

APPENDIX 7A-1
ECONOMIC TABLES

**Santa Clara Valley Water District
Proposition 1E
Stormwater Flood Management Grant**

Table 10 - Annual Cost of Flood Damage Reduction Project (All costs should be in 2009 dollars) Project: Lower Silver Creek Watershed Project									
Year	Initial Costs	Operations and Maintenance Costs					Discounting Calculations		
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)
	Capital and Other Initial Costs from Table 6	Admin	Operation	Maintenance	Replacement	Other	Total Costs (a)+...+(f)	Discount Factor	Discounted Costs (g) x (h)
2009	\$0	\$0	\$0	\$0	\$0	\$0	\$0	1.00	\$0
2010	\$10,000,000	\$0	\$0	\$0	\$0	\$0	\$10,000,000	0.94	\$9,433,962
2011	\$10,000,000	\$0	\$0	\$0	\$0	\$0	\$10,000,000	0.89	\$8,899,964
2012	\$10,000,000	\$0	\$0	\$0	\$0	\$0	\$10,000,000	0.84	\$8,396,193
2013	\$15,000,000	\$0	\$0	\$0	\$0	\$0	\$15,000,000	0.79	\$11,881,405
2014	\$10,000,000	\$0	\$100,000	\$75,000	\$25,000	\$0	\$10,200,000	0.75	\$7,622,033
2015	\$0	\$0	\$100,000	\$75,000	\$25,000	\$0	\$200,000	0.70	\$140,992
2016	\$0	\$0	\$100,000	\$75,000	\$25,000	\$0	\$200,000	0.67	\$133,011
2017	\$0	\$0	\$100,000	\$75,000	\$25,000	\$0	\$200,000	0.63	\$125,482
2018	\$0	\$0	\$100,000	\$75,000	\$25,000	\$0	\$200,000	0.59	\$118,380
2019	\$0	\$0	\$100,000	\$75,000	\$25,000	\$0	\$200,000	0.56	\$111,679
2020	\$0	\$0	\$100,000	\$75,000	\$25,000	\$0	\$200,000	0.53	\$105,358
2021	\$0	\$0	\$100,000	\$75,000	\$25,000	\$0	\$200,000	0.50	\$99,394
2022	\$0	\$0	\$100,000	\$75,000	\$25,000	\$0	\$200,000	0.47	\$93,768
2023	\$0	\$0	\$100,000	\$75,000	\$25,000	\$0	\$200,000	0.44	\$88,460
2024	\$0	\$0	\$100,000	\$75,000	\$25,000	\$0	\$200,000	0.42	\$83,453
2025	\$0	\$0	\$100,000	\$75,000	\$25,000	\$0	\$200,000	0.39	\$78,729
2026	\$0	\$0	\$100,000	\$75,000	\$25,000	\$0	\$200,000	0.37	\$74,273
2027	\$0	\$0	\$100,000	\$75,000	\$25,000	\$0	\$200,000	0.35	\$70,069
2028	\$0	\$0	\$100,000	\$75,000	\$25,000	\$0	\$200,000	0.33	\$66,103
2029	\$0	\$0	\$100,000	\$75,000	\$25,000	\$0	\$200,000	0.31	\$62,361
2030	\$0	\$0	\$100,000	\$75,000	\$25,000	\$0	\$200,000	0.29	\$58,831
2031	\$0	\$0	\$100,000	\$75,000	\$25,000	\$0	\$200,000	0.28	\$55,501
2032	\$0	\$0	\$100,000	\$75,000	\$25,000	\$0	\$200,000	0.26	\$52,359
2033	\$0	\$0	\$100,000	\$75,000	\$25,000	\$0	\$200,000	0.25	\$49,396
2034	\$0	\$0	\$100,000	\$75,000	\$25,000	\$0	\$200,000	0.23	\$46,600
2035	\$0	\$0	\$100,000	\$75,000	\$25,000	\$0	\$200,000	0.22	\$43,962
2036	\$0	\$0	\$100,000	\$75,000	\$25,000	\$0	\$200,000	0.21	\$41,474
2037	\$0	\$0	\$100,000	\$75,000	\$25,000	\$0	\$200,000	0.20	\$39,126
2038	\$0	\$0	\$100,000	\$75,000	\$25,000	\$0	\$200,000	0.18	\$36,911
2039	\$0	\$0	\$100,000	\$75,000	\$25,000	\$0	\$200,000	0.17	\$34,822
2040	\$0	\$0	\$100,000	\$75,000	\$25,000	\$0	\$200,000	0.16	\$32,851
2041	\$0	\$0	\$100,000	\$75,000	\$25,000	\$0	\$200,000	0.15	\$30,991
2042	\$0	\$0	\$100,000	\$75,000	\$25,000	\$0	\$200,000	0.15	\$29,237
2043	\$0	\$0	\$100,000	\$75,000	\$25,000	\$0	\$200,000	0.14	\$27,582
2044	\$0	\$0	\$100,000	\$75,000	\$25,000	\$0	\$200,000	0.13	\$26,021
2045	\$0	\$0	\$100,000	\$75,000	\$25,000	\$0	\$200,000	0.12	\$24,548
2046	\$0	\$0	\$100,000	\$75,000	\$25,000	\$0	\$200,000	0.12	\$23,159
2047	\$0	\$0	\$100,000	\$75,000	\$25,000	\$0	\$200,000	0.11	\$21,848
2048	\$0	\$0	\$100,000	\$75,000	\$25,000	\$0	\$200,000	0.10	\$20,611
2049	\$0	\$0	\$100,000	\$75,000	\$25,000	\$0	\$200,000	0.10	\$19,444
2050	\$0	\$0	\$100,000	\$75,000	\$25,000	\$0	\$200,000	0.09	\$18,344
2051	\$0	\$0	\$100,000	\$75,000	\$25,000	\$0	\$200,000	0.09	\$17,305
2052	\$0	\$0	\$100,000	\$75,000	\$25,000	\$0	\$200,000	0.08	\$16,326
2053	\$0	\$0	\$100,000	\$75,000	\$25,000	\$0	\$200,000	0.08	\$15,402
2054	\$0	\$0	\$100,000	\$75,000	\$25,000	\$0	\$200,000	0.07	\$14,530
2055	\$0	\$0	\$100,000	\$75,000	\$25,000	\$0	\$200,000	0.07	\$13,708
2056	\$0	\$0	\$100,000	\$75,000	\$25,000	\$0	\$200,000	0.06	\$12,932
2057	\$0	\$0	\$100,000	\$75,000	\$25,000	\$0	\$200,000	0.06	\$12,200
2058	\$0	\$0	\$100,000	\$75,000	\$25,000	\$0	\$200,000	0.06	\$11,509
2059	\$0	\$0	\$100,000	\$75,000	\$25,000	\$0	\$200,000	0.05	\$10,858
2060	\$0	\$0	\$100,000	\$75,000	\$25,000	\$0	\$200,000	0.05	\$10,243
TOTALS	\$55,000,000	\$0	\$4,700,000	\$3,525,000	\$1,175,000	\$0	\$64,400,000	\$17	\$48,553,700
Project Life	Total Present Value of Discounted Costs (Sum of Column (i)) Transfer to Table 20, Column (c), Exhibit F: Proposal Costs and Benefit Summaries								\$48,553,700
Comments:									

San Diego Integrated Regional Water Management
 Implementation Grant Proposal
 Appendix 9-1

Table 12 - Present Value of Expected Annual Damage Benefits (2009 dollars)			
Project: Lower Silver Creek Watershed Project			
(a)	Expected Annual Damage Without Project ⁽¹⁾		\$3,540,000
(b)	Expected Annual Damage With Project ⁽¹⁾		\$387,500
(c)	Expected Annual Damage Benefit	[a - b]	\$3,152,500
(d)	Present Value Coefficient ⁽²⁾		15.76
(e)	Present Value of Future Benefits	[c x d]	\$49,683,400
Comments:			

**San Diego Integrated Regional Water Management
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Appendix 7-2

Table 8 – Discount Factors
(Pg. 38 of Solicitation Package)

Table 10 - Update Factors
(Pg. 39 of Solicitation Package)

Year	Discount Factor	6%
2009	1.000	<i>1.000</i>
2010	0.943	<i>0.943</i>
2011	0.890	<i>0.890</i>
2012	0.840	<i>0.840</i>
2013	0.792	<i>0.792</i>
2014	0.747	<i>0.747</i>
2015	0.705	<i>0.705</i>
2016	0.665	<i>0.665</i>
2017	0.627	<i>0.627</i>
2018	0.592	<i>0.592</i>
2019	0.558	<i>0.558</i>
2020	0.527	<i>0.527</i>
2021	0.497	<i>0.497</i>
2022	0.469	<i>0.469</i>
2023	0.442	<i>0.442</i>
2024	0.417	<i>0.417</i>
2025	0.390	<i>0.394</i>
2026	0.371	<i>0.371</i>
2027	0.350	<i>0.350</i>
2028	0.331	<i>0.331</i>
2029	0.312	<i>0.312</i>
2030	0.294	<i>0.294</i>
2031	0.278	<i>0.278</i>
2032	0.262	<i>0.262</i>
2033	0.247	<i>0.247</i>
2034	0.233	<i>0.233</i>
2035	0.220	<i>0.220</i>
2036	0.207	<i>0.207</i>
2037	0.196	<i>0.196</i>
2038	0.185	<i>0.185</i>
2039	0.174	<i>0.174</i>
2040	0.164	<i>0.164</i>
2041	0.155	<i>0.155</i>

Year	Update Factor ¹
2000	1.25
2001	1.21
2002	1.19
2003	1.17
2004	1.13
2005	1.1
2006	1.06
2007	1.04
2008	1.01

1 Provided by Farhad Farnam, Department of Water Resource, March 15, 2011

Estimated Average Annual Flood Damage Reduction Benefits
 Table 5 (revised) from Supplemental Watershed Plan, January 2001

	Annual EAD (2000 dollars)		Annual EAD (2009 dollars)	
	Without Project	With Project	Without Project	With Project
Floodwater				
Nonagricultural				
Buildings and Improvements	\$ 2,328,000	\$ 230,000	\$ 2,910,000	\$ 287,500
Vehicles	\$ 429,000	\$ 66,000	\$ 536,250	\$ 82,500
Transportation Disruption	\$ 30,000	\$ 10,000	\$ 37,500	\$ 12,500
Emergency Services	\$ 25,000	\$ 4,000	\$ 31,250	\$ 5,000
			\$ -	\$ -
Sediment			\$ -	\$ -
Overbank Deposition	\$ 20,000	\$ -	\$ 25,000	\$ -
TOTAL			\$ 3,540,000	\$ 387,500

APPENDIX 7A-2

FLOOD DAMAGE REDUCTION BENEFITS

TABLES FROM EIR/S

TABLE A
FLOOD DAMAGES BY FLOOD FREQUENCY

TYPE OF BUILDING	5-YEAR	10-YEAR	25-YEAR	100-YEAR	500-YEAR
<u>Residential</u>					
Total Damages (\$)¹	255,300	3,867,300	5,970,500	21,899,200	42,746,800
Number Flooded²	16	339	478	1,305	1,943
<u>Commercial</u>					
Total Damages (\$)	0	528,000	805,800	2,268,700	4,109,800
Number Flooded	0	22	29	73	107
<u>Industrial</u>					
Total Damages (\$)	4,500	1,200,700	1,720,500	2,280,200	2,830,800
Number Flooded	1	14	17	17	17
<u>Churches</u>					
Total Damages (\$)	9,800	18,900	19,000	22,400	25,800
Number Flooded	1	1	1	2	2
<u>Schools</u>					
Total Damages (\$)	51,200	214,200	249,000	347,600	927,000
Number Flooded	3	14	14	15	22
TOTAL DAMAGES (\$)	320,800	5,829,100	8,764,800	26,818,100	50,640,200
TOTAL FLOODED (#)	21	390	539	1,412	2,091

¹Includes damages to yards and outside improvements.

²Number of buildings suffering damages from interior flooding.

The 100-year floodplain is shown in Figure B-1, Appendix B. The following depths of flooding can be expected during the 100-year flood event (see Figure 7, page 59, for street locations):

- Three feet - Along Capitol Expressway between Lake Cunningham and Story Road,
- Four feet - Between Story Road and Interstate 680 road embankment,
- Two feet - Between Interstate 680 and intersection of King and McKee Roads,
- Three to four feet - Low areas between intersection of King and McKee Roads to confluence with Coyote Creek.

Ponding of floodwaters, as a result of man-made obstacles such as railroad and road embankments would occur in the following locations:

- Interstate 680 intersection with Capitol Expressway,

--West of the McKee and King Road intersection,

--Industrial Park along Lenfest Avenue.

A slow moving, sheet flow of floodwaters would cover the remaining floodplain. Several major roadways would also be severely affected by flooding. Stretches of Capitol Expressway, Ocala Avenue, Story Road, Jackson Avenue, Alum Rock Avenue, Bayshore Freeway, Interstate 680, McKee Road, King Road, and a number of smaller roads would be subject to closure because of flooding (Table B).

TABLE B
ROAD FLOODING
Depth (ft.)/Duration (hrs.)

LOCATION	10-YEAR	25-YEAR	100-YEAR
Ocala Avenue at Capitol Expressway	0	0	$\frac{2.2}{18}$
Capitol Expressway (between Lake Cunningham and Interstate 680)	$\frac{1.5}{2}$	$\frac{2.4}{4}$	$\frac{2.7}{18}$
Story Road (between Jackson Avenue and Capitol Expressway)	$\frac{0.7}{2}$	$\frac{0.9}{4}$	$\frac{1.8}{18}$
Jackson Avenue (at Interstate 680)	Minor	$\frac{0.1}{13}$	$\frac{1.6}{20}$
Alum Rock Avenue (west of Lower Silver Creek Channel)	$\frac{1.1}{7}$	$\frac{1.1}{7}$	$\frac{2.5}{15}$
McKee and King Roads	$\frac{1.0}{20}$	$\frac{1.3}{20}$	$\frac{1.8}{20}$
Bayshore Freeway (at McKee Road)	$\frac{11.0}{20}$	$\frac{11.3}{20}$	$\frac{12.0}{20}$
Interstate 680 (at McKee Road)	0	$\frac{22.0}{20}$	$\frac{22.0}{20}$

Closure of these roads would cause major traffic disruptions and congestions. Traffic flows in many cases would be re-routed to flood-free areas causing motorists significant time delays and increased operating costs to arrive at their destinations. At the 100-year event, estimates are that nearly 210,000 vehicle trips involving 294,000 people have the potential to be affected by these road closures. These people could be expected to have a 30-minute to one-hour delay in travel time and each vehicle would average about \$1.00 in extra operating expenses. Average annual losses due to this traffic disruption are estimated to be \$19,700.

Road closures would also affect emergency services. Police, fire, and medical vehicles will be delayed in responding to calls for assistance, thereby resulting in a threat to human lives, health, and safety.

In addition to traffic disruptions, sediment deposition would occur on many of the roadways, necessitating lengthy and expensive cleanup activities (Table C). In many areas, this sedimentation would be only minor (1 inch or less) at the 100-year event. However, in the ponded areas where sediment would have the opportunity to deposit, such as on Capitol Expressway at its intersection with Interstate 680, and at the intersection of McKee and King Roads, sediment depths would range from 3 to 6 inches. Average annual cleanup costs are estimated to be \$13,900.

TABLE C
SEDIMENT DAMAGES TO MAJOR ROADS

Flood Frequency (Years)	Sediment Deposition		Maximum Depth (Inches)	Average Depth (Inches)	Cleanup Cost (Dollars)
	(Tons)	(Cubic Yards)			
25	3,480	3,220	3	0.1	121,000
50	5,660	5,240	4	0.3	217,000
100	10,040	9,300	6	0.5	339,000

Approximately 7,500 automobiles are owned by floodplain residents and if these vehicles are not removed from the floodplain before floodwaters rise, they would also suffer damages. Nuisance damages would begin when floodwaters exceed 6 inches in depth and increase substantially when the water reaches 12 inches and begins to enter vehicles. Approximately 3,400 vehicles would receive some damages due to flooding during the 100-year flood. Average annual damages to these vehicles are estimated to be \$273,700.

In the event of a large flood, emergency services would be required in the floodplain. In the Lower Silver Creek floodplain, floodplain residents would require some form of emergency assistance for floods exceeding the 5-year event. The amount of emergency help required would increase as the severity of the flood event increases. For instance, at the 100-year event about 250 police, civil defense, and/or national guardsmen would be needed to secure

the local administering agencies requested that no activities be undertaken that might change the master plan for the lake or affect the operation and maintenance (O&M) plans for the facility since these plans were a result of lengthy coordination and public participation efforts (6, 7).

Existing Resources

An inventory and analysis of resources within the watershed that could be affected by any proposed alternatives were made. A description with baseline information on these resources important to decision making follows.

Economic: The Lower Silver Creek floodplain is 95 percent urbanized. An inventory of buildings located in the floodplain was conducted in early 1980 and updated in late 1981. A summary of the inventory appears below.

TABLE E
INVENTORY OF BUILDINGS LOCATED
IN FLOODPLAIN

<u>Type of Building</u>	<u>Number of Buildings</u>
Residential:	
Houses	3,420
Apartments	141
Commercial	155
Industrial	34
Schools and Churches	37
<u>TOTAL</u>	<u>3,787</u>

Approximately 2,200 of the houses in the floodplain are less than 20 years old with about 1,000 of these being less than 10 years old. The majority of these 2,200 houses are single story structures ranging in size from 1,000 to 1,600 square feet, are built on foundations, and have wood subflooring with first floors ranging from 15 to 24 inches from ground level. About 300 of these houses are built on concrete slabs directly on the ground. Another 900 to 1,000 houses were built 20 to 30 years ago. Most of these are single-story structures built on foundations. The remaining 300 to 400 houses were built prior to 1950. Very few houses in the floodplain have basements. The

TABLE H
AVERAGE ANNUAL
EROSION AND SEDIMENT YIELD (1990)

Source	Erosion		Sediment Yield to Coyote Creek	
	(Tons/Year)	(Percent)	(Tons/Year)	(Percent)
Sheet and Rill				
Rangeland	27,560	85	11,500	77
Urbanizing Land				
Residences	790	2	530	4
Roads and Driveways	770	2	520	3
Urban Land	750	2	500	3
Open, Unimproved Land in Urban Service Area	470	2	310	2
Streambanks	440	2	420	3
Gullies	160	1	120	1
Existing Roads	1,330	4	1,020	7
TOTAL	32,270	100	14,920	100

The SCVWD has installed or is in the process of installing seven debris basins for the primary purpose of controlling sediment from burned or urbanizing areas in the upper watershed. These debris basins are all scheduled to be installed prior to the installation of any proposed project actions. On an average annual basis, these basins trap 6,890 tons of sediment from 4,092 acres. Sediment yields from rangeland and urbanizing land (Table H) include sediment reductions due to the installation of the basins and the on-going land treatment program of the Evergreen Resource Conservation District (ERCD). Of the 12,600 acres of hillside and rangeland, 70 percent is adequately treated.

The 14,920 tons of sediment (Table H) is the sediment yield to Coyote Creek. On an average annual basis, 6,890 tons are deposited in the debris basins, 90 tons in Lake Cunningham, and 970 tons on the floodplain. For specific storm events, sediment values will vary (Table I).

TABLE I
SEDIMENT DEPOSITION BY FLOOD FREQUENCY (1990)

Flood Frequency (Years)	Sediment Deposition (Tons)			Sediment Yield to Coyote Creek (Tons)
	Debris Basin	Lake Cunningham	Floodplain	
10	16,110	110	2,610	33,280
25	25,760	810	6,970	46,380
50	32,200	1,270	11,320	57,770
100	38,640	2,110	20,080	68,920
500	38,640	5,020	35,790	126,570

Downstream Areas: Coyote Creek, from its confluence with Lower Silver Creek, flows 18 miles before it empties into San Francisco Bay. Along the way Upper and Lower Penitencia Creeks flow into it. The capacity of Coyote Creek is severely limited as it nears the bay. The area downstream of Highway 17 frequently floods due to the insufficient channel capacity.

Part of the San Francisco Bay National Wildlife Refuge is located where Coyote Creek empties into the bay. The refuge provides habitat for two listed endangered species, the salt marsh harvest mouse and California clapper rail.

Forecasted Conditions

The resources inventoried in the preceding section could change in the future. Since the planning period for this study is 100 years, the conditions of these resources were projected into the future. These projections were made to:

- insure that the design of a plan will take into account the resource conditions that are most likely to exist in the future and,
- Serve as a baseline in evaluating the effects of the solutions over their expected life.

The total estimated installation costs allocated for the project during the 4-year installation period are shown below.

TABLE N
INSTALLATION COSTS

Year	Measures	PL-566 Funds (\$)	Other Funds (\$)	Total (\$)
1	Nonstructural	1,000	0	1,000
	Structural	176,000	0	176,000
	Land Rights	0	386,000	386,000
2	Nonstructural	7,000	2,000	9,000
	Structural	3,530,000	0	3,530,000
	Land Rights	0	431,000	431,000
3	Structural	4,847,000	0	4,847,000
	Land Rights	0	882,000	882,000
4	Structural	3,662,000	0	3,662,000
	Land Rights	0	30,000	30,000
TOTAL		12,223,000	1,731,000	13,954,000

Specific responsibilities of SCVWD and SCS for project installation are the following:

The SCVWD will be responsible for:

1. acquiring the necessary permits, licenses, and other entitlements to install the project;
2. acquiring all landrights;
3. administration of all landrights contracts;
4. designing, installing, or modifying all road crossings and relocating utilities as necessary;
5. inspection of road crossing construction;
6. the costs as described earlier and summarized in Tables 1 and 2 at the end of this section;
7. operation and maintenance on the channel, mitigation plantings, and the nonstructural measures;
8. irrigation of plantings after two-year establishment period until plants are able to survive without supplemental irrigation.

EFFECTS OF RECOMMENDED PLAN

Floodwater and Sediment

The number of buildings damaged by a 100-year flood will be reduced from 1,412 to 140. Project installation will provide protection to 1,272 buildings (1,194 residences, 61 commercial establishments, 12 industrial buildings, 1 church, and 4 school buildings). The number of vehicles damaged by a 100-year flood will be reduced from 3,400 to 400. All major roadways except the underpasses at Bayshore Freeway/McKee Road and Interstate 680/McKee Road will remain open. This will reduce the number of motorists that would have to be rerouted due to a 100-year flood from 294,000 to 145,000. Sediment deposition on the floodplain for the 100-year flood will be reduced from 20,080 tons to 140 tons. Deposition on roadways will be virtually eliminated except in and around Bayshore Freeway. The number of people requiring food, shelter, and other emergency services during a 100-year flood will be reduced from 2,900 to 350.

The project will reduce average annual flood damages from \$1,782,700 to \$195,400 (Table 0). In addition to this \$1,587,300 in floodwater reduction benefits, the project will also produce \$29,000 in average annual benefits in the form of savings in future Federal Emergency Management Agency (FEMA) administrative costs. The project will produce a benefit to cost ratio of 1.3 to 1.0.

TABLE 0
AVERAGE ANNUAL DAMAGE REDUCTION BENEFITS AND RESIDUAL DAMAGES

Damage Category	Future Without Project Damages	Residual Damages With Project	Project Benefits
Buildings	\$1,461,400	\$144,400	\$1,317,000
Vehicles	273,700	42,000	231,700
Transportation Disruption	19,700	6,600	13,100
Sediment	13,900	0	13,900
Emergency Services	14,000	2,400	11,600
TOTAL	\$1,782,700	\$195,400	\$1,587,300

APPENDIX 7A-3

WATERSHED PLAN SUPPLEMENT, 2001

SUPPLEMENTAL WATERSHED PLAN

LOWER SILVER CREEK WATERSHED Santa Clara County, California

January 2001

Need for a Supplement

The original watershed agreement for the Lower Silver Creek watershed project was signed on September 23, 1983. Installation of the project was authorized on October 27, 1986. The project purpose is flood prevention. The plan includes non-structural and structural measures to reduce flood damage.

The sponsors shown in the original plan are the Evergreen Resource Conservation District (ERCD) and the Santa Clara Valley Water District (SCVWD), with federal assistance to be furnished by the Soil Conservation Service (SCS). The ERCD is now the Guadalupe-Coyote Resource Conservation District. The SCS is now the Natural Resources Conservation Service (NRCS).

The Lower Silver Creek watershed plan has been amended once. The original plan called for the SCS to administer all construction contracts. An exchange of correspondence completed on September 27, 1991 provided for the SCVWD to administer all construction contracts except those for biological and landscape mitigation plantings.

The structural measures proposed in the original plan consisted of 4.64 miles of channel work. This included construction of 0.87 miles of enlarged earth channel and 3.38 miles of concrete channel, and modification of 0.39 miles of existing concrete channel. The plan also included 6.6 acres of vegetative plantings, including 6.1 acres for habitat replacement and 0.5 acres for landscaping. This vegetative work was described as mitigation, but it was also an integral part of the design.

The first unit of construction was completed in January 1993. It consisted of approximately 70 feet of rectangular concrete channel, immediately downstream of the culvert under the intersection of King and McKee Roads. Additional work has been delayed as a result of objections to the project that arose when the SCVWD applied for a permit under Section 404 of the Clean Water Act. The objections focused on the proposed concrete lining. Alternatives were re-evaluated and a channel plan that reduces the amount of concrete has now been prepared.

The purpose of this supplement is to modify the features of the proposed channel design. There is no change in purpose or scope of the plan. Estimated benefits shown in the original plan have been adjusted to current price levels using cost index factors. The non-structural component of the plan remains unchanged.

Changes to the Recommended Plan

Plan Elements

A reach-by-reach description of the original proposal is found beginning on page 57 of the 1983 plan. This supplement modifies the plan to reduce the length of concrete channel. It does this by substituting a channel with a vegetated block wall and an earth-covered riprap bottom wherever this can be done without increasing the required right-of-way width. The level of protection will remain the same. However, design flows have been reduced as a result of a review of the project hydrology.

This supplement also documents modifications and additional details regarding the typical cross-sections shown in the plan. Figures 1 through 3 show new typical cross-sections for earth and concrete channels. Figure 4 shows a typical section and additional detail regarding the vegetated block wall channel, referred to herein as a "hybrid block channel." Additional channel design information, including the new design flows, may be found in Table 3B.

The design changes for the earth channel reaches will provide more vegetation within the channel. The additional vegetation will increase resistance to flow, so a larger cross-section will be required in order to maintain the level of protection. This will be achieved by eliminating the maintenance road at the top of one bank to allow a wider excavation, and providing maintenance access in the channel bottom.

The changes in the proposed cross-sections will produce a design water surface elevation that is somewhat higher than originally planned. Floodwalls will be constructed at the edge of the right-of-way where needed to provide the necessary depth. The original plan included floodwalls along about 4,300 feet of the channel. The modified plan includes floodwalls along about 9,000 feet. It also includes an additional culvert replacement, at Story Road.

The mitigation plan is also modified, to provide about 6 acres of wetlands and 14 acres of riparian and upland habitat planting (estimated to reach 22 acres of total canopy area at maturity). As in the original plan, these areas are incorporated into the channel design. In addition, intermittent tree clusters will be planted along the low-flow channel in earth and hybrid block reaches wherever the final hydraulic design shows that this can be done without encroaching on the required freeboard.

Most of the land required for the project was already owned by the SCVWD at the time of the original plan. The plan provided for the acquisition of an estimated 5.61 acres of additional land rights. This estimate has been revised to 6.46 acres.

A reach-by reach description of the modified plan follows. The description is based on preliminary designs, and some items may be changed somewhat as final designs are developed.

Reach 1 extends from Coyote Creek to Miguelita Creek, approximately 1,200 feet downstream of McKee Road. Proposed work in this reach includes the following:

- An enlarged earth channel from Coyote Creek to a point about 200 feet downstream of Wooster Avenue (Reach 1a).
- A hybrid block channel from the end of the earth channel to just downstream of the railroad bridge (Reach 1b).
- A trapezoidal concrete channel from the end of the hybrid block channel to the existing lined channel under Highway 101 and Marburg Way (part of Reach 1c).
- A trapezoidal concrete channel from the upstream side of Marburg Way to a point about 800 feet upstream (remainder of Reach 1c).
- An enlarged earth channel from there to the curve at King Road (Reach 1d).

If final design studies show that sufficient land rights are available, a hybrid block channel would be used instead of concrete in part or all of Reach 1c. Should this be done, any extra cost would be a non-project cost.

Two grouted rock grade control structures will be installed in the bottom of the lower reach of earth channel. One will be 2 feet high and the other 2.5 feet. Both will include low flow notches and resting pools for fish. Floodwalls will be installed along the hybrid block channel and the earth channel in Reach 1d.

The original plan included the construction of 0.14 miles of levees at the outlet of Lower Silver Creek. However, the land protected by the levees would still be subject to flooding from Coyote Creek. The levees would impede the recession of the Coyote Creek overflows. Therefore, the levees are deleted from the plan.

The channel bottom in the earth reaches will provide about 2.0 acres of emergent wetlands. Approximately 3.2 acres of riparian trees and shrubs will also be planted.

The bridge at Wooster Avenue is being replaced by the City of San Jose. This will be done even if the project is not installed. Therefore, it is not included in the project cost, although it may be incorporated into the project's construction contract. The new bridge will accommodate the hybrid block channel to be installed beneath it. The bridges at the railroad, Highway 101, and Marburg Way will remain. Approximately 2.05 acres of land rights will be acquired, all private land.

The original plan provided for flood-proofing two buildings in this reach. This has not yet been done. It will remain part of the plan.

Reach 2 extends from the end of Reach 1 to the upstream end of the triple box culvert under the intersection of King and McKee Roads. The plan for this reach is a rectangular concrete channel. Approximately 70 feet of it have already been built. The completed portion has the low-flow channel in the center of the bottom. The remainder will be built with the low-flow channel along the base of the west wall. Low weirs with notches to pool water and trap sediment will also be provided. Riparian trees and vines, totaling about 0.3 acres, will be planted at the top of the wall.

The triple box culvert under the King-McKee intersection will remain. No additional right-of-way is required in this reach.

Reach 3 is from the upstream end of the King-McKee culvert to the downstream end of the triple box culvert under Interstate 680. Proposed work in Reach 3 includes:

- An enlarged earth channel from the King-McKee culvert to a point about 1,600 feet upstream, next to a bend in Checkers Drive (Reach 3a). Most of this reach is along the north edge of Plata Arroyo Park.
- A trapezoidal concrete channel from the bend in Checkers Drive to the downstream end of an existing trapezoidal concrete lining (Reach 3b). The length of this reach is approximately 975 feet.
- Modification of the existing concrete-lined reach (Reach 3c) to accommodate the design flow and allow for fish passage. Total length of this reach is about 2095 feet, including 110 feet of triple box culvert at Sunset Avenue. The upper end of this reach is about 300 feet downstream of San Antonio Street.
- A trapezoidal concrete channel from the end of Reach 3c to a point about 300 feet upstream of San Antonio Street (Reach 3d).
- An enlarged earth channel from the end of Reach 3d to Kammerer Avenue (Reach 3e). Most of this reach is along the north side of Mayfair Park.
- An enlarged earth channel from Kammerer Avenue to Interstate 680 (Reach 3f). This reach lies along the north side of the Mathson School grounds.

The channel through the two parks will include an earth levee on the north side to contain the flows. The south bank will be blended into the parks. The reach through the school will be designed to allow it to be used as an outdoor classroom. Resting pools will be located away from public access to limit predation.

The modification of the existing trapezoidal concrete channel consists of cutting a strip out of the bottom and replacing it with a concrete-lined low-flow channel. Floodwalls will also be installed along the existing and new concrete channels as necessary.

The low-flow channel in the earth reaches will provide about 0.5 acres of emergent wetlands. Approximately 3.7 acres of riparian trees and shrubs will also be planted, along both the earth and concrete reaches.

The bridge at Alum Rock Avenue in Reach 3c will be modified to increase the flow capacity beneath it. The triple box at Sunset Avenue will be modified to accommodate the design flow as necessary. The bridge at San Antonio Street will remain. The bridge at Kammerer Avenue will be removed and replaced with a footbridge. The other three bridges proposed for removal in the original plan have been removed by others, at no cost to the project. Some of the lighting and irrigation facilities in the park will be relocated, along with some fencing. The parking lot at Mathson School will also be relocated. The sports track relocation in the original plan has been done by others, at no cost to the project.

Approximately 4.35 acres of land rights will be acquired in Reach 3. This includes 0.92 acres of private land, 1.63 acres in the two parks, and 1.8 acres of school grounds.

Reach 4 extends from the downstream end of the Interstate 680 culverts to North Babb Creek. A hybrid block channel will be installed from the upstream side of Interstate 680 to the upstream end of the reach. Floodwalls will be provided along about 1,800 feet of the channel.

The low-flow channel will provide about 1.0 acres of emergent wetlands. Approximately 2.2 acres of riparian trees and shrubs will also be planted.

The double box culvert at Jackson Avenue will be replaced with a bridge. A third box will be added at Capitol Avenue and will include a low-flow channel. The triple box at Interstate 680 will remain as is. No additional right-of-way is required in this reach.

Reach 5 runs from North Babb Creek to South Babb Creek, including the junction and transition at the downstream end. A hybrid block channel will be installed, along with short lengths of floodwall. The low-flow channel will provide about 1.0 acres of emergent wetlands. Approximately 1.7 acres of riparian trees and shrubs will also be planted.

The triple box culvert at Story Road will be replaced with a bridge. A footbridge at the end of Silver Avenue and a roadway bridge at Murtha Drive will remain. Approximately 0.06 acres of land rights will be acquired. This land is located on the north side of Story Road, and is needed because the culverts to be removed extend about 140 feet downstream from the edge of the road.

Reach 6 extends from South Babb Creek through Cunningham Avenue. A hybrid block channel will be installed from South Babb Creek to Moss Point Drive, and from Moss Point Drive through Cunningham Avenue. The rock riprap in the bottom will be omitted upstream of Moss Point Drive because the design velocities will be non-erosive. Floodwalls will be included along about 2,200 feet of the channel. The low-flow channel will provide about 2.0 acres of emergent wetlands. About 2.4 acres of riparian trees and shrubs will also be planted.

Existing road crossings, a triple box culvert at Moss Point Drive and bridges at Ocala and Cunningham Avenues, will remain. No additional right-of-way is required in this reach.

Mitigation Features

The original plan proposed mitigation plantings along about 1.2 miles of the creek, at the locations described on page 61. The modified plan includes riparian plantings along the entire channel. A low-flow channel for fish passage will be provided in all newly constructed reaches. The plan also includes adding a low-flow channel to the existing trapezoidal concrete channel in Reach 3. In earth and hybrid block reaches, the channel will include rock vortex weirs to concentrate low flows and aerate water. The concrete channel bottoms will include resting pools.

Items related to pollution control during construction and maintenance activities will conform to current practice at the time they occur. These are discussed in more detail in the "Best Management Practices" section of the initial study/environmental assessment for the modified plan.

Costs

Tables 1 and 2 show the estimated installation costs of the project as modified. Completed work and remaining work were not separated because the construction cost of the completed work was only \$195,000. Table 4 shows average annual costs. Table 2A has been deleted because there are no costs allocated to any purpose other than flood prevention. Cost sharing percentages are unchanged from the original plan. Project administration costs are not shared but are borne by the agencies that incur them. Any non-project costs will be the responsibility of the Santa Clara Valley Water District.

Installation and Financing

Supplement No. 1 provided for NRCS to administer the construction contracts for mitigation plantings and for the SCVWD to administer all other construction contracts. The SCVWD will now do all the contracting. In addition to the items listed on page 65, the SCVWD will be responsible for preparing and administering the contracts, and inspecting construction. The project administration costs in Table 2 have been adjusted accordingly. The SCVWD will carry out its responsibilities in accordance with OMB Circular A-102; 7 CFR 3015, 3016, 3017, 3018, and 3052; and the NRCS Contracts, Grants, and Cooperative Agreements Manual.

A project agreement will be signed by the SCVWD and NRCS prior to the issuance of invitations to bid on each construction contract. The project agreement is the instrument that obligates the PL-566 construction funds. Each one will be signed after NRCS has approved the design, plans and specifications and the SCVWD has furnished a land rights certification. If funds are not available at the time a contract bid package is ready to be issued, a modified form of project agreement will be used. This modified agreement will not obligate funds. Instead it will provide for the SCVWD to install that particular construction unit with other funds, and for California NRCS to ask for money to

reimburse the SCVWD in future annual funding requests. The agreement may include an expiration date.

Operation, Maintenance, and Replacement

An operation and maintenance agreement for the entire project took effect on September 27, 1991. Each unit of construction becomes subject to the agreement upon completion. There is no change in the responsibilities set forth on page 67 of the original plan. The agreement presently includes an operation and maintenance plan for Reaches 1 and 2. That plan will be modified to reflect the changes in design configuration.

Table 1 (Revised) - Estimated Installation Cost
Lower Silver Creek Watershed, California

Installation Cost Item	Unit	Number	Estimated Cost (Dollars) ¹		Total
			PL-566 Funds	Other Funds	
<u>Non-Structural Measures</u>					
Floodproofing	Structures	2	12,000	3,000	15,000
<u>Structural Measures</u>					
Channel Work (M)	Miles	4.64	26,180,000	12,110,000	38,290,000
Total Project			26,192,000	12,113,000	38,305,000
¹ Price base 2000.				January 2001	

Table 2 (Revised) - Estimated Cost Distribution - Structural and Non-structural Measures
 Lower Silver Creek Watershed, California
 (Dollars)¹

Item	Construction	Engineering	Project Admin.	Total PL-566	Land Rights	Project Admin.	Total Other	Total Installation Cost
<u>Non-structural Measures</u>								
Floodproofing	9,000	2,000	1,000	12,000	1,000	2,000	3,000	15,000
Subtotal - Non-structural	9,000	2,000	1,000	12,000	1,000	2,000	3,000	15,000
<u>Structural Measures</u>								
Reaches 1 and 2	8,660,000	520,000	480,000	9,660,000	1,780,000	520,000	2,300,000	11,960,000
Reach 3	4,070,000	250,000	220,000	4,540,000	6,150,000 ²	240,000	6,390,000	10,930,000
Reach 4	4,240,000	260,000	230,000	4,730,000	1,630,000 ³	250,000	1,880,000	6,610,000
Reaches 5 and 6	6,500,000	390,000	360,000	7,250,000	1,150,000 ⁴	390,000	1,540,000	8,790,000
Subtotal - Structures	23,470,000	1,420,000	1,290,000	26,180,000	10,710,000	1,400,000	12,110,000	38,290,000
Grand Total	23,479,000	1,422,000	1,291,000	26,192,000	10,711,000	1,402,000	12,113,000	38,305,000

¹ Price base 2000.

² Includes \$140,000 for modifying the Alum Rock Ave. bridge, \$20,000 for a pedestrian bridge, \$50,000 for modifying the Sunset Ave. culvert, and \$12,000 for modifying park and school facilities.

³ Includes \$960,000 for a bridge at Jackson Ave. and \$670,000 for modifying the Capitol Expwy. culverts.

⁴ Includes \$1,010,000 for a bridge at Story Rd.

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Table 3B (Revised) - Structural Data - Channel Work
Lower Silver Creek Watershed, California

Reach	Station	Drainage Area (sq. mi.)	Design Dischg. ¹ (cfs)	Channel Config. ² (ft./ft.)	Channel Dimensions			n-value Aged	As-Built ³	Velocity (ft./sec.) ⁴	Excav. Volume (cu. yds.)	Type of Work ⁵	Existing Channel Type ⁶	Present Flow Cond. ⁷
					Bottom Width (ft.)	Side Slope	Water Depth (ft.)							
1a	0+50 to 8+20	43.4	5,630	Earth	65	2:1	15.8	0.043	0.024	4.75	8	II	M(1956)	I
1b	8+20 to 13+50	43.4	5,630	HB	62	0.8:1	9.9	0.046	n.c.	6.70	8	II	M(1956)	I
1c	13+50 to 18+60	43.4	5,630	TC	35	1.5:1	12.8	0.015	0.015	9.66	8	II-L	M(1956)	I
	(Existing trapezoidal concrete channel under Hwy. 101 and Marburg Way.)													
1d	20+30 to 28+00	43.4	5,630	TC	35	1.5:1	12.8	0.015	0.015	9.66	8	II-L	M(1956)	I
	28+00 to 37+85	43.4	5,630	Earth	75	2:1	13.0	0.035	0.024	4.40	8	II	M(1956)	I
2	37+85 to 51+70	43.4	4,930	RC	48	Vert.	11.7	0.014	0.014	11.70	120,000	II-L	M(1956)	I
	(Existing triple box culvert under King and McKee Roads.)													
3a	54+00 to 70+00	36.1	4,830	Earth	50	2:1 ⁸	10.8	0.035	0.024	7.00	8	II	M(1956)	I
3b	70+00 to 79+75	36.1	4,830	TC	35	1.5:1	9.8	0.015	0.015	13.50	8	II-L	M(1956)	I
3c	79+75 to 87+07	36.1	4,830	TC ¹⁰	25	1.5:1	9.8	0.015	0.015	13.60	8	II-L	M(1956)	I
	87+07 to 88+07	36.1	4,830	Modify existing bridge at Alum Rock Avenue.										
	88+07 to 93+10	36.1	4,830	TC ¹⁰	25	1.5:1	9.8	0.015	0.015	13.60	8	II-L	M(1956)	I
	93+10 to 94+20	36.1	4,830	Modify triple box culvert under Sunset Avenue.										
	94+20 to 100+70	36.1	4,830	TC ¹⁰	25	1.5:1	9.8	0.015	0.015	13.60	8	II-L	M(1956)	I
3d	100+70 to 107+25	36.1	4,830	TC	25	1.5:1	12.3	0.015	0.015	9.70	8	II-L	M(1956)	I
3e	107+25 to 114+40	36.1	4,830	Earth	60	2:1 ⁸	12.4	0.035	0.024	4.00	8	II	M(1956)	I
3f	114+40 to 123+40	36.1	4,830	Earth	75	2:1 ⁸	12.4	0.035	0.024	4.00	70,000	II	M(1956)	I
4a	123+40 to 127+40	(Existing triple box culvert under Interstate 680.)												
	127+40 to 129+60	33.7	4,600	HB	62	0.8:1	9.9	0.046	n.c.	6.70	8	II	M(1977)	I
	129+60 to 130+80	33.7	4,600	Replace the Jackson Avenue box culverts with a bridge.										
4b	130+80 to 153+80	33.7	4,600	HB	62	0.8:1	9.9	0.046	n.c.	6.70	8	II	M(1977)	I
	153+80 to 156+00	33.7	4,600	Add third box with low-flow channel to existing double box at Capitol Expressway.										
4c	156+00 to 169+00	33.7	4,600	HB	34	0.8:1	10.0	0.035	n.c.	11.00	40,000	II	M(1977)	I

Table 3B (Revised) - Structural Data - Channel Work
Lower Silver Creek Watershed, California
(Continued)

Reach	Station	Drainage Area (sq. mi.)	Design Dischg. ¹ (cfs)	Channel Config. ²	Channel Dimensions			n-value Aged	As-Built ³	Velocity (ft./sec.) ⁴	Excav. Volume (cu.yds.)	Type of Work ⁵	Existing Channel Type ⁶	Present Flow Cond. ⁷	
					Gradient (ft./ft.)	Bottom Width (ft.)	Water Depth (ft.)								
5a	169+00 to 171+40	33.7	4,600	HB	0.0049	34	0.8:1	10.0	0.035	n.c.	a	II	M(1977)	I	
5b	171+40 to 180+00	31.2	4,210	HB	0.0036	37	0.8:1	9.9	0.035	n.c.	a	II	M(1977)	I	
5c	180+00 to 182+60	31.2	4,210	Replace the Story Road box culverts with a bridge.											
	182+60 to 201+60	31.2	4,210	HB	0.0012	50	0.5:1	11.0	0.035	n.c.	a	II	M(1977)	I	
6a	201+60 to 216+60	26.3	3,600	HB	0.0011	50	0.75:1	11.2	0.035	n.c.	a	II	M(1977)	I	
	216+60 to 217+20	(Existing triple box culvert under Moss Point Drive.)													
6b	217+20 to 244+42	26.3	3,600	HB	0.0060	80	0.8:1	10.4	0.037	n.c.	100,000	II	M(1977)	I	

¹ 1 percent chance peak flow.

² HB = Hybrid block channel.

TC = Trapezoidal concrete channel.

RC = Rectangular concrete channel.

³ n.c. = Not computed.

⁴ Velocity for aged condition and 1 percent chance peak flow.

⁵ II = Enlargement or realignment of existing channel or stream.

II-L = Includes impervious lining.

⁶ M = Man-made ditch or previously modified channel (date modified).

⁷ I = Intermittent - Continuous flow through some seasons of the year, but little or no flow during other seasons.

⁸ Included in following entry.

⁹ Left bank (looking upstream) to be 2:1; right bank to blend into existing landscape grading.

¹⁰ Add low-flow channel and floodwalls to existing trapezoidal concrete channel.

Table 4 (Revised) - Estimated Average Annual NED Costs
 Lower Silver Creek Watershed, California
 (Dollars)¹

Evaluation Unit	Amortization of Installation Cost	Operation, Maintenance, and Replacement Cost	Total
<u>Non-Structural</u>			
Floodproofing	1,000	400	1,400
<u>Structural</u>			
Channel Work	2,541,000	47,000	2,588,000
Grand Total	2,542,000	47,400	2,589,400

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¹ Price base 2000, amortized over 100 years at a discount rate of 6-5/8 percent.

Table 5 (Revised) - Estimated Average Annual Flood Damage Reduction Benefits
 Lower Silver Creek Watershed, California
 (Dollars)¹

Item	Estimated Average Annual Damage		Damage Reduction Benefit
	Without Project	With Project	
<u>Floodwater</u>			
Nonagricultural			
Buildings and Improvements	2,328,000	230,000	2,098,000
Vehicles	429,000	66,000	363,000
Transportation Disruption	30,000	10,000	20,000
Emergency Services	25,000	4,000	21,000
Subtotal	2,812,000	310,000	2,502,000
<u>Sediment</u>			
Overbank Deposition	20,000	0	20,000
Subtotal	20,000	0	20,000
Grand Total	2,832,000	310,000	2,522,000

¹ Price base 2000.

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**Table 6 (Revised) - Comparison of NED Benefits and Costs
Lower Silver Creek Watershed, California
(Dollars)¹**

Evaluation Unit	Damage Reduction	Savings in Future Costs	Total	Average Annual Cost ²	Benefit- Cost Ratio
<u>Non-structural</u> Floodproofing	4,000		4,000	1,400	2.9:1
<u>Structural</u> Channel Work	2,518,000	305,000	2,823,000	2,588,000	1.1:1
Total	2,522,000	305,000	2,827,000	2,589,400	1.1:1

¹ Price base 2000.

² From Table 4.

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