

ITEMS		QUANTITIES		ENGINEER'S ESTIMATE		
				UNIT PRICE	AMOUNT	
1	DIVERSION STRUCTURE					524,061
1.1	clearing and grubbing	0	AC	12,358		3,519
1.2	excavation	1,810	CY	26		47,067
1.3	backfill	0	CY	17		0
1.4	hauling and disposal	1,769	CY	35		61,931
1.5	structural concrete	460	CY	850		391,128
1.6	rock slope protection	340	CY	60		20,417
2	FLOODWALLS					2,244,403
2.1	clearing and grubbing	1	AC	12,358		6,502
2.2	excavation	2,691	CY	26		69,965
2.3	backfill	170	CY	17		2,886
2.4	hauling and disposal	2,691	CY	35		94,184
2.5	structural concrete	2,436	CY	850		2,070,864
3	BYPASS U-FRAME CHANNEL					4,609,957
3.1	clearing and grubbing	3	AC	12,358		33,512
3.2	excavation	35,194	CY	26		915,056
3.3	backfill	0	CY	17		0
3.4	hauling and disposal	35,194	CY	35		1,231,806
3.5	structural concrete	2,858	CY	850		2,429,583
4	BYPASS CULVERT	1	EA			1,181,072
4.1	clearing and grubbing	0	AC	12,358		4,787
4.2	excavation	8,368	CY	26		217,569
4.3	backfill	0	CY	17		0
4.4	hauling and disposal	8,368	CY	35		292,882
4.5	structural concrete	783	CY	850		665,833
5	OUTLET STRUCTURE					26,342
5.1	clearing and grubbing	0	AC	12,358		1,064
5.2	excavation	278	CY	26		7,222
5.3	backfill	0	CY	17		0
5.4	hauling and disposal	278	CY	35		9,722
5.5	rock slope protection	139	CY	60		8,333
6	FLOOD GATE					150,000
6.1	geng road	1	EA	50,000		50,000
6.2	golf course	1	EA	50,000		50,000
6.3	airport	1	EA	50,000		50,000
7	NEW PAVEMENT	1	EA	23,383		23,383
8	TRAFFIC CONTROL	1	EA	50,000		50,000
9	UTILITY RELOCATION	1	EA	150,000		150,000

SUB-TOTAL: ITEMS 1 THRU 9 **\$8,959,217**
Mobilization (10%) **\$895,922**

TOTAL CONSTRUCTION **\$9,855,139**

Planning, Design, Geotechnical (15% of construction) \$1,478,270.84
Construction Management (10%) \$985,513.89

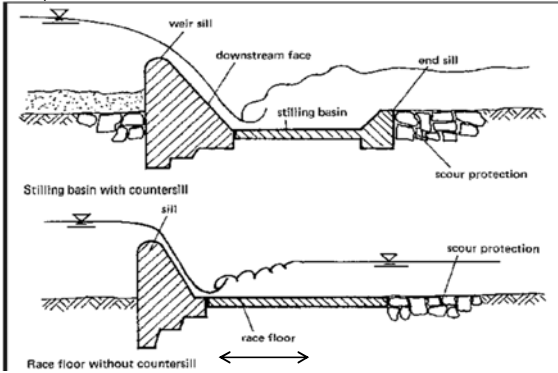
10	PROPERTY ACQUISITION	1	EA	4,687,500	\$4,687,500	\$4,687,500
11	MAINTENANCE	1	EA	1,000,000	\$1,000,000	\$1,000,000

**TOTAL COST FOR PLANNING, DESIGN, GEOTECH, CONSTRUCTION,
REAL ESTATE, AND MAINTENANCE** **\$18,006,424**
Contingencies (0%)

TOTAL COST **\$18,006,424**

1.0 DIVERSION STRUCTURE

Example



Assume weir with race floor without countersill
 length of weir = 130 see Note 1
 width of weir = 35 see Note 1
 width of race floor = 50
 width of scour pro = 50

KevisSib:
 Lengths multiplied by
 2000/3200 = .63 for lower
 flow estimate

1.1 clear and grub

	H	W	L	Area (ac)	Vol (cy)
weir		35	92	0.07	
race floor		50	92	0.11	
scour protection		50	92	0.11	
Total				0.3	

1.2 excavation

	H	W	L	Vol (cf)	Vol (cy)
weir	12	35	92	38,588	1,429
cutt-off wall	12	2	92	1,103	41
race floor	2	50	92	9,188	340
scour protection	2	50	92	9,188	340
Total				1,810	

1.3 backfill

	H	W	L	Vol (cf)	Vol (cy)
weir					
race floor					
Total				0	

1.4 hauling and disposal

	H	W	L	Vol (cf)	Vol (cy)
weir					1,429
race floor					340
Total				1,769	

equal to excavation
 equal to excavation

1.5 structural concrete

	H	W	L	Vol (cf)	Vol (cy)
weir	1	35	92	1,608	60
Wall (u/s)	32	40	2	2,560	95
Wall (d/s)	32	40	2	2,560	95
cutt-off wall	12	2	92	1,103	41
race floor	1	50	92	4,594	170
Contingencies (0%)				Total	460

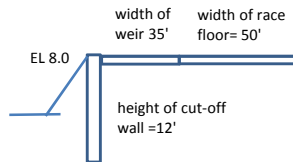
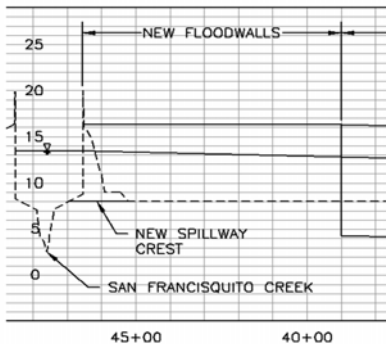
see Note 2
 headwall at edge of spillway
 headwall at edge of spillway
 see Note 2

1.6 rock slope protection

	H	W	L	Vol (cf)	Vol (cy)
scour protection	2	50	92	9,188	340
Total				340	

Notes

1. Revised diversion structure diagram
2. 1 ft concrete thickness



2.0 FLOODWALLS

2.1 clear and grub

	H	W	L	Area (ac)	Vol (cy)
floodwalls		10	2,292	0.53	
Total				1	

2.2 excavation

	H	W	L	Vol (cf)	Vol (cy)
pile cap beam	4	4	2,292	36,672	1,358
CIDH piles	30	3.14	382	35,984	1,333
Total				2,691	

piles every 10 feet, 2 feet wide; see Note 3

2.3 backfill

	H	W	L	Vol (cf)	Vol (cy)
pile cap beam	2	1	2,292	4,584	170
CIDH piles					
Total				170	

above pilecap beam located 2 feet below gr

2.4 hauling and disposal

	H	W	L	Vol (cf)	Vol (cy)
pile cap beam					1,358
CIDH piles					1,333
Total				2,691	

equal to excavation
equal to excavation

2.5 structural concrete

	H	W	L	Vol (cf)	Vol (cy)
wall	10	1	2,292	11,460	424
pile cap beam	2	4	2,292	18,336	679
CIDH piles	30	3.14	382	35,984	1,333
Total				2,436	

wall 8 ft, pilecap 2 ft below grade; see Note
see Note 2
see Note 3

Notes

1. 1 ft wall thickness
2. Pile cap 2' in height, 4' in width for single CIDH pile FW
3. FW- 24" in diameter CIDH concrete pile at spacing of 6 ft, 30 ft deep

ade

1

3.0 BYPASS U-FRAME CHANNEL

3.1 clear and grub

	H	W	L	Area (ac)	Vol (cy)
floodwalls		38	3,150	2.71	
			Total	3	

KeviSibl:
Widths multiplied by
2000/3200 = .63 for lower
flow estimate

3.2 excavation

	H	W	AREA	Vol (cf)	Vol (cy)
bypass		38	25,340	950,250	35,194
			Total	35,194	

from profile with added 4 feet for subgrade

3.3 backfill

	H	W	L	Vol (cf)	Vol (cy)
bypass					
			Total	0	

3.4 hauling and disposal

	H	W	L	Vol (cf)	Vol (cy)
bypass					35,194
			Total	35,194	

equal to excavation

3.5 structural concrete

	H	W	L	Vol (cf)	Vol (cy)
walls	12	1	6,300	37,800	1,400
floor	1	25	3,150	39,375	1,458
foundation	4	4	3,150	25,200	933
			Total	2,858	

8.5 + 3.5 of freeboard; see Note 1

2 feet thick full width; see Note 1

2 stems 2 feet thick, 4 feet deep; see Note 2

Notes

1. 1 ft wall thickness
2. No footing underneath U-frame channel

4.0 BYPASS CULVERT

4.1 clear and grub

	H	W	L	Area (ac)	Vol (cy)
floodwalls		38	450	0.39	
			Total	0	

KeviSibi:
Widths multiplied by
 $2000/3200 = .63$ for lower
flow estimate

4.2 excavation

	H	W	AREA	Vol (cf)	Vol (cy)
bypass		38	6,025	225,938	8,368
			Total	8,368	

from profile with added 4 feet for subgrade

4.3 backfill

	H	W	L	Vol (cf)	Vol (cy)
bypass				0	0
			Total	0	

4.4 hauling and disposal

	H	W	L	Vol (cf)	Vol (cy)
bypass					8,368
			Total	8,368	

equal to excavation

4.5 structural concrete

	H	W	L	Vol (cf)	Vol (cy)
walls	11	1	1,800	9,900	367
roof+floor	1	25	900	11,250	417
foundation	4	4	450	3,600	133
			Total	783	

8.5 + 2.5 of freeboard; see Notes 1 and 2

2 feet thick full width; see Note 2

2 stems 2 feet thick, 4 feet deep; see Note 3

Notes

1. 40 ft wide- uswing 3-cell box culvert (4 vertical walls)
2. 1 ft wall thickness
3. No footing underneath box culvert

5.0 OUTLET STRUCTURE

KeviSibi:
Widths multiplied by
 $2000/3200 = .63$ for lower
flow estimate

5.1 clear and grub

	H	W	L	Area (ac)	Vol (cy)
outlet		38	100	0.09	
Total				0.09	

5.2 excavation

	H	W	L	Vol (cf)	Vol (cy)
outlet	2	38	100	7,500	278
Total					278

from profile with added 4 feet for subgrade

5.3 backfill

	H	W	L	Vol (cf)	Vol (cy)
outlet				0	0
Total					0

5.5 hauling and disposal

	H	W	L	Vol (cf)	Vol (cy)
outlet					278
Total					278

equal to excavation

5.5 rock slope protection

	H	W	L	Vol (cf)	Vol (cy)
outlet	2	38	100	3,750	139
Total					139

8.5 + 2.5 of freeboard

6.0 Floodgate passive flood gate

7.0 NEW PAVEMENT

7.1 golf course (station 18+00)

	Area (sf)	Vol (cy)	Unit cost	Amount
Class II Aggregate Base for Street Improvement	2,536	94	3	282
Asphalt Concrete (Type A) for 12" thick	5,071	188	40	7,513
				7,794.31

7.2 airport (station 15+00)

	Area (sf)	Vol (cy)	Unit cost	Amount
Class II Aggregate Base for Street Improvement	2,536	94	3	282
Asphalt Concrete (Type A) for 12" thick	5,071	188	40	7,513
				7,794.31

7.3 embarcadero road (station 5+00)

	Area (sf)	Vol (cy)	Unit cost	Amount
Class II Aggregate Base for Street Improvement	2,536	94	3	282
Asphalt Concrete (Type A) for 12" thick	5,071	188	40	7,513
				7,794.31

total 23,383

8.0	TRAFFIC CONTROL	1	EA	50,000
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9.0	UTILITY RELOCATION	1	EA	150,000
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10.0 PROPERTY ACQUISITION

		Area (ac)	Unit cost	Amount
10.1	City of Palo Alto Land	3.38	0	0
10.2	airport	0.94	5,000,000	4,687,500
Total				4,687,500

Assuming that Palo Alto would dedicate the property for

KeviSibi:
 Areas multiplied by
 $2000/3200 = .63$ for lower
 flow estimate

the project.

11.0 MAINTENANCE

11.1 significant maintenance expected once every ten years

cost per event 150,000

of events in 50 yrs 5

11.2 miscellaneous maintenance

cost per event 5,000

of events in 50 yrs 50

total 1,000,000