

# **TECHNICAL MEMORANDUM**

Subject: **CORTE MADERA CREEK FLOOD CONTROL PROJECT**  
**OCTOBER 2006 UNIT 4 DESIGN ALTERNATIVES**

## **APPENDIX D**

**Table 5. Summary of fish passage structures and bank regrading required for 1999-2000 and October 2006 Design Alternatives, Unit 4 Flood Control Channel, Corte Madera Creek.**

**Table 6. Summary of retaining wall dimensions and riparian tree removal required for 1999-2000 and October 2006 Design Alternatives, Unit 4 Flood Control Channel, Corte Madera Creek.**

**Table 7. List of existing trees on the streambanks of Corte Madera Creek in the downstream 625-ft long reach of Unit 4, between Lagunitas Road Bridge and the Unit 3 concrete channel (2006).**

**Table 5. Summary of fish passage structures and bank regrading required for 1999-2000 and October 2006 Design Alternatives, Unit 4 Flood Control Channel, Corte Madera Creek.**

Plan No.	Date	Plan Title	Unit 4 Design Capacity (cfs)	Geometry File	Steady Flow File	Fish Ladder/Bulkhead	Lagunitas Road Bridge	Sediment basin	Fish passage structure	Other impacted utilities	West bank regrading	East bank regrading
Plan 01	1999	(Alt IV) Minimum Plan	4,100	g01	f01	removed	intact	small	natural grade with boulder weirs	none	minor west bank regrading	minor east bank regrading
Plan 02	1999	(Alt I) Existing Conditions with 2 yr clean out	3,200	g02	f01	replaced	intact	none	replacement fish ladder	none	none	none
Plan 03	1999	(Alt II) 5400 cfs plan with 5 yr clean out	5,400	g03	f01	removed	intact	large	natural grade with boulder weirs	none	minor west bank regrading	major east bank regrading for vertical sheetpile wall
Plan 04	1999	(Alt II) 5400 cfs plan with 10 yr clean out	5,400	g04	f01	removed	intact	large	natural grade with boulder weirs	none	minor west bank regrading	major east bank regrading for vertical sheetpile wall
Plan 05	2006	Exist Cond (1999) w/2 yr clean out	3,200	g02	f01	intact	intact	none	existing wooden Denil fish ladder	none	none	none
Plan 06	2006	Exist Cond (2005) w/2 yr clean out	3,200	g05	f01	intact	intact	none	existing wooden Denil fish ladder	none	none	none
Plan 07	2006	Exist Cond (2005) w/2 yr clean out and bridge removal	3,200	g06	f01	intact	removed	none	existing wooden Denil fish ladder	none	none	none
Plan 08	2006	Baseline (Existing Conditions) Alternative	3,200	g07	f01	intact	removed	none	existing wooden Denil fish ladder	none	none	none
Plan 09	2006	Baseline (Existing Conditions) Alternative (w/ rev bidge abuts)	3,200	g08	f01	intact	removed	none	existing wooden Denil fish ladder	none	minor west bank regrading in vicinity of bridge	minor west bank regrading in vicinity of bridge
Plan 10	2006	Design Alternative I test	3,200	g09	f01	replaced	removed	none	replacement fish ladder	none	none	none
Plan 11	2006	Design Alternative I Variant 1	3,200	g10	f01	replaced	removed	none	replacement fish ladder	none	minor; 100-ft long 1(H):2(V) sloped vegetated rip-rap bank	none
Plan 12	2006	Design Alternative I Variant 2	3,200	g11	f01	replaced	removed	none	replacement fish ladder	none	minor; same as Variant 1 plus a 100-ft long retaining wall	none
Plan 13	2006	Design Alternative II test	5,200	g12	f01	removed	removed	none	natural grade with rip-rap lining	none	none	none
Plan 14	2006	Design Alternative II Variant 1	5,200	g13	f01	removed	removed	none	natural grade with rip-rap lining	none	minor west bank regrading	none
Plan 15	2006	Design Alternative II Variant 2	5,400	g14	f01	removed	removed	none	natural grade with rip-rap lining	none	major west mid-bank regrading	minor east bank regrading at 2 biotechnical sites
Plan 17	2006	Design Alternative II Variant 3	5,400	g16	f01	removed	removed	none	natural grade with rip-rap lining	none	major west mid-bank regrading	minor east bank regrading at 2 biotechnical sites
Plan 18	2006	Design Alternative II Variant 4	5,400	g17	f01	removed	removed	none	natural grade with rip-rap lining	none	major west mid-bank regrading	minor east bank regrading at 2 biotechnical sites
Plan 16	2006	Design Alternative III test	5,400	g15	f01	removed	removed	none	natural grade with rip-rap lining	none	major west mid- and upper bank regrading	minor east bank regrading at 2 biotechnical sites
Plan 21	2006	Design Alternative III Variant 1	5,400	g18	f01	removed	removed	none	natural grade with rip-rap lining	none	major west mid- and upper bank regrading	minor east bank regrading at 2 biotechnical sites
Plan 22	2006	Design Alternative III Variant 2	5,400	g19	f01	removed	removed	none	natural grade with rip-rap lining	reconfigure water line, parking area, and pedestrian ROW	major west mid- and upper bank regrading	minor east bank regrading at 2 biotechnical sites
<b>Recommended October 2006 Design Alternatives:</b>												
Plan 25	2006	Baseline (Existing Conditions) Alternative	3,200	g07	f02	removed	removed	none	existing wooden Denil fish ladder	none	none	none
Plan 26	2006	Alternative I (same as Alt I test)	3,200	g09	f02	replaced	removed	none	replacement fish ladder	none	none	none
Plan 27	2006	Alternative IIA (same as Alt II Var 1)	5,200	g13	f02	removed	removed	none	natural grade with rip-rap lining	none	minor west bank regrading	none
Plan 28	2006	Alternative IIB (same as Alt II Var 2)	5,400	g14	f02	removed	removed	none	natural grade with rip-rap lining	none	major west mid-bank regrading	minor east bank regrading at 2 biotechnical sites
Plan 29	2006	Alternative III (same as Alt III test)	5,600	g15	f02	removed	removed	none	natural grade with rip-rap lining	none	major west mid- and upper bank regrading	minor east bank regrading at 2 biotechnical sites

**Table 6. Summary of retaining wall dimensions and riparian tree removal required for 1999-2000 and October 2006 Design Alternatives, Unit 4 Flood Control Channel, Corte Madera Creek.**

Plan No.	Date	Plan Title	Unit 4 Design Capacity (cfs)	Length vert wall (ft)	Avg ht vert wall (ft)	Max ht vert wall (ft)	Toe of bank existing natives (alders) (west bank)	Mid-bank existing natives (west bank)	Top of bank existing natives (west bank)	Number of native trees removed (west bank)	Number of native trees removed (east bank)	As percent of total 94 natives in Unit 4	List of trees to be removed (tree number)
Plan 01	1999	(Alt IV) Minimum Plan	4,100	nd	nd	nd	removed	removed	preserved	nd	nd	nd	nd
Plan 02	1999	(Alt I) Existing Conditions with 2 yr clean out	3,200	nd	nd	nd	preserved	preserved	preserved	0	0	0	none
Plan 03	1999	(Alt II) 5400 cfs plan with 5 yr clean out	5,400	nd	nd	16	removed	preserved	preserved	nd	nd	nd	nd
Plan 04	1999	(Alt II) 5400 cfs plan with 10 yr clean out	5,400	nd	nd	16	removed	preserved	preserved	nd	nd	nd	nd
Plan 05	2006	Exist Cond (1999) w/2 yr clean out	3,200	0	0	0	preserved	preserved	preserved	0	0	0%	none
Plan 06	2006	Exist Cond (2005) w/2 yr clean out	3,200	0	0	0	preserved	preserved	preserved	0	0	0%	none
Plan 07	2006	Exist Cond (2005) w/2 yr clean out and bridge removal	3,200	0	0	0	preserved	preserved	preserved	0	0	0%	none
Plan 08	2006	Baseline (Existing Conditions) Alternative	3,200	0	0	0	preserved	preserved	preserved	0	0	0%	none
Plan 09	2006	Baseline (Existing Conditions) Alternative (w/ rev bdge abutments)	3,200	0	0	0	preserved	preserved	preserved	0	0	0%	none
Plan 10	2006	Design Alternative I test	3,200	0	0	0	preserved	preserved	preserved	0	0	0%	none
Plan 11	2006	Design Alternative I Variant 1	3,200	0	0	0	preserved	preserved	preserved	0	0	0%	none
Plan 12	2006	Design Alternative I Variant 2	3,200	100	4	7	preserved	preserved	preserved	2	0	2%	46, 46, 47, 48
Plan 13	2006	Design Alternative II test	5,200	0	0	0	preserved	preserved	preserved	0	0	0%	none
Plan 14	2006	Design Alternative II Variant 1	5,200	114	6	9	preserved	preserved	preserved	0	0	0%	none
Plan 15	2006	Design Alternative II Variant 2	5,400	550	7	11	preserved	removed	preserved	11	8	20%	16, 17, 18, 19, 21, 25, 26, 37, 44, 45, 46, 47, 48, 49, 57, 74, 75, 5 at left bank site 1, 3 at left bank site 2
Plan 17	2006	Design Alternative II Variant 3	5,400	568	7	11	preserved	removed	preserved	12	8	21%	same as Variant 2 plus Tree No. 73
Plan 18	2006	Design Alternative II Variant 4	5,400	588	7	11	preserved	removed	preserved	15	8	24%	same as Variant 2 plus Trees No. 55, 66, 73, and 76
Plan 16	2006	Design Alternative III test	5,400	785	9	13	preserved	removed	removed	27	8	37%	16, 17, 18, 19, 21, 25, 26, 37, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 64, 55, 66, 67, 68, 69, 70, 57, 73, 74, 75, 76, 4 at right bank u/s from bridge, 5 at left bank site 1, 3 at left bank site 2
Plan 21	2006	Design Alternative III Variant 1	5,400	785	9	13	removed	removed	removed	54	8	66%	same as test plus Trees No. 20, 22, 23, 24, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 38, 39, 40, 41, 56, 58, 59, 60, 61, 62, 63, 64, 65
Plan 22	2006	Design Alternative III Variant 2	5,400	790	9	13	preserved	removed	removed	27	8	37%	same as test plus 2 add'l trees (6 total) at right bank u/s from bridge
<b>Recommended October 2006 Design Alternatives:</b>													
Plan 25	2006	Baseline (Existing Conditions) Alternative	3,200	0	0	0	preserved	preserved	preserved	0	0	0%	none
Plan 26	2006	Alternative I	3,200	0	0	0	preserved	preserved	preserved	0	0	0%	none
Plan 27	2006	Alternative IIA	5,200	114	6	9	preserved	preserved	preserved	0	0	0%	none
Plan 28	2006	Alternative IIB	5,400	550	7	11	preserved	removed	preserved	11	8	20%	16, 17, 18, 19, 21, 25, 26, 37, 44, 45, 46, 47, 48, 49, 57, 74, 75, 5 at left bank site 1, 3 at left bank site 2
Plan 29	2006	Alternative III	5,600	785	9	13	preserved	removed	removed	27	8	37%	16, 17, 18, 19, 21, 25, 26, 37, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 64, 55, 66, 67, 68, 69, 70, 57, 73, 74, 75, 76, 4 at right bank u/s from bridge, 5 at left bank site 1, 3 at left bank site 2

**Table 7. List of existing trees on the streambanks of Corte Madera Creek in the downstream 625-ft long reach of Unit 4, between Lagunitas Road Bridge and the Unit 3 concrete channel (2006).**

Tree Number	California Native?	Species	Diameter dbh (ft)	Avg Canopy Radius (ft)	Tree Number	California Native Riparian?	Species	Diameter dbh (ft)	Avg Canopy Radius (ft)
16	NON	ACACIA	0.8	15	53	NATIVE	ASH	2.9	40
17	NON	ACACIA	1.1	16	54	NATIVE	ASH	1.2	25
18	NATIVE	WILLOW	0.8	10	55	NATIVE	BAY	1.4	13
19	NATIVE	MAPLE	0.9	15	56	NATIVE	ALDER	0.3	10
20	NATIVE	ALDER	1.1	20	57	NATIVE	BAY	0.8	10
21	NATIVE	WILLOW	0.9	13	58	NATIVE	ALDER	0.5	10
22	NATIVE	ALDER	0.6	10	59	NATIVE	ALDER	1.7	20
23	NATIVE	ALDER	0.7	10	60	NATIVE	ALDER	1.1	25
24	NATIVE	ALDER	0.8	10	61	NATIVE	ALDER	0.5	20
25	NATIVE	WILLOW	0.6	15	62	NATIVE	ALDER	1.0	25
26	NATIVE	WILLOW	1.3	11	63	NATIVE	ALDER	1.2	25
27	NATIVE	WILLOW	1.6	14	64	NATIVE	ALDER	1.4	25
28	NATIVE	ALDER	0.5	10	65	NATIVE	ALDER	1.2	20
29	NATIVE	ALDER	0.9	15	66	NATIVE	ASH	1.5	26
30	NATIVE	ALDER	0.8	15	67	NATIVE	WILLOW	2.5	31
31	NATIVE	ALDER	0.9	11	68	NATIVE	WILLOW	0.5	9
32	NATIVE	ALDER	1.2	20	69	NATIVE	WILLOW	0.8	10
33	NATIVE	ALDER	0.6	10	70	NATIVE	WILLOW	0.4	10
34	NATIVE	ALDER	1.2	21	71	NATIVE	ASH	1.1	30
35	NATIVE	ALDER	1.1	21	72	NATIVE	ASH	2.0	20
36	NATIVE	ALDER	0.6	13	73	NATIVE	BAY	2.0	20
37	NATIVE	ALDER	1.4	30	74	NON	ACACIA	1.0	18
38	NATIVE	ALDER	1.3	21	75	NON	ACACIA	0.9	14
39	NATIVE	ALDER	0.8	18	76	NATIVE	OAK	2.2	26
40	NATIVE	WILLOW	0.7	NA	77	NATIVE	ASH	1.1	14
41	NATIVE	ALDER	1.2	25	78	NATIVE	ASH	1.9	24
42	NATIVE	BAY	1.0	10	79	NATIVE	ASH	0.8	13
43	NATIVE	BAY	1.9	20	80	NON	ACACIA	3.0	44
44	NATIVE	ASH	1.6	15	81	NATIVE	ASH	1.1	14
45	NATIVE	ASH	1.8	19	82	NATIVE	ASH	0.9	11
46	NATIVE	WILLOW	1.0	24	83	NATIVE	ASH	1.1	14
47	NATIVE	WILLOW	1.0	23	84	NATIVE	BAY	1.1	15
48	NON	WILLOW	1.8	25	85	NATIVE	ASH	1.1	NA
49	NON	WILLOW	1.9	29	86	NATIVE	ASH	1.0	NA
50	NATIVE	MAPLE	0.5	8	87	NATIVE	ASH	1.0	15
51	NATIVE	MAPLE	0.5	10	88	NON	FIR	0.9	15
52	NATIVE	ASH	1.1	19	89	NATIVE	ASH	1.3	25