Appendix E
Water Quality Data

ESA

TABLE E-1
GROUNDWATER MONITORING SUMMARY, 2001-2003

	MW1			MW2			MW3			MW4			MW5			MW6			MW7			MW8			MW9			MW10			MW11		
Constituent	**Ave.**	**Min.**	**Max.**	**Ave.**	**Min.**	**Max.**	**Ave.**	**Min.**	**Max.**	**Ave.**	**Min.**	**Max.**	**Ave.**	**Min.**	**Max.**	**Ave.**	**Min.**	**Max.**	**Ave.**	**Min.**	**Max.**	**Ave.**	**Min.**	**Max.**	**Ave.**	**Min.**	**Max.**	**Ave.**	**Min.**	**Max.**	**Ave.**	**Min.**	**Max.**
Alkalinity, mg/L	300	250	350	298	270	330	376	270	440	281	240	300	499	440	540	586	460	660	678	460	740	338	300	390	298	280	330	364	250	420	445	360	470
Aluminum, mg/L	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.09	0.00	0.00	0.00	0.15	0.00	0.36	0.25	0.00	1.10	0.43	0.00	2.70	0.12	0.00	0.42	0.41	0.00	1.70	1.94	0.00	7.40	0.40	0.00	0.91
Ammonia, mg/L	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	12	0	0	0	0	0.00	0.00
Arsenic, µg/L	8	0	10	4	0	5	9	0	13	7	0	9	9	6	19	74	58	81	53	46	60	10	6	20	19	14	24	18	16	21	5	0.00	6.00
Barium, mg/L	0.22	0.16	0.25	0.15	0.10	0.17	0.36	0.14	0.42	0.18	0.16	0.20	0.10	0.09	0.11	0.36	0.32	0.40	0.51	0.43	0.54	0.12	0.06	0.16	0.15	0.13	0.19	0.24	0.15	0.30	0.12	0.06	0.15
Bicarbonate, mg/L	300	250	350	299	270	330	376	270	440	281	240	300	499	440	540	586	460	660	678	460	740	338	300	390	298	280	330	364	250	420	445	360	470
Boron, mg/L	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.3	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.0	0.0	0.1
Cadmium, µg/L	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Calcium, mg/L	71	51	88	50	41	61	114	48	140	74	70	78	92	86	100	129	120	140	140	130	150	50	46	53	65	59	74	98	85	120	84	76	91
Carbonate, mg/L	0	0	0	0	0	0	0	0	0	0	0	0	251	0	540	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chloride, mg/L	27	19	32	9	0	14	74	9	93	61	55	66	70	62	88	107	83	140	89	82	93	77	66	100	76	67	86	97	86	110	28	21	43
Total Chromium, µg/L	8	0	12	4	0	10	6	0	20	4	0	11	2	0	8	6	0	14	8	0	20	4	2	11	4	0	8	9	2	30	7	0	11
Specific Conductance, µmhos/cm	794	620	900	608	550	680	1104	550	1300	778	690	860	1513	1400	1700	1675	1500	1800	1700	1600	1800	905	810	1000	1018	890	1300	1171	970	1400	1300	1200	1400
Copper, µg/L	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	5	2	0	12	0	0	0	0	0	0	0	0	0	0	0	0
Fluoride, mg/L	0.0	0.0	0.2	0.0	0.0	0.1	0.0	0.0	0.2	0.0	0.0	0.2	0.0	0.0	0.3	0.2	0.0	0.7	0.1	0.0	0.5	0.2	0.0	0.5	0.2	0.0	0.5	0.2	0.0	0.4	0.0	0.0	0.2
Hardness, mg/L	323	230	400	233	190	280	493	220	600	353	330	370	584	540	640	733	670	800	749	710	790	329	290	360	303	270	360	435	370	530	388	360	420
Hydroxide, mg/L	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Iron, mg/L	0.00	0.00	0.00	0.02	0.00	0.18	0.03	0.00	0.15	0.01	0.00	0.06	0.19	0.00	0.41	4.28	3.80	4.80	4.66	3.60	8.50	0.17	0.00	0.60	0.55	0.00	2.30	2.94	0.00	12.00	0.58	0.00	1.40
Iron-Dissolved, mg/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.24	0.00	0.66	0.14	0.00	0.77	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lead, µg/L	0	0	0	1	0	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Magnesium, mg/L	36	26	43	26	21	32	51	25	62	41	38	43	86	76	96	100	91	110	97	93	100	50	42	59	35	30	44	46	35	56	44	42	47
Manganese, mg/L	2.00	0.00	24.00	1.84	0.00	22.00	4.07	0.00	44.00	3.33	0.00	40.00	1.29	1.20	1.40	6.75	5.70	7.50	8.13	7.20	9.20	0.46	0.29	0.88	2.41	0.00	3.70	0.07	0.05	0.08	0.00	0.00	0.00
Mercury, µg/L	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nickel, µg/L	0	0	0	0	0	0	8	0	15	8	0	11	13	10	20	30	20	40	23	20	30	20	20	20	18	0	20	16	10	30	0	0	0
Nitrate (NO_3 + NO_2), mg/L	2.7	1.6	6.0	1.4	0.0	8.0	0.6	0.0	4.9	0.0	0.0	0.2	39.0	21.0	120.0	0.0	0.0	0.3	0.2	0.0	0.5	0.6	0.0	3.4	2.5	0.0	18.0	1.1	0.0	6.9	44.5	23.0	110.0
Nitrogen - Total (N) mg/L	2.3	1.4	6.0	0.7	0.0	6.0	0.1	0.0	0.5	0.6	0.0	5.1	23.3	1.7	37.0	0.7	0.0	2.0	1.6	0.0	2.9	0.7	0.0	3.4	6.2	3.8	8.1	1.2	0.0	6.9	21.5	1.3	27.0
Kjeldahl Nitrogen, mg/L	0	0	0	0	0	0	0	0	5	1	0	5	2	0	8	3	0	18	3	0	13	0	0	2	6	4	8	1	0	3	0	0	2
ortho-Phosphate, mg/L	0	0	0	0	0	0	1	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	0	0	1	0	0	0
pH	7.6	7.2	8.0	7.5	7.0	8.0	7.2	6.6	7.8	7.6	7.2	8.0	7.3	6.9	7.8	7.2	6.8	7.6	7.2	6.8	7.7	7.4	7.0	7.9	7.4	6.7	7.9	7.5	7.0	8.3	7.5	7.1	8.0
Total Phosphorus, mg/L	0	0	0	0	0	0	0	0	0	0	0	0	4	0	34	0	0	1	1	0	2	0	0	1	2	0	5	0	0	2	3	0	23
Potassium, mg/L	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	2	0	0	3	0	0	3	8	6	10	0	0	3	1	0	3
Total Selenium, µg/L	0	0	2	0	0	0	2	0	3	0	0	2	7	0	42	9	2	46	3	0	4	7	0	50	0	0	2	0	0	0	4	0	6
Total Silica, mg/L	61.9	49.0	64.0	55.3	0.0	64.0	53.1	42.0	62.0	59.8	49.0	64.0	55.4	53.0	60.0	55.8	53.0	58.0	61.9	58.0	75.0	73.6	68.0	84.0	68.8	58.0	74.0	71.8	60.0	98.0	65.9	63.0	71.0
Silver, µg/L	0	0	0	5	0	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sodium, mg/L	67	59	72	53	0	73	75	49	88	43	40	48	133	120	150	134	130	140	143	130	150	86	74	100	104	77	150	106	97	120	156	140	170
Sulfate, mg/L	79	56	90	16	0	21	116	17	160	31	25	35	111	100	120	204	170	240	169	160	180	28	19	34	108	54	210	101	30	160	114	100	130
Total Dissolved Solids, mg/L	509	430	610	396	340	510	725	340	870	493	440	680	950	880	1000	1113	1000	1200	1125	1000	1200	550	490	600	625	560	770	736	550	920	858	820	890
Total Organic Carbon, mg/L	1	1	1	1	0	2	3	1	3	1	0	1	6	0	7	13	0	18	13	0	17	2	0	6	3	0	4	3	0	4	2	0	2
Zinc, µg/L	0	0	0	6	0	70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fecal Coliform, MPN	<1.0	0.0	0.0	1.0	1.0	1.0	0.0	0.0	0.0	<1.0	0.0	0.0	2.6	1.1	6.9	1.1	1.1	1.1	6.5	1.0	23.0	1.4	1.1	2.2	1.4	1.1	2.2	1.4	1.1	2.2	1.3	1.0	2.2
Total Coliform, MPN	<1.0	0.0	0.0	1.0	1.0	1.0	0.0	0.0	0.0	<1.0	0.0	0.0	4.9	1.1	16.1	1.4	1.1	2.2	8.6	1.0	23.0	3.1	1.1	9.2	3.8	1.1	12.0	3.1	1.1	9.2	1.1	1.0	1.1

Source: City of Merced 2005, ECO:LOGIC 2006

TABLE E-2
ANALYSIS OF PRIORITY POLLUTANTS IN HARTLEY SLOUGH, JANUARY 23, 2002 (µG/L UNLESS OTHERWISE NOTED)

Constituent	Lab MDL	Effluent	Receiving Water Upstream	Receiving Water Downstream
Inorganics				
Aluminum		100	240	400
Antimony	0.01	*0.3	*0.2	*.3
Arsenic	0.08	3.5	2.6	3.7
Barium		100	240	210
Beryllium	0.06	ND	ND	ND
Cadmium	0.04	*0.08	ND	ND
Chromium	0.2	1.2	1.1	2.8
Chromium VI		**ND	NS	NS
Copper	0.2	3.5	1.9	7.7
Cyanide	0.6	**ND	NS	NS
Lead	0.02	1.5	0.44	0.3
Mercury	0.00017	0.0086	0.001	0.0012
Nickel	0.2	1.4	2.5	2.1
Selenium	0.3	ND	ND	ND
Silver	0.02	0.2	ND	ND
Thallium	0.03	*0.04	ND	ND
Zinc	0.5	63	3.0	8.0

*****Estimated concentration above Method Detection Limit (MDL) and below the RL/ML (Reporting Limit/Minimum Level).
**Four discrete samples taken over twenty four hours.

NS - Not Sampled
ND = Not Detected

Asbestos				
Asbestos	0.2	<10µm	<10µm	<10µm
Volatile Organic Substances				
Acrolein	3.3	ND	ND	ND
Acrylonitrile	1.6	ND	ND	ND
Benzene	0.5	ND	ND	ND
Bromodichloromethane	0.46	0.6	ND	ND
Bromoform	0.1	ND	ND	ND
Bromomethane	0.46	ND	ND	ND
Carbon Tetrachloride	0.42	ND	ND	ND
Chlorobenzene	0.19	ND	ND	ND
Chloroethane	0.34	ND	ND	ND
2-Chloroethylvinyl ether	0.31	ND	ND	ND
Chloroform	0.24	4.6	ND	ND
Chloromethane	0.36	ND	ND	ND
Dibromochloromethane	NA	ND	ND	ND
1,2 Dichorobenzene	0.12	ND	ND	ND
1,3 Dichlorobenzene	0.16	ND	ND	ND
1,4 Dichlorobenzene	0.12	4.0	ND	ND
Dichlorodifluoromethane (F-12)	0.31	ND	ND	ND
1,1 Dichloroethane	0.28	ND	ND	ND
1,2 Dichloroethane	0.18	ND	ND	ND
1,1 Dichloroethene	0.37	ND	ND	ND
cis-1,2-Dichloroethene	0.24	ND	ND	ND
Trans-1, 2 Dichloroethylene	0.3	ND	ND	ND
1,2 Dichloropropane	0.22	ND	ND	ND

TABLE E-2
ANALYSIS OF PRIORITY POLLUTANTS IN HARTLEY SLOUGH,
JANUARY 23, 2002 (µG/L UNLESS OTHERWISE NOTED)

Constituent	Lab MDL	Effluent	Receiving Water Upstream	Receiving Water Downstream
cis-1,3-Dichloropropene	0.25	ND	ND	ND
Trans-1,3-Dichloropropene	0.22	ND	ND	ND
Dichlorotrifluoroethane	0.22	ND	ND	ND
Ethylbenzene	0.3	0.4	ND	ND
Methylene Chloride	0.38	0.5	ND	ND
Methyl-t-Butyl Ether	0.19	ND	ND	ND
Styrene	NR	ND	ND	ND
1,1,2,2 Tetrachloroethane	0.34	ND	ND	ND
Tetrachoroethene	0.32	ND	ND	ND
1,2,4 Trichlorobenzene	0.3	ND	ND	ND
Toluene	0.25	2.5	ND	ND
1,1,1 Trichloroethane	0.35	ND	ND	ND
1,1,2 Trichloroethane	0.27	ND	ND	ND
Trichloroethene	0.29	ND	ND	ND
Trichlorofluoromethane (F-11)	0.41	ND	ND	ND
Trichlorotrifluoroethane	0.48	ND	ND	ND
Vinyl Chloride	0.34	ND	ND	ND
Total Xylene Isomers	0.4	1.7	ND	ND
Semi -Volatile Organic Substances				
Benzidine	0.3	ND	ND	ND
Butyl benzyl phthalate	0.4	ND	ND	ND
4-Bromophenyl phenyl ether	0.5	ND	ND	ND
Bis 2-(1-Chloroethoxy) methane	0.3	ND	ND	ND
Bis (2-chloroethyl) ether	0.3	ND	ND	ND
Bis (2-Chloroisopropyl) ether	1.0	ND	ND	ND
2-Chloronaphthalene	0.3	ND	ND	ND
4-Chlorophenyl phenyl ether	0.4	ND	ND	ND
di-n-Butyl phthalate	0.4	ND	ND	ND
3,3 Dichlorobenzidine	0.4	ND	ND	ND
Diethyl phthalate	0.4	ND	*0.7	ND
Dimethyl phthalate	0.4	ND	ND	ND
2,4 Dinitrotoluene	0.3	ND	ND	ND
2,6 Dinitrotoluene	0.3	ND	ND	ND
di-n-Octyl phthalate	0.4	ND	ND	ND
1,2 Diphenylhydrazine	0.3	ND	ND	ND
Bis (2-Ethylhexyl) phthalate	0.284	*0.9	ND	ND
Hexachlorobenzene	0.4	ND	ND	ND
Hexachlorobutadiene	0.2	ND	ND	ND
Hexachloro-cyclopentadiene	0.1	ND	ND	ND
Hexachloroethane	0.2	ND	ND	ND
Isophorone	0.3	ND	ND	ND
Nitrobenzene	0.3	ND	ND	ND
N-Nitroso-dimethyl amine	0.4	ND	ND	ND
N-Nitroso diphenyl amine	0.4	ND	ND	ND
N-Nitroso-di n-propyl amine	0.3	ND	ND	ND
4 Chloro-3-methylphenol	0.3	ND	ND	ND
2 Chlorophenol	0.4	ND	ND	ND
2,4 Dichlorophenol	0.3	ND	ND	ND
2,4 Dimethylphenol	0.3	ND	ND	ND

TABLE E-2
ANALYSIS OF PRIORITY POLLUTANTS IN HARTLEY SLOUGH, JANUARY 23, 2002 (µG/L UNLESS OTHERWISE NOTED)

Constituent	Lab MDL	Effluent	Receiving Water Upstream	Receiving Water Downstream
2,4 Dinitrophenol	0.3	ND	ND	ND
2-Methyl-4,6-dinitrophenol	0.4	ND	ND	ND
2-Nitrophenol	0.3	ND	ND	ND
4-Nitrophenol	0.2	ND	ND	ND
Pentachlorophenol	0.4	ND	ND	ND
Phenol	0.4	ND	ND	ND
2, 4, 6 Trichlorophenol	0.2	ND	ND	ND
Polynuclear Aromatic Hydrocarbons				
Acenaphthene	0.04	**ND**	**ND**	**ND**
Acenaphthylene	0.05	ND	ND	ND
Anthracene	0.04	ND	ND	ND
Benzo (a) anthracene	0.02	ND	ND	ND
Benzo (a) pyrene	0.03	ND	ND	ND
Benzo (b) fluoranthene	0.02	ND	ND	ND
Benzo (g, h, I) perylene	0.04	ND	ND	ND
Benzo (k) fluoranthene	0.02	ND	ND	ND
Chrysene	0.02	ND	ND	ND
Dibenzo (a, h)-anthracene	0.04	ND	ND	ND
Fluoranthene	0.02	ND	ND	ND
Fluorene	0.05	ND	ND	ND
Indeno (1,2,3,cd)-pyrene	0.04	ND	ND	ND
Naphthalene	0.05	ND	ND	ND
Phenanthrene	0.03	ND	ND	ND
Pyrene	0.02	ND	ND	ND
OCL Pesticides - PCBs				
Aldrin	0.003	ND	ND	ND
alpha-BHC	0.002	ND	ND	ND
beta-BHC	0.001	ND	ND	ND
gamma-BHC (Lindane)	0.001	ND	ND	ND
delta-BHC	0.001	ND	ND	ND
Chlordane	0.005	ND	ND	ND
4,4 – DDD	0.01	ND	ND	ND
4,4 – DDE	0.01	ND	ND	ND
4,4 – DDT	0.01	ND	ND	ND
Dieldrin	0.002	ND	ND	ND
a-Endosulfan	0.003	ND	ND	ND
b-Endosulfan	0.001	ND	ND	ND
Endosulfan Sulfate	0.001	ND	ND	ND
Endrin	0.002	ND	ND	ND
Endrin Aldehyde	0.002	ND	ND	ND
Endrin Keytone	0.002	ND	ND	ND
Heptachlor	0.003	ND	ND	ND
Heptachlor Epoxide	0.003	ND	ND	ND
Methoxychlor	0.002	ND	ND	ND
Toxaphene	0.2	ND	ND	ND
PCB 1016	0.08	ND	ND	ND
PCB 1221	0.03	ND	ND	ND
PCB 1232	0.04	ND	ND	ND
PCB 1242	0.08	ND	ND	ND

TABLE E-2
ANALYSIS OF PRIORITY POLLUTANTS IN HARTLEY SLOUGH, JANUARY 23, 2002 (µG/L UNLESS OTHERWISE NOTED)

Constituent	Lab MDL	Effluent	Receiving Water Upstream	Receiving Water Downstream
PCB 1248	0.05	ND	ND	ND
PCB 1254	0.07	ND	ND	ND
PCB 1260	0.05	ND	ND	ND
Organophosphorous Pesticides				
Chlorpyrifos (Dursban)	0.12	ND	ND	ND
Dameton - O and - S	0.12	ND	ND	ND
Diazinon	0.32	ND	ND	0.2
Disulfoton (Di-syston)	0.11	ND	ND	ND
Ethion	0.14	ND	ND	ND
Azinphos methyl (Guthion)	0.13	ND	ND	ND
Parathion methyl	0.18	ND	ND	ND
Malathion	0.17	ND	ND	ND
Parathion (Ethyl Parathion)	0.18	ND	ND	ND
Dioxin				
2, 3, 7, 8-TCDD (Dioxin)	0.847	ND	ND	ND
1,2,3,7,8-PeCDD	1.39	ND	ND	ND
1,2,3,4,7,8-HxCDD	2.01	ND	ND	ND
1,2,3,6,7,8-HxCDD	1.75	ND	ND	ND
1,2,3,7,8,9-HxCDD	3.95	ND	ND	ND
1,2,3,4,6,7,8-HpCDD	2.37	1.8	5.56	2.21
OCDD	9.67	9.09	36.9	10.6
2,3,7,8-TCDF	0.478	ND	ND	ND
1,2,3,7,8-PeCDF	3.06	ND	ND	ND
2,3,4,7,8-PeCDF	1.84	ND	ND	ND
1,2,3,4,7,8-HxCDF	2.06	0.832	ND	ND
1,2,3,6,7,8-HxCDF	2.57	ND	ND	ND
2,3,4,6,7,8-HxCDF	2.48	ND	ND	ND
1,2,3,7,8,9-HxCDF	2.04	ND	ND	ND
1,2,3,4,6,7,8-HpCDF	2.57	1.01	2.32	ND
1,2,3,4,7,8,9-HpCDF	2.38	ND	ND	ND
OCDF	4.26	3.62	5.21	3.23

* Sample specific estimated detection limit - OCDD and OCDF Estimated maximum possible concentration.

Source: ECO:LOGIC, 2005