Appendix A.1

Wastewater Treatment Plants
Self-Reported Flow

Table A.1-1. WWTP Self-Reported flows

Reporting Month	02229-000	02731-000	03153-000	02710-000	04760-000	10495-030	10495-076	10495-099	10495-109	10495-135	10495-139	10584-001	10706-001	10876-001	10876-002	10932-001	11005-001	11051-001
01-Jan-00	0.01057	0	0.011039	0.0016	0	8.891	6.616	1.474	3.925	0.429	0.385	1.877	1.098	0.873	0.758	0.011345	0.146025	0.019028
01-Feb-00	0.010424	0	0.010417	0.00175	0	9.003	6.739	1.436	4.15	0.451	0.368	1.965	1.085	0.849	0.758	0.011345	0.110962	0.0193
01-Mar-00	0.00955	0	0.010262	0.000032	0	8.773	6.642	1.461	4.145	0.422	0.37	1.666	1.085	0.823	0.76	0.011345	0.107465	0.0172
01-Apr-00	0.00966	0	0.009095	0.0014	0	10.03	6.792	1.593	4.547	0.486	0.426	2.258	1.236	0.836	0.761	0.019358	0.124632	0.0181
01-May-00	0.01128	0	0.010076	0.0016	0.0012	9.788	6.11	1.69	4.552	0.509	0.441	2.303	1.26	0.953	0.775	0.019825	0.129235	0.0165
01-Jun-00	0	0	0.02182	0.000073	0.002	9.09	6.928	1.607	4.306	0.501	0.404	2.076	1.2432	0.827	0.775	0.019825	0.102946	0.0191
01-Jul-00	0	0	0.017687	0.000073	0.002	8.039	7.408	1.571	3.959	0.476	0.4	1.821	1.101	0.817	0.775	0.009174	0.087806	0.0191
01-Aug-00	0	0	0.01439	0.000073	0.00105	8.294	7.148	1.582	4.358	0.51	0.39	2.017	1.008	0.829	0.775	0.011774	0.097032	0.0167
01-Sep-00	0	0	0.013558	0.0009	0.0011	8.363	7.518	1.55	4.431	0.495	0.364	2.079	0.988	0.803	0.775	0.01057	0.136675	0.023
01-Oct-00	0	0	0.016164	0.00125	0.001	9.18	7.489	1.565	4.537	0.544	0.37	2.151	1.08	0.805	0.759	0.01308	0.126903	0.034
01-Nov-00	0	0	0.016987	0.00125	0.001	12.079	10.392	1.784	5	0.605	0.48	3.186	1.32	0.939	0.813	0.01308	0.126903	0.032
01-Dec-00	0	0	0.007177	0.0018	0.0014	9.421	7.562	1.573	4.369	0.591	0.457	22.84	1.073	0.838	0.771	0.016983	0.129807	0.029
01-Jan-01	0	0	0.006918	0.00022	0.0013	10.138	8.766	1.672	4.813	0.622	0.403	2.805	1.15	0.91	0.794	0.019716	0.157421	0.035
01-Feb-01	0	0	0.009154	0.0013	0.00103	9.12	7.982	1.601	4.388	0.59	0.409	21.47	0.948	0.78	0.768	0.012607	0.147271	0.031
01-Mar-01	0	0	0.009154	0.0013	0.002	11.635	11.891	1.838	5.504	0.7	0.476	2.997	1.309	0.924	0.828	0.02557	0.179233	0.03
01-Apr-01	0	0	0.01022	0.0013	0.0018	9.001	8.768	1.683	4.741	0.662	0.427	2.29	1.013	0.886	0.777	0.015473	0.147165	0.033
01-May-01	0	0	0.008859	0.00013	0.0018	9.359	8.306	1.591	4.706	0.661	0.476	2.514	1.1	0.897	0.792	0.018267	0.132232	0.033
01-Jun-01	0	0	0.007208	0.00027	0.0023	11.001	12.472	1.818	4.983	0.715	0.759	2.694	1.027	1.02	0.942	0.020916	0.142079	0.032
01-Jul-01	0	0	0.006594	0.000535	0.002	8.752	7.979	1.572	4.529	0.701	0.761	2.139	1.02	0.893	0.798	0.012232	0.141606	0.025
01-Aug-01	0	0	0.009997	0.000535	0.0022	10.326	9.438	1.729	4.957	0.8	0.504	2.538	1.2	0.838	0.853	0.010874	0.129745	0.034
01-Sep-01	0	0	0.010736	0.000535	0.0017	10.235	9.575	1.773	5.252	0.695	0.515	2.414	1.308	0.818	0.848	0.022955	0.147593	0.029
01-Oct-01	0	0	0.013744	0.000535	0.003	10.113	10.405	1.776	5.025	0.599	0.49	2.377	1.296	0.88	0.898	0.02	0.142645	0.031
01-Nov-01	0	0	0.012608	0.000535	0.002	9.225	8.349	1.59	4.281	0.526	0.465	2.377	1.102	0.765	0.832	0.005	0.131517	0.028
01-Dec-01	0	0	0.011303	0.000535	0.002	11.022	11.819	1.907	4.914	0.498	0.536	2.762	1.261	0.873	0.887	0.009	0.200261	0.029
01-Jan-02	0	0	0.008043	0.0008	0.0024	9.291	9.213	1.661	4.514	0.489	0.484	2.262	1.106	0.79	0.82	0.0061	0.161753	0.028
01-Feb-02	0	0	0.00868	0.001	0.0025	9.144	8.511	1.631	4.502	0.513	0.474	2.109	1.073	0.776	0.816	0.006	0.159186	0.028
01-Mar-02	0	0	0.006122	0.0017	0.0018	9.354	7.798	1.735	4.593	0.531	0.478	2.119	1.096	0.788	0.785	0.005	0.167907	0.37
01-Apr-02	0	0	0.009875	0.002	0.0028	10.16	9.84	1.815	4.959	0.551	0.514	2.256	1.166	0.83	0.855	0.014	0.190197	0.034
01-May-02	0	0	0.01337	0.0012	0.002	9.05	7.476	1.647	4.635	0.573	0.454	1.63	0.991	0.746	0.788	0.008	0.15061	0.03
01-Jun-02	0.01121	0.007	0.009797	0.001	0.0018	9.419	7.167	1.696	4.686	0.573	0.457	2.184	1.058	0.761	0.874	0.0044	0.1624	0.025
01-Jul-02	0.00862	0.0066	0.009098	0.0008	0.0021	8.206	8.336	1.797	4.897	0.606	0.454	2.428	1.108	0.802	0.827	0.004	0.183415	0.037
01-Aug-02	0.0061	0.0051	0.010866	0.0007	0.0021	9.051	8.613	1.766	5.225	0.606	0.485	2.859	1.19	0.852	0.882	0.0048	0.174503	0.032
01-Sep-02	0.008	0.0042	0.00933	0.0004	0.0022	8.579	7.907	1.752	5.169	0.617	0.483	2.332	1.19	0.858	1.104	0.023	0.17735	0.03
01-Oct-02	0.00851	0.005	0.012845	0.0004	0.0022	11.685	11.156	1.949	5.733	0.655	0.564	3.016	1.529	0.95	1.163	0.015	0.213997	0.03
01-Nov-02	0.00897	0.00698	0.009908	0.0007	0.00176	10.985	11.5	1.99	5.768	0.58	0.533	2.742	1.275	0.942	1.165	0.2115	0.229352	0.039
01-Dec-02	0.00905	0.012	0.006711	0.00037	0.0018	10.131	10.746	1.862	4.276	0.52	0.528	2.604	1.241	0.923	1.175	0.106	0.245968	0.039
01-Jan-03	0.00748	0.0061	0.006678	0.0006	0.0029	8.807	9.493	1.779	3.67	0.524	0.528	2.328	1.091	0.868	1.062	0.0148	0.23828	0.039
01-Feb-03	0.00842	0.0041	0.007254	0.0012	0.0019	10.28	14.223	2.338	4.106	0.558	0.544	2.774	1.132	0.869	1.049	0.05	0.174273	0.039
01-Mar-03	0.00868	0.00388	0.00633	0.0009	0.002	9.247	11.63	2.023	3.581	0.541	0.544	2.133	1.029	0.905	1.055	0.0142	0.182087	0.048
01-Apr-03	0.00978	0.005	0.006376	0.0006	0.0017	8.499	8.709	1.716	3.19	0.544	0.521	1.775	0.98	0.866	1.04	0.0155	0.157037	0.048
01-May-03	0.00873	0.0057	0.006486	0.00045	0.0027	8.169	7.631	1.625	3.299	0.513	0.511	1.674	0.994	0.917	1.078	0.022	0.128187	0.032
01-Jun-03	0.01739	0.0044	0.0064521	0.0007	0.0024	8.766	8.46	1.818	3.502	0.546	0.514	1.935	1.08	1.02	1.131	0.023	0.127271	0.028
01-Jul-03	0.0176	0.0044	0.00668	0.00064	0.0023	9.082	8.349	1.755	4.641	0.581	0.543	2.008	1.103	0.94	1.007	0.0128	0.132174	0.025
01-Aug-03	0.12614	0.0044	0.0064	0.00064	0.0021	9.156	7.656	1.718	1.131	0.601	0.508	2.009	1.112	0.923	1.157	0.0068	0.129548	0.027
01-Sep-03	0.018081	0.0044	0.0066	0.0011	0.0016	10.188	8.949	1.892	4.339	0.592	0.532	2.372	1.18	0.966	1.169	0.012	0.167009	0.028

Zero or extensive amount of no data, confirmed with Envirofacts database
Assumned previous month's data
TCEQ flow database supplemented with data from Envirofacts
Assumed average of previous and subsequent month, averaged if 5 or more consecutive months are missing

Table A.1-1. WWTP Self-Reported flows

Reporting Month	11152-001	11188-001	11193-001	11273-001	11284-001	11290-001	11375-001	11389-001	11414-001	11472-001	11485-001	11486-001	11523-001	11538-001	11563-001	11598-001	11670-001	11682-001
01-Jan-00	1.59	0.248	0.414	0.40703	0.507	2.123	0.106	0.016	0.038	0.285506	0.4298	0.507	0.872	0.96226	0.583	0.664	0.58123	0.552
01-Feb-00	1.586	0.23	0.414	0.40703	0.516	2.031	0.1079	0.013	0.0354	0.318921	0.411	0.627	1.041	0.968	0.578	0.658	0.304	0.553
01-Mar-00	1.558	0.258	0.4259	0.40703	0.512	2.051	0.1038	0.0213	0.0428	0.321233	0.373	0.493	1.1925	0.968	0.566	0.657	0.319	0.535
01-Apr-00	1.776	0.253	0.62247	0.40703	0.568	2.146	0.1154	0.0201	0.037	0.346519	0.399	0.519	1.1479	1.029	0.608	0.696	0.344	0.58
01-May-00	2.044	0.268	0.553	0.40703	0.568	2.297	0.1264	0.0141	0.0298	0.346519	0.42	0.559	1.19037	1.088	0.668	0.711	0.321	0.626
01-Jun-00	2.157	0.294	0.553	0.38913	0.564	2.312	0.115	0.0147	0.0312	0.36558	0.392	0.559	1.07318	0.96417	0.5939	0.711	0.321	0.587
01-Jul-00	2.089	0.231	0.5047	0.3735	0.566	2.646	0.1508	0.002	0.046	0.323557	0.392	0.498	0.7885	0.9417	0.592	0.665	0.321	0.497
01-Aug-00	2.222	0.234	0.4394	0.38023	0.568	3.536	0.0989	0.017	0.0262	0.33385	0.383	0.498	0.763	0.98581	0.629	0.682	0.307	0.43
01-Sep-00	2.124	0.252	0.46227	0.3819	0.574	2.499	0.088	0.0164	0.0256	0.319689	0.389	0.538	0.7072	0.93483	0.598	0.682	0.3755	0.414
01-Oct-00	2.146	0.35	0.5456	0.40735	0.558	2.522	0.09	0.0168	0.0365	0.322534	0.394	0.538	0.6754	1.04852	0.584	0.667	0.3755	0.418
01-Nov-00	2.324	0.401	0.7672	0.4209	0.604	2.69	0.135	0.0122	0.043	0.540107	0.435	0.538	0.7705	1.1997	0.636	0.696	0.3755	0.476
01-Dec-00	2.043	0.311	0.4845	0.40942	0.541	2.503	0.1149	0.0063	0.038	0.39411	0.395	0.538	0.71777	1.04029	0.584	0.757	0.3755	0.474
01-Jan-01	2.205	0.323	0.771	0.40942	0.55	2.462	0.1149	0.054	0.04	0.394369	0.414	0.538	0.7212	1.17032	0.618	0.671	0.3755	0.513
01-Feb-01	1.5	0.297	0.771	0.36614	0.51	2.369	0.1	0.0038	0.05	0.37637	0.378	0.467	0.6918	1.0125	0.588	0.709	0.444	0.447
01-Mar-01	1.41	0.322	0.7567	0.36614	0.588	2.635	0.12	0.0053	0.04	0.415042	0.419	0.499	0.7443	1.424	0.645	0.638	0.471	0.479
01-Apr-01	1.412	0.302	0.5253	0.358	0.557	2.356	0.1071	0.005	0.039	0.372955	0.419	0.467	0.7083	1.1803	0.627	0.705	0.448	0.416
01-May-01	2.044	0.304	0.6193	0.3609	0.57	2.501	0.1099	0.0051	0.039	0.402755	0.395	0.478	0.71316	1.2246	0.632	0.683	0.436	0.402
01-Jun-01	1.361	0.369	0.6679	0.4465	0.589	2.745	0.1316	0.015	0.039	0.443713	0.442	0.557	0.765	1.3393	0.734	0.712	0.493	0.449
01-Jul-01	2.089	0.313	0.5219	0.3814	0.572	2.517	0.108	0.0039	0.039	0.443713	0.347	0.494	0.73826	1.026	0.718	0.708	0.438	0.374
01-Aug-01	1.604	0.275	0.6192	0.40187	0.635	2.749	0.121	0.0039	0.045	0.414477	0.373	0.572	0.7629	1.15465	0.75	0.71	0.416	0.403
01-Sep-01	1.42	0.229	0.5397	0.3894	0.592	2.633	0.1037	0.0051	0.044	0.381981	0.355	0.606	0.78423	1.0339	0.73	0.777	0.426	0.402
01-Oct-01	1.354	0.238	0.5454	0.4518	0.597	2.636	0.1132	0.006	0.043	0.446372	0.3815	0.6	0.7724	1.1932	0.757	0.756	0.411	0.392
01-Nov-01	1.427	0.249	0.456	0.41887	0.571	2.347	0.0948	0.004	0.038	0.391435	0.3535	0.537	0.7343	1.0078	0.687	0.749	0.352	0.334
01-Dec-01	1.661	0.241	0.518	0.4565	0.629	2.639	0.1138	0.001	0.043	0.416482	0.4273	0.577	0.7629	1.2325	0.741	0.673	0.0353	0.39
01-Jan-02	1.53	0.225	0.4334	0.4056	0.566	2.639	0.0872	0.001	0.045	0.381971	0.3706	0.533	0.7492	1.0207	0.69	0.716	0.336	0.173
01-Feb-02	1.498	0.216	0.4434	0.4047	0.542	2.519	0.07618	0.001	0.04	0.367471	0.3605	0.531	0.70946	1.0389	0.667	0.686	0.317	0.346
01-Mar-02	1.54	0.216	0.5512	0.4077	0.555	2.549	0.0811	0.002	0.045	0.354439	0.4136	0.53	0.6732	1.022	0.675	0.677	0.313	0.345
01-Apr-02	1.659	0.236	0.469	0.418	0.565	2.675	0.0959	0.001	0.04	0.374625	0.4397	0.571	0.7278	1.1302	0.709	0.66	0.315	0.453
01-May-02	1.452	0.223	0.4359	0.4074	0.54	2.611	0.0875	0.001	0.04	0.361948	0.4163	0.562	0.7323	1.03216	0.688	0.709	0.295	0.439
01-Jun-02	1.357	0.23	0.4624	0.4074	0.615	2.662	0.0771	0.001	0.03	0.35223	0.443	0.558	0.7502	1.0292	0.708	0.675	0.295	0.452
01-Jul-02	1.461	0.226	0.4735	0.4281	0.64	2.757	0.0715	0.001	0.04	0.365939	0.4382	0.551	0.8059	1.034	0.716	0.689	0.302	0.459
01-Aug-02	1.534	0.226	0.3906	0.4489	0.668	2.938	0.0858	0.0014	0.041	0.374042	0.4598	0.612	0.8062	1.086	0.744	0.718	0.289	0.459
01-Sep-02	1.419	0.23	0.3761	0.4341	0.638	2.815	0.1174	0.0014	0.04	0.360581	0.384	0.629	0.7936	1.0628	0.748	0.73	0.26	0.492
01-Oct-02	1.553	0.259	0.4927	0.5163	0.67	2.997	0.11	0.006	0.04	0.384875	0.4305	0.649	0.83455	1.3579	0.813	0.713	0.305	0.517
01-Nov-02	1.383	0.259	0.4164	0.4628	0.645	2.844	0.0989	0.0014	0.04	0.33556	0.3949	0.611	0.7765	1.24	0.766	0.735	0.278	0.49
01-Dec-02	1.342	0.229	0.4064	0.4603	0.597	2.716	0.0794	0.002	0.04	0.352379	0.4735	0.592	0.7772	1.215	0.748	0.664	0.257	0.394
01-Jan-03	1.236	0.209	0.3784	0.403	0.561	2.622	0.0456	0.0011	0.04	0.349294	0.4899	0.564	0.7549	1.0806	0.707	0.691	0.25748	0.394
01-Feb-03	1.309	0.227	0.4518	0.4726	0.565	2.683	0.0777	0.0012	0.04	0.348705	0.4088	0.568	0.7592	1.2673	0.722	0.731	0.25748	0.383
01-Mar-03	1.259	0.213	0.3927	0.4605	0.57	2.686	0.0761	0.0014	0.042	0.33809	0.3962	0.542	0.7358	1.1359	0.721	0.728	0.12	0.383
01-Apr-03	1.273	0.209	0.3697	0.415	0.568	2.616	0.0761	0.0015	0.041	0.328372	0.3853	0.557	0.7328	1.0342	0.692	0.708	0.221033	0.317
01-May-03	1.346	0.213	0.393	0.4264	0.584	2.671	0.064	0.0002	0.043	0.325235	0.3617	0.563	0.7635	0.0206	0.696	0.688	0.250903	0.359
01-Jun-03	1.35	0.221	0.393	0.4954	0.601	2.662	0.067	0.004	0.038	0.360024	0.3665	0.543	0.7635	0.0206	0.76	0.675032	0.2354	0.359
01-Jul-03	1.418	0.219	0.43	0.461	0.61	2.424	0.067	0.003	0.0412	0.336709	0.3756	0.558	0.7842	1.1002	0.748	0.618	0.227	0.332
01-Aug-03	1.837	0.225	0.45	0.5988	0.642	2.542	0.071	0.0021	0.0395	0.37532	0.38	0.588	0.8074	1.103	0.814	0.614	0.228	0.372
01-Sep-03	1.791	0.224	0.52	0.4525	0.609	2.585	0.072	0.00211	0.0423	0.37795	0.391	0.613	0.8088	1.2093	0.705	0.707	0.232	0.343

Zero or extensive amount of no data, confirmed with Envirofacts database
Assumned previous month's data
TCEQ flow database supplemented with data from Envirofacts
Assumed average of previous and subsequent month, averaged if 5 or more consecutive months are missing

Table A.1-1. WWTP Self-Reported flows

Reporting Month	11696-002	11792-002	11836-001	11883-001	11893-001	11906-001	11917-001	11935-001	11947-001	11969-001	11979-002	11989-001	12110-001	12121-001	12124-001	12128-001	12132-001	12139-001
01-Jan-00	0.087	0.132	0.283	0.407	1.24	0.241	0.194	0.1156	1.862	0.621	0.182	0.215	0.0616	0.925	0.263	0.49571	0.047782	0.024
01-Feb-00	0.101	0.1	0.283	0.414	1.284	0.228	0.187	0.118	1.792	0.619	0.188	0.215	0.0656	0.925	0.262	0.4749	0.046048	0.026
01-Mar-00	0.109	0.096	0.283	0.413	1.2	0.228	0.187	0.1108	1.645	0.593	0.181	0.208	0.0575	0.925	0.255	0.4781	0.042913	0.029
01-Apr-00	0.106	0.123	0.295	0.519	1.358	0.238	0.198	0.1162	1.8	0.691	0.199	0.231	0.0508	0.925	0.265	0.49	0.04175	0.033
01-May-00	0.106	0.218	0.325	0.429	1.412	0.26	0.197	0.1309	1.782	0.699	0.199	0.232	0.0592	1	0.268	0.53074	0.032757	0.037
01-Jun-00	0.104	0.218	0.3085	0.411	1.306	0.237	0.178	0.1429	1.771	0.662	0.194	0.227	0.048	0.984	0.285	0.52367	0.034952	0.036
01-Jul-00	0.094	0.206	0.3085	0.399	1.249	0.228	0.17	0.112	1.466	0.63	0.19	0.295	0.0474	0.976	0.266	0.46303	0.034952	0.034
01-Aug-00	0.116	0.224	0.3085	0.42	1.302	0.244	0.183	0.1056	1.584	0.635	0.187	0.279	0.0634	0.98	0.258	0.50187	0.034952	0.04
01-Sep-00	0.175	0.2125	0.3085	0.411	1.255	0.245	0.219	0.1197	1.58	0.617	0.184	0.259	0.0559	0.968	0.251	0.52603	0.043286	0.033
01-Oct-00	0.161	0.21958	0.3085	0.434	1.304	0.258	0.272	0.1237	1.655	0.646	0.186	0.28	0.0639	0.991	0.281	0.52671	0.043286	0.032
01-Nov-00	0.146	0.2413	0.292	0.477	1.451	0.28	0.341	0.1156	2.327	0.713	0.21	0.31	0.0606	1.01	0.261	0.54427	0.043286	0.032
01-Dec-00	0.122	0.2316	0.271	0.395	1.291	0.252	0.272	0.1433	2.963	0.606	0.198	0.268	0.05245	0.949	0.268	0.54829	0.043286	0.036
01-Jan-01	0.139	0.2402	0.239	0.495	1.348	0.3	0.345	0.1184	2.461	0.701	0.197	0.291	0.0633	1.019	0.304	0.70233	0.043286	0.032
01-Feb-01	0.125	0.2242	0.231	0.425	1.275	0.277	0.235	0.1546	1.75	0.597	0.185	0.267	0.069	0.954	0.276	0.497	0.03255	0.029
01-Mar-01	0.137	0.2731	0.266	0.457	1.392	0.353	0.331	0.1595	1.872	0.787	0.193	0.291	0.068	1.007	0.295	0.639	0.040495	0.015
01-Apr-01	0.131	0.2127	0.244	0.473	1.348	0.264	0.265	0.1624	1.737	0.607	0.174	0.261	0.0618	1.016	0.239	0.582	0.039524	0.017
01-May-01	0.136	0.2256	0.253	0.505	1.356	0.266	0.303	0.1624	1.755	0.651	0.1825	0.274	0.0584	1.008	0.245	0.50439	0.039524	0.015
01-Jun-01	0.138	0.248	0.247	0.521	1.345	0.364	0.278	0.1713	1.987	0.706	0.2216	0.282	0.0598	1.015	0.253	0.55273	0.039524	0.014
01-Jul-01	0.129	0.2315	0.259	0.547	1.337	0.26	0.276	0.1419	1.737	0.668	0.18	0.282	0.0645	0.929	0.253	0.51113	0.0315	0.014
01-Aug-01	0.129	0.26046	0.294	0.595	1.491	0.308	0.286	0.1341	1.865	0.684	0.192	0.307	0.0659	0.973	0.271	0.53081	0.033957	0.014
01-Sep-01	0.129	0.28695	0.291	0.541	1.442	0.359	0.317	0.12	1.986	0.691	0.1906	0.299	0.0698	0.929	0.257	0.52493	0.0376	0.014
01-Oct-01	0.135	0.2808	0.316	0.842	1.394	0.359	0.361	0.1348	1.97	0.7188	0.202	0.31	0.0687	0.978	0.026	0.53787	0.036	0.053
01-Nov-01	0.135	0.2444	0.289	0.891	1.316	0.258	0.367	0.1232	1.81	0.617	0.216	0.322	0.0628	0.907	0.1813	0.5015	0.036	0.016
01-Dec-01	0.136	0.2809	0.305	0.642	1.431	0.34	0.387	0.1232	2.036	0.751	0.205	0.35	0.0605	0.959	0.14	0.60097	0.04	0.018
01-Jan-02	0.125	0.313	0.274	0.688	1.353	0.27	0.393	0.1402	1.892	0.614	0.199	0.319	0.0691	0.894	0.13	0.60097	0.029	0.015
01-Feb-02	0.121	0.2306	0.268	0.684	1.274	0.261	0.43	0.135	1.723	0.601	0.194	0.315	0.0711	0.876	0.118	0.60097	0.0372	0.019
01-Mar-02	0.133	0.2345	0.272	0.598	1.317	0.27	0.355	0.141	1.772	0.631	0.201	0.306	0.0646	0.861	0.12	0.60097	0.040095	0.022
01-Apr-02	0.138	0.252	0.288	0.834	1.426	0.322	0.336	0.145	1.796	0.69	0.197	0.323	0.0657	0.894	0.122	0.5177	0.035136	0.024
01-May-02	0.141	0.2546	0.277	0.956	1.342	0.284	0.348	0.151	1.647	0.599	0.205	0.315	0.0626	0.864	0.123	0.5004	0.032696	0.022
01-Jun-02	0.127	0.2619	0.287	1.243	1.351	0.292	0.309	0.159	1.622	0.627	0.206	0.31	0.055	0.893	0.119	0.5115	0.0313	0.021
01-Jul-02	0.135	0.2556	0.294	1.346	1.464	0.311	0.335	0.163	1.799	0.668	0.2	0.316	0.049	0.881	0.231	0.5269	0.037304	0.024
01-Aug-02	0.145	0.283	0.343	0.89	1.52	0.371	0.351	0.1726	1.819	0.7	0.211	0.316	0.067	0.881	0.397	0.5334	0.033591	0.024
01-Sep-02	0.134	0.2737	0.289	0.389	1.456	0.376	0.387	0.174	1.844	0.687	0.204	0.311	0.078	0.925	0.66	0.519	0.039476	0.013
01-Oct-02	0.141	0.2906	0.407	0.434	1.626	0.43	0.382	0.19	2.028	0.728	0.207	0.286	0.08	0.976	0.334	0.595	0.036565	0.03
01-Nov-02	0.138	0.3058	0.287	0.462	1.498	0.437	0.406	0.179	1.962	0.692	0.182	0.38	0.063	0.926	0.264	0.5454	0.038095	0.024
01-Dec-02	0.146	0.335	0.278	0.434	1.392	0.378	0.387	0.182	1.962	0	0.168	0.375	0.058	0.917	0.243	0.5526	0.035455	0.023
01-Jan-03	0.128	0.2846	0.25	0.432	1.213	0.342	0.377	0.169	1.907	0.652	0.158	0.368	0.063	0.884	0.236	0.5143	0.037783	0.025
01-Feb-03	0.145	0.2846	0.26	0.427	1.246	0.399	0.325	0.185	1.914	0.652	0.162	0.344	0.081	0.887	0.246	0.5374	0.0365	0.026
01-Mar-03	0.133	0.329	0.269	0.412	1.231	0.331	0.37	0.185	1.417	0.647	0.165	0.343	0.113	0.875	0.257	0.4393	0.037714	0.023
01-Apr-03	0.135	0.2513	0.269	0.436	1.207	0.29	0.425	0.2314	1.272	0.64	0.171	0.352	0.1175	0.861	0.261	0.4171	0.041727	0.02
01-May-03	0.132	0.2573	0.275	0.477	1.224	0.304	0.388	0.2368	1.384	0.642	0.174	0.338	0.108	0.872	0.256	0.4196	0.037364	0.015
01-Jun-03	0.135	0.2629	0.298	0.507	1.255	0.347	0.453	0.208	1.783	0.691	0.18	0.338	0.0974	0.908	0.268	0.4391	0.040286	0.016
01-Jul-03	0.135	0.3312	0.302	0.52	1.262	0.435	0.611	0.24	1.824	0.704	0.177	0.324	0.0935	0.903	0.257	0.4342	0.048739	0.007
01-Aug-03	0.144	0.3363	0.328	0.486	1.327	0.52	0.619	0.2274	1.868	0.734	0.18	0.351	0.121	0.92	0.262	0.4604	0.03471	0.018
01-Sep-03	0.152	0.2731	0.343	0.471	1.295	0.57	0.664	0.266	1.924	0.735	0.17	0.359	0.127	0.935	0.241	0.453	0.041955	0.008

Zero or extensive amount of no data, confirmed with Envirofacts database
Assumned previous month's data
TCEQ flow database supplemented with data from Envirofacts
Assumed average of previous and subsequent month, averaged if 5 or more consecutive months are missing

Table A.1-1. WWTP Self-Reported flows

Reporting Month	12140-001	12189-001	12209-001	12222-001	12223-001	12233-001	12247-001	12289-001	12298-001	12304-001	12310-001	12342-001	12346-001	12355-001	12356-001	12370-001	12397-001	12427-001
01-Jan-00	0.121	0.037	0.191	0.067	0.1622	0.0005	0.1957	0.533	0.065	0.26	0.02	0.016594	0.181	0.0002	0.139	0.117	0.0002	0.000039
01-Feb-00	0.118	0.0348	0.206	0.0644	0.15	0.0004	0.191	0.517	0.065	0.314	0.019	0.02126	0.162	0.0002	0.137	0.117	0.0034	0.000051
01-Mar-00	0.109	0.0362	0.205	0.0691	0.163	0.0004	0.186	0.518	0.066	0.319	0.0215	0.0206	0.175	0.0006	0.136	0.112	0.0023	0.000072
01-Apr-00	0.132	0.0386	0.176	0.0655	0.154	0.0001	0.127	0.468	0.074	0.319	0.0231	0.018715	0.184	0.00027	0.153	0.127	0.001	0.000064
01-May-00	0.129	0.0261	0.176	0.0554	0.154	0.0001	0.181	0.514	0.076	0.319	0.0145	0.018595	0.184	0.0003	0.152	0.122	0.002	0.000054
01-Jun-00	0.132	0.0311	0.176	0.08612	0.166	0.0001	0.177	0.484	0.072	0.359	0.0145	0.018595	0.207	0.0004	0.145	0.118	0.0029	0.000043
01-Jul-00	0.12	0.0427	0.173	0.078	0.168	0.0001	0.173	0.438	0.069	0.335	0.0145	0.018595	0.192	0.0004	0.143	0.138	0.011	0.000043
01-Aug-00	0.133	0.034	0.171	0.1024	0.183	0.0001	0.17	0.468	0.068	0.355	0.0145	0.018595	0.177	0.0004	0.153	0.149	0.0014	0.000051
01-Sep-00	0.126	0.0356	0.1736	0.1276	0.187	0.004	0.173	0.457	0.066	0.333	0.0127	0.019365	0.158	0.0005	0.147	0.128	0.0015	0.000047
01-Oct-00	0.124	0.063	0.1818	0.095	0.196	0.0024	0.178	0.56	0.07	0.331	0.0169	0.019365	0.158	0.0005	0.156	0.111	0.0023	0.000047
01-Nov-00	0.145	0.065	0.203	0.0942	0.221	0.0024	0.199	0.555	0.088	0.331	0.0169	0.019365	0.155	0.0005	0.169	0.138	0.0019	0.000051
01-Dec-00	0.128	0.071	0.18	0.0882	0.221	0.0008	0.195	0.559	0.076	0.332	0.0221	0.019365	0.162	0.00019	0.15	0.099	0.0005	0.000047
01-Jan-01	0.142	0.06	0.187	0.078	0.233	0.001	0.213	0.664	0.086	0.356	0.0221	0.019365	0.176	0.0002	0.159	0.12	0.0003	0.000048
01-Feb-01	0.134	0.07	0.187	0.0637	0.233	0.0009	0.205	0.635	0.075	0.312	0.02	0.018205	0.161	0.001	0.15	0.099	0.0005	0.000047
01-Mar-01	0.134	0.06	0.187	0.068	0.233	0.001	0.2008	0.612	0.097	0.364	0.02	0.017205	0.172	0.0004	0.16	0.125	0.0004	0.000047
01-Apr-01	0.152	0.0586	0.197	0.0662	0.242	0.0002	0.181	0.527	0.079	0.34	0.0215	0.016929	0.209	0.0007	0.159	0.104	0.0009	0.000047
01-May-01	0.147	0	0.215	0.0865	0.228	0.0003	0.179	0.503	0.075	0.352	0.026	0.020627	0.199	0.0006	0.16	0.116	0.0016	0.000051
01-Jun-01	0.145	0.068	0.2588	0.0789	0.242	0.0001	0.183	0.499	0.1	0.392	0.029	0.017371	0.207	0.0005	0.16	0.106	0.003	0.000043
01-Jul-01	0.137	0.063	0.2413	0.106	0.242	0.00006	0.181	0.493	0.068	0.328	0.024	0.015891	0.205	0.0003	0.15	0.131	0.0009	0.000048
01-Aug-01	0.149	0.074	0.2644	0.0809	0.267	0.0001	0.183	0.552	0.076	0.369	0.03	0.018652	0.0217	0.0007	0.161	0.15	0.0048	0.00004
01-Sep-01	0.13	0.06	0.2398	0.08143	0.263	0.0001	0.176	0.554	0.082	0.345	0.03	0.014679	0.21	0.0002	0.159	0.131	0.0037	0.000031
01-Oct-01	0.139	0.075	0.2444	0.09361	0.242	0.00016	0.198	0.577	0.079	0.373	0.021	0.01447	0.186	0.0003	0.157	0.117	0.005	0.000051
01-Nov-01	0.424	0.07	0.3368	0.0602	0.224	0.00008	0.203	0.532	0.073	0.338	0.017	0.018864	0.2	0.0004	0.155	0.102	0.0029	0.000051
01-Dec-01	0.151	0.07	0.271	0.0522	0.224	0.0007	0.208	0.608	0.095	0.363	0.019	0.01991	0.224	0.0002	0.168	0.119	0.0039	0.000053
01-Jan-02	0.139	0.07	0.2446	0.0553	0.214	0.00015	0.194	0.563	0.08	0.32	0.027	0.01991	0.224	0.00001	0.158	0.103	0.00545	0.000038
01-Feb-02	0.146	0.07	0.2211	0.0518	0.201	0.00007	0.185	0.563	0.074	0.32	0.02	0.017045	0.2112	0.00002	0.153	0.094	0.00545	0.000053
01-Mar-02	0.136	0.07	0.2308	0.0548	0.213	0.0014	0.186	0.563	0.072	0.332	0.017	0.016167	0.137	0.00004	0.138	0.094	0.00545	0.000034
01-Apr-02	0.123	0.08	0.2579	0.0607	0.249	0.0006	0.186	0.563	0.078	0.357	0.023	0.016277	0.165	0.00002	0.144	0.096	0.00545	0.000048
01-May-02	0.112	0.07	0.2445	0.0581	0.231	0.0002	0.182	0.563	0.073	0.328	0.021	0.016255	0.204	0	0.138	0.096	0.00545	0.000048
01-Jun-02	0.143	0.08	0.247	0.0633	0.255	0.00023	0.1497	0.563	0.072	0.338	0.02	0.02053	0.205	0.0001	0.136	0.092	0.007	0.000041
01-Jul-02	0.157	0.082	0.2678	0.0607	0.229	0.0002	0.201	0.563	0.079	0.327	0.027	0.018517	0.209	0.0002	0.139	0.099	0.0066	0.000043
01-Aug-02	0.158	0.08	0.2885	0.1021	0.235	0.00015	0.201	0.563	0.082	0.353	0.0308	0.015559	0.196	0.0013	0.146	0.109	0.0051	0.000054
01-Sep-02	0.158	0.09	0.293	0.1122	0.252	0.00014	0.268	0.563	0.085	0.337	0.0308	0.01602	0.196	0.0001	0.152	0.109	0.0042	0.000051
01-Oct-02	0.167	0.09	0.3182	0.1075	0.197	0.0002	0.215	0.563	0.095	0.405	0.0308	0.01602	0.196	0.0001	0.166	0.12	0.005	0.000051
01-Nov-02	0.141	0.08	0.2793	0.0699	0.165	0.00036	0.205	0.563	0.103	0.358	0.024	0.0216	0.19	0.0002	0.159	0.108	0.00698	0.000053
01-Dec-02	0.144	0.08	0.2743	0.0539	0.156	0.0004	0.204	0.518	0.1	0.413	0.02	0.01969	0.197	0.0002	0.155	0.109	0.012	0.000041
01-Jan-03	0.145	0.08	0.2603	0.0134	0.2	0.00022	0.206	0.503	0.094	0.395	0.023	0.024909	0.162	0.0002	0.152	0.095	0.0061	0.000051
01-Feb-03	0.151	0.09	0.2857	0.0005	0.157	0.00008	0.202	0.611	0.091	0.42	0.023	0.0275	0.192	0.00012	0.145	0.092	0.0041	0.000035
01-Mar-03	0.142	0.06	0.2767	0.0004	0.146	0.0004	0.205	0.481	0.095	0.398	0.021	0.021405	0.18	0.0002	0.154	0.092	0.00388	0.000032
01-Apr-03	0.135	0.09	0.2787	0.0383	0.109	0.0006	0.202	0.438	0.121	0.35	0.022	0.022955	0.18	0.0001	0.148	0.094	0.005	0.000032
01-May-03	0.14	0.089	0.2889	0.036	0.163	0.0023	0.198	0.429	0.125	0.4	0.019	0.016755	0.141	0.0001	0.154	0.095	0.0057	0.000045
01-Jun-03	0.134	0.088	0.2958	0.038	0.159	0.002	0.104	0.429	0.104	0.43	0.019	0.021286	0.152	0.0009	0.145	0.094	0.0044	0.000056
01-Jul-03	0.122	0.0881	0.3051	0.038	0.206	0.001	0.209	0.418	0.147	0.418	0.0157	0.017568	0.148	0.0002	0.164	0.093	0.0044	0.000053
01-Aug-03	0.156	0.0885	0.3346	0.033	0.232	0.0007	0.213	0.438	0.142	0.433	0.0151	0.020124	0.126	0.0001	0.164	0.092	0.0044	0.000034
01-Sep-03	0.137	0.0893	0.3572	0.043	0.254	0.00002	0.216	0.459	0.15	0.465	0.0214	0.020452	0.124	0.0001	0.166	0.119	0.0044	0.000032

Zero or extensive amount of no data, confirmed with Envirofacts database
Assumned previous month's data
TCEQ flow database supplemented with data from Envirofacts
Assumed average of previous and subsequent month, averaged if 5 or more consecutive months are missing

Table A.1-1. WWTP Self-Reported flows

Reporting Month	12443-001	12447-001	12465-001	12466-001	12474-001	12479-001	12516-001	12552-001	12552-002	12573-001	12574-001	12681-001	12682-001	12685-001	12714-001	12726-001	12795-001	12802-001
01-Jan-00	0.001	0.093	0.005	0.00083	0	0.392	0.001	0.0095	0.0031	0.032	0.085285	0.0966	0.02495	0.072	0.125	0.242	0.12806	0.156
01-Feb-00	0.0009	0.091	0.005	0.00083	0	0.397	0.0009	0.0057	0.0024	0.031	0.085285	0.1055	0.02495	0.073	0.128	0.245	0.133	0.151
01-Mar-00	0.001	0.09	0.005	0.00083	0	0.378	0.0015	0.0033	0.0027	0.031	0.085285	1.182	0.02495	0.066	0.117	0.258	0.1377	0.143
01-Apr-00	0.001	0.1	0.005	0.00066	0	0.43	0.0017	0.0036	0.0031	0.031	0.085285	0.1391	0.02495	0.071	0.133	0.263	0.1376	0.15
01-May-00	0.001	0.113	0.005	0.0009	0	0.424	0.0017	0.0026	0.0022	0.031	0.085285	0.1511	0.0351	0.078	0.138	0.279	0.14526	0.161
01-Jun-00	0.001	0.113	0.005	0.00101	0	0.389	0.0017	0.0042	0.0028	0.031	0.12647	0.1459	0.0375	0.072	0.141	0.283	0.1426	0.161
01-Jul-00	0.003	0.112	0.004	0.0012	0	0.373	0.0014	0.005	0.0057	0.03	0.0987	0.1567	0.0363	0.075	0.132	0.262	0.1309	0.137
01-Aug-00	0.0007	0.112	0.005	0.00182	0	0.404	0.0014	0.0027	0.009	0.024	0.09265	0.16	0.0385	0.0891	0.132	0.277	0.14455	0.137
01-Sep-00	0.0007	0.127	0.005	0.00124	0	0.386	0.0012	0.0027	0.008	0.034	0.087	0.1367	0.0247	0.082	0.139	0.274	0.1481	0.139
01-Oct-00	0.00038	0.127	0.005	0.00163	0	0.408	0.0012	0.0027	0.0106	0.037	0.09542	0.1092	0.0247	0.076	0.139	0.282	0.15106	0.139
01-Nov-00	0.0005	0.127	0.004	0.0012	0	0.456	0.0012	0.0042	0.0087	0.015	0.1272	0.084	0.0344	0.078	0.131	0.316	0.1585	0.139
01-Dec-00	0.0008	0.137	0.004	0.00105	0	0.403	0.0013	0.00459	0.0055	0.0217	0.1032	0.052	0.0276	0.066	0.11	0.283	0.1563	0.139
01-Jan-01	0.001	0.162	0.004	0.0014	0	0.415	0.0016	0.0039	0.0104	0.024	0.13145	0.0677	0.0383	0.079	0.13	0.314	0.1691	0.15
01-Feb-01	0.001	0.165	0.004	0.0019	0	0.378	0.001	0.003	0.006	0.02	0.12739	0.1645	0.039	0.074	0.125	0.286	0.15254	0.133
01-Mar-01	0.001	0.165	0.004	0.002	0	0.425	0.0013	0.0039	0.0089	0.03	0.16155	0.179	0.0375	0.078	0.134	0.321	0.1707	0.133
01-Apr-01	0.001	0.159	0.004	0.0024	0	0.381	0.0012	0.0025	0.00088	0.0203	0.1544	0.2422	0.037	0.075	0.134	0.269	0.1621	0.137
01-May-01	0.001	0.168	0.005	0.0027	0	0.388	0.001	0.0032	0.003	0	0.1585	0.282	0.04	0.081	0.145	0.262	0.17132	0.138
01-Jun-01	0.001	0.206	0.005	0.0018	0	0.392	0.001	0.0084	0.0035	0.027	0.1827	0.2827	0.055	0.084	0.173	0.303	0.24943	0.141
01-Jul-01	0.001	0.188	0.005	0.001	0	0.373	0.001	0.005	0.0028	0.028	0.12965	0.2219	0.047	0.075	0.173	0.282	0.12371	0.132
01-Aug-01	0.001	0.216	0.005	0.0016	0	0.422	0.001	0.0033	0.0025	0	0.12284	0.15	0.0493	0.08	0.161	0.309	0.199	0.15
01-Sep-01	0.001	0.222	0.005	0.0017	0	0.407	0.0015	0.004	0.0024	0	0.13343	0.1374	0.054	0.075	0.161	0.294	0.2018	0.139
01-Oct-01	0.0014	0.236	0.004	0.002	0	0.423	0.0009	0.0065	0.0043	0	0.152	0.1327	0.048	0.072	0.163	0.312	0.21845	0.139
01-Nov-01	0.0018	0.225	0.01	0.003	0	0.426	0.001	0.0069	0.004	0	0.1332	0.09	0.046	0.068	0.207	0.277	0.2051	0.14
01-Dec-01	0.0024	0.245	0.005	0.002	0	0.47	0.0016	0.0075	0.0067	0	0.1332	0.074	0.045	0.067	0.162	0.32	0.2387	0.146
01-Jan-02	0.0015	0.222	0.005	0.005	0	0.43	0.0013	0.0074	0.0064	0	0.1376	0.0027	0.043	0.064	0.151	0.296	0.2241	0.141
01-Feb-02	0.002	0.254	0.005	0.0029	0	0.416	0.0013	0.0066	0.0066	0	0.1255	0.067	0.04128	0.061	0.152	0.317	0.2134	0.139
01-Mar-02	0.0017	0.25	0.009	0.001	0	0.416	0.0013	0.0069	0.0073	0	0.2124	0.0856	0.042709	0.064	0.157	0.305	0.2233	0.14
01-Apr-02	0.002	0.269	0.005	0.0004	0.012	0.481	0.00021	0.0052	0.00499	0	0.2151	0.1225	0.049	0.072	0.1165	0.351	0.2368	0.14
01-May-02	0.0015	0.266	0.005	0.0007	0.012	0.443	0.0011	0.0023	0.0047	0	0.2185	0.1295	0.05	0.069	0.154	0.349	0.2164	0.147
01-Jun-02	0.002	0.278	0.005	0.0014	0.019	0.451	0.0011	0.0045	0.0064	0	0.1073	0.1667	0.051	0.066	0.135	0.321	0.2289	0.163
01-Jul-02	0.002	0.255	0.005	0.0003	0.027	0.477	0.0009	0.0067	0.0053	0	0.1175	0.1766	0.059	0.068	0.142	0.316	0.2324	0.161
01-Aug-02	0.0024	0.267	0.005	0.0003	0.045	0.514	0.0019	0.0067	0.0044	0	0.1137	0.1893	0.062	0.059	0.153	0.345	0.2431	0.175
01-Sep-02	0.001	0.27	0.005	0.0008	0.034	0.485	0.0013	0.0042	0.0048	0	0.1138	0.155	0.061	0.061	0.143	0.345	0.2433	0.167
01-Oct-02	0.002	0.292	0.005	0.0011	0.043	0.543	0.00021	0.0094	0.0089	0	0.1404	0.1384	0.068	0.073	0.148	0.345	0.2563	0.177
01-Nov-02	0.0026	0.292	0.005	0.0012	0.041	0.508	0.000238	0.007	0.0089	0	0.1521	0.0926	0.063	0.052	0.148	0.343	0.2514	0.173
01-Dec-02	0.0026	0.302	0.005	0.0006	0.045	0.49	0.00026	0.01	0.0089	0	0.1355	0.0791	0.057	0.052	0.132	0.31	0.2468	0.169
01-Jan-03	0.002	0.293	0.005	0.0007	0.04	0.468	0.000283	0.006	0.0044	0	0.1466	0.0904	0.06	0.051	0.131	0.288	0.2356	0.161
01-Feb-03	0.003	0.299	0.005	0.0007	0.046	0.491	0	0.007	0.0049	0	0.1647	0.122	0.055	0.059	0.14	0.289	0.2572	0.163
01-Mar-03	0.002	0.302	0.005	0.001	0.045	0.456	0	0.0047	0.0037	0	0.1424	0.1421	0.062	0.064	0.134	0.32	0.2538	0.164
01-Apr-03	0.001	0.324	0.007	0.0012	0.049	0.455	0	0.006	0.0039	0	0.1334	0.1774	0.059	0.063	0.128	0.315	0.2608	0.164
01-May-03	0.0004	0.294	0.007	0.0008	0.049	0.444	0	0.009	0.004	0	0.1232	0.2396	0.059	0.064	0.124	0.35	0.2614	0.169
01-Jun-03	0.0009	0.296	0.005	0.0009	0.055	0.442	0	0.0093	0.0053	0	0.1149	0.2574	0.064	0.067	0.132	0.338	0.2729	0.183
01-Jul-03	0.0013	0.306	0.005	0.0008	0.055	0.471	0	0.0077	0.0032	0	0.1096	0.2657	0.042	0.061	0.134	0.292	0.264	0.178
01-Aug-03	0.0013	0.314	0.005	0.0009	0.065	0.496	0	0.00799	0.004	0	0.1431	0.2612	0.037	0.07	0.138	0.339	0.264	0.188
01-Sep-03	0.001	0.334	0.011	0.0019	0.078	0.469	0	0.00988	0.0053	0	0.1779	0.2217	0.037	0.0679	0.146	0.335	0.2673	0.21

Zero or extensive amount of no data, confirmed with Envirofacts database
Assumned previous month's data
TCEQ flow database supplemented with data from Envirofacts
Assumed average of previous and subsequent month, averaged if 5 or more consecutive months are missing

Table A.1-1. WWTP Self-Reported flows

Reporting Month	12830-001	12834-001	12841-001	12858-001	12927-001	12949-001	13021-001	13172-002	13228-001	13245-001	13328-001	13433-001	13484-001	13509-001	13558-001	13578-001	13623-001	13674-001
01-Jan-00	0.0011	0.073	0.02104	0.001464	0	0	0.105	0.184	0.0304	0.072	0	0	0.036748	0.0265	0.611	0.0047	0.178	0.0233
01-Feb-00	0.0014	0.071	0.02223	0.00221	0	0	0.105	0.18	0.031	0.049	0	0	0.037555	0.0225	0.631	0.005	0.181	0.02
01-Mar-00	0.001	0.0552	0.02211	0.0009	0	0	0.101	0.237	0.0314	0.041	0	0	0.029719	0.014227	1.402	0.0047	0.173	0.025
01-Apr-00	0.0001	0.054	0.03335	0.002368	0	0	0.117	0.274	0.0327	0.05	0	0	0.029839	0.01066	0.725	0.0051	0.07	0.025
01-May-00	0.001	0.065	0.03618	0.003045	0	0	0.119	0.276	0.035	0.06	0	0	0.029222	0.0105	0.725	0.0042	0.07	0.0267
01-Jun-00	0.001	0.0481	0.02909	0.00202	0	0	0.113	0.264	0.0338	0.06	0	0	0.03198	0.009	0.725	0.0044	0.07	0.025
01-Jul-00	0.0004	0.0436	0.02757	0.000919	0	0	0.113	0.259	0.0317	0.066	0	0	0.015477	0.0235	0.725	0.0049	0.121	0.0175
01-Aug-00	0.0004	0.056	0.03062	0.00098	0	0	0.117	0.275	0.0329	0.075	0	0	0.020629	0.0143	0.725	0.0041	0.07	0.0265
01-Sep-00	0.00006	0.049	0.02839	0.001573	0	0	0.117	0.263	0.0348	0.08	0	0	0.013962	0.027	0.697	0.004	0.043	0.024
01-Oct-00	0.0004	0.048	0.03129	0.001912	0	0	0.117	0.3	0.052	0.088	0	0	0.05698	0.018	0.697	0.0064	0.036	0.03
01-Nov-00	0.00033	0.057	0.04778	0.002153	0	0	0.159	0.327	0.0345	0.095	0	0	0.0245	0.0227	0.829	0.0063	0.069	0.04
01-Dec-00	0.00029	0.041	0.03434	0.001333	0	0	0.122	0.305	0.0308	0.083	0	0	0.037313	0	0.734	0.0047	0.054	0.025
01-Jan-01	0.00029	0.06	0.04553	0.004654	0	0	0.134	0.324	0.0347	0.092	0	0.00945	0.032445	0	0.823	0.007	0.052	0.02
01-Feb-01	0.00024	0.0618	0.03538	0.002389	0	0	0.111	0.306	0.0295	0.086	0	0.00543	0.02517	0	0.697	0.008	0.057	0.02
01-Mar-01	0.0004	0.0606	0.0436	0.010196	0	0	0.134	0.337	0.0295	0.12	0	0.00568	0.034182	0	0.697	0.05	0.055	0.02
01-Apr-01	0.0003	0.0606	0.03303	0.008466	0	0.007	0.113	0.335	0.0267	0.1	0	0.00593	0.049471	0	0.603	0.00606	0.025	0.02
01-May-01	0.0008	0.0579	0.03727	0.003206	0	0.006	0.114	0.334	0.0478	0.109	0	0.0089	0.030995	0	0.612	0.0075	0.024	0.02
01-Jun-01	0.0023	0.0854	0.03852	0.002622	0	0.01	0.132	0.351	0.0214	0.123	0	0.0257	0.038552	0	0.916	0.0054	0.055	0.025
01-Jul-01	0.003	0.0684	0.03512	0.00179	0	0.011	0.12	0.334	0.0539	0.115	0	0.00923	0.020648	0	1.004	0.005	0.063	0.025
01-Aug-01	0.0015	0.069	0.05148	0.001664	0	0.015	0.145	0.379	0.0627	0.147	0	0.00829	0.020648	0	0.992	0.006	0.06	0.05
01-Sep-01	0.003	0.062	0.04283	0.006513	0	0.018	0.152	0.366	0.0599	0.136	0	0.0079	0.051725	0	1.059	0.004	0.041	0.03
01-Oct-01	0.0028	0.068	0.05056	0.0024	0	0.018	0.14	0.371	0.0599	0.131	0	0.00797	0.029952	0	0.85	0.006	0.032	0.01
01-Nov-01	0.003	0.054	0.04943	0.0002	0	0.021	0.132	0.357	0.0545	0.131	0	0.0088	0.03074	0	0.834	0.005	0.067	0.03
01-Dec-01	0.003	0.057	0.05048	0.0034	0	0.022	0.157	0.388	0.0585	0.211	0	0.01868	0.025819	0	1.173	0.004	0.069	0.04
01-Jan-02	0.003	0.054	0.05459	0.0032	0	0.022	0.128	0.36	0.0517	0.176	0	0.01477	0.025819	0	0.929	0.004	0.07	0.02
01-Feb-02	0.0023	0.054	0.05459	0.0032	0	0.02	0.129	0.411	0.0329	0.139	0	0.01079	0.025819	0	0.864	0.005	0.069	0.02
01-Mar-02	0.0025	0.051	0.05459	0.0032	0	0.023	0.131	0.456	0.0376	0.132	0	0.0194	0.071168	0	0.899	0.005	0.086	0.044
01-Apr-02	0.004	0.07	0.05459	0.0032	0	0.031	0.14	0.488	0.0369	0.158	0	0.0152	0.09051	0	0.998	0.005	0.034	0.048
01-May-02	0.0039	0.064	0.05459	0.0032	0	0.024	0.139	0.431	0.0434	0.154	0	0.0163	0.0547	0	0.965	0.007	0.024	0.0408
01-Jun-02	0.006	0.057	0.05459	0.003	0	0.042	0.144	0.431	0.0345	0.174	0	0.0176	0.055621	0	0.966	0.007	0.033	0.063
01-Jul-02	0.0046	0.051	0.0587	0.0017	0	0.041	0.185	0.407	0.0387	0.192	0	0.0198	0.058751	0	1.061	0.007	0.066	0.032
01-Aug-02	0.003	0.073	0.0667	0.0023	0	0.045	0.181	0.433	0.0384	0.212	0.053	0.0238	0.05716	0	1.05	0.006	0.073	0.032
01-Sep-02	0.0023	0.074	0.0639	0.0027	0	0.063	0.176	0.434	0.0377	0.21	0.057	0.0232	0.053153	0	1.109	0.006	0.044	0.08
01-Oct-02	0.0023	0.08	0.0715	0.011	0	0.08	0.22	0.473	0.0473	0.236	0.068	0.0313	0.065225	0	1.19	0.006	0.051	0.08
01-Nov-02	0.0034	0.071	0.068	0.1311	0	0.049	0.327	0.448	0.0429	0.235	0.071	0.0264	0.051182	0	1.12	0.0075	0.067	0.08
01-Dec-02	0.004	0.068	0.0679	0.0131	0	0.046	0.198	0.439	0.0385	0.242	0.079	0.0237	0.058264	0.003	1.205	0.0075	0.072	0.08
01-Jan-03	0.0054	0.078	0.0618	0.0047	0.004	0.061	0.179	0.0422	0.052	0.232	0.081	0.0235	0.054196	0.037	1.286	0.0075	0.058	0.08
01-Feb-03	0.0054	0.085	0.0674	0.0065	0.008	0.058	0.212	0.403	0.0498	0.194	0.088	0.0229	0.054582	0.037	1.076	0.0075	0.063	0.045
01-Mar-03	0.0059	0.086	0.0465	0.0057	0.011	0.053	0.188	0.385	0.0449	0.211	0.09	0.0211	0.054219	0.034	0.983	0.0066	0.057	0.038
01-Apr-03	0.0032	0.0825	0.0433	0.0025	0.021	0.049	0.161	0.35	0.0308	0.223	0.089	0.0214	0.07354	0.034	1.251	0.006	0.03	0.038
01-May-03	0.0035	0.0825	0.0443	0.0036	0.008	0.047	0.165	0.345	0.0496	0.226	0.097	0.0276	0.07275	0.033	1.44	0.006	0.023	0.038
01-Jun-03	0.003	0.0825	0.05	0.002	0.026	0.045	0.174	0.336	0.0691	0.219	0.109	0.031	0.07275	0.033	1.444	0.006	0.03	0.01
01-Jul-03	0.0026	0.0825	0.0515	0.0024	0.038	0.057	0.207	0.35	0.0356	0.245	0.117	0.032	0.058283	0.037	1.58	0.0061	0.055	0.01
01-Aug-03	0.0018	0.0825	0.0489	0.015	0.051	0.086	0.184	0.354	0.0259	0.268	0.133	0.034	0.062886	0.028	1.703	0.0055	0.058	0.031
01-Sep-03	0.0026	0.0825	0.0582	0.006	0.05	0.1	0.21	0.373	0.0356	0.276	0.144	0.032	0.06563	0.021	1.59	0.0061	0.03	0.031

Zero or extensive amount of no data, confirmed with Envirofacts database
Assumned previous month's data
TCEQ flow database supplemented with data from Envirofacts
Assumed average of previous and subsequent month, averaged if 5 or more consecutive months are missing

Table A.1-1. WWTP Self-Reported flows

Reporting Month	13689-001	13727-001	13764-001	13775-001	13778-001	13807-001	13921-001	13939-001	13983-001	13996-001	14011-001	14070-001	14109-001	14072-001	14117-001	14134-001	14182-001	14359-001	14538-001
01-Jan-00	0.301	0.006	0.04157	0.03761	0.002	0.001	0	0.000972	0.0016	0	0	0	0	0.975	0	0	0	0	1.247
01-Feb-00	0.32	0.0082	0.04336	0.0361	0.001	0.001	0	0.000981	0.00175	0	0	0	0	0.975	0	0	0	0	1.267
01-Mar-00	0.252	0.0081	0.05361	0.0389	0.001	0.0013	0	0.000981	0.000032	0	0	0	0	0.902	0	0	0	0	1.269
01-Apr-00	0.306	0.0076	0.05475	0.05285	0.001	0.001	0	0.001	0.0014	0	0	0	0	0.481	0	0	0	0	1.365
01-May-00	0.321	0.004	0.05545	0.04288	0.001	0.001	0	0.001158	0.0016	0	0	0.0012	0	0.589	0	0	0	0	1.475
01-Jun-00	0.321	0.004	0.05613	0.03616	0.001	0.001	0.0069	0.001012	0.000073	0	0	0.002	0	0.599	0	0	0	0	1.371
01-Jul-00	0.321	0.0079	0.05691	0.03825	0.0013	0.001	0.0119	0.001012	0.000073	0	0	0.002	0	0.852	0	0	0	0	1.386
01-Aug-00	0.321	0.0056	0.05711	0.03878	0.0015	0.001	0.0072	0.001207	0.000073	0	0	0.00105	0	1.047	0	0	0	0	1.386
01-Sep-00	0.318	0.0036	0.06176	0.03667	0.0015	0.001	0.0072	0.000964	0.0009	0	0	0.0011	0	1.009	0	0	0	0	1.337
01-Oct-00	0.318	0.0066	0.06036	0.04585	0.0019	0.0011	0.0036	0.001264	0.00125	0	0	0.001	0	0.979	0	0	0	0.011	1.348
01-Nov-00	0.318	0.0071	0.04411	0.07488	0.0035	0.0014	0.0036	0.001264	0.00125	0	0	0.001	0	1.05	0	0	0	0.0216	1.428
01-Dec-00	0.318	0.0065	0.0411	0.0749	0.0018	0.001	0.003	0.00091	0.0018	0	0	0.0014	0	1.05	0	0	0	0.0194	1.29
01-Jan-01	0.318	0.0087	0.061	0.07516	0.001	0.001	0.0037	0.00091	0.00022	0	0	0.0013	0	1.05	0	0	0	0.0241	1.319
01-Feb-01	0.284	0.01	0.041	0.07382	0.001	0.001	0.0086	0.000883	0.0013	0	0	0.00103	0	0.981	0	0	0	0.0194	1.238
01-Mar-01	0.306	0.01	0.054	0.08423	0.0013	0.0015	0.0057	0.001644	0.0011	0	0	0.002	0	0.981	0	0	0	0.0278	1.353
01-Apr-01	0.311	0.0069	0.085	0.06593	0.001	0.0007	0.0072	0.00103	0.0009	0	0	0.0018	0	0.989	0	0	0	0.0278	1.319
01-May-01	0.321	0.0069	0.08732	0.08403	0.0008	0.0007	0.0074	0.001128	0.00013	0	0	0.0018	0	1.032	0	0	0	0.0228	1.322
01-Jun-01	0.351	0.0069	0.09168	0.08577	0.0002	0.0012	0.0086	0.000388	0.00027	0	0	0.0023	0	1.179	0	0	0	0.0194	1.648
01-Jul-01	0.3	0.0069	0.08357	0.08177	0.0006	0.001	0.0086	0.001965	0.0012	0	0	0.002	0	0.969	0	0	0	0.022	1.396
01-Aug-01	0.29	0.006	0.09431	0.09481	0.0007	0.0006	0.015	0.001392	0.0015	0	0	0.0022	0	1.106	0	0	0	0.026	1.447
01-Sep-01	0.282	0.008	0.09104	0.08717	0.0008	0.0006	0.011	0.001036	0.0014	0	0	0.0017	0	1.061	0.0636	0	0	0.0275	1.4
01-Oct-01	0.285	0.007	0.08136	0.08329	0.00049	0.00051	0.009	0.001282	0.0005	0	0	0.003	0	1.039	0.0987	0	0	0.0275	1.429
01-Nov-01	0.281	0.008	0.07695	0.0892	0.00011	0.0005	0.007	0.001021	0.0005	0	0.0071	0.002	0	0.952	0.1127	0	0	0.0273	1.25
01-Dec-01	0.318	0.007	0.07714	0.09603	0.0006	0.0005	0.007	0.001127	0.0013	0	0.0066	0.002	0	1.004	0.1898	0	0	0.0289	1.359
01-Jan-02	0.28	0.008	0.06307	0.09603	0.0006	0.00087	0.004	0.000895	0.0008	0	0.0063	0.0024	0	1.074	0.185	0	0	0.0245	1.266
01-Feb-02	0.265	0.007	0.06307	0.0967	0.0006	0.0005	0.01	0.000901	0.001	0	0.0071	0.0025	0	1.17	0.1551	0	0	0.0245	1.247
01-Mar-02	0.263	0.006	0.06307	0.0966	0.0006	0.0005	0.0089	0.000779	0.0017	0	0.0114	0.0018	0	1.176	0.1551	0	0	0.027	1.273
01-Apr-02	0.263	0.007	0.06307	0.108	0.0004	0.0003	0.007	0.000969	0.002	0	0.0188	0.0028	0	1.288	0.1551	0	0	0.32	1.38
01-May-02	0.271	0.008	0.06307	0.1534	0.0004	0.0003	0.006	0.000861	0.0012	0	0.0116	0.002	0	1.2	0.1551	0.0279	0	0.04	1.31
01-Jun-02	0.282	0.007	0.06307	0.1479	0.0004	0.0004	0.008	0.001328	0.001	0	0.0139	0.0018	0	1.148	0.1551	0.0078	0	0.02586	1.367
01-Jul-02	0.293	0.007	0.06307	0.1814	0.0004	0.0004	0.007	0.001328	0.0008	0	0.0145	0.0021	0	1.14	0.1551	0.0116	0	0.035	1.42
01-Aug-02	0.286	0.01	0.06307	0.1736	0.0004	0.0012	0.008	0.001921	0.0007	0	0.0212	0.0021	0	1.182	0.1551	0.0211	0	0.0423	1.503
01-Sep-02	0.279	0.006	0.06307	0.1524	0.0011	0.00085	0.008	0.001424	0.0004	0	0.0237	0.0022	0	1.178	0.1551	0.0272	0	0.03895	1.455
01-Oct-02	0.341	0.007	0.06307	0.1786	0.0009	0.00085	0.0085	0.001873	0.0004	0	0.0322	0.0022	0	1.241	0.3154	0.0283	0	0.0384	1.574
01-Nov-02	0.443	0.009	0.06307	0.1632	0.0012	0.00085	0.0056	0.001658	0.0007	0.001175	0.0285	0.00176	0	1.136	0.2573	0.0317	0	0.036	1.429
01-Dec-02	0.362806	0.009	0.049	0.1702	0.0012	0.00085	0.0073	0.001658	0.00037	0.0024	0.0251	0.0018	0	1.088548	0.2564	0.0363	0	0.0288	1.382
01-Jan-03	0.354	0.007	0.0547	0.165	0.0012	0.00085	0.0062	0.001707	0.0006	0.0024	0.0205	0.0029	0	1.081	0.2291	0.0414	0	0.0288	1.314
01-Feb-03	0.413071	0.007	0.0487	0.1649	0.0004	0.0005	0.0094	0.000822	0.0012	0.0072	0.0186	0.0019	0	1.046	0.2712	0.0406	0	0.037	1.417
01-Mar-03	0.401	0.008	0.0491	0.1598	0.0004	0.0003	0.0171	0.003	0.0009	0.004	0.0173	0.002	0.0055	0.993	0.2324	0.0415	0	0.354	1.395
01-Apr-03	0.334	0.007	0.0477	0.1475	0.0004	0.0003	0.01	0.000739	0.0006	0.0056	0.0157	0.0017	0.0064	0.948	0.238	0.045	0	0.037	1.385
01-May-03	0.481387	0.008	0.0411	0.157	0.0002	0.0002	0.0138	0.000765	0.00045	0.0062	0.0187	0.0027	0.0078	1.001709	0.225	0.0784	0	0.032	1.386
01-Jun-03	0.4812	0.0076	0.0417	0.165	0.002	0.00007	0.02	0.000976	0.0007	0.0096	0.0233	0.0024	0.0113	1.011567	0.281	0.0526	0	0.038	1.491
01-Jul-03	0.335	0.0078	0.0359	0.1733	0.0006	0.00001	0.0108	0.000833	0.00064	0.011	0.0285	0.0023	0.0117	0.991	0.27	0.0494	0	0.046	1.501
01-Aug-03	0.454	0.0083	0.0268	0.1697	0.0006	0.000014	0.0095	0.000939	0.00064	0.0109	0.0233	0.0021	0.01	1.03	0.29	0.0495	0.016	0.041	1.563
01-Sep-03	0.572	0.0076	0.0209	0.1753	0.0006	0.0002	0.006	0.001374	0.0011	0.0115	0.0317	0.0016	0.0116	1.008	0.32	0.0543	0.02	0.034	1.597

Zero or extensive amount of no data, confirmed with Envirofacts database
Assumned previous month's data
TCEQ flow database supplemented with data from Envirofacts
Assumed average of previous and subsequent month, averaged if 5 or more consecutive months are missing

Table A.1-1. WWTP Self-Reported TSS Concentrations

Reporting Month	02229-000	02731-000	03153-000	02710-000	04760-000	10495-030	10495-076	10495-099	10495-109	10495-135	10495-139	10584-001	10706-001	10876-001	10876-002	10932-001	11005-001	11051-001
01-Jan-00	7.10	0	4.5	8.83	0	4	3	2	7	2	14	1.81	12.1	2.88	3.065	10.35	14.8	2.73
01-Feb-00	7.10	0	4.5	8.83	0	4	3	3	6	3	13	2.29	4.2	3.09	3.065	10.35	11.5	4.15
01-Mar-00	7.10	0	2.88	8.83	0	4	2	3	6	2	8	1.17	3.2	3.1	3.065	10.35	11.8	3.84
01-Apr-00	7.10	0	1.575	8.83	0	5	5	3	5	1	115	2.53	3.7	1.99	3.065	10.35	8	8.57
01-May-00	7.10	0	3.5	8.83	24.25	4	3	3	3	2	12	2.56	5.63	2.12	3.065	7	9.8	6.8
01-Jun-00	0	0	2.8	8.83	9	4	2	3	6	2	10	1.62	3.3	2.3	3.065	7	12	7.77
01-Jul-00	0	0	3.8	8.83	9	9	2	4	3	1	4	1.86	4.525	1.98	3.065	7	10.8	7.75
01-Aug-00	0	0	4.32	8.83	8.75	17	2	4	3	3	2	1.96	2.33	2.93	3.065	4.4	4	2.87
01-Sep-00	0	0	2.2	8.83	7.75	4	3	3	3	8	4	1.78	3.713	1.95	3.065	4.4	6.4	2.8
01-Oct-00	0	0	2.05	8.83	10.4	3	3	4	3	3	2	1.44	2.93	2.54	4.24	10.5	10.8	3.4
01-Nov-00	0	0	4.7	8.83	18	4	3	5	4	3	3	2.56	4.1	3.48	1.67	10.5	11.4	8.61
01-Dec-00	0	0	16.3	8.83	34.33	4	2	6	6	3	3	1.86	5.7	4.13	2.08	9.8	14.8	6.4
01-Jan-01	0	0	28.75	8.83	34.8	5	4	10	6	5	6	4.6	8.9	5.07	2	14	13.3	6.71
01-Feb-01	0	0	11.15	8.83	11.6	4	4	8	5	11	3	3.33	5.1	3.58	2.24	14	11	4.15
01-Mar-01	0	0	11.78	8.83	11.2	5	7	14	6	7	6	4.89	6.2	2.67	2.88	10	11.4	3.27
01-Apr-01	0	0	5.433	8.83	15	5	3	5	6	3	4	2.55	5.4	2.06	3.02	7.5	6.3	2.55
01-May-01	0	0	4.4	8.83	11.25	3	4	4	4	11	3	3.37	3.3	2.43	1.98	4	13.5	1.76
01-Jun-01	0	0	5.325	8.83	15.25	3	4	9	4	19	7	2.61	3.7	2.39	1.95	6.8	8.3	3.6
01-Jul-01	0	0	2.65	8.83	8.6	3	3	3	4	13	4	2.64	3.1	1.38	1.93	6.8	9.5	5.11
01-Aug-01	0	0	3.5	8.83	11.25	3	4	5	4	9	3	2.07	2.5	3.38	2.42	8.6	9.6	2.36
01-Sep-01	0	0	3.25	8.83	13	3	3	3	3	3	3	2.75	2.7	2.8	1.15	8.6	10	5.9
01-Oct-01	0	0	1.1	8.83	16.66	3	10	3	3	4	3	2.92	4.8	2.21	1.44	13.25	8.3	5.4
01-Nov-01	0	0	1.6	8.83	8.8	3	3	4	4	8	3	2.82	8.3	3.12	1.33	7.4	11.8	3.44
01-Dec-01	0	0	7.65	8.83	8.8	5	6	4	5	7	11	2.2	7.2	3.37	3.09	14.75	11.8	3.3
01-Jan-02	0	0	6.8	8.83	6.25	4	4	4	5	5	3	3.58	8.8	3.82	3.11	11.8	13	3.36
01-Feb-02	0	0	5.8	8.83	7	10	4	4	5	8	5	3.79	8.9	4.8	3.24	11.8	14.5	4.5
01-Mar-02	0	0	4.85	8.83	7	5	6	3	7	7	2	3.53	5.5	6.26	2.61	7	12.8	4.7
01-Apr-02	0	0	2.25	8.83	10.5	5	23	5	6	13	2	3.28	4.7	3.04	1.64	6.75	14.8	5.2
01-May-02	0	0	1.36	8.83	18	4	13	3	4	13	2	2.94	5.9	3.19	2.59	6	12.4	4.08
01-Jun-02	9.25	6.7	5.275	8.83	13.5	3	2	4	5	18	7	2.38	4	2.04	1.65	9.5	9	7.6
01-Jul-02	7.4	4.5	5.15	8.83	7.75	3	3	4	3	6	2	2.39	3.1	2.44	3.54	5.75	9.6	8.6
01-Aug-02	6.25	3.8	2.3	8.83	7.2	4	3	4	3	5	2	2.94	3	2.29	2.61	12.75	6.5	7.04
01-Sep-02	23	3.05	1.2	8.83	10	3	3	3	3	4	2	1.45	2.9	1.5	1.6	12.75	7.3	10.85
01-Oct-02	6.2	6.04	4.4	8.83	8.2	3	5	4	3	9	4	5.38	3.9	1.43	2.74	19	11.8	10.85
01-Nov-02	3.25	3	11.7	9.92	7.75	8	3	3	3	7	11	2.6	2.5	4.78	2.79	19	13	9.95
01-Dec-02	4	4.95	11.175	6.45	10.25	8	3	3	5	9	2	4.88	5.5	3.99	2.88	19.25	13.3	7.9
01-Jan-03	9.2	9.8	12.9	12.78	8.8	6	3	5	6	11	3	2.38	5.1	4.51	1.89	13.5	13.8	11.36
01-Feb-03	4.75	6.3	9.325	5.05	10.25	10	4	5	9	13	5	3.53	4.7	3.94	3.18	16	14	16.2
01-Mar-03	5.25	6.3	13.083	8.7	7.5	6	3	4	8	10	5	2.05	5.4	5.56	5.82	19.25	13	17.1
01-Apr-03	5.25	6.64	7.325	10.49	14	4	3	3	5	8	3	3.38	8.56	2.9	3.1	7	12.4	17.1
01-May-03	6.2	7.8	9.94	14	8	3	2	2	4	11	2	2.8	11.3	8.4	3.61	6.8	13.8	13.6
01-Jun-03	9.2	2.45	3.55	4.72	7	2	2	5	2	14	2	2.03	9.75	5.5	4	9.5	12	8.9
01-Jul-03	6.25	2.45	3.26	7.44	2.8	3	2	3	3	13	2	1.58	8.5	4.54	2.79	4.6	9.6	13.77
01-Aug-03	5.3	4.5	4.03	7.44	2	3	2	3	3	6	3	1.76	5.38	7.55	2.84	9.5	10.8	12.1
01-Sep-03	5.7	4.5	6.08	12.67	2.25	2	3	2	4	4	4	1.53	9.78	5.8	4.9	12.5	10.8	14.97
01-Oct-03	4.2	6.3	4.66	4.87	5.5	3	3	3	3	4	2	1.44	6	4.49	5.02	12.8	11.2	12.48

Table A.1-1. WWTP Self-Reported TSS Concentrations

Reporting Month	11152-001	11188-001	11193-001	11273-001	11284-001	11290-001	11375-001	11389-001	11414-001	11472-001	11485-001	11486-001	11523-001	11538-001	11563-001	11598-001	11670-001	11682-001
01-Jan-00	2.2	5.1	14.988	6	4.6	2.2	5.8	6	5.75	3.125	7.5	4.14	2	1	8.38	5.44	9.15	6
01-Feb-00	4	3.8	14.7	6.75	10	2.2	4.8	7.75	4.25	2.8	6.75	4.14	4.222	2.2	5.78	4.38	9.15	3
01-Mar-00	4.1	10.8	15.636	12.4	7.3	2	10.8	11.599	11.19	2.7	4.4	4.14	1.889	2.2	3.42	2.71	9.15	3.3
01-Apr-00	3.5	3.8	15.636	1.575	7.1	4	7.8	12.75	5.75	2.625	4.25	4.14	2.125	2.2	2.23	4.40	9.15	3.4
01-May-00	2.3	7.2	15.636	4.075	3.5	2.5	9	8.5	4	2.625	2	4.14	1.9	2.2	2.98	4.4	9.15	2.7
01-Jun-00	1.5	3.9	15.636	1.575	5.3	1.9	8.2	3.39999	7	2.3	2.08	4.14	1.7	6.122	1.83	4.4	9.15	2.45
01-Jul-00	1.5	2.6	27.375	4.075	2.9	1.9	2.4	3.52499	5	3.2	2.08	2.6	2.033	6.533	4.99	2.09	9.15	5.4
01-Aug-00	1.9	2.8	21.078	2.88	3.7	1.9	5.44	6.79999	14.5999	2.9	2.94	4.5	1.7	2.43	4.77	2.87	9.15	2.6
01-Sep-00	3.1	4	26.222	2.325	6.1	3.1	7.15	4.5	5	2.2	3.925	4.5	2.8	3.463	3.06	2.79	9.15	2.7
01-Oct-00	1.6	5	14.222	1.525	2.9	2.8	5.8	6.25	5.75	2.3	4.575	4.5	2.889	4.225	3.08	6.56	9.15	3.1
01-Nov-00	1.7	3.4	77.667	12.066	3.4	2.9	3.1	4.8	3	1.8	5.008	4.5	2.87	2.236	4.59	4.22	9.15	2.3
01-Dec-00	2	2.8	28.759	6.908	6.5	2.3	9.4	11.25	4.8	3.3	5.666	4.5	9.588	1.708	5.23	11.26	9.15	7.8
01-Jan-01	3.5	3.2	106.41	6.908	4.7	6	9.4	22	13	3	4.668	4.5	5.663	1.667	5.38	10.16	9.15	10.1
01-Feb-01	4.5	4.1	20	13.657	3.7	4.9	5.2	19.25	17.5	4.32	5.998	6.4	3.459	2.249	4.13	9.23	9.15	8.1
01-Mar-01	3.5	6	166.13	10.346	5.2	3.6	6.5	9	4.4	2.1	6.34	6.8	3.501	4.458	4.24	13.55	9.15	9.94
01-Apr-01	3.3	6	19.94	2.417	7.4	3.4	5.2	8.25	3	2.8	6.34	6.4	2.166	2.625	3.25	8.57	9.15	4.66
01-May-01	2.5	3.6	6.63	3.833	14.5	3.1	5.2	5	3	2.5	3.11	4.3	6.196	2.89	5	3.75	9.15	4.4
01-Jun-01	2.5	3.1	43.17	2.132	4.4	4.8	9.1	6	3	2.74	2.4	7.2	5.376	3.889	2.2	3.90	9.15	3.7
01-Jul-01	3.1	3.9	7.34	1.266	4.2	2.9	7.2	8.5	3	2.74	2.866	6.3	3.483	3.557	3.6	3.4	8.93	3.1
01-Aug-01	2.7	2.3	6.16	1.165	2.4	3.9	6.1	8.5	8	2.9	2.418	5.9	2.556	2.076	3.9	4.82	8.48	5.2
01-Sep-01	3	4.6	10.96	1.083	2.2	2.5	8.918	3.75	5	1.9	3.333	3.7	2.085	2.168	3.3	5.45	16.45	2.8
01-Oct-01	2.9	3.9	109.38	1.332	2.9	2.6	10.994	4.3	4.5	2.089	6.4	3.2	5.734	2.067	2.2	5.6	14	5.2
01-Nov-01	4.4	3.4	18.46	1.083	3.3	4.1	7.583	6.4	8.4	3.2	6.328	5.8	3.458	3.626	5.7	3.18	13.92	3.6
01-Dec-01	4	2.4	10.87	1	2.2	2.9	8.928	4	14.5	1.6	5.068	2.8	4.334	2.123	10.8	6.38	16.2	5.24
01-Jan-02	2.6	4.1	19.89	1.25	2.1	2.1	34	6	15.6	3.6	2.918	4.7	8.414	3.735	4.1	2.98	11.6	5.15
01-Feb-02	2.1	4.5	22.34	1	2.8	2.8	18.408	12	16	1.8	5.415	3.9	9.959	8.249	4	7.00	11.9	3.98
01-Mar-02	2.8	4.4	166.61	2.085	3.8	3.9	39.775	8.8	15.5	4.2	7.168	6.3	7.004	3.166	2.7	10.58	16.9	3.48
01-Apr-02	2.2	10.4	21.46	1.932	2.8	4.7	39.2	14.3	15	2.6	15.104	5.5	5.886	2.85	2.8	7.51	11.1	4.18
01-May-02	2.6	3.9	16.89	1.918	3	2.7	34.95	11.8	14.8	1.09	6.5	2.6	5.963	3.222	2.5	7.47	8.4	2.68
01-Jun-02	2.5	2.8	4.5	1.918	5.4	3.4	7.857	9.3	4.3	1.738	6.25	4.8	4.833	2.416	2.4	6.25	7.3	3.6
01-Jul-02	2.6	2.5	9.66	1.266	3.8	3.1	7.333	4.8	4.3	2.8	11.808	2.3	5.333	1.133	2.7	6.76	5.6	2.6
01-Aug-02	2.3	3.3	9.53	1	4.3	3	3.2	4	3.8	2.5	13.833	2.9	3.482	1.666	2.3	4.62	4.6	2.5
01-Sep-02	2.1	4.8	11.01	1.066	2.7	2.6	5.75	3.5	5	1.075	6.2	2.3	8.213	2.5	2.1	4.64	7.4	3.49
01-Oct-02	2.6	5.1	6.52	1.583	2.8	3.8	8.662	8.6	5	1.43	4.168	2.2	4.199	1.767	2.1	11.05	8	5.03
01-Nov-02	2.2	5.1	7.84	4.583	4.4	2.8	5.333	5.5	5	1.514	4.165	5.7	3.751	2.668	3.3	7.6	7.2	6.76
01-Dec-02	4.1	4	11.5	2.732	2.1	2.1	11.88	6.4	10	2.89	5.868	3.8	5.034	3.186	2.2	6.64	15	7.2
01-Jan-03	3.2	3.4	20.18	1.25	5.4	2	4.868	9.3	14	2.33	5.918	2.5	11.211	2.889	2.4	4.51	8.64	7.2
01-Feb-03	2.8	5.5	28.11	1.998	4.8	4.6	10.235	8.8	14	1.31	2.253	3.3	13.195	4.37	2.2	5.8	8.64	3.1
01-Mar-03	4	7	13.82	3.932	6	2.3	11.825	13.75	5.8	2.19	2.86	5.2	9.421	2.876	2.7	10.13	10.6	3.1
01-Apr-03	2.8	4	16.78	2.415	3.5	2.9	11.825	12.75	5	1.15	4.335	4.1	6.733	2.367	2.2	7.24	7.65	3.02
01-May-03	2.3	2.8	12.01	1.748	3.1	3.2	16.806	11.4	7.6	1.36	2.25	4.1	4.374	4.208	2.1	4.2	4.96	2.48
01-Jun-03	2	5.1	4.8	1.466	2.9	3.2	5	9.5	8.5	1.115	2.598	2.9	4.374	4.208	2.2	6.31	5.1	2.48
01-Jul-03	2.3	4	1.5	1.415	3.2	2.6	5	6	20	1.22	3.168	2.3	5.336	2.5	2	6.51	5.5	2.7
01-Aug-03	3.1	4.1	2.6	1.583	3.5	2.2	5	5.25	7.25	1.83	3.168	3.8	1.918	2.043	2	9.5	3.6	2.2
01-Sep-03	2.1	2.9	1.6	1	2.1	2.3	1.2	4	11.5	1.58	2.332	2.2	3.218	2.036	2.7	8.09	4.3	2.4
01-Oct-03	2.2	2.8	3.42	2.688	3.1	2.1	2.67	4.6	11.2	2.89	2.083	2.1	3.144	2.63	2	3.53	3.76	2.2

Table A.1-1. WWTP Self-Reported TSS Concentrations

Reporting Month	11696-002	11792-002	11836-001	11883-001	11893-001	11906-001	11917-001	11935-001	11947-001	11969-001	11979-002	11989-001	12110-001	12121-001	12124-001	12128-001	12132-001	12139-001
01-Jan-00	14.1	3.15	4.46	1.5	3.4	7.9	5.86	11.67	3.6	3.125	6.25	4.4	15	5.7	6.8	3.29	6.37	7.6
01-Feb-00	16.56	3.15	4.46	1.9	3.3	5.6	5.86	11	3.7	3.375	3.4	2.35	10.2	5.7	2.6	3.29	6.37	11.8
01-Mar-00	11.77	3.15	4.46	2.2	3.2	2.8	5.86	21.25	4.4	4	5.15	1.85	3.9	5.7	3	3.29	6.37	6.5
01-Apr-00	6.55	3.15	4.46	3.5	4.2	3.7	5.86	11.15	3.5	4.125	4.53	1.15	4	5.7	4.73	3.29	6.37	9.2
01-May-00	6.55	3.15	4.46	3.3	2.9	2.4	5.86	10.32	3.14	3.4	4.53	2.45	2.7	2.7	4.3	3.29	3	3.2
01-Jun-00	4.77	3.15	4.46	1.4	2.8	3.1	5.86	14.2	3.4	1.588	2.24	2.68	3.5	5.6	2.7	3.29	6	4.8
01-Jul-00	5.29	4.3	4.46	2.1	2.3	3.3	5.86	6.65	3.5	2.954	3.7	4.28	4.3	5.4	6.4	3.29	6.37	10
01-Aug-00	4.95	4.922	4.46	3.1	2.3	3.3	5.86	5.58	2.9	2.73	3.48	2	4.3	4.8	9.7	3.29	3.00	4.7
01-Sep-00	4.4	5.814	4.46	5	3	2.3	5.86	6.63	4.5	2.675	1.55	1.8	5.9	5	9.4	3.29	6.00	4.1
01-Oct-00	3.12	2.914	4.46	3.5	3.2	3.3	5.86	7	3.6	7.789	2.64	1.52	4.7	6.2	7.8	3.29	6.37	4.2
01-Nov-00	2.6	3.375	4.7	2.6	5.5	4	5.86	13.86	3.5	13.297	3.9	5.1	15.6	6.6	9.7	3.29	3.00	4
01-Dec-00	3.6	3.333	3.8	2.7	5.9	9.5	5.86	29.93	4.7	8.291	8.08	1.9	8.2	6.3	27	3.29	6.00	4.3
01-Jan-01	6.72	6.161	6.3	5.1	4.5	9.9	5.86	14.2	8.8	5.374	4.44	17.68	9	10.3	18.3	3.29	6.37	20.1
01-Feb-01	6.25	4.388	8	3.9	4	7.7	5.86	11.7	7.5	6.284	6.05	3.75	15.2	11.4	10.8	3.29	3	5.2
01-Mar-01	5.93	5.631	8.6	4.6	5.4	6.5	5.86	11.3	5.2	8.684	5.5	3.65	10.3	8.7	9.2	3.29	35	3
01-Apr-01	4.2	7.619	10.8	3.5	9.4	5.8	5.86	12.75	7	4.584	2.85	2.94	27.3	12.5	30.8	3.29	5.5	3.3
01-May-01	7.03	5	13.5	3	5.7	5.6	5.86	11	3.9	3.441	4.92	2.07	3.7	7.9	9.6	3.29	5.5	4.2
01-Jun-01	5.52	7.8	6.8	3.2	4	5.6	5.86	10.3	4.8	1.629	1.98	2.08	2.7	8.9	11.7	3.29	5.5	4.1
01-Jul-01	3.16	5.62	3	2.5	5.5	2.4	5.86	9.68	5.6	1.458	3.12	3.1	9.4	6.8	3.7	3.29	6.5	13.7
01-Aug-01	2.1	6.554	5.1	2.2	4.4	2.7	5.86	4.7	6.9	1.999	2.4	2.85	8.1	3.2	9.2	3.29	3	4.5
01-Sep-01	2.1	4.143	8.8	3.2	6.6	5.1	5.86	2.75	5	2.584	3.13	2.1	4.1	3.7	2.6	3.29	3.5	4.5
01-Oct-01	4.76	4.239	5	3.4	4.7	8.3	5.86	3.2	4.5	2.703	2.6	6.2	4.6	6.3	9.7	3.29	3	3.8
01-Nov-01	4.76	6.043	4.6	3.8	3.2	6.5	4.1	4.85	5.2	2.42	5.9	12.4	8.5	6.4	8.2	3.29	8.5	6.5
01-Dec-01	4.7	6.424	7.3	3	4.2	6.6	2.7	5.58	7.7	5.65	5	4.05	13.8	12.3	12.2	3.29	5	4.3
01-Jan-02	5.04	6.144	4.1	2.6	3.9	4.7	6.6	4.56	6.9	4.66	3.5	4.8	5.5	10.8	18.9	3.29	9	12
01-Feb-02	8.7	5.147	7.5	2.6	4.3	5.1	10.8	4.8	5.9	4	4.8	2.4	2.3	6.3	3.8	3.29	8	8.1
01-Mar-02	10.2	6.889	3.3	2.6	3.6	4.8	7.6	5.2	6.4	7.16	5.9	6.05	3.1	5.8	2.8	3.29	8	4.4
01-Apr-02	13.1	5.959	2.3	2.6	4.2	4.8	5.5	4.64	5.3	5.29	3.2	3.68	5.9	11.9	2.4	3.932	5.5	17
01-May-02	5.68	6.168	2.1	4.4	4.3	6.3	3.9	9.23	3.2	4.56	4	2.35	5.6	9.3	4.2	2.5	6.5	6.1
01-Jun-02	6.8	3.429	2	4.6	3.1	2.6	3.5	5.68	3.2	3.25	2.9	1.6	3	4.3	3.8	2.335	11.5	5
01-Jul-02	6.45	2.291	2.1	3.3	3.2	3.6	4.6	3.54	3.3	3.04	3.4	2.48	3.1	5.5	3.1	2.2	10	2
01-Aug-02	2.65	2	2	3.3	4.5	2.7	2.5	3.3	5.2	3.67	2.5	6.5	4.7	5.5	3.1	2.583	10	2
01-Sep-02	4.35	2.333	2	3.2	3.2	2.4	4.8	2.2	2.7	4.33	1.9	5.12	3.9	5	2.3	1.75	5	3.4
01-Oct-02	8.64	2.408	2	2.7	3.3	2.5	3.5	3.6	4.4	5.82	2.4	5.29	3.4	8.9	2	2.066	6	2.9
01-Nov-02	9.72	2.334	2	7.2	3.3	2.8	7.8	3.98	4.6	4.82	1.4	3.84	1.1	4.9	2	12.908	7.5	10.4
01-Dec-02	7.2	4.334	3.1	5.2	2.7	2.2	17.2	10.14	4.1	8.16	4.2	7.1	2.5	6.9	2.4	5.194	5	10.3
01-Jan-03	8	5.287	5	4.3	4.2	3.2	9.1	7.28	5.6	5.53	2.3	5.44	4.7	10.9	2.8	2.168	3	7.8
01-Feb-03	16	3.143	4.5	7.7	4	8.4	9	9.3	5.9	6.2	2.9	5.7	5.5	6.7	2.6	4.835	2.8	7.1
01-Mar-03	8.8	3.286	4.2	6.3	4	3.9	8.9	5.68	4.1	9.69	5	9.6	2.9	6.9	2.8	3.583	3.8	6.2
01-Apr-03	13.37	5.413	3	4.3	2.9	4.4	3.2	6.88	4.4	10.09	4.4	7.04	6.6	8.5	3.5	2.132	3.8	4.1
01-May-03	11	2.585	2.6	3.4	2.5	5.6	4.9	3.63	5.8	5.25	1.8	8.2	7.3	6.1	3.4	2.418	2.3	5.8
01-Jun-03	11.2	2.751	2	2.8	2.4	6.4	4.5	4.1	6.2	5.87	2.5	5.2	6.8	8.3	2.1	3	2.3	6.7
01-Jul-03	9.6	2.251	2.1	2.7	4.1	3.6	3.4	2.66	4.6	5.87	2.7	6.36	6.9	6.8	2.6	2.866	5.8	4.7
01-Aug-03	14.1	2.571	2	3	2.4	3.1	3.9	3.55	5.8	9	1.8	5.5	6.2	5.9	2	2.498	5.5	14.2
01-Sep-03	13.43	3.444	2.2	2.6	4.1	4.2	4.9	3.8	5.3	5.82	2.2	6.4	6.5	3.5	2.2	1.134	3.6	8.1
01-Oct-03	5.6	10.584	2	2.8	2.4	4.8	3.7	5.5	6.3	3.93	3.3	13.84	6.5	4.5	2.8	2.418	2.8	7.5

Table A.1-1. WWTP Self-Reported TSS Concentrations

Reporting Month	12140-001	12189-001	12209-001	12222-001	12223-001	12233-001	12247-001	12289-001	12298-001	12304-001	12310-001	12342-001	12346-001	12355-001	12356-001	12370-001	12397-001	12427-001
01-Jan-00	2.3	9.25	5.70	6.4	18.85	5	18.63	6.28	3.1	2.78	10.8	8.17	2.05	11.08	5.54	4.3	5.48	3
01-Feb-00	9	11.75	5.70	5.9	18.36	5.5	9.15	6.28	6	2.78	10.8	8.17	1.25	11.08	5.54	4.3	5.48	7
01-Mar-00	6	10.8	5.70	5.7	10.78	5.6	3.99	6.28	4	2.78	10.8	8.17	1	11.08	5.54	8	5.48	4
01-Apr-00	3.6	16.39	5.70	6.7	8.01	3.7	7.4	6.28	4.6	2.78	10.8	8.17	1.8	11.08	5.54	5	5.48	2.4
01-May-00	3.2	10.75	5.70	6.1	7.92	2.3	2.8	6.28	3	2.78	11.5	8.17	1.8	11.08	5.54	7.3	5.48	12.4
01-Jun-00	2.4	10.8	5.70	6.6	8.61	20.9	3.76	6.28	3.1	3.5	7.2	8.17	1.05	11.08	5.54	2.7	5.48	4
01-Jul-00	1.8	14.5	12.6	10.9	4.6	4.7	3.28	6.28	3	3	7.2	8.17	1	11.08	5.54	2.5	5.48	1
01-Aug-00	2.8	4.4	4.1	4.9	4.3	4.7	4.55	6.28	5.5	1.6	7.2	8.17	1.63	11.08	5.54	5.9	5.48	3.2
01-Sep-00	2.1	3	6.2	3.4	5.15	4.4	2.58	6.28	5.8	1.9	2.25	8.17	2.05	11.08	5.54	3.9	5.48	2.4
01-Oct-00	1.8	4.25	13.1	3.5	4.35	8.1	3.6	6.28	4.5	2.1	2	8.17	3.45	11.08	5.54	4.8	5.48	2.4
01-Nov-00	3.8	4.25	10	12.1	4.88	8.1	6.69	6.28	4.3	2.1	2	8.17	3.16	11.08	5.54	4.6	5.48	5.5
01-Dec-00	6	7.75	11.5	6.6	4.88	3.1	5.33	6.28	4.3	3	3.5	8.17	4.37	10.75	5.54	5	5.48	5.5
01-Jan-01	8.2	10.8	10.2	10.3	8.4	12.1	8.09	6.28	6.8	4	3.5	8.17	3.2	14	5.54	6.6	5.48	6.8
01-Feb-01	12.4	12.5	10.2	9.1	8.4	9	12.81	6.28	4.8	8.2	9.5	8.17	1.55	31.3	5.54	10.1	5.48	3.33
01-Mar-01	12.4	6.2	10.2	7.3	8.4	9.5	13.01	6.28	6	1.7	6.2	8.17	4.13	22	5.54	4.9	5.48	3.33
01-Apr-01	8.5	4.3	7.2	19.5	4.96	12.8	12.19	6.28	3.6	3.6	4.5	8.17	6.15	9.8	5.54	4.2	5.48	1.8
01-May-01	4	26	7.6	13.6	6.71	5.3	6.41	6.28	3.3	1.2	3.4	8.17	12.32	8.6	6.9	2.3	5.48	4.8
01-Jun-01	12.7	2.75	4.8	11.4	3.84	5.8	5.48	6.28	5.9	1.8	3	4.5	2.1	1	8.3	3.7	5.48	8.54
01-Jul-01	3.8	2.75	5.5	12.9	3.84	16.5	19.46	6.28	6.8	5.1	2.5	4.5	1.95	1	4.4	4.3	5.48	7.2
01-Aug-01	3.3	2.8	6.5	12.3	6.62	8.5	3.84	6.28	4.1	1.4	6.3	5	3.48	2	4.9	4.3	5.48	1.6
01-Sep-01	4.8	1.8	6.1	12.025	5.4	7.2	2.23	6.28	3.1	2	6.3	10.3	6.2	1	5.2	4	5.48	4.4
01-Oct-01	4.1	3.3	6.8	12.168	5.47	13.4	8.49	6.28	3.3	1.4	2.3	13	2.48	6	6.3	3.7	5.48	2.8
01-Nov-01	3.6	3.8	7.3	10.386	5.73	47.8	5.78	6.28	2.6	2.1	8.8	7.6	3.1	12.8	9.1	4.9	5.48	2.8
01-Dec-01	2	11.5	8.2	10.16	7.05	30.3	4.35	6.28	3.4	1.7	9	9.8	4.1	23	7.9	4.7	5.48	3.6
01-Jan-02	4.9	14	8.3	8.7	9.24	10.7	11.52	6.28	2.9	1.5	5.2	9.8	8.47	14.8	3.6	5.7	5.48	1.2
01-Feb-02	3	10.5	12.1	6	6.49	11.6	14.9	6.28	4.3	1	6.3	8.8	32.23	13	5	5.5	5.48	2.4
01-Mar-02	3.6	10.8	6.3	12.583	7.85	12.3	12.8	6.28	3.4	2	4.8	8.8	9.1	23	6.2	8	5.48	2.8
01-Apr-02	4.3	8.5	3.1	6.668	8.2	7.3	7.34	6.28	5.8	1.9	9	5.3	9.6	9.8	3.7	8.6	5.48	6
01-May-02	4.5	7.2	5.8	6.194	11.06	11.4	8.06	6.28	9.2	1.4	4	6.8	4.88	13.6	3.2	4	5.48	6
01-Jun-02	4	3.5	2.1	4.333	10.32	12.2	10.3	6.28	4.4	4.3	2	13.4	14.3	12.5	4.6	3.5	6.7	2.4
01-Jul-02	5.6	3.5	1.9	8.206	5.68	6.1	5.52	6.28	2.5	3.9	15.5	8.2	4.6	11.3	2.8	3	4.5	3
01-Aug-02	3.4	4.2	2.9	5	8.58	5.4	5.52	6.28	5.1	2.5	6	6.5	4.75	13.2	2.4	3.5	3.8	5.6
01-Sep-02	2.2	6.3	2.8	7.928	5.2	8.9	7.87	6.28	2.5	4.3	6	14.5	4.75	6.5	2.4	4.4	3.05	7.6
01-Oct-02	2.6	4.8	3.6	15.508	8.44	14.5	4.73	6.28	5.2	1.8	6	13.6	4.75	17	2.8	6.1	6.04	6
01-Nov-02	2	8.8	7.4	14.559	10.38	5.9	5.65	6.28	6.8	4.9	6	5.3	3.5	14.3	8.8	7.7	3	10
01-Dec-02	2	13.3	3.6	6.493	10.4	13.1	12.67	6.3	6.3	2.1	3.5	6	6.3	14.3	8	6.5	4.95	2.2
01-Jan-03	2	13.3	1.8	24.54	13.24	17.5	17.24	7.52	3.9	1.7	4.6	13.3	7.44	7.2	6.1	3.8	9.8	7.2
01-Feb-03	2.8	4.8	2.6	11.918	11.85	12.6	13	7.1	5.9	1.2	4.6	5.8	5.45	7.5	8.7	4.4	6.3	6.8
01-Mar-03	2.5	6.2	2.9	18.14	12.33	6.2	13.07	8.7	3.3	1.2	9.8	10.8	7.3	7.3	12.6	5.4	6.3	5.6
01-Apr-03	3	9.75	5.8	15.817	8.2	9.1	9.36	6.24	4.3	1.1	13.8	6.5	4	12	6.5	12	6.64	5.6
01-May-03	4.3	11.2	2.4	14.67	10.25	8.9	7.83	8	2.3	1.8	12.8	7.2	11.8	7.4	4.6	5.9	7.8	6
01-Jun-03	2.8	8.3	1.9	15.5	8.36	11.9	7.91	4	2.8	1	4	7.8	4.3	6.5	2.2	3.9	2.45	6
01-Jul-03	3	3.2	2.9	15.5	11.4	12.2	6.55	4.96	3.5	1.3	2.8	5.2	5.2	9	3.6	3.6	2.45	2.8
01-Aug-03	2.2	2.25	2.8	6.7	13.91	7.9	7.42	4.4	3.5	1.2	3	6	6.7	4.5	2.5	3.4	4.5	9.6
01-Sep-03	3	5.25	3.6	6.7	14.56	7.1	7.82	6.32	2.5	12.3	3.75	6.3	8.3	7.25	4.4	5.6	4.5	5.2
01-Oct-03	3.5	7.2	2.4	10.168	6.8	14.8	4.31	5.5	5.8	1.4	4.8	8	4.08	15.8	8.4	7.4	6.3	3.6

Table A.1-1. WWTP Self-Reported TSS Concentrations

Reporting Month	12443-001	12447-001	12465-001	12466-001	12474-001	12479-001	12516-001	12552-001	12552-002	12573-001	12574-001	12681-001	12682-001	12685-001	12714-001	12726-001	12795-001	12802-001
01-Jan-00	8.54	3.71	9	7.52	0	4.4	12.3	12.59	34.77	25.4	3.89	8.6	12.50	7.8	8.8	11	15	10.32
01-Feb-00	28.76	3.71	7.5	7.52	0	6	13	5	11.75	20.2	3.89	6.1	7.20	8.8	11.3	4	7.25	10.32
01-Mar-00	7.82	3.71	3.2	7.52	0	6.6	4.4	6.36	5.8	20.2	3.89	6.9	12.50	3.4	8.2	3.3	6.8	10.32
01-Apr-00	7.77	3.71	4.4	7.675	0	4.6	16.2	6.4	4.35	20.2	3.89	6.9	7.20	3	7.9	7.5	7.75	10.32
01-May-00	9.07	3.71	3.6	7.12	0	4.9	4.7	9.3	9.55	20.2	3.89	6.9	4.5	3.3	9.6	3.1	5	10.32
01-Jun-00	6.28	1.4	2.2	10.55	0	7.4	7.8	5.1	5.52	20.2	3.2	6.9	4.5	3.6	5.4	2.5	5.22	10.32
01-Jul-00	3.9	0.4	1.1	11.1	0	4	7.5	3.2	5.32	15	4.9	5.7	7	2	7.1	2.3	3.15	2.8
01-Aug-00	3.8	0.4	2.1	5.72	0	6.7	4.5	10.65	3.15	7.2	6.12	5.2	7.5	2.4	7.1	4.2	11.06	3.65
01-Sep-00	3.8	0.4	2.6	8.15	0	6	9.5	10.98	3.59	3.25	5.175	10.5	6.4	4.3	6.2	5.2	14.34	3.65
01-Oct-00	1.6	0.4	2	11.55	0	6.4	10.3	10.59	4.57	8.25	11.15	10.2	6.4	4.9	6.2	4.3	5.675	3.65
01-Nov-00	1.84	0.4	1.9	5.92	0	4.9	8.2	10.68	8.23	8.4	7.328	8.9	2.1	5.8	11.1	2.5	10.872	3.65
01-Dec-00	6.5	0.94	1.9	8.95	0	2.9	8	24.62	4.73	11.25	13.9	11.6	5.6	3.9	13.9	5.6	10.09	3.65
01-Jan-01	14.08	3.7	4.7	9.92	0	4.7	10.3	13.49	7.91	18	4.734	12.2	6.8	5.9	15	5	16.222	4.5
01-Feb-01	12.51	3.7	7.4	8.5	0	4.5	9.8	19.15	5.35	25.5	14.258	10.3	12.2	6.4	6.8	5.2	6.583	6.3
01-Mar-01	12.51	3.7	10.2	9.25	0	3.9	5.4	12.53	10.2	13	10.075	8.1	14	6.5	9	4.1	8.503	6.3
01-Apr-01	14.83	3.3	3.83	8.725	0	5.5	5.5	14.25	7.92	8.25	4.085	11	14.4	8	6.7	3.8	4.668	13.7
01-May-01	5.23	2.8	2.38	7.68	0	5.2	3.2	13.82	6.37	0	4.066	7.6	10.1	7.4	12.2	2.3	11.132	5
01-Jun-01	5.38	3.8	2.55	8.9	0	3.5	3.6	12.34	8.74	4.25	3.415	9.9	6.4	6.9	8.2	189.4	5.168	4.4
01-Jul-01	4.18	3.9	4.73	6.9	0	4.8	3.6	5.16	4.68	5	2.918	8.6	7.3	3.2	8.2	6.9	6.09	3.4
01-Aug-01	4.24	4.6	4.2	7.54	0	4.6	2	11.4	3.4	0	3.2	8.6	7.7	4.6	8.4	2.5	6.266	11
01-Sep-01	4.7	2.2	2.6	8.775	0	4.9	5.7	11.1	7.7	0	4.498	5.8	16.5	3.9	8.4	7	6.415	9.9
01-Oct-01	6.5	6.6	3.44	8.2	0	5.2	6.75	10	8.55	0	5.534	5.3	17.7	4	8	4.9	8.325	38.8
01-Nov-01	10.96	2.3	3	10.42	0	2.9	4.4	12.62	7.84	0	4.665	6.4	7.7	4.6	12.5	8.4	9.266	15.8
01-Dec-01	13.4	5	4	15	0	2.9	7.2	11.2	7.2	0	4.665	7.2	3.1	12.2	12.3	14.3	16.243	5.5
01-Jan-02	27.04	2.8	9.5	15.44	0	4.5	5.2	9.52	7.36	0	3.534	6.4	4.2	5.2	25.9	4.6	7.736	8.4
01-Feb-02	56.75	7.8	4.3	13.8	0	4.8	5.75	8.3	13.44	0	3.835	7.6	6.3	7.7	14.6	2.5	9.343	9.4
01-Mar-02	27.04	4.9	4.9	8.95	0	6.6	11.25	17.55	12.8	0	1.333	10.3	5.1	5.7	9.3	7.2	10.5	9.4
01-Apr-02	17.13	4.2	4.4	11.65	56.8	2.9	11	4.24	6.48	0	1.333	10.4	2.8	4.2	12.1	6.4	11.158	9.4
01-May-02	19	2.5	3.1	2.96	14.4	2.8	8.2	3.44	8.32	0	1.666	11.6	4.8	4.8	7.3	3.5	7.392	14.8
01-Jun-02	10.7	3.6	2.1	5.15	3.3	2.7	8.2	6.55	7.7	0	1.75	11.5	3.1	8.9	5	2.6	7.165	6.9
01-Jul-02	8.4	3	4.4	5.04	36	2.2	7.5	3.84	6.1	0	4.466	10	3.1	2.2	5.2	2.3	5.866	9.2
01-Aug-02	12.6	3.9	4.4	5.425	16.5	2.1	6	3.75	7.04	0	2.75	8	3.6	5.1	4.8	2.6	5.503	8.2
01-Sep-02	9.4	4.4	3.8	9.725	5.6	2.2	10.25	5.92	12.72	0	1.668	6.6	3.9	5.7	3.3	4.2	3.335	7.1
01-Oct-02	14.24	4.1	3.8	7.84	11.1	4.6	7.4	7.9	4.8	0	3.334	11.3	4.2	9.1	5.7	4.2	7.332	8.8
01-Nov-02	24.56	2.3	6.3	3.275	9.8	2.1	4.25	5.44	7.92	0	2.5	9.7	4.7	4.8	7.7	3.3	11.4	11
01-Dec-02	50.15	2.8	7.6	4.72	8.1	2.3	7.75	8.65	25.4	0	1.4	10.9	4.2	6.4	14.2	4.4	17.06	14.8
01-Jan-03	27.1	3	7.9	4.7	10.5	3.3	7.8	8.04	10.93	0	1.418	10.1	2.9	6.9	10.6	4.1	7.333	14.9
01-Feb-03	25.48	3.3	10.3	3.85	6.6	4	0	8.4	10.3	0	1.083	7.6	3.4	8.2	8.5	9.1	7.333	14.9
01-Mar-03	15	2.8	5.5	3.27	7.4	3.1	0	6.08	9.84	0	1.165	5.2	3	7.1	12.8	8.5	8.493	11.5
01-Apr-03	9.7	6.7	3.1	3.3	5.5	4.5	0	11.02	12.8	0	1.2	6.4	3.8	8.4	5.6	4.5	21.257	12.4
01-May-03	10.56	3.2	2.1	6	13.4	2.8	0	3.3	6.1	0	1	8	3.3	9	5	3.9	14.49	8.7
01-Jun-03	9.7	4.8	2.9	3.42	5	5.5	0	7.1	6.44	0	1.165	5.5	11.9	8.1	5.9	2.9	8.41	7.7
01-Jul-03	6.7	2.6	2.7	3.32	5	6.4	0	8.3	10.9	0	1.268	8.1	13.6	7.2	3.5	3.7	13.06	14
01-Aug-03	6.7	2.8	2	5.37	7.9	2.5	0	6.7	13.3	0	1.25	5.2	12.6	8.4	6.3	3	13.06	7.2
01-Sep-03	6.6	7.3	2.1	5.77	5.1	2.6	0	10.4	9.82	0	1.2	5.6	13.8	5.9	9.2	3.9	6.26	11.9
01-Oct-03	6.24	6.2	3.5	3.84	5.1	2.1	0	5.3	7.2	0	2	5.6	10.12	8.4	7.2	4	7.908	8.3

Table A.1-1. WWTP Self-Reported TSS Concentrations

Reporting Month	12830-001	12834-001	12841-001	12858-001	12927-001	12949-001	13021-001	13172-002	13228-001	13245-001	13328-001	13433-001	13484-001	13509-001	13558-001	13578-001	13623-001	13674-001
01-Jan-00	7.91	8.75	5.16	6.99	0	0	8.20	37.8	4.5	6	0	0	8.59	15.77	3.86	14.7	7.69	0.05
01-Feb-00	7.91	5.8	5.16	6.99	0	0	8.20	22.3	11.75	9.6	0	0	8.59	14.88	3.86	11.25	7.69	0.05
01-Mar-00	7.91	4.25	5.16	6.99	0	0	8.20	22.3		3.2	0	0	8.59	12.1	4.8	13.5	7.69	0.06
01-Apr-00	7.91	8.83	5.16	6.99	0	0	33.3	22.3	5.5	13.8	0	0	8.59	7.6	3.86	15	7.69	0.06
01-May-00	7.91	3.45	5.16	6.99	0	0	5.5	22.3	6.25	7.8	0	0	8.59	8.8	3.86	15.75	7.69	0.08
01-Jun-00	7.91	3.74	5.16	6.99	0	0	4	22.3	5.94	4.8	0	0	8.59	6.36	3.86	14.59999	7.69	5.9
01-Jul-00	14.93	5.3	5.16	6.99	0	0	4.8	22.3	3.75	2.4	0	0	8.59	6.63	3.86	13.75	3.8	3.3
01-Aug-00	14.93	2.84	5.16	6.99	0	0	5.5	22.3	4.12	7.8	0	0	8.59	11.28	3.86	10.7	3.5	0.05
01-Sep-00	11.79	4.25	5.16	6.99	0	0	7.1	22.3	3.425	10	0	0	8.59	3.77	3.86	2.25	3.3	4.1
01-Oct-00	6.43	3.74	5.16	6.99	0	0	12.4	22.3	7.425	14.5	0	0	8.59	8.15	3.86	7.5	7.4	2.3
01-Nov-00	11.96	3.45	5.16	6.99	0	0	6.2	6.8	5.932	14.4	0	0	8.59	16.88	3.6	16.2	9.6	0.08
01-Dec-00	9.7	4.55	5.16	6.99	0	0	8.8	7	6.5	9	0	0	8.59	0	6.4	16.5	10.4	2
01-Jan-01	9.7	23.74	5.16	6.99	0	0	20.6	6.7	4.083	6.1	0	8.585	8.59	0	6.5	15	30.5	0.04
01-Feb-01	7.56	15	5.16	6.99	0	0	7.9	10.3	4.585	9.5	0	2.085	8.59	0	5.1	30.3	8.1	0.04
01-Mar-01	7.56	5.68	5.16	6.99	0	0	13.3	4.7	4.585	90.4	0	4.734	8.59	0	5.1	23.2	11.3	2
01-Apr-01	5.1	5.68	5.16	6.99	0	65.5	8.8	4.7	5.165	6.9	0	2.165	8.59	0	12	6.75	4	2.4
01-May-01	5.1	3.74	5.16	6.99	0	43.9	7.1	4.7	4.532	10.3	0	5.074	8.59	0	2.8	14	4.9	2.8
01-Jun-01	6.62	5.8	5.16	6.99	0	10.3	3.1	2.7	8.41	9.8	0	2.168	8.59	0	3	12	8.3	8.5
01-Jul-01	3.86	1.92	5.16	6.99	0	5.7	2.4	4.8	4.908	3.5	0	6.593	8.59	0	6.8	10.75	7.3	8.5
01-Aug-01	7.44	8.25	5.16	6.99	0	10.8	4.4	4.5	5.466	13	0	3.2	8.59	0	2.9	10.6	2.5	3.5
01-Sep-01	10.3	8.1	5.16	6.99	0	13.9	3.9	5.6	5.503	14.8	0	3.5	8.59	0	6.5	13.8	2.9	2
01-Oct-01	8.4	6	5.16	6.99	0	5	4.8	4.9	8.5	12.3	0	6.915	8.59	0	4.6	13.3	4.8	3
01-Nov-01	12.34	4.2	5.16	6.99	0	7	4.6	5	6.4	11.8	0	5.866	8.59	0	5.3	5.8	6.9	2
01-Dec-01	11.31	6	5.16	6.99	0	5.2	5.4	2.1	5.25	8.6	0	106.258	8.59	0	4.2	8.8	13.9	3
01-Jan-02	6.85	8	5.16	6.99	0	6.4	6.9	3.4	6.333	8.6	0	5.806	8.59	0	4.3	15.6	12.8	2
01-Feb-02	5.1	14.7	5.16	6.99	0	5.7	21.4	2.4	7.808	8.6	0	4.575	8.59	0	4.8	18.7	7	2
01-Mar-02	5.76	7.2	5.16	6.99	0	7.7	20.4	2	7.415	11.3	0	17.445	9	0	2.9	14.5	3.8	2.3
01-Apr-02	7.84	7.4	5.16	6.99	0	8	15.8	2.1	7.743	11	0	4	13.8	0	3.2	21.5	5.5	3.5
01-May-02	2.5	5.4	5.16	6.99	0	7.5	14.4	2	5.6	8.8	0	12.86	11.2	0	2.9	17.4	6.7	5.6
01-Jun-02	7.3	5.8	5.16	2	0	8.7	5.4	2.1	4.415	5.3	0	9.318	7.5	0	3.2	17.4	4.4	14.5
01-Jul-02	6.7	5.4	4.068	2.25	0	3.5	4.6	2	5.925	4.4	0	6.328	10.5	0	4.1	17.4	6.4	2.5
01-Aug-02	4.8	3.5	1.585	14.6	0	25.8	5.6	2.1	6.394	4.7	24.8	5.202	11.8	0	3.4	10	9.5	2.5
01-Sep-02	7.7	4.6	2.002	4.5	0	4.1	5	2	5.168	4.5	5.2	4.253	12.5	0	3.8	10	2.8	9.5
01-Oct-02	7.7	5.2	2.918	14.4	0	3.8	5.6	2	7.918	6.3	4.4	7.66	8.4	0	2.6	9	13.1	9.5
01-Nov-02	5.36	4.9	6.325	18	0	5.2	10	2.1	8.94	8.5	2.3	5.5	8	0	2.5	17	10.1	9.5
01-Dec-02	7.33	13	6.192	10	0	9.3	8	2	5.083	9.3	4	4.668	7.8	13.1	2.9	17	5	9.5
01-Jan-03	4.28	9.9	7.175	5.5	9.2	8.3	11.4	2.2	9.534	9.2	2.6	8.726	6.6	10.64	3.8	17	23.7	9.5
01-Feb-03	4.28	7.2	6.823	5	10.1	13.1	11.3	2.5	6.75	12	4.3	8.425	7.3	10.64	3.1	17	13.4	8
01-Mar-03	10.4	14.6	6.466	7.5	9.4	7	6.3	2.3	13.041	8.5	5.2	10.158	10.3	8.2	2.3	5.8	14.1	14
01-Apr-03	10.64	8.8	5.418	5.5	6	9.5	5.7	2.2	7.253	8.8	2.9	9.993	12.5	7.1	2.4	11.5	3.4	14
01-May-03	6.6	8.8	6.335	5.6	7.02	4.9	3.9	2.9	13.619	2.8	2.85	9.726	8.6	6.48	2	6.4	2	14
01-Jun-03	8.6	8.8	3.198	3.75	15.09	7.9	2.5	2.1	6.25	4.4	2.85	5.24	4.8	6.48	2	6.3	2.4	8.5
01-Jul-03	10.72	8.8	6.415	7.2	11	9.2	3.6	3.2	4.998	4.5	2.9	7.1	5	8.64	2	7.6	4.3	8.5
01-Aug-03	6.1	8.8	8.175	2.5	7.3	5.7	3	3.7	3.918	4.9	2.9	8	3.8	9	2	6	3.3	11.5
01-Sep-03	9.44	8.8	3.866	3.3	7.8	4.4	3.5	2	6.328	4.1	2.8	6.5	4.5	11.4	2	6	2.9	11.5
01-Oct-03	7.09	8.8	5.668	7.2	6	5	4.3	2	5.8	9.6	3	9.72	7.8	6.32	2.2	12.4	5.4	11.5

Table A.1-1. WWTP Self-Reported TSS Concentrations

Reporting Month	13689-001	13727-001	13764-001	13775-001	13778-001	13807-001	13921-001	13939-001	13983-001	13996-001	14011-001	14070-001	14109-001	14072-001	14117-001	14134-001	14182-001	14359-001
01-Jan-00	7.37	4.71	7.35	6.06	9.94	6.3	0	5.45	8.83	0	0	0	0	15.49	0	0		0
01-Feb-00	7.37	4.71	7.35	6.06	9.94	5.2	0	10.35	8.83	0	0	0	0	15.49	0	0		0
01-Mar-00	7.37	4.71	7.35	6.06	9.94	3.9	0	10.35	8.83	0	0	0	0	10.44	0	0		0
01-Apr-00	7.37	4.71	7.35	6.06	9.94	5.7	0	4.85	8.83	0	0	0	0	5.69	0	0		0
01-May-00	7.37	4.71	7.35	6.06	9.94	5.7	0	3.01	8.83	0	0	24.25	0	3.22	0	0		0
01-Jun-00	7.37	4.71	7.35	6.06	9.94	4.4	12.8	5.7	8.83	0	0	9	0	4.22	0	0		0
01-Jul-00	7.37	3.75	7.35	6.06	9.94	6.2	7.75	5.7	8.83	0	0	9	0	2.45	0	0		0
01-Aug-00	7.37	4.2	7.35	6.06	9.94	6.2	5	3.49	8.83	0	0	8.75	0	5.53	0	0		0
01-Sep-00	7.37	3	7.35	6.06	9.94	6.2	4.5	8.35	8.83	0	0	7.75	0	2.35	0	0		0
01-Oct-00	7.37	1.75	7.35	6.06	9.94	10.5	5.75	7.25	8.83	0	0	10.4	0	3.79	0	0		8.7
01-Nov-00	7.37	3	7.35	6.06	9.94	6.4	5.75	7.25	8.83	0	0	18	0	4.24	0	0		5.1
01-Dec-00	7.37	8.25	7.35	6.06	9.94	14	15	8.77	8.83	0	0	34.33	0	6.91	0	0		13
01-Jan-01	7.37	6.25	7.35	6.06	9.94	10.1	17.75	8.77	8.83	0	0	34.8	0	8.35	0	0		13.8
01-Feb-01	7.37	9.3	7.35	6.06	9.94	10.1	23.25	28.86	8.83	0	0	11.6	0	6.82	0	0		12.1
01-Mar-01	7.37	7.8	7.35	6.06	9.94	8.9	16.14	7.67	8.83	0	0	11.2	0	3.94	0	0		13.6
01-Apr-01	7.37	3	7.35	6.06	9.94	8.9	34.75	12.2	8.83	0	0	15	0	4.21	0	0		13.6
01-May-01	7.37	3	7.35	6.06	9.94	5.3	62.6	6.48	8.83	0	0	15	0	5.16	0	0		13.9
01-Jun-01	7.37	3	7.35	6.06	9.94	7.9	13	8.7	8.83	0	0	11.25	0	3.67	0	0		13.6
01-Jul-01	6.96	3	7.35	6.06	9.94	1.8	13	11.02	8.83	0	0	15.25	0	2.73	0	0		3.5
01-Aug-01	4.48	4	7.35	6.06	9.94	16.6	18.2	9.56	8.83	0	0	8.6	0	3.66	0	0		6.6
01-Sep-01	5.55	4	7.35	6.06	9.94	16.6	22.3	5.9	8.83	0	0	11.25	0	5.33	1.67	0		3
01-Oct-01	4.8	4	7.35	6.06	9.94	11.8	15	9.4	8.83	0	0	13	0	4.18	57.175	0		3
01-Nov-01	4.58	3.6	7.35	6.06	9.94	20.4	10.4	10.7	8.83	0	47.7	16.66	0	4.11	27.82	0		5.6
01-Dec-01	4.63	2.8	7.35	6.06	9.94	11.9	24.8	9.1	8.83	0	15.433	16.66	0	5.72	62.975	0		6.1
01-Jan-02	4.88	3.6	7.35	6.06	9.94	15	11.8	9.6	8.83	0	9.974	8.8	0	5.33	24.1	0		13.7
01-Feb-02	5.95	5.8	7.35	4.5	9.94	5.2	21	11.4	8.83	0	13.65	6.25	0	4.65	15.778	0		13.7
01-Mar-02	5.53	5.3	7.35	8.325	9.94	5.2	35.3	15.2	8.83	0	8.743	7	0	6.67	18.34	0		4.2
01-Apr-02	5.53	4.3	7.35	4.083	22.3	4.9	25.8	10.6	8.83	0	11.818	10.5	0	3.22	23.667	0		3.2
01-May-02	3.48	3.6	7.35	4.464	22.3	4.9	20	8.08	8.83	0	7.738	18	0	3.74	12.006	73.1		17.3
01-Jun-02	4.15	3.5	7.35	3.748	22.3	4.9	7	11.8	8.83	0	15.225	13.5	0	3.7	11.425	51.833		13.63
01-Jul-02	8.89	6.2	7.35	2.83	22.3	4.9	8.5	11.8	8.83	0	11.008	7.75	0	3.7	8.33	21.676		6.9
01-Aug-02	14.84	3	7.35	3.4	8.4	4.1	9.2	12.92	8.83	0	5.866	7.2	0	5.22	18.658	14.288		5.4
01-Sep-02	9.38	2.5	7.35	3.083	2.8	4.7	14.5	14.5	8.83	0	3.335	10	0	3.25	7.732	5.25		4.3
01-Oct-02	11.96	4.8	7.35	4.5	10.4	4.7	12.2	15.28	8.83	0	5.994	8.2	0	5.38	3.333	6.46		12.8
01-Nov-02	8.26	9.3	7.35	4.268	28	4.7	11.7	11.2	9.92	14.2	12.15	7.75	0	7.89	13.224	4.165		15.9
01-Dec-02	9.91	9.3	6.402	6.76	28	4.7	11.7	11.2	6.45	13.6	9.508	10.25	0	7.16	10.992	15		25.9
01-Jan-03	5.93	3.75	4.333	5.602	28	4.7	12.2	30.27	12.78	13.6	9.394	8.8	0	7.3	15	9.06		15.6
01-Feb-03	12.05	3.75	6.585	7.835	8	5.3	14	11.1	5.05	8.4	8.825	10.25	0	17.5	7.134	11.243		14.3
01-Mar-03	11.06	3.5	9.14	6.665	4.8	13.3	11.75	34.3	8.7	13.3	13.92	7.5	6.9	12.67	9.58	9.418		4.45
01-Apr-03	7.2	3.3	6.75	4.75	4.8	12.8	11	20	10.49	13.4	12.075	14	8.3	9.47	5.75	8.593		8.7
01-May-03	6.6	10.6	13.25	9.534	6.4	4.4	5.2	8.96	14	13.2	15.86	8	7.7	4.65	10.415	14.34		4.6
01-Jun-03	10.13	4	7.675	12.258	3.8	13.3	3	13.9	4.72	19.1	10.957	7	6.6	6.64	10.415	4.75		4.15
01-Jul-03	8.3	5	4.25	6.274	10.88	9.5	2.4	8.1	7.44	8.72	8.908	2.8	4.6	5.07	14.2	5.8		4
01-Aug-03	5.81	3.25	6.418	4.165	10.88	5.6	4.25	6.3	7.44	10.1	10.296	20	9.3	7.45	8.9	3.6	92.7	5.7
01-Sep-03	7.56	4.25	8.468	4.75	10.88	5.8	5.5	14.9	12.67	7.6	5.085	2.25	5.2	8.04	7.8	9.5	14.7	3.36
01-Oct-03	6.04	6.6	6.668	15.478	3.6	6.1	3.8	9.12	4.87	10.2	7.192	5.5	4.2	5.64	6.667	7.866	10.2	8.3

Appendix A.2
WWTP Sampling Results

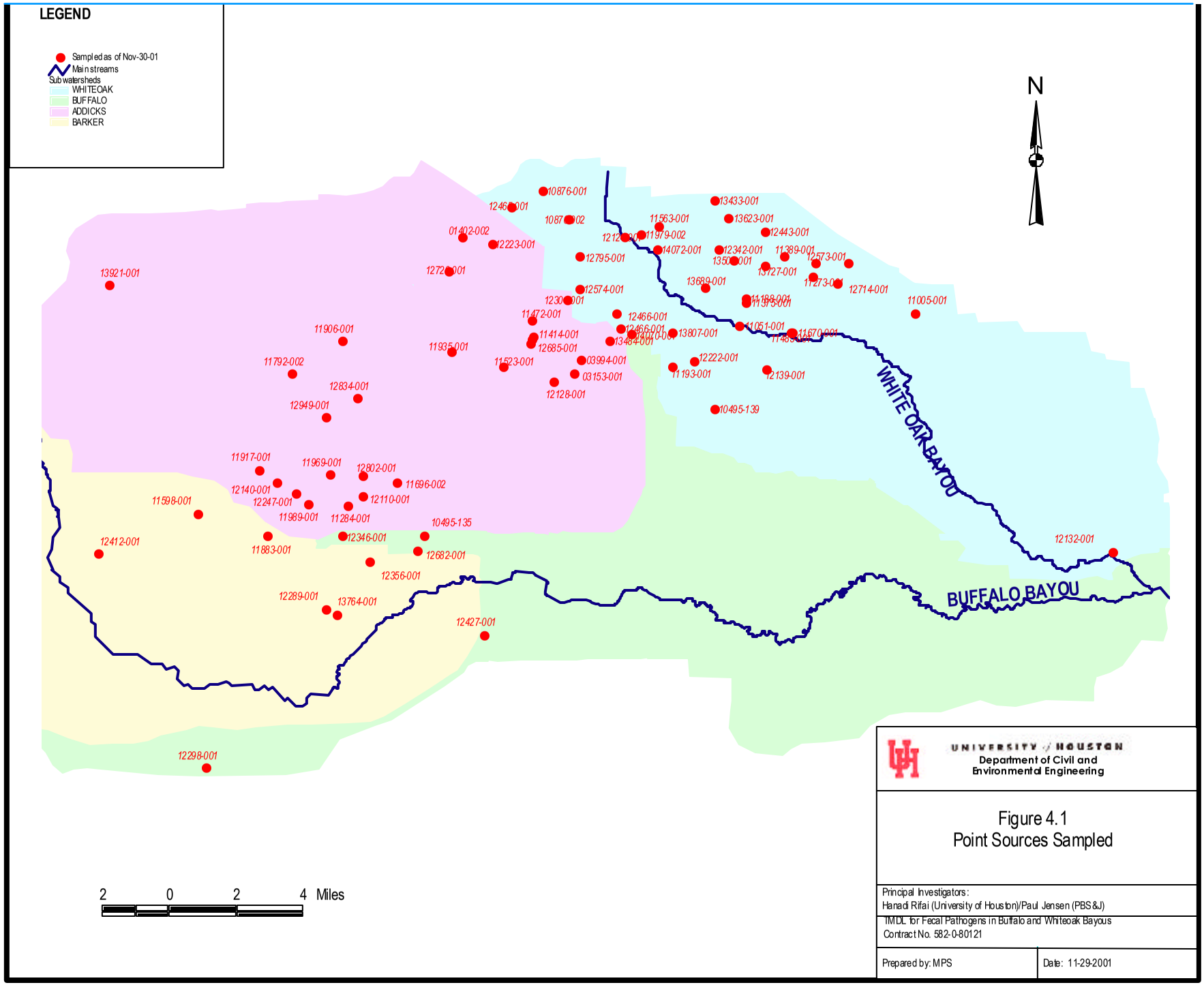

LEGEND
Sampled as of Nov-30-01
Main streams
Sub watersheds
WHITEOAK
BUFFALO
ADDICKS
BARKER
N
WHITE OAK BAYOU
BUFFALO BAYOU
10876-001
13433-001
12466-001
11563-001
13623-001
01402-002
12223-001
12443-001
12795-001
14072-001
12342-001
11389-001
12573-001
13500-001
13727-001
13921-001
12720-001
13689-001
11273-001
12714-001
12574-001
11199-001
11375-001
11005-001
11472-001
12466-001
11906-001
11414-001
13807-001
11051-001
11670-001
12685-001
13484-001
11935-001
12222-001
11792-002
11523-001
03994-001
11193-001
12139-001
03153-001
12834-001
12128-001
12949-001
10495-139
11917-001
11969-001
12802-001
11696-002
12140-001
12247-001
12110-001
11598-001
11989-001
11284-001
10495-135
12412-001
12346-001
12132-001
11883-001
12682-001
12356-001
12289-001
13764-001
12427-001
12298-001
2 0 2 4 Miles
UNIVERSITY of HOUSTON
Department of Civil and Environmental Engineering
Figure 4.1
Point Sources Sampled
Principal Investigators:
Hanadi Rifai (University of Houston)/Paul Jensen (PBS&J)
TMDL for Fecal Pathogens in Buffalo and Whiteoak Bayous
Contract No. 582-0-80121
Prepared by: MPS
Date: 11-29-2001

Table A.2-1 Results from Field Measurements for Point Source Monitoring

Sample ID	Location	Date	DO (mg/L)	pH	Temperature (^{o}C)	Residual Chlorine (mg/L)	Flow (MGD)	Conductivity (µS/cm)	Turbidity (NTU)	Ammonia (mg/L)	Ortho-phosphorous (mg/L)
10876-001-M	Barwood WWTP	7/24/2001	7.73	7.46	28.46	0	1.3990	694	0.4	0.18	0
10876-002-M	Hastings Green WWTP	7/24/2001	7.13	7.54	29.28	0	1.0760	896	0.4	0	5.5
10876-001-P	Barwood WWTP	7/24/2001	7.47	7.51	29.01	0.03	1.1140	723	0	0	4.96
10876-002-P	Hastings Green WWTP	7/24/2001	6.91	7.65	30.15	0.03	0.7250	906	0.1	0	4.27
12121-M	Harris County MUD 170	7/25/2001		7.41	29.76	0	1.2000	1128	0.9	0.82	3.06
12121-P	Harris County MUD 170	7/25/2001	6.63	7.43	30.14	0.05	1.0000	1075	0.9	0.76	5.33
12795-M	Northwest Harris County MUD 29	7/26/2001	6.92	7.36	30.19	2.85	0.2950	1106	0.7	0	57
11273-M	Harris County MUD 6	7/26/2001	8.62	7.68	29.05	2.32	0.2135	803	0.4	0	12.3
12795-P	Northwest Harris County MUD 29	7/26/2001	4.93	7.3	30.57	0.89	0.0210	1110	0.5	0.02	13.2
11273-P	Harris County MUD 6	7/26/2001	2.29	7.66	29.4	0.31	0.2130	793	0	0	12.5
12443-M	Superior Derrick	7/27/2001	6.62	7.21	27.68	5.07	0.0012	970	2.3	0	14.55
12573-M	William Smith MHP	7/27/2001	6.76	7.41	28.52	5.45	0.0152	707	0.3	0	5.2
12443-P	Superior Derrick	7/27/2001	6.9	7.28	27.99	3.7	0.0013	971	3.4	na	15.4
12573-P	William Smith MHP	7/27/2001	6.89	7.39	28.38	5.74	0.0152	693	0.1	na	5.92
11979-M	White Oak Bend WWTP	7/30/2001	7.72	7.66	29.81	14.2	0.2720	1561	2.1	0.31	10.66
11979-P	White Oak Bend WWTP	7/30/2001	7.86		29.99	7.26	0.2300	1535	2.2	0.16	9.28
13623-M	WHC MUD #21	7/31/2001	8.15	7.76	29.04	11	0.4000	2315	6	0	22.1
11563-M	Reid Road	7/31/2001	7.34	7.56	29.08	na	0.7450	1306	8.2	0.6	5.9
13623-P	WHC MUD #21	7/31/2001	8.66	7.69	29.38	5	0.3300	2348	8.5	na	13.15
11563-P	Reid Road	7/31/2001	7.33	7.7	29.67	na	0.6130	1373	4.1	na	7.18
11375-M	Creekside	8/1/2001	8.47	7.65	27.79	0.89	0.1560	847	3.8	32	2.84
13433-M	Heron Lake	8/1/2001	11.08	7.5	28.79	13.3	0.0024	835	0.8	0	2.39
11375-P	Creekside	8/1/2001	10.81	7.61	28.28	1.27	0.1110	862	3.3	82	2.7
13433-P	Heron Lake	8/1/2001	11.05	7.42	29.28	16.6	0.00002	837	0.6	na	0.79
13912-M	Konecrans Landel	8/2/2001	10.45	6.94	30	0.26	0.0020	692	1.4	0	18.85
11389-M	CB&I	8/2/2001	9.12	7.28	29.4	2.46	0.0091	720	1.2	0.15	12.35
13912-P	Konecrans Landel	8/2/2001	10.18	7.01	30.13	0.58	0.0024	693	0.9	na	17.65
11389-P	CB&I	8/2/2001	9.09	7.26	29.61	1.86	0.0114	715	0.3	0.03	10.75
12466-M	Oceaneering	8/3/2001	10.27	7.37	29.8	0.57	0.0076	1159	1.2	1.04	19.75
14070-M	Weatherford	8/3/2001	10.34	7.15	28.99	3.5	0.0026	311	1.3	0.12	12.95
12466-P	Oceaneering	8/3/2001	13.16	7.35	31.78	0.81	0.0051	1176	1.6	4.15	19.1
14070-P	Weatherford	8/3/2001	10.65	7.06	28.6	4.25	0.0037	614	2.9	0.13	12.5
12223-M	West Harris Couty MUD 15	8/7/2001	11	7.55	28.09	2.83	0.4400	883	5.7	0.09	6.74
01402-M	Wyman-Gordon	8/7/2001	5.94	8.88	29.24	0.21	nm	216	200.4	0.15	1.34
12223-P	West Harris Couty MUD 15	8/7/2001	9.42	7.56	28.88	0.57	0.6500	909	4.8	0.04	5.6
01402-Duplicate	Wyman-Gordon	8/7/2001	na	na	na	0.02	na	na	na	0.09	1.19
12726-M	Harris County MUD 155	8/8/2001	22.4	8.04	28.8	0.08	0.0660	793	1.7	0.09	6.65
12685-M	Harris County MUD 250	8/8/2001	21.22	7.13	28.18	0.34	0.0945	658	1.7	1.65	6.02
12726-P	Harris County MUD 155	8/8/2001	22.19	8.03	29.24	0.09		798	0.9	0.01	7.5
12685-P	Harris County MUD 250	8/8/2001	20.89	7.13	28.85	0.43	0.0831	638	1.7	1.56	5.54
12304-M	Chimney Hill	8/9/2001	21	7.52	30.23	2.2	0.6130	848	1.8	0.11	1.15
12304-P	Chimney Hill	8/9/2001	22.3	7.46	30.86	1.7	0.5980	844	1.3	0.02	1.82

Table A.2-1 Results from Field Measurements for Point Source Monitoring

Sample ID	Location	Date	DO (mg/L)	pH	Temperature (^{o}C)	Residual Chlorine (mg/L)	Flow (MGD)	Conductivity (µS/cm)	Turbidity (NTU)	Ammonia (mg/L)	Ortho-phosphorous (mg/L)
12128-M	Horsepen Bayou	8/10/2001	6.21	7.36	29.45	0.19	0.5890	821	1.2	0	7.25
11523-M	Harris County MUD 102	8/10/2001	7.46	8.17	30.05	na	0.5500	955	-0.2	0	8.9
12128-P	Horsepen Bayou	8/10/2001	6.2	7.4	29.9	0.06	0.6360	815	0.7	0	9.24
11523-P	Harris County MUD 102	8/10/2001	7.68	8.01	30.5	na	1.3100	963	0.1	0	10.82
11969-M	Mayde Creek	8/13/2001	7.44	7.76	29.23	0.01	0.0847	814	3.3	54	14.8
12834-M	Harris County MUD167	8/13/2001	7.96	8.18	28.75	2.42	0.0048	826	2.9	0.03	7.42
11969-P	Mayde Creek	8/13/2001	7.45	7.74	29.49	0.01	0.0640	808	2.7	56	11.45
12834-P	Harris County MUD167	8/13/2001	8.26	8.16	29.04	2.32	0.0042	799	3.1		8.86
12834-Duplicate	Harris County MUD167	8/13/2001				2.82				0	7.56
12574-M	Harris County MUD 130	8/14/2001	8.24	7.85	28.09	1.88	0.1640	847	1.2	0.05	10.32
11935-M	NWHC MUD 17	8/14/2001	7.97	7.58	29.67	1.04	0.1450	781	1.6	0.12	9.45
12574-P	Harris County MUD 130	8/14/2001	8.03	7.81	28.03	0.33	0.1430	845	0.3		8.8
11935-P	NWHC MUD 17	8/14/2001	7.9	7.53	30.09	1.22		782	1	0.06	9.45
11989-M	Fry Road MUD	8/15/2001	7.15	7.34	29.93	0.15	0.5250	938	0.7	0.26	12.35
12247-M	WHC MUD 017	8/15/2001	7.53	7.76	30.05	1.47	0.0060	797	1	0	7.95
11989-P	Fry Road MUD	8/15/2001	7.09	7.35	30.21	0.08	0.2302	945	0.6	0.16	13.15
12247-P	WHC MUD 017	8/15/2001	7.5	7.76	30.22	0.57	0.0061	798	0.8	na	8.2
11193-M	Brittmore	8/21/2001	6.35	na	29.63	0	1.45	0.99	3.3	2.8	8.62
12222-M	WXNW	8/21/2001	7.63	na	29.46	0.02	4.5000	0.936	7.9	0.04	13.2
11193-P	Brittmore	8/21/2001	6.52	na	30.19	0.04	0.95	0.982	3.9	1.7	6.2
12222-P	WXNW	8/21/2001	7.56	na	29.59	0.04	1.1800	0.947	8.1	0.03	15.25
12222- Duplicate	WXNW	8/21/2001				0.03				0	14.7
12346-M	West Park MUD	8/22/2001	6.91	na	29.47	1.82	0.1970	0.783	1.1	0.04	6.4
11696-M	Addicks UD	8/22/2001	7.42	na	29.55	0.03	0.1104	0.809	1.3	0	9.9
12346-P	West Park MUD	8/22/2001		na			0.1770				
11696-P	Addicks UD	8/22/2001	7.58	na	29.8	0.11	0.4690	0.836	2		3.3
12110-M	Katy ISD	8/23/2001	7.93	na	27.66	0.49	0.1405	0.696	8.3	0.1	10.4
12110-Duplicate	Katy ISD	8/23/2001				0.1					10.32
12110-P	Katy ISD	8/23/2001	8.04	na	28.34	0.17	0.1825	0.739	6.2		11.6
11414-M	Eli Sasson	8/24/2001	7.34	na	28.27	1.9	0.0115	669	2.6	0.1	12.1
12310-M	Richard Verry	8/24/2001	4.66	na	28.86	0.1	0.0077	750	0.3	28	1.22
11414-P	Eli Sasson	8/24/2001	6.76	na	28.87	0.39	0.0133	672	2.1	10	13.15
12310-P	Richard Verry	8/24/2001	4.99	na	29.61	0.11	0.0063	752	na	24	1.42
14072-M	WHC MUD 10	8/27/2001	6.92	na	28.81	0.03	1.5200	0.934	4.2	>50	10.9
13689-M	WHC MUD 11	8/27/2001	6.88	na	29.09	0	0.1300	1.039	3.1	0	13.9
14072-P	WHC MUD 10	8/27/2001	7.05	na	29.33	0.04	1.3000	0.925	4	>50	12.8
13689-P	WHC MUD 11	8/27/2001	7.19	na	29.48	0	0.2470	1.039	1.2	na	14.65
12479-M	Nottingham	8/28/2001	6.97	6.8	28.46	0.01	0.4430	0.379	0	0.03	12.75
12479-Duplicate	Nottingham	8/28/2001				0.03	0.4080			0.02	13.2
11188-M	Rolling Fork PUD	09/06/01		7.65	28.38	4.25	0.5120	744	1.6	0.01	6.72
11051-M	Vancouver	09/06/01	6.24	7.77	27.99	0.04	0.0266	773	12.3	0.2	11.15
11188-P	Rolling Fork PUD	09/06/01	7.51	7.78	28.72	1.55	0.2510	733	0.6		7.56

Table A.2-1 Results from Field Measurements for Point Source Monitoring

Sample ID	Location	Date	DO (mg/L)	pH	Temperature (^{o}C)	Residual Chlorine (mg/L)	Flow (MGD)	Conductivity (µS/cm)	Turbidity (NTU)	Ammonia (mg/L)	Ortho-phosphorous (mg/L)
11051-P	Vancouver	09/06/01	6.51	7.75	28.12	0.04	0.0319	764	0.4	0.34	10.45
11883-M	Castlewood	09/11/01	7.72	7.2	27.72	5.95	0.6100	763	4.9	0.12	10.3
12682-M	MUD #345	09/11/01	7.18	7.23	28.56	0.56	0.1040	904	4	0	13.6
11883-P	Castlewood	09/11/01	6.39	6.94	28.08	0.03	0.4690	760	2.7	0.07	11.35
12682-P	MUD #345	09/11/01	7.28	7.29	28.68	0.14	0.1240	840	3.2	0.12	19.5
13509-M	Bob Smith	09/13/01	6.88	7.55	26.78	0.07	0.0023	745	4	7	13.85
13727-M	Moorpark Village	09/13/01	7.53	7.56	26.81	4.2	0.0192	640	0.6	0	14.35
13509-P	Bob Smith	09/13/01	6.65	7.52	27.04	0.07	0.0035	735	3.6	5.92	13.85
13727-P	Moorpark Village	09/13/01	7.47	7.58	27.24	2.8	0.0055	841	1	na	16.45
13578-M	Cooper Energy Services	09/14/01	2.62	6.33	30.52	0.11	0.0024	720	12.3	2.34	20.15
13807-M	McDonalds Corp	09/14/01	7.72	7.57	27.67	2.16	0.0021	1115	4.7	0	42.4
13578-P	Cooper Energy Services	09/14/01	3.14	6.47	31.14	0.21	0.0047	706	13.7	2.78	21.2
13807-P	McDonalds Corp	09/14/01	7.23	7.48	28.48	1.07	nm	1117	5.4	0	49.9
13921-M	HC Juvenile Boot Camp	09/17/01	7.76	7.06	28.69	11	0.0180	647	91.5	0.83	27.5
13921-M-Duplicat	HC Juvenile Boot Camp	09/17/01	na	na	na	1.6	na	na	na	0.72	27.5
13921-P	HC Juvenile Boot Camp	09/17/01	7.73	6.4	28.77	0.12	0.0030	629	93	0.83	27.5
11284-M	Westlake MUD	09/19/01	6.66	7.37	28.96	0.04	0.7035	856	0	0.27	4.08
12802-M	HC MUD 238	09/19/01	8.29	7.37	29.79	0.9	0.1188	740	5.2	0	12.7
11284-P	Westlake MUD	09/19/01	7.93	7.28	29.41	0.18	0.6248	860	0	0	2.92
12802-P	HC MUD 238	09/19/01	8.19	7.48	29.93	1.73	0.0821	750	1.5	0	11.05
11906-M	HC MUD 157	09/20/01	7.33	7.37	28.94	0.2	0.3200	832	0.7	0	10.7
11792-M	HC MUD 105	09/20/01	7.35	7.47	27.9	0.04	0.3010	709	0.4	0.31	6.74
11906-P	HC MUD 157	09/20/01	7.36	7.36	29.43	>2	0.3100	842	2		9.55
11792-P	HC MUD 105	09/20/01	7.32	7.49	28.26	0.06	0.2410	706	0.1		7.22
12298-M	Ft. Bend Coutny MUD 34	09/25/01	7.91	7.85	24.05	2.68	0.0210	888	3.1	0	6.8
12298-P	Ft. Bend Coutny MUD 34	09/25/01	7.96	7.83	24.1	0.96	0.0513	911	2.3	na	7.04
11485-M	Harris County MUD 023	09/26/01	7.1	7.37	25.81	0.73	0.4520	834	6.2	0	12.05
12139-M	Fairbanks Plaza	09/26/01	7.5	7.8	25.39	0	0.0065	772	0.9	0.16	0.53
11485-P	Harris County MUD 023	09/26/01	8.65	7.39	26.16	0.15	0.2871	817	4.1	0	11.85
12139-P	Fairbanks Plaza	09/26/01	7.64	7.81	25.53	0.06	0.000004	739	1.5	0.07	0.61
11917-M	HCMUD 71	09/27/01	7.87	7.92	26.66	0.59	0.4830	795	0.4	1.99	13.25
11917-dup	HCMUD 71	09/27/01				0.47	0.3900			2.26	9.05
11917-P	HCMUD 71	09/27/01	8.06	7.93	26.94	0.13	0.2500	826	0.9	0.04	9.95
12714-M	Harris County MUD 119	09/28/01	6.56	7.55	27.91	2.6	0.2320	845	5.2	0.05	8.08
12714-outfall	Harris County MUD 119	09/28/01	8.01	7.84	26.32	2.78		842	2.6	0.02	8.38
12714-P	Harris County MUD 119	09/28/01	6.52	7.5	27.92	2.42	0.1220	846	4.5	0.04	8.3
12949-M	HCMUD 284	10/01/01	8.4	7.21	22.47	4.1	0.0055	911	8.2	0	10.75
12140-M	WHC 007	10/01/01	8.6	7.48	25.42	0.12	0.1590	842	3.4	0.04	14.6
12427-M	Aivazian	10/02/01	6.5	7.8	24.47	0.06	nm	587	12.6	0.01	11.75
12427-P	Aivazian	10/02/01	6.73	7.94	25.52	11.2	0.0218	674	12.5	0.01	12
12465-M	TIFCO	10/03/01	9.85	1.65	23.64	0.01	0.0052	6488	2.7	5.4	13.6
12465-P	TIFCO	10/03/01	9.76	1.9	24.17	0.01	0.0021	4137	1.3	3.28	16.55

Table A.2-1 Results from Field Measurements for Point Source Monitoring

Sample ID	Location	Date	DO (mg/L)	pH	Temperature (^{o}C)	Residual Chlorine (mg/L)	Flow (MGD)	Conductivity (µS/cm)	Turbidity (NTU)	Ammonia (mg/L)	Ortho-phosphorous (mg/L)
13807-P	McDonalds	10/03/01	7.96	7.32	25.35	2.16	0.0035	7180	9.2	0.04	51.2
13807-P1	McDonalds	10/03/01					0.0058			0.08	98
03153-M	Toshiba Corp.	10/05/01		7	25.5	1.48	0.0287	1133	2.6	0	23.45
03994-M	Varco Shaffer	10/05/01		7.6	24	0.09	0.0022	706	2.4	0	10
03153-P	Toshiba Corp.	10/05/01		6.95	25.3	1	0.0320	1092	4	0	21.05
03994-P	Varco Shaffer	10/05/01		7.57	23.9	0.11	0.0224	736	1.6	0	13.65
03994-P-Duplicate	Varco Shaffer	10/05/01				0.03				0	12.25
11670-M	Sunbelt	10/09/01				0.06	0.4970			0.83	9.44
11670-M-Duplicat	Sunbelt	10/09/01	6.07	6.98	25.33	0.04	0.4970	811	2.4	0.74	9.4
11670-P	Sunbelt	10/09/01	6.54	7.04	26.12	0.07	0.3000		14	0.76	10.08
11598-M	Williamsburg Regional	10/10/01	6.62	7.06	27.36	1.09	0.8120	914	2.3	0	9.9
11598-M-Duplicat	Williamsburg Regional	10/10/01				1.24	0.7950			0	10.6
11598-P	Williamsburg Regional	10/10/01	6.88	7.11	27.8	0.1	0.7090	917	0.9	0	10.5
12682-M	HCMUD 216	10/11/01	8.26	7.92	26.38	0.12	0.0440	654	33.5	0.01	6.88
12289-M	Green Trails	10/11/01				0.03	2.1090			0	10.1
12412-M	Cooper Cameron Corp.	10/15/01	8.12	7.37	21.42	0.08	0.0003	724	8.3	0	9.06
12412-P	Cooper Cameron Corp.	10/15/01	8.28	7.36	21.62	0.03	0.0006	721	8.2	0	6.8
12412-P-Duplicate	Cooper Cameron Corp.	10/15/01				0.06				0	9.3
11472-M	Spencer Road	10/16/01	8.43	7.45	23.59	3.9	0.5500	910	0.5	0	8.74
11472-P	Spencer Road	10/16/01	8.45	7.43	23.22	3.18	0.5100	911	0.8	na	8.42
10495-139-M	Westway WWTP	10/17/01	8.13	7.77	23.56	1.98	1.7900	794	1.6	0	7.9
10495-139-P	Westway WWTP	10/17/01	7.75	7.76	23.32	1.58	0.0900	759	1.6	0	7.3
13484-M	529 #35	10/18/01	8.91	6.91	21.07	0	0.0290	714	5.6	0	12.35
12132-M	White Oak	10/18/01	8.56			1.08	0.0189	512	4.6	0	7.24
13484-P	529 #35	10/18/01	8.97	7.01	21.2	0.89	0.0560	703	4.9	na	12.65
10495-M	P Ten	10/23/01	8.16	7.57	27.67	0.03	1.6000	947	1.6	0.04	7.66
10495-P	P Ten	10/23/01	7.56	7.4	28.12	0.02	0.5760	950	6.4		7.24
10495-Duplicate	P Ten	10/23/01				0.03	0.5760				7.26
11005-M	Champ's Water	10/24/01	7.57	7.74	25.85	0.36	0.0950	682	3.9	0	1.65
12342-M	C&P Utilities	10/24/01	6.29	7.27	25.47	3.3	0.0230	794	0.3	0.06	12.15
11005-P	Champ's Water	10/24/01	6.09	7.54	26.17	0.24	0.2180	680	3.4	0	1.6
12342-P	C&P Utilities	10/24/01	7.2	7.27	25.93	3.32	0.0105	798	0.1	0.02	12.05

Notes/Abbreviations:

M denotes a measurement made early in the morning
P denotes a measurement made at mid-morning
WWTP = waste water treatment plant
na = not available
MUD = municipal utility district
mg = milligram
µS = micro Siemens
WHC = West Harris County
NWHC = North West Harris County
MGD = million gallons per day
nm = not measurable (flow too low to be quantified)
L = liter
cm = centimeter
NTU = Nephelometric Turbidity units

Table A.2-2 Results from Lab Analyses for Point Source Monitoring

Sample ID	Location	Date	Flow (MGD)	Total Coliforms (MPN/100 mL)[a]	*E coli* (MPN/100 mL)[a]	Fecal Coliforms (cfu/100 mL)[b]	TSS (mg/L)[b]
10876-001-M	Barwood WWTP	07/24/01	1.3990	568.8	2.7	450	4.7
10876-002-M	Hastings Green WWTP	07/24/01	1.0760	78.1	9.5	100	2.7
10876-001-P	Barwood WWTP	07/24/01	1.1140	388.1	6.1	150	<1.0
10876-002-P	Hastings Green WWTP	07/24/01	0.7250	44.2	1.0	11	1.3
12121-001-M	Harris County MUD 170	07/25/01	1.2000	1460.1	21.0	0	2
12121-001-P	Harris County MUD 170	07/25/01	1.0000	1305.5	5.6	0	2.7
12795-M	Northwest Harris County MUD 29	07/26/01	0.2950	1986.3	30.1	7	8.8
11273-M	Harris County MUD 6	07/26/01	0.2135	4.1	1.6	0	<1.0
12795-P	Northwest Harris County MUD 29	07/26/01	0.0210	604.3	322.1	7	7.6
11273-P	Harris County MUD 6	07/26/01	0.2130	12.3	<1	0	1.2
12443-M	Superior Derrick	07/27/01	0.0012	34.0	<1	0	4
12573-M	William Smith MHP	07/27/01	0.0152	2.4	<1	0	3
12443-P	Superior Derrick	07/27/01	0.0013	128.8	14.3	0	4.5
12573-P	William Smith MHP	07/27/01	0.0152	33.0	<1	0	4
11979-M	White Oak Bend WWTP	07/30/01	0.2720	39.3	<1	3	2.5
11979-P	White Oak Bend WWTP	07/30/01	0.2300	<1	<1	0	4.8
11563-M	WHC MUD #21	07/31/01	0.7450	1053.5	15.4	73	13.6
13623-M	Reid Road	07/31/01	0.4000	<1	<1	0	8.4
11563-P	WHC MUD #21	07/31/01	0.6130	918.8	13.3	93	9.5
13623-P	Reid Road	07/31/01	0.3300	<1	<1	0	9.5
11375-M	Creekside	08/01/01	0.1560	2814.3	32.3	2	5.5
13433-M	Heron Lake	08/01/01	0.0024	<1	<1	0	1.5
11375-P	Creekside	08/01/01	0.1110	220.4	3.4	0	4
11375-outfall	Creekside	08/01/01		15530.7	292.7	60	
13433-P	Heron Lake	08/01/01	0.00002	<1	<1	0	1
13912-M	Konecrans Landel	08/02/01	0.0020	<1	<1	0	7.5
11389-M	CB&I	08/02/01	0.0091	573.0	0.0	7	3
13912-P	Konecrans Landel	08/02/01	0.0024	4.9	0.5	2	3.5
11389-P	CB&I	08/02/01	0.0114	28.8	3.1	1	2.5
12466-M	Oceaneering	08/03/01	0.0076	742.7	295.2	4	8.5
14070-M	Weatherford	08/03/01	0.0026	29.1	<1	0	8.5
12466-P	Oceaneering	08/03/01	0.0051	18.3	3.8	0	9

Table A.2-2 Results from Lab Analyses for Point Source Monitoring

Sample ID	Location	Date	Flow (MGD)	Total Coliforms (MPN/100 mL)[a]	*E coli* (MPN/100 mL)[a]	Fecal Coliforms (cfu/100 mL)[b]	TSS (mg/L)[b]
14070-P	Weatherford	08/03/01	0.0037	21.4	<1	0	12
12223-M	West Harris Couty MUD 15	08/07/01	0.4400	16.5	7.4	4	9.5
12223-P	Wyman-Gordon	08/07/01	0.6500	14.0	<1	2	10.5
01402-M	West Harris Couty MUD 15	08/07/01		>24192	1231.2	5000	60
12726-M	Harris County MUD 155	08/08/01	0.0660	665.6	65.8	34	6.5
12685-M	Harris County MUD 250	08/08/01	0.0945	<1	<1	0	8
12726-P	Harris County MUD 155	08/08/01		893.0	96.5	24	8
12685-P	Harris County MUD 250	08/08/01	0.0831	<1	<1	0	7.5
12304-M	Chimney Hill	08/09/01	0.6130	609.6	3.1	2	7
12304-P	Chimney Hill	08/09/01	0.5980	95.3	<1	5	8
11523-M	Harris County MUD 102	08/10/01	0.5500	2202.7	33.3	0	3
12128-M	Horsepen Bayou	08/10/01	0.5890	1081.6	10.5	0	3
11523-P	Harris County MUD 102	08/10/01	1.3100	2130.6	28.6	0	2
12128-P	Horsepen Bayou	08/10/01	0.6360	714.5	26.8	0	1
11969-M	Mayde Creek	08/13/01	0.0847	6131.0	24.7	19	5.5
12834-M	Harris County MUD167	08/13/01	0.0048	6.2	<1	0	5
11969-P	Mayde Creek	08/13/01	0.0640	6998.0	28.1	0	7
12834-P	Harris County MUD167	08/13/01	0.0042	1.0	<1	0	2.5
12574-M	Harris County MUD 130	08/14/01	0.1640	9.2	<1	0	4.7
11935-M	NWHC MUD 17	08/14/01	0.1450	409.8	0.7	4	4.7
12574-P	Harris County MUD 130	08/14/01	0.1430	4.2	2.1	0	7.3
11935-P	NWHC MUD 17	08/14/01		549.0	0.0	3	8
11989-M	Fry Road MUD	08/15/01	0.5250	0.7	0.0	0	<1.0
12247-M	WHC MUD 017	08/15/01	0.0060	397.8	<1	0	2
11989-P	Fry Road MUD	08/15/01	0.2302	2.0	<1	0	2
12247-P	WHC MUD 017	08/15/01	0.0061	305.8	<1	0	2
11193-M	Brittmore	08/21/01	1.4500	8891.0	1295.8	0	7
12222-M	WXNW	08/21/01	4.5000	>24,192	22027.3	0	12
11193-P	Brittmore	08/21/01	0.9500	4531.3	126.9	0	7
12222-P	WXNW	08/21/01	1.1800	20760.2	7597.0	0	12
12346-M	West Park MUD	08/22/01	0.1970	<1	<1	0	1
11696-M	Addicks UD	08/22/01	0.1104	5.2	<1	0	3

Table A.2-2 Results from Lab Analyses for Point Source Monitoring

Sample ID	Location	Date	Flow (MGD)	Total Coliforms (MPN/100 mL)[a]	*E coli* (MPN/100 mL)[a]	Fecal Coliforms (cfu/100 mL)[b]	TSS (mg/L)[b]
11696-P	Addicks UD	08/22/01	0.4690	20.0	2.3	4	8
12110-M	Katy ISD	08/23/01	0.1405	1.6	<1	0	4
12110-P	Katy ISD	08/23/01	0.1825	3.1	<1	0	3.5
11414-M	Eli Sasson	08/24/01	0.0115	<1	<1	0	4
12310-M	Richard Verry	08/24/01	0.0077	6.7	<1	0	<1.0
11414-P	Eli Sasson	08/24/01	0.0133	4.1	<1	0	4
12310-P	Richard Verry	08/24/01	0.0063	2.7	<1	0	1.5
14072-M	WHC MUD 10	08/27/01	1.5200	1506.6	17.3	16	2.5
13689-M	WHC MUD 11	08/27/01	0.1300	2130.6	314.4	58	2
14072-P	WHC MUD 10	08/27/01	1.3000	1018.7	<1	18	2.5
13689-P	WHC MUD 11	08/27/01	0.2470	1299.7	38.5	12	1.5
12479-M	Nottingham	08/28/01	0.4430	2274.9	54.3	30	3
11188-M	Rolling Fork PUD	09/06/01	0.5120	<1	<1	0.0	3.0
11051-M	Vancouver	09/06/01	0.0266	1171.3	49.4	0.0	2.0
11188-P	Rolling Fork PUD	09/06/01	0.2510	<1	<1	0.0	1.0
11051-P	Vancouver	09/06/01	0.0319	1817.2	44.1	0.0	1.0
11883-M	Castlewood	09/11/01	0.6100	<1	<1	0.0	3.0
12682-M	MUD #345	09/11/01	0.1040	22.6	<1	0.0	28.0
11883-P	Castlewood	09/11/01	0.4690	8.9	<1	0.0	2.0
12682-P	MUD #345	09/11/01	0.1240	18.1	<1	2.0	1.0
13509-M	Bob Smith	09/13/01	0.0023	>2419.2	74.1	1.0	6.0
13727-M	Moorpark Village	09/13/01	0.0192	<1	<1	0.0	5.0
13509-P	Bob Smith	09/13/01	0.0035	3480.3	68.3	0.0	10.0
13727-P	Moorpark Village	09/13/01	0.0055	3.2	<1	0.0	5.0
13807-M	McDonalds Corp	09/14/01	0.0021	<1	<1	0.0	8.0
13578-M	Cooper Energy Services	09/14/01	0.0024	<1	<1	0.0	14.0
13807-P	McDonalds Corp	09/14/01		<1	<1	0.0	4.0
13578-P	Cooper Energy Services	09/14/01	0.0047	<1	<1	0.0	20.0
13807-dup		09/14/01		<1	<1	0.0	6.0
13921-M	HC Juvenile Boot Camp	09/17/01	0.0180	84.2	<1	0.0	19.0
13921-M dup	HC Juvenile Boot Camp	09/17/01	na	385.3	<1	18.0	21.0
13921-P	HC Juvenile Boot Camp	09/17/01	0.0030	1528.5	3.0	2.0	21.0

Table A.2-2 Results from Lab Analyses for Point Source Monitoring

Sample ID	Location	Date	Flow (MGD)	Total Coliforms (MPN/100 mL)[a]	*E coli* (MPN/100 mL)[a]	Fecal Coliforms (cfu/100 mL)[b]	TSS (mg/L)[b]
11284-M	Westlake MUD	09/19/01	0.7035	1483.3	8.2	13.0	1.0
12802-M	HC MUD 238	09/19/01	0.1188	7.2	8.6	0.0	4.0
11284-P	Westlake MUD	09/19/01	0.6248	1855.2	7.9	11.0	9.0
12802-P	HC MUD 238	09/19/01	0.0821	6.7	<1	0.0	3.0
11906-M	HC MUD 157	09/20/01	0.3200	3.1	<1	0.0	1.0
11792-M	HC MUD 105	09/20/01	0.3010	1961.6	3.7	36.0	1.0
11906-P	HC MUD 157	09/20/01	0.3100	<1	<1	0.0	1.0
11792-P	HC MUD 105	09/20/01	0.2410	1496.4	6.7	21.0	1.0
11917-M	HCMUD 71	09/24/01	0.4830	190.0	0.7	0.0	1.0
11917-M-dup	HCMUD 71	09/24/01	0.3900	137.9	<1	0.0	1.0
11917-P	HCMUD 71	09/24/01	0.2500	94.6	<1	0.0	1.0
12298-M	Ft. Bend Coutny MUD 34	09/25/01	0.0210	<1	<1	0.0	3.0
12298-P	Ft. Bend Coutny MUD 34	09/25/01	0.0513	2.5	<1	0.0	3.0
11485-M	Harris County MUD 023	09/26/01	0.4520	1.0	<1	0.0	3.5
12139-M	Fairbanks Plaza	09/26/01	0.0065	>24192	2076.0	380.0	3.5
11485-P	Harris County MUD 023	09/26/01	0.2871	3.1	1.0	0.0	2.0
12139-P	Fairbanks Plaza	09/26/01	0.000004	260.6	3.7	0.0	6.0
12714-M	Harris County MUD 119	09/28/01	0.2320	8.4	2.0	0.0	6.5
12714-P	Harris County MUD 119	09/28/01	0.1220	4.5	<1	0.0	4.0
12714-outfall	Harris County MUD 119	09/28/01		2.4	<1	0.0	6.0
12949-M	HCMUD 284	10/01/01	0.0055	<1	<1	0.0	1.0
12140-M	WHC 007	10/01/01	0.1590	4.1	<1	1.0	3.0
12427-M	Aivazian	10/02/01		2419.2	4.5	6.0	<1
12427-P	Aivazian	10/02/01	0.0218	1.5	<1	0.0	1.0
12465-M	TIFCO	10/03/01	0.0052	<1	<1	0.0	13.5
12465-P	TIFCO	10/03/01	0.0021	251.9	193.0	0.0	6.5
13807-P	McDonalds	10/03/01	0.0035	7.2	<1	0.0	10.0
03153-M	Toshiba Corp.	10/05/01	0.0287	<1	<1	0.0	2.5
03994-M	Varco Shaffer	10/05/01	0.0022	<1	<1	0.0	2.0
03153-P	Toshiba Corp.	10/05/01	0.0320	2.7	<1	0.0	1.5
03994-P	Varco Shaffer	10/05/01	0.0224	9.0	<1	0.0	2.0

Table A.2-2 Results from Lab Analyses for Point Source Monitoring

Sample ID	Location	Date	Flow (MGD)	Total Coliforms (MPN/100 mL)[a]	*E coli* (MPN/100 mL)[a]	Fecal Coliforms (cfu/100 mL)[b]	TSS (mg/L)[b]
11670-M	Sunbelt	10/09/01	0.4970	467.3	15.4	1.0	24.5
11670-M-dup	Sunbelt	10/09/01	0.4970	401.3	12.3	1.0	23.0
11670-P	Sunbelt	10/09/01	0.3000	1041.3	24.7	0.0	22.5
11598-M	Williamsburg Regional	10/10/01	0.8120	1245.6	55.1	14.0	4.5
11598-M-dup	Williamsburg Regional	10/10/01	0.7950	964.0	34.0	13.0	4.0
11598-P	Williamsburg Regional	10/10/01	0.7090	1048.8	51.8	10.0	5.5
12682-M	HCMUD 216	10/11/01	0.0440	522.7	<1	0.0	22.5
12289-M	Green Trails	10/11/01	2.1090	169.7	5.8	5.0	3.5
12412-M	Cooper Cameron Corp.	10/15/01	0.0003	52.8	4.8	2.0	20.5
12412-P	Cooper Cameron Corp.	10/15/01	0.0006	46.6	3.8	0.0	23.5
12412-P-Dup	Cooper Cameron Corp.	10/15/01		128.9	15.1	3.0	23.0
11472-M	Spencer Road	10/16/01	0.5500	<1	<1	4.0	2.5
11472-P	Spencer Road	10/16/01	0.5100	<1	<1	0.0	3.0
10495-139-M	Westway WWTP	10/17/01	1.7900	<1	<1	0.0	2.0
10495-139-P	Westway WWTP	10/17/01	0.0900	1.3	<1	0.0	2.0
13484-M	529 #35	10/18/01	0.0290	12.7	<1	0.0	6.0
12132-M	White Oak	10/18/01	0.0189	<1	<1	0.0	4.2
13484-P	529 #35	10/18/01	0.0560	<1	<1	0.0	3.9
10495-M	P Ten	10/23/01	1.6000	2419.2	4.1	3.0	5.6
10495-P	P Ten	10/23/01	0.5760	1672.9	16.6	2.0	7.1
10495-P-Dup	P Ten	10/23/01	0.5760	682.9	0.0	2.0	4.0
11005-M	Champ's Water	10/24/01	0.0950	10.0	2.1	0.0	3.5
12342-M	C&P Utilities	10/24/01	0.0230	48.4	2.0	0.0	4.5
11005-P	Champ's Water	10/24/01	0.2180	3.8	<1	0.0	2.0
12342-P	C&P Utilities	10/24/01	0.0105	9.9	0.0	0.0	6.0

Notes/Abbreviations:

[a] Parameter analyzed at UH lab. The results are the average of triplicates for a given dilution. At least two different dilutions were prepared for each sample (1:1 and 1:10). If historical data showed high levels a third dilution (1:100) was prepared

[b] Parameter analyzed at NWDLS lab

M denotes a measurement made early in the morning

P denotes a measurement made at mid-morning

E. coli = Escherichia coli

cfu = colony forming units

MGD = million gallons per day

MPN = most probable number

TSS = total suspended solids

mg = milligram

L = liter

Samples exceeding the EC criterion of 126 MPN/100 mL are highlighted in green

Table A.2-3 Results of WWTP Sampling

DATE	TIME	SAMPLE ID	Plant ID	Sample Comments	Flow (MGD)	E. coli (MPN/dL)	TSS (mg/L)	OBSERVATIONS	DAYS SINCE RAINFALL	pH	Cl_2	QA/QC Notes
06/08/06	7:57	12132-001	12132-001		7.22E-03	18	5.5	slightly turbid	6	-	2	3
06/08/06	8:01	12132-001	12132-001		7.22E-03	15	6.5	-	6	-	-	3
06/08/06	9:08	13764-001	13764-001		5.13E-02	9	3.9	slightly turbid	6	-	<1	2, 3
06/08/06	10:00	10495-076	10495-076		5.80E+00	2	4.1	clear	6	-	3.5	
06/08/06	11:00	11670-001	11670-001		1.97E-01	< 2	2.5	clear with a few sludge balls	6	-	2.6	
06/08/06	11:17	10495-099	10495-099		1.25E+00	< 2	3.5	clear	6	-	2	
06/08/06	12:02	12233-001	12233-001		4.82E-03	26	22	slightly turbid	6	-	2.2	
6/13/2006	11:55	11538-001	11538-001		9.85E-01	11	4.9	-	>7	-	0	
06/13/06	12:25	12121-001	12121-001		1.02E+00	1	5.1	-	>7	-	0	
06/13/06	12:50	11563-001	11563-001		4.38E+00	11	4.2	-	>7	-	0	
6/14/2006	8:10	10876-001	10876-001		1.37E+00	2	2.5	-	>7	-	0.02	
6/14/2006	8:29	11969-02	11969-001		7.85E-01	< 1	3.8	clear sample	>7	-	-	2
6/14/2006	8:33	11969-03	11969-001	Duplicate	7.85E-01	9	2.5	clear sample	>7	-	-	2
6/14/2006	8:45	10876-002	10876-002		1.75E+00	27	7.9	-	>7	-	-	
6/14/2006	8:55	12802-01	12802-001		1.61E+00	1	2.5	clear sample	>7	7.2	1.44	2
6/14/2006	9:25	11284-01	11284-001		6.61E-01	32	2.5	clear sample	>7	7.1	1.4	2
6/14/2006	9:45	13623-001	13623-001		3.27E-02	< 1	4.5	-	>7	-	-	
6/14/2006	10:05	13433-001	13433-001		3.50E-01	1	7.9	-	>7	-	-	
6/14/2006	10:13	12346-01	12346-001	East Plant	1.40E-01	1540	2.5	clear sample	>7	7.4	0.05	2
6/14/2006	10:25	12346-02	12346-001	West Plant	1.82E-01	407	3.9	clear sample	>7	-	0.32	2
6/14/2006	10:35	13939-001	13939-001		4.00E-03	< 1	2.5	-	>7	-	-	
6/14/2006	11:50	11696-002	11696-002		1.05E-01	< 1	3.1	clear sample	>7	6.9	4.4	2
6/14/2006	12:50	10495-135	10495-135		4.99E-01	2	3.5	slight scum on surface	>7	7.5	3.5	2
6/15/2006	7:32	13770-001	13770-001		8.09E-03	250	2.5	clear sample	>7	-	-	1, 2
6/15/2006	7:35	13770-02	13770-001	Duplicate	8.09E-03	225	2.5	clear sample	>7	-	-	1, 2
6/15/2006	8:14	11005-001	11005-001		1.05E-01	< 1	20	moderately turbid	>7	7.2	1.5	4
6/15/2006	8:44	12714-001	12714-001		1.48E-01	6	4.3	clear with grease balls and grease layers	>7	7.4	2.5	4
6/15/2006	9:08	14506-001	14506-001		1.48E-01	> 241920	3781	turbid brown, sludge going over final weir	>7	6.6	0	4
6/15/2006	10:02	14259-001	14259-001		1.48E-01	< 1	12.8	clear with med. Size grease balls	>7	5.5	5	
6/15/2006	10:30	14538-001	14538-001		1.54E+00	< 1	2.5	clear sample	>7	7.15	1.5	
6/21/2006	9:15	13578-002	13578-001	Duplicate	7.83E-04	4	41.5	fine solids in effluent, partly cloudy, no odors	0.8	7.2	1	2, 4
6/21/2006	9:15	13578-003	13578-001		7.83E-04	2	42.1	fine solids in effluent, partly cloudy, no odors	0.8	-	-	2, 4
6/21/2006	10:13	12552-001	12552-001		4.16E-03	1935	34.1	water light brown, partly cloudy, no odors	0.8	7.2	0.11	4
6/21/2006	10:39	12552-002	12552-002		3.96E-03	< 1	5.2	effluent clear, partly cloudy, no odors	0.8	7.3	1.5	4
6/21/2006	11:19	13484-001	13484-001		9.33E-03	< 1	5.7	water clear, no odors, partly cloudy	0.8	6.4	2.5	4
6/22/2006	8:49	14072-001	14072-001		1.82E+00	< 1	9.9	clear	1.7	7.4	3.5	1, 2, 3

Abbreviations: Cl_2 - chlorine, dL, deciliter, ID - identification, MGD - million gallons per day, MPN - most probable number, QA/QC - quality assurance/quality control, TSS - total suspended solids

QA/QC Notes:

1. TSS duplicate samples did not meet DQO in this batch, flagged with "J" to indicate estimates
2. TSS equipment blanks had levels greater than detection limit, samples considered acceptable
3. TSS samples did not have lab control split duplicates (LCSD), samples considered acceptable
4. TSS samples for LCSD failed the DQO in this batch, flagged witih "J" to indicate estimates
5. Samples run at TCEQ Region 12 Laboratory
6. E. coli contamination found in equipment blank

Table 2.1, continued Results of WWTP Sampling

DATE	TIME	SAMPLE ID	Plant ID	Sample Comments	Flow (MGD)	E. coli (MPN/dL)	TSS (mg/L)	OBSERVATIONS	DAYS SINCE RAINFALL	pH	Cl_2	QA/QC Notes
6/22/2006	8:50	14072-02	14072-001	Duplicate	1.77E+00	< 1	< 2.5	clear	1.7	-	-	1, 2, 3
6/22/2006	9:20	12681-001	12681-001		1.82E-01	< 1	4.8	clear	1.7	6.5	2.3	3
6/22/2006	9:48	12574-001	12574-001		2.31E-01	< 1	4.3	clear	1.7	-	3	3
6/22/2006	10:37	11979-002	11979-002		1.64E-01	1	4.2	slightly turbid to clear	1.7	7.5	3.5	3
6/22/2006	11:23	12397-001	12397-001		0.00E+00	179	42.6	turbid, brownish-yellow tint	1.7	-	2	3
6/26/2006	8:31	11917-001	11917-001		3.48E-03	< 1	3.7	clear	0.5	7.6	3.5	2, 3
6/26/2006	8:34	11917-03	11917-001	Duplicate	3.61E-03	< 1	6.8	clear	0.5	-	-	2, 3
6/26/2006	9:42	12189-001	12189-001		2.82E-02	3	3.3	clear w/a few grease balls	0.5	-	0.57	2, 3
6/26/2006	10:20	12140-001	12140-001		2.86E-01	< 1	4.6	slightly turbid	0.5	7.4	3.5	2, 3
6/26/2006	11:07	11989-001	11989-001		2.86E-01	< 1	< 2.5	clear - light pin floe	0.5	-	0.45	2, 3
6/26/2006	11:51	12247-001	12247-001		1.71E-01	11	6.8	slightly turbid	0.5	-	1.4	3
6/26/2006	12:45	12110-001	12110-001		5.13E-02	2	17.1	clear to grayish in color w/ small grease balls	0.5	-	0.55	3
6/28/2006	8:23	11273-01	11273-001		3.16E-01	< 1	3.6	clear	2.5	7.7	2.5	1, 2, 3
6/28/2006	8:27	11273-02	11273-001	Duplicate	3.01E-01	< 1	7.4	clear	2.5	-	-	1, 2, 3
6/28/2006	9:06	11389-01	11389-001	Main Plant	3.48E-03	1	2.5	clear w/small floating particles	2.5	7.3	2	1, 2, 3
6/28/2006	9:14	11389-02	11389-001	Small Tank	1.03E-03	< 1	6.5	clear w/small floating particles	2.5	-	-	1, 2, 3
6/28/2006	9:41	12443-01	12443-01		4.16E-03	33	19.9	slightly turbid w/ yellowish tint	2.5	6.6	1.5	1, 2, 3
6/28/2006	10:24	13509-01	13509-01		1.10E-02	< 1	6.8	slightly turbid	2.5	6.8	3	
6/28/2006	10:48	12342-01	12342-01		5.46E-03	1	3.2	slightly turbid	2.5	7.1	1.5	
6/28/2006	11:11	13727-01	13727-01		4.04E-03	1	3.2	moderately turbid	2.5	7.2	1	
6/28/2006	11:34	13727-02	13727-02		7.66E-02	52	410	very turbid	2.5	-	-	
7/5/2006	9:13	10495-030	10495-030		1.85E+01			fairly clear	none	7.1	1.8	5
7/5/2006	9:55	12355-001	12355-001		4.32E-04			slightly turbid, tea colored	none	5.3	3	5
7/5/2006	10:43	13996-001	13996-001		0.00E+00			fairly clear	none	7.1	0.32	5
7/5/2006	11:06	12139-03	12139-001		6.84E-03			clear	none	-	-	5
7/5/2006	11:15	12139-02	12139-001		6.84E-03			turbid with whitish solids	none	-	-	5
7/5/2006	11:17	12139-01	12139-001		6.84E-03			turbid with whitish solids	none	6.9	1	5
7/5/2006	12:40	10495-139	10495-139		1.24E+00			clear with slight tea color	none	7.4	0.38	5
7/5/2006	13:43	10584-001	10584-001		8.39E+00			slightly turbid with light tea color	none	7.2	1.1	5
7/6/2006	8:20	13983-03	13983-001	Duplicate	trickle	< 1	< 2.5	trickle into outfall	1	-	-	2
7/6/2006	8:20	13983-02	13983-001		trickle	< 1	< 2.5	trickle into outfall	1	6.9	2.5	2
7/6/2006	8:41	13807-01	13807-01		7.09E-03	9	2.6	clear	1	7.4	2.2	2
7/6/2006	9:01	12222-01	12222-01		1.75E-03	< 1	3.5	clear	1	6.7	2.1	2
7/6/2006	9:31	11193-01	11193-01		5.85E-01	< 1	< 2.5	clear	1	6.5	3.4	2
7/6/2006	10:02	14117-01	14117-001	West Plant	1.82E-01	< 1	3.8	clear	1	7	3.5	
7/6/2006	10:15	14117-01	14117-001	East Plant	2.86E-01	< 1	2.6	clear	1	7	3.5	

Abbreviations: Cl_2 - chlorine, dL, deciliter, ID - identification, MGD - million gallons per day, MPN - most probable number, QA/QC - quality assurance/quality control, TSS - total suspended solids

QA/QC Notes:

1. TSS duplicate samples did not meet DQO in this batch, flagged with "J" to indicate estimates
2. TSS equipment blanks had levels greater than detection limit, samples considered acceptable
3. TSS samples did not have lab control split duplicates (LCSD), samples considered acceptable
4. TSS samples for LCSD failed the DQO in this batch, flagged witih "J" to indicate estimates
5. Samples run at TCEQ Region 12 Laboratory
6. E. coli contamination found in equipment blank

Table 2.1, continued Results of WWTP Sampling

DATE	TIME	SAMPLE ID	Plant ID	Sample Comments	Flow (MGD)	E. coli (MPN/dL)	TSS (mg/L)	OBSERVATIONS	DAYS SINCE RAINFALL	pH	Cl_2	QA/QC Notes
7/6/2006	10:38	14070-01	14070-01		0.00E+00	2	4.6	clear	1	6.1	11.3	
7/10/2006	8:36	12128-01	12128-001		3.75E-01	1	< 2.5	clear to slightly turbid	Dups Cl2	7	3.25	2, 4
7/10/2006	8:39	12128-02	12128-001	Duplicate	3.75E-01	2	< 2.5	clear to slightly turbid	2	-	-	2, 4
7/10/2006	9:05	12310-001	12310-001		5.90E-02	< 1	< 2.5	clear	2	6.9	6.8	4
7/10/2006	9:23	11414-001	11414-001		1.10E-02	< 1	5.7	slightly turbid	2	7.4	3.7	2, 4
7/10/2006	10:08	12685-001	12685-001		6.10E-02	< 1	< 2.5	slightly turbid	2	7.4	1.2	2, 4
7/10/2006	10:25	11472-001	11472-001		3.28E-01	< 1	< 2.5	slightly turbid	2	7.1	3	4
7/10/2006	10:58	11947-001	11947-001		9.06E-01	18	< 2.5	slightly turbid	2	7.2	3.5	4
7/12/2006	8:50	11051-01	11051-001		3.74E-02	1	< 2.5	slightly turbid	3	7.6	2.5	1, 2, 3
7/12/2006	8:52	11051-02	11051-001	Duplicate	3.74E-02	10	2.6	-	3	-	-	1, 2, 3
7/12/2006	9:11	11375-001	11375-001		4.14E-02	< 1	11.6	slightly turbid	3	6.9	6.7	1, 2, 3
7/12/2006	9:54	11485-001	11485-001		1.82E-01	< 1	< 2.5	slightly turbid	3	7.2	3	1, 2, 3
7/12/2006	10:47	13689-001	13689-001		2.50E-01	105	< 2.5	moderately turbid	3	7.6	3.5	3
7/12/2006	11:09	11538-001	11538-001		1.25E+00	5	3.3	slightly turbid	3	6.9	3.5	
7/13/2006	8:14	12927-001	12927-001		1.82E-01	2	4.6	clear	4	8	1.5	3
7/13/2006	8:46	12124-001	12124-001		1.92E-01	< 1	< 2.5	slightly turbid	4	7.4	1.9	2, 4
7/13/2006	9:14	11523-01	11523-001		1.34E+00	3	3.5	slightly turbid	4	7.2	UV	2, 4
7/13/2006	9:17	11523-02	11523-001	Duplicate	1.34E+00	< 1	< 2.5	-	4	-	-	2, 4
7/13/2006	9:43	13778-001	13778-001		1.18E-02	< 1	< 2.5	slightly turbid	4	6.9	2.5	2
7/13/2006	9:48	13778-02	13778-001		9.33E-03	120	288	turbid	4	-	-	2, 3
7/13/2006	10:31	11682-001	11682-001		7.85E-01	2	< 2.5	-	4	6.9	3.5	3
7/13/2006	11:24	12474-001	12474-001		5.13E-02	8	60.4	turbid	4	7.9	1.8	3
7/13/2006	12:18	11935-001	11935-001	East Plant	1.44E-01	< 1	5.4	-	4	7.9	1	2, 4
7/17/2006	8:03	13623-01	13623-001		3.27E-02	< 1	4.3	clear	> 7	7.8	2.5	2
7/17/2006	8:05	13623-02	13623-001	Duplicate	3.27E-02	< 1	5.9	-	> 7	-	-	2
7/17/2006	8:23	13433-001	13433-001		1.05E-01	< 1	16.2	Moderately turbid	> 7	7.8	1.5	2
7/17/2006	8:44	11563-001	11563-001		1.02E+00	11	4.3	Slightly to moderately turbid	> 7	7.4	UV	
7/17/2006	9:03	12121-001	12121-001		5.85E-01	2	3.8	Slightly turbid	> 7	7.6	3.5+	2, 3
7/17/2006	9:44	10876-001	10876-001		3.69E-01	342	9.8	Slightly turbid	> 7	6.9	1.3	2, 3
7/17/2006	10:25	13939-001	13939-001		2.61E-03	11190	11.7	Moderately turbid with a yellow tint	> 7	7.5	0.36	2
7/24/2006	8:44	12447-01	12447-001		4.20E-01	3	3.6	clear	2	6.9	2.5	2, 3
7/24/2006	8:47	12447-02	12447-001		4.20E-01	< 1	< 2.5	clear	2	-	-	2, 3
7/24/2006	9:28	13328-001	13328-001		0.00E+00	56	2.7	clear	2	7.2	0.16	2, 3
7/24/2006	10:23	12465-001	12465-001		1.46E-02	1	5	clear with slight turbidity	2	7.2	0.42	2, 3
7/24/2006	11:02	10876-002	10876-002		1.62E+00	794	4.8	slightly turbid with yellow ?	2	7.9	UV	2, 3
7/24/2006	11:20	12223-001	12223-001	Left	5.24E-04	2	4.4	slightly turbid	2	7.5	1.6	2, 3

Abbreviations: Cl_2 - chlorine, dL, deciliter, ID - identification, MGD - million gallons per day, MPN - most probable number, QA/QC - quality assurance/quality control, TSS - total suspended solids

QA/QC Notes:

1. TSS duplicate samples did not meet DQO in this batch, flagged with "J" to indicate estimates
2. TSS equipment blanks had levels greater than detection limit, samples considered acceptable
3. TSS samples did not have lab control split duplicates (LCSD), samples considered acceptable
4. TSS samples for LCSD failed the DQO in this batch, flagged witih "J" to indicate estimates
5. Samples run at TCEQ Region 12 Laboratory
6. E. coli contamination found in equipment blank

Table 2.1, continued Results of WWTP Sampling

DATE	TIME	SAMPLE ID	Plant ID	Sample Comments	Flow (MGD)	E. coli (MPN/dL)	TSS (mg/L)	OBSERVATIONS	DAYS SINCE RAINFALL	pH	Cl_2	QA/QC Notes
7/24/2006	12:15	12726-001	12726-001		3.96E-01	< 1	4.8	slightly turbid	2	7.6	3.5	2, 3
7/27/2006	8:50	12949-01	12949-001		1.64E-01	2	4.6	moderately turbid	1	6.7	3	1, 2
7/27/2006	8:52	12949-03	12949-001	Duplicate	1.64E-01	6	< 2.5	-	1	-	-	1, 2
7/27/2006	9:20	12834-001	12834-001		1.62E-01	< 1	195	light brown	1	6.9	1.5	1, 2
7/27/2006	9:54	12841-001	12841-001		9.34E-03	< 1	11.7	moderately turbid, some flow	1	6.7	8.2	1, 2
7/27/2006	11:00	12516-001	12561-001		2.61E-03	< 1	< 2.5	clear	1	7.4	0.8	1, 2
7/27/2006	11:40	11290-001	11290-001		3.24E+00	32550	8.4	slightly yellow, clear	1	7.2	0	1, 2
7/31/2006	7:25	11893-01	11893-001		2.86E-01	88	8.8	clear	5	7.4	1.2	1, 2, 6
7/31/2006	7:27	11893-03	11893-001	Duplicate	2.86E-01	80	< 2.5	-	5	-	-	1, 6
7/31/2006	7:56	13674-001	13674-001		4.99E-01	166	8.8	slightly turbid	5	7.4	1	1, 6
7/31/2006	8:25	12289-001	12289-001		1.64E-01	100	7.6	clear	5	7.6	2.9	1, 6
7/31/2006	9:04	11152-001	11152-001		1.35E+00	< 1	< 2.5	clear	5	7.3	0	1, 2, 6
8/28/2006	8:49	13921-02	13921-001	Duplicate	0.00E+00	< 1	24	-	3			2
8/28/2006	8:49	13921-001	13921-001		0.00E+00	1	23.5	-	3			
8/28/2006	9:48	10932-001	10932-001		0.00E+00	1	7.5	-	3			
8/28/2006	10:36	11538-001	11538-001		0.00E+00	59	< 2.5	-	3			2
8/28/2006	11:00	11188-001	11188-001		0.00E+00	< 1	< 2.5	-	3			2

Abbreviations: Cl_2 - chlorine, dL, deciliter, ID - identification, MGD - million gallons per day, MPN - most probable number, QA/QC - quality assurance/quality control, TSS - total suspended solids

QA/QC Notes:

1. TSS duplicate samples did not meet DQO in this batch, flagged with "J" to indicate estimates
2. TSS equipment blanks had levels greater than detection limit, samples considered acceptable
3. TSS samples did not have lab control split duplicates (LCSD), samples considered acceptable
4. TSS samples for LCSD failed the DQO in this batch, flagged witih "J" to indicate estimates
5. Samples run at TCEQ Region 12 Laboratory
6. E. coli contamination found in equipment blank

Appendix A.3
City of Houston WWTP Data and Regressions

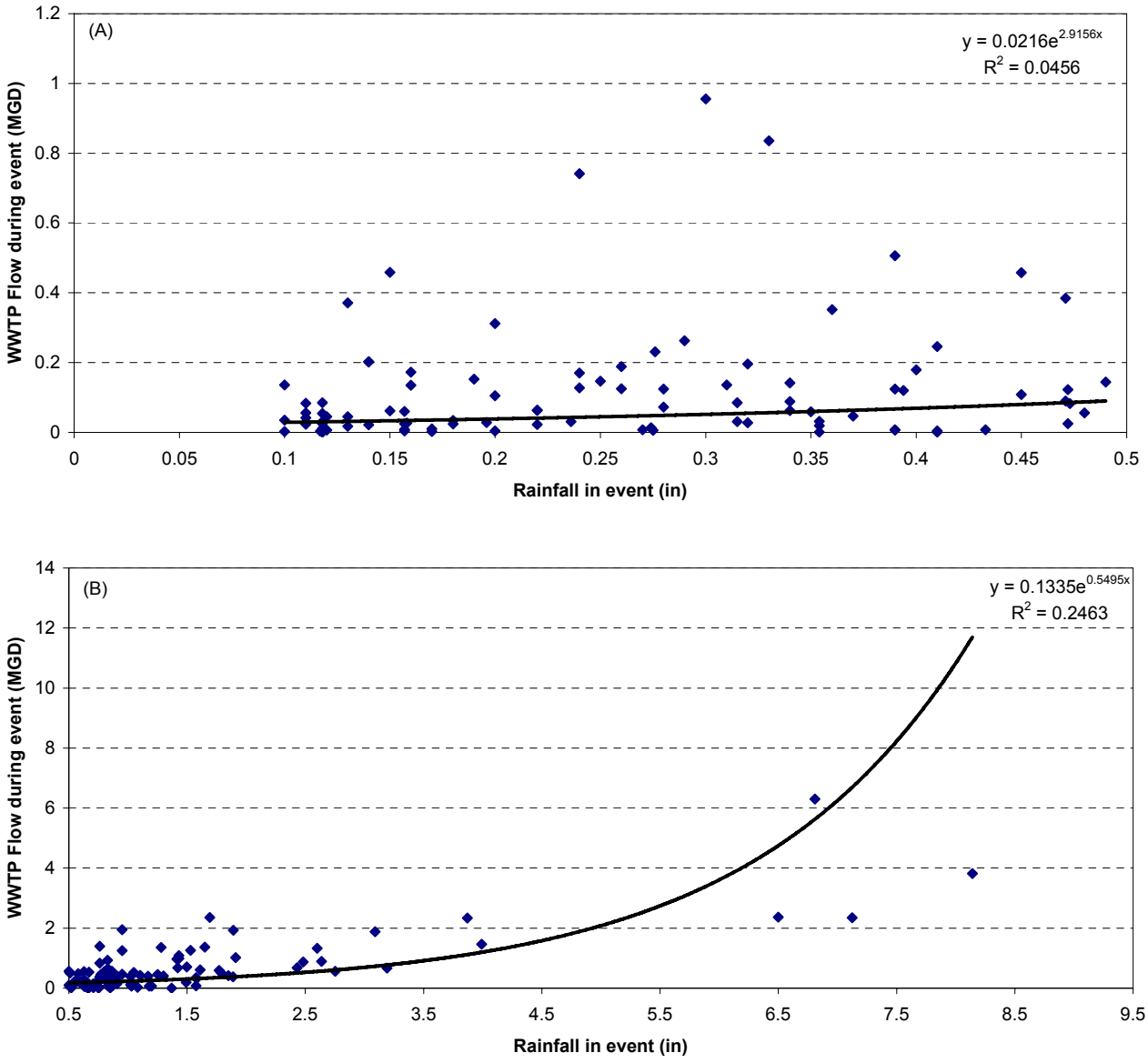


Figure A.3-1. Effect of Rainfall on WWTP Flows

Appendix A.4
Sampling Data from Reported Biosolids Releases

BIOSOLIDS/EXCEEDANCE OF CAPACITY LOAD DEVELOPMENT

After the wet weather flows were developed, the next step was to determine biosoldis/exceedance of WWTP capacity loads for both TSS and EC. Although there are differences between loads associated with biosolids and those related to exceedance of capacity of the WWTP system, these two loads were not separated in the HSPF model. This is because these sources stem from the same root cause, namely precipitation, and there are no data that distinguish the two from each other. Therefore, the following discussion treats both of these sources as a single source.

Biosolids releases and capacity exceedances were assumed to occur under conditions when WWTPs are overloaded. Therefore, it was assumed that these discharges only occurred for rainfall events that exceeded 0.5 inches of rain over a 12-hour period.

The concentrations that were associated with the biosolids releases were based upon data collected from actual biosolids releases by the TCEQ, as shown in **Table A4-1**. This table presents results from sampling biosolids releases at the WWTPs listed in the table. The data in the table are derived from several different plants over the course of four years. The final values used in the model are shaded in the table. The geometric mean value, 2612 MPN/dL, was selected for EC data, while the median value, 82 mg/L, was chosen for TSS.

To calculate the biosolids load, first rainfall events with total precipitation greater than 0.5 inches were identified. Next, wet weather flows for these events were multiplied by the bacteria and TSS concentrations described above. A conversion factor was used to obtain the loads in the appropriate units and zeros were placed in any hour where the

rainfall event did not have more than 0.5 inches of rainfall. For rainfall events that fell below the biosolids range (i.e., 0.1 in to 0.5), the dry weather concentrations for these two constituents were used to determine a load.

Table A.4-1 Sampling data from reported biosoldis releases

		FC (cfu/dL)	EC (MPN/dL)[1]	TSS (mg/L)
13765-001	5/17/2001	153000	96390	
	5/23/2001	4500	2835	
	10/29/2002	10000	6300	
	12/17/2002			464
11673-001	3/18/1999	2950	1858.5	1010
11720	3/8/2000	100	63	13
	3/25/1999	19000	11970	17
11325	11/29/1999			1460
12571	5/12/1999	80000	50400	43
10436-001	4/20/1999	1800	1134	26
	5/12/1999	90	56.7	32
10495-002	1/9/2002	3000	1890	31
Average		**27444**	**17290**	**344**
Geomean		**4146**	**2612**	**82**
Median		**2950**	**1859**	**32**

1 FC converted to EC through the use of the ratio of the standards, 126/200 (0.63)

Highlighted cells were values used for HSPF models.

Appendix B
Sanitary Sewer Overflows

Appendix B.1
SSO Occurrences Estimate

Appendix B.1: Details on Development of SSO Occurrence

1.1 SSOS WITHIN THE CITY OF HOUSTON

The City of Houston sanitary sewer system was designed to convey sewage and storm water separately. The system contains 5,700 miles of pipeline, provides service for 1.72 million people and extends 600 square miles (Bastad, 1997). The City of Houston has an ongoing program to identify and eliminate SSOs, including a sanitary sewer system rehabilitation program initiated in July 1, 2004. The pipe renewal program will renew almost 7,000,000 linear feet of pipe over a 10-year period and will ultimately result in significant reductions in SSOs across the study watershed. **Figure 1.1** shows the location of pipe renewal already completed as of August 2007 and areas where pipe renewal is scheduled to occur.

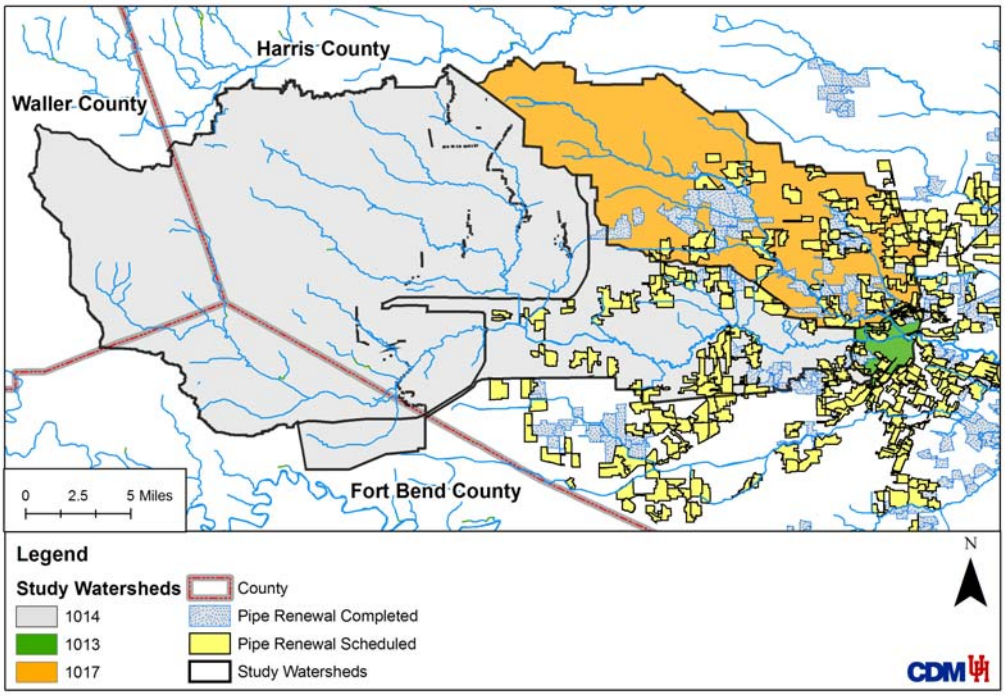


Figure 1.1 City of Houston Pipe Renewal Locations

The City of Houston collects data on SSOs that occur within its boundaries, including the locations, causes and reported discharge volumes. To support the load estimation, the database of SSO occurrences between March 2000 and December 2003 was obtained from the City of Houston. For the purposes of this analysis, all duplicate events were purged and events between June 4, 2001 and June 14, 2001 were excluded because they reflect the influence of Tropical Storm Allison. The location of the SSOs was determined by joining the manhole location provided in the database with the City of Houston Geographic Information Management System (GIMS) manhole shapefile and related to model subbasins. A total of 1,214 SSOs were recorded in the database for Buffalo and Whiteoak Bayous during the 3-year database time period. The database used in the analysis is presented in **Appendix B.4**.

SSOs were categorized into two types: wet and dry SSOs. To identify the SSOs associated with wet weather, three-day rainfall totals from the National Weather Service Addicks gage were calculated and joined with the SSO database. Any SSO event related to a three-day rainfall greater than 0.1 inches was considered to be a wet weather overflow. The number of wet weather related SSO events were tallied and found to comprise 30% of the database covering Buffalo and Whiteoak Bayous. The number of wet and dry SSOs per subbasin was determined from the COH database as shown in **Table 1.**.

Table 1.1 Summary of Empirically-Calculated SSO Events in Buffalo and Whiteoak Bayou Watersheds

Sub-watershed	Segment	Dry Weather	Wet Weather	Total
1	1017	43	18	61
2	1017	17	7	24
3	1017	32	14	45
5	1013	108	46	154
6	1013	25	11	36
7	1017	25	11	36
8	1017	7	3	10
17	1017	27	11	38
26	1014	34	14	48
27	1014	12	5	17
33	1013	20	9	29
34	1017	6	2	8
35	1017	1	0	1
36	1013	24	10	34
37	1013	34	15	49
38	1013	29	13	42
39	1014	30	13	43
40	1017	25	11	36
41	1017	21	9	30
42	1017	30	13	43
43	1017	22	9	31
44	1014	18	8	25
45	1014	35	15	50
46	1013	7	3	10
47	1013	4	2	6
48	1013	50	22	72
49	1013	43	18	61
50	1014	17	7	24
51	1014	48	20	68
52	1014	29	12	41
53	1014	12	5	17
54	1014	12	5	17
55	1014	4	2	5
56	1014	2	1	3
Total		**850**	**364**	**1,214**

Abbreviations: SSO - sanitary sewer overflow

1.2 NUMBER OF UNKNOWN SSOS

The majority of subwatersheds in the Buffalo and White Oak Bayou watersheds do not lie within the City of Houston, and, consequently, did not have SSO event data in the City of Houston database. It has been noted that as sewers age, the structural integrity

of the piping deteriorates (US EPA 2004). Thus, it was suspected that older pipes might experience more frequent SSO events. This theory was investigated using the City of Houston SSO database. The database was spatially joined to maintenance and wastewater piping data downloaded from the City of Houston geographic information management system (GIMS). The age of the pipes was then extracted from the database and linked to maintenance hole data and SSO information. **Figure 1.2** presents the results of this analysis.

As demonstrated by the figure, older piping exhibits more SSOs than newer piping. Piping installed prior to 1940 exhibits significantly more SSOs than piping installed after 1940 ($\alpha = 0.05$), with up to 20% of the installed maintenance holes having SSO occurrences. Based upon these results, the age of piping was determined to be an adequate means of assigning SSO failure rates to regions outside the City of Houston.

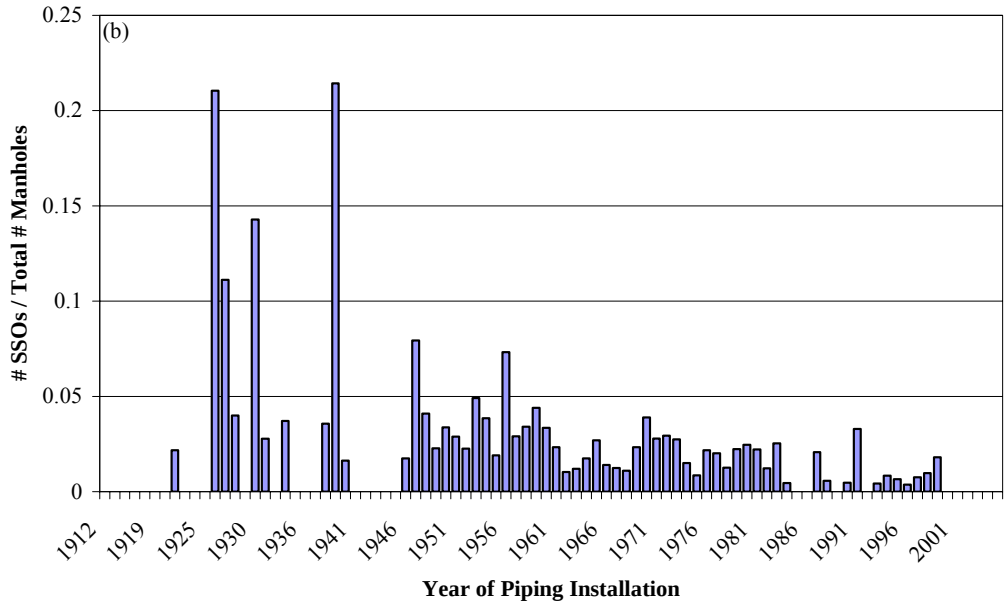


Figure 1.2 Influence of Age on SSOs in Buffalo and Whiteoak Bayous

The number of SSOs per subwatershed were estimated using decadal SSO occurrence rates calculated using **Figure 1.2** as well as pipe ages and municipal utility district (MUD) coverages. The calculated decadal SSO occurrence rates are shown in **Table 1.**. The maximum failure rate per maintenance hole was found in piping constructed during the period 1930-1939, while the lowest failure rate was found in piping from 1995-1998.

Using the calculated decadal failure rates to estimate SSO occurrence requires an estimate of piping age. Because data on pipe age were not available, home ages obtained from the 2000 U.S. Census were assumed to be equivalent to pipe age. Housing ages for five different census community divisions (CCD), including Brookshire, Sugarland, Fulshear- Simonton, Northwest Harris, and Houston (shown in **Figure 1.3**), were obtained. The housing ages were paired with the previously calculated decadal failure rates to determine the CCD SSO occurrence rate, or an estimate of the number of SSOs

Table 1.2 SSO distribution by pipe age[1]

Date	# SSOs	# Maintenance Holes (MH)	SSOs per MH	SSO per MH per yr[2]
Built 1999 to March 2000	2	186	1.08E-02	2.87E-03
Built 1995 to 1998	11	1514	7.27E-03	1.94E-03
Built 1990 to 1994	13	1158	1.12E-02	3.00E-03
Built 1980 to 1989	44	2902	1.52E-02	4.05E-03
Built 1970 to 1979	169	6915	2.44E-02	6.53E-03
Built 1960 to 1969	160	8887	1.80E-02	4.81E-03
Built 1950 to 1959	225	5849	3.85E-02	1.03E-02
Built 1940 to 1949	32	923	3.47E-02	9.26E-03
Built 1939 or earlier	18	482	3.73E-02	9.98E-03
Arithmetic Mean			0.0219	

[1] Not all maintenance holes could be associated with pipe age.
[2] Calculation for SSO per MH per year adjusts the number of SSOs reported over 3 year period between 3/12/2000 and 12/9/2003 to a single year. This was done by dividing the number of days in a typical year by the total number of days in the database (365/1367 = 0.267)
Abbreviations: SSO = sanitary sewer overflow, MH = maintenance hole, yr = year

that would be expected on a yearly basis from a single maintenance hole in each CCD. **Table 1.** presents a summary of home constructions statistics for the CCDs of interest. The percentages of homes built in the Houston exhibit some differences between CCDs, with Fulshear-Simonton exhibiting the largest recent construction efforts and the oldest homes being found in Brookshire and Houston.

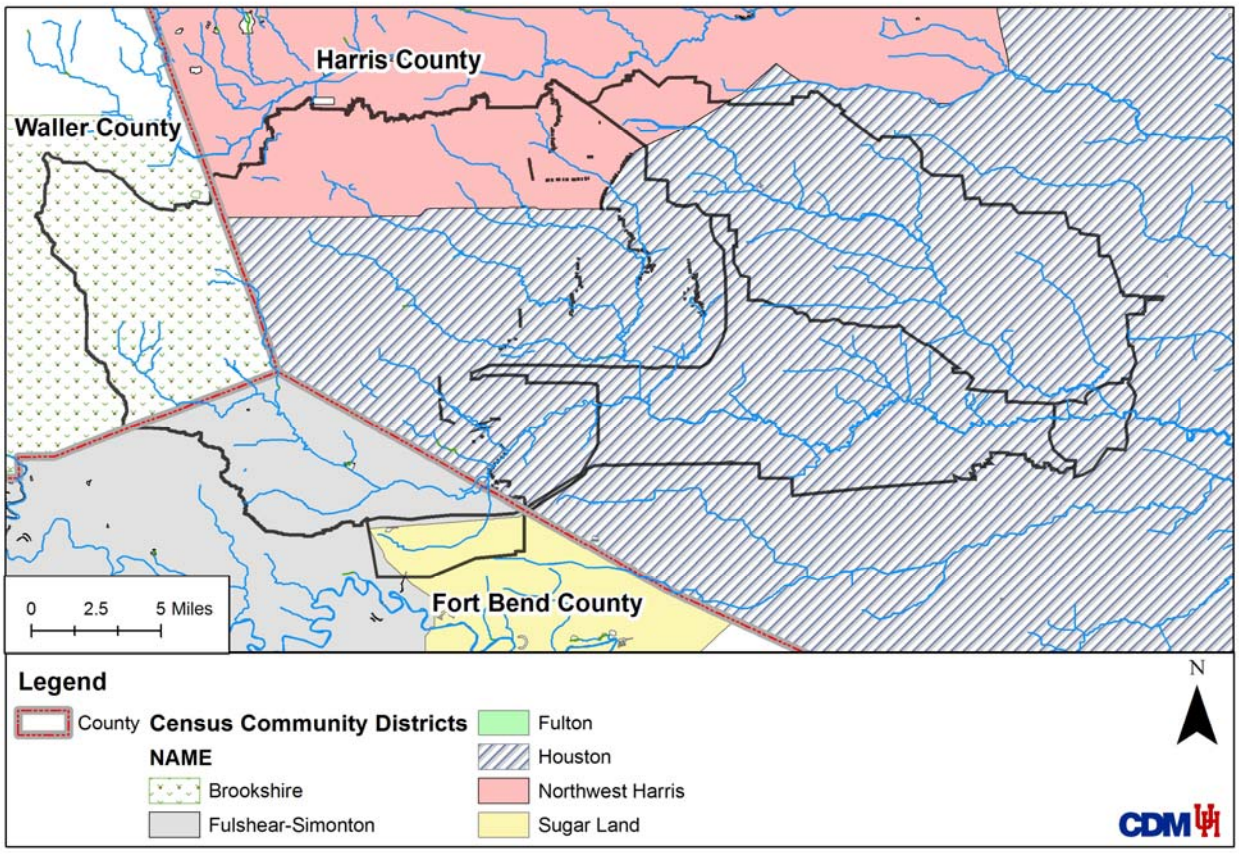


Figure 1.3 Location of Census Community Districts (CCDs) in Buffalo and Whiteoak Bayou

Table 1.3 Percentage of Houses Built in Houston-area Census Community Districts

Geography	Brookshire	Sugar Land	Fulshear-Simonton	Houston	Northwest Harris
Built 1999 to March 2000	4%	6%	20%	3%	6%
Built 1995 to 1998	14%	20%	31%	6%	12%
Built 1990 to 1994	8%	17%	21%	6%	12%
Built 1980 to 1989	25%	38%	13%	21%	36%
Built 1970 to 1979	23%	15%	8%	27%	28%
Built 1960 to 1969	10%	2%	3%	16%	4%
Built 1950 to 1959	7%	1%	2%	12%	1%
Built 1940 to 1949	6%	0%	1%	5%	0%
Built 1939 or earlier	4%	1%	1%	4%	1%
Median year structure built	1981	1988	1995	1975	1984

Finally, an estimate of maintenance hole density was required to calculate SSO occurrence using the data previously described. Therefore, the number of maintenance holes within the City of Houston was calculated and divided by the area covered by MUDs as shown in **Table 1.** Regions with primarily high intensity land use and/or commercial land uses in the central business district of Houston were excluded as they are not representative of the watershed as a whole. Based upon these data, an average maintenance-hold density of 0.478/acre was determined. This value, coupled with areas of the watershed expected to have wastewater lines (i.e., MUDs), was used to estimate the number of maintenance holes per subwatershed. MUD coverage of the watershed is shown in **Figure 1.4**.

Table 1.4 Calculation of Maintenance Hole Density in Residential areas

Sub-watershed	Number Maintenance Holes (MH)	Acres	MH per acre
1	2653	7680.3	0.345
3	1735	4411.4	0.393
5	2212	5263.8	0.420
6	1665	3848.1	0.433
7	903	1814.8	0.498
8	199	760.3	0.262
17	952	1999.6	0.476
26	1853	4088.1	0.453
27	806	2870.7	0.281
28	258	887.3	0.291
33	1176	3001.4	0.392
34	767	1037.7	0.739
41	703	1693.4	0.415
42	985	2175.6	0.453
43	1672	4150.2	0.403
48	1241	2271.9	0.546
49	1610	3018.0	0.533
50	948	2001.6	0.474
54	1612	3262.4	0.494
55	1523	3174.3	0.480
56	854	3613.6	0.236
		Average	0.429

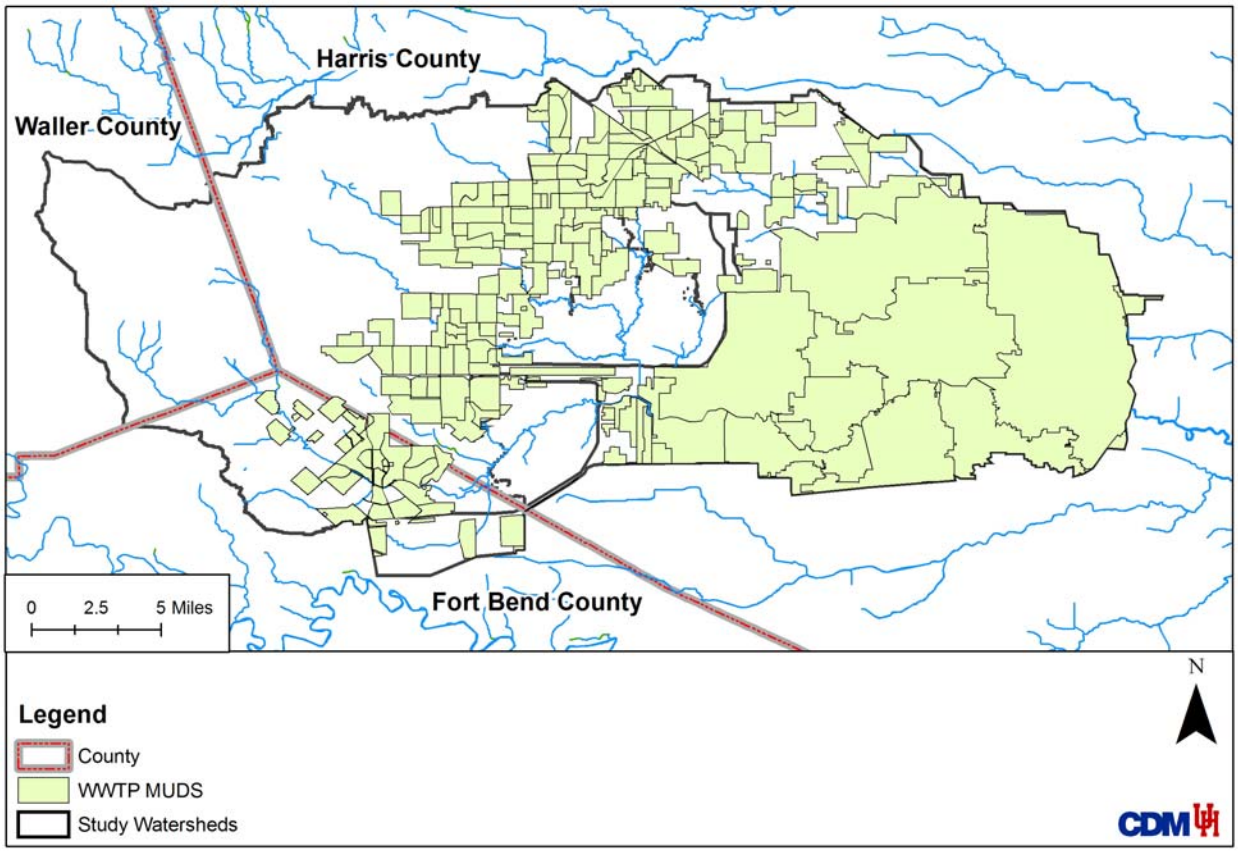


Figure 1.4 Location of Municipal Utility Districts (MUDs) in Buffalo and Whiteaok Bayous

1.3 ERROR EVALUATION

To evaluate the error involved in these estimates, the estimate number of SSOs per year was compared to subwatersheds where observed data were available. A total of four outliers were excluded from the analysis. These outliers were determined using either the standard formula of three times the standard deviation plus or minus the average or based upon their location in the central business district of Houston.

As can be seen in **Figure 1.5**, the method used for SSO estimation generally underestimates higher numbers of SSOs. This type of error indicates that there are

factors controlling the number of SSOs that occur in a watershed that are not accounted for in this estimation method. Such factors could include construction materials, size of pipes, and types of maintenance performed on piping. However, because the 1:1 line and regression line are fairly close, the regression was considered adequate for the purposes of this estimate.

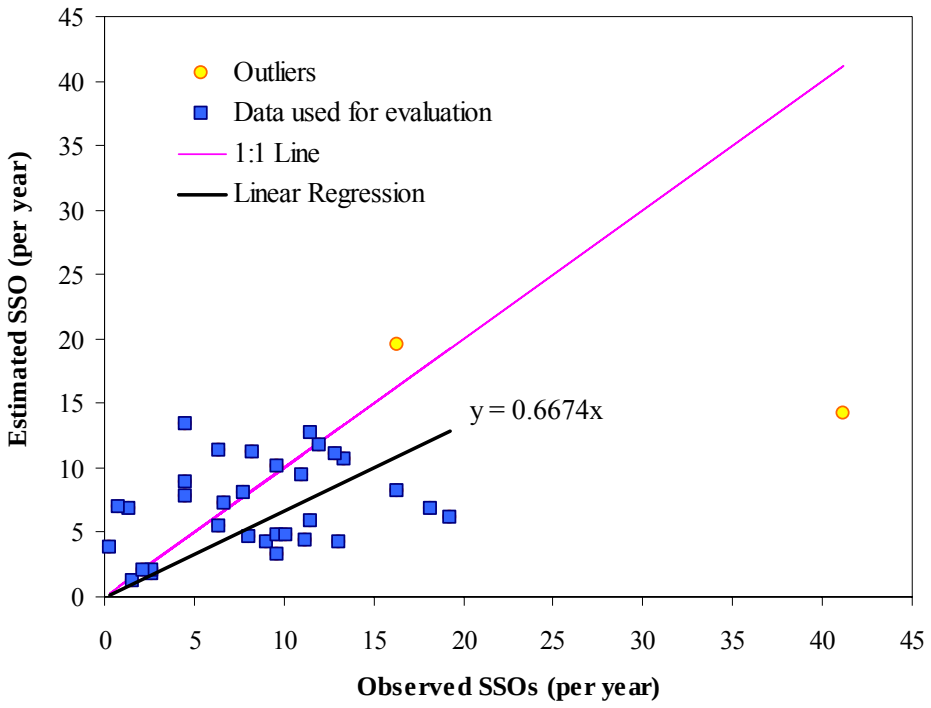


Figure 1.5 Comparison of Estimated and Observed SSO/year

Appendix B.2
Effluent Sampling Results

Work Order 8 Report
WWTP Investigation

Date: Sep-08-2005

Influent

TSS	=	34 mg/l
E-Coli	=	$1.94x10^{7}$ (MPN/dl)
BOD	=	237 (mg/l)

Activated Sludge

TSS	=	48.10%
E-Coli	=	$2.27x10^{6}$ (MPN/dl)
Volatile Soilds	=	60%
Moisture	=	99.50%

Appendix B.2
Effluent Sampling Results

Work Order 8 Report
SSO Investigation

COMPLETE INVESTIGATION OF BACTERIA LOADS FROM OVERFLOWS AND BYPASSES

Task 8 of Work Order 6 addresses bacteria loads from sanitary sewer overflows. Sampling was to include overflows directly, if possible, and also inflows to wastewater treatment plants to approximate the concentrations that would be seen in overflows. Considerable effort was spent trying to sample overflows, but it was never possible to have sampling personnel at the precise point when a relatively infrequent event occurs during a heavy rain.

Three rounds of backup samples of wastewater influent were collected during dry weather conditions. In this phase of the work an additional three rounds of WWTP influent were collected under wet weather conditions. Results are shown on the attached table. Some difficulties were encountered. One of the treatment plants was locked during one visit that precluded sampling. Also, the FC results for one period performed by the contract laboratory were invalid due to an error in dilutions. The loss of these data is not critical to the project as the FC criterion has been replaced with the EC criterion, and only the EC data are used. All of the EC results met quality requirements.

Table B.2-1 Wastewater sampling - Wet Weather

				Storet Code	00530	31616	31699	72053	82553	82554
Station	Stationid	Date	Enddate	Endtime	TSS (mg/L)	FC (cfu/dL)	EC (MPN/dL)	Days from last rain	1-d prior rain (in)	7-d prior rain (in)
Turkey Creek WWTP	PBW02	3/2/2005	02/03/2005	14:00	142	21000 (1)	1,492,000	4	1.02	3.58
Turkey Creek WWTP split	PBW02	3/2/2005	02/03/2005	14:00			2,430,000			
Turkey Creek WWTP	PBW02	4/11/2005	11/04/2005	12:40	480	10,500,000	6,686,563	16	0.94	0.94
Turkey Creek WWTP split	PBW02	4/11/2005	11/04/2005	12:40			5,695,750			
West District WWTP	PBW03	3/2/2005	02/03/2005	14:30	336	26000 (1)	3,255,000	4	1.02	3.58
West District WWTP DUP	PBW03	3/2/2005	02/03/2005	14:30			4,352,000			
West District WWTP	PBW03	3/7/2005	07/03/2005	13:42	402	20000 (1)	2,670,000	5	0.59	1.42
West District WWTP DUP	PBW03	3/7/2005	07/03/2005	13:42			3,591,000			
West District WWTP split	PBW03	3/7/2005	07/03/2005	13:42			3,978,000			
West District WWTP	PBW03	4/11/2005	11/04/2005	13:28	594	6,900,000	3,262,000	16	0.94	0.94
West District WWTP DUP	PBW03	4/11/2005	11/04/2005	13:28			3,528,500			

Note: Turkey Creek WWTP was locked on 3/7/2005 so the sampling crew could not enter to collect samples. City of Houston was contacted but no one was available that day to unlock the door.

(1) Result not valid as improper dilutions used by laboratory

TABLE B.2-2
WASTEWATER SAMPLING DATA AT CITY OF HOUSTON FACILITIES

Station	Stationid	Date	Time	FC 31616 (cfu/dL)	EC 31699 (MPN/dL)	Days from last rain 72053	1-d prior rain 82553 (in)	7-d prior rain 82554 (in)
Turkey Cre	PBW02	08/04/04	11:30	1,980,000	3,230,000	6	0	0.65
Turkey Cre	PBW02	08/05/04	08:45	1,850,000	7,270,000	7	0	0.375
Turkey Cre	PBW02	08/06/04	10:30	580,000	7,113,500	8	0	0.16
West Distri	PBW03	08/04/04	12:15	1,780,000	7,485,500	4	0	0.55
West Distri	PBW03	08/05/04	09:15	1,500,000	1,152,750	5	0	0.51
West Distri	PBW03	08/06/04	11:30	1,550,000	9,616,333	6	0	0.16
West Distri	PBW03 spl	08/06/04	11:30		8,182,500			

Note:
Storet code shown under name of parameter.

Appendix B.3
Potential of Effluent to Reach Bayou Analysis

POTENTIAL OF SSOS TO REACH BAYOUS

Some dry weather SSO excursions may not reach a bayou because their volume is too small (evaporated and/or infiltrated) or their location is too far from a pathway such as a ditch or a storm sewer line that can reach a bayou. When quantifying potential impacts it is conservative and appropriate to assume that all SSO flow would enter the bayous. However, when assessing the likely effect of a measure, a realistic estimate of the potential for the SSO excursions to reach the bayous can also be useful.

Two approaches were considered to determine such potential. The first was to sort the data within the SSO Excursion Database using the "Flow Location" field, which identifies the observed destination of the SSO excursion as recorded by field personnel. The second is to create a buffer zone along the storm sewer, ditch, and bayou lines, and identify the SSO locations that were well removed from a flow pathway (outside of the buffer zone) and thus will have little potential of reaching the bayous.

Table 6.3 shows the results of the first approach. The total number of SSO excursions and their volumes associated with each destination was calculated and listed in the table. A total of 529 and 493 records within BB and WOB watersheds, respectively, were found to have no documentation of the SSO destination. These SSO excursions are labeled as "Blank" in Table 6.3

Table 6.3

Potential of SSO To Reach Bayous Based on Destination Records

SSO Destinations	SSO Excursions	SSO Volume (gallons)	% of Total SSO Excursions		% of Total SSO Volume	
			w/ "Blank"	non-"Blank	w/ "Blank"	non-"Blank
Buffalo Bayou						
"Blank"	529	1,296,452	45%		49%	
Bayou	35	143,885	3%	5%	5%	10%
Contained On Site	169	207,788	14%	26%	8%	15%
Drainage Ditch	73	127,082	6%	11%	5%	9%
Storm Sewer	375	892,989	32%	58%	33%	65%
Total	**1181**	**2,668,196**	**100%**	**100%**	**100%**	**100%**
White Oak Bayou						
"Blank"	493	979,158	46%		51%	
Bayou	23	44,220	2%	4%	2%	5%
Contained On Site	154	190,409	14%	26%	10%	20%
Drainage Ditch	95	159,149	9%	16%	8%	17%
Storm Sewer	311	538,335	29%	53%	28%	58%
Total	**1076**	**1,911,271**	**100%**	**100%**	**100%**	**100%**

Table 6.3 also lists the percentages of SSO associated with a bayou, storm sewer, or drainage ditch destination, as well as those documented as "contained on site". The percentages were calculated with and without the "Blank" records. Also, the blank records were apportioned with the same percentages as with the "non-Blank" data. The non-blank data suggest that 26% of the SSO events were contained on site. However, the volume contained on site was 15% to 20%. If it were assumed that the records where the destination is blank tend to be those where no pathway was obvious (e.g., the spill stayed in the yard) then a higher percentage would not get to the bayous.

As shown in Table 6.3, the calculations show that 57% and 61% of SSO excursion volumes in BB and WOB watersheds, respectively, were not assigned a bayou, storm sewer, or drainage ditch destination. From these data, it can be said that most of the 43% and 39% of SSO volumes in BB and WOB, respectively, were likely to reach the bayous, but we can't determine a fraction that did not reach the bayous.

The second approach involves the use of a buffer zone to estimate the potential of an SSO excursion to reach a bayou. This approach involved significant GIS processing. First, the Harris County stream system shapefile called "CAP" and the GIMS storm sewer shapefiles were clipped to the boundaries of the BB and WOB watershed boundaries. Then, a 100-foot buffer zone was created around the CAP centerline, and a 75-foot buffer zone was created around the GIMS storm sewer centerline. The created 100-foot CAP and 75-foot storm sewer buffer zones were then merged into one shapefile. This shapefile was then overlapped with the SSO excursion manhole locations to identify manholes inside and outside of the buffer zones. Figure 6.2 shows an example of the created buffer zones and SSO manhole locations.

Figure 6.2

Example Buffer Zones and SSO Manhole Locations

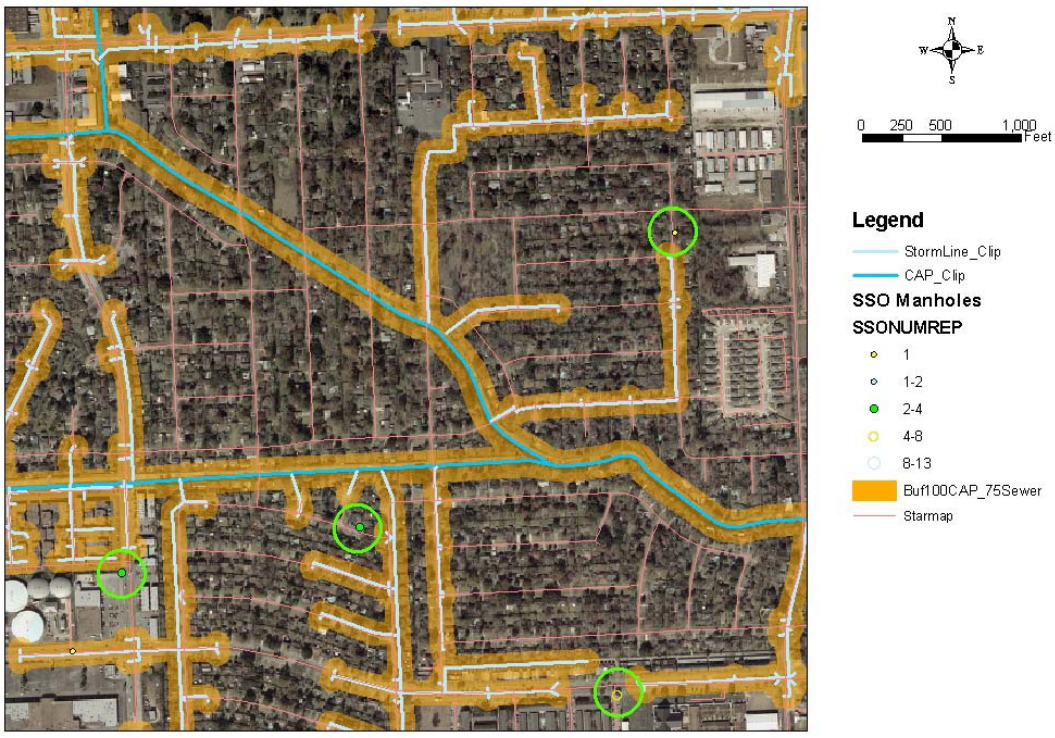


Table 6.4 lists the results of calculations using the second approach. The results show that about 36% and 33% of SSO excursions in BB and WOB, respectively, are within the buffer zones. In terms of volumes, 36% and 27% of SSOs in BB and WOB, respectively, are within the buffer zones. The percentages were calculated using the adjusted total volumes listed in Table 6.4. The adjustment was made by assigning those SSO excursions without a volume to BB and WOB based on the 18.6% for BB and 17.0% for WOB ratios and the 2,729 gallons per excursion number. This method suggests that something on the order of half of the SSO volumes are within a reasonable distance of a conveyance that might get the flow to a bayou, while the other half of the volume is fairly far removed. Clearly, nothing definitive can be based on a buffer zone analysis, but it does suggest that about half of SSO flows would have a substantial opportunity to soak into the ground or evaporate before reaching a bayou.

Appendix B.4

SSO Database

TNRCC Permit	Excursion Address	Street	Manhole	WWTP	Not Observed	Excursion Start Date	Excursion Start Time	Excursion End Date	Excursion End Time	Location	System	Area	Subbasin	3 day Rainfall'
10495-076	12504	Mangum @ Creekmont	NW172091	27	0	2/14/2001	12:21:00 PM	2/14/2001	13:44:00	Street	Public System	Commercial Business	1	0.05
10495-076	12504	Mangum @ Creekmont	NW172091	27	0	2/14/2001	12:21:00 PM	2/14/2001	13:44:00	Street	Public System	Commercial Business	1	0.05
10495-090	3845	S. Sgt. Macario Garcia	IA067125	1	0	2/16/2001	1:38:00 PM	2/17/2001	13:00:00	Street	Public System	Residence	1	0.05
10495-090	3845	S. Sgt. Macario Garcia	IA067125	1	0	2/16/2001	1:38:00 PM	2/17/2001	13:00:00	Street	Public System	Residence	1	0.05
10495-090	3845	S. Sgt. Macario Garcia	IA067125	1	0	2/16/2001	1:38:00 PM	2/17/2001	13:00:00	Street	Public System	Residence	1	0.05
10495-090	3900	S. Sgt. Macario Garcia	IA078007	1	0	3/10/2001	9:20:00 PM	3/12/2001	9:35:00	Backlot Easement	Public System	Residence	1	0.84
10495-090	3900	S. Sgt. Macario Garcia	IA078007	1	0	3/10/2001	9:20:00 PM	3/12/2001	9:35:00	Backlot Easement	Public System	Residence	1	0.84
10495-030	9703	Hermitage Lane	WD055036	40	0	3/12/2001	7:59:00 PM	3/13/2001	10:05:00	Backlot Easement	Public System	Residence	1	0.65
10495-030	9703	Hermitage Lane	WD055036	40	0	3/12/2001	7:59:00 PM	3/13/2001	10:05:00	Backlot Easement	Public System	Residence	1	0.65
10495-076	6430	Mangum @ Creekmont	NW168211	27	0	3/25/2001	5:23:00 PM	3/26/2001	10:17:00	Backlot Easement	Public System	Residence	1	0.00
10495-076	3119	Mangum @ Creekmont	NW171047	27	0	5/14/2001	10:41:00 AM	5/14/2001	13:05:00	Backlot Easement	Public System	Residence	1	0.09
10495-076	3119	Mangum @ Creekmont	NW171047	27	0	5/14/2001	10:41:00 AM	5/14/2001	13:05:00	Backlot Easement	Public System	Residence	1	0.09
10495-076	9802	Mangum @ Creekmont	NW177089	27	0	5/29/2001	1:38:00 PM	5/29/2001	19:35:00	Street	Public System	Residence	1	0.75
10495-076	9802	Mangum @ Creekmont	NW177089	27	0	5/29/2001	1:38:00 PM	5/29/2001	19:35:00	Street	Public System	Residence	1	0.75
10495-076	9802	Mangum @ Creekmont	NW177089	27	0	5/29/2001	1:38:00 PM	5/29/2001	19:35:00	Street	Public System	Residence	1	0.75
10495-139	10526	Genard	WW001091	41	0	5/30/2001	8:50:00 AM	5/30/2001	18:05:00	Street	Public System	Residence	1	0.75
10495-139	10526	Genard	WW001091	41	0	5/30/2001	8:50:00 AM	5/30/2001	18:05:00	Street	Public System	Residence	1	0.75
10495-139	10526	Genard	WW001091	41	0	5/30/2001	8:50:00 AM	5/30/2001	18:05:00	Street	Public System	Residence	1	0.75
10495-076	13333	Mangum @ Creekmont	NW143021	27	0	6/19/2001	8:57:00 AM	6/19/2001	9:46:00	Backlot Easement	Public System	Residence	1	0.16
10495-076	13333	Mangum @ Creekmont	NW143021	27	0	6/19/2001	8:57:00 AM	6/19/2001	9:46:00	Backlot Easement	Public System	Residence	1	0.16
10495-076	13333	Mangum @ Creekmont	NW143021	27	0	6/19/2001	8:57:00 AM	6/19/2001	9:46:00	Backlot Easement	Public System	Residence	1	0.16
10495-076	4002	Mangum @ Creekmont	NW172062	27	0	7/12/2001	11:40:00 AM	7/12/2001	12:40:00	Open Paved Area	Public System	Residence	1	0.00
10495-076	4002	Mangum @ Creekmont	NW172062	27	0	7/12/2001	11:40:00 AM	7/12/2001	12:40:00	Open Paved Area	Public System	Residence	1	0.00
10495-076	4002	Mangum @ Creekmont	NW172062	27	0	7/12/2001	11:40:00 AM	7/12/2001	12:40:00	Open Paved Area	Public System	Residence	1	0.00
10495-076	3219	Mangum @ Creekmont	NW176100	27	0	8/4/2001	7:15:00 PM	8/5/2001	12:20:00	Backlot Easement	Public System	Residence	1	0.00
10495-076	3219	Mangum @ Creekmont	NW176100	27	0	8/4/2001	7:15:00 PM	8/5/2001	12:20:00	Backlot Easement	Public System	Residence	1	0.00
10495-076	3219	Mangum @ Creekmont	NW176100	27	0	8/4/2001	7:15:00 PM	8/5/2001	12:20:00	Backlot Easement	Public System	Residence	1	0.00
10495-139	10526	Genard	WW001091	41	0	11/4/2001	10:45:00 AM	11/4/2001	11:40:00	Street	Public System	Residence	1	0.00
10495-139	10526	Genard	WW001091	41	0	11/4/2001	10:45:00 AM	11/4/2001	11:40:00	Street	Public System	Residence	1	0.00
10495-139	10526	Genard	WW001091	41	0	11/4/2001	10:45:00 AM	11/4/2001	11:40:00	Street	Public System	Residence	1	0.00
10495-090	6002	S. Sgt. Macario Garcia	IA072109	1	0	11/22/2001	8:27:00 AM	11/22/2001	9:33:00		Public System	Residence	1	0.00
10495-090	6002	S. Sgt. Macario Garcia	IA072109	1	0	11/22/2001	8:27:00 AM	11/22/2001	9:33:00		Public System	Residence	1	0.00
10495-090	6002	S. Sgt. Macario Garcia	IA072109	1	0	11/22/2001	8:27:00 AM	11/22/2001	9:33:00		Public System	Residence	1	0.00
10495-090	6002	S. Sgt. Macario Garcia	IA072109	1	0	12/3/2001	2:23:00 PM	12/3/2001	15:14:00		Public System	Residence	1	0.00
10495-076	3219	Mangum @ Creekmont	NW176100	27	0	12/12/2001	11:44:00 AM	12/12/2001	15:18:00	Open Paved Area		Residence	1	2.77
10495-076	3219	Mangum @ Creekmont	NW176100	27	0	12/12/2001	11:44:00 AM	12/12/2001	15:18:00	Open Paved Area		Residence	1	2.77
10495-076	3219	Mangum @ Creekmont	NW176100	27	0	12/12/2001	11:44:00 AM	12/12/2001	15:18:00	Open Paved Area		Residence	1	2.77
10495-076	6602	Mangum @ Creekmont	NW169031	27	0	12/17/2001	10:33:00 AM	12/17/2001	14:30:00	Open Paved Area		Residence	1	0.99
10495-090	4259	S. Sgt. Macario Garcia	IA071042	1	0	1/11/2002	1:40:00 PM	1/12/2002	8:39:00	Street	Private System	Residence	1	0.00
10495-090	4259	S. Sgt. Macario Garcia	IA071042	1	0	1/11/2002	1:40:00 PM	1/12/2002	8:39:00	Street	Private System	Residence	1	0.00
10495-090	4259	S. Sgt. Macario Garcia	IA071042	1	0	1/11/2002	1:40:00 PM	1/12/2002	8:39:00	Street	Private System	Residence	1	0.00
10495-076	8554	Mangum @ Creekmont	NW171060	27	0	1/14/2002	7:00:00 PM	1/15/2002	13:01:00	Street	Public System	Residence	1	0.00
10495-076	8554	Mangum @ Creekmont	NW171060	27	0	1/14/2002	7:00:00 PM	1/15/2002	13:01:00	Street	Public System	Residence	1	0.00
10495-076	8554	Mangum @ Creekmont	NW171060	27	0	1/14/2002	7:00:00 PM	1/15/2002	13:01:00	Street	Public System	Residence	1	0.00
10495-090	4922	S. Sgt. Macario Garcia	IA070014	1	0	1/27/2002	11:20:00 AM	1/28/2002	12:09:00	Open Paved Area	Public System	Residence	1	0.00
10495-076	4300	Mangum @ Creekmont	NW177058	27	0	2/2/2002	10:52:00 AM	2/3/2002	13:40:00	Street	Public System	Residence	1	0.00
10495-076	4300	Mangum @ Creekmont	NW177058	27	0	2/2/2002	10:52:00 AM	2/3/2002	13:40:00	Street	Public System	Residence	1	0.00
10495-076	7825	Mangum @ Creekmont	NW143020	27	0	2/26/2002	9:30:00 AM	2/26/2002	10:19:00	Street	Public System	Residence	1	0.00
10495-076	7825	Mangum @ Creekmont	NW143020	27	0	2/26/2002	9:30:00 AM	2/26/2002	10:19:00	Street	Public System	Residence	1	0.00
10495-076	7825	Mangum @ Creekmont	NW143020	27	0	2/26/2002	9:30:00 AM	2/26/2002	10:19:00	Street	Public System	Residence	1	0.00
10495-076	10143	Mangum @ Creekmont	NW145030	27	0	4/4/2002	10:25:00 AM	4/4/2002	11:26:00	Street	Public System	Residence	1	0.00
10495-076	10143	Mangum @ Creekmont	NW145030	27	0	4/4/2002	10:25:00 AM	4/4/2002	11:26:00	Street	Public System	Residence	1	0.00
10495-076	10143	Mangum @ Creekmont	NW145030	27	0	4/4/2002	10:25:00 AM	4/4/2002	11:26:00	Street	Public System	Residence	1	0.00
10495-139	10526	Genard	WW001091	41	0	4/30/2002	9:13:00 AM	4/30/2002	10:04:00	Street	Public System	Residence	1	0.00
10495-139	10526	Genard	WW001091	41	0	4/30/2002	9:13:00 AM	4/30/2002	10:04:00	Street	Public System	Residence	1	0.00
10495-030	3125	Hermitage Lane	WD054016	40	0	5/13/2002	5:30:00 PM	5/13/2002	18:20:00	Street	Public System	Residence	1	0.00

TNRCC Permit	Excursion Address	Street	Manhole	WWTP	Not Observed	Excursion Start Date	Excursion Start Time	Excursion End Date	Excursion End Time	Location	System	Area	Subbasin	3 day Rainfall'
10495-030	3125	Hermitage Lane	WD054016	40	0	5/13/2002	5:30:00 PM	5/13/2002	18:20:00	Street	Public System	Residence	1	0.00
10495-030	3125	Hermitage Lane	WD054016	40	0	5/13/2002	5:30:00 PM	5/13/2002	18:20:00	Street	Public System	Residence	1	0.00
10495-030	3125	Hermitage Lane	WD054016	40	0	5/20/2002	5:27:00 PM	5/21/2002	9:30:00	Open Paved Area	Public System	Residence	1	0.07
10495-030	3125	Hermitage Lane	WD054016	40	0	5/20/2002	5:27:00 PM	5/21/2002	9:30:00	Open Paved Area	Public System	Residence	1	0.07
10495-030	3125	Hermitage Lane	WD054016	40	0	5/20/2002	5:27:00 PM	5/21/2002	9:30:00	Open Paved Area	Public System	Residence	1	0.07
10495-076	5807	Mangum @ Creekmont	NW138007	27	0	3/16/2001	10:07:00 AM	3/16/2001	14:50:00	Street	Public System	Residence	2	1.65
10495-076	5807	Mangum @ Creekmont	NW138007	27	0	3/16/2001	10:07:00 AM	3/16/2001	14:50:00	Street	Public System	Residence	2	1.65
10495-076	6827	Mangum @ Creekmont	NW139016	27	0	7/28/2001	10:40:00 AM	7/28/2001	11:49:00	Open Unpaved Area	Public System	Residence	2	1.13
10495-076	6827	Mangum @ Creekmont	NW139016	27	0	7/28/2001	10:40:00 AM	7/28/2001	11:49:00	Open Unpaved Area	Public System	Residence	2	1.13
10495-076	6827	Mangum @ Creekmont	NW139016	27	0	7/28/2001	10:40:00 AM	7/28/2001	11:49:00	Open Unpaved Area	Public System	Residence	2	1.13
10495-076	5500	Mangum @ Creekmont	NW138007	27	0	10/17/2001	10:46:00 AM	10/17/2001	15:00:00	Open Paved Area		Residence	2	0.00
10495-076	5500	Mangum @ Creekmont	NW138007	27	0	10/17/2001	10:46:00 AM	10/17/2001	15:00:00	Open Paved Area		Residence	2	0.00
10495-076	5500	Mangum @ Creekmont	NW138007	27	0	10/17/2001	10:46:00 AM	10/17/2001	15:00:00	Open Paved Area		Residence	2	0.00
10495-076	5200	Mangum @ Creekmont	NW168092A	27	0	11/2/2001	10:57:00 AM	11/3/2001	11:56:00	Street	Public System	Commercial Business	2	0.00
10495-076	5200	Mangum @ Creekmont	NW168092A	27	0	11/2/2001	10:57:00 AM	11/3/2001	11:56:00	Street	Public System	Commercial Business	2	0.00
10495-076	5200	Mangum @ Creekmont	NW168092A	27	0	11/2/2001	10:57:00 AM	11/3/2001	11:56:00	Street	Public System	Commercial Business	2	0.00
10495-076	7303	Mangum @ Creekmont	NW162174	27	0	12/12/2001	2:00:00 PM	12/12/2001	18:09:00	Open Paved Area		Residence	2	2.77
10495-076	7303	Mangum @ Creekmont	NW162174	27	0	12/12/2001	2:00:00 PM	12/12/2001	18:09:00	Open Paved Area		Residence	2	2.77
10495-076	7303	Mangum @ Creekmont	NW162174	27	0	12/12/2001	2:00:00 PM	12/12/2001	18:09:00	Open Paved Area		Residence	2	2.77
10495-076	7303	Mangum @ Creekmont	NW162174	27	0	12/12/2001	2:00:00 PM	12/12/2001	18:09:00	Open Paved Area		Residence	2	2.77
10495-076	5800	Mangum @ Creekmont	NW139032	27	0	1/18/2002	9:10:00 AM	1/19/2002	9:40:00	Street	Public System	Residence	2	0.00
10495-076	5800	Mangum @ Creekmont	NW139032	27	0	1/18/2002	9:10:00 AM	1/19/2002	9:40:00	Street	Public System	Residence	2	0.00
10495-076	5800	Mangum @ Creekmont	NW139032	27	0	1/18/2002	9:10:00 AM	1/19/2002	9:40:00	Street	Public System	Residence	2	0.00
NWHC MU	7100		JV025028	419	0	3/13/2002	1:45:00 PM	3/13/2002	14:25:00	Street	Public System	Residence	2	0.05
NWHC MU	7100		JV025028	419	0	3/13/2002	1:45:00 PM	3/13/2002	14:25:00	Street	Public System	Residence	2	0.05
NWHC MU	7100		JV025028	419	0	3/13/2002	1:45:00 PM	3/13/2002	14:25:00	Street	Public System	Residence	2	0.05
10495-076	5122	Mangum @ Creekmont	NW167025	27	0	5/4/2002	11:48:00 AM	5/4/2002	13:07:00	Open Paved Area	Public System	Residence	2	0.00
10495-076	5122	Mangum @ Creekmont	NW167025	27	0	5/4/2002	11:48:00 AM	5/4/2002	13:07:00	Open Paved Area	Public System	Residence	2	0.00
10495-076	5122	Mangum @ Creekmont	NW167025	27	0	5/4/2002	11:48:00 AM	5/4/2002	13:07:00	Open Paved Area	Public System	Residence	2	0.00
10495-076	4438	Mangum @ Creekmont	NW148019	27	0	3/10/2001	9:05:00 AM	3/10/2001	9:37:00	Backlot Easement	Public System	Residence	3	0.84
10495-076	4438	Mangum @ Creekmont	NW148019	27	0	3/10/2001	9:05:00 AM	3/10/2001	9:37:00	Backlot Easement	Public System	Residence	3	0.84
10495-090	2200	S. Sgt. Macario Garcia	IA059001	1	0	3/11/2001	6:13:00 PM	3/12/2001	10:30:00	Backlot Easement	Public System	Residence	3	0.25
10495-090	2200	S. Sgt. Macario Garcia	IA059001	1	0	3/11/2001	6:13:00 PM	3/12/2001	10:30:00	Backlot Easement	Public System	Residence	3	0.25
10495-090	1400	S. Sgt. Macario Garcia	IA076055	1	0	3/16/2001	7:18:00 PM	3/17/2001	14:10:00	Backlot Easement	Public System	Residence	3	1.65
10495-090	1400	S. Sgt. Macario Garcia	IA076055	1	0	3/16/2001	7:18:00 PM	3/17/2001	14:10:00	Backlot Easement	Public System	Residence	3	1.65
10495-090	1400	S. Sgt. Macario Garcia	IA076055	1	0	3/16/2001	7:18:00 PM	3/17/2001	14:10:00	Backlot Easement	Public System	Residence	3	1.65
10495-090	1400	S. Sgt. Macario Garcia	IA076055	1	0	3/16/2001	7:18:00 PM	3/17/2001	14:10:00	Street	Public System	Residence	3	1.65
10495-090	1400	S. Sgt. Macario Garcia	IA076055	1	0	3/16/2001	7:18:00 PM	3/17/2001	14:10:00	Street	Public System	Residence	3	1.65
10495-090	1400	S. Sgt. Macario Garcia	IA076055	1	0	3/16/2001	7:18:00 PM	3/17/2001	14:10:00	Street	Public System	Residence	3	1.65
10495-076	1620	Mangum @ Creekmont	NW159037	27	0	3/22/2001	11:40:00 AM	3/22/2001	15:10:00	Backlot Easement	Public System	Residence	3	0.00
10495-076	1620	Mangum @ Creekmont	NW159037	27	0	3/22/2001	11:40:00 AM	3/22/2001	15:10:00	Backlot Easement	Public System	Residence	3	0.00
10495-076	1825	Mangum @ Creekmont	NW159065	27	0	3/24/2001	8:45:00 AM	3/24/2001	13:41:00	Backlot Easement	Private System	Residence	3	0.00
10495-090	4102	S. Sgt. Macario Garcia	IA060008	1	0	3/27/2001	9:30:00 AM	3/27/2001	10:46:00	Backlot Easement	Private System	Residence	3	5.05
10495-090	4102	S. Sgt. Macario Garcia	IA060008	1	0	3/27/2001	9:30:00 AM	3/27/2001	10:46:00	Backlot Easement	Private System	Residence	3	5.05
10495-076	4327	Mangum @ Creekmont	NW148021	27	0	4/6/2001	9:10:00 AM	4/6/2001	12:49:00	Backlot Easement	Private System	Residence	3	0.00
10495-076	6706	Mangum @ Creekmont	NW159079	27	0	4/30/2001	1:49:00 PM	5/1/2001	13:32:00	Backlot Easement	Public System	Residence	3	0.00
10495-076	6706	Mangum @ Creekmont	NW159079	27	0	4/30/2001	1:49:00 PM	5/1/2001	13:32:00	Backlot Easement	Public System	Residence	3	0.00
10495-076	4342	Mangum @ Creekmont	NW148021	27	0	5/6/2001	2:14:00 AM	5/7/2001	9:19:00	Backlot Easement	Public System	Residence	3	0.00
10495-090		S. Sgt. Macario Garcia	IA069025	1	0	8/9/2001	9:57:00 AM	8/9/2001	12:28:00	Open Paved Area		Residence	3	0.00
10495-090		S. Sgt. Macario Garcia	IA069025	1	0	8/9/2001	9:57:00 AM	8/9/2001	12:28:00	Open Paved Area		Residence	3	0.00
10495-090		S. Sgt. Macario Garcia	IA069025	1	0	8/9/2001	9:57:00 AM	8/9/2001	12:28:00	Open Paved Area		Residence	3	0.00
10495-090	4618	S. Sgt. Macario Garcia	IA075011	1	0	9/8/2001	1:05:00 PM	9/8/2001	16:03:00	Street	Public System	Residence	3	0.00
10495-090	4618	S. Sgt. Macario Garcia	IA075011	1	0	9/8/2001	1:05:00 PM	9/8/2001	16:03:00	Street	Public System	Residence	3	0.00
10495-090	4618	S. Sgt. Macario Garcia	IA075011	1	0	9/8/2001	1:05:00 PM	9/8/2001	16:03:00	Street	Public System	Residence	3	0.00
10495-090	6327	S. Sgt. Macario Garcia	IA076026	1	0	10/14/2001	12:51:00 PM	10/15/2001	10:39:00	Backlot Easement		Residence	3	2.74
10495-090	6327	S. Sgt. Macario Garcia	IA076026	1	0	10/14/2001	12:51:00 PM	10/15/2001	10:39:00	Backlot Easement		Residence	3	2.74

TNRCC Permit	Excursion Address	Street	Manhole	WWTP	Not Observed	Excursion Start Date	Excursion Start Time	Excursion End Date	Excursion End Time	Location	System	Area	Subbasin	3 day Rainfall'
10495-090	4300	S. Sgt. Macario Garcia	IA060043	1	0	12/8/2001	8:30:00 AM	12/8/2001	15:01:00	Street	Public System	Residence	3	0.87
10495-090	4300	S. Sgt. Macario Garcia	IA060043	1	0	12/8/2001	8:30:00 AM	12/8/2001	15:01:00	Street	Public System	Residence	3	0.87
10495-090	4300	S. Sgt. Macario Garcia	IA060043	1	0	12/8/2001	8:30:00 AM	12/8/2001	15:01:00	Street	Public System	Residence	3	0.87
10495-090	4300	S. Sgt. Macario Garcia	IA060043	1	0	2/13/2002	11:34:00 AM	2/14/2002	10:42:00		Public System	Residence	3	0.00
10495-090	4300	S. Sgt. Macario Garcia	IA060043	1	0	2/13/2002	11:34:00 AM	2/14/2002	10:42:00		Public System	Residence	3	0.00
10495-090	4300	S. Sgt. Macario Garcia	IA060043	1	0	2/13/2002	11:34:00 AM	2/14/2002	10:42:00		Public System	Residence	3	0.00
10495-090	1800	S. Sgt. Macario Garcia	IA060041	1	0	2/14/2002	6:17:00 AM	2/14/2002	10:42:00		Public System	Residence	3	0.00
10495-090	1800	S. Sgt. Macario Garcia	IA060041	1	0	2/14/2002	6:17:00 AM	2/14/2002	10:42:00		Public System	Residence	3	0.00
10495-090	1800	S. Sgt. Macario Garcia	IA060041	1	0	2/14/2002	6:17:00 AM	2/14/2002	10:42:00		Public System	Residence	3	0.00
10495-090	1514	S. Sgt. Macario Garcia	IA062023	1	0	2/21/2002	7:00:00 AM	2/23/2002	13:29:00	Backlot Easement	Public System	Residence	3	0.83
10495-090	1514	S. Sgt. Macario Garcia	IA062023	1	0	2/21/2002	7:00:00 AM	2/23/2002	13:29:00	Backlot Easement	Public System	Residence	3	0.83
10495-076	4446	Mangum @ Creekmont	NW148010	27	0	5/31/2002	10:00:00 AM	5/31/2002	11:03:00	Backlot Easement	Public System	Residence	3	0.00
10495-076	4446	Mangum @ Creekmont	NW148010	27	0	5/31/2002	10:00:00 AM	5/31/2002	11:03:00	Backlot Easement	Public System	Residence	3	0.00
10495-076	4514	Mangum @ Creekmont	NW148010	27	0	6/11/2002	12:39:00 PM	6/11/2002	13:45:00	Open Paved Area	Public System	Residence	3	0.03
10495-076	4514	Mangum @ Creekmont	NW148010	27	0	6/11/2002	12:39:00 PM	6/11/2002	13:45:00	Open Paved Area	Public System	Residence	3	0.03
10495-076	5502	Mangum @ Creekmont	NW148033	27	0	7/7/2002	4:40:00 PM	7/7/2002	18:40:00	Street	Public System	Residence	3	0.00
10495-076	5502	Mangum @ Creekmont	NW148033	27	0	7/7/2002	4:40:00 PM	7/7/2002	18:40:00	Street	Public System	Residence	3	0.00
10495-076	5502	Mangum @ Creekmont	NW148033	27	0	7/7/2002	4:40:00 PM	7/7/2002	18:40:00	Street	Public System	Residence	3	0.00
10495-090	250	S. Sgt. Macario Garcia	II065027	1	0	2/22/2001	7:22:00 PM	2/23/2001	14:00:00	Backlot Easement	Public System	Residence	5	0.00
10495-090	250	S. Sgt. Macario Garcia	II065027	1	0	2/22/2001	7:22:00 PM	2/23/2001	14:00:00	Backlot Easement	Public System	Residence	5	0.00
10495-090	250	S. Sgt. Macario Garcia	II065027	1	0	2/22/2001	7:22:00 PM	2/23/2001	14:00:00	Backlot Easement	Public System	Residence	5	0.00
10495-090	4303	S. Sgt. Macario Garcia	II057050	1	0	2/22/2001	8:28:00 AM	2/23/2001	12:41:00	Open Unpaved Area	Private System	Residence	5	0.00
10495-090	4303	S. Sgt. Macario Garcia	II057050	1	0	2/22/2001	8:28:00 AM	2/23/2001	12:41:00	Open Unpaved Area	Private System	Residence	5	0.00
10495-090	6400	S. Sgt. Macario Garcia	II050073	1	0	2/23/2001	1:05:00 PM	2/24/2001	10:34:00	Street	Public System	Residence	5	0.00
10495-090	6400	S. Sgt. Macario Garcia	II050073	1	0	2/23/2001	1:05:00 PM	2/24/2001	10:34:00	Street	Public System	Residence	5	0.00
10495-090	901	S. Sgt. Macario Garcia	II057007	1	0	2/26/2001	10:01:00 AM	2/26/2001	12:02:00		Public System	Residence	5	0.00
10495-090	901	S. Sgt. Macario Garcia	II057007	1	0	2/26/2001	10:01:00 AM	2/26/2001	12:02:00		Public System	Residence	5	0.00
10495-090	606	S. Sgt. Macario Garcia	II044014	1	0	3/7/2001	10:40:00 AM	3/7/2001	12:30:00	Backlot Easement	Public System	Residence	5	0.00
10495-090	226	S. Sgt. Macario Garcia	II058030	1	0	3/10/2001	11:50:00 AM	3/11/2001	14:50:00	Backlot Easement	Public System	Residence	5	0.84
10495-090	8319	S. Sgt. Macario Garcia	II030018	1	0	3/13/2001	12:10:00 PM	3/13/2001	12:50:00	Backlot Easement	Public System	Residence	5	0.65
10495-090	8319	S. Sgt. Macario Garcia	II030018	1	0	3/13/2001	12:10:00 PM	3/13/2001	12:50:00	Backlot Easement	Public System	Residence	5	0.65
10495-090	8319	S. Sgt. Macario Garcia	II030018	1	0	3/13/2001	12:10:00 PM	3/13/2001	12:50:00	Backlot Easement	Public System	Residence	5	0.65
10495-090	126	S. Sgt. Macario Garcia	II055030	1	0	3/14/2001	12:08:00 PM	3/14/2001	12:34:00	Backlot Easement	Public System	Residence	5	2.05
10495-090	126	S. Sgt. Macario Garcia	II055030	1	0	3/14/2001	12:08:00 PM	3/14/2001	12:34:00	Backlot Easement	Public System	Residence	5	2.05
10495-090	311	S. Sgt. Macario Garcia	II065131	1	0	3/16/2001	12:38:00 PM	3/16/2001	17:46:00	Street	Public System	Residence	5	1.65
10495-090	311	S. Sgt. Macario Garcia	II065131	1	0	3/16/2001	12:38:00 PM	3/16/2001	17:46:00	Street	Public System	Residence	5	1.65
10495-090	311	S. Sgt. Macario Garcia	II065131	1	0	3/16/2001	12:38:00 PM	3/16/2001	17:46:00	Street	Public System	Residence	5	1.65
10495-090	317	S. Sgt. Macario Garcia	II050009	1	0	3/16/2001	8:50:00 PM	3/18/2001	10:35:00	Backlot Easement	Public System	Residence	5	1.65
10495-090	317	S. Sgt. Macario Garcia	II050009	1	0	3/16/2001	8:50:00 PM	3/18/2001	10:35:00	Backlot Easement	Public System	Residence	5	1.65
10495-090	8400	S. Sgt. Macario Garcia	II030037	1	0	3/20/2001	10:15:00 AM	3/20/2001	12:41:00	Backlot Easement	Public System	Residence	5	0.00
10495-090	8400	S. Sgt. Macario Garcia	II030037	1	0	3/20/2001	10:15:00 AM	3/20/2001	12:41:00	Backlot Easement	Public System	Residence	5	0.00
10495-090	202	S. Sgt. Macario Garcia	II065029	1	0	3/29/2001	10:17:00 AM	3/29/2001	14:51:00	Street	Public System	Residence	5	6.05
10495-090	202	S. Sgt. Macario Garcia	II065029	1	0	3/29/2001	10:17:00 AM	3/29/2001	14:51:00	Street	Public System	Residence	5	6.05
10495-090	307	S. Sgt. Macario Garcia	II065134	1	0	3/30/2001	3:34:00 PM	3/30/2001	16:28:00	Street	Public System	Residence	5	1.00
10495-090	307	S. Sgt. Macario Garcia	II065134	1	0	3/30/2001	3:34:00 PM	3/30/2001	16:28:00	Street	Public System	Residence	5	1.00
10495-090	6400	S. Sgt. Macario Garcia	II050050	1	0	4/12/2001	1:35:00 PM	4/13/2001	11:00:00	Backlot Easement	Public System	Residence	5	0.00
10495-090	6400	S. Sgt. Macario Garcia	II050050	1	0	4/12/2001	1:35:00 PM	4/13/2001	11:00:00	Backlot Easement	Public System	Residence	5	0.00
10495-090	6400	S. Sgt. Macario Garcia	II050050	1	0	4/12/2001	1:35:00 PM	4/13/2001	11:00:00	Backlot Easement	Public System	Residence	5	0.00
10495-090	250	S. Sgt. Macario Garcia	II065029	1	0	5/10/2001	2:19:00 PM	5/10/2001	18:58:00	Street	Public System	Residence	5	0.20
10495-090	7235	S. Sgt. Macario Garcia	II029039	1	0	5/14/2001	11:36:00 AM	5/14/2001	14:15:00	Backlot Easement	Public System	Residence	5	0.09
10495-090	7235	S. Sgt. Macario Garcia	II029039	1	0	5/14/2001	11:36:00 AM	5/14/2001	14:15:00	Backlot Easement	Public System	Residence	5	0.09
10495-090	5000	S. Sgt. Macario Garcia	IIP27035	1	0	5/15/2001	9:36:00 AM	5/15/2001	15:26:00		Public System	Residence	5	0.09
10495-090	5000	S. Sgt. Macario Garcia	IIP27035	1	0	5/15/2001	9:36:00 AM	5/15/2001	15:26:00		Public System	Residence	5	0.09
10495-090	5000	S. Sgt. Macario Garcia	IIP27035	1	0	5/15/2001	9:36:00 AM	5/15/2001	15:26:00		Public System	Residence	5	0.09
10495-090	56	S. Sgt. Macario Garcia	II034052	1	0	5/19/2001	12:36:00 PM	5/19/2001	16:37:00	Backlot Easement	Public System	Residence	5	0.00
10495-090	56	S. Sgt. Macario Garcia	II034052	1	0	5/19/2001	12:36:00 PM	5/19/2001	16:37:00	Backlot Easement	Public System	Residence	5	0.00

TNRCC Permit	Excursion Address	Street	Manhole	WWTP	Not Observed	Excursion Start Date	Excursion Start Time	Excursion End Date	Excursion End Time	Location	System	Area	Subbasin	3 day Rainfall'
10495-090	9400	S. Sgt. Macario Garcia	II042008	1	0	5/24/2001	6:30:00 PM	5/24/2001	21:18:00	Backlot Easement	Public System	Residence	5	0.00
10495-090	9400	S. Sgt. Macario Garcia	II042008	1	0	5/24/2001	6:30:00 PM	5/24/2001	21:18:00	Backlot Easement	Public System	Residence	5	0.00
10495-090	302	S. Sgt. Macario Garcia	II057058	1	0	5/25/2001	9:56:00 AM	5/25/2001	12:10:00	Open Unpaved Area	Public System	Residence	5	0.00
10495-090	302	S. Sgt. Macario Garcia	II057058	1	0	5/25/2001	9:56:00 AM	5/25/2001	12:10:00	Open Unpaved Area	Public System	Residence	5	0.00
10495-090	302	S. Sgt. Macario Garcia	II057058	1	0	5/25/2001	9:56:00 AM	5/25/2001	12:10:00	Open Unpaved Area	Public System	Residence	5	0.00
10495-090	1316	S. Sgt. Macario Garcia	II057025	1	0	5/29/2001	5:11:00 PM	5/30/2001	11:25:00	Open Unpaved Area	Public System	Commercial Business	5	0.75
10495-090	1316	S. Sgt. Macario Garcia	II057025	1	0	5/29/2001	5:11:00 PM	5/30/2001	11:25:00	Open Unpaved Area	Public System	School	5	0.75
10495-090	1316	S. Sgt. Macario Garcia	II057025	1	0	5/29/2001	5:11:00 PM	5/30/2001	11:25:00	Open Unpaved Area	Public System	School	5	0.75
10495-090	1316	S. Sgt. Macario Garcia	II057025	1	0	5/29/2001	5:11:00 PM	5/30/2001	11:25:00	Open Unpaved Area	Public System	Commercial Business	5	0.75
10495-090	1316	S. Sgt. Macario Garcia	II057025	1	0	5/29/2001	5:11:00 PM	5/30/2001	11:25:00	Open Unpaved Area	Public System	Residence	5	0.75
10495-090	1316	S. Sgt. Macario Garcia	II057025	1	0	5/29/2001	5:11:00 PM	5/30/2001	11:25:00	Open Unpaved Area	Public System	Residence	5	0.75
10495-090	511	S. Sgt. Macario Garcia	II065065	1	0	6/29/2001	12:22:00 PM	6/29/2001	15:50:00		Public System	Residence	5	1.01
10495-090	511	S. Sgt. Macario Garcia	II065065	1	0	6/29/2001	12:22:00 PM	6/29/2001	15:50:00		Public System	Residence	5	1.01
10495-090	511	S. Sgt. Macario Garcia	II065065	1	0	6/29/2001	12:22:00 PM	6/29/2001	15:50:00		Public System	Residence	5	1.01
10495-090	108	S. Sgt. Macario Garcia	II058043	1	0	7/11/2001	9:42:00 AM	7/11/2001	14:50:00	Backlot Easement	Public System	Residence	5	0.00
10495-090	108	S. Sgt. Macario Garcia	II058043	1	0	7/11/2001	9:42:00 AM	7/11/2001	14:50:00	Backlot Easement	Public System	Residence	5	0.00
10495-090	108	S. Sgt. Macario Garcia	II058043	1	0	7/11/2001	9:42:00 AM	7/11/2001	14:50:00	Backlot Easement	Public System	Residence	5	0.00
10495-090	709	S. Sgt. Macario Garcia	II026093	1	0	7/20/2001	4:45:00 PM	7/20/2001	17:55:00	Open Unpaved Area	Public System	Residence	5	0.00
10495-090	709	S. Sgt. Macario Garcia	II026093	1	0	7/20/2001	4:45:00 PM	7/20/2001	17:55:00	Open Unpaved Area	Public System	Residence	5	0.00
10495-090	230	S. Sgt. Macario Garcia	II065028	1	0	8/8/2001	11:45:00 AM	8/8/2001	14:43:00	Open Paved Area		Residence	5	1.15
10495-090	230	S. Sgt. Macario Garcia	II065028	1	0	8/8/2001	11:45:00 AM	8/8/2001	14:43:00	Open Paved Area		Residence	5	1.15
10495-090	230	S. Sgt. Macario Garcia	II065028	1	0	8/8/2001	11:45:00 AM	8/8/2001	14:43:00	Open Paved Area		Residence	5	1.15
10495-090	613	S. Sgt. Macario Garcia	II044015	1	0	8/14/2001	1:23:00 PM	8/14/2001	14:13:00	Backlot Easement	Private System	Residence	5	0.00
10495-090	613	S. Sgt. Macario Garcia	II044015	1	0	8/14/2001	1:23:00 PM	8/14/2001	14:13:00	Backlot Easement	Private System	Residence	5	0.00
10495-090	613	S. Sgt. Macario Garcia	II044015	1	0	8/14/2001	1:23:00 PM	8/14/2001	14:13:00	Backlot Easement	Private System	Residence	5	0.00
10495-090	510	S. Sgt. Macario Garcia	II057086	1	0	9/4/2001	8:23:00 AM	9/4/2001	13:45:00	Open Unpaved Area	Private System	Residence	5	0.00
10495-090	510	S. Sgt. Macario Garcia	II057086	1	0	9/4/2001	8:23:00 AM	9/4/2001	13:45:00	Open Unpaved Area	Private System	Residence	5	0.00
10495-090	124	S. Sgt. Macario Garcia	II058045	1	0	9/25/2001	5:48:00 PM	9/26/2001	13:15:00	Backlot Easement		Residence	5	0.65
10495-090	124	S. Sgt. Macario Garcia	II058045	1	0	9/25/2001	5:48:00 PM	9/26/2001	13:15:00	Backlot Easement		Residence	5	0.65
10495-090	1008	S. Sgt. Macario Garcia	II056050	1	0	10/18/2001	1:29:00 PM	10/19/2001	9:40:00	Open Paved Area	Public System	Residence	5	0.00
10495-090	1008	S. Sgt. Macario Garcia	II056050	1	0	10/18/2001	1:29:00 PM	10/19/2001	9:40:00	Open Paved Area	Public System	Residence	5	0.00
10495-090	1008	S. Sgt. Macario Garcia	II056050	1	0	10/18/2001	1:29:00 PM	10/19/2001	9:40:00	Open Paved Area	Public System	Residence	5	0.00
10495-090	8210	S. Sgt. Macario Garcia	II030017	1	0	10/29/2001	10:00:00 AM	10/29/2001	14:21:00	Open Paved Area		Residence	5	0.00
10495-090	8210	S. Sgt. Macario Garcia	II030017	1	0	10/29/2001	10:00:00 AM	10/29/2001	14:21:00	Open Paved Area		Residence	5	0.00
10495-090	8210	S. Sgt. Macario Garcia	II030017	1	0	10/29/2001	10:00:00 AM	10/29/2001	14:21:00	Open Paved Area		Residence	5	0.00
10495-090	116	S. Sgt. Macario Garcia	II057046	1	0	11/17/2001	2:25:00 PM	11/19/2001	11:22:00	Street	Public System	Commercial Business	5	0.00
10495-090	116	S. Sgt. Macario Garcia	II057046	1	0	11/17/2001	2:25:00 PM	11/19/2001	11:22:00	Street	Public System	Commercial Business	5	0.00
10495-090	116	S. Sgt. Macario Garcia	II057046	1	0	11/17/2001	2:25:00 PM	11/19/2001	11:22:00	Street	Public System	Commercial Business	5	0.00
10495-090	4202	S. Sgt. Macario Garcia	II056045	1	0	12/1/2001	9:43:00 AM	12/1/2001	14:34:00	Open Paved Area		Residence	5	0.79
10495-090	417	S. Sgt. Macario Garcia	IIP39029	1	0	12/5/2001	7:51:00 AM	12/5/2001	12:22:00	Open Paved Area		Residence	5	0.00
10495-090	417	S. Sgt. Macario Garcia	IIP39029	1	0	12/5/2001	7:51:00 AM	12/5/2001	12:22:00	Open Paved Area		Residence	5	0.00
10495-090	417	S. Sgt. Macario Garcia	IIP39029	1	0	12/5/2001	7:51:00 AM	12/5/2001	12:22:00	Open Paved Area		Residence	5	0.00
10495-090	807	S. Sgt. Macario Garcia	II062043	1	0	1/2/2002	2:45:00 PM	1/2/2002	15:30:00	Street	Public System	Residence	5	0.00
10495-090	807	S. Sgt. Macario Garcia	II062043	1	0	1/2/2002	2:45:00 PM	1/2/2002	15:30:00	Street	Public System	Residence	5	0.00
10495-090	807	S. Sgt. Macario Garcia	II062043	1	0	1/2/2002	2:45:00 PM	1/2/2002	15:30:00	Street	Public System	Residence	5	0.00
10495-090	530	S. Sgt. Macario Garcia	II058061	1	0	1/4/2002	8:26:00 AM	1/4/2002	12:43:00		Public System	Residence	5	0.00
10495-090	530	S. Sgt. Macario Garcia	II058061	1	0	1/4/2002	8:26:00 AM	1/4/2002	12:43:00		Public System	Residence	5	0.00
10495-090	530	S. Sgt. Macario Garcia	II058061	1	0	1/4/2002	8:26:00 AM	1/4/2002	12:43:00		Public System	Residence	5	0.00
10495-090	116	S. Sgt. Macario Garcia	II057047	1	0	1/12/2002	10:20:00 AM	1/12/2002	14:30:00	Open Paved Area	Public System	Bus Stop	5	0.00
10495-090	116	S. Sgt. Macario Garcia	II057047	1	0	1/12/2002	10:20:00 AM	1/12/2002	14:30:00	Open Paved Area	Public System	Bus Stop	5	0.00
10495-090	106	S. Sgt. Macario Garcia	II035012	1	0	1/22/2002	6:00:00 AM	1/22/2002	11:31:00		Public System	Residence	5	0.00
10495-090	106	S. Sgt. Macario Garcia	II035012	1	0	1/22/2002	6:00:00 AM	1/22/2002	11:31:00		Public System	Residence	5	0.00
10495-090	118	S. Sgt. Macario Garcia	II057124	1	0	1/25/2002	1:18:00 PM	1/25/2002	15:43:00	Open Paved Area	Public System	Residence	5	0.00
10495-090	118	S. Sgt. Macario Garcia	II057124	1	0	1/25/2002	1:18:00 PM	1/25/2002	15:43:00	Open Paved Area	Public System	Residence	5	0.00
10495-090	11017	S. Sgt. Macario Garcia	II035039	1	0	1/29/2002	8:59:00 AM	1/31/2002	14:20:00	Street	Public System	Residence	5	0.00
10495-090	11017	S. Sgt. Macario Garcia	II035039	1	0	1/29/2002	8:59:00 AM	1/31/2002	14:20:00	Street	Public System	Residence	5	0.00

TNRCC Permit	Excursion Address	Street	Manhole	WWTP	Not Observed	Excursion Start Date	Excursion Start Time	Excursion End Date	Excursion End Time	Location	System	Area	Subbasin	3 day Rainfall'
10495-090	814	S. Sgt. Macario Garcia	II057055	1	0	2/8/2002	1:15:00 PM	2/11/2002	10:10:00	Street	Public System	Residence	5	0.05
10495-090	814	S. Sgt. Macario Garcia	II057055	1	0	2/8/2002	1:15:00 PM	2/11/2002	10:10:00	Street	Public System	Residence	5	0.05
10495-090	814	S. Sgt. Macario Garcia	II057055	1	0	2/8/2002	1:15:00 PM	2/11/2002	10:10:00	Street	Public System	Residence	5	0.05
10495-090	301	S. Sgt. Macario Garcia	II057119	1	0	2/9/2002	1:35:00 PM	2/9/2002	14:05:00	Street	Public System	Residence	5	0.00
10495-090	301	S. Sgt. Macario Garcia	II057119	1	0	2/9/2002	1:35:00 PM	2/9/2002	14:05:00	Street	Public System	Residence	5	0.00
10495-090	4218	S. Sgt. Macario Garcia	II056051	1	0	2/15/2002	11:33:00 AM	2/18/2002	10:53:00	Backlot Easement	Public System	Residence	5	0.00
10495-090	4218	S. Sgt. Macario Garcia	II056051	1	0	2/15/2002	11:33:00 AM	2/18/2002	10:53:00	Backlot Easement	Public System	Residence	5	0.00
10495-090	512	S. Sgt. Macario Garcia	IIP39029	1	0	2/21/2002	8:21:00 AM	2/21/2002	9:30:00	Street	Public System	Residence	5	0.83
10495-090	512	S. Sgt. Macario Garcia	IIP39029	1	0	2/21/2002	8:21:00 AM	2/21/2002	9:30:00	Street	Public System	Residence	5	0.83
10495-090	4218	S. Sgt. Macario Garcia	II056051	1	0	2/24/2002	8:09:00 AM	2/24/2002	8:49:00	Street	Public System	Residence	5	0.05
10495-090	4218	S. Sgt. Macario Garcia	II056051	1	0	2/24/2002	8:09:00 AM	2/24/2002	8:49:00	Street	Public System	Residence	5	0.05
10495-090	4218	S. Sgt. Macario Garcia	II056051	1	0	2/24/2002	8:09:00 AM	2/24/2002	8:49:00	Street	Public System	Residence	5	0.05
10495-090	21	S. Sgt. Macario Garcia	II035015	1	0	2/25/2002	11:20:00 AM	2/25/2002	12:41:00	Open Unpaved Area	Public System	Residence	5	0.00
10495-090	245	S. Sgt. Macario Garcia	II035007	1	0	3/3/2002	3:18:00 AM	3/4/2002	13:30:00		Public System	Residence	5	0.05
10495-090	245	S. Sgt. Macario Garcia	II035007	1	0	3/3/2002	3:18:00 AM	3/4/2002	13:30:00		Public System	Residence	5	0.05
10495-090	417	S. Sgt. Macario Garcia	IIP39029	1	0	3/4/2002	9:13:00 AM	3/4/2002	10:28:00	Street	Public System	Residence	5	0.38
10495-090	4300	S. Sgt. Macario Garcia	II056046	1	0	3/18/2002	4:21:00 PM	3/19/2002	10:27:00	Street	Public System	Residence	5	0.07
10495-090	4300	S. Sgt. Macario Garcia	II056046	1	0	3/18/2002	4:21:00 PM	3/19/2002	10:27:00	Street	Public System	Residence	5	0.07
10495-090	4300	S. Sgt. Macario Garcia	II056046	1	0	3/18/2002	4:21:00 PM	3/19/2002	10:27:00	Street	Public System	Residence	5	0.07
10495-090	925	S. Sgt. Macario Garcia	IIP41052	1	0	3/26/2002	12:00:00 PM	3/26/2002	14:45:00	Street	Public System	Commercial Business	5	0.00
10495-090	925	S. Sgt. Macario Garcia	IIP41052	1	0	3/26/2002	12:00:00 PM	3/26/2002	14:45:00	Street	Public System	Commercial Business	5	0.00
10495-090	7322	S. Sgt. Macario Garcia	II029009	1	0	3/29/2002	7:00:00 AM	4/1/2002	11:00:00	Backlot Easement		Residence	5	0.00
10495-090	7322	S. Sgt. Macario Garcia	II029009	1	0	3/29/2002	7:00:00 AM	4/1/2002	11:00:00	Backlot Easement		Residence	5	0.00
10495-090	6831	S. Sgt. Macario Garcia	II025024	1	0	4/1/2002	10:48:00 AM	4/1/2002	15:18:00	Open Paved Area	Public System	Residence	5	1.00
10495-090	6831	S. Sgt. Macario Garcia	II025024	1	0	4/1/2002	10:48:00 AM	4/1/2002	15:18:00	Open Paved Area	Public System	Residence	5	1.00
10495-090	55	S. Sgt. Macario Garcia	II034053	1	0	4/1/2002	8:10:00 AM	4/1/2002	16:14:00	Open Unpaved Area	Public System	Residence	5	1.00
10495-090	55	S. Sgt. Macario Garcia	II034053	1	0	4/1/2002	8:10:00 AM	4/1/2002	16:14:00	Open Unpaved Area	Public System	Residence	5	1.00
10495-090	602	S. Sgt. Macario Garcia	II026086	1	0	4/2/2002	9:25:00 AM	4/3/2002	9:40:00	Street	Public System	Residence	5	1.00
10495-090	602	S. Sgt. Macario Garcia	II026086	1	0	4/2/2002	9:25:00 AM	4/3/2002	9:40:00	Street	Public System	Residence	5	1.00
10495-090	602	S. Sgt. Macario Garcia	II026086	1	0	4/2/2002	9:25:00 AM	4/3/2002	9:40:00	Street	Public System	Residence	5	1.00
10495-090	4800	S. Sgt. Macario Garcia	II065031	1	0	4/4/2002	10:49:00 AM	4/4/2002	12:05:00	Street	Public System	Residence	5	0.00
10495-090	4800	S. Sgt. Macario Garcia	II065031	1	0	4/4/2002	10:49:00 AM	4/4/2002	12:05:00	Street	Public System	Residence	5	0.00
10495-090	4800	S. Sgt. Macario Garcia	II065031	1	0	4/4/2002	10:49:00 AM	4/4/2002	12:05:00	Street	Public System	Residence	5	0.00
10495-090	4100	S. Sgt. Macario Garcia	II056044	1	0	4/9/2002	5:40:00 PM	4/10/2002	14:36:00	Open Paved Area	Public System	Residence	5	0.00
10495-090	4100	S. Sgt. Macario Garcia	II056044	1	0	4/9/2002	5:40:00 PM	4/10/2002	14:36:00	Open Paved Area	Public System	Residence	5	0.00
10495-090	207	S. Sgt. Macario Garcia	II061017	1	0	4/12/2002	7:00:00 AM	4/13/2002	13:25:00	Street	Public System	Residence	5	0.00
10495-090	207	S. Sgt. Macario Garcia	II061017	1	0	4/12/2002	7:00:00 AM	4/13/2002	13:25:00	Street	Public System	Residence	5	0.00
10495-090	718	S. Sgt. Macario Garcia	II025030	1	0	4/17/2002	1:15:00 PM	4/17/2002	13:55:00	Street	Public System	Residence	5	0.00
10495-090	718	S. Sgt. Macario Garcia	II025030	1	0	4/17/2002	1:15:00 PM	4/17/2002	13:55:00	Street	Public System	Residence	5	0.00
10495-090	722	S. Sgt. Macario Garcia	II025030	1	0	4/17/2002	2:00:00 PM	4/17/2002	14:22:00	Street	Public System	Residence	5	0.00
10495-090	722	S. Sgt. Macario Garcia	II025030	1	0	4/17/2002	2:00:00 PM	4/17/2002	14:22:00	Street	Public System	Residence	5	0.00
10495-090	7317	S. Sgt. Macario Garcia	IIP43049	1	0	4/17/2002	11:51:00 AM	4/17/2002	15:15:00	Open Paved Area	Public System	Residence	5	0.00
10495-090	7317	S. Sgt. Macario Garcia	IIP43049	1	0	4/17/2002	11:51:00 AM	4/17/2002	15:15:00	Open Paved Area	Public System	Residence	5	0.00
10495-090	542	S. Sgt. Macario Garcia	II029037	1	0	4/29/2002	4:28:00 PM	4/29/2002	18:15:00	Street	Public System	Residence	5	0.00
10495-090	129	S. Sgt. Macario Garcia	II061082	1	0	5/6/2002	1:55:00 PM	5/7/2002	13:03:00	Open Paved Area	Public System	Residence	5	0.00
10495-090	129	S. Sgt. Macario Garcia	II061082	1	0	5/6/2002	1:55:00 PM	5/7/2002	13:03:00	Open Paved Area	Public System	Residence	5	0.00
10495-090	129	S. Sgt. Macario Garcia	II061082	1	0	5/6/2002	1:55:00 PM	5/7/2002	13:03:00	Open Paved Area	Public System	Residence	5	0.00
10495-090	914	S. Sgt. Macario Garcia	II042029	1	0	5/8/2002	8:40:00 AM	5/8/2002	15:00:00	Open Paved Area	Public System	Commercial Business	5	0.00
10495-090	914	S. Sgt. Macario Garcia	II042029	1	0	5/8/2002	8:40:00 AM	5/8/2002	15:00:00	Open Paved Area	Public System	Commercial Business	5	0.00
10495-090	129	S. Sgt. Macario Garcia	II057047	1	0	6/5/2002	10:30:00 AM	6/5/2002	12:34:00	Open Paved Area	Public System	Bus Stop	5	0.00
10495-090	129	S. Sgt. Macario Garcia	II057047	1	0	6/5/2002	10:30:00 AM	6/5/2002	12:34:00	Open Paved Area	Public System	Bus Stop	5	0.00
10495-090	129	S. Sgt. Macario Garcia	II057047	1	0	6/5/2002	10:30:00 AM	6/5/2002	12:34:00	Open Paved Area	Public System	Residence	5	0.00
10495-090	129	S. Sgt. Macario Garcia	II057047	1	0	6/5/2002	10:30:00 AM	6/5/2002	12:34:00	Open Paved Area	Public System	Residence	5	0.00
10495-090	62	S. Sgt. Macario Garcia	IIP27039	1	0	6/7/2002	5:58:00 PM	6/7/2002	18:42:00	Street	Public System	Residence	5	0.62
10495-090	62	S. Sgt. Macario Garcia	IIP27039	1	0	6/7/2002	5:58:00 PM	6/7/2002	18:42:00	Street	Public System	Residence	5	0.62
10495-090	327	S. Sgt. Macario Garcia	II029008	1	0	6/29/2002	8:55:00 AM	7/2/2002	8:30:00	Street	Public System	Residence	5	1.89

TNRCC Permit	Excursion Address	Street	Manhole	WWTP	Not Observed	Excursion Start Date	Excursion Start Time	Excursion End Date	Excursion End Time	Location	System	Area	Subbasin	3 day Rainfall'
10495-090	703	S. Sgt. Macario Garcia	II027035	1	0	7/1/2002	1:50:00 PM	7/1/2002	14:20:00	Street	Public System	Residence	5	0.69
10495-090	703	S. Sgt. Macario Garcia	II027035	1	0	7/1/2002	1:50:00 PM	7/1/2002	14:20:00	Street	Public System	Residence	5	0.69
10495-090	705	S. Sgt. Macario Garcia	II044022	1	0	7/6/2002	7:16:00 PM	7/6/2002	20:24:00	Street	Public System	Residence	5	0.00
10495-090	705	S. Sgt. Macario Garcia	II044022	1	0	7/6/2002	7:16:00 PM	7/6/2002	20:24:00	Street	Public System	Residence	5	0.00
10495-090	818	S. Sgt. Macario Garcia	II066015A	1	0	2/23/2001	12:58:00 PM	2/23/2001	18:30:00	Backlot Easement	Public System	Residence	6	0.00
10495-090	818	S. Sgt. Macario Garcia	II066015A	1	0	2/23/2001	12:58:00 PM	2/23/2001	18:30:00	Backlot Easement	Public System	Residence	6	0.00
10495-090	818	S. Sgt. Macario Garcia	II066015A	1	0	2/23/2001	12:58:00 PM	2/23/2001	18:30:00	Backlot Easement	Public System	Residence	6	0.00
10495-090	6717	S. Sgt. Macario Garcia	II077016	1	0	3/5/2001	8:42:00 AM	3/5/2001	12:05:00	Backlot Easement	Public System	Residence	6	0.10
10495-090	6717	S. Sgt. Macario Garcia	II077016	1	0	3/5/2001	8:42:00 AM	3/5/2001	12:05:00	Backlot Easement	Public System	Residence	6	0.10
10495-090	1026 1/2	S. Sgt. Macario Garcia	II088060	1	0	3/26/2001	11:14:00 AM	3/26/2001	11:31:00	Open Unpaved Area	Private System	Residence	6	0.00
10495-090	1026 1/2	S. Sgt. Macario Garcia	II088060	1	0	3/26/2001	11:14:00 AM	3/26/2001	11:31:00	Open Unpaved Area	Private System	Residence	6	0.00
10495-090	911	S. Sgt. Macario Garcia	II082062	1	0	4/25/2001	9:02:00 AM	4/25/2001	13:51:00		Public System	Residence	6	0.24
10495-090	911	S. Sgt. Macario Garcia	II082062	1	0	4/25/2001	9:02:00 AM	4/25/2001	13:51:00		Public System	Residence	6	0.24
10495-090	7702	S. Sgt. Macario Garcia	II054010	1	0	4/28/2001	1:29:00 PM	4/30/2001	9:30:00		Public System	Residence	6	0.00
10495-090	7702	S. Sgt. Macario Garcia	II054010	1	0	4/28/2001	1:29:00 PM	4/30/2001	9:30:00		Public System	Residence	6	0.00
10495-090	5050	S. Sgt. Macario Garcia	II073021	1	0	4/30/2001	9:06:00 AM	4/30/2001	17:23:00	Street	Public System	Residence	6	0.00
10495-090	6000	S. Sgt. Macario Garcia	II076001	1	0	5/3/2001	8:32:00 AM	5/3/2001	11:30:00	Backlot Easement	Public System	Residence	6	0.00
10495-090	6000	S. Sgt. Macario Garcia	II076001	1	0	5/3/2001	8:32:00 AM	5/3/2001	11:30:00	Backlot Easement	Public System	Residence	6	0.00
10495-090	6000	S. Sgt. Macario Garcia	II076001	1	0	5/3/2001	8:32:00 AM	5/3/2001	11:30:00	Backlot Easement	Public System	Residence	6	0.00
10495-090	735	S. Sgt. Macario Garcia	II077030	1	0	5/18/2001	1:27:00 PM	5/20/2001	17:59:00	Open Unpaved Area	Private System	Residence	6	0.00
10495-090	735	S. Sgt. Macario Garcia	II077030	1	0	5/18/2001	1:27:00 PM	5/20/2001	17:59:00	Open Unpaved Area	Private System	Residence	6	0.00
10495-090	735	S. Sgt. Macario Garcia	II077030	1	0	5/18/2001	1:27:00 PM	5/20/2001	17:59:00	Open Unpaved Area	Private System	Residence	6	0.00
10495-090	400	S. Sgt. Macario Garcia	II073036	1	0	7/9/2001	11:30:00 AM	7/9/2001	13:00:00	Street	Public System	Residence	6	1.09
10495-090	400	S. Sgt. Macario Garcia	II073036	1	0	7/9/2001	11:30:00 AM	7/9/2001	13:00:00	Street	Public System	Residence	6	1.09
10495-090	714	S. Sgt. Macario Garcia	II078040	1	0	7/26/2001	11:31:00 AM	7/27/2001	9:41:00	Backlot Easement		Residence	6	0.32
10495-090	714	S. Sgt. Macario Garcia	II078040	1	0	7/26/2001	11:31:00 AM	7/27/2001	9:41:00	Backlot Easement		Residence	6	0.32
10495-090	714	S. Sgt. Macario Garcia	II078040	1	0	7/26/2001	11:31:00 AM	7/27/2001	9:41:00	Backlot Easement		Residence	6	0.32
10495-090	714	S. Sgt. Macario Garcia	II078040	1	0	8/22/2001	1:14:00 PM	8/22/2001	14:27:00	Backlot Easement	Public System	Residence	6	0.00
10495-090	750	S. Sgt. Macario Garcia	II084009	1	0	9/5/2001	12:07:00 PM	9/7/2001	9:29:00	Backlot Easement	Public System	Residence	6	0.06
10495-090	909	S. Sgt. Macario Garcia	II083005	1	0	9/27/2001	9:30:00 AM	9/27/2001	18:05:00	Backlot Easement		Residence	6	0.00
10495-090	909	S. Sgt. Macario Garcia	II083005	1	0	9/27/2001	9:30:00 AM	9/27/2001	18:05:00	Backlot Easement		Residence	6	0.00
10495-090	909	S. Sgt. Macario Garcia	II083005	1	0	9/27/2001	9:30:00 AM	9/27/2001	18:05:00	Backlot Easement		Residence	6	0.00
10495-090	706	S. Sgt. Macario Garcia	II066006	1	0	11/5/2001	2:50:00 PM	11/5/2001	15:53:00	Backlot Easement	Public System	Undeveloped Area	6	0.00
10495-090	706	S. Sgt. Macario Garcia	II066006	1	0	11/5/2001	2:50:00 PM	11/5/2001	15:53:00	Backlot Easement	Public System	Undeveloped Area	6	0.00
10495-090	706	S. Sgt. Macario Garcia	II066006	1	0	11/5/2001	2:50:00 PM	11/5/2001	15:53:00	Backlot Easement	Public System	Undeveloped Area	6	0.00
10495-090	706	S. Sgt. Macario Garcia	II066006	1	0	11/5/2001	2:50:00 PM	11/5/2001	15:53:00	Backlot Easement	Public System	Residence	6	0.00
10495-090	706	S. Sgt. Macario Garcia	II066006	1	0	11/5/2001	2:50:00 PM	11/5/2001	15:53:00	Backlot Easement	Public System	Residence	6	0.00
10495-090	706	S. Sgt. Macario Garcia	II066006	1	0	11/5/2001	2:50:00 PM	11/5/2001	15:53:00	Backlot Easement	Public System	Residence	6	0.00
10495-090	5050	S. Sgt. Macario Garcia	II073021	1	0	1/26/2002	2:50:00 PM	1/28/2002	15:53:00	Street	Public System	Residence	6	0.00
10495-090	3500	S. Sgt. Macario Garcia	II084006	1	0	2/17/2002	8:30:00 AM	2/18/2002	9:47:00	Street	Public System	Residence	6	0.00
10495-076	9027	Mangum @ Creekmont	NW162017	27	0	3/2/2001	9:34:00 AM	3/2/2001	12:39:00	Backlot Easement	Public System	Residence	7	2.13
10495-076	9027	Mangum @ Creekmont	NW162017	27	0	3/2/2001	9:34:00 AM	3/2/2001	12:39:00	Backlot Easement	Public System	Residence	7	2.13
10495-099	6503	Gulf Bank Rd., West	WO134026	42	0	4/19/2001	6:27:00 PM	4/19/2001	18:50:00	Backlot Easement	Public System	Residence	7	0.00
10495-099	6503	Gulf Bank Rd., West	WO134026	42	0	4/19/2001	6:27:00 PM	4/19/2001	18:50:00	Backlot Easement	Public System	Residence	7	0.00
10495-099	6503	Gulf Bank Rd., West	WO134026	42	0	4/19/2001	6:27:00 PM	4/19/2001	18:50:00	Backlot Easement	Public System	Residence	7	0.00
10495-099	6507	Gulf Bank Rd., West	WO134026	42	0	4/24/2001	8:40:00 AM	4/24/2001	12:03:00	Backlot Easement	Public System	Residence	7	0.24
10495-099	6507	Gulf Bank Rd., West	WO134026	42	0	4/24/2001	8:40:00 AM	4/24/2001	12:03:00	Backlot Easement	Public System	Residence	7	0.24
10495-099	6507	Gulf Bank Rd., West	WO134026	42	0	4/24/2001	8:40:00 AM	4/24/2001	12:03:00	Backlot Easement	Public System	Residence	7	0.24
10495-076	7718	Mangum @ Creekmont	NW164026	27	0	4/25/2001	10:44:00 AM	4/25/2001	13:51:00		Public System	Residence	7	0.24
10495-076	7718	Mangum @ Creekmont	NW164026	27	0	4/25/2001	10:44:00 AM	4/25/2001	13:51:00		Public System	Residence	7	0.24
10495-099	6730	Gulf Bank Rd., West	WO134095	42	0	6/20/2001	11:44:00 AM	6/20/2001	14:06:00	Street	Public System	Residence	7	0.16
10495-099	6730	Gulf Bank Rd., West	WO134095	42	0	6/20/2001	11:44:00 AM	6/20/2001	14:06:00	Street	Public System	Residence	7	0.16
10495-076	8018	Mangum @ Creekmont	NW164084	27	0	6/28/2001	1:18:00 PM	6/28/2001	15:59:00	Backlot Easement	Public System	Residence	7	0.85
10495-076	8018	Mangum @ Creekmont	NW164084	27	0	6/28/2001	1:18:00 PM	6/28/2001	15:59:00	Backlot Easement	Public System	Residence	7	0.85
10495-099	6507	Gulf Bank Rd., West	WO134026	42	0	10/5/2001	8:27:00 AM	10/5/2001	13:05:00	Street	Public System	Residence	7	0.00
10495-099	6507	Gulf Bank Rd., West	WO134026	42	0	10/5/2001	8:27:00 AM	10/5/2001	13:05:00	Street	Public System	Residence	7	0.00

TNRCC Permit	Excursion Address	Street	Manhole	WWTP	Not Observed	Excursion Start Date	Excursion Start Time	Excursion End Date	Excursion End Time	Location	System	Area	Subbasin	3 day Rainfall'
10495-099	6929	Gulf Bank Rd., West	WO134123	42	0	11/20/2001	9:00:00 AM	11/20/2001	12:37:00	Street	Public System	Residence	7	0.00
10495-099	6929	Gulf Bank Rd., West	WO134123	42	0	11/20/2001	9:00:00 AM	11/20/2001	12:37:00	Street	Public System	Residence	7	0.00
10495-099	6929	Gulf Bank Rd., West	WO134123	42	0	11/20/2001	9:00:00 AM	11/20/2001	12:37:00	Street	Public System	Residence	7	0.00
10495-076	8003	Mangum @ Creekmont	NW164091	27	0	11/29/2001	11:45:00 AM	11/29/2001	13:25:00	Street	Public System	Residence	7	0.79
10495-076	8003	Mangum @ Creekmont	NW164091	27	0	11/29/2001	11:45:00 AM	11/29/2001	13:25:00	Street	Public System	Residence	7	0.79
10495-076	7733	Mangum @ Creekmont	NW164027	27	0	12/1/2001	8:52:00 AM	12/1/2001	12:30:00	Street	Public System	Residence	7	0.79
10495-076	7733	Mangum @ Creekmont	NW164027	27	0	12/1/2001	8:52:00 AM	12/1/2001	12:30:00	Street	Public System	Residence	7	0.79
10495-076	7030	Mangum @ Creekmont	NW161022	27	0	12/15/2001	8:26:00 AM	12/15/2001	14:30:00		Public System	Commercial Business	7	0.94
10495-076	7030	Mangum @ Creekmont	NW161022	27	0	12/15/2001	8:26:00 AM	12/15/2001	14:30:00		Public System	Commercial Business	7	0.94
10495-099	7114	Gulf Bank Rd., West	WO129055	42	0	12/27/2001	9:39:00 AM	12/29/2001	11:39:00	Open Paved Area	Public System	Residence	7	0.00
10495-099	7114	Gulf Bank Rd., West	WO129055	42	0	12/27/2001	9:39:00 AM	12/29/2001	11:39:00	Open Paved Area	Public System	Residence	7	0.00
10495-076	5815	Mangum @ Creekmont	NW161047	27	0	4/11/2002	10:12:00 AM	4/11/2002	11:00:00	Street	Public System	Residence	7	0.00
10495-076	5815	Mangum @ Creekmont	NW161047	27	0	4/11/2002	10:12:00 AM	4/11/2002	11:00:00	Street	Public System	Residence	7	0.00
10495-076	5815	Mangum @ Creekmont	NW161047	27	0	4/11/2002	10:12:00 AM	4/11/2002	11:00:00	Street	Public System	Residence	7	0.00
10495-076	5815	Mangum @ Creekmont	NW161047	27	0	4/11/2002	10:12:00 AM	4/11/2002	11:00:00	Street	Public System	Residence	7	0.00
10495-076	5815	Mangum @ Creekmont	NW161047	27	0	4/11/2002	10:12:00 AM	4/11/2002	11:00:00	Street	Public System	Residence	7	0.00
10495-076	5815	Mangum @ Creekmont	NW161047	27	0	4/11/2002	10:12:00 AM	4/11/2002	11:00:00	Street	Public System	Residence	7	0.00
10495-076	8019	Mangum @ Creekmont	NW164084	27	0	5/11/2002	10:16:00 AM	5/11/2002	12:41:00	Open Paved Area	Public System	Residence	7	0.00
10495-076	8019	Mangum @ Creekmont	NW164084	27	0	5/11/2002	10:16:00 AM	5/11/2002	12:41:00	Open Paved Area	Public System	Residence	7	0.00
10495-076	6917	Mangum @ Creekmont	NW161001	27	0	6/18/2002	9:07:00 AM	6/19/2002	11:35:00		Public System	Residence	7	2.07
10495-076	5500	Mangum @ Creekmont	NW137081	27	0	5/18/2001	8:11:00 AM	5/18/2001	11:19:00	Street	Public System	Residence	8	0.00
10495-076	5500	Mangum @ Creekmont	NW137081	27	0	5/18/2001	8:11:00 AM	5/18/2001	11:19:00	Street	Public System	Residence	8	0.00
10495-076	6696	Mangum @ Creekmont	NW137156	27	0	6/2/2001	7:51:00 PM	6/3/2001	9:37:00	Open Paved Area	Public System	Commercial Business	8	0.05
10495-076	6696	Mangum @ Creekmont	NW137156	27	0	6/2/2001	7:51:00 PM	6/3/2001	9:37:00	Open Paved Area	Public System	Commercial Business	8	0.05
10495-076	6696	Mangum @ Creekmont	NW137156	27	0	6/2/2001	7:51:00 PM	6/3/2001	9:37:00	Open Paved Area	Public System	Commercial Business	8	0.05
10495-076	5365	Mangum @ Creekmont	NW137086	27	0	10/9/2001	11:37:00 AM	10/9/2001	16:00:00	Backlot Easement	Public System	Residence	8	1.78
10495-076	5365	Mangum @ Creekmont	NW137086	27	0	10/9/2001	11:37:00 AM	10/9/2001	16:00:00	Backlot Easement	Public System	Residence	8	1.78
10495-076	6692	Mangum @ Creekmont	NW137157	27	0	10/30/2001	2:55:00 PM	10/30/2001	15:33:00		Public System	Residence	8	0.00
10495-076	6692	Mangum @ Creekmont	NW137157	27	0	10/30/2001	2:55:00 PM	10/30/2001	15:33:00		Public System	Residence	8	0.00
10495-076	6692	Mangum @ Creekmont	NW137157	27	0	10/30/2001	2:55:00 PM	10/30/2001	15:33:00		Public System	Residence	8	0.00
10495-076	7800	Mangum @ Creekmont	NW164056	27	0	2/16/2001	11:49:00 AM	2/17/2001	10:39:00	Backlot Easement	Public System	Residence	17	0.05
10495-076	7800	Mangum @ Creekmont	NW164056	27	0	2/16/2001	11:49:00 AM	2/17/2001	10:39:00	Backlot Easement	Public System	Residence	17	0.05
10495-076	5714	Mangum @ Creekmont	NW166138	27	0	2/23/2001	12:22:00 PM	2/23/2001	16:27:00	Street	Public System	Residence	17	0.00
10495-076	5714	Mangum @ Creekmont	NW166138	27	0	2/23/2001	12:22:00 PM	2/23/2001	16:27:00	Street	Public System	Residence	17	0.00
10495-076	5714	Mangum @ Creekmont	NW166138	27	0	2/23/2001	12:22:00 PM	2/23/2001	16:27:00	Street	Public System	Residence	17	0.00
10495-076	5714	Mangum @ Creekmont	NW166138	27	0	3/7/2001	9:13:00 PM	3/8/2001	14:46:00	Street	Public System	Residence	17	0.00
10495-076	5714	Mangum @ Creekmont	NW166138	27	0	3/7/2001	9:13:00 PM	3/8/2001	14:46:00	Street	Public System	Residence	17	0.00
10495-076	5706	Mangum @ Creekmont	NW163087A	27	0	3/13/2001	5:01:00 PM	3/13/2001	17:39:00	Street	Public System	Residence	17	0.65
10495-076	7603	Mangum @ Creekmont	NW166084	27	0	4/6/2001	10:02:00 AM	4/6/2001	13:00:00	Open Unpaved Area	Private System	School	17	0.00
10495-076	7603	Mangum @ Creekmont	NW166084	27	0	4/6/2001	10:02:00 AM	4/6/2001	13:00:00	Open Unpaved Area	Private System	School	17	0.00
10495-076	7603	Mangum @ Creekmont	NW166084	27	0	4/6/2001	10:02:00 AM	4/6/2001	13:00:00	Open Unpaved Area	Private System	Residence	17	0.00
10495-076	7603	Mangum @ Creekmont	NW166084	27	0	4/6/2001	10:02:00 AM	4/6/2001	13:00:00	Open Unpaved Area	Private System	Residence	17	0.00
10495-076	7603	Mangum @ Creekmont	NW166084	27	0	5/10/2001	12:17:00 PM	5/11/2001	13:07:00	Street	Public System	Residence	17	0.20
10495-076	7603	Mangum @ Creekmont	NW166084	27	0	5/10/2001	12:17:00 PM	5/11/2001	13:07:00	Street	Public System	Residence	17	0.20
10495-076	3615	Mangum @ Creekmont	NW151058	27	0	5/15/2001	8:44:00 AM	5/15/2001	12:15:00	Open Paved Area	Public System	Residence	17	0.09
10495-076	3615	Mangum @ Creekmont	NW151058	27	0	5/15/2001	8:44:00 AM	5/15/2001	12:15:00	Open Paved Area	Public System	Residence	17	0.09
10495-076	3615	Mangum @ Creekmont	NW151058	27	0	5/15/2001	8:44:00 AM	5/15/2001	12:15:00	Open Paved Area	Public System	Residence	17	0.09
10495-076	5714	Mangum @ Creekmont	NW166138	27	0	6/26/2001	6:10:00 AM	6/26/2001	20:49:00	Open Paved Area	Public System	Residence	17	0.05
10495-076	5714	Mangum @ Creekmont	NW166138	27	0	6/26/2001	6:10:00 AM	6/26/2001	20:49:00	Open Paved Area	Public System	Residence	17	0.05
10495-076	5714	Mangum @ Creekmont	NW166138	27	0	6/26/2001	6:10:00 AM	6/26/2001	20:49:00	Open Paved Area	Public System	Residence	17	0.05
10495-076	5350	Mangum @ Creekmont	NW166149	27	0	11/21/2001	6:10:00 PM	11/21/2001	18:53:00		Public System	Residence	17	0.00
10495-076	5350	Mangum @ Creekmont	NW166149	27	0	11/21/2001	6:10:00 PM	11/21/2001	18:53:00		Public System	Residence	17	0.00
10495-076	5350	Mangum @ Creekmont	NW166149	27	0	11/21/2001	6:10:00 PM	11/21/2001	18:53:00		Public System	Residence	17	0.00
10495-076	5335	Mangum @ Creekmont	NW165147	27	0	12/14/2001	4:30:00 PM	12/14/2001	17:12:00	Street	Public System	Residence	17	1.04
10495-076	5335	Mangum @ Creekmont	NW165147	27	0	12/14/2001	4:30:00 PM	12/14/2001	17:12:00	Street	Public System	Residence	17	1.04
10495-076	5335	Mangum @ Creekmont	NW165147	27	0	12/14/2001	4:30:00 PM	12/14/2001	17:12:00	Street	Public System	Residence	17	1.04

TNRCC Permit	Excursion Address	Street	Manhole	WWTP	Not Observed	Excursion Start Date	Excursion Start Time	Excursion End Date	Excursion End Time	Location	System	Area	Subbasin	3 day Rainfall'
10495-076	5335	Mangum @ Creekmont	NW166158	27	0	12/22/2001	7:35:00 AM	12/22/2001	9:25:00	Open Paved Area	Public System	Residence	17	0.00
10495-076	5335	Mangum @ Creekmont	NW166158	27	0	12/22/2001	7:35:00 AM	12/22/2001	9:25:00	Open Paved Area	Public System	Residence	17	0.00
10495-076	5335	Mangum @ Creekmont	NW166158	27	0	12/22/2001	7:35:00 AM	12/22/2001	9:25:00	Open Paved Area	Public System	Residence	17	0.00
10495-076	7735	Mangum @ Creekmont	NW166054U	27	0	2/4/2002	8:00:00 AM	2/4/2002	14:01:00	Backlot Easement	Public System	Residence	17	0.06
10495-076	7735	Mangum @ Creekmont	NW166054U	27	0	2/4/2002	8:00:00 AM	2/4/2002	14:01:00	Backlot Easement	Public System	Residence	17	0.06
10495-076	7735	Mangum @ Creekmont	NW166054U	27	0	2/4/2002	8:00:00 AM	2/4/2002	14:01:00	Backlot Easement	Public System	Residence	17	0.06
10495-076	5335	Mangum @ Creekmont	NW166158	27	0	3/6/2002	8:19:00 AM	3/6/2002	17:37:00	Street	Public System	Residence	17	0.38
10495-076	5335	Mangum @ Creekmont	NW166158	27	0	3/6/2002	8:19:00 AM	3/6/2002	17:37:00	Street	Public System	Residence	17	0.38
10495-076	5335	Mangum @ Creekmont	NW166158	27	0	3/6/2002	8:19:00 AM	3/6/2002	17:37:00	Street	Public System	Residence	17	0.38
10495-076	5335	Mangum @ Creekmont	NW166158	27	0	4/30/2002	11:15:00 AM	4/30/2002	12:45:00	Street	Public System	Residence	17	0.00
10495-076	5417	Mangum @ Creekmont	NW166135	27	0	5/29/2002	6:37:00 PM	5/29/2002	19:47:00	Open Paved Area	Public System	Residence	17	0.00
10495-076	5417	Mangum @ Creekmont	NW166135	27	0	5/29/2002	6:37:00 PM	5/29/2002	19:47:00	Open Paved Area	Public System	Residence	17	0.00
10495-030	1626	Hermitage Lane	WD050015	40	0	2/16/2001	12:28:00 PM	2/17/2001	9:11:00	Backlot Easement	Public System	Residence	26	0.05
10495-030	1626	Hermitage Lane	WD050015	40	0	2/16/2001	12:28:00 PM	2/17/2001	9:11:00	Backlot Easement	Public System	Residence	26	0.05
10495-090	2050	S. Sgt. Macario Garcia	IA032026	1	0	3/20/2001	9:44:00 AM	3/20/2001	11:42:00	Backlot Easement	Private System	Residence	26	0.00
10495-090	2050	S. Sgt. Macario Garcia	IA032026	1	0	3/20/2001	9:44:00 AM	3/20/2001	11:42:00	Backlot Easement	Private System	Residence	26	0.00
10495-090	2050	S. Sgt. Macario Garcia	IA032026	1	0	3/20/2001	9:44:00 AM	3/20/2001	11:42:00	Backlot Easement	Private System	Residence	26	0.00
10495-090	7422	S. Sgt. Macario Garcia	IA029040	1	0	4/24/2001	8:26:00 AM	4/24/2001	13:20:00	Backlot Easement	Public System	Residence	26	0.24
10495-090	7422	S. Sgt. Macario Garcia	IA029040	1	0	4/24/2001	8:26:00 AM	4/24/2001	13:20:00	Backlot Easement	Public System	Residence	26	0.24
10495-090	7422	S. Sgt. Macario Garcia	IA029040	1	0	4/24/2001	8:26:00 AM	4/24/2001	13:20:00	Backlot Easement	Public System	Residence	26	0.24
10495-090	8024	S. Sgt. Macario Garcia	IA015064	1	0	4/30/2001	12:45:00 PM	4/30/2001	15:40:00	Backlot Easement	Public System	Residence	26	0.00
10495-090	8012	S. Sgt. Macario Garcia	IA015053	1	0	5/4/2001	11:03:00 AM	5/4/2001	12:00:00	Backlot Easement	Public System	Residence	26	0.00
10495-090	8012	S. Sgt. Macario Garcia	IA015053	1	0	5/4/2001	11:03:00 AM	5/4/2001	12:00:00	Backlot Easement	Public System	Residence	26	0.00
10495-090	8227	S. Sgt. Macario Garcia	IA012113	1	0	5/10/2001	12:05:00 PM	5/11/2001	6:06:00	Street	Public System	Residence	26	0.20
10495-090		S. Sgt. Macario Garcia	IA015053	1	0	5/17/2001	4:39:00 PM	5/17/2001	19:21:00	Street	Public System	Residence	26	0.00
10495-090		S. Sgt. Macario Garcia	IA015053	1	0	5/17/2001	4:39:00 PM	5/17/2001	19:21:00	Street	Public System	Residence	26	0.00
10495-030	10010	Hermitage Lane	WDP10134	40	0	5/17/2001	8:17:00 PM	5/18/2001	13:51:00	Open Unpaved Area	Public System	Residence	26	0.00
10495-030	10010	Hermitage Lane	WDP10134	40	0	5/17/2001	8:17:00 PM	5/18/2001	13:51:00	Open Unpaved Area	Public System	Residence	26	0.00
10495-030	10010	Hermitage Lane	WDP10134	40	0	5/17/2001	8:17:00 PM	5/18/2001	13:51:00	Open Unpaved Area	Public System	Residence	26	0.00
10495-090	2010	S. Sgt. Macario Garcia	IA029048	1	0	5/25/2001	7:11:00 PM	5/26/2001	10:25:00	Street	Public System	Residence	26	0.00
10495-090	2010	S. Sgt. Macario Garcia	IA029048	1	0	5/25/2001	7:11:00 PM	5/26/2001	10:25:00	Street	Public System	Residence	26	0.00
10495-090	2010	S. Sgt. Macario Garcia	IA029048	1	0	5/25/2001	7:11:00 PM	5/26/2001	10:25:00	Street	Public System	Residence	26	0.00
10495-090	1937	S. Sgt. Macario Garcia	IA016051	1	0	5/30/2001	8:59:00 PM	5/31/2001	10:50:00		Public System	Residence	26	0.75
10495-090	1937	S. Sgt. Macario Garcia	IA016051	1	0	5/30/2001	8:59:00 PM	5/31/2001	10:50:00		Public System	Residence	26	0.75
10495-090	1000	S. Sgt. Macario Garcia	IA009014	1	0	7/7/2001	2:44:00 PM	7/8/2001	11:46:00	Street	Public System	Commercial Business	26	0.00
10495-090	1000	S. Sgt. Macario Garcia	IA009014	1	0	7/7/2001	2:44:00 PM	7/8/2001	11:46:00	Street	Public System	Commercial Business	26	0.00
10495-030	1742	Hermitage Lane	WD050018	40	0	7/11/2001	11:50:00 AM	7/11/2001	15:41:00	Backlot Easement	Public System	Residence	26	0.00
10495-030	1742	Hermitage Lane	WD050018	40	0	7/11/2001	11:50:00 AM	7/11/2001	15:41:00	Backlot Easement	Public System	Residence	26	0.00
10495-030	1742	Hermitage Lane	WD050018	40	0	7/11/2001	11:50:00 AM	7/11/2001	15:41:00	Backlot Easement	Public System	Residence	26	0.00
10495-090	1811	S. Sgt. Macario Garcia	IA015074	1	0	9/20/2001	1:50:00 PM	9/20/2001	19:05:00	Street	Public System	Residence	26	0.00
10495-090	1811	S. Sgt. Macario Garcia	IA015074	1	0	9/20/2001	1:50:00 PM	9/20/2001	19:05:00	Street	Public System	Residence	26	0.00
10495-090	1811	S. Sgt. Macario Garcia	IA015074	1	0	9/20/2001	1:50:00 PM	9/20/2001	19:05:00	Street	Public System	Residence	26	0.00
10495-090	900	S. Sgt. Macario Garcia	IA012110	1	0	10/24/2001	3:10:00 PM	10/24/2001	16:06:00	Open Paved Area		Residence	26	0.00
10495-090	900	S. Sgt. Macario Garcia	IA012110	1	0	10/24/2001	3:10:00 PM	10/24/2001	16:06:00	Open Paved Area		Residence	26	0.00
10495-090	900	S. Sgt. Macario Garcia	IA012110	1	0	10/24/2001	3:10:00 PM	10/24/2001	16:06:00	Open Paved Area		Residence	26	0.00
10495-030	1722	Hermitage Lane	WD050017	40	0	10/26/2001	11:31:00 AM	10/26/2001	14:24:00	Street	Public System	Residence	26	0.00
10495-090	2326	S. Sgt. Macario Garcia	IA026042	1	0	12/4/2001	12:47:00 PM	12/4/2001	14:26:00	Street		Residence	26	0.00
10495-090	2326	S. Sgt. Macario Garcia	IA026042	1	0	12/4/2001	12:47:00 PM	12/4/2001	14:26:00	Street		Residence	26	0.00
10495-090	2126	S. Sgt. Macario Garcia	IA033026	1	0	1/28/2002	12:17:00 PM	1/29/2002	9:58:00	Street	Public System	Residence	26	0.00
10495-030	1730	Hermitage Lane	WD050018	40	0	3/23/2002	10:53:00 AM	3/23/2002	11:40:00	Street	Public System	Residence	26	0.00
10495-030	1730	Hermitage Lane	WD050018	40	0	3/23/2002	10:53:00 AM	3/23/2002	11:40:00	Street	Public System	Residence	26	0.00
10495-030	1730	Hermitage Lane	WD050018	40	0	3/23/2002	10:53:00 AM	3/23/2002	11:40:00	Street	Public System	Residence	26	0.00
10495-030	10230	Hermitage Lane	WDP08034	40	0	4/4/2002	1:17:00 PM	4/4/2002	14:14:00	Street	Public System	Residence	26	0.00
10495-030	10230	Hermitage Lane	WDP08034	40	0	4/4/2002	1:17:00 PM	4/4/2002	14:14:00	Street	Public System	Residence	26	0.00
10495-030	10230	Hermitage Lane	WDP08034	40	0	4/4/2002	1:17:00 PM	4/4/2002	14:14:00	Street	Public System	Residence	26	0.00
10495-030	1730	Hermitage Lane	WD050018	40	0	5/21/2002	3:39:00 PM	5/22/2002	10:08:00	Open Paved Area	Public System	Residence	26	0.07

TNRCC Permit	Excursion Address	Street	Manhole	WWTP	Not Observed	Excursion Start Date	Excursion Start Time	Excursion End Date	Excursion End Time	Location	System	Area	Subbasin	3 day Rainfall'
10495-030	1730	Hermitage Lane	WD050018	40	0	5/21/2002	3:39:00 PM	5/22/2002	10:08:00	Open Paved Area	Public System	Residence	26	0.07
10495-090	1817	S. Sgt. Macario Garcia	IA028054	1	0	6/13/2002	7:22:00 PM	6/14/2002	10:40:00	Open Paved Area	Public System	Residence	26	0.00
10495-090	1817	S. Sgt. Macario Garcia	IA028054	1	0	6/13/2002	7:22:00 PM	6/14/2002	10:40:00	Open Paved Area	Public System	Residence	26	0.00
10495-090	1817	S. Sgt. Macario Garcia	IA028054	1	0	6/13/2002	7:22:00 PM	6/14/2002	10:40:00	Open Paved Area	Public System	Residence	26	0.00
10495-030	10011	Hermitage Lane	WD046009	40	0	5/13/2001	9:45:00 PM	5/14/2001	12:31:00	Open Paved Area	Public System	Residence	27	0.00
10495-030	1410	Hermitage Lane	WDP07019	40	0	7/13/2001	12:17:00 PM	7/13/2001	14:05:00	Open Paved Area	Public System	Commercial Business	27	0.00
10495-030	1410	Hermitage Lane	WDP07019	40	0	7/13/2001	12:17:00 PM	7/13/2001	14:05:00	Open Paved Area	Public System	Commercial Business	27	0.00
10495-030	1410	Hermitage Lane	WDP07019	40	0	7/13/2001	12:17:00 PM	7/13/2001	14:05:00	Open Paved Area	Public System	Commercial Business	27	0.00
10495-090	1400	S. Sgt. Macario Garcia	IA024034	1	0	7/23/2001	11:25:00 AM	7/23/2001	13:29:00	Street	Public System	Residence	27	0.00
10495-090	1400	S. Sgt. Macario Garcia	IA024034	1	0	7/23/2001	11:25:00 AM	7/23/2001	13:29:00	Street	Public System	Residence	27	0.00
10495-090	1400	S. Sgt. Macario Garcia	IA024034	1	0	7/23/2001	11:25:00 AM	7/23/2001	13:29:00	Street	Public System	Residence	27	0.00
10495-090	9219	S. Sgt. Macario Garcia	IA023017	1	0	9/21/2001	6:43:00 PM	9/22/2001	10:17:00	Backlot Easement	Public System	Residence	27	2.32
10495-090	9317	S. Sgt. Macario Garcia	IA023026	1	0	12/30/2001	8:30:00 PM	12/31/2001	10:58:00	Street	Public System	Residence	27	0.00
10495-090	9317	S. Sgt. Macario Garcia	IA023026	1	0	12/30/2001	8:30:00 PM	12/31/2001	10:58:00	Street	Public System	Residence	27	0.00
10495-090	9317	S. Sgt. Macario Garcia	IA023026	1	0	12/30/2001	8:30:00 PM	12/31/2001	10:58:00	Street	Public System	Residence	27	0.00
10495-090	9745	S. Sgt. Macario Garcia	IA024040	1	0	2/4/2002	2:32:00 PM	2/5/2002	11:13:00	Backlot Easement	Private System	Residence	27	0.06
10495-090	9745	S. Sgt. Macario Garcia	IA024040	1	0	2/4/2002	2:32:00 PM	2/5/2002	11:13:00	Backlot Easement	Private System	Residence	27	0.06
10495-090	9745	S. Sgt. Macario Garcia	IA024040	1	0	2/4/2002	2:32:00 PM	2/5/2002	11:13:00	Backlot Easement	Private System	Residence	27	0.06
10495-090	9745	S. Sgt. Macario Garcia	IA024040	1	0	4/18/2002	8:31:00 AM	4/18/2002	9:35:00	Street	Public System	Residence	27	0.00
10495-090	9745	S. Sgt. Macario Garcia	IA024040	1	0	4/18/2002	8:31:00 AM	4/18/2002	9:35:00	Street	Public System	Residence	27	0.00
10495-030	1017	Hermitage Lane	WDP07007	40	0	4/19/2002	1:00:00 PM	4/19/2002	15:00:00	Street	Public System	Residence	27	0.00
10495-030	12942	Hermitage Lane	WD033055	40	0	3/24/2001	2:10:00 AM	3/24/2001	18:13:00	Backlot Easement	Public System	Residence	33	0.00
10495-030	12942	Hermitage Lane	WD033055	40	0	3/24/2001	2:10:00 AM	3/24/2001	18:13:00	Backlot Easement	Public System	Residence	33	0.00
10495-030	12942	Hermitage Lane	WD033055	40	0	3/24/2001	2:10:00 AM	3/24/2001	18:13:00	Backlot Easement	Public System	Residence	33	0.00
10495-030	13174	Hermitage Lane	WD082041	40	0	3/31/2001	7:17:00 PM	4/1/2001	11:10:00	Back of Curb / Off Pavement	Public System	Residence	33	0.10
10495-030	13174	Hermitage Lane	WD082041	40	0	3/31/2001	7:17:00 PM	4/1/2001	11:10:00	Back of Curb / Off Pavement	Public System	Residence	33	0.10
10495-030	1119	Hermitage Lane	WDP13059	40	0	5/12/2001	5:27:00 AM	5/12/2001	19:37:00	Backlot Easement	Public System	Residence	33	0.20
10495-030	1119	Hermitage Lane	WDP13059	40	0	5/12/2001	5:27:00 AM	5/12/2001	19:37:00	Backlot Easement	Public System	Residence	33	0.20
10495-030	1119	Hermitage Lane	WDP13059	40	0	5/12/2001	5:27:00 AM	5/12/2001	19:37:00	Backlot Easement	Public System	Residence	33	0.20
10495-030	10488	Hermitage Lane	WDP11045	40	0	6/29/2001	8:20:00 AM	6/29/2001	11:19:00	Backlot Easement	Public System	Residence	33	1.01
10495-030	10488	Hermitage Lane	WDP11045	40	0	6/29/2001	8:20:00 AM	6/29/2001	11:19:00	Backlot Easement	Public System	Residence	33	1.01
10495-030	10488	Hermitage Lane	WDP11045	40	0	6/29/2001	8:20:00 AM	6/29/2001	11:19:00	Backlot Easement	Public System	Residence	33	1.01
10495-030	1623	Hermitage Lane	WD136011	40	0	7/2/2001	11:40:00 AM	7/2/2001	14:20:00	Open Unpaved Area	Public System	Residence	33	0.00
10495-030	1623	Hermitage Lane	WD136011	40	0	7/2/2001	11:40:00 AM	7/2/2001	14:20:00	Open Unpaved Area	Public System	Residence	33	0.00
10495-030	1614	Hermitage Lane	WD136011	40	0	7/4/2001	9:45:00 AM	7/4/2001	19:30:00	Open Paved Area	Public System	Residence	33	0.00
10495-030	1614	Hermitage Lane	WD136011	40	0	7/4/2001	9:45:00 AM	7/4/2001	19:30:00	Open Paved Area	Public System	Residence	33	0.00
10495-030	1614	Hermitage Lane	WD136011	40	0	7/4/2001	9:45:00 AM	7/4/2001	19:30:00	Open Paved Area	Public System	Residence	33	0.00
10495-030	1614	Hermitage Lane	WD136011	40	0	7/4/2001	9:45:00 AM	7/4/2001	19:30:00	Open Paved Area	Public System	Residence	33	0.00
10495-030	13116	Hermitage Lane	WDP11023	40	0	10/23/2001	4:00:00 PM	10/23/2001	16:38:00	Street	Public System	Residence	33	0.00
10495-030	13116	Hermitage Lane	WDP11023	40	0	10/23/2001	4:00:00 PM	10/23/2001	16:38:00	Street	Public System	Residence	33	0.00
10495-030	1118	Hermitage Lane	WDP13011	40	0	10/27/2001	9:27:00 AM	10/27/2001	10:11:00	Street	Public System	Residence	33	0.00
10495-030	1118	Hermitage Lane	WDP13011	40	0	10/27/2001	9:27:00 AM	10/27/2001	10:11:00	Street	Public System	Residence	33	0.00
10495-030	607	Hermitage Lane	WD082013	40	0	11/29/2001	12:33:00 PM	11/29/2001	13:47:00	Street	Public System	Commercial Business	33	0.79
10495-030	607	Hermitage Lane	WD082013	40	0	11/29/2001	12:33:00 PM	11/29/2001	13:47:00	Street	Public System	Commercial Business	33	0.79
10495-030	607	Hermitage Lane	WD082013	40	0	11/29/2001	12:33:00 PM	11/29/2001	13:47:00	Street	Public System	Commercial Business	33	0.79
10495-030	206	Hermitage Lane	WD033012	40	0	1/18/2002	9:30:00 AM	1/18/2002	16:49:00	Backlot Easement	Public System	Residence	33	0.00
10495-030	206	Hermitage Lane	WD033012	40	0	1/18/2002	9:30:00 AM	1/18/2002	16:49:00	Backlot Easement	Public System	Residence	33	0.00
10495-030	10333	Hermitage Lane	WDP06119	40	0	2/10/2002	11:40:00 AM	2/11/2002	11:55:00	Street	Public System	Commercial Business	33	0.00
10495-030	10333	Hermitage Lane	WDP06119	40	0	2/10/2002	11:40:00 AM	2/11/2002	11:55:00	Street	Public System	Commercial Business	33	0.00
10495-030	10333	Hermitage Lane	WDP06119	40	0	2/10/2002	11:40:00 AM	2/11/2002	11:55:00	Street	Public System	Commercial Business	33	0.00
10495-109	15843	Enclave Parkway	TK216152A	35	0	6/25/2001	10:08:00 AM	6/25/2001	15:23:00	Backlot Easement	Public System	Residence	34	0.00
10495-109	15843	Enclave Parkway	TK216152A	35	0	6/25/2001	10:08:00 AM	6/25/2001	15:23:00	Backlot Easement	Public System	Residence	34	0.00
10495-109	5500	Enclave Parkway	TK225229	35	0	10/13/2001	8:21:00 PM	10/15/2001	18:05:00	Street	Public System	Residence	34	4.23
10495-109	5500	Enclave Parkway	TK225229	35	0	10/13/2001	8:21:00 PM	10/15/2001	18:05:00	Street	Public System	Residence	34	4.23
10495-109	735	Enclave Parkway	TK216134	35	0	3/2/2002	8:14:00 AM	3/6/2002	15:55:00	Open Unpaved Area	Public System	Residence	34	0.05
10495-109	735	Enclave Parkway	TK216134	35	0	3/2/2002	8:14:00 AM	3/6/2002	15:55:00	Open Unpaved Area	Public System	Residence	34	0.05

TNRCC Permit	Excursion Address	Street	Manhole	WWTP	Not Observed	Excursion Start Date	Excursion Start Time	Excursion End Date	Excursion End Time	Location	System	Area	Subbasin	3 day Rainfall'
10495-109	735	Enclave Parkway	TK216134	35	0	3/2/2002	8:14:00 AM	3/6/2002	15:55:00	Open Unpaved Area	Public System	Residence	34	0.05
10495-109	702	Enclave Parkway	TK216142	35	0	4/24/2002	2:29:00 PM	4/24/2002	16:45:00	Open Paved Area	Public System	Residence	34	0.00
10495-135	16500	Park Row	PT001007	28	0	2/26/2002	3:00:00 PM	2/27/2002	9:00:00	Open Paved Area	Public System	Residence	35	0.00
10495-090	2920	S. Sgt. Macario Garcia	II169043	1	0	3/7/2001	2:57:00 PM	3/8/2001	9:00:00	Street	Public System	Residence	36	0.00
10495-090	1606	S. Sgt. Macario Garcia	II107005	1	0	3/10/2001	8:53:00 AM	3/12/2001	8:30:00	Backlot Easement	Private System	Residence	36	0.84
10495-090	1406	S. Sgt. Macario Garcia	II110055	1	0	3/28/2001	6:49:00 PM	3/29/2001	12:31:00	Backlot Easement	Public System	Residence	36	5.95
10495-090	1406	S. Sgt. Macario Garcia	II110055	1	0	3/28/2001	6:49:00 PM	3/29/2001	12:31:00	Backlot Easement	Public System	Residence	36	5.95
10495-090	1701	S. Sgt. Macario Garcia	II188077	1	0	4/18/2001	8:45:00 AM	4/18/2001	9:08:00	Street	Public System	Residence	36	1.65
10495-090	1701	S. Sgt. Macario Garcia	II188077	1	0	4/18/2001	8:45:00 AM	4/18/2001	9:08:00	Street	Public System	Residence	36	1.65
10495-090	1117	S. Sgt. Macario Garcia	II167019	1	0	4/30/2001	6:15:00 PM	4/30/2001	19:30:00	Street	Public System	Residence	36	0.00
10495-090	1117	S. Sgt. Macario Garcia	II167019	1	0	4/30/2001	6:15:00 PM	4/30/2001	19:30:00	Street	Public System	Residence	36	0.00
10495-090	1117	S. Sgt. Macario Garcia	II167019	1	0	4/30/2001	6:15:00 PM	4/30/2001	19:30:00	Street	Public System	Residence	36	0.00
10495-090	1117	S. Sgt. Macario Garcia	II167019	1	0	4/30/2001	6:15:00 PM	4/30/2001	19:30:00	Street	Public System	Residence	36	0.00
10495-090	1601	S. Sgt. Macario Garcia	II111003	1	0	7/16/2001	9:30:00 AM	7/16/2001	11:30:00	Street	Public System	Residence	36	1.14
10495-090	2300	S. Sgt. Macario Garcia	II167074	1	0	9/27/2001	8:07:00 AM	9/27/2001	18:40:00	Street		Residence	36	0.00
10495-090	2300	S. Sgt. Macario Garcia	II167074	1	0	9/27/2001	8:07:00 AM	9/27/2001	18:40:00	Street		Residence	36	0.00
10495-090	2006	S. Sgt. Macario Garcia	II245068	1	0	1/3/2002	9:36:00 PM	1/5/2002	9:22:00	Open Paved Area		Residence	36	0.00
10495-090	2006	S. Sgt. Macario Garcia	II245068	1	0	1/3/2002	9:36:00 PM	1/5/2002	9:22:00	Open Paved Area		Residence	36	0.00
10495-090	2006	S. Sgt. Macario Garcia	II245068	1	0	1/3/2002	9:36:00 PM	1/5/2002	9:22:00	Open Paved Area		Residence	36	0.00
10495-090	2006	S. Sgt. Macario Garcia	II245068	1	0	1/3/2002	9:36:00 PM	1/5/2002	9:22:00	Open Paved Area		Residence	36	0.00
10495-090	1920	S. Sgt. Macario Garcia	II110049	1	0	3/7/2002	10:08:00 AM	3/7/2002	15:10:00	Open Paved Area	Public System	Residence	36	0.00
10495-090	1920	S. Sgt. Macario Garcia	II110049	1	0	3/7/2002	10:08:00 AM	3/7/2002	15:10:00	Open Paved Area	Public System	Residence	36	0.00
10495-003	1600	Almeda Road	AS081022	2	0	3/12/2002	3:49:00 PM	3/14/2002	14:19:00	Backlot Easement	Public System	Residence	36	0.05
10495-090	201	S. Sgt. Macario Garcia	II261011	1	0	4/1/2002	10:26:00 AM	4/1/2002	14:48:00	Open Paved Area	Private System	Residence	36	1.00
10495-090	201	S. Sgt. Macario Garcia	II261011	1	0	4/1/2002	10:26:00 AM	4/1/2002	14:48:00	Open Paved Area	Private System	Residence	36	1.00
10495-090	1919	S. Sgt. Macario Garcia	II169006	1	0	4/9/2002	8:16:00 AM	4/9/2002	10:33:00	Open Unpaved Area	Public System	Residence	36	0.00
10495-090	2614	S. Sgt. Macario Garcia	II170015	1	0	4/17/2002	10:31:00 PM	4/18/2002	10:41:00	Street	Public System	Commercial Business	36	0.00
10495-090	2614	S. Sgt. Macario Garcia	II170015	1	0	4/17/2002	10:31:00 PM	4/18/2002	10:41:00	Street	Public System	Commercial Business	36	0.00
10495-090	2614	S. Sgt. Macario Garcia	II170015	1	0	4/17/2002	10:31:00 PM	4/18/2002	10:41:00	Street	Public System	Commercial Business	36	0.00
10495-090	1920	S. Sgt. Macario Garcia	II110049	1	0	5/5/2002	10:00:00 AM	5/5/2002	11:12:00	Street	Public System	Residence	36	0.00
10495-090	1920	S. Sgt. Macario Garcia	II110049	1	0	5/5/2002	10:00:00 AM	5/5/2002	11:12:00	Street	Public System	Residence	36	0.00
10495-090	1920	S. Sgt. Macario Garcia	II110049	1	0	5/5/2002	10:00:00 AM	5/5/2002	11:12:00	Street	Public System	Residence	36	0.00
10495-090	2015	S. Sgt. Macario Garcia	II110049	1	0	5/28/2002	11:14:00 AM	5/28/2002	14:00:00	Open Paved Area	Public System	Residence	36	0.00
10495-090	2015	S. Sgt. Macario Garcia	II110049	1	0	5/28/2002	11:14:00 AM	5/28/2002	14:00:00	Open Paved Area	Public System	Residence	36	0.00
10495-090	2015	S. Sgt. Macario Garcia	II110049	1	0	5/28/2002	11:14:00 AM	5/28/2002	14:00:00	Open Paved Area	Public System	Residence	36	0.00
10495-090	200	S. Sgt. Macario Garcia	II261011	1	0	6/25/2002	11:44:00 AM	6/25/2002	13:33:00	Open Paved Area	Public System	Commercial Business	36	0.34
10495-090	200	S. Sgt. Macario Garcia	II261011	1	0	6/25/2002	11:44:00 AM	6/25/2002	13:33:00	Open Paved Area	Public System	Commercial Business	36	0.34
10495-003	605	Almeda Road	AS088188	2	0	2/21/2001	8:45:00 AM	2/21/2001	13:01:00	Backlot Easement	Public System	Commercial Business	37	0.00
10495-003	605	Almeda Road	AS088188	2	0	2/21/2001	8:45:00 AM	2/21/2001	13:01:00	Backlot Easement	Public System	Commercial Business	37	0.00
10495-003	1025	Almeda Road	AS071081A	2	0	2/23/2001	8:20:00 AM	2/23/2001	11:05:00	Backlot Easement	Public System	Commercial Business	37	0.00
10495-003	1025	Almeda Road	AS071081A	2	0	2/23/2001	8:20:00 AM	2/23/2001	11:05:00	Backlot Easement	Public System	Commercial Business	37	0.00
10495-003	1025	Almeda Road	AS071081A	2	0	2/23/2001	8:20:00 AM	2/23/2001	11:05:00	Backlot Easement	Public System	Commercial Business	37	0.00
10495-003	1025	Almeda Road	AS071081A	2	0	2/23/2001	8:20:00 AM	2/23/2001	11:05:00	Backlot Easement	Public System	Commercial Business	37	0.00
10495-003	805	Almeda Road	AS086044	2	0	2/24/2001	11:36:00 AM	2/24/2001	12:25:00	Backlot Easement	Public System	Commercial Business	37	0.00
10495-003	805	Almeda Road	AS086044	2	0	2/24/2001	11:36:00 AM	2/24/2001	12:25:00	Backlot Easement	Public System	Commercial Business	37	0.00
10495-090	1315	S. Sgt. Macario Garcia	II173038	1	0	3/6/2001	9:44:00 PM	3/7/2001	13:20:00	Open Paved Area	Private System	Commercial Business	37	0.00
10495-090	1315	S. Sgt. Macario Garcia	II173038	1	0	3/6/2001	9:44:00 PM	3/7/2001	13:20:00	Open Paved Area	Private System	Commercial Business	37	0.00
10495-090	1315	S. Sgt. Macario Garcia	II173038	1	0	3/6/2001	9:44:00 PM	3/7/2001	13:20:00	Open Paved Area	Private System	Residence	37	0.00
10495-090	1315	S. Sgt. Macario Garcia	II173038	1	0	3/6/2001	9:44:00 PM	3/7/2001	13:20:00	Open Paved Area	Private System	Residence	37	0.00
10495-003	3809	Almeda Road	AS071075	2	0	3/14/2001	12:58:00 PM	3/14/2001	16:35:00	Backlot Easement	Public System	Residence	37	2.05
10495-090	1113	S. Sgt. Macario Garcia	IIP18130	1	0	3/24/2001	9:50:00 AM	3/28/2001	14:30:00	Backlot Easement	Public System	Residence	37	0.00
10495-003	2500	Almeda Road	AS086071	2	0	3/26/2001	2:51:00 PM	3/26/2001	16:49:00	Backlot Easement	Private System	Residence	37	0.00
10495-090	1320	S. Sgt. Macario Garcia	II172037	1	0	3/26/2001	3:40:00 PM	3/26/2001	19:33:00	Backlot Easement	Public System	Residence	37	0.00
10495-090	1320	S. Sgt. Macario Garcia	II172037	1	0	3/26/2001	3:40:00 PM	3/26/2001	19:33:00	Backlot Easement	Public System	Residence	37	0.00
10495-090	1320	S. Sgt. Macario Garcia	II172037	1	0	3/30/2001	9:05:00 AM	3/30/2001	9:33:00	Open Unpaved Area	Private System	Residence	37	1.00
10495-090	1320	S. Sgt. Macario Garcia	II172037	1	0	3/30/2001	9:05:00 AM	3/30/2001	9:33:00	Open Unpaved Area	Private System	Residence	37	1.00

TNRCC Permit	Excursion Address	Street	Manhole	WWTP	Not Observed	Excursion Start Date	Excursion Start Time	Excursion End Date	Excursion End Time	Location	System	Area	Subbasin	3 day Rainfall'
10495-090	803	S. Sgt. Macario Garcia	II162065	1	0	4/22/2001	1:42:00 PM	4/23/2001	9:57:00	Street	Public System	Residence	37	0.00
10495-090	803	S. Sgt. Macario Garcia	II162065	1	0	4/22/2001	1:42:00 PM	4/23/2001	9:57:00	Street	Public System	Residence	37	0.00
10495-090	803	S. Sgt. Macario Garcia	II162065	1	0	4/22/2001	1:42:00 PM	4/23/2001	9:57:00	Street	Public System	Residence	37	0.00
10495-003	2600	Almeda Road	AS087109	2	0	4/26/2001	7:30:00 AM	4/26/2001	13:30:00	Backlot Easement	Public System	Residence	37	0.05
10495-003	2600	Almeda Road	AS087109	2	0	4/26/2001	7:30:00 AM	4/26/2001	13:30:00	Backlot Easement	Public System	Residence	37	0.05
10495-003	2600	Almeda Road	AS087109	2	0	4/26/2001	7:30:00 AM	4/26/2001	13:30:00	Backlot Easement	Public System	Residence	37	0.05
10495-090	1603	S. Sgt. Macario Garcia	II172035	1	0	5/1/2001	8:50:00 AM	5/1/2001	13:05:00	Street	Public System	Residence	37	0.00
10495-003	1700	Almeda Road	AS087208	2	0	5/25/2001	8:15:00 AM	5/25/2001	9:34:00	Backlot Easement	Public System	Residence	37	0.00
10495-003	1700	Almeda Road	AS087208	2	0	5/25/2001	8:15:00 AM	5/25/2001	9:34:00	Backlot Easement	Public System	Residence	37	0.00
10495-003	616	Almeda Road	AS088018	2	0	5/28/2001	3:40:00 PM	5/29/2001	10:34:00	Street	Public System	Park	37	0.00
10495-003	616	Almeda Road	AS088018	2	0	5/28/2001	3:40:00 PM	5/29/2001	10:34:00	Street	Public System	Park	37	0.00
10495-003	2500	Almeda Road	AS090014	2	0	6/18/2001	10:13:00 AM	6/18/2001	11:29:00	Street	Public System	Residence	37	0.16
10495-003	2500	Almeda Road	AS090014	2	0	6/18/2001	10:13:00 AM	6/18/2001	11:29:00	Street	Public System	Residence	37	0.16
10495-003	2316	Almeda Road	AS087049	2	0	7/5/2001	12:56:00 PM	7/5/2001	17:22:00	Street	Public System	Residence	37	0.00
10495-003	2316	Almeda Road	AS087049	2	0	7/5/2001	12:56:00 PM	7/5/2001	17:22:00	Street	Public System	Residence	37	0.00
10495-003	511	Almeda Road	AS088006	2	0	8/25/2001	4:07:00 PM	8/26/2001	13:26:00	Backlot Easement	Public System	Commercial Business	37	0.00
10495-003	511	Almeda Road	AS088006	2	0	8/25/2001	4:07:00 PM	8/26/2001	13:26:00	Backlot Easement	Public System	Commercial Business	37	0.00
10495-003	1311	Almeda Road	AS081004	2	0	9/17/2001	7:06:00 PM	9/18/2001	11:30:00	Backlot Easement	Public System	Residence	37	0.06
10495-003	1311	Almeda Road	AS081004	2	0	9/17/2001	7:06:00 PM	9/18/2001	11:30:00	Backlot Easement	Public System	Residence	37	0.06
10495-003	1311	Almeda Road	AS081004	2	0	9/17/2001	7:06:00 PM	9/18/2001	11:30:00	Backlot Easement	Public System	Residence	37	0.06
10495-003	1311	Almeda Road	AS081004	2	0	9/17/2001	7:06:00 PM	9/18/2001	11:30:00	Backlot Easement	Public System	Residence	37	0.06
10495-090	3100	S. Sgt. Macario Garcia	IIU11010	1	0	11/14/2001	9:53:00 AM	11/15/2001	13:00:00	Open Paved Area	Public System	Residence	37	0.00
10495-090	3100	S. Sgt. Macario Garcia	IIU11010	1	0	11/14/2001	9:53:00 AM	11/15/2001	13:00:00	Open Paved Area	Public System	Residence	37	0.00
10495-090	603	S. Sgt. Macario Garcia	II173011	1	0	11/30/2001	11:27:00 AM	12/1/2001	10:28:00	Street	Public System	Residence	37	0.79
10495-090	603	S. Sgt. Macario Garcia	II173011	1	0	11/30/2001	11:27:00 AM	12/1/2001	10:28:00	Street	Public System	Residence	37	0.79
10495-003	307	Almeda Road	AS082018	2	0	12/20/2001	4:48:00 PM	12/20/2001	18:20:00	Street	Public System	Commercial Business	37	0.00
10495-003	307	Almeda Road	AS082018	2	0	12/20/2001	4:48:00 PM	12/20/2001	18:20:00	Street	Public System	Commercial Business	37	0.00
10495-003	307	Almeda Road	AS082018	2	0	12/20/2001	4:48:00 PM	12/20/2001	18:20:00	Street	Public System	Residence	37	0.00
10495-003	307	Almeda Road	AS082018	2	0	12/20/2001	4:48:00 PM	12/20/2001	18:20:00	Street	Public System	Residence	37	0.00
10495-090		S. Sgt. Macario Garcia	IIP20059	1	0	4/8/2002	8:00:00 AM	4/8/2002	9:30:00	Street	Public System	Commercial Business	37	0.00
10495-003	1500	Almeda Road	AS090080	2	0	3/9/2001	4:20:00 PM	3/9/2001	21:17:00	Street	Public System	Commercial Business	38	0.84
10495-003	1500	Almeda Road	AS090080	2	0	3/9/2001	4:20:00 PM	3/9/2001	21:17:00	Street	Public System	Commercial Business	38	0.84
10495-003	2231	Almeda Road	AS069007	2	0	3/21/2001	2:45:00 PM	3/21/2001	20:22:00	Street	Private System	Residence	38	0.00
10495-003	2500	Almeda Road	AS091041	2	0	3/24/2001	3:36:00 PM	3/25/2001	18:30:00	Street	Public System	Commercial Business	38	0.00
10495-003	2500	Almeda Road	AS091041	2	0	3/24/2001	3:36:00 PM	3/25/2001	18:30:00	Street	Public System	Commercial Business	38	0.00
10495-003	1215	Almeda Road	AS090016	2	0	3/31/2001	8:00:00 AM	3/31/2001	16:00:00	Backlot Easement	Private System	Residence	38	0.10
10495-003	2407	Almeda Road	AS090043	2	0	4/18/2001	12:00:00 PM	4/18/2001	16:20:00	Street	Public System	Residence	38	1.65
10495-003	1756	Almeda Road	AS077023	2	0	5/16/2001	7:07:00 PM	5/17/2001	9:59:00	Open Unpaved Area	Private System	Residence	38	0.09
10495-003	1756	Almeda Road	AS077023	2	0	5/16/2001	7:07:00 PM	5/17/2001	9:59:00	Open Unpaved Area	Private System	Residence	38	0.09
10495-003	4010	Almeda Road	AS077052	2	0	5/28/2001	8:13:00 PM	5/29/2001	8:45:00	Street	Public System	Residence	38	0.00
10495-003	4010	Almeda Road	AS077052	2	0	5/28/2001	8:13:00 PM	5/29/2001	8:45:00	Street	Public System	Residence	38	0.00
10495-003	3715	Almeda Road	AS089028	2	0	8/14/2001	10:45:00 PM	8/15/2001	9:30:00	Open Paved Area		Residence	38	0.00
10495-003	3715	Almeda Road	AS089028	2	0	8/14/2001	10:45:00 PM	8/15/2001	9:30:00	Open Paved Area		Residence	38	0.00
10495-003	3715	Almeda Road	AS089028	2	0	8/14/2001	10:45:00 PM	8/15/2001	9:30:00	Open Paved Area		Residence	38	0.00
10495-003	2401	Almeda Road	AS091020	2	0	10/7/2001	8:47:00 AM	10/7/2001	11:19:00		Public System	Residence	38	0.00
10495-003	2401	Almeda Road	AS091020	2	0	10/7/2001	8:47:00 AM	10/7/2001	11:19:00		Public System	Residence	38	0.00
10495-090	1109	S. Sgt. Macario Garcia	II180004	1	0	10/10/2001	9:47:00 AM	10/10/2001	12:34:00		Private System	Residence	38	1.78
10495-090	1109	S. Sgt. Macario Garcia	II180004	1	0	10/10/2001	9:47:00 AM	10/10/2001	12:34:00		Private System	Residence	38	1.78
10495-090	2701	S. Sgt. Macario Garcia	II177031	1	0	11/14/2001	11:56:00 AM	11/16/2001	14:18:00	Open Paved Area		Residence	38	0.00
10495-003	2100	Almeda Road	AS090139	2	0	12/8/2001	9:00:00 AM	12/8/2001	10:10:00	Street	Public System	Residence	38	0.87
10495-003	2100	Almeda Road	AS090139	2	0	12/8/2001	9:00:00 AM	12/8/2001	10:10:00	Street	Public System	Residence	38	0.87
10495-003	2100	Almeda Road	AS090139	2	0	12/8/2001	9:00:00 AM	12/8/2001	10:10:00	Street	Public System	Residence	38	0.87
10495-003	2510	Almeda Road	AS091027C	2	0	12/22/2001	6:56:00 PM	12/23/2001	10:59:00	Street	Public System	Commercial Business	38	0.00
10495-003	2510	Almeda Road	AS091027C	2	0	12/22/2001	6:56:00 PM	12/23/2001	10:59:00	Street	Public System	Residence	38	0.00
10495-003	2504	Almeda Road	AS091027C	2	0	12/25/2001	12:35:00 PM	12/25/2001	17:36:00	Backlot Easement	Public System	Residence	38	0.00
10495-003	2504	Almeda Road	AS091027C	2	0	12/25/2001	12:35:00 PM	12/25/2001	17:36:00	Backlot Easement	Public System	Residence	38	0.00

TNRCC Permit	Excursion Address	Street	Manhole	WWTP	Not Observed	Excursion Start Date	Excursion Start Time	Excursion End Date	Excursion End Time	Location	System	Area	Subbasin	3 day Rainfall'
10495-003	2504	Almeda Road	AS091027C	2	0	12/25/2001	12:35:00 PM	12/25/2001	17:36:00	Backlot Easement	Public System	Residence	38	0.00
10495-003	1302	Almeda Road	AS090061	2	0	1/21/2002	4:15:00 PM	1/21/2002	20:59:00	Street	Public System	Residence	38	0.00
10495-003	1302	Almeda Road	AS090061	2	0	1/21/2002	4:15:00 PM	1/21/2002	20:59:00	Street	Public System	Residence	38	0.00
10495-003	3315	Almeda Road	AS085055	2	0	1/25/2002	6:10:00 PM	1/26/2002	10:24:00	Street	Public System	Residence	38	0.00
10495-003	3315	Almeda Road	AS085055	2	0	1/25/2002	6:10:00 PM	1/26/2002	10:24:00	Street	Public System	Residence	38	0.00
10495-090	2817	S. Sgt. Macario Garcia	II173058	1	0	1/31/2002	12:50:00 PM	1/31/2002	18:54:00	Street	Public System	Residence	38	0.00
10495-003	1420	Almeda Road	AS086058	2	0	2/3/2002	4:33:00 PM	2/4/2002	13:55:00	Street	Public System	Residence	38	0.00
10495-003	1984	Almeda Road	AS070043	2	0	2/25/2002	9:07:00 AM	2/25/2002	9:33:00	Street	Public System	Residence	38	0.00
10495-003	1984	Almeda Road	AS070043	2	0	2/25/2002	9:07:00 AM	2/25/2002	9:33:00	Street	Public System	Residence	38	0.00
10495-003	1984	Almeda Road	AS070043	2	0	2/25/2002	9:07:00 AM	2/25/2002	9:33:00	Street	Public System	Residence	38	0.00
10495-003	2509	Almeda Road	AS091020	2	0	5/21/2002	6:49:00 PM	5/22/2002	9:00:00	Open Paved Area	Public System	Residence	38	0.07
10495-003	2509	Almeda Road	AS091020	2	0	5/21/2002	6:49:00 PM	5/22/2002	9:00:00	Open Paved Area	Public System	Residence	38	0.07
10495-003	2509	Almeda Road	AS091020	2	0	5/21/2002	6:49:00 PM	5/22/2002	9:00:00	Open Paved Area	Public System	Residence	38	0.07
10495-003	603	Almeda Road	AS084020	2	0	6/26/2002	11:47:00 AM	6/29/2002	9:30:00	Street	Public System	Residence	38	0.69
10495-003	603	Almeda Road	AS084020	2	0	6/26/2002	11:47:00 AM	6/29/2002	9:30:00	Street	Public System	Residence	38	0.69
10495-003	603	Almeda Road	AS084020	2	0	6/26/2002	11:47:00 AM	6/29/2002	9:30:00	Street	Public System	Residence	38	0.69
10495-030	411	Hermitage Lane	WD004018	40	0	3/25/2001	8:49:00 PM	3/26/2001	11:58:00	Street	Public System	Residence	39	0.00
10495-030	411	Hermitage Lane	WD004018	40	0	3/25/2001	8:49:00 PM	3/26/2001	11:58:00	Street	Public System	Residence	39	0.00
10495-030	411	Hermitage Lane	WD004018	40	0	3/25/2001	8:49:00 PM	3/26/2001	11:58:00	Street	Public System	Residence	39	0.00
10495-109	11812	Enclave Parkway	TK219061	35	0	4/2/2001	8:57:00 AM	4/2/2001	12:45:00	Open Unpaved Area	Public System	Undeveloped Area	39	0.00
10495-116	2300	Old Westheimer	WD028043	36	0	5/2/2001	12:55:00 PM	5/3/2001	10:50:00	Backlot Easement	Public System	Residence	39	0.00
10495-116	600	Old Westheimer	WD026064	36	0	5/4/2001	10:33:00 AM	5/4/2001	12:15:00		Public System	Residence	39	0.00
10495-116	600	Old Westheimer	WD026064	36	0	5/4/2001	10:33:00 AM	5/4/2001	12:15:00		Public System	Residence	39	0.00
10495-116	600	Old Westheimer	WD026064	36	0	5/4/2001	10:33:00 AM	5/4/2001	12:15:00		Public System	Residence	39	0.00
10495-030	791	Hermitage Lane	WD008045	40	0	9/2/2001	1:41:00 PM	9/2/2001	15:27:00		Public System	Residence	39	2.30
10495-030	791	Hermitage Lane	WD008045	40	0	9/2/2001	1:41:00 PM	9/2/2001	15:27:00		Public System	Residence	39	2.30
10495-030	788	Hermitage Lane	WD014013	40	0	9/2/2001	1:34:00 PM	9/2/2001	15:27:00		Private System	Residence	39	2.30
10495-030	788	Hermitage Lane	WD014013	40	0	9/2/2001	1:34:00 PM	9/2/2001	15:27:00		Private System	Residence	39	2.30
10495-109	11326	Enclave Parkway	TK209157	35	0	9/7/2001	1:45:00 PM	9/8/2001	8:20:00	Backlot Easement	Public System	Commercial Business	39	0.06
10495-109	11326	Enclave Parkway	TK209157	35	0	9/7/2001	1:45:00 PM	9/8/2001	8:20:00	Backlot Easement	Public System	Commercial Business	39	0.06
10495-116	1500	Old Westheimer	WD091017	36	0	11/21/2001	1:13:00 PM	11/21/2001	13:55:00	Street	Public System	Commercial Business	39	0.00
10495-116	1500	Old Westheimer	WD091017	36	0	11/21/2001	1:13:00 PM	11/21/2001	13:55:00	Street	Public System	Commercial Business	39	0.00
10495-116	1500	Old Westheimer	WD091017	36	0	11/21/2001	1:13:00 PM	11/21/2001	13:55:00	Street	Public System	Commercial Business	39	0.00
10495-116	1500	Old Westheimer	WD091017	36	0	11/21/2001	1:13:00 PM	11/21/2001	13:55:00	Street	Public System	Commercial Business	39	0.00
10495-030	11113	Hermitage Lane	WD086035	40	0	12/9/2001	5:25:00 PM	12/10/2001	9:33:00	Street	Public System	Residence	39	0.87
10495-030	11113	Hermitage Lane	WD086035	40	0	12/9/2001	5:25:00 PM	12/10/2001	9:33:00	Street	Public System	Residence	39	0.87
10495-030	11113	Hermitage Lane	WD086035	40	0	12/9/2001	5:25:00 PM	12/10/2001	9:33:00	Street	Public System	Residence	39	0.87
10495-030	14400	Hermitage Lane	WD013033	40	0	1/18/2002	6:39:00 PM	1/19/2002	11:40:00	Street	Public System	Residence	39	0.00
10495-030	14400	Hermitage Lane	WD013033	40	0	1/18/2002	6:39:00 PM	1/19/2002	11:40:00	Street	Public System	Residence	39	0.00
10495-109	11802	Enclave Parkway	TK212044	35	0	1/25/2002	10:40:00 AM	1/25/2002	15:55:00	Back of Curb / Off Pavement	Public System	Residence	39	0.00
10495-109	11802	Enclave Parkway	TK212044	35	0	1/25/2002	10:40:00 AM	1/25/2002	15:55:00	Back of Curb / Off Pavement	Public System	Residence	39	0.00
10495-030	14250	Hermitage Lane	WD015007A	40	0	1/25/2002	1:42:00 PM	1/25/2002	16:45:00	Open Paved Area	Public System	Residence	39	0.00
10495-030	14250	Hermitage Lane	WD015007A	40	0	1/25/2002	1:42:00 PM	1/25/2002	16:45:00	Open Paved Area	Public System	Residence	39	0.00
10495-030	13814	Hermitage Lane	WD011051	40	0	2/3/2002	9:15:00 AM	2/3/2002	12:54:00		Public System	Residence	39	0.00
10495-030	13814	Hermitage Lane	WD011051	40	0	2/11/2002	10:08:00 AM	2/11/2002	10:38:00	Street	Public System	Residence	39	0.00
10495-030	13814	Hermitage Lane	WD011051	40	0	2/11/2002	10:08:00 AM	2/11/2002	10:38:00	Street	Public System	Residence	39	0.00
10495-030	13814	Hermitage Lane	WD011051	40	0	2/11/2002	10:08:00 AM	2/11/2002	10:38:00	Street	Public System	Residence	39	0.00
10495-030	13814	Hermitage Lane	WD011051	40	0	2/18/2002	3:00:00 PM	2/18/2002	15:45:00	Backlot Easement	Public System	Residence	39	0.00
10495-030	13814	Hermitage Lane	WD011051	40	0	2/18/2002	3:00:00 PM	2/18/2002	15:45:00	Backlot Easement	Public System	Residence	39	0.00
10495-116	1300	Old Westheimer	WD027090Z	36	0	3/17/2002	7:00:00 AM	3/18/2002	9:15:00	Backlot Easement	Public System	Residence	39	0.00
10495-116	1300	Old Westheimer	WD027090Z	36	0	3/17/2002	7:00:00 AM	3/18/2002	9:15:00	Backlot Easement	Public System	Residence	39	0.00
10495-030	11113	Hermitage Lane	WD086035	40	0	4/1/2002	7:00:00 AM	4/2/2002	9:30:00	Backlot Easement	Public System	Residence	39	1.00
10495-030	11113	Hermitage Lane	WD086035	40	0	4/1/2002	7:00:00 AM	4/2/2002	9:30:00	Backlot Easement	Public System	Residence	39	1.00
10495-030	788	Hermitage Lane	WD014013	40	0	5/6/2002	8:13:00 AM	5/6/2002	8:50:00	Backlot Easement	Public System	Residence	39	0.00
10495-030	788	Hermitage Lane	WD014013	40	0	5/6/2002	8:13:00 AM	5/6/2002	8:50:00	Backlot Easement	Public System	Residence	39	0.00
10495-109	2520	Enclave Parkway	TK207019	35	0	5/6/2002	9:47:00 AM	5/6/2002	10:39:00	Backlot Easement	Public System	Commercial Business	39	0.00

TNRCC Permit	Excursion Address	Street	Manhole	WWTP	Not Observed	Excursion Start Date	Excursion Start Time	Excursion End Date	Excursion End Time	Location	System	Area	Subbasin	3 day Rainfall'
10495-109	2520	Enclave Parkway	TK207019	35	0	5/6/2002	9:47:00 AM	5/6/2002	10:39:00	Backlot Easement	Public System	Commercial Business	39	0.00
10495-109	12407	Enclave Parkway	TK221082	35	0	7/9/2002	12:00:00 PM	7/9/2002	12:51:00	Street	Public System	Residence	39	0.00
10495-109	12407	Enclave Parkway	TK221082	35	0	7/9/2002	12:00:00 PM	7/9/2002	12:51:00	Street	Public System	Residence	39	0.00
10495-090	600	S. Sgt. Macario Garcia	II117052	1	0	2/25/2001	12:00:00 PM	2/25/2001	14:55:00	Backlot Easement	Public System	Residence	40	0.00
10495-090	600	S. Sgt. Macario Garcia	II117052	1	0	2/25/2001	12:00:00 PM	2/25/2001	14:55:00	Backlot Easement	Public System	Residence	40	0.00
10495-090	2928	S. Sgt. Macario Garcia	II115121	1	0	3/6/2001	5:08:00 PM	3/7/2001	17:30:00	Back of Curb / Off Pavement	Public System	Residence	40	0.00
10495-090	2928	S. Sgt. Macario Garcia	II115121	1	0	3/6/2001	5:08:00 PM	3/7/2001	17:30:00	Back of Curb / Off Pavement	Public System	Residence	40	0.00
10495-090	2928	S. Sgt. Macario Garcia	II115121	1	0	3/6/2001	5:08:00 PM	3/7/2001	17:30:00	Back of Curb / Off Pavement	Public System	Residence	40	0.00
10495-090	2703	S. Sgt. Macario Garcia	II115124	1	0	6/20/2001	9:57:00 AM	6/20/2001	15:11:00	Backlot Easement	Public System	Residence	40	0.16
10495-090	2703	S. Sgt. Macario Garcia	II115124	1	0	6/20/2001	9:57:00 AM	6/20/2001	15:11:00	Backlot Easement	Public System	Residence	40	0.16
10495-090	2928	S. Sgt. Macario Garcia	II115121	1	0	6/25/2001	8:12:00 AM	6/25/2001	11:19:00	Backlot Easement	Public System	Residence	40	0.00
10495-090	2928	S. Sgt. Macario Garcia	II115121	1	0	6/25/2001	8:12:00 AM	6/25/2001	11:19:00	Backlot Easement	Public System	Residence	40	0.00
10495-090	612	S. Sgt. Macario Garcia	II117052	1	0	8/21/2001	6:15:00 PM	8/21/2001	19:09:00	Street	Public System	Residence	40	0.00
10495-090	612	S. Sgt. Macario Garcia	II117052	1	0	8/21/2001	6:15:00 PM	8/21/2001	19:09:00	Street	Public System	Residence	40	0.00
10495-090	612	S. Sgt. Macario Garcia	II117052	1	0	8/21/2001	6:15:00 PM	8/21/2001	19:09:00	Street	Public System	Residence	40	0.00
10495-090	1909	S. Sgt. Macario Garcia	II160022	1	0	9/7/2001	8:12:00 AM	9/8/2001	11:31:00	Backlot Easement	Public System	Commercial Business	40	0.06
10495-090	2928	S. Sgt. Macario Garcia	II115121	1	0	10/23/2001	9:13:00 AM	10/23/2001	12:05:00	Backlot Easement	Public System	Park	40	0.00
10495-090	2928	S. Sgt. Macario Garcia	II115121	1	0	10/23/2001	9:13:00 AM	10/23/2001	12:05:00	Backlot Easement	Public System	Park	40	0.00
10495-090	2928	S. Sgt. Macario Garcia	II115121	1	0	10/23/2001	9:13:00 AM	10/23/2001	12:05:00	Backlot Easement	Public System	Park	40	0.00
10495-090	2928	S. Sgt. Macario Garcia	II115121	1	0	10/23/2001	9:13:00 AM	10/23/2001	12:05:00	Backlot Easement	Public System	Residence	40	0.00
10495-090	2928	S. Sgt. Macario Garcia	II115121	1	0	10/23/2001	9:13:00 AM	10/23/2001	12:05:00	Backlot Easement	Public System	Residence	40	0.00
10495-090	2928	S. Sgt. Macario Garcia	II115121	1	0	10/23/2001	9:13:00 AM	10/23/2001	12:05:00	Backlot Easement	Public System	Residence	40	0.00
10495-090	826	S. Sgt. Macario Garcia	II115148	1	0	10/25/2001	2:40:00 PM	10/26/2001	12:04:00	Backlot Easement	Public System	Residence	40	0.00
10495-090	826	S. Sgt. Macario Garcia	II115148	1	0	10/25/2001	2:40:00 PM	10/26/2001	12:04:00	Backlot Easement	Public System	Residence	40	0.00
10495-090	826	S. Sgt. Macario Garcia	II115148	1	0	10/25/2001	2:40:00 PM	10/26/2001	12:04:00	Backlot Easement	Public System	Residence	40	0.00
10495-090	2425	S. Sgt. Macario Garcia	II130049	1	0	12/16/2001	9:00:00 AM	12/18/2001	14:15:00	Street	Public System	Commercial Business	40	0.97
10495-090	826	S. Sgt. Macario Garcia	II115148	1	0	1/15/2002	9:15:00 AM	1/15/2002	14:20:00	Street	Public System	Residence	40	0.00
10495-090	826	S. Sgt. Macario Garcia	II115148	1	0	1/15/2002	9:15:00 AM	1/15/2002	14:20:00	Street	Public System	Residence	40	0.00
10495-090	1005	S. Sgt. Macario Garcia	II117003	1	0	1/19/2002	4:45:00 PM	1/19/2002	18:14:00	Street	Public System	Residence	40	0.00
10495-090	1005	S. Sgt. Macario Garcia	II117003	1	0	1/19/2002	4:45:00 PM	1/19/2002	18:14:00	Street	Public System	Residence	40	0.00
10495-090	1005	S. Sgt. Macario Garcia	II117003	1	0	1/19/2002	4:45:00 PM	1/19/2002	18:14:00	Street	Public System	Residence	40	0.00
10495-090	826	S. Sgt. Macario Garcia	II115148	1	0	2/4/2002	8:10:00 AM	2/4/2002	9:40:00	Backlot Easement	Public System	Residence	40	0.06
10495-090	826	S. Sgt. Macario Garcia	II115148	1	0	2/4/2002	8:10:00 AM	2/4/2002	9:40:00	Backlot Easement	Public System	Residence	40	0.06
10495-090	826	S. Sgt. Macario Garcia	II115148	1	0	2/4/2002	8:10:00 AM	2/4/2002	9:40:00	Backlot Easement	Public System	Residence	40	0.06
10495-090	2400	S. Sgt. Macario Garcia	II115103	1	0	2/6/2002	1:39:00 PM	2/6/2002	16:25:00	Street		Residence	40	0.68
10495-090	2400	S. Sgt. Macario Garcia	II115103	1	0	2/6/2002	1:39:00 PM	2/6/2002	16:25:00	Street		Residence	40	0.68
10495-090	1500	S. Sgt. Macario Garcia	II160076	1	0	4/20/2002	9:07:00 AM	4/20/2002	11:30:00	Street	Public System	Residence	40	0.00
10495-090	1500	S. Sgt. Macario Garcia	II160076	1	0	4/20/2002	9:07:00 AM	4/20/2002	11:30:00	Street	Public System	Residence	40	0.00
10495-090	1505	S. Sgt. Macario Garcia	II160076	1	0	4/24/2002	12:13:00 PM	4/24/2002	13:05:00	Open Paved Area	Public System	Residence	40	0.00
10495-090	301	S. Sgt. Macario Garcia	II127023	1	0	2/15/2001	11:10:00 AM	2/15/2001	12:15:00	Street	Public System	Residence	41	0.05
10495-090	301	S. Sgt. Macario Garcia	II127023	1	0	2/15/2001	11:10:00 AM	2/15/2001	12:15:00	Street	Public System	Residence	41	0.05
10495-090	301	S. Sgt. Macario Garcia	II127023	1	0	2/15/2001	11:10:00 AM	2/15/2001	12:15:00	Street	Public System	Residence	41	0.05
10495-090	301	S. Sgt. Macario Garcia	II127023	1	0	2/15/2001	11:10:00 AM	2/15/2001	12:15:00	Street	Public System	Residence	41	0.05
10495-090	1701	S. Sgt. Macario Garcia	II150070	1	0	4/2/2001	1:10:00 PM	4/2/2001	19:47:00	Backlot Easement	Public System	Residence	41	0.00
10495-090	15423	S. Sgt. Macario Garcia	II147013	1	0	4/15/2001	9:02:00 AM	4/15/2001	10:40:00	Backlot Easement	Public System	Residence	41	0.00
10495-090	15423	S. Sgt. Macario Garcia	II147013	1	0	4/15/2001	9:02:00 AM	4/15/2001	10:40:00	Backlot Easement	Public System	Residence	41	0.00
10495-003	4118	Almeda Road	AS067020	2	0	4/27/2001	9:13:00 AM	4/27/2001	14:27:00	Backlot Easement	Public System	Residence	41	0.00
10495-090	5738	S. Sgt. Macario Garcia	II148049	1	0	5/3/2001	9:50:00 AM	5/3/2001	14:45:00	Backlot Easement	Public System	Residence	41	0.00
10495-090	5738	S. Sgt. Macario Garcia	II148049	1	0	5/3/2001	9:50:00 AM	5/3/2001	14:45:00	Backlot Easement	Public System	Residence	41	0.00
10495-090	1701	S. Sgt. Macario Garcia	II150070	1	0	6/25/2001	10:00:00 AM	6/25/2001	17:27:00	Backlot Easement	Public System	Residence	41	0.00
10495-090	1701	S. Sgt. Macario Garcia	II150070	1	0	6/25/2001	10:00:00 AM	6/25/2001	17:27:00	Backlot Easement	Public System	Residence	41	0.00
10495-090	1000	S. Sgt. Macario Garcia	II127006A	1	0	8/11/2001	5:06:00 PM	8/12/2001	10:10:00	Backlot Easement	Public System	Residence	41	0.00
10495-090	1000	S. Sgt. Macario Garcia	II127006A	1	0	8/11/2001	5:06:00 PM	8/12/2001	10:10:00	Backlot Easement	Public System	Residence	41	0.00
10495-090	1000	S. Sgt. Macario Garcia	II127006A	1	0	8/11/2001	5:06:00 PM	8/12/2001	10:10:00	Backlot Easement	Public System	Residence	41	0.00
10495-090	1600	S. Sgt. Macario Garcia	II150063	1	0	9/2/2001	9:02:00 AM	9/3/2001	14:00:00	Street	Public System	Residence	41	2.30
10495-090	1613	S. Sgt. Macario Garcia	II150062	1	0	9/7/2001	4:28:00 PM	9/7/2001	19:45:00	Backlot Easement	Public System	Commercial Business	41	0.06

TNRCC Permit	Excursion Address	Street	Manhole	WWTP	Not Observed	Excursion Start Date	Excursion Start Time	Excursion End Date	Excursion End Time	Location	System	Area	Subbasin	3 day Rainfall'
10495-090	1613	S. Sgt. Macario Garcia	II150062	1	0	9/7/2001	4:28:00 PM	9/7/2001	19:45:00	Backlot Easement	Public System	Commercial Business	41	0.06
10495-090	200	S. Sgt. Macario Garcia	II130015	1	0	12/5/2001	7:24:00 PM	12/6/2001	16:00:00	Open Paved Area		Residence	41	0.00
10495-090	200	S. Sgt. Macario Garcia	II130015	1	0	12/5/2001	7:24:00 PM	12/6/2001	16:00:00	Open Paved Area		Residence	41	0.00
10495-090	2506	S. Sgt. Macario Garcia	II148067	1	0	1/25/2002	11:10:00 AM	1/25/2002	11:52:00	Street	Private System	Residence	41	0.00
10495-090	2506	S. Sgt. Macario Garcia	II148067	1	0	1/25/2002	11:10:00 AM	1/25/2002	11:52:00	Street	Private System	Residence	41	0.00
10495-090	2506	S. Sgt. Macario Garcia	II148067	1	0	1/25/2002	11:10:00 AM	1/25/2002	11:52:00	Street	Private System	Residence	41	0.00
10495-090	5846	S. Sgt. Macario Garcia	II148055	1	0	1/30/2002	8:25:00 AM	1/30/2002	14:20:00	Street	Public System	Residence	41	0.00
10495-090	5846	S. Sgt. Macario Garcia	II148055	1	0	1/30/2002	8:25:00 AM	1/30/2002	14:20:00	Street	Public System	Residence	41	0.00
10495-090	5846	S. Sgt. Macario Garcia	II148055	1	0	2/28/2002	1:37:00 PM	2/28/2002	14:14:00	Street	Public System	Residence	41	0.00
10495-090	5846	S. Sgt. Macario Garcia	II148055	1	0	2/28/2002	1:37:00 PM	2/28/2002	14:14:00	Street	Public System	Residence	41	0.00
10495-090	5846	S. Sgt. Macario Garcia	II148055	1	0	2/28/2002	1:37:00 PM	2/28/2002	14:14:00	Street	Public System	Residence	41	0.00
10495-090	1502	S. Sgt. Macario Garcia	II147071	1	0	3/10/2002	2:20:00 PM	3/10/2002	14:56:00	Street	Public System	Residence	41	0.00
10495-090	1502	S. Sgt. Macario Garcia	II147071	1	0	3/10/2002	2:20:00 PM	3/10/2002	14:56:00	Street	Public System	Residence	41	0.00
10495-090	1122	S. Sgt. Macario Garcia	II147048	1	0	2/26/2001	7:59:00 AM	2/26/2001	12:30:00		Public System	Residence	42	0.00
10495-090	1122	S. Sgt. Macario Garcia	II147048	1	0	2/26/2001	7:59:00 AM	2/26/2001	12:30:00		Public System	Residence	42	0.00
10495-090	1125	S. Sgt. Macario Garcia	IA046043	1	0	3/7/2001	5:35:00 PM	3/7/2001	19:42:00	Street	Public System	Residence	42	0.00
10495-090	1125	S. Sgt. Macario Garcia	IA046043	1	0	3/7/2001	5:35:00 PM	3/7/2001	19:42:00	Street	Public System	Residence	42	0.00
10495-090	1125	S. Sgt. Macario Garcia	IA046043	1	0	3/7/2001	5:35:00 PM	3/7/2001	19:42:00	Street	Public System	Residence	42	0.00
10495-090	819	S. Sgt. Macario Garcia	II144108	1	0	3/29/2001	2:35:00 PM	3/30/2001	14:30:00	Backlot Easement	Private System	Residence	42	6.05
10495-090	623	S. Sgt. Macario Garcia	II062045	1	0	6/16/2001	12:10:00 PM	6/16/2001	16:45:00	Open Unpaved Area	Public System	Residence	42	0.00
10495-090	623	S. Sgt. Macario Garcia	II062045	1	0	6/16/2001	12:10:00 PM	6/16/2001	16:45:00	Open Unpaved Area	Public System	Residence	42	0.00
10495-090	1342	S. Sgt. Macario Garcia	II122060	1	0	6/26/2001	11:21:00 AM	6/26/2001	14:23:00	Backlot Easement	Public System	Residence	42	0.05
10495-090	1342	S. Sgt. Macario Garcia	II122060	1	0	6/26/2001	11:21:00 AM	6/26/2001	14:23:00	Backlot Easement	Public System	Residence	42	0.05
10495-090	2505	S. Sgt. Macario Garcia	IA048032	1	0	6/27/2001	2:18:00 PM	6/28/2001	9:47:00	Street	Public System	Residence	42	0.05
10495-090	2505	S. Sgt. Macario Garcia	IA048032	1	0	6/27/2001	2:18:00 PM	6/28/2001	9:47:00	Street	Public System	Residence	42	0.05
10495-090	1126	S. Sgt. Macario Garcia	II147062	1	0	8/18/2001	7:35:00 PM	8/18/2001	21:31:00	Backlot Easement		Residence	42	0.00
10495-090	1126	S. Sgt. Macario Garcia	II147062	1	0	8/18/2001	7:35:00 PM	8/18/2001	21:31:00	Backlot Easement		Residence	42	0.00
10495-090	1126	S. Sgt. Macario Garcia	II147062	1	0	8/18/2001	7:35:00 PM	8/18/2001	21:31:00	Backlot Easement		Residence	42	0.00
10495-090	1100	S. Sgt. Macario Garcia	IA044013	1	0	8/20/2001	8:57:00 AM	8/20/2001	11:30:00	Open Paved Area	Public System	Residence	42	0.00
10495-090	1100	S. Sgt. Macario Garcia	IA044013	1	0	8/20/2001	8:57:00 AM	8/20/2001	11:30:00	Open Paved Area	Public System	Residence	42	0.00
10495-090	500	S. Sgt. Macario Garcia	II123003	1	0	9/5/2001	8:40:00 AM	9/5/2001	14:12:00	Backlot Easement	Public System	Park	42	0.06
10495-090	500	S. Sgt. Macario Garcia	II123003	1	0	9/5/2001	8:40:00 AM	9/5/2001	14:12:00	Backlot Easement	Public System	Park	42	0.06
10495-090	1700	S. Sgt. Macario Garcia	II124009	1	0	9/7/2001	4:18:00 PM	9/7/2001	19:45:00	Backlot Easement	Public System	Commercial Business	42	0.06
10495-090	1700	S. Sgt. Macario Garcia	II124009	1	0	9/7/2001	4:18:00 PM	9/7/2001	19:45:00	Backlot Easement	Public System	Commercial Business	42	0.06
10495-090	1126	S. Sgt. Macario Garcia	II147069	1	0	9/13/2001	10:51:00 AM	9/13/2001	11:35:00	Street	Public System	Residence	42	0.00
10495-090	1126	S. Sgt. Macario Garcia	II147069	1	0	9/13/2001	10:51:00 AM	9/13/2001	11:35:00	Street	Public System	Residence	42	0.00
10495-090	1126	S. Sgt. Macario Garcia	II147069	1	0	9/13/2001	10:51:00 AM	9/13/2001	11:35:00	Street	Public System	Residence	42	0.00
10495-090	500	S. Sgt. Macario Garcia	II123003	1	0	9/16/2001	8:38:00 PM	9/18/2001	10:17:00	Street	Public System	Residence	42	0.00
10495-090	515	S. Sgt. Macario Garcia	II123008	1	0	9/26/2001	8:42:00 AM	9/26/2001	12:00:00	Backlot Easement		Residence	42	0.03
10495-090	515	S. Sgt. Macario Garcia	II123008	1	0	9/26/2001	8:42:00 AM	9/26/2001	12:00:00	Backlot Easement		Residence	42	0.03
10495-090	1501	S. Sgt. Macario Garcia	IA046010	1	0	10/5/2001	9:37:00 AM	10/5/2001	17:03:00	Open Paved Area		Residence	42	0.00
10495-090	1501	S. Sgt. Macario Garcia	IA046010	1	0	10/5/2001	9:37:00 AM	10/5/2001	17:03:00	Open Paved Area		Residence	42	0.00
10495-090	803	S. Sgt. Macario Garcia	II143004	1	0	10/7/2001	1:00:00 AM	10/8/2001	10:01:00		Public System	Industrial Facility	42	0.00
10495-090	803	S. Sgt. Macario Garcia	II143004	1	0	10/7/2001	1:00:00 AM	10/8/2001	10:01:00		Public System	Industrial Facility	42	0.00
10495-090	803	S. Sgt. Macario Garcia	II143004	1	0	10/7/2001	1:00:00 AM	10/8/2001	10:01:00		Public System	Residence	42	0.00
10495-090	803	S. Sgt. Macario Garcia	II143004	1	0	10/7/2001	1:00:00 AM	10/8/2001	10:01:00		Public System	Residence	42	0.00
10495-090	717	S. Sgt. Macario Garcia	II144116	1	0	1/19/2002	8:30:00 AM	1/19/2002	14:29:00	Open Paved Area	Public System	Residence	42	0.00
10495-090	717	S. Sgt. Macario Garcia	II144116	1	0	1/19/2002	8:30:00 AM	1/19/2002	14:29:00	Open Paved Area	Public System	Residence	42	0.00
10495-090	717	S. Sgt. Macario Garcia	II144116	1	0	1/19/2002	8:30:00 AM	1/19/2002	14:29:00	Open Paved Area	Public System	Residence	42	0.00
10495-090	1219	S. Sgt. Macario Garcia	II144027	1	0	4/4/2002	8:45:00 AM	4/4/2002	10:25:00	Street	Public System	Residence	42	0.00
10495-090	1219	S. Sgt. Macario Garcia	II144027	1	0	4/4/2002	8:45:00 AM	4/4/2002	10:25:00	Street	Public System	Residence	42	0.00
10495-090	1219	S. Sgt. Macario Garcia	II144027	1	0	4/4/2002	8:45:00 AM	4/4/2002	10:25:00	Street	Public System	Residence	42	0.00
10495-090	1510	S. Sgt. Macario Garcia	II060046	1	0	4/15/2002	8:30:00 AM	4/15/2002	9:20:00	Street	Public System	Residence	42	0.00
10495-090	700	S. Sgt. Macario Garcia	II143015	1	0	5/8/2002	12:15:00 PM	5/8/2002	14:45:00	Street	Public System	Residence	42	0.00
10495-090	700	S. Sgt. Macario Garcia	II143015	1	0	5/8/2002	12:15:00 PM	5/8/2002	14:45:00	Street	Public System	Residence	42	0.00
10495-090	700	S. Sgt. Macario Garcia	II143015	1	0	5/8/2002	12:15:00 PM	5/8/2002	14:45:00	Street	Public System	Residence	42	0.00

TNRCC Permit	Excursion Address	Street	Manhole	WWTP	Not Observed	Excursion Start Date	Excursion Start Time	Excursion End Date	Excursion End Time	Location	System	Area	Subbasin	3 day Rainfall'
10495-090	1700	S. Sgt. Macario Garcia	IA044102	1	0	2/25/2001	4:05:00 PM	2/25/2001	18:32:00	Open Unpaved Area	Public System	Commercial Business	43	0.00
10495-090	1700	S. Sgt. Macario Garcia	IA044102	1	0	2/25/2001	4:05:00 PM	2/25/2001	18:32:00	Open Unpaved Area	Public System	Commercial Business	43	0.00
10495-090	1700	S. Sgt. Macario Garcia	IA044102	1	0	2/25/2001	4:05:00 PM	2/25/2001	18:32:00	Open Unpaved Area	Public System	Commercial Business	43	0.00
10495-090	4000	S. Sgt. Macario Garcia	IA067005	1	0	3/1/2001	12:40:00 PM	3/1/2001	14:43:00		Public System	Park	43	0.10
10495-090	2400	S. Sgt. Macario Garcia	IA044148	1	0	3/2/2001	9:40:00 AM	3/2/2001	11:44:00	Backlot Easement	Public System	Residence	43	2.13
10495-090	2400	S. Sgt. Macario Garcia	IA044148	1	0	3/2/2001	9:40:00 AM	3/2/2001	11:44:00	Backlot Easement	Public System	Residence	43	2.13
10495-090	2400	S. Sgt. Macario Garcia	IA044148	1	0	3/2/2001	9:40:00 AM	3/2/2001	11:44:00	Backlot Easement	Public System	Residence	43	2.13
10495-090	4303	S. Sgt. Macario Garcia	II064063Z	1	0	3/7/2001	8:50:00 AM	3/7/2001	11:05:00	Open Paved Area	Private System	Commercial Business	43	0.00
10495-090	4303	S. Sgt. Macario Garcia	II064063Z	1	0	3/7/2001	8:50:00 AM	3/7/2001	11:05:00	Open Paved Area	Private System	Commercial Business	43	0.00
10495-090	4303	S. Sgt. Macario Garcia	II064063Z	1	0	3/7/2001	8:50:00 AM	3/7/2001	11:05:00	Open Paved Area	Private System	Commercial Business	43	0.00
10495-090	1516	S. Sgt. Macario Garcia	IA049029	1	0	3/12/2001	12:07:00 PM	3/12/2001	14:41:00	Backlot Easement	Private System	Residence	43	0.65
10495-090	2701	S. Sgt. Macario Garcia	IA037047	1	0	4/2/2001	1:08:00 PM	4/2/2001	17:02:00	Street	Public System	Residence	43	0.00
10495-090	2701	S. Sgt. Macario Garcia	IA037047	1	0	4/2/2001	1:08:00 PM	4/2/2001	17:02:00	Street	Public System	Residence	43	0.00
10495-090	10333	S. Sgt. Macario Garcia	IA037052	1	0	6/29/2001	1:43:00 PM	6/29/2001	14:20:00	Backlot Easement		Residence	43	1.01
10495-090	10333	S. Sgt. Macario Garcia	IA037052	1	0	6/29/2001	1:43:00 PM	6/29/2001	14:20:00	Backlot Easement		Residence	43	1.01
10495-090	10333	S. Sgt. Macario Garcia	IA037052	1	0	6/29/2001	1:43:00 PM	6/29/2001	14:20:00	Backlot Easement		Residence	43	1.01
10495-090	1006	S. Sgt. Macario Garcia	IA066044	1	0	9/2/2001	12:08:00 PM	9/3/2001	14:34:00		Public System	Residence	43	2.30
10495-090	1006	S. Sgt. Macario Garcia	IA066044	1	0	9/2/2001	12:08:00 PM	9/3/2001	14:34:00		Public System	Residence	43	2.30
10495-090	3317	S. Sgt. Macario Garcia	IA001014	1	0	1/18/2002	11:12:00 AM	1/18/2002	15:44:00	Street	Public System	Commercial Business	43	0.00
10495-090	3317	S. Sgt. Macario Garcia	IA001014	1	0	1/18/2002	11:12:00 AM	1/18/2002	15:44:00	Street	Public System	Commercial Business	43	0.00
10495-090	10333	S. Sgt. Macario Garcia	IA037052	1	0	1/25/2002	1:36:00 PM	1/26/2002	9:00:00	Open Paved Area	Public System	Residence	43	0.00
10495-090	10333	S. Sgt. Macario Garcia	IA037052	1	0	1/25/2002	1:36:00 PM	1/26/2002	9:00:00	Open Paved Area	Public System	Residence	43	0.00
10495-090	1600	S. Sgt. Macario Garcia	IA050092	1	0	2/7/2002	11:24:00 AM	2/7/2002	19:01:00	Open Paved Area	Public System	Residence	43	0.62
10495-090	1600	S. Sgt. Macario Garcia	IA050092	1	0	2/7/2002	11:24:00 AM	2/7/2002	19:01:00	Open Paved Area	Public System	Residence	43	0.62
10495-090	1600	S. Sgt. Macario Garcia	IA050092	1	0	2/7/2002	11:24:00 AM	2/7/2002	19:01:00	Open Paved Area	Public System	Residence	43	0.62
10495-090	1003	S. Sgt. Macario Garcia	II063018	1	0	5/6/2002	10:00:00 AM	5/6/2002	11:27:00	Open Paved Area	Public System	Residence	43	0.00
10495-090	1003	S. Sgt. Macario Garcia	II063018	1	0	5/6/2002	10:00:00 AM	5/6/2002	11:27:00	Open Paved Area	Public System	Residence	43	0.00
10495-090	1000	S. Sgt. Macario Garcia	II063027	1	0	5/16/2002	9:33:00 AM	5/16/2002	10:44:00	Street	Public System	Residence	43	0.00
10495-090	1000	S. Sgt. Macario Garcia	II063027	1	0	5/16/2002	9:33:00 AM	5/16/2002	10:44:00	Street	Public System	Residence	43	0.00
10495-090	1000	S. Sgt. Macario Garcia	II063027	1	0	5/16/2002	9:33:00 AM	5/16/2002	10:44:00	Street	Public System	Residence	43	0.00
10495-090	1158	S. Sgt. Macario Garcia	II064059Y	1	0	6/3/2002	9:32:00 AM	6/3/2002	12:30:00	Street	Private System	Residence	43	0.00
10495-037	2327	Beechnut	SW224100	33	0	2/22/2001	12:24:00 PM	2/22/2001	19:31:00	Back of Curb / Off Pavement	Public System	Residence	44	0.00
10495-037	2327	Beechnut	SW224100	33	0	2/22/2001	12:24:00 PM	2/22/2001	19:31:00	Back of Curb / Off Pavement	Public System	Residence	44	0.00
10495-037	7	Beechnut	SW221033	33	0	2/26/2001	8:30:00 AM	2/27/2001	12:42:00	Open Unpaved Area	Public System	Residence	44	0.00
10495-037	5318	Beechnut	SW237015	33	0	3/4/2001	10:35:00 AM	3/6/2001	15:18:00	Backlot Easement	Public System	Residence	44	2.13
10495-037	5318	Beechnut	SW237015	33	0	3/4/2001	10:35:00 AM	3/6/2001	15:18:00	Backlot Easement	Public System	Residence	44	2.13
10495-037	12500	Beechnut	SW233052	33	0	3/10/2001	1:48:00 AM	3/10/2001	16:23:00	Backlot Easement	Public System	Residence	44	0.84
10495-037	4906	Beechnut	SW224096	33	0	3/20/2001	9:17:00 PM	3/21/2001	10:28:00	Open Paved Area	Public System	Commercial Business	44	0.00
10495-037	21	Beechnut	SW225106	33	0	4/6/2001	8:54:00 AM	4/6/2001	14:30:00	Open Unpaved Area	Public System	Residence	44	0.00
10495-037	21	Beechnut	SW225106	33	0	4/6/2001	8:54:00 AM	4/6/2001	14:30:00	Open Unpaved Area	Public System	Residence	44	0.00
10495-037	21	Beechnut	SW225106	33	0	4/6/2001	8:54:00 AM	4/6/2001	14:30:00	Open Unpaved Area	Public System	Residence	44	0.00
10495-037	3900	Beechnut	SW221005	33	0	7/13/2001	8:12:00 AM	7/13/2001	11:17:00	Open Paved Area	Public System	Residence	44	0.00
10495-037	3900	Beechnut	SW221005	33	0	7/13/2001	8:12:00 AM	7/13/2001	11:17:00	Open Paved Area	Public System	Residence	44	0.00
10495-037	3900	Beechnut	SW221005	33	0	7/13/2001	8:12:00 AM	7/13/2001	11:17:00	Open Paved Area	Public System	Residence	44	0.00
10495-003	2703	Almeda Road	AS057050	2	0	8/6/2001	12:42:00 PM	8/6/2001	19:44:00	Backlot Easement	Public System	Residence	44	1.15
10495-003	2703	Almeda Road	AS057050	2	0	8/6/2001	12:42:00 PM	8/6/2001	19:44:00	Backlot Easement	Public System	Residence	44	1.15
10495-003	2703	Almeda Road	AS057050	2	0	8/6/2001	12:42:00 PM	8/6/2001	19:44:00	Backlot Easement	Public System	Residence	44	1.15
10495-037	5160	Beechnut	SW220090	33	0	10/23/2001	4:36:00 PM	10/26/2001	20:00:00	Street	Public System	Commercial Business	44	0.00
10495-037	3000	Beechnut	SW223014	33	0	10/25/2001	8:25:00 AM	10/27/2001	8:00:00	Street	Public System	Residence	44	0.00
10495-037	3000	Beechnut	SW223014	33	0	10/25/2001	8:25:00 AM	10/27/2001	8:00:00	Street	Public System	Residence	44	0.00
10495-037	3100	Beechnut	SW237006	33	0	1/26/2002	9:40:00 AM	1/27/2002	13:04:00	Street	Public System	Residence	44	0.00
10495-037	3100	Beechnut	SW237006	33	0	1/26/2002	9:40:00 AM	1/27/2002	13:04:00	Street	Public System	Residence	44	0.00
10495-037	3100	Beechnut	SW237006	33	0	1/26/2002	9:40:00 AM	1/27/2002	13:04:00	Street	Public System	Residence	44	0.00
10495-037	3440	Beechnut	SW220079	33	0	2/27/2002	1:46:00 AM	2/28/2002	11:29:00	Street	Public System	Commercial Business	44	0.00
10495-037	3440	Beechnut	SW220079	33	0	2/27/2002	1:46:00 AM	2/28/2002	11:29:00	Street	Public System	Commercial Business	44	0.00
10495-037	3440	Beechnut	SW220079	33	0	2/27/2002	1:46:00 AM	2/28/2002	11:29:00	Street	Public System	Commercial Business	44	0.00

TNRCC Permit	Excursion Address	Street	Manhole	WWTP	Not Observed	Excursion Start Date	Excursion Start Time	Excursion End Date	Excursion End Time	Location	System	Area	Subbasin	3 day Rainfall'
10495-003	3162	Almeda Road	AS056019	2	0	2/28/2001	8:09:00 AM	2/28/2001	13:10:00	Backlot Easement	Public System	Residence	45	0.05
10495-003	3162	Almeda Road	AS056019	2	0	2/28/2001	8:09:00 AM	2/28/2001	13:10:00	Backlot Easement	Public System	Residence	45	0.05
10495-003	2500	Almeda Road	AS058036	2	0	3/5/2001	10:33:00 AM	3/5/2001	14:00:00		Public System	Residence	45	0.10
10495-003	2500	Almeda Road	AS058036	2	0	3/5/2001	10:33:00 AM	3/5/2001	14:00:00		Public System	Residence	45	0.10
10495-003	2015	Almeda Road	AS057034	2	0	3/6/2001	12:58:00 PM	3/6/2001	15:10:00	Backlot Easement	Public System	Residence	45	0.00
10495-003	2015	Almeda Road	AS057034	2	0	3/6/2001	12:58:00 PM	3/6/2001	15:10:00	Backlot Easement	Public System	Residence	45	0.00
10495-003	2015	Almeda Road	AS057034	2	0	3/6/2001	12:58:00 PM	3/6/2001	15:10:00	Backlot Easement	Public System	Residence	45	0.00
10495-090	4906	S. Sgt. Macario Garcia	II152100	1	0	3/19/2001	11:02:00 AM	3/20/2001	13:45:00	Backlot Easement	Public System	Residence	45	0.00
10495-090	4906	S. Sgt. Macario Garcia	II152100	1	0	3/19/2001	11:02:00 AM	3/20/2001	13:45:00	Backlot Easement	Public System	Residence	45	0.00
10495-003	4100	Almeda Road	AS057048	2	0	3/29/2001	1:53:00 PM	3/29/2001	20:30:00	Open Paved Area	Private System	Commercial Business	45	6.05
10495-003	4100	Almeda Road	AS057048	2	0	3/29/2001	1:53:00 PM	3/29/2001	20:30:00	Open Paved Area	Private System	Commercial Business	45	6.05
10495-003	4100	Almeda Road	AS057048	2	0	3/29/2001	1:53:00 PM	3/29/2001	20:30:00	Open Paved Area	Private System	Commercial Business	45	6.05
10495-003	4100	Almeda Road	AS057048	2	0	3/29/2001	1:53:00 PM	3/29/2001	20:30:00	Open Paved Area	Private System	Commercial Business	45	6.05
10495-003	2518	Almeda Road	AS069118	2	0	4/27/2001	8:50:00 AM	4/27/2001	11:07:00	Backlot Easement	Public System	Residence	45	0.00
10495-003	3202	Almeda Road	AS059004	2	0	5/15/2001	9:36:00 AM	5/16/2001	12:25:00	Backlot Easement	Private System	Residence	45	0.09
10495-003	2011	Almeda Road	AS057039	2	0	5/18/2001	7:47:00 PM	5/20/2001	9:47:00	Backlot Easement	Public System	Residence	45	0.00
10495-003	2011	Almeda Road	AS057039	2	0	5/30/2001	8:05:00 PM	5/31/2001	12:30:00	Open Unpaved Area	Public System	Residence	45	0.75
10495-003	2011	Almeda Road	AS057039	2	0	5/30/2001	8:05:00 PM	5/31/2001	12:30:00	Open Unpaved Area	Public System	Residence	45	0.75
10495-003	2011	Almeda Road	AS057039	2	0	5/30/2001	8:05:00 PM	5/31/2001	12:30:00	Open Unpaved Area	Public System	Residence	45	0.75
10495-003	2011	Almeda Road	AS057039	2	0	5/30/2001	8:05:00 PM	5/31/2001	12:30:00	Open Unpaved Area	Public System	Residence	45	0.75
10495-090	6103	S. Sgt. Macario Garcia	II156054	1	0	6/29/2001	11:11:00 AM	6/29/2001	13:12:00	Backlot Easement	Public System	Residence	45	1.01
10495-090	6103	S. Sgt. Macario Garcia	II156054	1	0	6/29/2001	11:11:00 AM	6/29/2001	13:12:00	Backlot Easement	Public System	Residence	45	1.01
10495-090	6103	S. Sgt. Macario Garcia	II156054	1	0	6/29/2001	11:11:00 AM	6/29/2001	13:12:00	Backlot Easement	Public System	Residence	45	1.01
10495-003	6552	Almeda Road	AS066022	2	0	7/10/2001	11:28:00 AM	7/10/2001	13:44:00	Backlot Easement	Public System	Residence	45	1.09
10495-090	1415	S. Sgt. Macario Garcia	II155024	1	0	7/13/2001	9:46:00 AM	7/13/2001	12:05:00	Backlot Easement	Public System	Commercial Business	45	0.00
10495-090	1415	S. Sgt. Macario Garcia	II155024	1	0	7/13/2001	9:46:00 AM	7/13/2001	12:05:00	Backlot Easement	Public System	Commercial Business	45	0.00
10495-003	3900	Almeda Road	AS045204	2	0	8/1/2001	9:46:00 AM	8/2/2001	14:10:00	Street	Public System	Residence	45	0.00
10495-003	3900	Almeda Road	AS045204	2	0	8/1/2001	9:46:00 AM	8/2/2001	14:10:00	Street	Public System	Residence	45	0.00
10495-003	3900	Almeda Road	AS045204	2	0	8/1/2001	9:46:00 AM	8/2/2001	14:10:00	Street	Public System	Residence	45	0.00
10495-003	2005	Almeda Road	AS057029	2	0	9/7/2001	7:40:00 AM	9/8/2001	13:58:00	Backlot Easement	Public System	Residence	45	0.06
10495-003	2005	Almeda Road	AS057029	2	0	9/7/2001	7:40:00 AM	9/8/2001	13:58:00	Backlot Easement	Public System	Residence	45	0.06
10495-003	2005	Almeda Road	AS057029	2	0	9/7/2001	7:40:00 AM	9/8/2001	13:58:00	Backlot Easement	Public System	Residence	45	0.06
10495-003	2229	Almeda Road	AS069066	2	0	11/11/2001	4:47:00 PM	11/12/2001	11:32:00		Private System	Residence	45	0.00
10495-003	2229	Almeda Road	AS069066	2	0	11/11/2001	4:47:00 PM	11/12/2001	11:32:00		Private System	Residence	45	0.00
10495-003	6552	Almeda Road	AS066022	2	0	12/10/2001	12:17:00 PM	12/10/2001	14:11:00	Street	Public System	Residence	45	0.77
10495-003	6552	Almeda Road	AS066022	2	0	12/10/2001	12:17:00 PM	12/10/2001	14:11:00	Street	Public System	Residence	45	0.77
10495-003	6552	Almeda Road	AS066022	2	0	12/10/2001	12:17:00 PM	12/10/2001	14:11:00	Street	Public System	Residence	45	0.77
10495-090	303	S. Sgt. Macario Garcia	II178065	1	0	1/9/2002	8:26:00 PM	1/10/2002	14:40:00	Open Unpaved Area	Public System	Residence	45	0.00
10495-090	303	S. Sgt. Macario Garcia	II178065	1	0	1/9/2002	8:26:00 PM	1/10/2002	14:40:00	Open Unpaved Area	Public System	Residence	45	0.00
10495-090	303	S. Sgt. Macario Garcia	II178065	1	0	1/9/2002	8:26:00 PM	1/10/2002	14:40:00	Open Unpaved Area	Public System	Residence	45	0.00
10495-003	3900	Almeda Road	AS055016	2	0	1/9/2002	9:11:00 PM	1/10/2002	18:24:00	Street	Public System	Residence	45	0.00
10495-003	3900	Almeda Road	AS055016	2	0	1/9/2002	9:11:00 PM	1/10/2002	18:24:00	Street	Public System	Residence	45	0.00
10495-003	3822	Almeda Road	AS055045	2	0	1/9/2002	9:09:00 PM	1/10/2002	11:26:00	Open Unpaved Area		Residence	45	0.00
10495-003	3218	Almeda Road	AS059021	2	0	2/21/2002	9:25:00 AM	2/21/2002	12:50:00	Open Unpaved Area	Private System	Residence	45	0.83
10495-003	3218	Almeda Road	AS059021	2	0	2/21/2002	9:25:00 AM	2/21/2002	12:50:00	Open Unpaved Area	Private System	Residence	45	0.83
10495-003	3218	Almeda Road	AS059021	2	0	2/21/2002	9:25:00 AM	2/21/2002	12:50:00	Open Unpaved Area	Private System	Residence	45	0.83
10495-003	6404	Almeda Road	AS066012	2	0	2/22/2002	8:02:00 AM	2/22/2002	8:55:00	Backlot Easement	Public System	Residence	45	0.53
10495-003	6404	Almeda Road	AS066012	2	0	2/22/2002	8:02:00 AM	2/22/2002	8:55:00	Backlot Easement	Public System	Residence	45	0.53
10495-003	3258	Almeda Road	AS056022A	2	0	3/31/2002	11:50:00 AM	4/1/2002	7:00:00	Street	Public System	Residence	45	1.00
10495-003	3258	Almeda Road	AS056022A	2	0	3/31/2002	11:50:00 AM	4/1/2002	7:00:00	Street	Public System	Residence	45	1.00
10495-090	1612	S. Sgt. Macario Garcia	II112005	1	0	4/24/2001	10:20:00 PM	4/25/2001	11:02:00		Public System	Residence	46	0.24
10495-090	1612	S. Sgt. Macario Garcia	II112005	1	0	4/24/2001	10:20:00 PM	4/25/2001	11:02:00		Public System	Residence	46	0.24
10495-090	1612	S. Sgt. Macario Garcia	II112005	1	0	4/24/2001	10:20:00 PM	4/25/2001	11:02:00		Public System	Residence	46	0.24
10495-090	505	S. Sgt. Macario Garcia	II112037	1	0	6/19/2001	9:28:00 PM	6/20/2001	12:51:00		Public System	Residence	46	0.16
10495-090	505	S. Sgt. Macario Garcia	II112037	1	0	6/19/2001	9:28:00 PM	6/20/2001	12:51:00		Public System	Residence	46	0.16
10495-090	505	S. Sgt. Macario Garcia	II112037	1	0	6/19/2001	9:28:00 PM	6/20/2001	12:51:00		Public System	Residence	46	0.16

TNRCC Permit	Excursion Address	Street	Manhole	WWTP	Not Observed	Excursion Start Date	Excursion Start Time	Excursion End Date	Excursion End Time	Location	System	Area	Subbasin	3 day Rainfall'
10495-090	1108	S. Sgt. Macario Garcia	II110065	1	0	4/15/2002	9:45:00 AM	4/17/2002	12:26:00	Open Unpaved Area	Public System	Residence	46	0.00
10495-090	1000	S. Sgt. Macario Garcia	II111071	1	0	6/28/2002	10:24:00 AM	6/28/2002	11:03:00	Street	Public System	Residence	46	1.60
10495-090	1000	S. Sgt. Macario Garcia	II111071	1	0	6/28/2002	10:24:00 AM	6/28/2002	11:03:00	Street	Public System	Residence	46	1.60
10495-090	1000	S. Sgt. Macario Garcia	II111071	1	0	6/28/2002	10:24:00 AM	6/28/2002	11:03:00	Street	Public System	Residence	46	1.60
10495-090	8500	S. Sgt. Macario Garcia	II162015	1	0	12/10/2001	2:28:00 PM	12/11/2001	11:59:00	Street		Residence	47	0.77
10495-090	8500	S. Sgt. Macario Garcia	II162015	1	0	12/10/2001	2:28:00 PM	12/11/2001	11:59:00	Street		Residence	47	0.77
10495-090	777	S. Sgt. Macario Garcia	II189045	1	0	12/21/2001	10:08:00 AM	12/22/2001	9:21:00	Backlot Easement	Public System	Commercial Business	47	0.00
10495-090	777	S. Sgt. Macario Garcia	II189045	1	0	12/21/2001	10:08:00 AM	12/22/2001	9:21:00	Backlot Easement	Public System	Commercial Business	47	0.00
10495-090	777	S. Sgt. Macario Garcia	II189045	1	0	12/21/2001	10:08:00 AM	12/22/2001	9:21:00	Backlot Easement	Public System	Commercial Business	47	0.00
10495-090	777	S. Sgt. Macario Garcia	II189045	1	0	12/21/2001	10:08:00 AM	12/22/2001	9:21:00	Backlot Easement	Public System	Commercial Business	47	0.00
10495-090	4603	S. Sgt. Macario Garcia	II135061	1	0	3/12/2001	8:25:00 PM	3/13/2001	11:15:00	Backlot Easement	Public System	Residence	48	0.65
10495-090	4603	S. Sgt. Macario Garcia	II135061	1	0	3/12/2001	8:25:00 PM	3/13/2001	11:15:00	Backlot Easement	Public System	Residence	48	0.65
10495-090	4603	S. Sgt. Macario Garcia	II135061	1	0	3/12/2001	8:25:00 PM	3/13/2001	11:15:00	Backlot Easement	Public System	Residence	48	0.65
10495-090	3703	S. Sgt. Macario Garcia	II133012	1	0	3/14/2001	2:20:00 PM	3/14/2001	18:09:00	Street	Public System	Residence	48	2.05
10495-090	3703	S. Sgt. Macario Garcia	II133012	1	0	3/14/2001	2:20:00 PM	3/14/2001	18:09:00	Street	Public System	Residence	48	2.05
10495-090	812	S. Sgt. Macario Garcia	II140014	1	0	4/5/2001	1:19:00 PM	4/6/2001	18:00:00	Street	Public System	Residence	48	0.00
10495-090	812	S. Sgt. Macario Garcia	II140014	1	0	4/5/2001	1:19:00 PM	4/6/2001	18:00:00	Street	Public System	Residence	48	0.00
10495-090	1500	S. Sgt. Macario Garcia	II137028	1	0	4/5/2001	8:18:00 PM	4/6/2001	12:40:00	Back of Curb / Off Pavement	Public System	Residence	48	0.00
10495-090	1500	S. Sgt. Macario Garcia	II137028	1	0	4/5/2001	8:18:00 PM	4/6/2001	12:40:00	Back of Curb / Off Pavement	Public System	Residence	48	0.00
10495-090	618	S. Sgt. Macario Garcia	II115052	1	0	4/7/2001	12:50:00 PM	4/7/2001	14:30:00		Public System	Residence	48	0.00
10495-090	618	S. Sgt. Macario Garcia	II115052	1	0	4/7/2001	12:50:00 PM	4/7/2001	14:30:00		Public System	Residence	48	0.00
10495-090	618	S. Sgt. Macario Garcia	II115052	1	0	4/7/2001	12:50:00 PM	4/7/2001	14:30:00		Public System	Residence	48	0.00
10495-090	618	S. Sgt. Macario Garcia	II115052	1	0	4/7/2001	12:50:00 PM	4/7/2001	14:30:00		Public System	Residence	48	0.00
10495-090	1602	S. Sgt. Macario Garcia	II109050	1	0	5/21/2001	11:25:00 AM	5/22/2001	11:00:00	Backlot Easement	Public System	Residence	48	0.06
10495-090	1602	S. Sgt. Macario Garcia	II109050	1	0	5/21/2001	11:25:00 AM	5/22/2001	11:00:00	Backlot Easement	Public System	Residence	48	0.06
10495-090	1602	S. Sgt. Macario Garcia	II109050	1	0	5/21/2001	11:25:00 AM	5/22/2001	11:00:00	Backlot Easement	Public System	Residence	48	0.06
10495-090	706	S. Sgt. Macario Garcia	II115052	1	0	6/21/2001	3:05:00 PM	6/21/2001	16:15:00	Open Paved Area	Public System	Residence	48	0.00
10495-090	4004	S. Sgt. Macario Garcia	II135035	1	0	6/22/2001	8:52:00 PM	6/23/2001	14:16:00	Street	Public System	Residence	48	0.34
10495-090	4004	S. Sgt. Macario Garcia	II135035	1	0	6/22/2001	8:52:00 PM	6/23/2001	14:16:00	Street	Public System	Residence	48	0.34
10495-090	5904	S. Sgt. Macario Garcia	II140047	1	0	8/17/2001	9:40:00 AM	8/17/2001	10:20:00	Backlot Easement	Private System	Residence	48	0.00
10495-090	5904	S. Sgt. Macario Garcia	II140047	1	0	8/17/2001	9:40:00 AM	8/17/2001	10:20:00	Backlot Easement	Private System	Residence	48	0.00
10495-090	5814	S. Sgt. Macario Garcia	II138035	1	0	9/4/2001	9:26:00 AM	9/4/2001	9:48:00		Public System	Residence	48	0.00
10495-090	5814	S. Sgt. Macario Garcia	II138035	1	0	9/4/2001	9:26:00 AM	9/4/2001	9:48:00		Public System	Residence	48	0.00
10495-090	5814	S. Sgt. Macario Garcia	II138035	1	0	9/4/2001	9:26:00 AM	9/4/2001	9:48:00		Public System	Residence	48	0.00
10495-090	3214	S. Sgt. Macario Garcia	II134029	1	0	9/27/2001	7:05:00 PM	9/29/2001	12:30:00	Street		Residence	48	0.00
10495-090	3214	S. Sgt. Macario Garcia	II134029	1	0	9/27/2001	7:05:00 PM	9/29/2001	12:30:00	Street		Residence	48	0.00
10495-090	7008	S. Sgt. Macario Garcia	II024028	1	0	10/14/2001	4:11:00 PM	10/16/2001	15:28:00	Street	Public System	Residence	48	2.74
10495-090	7008	S. Sgt. Macario Garcia	II024028	1	0	10/14/2001	4:11:00 PM	10/16/2001	15:28:00	Street	Public System	Residence	48	2.74
10495-090	214	S. Sgt. Macario Garcia	II115016	1	0	10/23/2001	9:15:00 AM	10/23/2001	13:27:00	Street	Public System	Residence	48	0.00
10495-090	214	S. Sgt. Macario Garcia	II115016	1	0	10/23/2001	9:15:00 AM	10/23/2001	13:27:00	Street	Public System	Residence	48	0.00
10495-090	214	S. Sgt. Macario Garcia	II115016	1	0	10/23/2001	9:15:00 AM	10/23/2001	13:27:00	Street	Public System	Residence	48	0.00
10495-090	5814	S. Sgt. Macario Garcia	II138035	1	0	11/15/2001	9:43:00 PM	11/16/2001	10:36:00		Public System	Residence	48	0.00
10495-090	902	S. Sgt. Macario Garcia	II140013	1	0	11/27/2001	10:27:00 PM	11/28/2001	12:00:00	Street		Residence	48	0.00
10495-090	902	S. Sgt. Macario Garcia	II140013	1	0	11/27/2001	10:27:00 PM	11/28/2001	12:00:00	Street		Residence	48	0.00
10495-090	902	S. Sgt. Macario Garcia	II140013	1	0	11/27/2001	10:27:00 PM	11/28/2001	12:00:00	Street		Residence	48	0.00
10495-090	1311	S. Sgt. Macario Garcia	II138026	1	0	12/6/2001	8:27:00 PM	12/7/2001	8:44:00		Public System	Residence	48	0.00
10495-090	1311	S. Sgt. Macario Garcia	II138026	1	0	12/6/2001	8:27:00 PM	12/7/2001	8:44:00		Public System	Residence	48	0.00
10495-090	1311	S. Sgt. Macario Garcia	II138026	1	0	12/6/2001	8:27:00 PM	12/7/2001	8:44:00		Public System	Residence	48	0.00
10495-090	1311	S. Sgt. Macario Garcia	II138026	1	0	12/6/2001	8:27:00 PM	12/7/2001	8:44:00		Public System	Residence	48	0.00
10495-090	902	S. Sgt. Macario Garcia	II140004	1	0	12/22/2001	11:57:00 AM	12/23/2001	17:52:00	Street	Public System	Residence	48	0.00
10495-090	902	S. Sgt. Macario Garcia	II140004	1	0	12/22/2001	11:57:00 AM	12/23/2001	17:52:00	Street	Public System	Residence	48	0.00
10495-090	902	S. Sgt. Macario Garcia	II140004	1	0	12/22/2001	11:57:00 AM	12/23/2001	17:52:00	Street	Public System	Residence	48	0.00
10495-090	704	S. Sgt. Macario Garcia	II140070	1	0	12/28/2001	11:54:00 AM	12/29/2001	10:46:00	Street	Public System	Residence	48	0.00
10495-090	704	S. Sgt. Macario Garcia	II140070	1	0	12/28/2001	11:54:00 AM	12/29/2001	10:46:00	Street	Public System	Residence	48	0.00
10495-090	830	S. Sgt. Macario Garcia	II118082	1	0	1/19/2002	1:23:00 PM	1/21/2002	10:00:00	Open Paved Area	Public System	Residence	48	0.00
10495-090	830	S. Sgt. Macario Garcia	II118082	1	0	1/19/2002	1:23:00 PM	1/21/2002	10:00:00	Open Paved Area	Public System	Residence	48	0.00

TNRCC Permit	Excursion Address	Street	Manhole	WWTP	Not Observed	Excursion Start Date	Excursion Start Time	Excursion End Date	Excursion End Time	Location	System	Area	Subbasin	3 day Rainfall'
10495-090	830	S. Sgt. Macario Garcia	II118082	1	0	1/19/2002	1:23:00 PM	1/21/2002	10:00:00	Open Paved Area	Public System	Residence	48	0.00
10495-090	822	S. Sgt. Macario Garcia	II115055	1	0	1/26/2002	8:08:00 PM	1/29/2002	11:26:00	Street	Public System	Residence	48	0.00
10495-090	1819	S. Sgt. Macario Garcia	II109087	1	0	3/12/2002	8:08:00 AM	3/12/2002	9:10:00	Street	Public System	Residence	48	0.05
10495-090	1819	S. Sgt. Macario Garcia	II109087	1	0	3/12/2002	8:08:00 AM	3/12/2002	9:10:00	Street	Public System	Residence	48	0.05
10495-090	1514	S. Sgt. Macario Garcia	IIP28002	1	0	3/14/2002	4:38:00 PM	3/14/2002	17:10:00	Back of Curb / Off Pavement	Public System	Residence	48	0.00
10495-090	1514	S. Sgt. Macario Garcia	IIP28002	1	0	3/14/2002	4:38:00 PM	3/14/2002	17:10:00	Back of Curb / Off Pavement	Public System	Residence	48	0.00
10495-090	2313	S. Sgt. Macario Garcia	IIP22071	1	0	3/24/2002	8:20:00 AM	3/24/2002	9:05:00	Street	Public System	Residence	48	0.00
10495-090	2313	S. Sgt. Macario Garcia	IIP22071	1	0	3/24/2002	8:20:00 AM	3/24/2002	9:05:00	Street	Public System	Residence	48	0.00
10495-090	2313	S. Sgt. Macario Garcia	IIP22071	1	0	3/24/2002	8:20:00 AM	3/24/2002	9:05:00	Street	Public System	Residence	48	0.00
10495-090	4400	S. Sgt. Macario Garcia	II137047	1	0	4/11/2002	10:05:00 AM	4/11/2002	14:52:00	Street	Public System	Residence	48	0.00
10495-090	5209	S. Sgt. Macario Garcia	II137043	1	0	4/19/2002	10:36:00 AM	4/19/2002	18:00:00	Open Paved Area	Public System	Residence	48	0.00
10495-090	5209	S. Sgt. Macario Garcia	II137043	1	0	4/19/2002	10:36:00 AM	4/19/2002	18:00:00	Open Paved Area	Public System	Residence	48	0.00
10495-090	5209	S. Sgt. Macario Garcia	II137043	1	0	4/19/2002	10:36:00 AM	4/19/2002	18:00:00	Open Paved Area	Public System	Residence	48	0.00
10495-090	2616	S. Sgt. Macario Garcia	II252002	1	0	4/22/2002	10:17:00 AM	4/22/2002	17:15:00	Open Paved Area	Public System	Residence	48	0.00
10495-090	2616	S. Sgt. Macario Garcia	II252002	1	0	4/22/2002	10:17:00 AM	4/22/2002	17:15:00	Open Paved Area	Public System	Residence	48	0.00
10495-090	1201	S. Sgt. Macario Garcia	II110011	1	0	5/7/2002	10:47:00 AM	5/9/2002	9:01:00	Open Paved Area	Public System	Residence	48	0.00
10495-090	1201	S. Sgt. Macario Garcia	II110011	1	0	5/7/2002	10:47:00 AM	5/9/2002	9:01:00	Open Paved Area	Public System	Residence	48	0.00
10495-090	2315	S. Sgt. Macario Garcia	IIP22071	1	0	5/24/2002	5:32:00 PM	5/25/2002	9:17:00	Open Paved Area	Public System	Residence	48	0.00
10495-090	2315	S. Sgt. Macario Garcia	IIP22071	1	0	5/24/2002	5:32:00 PM	5/25/2002	9:17:00	Open Paved Area	Public System	Residence	48	0.00
10495-090	5719	S. Sgt. Macario Garcia	II138094	1	0	5/28/2002	10:05:00 AM	5/29/2002	11:00:00	Street	Private System	Residence	48	0.00
10495-090	5719	S. Sgt. Macario Garcia	II138094	1	0	5/28/2002	10:05:00 AM	5/29/2002	11:00:00	Street	Private System	Residence	48	0.00
10495-090	5510	S. Sgt. Macario Garcia	II138033	1	0	6/9/2002	8:50:00 AM	6/13/2002	13:00:00	Open Unpaved Area	Public System	Residence	48	0.61
10495-090	5510	S. Sgt. Macario Garcia	II138033	1	0	6/9/2002	8:50:00 AM	6/13/2002	13:00:00	Open Unpaved Area	Public System	Residence	48	0.61
10495-090	5510	S. Sgt. Macario Garcia	II138033	1	0	6/9/2002	8:50:00 AM	6/13/2002	13:00:00	Open Unpaved Area	Public System	Residence	48	0.61
10495-090	5903	S. Sgt. Macario Garcia	II138052	1	0	7/7/2002	8:52:00 AM	7/7/2002	11:52:00	Street	Public System	Residence	48	0.00
10495-090	5903	S. Sgt. Macario Garcia	II138052	1	0	7/7/2002	8:52:00 AM	7/7/2002	11:52:00	Street	Public System	Residence	48	0.00
10495-090	767	S. Sgt. Macario Garcia	II121023	1	0	2/14/2001	9:15:00 PM	2/15/2001	13:08:00	Street	Public System	Residence	49	0.05
10495-090	767	S. Sgt. Macario Garcia	II121023	1	0	2/14/2001	9:15:00 PM	2/15/2001	13:08:00	Street	Public System	Residence	49	0.05
10495-090	767	S. Sgt. Macario Garcia	II121023	1	0	2/14/2001	9:15:00 PM	2/15/2001	13:08:00	Street	Public System	Residence	49	0.05
10495-090	4002	S. Sgt. Macario Garcia	II135065	1	0	3/10/2001	8:30:00 AM	3/10/2001	16:17:00	Backlot Easement	Public System	Residence	49	0.84
10495-090	4002	S. Sgt. Macario Garcia	II135065	1	0	3/10/2001	8:30:00 AM	3/10/2001	16:17:00	Backlot Easement	Public System	Residence	49	0.84
10495-090	400	S. Sgt. Macario Garcia	II122036	1	0	3/14/2001	7:01:00 PM	3/15/2001	9:40:00	Street	Public System	Residence	49	2.05
10495-090	1009	S. Sgt. Macario Garcia	II093017	1	0	3/16/2001	8:50:00 AM	3/16/2001	14:20:00	Open Unpaved Area	Public System	Residence	49	1.65
10495-090	1009	S. Sgt. Macario Garcia	II093017	1	0	3/16/2001	8:50:00 AM	3/16/2001	14:20:00	Open Unpaved Area	Public System	Residence	49	1.65
10495-090	6305	S. Sgt. Macario Garcia	II023032	1	0	3/26/2001	7:58:00 AM	3/26/2001	14:37:00	Open Unpaved Area	Private System	Residence	49	0.00
10495-090	6305	S. Sgt. Macario Garcia	II023032	1	0	3/26/2001	7:58:00 AM	3/26/2001	14:37:00	Open Unpaved Area	Private System	Residence	49	0.00
10495-090	4500	S. Sgt. Macario Garcia	IIP24072	1	0	5/4/2001	8:31:00 AM	5/4/2001	11:02:00	Street	Public System	Park	49	0.00
10495-090	4500	S. Sgt. Macario Garcia	IIP24072	1	0	5/4/2001	8:31:00 AM	5/4/2001	11:02:00	Street	Public System	Park	49	0.00
10495-090	4500	S. Sgt. Macario Garcia	IIP24072	1	0	5/4/2001	8:31:00 AM	5/4/2001	11:02:00	Street	Public System	Park	49	0.00
10495-090	4500	S. Sgt. Macario Garcia	IIP24072	1	0	5/4/2001	8:31:00 AM	5/4/2001	11:02:00	Street	Public System	Residence	49	0.00
10495-090	4500	S. Sgt. Macario Garcia	IIP24072	1	0	5/4/2001	8:31:00 AM	5/4/2001	11:02:00	Street	Public System	Residence	49	0.00
10495-090	4500	S. Sgt. Macario Garcia	IIP24072	1	0	5/4/2001	8:31:00 AM	5/4/2001	11:02:00	Street	Public System	Residence	49	0.00
10495-090	6700	S. Sgt. Macario Garcia	II023050A	1	0	5/30/2001	8:54:00 AM	5/30/2001	14:28:00	Open Unpaved Area	Public System	Residence	49	0.75
10495-090	6700	S. Sgt. Macario Garcia	II023050A	1	0	5/30/2001	8:54:00 AM	5/30/2001	14:28:00	Open Unpaved Area	Public System	Residence	49	0.75
10495-090	6700	S. Sgt. Macario Garcia	II023050A	1	0	5/30/2001	8:54:00 AM	5/30/2001	14:28:00	Open Unpaved Area	Public System	Residence	49	0.75
10495-090	512	S. Sgt. Macario Garcia	IIP23030	1	0	7/20/2001	9:49:00 AM	7/20/2001	12:30:00	Open Unpaved Area	Public System	Residence	49	0.00
10495-090	512	S. Sgt. Macario Garcia	IIP23030	1	0	7/20/2001	9:49:00 AM	7/20/2001	12:30:00	Open Unpaved Area	Public System	Residence	49	0.00
10495-090	5500	S. Sgt. Macario Garcia	II140024	1	0	8/12/2001	9:35:00 AM	8/13/2001	20:43:00	Open Paved Area	Public System	Residence	49	0.00
10495-090	5500	S. Sgt. Macario Garcia	II140024	1	0	8/12/2001	9:35:00 AM	8/13/2001	20:43:00	Open Paved Area	Public System	Residence	49	0.00
10495-090	5500	S. Sgt. Macario Garcia	II140024	1	0	8/12/2001	9:35:00 AM	8/13/2001	20:43:00	Open Paved Area	Public System	Residence	49	0.00
10495-090	225	S. Sgt. Macario Garcia	II023056	1	0	9/5/2001	8:56:00 AM	9/6/2001	13:50:00	Back of Curb / Off Pavement	Public System	Residence	49	0.06
10495-090	225	S. Sgt. Macario Garcia	II023056	1	0	9/5/2001	8:56:00 AM	9/6/2001	13:50:00	Back of Curb / Off Pavement	Public System	Residence	49	0.06
10495-090	225	S. Sgt. Macario Garcia	II023056	1	0	9/5/2001	8:56:00 AM	9/6/2001	13:50:00	Back of Curb / Off Pavement	Public System	Residence	49	0.06
10495-090	311	S. Sgt. Macario Garcia	II023043	1	0	10/6/2001	10:45:00 AM	10/6/2001	11:32:00	Backlot Easement	Public System	Residence	49	0.00
10495-090	311	S. Sgt. Macario Garcia	II023043	1	0	10/6/2001	10:45:00 AM	10/6/2001	11:32:00	Backlot Easement	Public System	Residence	49	0.00
10495-090	311	S. Sgt. Macario Garcia	II023043	1	0	10/6/2001	10:45:00 AM	10/6/2001	11:32:00	Backlot Easement	Public System	Residence	49	0.00

TNRCC Permit	Excursion Address	Street	Manhole	WWTP	Not Observed	Excursion Start Date	Excursion Start Time	Excursion End Date	Excursion End Time	Location	System	Area	Subbasin	3 day Rainfall'
10495-090	900	S. Sgt. Macario Garcia	II140016	1	0	12/28/2001	2:26:00 PM	12/31/2001	13:31:00	Street	Public System	Residence	49	0.00
10495-090	900	S. Sgt. Macario Garcia	II140016	1	0	12/28/2001	2:26:00 PM	12/31/2001	13:31:00	Street	Public System	Residence	49	0.00
10495-090	900	S. Sgt. Macario Garcia	II140016	1	0	12/28/2001	2:26:00 PM	12/31/2001	13:31:00	Street	Public System	Residence	49	0.00
10495-090	900	S. Sgt. Macario Garcia	II140016	1	0	12/28/2001	2:26:00 PM	12/31/2001	13:31:00	Street	Public System	Residence	49	0.00
10495-090	325	S. Sgt. Macario Garcia	II023043	1	0	1/14/2002	6:14:00 AM	1/14/2002	10:46:00	Backlot Easement	Public System	Residence	49	0.00
10495-090	411	S. Sgt. Macario Garcia	II116079	1	0	1/20/2002	5:22:00 PM	1/21/2002	16:16:00	Street	Public System	Residence	49	0.00
10495-090	411	S. Sgt. Macario Garcia	II116079	1	0	1/20/2002	5:22:00 PM	1/21/2002	16:16:00	Street	Public System	Residence	49	0.00
10495-090	1113	S. Sgt. Macario Garcia	II098010	1	0	1/23/2002	9:26:00 AM	1/23/2002	10:59:00	Backlot Easement		Residence	49	0.00
10495-090	1113	S. Sgt. Macario Garcia	II098010	1	0	1/23/2002	9:26:00 AM	1/23/2002	10:59:00	Backlot Easement		Residence	49	0.00
10495-090	1004	S. Sgt. Macario Garcia	II139019	1	0	2/4/2002	10:25:00 PM	2/5/2002	10:40:00	Street	Public System	Commercial Business	49	0.06
10495-090	1004	S. Sgt. Macario Garcia	II139019	1	0	2/4/2002	10:25:00 PM	2/5/2002	10:40:00	Street	Public System	Commercial Business	49	0.06
10495-090	1314	S. Sgt. Macario Garcia	IIP24072	1	0	2/7/2002	3:32:00 PM	2/8/2002	10:38:00	Street	Public System	Residence	49	0.62
10495-090	1314	S. Sgt. Macario Garcia	IIP24072	1	0	2/7/2002	3:32:00 PM	2/8/2002	10:38:00	Street	Public System	Residence	49	0.62
10495-090	1314	S. Sgt. Macario Garcia	IIP24072	1	0	2/7/2002	3:32:00 PM	2/8/2002	10:38:00	Street	Public System	Residence	49	0.62
10495-090	1233	S. Sgt. Macario Garcia	II095040	1	0	2/14/2002	7:54:00 AM	2/16/2002	10:30:00	Street	Public System	Residence	49	0.00
10495-090	6805	S. Sgt. Macario Garcia	IIP43014	1	0	3/15/2002	1:28:00 PM	3/15/2002	15:00:00	Street	Public System	Residence	49	0.00
10495-090	6805	S. Sgt. Macario Garcia	IIP43014	1	0	3/15/2002	1:28:00 PM	3/15/2002	15:00:00	Street	Public System	Residence	49	0.00
10495-090	6805	S. Sgt. Macario Garcia	IIP43014	1	0	3/15/2002	1:28:00 PM	3/15/2002	15:00:00	Street	Public System	Residence	49	0.00
10495-090	723	S. Sgt. Macario Garcia	II096014	1	0	3/30/2002	11:16:00 AM	3/30/2002	14:05:00	Street	Public System	Residence	49	0.00
10495-090	723	S. Sgt. Macario Garcia	II096014	1	0	3/30/2002	11:16:00 AM	3/30/2002	14:05:00	Street	Public System	Residence	49	0.00
10495-090	723	S. Sgt. Macario Garcia	II096014	1	0	3/30/2002	11:16:00 AM	3/30/2002	14:05:00	Street	Public System	Residence	49	0.00
10495-090	723	S. Sgt. Macario Garcia	II096014	1	0	3/30/2002	11:22:00 AM	3/30/2002	14:05:00	Street	Public System	Residence	49	0.00
10495-090	723	S. Sgt. Macario Garcia	II096014	1	0	3/30/2002	11:22:00 AM	3/30/2002	14:05:00	Street	Public System	Residence	49	0.00
10495-090	723	S. Sgt. Macario Garcia	II096014	1	0	3/30/2002	11:22:00 AM	3/30/2002	14:05:00	Street	Public System	Residence	49	0.00
10495-090	713	S. Sgt. Macario Garcia	II096014	1	0	4/29/2002	8:45:00 AM	4/30/2002	14:00:00	Open Unpaved Area	Public System	Residence	49	0.00
10495-090	713	S. Sgt. Macario Garcia	II096014	1	0	4/29/2002	8:45:00 AM	4/30/2002	14:00:00	Open Unpaved Area	Public System	Residence	49	0.00
10495-090	713	S. Sgt. Macario Garcia	II096014	1	0	4/29/2002	8:45:00 AM	4/30/2002	14:00:00	Open Unpaved Area	Public System	Residence	49	0.00
10495-090	713	S. Sgt. Macario Garcia	II096014	1	0	4/29/2002	8:45:00 AM	4/30/2002	14:00:00	Open Unpaved Area	Public System	Residence	49	0.00
10495-090	402	S. Sgt. Macario Garcia	II023043	1	0	5/14/2002	3:32:00 PM	5/15/2002	9:58:00	Street	Public System	Residence	49	0.00
10495-090	400	S. Sgt. Macario Garcia	II094013	1	0	5/28/2002	11:38:00 AM	5/28/2002	13:00:00	Street	Public System	Residence	49	0.00
10495-090	400	S. Sgt. Macario Garcia	II094013	1	0	5/28/2002	11:38:00 AM	5/28/2002	13:00:00	Street	Public System	Residence	49	0.00
10495-037	7	Beechnut	SW240031	33	0	2/14/2001	2:03:00 PM	2/14/2001	15:00:00	Street	Public System	Residence	50	0.05
10495-037	7	Beechnut	SW240031	33	0	2/14/2001	2:03:00 PM	2/14/2001	15:00:00	Street	Public System	Residence	50	0.05
10495-037	7	Beechnut	SW240031	33	0	2/14/2001	2:03:00 PM	2/14/2001	15:00:00	Street	Public System	Residence	50	0.05
10495-037	1600	Beechnut	SW224052	33	0	3/25/2001	5:37:00 PM	3/25/2001	19:47:00	Street	Public System	Commercial Business	50	0.00
10495-037	1700	Beechnut	SW224055	33	0	9/11/2001	9:14:00 AM	9/11/2001	16:30:00	Street	Public System	Residence	50	0.16
10495-037	1700	Beechnut	SW224055	33	0	9/11/2001	9:14:00 AM	9/11/2001	16:30:00	Street	Public System	Residence	50	0.16
10495-037	1700	Beechnut	SW224055	33	0	9/11/2001	9:14:00 AM	9/11/2001	16:30:00	Street	Public System	Residence	50	0.16
10495-037	1600	Beechnut	SW224052	33	0	10/28/2001	9:00:00 AM	10/28/2001	11:45:00	Street	Public System	Residence	50	0.00
10495-037	1600	Beechnut	SW224052	33	0	10/28/2001	9:00:00 AM	10/28/2001	11:45:00	Street	Public System	Residence	50	0.00
10495-037	1600	Beechnut	SW224052	33	0	10/28/2001	9:00:00 AM	10/28/2001	11:45:00	Street	Public System	Residence	50	0.00
10495-037	2525	Beechnut	SW223068	33	0	3/27/2002	8:08:00 AM	3/27/2002	12:07:00	Open Paved Area	Public System	Residence	50	0.00
10495-037	2525	Beechnut	SW223068	33	0	3/27/2002	8:08:00 AM	3/27/2002	12:07:00	Open Paved Area	Public System	Residence	50	0.00
10495-037	2525	Beechnut	SW223068	33	0	3/27/2002	8:08:00 AM	3/27/2002	12:07:00	Open Paved Area	Public System	Residence	50	0.00
10495-037	5555	Beechnut	SW229009	33	0	4/4/2002	8:15:00 AM	4/4/2002	11:45:00	Street	Public System	Residence	50	0.00
10495-037	5555	Beechnut	SW229009	33	0	4/4/2002	8:15:00 AM	4/4/2002	11:45:00	Street	Public System	Residence	50	0.00
10495-037	5555	Beechnut	SW229009	33	0	4/4/2002	8:15:00 AM	4/4/2002	11:45:00	Street	Public System	Residence	50	0.00
10495-090	7398	S. Sgt. Macario Garcia	IA007001	1	0	5/7/2002	9:30:00 AM	5/7/2002	11:41:00	Street	Public System	Residence	50	0.00
10495-090	7398	S. Sgt. Macario Garcia	IA007001	1	0	5/7/2002	9:30:00 AM	5/7/2002	11:41:00	Street	Public System	Residence	50	0.00
10495-090	7398	S. Sgt. Macario Garcia	IA007001	1	0	5/7/2002	9:30:00 AM	5/7/2002	11:41:00	Street	Public System	Residence	50	0.00
10495-037	5000	Beechnut	SW228063	33	0	5/19/2002	12:55:00 PM	5/20/2002	10:15:00	Open Paved Area	Public System	Residence	50	0.00
10495-037	5000	Beechnut	SW228063	33	0	5/19/2002	12:55:00 PM	5/20/2002	10:15:00	Open Paved Area	Public System	Residence	50	0.00
10495-037	5000	Beechnut	SW228063	33	0	5/19/2002	12:55:00 PM	5/20/2002	10:15:00	Open Paved Area	Public System	Residence	50	0.00
10495-037	1700	Beechnut	SW224055	33	0	6/19/2002	12:10:00 PM	6/19/2002	12:50:00	Street	Public System	Residence	50	2.07
10495-037	1700	Beechnut	SW224055	33	0	6/19/2002	12:10:00 PM	6/19/2002	12:50:00	Street	Public System	Residence	50	2.07
10495-090	1100	S. Sgt. Macario Garcia	IA008071	1	0	3/7/2001	12:15:00 PM	3/7/2001	18:42:00	Backlot Easement	Public System	Residence	51	0.00

TNRCC Permit	Excursion Address	Street	Manhole	WWTP	Not Observed	Excursion Start Date	Excursion Start Time	Excursion End Date	Excursion End Time	Location	System	Area	Subbasin	3 day Rainfall'
10495-090	1100	S. Sgt. Macario Garcia	IA008071	1	0	3/7/2001	12:15:00 PM	3/7/2001	18:42:00	Backlot Easement	Public System	Residence	51	0.00
10495-090	1100	S. Sgt. Macario Garcia	IA008071	1	0	3/7/2001	12:15:00 PM	3/7/2001	18:42:00	Backlot Easement	Public System	Residence	51	0.00
10495-090	2054	S. Sgt. Macario Garcia	IA017031	1	0	3/21/2001	11:35:00 AM	3/21/2001	13:48:00	Backlot Easement	Private System	Residence	51	0.00
10495-090	2054	S. Sgt. Macario Garcia	IA017031	1	0	4/2/2001	10:03:00 AM	4/2/2001	12:45:00	Backlot Easement	Public System	Residence	51	0.00
10495-090	2054	S. Sgt. Macario Garcia	IA017031	1	0	4/2/2001	10:03:00 AM	4/2/2001	12:45:00	Backlot Easement	Public System	Residence	51	0.00
10495-090	7435	S. Sgt. Macario Garcia	IA013067	1	0	5/2/2001	11:25:00 AM	5/2/2001	12:52:00	Backlot Easement	Public System	Residence	51	0.00
10495-090	7435	S. Sgt. Macario Garcia	IA013067	1	0	5/2/2001	11:25:00 AM	5/2/2001	12:52:00	Backlot Easement	Public System	Residence	51	0.00
10495-090	1901	S. Sgt. Macario Garcia	IA034046	1	0	5/23/2001	8:55:00 AM	5/23/2001	12:39:00	Open Paved Area	Public System	Residence	51	0.06
10495-090	1901	S. Sgt. Macario Garcia	IA034046	1	0	5/23/2001	8:55:00 AM	5/23/2001	12:39:00	Open Paved Area	Public System	Residence	51	0.06
10495-090	1901	S. Sgt. Macario Garcia	IA034046	1	0	5/23/2001	8:55:00 AM	5/23/2001	12:39:00	Open Paved Area	Public System	Residence	51	0.06
10495-090	7511	S. Sgt. Macario Garcia	IA013067	1	0	5/30/2001	8:05:00 AM	5/30/2001	16:39:00	Backlot Easement	Public System	Residence	51	0.75
10495-090	7511	S. Sgt. Macario Garcia	IA013067	1	0	5/30/2001	8:05:00 AM	5/30/2001	16:39:00	Backlot Easement	Public System	Residence	51	0.75
10495-090	7511	S. Sgt. Macario Garcia	IA013067	1	0	5/30/2001	8:05:00 AM	5/30/2001	16:39:00	Backlot Easement	Public System	Residence	51	0.75
10495-090	7511	S. Sgt. Macario Garcia	IA013067	1	0	5/30/2001	8:05:00 AM	5/30/2001	16:39:00	Backlot Easement	Public System	Residence	51	0.75
10495-090	7511	S. Sgt. Macario Garcia	IA013067	1	0	5/31/2001	1:16:00 PM	5/31/2001	16:39:00	Open Unpaved Area	Public System	Residence	51	0.80
10495-090	7511	S. Sgt. Macario Garcia	IA013067	1	0	5/31/2001	1:16:00 PM	5/31/2001	16:39:00	Open Unpaved Area	Public System	Residence	51	0.80
10495-090	7511	S. Sgt. Macario Garcia	IA013067	1	0	5/31/2001	1:16:00 PM	5/31/2001	16:39:00	Open Unpaved Area	Public System	Residence	51	0.80
10495-090	7530	S. Sgt. Macario Garcia	IA013032	1	0	7/17/2001	10:50:00 AM	7/17/2001	13:05:00	Street	Public System	Residence	51	1.19
10495-090	1710	S. Sgt. Macario Garcia	IA006023	1	0	8/31/2001	9:39:00 AM	8/31/2001	17:13:00	Backlot Easement		Residence	51	4.62
10495-090	1710	S. Sgt. Macario Garcia	IA006023	1	0	8/31/2001	9:39:00 AM	8/31/2001	17:13:00	Backlot Easement		Residence	51	4.62
10495-090	1710	S. Sgt. Macario Garcia	IA006023	1	0	8/31/2001	9:39:00 AM	8/31/2001	17:13:00	Backlot Easement		Residence	51	4.62
10495-090	1710	S. Sgt. Macario Garcia	IA006023	1	0	9/6/2001	9:08:00 AM	9/7/2001	11:26:00	Open Paved Area	Public System	Residence	51	0.06
10495-090	1710	S. Sgt. Macario Garcia	IA006023	1	0	9/6/2001	9:08:00 AM	9/7/2001	11:26:00	Open Paved Area	Public System	Residence	51	0.06
10495-090	1710	S. Sgt. Macario Garcia	IA006023	1	0	9/6/2001	9:08:00 AM	9/7/2001	11:26:00	Open Paved Area	Public System	Residence	51	0.06
10495-090	7500	S. Sgt. Macario Garcia	IA034069	1	0	10/14/2001	8:52:00 AM	10/14/2001	9:56:00	Street	Public System	Residence	51	2.74
10495-090	7500	S. Sgt. Macario Garcia	IA034069	1	0	10/14/2001	8:52:00 AM	10/14/2001	9:56:00	Street	Public System	Residence	51	2.74
10495-090	1647	S. Sgt. Macario Garcia	IA013031	1	0	10/20/2001	1:45:00 PM	10/20/2001	19:09:00	Street	Public System	Residence	51	0.00
10495-090	1647	S. Sgt. Macario Garcia	IA013031	1	0	10/20/2001	1:45:00 PM	10/20/2001	19:09:00	Street	Public System	Residence	51	0.00
10495-090	1647	S. Sgt. Macario Garcia	IA013031	1	0	10/20/2001	1:45:00 PM	10/20/2001	19:09:00	Street	Public System	Residence	51	0.00
10495-090	1728	S. Sgt. Macario Garcia	IA073009	1	0	12/1/2001	11:27:00 AM	12/3/2001	10:05:00	Open Paved Area		Residence	51	0.79
10495-090	1728	S. Sgt. Macario Garcia	IA073009	1	0	12/1/2001	11:27:00 AM	12/3/2001	10:05:00	Open Paved Area		Residence	51	0.79
10495-090	1728	S. Sgt. Macario Garcia	IA073009	1	0	12/1/2001	11:27:00 AM	12/3/2001	10:05:00	Open Paved Area		Residence	51	0.79
10495-090	1223	S. Sgt. Macario Garcia	IA009059	1	0	12/14/2001	2:09:00 PM	12/16/2001	14:43:00	Open Unpaved Area	Public System	Residence	51	1.04
10495-090	1223	S. Sgt. Macario Garcia	IA009059	1	0	12/14/2001	2:09:00 PM	12/16/2001	14:43:00	Open Unpaved Area	Public System	Residence	51	1.04
10495-090	1223	S. Sgt. Macario Garcia	IA009059	1	0	12/14/2001	2:09:00 PM	12/16/2001	14:43:00	Open Unpaved Area	Public System	Residence	51	1.04
10495-090	1500	S. Sgt. Macario Garcia	IA014014	1	0	12/20/2001	11:08:00 AM	12/20/2001	12:43:00	Street		Residence	51	0.00
10495-090	2011	S. Sgt. Macario Garcia	IA034042	1	0	12/23/2001	6:55:00 PM	12/26/2001	9:21:00	Open Unpaved Area		Residence	51	0.00
10495-090	2011	S. Sgt. Macario Garcia	IA034042	1	0	12/23/2001	6:55:00 PM	12/26/2001	9:21:00	Open Unpaved Area		Residence	51	0.00
10495-090	2011	S. Sgt. Macario Garcia	IA034042	1	0	12/23/2001	6:55:00 PM	12/26/2001	9:21:00	Open Unpaved Area		Residence	51	0.00
10495-090	2011	S. Sgt. Macario Garcia	IA034042	1	0	12/23/2001	6:55:00 PM	12/26/2001	9:21:00	Open Unpaved Area		Residence	51	0.00
10495-090	9521	S. Sgt. Macario Garcia	IA034046	1	0	1/10/2002	4:15:00 PM	1/11/2002	13:50:00	Open Unpaved Area	Public System	Residence	51	0.00
10495-090	9521	S. Sgt. Macario Garcia	IA034046	1	0	1/10/2002	4:15:00 PM	1/11/2002	13:50:00	Open Unpaved Area	Public System	Residence	51	0.00
10495-090	9521	S. Sgt. Macario Garcia	IA034046	1	0	1/10/2002	4:15:00 PM	1/11/2002	13:50:00	Open Unpaved Area	Public System	Residence	51	0.00
10495-090	1901	S. Sgt. Macario Garcia	IA034046	1	0	1/12/2002	1:47:00 PM	1/12/2002	16:48:00	Street	Public System	Residence	51	0.00
10495-090	1901	S. Sgt. Macario Garcia	IA034046	1	0	1/12/2002	1:47:00 PM	1/12/2002	16:48:00	Street	Public System	Residence	51	0.00
10495-090	1901	S. Sgt. Macario Garcia	IA034046	1	0	1/12/2002	1:47:00 PM	1/12/2002	16:48:00	Street	Public System	Residence	51	0.00
10495-090	1806	S. Sgt. Macario Garcia	IA017037	1	0	2/7/2002	2:56:00 PM	2/7/2002	18:15:00	Open Paved Area	Public System	Residence	51	0.62
10495-090	1806	S. Sgt. Macario Garcia	IA017037	1	0	2/7/2002	2:56:00 PM	2/7/2002	18:15:00	Open Paved Area	Public System	Residence	51	0.62
10495-090	1804	S. Sgt. Macario Garcia	IA017016	1	0	2/7/2002	1:38:00 PM	2/7/2002	16:53:00	Open Paved Area	Public System	Residence	51	0.62
10495-090	1804	S. Sgt. Macario Garcia	IA017016	1	0	2/7/2002	1:38:00 PM	2/7/2002	16:53:00	Open Paved Area	Public System	Residence	51	0.62
10495-090	1804	S. Sgt. Macario Garcia	IA017016	1	0	2/7/2002	1:38:00 PM	2/7/2002	16:53:00	Open Paved Area	Public System	Residence	51	0.62
10495-090	2080	S. Sgt. Macario Garcia	IA034020	1	0	2/11/2002	3:35:00 PM	2/11/2002	16:29:00	Street	Private System	Residence	51	0.00
10495-090	2080	S. Sgt. Macario Garcia	IA034020	1	0	2/11/2002	3:35:00 PM	2/11/2002	16:29:00	Street	Private System	Residence	51	0.00
10495-090	2080	S. Sgt. Macario Garcia	IA034020	1	0	2/11/2002	3:35:00 PM	2/11/2002	16:29:00	Street	Private System	Residence	51	0.00
10495-037	5627	Beechnut	SW031059	33	0	2/21/2002	7:00:00 AM	2/22/2002	10:20:00	Backlot Easement	Public System	Residence	51	0.83
10495-037	5627	Beechnut	SW031059	33	0	2/21/2002	7:00:00 AM	2/22/2002	10:20:00	Backlot Easement	Public System	Residence	51	0.83

TNRCC Permit	Excursion Address	Street	Manhole	WWTP	Not Observed	Excursion Start Date	Excursion Start Time	Excursion End Date	Excursion End Time	Location	System	Area	Subbasin	3 day Rainfall'
10495-037	5627	Beechnut	SW031059	33	0	2/21/2002	7:00:00 AM	2/22/2002	10:20:00	Backlot Easement	Public System	Residence	51	0.83
10495-090	6800	S. Sgt. Macario Garcia	IA010019	1	0	2/26/2002	11:45:00 AM	2/26/2002	12:30:00	Street	Public System	Residence	51	0.00
10495-090	6800	S. Sgt. Macario Garcia	IA010019	1	0	2/26/2002	11:45:00 AM	2/26/2002	12:30:00	Street	Public System	Residence	51	0.00
10495-090	2017	S. Sgt. Macario Garcia	IA017030	1	0	3/7/2002	2:21:00 PM	3/7/2002	15:07:00	Open Paved Area	Public System	Residence	51	0.00
10495-090	2017	S. Sgt. Macario Garcia	IA017030	1	0	3/7/2002	2:21:00 PM	3/7/2002	15:07:00	Open Paved Area	Public System	Residence	51	0.00
10495-090	2017	S. Sgt. Macario Garcia	IA017030	1	0	3/7/2002	2:21:00 PM	3/7/2002	15:07:00	Open Paved Area	Public System	Residence	51	0.00
10495-090	7609	S. Sgt. Macario Garcia	IA034072	1	0	3/12/2002	8:33:00 AM	3/12/2002	9:17:00	Street	Public System	Residence	51	0.05
10495-090	7609	S. Sgt. Macario Garcia	IA034072	1	0	3/12/2002	8:33:00 AM	3/12/2002	9:17:00	Street	Public System	Residence	51	0.05
10495-090	1901	S. Sgt. Macario Garcia	IA034046	1	0	3/29/2002	11:00:00 AM	3/29/2002	11:47:00	Street	Public System	Residence	51	0.00
10495-090	1901	S. Sgt. Macario Garcia	IA034046	1	0	3/29/2002	11:00:00 AM	3/29/2002	11:47:00	Street	Public System	Residence	51	0.00
10495-037	2	Beechnut	SW227018	33	0	3/30/2002	7:00:00 AM	4/1/2002	13:44:00	Backlot Easement	Public System	Residence	51	0.00
10495-037	1422	Beechnut	SW034003	33	0	3/4/2001	10:29:00 AM	3/4/2001	14:00:00	Street	Public System	Residence	52	2.13
10495-037	1422	Beechnut	SW034003	33	0	3/4/2001	10:29:00 AM	3/4/2001	14:00:00	Street	Public System	Residence	52	2.13
10495-037	1422	Beechnut	SW034003	33	0	3/4/2001	10:29:00 AM	3/4/2001	14:00:00	Street	Public System	Residence	52	2.13
10495-037	1311	Beechnut	SW034041	33	0	4/16/2001	1:52:00 PM	4/18/2001	10:27:00	Street	Public System	Residence	52	1.65
10495-037	1311	Beechnut	SW034041	33	0	4/16/2001	1:52:00 PM	4/18/2001	10:27:00	Street	Public System	Residence	52	1.65
10495-037	5854	Beechnut	SW033018	33	0	5/7/2001	9:38:00 AM	5/7/2001	14:00:00		Public System	Residence	52	0.28
10495-037	6010	Beechnut	SW029026	33	0	5/21/2001	11:37:00 AM	5/21/2001	13:24:00	Backlot Easement	Public System	Residence	52	0.06
10495-037	6010	Beechnut	SW029026	33	0	5/21/2001	11:37:00 AM	5/21/2001	13:24:00	Backlot Easement	Public System	Residence	52	0.06
10495-037	6370	Beechnut	SW260051	33	0	7/17/2001	4:21:00 PM	7/18/2001	3:45:00	Open Paved Area	Public System	Residence	52	1.19
10495-037	6370	Beechnut	SW260051	33	0	7/17/2001	4:21:00 PM	7/18/2001	3:45:00	Open Paved Area	Public System	Residence	52	1.19
10495-037	6370	Beechnut	SW260051	33	0	7/17/2001	4:21:00 PM	7/18/2001	3:45:00	Open Paved Area	Public System	Residence	52	1.19
10495-037	6370	Beechnut	SW260051	33	0	7/17/2001	4:21:00 PM	7/18/2001	3:45:00	Open Paved Area	Public System	Residence	52	1.19
10495-116	6423	Old Westheimer	WD111089	36	0	8/22/2001	12:36:00 PM	8/22/2001	14:26:00	Backlot Easement	Private System	Commercial Business	52	0.00
10495-037	1399	Beechnut	SW034072	33	0	9/17/2001	12:39:00 PM	9/17/2001	19:42:00	Street	Public System	Residence	52	0.06
10495-037	1399	Beechnut	SW034072	33	0	9/17/2001	12:39:00 PM	9/17/2001	19:42:00	Street	Public System	Residence	52	0.06
10495-037	1399	Beechnut	SW034072	33	0	9/17/2001	12:39:00 PM	9/17/2001	19:42:00	Street	Public System	Residence	52	0.06
10495-037	5854	Beechnut	SW033018	33	0	9/30/2001	11:51:00 AM	9/30/2001	13:09:00	Street	Public System	Residence	52	0.00
10495-037	5854	Beechnut	SW033018	33	0	9/30/2001	11:51:00 AM	9/30/2001	13:09:00	Street	Public System	Residence	52	0.00
10495-037	5854	Beechnut	SW033018	33	0	9/30/2001	11:51:00 AM	9/30/2001	13:09:00	Street	Public System	Residence	52	0.00
10495-116	2823	Old Westheimer	WD137033	36	0	11/1/2001	11:47:00 AM	11/1/2001	13:44:00	Street	Public System	Residence	52	0.00
10495-116	2823	Old Westheimer	WD137033	36	0	11/1/2001	11:47:00 AM	11/1/2001	13:44:00	Street	Public System	Residence	52	0.00
10495-116	2823	Old Westheimer	WD137033	36	0	11/1/2001	11:47:00 AM	11/1/2001	13:44:00	Street	Public System	Residence	52	0.00
10495-037	5854	Beechnut	SW033018	33	0	12/12/2001	1:31:00 PM	12/12/2001	14:45:00	Backlot Easement		Commercial Business	52	2.77
10495-037	5854	Beechnut	SW033018	33	0	12/12/2001	1:31:00 PM	12/12/2001	14:45:00	Backlot Easement		Commercial Business	52	2.77
10495-037	1117	Beechnut	SW033029	33	0	3/25/2002	7:00:00 AM	3/26/2002	11:10:00	Backlot Easement	Public System	Residence	52	0.00
10495-037	1117	Beechnut	SW033029	33	0	3/25/2002	7:00:00 AM	3/26/2002	11:10:00	Backlot Easement	Public System	Residence	52	0.00
10495-037	6500	Beechnut	SW036069	33	0	5/4/2002	2:20:00 PM	5/4/2002	15:27:00	Backlot Easement	Public System	Residence	52	0.00
10495-037	6500	Beechnut	SW036069	33	0	5/4/2002	2:20:00 PM	5/4/2002	15:27:00	Backlot Easement	Public System	Residence	52	0.00
10495-037	6500	Beechnut	SW036069	33	0	5/4/2002	2:20:00 PM	5/4/2002	15:27:00	Backlot Easement	Public System	Residence	52	0.00
10495-037	311	Beechnut	SW033122	33	0	5/6/2002	1:55:00 PM	5/7/2002	10:30:00	Open Paved Area	Public System	Residence	52	0.00
10495-037	311	Beechnut	SW033122	33	0	5/6/2002	1:55:00 PM	5/7/2002	10:30:00	Open Paved Area	Public System	Residence	52	0.00
10495-037	311	Beechnut	SW033122	33	0	5/6/2002	1:55:00 PM	5/7/2002	10:30:00	Open Paved Area	Public System	Residence	52	0.00
10495-037	6352	Beechnut	SW260051	33	0	5/28/2002	12:28:00 PM	5/28/2002	13:07:00	Street	Public System	Residence	52	0.00
10495-037	6352	Beechnut	SW260051	33	0	5/28/2002	12:28:00 PM	5/28/2002	13:07:00	Street	Public System	Residence	52	0.00
10495-037	352 1/2	Beechnut	SW031001	33	0	6/7/2002	10:30:00 AM	6/7/2002	17:30:00	Street	Public System	Commercial Business	52	0.62
10495-116	6405	Old Westheimer	WD111024	36	0	7/1/2002	11:00:00 AM	7/1/2002	14:13:00	Open Unpaved Area	Public System	Residence	52	0.69
10495-116	6405	Old Westheimer	WD111024	36	0	7/1/2002	11:00:00 AM	7/1/2002	14:13:00	Open Unpaved Area	Public System	Residence	52	0.69
10495-116	6405	Old Westheimer	WD111024	36	0	7/1/2002	11:00:00 AM	7/1/2002	14:13:00	Open Unpaved Area	Public System	Residence	52	0.69
10495-037	5854	Beechnut	SW033018	33	0	7/7/2002	11:25:00 AM	7/7/2002	12:40:00	Street	Public System	Residence	52	0.00
10495-037	5854	Beechnut	SW033018	33	0	7/7/2002	11:25:00 AM	7/7/2002	12:40:00	Street	Public System	Residence	52	0.00
10495-037	5854	Beechnut	SW033018	33	0	7/7/2002	11:25:00 AM	7/7/2002	12:40:00	Street	Public System	Residence	52	0.00
10495-116	3315	Old Westheimer	WD108012	36	0	3/18/2001	8:56:00 PM	3/19/2001	14:47:00	Backlot Easement	Public System	Residence	53	0.00
10495-116	3315	Old Westheimer	WD108012	36	0	3/18/2001	8:56:00 PM	3/19/2001	14:47:00	Backlot Easement	Public System	Residence	53	0.00
10495-116	7930	Old Westheimer	WD105006	36	0	3/26/2001	9:53:00 AM	3/26/2001	12:31:00	Backlot Easement	Public System	Residence	53	0.00
10495-116	7930	Old Westheimer	WD105006	36	0	3/26/2001	9:53:00 AM	3/26/2001	12:31:00	Backlot Easement	Public System	Residence	53	0.00

TNRCC Permit	Excursion Address	Street	Manhole	WWTP	Not Observed	Excursion Start Date	Excursion Start Time	Excursion End Date	Excursion End Time	Location	System	Area	Subbasin	3 day Rainfall'
10495-119	9318	White Chapel Lane	KB321030	16	0	4/27/2001	8:02:00 AM	4/27/2001	9:35:00	Backlot Easement	Public System	Residence	53	0.00
10495-119	9318	White Chapel Lane	KB321030	16	0	4/27/2001	8:02:00 AM	4/27/2001	9:35:00	Backlot Easement	Public System	Residence	53	0.00
10495-119	9009	White Chapel Lane	KB322075	16	0	6/23/2001	2:20:00 PM	6/23/2001	18:31:00	Backlot Easement	Public System	Residence	53	0.34
10495-119	9009	White Chapel Lane	KB322075	16	0	6/23/2001	2:20:00 PM	6/23/2001	18:31:00	Backlot Easement	Public System	Residence	53	0.34
10495-116	7500	Old Westheimer	WD109026	36	0	10/15/2001	8:11:00 AM	10/15/2001	13:55:00	Open Paved Area		Commercial Business	53	2.60
10495-116	7500	Old Westheimer	WD109026	36	0	10/15/2001	8:11:00 AM	10/15/2001	13:55:00	Open Paved Area		Commercial Business	53	2.60
10495-116	7500	Old Westheimer	WD109026	36	0	10/15/2001	8:11:00 AM	10/15/2001	13:55:00	Open Paved Area		Commercial Business	53	2.60
10495-116	3400	Old Westheimer	WD108002	36	0	11/14/2001	10:59:00 AM	11/15/2001	7:30:00		Public System	Residence	53	0.00
10495-116	3400	Old Westheimer	WD108002	36	0	11/14/2001	10:59:00 AM	11/15/2001	7:30:00		Public System	Residence	53	0.00
10495-116	3400	Old Westheimer	WD108002	36	0	11/14/2001	10:59:00 AM	11/15/2001	7:30:00		Public System	Residence	53	0.00
10495-119	9009	White Chapel Lane	KB322075	16	0	3/13/2002	2:20:00 PM	3/13/2002	14:43:00	Street	Public System	Residence	53	0.05
10495-119	9009	White Chapel Lane	KB322075	16	0	3/13/2002	2:20:00 PM	3/13/2002	14:43:00	Street	Public System	Residence	53	0.05
10495-119	9009	White Chapel Lane	KB322075	16	0	3/13/2002	2:20:00 PM	3/13/2002	14:43:00	Street	Public System	Residence	53	0.05
10495-116	10560	Old Westheimer	WD032070	36	0	4/6/2001	9:47:00 AM	4/7/2001	15:00:00	Backlot Easement	Private System	Residence	54	0.00
10495-116	2600	Old Westheimer	WD091069	36	0	5/18/2001	8:56:00 AM	5/18/2001	14:18:00	Backlot Easement	Public System	Residence	54	0.00
10495-116	2600	Old Westheimer	WD091069	36	0	5/18/2001	8:56:00 AM	5/18/2001	14:18:00	Backlot Easement	Public System	Residence	54	0.00
10495-116	2600	Old Westheimer	WD091069	36	0	5/18/2001	8:56:00 AM	5/18/2001	14:18:00	Backlot Easement	Public System	Residence	54	0.00
10495-030	11900	Hermitage Lane	WD042036	40	0	5/29/2001	11:36:00 AM	5/30/2001	15:00:00	Street	Public System	Residence	54	0.75
10495-030	11900	Hermitage Lane	WD042036	40	0	5/29/2001	11:36:00 AM	5/30/2001	15:00:00	Street	Public System	Residence	54	0.75
10495-030	11900	Hermitage Lane	WD042036	40	0	5/29/2001	11:36:00 AM	5/30/2001	15:00:00	Street	Public System	Residence	54	0.75
10495-116	6689	Old Westheimer	WD091056	36	0	10/15/2001	11:42:00 AM	10/15/2001	17:12:00	Open Paved Area	Public System	Commercial Business	54	2.60
10495-116	6689	Old Westheimer	WD091056	36	0	10/15/2001	11:42:00 AM	10/15/2001	17:12:00	Open Paved Area	Public System	Commercial Business	54	2.60
10495-116	6689	Old Westheimer	WD091056	36	0	10/15/2001	11:42:00 AM	10/15/2001	17:12:00	Open Paved Area	Public System	Commercial Business	54	2.60
10495-116	10703	Old Westheimer	UBU01012	36	0	12/30/2001	8:14:00 PM	12/30/2001	20:25:00	Street	Public System	Residence	54	0.00
10495-030	12210	Hermitage Lane	WD037014	40	0	1/14/2002	4:54:00 PM	1/15/2002	19:09:00	Street	Public System	Residence	54	0.00
10495-030	12210	Hermitage Lane	WD037014	40	0	1/14/2002	4:54:00 PM	1/15/2002	19:09:00	Street	Public System	Residence	54	0.00
10495-030	12210	Hermitage Lane	WD037014	40	0	1/14/2002	4:54:00 PM	1/15/2002	19:09:00	Street	Public System	Residence	54	0.00
10495-116	10034	Old Westheimer	WD096014	36	0	5/18/2002	12:50:00 PM	5/19/2002	14:50:00		Public System	Residence	54	0.00
10495-116	10034	Old Westheimer	WD096014	36	0	5/18/2002	12:50:00 PM	5/19/2002	14:50:00		Public System	Residence	54	0.00
10495-116	10034	Old Westheimer	WD096014	36	0	5/18/2002	12:50:00 PM	5/19/2002	14:50:00		Public System	Residence	54	0.00
10495-109	10950	Enclave Parkway	TK213061	35	0	3/24/2001	8:49:00 AM	3/24/2001	14:40:00	Backlot Easement	Public System	Residence	55	0.00
10495-109	10950	Enclave Parkway	TK213061	35	0	3/24/2001	8:49:00 AM	3/24/2001	14:40:00	Backlot Easement	Public System	Residence	55	0.00
10495-109	10950	Enclave Parkway	TK213061	35	0	3/24/2001	8:49:00 AM	3/24/2001	14:40:00	Backlot Easement	Public System	Residence	55	0.00
10495-030	14604	Hermitage Lane	WD021009	40	0	10/17/2001	10:50:00 AM	10/17/2001	12:30:00	Open Paved Area	Public System	Residence	55	0.00
10495-030	14604	Hermitage Lane	WD021009	40	0	10/17/2001	10:50:00 AM	10/17/2001	12:30:00	Open Paved Area	Public System	Residence	55	0.00
10495-030	11534	Hermitage Lane	WD020040	40	0	5/10/2001	9:34:00 PM	5/11/2001	10:06:00	Street	Public System	Residence	56	0.20
10495-030	10970	Hermitage Lane	SO201021A	40	0	2/2/2002	11:45:00 AM	2/2/2002	19:10:00	Street	Public System	Residence	56	0.00
10495-030	10970	Hermitage Lane	SO201021A	40	0	2/2/2002	11:45:00 AM	2/2/2002	19:10:00	Street	Public System	Residence	56	0.00

Appendix C.1

Dry Weather Storm Sewer Data

Table C.1-1 Results from Field Measurements for Dry-weather Discharges Monitoring

Sample ID	Location		Date	Pipe Size	DO (mg/L)	pH	Temp (°C)	Flow (MGD)	Conductivity (µS)	Turbidity (NTU)	Residual Chlorine (mg/L)	Total Chlorine (mg/L)	Ammonia (mg/L)	Ortho-phosphorous (mg/L)	Type of Pipe
	Latitude	Longitude													
I-1	29 55 037	95 34 934	11/20/2001	1 m				0.0001522			0.04	0.04	0.06	7.6	*
I-2	29 54 826	95 34 761	11/20/2001	3/4 m	6.38	7.8	17.89	0.0008780	1244	9.7	0.26	0.24	1.36	2.49	*
I-3	29 54 804	95 34	11/20/2001	4 ft	7.2	8.44	12.87	0.0006468	1000	2.2	0	0	0	1.69	*
I-4	29 54 698	95 34 417	11/20/2001	3.5 ft	7.4	8.5	20.16	0.0114135	1209	7.7	0.55	0.55	0.02	0	*
I-5	29 54 687	95 34 413	11/20/2001	3.5 ft	6.24	8.4	13.86	0.0008152	1036	5.1	0.12	0	0	0.74	*
I-7	29 54 556	95 34 243	11/20/2001	4.5 ft	10.38	7.97	18.61	0.0045654	1389	7	0.02	0.04	0.03	0.71	*
I-8	29 54 556	95 34 243	11/20/2001	3 ft	12.65	8.28	17.11	0.0011160	2607	5.9	0	0	0.03	1.03	*
I-9	29 55 054	95 35 161	1/17/2002	2 ft	9.22	7.49	22.11	0.0101453	957	1	0.04	na			WW
I-10	29 55 765	95 37 439	1/17/2002	3 ft	11.09	8.47	18.1	0.0018857	693	2.6	0.05	na			*
I-11	29 55 772	95 97 274	1/17/2002	3.5 ft	11.4	8.58	18.51	0.0047556	687	6.3	0.044	na			*
I-12	29 55 763	95 37 223	1/17/2002	2.5 ft	12.14	8.54	17.75	0.0018479	671	0.9	0	na			*
I-14	29 52 538	95 31 177	1/22/2002	3.5 ft	8.16	7.81	15.86	0.0009912	360	27.5	0	0.01	0.01	0.29	*
I-15	29 52 574	95 29 460	1/22/2002	na	7.47	7.62	18.74		227	3.2	0	0.08	0.04	0.35	SW
I-16	29 52 596	95 29 854	1/22/2002	4 ft	9.5	7.83	17.12	0.0019657	1019	2.3	0	0.7			WW
I-17	29 48 233	95 25 951	2/12/2002	box culvert	9.87	7.93	11.93	0.2130515	996	4.9	0.11	0	0	0.62	SW
I-18	29 48 187	95 25 775	2/12/2002	box culvert	10.1	8.21	14.84	0.05935007	318	3.6	1.55	2.3	0.3	0.27	SW
I-19	29 48 166	95 25 616	2/12/2002	4 ft	5.6	7.43	16.39	0.0456539	685	68.9	0.11	0	1.2	1.22	SW
I-20	29 47 963	95 25 488	2/12/2002	3.5 ft.	9.37	8.15	18.96	0.0319577	551	5.3	0.11	0.39	0.2	10.95	SW
I-21	29 47 884	95 25 483	2/12/2002	6 ft.	10.82	8.54	14.55	0.00228269	441	5.4	1.29	1.6	0.79	0.39	SW
I-22	29 47 088	95 24 876	2/12/2002	1 m.	10.1	7.94	15.15	0.0114135	na	29.7	0.02	0.02	0.56	0.46	WW
I-23	29 47 116	95 24 917	2/12/2002	3 ft.	9.92	7.9	16.29	0.0067635	421	47.1	0	0	0	0	WW
I-24	29 46 779	95 24 570	2/12/2002	3 ft.	10.1	8.03	15.65	0.0001171	na	26.8	0.13	0	0.69	3.37	WW
I-25	29 46 946	95 24 709	2/12/2002	1 m	9.15	7.85	13.17	0.0001505	1135	15.6	0.05	0	0.17	0.99	SW
I-26	29 46 794	29 46 794	2/12/2002	1m	8.37	6.9	15.93	0.0015218	837	268.6	0.05	>2.2			SW
I-27	29 46 787	95 24 482	2/12/2002	3.5 m	7.11	8.55	17.43	0.0001141	1467	7.5	0	0	2.82	4.22	SW
I-28	29 46 841	95 24 425	2/12/2002	2 ft.	7.28	7.1	19.24	0.0006617	1286	5	0	0	0.33	1.39	SW
I-29	29 46 845	95 24 333	2/12/2002	2 ft.	8.84	7.77	16.97	0.0045654	1840	14.1	0.05	0	0	2.28	WW
I-30	29 46 752	95 24 262	2/12/2002	4 ft.	11.07	8.47	18.16	0.0202906	542	1.1	0.03	0	0	0.18	WW
I-31	29 46 787	95 24 301	2/12/2002	4 ft.	11.23	8.2	17.61	0.0001556	1534	11.2	0.07	0.05		1.11	SW
I-32	29 46.519	95 23.048	2/25/2002	2 ft	N/A	8.37	19.27	0.0004891	441	28	0.05	0	0	0.06	SW
I-33	29 46.523	95 23.905	2/25/2002	3.5 ft	N/A	8.42	18.08	0.0013044	415	1.4	0.04	0.01	0	0.09	SW
I-34	29 46.472	95 23.746	2/25/2002	no pipe	N/A	9.33	19.68	0.0003845	329	4.3	0.05	0	0	0.32	SW
I-35	29 46.468	95 23.739	2/25/2002	1.5m	N/A	8.05	20.34	0.0913078	438	2.7	0.09	0.35	0.25	0.22	SW
I-36	29 46.651	95 23.140	2/26/2002	2.5 ft	11.28	7.96	8.88	0.0006297	500	1.9	0.04	0	0	1.05	SW
I-37	29 46.649	95 23.127	2/26/2002		10.42	7.82	9.3	0.0004150	1393	1.3	0	0	0.01	0.34	SW
I-38	29 46.753	95 22.784	2/26/2002		10.46	8.39	6.84	0.0000692	2801	23	0.05	0.03	0.09	0.94	SW
I-39	29 46.866	95 22.618	2/28/2002	0.5 ft	7.57	7.33	17.09	0.01141347	771	5.7	1.4	1.92	0.47	7.38	SW
I-40	29 46.856	95 22.638	2/28/2002	1 m	8.08	8.18	15.47	0.0050727	2000	1.1	0.02	0	0	0.73	SW
I-41	29 46.873	95 22.568	2/28/2002	2 ft	7.63	7.72	10.71	0.0001863	1937	4.1	0.04	0.19	0.36	0.46	SW

Table C.1-1 Results from Field Measurements for Dry-weather Discharges Monitoring

Sample ID	Location		Date	Pipe Size	DO (mg/L)	pH	Temp (^{o}C)	Flow (MGD)	Conductivity (µS)	Turbidity (NTU)	Residual Chlorine (mg/L)	Total Chlorine (mg/L)	Ammonia (mg/L)	Ortho-phosphorous (mg/L)	Type of Pipe
	Latitude	Longitude													
I-42	29 46.810	95 22.438	2/28/2002	2 ft	5.8	7.6	10.39	0.0027718	808	4.5	0.07	0.04	0.25	1.32	SW
I-43	29 51.875	95 28.376	3/12/2002	3.5ft	8.84	7.53	19.91	0.0106526	496	2.4	0	0.12	1.28	0	WW
I-44	29 46.512	95 21.982	3/12/2002	1.5 m	6.68	7.87	20.61	0.0136962	779	67.3	0.12	0	4.3	na	SW
I-44A	29 46.748	95 33.473	4/24/2002	1.5 m	8.63	7.17	25.8	0.0821770	1169	N/A	0	N/A	0.52	0.06	SW
I-45	29 45.539	95 32.872	4/24/2002	2.5 ft	9.23	7.24	25.9	0.0009131	433	N/A	0.04	0	0.29	0.07	SW
I-46	29 45.464	95 32.917	4/24/2002	2.5 ft	6.97	7.11	24.4	0.0015979	818	N/A	0.03	0	1.46	0.33	SW
I-47	29 45.955	95 32.767	4/24/2002	2.5 ft	7.07	7.04	26.4	0.0000543	647	N/A	0	0	0.43	0	SW
I-48	29 45.339	95 32.735	4/24/2002		8.08	7.24	23.7	0.0042393	435	N/A	0	0	0	0.09	WW
I-49	29 44.762	95 31.679	4/24/2002		10.2	7.04	24.4	0.0045654	200	N/A	0	0	0.91	0	SW
I-50	29 44.876	95 31.868	4/25/2002		6.09	7.19	23.4	0.0031607	430	N/A	0.01	0	0.47	0.4	SW
I-51	29 44.745	95 31.220	4/25/2002		9.02	7.09	25	0.0011045	600	N/A	0	0	0.38	0.34	SW
I-52	29 44.727	95 31.225	4/25/2002		8.61	7.21	22.6	0.0015522	689	N/A	0	0	0.33	0	SW
I-53	29 44.727	95 31.226	4/25/2002		6.1	6.77	26.9	0.0035118	436	N/A	0.01	0	1.17	0.38	SW
I-54	29 44.701	95 30.865	4/25/2002		8.57	6.71	25.3		640	N/A	0.03	0	1.15	0	SW
I-56	29 45.896	95 29.686	5/2/2002		7.52	7.52	28.5	0.0004429	549	N/A	0.06	0.05	0.64	0.41	SW
I-57	29 45.602	95 29.982	5/2/2002	3 ft	9.01	6.87	28.1	0.0167398	445	N/A	0.01	0.02	0.77	0.43	SW
I-58	29 45.616	95 29.987	5/2/2002	0.5 ft	8.51	7.68	29.8	0.0219139	559	N/A	0.08	0	0.22	0.01	SW
I-59	29 45.794	95 29.534	5/2/2002	3 ft	4.28	7.4	26.5	0.0002663	1315	N/A	0.01	0.01	2.13	1	SW
I-60	29 45.811	95 29.473	5/2/2002	4.5 ft	5.75	7.67	29.8	0.0060872	437	N/A	0.01	0.02	1.63	1.48	SW
I-61	29 46.006	95 29.319	5/2/2002	0.5 ft	8.93	8.93	28.5	0.0009925	695	N/A	0.05	0.08	2.72	0.01	SW
I-62	29 45.438	95 27.181	5/4/2002	2.5 ft	1.005	5.17	25.7	0.0179657	N/A	N/A	0	0.04	0.26	0.12	SW
I-63	29 45.430	95 27.132	5/4/2002		0.901	5.09	25.6	0.0002410	N/A	N/A	0.1	0.16	1.26	0.43	SW
I-64	29 45.405	95 25.484	5/4/2002	trib	0.741	5.16	27	0.0055799	N/A	N/A	0.02	0.04	6.22	0.8	SW
I-65	29 45.431	95 25.355	5/4/2002	1.8 m	0.98	5.15	24.6	0.0228269	N/A	N/A	0.03	0	2.14	0.64	WW
I-66	29 45.620	95 24.971	5/4/2002	1.5 m	0.982	5.26	26.7	0.0041089	N/A	N/A	0.04	0.07	0.88	0.26	WW
I-67	29 45.849	95 21.926	5/8/2002	1 foot	0.967	4.56	26.4	0.0004264	464	N/A	0	0.05	5.48	0.13	SW
I-68	29 46.118	95 27.967	5/8/2002	18 inch	0.952	7.11	25.6	0.0004723	N/A	N/A	0.03	0	0.28	0	SW
I-69	29 46.128	95 27.926	5/8/2002	trib	0.959	8.08	24.5	0.0033083	N/A	N/A	0.04	0.04	0.46	0.04	SW
I-72	29 46.187	95 38.622	5/9/2002	2.5 ft	1.012	7.64	29.4	0.0296750	820	N/A	0.04	0.03	0.32	0	WW
I-73	29 46.158	95 38.583	5/9/2002		1.03	8.19	28	0.0004565	447	N/A	0	0.01	0.85	0.1	WW
I-74	29 46.187	95 38.230	5/9/2002		10.23	8.98	24.7	0.0049166	878	N/A	0.01	0	0.77	0.05	WW
I-75	29 46.202	95 38.205	5/9/2002		9.6	7.88	25.8	0.0062255	440	N/A	0.1	0.08	0	0.07	SW
I-76	29 48.201	95 38.204	5/9/2002		13.51	4.37	24.3	0.0001902	3	N/A	0.01	0.02	1.76	0.01	SW
I-77	29 46.400	95 37.928	5/9/2002	4.5 ft	16.4	6.48	25.4	0.0209247	1052	N/A	0.1	0.1	0.13	0.04	SW
I-78	29 45.630	95 36.846	5/9/2002			9.2			472	N/A	0.37	0.49	1	0	WW
I-79	29 45.628	95 36.697	5/10/2002	8 ft		5.44	24.4	0.0410885	687	N/A	0.05		1	0.06	SW
I-79dup			5/10/2002							N/A			1.02	0.05	SW
I-80	29 45.708	95 36.209	5/10/2002		12.28	6.74	24.4	0.0004923	1251	N/A	0.03	0	0.58	0	SW
I-81	29 45.607	95 35.832	5/10/2002	8 ft	7.83	5.2		0.0010145	831	N/A	0.03	0.04	0.16	0	SW
I-82	29 45.569	95 35.564	5/10/2002	8 ft	7.16	3.36	26.3	0.0002156	381	N/A	0.13	0.09	0.7	1.44	SW

Table C.1-1 Results from Field Measurements for Dry-weather Discharges Monitoring

Sample ID	Location		Date	Pipe Size	DO (mg/L)	pH	Temp (^{o}C)	Flow (MGD)	Conductivity (µS)	Turbidity (NTU)	Residual Chlorine (mg/L)	Total Chlorine (mg/L)	Ammonia (mg/L)	Ortho-phosphorous (mg/L)	Type of Pipe
	Latitude	Longitude													
I-83	29 45.592	95 35.356	5/10/2002	8 ft	7.6	4.82	26.9	0.1677781	483	N/A	0.19	0.26	0.29	0	WW
I-83A			5/16/2002	3 ft	2.03	7.77	28.91	0.0000342	1751	74	0.18	0.07	0.3	0.2	WW
I-84			5/16/2002	3 ft	6.00	7.77	27.17	0.0188307	829	36.5	0.06	0	5.5	>13.75	WW
I-85			5/16/2002	3 ft	10.42	8.58	27.73	0.0002417	3090	1.7	0.11	0.01	0	0	SW
I-86			5/16/2002	6 ft.	12.57	8.6	24.38	0.0185963	804	0	0.06	0.25	0.87	0.06	SW
I-87			5/16/2002	box culvert	13.53	9.75	31.47	0.0011105	299	0.4	0.05	0	0.24	0.01	
I-88			5/16/2002	3 ft	12.07	8.2	27.42	0.0001756	1274	0	0.12	0	0.5	0.1	SW

Notes/Abbreviations:

MGD - million gallons per day

N/A - parameter not available

Samples highlighted in blue are likely drinking water leaks (high residual chlorine values)

Occassionally, sample IDs were duplicated. To distinguish between samples with same ID, the second sample was assigned an "A" at the end of its ID

MGD = million gallons per day

NTU = Nephelometric turbidity units

L = liter

WW - wastewater line

SW - stormwater line

* - no data to determine type of pipe available

The suffix "dup" stands for field duplicate

µS = micro-Siemens

mg = milligram

ft = foot

Table C.1-2 Results from Lab Analyses for Dry-weather Discharges Monitoring

Sample ID	Date	Flow (MGD)	Total Coliforms (MPN/100 mL)[a]	*E coli* (MPN/100 mL)[b]	Fecal Coliforms (cfu/100 mL)[c]	TSS (mg/L)[c]
I-1	11/20/2001	0.0002	> 241,920	6,389	4,300	8
I-2	11/20/2001	0.0009	141,360	9,087	5,000	10
I-3	11/20/2001	0.0006	15,531	274	40	2
I-4	11/20/2001	0.0114	<1	19	0	3
I-5	11/20/2001	0.0008	17,329	143	470	2
I-6	11/20/2001		98,040	416		
I-7	11/20/2001	0.0046	> 241,920	1,212	1,400	<1.0
I-8	11/20/2001	0.0011	105,013	10,608	5,600	3
I-9	1/17/2002	0.0101	10,462	37	1	5
I-10	1/17/2002	0.0019	2,419	28	0	1
I-11	1/17/2002	0.0048	236	19	2	5
I-12	1/17/2002	0.0018	3,871	22	0	1
I-14	1/22/2002	0.0010	28,345	27	25	16
I-14dup	1/22/2002		19,863	23	20	16
I-15	1/22/2002		24,192	20	200	7
I-16	1/22/2002	0.0020	173,287	106	140	7
I-17	2/12/2002	0.2131	4,525	108	52	4
I-18	2/12/2002	0.0594	30	19	0	2
I-19	2/12/2002	0.0457	> 241,920	10,295	3,800	48
I-20	2/12/2002	0.0320	156	20	0	9
I-21	2/12/2002	0.0023	368	19		
I-22	2/13/2002	0.0114	241,917	3,429	2,400	21
I-23	2/13/2002	0.0068	19,164	19	10	31
I-24	2/13/2002	0.0001	> 241,920	477	350	21
I-25	2/14/2002	0.0002	135,663	19	25	20
I-26	2/14/2002	0.0015	> 241,920	17,384	1	125
I-26dup	2/14/2002		> 241,920	12,673	3	146
I-27	2/14/2002	0.0001	72,290	19	15	12
I-28	2/14/2002	0.0007	17,370	23	11	7
I-29	2/15/2002	0.0046	22,300	5,774	8	11
I-30	2/15/2002	0.0203	2,419	30	0	2
I-31	2/15/2002	0.0002	3,708	12	0	6
I-32	2/25/2002	0.0005	24,192	646	460	13
I-33	2/25/2002	0.0013	20,760	42	6	2
I-34	2/25/2002	0.0004	16,430	20	9	24
I-35	2/25/2002	0.0913	9,506	29	0	3
I-36	2/26/2002	0.0006	11,400	542	330	3
I-37	2/26/2002	0.0004	5,242	1,157	520	3
I-38	2/26/2002	0.0001	12,033	205	170	42
I-39	2/28/2002	0.0114	1,300	18	0	12

Table C.1-2 Results from Lab Analyses for Dry-weather Discharges Monitoring

Sample ID	Date	Flow (MGD)	Total Coliforms (MPN/100 mL)[a]	*E coli* (MPN/100 mL)[b]	Fecal Coliforms (cfu/100 mL)[c]	TSS (mg/L)[c]
I-39dup	2/28/2002		2,203	19	0	10
I-40	2/28/2002	0.0051	60,195	1,205	420	<1.0
I-41	2/28/2002	0.0002	42,290	54	32	23
I-42	2/28/2002	0.0028	1,553	24	25	4
I-43	3/12/2002	0.0107	>241920	75	32	4
I-44	3/12/2002	0.0137	>241920	>241920	6,200	58
I-44A	4/24/2002	0.0822	141,360	4,062	3,800	2
I-45	4/24/2002	0.0009	4,166	31	20	16
I-46	4/24/2002	0.0016	>241920	53,390	11,000	9
I-47	4/24/2002	0.0001	8,070	33	31	6
I-48	4/24/2002	0.0042	155,307	895	360	703
I-48dup	4/24/2002		148,334	1,073		
I-49	4/24/2002	0.0046	185,958	2,123	1,200	23
I-50	4/25/2002	0.0032	1,011	215	40	3
I-51	4/25/2002	0.0011	66,680	99	50	15
I-52	4/25/2002	0.0016	6,135	73	60	5
I-53	4/25/2002	0.0035	>241920	757	800	16
I-54	4/25/2002		15,732	678	130	22
I-56	5/2/2002	0.0004	17,697	125	38	3
I-57	5/2/2002	0.0167	>241920	3,674	2	7
I-58	5/2/2002	0.0219	337	79	3	3
I-59	5/2/2002	0.0003	122	18	1	23
I-60	5/2/2002	0.0061	>241920	173,287	26,000	8
I-61	5/2/2002	0.0010	2,419	30	9	5
I-62	5/4/2002	0.0180	73,440	1,765	4,000	<1.0
I-63	5/4/2002	0.0002	135,663	65	5,200	<1.0
I-64	5/4/2002	0.0056	74,805	904	2,600	22
I-65	5/4/2002	0.0228	133,646	12,392	880	3
I-66	5/4/2002	0.0041	241,917	8,931	20,000	8
I-67	5/8/2002	0.0004	>241920	724	3,200	14
I-68	5/8/2002	0.0005	1,327	26	22	2
I-69	5/8/2002	0.0033	92,340	940	17,500	13
I-72	5/9/2002	0.0297	15,163	22	7	<1.0
I-72dup	5/9/2002		17,151	22		
I-73	5/9/2002	0.0005	19,863	23	0	13
I-74	5/9/2002	0.0049	19,861	99	38	2
I-75	5/9/2002	0.0062	220,273	4,467	2,000	6
I-76	5/9/2002	0.0002	>241920	1,164	2,900	14
I-77	5/9/2002	0.0209	198,628	1,211	1,800	6

Table C.1-2 Results from Lab Analyses for Dry-weather Discharges Monitoring

Sample ID	Date	Flow (MGD)	Total Coliforms (MPN/100 mL)[a]	*E coli* (MPN/100 mL)[b]	Fecal Coliforms (cfu/100 mL)[c]	TSS (mg/L)[c]
I-78	5/9/2002		<1	19	0	1
I-79	5/10/2002	0.0411	49,135	11,023	1,500	14
I-79dup	5/10/2002		50,710	9,969		
I-80	5/10/2002	0.0005	24,192	4,372	2,300	5
I-81	5/10/2002	0.0010	19,863	53	47	9
I-82	5/10/2002	0.0002	20,760	63	31	8
I-83	5/10/2002	0.1678	28	18	1	2
I-83A	5/16/2002	0.0000		455	60	46
I-84	5/16/2002	0.0188		241,920	20,000	46
I-85	5/16/2002	0.0002		2,149	210	6
I-86	5/16/2002	0.0186		2,391	300	4
I-87	5/16/2002	0.0011		16,712	2,800	9
I-88	5/16/2002	0.0002		209	240	11

Notes/Abbreviations:

[a] Parameter analyzed at UH lab. The results are the average of duplicates for a given dilution. Three different dilutions were prepared for each sample (1:1, 1:10 and 1:100).

[b] Parameter analyzed at UH lab. The results are the average of duplicates of all the dilutions that could be read. Three different dilutions wer prepared for each sample (1:1, 1:10 and 1:100).

[c] Parameter analyzed at NWDLS lab.

E. coli = Escherichia coli

MPN = most probable number

cfu = colony forming units

TSS = total suspended solids

WW - wastewater line

SW - stormwater line

* - no data to determine type of pipe available

Samples exceeding the EC criterion of 126 MPN/100 mL are highlighted in green

Occassionally, sample IDs were duplicated. To distinguish between samples with same ID, the second sample was assigned an "A" at the en

The suffix "dup" stands for field duplicate

Appendix D.1
Results of Runoff

3.2 BACTERIA FROM RAINFALL RUNOFF EVENTS

As is well recognized, both bacteria and suspended particulate matter (TSS) concentrations in runoff samples tend to be very high. The reasons for these high concentrations are not fully understood, but the empirical evidence is clear. Understanding this process is important because runoff from moderate rain events is a common phenomenon in Houston and it is reasonable to expect that these events make a significant contribution to the long-term average EC levels seen in the bayous. Accordingly, two runoff events were monitored during the month of August. The results are presented below, grouped by location. First, the results for Buffalo Bayou, then Whiteoak Bayou and then a smaller tributary, Cole Creek are presented for each runoff event.

3.2.1 Buffalo Bayou Runoff Monitoring

About an inch of rain occurred in the upper watershed on the 6th of August, resulting in a fairly clean spike in the flow records in the gages along Buffalo Bayou about 8 pm on the 6th (Table 3.2). A smaller event (0.6 inch) occurred on the 7th mostly near the mid-stream (Beltway 8 to IH-610) area. The sampling crew mobilized on the 7th and was able to sample the rain event twice at four U.S. Geological Survey (USGS) gage locations on the 7th, 8th, and 9th, resulting in a reasonably complete characterization of bacteria levels associated with the runoff event as the flows steadily declined.

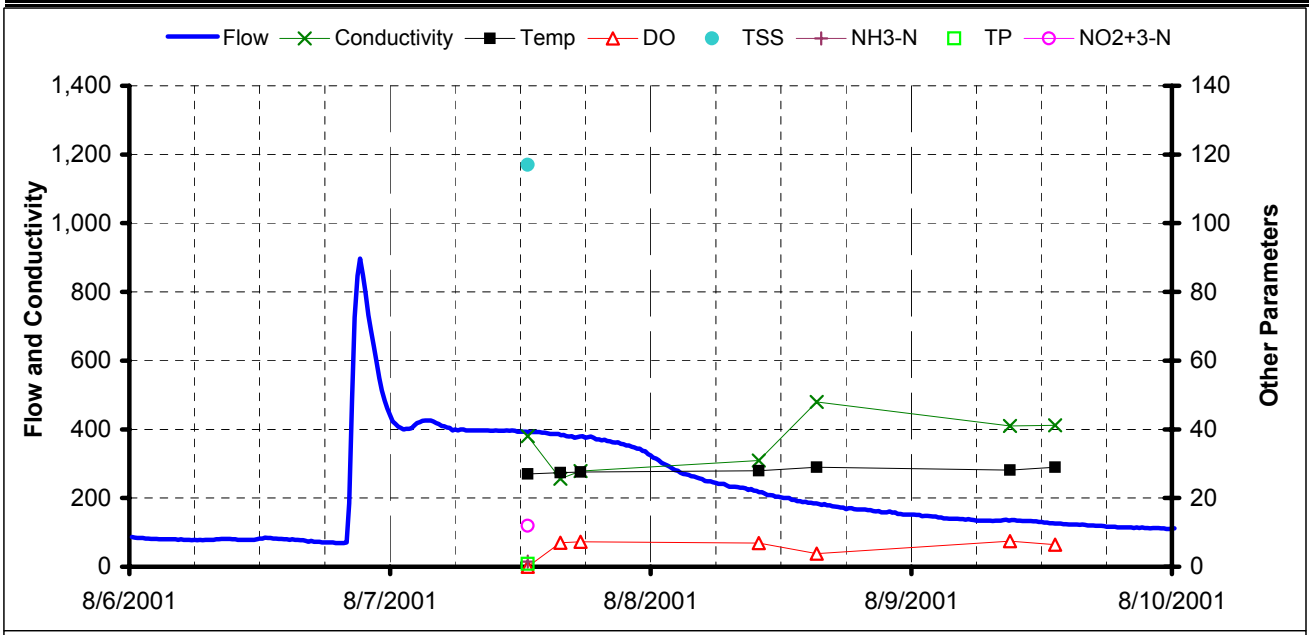
Tables 3.20a through 3.20d show the results from upstream to downstream at Dairy Ashford, Beltway 8, Piney Point, and Shepherd. With each location, the flow at the closest USGS gage is shown along with the other data collected.

Prior to the rain event, conditions in the bayou were low and stable, with little evidence of diurnal variations associated with wastewater discharges. The rain was intense enough to result in a very sharp increase in the flow rate. At the Dairy Ashford location, the flow increased from a base of about 75 cfs to the peak of about 900 cfs in a 2-hour period. The flow dropped to about 400 cfs in the next 6 hours, and then slowly declined until it was close to the original level on the third day after the rain.

Conventional parameters were sampled on the first day from upstream to downstream, following the flow. The results for TSS, TP, Nitrate-N and Ammonia-N are similar at each station. The crew could have been inadvertently tracking the same water at successive samplings.

TABLE 3.20a
RUNOFF STUDY - 7-9 August 2001 - Buffalo Bayou at Dairy Ashford

Time	Temp (°C)	DO (mg/L)	Cond (1/µΩ/cm)	TSS (mg/L)	TP (mg/L)	NH3-N (mg/L)	NO2+3-N (mg/L)	TC (MPN/dL)	EC (MPN/dL)
8/7/2001 12:41	27.0		380	117	0.812	1.45	11.9	> 24,192	> 24,192
8/7/2001 15:41	27.4	7.0	256					> 24,192	17,329
8/7/2001 17:32	27.6	7.3	279					> 24,192	17,329
8/8/2001 9:58	27.9	6.9	309					> 24,192	2,602
8/8/2001 15:17	29.0	3.8	480					> 24,192	3,255
8/9/2001 9:06	28.2	7.5	410					> 48,384	1,800
8/9/2001 13:15	29.0	6.4	412					> 48,384	1,724
Remarks	Flow data from **USGS** gage **08073500 - Buffalo Bayou near Addicks**								



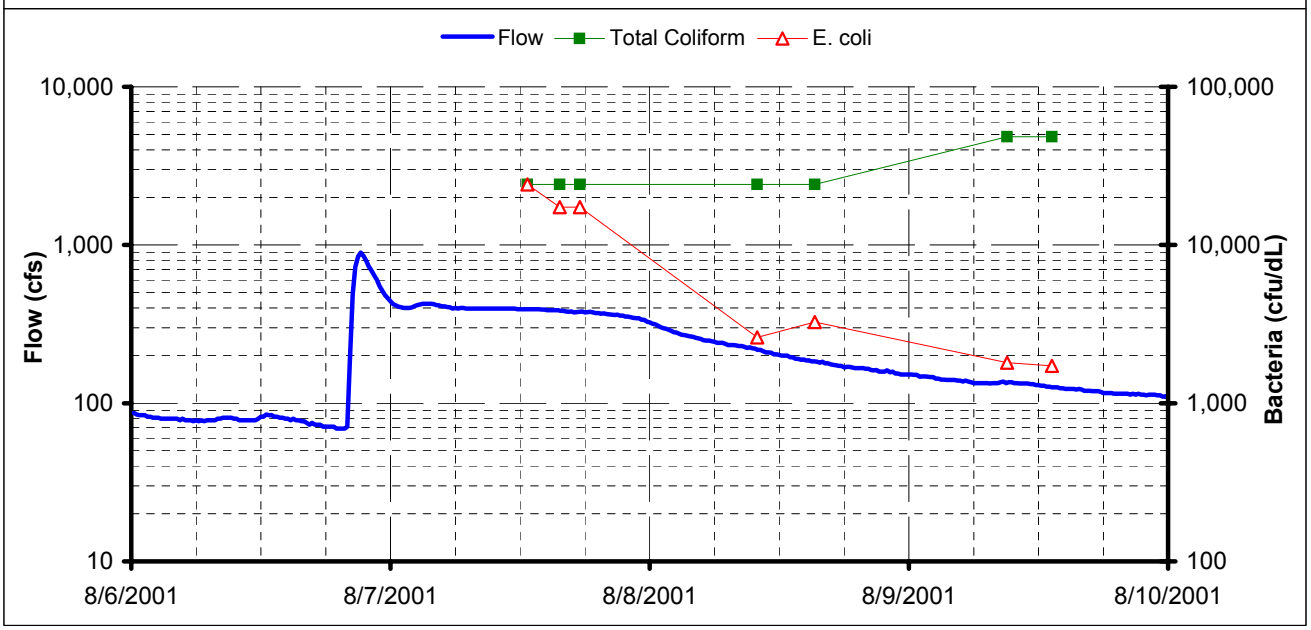
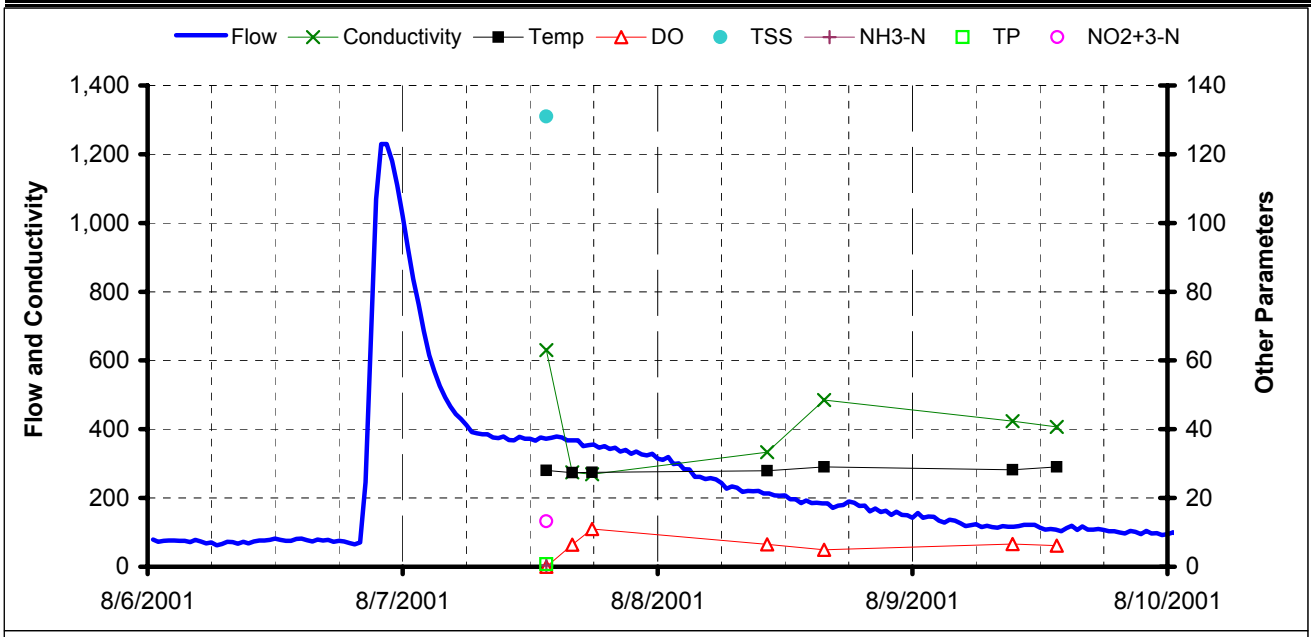


TABLE 3.20b
RUNOFF STUDY - 7-9 August 2001 - Buffalo Bayou at Beltway 8

Time	Temp (°C)	DO (mg/L)	Cond (1/µΩ/cm)	TSS (mg/L)	TP (mg/L)	NH3-N (mg/L)	NO2+3-N (mg/L)	TC (MPN/dL)	EC (MPN/dL)
8/7/2001 13:32	28.0		630	131	0.782	0.37	13.2	> 24,192	14,136
8/7/2001 15:59	27.3	6.5	275					> 24,192	14,136
8/7/2001 17:51	27.5	11.0	269					> 24,192	19,863
8/8/2001 10:19	28.0	6.5	333					> 24,192	1,850
8/8/2001 15:40	29.0	4.9	485					> 24,192	5,172
8/9/2001 9:26	28.2	6.6	424					> 48,384	3,232
8/9/2001 13:35	29.0	6.1	407					> 48,384	6,896
Remarks	Flow data from **USGS** gage **08073600 Buffalo Bayou at W Belt Dr at Houston, TX**								



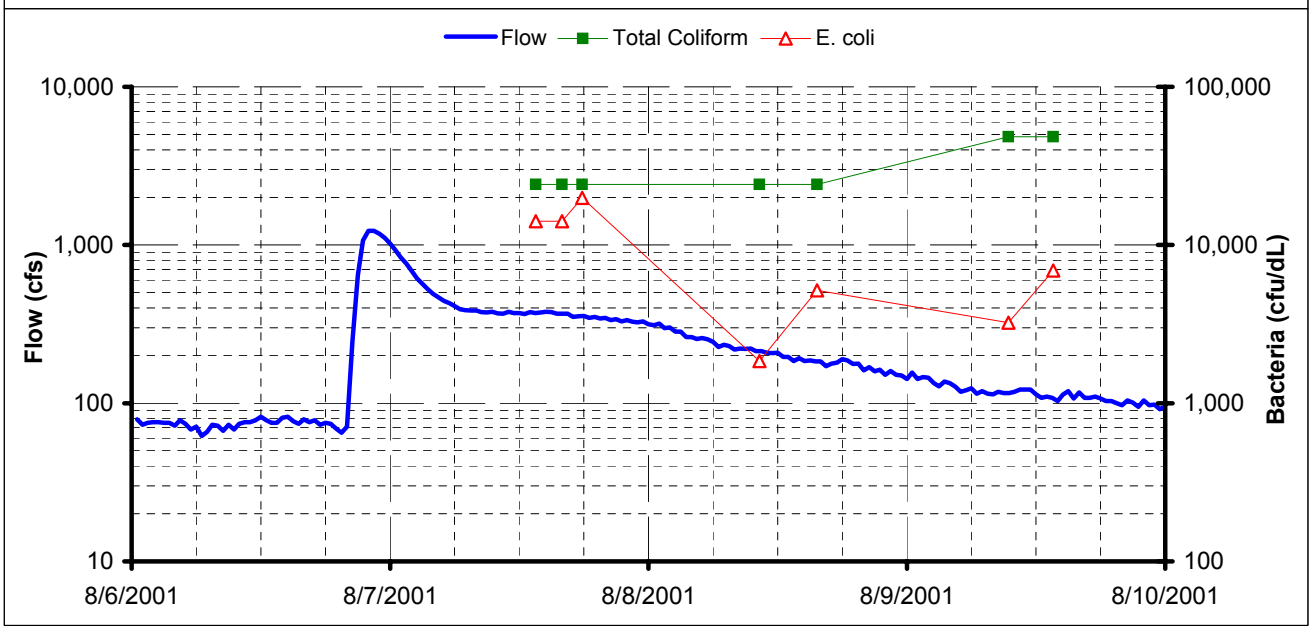
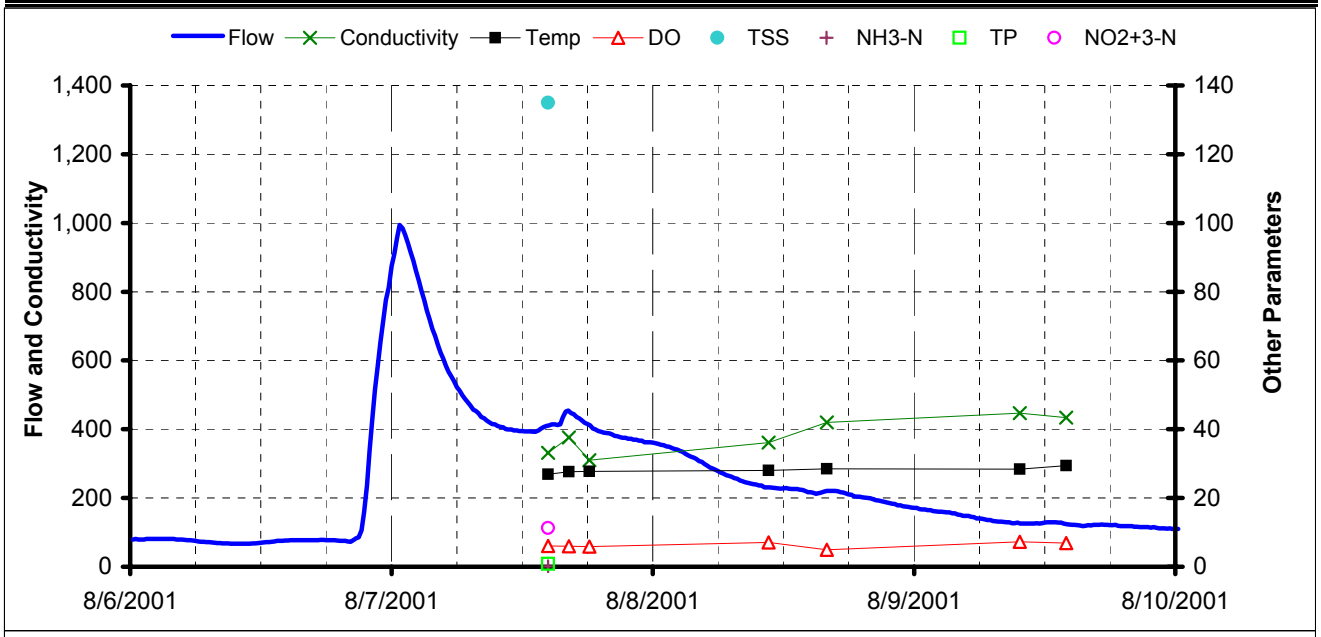


TABLE 3.20c
RUNOFF STUDY - 7-9 August 2001 - Buffalo Bayou at Piney Point

Time	Temp (°C)	DO (mg/L)	Cond (1/µΩ/cm)	TSS (mg/L)	TP (mg/L)	NH3-N (mg/L)	NO2+3-N (mg/L)	TC (MPN/dL)	EC (MPN/dL)
8/7/2001 14:24	26.9	6.0	332	135	0.803	< 0.1	11.3	> 24,192	> 24,192
8/7/2001 16:18	27.6	6.0	376					> 24,192	19,863
8/7/2001 18:10	27.7	5.9	310					> 24,192	15,531
8/8/2001 10:39	28.0	7.1	362					> 24,192	2,986
8/8/2001 16:00	28.5	4.9	420					> 24,192	4,611
8/9/2001 9:42	28.4	7.3	447					> 48,384	2,162
8/9/2001 13:58	29.4	6.9	434					> 48,384	2,626
Remarks	Flow data from **USGS** gage **08073700 Buffalo Bayou at Piney Point, TX**								



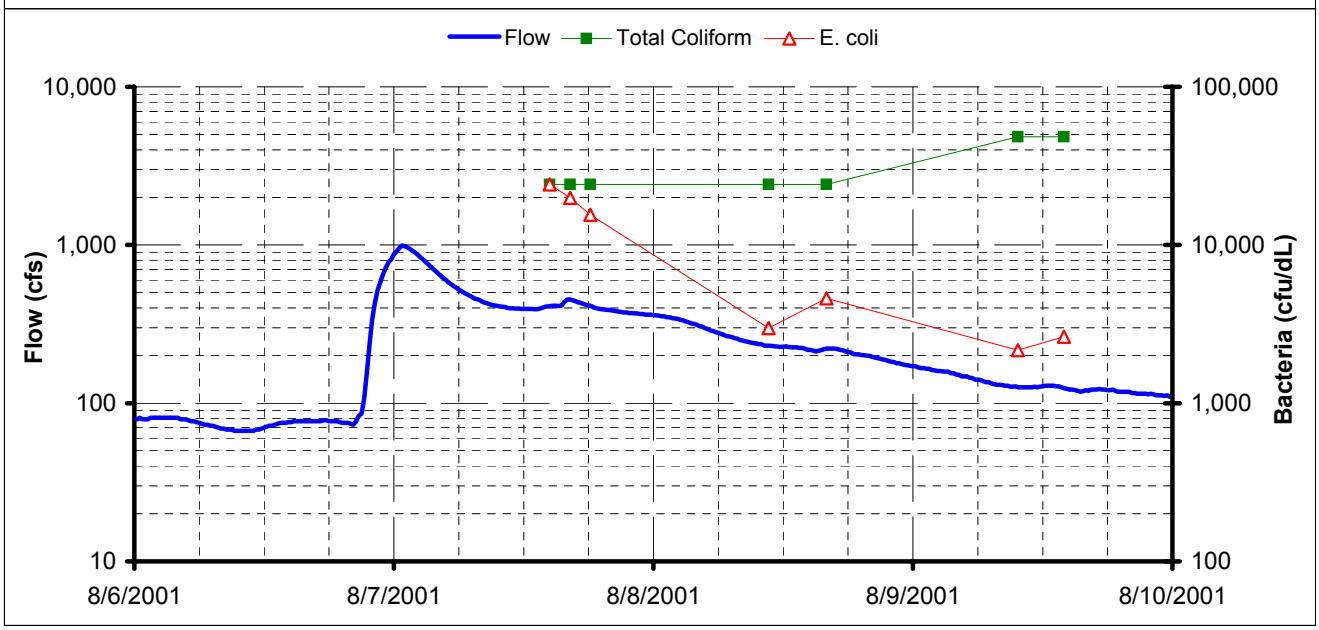
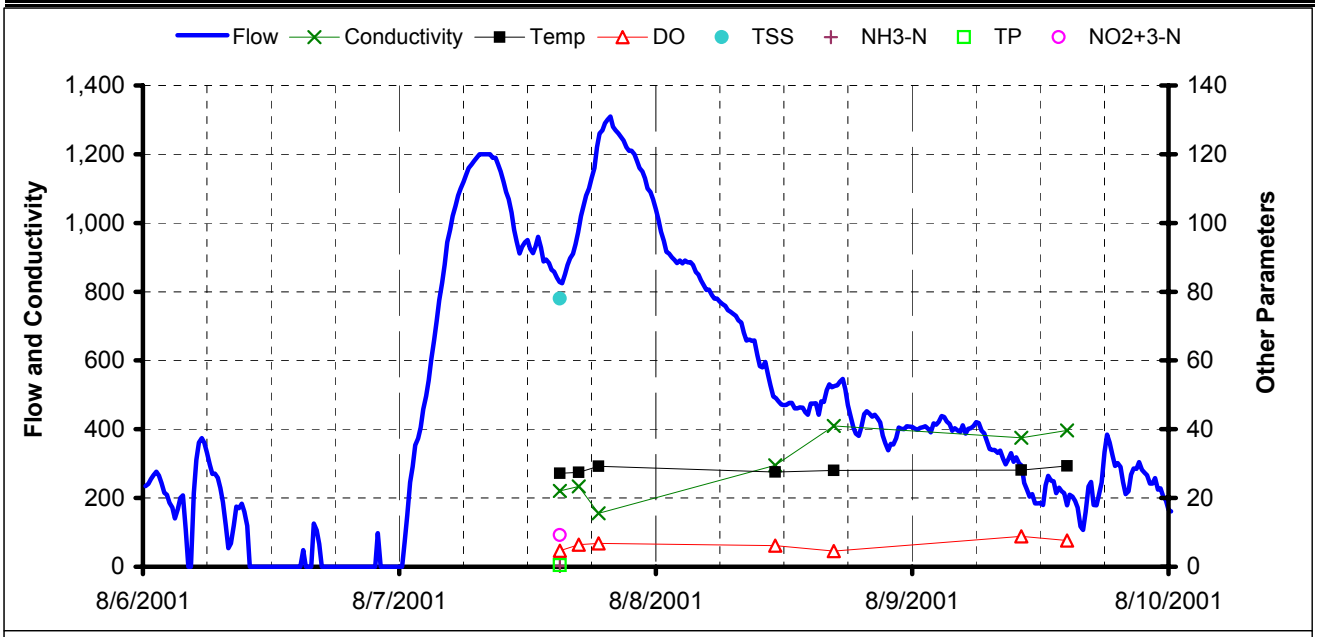
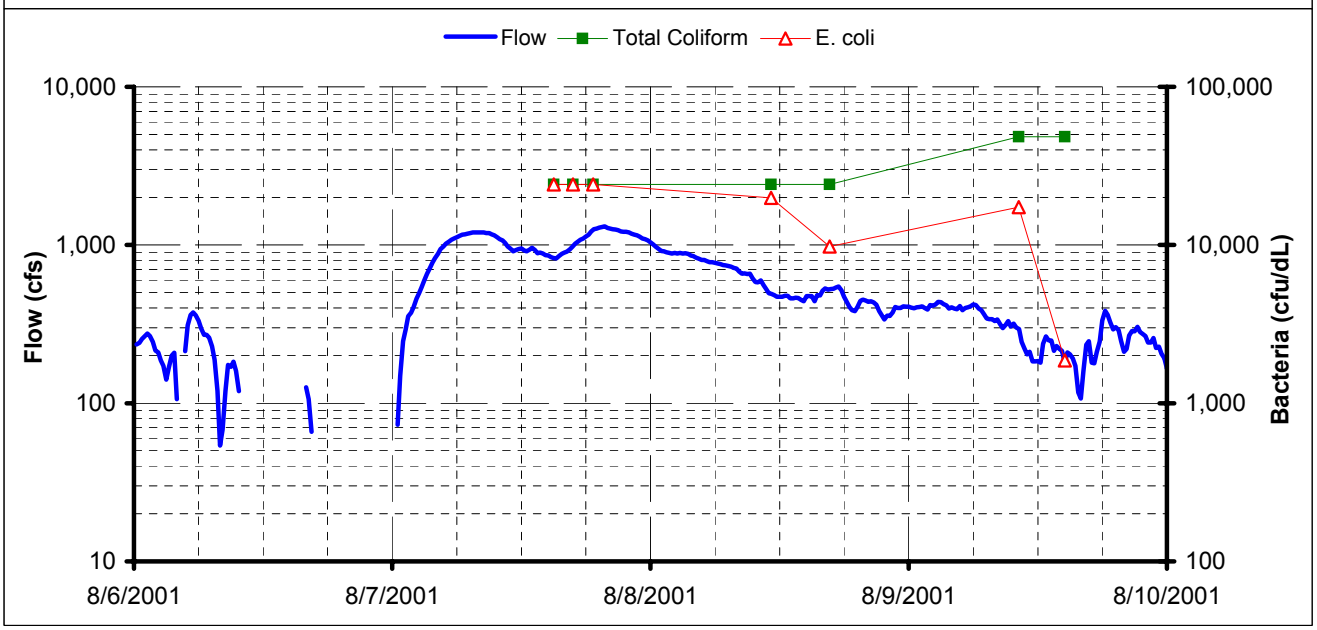


TABLE 3.20d
RUNOFF STUDY - 7-9 August 2001 - Buffalo Bayou at Shepherd

Time	Temp (°C)	DO (mg/L)	Cond (1/µΩ/cm)	TSS (mg/L)	TP (mg/L)	NH3-N (mg/L)	NO2+3-N (mg/L)	TC (MPN/dL)	EC (MPN/dL)
8/7/2001 15:01	27.1	4.7	220	78	0.492	0.22	9.2	> 24,192	> 24,192
8/7/2001 16:48	27.5	6.4	233					> 24,192	> 24,192
8/7/2001 18:40	29.2	6.8	156					> 24,192	> 24,192
8/8/2001 11:12	27.5	6.1	295					> 24,192	19,863
8/8/2001 16:40	28.0	4.6	410					> 24,192	9,804
8/9/2001 10:13	28.1	8.9	375					> 48,384	17,328
8/9/2001 14:31	29.4	7.6	397					> 48,384	1,866
Remarks	Flow data from **USGS** gage **08074000 Buffalo Bayou at Houston, TX (at Shepherd)**								





The conductivity showed a sharp decline between the first and second samplings. After that point, the conductivity data indicated a gradual rebound as the flows subsided.

The initial EC results tended to be above the quantification level. Over the monitoring period the EC results trended downwards in approximate coordination with the bayou flow. The TC results, in contrast, stayed above the quantification limit for the entire period.

A slight difference in the pattern can be seen in Table 3.20d, at Shepherd. The flow at this gage is influenced by tides during low flow periods. Being further downstream, the runoff spike did not arrive until early on the 7th. The flow exhibited a pronounced second spike late on the 7th triggered by more rainfall on the 7th and 8th occurring over the downstream area. This spike is not reflected in the other more-upstream gages.

The second monitored Buffalo Bayou event was between August 28 and August 30. Prior to this event there had been moderate rain events (about 0.6 inch on the 27th), and smaller rains continued during the monitoring period. At the start of the series the flow near Addicks Reservoir was about 250 cfs, much higher than the dry weather flows of about 50 cfs. On the late morning of the 28th the flow spiked to near 1,250 cfs, and then declined back to a lower level before 6 pm. At mid-day on the 29th the flow spiked again and then declined during the night of the 29th and morning of the 30th. Another spike in the flow occurred in the late morning of the 30th.

The field crew was able to sample during the leading edge of the first spike and then to continue monitoring during the entire event. As with the earlier event, monitoring runs were

made from upstream to downstream. Tables 3.21a through 3.21d show the monitoring results at Dairy Ashford, Beltway 8, Piney Point, and Shepherd, along with the flow measurements at the nearest USGS gage.

One observation is that with the higher flows during the initial sampling, the chemical concentrations were lower, with nitrate-N levels more typical of runoff water than wastewater. While the total coliform levels were above the quantification limits during the entire event, the EC levels were not and tended to follow the flow closely. Throughout most of the event the EC levels were often >10,000 MPN/dL.

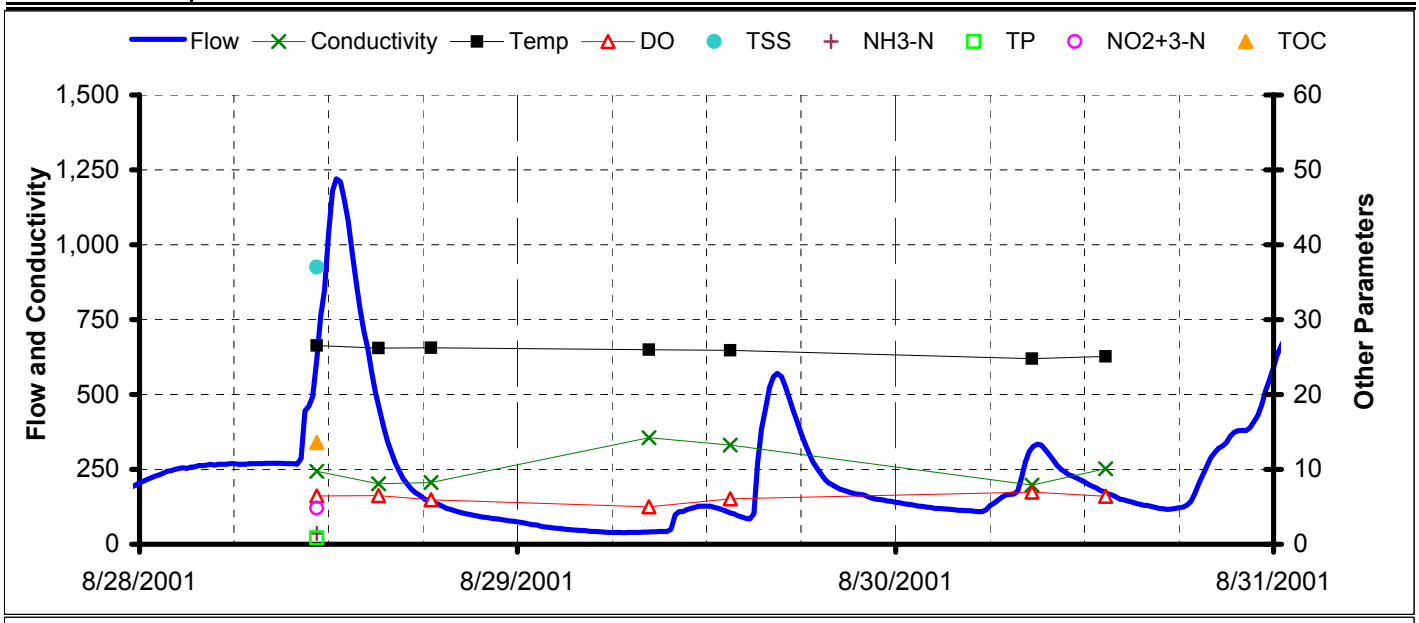
3.2.2 Whiteoak Bayou Runoff

Small (about 0.1 inch) rains occurred in upper Whiteoak bayou on the 7th and 8th, following a rain of more than 2 inches on the 6th. The sampling crew was able to sample the two USGS gages on Whiteoak bayou right before and during the middle of the runoff-related spike in the bayou flow. Tables 3.22a and 3.22b show the results at the two locations.

The flow at the Heights Street gage was about 100 cfs with and increased up to about 300 cfs after the rain. These values are higher than the base flow, but not by a significant amount. The conductivity declined by about a hundred units during the rain pulse and steadily rebounded to almost 600 micro ohms. The TC levels were almost always beyond the quantification limit, but the EC values were quantifiable. The first two EC samples at the Height Street gage were collected before the flow peak. The first was elevated and the second was not. The peak flow

TABLE 3.21a
RUNOFF STUDY - 28-30 August 2001 - Buffalo Bayou at Dairy Ashford

Time	Temp (°C)	DO (mg/L)	Cond (1/μΩ/cm)	TSS (mg/L)	TP (mg/L)	NH3-N (mg/L)	NO2+3-N (mg/L)	TOC (mg/L)	TC (MPN/dL)	EC (MPN/dL)
8/28/2001 11:15	26.5	6.5	244	37	0.85	1.47	4.84	13.6	> 48,384	20,925
8/28/2001 15:10	26.2	6.5	202						> 48,384	34,657
8/28/2001 18:30	26.2	5.9	206						> 48,384	34,657
8/29/2001 8:20	26.0	5.0	356						> 48,384	2,338
8/29/2001 13:30	25.9	6.1	332						> 48,384	9,222
8/30/2001 8:40	24.8	7.0	198						> 48,384	16,328
8/30/2001 13:20	25.1	6.4	253						> 48,384	3,978
Remarks	Flow data from **USGS** gage **08073500 - Buffalo Bayou near Addicks**									



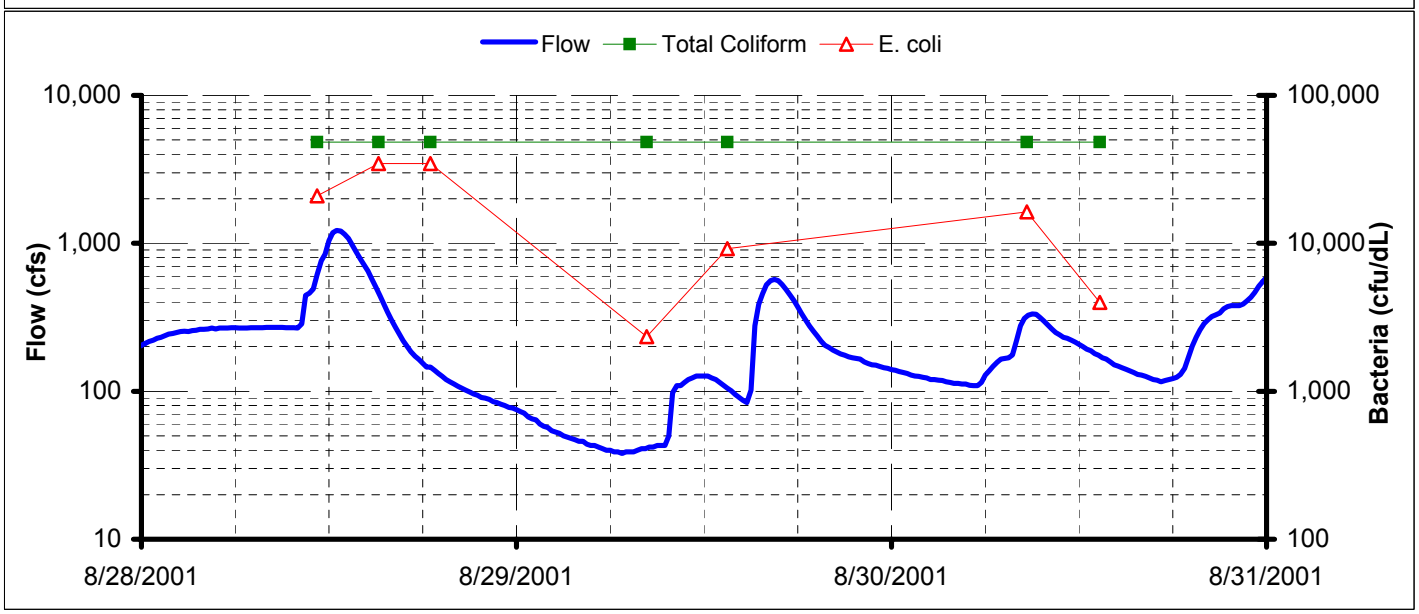
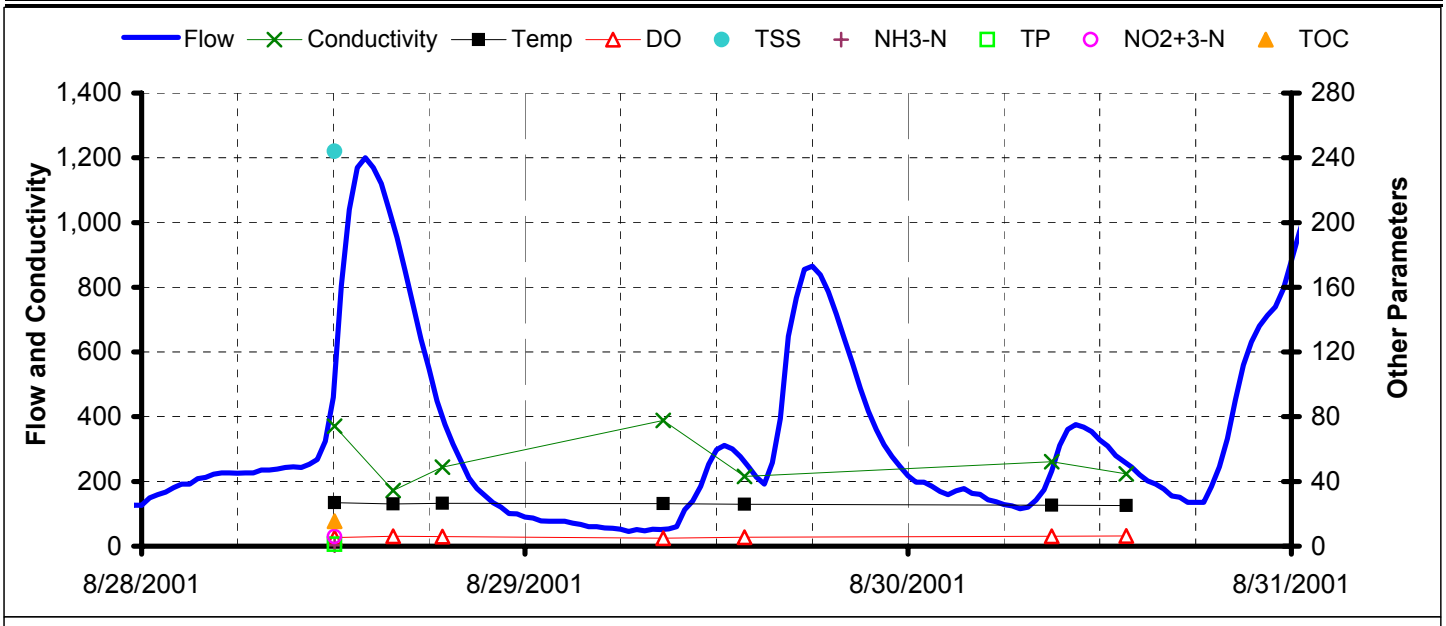


TABLE 3.21b
RUNOFF STUDY - 28-30 August 2001 - Buffalo Bayou at Beltway 8

Time	Temp (°C)	DO (mg/L)	Cond (1/µΩ/cm)	TSS (mg/L)	TP (mg/L)	NH3-N (mg/L)	NO2+3-N (mg/L)	TOC (mg/L)	TC (MPN/dL)	EC (MPN/dL)
8/28/2001 12:05	27.0	5.4	371	244	1.18	0.55	5.96	15.4	> 48,384	20,925
8/28/2001 15:45	26.2	6.1	173						> 48,384	31,061
8/28/2001 18:50	26.4	5.9	244						> 48,384	25,993
8/29/2001 8:40	26.3	5.0	389						> 48,384	3,808
8/29/2001 13:45	25.8	5.5	216						> 48,384	34,657
8/30/2001 9:00	25.3	6.1	261						> 48,384	4,448
8/30/2001 13:40	25.2	6.4	223						> 48,384	10,950
Remarks	Flow data from **USGS** gage **08073600 - Buffalo Bayou at W Belt Dr at Houston, TX**									



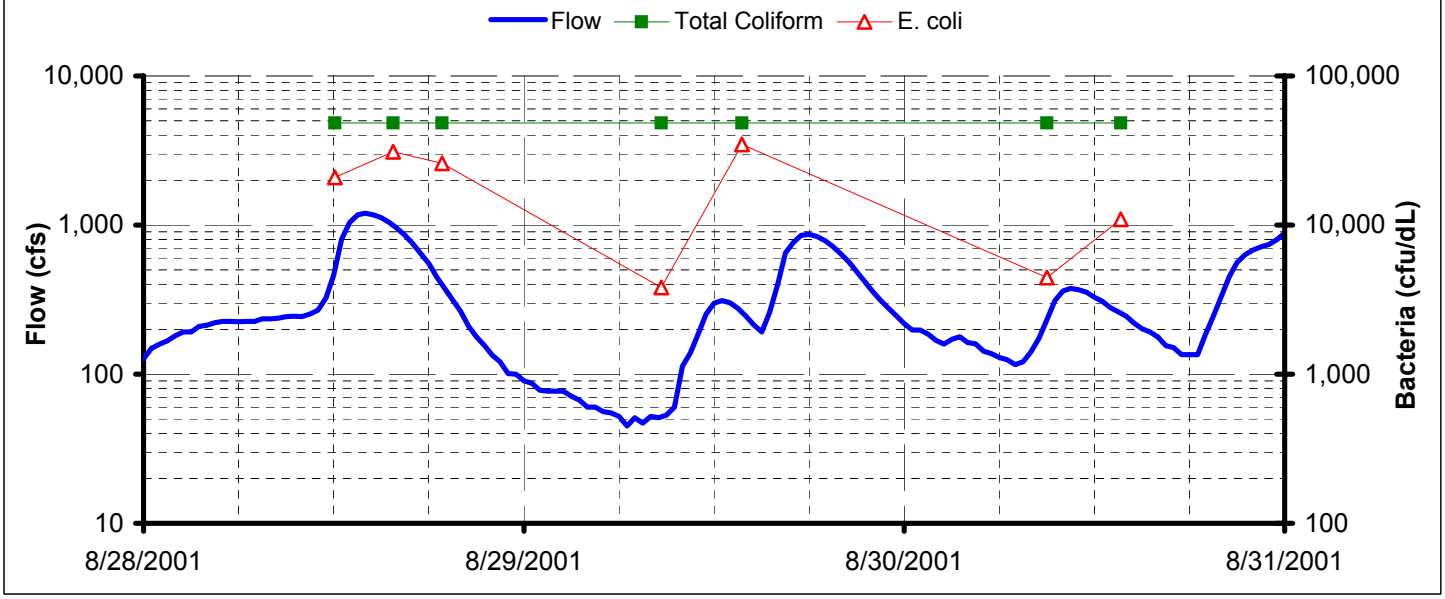
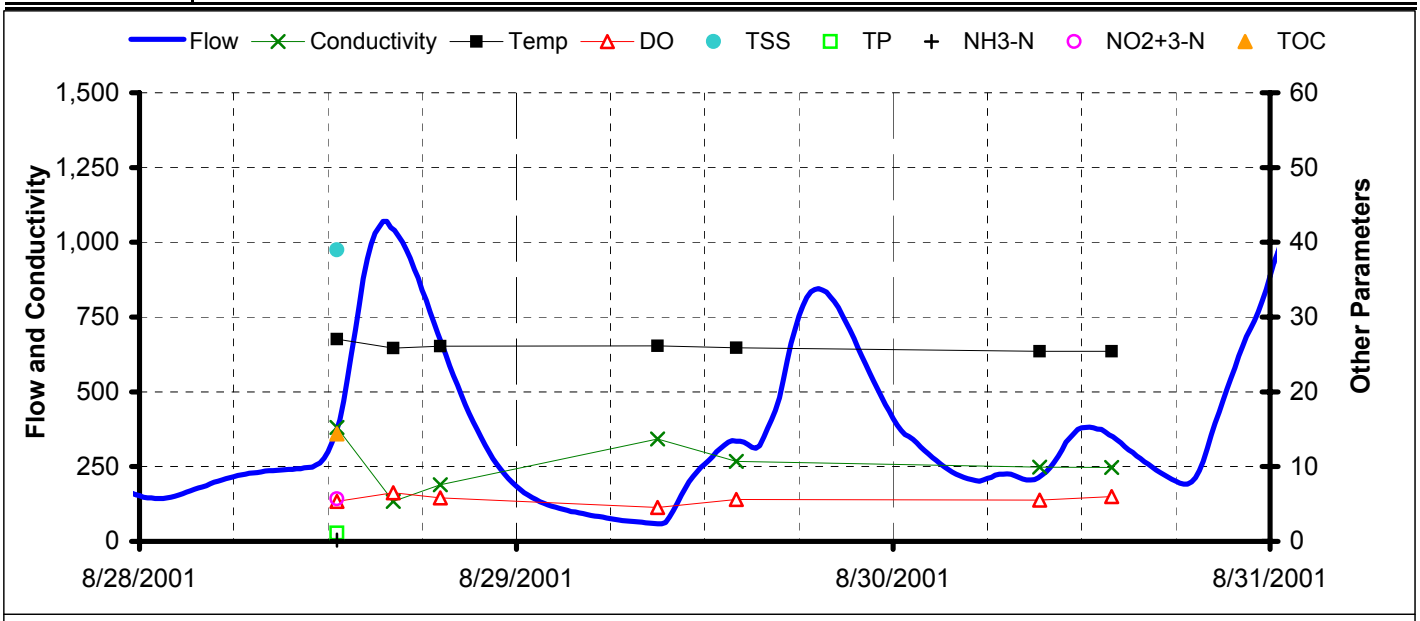


TABLE 3.21c
RUNOFF STUDY - 28-30 August 2001 - Buffalo Bayou at Piney Point

Time	Temp (°C)	DO (mg/L)	Cond (1/µΩ/cm)	TSS (mg/L)	TP (mg/L)	NH3-N (mg/L)	NO2+3-N (mg/L)	TOC (mg/L)	TC (MPN/dL)	EC (MPN/dL)
8/28/2001 12:35	27.0	5.3	380	39	1.12	0.18	5.7	14.4	> 48,384	24,066
8/28/2001 16:10	25.9	6.5	134						> 48,384	48,383
8/28/2001 19:10	26.1	5.8	189						> 48,384	25,993
8/29/2001 9:00	26.2	4.6	342						> 48,384	3,452
8/29/2001 14:00	25.9	5.6	268						> 48,384	> 48,384
8/30/2001 9:20	25.4	5.5	248						> 48,384	8,212
8/30/2001 13:55	25.4	6.0	247						> 48,384	12,976
Remarks	Flow data from **USGS** gage **08073700 - Buffalo Bayou at Piney Point, TX**									



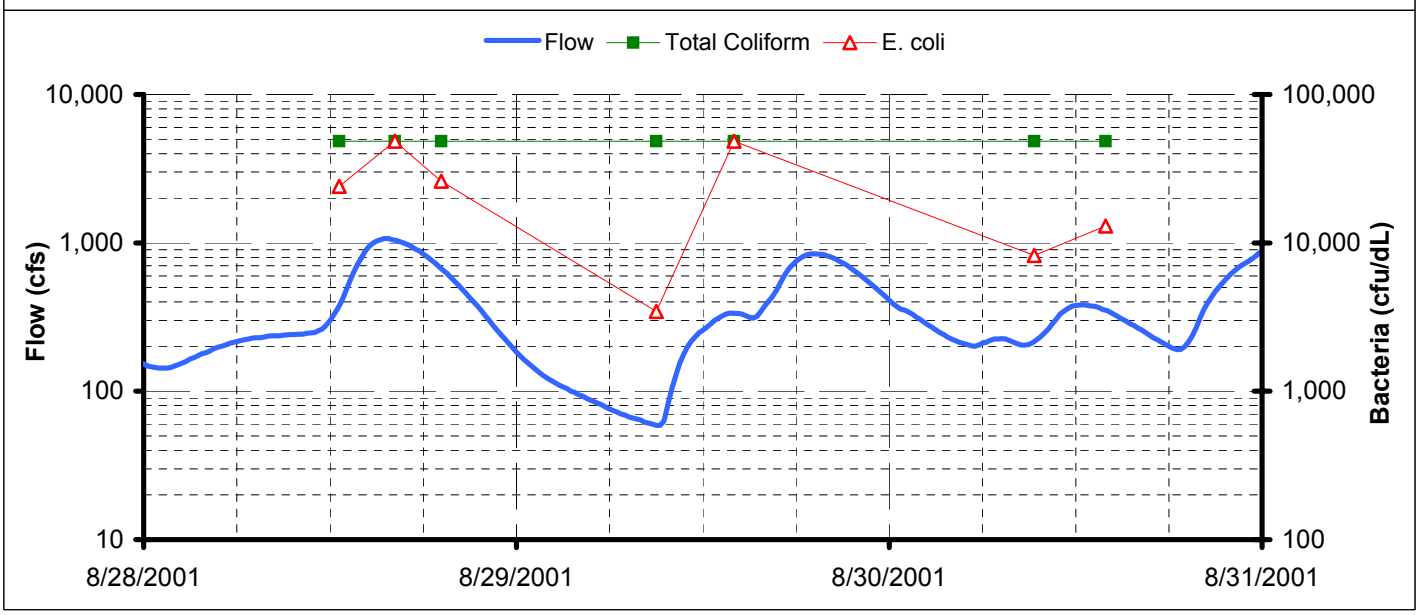
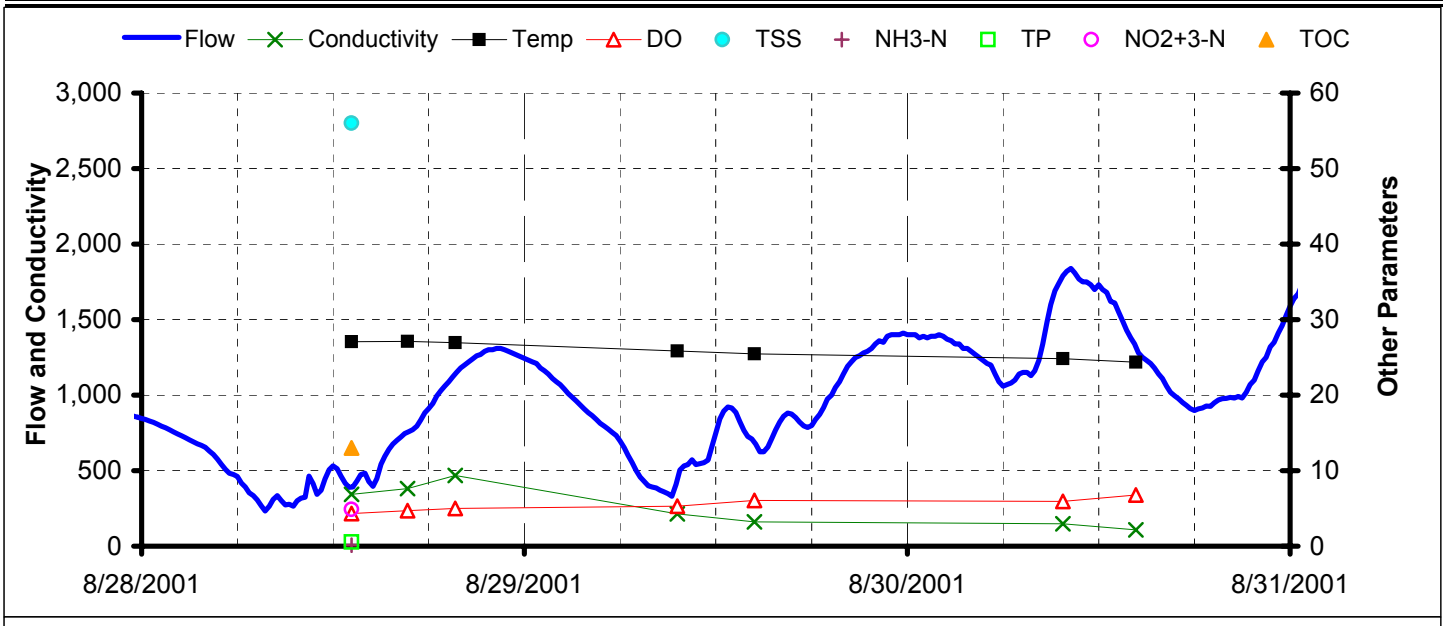


TABLE 3.21d
RUNOFF STUDY - 28-30 August 2001 - Buffalo Bayou at Shepherd

Time	Temp (°C)	DO (mg/L)	Cond (1/µΩ/cm)	TSS (mg/L)	TP (mg/L)	NH3-N (mg/L)	NO2+3-N (mg/L)	TOC (mg/L)	TC (MPN/dL)	EC (MPN/dL)
8/28/2001 13:10	27.1	4.3	344	56	0.54	0.13	4.86	13	> 48,384	25,993
8/28/2001 16:40	27.1	4.7	381						> 48,384	19,608
8/28/2001 19:40	27.0	5.0	468						> 48,384	24,066
8/29/2001 9:35	25.8	5.3	215						> 48,384	15,402
8/29/2001 14:25	25.5	6.0	162						> 48,384	39,726
8/30/2001 9:45	24.8	6.0	149						> 48,384	25,993
8/30/2001 14:20	24.4	6.8	108						> 48,384	25,993
Remarks	Flow data from **USGS** gage **08074000 - Buffalo Bayou at Houston, TX (at Shepherd)**									



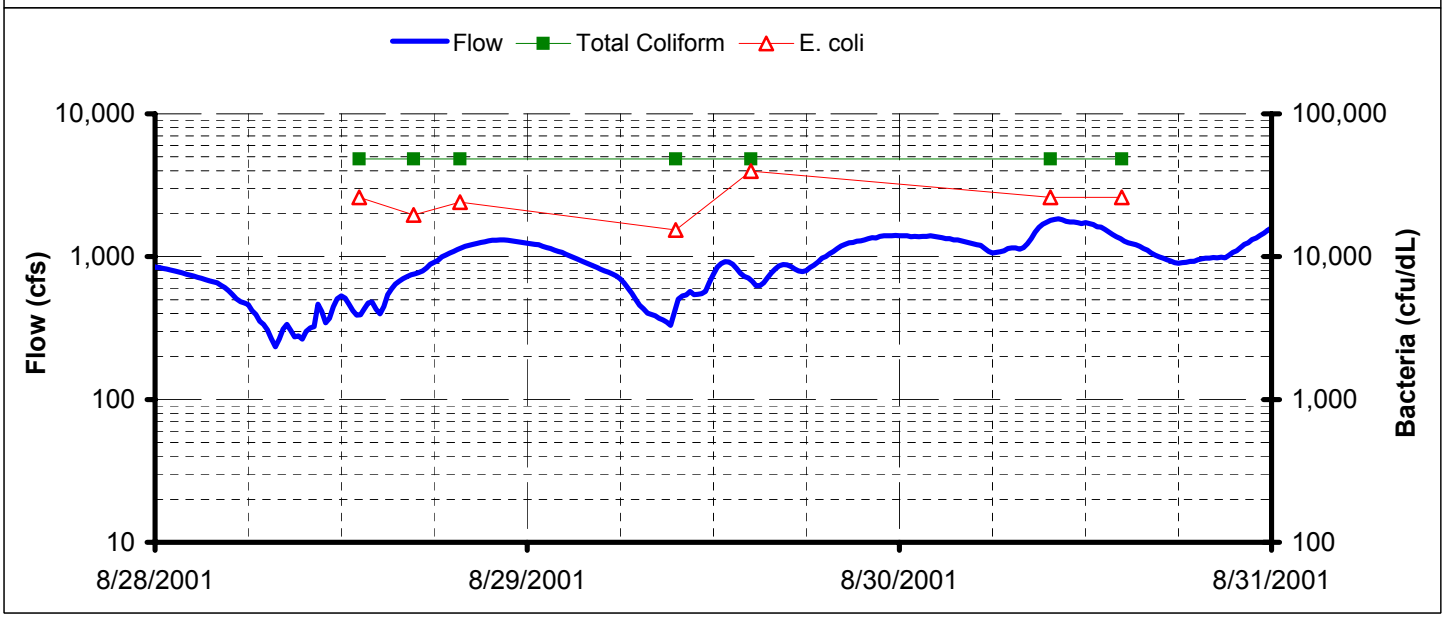


TABLE 3.22a
RUNOFF STUDY - 8-10 August 2001 - White Oak Bayou at Height

Time	Temp (°C)	DO (mg/L)	Cond (1/µΩ/cm)	TSS (mg/L)	TP (mg/L)	NH3-N (mg/L)	NO2+3-N (mg/L)	TC (MPN/dL)	EC (MPN/dL)
8/8/2001 15:50	31.8	11.4	475	30	0.736	0.39	12.8	> 48,384	39,726
8/8/2001 17:05	31.1	8.0	488					> 48,384	3,446
8/8/2001 19:15	30.7	8.7	324					> 48,384	20,925
8/9/2001 10:27		10.1	457					> 48,384	4,494
8/9/2001 15:00	33.1	14.9	519					28,272	1,588
8/10/2001 9:23	28.6	8.6	540					48,383	10,344
8/10/2001 13:35	33.5	11.3	593					48,383	1,366
Remarks	Flow data from **USGS** gage **08074500 Whiteoak Bayou at Houston, TX (at Height)**								

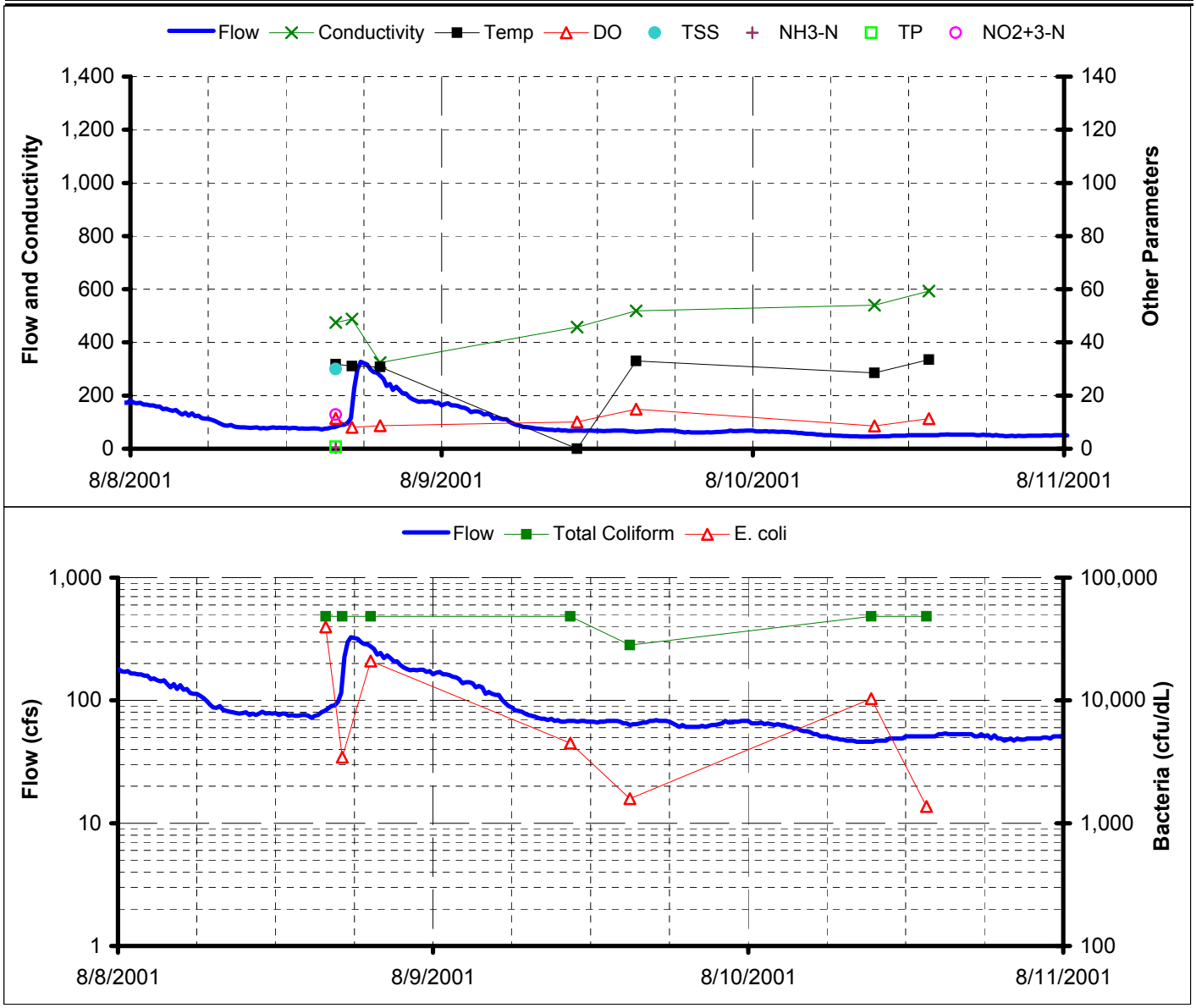
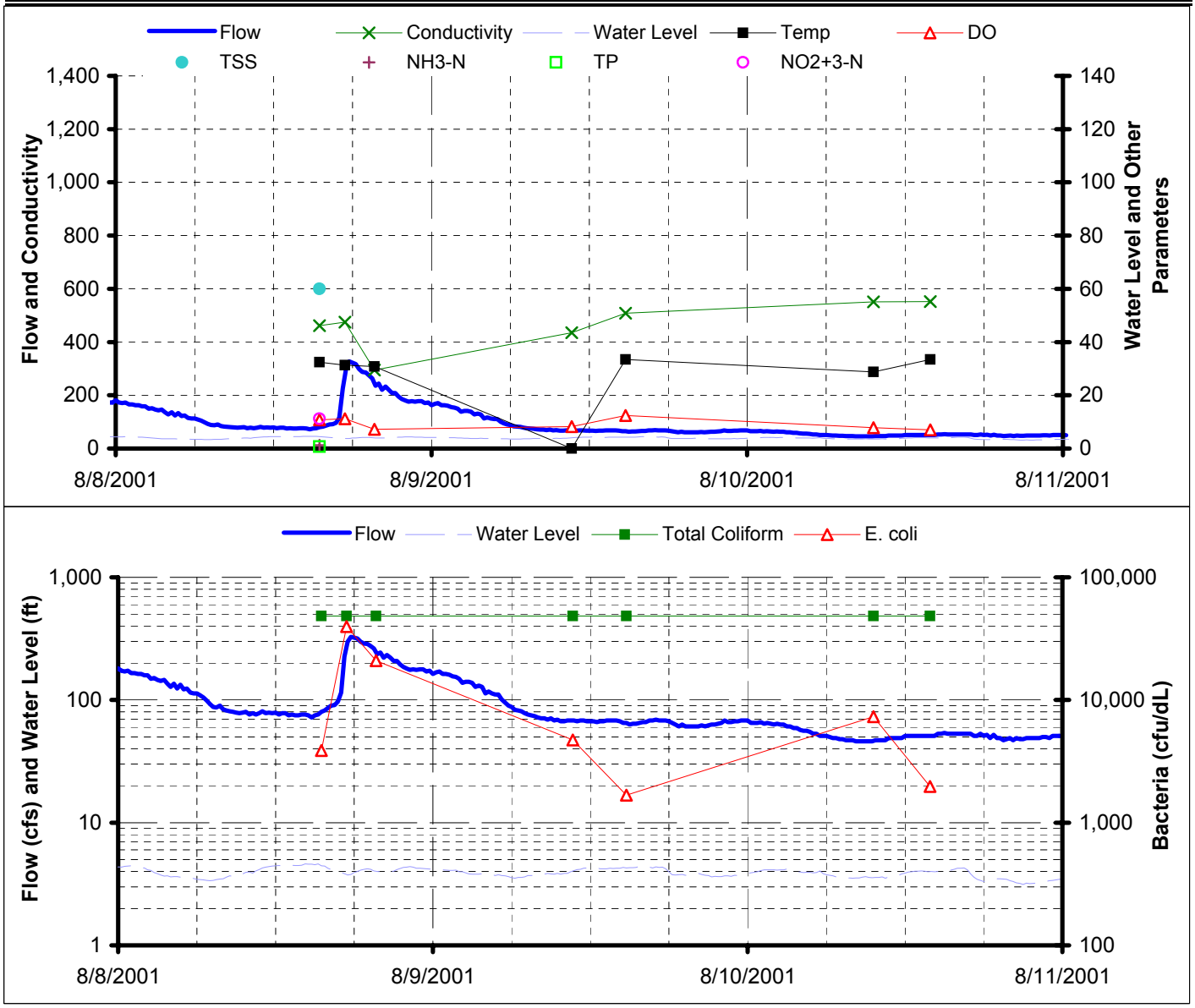


TABLE 3.22b
RUNOFF STUDY - 8-10 August 2001 - White Oak Bayou at Houston

Time	Temp (°C)	DO (mg/L)	Cond (1/µΩ/cm)	TSS (mg/L)	TP (mg/L)	NH3-N (mg/L)	NO2+3-N (mg/L)	TC (MPN/dL)	EC (MPN/dL)
8/8/2001 15:30	32.4	10.8	461	60	0.672	1.22	11.2	> 48,384	3,870
8/8/2001 17:25	31.3	11.2	475					> 48,384	39,726
8/8/2001 19:40	30.8	7.2	295					> 48,384	20,925
8/9/2001 10:40		8.3	435					> 48,384	4,718
8/9/2001 14:45	33.5	12.4	508					> 48,384	1,672
8/10/2001 9:36	28.7	7.8	551					> 48,384	7,308
8/10/2001 13:55	33.5	7.0	552					> 48,384	1,970
Remarks	Flow data from **USGS** gage **08074500 Whiteoak Bayou at Houston, TX (at Height)** Water level data from **USGS** gage **08074598 Whiteoak Bayou at Main St, Houston, TX**								



was sampled with the third sample and the EC level was elevated. Following that the EC levels declined over the next two days.

A similar pattern was exhibited by the EC levels at the Houston (Main Street) gage. One difference was that only the first sample was before the peak flow, and it was relatively low in EC as would be expected. The next samples during the peak flow had elevated EC levels. As the bayou flow declined, so did the EC concentrations.

A somewhat different runoff pattern was observed during the second event (August 28-30, 2001). In this event, moderate rains occurred on a daily basis (0.26, 0.70, and 0.95 inch on the 28th, 29th, and 30th) and the bayou flow oscillated between 100 and 2,000 cfs over the 3-day period. The field crew was able to sample initially at a lower point in the flow and then to sample several of the higher flow spikes that followed (Tables 3.23a and b). The chemical concentrations were more dilute than wastewater, and conductivity appeared to follow the reverse of the flow measurements. Tables 3.23a and b show the results from this sampling event.

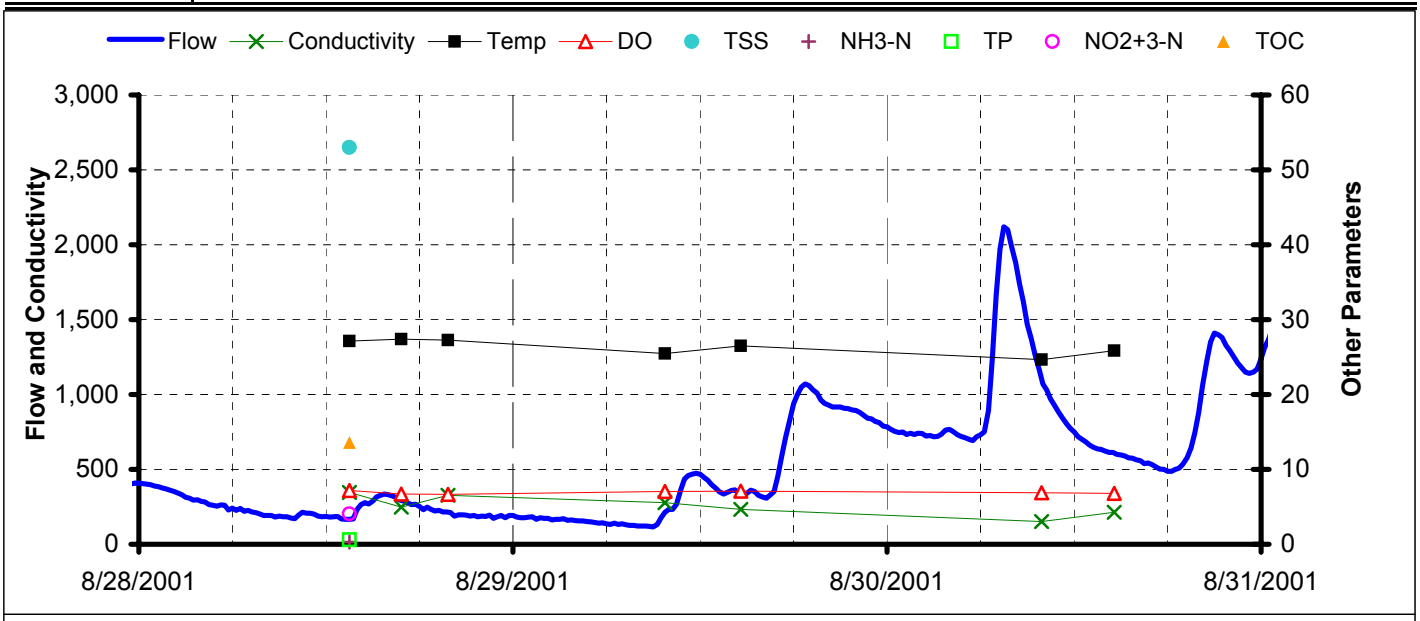
The EC concentrations were high throughout the event and appeared to track changes in the flow reasonably well. The TC concentrations were above their quantification level during the entire event.

3.2.3 Cole Creek Runoff

Cole Creek is a major tributary to Whiteoak Bayou with a USGS flow gage at the Deihl Road crossing. The watershed of Cole Creek is 4,800 acres at this point and is primarily urban.

TABLE 3.23a
RUNOFF STUDY - 28-30 August 2001 - White Oak Bayou at Height

Time	Temp (°C)	DO (mg/L)	Cond (1/µΩ/cm)	TSS (mg/L)	TP (mg/L)	NH3-N (mg/L)	NO2+3-N (mg/L)	TOC (mg/L)	TC (MPN/dL)	EC (MPN/dL)
8/28/2001 13:30	27.2	7.2	347	53	0.58	0.29	4.04	13.6	> 48,384	5,974
8/28/2001 16:50	27.4	6.7	247						> 48,384	> 48,384
8/28/2001 19:50	27.3	6.7	326						> 48,384	18,416
8/29/2001 9:45	25.5	7.1	277						> 48,384	39,726
8/29/2001 14:37	26.5	7.1	233						> 48,384	48,383
8/30/2001 9:55	24.7	6.9	151						> 48,384	48,383
8/30/2001 14:35	25.9	6.8	213						> 48,384	20,925
Remarks	Flow data from **USGS** gage **08074500 - Whiteoak Bayou at Houston, TX (at Height)**									



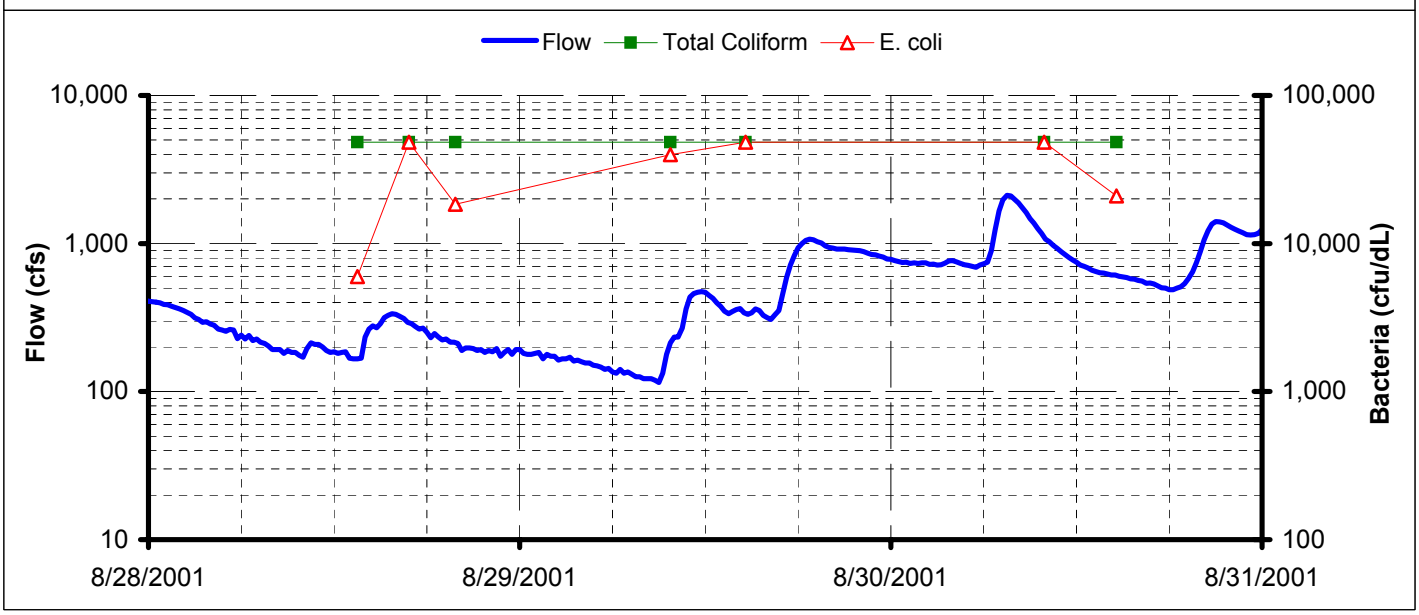
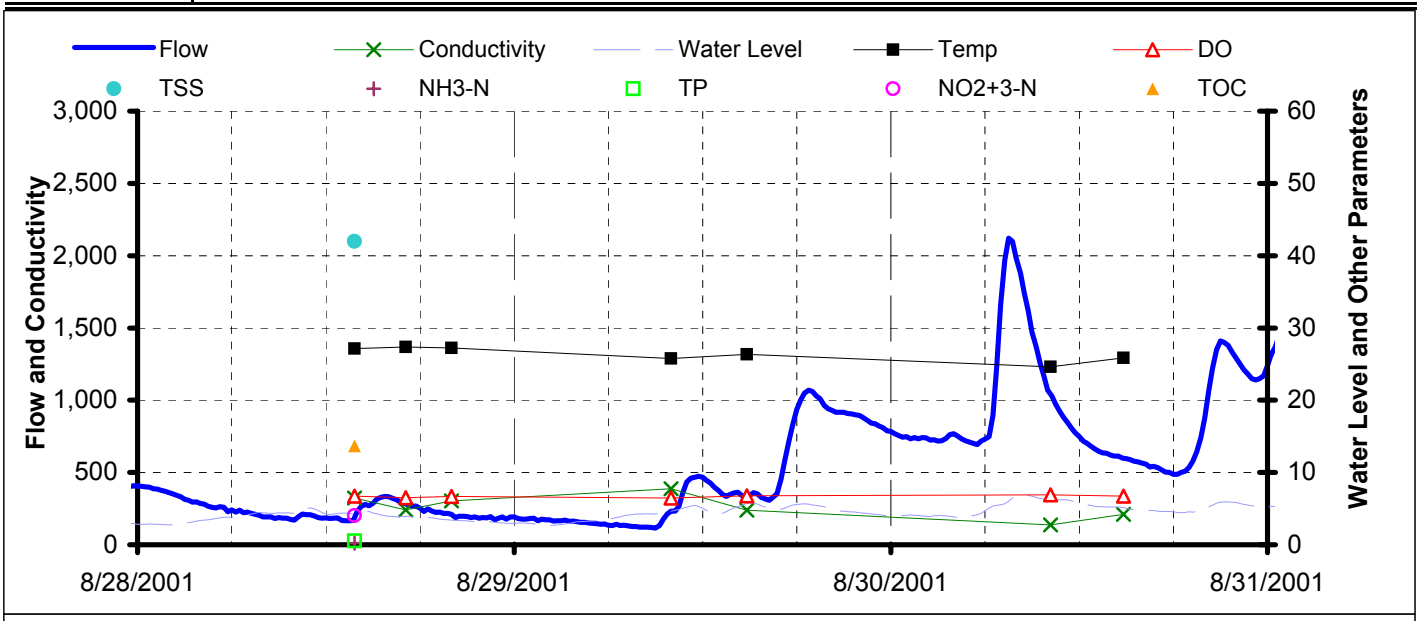
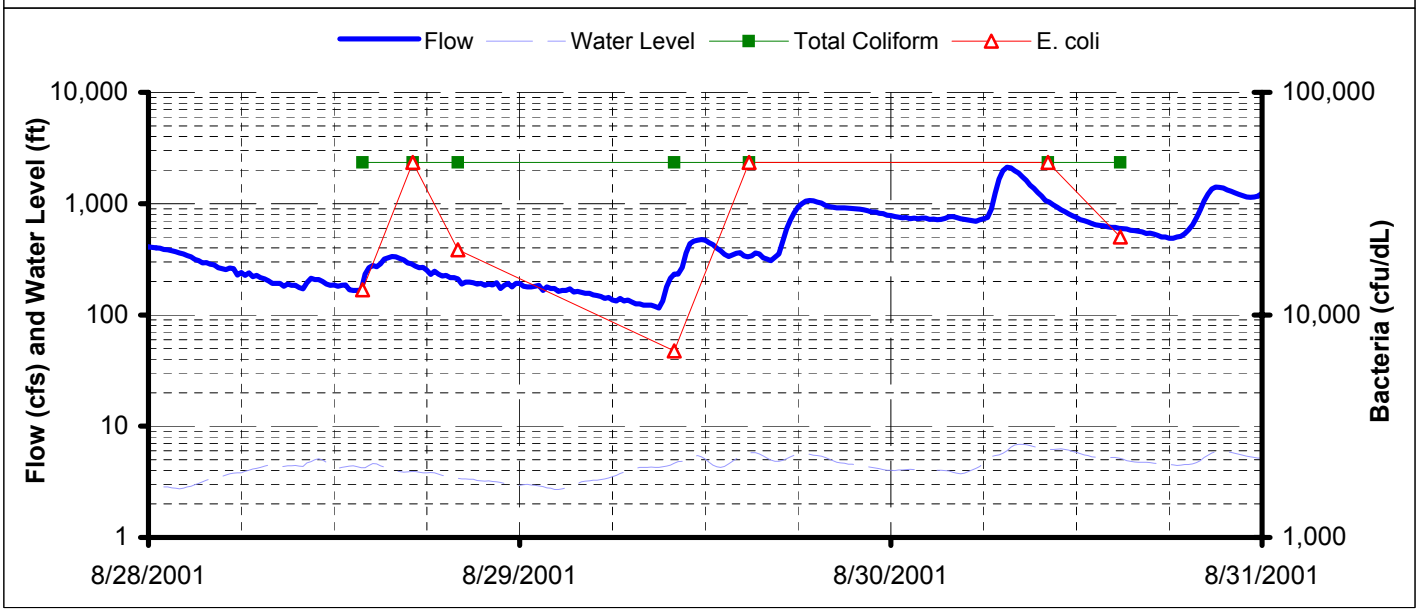


TABLE 3.23b
RUNOFF STUDY - 28-30 August 2001 - White Oak Bayou at Houston

Time	Temp (°C)	DO (mg/L)	Cond (1/µΩ/cm)	TSS (mg/L)	TP (mg/L)	NH3-N (mg/L)	NO2+3-N (mg/L)	TOC (mg/L)	TC (MPN/dL)	EC (MPN/dL)
8/28/2001 13:50	27.2	6.7	324	42	0.54	0.22	4.05	13.7	> 48,384	12,976
8/28/2001 17:05	27.4	6.5	241						> 48,384	48,383
8/28/2001 20:00	27.2	6.7	304						> 48,384	19,608
8/29/2001 10:00	25.8	6.5	388						> 48,384	6,896
8/29/2001 14:50	26.4	6.8	238						> 48,384	> 48,384
8/30/2001 10:10	24.6	6.9	138						> 48,384	48,383
8/30/2001 14:50	25.9	6.8	210						> 48,384	22,397
Remarks	Flow data from **USGS** gage **08074500 - Whiteoak Bayou at Houston, TX (at Height)** Water level data from **USG**									





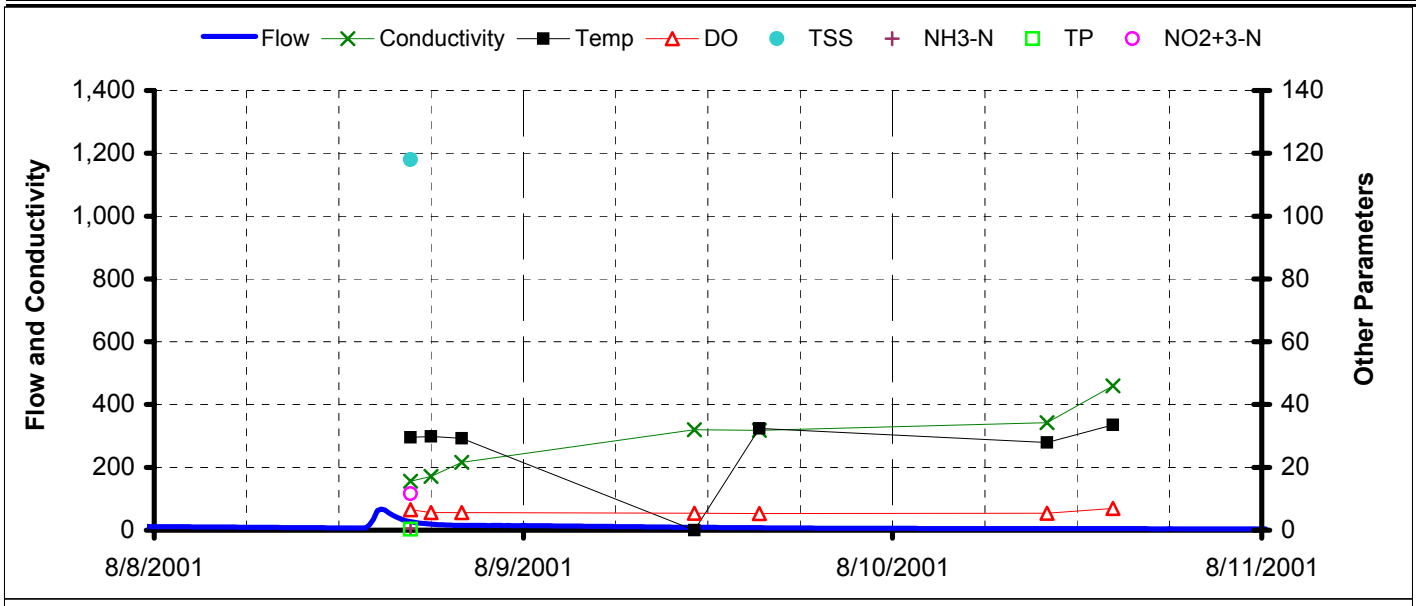
Runoff at this location was sampled during the August 8-10 rain event and again during the August 28-30 event.

With rainfall of only about 0.2 inch on the 8th, the first event produced a fairly clean spike in the flow from about 7 to nearly 70 cfs in less than 2 hours. Table 3.24a shows the data collected. The field crew was able to sample within about two hours of the flow peak, and TSS and bacteria concentrations were quite high, as would be expected. The flow then declined to about 4 cfs over the next two days, and the EC levels tracked the flow declines. The conductivity rose as the flow declined.

A somewhat different pattern was observed in the second Cole Creek sampling event during August 28-30, 2001. The rainfall exceeded the first event, about 0.16, 1.00, and 1.36 on the 28th, 29th, and 30th, respectively. Table 3.24b shows that the flow was initially low and then exhibited a moderate spike before the flow gage failed. The EC levels tracked the initial spike and then fluctuated. Referring to the flow data from other gages during this time it is apparent that a series of small rains was causing significant local fluctuations in flow and associated EC levels. There is also a sharp drop in the conductivity at the same time as there is a sharp rise in the EC on the 29th. Like most stations, the TC levels were higher than the quantification limit in all cases.

TABLE 3.24a
RUNOFF STUDY - 8-10 August 2001 - Cole Creek at Deihl

Time	Temp (°C)	DO (mg/L)	Cond (1/µΩ/cm)	TSS (mg/L)	TP (mg/L)	NH3-N (mg/L)	NO2+3-N (mg/L)	TC (MPN/dL)	EC (MPN/dL)
8/8/2001 16:40	29.6	6.6	156	118	0.327	0.56	11.6	> 48,384	48,384
8/8/2001 18:00	29.9	5.6	172					> 48,384	28,272
8/8/2001 20:00	29.3	5.6	216					> 48,384	22,397
8/9/2001 11:07		5.4	320					> 48,384	1,262
8/9/2001 15:20	32.4	5.3	318					> 48,384	2,634
8/10/2001 10:02	27.9	5.4	343					> 48,384	826
8/10/2001 14:20	33.5	6.9	460					> 48,384	718
Remarks	Flow data from **USGS** gage **08074150 Cole Ck at Deihl Rd, Houston, TX**								



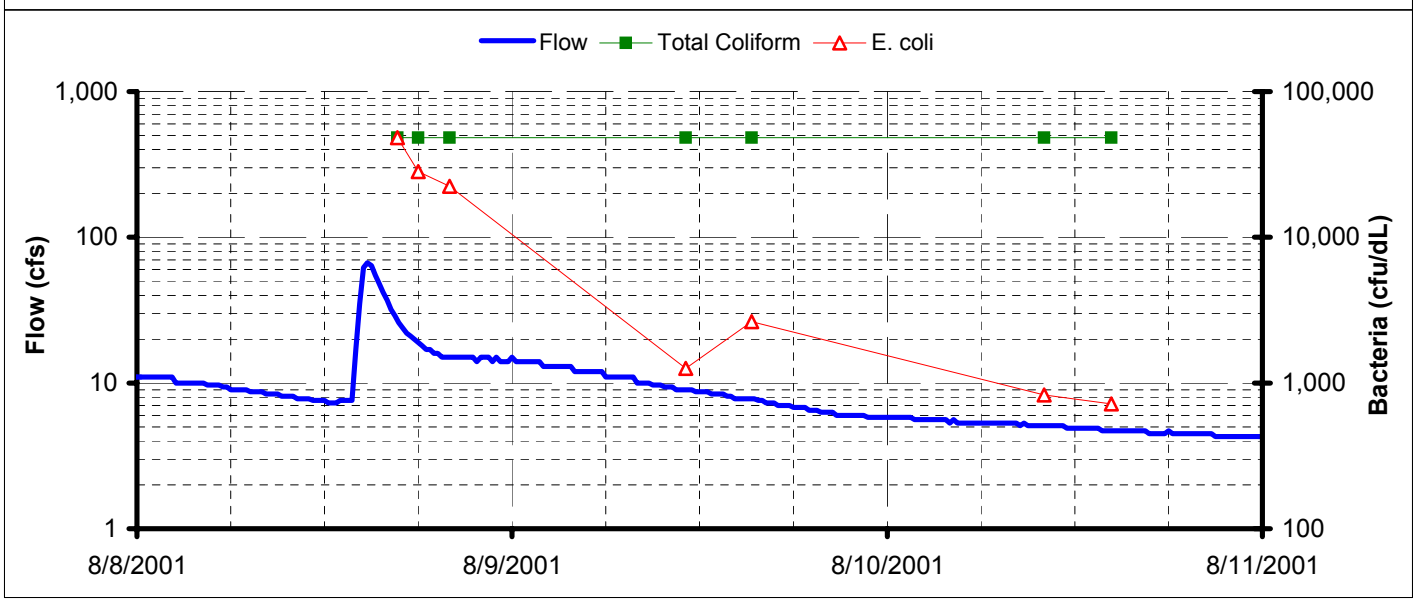
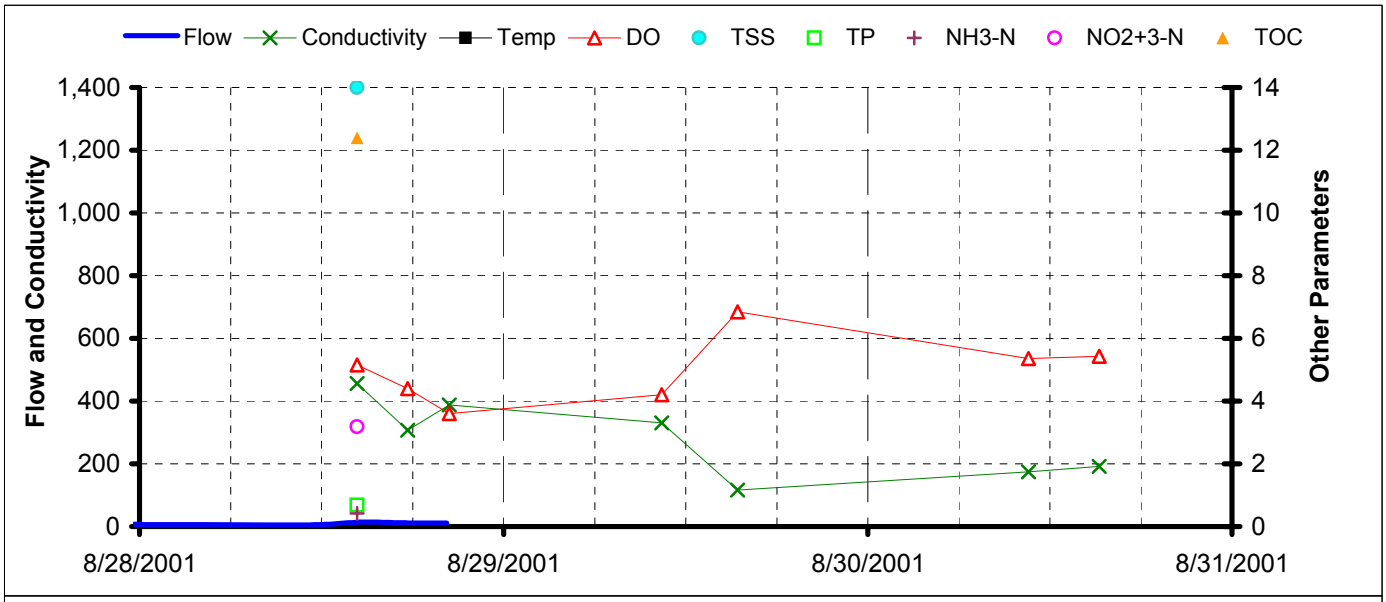
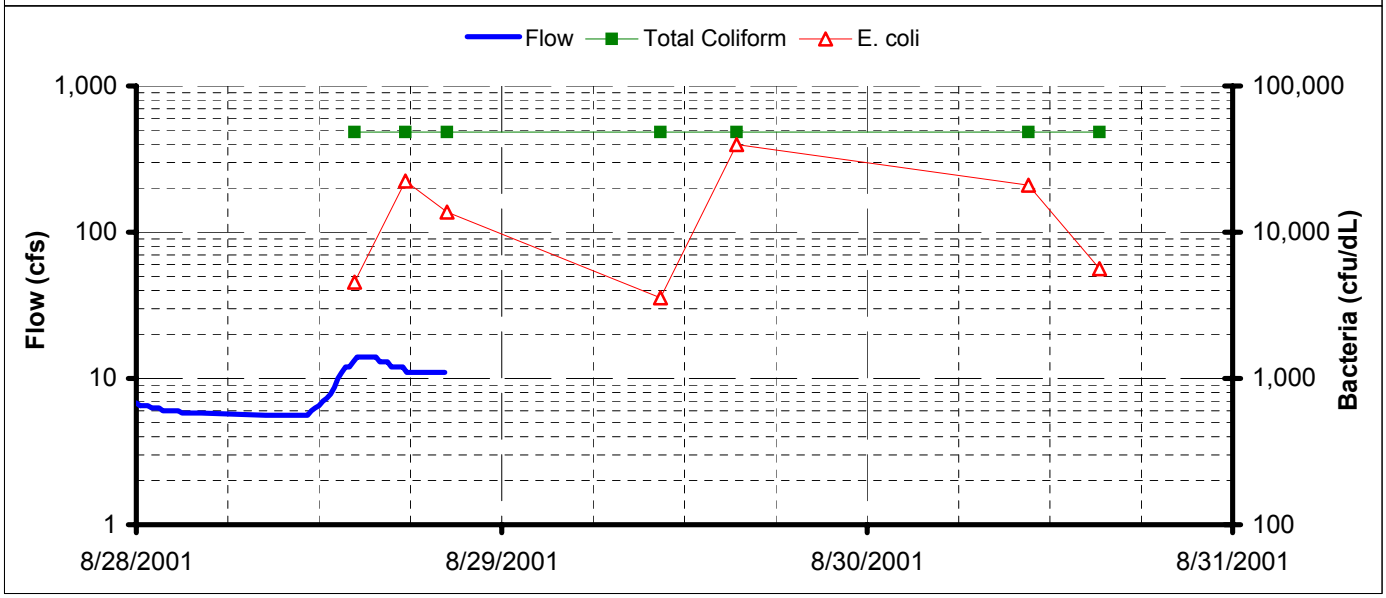


TABLE 3.24b
RUNOFF STUDY - 28-30 August 2001 - Cole Creek at Deihl

Time	Temp (°C)	DO (mg/L)	Cond (1/µΩ/cm)	TSS (mg/L)	TP (mg/L)	NH3-N (mg/L)	NO2+3-N (mg/L)	TOC (mg/L)	TC (MPN/dL)	EC (MPN/dL)
8/28/2001 14:20	27.2	5.2	456	14	0.68	0.42	3.18	12.4	> 48,384	4,564
8/28/2001 17:40	27.2	4.4	307						> 48,384	22,397
8/28/2001 20:25	26.9	3.6	388						> 48,384	13,734
8/29/2001 10:25	26.5	4.2	331						> 48,384	3,558
8/29/2001 15:25	25.4	6.9	116						> 48,384	39,726
8/30/2001 10:35	25.2	5.4	174						> 48,384	20,925
8/30/2001 15:15	25.9	5.4	192						> 48,384	5,618
Remarks	Flow data from **USGS** gage **08074150 - Cole Ck at Deihl Rd, Houston, TX** USGS gage malfunctioned from 8/28/2001 8:30 pm to 8/31/2001 12:30 am.									





3.2.4 Discussion of Runoff Results

As a whole, the runoff sampling results confirm expectations. That is, higher bacteria levels would be observed in bayou waters during storm events. At most stations there appears to be some tracking between bayou flow and EC levels. The causes of higher bacteria levels undoubtedly include wash-off of bacteria by stormwater runoff from land surfaces and possibly re-suspension from sediments.

Appendix E.1
Harris County Database and Census Data

Table E.1-1 Estimate of Septic System Totals, Flow and Loading

Sub basin	Water-shed	Number of Failing Septic Systems - Harris County Data	Number of septic systems - 1990 Census
1	WO	2	169
2	WO	0	222
3	WO	0	162
4	WO	4	634
5	WO	0	198
6	WO	0	196
7	WO	0	65
8	WO	0	25
9	WO	0	641
10	WO	0	235
11	WO	0	3
12	WO	0	369
13	WO	0	636
17	WO	0	72
26	Buffalo	0	27
27	Buffalo	0	38
28	Buffalo	0	1
33	Buffalo	0	18
34	Buffalo	0	5
35	Buffalo	0.48	125
36	Buffalo	0	22
37	Buffalo	0	14
38	Buffalo	0	25
39	Buffalo	0	19
40	WO	0	25
41	WO	0	35
42	WO	0	14
43	WO	0	7
44	Buffalo	0	3
45	Buffalo	0	28
46	Buffalo	0	25
47	Buffalo	0	3
48	WO	0	52
49	WO	0	28
50	Buffalo	0	1
51	Buffalo	0	25
52	Buffalo	0	17
53	Buffalo	0	14
54	Buffalo	0	31
55	Buffalo	0	40
56	Buffalo	0	75
101	Buffalo	0	20
102	Buffalo	0	36
103	Buffalo	1	33
104	Buffalo	0	50
105	Buffalo	4	60
106	Buffalo	0	42
107	Buffalo	0	4
108	Buffalo	1	16
109	Buffalo	0	7
110	Buffalo	0	21
111	Buffalo	0	13
112	Buffalo	0	20
113	Buffalo	0	115
114	Buffalo	0	5
115	Buffalo	0	8
116	Buffalo	0	6
117	Buffalo	0	20
118	Buffalo	5	42
119	Buffalo	0	73
120	Buffalo	0	21
121	Buffalo	0	25
122	Buffalo	0	20
123	Buffalo	0	8
124	Buffalo	0	5
125	Buffalo	0	19
126	Buffalo	0	5
127	Buffalo	0	30
128	Buffalo	0.03	30
129	Buffalo	0	9
130	Buffalo	0	18
131	Buffalo	0	18
132	Buffalo	0.01	3
133	Buffalo	0.78	119
134	Buffalo	0.07	11
135	Buffalo	0.36	62
136	Buffalo	0.05	8
137	Buffalo	0.05	9
138	Buffalo	0.01	14
139	Buffalo	0.02	14
140	Buffalo	0.10	10
141	Buffalo	0.78	95
142	Buffalo	0.06	6
143	Buffalo	0.33	36
144	Buffalo	0.35	45
145	Buffalo	0.23	30
146	Buffalo	0	1
147	Buffalo	0	0
148	Buffalo	1	1
149	Buffalo	0	0
150	Buffalo	0	11
151	Buffalo	0	18
152	Buffalo	0.000817612	17
153	Buffalo	0	8
154	Buffalo	0.003449219	9
155	Buffalo	0	0
156	Buffalo	0.11	25
171	Buffalo	0.15	23
172	Buffalo	0.10	17
173	Buffalo	0.07	15
174	Buffalo	0.05	10
175	Buffalo	0.05	6
176	Buffalo	0.21	20
177	Buffalo	0.01	3
178	Buffalo	0.40	68
180	Buffalo	0	0
181	Buffalo	0	5
182	Buffalo	0	3
183	Buffalo	0	10
184	Buffalo	0	4
185	Buffalo	0	3
186	Buffalo	0	1
187	Buffalo	0	3
188	Buffalo	0	28

Appendix E.2
MUD Coverage Map

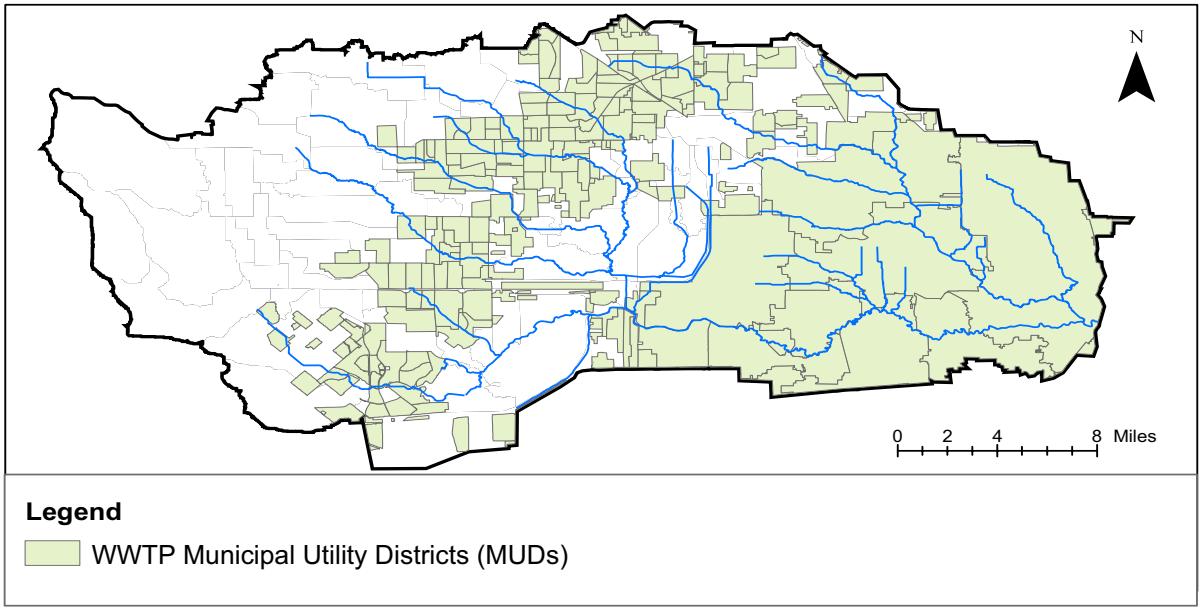


Figure 1 Location of Municipal Utility Districts (MUDs) in Buffalo and Whiteoak Bayous

Appendix E.3
Load Estimate Assumptions

The septic system loading presented in Section 3 were calculated using literature values.

Failure Rates:
There is a wide variation in reported failure rates, with rates between 1-5% reported by De Walle (1981), 10-15% reported by the US EPA (US EPA 2002), 15% reported by Moyer and Hyer (2003) and 5-35% reported by Schueler (2000). For this study, Harris County provided data on failing septic systems in the project watersheds and thus a failure rate was not necessary.

Number of persons per household:
The number of individuals per household was determined based upon Harris County Census data (2000), which reported 2.79 individuals per household.

Per capita Wastewater production:
The average amount of wastewater produced by an individual per day of 70 gallons was obtained from literature values reported in Metcalf and Eddy (1991).

E. coli concentration:
E. coli concentrations associated with wastewater were based upon the same influent data as SSO *E. coli* concentrations (Table 1). The geometric mean value used for *E. coli* concentration in wastewater for OSSFs (4.78 x 106 MPN/dL) is slightly greater than that used for SSOs (4.70 x 106 MPN/dL) since the dry weather SSO measurement was excluded.

Table 1: Summary of Assumptions Made for Septic Systems

Assumption	Value	Units
Number People per Household	2.79	persons/household
Wastewater Production	70	gallons/person/day
E. coli in Wastewater	4.78E+06	cfu/dL

Abbreviations: cfu - colony forming unit, dL – deciliter; OSSF - on-site sewage facility

Appendix F.1
Direct Deposition
Load Estimate
Assumptions

Appendix F

The direct deposition loading presented in Section 3 were calculated using literature values as detailed below.

Waterfowl:

Because limited data were available on waterfowl production rates, rates from geese, ducks turkey and chicken were used to estimate loading for all water fowl species. The range of production rates is shown in **Table 1** and the geometric mean of these values was used to calculate the waterfowl direct deposition load, determined as the multiplication of stream length, stream width, bird density, and fecal production rate to yield waterfowl direct deposition loading in MPN/day.

Table 1 Summary of Bird Fecal Production Rates

Animal	*E. coli* Production Rate (MPN/day)	Reference
Goose	8.00+08	Zeckoski et al.(2003)
Goose	7.04E+04	MapTech Inc., (2000)
Goose	4.90E+10	US EPA, (2000)
Duck	2.4E+09	Zeckoski et al.(2003)
Duck	2.43E+09	US EPA, (2000)
Duck	7.35E+04	MapTech Inc., (2000)
Chicken	1.36E+08	US EPA (2000)
Turkey	9.30E+07	US EPA (2000)
Geometric Mean	1.05E+08	N/A

Abbreviations:
EPA – Environmental Protection Agency
MPN - most probable number
N/A – not applicable

Waterfowl:

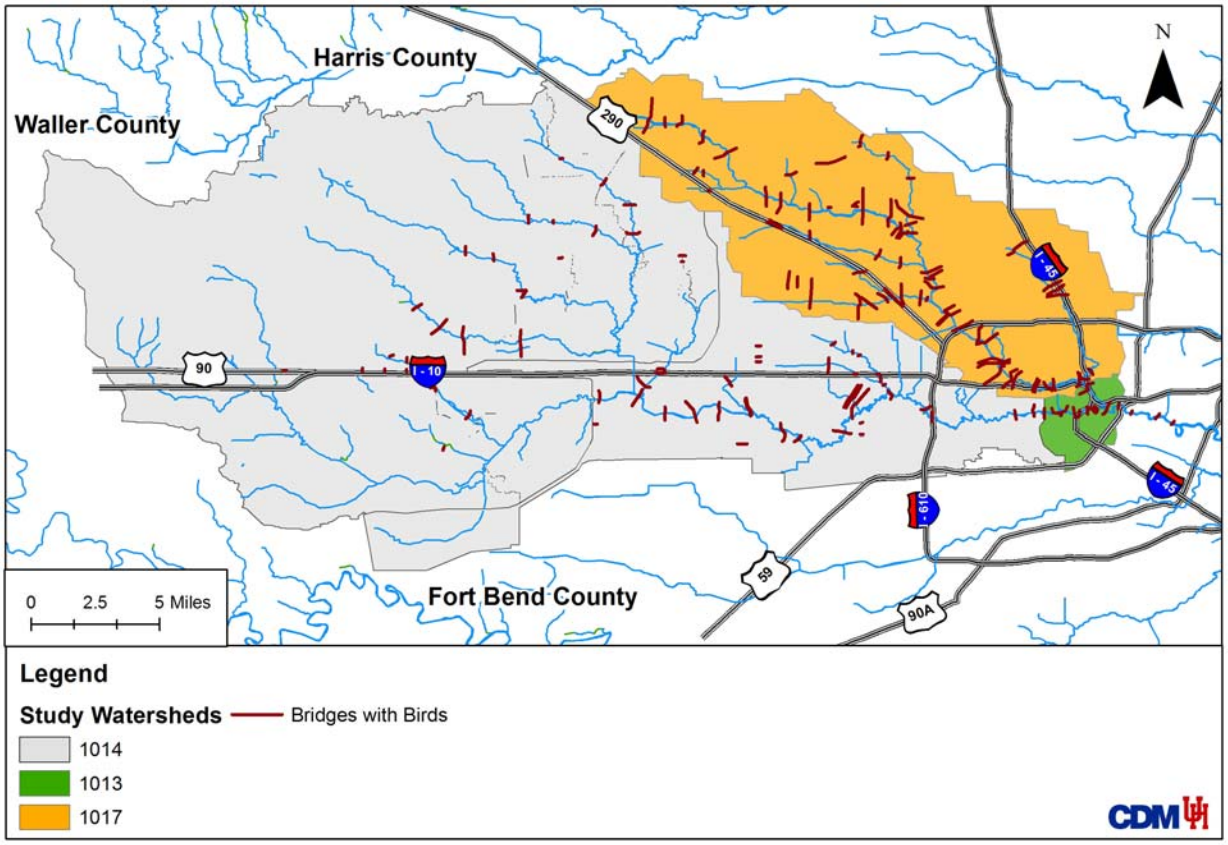
Because limited data were available on mammal production rates, rates from a variety of animals were used to estimate loading in the watershed. Loading rates are presented in Table 2.

Table 2 Summary of Other Mammal Fecal Production Rates

Fecal Coliform Production Rate (MPN/day)	Animal	Reference
9.90E+08	Dog	MapTech Inc., (2000)
4.09E+09	Dog	US EPA, (2000)
5.90E+09	Raccoon	MapTech Inc., (2000)
1.25E+08	Raccoon	Zeckoski et al.(2003)
1.90E+08	Muskrat	US EPA, (2000)
2.55E+09	Deer	MapTech Inc., (2000)
5.00E+08	Deer	US EPA, (2000)
2.50E+08	Beaver	US EPA, (2000)
1.88E+08	Other	Northern Virginia Regional Commission (2002)

Abbreviations: EPA – Environmental Protection Agency, MPN - most probable number

Appendix F.2
Bridge Locations in Buffalo and Whiteoak Bayous



Appendix F.2 – Bridge locations in Buffalo and Whiteoak Bayous

Appendix F.3
Dog Density Calculations

Table 1. Dog density calculation

0.58	dogs per household
826,000	population of Whiteoak and Buffalo Bayou watersheds
2.79	individuals per household
325,117	area of watersheds (acre)
171,713	total dogs
0.53	dogs per acre
78%	Of the watershed suitable for dog recretation (grassland, residential, commercial land)
0.41	dog population density (dog/acre)

Appendix G.1
Bacteria sediment studies

3.1.4 Bacteria Resupply from Sediments

Both Buffalo and Whiteoak bayous are small systems with mean depths varying from 5 to 11 ft for Buffalo and around 3-4 feet (ft) for Whiteoak. The low-flow widths for these bayous are always less than 30 ft and often less than 10 ft. This small size means that water is in frequent contact with the stream bottom. Presumably the particulate matter of the sediment exchanges frequently with the suspended particulate matter in the water. It follows that the sediment in the bayou bottom can act as a reservoir, supplying particulate matter to the water column when the bayou flows increase enough to resuspend the sediment, and accepting

P*reviously presented in Response to Stakeholder Comments*

particulate matter when the flow declines enough to allow settling to occur. This may be significant in the case of Buffalo Bayou and the upper part of Whiteaok Bayou which is unpaved. However, this does not appear to be significant for the lower part of Whiteoak Bayou due to the fact that it is a concrete-lined channel designed to prevent sediment accumulation.

3.1.4.1 Bacteria Concentrations in Sediment

To better understand and quantify the role of sediments in the bacterial balance, sediment sampling was undertaken. The basic procedure was to employ a suitable dredge (Ponar or Ekman, depending on sediment characteristics) to collect a small portion of sediment from the bayou at a number of stations. At each station, the soft unconsolidated sediment collected from the top of the sediment grab was transferred with a sterilized stainless spatula into a sterile wide mouth jar. The jar was then iced prior to analysis. Difficulties in sample collection were encountered at several stations because there was little soft sediment available. Stations on the concrete portion of White Oak Bayou (Pinemont, W. 43rd, W 34th, IH-610, and Heights) proved impossible to sample.

A portion of the soft sediment was removed from the wide mouth jar with a pipette and transferred to a sterilized beaker. Three different dilutions of sediment were analyzed for each sediment test. First both a 1-mL and 0.5 mL portions of the soft sediment were transferred to the 100 mL sample jars after first passing the sediment through a sterilized screen to reject large pieces that could cause problems in the analysis. The rest of the water for the samples came from bayou water that had been boiled for 20 minutes to kill bacteria, and then cooled to room

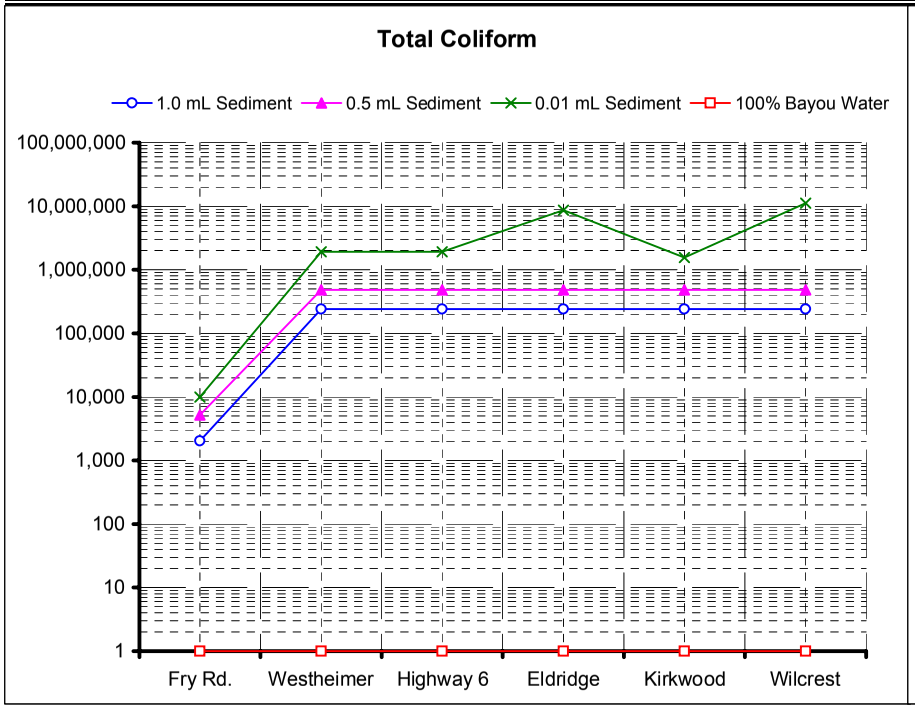
temperature. The third dilution was obtained by first transferring 1 mL of sediment to a jar with 99 mL of sterilized bayou water, and mixing thoroughly. Then a 1 mL portion of this mixture was added to another 99 mL volume of bayou water, yielding a total of 10,000:1 dilution. The three mixtures of soft stream sediment and sterilized bayou water were then treated as normal bacteria water samples and analyzed for TC and EC with the Colilert procedure. For each set of sediment samples, a blank sample using boiled bayou water only was first prepared by running the water through the screen and beaker to verify that sterile conditions were being maintained.

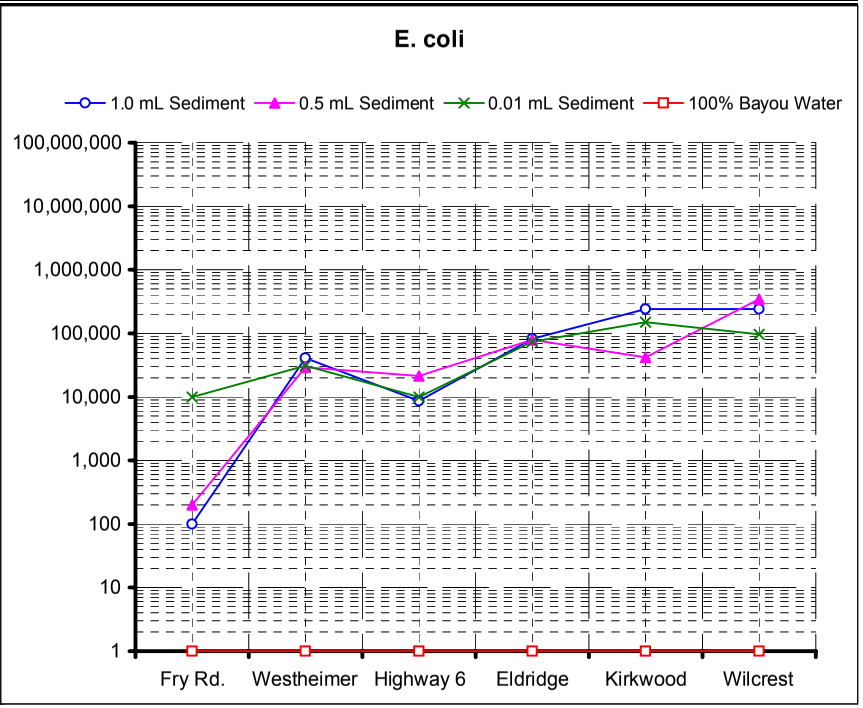
Tables 3.13a and b show the results for stations on Buffalo Bayou and Table 3.14 shows the results for Whiteoak Bayou and Cole Creek. Each sample had a total of three concentration measurements expressed as a number of colony forming units per deciliter of in-situ sediment, along with a geometric mean value for the station. While there was often considerable variation between individual measurements/dilutions, the general patterns seem reasonably consistent. The most upstream station at Fry Road on Buffalo Bayou had sediment bacteria levels that were markedly lower than the rest. There appears to be a steady increase going downstream towards Beltway 8. Downstream of Beltway 8 the values appear to be similar. On Whiteoak Bayou the most downstream station, Houston Avenue, had markedly higher concentration than the rest. The Cole Creek station at Deihl Road had also relatively high bacteria levels.

TABLE 3.13a
BUFFALO BAYOU SEDIMENTS UPSTREAM OF BELTWAY 8

SampleType	Total Coliform (MPN/dL)						E coli (MPN/dL)					
Sediment Collection Sites	Wilcrest	Kirkwood	Eldridge	Highway 6	Westheimer	Fry Rd.	Wilcrest	Kirkwood	Eldridge	Highway 6	Westheimer	Fry Rd.
Date	8/15/2001	8/15/2001	8/15/2001	8/15/2001	8/15/2001	8/15/2001	8/15/2001	8/15/2001	8/15/2001	8/15/2001	8/15/2001	8/15/2001
1.0 mL Sediment	> 241,920	> 241,920	> 241,920	> 241,920	> 241,920	2,040	> 241,920	241,917	81,640	8,620	41,060	< 100
0.5 mL Sediment	> 483,840	> 483,840	> 483,840	> 483,840	> 483,840	5,180	346,574	41,960	79,360	21,340	29,100	< 200
0.01 mL Sediment	11,198,500	1,550,700	8,664,000	1,918,000	1,918,000	10,000	97,000	150,000	74,000	10,000	31,000	< 10,000
Geometric Means	1,094,404	566,196	1,004,687	607,772	607,772	4,728	201,101	115,044	78,267	12,253	33,334	585
100% Boiled Bayou Water	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1

ANACON Results	Date	Time	TSS	TP	NH3-N	NO2+3-N	TOC	Remarks
Beltway 8 - Boiled Water	8/6/2001	9:40	28.0	1.63	< 0.20	4.7	8	BB@ Beltway 8.



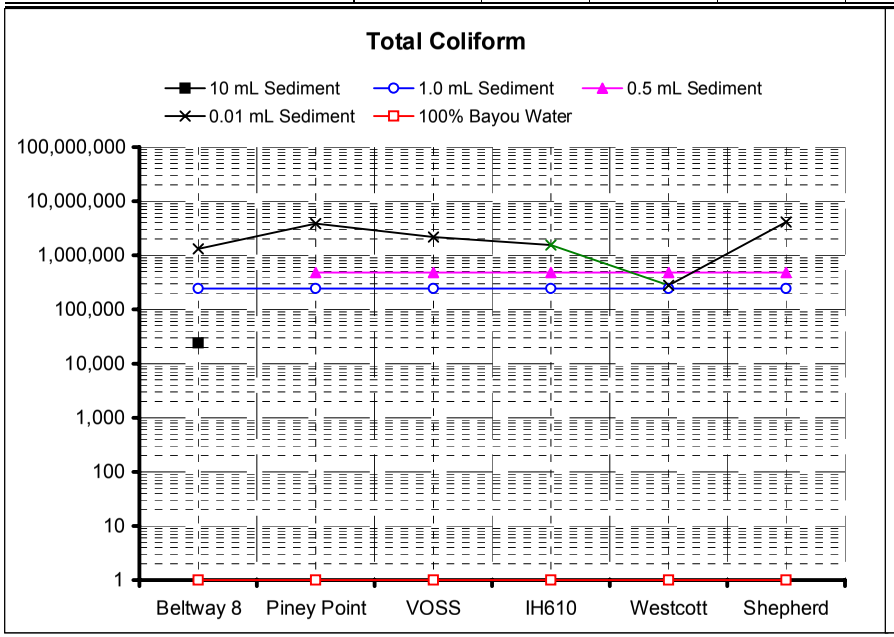


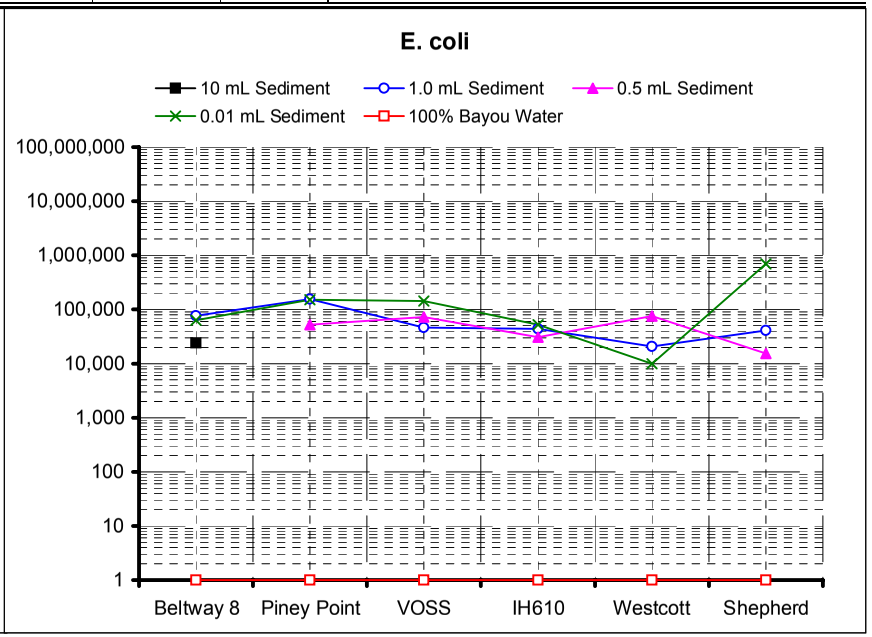
Note: Water samples collected from BB @ Beltway 8, boiled then cooled for flushing sediment samples through sterilized solar screen.

TABLE 3.13b
BUFFALO BAYOU SEDIMENTS DOWNSTREAM OF BELTWAY 8

SampleType	Total Coliform (MPN/dL)						E coli (MPNdL)					
Sediment Collection Sites	Shepherd	Westcott	IH610	VOSS	Piney Point	Beltway 8	Shepherd	Westcott	IH610	VOSS	Piney Point	Beltway 8
Date	8/6/2001	8/6/2001	8/6/2001	8/6/2001	8/6/2001	8/6/2001	8/6/2001	8/6/2001	8/6/2001	8/6/2001	8/6/2001	8/6/2001
10 mL Sediment						> 24,192						24,192
1.0 mL Sediment	> 241,920	> 241,920	> 241,920	> 241,920	> 241,920	> 241,920	41,060	20,750	43,520	46,110	155,307	77,010
0.5 mL Sediment	> 483,840	> 483,840	> 483,840	> 483,840	> 483,840		15,360	75,680	30,820	72,180	52,040	
0.01 mL Sediment	4,160,000	278,000	1,553,000	2,178,000	3,873,000	1,313,000	697,000	< 10,000	52,000	143,000	152,000	63,000
Geometric Means	786,724	319,256	566,476	634,080	768,199	197,334	76,035	25,042	41,163	78,076	107,100	48,961
100% Boiled Bayou Water	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1

ANACON Results	Date	Time	TSS	TP	NH3-N	NO2+3-N	TOC	Remarks
Beltway 8 - Boiled Water	8/6/2001	9:40	28.0	1.63	< 0.20	4.7	8	BB@ Beltway 8.



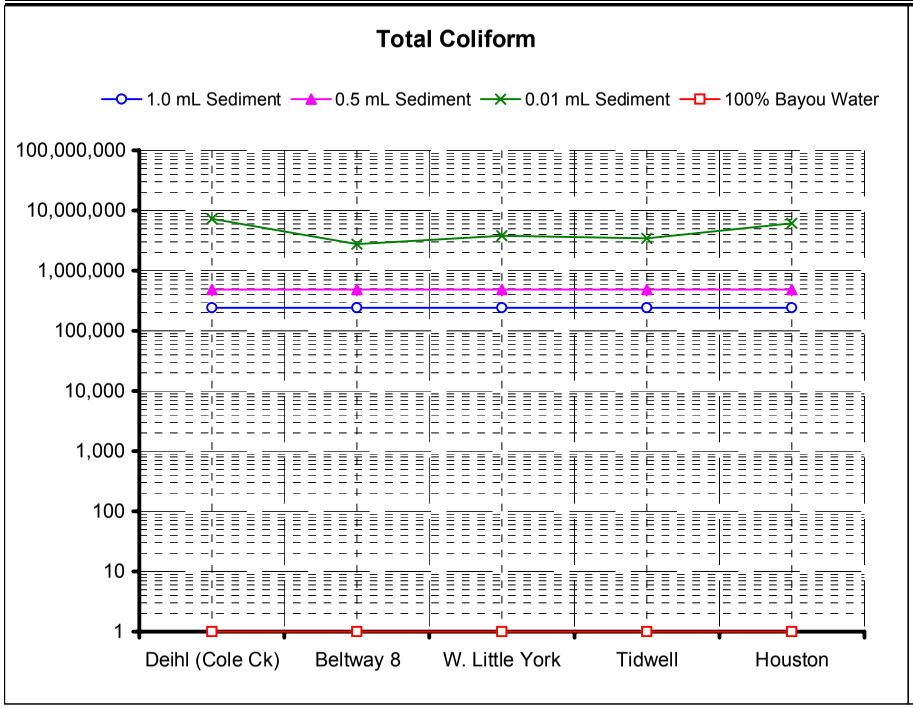


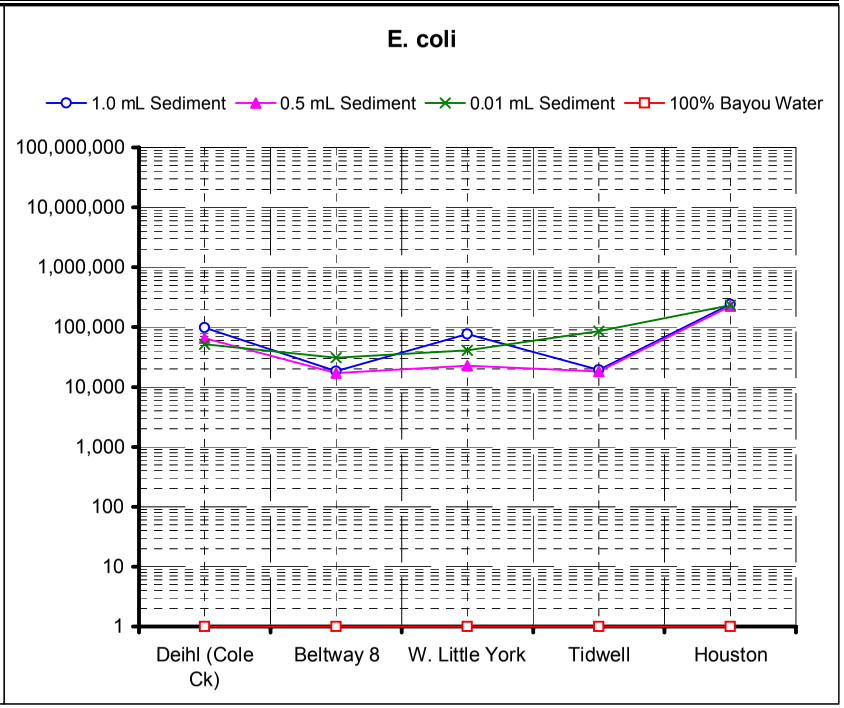
Note: Water samples collected from BB @ Beltway 8, boiled then cooled for flushing sediment samples through sterilized solar screen.

TABLE 3.14
WHITE OAK BAYOU SEDIMENTS

SampleType	Total Coliform (MPN/dL)					E coli (MPN/dL)				
Sediment Collection Sites	Houston	Tidwell	W. Little York	Beltway 8	Deihl (Cole Ck)	Houston	Tidwell	W. Little York	Beltway 8	Deihl (Cole Ck)
Date	8/13/2001	8/13/2001	8/13/2001	8/13/2001	8/13/2001	8/13/2001	8/13/2001	8/13/2001	8/13/2001	8/13/2001
1.0 mL Sediment	> 241,920	> 241,920	> 241,920	> 241,920	> 241,920	241,917	19,350	77,010	18,500	98,040
0.5 mL Sediment	> 483,840	> 483,840	> 483,840	> 483,840	> 483,840	223,970	18,140	22,600	17,100	65,640
0.01 mL Sediment	6,131,000	3,448,000	3,784,000	2,755,000	7,260,000	231,000	86,000	41,000	31,000	52,000
Geometric Means	895,299	739,004	762,269	685,749	947,189	232,179	31,137	41,478	21,405	69,426
100% Boiled Bayou Water	< 1	< 1	1	< 1	< 1	< 1	< 1	< 1	< 1	< 1

ANACON Results	Date	Time	TSS	TP	NH3-N	NO2+3-N	TOC	Remarks
Beltway 8 - Boiled Water	8/6/2001	9:40	28.0	1.63	< 0.20	4.7	8	BB@ Beltway 8.





Note: Water samples collected from BB @ Beltway 8, boiled then cooled for flushing sediment samples through sterilized solar screen.

3.1.4.2 Sediment Resupply

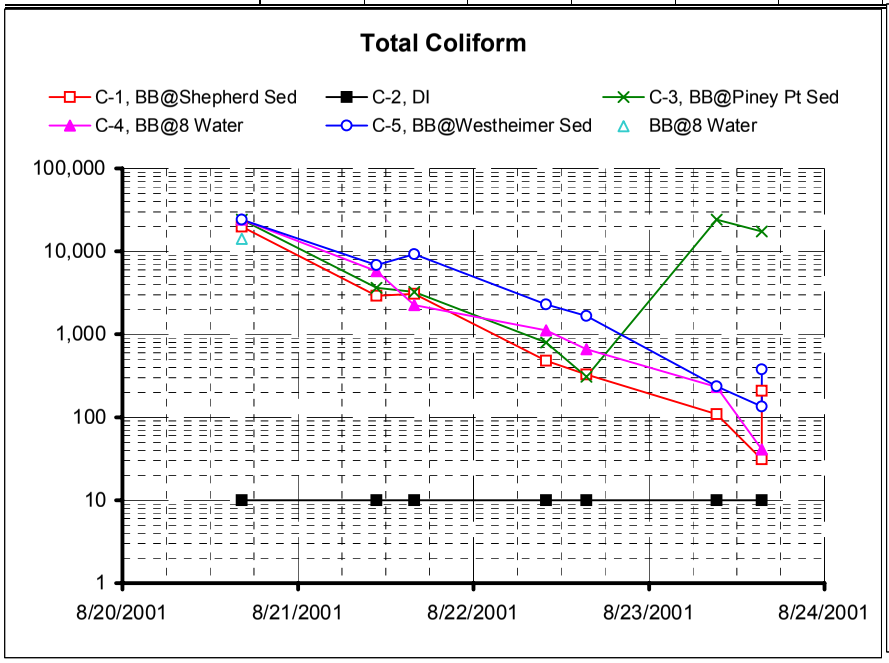
To assess the role of bacteria resupply from sediments, three of the sediment samples collected on both Buffalo and Whiteoak bayous were transferred to test chambers and fresh bayou water was added with minimal disturbance of the sediment in the bottom of the test chambers. The bacteria concentrations were monitored at the start of the test and also on a daily basis during the period August 20 to August 24. Also monitored was a water sample collected from the same location but without sediment and a DI control (field blank) water source.

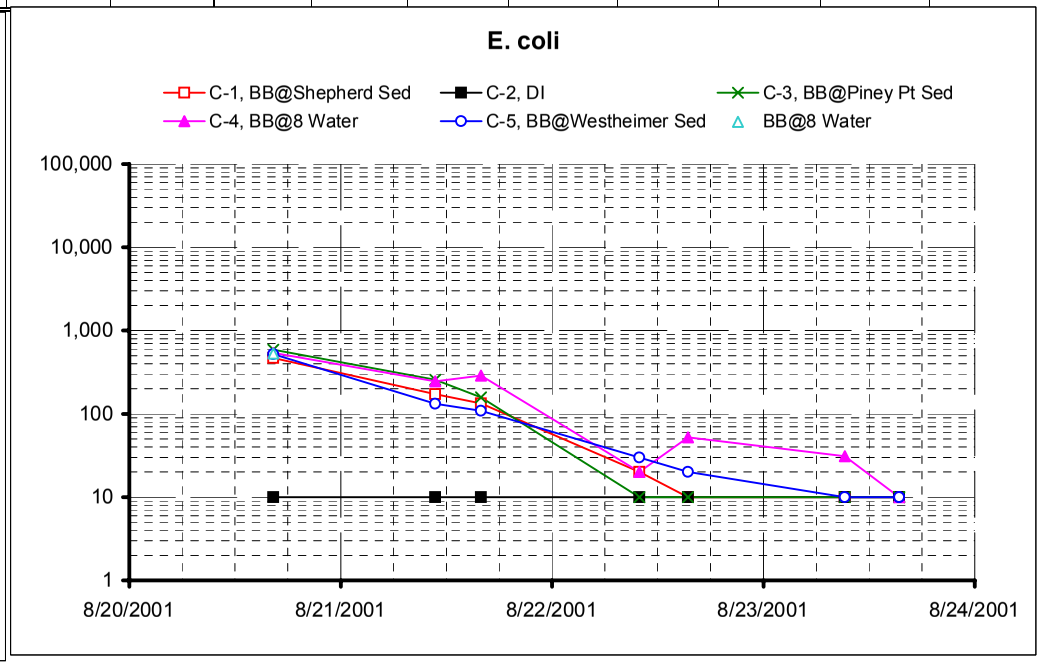
Tables 3.15 and 3.16 show the time series for the test chambers with sediment added from Buffalo and Whiteoak bayous, respectively. The major observation from these resupply tests was that the rate of decay of the bacteria in the test chambers with sediment was not significantly different from the rate of decay of the water without sediment. A mild stirring of the water in the chambers was conducted and a second set of samples was collected. Analysis of these samples did not show an increase in EC bacteria , but did show a significant increase in TC. This result suggests some potential for higher bacteria levels in the water column due to sediment re-suspension by turbulence.

A limitation of this resupply analysis is that there was little water motion in the test chambers like there would be in the bayous. With no current movement and associated turbulence, there is much greater settling of suspended matter and very little resuspension.

TABLE 3.15
BUFFALO BAYOU SEDIMENT RESUPPLY TEST CHAMBER STUDY

SampleType	Total Coliform (MPN/dL)								E coli (MPN/dL)							
Date	8/20/2001	8/21/2001	8/21/2001	8/22/2001	8/22/2001	8/23/2001	8/23/2001	8/23/2001	8/20/2001	8/21/2001	8/21/2001	8/22/2001	8/22/2001	8/23/2001	8/23/2001	8/23/2001
Time	16:20	10:45	15:55	9:55	15:26	9:15	15:25	15:25	16:20	10:45	15:55	9:55	15:26	9:15	15:25	15:25
C-1, BB@Shepherd Sed	19,863	2,909	3,076	479	327	109	31	209	470	173	134	20	10	< 10	10	< 10
C-2, DI	< 10	< 10	< 10	< 10	< 10	< 10	< 10		< 10	< 10	< 10	< 10	< 10	< 10	< 10	
C-3, BB@Piney Pt Sed	24,192	3,654	3,255	794	309	> 24,192	17,329	19,863	591	256	158	10	10	< 10	< 10	< 10
C-4, BB@8 Water	> 24,192	5,794	2,247	1,112	663	231	41		538	246	288	20	52	31	< 10	
C-5, BB@Westheimer Sed	> 24,192	6,867	9,208	2,300	1,664	235	135	379	520	132	109	30	20	< 10	< 10	< 10
BB@8 Water	14,136								529							
Remarks								Stirred								Stirred

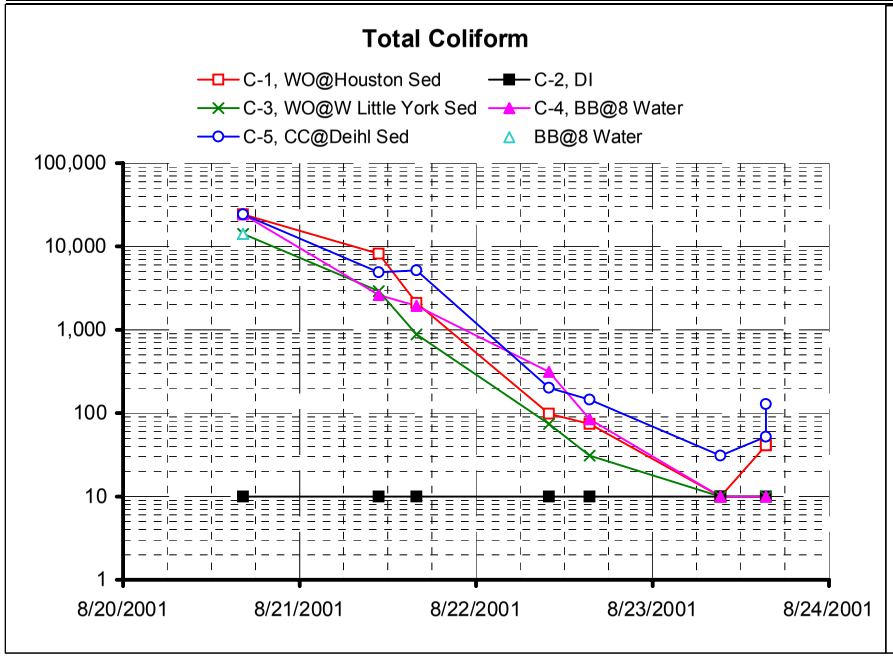


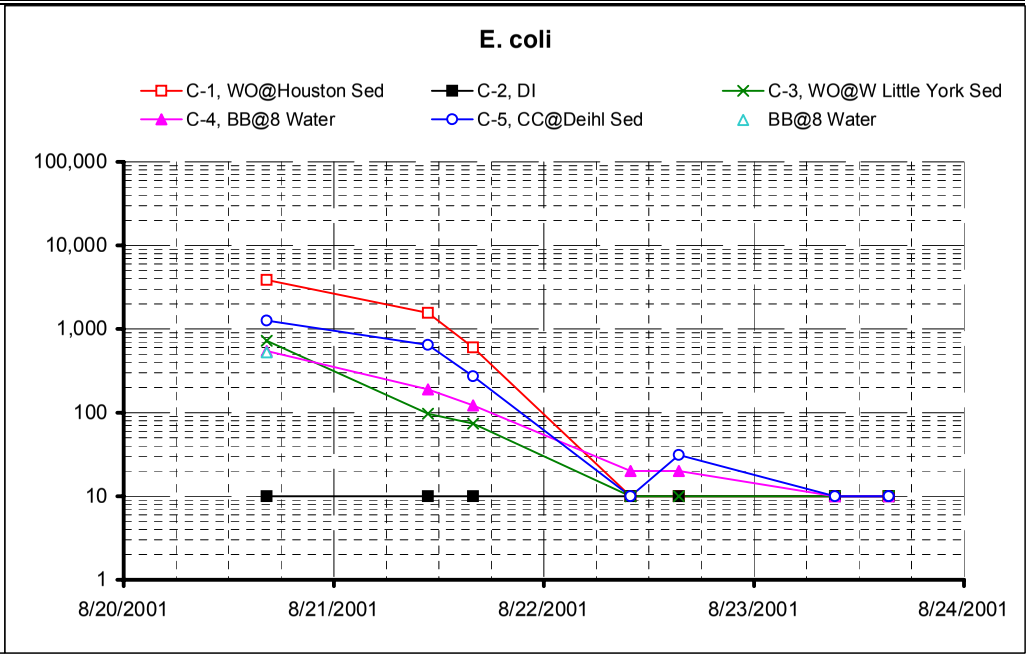


Note: 1. Water samples collected from BB @ Beltway 8. 2. The "stirred" data involve using a pipet to stir water in a chamber for 10 seconds before taking the water sample.

TABLE 3.16
WHITE OAK BAYOU SEDIMENT RESUPPLY TEST CHAMBER STUDY

SampleType	Total Coliform (MPN/dL)								E coli (MPN/dL)							
Date	8/20/2001	8/21/2001	8/21/2001	8/22/2001	8/22/2001	8/23/2001	8/23/2001	8/23/2001	8/20/2001	8/21/2001	8/21/2001	8/22/2001	8/22/2001	8/23/2001	8/23/2001	8/23/2001
Time	16:20	10:45	15:55	9:55	15:26	9:15	15:25	15:25	16:20	10:45	15:55	9:55	15:26	9:15	15:25	15:25
C-1, WO@Houston Sed	> 24,192	8,164	2,098	98	74	10	41	41	3,873	1,553	601	10	10	< 10	10	< 10
C-2, DI	< 10	< 10	< 10	< 10	< 10	< 10	< 10		< 10	< 10	< 10	< 10	< 10	< 10	< 10	
C-3, WO@W Little York Sed	14,136	2,909	880	74	31	10	< 10	402	723	97	74	10	< 10	10	< 10	< 10
C-4, BB@8 Water	24,192	2,613	1,935	314	85	< 10	10		546	189	122	20	20	< 10	< 10	
C-5, CC@Deihl Sed	> 24,192	4,884	5,172	201	145	31	52	128	1,259	645	272	10	31	< 10	< 10	< 10
BB@8 Water	14,136								529							
Remarks								Stirred								Stirred





Note: 1. Water samples collected from BB @ Beltway 8. 2. The "stirred" data involve using a pipet to stir water in a chamber for 10 seconds before taking the water sample.

3.1.4.3 Maintenance of Sediment Bacteria Levels

To evaluate the stability of bacteria concentrations in sediment, additional measurements using the same methods were taken after a week of refrigerated storage and a week of storage in the test chambers at ambient temperatures. Table 3.17 shows the results for each bayou for these aged samples, along with the geometric mean of the sediment concentrations originally measured. As listed in the table, the bacteria concentrations after collection, refrigerated storage for two weeks, and then maintained at ambient temperature for a week, were between 10,000 and 100,000 MPN/dL, or between 5% and 67% of the original values. This is very different from the water samples that would typically drop to non-detect levels in two days, suggesting that the sediments provide an environment that is conducive to supporting and maintaining high levels of both TC and EC bacteria.

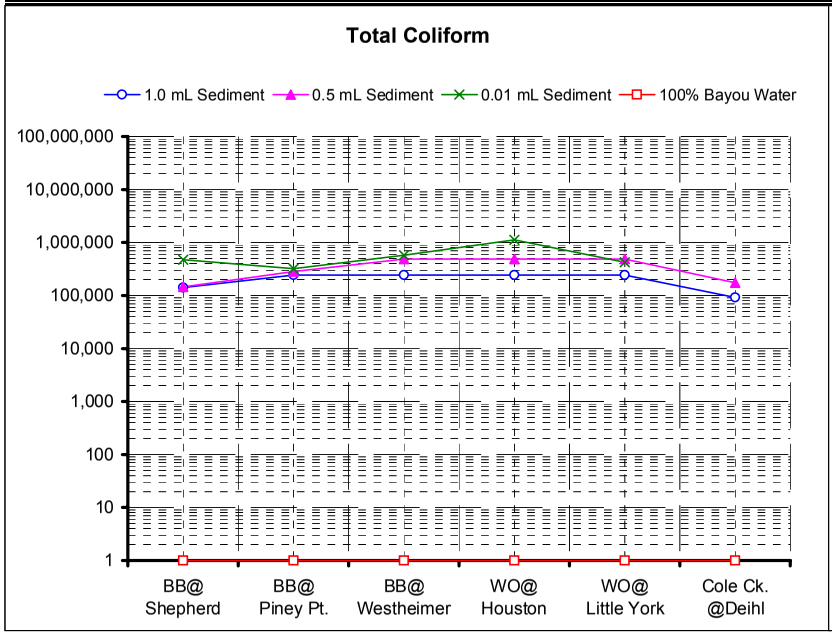
3.1.4.4 Relationship between Bacteria and Sediment Characteristics

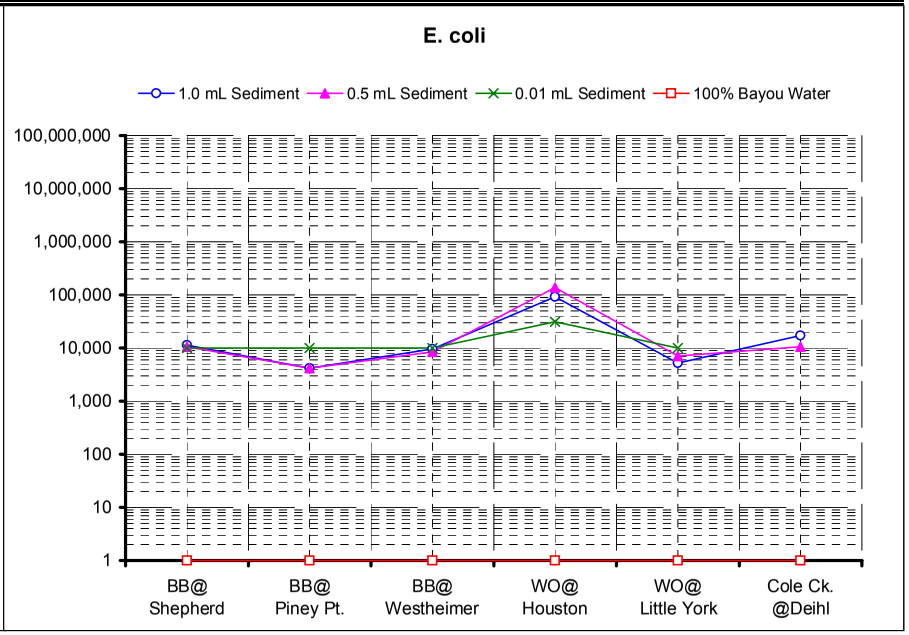
As part of the sediment sampling process, a part of each sample was placed in a separate container and provided to ANACON, Inc. and NWDLS for analysis of physical characteristics and measures of organic content. These data are presented in Table 3.18. The sediment organic carbon content ranged from over 3,000 to over 50,000 milligrams per kilogram (mg/kg), expressed on a dry weight basis. The solids percentage tended to be fairly high, sometimes more than 80%. The sand content of the sediments was also high, in some cases exceeding 90%. The particle size distribution data gives the size in mm for different percentile values, and the EC concentration of the sediments shown is the geometric mean of the values measured.

TABLE 3.17
SEDIMENT RESUPPLY - SEDIMENTS FROM TEST CHAMBERS AFTER ONE WEEK IN STREAM

SampleType	Total Coliform (MPN/dL)						E coli (MPN/dL)					
Sediment Collection Sites	BB@ Shepherd	BB@ Piney Pt.	BB@ Westheimer	WO@ Houston	WO@ Little York	Cole Ck. @Deihl	BB@ Shepherd	BB@ Piney Pt.	BB@ Westheimer	WO@ Houston	WO@ Little York	Cole Ck. @Deihl
Date	8/27/2001	8/27/2001	8/27/2001	8/27/2001	8/27/2001	8/27/2001	8/27/2001	8/27/2001	8/27/2001	8/27/2001	8/27/2001	8/27/2001
10 mL Sediment												
1.0 mL Sediment	141,360	> 241,920	> 241,920	> 241,920	> 241,920	92,080	11,300	4,160	9,590	92,080	5,200	17,230
0.5 mL Sediment	145,200	282,720	483,834	> 483,840	483,834	173,280	10,580	4,180	8,500	137,340	7,080	10,560
0.01 mL Sediment	471,000	323,000	576,000	1,124,000	426,000		< 10,000	10,000	10,000	31,000	10,000	
Geometric Mean after storage	213,029	280,593	407,002	508,604	368,066	173,280	10,613	5,582	9,341	73,188	7,167	13,489
% of Levels at Collection	27.1	36.5	67.0	56.8	48.3	18.3	14.0	5.2	28.0	31.5	17.3	19.4
100% Boiled Bayou Water	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Concentrations measured when samples were first obtained from the streams:												
Date	8/6/2001	8/6/2001	8/15/2001	8/13/2001	8/13/2001	8/13/2001	8/6/2001	8/6/2001	8/15/2001	8/13/2001	8/13/2001	8/13/2001
1.0 mL Sediment	> 241,920	> 241,920	> 241,920	> 241,920	> 241,920	> 241,920	41,060	155,307	41,060	241,917	77,010	98,040
0.5 mL Sediment	> 483,840	> 483,840	> 483,840	> 483,840	> 483,840	> 483,840	15,360	52,040	29,100	223,970	22,600	65,640
0.01 mL Sediment	4,160,000	3,873,000	1,918,000	6,131,000	3,784,000	7,260,000	697,000	152,000	31,000	231,000	41,000	52,000
Geometric Mean at collection	786,724	768,199	607,772	895,299	762,269	947,189	76,035	107,100	33,334	232,179	41,478	69,426

ANACON Results	Date	Time	TSS	TP	NH3-N	NO2+3-N	TOC	Remarks
Beltway 8 - Boiled Water	8/6/2001	9:40	28.0	1.63	< 0.20	4.7	8	BB@ Beltway 8.





Note: Water samples collected from BB @ Beltway 8, boiled then cooled for flushing sediment samples through sterilized solar screen.

TABLE 3.18
CHARACTERISTICS OF SEDIMENT SAMPLES FROM BUFFALO AND WHITE OAK BAYOUS

Station	Description	Date	TKN (mg/kg)	TOC (mg/kg)	% Solids	Size Distribution			Particle Size (mm)						EC[1] (MPN/dL)
						% Sand	% Silt	% Clay	D85	D60	D50	D30	D15	D10	
	BB @ Sheperd	8/06/01	421	9,700	80.8	77.2	21.6	1.2	0.220	0.160	0.140	0.091	0.058	0.046	76,035
	BB @ Westcott	8/06/01	108	3,100	79.9	87.7	13.6		0.170	0.140	0.130	0.108	0.083	0.068	25,042
	BB @ 610	8/06/01	109	4,110	81.2	93.1	8.2		0.300	0.240	0.230	0.198	0.150	0.116	41,163
	BB @ Voss	8/06/01	144	3,320	81.9	90.4	9.6		0.210	0.180	0.170	0.151	0.109	0.078	78,076
	BB @ Piney Point	8/06/01	558	16,800	80.8	76.0	23.6		0.200	0.160	0.130	0.089	0.058	0.049	107,100
	BB @ Beltway 8	8/06/01	156	9,640	77.2	85.4	13.4	0.2	0.260	0.230	0.220	0.167	0.083	0.057	48,961
	BB @ Wilcrest	8/06/01	130	20,500	82.6	81.6	13.6	1.1	1.350	0.340	0.250	0.212	0.077	0.053	201,101
	BB @ Kirkwood	8/15/01	420	9,500	71.9	61.6	36.9	1.5	0.210	0.100	0.090	0.067	0.049	0.040	115,044
	BB @ Eldridge	8/15/01	386	22,000	70.5	63.8	31.7	4.5	0.230	0.160	0.110	0.063	0.037	0.014	78,267
	BB @ Hwy. 6	8/15/01	206	5,650	81.2	91.5	8.6		0.210	0.180	0.170	0.141	0.110	0.088	12,253
	BB @ Westheimer	8/15/01	278	6,990	66.0	31.8	47.5	19.3	0.190		0.040	0.019	0.003	0.002	33,334
	BB @ Fry	8/15/01	267	13,600	53.1	9.4	55.7	34.9			0.010	0.004			< 585
	WO @ Houston	8/13/01	314	13,100	76.7	88.2	13.2		0.230	0.210	0.200	0.140	0.092	0.066	232,179
	WO @ Tidwell	8/13/01	190	51,700	80.8	77.4	5.5	0.9	4.750	1.420	1.050	0.626	0.360	0.207	31,137
	WO @ W. Little York	8/13/01	512	20,100	55.7	46.1	41.2	12.7	0.190	0.090	0.070	0.040	0.010	0.004	41,478
	WO @ Beltway 8	8/13/01	120	4,720	83.7	79.7	4.5	0.9	4.680	0.300	0.250	0.219	0.188	0.162	21,405
	Cole Ck @ Deihl	8/13/01	218	3,690	80.0	84.5	14.0	1.3	0.160	0.120	0.110	0.093	0.074	0.055	69,426

[1]Values listed represent geometric means of data obtained using various dilutions.

The sediment characteristics are illustrated using a correlation matrix (Table 3.19). First, it is noted that there is a 0.9 correlation coefficient between the % solids and % sand, with a similar negative coefficient between % solids and silt and clay indicating the sediments were mostly sandy. The EC concentration in the sediment is most strongly related to % clay (r = -0.48). The EC concentration was positively related to % sand, but not by as large of a correlation

coefficient (r = 0.29). It was weakly correlated to the total Kjeldahl nitrogen (TKN) and the total organic carbon (TOC). The EC is also weakly negatively correlated with the sizes of finer particles (D15 and D10) (r = -0.22 and -0.25, respectively). Not all correlations appear to make physical sense. For example, the TOC level shows a high degree of correlation with the sediment grain size at the higher percentile levels, but not with the % sand.

At the start of the work it was expected that the highest sediment bacteria levels would be associated with the smallest particles and most organic sediment. While there was some correlation with organic carbon and nitrogen, there was a bigger correlation factor (r) with % sand, and the strongest r was the negative one with the % clay. Possible factors include the relationship between bacteria colonies and different kinds of substrate, and ability to get separation and quantification of sand versus clay particles. Additionally, these results could be a function of the limited dataset generated.

3.1.4.5 Sediment Discussion

The series of sediment tests clearly demonstrate that unconsolidated sediments in the bayous are a reservoir of bacteria. This can be viewed as an expected result because at a basic

TABLE 3.19
CORRELATION MATRIX FOR SEDIMENT CHARACTERISTICS

	TKN	TOC	%Solids	% Sand	% Silt	% Clay	D85	D60	D50	D30	D15	D10	EC
TKN	1.00												
TOC	0.20	1.00											
%Solids	-0.44	-0.10	1.00										
% Sand	-0.39	-0.14	0.90	1.00									
% Silt	0.57	0.00	-0.90	-0.94	1.00								
% Clay	0.18	-0.11	-0.85	-0.96	0.83	1.00							
D85	-0.34	0.53	0.32	0.08	-0.44	-0.33	1.00						
D60	-0.26	0.83	0.24	0.07	-0.41	-0.27	0.76	1.00					
D50	-0.29	0.78	0.38	0.30	-0.51	-0.38	0.76	1.00	1.00				
D30	-0.41	0.68	0.49	0.41	-0.63	-0.45	0.79	0.98	0.98	1.00			
D15	-0.48	0.55	0.52	0.43	-0.70	-0.47	0.82	0.90	0.92	0.96	1.00		
D10	-0.55	0.35	0.62	0.52	-0.78	-0.52	0.82	0.77	0.80	0.87	0.97	1.00	
EC	0.19	0.09	0.25	0.29	-0.15	-0.48	-0.21	-0.15	-0.05	-0.02	-0.22	-0.25	1.00

level, bacteria themselves are suspended particulate matter, although that definition is not generally applied. These loose sediments and associated bacteria are continually getting exchanged between the water and streambed, settling during low flow periods and getting scoured during higher flows.

The test chamber studies described in section 3.2 demonstrate that in the absence of water turbulence and scour, bacteria concentrations drop off quickly, probably associated with the settling of suspended particulate matter. One immediate implication of this finding is that it may be possible to attain bacteria concentrations appropriate for contact recreation by providing areas where settling can occur during low flow periods.

Appendix G.2
Field Measurements Taken by USGS 1990 to Present

Appendix G.1 Field measurements taken by USGS from 1990 to present

Gage ID	Number	Date	Mean Vel (ft/s)	Stream Q cfs
08072300	216	6/20/2005 16:20	0.1	2.26
08072300	214	4/20/2005 10:22	0.23	3.32
08072300	198	3/13/2003 9:35	0.31	8.17
08072300	202	10/3/2003 11:19	0.32	2.71
08072300	144	1/21/1994 12:30	0.33	2.79
08072300	137	2/8/1993 15:45	0.35	8.04
08072300	195	8/29/2002 10:35	0.35	2.3
08072300	117	12/21/1990 9:33	0.38	1.73
08072300	149	9/23/1994 10:54	0.38	3.24
08072300	191	2/26/2002 12:08	0.38	1.97
08072300	221	7/18/2006 14:39	0.38	5.84
08072300	173	11/30/1999 12:48	0.39	1.74
08072300	175	2/29/2000 13:25	0.39	2.67
08072300	150	11/21/1994 11:45	0.4	3.58
08072300	154	10/11/1995 10:15	0.4	2.54
08072300	165	1/26/1998 13:00	0.4	8.95
08072300	189	11/14/2001 9:50	0.4	2.71
08072300	193	5/28/2002 11:05	0.4	2.54
08072300	203	11/25/2003 10:35	0.4	11.4
08072300	174	1/10/2000 11:25	0.42	2.91
08072300	185	5/2/2001 10:10	0.42	2.59
08072300	208	8/2/2004 10:40	0.44	8.96
08072300	115	8/29/1990 10:25	0.45	1.53
08072300	148	8/23/1994 13:20	0.5	4.09
08072300	172	10/4/1999 10:55	0.5	5.42
08072300	111	2/28/1990 10:40	0.52	4.54
08072300	141	8/24/1993 8:00	0.53	6.9
08072300	164	12/17/1997 12:50	0.57	15.1
08072300	136	12/19/1992 12:15	0.58	30.9
08072300	209	10/14/2004 11:50	0.59	21.9
08072300	145	3/14/1994 12:05	0.6	18.9
08072300	186	6/21/2001 10:35	0.65	2.27
08072300	120	3/27/1991 16:40	0.66	2.84
08072300	179	9/6/2000 11:15	0.67	2.25
08072300	129	6/15/1992 13:08	0.68	16.9
08072300	152	6/19/1995 10:10	0.68	6.34
08072300	156	3/12/1996 9:20	0.68	1.87
08072300	178	5/31/2000 10:10	0.68	3.43
08072300	123	8/29/1991 10:54	0.71	7.1
08072300	166	5/6/1998 13:20	0.71	2.42
08072300	190	1/8/2002 10:00	0.71	6.41
08072300	167	10/14/1998 9:45	0.72	34.4
08072300	110	1/10/1990 13:00	0.73	6.18
08072300	200	6/17/2003 11:02	0.81	20.5
08072300	124	10/16/1991 13:50	0.83	3.18
08072300	199	5/5/2003 10:00	0.84	2.68

Appendix G.1 Field measurements taken by USGS from 1990 to present

Gage ID	Number	Date	Mean Vel (ft/s)	Stream Q cfs
08072300	217	7/26/2005 17:13	0.84	16.5
08072300	170	7/1/1999 10:55	0.87	5.02
08072300	146	4/22/1994 13:45	0.9	3.85
08072300	205	3/11/2004 12:50	0.91	9.96
08072300	197	1/21/2003 11:35	0.93	20.9
08072300	215	5/23/2005 11:05	0.95	2.86
08072300	219	1/24/2006 10:25	0.96	7.46
08072300	127	3/11/1992 10:39	0.97	23.9
08072300	113	6/14/1990 10:20	0.99	5
08072300	169	3/24/1999 12:30	0.99	7.49
08072300	134	9/16/1992 11:25	1	5.21
08072300	181	12/15/2000 9:35	1	4.79
08072300	220	4/11/2006 9:56	1.03	2.36
08072300	158	7/23/1996 11:21	1.05	7.65
08072300	201	8/11/2003 11:05	1.08	3.9
08072300	139	5/17/1993 15:40	1.1	7.9
08072300	218	10/13/2005 14:03	1.11	4.37
08072300	112	4/30/1990 10:05	1.12	22.6
08072300	171	8/18/1999 9:50	1.13	3.53
08072300	168	11/30/1998 11:55	1.14	11.6
08072300	119	2/14/1991 11:43	1.18	6.44
08072300	204	1/22/2004 13:40	1.18	22.8
08072300	147	6/14/1994 10:10	1.19	10.2
08072300	151	4/10/1995 11:50	1.19	22.8
08072300	160	12/9/1996 13:53	1.21	3.71
08072300	155	11/27/1995 11:13	1.24	3.06
08072300	194	7/22/2002 10:00	1.28	19
08072300	153	8/23/1995 11:05	1.32	14.5
08072300	116	10/31/1990 9:52	1.36	17.7
08072300	135	11/10/1992 11:07	1.36	11.2
08072300	162	7/10/1997 11:10	1.4	4.24
08072300	157	6/13/1996 11:00	1.41	1.86
08072300	159	11/5/1996 8:18	1.52	6.03
08072300	180	10/10/2000 11:05	1.6	8.29
08072300	138	3/29/1993 12:55	1.69	16
08072300	213	3/4/2005 9:07	1.73	187
08072300	122	7/9/1991 12:31	1.76	22
08072300	130	7/29/1992 16:29	1.77	10.9
08072300	140	6/30/1993 14:50	1.8	100
08072300	163	8/26/1997 9:55	1.8	6.11
08072300	114	8/1/1990 9:55	1.81	13
08072300	125	1/8/1992 9:52	1.87	84.7
08072300	188	10/11/2001 9:40	1.88	23
08072300	212	3/4/2005 8:54	1.94	174
08072300	121	5/20/1991 11:35	1.96	40.9
08072300	207	7/1/2004 10:07	2	200

Appendix G.1 Field measurements taken by USGS from 1990 to present

Gage ID	Number	Date	Mean Vel (ft/s)	Stream Q cfs
08072300	161	2/14/1997 9:13	2.19	146
08072300	184	3/20/2001 9:30	2.2	28.2
08072300	187	8/8/2001 9:22	2.28	38
08072300	143	12/6/1993 15:07	2.3	61.1
08072300	206	4/27/2004 10:45	2.36	278
08072300	128	4/21/1992 12:15	2.49	197
08072300	192	4/9/2002 11:10	2.73	393
08072300	176	4/12/2000 11:42	2.86	535
08072300	183	1/19/2001 12:45	2.92	497
08072300	182	1/19/2001 10:20	2.96	522
08072300	177	4/12/2000 12:30	3.02	501
08072300	133	8/13/1992 14:48	3.92	443
08072300	142	10/13/1993 16:50	3.99	278
08072300	132	8/13/1992 12:52	4.04	546
08072300	118	1/18/1991 18:10	4.09	1590
08072300	131	8/13/1992 9:53	4.24	908
08072300	126	2/4/1992 10:10	4.41	1390
08072300	211	11/24/2004 10:55	4.85	1810
08072300	210	11/23/2004 12:31	5.01	2250
08072300	196	11/4/2002 13:30	5.24	2330
08072730	132	3/29/1991 14:30	0.02	0.22
08072730	125	8/28/1990 10:45	0.08	0.004
08072730	136	10/16/1991 16:55	0.1	0.06
08072730	192	1/13/2000 11:05	0.1	0.62
08072730	120	1/11/1990 10:09	0.11	0.81
08072730	131	2/14/1991 14:48	0.11	6.57
08072730	190	10/5/1999 10:00	0.12	0.54
08072730	126	11/2/1990 8:41	0.13	0.348
08072730	193	2/28/2000 11:35	0.13	0.81
08072730	191	11/22/1999 10:30	0.14	0.52
08072730	183	9/3/1998 11:25	0.15	1.38
08072730	231	6/20/2005 15:00	0.16	1.97
08072730	238	7/17/2006 15:28	0.17	3.12
08072730	237	5/22/2006 13:48	0.19	2.23
08072730	208	5/22/2002 13:15	0.21	0.69
08072730	175	12/12/1996 9:40	0.22	0.513
08072730	218	8/11/2003 11:35	0.24	3.19
08072730	144	9/16/1992 15:00	0.26	1.52
08072730	189	8/16/1999 11:40	0.26	2.28
08072730	142	6/16/1992 13:45	0.27	1.14
08072730	232	8/8/2005 13:59	0.27	2.18
08072730	127	12/21/1990 12:45	0.28	0.08
08072730	174	10/28/1996 11:00	0.28	0.74
08072730	171	7/18/1996 9:45	0.3	0.59
08072730	167	11/27/1995 13:10	0.32	0.48
08072730	123	6/13/1990 11:30	0.34	0.11

Appendix G.1 Field measurements taken by USGS from 1990 to present

Gage ID	Number	Date	Mean Vel (ft/s)	Stream Q cfs
08072730	137	1/9/1992 10:28	0.35	90.9
08072730	235	1/11/2006 12:45	0.35	1.96
08072730	236	4/12/2006 11:28	0.35	1.76
08072730	135	8/29/1991 14:50	0.36	0.22
08072730	196	9/6/2000 14:20	0.38	0.64
08072730	138	1/28/1992 13:14	0.39	103
08072730	204	11/9/2001 11:58	0.39	1.04
08072730	221	1/7/2004 17:22	0.39	1.21
08072730	121	3/9/1990 11:48	0.4	1.52
08072730	202	8/8/2001 11:30	0.42	2.54
08072730	197	10/17/2000 8:52	0.43	1.46
08072730	217	7/16/2003 11:22	0.44	5.63
08072730	230	4/20/2005 14:45	0.44	1.4
08072730	164	7/10/1995 9:50	0.47	0.64
08072730	177	3/13/1997 10:25	0.47	113
08072730	151	8/24/1993 11:43	0.49	0.67
08072730	158	7/21/1994 13:50	0.49	1.24
08072730	172	7/29/1996 9:25	0.49	1.86
08072730	233	10/14/2005 8:22	0.52	2.58
08072730	133	5/22/1991 12:17	0.53	4.85
08072730	124	8/1/1990 12:35	0.54	5.64
08072730	145	11/9/1992 15:45	0.54	0.42
08072730	186	10/26/1998 12:55	0.54	144
08072730	194	4/11/2000 11:00	0.56	0.82
08072730	163	5/15/1995 14:15	0.59	0.72
08072730	168	1/16/1996 11:55	0.6	0.52
08072730	156	4/22/1994 16:45	0.61	0.25
08072730	173	10/4/1996 7:36	0.62	2.71
08072730	195	7/12/2000 14:20	0.63	0.65
08072730	134	7/10/1991 13:15	0.64	5.84
08072730	159	9/7/1994 9:35	0.64	0.45
08072730	179	7/1/1997 12:55	0.64	0.67
08072730	153	12/3/1993 14:40	0.65	0.28
08072730	170	4/30/1996 12:25	0.65	0.947
08072730	206	2/27/2002 12:10	0.65	1.16
08072730	211	10/17/2002 13:05	0.66	0.73
08072730	162	3/29/1995 11:14	0.68	2.08
08072730	169	3/6/1996 13:20	0.68	0.46
08072730	160	10/31/1994 13:55	0.69	35.5
08072730	223	3/12/2004 11:05	0.71	1.42
08072730	213	12/23/2002 9:30	0.72	2.79
08072730	220	11/19/2003 11:20	0.72	149
08072730	188	5/19/1999 14:05	0.74	1.66
08072730	199	1/29/2001 11:05	0.74	139
08072730	214	1/10/2003 12:32	0.75	3.21
08072730	198	12/13/2000 11:18	0.76	1.1

Appendix G.1 Field measurements taken by USGS from 1990 to present

Gage ID	Number	Date	Mean Vel (ft/s)	Stream Q cfs
08072730	201	5/2/2001 14:00	0.76	0.64
08072730	205	1/11/2002 13:00	0.76	1.33
08072730	157	6/10/1994 13:40	0.77	0.59
08072730	224	6/24/2004 17:12	0.78	464
08072730	146	12/21/1992 8:55	0.79	14
08072730	147	2/8/1993 13:54	0.8	0.93
08072730	229	3/2/2005 10:33	0.81	23.8
08072730	182	3/24/1998 14:05	0.82	1.06
08072730	210	9/6/2002 12:56	0.83	1.02
08072730	225	8/4/2004 10:00	0.83	1.51
08072730	143	7/30/1992 14:52	0.86	4.35
08072730	215	3/12/2003 10:50	0.86	4.62
08072730	148	3/30/1993 14:15	0.87	5.02
08072730	178	5/20/1997 10:55	0.87	1.22
08072730	219	10/2/2003 11:10	0.88	1.25
08072730	226	10/15/2004 13:25	0.88	1.7
08072730	154	1/20/1994 13:20	0.89	0.39
08072730	166	10/11/1995 14:00	0.94	0.38
08072730	139	3/11/1992 13:34	0.95	14.2
08072730	228	1/5/2005 12:45	0.95	3.8
08072730	234	12/15/2005 16:55	0.96	53.6
08072730	187	12/3/1998 14:15	0.98	3.89
08072730	200	3/21/2001 10:35	0.98	7.26
08072730	176	2/5/1997 10:40	0.99	1.17
08072730	216	6/23/2003 13:41	1	0.08
08072730	185	10/21/1998 12:33	1.02	1350
08072730	140	4/22/1992 11:10	1.04	21.6
08072730	184	10/14/1998 13:15	1.07	2.19
08072730	180	10/23/1997 9:35	1.1	11.4
08072730	181	1/28/1998 10:10	1.15	4.56
08072730	207	4/8/2002 12:50	1.2	471
08072730	212	11/7/2002 12:02	1.21	348
08072730	149	5/18/1993 18:55	1.23	3.9
08072730	155	3/4/1994 13:45	1.27	2.25
08072730	122	5/1/1990 11:49	1.29	12.4
08072730	165	8/29/1995 11:35	1.33	2.19
08072730	222	1/21/2004 14:20	1.33	19.8
08072730	161	2/3/1995 11:10	1.42	8.64
08072730	129	1/15/1991 16:25	1.48	225
08072730	209	7/17/2002 11:15	1.52	10.5
08072730	203	10/11/2001 13:30	1.73	1260
08072730	227	11/23/2004 9:08	1.73	1020
08072730	128	1/11/1991 11:39	1.85	62.5
08072730	152	10/13/1993 11:55	1.92	64.2
08072730	130	1/17/1991 13:10	2.56	64.4
08072730	150	6/30/1993 11:50	3.17	73.9

Appendix G.1 Field measurements taken by USGS from 1990 to present

Gage ID	Number	Date	Mean Vel (ft/s)	Stream Q cfs
08072730	141	6/8/1992 14:13	3.26	127
08072760	93	1/11/1990 12:15	0.21	1.89
08072760	156	5/26/2006 11:28	0.25	5.63
08072760	111	8/23/1993 12:45	0.27	3.58
08072760	110	3/30/1993 12:15	0.3	4.57
08072760	137	8/11/2003 13:50	0.3	5.59
08072760	129	7/23/2002 13:00	0.31	2.41
08072760	136	7/16/2003 9:33	0.32	8.58
08072760	157	7/19/2006 15:54	0.32	8.89
08072760	94	3/16/1990 11:05	0.39	2.09
08072760	143	3/12/2004 13:50	0.39	3.4
08072760	130	9/6/2002 11:39	0.4	2.94
08072760	124	12/14/2001 10:45	0.48	90.2
08072760	152	8/8/2005 12:07	0.49	4.31
08072760	98	3/28/1991 10:55	0.52	0.91
08072760	96	6/15/1990 10:00	0.56	2.41
08072760	114	4/26/1994 16:00	0.56	2.34
08072760	153	10/25/2005 14:42	0.56	4.25
08072760	112	1/20/1994 11:25	0.57	1.7
08072760	100	8/29/1991 16:30	0.58	1.2
08072760	155	4/11/2006 12:35	0.58	3.37
08072760	123	12/12/2001 9:25	0.59	135
08072760	121	6/12/2001 8:42	0.6	222
08072760	131	10/17/2002 10:40	0.6	2.97
08072760	133	1/13/2003 11:30	0.6	90.7
08072760	138	8/26/2003 10:58	0.63	3.78
08072760	144	4/12/2004 10:45	0.63	185
08072760	128	5/22/2002 9:50	0.65	2.03
08072760	139	9/12/2003 13:00	0.66	219
08072760	151	6/20/2005 13:42	0.67	3.47
08072760	147	10/15/2004 10:50	0.71	4.06
08072760	154	1/11/2006 10:19	0.73	4.52
08072760	135	5/2/2003 9:25	0.76	3.19
08072760	132	1/10/2003 8:24	0.77	2.86
08072760	146	7/23/2004 11:54	0.77	3.65
08072760	145	5/14/2004 13:20	0.78	384
08072760	149	3/2/2005 9:28	0.78	17.5
08072760	99	7/10/1991 10:59	0.86	16.2
08072760	107	9/18/1992 14:00	0.91	8.29
08072760	122	11/9/2001 9:53	0.91	2.56
08072760	148	1/5/2005 10:55	0.91	3.84
08072760	141	12/1/2003 12:30	0.93	3.35
08072760	134	3/11/2003 10:10	1	4.46
08072760	117	10/6/1998 10:55	1.01	177
08072760	103	3/10/1992 14:08	1.03	19
08072760	125	1/11/2002 10:40	1.04	2.69

Appendix G.1 Field measurements taken by USGS from 1990 to present

Gage ID	Number	Date	Mean Vel (ft/s)	Stream Q cfs
08072760	126	2/27/2002 9:50	1.08	2.57
08072760	97	2/19/1991 12:05	1.09	16.3
08072760	150	5/11/2005 9:55	1.09	9.6
08072760	101	10/17/1991 13:23	1.1	5.5
08072760	120	3/28/2001 13:15	1.14	467
08072760	104	4/20/1992 13:02	1.22	91.1
08072760	127	4/8/2002 10:30	1.28	608
08072760	95	4/30/1990 13:01	1.32	57.3
08072760	105	5/28/1992 12:30	1.32	64.2
08072760	142	1/22/2004 10:10	1.6	13.6
08072760	106	7/24/1992 9:53	1.71	28.7
08072760	115	11/1/1994 9:20	1.77	15.9
08072760	102	1/29/1992 11:42	1.88	48.4
08072760	116	3/13/1997 8:53	1.88	225
08072760	109	1/7/1993 16:28	1.94	217
08072760	118	10/22/1998 12:36	1.97	491
08072760	108	12/15/1992 15:30	2.22	293
08072760	113	2/22/1994 18:45	2.55	425
08072760	119	11/13/1998 10:06	2.84	1210
08072760	140	11/17/2003 14:30	3.38	3410
08073500	606	11/24/1992 11:10	0.65	89.1
08073500	596	7/11/1991 10:52	0.8	101
08073500	660	4/26/2002 10:32	0.83	18.9
08073500	630	6/13/1996 8:35	0.86	28.8
08073500	614	12/8/1993 9:30	0.92	117
08073500	639	4/21/1999 11:25	0.92	16.8
08073500	617	4/28/1994 8:35	0.93	46.3
08073500	628	11/29/1995 10:50	0.94	31.4
08073500	594	4/3/1991 14:37	0.98	10.3
08073500	642	10/5/1999 12:30	1	46
08073500	645	3/1/2000 13:15	1.05	44.6
08073500	619	7/26/1994 10:00	1.11	41.5
08073500	620	9/7/1994 12:25	1.13	40.6
08073500	605	10/6/1992 10:15	1.15	29.9
08073500	643	11/29/1999 11:20	1.15	49.4
08073500	637	4/1/1998 13:05	1.16	48.4
08073500	653	5/1/2001 10:20	1.16	55.6
08073500	602	5/12/1992 10:10	1.17	42.4
08073500	650	12/19/2000 9:50	1.19	53.7
08073500	634	9/3/1997 10:20	1.21	49.1
08073500	649	10/16/2000 10:02	1.22	51.6
08073500	680	6/24/2005 11:52	1.22	61.2
08073500	684	4/13/2006 11:26	1.22	56.6
08073500	591	11/5/1990 9:47	1.23	189
08073500	612	9/7/1993 13:30	1.23	42.1
08073500	644	1/11/2000 10:10	1.27	65.8

Appendix G.1 Field measurements taken by USGS from 1990 to present

Gage ID	Number	Date	Mean Vel (ft/s)	Stream Q cfs
08073500	657	11/14/2001 12:55	1.32	48.1
08073500	590	9/21/1990 12:40	1.33	48.2
08073500	627	10/10/1995 12:20	1.34	41.1
08073500	598	10/22/1991 13:24	1.36	33.2
08073500	632	12/11/1996 12:45	1.36	36.5
08073500	666	5/7/2003 12:50	1.36	59.1
08073500	662	9/5/2002 11:00	1.39	59
08073500	654	7/3/2001 9:20	1.4	50.7
08073500	592	12/18/1990 9:35	1.42	55.1
08073500	615	1/19/1994 11:55	1.42	47.9
08073500	647	7/12/2000 8:55	1.42	45
08073500	585	1/22/1990 9:55	1.44	44.7
08073500	659	2/26/2002 9:15	1.44	59.8
08073500	667	6/30/2003 11:22	1.44	71.3
08073500	675	8/16/2004 10:45	1.48	67
08073500	636	1/29/1998 10:10	1.55	82.4
08073500	672	6/3/2004 10:16	1.57	68.1
08073500	655	8/6/2001 11:27	1.58	66.5
08073500	658	1/10/2002 11:25	1.6	81.5
08073500	587	4/19/1990 10:20	1.61	296
08073500	597	9/3/1991 11:47	1.61	266
08073500	641	8/3/1999 9:30	1.61	55.7
08073500	665	3/18/2003 9:40	1.63	84.1
08073500	626	8/22/1995 13:00	1.65	57.2
08073500	616	3/15/1994 8:15	1.67	460
08073500	623	4/3/1995 10:45	1.69	91.9
08073500	670	3/10/2004 12:45	1.7	85.7
08073500	622	2/9/1995 9:40	1.73	68.1
08073500	603	7/1/1992 7:40	1.75	461
08073500	611	8/3/1993 12:00	1.75	63.7
08073500	601	3/4/1992 19:40	1.82	4410
08073500	586	3/9/1990 9:40	1.85	72
08073500	652	3/26/2001 11:05	1.87	92.6
08073500	610	6/7/1993 14:10	1.91	96.8
08073500	604	8/18/1992 10:06	1.97	669
08073500	629	3/6/1996 10:12	1.99	42.6
08073500	631	10/29/1996 12:46	2.02	53.6
08073500	608	3/2/1993 10:54	2.06	804
08073500	664	12/30/2002 11:30	2.07	102
08073500	607	1/13/1993 10:37	2.23	1250
08073500	609	4/19/1993 12:55	2.24	1210
08073500	613	10/15/1993 9:40	2.24	885
08073500	588	6/11/1990 9:50	2.29	56.7
08073500	648	9/1/2000 10:10	2.37	41.2
08073500	599	1/6/1992 12:53	2.44	1450
08073500	589	7/24/1990 9:20	2.47	94

Appendix G.1 Field measurements taken by USGS from 1990 to present

Gage ID	Number	Date	Mean Vel (ft/s)	Stream Q cfs
08073500	600	1/30/1992 11:20	2.52	1630
08073500	682	10/26/2005 14:41	2.53	63.5
08073500	593	2/15/1991 10:50	2.54	1350
08073500	618	6/14/1994 14:00	2.58	230
08073500	668	8/11/2003 9:14	2.67	197
08073500	621	11/2/1994 9:15	2.76	1800
08073500	676	10/13/2004 14:05	2.78	66
08073500	663	11/14/2002 12:15	2.99	2090
08073500	635	10/27/1997 12:50	3.02	1210
08073500	633	3/19/1997 10:37	3.04	472
08073500	673	7/6/2004 10:10	3.1	2050
08073500	638	3/23/1999 12:35	3.12	1350
08073500	669	11/21/2003 12:30	3.12	1940
08073500	646	5/23/2000 9:42	3.13	1730
08073500	677	11/4/2004 9:34	3.13	1780
08073500	686	6/26/2006 12:33	3.23	1670
08073500	625	7/11/1995 10:00	3.24	353
08073500	640	6/30/1999 9:00	3.34	627
08073500	678	2/14/2005 10:32	3.46	2120
08073500	595	5/28/1991 15:00	3.48	1380
08073500	671	4/13/2004 13:30	3.5	1790
08073500	683	1/23/2006 11:38	3.53	563
08073500	685	5/24/2006 11:04	3.59	118
08073500	681	8/9/2005 10:55	3.62	536
08073500	661	7/18/2002 12:30	3.64	725
08073500	656	10/10/2001 13:10	3.73	347
08073500	679	5/10/2005 10:14	3.75	1860
08073500	651	1/23/2001 9:30	3.79	425
08073500	624	5/17/1995 13:55	4.13	227
08073500	674	7/30/2004 10:50	4.94	205
08074500	753	1996-01-10 11:12	0.40	35.3
08074500	758	1997-11-25 09:05	1.66	37.8
08074500	733	1990-07-26 08:39	2.03	30.0
08074500	734	1990-10-30 08:54	2.06	26.6
08074500	737	1991-06-03 12:15	2.11	37.1
08074500	732	1990-04-24 13:05	2.18	39.3
08074500	797	2006-04-12 08:47	2.18	27.5
08074500	763	1999-09-07 08:27	2.29	35.1
08074500	764	1999-11-03 14:03	2.29	34.8
08074500	731	1990-01-23 08:38	2.30	32.9
08074500	760	1999-02-11 08:55	2.33	40.6
08074500	765	1999-12-30 08:26	2.34	33.4
08074500	741	1992-07-06 12:00	2.40	38.1
08074500	745	1993-08-13 11:20	2.40	36.0
08074500	746	1993-10-12 12:25	2.54	34.8
08074500	768	2000-07-10 09:40	2.55	32.6

Appendix G.1 Field measurements taken by USGS from 1990 to present

Gage ID	Number	Date	Mean Vel (ft/s)	Stream Q cfs
08074500	761	1999-05-17 12:54	2.56	50.2
08074500	757	1997-02-04 15:55	2.58	44.1
08074500	756	1996-10-21 12:55	2.60	36.4
08074500	773	2001-04-30 10:50	2.60	42.9
08074500	754	1996-04-08 14:18	2.61	38.4
08074500	755	1996-09-11 13:15	2.61	38.4
08074500	780	2002-05-24 09:35	2.61	30.5
08074500	748	1994-04-21 14:40	2.62	40.7
08074500	752	1995-06-26 13:40	2.62	39.1
08074500	749	1994-07-25 10:52	2.63	36.0
08074500	774	2001-08-06 09:42	2.64	34.3
08074500	778	2002-02-25 08:52	2.66	47.0
08074500	744	1993-04-21 14:20	2.67	50.4
08074500	783	2003-06-13 08:50	2.68	32.7
08074500	769	2000-09-05 08:41	2.70	32.1
08074500	747	1994-01-18 12:45	2.79	40.6
08074500	801	2006-09-06 12:34	2.81	40.0
08074500	742	1992-10-05 12:23	2.84	37.8
08074500	736	1991-02-25 12:44	2.85	55.3
08074500	766	2000-02-24 13:30	2.89	67.1
08074500	793	2005-06-20 10:30	2.90	52.4
08074500	770	2000-12-08 11:42	2.96	40.5
08074500	750	1994-11-01 12:10	3.01	46.1
08074500	771	2001-02-02 09:10	3.04	47.4
08074500	802	2006-11-15 10:44	3.04	43.7
08074500	796	2005-10-25 09:56	3.05	36.0
08074500	739	1992-01-10 10:27	3.06	121
08074500	799	2006-05-18 13:44	3.06	40.2
08074500	762	1999-07-06 12:00	3.08	67.8
08074500	789	2004-09-17 12:00	3.13	47.0
08074500	772	2001-03-19 11:05	3.14	60.0
08074500	775	2001-10-10 09:10	3.14	49.3
08074500	806	2007-05-21 10:12	3.17	52.1
08074500	743	1993-01-13 15:48	3.20	60.4
08074500	740	1992-03-13 10:10	3.24	65.2
08074500	803	2007-01-09 11:03	3.24	54.7
08074500	782	2003-02-18 10:50	3.26	54.1
08074500	784	2003-08-13 08:45	3.39	66.2
08074500	777	2002-01-10 09:28	3.44	53.0
08074500	786	2004-01-21 10:40	3.45	56.9
08074500	785	2003-10-08 09:54	3.53	72.1
08074500	759	1998-09-09 09:15	3.74	70.0
08074500	751	1995-04-20 11:27	3.98	68.4
08074500	804	2007-03-27 11:27	4.00	231
08074500	790	2004-12-09 11:02	4.40	78.0
08074500	791	2005-03-01 10:02	4.74	97.1

Appendix G.1 Field measurements taken by USGS from 1990 to present

Gage ID	Number	Date	Mean Vel (ft/s)	Stream Q cfs
08074500	798	2006-05-05 10:25	4.79	308
08074500	788	2004-07-26 10:10	4.88	165
08074500	805	2007-03-27 13:39	5.23	229
08074500	792	2005-05-09 09:41	6.11	1010
08074500	776	2001-12-12 08:05	6.69	3290
08074500	779	2002-04-08 10:10	6.82	9610
08074500	794	2005-07-14 17:34	6.84	1760
08074500	787	2004-06-23 08:48	7.17	1760
08074500	738	1991-09-06 11:45	7.50	1200
08074500	767	2000-04-03 08:30	7.68	1950
08074500	800	2006-06-19 12:43	7.70	13400
08074500	781	2002-10-29 09:16	7.74	9150
08074500	795	2005-07-15 12:26	8.44	2480
08074500	735	1991-01-10 13:08	8.79	2440
08074020	83	2006-04-13 09:44	0.17	11.4
08074020	81	2006-01-03 09:58	0.19	16.7
08074020	82	2006-02-14 09:28	0.19	17.9
08074020	77	2005-06-16 09:22	0.23	21.8
08074020	79	2005-08-02 08:35	0.25	18.9
08074020	86	2006-08-21 11:30	0.26	30.5
08074020	88	2007-02-07 12:27	0.27	21
08074020	89	2007-05-09 09:33	0.28	24
08074020	84	2006-05-17 11:55	0.31	14.7
08074020	76	2005-05-12 10:40	0.35	25.3
08074020	80	2005-10-12 09:45	0.35	21.5
08074020	90	2007-06-28 08:52	0.38	38.8
08074020	87	2006-10-12 11:09	0.47	22.7
08074020	64	2003-09-08 10:05	0.55	20.7
08074020	57	2002-09-11 09:47	0.58	18.7
08074020	53	2002-03-14 08:50	0.6	16.1
08074020	56	2002-08-01 12:43	0.61	16.7
08074020	52	2001-12-05 13:25	0.69	26.9
08074020	75	2005-03-22 08:49	0.7	43.5
08074020	54	2002-05-01 11:01	0.73	14.2
08074020	61	2003-04-03 09:58	0.73	23.6
08074020	66	2003-12-05 09:18	0.81	21.6
08074020	69	2004-04-28 13:00	0.84	18.8
08074020	62	2003-05-27 10:18	0.85	17.6
08074020	72	2004-10-15 12:50	0.87	22
08074020	71	2004-08-09 09:25	0.89	19
08074020	60	2003-03-07 08:07	0.91	33.1
08074020	65	2003-10-15 09:30	0.93	21.4
08074020	67	2004-01-26 12:44	1	100
08074020	68	2004-03-24 11:35	1	28.4
08074020	70	2004-07-02 11:50	1.24	66
08074020	55	2002-06-17 10:26	1.5	45.4

Appendix G.1 Field measurements taken by USGS from 1990 to present

Gage ID	Number	Date	Mean Vel (ft/s)	Stream Q cfs
08074020	63	2003-07-10 08:25	2.2	105
08074020	74	2005-02-02 10:00	2.24	235
08074020	58	2002-10-09 13:14	3.22	489
08074020	73	2004-11-17 13:55	3.3	766
08074020	78	2005-07-15 13:52	3.43	1560
08074020	59	2002-11-04 09:28	4.43	1620
08074020	85	2006-06-19 11:00	5.91	7990

Indicates samples collected near 2.95 ft/s that were used to calculate flow needed for resuspension to occur

Table G.1-2 Average flow at velocity that causes resuspension

Segment	Bayou	Stream Bed Type	USGS Gage used to Calculate Resupension Flows	Resuspension Flow (MGD)	% Wet Days Resuspension Occurs
1017	Whiteoak Bayou –lower	Concrete	08074500	34	-
1017	Whiteoak Bayou - upper	Earthen	08074020	406	5%
1013	Buffalo - lower	Earthen	08073500	1964	1%
1014	Buffalo - lower	Earthen	08073500	1964	1%
Reservoirs	Buffalo - upper	Earthen	Average of Flows from 08072300, 08072760, 08072730	86	13%

Note: Resuspension does not occur in concrete lined portions of Whiteoak Bayou because its resuspension flow is near the median flow condition, indicating sediment settling is not permited and thus sediment is not available for resuspension

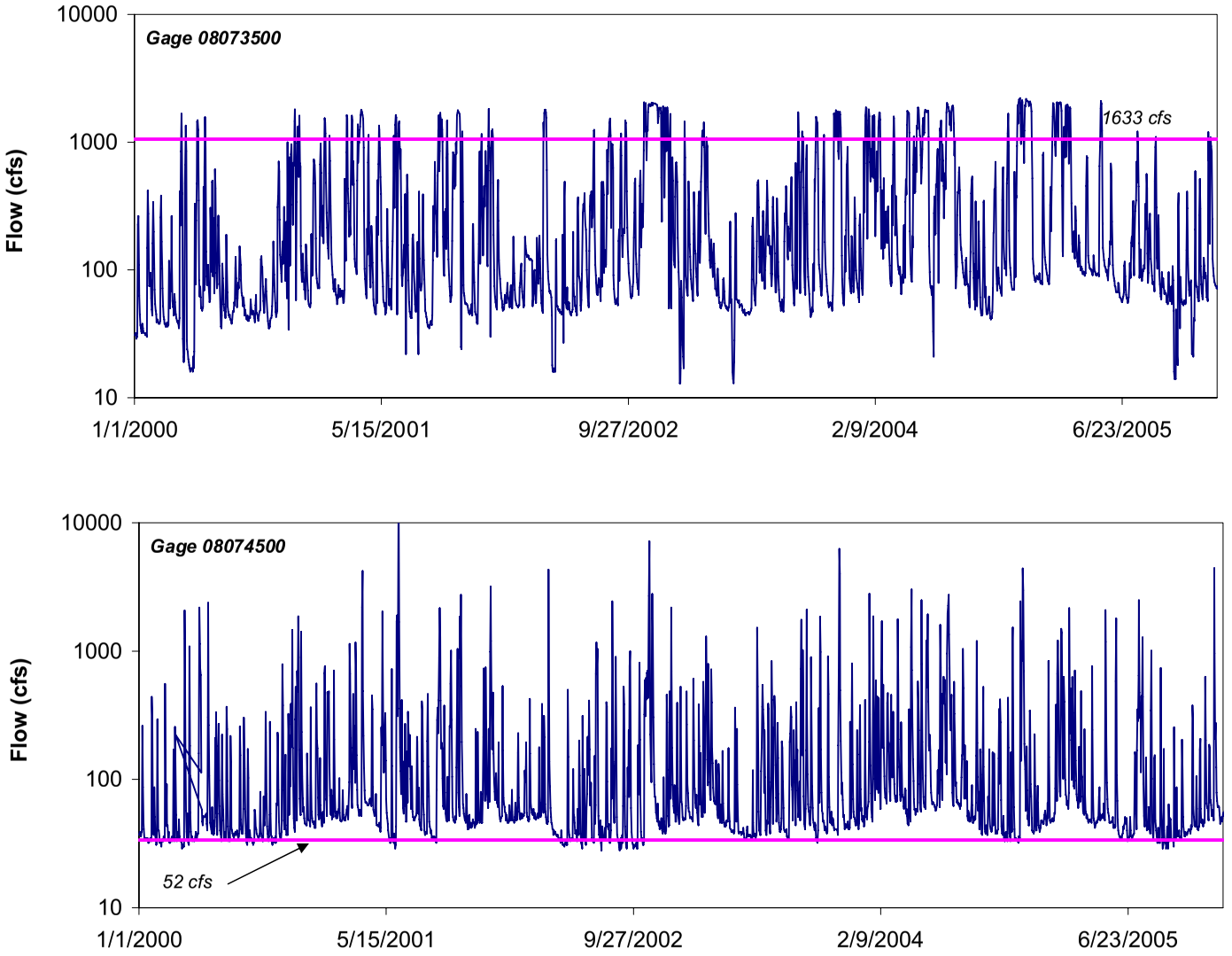


Figure G.1-1. Flow at USGS Gages Compared with Resuspension Flow Rates (shown as straight line in figures)

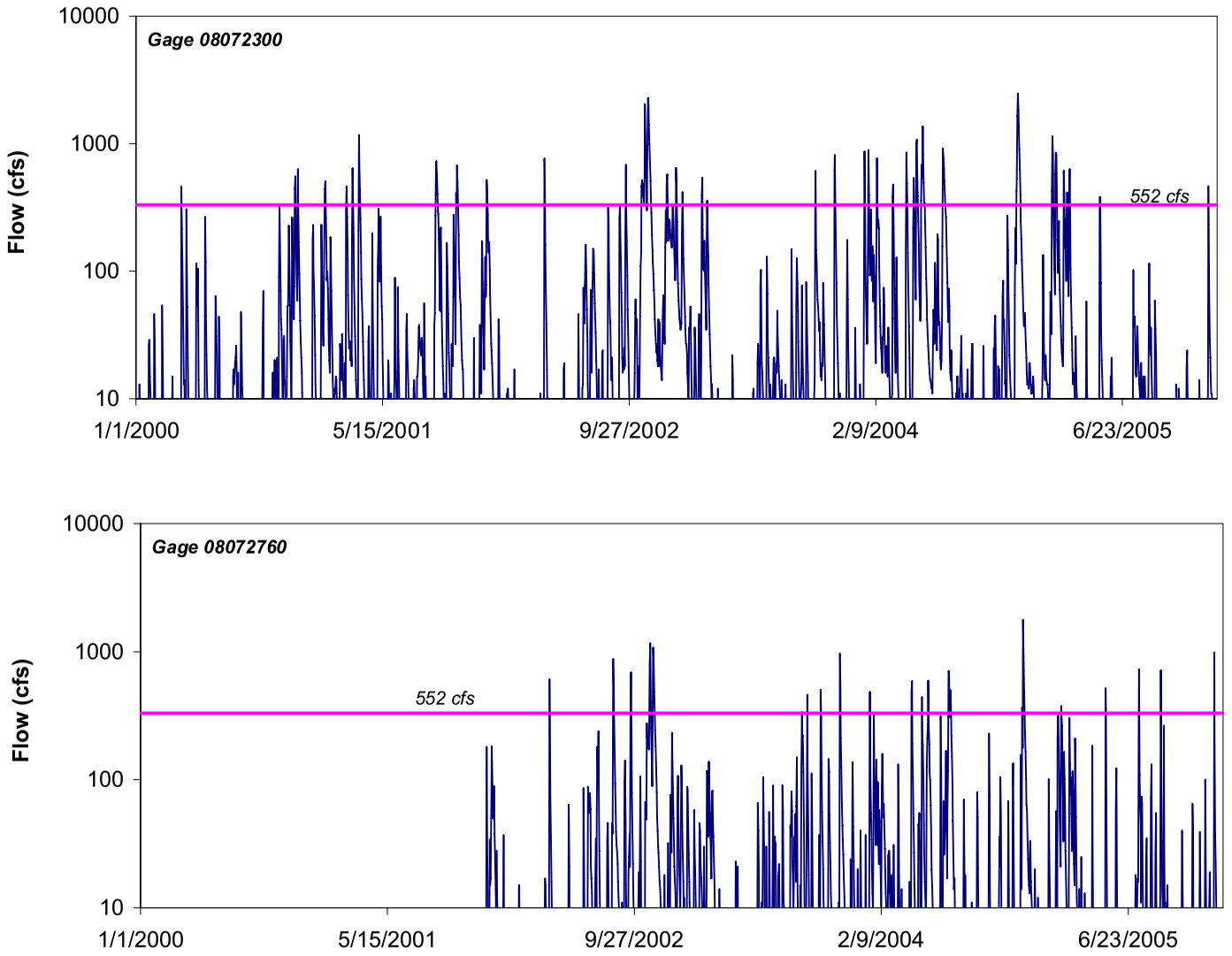


Figure G.1-1. Flow at USGS Gages Compared with Resuspension Flow Rates (shown as straight line in figures)

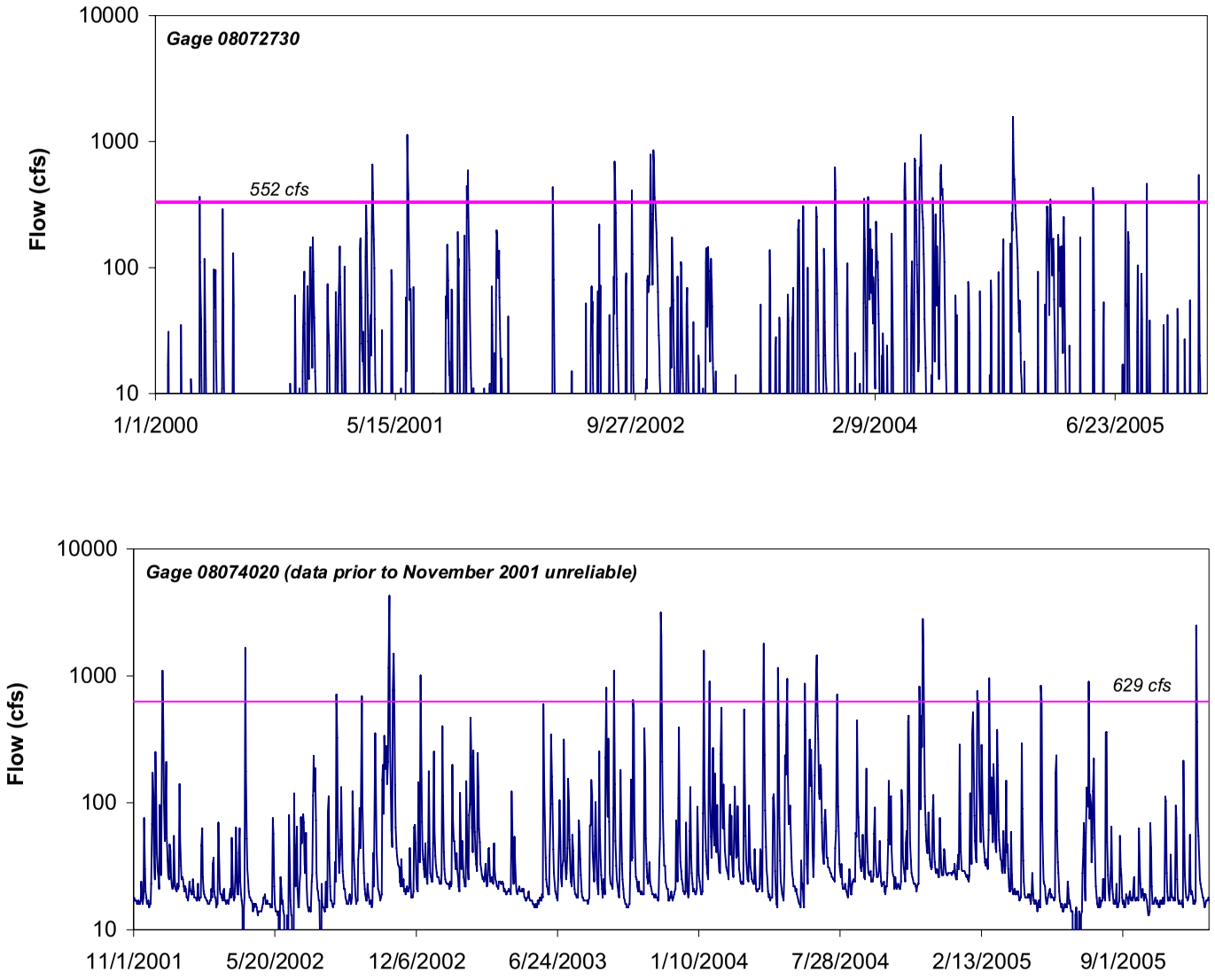


Figure G.1-1. Flow at USGS Gages Compared with Resuspension Flow Rates (shown as straight line in figures)

Appendix H.1
Die-off and Regrowth

Dynamics of Bacteria Population Change (Light/Dark Test Chambers)

The objective of the tests described in this section was to obtain data on the rates of change in bacteria concentration when water samples are isolated from new sources, and also to examine the effects of different light levels. A series of four test chamber experiments was completed. All of the test chambers were located in Buffalo Bayou near the Beltway 8 crossing, but some of the water samples came from Whiteoak Bayou. This section describes these four tests and the major findings.*1*

1.1 Test Started on July 11, 2001

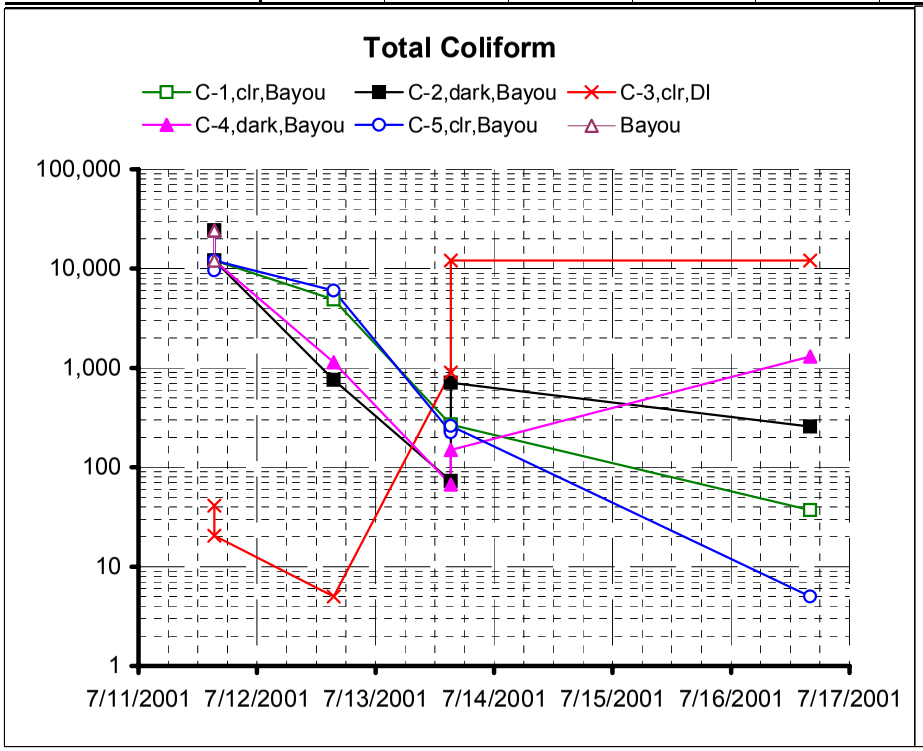
The first test was performed with Buffalo Bayou water between July 11 and July 16. The main factor being tested was the effect of clear versus dark covers over the test chambers on EC concentrations in samples that were isolated from new sources. Table 3.4 shows the results for both TC (total coliform) and EC along with plots of the data over time.

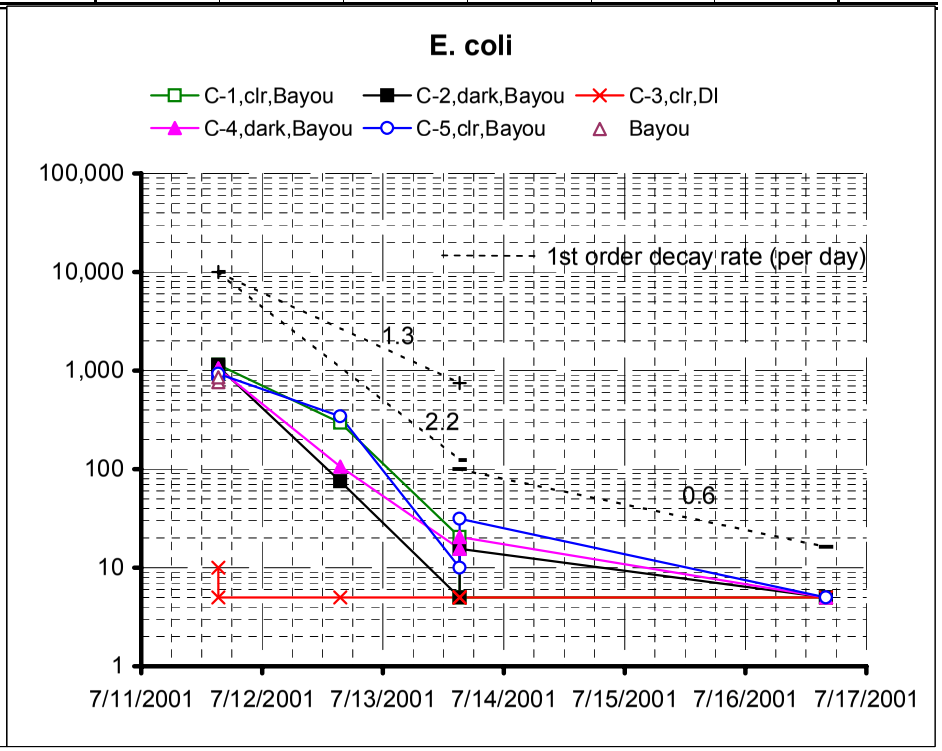
The first point to note is that there are very different results with the IDEXX TC and EC results. The TC values were initially beyond the measurement limit with the dilutions employed, while the EC levels were within range, at approximately 1,000 MPN/dL.

For the test chambers with clear covers, both the TC and EC declined quickly for the first two days, with the dark covered test chambers showing a more rapid decline in both cases. However, on the second day the dark TC test chambers stopped declining and in some cases rebounded. Similarly, the deionized (DI) lab water control with a clear cover spiked in TC

TABLE 3.4
LIGHT/DARK EFFECTS, BUFFALO BAYOU, TEST 1

SampleType	Total Coliform (MPN/dL)						E coli (MPN/dL)						DO
Date	7/11/2001	7/11/2001	7/12/2001	7/13/2001	7/13/2001	7/16/2001	7/11/2001	7/11/2001	7/12/2001	7/13/2001	7/13/2001	7/16/2001	#######
Time	15:20	15:20	15:30	15:15	15:15	16:00	15:20	15:20	15:30	15:15	15:15	16:00	16:00
C-1,clr,Bayou	> 24,192	> 12,096	4,902	269	269	37	933	1,141	296	21	5	< 5	11.2
C-2,dark,Bayou	> 24,192	> 12,096	758	73	711	256	1,145	1,094	75	5	16	< 5	6.6
C-3,clr,DI	41	21	< 5	901	> 12,096	> 12,096	< 10	< 5	< 5	< 5	< 5	< 5	6.5
C-4,dark,Bayou	24,192	> 12,096	1,141	67	150	1,301	1,054	1,049	107	16	21	5	6.3
C-5,clr,Bayou	9,606	> 12,096	6,017	224	260	< 5	836	925	345	10	32	< 5	8.8
Bayou	> 12,096	> 24,192					765	857					
Remarks		Duplicate			Duplicate			Duplicate			Duplicate		





Note: A dead fly was found in DI chamber on 7/13/01.

concentration. However, the EC test of the same water (same test) did not show any increase in concentration. Note that all the test chambers were open under the covers for air exchange. The chambers were built using two longitudinal wooden side boards and six lateral boards placed in between the side boards. The longitudinal ones were shorter in height than the lateral ones and all of them were lined up on the bottom, resulting in the lateral boards being about one inch higher than the longitudinal side boards. A flat lid/cover was attached to the top of the lateral boards, forming open spaces under the lid and above the top of the longitudinal side boards. The lid prevented bird droppings from entering the chambers while the open spaces allowed air, insects, and dust to enter the chambers. It is noted that a dead fly was found in the DI water test chamber on July 13.

The EC test results for both light and dark chambers showed strong bacterial die-off while the DI water control remained at the non-detect level. Of interest is that for both EC and TC, the rate of initial (first 2 days) die-off was higher with the dark test chambers than with the clear plastic covered chambers. The EC plots on the bottom of Table 3.4 include as dashed lines the approximate first-order decay rate, plotted above or below the actual data for clarity. The decay rate for EC in the clear test chambers was approximately 1.3/day while it was 2.2/day in the dark test chambers. After two days, the EC levels became so low that the decay rate dropped to approximately 0.6/day, probably limited by the lower concentration limit of the test.

Another point of interest was the dissolved oxygen levels at the end of the experiment. They were above saturation for the light test chambers and below saturation for the dark and DI water clear test chambers. A related observation was that at the end of the 5-day experiment,

there was noticeable periphyton accumulation on the clear bayou water test chambers but not on the DI water or the bayou water test chambers with dark covers.

.1.2 Test started on July 30, 2001

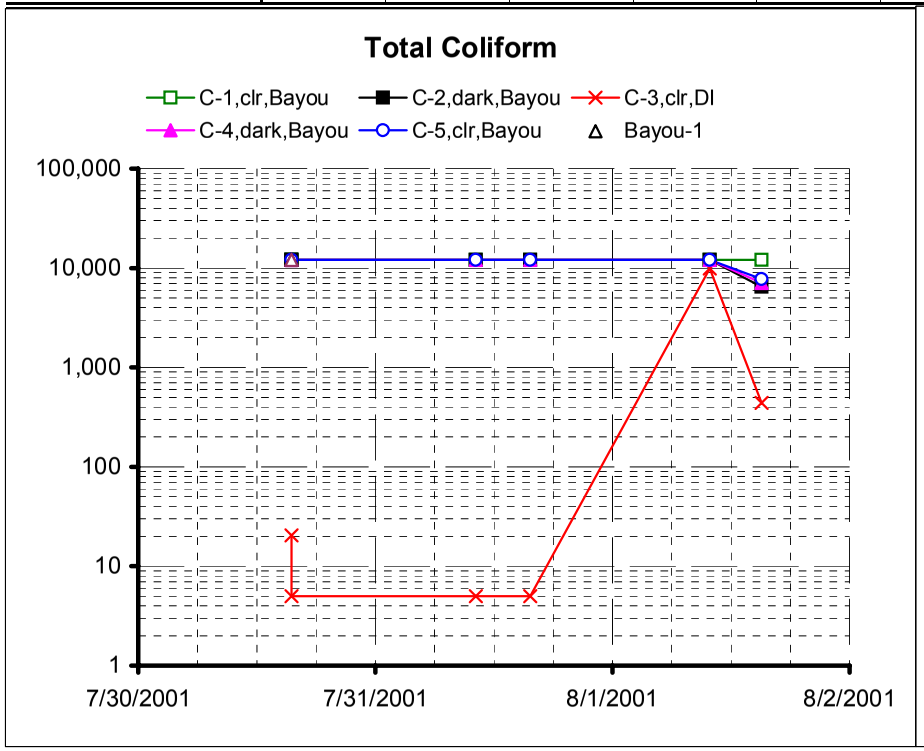
From July 30 to August 1, similar experiments were conducted using Buffalo Bayou water with light and dark covers and also open test chambers. Results are shown in Table 3.5a for covered and Table 3.5b for open test chambers. Both tests were performed near the Beltway 8 bridge on Buffalo Bayou. It is noted that when water samples were taken to fill the test chambers in this test, there had been no recent rainfall events but the Barker and Addicks flood reservoirs were releasing water from previous rains. Therefore, water samples for this test contained more than the typical dry-weather flow.

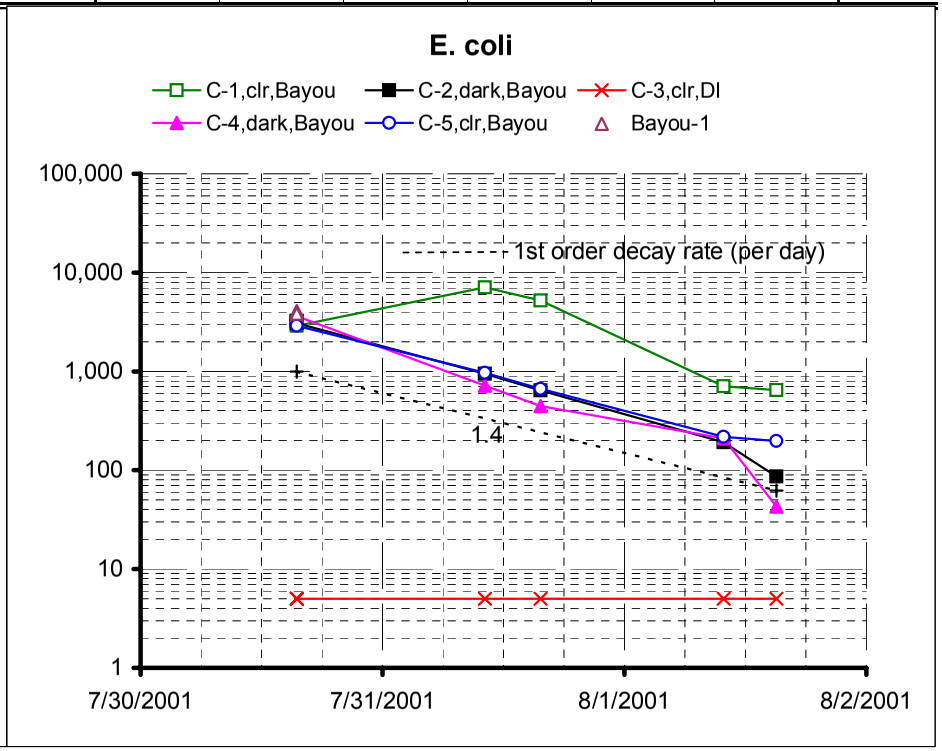
For both the covered and open test chambers, the Buffalo Bayou TC results were too high to quantify. The main difference between the covered and open test chambers is that the DI control showed more of an increase with the clear cover than with the open test chamber. However, all the EC control results were negative. Apparently, airborne inputs of TC (bacteria that grow on the media provided but do not fluoresce under UV light) are fairly common but airborne inputs of EC bacteria (bacteria that grow and do fluoresce) are more rare.

Both the covered (clear and dark) and open test chambers showed very consistent and monotonic die-off of EC bacteria. The first order die-off rates were in the 1.4 to 1.5/day range. An exception was one clear covered test chamber that showed an increase in concentration on the

TABLE 3.5a
LIGHT/DARK EFFECTS, BUFFALO BAYOU, TEST 2, COVERED TEST CHAMBERS

SampleType	Total Coliform (MPN/dL)						E coli (MPN/dL)						DO
Date	7/30/2001	7/30/2001	7/31/2001	7/31/2001	8/1/2001	8/1/2001	7/30/2001	7/30/2001	7/31/2001	7/31/2001	8/1/2001	8/1/2001	
Time	15:30	15:30	10:10	15:40	9:50	15:05	15:30	15:30	10:10	15:40	9:50	15:05	
C-1,clr,Bayou	> 12,096	> 12,096	> 12,096	> 12,096	> 12,096	> 12,096	3,244	2,897	7,068	5,231	710	648	
C-2,dark,Bayou	> 12,096	> 12,096	> 12,096	> 12,096	12,096	6,498	3,244	3,066	946	644	192	87	
C-3,clr,DI	21	5	< 5	< 5	9,931	440	< 5	< 5	< 5	< 5	5	< 5	
C-4,dark,Bayou	> 12,096	> 12,096	> 12,096	> 12,096	12,096	7,068	3,244	3,630	720	445	210	43	
C-5,clr,Bayou		> 12,096	> 12,096	> 12,096	> 12,096	7,765		2,897	968	667	218	198	
Bayou-1	> 12,096	> 12,096					4,082	3,851					
Remarks		Duplicate						Duplicate					

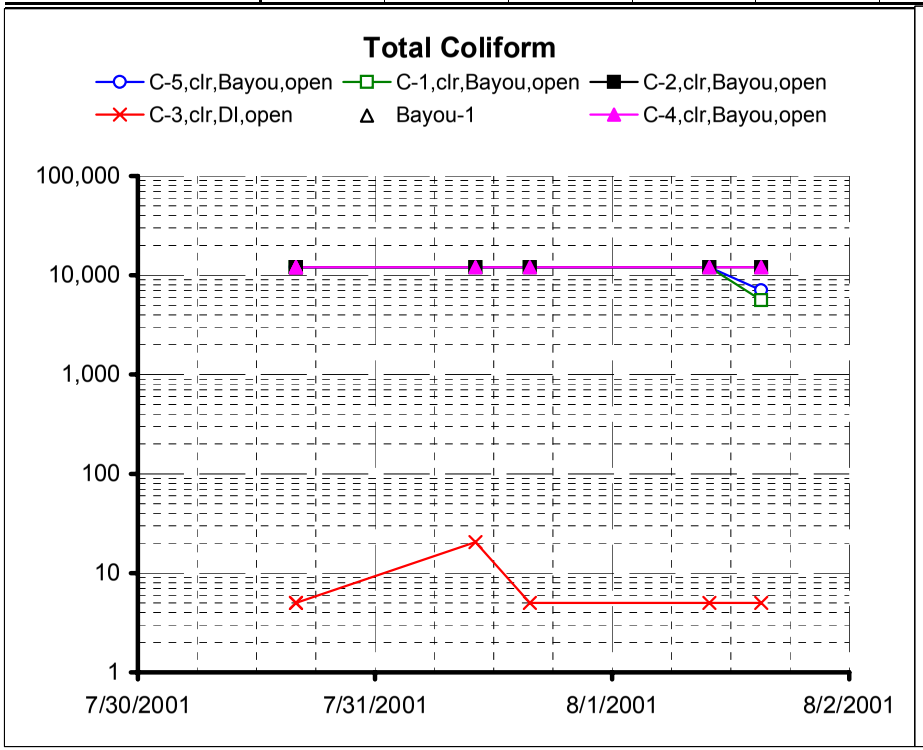


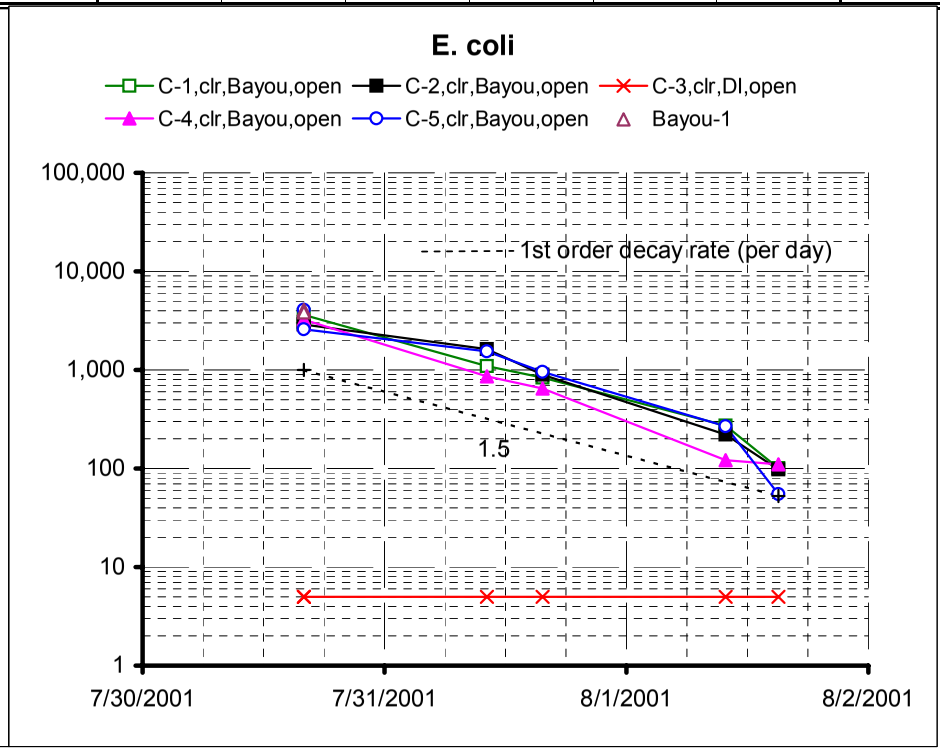


Note: Water samples collected from BB @ Beltway 8.

TABLE 3.5b
LIGHT/DARK EFFECTS, BUFFALO BAYOU, TEST 2, OPEN TEST CHAMBERS

SampleType	Total Coliform (MPN/dL)						E coli (MPN/dL)						DO
Date	7/30/2001	7/30/2001	7/31/2001	7/31/2001	8/1/2001	8/1/2001	7/30/2001	7/30/2001	7/31/2001	7/31/2001	8/1/2001	8/1/2001	
Time	16:00	16:00	10:10	15:40	9:50	15:05	16:00	16:00	10:10	15:40	9:50	15:05	
C-1,clr,Bayou,open	> 12,096	> 12,096	> 12,096	> 12,096	12,096	5,599	2,897	3,630	1,094	835	273	101	
C-2,clr,Bayou,open	> 12,096	> 12,096	> 12,096	> 12,096	> 12,096	> 12,096	3,066	2,897	1,628	893	222	98	
C-3,clr,DI,open	< 5	< 5	21	< 5	5	5	< 5	< 5	5	< 5	< 5	5	
C-4,clr,Bayou,open	> 12,096	> 12,096	> 12,096	> 12,096	12,096	12,096	2,897	3,244	863	648	122	111	
C-5,clr,Bayou,open	> 12,096	> 12,096	> 12,096	> 12,096	> 12,096	7,068	4,082	2,586	1,538	959	269	55	
Bayou-1	> 12,096	> 12,096					4,082	3,851					
Remarks		Duplicate						Duplicate					





Note: Water samples collected from BB @ Beltway 8.

second day, and then resumed the monotonic decline typical of the other results. The cause for the observed increase remains unknown.

1.3 Test started August 1, 2001

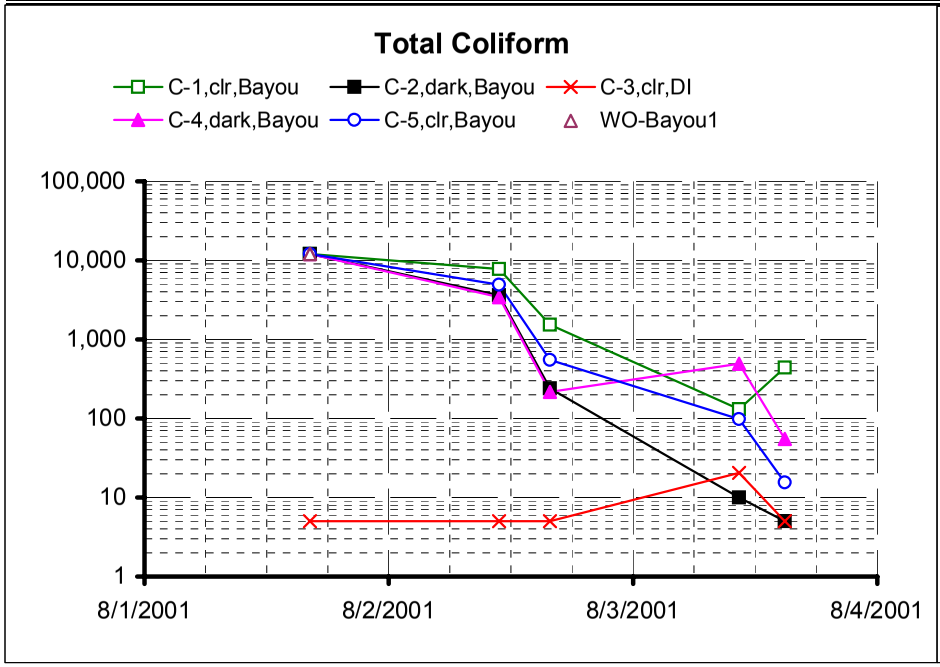
From August 1 to 3, light-dark test chambers were set up using Whiteoak Bayou water collected at IH-610 (West Loop). Two sets of test chambers were set up, one with both clear and opaque plastic covers and the other with the surface open. Both racks of test chambers were deployed at the Beltway 8 bridge on Buffalo Bayou. Results of the two series are shown in Tables 3.6a (covered) and 3.6b (open). Two water samples were collected from Whiteoak Bayou for EC analysis at the same time as a large volume of water was collected in new 5-gallon cubitainers for transport to the Buffalo Bayou test site. The analytical results for the two samples plus the large volume samples were markedly lower than the readings obtained from Buffalo Bayou during the earlier tests. This reflected a period of stable flow in Whiteoak bayou compared to flow impacted by reservoir releases in Buffalo Bayou. By the time the test chambers were set up and the water placed in the new bags, the initial samples taken from the test chambers were lower in EC than when the water was first collected. The average of the initial values was 282 MPN/dL for the open test chambers and 253 MPN/dL for the covered test chambers versus approximately 450 MPN/dL for the samples taken directly from the bayou.

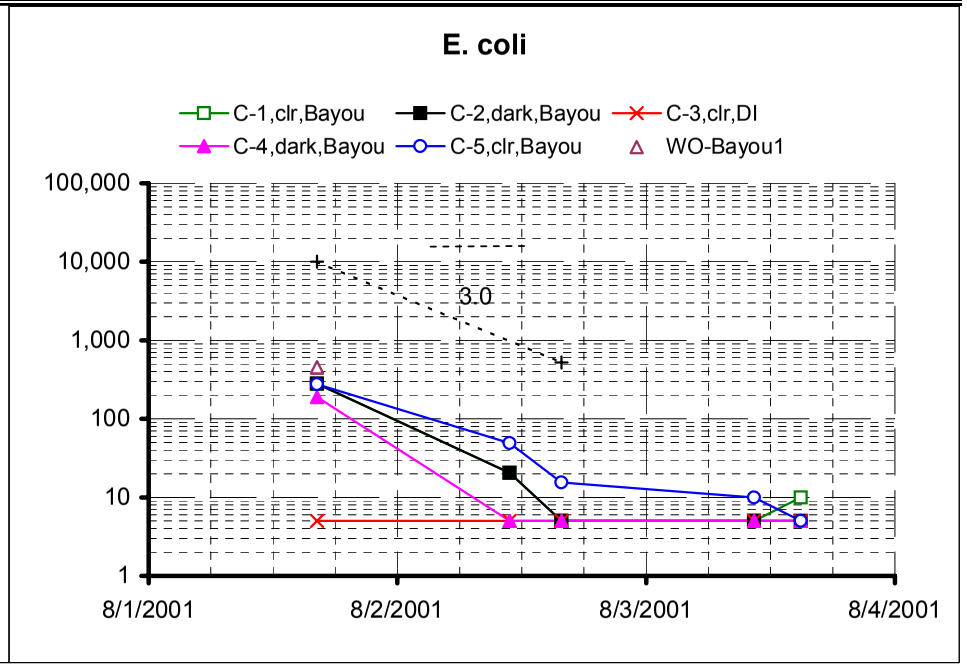
By the next morning the EC level in most of the test chambers had declined further. One open test chamber showed a sharp increase but the other three and all the closed test chambers showed strong decreases in EC levels. The rapid decline continued that afternoon and both sets

TABLE 3.6a
LIGHT/DARK EFFECTS, WHITE OAK BAYOU, TEST 3, COVERED TEST CHAMBERS

SampleType	Total Coliform (MPN/dL)						E coli (MPN/dL)						DO
Date	8/1/2001	8/1/2001	8/2/2001	8/2/2001	8/3/2001	8/3/2001	8/1/2001	8/1/2001	8/2/2001	8/2/2001	8/3/2001	8/3/2001	8/3/2001
Time	16:15	16:15	10:50	15:50	10:25	14:55	16:15	16:15	10:50	15:50	10:25	14:55	14:55
C-1,clr,Bayou	> 12,096		7,765	1,538	131	441	278		21	< 5	< 5	10	11.3
C-2,dark,Bayou	> 12,096		3,630	241	10	5	282		21	< 5	< 5	< 5	8.2
C-3,clr,DI	< 5		< 5	< 5	21	< 5	< 5		< 5	< 5	< 5	< 5	7.6
C-4,dark,Bayou	> 12,096		3,434	216	492	55	190		5	5	< 5	< 5	7.8
C-5,clr,Bayou	> 12,096		4,902	553	99	16	277		49	16	10	< 5	11.2
WO-Bayou1	> 12,096	> 12,096					450	455					
Remarks		Duplicate						Duplicate					

NWDLS Results	Date	Time	TSS	TP	NH3-N	NO2+3-N	FC	EC	Remarks
WO-Bayou1	8/1/2001	16:15	18.4				220	120	WO @ 610; NWDLS picked up samples on 8/7/01.



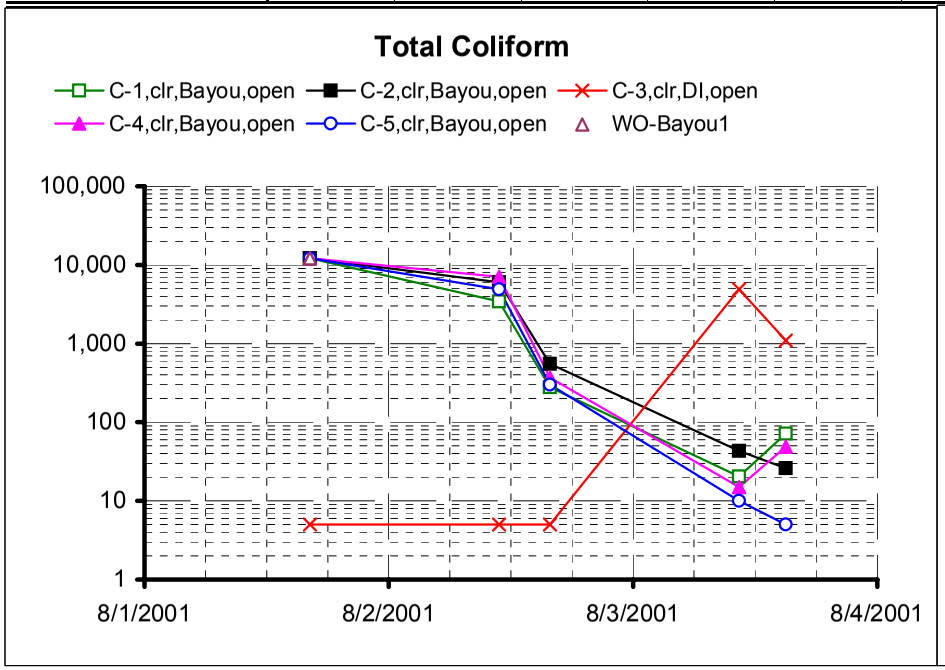


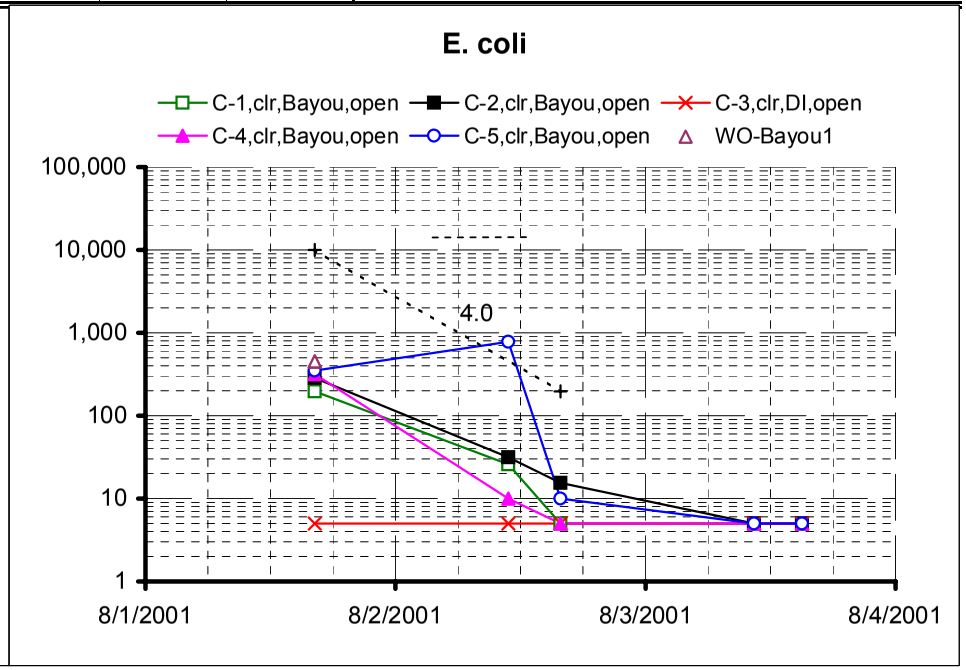
Note: Water samples collected from WO @ 610.

TABLE 3.6b
LIGHT/DARK EFFECTS, WHITE OAK BAYOU, TEST 3, OPEN TEST CHAMBERS

SampleType	Total Coliform (MPN/dL)						E coli (MPN/dL)						DO
Date	8/1/2001	8/1/2001	8/2/2001	8/2/2001	8/3/2001	8/3/2001	8/1/2001	8/1/2001	8/2/2001	8/2/2001	8/3/2001	8/3/2001	8/3/2001
Time	16:15	16:15	10:50	15:50	10:25	15:01	16:15	16:15	10:50	15:50	10:25	15:01	15:01
C-1,clr,Bayou,open	> 12,096		3,434	279	21	72	197		26	< 5	< 5	5	11.1
C-2,clr,Bayou,open	> 12,096		6,017	553	43	26	287		32	16	< 5	< 5	10.5
C-3,clr,DI,open	< 5		5	< 5	4,902	1,094	< 5		5	< 5	< 5	< 5	8.0
C-4,clr,Bayou,open	12,096		7,068	369	15	49	319		10	< 5	< 5	< 5	11.3
C-5,clr,Bayou,open	> 12,096		4,902	301	10	< 5	352		783	10	< 5	< 5	10.9
WO-Bayou1	> 12,096	> 12,096					450	455					
Remarks		Duplicate						Duplicate					

NWDLS Results	Date	Time	TSS	TP	NH3-N	NO2+3-N	FC	EC	Remarks
WO-Bayou1	8/1/2001	16:15	18.4				220	120	WO @ 610; NWDLS picked up samples on 8/7/01.





Note: Water samples collected from WO @ 610.

of test chambers were at the non-detect level at that time and also on the following morning when the test chamber experiments were ended. The first-order die-off rate for both sets of experiments was very high, in the range of 3-4/day.

The DI water controls for both experiments were at non-detect the entire time for EC, but showed TC growth in the open control test chamber but not the covered one. All of the samples had high TC levels initially and TC die-off rates were also fairly high.

Dissolved oxygen (DO) levels were measured when the test chamber experiments were ended. The levels for the DI water controls, both open and covered, were essentially at saturation and there was no indication of attached algal growth on the inside of the plastic cubitainers. The bayou water samples were supersaturated (10.5 to 11.3 where saturation was 7.6 milligrams per liter [mg/L]) when there was either no cover or a clear cover. These test chambers showed attached algal growth on the inside walls of the plastic container. For the two test chambers with a dark cover, the DO levels were 7.8 and 8.2 mg/L, and there was no algal growth.

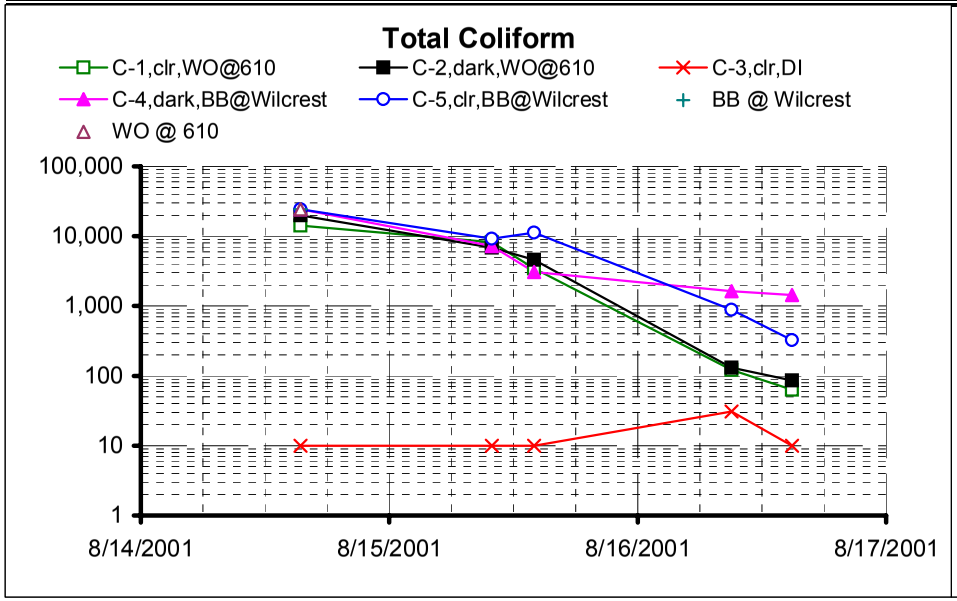
1.4 Test started August 14, 2001

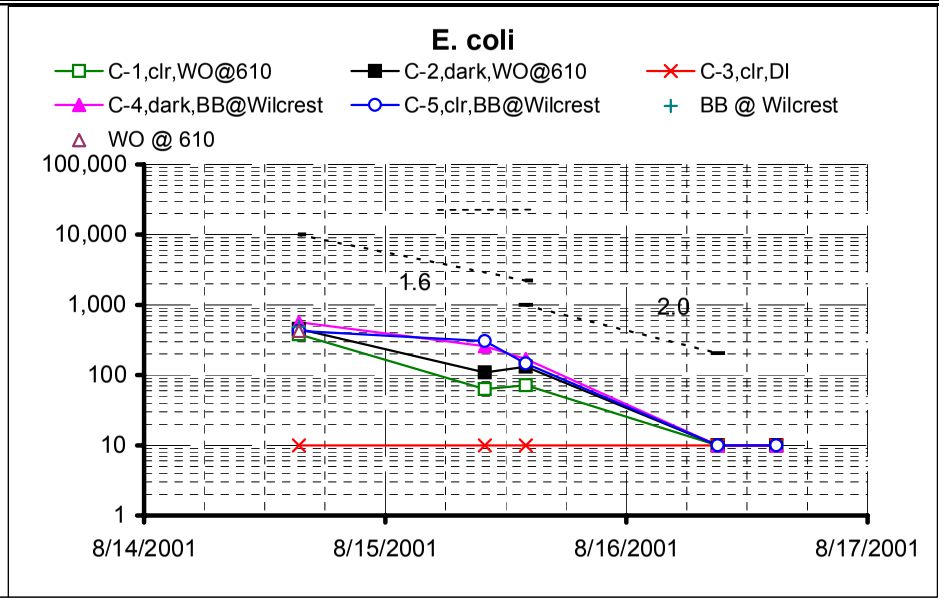
A final set of light/dark test chamber tests was conducted during August 14-16 using water samples collected from Buffalo Bayou at Wilcrest and Whiteoak Bayou at IH-610. These test chambers were covered and the results are shown in Table 3.7. Similar fast die-off rates to those from earlier tests were observed and the first-order rates were in the range of 1.6/day.

TABLE 3.7
LIGHT/DARK EFFECTS, TEST 4, COVERED TEST CHAMBERS

SampleType	Total Coliform (MPN/dL)					E coli (MPN/dL)					DO
Date	8/14/2001	8/15/2001	8/15/2001	8/16/2001	8/16/2001	8/14/2001	8/15/2001	8/15/2001	8/16/2001	8/16/2001	8/16/2001
Time	15:25	9:55	14:00	9:05	14:55	15:25	9:55	14:00	9:05	14:55	14:55
C-1,clr,WO@610	14,136	8,164	3,448	122	63	379	63	72	10	< 10	6.6
C-2,dark,WO@610	19,863	6,867	4,611	131	86	452	109	132	< 10	< 10	4.9
C-3,clr,DI	< 10	< 10	< 10	31	< 10	< 10	< 10	10	< 10	< 10	5.0
C-4,dark,BB@Wilcrest	> 24,192	7,260	3,076	1,631	1,440	565	259	169	10	10	5.3
C-5,clr,BB@Wilcrest	> 24,192	9,208	11,199	882	323	426	305	146	10	10	5.8
BB @ Wilcrest	> 24,192					487					
WO @ 610	24,192					428					
Remarks											Hydrolab mulfunction.

NWDLS Results	Date	Time	TSS	TP	NH3-N	NO2+3-N	FC	EC	Remarks
BB @ Wilcrest	8/14/2001	11:00	45.0	1.03	< 0.10	11.0			Buffalo Bayou @ Wilcrest
WO @ 610	8/14/2001	11:40	9.0	0.92	1.61	9.9			White Oak Bayou @ 610





Note: Water samples collected from BB @ Wilcrest and WO @ 610.

1.5 Discussion of Light/Dark Test Chamber Results

The studies of light and dark effects gave us insight to dieoff rates under light and dark conditions The test chambers were designed to replicate as many aspects of bayou water conditions as possible while still allowing parcels of water to be isolated from new sources. One unavoidable consequence of the isolation was that the level of water turbulence in the test chamber was considerably less than that in the flowing stream. A lower level of turbulence allows particulate matter to settle much more readily than would be the case in the bayous.

These studies consistently demonstrated that bacteria levels decay rapidly in volumes of water that are isolated from turbulence and external resupply. The overall rate varied in these tests from over 1 to as high as 4/day. Table 3.8 presents a summary of the light/dark test chamber test results. One general finding is that bacteria levels in the test chambers tended to follow first-order kinetics and drop off rapidly. If ambient bacteria concentrations in the bayous dropped at the first-order rates observed in the test chamber tests, it is likely that ambient concentrations would be much lower than actually observed. It follows that either the concentrations in the test chambers are reducing more rapidly than in the bayous or there are major external sources to the bayous that maintain the high concentrations despite rapid die-off. Of these two explanations, the first seems more likely. Major efforts have been made to find and correct significant sewage sources. While leaks have been found and corrected, and very high concentrations reduced, the overall high background levels have not been affected. On the other hand, the relatively quiescent conditions in the test chambers would seem to allow more settling of particulate matter than

TABLE 3.8
LIGHT/DARK EFFECTS SUMMARY

TABLE	INITIAL EC (MPN/dL)	TSS (mg/L)	FLOW at Collection (cfs)	K Rates for EC (/day)		
				Covered Clear	Covered Dark	Open
2.3	1022		75	1.3	2.2	
2.4a	3112		372	1.4	1.4	
2.4b	3122		372			1.5
2.5a	257	18.4	37	3	4	
2.5b	273	18.4	37			4
2.6BB	496	45	71	1.6	1.6	
2.6WO	416	9	40	1.6	1.6	

would be the case in the bayous. Since bacteria are settleable particulate matter, this could account for the high die-off rates observed.

Another finding from these data is that there appear to be slightly higher decay rates in some of the dark covered test chambers relative to the clear covered test chambers. In other cases there was no difference between the clear and covered test chambers. The expected result was that the clear test chambers would produce higher die-off because of the disinfection effect of sunlight. It is possible that the clear plastic covers functioned as filters for uv light, effectively eliminating the bactericidal effect. If that were the case, no strong pattern of difference would be expected. There is still the difference in photosynthetic activity between light and dark test chambers. The DO levels at the end of the tests were clearly higher in the light test chambers and there was noticeably more attached algae in the clear and open test chambers than in the dark test chambers. It is not clear how differences in DO and attached algae would have affected the die-off rates.

One fairly dramatic difference was observed between the Buffalo and White Oak bayou results. The White Oak tests (Table 3.6a&b) have die-off rates that are almost twice those observed in Buffalo Bayou (see Tables 3.4 and 3.5). This might be caused by the fact that during dry weather Whiteoak Bayou contains mostly wastewater effluent while Buffalo Bayou includes upstream reservoir discharge that is mostly stormwater. However, the side-by-side covered test chamber experiments using Buffalo and Whiteoak water (Table 3.7) showed similar results.

The test chamber experiments provided useful information, but few definitive answers. While the causes of the observed high decay rates are not certain, it is very likely that settling

probably is one of the major ones. This conclusion is supported by the findings of the sediment resupply study discussed in the following section that indicate high levels of bacteria in the sediment. Understanding the settling process and its impacts on bacteria concentrations is important for developing implementation strategies for the TMDL.

In-stream Dynamics - Post Treatment Bacteria Regrowth

One of the areas of interest for the study is the extent to which bacteria levels in wastewater effluent, which constitutes the bulk of bayou flows in dry weather, can affect bayou bacteria concentrations. Data gathering in this study (Chapter 4) generally confirmed that wastewater treatment plant (WWTP) effluent has low indicator bacteria concentrations after normal disinfection. Effluent from the smaller plants in the area contains a chlorine residual that acts to insure low levels in the receiving stream until that residual is consumed. A consideration is that dechlorination is now required for all domestic WWTPs with permitted flows over 1 million gallons per day (MGD). Although it is not considered likely, this could allow the possibility of regrowth in the stream. To assess this possibility, a series of experiments was performed in the test chambers.

Water samples were collected under dry weather conditions from upstream and downstream of large domestic wastewater treatment plants. The samples were collected in new 2.5-gallon cubitainers and brought to the BB at Beltway 8 site where the test chambers were located. A pre-calculated quantity of sodium bisulfite (assuming 1 mg/L of residual chlorine)

was added to the cubitainers containing effluent samples to prevent any effects that residual chlorine may have on bacterial regrowth.

Four major domestic treatment plants were selected for this study (Figure 3.4):

1. West District Wastewater Treatment Plant in Buffalo Bayou,
2. Turkey Creek Wastewater Treatment Plant in Buffalo Bayou,
3. White Oak Wastewater Treatment Plant in Whiteoak Bayou, and
4. Northwest Wastewater Treatment Plant in Cole Creek (Whiteoak)

For West District WWTP, the upstream and downstream locations were Buffalo Bayou at Wilcrest and Beltway 8, respectively. For Turkey Creek WWTP, the locations were Buffalo Bayou at Eldridge and Dairy Ashford. For White Oak WWTP, the upstream and downstream locations were Whiteoak Bayou downstream of confluence with E122 drainage ditch and Whiteoak Bayou at N. Houston Rosslyn, respectively. Finally, for Northwest WWTP, the locations were Cole Creek at Antoine and Whiteoak Bayou at Creekmont.

Appendix H.2
Die-off and Regrowth
Summary

Table H.2-1. Rates Used to Develop Net Processes Rate

Rate (per day)	Study	Source	Notes
1.3	Clear, light/dark effect	Table 3.8, Work Order 2 Final Report	
2.2	Dark, light/dark effect	Table 3.8, Work Order 2 Final Report	
1.4	Clear, light/dark effect	Table 3.8, Work Order 2 Final Report	
1.4	Dark, light/dark effect	Table 3.8, Work Order 2 Final Report	
1.5	Open, light/dark effect	Table 3.8, Work Order 2 Final Report	
3	Clear, light/dark effect	Table 3.8, Work Order 2 Final Report	Excluded because rates appear to be out of range of others
4	Dark, light/dark effect	Table 3.8, Work Order 2 Final Report	Excluded because rates appear to be out of range of others
4	Open, light/dark effect	Table 3.8, Work Order 2 Final Report	Excluded because rates appear to be out of range of others
1.6	Clear, light/dark effect	Table 3.8, Work Order 2 Final Report	
1.6	Dark, light/dark effect	Table 3.8, Work Order 2 Final Report	
1.6	Clear, light/dark effect	Table 3.8, Work Order 2 Final Report	
1.6	Dark, light/dark effect	Table 3.8, Work Order 2 Final Report	
2	Regrowth	Table 3.12, Work Order 2 Final Report	
1	Regrowth	Table 3.12, Work Order 2 Final Report	
1.4	Regrowth	Table 3.12, Work Order 2 Final Report	
1.4	Regrowth	Table 3.12, Work Order 2 Final Report	
0.9	Regrowth	Table 3.12, Work Order 2 Final Report	
4.5	Regrowth	Table 3.12, Work Order 2 Final Report	Excluded because rates appear to be out of range of others

Average = 1.5 per day

Appendix I
Time-Varying Flow Algorithm Development

1.1 TIME-VARYING FLOW REVISION

During Work Order 6, an algorithm was developed to create a model that predicts daily and hourly wastewater treatment plant (WWTP) discharge flows based upon monthly average flows. This model has been refined to reflect new hourly data gathered from additional City of Houston WWTPs. The refinements base hourly flows on randomly generated daily flows. The statistical fit of the generated data is compared against actual data. Additionally, a spreadsheet model to predict daily and hourly flows based on monthly averages was developed and is described in further detail in the next section.

1.1.1 DETERMINATION OF HOURLY FLOW PATTERNS AND COEFFICIENTS

New hourly flow data were obtained for Turkey Creek, Whiteoak and West District. Data from Park 10 were excluded because it primarily supports business and commercial areas in contrast with the other WWTPs. To check for a common pattern, the first week of January 2003 for each of 4 WWTPs was compared. Coefficients were calculated for each of the plants by subtracting the hourly flow from the daily average flow, then dividing by the daily average flow. This yields a coefficient that can be compared across plants with different average flows and allows for comparisons between plants.

The results are depicted in Figure I.1. The data in Figure I.1 show that although the patterns do not match perfectly, the general pattern is the same. There is an obvious outlier from West District that is unreasonably high; however, the cause is unknown. These outliers will have less of an effect when all days of the month are averaged together.

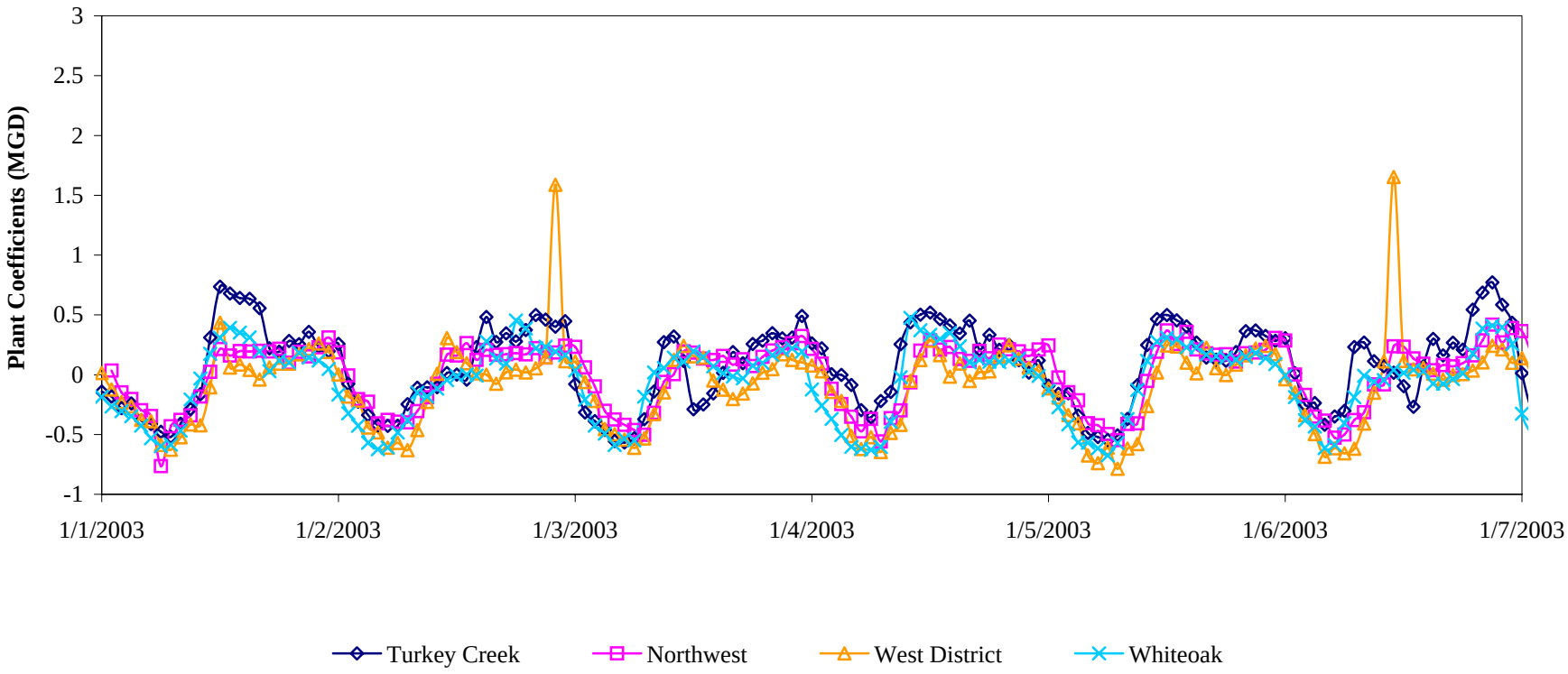


Figure I-1. Comparison of Coefficients Between Plants

NOTE: Coefficients were calculated for each of the plants by subtracting the hourly flow from the daily average flow, then dividing by the daily average flow.

Once it was determined that the plants share a common hourly pattern, hourly coefficients for the period from 1999 through 2003 were calculated for each month. The coefficients for each hour were averaged between the plants to calculate an average hourly coefficient for each 24 hours for each day of the month. The hourly coefficients were then averaged across all days of the month, at each hour, to obtain 24 coefficients total for each month. Days with rainfall greater than 0.2 inches at the nearest rain gauge were not included in the calculation of coefficients.

Using January of 2003 as an example, Figure I.2 shows how the patterns between WWTPs are similar, and how the calculated January coefficients compare to the actual coefficients for each plant. All 31 days of the month are plotted, and although Turkey Creek and West District exhibits relatively high coefficients, those coefficients were included anyway. In general, the trend is similar at all plants, although Turkey Creek and West District WWTPs have more variable flow than Northwest and Whiteoak.

1.1.2 DAILY FLOW RANDOM GENERATION

Due to the fact that there was no discernable pattern common to all waste water treatment plants at the daily flow level, a method to develop daily flows was needed. The previous method used in Work Order 6 used a constant monthly average, which was highly skewed when compared to daily and hourly values due to the influence of small, extreme peaks in flow. The approach used employs randomly changing intervals to create scatter around the self-reported monthly averages.

In order to generate the daily flow intervals, random values were generated from the self-reported monthly flow multiplied by a random number between 0 and 0.3 and that number was then added or subtracted from the monthly value. This method was used for days with no rain,

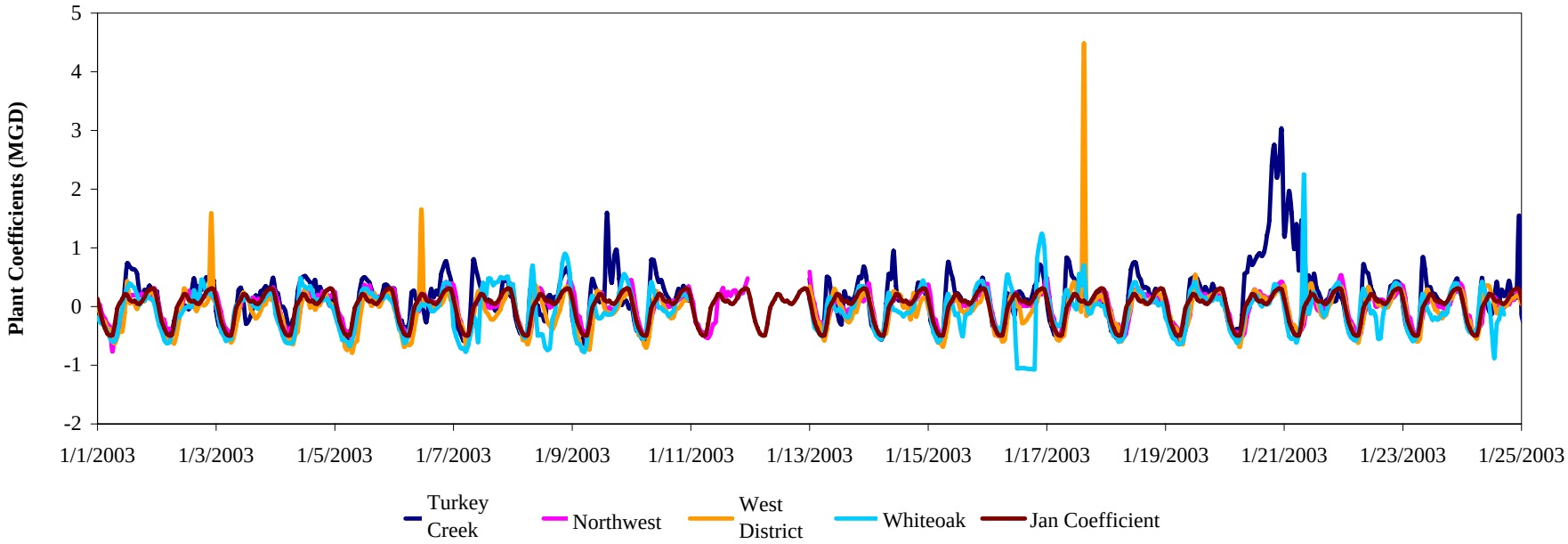


Figure I.2
Comparison of Coefficients from all WWTPs and the Calculated January Coefficient

NOTE: Coefficients were calculated for each of the plants by subtracting the hourly flow from the daily average flow, then dividing by the daily average flow.
The January coefficient is the average of all plant coefficients for each day of the month to yield 24 coefficients per day

and a value from 1.1 to 1.3 times the non-rain day interval was used on days with rain events greater than 0.2 inches. This allowed for some scatter around the mean, as the purpose of the effort was to develop a method that did not use the monthly average flow as a constant. Excel was used for the random number generation, and a uniform distribution was assumed due to the fact that no other information for WWTPs, other than the daily and hourly data from the four City of Houston plants, was available. Once the daily values were calculated using the random number approach, it was noted that there was quite a bit of scatter around the monthly mean. This was determined to be appropriate since most months experience scatter, exhibiting one or two high flow events. The use of random numbers from randomly changing intervals will more accurately predict the daily flow values than using the monthly average as a constant value.

Figure I.3 shows a graph of White Oak 2003 actual daily flows and monthly average flows with randomly generated daily flows overlain on the graph. Table I.1 illustrates the fit of the randomly generated flows to the actual flows. The measure of fit between the actual daily flows and generated flows was calculated using two approaches: the difference and percent difference. The difference was calculated as the average of the difference between the daily flows for a week. The percent difference was calculated as the difference divided by the monthly self-reported average. As can be seen in Table I.1, the model under-predicts monthly flow by 0.46% in March, and over-predicts by 6.2% in February. This is considered acceptable, given that the flow data are randomly generated. It is also important to remember that this measure is a snapshot of potential fits because random numbers are re-generated each time the Excel file is used.

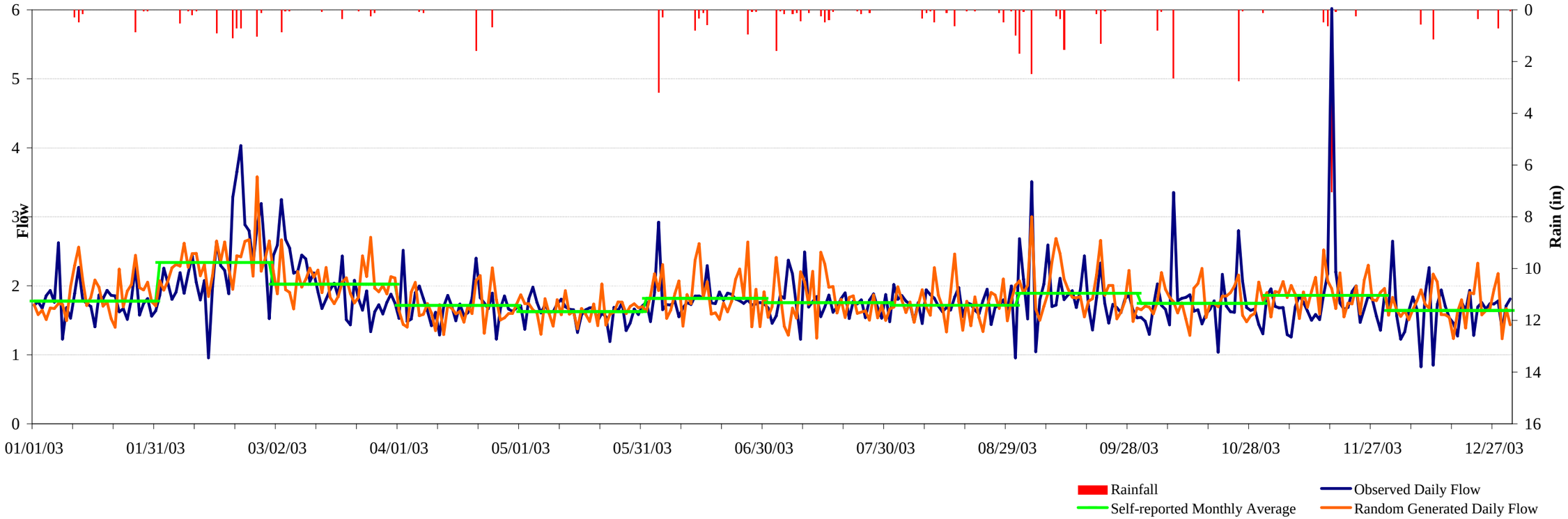


Figure I.3
Whiteoak Monthly Averaged Compared with Observed and Generated Daily Flows

Table I.1
Statistical Comparison of Actual
and Modeled Daily Flows for
White Oak WWTP during 2003

Month	Difference (MGD)	% Difference
Jan	0.089	5
Feb	0.145	6
Mar	-0.009	-0.5
Apr	0.053	3
May	0.057	3
Jun	0.085	5
Jul	0.045	3
Aug	0.101	6
Sep	0.066	3
Oct	0.006	0.3
Nov	0.088	5
Dec	0.055	3

Note: Difference calculated as average of differences between daily flows over a 1-wk period
Percent difference calculated as predicted flow minus actual flow divided by weekly average flow

and a value from 1.1 to 1.3 times the non-rain day interval was used on days with rain events greater than 0.2 inches. This allowed for some scatter around the mean, as the purpose of the effort was to develop a method that did not use the monthly average flow as a constant. Excel was used for the random number generation, and a uniform distribution was assumed due to the fact that no other information for WWTPs, other than the daily and hourly data from the four City of Houston plants, was available. Once the daily values were calculated using the random number approach, it was noted that there was quite a bit of scatter around the monthly mean. This was determined to be appropriate since most months experience scatter, exhibiting one or two high flow events. The use of random numbers from randomly changing intervals will more accurately predict the daily flow values than using the monthly average as a constant value.

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1.1.3 GENERATION OF HOURLY FLOWS

The calculated hourly coefficients for each month were used to predict hourly flows. This is done by multiplying the coefficient by the randomly generated daily flow and then added to the randomly generated daily flow. This was completed for all hours of all days of all months for the years 1999 through 2003. An example, shown in Figure I.4, for one month in 2003 at the City of Houston White Oak Bayou Plant illustrates the goodness of fit for this method.

A look at the fit by week, where the measure of fit is the predicted flow minus the actual flow, and then divided by the average weekly flow is summarized in Table I.2. According to this measure of error, and for most weeks the predicted hourly values are, on average, within 5% of the actual hourly values. An examination of Figure I.4 shows that although the values do not seem to match perfectly, on average the predicted flows are very similar to the actual hourly flows. White Oak flows are also somewhat harder to predict than flows from other plants, as there seems to be more variability in the hourly flow, with high flows on days when there does not seem to be an explanation from rain.

1.1.4 FORMULATION OF A TOOL FOR HOURLY FLOW PREDICTIONS

As the final step, an Excel file was set up which automatically calculates the hourly predicted flows by simply changing the monthly average flow and inputting daily rainfall data.

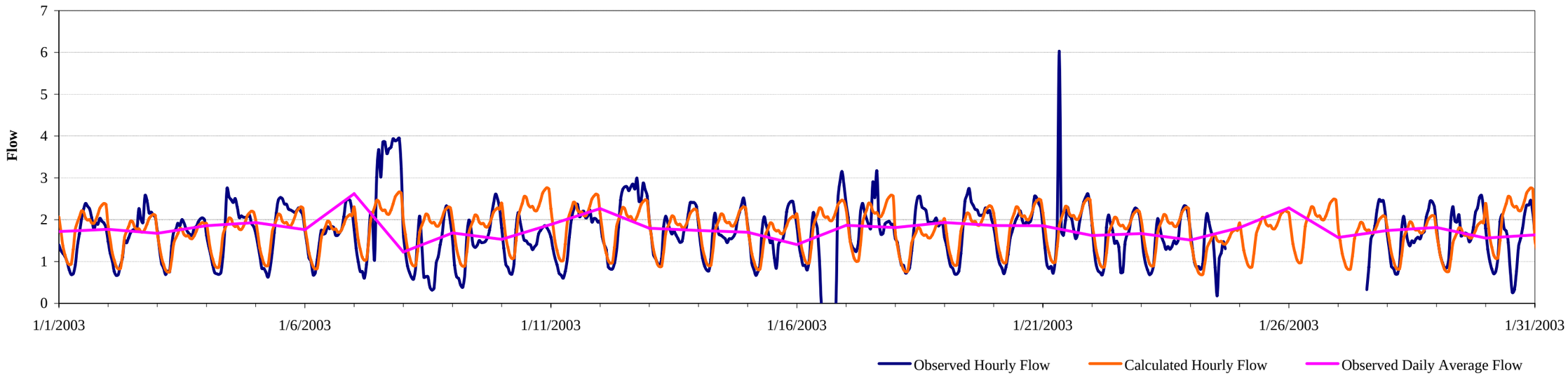

Figure I.4
January 2003 Actual Hourly flow, Generated Hourly Flow, and Generated Daily Flow for White Oak WWTP

Table I.2
Measure of Fit for Whiteoak WWTP during 2003

Week	Difference (MGD)	% Difference	Week	Difference (MGD)	% Difference	Week	Difference (MGD)	% Difference
1	0.007	0	17	0.050	3	36	0.066	3
2	0.007	0	18	0.031	2	37	0.062	3
3	0.006	0	19	0.008	0	38	0.053	3
4	0.006	0	20	0.008	0	39	0.049	3
5	0.033	2	21	0.009	0	40	0.068	4
6	0.208	7	22	0.008	0	41	0.078	4
7	0.177	7	23	-0.030	-2	42	0.074	4
8	0.206	7	24	-0.033	-2	43	0.081	4
9	0.153	7	25	-0.031	-2	44	0.069	4
10	0.039	2	26	-0.027	-2	45	0.033	2
11	0.035	2	27	0.106	6	46	0.035	2
12	0.037	2	28	0.171	9	47	0.034	2
13	0.037	2	29	0.163	9	48	0.034	2
14	0.043	2	30	0.156	9	49	0.005	0
15	0.043	3	31	0.145	8	50	0.000	0
16	0.046	3	32	0.096	5	51	0.000	0
17	0.050	3	33	0.103	5	52	0.000	0
18	0.031	2	34	0.096	5	53	0.000	0
19	0.008	0	35	0.098	5	54	0.000	0

Percent error greater than 5%

Note: Difference calculated as average of differences between daily flows over a 1-wk period
Percent difference calculated as predicted flow minus actual flow divided by weekly average flow

1.1.5 IMPLEMENTATION OF TVF IN HSPF MODEL

The TVF Excel tool was utilized to develop time-varying WWTP flows for all plants in Whiteoak Bayou using randomly generated daily flows and employing the developed coefficients to convert daily flows to hourly flows.

Appendix J

Background and Summary of Buffalo and Whiteoak Bayou TMDL Study Components

Administrative Project Summary

The Total Maximum Daily Load for Fecal Pathogens in Buffalo Bayou and Whiteoak Bayou project ("the project") was initiated in March 2000 by the University of Houston and PBS&J under contract with TCEQ. PBS&J was a member of the project team through August 2005. Texas A&M University – Corpus Christi was also a member of the project team between 2003 and 2005. The study has had a stakeholder group almost since its inception, with the first stakeholder meeting on May 2000.

Over the course of this project, there have been a total of seven work orders issued by TCEQ, as summarized in Table 1. Work Order numbers are not necessarily sequential as they may have because work order numbers are assigned to projects as they occur.

Table 1. Summary of Contract Numbers and Periods

Contract No.	Work Order No.	Period	Status
582-0-80121	582-0-80121-01	6/2000 to 5/2001	Completed
582-0-80121	582-0-80121-02	7/2001 to 8/2002	Completed
582-0-80121	582-0-80121-05	9/2002 to 8/2003	Completed
582-0-80121	582-0-80121-06	9/2003 to 8/2004	Completed
582-0-80121	582-0-80121-08	9/2004 to 8/2005	Completed
582-6-70860	582-6-70860-01	9/2005 to 8/2006	Completed
582-6-70860	582-6-70860-09	9/2006 to 8/2007	In Progress

Contract 582-0-80121; Work Order #1

The scope of work performed under Work Order #1 (June 1, 2000 through May 31, 2001) included the following tasks:

- An assessment of current fecal pathogen levels and trends in Buffalo and Whiteoak Bayous;
- A survey of the current knowledge of major sources, and fate and transport of fecal pathogen contamination in surface waters;
- Selection of a fate and transport model for the scope area;
- Development of a quality assurance project plan for the project;
- Development of a work plan for additional sampling and modeling activities; and
- Participation in the Buffalo and Whiteoak Bayous stakeholder participation/communication process.

The results from Work Order 1 were detailed in a final report submitted to TCEQ in June, 2001. The work conducted under Work Order 1 demonstrated that for both Buffalo and Whiteoak Bayous, the average concentrations of fecal coliform increase from upstream to

downstream by up to two orders of magnitude. Data gatherings and analysis of nine potential sources of high indicator bacteria levels indicated that point sources, illegal discharges, sediments, runoff, and upstream sources were relatively significant contributors of bacteria in the bayous. Finally, a review of suitable models to quantify the fate and transport of the indicator bacteria suggested that HSPF is an appropriate model for the purposes of this TMDL study.

Contract 582-0-80121; Work Order #2

Work Order No. 2 (July 5, 2001 through August 31, 2002) encompassed the following tasks:

- Project administration;
- Stakeholder/public education and involvement;
- Assessment of current levels and trends of bacterial indicators of fecal pathogens in Buffalo and Whiteoak Bayous;
- Assessment of major sources of bacterial indicators of fecal contamination;
- Application of models to elucidate the sources and major processes controlling observed levels of bacterial indicators of fecal contamination; and
- TMDL allocation analysis.

A final report for Work Order No. 2 was submitted to TCEQ in January 2003. The report included identification and quantification of the sources in the watershed and the development of HSPF models to predict the fate and transport of bacteria in water and sediment.

Contract 582-0-80121; Work Order #5

Work Order #5 and its amendment (September 1, 2002 to August 31, 2003) included the following scope of work:

- Project administration;
- Stakeholder/public education and involvement;
- Supplying the information and assistance to the TCEQ TMDL Team necessary to complete a TMDL for submittal to the TCEQ Commissioners and to assist in the defense of the TMDL;
- Supplying the information and assistance to the TCEQ TMDL Team necessary to develop an Implementation Plan to reduce the levels of bacterial indicators of fecal pathogens in Buffalo Bayou and Whiteoak Bayou for submittal to the TCEQ Commissioners and to assist in the defense of the Implementation Plan; and

- Preparing a Bacteria Source Tracking study to determine the proportion of the *E. coli* in the water and sediment of the bayous that is of human origin.

The final report for Work Order 5 was submitted to TCEQ in November 2003. Several special studies were undertaken Work Order 5, including a synopsis of current understanding on sediment and bacteria source tracking, a summary of bacteria loading from various sources in Buffalo and Whiteoak Bayous, the determination of a low flow condition, HSPF modeling updates, an evaluation of load allocations using HSPF and a summary of best management practices and discussion of controls being currently used in the Houston area. The discussion of low flow conditions was completed in response to requests from stakeholders to better quantify the definition.

Contract 582-0-80121; Work Order #6

There were a total of 21 tasks included in Work Order 6 and its associated amendments (September 1, 2003 to August 31, 2004). These tasks included the following:

- Project Administration;
- Participate in stakeholder process;
- Develop a quality assurance project plan (QAPP) for additional data collection;
- Sampling
    - Assess the impact of possible biosolid releases on bacteria levels;
    - Assess sediment contributions;
    - Assess E. coli levels downstream of WWTP outfalls;
    - Investigate the levels of bacteria from Addicks and Barker reservoirs;
    - Quantify loads of bacterial indicators to the bayous from overflows and bypasses;
- Bacteria Source Tracking
    - Expand the antibiotic resistance profiling (ARP) database;
    - Expand the Houston Bacteria Source Tracking Database.
    - Finalize bacteria source tracking (BST) sampling plan;
    - Conduct bacteria source tracking (BST) sampling and analyses;

- Modeling
    - Expand the HSPF TMDL model for Buffalo and Whiteoak Bayous to include additional sources evaluated as part of this work order as appropriate;
    - Expand the HSPF TMDL model for Buffalo Bayou to include areas above Addicks and Barker reservoirs;
    - Refine the existing modeling of point sources using time-varying flow and concentrations;
- Diversions and Withdrawls
    - Review Region H Water Availability Model (WAM) including assumptions and results relating to reuse and diversions in smaller tributaries;
    - Gather, review, and summarize applications for reuse and diversion of surface waters in the Houston area;
    - Formulate how possible reductions in WWTP flow, as well as changes in stream diversions and return flows, would operate under different stream flow and seasonal conditions;
    - Use the refined model to analyze the effects of diversions and withdrawals on attaining water quality criteria under a range of flow conditions and assess the uncertainty in refined model predictions;
    - Formulate draft limitations on withdrawals and diversions that may be necessary to maintain acceptable levels of indicator bacteria; and
- Develop Work Plan for FY 2005.

The results of these tasks were presented in the Final Report for Work Order 6 submitted in November 2004. The assessment of E. coli concentrations downstream of WWTPs was completed in response to a request by stakeholders.

Contract 582-0-80121; Work Order #8

The tasks associated with Work Order 8 (September 1, 2004 to August 31, 2005) included the following:

- Project Administration;
- Participate in stakeholder process;
- Complete quality assurance project plan (QAPP) preparation for additional data collection;

- Assessment of biosolids impact on bacteria levels in BB and Whiteoak Bayou;
- Complete assessment of EC levels downstream of WWTP outfalls;
- Complete investigation of bacteria loads from overflows and bypasses;
- Bacteria Source Tracking;
- Expansion and Refinement of HSPF model to focus on low and very low flow condition;
- Additional Sources in HSPF; and
- Allocation scenarios.

The final report for Work Order 8 was submitted to TCEQ in November 2005. This report contained results of sampling during fiscal year 2005, bacteria source tracking results, as well as expanding the HSPF model to better simulate low and very low flow conditions. Finally, the Work Order 8 report presented the spreadsheet tool to be used for load allocation development.

Contract 582-0-70860; Work Order #1

The tasks associated with Work Order 1 (September 1, 2005 to August 31, 2006) included the following:

- Project Administration;
- Participate in stakeholder process;
- Assist in preparation of TMDL report;
- Assist in preparation of TMDL implementation plan; and
- Conduct indicator bacteria sampling at all municipal wastewater treatment plants discharging to Buffalo and Whiteoak Bayous.

The final report for Work Order 1 was submitted to TCEQ in November 2006. This report detailed the spreadsheet tool for load allocations for the Buffalo and Whiteoak Bayou watersheds, called the Bacteria Load Estimator Spreadsheet Tool (BLEST), and its application.

Contract 582-0-70860; Work Order #9

The tasks associated with Work Order 9 (September 1, 2006 to August 31, 2007) are the following:

- Project Administration;

- Participate in stakeholder process;
- Complete WWTP Sampling;
- Address all allocation issues;
- Assist in the preparation of the TMDL Report; and
- Support Implementation Plan activities.

This Work Order is currently in progress. So far, four stakeholder meetings, on September 6, 2006, February 8, 2007, June 25, 2007 and August 21, 2007 have been held this fiscal year. In addition to stakeholder participation, the majority of the effort for this Work Order has been focused on responding to and updating BLEST per comments received from stakeholders.

Stakeholder Involvement Summary

Over the course of the Buffalo and Whiteoak Bayou TMDLs, a total of 18 meetings have been held between May 2000 and July 2007 to present information to project stakeholders and provide an opportunity for feedback. A list of these meetings is provided in Table 1. This document provides an overview of each stakeholder meeting and specifically lists any requests that were submitted to the project team and how comments from stakeholders influenced the study. All stakeholder meeting minutes and presentations are included as Attachment A of this document.

Table 1. Stakeholder Meeting Dates and Corresponding Work Orders

Fiscal Year	Work Order	Meeting Date
2001	582-0-80121-01	May 1, 2000
		January 25, 2001
		March 8, 2001
2002	582-0-80121-02	March 7, 2002
		June 26, 2002
2003	582-0-80121-05	February 23, 2003
		April 16, 2003
		May 14, 2003
2004	582-0-80121-06	October 15, 2003
		January 28, 2004
		May 18, 2004
2005	582-0-80121-08	November 16, 2004
		April 6, 2005
		July 19, 2005
		August 18, 2005
2006	582-6-70860-01	November 1, 2005
		February 7, 2006
2007	582-6-70860-09	September 7, 2006
		February 8, 2007
		June 26, 2007

The first stakeholder meeting was held was held during **May 2000**. This meeting provided an initial overview of the project. No technical aspects of the project were presented by the project team.

The second stakeholder meeting was held on **January 25, 2001**. This meeting summarized the historical flow and bacteria data. Input received by the stakeholders included a request by Linda Broach to see better quantification of bypasses and leaks. This request was addressed in subsequent work orders when the project team sampled dry weather storm sewer discharges and evaluated bypasses within the watershed (none found).

Stein discussed the organization of the implementation plan partnership and that its formation would begin during the spring of 2007.

Linda Pechacek presented comments during the **September 7, 2006** stakeholder meeting. Her comments were as follows:

- Comprehensive BMP program may not be successful in meeting bacteria in state stream standards during all flow regimes;
- Need to place importance on developing or modifying criteria to address wet weather flows;
- Afraid that regulations are getting ahead of the science and that it will cost a lot of money;
- Concerned that there is too much uncertainty in available data for TCEQ to set final TMDLs.

The **February 8, 2007** stakeholder meeting was organized to review progress on the project. Ron Stein presented TCEQ's perspective on the uncertainty in TMDL Allocations. His discussion centered on the fact that although uncertainty exists in the load estimates, the implementation strategy is the same for any magnitude of load from these sources. A comparison of HSPF, BLEST and Load Duration Curves were presented by the technical team (see Attachment A for handouts). The comparison of the three methods suggests that minimal differences exist between the load estimation methods. Finally, the meeting was concluded with a presentation from Tom Weber on the Bacteria Task Force. Comments on the BLEST model were requested with a deadline of March 8, 2007 so that a final modeling report could be completed.

The **June 26, 2007** was focused on a technical presentation given by Dr. Robin Brinkmeyer on the results of a virus study on waterbodies in Harris County. Findings of the study suggest that viruses are detected downstream of WWTPs, but the viability of the viruses is not known. TCEQ gave a presentation on Watershed Protection Plans and a brief statement was given by Mark Lowry, presenting the Joint Task Force position on the TMDL and their desire to pursue a watershed protection plan.

The stakeholder meeting held on **March 8, 2001** was the project's third meeting. At this meeting, Dr. Hanadi Rifai presented a recap of historical data in the study area and then focused the discussion on the proposed monitoring plan. Input was solicited from the stakeholders on the monitoring plan during the meeting to be forwarded to Hanadi Rifai by March 23, 2001. Comments received from the stakeholders included the following:

- Donna Phillips asked about the focus on WWTPs only during dry weather. She suggested identifying a few sites for wet weather testing. This request was incorporated into Work Order 582-80121-08.

- Linda Broach asked why only one runoff sampling site was selected for Whiteoak Bayou and suggested adding an additional location. Her recommendation was implemented by the project team to include a total of three monitoring points in Whiteoak Bayou in the runoff sampling plan.

- Theo Glanton suggested evaluating both fecal coliform and E. coli. The project team implemented this suggestion for the WWTP sampling effort.

A stakeholder meeting was held on **March 7, 2002** to present findings from the Clean Rivers Program Bacteria DNA/Source Tracking as well as results from the monitoring were discussed. The results of the monitoring showed that runoff is a significant source of bacteria to the bayou, regrowth did not appear to be an important bacteria source, WWTP exceedances occur about 10% of the time and illicit discharges may be more important than WWTPs in contributing bacteria loading to the bayous. During this meeting, stakeholders posed a number of questions regarding the monitoring as well as the study in general. Monitoring questions were answered by the project team throughout the course of this stakeholder meeting but as the meeting was running beyond its scheduled time, an additional meeting was scheduled to address the general questions in more detail.

The follow-up meeting for the March 7, 2002 stakeholder meeting was held on **June 26, 2002:**

- Theo Glanton discussed fertilizers and sediment fertilizer from local store tested for bacteria and found high levels as well as in soil.

- Dr. Yu-Chun Su presented findings of contribution of bacteria from sediment on the stream bank; sediments were found to have high levels of bacteria along the bayou banks (under bridges as well as away from bridges).

- Dr. Hanadi Rifai presented information on reservoirs to show that they do constitute a source of bacteria, but also function as removal mechanisms when water is held for long periods of time.

- Dr. Rifai and Ms. Monica Suarez presented on WWTPs and offered a discussion on the plants that were not sampled and why prior notice was required. Mel Vargas suggested that the benefit of obtaining additional data is uncertain given the cost and time it would take to secure the right of entry for monitoring plants without prior notice.

- Dr. Paul Jensen presented on new standards. He provided a summary of recommendations before the standards group in the triennial standard revision. The focus of this recommendation was to get the waters of the state into 4 groups: A – managed swimming areas, B – stable waters, C – smaller, variable waters, and D- non-contact areas. Streams in category C would be subject to contact recreation standards when velocity < 2 ft/s, depth > 18 in, water clarity was sufficient to see bottom or have a known bottom, temperature greater than 59 F.

The meeting held on **February 23, 2003** focused on the identification of bacteria sources and the presentation of initial HSPF modeling results. Results of the modeling showed that nonpoint sources and upstream reservoir inputs were the major sources of bacteria. Stakeholders suggested that because such a large amount of information had been presented at this meeting, a second meeting would be helpful to recap and review. Ron Stein suggested a second meeting approximately 30 days later.

The requested meeting was subsequently held on **April 16, 2003**. The meeting focused on recapping information provided at the February 23, 2003 meeting. The project team answered questions raised by the stakeholders on the following topics:

- relationship of sediment to bacteria
- examination of flow conditions are safe for contact recreation,
- accuracy of reported flows from WWTPs,
- restoring riparian buffers to filter runoff from entering the bayous,
- lack of actual measurements of nonpoint source loads,
- using BMPs to slow down water,
- human versus animal/bird sources of bacteria, and
- how much bacteria might be contained in sediments from past discharges of wastewater treatment plants.

The stakeholder meeting held on **May 14, 2003** was intended to begin a process of brainstorming to identify questions and issues as well as elements needed to fill gaps in the TMDL study. The goal was also to agree on when/where/how to secure additional information and enable the stakeholders to make practical recommendations regarding a watershed implementation plan. A large focus of the meeting was to summarize “what we know”, “what we need”, and “what others can offer”. At the end of this meeting, stakeholders were given three dots to vote for their selection as to what piece of work to add to the upcoming work order between TCEQ & UH. The three top choices of aspects to include in the next project team work order were to:

- Define conditions where safe contact can happen;

- More correlation data between WWTP outfalls and instream conditions; and
- Identify areas of failing septic systems.

The project team incorporated the correlation between WWTP outfalls and instream conditions into the fiscal year 2004 work plan. The project team defined what constitutes a low flow condition in the Final Report for Work Order 5. Finally, the project team conducted detailed analyses of septic systems as detailed in the Final Reports for Work Order 8 and Work Order 582-6-70860-01.

On **October 15, 2003**, a stakeholder meeting was held as a follow-up to the brainstorming session held on May 14, 2003. The addition of the task to assess E. coli levels downstream of WWTP outfalls was discussed. In addition, updates on related projects were given by Harris County and H-GAC. Finally, Carl Masterson presented the results of the stakeholder survey.

The stakeholder meeting held on **January 28, 2004** focused on a discussion of the project status, including load allocations. Runoff was noted to be an important contributor to the bayou concentrations and modeling results showed when eliminated, the standard could be met in most parts of the bayou. During this discussion, stakeholders noted that a jump in bacteria concentrations occurred near Memorial Park and suggested that this jump be investigated by the project team. Results of the investigation were to presented at the next stakeholder meeting. Ron Stein also provided an updated on the next monitoring phase of the project.

The stakeholder meeting on **May 18, 2004** focused on several technical issues. The project team provided an update on analyses conducted regarding a dog park in Buffalo Bayou. Results from the analyses of the jump in bacteria concentrations noted at the stakeholder meeting in January 28, 2004 was presented and the resulting recommendation was to shift the modeling period to a time when E. coli data are available, rather than converting fecal coliform to E. coli. Stakeholders brought up the point that we should begin looking at BMPs now even without knowing what sources are. This recommendation was implemented by TCEQ by initiating a BMP study to determine their impacts on bacteria in 2005. An End Game Strategy workgroup was formed by the stakeholders.

On **November 16, 2004**, a stakeholder meeting was convened to discuss project status and present results of the sampling conducted in 2004. Prior to the technical presentation, Tom Weber, of the TCEQ, gave an overview on different stream standards. Results of the WWTP sampling conducted to address stakeholder concerns showed that not much effect was observed from WWTP outfalls. Bacteria source tracking results were also presented.

At the **April 6, 2005** stakeholder meeting, the End Game Strategy group presented an update. They had requested a summary of what we know and what we don't know and in response, the project team created a document titled "Key Issues and Scientific Conclusions" (see Attachment A). The End Game Strategy group members stated that although they had requested this document, it did not meet their needs. They requested an executive summary covering all of the studies that was more specific that the document that was prepared. The request was responded to and the technical team developed the executive summary (see August 18, 2005 meeting). At this meeting, Ron Stein presented an overview of the TMDL process. Ron Stein laid out a

project timeline of having the TMDL adopted in June 2006 with EPA approval received in December 2006. Ron Stein also provided an update on the BMP study that was submitted as a 319 grant request.

The stakeholder meeting held on **July 19, 2005** focused on membership issues.

On **August 18, 2005** a stakeholder meeting was organized to discuss the Technical Summary document prepared by the project team (see Attachment A), the best management practices evaluation project, and the development of TMDL allocations. PBS&J announced during this meeting that they would no longer be part of the technical project team due to a conflict in philosophy.

The Technical Summary document was prepared for the End Game Strategy Workgroup and summarized all the work that has been done to date with conclusions. The Technical Summary document initiated discussion on a variety of topics, including:

- Relationship with solids and BMPs;
- What is the real problem and how bad is it;
- Can the water quality standards be achieved;
- No clear understanding on solids discharges and their contribution;
- Regrowth and its role as a contributor or a characteristic of the bayou environment; and
- Whether the WWTPs that were given advanced notice compare favorably to samples from unannounced visits by the technical team and Harris County.

In addition to this discussion, Ron Stein announced the availability of a BMP Evaluation Project. This project was applied and funded because of stakeholder concerns regarding BMPs and their effectiveness in the Houston area.

The meeting on **August 18, 2005** concluded with a presentation on load allocations. The load allocation method presented was based upon a spreadsheet tool that summarized all sources of bacteria and their estimated loading. Load reductions for median flow conditions were estimated using this spreadsheet tool to be 96% in both bayous to meet the contact recreation standard and 81% to meet the non-contact recreation standard.

The stakeholder meeting held on **November 1, 2005** included presentations on several topics, including several projects sponsored by Harris County to investigate illicit discharges, the source of the bacteria (human versus non-human), and the affinity of bacteria for sand, silt and clay from detention basins. In addition, Linda Pechacek was voted in to the stakeholder committee, and a discussion led by Carl Masterson on the implementation plan development organization.

The stakeholder meeting held on **February 7, 2006** included a presentation from Tom Weber, TCEQ, on the status of the TMDL. Tom laid out the timeline for the TMDL, stating that the TCEQ intended to have the TMDL recommendation to the Commissioners in late 2006. Mr.

Weber requested stakeholder input on three issues: background loads, the flow cutoff and loads from treatment facilities.

A decision must be made on what constitutes a background load, as it is not considered controllable (i.e., direct deposition into the water, release from sediment, runoff from birds, domestic animals and wildlife). If all are included in background load, then the background might exceed the standard –then TCEQ's ability to issue permits for new treatment facilities would be hindered. Comments and questions from the stakeholders on background loads included the following:

- It would be incorrect to assume that all background levels are natural
- The Clean Rivers Program sampled less developed streams Lake Creek and Peach Creek, and found that bacteria levels are nowhere near Buffalo and Whiteoak Bayous, and that higher concentrations in Lake Creek could be related to a higher watershed population and more impervious surface
- The appropriateness of the E. coli indicator was questioned
- Direct deposition into the water should be considered background and runoff from wildlife could be included in the Load Allocation
- The TCEQ should be cautious about taking loads out of NPS runoff as all control recommendations have to be justified
- Runoff containing bacteria from wildlife and mulch should not be included in background

The flow cutoff could be a way to address the fact that contact recreation doesn't occur at the upper end of the flow regime. Should the flow cut off be based upon safe flows or a percentile flow? Safe flow can have the rationale that equates more with what is going on in the real world, while percentile flows might be somewhat arbitrary but easy to determine. Comments and questions from the stakeholders on flow cutoffs included the following:

- Can we develop a safe flow without changing the standard?
- How will TCEQ account for WWTPs dumping pollutants just before or during safe flow events?
- A high cut off flow could help reduce what is calculated as contributing to background components.
- TNRCC had goal to develop wet weather standards in 1994, very complex issue that has not moved forward
- There could be agreement on safeness of a particular flow, while flow percentiles might be more difficult
- Regardless of flow, very few people use Buffalo Bayou for recreation

- Buffalo Bayou Partnership is spending millions of dollars to bring people closer to the bayou
- There is no link between the indicator species and pathogenic bacteria

Current permits for WWTPs require a minimum chlorine residual. If an alternative disinfection process is used then facilities are required to test for bacteria, with the stream standard being the permit limit. The TCEQ is seeking input on what a reasonable amount of bacteria loading would be. Comments and questions from the stakeholders on effluent loads included the following:

- WWTPs will not discharge zero bacteria
- Need better checks and balances so the end of the pipe meets design and the design is right
- Bacteria issue is more complex in urban areas, where streams do not dry out

Additional comments and questions from the stakeholders following Tom Weber's discussion included:

- Is the 99% stormwater reduction similar to other bacteria TMDLs (TCEQ responded no, it is likely a reflection of area and land use)
- Why were the issues discussed the only things for which comments were requested (TCEQ responded that these are the ones that the TCEQ needs the input, because without resolving them the TMDL cannot be developed)
- How will allocations for construction permits be handled (TCEQ responded that the allocation will not be broken down to that specific level)
- Still uncertainty about the background load (TCEQ responded that it is in a developmental period, and more discussions can be held during implementation planning. No new studies will be undertaken for the TMDL).

Next, the technical team presented an updated on bacteria source tracking. Updates to the model with septic system data from Harris County were also presented. Comments from the stakeholders focused on background loads and the distribution of loading by land use.

The **September 7, 2006** stakeholder meeting was held to review the allocation strategy and presentation of Harris County sampling efforts. The results of the Discharge Elimination study were presented to the stakeholder group. Findings from this study showed that most of the discharges were allowable and nutrient levels are two to three times what would be found in a natural stream. The Harris County sampling also examined WWTPs on Whiteoak Bayou that were loaded at 50% or greater levels. The samples were taken from the pipe, not at the regulatory discharge point. Measurements taken in this study showed that concentrations were higher than those collected with prior notice. In addition, the possibility of regrowth in the WWTP pipes was discussed. Allocation strategy and likely allocations were also presented, with a discussion of the spreadsheet tool (BLEST) and its estimates for load allocations. Finally, Ron