



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY Urban River Stormwater Monitoring Data Report 12/9/08

This data report describes the Urban River surface water monitoring data that EPA collected from June 23, 2008 to September 22, 2008, totaling 17 sample events. The primary objective of this project was to retrieve surface water samples from in stream and outfalls for delineating and examining areas of possible illicit discharges. The project focused mainly on the Mystic River Watershed, with a small number of samples being collected in the Charles and Merrimack Rivers. Only data collected in or near the Mystic River Watershed are presented in this report.

Over the course of this project, 141 samples sets were collected at 93 sites in the Mystic River Watershed. Of these, 435 samples were submitted for laboratory analysis and 183 samples were analyzed using field kits or bench-top screening. Table 1 below displays the data collected on each of the sampling events, sorted by the town in which the samples were collected, sampling date, and then by sampling time.

Site locations were determined from field or desktop reconnaissance by project staff. Sample analyses were predetermined based on conditions known about the sampling location. These conditions were determined by reviewing existing data from Federal, State, local Municipalities or local Watershed Groups. Nearly all locations were sampled for laboratory analyses of *Escherichia coli* (*E. coli*), surfactants, ammonia, and laboratory bench top screening for optical brighteners. Selected sites were also sampled for pharmaceuticals and personal care products (Table 3), biological oxygen demand (Table 4), total suspended solids (Table 5), chlorine and total phosphorus to provide additional information on water quality. The parameters measured at each site were used to identify possible sewage contamination using a weight of evidence approach. The optical brightener analyses were conducted during changing calibration standards for method development; these data are not presented in this data report.

Bacterial and chemistry data were compared to Massachusetts Surface Water Quality Standards or literature values as appropriate. *E. coli* bacteria concentrations were compared to (standards for Class B waters) single sample water quality standards for primary (235 cfu/100 ml) and secondary (1,270 cfu/100 ml) contact recreation. Ammonia results were compared to a threshold value of 1.0 mg/l ammonia, and surfactant values were compared to a threshold value of 0.25 mg/l.

Sampling conditions were determined by evaluating prior rainfall amounts. If rainfall amounts prior to sampling were greater than or equal to 0.10 inches in 24hrs or greater than or equal to 0.20 inches in 48hrs the sampling was classified as wet weather. All sample conditions not meeting this criterion were identified as dry weather.

Quality control criteria were established to insure data quality. Criteria were specified for holding times, sample preservation, and precision and accuracy goals. The quality control requirements for this project were documented in the Project Work/QA Plan – Stormwater Monitoring Quality Assurance Project Plan dated June 23, 2008. Laboratory generated data that did not meet laboratory quality control parameters or concentrations that were less than the associated reporting limit were reported as estimated values. All estimated data were identified with a swung dash (~) preceding the value. The holding times specified in the Project Work/QA Plan were met for all samples.

The Project Work/QA Plan specified that the Relative Percent Difference (RPD) goals between the regular and the duplicate field samples should be less than 30%. Samples collected for surfactants and ammonia on August 25, 2008 and September 22, 2008 respectively failed to meet this criterion and results are reported as estimates in table below.

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Table 1: Urban River Sampling Data														
Date	Time	Site	Town	E. coli	NH ₃	Surfactant	CL ₂	TP	Conditions	Site Description	Field Notes	GPS		
				col/100ml	mg/L	mg/L	mg/L	ug/L				North (+)	West (-)	
7/21/08	11:20	IsEnd01	Chelsea	2595	ND (0.4)	0.08	NA	NA	wet	Beacham and Market street culvert	closest to road-strong odor	42.394445	71.049817	
7/21/08	11:25	IsEnd02	Chelsea	3080	ND (0.4)	0.19	NA	NA	wet	Beacham and Market street culvert	midpoint from road-strong odor	42.394436	71.049780	
7/21/08	11:30	IsEnd04	Chelsea	>241960	13.0	0.14	NA	NA	wet	Beacham and Market street culvert	farthest from road-strong odor	42.394405	71.049676	
8/21/08	10:35	IsEnd04	Chelsea	2595	2.68	ND (0.05)	NA	NA	dry	Beacham and Market street culvert	suds in water	42.394405	71.049676	
7/21/08	11:30	IsEnd04d	Chelsea	>241960	13.5	0.15	NA	NA	wet	Duplicate	Duplicate	42.394405	71.049676	
9/4/08	11:00	Mill	Chelsea	7945	ND (0.4)	0.08	NA	NA	dry	Mill Creek sample mid-stream	Clear flow, low flow	42.403301	71.017871	
7/21/08	9:35	Mill1	Chelsea	9330	ND (0.4)	0.18	NA	NA	wet	Broadway at New Cronin Ice Rink	Outfall on opposite stream bank	42.403156	71.018129	
9/4/08	10:52	Mill1A	Chelsea	406	0.78	0.13	NA	NA	dry	Culvert across stream from Mill1	orange plaque, discoloration inside pipe	42.4033422	71.017761	
7/21/08	9:55	Mill2	Chelsea	9678	1.33	0.18	NA	NA	wet	Cabot St behind Beacon Medical	Sewage odor (Gillooly)	42.403340	71.020587	
9/4/08	11:20	Mill2	Chelsea	38	4.12	0.24	ND	NA	dry	Cabot St behind Beacon Medical	Flow about 8 gal/min (Gillooly)	42.403340	71.020587	
9/4/08	11:20	Mill2d	Chelsea	54	4.01	0.22	ND	NA	dry	Duplicate	Duplicate	42.403340	71.020587	
7/21/08	10:10	Mill3	Chelsea	15530	ND (0.4)	0.09	NA	NA	wet	Downstream of Rev06 - walked culvert	Plaque covering outfall, turbid water	42.407977	71.027112	
8/21/08	9:55	Mill3	Chelsea	1844	0.27	0.07	NA	NA	dry	Downstream of Rev06, Walked culvert	little flow, greenish just outside pipe	42.407977	71.027112	
8/21/08	10:04	Mill3A	Chelsea	271	ND (0.075)	0.06	NA	NA	dry	culvert opposite Mill 3, low flow	gray up the pipe, green at daylight.	42.407993	71.027011	
7/21/08	10:35	Mill4	Chelsea	3266	ND (0.4)	0.11	NA	NA	wet	Head of Millcreek		42.410125	71.028722	
7/21/08	10:30	Rev06	Chelsea	7945	ND (0.4)	0.08	NA	NA	wet	Downstream of Mill04 - walked culvert		42.409914	71.028297	
7/21/08	8:10	Bos014	E. Boston	3266	ND (0.4)	0.08	NA	NA	wet	Upstream of Condor Urban Wild	plaque covering all rocks, very musty	42.382423	71.027076	
7/21/08	7:55	Con	E. Boston	54750	ND (0.4)	0.09	NA	NA	wet	Condor Urban Wild, outfall to west	Sewage odor, plaque covering rocks	42.383054	71.030131	
8/21/08	11:56	AF1	Everett	138	0.41	0.14	NA	NA	dry	Down Air force road by Boston Charters	Scum on top, lots of debris and trash.	42.407709	71.069853	
8/21/08	11:15	Floyd	Everett	48	0.11	0.05	NA	NA	dry	Madeline School end of Floyd St	1/4" orange, very low flow, slight odor	42.412663	71.069288	
8/21/08	10:45	IsEnd03A	Everett	11870	0.82	0.11	NA	NA	dry	stream exits under RR in produce area	orange all over the rocks	42.399997	71.053984	
9/4/08	9:57	IsEnd03A	Everett	86640	1.03	0.11	NA	NA	dry	stream exits under RR in produce area	very silty, plaque accumulation	42.399997	71.053984	
9/22/08	11:40	IsEnd03A	Everett	6932	~0.542	0.14	0.06	NA	wet	stream exits under RR in produce area	plaque accumulation, slight sewage odor	42.399997	71.053984	
8/21/08	10:50	IsEnd03B	Everett	3266	1.17	0.08	0.10	NA	dry	small pipe near IsEnd03A, strong flow	orange & turbid sheen on water	42.400115	71.050172	
9/4/08	9:58	IsEnd03B	Everett	9678	0.56	0.09	NA	NA	dry	small pipe near IsEnd03A	orange, slimy, and very dirty - cloudy water	42.400115	71.050172	
9/22/08	11:42	IsEnd03B	Everett	1164	~0.48	0.11	NA	NA	wet	small pipe near IsEnd03A	orange, slimy, and very dirty - cloudy water	42.400115	71.050172	
8/21/08	8:47	TLB2	Malden	312	1.44	0.10	NA	NA	dry	daylights under Rt99 by Meineke	Orange plaque, oil slick	42.424881	71.041827	
9/4/08	8:40	Kohl01	Medford	68	0.50	0.09	NA	NA	dry	off Kohl's at Meadow Glen Mall	culvert collapsed some water flowing	42.4071782	71.090874	
7/21/08	12:30	Mhb	Medford	7945	ND (0.4)	0.06	NA	NA	wet	Mystic Valley Pkwy at MHB	Pretty clear, Meeting House Brook	42.419214	71.117619	
7/21/08	12:40	Mhb2	Medford	9678	NA	NA	NA	NA	wet	Culvert about 20ft from MHB	Strong sewage odor coming from culvert	42.419214	71.117619	
9/4/08	7:42	Ship01	Medford	4	0.49	ND (0.05)	0.63	NA	dry	Small pipe next to culvert off Ship Ave	Very fresh smelling	42.4153935	71.103014	
8/21/08	12:09	Tufts	Medford	91	0.19	0.06	NA	NA	dry	near Tufts boat house	slight film on water, very little outflow	42.413180	71.076268	
9/4/08	7:08	WB01	Medford	6212	0.40	0.07	NA	NA	dry	Whittmore Brook off Allston St	plaque on rocks-low flow cond.	42.25'07.64	71.87'40.3	
8/25/08	11:15	Ell1	Melrose	1741	ND(0.075)	~0.53	NA	NA	dry	Across from 50 Tremont Street	slight flow, clear	42.461136	71.069376	
8/25/08	11:15	Ell1d	Melrose	1462	ND(0.075)	~0.21	NA	NA	dry	Duplicate	Duplicate	42.461136	71.069376	
8/25/08	11:20	Ell2	Melrose	716	ND(0.075)	~0.2	NA	NA	dry	pipe ~10ft downstream of Ell1	flow appeared to change direction	42.461136	71.069370	
8/25/08	11:35	Ell3	Melrose	23820	0.09	~0.07	NA	NA	dry	culvert near DPW by batting cages	some algae on rocks slightly musty	42.461429	71.068840	
8/25/08	7:53	Mal1	Melrose	774	0.12	~0.06	NA	NA	dry	Malden R. across from Oak Gro. T	6-8" in depth, slight turbidity /murky water	42.440652	71.070136	
8/25/08	9:08	Mal2	Melrose	749	0.10	~0.06	NA	NA	dry	Just downstream of NG Armory	western channel. Good flow clear	42.444227	71.069626	
8/25/08	10:15	Mal3	Melrose	1462	0.11	~0.06	NA	NA	dry	downstream from Wyoming station	Highly turbid - orange/brown plaque	42.449076	71.069831	
8/25/08	8:20	OM1	Melrose	80	0.14	~0.13	NA	NA	dry	at head of stream	flow 3x-4x in matter of min. while sampling	42.441688	71.071068	

8/25/08	8:15	OM2	Melrose	25	1.18	-0.16	NA	NA	dry	Old Mill 16" pipe entering ditch from N	~2 gal/min. film/orange plague inside pipe.	42.441720	71.070899
8/25/08	8:25	OM3	Melrose	12	ND(0.075)	~ND(0.5)	-0.01	NA	dry	12inch clay pipe next to headwaters	2 or 3gal/min, clear flow	42.441687	71.071070

Table 1: Urban River Sampling Data (Cont.)

Date	Time	Site	Town	E. coli	NH ₃	Surfactant	CL ₂	TP	Conditions	Site Description	Field Notes	GPS		GrS
				col/100ml	mg/L	mg/L	mg/L	µg/L				North (+)	West (-)	
6/23/08	8:50	Otis	Melrose	3266	0.77	0.09	NA	NA	dry	Corner of Otis and Charles Street	4 gal/min flow est, Musty, sewage odor	42.461342	71.075691	
8/25/08	11:52	Otis	Melrose	96	ND(0.075)	-0.33	NA	NA	dry	Corner of Otis and Charles Street	move manhole, slightly musty	42.461342	71.075691	
8/25/08	12:12	Roo1	Melrose	9678	0.13	~0.08	NA	NA	dry	Roosevelt School off Brunswick Place	downstream, flowing water, musty odor	42.464603	71.070066	
8/25/08	10:45	SP1	Melrose	186	0.15	~ND(0.05)	NA	NA	dry	Corner of Philips Rd & W Wyoming St	downstream of spot pond. slight flow	42.455333	71.080747	
7/21/08	9:00	Hadd	Revere	612	ND (0.4)	0.15	NA	NA	wet	Revere Beach Pkwy-Slade spice mill	White PVC beside broken down culvert	42.402480	71.010704	
8/21/08	7:55	LinB	Revere	2190	0.27	0.07	NA	NA	dry	as it daylights before Pine R, Linden Br	Heavy silt deposits, lots of debris	42.434553	71.020547	
8/21/08	8:10	Rt1trib	Revere	351	0.14	0.07	NA	NA	dry	Tributary to Linden Br Just E. of LinB	Good flow, lots of debris, low turbidity	42.434497	71.020322	
8/21/08	8:25	TLB1	Revere	3266	0.30	0.08	NA	NA	dry	hole in fence from Bally fitness parking	Town Line Brook , Very silty	42.433793	71.021460	
8/21/08	9:20	trifone	Revere	14010	0.11	0.06	NA	NA	dry	Stream off Amelia Pl. Off Washington St	low flow, low turbidity	42.425568	71.026803	
6/23/08	11:00	100A	Stoneham	14400	ND (0.4)	0.19	NA	NA	dry	Sweetwater Brook west of Maple St	Slight musty odor	42.4787841	71.113156	
9/15/08	9:42	100A	Stoneham	1642	ND (0.4)	0.07	NA	NA	wet	west of Maple St	Clear flow, no obvious odor	42.4787841	71.113156	
6/23/08	11:16	1Linden	Stoneham	6932	ND (0.4)	0.20	NA	NA	dry	Sweetwater Brook @ Lindenwood St	No odor	42.4824877	71.106037	
9/15/08	9:54	1Linden	Stoneham	1549	ND (0.4)	0.06	NA	NA	wet	Sweetwater Brook @ Lindenwood St	downstream	42.4824877	71.106037	
9/15/08	9:54	1Lindend	Stoneham	1844	ND (0.4)	0.05	NA	NA	wet	Duplicate	Duplicate	42.4824877	71.106037	
6/23/08	11:42	1West	Stoneham	14100	0.410	0.29	~0.02 ¹	NA	dry	Unnamed tributary to Sweetwater B.	Medium sewage odor	42.4826072	71.104619	
7/15/08	7:57	1West	Stoneham	3266	ND (0.4)	0.05	NA ¹	NA	dry	opposite West St Unnamed tributary	Musty odor	42.4826072	71.104619	
8/12/08	7:29	1West	Stoneham	4813	0.18	NA	NA ¹	NA	wet	opposite West St	Unnamed tributary to Sweetwater Brook	42.4826072	71.104619	
9/22/08	10:45	1West	Stoneham	54750	~ND(0.075)	0.05	0.09	NA	wet	opposite West St	No distinct odor	42.4826072	71.104619	
6/23/08	12:02	2Linden	Stoneham	13700	ND (0.4)	0.30	NA	NA	dry	Duplicate	Duplicate	42.483930	71.103939	
9/22/08	9:56	2Linden	Stoneham	3266	~0.098	0.06	0.10	NA	wet	Duplicate	Duplicate	42.483930	71.103939	
7/15/08	8:20	2Lincul	Stoneham	430	ND (0.4)	0.06	NA	NA	dry	Inside culvert(2 LINDEN) 3 pipes exiting	pipe ~14" in diam. about 2-3 gal/min .	42.484141	71.103935	
9/22/08	10:10	2Lincul	Stoneham	9678	~0.078	0.06	0.03	NA	wet	Inside culvert upstream from 2 LINDEN	flow ~ 2-3 gal/min musty inside culvert	42.484141	71.103935	
6/23/08	12:02	2Lincul	Stoneham	9600	ND (0.4)	0.32	~0.01 ¹	NA	dry	Sweetwater Br @ Lindenwood-upstream	Slight odor, ambient sample	42.483930	71.103939	
7/15/08	8:15	2Linden	Stoneham	689	ND (0.4)	0.05	NA ¹	NA	dry	Sweetwater Br @ Lindenwood-upstream	No odor	42.483930	71.103939	
8/12/08	7:18	2Linden	Stoneham	8800	0.37	0.14	NA ¹	132	wet	Sweetwater Br @ Lindenwood-upstream	(0.1" 48hrs prior to sampling for all)	42.484033	71.103950	
9/22/08	9:56	2Linden	Stoneham	2747	~0.217	0.07	0.10	NA	wet	Sweetwater Br @ Lindenwood	Slightly musty odor	42.483930	71.103939	
6/23/08	9:30	62Sun	Winchester	533	ND (0.4)	ND (0.05)	NA	NA	dry	intersection of Churchill and Sunset	No odor	42.4733306	71.11875	
7/28/08	7:35	M01	Winchester	2452	ND (0.4)	0.09	NA	NA	wet	Sandy Beach Location		42.441521	71.149149	
7/28/08	7:58	M02	Winchester	4813	ND (0.4)	0.09	NA	NA	wet	Mystic River pkwy	Downstream – under memorial bridge	42.442878	71.142845	
7/28/08	8:14	M03	Winchester	3683	ND (0.4)	0.09	NA	NA	wet	commuter rail station bridge	bacon street bridge MRP	42.444363	71.138845	
7/28/08	8:31	M04	Winchester	156	ND (0.4)	0.07	NA	NA	wet	Main street bridge	between car lot and gas station	42.455647	71.137980	
9/15/08	8:00	M05	Winchester	373	ND (0.4)	0.07	NA	NA	wet	bridge across from Winchester PW	High flow pretty clear	42.456789	71.138966	
7/28/08	8:42	M05	Winchester	126	ND (0.4)	0.06	NA	NA	wet	bridge across from Winchester PW	Wedge Pond inlet	42.456789	71.138966	
7/28/08	9:10	M06	Winchester	44	ND (0.4)	0.06	NA	NA	wet	Horn Pond outlet, near treatment plant	lake ave	42.464865	71.151279	
7/28/08	9:26	M07	Winchester	4813	ND (0.4)	0.08	NA	NA	wet	ambient sample south of Skillings Rd	Near Super Stop & Shop	42.456149	71.136269	
8/25/08	12:55	M07	Winchester	806	0.24	~0.07	NA	NA	dry	ambient sample south of Skillings Rd	Murky, some foam on surface	42.456149	71.136269	
7/28/08	9:40	M08	Winchester	64	3.11	0.07	~0.01 ¹	NA	wet	exiting ballfield culvert N of Skillings Rd	small pipe	42.456399	71.136447	
9/15/08	7:35	M08	Winchester	7945	0.615	0.08	NA	NA	wet	culvert N of Skillings Rd, pipe on rt	Occasional discharges w/bacterial sheen	42.456399	71.136447	
9/15/08	7:40	M08main	Winchester	5654	0.876	0.08	NA	NA	wet	Main stream next to M08	Lots of leaf litter, many TSS	42.456425	71.136466	
9/4/08	12:15	M08A	Winchester	408	0.994	0.25	NA	NA	dry	flow directly under baseball field, on side	deep deposits of plaque, composite?	42.456365	71.136337	
7/28/08	9:55	M09	Winchester	6212	ND (0.4)	0.07	NA	NA	wet	down street from Aberjona apts	2 pipes on bridge bottom, no flow	42.460935	71.137149	

7/28/08	10:16	M10	Winchester	5654	ND (0.4)	0.06	NA	NA	wet	Tufts school far corner	Next to Amtrak rail	42.464339	71.132424
7/28/08	10:30	M10a	Winchester	162	ND (0.4)	0.07	NA	NA	wet	Tufts school stream near bus circle		42.464200	71.131111

Table 1: Urban River Sampling Data (Cont.)

Date	Time	Site	Town	E. coli col/100ml	NH ₃ mg/L	Surfactant mg/L	CL ₂ mg/L	TP µg/L	Conditions	Site Description	Field Notes	GPS	
												North (+)	West (-)
7/28/08	10:48	M11	Winchester	241	ND (0.4)	0.07	NA	NA	wet	park near Forest rd,	on cross culvert under tracks into pond	42.468186	71.130921
7/28/08	10:48	M11d	Winchester	248	ND (0.4)	0.09	NA	NA	wet	Duplicate	Duplicate	42.468186	71.130921
7/28/08	11:35	M12	Winchester	6932	ND (0.4)	0.05	NA	NA	wet	behind Radiation Oncology Center	MyRWA baseline site	42.469507	71.125285
9/15/08	8:25	M12	Winchester	7945	0.63	0.09	NA	NA	wet	behind hospital, MyRWA baseline site	High flow no distinct odor	42.469507	71.125285
7/28/08	12:31	M13	Winchester	248	NA	NA	NA	NA	wet	outlet to reservoir	Across from Highland Terr.	42.467019	71.120658
6/23/08	10:17	1Kraft	Woburn	5654	ND (0.4)	0.27	NA	NA	dry	Sweetwater B. upstream of Aberjona	strong jello smell along with very bad odor	42.4770646	71.117594
9/15/08	8:50	1Kraft	Woburn	767	ND (0.4)	0.09	NA	NA	wet	upstream of confluence with Aberjona	very little odor, may be due to strong winds	42.4770646	71.117594
6/23/08	10:00	1Merrell	Woburn	2069	0.76	0.10	NA	NA	dry	Aberjona mainstem	No odor	42.4764251	71.1182
9/15/08	8:40	1Merrell	Woburn	6212	0.776	0.08	NA	NA	wet	downstream of Sweetwater Brook	Low TSS, tannish stained	42.4764251	71.1182
6/23/08	10:23	2Merrell	Woburn	2190	0.41	0.08	NA	NA	dry	Aberjona upstream of Sweetwater Br.	strong jello smell along with very bad odor	42.477141	71.117667
7/15/08	9:20	Aber	Woburn	408	ND (0.4)	0.06	NA	NA	dry	Washington street corner of Salem St		42.493138	71.124117
7/15/08	9:08	Burb	Woburn	599	ND (0.4)	0.06	NA	NA	dry	Operator of AMR granted permission	Lots of seeds in the water	42.491300	71.127027
7/15/08	10:55	Fit	Woburn	152	3.91	0.09	NA	NA	dry	near 60 Olympia Ave at Bally Fitness	Pretty clear water	42.501121	71.134909
7/15/08	10:55	Fitd	Woburn	152	3.94	0.08	NA	NA	dry	Duplicate	Duplicate	42.501121	71.134909
9/15/08	9:20	McDO1	Woburn	5654	1.02	0.09	NA	NA	wet	Behind McDonalds off Montvale Ave	Manhole nearby with strong sewage odor	42.478598	71.118001
7/10/08	8:15	Mys1	Woburn	7945	2.37	0.09	NA	NA	wet	Restaurant 99 off Mishuwan Street	ambient sample (no odor)	42.503179	71.135298
7/15/08	11:15	Mys1	Woburn	164	3.46	0.08	NA	NA	dry	Restaurant 99 off Mishuwan Street	Sampled main stream	42.503179	71.135298
8/12/08	8:35	Mys1	Woburn	3922	NA	NA	NA	NA	wet	Restaurant 99 off Mishuwan Street	Waded 3 ft upstream from running culvert	42.503179	71.135298
7/10/08	11:13	Mys10	Woburn	2452	1.25	0.06	NA	NA	wet	Just upstream from Mys7	sampled northwest of landfill, no odor	42.517881	71.150535
8/12/08	10:00	Mys10	Woburn	4480	NA	NA	NA	18	wet	Upstream of Mys 7 near landfill	Good flow	42.517881	71.150535
7/10/08	8:45	Mys2	Woburn	1230	3.70	0.08	NA	NA	wet	74 Commerce Way-Metro N.Busi. Center	No odor	42.513504	71.138870
7/10/08	9:11	Mys3	Woburn	6932	ND (0.4)	0.08	NA	NA	wet	across from Metro N. Business Center	Marshalls shipping lot	42.515744	71.136289
7/10/08	9:20	Mys4	Woburn	5199	0.50	0.10	NA	NA	wet	Across Street from last sample at culvert	geese downstream of sample site	42.516016	71.136885
7/10/08	9:38	Mys5	Woburn	239	ND (0.4)	ND (0.05)	NA	NA	wet	Atlantic Ave pk on right lot to sample	No odor	42.517193	71.141968
7/10/08	9:56	Mys6	Woburn	2452	0.73	0.08	NA	NA	wet	Hulls brook under New Boston St		42.513758	71.144110
7/10/08	10:18	Mys7	Woburn	27230	4.29	0.07	NA	NA	wet	New Boston St down stream of landfill	water very turbid slightly foul odor	42.518563	71.146526
8/12/08	8:46	Mys7	Woburn	111990	NA	NA	NA	181	wet	New Boston St where culvert enters	Film on water, low flow	42.518563	71.146526
9/22/08	8:09	Mys7	Woburn	~3080	6.22	0.06	~0.01	NA	wet	New Boston St where culvert enters	Water grayish/green color	42.518563	71.146526
8/12/08	9:50	Mys71	Woburn	57940	106.00	0.16	NA	196	wet	Stream entering upstream of Mys7	Thick sediment, oily, turbid	42.518477	71.148139
9/22/08	9:00	Mys71	Woburn	~3466	124	0.18	NA	NA	wet	Stream entering upstream of Mys7	most likely from landscape facility	42.518477	71.148139
8/12/08	9:45	Mys72	Woburn	32550	3.30	0.08	NA	27	wet	upstream from 7 & 71, down from Mys10	Thick layer of duck weed	42.518433	71.148226
9/22/08	8:51	Mys72	Woburn	~395	4.45	0.07	NA	NA	wet	upstream from 7 & 71, down from Mys10		42.518433	71.148226
7/10/08	10:30	Mys8	Woburn	41060	4.57	0.06	NA	NA	wet	Opposite stream from Mys7	Very turbid, foul odor	42.518739	71.146411
8/12/08	8:47	Mys8	Woburn	1954	16.40	0.06	NA	34	wet	Opposite stream from Mys7	Suspended solids	42.518739	71.146411
8/12/08	9:10	Mys81	Woburn	992	15.10	0.06	NA	41	wet	Just upstream from Mys8	were driveway enters landscaping facility	42.519578	71.146937
7/10/08	10:30	Mys8d	Woburn	41060	4.52	0.06	NA	NA	wet	Duplicate	Duplicate	42.518739	71.146411
8/12/08	8:47	Mys8d	Woburn	1954	16.90	0.05	NA	35	wet	Duplicate	Duplicate	42.518739	71.146411
7/10/08	10:45	Mys9	Woburn	1549	4.93	0.06	NA	NA	wet	Just upstream from Mys8	were stream exits outfall, no odor	42.520981	71.147709
8/12/08	9:15	Mys9	Woburn	445	NA	NA	NA	59	wet	Upstream of Mys8, stream daylight	Low flow, light brown bottom	42.520981	71.147709
7/15/08	10:35	Olym	Woburn	606	ND (0.4)	0.09	NA	NA	dry	Olympia Ave	grass clippings on water surface	42.500145	71.141333
8/12/08	10:45	Olym1	Woburn	3922	0.26	0.12	NA	51	wet	Olympia Ave, just downstream of Olym	Sandy bottom, beaver cage	42.498925	71.137440

9/15/08	11:31	Olym1	Woburn	258	ND (0.4)	0.08	NA	NA	wet	Olympia Ave, just downstream of Olym	Sandy bottom, med flow	42.498925	71.137440
9/15/08	11:20	Olym2	Woburn	568	ND (0.4)	0.08	NA	NA	wet	Off Olym Ave back of Rohtstein Foods	Lots of duck weed. Light tannish color	42.497445	71.134658

Table 1: Urban River Sampling Data (Cont.)

Date	Time	Site	Town	E. coli	NH ₃	Surfactant	CL ₂	TP	Conditions	Site Description	Field Notes	GPS	
				col/100ml	mg/L	mg/L	mg/L	µg/L				North (+)	West (-)
9/22/08	7:46	Olym2	Woburn	~1549	0.196	0.09	NA	NA	wet	Off Olym Ave back of Rohtstein Foods	low flow (less than last sample event)	42.497445	71.134658
7/15/08	9:40	Sal	Woburn	430	1.84	0.09	NA	NA	dry	1921yr culvert	Downstream side	42.491580	71.128834
7/15/08	9:55	US1	Woburn	125	ND (0.4)	0.07	NA	NA	dry	behind United Stationers far top corner	Lots of trash in the area	42.495445	71.134031
7/15/08	10:05	US2	Woburn	740	ND (0.4)	1.60	NA	NA	dry	closer to culvert than US1	Very turbid water, brownish	42.495411	71.133994
8/12/08	7:53	US3	Woburn	>241960	0.14	0.18	NA	NA	wet	Blue culvert across RR from US1	Grey, turbid water	42.495550	71.133700
9/15/08	10:38	US3	Woburn	7945	ND (0.4)	0.08	NA	NA	wet	Blue culvert across RR from US1	Med flow tannish colored water	42.495550	71.133700
9/22/08	7:14	US3	Woburn	1140	~0.132	0.07	0.05	NA	wet	Blue culvert across RR from US1	Clear, good flow, no odor	42.495550	71.133700
8/12/08	8:03	US4	Woburn	198630	0.12	0.17	NA	NA	wet	Culvert just 5 ft south of US3	Lots of green duck weed	42.495400	71.133700
9/15/08	10:41	US4	Woburn	1164	ND (0.4)	0.09	NA	NA	wet	Culvert just 5 ft south of US3	Very little flow, tannish color	42.495400	71.133700
9/15/08	10:47	US5	Woburn	2595	ND (0.4)	0.07	NA	NA	wet	Upstream of US3, same pk lot	Clear flow	42.495412	71.134111
9/22/08	7:24	US5	Woburn	1102	~0.109	0.08	NA	NA	wet	Upstream of US3, same pk lot	Clear flow	42.495412	71.134111
7/15/08	8:55	WashC	Woburn	316	1.32	0.07	NA	NA	dry	Wash Cir, just off Wash St	downstream side	42.485896	71.120882

Table 2: Color Key

E. coli - color key	Red	≥ 10,000 col/100ml	Orange	≥ 1260 col/100ml	Yellow	≥ 235 col/100ml	No color	< 235 col/100ml.
Ammonia (NH₃)- color key	Red	≥ 3 mg/L	Orange	≥ 1.0 mg/L	Yellow	≥ 0.5 mg/L	No color	< 0.5 mg/L
Surfactants - color key	Red	≥ 0.25 mg/L	Orange	≥ 0.1 mg/L	No color	< 0.1 mg/L		
Chlorine (Cl₂) - color key	Orange	Denotes presence						
Total Phosphorus (TP) - color key	Red	≥ 100 µg/L	Orange	≥ 50 µg/L	Yellow	<50 µg/L		

Table 3: Pharmaceutical and Personal Care Products

Chemical Compound	Primary Use	US3	Mys7	2Linden	1West	IsEnd03A
		Woburn (ng/L)	Woburn (ng/L)	Stoneham (ng/L)	Stoneham (ng/L)	Everett (ng/L)
Acetaminophen	Analgesic	ND(1.0)	ND(1.0)	340	130	250
Androstenedione	Androgen	ND(100)	ND(100)	ND(100)	ND(10)	ND(100)
Atrazine	Herbicide	ND(10)	ND(10)	ND(10)	ND(1.0)	ND(10)
Caffeine	Stimulant	220	1400	340	950	1600
Carbamazepine	Anti-seizure	ND(10)	ND(10)	ND(10)	2.5	ND(10)
DEET	Insect Repellent	83	360	130	10	100
Diazepam	Muscle Relaxer	ND(10)	ND(10)	ND(10)	ND(1.0)	ND(10)
Meprobamate	Anti-anxiety	ND(50)	ND(52)	ND(50)	ND(5.0)	ND(50)
Oxybenzone	Sun Screen	ND(20)	ND(21)	ND(20)	ND(2.0)	ND(20)
Pentoxifyline	Improve Blood Flow	ND(10)	ND(10)	ND(10)	ND(1.0)	ND(10)
Progesterone	Ovulation Inhib/Estrogen	ND(100)	ND(100)	ND(100)	ND(10)	ND(100)
Sulfamethoxazole	Antibiotic	ND(1.0)	ND(1.0)	ND(1.0)	6.3	ND(1.0)

Testosterone	Androgen	ND(100)	ND(100)	ND(100)	ND(10)	ND(100)
Methadone	Opiate	ND(50)	ND(52)	ND(50)	ND(5.0)	ND(50)

Table 4: Biological Oxygen Demand

Site	Mys7	Mys8	Mys8	Mys10
BOD	6.30	4.90	3.20	2.50
Date	7/10/08	7/10/08	7/10/08	7/10/08
Time	10:18	10:30	10:30	11:13
Town	Woburn	Woburn	Woburn	Woburn

Table 5: Total Suspended Solids

Site	Mys8	Mys8d
TSS (mg/L)	10.0	12.0
Date	7/10/08	7/10/08
Time	10:30	10:30
Town	Woburn	Woburn

ND (reporting limit) = not detected above the associated reporting limit.

Reporting limit for chlorine (Cl₂) = 0.02 mg/L.

NA = not applicable (analyte not tested for at that site at this time).

(~) = estimate data.

Based on field observations EPA returned to select locations to sample for chlorine (Cl₂).

“1West” and “2Linden” were tested for Cl₂ on August 5, 2008.

“M08” was tested for Cl₂ on August 25, 2008.

E. coli, optical brightener, TP, Cl₂ were analyzed by EPA’s New England Laboratory.

Ammonia, surfactants TSS and BOD were analyzed by Alpha Analytical Laboratory.

PPCP was analyzed by Columbia Analytical Laboratory.