Table 5-1
FCSA Environmental Monitoring Program
Old Amherst Landfill FCSA Study

Analysis	Sample Media		
Field Parameters	**Groundwater**	**Surface Water**	**Sediment**
Dissolved Oxygen	X	X	
pH	X	X	
Specific Conductance	X	X	
Temperature	X	X	
General Water Quality Parameters			
Alkalinity	X	X	X
Chemical Oxygen Demand (COD)	X	X	X
Chloride	X	X	X
Cyanide	X	X	X
Hardness			
Nitrate Nitrogen (as N)	X	X	X
Sulfate (SO4)	X	X	X
Total Dissolved Solids (TDS)	X	X	
% Solids			X
Turbidity	X	X	
Metals			
Arsenic (As)	X	X	X
Barium (Ba)	X	X	X
Cadmium (Cd)	X	X	X
Chromium (Cr)	X	X	X
Copper (Cu)	X	X	X
Iron (Fe)	X	X	X
Lead (Pb)	X	X	X
Manganese (Mn)	X	X	X
Mercury (Hg)	X	X	X
Selenium (Se)	X	X	X
Silver (Ag)	X	X	X
Zinc (Zn)	X	X	X
Calcium (Ca)	X	X	X
Sodium (Na)	X	X	X
Volatile Organic Compounds (VOCs)			
EPA Method 8260M - including methyl ethyl ketone, methyl isobutyl ketone, acetone, and 1,4-dioxane - Including identification of unknown peaks at 5 times base	X	X	X

Table 5-2
General Water Chemistry Analyses
Old Amherst Landfill FCSA Study

Tighe & Bond, Inc.

Sampling Station	Date	General Landfill Contaminant Indicator Parameters											
		Field pH (Std units)	Field Temp. (C)	Field Spec. Cond. (umhos)	Field D.O. (mg/L)	Field Turbidity (NTU)	Alkalinity (mg/L)	COD (mg/L)	Chloride (mg/L)	NO3 (mg/L)	SO4 (mg/L)	TDS (mg/L)	Cyanide (mg/L)
MA Drinking Water Standards MMCLs or SMCLs		**6.5-8.5***							**250***	**10**	**250***	**500***	**0.2**
MA AWQC - 310 CMR 40.1516(1)													
Fresh Water - Acute Criteria													**0.022**
Fresh Water - Chronic Criteria													**0.0052**
MA Class B - Inland Fresh Water		**6.5 - 8.3**	**28.3**		**5.0**								
Landfill & Vicinity - Water Supply Test Wells & Groundwater Monitoring Wells													
Well PGW-6	11-Nov-05	6.86	10.1	242.2	1.85	584	87.7	120	31	0.066	14	157	<0.010
	21-Oct-08	**6.18**	11.1	289	1.41	18000 lab	67	180	40	0.13	9.5	180	<0.0060
Well #5-89	10-Nov-05	**5.94**	7.7	144.6	8.19	>1100	17.6	42	41	0.42	<2	122	<0.010
	16-Oct-08	**5.81**	13.5	168	5.73	820 lab	8.7	56	39	0.28	<2.0	110	<0.0060
Well 6-89	10-Nov-05	**6.03**	8.5	181.2	2.26	399	18.7	36	45	<0.05	<2	124	<0.010
	16-Oct-08	**6.08**	11.6	230	2.35	430 lab	21	52	48	<0.050	3.8	120	<0.0060
Well #3-68	10-Nov-05	**6.21**	9.4	388.6	2.29	>1100	174	68	30	<0.05	47	256	<0.010
	17-Oct-08	6.65	13.1	536	2.88	3900 lab	160	49	50	<0.050	24	310	<0.0060
Well #3-80	10-Nov-05	6.53	10.1	358.2	1.48	117	135	<20	34	<0.05	3.7	196	<0.010
	17-Oct-08	6.84	14.9	356	1.28	270 lab	120	46	27	<0.050	<2.0	180	<0.0060
Well #1-03	10-Nov-05	**6.13**	13.1	146.8	5.23	>1100	20.3	34	33	0.29	6.6	104	<0.010
	17-Oct-08	xxx	xxx	xxx	xxx	3000	17	110	45	0.43	9.4	160	<0.0060
Well #1-94	18-Nov-05	**8.60**	8.3	79.8	2.08	xxx	25	27	12	<0.05	<2	29	<0.010
Geothermal Well 163 Wildflower Ave.	10-Nov-05	**9.80**	10.1	76.0	9.17	6.72	84.7	<20	1.3	<0.05	6.8	96	<0.010

Table 5-2
General Water Chemistry Analyses
Old Amherst Landfill FCSA Study

Tighe & Bond, Inc.

Sampling Station	Date	General Landfill Contaminant Indicator Parameters											
		Field pH (Std units)	Field Temp. (C)	Field Spec. Cond. (umhos)	Field D.O. (mg/L)	Field Turbidity (NTU)	Alkalinity (mg/L)	COD (mg/L)	Chloride (mg/L)	NO3 (mg/L)	SO4 (mg/L)	TDS (mg/L)	Cyanide (mg/L)
MA Drinking Water Standards MMCLs or SMCLs		**6.5-8.5***							**250***	**10**	**250***	**500***	**0.2**
MA AWQC - 310 CMR 40.1516(1)													
Fresh Water - Acute Criteria													**0.022**
Fresh Water - Chronic Criteria													**0.0052**
MA Class B - Inland Fresh Water		**6.5 - 8.3**	**28.3**		**5.0**								
Well #1-08	16-Oct-08	**5.85**	15.4	304	2.09	19000 lab	31	2100	62	0.50	14	24	<0.0060
Well #2-08	23-Oct-08	**6.42**	10.7	1312	1.26	1200 lab	560	120	55	<0.050	8.7	**550**	<0.0060
Well #3-08	23-Oct-08	7.50	11.5	246	3.50	3200 lab	89	93	3.4	3.8	16	180	<0.0060
Well #4-08	23-Oct-08	**12.20**	12.2	3317	4.23	93 lab	710	23	7.7	0.39	2.6	**800**	<0.0060
Well #5-08	23-Oct-08	8.00	9.3	122	2.14	120 lab	27	<20	7.1	<0.050	14	66	<0.0060
Well #6-08	15-Oct-08	**6.01**	11.5	464	1.52	100 lab	86	<20	72	0.071	13	230	<0.0060
Well #7-08	15-Oct-08	6.82	13.3	183	2.22	1000 lab	71	120	4.3	<0.050	17	150	<0.0060
Well #8-08	16-Oct-08	6.50	15.5	686	3.01	4200 lab	37	120	170	2.1	12	360	<0.0060
Well #9-08	16-Oct-08	6.56	13.2	220	1.69	2000 lab	56	120	16	<0.050	19	100	<0.0060
Well #10-08	15-Oct-08	**6.09**	12.5	402	2.04	240 lab	110	28	32	<0.050	12	150	<0.0060
Well #11-08	15-Oct-08	**5.88**	15.1	233	4.19	4000 lab	36	170	35	2.0	9.6	110	<0.0060
Well #12-08	23-Oct-08	**6.33**	12.4	181	2.30	1900 lab	34	42	26	<0.050	7.9	120	<0.0060

Table 5-2
General Water Chemistry Analyses
Old Amherst Landfill FCSA Study

Tighe & Bond, Inc.

Sampling Station	Date	General Landfill Contaminant Indicator Parameters											
		Field pH (Std units)	Field Temp. (C)	Field Spec. Cond. (umhos)	Field D.O. (mg/L)	Field Turbidity (NTU)	Alkalinity (mg/L)	COD (mg/L)	Chloride (mg/L)	NO3 (mg/L)	SO4 (mg/L)	TDS (mg/L)	Cyanide (mg/L)
MA Drinking Water Standards MMCLs or SMCLs		**6.5-8.5***							**250***	**10**	**250***	**500***	**0.2**
MA AWQC - 310 CMR 40.1516(1)													
Fresh Water - Acute Criteria													**0.022**
Fresh Water - Chronic Criteria													**0.0052**
MA Class B - Inland Fresh Water		**6.5 - 8.3**	**28.3**		**5.0**								
Lawrence Swamp Monitoring Stations - Water Supply Test Wells & Groundwater Monitoring Wells													
Well #2-03	10-Nov-05	**5.47**	11.5	363.0	6.86	>1100	10.7	130	88	6.9	17	220	<0.010
	16-Oct-08	**5.79**	15.6	337.0	3.56	6900 lab	14	540	70	2.0	18	170	<0.0060
Well #1-83	11-Nov-05	**9.82**	9.4	79.10	1.95	2.22	51.4	<20	5.9	<0.05	2.9	73	<0.010
	20-Oct-08	7.23	10.7	210	1.56	0.68 lab	65	<20	9.6	<0.050	28	160	<0.0060
Well #2-83	10-Nov-05	7.18	7.9	98.6	1.77	61.6	45.6	46	7.5	<0.05	19	72	<0.010
	20-Oct-08	7.37	11.1	124	2.43	130 lab	43	25	12	<0.050	<2.0	72	<0.0060
Well #3-83	10-Nov-05	7.87	9.2	121.6	1.16	6.49	67.6	65	15	<0.05	5.3	84	<0.010
	20-Oct-08	7.38	10.1	170	0.43	>100000 lab	52	970	20	<0.050	7.2	110	<0.0060
Well #4-83	20-Oct-08	6.85	14.5	183	2.26	160 lab	23	<20	30	0.69	9.5	120	<0.0060
Well #2-85	10-Nov-05	**6.20**	9.0	131.5	1.57	471	22.5	42	21	0.41	20	98	<0.010
Well #3-85	10-Nov-05	**6.16**	9.1	182.2	6.87	247	26.6	24	34	3.4	11	140	<0.010
	22-Oct-08	6.84	10.5	192	4.25	110	17	<20	26	3.2	12	150	<0.0060

Table 5-2
General Water Chemistry Analyses
Old Amherst Landfill FCSA Study

Tighe & Bond, Inc.

Sampling Station	Date	General Landfill Contaminant Indicator Parameters											
		Field pH (Std units)	Field Temp. (C)	Field Spec. Cond. (umhos)	Field D.O. (mg/L)	Field Turbidity (NTU)	Alkalinity (mg/L)	COD (mg/L)	Chloride (mg/L)	NO3 (mg/L)	SO4 (mg/L)	TDS (mg/L)	Cyanide (mg/L)
MA Drinking Water Standards MMCLs or SMCLs		**6.5-8.5***							**250***	**10**	**250***	**500***	**0.2**
MA AWQC - 310 CMR 40.1516(1)													
Fresh Water - Acute Criteria													**0.022**
Fresh Water - Chronic Criteria													**0.0052**
MA Class B - Inland Fresh Water		**6.5 - 8.3**	**28.3**		**5.0**								
Pomeroy Pond - Adjacent to Landfill													
SW-3	8-Nov-05	6.68	9.2	162.7	6.30	5.25	12	32	41	0.062	11	110	<0.010
	27-May-08	6.80	20.3	252.8	7.32	0.54 lab	10	<20	59	<0.050	7.2	130	<0.0060
Gull Pond - Downgradient of Landfill													
Inlet SW-1	8-Nov-05	6.68	10.6	510	5.62	8.84	190	<20	49	0.31	14	230	<0.010
	22-May-08	**6.41**	12.4	150.5	**3.15**	15 lab	52	35	19	0.067	3.7	130	<0.0060
Inlet SW-9	8-Nov-05	6.59	9.5	262.7	8.96	4.96	41	<20	7.5	1.5	12	210	<0.010
	22-May-08	6.86	10.1	375.9	6.96	3.1 lab	43	<20	95	1.7	14	280	<0.0060
Pond SW-2	8-Nov-05	6.68	9.7	225.5	7.31	9.12	56	<20	53	1.5	11	170	<0.010
	22-May-08	6.83	13.9	337.2	7.31	6.1 lab	42	21	80	0.32	11	260	<0.0060
SW-12	22-May-08	7.53	14.9	343.2	6.17	4.7 lab	42	<20	79	0.34	11	230	<0.0060
SW-13	22-May-08	**6.49**	14.4	323.5	6.99	8.1 lab	46	<20	68	0.40	11	200	<0.0060
KC Trail - Seepage Areas in Downgradient Wetland													
SW-6	8-Nov-05	6.58	9.5	528	**1.72**	518	200	62	89	<0.05	16	240	<0.010
	23-May-08	**6.28**	20.3	293.3	**4.60**	550 lab	76	360	33	1.9	17	170	**0.0070**
SW-14	23-May-08	6.52	15.8	408.4	**3.23**	430 lab	120	120	34	1.4	16	200	<0.0060

Table 5-2
General Water Chemistry Analyses
Old Amherst Landfill FCSA Study

Tighe & Bond, Inc.

Sampling Station	Date	General Landfill Contaminant Indicator Parameters											
		Field pH (Std units)	Field Temp. (C)	Field Spec. Cond. (umhos)	Field D.O. (mg/L)	Field Turbidity (NTU)	Alkalinity (mg/L)	COD (mg/L)	Chloride (mg/L)	NO3 (mg/L)	SO4 (mg/L)	TDS (mg/L)	Cyanide (mg/L)
MA Drinking Water Standards													
MMCLs or SMCLs		**6.5-8.5***							**250***	**10**	**250***	**500***	**0.2**
MA AWQC - 310 CMR 40.1516(1)													
Fresh Water - Acute Criteria													**0.022**
Fresh Water - Chronic Criteria													**0.0052**
MA Class B - Inland Fresh Water		**6.5 - 8.3**	**28.3**		**5.0**								
Kettle Pond - Downgradient of Landfill													
SW-7	8-Nov-05	6.78	10.2	34.4	8.62	8.72	16	100	1.4	<0.05	<2	52	<0.010
	27-May-08	6.71	22.3	238.1	6.12	4.5 lab	10	30	59	<0.050	7.1	140	<0.0060
Brickyard Wellfield - Springs in Adjacent Wetland													
SW-8	8-Nov-05	6.62	9.5	334.1	5.47	3.17	150	<20	28	0.74	16	220	<0.010
	23-May-08	**6.41**	14.1	357.9	**4.84**	1.8 lab	120	<20	33	0.45	14	230	<0.0060
SW-17	23-May-08	**6.38**	15.1	312.9	**3.33**	0.93 lab	120	<20	33	0.45	14	220	<0.0060
Hop Brook - Downgradient Receiving Stream													
Upstream SW-4	8-Nov-05	7.24	8.2	93.0	7.86	5.80	14	20	15	0.087	9.4	65	<0.010
	23-May-08	7.15	18.7	105.8	7.22	3.1 lab	17	<20	16	<0.050	6.8	59	<0.0060
Downstream SW-5	8-Nov-05	6.67	9.8	100.8	8.27	6.55	18	20	17	0.16	9.9	77	<0.010
	23-May-08	6.70	15.4	127.1	7.01	4.3 lab	24	23	20	<0.050	7.3	88	<0.0060
Owens Pond (Outlet) - 3,200 feet West of the Old Amherst Landfill													
SW-10	22-May-08	7.00	15.2	93.8	7.24	2.2 lab	14	25	16	0.082	7.3	130	<0.0060

Table 5-2
General Water Chemistry Analyses
Old Amherst Landfill FCSA Study

Tighe & Bond, Inc.

Sampling Station	Date	General Landfill Contaminant Indicator Parameters											
		Field pH (Std units)	Field Temp. (C)	Field Spec. Cond. (umhos)	Field D.O. (mg/L)	Field Turbidity (NTU)	Alkalinity (mg/L)	COD (mg/L)	Chloride (mg/L)	NO3 (mg/L)	SO4 (mg/L)	TDS (mg/L)	Cyanide (mg/L)
MA Drinking Water Standards													
MMCLs or SMCLs		**6.5-8.5***							**250***	**10**	**250***	**500***	**0.2**
MA AWQC - 310 CMR 40.1516(1)													
Fresh Water - Acute Criteria													**0.022**
Fresh Water - Chronic Criteria													**0.0052**
MA Class B - Inland Fresh Water		**6.5 - 8.3**	**28.3**		**5.0**								
Unnamed Pond (East Edge) - 600 feet West of Gull Pond													
SW-11	22-May-08	**6.38**	15.8	398.1	5.98	8.7 lab	5.8	100	3.1	<0.050	<2.0	69	<0.0060
Wetland Area - 1,200 feet West of Old Amherst Landfill													
SW-15	22-May-08	6.62	20.0	355.5	**0.75**	320 lab	59	1400	79	<0.050	3.1	250	**0.031**
	15-Oct-08												<0.0060
SW-15A	15-Oct-08												**0.035**
	21-Jan-09												<0.0060
	21-Jan-09												<0.0060 PAC
SW-15B	15-Oct-08												<0.0060

* SMCL - Secondary Maximum Contaminant Level

Table 5-3
Metals Analyses
Old Amherst Landfill FCSA Study

Tighe & Bond, Inc.

Location	Date	Total or Dissolved	As (mg/L)	Ba (mg/L)	Cd (mg/L)	Cr (mg/L)	Cu (mg/L)	Fe (mg/L)	Pb (mg/L)	Mn (mg/L)	Hg (mg/L)	Se (mg/L)	Ag (mg/L)	Zn (mg/L)	Na (mg/L)	Ca (mg/L)
MA Drinking Water Standards																
MMCLs & SMCLs			**0.010**	**2**	**0.005**	**0.1**	**1.3**	**0.3***	**0.015**	**0.05***	**0.002**	**0.05**	**0.10***	**5***	**20**	
MA AWQC - 310 CMR 40.1516(1)																
Fresh Water - Acute Criteria			**0.850**		**0.0039**	**1.7**	**0.018**		**0.083**		**0.0024**	**0.020**	**0.00092**	**0.120**		
Fresh Water - Chronic Criteria					**0.0011**	**0.21**	**0.012**	**1.0**	**0.0032**		**0.000012**	**0.005**	**0.00012**	**0.110**		
GROUNDWATER MONITORING STATIONS (TOTAL METALS)																
Landfill & Vicinity - Water Supply Test Wells & Groundwater Monitoring Wells																
Well PGW-6	11-Nov-05	Total	<0.200	**9.50**	**0.028**	**1.30**	**1.70**	**2000**	**0.880**	**39.0**	<0.0002	<0.100	<0.050	3.90		
	21-Oct-08	Dissolved	<0.0010	0.180B	<0.0010	<0.0050	0.0022J	**0.560**	<0.0010	**2.40**	<0.00020	<0.010	<0.0050	0.018J	19.0	26.0
Well #5-89	10-Nov-05	Total	<0.010	0.800	0.0015	0.060	0.110	**110**	**0.100**	**1.60**	<0.0002	<0.010	<0.005	0.190		
	16-Oct-08	Dissolved	<0.0010	0.190	<0.0010	<0.0050	<0.010	<0.100	<0.0010	0.021B	<0.00020	<0.010	<0.0050	0.017J	6.80	13.0
Well #6-89	10-Nov-05	Total	<0.010	0.360	0.0021	0.062	0.059	**57.0**	**0.067**	**2.60**	<0.0002	<0.010	<0.005	0.140		
	16-Oct-08	Dissolved	0.00055J	0.097	<0.0010	<0.0050	<0.010	**3.70**	<0.0010	**3.60B**	<0.00020	0.0039J	<0.0050	0.014J	**23.0**	9.40
Well #3-68	10-Nov-05	Total	<0.010	0.620	**0.013**	**6.50**	**5.50**	**700**	**1.00**	**4.50**	**0.0022**	<0.050	<0.025	**32.0**		
	17-Oct-08	Dissolved	0.00077J	0.095	<0.0010	<0.0050	0.036	**2.40**	<0.0010	**2.40**	<0.00020	<0.010	<0.0050	0.390	19.0	61.0
Well #3-80	10-Nov-05	Total	<0.010	0.800	<0.001	<0.005	<0.010	**52.0**	0.0063	**1.30**	<0.0002	<0.010	<0.005	0.450		
	17-Oct-08	Dissolved	<0.0010	0.044	0.00020J	<0.0050	<0.010	<0.100	<0.0010	0.017	<0.00020	<0.010	<0.0050	0.019J	**30.0**	11.0
Well #1-03	10-Nov-05	Total	<0.050	0.670	0.0021	**0.120**	0.160	**130**	**0.100**	**2.30**	<0.0002	<0.010	<0.005	0.320		
	17-Oct-08	Dissolved	<0.0010	0.600	0.00034J	<0.0050	<0.010	**17.0**	<0.0010	**0.730**	<0.00020	<0.010	<0.0050	0.0089J	19.0	36.0
Well #1-94	10-Nov-05	Total	<0.010	0.096	0.0025	0.013	0.014	**95.0**	**0.033**	**0.890**	<0.0002	<0.020	<0.005	2.90		
Geothermal Well 163 Wildflower Ave.	10-Nov-05	Total	<0.010	<0.010	<0.001	<0.005	0.160	**0.530**	**0.015**	0.017	<0.0002	<0.010	<0.005	0.150		
Well #1-08	16-Oct-08	Dissolved	<0.0050	0.110	<0.0010	0.0016JB	0.0075J	**0.480**	**0.018**	**0.200**	<0.00020	<0.010	<0.0050	0.035J	**49.0**	10.0
Well #2-08	21-Oct-08	Dissolved	**0.026**	0.760B	0.0010B	<0.0050	<0.010	**69.0**	0.00043J	**2.00B**	<0.00020	<0.010	<0.0050	0.100	**63.0**	91.0
Well #3-08	21-Oct-08	Dissolved	<0.0010	0.170B	0.00026JB	<0.0050	0.0026J	0.039J	<0.0010	**2.90B**	<0.00020	<0.010	<0.0050	0.014J	7.40	27.0
Well #4-08	20-Oct-08	Dissolved	0.00084J	0.300	<0.0010	0.0044J	0.023	0.059J	0.00036J	0.00035J	<0.00020	<0.010	<0.0050	0.0029J	**180**	140
Well #5-08	23-Oct-08	Dissolved	<0.0010	0.052B	<0.0010	<0.0050	<0.010	<0.100	<0.0010	**0.110B**	<0.00020	<0.010	<0.0050	<0.050	15.0	6.40

Table 5-3
Metals Analyses
Old Amherst Landfill FCSA Study

Tighe & Bond, Inc.

Location	Date	Total or Dissolved	As (mg/L)	Ba (mg/L)	Cd (mg/L)	Cr (mg/L)	Cu (mg/L)	Fe (mg/L)	Pb (mg/L)	Mn (mg/L)	Hg (mg/L)	Se (mg/L)	Ag (mg/L)	Zn (mg/L)	Na (mg/L)	Ca (mg/L)
MA Drinking Water Standards																
MMCLs & SMCLs			**0.010**	**2**	**0.005**	**0.1**	**1.3**	**0.3***	**0.015**	**0.05***	**0.002**	**0.05**	**0.10***	**5***	**20**	
MA AWQC - 310 CMR 40.1516(1)																
Fresh Water - Acute Criteria			**0.850**		**0.0039**	**1.7**	**0.018**		**0.083**		**0.0024**	**0.020**	**0.00092**	**0.120**		
Fresh Water - Chronic Criteria					**0.0011**	**0.21**	**0.012**	**1.0**	**0.0032**		**0.000012**	**0.005**	**0.00012**	**0.110**		
Well #6-08	15-Oct-08	Dissolved	<0.0010	0.390	0.00048J	<0.0050	0.0021J	0.020J	<0.0010	**3.10**	<0.00020	0.0022JB	0.00092J	0.051	**39.0**	37.0
Well #7-08	15-Oct-08	Dissolved	0.00068J	0.029	<0.0010	<0.0050	0.0031J	**0.310**	<0.0010	**0.170**	<0.00020	<0.010	<0.0050	0.0087J	17.0	17.0
Well #8-08	16-Oct-08	Dissolved	0.00069J	0.210	0.00022J	<0.0050	<0.010	**1.30**	0.00033J	**3.50B**	<0.00020	<0.010	0.00091JB	0.014J	**87.0**	25.0
Well #9-08	16-Oct-08	Dissolved	0.00096J	0.230	0.00034J	0.00028JB	0.0019J	**13.0**	0.0031	**0.560B**	<0.00020	<0.010	<0.0050	0.021J	13.0	17.0
Well #10-08	16-Oct-08	Dissolved	**0.020**	0.340	0.0010	<0.0050	<0.010	**50.0**	<0.0010	**2.10**	<0.00020	<0.010	<0.0050	0.0091J	18.0	22.0
Well #11-08	16-Oct-08	Dissolved	0.0018	0.078	<0.0010	<0.0050	0.0029J	0.051J	<0.0010	**0.230**	<0.00020	<0.010	<0.0050	0.0057J	**25.0**	14.0
Well #12-08	17-Oct-08	Dissolved	0.00041J	0.180	<0.0010	<0.0050	0.0018J	**3.60**	<0.0010	**0.150**	<0.00020	<0.010	<0.0050	0.039J	11.0	14.0
Lawrence Swamp Monitoring Stations - Water Supply Test Wells & Groundwater Monitoring Wells																
Well #2-03	10-Nov-05	Total	<0.010	0.640	0.0012	0.069	0.098	**88.0**	**0.088**	**1.70**	<0.0002	<0.010	<0.005	0.190		
	16-Oct-08	Dissolved	<0.0010	0.099	<0.0010	<0.0050	0.0039J	<0.100	<0.0010	0.031B	<0.00020	<0.010	<0.0050	0.018J	**45.0**	13.0
Well #1-83	11-Nov-05	Total	<0.010	0.052	<0.001	<0.005	<0.010	<0.100	<0.001	<0.010	<0.0002	<0.010	<0.005	<0.050		
	20-Oct-08	Dissolved	0.0024	0.120	<0.0010	<0.0050	<0.010	0.053J	<0.0010	**0.250**	<0.00020	<0.010	<0.0050	0.0037J	**61.0**	35.0
Well #2-83	10-Nov-05	Total	<0.010	0.087	<0.001	<0.005	<0.010	**74.0**	<0.005	**0.230**	<0.0002	<0.010	<0.005	**6.80**		
	20-Oct-08	Dissolved	<0.0010	0.079	<0.0010	<0.0050	<0.010	**0.550**	<0.0010	**0.160**	<0.00020	<0.010	<0.0050	<0.050	7.70	10.0
Well #3-83	10-Nov-05	Total	<0.010	0.440	<0.020	<0.100	<0.200	**2100**	0.0048	**3.20**	<0.0002	<0.200	<0.100	**19.0**		
	20-Oct-08	Dissolved	<0.0010	0.058	<0.0010	<0.0050	<0.010	**0.460**	<0.0010	0.037	<0.00020	<0.010	<0.0050	0.0034J	11.0	18.0
Well #4-83	20-Oct-08	Dissolved	<0.0010	0.067	0.00022J	<0.0050	<0.010	**2.30**	<0.0010	**0.290**	<0.00020	<0.010	<0.0050	0.024J	13.0	14.0
Well #2-85	10-Nov-05	Total	<0.010	0.160	0.0018	0.035	0.076	**140**	**0.110**	**1.50**	<0.0002	<0.010	<0.005	1.10		
Well #3-85	10-Nov-05	Total	<0.010	0.290	0.0012	0.030	0.026	**110**	**0.017**	**0.790**	<0.0002	<0.010	<0.005	0.083		
	22-Oct-08	Dissolved	<0.0010	0.110B	<0.0010	<0.0050	<0.010	**0.570**	<0.0010	**0.110B**	<0.00020	<0.010	<0.0050	0.010J	15.0	13.0

Table 5-3
Metals Analyses
Old Amherst Landfill FCSA Study

Tighe & Bond, Inc.

Location	Date	Total or Dissolved	As (mg/L)	Ba (mg/L)	Cd (mg/L)	Cr (mg/L)	Cu (mg/L)	Fe (mg/L)	Pb (mg/L)	Mn (mg/L)	Hg (mg/L)	Se (mg/L)	Ag (mg/L)	Zn (mg/L)	Na (mg/L)	Ca (mg/L)
MA Drinking Water Standards																
MMCLs & SMCLs			**0.010**	**2**	**0.005**	**0.1**	**1.3**	**0.3***	**0.015**	**0.05***	**0.002**	**0.05**	**0.10***	**5***	**20**	
MA AWQC - 310 CMR 40.1516(1)																
Fresh Water - Acute Criteria			**0.850**		**0.0039**	**1.7**	**0.018**		**0.083**		**0.0024**	**0.020**	**0.00092**	**0.120**		
Fresh Water - Chronic Criteria					**0.0011**	**0.21**	**0.012**	**1.0**	**0.0032**		**0.000012**	**0.005**	**0.00012**	**0.110**		
SURFACE WATER MONITORING STATIONS (TOTAL METALS)																
Pomeroy Pond - Adjacent to Landfill																
SW-3	8-Nov-05	Total	<0.010	0.044	<0.0025	<0.005	<0.010	0.260	<0.001	0.047	<0.0002	<0.020	<0.005	<0.050		
	27-May-08	Total	0.00053J	0.050B	<0.0010	<0.0050	<0.010	0.093J	<0.0010	0.020	<0.00020	<0.010	<0.0050	0.0081J		
Gull Pond - Downgradient of Landfill																
Inlet SW-1	8-Nov-05	Total	<0.010	0.590	<0.0025	<0.005	<0.010	**14.0**	<0.001	1.50	<0.0002	<0.020	<0.005	<0.050		
	22-May-08	Dissolved	0.0010	0.150	<0.0010	0.00071J	0.0030J	**1.60**	<0.0010	0.200	<0.00020	<0.010	<0.0050	0.062		
Inlet SW-9	8-Nov-05	Total	<0.010	0.180	<0.0025	<0.005	<0.010	0.100	<0.001	0.150	<0.0002	<0.020	<0.005	<0.050		
	22-May-08	Dissolved	<0.0010	0.230	<0.0010	<0.0050	<0.010	0.030J	<0.0010	0.320	<0.00020	<0.010	<0.0050	0.012J		
Pond SW-2	8-Nov-05	Total	<0.010	0.180	<0.0025	<0.005	<0.010	**1.10**	<0.001	0.170	<0.0002	<0.020	<0.005	<0.050		
	22-May-08	Dissolved	0.00065J	0.120	0.00026J	<0.0050	<0.010	0.110	<0.0010	0.170	<0.00020	<0.010	<0.0050	0.0089J		
SW-12	22-May-08	Dissolved	0.00063J	0.120	<0.0010	<0.0050	<0.010	0.120	<0.0010	0.170	<0.00020	<0.010	<0.0050	0.025J		
SW-13	22-May-08	Dissolved	0.00065J	0.140	<0.0010	<0.0050	<0.010	0.250	<0.0010	0.310	<0.00020	<0.010	<0.0050	0.0069J	40.0	
KC Trail - Seepage Areas in Downgradient Wetland																
SW-6	8-Nov-05	Total	0.015	0.660	<0.0025	<0.005	<0.010	**150**	**0.0034**	6.00	<0.0002	<0.020	<0.005	<0.050		
	23-May-08	Dissolved	0.00042J	0.220	<0.0010	<0.0050	0.0019J	0.096J	0.0011	1.20	<0.00020	0.0027JB	<0.0050	0.033J	24.0	
SW-14	23-May-08	Dissolved	0.0018	0.450	<0.0010	0.00039JB	0.0021J	**6.40**	<0.0010	1.20	<0.00020	<0.010	<0.0050	0.096	26.0	
Kettle Pond - Downgradient of Landfill																
SW-7	8-Nov-05	Total	<0.010	0.018	<0.0025	<0.005	<0.010	**4.10**	<0.001	0.250	<0.0002	<0.020	<0.005	<0.050		
	27-May-08	Dissolved	0.00055J	0.050B	<0.0010	<0.0050	<0.010	0.120	<0.0010	0.025	<0.00020	<0.010	<0.0050	0.0068J		
Brickyard Wellfield - Springs in Adjacent Wetland																
SW-8	8-Nov-05	Total	<0.010	0.230	<0.0025	<0.005	<0.010	**1.00**	<0.005	2.70	<0.0002	<0.020	<0.005	<0.050		
	22-May-08	Dissolved	<0.0010	0.240	<0.0010	<0.0050	<0.010	0.190	<0.0010	2.90	<0.00020	0.0027JB	<0.0050	0.018J	19	
SW-17	23-May-08	Dissolved	<0.0010	0.250	0.00024J	<0.0050	0.0018J	0.220	<0.0010	2.90	<0.00020	<0.010	<0.0050	0.110	19	

Table 5-3
Metals Analyses
Old Amherst Landfill FCSA Study

Tighe & Bond, Inc.

Location	Date	Total or Dissolved	As (mg/L)	Ba (mg/L)	Cd (mg/L)	Cr (mg/L)	Cu (mg/L)	Fe (mg/L)	Pb (mg/L)	Mn (mg/L)	Hg (mg/L)	Se (mg/L)	Ag (mg/L)	Zn (mg/L)	Na (mg/L)	Ca (mg/L)
MA Drinking Water Standards																
MMCLs & SMCLs			**0.010**	**2**	**0.005**	**0.1**	**1.3**	**0.3***	**0.015**	**0.05***	**0.002**	**0.05**	**0.10***	**5***	**20**	
MA AWQC - 310 CMR 40.1516(1)																
Fresh Water - Acute Criteria			**0.850**		**0.0039**	**1.7**	**0.018**		**0.083**		**0.0024**	**0.020**	**0.00092**	**0.120**		
Fresh Water - Chronic Criteria					**0.0011**	**0.21**	**0.012**	**1.0**	**0.0032**		**0.000012**	**0.005**	**0.00012**	**0.110**		
Hop Brook - Downgradient Receiving Stream																
SW-4 (upstream)	8-Nov-05	Total	<0.010	0.037	<0.0025	<0.005	<0.010	0.750	<0.005	0.070	<0.0002	<0.020	<0.005	<0.050		
	23-May-08	Dissolved	0.00051J	0.046B	<0.0010	<0.0050	<0.010	0.400	<0.0010	0.074	<0.00020	<0.010	<0.0050	0.010J	11.0	
SW-5 (downstream)	8-Jan-05	Total	<0.010	0.045	<0.0025	<0.005	<0.010	**1.00**	<0.001	0.110	<0.0002	<0.020	<0.005	<0.050		
	23-May-08	Dissolved	0.00043J	0.054	<0.0010	<0.0050	<0.010	0.730	<0.0010	0.210	<0.00020	<0.010	<0.0050	0.011J	11.0	
Owens Pond (Outlet) - 3,200 feet West of the Old Amherst Landfill																
SW-10	22-May-08	Dissolved	<0.0010	0.026	0.00070J	<0.0050	<0.010	0.180	0.00062J	0.022	<0.00020	<0.010	<0.0050	0.010J		
Unnamed Pond (East Edge) - 600 feet West of Gull Pond																
SW-11	22-May-08	Dissolved	0.00063J	<0.020	<0.0010	0.00026J	0.0024J	0.700	0.0014	0.046	<0.00020	<0.010	<0.0050	0.021J	2.90	
Wetland Area - 1,200 feet West of Old Amherst Landfill																
SW-15	23-May-08	Total	0.0028	0.120	0.00020J	0.0012JB	0.0052J	**5.20**	**0.0083**	0.540	<0.00020	<0.010	<0.0050	0.052	63.0	
	15-Oct-08	Dissolved							0.0018							
SW-15A	15-Oct-08	Dissolved							**0.0140**							
SW-15B	15-Oct-08	Dissolved							**0.0074**							

* SMCL - US EPA Secondary Maximum Contaminant Level
"J" values are estimated concentrations; less than the analytical Reporting Limit (RL) but greater than the Method Detection Limit (MDL).
"B" = Analyte detected in the laboratory quality control blank.

TABLE 5-4
Volatile Organic Compound (VOC) Analyses
Old Amherst Landfill FCSA Study

Tighe & Bond, Inc.

EPA METHOD 8260 Compound	Standards MMCL / ORSG (ug/L)	Well PGW-6		Well #5-89		Well #6-89		Well #3-68	
		11/11/05	10/21/08	11/10/05	10/16/08	11/10/05	10/16/08	11/10/05	10/17/08
Acetone	6,300 ORSG	U	U	U	U	U	U	U	U
Bromobenzene		U	U	U	U	U	U	U	U
Benzene	5 MMCL	U	U	U	U	U	U	U	U
Bromochloromethane		U	U	U	U	U	U	U	U
Bromodichloromethane		U	U	U	U	U	U	U	U
Bromoform		U	U	U	U	U	U	U	U
Bromomethane	10 ORSG	U	U	U	U	U	U	U	U
2-Butanone (MEK)	4,000 ORSG	U	U	U	U	U	U	U	U
Carbon tetrachloride	5 MMCL	U	U	U	U	U	U	U	U
Chlorobenzene	100 MMCL	U	U	U	U	U	U	0.95 J	1.1
Chlorodibromomethane		U	U	U	U	U	U	U	U
Chloroethane		U	U	U	U	U	U	U	U
Chloroform	5 ORSG	U	U	U	U	U	U	U	U
Chloromethane		U	U	U	U	U	U	U	0.34 J
2-Chlorotoluene		U	U	U	U	U	U	U	U
4-Chlorotoluene		U	U	U	U	U	U	U	U
cis-1,2-Dichloroethene	70 MMCL	U	U	U	U	U	U	U	U
Dibromomethane		U	U	U	U	U	U	U	U
1,2-Dibromo-3-chloropropane		U	U	U	U	U	U	U	U
Dichlorodifluoromethane		U	U	U	U	U	U	U	U
1,2-Dichlorobenzene	600 MMCL	U	U	U	U	U	U	U	U
1,3-Dichlorobenzene		U	U	U	U	U	U	U	U
1,4-Dichlorobenzene	5 MMCL	U	U	U	U	U	U	U	U
1,1-Dichloroethane	70 ORSG	U	U	U	U	U	U	U	U
1,2-Dichloroethane	5 MMCL	U	U	U	U	U	U	0.61 J	U
1,1-Dichloroethene	7 MMCL	U	U	U	U	U	U	U	U
1,2-Dichloropropane	5 MMCL	U	U	U	U	U	U	U	U
1,3-Dichloropropane	0.4 ORSG	U	U	U	U	U	U	U	U
2,2-Dichloropropane		U	U	U	U	U	U	U	U
1,1-Dichloropropene		U	U	U	U	U	U	U	U
cis-1,3-Dichloropropene		U	U	U	U	U	U	U	U
trans-1,3-Dichloropropene		U	U	U	U	U	U	U	U
Ethylbenzene	700 MMCL	U	U	U	U	U	U	U	U
Ethylene Dibromide	0.02 MMCL	U	U	U	U	U	U	U	U
Fluorotrichloromethane		U	U	U	U	U	U	U	U
2-Hexanone		U	U	U	U	U	U	U	U
Hexachlorobutadiene		U	U	U	U	U	U	U	U
Isopropylbenzene		U	U	U	U	U	U	U	U
4-Methyl-2-pentanone	350 ORSG	U	U	U	U	U	U	U	U
Methylene chloride	5 MMCL	U	U	U	U	U	U	U	U
Methyl-tert-butyl ether	70 ORSG	U	U	U	U	U	U	U	U
n-Butylbenzene		U	U	U	U	U	U	U	U
n-Propylbenzene		U	U	U	U	U	U	U	U
Naphthalene		U	U	U	U	U	U	U	U
m&p-Xylene	10000 Total MMCL	U	U	U	U	U	U	U	U
p-Isopropyltoluene		U	U	U	U	U	U	U	U
o-Xylene	10000 Total MMCL	U	U	U	U	U	U	U	U
sec-Butylbenzene		U	U	U	U	U	U	U	U
Styrene	100 MMCL	U	U	U	U	U	U	U	U
Tert-Butylbenzene		U	U	U	U	U	U	U	U
Tetrachloroethene	5 MMCL	U	U	U	U	U	U	U	U
1,1,1,2-Tetrachloroethane		U	U	U	U	U	U	U	U
1,1,2,2-Tetrachloroethane		U	U	U	U	U	U	U	U
Toluene	1000 MMCL	U	U	U	U	0.69 J	11	U	U
trans-1,2-Dichloroethene	100 MMCL	U	U	U	U	U	U	U	U
1,2,3-Trichlorobenzene		U	U	U	U	U	U	U	U
1,2,4-Trichlorobenzene	70 MMCL	U	U	U	U	U	U	U	U
1,1,1-Trichloroethane	200 MMCL	U	U	U	U	U	U	U	U
1,1,2-Trichloroethane	5 MMCL	U	U	U	U	U	U	U	U
Trichloroethene	5 MMCL	U	U	U	U	U	U	U	U
1,2,3-Trichloropropane		U	U	U	U	U	U	U	U
1,2,4-Trimethylbenzene		U	U	U	U	U	U	U	U
1,3,5-Trimethylbenzene		U	U	U	U	U	U	U	U
Vinyl Chloride	2 MMCL	U	U	U	U	U	U	U	U
1,4-dioxane (low-level analysis)	3 ORSG		U @ 1.0		U @ 1.0		U @ 1.0		U @ 1.0
Total Quantified Target VOCs		0.0	0.0	0.0	0.0	0.0	11.0	0.0	1.1
Identified Non-Target Compounds		0	0	0	0	0	0	0	1

MMCL = Massachusetts Maximum Contaminant Level
ORSG = Office of Research & Standards Guidelines
AWQC = Massachusetts Ambient Water Quality Criteria for fresh water under 310 CMR 40.1516
U or ND = Not detected.

TABLE 5-4
Volatile Organic Compound (VOC) Analyses
Old Amherst Landfill FCSA Study

EPA METHOD 8260 Compound	Standards MMCL / ORSG (ug/L)	Well #3-80		Well #1-03		Well #1-94	Geothermal Well 163 Wildflower Ave.
		11/10/05	10/17/08	11/10/05	10/17/08	11/18/05	11/10/05
Acetone	6,300 ORSG	U	U	U	U	U	U
Bromobenzene		U	U	U	U	U	U
Benzene	5 MMCL	0.74 J	U	U	U	U	U
Bromochloromethane		U	U	U	U	U	U
Bromodichloromethane		U	U	U	U	U	U
Bromoform		U	U	U	U	U	U
Bromomethane	10 ORSG	U	U	U	U	U	U
2-Butanone (MEK)	4,000 ORSG	U	U	U	U	U	U
Carbon tetrachloride	5 MMCL	U	U	U	U	U	U
Chlorobenzene	100 MMCL	U	U	U	U	U	U
Chlorodibromomethane		U	U	U	U	U	U
Chloroethane		U	U	U	U	U	U
Chloroform	5 ORSG	U	U	U	U	U	U
Chloromethane		U	0.46 J	U	U	U	U
2-Chlorotoluene		U	U	U	U	U	U
4-Chlorotoluene		U	U	U	U	U	U
cis-1,2-Dichloroethene	70 MMCL	5.0	2.6	U	U	U	U
Dibromomethane		U	U	U	U	U	U
1,2-Dibromo-3-chloropropane		U	U	U	U	U	U
Dichlorodifluoromethane		U	U	U	U	U	U
1,2-Dichlorobenzene	600 MMCL	U	U	U	U	U	U
1,3-Dichlorobenzene		U	U	U	U	U	U
1,4-Dichlorobenzene	5 MMCL	U	U	U	U	U	U
1,1-Dichloroethane	70 ORSG	U	U	U	U	U	U
1,2-Dichloroethane	5 MMCL	U	U	U	U	U	U
1,1-Dichloroethene	7 MMCL	U	U	U	U	U	U
1,2-Dichloropropane	5 MMCL	U	U	U	U	U	U
1,3-Dichloropropane	0.4 ORSG	U	U	U	U	U	U
2,2-Dichloropropane		U	U	U	U	U	U
1,1-Dichloropropene		U	U	U	U	U	U
cis-1,3-Dichloropropene		U	U	U	U	U	U
trans-1,3-Dichloropropene		U	U	U	U	U	U
Ethylbenzene	700 MMCL	U	U	U	U	U	U
Ethylene Dibromide	0.02 MMCL	U	U	U	U	U	U
Fluorotrichloromethane		U	U	U	U	U	U
2-Hexanone		U	U	U	U	U	U
Hexachlorobutadiene		U	U	U	U	U	U
Isopropylbenzene		U	U	U	U	U	U
4-Methyl-2-pentanone	350 ORSG	U	U	U	U	U	U
Methylene chloride	5 MMCL	U	U	U	U	U	U
Methyl-tert-butyl ether	70 ORSG	U	U	U	U	U	U
n-Butylbenzene		U	U	U	U	U	U
n-Propylbenzene		U	U	U	U	U	U
Naphthalene		U	U	U	U	U	U
m&p-Xylene	10000 Total MMCL	U	U	U	U	U	U
p-Isopropyltoluene		U	U	U	U	U	U
o-Xylene	10000 Total MMCL	U	U	U	U	U	U
sec-Butylbenzene		U	U	U	U	U	U
Styrene	100 MMCL	U	U	U	U	U	U
Tert-Butylbenzene		U	U	U	U	U	U
Tetrachloroethene	5 MMCL	U	U	U	U	U	U
1,1,1,2-Tetrachloroethane		U	U	U	U	U	U
1,1,2,2-Tetrachloroethane		U	U	U	U	U	U
Toluene	1000 MMCL	U	U	U	U	U	U
trans-1,2-Dichloroethene	100 MMCL	U	U	U	U	U	U
1,2,3-Trichlorobenzene		U	U	U	U	U	U
1,2,4-Trichlorobenzene	70 MMCL	U	U	U	U	U	U
1,1,1-Trichloroethane	200 MMCL	U	U	U	U	U	U
1,1,2-Trichloroethane	5 MMCL	U	U	U	U	U	U
Trichloroethene	5 MMCL	U	U	U	U	U	U
1,2,3-Trichloropropane		U	U	U	U	U	U
1,2,4-Trimethylbenzene		U	U	U	U	U	U
1,3,5-Trimethylbenzene		U	U	U	U	U	U
Vinyl Chloride	2 MMCL	U	0.47 J	U	U	U	U
1,4-dioxane (low-level analysis)	3 ORSG		0.21 J		U @ 1.0		
Total Quantified Target VOCs		5.0	2.6	0.0	0.0	0.0	0.0
Identified Non-Target Compounds		0	2	0	0	0	0

MMCL = Massachusetts Maximum Contaminant Level
ORSG = Office of Research & Standards Guidelines
AWQC = Massachusetts Ambient Water Quality Criteria fo
U or ND = Not detected.

TABLE 5-4
Volatile Organic Compound (VOC) Analyses
Old Amherst Landfill FCSA Study

Tighe & Bond, Inc.

EPA METHOD 8260 Compound	Standards MMCL / ORSG (ug/L)	Well #2-03		Well #1-83		Well #2-83		Well #3-83	
		11/10/05	10/16/08	11/11/05	10/20/08	11/10/05	10/20/08	11/10/05	10/20/08
									2x dilution
Acetone	6,300 ORSG	U	U	U	U	U	U	U	U
Bromobenzene		U	U	U	U	U	U	U	U
Benzene	5 MMCL	U	U	U	U	U	U	U	U
Bromochloromethane		U	U	U	U	U	U	U	U
Bromodichloromethane		U	U	U	U	U	U	U	U
Bromoform		U	U	U	U	U	U	U	U
Bromomethane	10 ORSG	U	U	U	U	U	U	U	U
2-Butanone (MEK)	4,000 ORSG	U	U	U	U	U	U	U	U
Carbon tetrachloride	5 MMCL	U	U	U	U	U	U	U	U
Chlorobenzene	100 MMCL	U	U	U	U	U	U	U	U
Chlorodibromomethane		U	U	U	U	U	U	U	U
Chloroethane		U	U	U	U	U	U	U	U
Chloroform	5 ORSG	U	U	U	U	U	U	U	U
Chloromethane		U	U	U	U	U	U	U	U
2-Chlorotoluene		U	U	U	U	U	U	U	U
4-Chlorotoluene		U	U	U	U	U	U	U	U
cis-1,2-Dichloroethene	70 MMCL	U	U	U	U	U	U	U	U
Dibromomethane		U	U	U	U	U	U	U	U
1,2-Dibromo-3-chloropropane		U	U	U	U	U	U	U	U
Dichlorodifluoromethane		U	U	U	U	U	U	U	U
1,2-Dichlorobenzene	600 MMCL	U	U	U	U	U	U	U	U
1,3-Dichlorobenzene		U	U	U	U	U	U	U	U
1,4-Dichlorobenzene	5 MMCL	U	U	U	U	U	U	U	U
1,1-Dichloroethane	70 ORSG	U	U	U	U	U	U	U	U
1,2-Dichloroethane	5 MMCL	U	U	U	U	U	U	U	U
1,1-Dichloroethene	7 MMCL	U	U	U	U	U	U	U	U
1,2-Dichloropropane	5 MMCL	U	U	U	U	U	U	U	U
1,3-Dichloropropane	0.4 ORSG	U	U	U	U	U	U	U	U
2,2-Dichloropropane		U	U	U	U	U	U	U	U
1,1-Dichloropropene		U	U	U	U	U	U	U	U
cis-1,3-Dichloropropene		U	U	U	U	U	U	U	U
trans-1,3-Dichloropropene		U	U	U	U	U	U	U	U
Ethylbenzene	700 MMCL	U	U	U	U	U	U	U	U
Ethylene Dibromide	0.02 MMCL	U	U	U	U	U	U	U	U
Fluorotrichloromethane		U	U	U	U	U	U	U	U
2-Hexanone		U	U	U	U	U	U	U	U
Hexachlorobutadiene		U	U	U	U	U	U	U	U
Isopropylbenzene		U	U	U	U	U	U	U	U
4-Methyl-2-pentanone	350 ORSG	U	U	U	U	U	U	U	U
Methylene chloride	5 MMCL	U	U	U	U	U	U	U	U
Methyl-tert-butyl ether	70 ORSG	U	U	U	U	U	U	U	U
n-Butylbenzene		U	U	U	U	U	U	U	U
n-Propylbenzene		U	U	U	U	U	U	U	U
Naphthalene		U	U	U	U	U	U	U	U
m&p-Xylene	10000 Total MMCL	U	U	U	U	U	U	U	U
p-Isopropyltoluene		U	U	U	U	U	U	U	U
o-Xylene	10000 Total MMCL	U	U	U	U	U	U	U	U
sec-Butylbenzene		U	U	U	U	U	U	U	U
Styrene	100 MMCL	U	U	U	U	U	U	U	U
Tert-Butylbenzene		U	U	U	U	U	U	U	U
Tetrachloroethene	5 MMCL	U	U	U	U	U	U	U	U
1,1,1,2-Tetrachloroethane		U	U	U	U	U	U	U	U
1,1,2,2-Tetrachloroethane		U	U	U	U	U	U	U	U
Toluene	1000 MMCL	U	U	U	U	U	U	U	U
trans-1,2-Dichloroethene	100 MMCL	U	U	U	U	U	U	U	U
1,2,3-Trichlorobenzene		U	U	U	U	U	U	U	U
1,2,4-Trichlorobenzene	70 MMCL	U	U	U	U	U	U	U	U
1,1,1-Trichloroethane	200 MMCL	U	U	U	U	U	U	U	U
1,1,2-Trichloroethane	5 MMCL	U	U	U	U	U	U	U	U
Trichloroethene	5 MMCL	U	U	U	U	U	U	U	U
1,2,3-Trichloropropane		U	U	U	U	U	U	U	U
1,2,4-Trimethylbenzene		U	U	U	U	U	U	U	U
1,3,5-Trimethylbenzene		U	U	U	U	U	U	U	U
Vinyl Chloride	2 MMCL	U	U	U	U	U	U	U	U
1,4-dioxane (low-level analysis)	3 ORSG		U @ 1.0		U @ 1.0		U @ 1.0		U @ 1.0
Total Quantified Target VOCs		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Identified Non-Target Compounds		0	0	0	2	0	0	0	1

MMCL = Massachusetts Maximum Contaminant Level
ORSG = Office of Research & Standards Guidelines
AWQC = Massachusetts Ambient Water Quality Criteria fo
U or ND = Not detected.

TABLE 5-4
Volatile Organic Compound (VOC) Analyses
Old Amherst Landfill FCSA Study

EPA METHOD 8260 Compound	Standards MMCL / ORSG (ug/L)	Well #4-83		Well #2-85		Well #3-85	
		10/20/08		11/10/05		11/10/05	10/22/08
Acetone	6,300 ORSG	U		U		U	U
Bromobenzene		U		U		U	U
Benzene	5 MMCL	U		U		U	U
Bromochloromethane		U		U		U	U
Bromodichloromethane		U		U		U	U
Bromoform		U		U		U	U
Bromomethane	10 ORSG	U		U		U	U
2-Butanone (MEK)	4,000 ORSG	U		U		U	U
Carbon tetrachloride	5 MMCL	U		U		U	U
Chlorobenzene	100 MMCL	U		U		U	U
Chlorodibromomethane		U		U		U	U
Chloroethane		U		U		U	U
Chloroform	5 ORSG	U		U		U	U
Chloromethane		U		U		U	U
2-Chlorotoluene		U		U		U	U
4-Chlorotoluene		U		U		U	U
cis-1,2-Dichloroethene	70 MMCL	U		U		U	U
Dibromomethane		U		U		U	U
1,2-Dibromo-3-chloropropane		U		U		U	U
Dichlorodifluoromethane		U		U		U	U
1,2-Dichlorobenzene	600 MMCL	U		U		U	U
1,3-Dichlorobenzene		U		U		U	U
1,4-Dichlorobenzene	5 MMCL	U		U		U	U
1,1-Dichloroethane	70 ORSG	U		U		U	U
1,2-Dichloroethane	5 MMCL	U		U		U	U
1,1-Dichloroethene	7 MMCL	U		U		U	U
1,2-Dichloropropane	5 MMCL	U		U		U	U
1,3-Dichloropropane	0.4 ORSG	U		U		U	U
2,2-Dichloropropane		U		U		U	U
1,1-Dichloropropene		U		U		U	U
cis-1,3-Dichloropropene		U		U		U	U
trans-1,3-Dichloropropene		U		U		U	U
Ethylbenzene	700 MMCL	U		U		U	U
Ethylene Dibromide	0.02 MMCL	U		U		U	U
Fluorotrichloromethane		U		U		U	U
2-Hexanone		U		U		U	U
Hexachlorobutadiene		U		U		U	U
Isopropylbenzene		U		U		U	U
4-Methyl-2-pentanone	350 ORSG	U		U		U	U
Methylene chloride	5 MMCL	U		U		U	U
Methyl-tert-butyl ether	70 ORSG	U		U		U	U
n-Butylbenzene		U		U		U	U
n-Propylbenzene		U		U		U	U
Naphthalene		U		U		U	U
m&p-Xylene	10000 Total MMCL	U		U		U	U
p-Isopropyltoluene		U		U		U	U
o-Xylene	10000 Total MMCL	U		U		U	U
sec-Butylbenzene		U		U		U	U
Styrene	100 MMCL	U		U		U	U
Tert-Butylbenzene		U		U		U	U
Tetrachloroethene	5 MMCL	U		U		U	U
1,1,1,2-Tetrachloroethane		U		U		U	U
1,1,2,2-Tetrachloroethane		U		U		U	U
Toluene	1000 MMCL	U		U		U	U
trans-1,2-Dichloroethene	100 MMCL	U		U		U	U
1,2,3-Trichlorobenzene		U		U		U	U
1,2,4-Trichlorobenzene	70 MMCL	U		U		U	U
1,1,1-Trichloroethane	200 MMCL	U		U		U	U
1,1,2-Trichloroethane	5 MMCL	U		U		U	U
Trichloroethene	5 MMCL	U		U		U	U
1,2,3-Trichloropropane		U		U		U	U
1,2,4-Trimethylbenzene		U		U		U	U
1,3,5-Trimethylbenzene		U		U		U	U
Vinyl Chloride	2 MMCL	U		U		U	U
1,4-dioxane (low-level analysis)	3 ORSG	U @ 1.0					U @ 1.0
Total Quantified Target VOCs		0.0		0.0		0.0	0.0
Identified Non-Target Compounds		0		0		0	0

MMCL = Massachusetts Maximum Contaminant Level
ORSG = Office of Research & Standards Guidelines
AWQC = Massachusetts Ambient Water Quality Criteria fo
U or ND = Not detected.

TABLE 5-4
Volatile Organic Compound (VOC) Analyses
Old Amherst Landfill FCSA Study

EPA METHOD 8260 Compound	Standards MMCL / ORSG (ug/L)	Well #1-08 (upgradient)	Well #2-08 (LF-shallow well)	Well #3-08 (LF-shallow well)	Well #4-08 (bedrock well)
		10/16/08	10/21/08	10/21/08	10/20/08
			5x dilution		
Acetone	6,300 ORSG	U	U	U	28 J
Bromobenzene		U	U	U	U
Benzene	5 MMCL	U	U	U	U
Bromochloromethane		U	U	U	U
Bromodichloromethane		U	U	U	U
Bromoform		U	U	U	U
Bromomethane	10 ORSG	U	U	U	U
2-Butanone (MEK)	4,000 ORSG	U	U	U	U
Carbon tetrachloride	5 MMCL	U	U	U	U
Chlorobenzene	100 MMCL	U	U	U	U
Chlorodibromomethane		U	U	U	U
Chloroethane		U	U	U	U
Chloroform	5 ORSG	U	U	U	U
Chloromethane		U	U	U	0.53 J
2-Chlorotoluene		U	U	U	U
4-Chlorotoluene		U	U	U	U
cis-1,2-Dichloroethene	70 MMCL	U	U	U	U
Dibromomethane		U	U	U	U
1,2-Dibromo-3-chloropropane		U	U	U	U
Dichlorodifluoromethane		U	U	U	U
1,2-Dichlorobenzene	600 MMCL	U	U	U	U
1,3-Dichlorobenzene		U	4.2 J	U	U
1,4-Dichlorobenzene	5 MMCL	U	4.3 J	U	U
1,1-Dichloroethane	70 ORSG	U	U	U	U
1,2-Dichloroethane	5 MMCL	U	U	U	U
1,1-Dichloroethene	7 MMCL	U	U	U	U
1,2-Dichloropropane	5 MMCL	U	U	U	U
1,3-Dichloropropane	0.4 ORSG	U	U	U	U
2,2-Dichloropropane		U	U	U	U
1,1-Dichloropropene		U	U	U	U
cis-1,3-Dichloropropene		U	U	U	U
trans-1,3-Dichloropropene		U	U	U	U
Ethylbenzene	700 MMCL	U	U	U	U
Ethylene Dibromide	0.02 MMCL	U	U	U	U
Fluorotrichloromethane		U	U	U	U
2-Hexanone		U	U	U	U
Hexachlorobutadiene		U	U	U	U
Isopropylbenzene		U	U	U	U
4-Methyl-2-pentanone	350 ORSG	U	U	U	U
Methylene chloride	5 MMCL	U	U	U	U
Methyl-tert-butyl ether	70 ORSG	U	U	U	U
n-Butylbenzene		U	U	U	U
n-Propylbenzene		U	U	U	U
Naphthalene		U	U	U	U
m&p-Xylene	10000 Total MMCL	U	U	U	U
p-Isopropyltoluene		U	U	U	U
o-Xylene	10000 Total MMCL	U	U	U	U
sec-Butylbenzene		U	U	U	U
Styrene	100 MMCL	U	U	U	U
Tert-Butylbenzene		U	U	U	U
Tetrachloroethene	5 MMCL	U	U	U	U
1,1,1,2-Tetrachloroethane		U	U	U	U
1,1,2,2-Tetrachloroethane		U	U	U	U
Toluene	1000 MMCL	U	U	U	U
trans-1,2-Dichloroethene	100 MMCL	U	U	U	U
1,2,3-Trichlorobenzene		U	U	U	U
1,2,4-Trichlorobenzene	70 MMCL	U	U	U	U
1,1,1-Trichloroethane	200 MMCL	U	U	U	U
1,1,2-Trichloroethane	5 MMCL	U	U	U	U
Trichloroethene	5 MMCL	U	U	U	U
1,2,3-Trichloropropane		U	U	U	U
1,2,4-Trimethylbenzene		U	U	U	U
1,3,5-Trimethylbenzene		U	U	U	U
Vinyl Chloride	2 MMCL	U	U	U	U
1,4-dioxane (low-level analysis)	3 ORSG	U @ 1.0	U @ 1.0	U @ 1.0	U @ 1.0
Total Quantified Target VOCs		0.0	0.0	0.0	0.0
Identified Non-Target Compounds		0	1	0	0

MMCL = Massachusetts Maximum Contaminant Level
ORSG = Office of Research & Standards Guidelines
AWQC = Massachusetts Ambient Water Quality Criteria fo
U or ND = Not detected.

TABLE 5-4
Volatile Organic Compound (VOC) Analyses
Old Amherst Landfill FCSA Study

EPA METHOD 8260 Compound	Standards MMCL / ORSG (ug/L)	Well #5-08 (LF-bedrock well) 10/23/08	Well #6-08 (deep artesian) 10/16/08	Well #7-08 (shallow) 10/16/08	Well #8-08 (shallow) 10/16/08
Acetone	6,300 ORSG	U	U	U	U
Bromobenzene		U	U	U	U
Benzene	5 MMCL	U	U	U	U
Bromochloromethane		U	U	U	U
Bromodichloromethane		U	U	U	U
Bromoform		U	U	U	U
Bromomethane	10 ORSG	U	U	U	U
2-Butanone (MEK)	4,000 ORSG	U	U	U	U
Carbon tetrachloride	5 MMCL	U	U	U	U
Chlorobenzene	100 MMCL	U	3.4	U	U
Chlorodibromomethane		U	U	U	U
Chloroethane		U	U	U	U
Chloroform	5 ORSG	U	U	U	U
Chloromethane		0.38 JB	U	U	0.32 J
2-Chlorotoluene		U	U	U	U
4-Chlorotoluene		U	U	U	U
cis-1,2-Dichloroethene	70 MMCL	U	U	U	U
Dibromomethane		U	U	U	U
1,2-Dibromo-3-chloropropane		U	U	U	U
Dichlorodifluoromethane		U	U	U	U
1,2-Dichlorobenzene	600 MMCL	U	U	U	U
1,3-Dichlorobenzene		U	U	U	U
1,4-Dichlorobenzene	5 MMCL	U	U	U	U
1,1-Dichloroethane	70 ORSG	U	U	U	U
1,2-Dichloroethane	5 MMCL	U	U	U	U
1,1-Dichloroethene	7 MMCL	U	U	U	U
1,2-Dichloropropane	5 MMCL	U	U	U	U
1,3-Dichloropropane	0.4 ORSG	U	U	U	U
2,2-Dichloropropane		U	U	U	U
1,1-Dichloropropene		U	U	U	U
cis-1,3-Dichloropropene		U	U	U	U
trans-1,3-Dichloropropene		U	U	U	U
Ethylbenzene	700 MMCL	U	U	U	U
Ethylene Dibromide	0.02 MMCL	U	U	U	U
Fluorotrichloromethane		U	U	U	U
2-Hexanone		U	U	U	U
Hexachlorobutadiene		U	U	U	U
Isopropylbenzene		U	U	U	U
4-Methyl-2-pentanone	350 ORSG	U	U	U	U
Methylene chloride	5 MMCL	U	U	U	U
Methyl-tert-butyl ether	70 ORSG	U	U	U	U
n-Butylbenzene		U	U	U	U
n-Propylbenzene		U	U	U	U
Naphthalene		U	U	U	U
m&p-Xylene	10000 Total MMCL	U	U	U	U
p-Isopropyltoluene		U	U	U	U
o-Xylene	10000 Total MMCL	U	U	U	U
sec-Butylbenzene		U	U	U	U
Styrene	100 MMCL	U	U	U	U
Tert-Butylbenzene		U	U	U	U
Tetrachloroethene	5 MMCL	U	U	U	U
1,1,1,2-Tetrachloroethane		U	U	U	U
1,1,2,2-Tetrachloroethane		U	U	U	U
Toluene	1000 MMCL	U	U	U	U
trans-1,2-Dichloroethene	100 MMCL	U	U	U	U
1,2,3-Trichlorobenzene		U	U	U	U
1,2,4-Trichlorobenzene	70 MMCL	U	U	U	U
1,1,1-Trichloroethane	200 MMCL	U	U	U	U
1,1,2-Trichloroethane	5 MMCL	U	U	U	U
Trichloroethene	5 MMCL	U	U	U	U
1,2,3-Trichloropropane		U	U	U	U
1,2,4-Trimethylbenzene		U	U	U	U
1,3,5-Trimethylbenzene		U	U	U	U
Vinyl Chloride	2 MMCL	U	U	U	U
1,4-dioxane (low-level analysis)	3 ORSG	U @ 1.0	0.24 J	U @ 1.0	U @ 1.0
Total Quantified Target VOCs		0.0	3.4	0.0	0.0
Identified Non-Target Compounds		1	2	0	0

MMCL = Massachusetts Maximum Contaminant Level
ORSG = Office of Research & Standards Guidelines
AWQC = Massachusetts Ambient Water Quality Criteria fo
U or ND = Not detected.

TABLE 5-4
Volatile Organic Compound (VOC) Analyses
Old Amherst Landfill FCSA Study

EPA METHOD 8260 Compound	Standards MMCL / ORSG (ug/L)	Well #9-08 (deep)	Well #10-08 (deep)	Well #11-08 (shallow)	Well #12-08 (deep)
		10/16/08	10/16/08	10/16/08	10/17/08
Acetone	6,300 ORSG	U	U	U	U
Bromobenzene		U	U	U	U
Benzene	5 MMCL	U	U	U	U
Bromochloromethane		U	U	U	U
Bromodichloromethane		U	U	U	U
Bromoform		U	U	U	U
Bromomethane	10 ORSG	U	U	U	U
2-Butanone (MEK)	4,000 ORSG	U	U	U	U
Carbon tetrachloride	5 MMCL	U	U	U	U
Chlorobenzene	100 MMCL	U	0.87 J	U	U
Chlorodibromomethane		U	U	U	U
Chloroethane		U	U	U	U
Chloroform	5 ORSG	U	U	U	U
Chloromethane		U	U	U	U
2-Chlorotoluene		U	U	U	U
4-Chlorotoluene		U	U	U	U
cis-1,2-Dichloroethene	70 MMCL	U	U	U	U
Dibromomethane		U	U	U	U
1,2-Dibromo-3-chloropropane		U	U	U	U
Dichlorodifluoromethane		U	U	U	U
1,2-Dichlorobenzene	600 MMCL	U	U	U	U
1,3-Dichlorobenzene		U	U	U	U
1,4-Dichlorobenzene	5 MMCL	U	U	U	U
1,1-Dichloroethane	70 ORSG	U	U	U	U
1,2-Dichloroethane	5 MMCL	U	U	U	U
1,1-Dichloroethene	7 MMCL	U	U	U	U
1,2-Dichloropropane	5 MMCL	U	U	U	U
1,3-Dichloropropane	0.4 ORSG	U	U	U	U
2,2-Dichloropropane		U	U	U	U
1,1-Dichloropropene		U	U	U	U
cis-1,3-Dichloropropene		U	U	U	U
trans-1,3-Dichloropropene		U	U	U	U
Ethylbenzene	700 MMCL	U	U	U	U
Ethylene Dibromide	0.02 MMCL	U	U	U	U
Fluorotrichloromethane		U	U	U	U
2-Hexanone		U	U	U	U
Hexachlorobutadiene		U	U	U	U
Isopropylbenzene		U	U	U	U
4-Methyl-2-pentanone	350 ORSG	U	U	U	U
Methylene chloride	5 MMCL	U	U	U	U
Methyl-tert-butyl ether	70 ORSG	U	U	U	U
n-Butylbenzene		U	U	U	U
n-Propylbenzene		U	U	U	U
Naphthalene		U	U	U	U
m&p-Xylene	10000 Total MMCL	U	U	U	U
p-Isopropyltoluene		U	U	U	U
o-Xylene	10000 Total MMCL	U	U	U	U
sec-Butylbenzene		U	U	U	U
Styrene	100 MMCL	U	U	U	U
Tert-Butylbenzene		U	U	U	U
Tetrachloroethene	5 MMCL	U	U	U	U
1,1,1,2-Tetrachloroethane		U	U	U	U
1,1,2,2-Tetrachloroethane		U	U	U	U
Toluene	1000 MMCL	U	U	U	U
trans-1,2-Dichloroethene	100 MMCL	U	U	U	U
1,2,3-Trichlorobenzene		U	U	U	U
1,2,4-Trichlorobenzene	70 MMCL	U	U	U	U
1,1,1-Trichloroethane	200 MMCL	U	U	U	U
1,1,2-Trichloroethane	5 MMCL	U	U	U	U
Trichloroethene	5 MMCL	U	U	U	U
1,2,3-Trichloropropane		U	U	U	U
1,2,4-Trimethylbenzene		U	U	U	U
1,3,5-Trimethylbenzene		U	U	U	U
Vinyl Chloride	2 MMCL	U	U	1.9	U
1,4-dioxane (low-level analysis)	3 ORSG	U @ 1.0	U @ 1.0	U @ 1.0	U @ 1.0
Total Quantified Target VOCs		0.0	0.0	1.9	0.0
Identified Non-Target Compounds		1	1	0	0

MMCL = Massachusetts Maximum Contaminant Level
ORSG = Office of Research & Standards Guidelines
AWQC = Massachusetts Ambient Water Quality Criteria fo
U or ND = Not detected.

TABLE 5-4
Volatile Organic Compound (VOC) Analyses
Old Amherst Landfill FCSA Study

Tighe & Bond, Inc.

EPA METHOD 8260 Compound	Standards MMCL / ORSG (ug/L)	Surface Water Standards AWQC: Acute / Chronic (ug/L)	SW-1		SW-2		SW-3	
			11/08/05	05/22/08	11/08/05	05/22/08	11/08/05	05/27/08
Acetone	6,300 ORSG		U	U	U	U	U	U
Bromobenzene			U	U	U	U	U	U
Benzene	5 MMCL	5300 / xxxx	U	U	U	U	U	U
Bromochloromethane			U	U	U	U	U	U
Bromodichloromethane			U	U	U	U	U	U
Bromoform			U	U	U	U	U	U
Bromomethane	10 ORSG		U	U	U	U	U	U
2-Butanone (MEK)	4,000 ORSG		U	U	U	U	U	U
Carbon tetrachloride	5 MMCL		U	U	U	U	U	U
Chlorobenzene	100 MMCL	35,200 / xxxx	U	U	U	U	U	U
Chlorodibromomethane			U	U	U	U	U	U
Chloroethane			U	U	U	U	U	U
Chloroform	5 ORSG		U	U	U	U	U	U
Chloromethane		28,900 / 1,240	U	U	U	U	U	U
2-Chlorotoluene			U	U	U	U	U	U
4-Chlorotoluene			U	U	U	U	U	U
cis-1,2-Dichloroethene	70 MMCL		U	U	U	U	U	U
Dibromomethane			U	U	U	U	U	U
1,2-Dibromo-3-chloropropane			U	U	U	U	U	U
Dichlorodifluoromethane			U	U	U	U	U	U
1,2-Dichlorobenzene	600 MMCL		U	U	U	U	U	U
1,3-Dichlorobenzene		1120 / 763	U	U	U	U	U	U
1,4-Dichlorobenzene	5 MMCL	1,120 / 763	U	U	U	U	U	U
1,1-Dichloroethane	70 ORSG	1,120 / 763	U	U	U	U	U	U
1,2-Dichloroethane	5 MMCL		U	U	U	U	U	U
1,1-Dichloroethene	7 MMCL	118,000 / 20,000	U	U	U	U	U	U
1,2-Dichloropropane	5 MMCL	11,600 /xxxx	U	U	U	U	U	U
1,3-Dichloropropane	0.4 ORSG	23,000 / 5,700	U	U	U	U	U	U
2,2-Dichloropropane		23,000 / 5,700	U	U	U	U	U	U
1,1-Dichloropropene		23,000 / 5,700	U	U	U	U	U	U
cis-1,3-Dichloropropene		6,060 / 244	U	U	U	U	U	U
trans-1,3-Dichloropropene		6,060 / 244	U	U	U	U	U	U
Ethylbenzene	700 MMCL	6,060 / 244	U	U	U	U	U	U
Ethylene Dibromide	0.02 MMCL	32,000 / xxxx	U	U	U	U	U	U
Fluorotrichloromethane			U	U	U	U	U	U
2-Hexanone			U	U	U	U	U	U
Hexachlorobutadiene			U	U	U	U	U	U
Isopropylbenzene			U	U	U	U	U	U
4-Methyl-2-pentanone	350 ORSG		U	U	U	U	U	U
Methylene chloride	5 MMCL		U	U	U	U	U	U
Methyl-tert-butyl ether	70 ORSG		U	U	U	U	U	U
n-Butylbenzene			U	U	U	U	U	U
n-Propylbenzene			U	U	U	U	U	U
Naphthalene			U	U	U	U	U	U
m&p-Xylene	10000 Total MMCL		U	U	U	U	U	U
p-Isopropyltoluene			U	U	U	U	U	U
o-Xylene	10000 Total MMCL		U	U	U	U	U	U
sec-Butylbenzene			U	U	U	U	U	U
Styrene	100 MMCL		U	U	U	U	U	U
Tert-Butylbenzene			U	U	U	U	U	U
Tetrachloroethene	5 MMCL	5,280 / 840	U	U	U	U	U	U
1,1,1,2-Tetrachloroethane		9,320 / 2,400	U	U	U	U	U	U
1,1,2,2-Tetrachloroethane		9,320 / 2,400	U	U	U	U	U	U
Toluene	1000 MMCL	17,500 / xxxx	U	U	U	U	U	U
trans-1,2-Dichloroethene	100 MMCL		U	U	U	U	U	U
1,2,3-Trichlorobenzene			U	U	U	U	U	U
1,2,4-Trichlorobenzene	70 MMCL		U	U	U	U	U	U
1,1,1-Trichloroethane	200 MMCL	18,000 / xxxx	U	U	U	U	U	U
1,1,2-Trichloroethane	5 MMCL	18,000 / 9,400	U	U	U	U	U	U
Trichloroethene	5 MMCL	45,000 / 21,900	U	U	U	U	U	U
1,2,3-Trichloropropane			U	U	U	U	U	U
1,2,4-Trimethylbenzene			U	U	U	U	U	U
1,3,5-Trimethylbenzene			U	U	U	U	U	U
Vinyl Chloride	2 MMCL		U	U	U	U	U	U
1,4-dioxane (low-level analysis)	3 ORSG			U @ 3.0		U @ 3.0		U @ 3.0
Total Quantified Target VOCs			0.0	0.0	0.0	0.0	0.0	0.0
Identified Non-Target Compounds			0	0	0	0	0	0

MMCL = Massachusetts Maximum Contaminant Level
ORSG = Office of Research & Standards Guidelines
AWQC = Massachusetts Ambient Water Quality Criteria for fresh water under 310 CMR 40.1516
U or ND = Not detected.

TABLE 5-4
Volatile Organic Compound (VOC) Analyses
Old Amherst Landfill FCSA Study

Tighe & Bond, Inc.

EPA METHOD 8260 Compound	Standards MMCL / ORSG (ug/L)	Surface Water Standards AWQC: Acute / Chronic (ug/L)	SW-4		SW-5		SW-6	
			11/08/05	05/23/08	11/08/05	05/23/08	11/08/05	05/23/08
Acetone	6,300 ORSG		U	U	U	U	U	U
Bromobenzene			U	U	U	U	U	U
Benzene	5 MMCL	5300 / xxxx	U	U	U	U	U	U
Bromochloromethane			U	U	U	U	U	U
Bromodichloromethane			U	U	U	U	U	U
Bromoform			U	U	U	U	U	U
Bromomethane	10 ORSG		U	U	U	U	U	U
2-Butanone (MEK)	4,000 ORSG		U	U	U	U	U	U
Carbon tetrachloride	5 MMCL		U	U	U	U	U	U
Chlorobenzene	100 MMCL	35,200 / xxxx	U	U	U	U	1.3	U
Chlorodibromomethane			U	U	U	U	U	U
Chloroethane			U	U	U	U	U	U
Chloroform	5 ORSG		U	U	U	U	U	U
Chloromethane		28,900 / 1,240	U	U	U	U	U	U
2-Chlorotoluene			U	U	U	U	U	U
4-Chlorotoluene			U	U	U	U	U	U
cis-1,2-Dichloroethene	70 MMCL		U	U	U	U	U	U
Dibromomethane			U	U	U	U	U	U
1,2-Dibromo-3-chloropropane			U	U	U	U	U	U
Dichlorodifluoromethane			U	U	U	U	U	U
1,2-Dichlorobenzene	600 MMCL		U	U	U	U	U	U
1,3-Dichlorobenzene		1120 / 763	U	U	U	U	U	U
1,4-Dichlorobenzene	5 MMCL	1,120 / 763	U	U	U	U	U	U
1,1-Dichloroethane	70 ORSG	1,120 / 763	U	U	U	U	U	U
1,2-Dichloroethane	5 MMCL		U	U	U	U	U	U
1,1-Dichloroethene	7 MMCL	118,000 / 20,000	U	U	U	U	U	U
1,2-Dichloropropane	5 MMCL	11,600 /xxxx	U	U	U	U	U	U
1,3-Dichloropropane	0.4 ORSG	23,000 / 5,700	U	U	U	U	U	U
2,2-Dichloropropane		23,000 / 5,700	U	U	U	U	U	U
1,1-Dichloropropene		23,000 / 5,700	U	U	U	U	U	U
cis-1,3-Dichloropropene		6,060 / 244	U	U	U	U	U	U
trans-1,3-Dichloropropene		6,060 / 244	U	U	U	U	U	U
Ethylbenzene	700 MMCL	6,060 / 244	U	U	U	U	U	U
Ethylene Dibromide	0.02 MMCL	32,000 / xxxx	U	U	U	U	U	U
Fluorotrichloromethane			U	U	U	U	U	U
2-Hexanone			U	U	U	U	U	U
Hexachlorobutadiene			U	U	U	U	U	U
Isopropylbenzene			U	U	U	U	U	U
4-Methyl-2-pentanone	350 ORSG		U	U	U	U	U	U
Methylene chloride	5 MMCL		U	U	U	U	U	U
Methyl-tert-butyl ether	70 ORSG		U	U	U	U	U	U
n-Butylbenzene			U	U	U	U	U	U
n-Propylbenzene			U	U	U	U	U	U
Naphthalene			U	U	U	U	U	U
m&p-Xylene	10000 Total MMCL		U	U	U	U	U	U
p-Isopropyltoluene			U	U	U	U	U	U
o-Xylene	10000 Total MMCL		U	U	U	U	U	U
sec-Butylbenzene			U	U	U	U	U	U
Styrene	100 MMCL		U	U	U	U	U	U
Tert-Butylbenzene			U	U	U	U	U	U
Tetrachloroethene	5 MMCL	5,280 / 840	U	U	U	U	U	U
1,1,1,2-Tetrachloroethane		9,320 / 2,400	U	U	U	U	U	U
1,1,2,2-Tetrachloroethane		9,320 / 2,400	U	U	U	U	U	U
Toluene	1000 MMCL	17,500 / xxxx	U	U	U	U	U	U
trans-1,2-Dichloroethene	100 MMCL		U	U	U	U	U	U
1,2,3-Trichlorobenzene			U	U	U	U	U	U
1,2,4-Trichlorobenzene	70 MMCL		U	U	U	U	U	U
1,1,1-Trichloroethane	200 MMCL	18,000 / xxxx	U	U	U	U	U	U
1,1,2-Trichloroethane	5 MMCL	18,000 / 9,400	U	U	U	U	U	U
Trichloroethene	5 MMCL	45,000 / 21,900	U	U	U	U	U	U
1,2,3-Trichloropropane			U	U	U	U	U	U
1,2,4-Trimethylbenzene			U	U	U	U	U	U
1,3,5-Trimethylbenzene			U	U	U	U	U	U
Vinyl Chloride	2 MMCL		U	U	U	U	U	U
1,4-dioxane (low-level analysis)	3 ORSG			U @ 3.0		U @ 3.0		U @ 3.0
Total Quantified Target VOCs			0.0	0.0	0.0	0.0	1.3	0.0
Identified Non-Target Compounds			0	0	0	0	0	0

MMCL = Massachusetts Maximum Contaminant Level
ORSG = Office of Research & Standards Guidelines
AWQC = Massachusetts Ambient Water Quality Criteria for fresh water under 310 CMR 40
U or ND = Not detected.

TABLE 5-4
Volatile Organic Compound (VOC) Analyses
Old Amherst Landfill FCSA Study

Tighe & Bond, Inc.

EPA METHOD 8260 Compound	Standards MMCL / ORSG (ug/L)	Surface Water Standards AWQC: Acute / Chronic (ug/L)	SW-7		SW-8		SW-9	
			11/08/05	05/27/08	11/08/05	05/23/08	11/08/05	05/22/08
Acetone	6,300 ORSG		U	U	U	U	U	U
Bromobenzene			U	U	U	U	U	U
Benzene	5 MMCL	5300 / xxxx	U	U	U	U	U	U
Bromochloromethane			U	U	U	U	U	U
Bromodichloromethane			U	U	U	U	U	U
Bromoform			U	U	U	U	U	U
Bromomethane	10 ORSG		U	U	U	U	U	U
2-Butanone (MEK)	4,000 ORSG		U	U	U	U	U	U
Carbon tetrachloride	5 MMCL		U	U	U	U	U	U
Chlorobenzene	100 MMCL	35,200 / xxxx	U	U	U	U	U	U
Chlorodibromomethane			U	U	U	U	U	U
Chloroethane			U	U	U	U	U	U
Chloroform	5 ORSG		U	U	U	U	U	U
Chloromethane		28,900 / 1,240	U	U	U	U	U	U
2-Chlorotoluene			U	U	U	U	U	U
4-Chlorotoluene			U	U	U	U	U	U
cis-1,2-Dichloroethene	70 MMCL		U	U	U	U	U	U
Dibromomethane			U	U	U	U	U	U
1,2-Dibromo-3-chloropropane			U	U	U	U	U	U
Dichlorodifluoromethane			U	U	U	U	U	U
1,2-Dichlorobenzene	600 MMCL		U	U	U	U	U	U
1,3-Dichlorobenzene		1120 / 763	U	U	U	U	U	U
1,4-Dichlorobenzene	5 MMCL	1,120 / 763	U	U	U	U	U	U
1,1-Dichloroethane	70 ORSG	1,120 / 763	U	U	U	U	U	U
1,2-Dichloroethane	5 MMCL		U	U	U	U	U	U
1,1-Dichloroethene	7 MMCL	118,000 / 20,000	U	U	U	U	U	U
1,2-Dichloropropane	5 MMCL	11,600 /xxxx	U	U	U	U	U	U
1,3-Dichloropropane	0.4 ORSG	23,000 / 5,700	U	U	U	U	U	U
2,2-Dichloropropane		23,000 / 5,700	U	U	U	U	U	U
1,1-Dichloropropene		23,000 / 5,700	U	U	U	U	U	U
cis-1,3-Dichloropropene		6,060 / 244	U	U	U	U	U	U
trans-1,3-Dichloropropene		6,060 / 244	U	U	U	U	U	U
Ethylbenzene	700 MMCL	6,060 / 244	U	U	U	U	U	U
Ethylene Dibromide	0.02 MMCL	32,000 / xxxx	U	U	U	U	U	U
Fluorotrichloromethane			U	U	U	U	U	U
2-Hexanone			U	U	U	U	U	U
Hexachlorobutadiene			U	U	U	U	U	U
Isopropylbenzene			U	U	U	U	U	U
4-Methyl-2-pentanone	350 ORSG		U	U	U	U	U	U
Methylene chloride	5 MMCL		U	U	U	U	U	U
Methyl-tert-butyl ether	70 ORSG		U	U	U	U	U	U
n-Butylbenzene			U	U	U	U	U	U
n-Propylbenzene			U	U	U	U	U	U
Naphthalene			U	U	U	U	U	U
m&p-Xylene	10000 Total MMCL		U	U	U	U	U	U
p-Isopropyltoluene			U	U	U	U	U	U
o-Xylene	10000 Total MMCL		U	U	U	U	U	U
sec-Butylbenzene			U	U	U	U	U	U
Styrene	100 MMCL		U	U	U	U	U	U
Tert-Butylbenzene			U	U	U	U	U	U
Tetrachloroethene	5 MMCL	5,280 / 840	U	U	U	U	U	U
1,1,1,2-Tetrachloroethane		9,320 / 2,400	U	U	U	U	U	U
1,1,2,2-Tetrachloroethane		9,320 / 2,400	U	U	U	U	U	U
Toluene	1000 MMCL	17,500 / xxxx	U	U	U	U	U	U
trans-1,2-Dichloroethene	100 MMCL		U	U	U	U	U	U
1,2,3-Trichlorobenzene			U	U	U	U	U	U
1,2,4-Trichlorobenzene	70 MMCL		U	U	U	U	U	U
1,1,1-Trichloroethane	200 MMCL	18,000 / xxxx	U	U	U	U	U	U
1,1,2-Trichloroethane	5 MMCL	18,000 / 9,400	U	U	U	U	U	U
Trichloroethene	5 MMCL	45,000 / 21,900	U	U	U	U	U	U
1,2,3-Trichloropropane			U	U	U	U	U	U
1,2,4-Trimethylbenzene			U	U	U	U	U	U
1,3,5-Trimethylbenzene			U	U	U	U	U	U
Vinyl Chloride	2 MMCL		U	U	U	U	U	U
1,4-dioxane (low-level analysis)	3 ORSG			U @ 3.0		U @ 3.0		U @ 3.0
Total Quantified Target VOCs			0.0	0.0	0.0	0.0	0.0	0.0
Identified Non-Target Compounds			0	1	0	1	0	0

MMCL = Massachusetts Maximum Contaminant Level
ORSG = Office of Research & Standards Guidelines
AWQC = Massachusetts Ambient Water Quality Criteria for fresh water under 310 CMR 40
U or ND = Not detected.

TABLE 5-4
Volatile Organic Compound (VOC) Analyses
Old Amherst Landfill FCSA Study

Tighe & Bond, Inc.

EPA METHOD 8260 Compound	Standards MMCL / ORSG (ug/L)	Surface Water Standards AWQC: Acute / Chronic (ug/L)	SW-10		SW-11		SW-12		SW-13		SW
			05/22/08		05/23/08		05/22/08		05/23/08		05/23/08
Acetone	6,300 ORSG		U		U		U		U		U
Bromobenzene			U		U		U		U		U
Benzene	5 MMCL	5300 / xxxx	U		U		U		U		U
Bromochloromethane			U		U		U		U		U
Bromodichloromethane			U		U		U		U		U
Bromoform			U		U		U		U		U
Bromomethane	10 ORSG		U		U		U		U		U
2-Butanone (MEK)	4,000 ORSG		U		U		U		U		U
Carbon tetrachloride	5 MMCL		U		U		U		U		U
Chlorobenzene	100 MMCL	35,200 / xxxx	U		U		U		U		U
Chlorodibromomethane			U		U		U		U		U
Chloroethane			U		U		U		U		U
Chloroform	5 ORSG		U		U		U		U		U
Chloromethane		28,900 / 1,240	U		U		U		U		U
2-Chlorotoluene			U		U		U		U		U
4-Chlorotoluene			U		U		U		U		U
cis-1,2-Dichloroethene	70 MMCL		U		U		U		U		U
Dibromomethane			U		U		U		U		U
1,2-Dibromo-3-chloropropane			U		U		U		U		U
Dichlorodifluoromethane			U		U		U		U		U
1,2-Dichlorobenzene	600 MMCL		U		U		U		U		U
1,3-Dichlorobenzene		1120 / 763	U		U		U		U		U
1,4-Dichlorobenzene	5 MMCL	1,120 / 763	U		U		U		U		U
1,1-Dichloroethane	70 ORSG	1,120 / 763	U		U		U		U		U
1,2-Dichloroethane	5 MMCL		U		U		U		U		U
1,1-Dichloroethene	7 MMCL	118,000 / 20,000	U		U		U		U		U
1,2-Dichloropropane	5 MMCL	11,600 /xxxx	U		U		U		U		U
1,3-Dichloropropane	0.4 ORSG	23,000 / 5,700	U		U		U		U		U
2,2-Dichloropropane		23,000 / 5,700	U		U		U		U		U
1,1-Dichloropropene		23,000 / 5,700	U		U		U		U		U
cis-1,3-Dichloropropene		6,060 / 244	U		U		U		U		U
trans-1,3-Dichloropropene		6,060 / 244	U		U		U		U		U
Ethylbenzene	700 MMCL	6,060 / 244	U		U		U		U		U
Ethylene Dibromide	0.02 MMCL	32,000 / xxxx	U		U		U		U		U
Fluorotrichloromethane			U		U		U		U		U
2-Hexanone			U		U		U		U		U
Hexachlorobutadiene			U		U		U		U		U
Isopropylbenzene			U		U		U		U		U
4-Methyl-2-pentanone	350 ORSG		U		U		U		U		U
Methylene chloride	5 MMCL		U		U		U		U		U
Methyl-tert-butyl ether	70 ORSG		U		U		U		U		U
n-Butylbenzene			U		U		U		U		U
n-Propylbenzene			U		U		U		U		U
Naphthalene			U		U		U		U		U
m&p-Xylene	10000 Total MMCL		U		U		U		U		U
p-Isopropyltoluene			U		U		U		U		U
o-Xylene	10000 Total MMCL		U		U		U		U		U
sec-Butylbenzene			U		U		U		U		U
Styrene	100 MMCL		U		U		U		U		U
Tert-Butylbenzene			U		U		U		U		U
Tetrachloroethene	5 MMCL	5,280 / 840	U		U		U		U		U
1,1,1,2-Tetrachloroethane		9,320 / 2,400	U		U		U		U		U
1,1,2,2-Tetrachloroethane		9,320 / 2,400	U		U		U		U		U
Toluene	1000 MMCL	17,500 / xxxx	U		U		U		U		U
trans-1,2-Dichloroethene	100 MMCL		U		U		U		U		U
1,2,3-Trichlorobenzene			U		U		U		U		U
1,2,4-Trichlorobenzene	70 MMCL		U		U		U		U		U
1,1,1-Trichloroethane	200 MMCL	18,000 / xxxx	U		U		U		U		U
1,1,2-Trichloroethane	5 MMCL	18,000 / 9,400	U		U		U		U		U
Trichloroethene	5 MMCL	45,000 / 21,900	U		U		U		U		U
1,2,3-Trichloropropane			U		U		U		U		U
1,2,4-Trimethylbenzene			U		U		U		U		U
1,3,5-Trimethylbenzene			U		U		U		U		U
Vinyl Chloride	2 MMCL		U		U		U		U		U
1,4-dioxane (low-level analysis)	3 ORSG		U @ 3.0		U @ 3.0		U @ 3.0		U @ 3.0		U @ 3.0
Total Quantified Target VOCs			0.0		0.0		0.0		0.0		0.0
Identified Non-Target Compounds			0		0		0		0		0

MMCL = Massachusetts Maximum Contaminant Level
ORSG = Office of Research & Standards Guidelines
AWQC = Massachusetts Ambient Water Quality Criteria for fresh water under 310 CMR 40
U or ND = Not detected.

TABLE 5-4
Volatile Organic Compound (VOC) Analyses
Old Amherst Landfill FCSA Study

EPA METHOD 8260 Compound	Standards MMCL / ORSG (ug/L)	Surface Water Standards AWQC: Acute / Chronic (ug/L)	-14	SW-15		SW-17	
				05/23/08		05/23/08	
Acetone	6,300 ORSG			U		U	
Bromobenzene				U		U	
Benzene	5 MMCL	5300 / xxxx		U		U	
Bromochloromethane				U		U	
Bromodichloromethane				U		U	
Bromoform				U		U	
Bromomethane	10 ORSG			U		U	
2-Butanone (MEK)	4,000 ORSG			U		U	
Carbon tetrachloride	5 MMCL			U		U	
Chlorobenzene	100 MMCL	35,200 / xxxx		U		U	
Chlorodibromomethane				U		U	
Chloroethane				U		U	
Chloroform	5 ORSG			U		U	
Chloromethane		28,900 / 1,240		U		U	
2-Chlorotoluene				U		U	
4-Chlorotoluene				U		U	
cis-1,2-Dichloroethene	70 MMCL			U		U	
Dibromomethane				U		U	
1,2-Dibromo-3-chloropropane				U		U	
Dichlorodifluoromethane				U		U	
1,2-Dichlorobenzene	600 MMCL			U		U	
1,3-Dichlorobenzene		1120 / 763		U		U	
1,4-Dichlorobenzene	5 MMCL	1,120 / 763		U		U	
1,1-Dichloroethane	70 ORSG	1,120 / 763		U		U	
1,2-Dichloroethane	5 MMCL			U		U	
1,1-Dichloroethene	7 MMCL	118,000 / 20,000		U		U	
1,2-Dichloropropane	5 MMCL	11,600 /xxxx		U		U	
1,3-Dichloropropane	0.4 ORSG	23,000 / 5,700		U		U	
2,2-Dichloropropane		23,000 / 5,700		U		U	
1,1-Dichloropropene		23,000 / 5,700		U		U	
cis-1,3-Dichloropropene		6,060 / 244		U		U	
trans-1,3-Dichloropropene		6,060 / 244		U		U	
Ethylbenzene	700 MMCL	6,060 / 244		U		U	
Ethylene Dibromide	0.02 MMCL	32,000 / xxxx		U		U	
Fluorotrichloromethane				U		U	
2-Hexanone				U		U	
Hexachlorobutadiene				U		U	
Isopropylbenzene				U		U	
4-Methyl-2-pentanone	350 ORSG			U		U	
Methylene chloride	5 MMCL			U		U	
Methyl-tert-butyl ether	70 ORSG			U		U	
n-Butylbenzene				U		U	
n-Propylbenzene				U		U	
Naphthalene				U		U	
m&p-Xylene	10000 Total MMCL			U		U	
p-Isopropyltoluene				U		U	
o-Xylene	10000 Total MMCL			U		U	
sec-Butylbenzene				U		U	
Styrene	100 MMCL			U		U	
Tert-Butylbenzene				U		U	
Tetrachloroethene	5 MMCL	5,280 / 840		U		U	
1,1,1,2-Tetrachloroethane		9,320 / 2,400		U		U	
1,1,2,2-Tetrachloroethane		9,320 / 2,400		U		U	
Toluene	1000 MMCL	17,500 / xxxx		U		U	
trans-1,2-Dichloroethene	100 MMCL			U		U	
1,2,3-Trichlorobenzene				U		U	
1,2,4-Trichlorobenzene	70 MMCL			U		U	
1,1,1-Trichloroethane	200 MMCL	18,000 / xxxx		U		U	
1,1,2-Trichloroethane	5 MMCL	18,000 / 9,400		U		U	
Trichloroethene	5 MMCL	45,000 / 21,900		U		U	
1,2,3-Trichloropropane				U		U	
1,2,4-Trimethylbenzene				U		U	
1,3,5-Trimethylbenzene				U		U	
Vinyl Chloride	2 MMCL			U		U	
1,4-dioxane (low-level analysis)	3 ORSG			U @ 6.0		U @ 3.0	
Total Quantified Target VOCs				0.0		0.0	
Identified Non-Target Compounds				0		0	

MMCL = Massachusetts Maximum Contaminant Level
ORSG = Office of Research & Standards Guidelines
AWQC = Massachusetts Ambient Water Quality Criteria for fresh water under 310 CMR 40
U or ND = Not detected.

TABLE 5-5
General Sediment Chemistry Analyses
Old Amherst Landfill FCSA Study

Tighe & Bond, Inc.

Sampling Station	Date	General Landfill Contaminant Indicator Parameters											
		Field pH (Std units)	Field Temp. (C)	Field Spec. Cond. (umhos)	Field D.O. (mg/L)	% Solids	Alkalinity (mg/kg)	COD (mg/kg)	Chloride (mg/kg)	NO3 (mg/kg)	SO4 (mg/kg)	TDS (mg/kg)	Cyanide (mg/kg)
SEDIMENT MONITORING STATIONS (Equivalent to Surface Water Stations)													
Pomeroy Pond - Adjacent to Landfill													
SED-3 (SW-3)	8-Nov-05	xxx	xxx	xxx	xxx	51%	87	430	<37	<9.2	<73	xxx	<21
Gull Pond - Downgradient of Landfill													
SED-1 (Inlet SW-1)	8-Nov-05	xxx	xxx	xxx	xxx	42%	250	<480	<48	<12	140	xxx	<32
	22-May-08	xxx	xxx	xxx	xxx	34%	11	<1200	<59	<15	<120	xxx	<2.9
SED-9 (Inlet SW-9)	8-Nov-05	xxx	xxx	xxx	xxx	77%	37	<260	<180	<44	<350	xxx	<17
SED-2 (Pond SW-2)	8-Nov-05	xxx	xxx	xxx	xxx	78%	11	<260	<22	<5.5	<44	xxx	<26
KC Trail - Seepage Area in Downgradient Wetland													
SED-6 (SW-6)	8-Nov-05	xxx	xxx	xxx	xxx	29%	330	1200	88	<18	<140	xxx	<19
	23-May-08	xxx	xxx	xxx	xxx	23%	660	<890	95	<22	<180	xxx	3.7
SED-14 (SW-6)	23-May-08	xxx	xxx	xxx	xxx	16%	xxx	xxx	xxx	xxx	xxx	xxx	xxx
SED-16 (SW-6)	23-May-08	xxx	xxx	xxx	xxx	23%	xxx	xxx	xxx	xxx	xxx	xxx	xxx
Kettle Pond - Downgradient of Landfill													
SED-7 (SW-7)	8-Nov-05	xxx	xxx	xxx	xxx	37%	160	1300	<150	<37	<300	xxx	<22
	27-May-08	xxx	xxx	xxx	xxx	64%	20	<310	<31	<7.8	<62	xxx	<1.5

TABLE 5-5
General Sediment Chemistry Analyses
Old Amherst Landfill FCSA Study

Tighe & Bond, Inc.

Sampling Station	Date	General Landfill Contaminant Indicator Parameters											
		Field pH (Std units)	Field Temp. (C)	Field Spec. Cond. (umhos)	Field D.O. (mg/L)	% Solids	Alkalinity (mg/kg)	COD (mg/kg)	Chloride (mg/kg)	NO3 (mg/kg)	SO4 (mg/kg)	TDS (mg/kg)	Cyanide (mg/kg)
Brickyard Wellfield - Spring in Adjacent Wetland													
SED-8 (SW-8)	8-Nov-05	xxx	xxx	xxx	xxx	24%	230	1400	<150	<37	<290	xxx	<23
	23-May-08	xxx	xxx	xxx	xxx	69%	74	<290	<29	<7.2	58	xxx	<0.97
Hop Brook - Downgradient Receiving Stream													
SED 4 (Upstream SW-4)	8-Nov-05	xxx	xxx	xxx	xxx	35%	21	1300	46	<12	110	xxx	<22
	23-May-08	xxx	xxx	xxx	xxx	73%	31	450	<28	<7.0	<56	xxx	<1.4
SED-5 (Downstream SW-5)	8-Nov-05	xxx	xxx	xxx	xxx	53%	19	690	<38	<9.4	<75	xxx	<21
	23-May-08	xxx	xxx	xxx	xxx	61%	19	<320	<32	<8.1	<65	xxx	<1.7
Wetland Area - 1,200 feet West of Old Amherst Landfill													
SED-15 (SW-15)	23-May-08	xxx	xxx	xxx	xxx	33%	46	970	150	<15	140	xxx	<2.1
SED-15A (SW-15A)	8-Jan-09												<5.8
	8-Jan-09												<5.7 PAC

"J" values are estimated concentrations; less than the analytical Reporting Limit (RL) but greater than the Method Detection Limit (MDL).
"B" = Analyte detected in the laboratory quality control blank.
"xxx" = No data.

TABLE 5-6
Sediment Metals Analyses
Old Amherst Landfill FCSA Study

Tighe & Bond, Inc.

Location	Date	As (mg/kg)	Ba (mg/kg)	Cd (mg/kg)	Cr (mg/kg)	Cu (mg/kg)	Fe (mg/kg)	Pb (mg/kg)	Mn (mg/kg)	Hg (mg/kg)	Se (mg/kg)	Ag (mg/kg)	Zn (mg/kg)
MassDEP Sediment Screening Criteria		**33**		**5.0**	**110**	**150**		**130**		**0.18**			**460**
MDEP Sediment Guideline Reference: Ontario Guidelines for Aquatic Sediment Quality (Sept, 1993)													
Lowest Effect Level		6.0		0.6	26	16	20,000	31	460	0.2			120
Severe Effect Level		33		10	110	110	40,000	250	1,100	2.0			820
MDEP Sediment Reuse Standards		40		80	1000			2000		10			
SEDIMENT MONITORING STATIONS (Equivalent to Surface Water Stations)													
Pomeroy Pond - Adjacent to Landfill													
SED-3 (SW-3)	8-Nov-05	<9.9	80	<2.0	9.5	<9.9	12000	23	140	0.096	<15	<4.9	52
Gull Pond - Downgradient of Landfill													
SED-1 (Inlet SW-1)	8-Nov-05	28	430	<2.8	20	23	99000	16	610	0.098	<21	<6.9	230
	22-May-08	**98**	760B	4.2 B	24	29 B	240000	16 B	1300	<0.22	<8.5	<8.5	420 B
	15-Oct-08	**98**											
SED-1A	15-Oct-08	**64**											
SED-1B	15-Oct-08	18											
SED-1C	15-Oct-08	**130**											
SED-9 (Inlet SW-9)	8-Nov-05	<7.0	57	<1.4	11	11	13000	9.6	240	<0.047	<11	<3.5	22
SED-2 (Pond SW-2)	8-Nov-05	<7.5	60	<1.5	9.0	<7.5	9400	4.3	110	<0.047	<11	<3.8	27

TABLE 5-6
Sediment Metals Analyses
Old Amherst Landfill FCSA Study

Tighe & Bond, Inc.

Location	Date	As (mg/kg)	Ba (mg/kg)	Cd (mg/kg)	Cr (mg/kg)	Cu (mg/kg)	Fe (mg/kg)	Pb (mg/kg)	Mn (mg/kg)	Hg (mg/kg)	Se (mg/kg)	Ag (mg/kg)	Zn (mg/kg)
MassDEP Sediment Screening Criteria		**33**		**5.0**	**110**	**150**		**130**		**0.18**			**460**
MDEP Sediment Guideline Reference: Ontario Guidelines for Aquatic Sediment Quality (Sept, 1993)													
Lowest Effect Level		6.0		0.6	26	16	20,000	31	460	0.2			120
Severe Effect Level		33		10	110	110	40,000	250	1,100	2.0			820
MDEP Sediment Reuse Standards		40		80	1000			2000		10			
KC Trail Seepage Area in Wetland													
SED-6 (SW-6)	8-Nov-05	**53**	800	<8.0	<20	<40	350000	<20	7800	0.12	<20	<20	<99
	23-May-08	**87**	850 B	**6.4 J**	9.9 J	16 JB	380000 B	<25	1900	<0.29	<25	<25	39 JB
SED-6A	15-Oct-08	6.6		0.95									
SED-6B	15-Oct-08	18		1.7									
SED-6C	15-Oct-08	1.6 J		0.51 J									
SED-6D	15-Oct-08	1.9 J		0.50 J									
SED-6E	15-Oct-08	4.6		0.97									
SED-6F	15-Oct-08	11		0.98									
SED-6G	15-Oct-08	15		1.5 J									
SED-6H	15-Oct-08	2.5		0.33 J									
SED-6I	15-Oct-08	2.1 J		0.40 J									
SED-6J	15-Oct-08	23 J		4.5 J									
SED-6K (middle of wetland)	15-Oct-08	**260**		**11**									
SED-6L	15-Oct-08	30.0		1.9									
SED-14 (middle of wetland)	23-May-08	**91**	1200 B	**8.4 J**	<31	8.8 JB	510000 B	<31	1800	<0.42	<31	<31	23 JB
SED-16 (middle of wetland)	23-May-08	**150**	1700 B	**5.9 J**	12 JB	10 JB	340000 B	17 J	1200	0.15 J	<24	<24	42 JB

TABLE 5-6
Sediment Metals Analyses
Old Amherst Landfill FCSA Study

Tighe & Bond, Inc.

Location	Date	As (mg/kg)	Ba (mg/kg)	Cd (mg/kg)	Cr (mg/kg)	Cu (mg/kg)	Fe (mg/kg)	Pb (mg/kg)	Mn (mg/kg)	Hg (mg/kg)	Se (mg/kg)	Ag (mg/kg)	Zn (mg/kg)
MassDEP Sediment Screening Criteria		**33**		**5.0**	**110**	**150**		**130**		**0.18**			**460**
MDEP Sediment Guideline Reference: Ontario Guidelines for Aquatic Sediment Quality (Sept, 1993)													
Lowest Effect Level		6.0		0.6	26	16	20,000	31	460	0.2			120
Severe Effect Level		33		10	110	110	40,000	250	1,100	2.0			820
MDEP Sediment Reuse Standards		40		80	1000			2000		10			
Kettle Pond - Downgradient of Landfill													
SED-7 (SW-7)	8-Nov-05	<16	78	<3.2	<8.0	<24	8800	24	250	**0.18**	<24	<8.0	140
	27-May-08	1.2 J	19 B	0.16 J	9.3	11 B	8700 B	6.7	72	<0.065	<0.92	<1.8	29 B
Brickyard Wellfield - Spring in Downgradient Wetland													
SED-8 (SW-8)	8-Nov-05	<25	110	<4.9	<12	**370**	21000	47	220	<0.16	<37	<12	120
	23-May-08	1.5 J	160 B	0.47	5.4 B	8.1 B	6500	4.4	690	<0.12	<0.92	<0.92	25 B
Hop Brook - Downgradient Receiving Stream													
SED-4 (Upstream SW-4)	8-Nov-05	<18	110	<3.7	9.7	<18	14000	23	270	<0.14	<27	<9.1	<46
	23-May-08	5.9	180 B	0.73	37 B	38 B	38000 B	10	860	<0.11	<1.6	<1.6	82 B
SED-5 (Downstream SW-5)	8-Nov-05	<12	240	<2.3	25	23	29000	37	840	0.15	<18	<5.9	120
	23-May-08	5.1	120 B	0.57	17 B	32 B	22000	31	660	0.10	<0.82	<0.82	58 B

TABLE 5-6
Sediment Metals Analyses
Old Amherst Landfill FCSA Study

Tighe & Bond, Inc.

Location	Date	As (mg/kg)	Ba (mg/kg)	Cd (mg/kg)	Cr (mg/kg)	Cu (mg/kg)	Fe (mg/kg)	Pb (mg/kg)	Mn (mg/kg)	Hg (mg/kg)	Se (mg/kg)	Ag (mg/kg)	Zn (mg/kg)
MassDEP Sediment Screening Criteria		**33**		**5.0**	**110**	**150**		**130**		**0.18**			**460**
MDEP Sediment Guideline Reference: Ontario Guidelines for Aquatic Sediment Quality (Sept, 1993)													
Lowest Effect Level		6.0		0.6	26	16	20,000	31	460	0.2			120
Severe Effect Level		33		10	110	110	40,000	250	1,100	2.0			820
MDEP Sediment Reuse Standards		40		80	1000			2000		10			
Wetland Area - 1,200 feet West of Old Amherst Landfill													
SED-15 (SW-15)	23-May-08	3.8 J	190 B	0.68 J	23 B	28 B	14000 B	40	260	**0.19 J**	1.8 J	<2.0	46 B
	15-Oct-08									**0.31 JB**			
SED-15A	15-Oct-08									**0.34 B**			
SED-15B	15-Oct-08									**0.50 B**			

"J" values are estimated concentrations; less than the analytical Reporting Limit (RL) but greater than the Method Detection Limit (MDL).
"B" = Analyte detected in the laboratory quality control blank.

TABLE 5-7
Sediment VOC Data Summary
Old Amherst Landfill FCSA Study

Tighe & Bond, Inc.

EPA METHOD 8260 Compound	MCP Method 1 Cleanup Standards (µg/kg)	SED-1 (SW-1) Gull Pond Inlet		SED-2 (SW-2) Gull Pond	SED-3 (SW-3) Pomeroy Pond
		11/08/05	05/22/08	11/08/05	11/08/05
Acetone	3,000	U	240 J	U	U
Bromobenzene		U	U	U	U
Benzene	10,000	U	U	U	U
Bromochloromethane		U	U	U	U
Bromodichloromethane	100	U	U	U	U
Bromoform	100	U	U	U	U
Bromomethane	10,000	U	U	U	U
2-Butanone (MEK)	300	U	120	U	U
Carbon tetrachloride	1,000	U	U	U	U
Chlorobenzene	8,000	U	U	U	U
Dibromochloromethane		U	U	U	U
Chloroethane		U	U	U	U
Chloroform	100	U	U	U	U
Chloromethane		U	U	U	U
2-Chlorotoluene		U	U	U	U
4-Chlorotoluene		U	U	U	U
cis-1,2-Dichloroethene	2,000	U	U	U	U
trans-1,2-Dichloroethene	4,000	U	U	U	U
Dibromomethane		U	U	U	U
1,2-Dibromo-3-chloropropane		U	U	U	U
1,2-Dichlorobenzene	100,000	U	U	U	U
1,3-Dichlorobenzene	100,000	U	U	U	U
1,4-Dichlorobenzene	2,000	U	U	U	U
1,1-Dichloroethane	3,000	U	U	U	U
1,2-Dichloroethane	50	U	U	U	U
1,1-Dichloroethene	700	U	U	U	U
1,2-Dichloropropane	100	U	U	U	U
1,3-Dichloropropane	10	U	U	U	U
2,2-Dichloropropane		U	U	U	U
1,1-Dichloropropene		U	U	U	U
cis-1,3-Dichloropropene		U	U	U	U
trans-1,3-Dichloropropene		U	U	U	U
Ethylbenzene	80,000	U	U	U	U
Ethylene Dibromide	5.0	U	U	U	U
Trichlorofluoromethane		U	U	U	U
2-Hexanone (MBK)		U	U	U	U
Hexachlorobutadiene	3,000	U	U	U	U
Isopropylbenzene		U	U	U	U
4-Methyl-2-pentanone	500	U	U	U	U
Methylene chloride	100	U	U	U	U
Methyl-tert-Butyl ether	300	U	U	U	U
n-Butylbenzene		U	U	U	U
n-Propylbenzene		U	U	U	U
Naphthalene	4,000	U	U	U	U
m&p-Xylene	500,000	U	U	U	U
p-Isopropyltoluene		U	U	U	U
o-Xylene	500,000	U	U	U	U
sec-Butylbenzene		U	U	U	U
Styrene	2,000	U	U	U	U
Tert-Butylbenzene		U	U	U	U
Tetrachloroethene	500	U	U	U	U
1,1,1,2-Tetrachloroethane	400	U	U	U	U
1,1,2,2-Tetrachloroethane	20	U	U	U	U
Toluene	90,000	U	U	U	U
1,2,3-Trichlorobenzene		U	U	U	U
1,2,4-Trichlorobenzene	100,000	U	U	U	U
1,1,1-Trichloroethane	30,000	U	U	U	U
1,1,2-Trichloroethane	300	U	U	U	U
Trichloroethene	400	U	U	U	U
1,2,3-Trichloropropane		U	U	U	U
1,2,4-Trimethylbenzene		U	U	U	U
1,3,5-Trimethylbenzene		U	U	U	U
Vinyl Chloride	300	U	U	U	U
1,4-Dioxane			U		
Total Quantified Target VOCs		0	120	0	0
Identified Non-Target Compounds		0	0	0	
Dimethyl ether					U
Hexanal					11.4
Pentanal					2.3

U = Not Detected
NA = Not Analyzed

TABLE 5-7
Sediment VOC Data Summary
Old Amherst Landfill FCSA Study

Tighe & Bond, Inc.

EPA METHOD 8260 Compound	MCP Method 1 Cleanup Standards (µg/kg)	SED-4 (SW-4) Upstream - Hop Brook			SED-5 (SW-5) Downstream - Hop Brook		
		11/08/05	05/23/08		11/08/05	05/27/08	
Acetone	3,000	U	U		U	U	
Bromobenzene		U	U		U	U	
Benzene	10,000	U	U		U	U	
Bromochloromethane		U	U		U	U	
Bromodichloromethane	100	U	U		U	U	
Bromoform	100	U	U		U	U	
Bromomethane	10,000	U	U		U	U	
2-Butanone (MEK)	300	U	U		U	U	
Carbon tetrachloride	1,000	U	U		U	U	
Chlorobenzene	8,000	U	U		U	U	
Dibromochloromethane		U	U		U	U	
Chloroethane		U	U		U	U	
Chloroform	100	U	U		U	U	
Chloromethane		U	U		U	U	
2-Chlorotoluene		U	U		U	U	
4-Chlorotoluene		U	U		U	U	
cis-1,2-Dichloroethene	2,000	U	U		U	U	
trans-1,2-Dichloroethene	4,000	U	U		U	U	
Dibromomethane		U	U		U	U	
1,2-Dibromo-3-chloropropane		U	U		U	U	
1,2-Dichlorobenzene	100,000	U	U		U	U	
1,3-Dichlorobenzene	100,000	U	U		U	U	
1,4-Dichlorobenzene	2,000	U	U		U	U	
1,1-Dichloroethane	3,000	U	U		U	U	
1,2-Dichloroethane	50	U	U		U	U	
1,1-Dichloroethene	700	U	U		U	U	
1,2-Dichloropropane	100	U	U		U	U	
1,3-Dichloropropane	10	U	U		U	U	
2,2-Dichloropropane		U	U		U	U	
1,1-Dichloropropene		U	U		U	U	
cis-1,3-Dichloropropene		U	U		U	U	
trans-1,3-Dichloropropene		U	U		U	U	
Ethylbenzene	80,000	U	U		U	U	
Ethylene Dibromide	5.0	U	U		U	U	
Trichlorofluoromethane		U	U		U	U	
2-Hexanone (MBK)		U	U		U	U	
Hexachlorobutadiene	3,000	U	U		U	U	
Isopropylbenzene		U	U		U	U	
4-Methyl-2-pentanone	500	U	U		U	U	
Methylene chloride	100	U	U		U	U	
Methyl-tert-Butyl ether	300	U	U		U	U	
n-Butylbenzene		U	U		U	U	
n-Propylbenzene		U	U		U	U	
Naphthalene	4,000	U	U		U	U	
m&p-Xylene	500,000	U	U		U	U	
p-Isopropyltoluene		U	U		U	U	
o-Xylene	500,000	U	U		U	U	
sec-Butylbenzene		U	U		U	U	
Styrene	2,000	U	U		U	U	
Tert-Butylbenzene		U	U		U	U	
Tetrachloroethene	500	U	U		U	U	
1,1,1,2-Tetrachloroethane	400	U	U		U	U	
1,1,2,2-Tetrachloroethane	20	U	U		U	U	
Toluene	90,000	3.5	U		U	U	
1,2,3-Trichlorobenzene		U	U		U	U	
1,2,4-Trichlorobenzene	100,000	U	U		U	U	
1,1,1-Trichloroethane	30,000	U	U		U	U	
1,1,2-Trichloroethane	300	U	U		U	U	
Trichloroethene	400	U	U		U	U	
1,2,3-Trichloropropane		U	U		U	U	
1,2,4-Trimethylbenzene		U	U		U	U	
1,3,5-Trimethylbenzene		U	U		U	U	
Vinyl Chloride	300	U	U		U	U	
1,4-Dioxane			U			U	
Total Quantified Target VOCs		3.5	0		0	0	
Identified Non-Target Compounds			0		0	0	
Dimethyl ether		U					
Hexanal		2.5					
Pentanal		U					

U = Not Detected
NA = Not Analyzed

TABLE 5-7
Sediment VOC Data Summary
Old Amherst Landfill FCSA Study

Tighe & Bond, Inc.

EPA METHOD 8260 Compound	MCP Method 1 Cleanup Standards (µg/kg)	SED-6 (SW-6) Trail - Wetland Seepage Area			SED-7 (SW-7) Kettle Pond - Downgradient		
		11/08/05	05/23/08		11/08/05	05/27/08	
Acetone	3,000	U	U		U	U	
Bromobenzene		U	U		U	U	
Benzene	10,000	U	U		U	U	
Bromochloromethane		U	U		U	U	
Bromodichloromethane	100	U	U		U	U	
Bromoform	100	U	U		U	U	
Bromomethane	10,000	U	U		U	U	
2-Butanone (MEK)	300	U	110 J		U	U	
Carbon tetrachloride	1,000	U	U		U	U	
Chlorobenzene	8,000	U	U		U	U	
Dibromochloromethane		U	U		U	U	
Chloroethane		U	U		U	U	
Chloroform	100	U	U		U	U	
Chloromethane		U	U		U	U	
2-Chlorotoluene		U	U		U	U	
4-Chlorotoluene		U	U		U	U	
cis-1,2-Dichloroethene	2,000	U	U		U	U	
trans-1,2-Dichloroethene	4,000	U	U		U	U	
Dibromomethane		U	U		U	U	
1,2-Dibromo-3-chloropropane		U	U		U	U	
1,2-Dichlorobenzene	100,000	U	U		U	U	
1,3-Dichlorobenzene	100,000	U	U		U	U	
1,4-Dichlorobenzene	2,000	3.7	U		U	U	
1,1-Dichloroethane	3,000	U	U		U	U	
1,2-Dichloroethane	50	U	U		U	U	
1,1-Dichloroethene	700	U	U		U	U	
1,2-Dichloropropane	100	U	U		U	U	
1,3-Dichloropropane	10	U	U		U	U	
2,2-Dichloropropane		U	U		U	U	
1,1-Dichloropropene		U	U		U	U	
cis-1,3-Dichloropropene		U	U		U	U	
trans-1,3-Dichloropropene		U	U		U	U	
Ethylbenzene	80,000	U	U		U	U	
Ethylene Dibromide	5.0	U	U		U	U	
Trichlorofluoromethane		U	U		U	U	
2-Hexanone (MBK)		U	U		U	U	
Hexachlorobutadiene	3,000	U	U		U	U	
Isopropylbenzene		U	U		U	U	
4-Methyl-2-pentanone	500	U	U		U	U	
Methylene chloride	100	U	U		U	U	
Methyl-tert-Butyl ether	300	U	U		U	U	
n-Butylbenzene		U	U		U	U	
n-Propylbenzene		U	U		U	U	
Naphthalene	4,000	U	U		U	U	
m&p-Xylene	500,000	U	U		U	U	
p-Isopropyltoluene		U	U		U	U	
o-Xylene	500,000	U	U		U	U	
sec-Butylbenzene		U	U		U	U	
Styrene	2,000	U	U		U	U	
Tert-Butylbenzene		U	U		U	U	
Tetrachloroethene	500	U	U		U	U	
1,1,1,2-Tetrachloroethane	400	U	U		U	U	
1,1,2,2-Tetrachloroethane	20	U	U		U	U	
Toluene	90,000	U	U		5.7	U	
1,2,3-Trichlorobenzene		U	U		U	U	
1,2,4-Trichlorobenzene	100,000	U	U		U	U	
1,1,1-Trichloroethane	30,000	U	U		U	U	
1,1,2-Trichloroethane	300	U	U		U	U	
Trichloroethene	400	U	U		U	U	
1,2,3-Trichloropropane		U	U		U	U	
1,2,4-Trimethylbenzene		U	U		U	U	
1,3,5-Trimethylbenzene		U	U		U	U	
Vinyl Chloride	300	U	U		U	U	
1,4-Dioxane			U			U	
Total Quantified Target VOCs		3.7	0		5.7	0	
Identified Non-Target Compounds		0	0			0	
Dimethyl ether					4.8		
Hexanal					5.6		
Pentanal					U		

U = Not Detected
NA = Not Analyzed

TABLE 5-7
Sediment VOC Data Summary
Old Amherst Landfill FCSA Study

Tighe & Bond, Inc.

EPA METHOD 8260 Compound	MCP Method 1 Cleanup Standards (µg/kg)	SED-8 (SW-8) Brickyard Wellfield - Spring			SED-9 (SW-9) Gull Pond Inlet	
		11/08/05	05/23/08		11/08/05	
Acetone	3,000	U	U		U	
Bromobenzene		U	U		U	
Benzene	10,000	U	U		U	
Bromochloromethane		U	U		U	
Bromodichloromethane	100	U	U		U	
Bromoform	100	U	U		U	
Bromomethane	10,000	U	U		U	
2-Butanone (MEK)	300	U	U		U	
Carbon tetrachloride	1,000	U	U		U	
Chlorobenzene	8,000	3.0	U		U	
Dibromochloromethane		U	U		U	
Chloroethane		U	U		U	
Chloroform	100	U	U		U	
Chloromethane		U	U		U	
2-Chlorotoluene		U	U		U	
4-Chlorotoluene		U	U		U	
cis-1,2-Dichloroethene	2,000	U	U		U	
trans-1,2-Dichloroethene	4,000	U	U		U	
Dibromomethane		U	U		U	
1,2-Dibromo-3-chloropropane		U	U		U	
1,2-Dichlorobenzene	100,000	U	U		U	
1,3-Dichlorobenzene	100,000	U	U		U	
1,4-Dichlorobenzene	2,000	U	U		U	
1,1-Dichloroethane	3,000	U	U		U	
1,2-Dichloroethane	50	U	U		U	
1,1-Dichloroethene	700	U	U		U	
1,2-Dichloropropane	100	U	U		U	
1,3-Dichloropropane	10	U	U		U	
2,2-Dichloropropane		U	U		U	
1,1-Dichloropropene		U	U		U	
cis-1,3-Dichloropropene		U	U		U	
trans-1,3-Dichloropropene		U	U		U	
Ethylbenzene	80,000	U	U		U	
Ethylene Dibromide	5.0	U	U		U	
Trichlorofluoromethane		U	U		U	
2-Hexanone (MBK)		U	U		U	
Hexachlorobutadiene	3,000	U	U		U	
Isopropylbenzene		U	U		U	
4-Methyl-2-pentanone	500	U	U		U	
Methylene chloride	100	U	U		U	
Methyl-tert-Butyl ether	300	U	U		U	
n-Butylbenzene		U	U		U	
n-Propylbenzene		U	U		U	
Naphthalene	4,000	U	U		U	
m&p-Xylene	500,000	U	U		U	
p-Isopropyltoluene		U	U		U	
o-Xylene	500,000	U	U		U	
sec-Butylbenzene		U	U		U	
Styrene	2,000	U	U		U	
Tert-Butylbenzene		U	U		U	
Tetrachloroethene	500	U	U		U	
1,1,1,2-Tetrachloroethane	400	U	U		U	
1,1,2,2-Tetrachloroethane	20	U	U		U	
Toluene	90,000	U	U		U	
1,2,3-Trichlorobenzene		U	U		U	
1,2,4-Trichlorobenzene	100,000	U	U		U	
1,1,1-Trichloroethane	30,000	U	U		U	
1,1,2-Trichloroethane	300	U	U		U	
Trichloroethene	400	U	U		U	
1,2,3-Trichloropropane		U	U		U	
1,2,4-Trimethylbenzene		U	U		U	
1,3,5-Trimethylbenzene		U	U		U	
Vinyl Chloride	300	U	U		U	
1,4-Dioxane			U			
Total Quantified Target VOCs		3	0		0	
Identified Non-Target Compounds		0	0			
Dimethyl ether					U	
Hexanal					2.1	
Pentanal					U	

U = Not Detected
NA = Not Analyzed

TABLE 5-7
Sediment VOC Data Summary
Old Amherst Landfill FCSA Study

EPA METHOD 8260 Compound	MCP Method 1 Cleanup Standards (µg/kg)	SED-15 (SW-15) Wetland Seepage Area 05/23/08	
Acetone	3,000	U	
Bromobenzene		U	
Benzene	10,000	U	
Bromochloromethane		U	
Bromodichloromethane	100	U	
Bromoform	100	U	
Bromomethane	10,000	U	
2-Butanone (MEK)	300	39 J	
Carbon tetrachloride	1,000	U	
Chlorobenzene	8,000	U	
Dibromochloromethane		U	
Chloroethane		U	
Chloroform	100	U	
Chloromethane		U	
2-Chlorotoluene		U	
4-Chlorotoluene		U	
cis-1,2-Dichloroethene	2,000	U	
trans-1,2-Dichloroethene	4,000	U	
Dibromomethane		U	
1,2-Dibromo-3-chloropropane		U	
1,2-Dichlorobenzene	100,000	U	
1,3-Dichlorobenzene	100,000	U	
1,4-Dichlorobenzene	2,000	U	
1,1-Dichloroethane	3,000	U	
1,2-Dichloroethane	50	U	
1,1-Dichloroethene	700	U	
1,2-Dichloropropane	100	U	
1,3-Dichloropropane	10	U	
2,2-Dichloropropane		U	
1,1-Dichloropropene		U	
cis-1,3-Dichloropropene		U	
trans-1,3-Dichloropropene		U	
Ethylbenzene	80,000	U	
Ethylene Dibromide	5.0	U	
Trichlorofluoromethane		U	
2-Hexanone (MBK)		U	
Hexachlorobutadiene	3,000	U	
Isopropylbenzene		U	
4-Methyl-2-pentanone	500	U	
Methylene chloride	100	U	
Methyl-tert-Butyl ether	300	U	
n-Butylbenzene		U	
n-Propylbenzene		U	
Naphthalene	4,000	U	
m&p-Xylene	500,000	U	
p-Isopropyltoluene		U	
o-Xylene	500,000	U	
sec-Butylbenzene		U	
Styrene	2,000	U	
Tert-Butylbenzene		U	
Tetrachloroethene	500	U	
1,1,1,2-Tetrachloroethane	400	U	
1,1,2,2-Tetrachloroethane	20	U	
Toluene	90,000	U	
1,2,3-Trichlorobenzene		U	
1,2,4-Trichlorobenzene	100,000	U	
1,1,1-Trichloroethane	30,000	U	
1,1,2-Trichloroethane	300	U	
Trichloroethene	400	U	
1,2,3-Trichloropropane		U	
1,2,4-Trimethylbenzene		U	
1,3,5-Trimethylbenzene		U	
Vinyl Chloride	300	U	
1,4-Dioxane		U	
Total Quantified Target VOCs		0	
Identified Non-Target Compounds		0	
Dimethyl ether			
Hexanal			
Pentanal			

U = Not Detected
NA = Not Analyzed

Section 6
FCSA Baseline Risk Assessment

A qualitative risk assessment was performed to evaluate the potential risk to the human health, public safety and the environment that may be posed by the Old Amherst Landfill site and associated site impacts. The qualitative risk assessment was conducted following MassDEP guidelines set forth in the LAC program document *Landfill Technical Guidance Manual, Revised May 1997.*

The qualitative risk assessment involves a comprehensive evaluation of site data to determine if substantial contamination or risk from contamination is present due to waste disposal area impact. If the qualitative risk assessment indicates that further evaluation is required to determine the level of risk the site presents to its surroundings or potential human receptors, a quantitative risk assessment is undertaken.

The qualitative risk assessment process follows a four step evaluation process. The steps include:

- Identification of potential human, public safety and environmental receptors that may be impacted by contaminants released at the site.
- Identification of type and extent of contaminants.
- Identification of exposure pathways by which contaminants may reach potential receptors and identification of exposure points.
- Qualitative evaluation of the current and potential future risk due to the site and associated contaminants on human health, public safety and the environment.

The qualitative risk assessment will also identify specific site impacts that may require evaluation in a Corrective Action Alternatives Analysis (CAAA) report.

6.1 Potential Receptors

A list of current and future potential receptors was developed for the qualitative risk assessment based on ISA and CSA information. Potential receptors are those receptors that could contact potentially contaminated media affected by contaminants released at the waste disposal site, which at a typical landfill include waste materials, groundwater, surface water, sediments and landfill gas emissions. Potential receptors to be evaluated in the qualitative risk assessment include human receptors such as site workers and users, private and public drinking water supplies (wells or surface water), residences and abutters; public health sensitive receptors such as day care facilities, churches, schools, nursing homes, hospitals and recreation areas; and environmental receptors such as abutting wetland areas and downgradient surface waters, and aquatic and terrestrial biota.

6.1.1 Human Receptors

Potential human receptors include site workers, trespassers and local residents.

6.1.1.1 Site Workers & Public Access

Site workers from the Town DPW have limited potential to directly contact contaminated media such as municipal solid waste type debris because the debris is covered by soil cover. In addition, the landfill is closed and no longer in use. Site workers typically do not conduct operations in the Old Amherst Landfill site. Site workers could potentially be exposed to municipal solid waste type debris through maintenance work (i.e. supplementing soil cover and general brush removal/mowing).

There is no regular public usage of the Old Amherst Landfill at this time.

6.1.1.2 Abutters & Nearby Residences

As reviewed in the ISA Report, the Old Amherst Landfill Disposal Area is primarily surrounded by residential properties, town-owned land and the current/in-use Amherst Lined Landfill. The land uses (or types) within the Site are residential properties, commercial properties and forested and non-forested wetlands, as depicted in the MassGIS Land Use Figure in Appendix A.

Descriptions of abutting properties surrounding the site are as follows:

- **North:** The Site is bound to the north by Belchertown Road (Route 9) and Old Belchertown Road. The closed Amherst Lined Landfill is located across Belchertown Road to the northeast. Residential properties are located across Belchertown Road to the north.

- **South:** The Site is bound to the south by residential properties and Wildflower Drive. The large residential development located south of the Site is identified as Amherst Woods.

- **East:** The Site is bound to the east by Pomeroy Pond, residential properties, Old Belchertown Road and Larkspur Drive.

- **West**: The Site is bound to the west by residential properties, Tanglewood Drive, undeveloped forested land and a commercial property.

6.1.1.3 Public & Private Water Supply Wells

The area surrounding the site is mapped as a Potentially Productive Medium Yield Aquifer (see Figure 2 Priority Resource Areas Map). A MassDEP Approved Zone II Wellhead Protection Area is located approximately 400 feet south and 2,000 feet east of the site for the Amherst and Belchertown groundwater supply wells located in the Lawrence Swamp basin to the south of the site (see Figure 2 Priority Resource Areas and the FCSA August 2008 Groundwater Contour Plan in Appendix B). One Non-Community Transient Public Water Supply well is located approximately 6,000 feet southeast of the site.

There are no private residential water supply wells located downgradient of the Old Amherst Landfill site. Municipal drinking water is supplied to these residences. The closest private water supply well is located approximately 500 feet east of the site at 126 Old Belchertown Road and is upgradient of the site.

6.1.1.4 Trespassers

Direct access to the capped Old Amherst Landfill area is not limited. The area is not fenced or secured to prevent direct access to the capped portion of the Site. Area

residents use the capped Landfill area for recreational activities, such as; dog walking and running. Frequency of trespasser activity is considered high.

6.1.1.5 Recreational Users of Downgradient Resource Areas

Recreational use of the wetlands adjacent to and downgradient of the site to the west is expected to be limited. However, wetlands located west and northwest of the Site are occasionally used for recreation, primarily hiking. More specifically, an elevated boardwalk, as part of the KC Trail, transects the southern portion of the wetland (KC Trail wetland) located between Hop Brook Drive and Old Farm Road. In addition, Gull Pond, located west-northwest of the Old Amherst Landfill site is occasionally used for fishing by area residents. Based on the current land uses described above, human exposure to areas impacted by the site from abutters and nearby residences is considered likely.

6.1.2 Public Health Sensitive Receptors

No schools are located within ½ mile of the Old Amherst Landfill. There are no hospitals, nursing homes or preschool/daycare facilities located within ½ mile of the site. Given that no public health sensitive receptors are located within ½ mile of the Site, these receptors are not considered to be affected by the site.

6.1.3 Environmental Receptors

Potentially sensitive environmental receptors at and downgradient of the Old Amherst Landfill site include: the surficial aquifer underlying the site, wetland areas surrounding the site, and aquatic and terrestrial biota potentially exposed to contaminants associated with the Site.

Multiple groundwater monitoring wells have been installed at the site and downgradient of the site in the surficial, confined and bedrock aquifers for the landfill assessment. As part of the CSA study, groundwater samples were collected from surficial aquifer, confined aquifer and bedrock groundwater monitoring wells for laboratory analysis. Additionally, surface water and sediment samples were also collected from areas that are potentially impacted by the site for laboratory analysis. The CSA study indicates that the water quality of the surficial and confined aquifers, and wetland areas downgradient of the site may be impacted by landfill contaminants.

As shown on the MassGIS Priority Resource Areas Map (Figure 2), the site is located within a Potentially Productive Medium Yield Aquifer. The MassDEP Approved Wellhead Protection Area (Zone II) for the Lawrence Swamp water supply wells is located approximately 400 feet south and 2,000 feet east of the site. Protected and Recreational Open Space is located approximately 1,500 feet west and approximately 2,000 feet northwest of the site. Natural Heritage & Endangered Species Program (NHESP) designated areas of Rare Species and Rare Wildlife are located approximately 3,000 feet west, 2,250 feet northwest and 2,500 feet southwest of the site. NHESP must be formally contacted in order to identify listed species that may exist in the vicinity of the site.

According to the Priority Resource Areas map, Areas of Critical Environmental Concern (ACECs) are not located near the Site.

6.2 Landfill "Contaminants of Concern (COCs)"

As part of the CSA qualitative risk assessment, landfill contaminants and concentrations in various media are identified to evaluate potential impact to receptors. Landfill "contaminants of concern" or COCs for groundwater, surface water, and sediment at the site that may impact on-site or off-site receptors and the environment were previously identified in Section 5.3.

6.2.1 Groundwater

Groundwater COCs include the metals arsenic (As), iron (Fe) and manganese (Mn). Arsenic (As) was detected at trace to low concentrations exceeding the MMCL of 0.010 mg/L in groundwater downgradient of the landfill site. Iron (Fe) and manganese (Mn) were detected at levels exceeding the SMCL of 0.3 mg/L and 0.05 mg/L, respectively, for drinking water. However, the SMCLs for iron (Fe) and manganese (Mn) are not health risk based guidelines but are aesthetic guidelines based on taste, color and fixture staining. Groundwater COCs are summarized in Section 5.3 of this report.

6.2.2 Surface Water

Two rounds of sampling and analysis of surface water for the parameters outlined under Massachusetts Solid Waste Regulations 310 CMR 19,132(1)h including landfill contaminant indicator parameters, metals and volatile organic compounds (VOCs) were performed for the CSA study in November 2005 and October 2008. Impacted surface water was identified as part of the FCSA study. Laboratory analytical results identified the metals iron (Fe) and lead (Pb) in surface water located downgradient of the site above applicable AWQC Chronic Criteria guidelines. However, the lead (Pb) level was less than the MMCL for drinking water and the iron (Fe) SMCL is based on aesthetic considerations such as taste, color and staining and is not a human health concern; therefore human exposure to surface water is not considered a significant exposure pathway. Trace levels of cyanide were identified at the KC Trail wetland area (SW-6) and the SW-15 wetland area that exceeded applicable AQWC criteria but were less than the MMCL of 0.2 mg/L; therefore trace concentrations cyanide in the surface water is not considered a human health concern or significant exposure pathway. Surface water COCs are summarized in Section 5.3 of this report.

6.2.3 Sediment

Two rounds of sampling and analysis of sediment for the parameters outlined under Massachusetts Solid Waste Regulations 310 CMR 19,132(1)h, including RCRA 8 metals and volatile organic compounds (VOCs) were performed for the CSA study in November 2005 and October 2008. Impacted sediments were identified as an environmental concern. Laboratory analytical results indicate that elevated concentrations of arsenic (As) and cadmium (Cd) are distributed in wetland sediments between Hop Brook Drive and Old Farm Road, arsenic (As) in sediments at the inlet of Gull Pond, and mercury (Hg) at the SW-15 wetland area at concentrations above MassDEP Sediment Screening Criteria guidelines. An elevated boardwalk transects the wetland between Hop Brook Drive and Old Farm Road that is used for hiking by local residents. Wetland and pond sediments are considered accessible to area residents. Arsenic (As), cadmium (Cd) and mercury (Hg) are considered landfill COCs for sediment at respective locations. Sediment COCs are summarized in Section 5.3.

6.2.4 Soil Gas - Landfill Site

Two rounds of soil gas monitoring of gas monitoring wells and existing soil gas points for percent methane, percent oxygen and hydrogen sulfide gas was performed for the CSA

study in 2005 and 2008. Landfill gases were below threshold levels in the soil air at site property boundaries. However, these gases have the potential to impact abutting properties at some future time through off-site migration in soils abutting the waste disposal areas on-site.

6.3 Exposure Pathways

Potential exposure pathways identified for contaminants released at the site are through contact with impacted groundwater, surface water or sediments. An exposure pathway is the means by which a receptor is exposed to the contaminant, such as drinking contaminated groundwater, recreational contact with surface water, or direct contact with contaminated sediments.

Exposure pathways for each of the media are identified and evaluated as follows.

6.3.1 Groundwater

Groundwater is typically the primary transport media for landfill contaminants found off-site in groundwater, surface water and sediments. Contaminants released to the groundwater through the leaching of contaminants from buried waste materials or discharge of leachate seepage areas to the groundwater may be transported off-site by groundwater flow and be discharged to downgradient wetlands or surface water where contaminants impact surface water quality, wetland soils or aquatic sediment quality. Contaminant impacts to surface water quality and aquatic sediments may also affect local biota exposed to contaminated media.

The groundwater exposure pathway is the aquifer underlying the site. Groundwater exposure pathways for the surficial and confined aquifers include contaminant transport and discharge to local wetlands and surface waters where wetland soils, surface water quality and aquatic sediments may be impacted. Assessment of potential groundwater contaminant transport and discharge was accomplished by the sampling and evaluation of groundwater, surface water and sediments conducted as part of the CSA study.

Direct exposure to contaminated groundwater in the surficial and confined aquifers is not considered an exposure pathway. No private or public water supply wells with the potential to be impacted by landfill contaminants are located downgradient of the landfill. Limited exposure to site workers during periodic sampling at monitoring wells is not a significant exposure concern as these workers are trained to minimize exposure.

6.3.2 Surface Water

Direct human exposure to surface water is limited to occasional activities such as hiking, fishing or other recreational activities associated with the KC Trail wetland and elevated boardwalk, and Gull Pond. As described in Section 6.2.2 of this report, surface water metals concentrations were less than MMCL, ORSG and SMCL guidelines. Few landfill COCs were identified in surface water, limited to lead (Pb) and cyanide at the SW-15 wetland area and cyanide at the KC Trail wetland. Therefore, human exposure to surface water is not considered a significant exposure pathway.

Surface water is an environmental exposure pathway.

6.3.3 Sediment

Direct human exposure to sediments located in the KC Trail wetland and at the inlet to Gull Pond (SW-1 station) is limited to occasional activities such as hiking, fishing or other recreational activities. As described in section 6.2.3 of this report, the metals arsenic (As), cadmium (Cd) and mercury (Hg) were identified in some of the sediments at concentrations exceeding MassDEP Sediment Screening Criteria guidelines. These sediments are considered accessible and a potential human health exposure pathway.

6.3.4 Soil Gas - Landfill Site

Off-site subsurface migration of landfill gases at the perimeter of the site is considered an exposure pathway where landfill gases could impact the air space of a residential dwelling and subsurface utility such as a drainage line or catch basin and result in either a combustible condition due to high methane, a hazardous atmosphere due to low oxygen levels or be impacted by trace gases such as hydrogen sulfide that may be present in the landfill gas.

6.3.5 Buried Solid Wastes

The waste disposal area at the Old Amherst Landfill is covered with at least two feet of soil cover and is not considered accessible to the surface environment. Therefore, human or environmental exposure to buried solid waste is not considered a significant exposure pathway.

6.4 Qualitative Evaluation of Site Risk

The qualitative risk assessment for the Old Amherst Landfill site identified five potential exposure pathways for human health, public safety and environmental impact:

1) Groundwater exposure pathways are limited to downgradient groundwater discharge areas for the aquifer underlying the site. These exposure pathways include contaminant transport and discharge to downgradient wetlands and surface waters. Potential risks associated with groundwater discharge to these areas are evaluated through the assessment of surface water and sediment data collected as part of the CSA study. Given the absence of private or public supply wells in the vicinity of the site with the potential to be impacted, direct exposure to contaminated groundwater in the surficial, confined, or bedrock aquifer is not identified as a potential exposure pathway.

2) Potential surface water exposure pathways are limited. Although the discharge of contaminated groundwater from the surficial aquifer to downgradient surface waters is a contaminant transport pathway, environmental monitoring of surface waters in streams, ponds and wetlands downgradient and adjacent to the site indicate that there are few significant water quality impacts to surface water attributable to the site at concentrations less than drinking water standards or guidelines.

3) Analytical results from sediment samples collected from the KC Trail wetland (As and Cd) located between Hop Brook Drive and Old Farm Road, from the inlet of Gull Pond (As) and from the SW-15 wetland area (Hg) indicate that a potential human exposure pathway to impacted sediments exists. The KC Trail wetland and the Gull Pond inlet were separately evaluated by a limited quantitative risk assessment summarized in Section 6.5 and provided in Appendix J.

The SW-15 wetland area is a forested wetland not readily accessible to the general public and therefore was not considered a significant human health or public safely exposure risk. No additional assessment or evaluation is recommended for this area.

4) In addition, sediment the KC Trail wetland (As and Cd), the inlet of Gull Pond (As) and the SW-15 wetland area (Hg) are also considered contaminant exposure pathways for environmental receptors, specifically to local terrestrial and aquatic biota. A summary evaluation of the potential exposure risk from impacted sediments to the environment (terrestrial and aquatic biota) is based on the following criteria:

   KC Trail Wetland: Arsenic (As) and cadmium (Cd) were detected at concentrations exceeding the MassDEP Screening Criteria of 33 mg/kg and 5.0 mg/kg, respectively. Concentrations were highest in the central portion of the wetland and less than MassDEP threshold levels along the edges of the wetland. Iron (Fe) levels exceeded Ontario Guidelines for "Severe Effect Levels" (SELs) for iron (Fe) of 40,000 mg/kg in four of four samples. The Ontario SEL is defined as the concentration that would be detrimental to the majority of benthic species.

   Gull Pond Inlet: Arsenic (As) was detected at concentrations exceeding the MassDEP Screening Criteria of 33 mg/kg in four of six samples. Iron (Fe) concentrations in two of two samples exceeded the Ontario Guideline SEL for iron (Fe) of 40,000 mg/kg.

   SW-15 Wetland: Mercury (Hg) was detected in four of four samples at concentrations exceeding MassDEP Screening Criteria of 0.18 mg/kg.

5) Off-site subsurface migration of landfill gases in the soil air represents a human health and public safety risk.

6.5 Quantitative Risk Assessment for Sediment Exposure

The results of the Qualitative Risk Evaluation indicate that COCs identified in sediments at the KC Trail wetland and from the inlet of Gull Pond exceeded MassDEP Sediment Screening Criteria for the metals arsenic (As) and cadmium (Cd) at the KC Trail wetland (SED-6 series, SED-14 and SED-16) and for arsenic (As) at the inlet to Gull Pond (SED-1). Because the KC Trail wetland area and Gull Pond inlet are considered accessible to area residents, a site-specific quantitative risk assessment was required by the MassDEP and performed by KERA Environmental, LLC (KERA) of Worthington, Massachusetts to further evaluate site impacts. The quantitative risk assessment was conducted in compliance with Massachusetts Contingency Plan (MCP, 310 CMR 40.0000) Method 3 Risk Characterization as it applies to landfills. A copy of the KERA Quantitative Risk Assessment is provided in Appendix J to this report.

6.5.1 Inlet to Gull Pond - SW-1 Wetland Area

Results of the focused site-specific quantitative risk assessment indicate that a condition of No Significant Risk to human health exists for fall victims and neighborhood children who engage in recreational activities or trespassing at the Gull Pond inlet station.

6.5.2 KC Trail Wetland Area

Results of the focused site-specific quantitative risk assessment indicate that a condition of No Significant Risk to human health exists for fall victims and neighborhood children who engage in recreational or trespassing activities within the KC Trail wetland area located between Hop Brook Drive and Old Farm Road.