Tables

Table 1 Soil Testing Results

Ottawa County Farms Landfill

Ottawa County, Michigan

Boring Number	Sample Interval (ft. BGS)	Geologic Unit	Sample Description	Grain Size Analysis (ASTM D422)								Atterberg Limits (ASTM D4318)			Hydraulic Conductivity (cm/sec)		
				Gravel		Sand			Fines	USCS Classification					Value	Method Used	
				Coarse	Fine	Coarse	Medium	Fine				LL	PL	PI		ASTM D2434	ASTM D5084
DB-1	28-30	Upper Clay	Gray CLAY with trace fine sand	0.0%	2.5%	2.5%	3.3%	23.4%	69.1%	Sandy Lean CLAY	CL	29.5	15.4	14.1	1.85E-08		X
DB-1	159-161	Upper Sand	Brown fine SAND with fine gravel	21.4%	5.1%	2.7%	4.5%	49.2%	17.1%	Clayey SAND with gravel	SC	N/A	N/A	N/A	N/A	N/A	N/A
DB-1	179-201	Lower Sand	Sandy CLAY	0.0%	7.4%	2.9%	5.8%	40.9%	42.5%	Clayey SAND	SC	14.7	12.4	2.3	N/A	N/A	N/A
DB-2	42-44	Upper Clay	Gray Clay	0.0%	0.6%	1.0%	2.2%	16.3%	79.9%	Lean CLAY with sand	CL	36.1	17.9	18.2	1.31E-08		X
DB-2	135-137	Upper Sand	Gray fine SAND with trace silt	0.0%	0.0%	0.0%	1.1%	94.8%	4.1%	Poorly graded SAND	SP	N/A	N/A	N/A	N/A	N/A	N/A
DB-2	184-185.5	Lower Sand	Medium SAND and gravel	25.6%	24.7%	8.6%	8.1%	21.0%	11.8%	GRAVEL with clay and sand	GW-GC	N/A	N/A	N/A	N/A	N/A	N/A
DB-3	54-56	Upper Clay	Gray silty CLAY with fine sand	0.0%	1.3%	1.5%	3.1%	24.7%	69.4%	Sandy Lean CLAY	CL	26.1	14.6	11.5	1.03E-08		X
DB-3	124-125	Upper Sand	Gray medium to coarse SAND	0.0%	0.0%	1.2%	70.5%	26.5%	1.8%	Poorly graded SAND	SP	N/A	N/A	N/A	N/A	N/A	N/A
DB-3	134-141.5	Lower Clay	Gray sandy CLAY	0.0%	0.0%	0.4%	1.4%	41.2%	56.7%	CLAY with sand	CL,CL-ML	N/A	N/A	N/A	N/A	N/A	N/A
DB-3	182-184	Lower Sand	Gray fine to medium SAND	0.0%	0.0%	3.6%	18.5%	70.4%	7.5%	SAND with clay	SP-SC	N/A	N/A	N/A	N/A	N/A	N/A
DB-5	38-40	Upper Clay (sand seam)	Fine SAND and silt seam	0.0%	0.0%	0.0%	0.0%	97.9%	1.8%	Poorly graded SAND	SP	N/A	N/A	N/A	N/A	NA	NA
DB-5	53-55	Upper Clay	Gray clay with trace of silt	0.0%	1.0%	1.4%	2.4%	15.5%	79.8%	Lean CLAY with sand	CL	35.5	17.7	17.8	6.31E-09		X
DB-7	88-90	Upper Clay	Brown/gray CLAY	0.0%	1.1%	1.8%	2.9%	20.6%	73.6%	Lean CLAY with sand	CL	33.4	17.2	16.2	3.25E-08		X
DB-11	102-104	Upper Sand	Fine to medium SAND	0.0%	1.2%	0.6%	32.6%	58.6%	6.9%	Fine SAND with clay	SP-SC	N/A	N/A	N/A	N/A	N/A	N/A
DB-11	124-126	Upper Sand	Brown/gray fine silty SAND	0.0%	6.1%	4.0%	7.9%	40.0%	41.9%	Silty, Clayey SAND	SC-SM	N/A	N/A	N/A	N/A	N/A	N/A
DB-11	669.78	Lower Clay (sand seam)	Fine sandy CLAY	0.0%	11.4%	4.2%	7.1%	38.5%	38.5%	Clayey SAND	SC	N/A	N/A	N/A	N/A	N/A	N/A
DB-13	60-62	Upper Clay	Gray CLAY	0.0%	4.2%	1.9%	3.8%	28.0%	62.0%	Sandy Lean CLAY	CL	29.8	15.9	13.9	4.21E-09		X
DB-17	149-151	Upper Sand	Fine to coarse SAND	0.0%	2.3%	5.1%	39.2%	44.8%	8.4%	Poorly graded SAND	SP	N/A	N/A	N/A	N/A	N/A	N/A
DB-17	169-181	Lower Clay	Gray fine sandy CLAY	0.0%	0.9%	1.3%	9.0%	51.7%	37.0%	Clayey SAND	SC	14.4	11.2	3.2	N/A	N/A	N/A
DB-24	22-24	Upper Clay	Dark grayish brown (10YR4/2) silty CLAY	N/A	N/A	N/A	N/A	N/A	97.6%	Silt	ML	43	31	12	1.40E-08		X
DB-24	89-91	Upper Clay	Dark grayish brown (10YR4/2) silty CLAY	0.0%	1.0%	0.6%	2.1%	15.8%	80.5%	Lean CLAY with sand	CL	28	12	16	N/A	N/A	N/A
DB-24	154-160	Upper Sand	Grayish brown (10YR5/2) clayey fine SAND	3.3%	14.5%	10.3%	25.1%	36.9%	9.9%	Well graded SAND with silt and gravel	SW-SM	N/A	N/A	N/A	N/A	N/A	N/A
DB-25	75-77	Upper Clay	Dark grayish brown (10YR4/2) silty CLAY	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2.40E-08		X
DB-25	84-86	Upper Clay	Dark grayish brown (10YR4/2) silty CLAY	0.0%	6.2%	0.8%	2.3%	17.4%	73.3%	Lean CLAY with sand	CL	27	11	16	N/A	N/A	N/A
DB-25	148-162	Upper Sand	Grayish brown (10YR5/2) silty fine SAND	3.9%	21.9%	21.8%	22.7%	21.2%	8.6%	Well graded SAND with silt and gravel	SW-SM	N/A	N/A	N/A	N/A	N/A	N/A
DB-26	41-43	Upper Clay	Dark grayish brown (10YR4/2) silty CLAY	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	4.10E-08		X
DB-26	43-45	Upper Clay	Dark grayish brown (10YR4/2) silty CLAY	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	4.40E-08		X
DB-26	104-106	Upper Clay	Dark grayish brown (10YR4/2) silty CLAY	0.0%	6.7%	2.2%	6.2%	37.7%	47.1%	Clayey SAND	SC	17	9	8	N/A	N/A	N/A
DB-26	150-163	Upper Sand	Grayish brown (10YR5/2) silty fine SAND	0.0%	0.1%	0.9%	18.1%	68.4%	12.5%	Well graded SAND with silt	SW-SM	N/A	N/A	N/A	N/A	N/A	N/A
DB-27	20-24	Upper Clay	Grayish brown (10YR5/2) silty CLAY	N/A	N/A	N/A	N/A	N/A	96.2%	Lean Clay	CL	48	23	25	9.40E-09		X
DB-27	40-44	Upper Clay	Grayish brown (10YR5/2) silty CLAY	N/A	N/A	N/A	N/A	N/A	89.0%	Lean Clay	CL	44	22	22	1.20E-08		X
DB-27	80-87	Upper Sand	Dark grayish brown silty fine SAND	7.9%	18.7%	9.4%	12.2%	40.4%	11.4%	Well graded SAND with silt and gravel	SW-SM	N/A	N/A	N/A	N/A	N/A	N/A
DB-28	131-133	Lower Clay	Dark grayish brown (10YR4/2) silty CLAY	0.0%	0.0%	0.3%	1.6%	5.6%	92.5%	Fat CLAY	CH	26	14	12	N/A	N/A	N/A
DB-28	143-149	Lower Clay (sand seam)	Grayish brown (10YR5/2) clayey fine SAND	0.0%	12.8%	18.3%	26.3%	30.2%	12.4%	Well graded SAND with silt	SW-SM	N/A	N/A	N/A	N/A	N/A	N/A
DB-28	163-165	Lower Clay	Dark grayish brown sandy CLAY	0.0%	2.6%	3.5%	8.7%	38.3%	46.9%	Clayey SAND	SC	17	9	9	N/A	N/A	N/A
SB-31	48-50	Upper Clay	Brown (10YR5/3) sandy CLAY	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	5.80E-08		X
SB-31	58-60	Upper Clay	Dark grayish brown (10YR4/2) silty CLAY	5.8%	2.6%	0.5%	2.7%	20.2%	68.2%	Lean CLAY with sand	CL	26	12	14	N/A	N/A	N/A
SB-32	60-62	Upper Clay	Dark grayish brown (10YR4/2) silty CLAY	2.0%	2.0%	0.8%	3.7%	22.3%	69.1%	Lean CLAY with sand	CL	26	11	15	N/A	N/A	N/A
SB-33	48-50	Upper Clay	Dark grayish brown (10YR4/2) silty CLAY	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	3.90E-08		X
SB-33	56-58	Upper Clay	Dark grayish brown (10YR4/2) silty CLAY	0.0%	1.3%	1.1%	3.6%	26.1%	67.9%	Sandy Lean CLAY	CL	25	12	13	N/A	N/A	N/A
SB-34	56-58	Upper Clay	Dark grayish brown (10YR4/2) silty CLAY	0.0%	0.0%	0.1%	1.1%	6.7%	92.0%	Lean CLAY	CL	34	12	22	N/A	N/A	N/A
SB-35	42-44	Upper Clay	Dark grayish brown (10YR4/2) silty CLAY	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	4.20E-08		X
SB-35	48-50	Upper Clay	Dark grayish brown (10YR4/2) silty CLAY	0.0%	0.1%	0.4%	1.4%	12.6%	85.4%	Lean CLAY	CL	32	13	19	N/A	N/A	N/A
SB-36	52-54	Upper Clay	Dark grayish brown (10YR4/2) silty CLAY	0.0%	0.1%	0.8%	2.3%	20.9%	75.8%	Lean CLAY with sand	CL	26	11	15	N/A	N/A	N/A
SB-37	42-44	Upper Clay	Dark grayish brown (10YR4/2) silty CLAY	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	5.10E-08		X
SB-37	48-50	Upper Clay	Dark grayish brown (10YR4/2) silty CLAY	0.0%	0.3%	0.6%	2.4%	19.9%	76.9%	Lean CLAY with sand	CL	25	10	15	N/A	N/A	N/A
SB-38	50-52	Upper Clay	Dark grayish brown (10YR4/2) silty CLAY	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	4.90E-08		X
SB-38	60-68	Upper Clay	Dark grayish brown (10YR4/2) silty CLAY	0.0%	0.3%	1.8%	3.6%	16.5%	77.8%	Lean CLAY with sand	CL	20	9	11	N/A	N/A	N/A
SB-38	104-111	Upper Sand	Grayish brown (10YR5/2) silty fine SAND	0.0%	0.3%	0.1%	4.5%	76.9%	18.1%	Clayey SAND	SC	N/A	N/A	N/A	N/A	N/A	N/A
SB-39	50-52	Upper Clay	Dark grayish brown (10YR4/2) silty CLAY	2.2%	0.1%	0.6%	2.2%	33.5%	61.4%	Sandy Lean CLAY	CL	24	10	14	N/A	N/A	N/A
SB-40	42-44	Upper Clay	Dark grayish brown (10YR4/2) silty CLAY	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2.60E-08		X
SB-40	48-50	Upper Clay	Dark grayish brown (10YR4/2) silty CLAY	0.0%	1.4%	1.2%	2.3%	20.5%	74.5%	Lean CLAY with sand	CL	23	9	14	N/A	N/A	N/A
SB-41	38-40	Upper Clay	Dark grayish brown (10YR4/2) silty CLAY	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	5.80E-08		X
SB-41	66-80	Upper Sand	Grayish brown (10YR5/2) silty fine SAND	9.5%	21.2%	19.9%	23.8%	18.4%	7.2%	Well graded SAND and gravel	SW-SM	N/A	N/A	N/A	N/A	N/A	N/A
SB-42	77-84	Upper Sand	Dark grayish brown (10YR4/2) find SAND	0.0%	4.6%	9.1%	2.8%	52.6%	30.9%	Clayey SAND	SC	N/A	N/A	N/A	N/A	N/A	N/A
SB-43	111.2-117	Upper Sand	Dark grayish brown (10YR4/2) find SAND	0.0%	0.7%	2.7%	5.2%	71.9%	19.4%	Clayey SAND	SC	N/A	N/A	N/A	N/A	N/A	N/A
SB-44	113-116	Upper Sand	Dark grayish brown (10YR4/2) find SAND	0.0%	0.0%	0.2%	0.6%	73.7%	25.5%	Clayey SAND	SC	N/A	N/A	N/A	N/A	N/A	N/A
MM-21	45-47	Upper Clay	Dark grayish brown (10YR4/2) silty CLAY	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	3.90E-08		X
MM-21	47-49	Upper Clay	Dark grayish brown (10YR4/2) silty CLAY	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	4.90E-08		X

Table 2 Summary of Well Construction Details
Ottawa County Farms Landfill
Ottawa County, Michigan

Well/Boring Identification	Date Installed	Northing	Easting	Top-of-Casing Elevation	Ground Surface Elevation	Aquifer or Water-Bearing Unit Screened	Total Depth of Boring (feet BGS)	Well Diameter (inches)	Boring Diameter (inches)	Well Construction Material	Screened Interval (feet BGS)	Sand pack[2] Interval (feet BGS)	Seal/Grout Interval (feet BGS)
MW-1R	24-Aug-1993	6701.20	4784.50	650.25	NA	upper aquifer	80.0	2.0	8.25	Schedule 40 PVC	73-78	68-80	0-68
MW-2R	23-Aug-1993	6497.00	4916.70	652.49	NA	upper aquifer	80.0	2.0	8.25	Schedule 40 PVC	73-78	68-80	0-68
MW-11	15-Jan-1987	6200.20	3633.80	653.38	652.30	perched	22.5	2.0	8.25	Galvanized Steel[4]	17-19.5	9.5-19.5	0.9.5
MW-12	NA	5616.30	3678.60	661.06	659.20	perched	30.0	2.0	8.25	Galvanized Steel[5]	25-30	15-30	0-15
DB-1	8-Jul-1994	7017.70	1288.00	672.66	670.20	lower aquifer	213.0	2.0	8.25	Stainless Steel[3]	208-213	203-213	0-203
DB-2	15-Jul-1994	4660.70	3499.90	669.46	666.60	lower aquifer	210.0	2.0	8.25	Stainless Steel[3]	196-201	190-201	0-190
DB-3	21-Jul-1994	5908.00	4925.10	661.74	658.90	lower aquifer	215.0	2.0	8.25	Stainless Steel[3]	201.5-206.5	197.5-215	0-197.5
DB-5	12-Jul-1994	4530.00	1882.40	678.57	675.70	perched	43.0	2.0	8.25	Schedule 40 PVC	37.5-42.5	34-42.5	0-34
DB-11	15-Aug-1994	6912.40	4136.90	652.92	650.30	upper aquifer	190.0	2.0	8.25	Stainless Steel[3]	102-107	98-107	0-98
DB-14	2-Aug-1994	7024.50	1277.90	673.19	671.10	upper aquifer	167.0	2.0	8.25	Stainless Steel[3]	155-160	151-167	0-151
DB-15	3-Aug-1994	7014.60	1274.70	673.37	671.80	perched	52.0	2.0	8.25	Schedule 40 PVC	43.5-48.5	40-52	0-40
DB-16	12-Aug-1994	5919.30	4924.20	660.96	659.00	upper aquifer	117.0	2.0	8.25	Stainless Steel[3]	110-115	107-117	0-107
DB-17R	23-Aug-1995	4527.00	1242.60	679.31	676.90	upper aquifer	160.5	2.0	8.25	Stainless Steel[3]	148-153	146-160.5	0-146
DB-18	26-Sep-1994	6109.20	1217.30	675.87	673.40	upper aquifer	176.0	2.0	8.25	Stainless Steel[3]	160-165	147-176	0-147
DB-19R	17-Aug-1995	4484.00	2415.40	677.79	NA	upper aquifer	150.0	2.0	8.25	Stainless Steel[3]	143-148	139-150	0-139
DB-20	3-Oct-1994	5157.70	1219.50	673.75	672.06	upper aquifer	149.3	2.0	8.25	Stainless Steel[3]	143-148	140-149.3	0-140
DB-21	7-Jul-2000	4460.11	3215.88	676.65	673.40	upper aquifer	159.0	2.0	8.25	Stainless Steel[3]	152.6-157.6	146.0-158	0-146.0
DB-22	12-Jul-2000	4468.55	4034.52	674.78	672.02	upper aquifer	184.0	2.0	8.25	Stainless Steel[3]	178.5-183.5	172.0-184.0	0-172.0
DB-23	1-Jul-2003	5922.30	6205.79	644.20	641.93	upper aquifer	165.5	2.0	8.25	Stainless Steel[1]	100-105	97-105	2-97
DB-24	3-Nov-2015	4452.04	5100.42	658.85	656.46	upper aquifer	184.0	2.0	8.25	Schedule 40 PVC	165-170	160-170	0-160
DB-25	11-Nov-2015	4461.97	6159.73	653.30	651.05	upper aquifer	170.0	2.0	8.25	Schedule 40 PVC	155-160	151-160	0-151
DB-26	13-Nov-2015	5251.42	6221.31	657.65	654.73	upper aquifer	180.5	2.0	8.25	Schedule 40 PVC	147-152	143-152	0-143
DB-27	28-Oct-2015	6508.72	5877.31	661.00	657.47	upper aquifer	88.0	2.0	8.25	Schedule 40 PVC	80-85	76-85	0-76
DB-28	27-Oct-2015	6510.93	5871.99	660.85	657.43	lower aquifer	215.0	2.0	8.25	Schedule 40 PVC	209-214	205-214	0-205
MM-17	14-Oct-2015	7019.95	1265.69	674.54	671.98	n/a	51.5	2.0	8.25	Schedule 40 PVC	5-46	5-51.5	0-5

NOTES:
1 - Well constructed with stainless steel screen and 20 feet of stainless steel riser pipe, followed by a schedule 40 PVC riser to the surface.
2 - #3 Global Gravel was used for the sand pack at gas probes MM-17 through MM-21
3 - Well constructed with stainless steel screen and 20 feet of stainless steel riser pipe, followed by a galvanized steel riser to the surface.
4 - Screen material unknown.
5 - Well constructed with stainless steel screen and a galvanized steel riser to the surface.
n/a - not applicable
NA - not available
BGS - Below Ground Surface

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MM-18	14-Oct-2015	4809.50	1088.76	681.57	679.04	n/a	56.5	2.0	8.25	Schedule 40 PVC	5-51	5-56.5	0-5
MM-19	13-Oct-2015	4461.97	3751.02	674.91	672.59	n/a	51.5	2.0	8.25	Schedule 40 PVC	5-46	5-51.5	0-5
MM-20	13-Oct-2015	6959.81	3749.92	658.51	655.86	n/a	31.4	2.0	8.25	Schedule 40 PVC	5-26	5-31.4	0-5
MM-21	13-Nov-2015	5254.75	6221.47	657.61	654.73	n/a	51.5	2.0	8.25	Schedule 40 PVC	5-46	5-51.5	0-5
SB-31	9-Oct-2015	6250.06	5130.00	n/a	656.47	n/a	66.0	n/a	8.25	n/a	n/a	n/a	0-66
SB-32	8-Oct-2015	5770.00	5130.04	n/a	659.14	n/a	66.0	n/a	8.25	n/a	n/a	n/a	0-66
SB-33	8-Oct-2015	5274.98	5129.99	n/a	654.92	n/a	60.0	n/a	8.25	n/a	n/a	n/a	0-60
SB-34	12-Oct-2015	4800.01	5129.90	n/a	651.70	n/a	60.0	n/a	8.25	n/a	n/a	n/a	0-60
SB-35	7-Oct-2015	4800.00	5530.01	n/a	649.79	n/a	56.0	n/a	8.25	n/a	n/a	n/a	0-56
SB-36	6-Oct-2015	4800.04	5930.00	n/a	649.36	n/a	58.0	n/a	8.25	n/a	n/a	n/a	0-58
SB-37	7-Oct-2015	5220.03	5930.01	n/a	650.00	n/a	56.0	n/a	8.25	n/a	n/a	n/a	0-56
SB-38	6-Oct-2015	5570.04	5530.01	n/a	657.57	n/a	111.0	n/a	8.25	n/a	n/a	n/a	0-111
SB-39	7-Oct-2015	5629.93	5930.00	n/a	649.61	n/a	54.0	n/a	8.25	n/a	n/a	n/a	0-54
SB-40	12-Oct-2015	6050.00	5630.00	n/a	650.40	n/a	56.0	n/a	8.25	n/a	n/a	n/a	0-56
SB-41	23-Nov-2015	6375.00	5560.00	n/a	649.50	n/a	84.0	n/a	8.25	n/a	n/a	n/a	0-84
SB-42	15-Dec-2015	5962.09	5455.05	n/a	657.46	n/a	86.0	n/a	8.25	n/a	n/a	n/a	0-86
SB-43	18-Dec-2015	5005.68	5108.38	n/a	652.28	n/a	117.8	n/a	8.25	n/a	n/a	n/a	0-117.8
SB-44	22-Dec-2015	4993.29	5647.67	n/a	649.95	n/a	116.0	n/a	8.25	n/a	n/a	n/a	0-116

NOTES:
1 - Well constructed with stainless steel screen and 20 feet of stainless steel riser pipe, followed by a schedule 40 PVC riser to the surface.
2 - #3 Global Gravel was used for the sand pack at gas probes MM-17 through MM-21
3 - Well constructed with stainless steel screen and 20 feet of stainless steel riser pipe, followed by a galvanized steel riser to the surface.
4 - Screen material unknown.
5 - Well constructed with stainless steel screen and a galvanized steel riser to the surface.
n/a - not applicable
NA - not available
BGS - Below Ground Surface

Table 3 Historical Groundwater Elevations
Ottawa County Farms Landfill
Ottawa County, Michigan

Well Identification	Top of Casing Elevation	Ground Surface Elevation	Groundwater Elevation (feet USGS)						
			09-23-93	08-17-94	08-26-94	10-06-94	12-01-94	01-30-95	03-08-95
DB-1	672.66	670.2	--	612.96	611.80	614.35	617.11	--	617.30
DB-2	669.46	666.6	--	618.95	619.19	619.89	620.93	--	621.11
DB-3	661.74	658.9	--	619.88	620.10	621.21	622.22	--	622.56
DB-5	678.57	675.7	--	670.14	670.13	669.65	670.57	672.112	671.91
DB-11	652.92	650.3	--	624.54	624.73	625.79	626.73	627.05	626.94
DB-14	673.19	671.1	--	617.35	617.50	618.61	--	--	--
DB-15	673.37	671.8	--	660.16	660.70	661.45	662.31	662.64	662.39
DB-16	660.96	659.0	--	624.52	624.72	625.77	626.74	627.11	627.00
DB-17	679.65	677.2	--	616.32	616.62	617.51	618.65	619.03	619.03
DB-17R	679.33	676.8	--	--	--	--	--	--	--
DB-18	675.87	673.4	--	--	--	618.14	619.27	619.77	619.69
DB-19	678.57	676.5	--	--	--	618.51	619.45	619.89	619.91
DB-19R	677.79	675.3	--	--	--	--	--	--	--
DB-20	673.75	672.1	--	--	--	617.57	618.97	619.38	619.38
DB-21	676.65	673.4	--	--	--	--	--	--	--
DB-22	674.78	672.0	--	--	--	--	--	--	--
DB-23	644.20	641.9	--	--	--	--	--	--	--
DB-24	658.85	656.5	--	--	--	--	--	--	--
DB-25	653.30	651.1	--	--	--	--	--	--	--
DB-26	657.65	654.7	--	--	--	--	--	--	--
DB-27	661.00	657.5	--	--	--	--	--	--	--
DB-28	660.85	657.4	--	--	--	--	--	--	--
MW-1R	650.25	--	623.91	--	--	625.75	--	627.05	627.02
MW-2R	652.49	--	623.93	--	--	625.78	626.72	627.23	627.09
MW-11	653.38	652.3	649.56	--	--	644.02	--	--	--
MW-12	661.06	659.2	656.54	--	--	656.74	--	--	--

Notes:

USGS Feet above mean sea level

-- Data not available

Table 3 Historical Groundwater Elevations
Ottawa County Farms Landfill
Ottawa County, Michigan

Well Identification	Top of Casing Elevation	Ground Surface Elevation	Groundwater Elevation (feet USGS)							
			06-21-95	07-21-95	08-29-95	09-28-95	12-20-95	02-26-96	04-17-96	10-26-98
DB-1	672.66	670.2	615.68	615.26	614.27	614.60	616.51	617.14	617.01	615.30
DB-2	669.46	666.6	619.87	618.60	618.04	--	--	--	--	--
DB-3	661.74	658.9	621.64	620.37	619.98	620.20	621.56	622.00	622.05	620.49
DB-5	678.57	675.7	670.64	669.43	668.48	--	--	--	--	--
DB-11	652.92	650.3	626.36	624.90	624.34	624.60	625.73	625.91	626.20	624.73
DB-14	673.19	671.1	--	618.19	617.42	617.54	618.89	619.83	619.84	618.22
DB-15	673.37	671.8	661.74	661.30	661.16	660.99	662.18	662.17	661.97	661.63
DB-16	660.96	659.0	626.37	624.89	624.33	624.58	625.76	625.92	626.18	624.71
DB-17	679.65	677.2	617.92	661.78	--	--	--	--	--	--
DB-17R	679.33	676.8	--	--	595.50	616.31	617.75	618.36	618.33	616.76
DB-18	675.87	673.4	618.87	617.71	616.84	616.98	618.42	619.20	619.19	617.69
DB-19	678.57	676.5	620.63	617.48	--	--	--	--	--	--
DB-19R	677.79	675.3	--	--	616.93	617.17	618.56	619.09	619.00	617.46
DB-20	673.75	672.1	618.33	617.17	616.46	616.62	618.05	618.71	618.70	617.11
DB-21	676.65	673.4	--	--	--	--	--	--	--	--
DB-22	674.78	672.0	--	--	--	--	--	--	--	--
DB-23	644.20	641.9	--	--	--	--	--	--	--	--
DB-24	658.85	656.5	--	--	--	--	--	--	--	--
DB-25	653.30	651.1	--	--	--	--	--	--	--	--
DB-26	657.65	654.7	--	--	--	--	--	--	--	--
DB-27	661.00	657.5	--	--	--	--	--	--	--	--
DB-28	660.85	657.4	--	--	--	--	--	--	--	--
MW-1R	650.25	--	626.36	624.90	--	--	--	--	--	--
MW-2R	652.49	--	626.48	625.00	624.44	624.71	625.88	626.05	626.31	624.58
MW-11	653.38	652.3	--	--	--	--	--	--	--	--
MW-12	661.06	659.2	--	--	--	--	--	--	--	--

Notes:

USGS Feet above mean sea level

-- Data not available

Table 3 Historical Groundwater Elevations
Ottawa County Farms Landfill
Ottawa County, Michigan

Well Identification	Top of Casing Elevation	Ground Surface Elevation	Groundwater Elevation (feet USGS)							
			01-21-99	04-26-99	07-26-99	10-18-99	01-25-00	04-24-00	07-24-00	10-30-00
DB-1	672.66	670.2	617.19	617.05	614.59	615.18	617.46	617.45	616.10	617,10
DB-2	669.46	666.6	--	--	--	--	--	--	--	--
DB-3	661.74	658.9	621.92	622.32	620.86	621.03	622.38	622.82	621.86	622.53
DB-5	678.57	675.7	--	--	--	--	--	--	--	--
DB-11	652.92	650.3	626.35	627.34	625.64	625.71	626.82	627.27	626.71	627.03
DB-14	673.19	671.1	619.96	620.15	618.87	618.85	620.36	620.66	619.68	620.26
DB-15	673.37	671.8	662.41	662.25	661.84	661.40	661.86	661.89	661.51	661.50
DB-16	660.96	659.0	626.33	626.84	625.59	625.67	626.80	627.24	626.69	626.98
DB-17	679.65	677.2	--	--	--	--	--	--	--	--
DB-17R	679.33	676.8	618.27	618.62	616.92	617.26	618.69	619.12	618.16	618.84
DB-18	675.87	673.4	619.29	619.59	618.02	618.22	619.69	620.12	619.05	619.67
DB-19	678.57	676.5	--	--	--	--	--	--	--	--
DB-19R	677.79	675.3	618.89	619.38	617.65	617.98	619.31	619.86	618.91	619.64
DB-20	673.75	672.1	618.67	619.37	617.32	617.62	619.38	619.44	618.52	619.14
DB-21	676.65	673.4	--	--	--	--	--	--	--	--
DB-22	674.78	672.0	--	--	--	--	--	--	--	--
DB-23	644.20	641.9	--	--	--	--	--	--	--	--
DB-24	658.85	656.5	--	--	--	--	--	--	--	--
DB-25	653.30	651.1	--	--	--	--	--	--	--	--
DB-26	657.65	654.7	--	--	--	--	--	--	--	--
DB-27	661.00	657.5	--	--	--	--	--	--	--	--
DB-28	660.85	657.4	--	--	--	--	--	--	--	--
MW-1R	650.25	--	--	--	--	--	--	--	--	--
MW-2R	652.49	--	626.21	626.89	625.61	625.67	626.81	627.24	626.71	627.00
MW-11	653.38	652.3	--	--	--	--	--	--	--	--
MW-12	661.06	659.2	--	--	--	--	--	--	--	--

Notes:

USGS Feet above mean sea level

-- Data not available

Table 3 Historical Groundwater Elevations
Ottawa County Farms Landfill
Ottawa County, Michigan

Well Identification	Top of Casing Elevation	Ground Surface Elevation	Groundwater Elevation (feet USGS)							
			01-29-01	04-30-01	07-23-01	00-00-02	00-00-03	00-00-04	00-00-05	00-00-06
DB-1	672.66	670.2	618.48	618.48	615.33					
DB-2	669.46	666.6	--	--	--	--	--	--	--	--
DB-3	661.74	658.9	623.44	623.44	620.17					
DB-5	678.57	675.7	--	--	--	--	--	--	--	--
DB-11	652.92	650.3	627.86	627.86	625.14					
DB-14	673.19	671.1	621.13	621.13	618.75					
DB-15	673.37	671.8	662.33	662.33	661.31					
DB-16	660.96	659.0	627.09	627.09	625.12					
DB-17	679.65	677.2	--	--	--	--	--	--	--	--
DB-17R	679.33	676.8	619.76	619.76	616.94					
DB-18	675.87	673.4	620.56	620.56	617.92					
DB-19	678.57	676.5	--	--	--	--	--	--	--	--
DB-19R	677.79	675.3	620.55	620.55	617.22					
DB-20	673.75	672.1	620.08	620.08	617.16					
DB-21	676.65	673.4	--	--	--					
DB-22	674.78	672.0	--	--	--					
DB-23	644.20	641.9	--	--	--	--	--	--	--	--
DB-24	658.85	656.5	--	--	--	--	--	--	--	--
DB-25	653.30	651.1	--	--	--	--	--	--	--	--
DB-26	657.65	654.7	--	--	--	--	--	--	--	--
DB-27	661.00	657.5	--	--	--	--	--	--	--	--
DB-28	660.85	657.4	--	--	--	--	--	--	--	--
MW-1R	650.25	--	--	--	--	--	--	--	--	--
MW-2R	652.49	--	627.79	627.79	625.10					
MW-11	653.38	652.3	--	--	--	--	--	--	--	--
MW-12	661.06	659.2	--	--	--	--	--	--	--	--

Notes:

USGS Feet above mean sea level

-- Data not available

Table 3 Historical Groundwater Elevations
Ottawa County Farms Landfill
Ottawa County, Michigan

Well Identification	Top of Casing Elevation	Ground Surface Elevation	Groundwater Elevation (feet USGS)								
			07-23-08	07-14-09	07-21-10	07-19-11	07-24-12	07-15-13	07-15-14	07-13-15	01-21-16
DB-1	672.66	670.2	609.99	610.64	607.81	610.84	599.55	608.71	609.94	611.73	610.39
DB-2	669.46	666.6	--	--	--	--	--	--	--	--	--
DB-3	661.74	658.9	616.57	616.89	615.32	617.64	610.32	617.38	617.27	617.71	616.43
DB-5	678.57	675.7	--	--	--	--	--	--	--	--	--
DB-11	652.93	650.3	622.29	622.45	621.29	622.98	616.61	622.89	622.67	623.14	621.70
DB-14	673.19	671.1	614.26	613.83	611.96	615.16	606.11	614.38	614.16	615.00	612.68
DB-15	673.28	671.8	661.22	657.44	658.49	661.45	660.60	660.87	661.15	660.92	662.02
DB-16	660.95	659.0	622.27	622.45	621.29	622.99	616.59	622.84	622.66	623.07	621.70
DB-17	679.65	677.2	--	--	--	--	--	--	--	--	--
DB-17R	679.33	676.8	612.47	612.80	610.84	613.96	605.44	613.42	613.23	613.96	612.41
DB-18	675.89	673.4	613.52	613.45	611.49	614.67	605.80	613.94	613.77	614.62	612.88
DB-19	678.57	676.5	--	--	--	--	--	--	--	--	--
DB-19R	685.88	675.3	613.51	613.98	612.72	615.43	607.69	615.00	614.98	615.59	--
DB-20	673.78	672.1	612.90	613.09	611.13	614.22	605.63	613.66	613.47	614.21	612.60
DB-21	676.65	--	616.62	617.03	615.54	617.77	610.89	617.54	617.35	617.82	--
DB-22	674.78	--	615.96	616.36	614.88	617.11	610.16	616.88	616.71	617.20	615.83
DB-23	644.20	641.9	--	--	--	--	--	--	--	--	621.81
DB-24	658.85	656.5	--	--	--	--	--	--	--	--	617.56
DB-25	653.30	651.1	--	--	--	--	--	--	--	--	617.85
DB-26	657.65	654.7	--	--	--	--	--	--	--	--	620.75
DB-27	661.00	657.5	--	--	--	--	--	--	--	--	621.80
DB-28	660.85	657.4	--	--	--	--	--	--	--	--	617.67
MW-2R	653.38	652.3	622.24	622.44	621.26	622.96	616.59	622.85	622.64	623.04	621.50
MW-12	661.06	659.2	--	--	--	--	--	--	--	--	--

Notes:

USGS Feet above mean sea level

-- Data not available

Table 4 Hydraulic Conductivity Data Comparison
Ottawa County Farms Landfill
Ottawa County, Michigan

Physical Soil Testing Results (ASTM D5084)				
Well Identification	Sample Interval (feet)	USCS Classification Sample Description	Geologic Unit	Vertical Hydraulic Conductivity (cm/sec)
DB-1	28-30	CL - Sandy lean CLAY	Upper Clay	1.85E-08
DB-2	42-44	CL - Lean CLAY with sand	Upper Clay	1.31E-08
DB-3	54-56	CL - Sandy lean CLAY	Upper Clay	1.03E-08
DB-5	53-55	CL - Lean CLAY with sand	Upper Clay	6.31E-09
DB-7	88-90	CL - Lean CLAY with sand	Upper Clay	3.25E-08
DB-13	60-62	CL - Sandy lean CLAY	Upper Clay	4.21E-09
DB-24	20-24	Silty CLAY	Upper Clay	1.40E-08
DB-25	75-77	Silty CLAY	Upper Clay	2.40E-08
DB-26	41-43	Silty CLAY	Upper Clay	4.10E-08
DB-26	43-45	Silty CLAY	Upper Clay	4.40E-08
DB-27	20-24	Silty CLAY	Upper Clay	9.40E-09
DB-27	40-44	Silty CLAY	Upper Clay	1.20E-08
SB-31	48-50	Sandy CLAY	Upper Clay	5.80E-08
SB-33	48-50	Silty CLAY	Upper Clay	3.90E-08
SB-35	42-44	Silty CLAY	Upper Clay	4.20E-08
SB-37	42-44	Silty CLAY	Upper Clay	5.10E-08
SB-38	50-52	Silty CLAY	Upper Clay	4.90E-08
SB-40	42-44	Silty CLAY	Upper Clay	2.60E-08
SB-41	38-40	Silty CLAY	Upper Clay	5.80E-08
MM-21	45-47	Silty CLAY	Upper Clay	3.90E-08
MM-21	47-49	Silty CLAY	Upper Clay	4.90E-08
Hydraulic Conductivity Estimated from Grain Size Analysis				
Well Identification	Sample Interval (feet)	USCS Classification Sample Description	Geologic Unit	Horizontal Hydraulic Conductivity (cm/sec)
DB-1	159-161	SC - Clayey SAND with gravel	Upper Sand	1.00E-03
DB-2	135-137	SP - Poorly graded SAND	Upper Sand	2.60E-02
DB-3	124-125	SP - Poorly graded SAND	Upper Sand	6.80E-03
DB-11	102-104	SP-SC - Fine SAND with clay	Upper Sand	3.50E-02
DB-17	149-151	SP-SC - SAND with clay	Upper Sand	1.70E-02
DB-24	154-160	SW-SM - Well graded SAND with silt/gravel	Upper Sand	3.30E-02
DB-25	148-162	SW-SM - Well graded SAND with silt/gravel	Upper Sand	3.30E-02
DB-26	150-163	SW-SM - Well graded SAND with silt	Upper Sand	1.70E-02
DB-27	80-87	SW-SM - Well graded SAND with silt/gravel	Upper Sand	3.30E-02
SB-38	104-111	SC - Clayey SAND	Upper Sand	1.20E-02
SB-41	66-80	SW-SM - Well graded SAND and gravel	Upper Sand	3.80E-02
SB-42	77-84	SC - Clayey SAND	Upper Sand	2.10E-02
SB-43	111.2-117	SC - Clayey SAND	Upper Sand	1.20E-02
SB-44	113-116	SC - Clayey SAND	Upper Sand	9.50E-03
DB-1	179-201	SC - Clayey SAND	Lower Sand	7.10E-03
DB-3	182-184	SP-SC - SAND with clay	Lower Sand	3.00E-02
Hydraulic Conductivity Estimated from Slug Test Results				
Well Identification	Screen Interval (feet)	Soil/Bedrock Type at Screened Interval	Geologic Unit	Horizontal Hydraulic Conductivity (cm/sec)
DB-11	102-107	Sand	Upper Sand	1.76E-03
DB-14	155-160	Sand	Upper Sand	2.97E-03
DB-16	110-115	Sand	Upper Sand	1.31E-02
DB-17	147-152	Sand	Upper Sand	5.08E-06
DB-1	208-213	Sandstone	Bedrock	5.70E-03
DB-2	196-201	Sandstone	Bedrock	5.10E-03
DB-3	201.5-206.5	Sandstone	Bedrock	5.56E-03