CONESTOGA-ROVERS & ASSOCIATES

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MEMORANDUM

TO:	Michael Berkoff - U.S. EPA	REF. NO.:	056393-07
FROM:	Greg Carli/Aaron Stadnyk - CRA/cs/11	DATE:	August 12, 2011
CC:	12th Street Landfill Technical Team: Richard Gay; Weyerhaeuser; Kristi Zakrzewski; MDEQ; John Bradley; MDEQ; Jeff Keiser; CH2MHill; Scott Hutsell; CH2MHill;		
RE:	**Remedial Action - April 2011 Groundwater Sampling Results Following the Groundwater Monitoring Well Installations 12th Street Landfill-Operable Unit No. 4-Allied Paper/Portage Creek/Kalamazoo River Superfund Site; Otsego Township, Michigan**		

The following memorandum was prepared by Conestoga-Rovers & Associates (CRA), to summarize the results of the April 2011 groundwater sampling event, which was preformed following the installation of the groundwater monitoring well network at the 12th Street Landfill, Operable Unit No. 4 - Allied Paper/ Portage Creek/Kalamazoo River Superfund Site, located in Otsego Township, Michigan.

The purpose of the April 2011 groundwater sampling event was to conduct a round of groundwater sampling prior to implementing the Operation, Maintenance and Monitoring (OMM) activities at the Site and as a follow up to the Vertical Aquifer Sampling (VAS) completed in November 2010.

A total of 15 on-Site groundwater monitoring wells (MW-101S, MW-101D, MW-102S, MW-102D, MW-103D, MW-104S, MW-104D, MW-105S, MW-105D, MW-106S, MW-106D, MW-107S, MW-108S, MW-108D, and MW-109D) were installed in February, at varying depths, around the perimeter of the landfill to complete the OMM monitoring well network. The locations of the monitoring wells are shown on Figure 1. Monitoring well completion details, which were selected based on the VAS analytical data, are presented in Table 1.

In March and April 2011, CRA collected groundwater elevation data from the monitoring well network to assess the groundwater flow patterns at the Site. Figures 2 and 3 present the groundwater elevations and contours for March 2011 and April 2011, respectively. In April 2011, CRA collected a round of groundwater samples from the monitoring well network, via low-flow sampling techniques. Groundwater samples were analyzed in the field for pH, oxidation-reduction potential (ORP), dissolved oxygen (DO), conductivity, temperature, and turbidity. Samples were collected and submitted for laboratory analysis of total compound list (TCL) volatile organic compounds (VOCs), polychlorinated biphenyls (PCBs), and total analyte list (TAL) metals. The April 2011 analytical results are presented in Table 2. For comparison purposes, select November 2010 VAS analytical results, for the 15 well screen intervals that correspond to the groundwater monitoring well network, are presented in Table 3. Both the April 2011 and

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November 2010 VAS analytical results were compared to Michigan Act 451, Part 201 Cleanup Criteria and Part 213 Risk-based Screening Levels: Residential and Non-Residential Generic Cleanup Criteria, identified by MDEQ RRD Op Memo No. 1, updated March 25, 2011, pursuant to 1994 PA 451 as amended.

The monitoring well network was installed at the Site as specific well screen depths, based on the VAS sampling and approved by the United States Environmental Protection Agency (U.S. EPA). Each well screen depth was selected based on an evaluation of the analytical data, which determined the VAS results that best represented the highest concentrations of potential landfill constituents present in groundwater at each location.

At each monitoring well location, the selection of each proposed screen interval was based on the presence of following parameters:

- Highest concentration of PCBs
- Presence of mercury
- Highest concentration of VOCs
- Highest concentration of TAL Metals

By applying this methodology to compare the April 2010 analytical results against the VAS analytical results, the following observations can be made:

- In both the April 2011 and November 2010 analytical results, PCBs were not detected at or above the applicable criteria. Only two detections of PCBs were noted in the in April 2011 analytical results (i.e., MW-106D and MW-108S), at concentrations which were an order of magnitude lower than those detected during the VAS sampling and below the detection limit for PCBs in groundwater.

- Mercury was previously detected in the November 2010 VAS analytical results at 10 of 15 VAS intervals, at concentrations above the Groundwater Surface Water Interface criteria (GSI). During the April 2011 sampling event, mercury was not detected in any of the groundwater samples. It should be noted that the low level sampling protocol for mercury was not used during the follow up sampling event so that a true comparison could be made to the November 2010 VAS analytical results. Therefore, the detection limit for mercury is above the GSI criteria. Low level mercury sampling method will be used during the OMM sampling to evaluate compliance with Part 201 GSI criteria.

- In both the April 2011 and VAS analytical results, very few VOCs were detected in the groundwater samples. For those parameters that were detected, all detections were well below the applicable criteria.

- Various TAL metals (aluminum, chromium, copper, iron, lead, manganese, and vanadium) were consistently detected throughout the VAS samples at concentrations exceeding both the residential and non-residential generic criteria. Fewer detections were noted in the April 2011 analytical results. Of the TAL metals detected in the April 2011 analytical results, only aluminum, iron, and manganese were detected at concentrations exceeding the residential and non-residential generic criteria.

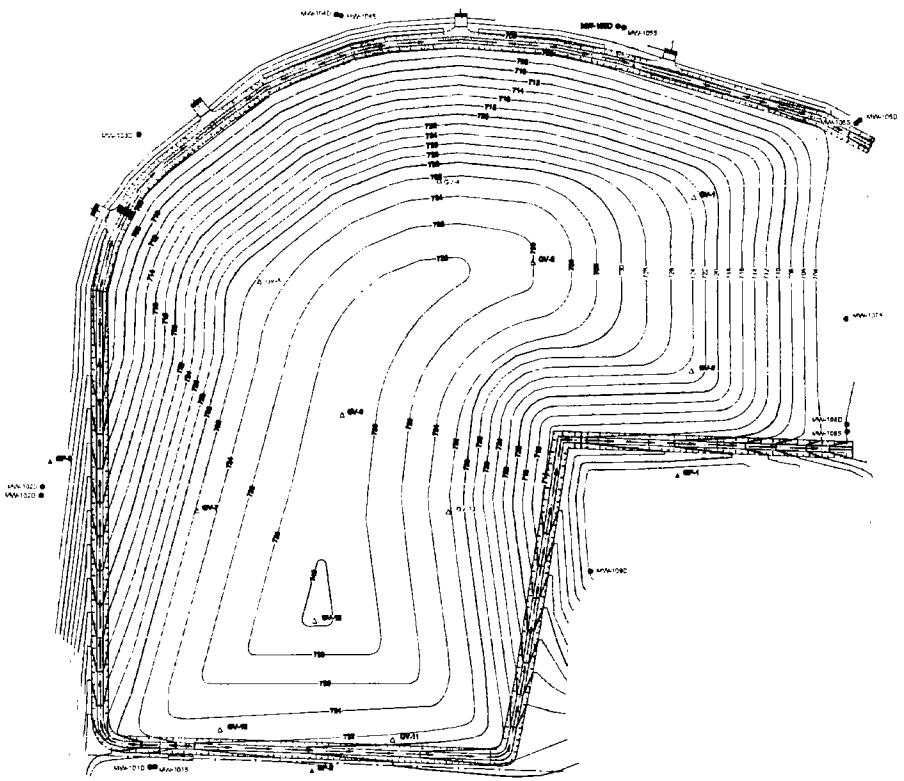
- A comparison of the results for the deep sampling interval locations (i.e., VAS versus April 2011 groundwater sampling), presented in the below table, show that the parameters which were driving the well screen placement at these locations were not detect or not present at levels which are of significant concern and therefore further evaluation at lower elevations is not warranted.

Location	*VAS Driver*	*Follow Up Results*
MW-101D	TAL Metals	All TAL Metals < GSI
MW-102D	PCBs, Hg	PCB and Hg: ND
MW-104D	PCBs, Hg	PCB and Hg: ND
MW-105D	PCBs, Hg	PCB and Hg: ND
MW-106D	PCBs, Hg	PCB and Hg: ND
MW-108D	VOCs	VOCs < Part 201 Criteria

In addition, based on a review of the recorded field parameters, there was a significant decrease in the observed turbidity levels collected during the April 2011 sampling event versus the VAS sampling event. Previous turbidity readings collected during the VAS sampling activities frequently exceeded the recordable limits of the field equipment. However, during the April 2011 sampling event, turbidity in all samples did not exceed 60 Nephelometric Turbidity Units (NTU), with the majority of turbidity readings being recorded below 15 NTU.

Observed groundwater quality, as expected, has drastically improved between the VAS sampling and the April 2011 sampling events. Moreover, the monitoring well network installed appears to be providing a complete characterization of the groundwater quality in the vicinity of the 12th Street Landfill and will be suitable for the OMM purposes. Therefore, based on the analytical results for the April 2011 event, no further groundwater investigation or additional groundwater monitoring well installation is recommended at this time.

Following the U.S. EPA review/comment and subsequent approval of the OMM Plan, the long-term groundwater monitoring program will be initiated at the Site.



No.	Revision	Date	Initial

LEGEND

- APPROXIMATE PROPERTY BOUNDARY
- EXISTING PAVED ROAD
- EXISTING UNPAVED ROAD
- EXISTING FENCE
- EXISTING BUILDING
- EXISTING GROUND ELEVATION CONTOUR
- EXISTING TREES AND/OR BRUSH
- EXISTING WET AREA AND WETLAND
- EXISTING EDGE OF WATER
- 718 PROPOSED FINAL ELEVATION CONTOURS
- ROAD/DRAINAGE SWALE
- Mini TURF REINFORCEMENT MAT
- ROAD/DRAINAGE SWALE STABILIZED WITH GEOWEB
- GV-1 GAS VENT LOCATION
- MW-108S MONITORING WELL LOCATION
- GP-1 GAS PROBE LOCATION

SCALE VERIFICATION

THIS BAR MEASURES 1 ON ORIGINAL. ADJUST SCALE ACCORDINGLY

Approved

DRAWING STATUS

Status	Date	Initial

12th STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN

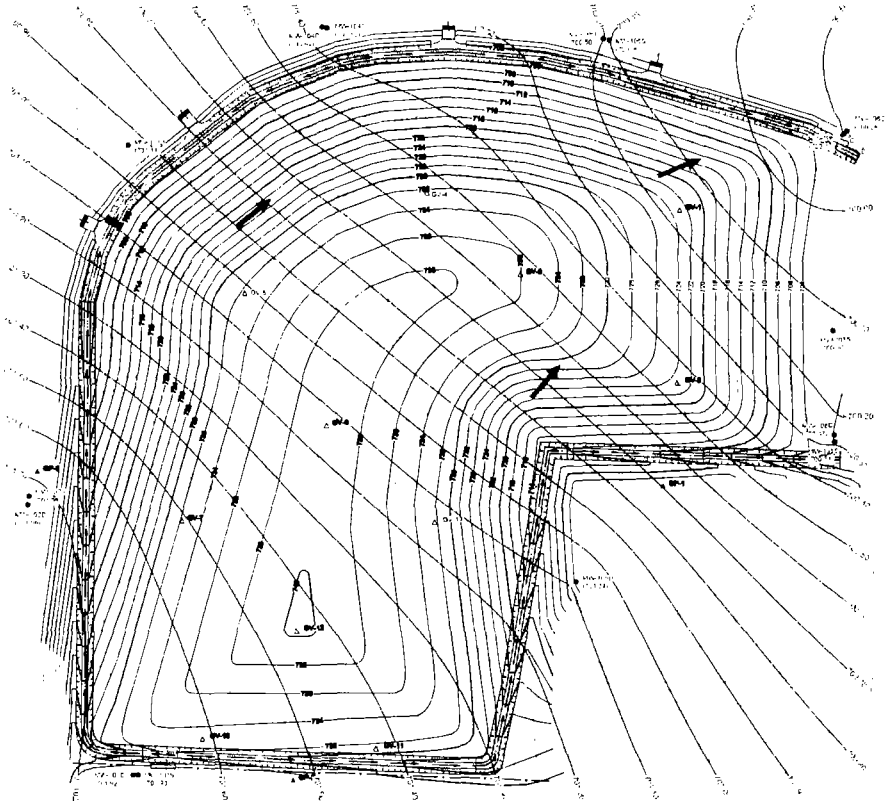
OM&M
MONITORING LOCATIONS

CONESTOGA-ROVERS & ASSOCIATES

Source Reference: BASE ADAPTED FROM PREVIOUS PMT DESIGN

Project Manager	Reviewed By	Date	
J. CARLI	P. HOEKSTRA	AUGUST 2011	
Scale	Project No.	Report No.	Drawing No.
AS SHOWN	56393-07	MEMO011	figure 1

56393-07\MEMO011 Grid\MW001 AUG 11-2011



No.	Revision	Date	Initial

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- PROPERTY BOUNDARY
- EXISTING PAVED ROAD
- EXISTING UNPAVED ROAD
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- EXISTING GROUND ELEVATION CONTOUR
- EXISTING TREES AND/OR BRUSH
- EXISTING WET AREA AND WETLAND
- EXISTING EDGE OF WATER
- PROPOSED FINAL ELEVATION CONTOURS
- ROAD DRAINAGE SWALE (IN TURF REINFORCEMENT MAT)
- ROAD DRAINAGE SWALE STABILIZED WITH GEOWEB
- GAS VENT LOCATION
- MONITORING WELL LOCATION
- GAS PROBE LOCATION
- GROUNDWATER ELEVATION CONTOUR
- GROUNDWATER ELEVATION
- GROUNDWATER FLOW DIRECTION

SCALE VERIFICATION

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Approved

DRAWING STATUS

Status	Date	Initial

12th STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN

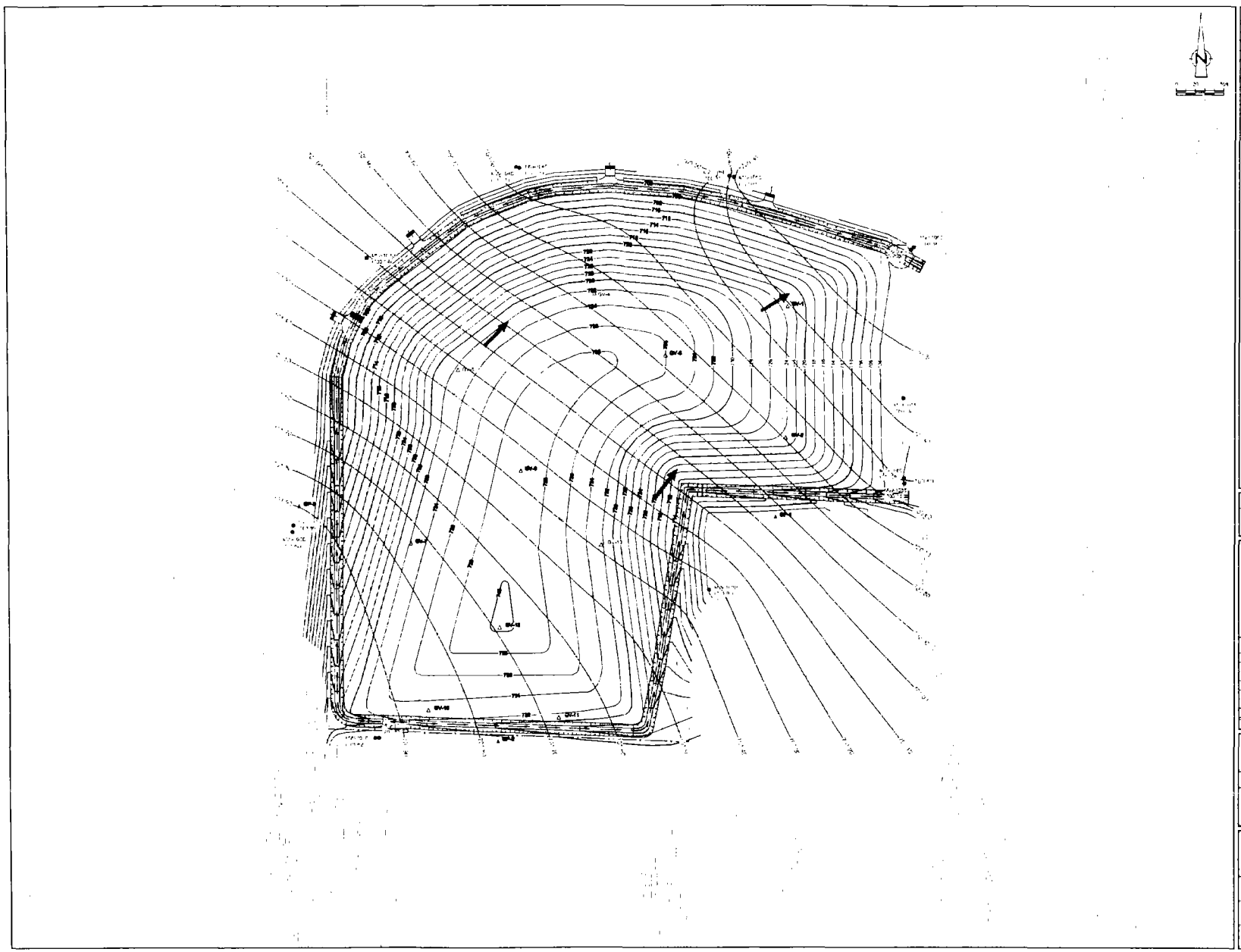
GROUNDWATER ELEVATION CONTOURS MARCH 31, 2011

CONESTOGA-ROVERS & ASSOCIATES

Source Reference: BASE ADAPTED FROM PREVIOUS RMT DESIGN

Project Manager	Reviewed By	Date	
D. CARLI	B. HOEKSTRA	AUGUST 2011	
Scale: AS SHOWN	Project No. 56393-07	Report No. MEMO011	Drawing No. figure 2

56393-07(MEMO011)GH-WA002 AUG 11/2011



No.	Revision	Date	Initial

LEGEND

- APPROXIMATE PROPERTY BOUNDARY
- EXISTING PAVED ROAD
- EXISTING UNPAVED ROAD
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- ROAD/DRAINAGE SWALE / GEOTURF REINFORCEMENT MAT
- ROAD/DRAINAGE SWALE / STABILIZED WITH GEOWEB
- GAS VENT LOCATION
- MONITORING WELL LOCATION
- GAS PROBE LOCATION
- GROUNDWATER ELEVATION CONTOUR
- GROUNDWATER ELEVATION
- GROUNDWATER FLOW DIRECTION

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY

Approved

DRAWING STATUS

Status	Date	Initial

12th STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN

GROUNDWATER ELEVATION
CONTOURS APRIL 7, 2011

CONESTOGA-ROVERS & ASSOCIATES

Source Reference: BASE ADAPTED FROM PREVIOUS RMT DESIGN

Project Manager	Reviewed By	Date
[illegible]	R. HOEKSTRA	AUGUST 2011

Scale	Project No.	Report No.	Drawing No.
AS SHOWN	58393-07	MEMO011	figure 3

58393-07(MEMO011-GW-LA001) AUG 11 2011

TABLE 1

MONITORING LOCATION COMPLETION DATA
12th STREET LANDFILL
OTSEGO, MICHIGAN

Monitoring Locations	*Ground Surface Elevation (feet AMSL)*	*Reference Elevation (feet AMSL)*	*Well Depth (feet)*	*Screen Length (feet)*	*Depth to Top of Screen (feet)*	*Top of Screen Elevation (feet AMSL)*
Groundwater Monitoring Wells						
MW-101S	734.35	737.46	39	7	32	702.35
MW-101D	734.33	737.14	75	5	70	664.33
MW-102S	704.18	707.36	10	7	3	701.18
MW-102D	704.43	707.43	45	5	40	664.43
MW-103D	704.37	707.36	35	5	30	674.37
MW-104S	703.86	706.55	25.5	7	19	684.86
MW-104D	703.48	706.42	45	5	40	663.48
MW-105S	704.89	707.86	12	7	5	699.89
MW-105D	704.78	707.89	47	5	42	662.78
MW-106S	703.88	706.96	9	7	2	701.88
MW-106D	703.66	706.36	45	5	39	664.66
MW-107S	703.76	706.73	13	5	8	695.76
MW-108S	703.32	706.21	9	7	2	701.32
MW-108D	703.39	706.16	45	5	40	663.39
MW-109D	707.41	710.46	23	5	18	689.41

TABLE 2

SUMMARY OF
APRIL 2010 FOLLOW-UP GROUNDWATER ANALYTICAL RESULTS
12th STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN

Sample Location					*MW-101S*	*MW-101S*	*MW-101D*	*MW-102S*	*MW-102D*	*MW-102D*
Sample Identification					*GW-56393-040611-EV-002*	*GW-56393-040611-EV-003*	*GW-56393-040611-EV-001*	*GW-56393-040811-EV-017*	*GW-56393-040811-EV-015*	*GW-56393-040811-EV-016*
Sample Date					*4/6/2011*	*4/6/2011*	*4/6/2011*	*4/8/2011*	*4/8/2011*	*4/8/2011*
Sample Elevation (feet AMSL)					*702.35 - 663.35*	*702.35 - 663.35*	*664.33 - 589.33*	*701.18 - 697.18*	*664.43 - 619.43*	*664.43 - 619.43*
Screen Depth (feet bgs)					*32-39*	*32-39*	*70-75*	*3-10*	*40-45*	*40-45*
Sample Type	*Groundwater Cleanup Criteria* [a]					*Duplicate*				*Duplicate*
	Units	*a*	*b*	*c*						
Metals										
Aluminum	µg/L	50	50	-	8.7	9.6	**185[ab]**	**65.6[ab]**	43.1	**67.2[ab]**
Antimony	µg/L	6	6	130	0.05 U	0.02 J	0.11	0.05 U	0.05 U	0.05 U
Arsenic	µg/L	10	10	10	0.19 J	0.25 J	1.10	0.44 J	0.18 J	0.44 J
Barium	µg/L	2000	2000	1400	73.1	72.7	78.9	81.8	68.8	83.4
Beryllium	µg/L	4	4	41	0.004 J	0.020 U	0.022	0.005 J	0.004 J	0.004 J
Cadmium	µg/L	5	5	5.1	0.005 J	0.005 J	0.021	0.023	0.006 J	0.025
Chromium	µg/L	100	100	11	0.41	0.49	1.11	0.34 U	0.26 U	0.31 U
Cobalt	µg/L	40	100	100	0.124	0.128	1.040	0.515	0.153 J	0.506 J
Copper	µg/L	1000	1000	23	0.77	0.79	2.94	0.93	0.78	0.94
Iron	µg/L	300	300	-	80.8	68.5	**1510[ab]**	**426 J[ab]**	171 J	**430 J[ab]**
Lead	µg/L	4	4	34	0.041	0.048	1.200	0.207	0.183	0.208
Magnesium	µg/L	4000000	11000000	-	25300	24900	21300	29000	24200	28900
Manganese	µg/L	50	50	5200	2.94	2.90	**65.8[ab]**	**579[ab]**	8.35 J	**577 J[ab]**
Mercury	µg/L	2	2	0.0013	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Nickel	µg/L	100	100	130	1.03	1.07	2.41	2.15	0.92	2.11
Selenium	µg/L	50	50	5	0.3 J	0.4 J	1.0 U	1.0 U	1.0 U	1.0 U
Silver	µg/L	34	98	0.2	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Sodium	µg/L	120000	350000	-	23400	23000	24900	20000	20900	19900
Thallium	µg/L	2	2	3.7	0.003 J	0.003 J	0.020 J	0.051	0.020 U	0.051
Vanadium	µg/L	4.5	62	12	0.17 J	0.16 J	1.08	0.36	0.26	0.34
Zinc	µg/L	2400	5000	310	0.78	1.21	52.4	1.27	1.46	1.43
PCBs										
Aroclor-1016 (PCB-1016)	µg/L	-	-	-	0.021 UJ	0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ
Aroclor-1221 (PCB-1221)	µg/L	-	-	-	0.041 UJ	0.040 UJ	0.040 UJ	0.040 UJ	0.040 UJ	0.040 UJ
Aroclor-1232 (PCB-1232)	µg/L	-	-	-	0.021 UJ	0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ
Aroclor-1242 (PCB-1242)	µg/L	-	-	-	0.021 UJ	0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ
Aroclor-1248 (PCB-1248)	µg/L	-	-	-	0.021 UJ	0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ
Aroclor-1254 (PCB-1254)	µg/L	-	-	-	0.021 UJ	0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ
Aroclor-1260 (PCB-1260)	µg/L	-	-	-	0.021 UJ	0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ
Total PCBs	µg/L	0.5	0.5	0.2	ND	ND	ND	ND	ND	ND

TABLE 2

SUMMARY OF
APRIL 2010 FOLLOW-UP GROUNDWATER ANALYTICAL RESULTS
12th STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN

Sample Location					*MW-101S*	*MW-101S*	*MW-101D*	*MW-102S*	*MW-102D*	*MW-102D*
Sample Identification					*GW-56393-040611-EV-002*	*GW-56393-040611-EV-003*	*GW-56393-040611-EV-001*	*GW-56393-040811-EV-017*	*GW-56393-040811-EV-015*	*GW-56393-040811-EV-016*
Sample Date					*4/6/2011*	*4/6/2011*	*4/6/2011*	*4/8/2011*	*4/8/2011*	*4/8/2011*
Sample Elevation (feet AMSL)					*702.35 - 663.35*	*702.35 - 663.35*	*664.33 - 589.33*	*701.18 - 691.18*	*664.43 - 619.43*	*664.43 - 619.43*
Screen Depth (feet bgs)					*32-39*	*32-39*	*70-75*	*3-10*	*40-45*	*40-45*
Sample Type	*Groundwater Cleanup Criteria* [1]					*Duplicate*				*Duplicate*
	Units	*a*	*b*	*c*						
Volatile Organic Compounds										
Acetone	µg/L	730	2100	1700	R	R	R	R	R	R
Benzene	µg/L	5	5	200	0.50 UJ	0.50 UJ	0.50 UJ	0.50 U	0.50 U	0.50 U
Bromobenzene	µg/L	18	50	-	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
Bromodichloromethane	µg/L	80	80	ID	0.50 UJ	0.50 UJ	0.58	0.50 UJ	0.50 UJ	0.50 UJ
Bromoform	µg/L	80	80	ID	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
Bromomethane (Methyl bromide)	µg/L	10	29	35	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
2-Butanone (Methyl ethyl ketone) (MEK)	µg/L	13000	38000	2200	R	R	R	R	R	R
N-Butylbenzene	µg/L	80	230	ID	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
Carbon disulfide	µg/L	800	2300	ID	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
Carbon tetrachloride	µg/L	5	5	45	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
Chlorobenzene	µg/L	100	100	25	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
Chlorobromomethane	µg/L	-	-	-	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
Chloroethane	µg/L	430	1700	1100	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
Chloroform (Trichloromethane)	µg/L	80	80	350	0.50 UJ	0.50 UJ	1.1	0.50 UJ	0.090 J	0.50 UJ
Chloromethane (Methyl chloride)	µg/L	260	1100	ID	0.50 UJ	0.50 UJ	0.50 UJ	0.080 J	0.080 J	0.080 J
2-Chlorotoluene	µg/L	150	420	ID	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
4-Chlorotoluene	µg/L	-	-	-	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
Cymene (p-Isopropyltoluene)	µg/L	-	-	-	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
1,2-Dibromo-3-chloropropane (DBCP)	µg/L	0.2	0.2	-	R	R	R	2.0 UJ	2.0 UJ	2.0 UJ
Dibromochloromethane	µg/L	80	80	ID	0.50 UJ	0.50 UJ	0.24 J	0.50 UJ	0.50 UJ	0.50 UJ
1,2-Dibromoethane (Ethylene dibromide)	µg/L	0.05	0.05	5.7	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
Dibromomethane	µg/L	80	230	-	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
1,2-Dichlorobenzene	µg/L	600	600	13	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
1,3-Dichlorobenzene	µg/L	6.6	19	28	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
1,4-Dichlorobenzene	µg/L	75	75	17	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
Dichlorodifluoromethane (CFC-12)	µg/L	1700	4800	ID	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
1,1-Dichloroethane	µg/L	880	2500	740	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
1,2-Dichloroethane	µg/L	5	5	360	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
1,1-Dichloroethene	µg/L	7	7	130	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
cis-1,2-Dichloroethene	µg/L	70	70	620	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
trans-1,2-Dichloroethene	µg/L	100	100	1500	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
1,3-Dichloropropane	µg/L	-	-	-	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
1,2-Dichloropropane	µg/L	5	5	230	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
2,2-Dichloropropane	µg/L	-	-	-	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
1,1-Dichloropropene	µg/L	-	-	-	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
cis-1,3-Dichloropropene	µg/L	-	-	-	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
trans-1,3-Dichloropropene	µg/L	-	-	-	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ

TABLE 2

SUMMARY OF
APRIL 2010 FOLLOW-UP GROUNDWATER ANALYTICAL RESULTS
12th STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN

Sample Location					*MW-101S*	*MW-101S*	*MW-101D*	*MW-102S*	*MW-102D*	*MW-102D*
Sample Identification					*GW-56393-040611-EV-002*	*GW-56393-040611-EV-003*	*GW-56393-040611-EV-001*	*GW-56393-040811-EV-017*	*GW-56393-040811-EV-015*	*GW-56393-040811-EV-016*
Sample Date					*4/6/2011*	*4/6/2011*	*4/6/2011*	*4/8/2011*	*4/8/2011*	*4/8/2011*
Sample Elevation (feet AMSL)					*702.35 - 663.35*	*702.35 - 663.35*	*664.33 - 589.33*	*701.18 - 691.18*	*664.43 - 619.43*	*664.43 - 619.43*
Screen Depth (feet bgs)					*32-39*	*32-39*	*70-75*	*3-10*	*40-45*	*40-45*
Sample Type	*Groundwater Cleanup Criteria* [1]					*Duplicate*				*Duplicate*
	Units	*a*	*b*	*c*						
Ethylbenzene	µg/L	74	74	18	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
Hexachlorobutadiene	µg/L	15	42	0.053	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
2-Hexanone	µg/L	1000	2900	ID	R	R	R	20 UJ	20 UJ	20 UJ
Isopropylbenzene	µg/L	800	2300	28	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
4-Methyl-2-pentanone(MIBK)	µg/L	1800	5200	ID	R	R	R	R	R	R
Methylene chloride	µg/L	5	5	1500	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
Naphthalene	µg/L	520	1500	11	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
N-Propylbenzene	µg/L	80	230	ID	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
2-Phenylbutane (sec-Butylbenzene)	µg/L	80	230	ID	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
Styrene	µg/L	100	100	80	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
tert-Butylbenzene	µg/L	80	230	ID	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
1,1,2,2-Tetrachloroethane	µg/L	8.5	35	78	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
1,1,1,2-Tetrachloroethane	µg/L	77	320	ID	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
Tetrachloroethene	µg/L	5	5	60	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
Toluene	µg/L	790	790	270	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
1,2,4-Trichlorobenzene	µg/L	70	70	99	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
1,2,3-Trichlorobenzene	µg/L	-	-	-	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
1,1,1-Trichloroethane	µg/L	200	200	89	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
1,1,2-Trichloroethane	µg/L	5	5	330	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
Trichloroethene	µg/L	5	5	200	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
Trichlorofluoromethane (CFC-11)	µg/L	2600	7300	-	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
1,2,3-Trichloropropane	µg/L	42	120	-	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
1,2,4-Trimethylbenzene	µg/L	63	63	17	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
1,3,5-Trimethylbenzene	µg/L	72	72	45	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
Vinyl chloride	µg/L	2	2	13	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
o-Xylene	µg/L	280	280	41	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
m&p-Xylenes	µg/L	-	-	-	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
Field Parameters										
Conductivity, field	mS/cm	-	-	-	0.67	0.67	0.676	0.699	0.595	0.595
Dissolved oxygen (DO), field	mg/L	-	-	-	4.07	4.07	3.82	0.58	0.76	0.76
Oxidation reduction potential (ORP), field	millivolts	-	-	-	84	84	91	154	139	139
pH, field	s.u.	6.5 - 8.5	6.5 - 8.5	-	8.21	8.21	8.21	8.5	8.34	8.34
Temperature, field	Deg C	-	-	-	7.96	7.96	9.25	6.6	8.27	8.27
Turbidity, field	NTU	-	-	-	6.33	6.33	56.9	46.9	14.4	14.4

TABLE 2

SUMMARY OF
APRIL 2010 FOLLOW-UP GROUNDWATER ANALYTICAL RESULTS
12th STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN

Sample Location					*MW-103D*	*MW-104S*	*MW-104D*	*MW-105S*	*MW-105D*	*MW-106S*
Sample Identification					*GW-56393-040711-EV-014*	*GW-56393-040711-EV-012*	*GW-56393-040711-EV-013*	*GW-56393-040711-EV-010*	*GW-56393-040711-EV-011*	*GW-56393-040711-EV-008*
Sample Date					*4/7/2011*	*4/7/2011*	*4/7/2011*	*4/7/2011*	*4/7/2011*	*4/7/2011*
Sample Elevation (feet AMSL)					*674.37 - 639.37*	*684.86 - 658.86*	*663.48 - 618.48*	*699.89 - 687.89*	*662.79 - 615.79*	*701.89 - 692.89*
Screen Depth (feet bgs)					*30-35*	*20-25*	*40-45*	*5-12*	*42-47*	*2-9*
Sample Type	*Groundwater Cleanup Criteria* [1]									
	Units	*a*	*b*	*c*						
Metals										
Aluminum	µg/L	50	50	-	10.5	**97.4** [ab]	18.4	33.1	7.6	27.8
Antimony	µg/L	6	6	130	0.05 U	0.05 U	0.07 U	0.05 U	0.05 U	0.11 U
Arsenic	µg/L	10	10	10	0.50 U	0.43 J	0.28 J	0.25 J	0.50 U	**15.3** [ab]
Barium	µg/L	2000	2000	1400	67.3	73.4	79.1	146	74.4	538
Beryllium	µg/L	4	4	41	0.020 U	0.005 J	0.020 U	0.020 U	0.020 U	0.003 J
Cadmium	µg/L	5	5	5.1	0.011 J	0.010 J	0.017 J	0.013 J	0.005 J	0.009 J
Chromium	µg/L	100	100	11	0.29 U	0.35 U	0.60	0.24 U	0.22 U	0.40
Cobalt	µg/L	40	100	100	0.117	0.302	0.293	0.608	0.126	0.760
Copper	µg/L	1000	1000	23	0.62	0.92	0.76	0.76	0.92	1.68
Iron	µg/L	300	300	-	19.6 J	**474 J** [ab]	34.4 J	**419 J** [ab]	16.8 J	**20800 J** [ab]
Lead	µg/L	4	4	34	0.032	0.323	0.080	0.111	0.070	0.330
Magnesium	µg/L	400000	1100000	-	25300	25500	25600	31800	26000	37000
Manganese	µg/L	50	50	5200	5.05	13.5	**83.7** [ab]	**208** [ab]	2.12	**483** [ab]
Mercury	µg/L	2	2	0.0013	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Nickel	µg/L	100	100	130	1.15	1.24	1.43	1.92	0.98	1.87
Selenium	µg/L	50	50	5	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Silver	µg/L	34	98	0.2	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Sodium	µg/L	120000	350000	-	22400	24800	24900	25000	21900	21500
Thallium	µg/L	2	2	3.7	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Vanadium	µg/L	4.5	62	12	0.18 J	0.48	0.25	0.18 J	0.14 J	0.29
Zinc	µg/L	2400	5000	310	1.52	1.50	2.48	0.92	1.23	4.82
PCBs										
Aroclor-1016 (PCB-1016)	µg/L	-	-	-	0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ
Aroclor-1221 (PCB-1221)	µg/L	-	-	-	0.040 UJ	0.040 UJ	0.040 UJ	0.040 UJ	0.040 UJ	0.040 UJ
Aroclor-1232 (PCB-1232)	µg/L	-	-	-	0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ
Aroclor-1242 (PCB-1242)	µg/L	-	-	-	0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ
Aroclor-1248 (PCB-1248)	µg/L	-	-	-	0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ
Aroclor-1254 (PCB-1254)	µg/L	-	-	-	0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ
Aroclor-1260 (PCB-1260)	µg/L	-	-	-	0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ
Total PCBs	µg/L	0.5	0.5	0.2	ND	ND	ND	ND	ND	ND

TABLE 2

SUMMARY OF
APRIL 2010 FOLLOW-UP GROUNDWATER ANALYTICAL RESULTS
12th STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN

Sample Location					*MW-103D*	*MW-104S*	*MW-104D*	*MW-105S*	*MW-105D*	*MW-106S*
Sample Identification					*GW-56393-040711-EV-014*	*GW-56393-040711-EV-012*	*GW-56393-040711-EV-013*	*GW-56393-040711-EV-010*	*GW-56393-040711-EV-011*	*GW-56393-040711-EV-008*
Sample Date					*4/7/2011*	*4/7/2011*	*4/7/2011*	*4/7/2011*	*4/7/2011*	*4/7/2011*
Sample Elevation (feet AMSL)					*674.37 - 639.37*	*684.86 - 658.86*	*663.48 - 618.48*	*699.89 - 687.89*	*662.79 - 615.79*	*701.89 - 692.89*
Screen Depth (feet bgs)					*30-35*	*20-25*	*40-45*	*5-12*	*42-47*	*2-9*
Sample Type	*Groundwater Cleanup Criteria* [a]									
	Units	*a*	*b*	*c*						
Volatile Organic Compounds										
Acetone	µg/L	730	2100	1700	R	R	R	R	R	R
Benzene	µg/L	5	5	200	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Bromobenzene	µg/L	18	50	-	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
Bromodichloromethane	µg/L	80	80	ID	0.50 UJ	0.50 UJ	0.45 J	0.50 UJ	0.50 UJ	0.50 UJ
Bromoform	µg/L	80	80	ID	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
Bromomethane (Methyl bromide)	µg/L	10	29	35	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
2-Butanone (Methyl ethyl ketone) (MEK)	µg/L	13000	38000	2200	R	R	R	R	R	R
N-Butylbenzene	µg/L	80	230	ID	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
Carbon disulfide	µg/L	800	2300	ID	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
Carbon tetrachloride	µg/L	5	5	45	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
Chlorobenzene	µg/L	100	100	25	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
Chlorobromomethane	µg/L	-	-	-	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
Chloroethane	µg/L	430	1700	1100	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
Chloroform (Trichloromethane)	µg/L	80	80	350	0.50 UJ	0.50 UJ	0.58	0.50 UJ	0.090 J	0.50 UJ
Chloromethane (Methyl chloride)	µg/L	260	1100	ID	0.12 J	0.50 UJ	0.29 J	0.50 UJ	0.50 UJ	0.50 UJ
2-Chlorotoluene	µg/L	150	420	ID	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
4-Chlorotoluene	µg/L	-	-	-	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
Cymene (p-Isopropyltoluene)	µg/L	-	-	-	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
1,2-Dibromo-3-chloropropane (DBCP)	µg/L	0.2	0.2	-	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
Dibromochloromethane	µg/L	80	80	ID	0.50 UJ	0.50 UJ	0.38 J	0.50 UJ	0.50 UJ	0.50 UJ
1,2-Dibromoethane (Ethylene dibromide)	µg/L	0.05	0.05	5.7	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
Dibromomethane	µg/L	80	230	-	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
1,2-Dichlorobenzene	µg/L	600	600	13	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
1,3-Dichlorobenzene	µg/L	6.6	19	28	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
1,4-Dichlorobenzene	µg/L	75	75	17	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
Dichlorodifluoromethane (CFC-12)	µg/L	1700	4800	ID	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
1,1-Dichloroethane	µg/L	880	2500	740	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
1,2-Dichloroethane	µg/L	5	5	360	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
1,1-Dichloroethene	µg/L	7	7	130	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
cis-1,2-Dichloroethene	µg/L	70	70	620	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
trans-1,2-Dichloroethene	µg/L	100	100	1,000	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
1,3-Dichloropropane	µg/L	-	-	-	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
1,2-Dichloropropane	µg/L	5	5	230	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
2,2-Dichloropropane	µg/L	-	-	-	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
1,1-Dichloropropene	µg/L	-	-	-	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
cis-1,3-Dichloropropene	µg/L	-	-	-	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
trans-1,3-Dichloropropene	µg/L	-	-	-	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ

TABLE 2

SUMMARY OF
APRIL 2010 FOLLOW-UP GROUNDWATER ANALYTICAL RESULTS
12th STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN

Sample Location					*MW-103D*	*MW-104S*	*MW-104D*	*MW-105S*	*MW-105D*	*MW-106S*
Sample Identification					*GW-56393-040711-EV-014*	*GW-56393-040711-EV-012*	*GW-56393-040711-EV-013*	*GW-56393-040711-EV-010*	*GW-56393-040711-EV-011*	*GW-56393-040711-EV-008*
Sample Date					*4/7/2011*	*4/7/2011*	*4/7/2011*	*4/7/2011*	*4/7/2011*	*4/7/2011*
Sample Elevation (feet AMSL)					*674.37 - 639.37*	*684.86 - 658.86*	*663.48 - 618.48*	*699.89 - 687.89*	*662.79 - 615.79*	*701.89 - 692.89*
Screen Depth (feet bgs)					*30-35*	*20-25*	*40-45*	*5-12*	*42-47*	*2-9*
Sample Type	*Groundwater Cleanup Criteria* [1b]									
	Units	*a*	*b*	*c*						
Ethylbenzene	µg/L	74	74	18	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
Hexachlorobutadiene	µg/L	15	42	0.053	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
2-Hexanone	µg/L	1000	2900	ID	20 UJ	20 UJ	20 UJ	20 UJ	20 UJ	20 UJ
Isopropyl benzene	µg/L	800	2300	28	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
4-Methyl-2-pentanone(MIBK)	µg/L	1800	5200	ID	R	R	R	R	R	R
Methylene chloride	µg/L	5	5	1500	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
Naphthalene	µg/L	520	1500	11	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
N-Propylbenzene	µg/L	80	230	ID	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
2-Phenylbutane (sec-Butylbenzene)	µg/L	80	230	ID	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
Styrene	µg/L	100	100	80	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
tert-Butylbenzene	µg/L	80	230	ID	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
1,1,2,2-Tetrachloroethane	µg/L	8.5	35	78	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
1,1,1,2-Tetrachloroethane	µg/L	77	320	ID	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
Tetrachloroethene	µg/L	5	5	60	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
Toluene	µg/L	790	790	270	0.50 UJ	0.060 J	0.060 J	0.50 UJ	0.50 UJ	0.090 J
1,2,4-Trichlorobenzene	µg/L	70	70	99	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
1,2,3-Trichlorobenzene	µg/L	-	-	-	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
1,1,1-Trichloroethane	µg/L	200	200	89	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
1,1,2-Trichloroethane	µg/L	5	5	330	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
Trichloroethene	µg/L	5	5	200	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
Trichlorofluoromethane (CFC-11)	µg/L	2600	7300	-	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
1,2,3-Trichloropropane	µg/L	42	120	-	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
1,2,4-Trimethylbenzene	µg/L	63	63	17	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
1,3,5-Trimethylbenzene	µg/L	72	72	45	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
Vinyl chloride	µg/L	2	2	13	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
o-Xylene	µg/L	280	280	41	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
m&p-Xylenes	µg/L	-	-	-	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
Field Parameters										
Conductivity, field	mS/cm	-	-	-	0.626	0.64	0.648	0.813	0.656	1.171
Dissolved oxygen (DO), field	mg/L	-	-	-	1.33	1.17	0.96	0.23	2.32	0.2
Oxidation reduction potential (ORP), field	millivolts	-	-	-	40	13	40	-12	9	0.84
pH, field	s.u.	6.5 - 8.5	6.5 - 8.5	-	8.22	8.17	8.18	7.94	8.14	7.75
Temperature, field	Deg C	-	-	-	10.68	10.88	10.39	9.75	11.34	8.25
Turbidity, field	NTU	-	-	-	2.94	5	20.5	7.99	4.16	15.6

TABLE 2

SUMMARY OF
APRIL 2010 FOLLOW-UP GROUNDWATER ANALYTICAL RESULTS
12th STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN

Sample Location					*MW-106D*	*MW-107S*	*MW-108S*	*MW-108D*	*MW-109D*
Sample Identification					*GW-56393-040711-EV-009*	*GW-56393-040711-EV-007*	*GW-56393-040711-EV-005*	*GW-56393-040711-EV-006*	*GW-56393-040611-EV-004*
Sample Date					*4/7/2011*	*4/7/2011*	*4/7/2011*	*4/7/2011*	*4/6/2011*
Sample Elevation (feet AMSL)					*664.66 - 620.66*	*695.76 - 682.76*	*701.32 - 692.32*	*663.39 - 618.39*	*689.41 - 666.41*
Screen Depth (feet bgs)					*40-45*	*8-13*	*2-9*	*40-45*	*22-27*
Sample Type	*Groundwater Cleanup Criteria* [1]								
	Units	*a*	*b*	*c*					
Metals									
Aluminum	µg/L	50	50	-	6.3	5.2	**74.0**[ab]	28.8	10.7
Antimony	µg/L	6	6	130	0.18	0.06 U	0.07 U	0.08 U	0.03 J
Arsenic	µg/L	10	10	10	0.09 J	0.48 J	0.30 J	0.52	0.16 J
Barium	µg/L	2000	2000	1400	95.9	86.1	78.7	331	74.8
Beryllium	µg/L	4	4	41	0.020 U	0.020 U	0.008 J	0.004 J	0.020 U
Cadmium	µg/L	5	5	5.1	0.012 J	0.111	0.010 J	0.018 J	0.008 J
Chromium	µg/L	100	100	11	0.50	0.22 U	0.46	0.20 U	0.43
Cobalt	µg/L	40	100	100	0.138	0.344	0.238	0.553	0.136
Copper	µg/L	1000	1000	23	0.95	1.37	1.60	1.59	1.33
Iron	µg/L	300	300	-	14.9 J	**830 J**[ab]	275 J	240 J	31.7
Lead	µg/L	4	4	34	0.059	0.058	0.263	0.275	0.079
Magnesium	µg/L	400000	1100000	-	24700	30700	23300	31900	24300
Manganese	µg/L	50	50	5200	36.4	**268**[ab]	24.3	**201**[ab]	2.16
Mercury	µg/L	2	2	0.0013	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Nickel	µg/L	100	100	130	1.40	3.91	1.33	2.13	1.17
Selenium	µg/L	50	50	5	1.0 U	1.0 U	1.0 U	1.0 U	0.4 J
Silver	µg/L	34	98	0.2	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Sodium	µg/L	120000	350000	-	30000	21900	20600	54300	21300
Thallium	µg/L	2	2	3.7	0.026	0.213	0.020 U	0.098	0.006 J
Vanadium	µg/L	4.5	62	12	0.13 J	0.09 J	0.30	0.19 J	0.15 J
Zinc	µg/L	2400	5000	310	1.62	4.20	2.90	3.28	1.56
PCBs									
Aroclor-1016 (PCB-1016)	µg/L	-	-	-	0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ
Aroclor-1221 (PCB-1221)	µg/L	-	-	-	0.040 UJ	0.040 UJ	0.040 UJ	0.040 UJ	0.040 UJ
Aroclor-1232 (PCB-1232)	µg/L	-	-	-	0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ
Aroclor-1242 (PCB-1242)	µg/L	-	-	-	0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ
Aroclor-1248 (PCB-1248)	µg/L	-	-	-	0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ
Aroclor-1254 (PCB-1254)	µg/L	-	-	-	0.0083 J	0.020 UJ	0.0056 J	0.020 UJ	0.020 UJ
Aroclor-1260 (PCB-1260)	µg/L		-		0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ
Total PCBs	µg/L	0.5	0.5	0.2	0.0083 J	ND	0.0056 J	ND	ND

TABLE 2

SUMMARY OF
APRIL 2010 FOLLOW-UP GROUNDWATER ANALYTICAL RESULTS
12th STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN

Sample Location					*MW-106D*	*MW-107S*	*MW-108S*	*MW-108D*	*MW-109D*
Sample Identification					*GW-56393-040711-EV-009*	*GW-56393-040711-EV-007*	*GW-56393-040711-EV-005*	*GW-56393-040711-EV-006*	*GW-56393-040611-EV-004*
Sample Date					*4/7/2011*	*4/7/2011*	*4/7/2011*	*4/7/2011*	*4/6/2011*
Sample Elevation (feet AMSL)					*664.66 - 620.66*	*695.76 - 682.76*	*701.32 - 692.32*	*663.39 - 618.39*	*689.41 - 666.41*
Screen Depth (feet bgs)					*40-45*	*8-13*	*2-9*	*40-45*	*22-27*
Sample Type	*Groundwater Cleanup Criteria* [1b]								
	Units	*a*	*b*	*c*					
Volatile Organic Compounds									
Acetone	µg/L	730	2100	1700	R	R	R	R	R
Benzene	µg/L	5	5	200	0.50 U	0.50 U	0.50 U	0.50 U	0.50 UJ
Bromobenzene	µg/L	18	50	-	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
Bromodichloromethane	µg/L	80	80	ID	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
Bromoform	µg/L	80	80	ID	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
Bromomethane (Methyl bromide)	µg/L	10	29	35	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
2-Butanone (Methyl ethyl ketone) (MEK)	µg/L	13000	38000	2200	R	R	R	R	R
N-Butylbenzene	µg/L	80	230	ID	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
Carbon disulfide	µg/L	800	2300	ID	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
Carbon tetrachloride	µg/L	5	5	45	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
Chlorobenzene	µg/L	100	100	25	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
Chlorobromomethane	µg/L	-	-	-	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
Chloroethane	µg/L	430	1700	1100	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
Chloroform (Trichloromethane)	µg/L	80	80	350	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
Chloromethane (Methyl chloride)	µg/L	260	1100	ID	0.10 J	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
2-Chlorotoluene	µg/L	150	420	ID	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
4-Chlorotoluene	µg/L	-	-	-	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
Cymene (p-Isopropyltoluene)	µg/L	-	-	-	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
1,2-Dibromo-3-chloropropane (DBCP)	µg/L	0.2	0.2	-	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	R
Dibromochloromethane	µg/L	80	80	ID	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
1,2-Dibromoethane (Ethylene dibromide)	µg/L	0.05	0.05	5.7	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
Dibromomethane	µg/L	80	230	-	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
1,2-Dichlorobenzene	µg/L	600	600	13	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
1,3-Dichlorobenzene	µg/L	6.6	19	28	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
1,4-Dichlorobenzene	µg/L	75	75	17	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
Dichlorodifluoromethane (CFC-12)	µg/L	1700	4800	ID	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
1,1-Dichloroethane	µg/L	880	2500	740	0.50 UJ	0.50 UJ	0.50 UJ	0.14 J	0.50 UJ
1,2-Dichloroethane	µg/L	5	5	360	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
1,1-Dichloroethene	µg/L	7	7	130	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
cis-1,2-Dichloroethene	µg/L	70	70	620	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
trans-1,2-Dichloroethene	µg/L	100	100	1500	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
1,3-Dichloropropane	µg/L	-	-	-	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
1,2-Dichloropropane	µg/L	5	5	230	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
2,2-Dichloropropane	µg/L	-	-	-	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
1,1-Dichloropropene	µg/L	-	-	-	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
cis-1,3-Dichloropropene	µg/L	-	-	-	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
trans-1,3-Dichloropropene	µg/L	-	-	-	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ

TABLE 2

SUMMARY OF
APRIL 2010 FOLLOW-UP GROUNDWATER ANALYTICAL RESULTS
12th STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN

Sample Location					*MW-106D*	*MW-107S*	*MW-108S*	*MW-108D*	*MW-109D*
Sample Identification					*GW-56393-040711-EV-009*	*GW-56393-040711-EV-007*	*GW-56393-040711-EV-005*	*GW-56393-040711-EV-006*	*GW-56393-040611-EV-004*
Sample Date					*4/7/2011*	*4/7/2011*	*4/7/2011*	*4/7/2011*	*4/6/2011*
Sample Elevation (feet AMSL)					*664.66 - 620.66*	*695.76 - 682.76*	*701.32 - 692.32*	*663.39 - 618.39*	*689.41 - 666.41*
Screen Depth (feet bgs)					*40-45*	*8-13*	*2-9*	*40-45*	*22-27*
Sample Type	*Groundwater Cleanup Criteria* [1]								
	Units	*a*	*b*	*c*					
Ethylbenzene	µg/L	74	74	18	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
Hexachlorobutadiene	µg/L	15	42	0.053	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
2-Hexanone	µg/L	1000	2900	ID	20 UJ	20 UJ	20 UJ	20 UJ	R
Isopropylbenzene	µg/L	800	2300	28	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
4-Methyl-2-pentanone(MIBK)	µg/L	1800	5200	ID	R	R	R	R	R
Methylene chloride	µg/L	5	5	1500	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
Naphthalene	µg/L	520	1500	11	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
N-Propylbenzene	µg/L	80	230	ID	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
2-Phenylbutane (sec-Butylbenzene)	µg/L	80	230	ID	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
Styrene	µg/L	100	100	80	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
tert-Butylbenzene	µg/L	80	230	ID	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
1,1,2,2-Tetrachloroethane	µg/L	8.5	35	78	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
1,1,1,2-Tetrachloroethane	µg/L	77	320	ID	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
Tetrachloroethene	µg/L	5	5	60	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
Toluene	µg/L	790	790	270	0.060 J	0.50 UJ	0.50 UJ	0.070 J	0.50 UJ
1,2,4-Trichlorobenzene	µg/L	70	70	99	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
1,2,3-Trichlorobenzene	µg/L	-	-	-	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
1,1,1-Trichloroethane	µg/L	200	200	89	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
1,1,2-Trichloroethane	µg/L	5	5	330	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
Trichloroethene	µg/L	5	5	200	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
Trichlorofluoromethane (CFC-11)	µg/L	2600	7300	-	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
1,2,3-Trichloropropane	µg/L	42	120	-	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
1,2,4-Trimethylbenzene	µg/L	63	63	17	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
1,3,5-Trimethylbenzene	µg/L	72	72	45	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
Vinyl chloride	µg/L	2	2	13	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
o-Xylene	µg/L	280	280	41	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
m&p-Xylenes	µg/L				0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
Field Parameters									
Conductivity, field	mS/cm	-	-	-	--	0.806	0.642	0.905	0.662
Dissolved oxygen (DO), field	mg/L	-	-	-	--	0.22	2.68	0.3	3.18
Oxidation reduction potential (ORP), field	millivolts	-	-	-	--	0.32	98	92	92
pH, field	s.u.	6.5 - 8.5	6.5 - 8.5	-	--	8.04	8.27	8.1	8.15
Temperature, field	Deg C	-	-	-	--	9.77	9.96	10.54	10.36
Turbidity, field	NTU	-	-	-	--	3.79	13.7	10.3	3.27
					--				

TABLE 2

SUMMARY OF
APRIL 2010 FOLLOW-UP GROUNDWATER ANALYTICAL RESULTS
12th STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN

Sample Location					*MW-101S*	*MW-101S*	*MW-101D*
Sample Identification					*GW-56393-040611-EV-002*	*GW-56393-040611-EV-003*	*GW-56393-040611-EV-001*
Sample Date					*4/6/2011*	*4/6/2011*	*4/6/2011*
Sample Elevation (feet AMSL)					*702.35 - 663.35*	*702.35 - 663.35*	*664.33 - 589.33*
Screen Depth (feet bgs)					*32-39*	*32-39*	*70-75*
Sample Type	*Groundwater Cleanup Criteria* [1]					*Duplicate*	
	Units	*a*	*b*	*c*			

Notes:

Michigan Act 451, Part 201 Cleanup Criteria and Part 213 Risk-based Screening Levels Residential and Non-Residential Generic Cleanup Criteria [1]

(1) Cleanup criteria identified by MDEQ RRD Op Memo No. 1, updated 3/25/2011, pursuant to 1994 PA 451 as amended.

a - Residential drinking water criteria.

b - Non-Residential drinking water criteria.

c - Groundwater surface water interface.

U - Not present at or above the associated value.

J - Estimated concentration.

UJ - Estimated reporting limit

R - Rejected.

feet AMSL - feet above mean sea level

feet bgs - feet below ground surface

TABLE 3

SUMMARY OF
VAS ANALYTICAL RESULTS FOR SELECTED MONITORING WELL INTERVALS
12th STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN

Sample Location					MW-101S	MW-101D	MW-102S	MW-102D	MW-102D	MW-103D
Sample Identification					*VAS-56393-111010-DD-010*	*VAS-56393-110910-DD-001*	*VAS-56393-112210-DD-107*	*VAS-56393-112210-DD-098*	*VAS-56393-112210-DD-099*	*VAS-56393-111910-DD-087*
Sample Date					*11/10/2010*	*11/9/2010*	*11/22/2010*	*11/22/2010*	*11/22/2010*	*11/19/2010*
Sample Elevation (feet AMSL)					695.35 - 690.35	665.33 - 660.33	699.18 - 694.18	664.43 - 659.43	664.43 - 659.43	675.37 - 670.37
Screen Depth (feet bgs)					39-44	69-74	5-10	40-45	40-45	29-34
Sample Type	*Groundwater Cleanup Criteria* [1]									
	Units	*a*	*b*	*c*						
Metals										
Aluminum	µg/L	50	50	-	**2210**[ab]	**2390**[ab]	**2190**[ab]	**5350**[ab]	**6240**[ab]	**6030**[ab]
Antimony	µg/L	6	6	130	0.162	0.744 J	0.148 J	0.240 J	0.236 J	0.162 J
Arsenic	µg/L	10	10	10	4.9	4.4 J	2.8 J	5.7 J	6.0 J	3.3 J
Barium	µg/L	2000	2000	1400	148	344	141	282	301	195
Beryllium	µg/L	4	4	41	0.239	0.192	0.172	0.525	0.611	0.514
Cadmium	µg/L	5	5	5.1	0.127	0.766	0.084	0.349	0.393	0.302
Chromium	µg/L	100	100	11	**27.3**[f]	**32.5**[f]	**14.7**[f]	**153**[abc]	**165**[abc]	**71.4**[f]
Cobalt	µg/L	40	100	100	7.480	17.5	8.030	17.1	18.3	11.4
Copper	µg/L	1000	1000	23	14.5	**58.0**[f]	8.80	**65.7**[f]	**70.1**[f]	**37.0**[f]
Iron	µg/L	300	300	-	**24100**[ab]	**30500**[ab]	**12300**[ab]	**92100**[ab]	**95400**[ab]	**46100**[ab]
Lead	µg/L	4	4	34	**11.2**[ab]	**17.3**[ab]	**7.300**[ab]	**34.9**[abc]	**38.2**[abc]	**29.1**[ab]
Magnesium	µg/L	400000	1100000	-	52800 J	41400	49800	83400	89100	75300
Manganese	µg/L	50	50	5200	**1150**[ab]	**5280**[abc]	**2990**[ab]	**3270**[ab]	**3500**[ab]	**1150**[ab]
Mercury	µg/L	2	2	0.0013	0.20 U	0.20 U	0.20 U	**0.04 J**[f]	**0.04 J**[f]	**0.04 J**[f]
Nickel	µg/L	100	100	130	21.9	75.5	19.4	52.7	55.9	31.1
Selenium	µg/L	50	50	5	1.0 U	1.0 UJ	R	R	R	1.0 UJ
Silver	µg/L	34	98	0.2	0.020 U	0.028 U	0.020 U	0.068 U	0.078	0.046 U
Sodium	µg/L	120000	350000	-	24100	24400	23200	23400	23100	23600
Thallium	µg/L	2	2	3.7	0.192	0.990	0.161	0.380	0.408	0.177
Vanadium	µg/L	4.5	62	12	**7.92**[a]	**7.64**[a]	**5.56**[a]	**10.8**[a]	**11.8**[a]	**11.2**[a]
Zinc	µg/L	2400	5000	340	42.5	121	38.4	306	**318**[f]	152
PCBs										
Aroclor-1016 (PCB-1016)	µg/L	-	-	-	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Aroclor-1221 (PCB-1221)	µg/L	-	-	-	0.040 U	0.040 U	0.039 U	0.039 U	0.040 U	0.040 U
Aroclor-1232 (PCB-1232)	µg/L	-	-	-	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Aroclor-1242 (PCB-1242)	µg/L	-	-	-	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Aroclor-1248 (PCB-1248)	µg/L	-	-	-	0.020 U	0.020 U	0.040	0.0088 J	0.014 J	0.020
Aroclor-1254 (PCB-1254)	µg/L	-	-	-	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Aroclor-1260 (PCB-1260)	µg/L	-	-	-	0.020 U	0.020 U	0.0086 J	0.0051 J	0.0073 J	0.020 U
Total PCBs	µg/L	0.5	0.5	0.2	ND	ND	0.0486 J	0.0139 J	0.0213 J	0.02

TABLE 3

SUMMARY OF
VAS ANALYTICAL RESULTS FOR SELECTED MONITORING WELL INTERVALS
12th STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN

Sample Location					MW-101S	MW-101D	MW-102S	MW-102D	MW-102D	MW-103D
Sample Identification					*VAS-56393-111010-DD-010*	*VAS-56393-110910-DD-001*	*VAS-56393-112210-DD-107*	*VAS-56393-112210-DD-098*	*VAS-56393-112210-DD-099*	*VAS-56393-111910-DD-087*
Sample Date					*11/10/2010*	*11/9/2010*	*11/22/2010*	*11/22/2010*	*11/22/2010*	*11/19/2010*
Sample Elevation (feet AMSL)					695.35 - 690.35	665.33 - 660.33	699.18 - 694.18	664.43 - 659.43	664.43 - 659.43	675.37 - 670.37
Screen Depth (feet bgs)					*39-44*	*69-74*	*5-10*	*40-45*	*40-45*	*29-34*
Sample Type	*Groundwater Cleanup Criteria* [1]									
	Units	*a*	*b*	*c*						
Volatile Organic Compounds										
Acetone	µg/L	730	2100	1700	R	R	20 U	R	R	R
Benzene	µg/L	5	5	200	0.060 J	0.15 J	0.17 J	0.22 J	0.24 J	0.060 J
Bromobenzene	µg/L	18	50	-	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Bromodichloromethane	µg/L	80	80	ID	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Bromoform	µg/L	80	80	ID	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Bromomethane (Methyl bromide)	µg/L	10	29	35	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
2-Butanone (Methyl ethyl ketone) (MEK)	µg/L	13000	38000	2200	R	R	R	R	R	R
N-Butylbenzene	µg/L	80	230	ID	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Carbon disulfide	µg/L	800	2300	ID	0.50 U	0.11 J	0.10 J	0.23 J	0.25 J	0.50 U
Carbon tetrachloride	µg/L	5	5	45	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Chlorobenzene	µg/L	100	100	25	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Chlorobromomethane	µg/L	-	-	-	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Chloroethane	µg/L	430	1700	1100	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Chloroform (Trichloromethane)	µg/L	80	80	350	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Chloromethane (Methyl chloride)	µg/L	260	1100	ID	0.50 U	0.50 U	0.50 U	0.50 U	0.080 J	0.50 U
2-Chlorotoluene	µg/L	150	420	ID	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
4-Chlorotoluene	µg/L	-	-	-	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Cymene (p-isopropyltoluene)	µg/L				2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
1,2-Dibromo-3-chloropropane (DBCP)	µg/L	0.2	0.2	-	2.0 U	R	2.0 U	2.0 U	2.0 U	2.0 U
Dibromochloromethane	µg/L	80	80	ID	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2-Dibromoethane (Ethylene dibromide)	µg/L	0.05	0.05	5.7	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Dibromomethane	µg/L	80	230	-	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2-Dichlorobenzene	µg/L	600	600	13	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,3-Dichlorobenzene	µg/L	6.6	19	28	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,4-Dichlorobenzene	µg/L	75	75	17	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Dichlorodifluoromethane (CFC-12)	µg/L	1700	4800	ID	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,1-Dichloroethane	µg/L	880	2500	740	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2-Dichloroethane	µg/L	5	5	360	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,1-Dichloroethene	µg/L	7	7	130	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
cis-1,2-Dichloroethene	µg/L	70	70	620	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
trans-1,2-Dichloroethene	µg/L	100	100	1500	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,3-Dichloropropane	µg/L	-	-	-	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2-Dichloropropane	µg/L	5	5	230	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
2,2-Dichloropropane	µg/L	-	-	-	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,1-Dichloropropene	µg/L	-	-	-	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
cis-1,3-Dichloropropene	µg/L				0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
trans-1,3-Dichloropropene	µg/L	-	-	-	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U

TABLE 3

SUMMARY OF
VAS ANALYTICAL RESULTS FOR SELECTED MONITORING WELL INTERVALS
12th STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN

Sample Location					*MW-101S*	*MW-101D*	*MW-102S*	*MW-102D*	*MW-102D*	*MW-103D*
Sample Identification					*VAS-56393-111010-DD-010*	*VAS-56393-110910-DD-001*	*VAS-56393-112210-DD-107*	*VAS-56393-112210-DD-098*	*VAS-56393-112210-DD-099*	*VAS-56393-111910-DD-087*
Sample Date					*11/10/2010*	*11/9/2010*	*11/22/2010*	*11/22/2010*	*11/22/2010*	*11/19/2010*
Sample Elevation (feet AMSL)					695.35 - 690.35	665.33 - 660.33	699.18 - 694.18	664.43 - 659.43	664.43 - 659.43	675.37 - 670.37
Screen Depth (feet bgs)					39-44	69-74	5-10	40-45	40-45	29-34
Sample Type	*Groundwater Cleanup Criteria* [1]									
	Units	*a*	*b*	*c*						
Ethylbenzene	µg/L	74	74	18	0.50 U	0.090 J	0.060 J	0.23 J	0.22 J	0.50 U
Hexachlorobutadiene	µg/L	15	42	0.053	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
2-Hexanone	µg/L	1000	2900	ID	20 U	20 U	20 U	20 U	20 U	20 U
Isopropyl benzene	µg/L	800	2300	28	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
4-Methyl-2-pentanone (MIBK)	µg/L	1800	5200	ID	R	20 U	20 U	20 U	20 U	20 U
Methylene chloride	µg/L	5	5	1500	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Naphthalene	µg/L	520	1500	11	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
N-Propylbenzene	µg/L	80	230	ID	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
2-Phenylbutane (sec-Butylbenzene)	µg/L	80	230	ID	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Styrene	µg/L	100	100	80	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
tert-Butylbenzene	µg/L	80	230	ID	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
1,1,2,2-Tetrachloroethane	µg/L	8.5	35	78	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,1,1,2-Tetrachloroethane	µg/L	77	320	ID	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Tetrachloroethene	µg/L	5	5	60	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Toluene	µg/L	790	790	270	1.8	0.40 J	0.29 J	0.66	0.70	0.16 J
1,2,4-Trichlorobenzene	µg/L	70	70	99	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
1,2,3-Trichlorobenzene	µg/L	-	-	-	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
1,1,1-Trichloroethane	µg/L	200	200	89	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,1,2-Trichloroethane	µg/L	5	5	330	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Trichloroethene	µg/L	5	5	200	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Trichlorofluoromethane (CFC-11)	µg/L	2600	7300	-	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2,3-Trichloropropane	µg/L	42	120	-	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2,4-Trimethylbenzene	µg/L	63	63	17	2.0 U	0.080 J	2.0 U	0.12 J	0.14 J	2.0 U
1,3,5-Trimethylbenzene	µg/L	72	72	45	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Vinyl chloride	µg/L	2	2	13	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
o-Xylene	µg/L	280	280	41	0.50 U	0.50 U	0.50 U	0.090 J	0.11 J	0.50 U
m&p-Xylenes	µg/L	-	-	-	0.50 U	0.15 J	0.10 J	0.23 J	0.26 J	0.50 U
Field Parameters										
Conductivity, field	mS/cm	-	-	-	0.674	0.690	0.832	0.662	0.662	0.628
Dissolved oxygen (DO), field	mg/L	-	-	-	--	0.59	5.52	0.09	0.09	0.53
Oxidation reduction potential (ORP), field	millivolts	-	-	-	-164	-357	37	-147	-147	-133
pH, field	s.u.	6.5 - 8.5	6.5 - 8.5	-	7.21	7.21	7.68	7.85	7.85	7.33
Temperature, field	Deg C	-	-	-	15.45	14.76	14.51	14.62	14.62	9.1
Turbidity, field	NTU	-	-	-	211	1000 U	1000 U	1000 U	1000 U	1000 U

TABLE 3

SUMMARY OF
VAS ANALYTICAL RESULTS FOR SELECTED MONITORING WELL INTERVALS
12th STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN

Sample Location					*MW-104S*	*MW-104D*	*MW-105S*	*MW-105D*	*MW-106S*
Sample Identification					*VAS-56393-111610-DD-047*	*VAS-56393-111510-DD-036*	*VAS-56393-111610-DD-054*	*VAS-56393-111510-DD-034*	*VAS-56393-111510-DD-033*
Sample Date					*11/16/2010*	*11/15/2010*	*11/16/2010*	*11/15/2010*	*11/15/2010*
Sample Elevation (feet AMSL)					*683.86 - 678.86*	*663.48 - 658.48*	*697.89 - 692.89*	*662.78 - 657.78*	*699.88 - 694.88*
Screen Depth (feet bgs)					*20-25*	*40-45*	*7-12*	*42-47*	*4-9*
Sample Type	*Groundwater Cleanup Criteria* [1]								
	Units	*a*	*b*	*c*					
Metals									
Aluminum	µg/L	50	50	-	**4080**[ab]	**3090**[ab]	**3730**[ab]	**5060**[ab]	**1110**[ab]
Antimony	µg/L	6	6	130	0.163 J	0.184	0.074	0.160	0.124 U
Arsenic	µg/L	10	10	10	5.4 J	3.5	3.0	7.7	**18.3**[ab]
Barium	µg/L	2000	2000	1400	164	142	177	204	693
Beryllium	µg/L	4	4	41	0.373	0.202	0.282	0.430	0.102
Cadmium	µg/L	5	5	5.1	0.276	0.139	0.181	0.237	0.084 U
Chromium	µg/L	100	100	11	**27.7**[c]	**73.4**[c]	**11.5**[c]	**59.2**[c]	6.62 U
Cobalt	µg/L	40	100	100	11.6	5.670	6.180	8.440	2.210
Copper	µg/L	1000	1000	23	**25.7**[c]	**28.2**[c]	12.6	**27.9**[c]	6.81 U
Iron	µg/L	300	300	-	**32300**[ab]	**26000**[ab]	**19800**[ab]	**37800**[ab]	**29000**[ab]
Lead	µg/L	4	4	34	**22.5 J**[ab]	**8.920**[ab]	**15.4**[ab]	**24.5**[ab]	4.050 U
Magnesium	µg/L	400000	1100000	-	55700	43900	42300	81900	38000
Manganese	µg/L	50	50	5200	**1090**[ab]	**798**[ab]	**956**[ab]	**1180**[ab]	**979**[ab]
Mercury	µg/L	2	2	0.0013	**0.05 J**[c]	**0.02 J**[c]	**0.05 J**[c]	**0.10 J**[c]	**0.04 J**[c]
Nickel	µg/L	100	100	130	24.9	25.1	14.6	25.3	5.37
Selenium	µg/L	50	50	5	1.0 UJ	1.0 U	1.0 U	1.0 U	1.0 U
Silver	µg/L	34	98	0.2	0.025 U	0.035 U	0.020 U	0.043 U	0.031 U
Sodium	µg/L	1200000	3500000	-	24000	24600	23600	22100	18000
Thallium	µg/L	2	2	3.7	0.164	0.098	0.104	0.127	0.020 U
Vanadium	µg/L	4.5	62	12	**11.4**[a]	**6.62**[a]	**7.19**[a]	**10.4**[a]	3.27
Zinc	µg/L	2400	5000	310	134	239	50.7	78.4	14.2
PCBs									
Aroclor-1016 (PCB-1016)	µg/L	-	-	-	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Aroclor-1221 (PCB-1221)	µg/L	-	-	-	0.040 U	0.040 U	0.039 U	0.040 U	0.039 U
Aroclor-1232 (PCB-1232)	µg/L	-	-	-	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Aroclor-1242 (PCB-1242)	µg/L	-	-	-	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Aroclor-1248 (PCB-1248)	µg/L	-	-	-	0.0059 J	0.029	0.027	0.018 J	0.020 U
Aroclor-1254 (PCB-1254)	µg/L	-	-	-	0.020 U	0.020 U	0.020 U	0.020 U	0.075
Aroclor-1260 (PCB-1260)	µg/L	-	-	-	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Total PCBs	µg/L	0.5	0.5	0.2	0.0059 J	0.029	0.027	0.018 J	0.075

TABLE 3

SUMMARY OF
VAS ANALYTICAL RESULTS FOR SELECTED MONITORING WELL INTERVALS
12th STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN

Sample Location					*MW-104S*	*MW-104D*	*MW-105S*	*MW-105D*	*MW-106S*
Sample Identification					*VAS-56393-111610-DD-047*	*VAS-56393-111510-DD-036*	*VAS-56393-111610-DD-054*	*VAS-56393-111510-DD-034*	*VAS-56393-111510-DD-033*
Sample Date					*11/16/2010*	*11/15/2010*	*11/16/2010*	*11/15/2010*	*11/15/2010*
Sample Elevation (feet AMSL)					*683.86 - 678.86*	*663.48 - 658.48*	*697.89 - 692.89*	*662.78 - 657.78*	*699.88 - 694.88*
Screen Depth (feet bgs)					*20-25*	*40-45*	*7-12*	*42-47*	*4-9*
Sample Type	*Groundwater Cleanup Criteria* [1]								
	Units	*a*	*b*	*c*					
Volatile Organic Compounds									
Acetone	µg/L	730	2100	1700	R	R	R	R	R
Benzene	µg/L	5	5	200	0.093 J	0.50 U	0.50 U	0.50 U	0.50 U
Bromobenzene	µg/L	18	50	-	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Bromodichloromethane	µg/L	80	80	ID	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Bromoform	µg/L	80	80	ID	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Bromomethane (Methyl bromide)	µg/L	10	29	35	0.50 U	0.50 UJ	0.50 U	0.50 UJ	0.50 UJ
2-Butanone (Methyl ethyl ketone) (MEK)	µg/L	13000	38000	2200	R	R	R	R	R
N-Butylbenzene	µg/L	80	230	ID	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Carbon disulfide	µg/L	800	2300	ID	0.50 U	0.18 J	0.50 U	0.14 J	0.50 U
Carbon tetrachloride	µg/L	5	5	45	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Chlorobenzene	µg/L	100	100	25	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Chlorobromomethane	µg/L	-	-	-	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Chloroethane	µg/L	430	1700	1100	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Chloroform (Trichloromethane)	µg/L	80	80	350	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Chloromethane (Methyl chloride)	µg/L	260	1100	ID	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
2-Chlorotoluene	µg/L	150	420	ID	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
4-Chlorotoluene	µg/L	-	-	-	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Cymene (p-Isopropyltoluene)	µg/L				2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
1,2-Dibromo-3-chloropropane (DBCP)	µg/L	0.2	0.2	-	R	R	R	R	R
Dibromochloromethane	µg/L	80	80	ID	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2-Dibromoethane (Ethylene dibromide)	µg/L	0.05	0.05	5.7	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Dibromomethane	µg/L	80	230	-	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2-Dichlorobenzene	µg/L	600	600	13	0.50 UJ	0.50 U	0.50 UJ	0.50 U	0.50 U
1,3-Dichlorobenzene	µg/L	6.6	19	28	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,4-Dichlorobenzene	µg/L	75	75	17	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Dichlorodifluoromethane (CFC-12)	µg/L	1700	4800	ID	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,1-Dichloroethane	µg/L	880	2500	740	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2-Dichloroethane	µg/L	5	5	360	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,1-Dichloroethene	µg/L	7	7	130	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
cis-1,2-Dichloroethene	µg/L	70	70	620	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
trans-1,2-Dichloroethene	µg/L	100	100	1500	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,3-Dichloropropane	µg/L	-	-	-	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2-Dichloropropane	µg/L	5	5	230	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
2,2-Dichloropropane	µg/L	-	-	-	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,1-Dichloropropene	µg/L	-	-	-	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
cis-1,3-Dichloropropene	µg/L				0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
trans-1,3-Dichloropropene	µg/L	-	-	-	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U

TABLE 3

SUMMARY OF
VAS ANALYTICAL RESULTS FOR SELECTED MONITORING WELL INTERVALS
12th STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN

Sample Location					*MW-104S*	*MW-104D*	*MW-105S*	*MW-105D*	*MW-106S*
Sample Identification					*VAS-56393-111610-DD-047*	*VAS-56393-111510-DD-036*	*VAS-56393-111610-DD-054*	*VAS-56393-111510-DD-034*	*VAS-56393-111510-DD-033*
Sample Date					*11/16/2010*	*11/15/2010*	*11/16/2010*	*11/15/2010*	*11/15/2010*
Sample Elevation (feet AMSL)					*683.86 - 678.86*	*663.48 - 658.48*	*697.89 - 692.89*	*662.78 - 657.78*	*699.88 - 694.88*
Screen Depth (feet bgs)					*20-25*	*40-45*	*7-12*	*42-47*	*4-9*
Sample Type	*Groundwater Cleanup Criteria* [1]								
	Units	*a*	*b*	*c*					
Ethylbenzene	µg/L	74	74	18	0.050 J	0.080 J	0.50 U	0.090 J	0.080 J
Hexachlorobutadiene	µg/L	15	42	0.053	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
2-Hexanone	µg/L	1000	2900	ID	20 U	20 U	20 U	20 U	20 U
Isopropyl benzene	µg/L	800	2300	28	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
4-Methyl-2-pentanone (MIBK)	µg/L	1800	5200	ID	20 U	20 U	20 U	20 U	20 U
Methylene chloride	µg/L	5	5	1500	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Naphthalene	µg/L	520	1500	11	2.0 UJ	2.0 U	2.0 UJ	2.0 U	2.0 U
N-Propylbenzene	µg/L	80	230	ID	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
2-Phenylbutane (sec-Butylbenzene)	µg/L	80	230	ID	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Styrene	µg/L	100	100	80	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
tert-Butylbenzene	µg/L	80	230	ID	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
1,1,2,2-Tetrachloroethane	µg/L	8.5	35	78	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,1,1,2-Tetrachloroethane	µg/L	77	320	ID	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Tetrachloroethene	µg/L	5	5	60	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Toluene	µg/L	790	790	270	0.25 J	0.69 U	0.15 J	0.59 U	2.3
1,2,4-Trichlorobenzene	µg/L	70	70	99	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
1,2,3-Trichlorobenzene	µg/L	-	-	-	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
1,1,1-Trichloroethane	µg/L	200	200	89	0.50 U	0.50 U	0.18 J	0.50 U	0.50 U
1,1,2-Trichloroethane	µg/L	5	5	330	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Trichloroethene	µg/L	5	5	200	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Trichlorofluoromethane (CFC-11)	µg/L	2600	7300	-	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2,3-Trichloropropane	µg/L	42	120	-	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2,4-Trimethylbenzene	µg/L	63	63	17	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
1,3,5-Trimethylbenzene	µg/L	72	72	45	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Vinyl chloride	µg/L	2	2	13	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
o-Xylene	µg/L	280	280	41	0.50 U	0.50 U	0.50 U	0.50 U	0.10 J
m&p-Xylenes	µg/L	-	-	-	0.50 U	0.50 U	0.50 U	0.11 J	0.23 J
Field Parameters									
Conductivity, field	mS/cm	-	-	-	0.676	0.706	0.743	0.635	1.205
Dissolved oxygen (DO), field	mg/L	-	-	-	0.68	0.8	0.67	0.61	0.43
Oxidation reduction potential (ORP), field	millivolts	-	-	-	-79	-122	-20	-56	-98
pH, field	s.u.	6.5 - 8.5	6.5 - 8.5	-	7.55	7.38	7.17	7.67	6.64
Temperature, field	Deg C	-	-	-	10.33	12.52	11.12	10.95	11.87
Turbidity, field	NTU	-	-	-	1000 U	1000 U	1000 U	1000 U	134

TABLE 3

SUMMARY OF
VAS ANALYTICAL RESULTS FOR SELECTED MONITORING WELL INTERVALS
12th STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN

Sample Location					*MW-106D*	*MW-107S*	*MW-108S*	*MW-108D*	*MW-109D*
Sample Identification					*VAS-56393-111110-DD-014*	*VAS-56393-111210-DD-029*	*VAS-56393-111810-DD-076*	*VAS-56393-111710-DD-056*	*VAS-56393-111710-DD-067*
Sample Date					*11/11/2010*	*11/12/2010*	*11/18/2010*	*11/17/2010*	*11/17/2010*
Sample Elevation (feet AMSL)					664.66 - 659.66	694.76 - 689.76	699.32 - 694.32	664.39 - 659.39	685.41 - 680.41
Screen Depth (feet bgs)					39-44	9-14	4-9	39-44	22-27
Sample Type	*Groundwater Cleanup Criteria* [a]								
	Units	*a*	*b*	*c*					
Metals									
Aluminum	µg/L	50	50	-	3040	**2910**[ab]	12.6 U	**2770 J**[ab]	68.2 U
Antimony	µg/L	6	6	136	0.194	0.209	0.089 J	0.166 J	0.069 J
Arsenic	µg/L	10	10	10	7.7	3.4	0.3 J	9.2 J	0.4 J
Barium	µg/L	2000	2000	1400	155	141	88.7	614	75.0
Beryllium	µg/L	4	4	41	0.269	0.285	0.020 U	0.276 J	0.020 U
Cadmium	µg/L	5	5	5.1	0.191	0.212	0.020 U	0.392	0.020 U
Chromium	µg/L	100	100	11	43.4	**41.7**[f]	0.48 U	**62.7 J**[f]	0.81 U
Cobalt	µg/L	40	100	100	5.77	8.360	0.834	16.0	1.410
Copper	µg/L	1000	1000	23	28.4	**27.6**[f]	0.42 U	**38.8 J**[f]	1.19 U
Iron	µg/L	300	300	-	27600	**26600**[ab]	84.8 U	**28000 J**[ab]	**555 J**[ab]
Lead	µg/L	4	4	34	20.9	**16.9**[ab]	0.052 U	**13.0 J**[ab]	0.232 U
Magnesium	µg/L	400000	1100000	-	42300	47000	26400	124000	26100
Manganese	µg/L	50	50	5200	579	**1810**[ab]	**447**[ab]	**3750**[ab]	**398**[ab]
Mercury	µg/L	2	2	0.0013	0.09 J	**0.02 J**[f]	0.20 U	**0.05 J**[f]	0.20 U
Nickel	µg/L	100	100	130	22.6	35.7	3.04	43.8 J	6.16 J
Selenium	µg/L	50	50	5	1.0 U	0.3 J	1.0 UJ	R	R
Silver	µg/L	34	98	0.2	0.041 U	0.020 U	0.020 U	0.020 U	0.020 U
Sodium	µg/L	1200000	3500000	-	40400	23200	21800	57700	22000
Thallium	µg/L	2	2	3.7	0.089	0.296	0.042 J	0.381 J	0.067 J
Vanadium	µg/L	4.3	62	12	8.03	**9.86**[a]	0.24 U	**8.06 J**[a]	0.32 U
Zinc	µg/L	2400	5000	310	69.4	57.9	1.9 U	166	12.2
PCBs									
Aroclor-1016 (PCB-1016)	µg/L	-	-	-	0.020 U	0.020 U	0.020 UJ	0.020 UJ	0.020 UJ
Aroclor-1221 (PCB-1221)	µg/L	-	-	-	0.040 U	0.040 U	0.039 UJ	0.039 UJ	0.039 UJ
Aroclor-1232 (PCB-1232)	µg/L	-	-	-	0.020 U	0.020 U	0.020 UJ	0.020 UJ	0.020 UJ
Aroclor-1242 (PCB-1242)	µg/L	-	-	-	0.020 U	0.020 U	0.020 UJ	0.020 UJ	0.020 UJ
Aroclor-1248 (PCB-1248)	µg/L	-	-	-	0.020 U	0.020 U	0.012 J	0.020 UJ	0.020 UJ
Aroclor-1254 (PCB-1254)	µg/L	-	-	-	0.15	0.020 U	0.020 UJ	0.039 J	0.020 UJ
Aroclor-1260 (PCB-1260)	µg/L	-	-	-	0.020 U	0.020 U	0.020 UJ	0.020 UJ	0.020 UJ
Total PCBs	µg/L	0.5	0.5	0.2	0.15	ND	0.012 J	0.039 J	ND

TABLE 3

SUMMARY OF
VAS ANALYTICAL RESULTS FOR SELECTED MONITORING WELL INTERVALS
12th STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN

Sample Location					*MW-106D*	*MW-107S*	*MW-108S*	*MW-108D*	*MW-109D*
Sample Identification					*VAS-56393-111110-DD-014*	*VAS-56393-111210-DD-029*	*VAS-56393-111810-DD-076*	*VAS-56393-111710-DD-056*	*VAS-56393-111710-DD-067*
Sample Date					*11/11/2010*	*11/12/2010*	*11/18/2010*	*11/17/2010*	*11/17/2010*
Sample Elevation (feet AMSL)					*664.66 - 659.66*	*694.76 - 689.76*	*699.32 - 694.32*	*664.39 - 659.39*	*685.41 - 680.41*
Screen Depth (feet bgs)					*39-44*	*9-14*	*4-9*	*39-44*	*22-27*
Sample Type	*Groundwater Cleanup Criteria* [1]								
	Units	*a*	*b*	*c*					
Volatile Organic Compounds									
Acetone	µg/L	730	2100	1700	R	R	R	R	R
Benzene	µg/L	5	5	200	0.50 U	0.50 U	0.10 J	0.14 J	0.070 J
Bromobenzene	µg/L	18	50	-	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Bromodichloromethane	µg/L	80	80	ID	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Bromoform	µg/L	80	80	ID	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Bromomethane (Methyl bromide)	µg/L	10	29	35	0.50 U	0.50 UJ	0.50 U	0.50 U	0.50 U
2-Butanone (Methyl ethyl ketone) (MEK)	µg/L	13000	38000	2200	R	R	R	R	R
N-Butylbenzene	µg/L	80	230	ID	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Carbon disulfide	µg/L	800	2300	ID	0.50 U	0.50 U	0.50 U	0.13 J	0.50 U
Carbon tetrachloride	µg/L	5	5	45	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Chlorobenzene	µg/L	100	100	25	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Chlorobromomethane	µg/L	-	-	-	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Chloroethane	µg/L	430	1700	1100	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Chloroform (Trichloromethane)	µg/L	80	80	350	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Chloromethane (Methyl chloride)	µg/L	260	1100	ID	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
2-Chlorotoluene	µg/L	150	420	ID	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
4-Chlorotoluene	µg/L	-	-	-	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Cymene (p-Isopropyltoluene)	µg/L				2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
1,2-Dibromo-3-chloropropane (DBCP)	µg/L	0.2	0.2	-	R	R	2.0 U	R	2.0 U
Dibromochloromethane	µg/L	80	80	ID	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2-Dibromoethane (Ethylene dibromide)	µg/L	0.05	0.05	5.7	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Dibromomethane	µg/L	80	230	-	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2-Dichlorobenzene	µg/L	600	600	13	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,3-Dichlorobenzene	µg/L	6.6	19	28	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,4-Dichlorobenzene	µg/L	75	75	17	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Dichlorodifluoromethane (CFC-12)	µg/L	1700	4800	ID	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,1-Dichloroethane	µg/L	880	2500	740	0.50 U	0.50 U	0.50 U	0.16 J	0.50 U
1,2-Dichloroethane	µg/L	5	5	360	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,1-Dichloroethene	µg/L	7	7	130	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
cis-1,2-Dichloroethene	µg/L	70	70	620	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
trans-1,2-Dichloroethene	µg/L	100	100	1500	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,3-Dichloropropane	µg/L	-	-	-	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2-Dichloropropane	µg/L	5	5	230	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
2,2-Dichloropropane	µg/L	-	-	-	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,1-Dichloropropene	µg/L	-	-	-	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
cis-1,3-Dichloropropene	µg/L				0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
trans-1,3-Dichloropropene	µg/L	-	-	-	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U

TABLE 3

SUMMARY OF
VAS ANALYTICAL RESULTS FOR SELECTED MONITORING WELL INTERVALS
12th STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN

Sample Location					MW-106D	MW-107S	MW-108S	MW-108D	MW-109D
Sample Identification					*VAS-56393-111110-DD-014*	*VAS-56393-111210-DD-029*	*VAS-56393-111810-DD-076*	*VAS-56393-111710-DD-056*	*VAS-56393-111710-DD-067*
Sample Date					*11/11/2010*	*11/12/2010*	*11/18/2010*	*11/17/2010*	*11/17/2010*
Sample Elevation (feet AMSL)					*664.66 - 659.66*	*694.76 - 689.76*	*699.32 - 694.32*	*664.39 - 659.39*	*685.41 - 680.41*
Screen Depth (feet bgs)					*39-44*	*9-14*	*4-9*	*39-44*	*22-27*
Sample Type	*Groundwater Cleanup Criteria* [10]								
	Units	*a*	*b*	*c*					
Ethylbenzene	µg/L	74	74	18	0.50 U	0.50 U	0.080 J	0.11 J	0.50 U
Hexachlorobutadiene	µg/L	15	42	0.053	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
2-Hexanone	µg/L	1000	2900	ID	20 U	20 U	20 U	20 U	20 U
Isopropyl benzene	µg/L	800	2300	28	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
4-Methyl-2-pentanone (MIBK)	µg/L	1800	5200	ID	20 U	20 U	20 U	20 U	R
Methylene chloride	µg/L	5	5	1500	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Naphthalene	µg/L	520	1500	11	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
N-Propylbenzene	µg/L	80	230	ID	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
2-Phenylbutane (sec-Butylbenzene)	µg/L	80	230	ID	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Styrene	µg/L	100	100	80	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
tert-Butylbenzene	µg/L	80	230	ID	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
1,1,2,2-Tetrachloroethane	µg/L	8.5	35	78	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,1,1,2-Tetrachloroethane	µg/L	77	320	ID	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Tetrachloroethene	µg/L	5	5	60	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Toluene	µg/L	790	790	270	0.50 U	0.50 U	0.26 J	0.44 J	0.14 J
1,2,4-Trichlorobenzene	µg/L	70	70	99	2.0 UJ	2.0 U	2.0 U	2.0 UJ	2.0 U
1,2,3-Trichlorobenzene	µg/L	-	-	-	2.0 UJ	2.0 U	2.0 U	2.0 UJ	2.0 U
1,1,1-Trichloroethane	µg/L	200	200	89	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,1,2-Trichloroethane	µg/L	5	5	330	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Trichloroethene	µg/L	5	5	200	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Trichlorofluoromethane (CFC-11)	µg/L	2600	7300	-	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2,3-Trichloropropane	µg/L	42	120	-	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2,4-Trimethylbenzene	µg/L	63	63	17	2.0 U	2.0 U	2.0 U	0.070 J	2.0 U
1,3,5-Trimethylbenzene	µg/L	72	72	45	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Vinyl chloride	µg/L	2	2	13	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
o-Xylene	µg/L	280	280	41	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
m&p-Xylenes	µg/L	-	-	-	0.50 U	0.50 U	0.11 J	0.15 J	0.50 U
Field Parameters									
Conductivity, field	mS/cm	-	-	-	0.785	0.777	0.751	0.966	0.701
Dissolved oxygen (DO), field	mg/L	-	-	-	1.26	0.67	3.24	0.33	1.39
Oxidation reduction potential (ORP), field	millivolts	-	-	-	23	37	9	-125	-1
pH, field	s.u.	6.5 - 8.5	6.5 - 8.5	-	7.79	7.63	7.55	7.28	7.35
Temperature, field	Deg C	-	-	-	12.76	14.62	11.2	10.9	12.11
Turbidity, field	NTU	-	-	-	1000 U	157	2.45	1000 U	26.9

TABLE 3

SUMMARY OF
VAS ANALYTICAL RESULTS FOR SELECTED MONITORING WELL INTERVALS
12th STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN

Sample Location				*MW-101S*	*MW-101D*	*MW-102S*
Sample Identification				*VAS-56393-111010-DD-010*	*VAS-56393-110910-DD-001*	*VAS-56393-112210-DD-107*
Sample Date				*11/10/2010*	*11/9/2010*	*11/22/2010*
Sample Elevation (feet AMSL)				*695.35 - 690.35*	*665.33 - 660.33*	*699.18 - 694.18*
Screen Depth (feet bgs)				*39-44*	*69-74*	*5-10*
Sample Type						
	Groundwater Cleanup Criteria [1]					
	Units	*a*	*b*	*c*		

Notes:

Michigan Act 451, Part 201 Cleanup Criteria and Part 213 Risk-based Screening Levels: Residential and Non-Residential Generic Cleanup Criteria [1]

(1) Cleanup criteria identified by MDEQ RRD Op Memo No. 1, updated 3/25/2011, pursuant to 1994 PA 451 as amended.

a - Residential drinking water criteria.

b - Non-Residential drinking water criteria.

c - Groundwater surface water interface

U - Not present at or above the associated value

J - Estimated concentration

UJ - Estimated reporting limit.

R - Rejected.