



# MEMO

**To:** Mr. Chris Black, U.S. EPA  
**From:** Mr. Francis Biehl, PE and Mr. Michael J. Friedhoff, CPG  
**CC:** Mr. Grant Trigger, RACER Trust; Mr. David Favero, RACER Trust  
**Date:** March 12, 2014

**Project #:** R2330012  
**Re:** RACER Van Buren Landfill Site – Phase II Site Investigation

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The Mannik & Smith Group, Inc. (MSG) has been performing site investigation activities at the Van Buren Landfill (VBL) Property located northeast of the Ecorse Road / Michigan Avenue intersection in Van Buren Township, Wayne County, Michigan (Site) on behalf of Revitalizing Auto Communities Environmental Response (RACER) Trust. These activities are being performed to ensure compliance with the Executed Performance-based Voluntary Agreement dated September 30, 2011 between the United States Environmental Protection Agency (USEPA) and RACER Trust. *Figure 1, Site Location Map*, depicts the location of the Site relative to nearby roads and major topographic features.

Two completed phases of this investigation were documented in the report "Phase IA Site Investigation", dated February 19, 2013 and the memo "RACER Van Buren Landfill Site – Phase IB Site Investigation" submitted to you on October 7, 2013. The Phase IB Site Investigation memo was resubmitted to you on November 20, 2013 after revisions were made in accordance with your review comments. Recommendations for a third phase of the investigation were provided in the Phase IB Site Investigation memo since the first two phases did not fully address "the migration of all ground water known or reasonably suspected to be contaminated with hazardous wastes or hazardous constituents above acceptable levels is stabilized to remain with any designated at the time of the demonstration" criteria that is a part of RCRA Corrective Action Environmental Indicator (EI) CA750 Migration of Contaminated Ground Water Under Control which is required to be submitted by June 30, 2015 pursuant to an agreed upon extension to the original date included in the Executed Performance-based Voluntary Agreement.

An additional benzene delineation scope of work was proposed as part of this third phase of investigation in a separate Memo "2013 Phase I Benzene Delineation Scope of Work" submitted to you on October 31, 2013. This scope of work was prepared based on correspondence between RACER and the USEPA during the RACER VBL 2014 Scope and Budget Review meeting on October 24, 2013 and subsequent correspondence on the topic between RACER and MSG on Friday, October 25, 2013 regarding the identification of benzene in ground water at monitoring well MW-10 at concentrations above Michigan Part 201 Drinking Water criteria. The scope of work was prepared to support the USEPA's goal of delineating the benzene impacted ground water and to investigate the potential for a source area within the landfill.

## PHASE II INVESTIGATION SCOPE OF WORK

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The scope of work for the Phase II investigation associated with delineation of offsite ground water contaminant migration exceedances consisted of the advancement of soil borings, installation of temporary monitoring wells and collection of ground water samples at locations along the northern perimeter of the Site just inside the property line or within the Michigan Department of Transportation Right-of-Way (MDOT ROW) on either the west side of Michigan Avenue or on the north and south sides of Ecorse Road.

Eleven (11) soil borings (SB-13, SB-14, SB-15 and SB-21 through SB-28) were advanced to a depth of at least 13.3-feet below ground surface (bgs) to collect ground water samples from temporary monitoring wells installed at each soil boring

location. Soil boring, temporary monitoring well installation and ground water collection activities occurred from December 4 through 11, 2013.

The Phase II investigation scope of work for the benzene delineation consisted of the advancement of six (6) soil borings (SB-29 through SB-34) to depths ranging from 25.0 to 30.0 feet below ground surface (bgs) and the associated collection of one soil/waste sample, the installation of temporary monitoring wells and the collection of ground water samples. Soil boring, soil/waste sample collection, temporary monitoring well installation and ground water collection activities occurred from December 3 through 13, 2013. The soil boring and associated temporary monitoring wells were placed at approximately 200-foot spacing to the south of monitoring well MW-10. Soil borings SB-21 and SB-22 which were approximately 200 feet west and east, respectively of MW-10 were also used in support of the benzene delineation scope in addition to their use for the offsite ground water contaminant migration exceedance delineation scope. One permanent monitoring well MW-13 was installed at SB-33 to obtain water level measurements in support of and to supplement future updates to Ground Water Elevation Contour Maps prepared for the Site.

The third and final part of the Phase II investigation consisted of continuous soil sampling to a depth of 20 feet below the top of the lacustrine clay layer (or 35 to 40 feet bgs) from soil borings SB-15, SB-23 and SB-26. One undisturbed Shelby tube sample was also collected from the lacustrine clay layer in each of the three borings and submitted to MSG's geotechnical laboratory for soil classification in accordance with ASTM D2487 (which in turn included soil particle size analysis via the hydrometer method ASTM D422 and Atterberg Limits testing via D4318) and hydraulic conductivity in accordance with ASTM D5084.

The Phase II investigation was performed in general accordance with the United States Environmental Protection Agency (USEPA) approved Sampling and Analysis Plan (SAP) and Quality Assurance Project Plan (QAPP), dated June 2012. Soil boring and associated temporary monitoring well locations are illustrated on *Figure 2, Site Schematic*.

In addition to the Phase II investigation efforts, a third round of quarterly ground water sampling and analysis occurred in November of 2013 with sampling performed between November 12 and November 14, 2013. As in the August 2013 ground water sampling event, total metals were collected in addition to dissolved metals for comparison purposes to confirm metals content in dissolved phase versus the amount present in the particulates in the samples.

## GEOLOGY

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Soil boring and monitoring well construction logs for this phase of the project are contained in *Attachment 1, Soil Boring and Monitoring Well Logs*, and their locations illustrated on *Figure 2*. Soil borings conducted within the MDOT ROW for this phase of the project including SB-13, SB-14, SB-15 and SB-24 through SB-27, as well as SB-28 (which was shifted from its proposed location within the MDOT ROW north to just within the property line due to subsurface utility interferences) confirmed the local geologic conditions determined during the Phase 1A and 1B investigation with the soil profile generally consisting of silty fine to coarse grained sand and gravel overlying a silty clay deposit which was encountered at depths ranging from 9.2 to 17.0 feet bgs.

Loose, brown to black silty fine to medium sand and/or brown to black sandy clay intermixed with fill including bricks, wood fragments, glass, concrete, paper, slag, generic municipal waste, plastic and metal fragments was encountered overlying the lacustrine silty clay deposit in those borings that were a part of the benzene delineation scope and which were located inside of the former landfill perimeter, based on the extent of earth disturbance illustrated on the April 26, 1970 aerial photograph of the Site. The lacustrine clay deposit in these borings was encountered at depths ranging from 21.0 to 23.4 feet bgs.

As noted in the Phase 1B memo, our review of historical water supply well logs within approximately one mile of the site indicates that the regional geology consists of approximately 70 to 80 feet of lacustrine clay deposits underlain by approximately 8 to 13 feet of sand and gravel deposits which in turn are underlain by bedrock (noted as being approximately 90 to 97 feet bgs). Due to the concern of vertical fracturing in the lacustrine clay deposit, soil borings SB-15, SB-23 and SB-26 were extended twenty (20) feet into this layer to confirm the existence and assess the competency and hydraulic conductivity of the clay underlying the impacted sand layer. Photographs of the samples collected from the lacustrine clay layer are presented in *Attachment 2, Lacustrine Clay Layer Photographs*. The results of geotechnical laboratory testing performed on undisturbed Shelby tube samples collected from the clay are included in *Attachment 3, Geotechnical Laboratory Testing Results*. The results indicate that the samples collected consisted of a "lean clay" in accordance with ASTM D2487

with an average permeability (of the three samples) of  $3.10 \times 10^{-8}$  cm/sec. Vertical fractures were not present in any of the samples collected from soil borings SB-15, SB-23 or SB-26.

## SOIL / WASTE SAMPLE RESULTS

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Continuous soil sampling was performed at soil boring locations SB-21 and SB-22 and SB-29 through SB-34 to specifically address the detection of benzene in previous ground water samples collected from MW-10. The portion of the continuous soil sample which appeared to be most significantly impacted based on PID readings and sensory observations was submitted to ALS Global for analytical testing. Soil sample analytical results are summarized in *Table 2, Summary of Soil Sample Analytical Results*. Soil sample laboratory analytical results that exceed Michigan Part 201 Drinking Water Protection (DWP) and / or Ground Water Surface Water Interface (GSI) Protection Criteria (recently revised in accordance with Part 201 Administrative Rules released on December 30, 2013) are presented and illustrated on *Figure 3, Summary of Soil Sample Exceedances*. Soil sample laboratory analytical results are included in Attachment 4, *Laboratory Analytical Data Reports*.

Based on a review of the soil / waste sample laboratory analytical results as indicated in Table 2 and Figure 3, the soil samples from SB-29 and SB-34 contained exceedances for benzene above Michigan Part 201 Non-residential DWP criteria and Soil Vapor Intrusion (SVI) concentration screening levels which while not currently applicable could become so if buildings are constructed on the site in the future. Soil samples from SB-21 and SB-33 contained exceedances for benzene above Michigan Part 201 SVI concentration screening levels. The soil sample from SB-21 and SB-34 also contained ethylbenzene and xylenes above Michigan Part 201 DWP and Ground Water / Surface Water Interface Protection (GSIP) criteria and/or SVI concentration screening levels and the soil sample from SB-21 contained 1,2-Dichlorobenzene above Michigan Part 201 GSIP criteria.

Soil sample analytical results from SB-30, SB-31 and SB-34 also contained tetrachloroethene above Michigan Part 201 Non-residential DWP and GSIP criteria and/or SVI concentration screening levels. The soil sample from SB-21 also contained cis-1,2 dichloroethene above Michigan Part 201 GSIP.

Soil sample analytical results from SB-29 contained fluoranthene and phenanthrene, SB-30 contained naphthalene and SB-34 contained naphthalene and phenanthrene above Michigan Part 201 Non-residential GSIP criteria.

Soil sample analytical results from SB-21, SB-29 and SB-32 contained multiple metals exceeding Michigan Part 201 Non-residential DWP and GSIP criteria, as listed on Table 2 and depicted on Figure 3. Soil sample analytical results from SB-22 and SB-23 contained selenium exceeding Michigan Part 201 Non-residential GSIP criteria and SB-22 contained iron exceeding Michigan Part 201 Non-residential DWP criteria.

## HYDROGEOLOGY

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Hydraulic monitoring data were collected on November 12, 2013 from all monitoring wells prior to the start of ground water sampling. Based on the November 12, 2013 data, ground water appears to flow from a local ground water high in the central portion of the Site towards both the northwest and to the east / southeast, which is similar to recent ground water monitoring events in May and August 2013. A summary of the Site monitoring well construction and monitoring data is included in *Table 1, Monitoring Well Construction and Monitoring Data*. Additional information including Site soil boring and monitoring well construction logs are provided in *Attachment 1*. Ground water elevation contours and ground water flow from the November 12, 2013 ground water hydraulic monitoring data are illustrated on *Figure 4, Ground Water Elevation Contour Map* (November 12, 2013 Data), for the monitoring wells around the Site perimeter.

The surface water level at the location SW-2 in the southeast portion of the site where surface water appears to collect and pond on a seasonal, intermittent basis was dry during the November 2013 ground water sampling event. The locations where seep samples SW-1 and SW-3 have been collected during a previous sampling event were also dry.

## NOVEMBER 2013 GROUND WATER SAMPLE RESULTS

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Ground water samples were collected from MW-1 and MW-3 though MW-12 during the November 2013 quarterly ground water sampling event in general accordance with *USEPA Low-flow (Minimal Drawdown) Ground-Water Sampling Procedures* and the Site SAP/QAPP. Ground water samples were analyzed for VOCs, SVOCs, amenable cyanide and total and dissolved metals. Ground water sample analytical results are summarized in *Table 3, Summary of Ground Water Sample Laboratory*

Analytical Data and illustrated on Figure 5, *Summary of Ground Water Sample Exceedances*. Detailed ground water sample analytical results can be found in Attachment 4 *Laboratory Analytical Data Reports*. Surface water sample locations SW-1 through SW-3 were dry during the November 2013 ground water sampling event.

In summary, the ground water sample analytical results from the November 2013 event were very similar to previous quarterly ground water sampling results. In addition, the results for the total/unfiltered and dissolved/filtered metals analyses were very similar as well (excluding the results for Aluminum). The results indicate that ground water samples collected to date from wells along the northern and western perimeter of the Site (monitoring wells MW-1, MW-5 and MW-9) have exceedances for arsenic, barium and iron above Michigan Part 201 Non-residential health-based DW and/or GSI criteria. The ground water sample from monitoring well MW-10 (also on the northern Site perimeter) contained exceedances for barium and iron above Michigan Part 201 Non-residential DW criteria and, the only volatile organic compound (VOC) exceedances, benzene and chlorobenzene, above Michigan Part 201 Non-residential DW and GSI criteria, respectively. On the southern portion of the Site, ground water samples from monitoring wells MW-4, MW-6, MW-8 and MW-12 have exceedances for iron above Michigan Part 201 Non-residential health-based DW criteria and MW-12 has exceedances for barium above Michigan Part 201 GSI criteria. The ground water samples from monitoring wells MW-3 and MW-11 contained no exceedances above Michigan Part 201 Non-residential health-based criteria during the November 2013 ground water sampling event.

## **SITE INVESTIGATION-PHASE II GROUND WATER SAMPLE RESULTS**

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During Phase II of the Site Investigation, ground water samples were collected from temporary wells from within the sand layer at soil boring locations SB-13 through SB-15 and SB-21 thru SB-34. Ground water samples from SB-21 through SB-23 and SB-29 through SB-34 were collected to specifically address the detection of benzene in previous ground water samples collected from MW-10. Temporary wells were installed within each soil boring and constructed of 1.5-inch diameter Schedule 40 polyvinyl chloride (PVC) casing with either a 5-foot long or 10-foot long 0.010-inch slotted (10-slot) 1.5-inch diameter PVC well screen. Ground water samples were collected from each soil boring location through the temporary well using a properly decontaminated Geotech® 0.85-inch diameter stainless steel bladder pump, a Teflon® bladder and Teflon®-lined polyethylene tubing. Ground water samples were analyzed for VOCs, SVOCs, amenable cyanide and total and dissolved metals. Dissolved metals ground water samples were collected using a 0.45-um in-line filter. Ground water sample analytical results are summarized in *Table 3* and illustrated on Figure 5. Detailed ground water sample analytical results can be found in Attachment 4.

In summary, the ground water sample analytical results from SB-13 through SB-15, along the west side of Michigan Avenue, contained no exceedances above Michigan Part 201 Non-residential health-based criteria. Ground water sample analytical results from SB-24 through SB-28, south of the Site along Ecorse Road, only have exceedances for arsenic and cyanide in the ground water sample from SB-26 above Michigan Part 201 Non-residential health-based Drinking Water (DW) and/or GSI criteria and an exceedance of iron in the ground water sample from SB-27 above Michigan Part 201 Non-residential health-based DW criteria. It should be noted that the duplicate ground water sample from SB-27 contained no exceedances above Michigan Part 201 Non-residential health-based criteria.

Ground water sample analytical results from SB-21 through SB-23, along the northern perimeter of the Site, have exceedances for barium and iron above Michigan Part 201 Non-residential health-based DW and/or GSI criteria, as well as arsenic in SB-23 above Michigan Part 201 Non-residential health-based DW and GSI criteria and cyanide in SB-21 and SB-23 above Michigan Part 201 Non-residential GSI criteria. The ground water sample from soil boring SB-21 also contained benzene above Michigan Part 201 Non-residential DW criteria. Ground water sample analytical results from SB-29 and SB-30, collected to address the detection of benzene in ground water samples collected from MW-10, contained benzene above Michigan Part 201 Non-residential DW criteria. Ground water sample analytical results from SB-29 through SB-34 all contained iron above Michigan Part 201 Non-residential health-based DW criteria, SB-29, SB-30, SB-32, SB-33 AND SB-34 contained barium above Michigan Part 201 Non-residential health-based DW and/or GSI criteria and SB-29 contained cyanide above Michigan Part 201 Non-residential GSI criteria.

## **SUMMARY AND RECOMMENDATIONS**

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The Phase II Investigation efforts were proposed for the Fall of 2013 to confirm the extent of the ground water exceedances, delineate the benzene impacted ground water and investigate the potential for a source area within the landfill, to confirm the

existence and assess the competency and hydraulic conductivity of the clay underlying the impacted sand layer, and to ensure that sufficient information exists to adequately address the completion of the CA750 document by March 31, 2014.

The ground water sample analytical results from soil boring locations SB-13 through SB-15, along the west side of Michigan Avenue, contained no exceedances above Michigan Part 201 Non-residential health-based criteria. Based on the composition, elevation and thickness of the sand layer encountered at SB-13 through SB-15, it appears this layer was once hydraulically connected to the impacted sand layer encountered at MW-5 and MW-9 which are located on the eastern side slope of Michigan Avenue just west of the RACER property line. Off-site ground water impacts likely terminate along the eastern side slope of Michigan Avenue due to the removal of the sand layer during the road cut or excavation associated with construction of Michigan Avenue (US-12) roadcut. Ground water sample analytical results from soil boring locations SB-24 through SB-28, south of the Site along Ecorse Road, only have exceedances for arsenic and cyanide in the ground water sample from SB-26 (slightly) above Michigan Part 201 Non-residential health-based DW and/or GSI criteria and an exceedance of iron in the ground water sample from SB-27 above Michigan Part 201 health-based DW criteria. It should be noted that the duplicate ground water sample from SB-27 contained no exceedances above Michigan Part 201 Non-residential health-based criteria. Taking into account this information, we propose to install permanent monitoring wells at SB-26, SB-27 and SB-28. In addition to confirming whether the exceedances will occur during ground water sampling from permanent wells in lieu of sampling from temporary wells, ground water elevation measurements at these locations will assist in determining whether these wells are side/upgradient and whether the samples collected from the wells can be considered background samples. The location of these permanent wells, as well as the other elements of the proposed Phase III Investigation, are presented in Figure 6, *Proposed Phase III Investigation*.

Ground water sample analytical results from SB-21 through SB-23, along the northern perimeter of the Site, have exceedances for barium and iron above Michigan Part 201 Non-residential health-based DW and/or GSI criteria, as well as arsenic in SB-23 above Michigan Part 201 Non-residential health-based DW and GSI criteria and cyanide in SB-21 and SB-23 above Michigan Part 201 Non-residential GSI criteria. The "off-site" portion of the delineation on the north side of the site was not completed in full in the Fall of 2013 since the access agreement with the adjacent property owner was not in place at the time. Access agreement negotiations with the adjacent property owner, Harold Smith, are currently ongoing and it is our intent to complete this work very quickly and as part of the Phase III Investigation after the access agreement is in place. To ensure a time-efficient approach to the off-site delineation on the north side, we propose to use a "step out" approach as presented in Figure 6 with rush chemical analysis of ground water samples collected from temporary wells to confirm if permanent wells can be set at the initial proposed sampling locations or whether they will need to be set at the approximate "step out" locations (with each step out row an approximate 200 foot distance from the previous row).

The only Phase II investigation off-site migration effort that was planned for the East side of the Site was the completion of the soil boring and temporary monitoring well at SB-28. As noted above, we propose to install a permanent well at SB-28. Due to the approximate 1,200 foot distance between MW-3 and SB-28 and taking into account the iron exceedance at MW-4 we propose to place another soil boring and associated permanent monitoring well at the site boundary approximately mid-distance between MW-3 and SB-28. Based on a review of the soil / waste sample laboratory analytical results as indicated in Table 2 and Figure 3, the soil samples from SB-29 and SB-34 contained exceedances for benzene above Michigan Part 201 Non-residential DWP criteria and SVI concentration screening levels. Soil samples from SB-21 and SB-33 contained exceedances for benzene above Michigan Part 201 SVI concentration screening levels. The soil sample from SB-21 and SB-34 also contained ethylbenzene and xylenes above Michigan Part 201 Non-residential DWP and GSIP criteria and/or SVI concentration screening levels and the soil sample from SB-21 contained 1,2-Dichlorobenzene above Michigan Part 201 Non-residential GSIP criteria.

The highest concentration of benzene detected in soil / waste samples exceeding Michigan Part 201 Non-residential DWP criteria at the Site was SB-29, followed by SB-21.

Ground water sample analytical results from monitoring well MW-10 and soil borings SB-30, SB-29 and SB-21 contained benzene above Michigan Part 201 DW criteria. Benzene in these ground water samples decreases in concentration from east to west, generally decreasing in concentration down gradient. This is demonstrated at the location of surface water / seep sample SW-3, where benzene was not detected. The ground water sample concentration of benzene in SB-21 (6.7 ug/L) was just above Michigan Part 201 Non-residential DW criteria (5 ug/L), it may be likely that ground water impacts may be below Michigan Part 201 Residential DW criteria off-Site to the north. However this, along with arsenic, barium, iron, cyanide

impacts, will need to be verified with the ground water samples to be collected from proposed soil borings SB-16 through SB-20 on the Harold Smith property (Parcel ID #83-023-99-0005-000).

Based on the ground water elevation contours and flow direction illustrated on Figures 4 and 5, the relative locations of the eight borings performed in support of the benzene delineation (and specifically their locations relative to the location of the old landfill Cells 1 and 2 which are depicted on Figure 6), the analytical results of the soil/waste and ground water samples (from the eight borings) and the depths that these samples were collected, and taking into account results from the Phase 1A and 1B investigations, it is our opinion that benzene impacted ground water has been generally delineated on site with off-site delineation to occur once the access agreement with Mr. Smith is in place. The results also suggest that the potential for at least one source area is likely within the area surrounded by soil borings SB-29, SB-30, SB-32 and SB-33. We are proposing five additional borings within this area following the same protocol provided in the "2013 Phase I Benzene Delineation Scope of Work" Memo dated October 31, 2013 to further delineate the source area(s) (which in turn will be used to evaluate implementation of a single step localized waste excavation or two-step test pit/localized excavation effort (possibly an interim measure)).

We propose to install three additional monitoring wells inside the old landfill to be used for obtaining water level measurements (similar to the one installed at MW-13) and in turn to supplement future updates to Ground Water Elevation Contour Maps prepared for the Site since we believe that the water level contours as currently presented in Figures 4 and 5 are not entirely accurate with the old landfill (with its clay berm perimeter) likely acting as a bathtub with water mounding within the landfill and flowing out in all directions. This information, along with water level measurements obtained from the other wells installed in the Phase III investigation will assist in determining if and where Part 201 GSI criteria are applicable.

The lacustrine clay layer has been encountered and confirmed at approximately the same depth in every soil boring completed thus far in all three phases of the investigation. The existence of this extensive clay layer is not only documented locally but also within the greater general area. Readily available information documenting the extent and hydraulic competency of this layer can be obtained from the MDEQ for multiple currently operating landfills that are located within 5 miles to the east (Republic Sauk Trail Hills and Waste Management Woodland Meadows) 2 miles to the south (EQ Wayne Disposal Inc.) and 10 miles to the north (Advanced Disposal Services Arbor Hills) of the site.

Visual inspection of the samples collected and documented in the photograph log provided in Attachment 2 indicate that vertical fracturing was not encountered, not surprisingly given the geologic process that resulted in the formation of the lacustrine clay layer. The average hydraulic conductivity of  $3.10 \times 10^{-8}$  cm/sec is indicative of the hydraulic conductivity that has been documented within the greater general area including at the aforementioned active landfill sites. Given the approximately ten (10) foot head on the lacustrine clay layer at the site, the time of travel of water within the old landfill (as defined by typical landfill liner time of travel equation such as  $T = nt/[k(1 + h/t)]$  where T is time of travel, n is the porosity, t is the thickness of the clay layer and h is the head on the clay layer) moving vertically through the lacustrine clay layer would be in the approximately 1,000 to 2,000 year range dependent on the actual thickness of the layer (reported to be 70 feet thick), the level of saturation, the specific gravity and the void ratio/porosity.

In summary, MSG proposes to perform this work upon execution of the access agreement with the property owner (Mr. Smith) to the north of the Site and upon permit receipt from MDOT to allow for the installation of permanent wells along the Ecorse Road ROW. We expect these two items to be completed within the next one (1) to two (2) months. We intend to initiate the Phase III on-Site efforts immediately, pending USEPA approval.

TABLES



**Table 1**  
Monitoring Well Construction and Monitoring Data

Van Buren Landfill Site  
Van Buren Township, Wayne County, Michigan

Well ID	Northing (US State Plane NAD83 <sup>1</sup> )	Easting (US State Plane NAD83)	Top of Casing Elevation (feet above MSL <sup>2</sup> )	Ground Surface Elevation (feet above MSL)	Screen Length (feet)	Stickup (feet)	Total Depth of Well from TOC <sup>3</sup> (feet)	Top of Screen Elevation (feet above MSL)	Date	Depth to Water (feet TOC)	Groundwater Elevation (feet above MSL)
MW-1	275,331.04	13,347,841.62	723.83	721.2	10	2.67	21.22	712.61	4/29/2013	10.88	712.95
									8/7/2013	11.63	712.20
									11/14/2013	12.72	711.11
MW-3	274,792.30	13,348,574.41	714.28	711.0	10	3.28	11.52	712.76	4/29/2013	4.25	710.03
									8/7/2013	6.15	708.13
									11/12/2013	6.62	707.66
MW-4	274,332.44	13,348,192.73	723.72	724.3	10	-0.53	21.60	712.12	4/29/2013	10.54	713.18
									8/7/2013	14.00	709.72
									11/12/2013	14.95	708.77
MW-5	275,074.96	13,346,833.88	719.62	719.8	10	-0.18	30.02	699.60	4/29/2013	9.81	709.81
									8/7/2013	11.08	708.54
									11/12/2013	12.02	707.60
MW-6	273,963.47	13,347,317.78	718.47	715.1	10	3.35	16.38	712.09	4/29/2013	5.22	713.25
									8/7/2013	7.30	711.17
									11/13/2013	7.75	710.72
MW-7	274,354.61	13,346,295.14	716.85	717.2	5	-0.34	8.81	713.04	4/29/2013	4.21	712.64
									8/7/2013	5.69	711.16
									11/13/2013	6.80	710.05
MW-8	274,067.17	13,346,770.57	713.36	714.0	5	-0.60	7.51	710.85	4/29/2013	(FLOWING)	>713.36
									8/7/2013	1.73	711.63
									11/12/2013	1.97	711.39
MW-9	274,824.06	13,346,622.78	721.17	721.4	5	-0.19	14.74	711.43	4/29/2013	8.60	712.57
									8/7/2013	9.15	712.02
									11/14/2013	10.35	710.82
MW-10	275,236.53	13,347,440.42	727.87	724.7	5	3.19	23.45	709.42	4/29/2013	14.86	713.01
									8/7/2013	15.60	712.27
									11/13/2013	16.68	711.19
MW-11	275,501.53	13,348,552.50	718.32	715.2	10	3.11	18.10	710.22	4/29/2013	7.70	710.62
									8/7/2013	9.02	709.30
									11/12/2013	9.60	708.72
MW-12	274,233.16	13,347,712.66	721.97	719.3	10	2.66	17.60	714.37	4/29/2013	8.43	713.54
									8/7/2013	10.60	711.37
									11/13/2013	11.60	710.37
MW-13 <sup>4</sup>	274,918.4	13,347,527.6	See Note 4	728.0	10	See Note 4	See Note 4	See Note 4	12/12/2013	13.8	714.2

Notes:

1. NAD83 = North American Datum 1983.
2. MSL = Mean Sea Level.
3. TOC = Feet from Top of Casing.
4. Northing, Easting and Ground Surface Elevation from GPS. Ground water information based on observations during completion of soil boring. Information to be updated once well is surveyed, developed and used for water level measurements.



**Table 2**  
**Summary of Soil / Waste Sample Results**  
 Van Buren Landfill Site  
 Michigan Avenue and Ecorse Road  
 Van Buren Township, Wayne County, Michigan

SOIL: Part 201/213 Generic Non-Residential Cleanup Criteria Revised December 30, 2013 and Guidance Document for the Vapor Intrusion Pathway May 2013 Units: µg/kg				Semivolatile Organic Compounds (SVOCs)																					
				Bis(2-ethylhexyl)phthalate	Butyl Benzyl Phthalate	Caprolactam	Carbazole	Chrysene	2,4-Dinitrotoluene	Dibenz(a,h)anthracene	Dibenzofuran	Dibutyl Phthalate	Di-n-butyl Phthalate	Di-n-octyl Phthalate	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	Isophorone	2-Methylnaphthalene	2-Methylphenol	4-Methylphenol	Naphthalene	Phenanthrene	Phenol	Pyrene
Statewide Default Background Levels (X)				NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		
Drinking Water Protection Criteria (XXI)				NLL	5.0E+06 (C)	3.4E+05	39,000	NLL	640	NLL	ID	3.2E+05	2.7E+06 (C)	2.9E+08 (C)	7.3E+05	8.9E+05	NLL	62,000	1.7E+05	NA	NA	1.0E+05	1.6E+05	2.6E+05	4.8E+05
Groundwater/Surface Water Interface Protection Criteria (XII)				NLL	1.2E+05 (X)	NA	1,100	NLL	NA	NLL	1,700	2,200	11,000	ID	5,500	5,300	NLL	26,000 (X)	4,200	NA	NA	730	2,100	9,000	ID
Soil Vapor Intrusion Concentration Screening Levels (SVI-nr) (c)				NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.19E+07	NA	NA	1.26E+05	NA	NA	8,940	86,300	NA	1.09E+09	
Soil Volatilization to Indoor Air Inhalation (XXII)				NLV	NLV	NLV	NLV	ID	NLV	NLV	3.6E+06	NLV	NLV	NLV	1.0E+09 (D)	NLV	NLV	4.9E+06	NA	NA	4.7E+05	5.1E+06	NLV	1.0E+09 (D)	
Infinite Source Volatile Soil Inhalation Criteria (XXIII)				NLV	NLV	NLV	NLV	ID	NLV	NLV	1.6E+05	NLV	NLV	NLV	8.9E+08	1.5E+08	NLV	NLV	1.8E+06	NA	NA	3.5E+05	1.9E+05	NLV	7.8E+08
Finite Source Volatile Soil Inhalation Criteria (5 m) (XXIV)				NLV	NLV	NLV	NLV	ID	NLV	NLV	1.6E+05	NLV	NLV	NLV	8.8E+08	1.5E+08	NLV	NLV	1.8E+06	NA	NA	3.5E+05	1.9E+05	NLV	7.8E+08
Finite Source Volatile Soil Inhalation Criteria (2 m) (XXV)				NLV	NLV	NLV	NLV	ID	NLV	NLV	1.6E+05	NLV	NLV	NLV	8.8E+08	1.5E+08	NLV	NLV	1.8E+06	NA	NA	3.5E+05	1.9E+05	NLV	7.8E+08
Particulate Soil Inhalation Criteria (XXVI)				8.9E+08	2.1E+10	2.9E+08	7.8E+07	ID	2.0E+06	ID	2.9E+06	1.5E+09	1.5E+09	1.4E+10	4.1E+09	4.1E+09	ID	8.2E+09	2.9E+08	NA	NA	8.8E+07	2.9E+06	1.8E+10	2.9E+09
Non-Residential Direct Contact Criteria (XXVII)				1.2E+07 (C)	1.2E+08 (C)	3.1E+08 (DD)	2.4E+06	8.0E+06	2.2E+05	8,000	ID	5.5E+08 (C)	7.6E+05 (C)	2.0E+07	1.3E+08	8.7E+07	80,000	2.4E+06 (C)	2.6E+07	NA	NA	5.2E+07	5.2E+06	2.3E+08 (C, DD)	8.4E+07
Soil Saturation Concentration Screening Levels (C <sub>so</sub> ) (XX)				1.0E+06	3.1E+05	NA	NA	NA	NA	NA	NA	7.4E+05	7.6E+05	1.4E+08	NA	NA	NA	2.4E+06	NA	NA	NA	NA	NA	1.2E+07	NA
BORING ID	DEPTH	SAMPLE ID	SAMPLE DATE																						
SB-1	0'-2'	S-R2330004-071212-MF-006	7/12/2012	740 J	<1700	<3500	<1700	270 J	<1700	<320	<1700	<3500	200 J	<1700	410	<320	<320	<1700	<840	<1700	<1700	<320	<320	<1700	420
SB-1	8'-9'	S-R2330004-071212-MF-007	7/12/2012	47 J	<170	<360	<170	22 J	<170	<32	<170	32 J	32 J	<170	28 J	<32	<32	54 J	<86	<170	<170	22 J	<32	<170	24 J
SB-1A	0'-2'	S-R2330009-032513-MJF-001	3/25/2013	78 J	<170	87 J	<170	44	<170	<32	20 J	<350	29 J	33 J	51	<32	<32	<170	60 J	<170	<170	43	77	<170	48
SB-1A	10'-11'	S-R2330009-032513-MJF-002	3/25/2013	20 J	<170	<350	<170	23 J	<170	<32	<170	<350	38 J	34 J	22 J	<32	<32	<170	<85	<170	<170	<32	<32	<170	20 J
SB-2	0'-2'	S-R2330004-071212-MF-01C	7/12/2012	400	<160	35 J	<160	46	<160	<30	<160	<330	<330	<160	67	<30	<30	20 J	<80	<160	<160	<30	44	<160	52
SB-2	0'-2'	S-R2330004-071212-MF-011 (DUP)	7/12/2012	390 J	<1600	<3400	<1600	<310	<1600	<310	<1600	<3400	<3400	<1600	<310	<310	<310	<1600	<820	<1600	<1600	<310	<310	<1600	<310
SB-2	10'-12'	S-R2330004-071212-MF-012	7/12/2012	94 J	<170	<350	<170	19 J	<170	<32	<170	<350	<350	<170	19 J	<32	<32	<170	<85	<170	<170	<32	<32	<170	19 J
SB-3	0'-2'	S-R2330004-071112-MF-005	7/11/2012	48 J	<170	<350	<170	<32	<170	<32	<170	<350	<350	<170	<32	<32	<32	<170	<86	<170	<170	<32	<32	<170	<32
SB-4	0'-2'	S-R2330004-071212-MF-006	7/12/2012	<340	<160	<340	<160	29 J	<160	<31	<160	<340	<340	<160	54	<31	<31	<160	<82	<160	<160	<31	<31	<160	38
SB-4	10'-11'	S-R2330004-071212-MF-009	7/12/2012	<360	<180	<360	<180	<33	<180	<33	<180	<360	<360	<180	21 J	<33	<33	<180	<88	<180	<180	<33	<33	<180	<33
SB-5	0'-2'	S-R2330004-071112-MF-001	7/11/2012	420 J	540 J	<3400	<1700	390	<1700	<310	<1700	<3400	<3400	<1700	230 J	<310	<310	<1700	<830	<1700	<1700	<310	<310	<1700	170 J
SB-5	25'-27'	S-R2330004-071112-MF-002	7/11/2012	130 J	70 J	<400	32 J	140	<190	21 J	48 J	<400	<400	<190	210	73	64	<190	40 J	<190	<190	32 J	81	190	180
SB-5C	0'-2'	S-R2330009-040213-MJF-005	4/2/2013	<370	<180	<370	<180	42	<180	<33	<180	<370	<370	<180	43	<33	<33	<180	<89	<180	<180	<33	<33	<180	41
SB-5C	17'-18'	S-R2330009-040213-MJF-006	4/2/2013	190	<180	<380	<180	210	<1,800	<34	<1,800	<3,800	<380	<180	400	<340	56	<180	48 J	<180	53 J	62	230	<180	330
SB-6	1.5'-2.5'	S-R2330004-071212-MF-013	7/12/2012	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	<1800	NS	<1800	NS	NS	NS	NS
SB-6	1.5'-3'	S-R2330004-071212-MF-013	7/12/2012	1,900 J	<1800	<3600	<1800	1,400	<1800	<330	<1800	<3600	<3600	<1800	2,700	<330	440	<1800	<880	<1800	<1800	<330	1,700	<1800	1,900
SB-6	1.5'-3'	S-R2330004-071212-MF-017 (DUP)	7/12/2012	520 J	290 J	<3600	<1800	2,100	<1800	<330	<1800	<3600	<3600	<1800	3,900	<330	540	<1800	<880	<1800	<1800	<330	2,100	<1800	2,900
SB-6	6'-7'	S-R2330004-071212-MF-014	7/12/2012	<370	<180	<370	<180	<33	<180	<33	<180	<370	<370	<180	18 J	<33	<33	<180	<89	<180	<180	<33	<33	<180	<33
SB-6A	0'-2'	S-R2330004-071612-MF-015	7/16/2012	270 J	350 J	<3500	<1700	<310	<1700	<310	<1700	<3500	<3500	<1700	180 J	<310	<310	<1700	<840	<1700	<1700	<310	<310	<1700	<310
SB-6A	2.5'-4.5'	S-R2330004-071612-MF-016	7/16/2012	<390	<190	<390	<190	250	<190	21 J	64 J	<390	<390	<190	650	97	60	<190	<95	<190	<190	49	550	<190	490
SB-7	0'-2'	S-R2330004-071112-MF-003	7/11/2012	7,400	590 J	<3500	<1700	610	<1700	<320	<1700	<3500	<3500	440 J	1,100	<320	220 J	<1700	<840	<1700	<1700	<320	700	<1700	880
SB-7	10'-11'	S-R2330004-071112-MF-004	7/11/2012	2,300 J	750 J	<3800	<1900	1,100	440 J	<350	390 J	<3800	<3800	<1900	3,000	570	310 J	<1900	410 J	<1900	540 J	1,000	2,700	290 J	2,100
SB-7E	0'-2'	S-R2330009-040213-MJF-004	4/2/2013	27 J	<180	<370	<180	<33	<180	<33	<180	<370	<370	<180	<33	<33	<33	<180	<89	<180	<180	<33	<33	<180	<33
SB-7E	5'-6'	S-R2330009-040213-MJF-01C	4/2/2013	<380	<180	<380	<180	37	<180	<34	<180	<380	<380	<180	82	<34	<34	<180	<92	<180	<180	<34	47	<180	64
SB-8	0'-2'	S-R2330009-032813-MJF-011	3/28/2013	<380	29 J	<380	<180	51	<180	<34	<180	<380	<380	<180	86	<34	<34	<180	<91	<180	<180	<34	43	<180	73
SB-9	0'-2'	S-R2330009-032613-MJF-012	3/26/2013	<360	<170	<360	<170	280	<170	32	<170	33 J	<360	<170	530	<33	110	<170	<87	<170	<170	<33	170	<170	450
SB-9	10'-11'	S-R2330009-032613-MJF-013	3/26/2013	<380	<190	<380	<190	49	<190	<35	<190	<380	<380	<190	59	<35	<35	<190	<93	<190	<190	<35	39	<190	57
SB-10	0'-2'	S-R2330009-032513-MJF-014	3/25/2013	<360	<170	72 J	<170	<32	<170	<32	<170	<360	<360	<170	<32	<32	<32	<170	<86	<170	<170	<32	<32	<170	<32
SB-10	13'-14'	S-R2330009-032513-MJF-015	3/25/2013	<360	<170	<360	<170	<33	<170	<33	<170	<360	<360	34 J	<33	<33	<33	<170	<87	<170	<170	<33	<33	<170	<33
SB-11	0'-2'	S-R2330009-032613-MJF-016	3/26/2013	<360	<180	<360	<180	<33	<180	<33	<180	<360	<360	<180	<33	<33	<33	<180	<88	<180	<180	<33	<33	44 J	<33
SB-11	6.5'-7.5'	S-R2330009-032613-MJF-017	3/26/2013	<370	<180	85 J	<180	<33	<180	<33	<180	<370	<370	<180	<33	<33	<33	<180	<89	<180	<180	<33	<33	<180	<33
SB-12	0'-2'	S-R2330009-032513-MJF-018	3/25/2013	1,800 J	<1,900	520 J	<1,900	1,200	<1,900	<360	<1,900	<3,900	<3,900	730 J	1,400	<360	420	<1,900	<950	<1900	<1900	270 J	690	<1,900	1,200
SB-12	8'-9'	S-R2330009-032513-MJF-019	3/25/2013	30 J	<180	<370	<180	<33	<180	<33	<180	<370	<370	<180	<33	<33	<33	<180	<88	<180	<180	<33	<33	<180	<33
SB-21	10'-15'	S-R2330009-120413-RD-003	12/4/2013	920 J	400 J	<3800	<1800	1,100	<1800	190 J	130 J	<3800	200 J	<1800	2,400	190 J	560	<1800	310 J	<95	270 J	370	1,400	470	

**Table 2**  
**Summary of Soil / Waste Sample Results**  
 Van Buren Landfill Site  
 Michigan Avenue and Ecorse Road  
 Van Buren Township, Wayne County, Michigan

SOIL: Part 201/213 Generic Non-Residential Cleanup Criteria Revised December 30, 2013 and Guidance Document for the Vapor Intrusion Pathway May 2013 Units: µg/kg				Metals																	PCBs					
				Aluminum (B)	Antimony	Arsenic (B)	Barium (B)	Beryllium	Cadmium (B)	Chromium	Cobalt	Copper (B)	Iron (B)	Lead (B)	Manganese (B)	Mercury (B,Z)	Nickel (B)	Selenium (B)	Silver (B)	Thallium (B)	Vanadium	Zinc (B)	Aroclor 1248	Aroclor 1254	Total PCBs	
Statewide Default Background Levels (X)				6.9E+06	NA	5,800	75,000	NA	1,200	18,000	6,800	32,000	75,000	1,20E+07	21,000	4,40E+05	130	20,000	410	1,000	NA	NA	47,000	NA	NA	NA
Drinking Water Protection Criteria (XXI)				1,000	4,300	4,600	1.30E+06	51,000	6,000	30,000	2,000	5.80E+06	6,000	7.00E+05	1,000	1,700	100,000	4,000	13,000	2,300	9.90E+05	5.00E+06	NA	NA	NLL	
Groundwater/Surface Water Interface Protection Criteria (XII)				NA	94,000 (X)	4,600	4.4E+05 (G)	8.5E+04 (G)	3.6E+03 (G,X)	3,300	2,000	7.5E+04 (G)	NA	5.1E+06 (G,X)	5.6E+04 (G,X)	50 (M); 1.2	7.6E+04 (G)	400	100 (M); 27	4,200 (X)	4.30E+05	1.7E+05 (G)	NA	NA	NLL	
Soil Vapor Intrusion Concentration Screening Levels (SVI-nr) (c)				NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	39,100	
Soil Volatilization to Indoor Air Inhalation (XXII)				NLV	NLV	NLV	NLV	NLV	NLV	NLV	NLV	NLV	NLV	NLV	NLV	8.9E+04	NLV	NLV	NLV	NLV	NLV	NA	NA	NA	1.6E-07	
Infinite Source Volatile Soil Inhalation Criteria (XXIII)				NLV	NLV	NLV	NLV	NLV	NLV	NLV	NLV	NLV	NLV	NLV	NLV	6.2E+04	NLV	NLV	NLV	NLV	NLV	NA	NA	NA	8.1E+05	
Finite Source Volatile Soil Inhalation Criteria (5 m) (XXIV)				NLV	NLV	NLV	NLV	NLV	NLV	NLV	NLV	NLV	NLV	NLV	NLV	6.2E+04	NLV	NLV	NLV	NLV	NLV	NA	NA	NA	2.8E+07	
Finite Source Volatile Soil Inhalation Criteria (2 m) (XXV)				NLV	NLV	NLV	NLV	NLV	NLV	NLV	NLV	NLV	NLV	NLV	NLV	6.2E+04	NLV	NLV	NLV	NLV	NLV	NA	NA	NA	2.8E+07	
Particulate Soil Inhalation Criteria (XXVI)				ID	5.9E+06	9.1E+05	1.5E+08	5.9E+05	2.2E+06	2.4E+05	5.9E+06	5.9E+07	ID	4.4E+07	1.5E+06	8.8E+06	1.6E+07	5.9E+07	2.9E+06	5.9E+06	ID	ID	NA	NA	6.5E+06	
Non-Residential Direct Contact Criteria (XXVII)				3.7E+08 (DD)	6.7E+05	3.7E+04	1.3E+08	1.6E+06	2.1E+06	9.2E+06	9.0E+06	7.3E+07	5.8E+08	9.0E+05 (DD)	9.0E+07	5.8E+05	1.5E+08	9.6E+06	9.0E+06	1.3E+05	5.5E+06 (DD)	6.3E+08	NA	NA	(T)	
Soil Saturation Concentration Screening Levels (C <sub>so</sub> ) (XX)				NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
BORING ID	DEPTH	SAMPLE ID	SAMPLE DATE	Aluminum (B)	Antimony	Arsenic (B)	Barium (B)	Beryllium	Cadmium (B)	Chromium	Cobalt	Copper (B)	Iron (B)	Lead (B)	Manganese (B)	Mercury (B,Z)	Nickel (B)	Selenium (B)	Silver (B)	Thallium (B)	Vanadium	Zinc (B)	Aroclor 1248	Aroclor 1254	Total PCBs	
SB-1	0'-2'	S-R2330004-071212-MF-006	7/12/2012	9,500,000	5,800	6,100	140,000	500 J	1,500	24,000	8,200	130,000	20,000,000	190,000	220,000	72	19,000	580	500 J	160 J	18,000	280,000	340	840	1,180	
SB-1	8'-9'	S-R2330004-071212-MF-007	7/12/2012	3,600,000	430	2,800	44,000	140 J	390	7,100	3,000	15,000	12,000,000	52,000	270,000	11 J	8,200	440	78 J	83 J	9,500	38,000	<43	75	75	
SB-1A	0'-2'	S-R2330009-032513-MJF-001	3/25/2013	3,800,000	130 J	3,200	25,000	280 J	150 J	6,400	2,500	6,300	6,900,000	7,800	270,000	22	7,000	290 J	1.1 J	9.1 J	9,600	19,000	<43	<43	ND	
SB-1A	10'-11'	S-R2330009-032513-MJF-002	3/25/2013	3,600,000	100 J	3,300	18,000	220 J	130 J	8,500	2,700	7,500	8,400,000	5,200	200,000	31	7,900	<230	18 J	110 J	11,000	21,000	<43	<43	ND	
SB-2	0'-2'	S-R2330004-071212-MF-010	7/12/2012	4,500,000	1,600	2,800	45,000	120 J	860	8,500	2,700	31,000	15,000,000	64,000	360,000	620	9,800	320	390 J	86 J	9,100	98,000	<40	140	140	
SB-2	0'-2'	S-R2330004-071212-MF-011 (DUP)	7/12/2012	4,100,000	1,800	2,700	70,000	120 J	840	9,000	2,600	27,000	14,000,000	69,000	360,000	710	10,000	270 J	490 J	77 J	9,300	100,000	<39	160	160	
SB-2	10'-12'	S-R2330004-071212-MF-012	7/12/2012	3,300,000	550	3,000	22,000	120 J	250	5,800	2,400	13,000	9,800,000	16,000	380,000	160	7,300	380	130 J	94 J	8,600	40,000	<42	<42	ND	
SB-3	0'-2'	S-R2330004-071112-MF-005	7/11/2012	2,700,000	150 J	2,100	8,000	97 J	88 J	5,200	1,900	5,200	5,400,000	4,000	170,000	6.4 J	5,600	320	18 J	56 J	8,900	22,000	<42	<42	ND	
SB-4	0'-2'	S-R2330004-071212-MF-008	7/12/2012	6,300,000	150 J	2,600	20,000	140 J	160	6,300	1,800	3,300	7,100,000	10,000	77,000	27	4,600	250 J	16 J	89 J	13,000	24,000	<41	150	150	
SB-4	10'-11'	S-R2330004-071212-MF-009	7/12/2012	6,900,000	140 J	3,000	41,000	240	120 J	18,000	2,300	5,500	9,800,000	7,300	140,000	27	6,900	390	26 J	63 J	18,000	19,000	<42	<42	ND	
SB-5	0'-2'	S-R2330004-071112-MF-001	7/11/2012	6,900,000	2,900	5,600	92,000	350 J	1,600	17,000	5,500	120,000	20,000,000	99,000	470,000	210	18,000	830	800 J	210 J	17,000	510,000	250	110	360	
SB-5	25'-27'	S-R2330004-071112-MF-002	7/11/2012	5,400,000	5,300	8,200	430,000	160 J	5,600	22,000	5,300	150,000	53,000,000	2,600,000	570,000	30	26,000	270 J	410 J	94 J	15,000	730,000	<49	<49	ND	
SB-5C	0'-2'	S-R2330009-040213-MJF-005	4/2/2013	5,000,000	190 J	11,000	27,000	320 J	230 J	8,800	3,600	11,000	15,000,000	16,000	380,000	27	11,000	320 J	21 J	130 J	16,000	34,000	<44	<44	ND	
SB-5C	17'-18'	S-R2330009-040213-MJF-006	4/2/2013	5,700,000	1,100	5,900	93,000	210 J	2,000	13,000	5,000	42,000	24,000,000	85,000	310,000	45	19,000	<250	310 J	150 J	12,000	210,000	<43	<43	ND	
SB-6	1.5'-2.5'	S-R2330004-071212-MF-013	7/12/2012	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
SB-6	1.5'-3'	S-R2330004-071212-MF-013	7/12/2012	9,100,000	5,900	7,300	290,000	200	5,000	38,000	5,600	240,000	50,000,000	540,000	500,000	240	90,000	570	1,300	100 J	15,000	990,000	620	750	1,370	
SB-6	1.5'-3'	S-R2330004-071212-MF-017 (DUP)	7/12/2012	9,000,000	4,300	6,600	360,000	180	5,100	58,000	5,600	180,000	42,000,000	410,000	330,000	220	83,000	410	1,100 J	71 J	18,000	970,000	640	790	1,430	
SB-6	6'-7'	S-R2330004-071212-MF-014	7/12/2012	3,700,000	170 J	1,900	15,000	130 J	110 J	7,900	2,300	6,100	6,100,000	5,000	140,000	15 J	6,800	430	12 J	67 J	10,000	16,000	<45	<45	ND	
SB-6A	0'-2'	S-R2330004-071612-MF-015	7/16/2012	7,600,000	1,500	4,300	89,000	160 J	2,100	22,000	3,500	110,000	17,000,000	130,000	240,000	100	62,000	240 J	300 J	75 J	12,000	320,000	280	410	690	
SB-6A	2.5'-4.5'	S-R2330004-071612-MF-016	7/16/2012	3,800,000	170 J	2,500	15,000	140 J	200	8,600	2,800	8,800	7,300,000	5,700	130,000	18 J	7,900	340 J	14 J	84 J	12,000	41,000	<47	<47	ND	
SB-7	0'-2'	S-R2330004-071112-MF-003	7/11/2012	12,000,000	18,000	12,000	540,000	220	9,300	53,000	7,800	1,500,000	74,000,000	770,000	600,000	450	60,000	690	4,200 J	65 J	18,000	2,400,000	240	270	510	
SB-7	10'-11'	S-R2330004-071112-MF-004	7/11/2012	5,900,000	8,800	9,800	200,000	150 J	7,100	40,000	7,000	160,000	51,000,000	960,000	820,000	190	31,000	340 J	950	56 J	12,000	800,000	390	280	ND	
SB-7E	0'-2'	S-R2330009-040213-MJF-009	4/2/2013	5,100,000	160	5,300	34,000	260 J	370 J	9,000	4,400	10,000	11,000,000	9,500	260,000	18	12,000	<1,500	38 J	170 J	18,000	32,000	<43	<43	ND	
SB-7E	5'-6'	S-R2330009-040213-MJF-010	4/2/2013	4,900,000	22 J	4,900	45,000	250 J	230 J	10,000	4,900	14,000	12,000,000	12,000	310,000	17 J	14,000	510 J	46 J	180 J	15,000	44,000	<44	<44	ND	
SB-8	0'-2'	S-R2330009-032813-MJF-011	3/28/2013	5,600,000	190 J	4,900	37,000	230 J	290 J	12,000	3,300	8,400	12,000,000	21,000	250,000	37	8,900	<1,700	29 J	68 J	14,000	43,000	<44	<44	ND	
SB-9	0'-2'	S-R2330009-032613-MJF-012	3/26/2013	3,800,000	150 J	4,100	21,000	210 J	180 J	8,200	2,600	9,800	9,200,000	21,000	200,000	25	7,300	<1,700	12 J	90 J	11,000	34,000	<43	<43	ND	
SB-9	10'-11'	S-R2330009-032613-MJF-013	3/26/2013	5,000,000	230 J	4,300	34,000	230 J	260 J	8,900	4,200	14,000	12,000,000	23,000	250,000	23	12,000	<1,700	40 J	16 J	15,000	42,000	<46	<46	ND	
SB-10	0'-2'	S-R2330009-032513-MJF-014	3/25/2013	5,000,000	240 J	4,200	19,000	210 J	510 J	9,400	2,900	11,000	11,000,000	20,000	310,000	25	9,900	<1,400	110 J	120 J	12,000	59,000	<41	<41	ND	
SB-10	13'-14'	S-R2330009-032513-MJF-015	3/25/2013	5,700,000	72 J	5,600	21,000	320 J	120 J	11,000	3,900	14,000	13,000,000	6,400	180,000	30	14,000	<1,500	10 J	85 J	17,000	33,000	<43	<43	ND	
SB-11	0'-2'	S-R2330009-032613-MJF-016	3/26/2013	4,800,000	28 J	1,800	24,000	220 J	95 J	7,100	1,700 J	2,900	8,200,000	5,000	86,000	25	4,900	<1,400	8 J	<1,800	11,000	18,000	<42	<42	ND	
SB-11	6.5'-7.5'	S-R2330009-032613-MJF-017	3/26/2013	1,400,000	83 J	2,200	6,100	92 J	72 J	4,500	1,600 J	4,900	5,400,000	2,100	210,000	6.9 J	5,500	<1,500	<740	50 J	5,600	12,000	<45	<45	ND	
SB-12	0'-2'	S-R2330009-032513-MJF-018	3/25/2013	14,000,000	4,500	8,000	460,000	240 J	9,900	34,000	6,700	240,000	44,000,000	860,000	460,000	120	41,000	<1,700	1,200	65 J	13,000	1,100,000	<48	310	310	
SB-12	8'-9'	S-R2330009-032513-MJF-019	3/25/2013	3,100,000	88 J	1,800	21,000	120 J																		

**TABLE 3  
SUMMARY OF GROUND WATER SAMPLE LABORATORY ANALYTICAL DATA**

Van Buren Landfill Site  
Van Buren Township, Wayne County, Michigan

GROUNDWATER: Part 201/213 Generic Non-Residential Cleanup Criteria Revised December 30, 2013 and Guidance Document for the Vapor Intrusion Pathway May 2013 Units: µg/L			Volatile Organic Compounds (VOCs)													
			2-Butanone (MEK)	1,2-Dichlorobenzene	1,4-Dichlorobenzene	Acetone	Benzene	Carbon disulfide	Chlorobenzene	Chloroethane	Chloroform	Cyclohexane	Ethylbenzene	Isopropylbenzene	Toluene	Xylenes
Non-residential Drinking Water Criteria (II)			38,000	600 (A)	75 (A)	2,100	5.0 (A)	2,300	100 (A)	1,700	80 (A,W)	NA	74 (E)	2,300	790 (E)	280 (E)
Non-residential Health-Based Drinking Water Value			NA	NA	NA	NA	NA	NA	NA	NA	NA	700	NA	1,000	10,000	
Ground Water Surface Water Interface Criteria (GSI) (III)			2,200	13	17	1,700	200 (X)	ID	25	1,100 (X)	350	NA	18	28	270	41
GSI Final Acute Value (FAV)			40,000	240	210	30,000	1,900	ID	450	20,000	11,000	ID	320	500	2,600	730
Groundwater Volatilization to Indoor Air Inhalation Criteria (V)			2.4E+8 (S)	1.6E+05 (S)	74,000 (S)	1.0E+09 (D,S)	35,000	5.5E+05	4.7E+05 (S)	5.7E+06 (S)	1.8E+05	NA	1.7E+05 (S)	56,000 (S)	5.3E+05 (S)	1.9E+05 (S)
Draft Ground Water Concentration for Vapor Intrusion (GW <sub>Vapor Intrusion</sub> ) (a)			1.8E+07	32,000	380	3.4E+07	140	9,900	4,600	1.80E+05	720	8,100	2,600	53.0	1.50E+05	10,000 (d)
Water Solubility (VII)			2.40E+08	1.56E+05	73,800	1.0E+09	1.75E+06	1.19E+06	4.72E+05	5.74E+06	7.92E+06	NA	1.69E+05	56,000	5.26E+05	1.86E+05
Flammability & Explosivity Screening Level (VIII)			ID	NA	NA	1.5E+07	68,000	13,000	1.6E+05	1.1E+05	ID	NA	43,000	29,000	61,000	70,000
MONITORING WELL ID	SAMPLE ID	SAMPLE DATE	2-Butanone (MEK)	1,2-Dichlorobenzene	1,4-Dichlorobenzene	Acetone	Benzene	Carbon disulfide	Chlorobenzene	Chloroethane	Chloroform	Cyclohexane	Ethylbenzene	Isopropylbenzene	Toluene	Xylenes
MW-1	W-R2330009-043013-MJF-002	4/30/2013	<25	<1.0	<1.0	<50	<b>0.66 J</b>	<5.0	<1.0	<b>7.3</b>	<1.0	<10	<1.0	<5.0	<1.0	<3.0
MW-1 <sup>A</sup>	W-R2330009-080713-ZTR-007	8/7/2013														
MW-1	W-R2330009-080713-ZTR-007	8/7/2013	<25	<1.0	<1.0	<50	<b>0.78 J</b>	<5.0	<1.0	<b>6.9</b>	<1.0	<10	<1.0	<5.0	<1.0	<3.0
MW-1 <sup>A</sup>	W-R2330009-111413-ACN-013	11/14/2013														
MW-1	W-R2330009-111413-ACN-013	11/14/2013	<25	<1.0	<1.0	<50	<b>6.9 J</b>	<5.0	<1.0	<b>9.9</b>	<1.0	<10	<1.0	<5.0	<1.0	<3.0
MW-3	W-R2330004-090512-MJF-01	9/5/2012	<25	<1.0	<1.0	<50	<b>0.66 J</b>	<5.0	<1.0	<5.0	<1.0	<10	<1.0	<5.0	<1.0	<3.0
MW-3	W-R2330009-050213-MJF-009	5/2/2013	<25	<1.0	<1.0	<50	<1.0	<5.0	<1.0	<5.0	<1.0	<10	<1.0	<5.0	<1.0	<3.0
MW-3 <sup>A</sup>	W-R2330009-080713-ZTR-004	8/7/2013														
MW-3	W-R2330009-080713-ZTR-004	8/7/2013	<25	<1.0	<1.0	<50	<1.0	<5.0	<1.0	<5.0	<1.0	<10	<1.0	<5.0	<1.0	<3.0
MW-3 <sup>A</sup>	W-R2330009-111213-ACN-002	11/12/2013														
MW-3	W-R2330009-111213-ACN-002	11/12/2013	<25	<1.0	<1.0	<50	<1.0	<5.0	<1.0	<5.0	<1.0	<10	<1.0	<5.0	<1.0	<3.0
MW-4	W-R2330004-090512-MJF-02	9/5/2012	<25	<1.0	<1.0	<50	<b>12 J</b>	<b>0.39 J</b>	<5.0	<1.0	<5.0	<1.0	<10	<1.0	<5.0	<3.0
MW-4 (DUP)	W-R2330004-090512-MJF-03	9/5/2012	<25	<1.0	<1.0	<50	<b>8.5 J</b>	<b>0.43 J</b>	<5.0	<1.0	<5.0	<1.0	<10	<1.0	<5.0	<3.0
MW-4	W-R2330009-050213-MJF-010	5/2/2013	<25	<1.0	<1.0	<50	<1.0	<5.0	<1.0	<5.0	<1.0	<10	<1.0	<5.0	<1.0	<3.0
MW-4 <sup>A</sup>	W-R2330009-080713-ZTR-005	8/7/2013														
MW-4	W-R2330009-080713-ZTR-005	8/7/2013	<25	<1.0	<1.0	<50	<1.0	<5.0	<1.0	<5.0	<1.0	<10	<1.0	<5.0	<1.0	<3.0
MW-4 <sup>A</sup>	W-R2330009-111213-ACN-003	11/12/2013														
MW-4	W-R2330009-111213-ACN-003	11/12/2013	<25	<1.0	<1.0	<50	<1.0	<5.0	<1.0	<5.0	<1.0	<10	<1.0	<5.0	<1.0	<3.0
MW-5	W-R2330009-050113-MJF-004	5/1/2013	<25	<1.0	<1.0	<50	<b>6.9 J</b>	<1.0	<5.0	<1.0	<5.0	<1.0	<10	<1.0	<5.0	<3.0
MW-5 (DUP)	W-R2330009-050113-MJF-005	5/1/2013	<25	<1.0	<1.0	<50	<1.0	<5.0	<1.0	<5.0	<1.0	<10	<1.0	<5.0	<1.0	<3.0
MW-5 <sup>A</sup>	W-R2330009-080813-ZTR-009	8/8/2013														
MW-5	W-R2330009-080813-ZTR-009	8/8/2013	<25	<1.0	<1.0	<50	<1.0	<5.0	<1.0	<5.0	<1.0	<10	<1.0	<5.0	<1.0	<3.0
MW-5 <sup>A</sup>	W-R2330009-111213-ACN-004	11/12/2013														
MW-5	W-R2330009-111213-ACN-004	11/12/2013	<25	<1.0	<1.0	<50	<b>15 J</b>	<1.0	<5.0	<1.0	<5.0	<1.0	<10	<1.0	<5.0	<3.0
MW-6	W-R2330004-090512-MJF-04	9/5/2012	<25	<1.0	<1.0	<50	<b>11 J</b>	<b>4.9</b>	<5.0	<1.0	<5.0	<1.0	<10	<1.0	<5.0	<3.0
MW-6	W-R2330009-050213-MJF-012	5/2/2013	<25	<1.0	<1.0	<50	<b>2.8</b>	<5.0	<1.0	<5.0	<1.0	<10	<1.0	<5.0	<1.0	<3.0
MW-6 <sup>A</sup>	W-R2330009-080713-ZTR-002	8/7/2013														
MW-6	W-R2330009-080713-ZTR-002	8/7/2013	<25	<1.0	<1.0	<50	<b>4.0</b>	<5.0	<1.0	<5.0	<1.0	<10	<1.0	<5.0	<1.0	<3.0
MW-6 <sup>A</sup>	W-R2330009-111313-ACN-011	11/13/2013														
MW-6	W-R2330009-111313-ACN-011	11/13/2013	<25	<1.0	<1.0	<50	<b>4.6</b>	<5.0	<1.0	<5.0	<1.0	<10	<1.0	<5.0	<1.0	<3.0

Notes:  
**Bold** indicates concentration above method detection limits.  
 Roman numerals indicate DEQ criterion number  
 A = Total Metals sample collected for comparison to dissolved metals analytical results.  
 E = Criterion is the aesthetic drinking water value, as required by Section 20120a(5) of NREPA  
 G = Calculated value based on a hardness of 150 mg/L  
 J = Analyte detected below quantitation limit.  
 Exceeds Generic Drinking Water Criteria (II)  
 Exceeds Generic Drinking Water Cleanup Criteria (II) and the Generic Health-Based Drinking Water Value  
 Exceeds Groundwater Surface Water Interface Criteria (III)  
 Exceeds Two or More DW (I), GSI (III) and/or Residential Health-Based Water Value (E)  
 Exceeds GSI Final Acute Value (FAV), also exceeds others  
 Notes in parentheses and standard abbreviations from MDEQ Operational Memorandum 1, Attachment 1, dated December 30, 2013 or MDEQ Guidance Document for the Vapor Intrusion Pathway, dated May 2013

**TABLE 3  
SUMMARY OF GROUND WATER SAMPLE LABORATORY ANALYTICAL DATA**

Van Buren Landfill Site  
Van Buren Township, Wayne County, Michigan

GROUNDWATER: Part 201/213 Generic Non-Residential Cleanup Criteria Revised December 30, 2013 and Guidance Document for the Vapor Intrusion Pathway May 2013 Units: µg/L			Volatile Organic Compounds (VOCs)													
			2-Butanone (MEK)	1,2-Dichlorobenzene	1,4-Dichlorobenzene	Acetone	Benzene	Carbon disulfide	Chlorobenzene	Chloroethane	Chloroform	Cyclohexane	Ethylbenzene	Isopropylbenzene	Toluene	Xylenes
Non-residential Drinking Water Criteria (II)			38,000	600 (A)	75 (A)	2,100	5.0 (A)	2,300	100 (A)	1,700	80 (A,W)	NA	74 (E)	2,300	790 (E)	280 (E)
Non-residential Health-Based Drinking Water Value			NA	NA	NA	NA	NA	NA	NA	NA	NA	700	NA	1,000	10,000	
Ground Water Surface Water Interface Criteria (GSI) (III)			2,200	13	17	1,700	200 (X)	ID	25	1,100 (X)	350	NA	18	28	270	41
GSI Final Acute Value (FAV)			40,000	240	210	30,000	1,900	ID	450	20,000	11,000	ID	320	500	2,600	730
Groundwater Volatilization to Indoor Air Inhalation Criteria (V)			2.4E+8 (S)	1.6E+05 (S)	74,000 (S)	1.0E+09 (D,S)	35,000	5.5E+05	4.7E+05 (S)	5.7E+06 (S)	1.8E+05	NA	1.7E+05 (S)	56,000 (S)	5.3E+05 (S)	1.9E+05 (S)
Draft Ground Water Concentration for Vapor Intrusion (GW <sub>Vapor</sub> ) (a)			1.8E+07	32,000	380	3.4E+07	140	9,900	4,600	1.80E+05	720	8,100	2,600	53.0	1.50E+05	10,000 (d)
Water Solubility (VII)			2.40E+08	1.56E+05	73,800	1.0E+09	1.75E+06	1.19E+06	4.72E+05	5.74E+06	7.92E+06	NA	1.69E+05	56,000	5.26E+05	1.86E+05
Flammability & Explosivity Screening Level (VIII)			ID	NA	NA	1.5E+07	68,000	13,000	1.6E+05	1.1E+05	ID	NA	43,000	29,000	61,000	70,000
MONITORING WELL ID	SAMPLE ID	SAMPLE DATE	2-Butanone (MEK)	1,2-Dichlorobenzene	1,4-Dichlorobenzene	Acetone	Benzene	Carbon disulfide	Chlorobenzene	Chloroethane	Chloroform	Cyclohexane	Ethylbenzene	Isopropylbenzene	Toluene	Xylenes
MW-7	W-R2330009-050213-MJF-008	5/2/2013	<25	<1.0	<1.0	<50	<1.0	<5.0	<1.0	<5.0	<1.0	<1.0	<1.0	<5.0	<1.0	<3.0
MW-7 <sup>A</sup>	W-R2330009-080613-ZTR-001	8/6/2013														
MW-7	W-R2330009-080613-ZTR-001	8/6/2013	<25	<1.0	<1.0	5.5 J	<1.0	<5.0	<1.0	<5.0	<1.0	<1.0	<1.0	<5.0	<1.0	<3.0
MW-7 <sup>A</sup>	W-R2330009-111313-ACN-006	11/13/2013														
MW-7	W-R2330009-111313-ACN-006	11/13/2013	<25	<1.0	<1.0	12 J	<1.0	<5.0	<1.0	<5.0	<1.0	<1.0	<1.0	<5.0	<1.0	<3.0
MW-8	W-R2330009-050313-MJF-013	5/3/2013	<25	<1.0	<1.0	<50	<1.0	<5.0	<1.0	<5.0	<1.0	<1.0	<1.0	<5.0	<1.0	<3.0
MW-8 <sup>A</sup>	W-R2330009-080713-ZTR-008	8/7/2013														
MW-8	W-R2330009-080713-ZTR-008	8/7/2013	<25	<1.0	<1.0	<50	<1.0	<5.0	<1.0	<5.0	<1.0	<1.0	<1.0	<5.0	<1.0	<3.0
MW-8 <sup>A</sup>	W-R2330009-111213-ACN-005	11/12/2013														
MW-8	W-R2330009-111213-ACN-005	11/12/2013	<25	<1.0	<1.0	<50	<1.0	<5.0	<1.0	<5.0	<1.0	<1.0	<1.0	<5.0	<1.0	<3.0
MW-9	W-R2330009-050113-MJF-007	5/1/2013	<25	<1.0	<1.0	<50	<1.0	<5.0	<1.0	<5.0	<1.0	<1.0	<1.0	<5.0	<1.0	<3.0
MW-9 <sup>A</sup>	W-R2330009-080813-ZTR-013	8/8/2013														
MW-9	W-R2330009-080813-ZTR-013	8/8/2013	<25	<1.0	<1.0	<50	<1.0	<5.0	<1.0	<5.0	<1.0	<1.0	<1.0	<5.0	<1.0	<3.0
MW-9 <sup>A</sup>	W-R2330009-111413-ACN-012	11/14/2013														
MW-9	W-R2330009-111413-ACN-012	11/14/2013	<25	<1.0	<1.0	<50	<1.0	<5.0	<1.0	<5.0	<1.0	<1.0	<1.0	<5.0	<1.0	<3.0
MW-10	W-R2330009-050113-MJF-003	5/1/2013	<25	<1.0	<1.0	4.3 J	8.6	<5.0	25	<5.0	<1.0	<1.0	<1.0	<5.0	<1.0	<3.0
MW-10 <sup>A</sup>	W-R2330009-080813-ZTR-010	8/8/2013														
MW-10	W-R2330009-080813-ZTR-010	8/8/2013	<25	<1.0	<1.0	<50	8.5	<5.0	24	<5.0	<1.0	<1.0	<1.0	<5.0	<1.0	<3.0
MW-10 <sup>A</sup> (DUP)	W-R2330009-080813-ZTR-011	8/8/2013														
MW-10 (DUP)	W-R2330009-080813-ZTR-011	8/8/2013	<25	<1.0	<1.0	<50	8.2	<5.0	23	<5.0	<1.0	<1.0	<1.0	<5.0	<1.0	<3.0
MW-10 <sup>A</sup>	W-R2330009-111313-ACN-008	11/13/2013														
MW-10	W-R2330009-111313-ACN-008	11/13/2013	<25	<1.0	<1.0	16 J	13	<5.0	36	<5.0	<1.0	<1.0	<1.0	<5.0	<1.0	<3.0
MW-10 <sup>A</sup> (DUP)	W-R2330009-111313-ACN-009	11/13/2013														
MW-10 (DUP)	W-R2330009-111313-ACN-009	11/13/2013	<25	<1.0	<1.0	16 J	12	<5.0	35	<5.0	<1.0	<1.0	<1.0	<5.0	<1.0	<3.0
MW-11	W-R2330009-043013-MJF-001	4/30/2013	<25	<1.0	<1.0	<50	<1.0	<5.0	<1.0	<5.0	<1.0	<1.0	<1.0	<5.0	<1.0	<3.0
MW-11 <sup>A</sup>	W-R2330009-080713-ZTR-006	8/7/2013														
MW-11 <sup>A</sup>	W-R2330009-111213-ACN-001	11/12/2013														
MW-11	W-R2330009-111213-ACN-001	11/12/2013	<25	<1.0	<1.0	<50	<1.0	<5.0	<1.0	<5.0	<1.0	<1.0	<1.0	<5.0	<1.0	<3.0
MW-12	W-R2330009-050213-MJF-011	5/2/2013	<25	<1.0	<1.0	<50	<1.0	<5.0	<1.0	<5.0	<1.0	<1.0	<1.0	<5.0	<1.0	<3.0
MW-12 <sup>A</sup>	W-R2330009-080713-ZTR-003	8/7/2013														
MW-12	W-R2330009-080713-ZTR-003	8/7/2013	<25	<1.0	<1.0	<50	<1.0	<5.0	<1.0	<5.0	<1.0	<1.0	<1.0	<5.0	<1.0	<3.0
MW-12 <sup>A</sup>	W-R2330009-111313-ACN-007	11/13/2013														
MW-12	W-R2330009-111313-ACN-007	11/13/2013	<25	<1.0	<1.0	<50	<1.0	<5.0	<1.0	<5.0	<1.0	<1.0	<1.0	<5.0	<1.0	<3.0
SW-1	W-R2330009-050313-MJF-015	5/3/2013	<25	<1.0	<1.0	<50	<1.0	<5.0	<1.0	<5.0	<1.0	<1.0	<1.0	<5.0	<1.0	<3.0
SW-2	W-R2330009-050313-MJF-014	5/3/2013	<25	<1.0	<1.0	4.0 J	<1.0	<5.0	<1.0	<5.0	<1.0	<1.0	<1.0	<5.0	<1.0	<3.0
SW-3	W-R2330009-051013-MJF-016	5/10/2013	<25	<1.0	<1.0	<50	<5.0	<5.0	<5.0	<25	<1.0	<1.0	<1.0	<5.0	<1.0	<3.0

Notes:  
**Bold** indicates concentration above method detection limits.  
 Roman numerals indicate DEQ criterion number  
 A = Total Metals sample collected for comparison to dissolved metals analytical results.  
 E = Criterion is the aesthetic drinking water value, as required by Section 20120a(5) of NREPA  
 G = Calculated value based on a hardness of 150 mg/L  
 J = Analyte detected below quantitation limit.  
 Exceeds Generic Drinking Water Criteria (II)  
 Exceeds Generic Drinking Water Cleanup Criteria (II) and the Generic Health-Based Drinking Water Value  
 Exceeds Groundwater Surface Water Interface Criteria (III)  
 Exceeds Two or More DW (I), GSI (III) and/or Residential Health-Based Water Value (E)  
 Exceeds GSI Final Acute Value (FAV), also exceeds others  
 Notes in parentheses and standard abbreviations from MDEQ Operational Memorandum 1, Attachment 1, dated December 30, 2013 or MDEQ Guidance Document for the Vapor Intrusion Pathway, dated May 2013

**TABLE 3  
SUMMARY OF GROUND WATER SAMPLE LABORATORY ANALYTICAL DATA**

Van Buren Landfill Site  
Van Buren Township, Wayne County, Michigan

GROUNDWATER: Part 201/213 Generic Non-Residential Cleanup Criteria Revised December 30, 2013 and Guidance Document for the Vapor Intrusion Pathway May 2013 Units: µg/L			Volatile Organic Compounds (VOCs)													
			2-Butanone (MEK)	1,2-Dichlorobenzene	1,4-Dichlorobenzene	Acetone	Benzene	Carbon disulfide	Chlorobenzene	Chloroethane	Chloroform	Cyclohexane	Ethylbenzene	Isopropylbenzene	Toluene	Xylenes
Non-residential Drinking Water Criteria (II)			38,000	600 (A)	75 (A)	2,100	5.0 (A)	2,300	100 (A)	1,700	80 (A,W)	NA	74 (E)	2,300	790 (E)	280 (E)
Non-residential Health-Based Drinking Water Value			NA	NA	NA	NA	NA	NA	NA	NA	NA	700	NA	1,000	10,000	
Ground Water Surface Water Interface Criteria (GSI) (III)			2,200	13	17	1,700	200 (X)	ID	25	1,100 (X)	350	18	28	270	41	
GSI Final Acute Value (FAV)			40,000	240	210	30,000	1,900	ID	450	20,000	11,000	ID	320	500	2,600	730
Groundwater Volatilization to Indoor Air Inhalation Criteria (V)			2.4E+8 (S)	1.6E+05 (S)	74,000 (S)	1.0E+09 (D,S)	35,000	5.5E+05	4.7E+05 (S)	5.7E+06 (S)	1.8E+05	NA	1.7E+05 (S)	56,000 (S)	5.3E+05 (S)	1.9E+05 (S)
Draft Ground Water Concentration for Vapor Intrusion (GW <sub>V</sub> ) <sub>100ppm</sub> (a)			1.8E+07	32,000	380	3.4E+07	140	9,900	4,600	1.80E+05	720	8,100	2,600	53.0	1.50E+05	10,000 (d)
Water Solubility (VII)			2.40E+08	1.56E+05	73,800	1.0E+09	1.75E+06	1.19E+06	4.72E+05	5.74E+06	7.92E+06	NA	1.69E+05	56,000	5.26E+05	1.86E+05
Flammability & Explosivity Screening Level (VII)			ID	NA	NA	1.5E+07	68,000	13,000	1.6E+05	1.1E+05	ID	NA	43,000	29,000	61,000	70,000
MONITORING WELL ID	SAMPLE ID	SAMPLE DATE	2-Butanone (MEK)	1,2-Dichlorobenzene	1,4-Dichlorobenzene	Acetone	Benzene	Carbon disulfide	Chlorobenzene	Chloroethane	Chloroform	Cyclohexane	Ethylbenzene	Isopropylbenzene	Toluene	Xylenes
SB-13 <sup>A</sup>	W-R2330009-121013-AJL-008	12/10/2013	<25	<1.0	<1.0	<50	<1.0	<5.0	<1.0	<5.0	<1.0	<1.0	<1.0	<5.0	0.37 J	<3.0
SB-13	W-R2330009-121013-AJL-008	12/10/2013	<25	<1.0	<1.0	<50	<1.0	<5.0	<1.0	<5.0	<1.0	<1.0	<1.0	<5.0	0.37 J	<3.0
SB-14 <sup>A</sup>	W-R2330009-121013-AJL-007	12/10/2013	<25	<1.0	<1.0	<50	<1.0	<5.0	<1.0	<5.0	<1.0	<1.0	<1.0	<5.0	<1.0	<3.0
SB-14	W-R2330009-121013-AJL-007	12/10/2013	<25	<1.0	<1.0	<50	<1.0	<5.0	<1.0	<5.0	<1.0	<1.0	<1.0	<5.0	<1.0	<3.0
SB-15 <sup>A</sup>	W-R2330009-120913-AJL-006	12/9/2013	<25	<1.0	<1.0	<50	<1.0	<5.0	<1.0	<5.0	<1.0	<1.0	<1.0	<5.0	0.31 J	<3.0
SB-15	W-R2330009-120913-AJL-006	12/9/2013	<25	<1.0	<1.0	<50	<1.0	<5.0	<1.0	<5.0	<1.0	<1.0	<1.0	<5.0	0.31 J	<3.0
SB-21 <sup>A</sup>	W-R2330009-120513-RD-001	12/5/2013	<25	<1.0	<1.0	<50	6.7	<5.0	0.71	<5.0	<5.0	<1.0	1.4	2.5 J	0.44 J	4.2
SB-21	W-R2330009-120513-RD-001	12/5/2013	<25	<1.0	<1.0	<50	6.7	<5.0	0.71	<5.0	<5.0	<1.0	1.4	2.5 J	0.44 J	4.2
SB-22 <sup>A</sup>	W-R2330009-120513-RD-002	12/5/2013	<25	<1.0	<1.0	<50	<1.0	<5.0	0.72 J	<5.0	<1.0	<1.0	<1.0	<5.0	<1.0	<3.0
SB-22	W-R2330009-120513-RD-002	12/5/2013	<25	<1.0	<1.0	<50	<1.0	<5.0	0.72 J	<5.0	<1.0	<1.0	<1.0	<5.0	<1.0	<3.0
SB-23 <sup>A</sup>	W-R2330009-120513-RD-003	12/5/2013	<25	<1.0	<1.0	<50	2.4	<5.0	<1.0	<5.0	<1.0	<1.0	<1.0	<5.0	<1.0	<3.0
SB-23	W-R2330009-120513-RD-003	12/5/2013	<25	<1.0	<1.0	<50	2.4	<5.0	<1.0	<5.0	<1.0	<1.0	<1.0	<5.0	<1.0	<3.0
SB-24 <sup>A</sup>	W-R2330009-120613-RD-004	12/6/2013	<25	<1.0	<1.0	<50	<1.0	<5.0	<1.0	<5.0	<1.0	<1.0	<1.0	<5.0	0.29 J	<3.0
SB-24	W-R2330009-120613-RD-004	12/6/2013	<25	<1.0	<1.0	<50	<1.0	<5.0	<1.0	<5.0	<1.0	<1.0	<1.0	<5.0	0.29 J	<3.0
SB-25 <sup>A</sup>	W-R2330009-120613-RD-005	12/6/2013	<25	<1.0	<1.0	<50	<1.0	<5.0	<1.0	<5.0	<1.0	<1.0	<1.0	<5.0	0.48 J	<3.0
SB-25	W-R2330009-120613-RD-005	12/6/2013	<25	<1.0	<1.0	<50	<1.0	<5.0	<1.0	<5.0	<1.0	<1.0	<1.0	<5.0	0.48 J	<3.0
SB-26 <sup>A</sup>	W-R2330009-121013-AJL-009	12/10/2013	<25	<1.0	<1.0	3.2 J	<1.0	<5.0	<1.0	<5.0	<1.0	<1.0	<1.0	<5.0	0.28 J	<3.0
SB-26	W-R2330009-121013-AJL-009	12/10/2013	<25	<1.0	<1.0	3.2 J	<1.0	<5.0	<1.0	<5.0	<1.0	<1.0	<1.0	<5.0	0.28 J	<3.0
SB-27 <sup>A</sup>	W-R2330009-121113-AJL-010	12/11/2013	<25	<1.0	<1.0	6.1 J	<1.0	0.53 J	<1.0	2.9 J	<1.0	<1.0	<1.0	<5.0	<1.0	<3.0
SB-27	W-R2330009-121113-AJL-010	12/11/2013	<25	<1.0	<1.0	6.1 J	<1.0	0.53 J	<1.0	2.9 J	<1.0	<1.0	<1.0	<5.0	<1.0	<3.0
SB-27 <sup>A</sup> (DUP)	W-R2330009-121113-AJL-011	12/11/2013	<25	<1.0	<1.0	<50	<1.0	<5.0	<1.0	4.3 J	<1.0	<1.0	<1.0	<5.0	<1.0	<3.0
SB-27 (DUP)	W-R2330009-121113-AJL-011	12/11/2013	<25	<1.0	<1.0	<50	<1.0	<5.0	<1.0	4.3 J	<1.0	<1.0	<1.0	<5.0	<1.0	<3.0
SB-28 <sup>A</sup>	W-R2330009-121113-AJL-012	12/11/2013	<25	<1.0	<1.0	3.6 J	<1.0	0.47 J	<1.0	<5.0	<1.0	<1.0	<1.0	<5.0	<1.0	<3.0
SB-28	W-R2330009-121113-AJL-012	12/11/2013	<25	<1.0	<1.0	3.6 J	<1.0	0.47 J	<1.0	<5.0	<1.0	<1.0	<1.0	<5.0	<1.0	<3.0
SB-29 <sup>A</sup>	W-R2330009-121213-AJL-014	12/12/2013	<25	1.3	2.6	4.7 J	12	<5.0	<1.0	<5.0	<1.0	0.84 J	14	6.0	39	74
SB-29	W-R2330009-121213-AJL-014	12/12/2013	<25	1.3	2.6	4.7 J	12	<5.0	<1.0	<5.0	<1.0	0.84 J	14	6.0	39	74
SB-30 <sup>A</sup>	W-R2330009-121213-AJL-016	12/12/2013	<25	<1.0	0.98 J	<50	21	<5.0	<1.0	<5.0	<1.0	5.5 J	0.29 J	2.0 J	0.33 J	1.0 J
SB-30	W-R2330009-121213-AJL-016	12/12/2013	<25	<1.0	0.98 J	<50	21	<5.0	<1.0	<5.0	<1.0	5.5 J	0.29 J	2.0 J	0.33 J	1.0 J
SB-31 <sup>A</sup>	W-R2330009-121213-AJL-018	12/12/2013	<25	<1.0	<1.0	<50	<1.0	<5.0	<1.0	<5.0	<1.0	<1.0	<1.0	<5.0	0.44 J	<3.0
SB-31	W-R2330009-121213-AJL-018	12/12/2013	<25	<1.0	<1.0	<50	<1.0	<5.0	<1.0	<5.0	<1.0	<1.0	<1.0	<5.0	0.44 J	<3.0
SB-32 <sup>A</sup>	W-R2330009-121213-AJL-015	12/12/2013	<25	<1.0	<1.0	<50	1.1	<5.0	1.4	<5.0	<1.0	<1.0	<1.0	1.3 J	0.27 J	1.0 J
SB-32	W-R2330009-121213-AJL-015	12/12/2013	<25	<1.0	<1.0	<50	1.1	<5.0	1.4	<5.0	<1.0	<1.0	<1.0	1.3 J	0.27 J	1.0 J
SB-33 <sup>A</sup>	W-R2330009-121213-AJL-017	12/12/2013	<25	<1.0	<1.0	3.9 J	0.71 J	0.44 J	1.2	<5.0	<1.0	<1.0	<1.0	0.62 J	0.29 J	1.3 J
SB-33	W-R2330009-121213-AJL-017	12/12/2013	<25	<1.0	<1.0	3.9 J	0.71 J	0.44 J	1.2	<5.0	<1.0	<1.0	<1.0	0.62 J	0.29 J	1.3 J
SB-34 <sup>A</sup>	W-R2330009-121313-AJL-019	12/13/2013	<25	<1.0	<1.0	<50	<1.0	<5.0	<1.0	<5.0	<1.0	<1.0	<1.0	<5.0	0.38 J	<3.0
SB-34	W-R2330009-121313-AJL-019	12/13/2013	<25	<1.0	<1.0	<50	<1.0	<5.0	<1.0	<5.0	<1.0	<1.0	<1.0	<5.0	0.38 J	<3.0
Equipment Blank	W-R2330004-090512-MJF-05	9/5/2012	<25	<1.0	<1.0	120	<1.0	<5.0	<1.0	<5.0	<1.0	<1.0	<1.0	<5.0	<1.0	<3.0
Equipment Blank	W-R2330009-050113-MJF-006	5/1/2013	6.2 J	<1.0	<1.0	4.4 J	<1.0	<5.0	<1.0	<5.0	<1.0	<1.0	<1.0	<5.0	<1.0	<3.0
Equipment Blank <sup>A</sup>	W-R2330009-080813-ZTR-012	8/8/2013	2.8 J	<1.0	<1.0	0.79 J	<1.0	<5.0	<1.0	<5.0	1.3	<1.0	<1.0	<5.0	<1.0	<3.0
Equipment Blank	W-R2330009-080813-ZTR-012	8/8/2013	2.8 J	<1.0	<1.0	0.79 J	<1.0	<5.0	<1.0	<5.0	1.3	<1.0	<1.0	<5.0	<1.0	<3.0
Equipment Blank <sup>A</sup>	W-R2330009-121113-AJL-013	12/11/2013	<25	<1.0	<1.0	<50	<1.0	<5.0	<1.0	<5.0	<1.0	<1.0	<1.0	<5.0	<1.0	<3.0
Equipment Blank	W-R2330009-121113-AJL-013	12/11/2013	<25	<1.0	<1.0	<50	<1.0	<5.0	<1.0	<5.0	<1.0	<1.0	<1.0	<5.0	<1.0	<3.0

Notes:  
**Bold** indicates concentration above method detection limits.  
 Roman numerals indicate DEQ criterion number  
 A = Total Metals sample collected for comparison to dissolved metals analytical results.  
 E = Criterion is the aesthetic drinking water value, as required by Section 20120a(5) of NREPA  
 G = Calculated value based on a hardness of 150 mg/L  
 J = Analyte detected below quantitation limit.  
 Exceeds Generic Drinking Water Criteria (II)  
 Exceeds Generic Drinking Water Cleanup Criteria (II) and the Generic Health-Based Drinking Water Value  
 Exceeds Groundwater Surface Water Interface Criteria (III)  
 Exceeds Two or More DW (I), GSI (III) and/or Residential Health-Based Water Value (E)  
 Exceeds GSI Final Acute Value (FAV), also exceeds others  
 Notes in parentheses and standard abbreviations from MDEQ Operational Memorandum 1, Attachment 1, dated December 30, 2013 or MDEQ Guidance Document for the Vapor Intrusion Pathway, dated May 2013

**TABLE 3  
SUMMARY OF GROUND WATER SAMPLE LABORATORY ANALYTICAL DATA**

Van Buren Landfill Site  
Van Buren Township, Wayne County, Michigan

GROUNDWATER: Part 201/213 Generic Non-Residential Cleanup Criteria Revised December 30, 2013 and Guidance Document for the Vapor Intrusion Pathway May 2013 Units: µg/L			Semivolatile Organic Compounds (SVOCs)																			
			1,1-Biphenyl	2-Chlorophenol	2-Methylnaphthalene	2-Methylphenol	4-Methylphenol	2,4-Dimethylphenol	4-Chloroaniline	bis(2-Ethylhexyl)phthalate	Acetanaphthene	Acetophenone	Benzaldehyde	Butyl benzyl phthalate	Carbazole	Dibenzofuran	Diethyl phthalate	Dimethyl phthalate	Di-n-butyl phthalate	Fluorene	Naphthalene	Phenol
Non-residential Drinking Water Criteria (II)			ID	130	750	1,000	1,000	1,000	NA	6.0 (A)	3,800	4,400	NA	2,700 (S)	350	ID	16,000	2.1E+05	2,500	2,000 (S)	1,500	13,000
Non-residential Health-Based Drinking Water Value			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ground Water Surface Water Interface Criteria (GSI) (III)			ID	18	19	30 (M); 25	30 (M); 25	380	NA	25	38	ID	67 (X)	10 (M); 4.0	4.0	110	NA	9.7	12	11	450	NA
GSI Final Acute Value (FAV)			ID	NA	340	NA	NA	2,700	ID	285	200	NA	NA	72	NA	2,000	NA	75	220	200	6,800	NA
Groundwater Volatilization to Indoor Air Inhalation Criteria (V)			ID	1.1E+06	25,000 (S)	NLV	NLV	NLV	NA	NLV	4,200 (S)	6.1E+06 (S)	NA	NLV	NLV	10,000 (S)	NLV	NLV	NLV	2,000 (S)	31,000 (S)	NLV
Draft Ground Water Concentration for Vapor Intrusion (GV <sub>VIR</sub> ) (a)			ID	NA	3,900	NA	NA	NLV	NA	NA	2.30E+05	NA	NA	NA	NA	NA	NA	NA	3.00E+05	1,200	NA	NA
Water Solubility (VII)			ID	2.20E+07	24,600	2.80E+07	2.80E+07	7.87E+06	NA	340	4,240	6.1E+06 (S)	NA	2.69E+03	7,480	10,000	1.08E+06	4.19E+06	11,200	1,980	31,000	8.28E+07
Flammability & Explosivity Screening Level (VIII)			ID	ID	ID	NA	NA	ID	NA	NA	ID	ID	NA	ID	ID	ID	NA	NA	NA	ID	NA	NA
MONITORING WELL ID	SAMPLE ID	SAMPLE DATE	<10	<10	<5.0	<10	<10	<5.0	<10	<5.0	<5.0	<5.0	<10	<5.0	<10	<4.0	1.0 J	<5.0	1.7 J	<5.0	<5.0	<5.0
MW-1	W-R2330009-043013-MJF-002	4/30/2013	<10	<10	<5.0	<10	<10	<5.0	<10	<5.0	<5.0	<5.0	<10	<5.0	<10	<4.0	1.0 J	<5.0	1.7 J	<5.0	<5.0	<5.0
MW-1 <sup>A</sup>	W-R2330009-080713-ZTR-007	8/7/2013																				
MW-1	W-R2330009-080713-ZTR-007	8/7/2013	<10	<10	<5.0	<10	<10	<5.0	<10	<5.0	<5.0	<5.0	<10	<5.0	<10	<4.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
MW-1 <sup>A</sup>	W-R2330009-111413-ACN-013	11/14/2013																				
MW-1	W-R2330009-111413-ACN-013	11/14/2013	<10	<10	<5.0	<10	<10	<5.0	<10	<5.0	<5.0	<5.0	<10	<5.0	<10	<4.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
MW-3	W-R2330004-090512-MJF-01	9/5/2012	<10	<10	<5.0	<10	<10	<5.0	4.2 J	<5.0	<5.0	<5.0	<10	<5.0	0.85 J	<4.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
MW-3	W-R2330009-050213-MJF-009	5/2/2013	<10	<10	<5.0	<10	<10	<5.0	<10	<5.0	<5.0	<5.0	<10	<5.0	<10	<4.0	<5.0	<5.0	1.4 J	<5.0	<5.0	<5.0
MW-3 <sup>A</sup>	W-R2330009-080713-ZTR-004	8/7/2013																				
MW-3	W-R2330009-080713-ZTR-004	8/7/2013	<10	<10	<5.0	<10	<10	<5.0	<10	<5.0	<5.0	<5.0	<10	<5.0	<10	<4.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
MW-3 <sup>A</sup>	W-R2330009-111213-ACN-002	11/12/2013																				
MW-3	W-R2330009-111213-ACN-002	11/12/2013	<10	<10	<5.0	<10	<10	<5.0	<10	<5.0	<5.0	<5.0	<10	<5.0	<10	<4.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
MW-4	W-R2330004-090512-MJF-02	9/5/2012	<10	<10	<5.0	<10	<10	<5.0	<1.1	<5.0	<5.0	<5.0	<10	<5.0	<0.84	<4.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
MW-4 (DUP)	W-R2330004-090512-MJF-03	9/5/2012	<10	<10	<5.0	<10	<10	<5.0	<1.1	<5.0	<5.0	<5.0	<10	<5.0	<0.84	<4.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
MW-4	W-R2330009-050213-MJF-010	5/2/2013	<10	<10	<5.0	<10	<10	<5.0	<10	<5.0	<5.0	<5.0	<10	<5.0	<10	<4.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
MW-4 <sup>A</sup>	W-R2330009-080713-ZTR-005	8/7/2013																				
MW-4	W-R2330009-080713-ZTR-005	8/7/2013	<10	<10	<5.0	<10	<10	<5.0	<10	<5.0	<5.0	<5.0	<10	<5.0	<10	<4.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
MW-4 <sup>A</sup>	W-R2330009-111213-ACN-003	11/12/2013																				
MW-4	W-R2330009-111213-ACN-003	11/12/2013	<10	<10	<5.0	<10	<10	<5.0	<10	<5.0	<5.0	<5.0	<10	<5.0	<10	<4.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
MW-5	W-R2330009-050113-MJF-004	5/1/2013	<10	<10	<5.0	<10	<10	<5.0	<10	1.3 J	<5.0	<5.0	<10	<5.0	1.2 J	<4.0	0.99 J	<5.0	<5.0	<5.0	<5.0	<5.0
MW-5 (DUP)	W-R2330009-050113-MJF-005	5/1/2013	<10	<10	<5.0	<10	<10	<5.0	<10	1.3 J	<5.0	<5.0	<10	<5.0	1.2 J	<4.0	0.93 J	<5.0	<5.0	<5.0	<5.0	<5.0
MW-5 <sup>A</sup>	W-R2330009-080813-ZTR-009	8/8/2013			<5.0																	
MW-5	W-R2330009-080813-ZTR-009	8/8/2013	<10	<10	<5.0	<10	<10	<5.0	<10	<5.0	<5.0	<5.0	<10	<5.0	<10	<4.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
MW-5 <sup>A</sup>	W-R2330009-111213-ACN-004	11/12/2013			<5.0																	
MW-5	W-R2330009-111213-ACN-004	11/12/2013	<10	<10	<5.0	<10	<10	<5.0	<10	<5.0	<5.0	<5.0	<10	<5.0	<10	<4.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
MW-6	W-R2330004-090512-MJF-04	9/5/2012	<10	<10	<5.0	<10	<10	<5.0	<1.1	<5.0	<5.0	<5.0	<10	<5.0	<10	<4.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
MW-6	W-R2330009-050213-MJF-012	5/2/2013	<10	<10	<5.0	<10	<10	<5.0	<10	<5.0	<5.0	<5.0	<10	<5.0	<10	<4.0	<5.0	<5.0	1.4 J	<5.0	<5.0	<5.0
MW-6 <sup>A</sup>	W-R2330009-080713-ZTR-002	8/7/2013																				
MW-6	W-R2330009-080713-ZTR-002	8/7/2013	<10	<10	<5.0	<10	<10	<5.0	<1.1	<5.0	<5.0	<5.0	<10	<5.0	<10	<4.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
MW-6 <sup>A</sup>	W-R2330009-111313-ACN-011	11/13/2013																				
MW-6	W-R2330009-111313-ACN-011	11/13/2013	<10	<10	<5.0	<10	<10	<5.0	<10	0.47 J	<5.0	<5.0	<10	<5.0	<10	<4.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0

Notes:

**Bold** indicates concentration above method detection limits.

Roman numerals indicate DEQ criterion number

A = Total Metals sample collected for comparison to dissolved metals analytical results.

E = Criterion is the aesthetic drinking water value, as required by Section 20120a(5) of NREPA

G = Calculated value based on a hardness of 150 mg/L

J = Analyte detected below quantitation limit.

Exceeds Generic Drinking Water Criteria (II)

Exceeds Generic Drinking Water Cleanup Criteria (II) and the Generic Health-Based Drinking Water Value

Exceeds Groundwater Surface Water Interface Criteria (III)

Exceeds Two or More DW (I), GSI (III) and/or Residential Health-Based Water Value (E)

Exceeds GSI Final Acute Value (FAV), also exceeds others

Notes in parentheses and standard abbreviations from MDEQ Operational Memorandum 1, Attachment 1, dated December 30, 2013 or MDEQ Guidance

Document for the Vapor Intrusion Pathway, dated May 2013

**TABLE 3  
SUMMARY OF GROUND WATER SAMPLE LABORATORY ANALYTICAL DATA**

Van Buren Landfill Site  
Van Buren Township, Wayne County, Michigan

GROUNDWATER: Part 201/213 Generic Non-Residential Cleanup Criteria Revised December 30, 2013 and Guidance Document for the Vapor Intrusion Pathway May 2013 Units: µg/L			Semivolatile Organic Compounds (SVOCs)																			
			1,1-Biphenyl	2-Chlorophenol	2-Methylnaphthalene	2-Methylphenol	4-Methylphenol	2,4-Dimethylphenol	4-Chloroaniline	bis(2-Ethylhexyl)phthalate	Acetanaphthene	Acetophenone	Benzaldehyde	Butyl benzyl phthalate	Carbazole	Dibenzofuran	Diethyl phthalate	Dimethyl phthalate	Di-n-butyl phthalate	Fluorene	Naphthalene	Phenol
Non-residential Drinking Water Criteria (II)	ID	130	750	1,000	1,000	1,000	NA	6.0 (A)	3,800	4,400	NA	2,700 (S)	350	ID	16,000	2.1E+05	2,500	2,000 (S)	1,500	13,000		
Non-residential Health-Based Drinking Water Value	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		
Ground Water Surface Water Interface Criteria (GSI) (III)	ID	18	19	30 (M); 25	30 (M); 25	380	NA	25	38	ID	NA	67 (X)	10 (M); 4.0	4.0	110	NA	9.7	12	11	450		
GSI Final Acute Value (FAV)	ID	NA	340	NA	NA	2,700	ID	285	200	NA	NA	72	NA	2,000	NA	75	220	200	6,800			
Groundwater Volatilization to Indoor Air Inhalation Criteria (V)	ID	1.1E+06	25,000 (S)	NLV	NLV	NLV	NA	NLV	4,200 (S)	6.1E+06 (S)	NA	NLV	NLV	10,000 (S)	NLV	NLV	NLV	2,000 (S)	31,000 (S)	NLV		
Draft Ground Water Concentration for Vapor Intrusion (GW <sub>VIR</sub> ) (a)	ID	NA	3,900	NA	NA	NLV	NA	NA	2.30E+05	NA	NA	NA	NLV	NA	NA	NA	NA	3.00E+05	1,200	NA		
Water Solubility (VII)	ID	2.20E+07	24,600	2.80E+07	2.80E+07	7.87E+06	NA	340	4,240	6.1E+06 (S)	NA	2.69E+03	7,480	10,000	1.08E+06	4.19E+06	11,200	1,980	31,000	8.28E+07		
Flammability & Explosivity Screening Level (VIII)	ID	ID	ID	NA	NA	ID	NA	NA	ID	ID	NA	ID	ID	ID	NA	NA	NA	ID	NA	NA		
MONITORING WELL ID	SAMPLE ID	SAMPLE DATE																				
MW-7	W-R2330009-050213-MJF-008	5/2/2013	<10	<10	<5.0	<10	<10	<5.0	<10	1.1 J	<5.0	<5.0	<10	<5.0	<10	<4.0	0.95 J	<5.0	<5.0	<5.0	<5.0	
MW-7 <sup>A</sup>	W-R2330009-080613-ZTR-001	8/6/2013																				
MW-7	W-R2330009-080613-ZTR-001	8/6/2013		<10	<5.0	<10	<10				<5.0	<5.0	<10	<5.0		<4.0					<5.0	<5.0
MW-7 <sup>A</sup>	W-R2330009-111313-ACN-006	11/13/2013																				
MW-7	W-R2330009-111313-ACN-006	11/13/2013	<10	<10	<5.0	<10	<10	<5.0	<10	0.18 J	<5.0	<5.0	<10	<5.0	<10	<4.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
MW-8	W-R2330009-050313-MJF-013	5/3/2013	<10	<10	<5.0	<10	<10	<5.0	<10	<5.0	<5.0	<10	<5.0	<10	<4.0	<5.0	<5.0	1.4 J	<5.0	<5.0	<5.0	<5.0
MW-8 <sup>A</sup>	W-R2330009-080713-ZTR-008	8/7/2013																				
MW-8	W-R2330009-080713-ZTR-008	8/7/2013	<10	<10	<5.0	<10	<10	<5.0	<10	<5.0	<5.0	<10	<5.0	<10	<4.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
MW-8 <sup>A</sup>	W-R2330009-111213-ACN-005	11/12/2013																				
MW-8	W-R2330009-111213-ACN-005	11/12/2013	<10	<10	<5.0	<10	<10	<5.0	<10	<5.0	<5.0	<10	<5.0	<10	<4.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
MW-9	W-R2330009-050113-MJF-007	5/1/2013	<10	<10	<5.0	<10	<10	<5.0	<10	1.1 J	<5.0	<5.0	<10	<5.0	<10	<4.0	0.91 J	0.92 J	1.7 J	<5.0	<5.0	<5.0
MW-9 <sup>A</sup>	W-R2330009-080813-ZTR-013	8/8/2013																				
MW-9	W-R2330009-080813-ZTR-013	8/8/2013	<10	<10	<5.0	<10	<10	<5.0	<10	<5.0	<5.0	<10	<5.0	<10	<4.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
MW-9 <sup>A</sup>	W-R2330009-111413-ACN-012	11/14/2013																				
MW-9	W-R2330009-111413-ACN-012	11/14/2013	<10	<10	<5.0	<10	<10	<5.0	<10	<5.0	<5.0	<10	<5.0	<10	<4.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
MW-10	W-R2330009-050113-MJF-003	5/1/2013	<10	<10	<5.0	<10	<10	0.86 J	<10	<5.0	<5.0	<10	<5.0	<10	<4.0	1.0 J	<5.0	1.7 J	1.1 J	<5.0	<5.0	<5.0
MW-10 <sup>A</sup>	W-R2330009-080813-ZTR-010	8/8/2013																				
MW-10	W-R2330009-080813-ZTR-010	8/8/2013	<10	<10	<5.0	<10	<10	<5.0	<10	<5.0	<5.0	<10	<5.0	<10	<4.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
MW-10 (DUP)	W-R2330009-080813-ZTR-011	8/8/2013																				
MW-10 (DUP)	W-R2330009-080813-ZTR-011	8/8/2013	<10	<10	<5.0	<10	<10	<5.0	<10	<5.0	<5.0	<10	<5.0	<10	<4.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
MW-10 <sup>A</sup>	W-R2330009-111313-ACN-008	11/13/2013																				
MW-10	W-R2330009-111313-ACN-008	11/13/2013	<10	<10	<5.0	<10	<10	<5.0	<10	<5.0	<5.0	<10	<5.0	0.28 J	<4.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
MW-10 <sup>A</sup> (DUP)	W-R2330009-111313-ACN-009	11/13/2013																				
MW-10 (DUP)	W-R2330009-111313-ACN-009	11/13/2013	<10	<10	<5.0	<10	<10	<5.0	<10	<5.0	<5.0	<10	<5.0	<10	<4.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
MW-11	W-R2330009-043013-MJF-001	4/30/2013	0.56 J	<10	<5.0	<10	<10	<5.0	<10	1.1 J	<5.0	<5.0	<10	<5.0	<10	<4.0	0.92 J	<5.0	1.7 J	<5.0	<5.0	<5.0
MW-11 <sup>A</sup>	W-R2330009-080713-ZTR-006	8/7/2013																				
MW-11 <sup>A</sup>	W-R2330009-111213-ACN-001	11/12/2013																				
MW-11	W-R2330009-111213-ACN-001	11/12/2013	<10	<10	<5.0	<10	<10	<5.0	<10	<5.0	<5.0	<10	<5.0	<10	<4.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
MW-12	W-R2330009-050213-MJF-011	5/2/2013	<10	<10	<5.0	<10	<10	<5.0	<10	<5.0	<5.0	<10	<5.0	<10	<4.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
MW-12 <sup>A</sup>	W-R2330009-080713-ZTR-003	8/7/2013																				
MW-12	W-R2330009-080713-ZTR-003	8/7/2013	<10	<10	<5.0	<10	<10	<5.0	<10	<5.0	<5.0	<10	<5.0	<10	<4.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
MW-12 <sup>A</sup>	W-R2330009-111313-ACN-007	11/13/2013																				
MW-12	W-R2330009-111313-ACN-007	11/13/2013	<10	<10	<5.0	<10	<10	0.24 J	<5.0	<5.0	<5.0	<10	<5.0	<10	<4.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
SW-1	W-R2330009-050313-MJF-015	5/3/2013	<80	<10	<5.0	<10	<10	<80	<80	<40	<5.0	<5.0	<10	<5.0	<80	<4.0	<40	<40	<40	<40	<40	<5.0
SW-2	W-R2330009-050313-MJF-014	5/3/2013	<80	<10	<5.0	<10	<10	<80	<80	<40	<5.0	<5.0	<10	<5.0	<80	<4.0	<40	<40	<40	1.3 J	<40	<5.0
SW-3	W-R2330009-051013-MJF-016	5/10/2013	<80	<10	<5.0	<10	<10	<80	<80	<40	<5.0	<5.0	<10	<5.0	<80	<4.0	<40	<40	<40	<40	<40	<5.0

Notes:  
**Bold** indicates concentration above method detection limits.  
 Roman numerals indicate DEQ criterion number  
 A = Total Metals sample collected for comparison to dissolved metals analytical results.  
 E = Criterion is the aesthetic drinking water value, as required by Section 20120a(5) of NREPA  
 G = Calculated value based on a hardness of 150 mg/L  
 J = Analyte detected below quantitation limit.  
 Exceeds Generic Drinking Water Criteria (II)  
 Exceeds Generic Drinking Water Cleanup Criteria (II) and the Generic Health-Based Drinking Water Value  
 Exceeds Groundwater Surface Water Interface Criteria (III)  
 Exceeds Two or More DW (I), GSI (III) and/or Residential Health-Based Water Value (E)  
 Exceeds GSI Final Acute Value (FAV), also exceeds others

Notes in parentheses and standard abbreviations from MDEQ Operational Memorandum 1, Attachment 1, dated December 30, 2013 or MDEQ Guidance Document for the Vapor Intrusion Pathway, dated May 2013

**TABLE 3  
SUMMARY OF GROUND WATER SAMPLE LABORATORY ANALYTICAL DATA**

Van Buren Landfill Site  
Van Buren Township, Wayne County, Michigan

GROUNDWATER: Part 201/213 Generic Non-Residential Cleanup Criteria Revised December 30, 2013 and Guidance Document for the Vapor Intrusion Pathway May 2013 Units: µg/L			Semivolatile Organic Compounds (SVOCs)																			
			1,1-Dibromoethene	1,1-Dichloroethene	1,1-Dichloroethane	1,1-Dichloroethane	1,1-Dichloroethane	1,1-Dichloroethane	1,1-Dichloroethane	1,1-Dichloroethane	1,1-Dichloroethane	1,1-Dichloroethane	1,1-Dichloroethane	1,1-Dichloroethane	1,1-Dichloroethane	1,1-Dichloroethane	1,1-Dichloroethane	1,1-Dichloroethane	1,1-Dichloroethane	1,1-Dichloroethane	1,1-Dichloroethane	1,1-Dichloroethane
Non-residential Drinking Water Criteria (II)	ID	130	750	1,000	1,000	1,000	1,000	1,000	6.0 (A)	3,800	4,400	NA	2,700 (S)	350	ID	16,000	2.1E+05	2,500	2,000 (S)	1,500	13,000	
Non-residential Health-Based Drinking Water Value	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Ground Water Surface Water Interface Criteria (GSI) (III)	ID	18	19	30 (M); 25	30 (M); 25	380	NA	25	38	ID	NA	67 (X)	10 (M); 4.0	4.0	110	NA	9.7	12	11	450		
GSI Final Acute Value (FAV)	ID	NA	340	NA	NA	2,700	ID	285	200	NA	NA	72	NA	2,000	NA	75	220	200	6,800			
Groundwater Volatilization to Indoor Air Inhalation Criteria (V)	ID	1.1E+06	25,000 (S)	NLV	NLV	NLV	NA	NLV	4,200 (S)	6.1E+06 (S)	NA	NLV	NLV	10,000 (S)	NLV	NLV	NLV	NLV	2,000 (S)	31,000 (S)	NLV	
Draft Ground Water Concentration for Vapor Intrusion (GW <sub>VI,corrected</sub> ) (a)	ID	NA	3,900	NA	NA	NLV	NA	NA	2.30E+05	NA	NA	NA	NLV	NA	NA	NA	NA	NA	3.00E+05	1,200	NA	
Water Solubility (VII)	ID	2.20E+07	24,600	2.80E+07	2.80E+07	7.87E+06	NA	340	4,240	6.1E+06 (S)	NA	2.69E+03	7,480	10,000	1.08E+06	4.19E+06	11,200	1,980	31,000	8.28E+07		
Flammability & Explosivity Screening Level (VIII)	ID	ID	ID	NA	NA	ID	NA	NA	ID	ID	ID	NA	ID	ID	ID	NA	NA	NA	ID	NA	NA	
MONITORING WELL ID	SAMPLE ID	SAMPLE DATE	1,1-Dibromoethene	1,1-Dichloroethene	1,1-Dichloroethane	1,1-Dichloroethane	1,1-Dichloroethane	1,1-Dichloroethane	1,1-Dichloroethane	1,1-Dichloroethane	1,1-Dichloroethane	1,1-Dichloroethane	1,1-Dichloroethane	1,1-Dichloroethane	1,1-Dichloroethane	1,1-Dichloroethane	1,1-Dichloroethane	1,1-Dichloroethane	1,1-Dichloroethane	1,1-Dichloroethane	1,1-Dichloroethane	
SB-13 <sup>A</sup>	W-R2330009-121013-AJL-008	12/10/2013	<10	<10	<5.0	<10	<10	<5.0	<10	<5.0	<5.0	<5.0	<10	<b>0.28 J</b>	<10	<4.0	<5.0	<5.0	<b>0.21 J</b>	<5.0	<5.0	<5.0
SB-13	W-R2330009-121013-AJL-008	12/10/2013	<10	<10	<5.0	<10	<10	<5.0	<10	<5.0	<5.0	<5.0	<10	<b>0.28 J</b>	<10	<4.0	<5.0	<5.0	<b>0.21 J</b>	<5.0	<5.0	<5.0
SB-14 <sup>A</sup>	W-R2330009-121013-AJL-007	12/10/2013	<10	<10	<5.0	<10	<10	<5.0	<10	<b>0.77 J</b>	<5.0	<5.0	<10	<b>0.34 J</b>	<10	<4.0	<5.0	<5.0	<b>0.25 J</b>	<5.0	<5.0	<5.0
SB-14	W-R2330009-121013-AJL-007	12/10/2013	<10	<10	<5.0	<10	<10	<5.0	<10	<b>0.77 J</b>	<5.0	<5.0	<10	<b>0.34 J</b>	<10	<4.0	<5.0	<5.0	<b>0.25 J</b>	<5.0	<5.0	<5.0
SB-15 <sup>A</sup>	W-R2330009-120913-AJL-006	12/9/2013	<10	<10	<5.0	<10	<10	<5.0	<10	<5.0	<5.0	<5.0	<10	<b>0.56 J</b>	<10	<4.0	<5.0	<5.0	<b>0.23 J</b>	<5.0	<5.0	<5.0
SB-15	W-R2330009-120913-AJL-006	12/9/2013	<10	<10	<5.0	<10	<10	<5.0	<10	<5.0	<5.0	<5.0	<10	<b>0.56 J</b>	<10	<4.0	<5.0	<5.0	<b>0.23 J</b>	<5.0	<5.0	<5.0
SB-21 <sup>A</sup>	W-R2330009-120513-RD-001	12/5/2013	<10	<10	<b>0.19 J</b>	<10	<b>0.41 J</b>	<5.0	<10	<b>1.6 J</b>	<b>0.54 J</b>	<b>0.22 J</b>	<b>0.79 J</b>	<5.0	<10	<b>0.41 J</b>	<b>0.35 J</b>	<5.0	<5.0	<b>0.94 J</b>	<5.0	<b>0.44 J</b>
SB-21	W-R2330009-120513-RD-001	12/5/2013	<10	<10	<b>0.19 J</b>	<10	<b>0.41 J</b>	<5.0	<10	<b>1.6 J</b>	<b>0.54 J</b>	<b>0.22 J</b>	<b>0.79 J</b>	<5.0	<10	<b>0.41 J</b>	<b>0.35 J</b>	<5.0	<5.0	<b>0.94 J</b>	<5.0	<b>0.44 J</b>
SB-22 <sup>A</sup>	W-R2330009-120513-RD-002	12/5/2013	<10	<10	<5.0	<10	<10	<5.0	<10	<5.0	<5.0	<5.0	<10	<b>0.12 J</b>	<5.0	<4.0	<5.0	<5.0	<b>0.14 J</b>	<5.0	<5.0	<5.0
SB-22	W-R2330009-120513-RD-002	12/5/2013	<10	<10	<5.0	<10	<10	<5.0	<10	<5.0	<5.0	<5.0	<10	<b>0.12 J</b>	<5.0	<4.0	<5.0	<5.0	<b>0.14 J</b>	<5.0	<5.0	<5.0
SB-23 <sup>A</sup>	W-R2330009-120513-RD-003	12/5/2013	<10	<10	<5.0	<10	<10	<5.0	<10	<5.0	<5.0	<5.0	<10	<5.0	<10	<4.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
SB-23	W-R2330009-120513-RD-003	12/5/2013	<10	<10	<5.0	<10	<10	<5.0	<10	<5.0	<5.0	<5.0	<10	<5.0	<10	<4.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
SB-24 <sup>A</sup>	W-R2330009-120613-RD-004	12/6/2013	<10	<10	<5.0	<10	<10	<5.0	<10	<5.0	<5.0	<5.0	<10	<5.0	<10	<4.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
SB-24	W-R2330009-120613-RD-004	12/6/2013	<10	<10	<5.0	<10	<10	<5.0	<10	<5.0	<5.0	<5.0	<10	<5.0	<10	<4.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
SB-25 <sup>A</sup>	W-R2330009-120613-RD-005	12/6/2013	<10	<10	<5.0	<10	<10	<5.0	<10	<5.0	<5.0	<5.0	<10	<5.0	<10	<4.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
SB-25	W-R2330009-120613-RD-005	12/6/2013	<10	<10	<5.0	<10	<10	<5.0	<10	<5.0	<5.0	<5.0	<10	<5.0	<10	<4.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
SB-26 <sup>A</sup>	W-R2330009-121013-AJL-009	12/10/2013	<10	<10	<5.0	<10	<10	<5.0	<10	<5.0	<5.0	<5.0	<10	<5.0	<10	<4.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
SB-26	W-R2330009-121013-AJL-009	12/10/2013	<10	<10	<5.0	<10	<10	<5.0	<10	<5.0	<5.0	<5.0	<10	<5.0	<10	<4.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
SB-27 <sup>A</sup>	W-R2330009-121113-AJL-010	12/11/2013	<10	<10	<5.0	<10	<10	<5.0	<10	<b>0.26 J</b>	<5.0	<5.0	<10	<b>0.28 J</b>	<10	<4.0	<5.0	<5.0	<b>0.22 J</b>	<5.0	<5.0	<5.0
SB-27	W-R2330009-121113-AJL-010	12/11/2013	<10	<10	<5.0	<10	<10	<5.0	<10	<b>0.26 J</b>	<5.0	<5.0	<10	<b>0.28 J</b>	<10	<4.0	<5.0	<5.0	<b>0.22 J</b>	<5.0	<5.0	<5.0
SB-27 <sup>A</sup> (DUP)	W-R2330009-121113-AJL-011	12/11/2013	<10	<10	<5.0	<10	<10	<5.0	<10	<5.0	<5.0	<5.0	<10	<b>0.29 J</b>	<10	<4.0	<5.0	<5.0	<b>0.19 J</b>	<5.0	<5.0	<5.0
SB-27 (DUP)	W-R2330009-121113-AJL-011	12/11/2013	<10	<10	<5.0	<10	<10	<5.0	<10	<5.0	<5.0	<5.0	<10	<b>0.29 J</b>	<10	<4.0	<5.0	<5.0	<b>0.19 J</b>	<5.0	<5.0	<5.0
SB-28 <sup>A</sup>	W-R2330009-121113-AJL-012	12/11/2013	<10	<10	<5.0	<10	<10	<5.0	<10	<b>0.46 J</b>	<5.0	<5.0	<10	<5.0	<10	<4.0	<5.0	<5.0	<b>0.18 J</b>	<5.0	<5.0	<5.0
SB-28	W-R2330009-121113-AJL-012	12/11/2013	<10	<10	<5.0	<10	<10	<5.0	<10	<b>0.46 J</b>	<5.0	<5.0	<10	<5.0	<10	<4.0	<5.0	<5.0	<b>0.18 J</b>	<5.0	<5.0	<5.0
SB-29 <sup>A</sup>	W-R2330009-121213-AJL-014	12/12/2013	<10	<b>0.67 J</b>	<b>1.6 J</b>	<b>0.46 J</b>	<b>2.0 J</b>	<5.0	<10	<5.0	<b>0.60 J</b>	<b>1.0 J</b>	<b>1.2 J</b>	<5.0	<10	<4.0	<5.0	<5.0	<b>0.26 J</b>	<b>0.57 J</b>	<b>1.3 J</b>	<b>0.36 J</b>
SB-29	W-R2330009-121213-AJL-014	12/12/2013	<10	<b>0.67 J</b>	<b>1.6 J</b>	<b>0.46 J</b>	<b>2.0 J</b>	<5.0	<10	<5.0	<b>0.60 J</b>	<b>1.0 J</b>	<b>1.2 J</b>	<5.0	<10	<4.0	<5.0	<5.0	<b>0.26 J</b>	<b>0.57 J</b>	<b>1.3 J</b>	<b>0.36 J</b>
SB-30 <sup>A</sup>	W-R2330009-121213-AJL-016	12/12/2013	<10	<b>3.1 J</b>	<b>2.9 J</b>	<10	<10	<5.0	<10	<5.0	<b>1.2 J</b>	<5.0	<b>0.92 J</b>	<5.0	<10	<b>0.64 J</b>	<5.0	<5.0	<b>0.21 J</b>	<b>1.1 J</b>	<b>2.2 J</b>	<b>0.40 J</b>
SB-30	W-R2330009-121213-AJL-016	12/12/2013	<10	<b>3.1 J</b>	<b>2.9 J</b>	<10	<10	<5.0	<10	<5.0	<b>1.2 J</b>	<5.0	<b>0.92 J</b>	<5.0	<10	<b>0.64 J</b>	<5.0	<5.0	<b>0.21 J</b>	<b>1.1 J</b>	<b>2.2 J</b>	<b>0.40 J</b>
SB-31 <sup>A</sup>	W-R2330009-121213-AJL-018	12/12/2013	<10	<10	<5.0	<10	<10	<5.0	<10	<5.0	<5.0	<5.0	<10	<b>0.65 J</b>	<10	<4.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
SB-31	W-R2330009-121213-AJL-018	12/12/2013	<10	<10	<5.0	<10	<10	<5.0	<10	<5.0	<5.0	<5.0	<10	<b>0.65 J</b>	<10	<4.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
SB-32 <sup>A</sup>	W-R2330009-121213-AJL-015	12/12/2013	<10	<10	<b>1.2 J</b>	<10	<10	<5.0	<10	<b>0.46 J</b>	<5.0	<5.0	<b>0.85 J</b>	<5.0	<10	<4.0	<5.0	<5.0	<b>0.37 J</b>	<b>0.17 J</b>	<b>1.0 J</b>	<5.0
SB-32	W-R2330009-121213-AJL-015	12/12/2013	<10	<10	<b>1.2 J</b>	<10	<10	<5.0	<10	<b>0.46 J</b>	<5.0	<5.0	<b>0.85 J</b>	<5.0	<10	<4.0	<5.0	<5.0	<b>0.37 J</b>	<b>0.17 J</b>	<b>1.0 J</b>	<5.0
SB-33 <sup>A</sup>	W-R2330009-121213-AJL-017	12/12/2013	<10	<10	<b>0.29 J</b>	<10	<b>0.40 J</b>	<5.0	<10	<b>0.59 J</b>	<b>0.39 J</b>	<5.0	<b>0.73 J</b>	<5.0	<10	<4.0	<b>0.37 J</b>	<5.0	<b>0.26 J</b>	<5.0	<b>0.20 J</b>	<5.0
SB-33	W-R2330009-121213-AJL-017	12/12/2013	<10	<10	<b>0.29 J</b>	<10	<b>0.40 J</b>	<5.0	<10	<b>0.59 J</b>	<b>0.39 J</b>	<5.0										

**TABLE 3  
SUMMARY OF GROUND WATER SAMPLE LABORATORY ANALYTICAL DATA**

Van Buren Landfill Site  
Van Buren Township, Wayne County, Michigan

GROUNDWATER: Part 201/213 Generic Non-Residential Cleanup Criteria Revised December 30, 2013 and Guidance Document for the Vapor Intrusion Pathway May 2013 Units: µg/L			Metals																			
			Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper (E)	Cyanide (P,R)	Iron (E)	Lead (E)	Manganese (E)	Mercury	Nickel	Selenium (E)	Silver	Thallium	Vanadium	Zinc
Non-residential Drinking Water Criteria (II)			50 (E)(V)	6.0 (A)	10 (A)	2,000 (A)	4.0 (A)	5.0(A)	100 (A)	100	1,000 (E)	200 (A)	300 (E)	4.0 (L)	50 (E)	2.0 (A)	100 (A)	50 (A)	98	2.0 (A)	62	5,000 (E)
Non-residential Health-Based Drinking Water Value			4,100	NA	NA	NA	NA	NA	NA	4,000	NA	5,600	NA	2,500	NA	NA	NA	NA	NA	NA	NA	
Ground Water Surface Water Interface Criteria (GSI) (III)			NA	130 (X)	10	670 (G)	6.7 (G)	2.5 (G,X)	11	100	13 (G)	5.2	NA	29 (G,X)	2,800 (G,X)	0.0013	(G)	5.0	0.2 (M); 0.06	3.7 (X)	27	170 (G)
GSI Final Acute Value (FAV)			NA	2,300	680	3,844 (G)	120	13 (G)	1,588	740	39 (G)	NA	NA	551	12,112 (G)	2.8 <sup>P</sup>	1,320 (G)	120	1.1	94	220	330 (G)
Groundwater Volatilization to Indoor Air Inhalation Criteria (V)			NLV	NLV	NLV	NLV	NLV	NLV	NLV	NLV	NLV	NLV	NLV	NLV	56 (S)	NLV	NLV	NLV	NLV	NLV	NLV	NLV
Draft Ground Water Concentration for Vapor Intrusion (GV <sub>Vapor</sub> ) (a)			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Water Solubility (VII)			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	56	NA	NA	NA	NA	NA	NA	NA
Flammability & Explosivity Screening Level (VIII)			ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
MONITORING WELL ID	SAMPLE ID	SAMPLE DATE	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper (E)	Cyanide (P,R)	Iron (E)	Lead (E)	Manganese (E)	Mercury	Nickel	Selenium (E)	Silver	Thallium	Vanadium	Zinc
MW-1	W-R2330009-043013-MJF-002	4/30/2013	6.1 J	0.43 J	15	1,500	<1.0	<1.0	1.1 J	2.8 J	1.3 J	<0.005	17,000	<3.0	130	<0.2	5.3 J	<5.0	<2.0	<2.0	1.4 J	9.1 J
MW-1 <sup>A</sup>	W-R2330009-080713-ZTR-007	8/7/2013	67	0.21 J	23	1,700	<1.0	0.17 J	1.5 J	3.4 J	3.3 J	<0.005	25,000	0.25 J	120	<0.2	8.0 J	<5.0	<2.0	<2.0	2.0 J	6.0 J
MW-1	W-R2330009-080713-ZTR-007	8/7/2013	5.3 J	0.27 J	23	1,900	<1.0	0.10 J	1.3 J	3.7 J	1.2 J	<0.005	25,000	0.076 J	120	<0.2	7.4 J	<5.0	<2.0	<2.0	1.7 J	5.6 J
MW-1 <sup>A</sup>	W-R2330009-111413-ACN-013	11/14/2013	33 J	0.19 J	28	2,200	<1.0	<1.0	2.0 J	3.1 J	0.62 J	<0.005	21,000	0.17 J	86	<0.2	7.7 J	<5.0	<2.0	<2.0	1.7 J	3.4 J
MW-1	W-R2330009-111413-ACN-013	11/14/2013	4.8 J	0.21 J	27	2,200	<1.0	0.12 J	2.5 J	3.7 J	<4.0	0.0044 J	21,000	<3.0	90	<0.2	8.2 J	<5.0	<2.0	<2.0	1.8 J	3.4 J
MW-3	W-R2330004-090512-MJF-01	9/5/2012	6.0 J	0.29 J	14	900	<1.0	<1.0	1.1 J	4.2 J	0.39 J	<0.005	9,300	0.12 J	86	<0.2	15 J	0.91 J	<2.0	<2.0	0.60 J	3.7 J
MW-3	W-R2330009-050213-MJF-009	5/2/2013	10 J	0.51 J	1.5 J	220	<1.0	0.047 J	0.86 J	1.5 J	3.2 J	<0.005	2,000	0.11 J	67	<0.2	4.9 J	0.98 J	<2.0	0.49 J	0.53 J	2.3 J
MW-3 <sup>A</sup>	W-R2330009-080713-ZTR-004	8/7/2013	120	0.28 J	3.9 J	300	<1.0	0.11 J	0.84 J	0.95 J	5.4	<0.005	4,000	0.24 J	44 J	<0.2	5.6 J	3.6 J	<2.0	<2.0	0.75 J	4.4 J
MW-3	W-R2330009-080713-ZTR-004	8/7/2013	5.2 J	0.40 J	3.8 J	320	<1.0	0.063 J	4.5 J	1.9 J	3.5 J	<0.005	4,000	<3.0	46 J	<0.2	7.2 J	3.6 J	<2.0	<2.0	0.60 J	2.4 J
MW-3 <sup>A</sup>	W-R2330009-111213-ACN-002	11/12/2013	190	0.33 J	3.3 J	260	<1.0	<1.0	1.1 J	1.0 J	2.1 J	<0.005	3,800	0.30 J	38 J	<0.2	6.4 J	5.6	<2.0	<2.0	0.88 J	4.3 J
MW-3	W-R2330009-111213-ACN-002	11/12/2013	4.1 J	0.31 J	3.7 J	300	<1.0	<1.0	0.46 J	1.3 J	1.3 J	<0.005	3,900	<3.0	36 J	<0.2	6.6 J	5.0 J	<2.0	<2.0	0.32 J	2.6 J
MW-4	W-R2330004-090512-MJF-02	9/5/2012	7.6 J	0.097 J	1.4 J	470	<1.0	<1.0	1.1 J	1.2 J	<4.0	<0.005	14,000	<3.0	56	<0.2	2.4 J	0.46 J	<2.0	<2.0	0.75 J	1.9 J
MW-4 (DUP)	W-R2330004-090512-MJF-03	9/5/2012	11 J	0.14 J	1.2 J	480	<1.0	<1.0	0.85 J	1.3 J	0.26 J	<0.005	15,000	0.034 J	55	<0.2	2.4 J	<2.0	<2.0	<2.0	0.73 J	2.4 J
MW-4	W-R2330009-050213-MJF-010	5/2/2013	13 J	0.21 J	<5.0	410	<1.0	<1.0	0.84 J	2.7 J	<4.0	<0.005	11,000	<3.0	490	<0.2	2.8 J	<5.0	<2.0	<2.0	0.85 J	1.1 J
MW-4 <sup>A</sup>	W-R2330009-080713-ZTR-005	8/7/2013	4.5 J	0.22 J	<5.0	480	<1.0	0.29 J	0.80 J	2.4 J	2.7 J	<0.005	16,000	<3.0	77	<0.2	4.0 J	<5.0	<2.0	<2.0	1.0 J	2.4 J
MW-4	W-R2330009-080713-ZTR-005	8/7/2013	170	0.12 J	<5.0	490	<1.0	0.29 J	1.4 J	1.5 J	2.6 J	<0.005	16,000	0.30 J	80	<0.2	4.0 J	1.0 J	<2.0	<2.0	1.4 J	3.5 J
MW-4 <sup>A</sup>	W-R2330009-111213-ACN-003	11/12/2013	490	0.23 J	1.7 J	460	<1.0	<1.0	2.9 J	2.2 J	1.4 J	<0.005	16,000	1.2 J	96	<0.2	8.4 J	<5.0	<2.0	<2.0	2.1 J	7.5 J
MW-4	W-R2330009-111213-ACN-003	11/12/2013	10 J	0.19 J	1.1 J	460	<1.0	0.34 J	0.78 J	2.0 J	0.65 J	<0.005	15,000	<3.0	70	<0.2	4.7 J	<5.0	<2.0	<2.0	0.94 J	2.8 J
MW-5	W-R2330009-050113-MJF-004	5/1/2013	15 J	0.17 J	31	1,300	<1.0	<1.0	1.5 J	2.3 J	<4.0	<0.005	5,300	0.3 J	56	<0.2	3.5 J	0.69 J	<2.0	<2.0	1.3 J	1.1 J
MW-5 (DUP)	W-R2330009-050113-MJF-005	5/1/2013	12 J	0.27 J	31	1,300	<1.0	<1.0	1.9 J	2.3 J	<4.0	<0.005	5,400	0.061 J	58	<0.2	3.9 J	0.67 J	<2.0	0.069 J	1.2 J	1.1 J
MW-5 <sup>A</sup>	W-R2330009-080813-ZTR-009	8/8/2013	330	2.2 J	34	1,500	<1.0	0.84 J	2.1 J	2.3 J	3.5 J	<0.005	5,300	2.1 J	56	<0.2	4.9 J	0.75 J	<2.0	<2.0	2.2 J	10 J
MW-5	W-R2330009-080813-ZTR-009	8/8/2013	6.7 J	0.27 J	31	1,400	<1.0	0.16 J	1.6 J	3.1 J	2.1 J	<0.005	4,300	0.069 J	50	<0.2	4.3 J	<5.0	<2.0	<2.0	1.4 J	3.1 J
MW-5 <sup>A</sup>	W-R2330009-111213-ACN-004	11/12/2013	420	0.26 J	40	1,400	<1.0	0.98 J	2.6 J	2.6 J	3.5 J	<0.005	6,500	4.9 J	81 J	<0.2	6.3 J	<5.0	<2.0	<2.0	2.5 J	11 J
MW-5	W-R2330009-111213-ACN-004	11/12/2013	13 J	0.20 J	38	1,300	<1.0	0.57 J	2.9 J	2.6 J	<4.0	0.0016	5,900	<3.0	71 J	<0.2	5.9 J	<5.0	<2.0	<2.0	1.3 J	2.4 J
MW-6	W-R2330004-090512-MJF-04	9/5/2012	17 J	0.16 J	9.4	580	<1.0	<1.0	1.0 J	2.4 J	0.31 J	<0.005	26,000	0.057 J	500	<0.2	3.8 J	0.051 J	<2.0	<2.0	1.2 J	1.5 J
MW-6	W-R2330009-050213-MJF-012	5/2/2013	7.5 J	0.15 J	3.7 J	480	<1.0	<1.0	1.6 J	1.5 J	<4.0	<0.005	18,000	0.31 J	640	<0.2	5.0 J	<5.0	<2.0	<2.0	0.99 J	2.1 J
MW-6 <sup>A</sup>	W-R2330009-080713-ZTR-002	8/7/2013	47 J	0.11 J	6.0	540	<1.0	0.19 J	0.94 J	1.9 J	4.40	<0.005	22,000	0.29 J	790	<0.2	7.5 J	<5.0	<2.0	<2.0	1.3 J	3.8 J
MW-6	W-R2330009-080713-ZTR-002	8/7/2013	6.8 J	0.15 J	5.5	550	<1.0	0.25 J	0.75 J	2.4 J	3.5 J	<0.005	21,000	0.063 J	750	<0.2	7.6 J	<5.0	<2.0	<2.0	1.3 J	3.2 J
MW-6 <sup>A</sup>	W-R2330009-111313-ACN-011	11/13/2013	200 J	0.16 J	5.4 J	520	<1.0	0.25 J	1.8 J	1.7 J	1.4 J	<0.005	18,000	0.55 J	430	<0.2	8.5 J	<5.0	<2.0	<2.0	1.6 J	3.7 J
MW-6	W-R2330009-111313-ACN-011	11/13/2013	160	0.14 J	5.5 J	520	<1.0	0.43 J	2.2 J	1.7 J	1.3 J	<0.005	18,000	0.41 J	430	<0.2	8.5 J	<5.0	<2.0	<2.0	1.6 J	3.3 J

Notes:

**Bold** indicates concentration above method detection limits.

Roman numerals indicate DEQ criterion number

A = Total Metals sample collected for comparison to dissolved metals analytical results.

E = Criterion is the aesthetic drinking water value, as required by Section 20120a(5) of NREPA

G = Calculated value based on a hardness of 150 mg/L

J = Analyte detected below quantitation limit.

Exceeds Generic Drinking Water Criteria (II)

Exceeds Generic Drinking Water Cleanup Criteria (II) and the Generic Health-Based Drinking Water Value

Exceeds Groundwater Surface Water Interface Criteria (III)

Exceeds Two or More DW (I), GSI (III) and/or Residential Health-Based Water Value (E)

Exceeds GSI Final Acute Value (FAV), also exceeds others

Notes in parentheses and standard abbreviations from MDEQ Operational Memorandum 1, Attachment 1, dated December 30, 2013 or MDEQ Guidance

Document for the Vapor Intrusion Pathway, dated May 2013

**TABLE 3  
SUMMARY OF GROUND WATER SAMPLE LABORATORY ANALYTICAL DATA**

Van Buren Landfill Site  
Van Buren Township, Wayne County, Michigan

GROUNDWATER: Part 201/213 Generic Non-Residential Cleanup Criteria Revised December 30, 2013 and Guidance Document for the Vapor Intrusion Pathway May 2013 Units: µg/L			Metals																			
			Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper (B)	Cyanide (P-R)	Iron (B)	Lead (B)	Manganese (B)	Mercury	Nickel	Selenium (B)	Silver	Thallium	Vanadium	Zinc
Non-residential Drinking Water Criteria (II)			50 (E)(V)	6.0 (A)	10 (A)	2,000 (A)	4.0 (A)	5.0(A)	100 (A)	100	1,000 (E)	200 (A)	300 (E)	4.0 (L)	50 (E)	2.0 (A)	100 (A)	50 (A)	98	2.0 (A)	62	5,000 (E)
Non-residential Health-Based Drinking Water Value			4,100	NA	NA	NA	NA	NA	NA	NA	4,000	NA	5,600	NA	2,500	NA	NA	NA	NA	NA	NA	NA
Ground Water Surface Water Interface Criteria (GSI) (III)			NA	130 (X)	10	670 (G)	6.7 (G)	2.5 (G,X)	11	100	13 (G)	5.2	NA	29 (G,X)	2,800 (G,X)	0.0013	(G)	5.0	0.2 (M); 0.06	3.7 (X)	27	170 (G)
GSI Final Acute Value (FAV)			NA	2,300	680	3,844 (G)	120	13 (G)	1,588	740	39 (G)	NA	NA	551	12,112 (G)	2.8 <sup>P</sup>	1,320 (G)	120	1.1	94	220	330 (G)
Groundwater Volatilization to Indoor Air Inhalation Criteria (V)			NLV	NLV	NLV	NLV	NLV	NLV	NLV	NLV	NLV	NLV	NLV	NLV	56 (S)	NLV	NLV	NLV	NLV	NLV	NLV	NLV
Draft Ground Water Concentration for Vapor Intrusion (GV <sub>Vapor</sub> ) (a)			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Water Solubility (VII)			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	56	NA	NA	NA	NA	NA	NA
Flammability & Explosivity Screening Level (VIII)			ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
MONITORING WELL ID	SAMPLE ID	SAMPLE DATE	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper (B)	Cyanide (P-R)	Iron (B)	Lead (B)	Manganese (B)	Mercury	Nickel	Selenium (B)	Silver	Thallium	Vanadium	Zinc
MW-7	W-R2330009-050213-MJF-008	5/2/2013	6.4 J	0.84 J	0.87 J	450	<1.0	<1.0	1.4 J	3.4 J	2.1 J	<0.005	3,400	0.074 J	530	<0.2	11 J	<5.0	<2.0	<2.0	1.2 J	40 J
MW-7 <sup>A</sup>	W-R2330009-080613-ZTR-001	8/6/2013	39 J	0.39 J	18	520	<1.0	0.43 J	1.4 J	3.8 J	2.2 J		8,100	0.47 J	910	<0.2	14 J	<5.0	<2.0	<2.0	1.4 J	44 J
MW-7	W-R2330009-080613-ZTR-001	8/6/2013	5.3 J	0.48 J	17	520	<1.0	0.21 J	1.2 J	4.3 J	3.1 J	<0.005	7,700	0.096 J	880	<0.2	14 J	<5.0	<2.0	<2.0	1.2 J	39 J
MW-7 <sup>A</sup>	W-R2330009-111313-ACN-006	11/13/2013	21 J	0.58 J	7.0 J	370	<1.0	1.2 J	1.3 J	3.6 J	2.4 J		5,700	0.31 J	490	<0.2	14 J	<5.0	<2.0	<2.0	2.2 J	22 J
MW-7	W-R2330009-111313-ACN-006	11/13/2013	6.9 J	0.57 J	6.4 J	380	<1.0	0.92 J	1.3 J	4.1 J	1.5 J	0.0037 J	5,600	<3.0	480	<0.2	14 J	<5.0	<2.0	<2.0	2.3 J	6.6 J
MW-8	W-R2330009-050313-MJF-013	5/3/2013	11 J	0.21 J	1.2 J	380	<1.0	<1.0	0.56 J	1.5 J	<4.0	<0.005	6,200	<3.0	180	<0.2	4.4 J	<5.0	<2.0	<2.0	0.89 J	2.0 J
MW-8 <sup>A</sup>	W-R2330009-080713-ZTR-008	8/7/2013	51	0.16 J	4.1 J	470	<1.0	0.12 J	1.2 J	1.5 J	3.8 J		8,200	0.80 J	200	<0.2	6.8 J	<5.0	<2.0	<2.0	1.3 J	4.0 J
MW-8	W-R2330009-080713-ZTR-008	8/7/2013	6.3 J	0.20 J	3.9 J	460	<1.0	0.098 J	0.94 J	2.3 J	1.6 J	<0.005	8,100	0.074 J	200	<0.2	6.6 J	<5.0	<2.0	<2.0	0.91 J	3.0 J
MW-8 <sup>A</sup>	W-R2330009-111213-ACN-005	11/12/2013	98 J	0.12 J	3.7 J	420	<1.0	0.50 J	1.3 J	1.6 J	1.6 J		7,700	0.34 J	200	<0.2	7.6 J	<5.0	<2.0	<2.0	1.5 J	3.2 J
MW-8	W-R2330009-111213-ACN-005	11/12/2013	8.4 J	0.13 J	3.6 J	440	<1.0	0.49 J	2.0 J	1.8 J	1.5 J	0.0015 J	7,500	<3.0	210	<0.2	7.9 J	<5.0	<2.0	<2.0	0.89 J	2.4 J
MW-9	W-R2330009-050113-MJF-007	5/1/2013	6.6 J	0.2 J	44	1,700	<1.0	<1.0	1.9 J	2.4 J	0.71 J	<0.005	28,000	0.053 J	760	<0.2	6.3 J	<5.0	<2.0	<2.0	1.2 J	7.5 J
MW-9 <sup>A</sup>	W-R2330009-080813-ZTR-013	8/8/2013	13 J	0.13 J	52	1,300	<1.0	0.22 J	1.0 J	1.4 J	2.1 J		31,000	0.17 J	440	<0.2	5.2 J	<5.0	<2.0	<2.0	1.5 J	4.6 J
MW-9	W-R2330009-080813-ZTR-013	8/8/2013	4.7 J	0.21 J	52	1,300	<1.0	0.24 J	0.91 J	2.2 J	1.7 J	<0.005	30,000	0.068 J	430	<0.2	5.2 J	<5.0	<2.0	<2.0	1.4 J	2.9 J
MW-9 <sup>A</sup>	W-R2330009-111413-ACN-012	11/14/2013	43 J	0.16 J	59	2,100	<1.0	<1.0	2.0 J	1.7 J	<4.0		30,000	0.30 J	400	<0.2	6.9 J	<5.0	<2.0	0.14 J	1.5 J	3.7 J
MW-9	W-R2330009-111413-ACN-012	11/14/2013	4.7 J	0.17 J	60	2,200	<1.0	<1.0	1.0 J	1.7 J	<4.0	<0.005	29,000	0.083 J	340	<0.2	6.3 J	<5.0	<2.0	<2.0	1.5 J	2.5 J
MW-10	W-R2330009-050113-MJF-003	5/1/2013	6.1 J	0.19 J	7.4	1,800	<1.0	<1.0	1.8 J	2.6 J	<4.0	<0.005	17,000	0.054 J	350	<0.2	4.9 J	0.66 J	<2.0	<2.0	2.3 J	2.4 J
MW-10 <sup>A</sup>	W-R2330009-080813-ZTR-010	8/8/2013	26 J	0.27 J	6.5	1,700	<1.0	0.29 J	2.2 J	3.1 J	3.4 J		17,000	7.3	600	<0.2	7.5 J	<5.0	<2.0	<2.0	2.4 J	9.6 J
MW-10	W-R2330009-080813-ZTR-010	8/8/2013	8.1 J	0.31 J	6.7	1,800	<1.0	0.22 J	2.0 J	3.5 J	2.7 J	<0.005	17,000	2.4 J	600	<0.2	7.6 J	<5.0	<2.0	<2.0	2.3 J	5.2 J
MW-10 <sup>A</sup> (DUP)	W-R2330009-080813-ZTR-011	8/8/2013	25 J	0.26 J	6.7	1,700	<1.0	0.40 J	2.0 J	3.1 J	3.4 J		17,000	7.2	580	<0.2	7.4 J	0.75 J	<2.0	<2.0	2.2 J	8.5 J
MW-10 (DUP)	W-R2330009-080813-ZTR-011	8/8/2013	7.4 J	0.25 J	6.4	1,700	<1.0	0.27 J	2.0 J	3.1 J	2.4 J	<0.005	17,000	2.7 J	600	<0.2	7.4 J	0.79 J	<2.0	<2.0	2.2 J	4.9 J
MW-10 <sup>A</sup>	W-R2330009-111313-ACN-008	11/13/2013	26 J	0.24 J	10	1,900	<1.0	1.7 J	3.7 J	3.3 J	1.8 J		2,300	2.8 J	460	<0.2	8.1 J	<5.0	<2.0	<2.0	3.0 J	7.0 J
MW-10	W-R2330009-111313-ACN-008	11/13/2013	12 J	0.23 J	9.7 J	1,900	<1.0	1.4 J	2.7 J	3.8 J	1.1 J	0.0019 J	2,100	0.16 J	480	<0.2	8.1 J	<5.0	<2.0	<2.0	2.1 J	3.4 J
MW-10 <sup>A</sup> (DUP)	W-R2330009-111313-ACN-009	11/13/2013	26 J	0.23 J	10	1,900	<1.0	1.7 J	2.9 J	3.4 J	1.4 J		2,300	2.8 J	450	<0.2	8.0 J	<5.0	<2.0	<2.0	3.0 J	3.8 J
MW-10 (DUP)	W-R2330009-111313-ACN-009	11/13/2013	8.8 J	0.20 J	9.2 J	1,900	<1.0	1.7 J	2.6 J	3.4 J	1.1 J	0.0023 J	2,100	0.18 J	470	<0.2	8.2 J	<5.0	<2.0	<2.0	2.3 J	5.0 J
MW-11	W-R2330009-043013-MJF-001	4/30/2013	4.6 J	0.13 J	<5.0	26	<1.0	<1.0	0.69 J	0.41 J	0.76 J	<0.005	13 J	0.0079 J	7.4 J	<0.2	1.2 J	1.7 J	<2.0	<2.0	<4.0	2.0 J
MW-11 <sup>A</sup>	W-R2330009-080713-ZTR-006	8/7/2013	22 J	0.079 J	<5.0	57 J	<1.0	<1.0	0.49 J	0.51 J	2.7 J		270	<3.0	58	<0.2	2.2 J	0.74 J	<2.0	<2.0	0.24 J	2.5 J
MW-11 <sup>A</sup>	W-R2330009-111213-ACN-001	11/12/2013	730	0.66 J	1.0 J	38 J	0.13 J	<1.0	3.1 J	1.2 J	3.0 J		1,600	1.3 J	75	<0.2	4.8 J	1.1 J	<2.0	0.24 J	2.1 J	8.6 J
MW-11	W-R2330009-111213-ACN-001	11/12/2013	22 J	0.30 J	0.65 J	47 J	<1.0	<1.0	0.40 J	0.91 J	0.82 J	<0.005	150 J	<3.0	60	<0.2	3.2 J	0.83 J	<2.0	<2.0	<4.0	3.1 J
MW-12	W-R2330009-050213-MJF-011	5/2/2013	14 J	0.22 J	1.4 J	1,100	<1.0	<1.0	1.9 J	4.0 J	<4.0	<0.005	15,000	0.17 J	1,500	<0.2	3.3 J	<5.0	<0.20	<2.0	0.99 J	8.8 J
MW-12 <sup>A</sup>	W-R2330009-080713-ZTR-003	8/7/2013	170	0.15 J	1.2 J	1,400	<1.0	0.27 J	1.2 J	1.4 J	6.1		18,000	0.36 J	470	<0.2	4.3 J	<5.0	<0.20	<2.0	1.7 J	4.5 J
MW-12	W-R2330009-080713-ZTR-003	8/7/2013	6.9 J	0.26 J	0.93 J	1,500	<1.0	0.30 J	0.73 J	2.4 J	3.6 J	<0.005	17,000	0.062 J	420	<0.2	4.2 J	<5.0	<0.20	<2.0	1.2 J	2.7 J
MW-12 <sup>A</sup>	W-R2330009-111313-ACN-007	11/13/2013	89	0.16 J	0.79 J	1,600	<1.0	0.33 J	1.0 J	1.5 J	1.5 J		12,000	0.26 J	210	<0.2	4.5 J	<5.0	<2.0	0.12 J	1.3 J	3.4 J
MW-12	W-R2330009-111313-ACN-007	11/13/2013	6.9 J	0.16 J	0.85 J	1,500	<1.0	0.68 J	0.99 J	1.9 J	1.3 J	0.0012 J	12,000	<3.0	190	<0.2	4.7 J	<5.0	<2.0	<2.0	0.97 J	2.2 J
SW-1	W-R2330009-050313-MJF-015	5/3/2013	25 J	0.40 J	<5.0	27 J	<1.0	<1.0	1.1 J	1.5 J	4.0		50 J	0.069 J	22 J	<0.2	6.4 J	<5.0	<0.20	<2.0	<4.0	1.9 J
SW-2	W-R2330009-050313-MJF-014	5/3/2013	3.4 J	1.1 J	0.93 J	93 J	<1.0	0.063 J	0.44 J	0.55 J	5.2 J	0.0012 J	170 J	0.25 J	69	<0.2	4.8 J	<5.0	<0.20	<2.0	0.28 J	10 J
SW-3	W-R2330009-051013-MJF-016	5/10/2013	26 J	0.43 J	4.6 J	340	<1.0	0.046 J	1.2 J	3.4 J	13 J	<0.005	4,100	1.7 J	880	<0.2	13 J	<5.0	<2.0	0.093 J	1.1 J	51

Notes:

**Bold** indicates concentration above method detection limits.

Roman numerals indicate DEQ criterion number

A = Total Metals sample collected for comparison to dissolved metals analytical results.

E = Criterion is the aesthetic drinking water value, as required by Section 20120a(5) of NREPA

G = Calculated value based on a hardness of 150 mg/L

J = Analyte detected below quantitation limit.

Exceeds Generic Drinking Water Criteria (II)

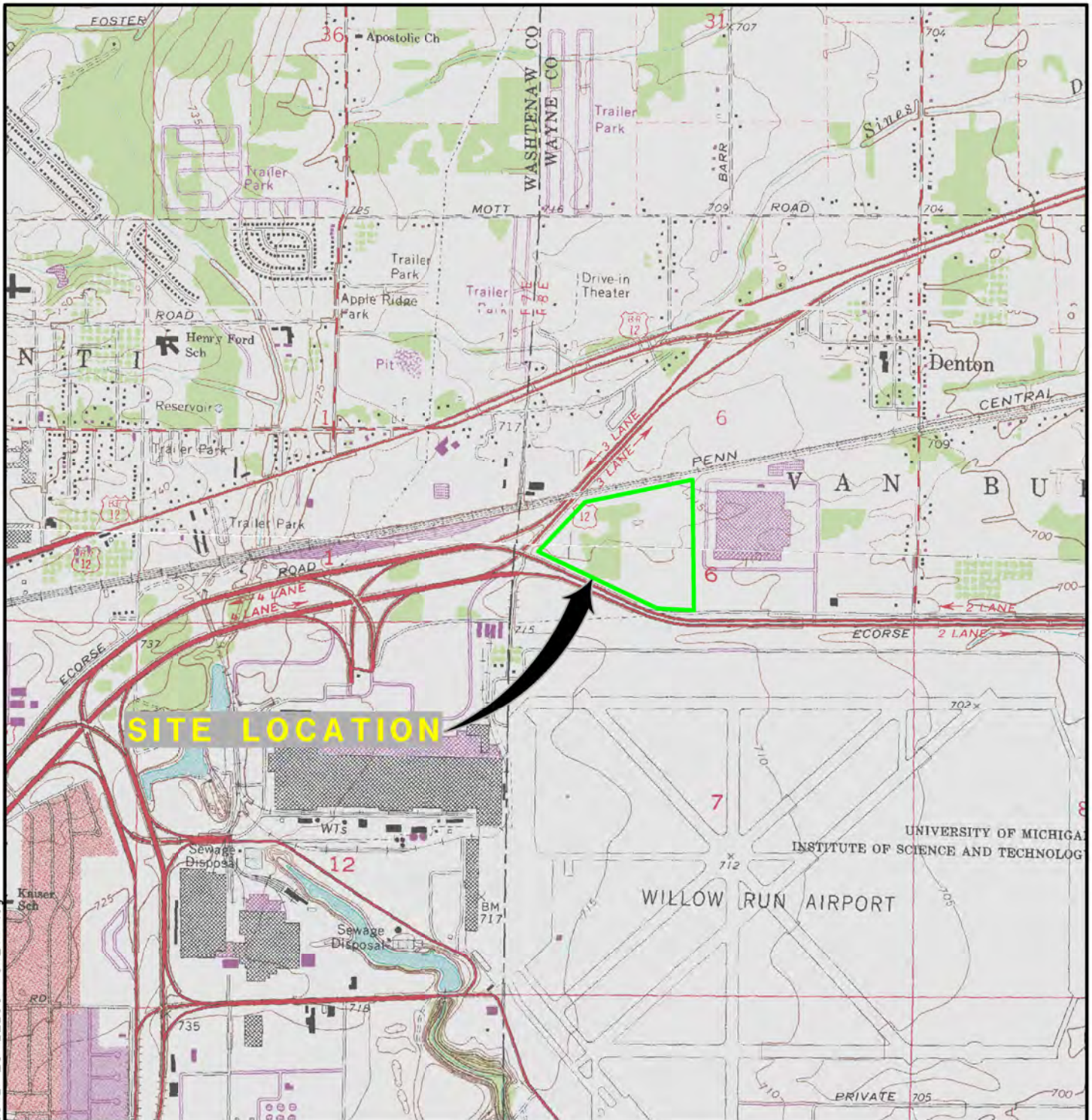
**TABLE 3  
SUMMARY OF GROUND WATER SAMPLE LABORATORY ANALYTICAL DATA**

Van Buren Landfill Site  
Van Buren Township, Wayne County, Michigan

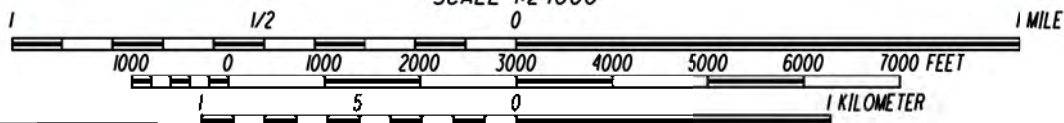
GROUNDWATER: Part 201/213 Generic Non-Residential Cleanup Criteria Revised December 30, 2013 and Guidance Document for the Vapor Intrusion Pathway May 2013 Units: µg/L			Metals																			
			Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper (B)	Cyanide (P,R)	Iron (B)	Lead (B)	Manganese (B)	Mercury	Nickel	Selenium (B)	Silver	Thallium	Vanadium	Zinc
Non-residential Drinking Water Criteria (II)			50 (E)(V)	6.0 (A)	10 (A)	2,000 (A)	4.0 (A)	5.0(A)	100 (A)	100	1,000 (E)	200 (A)	300 (E)	4.0 (L)	50 (E)	2.0 (A)	100 (A)	50 (A)	98	2.0 (A)	62	5,000 (E)
Non-residential Health-Based Drinking Water Value			4,100	NA	NA	NA	NA	NA	NA	NA	4,000	NA	5,600	NA	2,500	NA	NA	NA	NA	NA	NA	NA
Ground Water Surface Water Interface Criteria (III)			NA	130 (X)	10	670 (G)	6.7 (G)	2.5 (G,X)	11	100	13 (G)	5.2	NA	29 (G,X)	2,800 (G,X)	0.0013	(G)	5.0	0.2 (M); 0.06	3.7 (X)	27	170 (G)
GSI Final Acute Value (FAV)			NA	2,300	680	3,844 (G)	120	13 (G)	1,588	740	39 (G)	NA	NA	551	12,112 (G)	2.8 <sup>P</sup>	1,320 (G)	120	1.1	94	220	330 (G)
Groundwater Volatilization to Indoor Air Inhalation Criteria (V)			NLV	NLV	NLV	NLV	NLV	NLV	NLV	NLV	NLV	NLV	NLV	NLV	NLV	56 (S)	NLV	NLV	NLV	NLV	NLV	NLV
Draft Ground Water Concentration for Vapor Intrusion (GV <sub>Vapor</sub> ) (a)			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Water Solubility (VII)			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	56	NA	NA	NA	NA	NA	NA	NA
Flammability & Explosivity Screening Level (VIII)			ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
MONITORING WELL ID	SAMPLE ID	SAMPLE DATE	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper (B)	Cyanide (P,R)	Iron (B)	Lead (B)	Manganese (B)	Mercury	Nickel	Selenium (B)	Silver	Thallium	Vanadium	Zinc
SB-13 <sup>A</sup>	W-R2330009-121013-AJL-008	12/10/2013	1.2E+05	2.8 J	300	730 J	5.9 J	4.0 J	240	140 J	510		3.10E+05	250	5,300	0.98	410	13 J	0.78 J	7.6 J	380	1,500
SB-13	W-R2330009-121013-AJL-008	12/10/2013	23 J	0.37 J	<2.0	59 J	<1.0	0.071 J	<10	8.0 J	2.3 J	<0.005	71 J	0.072 J	610	<0.2	14 J	<5.0	<2.0	<2.0	0.20 J	4.0 J
SB-14 <sup>A</sup>	W-R2330009-121013-AJL-007	12/10/2013	2,100	0.54 J	2.1 J	65 J	0.12 J	0.20 J	4.6 J	9.6 J	7.4		3,500	4.0	800	<0.2	22	0.68 J	<2.0	0.35 J	7.3	22 J
SB-14	W-R2330009-121013-AJL-007	12/10/2013	14 J	0.37 J	<2.0	49 J	<1.0	0.064 J	<10	5.4 J	1.9 J	<0.005	150 J	0.11 J	470	<0.2	12 J	0.68 J	<2.0	<2.0	0.19 J	4.8 J
SB-15 <sup>A</sup>	W-R2330009-120913-AJL-006	12/9/2013	790	0.32 J	2.0 J	33 J	<1.0	0.052 J	5.2 J	1.5 J	2.9 J		1600	0.79 J	53	<0.2	10 J	0.77 J	<2.0	<2.0	2.4 J	8.1 J
SB-15	W-R2330009-120913-AJL-006	12/9/2013	6.9 J	0.43 J	0.77 J	34 J	<1.0	<1.0	<10	2.2 J	2.0 J	2.3 J	770	<3.0	53	<0.2	8.5 J	0.84 J	<2.0	<2.0	0.17 J	3.0 J
SB-21 <sup>A</sup>	W-R2330009-120513-RD-001	12/5/2013	38,000 J	13 J	37 J	2,900	1.7 J	11	75 J	38 J	320		73,000	1,700	1,800	0.39	86 J	<5.0	2.7	<2.0	86	2,200
SB-21	W-R2330009-120513-RD-001	12/5/2013	24 J	0.97 J	2.3 J	2,000	<1.0	<1.0	1.7 J	5.5 J	2.3 J	6.9	13,000	0.49 J	530	<0.2	10 J	<5.0	<2.0	1.1 J	1.3 J	26 J
SB-22 <sup>A</sup>	W-R2330009-120513-RD-002	12/5/2013	1,900	2.2 J	<5.0	1,000	<1.0	<1.0	8.1 J	4.3 J	40 J		16,000	59	550	<0.2	20 J	<5.0	<2.0	<2.0	4.0 J	210 J
SB-22	W-R2330009-120513-RD-002	12/5/2013	10 J	0.99 J	2.0 J	960	<1.0	<1.0	1.1 J	3.9 J	2.8 J	3.6 J	12,000	0.21 J	560	<0.2	16 J	<5.0	<2.0	0.081 J	0.77 J	24 J
SB-23 <sup>A</sup>	W-R2330009-120513-RD-003	12/5/2013	3,200	2.8 J	72	880 J	1.8 J	<1.0	130	40 J	150		8,600	86	1,600	0.12 J	130 J	12 J	<2.0	0.96 J	9.3	420 J
SB-23	W-R2330009-120513-RD-003	12/5/2013	17 J	0.39 J	23	690	<1.0	<1.0	2.3 J	3.0 J	1.5 J	31	12,000	0.084 J	70	<0.2	9.1 J	0.76 J	<2.0	<2.0	1.7 J	5.6 J
SB-24 <sup>A</sup>	W-R2330009-120613-RD-004	12/6/2013	6,700	2.6 J	130	860 J	3.5 J	2.9 J	130	77 J	220		1.9E+05	150	4,100	0.30	210	9.8 J	0.53 J	2.4 J	86	580
SB-24	W-R2330009-120613-RD-004	12/6/2013	52 J	0.60 J	6.7	410	<1.0	<1.0	<10	2.5 J	2.5 J	9.2	4,700	<3.0	360	<0.2	14 J	0.73 J	<2.0	<2.0	0.38 J	4.8 J
SB-25 <sup>A</sup>	W-R2330009-120613-RD-005	12/6/2013	250,000	2.6 J	470	1,300	9.8 J	13	540	270	700		5.2E+05	440	9,200	0.95	1,100	27 J	1.7 J	6.3 J	590	1,700
SB-25	W-R2330009-120613-RD-005	12/6/2013	930	4.3	11	84 J	<1.0	0.10 J	1.4 J	4.0 J	1.5 J	46.0	1,100	0.63 J	530	<0.2	5.0 J	<5.0	<2.0	0.26 J	3.2 J	4.5 J
SB-26 <sup>A</sup>	W-R2330009-121013-AJL-009	12/10/2013	15,000	5.0 J	610	970 J	12	17	1000	310	1,100		7.0E+05	640	14,000	0.51	1,100	47 J	2.5	13 J	660	2,900
SB-26	W-R2330009-121013-AJL-009	12/10/2013	60	22	8.6	57 J	<1.0	<1.0	<10	2.8 J	1.4 J	1.0 J	1,900	0.11 J	92	<0.2	14 J	0.75 J	<2.0	<2.0	0.67 J	14 J
SB-27 <sup>A</sup>	W-R2330009-121113-AJL-010	12/11/2013	62,000	2.5 J	86	610 J	3.2 J	3.2 J	290	57 J	220		1.4E+05	100	2,800	<0.2	210	9.4 J	<2.0	2.3 J	180	680
SB-27	W-R2330009-121113-AJL-010	12/11/2013	22 J	0.56 J	2.1 J	160	<1.0	<1.0	<10	5.3 J	2.8 J	1.5 J	7,400	<3.0	310	<0.2	25	<5.0	<2.0	<2.0	0.46 J	19 J
SB-27 <sup>A</sup> (DUP)	W-R2330009-121113-AJL-011	12/11/2013	17,000	1.1 J	18 J	300 J	<1.0	0.61 J	59 J	13 J	46		3.8E+04	19 J	730	<0.2	53 J	<5.0	<2.0	<2.0	46	140 J
SB-27 (DUP)	W-R2330009-121113-AJL-011	12/11/2013	11 J	0.48 J	2.0 J	150	<1.0	<1.0	<10	4.7 J	2.4 J	1.3 J	4,900	<3.0	300	<0.2	24	<5.0	<2.0	<2.0	<4.0	18 J
SB-28 <sup>A</sup>	W-R2330009-121113-AJL-012	12/11/2013	95,000	3.2 J	210	550 J	5.2 J	5.2 J	350	85 J	330		2.3E+05	200	4,100	0.23	310	13 J	0.75 J	3.3 J	320	800
SB-28	W-R2330009-121113-AJL-012	12/11/2013	31 J	1.8 J	10	110	<1.0	<1.0	<10	2.8 J	2.1 J	<0.005	1,400	<3.0	180	<0.2	15 J	<5.0	<2.0	<2.0	0.49 J	4.2 J
SB-29 <sup>A</sup>	W-R2330009-121213-AJL-014	12/12/2013	7,600	4.1 J	10 J	2,100	<1.0	2.8 J	71 J	12 J	90		5.1E+04	330	980	0.13	51 J	<5.0	<2.0	<2.0	24 J	470 J
SB-29	W-R2330009-121213-AJL-014	12/12/2013	25 J	0.83 J	<5.0	1,700	<1.0	<1.0	3.1 J	5.2 J	6.2 J	4.2 J	2.2E+04	<3.0	580	<0.2	12 J	<5.0	<2.0	<2.0	1.7 J	18 J
SB-30 <sup>A</sup>	W-R2330009-121213-AJL-016	12/12/2013	7,300	3.1 J	6.8 J	2,700	<1.0	2.4 J	22 J	7.2 J	58		4.1E+04	940	380 J	0.15	22 J	<5.0	<2.0	<2.0	19 J	950
SB-30	W-R2330009-121213-AJL-016	12/12/2013	18 J	0.43 J	<5.0	2,100	<1.0	<1.0	<10	3.6 J	<4.0	3.9 J	2.9E+04	1.1 J	260 J	<0.2	8.2 J	<5.0	<2.0	<2.0	<4.0	<500
SB-31 <sup>A</sup>	W-R2330009-121213-AJL-018	12/12/2013	2,000	0.34 J	5.7 J	84 J	0.1 J	<1.0	14	2.5 J	14		8.4E+03	11	130	0.1	9.7 J	<5.0	<2.0	<2.0	6.6	44
SB-31	W-R2330009-121213-AJL-018	12/12/2013	60 J	0.46 J	23 J	520 J	<1.0	<1.0	4.3 J	5.9 J	<4.0	2.1 J	2.1E+04	<3.0	170 J	<0.2	19 J	<5.0	<2.0	<2.0	<4.0	<27
SB-32 <sup>A</sup>	W-R2330009-121213-AJL-015	12/12/2013	1,600	1.7 J	<5.0	1,600	<1.0	2.4 J	12 J	6.2 J	31 J		3.0E+04	120	290 J	<0.2	31 J	<5.0	<2.0	<2.0	2.4 J	210 J
SB-32	W-R2330009-121213-AJL-015	12/12/2013	21 J	0.53 J	<5.0	1,500	<1.0	4.7 J	5.4 J	5.4 J	3.7 J		2.6E+04	<3.0	270 J	<0.2	19 J	<5.0	<2.0	<2.0	2.4 J	16 J
SB-33 <sup>A</sup>	W-R2330009-121213-AJL-017	12/12/2013	45,000	95	66	3,400	2.0 J	42	320	51 J	1,100		1.7E+05	3,200	2,200	2.2	320	<5.0	16	<2.0	90	9,900
SB-33	W-R2330009-121213-AJL-017	12/12/2013	30 J	1.6 J	<5.0	1,500	<1.0	<1.0	3.5 J	6.8 J	<4.0	60	2.3E+04	<3.0	420 J	<0.2	16 J	<5.0	<2.0	<2.0	2.3 J	61 J
SB-34 <sup>A</sup>	W-R2330009-121313-AJL-019	12/13/2013	11,000	0.97 J	12	150	0.49 J	0.26 J	59	11 J	50		3.1E+04	77	610	0.43	40	2.6 J	0.18 J	0.37 J	30	140
SB-34	W-R2330009-121313-AJL-019	12/13/2013	75 J	0.89 J	9.3 J	700 J	<1.0	<1.0	<10	4.6 J	<4.0	4.5 J	3.8E+04	<3.0	1,500	<0.2	26 J	<5.0	<2.0	<2.0	1.7 J	34 J
Equipment Blank	W-R2330004-090512-MJF-05	9/5/2012	2.9 J	<2.0	<5.0	0.59 J	<1.0	<1.0	0.14 J	0.26 J	0.70 J	6.9	24 J	0.27 J	1.5 J	<0.2	0.42 J	0.48 J	<2.0	<2.0	<0.30	15 J
Equipment Blank	W-R2330009-050113-MJF-006	5/1/2013	2.4 J	0.11 J	<5.0	3.1 J	<1.0	<1.0	0.59 J	0.79 J	0.57 J	<5.0	23 J	0.0053 J	2.3 J	<0.2	0.6 J	<5.0	<2.0	<2.0	<4.0	1.8 J

FIGURES





SCALE 1:24000



CONTOUR INTERVAL 10 FEET  
NATIONAL GEODETIC VERTICAL DATUM OF 1929



NOTE: MAP ADAPTED FROM USGS TOPOGRAPHIC QUADRANGLES, (MICHIGAN 7.5 MINUTE SERIES) DENTON, MICHIGAN (PHOTOGRAPHS TAKEN 1952 AND REVISED FROM PHOTOGRAPHS TAKEN 1966 AND FIELD CHECKED 1969, REVISED AGAIN IN 1982) AND YPSILANTI EAST, MICHIGAN, (PHOTOGRAPHS TAKEN 1952, AND REVISIONS TAKEN FROM PHOTOGRAPHS TAKEN 1966, AND FIELD CHECKED 1967, REVISED AGAIN IN 1982)



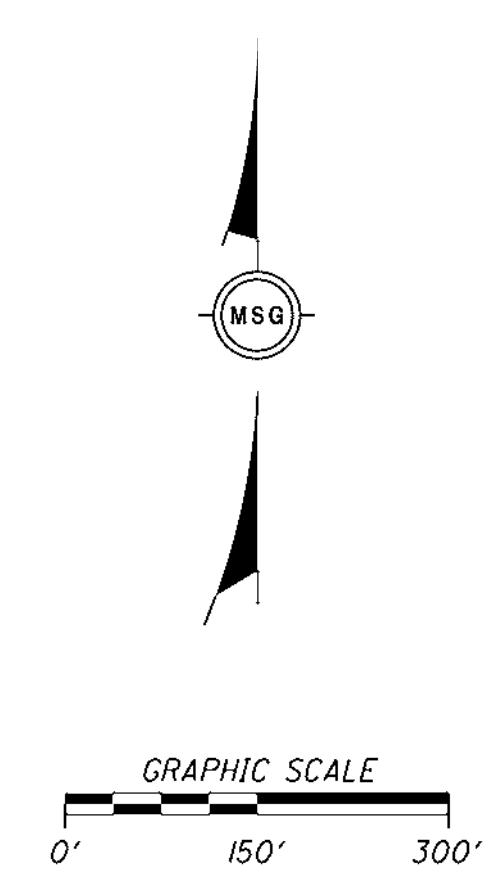
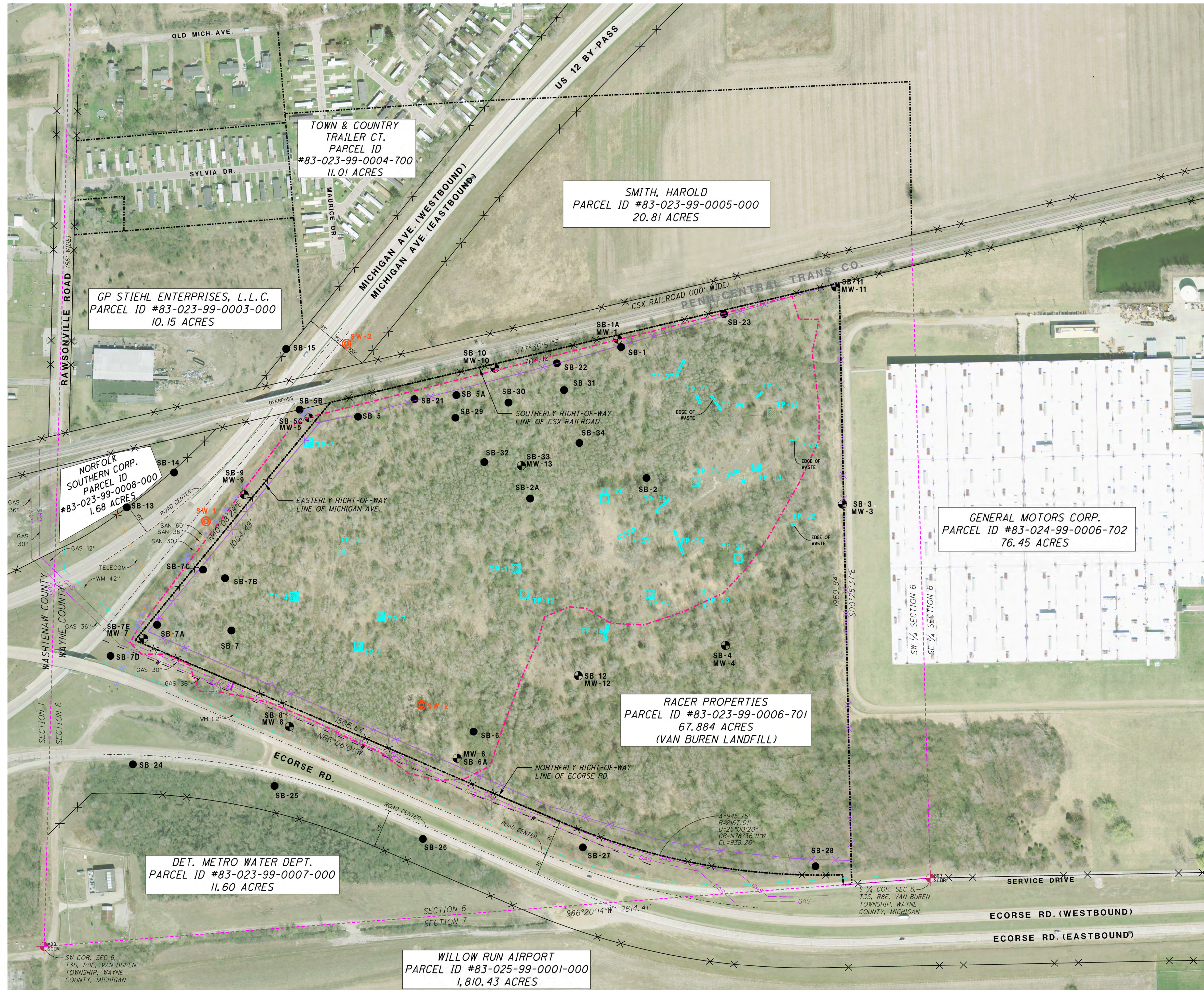
**FIGURE 1  
SITE LOCATION MAP**

VAN BUREN LANDFILL SITE  
MICHIGAN AVE. & ECORSE RD.  
VAN BUREN TOWNSHIP, WAYNE COUNTY, MICHIGAN

DATE 3/12/14	DRAWN BY CJB	DESIGNED BY MJF	PROJECT NO. R2330012
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3/11/2014

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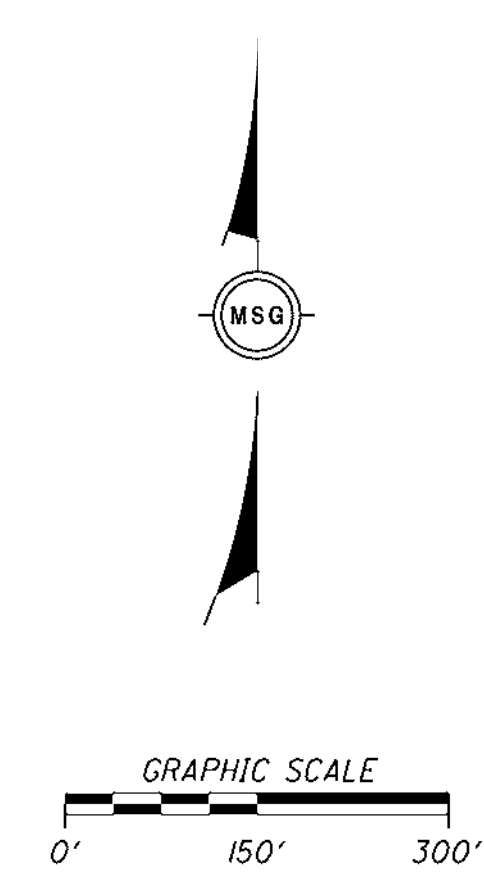


**LEGEND**

	PROPERTY LINE
	R/W LINE
	FENCE
	EXTENT OF EARTH DISTURBANCE BASED ON APRIL 26, 1970 AERIAL PHOTO
	GAS - EXISTING GAS MAIN
	FO - EXISTING FIBER OPTIC CABLE
	FW - EXISTING FIRE WATER
	W - EXISTING WATER MAIN
	ST - EXISTING STORM
	ST (3) THREE EX. PARALLEL STORM SEWERS
	SURFACE WATER SAMPLE LOCATION
	SOIL BORING LOCATION
	MONITORING WELL LOCATION
	TEST PIT LOCATION
	TP-32

- GENERAL NOTES:**
1. AERIAL PHOTO FROM SEMCOG DATED 2010.
  2. MONITORING WELL AND SURFACE WATER LOCATIONS SURVEYED APRIL 2013 BY MSG TO AN ACCURACY OF 0.01'.
  3. PHASE IA, IB AND II SITE INVESTIGATIONS, SOIL BORING, MONITORING WELL, TEST PIT AND GROUND AND GRUBBED TRAIL LOCATIONS SURVEYED JULY 2012, MAY 2013 AND DECEMBER 2013, RESPECTIVELY BY MSG USING SUBDECIMETER ACCURACY GLOBAL POSITIONING SYSTEM (GPS) UNIT.
  4. UTILITY LOCATIONS BASED ON INFORMATION FROM SAP/OAPP AND MISS DIG UTILITY MARKINGS.
  5. EASEMENT DIMENSIONS OBTAINED FROM MDOIT RIGHT-OF-WAY MAP NO. 82-R-1, PAGE 242, DATED SEPT 2006.
  6. PHASE II SITE INVESTIGATION BORINGS INCLUDING SB-13, SB-14, SB-15 AND SB-21 THROUGH SB-34 COMPLETED IN DECEMBER 2013.

NO.	DATE	BY	DESCRIPTION
	2/24/14	CJB	PHASE II SITE INVESTIGATION SAMPLING LOCATIONS
<b>FIGURE 2</b> <b>SITE SCHEMATIC</b>			



**LEGEND**

- EXTENT OF AREA OF INTEREST (AOI)
- PROPERTY LINE
- x R/W LINE
- FENCE
- TRAIL CLEARED AND GRUBBED BY MSG
- EXTENT OF EARTH DISTURBANCE BASED ON APRIL 26, 1970 AERIAL PHOTO
- EXISTING GAS MAIN
- EXISTING FIBER OPTIC CABLE
- EXISTING FIRE WATER
- EXISTING WATER MAIN
- EXISTING STORM
- ST (3) THREE EXISTING STORM SEWERS SIDE BY SIDE
- o SURFACE SAMPLE WATER LOCATION
- o SOIL BORING LOCATION
- o MONITORING WELL LOCATION
- o TEST PIT LOCATION

**CHEMICAL ABBREVIATIONS**

N = Naphthalene  
 Phen = Phenanthrene  
 E = Ethylbenzene  
 X = Total Xylenes  
 Fa = Fluoranthene  
 B = Benzene  
 T = Toluene  
 1,2-DCE = Dichlorobenzene  
 PCE = 1,1,1-Trichloroethylene  
 cis-1,2-DCE = cis-1,2-Dichloroethylene

Al = Aluminum  
 Sb = Antimony  
 As = Arsenic  
 Cd = Cadmium  
 Cr = Chromium  
 Fe = Iron  
 Pb = Lead  
 Mn = Manganese  
 Hg = Mercury  
 Se = Selenium  
 Ag = Silver  
 NE = Not Exceeding

Exceedence of Part 201 Non Residential Cleanup Criteria (Revised March 25, 2011)  
 Units: ug/Kg

**SOIL CRITERIA**

(XXI) Exceeds MDEQ Generic Drinking Water Protection Cleanup Criteria  
 (XII) Exceeds MDEQ Ground Water/Surface Water interface protection cleanup criteria

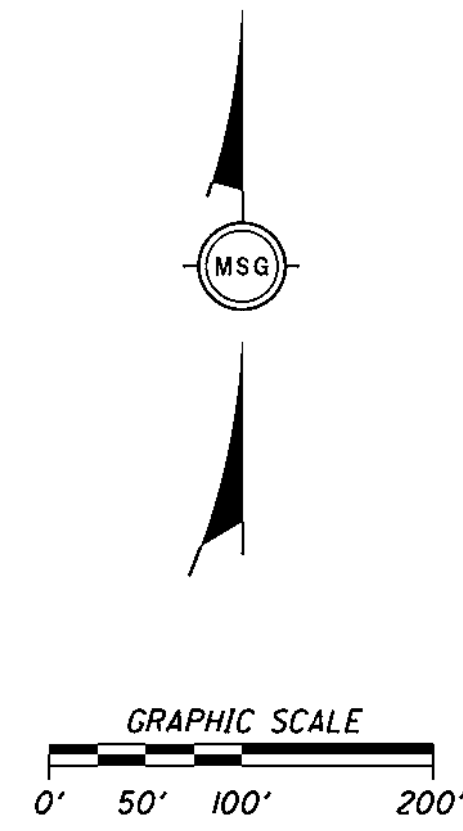
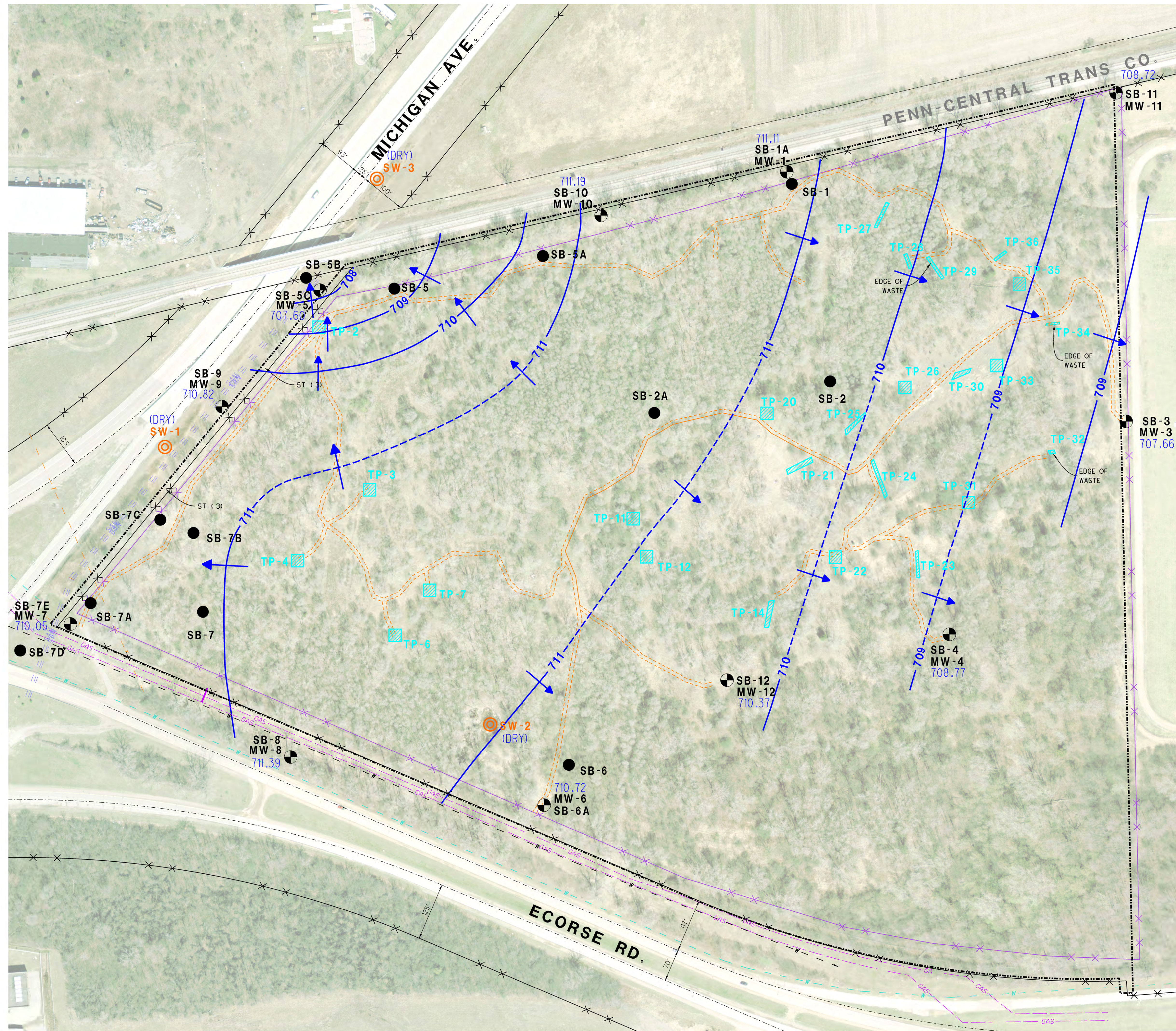
c Exceeds MDEQ Generic Soil Vapor Intrusion Screening Levels

**GENERAL NOTES:**

- AERIAL PHOTO FROM SEMCOG DATED 2010.
- MONITORING WELL AND SURFACE WATER LOCATIONS SURVEYED APRIL 2013 BY MSG TO AN ACCURACY OF 0.01'.
- PHASE IA, IB AND II SITE INVESTIGATIONS, SOIL BORING, MONITORING WELL, TEST PIT AND CLEARED AND GRUBBED TRAIL LOCATIONS SURVEYED JULY 2012, MAY 2013 AND DECEMBER 2013, RESPECTIVELY BY MSG USING SUBMETER ACCURACY GLOBAL POSITIONING SYSTEM (GPS) UNIT.
- UTILITY LOCATIONS BASED ON INFORMATION FROM SAP/OAPP AND MISS DIG UTILITY MARKINGS.
- EASEMENT DIMENSIONS OBTAINED FROM MDOOT RIGHT-OF-WAY MAP NO. B2-R-1, PAGE 242, DATED SEPT 2006.

3/11/2014

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**LEGEND**

- 711 GROUND WATER ELEVATION CONTOUR (FEET ABOVE MSL)
- GROUND WATER FLOW DIRECTION (NOVEMBER 12, 2013)
- SURFACE WATER SAMPLE LOCATION
- SOIL BORING LOCATION
- ⊙ MONITORING WELL LOCATION WITH GROUND WATER ELEVATION (FEET ABOVE MSL)
- TEST PIT LOCATION
- EXTENT OF AREA OF INTEREST (AOI)
- PROPERTY LINE
- x-x R/W LINE
- x-x FENCE
- TRAIL CLEARED AND GRUBBED BY MSG
- GAS EXISTING GAS MAIN
- FO EXISTING FIBER OPTIC CABLE
- FW EXISTING FIRE WATER
- WM EXISTING WATER MAIN
- EXISTING STORM

- GENERAL NOTES:
1. AERIAL PHOTO FROM SEMCOG DATED 2010.
  2. MONITORING WELL AND SURFACE WATER LOCATIONS SURVEYED APRIL 2013 BY MSG TO AN ACCURACY OF 0.01'.
  3. PHASE IA, IB AND II SITE INVESTIGATIONS, SOIL BORING, MONITORING WELL, TEST PIT AND CLEARED AND GRUBBED TRAIL LOCATIONS SURVEYED JULY 2012, MAY 2013 AND DECEMBER 2013, RESPECTIVELY BY MSG USING SUBDECIMETER ACCURACY GLOBAL POSITIONING SYSTEM (GPS) UNIT.
  4. UTILITY LOCATIONS BASED ON INFORMATION FROM SAP/OAPP AND MISS DIG UTILITY MARKINGS.
  5. EASEMENT DIMENSIONS OBTAINED FROM MDOT RIGHT-OF-WAY MAP NO. 82-R-1, PAGE 242, DATED SEPT 2006.
  6. GROUNDWATER ELEVATION CONTOUR INTERVAL = 1 FOOT.

NO.	DATE	BY	C/J/B	DESCRIPTION
1	2/24/14			REVISED USING NOVEMBER 2013 DATA

Participating in the Community Environmental Response Trust

www.manniksmithgroup.com

VAN BUREN LANDFILL SITE (11070)  
MICHIGAN AVE. & ECORSE RD.  
VAN BUREN TWP., WAYNE CO. MICHIGAN

**FIGURE 4- GROUNDWATER ELEVATION CONTOUR MAP (NOVEMBER 12, 2013)**

3/11/2014

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### LEGEND

- 711 GROUND WATER ELEVATION CONTOUR (FEET ABOVE MSL)
- GROUND WATER FLOW DIRECTION (NOVEMBER 12, 2013)
- - - BENZENE ISOCONCENTRATION CONTOUR (ug/L)
- SURFACE WATER SAMPLE LOCATION
- SOIL BORING LOCATION
- 713.18 MONITORING WELL LOCATION WITH GROUND WATER ELEVATION AND GROUND WATER SAMPLE BENZENE CONCENTRATION (ug/L)
- 2.4
- TEST PIT LOCATION
- - - EXTENT OF AREA OF INTEREST (AOI)
- - - PROPERTY LINE
- x x R/W LINE
- x x FENCE
- - - TRAIL CLEARED AND GRUBBED BY MSG
- - - GAS - EXISTING GAS MAIN
- - - FO - EXISTING FIBER OPTIC CABLE
- - - EXISTING FIRE WATER
- - - EXISTING WATER MAIN
- - - EXISTING STORM
- ST (3) THREE EXISTING STORM SEWERS SIDE BY SIDE

CHEMICAL ABBREVIATIONS- UNITS ARE MICROGRAMS PER LITER (ug/L)

- Benz = Benzene
  - CB = Chlorobenzene
  - Al = Dissolved Aluminum
  - As = Dissolved Antimony
  - As = Dissolved Arsenic
  - Ba = Dissolved Barium
  - Cn = Cyanide (Amenable)
  - Fe = Dissolved Iron
  - Mn = Dissolved Manganese
  - Se = Dissolved Selenium
  - NE = NOT EXCEEDING
- EXCEEDANCE OF APPLICABLE NONRESIDENTIAL PART 201 GENERIC CLEANUP CRITERIA AND SCREENING LEVELS (REVISED DECEMBER 30, 2013)
- II EXCEEDS MDEQ NON-RESIDENTIAL HEALTH BASED DRINKING WATER CRITERIA
  - III EXCEEDS MDEQ GROUNDWATER SURFACE WATER INTERFACE CRITERIA
  - IV TOTAL METALS

GENERAL NOTES:

1. AERIAL PHOTO FROM SEMCOG DATED 2010.
2. MONITORING WELL AND SURFACE WATER LOCATIONS SURVEYED APRIL 2013 BY MSG TO AN ACCURACY OF 0.01'.
3. PHASE IA, IB AND II SITE INVESTIGATIONS, SOIL BORING, MONITORING WELL, TEST PIT AND CLEARED AND GRUBBED TRAIL LOCATIONS SURVEYED JULY 2012, MAY 2013 AND DECEMBER 2013, RESPECTIVELY BY MSG USING SUBDECIMETER ACCURACY GLOBAL POSITIONING SYSTEM (GPS) UNIT.
4. UTILITY LOCATIONS BASED ON INFORMATION FROM SAP/OAPP AND MISS DIG UTILITY MARKINGS.
5. EASEMENT DIMENSIONS OBTAINED FROM MDOIT RIGHT-OF-WAY MAP NO. 82-R-1, PAGE 242, DATED SEPT 2006.
6. PHASE II SITE INVESTIGATION GROUNDWATER SAMPLING INCLUDED COLLECTION OF WATER SAMPLES FROM TEMPORARY MONITORING WELLS AT SOIL BORING LOCATIONS SB-13, SB-14, SB-15 AND SB-21 THROUGH SB-34; THE GROUND WATER SAMPLE BENZENE CONCENTRATIONS INDICATED ON THIS FIGURE ARE FROM BOTH THE NOVEMBER 2013 GROUND WATER SAMPLING EVENT AND THE PHASE II SITE INVESTIGATION.

NO.	DATE	BY	DESCRIPTION
1	2/24/14	CJB	INCLUDES PHASE II SITE INVESTIGATION GROUNDWATER SAMPLE RESULTS

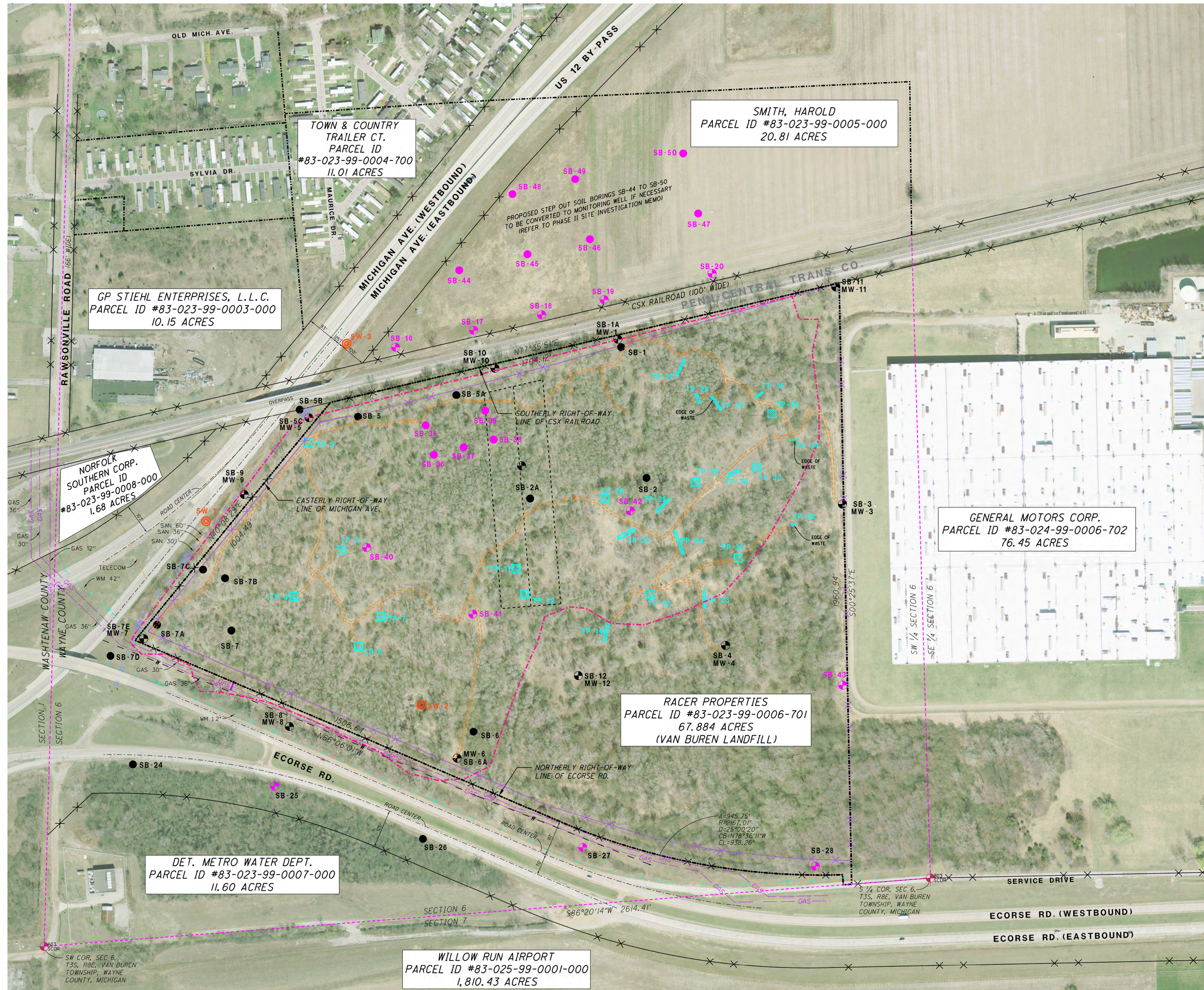


VAN BUREN LANDFILL SITE (11070)  
MICHIGAN AVE & ECORSE RD.  
VAN BUREN TWP., WAYNE CO. MICHIGAN

FIGURE 5  
SUMMARY OF GROUNDWATER  
SAMPLE EXCEEDENCES (ug/L)

3/12/2014

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### LEGEND

- SB-20 PROPOSED SOIL BORING LOCATION
- SB-20 PROPOSED SOIL BORING AND MONITORING WELL LOCATION
- PROPERTY LINE
- × × R/W LINE
- FENCE
- - - TRAIL CLEARED AND GRUBBED BY MSG
- - - EXTENT OF EARTH DISTURBANCE BASED ON APRIL 26, 1970 AERIAL PHOTO
- - - LANDFILL CELL 1 AND CELL 2 BOUNDARY
- GAS — EXISTING GAS MAIN
- FO — EXISTING FIBER OPTIC CABLE
- W — EXISTING FIRE WATER
- W — EXISTING WATER MAIN
- W — EXISTING STORM
- ST (3) THREE EX. PARALLEL STORM SEWERS
- SURFACE WATER SAMPLE LOCATION
- SOIL BORING LOCATION
- MONITORING WELL LOCATION
- TP-32 TEST PIT LOCATION

- GENERAL NOTES:
1. AERIAL PHOTO FROM SEMCOG DATED 2010.
  2. MONITORING WELL AND SURFACE WATER LOCATIONS SURVEYED APRIL 2013 BY MSG TO AN ACCURACY OF 0.01'.
  3. PHASE IA, IB AND II SITE INVESTIGATIONS, SOIL BORING, MONITORING WELL, TEST PIT AND CLEARED AND GRUBBED TRAIL LOCATIONS SURVEYED JULY 2012, MAY 2013 AND DECEMBER 2013, RESPECTIVELY BY MSG USING SUBDECIMETER ACCURACY GLOBAL POSITIONING SYSTEM (GPS) UNIT.
  4. UTILITY LOCATIONS BASED ON INFORMATION FROM SAP/OAPP AND MISS DIG UTILITY MARKINGS.
  5. EASEMENT DIMENSIONS OBTAINED FROM MDOT RIGHT-OF-WAY MAP NO. 82-R-1, PAGE 242, DATED SEPT 2006.
  6. PHASE II SITE INVESTIGATION BORINGS INCLUDING SB-13, SB-14, SB-15 AND SB-21 THROUGH SB-34 COMPLETED IN DECEMBER 2013.
  7. LANDFILL CELL BOUNDARY BASED ON CELL 1 AND 2 FROM MAP OF VAN BUREN DISPOSAL AREA, FOR VAN BUREN DEVELOPMENT COMPANY BY THOMAS R. KENNA, P.E., DATED MARCH 21, 1966, REVISED FEBRUARY 10, 1968.

NO.	DATE	BY	DESCRIPTION
1	2/24/14	CJB	PHASE II SITE INVESTIGATION SAMPLING LOCATIONS

Mannik Smith GROUP  
 Environmental Response Unit  
 10000 Ecorse Rd., Van Buren Twp., Wayne Co., Michigan 48147  
 www.manniksmithgroup.com

**FIGURE 6**  
**VAN BUREN LANDFILL SITE (11070)**  
**MICHIGAN AVE. & ECORSE RD.**  
**VAN BUREN TWP., WAYNE CO. MICHIGAN**  
**PROPOSED PHASE III**  
**INVESTIGATION**

ATTACHMENT 1

SOIL BORING AND MONITORING WELL LOGS





CANTON MAUMEE  
 DETROIT COLUMBUS  
 MONROE CLEVELAND  
 LANSING TRAVERSE CITY

The Mannik & Smith Group, Inc.  
 2365 Haggerty Road South, Canton, Michigan 48188  
 ph: (734)-397-3100 fax: (734)-397-3131

<b>CLIENT</b> RACER Trust	<b>PROJECT NAME</b> Van Buren Landfill
<b>PROJECT NUMBER</b> R2330009	<b>PROJECT LOCATION</b> Michigan and Ecorse, Van Buren Township, MI
<b>DATE STARTED</b> 12/10/13 <b>COMPLETED</b> 12/10/13	<b>BORING DIAMETER:</b> 2"
<b>DRILLING CONTRACTOR</b> MSG	<b>SURVEY COORDINATES:</b> 274,782.0 N; 13,346,240.1 E (US ST PLN 83)
<b>DRILLING METHOD</b> MacroCore	<b>GROUND SURFACE ELEV.:</b> 714 feet NAVD88
<b>LOGGED BY</b> AJL <b>CHECKED BY</b> FJB	<b>GROUND WATER ENCOUNTERED DURING DRILLING:</b> 6.5 FEET BGS
<b>NOTES</b> Soil boring backfilled with medium bentonite chips.	<b>WATER LEVEL AFTER DRILLING:</b> N/A

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (FEET)	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)	LABORATORY SAMPLE	REMARKS
0							
0.6				Black Sandy TOPSOIL; dry.	713.4		
				Brown fine to medium SAND (FILL); moist to dry.	0.0		
2.3					711.7		
2.6				Brown Sandy CLAY; moist.	711.4		
				Brown fine to medium SAND; trace Gravel; moist.	0.0		
5.0					709.0		
				Brown Gravelly SAND; moist.	0.0		
				-wet	0.0		
10.0					704.0		
				Brown Sandy GRAVEL; wet.	0.0		
13.0					701.0		
13.3				Gray SILT; wet.	700.7		
				Gray Silty CLAY; moist to dry.	0.0		
15					0.0		
					0.0		
					0.0		
20					694.0		

Collected ground water sample  
 W-R2330009-121013-AJL-008 from 8'-13' at 11:28.

Bottom of borehole at 20.0 feet.

ENV BORING LOG (PID) - GINT STD US LAB.GDT - 3/11/14 13:59 - W:\PROJECTS\PROJECTS P-T\R2330009\ADMINISTRATION\BORING LOGS + LAB\R2330009 BORING LOGS.LAB TEST.GPJ



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<b>PROJECT NUMBER</b> <u>R2330009</u>	<b>PROJECT LOCATION</b> <u>Michigan and Ecorse, Van Buren Township, MI</u>
<b>DATE STARTED</b> <u>12/9/13</u> <b>COMPLETED</b> <u>12/9/13</u>	<b>BORING DIAMETER:</b> <u>2"</u>
<b>DRILLING CONTRACTOR</b> <u>MSG</u>	<b>SURVEY COORDINATES:</b> <u>274,921.2 N; 13,346,371.7 E (US ST PLN 83)</u>
<b>DRILLING METHOD</b> <u>MacroCore</u>	<b>GROUND SURFACE ELEV.:</b> <u>714 feet NAVD88</u>
<b>LOGGED BY</b> <u>AJL</u> <b>CHECKED BY</b> <u>FJB</u>	<b>GROUND WATER ENCOUNTERED DURING DRILLING:</b> <u>8.05 FEET BGS</u>
<b>NOTES</b> <u>Soil boring backfilled with medium bentonite chips.</u>	<b>WATER LEVEL AFTER DRILLING:</b> <u>N/A</u>

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (FEET)	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)	LABORATORY SAMPLE	REMARKS
0				Black Sandy TOPSOIL.	0.0		
1.0				Brown Gravelly SAND; moist to dry.	713.0		
3.5	MC 1	3.5					
3.2				Black Clayey SAND; dry.	710.8		
3.3				Brown fine to medium SAND; moist to dry.	710.7		
5.8					708.2		
6.2				Brown with orange mottling Silty CLAY; moist to dry.	707.8		
6.4				Brown fine to medium SAND; moist.	707.6		
3.0	MC 2	3.0		Tan Gravelly SAND; moist.			
10.0				Gray fine to medium SAND; wet.	704.0		
3.0	MC 3	3.0					
13.0				Gray SILT; moist.	701.0		
14.0				Gray Silty CLAY; moist to dry.	700.0		
4.0	MC 4	4.0					
20.0					694.0		

Collected ground water sample  
 W-R2330009-121013-AJL-007 from 10'-15'.

Bottom of borehole at 20.0 feet.

ENV BORING LOG (PID) - GINT STD US LAB.GDT - 3/11/14 13:59 - W:\PROJECTS\PROJECTS P-T\R2330009\ADMINISTRATION\BORING LOGS + LAB\R2330009 BORING LOGS.LAB TEST.GPJ





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<b>CLIENT</b> <u>RACER Trust</u>	<b>PROJECT NAME</b> <u>Van Buren Landfill</u>
<b>PROJECT NUMBER</b> <u>R2330009</u>	<b>PROJECT LOCATION</b> <u>Michigan and Ecorse, Van Buren Township, MI</u>
<b>DATE STARTED</b> <u>12/9/13</u> <b>COMPLETED</b> <u>12/9/13</u>	<b>BORING DIAMETER:</b> <u>2"</u>
<b>DRILLING CONTRACTOR</b> <u>MSG</u>	<b>SURVEY COORDINATES:</b> <u>275,299.0 N; 13,346,760.1 E (US ST PLN 83)</u>
<b>DRILLING METHOD</b> <u>MacroCore</u>	<b>GROUND SURFACE ELEV.:</b> <u>715 feet NAVD88</u>
<b>LOGGED BY</b> <u>AJL</u> <b>CHECKED BY</b> <u>FJB</u>	<b>GROUND WATER ENCOUNTERED DURING DRILLING:</b> <u>5.9 FEET BGS</u>
<b>NOTES</b> <u>Soil boring backfilled with medium bentonite chips.</u>	<b>WATER LEVEL AFTER DRILLING:</b> <u>N/A</u>

ENV BORING LOG (PID) - GINT STD US LAB.GDT - 3/11/14 14:00 - W:\PROJECTS\PROJECTS P-T\TIR2330009\ADMINISTRATION\BORING LOGS + LAB\IR2330009 BORING LOGS.LAB TEST.GPJ

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (FEET)	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)	LABORATORY SAMPLE	REMARKS
20				Gray Silty CLAY; dry. (continued)	0.0		
	MC 5	5.0			0.0		
	ST 1	2.0			0.0		Collected Shelby Tube 23-25 feet.
25				Gray Silty CLAY; trace Gravel; dry.	690.0		
	MC 6	5.0			0.0		
	MC 7	2.0			0.0		
35				Bottom of borehole at 35.0 feet.	680.0		



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**CLIENT** RACER Trust **PROJECT NAME** Van Buren Landfill

**PROJECT NUMBER** R2330009 **PROJECT LOCATION** Michigan and Ecorse, Van Buren Township, MI

**DATE STARTED** 12/4/13 **COMPLETED** 12/4/13 **BORING DIAMETER:** 2"

**DRILLING CONTRACTOR** MSG **SURVEY COORDINATES:** 275,136.0 N; 13,347,178.2 E (US ST PLN 83)

**DRILLING METHOD** MacroCore **GROUND SURFACE ELEV.:** 726 feet NAVD88

**LOGGED BY** RD **CHECKED BY** FJB **GROUND WATER ENCOUNTERED DURING DRILLING:** 15.4 FEET BGS

**NOTES** Soil boring backfilled with medium bentonite chips. **WATER LEVEL AFTER DRILLING:** N/A

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (FEET)	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)	LABORATORY SAMPLE	REMARKS
0							
0 - 2.5	MC 1	2.5		Loose, brown to black Silty SAND and FILL (including Gravel, Organic Mater, Coal, Coke, Bricks); dry.	0.0		
2.5 - 5.5	MC-DS 2	3.0		Loose, brown to black Silty SAND and FILL (including Gravel, Wood fragments, Bricks); dry.	2.0		
5.5 - 7.5	MC-DS 3	2.0		Loose, brown to black Silty SAND and FILL (including Gravel, Wood fragments, Bricks, Glass); dry.	24.1		Collected soil sample S-R2330009-120413-RD-003 from 10'-15' bgs at 10:00.
7.5 - 15.5	MC-DS 4	2.0		Loose, brown to black Silty SAND and FILL (including Gravel, Bricks, Glass; trace Wood fragments); saturated at approximately 16' bgs.	22		Collected ground water sample W-R2330009-120513-RD-001 from 18'-23' bgs at 10:15.
15.5 - 19.0							
19.0 - 20.0				Loose, brown fine and medium SAND; saturated.	707.0		

ENV BORING LOG (PID) - GINT STD US LAB.GDT - 3/11/14 14:00 - W:\PROJECTS\PROJECTS P-T\R2330009\ADMINISTRATION\BORING LOGS + LAB\R2330009 BORING LOGS.LAB TEST.GPJ



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**PROJECT NUMBER** R2330009 **PROJECT LOCATION** Michigan and Ecorse, Van Buren Township, MI  
**DATE STARTED** 12/4/13 **COMPLETED** 12/4/13 **BORING DIAMETER:** 2"  
**DRILLING CONTRACTOR** MSG **SURVEY COORDINATES:** 275,136.0 N; 13,347,178.2 E (US ST PLN 83)  
**DRILLING METHOD** MacroCore **GROUND SURFACE ELEV.:** 726 feet NAVD88  
**LOGGED BY** RD **CHECKED BY** FJB **GROUND WATER ENCOUNTERED DURING DRILLING:** 15.4 FEET BGS  
**NOTES** Soil boring backfilled with medium bentonite chips. **WATER LEVEL AFTER DRILLING:** N/A

ENV BORING LOG (PID) - GINT STD US LAB.GDT - 3/11/14 14:00 - W:\PROJECTS\PROJECTS P-T\R2330009\ADMINISTRATION\BORING LOGS + LAB\R2330009 BORING LOGS.LAB TEST.GPJ

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (FEET)	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)	LABORATORY SAMPLE	REMARKS
20							
	MC 5	5.0		21.0 Loose, brown fine and medium SAND; saturated. (continued)	705.0	X	Collected ground water sample W-R2330009-120513-RD-001 from 18'-23' bgs at 10:15.
				22.0 Stiff, brown Silty fine SAND; saturated.	704.0		
				- ;dry			
25				25.0 Bottom of borehole at 25.0 feet.	701.0		



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**CLIENT** RACER Trust **PROJECT NAME** Van Buren Landfill  
**PROJECT NUMBER** R2330009 **PROJECT LOCATION** Michigan and Ecorse, Van Buren Township, MI  
**DATE STARTED** 12/4/13 **COMPLETED** 12/4/13 **BORING DIAMETER:** 2"  
**DRILLING CONTRACTOR** MSG **SURVEY COORDINATES:** 275,251.6 N; 13,347,646.9 E (US ST PLN 83)  
**DRILLING METHOD** MacroCore **GROUND SURFACE ELEV.:** 725 feet NAVD88  
**LOGGED BY** RD **CHECKED BY** FJB **GROUND WATER ENCOUNTERED DURING DRILLING:** 12.75 FEET BGS  
**NOTES** Soil boring backfilled with medium bentonite chips. **WATER LEVEL AFTER DRILLING:** N/A

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (FEET)	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)	LABORATORY SAMPLE	REMARKS
0				Loose, dark brown Clayey SAND and FILL (including Gravel, Bricks, Glass); dry.			
2.5	MC 1	2.5		Loose, tan fine and medium SAND, few Gravel; dry.	723.0		
4.0				Loose, dark brown Silty SAND and FILL (including Gravel, Organic matter & Wood fragments); dry.	721.0		
7.5	MC-DS 2	2.5		Loose, dark brown Clayey SAND and FILL (including Gravel, Bricks, Glass); dry.	717.5		
12.5	MC-DS 3	2.5		Loose, dark brown to black Silty SAND; little to some Gravel; saturated.	712.5		Collected soil sample S-R2330009-120413-RD-004 from 11'-12' bgs at 12:44.
16.0				Dark brown fine to medium SAND; trace Gravel; saturated.	709.0		
19.0	MC-DS 4	4.0		Dark brown fine to medium SAND; trace Gravel; interbedded with less than 0.25" thick brown SILT; saturated.	706.0		Collected ground water sample W-R2330009-120513-RD-002 from 12.5'-15' bgs at 11:20.
							Sewer like odor.

ENV BORING LOG (PID) - GINT STD US LAB.GDT - 3/11/14 14:00 - W:\PROJECTS\PROJECTS P-T\R2330009\ADMINISTRATION\BORING LOGS + LAB\R2330009 BORING LOGS.LAB TEST.GPJ



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**DATE STARTED** 12/4/13 **COMPLETED** 12/4/13 **BORING DIAMETER:** 2"  
**DRILLING CONTRACTOR** MSG **SURVEY COORDINATES:** 275,251.6 N; 13,347,646.9 E (US ST PLN 83)  
**DRILLING METHOD** MacroCore **GROUND SURFACE ELEV.:** 725 feet NAVD88  
**LOGGED BY** RD **CHECKED BY** FJB **GROUND WATER ENCOUNTERED DURING DRILLING:** 12.75 FEET BGS  
**NOTES** Soil boring backfilled with medium bentonite chips. **WATER LEVEL AFTER DRILLING:** N/A

ENV BORING LOG (PID) - GINT STD US LAB.GDT - 3/11/14 14:00 - W:\PROJECTS\PROJECTS P-T\R2330009\ADMINISTRATION\BORING LOGS + LAB\R2330009 BORING LOGS.LAB TEST.GPJ

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (FEET)	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)	LABORATORY SAMPLE	REMARKS
20							
21.0				Dark brown fine to medium SAND; trace Gravel; interbedded with less than 0.25" thick brown SILT; saturated.	704.0		
	MC 5	5.0		Soft, brown Silty CLAY; trace Gravel; plastic; moist.	0.0		
				- ;dry.	0.0		
25				Bottom of borehole at 25.0 feet.	700.0		



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<b>PROJECT NUMBER</b> <u>R2330009</u>	<b>PROJECT LOCATION</b> <u>Michigan and Ecorse, Van Buren Township, MI</u>
<b>DATE STARTED</b> <u>12/5/13</u> <b>COMPLETED</b> <u>12/5/13</u>	<b>BORING DIAMETER:</b> <u>2"</u>
<b>DRILLING CONTRACTOR</b> <u>MSG</u>	<b>SURVEY COORDINATES:</b> <u>275,413.0 N; 13,348,188.1 E (US ST PLN 83)</u>
<b>DRILLING METHOD</b> <u>MacroCore</u>	<b>GROUND SURFACE ELEV.:</b> <u>721 feet NAVD88</u>
<b>LOGGED BY</b> <u>RD</u> <b>CHECKED BY</b> <u>FJB</u>	<b>GROUND WATER ENCOUNTERED DURING DRILLING:</b> <u>12.4 FEET BGS</u>
<b>NOTES</b> <u>Soil boring backfilled with medium bentonite chips.</u>	<b>WATER LEVEL AFTER DRILLING:</b> <u>N/A</u>

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (FEET)	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)	LABORATORY SAMPLE	REMARKS
0				Loose, tan Silty medium to fine SAND; little FILL (Glass fragments); trace Gravel; moist.	0.0		
3.5	MC 1	3.5					
4.0				Loose, light tan Silty SAND; trace Gravel; dry.	717.0		
4.0	MC 2	4.0			0.0		
11.5					709.5		
12.0	MC 3	3.5		Medium compact, dark tan coarse SAND; trace Gravel; moist. Dark tan medium and fine SAND interbedded with coarse SAND less than 0.25" thick; saturated.	709.0		
14.5					706.5		
15				Medium compact, dark tan coarse SAND; trace Gravel; saturated.			
16.0					705.0		
16.0	MC 4	4.5		Medium compact, dark tan fine to medium SAND; trace Gravel; saturated.	0.0		
18.0					703.0		Collected soil sample S-R2330009-120513-RD-005 from 10'-12' bgs at 13:15.
18.0				Medium compact, brown fine to medium SAND; trace Gravel; saturated.			
19.5					701.5		
19.5				Compact, brown SILT; wet.			Collected ground water sample W-R2330009-120513-RD-003 from 12'-20' bgs at 15:00.

(Continued Next Page)



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**PROJECT NUMBER** R2330009 **PROJECT LOCATION** Michigan and Ecorse, Van Buren Township, MI  
**DATE STARTED** 12/5/13 **COMPLETED** 12/5/13 **BORING DIAMETER:** 2"  
**DRILLING CONTRACTOR** MSG **SURVEY COORDINATES:** 275,413.0 N; 13,348,188.1 E (US ST PLN 83)  
**DRILLING METHOD** MacroCore **GROUND SURFACE ELEV.:** 721 feet NAVD88  
**LOGGED BY** RD **CHECKED BY** FJB **GROUND WATER ENCOUNTERED DURING DRILLING:** 12.4 FEET BGS  
**NOTES** Soil boring backfilled with medium bentonite chips. **WATER LEVEL AFTER DRILLING:** N/A

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (FEET)	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)	LABORATORY SAMPLE	REMARKS
20				20.5 Compact, brown SILT; wet. (continued) Soft, brown Silty CLAY; plastic; moist.	700.5		
	MC 5	4.5		- ;moist to dry.	0.0		
25							
	MC 6	5.0			0.0		
30							
	ST 1	2.0			N/A		Collected Shelby Tube 30-32 feet.
	MC 7	3.0			0.0		
35							
	MC 8	5.0			0.0		
40							

Bottom of borehole at 40.0 feet.

ENV BORING LOG (PID) - GINT STD US LAB.GDT - 3/11/14 14:00 - W:\PROJECTS\PROJECTS P-T\TIR2330009\ADMINISTRATION\BORING LOGS + LAB\IR2330009 BORING LOGS.LAB TEST.GPJ



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<b>PROJECT NUMBER</b> <u>R2330009</u>	<b>PROJECT LOCATION</b> <u>Michigan and Ecorse, Van Buren Township, MI</u>
<b>DATE STARTED</b> <u>12/6/13</u> <b>COMPLETED</b> <u>12/6/13</u>	<b>BORING DIAMETER:</b> <u>2"</u>
<b>DRILLING CONTRACTOR</b> <u>MSG</u>	<b>SURVEY COORDINATES:</b> <u>273,945.6 N; 13,346,269.9 E (US ST PLN 83)</u>
<b>DRILLING METHOD</b> <u>MacroCore</u>	<b>GROUND SURFACE ELEV.:</b> <u>716 feet NAVD88</u>
<b>LOGGED BY</b> <u>RD</u> <b>CHECKED BY</b> <u>FJB</u>	<b>GROUND WATER ENCOUNTERED DURING DRILLING:</b> <u>8.72 FEET BGS</u>
<b>NOTES</b> <u>Soil boring backfilled with medium bentonite chips.</u>	<b>WATER LEVEL AFTER DRILLING:</b> <u>N/A</u>

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (FEET)	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)	LABORATORY SAMPLE	REMARKS
0				Brown and black TOPSOIL; dry.			
2.0				714.0	0.0		
3.8	MC 1	3.8		Loose, dark tan and red Silty fine SAND; moist.			
4.0				712.0	0.0		
5				Medium compact, dark tan fine SAND; moist.			
6.0				710.0	0.0		
7.5				Brown Clayey SAND; little Gravel; moist.			
7.5	MC 2	4.8		708.5	0.0		
8.72				- saturated at 8.72 feet	0.0		
10					0.0		
13.0	MC 3	4.8		Brown Silty fine SAND; trace Gravel; saturated.			
13.0				703.0	0.0		
15					0.0		Collected ground water sample W-R2330009-120613-RD-004 from 8'-13' bgs at 12:45.
17.0	MC 4	5.0		Stiff, brown Silty CLAY; trace Gravel; slightly plastic; moist.			
17.0				699.0	0.0		
20				696.0			

Bottom of borehole at 20.0 feet.

ENV BORING LOG (PID) - GINT STD US LAB.GDT - 3/11/14 14:00 - W:\PROJECTS\PROJECTS P-T\R2330009\ADMINISTRATION\BORING LOGS + LAB\R2330009 BORING LOGS.LAB TEST.GPJ



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<b>PROJECT NUMBER</b> R2330009	<b>PROJECT LOCATION</b> Michigan and Ecorse, Van Buren Township, MI
<b>DATE STARTED</b> 12/6/13 <b>COMPLETED</b> 12/6/13	<b>BORING DIAMETER:</b> 2"
<b>DRILLING CONTRACTOR</b> MSG	<b>SURVEY COORDINATES:</b> 273,878.4 N; 13,346,737.0 E (US ST PLN 83)
<b>DRILLING METHOD</b> MacroCore	<b>GROUND SURFACE ELEV.:</b> 716 feet NAVD88
<b>LOGGED BY</b> RD <b>CHECKED BY</b> FJB	<b>GROUND WATER ENCOUNTERED DURING DRILLING:</b> 8.58 FEET BGS
<b>NOTES</b> Soil boring backfilled with medium bentonite chips.	<b>WATER LEVEL AFTER DRILLING:</b> N/A

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (FEET)	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)	LABORATORY SAMPLE	REMARKS
0				Brown and black TOPSOIL; dry.			
2.0				714.0	0.0		
3.0	MC 1	3.0		Loose, tan and red Silty fine to medium SAND; trace Gravel; moist.	0.0		
5.0				711.0	0.0		
5.0				Loose, tan and red Silty SAND; trace Gravel; moist.	0.0		
7.0				709.0	0.0		
7.5				Brown Silty Clay; plastic; moist.	708.5		
4.0	MC 2	4.0		Brown coarse SAND; trace Gravel; moist.	0.0		
9.0				- saturated at 8.58 feet	707.0		
10.0				Brown fine to medium SAND; trace Gravel interbedded with Silty CLAY less than 0.25 inches thick; saturated.	705.0		
11.0				Brown fine to medium SAND; trace Gravel; saturated.	705.0		
4.8	MC 3	4.8					Collected ground water sample W-R2330009-120613-RD-005 from 8'-13' bgs at 14:50.
14.0				702.0	0.0		
14.0				Brown Silty CLAY; trace Gravel; plastic; moist.	0.0		
15.0					0.0		
4.8	MC 4	4.8					
20.0				696.0	0.0		

Bottom of borehole at 20.0 feet.

ENV BORING LOG (PID) - GINT STD US LAB.GDT - 3/11/14 14:00 - W:\PROJECTS\PROJECTS P-T\R2330009\ADMINISTRATION\BORING LOGS + LAB\R2330009\BORING LOGS.LAB TEST.GPJ



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 LANSING TRAVERSE CITY

The Mannik & Smith Group, Inc.  
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 ph: (734)-397-3100 fax: (734)-397-3131

<b>CLIENT</b> <u>RACER Trust</u>	<b>PROJECT NAME</b> <u>Van Buren Landfill</u>
<b>PROJECT NUMBER</b> <u>R2330009</u>	<b>PROJECT LOCATION</b> <u>Michigan and Ecorse, Van Buren Township, MI</u>
<b>DATE STARTED</b> <u>12/10/13</u> <b>COMPLETED</b> <u>12/10/13</u>	<b>BORING DIAMETER:</b> <u>2"</u>
<b>DRILLING CONTRACTOR</b> <u>MSG</u>	<b>SURVEY COORDINATES:</b> <u>273,700.5 N; 13,347,206.1 E (US ST PLN 83)</u>
<b>DRILLING METHOD</b> <u>MacroCore</u>	<b>GROUND SURFACE ELEV.:</b> <u>716 feet NAVD88</u>
<b>LOGGED BY</b> <u>AJL</u> <b>CHECKED BY</b> <u>FJB</u>	<b>GROUND WATER ENCOUNTERED DURING DRILLING:</b> <u>4.5 FEET BGS</u>
<b>NOTES</b> <u>Soil boring backfilled with medium bentonite chips.</u>	<b>WATER LEVEL AFTER DRILLING:</b> <u>N/A</u>

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (FEET)	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)	LABORATORY SAMPLE	REMARKS
0				Black Sandy TOPSOIL.	0.0		
2.0				Tan and gray fine SAND; moist.	714.0		
3.5	MC 1			Brown with orange mottling Silty CLAY; moist.	713.1		
2.9				Brown and orange Clayey SAND; trace Gravel; moist.	712.9		
5.0				Brown fine to medium SAND; wet.	711.0		
6.4				Gray Gravelly SAND; wet.	709.6		
5.0	MC 2			Gray SILT seam; wet.			Collected ground water sample W-R2330009-121013-AJL-009 from 5'-10' bgs at 15:30.
10.4				Gray Silty CLAY; moist.	705.6		
10.6				Gray Silty CLAY; moist.	705.4		
11.0				Gray SILT; wet.	705.0		
11.3				Gray Silty CLAY; moist to dry.	704.7		
11.6				Gray SILT; moist.	704.4		
12.1				Gray Silty CLAY; dry.	703.9		
12.5				Gray SILT; moist.	703.5		
3.5	MC 3			Gray Silty CLAY; dry.			
15.0				Gray Silty CLAY; dry.	701.0		
20.0				- ;trace gravel; dry.	696.0		
	MC 4	5.0					

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**CLIENT** RACER Trust **PROJECT NAME** Van Buren Landfill  
**PROJECT NUMBER** R2330009 **PROJECT LOCATION** Michigan and Ecorse, Van Buren Township, MI  
**DATE STARTED** 12/10/13 **COMPLETED** 12/10/13 **BORING DIAMETER:** 2"  
**DRILLING CONTRACTOR** MSG **SURVEY COORDINATES:** 273,700.5 N; 13,347,206.1 E (US ST PLN 83)  
**DRILLING METHOD** MacroCore **GROUND SURFACE ELEV.:** 716 feet NAVD88  
**LOGGED BY** AJL **CHECKED BY** FJB **GROUND WATER ENCOUNTERED DURING DRILLING:** 4.5 FEET BGS  
**NOTES** Soil boring backfilled with medium bentonite chips. **WATER LEVEL AFTER DRILLING:** N/A

ENV BORING LOG (PID) - GINT STD US LAB.GDT - 3/11/14 14:00 - W:\PROJECTS\PROJECTS P-T\TIR2330009\ADMINISTRATION\BORING LOGS + LAB\IR2330009 BORING LOGS.LAB TEST.GPJ

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (FEET)	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)	LABORATORY SAMPLE	REMARKS
20				Gray Silty CLAY; trace Gravel; moist to dry.	0.0		
	MC 5	5.0			0.0		
	ST 1	2.0			0.0	X	Collected Shelby Tube 23-25 feet.
25					0.0		
	MC 6	5.0			0.0		
	MC 7	5.0			0.0		
30					0.0		
	MC 7	5.0			0.0		
35				Bottom of borehole at 35.0 feet.	681.0		



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<b>CLIENT</b> RACER Trust	<b>PROJECT NAME</b> Van Buren Landfill
<b>PROJECT NUMBER</b> R2330009	<b>PROJECT LOCATION</b> Michigan and Ecorse, Van Buren Township, MI
<b>DATE STARTED</b> 12/11/13 <b>COMPLETED</b> 12/11/13	<b>BORING DIAMETER:</b> 2"
<b>DRILLING CONTRACTOR</b> MSG	<b>SURVEY COORDINATES:</b> 273,672.9 N; 13,347,727.4 E (US ST PLN 83)
<b>DRILLING METHOD</b> MacroCore	<b>GROUND SURFACE ELEV.:</b> 714 feet NAVD88
<b>LOGGED BY</b> AJL <b>CHECKED BY</b> FJB	<b>GROUND WATER ENCOUNTERED DURING DRILLING:</b> 3.5 FEET BGS
<b>NOTES</b> Soil boring backfilled with medium bentonite chips.	<b>WATER LEVEL AFTER DRILLING:</b> N/A

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (FEET)	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)	LABORATORY SAMPLE	REMARKS
0				Black Sandy TOPSOIL; dry.	0.0		
1.0				713.0	0.0		
1.6				Brown with orange mottling Silty CLAY; dry.	712.4	0.0	
2.1				Gray Gravelly SAND; moist.	711.9	0.0	
2.3				Brown with orange mottling Silty CLAY; dry.	711.7	0.0	
2.8				Gray fine to medium SAND; moist.	711.2	0.0	
3.0	MC 1	3.0		Gray Gravelly SAND; moist. - ;saturated at 3.5 feet	0.0		
5.0				709.0	0.0		
6.0				Gray fine to medium SAND; wet.	708.0	0.0	
7.5				Gray Gravelly SAND; wet.	706.5	0.0	
8.2				Gray fine SAND; wet.	705.8	0.0	
10.0	MC 2	4.5		Gray Gravelly SAND; wet.	704.0	0.0	
11.5				Gray Sandy GRAVEL; wet.	702.5	0.0	
15.0				Gray Silty CLAY; trace Gravel; moist to dry.	694.0	0.0	
20.0	MC 3	4.0					
	MC 4	2.5					

Collected ground water sample  
W-R2330009-121113-AJL-010 from 5'-10' bgs at 10:15.  
Collected ground water sample (DUPLICATE)  
W-R2330009-121113-AJL-011 from 5'-10' bgs at 10:15.

Bottom of borehole at 20.0 feet.

ENV BORING LOG (PID) - GINT STD US LAB.GDT - 3/11/14 14:00 - W:\PROJECTS\PROJECTS P-T\R2330009\ADMINISTRATION\BORING LOGS + LAB\R2330009 BORING LOGS.LAB TEST.GPJ



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<b>CLIENT</b> RACER Trust	<b>PROJECT NAME</b> Van Buren Landfill
<b>PROJECT NUMBER</b> R2330009	<b>PROJECT LOCATION</b> Michigan and Ecorse, Van Buren Township, MI
<b>DATE STARTED</b> 12/11/13 <b>COMPLETED</b> 12/11/13	<b>BORING DIAMETER:</b> 2"
<b>DRILLING CONTRACTOR</b> MSG	<b>SURVEY COORDINATES:</b> 273,611.8 N; 13,348,486.1 E (US ST PLN 83)
<b>DRILLING METHOD</b> MacroCore	<b>GROUND SURFACE ELEV.:</b> 713 feet NAVD88
<b>LOGGED BY</b> AJL <b>CHECKED BY</b> FJB	<b>GROUND WATER ENCOUNTERED DURING DRILLING:</b> 2.5 FEET BGS
<b>NOTES</b> Soil boring backfilled with medium bentonite chips.	<b>WATER LEVEL AFTER DRILLING:</b> N/A

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (FEET)	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)	LABORATORY SAMPLE	REMARKS
0				Black Sandy TOPSOIL; dry.	0.0		
0.9				Brown Sandy CLAY; moist.	712.1		
2.0				Brown fine to medium SAND; saturated.	711.0		
3.5	MC 1	3.5			0.0		
5.0				Gray Gravelly SAND; saturated.	708.0		
7.0				Gray fine SAND; saturated.	706.0		
7.7	MC 2	2.6		Gray Gravelly SAND; saturated.	705.3		
10.0				Gray fine to medium SAND; saturated.	703.0		
13.4	MC 3	4.5			699.6		
13.7				Gray SILT; saturated.	699.3		
15.0				Gray Silty CLAY; moist to dry.	0.0		
20.0	MC 4	3.5			0.0		

Collected ground water sample  
 W-R2330009-121113-AJL-012 from 3'-8' bgs at 13:05.

Bottom of borehole at 20.0 feet.

ENV BORING LOG (PID) - GINT STD US LAB.GDT - 3/11/14 14:00 - W:\PROJECTS\PROJECTS P-T\R2330009\ADMINISTRATION\BORING LOGS + LAB\R2330009 BORING LOGS.LAB TEST.GPJ



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<b>CLIENT</b> RACER Trust	<b>PROJECT NAME</b> Van Buren Landfill
<b>PROJECT NUMBER</b> R2330009	<b>PROJECT LOCATION</b> Michigan and Ecorse, Van Buren Township, MI
<b>DATE STARTED</b> 12/3/13	<b>COMPLETED</b> 12/12/13
<b>DRILLING CONTRACTOR</b> MSG	<b>BORING DIAMETER:</b> 2"
<b>DRILLING METHOD</b> MacroCore	<b>SURVEY COORDINATES:</b> 275,075.0 N; 13,347,312.2 E (US ST PLN 83)
<b>LOGGED BY</b> RD	<b>CHECKED BY</b> FJB
<b>NOTES</b> Soil boring backfilled with medium bentonite chips.	<b>GROUND SURFACE ELEV.:</b> 729 feet NAVD88
	<b>GROUND WATER ENCOUNTERED DURING DRILLING:</b> 17 FEET BGS
	<b>WATER LEVEL AFTER DRILLING:</b> N/A

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (FEET)	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)	LABORATORY SAMPLE	REMARKS
0				Brown SAND and CLAY; trace Gravel; trace Organic Material (Roots); loose; dry (FILL).	0.0		
2.0	MC 1	2.0					
5.0				Loose, dark brown to black SAND and CLAY; dry (FILL).	724.0		
7.5	MC 2	2.5			1.6		
10.0							
12.0	MC 3	2.0			1.8		Collected soil sample S-R2330009-120313-RD-001 from 10'-15' bgs at 10:40.
14.9				Loose, black Silty SAND; moist (FILL).	714.1		
16.0				Black FILL (including Glass, Brick, Concrete, Wood, Paper); moist.	713.0		
17.0				-saturated at 17' bgs.			
19.0	MC-DS 4	3.0			9.2		Collected ground water sample W-R2330009-121213-AJL-014 from 15'-20' at 08:56.
20.0					709.0		

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**CLIENT** RACER Trust **PROJECT NAME** Van Buren Landfill  
**PROJECT NUMBER** R2330009 **PROJECT LOCATION** Michigan and Ecorse, Van Buren Township, MI  
**DATE STARTED** 12/3/13 **COMPLETED** 12/12/13 **BORING DIAMETER:** 2"  
**DRILLING CONTRACTOR** MSG **SURVEY COORDINATES:** 275,075.0 N; 13,347,312.2 E (US ST PLN 83)  
**DRILLING METHOD** MacroCore **GROUND SURFACE ELEV.:** 729 feet NAVD88  
**LOGGED BY** RD **CHECKED BY** FJB **GROUND WATER ENCOUNTERED DURING DRILLING:** 17 FEET BGS  
**NOTES** Soil boring backfilled with medium bentonite chips. **WATER LEVEL AFTER DRILLING:** N/A

ENV BORING LOG (PID) - GINT STD US LAB.GDT - 3/11/14 14:00 - W:\PROJECTS\PROJECTS P-T\TIR2330009\ADMINISTRATION\BORING LOGS + LAB\IR2330009 BORING LOGS.LAB TEST.GPJ

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (FEET)	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)	LABORATORY SAMPLE	REMARKS
20				Black FILL (predominantly fragments of Wood); saturated.			
	MC-DS 5	3.0		22.5 Soft, brown Silty CLAY; some gravel and coarse sand; moist to dry.	706.5		
25							
	MC 6	4.0		27.0 Stiff, brown varved Silty CLAY; dry.	702.0		
30				30.0 Bottom of borehole at 30.0 feet.	699.0		



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**CLIENT** RACER Trust **PROJECT NAME** Van Buren Landfill  
**PROJECT NUMBER** R2330009 **PROJECT LOCATION** Michigan and Ecorse, Van Buren Township, MI  
**DATE STARTED** 12/12/13 **COMPLETED** 12/12/13 **BORING DIAMETER:** 2"  
**DRILLING CONTRACTOR** MSG **SURVEY COORDINATES:** 275,124.7 N; 13,347,485.3 E (US ST PLN 83)  
**DRILLING METHOD** MacroCore **GROUND SURFACE ELEV.:** 726 feet NAVD88  
**LOGGED BY** AJL **CHECKED BY** FJB **GROUND WATER ENCOUNTERED DURING DRILLING:** 14.3 FEET BGS  
**NOTES** Soil boring backfilled with medium bentonite chips. **WATER LEVEL AFTER DRILLING:** N/A

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (FEET)	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)	LABORATORY SAMPLE	REMARKS
0				0.4 Black Sandy TOPSOIL; dry. 725.6	0		
				0.8 Black fine to medium Sand; dry. 725.2	0		
				1.2 Brown Sandy CLAY; dry. 724.8	1.1		
				Brown CLAY and FILL (including Trash, Glass, Plastic, Wood fragments); dry.	15.6		
	MC 1	2.5		2.3 Black Sandy GRAVEL (FILL, including slag); dry. 723.7		X	Collected soil sample S-R2330009 -121213-AJL-015 from 2.5' bgs at 10:30.
					1.2		
5				5.0 721.0			
				5.6 Brown SAND and FILL (wood fragments). 720.4	0.1		
				6.3 Black and tan FILL (wood fragments); dry. 719.7	2.7		
	MC 2	2.0		Black Sandy CLAY and FILL (wood fragments); moist.	3.0		
10				10.0 716.0			
				Black CLAY and SAND and FILL (including Wood fragments, Bricks and Concrete).	2.5		
	MC 3	2.0			0.8		
					1.2		
					0.6		
15							-Macrocore full of water.
	MC 4	0.0				X	(No Recovery).
							Collected ground water sample W-R2330009 -121213-AJL-006 from 15'-20' bgs at 11:23.
20				20.0 706.0			



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**CLIENT** RACER Trust **PROJECT NAME** Van Buren Landfill  
**PROJECT NUMBER** R2330009 **PROJECT LOCATION** Michigan and Ecorse, Van Buren Township, MI  
**DATE STARTED** 12/12/13 **COMPLETED** 12/12/13 **BORING DIAMETER:** 2"  
**DRILLING CONTRACTOR** MSG **SURVEY COORDINATES:** 275,124.7 N; 13,347,485.3 E (US ST PLN 83)  
**DRILLING METHOD** MacroCore **GROUND SURFACE ELEV.:** 726 feet NAVD88  
**LOGGED BY** AJL **CHECKED BY** FJB **GROUND WATER ENCOUNTERED DURING DRILLING:** 14.3 FEET BGS  
**NOTES** Soil boring backfilled with medium bentonite chips. **WATER LEVEL AFTER DRILLING:** N/A

ENV BORING LOG (PID) - GINT STD US LAB.GDT - 3/11/14 14:00 - W:\PROJECTS\PROJECTS P-T\TIR2330009\ADMINISTRATION\BORING LOGS + LAB\IR2330009 BORING LOGS.LAB TEST.GPJ

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (FEET)	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)	LABORATORY SAMPLE	REMARKS
20				Black fine SAND; wet.	0.1		
	MC 5	4.0		Gray Silty CLAY; moist to dry.	0.1		
25				Bottom of borehole at 25.0 feet.	0.0		



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<b>CLIENT</b> RACER Trust	<b>PROJECT NAME</b> Van Buren Landfill
<b>PROJECT NUMBER</b> R2330009	<b>PROJECT LOCATION</b> Michigan and Ecorse, Van Buren Township, MI
<b>DATE STARTED</b> 12/13/13 <b>COMPLETED</b> 12/13/13	<b>BORING DIAMETER:</b> 2"
<b>DRILLING CONTRACTOR</b> MSG	<b>SURVEY COORDINATES:</b> 275,165.3 N; 13,347,665.9 E (US ST PLN 83)
<b>DRILLING METHOD</b> MacroCore / 4.25" Hollow Stem Auger	<b>GROUND SURFACE ELEV.:</b> 727 feet NAVD88
<b>LOGGED BY</b> AJL <b>CHECKED BY</b> FJB	<b>GROUND WATER ENCOUNTERED DURING DRILLING:</b> 13.6 FEET BGS
<b>NOTES</b> Soil boring backfilled with medium bentonite chips.	<b>WATER LEVEL AFTER DRILLING:</b> N/A

ENV BORING LOG (PID) - GINT STD US LAB.GDT - 3/11/14 14:00 - W:\PROJECTS\PROJECTS P-T\R2330009\ADMINISTRATION\BORING LOGS + LAB\R2330009 BORING LOGS.LAB TEST.GPJ

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (FEET)	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)	LABORATORY SAMPLE	REMARKS
0							
0.4				Black Sandy TOPSOIL; dry.	726.6		
0.8				Brown Gravelly SAND; dry.	726.2		
1.5	MC 1			Black Clayey SAND and FILL (including slag and generic municipal waste); dry.	0		Poor recovery due to waste in cutting shoe.
6.0				Gray Silty CLAY; dry.	721.0		
7.0				Light Brown SILT; dry.	720.0		
8.0				Light Brown SAND; trace Gravel; dry.	719.0		
10.0				Dark Brown SAND and FILL( including generic municipal waste, glass, wood fragments and plastic); dry.	717.0		
11.5				Light Brown SAND; trace Gravel; dry.	715.5		Collected soil sample S-R2330009-121313-AJL-017 from 11' bgs at 08:55.
13.0				Brown Clayey SAND; moist.	714.0		
13.6				Gray SAND; trace Gravel; moist. -saturated at 14 feet	713.4		
19.0				Gray Silty SAND; saturated.	708.0		
20.0					707.0		
15	MC 4	4.5					Collected ground water sample W-R2330009-121313-AJL-018 from 14'-19' bgs at 09:48.

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**CLIENT** RACER Trust **PROJECT NAME** Van Buren Landfill  
**PROJECT NUMBER** R2330009 **PROJECT LOCATION** Michigan and Ecorse, Van Buren Township, MI  
**DATE STARTED** 12/13/13 **COMPLETED** 12/13/13 **BORING DIAMETER:** 2"  
**DRILLING CONTRACTOR** MSG **SURVEY COORDINATES:** 275,165.3 N; 13,347,665.9 E (US ST PLN 83)  
**DRILLING METHOD** MacroCore / 4.25" Hollow Stem Auger **GROUND SURFACE ELEV.:** 727 feet NAVD88  
**LOGGED BY** AJL **CHECKED BY** FJB **GROUND WATER ENCOUNTERED DURING DRILLING:** 13.6 FEET BGS  
**NOTES** Soil boring backfilled with medium bentonite chips. **WATER LEVEL AFTER DRILLING:** N/A

ENV BORING LOG (PID) - GINT STD US LAB.GDT - 3/11/14 14:00 - W:\PROJECTS\PROJECTS P-T\R2330009\ADMINISTRATION\BORING LOGS + LAB\R2330009 BORING LOGS.LAB TEST.GPJ

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (FEET)	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)	LABORATORY SAMPLE	REMARKS
20							
	MC 5	5.0		Gray SAND; trace Gravel; saturated.	0		
				23.0	704.0		
				Gray Silty CLAY; trace Gravel; moist to dry.	0		
25		25.0		702.0			
				Bottom of borehole at 25.0 feet.			



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**CLIENT** RACER Trust **PROJECT NAME** Van Buren Landfill

**PROJECT NUMBER** R2330009 **PROJECT LOCATION** Michigan and Ecorse, Van Buren Township, MI

**DATE STARTED** 12/3/13 **COMPLETED** 12/12/13 **BORING DIAMETER:** 2"

**DRILLING CONTRACTOR** MSG **SURVEY COORDINATES:** 274,930.1 N; 13,347,406.2 E (US ST PLN 83)

**DRILLING METHOD** MacroCore **GROUND SURFACE ELEV.:** 732 feet NAVD88

**LOGGED BY** RD **CHECKED BY** FJB **GROUND WATER ENCOUNTERED DURING DRILLING:** 17 FEET BGS

**NOTES** Soil boring backfilled with medium bentonite chips. **WATER LEVEL AFTER DRILLING:** N/A

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (FEET)	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)	LABORATORY SAMPLE	REMARKS
0							
0 - 2.5	MC 1	2.5	[Cross-hatched pattern]	Brown Silty SAND; some Gravel; little Organic Material (Roots); some FILL (including Glass, Brick, Concrete); dry.	0.1		
2.5 - 5.0	MC-DS 2	2.5	[Cross-hatched pattern]		1.4		
5.0 - 10.0	MC-DS 3	3.0	[Cross-hatched pattern]	Black FILL (including Glass, Brick, Concrete, Wood, Paper); dry to moist.	25		Collected soil sample S-R2330009- 120313-RD-002 from 10'-15' bgs at 14:30.
10.0 - 15.0	MC-DS 4	3.0	[Cross-hatched pattern]		0.0		Collected ground water sample W-R2330009- 121213-AJL-015 from 15'-20' at 09:45.
15.0 - 20.0				saturated at 17' bgs.			
20.0					712.0		

ENV BORING LOG (PID) - GINT STD US LAB.GDT - 3/11/14 14:00 - W:\PROJECTS\PROJECTS P-T\R2330009\ADMINISTRATION\BORING LOGS + LAB\R2330009 BORING LOGS.LAB TEST.GPJ



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 LANSING TRAVERSE CITY

The Mannik & Smith Group, Inc.  
 2365 Haggerty Road South, Canton, Michigan 48188  
 ph: (734)-397-3100 fax: (734)-397-3131

**CLIENT** RACER Trust **PROJECT NAME** Van Buren Landfill  
**PROJECT NUMBER** R2330009 **PROJECT LOCATION** Michigan and Ecorse, Van Buren Township, MI  
**DATE STARTED** 12/3/13 **COMPLETED** 12/12/13 **BORING DIAMETER:** 2"  
**DRILLING CONTRACTOR** MSG **SURVEY COORDINATES:** 274,930.1 N; 13,347,406.2 E (US ST PLN 83)  
**DRILLING METHOD** MacroCore **GROUND SURFACE ELEV.:** 732 feet NAVD88  
**LOGGED BY** RD **CHECKED BY** FJB **GROUND WATER ENCOUNTERED DURING DRILLING:** 17 FEET BGS  
**NOTES** Soil boring backfilled with medium bentonite chips. **WATER LEVEL AFTER DRILLING:** N/A

ENV BORING LOG (PID) - GINT STD US LAB.GDT - 3/11/14 14:00 - W:\PROJECTS\PROJECTS P-T\TIR2330009\ADMINISTRATION\BORING LOGS + LAB\IR2330009\BORING LOGS.LAB TEST.GPJ

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (FEET)	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)	LABORATORY SAMPLE	REMARKS
20				Black FILL (including Glass, Brick, Concrete, Wood, Paper); saturated.			
22.0	MC 5	3.0		Soft, brown Silty CLAY; some Gravel; some coarse Sand; moist to dry.	710.0	0.0	
25							
27.0	MC 5	4.0		Stiff, brown varved Silty CLAY; moist to dry.	705.0	0.0	
30				Bottom of borehole at 30.0 feet.	702.0		



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**BORING / WELL ID: SB-33/ MW-13**

The Mannik & Smith Group, Inc.  
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ph: (734)-397-3100 fax: (734)-397-3131

<b>CLIENT</b> RACER Trust	<b>PROJECT NAME</b> Van Buren Landfill
<b>PROJECT NUMBER</b> R2330009	<b>PROJECT LOCATION</b> Michigan and Ecorse, Van Buren Township, MI
<b>DATE STARTED</b> 12/12/13 <b>COMPLETED</b> 12/12/13	<b>BORING DIAMETER:</b> 2"
<b>DRILLING CONTRACTOR</b> MSG	<b>SURVEY COORDINATES:</b> 274,918.4 N; 13,347,527.6 E (US ST PLN 83)
<b>DRILLING METHOD</b> MacroCore	<b>TOP OF CASING ELEV.:</b> N/A
<b>LOGGED BY</b> AJL <b>CHECKED BY</b> FJB	<b>GROUND WATER ENCOUNTERED DURING DRILLING:</b> 13.8 FEET BGS
<b>NOTES</b> Soil boring backfilled with medium bentonite chips.	<b>WATER LEVEL AFTER DRILLING:</b> N/A

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (FEET)	GRAPHIC LOG	DEPTH (FEET)	MATERIAL DESCRIPTION	ELEVATION (NAVD88)	PID (ppm)	LABORATORY SAMPLE	REMARKS	WELL DIAGRAM
0				0.3	Black Sandy TOPSOIL; dry.	727.7				Aboveground Pro-Casing Surface Elev. = 728 feet
				1.9	Black and brown CLAY and SAND and FILL (including Wood, Glass and Metal fragments); dry.	726.1	0.0			
				2.2	Tan fine SAND; dry.	725.8				
				2.4	Gray Silty CLAY; dry.	725.6				
	MC 1	2.5			Tan fine SAND; dry.		0.0			2-Inch Diameter PVC Riser
							0.0			Annular Seal (95% Neat Cement / 5% Bentonite Grout)
5							0.0			
							0.0			
							0.0			
	MC 2	1.0		7.5	Black and brown FILL (including wood fragments and generic municipal waste); dry.	720.5	0.0			Bentonite Seal (Medium Bentonite Chips)
							0.0			
10				10.0	Black Clayey SAND and FILL (including Glass & Plastic); moist	718.0	0.5		-odor	Sand Filter Pack (K&E Well Gravel - WP1)
							0.6			
	MC 3	4.0					1.1	X	Collected soil sample S-R2330009-121213-AJL-016 from 12' bgs at 12:45.	
							3.3			
15				15.0	Black Clayey SAND and FILL (including wood fragments); saturated.	713.0	0.1			
							0.1		Collected ground water sample W-R2330009-121213-AJL-007 from 14'-19' bgs at 13:30.	
	MC 4	1.0								2-Inch Diameter PVC Well Screen (10-Slot)
20										

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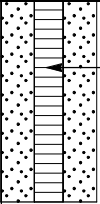



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**BORING / WELL ID: SB-33/ MW-13**

The Mannik & Smith Group, Inc. PAGE 2 OF 2  
 2365 Haggerty Road South, Canton, Michigan 48188  
 ph: (734)-397-3100 fax: (734)-397-3131

CLIENT RACER Trust PROJECT NAME Van Buren Landfill  
 PROJECT NUMBER R2330009 PROJECT LOCATION Michigan and Ecorse, Van Buren Township, MI  
 DATE STARTED 12/12/13 COMPLETED 12/12/13 BORING DIAMETER: 2"  
 DRILLING CONTRACTOR MSG SURVEY COORDINATES: 274,918.4 N; 13,347,527.6 E (US ST PLN 83)  
 DRILLING METHOD MacroCore TOP OF CASING ELEV.: N/A  
 LOGGED BY AJL CHECKED BY FJB  GROUND WATER ENCOUNTERED DURING DRILLING: 13.8 FEET BGS  
 NOTES Soil boring backfilled with medium bentonite chips.  WATER LEVEL AFTER DRILLING: N/A

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (FEET)	GRAPHIC LOG	DEPTH (FEET)	MATERIAL DESCRIPTION	ELEVATION (NAVD88)	PID (ppm)	LABORATORY SAMPLE	REMARKS	WELL DIAGRAM
20										
	MC 5	2.5		22.5	Black Clayey SAND and FILL (including wood fragments); saturated. (continued)	705.5	0.0			 <p>2-Inch Diameter PVC Well Screen (10-Slot)</p>
				25.0	Gray Silty CLAY; moist to dry.	703.0				
25					Bottom of borehole at 25.0 feet.					

ENV BORING/WELL LOG (PID) - GINT STD US LAB.GDT - 3/11/14 14:01 - W:\PROJECTS\PROJECTS P-T\T2330009\ADMINISTRATION\BORING LOGS + LAB\R2330009 BORING LOGS.LAB TEST.GPJ



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 ph: (734)-397-3100 fax: (734)-397-3131

<b>CLIENT</b> <u>RACER Trust</u>	<b>PROJECT NAME</b> <u>Van Buren Landfill</u>
<b>PROJECT NUMBER</b> <u>R2330009</u>	<b>PROJECT LOCATION</b> <u>Michigan and Ecorse, Van Buren Township, MI</u>
<b>DATE STARTED</b> <u>12/13/13</u> <b>COMPLETED</b> <u>12/13/13</u>	<b>BORING DIAMETER:</b> _____
<b>DRILLING CONTRACTOR</b> <u>MSG</u>	<b>SURVEY COORDINATES:</b> <u>274,992.5 N; 13,347,716.0 E (US ST PLN 83)</u>
<b>DRILLING METHOD</b> <u>MacroCore / 4.25" Hollow Stem Auger</u>	<b>GROUND SURFACE ELEV.:</b> <u>729 feet NAVD88</u>
<b>LOGGED BY</b> <u>AJL</u> <b>CHECKED BY</b> <u>FJB</u>	<b>GROUND WATER ENCOUNTERED DURING DRILLING:</b> <u>15.6 FEET BGS</u>
<b>NOTES</b> <u>Soil boring backfilled with medium bentonite chips.</u>	<b>WATER LEVEL AFTER DRILLING:</b> <u>N/A</u>

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (FEET)	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)	LABORATORY SAMPLE	REMARKS
0							
0.4				Black Sandy TOPSOIL; dry.	728.6		
0.7				Light Brown Fine SAND; dry.	728.3		
2.5	MC 1	2.5		Brown Fine to Medium SAND and FILL (including generic municipal waste, wood Fragments, slag, and concrete fragments); dry.	0		
5.6				Black Clayey SAND and FILL (wood fragments); moist.	723.4		
10	MC 2	1.0			0.1	X	Odor 5.6 to 10 feet. Collected soil sample S-R2330009-121313-AJL-018 from 6' bgs at 10:25.
11.0				Gray SILT; moist.	718.0		
15.0	MC 3	2.0			0		
15.0				Gray Silty CLAY; dry. -saturated at 15.6 feet.	714.0		
16.5				Gray Silty CLAY; dry	712.5		
18.0	MC 4	3.5			0		
18.0				Gray Fine to Medium SAND; trace Gravel; saturated.	711.0		Collected ground water sample W-R2330009-121313-AJL-019 from 15'-20' bgs at 11:17.
20.0					709.0		

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ENV BORING LOG (PID) - GINT STD US LAB.GDT - 3/11/14 14:00 - W:\PROJECTS\PROJECTS P-T\R2330009\ADMINISTRATION\BORING LOGS + LAB\R2330009 BORING LOGS.LAB TEST.GPJ



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The Mannik & Smith Group, Inc.  
 2365 Haggerty Road South, Canton, Michigan 48188  
 ph: (734)-397-3100 fax: (734)-397-3131

**CLIENT** RACER Trust **PROJECT NAME** Van Buren Landfill  
**PROJECT NUMBER** R2330009 **PROJECT LOCATION** Michigan and Ecorse, Van Buren Township, MI  
**DATE STARTED** 12/13/13 **COMPLETED** 12/13/13 **BORING DIAMETER:** \_\_\_\_\_  
**DRILLING CONTRACTOR** MSG **SURVEY COORDINATES:** 274,992.5 N; 13,347,716.0 E (US ST PLN 83)  
**DRILLING METHOD** MacroCore / 4.25" Hollow Stem Auger **GROUND SURFACE ELEV.:** 729 feet NAVD88  
**LOGGED BY** AJL **CHECKED BY** FJB **GROUND WATER ENCOUNTERED DURING DRILLING:** 15.6 FEET BGS  
**NOTES** Soil boring backfilled with medium bentonite chips. **WATER LEVEL AFTER DRILLING:** N/A

ENV BORING LOG (PID) - GINT STD US LAB.GDT - 3/11/14 14:00 - W:\PROJECTS\PROJECTS P-T\T2330009\ADMINISTRATION\BORING LOGS + LAB\R2330009\BORING LOGS.LAB TEST.GPJ

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (FEET)	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)	LABORATORY SAMPLE	REMARKS
20				Gray Fine to Medium SAND; saturated.	0		
				22.0 707.0 Gray Sandy GRAVEL; saturated.	0		
				23.2 705.8 23.4 705.6 Gray SILT; saturated.	0		
				Gray Silty CLAY; moist to dry.	0		
25				25.0 704.0 Bottom of borehole at 25.0 feet.	0		

ATTACHMENT 2

LACUSTRINE CLAY LAYER PHOTOGRAPHS





Photo 1: SB-15 0' to 35'



Photo 2: SB-26 0' to 35'



Photo 3: SB-23 20-25'



Photo 4: SB-23 25-30'



Photo 5: SB-23 25-30'



Photo 6: SB-23 25-30'



Photo 7: SB-23 25-30'



Photo 8: SB-23 25-30'



Photo 9: SB-23 25-30'



Photo 10: SB-23 25-30'



Photo 11: SB-23 25-30'



Photo 12: SB-23 32-34'



Photo 13: SB-23 32-34'



Photo 14: SB-23 32-34'



Photo 15: SB-23 36-40'



Photo 16: SB-23 36-40'



Photo 17: SB-23 36-40'



Photo 18: SB-23 36-40'



Photo 19: SB-23 36-40'



Photo 20: SB-23 36-40'



Photo 21: SB-23 36-40'



Photo 22: SB-23 36-40'

ATTACHMENT 3

GEOTECHNICAL LABORATORY TEST REPORTS





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# SUMMARY OF LABORATORY RESULTS

The Mannik & Smith Group, Inc.  
2365 Haggerty Road South, Canton, Michigan 48188  
ph: 734-397-3100 fax: 734-397-3131

**CLIENT** RACER Trust

**PROJECT NAME** Van Buren Landfill

**PROJECT NUMBER** R2330009

**PROJECT LOCATION** Michigan and Ecorse, Van Buren Township, MI

Sample No.	Depth	Liquid Limit	Plastic Limit	Plasticity Index	Maximum Size (mm)	%<#200 Sieve	Classification	Water Content (%)	Bulk Density (pcf)	Saturation (%)	Specific Gravity
SB-15	23.0	30	18	12	9.525	79	CL	16.9			
SB-23	30.0	27	16	11	9.525	78	CL	15.3			
SB-26	23.0	22	14	8	9.525	74	CL	14.9			



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# GRAIN SIZE DISTRIBUTION

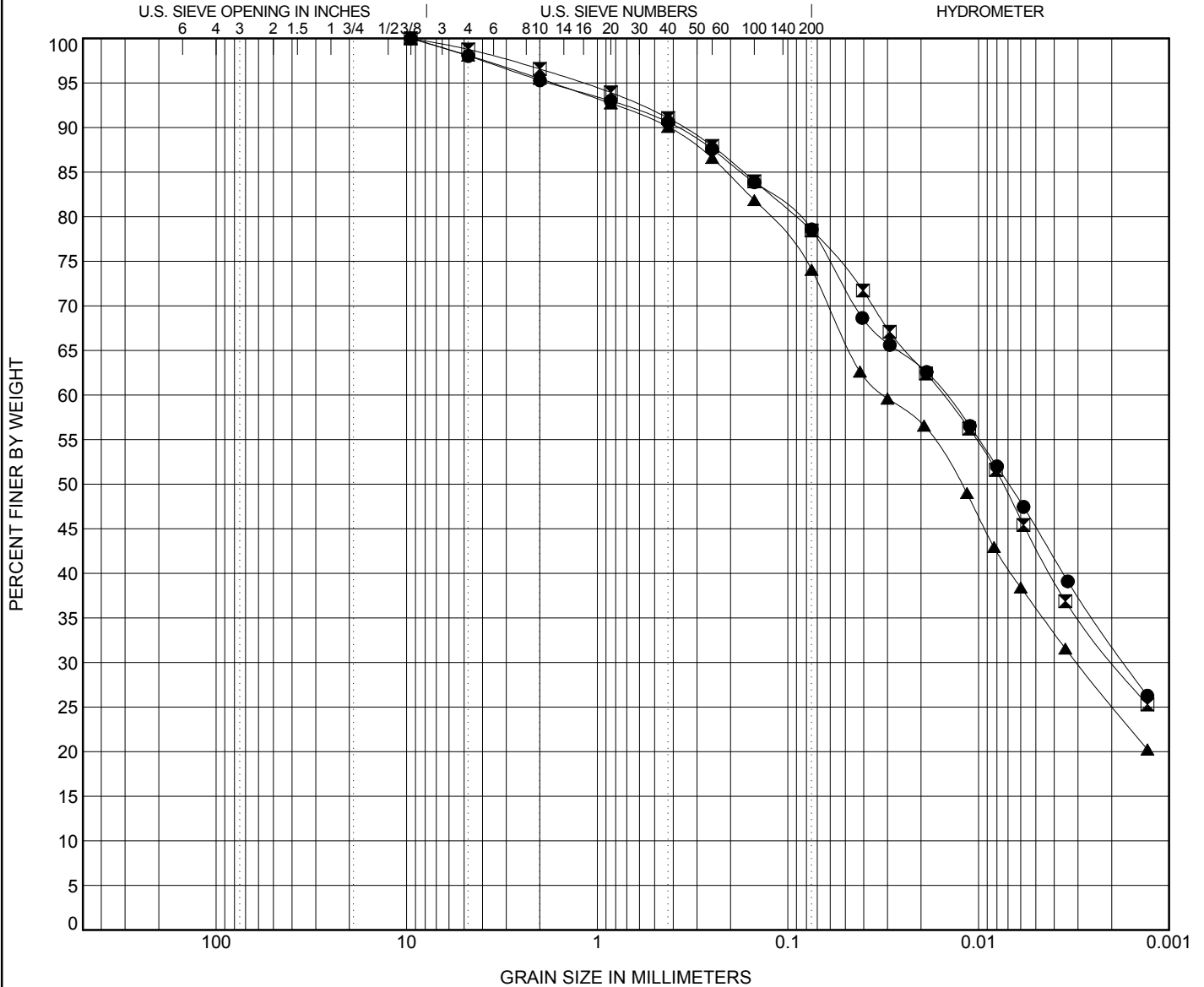
The Mannik & Smith Group, Inc.  
2365 Haggerty Road South, Canton, Michigan 48188  
ph: 734-397-3100 fax: 734-397-3131

CLIENT RACER Trust

PROJECT NAME Van Buren Landfill

PROJECT NUMBER R2330009

PROJECT LOCATION Michigan and Ecorse, Van Buren Township, MI



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● SB-15	LEAN CLAY with SAND(CL)	30	18	12		
☒ SB-23	LEAN CLAY with SAND(CL)	27	16	11		
▲ SB-26	LEAN CLAY with SAND(CL)	22	14	8		

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● SB-15	23.0	9.525	0.015	0.002	2.0	19.5	46.6	32.0
☒ SB-23	30.0	9.525	0.015	0.002	1.2	20.3	48.1	30.3
▲ SB-26	23.0	9.525	0.031	0.003	1.9	24.0	48.9	25.2

GRAIN SIZE - GINT STD US LAB.GDT - 2/28/14 08:52 - W:\PROJECTS\PROJECTS P-T\R2330009\ADMINISTRATION\BORING LOGS + LAB\R2330009.BORING LOGS.LAB TEST.GPJ



Project Name: Racer-Van Buren Landfill Project No: R2330009  
 Client's Sample No. SB-15 Date: 12/31/2013  
 Visual Description: Grey Lean Clay w/Sand Depth: 23'-25'  
 Recovery: 24"

Permeant:  De-aired tap water  0.01 N CaSO<sub>4</sub>

**Sample Preparation:**

- Sample was removed from a 3" Shelby tube and trimmed to length in a trimming jig. Any pebbles found on outer surface were removed and resulting voids were filled with material trimmed from the sample.
- Material was adjusted to required moisture content and remolded at the required density.
- Other: \_\_\_\_\_

**Soil Properties:**

Before Saturation			After Saturation		
Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Final Moisture Content (%)	Final Wet Density (pcf)	Final Dry Density (pcf)
16.86	136.32	116.66	17.58	137.00	116.51

**Formula:**

$$K = \frac{aL}{2At} \left( \ln \frac{P_B + h(t_1)}{P_B + h(t_2)} \right) R_T$$

K= Corrected Coefficient of Permeability (cm/sec)  
 a= Cross-sectional area of burette (cm<sup>2</sup>) = 0.906  
 L= Length of sample (cm) = 7.79  
 A= Cross-sectional area of sample (cm<sup>2</sup>) = 41.5105706  
 t= Elapsed time (sec)

$$h(t_1) = \frac{V_U(t_1) - V_L(t_1)}{a}$$

$$h(t_2) = \frac{V_U(t_2) - V_L(t_2)}{a}$$

R<sub>T</sub>= Correction factor for viscosity of water at various temperatures

P<sub>B</sub>= Bias Pressure (cm) = 140.74  
 psi x 70.37 cm/psi

**Degree of Saturation:**

Date	Time	Cell Pressure (psi)	Head Pressure (psi)	Back Pressure (psi)	Confining Pressure Increase (psi) = a	Pore Pressure Increase (psi) = b	Skempton's Parameter (B) = (b/a)
1/6/2014	2:30PM	50.0	45.0	45.0	5.0	5.0	1.0

**Permeability Measurement:**

Test No.	Date	t (sec)	Upper Volume Reading (V <sub>U</sub> )	Lower Volume Reading (V <sub>L</sub> )	h(t <sub>1</sub> )	h(t <sub>2</sub> )	Water Temp. T (°C)	R <sub>T</sub> (from table)	K (cm/sec)	K <sub>corrected</sub> (cm/sec)
1	1/8/2014	84,480	24.40	1.00	25.83		18	1.051	1.48E-08	1.55E-08
			23.20	2.00	23.40	18	1.051			
2	1/9/2014	92,760	23.20	2.00	23.40		18	1.051	1.30E-08	1.37E-08
			22.10	3.00	21.08	18	1.051			
3	1/10/2014	80,700	22.10	3.00	21.08		18	1.051	1.45E-08	1.52E-08
			21.10	4.00	18.87	18	1.051			
4	1/11/2014	86,460	21.10	4.00	18.87		18	1.051	1.37E-08	1.44E-08
			20.10	5.00	16.67	18	1.051			

AVERAGE CORRECTED COEFFICIENT OF PERMEABILITY (K): 1.47E-08 cm/sec

Tested By: MG/KL Reviewed By: THR Date: 1/20/2014

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Project Name:	Racer-Van Buren Landfill	Project No:	R2330009
Client's Sample No.:	SB-23	Date:	12/31/2013
Visual Description:	Grey Lean Clay with Sand	Depth:	30'-32'
		Recovery:	26"

Permeant:  De-aired tap water  0.01 N CaSO<sub>4</sub>

**Sample Preparation:**

- Sample was removed from a 3" Shelby tube and trimmed to length in a trimming jig. Any pebbles found on outer surface were removed and resulting voids were filled with material trimmed from the sample.
- Material was adjusted to required moisture content and remolded at the required density.
- Other: \_\_\_\_\_

**Soil Properties:**

Before Saturation			After Saturation		
Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Final Moisture Content (%)	Final Wet Density (pcf)	Final Dry Density (pcf)
15.27	137.02	118.87	17.10	137.44	117.37

**Formula:**

$$K = \frac{aL}{2At} \left( \ln \frac{P_B + h(t_1)}{P_B + h(t_2)} \right) * R_T$$

K= Corrected Coefficient of Permeability (cm/sec)  
a= Cross-sectional area of burette (cm<sup>2</sup>) = 0.906  
L= Length of sample (cm) = 7.9  
A= Cross-sectional area of sample (cm<sup>2</sup>) = 41.7392785  
t= Elapsed time (sec)

$$h(t_1) = \frac{V_U(t_1) - V_L(t_1)}{a}$$

$$h(t_2) = \frac{V_U(t_2) - V_L(t_2)}{a}$$

R<sub>T</sub>= Correction factor for viscosity of water at various temperatures

P<sub>B</sub>= Bias Pressure (cm) = 140.74  
psi x 70.37 cm/psi

**Degree of Saturation:**

Date	Time	Cell Pressure (psi)	Head Pressure (psi)	Back Pressure (psi)	Confining Pressure Increase (psi) = a	Pore Pressure Increase (psi) = b	Skempton's Parameter (B) = (b/a)
1/6/2014	2:10PM	51.0	46.0	46.0	5.0	5.0	1.0

**Permeability Measurement:**

Test No.	Date	t (sec)	Upper Volume Reading (V <sub>U</sub> )	Lower Volume Reading (V <sub>L</sub> )	h(t <sub>1</sub> )	h(t <sub>2</sub> )	Water Temp. T (°C)	R <sub>T</sub> (from table)	K (cm/sec)	K <sub>corrected</sub> (cm/sec)
1	1/8/2014	84,660	24.00	1.20	25.17		18	1.051	1.63E-08	1.71E-08
			22.80	2.40		22.52	18	1.051		
2	1/9/2014	92,760	22.80	2.40	22.52		18	1.051	1.45E-08	1.52E-08
			21.60	3.50		19.98	18	1.051		
3	1/10/2014	80,700	21.60	3.50	19.98		18	1.051	1.47E-08	1.54E-08
			20.60	4.50		17.77	18	1.051		
4	1/13/2014	255,600	20.60	4.50	17.77		18	1.051	1.43E-08	1.50E-08
			17.60	7.50		11.15	18	1.051		

AVERAGE CORRECTED COEFFICIENT OF PERMEABILITY (K): 1.57E-08 cm/sec

Tested By: MG Reviewed By: THR Date: 1/20/2014

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Project Name: Racer-Van Buren Landfill Project No: R2330009  
 Client's Sample No. SB-26 Date: 12/31/2013  
 Visual Description: Grey Lean Clay w/Sand Depth: 23'-25'  
 Recovery: 27'

Permeant:  De-aired tap water  0.01 N CaSO<sub>4</sub>

**Sample Preparation:**

- Sample was removed from a 3" Shelby tube and trimmed to length in a trimming jig. Any pebbles found on outer surface were removed and resulting voids were filled with material trimmed from the sample.
- Material was adjusted to required moisture content and remolded at the required density.
- Other: \_\_\_\_\_

**Soil Properties:**

Before Saturation			After Saturation		
Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Final Moisture Content (%)	Final Wet Density (pcf)	Final Dry Density (pcf)
14.89	139.59	121.50	14.77	139.12	121.21

**Formula:**

$$K = \frac{aL}{2At} \left( \ln \frac{P_B + h(t_1)}{P_B + h(t_2)} \right) R_T$$

K= Corrected Coefficient of Permeability (cm/sec)  
 a= Cross-sectional area of burette (cm<sup>2</sup>) = 0.906  
 L= Length of sample (cm) = 8.12  
 A= Cross-sectional area of sample (cm<sup>2</sup>) = 41.7392785  
 t= Elapsed time (sec)

$$h(t_1) = \frac{V_U(t_1) - V_L(t_1)}{a}$$

$$h(t_2) = \frac{V_U(t_2) - V_L(t_2)}{a}$$

R<sub>T</sub>= Correction factor for viscosity of water at various temperatures

P<sub>B</sub>= Bias Pressure (cm) = 140.74  
 psi x 70.37 cm/psi

**Degree of Saturation:**

Date	Time	Cell Pressure (psi)	Head Pressure (psi)	Back Pressure (psi)	Confining Pressure Increase (psi) = a	Pore Pressure Increase (psi) = b	Skempton's Parameter (B) = (b/a)
1/6/2014	2:20PM	51.0	46.0	46.0	5.0	5.0	1.0

**Permeability Measurement:**

Test No.	Date	t (sec)	Upper Volume Reading (V <sub>U</sub> )	Lower Volume Reading (V <sub>L</sub> )	h(t <sub>1</sub> )	h(t <sub>2</sub> )	Water Temp. T (°C)	R <sub>T</sub> (from table)	K (cm/sec)	K <sub>corrected</sub> (cm/sec)
1	1/7/2014	61,980	24.80	0.20	27.15		18	1.051	5.53E-08	5.81E-08
			21.90	3.10	20.75	18	1.051			
2	1/8/2014	84,540	21.90	3.10	20.75		18	1.051	6.09E-08	6.40E-08
			17.70	7.20	11.59	18	1.051			
3	1/9/2014	92,760	17.70	7.20	11.59		18	1.051	5.67E-08	5.96E-08
			13.70	11.20	2.76	18	1.051			
4	1/10/2014	80,700	13.70	11.20	2.76		18	1.051	6.58E-08	6.91E-08
			9.90	15.00	-5.63	18	1.051			

AVERAGE CORRECTED COEFFICIENT OF PERMEABILITY (K): 6.27E-08 cm/sec

Tested By: MG Reviewed By: THR Date: 1/20/2014

\*The certificate shall not be reproduced except in full, without the written approval of MSG.