



## MEMORANDUM

**DATE:** July 12, 2017  
**TO:** James Mahoney, Acting District Manager, Ministry of the Environment and Climate Change (MOECC)  
**CC:** Shawn Trimper, Peter Taylor and Chris Raffael (MOECC)  
Chris Prucha, Bill McDonough, Jim Forney and Tim Haaf, Waste Management (WM)  
**FROM:** Francois Richard and Phil Tibble (BluMetric™)  
**PROJECT NO:** 170193-11  
**SUBJECT:** Assessment of CVOC Impacts at Shallow Groundwater Monitoring Well M54-4, Waste Management Richmond Landfill, Town of Greater Napanee

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### BACKGROUND AND PURPOSE

This document was prepared on behalf of Waste Management (WM) in response to technical review comments of the Site Conceptual Model Update and Contaminant Attenuation Zone Delineation report and related addendum<sup>1,2</sup>. The review comments were provided by James Mahoney, Acting Manager, Kingston District Office, Ministry of the Environment and Climate Change (MOECC), in a letter dated July 27, 2016.

The scope of work (SoW) associated with the ongoing complementary Contaminant Attenuation Zone (CAZ) investigation was outlined in a memorandum dated October 5, 2016<sup>3</sup>. Under Task 5 of the SoW (reporting), a separate report was to be prepared to present the findings of the re-assessment of the presence of volatile organic compounds (VOCs) at shallow monitoring well M54-4, located on WM property south of the landfill and north of Beechwood Road. This particular item was identified by MOECC hydrogeologist Kyle Stephenson in his technical review comments outlined in a letter dated July 4, 2016, who requested that, while impacts from VOCs at M54-4 do not occur at the property boundary, further assessment / investigation of impacts at the shallow groundwater flow zone trigger well should be undertaken.

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<sup>1</sup> BluMetric 2016a: *Site Conceptual Model Update and Contaminant Attenuation Zone Delineation*, BluMetric Environmental Inc., Report dated January 2016

<sup>2</sup> BluMetric 2016b: *Addendum to Site Conceptual Model Update and Contaminant Attenuation Zone Delineation*, BluMetric Environmental Inc., Report dated April 2016

<sup>3</sup> BluMetric 2016c: *Proposed Work Program for Complementary CAZ Investigation*, Waste Management Richmond Landfill, Town of Greater Napanee, BluMetric Environmental Inc., Memorandum dated October 5, 2016



A summary and discussion of historical results at shallow monitoring well M54-4 and other relevant information are provided below, followed by recommendations.

## REVIEW AND DISCUSSION OF SHALLOW GROUNDWATER FLOW ZONE SOUTH OF LANDFILL

This section provides a summary of the latest hydrogeological site conceptual model (SCM) as it relates to the shallow groundwater flow zone at the WM Richmond Landfill, derived from historical results including multiple hydrogeological investigations and routine environmental monitoring. Relevant results from historical groundwater monitoring are summarized below, including physical hydrogeology and groundwater quality data as they relate to volatile organic compound (VOC) impacts in the shallow groundwater flow zone. Particular attention is given to the area south of the landfill where monitoring well M54-4 is located (see Figure 1). All results used in the present document have been previously presented and discussed in documents that include routine monitoring reports required by the Environmental Monitoring Plan (EMP) for the site, including the most recent related to the spring 2017 sampling event<sup>4</sup>, as well as various hydrogeological investigation reports.

### *Shallow Flow Zone Physical Hydrogeology*

The shallow groundwater flow zone at the site includes the saturated overburden, the overburden-bedrock contact and the upper one to two metres of bedrock. The direction of groundwater flow in the shallow flow zone is strongly influenced by ground surface topography. The spring 2017 shallow groundwater contours are presented on **Figure 1** and are consistent with historical results.

The Empey Hill drumlin is a local topographic high located southwest from the landfill that creates a local flow divide, with shallow groundwater being directed both to the north and to the south towards areas of lower hydraulic heads. North of the landfill, shallow groundwater converges towards Marysville Creek in the area immediately east of County Road 10 (Deseronto Road), while shallow flow in the southern portion of the site converges on Beechwood Ditch and the southern pond system. Shallow groundwater east of the landfill is influenced by a local zone of higher water levels in the vicinity of monitoring well M96; shallow groundwater north of M96 flows to the north-northwest and ultimately Marysville Creek, while groundwater south of M96 flows to the south-southwest, towards Beechwood Ditch and the stormwater management ponds.

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<sup>4</sup> BluMetric 2017a: *Spring 2017 Semi-Annual Monitoring Report, WM Richmond Landfill, Town of Greater Napanee*, BluMetric Environmental Inc., report dated July 2017

M54-4 is located just west of the access road on the front field of the landfill property, in an area where shallow groundwater contours converge from the northwest, north and east towards the stormwater management system (see **Figure 1**). This system consists of three ponds that discharge into Beechwood Ditch from an outlet at the western extremity of the western pond. The water elevations from staff gauges installed in the three ponds, which are in hydraulic communication with shallow groundwater, are used along with water levels from shallow groundwater monitoring wells and interpolated to produce the shallow piezometric surface.

The landfill and various site infrastructures are hydraulically upgradient from M54-4, as are shallow monitoring wells M81, M41, M18, M15 and M53-4. Groundwater flows offsite towards the south-southwest, across Beechwood Road and onto the proposed Contaminant Attenuation Zone (CAZ). Shallow monitoring wells M114-2 and M80-2 are located downgradient from M54-4. Beechwood Ditch is the local discharge point for shallow groundwater in this part of the site.

### *Shallow Groundwater Impacts South of Landfill*

Historical groundwater quality results from all shallow monitoring wells located south of the landfill are presented in **Appendix A** for chlorinated VOCs (CVOCs) and primary leachate indicators 1,4 dioxane and alkalinity. In addition to M54-4, other shallow monitoring wells located south of the landfill include M12, M14, M15, M41, M80-2 and M81 as well as M114-2 and M115-2, located south of Beechwood Road on the property associated with a former abattoir (Lewis Meats). **Table 1** summarizes historical groundwater quality results at monitoring well M54-4, while **Figure 2** shows time-concentration plots for CVOCs that were measured above the laboratory's reporting limits (RL). These include tetrachloroethylene (PCE) and its degradation products trichloroethylene (TCE), 1,1,1 trichloroethane (TCA), 1,1 dichloroethane (DCA), 1,1 dichloroethylene (DCE) and vinyl chloride (VC). Temporal trends at M54-4 show that PCE and TCA have been steadily declining since 2009, while all other CVOCs show slight increases until 2015 (which is expected as they are the degradation products), and have generally been stable or declining since 2015, with the exception of October 2016 when there was an uptick in all CVOC concentrations except PCE. In addition to the presence of CVOCs, results at M54-4 (**Table 1**) are characterized by elevated alkalinity, conductivity and total dissolved solids (TDS), which have shown an increasing trend in recent years while other parameters have generally remained stable and below their respective RULs. In recent sampling events it has been noted that the purge water at M54-4 may contain evidence of bentonite.

Impacts to groundwater from landfill leachate is characterized by the presence of 1,4 dioxane above the laboratory reporting limit of 0.001 mg/L, generally accompanied by alkalinity concentrations above approximately 400 mg/L. Reasonable Use Limits (RULs) have been established for other leachate indicator parameters, as summarized in the latest Environmental Monitoring Plan (EMP)<sup>5</sup>. **Appendix B** provides the historical results for 1,4 dioxane, alkalinity and selected CVOCs from leachate samples collected at the North and South Chamber, while **Table 2** summarizes the historical minimum and maximum concentrations in leachate and from the shallow groundwater monitoring wells located south of the landfill (M12, M14, M15, M41, M54-4, M80-2, M81, M114-2 and M115-2). M41 is located in close proximity (approximately 22 m) and hydraulically downgradient from the landfill footprint and is the only well south of the landfill that has been impacted by leachate, as defined by the presence of 1,4 dioxane. Despite the presence of isolated occurrences of elevated concentrations of water quality parameters (i.e., one or two parameters per sample), there is no evidence of groundwater impact away from the landfill footprint in the shallow groundwater flow zone. This includes shallow wells located in the front field upgradient (M12, M14, M15, M18 and M81), cross-gradient (M115-2) and downgradient (M80-2 and M114-2) relative to M54-4. Additional details on environmental monitoring results can be found in the semi-annual reports, including the most recent (BluMetric, 2017a).

The presence of CVOCs in the area between the landfill and Beechwood Road (referred to as the “front field”), including at shallow groundwater monitor M54-4, has been documented, investigated, and reported on previously. A summary of CVOC impacts up to 2008 was presented in section 5.4.1 of the site conceptual model (SCM) report<sup>6,7</sup>. A detailed evaluation<sup>8</sup> of the CVOC impacts south of the landfill was completed following a technical meeting held in the MOECC’s Kingston office on June 30, 2009, where it was agreed that current and historic data appeared to be consistent with an interpretation that there have been VOC releases from around the landfill and the maintenance area south of the footprint, and from Lewis Meats. Results from this study and subsequent investigation work concluded that the landfill was not the sole source of CVOCs detected in groundwater on the WM property. Other likely contributors include on-site sources such as the maintenance area and contaminated soils storage pad, as well as the former abattoir south of Beechwood Road.

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<sup>5</sup> BluMetric 2016d: *Interim Environmental Monitoring Plan, WM Richmond Landfill, Town of Greater Napanee, Ontario*, BluMetric Environmental Inc., Revision No. 5, April 2016

<sup>6</sup> BKA and WESA 2009: *Site Conceptual Model Report, WM Richmond Landfill*, B. Kueper and Assoc. Ltd. and WESA Inc., Report dated October, 2009

<sup>7</sup> BKA and WESA 2010: *Addendum to Site Conceptual Model Report, WM Richmond Landfill*, Dr. B.H. Kueper and WESA Inc., Report dated October, 2010

<sup>8</sup> WESA and ATG 2010: *On-Site groundwater and Surface Water Quality Assessment, WM Richmond Landfill*, WESA Inc. and Applied Testing & Geosciences, LLC, Memorandum dated June 14, 2010

Historical surface water impacts in the front field are documented to have occurred in the late 1990's and early 2000's as a result of periodic leachate seeps and runoff from a contaminated soils storage pad. For example, WESA and ATG (2010) includes photographs from 2004, 2006 and early 2008 that show runoff and ponding in the front field, a frequent occurrence until the retention pond system was reconstructed in the second half of 2008 to increase its volume and retention time.

## DISCUSSION AND RECOMMENDATIONS

At groundwater monitor M54-4, the concentrations for CVOCs PCE and TCA have been steadily declining since 2009, while all other CVOCs show slight increases between about 2010 and 2015, with generally stable or declining trends since then, with the exception of October 2016. As suggested by BKA and WESA (2009 and 2010), the generally much lower CVOC concentrations measured in 2009 relative to historical results, which in many cases have been reduced to non-detectable concentrations, confirm that the CVOCs have been naturally attenuated as a result of dispersion and biodegradation processes. In addition, the lack of a presence of 1,4 dioxane indicates that the landfill is not a current or continuous source for the chemistry seen at this location.

Shallow groundwater flow direction from the area of M54-4 is towards the south-southwest, across Beechwood Road and onto the proposed CAZ (see **Figure 1**). However based on the evidence presented and discussed previously, impacts from the landfill have not been identified at this well; the CVOCs identified at M54-4 are from historic releases, have been naturally attenuating for many years, and consequently do not represent a significant concern for off-site impacts. Moreover, WM intends to submit an application to amend the Environmental Compliance Approval (ECA) to include a proposed CAZ south of Beechwood Road. The extent of the proposed CAZ will be defined based on the results from hydrogeological investigations, and will be presented in a separate report based on the delineation of impacts to groundwater from the landfill<sup>9</sup>.

Monitoring well M54-4 is identified in the current, interim EMP as a shallow flow zone trigger well, in large part due to its proximity to the currently approved southern property boundary (Beechwood Road). Once the CAZ is approved and established, this location will be well within the approved site boundary and will no longer be a trigger well within the environmental monitoring program.

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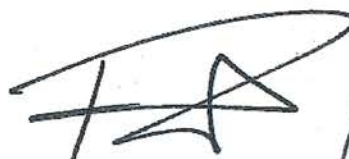
<sup>9</sup> BluMetric 2017b: *Site Conceptual Model Update and Contaminant Attenuation Zone Delineation*, BluMetric Environmental Inc., Report dated July 2017

We trust the above update on progress and schedule is satisfactory. If you have any questions or need further information regarding the proposed scope of work please do not hesitate to contact the undersigned.

Respectfully Submitted,  
BluMetric Environmental Inc.



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Senior Hydrogeologist



Phil Tibble, M.Sc. P.Geo.  
Senior Hydrogeologist



**Attachments:**

- Table 1: Historical Groundwater Chemistry at Shallow Monitoring Well M54-4
- Table 2: Summary of Historical Concentrations in Leachate and Shallow Groundwater for Selected VOCs
- Figure 1: Shallow Groundwater Flow Zone Potentiometric Surface – April 28, 2017
- Figure 2: Time-Concentration Plots Showing Historical Chlorinated VOC Concentrations at Shallow Groundwater Monitoring Well M54-4
- App. A: Historical Results for CVOCs and Primary Leachate Indicators in Shallow Groundwater South of Landfill
- App. B: Historical Results for CVOCs and Primary Leachate Indicators in Leachate

## TABLES







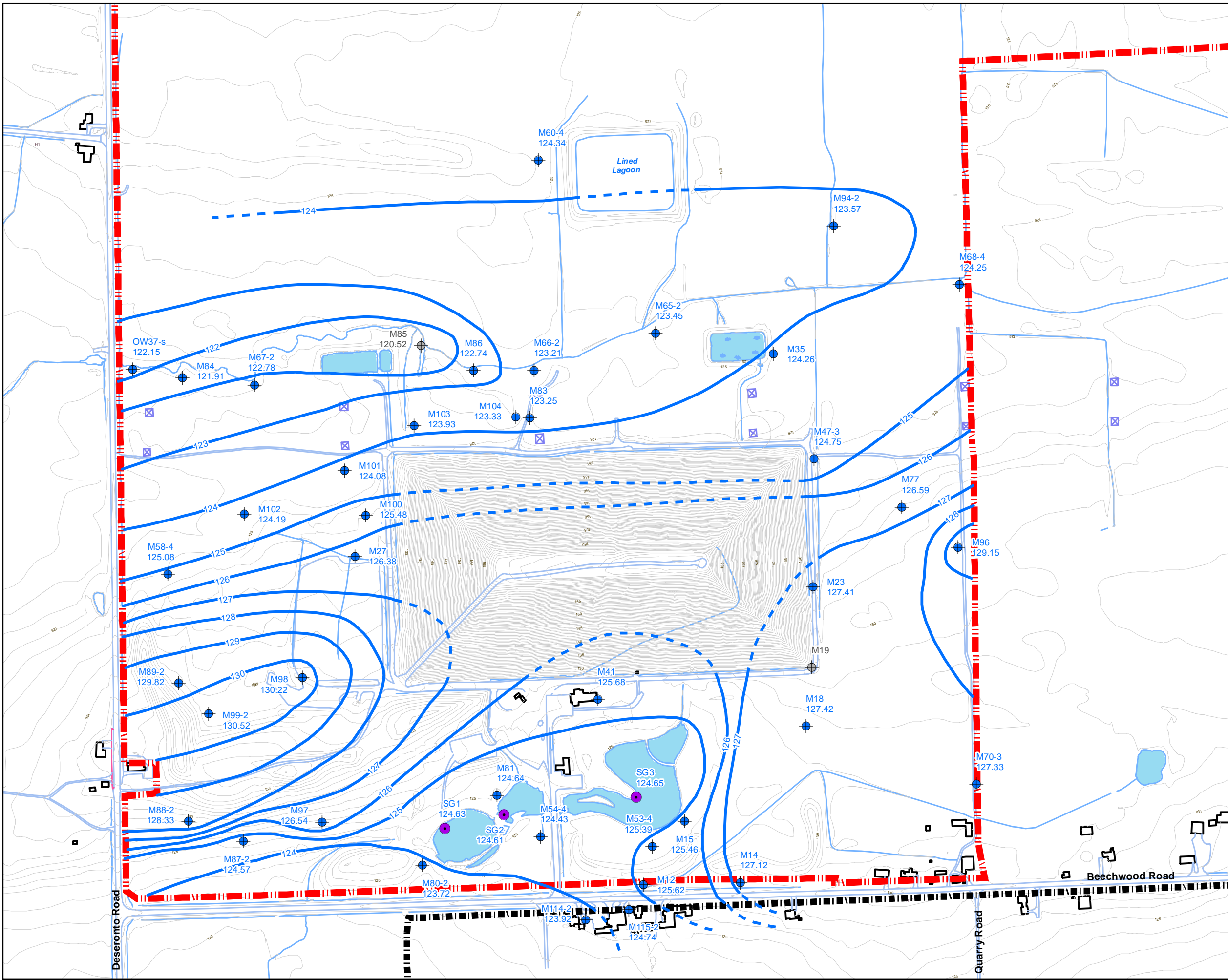
Table 2. Summary of Historical Concentrations in Leachate and Shallow Groundwater for Selected VOCs

	PCE (mg/L)		TCE (mg/L)		1,1 DCA (mg/L)		1,1 DCE (mg/L)		VC (mg/L)		1,4 Dioxane (mg/L)	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
<b>LEACHATE RESULTS</b>												
North Chamber (2003-2017)	< 0.0003	0.007	< 0.0003	0.0013	0.0006	0.0071	< RL*		< 0.0002	0.0112	0.042	0.103
South Chamber (1999-2017)	< RL*		0.0052 (1999) < RL* since 2000		0.00095	0.0062			0.0005	0.0136	0.028	0.376
									< RL* since 2007		< RL* since 2007	
North/South Chambers Combined (2013-2017)	< RL*				< RL*	0.0012	< RL*					
<b>SHALLOW GROUNDWATER RESULTS SOUTH OF LANDFILL</b>												
M54-4 (1998-2017)	0.0041	0.0095	0.0001	0.0028	0.0019	0.0052	0.0002	0.0022	0.00022	0.00066	< 0.001	
M41 (1991-2015)	< 0.0001				0.0019	0.0052	< 0.0001		< 0.0002		0.00161	0.00161
M12, M14, M15, M80-2, M81, M114-2 & M115-2 (1991-2017)	< RL*											

\* < RL: Non-detect (below laboratory's reporting limit)

## FIGURES





**LEGEND**

- Potentiometric Surface (masl)
- Topographic Contour Lines
- Surface Water
- Property Boundary
- Proposed CAZ Boundary
- M53-4 Shallow Groundwater Zone Elevation Monitor
- M5-3 Monitor Not Used in Contouring
- M35 Staff Gauge Location

1				
REV.	DESCRIPTION	YY/MM/DD	BY	CHK

**REFERENCES**  
 PROPRIETARY INFORMATION MAY NOT BE REPRODUCED OR DIVULGED WITHOUT PRIOR WRITTEN CONSENT OF BLUMETRIC ENVIRONMENTAL INC. DO NOT SCALE DRAWING.  
 THIS DRAWING MAY HAVE BEEN REDUCED. ALL SCALE NOTATIONS INDICATED ARE BASED ON 11"x17" FORMAT DRAWINGS.

**CLIENT**

**PROJECT**

**WM RICHMOND LANDFILL ASSESSMENT OF VOC IMPACTS AT M54-4**

**TITLE**

**Shallow Groundwater Flow Zone Potentiometric Surface – April 28, 2017**

The Tower - The Woolen Mill,  
 4 Cataraqui St.,  
 Kingston, Ontario K7K 1Z7  
 TEL: (613) 531-2725  
 FAX: (613) 531-1852  
 Email: info@blumetric.ca  
 Web: http://www.blumetric.ca

<b>PROJECT #</b> 170193-11	<b>DATE</b> July, 2017		
<b>DRAWN</b> YL	<b>CHECKED</b> FR	<b>FIG NO.</b> 01	<b>REV</b> 0

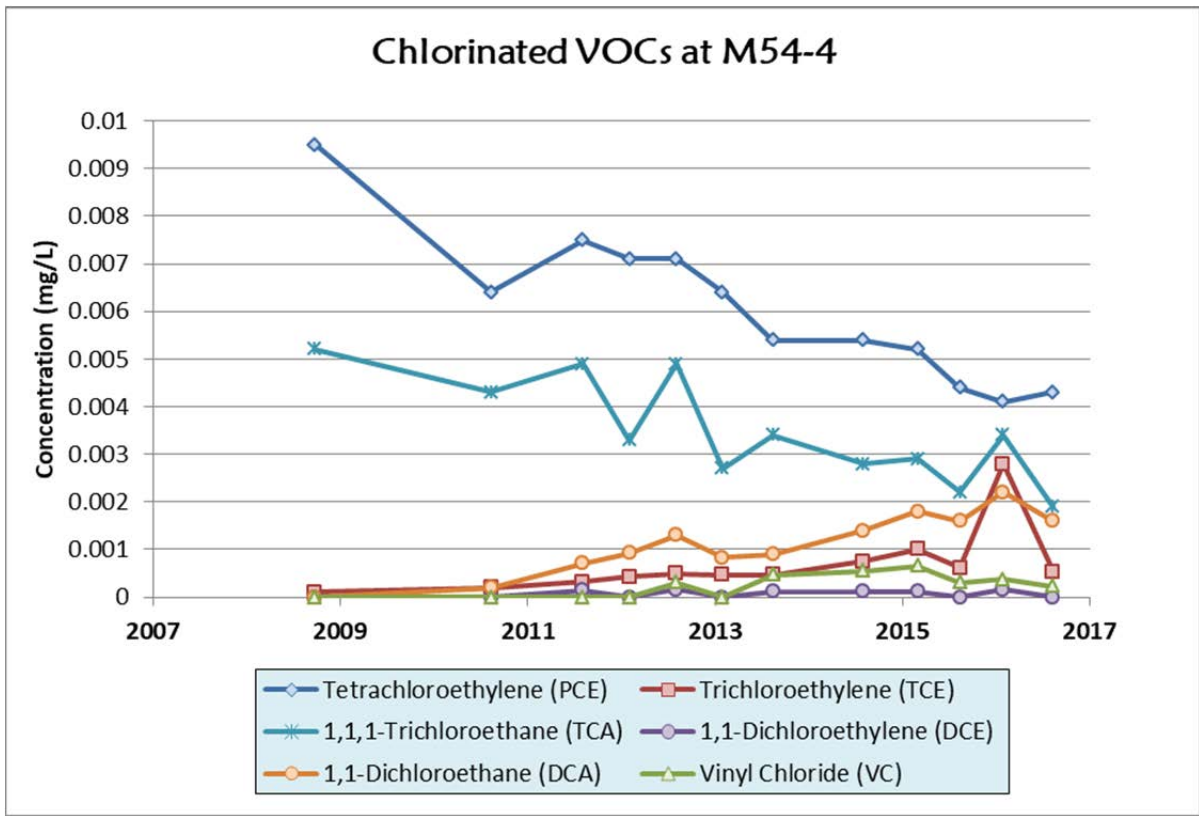


Figure 2. Time-Concentration Plots Showing Historical Chlorinated VOC Concentrations at Shallow Groundwater Monitoring Well M54-4

## APPENDIX A



Appendix A. WM Richmond Landfill Historical Results for CVOCs and Primary Leachate Indicators in Shallow Groundwater South of Landfill

Name	Sam Date	Primary Leachate Indicators		Chlorinated Volatile Organic Compounds (CVOCs)													
		1,4-Dioxane mg/L	Alkalinity mg/L	1,1,1-Trichloroethane mg/L	1,1,2-Trichloroethane mg/L	1,1-Dichloroethane mg/L	1,1-Dichloroethylene mg/L	1,2-Dichlorobenzene (o) mg/L	1,2-Dichloroethane mg/L	1,3-Dichlorobenzene (m) mg/L	1,4-Dichlorobenzene (p) mg/L	Bromodichloromethane mg/L	Chloroethane mg/L	Chloromethane mg/L	Tetrachloroethylene mg/L	Trichloroethylene mg/L	Vinyl Chloride mg/L
M12	7/1/1991			< RL	< RL	< RL	< RL	< RL	< RL	< RL	< RL	< RL	< RL	< RL	< RL	< RL	< RL
M12	10/24/2003												< 0.0024				
M12	5/3/2004		352										< 0.0024				
M12	5/2/2005		320										< 0.0024				
M12	5/30/2006		349										< 0.0004				< 0.0002
M12	4/29/2008		286										< 0.0002				
M12	6/16/2009		317	< 0.0001	< 0.0002	< 0.0001	< 0.0001	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0001	< 0.0002	< 0.0005	< 0.0001	< 0.0001	< 0.0002
M14	7/1/1991			< RL	< RL	< RL	< RL	< RL	< RL	< RL	< RL	< RL	< RL	< RL	< RL	< RL	< RL
M14	10/24/2003												< 0.0024				
M14	5/3/2004		250										< 0.0024				
M14	5/2/2005		251										< 0.0024				
M14	5/30/2006		290										< 0.0004				< 0.0002
M14	4/29/2008		311										< 0.0002				
M14	6/16/2009		299	< 0.0001	< 0.0002	< 0.0001	< 0.0001	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0001	< 0.0002	< 0.0005	< 0.0001	< 0.0001	< 0.0002
M15	6/16/2009			< 0.0001	< 0.0002	< 0.0001	< 0.0001	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0001	< 0.0002	< 0.0005	< 0.0001	< 0.0001	< 0.0002
M41	7/1/1991			< RL	< RL	< RL	< RL	< RL	< RL	< RL	< RL	< RL	< RL	< RL	< RL	< RL	< RL
M41	6/17/2009		462	< 0.0001	< 0.0002	< 0.0001	< 0.0001	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0001	< 0.0002	< 0.0005	< 0.0001	< 0.0001	< 0.0002
M41	5/3/2011		420	< 0.0001	< 0.0002	< 0.0001	< 0.0001	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0001	< 0.0002	< 0.0005	< 0.0001	< 0.0001	< 0.0002
M41	4/25/2012		470	< 0.0001	< 0.0002	< 0.0001	< 0.0001	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0001	< 0.0002	< 0.0005	< 0.0001	< 0.0001	< 0.0002
M41	10/22/2012		460	< 0.0001	< 0.0002	< 0.0001	< 0.0001	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0001			< 0.0001	< 0.0001	< 0.0002
M41	4/26/2013		430	< 0.0001	< 0.0002	0.0001	< 0.0001	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0001	< 0.001	< 0.0005	< 0.0001	< 0.0001	< 0.0002
M41	10/24/2013	0.00161	280	< 0.0001	< 0.0002	0.00012	< 0.0001	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0001	< 0.0002	< 0.0005	< 0.0001	< 0.0001	< 0.0002
M41	5/6/2014		450	< 0.0001	< 0.0002	< 0.0001	< 0.0001	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0001	< 0.0002	< 0.0005	< 0.0001	< 0.0001	< 0.0002
M41	4/22/2015		430	< 0.0001	< 0.0002	0.00011	< 0.0001	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0001	< 0.0002	< 0.0005	< 0.0001	< 0.0001	< 0.0002
M54-4	6/22/1998		287	< RL	< RL	< RL	< RL					< RL					
M54-4	6/15/2009		285	0.0052	< 0.0002	< 0.0001	< 0.0001	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0001	< 0.0002	< 0.0005	0.0095	0.0001	< 0.0002
M54-4	5/3/2011		341	0.0043	< 0.0002	0.0002	< 0.0001	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0001	< 0.0002	< 0.0005	0.0064	0.0002	< 0.0002
M54-4	4/24/2012		380	0.0049	< 0.0002	0.00071	0.00014	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0001	< 0.0002	< 0.0005	0.0075	0.00032	< 0.0002
M54-4	10/23/2012		410	0.0033	< 0.0002	0.00093	< 0.0001	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0001			0.0071	0.00042	< 0.0002
M54-4	4/23/2013		400	0.0049	< 0.0002	0.0013	0.00016	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0001	< 0.0002	< 0.0005	0.0071	0.00049	0.0003
M54-4	5/1/2013	< 0.001															
M54-4	10/21/2013	< 0.001	360	0.0027	< 0.0002	0.00083	< 0.0001	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0001	< 0.0002	< 0.0005	0.0064	0.00047	< 0.0002
M54-4	5/6/2014		410	0.0034	< 0.0002	0.0009	0.00011	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0001	< 0.0002	< 0.0005	0.0054	0.00046	0.00046
M54-4	10/22/2014		380														
M54-4	4/23/2015		430	0.0028	< 0.0002	0.0014	0.00012	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0001	< 0.0002	< 0.0005	0.0054	0.00075	0.00055
M54-4	11/23/2015	< 0.001	410	0.0029	< 0.0002	0.0018	0.00012	< 0.0002	< 0.0002	< 0.0002	< 0.0002		< 0.0002	< 0.0005	0.0052	0.001	0.00066
M54-4	5/5/2016	< 0.001	460	0.0022	< 0.0002	0.0016	< 0.0001	< 0.0002	< 0.0002	< 0.0002	< 0.0002		< 0.0002	< 0.0005	0.0044	0.00061	0.0003
M54-4	10/19/2016	< 0.001	450	0.0034	< 0.0002	0.0022	0.00016	< 0.0002	< 0.0002	< 0.0002	< 0.0002		< 0.0002	< 0.0005	0.0041	0.0028	0.00037
M54-4	5/3/2017	< 0.001	490	0.0019	< 0.0002	0.0016	< 0.0001	< 0.0002	< 0.0002	< 0.0002	< 0.0002		< 0.0002	< 0.0005	0.0043	0.00053	0.00022
M80-2	11/12/2004		312	< 0.0021	< 0.0019	< 0.0035	< 0.0016	< 0.0019	< 0.0029	< 0.0024	< 0.0024	< 0.002	< 0.001	< 0.001	< 0.0022	< 0.0019	< 0.0049
M80-2	5/2/2005		282	< 0.0021	< 0.0019	< 0.0035	< 0.0016	< 0.0019	< 0.0029	< 0.0024	< 0.0024	< 0.002	< 0.001	< 0.001	< 0.0022	< 0.0019	< 0.0049



## APPENDIX B





Appendix B. WM Richmond Landfill Historical Results for CVOCs and Primary Leachate Indicators in Leachate

Name	Sam Date	Primary Leachate Indicators		Chlorinated Volatile Organic Compounds (CVOCs)													
		1,4-Dioxane mg/L	Alkalinity mg/L	1,1,1-Trichloroethane mg/L	1,1,2-Trichloroethane mg/L	1,1-Dichloroethane mg/L	1,1-Dichloroethylene mg/L	1,2-Dichlorobenzene (o) mg/L	1,2-Dichloroethane mg/L	1,3-Dichlorobenzene (m) mg/L	1,4-Dichlorobenzene (p) mg/L	Bromodichloromethane mg/L	Chloroethane mg/L	Chloromethane mg/L	Tetrachloroethylene mg/L	Trichloroethylene mg/L	Vinyl Chloride mg/L
North Chamber	2/4/2000		5180														
North Chamber	3/1/2000		4630														
North Chamber	4/7/2000		4002														
North Chamber	5/5/2000		3700														
North Chamber	6/1/2000		3450														
North Chamber	7/4/2000		4240														
North Chamber	7/31/2000		3210														
North Chamber	8/29/2000		4220														
North Chamber	10/4/2000		4930														
North Chamber	10/30/2000		4180														
North Chamber	12/7/2000		2390														
North Chamber	1/3/2001		2950														
North Chamber	2/2/2001		3560														
North Chamber	3/7/2001		3130														
North Chamber	4/5/2001		2580														
North Chamber	6/6/2001		3550														
North Chamber	7/4/2001		4320														
North Chamber	8/8/2001		4910														
North Chamber	9/6/2001		3900														
North Chamber	10/3/2001		4270														
North Chamber	11/1/2001		5160														
North Chamber	12/7/2001		3420														
North Chamber	1/9/2002		3150														
North Chamber	2/6/2002		2670														
North Chamber	3/7/2002		2080														
North Chamber	4/8/2002		1620														
North Chamber	5/6/2002		2490														
North Chamber	6/7/2002		2410														
North Chamber	7/3/2002		3570														
North Chamber	8/1/2002		5010														
North Chamber	9/3/2002		5440														
North Chamber	10/2/2002		4980														
North Chamber	11/1/2002		3870														
North Chamber	12/16/2002		3790														
North Chamber	1/11/2003		3940														
North Chamber	2/10/2003		2810														
North Chamber	3/3/2003		3550														
North Chamber	4/1/2003		1800	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.04	< 0.02	< 0.02	< 0.02	< 0.05	< 0.05	< 0.02	< 0.02	< 0.02
North Chamber	5/8/2003		1170	< 0.004	< 0.004	< 0.004	< 0.005	< 0.0002	< 0.007	0.0016	< 0.0004	< 0.003	< 0.01	< 0.01	0.004	< 0.003	< 0.005
North Chamber	6/3/2003		3260														
North Chamber	7/4/2003		4310	< 0.021	< 0.019	< 0.035	< 0.016	< 0.019	< 0.029	< 0.024	< 0.024	< 0.02	< 0.01	< 0.01	< 0.022	< 0.019	< 0.049
North Chamber	8/5/2003		4930	< 0.021	< 0.019	< 0.035	< 0.016	< 0.019	< 0.029	< 0.024	< 0.024	< 0.02	< 0.01	< 0.01	< 0.022	< 0.019	< 0.049

Appendix B. WM Richmond Landfill Historical Results for CVOCs and Primary Leachate Indicators in Leachate

Name	Sam Date	1,4-Dioxane mg/L	Alkalinity mg/L	1,1,1-Trichloroethane mg/L	1,1,2-Trichloroethane mg/L	1,1-Dichloroethane mg/L	1,1-Dichloroethylene mg/L	1,2-Dichlorobenzene (o) mg/L	1,2-Dichloroethane mg/L	1,3-Dichlorobenzene (m) mg/L	1,4-Dichlorobenzene (p) mg/L	Bromodichloromethane mg/L	Chloroethane mg/L	Chloromethane mg/L	Tetrachloroethylene mg/L	Trichloroethylene mg/L	Vinyl Chloride mg/L
North Chamber	9/2/2003		4730	< 0.021	< 0.019	< 0.035	< 0.016	< 0.019	< 0.029	< 0.024	< 0.024	< 0.02	< 0.01	< 0.01	< 0.022	< 0.019	< 0.049
North Chamber	10/3/2003		4230	< 0.0021	< 0.0019	0.0036	< 0.0016	< 0.0019	< 0.0029	< 0.0024	0.012	< 0.002	0.0057	< 0.001	< 0.0022	< 0.0019	< 0.0049
North Chamber	11/3/2003		567	< 0.0021	< 0.0019	< 0.0035	< 0.0016	< 0.0019	< 0.0029	< 0.0024	< 0.0024	< 0.002	< 0.001	< 0.001	< 0.0022	< 0.0019	< 0.0049
North Chamber	12/5/2003		1520	< 0.021	< 0.019	< 0.035	< 0.016	< 0.019	< 0.029	< 0.024	< 0.024	< 0.02	< 0.01	< 0.01	< 0.022	< 0.019	< 0.049
North Chamber	1/7/2004		456	< 0.0021	< 0.0019	< 0.0035	< 0.0016	< 0.0019	< 0.0029	< 0.0024	< 0.0024	< 0.002	< 0.001	< 0.001	< 0.0022	< 0.0019	< 0.0049
North Chamber	2/11/2004		3050	< 0.0021	< 0.0019	< 0.0035	< 0.0016	< 0.0019	< 0.0029	< 0.0024	< 0.0024	< 0.002	< 0.001	< 0.001	< 0.0022	< 0.0019	< 0.0049
North Chamber	3/4/2004		630	< 0.0021	< 0.0019	< 0.0035	< 0.0016	< 0.0019	< 0.0029	< 0.0024	< 0.0024	< 0.002	< 0.001	< 0.001	< 0.0022	< 0.0019	< 0.0049
North Chamber	4/20/2004		2580	< 0.0021	< 0.0019	< 0.0035	< 0.0016	< 0.0019	< 0.0029	< 0.0024	0.0114	< 0.002	0.005	< 0.001	< 0.0022	< 0.0019	< 0.0049
North Chamber	5/6/2004		2300									< 0.002					
North Chamber	6/2/2004		2630	< 0.0021	< 0.0019	< 0.0035	< 0.0016	< 0.0019	< 0.0029	< 0.0024	0.0102	< 0.002	< 0.001	< 0.001	< 0.0022	< 0.0019	< 0.0049
North Chamber	7/6/2004		4650	< 0.0021	< 0.0019	< 0.0035	< 0.0016	< 0.0019	< 0.0029	< 0.0024	0.0082	< 0.002	0.0065	< 0.001	< 0.0022	< 0.0019	< 0.0049
North Chamber	8/10/2004		3170														
North Chamber	10/6/2004		3840														
North Chamber	11/16/2004											< 0.02					
North Chamber	12/1/2004		2250														
North Chamber	1/7/2005		2080														
North Chamber	1/25/2005		2400														
North Chamber	3/1/2005		4180	< 0.0021	< 0.0019	< 0.0035	< 0.0016	< 0.0019	< 0.0029	< 0.0024	0.0081	< 0.002	0.004	< 0.001	< 0.0022	< 0.0019	< 0.0049
North Chamber	3/30/2005		3900	< 0.0021	< 0.0019	< 0.0035	< 0.0016	< 0.0019	< 0.0029	< 0.0024	0.0077	< 0.002	< 0.001	< 0.001	< 0.0022	< 0.0019	< 0.0049
North Chamber	5/5/2005		431	< 0.0021	< 0.0019	< 0.0035	< 0.0016	< 0.0019	< 0.0029	< 0.0024	< 0.0024	< 0.002	< 0.001	< 0.001	< 0.0022	< 0.0019	< 0.0049
North Chamber	6/3/2005		420	< 0.0021	< 0.0019	< 0.0035	< 0.0016	< 0.0019	< 0.0029	< 0.0024	< 0.0024	< 0.002	< 0.001	< 0.001	< 0.0022	< 0.0019	< 0.0049
North Chamber	7/7/2005		668	< 0.0004	< 0.0004	< 0.0004	< 0.0005	< 0.0004	< 0.0005	< 0.0004	< 0.0004	< 0.0003		< 0.001	< 0.0003	< 0.0003	< 0.0002
North Chamber	8/9/2005		2250	< 0.004	< 0.004	< 0.004	< 0.005	< 0.004	< 0.005	< 0.004	0.011	< 0.003	< 0.01	< 0.01	< 0.003	< 0.003	< 0.002
North Chamber	9/23/2005		446	< 0.0021	< 0.0019	< 0.0035	< 0.0016	< 0.0019	< 0.0029	< 0.0024	< 0.0024	< 0.002	< 0.001	< 0.001	< 0.0022	< 0.0019	< 0.0049
North Chamber	10/6/2005		1300	< 0.0021	< 0.0019	< 0.0035	< 0.0016	< 0.0019	< 0.0029	< 0.0024	0.005	< 0.002	0.0012	< 0.001	< 0.0022	< 0.0019	< 0.0049
North Chamber	12/1/2005		2010	< 0.004	< 0.004	< 0.004	< 0.005	< 0.004	< 0.005	< 0.004	0.006	< 0.003	< 0.01	< 0.01	< 0.003	< 0.003	< 0.002
North Chamber	1/12/2006		1830	< 0.004	< 0.004	< 0.004	< 0.005	< 0.004	< 0.005	< 0.004	0.009	< 0.003	< 0.01	< 0.01	< 0.003	< 0.003	0.005
North Chamber	2/2/2006		2340	< 0.0004	< 0.0004	0.0024	< 0.0005	0.0006	< 0.0005	< 0.0004	0.0132	< 0.0003	< 0.001	< 0.001	< 0.0003	0.0003	0.0025
North Chamber	3/1/2006		1730	< 0.004	< 0.004	< 0.004	< 0.005	< 0.004	< 0.005	< 0.004	0.006	< 0.003	< 0.01	< 0.01	< 0.003	< 0.003	0.002
North Chamber	4/5/2006		2160	< 0.004	< 0.004	< 0.004	< 0.005	< 0.004	< 0.005	< 0.004	0.014	< 0.003	< 0.01	< 0.01	< 0.003	< 0.003	< 0.002
North Chamber	5/29/2006		2770	< 0.0004	< 0.0004	0.001	< 0.0005	0.0004	< 0.0005	< 0.0004	0.0117	< 0.0003	0.0024	< 0.001	< 0.0003	< 0.0003	0.0012
North Chamber	6/22/2006		793	< 0.0004	< 0.0004	< 0.0004	< 0.0005	< 0.0004	< 0.0005	< 0.0004	0.0019	< 0.0003	< 0.001	< 0.001	< 0.0003	< 0.0003	< 0.0002
North Chamber	7/11/2006		411	< 0.0004	< 0.0004	< 0.0004	< 0.0005	< 0.0004	< 0.0005	< 0.0004	< 0.0004	< 0.0003	< 0.001	< 0.001	< 0.0003	< 0.0003	< 0.0002
North Chamber	8/8/2006		409	< 0.0004	< 0.0004	< 0.0004	< 0.0005	< 0.0004	< 0.0005	< 0.0004	< 0.0004	< 0.0003	< 0.001	< 0.001	< 0.0003	< 0.0003	< 0.0002
North Chamber	9/13/2006		1240	< 0.0004	< 0.0004	< 0.0004	< 0.0005	< 0.0004	< 0.0005	< 0.0004	0.0023	< 0.0003	< 0.001	< 0.001	< 0.0003	< 0.0003	0.0003
North Chamber	10/5/2006		1380	< 0.0004	< 0.0004	0.0008	< 0.0005	< 0.0004	< 0.0005	< 0.0004	0.004	< 0.0003	< 0.001	< 0.001	< 0.0003	< 0.0003	0.0006
North Chamber	11/16/2006		2230	< 0.0004	< 0.0004	0.002	< 0.0005	< 0.0004	< 0.0005	< 0.0004	0.0125	< 0.0003	0.0024	< 0.001	< 0.0003	< 0.0003	0.0038
North Chamber	12/6/2006		2240	< 0.0004	< 0.0004	0.0018	< 0.0005	< 0.0004	< 0.0005	< 0.0004	0.009	< 0.0003	< 0.001	< 0.001	< 0.0003	0.0003	0.0025
North Chamber	1/9/2007		2200	< 0.0004	< 0.0004	0.0035	< 0.0005	0.0009	< 0.0005	< 0.0004	0.0111	< 0.0003	0.003	< 0.001	0.0006	0.0012	0.0043
North Chamber	2/22/2007		3710														
North Chamber	3/15/2007		2360	< 0.0004	< 0.0004	0.0048	< 0.0005	< 0.0004	< 0.0005	< 0.0004	0.0074	< 0.0003	0.0074	< 0.001	0.0004	0.0008	0.0031
North Chamber	4/17/2007		2020	< 0.004	< 0.004	< 0.004	< 0.005	< 0.004	< 0.005	< 0.004	0.01	< 0.003	< 0.01	< 0.01	0.007	< 0.003	0.005
North Chamber	5/8/2007		257	< 0.0004	< 0.0004	< 0.0004	< 0.0005	< 0.0004	< 0.0005	< 0.0004	< 0.0004	< 0.0003	< 0.001	< 0.001	< 0.0003	< 0.0003	< 0.0002
North Chamber	6/5/2007		336	< 0.0004	< 0.0004	< 0.0004	< 0.0005	< 0.0004	< 0.0005	< 0.0004	< 0.0004	< 0.0003	< 0.001	< 0.001	< 0.0003	< 0.0003	< 0.0002

Appendix B. WM Richmond Landfill Historical Results for CVOCs and Primary Leachate Indicators in Leachate

Name	Sam Date	1,4-Dioxane mg/L	Alkalinity mg/L	1,1,1-Trichloroethane mg/L	1,1,2-Trichloroethane mg/L	1,1-Dichloroethane mg/L	1,1-Dichloroethylene mg/L	1,2-Dichlorobenzene (o) mg/L	1,2-Dichloroethane mg/L	1,3-Dichlorobenzene (m) mg/L	1,4-Dichlorobenzene (p) mg/L	Bromodichloromethane mg/L	Chloroethane mg/L	Chloromethane mg/L	Tetrachloroethylene mg/L	Trichloroethylene mg/L	Vinyl Chloride mg/L
North Chamber	7/5/2007	2800	< 0.0004	< 0.0004	0.0008	< 0.0005	< 0.0004	< 0.0005	< 0.0004	0.0087	< 0.0003	0.0023	< 0.001	< 0.0003	< 0.0003	< 0.0003	0.0011
North Chamber	8/16/2007	6550	< 0.0004	< 0.0004	0.0013	< 0.0005	< 0.0004	< 0.0005	< 0.0004	0.0078	< 0.0003	0.0022	< 0.001	< 0.0003	< 0.0003	< 0.0003	0.0012
North Chamber	9/14/2007	7560	< 0.0004	< 0.0004	0.0013	< 0.0005	< 0.0004	< 0.0005	< 0.0004	0.0088	< 0.0003	< 0.001	< 0.001	< 0.0003	< 0.0003	< 0.0003	0.0012
North Chamber	10/15/2007	3120	< 0.0004	< 0.0004	0.0006	< 0.0005	< 0.0004	< 0.0005	< 0.0004	0.0052	< 0.0003	< 0.001	0.0048	< 0.0003	< 0.0003	< 0.0003	0.0008
North Chamber	11/12/2007	3160	< 0.0004	< 0.0004	0.002	< 0.0005	< 0.0004	< 0.0005	< 0.0004	0.0118	< 0.0003	0.0037	0.0113	< 0.0003	< 0.0003	< 0.0003	0.0015
North Chamber	12/5/2007	2780	< 0.0004	< 0.0004	0.0013	< 0.0005	< 0.0004	< 0.0005	< 0.0004	0.0113	< 0.0003	< 0.001	< 0.001	< 0.0003	< 0.0003	< 0.0003	0.0012
North Chamber	1/8/2008	1900	< 0.0004	< 0.0004	0.0071	< 0.0005	0.0006	< 0.0005	< 0.0004	0.0168	< 0.0003	0.0078	< 0.001	0.0007	0.0013	0.0012	0.0012
North Chamber	2/14/2008	2570	< 0.001	< 0.002	0.002	< 0.001	< 0.002	< 0.002	< 0.002	0.01	< 0.001	0.003	< 0.005	< 0.001	< 0.001	0.002	0.002
North Chamber	3/17/2008	2320	< 0.002	< 0.004	0.002	< 0.002	< 0.004	< 0.004	< 0.004	0.012	< 0.002	< 0.004	< 0.01	< 0.002	< 0.002	< 0.004	< 0.004
North Chamber	4/3/2008	1750	< 0.003	< 0.005	< 0.003	< 0.003	< 0.005	< 0.005	< 0.005	0.011	< 0.003	< 0.005	< 0.01	< 0.003	< 0.003	< 0.003	< 0.005
North Chamber	5/12/2008	2570	< 0.0005	< 0.001	0.0014	< 0.0005	< 0.001	< 0.001	< 0.001	0.009	< 0.0005	0.003	< 0.003	< 0.0005	< 0.0005	< 0.0005	< 0.001
North Chamber	5/15/2008										< 0.002						
North Chamber	6/9/2008	2210	< 0.002	< 0.004	< 0.002	< 0.002	< 0.004	< 0.004	< 0.004	0.007	< 0.002	< 0.004	< 0.01	< 0.002	< 0.002	< 0.002	< 0.004
North Chamber	7/2/2008	4610	< 0.002	< 0.004	< 0.002	< 0.002	< 0.004	< 0.004	< 0.004	0.008	< 0.002	< 0.004	0.011	< 0.002	< 0.002	< 0.002	< 0.004
North Chamber	8/20/2008	417	< 0.0003	< 0.0005	< 0.0003	< 0.0003	< 0.0005	< 0.0005	< 0.0005	0.001	< 0.0003	< 0.0005	< 0.001	< 0.0003	< 0.0003	< 0.0003	< 0.0005
North Chamber	10/14/2008	2350	< 0.001	< 0.002	< 0.001	< 0.001	< 0.002	< 0.002	< 0.002	0.007	< 0.001	< 0.002	< 0.005	< 0.001	< 0.001	< 0.002	< 0.002
North Chamber	11/17/2008	4620	< 0.002	< 0.004	< 0.002	< 0.002	< 0.004	< 0.004	< 0.004	0.009	< 0.002	< 0.004	< 0.01	< 0.002	< 0.002	< 0.002	< 0.004
North Chamber	12/9/2008	1020	< 0.001	< 0.002	< 0.001	< 0.001	< 0.002	< 0.002	< 0.002	0.006	< 0.001	< 0.002	< 0.005	< 0.001	< 0.001	< 0.001	< 0.002
North Chamber	1/12/2009	5300	< 0.002	< 0.004	< 0.002	< 0.002	< 0.004	< 0.004	< 0.004	0.013	< 0.002	0.004	< 0.01	< 0.002	< 0.002	< 0.002	< 0.004
North Chamber	2/10/2009	5800	< 0.003	< 0.005	< 0.003	< 0.003	< 0.005	< 0.005	< 0.005	0.008	< 0.003	< 0.005	< 0.01	< 0.003	< 0.003	< 0.003	< 0.005
North Chamber	3/9/2009	5700	< 0.001	< 0.002	0.002	< 0.001	< 0.002	< 0.002	< 0.002	0.012	< 0.001	0.003	< 0.005	< 0.001	< 0.001	< 0.001	< 0.002
North Chamber	4/16/2009	3080	< 0.003	< 0.005	< 0.003	< 0.003	< 0.005	< 0.005	< 0.005	0.012	< 0.003	< 0.005	< 0.01	< 0.003	< 0.003	< 0.003	< 0.005
North Chamber	6/2/2009	2150	< 0.003	< 0.005	< 0.003	< 0.003	< 0.005	< 0.005	< 0.005	0.008	< 0.003	< 0.005	< 0.01	< 0.003	< 0.003	< 0.003	< 0.005
North Chamber	7/15/2009	5500	< 0.001	< 0.002	0.002	< 0.001	< 0.002	< 0.002	< 0.002	0.014	< 0.001	0.004	< 0.005	< 0.001	< 0.001	< 0.001	< 0.002
North Chamber	8/24/2009	6080	< 0.003	< 0.005	< 0.003	< 0.003	< 0.005	< 0.005	< 0.005	0.015	< 0.003	< 0.005	< 0.01	< 0.003	< 0.003	< 0.003	< 0.005
North Chamber	9/15/2009	5700	< 0.001	< 0.002	0.002	< 0.001	< 0.002	< 0.002	< 0.002	0.01	< 0.001	0.003	< 0.005	< 0.001	< 0.001	< 0.001	< 0.002
North Chamber	10/14/2009	4310	< 0.002	< 0.004	0.003	< 0.002	< 0.004	< 0.004	< 0.004	0.011	< 0.002	< 0.004	< 0.01	< 0.002	< 0.002	< 0.002	< 0.004
North Chamber	11/24/2009	3260	< 0.002	< 0.004	< 0.002	< 0.002	< 0.004	< 0.004	< 0.004	0.009	< 0.002	< 0.004	< 0.01	< 0.002	< 0.002	< 0.002	< 0.004
North Chamber	12/10/2009	2740	< 0.001	< 0.002	0.002	< 0.001	< 0.002	< 0.002	< 0.002	0.008	< 0.001	0.002	< 0.005	< 0.001	< 0.001	< 0.001	< 0.002
North Chamber	1/14/2010	4640	< 0.002	< 0.004	< 0.002	< 0.002	< 0.004	< 0.004	< 0.004	0.009	< 0.002	< 0.004	< 0.01	< 0.002	< 0.002	< 0.002	< 0.004
North Chamber	2/9/2010	6560	< 0.001	< 0.002	0.002	< 0.001	< 0.002	< 0.002	< 0.002	0.012	< 0.001	0.003	< 0.005	< 0.001	< 0.001	< 0.001	< 0.002
North Chamber	3/3/2010	6750	< 0.003	< 0.005	< 0.003	< 0.003	< 0.005	< 0.005	< 0.005	0.016	< 0.003	< 0.005	< 0.01	< 0.003	< 0.003	< 0.003	< 0.005
North Chamber	4/13/2010	4810	< 0.003	< 0.005	< 0.003	< 0.003	< 0.005	< 0.005	< 0.005	0.012	< 0.003	< 0.005	< 0.01	< 0.003	< 0.003	< 0.003	< 0.005
North Chamber	5/4/2010	5470	< 0.001	< 0.002	0.002	< 0.001	< 0.002	< 0.002	< 0.002	0.009	< 0.001	0.003	< 0.005	< 0.001	< 0.001	< 0.001	< 0.002
North Chamber	5/21/2010										< 0.001						
North Chamber	6/2/2010	6140	< 0.003	< 0.005	< 0.003	< 0.003	< 0.005	< 0.005	< 0.005	0.013	< 0.003	< 0.005	< 0.01	< 0.003	< 0.003	< 0.003	< 0.005
North Chamber	7/14/2010	5330	< 0.005	< 0.01	< 0.005	< 0.005	< 0.01	< 0.01	< 0.01	< 0.01	< 0.005	< 0.01	< 0.03	< 0.005	< 0.005	< 0.01	< 0.01
North Chamber	8/11/2010	6310	< 0.003	< 0.005	< 0.003	< 0.003	< 0.005	< 0.005	< 0.005	0.011	< 0.003	< 0.005	< 0.01	< 0.003	< 0.003	< 0.003	< 0.005
North Chamber	9/29/2010	6290	< 0.003	< 0.005	< 0.003	< 0.003	< 0.005	< 0.005	< 0.005	0.009	< 0.003	< 0.005	< 0.01	< 0.003	< 0.003	< 0.003	< 0.005
North Chamber	10/25/2010	5920								0.011							
North Chamber	10/26/2010	5810	< 0.005	< 0.01	< 0.005	< 0.005	< 0.01	< 0.01	< 0.01	< 0.01	< 0.005	< 0.01	< 0.03	< 0.005	< 0.005	< 0.005	< 0.01
North Chamber	11/15/2010	5700	< 0.003	< 0.005	< 0.003	< 0.003	< 0.005	< 0.005	< 0.005	0.009	< 0.003	< 0.005	< 0.01	< 0.003	< 0.003	< 0.003	< 0.005
North Chamber	12/6/2010	2590	< 0.002	< 0.004	0.002	< 0.002	< 0.004	< 0.004	< 0.004	0.013	< 0.002	< 0.004	< 0.01	< 0.002	< 0.002	< 0.002	< 0.004
North Chamber	12/16/2010	3240	< 0.003	< 0.005	< 0.003	< 0.003	< 0.005	< 0.005	< 0.005	0.009	< 0.003	< 0.005	< 0.01	< 0.003	< 0.003	< 0.003	< 0.005

Appendix B. WM Richmond Landfill Historical Results for CVOCs and Primary Leachate Indicators in Leachate

Name	Sam Date	1,4-Dioxane mg/L	Alkalinity mg/L	1,1,1-Trichloroethane mg/L	1,1,2-Trichloroethane mg/L	1,1-Dichloroethane mg/L	1,1-Dichloroethylene mg/L	1,2-Dichlorobenzene (o) mg/L	1,2-Dichloroethane mg/L	1,3-Dichlorobenzene (m) mg/L	1,4-Dichlorobenzene (p) mg/L	Bromodichloromethane mg/L	Chloroethane mg/L	Chloromethane mg/L	Tetrachloroethylene mg/L	Trichloroethylene mg/L	Vinyl Chloride mg/L
North Chamber	1/18/2011		4450	< 0.001	< 0.002	0.001	< 0.001	< 0.002	< 0.002	< 0.002	0.007	< 0.001	< 0.002	< 0.005	< 0.001	< 0.001	< 0.002
North Chamber	2/23/2011		3030	< 0.001	< 0.002	0.002	< 0.001	< 0.002	< 0.002	< 0.002	0.007	< 0.001	0.003	< 0.005	< 0.001	< 0.001	< 0.002
North Chamber	3/25/2011		2980	< 0.003	< 0.005	< 0.003	< 0.003	< 0.005	< 0.005	< 0.005	0.008	< 0.003	< 0.005	< 0.01	< 0.003	< 0.003	< 0.005
North Chamber	4/20/2011		2550	< 0.005	< 0.01	< 0.005	< 0.005	< 0.01	< 0.01	< 0.01	< 0.01	< 0.005	< 0.01	< 0.03	< 0.005	< 0.005	< 0.01
North Chamber	5/3/2011		2520	< 0.002	< 0.004	0.002	< 0.002	< 0.004	< 0.004	< 0.004	0.009	< 0.002	< 0.004	< 0.01	< 0.002	< 0.002	< 0.004
North Chamber	5/4/2011		2500	< 0.001	< 0.002	0.002	< 0.001	< 0.002	< 0.002	< 0.002	0.009	< 0.001	0.003	< 0.005	< 0.001	< 0.001	< 0.002
North Chamber	6/13/2011		3630	< 0.002	< 0.004	< 0.002	< 0.002	< 0.004	< 0.004	< 0.004	0.009	< 0.002	< 0.004	< 0.01	< 0.002	< 0.002	< 0.004
North Chamber	7/25/2011		4870	< 0.002	< 0.004	< 0.002	< 0.002	< 0.004	< 0.004	< 0.004	0.008	< 0.002	< 0.004	< 0.01	< 0.002	< 0.002	< 0.004
North Chamber	8/16/2011		5200	< 0.001	< 0.002	0.002	< 0.001	< 0.002	< 0.002	< 0.002	0.011	< 0.001	0.003	< 0.005	< 0.001	< 0.001	< 0.002
North Chamber	9/14/2011		6080	< 0.003	< 0.005	< 0.003	< 0.003	< 0.005	< 0.005	< 0.005	0.007	< 0.003	< 0.005	< 0.01	< 0.003	< 0.003	< 0.005
North Chamber	10/13/2011		7060														
North Chamber	10/25/2011		4870														
North Chamber	10/28/2011			< 0.003	< 0.005	< 0.003	< 0.003	< 0.005	< 0.005	< 0.005	0.008	< 0.002	< 0.005	< 0.01	< 0.003	< 0.003	< 0.005
North Chamber	11/15/2011		7550	< 0.005	< 0.01	< 0.005	< 0.005	< 0.01	< 0.01	< 0.01	< 0.01	< 0.005	< 0.01	< 0.03	< 0.005	< 0.005	< 0.01
North Chamber	12/23/2011		2900	< 0.005	< 0.01	< 0.005	< 0.005	< 0.01	< 0.01	< 0.01	< 0.01	< 0.005	< 0.01	< 0.025	< 0.005	< 0.005	< 0.01
North Chamber	1/25/2012		3240	< 0.001	< 0.002	0.0015	< 0.001	< 0.002	< 0.002	< 0.002	0.012	< 0.001	0.0027	< 0.005	< 0.001	< 0.001	< 0.002
North Chamber	2/21/2012		4590	< 0.0025	< 0.005	< 0.0025	< 0.0025	< 0.005	< 0.005	< 0.005	0.011	< 0.0025	< 0.005	< 0.013	< 0.0025	< 0.0025	< 0.005
North Chamber	3/18/2012		3500	< 0.002	< 0.004	0.0021	< 0.002	< 0.004	< 0.004	< 0.004	0.01	< 0.002			< 0.002	< 0.002	< 0.004
North Chamber	3/19/2012	< 0.5	3600	< 0.001	< 0.002	0.002	< 0.001	< 0.002	< 0.002	< 0.002	0.0099	< 0.001	0.0027	< 0.005	< 0.001	< 0.001	< 0.002
North Chamber	4/22/2012		6700	< 0.0025	< 0.005	< 0.0025	< 0.0025	< 0.005	< 0.005	< 0.005	0.0052	< 0.0025	< 0.005	< 0.013	< 0.0025	< 0.0025	< 0.005
North Chamber	4/23/2012		6700	< 0.005	< 0.01	< 0.005	< 0.005	< 0.01	< 0.01	< 0.01	< 0.01	< 0.005	< 0.01	< 0.025	< 0.005	< 0.005	< 0.01
North Chamber	5/7/2012		3100	< 0.001	< 0.002	0.0019	< 0.001	< 0.002	< 0.002	< 0.002	0.0066	< 0.001	0.0025	< 0.005	< 0.001	< 0.001	< 0.002
North Chamber	6/12/2012		5800	< 0.005	< 0.01	< 0.005	< 0.005	< 0.01	< 0.01	< 0.01	< 0.01	< 0.005			< 0.005	< 0.005	< 0.01
North Chamber	6/13/2012		6000	< 0.005	< 0.01	< 0.005	< 0.005	< 0.01	< 0.01	< 0.01	< 0.01	< 0.005	< 0.01	< 0.025	< 0.005	< 0.005	< 0.01
North Chamber	7/5/2012		6200	< 0.001	< 0.002	< 0.001	< 0.001	< 0.002	< 0.002	< 0.002	0.0064	< 0.001	< 0.002	< 0.005	< 0.001	< 0.001	< 0.002
North Chamber	8/16/2012		6500	< 0.002	< 0.004	< 0.002	< 0.002	< 0.004	< 0.004	< 0.004	0.0062	< 0.002	< 0.004	< 0.01	< 0.002	< 0.002	< 0.004
North Chamber	9/24/2012		2400	< 0.005	< 0.01	< 0.005	< 0.005	< 0.01	< 0.01	< 0.01	< 0.01	< 0.005			< 0.005	< 0.005	< 0.01
North Chamber	9/25/2012		2600	< 0.005	< 0.01	< 0.005	< 0.005	< 0.01	< 0.01	< 0.01	< 0.01	< 0.005	< 0.01	< 0.025	< 0.005	< 0.005	< 0.01
North Chamber	9/26/2012		2400	< 0.005	< 0.01	< 0.005	< 0.005	< 0.01	< 0.01	< 0.01	< 0.01	< 0.005			< 0.005	< 0.005	< 0.01
North Chamber	10/22/2012		4000	< 0.005	< 0.01	< 0.005	< 0.005	< 0.01	< 0.01	< 0.01	< 0.01	< 0.005			< 0.005	< 0.005	< 0.01
North Chamber	10/23/2012		4600	< 0.005	< 0.01	< 0.005	< 0.005	< 0.01	< 0.01	< 0.01	< 0.01	< 0.005	< 0.01	< 0.025	< 0.005	< 0.005	< 0.01
North Chamber	11/21/2012		4300	< 0.001	< 0.002	0.001	< 0.001	< 0.002	< 0.002	< 0.002	0.0049	< 0.001	< 0.002	< 0.005	< 0.001	< 0.001	< 0.002
North Chamber	12/10/2012		3200	< 0.001	< 0.002	0.0012	< 0.001	< 0.002	< 0.002	< 0.002	0.0058	< 0.001			< 0.001	< 0.001	< 0.002
North Chamber	12/11/2012		3200	< 0.0025	< 0.005	< 0.0025	< 0.0025	< 0.005	< 0.005	< 0.005	0.0068	< 0.0025	< 0.005	< 0.013	< 0.0025	< 0.0025	< 0.005
North Chamber	1/8/2013		2900	< 0.001	< 0.002	0.0013	< 0.001	< 0.002	< 0.002	< 0.002	0.0092	< 0.001	0.0031	< 0.005	< 0.001	< 0.001	< 0.002
North Chamber	2/12/2013		3200	< 0.001	< 0.002	0.0016	< 0.001	< 0.002	< 0.002	< 0.002	0.0077	< 0.001	0.0023	< 0.005	< 0.001	< 0.001	< 0.002
North Chamber	3/12/2013		4700	< 0.0025	< 0.005	0.0031	< 0.0025	< 0.005	< 0.005	< 0.005	0.0094	< 0.0025			< 0.0025	< 0.0025	< 0.005
North Chamber	3/13/2013		4100	< 0.001	< 0.002	0.0024	< 0.001	< 0.002	< 0.002	< 0.002	0.0079	< 0.001	0.0031	< 0.005	< 0.001	< 0.001	< 0.002
North Chamber	4/25/2013		5200	< 0.01	< 0.02	< 0.01	< 0.01	< 0.02	< 0.02	< 0.02	< 0.02	< 0.01	< 0.02	< 0.05	< 0.01	< 0.01	< 0.02
North Chamber	4/26/2013		2700	< 0.005	< 0.01	< 0.005	< 0.005	< 0.01	< 0.01	< 0.01	< 0.01	< 0.005	< 0.01	< 0.025	< 0.005	< 0.005	< 0.01
North Chamber	5/2/2013	0.103						< 0.01			< 0.01				< 0.005	< 0.005	
North Chamber	5/28/2013		5000	< 0.005	< 0.01	< 0.005	< 0.005	< 0.01	< 0.01	< 0.01	< 0.01	< 0.005	< 0.01	< 0.025	< 0.005	< 0.005	< 0.01
North Chamber	5/31/2013											< 0.0025					
North Chamber	6/13/2013		3300	< 0.0025	< 0.005	< 0.0025	< 0.0025	< 0.005	< 0.005	< 0.005	0.0099	< 0.0025			< 0.0025	< 0.0025	< 0.005

Appendix B. WM Richmond Landfill Historical Results for CVOCs and Primary Leachate Indicators in Leachate

Name	Sam Date	1,4-Dioxane mg/L	Alkalinity mg/L	1,1,1-Trichloroethane mg/L	1,1,2-Trichloroethane mg/L	1,1-Dichloroethane mg/L	1,1-Dichloroethylene mg/L	1,2-Dichlorobenzene (o) mg/L	1,2-Dichloroethane mg/L	1,3-Dichlorobenzene (m) mg/L	1,4-Dichlorobenzene (p) mg/L	Bromodichloromethane mg/L	Chloroethane mg/L	Chloromethane mg/L	Tetrachloroethylene mg/L	Trichloroethylene mg/L	Vinyl Chloride mg/L
North Chamber	6/25/2013		5300	< 0.005	< 0.01	< 0.005	< 0.005	< 0.01	< 0.01	< 0.01	0.02	< 0.005	< 0.01	< 0.025	< 0.005	< 0.005	< 0.01
North Chamber	7/18/2013		5300	< 0.005	< 0.01	< 0.005	< 0.005	< 0.01	< 0.01	< 0.01	< 0.01	< 0.005	< 0.01	< 0.025	< 0.005	< 0.005	< 0.01
North Chamber	9/5/2013		5200	< 0.005	< 0.01	< 0.005	< 0.005	< 0.01	< 0.01	< 0.01	< 0.01	< 0.005			< 0.005	< 0.005	< 0.01
North Chamber	10/24/2013		5300	< 0.005	< 0.01	< 0.005	< 0.005	< 0.01	< 0.01	< 0.01	< 0.01	< 0.005			< 0.005	< 0.005	< 0.01
North Chamber	12/19/2013		4000	< 0.005	< 0.01	< 0.005	< 0.005	< 0.01	< 0.01	< 0.01	< 0.01	< 0.005			< 0.005	< 0.005	< 0.01
North Chamber	3/27/2014		3000	< 0.0005	< 0.001	0.0017	< 0.0005	< 0.001	< 0.001	< 0.001	< 0.001	< 0.006	< 0.0005		< 0.0005	< 0.0005	< 0.001
North Chamber	5/5/2014		1900	< 0.001	< 0.002	0.0022	< 0.001	< 0.002	< 0.002	< 0.002	0.0069	< 0.001	0.0038	< 0.005	< 0.001	< 0.001	< 0.002
North Chamber	5/6/2014	0.0604															
North Chamber	7/10/2014		2800	< 0.002	< 0.004	< 0.002	< 0.002	< 0.004	< 0.004	< 0.004	0.0085	< 0.002			< 0.002	< 0.002	< 0.004
North Chamber	9/15/2014		4900	< 0.001	< 0.002	0.001	< 0.001	< 0.002	< 0.002	< 0.002	0.0068	< 0.001			< 0.001	< 0.001	< 0.002
North Chamber	12/12/2014		3900	< 0.001	< 0.002	0.001	< 0.001	< 0.002	< 0.002	< 0.002	0.0081	< 0.001			< 0.001	< 0.001	< 0.002
North Chamber	3/31/2015		3300	< 0.001	< 0.002	0.0013	< 0.001	< 0.002	< 0.002	< 0.002	0.0075	< 0.001			< 0.001	< 0.001	< 0.002
North Chamber	4/20/2015	0.0727															
North Chamber	4/21/2015		2200	< 0.001	< 0.002	0.0013	< 0.001	< 0.002	< 0.002	< 0.002	0.0064	< 0.001	0.0031	< 0.005	< 0.001	< 0.001	< 0.002
North Chamber	11/24/2015	0.099	2900	< 0.005	< 0.01	< 0.005	< 0.005	< 0.01	< 0.01	< 0.01	< 0.01		< 0.01	< 0.025	< 0.005	< 0.005	< 0.01
North Chamber	3/30/2016		2400	< 0.001	< 0.002	0.0016	< 0.001	< 0.002	< 0.002	< 0.002	0.007	< 0.001	0.0031	< 0.005	< 0.001	< 0.001	< 0.002
North Chamber	5/2/2016	0.077	2400	< 0.001	< 0.002	0.0011	< 0.001	< 0.002	< 0.002	< 0.002	0.0083		0.003	< 0.005	< 0.001	< 0.001	< 0.002
North Chamber	8/10/2016		5200	< 0.0025	< 0.005	< 0.0025	< 0.0025	< 0.005	< 0.005	< 0.005	0.0068	< 0.0025	< 0.005	< 0.013	< 0.0025	< 0.0025	< 0.005
North Chamber	10/24/2016		2800	< 0.002	< 0.004	< 0.002	< 0.002	< 0.004	< 0.004	< 0.004	0.0065	< 0.002	< 0.004	< 0.01	< 0.002	< 0.002	< 0.004
North Chamber	12/19/2016		3400	< 0.005	< 0.01	< 0.005	< 0.005	< 0.01	< 0.01	< 0.01	< 0.01	< 0.005	< 0.01	< 0.025	< 0.005	< 0.005	< 0.01
North Chamber	3/16/2017		2300	< 0.001	< 0.002	0.0012	< 0.001	< 0.002	< 0.002	< 0.002	0.0082	< 0.001	0.0038	< 0.005	< 0.001	< 0.001	< 0.002
North Chamber	5/1/2017	0.042	2500	< 0.02	< 0.04	< 0.02	< 0.02	< 0.04	< 0.04	< 0.04	< 0.04		< 0.04	< 0.1	< 0.02	< 0.02	< 0.04
North Chamber	6/7/2017		2700	< 0.002	< 0.004	< 0.002	< 0.002	< 0.004	< 0.004	< 0.004	0.009	< 0.002	< 0.004	< 0.01	< 0.002	< 0.002	< 0.004
NORTH/SOUTH COMBINED	5/2/2013							< 0.05			< 0.05				< 0.025	< 0.025	
NORTH/SOUTH COMBINED	8/8/2013		6000	< 0.0025	< 0.005	< 0.0025	< 0.0025	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0025	< 0.005	< 0.013	< 0.0025	< 0.0025	< 0.005
NORTH/SOUTH COMBINED	9/5/2013		7300	< 0.0025	< 0.005	< 0.0025	< 0.0025	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0025	< 0.005	< 0.013	< 0.0025	< 0.0025	< 0.005
NORTH/SOUTH COMBINED	10/9/2013		5900	< 0.005	< 0.01	< 0.005	< 0.005	< 0.01	< 0.01	< 0.01	< 0.01	< 0.005	< 0.01	< 0.025	< 0.005	< 0.005	< 0.01
NORTH/SOUTH COMBINED	10/31/2013											< 0.005					
NORTH/SOUTH COMBINED	11/1/2013		4000	< 0.0005	< 0.001	0.00065	< 0.0005	< 0.001	< 0.001	< 0.001	0.0047	< 0.0005	0.0017	< 0.0025	< 0.0005	< 0.0005	< 0.001
NORTH/SOUTH COMBINED	12/3/2013		4700	< 0.005	< 0.01	< 0.005	< 0.005	< 0.01	< 0.01	< 0.01	< 0.01	< 0.005	< 0.01	< 0.025	< 0.005	< 0.005	< 0.01
NORTH/SOUTH COMBINED	1/7/2014		5000	< 0.001	< 0.002	< 0.001	< 0.001	< 0.002	< 0.002	< 0.002	0.0064	< 0.001	< 0.002	< 0.005	< 0.001	< 0.001	< 0.002
NORTH/SOUTH COMBINED	2/12/2014		5100	< 0.0005	< 0.001	0.00096	< 0.0005	< 0.001	< 0.001	< 0.001	0.0059	< 0.0005	0.0022	< 0.0025	< 0.0005	< 0.0005	< 0.001
NORTH/SOUTH COMBINED	3/13/2014		4200	< 0.002	< 0.004	< 0.002	< 0.002	< 0.004	< 0.004	< 0.004	0.0062	< 0.002	< 0.004	< 0.01	< 0.002	< 0.002	< 0.004
NORTH/SOUTH COMBINED	4/9/2014		2700	< 0.0025	< 0.005	< 0.0025	< 0.0025	< 0.005	< 0.005	< 0.005	0.0075	< 0.0025	< 0.005	< 0.013	< 0.0025	< 0.0025	< 0.005
NORTH/SOUTH COMBINED	5/7/2014		2600	< 0.0005	< 0.001	0.00097	< 0.0005	< 0.001	< 0.001	< 0.001	0.0064	< 0.001			< 0.0005	< 0.0005	< 0.001
NORTH/SOUTH COMBINED	5/8/2014		2700	< 0.0005	< 0.001	0.00086	< 0.0005	< 0.001	< 0.001	< 0.001	0.0065	< 0.0005	0.0016	< 0.0025	< 0.0005	< 0.0005	< 0.001
NORTH/SOUTH COMBINED	6/9/2014		4000	< 0.001	< 0.002	< 0.001	< 0.001	< 0.002	< 0.002	< 0.002	0.0058	< 0.001	< 0.002	< 0.005	< 0.001	< 0.001	< 0.002
NORTH/SOUTH COMBINED	7/10/2014		3400	< 0.001	< 0.002	< 0.001	< 0.001	< 0.002	< 0.002	< 0.002	0.0068	< 0.001	0.0022	< 0.005	< 0.001	< 0.001	< 0.002
NORTH/SOUTH COMBINED	8/8/2014		5100	< 0.0005	< 0.001	0.00092	< 0.0005	< 0.001	< 0.001	< 0.001	0.0059	< 0.0005	0.002	< 0.0025	< 0.0005	< 0.0005	< 0.001
NORTH/SOUTH COMBINED	9/16/2014		5700	< 0.0005	< 0.001	0.00075	< 0.0005	< 0.001	< 0.001	< 0.001	0.0057	< 0.0005	0.002	< 0.0025	< 0.0005	< 0.0005	< 0.001
NORTH/SOUTH COMBINED	10/8/2014		5600	< 0.002	< 0.004	< 0.002	< 0.002	< 0.004	< 0.004	< 0.004	0.0051	< 0.002	< 0.004	< 0.01	< 0.002	< 0.002	< 0.004
NORTH/SOUTH COMBINED	10/20/2014											< 0.002					
NORTH/SOUTH COMBINED	11/4/2014		6200	< 0.0005	< 0.001	0.00054	< 0.0005	< 0.001	< 0.001	< 0.001	0.0046	< 0.0005	0.0016	< 0.0025	< 0.0005	< 0.0005	< 0.001
NORTH/SOUTH COMBINED	12/4/2014		4400	< 0.002	< 0.004	< 0.002	< 0.002	< 0.004	< 0.004	< 0.004	0.0059	< 0.002	< 0.004	< 0.01	< 0.002	< 0.002	< 0.004

Appendix B. WM Richmond Landfill Historical Results for CVOCs and Primary Leachate Indicators in Leachate

Name	Sam Date	1,4-Dioxane mg/L	Alkalinity mg/L	1,1,1-Trichloroethane mg/L	1,1,2-Trichloroethane mg/L	1,1-Dichloroethane mg/L	1,1-Dichloroethylene mg/L	1,2-Dichlorobenzene (o) mg/L	1,2-Dichloroethane mg/L	1,3-Dichlorobenzene (m) mg/L	1,4-Dichlorobenzene (p) mg/L	Bromodichloromethane mg/L	Chloroethane mg/L	Chloromethane mg/L	Tetrachloroethylene mg/L	Trichloroethylene mg/L	Vinyl Chloride mg/L
NORTH/SOUTH COMBINED	1/12/2015		4400	< 0.0005	< 0.001	0.00059	< 0.0005	< 0.001	< 0.001	< 0.001	0.0055	< 0.0005	0.0014	< 0.0025	< 0.0005	< 0.0005	< 0.001
NORTH/SOUTH COMBINED	2/9/2015		5200	< 0.001	< 0.002	< 0.001	< 0.001	< 0.002	< 0.002	< 0.002	0.0067	< 0.001	0.0022	< 0.005	< 0.001	< 0.001	< 0.002
NORTH/SOUTH COMBINED	3/10/2015		5000	< 0.001	< 0.002	< 0.001	< 0.001	< 0.002	< 0.002	< 0.002	0.0062	< 0.001	< 0.002	< 0.005	< 0.001	< 0.001	< 0.002
NORTH/SOUTH COMBINED	4/8/2015		2200	< 0.0005	< 0.001	0.0012	< 0.0005	< 0.001	< 0.001	< 0.001	0.006	< 0.0005	0.0024	< 0.0025	< 0.0005	< 0.0005	< 0.001
NORTH/SOUTH COMBINED	4/21/2015											< 0.001					
NORTH/SOUTH COMBINED	5/12/2015		4000	< 0.002	< 0.004	< 0.002	< 0.002	< 0.004	< 0.004	< 0.004	0.006	< 0.002	< 0.004	< 0.01	< 0.002	< 0.002	< 0.004
NORTH/SOUTH COMBINED	6/4/2015		5100	< 0.0002	< 0.0004	0.00049	< 0.0002	< 0.0004	< 0.0004	< 0.0004	0.0031	< 0.0002	0.001	< 0.001	< 0.0002	< 0.0002	< 0.0004
NORTH/SOUTH COMBINED	6/18/2015			< 0.0025	< 0.005	< 0.0025	< 0.0025	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0025			< 0.0025	< 0.0025	< 0.005
NORTH/SOUTH COMBINED	7/10/2015		4100	< 0.005	< 0.01	< 0.005	< 0.005	< 0.01	< 0.01	< 0.01	0.046	< 0.005	< 0.01	< 0.025	< 0.005	< 0.005	< 0.01
NORTH/SOUTH COMBINED	7/17/2015		4400	< 0.002	< 0.005	< 0.002	< 0.002	< 0.005	< 0.005	< 0.005	0.0086	< 0.005			< 0.002	< 0.002	< 0.002
NORTH/SOUTH COMBINED	8/12/2015		4600	< 0.001	< 0.002	< 0.001	< 0.001	< 0.002	< 0.002	< 0.002	0.0047	< 0.001	< 0.002	< 0.005	< 0.001	< 0.001	< 0.002
NORTH/SOUTH COMBINED	9/10/2015		5100	< 0.0005	< 0.001	0.00058	< 0.0005	< 0.001	< 0.001	< 0.001	0.0053	< 0.0005	< 0.0025	< 0.0025	< 0.0005	< 0.0005	< 0.001
NORTH/SOUTH COMBINED	9/17/2015		5700	< 0.001	< 0.002	< 0.001	< 0.001	< 0.002	< 0.002	< 0.002	0.0042	< 0.001			< 0.001	< 0.001	< 0.002
NORTH/SOUTH COMBINED	10/13/2015		4900	< 0.0005	< 0.001	0.00074	< 0.0005	< 0.001	< 0.001	< 0.001	0.0059	< 0.0005	< 0.001	< 0.0025	< 0.0005	< 0.0005	< 0.001
NORTH/SOUTH COMBINED	11/18/2015		4500	< 0.005	< 0.01	< 0.005	< 0.005	< 0.01	< 0.01	< 0.01	< 0.01	< 0.005	< 0.01	< 0.025	< 0.005	< 0.005	< 0.01
NORTH/SOUTH COMBINED	11/23/2015											0.0025					
NORTH/SOUTH COMBINED	12/1/2015		4000	< 0.002	< 0.004	< 0.002	< 0.002	< 0.004	< 0.004	< 0.004	< 0.004	< 0.002	< 0.004	< 0.01	< 0.002	< 0.002	< 0.004
NORTH/SOUTH COMBINED	1/11/2016		2900	< 0.001	< 0.002	< 0.001	< 0.001	< 0.002	< 0.002	< 0.002	0.0061	< 0.001	< 0.002	< 0.005	< 0.001	< 0.001	< 0.002
NORTH/SOUTH COMBINED	2/10/2016		3700	< 0.001	< 0.002	< 0.001	< 0.001	< 0.002	< 0.002	< 0.002	0.0058	< 0.001	0.0021	< 0.005	< 0.001	< 0.001	< 0.002
NORTH/SOUTH COMBINED	3/10/2016		3900	< 0.002	< 0.004	< 0.002	< 0.002	< 0.004	< 0.004	< 0.004	0.0051	< 0.002	< 0.004	< 0.01	< 0.002	< 0.002	< 0.004
NORTH/SOUTH COMBINED	4/12/2016		3400	< 0.005	< 0.01	< 0.005	< 0.005	< 0.01	< 0.01	< 0.01	< 0.01	< 0.005	< 0.01	< 0.025	< 0.005	< 0.005	< 0.01
NORTH/SOUTH COMBINED	5/9/2016		3700	< 0.0025	< 0.005	< 0.0025	< 0.0025	< 0.005	< 0.005	< 0.005	0.0065	< 0.0025	< 0.005	< 0.013	< 0.0025	< 0.0025	< 0.005
NORTH/SOUTH COMBINED	6/6/2016		5200	< 0.002	< 0.004	< 0.002	< 0.002	< 0.004	< 0.004	< 0.004	0.0062	< 0.002	< 0.004	< 0.01	< 0.002	< 0.002	< 0.004
NORTH/SOUTH COMBINED	7/6/2016		5600	< 0.002	< 0.004	< 0.002	< 0.002	< 0.004	< 0.004	< 0.004	0.0051	< 0.002	< 0.004	< 0.01	< 0.002	< 0.002	< 0.004
NORTH/SOUTH COMBINED	8/4/2016		5400	< 0.0025	< 0.005	< 0.0025	< 0.0025	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0025	< 0.005	< 0.013	< 0.0025	< 0.0025	< 0.005
NORTH/SOUTH COMBINED	9/13/2016		5300	< 0.0025	< 0.005	< 0.0025	< 0.0025	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0025	< 0.005	< 0.013	< 0.0025	< 0.0025	< 0.005
NORTH/SOUTH COMBINED	10/5/2016		7400	< 0.002	< 0.004	< 0.002	< 0.002	< 0.004	< 0.004	< 0.004	0.0051	< 0.002	< 0.004	< 0.01	< 0.002	< 0.002	< 0.004
NORTH/SOUTH COMBINED	10/24/2016											< 0.005					
NORTH/SOUTH COMBINED	11/3/2016		4200	< 0.001	< 0.002	< 0.001	< 0.001	< 0.002	< 0.002	< 0.002	0.0048	< 0.001	< 0.002	< 0.005	< 0.001	< 0.001	< 0.002
NORTH/SOUTH COMBINED	12/2/2016		3900	< 0.002	< 0.004	< 0.002	< 0.002	< 0.004	< 0.004	< 0.004	0.005	< 0.002	< 0.004	< 0.01	< 0.002	< 0.002	< 0.004
NORTH/SOUTH COMBINED	1/11/2017		2500	< 0.001	< 0.002	< 0.001	< 0.001	< 0.002	< 0.002	< 0.002	0.0058	< 0.001	< 0.002	< 0.005	< 0.001	< 0.001	< 0.002
NORTH/SOUTH COMBINED	2/15/2017		2700	< 0.001	< 0.002	< 0.001	< 0.001	< 0.002	< 0.002	< 0.002	0.0064	< 0.001	< 0.002	< 0.005	< 0.001	< 0.001	< 0.002
NORTH/SOUTH COMBINED	3/15/2017		2600	< 0.001	< 0.002	< 0.001	< 0.001	< 0.002	< 0.002	< 0.002	0.0058	< 0.001	< 0.002	< 0.005	< 0.001	< 0.001	< 0.002
NORTH/SOUTH COMBINED	4/11/2017		2000	< 0.001	< 0.002	< 0.001	< 0.001	< 0.002	< 0.002	< 0.002	0.0049	< 0.001	< 0.002	< 0.005	< 0.001	< 0.001	< 0.002
NORTH/SOUTH COMBINED	5/11/2017		2000	< 0.001	< 0.002	< 0.001	< 0.001	< 0.002	< 0.002	< 0.002	0.0037	< 0.001	< 0.002	< 0.005	< 0.001	< 0.001	< 0.002
NORTH/SOUTH COMBINED	6/7/2017		2700	< 0.001	< 0.002	< 0.001	< 0.001	< 0.002	< 0.002	< 0.002	0.0027	< 0.001	< 0.002	< 0.005	< 0.001	< 0.001	< 0.002
South Chamber	5/1/1997		2691														
South Chamber	10/1/1997		3420														
South Chamber	5/8/1998		4320														
South Chamber	11/18/1998		2110														
South Chamber	5/11/1999		2990														
South Chamber	12/3/1999		5830						< RL		0.0032				< RL	0.0052	0.0136
South Chamber	1/4/2000		5180	< RL	< RL	< RL	< RL	< RL	< RL	< RL	0.0057				< RL	< RL	< RL
South Chamber	11/22/2000		7730	< RL	< RL	< RL	< RL	< RL	< RL	< RL	< RL	< RL	< RL	< RL	< RL	< RL	< RL

Appendix B. WM Richmond Landfill Historical Results for CVOCs and Primary Leachate Indicators in Leachate

Name	Sam Date	1,4-Dioxane mg/L	Alkalinity mg/L	1,1,1-Trichloroethane mg/L	1,1,2-Trichloroethane mg/L	1,1-Dichloroethane mg/L	1,1-Dichloroethylene mg/L	1,2-Dichlorobenzene (o) mg/L	1,2-Dichloroethane mg/L	1,3-Dichlorobenzene (m) mg/L	1,4-Dichlorobenzene (p) mg/L	Bromodichloromethane mg/L	Chloroethane mg/L	Chloromethane mg/L	Tetrachloroethylene mg/L	Trichloroethylene mg/L	Vinyl Chloride mg/L
South Chamber	12/7/2001		5580	< RL	< RL	0.0062	< RL	< RL	< RL	0.0083	< RL	< RL	< RL	< RL	< RL	< RL	< RL
South Chamber	5/29/2002		5090	< RL	< RL	< RL	< RL	< RL	< RL	< RL	< RL	< RL	< RL	< RL	< RL	< RL	< RL
South Chamber	11/21/2002		6130	< RL	< RL	< RL	< RL	< RL	< RL	< RL	0.0071	< RL	< RL	< RL	< RL	< RL	< RL
South Chamber	5/29/2003		6200	< 0.003	< 0.003	< 0.003	< 0.004	< 0.003	< 0.006	< 0.003	0.006	< 0.002	< 0.008	< 0.008	< 0.002	< 0.002	< 0.004
South Chamber	5/6/2004		4700	< 0.0021	< 0.0019	< 0.0035	< 0.0016	< 0.0019	< 0.0029	< 0.0024	0.0066	< 0.002	0.0026	< 0.001	< 0.0022	< 0.0019	< 0.0049
South Chamber	11/16/2004		6420	< 0.021	< 0.019	< 0.035	< 0.016	< 0.019	< 0.029	< 0.024	< 0.024	< 0.02	< 0.01	< 0.01	< 0.022	< 0.019	< 0.049
South Chamber	5/5/2005		2740	< 0.0021	< 0.0019	< 0.0035	< 0.0016	< 0.0019	< 0.0029	< 0.0024	0.0102	< 0.002	< 0.001	< 0.001	< 0.0022	< 0.0019	< 0.0049
South Chamber	11/2/2005		4330	< 0.0021	< 0.0019	< 0.0035	< 0.0016	< 0.0019	< 0.0029	< 0.0024	0.0112	< 0.002	0.0015	< 0.001	< 0.0022	< 0.0019	< 0.0049
South Chamber	5/29/2006		6630	< 0.0004		0.0022	< 0.0005				0.0089				< 0.0003		
South Chamber	9/13/2006		7480	< 0.0004	< 0.0004	0.0019	< 0.0005	< 0.0004	< 0.0005	< 0.0004	0.0103	< 0.0003	0.0018	< 0.001	< 0.0003	< 0.0003	0.0014
South Chamber	4/17/2007		1880	< 0.004		< 0.004	< 0.005				0.015				< 0.003		
South Chamber	10/15/2007		8600	< 0.0004	< 0.0004	0.001	< 0.0005	< 0.0004	< 0.0005	< 0.0004	0.0118	< 0.0003	< 0.001	0.0031	< 0.0003	< 0.0003	0.0005
South Chamber	5/15/2008		6100	< 0.003		< 0.003	< 0.003				0.009				< 0.003		
South Chamber	11/17/2008		6420	< 0.001		0.002	< 0.001				0.011				< 0.001		
South Chamber	6/2/2009		6100	< 0.001		0.002	< 0.001				0.007				< 0.001		
South Chamber	11/24/2009		4780	< 0.001		< 0.001	< 0.001				0.009				< 0.001		
South Chamber	4/13/2010		8070	< 0.001	< 0.002	0.001	< 0.001	< 0.002	< 0.002	< 0.002	0.013	< 0.001	< 0.002	< 0.005	< 0.001	< 0.001	< 0.002
South Chamber	5/4/2010		7930	< 0.001	< 0.002	0.001	< 0.001	< 0.002	< 0.002	< 0.002	0.011	< 0.001	< 0.002	< 0.005	< 0.001	< 0.001	< 0.002
South Chamber	5/21/2010											< 0.001					
South Chamber	6/2/2010		7240	< 0.003	< 0.005	< 0.003	< 0.003	< 0.005	< 0.005	< 0.005	0.011	< 0.003	< 0.005	< 0.01	< 0.003	< 0.003	< 0.005
South Chamber	10/25/2010		8700								0.015						
South Chamber	12/16/2010		6310	< 0.003	< 0.005	< 0.003	< 0.003	< 0.005	< 0.005	< 0.005	0.012	< 0.003	< 0.005	< 0.01	< 0.003	< 0.003	< 0.005
South Chamber	5/3/2011		4050	< 0.002	< 0.004	< 0.002	< 0.002	< 0.004	< 0.004	< 0.004	0.01	< 0.002	< 0.004	< 0.01	< 0.002	< 0.002	< 0.004
South Chamber	10/25/2011		9360														
South Chamber	3/19/2012	< 0.5															
South Chamber	4/23/2012		8100	< 0.005	< 0.01	< 0.005	< 0.005	< 0.01	< 0.01	< 0.01	< 0.01	< 0.005	< 0.01	< 0.025	< 0.005	< 0.005	< 0.01
South Chamber	10/22/2012		9100	< 0.005	< 0.01	< 0.005	< 0.005	< 0.01	< 0.01	< 0.01	< 0.01	< 0.005			< 0.005	< 0.005	< 0.01
South Chamber	4/26/2013		4000	< 0.005	< 0.01	< 0.005	< 0.005	< 0.01	< 0.01	< 0.01	< 0.01	< 0.005	< 0.01	< 0.025	< 0.005	< 0.005	< 0.01
South Chamber	5/2/2013	0.0767						< 0.01			< 0.01				< 0.005	< 0.005	
South Chamber	5/5/2014		2600	< 0.0005	< 0.001	0.00095	< 0.0005	< 0.001	< 0.001	< 0.001	0.006	< 0.0005	0.0013	< 0.0025	< 0.0005	< 0.0005	< 0.001
South Chamber	5/6/2014	0.0467															
South Chamber	4/20/2015	0.376															
South Chamber	4/21/2015		6300	< 0.0005	< 0.001	< 0.0005	< 0.0005	< 0.001	< 0.001	< 0.001	0.0054	< 0.0005	< 0.001	< 0.0025	< 0.0005	< 0.0005	< 0.001
South Chamber	11/24/2015	0.078	4000	< 0.005	< 0.01	< 0.005	< 0.005	< 0.01	< 0.01	< 0.01	< 0.01		< 0.01	< 0.025	< 0.005	< 0.005	< 0.01
South Chamber	5/2/2016	0.058	4900	< 0.002	< 0.004	< 0.002	< 0.002	< 0.004	< 0.004	< 0.004	0.0052		< 0.004	< 0.01	< 0.002	< 0.002	< 0.004
South Chamber	5/1/2017	0.028	3200	< 0.002	< 0.004	< 0.002	< 0.002	< 0.004	< 0.004	< 0.004	< 0.004		< 0.004	< 0.01	< 0.002	< 0.002	< 0.004

RL: Laboratory Reporting Limit

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