O'BRIEN & GERE

April 17, 2013

Mr. Richard Conforti
Environmental Engineer
Michigan Department of Environmental Quality
Permit and Corrective Action Unit
Office of Waste Management and Radiological Protection
P.O. Box 30241
Lansing, MI 48909-7741

RE: RACER Trust Coldwater Road Former WWTP Closure
FILE: 15388/50137

Dear Mr. Conforti

On behalf of Revitalizing Auto Communities Environmental Response Trust (RACER Trust), we are submitting one hard copy and one electronic copy of the Addendum to the June 1999 Closure Certification Report for the Former Wastewater Treatment Plant at the Coldwater Road facility in Flint, Michigan (EPA I.D. MID 005 356 860). Since the former wastewater treatment plant is the last area to be closed at the Coldwater Road facility under the Consent Order, RACER Trust requests closure approval for the entire Coldwater Road facility. Currently post-closure activities associated with the landfill are continuing in accordance with the approved Post-Closure Care Plan.

Please contact David Favero with RACER Trust at (217) 741-6235 or Tony Finch with O'Brien & Gere at (248) 477-5701 if you have any questions or comments.

Very truly yours,
O'Brien & Gere Engineers, Inc.

Scott Cormier
Vice President

cc: David Favero, RACER Trust, Ypsilanti, MI
Joseph Rogers, MDEQ, OWMRP, Lansing, MI (w/out report)
John McCabe, MDEQ, OWMRP, Lansing, MI (w/out report)

ADDENDUM TO THE JUNE 1999 CLOSURE CERTIFICATION REPORT FOR THE FORMER WASTEWATER TREATMENT PLANT

RACER Trust Coldwater Road Facility
6220 Horton Avenue
Genesee Township, Michigan
(MID 005 356 860)

RACER Trust
Ypsilanti, Michigan

April 2013

O'BRIEN & GERE

Addendum to the June 1999 Closure Certification Report for the Former Wastewater Treatment Plant

Coldwater Road Facility
6220 Horton Avenue
Genesee Township, Michigan
(MID 005 356 860)

Prepared for:
RACER Trust
Ypsilanti, Michigan

SCOTT L. CORMIER, PE – VICE PRESIDENT
O'Brien & Gere Engineers, Inc.

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List of Acronyms

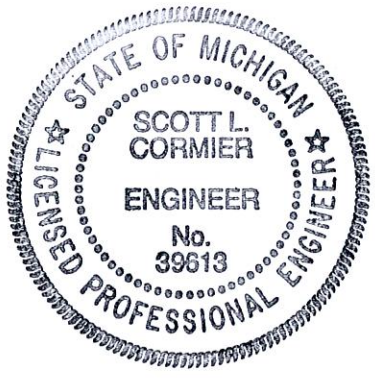
CACO	Corrective Action Consent Order
CLP	Contract Laboratory Program
COCs	Chemicals of Concern
CRA	Conestoga-Rovers & Associates
fbg	Feet below grade
GC/MS	Gas Chromatograph/Mass Spectrometer
GM	General Motors
GSI	Groundwater-Surface Water Interface
GWNIAA	Groundwater Not In An Aquifer
HSA	Hollow Stem Auger
ICP	Inductively Coupled Plasma
MDEQ	Michigan Department of Environmental Quality
MDL	Method Detection Limit
MLC	Motors Liquidation Corporation
NREPA	Natural Resources and Environmental Protection Act
ppb	Parts per billion
QA/QC	Quality Assurance/Quality Control
QAPP	Quality Assurance Project Plan
RCRA	Resource Conservation and Recovery Act
RMA	Remaining Materials Area
RRD	Remediation and Redevelopment Division
SAP	Sampling and Analysis Plan
SOP	Standard Operating Procedure
SVOCs	Semi-Volatile Organic Compounds
SWMU	Solid Waste Management Unit
TDL	Target Detection Limit
USEPA	United States Environmental Protection Agency
VOCs	Volatile Organic Compounds
WHMD	Waste and Hazardous Material Division
WWTP	Wastewater Treatment Plant

CLOSURE CERTIFICATION

This section presents the certification statement as required by 40 CFR 264.115 and Part 111, Hazardous Waste Management, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (Act 451), Mich. Admin. Code Rule 299.9613(2).

PROFESSIONAL ENGINEER'S CERTIFICATION

I, Scott L. Cormier, a Professional Engineer in the State of Michigan, certify under penalty of law that this document and attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.



O'BRIEN & GERE ENGINEERS, INC.

Scott L. Cormier, PE

Vice President

OWNER'S CERTIFICATION

I, David Favero, representing RACER Trust certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

RACER Trust

_____

David Favero

Deputy Cleanup Manager- Michigan

1 INTRODUCTION

This Addendum to the June 1999 Closure Certification Addendum Report for the Former Wastewater Treatment Plant (WWTP) at the Coldwater Road Facility (2013 Addendum Report) documents final closure of the former WWTP at the RACER Trust Coldwater Road Landfill facility in Flint, Michigan.

1.1 SITE HISTORY

1.1.1 Site Description

The RACER Trust Coldwater Road Landfill facility is located north of the RACER Trust former Peregrine U.S., Inc. (RACER Trust former Peregrine property) property as shown on the Site Location Map, Figure 1. The RACER Trust Coldwater Road Landfill facility consists of the wastewater treatment sludge monofill landfill, former WWTP (decommissioned and demolished in 1999), restored wetlands, and leachate accumulation facility. This facility is bordered on the south by the RACER Trust former Peregrine property, which formerly contained several manufacturing buildings and support facilities. The buildings on the RACER Trust former Peregrine property were decommissioned and demolished between 1999 and 2001. A figure depicting the division between the RACER Coldwater Road Landfill facility and the RACER Trust former Peregrine property is included as Figure 2.

1.1.2 Site Ownership

On December 10, 1996, an asset Purchase Agreement for the manufacturing portion of the Coldwater Road site, which is now referred to as the "RACER Trust former Peregrine property, MID 000 020 743", was signed by General Motors (GM) and Peregrine. GM retained ownership of the northern portion, which is now referred to as the "RACER Trust Coldwater Road Landfill facility MID 005 356 860" and sold the manufacturing facility (Former Peregrine Property). In August 1999, REALM (a wholly owned subsidiary of GM) took back ownership of the manufacturing facility from Peregrine. In April 2000 a MDEQ Notification of Regulated Waste Activity form (EQP5150) and United States Environmental Protection Agency (USEPA) Hazardous Waste Permit Application Part A (USEPA form 8700-23) were submitted to document change of ownership of the landfill and the former WWTP property from GM to REALM. REALM, a wholly-owned subsidiary of GM, managed the Resource Conservation and Recovery Act (RCRA) closure program for the REALM Coldwater Road Landfill facility under the 1992 Corrective Action Consent Order (CACO) until REALM filed for bankruptcy in October 2009 at which time Motors Liquidation Company (MLC), which was the former GM, assumed management of the property. The RACER Trust was created on March 31, 2011 by the U.S. Bankruptcy Court to clean up and position for redevelopment properties and facilities owned by the former GM and its subsidiaries. The Coldwater Road Landfill facility (including the former WWTP) and the former Peregrine property were two of the properties assigned to the RACER Trust. The RACER Trust currently manages the RCRA closure program for the Coldwater Road Landfill facility under the 1992 CACO.

1.1.3 RCRA Closure

Several of the RCRA units and Solid Waste Management Units (SWMUs) were closed in accordance with the 1989 Closure Plan during construction of the on-site hazardous waste landfill between 1990 and 1994. Roy F. Weston, Inc. (Weston) provided quality assurance oversight and closure verification during this construction phase. As documented in the Draft Closure Certification Documentation Package (Weston, November 1994), there were several units not closed at the completion of landfill construction. Closure of these remaining units was completed between 1994 and 2003 with oversight provided by O'Brien & Gere. Closure documentation for all units covered under the CACO for the RACER Trust Coldwater Road Landfill facility is provided in the following seven final closure reports:

- Final Closure Certification Documentation Package -Decontamination Pits and Sump, Chromium Reduction Basins at the WWTP, September 1998, Roy F. Weston, Inc. (Weston).
- Subsurface Investigation of Decontamination Pits/Sump and Chromium Reduction Basins Report, June 1999, O'Brien & Gere Engineers, Inc. (O'Brien & Gere).

- Final Closure Certification, former Drum Storage Area and Waste Pile Pad, June 1999, Weston.
- Part I - Final Closure Certification Documentation, November 2000, O'Brien & Gere and subsequent data submittals.
- Part II - Final Closure Certification Documentation, November 2000, Weston and subsequent data submittals.
- Addendum to the June 1999 Closure Certification Report for the Former Drum Storage Area at the Former Peregrine, U.S., Inc. Property at the Coldwater Road Facility. January 2005, O'Brien and Gere.
- Addendum to the June 1999 Closure Certification Report for the Former Drum Storage Area at the Former Peregrine, U.S., Inc. Property at the Coldwater Road Facility. September 2008, O'Brien and Gere.
- The former WWTP was not listed in the 1992 CACO for the Site.

The regulatory background for the WWTP is discussed in Section 1.2.

1.2 FORMER WASTEWATER TREATMENT PLANT BACKGROUND

The former WWTP at the Coldwater Road Landfill facility is located at the southwestern corner of the property as shown on Figure 2 (Site Plan). The WWTP was constructed in the early 1950s to treat plating waste streams as generated by the manufacturing facility. Plating operations ran from 1953 to 1987. Process wastewater from the former manufacturing plant discharged to the former WWTP in force mains. Chemical/physical treatment of the process wastewater was performed at the former WWTP on a batch basis. The chromium, nickel, and acid/alkali wastes were combined and treated for heavy metal removal, whereas the copper-cyanide waste was treated separately.

Use of the WWTP was terminated in December 1996 when the manufacturing plant was sold to Peregrine, Inc. The WWTP building and associated basins were subsequently decontaminated and demolished between December 1998 and May 1999.

Concurrent to WWTP demolition, REALM voluntarily implemented an investigation at the former WWTP to evaluate potential releases from the surrounding basins. The former WWTP basin investigation was performed in accordance with procedures outlined in O'Brien & Gere's January 1999 Quality Assurance Project Plan (QAPP) and Three Basement Basin Sampling and Analysis Plan (SAP) developed for the Coldwater Road facility. The basin investigation was performed between September 1998 and May 1999. It should be noted that during this investigation three soil borings were proposed to be monitoring wells. However, wet subsurface soil conditions were not observed during soil boring installation, therefore no wells were installed.

The basin investigation included collection of subsurface soil samples underneath and around the former WWTP and surrounding basins, concrete samples from the basins and former WWTP basement floor, rinsate samples, and groundwater samples from two existing monitoring wells (MW-11 and MW12) located southwest of the former WWTP. The former WWTP layout and previous soil sample locations are shown on Figure A-1 in Appendix A. Results of the basin investigation were reported to the MDEQ in the Former WWTP Basin Investigation Report dated November 2000. The analytical results summary tables from the Basin Investigation Report are included in Appendix A. The results supported closure approval and no further action for the former WWTP basins and surrounding area. However, in a letter from the MDEQ Waste and Hazardous Material Division (WHMD) dated March 24, 2005, the MDEQ did not extend the "no further action" determination to the former WWTP. The MDEQ indicated that the no further action did not meet the requirements specified in Parts 111 and 201, specifically, the dissolved lead in groundwater was not delineated. The dissolved lead in groundwater analytical results from the WWTP basin investigation area are included in Appendix A, on page 5 of Table 1. A detailed discussion of the Basin Investigation Report is included in Section 1.2.1.

A Work Plan was prepared and submitted to the MDEQ in April 2006, which addressed the issues raised by the MDEQ in their March 24, 2005 letter. The Work Plan proposed investigating the concentrations of dissolved lead in groundwater at the former WWTP. The MDEQ reviewed the Work Plan and after minor modifications were included, the Work Plan was approved in a letter dated January 26, 2007. Results of the December 2006 Work Plan investigation were reported to the MDEQ in the 2008 Addendum Report dated September 2008. The

analytical results summary tables from the 2008 Addendum Report are included in Appendix B. The results supported closure approval and no further action for the former WWTP basins and surrounding area. However, in a letter from the MDEQ WHMD dated March 24, 2009, the MDEQ did not extend the "no further action" determination to the former WWTP. The MDEQ comments to the 2008 Addendum Report indicated that several issues remained unresolved; specifically, that the dissolved iron and manganese in groundwater were not delineated horizontally, and that one of the report's conclusions, that shallow groundwater at the site was not in an aquifer, could not be supported unless that designation is formally approved through submittal of a Groundwater Not In An Aquifer (GWNIAA) Determination. Additionally, in a teleconference call on May 4, 2009, the MDEQ expressed concern that volatile organic compounds (VOCs) in soil were not delineated vertically. A detailed discussion of the 2008 Addendum Report is included in Section 1.2.2.

A response to MDEQ comments on the 2008 Addendum Report was submitted to the MDEQ July 13, 2009 which addressed the GWNIAA issue and two of the three delineation concerns (iron and VOCs) that were raised by the MDEQ. The July 13, 2009 response also proposed an additional investigation to address the third delineation concern (dissolved manganese in groundwater). The MDEQ approved the response to their comments and approved the additional investigation in a letter dated September 26, 2011.

Section 1.2.3 of this 2013 Addendum Report summarizes the MDEQ comments to the 2008 Addendum Report and the response to those comments. Section 2.0 presents the results of the additional investigation. MDEQ comments to the 2008 Addendum Report are included in Attachment A, the July 13, 2009 response to MDEQ comments are included in Attachment B, and the MDEQ's letter accepting the response to comments (dated September 26, 2011) is included as Attachment C.

1.2.1 Basin Investigation Report

The COCs for soil and groundwater at the former WWTP identified through the Basin Investigation Report (November 24, 2000) were as follows:

Soil	Groundwater
Benzene	Lead (dissolved)
Cyanide	
Nickel	
1,2,4- trimethylbenzene	
Trichloroethene	

A summary of the Basin Investigation Report results follow:

Soil

Subsurface soil sample analytical results from the initial Basin Investigation Report indicated semi-volatile organic compounds (SVOCs) below the MDEQ Part 201 Generic Residential and Non-Residential Drinking Water Protection Criteria. The analytical results for the subsurface soil samples indicate concentrations of benzene, trichloroethene, 1,2,4-trimethylbenzene, nickel and cyanide above MDEQ Part 201 Generic Residential and Non-Residential Drinking Water Protection Criteria.

Benzene was detected at a concentration of 200 parts per billion (ppb) in the soil sample from GB-18, located in the central deionized water basin. Trichloroethene was detected in two soil sample locations: GB-44 (west basement basin) and GB-47 (south of west basement basin), at concentrations of 570 ppb and 770 ppb respectively. Also, 1,2,4-trimethylbenzene was detected in two soil sample locations: GB-20 (east cyanide basin) at 3,120 ppb and GB-21 (west cyanide basin) at 2100 ppb.

Methylene chloride was detected in samples GB-42 through GB-47 above the MDEQ Generic Residential and Non-Residential Drinking Water Protection criteria; however, the results of these samples indicated methylene chloride was detected in the laboratory blanks and should be considered blank contamination. Also, the vinyl chloride detection limit achieved by the laboratory is above the MDEQ Part 201 Generic Residential and Non-Residential Drinking Water Protection criteria; however, these detections are half of the Target Detection Limit (TDL) for method 5035/8260 (methanol preservation) listed in the Environmental Response Division (ERD) former Operational Memorandum #6, revision 5, dated November 16, 1998, the guidance at the time of investigation.

Nickel and cyanide concentrations were detected above the MDEQ Part 201 Generic Residential and Non-Residential Drinking Water Protection criteria in the following samples:

- Nickel - GB-39 (WWTP basement floor north)
- Cyanide - GB-25 (west alkali basin)

Tables summarizing the soil analytical results from the Basin Investigation Report are included in Appendix A and a figure depicting historical sample locations and MDEQ Part 201 criteria exceedances is included in Appendix A as Figure A-1.

Groundwater

Groundwater samples collected for the Basin Investigation Report were analyzed for VOCs, SVOCs, dissolved metals (cadmium, chromium, copper, lead, nickel, and zinc), and cyanide during the initial basin investigation. The results of the VOCs, SVOCs and cyanide analyses were below detection limits.

The results of the dissolved metals analyses were below Part 201 Generic Residential Drinking Water criteria, except for dissolved lead which was present at concentrations of 8 ppb in OBG MW-1 (duplicate value of 9 ppb), and in OBG MW-2 at 32 ppb.

Tables summarizing the groundwater analytical results from the Basin Investigation Report are included in Appendix A and a figure showing the locations of the monitoring wells and MDEQ Part 201 criteria exceedances is included as Figure A-2 in Appendix A.

Results of the basin investigation were reported to MDEQ in the Former WWTP Basin Investigation Report dated November 2000. However, MDEQ did not extend a 'no further action' determination to the former WWTP on the basis of the Basin Investigation report and previous closure certification submittals. MDEQ indicated that the 'no further action' did not meet the requirements specified in Parts 111 and 201, specifically, the dissolved lead in groundwater was not delineated and that the potential impact of COCs in soil were not completely addressed. Therefore, a work plan was developed (as noted in Section 1.2) and implemented to address MDEQ comments. The results of that investigation are included in the 2008 Addendum Report (Section 1.2.2).

1.2.2 2008 Addendum Report

This section describes results of the groundwater sampling and analysis conducted in the vicinity of the former WWTP. Sampling and analysis was conducted in accordance with procedures outlined in the MDEQ-approved Post-Closure Care Plan (PC Plan) (O'Brien & Gere, 2006), MDEQ-approved December 2006 Work Plan for the former WWTP and February 2006 QAPP developed for the REALM Coldwater Road Landfill facility. The objective of the investigation was to assess the extent of COCs impact to groundwater and assess the potential for previously detected constituents in soil to leach to groundwater.

O'Brien & Gere completed investigation of the former WWTP in a phased approach following MDEQ approval of the Work Plan. Initially the installation of monitoring wells was performed in May 2007 and subsequent groundwater monitoring was performed quarterly for one year (June 19, 2007 through March 18, 2008).

Groundwater samples were collected quarterly for four quarters using low-flow sampling methods per Attachment 5 of the MDEQ Remediation and Redevelopment Division (RRD) Operational Memorandum No. 2, in accordance with the MDEQ-approved PC Plan and December 2006 Work Plan. In accordance with the December

2006 Work Plan, notifications to MDEQ were made 2 weeks prior to each groundwater sampling event via the Monthly Progress Reports submitted under the Post-Closure activities at the Site. The following discussions summarize the results of the quarterly groundwater monitoring program.

Summary of Subsurface Conditions

This section describes the subsurface conditions observed based on the installation of the monitoring wells (shown on Figure 3) and previously installed hydraulic probe borings at the former WWTP.

Subsurface soil conditions at the former WWTP consist of a clay unit from the original ground surface to a depth of 30 ft below grade with sand lenses observed ranging in thickness from non-existent (OBG MW-8) to 5 ft (OBG MW-5). The elevations shown on Table 1.1 below indicate that the sand lenses vary in elevation indicating a discontinuous perched zone condition at the former WWTP.

Table 1.1 *Sand Lens Elevations*

Well Location	Surface Elevation (NAVD 88)	Observed Sand Lens Elevation
OBG MW-1	809.46’	798.46-796.46'
OBG MW-2	812.45’	806.95-805.45' and 799.45-796.45'
OBG MW-3	807.47’	802.97-799.97'
OBG MW-4	810.10’	797.85-797.35'
OBG MW-5	813.05’	809.05-804.05'
OBG MW-6	813.02’	798.44-798.27'
OBG MW-7	810.23’	805.65-805.23' and 795.23-794.23'
OBG MW-8	814.72’	no sand lense observed

Sand lenses were observed in seven of the eight borings (OBG MW-1 – OBG MW-7) completed as monitoring wells under this investigation at the former WWTP. These locations are separated by previously installed borings in which a sand lens of the same elevation was not observed indicating the sand lenses are discontinuous in the vicinity of the former WWTP. A geologic cross section depicting the discontinuous sand lenses in the perched zone at the former WWTP area is included as Figure 4.

Following demolition of the former WWTP, approximately 3-4 ft of sand fill (offsite clean fill deemed inert by the supplier in accordance with NREPA Act 4512, Part 201) was placed over the former WWTP building and basins.

First Quarter Groundwater Sampling Results

Analytical results for the first quarter groundwater sampling event, performed in June 2007 and reported in the 2008 Addendum Report, indicated no detections of VOCs above MDEQ Part 201 Generic Non-Residential Drinking Water criteria. Analytical results for the inorganics indicated a detection of total lead at OBG MW-5 of 0.140 mg/l, which is above the MDEQ Part 201 Generic Non-Residential Drinking Water criterion (.004 mg/l). The analytical result for dissolved lead at this location was below the method detection limit (MDL). Also, at the OBG MW-5 location, there was a detection of cyanide of 0.295 mg/l, which is above the MDEQ Part 201 Generic Non-Residential Drinking Water criterion (0.200 mg/l). A table summarizing the first quarter groundwater analytical results is included as Table 1 in Appendix B.

Second Quarter Groundwater Sampling Results

Analytical results for the second quarter groundwater sampling event (September 2007) indicated no concentrations of VOCs above the MDEQ Part 201 Generic Non-Residential Drinking Water Criteria, comparable to the first quarter sampling results. Analytical results for the inorganics indicate concentrations for total chromium, total nickel and total lead either below MDLs or MDEQ Part 201 Generic Non-Residential Drinking

Water Criteria. No dissolved samples were collected for this sampling event in accordance with the Work Plan since groundwater turbidity did not stabilize above 10 NTU. Analytical results for total cyanide indicate no concentrations above MDEQ Part 201 Generic Non-Residential Drinking Water Criteria.

A table summarizing the 2008 Addendum Report second quarter groundwater analytical results is included as Table 3 in Appendix B.

During the second quarter sampling event, the MDEQ WHMD collected split groundwater samples (at locations OBG MW-5, OBG MW-7 and OBG MW-8) for laboratory analysis. In addition to the parameters approved under the December 2006 Work Plan, MDEQ also ran analysis for the following parameters (totals): antimony, arsenic, barium, beryllium, cadmium, cobalt, copper, manganese, molybdenum, mercury, selenium, silver, thallium, vanadium, zinc and iron. The results of the MDEQ analysis indicated concentrations of total arsenic, iron and manganese above the MDEQ Part 201 Generic Non-Residential Drinking Water Criteria. Therefore, a Work Plan Amendment was prepared and submitted to MDEQ on January 8, 2008 which included adding these parameters to the analytical list for the remaining third and fourth quarter groundwater sampling events.

Third Quarter Groundwater Sampling Results

Based on the results of the MDEQ split groundwater sampling during the second quarterly sampling event, additional parameters (arsenic, iron and manganese) were added to the third quarter sampling parameter list in accordance with the MDEQ-approved January 8, 2008 Amendment to the Work Plan.

Analytical results for the third quarter groundwater sampling event (December 2007) indicate no concentrations of VOCs above the MDEQ Part 201 Generic Non-Residential Drinking Water Criteria, comparable to the first and second quarterly sampling results. Analytical results for the inorganics indicate concentrations for total arsenic, total chromium, total nickel and total lead either below MDLs or MDEQ Part 201 Generic Non-Residential Drinking Water Criteria.

Groundwater analytical results indicated concentrations above the MDEQ Part 201 Non-Residential Drinking Water Criteria as follows:

- Total iron for the monitoring wells sampled during this event (OBG MW-1 through OBG MW-8)
- Total manganese for the groundwater monitoring well groundwater samples analyzed, except for OBG MW-7.

In addition to a groundwater sample collected for total analysis, a dissolved groundwater sample was collected from OBG MW-5 due to the groundwater turbidity not stabilizing above 10 NTU. Analytical results for the dissolved metals analysis indicate concentrations of dissolved chromium, dissolved lead and dissolved nickel either below MDLs or MDEQ Part 201 Generic Non-Residential Drinking Water Criteria. Analytical results for dissolved arsenic, dissolved iron and dissolved manganese indicate concentrations above MDEQ Part 201 Generic Non-Residential Drinking Water Criteria. Analytical results for total cyanide indicate no concentrations above MDEQ Part 201 Generic Non-Residential Drinking Water Criteria.

A summary of the 2008 Addendum Report third quarter groundwater analytical results is included as Table 4 in Appendix B.

Fourth Quarter Groundwater Sampling Results

Analytical results for the fourth quarter groundwater sampling event (March 2008) indicate no concentrations of VOCs above MDEQ Part 201 Generic Non-Residential Drinking Water Criteria. Fourth quarter groundwater sample results are comparable to the previous three quarterly sampling results. Analytical results for the inorganics indicate concentrations for total arsenic, total chromium, total nickel, total lead and cyanide either below MDLs or MDEQ Part 201 Generic Non-Residential Drinking Water Criteria. Groundwater analytical results also indicate concentrations above MDEQ Part 201 Non-Residential Drinking Water Criteria as follows:

- Total iron for monitoring well groundwater samples from OBG MW-3, OBG MW-5, OBG MW-6 and OBG MW-7
- Total manganese for the monitoring wells sampled during this event.

A dissolved groundwater sample was also collected from OBG MW-5 due to the groundwater turbidity stabilizing above 10 NTU. Analytical results for the dissolved metals analysis indicate concentrations of dissolved arsenic, chromium, dissolved iron, dissolved lead and dissolved nickel either below MDLs or MDEQ Part 201 Generic Non-Residential Drinking Water Criteria. Analytical results for dissolved manganese indicate concentrations above MDEQ Part 201 Generic Non-Residential Drinking Water Criteria.

Analytical results for total cyanide indicate no concentrations above MDEQ Part 201 Generic Non-Residential Drinking Water Criteria.

A table summarizing the 2008 Addendum Report fourth quarter groundwater analytical results is included as Table 5 in Appendix B.

2008 Addendum Report Conclusion

Based on the previous soil analytical results and the quarterly groundwater sampling results included in the 2008 Addendum Report indicating concentrations of arsenic, iron, lead, manganese and cyanide above Part 201 Generic Non-Residential Drinking Water Criteria, a migration pathway analysis was performed. Since the migration pathways applicable to the soil impacts at the former WWTP were addressed in the November 2000 Basin Investigation Report, the 2008 Addendum Report addressed the pertinent groundwater migration pathways.

Based on the evaluation of the pertinent groundwater migration pathways for the former WWTP and closure activities presented previously for the former WWTP, the 2008 Addendum Report concluded that closure of the former WWTP pursuant to the NREPA Part 111 had been achieved. MDEQ provided comments on the 2008 Addendum Report in a letter dated March 24, 2009 (Attachment A). MDEQ comments noted that the report did not demonstrate that closure had been achieved. MDEQ indicated that final closure of the area could not occur until it was documented that the extent of impact on-site was assessed. Specifically the letter noted that the dissolved iron and manganese in groundwater was not delineated horizontally, and that one of the report's conclusions, that shallow groundwater at the site was not in a aquifer, could not be supported unless that designation is formally approved through submittal of a GWNIAA Determination. Additionally, in a teleconference call on May 4, 2009, MDEQ expressed concern that VOCs in soil were not delineated vertically. MDEQ comments to the 2008 Addendum Report are included as Attachment A.

REALM responded to the MDEQ comments in a submittal dated July 13, 2009. The response to MDEQ comments are summarized below in Section 1.2.3 and are also included as Attachment B.

1.2.3 Facility Response to MDEQ Comments to the 2008 Addendum Report

MDEQ provided comments to the 2008 Addendum Report in a letter dated March 24, 2009 (Attachment A) and also in a teleconference call conducted on May 4, 2009. MDEQ indicated that the dissolved iron and manganese in groundwater were not delineated horizontally, and that one of the report's conclusions, that shallow groundwater at the site was not in an aquifer, could not be supported unless that designation is formally approved through submittal of a GWNIAA Determination. Additionally, in the teleconference call on May 4, 2009 MDEQ expressed concern that VOCs in soil were not delineated vertically. A response to the MDEQ comments on the 2008 Addendum Report was submitted to MDEQ in a letter dated July 13, 2009 (Attachment B).

The following summarize the response to the MDEQ comments:

Iron in Groundwater. Section R 299.5707, R299.5706a(5)(b) of the MI Part 201 regulations allows for a background concentration to be substituted for the generic cleanup criterion when the cleanup criterion is less than background. Therefore, background values were calculated for iron in groundwater at the former WWTP area. The background groundwater quality for iron was determined from the historical Coldwater Road Landfill Site (on-site) monitoring well data (dissolved concentrations). The background groundwater quality for iron was determined in accordance with MDEQ Sampling Strategies and Statistics Training Materials for Part 201 Cleanup Criteria 2002 (S^3TM). The background threshold value for iron was calculated as 1.73 mg/l (Exhibit A to the July 13, 2009 response to comments in Attachment B of this report).

A table included in the response to comments summarized the iron groundwater results from the last two quarters of the quarterly sampling program (December 2007 and March 2008) compared to the site-specific background values and MDEQ Residential Health-Based Drinking Water criteria. The comparison that the results of the quarterly groundwater sampling program at the former WWTP are below the site-specific background concentration for iron, except for one sample collected during the December 2007 sampling event at well OBG MW-3 (1.78 mg/l). However, this detection of iron is below the Health-Based Drinking Water criterion (2.0 mg/l). Therefore, no additional sampling or investigation was necessary to assess the extent of iron detected in groundwater at the former WWTP area.

Manganese in Groundwater. Background values were calculated for manganese in groundwater at the former WWTP area in accordance with the rationale for iron. The background threshold value for manganese was calculated as 1.31 mg/l (Exhibit B to the July 13, 2009 response to comments in Attachment B).

One well location (OBG MW-3) exhibited concentrations of manganese above the calculated background concentration for the last two quarterly sampling events included in the 2008 Addendum Report. The July 13, 2009 response to comments proposed that potential off-site exposure would be addressed through the installation and sampling of two monitoring wells at the west property boundary to determine the concentrations of manganese in groundwater.

It was further noted that if the results indicate manganese concentrations were below the site-specific background thus indicating that off-site migration was not occurring, closure of the area would be pursued through an Addendum to the Closure Certification Report. The site deed restriction would be expanded to prohibit use of the groundwater at the entire site, including the former WWTP area. The current Declaration of Restrictive Covenant prohibits the construction of wells or other devices to extract groundwater for consumption, irrigation, dewatering or any other use at two areas of the Coldwater Road Landfill Site: the Remaining Materials Area (RMA) and the landfill.

Groundwater Not in an Aquifer. As noted in the July 13, 2009 response to comments, the facility will not rely on a GWNIAA determination for Site closure, but instead document that there are no exceedances of the Residential Health-Based Drinking Water Criteria or site-specific background values at the western property boundary, thus demonstrating no off-site exposure (i.e., drinking contaminated groundwater) issues.

Volatile Organic Compounds at Well OBG MW-5. MDEQ recommended a deep monitoring well be installed at the site to assess the potential vertical extent of VOC impact to groundwater. The Natural Resources and Environmental Protection Act (NREPA), 1994 PA 451 R299.5528 states that a remedial investigation shall define the nature and extent of contamination in excess of the applicable generic residential cleanup criteria. No VOCs were detected at OBG MW-5 (or at adjacent wells OBG MW-6 or OBG MW-8) above the Generic Residential Drinking Water criteria during four rounds of quarterly sampling. Therefore, no further investigation is required under NREPA R299.5528.

In a letter dated September 26, 2011, MDEQ indicated they reviewed the July 13, 2009 response to comments regarding the 2008 Addendum Report for compliance with applicable regulations and the response to comments were acceptable and the additional investigation work could proceed.

1.3 CONTAMINANT DISTRIBUTION

The chemicals of concern (COCs) at the former WWTP were identified through the Basin Investigation Report (November 24, 2000) and the 2008 Addendum Report. The COCs were defined as those chemicals in which analytical results exceed MDEQ Part 201 Generic Non-Residential Drinking Water Protection Criteria for soil and the Part 201 Generic Non-Residential Drinking Water Criteria for groundwater. The following is a list of the COCs at the former WWTP:

Soil	Groundwater
Benzene	Iron (total and dissolved)
Cyanide	Lead (dissolved)
Nickel	Manganese (total and dissolved)
1,2,4- trimethylbenzene	
Trichloroethene	

Sections describing the specific distribution of impact in soil and groundwater at the former WWTP are included in Section 1.2.1 (Former Basin Investigation) and Section 1.2.2 (2008 Addendum Report).

Results from the previous investigations are included as appendices to this report. Tables summarizing the soil and groundwater analytical results from the Basin Investigation Report are included in Appendix A and a figure depicting historical soil sample locations and MDEQ Part 201 criteria exceedances from the Basin Investigation Report is included in Appendix A as Figure A-1. A figure depicting groundwater locations and MDEQ Part 201 criteria exceedances from the Basin Investigation Report is included in Appendix A as Figure A-2.

Tables summarizing the analytical results for the 2008 Addendum Report are included in Appendix B. A figure depicting groundwater locations and MDEQ Part 201 criteria exceedances from the 2008 Addendum Report is included in Appendix B as Figure B-1.

1.4 APPLICABLE CLOSURE CRITERIA

Under the October 1992 CACO, the Coldwater Road Landfill facility had interim status pursuant to RCRA and was subject to the regulations and environmental protection standards of the Michigan Hazardous Waste Management Act, 1979 PA 64, as amended. However, following removal of a substantial volume of delisted non-hazardous soils from the Coldwater Road landfill facility, verification soil samples still exceeded the background cleanup criteria established in the 1989 Closure Plan. Therefore, GM requested modification to the 1989 Closure Plan in a letter dated April 23, 1997. The letter requested changing the 1989 Closure Plan cleanup criteria (site-specific background concentrations) to MDEQ Type B health-based cleanup criteria specified in the administrative rules promulgated pursuant to Part 201 of the NREPA, 1994, PA, as amended. This modification to the 1989 Closure Plan was approved by MDEQ in a letter dated June 26, 1998. Therefore, on-going activities at the Coldwater Road Landfill facility under the CACO follow MDEQ Part 201 cleanup criteria. Groundwater analytical results are compared to MDEQ Generic Non-Residential criteria or site-specific background values for this 2013 Addendum Report.

In a March 24, 2009 letter, MDEQ provided comments on the Addendum to the June 1999 Closure Certification Report for the Former Wastewater Treatment Plant submitted in September 2008. One of MDEQ's comments stated the Closure Certification Report does not demonstrate the extent of manganese concentrations detected in groundwater above the drinking water criterion has been delineated. O'Brien & Gere, on behalf of REALM, submitted a response to the March 24, 2009 MDEQ letter dated July 13, 2009. This letter proposed establishing a site-specific background value for dissolved manganese using the mean plus three standard deviations with a 95% Upper Confidence Level (UCL) for log-normally distributed data following MDEQ S^{3}TM guidance. The data set included analytical data from monitoring wells B-7, B-9, B-18A, B-19AR, B-24R and B-28 for the time period of 1998 through 2008. MDEQ approved the calculated site-specific background for dissolved manganese in a letter from MDEQ dated September 26, 2011 (Attachment C).

During the preparation of this report, the method for calculating the site-specific background for dissolved manganese was revisited based upon a request by MDEQ regarding an adjacent RACER Trust property (former Peregrine property) and the site-specific background value proposed for inorganic constituents observed in

groundwater at that Site. MDEQ requested the use of Upper Tolerance Limits (UTLs) with 95% confidence and 95% coverage and using the ProUCL software program for calculating background values at the former Peregrine Site. In review of the data set used for the 2009 background calculation at the former WWTP, it was noted that well location B-9 data was used in the data set for the site-specific background calculation. In accordance with MDEQ S^{3}TM guidance, the B-9 well location (located on the former Peregrine property) does not meet the criteria for a background location. Therefore, a recalculation of the site-specific background for dissolved manganese, with the removal of the B-9 data and in accordance with the MDEQ request of 95% UTL with 95% coverage, was proposed to MDEQ on January 22, 2013 via email transmission. MDEQ approved the recalculation method via email transmission on January 22, 2013. The new background calculation using the MDEQ requested method yields a background value of 0.708 mg/l for dissolved manganese at the former WWTP. A copy of the ProUCL output and data set used for the background calculation for dissolved manganese is included in Appendix C.

Total manganese concentrations in groundwater will be compared to this background value due to an insufficient data set to develop a separate a background value for total manganese. MDEQ RRD Operational Memorandum No. 2- Attachment 5 (Collection of Samples for Comparison to Generic Criteria) indicates groundwater inorganic constituents must be measured as totals for site investigation under Part 201. Therefore, as a conservative measure, the total manganese concentrations were compared to the dissolved manganese site-specific background values for delineation purposes**.**

This new background value will be the criterion for dissolved and total manganese in groundwater for delineating the extent of impact pursuant to Part 201 regulations.

A discussion on the groundwater analytical results compared to the applicable criteria is included in Section 2.

2 SUMMARY OF FORMER WWTP INVESTIGATION

This section describes the methods for investigation, sample collection, results of the groundwater sampling, and analysis conducted in the vicinity of the former WWTP. Sampling and analysis was conducted in accordance with procedures outlined in the MDEQ approved PC Plan (O'Brien & Gere, 2006), MDEQ-approved July 13, 2009 Work Plan for the former WWTP and February 2006 QAPP developed for the RACER Trust Coldwater Road Landfill facility. The objective of the investigation was to assess the extent of total and dissolved manganese in groundwater at two off-site monitoring wells.

O'Brien & Gere completed investigation of the former WWTP in a phased approach following MDEQ approval of the July 13, 2009 Work Plan. The installation of monitoring wells was performed on October 10, 2011 and two subsequent groundwater sampling events were performed on November 4, 2011 and April 5, 2012.

2.1 MONITORING WELL INSTALLATION

Two monitoring wells (OBG MW-9 and OBG MW-10) were installed in accordance with the PC Plan and MDEQ-approved Work Plan, dated July 13, 2009 at the locations depicted on Figure 3. The wells were installed to assess the potential extent of total and dissolved manganese in groundwater south of the former WWTP building and surrounding basins.

The two wells were installed to an approximate depth of 15 ft below grade (fbg). This well depth was estimated based on the bottom of the former basins and basement of the former WWTP building (approximately 15 fbg), the depth of previously installed groundwater monitoring wells (15 to 20 fbg) and the stratigraphy (specifically the depth of water bearing units) at the new well locations.

Prior to well installation, the drill rig and drillers' tools were decontaminated using a portable steam cleaner. Drilling and sampling was completed utilizing the hollow stem auger (HSA) drilling method. Soil samples were collected using a 5-ft macrocore split barrel through the 4.25-inch HSAs. The soils were visually logged using the USCS soil classification system. Soil boring logs are included in Appendix D. Cuttings were spread on the ground surface at the Coldwater Road landfill Site.

Monitoring wells were constructed using 2-inch diameter, flush-threaded PVC casing. The screen length for the wells was 10 ft with slot openings of 0.010 inches and a PVC plug on the bottom of the screen. The annular space around the screen was back-filled with silt free silica sand (WB 40 grade) to a height no more than 2 ft above the top of the screen. A minimum 2-ft thick seal of hydrated bentonite was placed above the sand pack. The remaining annular space was filled with a cement bentonite grout placed with a tremie pipe. The PVC risers were covered with a lockable, watertight PVC cap. A 4-inch diameter steel, locking, protective casing was installed at the surface with a concrete anchor and runoff diversion apron. Monitoring well construction details are included in Appendix E.

Once installed, the grout was allowed a minimum of 24 hours to cure, after which time the well was developed. Well development was performed using the pump and surge method. A minimum of five casing volumes were removed from the well or until the well was pumped to dryness. Development fluids were discharged to the ground surface near each well.

Subsequent to installation of the newly installed monitoring wells, the well locations were surveyed to establish top-of-casing, grade elevations, and horizontal locations referenced to existing State Plane datum.

2.2 GROUNDWATER SAMPLE COLLECTION AND ANALYSIS

Subsequent to new well installation, groundwater samples were collected quarterly for two quarters (November 4, 2011 and April 5, 2012) using low-flow sampling methods per Attachment 5 of RRD Operational Memorandum No. 2, and in accordance with the MDEQ-approved PC Plan and December 2006 Work Plan. Groundwater samples were collected from the two newly installed wells (OBG MW-9 and OBG MW-10) for the two quarters of sampling.

Samples collected from the two newly installed wells were analyzed for total and dissolved manganese. Prior to

sampling, water within the well was purged using a submersible pump with dedicated tubing and physical parameters were monitored. During purging, specific conductivity, pH and temperature measurements were recorded to document stable conditions.

Subsequent to purging and immediately upon physical parameter stabilization within 10%, a groundwater sample was collected for total manganese analysis. Samples for dissolved metals analysis were filtered through a disposable 0.45-micron filter in the field. Pre-preserved (with HNO3) sample containers were provided by the laboratory for dissolved and total manganese analysis by Method 200.8. Quality assurance/quality control (QA/QC) samples were collected and analyzed in accordance with the QAPP for this site. QA/QC samples included an equipment blank, field blank, replicate sample, collected sample, matrix spike, and matrix spike duplicate. A Level III data package was requested from the laboratory.

2.3 DATA VALIDATION

Validation of the analytical data was performed by an independent consultant utilizing the "USEPA Contract Laboratory Program (CLP) National Functional Guidelines for Inorganic Data Review", USEPA 540-R 04 004, October 2004 (CLP National Functional Guidelines) and "USEPA CLP National Function Guidelines for Organic Data Review", USEPA-540/R-94-012 as a basis for data review establishing the specific objectives, defining the evaluation process and identifying the actions while incorporating the specific quality control limits presented in the QAPP and the laboratory standard operating procedures (SOP)s. The specific data qualifiers were used as presented and defined in the CLP National Functional Guidelines.

The following deliverables were evaluated in the data validation:

i. Technical holding times
ii. Gas chromatograph/Mass spectrometer (GC/MS) instrument performance check (for organics analysis)
iii. Initial calibration
iv. Initial and continuing calibration
v. Blanks
vi. Interference check samples
vii. Laboratory control samples
viii. Matrix duplicate sample analysis
ix. Matrix spike sample analysis
x. Inductively Coupled Plasma (ICP) serial dilution
xi. ICP/MS internal standard performance
xii. Sample result verification
xiii. Field duplicates.

The Data Validator also evaluated the overall completeness of the data package. Completeness checks were administered on all data to determine whether deliverables specified in the QAPP were present. At a minimum, deliverables included sample chain of custody forms, analytical results, and QC summaries. Data validation results are discussed in Section 2.4.

2.4 INVESTIGATION RESULTS

Groundwater samples were collected quarterly for two quarters using low-flow sampling methods per Attachment 5 of RRD Operational Memorandum No. 2, in accordance with the MDEQ-approved PC Plan and December 2006 Work Plan. In accordance with the December 2006 Work Plan, notifications to the MDEQ were made 2 weeks prior to each groundwater sampling event via the Monthly Progress Reports submitted under the Post-Closure activities at the Site. The following discussions summarize the results of the groundwater investigation.

2.4.1 Summary of Subsurface Conditions

This section describes the subsurface conditions observed based on the installation of the monitoring wells (shown on Figure 3) and previously installed borings at the former WWTP.

Generalized subsurface soil conditions at the former WWTP consist of a clay unit from the original ground surface to a depth of 30 ft below grade with sand lenses observed ranging in thickness from non-existent (OBG MW-8) to 5 ft (OBG MW-5). The elevations shown on Table 2.1 are from the 2008 Addendum Report. The current investigation indicates that the sand lenses are highly variable in elevation and thickness, signifying a discontinuous perched zone condition at the former WWTP.

Table 2.1 *Sand Lens Elevations (sources 2008 Addendum Report and current investigation)*

Well Location	Surface Elevation (NAVD 88)	Observed Sand Lens Elevation
OBG MW-1	809.46’	798.46-796.46'
OBG MW-2	812.45’	806.95-805.45' and 799.45-796.45'
OBG MW-3	807.47’	802.97-799.97'
OBG MW-4	810.10’	797.85-797.35'
OBG MW-5	813.05’	809.05-804.05'
OBG MW-6	813.02’	798.44-798.27'
OBG MW-7	810.23’	805.65-805.23' and 795.23-794.23'
OBG MW-8	814.72’	no sand lens observed
OBG MW-9	806.94’	800.94’-799.94’
OBG MW-10	808.70’	808.20’-796.20’

Sand lenses were observed in nine of the ten borings (OBG MW-1 through OBG MW-10) completed as monitoring wells under the May 2007 investigation and the recent current investigation at the former WWTP. These locations are separated by previously installed borings in which a sand lens of the same elevation was not observed indicating the sand lenses are discontinuous in the vicinity of the former WWTP. A geologic cross section depicting the discontinuous sand lenses in the perched zone at the former WWTP area is included as Figure 4.

Following demolition of the former manufacturing building, approximately 3-4 ft of sand fill was placed over the former WWTP building and basins.

2.4.2 First Quarter Groundwater Sampling Results

Analytical results for the first quarter groundwater sampling event (November 4, 2011) indicated detections of total and dissolved manganese at OBG MW-9 of 0.565 mg/l and 0.570 mg/l, respectively, which are below the site-specific background values for dissolved manganese (0.708 mg/l). Also, analytical results for OBG MW-10 indicated detections of total and dissolved manganese of 3.56 mg/l and 3.69 mg/L, respectively, which are above

Part 201 Health Based Drinking Water Criterion (2.50 mg/l). A figure depicting exceedances of site-specific background values and/or Part 201 Non-Residential Drinking Water values for the first quarter groundwater sampling event is included as Figure 5.

Table 1 summarizes the first quarter groundwater analytical results. The first quarter groundwater analytical results were validated and the overall data usability was found to be 100%. The data validation report (including analytical data sheets) for this sampling event is included in Appendix F.

Groundwater level data were collected from the wells sampled during the first quarter groundwater sampling event. A table with the water levels and groundwater elevations is included as Table 2.

2.4.3 Second Quarter Groundwater Sampling Results

Analytical results for the second quarter groundwater sampling event (April 5, 2012) indicated detections of total and dissolved manganese at OBG MW-9 of 0.591 mg/l and 0.562 mg/l, respectively, which are below the site-specific background values for dissolved manganese (0.708 mg/l). Also, analytical results for OBG MW-10 indicated detections of total and dissolved manganese of 2.62 mg/l and 2.57 mg/l, respectively, which are above Part 201 Health Based Drinking Water criterion (2.50 mg/l). A figure depicting exceedances of Site-Specific Background values and/or Part 201 Non-Residential Drinking Water values for the second quarter groundwater sampling event is included as Figure 5.

Table 1 summarizes the second quarter groundwater analytical results. The second quarter groundwater analytical results were validated and the overall data usability was found to be 100%. The data validation report (including analytical data sheets) for this sampling event is included in Appendix G.

Groundwater level data were collected from the wells sampled during the second quarter groundwater sampling event. Groundwater level data were also collected from the eight previously installed wells (OBG MW-1 through OBG MW-8) as part of the second quarter groundwater sampling event. Table 2 lists water levels and groundwater elevations. Figure 6 depicts the groundwater elevations.

2.4.4 Site-Specific Background Value for Manganese

As noted in Section 1.5 of this Report, a new site-specific background value for manganese was calculated in accordance with MDEQ's request of 95% UTL with 95% coverage using the ProUCL program with the removal of the B-9 well data. The new background calculation using the MDEQ requested method yields a background value of 0.708 mg/l for dissolved manganese at the former WWTP. A copy of the ProUCL output and data set used for the background calculation for dissolved manganese is included in Appendix C. This new background value is the criterion in which the concentrations of dissolved and total manganese detected in groundwater will be compared to for delineating the extent of manganese impact at the former WWTP pursuant to Part 201 regulations. Total recoverable manganese concentrations in groundwater will be compared to this background value due to an insufficient data set to develop a separate background value for total manganese. MDEQ RRD Operational Memorandum No. 2- Attachment 5 (Collection of Samples for Comparison to Generic Criteria) indicates groundwater inorganic constituents must be measured as totals for site investigation under Part 201. Therefore, as a conservative measure, the total manganese concentrations will be compared to the dissolved manganese site-specific background values for delineation purposes.

Groundwater analytical results from two quarters of groundwater sampling, along with previous groundwater analytical results, document that the manganese impact at the former WWTP has been assessed to the newly developed site-specific background value. Figure 7 depicts the highest concentrations of total and dissolved manganese concentrations detected in groundwater at the former WWTP and the well locations (OBG MW-4, OBG MW-5, OBG MW-6, OBG MW-7 and OBG MW-9) which delineate the manganese impact at the former WWTP.

3 MIGRATION PATHWAY EVALUATION

Based on the benzene, 1,2,4-trimethylbenzene, trichloroethene, nickel and cyanide exceedances of the MDEQ Part 201 Generic Non-Residential Drinking Water Protection Criteria and the arsenic, iron, lead, manganese and cyanide exceedances of the Part 201 Generic Non-Residential Drinking Water Criteria, a migration pathway analysis was performed.

In accordance with the NREPA, 1994 PA 451, as amended Part 201 (Environmental Remediation), Mich. Admin. Code Rule 299, compliance for Generic site closures are attained when chemical concentrations in soil and groundwater are below applicable values for migration pathways pertinent to the site. The following sections summarize pertinent migration pathways at the former WWTP. The COCs (defined as those compounds above appropriate Part 201 Generic Residential criteria) at the former WWTP are:

Soil	Groundwater
Benzene	Arsenic
Cyanide	Cyanide
Nickel	Lead
1,2,4- trimethylbenzene	Iron
Trichloroethene	Manganese

3.1 MIGRATION PATHWAY EVALUATION

The migration pathways applicable to soil impact at the former WWTP were addressed in the November 2000 Basin Investigation Report; the migration pathways applicable to groundwater impacts for arsenic, cyanide, and lead, were addressed in the 2008 Addendum Report; and delineation of iron in groundwater was addressed in the July 13, 2009 response to comments. Therefore, the following evaluation addresses the pertinent groundwater remaining migration pathways for manganese.

The pertinent migration pathways associated with the former WWTP are:

- Migration to groundwater in an aquifer based on ingestion
- Soil leaching of hazardous substances into groundwater
- Migration from groundwater to surface water
- Discharge to surface water from storm sewers
- Dermal contact with groundwater (utility worker exposure).

Each pertinent migration pathway evaluation for the former WWTP is discussed below:

Migration to groundwater in an aquifer based on ingestion. In accordance with Mich. Admin. Code Rule 299.5710, exposure to groundwater by ingestion may be considered a relevant pathway for groundwater that satisfies either of the following conditions: 1) The groundwater is in an aquifer. 2) The groundwater is not in an aquifer, but can reasonably be expected to transport a hazardous substance into an aquifer in a concentration that exceeds the generic residential criteria.

Based on the investigation results, the water observed in the sand lenses at the former WWTP in the perched zone is likely not contained within in an aquifer. Permeability tests of wells installed at the Coldwater Road site have indicated permeabilities within the shallow perched zone of 10^{-7} to 10^{-6} cm/sec. It is estimated that a well tapping the perched zone would have a yield ranging from 6 to 60 gallons per day. This range in well yield for the perched zone has been verified by the permeability tests conducted on the soil samples from the proposed

landfill. Furthermore, vertical permeabilities for the perched zone ranged from 3.5 x 10^{-7} cm/sec to 2.1 x 10^{-8} cm/sec (The Chester Engineers, 1986). Based on this information the perched zone is not capable of producing usable quantities of water analogous with an aquifer.

Deep soil borings installed on site near the landfill indicate the subsurface geology includes a clay till aquitard approximately 47.5 ft thick (former MW-23D located south of the landfill). This aquitard appears to be continuous across the Coldwater Road Landfill Site, and was observed at the former WWTP area.

Also, the differences in the flow direction, gradients, and water levels between the perched zone and drift aquifer make it apparent that there is little, if any, connectivity between the perched zone and drift aquifer (Dames & Moore, June 1980).

These conclusions suggest that movement of water from the perched zone to the drift aquifer is unlikely. It is also unlikely that chemical concentrations detected in the groundwater at the former WWTP could migrate vertically to the usable aquifer in concentrations exceeding Part 201 Generic Residential Drinking Water Criteria.

The results of groundwater sampling at the former WWTP indicate manganese concentrations are below Part 201 Health Based Drinking Water Criterion of 2.5 mg/l except for well OBG MW-3, which previously exhibited concentrations of total manganese of 5.08 mg/l (December 11, 2007) and 5.05 mg/l (March 18, 2008) mg/l. Therefore, the site deed restriction will be expanded to prohibit use of the groundwater at the entire Coldwater Road Landfill Site, including the former WWTP area. The current Declaration of Restrictive Covenant prohibits the construction of wells or other devices to extract groundwater for consumption, irrigation, dewatering or any other use at two areas of the Coldwater Road Landfill Site: the RMA and the landfill.

With the filing of the Declaration of Restrictive Covenant, the former WWTP is in compliance with Part 201 Generic Non-Residential standards for the migration of groundwater to an aquifer based on the ingestion exposure pathway.

Soil leaching of hazardous substances into groundwater. In accordance with Mich. Admin. Code Rule 299.5722, to assure that soils do not pose a threat of aquifer contamination, the concentration of the hazardous substance in soil shall be below that which produces a concentration in leachate that is equal to the least restrictive of the applicable groundwater criteria. The cleanup criteria protective of groundwater may be determined by; soil leachate analysis, comparing the concentration in soil to Part 201 Generic Non-residential Drinking Water Protection Criteria, or by other methods that demonstrate impact to soil will not result in applicable groundwater criteria being exceeded (e.g., groundwater data comparisons to criteria).

Since the former WWTP soil impacts could not be investigated through soil sample collection and analysis, MDEQ permitted monitoring wells to be installed in close proximity to soil impacts and collection and analysis of groundwater to assess the potential for soil impacts leaching to groundwater as an acceptable method for assessing this migration pathway. A previous investigation (2008 Addendum Report) indicated manganese levels near the property boundary (OBG MW-3) exceeded the site-specific background level and Part 201 Health Based Drinking Water Criterion. The results of the quarterly groundwater sampling indicated that concentrations of total and dissolved manganese are below both the site-specific background value and Part 201 Non-Residential Health Based Drinking Water Criterion at OBG MW-9 (south of OBG MW-3), delineating this impact.

Groundwater at the site is not used for drinking water. Additionally, upon approval of this 2013 Addendum Report, RACER will supplement the Declaration of Restrictive Covenant for the site and file the supplement with the Genesee County Register of Deeds, restricting potential future groundwater use for the entire Coldwater Road Landfill Site.

Currently institutional controls (Declaration of Restrictive Covenant form recorded on June 24, 2005) at the site restrict the installation of wells at a limited area of the site for drinking water purposes. Therefore, potential exposure associated with the soil leaching to groundwater pathway will be mitigated based on supplementing the Declaration of Restrictive Covenant restricting use of groundwater at the entire site for drinking water. With

the filing of the Declaration of Restrictive Covenant supplement, the former WWTP will be in compliance with Generic Non-Residential standards for the soil leaching of hazardous substances into groundwater pathway.

Groundwater to surface water. In accordance with Mich. Admin. Code Rule 299.5716, COCs in groundwater at the surface water interface must be no greater than the Part 201 Generic Non-Residential Groundwater-Surface Water Interface (GSI) Criteria. The surface water receptor (wetlands) on the property (the nearest surface water body- depicted on Figure 2) is located approximately 2,000 ft north of the former WWTP. The onsite wetlands are not used as a human drinking water source, thus, the criteria for the GSI Human Non-Drinking Water Value is applicable.

Total and dissolved manganese concentrations in groundwater are below Part 201 GSI Human Non-Drinking Water value. Based on the chemical characteristics for inorganics (low mobility), the unlikely transport mechanism for groundwater (non-continuous perched zone) and the potential for considerable dilution before groundwater reaches the nearest surface water body, it is unlikely the detected compounds would reach the nearest surface body of water in concentrations above GSI criteria. Therefore, the site is in compliance with Generic Non-Residential standards for the migration to surface water pathway.

Discharge to surface water from storm sewers. MDEQ regulations require that storm sewers must be addressed as a potential preferential pathway when evaluating the GSI migration pathway (GSI). The nearest storm sewer underground utility line (shown on Figure 5) is located approximately 80 ft east of the former WWTP. Based on the subsurface geology in this area, the chemical characteristics for the inorganics (low mobility) and the distance to the nearest storm sewer line, it is unlikely the discontinuous sand lenses containing water are connected to the sewer line corridor. Thus there does not appear to be a migration pathway from the sand lenses at the former WWTP to the nearest storm sewer line.

Therefore, the former WWTP is in compliance with Generic Non-Residential standards for the GSI migration pathway via storm sewers.

Dermal contact with groundwater (utility worker exposure). In accordance with Mich. Admin. Code Rule 299.5712, exposure to dermal contact shall apply when contaminated groundwater is, or will be as a result of migration of groundwater contamination, encountered at a depth where construction or maintenance of utilities or other subsurface activities may reasonably be expected to result in persons coming into contact with the groundwater.

The analytical results for the groundwater samples collected at the former WWTP indicate concentrations of manganese are below Part 201 Generic Non-Residential Contact criteria. Therefore, the former WWTP is in compliance with the Generic Non-Residential standards for the dermal contact with groundwater pathway.

Based on the above summary, and upon supplementing the MDEQ-approved Declaration of Restrictive Covenant restricting resource use at the entire site, Limited Non-Residential compliance is achieved for the former WWTP.

4 CONCLUSIONS

This Addendum Report supplements the June 1999 Final Certification Closure Report and the 2008 Addendum Report for the former WWTP at the RACER Coldwater Road Landfill facility in Flint, Michigan. The former WWTP falls under the CACO for the RACER Coldwater Road Landfill facility pursuant to NREPA Part 111 as a contiguous facility.

At the request of MDEQ, an additional groundwater investigation was performed at the former WWTP to evaluate the detected concentrations of manganese in groundwater at the former WWTP. A Work Plan with proposed groundwater sampling methodology, monitoring well investigation locations and site-specific background values developed for iron and manganese, was submitted to the MDEQ on July 13, 2000. This Work Plan was approved by MDEQ in a letter dated September 26, 2011. The Work Plan was implemented from October 10, 2011 through May 2012. Implementation of the Work Plan supported the demonstration of manganese impacts to groundwater was delineated.

An evaluation of pertinent migration pathways at the former WWTP concluded that compliance with Generic Non-Residential cleanup criteria is achieved for this area following supplementing the current Declaration of Restrictive Covenant to restricting groundwater use at the entire site. Based on the results of investigation activities and the migration pathway evaluation presented herein, closure of the former WWTP pursuant to NREPA Part 111 is achieved.

Post-closure activities associated with the landfill are continuing in accordance with the Post-Closure Plan. Following MDEQ approval of closure, RACER anticipates implementing a supplemental Declaration of Restrictive Covenant and establishing a post-closure operating license for the RACER Coldwater Road Landfill facility. Once the post closure operating license is established, RACER will request termination of the CACO.

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Tables

Table 1
RACER Trust
Coldwater Road Facility - Former WWTP
Groundwater Analytical Results - November 2011 April 2012
Manganese - Method 200.8

	1st Quarter		2nd Quarter		MDEQ Part 201 Residential/Nonresidential Health-Based Drinking Water Criteria	WWTP- Site Specific Background
Sample Location Date Collected Parameter	**OBG MW-9 11/4/2011**	**OBG MW-10 11/4/2011**	**OBG MW-9 4/5/2012**	**OBG MW-10 4/5/2012**		
Total Manganese	0.565	**3.56**	0.591	**2.62**	2.5	0.708 [6]
Dissolved Manganese	0.57	**3.69**	0.562	**2.57**	2.5	0.708

Notes:

1) Results and criteria are shown in mg/l (ppM).

2) Samples analyzed by Merit Laboratories, Inc. of East Lansing, Michigan.

3) MDEQ Part 201 Residential Health-Based Drinking Water Criteria as listed in Operational Memorandum #1, dated September 28, 2012.

4) Bold type indicates concentration above Site-Specifc Background and Part 201 Residential Health-Based Drinking Water criteria.

5) Site-specific background calculated in accordance with MDEQ Sampling Strategies and Statistical Training Materials for Part 201 Cleanup Criteria dated 2002 and USEPA ProUCL Technical Guide (USEPA 2010).

6) Adequate data to calculate a site-specific background for total manganese is not available, therefore, as a conservative measure total manganese concentrations will be compared to site-specific background concentrations for dissolved manganese.

Table 2
RACER Trust
Coldwater Road Facility - Former WWTP
Groundwater Elevation Data

			Depth to Water		Groundwater Elevation	
Monitoring Well	**Top of Casing**	**Surface Elevation**	1st Quarter 4-Nov-11	2nd Quarter 5-Apr-12	1st Quarter 4-Nov-11	2nd Quarter 5-Apr-12
OBG MW - 1	811.56	809.46	---	6.73	---	804.83
OBG MW - 2	813.77	812.45	---	7.01	---	806.76
OBG MW - 3	810.09	807.47	---	7.20	---	802.89
OBG MW - 4	812.66	810.10	---	12.19	---	800.47
OBG MW - 5	816.04	813.05	---	8.03	---	808.01
OBG MW - 6	815.75	813.02	---	11.55	---	804.20
OBG MW - 7	813.47	810.23	---	6.72	---	806.75
OBG MW - 8	817.50	814.72	---	8.56	---	808.94
OBG MW - 9	809.97	806.94	5.25	5.24	804.72	804.73
OBG MW - 10	811.54	808.70	5.58	6.20	805.96	805.34

Notes:

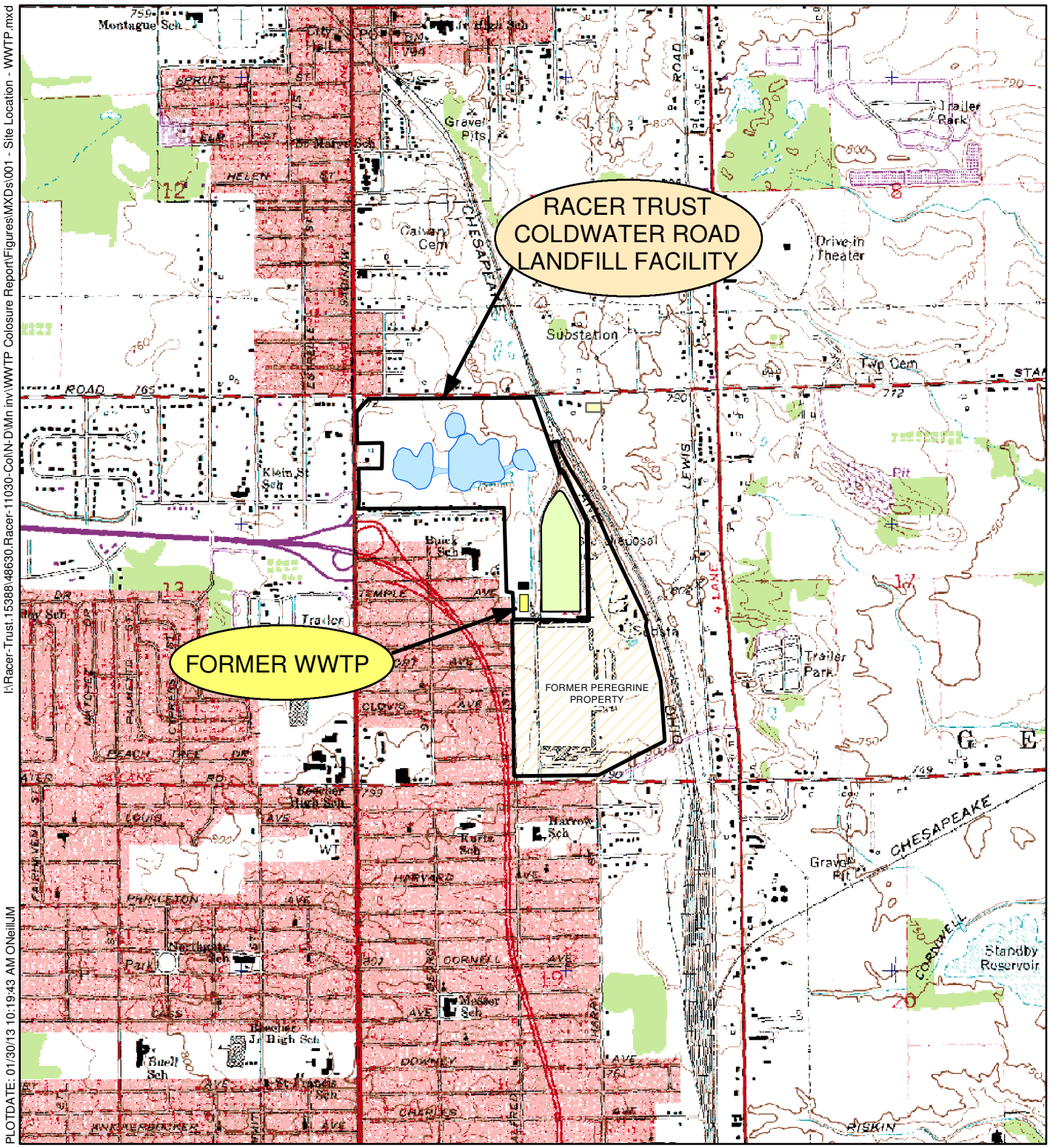
1) Measurements are in feet (ft).

2) Elevations referenced to NAVD 88 PID 0J0381=760.17 ft held record bearings.

3) ''---' denotes that the depth to water was not measured.

Figures

FIGURE 1



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RACER TRUST
COLDWATER ROAD FACILITY
FORMER WASTEWATER TREATMENT PLANT
FLINT, MICHIGAN

SITE LOCATION MAP

N

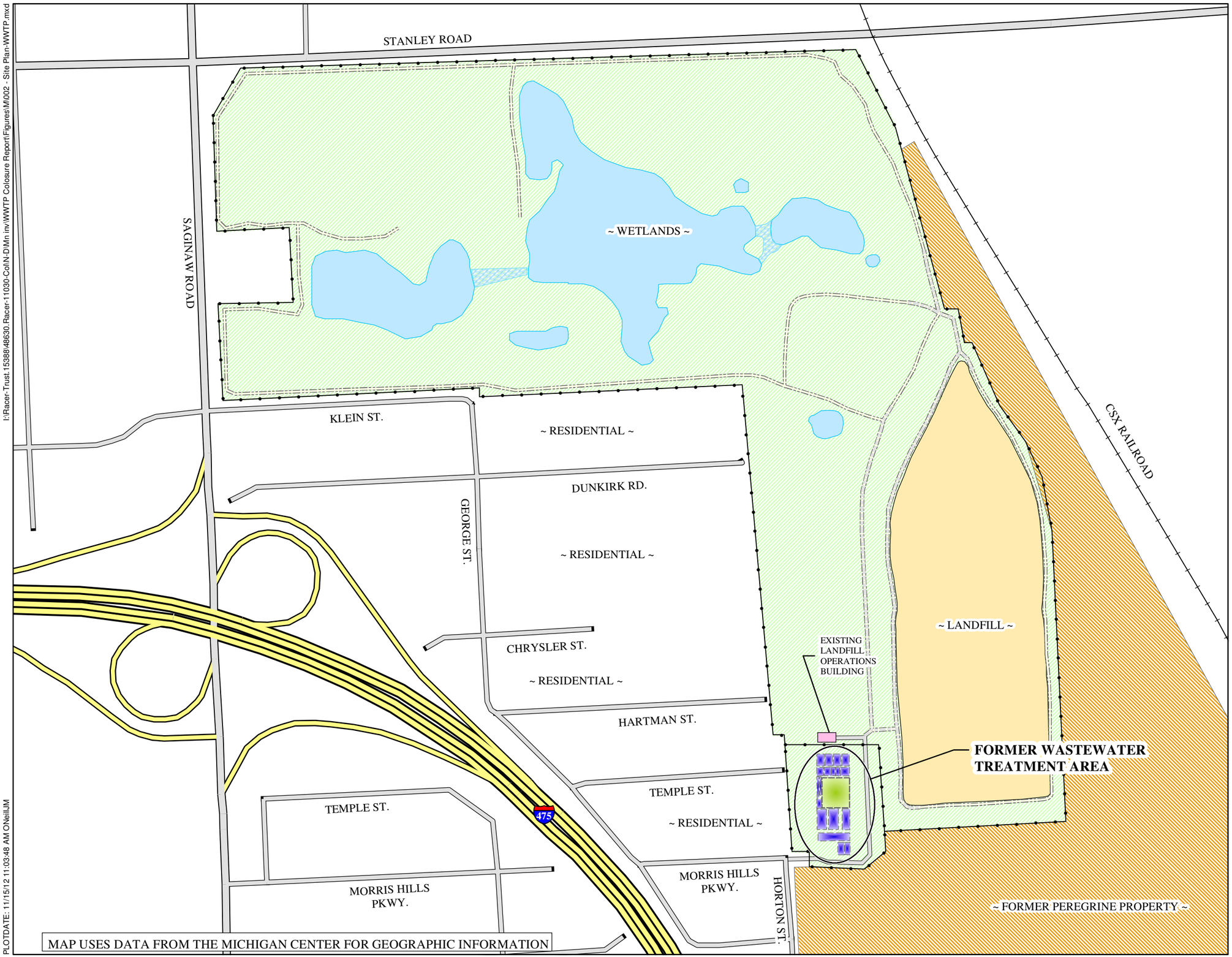
0 1/2 1

Mile

DATE: 11/1/12
FILE: 15388/48630-001.MXD

O'BRIEN & GERE ENGINEERS, INC.

FIGURE 2



N

LEGEND

- LANDFILL PROPERTY
- FORMER PEREGRINE PROPERTY
- LANDFILL
- EXISTING BUILDING
- FORMER WWTP BUILDING
- FORMER WWTP BASIN

RACER TRUST
COLDWATER ROAD
FORMER WWTP
FLINT, MICHIGAN

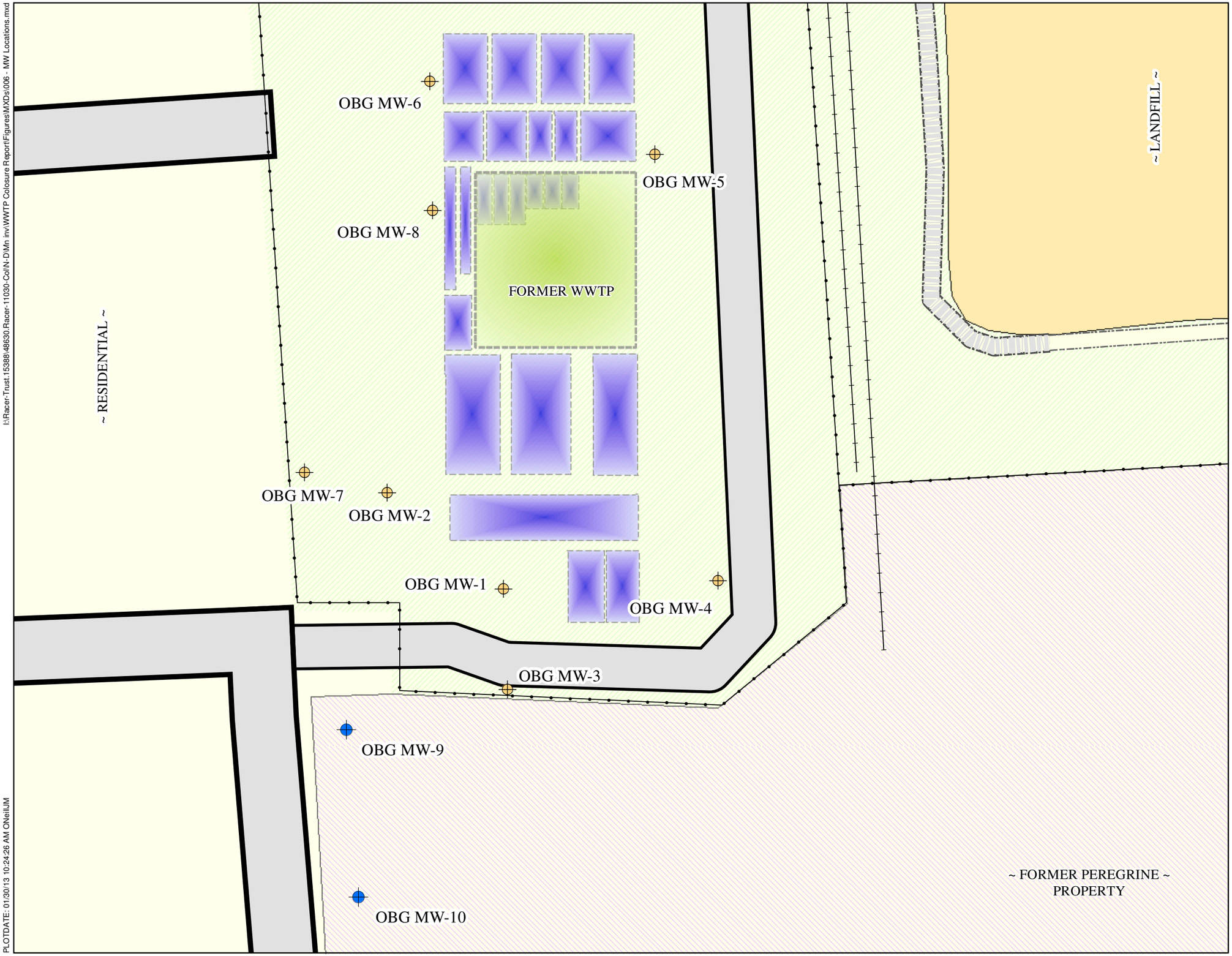
SITE PLAN

0 100 200 400 600 800
Feet

NOVEMBER 2012
15388/48630-002

O'BRIEN & GERE ENGINEERS, INC.

FIGURE 3



N

LEGEND

- FORMER WWTP BUILDING
- FORMER WWTP BASIN
- PREVIOUSLY INSTALLED MONITORING WELL
- MONITORING WELL INSTALLED OCTOBER 2011

RACER TRUST
COLDWATER ROAD
FORMER WWTP
FLINT, MICHIGAN

MONITORING WELL LOCATIONS

0 15 30 60 90 120
Feet

NOVEMBER 2012
15388/48360-006

O'BRIEN & GERE ENGINEERS, INC.

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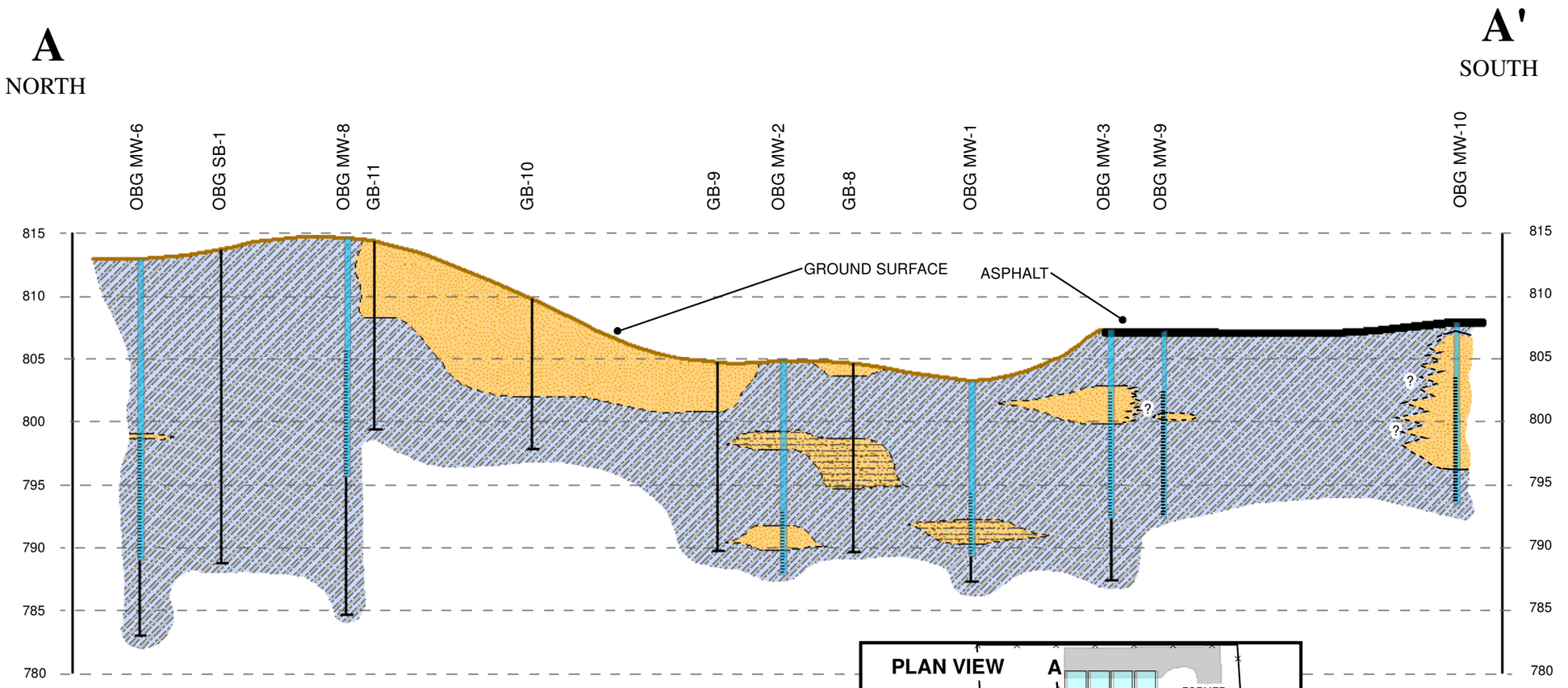
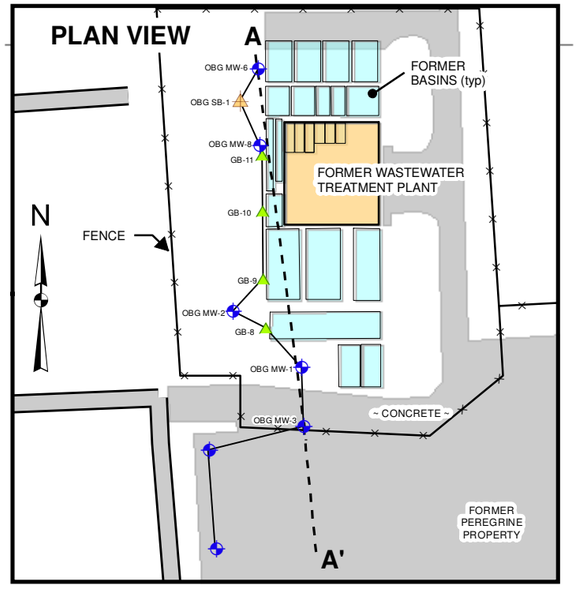
FIGURE 4





1) NOTES;
THERE IS APPROXIMATELY 100 FEET OF EAST-WEST SEPARATION BETWEEN OBG MW-3 AND OBG MW-9. THEREFORE A CONNECTION BETWEEN THE SAND LENSE AT SIMILAR ELEVATIONS WAS NOT INFERRED.

2) SIMILARLY, THE APPROXIMATELY 100 FOOT SEPARATION BETWEEN OBG MW-9 AND OBG MW-10 PRECLUDES AN INFERRENCE THAT THE SAND LENSE AT THOSE TWO LOCATIONS ARE CONNECTED.

LEGEND

- SAND
- SAND AND SILT
- CLAY
- MONITORING WELL
- SOIL BORING

RACER TRUST
COLDWATER ROAD
FORMER WWTP
FLINT, MICHIGAN

GEOLOGIC CROSS SECTION

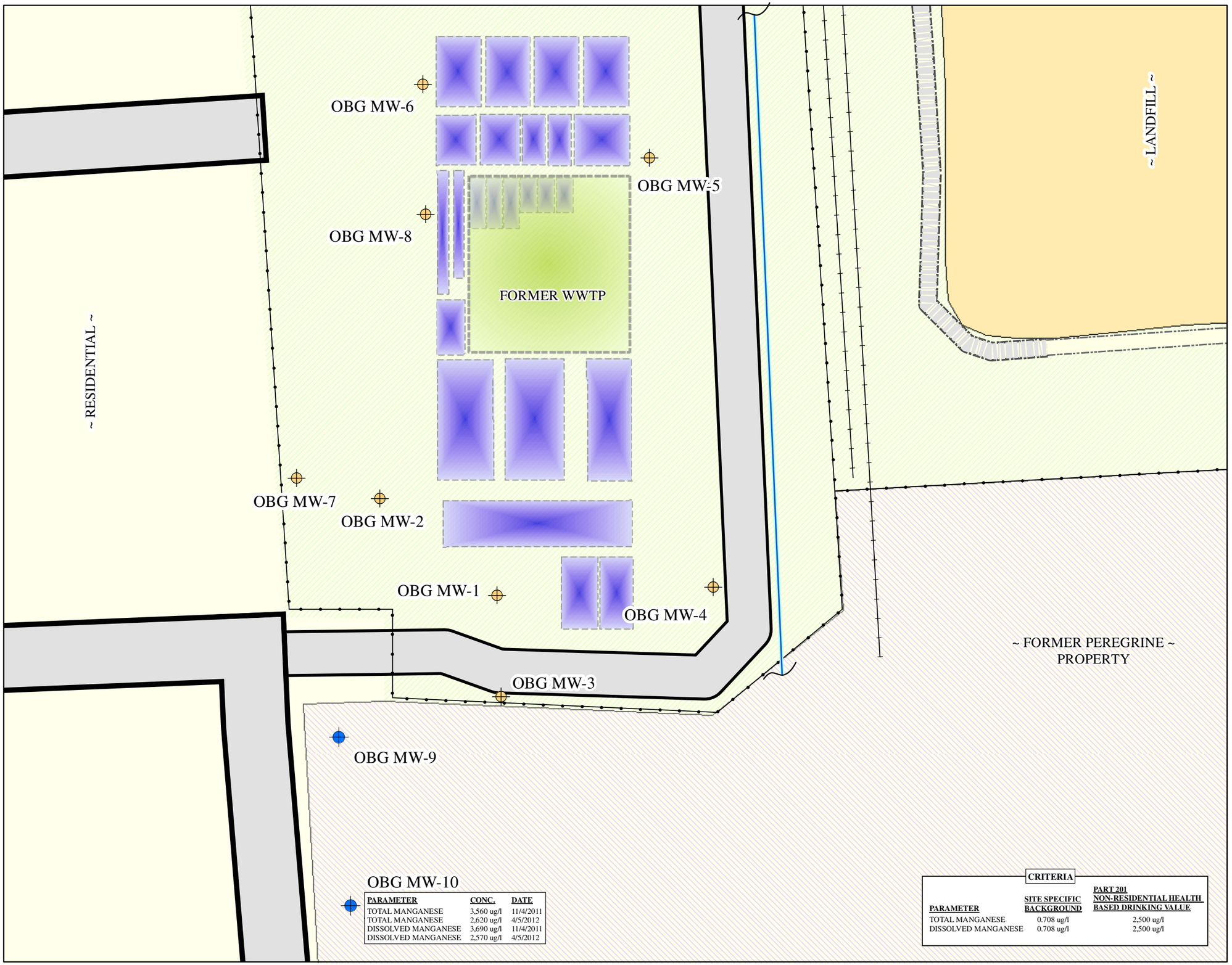
0 25 50 75 100

HORIZONTAL SCALE IN FEET
VERTICAL EXAGGERATION 5:1

NOVEMBERr 2012
15388/48630-007

O'BRIEN & GERE ENGINEERS, INC.

FIGURE 5



PARAMETER	CONC.	DATE
TOTAL MANGANESE	3,560 ug/l	11/4/2011
TOTAL MANGANESE	2,620 ug/l	4/5/2012
DISSOLVED MANGANESE	3,690 ug/l	11/4/2011
DISSOLVED MANGANESE	2,570 ug/l	4/5/2012

CRITERIA		
PARAMETER	SITE SPECIFIC BACKGROUND	PART 201 NON-RESIDENTIAL HEALTH BASED DRINKING VALUE
TOTAL MANGANESE	0.708 ug/l	2,500 ug/l
DISSOLVED MANGANESE	0.708 ug/l	2,500 ug/l

N

LEGEND

- FORMER WWTP BUILDING
- FORMER WWTP BASIN
- PREVIOUSLY INSTALLED MONITORING WELL
- MONITORING WELL INSTALLED OCTOBER 2011
- APPROXIMATE LOCATION OF UNDERGROUND STORM SEWER LINE

RACER TRUST
COLDWATER ROAD
FORMER WWTP
FLINT, MICHIGAN

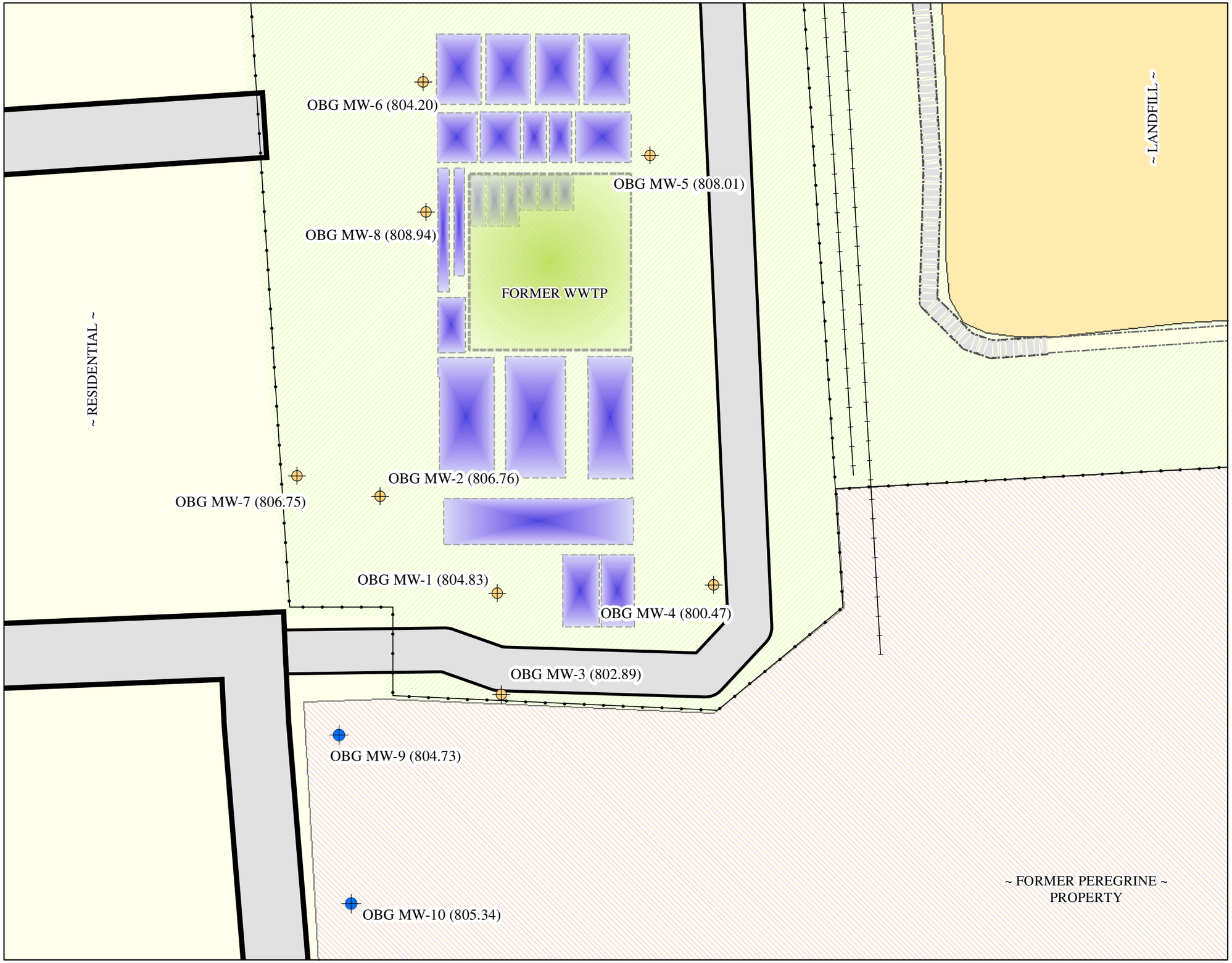
GROUNDWATER SAMPLING EXCEEDANCES 2011 INVESTIGATION

0 15 30 60 90 120
Feet

NOVEMBER 2012
15388/48360-008

O'BRIEN & GERE ENGINEERS, INC.

FIGURE 6



LEGEND

- FORMER WWTP BUILDING
- FORMER WWTP BASIN
- PREVIOUSLY INSTALLED MONITORING WELL
- MONITORING WELL INSTALLED OCTOBER 2011

NOTES:

1) MEASUREMENTS ARE IN FEET
2) ELEVATIONS ARE REFERENCED TO NAVD 88

RACER TRUST
COLDWATER ROAD
FORMER WWTP
FLINT, MICHIGAN

GROUNDWATER ELEVATIONS APRIL 5, 2012

0 25 50 75 100
Feet

NOVEMBER 2012
15388/48360-010

O'BRIEN & GERE ENGINEERS, INC.

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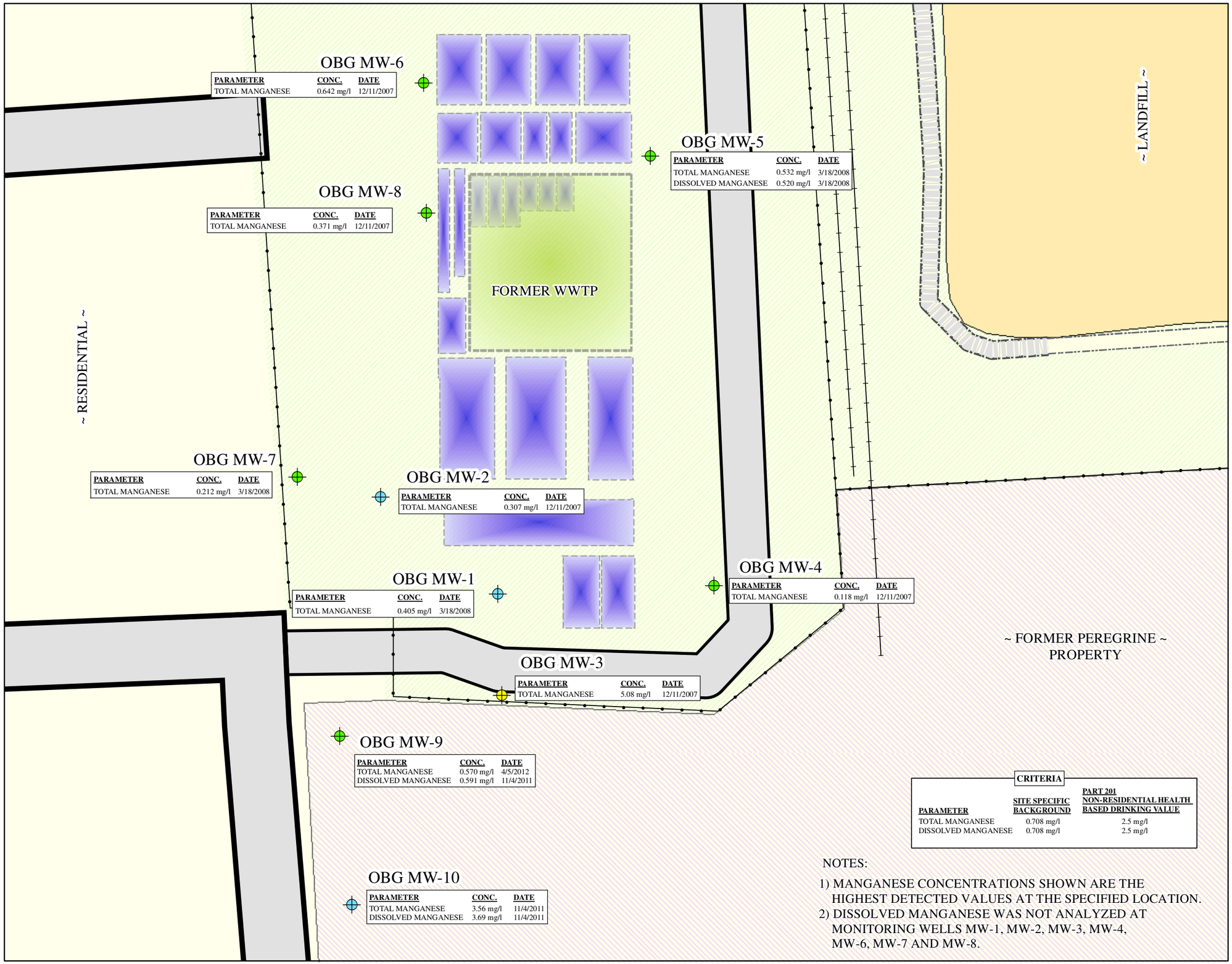
FIGURE 7



N

LEGEND

- FORMER WWTP BUILDING
- FORMER WWTP BASIN
- MONITORING WELL THAT DELINEATES MANGANESE BELOW THE SITE SPECIFIC BACKGROUNG VALUE
- ON-SITE MONITORING WELL WITH MANGANESE CONCENTRATION ABOVE CLEANUP CRITERIA
- MONITORING WELL

RACER TRUST
COLDWATER ROAD
FORMER WWTP
FLINT, MICHIGAN

GROUNDWATER DELINEATION WELLS

0 15 30 60 90 120
Feet

NOVEMBER 2012
15388/48360-008

O'BRIEN & GERE ENGINEERS, INC.

Appendices

Appendix A

Former WWTP Basin Investigation Analytical Results

REALM
Coldwater Road facility
Soil Analytical Results
Volatile Organic Compounds method 8260

Table 1

Sample Location	GB-2	GB-3	GB-7	GB-8	GB-9	GB-10	GB-11	GB-17	GB-18	GB-19	GB-20	GB-21	GB-22	GB-23	GB-24	GB-25	GB-26	GB-27	GB-28	GB-29	MDEQ Part 201 Generic Cleanup Criteria Industrial Drinking Water Protection Criteria
Sample Depth	(12-14')	(13-15')	(13-15')	(12-14')	(13-15')	(10-12')	(7-9')	(0-2')	(0-2')	(0-2')	(0-2')	(0-2')	(0-2')	(0-2')	(0-2')	(0-2')	(0-2')	(0-2')	(0-2')	(0-2')	
Date Collected	08/24/98	08/24/98	08/24/98	08/24/98	08/24/98	08/24/98	08/25/98	08/25/98	08/25/98	08/25/98	08/25/98	08/25/98	08/26/98	08/26/98	08/26/98	08/26/98	08/26/98	08/26/98	08/26/98	08/27/98	
Parameter																					
Benzene	50U	50U	50U	50U	50U	50U	50U	50U	200	50U	50U	50U	50U	50U	50U	50U	50UJ	50U	50U	50U	100
Bromobenzene	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50UJ	50U	50U	50U	1,500
Bromochloromethane	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50UJ	50U	50U	50U	-
Bromodichloromethane	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50UJ	50U	50U	50U	2,000(W)
Bromoform	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50UJ	50U	50U	50U	2,000(W)
Bromomethane	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50UJ	50U	50U	50U	580
n-Butylbenzene	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	1,220	550	50U	50U	50U	50U	330J	50U	100	50U	4,600
sec-Butylbenzene	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	380	220	50U	50U	50U	50U	150J	50U	50U	50U	4,600
tert-Butylbenzene	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	350	50U	50U	50U	50U	50U	50UJ	50U	50U	50U	4,600
Carbon tetrachloride	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50UJ	50U	50U	50U	100
Chlorobenzene	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50UJ	50U	50U	50U	2,000
Chloroethane	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50UJ	50U	50U	50U	34,000
Chloroform	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	190	50U	50U	50U	50U	50UJ	50U	50U	50U	2,000(W)
Chloromethane	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50UJ	50U	50U	50U	22,000
2-Chlorotoluene	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50UJ	50U	50U	50U	-
4-Chlorotoluene	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50UJ	50U	50U	50U	-
Dibromochloromethane	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50UJ	50U	50U	50U	2,000(W)
1,2-Dibromo-3-chloropropane	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50UJ	50U	50U	50U	-
1,2-Dibromoethane	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50UJ	50U	50U	50U	-
Dibromomethane	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50UJ	50U	50U	50U	4,600
1,2-Dichlorobenzene	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50UJ	50U	320	50U	14,000
1,3-Dichlorobenzene	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50UJ	50U	50U	50U	480
1,4-Dichlorobenzene	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50UJ	50U	50U	50U	1,700
Dichlorodifluoromethane	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50UJ	50U	50U	50U	270,000
1,1-Dichloroethane	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50UJ	50U	50U	50U	50,000
1,2-Dichloroethane	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50UJ	50U	50U	50U	100
1,1-Dichloroethene	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50UJ	50U	50U	50U	140
cis-1,2-Dichloroethene	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50UJ	50U	50U	50U	1,400
trans-1,2-Dichloroethene	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50UJ	50U	50U	50U	2,000
1,2-Dichloropropane	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50UJ	50U	50U	50U	100
1,3-Dichloropropane	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50UJ	50U	50U	50U	-
2,2-Dichloropropane	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50UJ	50U	50U	50U	-
1,1-Dichloropropene	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50UJ	50U	50U	50U	-
Ethylbenzene	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	260	180	50U	50U	50U	50U	210J	50U	210	50U	1,500
Hexachlorobutadiene	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50UJ	50U	50U	50U	72,000
Isopropylbenzene	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	150	140	50U	50U	50U	50U	60J	50U	50U	50U	260,000
p-Isopropyltoluene	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	690	780	50U	50U	50U	50U	390J	50U	270	50U	-
Methylene chloride	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50UJ	50U	50U	50U	100
Naphthalene	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	3,430	1,140	50U	50U	50U	50U	650J	50U	230	50U	100,000
n-Propylbenzene	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	340	390	50U	50U	50U	50U	130J	50U	50U	50U	4,600
Styrene	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50UJ	50U	50U	50U	2,700
1,1,1,2-Tetrachloroethane	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50UJ	50U	50U	50U	6,400
1,1,2,2-Tetrachloroethane	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50UJ	50U	50U	50U	700
Tetrachloroethene	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50UJ	50U	50U	50U	100
Toluene	50U	50U	50U	50U	50U	50U	50U	50U	480	80	80	100	50U	50U	50U	50U	140J	50U	50U	1,370	16,000
1,2,3-Trichlorobenzene	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50UJ	50U	50U	50U	-
1,2,4-Trichlorobenzene	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50UJ	50U	50U	50U	-
1,1,1-Trichloroethane	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50UJ	50U	50U	50U	4,000
1,1,2-Trichloroethane	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50UJ	50U	50U	50U	100
Trichloroethene	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50UJ	50U	50U	50U	100
Trichlorofluoromethane	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50UJ	50U	50U	50U	150,000
1,2,3-Trichloropropane	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50UJ	50U	50U	50U	2,400
1,2,4-Trimethylbenzene	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	3,120	2,100	50U	50U	50U	50U	960J	50U	320	50U	2,100
1,3,5-Trimethylbenzene	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	1,600	1,620	50U	50U	50U	50U	620J	50U	250	50U	1,800
Vinyl chloride	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50UJ	50U	50U	50U	40
o-Xylene	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	340	170	50U	50U	50U	50U	180J	50U	170	50U	5,600
p,m-Xylene	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	920	570	50U	50U	50U	50U	720J	50U	630	50U	5,600
cis-1,3-Dichloropropene	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50UJ	50U	50U	50U	-

notes:
1) Results and criteria are shown in ug/kg (ppb).
2) MDEQ Part 201 Industrial Drinking Water Protection Criteria as listed in the Interim Environmental Response Division Operational Memorandum #18, dated June 7, 2000.
3) "W" denotes Concentrations of trihalomethanes in groundwater must be added together to determine compliance with the State of Michigan Drinking Water Standard of 100 ug/l. Concentrations of trihalomethanes in soil must be added together to determine compliance with the drinking water protection criterion of 2,000 ug/kg.
4) Samples analyzed by Fire & Environmental Consulting Laboratories, Inc. of East Lansing, Michigan.
5) Bold type denotes exceedance of Part 201 Industrial Drinking Water Protection criteria.
6) "-" denotes no criteria established.
7) "U" denotes the analyte was analyzed for, but was not detected.
8) "UJ" denotes that the sample specific reporting limit for the analyte in this sample should be considered approximate.
9) "J" denotes that the concentration should be considered approximate.

Coldwater Road facility
Soil Analytical Results
Volatile Organic Compounds method 8260

Sample Location	GB-30	GB-31	GB-32	GB-33	GB-39	GB-40	GB-41	GB-42	GB-43	GB-44	GB-45	GB-46	GB-47	Soil Du	MDEQ Part 201 Generic Cleanup Criteria Industrial Drinking Water Protection Criteria
Sample Depth	(0-2')	(0-2')	(0-2')	(0-2')	(0-2')	(0-2')	(0-2')	(0-2')	(0-2')	(0-2')	(0-2')	(0-2')	(0-2')	(0-2')	
Date Collected	08/27/98	08/26/98	08/26/98	08/26/98	08/27/98	08/27/98	08/27/98	05/03/99	05/03/99	05/03/99	05/03/99	05/03/99	05/03/99	05/03/99	
Parameter															
Benzene	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	100
Bromobenzene**	50U	50U	50U	50U	50U	50U	50U	NA	NA	NA	NA	NA	NA	NA	1,500
Bromochloromethane**	50U	50U	50U	50U	50U	50U	50U	NA	NA	NA	NA	NA	NA	NA	-
Bromodichloromethane	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	2,000(W)
Bromoform	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	2,000(W)
Bromomethane	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	580
n-Butylbenzene	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	4,600
sec-Butylbenzene	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	4,600
tert-Butylbenzene	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	4,600
Carbon tetrachloride	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	100
Chlorobenzene	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	2,000
Chloroethane	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	34,000
Chloroform	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	2,000(W)
Chloromethane	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	22,000
2-Chlorotoluene**	50U	50U	50U	50U	50U	50U	50U	NA	NA	NA	NA	NA	NA	NA	-
4-Chlorotoluene**	50U	50U	50U	50U	50U	50U	50U	NA	NA	NA	NA	NA	NA	NA	-
Dibromochloromethane	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	2,000(W)
1,2-Dibromo-3-chloropropane**	50U	50U	50U	50U	50U	50U	50U	NA	NA	NA	NA	NA	NA	NA	-
1,2-Dibromoethane**	50U	50U	50U	50U	50U	50U	50U	NA	NA	NA	NA	NA	NA	NA	-
Dibromomethane**	50U	50U	50U	50U	50U	50U	50U	NA	NA	NA	NA	NA	NA	NA	4,600
1,2-Dichlorobenzene	50U	50U	50U	50U	630	50U	50U	50U	50U	50U	50U	50U	50U	50U	14,000
1,3-Dichlorobenzene	50U	50U	50U	50U	110	50U	50U	50U	50U	50U	50U	50U	50U	50U	480
1,4-Dichlorobenzene	50U	50U	50U	50U	130	50U	50U	50U	50U	50U	50U	50U	50U	50U	1,700
Dichlorodifluoromethane**	50U	50U	50U	50U	50U	50U	50U	NA	NA	NA	NA	NA	NA	NA	270,000
1,1-Dichloroethane	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50,000
1,2-Dichloroethane	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	100
1,1-Dichloroethene	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	140
cis-1,2-Dichloroethene	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	1,400
trans-1,2-Dichloroethene	50U	50U	50U	50U	50U	50U	50U	50U	50U	60	50U	50U	50U	50U	2,000
1,2-Dichloropropane	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	100
1,3-Dichloropropane**	50U	50U	50U	50U	50U	50U	50U	NA	NA	NA	NA	NA	NA	NA	-
2,2-Dichloropropane**	50U	50U	50U	50U	50U	50U	50U	NA	NA	NA	NA	NA	NA	NA	-
1,1-Dichloropropene**	50U	50U	50U	50U	50U	50U	50U	NA	NA	NA	NA	NA	NA	NA	-
Ethylbenzene	50U	50U	50U	50U	100	50U	50U	50U	50U	50U	50U	50U	50U	50U	1,500
Hexachlorobutadiene**	50U	50U	50U	50U	50U	50U	50U	NA	NA	NA	NA	NA	NA	NA	72,000
Isopropylbenzene	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	260,000
p-Isopropyltoluene	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	-
Methylene chloride	50U	50U	50U	50U	50U	50U	50U	3,190 UJ	2,950UJ	2,460UJ	2,400UJ	2,360UJ	2,550UJ	2,440UJ	100
Naphthalene	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	80	50	50U	50U	100,000
n-Propylbenzene	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	4,800
Styrene	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	2,700
1,1,1,2-Tetrachloroethane**	50U	50U	50U	50U	50U	50U	50U	NA	NA	NA	NA	NA	NA	NA	6,400
1,1,2,2-Tetrachloroethane	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	700
Tetrachloroethene	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	100
Toluene	50U	50U	50U	50U	50U	50U	50U	150U	50U	50U	50U	50U	50U	50U	16,000
1,2,3-Trichlorobenzene**	50U	50U	50U	50U	50U	50U	50U	NA	NA	NA	NA	NA	NA	NA	-
1,2,4-Trichlorobenzene**	50U	50U	50U	50U	50U	50U	50U	NA	NA	NA	NA	NA	NA	NA	-
1,1,1-Trichloroethane	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	4,000
1,1,2-Trichloroethane	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	100
Trichloroethene	50U	50U	50U	50U	50U	50U	50U	50U	50U	**570J**	50U	50U	**770**	50U	100
Trichlorofluoromethane**	50U	50U	50U	50U	50U	50U	50U	NA	NA	NA	NA	NA	NA	NA	150,000
1,2,3-Trichloropropane**	50U	50U	50U	50U	50U	50U	50U	NA	NA	NA	NA	NA	NA	NA	2,400
1,2,4-Trimethylbenzene	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	2,100
1,3,5-Trimethylbenzene	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	1,800
Vinyl chloride	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	40
o-Xylene	50U	50U	50U	50U	50U	50U	50U	220	50U	50U	50U	50U	50U	50U	5,600
p,m-Xylene	50U	50U	50U	50U	50U	50U	50U	70	50U	50U	50U	50U	50U	50U	5,600
cis-1,3-Dichloropropene	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	-
Acetone*	NA	NA	NA	NA	NA	NA	NA	3,600J	3,000J	1,300J	800J	1,100J	1,200J	1,100J	42,000
2-Butanone*	NA	NA	NA	NA	NA	NA	NA	500U	500U	500U	500U	500U	500U	500U	760,000
Carbon Disulfide*	NA	NA	NA	NA	NA	NA	NA	500U	500U	500U	500U	500U	500U	500U	46,000
2-Hexanone*	NA	NA	NA	NA	NA	NA	NA	500U	500U	500U	500U	500U	500U	500U	58,000
4-Methyl-2-pentanone*	NA	NA	NA	NA	NA	NA	NA	500U	500U	500U	500U	500U	500U	500U	100,000

notes:

1) Results and criteria are shown in ug/kg (ppb).
2) MDEQ Part 201 Industrial Drinking Water Protection Criteria as listed in the Interim Environmental Response Division operational Memorandum#18 dated June 7, 2000.
3) "W" denotes Concentrations of trihalomethanes in groundwater must be added together to determine compliance with the State of Michigan Drinking Water Standard of 100 ug/l. Concentrations of trihalomethanes in soil must be added together to determine compliance with the drinking water protection criteria of 2,000 ug/l.
5) Samples analyzed by Fire & Environmental Consulting Laboratories, Inc. of East Lansing, Michigan.
6) Bold type denotes exceedance of Part 201 Industrial Drinking Water Protection criteria.
7) "-" denotes no criteria established.
8) "U" denotes the analyte was analyzed for, but was not detected.
9) Soil duplicate sample collected at GB-44.
10) "UJ" denotes that the sample specific reporting limit for the analyte in this sample should be considered approximate.
11) "J" denotes that the concentration should be considered approximate.
12) "*" indicates these constituents were added after implementation of the QAPP.
13) "**" indicates these constituents were not part of the target compound list included in the QAPP.
14) NA denotes sample not analyzed or not part of target compound list in QAPP.

REALM
Coldwater Road Facility
Soil Analytical Results
Semivolatile Organic Compounds method 8270

Table 1 (cont.)

Sample Location	GB-2	GB-3	GB-7	GB-8	GB-9	GB-10	GB-11	GB-17	GB-18	GB-19	GB-20	GB-21	GB-22	GB-23	GB-24	GB-25	GB-26	GB-27	GB-28	GB-29	GB-30	GB-31	GB-32	GB-33	GB-39	GB-40	GB-41	GB-42	GB-43	GB-44	GB-45	GB-46	GB-47	Soil Dup	MDEQ Part 201 Generic Cleanup Criteria Industrial Drinking Water Protection Criteria
Sample Depth	(12-14')	(13-15')	(13-15')	(12-14')	(13-15')	(10-12')	(7-9')	(0-2')	(0-2')	(0-2')	(0-2')	(0-2')	(0-2')	(0-2')	(0-2')	(0-2')	(0-2')	(0-2')	(0-2')	(0-2')	(0-2')	(0-2')	(0-2')	(0-2')	(0-2')	(0-2')	(0-2')	(0-2')	(0-2')	(0-2')	(0-2')	(0-2')	(0-2')	(0-2')	
Date Collected	08/24/98	08/24/98	08/24/98	08/24/98	08/24/98	08/24/98	08/25/98	08/25/98	08/25/98	08/25/98	08/25/98	08/25/98	08/26/98	08/26/98	08/26/98	08/26/98	08/26/98	08/26/98	08/26/98	08/26/98	08/27/98	08/27/98	08/26/98	08/26/98	08/26/98	08/27/98	08/27/98	08/27/98	05/03/99	05/03/99	05/03/99	05/03/99	05/03/99	05/03/99	05/03/99	
Parameter																																			
Acenaphthene	300U	300U	300U	300U	300U	300U	300U	300U	300U	300U	300U	300U	300U	300U	300U	300U	3,000U	300U	300U	300U	300U	300U	300U	300U	5,000U	300U	300U	300U	300U	300U	600U	300U	1200U	300U	8.8+E5
Acenaphthylene	300U	300U	300U	300U	300U	300U	300U	300U	300U	300U	300U	300U	300U	300U	300U	300U	3,000U	300U	300U	300U	300U	300U	300U	300U	5,000U	300U	300U	300U	300U	300U	600U	300U	1200U	300U	17,000
Acetophenone*	300UJ	300UJ	300UJ	300UJ	300UJ	300UJ	300UJ	300UJ	300UJ	300UJ	300UJ	300UJ	300 UJ	300 UJ	300 UJ	300 UJ	3,000U	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	5,000 UJ	300 UJ	300 UJ	NA	NA	NA	NA	NA	NA	NA	88,000
Aniline*	300UJ	300UJ	300UJ	300UJ	300UJ	300UJ	300UJ	300UJ	300UJ	300UJ	300UJ	300UJ	300 UJ	300 UJ	300 UJ	300 UJ	3,000U	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	5,000 UJ	300 UJ	300 UJ	NA	NA	NA	NA	NA	NA	NA	4,400
Anthracene	300U	300U	300U	300U	300U	1,400	300U	300U	300U	300U	300U	300U	300U	300U	300U	300U	3,000U	300U	300U	300U	300	300U	300U	300U	5,000U	300U	300U	300U	300U	300U	600U	300U	1200U	300U	41,000
4-Aminobiphenyl*	300UJ	300UJ	300UJ	300UJ	300UJ	600UJ	300UJ	300UJ	300UJ	300UJ	300UJ	300UJ	300 UJ	300 UJ	300 UJ	300 UJ	3,000UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	5,000 UJ	300 UJ	300 UJ	NA	NA	NA	NA	NA	NA	NA	-
Benzidine*	300UJ	300UJ	300UJ	300UJ	300UJ	600UJ	300UJ	300UJ	300UJ	300UJ	300UJ	300UJ	300 UJ	300 UJ	300 UJ	300 UJ	3,000UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	5,000 UJ	300 UJ	300 UJ	NA	NA	NA	NA	NA	NA	NA	1,000 (M)
Benzoic acid*	300UJ	300UJ	300UJ	300UJ	300UJ	600UJ	300UJ	300UJ	300UJ	300UJ	300UJ	300UJ	300 UJ	300 UJ	300 UJ	300 UJ	3,000UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	5,000 UJ	300 UJ	300 UJ	NA	NA	NA	NA	NA	NA	NA	1.8+E6
Benzo(a)anthracene	400	300U	300U	300U	300U	1,600	300U	300U	300U	300U	300U	300U	300U	300U	300U	300U	3,000U	300U	300U	300U	300U	300U	300U	300U	5,000U	300U	300U	300U	300U	300U	600U	300U	1200U	300U	NLL
Benzo(b)fluoranthene	800	300U	300U	300U	300U	2,200J	300U	300U	300U	300U	300U	300U	300U	300U	300U	300U	3,000U	300U	300U	300U	300U	300U	300U	300U	5,000U	300U	300U	300U	300U	300U	600U	300U	1200U	300U	NLL
Benzo(k)fluoranthene	800	300U	300U	300U	300U	2,900J	300U	300U	300U	300U	300U	300U	300U	300U	300U	300U	3,000U	300U	300U	300U	300U	300U	300U	300U	5,000U	300U	300U	300U	300U	300U	600U	300U	1200U	300U	NLL
Benzo(ghi)perylene	300	300U	300U	300U	300U	600J	300U	300U	300U	300U	300U	300U	300U	300U	300U	300U	3,000U	300U	300U	300U	300U	300U	300U	300U	5,000U	300U	300U	300U	300U	300U	600U	300U	1200U	300U	NLL
Benzo(a)pyrene	900	300U	300U	300U	300U	2,700J	300U	300U	300U	300U	300U	300U	300U	300U	300U	300U	3,000U	300U	300U	300U	300U	300U	300U	300U	5,000U	300U	300U	300U	300U	300U	600U	300U	1200U	300U	NLL
Benzyl alcohol*	300UJ	300UJ	300UJ	300UJ	300UJ	600UJ	300UJ	300UJ	300UJ	300UJ	300UJ	300UJ	300 UJ	300 UJ	300 UJ	300 UJ	3,000UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	5,000 UJ	300 UJ	300 UJ	NA	NA	NA	NA	NA	NA	NA	580,000
Bis(2-chloroethoxy)methane	300U	300U	300U	300U	300U	600U	300U	300U	300U	300U	300U	300U	300U	300U	300U	300U	3,000U	300U	300U	300U	300U	300U	300U	300U	5,000U	300U	300U	300U	300U	300U	600U	300U	1200U	300U	-
Bis(2-chloroethyl)ether	300U	300U	300U	300U	300U	600U	300U	300U	300U	300U	300U	300U	300U	300U	300U	300U	3,000U	300U	300U	300U	300U	300U	300U	300U	5,000U	300U	300U	300U	300U	300U	600U	300U	1200U	300U	330 (M)
Bis(2-chlorisopropyl)ether	300U	300U	300U	300U	300U	600U	300U	300U	300U	300U	300U	300U	300U	300U	300U	300U	3,000U	300U	300U	300U	300U	300U	300U	300U	5,000U	300U	300U	300UJ	300UJ	300UJ	600UJ	300UJ	1200UJ	300U	-
Bis(2-ethylhexyl)phthalate	300U	300U	300U	300U	300U	600U	300U	300U	300U	300U	300U	300U	300U	300U	300U	300U	4,000	300U	300U	300U	600	300U	300U	300U	5,000U	300U	300U	300U	300U	300U	600U	300U	1200U	300U	NLL
4-Bromophenyl phenyl ether	300U	300U	300U	300U	300U	600U	300U	300U	300U	300U	300U	300U	300U	300U	300U	300U	3,000U	300U	300U	300U	300U	300U	300U	300U	5,000U	300U	300U	300U	300U	300U	600U	300U	1200U	300U	-
Butyl benzyl phthalate	300U	300U	300U	300U	300U	600U	300U	300U	300U	300U	300U	300U	300U	300U	300U	300U	3,000U	300U	300U	300U	300U	300U	300U	300U	5,000U	300U	300U	300U	300U	500U	600U	300U	1200U	300U	3.1+E5 (C)
4-Chloroaniline	300UJ	300UJ	300UJ	300UJ	300UJ	600UJ	300UJ	300UJ	300UJ	300UJ	300UJ	300UJ	300 UJ	300 UJ	300 UJ	300 UJ	3,000UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	5,000 UJ	300 UJ	300 UJ	300U	300U	300U	600U	300U	1200U	300U	-
1-Chloronaphthalene*	300UJ	300UJ	300UJ	300UJ	300UJ	600UJ	300UJ	300UJ	300UJ	300UJ	300UJ	300UJ	300 UJ	300 UJ	300 UJ	300 UJ	3,000UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	5,000 UJ	300 UJ	300 UJ	NA	NA	NA	NA	NA	NA	NA	-
2-Chloronaphthalene	300U	300U	300U	300U	300U	600U	300U	300U	300U	300U	300U	300U	300U	300U	300U	300U	3,000U	300U	300U	300U	300U	300U	300U	300U	5,000U	300U	300U	300U	300U	300U	600U	300U	1200U	300U	-
4-Chloro-3-methylphenol	300U	300U	300U	300U	300U	600U	300U	300U	300U	300U	300U	300U	300U	300U	300U	300U	3,000U	300U	300U	300U	300U	300U	300U	300U	5,000U	300U	300U	300U	300U	300U	600U	300U	1200U	300U	-
2-Chlorophenol	300U	300U	300U	300U	300U	600U	300U	300U	300U	300U	300U	300U	300U	300U	300U	300U	3,000U	300U	300U	300U	300U	300U	300U	300U	5,000U	300U	300U	300U	300U	300U	600U	300U	1200U	300U	2,600
4-Chlorophenyl phenyl ether	300U	300U	300U	300U	300U	600U	300U	300U	300U	300U	300U	300U	300U	300U	300U	300U	3,000U	300U	300U	300U	300U	300U	300U	300U	5,000U	300U	300U	300U	300U	300U	600U	300U	1200U	300U	-
Chrysene	600	300U	300U	300U	300U	1,700	300U	300U	300U	300U	300U	300U	300U	300U	300U	300U	3,000U	300U	300U	300U	300U	300U	300U	300U	5,000U	300U	300U	300U	300U	300U	600U	300U	1200U	300U	NLL
p,m-Cresol	300UJ	300UJ	300UJ	300UJ	300UJ	600UJ	300UJ	300UJ	300UJ	300UJ	300UJ	300UJ	300 UJ	300 UJ	300 UJ	300 UJ	3,000UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	5,000 UJ	300 UJ	300 UJ	300U	300U	300U	600U	300U	1200U	300U	-
o-Cresol	300UJ	300UJ	300UJ	300UJ	300UJ	600UJ	300UJ	300UJ	300UJ	300UJ	300UJ	300UJ	300 UJ	300 UJ	300 UJ	300 UJ	3,000UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	5,000 UJ	300 UJ	300 UJ	300U	300U	300U	600U	300U	1200U	300U	-
Dibenz(a,j)acridine*	300UJ	300UJ	300UJ	300UJ	300UJ	600UJ	300UJ	300UJ	300UJ	300UJ	300UJ	300UJ	300 UJ	300 UJ	300 UJ	300 UJ	3,000UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	5,000 UJ	300 UJ	300 UJ	NA	NA	NA	NA	NA	NA	NA	-
Dibenzo(ah)anthracene	300U	300U	300U	300U	300U	600U	300U	300U	300U	300U	300U	300U	300U	300U	300U	300U	3,000U	300U	300U	300U	300U	300U	300U	300U	5,000U	300U	300U	300U	300U	300U	600U	300U	1200U	300U	NLL
Dibenzofuran	300UJ	300UJ	300UJ	300UJ	300UJ	600UJ	300UJ	300UJ	300UJ	300UJ	300UJ	300UJ	300 UJ	300 UJ	300 UJ	300 UJ	3,000UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	5,000 UJ	300 UJ	300 UJ	300U	300U	300U	600U	300U	1200U	300U	ID
Di-n-butyl phthalate	300U	300U	300U	300U	300U	600U	300U	300U	300U	300U	300U	300U	300U	300U	300U	300U	3,000U	300U	300U	300U	300U	300U	300U	400	5,000U	300U	300U	300U	300U	300U	600U	300U	1200U	300U	7.6+E5 (C)
1,2-Dichlorobenzene	300U	300U	300U	300U	300U	600U	300U	300U	300U	300U	300U	300U	300U	300U	300U	300U	3,000U	300U	300U	300U	300U	300U	300U	300U	5,000U	300U	300U	300U	300U	300U	600U	300U	1200U	300U	14,000
1,3-Dichlorobenzene	300U	300U	300U	300U	300U	600U	300U	300U	300U	300U	300U	300U	300U	300U	300U	300U	3,000U	300U	300U	300U	300U	300U	300U	300U	5,000U	300U	300U	300U	300U	300U	600U	300U	1200U	300U	480
1,4-Dichlorobenzene	300U	300U	300U	300U	300U	600U	300U	300U	300U	300U	300U	300U	300U	300U	300U	300U	3,000U	300U	300U	300U	300U	300U	300U	300U	5,000U	300U	300U	300U	300U	300U	600U	300U	1200U	300U	1,700
3,3'-Dichlorobenzidine	300UJ	300UJ	300UJ	300UJ	300UJ	600UJ	300UJ	300UJ	300UJ	300UJ	300UJ	300UJ	300 UJ	300 UJ	300 UJ	300 UJ	3,000UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	5,000 UJ	300 UJ	300 UJ	300U	300U	300U	600U	300U	1200U	300U	2,000 (M)
2,4-Dichlorophenol	300U	300U	300U	300U	300U	600U	300U	300U	300U	300U	300U	300U	300U	300U	300U	300U	3,000U	300U	300U	300U	300U	300U	300U	300U	5,000U	300U	300U	300U	300U	300U	600U	300U	1200U	300U	4,200
2,6-Dichlorophenol*	300UJ	300UJ	300UJ	300UJ	300UJ	600UJ	300UJ	300UJ	300UJ	300UJ	300UJ	300UJ	300 UJ	300 UJ	300 UJ	300 UJ	3,000UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	5,000 UJ	300 UJ	300 UJ	NA	NA	NA	NA	NA	NA	NA	-
Diethyl phthalate	300U	300U	300U	300U	300U	600U	300U	300U	300U	300U	300U	300U	300U	300U	300U	300U	3,000U	300U	300U	300U	300U	300U	300U	300U	5,000U	300U	300U	300U	300U	300U	600U	300U	1200U	300U	3.2+E5
p-Dimethylaminoazobenzene*	300UJ	300UJ	300UJ	300UJ	300UJ	600UJ	300UJ	300UJ	300UJ	300UJ	300UJ	300UJ	300 UJ	300 UJ	300 UJ	300 UJ	3,000UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	5,000 UJ	300 UJ	300 UJ	NA	NA	NA	NA	NA	NA	NA	-
7,12-Dimethylbenz(a)anthacene*	300UJ	300UJ	300UJ	300UJ	300UJ	600UJ	300UJ	300UJ	300UJ	300UJ	300UJ	300UJ	300 UJ	300 UJ	300 UJ	300 UJ	3,000UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	5,000 UJ	300 UJ	300 UJ	NA	NA	NA	NA	NA	NA	NA	-
a-,a-Dimethylphenethylamine*	300UJ	300UJ	300UJ	300UJ	300UJ	600UJ	300UJ	300UJ	300UJ	300UJ	300UJ	300UJ	300 UJ	300 UJ	300 UJ	300 UJ	3,000UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	5,000 UJ	300 UJ	300 UJ	NA	NA	NA	NA	NA	NA	NA	-
2,4-Dimethylphenol	300U	300U	300U	300U	300U	600U	300U	300U	300U	300U	300U	300U	300U	300U	300U	300U	3,000U	300U	300U	300U	300U	300U	300U	300U	5,000U	300U	300U	300U	300U	300U	600U	300U	1200U	300U	-
Dimethyl phthalate*	300U	300U	300U	300U	300U	600U	300U	300U	300U	300U	300U	300U	300U	300U	300U	300U	3,000U	300U	300U	300U	300U	300U	300U	300U	5,000U	300U	300U	NA	NA	NA	NA	NA	NA	NA	7.9+E5 (C)

notes:
1) Results and criteria are shown in ug/kg (ppb).
2) MDEQ Part 201 Industrial Drinking Water Protection Criteria as listed in the Interim Environmental Response Division Operational Memorandum #18, dated June 7, 2000.
3) "C" denotes value presented is a screening level based on the chemical-specific generic soil saturation concentration (Csat) since the calculated risk-based criterion is greater than Csat.
4) "E" denotes exponential factor.
5) "M" denotes calculated criterion is below the analytical method detection limit, therefore, the criterion defaults to the method detection limit.
6) Samples analyzed by Fire & Environmental Consulting Laboratories, Inc. of East Lansing, Michigan.
7) "-" denotes no criteria established.
8) NLL denotes chemical is not likely to leach under most soil conditions.
9) ID denotes inadequate data to develop criterion.
10) "UJ" denotes that the sample-specific reporting limit for the analyte in this sample should be considered approximate.
11) "U" denotes the analyte was analyzed for, but was not detected.
12) "NA" Denotes constituent not analyzed.
13) Soil duplicate sample collected at GB-44.
14) (*) denotes constituents were not part of TCL in QAPP.

REALM
Coldwater Road Facility
Soil Analytical Results
Semivolatile Organic Compounds method 8270

Sample Location	GB-2	GB-3	GB-7	GB-8	GB-9	GB-10	GB-11	GB-17	GB-18	GB-19	GB-20	GB-21	GB-22	GB-23	GB-24	GB-25	GB-26	GB-27	GB-28	GB-29	GB-30	GB-31	GB-32	GB-33	GB-39	GB-40	GB-41	GB-42	GB-43	GB-44	GB-45	GB-46	GB-47	Soil Dup	MDEQ Part 201 Generic Cleanup Criteria
Sample Depth	(12-14')	(13-15')	(13-15')	(12-14')	(13-15')	(10-12')	(7-9')	(0-2')	(0-2')	(0-2')	(0-2')	(0-2')	(0-2')	(0-2')	(0-2')	(0-2')	(0-2')	(0-2')	(0-2')	(0-2')	(0-2')	(0-2')	(0-2')	(0-2')	(0-2')	(0-2')	(0-2')	(0-2')	(0-2')	(0-2')	(0-2')	(0-2')	(0-2')	(0-2')	Industrial Drinking Water Protection Criteria
Date Collected	08/24/98	08/24/98	08/24/98	08/24/98	08/24/98	08/24/98	08/25/98	08/25/98	08/25/98	08/25/98	08/25/98	08/25/98	08/26/98	08/26/98	08/26/98	08/26/98	08/26/98	08/26/98	08/26/98	08/27/98	08/27/98	08/26/98	08/26/98	08/26/98	08/27/98	08/27/98	08/27/98	05/03/99	05/03/99	05/03/99	05/03/99	05/03/99	05/03/99	05/03/99	Criteria
Parameter																																			
4,6-Dinitro-2-methylphenol	300U	300U	300U	300U	300U	600U	300U	300U	300U	300U	300U	300U	300U	300U	300U	300U	3,000U	300U	300U	300U	300U	300U	300U	300U	5,000U	300U	300U	300U	300U	300U	600U	300U	1200U	300U	-
2,4-Dinitrophenol	300U	300U	300U	300U	300U	600U	300U	300U	300U	300U	300U	300U	300U	300U	300U	300U	3,000U	300U	300U	300U	300U	300U	300U	300U	5,000U	300U	300U	300U	300U	300U	600U	300U	1200U	300U	-
2,4-Dinitrotoluene	300U	300U	300U	300U	300U	600U	300U	300U	300U	300U	300U	300U	300U	300U	300U	300U	3,000U	300U	300U	300U	300U	300U	300U	300U	5,000U	300U	300U	300U	300U	300U	600U	300U	1200U	300U	-
2,6-Dinitrotoluene	300U	300U	300U	300U	300U	600U	300U	300U	300U	300U	300U	300U	300U	300U	300U	300U	3,000U	300U	300U	300U	300U	300U	300U	300U	5,000U	300U	300U	300U	300U	300U	600U	300U	1200U	300U	-
Diphenylamine*	300UJ	300UJ	300UJ	300UJ	300UJ	600UJ	300UJ	300UJ	300UJ	300UJ	300UJ	300UJ	300 UJ	300 UJ	300 UJ	300 UJ	3,000UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	5,000 UJ	300 UJ	300 UJ	NA	NA	NA	NA	NA	NA	NA	-
1,2-Diphenylhydrazine*	300UJ	300UJ	300UJ	300UJ	300UJ	600UJ	300UJ	300UJ	300UJ	300UJ	300UJ	300UJ	300 UJ	300 UJ	300 UJ	300 UJ	3,000UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	5,000 UJ	300 UJ	300 UJ	NA	NA	NA	NA	NA	NA	NA	-
Di-n-octyl phthalate	300U	300U	300U	300U	300U	600U	300U	300U	300U	300U	300U	300U	300U	300U	300U	300U	3,000U	300U	300U	300U	300U	300U	300U	300U	5,000U	300U	300U	300U	300U	300U	600U	300U	1200U	300U	1.4+E8
Ethyl methanesulfonate*	300UJ	300UJ	300UJ	300UJ	300UJ	600UJ	300UJ	300UJ	300UJ	300UJ	300UJ	300UJ	300 UJ	300 UJ	300 UJ	300 UJ	3,000UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	5,000 UJ	300 UJ	300 UJ	NA	NA	NA	NA	NA	NA	NA	-
Fluoranthene	1,000	300U	300U	300U	300U	4,000	300U	300U	300U	300U	300U	300U	300U	300U	300U	300U	3,000U	300U	300U	300U	300U	300U	300U	300U	5,000U	300U	300U	300U	300U	300U	600U	300U	1200U	300U	7.3
Fluorene	300U	300U	300U	300U	300U	600U	300U	300U	300U	300U	300U	300U	300U	300U	300U	300U	3,000U	300U	300U	300U	300U	300U	300U	300U	5,000U	300U	300U	300U	300U	300U	600U	300U	1200U	300U	890,000
Hexachlorobenzene	300U	300U	300U	300U	300U	600U	300U	300U	300U	300U	300U	300U	300U	300U	300U	300U	3,000U	300U	300U	300U	300U	300U	300U	300U	5,000U	300U	300U	300U	300U	300U	600U	300U	1200U	300U	1,800
Hexachlorobutadiene	300U	300U	300U	300U	300U	600U	300U	300U	300U	300U	300U	300U	300U	300U	300U	300U	3,000U	300U	300U	300U	300U	300U	300U	300U	5,000U	300U	300U	300U	300U	300U	600U	300U	1200U	300U	72,000
Hexachlorocyclopentadiene	300R	300R	300R	300R	300R	600R	300R	300R	300R	300R	300R	300R	300R	300R	300R	300R	3,000R	300R	300R	300R	300R	300R	300R	300R	5,000R	300R	300R	300U	300U	300U	600U	300U	1200U	300U	320,000
Hexachloroethane	300U	300U	300U	300U	300U	600U	300U	300U	300U	300U	300U	300U	300U	300U	300U	300U	3,000U	300U	300U	300U	300U	300U	300U	300U	5,000U	300U	300U	300U	300U	300U	600U	300U	1200U	300U	1,200
Indeno(1,2,3-cd)pyrene	400	300U	300U	300U	300U	800	300U	300U	300U	300U	300U	300U	300U	300U	300U	300U	3,000U	300U	300U	300U	300U	300U	300U	300U	5,000U	300U	300U	300U	300U	300U	600U	300U	1200U	300U	NLL
Isophorone	300U	300U	300U	300U	300U	600U	300U	300U	300U	300U	300U	300U	300U	300U	300U	300U	3,000U	300U	300U	300U	300U	300U	300U	300U	5,000U	300U	300U	300U	300U	300U	600U	300U	1200U	300U	62,000
3-Methylcholanthrene*	300UJ	300UJ	300UJ	300UJ	300UJ	600UJ	300UJ	300UJ	300UJ	300UJ	300UJ	300UJ	300 UJ	300 UJ	300 UJ	300 UJ	3,000UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	5,000 UJ	300 UJ	300 UJ	NA	NA	NA	NA	NA	NA	NA	-
Methyl methanesulfonate*	300UJ	300UJ	300UJ	300UJ	300UJ	600UJ	300UJ	300UJ	300UJ	300UJ	300UJ	300UJ	300 UJ	300 UJ	300 UJ	300 UJ	3,000UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	5,000 UJ	300 UJ	300 UJ	NA	NA	NA	NA	NA	NA	NA	-
2-Methylnaphthalene	300U	300U	300U	300U	300U	600U	300U	300U	300U	300U	300U	300U	300U	300U	300U	300U	3,000U	300U	300U	300U	300U	300U	300U	300U	5,000U	300U	300U	300U	300U	300U	600U	300U	1200U	300U	170,000
Naphthalene	300U	300U	300U	300U	300U	600U	300U	300U	300U	300U	300U	300U	300U	300U	300U	300U	3,000U	300U	300U	300U	300U	300U	300U	300U	5,000U	300U	300U	300U	300U	300U	600U	300U	1200U	300U	100,000
1-Naphthylamine*	300UJ	300UJ	300UJ	300UJ	300UJ	600UJ	300UJ	300UJ	300UJ	300UJ	300UJ	300UJ	300 UJ	300 UJ	300 UJ	300 UJ	3,000UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	5,000 UJ	300 UJ	300 UJ	NA	NA	NA	NA	NA	NA	NA	-
2-Naphthylamine*	300UJ	300UJ	300UJ	300UJ	300UJ	600UJ	300UJ	300UJ	300UJ	300UJ	300UJ	300UJ	300 UJ	300 UJ	300 UJ	300 UJ	3,000UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	5,000 UJ	300 UJ	300 UJ	NA	NA	NA	NA	NA	NA	NA	-
2-Nitroaniline	300UJ	300UJ	300UJ	300UJ	300UJ	600UJ	300UJ	300UJ	300UJ	300UJ	300UJ	300UJ	300 UJ	300 UJ	300 UJ	300 UJ	3,000UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	5,000 UJ	300 UJ	300 UJ	300U	300U	300U	600U	300U	1200U	300U	-
3-Nitroaniline	300UJ	300UJ	300UJ	300UJ	300UJ	600UJ	300UJ	300UJ	300UJ	300UJ	300UJ	300UJ	300 UJ	300 UJ	300 UJ	300 UJ	3,000UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	5,000 UJ	300 UJ	300 UJ	300U	300U	300U	600U	300U	1200U	300U	-
4-Nitroaniline	300UJ	300UJ	300UJ	300UJ	300UJ	600UJ	300UJ	300UJ	300UJ	300UJ	300UJ	300UJ	300 UJ	300 UJ	300 UJ	300 UJ	3,000UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	5,000 UJ	300 UJ	300 UJ	300U	300U	300U	600U	300U	1200U	300U	-
Nitrobenzene	300U	300U	300U	300U	300U	600U	300U	300U	300U	300U	300U	300U	300U	300U	300U	300U	3,000U	300U	300U	300U	300U	300U	300U	300U	5,000U	300U	300U	300U	300U	300U	600U	300U	1200U	300U	-
2-Nitrophenol	300U	300U	300U	300U	300U	600U	300U	300U	300U	300U	300U	300U	300U	300U	300U	300U	3,000U	300U	300U	300U	300U	300U	300U	300U	5,000U	300U	300U	300U	300U	300U	600U	300U	1200U	300U	1,200
4-Nitrophenol	300U	300U	300U	300U	300U	600U	300U	300U	300U	300U	300U	300U	300U	300U	300U	300U	3,000U	300U	300U	300U	300U	300U	300U	300U	5,000U	300U	300U	300U	300U	300U	600U	300U	1200U	300U	-
N-Nitroso-di-n-butylamine*	300UJ	300UJ	300UJ	300UJ	300UJ	600UJ	300UJ	300UJ	300UJ	300UJ	300UJ	300UJ	300 UJ	300 UJ	300 UJ	300 UJ	3,000UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	5,000 UJ	300 UJ	300 UJ	NA	NA	NA	NA	NA	NA	NA	-
N-Nitrosodimethylamine*	300U	300U	300U	300U	300U	600U	300U	300U	300U	300U	300U	300U	300U	300U	300U	300U	3,000U	300U	300U	300U	300U	300U	300U	300U	5,000U	300U	300U	NA	NA	NA	NA	NA	NA	NA	-
N-Nitrosodiphenylamine	300U	300U	300U	300U	300U	600U	300U	300U	300U	300U	300U	300U	300U	300U	300U	300U	3,000U	300U	300U	300U	300U	300U	300U	300U	5,000U	300U	300U	300U	300U	300U	600U	300U	1200U	300U	-
N-Nitrosopiperidine*	300UJ	300UJ	300UJ	300UJ	300UJ	600UJ	300UJ	300UJ	300UJ	300UJ	300UJ	300UJ	300 UJ	300 UJ	300 UJ	300 UJ	3,000UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	5,000 UJ	300 UJ	300 UJ	NA	NA	NA	NA	NA	NA	NA	-
Pentachlorobenzene*	300UJ	300UJ	300UJ	300UJ	300UJ	600UJ	300UJ	300UJ	300UJ	300UJ	300UJ	300UJ	300 UJ	300 UJ	300 UJ	300 UJ	3,000UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	5,000 UJ	300 UJ	300 UJ	NA	NA	NA	NA	NA	NA	NA	81,000
Pentachloronitrobenzene*	300UJ	300UJ	300UJ	300UJ	300UJ	600UJ	300UJ	300UJ	300UJ	300UJ	300UJ	300UJ	300 UJ	300 UJ	300 UJ	300 UJ	3,000UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	5,000 UJ	300 UJ	300 UJ	NA	NA	NA	NA	NA	NA	NA	37,000
Pentachlorophenol	300U	300U	300U	300U	300U	600U	300U	300U	300U	300U	300U	300U	300U	300U	300U	300U	3,000U	300U	300U	300U	300U	300U	300	300U	5,000U	300U	300U	300U	300U	300U	600U	300U	1200U	300U	22
Phenacetin*	300UJ	300UJ	300UJ	300UJ	300UJ	600UJ	300UJ	300UJ	300UJ	300UJ	300UJ	300UJ	300 UJ	300 UJ	300 UJ	300 UJ	3,000UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	5,000 UJ	300 UJ	300 UJ	NA	NA	NA	NA	NA	NA	NA	34,000
Phenanthrene	700	300U	300U	300U	300U	2,800	300U	300U	300U	300U	300U	300U	300U	300U	300U	300U	3,000U	300U	300U	300U	300U	300U	300U	300U	5,000U	300U	300U	300U	300U	300U	600U	300U	1200U	300U	160,000
Phenol	300U	300U	300U	300U	300U	600U	300U	300U	300U	300U	300U	300U	300U	300U	300U	300U	3,000U	300U	300U	300U	300U	300U	300U	300U	5,000U	300U	300U	300U	300U	300U	600U	300U	1200U	300U	260,000
2-Picoline*	300UJ	300UJ	300UJ	300UJ	300UJ	600UJ	300UJ	300UJ	300UJ	300UJ	300UJ	300UJ	300 UJ	300 UJ	300 UJ	300 UJ	3,000UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	5,000 UJ	300 UJ	300 UJ	NA	NA	NA	NA	NA	NA	NA	-
Pronamide*	300UJ	300UJ	300UJ	300UJ	300UJ	600UJ	300UJ	300UJ	300UJ	300UJ	300UJ	300UJ	300 UJ	300 UJ	300 UJ	300 UJ	3,000UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	5,000 UJ	300 UJ	300 UJ	NA	NA	NA	NA	NA	NA	NA	-
Pyrene	1,100	300U	300U	300U	300U	4,600	300U	300U	300U	300U	300U	300U	300U	300U	300U	300U	3,000U	300U	300U	300U	300U	300U	300U	300U	5,000U	300U	300U	300U	300U	300U	600U	300U	1200U	300U	480,000
1,2,4,5-Tetrachlorobenzene*	300UJ	300UJ	300UJ	300UJ	300UJ	600UJ	300UJ	300UJ	300UJ	300UJ	300UJ	300UJ	300 UJ	300 UJ	300 UJ	300 UJ	3,000UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	5,000 UJ	300 UJ	300 UJ	NA	NA	NA	NA	NA	NA	NA	1.5+E6
2,3,4,6-Tetrachlorophenol*	300UJ	300UJ	300UJ	300UJ	300UJ	600UJ	300UJ	300UJ	300UJ	300UJ	300UJ	300UJ	300 UJ	300 UJ	300 UJ	300 UJ	3,000UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	5,000 UJ	300 UJ	300 UJ	NA	NA	NA	NA	NA	NA	NA	-
1,2,4-Trichlorobenzene	300U	300U	300U	300U	300U	600U	300U	300U	300U	300U	300U	300U	300U	300U	300U	300U	3,000U	300U	300U	300U	300U	300U	300U	300U	5,000U	300U	300U	300U	300U	300U	600U	300U	1200U	300U	4,200
2,4,5-Trichlorophenol	300UJ	300UJ	300UJ	300UJ	300UJ	600UJ	300UJ	300UJ	300UJ	300UJ	300UJ	300UJ	300 UJ	300 UJ	300 UJ	300 UJ	3,000UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	300 UJ	5,000 UJ	300 UJ	300 UJ	300U	300U	300U	600U	300U	1200U	300U	110,000
2,4,6-Trichlorophenol	300U	300U	300U	300U	300U	600U	300U	300U	300U	300U	300U	300U	300U	300U	300U	300U	3,000U	300U	300U	300U	300U	300U	300U	300U	5,000U	300U	300U	300U	300U	300U	600U	300U	1200U	300U	9,400
N-Nitroso-di-n-propylamine	300U	300U	300U	300U	300U	600U	300U	300U	300U	300U	300U	300U	300U	300U	300U	300U	3,000U	300U	300U	300U	300U	300U	300U	300U	5,000U	300U	300U	300UJ	300UJ	300UJ	600UJ	300UJ	1200UJ	300U	330 (M)

notes:
1) Results and criteria are shown in ug/kg (ppb).
2) MDEQ Part 201 Industrial Drinking Water Protection Criteria as listed in the Interim Environmental Response Division Operational Memorandum #18, dated June 7, 2000.
3) "C" denotes value presented is a screening level based on the chemical-specific generic soil saturation concentration (Csat) since the calculated risk-based criterion is greater than Csat.
4) "E" denotes exponential factor.
5) "M" denotes calculated criterion is below the analytical method detection limit, therefore, the criterion defaults to the method detection limit.
6) Samples analyzed by Fire & Environmental Consulting Laboratories, Inc. of East Lansing, Michigan.
7) "-" denotes no criteria established.
8) NLL denotes chemical is not likely to leach under most soil conditions.
9) ID denotes inadequate data to develop criterion.
10) "UJ" denotes that the sample-specific reporting limit for the analyte in this sample should be considered approximate.
11) "U" denotes the analyte was analyzed for, but was not detected.
12) "NA" Denotes constituent not analyzed.
13) Soil duplicate sample collected at GB-44.
14) "R" denotes that the reporting limit or sample results has been determined to be unusable due to deficiencies in the data generation process.
15) (*) denotes constituents were not part of TCL in QAPP.

REALM
Coldwater Road Facility
Soil Analytical Results
Metals method 6020, Cyanide method 9010, and pH method 9040

Sample Location	GB-2	GB-3	GB-7	GB-8	GB-9	GB-10	GB-11	GB-17	GB-18	GB-19	GB-20	GB-21	GB-22	GB-23	GB-24	GB-25	GB-26	GB-27	GB-28	MDEQ Part 201 Generic Cleanup Criteria Industrial Drinking Water Protection Criteria
Sample Depth	**(12-14')**	**(13-15')**	**(13-15')**	**(12-14')**	**(13-15')**	**(10-12')**	**(7-9')**	**(0-2')**	**(0-2')**	**(0-2')**	**(0-2')**	**(0-2')**	**(0-2')**	**(0-2')**	**(0-2')**	**(0-2')**	**(0-2')**	**(0-2')**	**(0-2')**	
Date Collected	**08/24/98**	**08/24/98**	**08/24/98**	**08/24/98**	**08/24/98**	**08/24/98**	**08/25/98**	**08/25/98**	**08/25/98**	**08/25/98**	**08/25/98**	**08/25/98**	**08/26/98**	**08/26/98**	**08/26/98**	**08/26/98**	**08/26/98**	**08/26/98**	**08/26/98**	
Parameter																				
Cadmium {B}	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	6,000
Chromium {B,H}	13,200	7,600	5,900	10,400	10,200	1,900	4,500	12,300	349,000	58,300	12,800	10,400	9,700	8,100	1,210,000	9,600	16,600	10,300	12,100	1.0+E9
Copper {B}	20,100	5,900	6,500	10,700	11,700	4,900	8,700	10,600	9,800	14,400	13,500	20,800	7,600	7,600	14,500	66,000	22,000	9,400	12,000	5.8+E6
Lead {B}	10,300	3,400	4,600	4,800	5,800	3,000	3,300	6,100	5,700	3,900	5,400	6,000	5,500	5,900	5,400	5,500	5,600	5,200	5,800	700,000
Nickel {B}	19,500	11,500	16,400	23,800	22,200	3,100	5,900	26,900	23,100	13,800	29,000	31,200	18,000	22,700	39,000	22,400	63,300	24,700	25,100	1.0+E5
Zinc {B}	45,500	28,100	24,600	33,200	33,300	15,200	15,300	36,700	37,500	29,800	39,400	34,800	32,200	28,900	85,300	32,300	59,900	31,800	48,200	5.0+E6
Cyanide	500U	500U	500U	500U	500U	500U	500U	500U	500U	500U	500U	500U	500U	500U	500U	**4,800**	500U	500U	500U	4,000
pH (STD Units)	7.88	8.09	7.93	7.93	7.92	7.83	8.22	8.62	9.69	9.23	9.70	9.78	7.68	7.78	8.51	8.20	7.62	8.32	8.44	-

Sample Location	GB-29	GB-30	GB-31	GB-32	GB-33	GB-36	GB-37	GB-38	GB-39	GB-40	GB-41	GB-42	GB-43	GB-44	GB-45	GB-46	GB-47	Soil Dup		MDEQ Part 201 Generic Cleanup Criteria Industrial Drinking Water Protection Criteria
Sample Depth	**(0-2')**	**(0-2')**	**(0-2')**	**(0-2')**	**(0-2')**	**(0-2')**	**(0-2')**	**(0-2')**	**(0-2')**	**(0-2')**	**(0-2')**	**(0-2')**	**(0-2')**	**(0-2')**	**(0-2')**	**(0-2')**	**(0-2')**	**(0-2')**		
Date Collected	**08/27/98**	**08/27/98**	**08/26/98**	**08/26/98**	**08/26/98**	**08/27/98**	**08/27/98**	**08/27/98**	**08/27/98**	**08/27/98**	**08/27/98**	**05/03/99**	**05/03/99**	**05/03/99**	**05/03/99**	**05/03/99**	**05/03/99**	**05/03/99**		
Parameter																				
Cadmium {B}	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	120J	260J	50UJ	50UJ	50UJ	50UJ		6,000
Chromium {B,H}	9,100	5,600	12,600	8,900	9,500	8,600	8,500	9,100	200,000	6,100	7,500	7,590	9,200	10,000	9,080	9,400	8,140	8,690		1.0+E9
Copper {B}	10,100	5,900	9,300	8,200	11,900	9,600	9,400	10,100	47,300	5,700	6,400	8,600	14,200	15,000	15,500	13,800	12,800	11,900		5.8+E6
Lead {B}	5,500	3,900	6,300	5,300	5,400	14,500	5,000	5,700	7,200	5,300	4,000	7,600J	8,500J	8,500J	7,900J	10,600J	8,900J	12,000J		700,000
Nickel {B}	20,900	15,200	28,200	20,700	23,100	20,400	20,900	23,700	**651,000**	16,300	17,100	16,900	18,000	18,900	18,400	19,600	16,400	17,600		1.0+E5
Zinc {B}	30,800	27,000	35,800	31,300	31,300	27,600	27,100	27,600	46,800	21,500	19,900	28,600J	35,500J	39,700J	29,100J	31,400J	28,500J	26,400J		5.0+E6
Cyanide	500U	500U	500U	500U	500U	500U	500U	500U	500U	500U	500U	600	600	600	600	600	600	600		4,000
pH (STD Units)	8.25	7.70	8.03	8.64	10.46	9.19	8.81	9.10	7.85	7.87	8.59	9.18	8.81	8.72	9.94	9.84	8.23	8.64		-

notes:
1) Results and criteria are shown in ug/kg (ppb).
2) MDEQ Part 201 Drinking Water Protection Criteria as listed in the Interim Environmental Response Division Operational Memorandum #18, dated June 7, 2000.
3) Samples analyzed by Fire & Environmental Consulting Laboratories, Inc. of East Lansing, Michigan.
4) Bold type denotes exceedance of Part 201 Industrial Drinking Water Protection criteria.
5) {B} denotes Background , as defined in Rule 299.5701(c), may be substituted if higher than the cleanup criterion.
6) {H} denotes CR III cleanup criterion for protection of drinking water can only be used at sites where groundwater is prevented from being used as a public water supply, currently and in the future.
7) "M" denotes Calculated criterion is below the analytical method detetction limit (mdl), therefore, the criterion defaults to the mdl.
8) "U" denotes the analyte was analyzed for, but was not detected.
9) "NA" Denotes constituent not analyzed.
10) "-" Denotes no criteria established.
11) Soil duplicate sample collected at GB-44.
12) "E" denotes exponential factor.
i/novi/project/4144/21487/4_notes/satb2.wb2

REALM
Coldwater Road Facility
Leachable Concrete Analytical Results
Volatile Organic Compounds method 624/1311

Sample Location	CF-1 Deionized Water Basin Floor	CW-1 Deionized Water Basin Wall	CF-2 Cyanide Basin Floor	CW-2 Cyanide Basin Wall	CF-3 Cyanate Basin Floor	CW-3 Cyanate Basin Wall	CF-4 Lime Basin Floor	CW-4 West Alkali Basin Wall	CF-5 West Alkali Basin Floor	CW-5 North Alkali Basin Wall	CF-6 North Alkali Basin Floor	CW-6 South Alkali Basin Wall	MDEQ Act 307 Type B Health-Based Drinking Water Criteria
Date Collected	**08/25/98**	**08/25/98**	**08/25/98**	**08/25/98**	**08/26/98**	**08/26/98**	**08/26/98**	**08/26/98**	**08/26/98**	**08/26/98**	**08/26/98**	**08/26/98**	
Parameter													
Benzene, TCLP	100U	100U	100U	100U	100U	100U	100U	100U	100U	100U	100U	100U	1.2
Carbon tetrachloride, TCLP	100U	100U	100U	100U	100U	100U	100U	100U	100U	100U	100U	100U	0.27
Chlorobenzene, TCLP	100U	100U	100U	100U	100U	100U	100U	100U	100U	100U	100U	100U	130
Chloroform, TCLP	100U	100U	100U	100U	100U	100U	100U	100U	100U	100U	100U	100U	5.6
1,4-Dichlorobenzene, TCLP	100U	100U	100U	100U	100U	100U	100U	100U	100U	100U	100U	100U	1.5
1,2-Dichloroethane, TCLP	100U	100U	100U	100U	100U	100U	100U	100U	100U	100U	100U	100U	0.38
1,1-Dichloroethene, TCLP	100U	100U	100U	100U	100U	100U	100U	100U	100U	100U	100U	100U	7
2-Butanone, TCLP	1,000U	1,000U	1,000U	1,000U	1,000U	1,000U	1,000U	1,000U	1,000U	1,000U	1,000U	1,000U	320
Tetrachloroethene, TCLP	100U	100U	100U	100U	100U	100U	100U	100U	100U	100U	100U	100U	0.7
Trichloroethene, TCLP	100U	100U	100U	100U	100U	100U	100U	100U	100U	100U	100U	100U	2.2
Vinyl Chloride, TCLP	100U	100U	100U	100U	100U	100U	100U	100U	100U	100U	100U	100U	0.016

Sample Location	CF-7 Leachate Basin Floor	CW-7 East Basement Basin Wall	CF-8 South Alkali Basin Floor	CW-8 Center Basement Basin Wall	CF-9 WWTP Basement Floor North	CW-9 West Basement Basin Wall	CF-10 WWTP Basement Floor Center	CF-11 WWTP Basement Floor South	CF-12 East Basement Basin Floor	CF-13 Center Basement Basin Floor	CF-14 West Basement Basin Floor	Concrete Duplicate	MDEQ Act 307 Type B Health-Based Drinking Water Criteria
Date Collected	**08/27/98**	**04/28/99**	**08/26/98**	**04/28/99**	**08/27/98**	**04/28/99**	**08/27/98**	**08/27/98**	**04/28/99**	**04/28/99**	**04/28/99**	**04/28/99**	
Parameter													
Benzene, TCLP	100U	100U	100U	100U	100U	100U	100U	100U	100U	100U	100U	100U	1.2
Carbon tetrachloride, TCLP	100U	100U	100U	100U	100U	100U	100U	100U	100U	100U	100U	100U	0.27
Chlorobenzene, TCLP	100U	100U	100U	100U	100U	100U	100U	100U	100U	100U	100U	100U	130
Chloroform, TCLP	100U	100U	100U	100U	100U	100U	100U	100U	100U	100U	100U	100U	5.6
1,4-Dichlorobenzene, TCLP	100U	100U	100U	100U	100U	100U	100U	100U	100U	100U	100U	100U	1.5
1,2-Dichloroethane, TCLP	100U	100U	100U	100U	100U	100U	100U	100U	100U	100U	100U	100U	0.38
1,1-Dichloroethene, TCLP	100U	100U	100U	100U	100U	100U	100U	100U	100U	100U	100U	100U	7
2-Butanone, TCLP	1,000U	1,000U	1,000U	1,000U	1,000U	1,000U	1,000U	1,000U	1,000U	1,000U	1,000U	1,000U	320
Tetrachloroethene, TCLP	100U	100U	100U	100U	100U	100U	100U	100U	100U	100U	100U	100U	0.7
Trichloroethene, TCLP	100U	100U	100U	100U	100U	100U	100U	100U	100U	100U	100U	100U	2.2
Vinyl Chloride, TCLP	100U	100U	100U	100U	100U	100U	100U	100U	100U	100U	100U	100U	0.016

Notes:
1) Results and criteria are shown in ug/l (ppb).
2) MDEQ Act 307 Type B Health-Based Drinking Water Criteria as listed in Operational Memorandum #8, Revision 3, June 1994.
3) Samples analyzed by Fire & Environmental Consulting Laboratories, Inc. of East Lansing, Michigan
4) "U" denotes the analyte was analyzed for, but was not detected.
5) Concrete duplicate sample collected at CF-12.

REALM
Coldwater Road Facility
Leachable Concrete Analytical Results
Semivolatile Organic Compounds method 625/1311

Sample Location	CF-1 Deionized Water Basin Floor	CW-1 Deionized Water Basin Wall	CF-2 Cyanide Basin Floor	CW-2 Cyanide Basin Wall	CF-3 Cyanate Basin Floor	CW-3 Cyanate Basin Wall	CF-4 Lime Basin Floor	CW-4 West Alkali Basin Wall	CF-5 West Alkali Basin Floor	CW-5 North Alkali Basin Wall	CF-6 North Alkali Basin Floor	CW-6 South Alkali Basin Wall	MDEQ Act 307 Type B Health-Based Drinking Water Criteria
Date Collected	08/25/98	08/25/98	08/25/98	08/25/98	08/26/98	08/26/98	08/26/98	08/26/98	08/26/98	08/26/98	08/26/98	08/26/98	
Parameter													
o-Cresol, TCLP	1,000U	1,000U	1,000U	1,000U	1,000U	1,000U	1,000U	1,000U	1,000U	1,000U	1,000U	1,000U	-
p,m-Cresol, TCLP	1,000U	1,000U	1,000U	1,000U	1,000U	1,000U	1,000U	1,000U	1,000U	1,000U	1,000U	1,000U	-
Pentachlorophenol, TCLP	1,000U	1,000U	1,000U	1,000U	1,000U	1,000U	1,000U	1,000U	1,000U	1,000U	1,000U	1,000U	0.29
2,4,5-Trichlorophenol, TCLP	1,000U	1,000U	1,000U	1,000U	1,000U	1,000U	1,000U	1,000U	1,000U	1,000U	1,000U	1,000U	700
2,4,6-Trichlorophenol, TCLP	1,000U	1,000U	1,000U	1,000U	1,000U	1,000U	1,000U	1,000U	1,000U	1,000U	1,000U	1,000U	3.2
2,4-Dinitrotoluene, TCLP	90U	90U	90U	90U	90U	90U	90U	90U	90U	90U	90U	90U	0.052
Hexachlorobenzene, TCLP	90U	90U	90U	90U	90U	90U	90U	90U	90U	90U	90U	90U	0.022
Hexachlorobutadiene, TCLP	100U	100U	100U	100U	100U	100U	100U	100U	100U	100U	100U	100U	0.46
Hexachloroethane	100U	100U	100U	100U	100U	100U	100U	100U	100U	100U	100U	100U	2.5
Nitrobenzene, TCLP	100U	100U	100U	100U	100U	100U	100U	100U	100U	100U	100U	100U	3.2
Pyridine, TCLP	100UJ	100UJ	100UJ	100UJ	100UJ	100UJ	100UJ	100UJ	100UJ	100UJ	100UJ	100UJ	7

Sample Location	CF-7 Leachate Basin Floor	CW-7 East Basement Basin Wall	CF-8 South Alkali Basin Floor	CW-8 Center Basement Basin Wall	CF-9 WWTP Basement Floor North	CW-9 West Basement Basin Wall	CF-10 WWTP Basement Floor Center	CF-11 WWTP Basement Floor South	CF-12 East Basement Basin Floor	CF-13 Center Basement Basin Floor	CF-14 West Basement Basin Floor	Concrete Duplicate	MDEQ Act 307 Type B Health-Based Drinking Water Criteria
Date Collected	08/27/98	04/28/99	08/26/98	04/28/99	08/27/98	04/28/99	08/27/98	08/27/98	04/28/99	04/28/99	04/28/99	04/28/99	
Parameter													
o-Cresol, TCLP	1,000U	1,000U	1,000U	1,000U	1,000U	1,000U	1,000U	1,000U	1,000U	1,000U	1,000U	1,000U	-
p,m-Cresol, TCLP	1,000U	1,000U	1,000U	1,000U	1,000U	1,000U	1,000U	1,000U	1,000U	1,000U	1,000U	1,000U	-
Pentachlorophenol, TCLP	1,000U	1,000U	1,000U	1,000U	1,000U	1,000U	1,000U	1,000U	1,000U	1,000U	1,000U	1,000U	0.29
2,4,5-Trichlorophenol, TCLP	1,000U	1,000U	1,000U	1,000U	1,000U	1,000U	1,000U	1,000U	1,000U	1,000U	1,000U	1,000U	700
2,4,6-Trichlorophenol, TCLP	1,000U	1,000U	1,000U	1,000U	1,000U	1,000U	1,000U	1,000U	1,000U	1,000U	1,000U	1,000U	3.2
2,4-Dinitrotoluene, TCLP	90U	90U	90U	90U	90U	90U	90U	90U	90U	90U	90U	90U	0.052
Hexachlorobenzene, TCLP	90U	90U	90U	90U	90U	90U	90U	90U	90U	90U	90U	90U	0.022
Hexachlorobutadiene, TCLP	100U	100U	100U	100U	100U	100U	100U	100U	100U	100U	100U	100U	0.46
Hexachloroethane	100U	100U	100U	100U	100U	100U	100U	100U	100U	100U	100U	100U	2.5
Nitrobenzene, TCLP	100U	100U	100U	100U	100U	100U	100U	100U	100U	100U	100U	100U	3.2
Pyridine, TCLP	100UJ	100U	100UJ	100U	100UJ	100U	100UJ	100UJ	100U	100U	100U	100U	7

Notes:

1) Results and criteria are shown in ug/l (ppb).

2) MDEQ Act 307 Type B Health-Based Drinking Water Criteria as listed in Operational Memorandum #8, Revision 3, June 1994.

3) Samples analyzed by Fire & Environmental Consulting Laboratories, Inc. of East Lansing, Michigan.

4) "-" denotes no criteria established.

5) "UJ" denotes that the sample-specific reporting limit for the analyte in this sample should be considered approximate.

6) "U" denotes the analyte was analyzed for, but was not detected.

7) "NA" Denotes constituent not analyzed.

8) Concrete duplicate sample colleted at CF-12.

REALM
Coldwater Road Facility
Leachable Concrete Analytical Results
Metals method 200.8/245.1/1311

Sample Location	CF-1 Deionized Water Basin Floor	CW-1 Deionized Water Basin Wall	CF-2 Cyanide Basin Floor	CW-2 Cyanide Basin Wall	CF-3 Cyanate Basin Floor	CW-3 Cyanate Basin Wall	CF-4 Lime Basin Floor	CW-4 West Alkali Basin Wall	CF-5 West Alkali Basin Floor	CW-5 North Alkali Basin Wall	CF-6 North Alkali Basin Floor	CW-6 South Alkali Basin Wall	MDEQ Act 307 Type B Health-Based Drinking Water Criteria
Date Collected	08/25/98	08/25/98	08/25/98	08/25/98	08/26/98	08/26/98	08/26/98	08/26/98	08/26/98	08/26/98	08/26/98	08/26/98	
Parameter													
Arsenic, TCLP	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	0.02 (C)
Barium, TCLP	440	370	550	400	370	340	580	370	380	340	290	400	2,400 (C)
Cadmium, TCLP	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	3.5 (C)
Chromium, TCLP	340	10	40	20	20	20	10	20	810	10	50	20	37,000 (C)
Copper, TCLP	10U	10U	50	470	10U	10U	10U	10U	990	100	10U	10U	1,300 (C)
Lead, TCLP	3U	3U	3U	3U	3U	3U	3U	3U	3U	3U	3U	3U	4 (C, O)
Mercury, TCLP	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U	5U	0.2U	0.2U	0.2U	0.2U	2.1 (C)
Selenium, TCLP	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	35 (C)
Silver, TCLP	1U	1U	1U	1U	1U	1U	1U	1U	1U	1U	1U	1U	33 (C)
Zinc, TCLP	120 J	110 J	150 J	110 J	30 J	40 J	130 J	30 J	70 J	30 J	30 J	130 J	2,300 (C)

Sample Location	CF-7 Leachate Basin Floor	CW-7 East Basement Basin Wall	CF-8 South Alkali Basin Floor	CW-8 Center Basement Basin Wall	CF-9 WWTP Basement Floor North	CW-9 West Basement Basin Wall	CF-10 WWTP Basement Floor Center	CF-11 WWTP Basement Floor South	CF-12 East Basement Basin Floor	CF-13 Center Basement Basin Floor	CF-14 West Basement Basin Floor	Concrete Duplicate	MDEQ Act 307 Type B Health-Based Drinking Water Criteria
Date Collected	08/27/98	04/28/99	08/26/98	04/28/99	08/27/98	04/28/99	08/27/98	08/27/98	04/28/99	04/28/99	04/28/99	04/28/99	
Parameter													
Arsenic, TCLP	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	0.02 (C)
Barium, TCLP	370	350	290	380	330	370	300	290	370	350	350	370	2,400 (C)
Cadmium, TCLP	5U	0.2U	5U	0.2U	5U	0.2U	5U	5U	0.2U	0.2U	0.2U	0.2U	3.5 (C)
Chromium, TCLP	10	10U	20	10U	30	10U	60	40	10U	10U	10U	10U	37,000 (C)
Copper, TCLP	10U	10U	10U	10U	10U	10U	10U	10U	10U	10U	10U	10U	1,300 (C)
Lead, TCLP	3U	3U	3U	3U	3U	3U	3U	3U	3U	3U	3U	3U	4 (C, O)
Mercury, TCLP	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U	2.1 (C)
Selenium, TCLP	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	35 (C)
Silver, TCLP	1U	0.5U	1U	0.5U	1U	0.5U	1U	1U	0.5U	0.5U	0.5U	0.5U	33 (C)
Zinc, TCLP	30 J	10	50 J	30	150 J	30	230 J	130 J	30	30	10	40	2,300 (C)

Notes:

1) Results and criteria are shown in ug/l (ppb).

2) MDEQ Act 307 Type B Health-Based Drinking Water Criteria as listed in Operational Memorandum #8, Revision 3, June 1994.

3) Samples analyzed by Fire & Environmental Consulting Laboratories, Inc. of East Lansing, Michigan

4) "C" denotes background as defined in Rule 701 (c), may be substituted as the cleanup criteria if higher than the Type B cleanup criterion.

5) "O" denotes higher level may be acceptable if soil concentration is less than 400 ppm and groundwater migrating off-site will not impact adjacent properties. Contact an ERD toxicologist for further explanation.

6) "J" denotes that the concentration should be considered approximate.

7) "U" denotes the analyte was analyzed for, but was not detected.

8) Concrete duplicate sample collected at CF-12.

REALM
Coldwater Road Facility
Concrete Analytical Results
Volatile Organic Compounds method 8260

Sample Location	CW-7 East Basement Basin Wall	CW-8 Center Basement Basin Wall	CW-9 West Basement Basin Wall	CF-12 East Basement Basin Floor	CF-13 Center Basement Basin Floor	CF-14 West Basement Basin Floor	Concrete Duplicate	MDEQ Act 307 20 X Drinking Water Criteria
Date Collected	04/28/99	04/28/99	04/28/99	04/28/99	04/28/99	04/28/99	04/28/99	
Parameter								
Benzene	100U	100U	100U	1,000U	1,000U	1,000U	1,000U	24
Bromodichloromethane	100U	100U	100U	1,000U	1,000U	1,000U	1,000U	11
Bromoform	100U	100U	100U	1,000U	1,000U	1,000U	1,000U	92
Bromomethane	100U	100U	100U	1,000U	1,000U	1,000U	1,000U	200
n-Butylbenzene	100U	100U	100U	1,000U	1,000U	1,000U	1,000U	-
sec-Butylbenzene	100U	100U	100U	1,000U	1,000U	1,000U	1,000U	-
tert-Butylbenzene	100U	100U	100U	1,000U	1,000U	1,000U	1,000U	-
Carbon tetrachloride	100U	100U	100U	1,000U	1,000U	1,000U	1,000U	5.4
Chlorobenzene	100U	100U	100U	1,000U	1,000U	1,000U	1,000U	2,600
Chloroethane	100U	100U	100U	1,000U	1,000U	1,000U	1,000U	180
Chloroform	100U	100U	100U	1,000U	1,000U	1,000U	1,000U	11
Chloromethane	100U	100U	100U	1,000U	1,000U	1,000U	1,000U	54
Dibromochloromethane	100U	100U	100U	1,000U	1,000U	1,000U	1,000U	8.4
1,2-Dichlorobenzene	100U	100U	100U	1,000U	1,000U	1,000U	1,000U	12,000
1,3-Dichlorobenzene	100U	100U	100U	1,000U	1,000U	1,000U	1,000U	12,000
1,4-Dichlorobenzene	100U	100U	100U	1,000U	1,000U	1,000U	1,000U	30
1,1-Dichloroethane	100U	100U	100U	1,000U	1,000U	1,000U	1,000U	17,000
1,2-Dichloroethane	100U	100U	100U	1,000U	1,000U	1,000U	1,000U	7.6
1,1-Dichloroethene	100U	100U	100U	1,000U	1,000U	1,000U	1,000U	-
cis-1,2-Dichloroethene	100U	100U	100U	1,000U	1,000U	1,000U	1,000U	-
trans-1,2-Dichloroethene	100U	100U	100U	1,000U	1,000U	1,000U	1,000U	-
1,2-Dichloropropane	100U	100U	100U	1,000U	1,000U	1,000U	1,000U	10
cis-1,3-Dichloropropene	100U	100U	100U	1,000U	1,000U	1,000U	1,000U	-
trans-1,3-Dichloropropene	100U	100U	100U	1,000U	1,000U	1,000U	1,000U	-
Ethylbenzene	100U	100U	100U	1,000U	1,000U	1,000U	1,000U	1,500
Isopropylbenezene	100U	100U	100U	1,000U	1,000U	1,000U	1,000U	-
p-Isopropyltoluene	100U	100U	100U	1,000U	1,000U	1,000U	1,000U	-
Methylene Chloride	700UJ	700UJ	700UJ	7,000UJ	7,000UJ	6,000UJ	6,000UJ	-
Naphthalene	100U	100U	100U	1,000U	1,000U	1,000U	1,000U	5,000
n-Propylbenzene	100U	100U	100U	1,000U	1,000U	1,000U	1,000U	-
Styrene	100U	100U	100U	1,000U	1,000U	1,000U	1,000U	24
1,1,2,2-Tetrachloroethane	100U	100U	100U	1,000U	1,000U	1,000U	1,000U	-
Toluene	100U	200	100U	1,000U	1,000U	1,000U	1,000U	16,000
1,1,1-Trichloroethane	100U	100U	100U	1,000U	1,000U	1,000U	1,000U	4,000
1,1,2-Trichloroethane	100U	100U	100U	1,000U	1,000U	1,000U	1,000U	13
Trichloroethene	100U	100U	100U	1,000U	1,000U	1,000U	1,000U	-
1,2,4-Trimethylbenzene	100U	100U	100U	1,000U	1,000U	1,000U	1,000U	-
1,3,5-Trimethylbenzene	100U	100U	100U	1,000U	1,000U	1,000U	1,000U	ID
Vinyl Chloride	100U	100U	100U	1,000U	1,000U	1,000U	1,000U	-
o-Xylene	100U	100U	100U	1,000U	1,000U	1,000U	1,000U	5,600
p,m-Xylene	100U	100U	100U	1,000U	1,000U	1,000U	1,000U	5,600
Acetone	1,000U	1,000U	1,000U	10,000U	10,000U	10,000U	10,000U	14,000
2-Butanone	1,000U	1,000U	1,000U	10,000U	10,000U	10,000U	10,000U	6,400
Carbon Disulfide	1,000U	1,000U	1,000U	10,000U	10,000U	10,000U	10,000U	15,000
2-Hexanone	1,000U	1,000U	1,000U	10,000U	10,000U	10,000U	10,000U	20,000
4-Methyl-2-pentanone	400	400	200	2,000J	3,000	5,000	5,000	7,000

Notes:

1) Results and criteria are shown in ug/l (ppb).

2) MDEQ Act 307 Type B Health-Based Drinking Water Criteria as listed in Operational Memorandum #8, Revision 3, June 1994.

3) Samples analyzed by Fire & Environmental Consulting Laboratories, Inc. of East Lansing, Michigan

4) Bold type denotes exceedance of Act 307 Type B 20 times Drinking Water Criteria.

5) "ID" Inadequate data to develope criterion.

6) "-" denotes no criteria established.

7) Concrete duplicate sample collected at CF-12.

8) "U" denotes analyte was analyzed for, but was not detected.

9) "UJ" denotes sample specific reporting limit for the analyte in this sample should be considered approximate.

10) "J" denotes that the concentration should be considered approximate.

REALM
Coldwater Road Facility
Concrete Analytical Results
Semi-Volatile Organic Compounds method 8270

Sample Location	CW-7 East Basement Basin Wall	CW-8 Center Basement Basin Wall	CW-9 West Basement Basin Wall	CF-12 East Basement Basin Floor	CF-13 Center Basement Basin Floor	CF-14 West Basement Basin Floor	Concrete Duplicate	MDEQ Act 307 20 X Drinking Water
Date Collected	04/28/99	04/28/99	04/28/99	04/28/99	04/28/99	04/28/99	04/28/99	Criteria
Parameter								
Acenaphthene	300U	300U	300U	300U	300U	300U	500	24,000
Acenaphthylene	300U	300U	300U	300U	300U	300U	300U	500
Anthracene	300U	300U	300U	300UJ	300U	300U	1,100J	1.4+E5
Benzo(a)anthracene	300U	300U	300U	300UJ	300U	300U	1,500J	(G)
Benzo(b)fluoranthene	300U	300U	300U	300UJ	300U	300U	1,600J	(G)
Benzo(k)fluoranthene	300U	300U	300U	300U	300U	300U	800	(G)
Benzo(ghi)perylene	300U	300U	300U	300U	300U	300U	900	(G)
Benzo(a)pyrene	300U	300U	300U	300UJ	300U	300U	1,600J	(G)
Bis(2-chloroethoxy)methane	300U	300U	300U	300U	300U	300U	300U	-
Bis(2-chloroethyl)ether	300U	300U	300U	300U	300U	300U	300U	0.64
Bis(2-chloroisopropyl)ether	300U	300U	300U	300U	300U	300U	300U	-
Bis(2-ethylhexyl)phthalate	300U	300U	300U	300U	300U	300U	300U	(G)
4-Bromophenyl phenyl ether	300U	300U	300U	300U	300U	300U	300U	-
Butyl benzyl phthalate	300U	300U	300U	300U	300U	300U	300U	-
4-Chloroaniline	300U	300U	300U	300U	300U	300U	300U	-
2-Chloronaphthalene	300U	300U	300U	300U	300U	300U	300U	-
4-Chloro-3-methylphenol	300R	300R	300R	300R	300R	300R	300R	-
2-Chlorophenol	300R	300R	300R	300R	300R	300R	300R	860
4-Chlorophenyl phenyl ether	300U	300U	300U	300U	300U	300U	300U	-
Chrysene	300U	300U	300U	300UJ	300U	300U	1,300J	-
p,m-Cresol	300U	300U	300U	300U	300U	300U	300U	-
o-Cresol	300U	300U	300U	300U	300U	300U	300U	-
Dibenzeno(a,h)anthracene	300U	300U	300U	300U	300U	300U	300U	(G)
Dibenzofuran	300U	300U	300U	300U	300U	300U	400	ID
Di-n-butyl phthalate	300U	300U	300U	300U	300U	300U	300U	17,000
1,2-Dichlorobenzene	300U	300U	300U	300U	300U	300U	300U	12,000
1,3-Dichlorobenzene	300U	300U	300U	300U	300U	300U	300U	12,000
1,4-Dichlorobenzene	300U	300U	300U	300U	300U	300U	300U	30
3,3-Dichlorobenzidine	300U	300U	300U	300U	300U	300U	300U	1.5
2,4-Dichlorophenol	300R	300R	300R	300R	300R	300R	300R	420
Diethyl phthalate	300U	300U	300U	300U	300U	300U	300U	1.0+E5
2,4-Dimethylphenol	300R	300R	300R	300R	300R	300R	300R	7,000
Dimethyl phthalate	300U	300U	300U	300U	300U	300U	300U	1.4+E6
4,6-Dinitro-2-methylphenol	300R	300R	300R	300R	300R	300R	300R	-
2,4-Dinitrophenol	300R	300R	300R	300R	300R	300R	300R	-
2,4-Dinitrotoluene	300U	300U	300U	300U	300U	300U	300U	-
2,6-Dinitrotoluene	300U	300U	300U	300U	300U	300U	300U	-
Di-n-octyl phthalate	300U	300U	300U	300U	300U	300U	300U	
Fluoranthene	300U	300U	300U	400J	300U	300U	3,100J	17,000
Fluorene	300U	300U	300U	300U	300U	300U	600	17,000
Hexachlorobenzene	300U	300U	300U	300U	300U	300U	300U	0.44
Hexachlorobutadiene	300U	300U	300U	300U	300U	300U	300U	9.2
Hexachlorocyclopentadiene	300U	300U	300U	300U	300U	300U	300U	1,000
Hexachloroethane	300U	300U	300U	300U	300U	300U	300U	50
Indeo(1,2,3-cd)pyrene	300U	300U	300U	300U	300U	300U	800	(G)
Isophorone	300U	300U	300U	300U	300U	300U	300U	760
2-Methylnaphthalene	300U	300U	300U	300U	300U	300U	300U	-
Naphthalene	300U	300U	300U	300U	300U	300U	500	5,000
2-Nitroaniline	300U	300U	300U	300U	300U	300U	300U	-
3-Nitroaniline	300U	300U	300U	300U	300U	300U	300U	-
4-Nitroaniline	300U	300U	300U	300U	300U	300U	300U	-
Nitrobenzene	300U	300U	300U	300U	300U	300U	300U	64
2-Nitrophenol	300R	300R	300R	300U	300R	300R	300R	-
4-Nitrophenol	300R	300R	300R	300R	300R	300R	300R	-
N-Nitrosodiphenylamine	300U	300U	300U	300U	300U	300U	300U	140
N-Nitrosodi-n-propylamine	300U	300U	300U	300U	300U	300U	300U	0.098
Pentachlorophenol	300R	300R	300R	300R	300R	300R	300R	-
Phenanthrene	300U	300U	300U	400J	300U	300U	3,000J	500
Phenol	300U	300U	300U	300U	300U	300U	300U	84,000
Pyrene	300U	300U	300U	400J	300U	300U	2,800J	10,000
1,2,4-Trichlorobenzene	300U	300U	300U	300U	300U	300U	300U	2,200
2,4,6-Trichlorophenol	300R	300R	300R	300R	300R	300R	300R	64
2,4,5- Trichlorophenol	300R	300R	300R	300R	300R	300R	300R	14,000

Notes:

1) Results and criteria are shown in ug/l (ppb).
2) MDEQ Act 307 Type B 20 times Drinking Water value as listed in Operational Memorandum #8, Revision 3, June 1994.
3) Samples analyzed by Fire & Environmental Consulting Laboratories, Inc. of East Lansing, Michigan
4) Bold type denotes exceedance of Act 307 Type B 20 times Drinking Water Criteria.
5) {G} Chemical, due to its physicochemical properties, is not expected to leach through soils to groundwater under most conditions. Therefore, the direct contact soil criterion is considered to be protective of groundwater. However, the presence of organic solvents in the soil may increase the solubility of these chemicals, thereby increasing their potential to leach from soil to groundwater. Under these conditions site-specific leachate testing may be required.
6) "ID" Inadequate data to develope criterion
7) "-" denotes criteria not established.
8) Concrete duplicate sample collected at CF-12.
9) "U" denotes the analyte was analyzed for , but was not detected.
10) "J" denotes that the concentration should be considered approximate.
11) "R" denotes that the reporting limit or sample result has been determined to be unusable due to deficiencies in the data generation proces
12 "UJ" denotes sample specific reporting limit for the analyte in this sample should be considered approximate.
13) "E" denotes exponential factor

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REALM
Coldwater Road Facility
Concrete Analytical Results
Metals method 6020/7471

Sample Location	CW-7 East Basement Basin Wall	CW-8 Center Basement Basin Wall	CW-9 West Basement Basin Wall	CF-12 East Basement Basin Floor	CF-13 Center Basement Basin Floor	CF-14 West Basement Basin Floor	Concrete Duplicate	MDEQ Act 307 20 X Drinking Water Criteria
Date Collected	**04/28/99**	**04/28/99**	**04/28/99**	**04/28/99**	**04/28/99**	**04/28/99**	**04/28/99**	
Parameter								
Arsenic	**4,270**	**4,810**	**4,730**	**5,820**	**5,430**	**9,500**	**4,160**	.4{C}
Barium	36,200	38,100	43,200	42,500	36,300	43,100	43,700	48,000{C}
Cadmium	50U	50U	50U	50U	70	50U	50U	70{C}
Chromium	**12,200**	**19,100**	**9,940**	**14,500**	**13,100**	**11,400**	**13,300**	2,400{C}
Copper	13,100J	19,900J	13,300J	**48,400J**	16,300J	**21,700J**	**125,000J**	20,000{C}
Lead	**2,400**	**3,000**	**3,200**	**2,800**	**3,100**	**6,100**	**3,800**	80{C}
Mercury	100U	100U	100U	100U	100U	100U	100U	42{C}
Selenium	500U	500U	500U	500U	500U	**1,490**	520	700{C}
Silver	200U	200U	200U	200U	200U	200U	200U	660{C}
Zinc	14,200J	14,700J	15,000J	16,500J	38,600J	14,800J	37,900J	46,000{C}

Notes:

1) Results and criteria are shown in ug/kg (ppb).
2) MDEQ Act 307 Type B Health-Based Drinking Water criteria as listed in Operational Memorandum #8, Revision 3, June 1994.
3) Samples analyzed by Fire & Environmental Consulting Laboratories, Inc. of East Lansing, Michigan
4) Bold type denotes exceedance of Act 307 Type B 20 times Drinking Water criteria.
5) "{C}" denotes Background, as defined in Rule 701(c), may be substituted as the cleanup criteria if higher than the Type B cleanup criterion.
6) Concrete duplicate sample collected at CF-12.
7) "U" denotes the analyte was analyzed for, but was not detected.
8) "J" denotes that the concentration should be considered approximate.

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REALM Table 3

Coldwater Road Facility

Concrete Rinseate Analytical Results

Metals method 200.8/245.1/1311

Sample Location	Deionized Water Basin floor	West Alkali Basin floor	Tap Water	MDEQ Act 307 Type B Health-Based Drinking Water Criteria
Date Collected	**12/21/98**	**12/21/98**	**12/21/98**	
Parameter				
Arsenic	**1U**	**3**	**5**	0.02 (C)
Barium	30	70	180	2,400 (C)
Cadmium	0.2U	0.2U	0.2U	3.5 (C)
Chromium	10U	(30)	10U	37,000 (C)
Copper	(30)	(100)	10U	1,300 (C)
Lead	3	3U	3U	4 (C, O)
Mercury	0.2U	0.2U	0.2U	2.1 (C)
Selenium	5U	5U	5U	35 (C)
Silver	0.5U	0.5U	0.5U	33 (C)
Zinc	(80)	(60)	30	2,300 (C)

Notes:

1) Results and criteria are shown in ug/l (ppb).
2) MDEQ Act 307 Type B Health-Based Drinking Water Criteria as listed in Operational Memorandum #8, Revision 3, June 1994.
3) Samples analyzed by Fire & Environmental Consulting Laboratories, Inc. of East Lansing, Michigan.
4) Bold type denotes exceedance of Act 307 Type B Health-Based Drinking Water Criteria.
5) "()" denotes exceedance of Tap Water sample.
6) "C" denotes background as defined in Rule 701 (c), may be substituted as the cleanup criteria if higher than the Type B cleanup criterion.
7) "O" denotes higher level may be acceptable if soil concentration is less than 400 ppm and groundwater migrating off-site will not impact adjacent properties. Contact an ERD toxicologist for further explanation.
8) "U" denotes the analyte was analyzed for, but was not detected.

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REALM
Coldwater Road Facility
Basement Basin Concrete Rinseate Analytical Results
Volatile Organics Method 8260

Sample Location	East Basement Basin	Center Basement Basin	West Basement Basin	Rinseate Duplicate	Tap Water	MDEQ Part 201 Generic Cleanup Criteria Industrial Drinking Water Criteria
Date Collected	04/20/99	04/21/99	04/21/99	04/20/99	04/21/99	
Parameter						
Benzene	1U	1U	1U	1U	1U	5.0 (A)
Bromodichloromethane	4U	5U	3U	4U	5U	100 (A, W)
Bromoform	1U	1U	1U	1U	1U	100 (A, W)
Bromomethane	1U	1U	1U	1U	1U	29
n-Butylbenzene	1U	1U	1U	1U	1U	230
sec-Butylbenzene	1U	1U	1U	1U	1U	230
tert-Butylbenzene	1U	1U	1U	1U	1U	230
Carbon tetrachloride	1U	1U	1U	1U	1U	5.0 (A)
Chlorobenzene	1U	1U	1U	1U	1U	100 (A)
Chloroethane	1U	1U	1U	1U	1U	1,700
Chloroform	5U	6U	4U	5U	6U	100 (A, W)
Chloromethane	1U	1U	1U	1U	1U	1,100
Dibromochloromethane	3U	3U	2U	3U	4U	100 (A, W)
1,2-Dichlorobenzene	1U	1U	3	1U	1U	600 (A)
1,3-Dichlorobenzene	1U	1U	1U	1U	1U	19
1,4-Dichlorbenzene	1U	1U	1U	1U	1U	75 (A)
1,1-Dichloroethane	1U	1U	1U	1U	1U	2,500
1,2-Dichloroethane	1U	1U	1U	1U	1U	5.0 (A)
1,1-Dichloroethene	1U	1U	1U	1U	1U	7.0 (A)
cis-1,2-Dichloroethane	1U	1U	1U	1U	1U	70 (A)
trans-1,2-Dichloroethene	1U	1U	1U	1U	1U	100 (A)
1,2-Dichloropropane	1U	1U	1U	1U	1U	5.0 (A)
cis-1,3-Dichloropropene	1U	1U	1U	1U	1U	-
trans-1,3-Dichloropropene	1U	1U	1U	1U	1U	-
Ethylbenzene	1U	1U	1U	1U	1U	74 (E)
Isopropylbenzene	1U	1U	1U	1U	1U	2,300
p-Isopropyltoluene	1U	1U	1U	1U	1U	-
Methylene chloride	9UJ	9UJ	8UJ	9UJ	9UJ	5.0 (A)
Naphthalene	3	1	3U	3	1U	1,500
n-Propylbenzene	1U	1U	1U	1U	1U	230
Styrene	1U	1U	1U	1U	1U	100 (A)
1,1,2,2-Tetrachloroethane	1U	1U	1U	1U	1U	35
Tetrachloroethene	1U	1U	1U	1U	1U	5.0 (A)
Toluene	1U	2U	4U	1U	1U	790 (E)
1,1,1-Trichloroethane	1U	1U	4U	1U	1U	200 (A)
1,1,2-Trichloroethane	1U	1U	1U	1U	1U	5.0 (A)
Trichloroethene	1U	1U	1U	1U	1U	5.0 (A)
1,2,4-Trimethylbenzene	1U	1U	2U	1U	1U	63 (E)
1,3,5-Trimethylbenzene	1U	1	3U	1U	1U	72 (E)
Vinyl chloride	1U	1U	1U	1U	1U	2.0 (A)
o-Xylene	1U	1U	5	1U	1U	280 (E)
p,m-Xylene	1U	1	3	1U	1U	280 (E)
Acetone	50U	50U	50U	50U	50U	2,100
2-Butanone	50U	50U	50U	50U	50U	38,000
Carbon Disulfide	50U	50U	50U	50U	50U	2,300
2-Hexanone	50U	50U	50U	50U	50U	2,900
4-Methyl-2-pentanone	50U	50U	50U	50U	50U	-

Notes:
1) Results and criteria are shown in ug/l (ppb).
2) MDEQ Part 201 Industrial Drinking Water Criteria as listed in Operational Memorandum #18, dated June 7, 2000.
3) Samples analyzed by Fire & Environmental Consulting Laboratories, Inc. of East Lansing, Michigan.
4) "A" denotes criterion is the State of Michigan Drinking Water Standard established pursuant to Section 5 of the Safe Drinking Water Act, Act No. 399 of the Public Acts of 1976.
5) "E" denotes criterion is the asthetic drinking water value, as required by Section 20120 (1)(5).
6) "W" denotes Concentrations of trihalomethanes in groundwater must be added together to determine compliance with the State of Michigan Drinking Water Standard of 100 ug/l. Concentrations of trihalomethanes in soil must be added together to determine compliance with the drinking water protection criterion of 2,000 ug/kg.
7) "U" denotes the analyte was analyzed for, but was not detected.
8) "-" denotes no criteria established.
9) Rinseate duplicate sample collected at East Basement Basin location.
10) "UJ" denotes that the sample-specific reporting limit for the analyte in this sample should be considered approximate.

REALM
Coldwater Road Facility
Basement Basin Concrete Rinseate Analytical Results
Semi-Volatile Organics Method 8270

Sample Location	East Basement Basin	Center Basement Basin	West Basement Basin	Rinseate Duplicate	Tap Water	MDEQ Part 201 Generic Cleanup Criteria
Date Collected	04/20/99	04/21/99	04/21/99	04/20/99	04/21/99	Industrial Drinking Water Criteria
Parameter						
Acenaphthene	20U	20U	40U	20U	10U	3,800
Acenaphthylene	20U	20U	40U	20U	10U	150
Anthracene	20U	20U	40U	20U	10U	43 (S)
Benzo(a)anthracene	20U	20U	40U	20U	10U	8.5
Benzo(b)fluoranthene	20U	20U	40U	20U	10U	2.0 (M)
Benzo(k)fluoranthene	20U	20U	40U	20U	10U	5.0(M)
Benzo(ghi)perylene	20U	20U	40U	20U	10U	5.0(M)
Benzo(a)pryene	20U	20U	40U	20U	10U	5.0 (A,M)
Bis(2-chlorothoxy)methane	20U	20U	40U	20U	10U	-
Bis(2-chloroisopropyl)ether	20U	20U	40U	20U	10U	8.3
Bis(2-ethylhexyl)phthalate	20	40	70	30	10U	6.0 (A)
4-Bromophenyl phenyl ether	20U	20U	40U	20U	10U	-
Butyl benzyl phthalate	20U	20U	40U	20U	10U	2,700 (S)
4-Chloroaniline	20UJ	20UJ	40UJ	20UJ	10UJ	-
2-Chloronaphthalene	20U	20U	40U	20U	10U	-
4-Chloro-3-methylphenol	20U	20U	40U	20U	10U	420
2-Chlorophenol	20U	20U	40U	20U	10U	130
4-Chlorophenyl phenyl ether	20U	20U	40U	20U	10U	-
Chrysene	20U	20U	40U	20U	10U	5.0(M)
p,m-Cresol	20U	20U	40U	20U	10U	-
o-Cresol	20U	20U	40U	20U	10U	-
Dibenzo(a,h)anthracene	20U	20U	40U	20U	10U	5.0 (M)
Dibenzofuran	20U	20U	40U	20U	10U	ID
Di-n-butyl phthalate	20U	20U	40U	20U	10U	2,500
1,2-Dichlorobenzene	20U	20U	40U	20U	10U	600 (A)
1,3-Dichlorobenzene	20U	20U	40U	20U	10U	19
1,4-Dichlorobenzene	20U	20U	40U	20U	10U	75(A)
3,3'-Dichlorobenzidine	20U	20U	40U	20U	10U	4.3
2,4-Dichlorophenol	20U	20UJ	40U	20U	10U	210
Diethyl phthalate	20U	20U	70U	20U	10U	16,000
2,4-Dimethylphenol	20U	20U	40U	20U	10U	1,000
Dimethyl phthalate	20U	20U	40U	20U	10U	210000
4,6-Dintro-2-methylphenol	20UJ	20U	40U	20U	10U	-
2,4-Dinitrophenol	20UJ	20U	40UJ	20UJ	10UJ	-
2,4-Dinitrotoluene	20U	20U	40U	20U	10U	32
2,6-Dinitrotoluene	20U	20U	40U	20U	10U	-
Di-n-octyl phthalate	20U	20U	40U	20U	10U	380
Fluoranthene	20U	20U	40U	20U	10U	210 (S)
Fluorene	20U	20U	40U	20U	10U	2,000 (S)
Hexachlorobenzene	20U	20U	40U	20U	10U	1.0 (A)
Hexachlorobutadiene	20U	20U	40U	20U	10U	42
Hexachlorocyclopentadiene	20U	20U	40U	20U	10U	50 (A)
Hexachloroethane	20U	20U	40U	20U	10U	21
Indeno(1,2,3-cd)pyrene	20U	20U	40U	20U	10U	5.0 (M)
Isophorone	20U	20U	40U	20U	10U	3,100
2-Methylnaphthalene	20U	20U	40U	20U	10U	750
Naphthalene	20U	20U	40U	20U	10U	1,500
2-Nitroaniline	20U	20U	40U	20U	10U	-
3-Nitroaniline	20U	20U	40U	20U	10U	-
4-Nitroaniline	20U	20U	40U	20U	10U	-
Nitrobenzene	20U	20U	40U	20U	10U	9.6
2-Nitrophenol	20U	20U	40U	20U	10U	58
4-Nitrophenol	20UJ	20UJ	40UJ	20UJ	10UJ	-
N-Nitrosodiphenylamine	20U	20U	40U	20U	10U	1,000
N-Nitrosodi-n-proplyamine	20U	20U	40U	20U	10U	5.0 (M)
Pentachlorophenol	20UJ	20U	40U	20U	10U	1.0(A)
Phenanthrene	20U	20U	40U	20U	10U	150
Phenol	20U	20U	40U	20U	10U	13,000
Pyrene	20U	20U	40U	20U	10U	140(S)
1,2,4-Trichlorobenzene	20U	20U	40U	20U	10U	70(A)
2,4,5-Trichlorophenol	20UJ	20U	40U	20U	10U	2,100
2,4,6-Trichlorophenol	20U	20U	40U	20U	10U	470

Notes:
1) Results and criteria are shown in ug/l (ppb).
2) MDEQ Part 201 Industrial Drinking Water criteria as listed in Operational Memorandum #18, Revision June 7, 2000.
3) Samples analyzed by Fire & Environmental Consulting Laboratories, Inc. of East Lansing, Michigan
4) "ID" Inadequate data to develop criterion
5) "A" denotes criterion is the State of Michigan Drinking Water Standard established pursuant to Section 5 of the Safe Drinking Water Act, Act No. 399 of the Public Acts of 1976.
6) "M" denotes calculated criterion is below the analytical method detection limit, therefore, the criterion defaults to the method detection limit.
7) "S" denotes criterion defaults to the chemical-specific water solubility limit.
8) "UJ" denotes that the sample-specific reporting limit for the analyte in this sample should be considered approximate
10) "U" denotes the analyte was analyzed for, but was not detected
11) Rinseate Duplicate sample collected at East basement Basin location
12) "-" denotes no criteria established.

REALM
Coldwater Road Facility
Basement Basin Concrete Rinseate Analytical Results
Metals method 200.8/245.1/1311

Table 4 (cont.)

Sample Location	East Basement Basin	Center Basement Basin	West Basement Basin	Tap Water	Rinseate Duplicate	MDEQ Part 201 Generic Cleanup Criteria
Date Collected	04/20/99	04/20/99	04/20/99	04/20/99	04/20/99	Industrial Drinking Water Criteria
Parameter						
Cadmium	.5U	.5U	1.2	.5U	.5U	5.0 (A)
Chromium	**260**	80	**2,180**	10U	**240**	100 (A)
Copper	**3,350**	430	**11,400**	10U	**3,060**	1,000 (E)
Lead	**96**	**20**	**169**	**52**	**93**	4.0 (L)
Nickel	**994**	**140**	**3,850**	5U	**913**	100 (A)
Zinc	1,080	240	4,190	20U	990	5,000 (E)

Notes:

1) Results and criteria are shown in ug/l (ppb).
2) MDEQ Part 201 Industrial Drinking Water criteria as listed in Operational Memorandum #18, dated June 7, 2000.
3) Samples analyzed by Fire & Environmental Consulting Laboratories, Inc. of East Lansing, Michigan
4) "A" denotes criterion is the State of Michigan Drinking Water Standard established pursuant to Section 5 of the Safe Drinking Water Act, Act No. 399 of the Public Acts of 1976.
5) "E" denotes criterion is the aesthetic drinking water value, as required by Sec. 20120(1)(5).
6) "L" denotes higher level may be acceptable(up to 15ug/l) if soil concentration is less than 400 ppm and groundwater migrating off-site will not result in unacceptable exposures. Contact an ERD toxicologist for further explanation.
7) "U" denotes the analyte was analyzed for, but was not detected.
8) Rinseate Duplicate sample collected at East Basement Basin location.
9) Bold type denotes exceedance of Part 201 Industrial Drinking Water criteria.

REALM

Table 5

Coldwater Road Facility

Groundwater Analytical Results

Volatile Organic Compounds method 8260

Sample Location	OBG MW-1	GW Duplicate	OBG MW-2	MDEQ Part 201 Generic Cleanup Criteria
Date Collected	01/26/99	01/26/99	01/26/99	Industrial Drinking Water
Parameter				Criteria
Benzene	1U	1U	1U	5.0 (A)
Bromodichloromethane	1U	1U	1U	100 (A, W)
Bromoform	1U	1U	1U	100 (A, W)
Bromomethane	1U	1U	1U	29
n-Butylbenzene	1U	1U	1U	230
sec-Butylbenzene	1U	1U	1U	230
tert-Butylbenzene	1U	1U	1U	230
Carbon tetrachloride	1U	1U	1U	5.0 (A)
Chlorobenzene	1U	1U	1U	100 (A)
Chloroethane	1U	1U	1U	1,700
Chloroform	1U	1U	1U	100 (A, W)
Chloromethane	1U	1U	1U	1,100
Dibromochloromethane	1U	1U	1U	100 (A, W)
1,2-Dichlorobenzene	1U	1U	1U	600 (A)
1,3-Dichlorobenzene	1U	1U	1U	19
1,4-Dichlorobenzene	1U	1U	1U	75 (A)
1,1-Dichloroethane	1U	1U	1U	2,500
1,2-Dichloroethane	1U	1U	1U	5.0 (A)
1,1-Dichloroethene	1U	1U	1U	7.0 (A)
cis 1,2-Dichloroethene	1U	1U	1U	70 (A)
trans 1,2-Dichloroethene	1U	1U	1U	100 (A)
1,2-Dichloropropane	1U	1U	1U	5.0 (A)
cis 1,3-Dichloropropene	1U	1U	1U	-
Ethylbenzene	1U	1U	1U	74 (E)
Isopropylbenzene	1U	1U	1U	2,300
p-Isopropyltoluene	1U	1U	1U	-
Methylene chloride	3 U	2 U	3 U	5.0 (A)
Naphthalene	1U	1U	1U	1,500
n-Propylbenzene	1U	1U	1U	-
Styrene	1U	1U	1U	100 (A)
1,1,2,2-Tetrachloroethane	1U	1U	1U	35
Tetrachloroethene	1U	1U	1U	5.0 (A)
Toluene	1U	1U	1U	790 (E)
1,1,1-Trichloroethane	1U	1U	1U	200 (A)
1,1,2-Trichloroethane	1U	1U	1U	5.0 (A)
Trichloroethene	1U	1U	1U	5.0 (A)
1,2,4-Trimethylbenzene	2	1 U	1 U	63 (E)
1,3,5-Trimethylbenzene	1	1U	1U	72 (E)
Vinyl chloride	1U	1U	1U	2.0 (A)
o-Xylene	1U	1U	1U	280 (E)
p,m-Xylene	1U	1U	1U	280 (E)
Acetone*	50UJ	50UJ	50UJ	2,100
2-Butanone*	50UJ	50UJ	50UJ	38,000
Carbon Disulfide*	50U	50U	50U	2,300
2-Hexanone*	50U	50U	50U	2,900
4-Methyl-2-pentanone*	50U	50U	50U	5,200

Notes:

1) Results and criteria are shown in ug/l (ppb).

2) MDEQ Part 201 Industrial Drinking Water criteria as listed in Operational Memorandum #18, dated June 7, 2000.

3) Samples analyzed by Fire & Environmental Consulting Laboratories, Inc. of East Lansing, Michigan

4) "-" denotes no criteria established.

5) "A" denotes criterion is the State of Michigan Drinking Water Standard established pursuant to Section 5 of the Safe Drinking Water Act, Act No. 399 of the Public Acts of 1976.

6) "E" denotes criterion is the asthetic drinking water value, as required by Section 20120 (1)(5).

7) "W" denotes Concentrations of trihalomethanes in groundwater must be added together to determine compliance with the State of Michigan Drinking Water Standard of 100 ug/l. Concentrations of trihalomethanes in soil must be added together to determine compliance with the drinking water protection criterion of 2,000 ug/kg.

8) "U" denotes the analyte was analyzed for, but was not detected.

9) "UJ" denotes that the sample-specific reporting limit for the analyte in this sample should be considered approximate.

10) Ground water duplicate sample collected at OBG MW-1.

11) "*" indicates these constituents were added after implementation of the QAPP.

REALM
Coldwater Road Facility
Groundwater Analytical Results
Semivolatile Organic Compounds method 8270

Sample Location	OBG MW-1	GW Duplicate	OBG MW-2	MDEQ Part 201 Generic Cleanup Criteria Industrial Drinking Water Criteria
Date Collected	01/26/99	01/26/99	01/26/99	
Parameter				
Acenaphthene	10UJ	10UJ	10UJ	3,800
Acenaphthylene	10UJ	10UJ	10UJ	150
Anthracene	10UJ	10UJ	10UJ	43 (S)
Benzo(a)anthracene	10U	10U	10U	8.5
Benzo(b)fluoranthene	10UJ	10UJ	10UJ	2(M)
Benzo(k)fluoranthene	10U	10U	10U	5.0(M)
Benzo(ghi)perylene	10U	10U	10U	5.0(M)
Benzo(a)pyrene	10U	10U	10U	5.0 (A,M)
Bis(2-chloroethoxy)methane	10U	10U	10U	-
Bis(2-chloroethyl)ether	10U	10U	10U	8.3
Bis(2-chloroisopropyl)ether	10UJ	10U	10U	-
Bis(2-ethylhexyl)phthalate	10UJ	10UJ	10UJ	6.0 (A)
4-Bromophenyl phenyl ether	10UJ	10UJ	10UJ	-
Butyl benzyl phthalate	10UJ	10UJ	10UJ	2,700 (S)
4-Chloroaniline	10UJ	10UJ	10UJ	-
2-Chloronaphthalene	10UJ	10UJ	10UJ	-
4-Chloro-3-methylphenol	10U	10U	10U	420
2-Chlorophenol	10UJ	10U	10U	130
4-Chlorophenyl phenyl ether	10U	10U	10U	-
Chrysene	10U	10U	10U	5.0(M)
p,m-Cresol	10U	10U	10U	-
o-Cresol	10U	10U	10U	-
Dibenzo(ah)anthracene	10U	10U	10U	5.0 (M)
Dibenzofuran	10UJ	10U	10U	ID
Di-n-butyl phthalate	10UJ	10UJ	10UJ	2,500
1,2-Dichlorobenzene	10U	10U	10U	600 (A)
1,3-Dichlorobenzene	10U	10U	10U	19
1,4-Dichlorobenzene	10U	10U	10U	75(A)
3,3'-Dichlorobenzidine	10UJ	10U	10U	4.3
2,4-Dichlorophenol	10U	10U	10U	210
Diethyl phthalate	10UJ	10UJ	10UJ	16,000
2,4-Dimethylphenol	10U	10U	10U	1,000
Dimethyl phthalate	10UJ	10U	10U	210000
4,6-Dinitro-2-methylphenol	10UJ	10UJ	10UJ	-
2,4-Dinitrophenol	10UJ	10U	10U	-
2,4-Dinitrotoluene	10UJ	10U	10U	32
2,6-Dinitrotoluene	10UJ	10U	10U	-
Di-n-octyl phthalate	10UJ	10UJ	10UJ	380
Fluoranthene	10UJ	10UJ	10UJ	210 (S)
Fluorene	10UJ	10UJ	10UJ	2,000 (S)
Hexachlorobenzene	10UJ	10U	10U	1.0 (A)
Hexachlorobutadiene	10U	10U	10U	42
Hexachlorocyclopentadiene	10UJ	10UJ	10UJ	50 (A)
Hexachloroethane	10U	10U	10U	21
Indeno(1,2,3-cd)pyrene	10U	10U	10U	5.0 (M)
Isophorone	10U	10U	10U	3,100
2-Methylnaphthalene	10U	10U	10U	750
Naphthalene	10UJ	10UJ	10U	1,500
2-Nitroaniline	10UJ	10UJ	10U	-
3-Nitroaniline	10UJ	10UJ	10U	-
4-Nitroaniline	10UJ	10UJ	10U	-
Nitrobenzene	10U	10U	10U	9.6
2-Nitrophenol	10U	10U	10U	58
4-Nitrophenol	10UJ	10UJ	10U	-
N-Nitrosodiphenylamine	10UJ	10UJ	10U	1,100
Phenanthrene	10UJ	10UJ	10U	150
Phenol	10UJ	10U	10U	13,000
Pyrene	10U	10U	10U	140 (S)
1,2,4-Trichlorobenzene	10U	10U	10U	70 (A)
2,4,5-Trichlorophenol	10U	10U	10U	2,100
2,4,6-Trichlorophenol	10U	10U	10U	470

Notes:

1) Results and criteria are shown in ug/l (ppb).

2) MDEQ Part 201 Industrial Drinking Water criteria as listed in Operational Memorandum #18, dated June 7,2000

3) Samples analyzed by Fire & Environmental Consulting Laboratories, Inc. of East Lansing, Michigan

4) "-" denotes no criteria established.

5) "A" denotes criterion is the State of Michigan Drinking Water Standard established pursuant to Section 5 of the Safe Drinking Water Act, Act No. 399 of the Public Acts of 1976.

6) "M" denotes calculated criterion is below the analytical method detection limit, therefore the criterion defaults to the method detection limit.

7) "S" denotes criterion defaults to the chemical-specific water solubility limit.

8) "UJ" denotes that the sample-specific reporting limit for the analyte in this sample should be considered approximate.

9) "ID" denotes inadequate data to develop criterion

10) "U" denotes the analyte was analyzed for, but was not detected.

11) Ground water duplicate sample collected at OBG MW-1

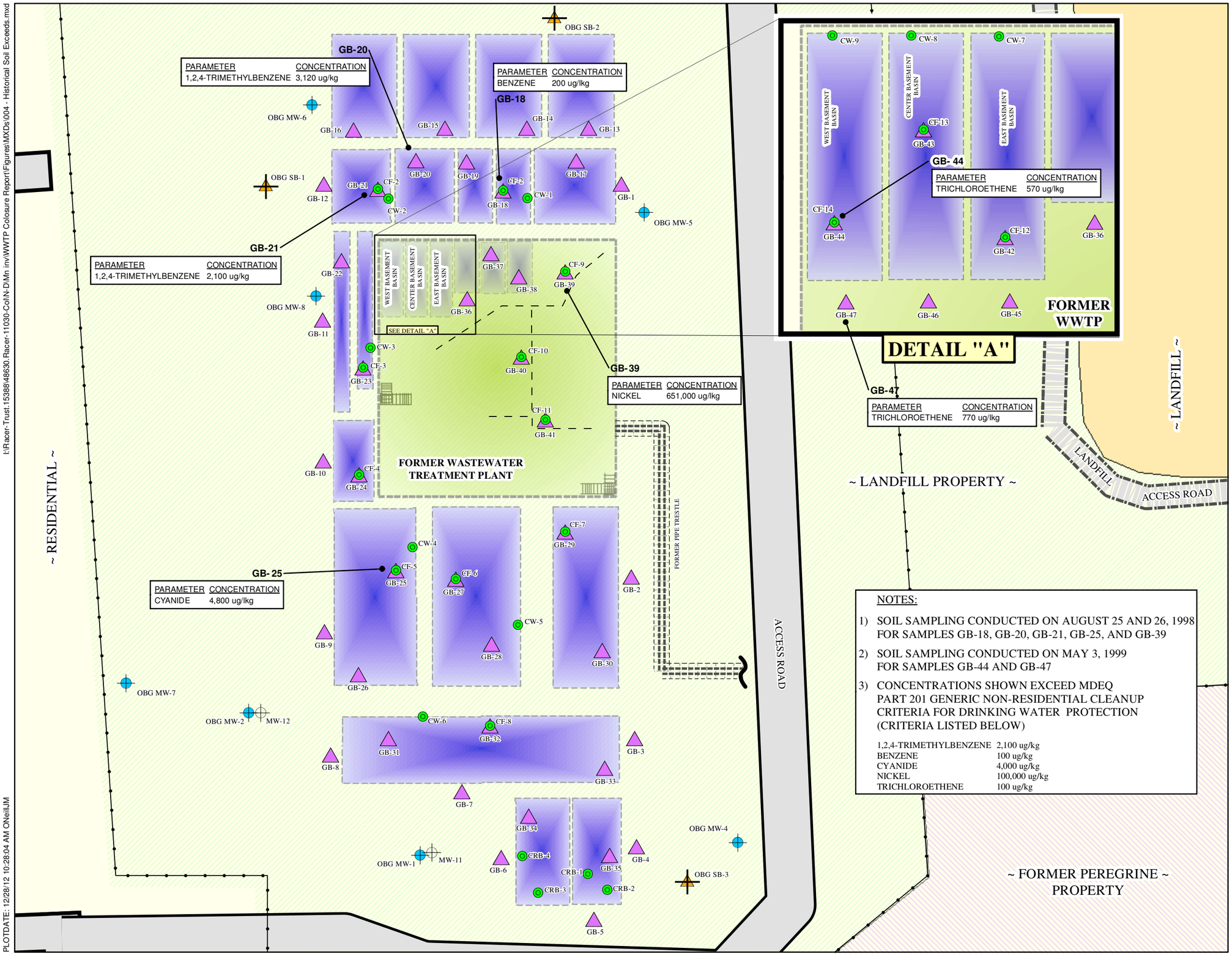
REALM
Coldwater Road Facility
Groundwater Analytical Results
Metals method 200.8 and Cyanide method 335.2

Sample Location	OBG MW-1	GW Duplicate	OBG MW-2	MDEQ Part 201 Generic Cleanup Criteria Industrial Drinking Water Criteria
Date Collected	**01/26/99**	**01/26/99**	**01/26/99**	
Parameter				
Cadmium, Dissolved	0.2U	0.2U	0.4	5.0 (A)
Chromium, Dissolved	10U	10U	10U	100 (A)
Copper, Dissolved	10	10	20	1,000 (E)
Lead , Dissolved	**8**	**9**	**32**	4 (L)
Nickel , Dissolved	15	15	13	100 (A)
Zinc, Dissolved	20	20	50	5,000 (E)
Cyanide	5U	5U	5U	200 (A)

Notes:

1) Results and criteria are shown in ug/l (ppb).
2) Samples analyzed by Fire & Environmental Consulting Laboratories, Inc. of East Lansing, Michigan.
3) Bold type denotes exceedance of Part 201 Industrial Drinking Water criteria.
4) MDEQ Part 201 Industrial Drinking Water Protection Criteria as listed in Operational Memorandum #18, dated June 7,2000.
5) "A" denotes criterion is the State of Michigan Drinking Water Standard established pursuant to Section 5 of the Safe Drinking Water Act, Act No. 399 of the Public Acts of 1976.
6) "E" denotes criterion is the aesthetic drinking water value, as required by Section 20120 (1)(5).
7) "L" denotes higher groundwater concentrations (up to 15 ug/L) may be acceptable if the soil concentration is less than 400 ppm and groundwater migrating off-site will not result in unacceptable exposures. Contact an ERD toxicologist if further explanatio is needed.
8) "U" denotes the analyte was analyzed for, but was not detected.
9) Ground water duplicate sample collected at OBG MW-1.

FIGURE A-1



LEGEND

- FORMER WWTP BUILDING
- FORMER WWTP BASIN
- FLOOR TRENCH

SAMPLE LOCATIONS

- CONCRETE
- GEOPROBE
- SOIL BORING
- FORMER MONITORING WELL
- MONITORING WELL

NOTES:

1) SOIL SAMPLING CONDUCTED ON AUGUST 25 AND 26, 1998 FOR SAMPLES GB-18, GB-20, GB-21, GB-25, AND GB-39
2) SOIL SAMPLING CONDUCTED ON MAY 3, 1999 FOR SAMPLES GB-44 AND GB-47
3) CONCENTRATIONS SHOWN EXCEED MDEQ PART 201 GENERIC NON-RESIDENTIAL CLEANUP CRITERIA FOR DRINKING WATER PROTECTION (CRITERIA LISTED BELOW)

1,2,4-TRIMETHYLBENZENE	2,100 ug/kg
BENZENE	100 ug/kg
CYANIDE	4,000 ug/kg
NICKEL	100,000 ug/kg
TRICHLOROETHENE	100 ug/kg

RACER TRUST
COLDWATER ROAD
FORMER WWTP
FLINT, MICHIGAN

FORMER BASIN INVESTIGATION SAMPLE LOCATIONS AND HISTORICAL SOIL CRITERIA EXCEEDANCES

0 12.5 25 50 75 100
Feet

NOVEMBER 2012
15388/48630-004

O'BRIEN & GERE ENGINEERS, INC.

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PLOTDATE: 12/28/12 10:39:28 AM ONeillJM

FIGURE A-2

N

FORMER WWTP

~ LANDFILL ~

ABANDONED RAILROAD TRACKS

~ RESIDENTIAL ~

OBG MW-2

PARAMETER	CONC.	DATE
DISSOLVED LEAD	32 ug/l	1/26/1999

OBG MW-1

PARAMETER	CONC.	DATE
DISSOLVED LEAD	8 ug/l	1/26/1999

~ FORMER PEREGRINE ~ PROPERTY

LEGEND

- FORMER WWTP BUILDING
- FORMER WWTP BASIN
- MONITORING WELL
- APPROXIMATE LOCATION OF UNDERGROUND STORM SEWER LINE

NOTES:

1 - ANALYTICAL RESULTS IN ug/l.

2 - MDEQ PART 201 GENERIC NON-RESIDENTIAL DRINKING WATER CRITERIA:
ARSENIC - 10 ug/l
CYANIDE - 200 ug/l
LEAD - 4 ug/l
MANGANESE - 50 ug/l

RACER TRUST
COLDWATER ROAD
FORMER WWTP
FLINT, MICHIGAN

FORMER BASIN INVESTIGATION SAMPLE LOCATIONS AND GROUNDWATER CRITERIA EXCEEDANCES

0 12.5 25 50 75 100
Feet

NOVEMBER 2012
15388/48630-005

O'BRIEN & GERE ENGINEERS, INC.

Appendix B

Former WWTP Addendum to the June 1999 Closure Certification Report Analytical Results

TABLE 1
REALM
Coldwater Road Facility
Ground Water Analytical Results - First Quarter (June 2007)
Volatile Organic Compounds Method 8260

Sample Location	OBG MW-5	OBG MW-6	OBG MW-8	MDEQ Part 201 Generic Cleanup Criteria Industrial Drinking Water Criteria
Date Collected	6/19/2007	6/19/2007	6/19/2007	
Parameter				
Benzene	1U	<1	<1	5.0 (A)
Bromodichloromethane	<1	<1	<1	100 (A, W)
Bromoform	<1	<1	<1	100 (A, W)
Bromomethane	<5	<5	<5	29
n-Butylbenzene	<1	<1	<1	230
sec-Butylbenzene	<1	<1	<1	230
tert-Butylbenzene	<1	<1	<1	230
Carbon tetrachloride	<1	<1	<1	5.0 (A)
Chlorobenzene	<1	<1	<1	100 (A)
Chloroethane	<5	<5	<5	1,700
Chloroform	<1	<1	<1	100 (A, W)
Chloromethane	0.5J	5U	5U	1,100
Dibromochloromethane	5UJ	<5	<5	100 (A, W)
1,2-Dichlorobenzene	<1	<1	<1	600 (A)
1,3-Dichlorobenzene	<1	<1	<1	19
1,4-Dichlorobenzene	<1	<1	<1	75 (A)
1,1-Dichloroethane	6	<1	0.3	2,500
1,2-Dichloroethane	<1	<1	<1	5.0 (A)
1,1-Dichloroethene	0.3	<1	<1	7.0 (A)
cis 1,2-Dichloroethene	12	<1	<1	70 (A)
trans 1,2-Dichloroethene	0.6	<1	<1	100 (A)
1,2-Dichloropropane	<1	<1	<1	5.0 (A)
cis 1,3-Dichloropropene	<1	<1	<1	-
Ethylbenzene	1U	<1	<1	74 (E)
Isopropylbenzene	0.1J	<5	<5	2,300
p-Isopropyltoluene	0.2J	<5	<5	-
Methylene chloride	1	<5	<5	5.0 (A)
Naphthalene	12	5U	5U	1,500
n-Propylbenzene	<1	<1	<1	-
Styrene	<1	<1	<1	100 (A)
1,1,2,2-Tetrachloroethane	<1	<1	<1	35
Tetrachloroethene	3	<1	<1	5.0 (A)
Toluene	7J	1U	<1	790 (E)
1,1,1-Trichloroethane	<1	<1	<1	200 (A)
1,1,2-Trichloroethane	<1	<1	<1	5.0 (A)
Trichloroethene	1	<1	<1	5.0 (A)
1,2,4-Trimethylbenzene	1U	<1	<1	63 (E)
1,3,5-Trimethylbenzene	1U	<1	<1	72 (E)
Vinyl chloride	2J	<1	<1	2.0 (A)
o-Xylene	2U	<1	<1	280 (E)
p,m-Xylene	2U	0.1	<2	280 (E)
Acetone*	50U	<50	<50	2,100
2-Butanone*	6J	<30	<30	38,000
Carbon Disulfide*	<5	<5	<5	2,300
2-Hexanone*	0.6J	<50	<50	2,900
4-Methyl-2-pentanone*	10J	<50	<50	5,200
tert-Methyl butyl ether	<5	<5	<5	40 (E)
1,1,1,2-Tetrachloroethane	<1	<1	<1	320
1,2,3-Trichlorobenzene	<5	<5	<5	-
1,2,3-Trichloropropane	<1	<1	<1	120
1,2,4-Trichlorobenzene	<5	<5	<5	70 (A)
1,2-Dibromo-3-chloropropane	<5	<5	<5	-
1,2-Dibromoethane	<1	<1	<1	0.05 (A)
2-Methylnaphthalene	5U	5U	5U	750
Acrylonitrile	<2	<2	<2	11
Bromobenzene	<1	<1	<1	50
Bromochloromethane	<1	<1	<1	-
Dibromomethane	<5	<5	<5	230
Dichlorodifluoromethane	5U	5U	5U	1,700
Diethyl ether	<10	<10	<10	10 (E)
Hexachloroethane	5U	<5	<5	21
Methyl iodide	<1	<1	<1	-
Tetrahydrofuran	3	<90	<90	270
Trichlorofluoromethane	<1	<1	<1	7,300
1,2,3-Trimethylbenzene	0.3	<1	<1	-
trans-1,4-Dichloro-2-butene	<1	<1	<1	-

Notes:

1) Results and criteria are shown in ug/l (ppb).

2) MDEQ Part 201 Generic Industrial Drinking Water criteria as listed in Operational Memorandum #1, dated January 23, 2006.

3) Samples analyzed by Merit Laboratories, Inc. of East Lansing, Michigan

4) "-" denotes no criteria established.

5) "A" denotes criterion is the State of Michigan Drinking Water Standard established pursuant to Section 5 of the Safe Drinking Water Act, Act No. 399 of the Public Acts of 1976.

6) "E" denotes criterion is the asthetic drinking water value, as required by Section 20120 (1)(5).

7) "W" denotes Concentrations of trihalomethanes in groundwater must be added together to determine compliance with the State of Michigan Drinking Water Standard of 100 ug/l. Concentrations of trihalomethanes in soil must be added together to determine compliance with the drinking water protection criterion of 2,000 ug/kg.

8) "U" denotes the analyte was analyzed for, but was not detected.

9) "UJ" denotes that the sample-specific reporting limit for the analyte in this sample should be considered approximate.

10) "J" denotes concentration should be considered approximate based on analyte concentration being greater than the MDL.

TABLE 1
REALM
Coldwater Road Facility
Ground Water Analytical Results - First Quarter (June 2007)
Metals Method 200.8 and Cyanide Method 335.2

Sample Location	OBG MW-1	OBG MW-2	OBG MW-3	OBG MW-4	OBG MW-5	OBG MW-6	OBG MW-7	OBG MW-8	MDEQ Part 201 Generic Cleanup Criteria Industrial Drinking Water Criteria
Date Collected	**06/19/2007**	**06/19/2007**	**06/19/2007**	**06/19/2007**	**06/19/2007**	**06/19/2007**	**06/19/2007**	**06/19/2007**	
Parameter									
Total inorganics									
Chromium	NS	NS	NS	NS	13	6	NS	10	100 (A)
Lead	<3	<3	<3	1	**14**	<3	<3	<3	4.0 (L)
Nickel	NS	NS	NS	NS	28	20	NS	41	100 (A)
Dissolved Inorganics									
Chromium	NS	NS	NS	NS	<5	NS	NS	NS	100 (A)
Lead	<3	<3	NS	NS	<3	NS	NS	NS	4.0 (L)
Nickel	NS	NS	NS	NS	17	NS	NS	NS	100 (A)
Total Cyanide									
Cyanide	NS	NS	NS	NS	**295**	<5	NS	<5	200 (A)

Notes:

1) Results and criteria are shown in ug/l (ppb).
2) Samples analyzed by Merit Laboratories, Inc. of East Lansing, Michigan.
3) Bold type denotes exceedance of Part 201 Generic Industrial Drinking Water criteria.
4) MDEQ Part 201 Generic Industrial Drinking Water Protection Criteria as listed in Operational Memorandum #1, dated January 23, 2006.
5) "A" denotes criterion is the State of Michigan Drinking Water Standard established pursuant to Section 5 of the Safe Drinking Water Act, Act No. 399 of the Public Acts of 1976.
6) "L" denotes higher groundwater concentrations (up to 15 ug/L) may be acceptable if the soil concentration is less than 400 ppm and groundwater migrating off-site will not result in unacceptable exposures. Contact an ERD toxicologist if further explanation is needed.
7) "NS" denotes the well was not sampled for this constituient.

TABLE 3
REALM
Coldwater Road Facility
Ground Water Analytical Results- Second Quarter (September 2007)
Volatile Organic Compounds Method 8260

Sample Location	OBG MW-5	OBG MW-6	OBG MW-8	MDEQ Part 201 Generic Cleanup Criteria Industrial Drinking Water Criteria
Date Collected	09/25/2007	09/25/2007	09/25/2007	
Parameter				
Benzene	0.2	<1	<1	5.0 (A)
Bromodichloromethane	<1	<1	<1	100 (A, W)
Bromoform	<1	<1	<1	100 (A, W)
Bromomethane	<5	<5	<5	29
n-Butylbenzene	<1	<1	<1	230
sec-Butylbenzene	<1	<1	<1	230
tert-Butylbenzene	<1	<1	<1	230
Carbon tetrachloride	<1	<1	<1	5.0 (A)
Chlorobenzene	<1	<1	<1	100 (A)
Chloroethane	<5	<5	<5	1,700
Chloroform	<1	<1	<1	100 (A, W)
Chloromethane	<5	<5	<5	1,100
Dibromochloromethane	<5	<5	<5	100 (A, W)
1,2-Dichlorobenzene	<1	<1	<1	600 (A)
1,3-Dichlorobenzene	<1	<1	<1	19
1,4-Dichlorobenzene	<1	<1	<1	75 (A)
1,1-Dichloroethane	7	<1	<1	2,500
1,2-Dichloroethane	<1	<1	<1	5.0 (A)
1,1-Dichloroethene	0.4	<1	<1	7.0 (A)
cis 1,2-Dichloroethene	21	<1	<1	70 (A)
trans 1,2-Dichloroethene	1	<1	<1	100 (A)
1,2-Dichloropropane	<1	<1	<1	5.0 (A)
cis 1,3-Dichloropropene	<1	<1	<1	-
trans-1,3-Dichloropropene	<1	<1	<1	
Ethylbenzene	0.2	<1	<1	74 (E)
Isopropylbenzene	<5	<5	<5	2,300
p-Isopropyltoluene	<5	<5	<5	-
Methylene chloride	<5	<5	<5	5.0 (A)
Naphthalene	5	5U	5U	1,500
n-Propylbenzene	<1	<1	<1	-
Styrene	0.1	<1	<1	100 (A)
1,1,2,2-Tetrachloroethane	<1	<1	<1	35
Tetrachloroethene	0.6	<1	<1	5.0 (A)
Toluene	2	1U	1U	790 (E)
1,1,1-Trichloroethane	<1	<1	<1	200 (A)
1,1,2-Trichloroethane	<1	<1	<1	5.0 (A)
Trichloroethene	1	<1	<1	5.0 (A)
1,2,4-Trimethylbenzene	0.2	<1	<1	63 (E)
1,3,5-Trimethylbenzene	<1	<1	<1	72 (E)
Vinyl chloride	2	<1	<1	2.0 (A)
o-Xylene	0.4	<1	<1	280 (E)
p,m-Xylene	0.6	0.1	0.1	280 (E)
Acetone*	<50R	<50R	<50R	2,100
2-Butanone*	<30	<30	<30	38,000
Carbon Disulfide*	<5	<5	<5	2,300
2-Hexanone*	<50	<50	<50	2,900
4-Methyl-2-pentanone*	3	<50	<50	5,200
tert-Methyl butyl ether	<5	<5	<5	40 (E)
1,1,1,2-Tetrachloroethane	<1	<1	<1	320
1,2,3-Trichlorobenzene	<5	<5	<5	-
1,2,3-Trichloropropane	<1	<1	<1	120
1,2,4-Trichlorobenzene	<5	<5	<5	70 (A)
1,2-Dibromo-3-chloropropane	<5	<5	<5	-
1,2-Dibromoethane	<1	<1	<1	0.05 (A)
2-Methylnaphthalene	<5	<1	5U	750
Acrylonitrile	<2	<2	<2	11
Bromobenzene	<1	<1	<1	50
Bromochloromethane	<1	<1	<1	-
Dibromomethane	<5	<5	<5	230
Dichlorodifluoromethane	<5	<5	<5	1,700
Diethyl ether	<10	<10	<10	10 (E)
Hexachloroethane	<5	<5	<5	21
Methyl iodide	<1	<1	<1	-
Tetrahydrofuran	2	<90	<90	270
Trichlorofluoromethane	<1	<1	<1	7,300
1,2,3-Trimethylbenzene	0.1	<1	<1	-
trans-1,4-Dichloro-2-butene	<1	<1	<1	-

Notes:

1) Results and criteria are shown in ug/l (ppb).

2) MDEQ Part 201 Generic Industrial Drinking Water criteria as listed in Operational Memorandum #1, dated January 23, 2006.

3) Samples analyzed by Merit Laboratories, Inc. of East Lansing, Michigan

4) "-" denotes no criteria established.

5) "A" denotes criterion is the State of Michigan Drinking Water Standard established pursuant to Section 5 of the Safe Drinking Water Act, Act No. 399 of the Public Acts of 1976.

6) "E" denotes criterion is the asthetic drinking water value, as required by Section 20120 (1)(5).

7) "W" denotes Concentrations of trihalomethanes in groundwater must be added together to determine compliance with the State of Michigan Drinking Water Standard of 100 ug/l. Concentrations of trihalomethanes in soil must be added together to determine compliance with the drinking water protection criterion of 2,000 ug/kg.

8) "U" denotes the analyte was analyzed for, but was not detected.

9)"R" data rejected due to initial calibration failure

TABLE 3
REALM
Coldwater Road Facility
Ground Water Analytical Results- Second Quarter (September 2007)
Metals Method 200.8 and Cyanide Method 335.2

Sample Location	OBG MW-1	OBG MW-2	OBG MW-3	OBG MW-4	OBG MW-5	OBG MW-6	OBG MW-7	OBG MW-8	MDEQ Part 201 Generic Cleanup Criteria Industrial Drinking Water Criteria
Date Collected	**09/25/2007**	**09/25/2007**	**09/25/2007**	**09/25/2007**	**09/25/2007**	**09/25/2007**	**09/25/2007**	**09/25/2007**	
Parameter									
Total inorganics									
Chromium	NS	NS	NS	NS	15	22	NS	16	100 (A)
Lead	<3	<3	<3	<3	4	<3	<3	<3	4.0 (L)
Nickel	NS	NS	NS	NS	9	23	NS	44	100 (A)
Total Cyanide									
Cyanide	NS	NS	NS	NS	108	<5	NS	14	200 (A)

Notes:

1) Results and criteria are shown in ug/l (ppb).

2) Samples analyzed by Merit Laboratories, Inc. of East Lansing, Michigan.

3) MDEQ Part 201 Generic Industrial Drinking Water Protection Criteria as listed in Operational Memorandum #1, dated January 23, 2006.

4) "A" denotes criterion is the State of Michigan Drinking Water Standard established pursuant to Section 5 of the Safe Drinking Water Act, Act No. 399 of the Public Acts of 1976.

5) "L" denotes higher groundwater concentrations (up to 15 ug/L) may be acceptable if the soil concentration is less than 400 ppm and groundwater migrating off-site will not result in unacceptable exposures. Contact an ERD toxicologist if further explanation is needed.

6) "NS" denotes the well was not sampled for this constituient.

TABLE 4
REALM
Coldwater Road Facility
Ground Water Analytical Results- Third Quarter (December 2007)
Volatile Organic Compounds Method 8260

Sample Location	OBG MW-5	OBG MW-6	OBG MW-8	MDEQ Part 201 Generic Cleanup Criteria
Date Collected	12/11/02007	12/11/02007	12/11/02007	Industrial Drinking Water Criteria
Parameter				
Benzene	<1	<1	<1	5.0 (A)
Bromodichloromethane	<1	<1	<1	100 (A, W)
Bromoform	<1	<1	<1	100 (A, W)
Bromomethane	<5	<5	<5	29
n-Butylbenzene	<1	<1	<1	230
sec-Butylbenzene	<1	<1	<1	230
tert-Butylbenzene	<1	<1	<1	230
Carbon tetrachloride	<1	<1	<1	5.0 (A)
Chlorobenzene	<1	<1	<1	100 (A)
Chloroethane	<5	<5	<5	1,700
Chloroform	<1	<1	<1	100 (A, W)
Chloromethane	5UJ	5UJ	5UJ	1,100
Dibromochloromethane	<5	<5	<5	100 (A, W)
1,2-Dichlorobenzene	<1	<1	<1	600 (A)
1,3-Dichlorobenzene	<1	<1	<1	19
1,4-Dichlorobenzene	<1	<1	<1	75 (A)
1,1-Dichloroethane	5	<1	0.2	2,500
1,2-Dichloroethane	<1	<1	<1	5.0 (A)
1,1-Dichloroethene	0.1	<1	<1	7.0 (A)
cis 1,2-Dichloroethene	12	<1	<1	70 (A)
trans 1,2-Dichloroethene	0.5	<1	<1	100 (A)
1,2-Dichloropropane	<1	<1	<1	5.0 (A)
cis 1,3-Dichloropropene	<1	<1	<1	-
trans-1,3-Dichloropropene	<1	<1	<1	
Ethylbenzene	0.2	<1	<1	74 (E)
Isopropylbenzene	<5	<5	<5	2,300
p-Isopropyltoluene	<5	<5	<5	-
Methylene chloride	<5	<5	<5	5.0 (A)
Naphthalene	5U	5U	5U	1,500
n-Propylbenzene	<1	<1	<1	-
Styrene	0.1	<1	<1	100 (A)
1,1,2,2-Tetrachloroethane	<1	<1	<1	35
Tetrachloroethene	0.4	<1	<1	5.0 (A)
Toluene	1U	<1	<1	790 (E)
1,1,1-Trichloroethane	<1	<1	<1	200 (A)
1,1,2-Trichloroethane	<1	<1	<1	5.0 (A)
Trichloroethene	1	<1	<1	5.0 (A)
1,2,4-Trimethylbenzene	<1	<1	<1	63 (E)
1,3,5-Trimethylbenzene	<1	<1	<1	72 (E)
Vinyl chloride	0.9	<1	<1	2.0 (A)
o-Xylene	<1	<1	<1	280 (E)
p,m-Xylene	<2	<2	0.1	280 (E)
Acetone*	<50	<50	<50	2,100
2-Butanone*	<30	<30	<30	38,000
Carbon Disulfide*	<5	<5	<5	2,300
2-Hexanone*	<50	<50	<50	2,900
4-Methyl-2-pentanone*	50UJ	50UJ	50UJ	5,200
tert-Methyl butyl ether	<5	<5	<5	40 (E)
1,1,1,2-Tetrachloroethane	<1	<1	<1	320
1,2,3-Trichlorobenzene	<5	<5	<5	-
1,2,3-Trichloropropane	<1	<1	<1	120
1,2,4-Trichlorobenzene	<5	<5	<5	70 (A)
1,2-Dibromo-3-chloropropane	<5	<5	<5	-
1,2-Dibromoethane	<1	<1	<1	0.05 (A)
2-Methylnaphthalene	<5	<1	5U	750
Acrylonitrile	<2	<2	<2	11
Bromobenzene	<1	<1	<1	50
Bromochloromethane	<1	<1	<1	-
Dibromomethane	<5	<5	<5	230
Dichlorodifluoromethane	<5	<5	<5	1,700
Diethyl ether	<10	<10	<10	10 (E)
Hexachloroethane	<5	<5	<5	21
Methyl iodide	<1	<1	<1	-
Tetrahydrofuran	2J	90UJ	90UJ	270
Trichlorofluoromethane	<1	<1	<1	7,300
1,2,3-Trimethylbenzene	<1	<1	<1	-
trans-1,4-Dichloro-2-butene	1UJ	1UJ	1UJ	-

Notes:

1) Results and criteria are shown in ug/l (ppb).
2) MDEQ Part 201 Generic Industrial Drinking Water criteria as listed in Operational Memorandum #1, dated January 23, 2006.
3) Samples analyzed by Merit Laboratories, Inc. of East Lansing, Michigan
4) "-" denotes no criteria established.
5) "A" denotes criterion is the State of Michigan Drinking Water Standard established pursuant to Section 5 of the Safe Drinking Water Act, Act No. 399 of the Public Acts of 1976.
6) "E" denotes criterion is the asthetic drinking water value, as required by Section 20120 (1)(5).
7) "W" denotes Concentrations of trihalomethanes in groundwater must be added together to determine compliance with the State of Michigan Drinking Water Standard of 100 ug/l. Concentrations of trihalomethanes in soil must be added together to determine compliance with the drinking water protection criterion of 2,000 ug/kg.
8) "U" denotes the analyte was analyzed for, but was not detected.
9) "J" denotes estimated concentration.
10) "UJ" denotes not detected, estimating reporting limit.

TABLE 4
REALM
Coldwater Road Facility
Ground Water Analytical Results- Third Quarter (December 2007)
Metals Method 200.8 and Cyanide Method 335.2

Sample Location	OBG MW-1	OBG MW-2	OBG MW-3	OBG MW-4	OBG MW-5	OBG MW-6	OBG MW-7	OBG MW-8	MDEQ Part 201 Generic Cleanup Criteria Industrial Drinking Water Criteria
Date Collected	**12/11/2007**	**12/11/2007**	**12/11/2007**	**12/11/2007**	**12/11/2007**	**12/11/2007**	**12/11/2007**	**12/11/2007**	
Parameter									
Total inorganics									
Arsenic	<2	<2	<2	<2	19	<2	5	<2	100 (A)
Chromium	NS	NS	NS	NS	20J	29J	NS	40J	100 (A)
Iron	**440**	**630**	**1,780**	**420**	**1,490**	**990**	**970**	**520**	300 (E)
Lead	<3	<3	<3	<3	<3	<3	<3	<3	4.0 (L)
Manganese	**216**	**307**	**5,080**	**118**	**521**	**642**	46	**371**	50 (E)
Nickel	NS	NS	NS	NS	18	15J	NS	44	100 (A)
Dissolved inorganics									
Arsenic	NS	NS	NS	NS	**15**	NS	NS	NS	10 (A)
Chromium	NS	NS	NS	NS	17	NS	NS	NS	100 (A)
Iron	NS	NS	NS	NS	**790**	NS	NS	NS	300 (E)
Lead	NS	NS	NS	NS	<3	NS	NS	NS	4.0 (L)
Manganese	NS	NS	NS	NS	**502**	NS	NS	NS	50 (E)
Nickel	NS	NS	NS	NS	17	NS	NS	NS	100 (A)
Total Cyanide									
Cyanide	NS	NS	NS	NS	32	<5	NS	<5	200 (A)

Notes:

1) Results and criteria are shown in ug/l (ppb).

2) Samples analyzed by Merit Laboratories, Inc. of East Lansing, Michigan.

3) MDEQ Part 201 Generic Industrial Drinking Water Protection Criteria as listed in Operational Memorandum #1, dated January 23, 2006.

4) "A" denotes criterion is the State of Michigan Drinking Water Standard established pursuant to Section 5 of the Safe Drinking Water Act, Act No. 399 of the Public Acts of 1976.

5) "L" denotes higher groundwater concentrations (up to 15 ug/L) may be acceptable if the soil concentration is less than 400 ppm and groundwater migrating off-site will not result in unacceptable exposures. Contact an ERD toxicologist if further explanation is needed.

6) "E" denotes criterion is aesthetic drinking water value.

7) "NS" denotes the well was not sampled for this constituent.

8) "J" denotes estimated concentration.

9) Bold type indicates concentration above MDEQ Part 201 Generic Industrial Drinking Water Criteria as listed in MDEQ RRD Operational Memorandum #1, dated January 23, 2006.

TABLE 5
REALM
Coldwater Road Facility
Ground Water Analytical Results- Fourth Quarter (March 2008)
Volatile Organic Compounds Method 8260

Sample Location	OBG MW-5	OBG MW-6	OBG MW-8	MDEQ Part 201 Generic Cleanup Criteria
Date Collected	03/18/2008	03/18/2008	03/18/2008	Industrial Drinking Water
Parameter				Criteria
Benzene	<1	<1	<1	5.0 (A)
Bromodichloromethane	<1	<1	<1	100 (A, W)
Bromoform	<1	<1	<1	100 (A, W)
Bromomethane	<5	<5	<5	29
n-Butylbenzene	<1	<1	<1	230
sec-Butylbenzene	<1	<1	<1	230
tert-Butylbenzene	<1	<1	<1	230
Carbon tetrachloride	<1	<1	<1	5.0 (A)
Chlorobenzene	<1	<1	<1	100 (A)
Chloroethane	<5	<5	<5	1,700
Chloroform	<1	<1	<1	100 (A, W)
Chloromethane	<5	<5	<5	1,100
Dibromochloromethane	<5	<5	<5	100 (A, W)
1,2-Dichlorobenzene	<1	<1	<1	600 (A)
1,3-Dichlorobenzene	<1	<1	<1	19
1,4-Dichlorobenzene	<1	<1	<1	75 (A)
1,1-Dichloroethane	2	<1	0.1	2,500
1,2-Dichloroethane	<1	<1	<1	5.0 (A)
1,1-Dichloroethene	<1	<1	<1	7.0 (A)
cis 1,2-Dichloroethene	4	<1	<1	70 (A)
trans 1,2-Dichloroethene	0.2	<1	<1	100 (A)
1,2-Dichloropropane	<1	<1	<1	5.0 (A)
cis 1,3-Dichloropropene	<1	<1	<1	-
trans-1,3-Dichloropropene	<1	<1	<1	
Ethylbenzene	<1	<1	<1	74 (E)
Isopropylbenzene	<5	<5	<5	2,300
p-Isopropyltoluene	<5	<5	<5	-
Methylene chloride	<5	<5	<5	5.0 (A)
Naphthalene	0.2	<5	<5	1,500
n-Propylbenzene	<1	<1	<1	-
Styrene	0.1	<1	<1	100 (A)
1,1,2,2-Tetrachloroethane	<1	<1	<1	35
Tetrachloroethene	0.2	<1	<1	5.0 (A)
Toluene	<1	<1	<1	790 (E)
1,1,1-Trichloroethane	<1	<1	<1	200 (A)
1,1,2-Trichloroethane	<1	<1	<1	5.0 (A)
Trichloroethene	0.5	<1	<1	5.0 (A)
1,2,4-Trimethylbenzene	<1	<1	<1	63 (E)
1,3,5-Trimethylbenzene	<1	<1	<1	72 (E)
Vinyl chloride	<1	<1	<1	2.0 (A)
o-Xylene	<1	<1	<1	280 (E)
p,m-Xylene	<2	<2	<2	280 (E)
Acetone*	50R	50R	50R	2,100
2-Butanone*	<30	<30	<30	38,000
Carbon Disulfide*	<5	<5	<5	2,300
2-Hexanone*	<50	<50	<50	2,900
4-Methyl-2-pentanone*	<50	<50	<50	5,200
tert-Methyl butyl ether	<5	<5	<5	40 (E)
1,1,1,2-Tetrachloroethane	<1	<1	<1	320
1,2,3-Trichlorobenzene	<5	<5	<5	-
1,2,3-Trichloropropane	<1	<1	<1	120
1,2,4-Trichlorobenzene	<5	<5	<5	70 (A)
1,2-Dibromo-3-chloropropane	<5	<5	<5	-
1,2-Dibromoethane	<1	<1	<1	0.05 (A)
2-Methylnaphthalene	<5	<5	<5	750
Acrylonitrile	<2	<2	<2	11
Bromobenzene	<1	<1	<1	50
Bromochloromethane	<1	<1	<1	-
Dibromomethane	<5	<5	<5	230
Dichlorodifluoromethane	<5	<5	<5	1,700
Diethyl ether	<10	<10	<10	10 (E)
Hexachloroethane	<5	<5	<5	21
Methyl iodide	<1	<1	<1	-
Tetrahydrofuran	<90	<90	<90	270
Trichlorofluoromethane	<1	<1	<1	7,300
1,2,3-Trimethylbenzene	<1	<1	<1	-
trans-1,4-Dichloro-2-butene	<1	<1	<1	-

Notes:

1) Results and criteria are shown in ug/l (ppb).

2) MDEQ Part 201 Generic Industrial Drinking Water criteria as listed in Operational Memorandum #1, dated January 23, 2006.

3) Samples analyzed by Merit Laboratories, Inc. of East Lansing, Michigan

4) "-" denotes no criteria established.

5) "A" denotes criterion is the State of Michigan Drinking Water Standard established pursuant to Section 5 of the Safe Drinking Water Act, Act No. 399 of the Public Acts of 1976.

6) "E" denotes criterion is the asthetic drinking water value, as required by Section 20120 (1)(5).

7) "W" denotes Concentrations of trihalomethanes in groundwater must be added together to determine compliance with the State of Michigan Drinking Water Standard of 100 ug/l. Concentrations of trihalomethanes in soil must be added together to determine compliance with the drinking water protection criterion of 2,000 ug/kg.

8) "R" denotes sample result rejected due to relative response factor minimum not being met.

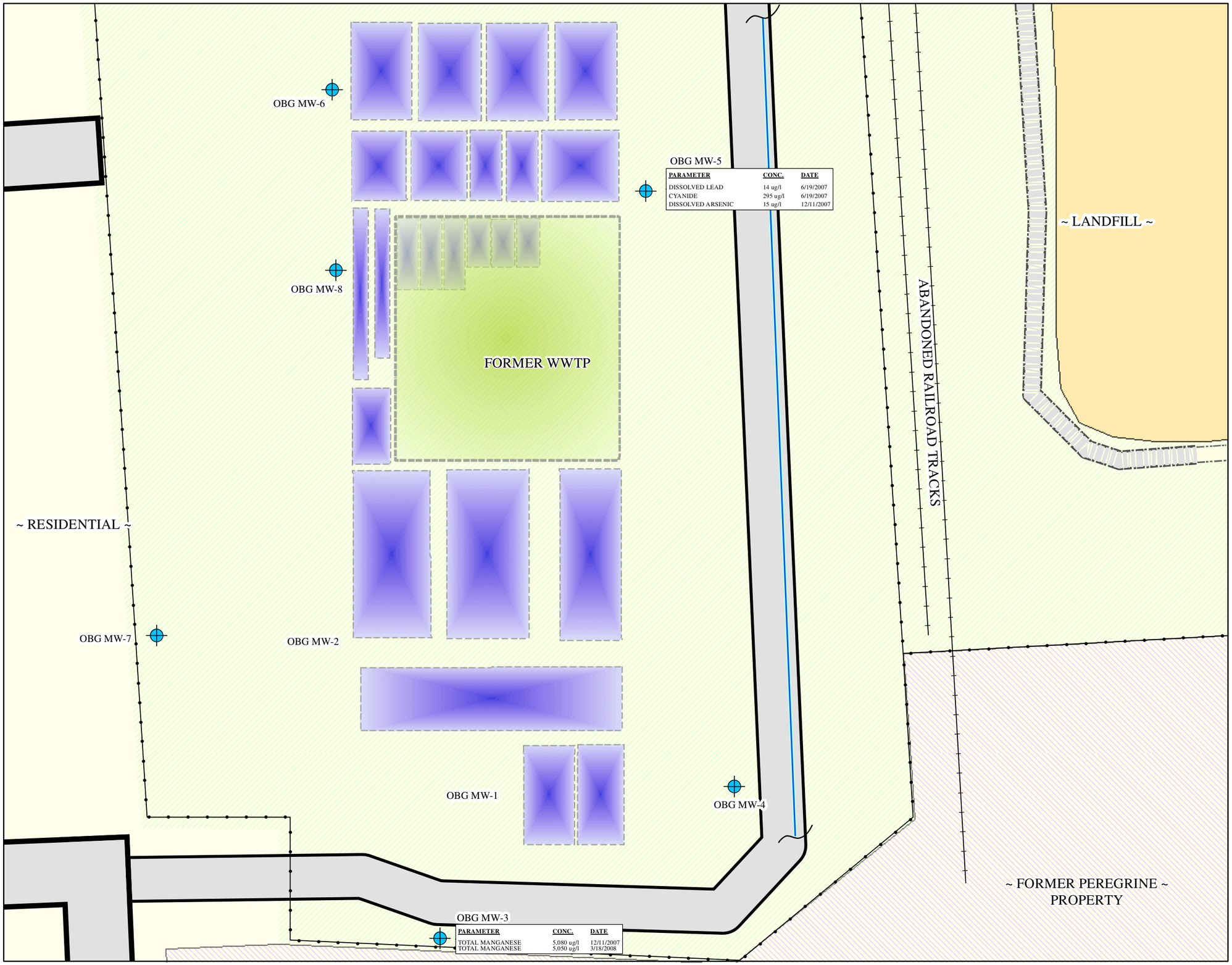
TABLE 5
REALM
Coldwater Road Facility
Ground Water Analytical Results- Fourth Quarter (March 2008)
Metals Method 200.8 and Cyanide Method 335.2

Sample Location	OBG MW-1	OBG MW-2	OBG MW-3	OBG MW-4	OBG MW-5	OBG MW-6	OBG MW-7	OBG MW-8	MDEQ Part 201 Generic Cleanup Criteria
Date Collected	**03/18/2008**	**03/18/2008**	**03/18/2008**	**03/18/2008**	**03/18/2008**	**03/18/2008**	**03/18/2008**	**03/18/2008**	**Industrial Drinking Water Criteria**
Parameter									
Total inorganics									
Arsenic	<1	<1	<1	<1	10	<1	3	<1	100 (A)
Chromium	NS	NS	NS	NS	1	1	NS	1	100 (A)
Iron	160J	280J	**1,180J**	130J	**1,770J**	**350J**	**560J**	280J	300 (E)
Lead	<3	<3	<3	<3	<3	<3	<3	<3	4.0 (L)
Manganese	**405**	**97**	**5,050**	**54**	**532**	**322**	**212**	**337**	50 (E)
Nickel	NS	NS	NS	NS	24	15	NS	38	100 (A)
Dissolved inorganics									
Arsenic	NS	NS	NS	NS	4	NS	NS	NS	10 (A)
Chromium	NS	NS	NS	NS	1	NS	NS	NS	100 (A)
Iron	NS	NS	NS	NS	190	NS	NS	NS	300 (E)
Lead	NS	NS	NS	NS	<3	NS	NS	NS	4.0 (L)
Manganese	NS	NS	NS	NS	**520**	NS	NS	NS	50 (E)
Nickel	NS	NS	NS	NS	24	NS	NS	NS	100 (A)
Total Cyanide									
Cyanide	NS	NS	NS	NS	22	<5	NS	<5	200 (A)

Notes:

1) Results and criteria are shown in ug/l (ppb).
2) Samples analyzed by Merit Laboratories, Inc. of East Lansing, Michigan.
3) MDEQ Part 201 Generic Industrial Drinking Water Protection Criteria as listed in Operational Memorandum #1, dated January 23, 2006.
4) "A" denotes criterion is the State of Michigan Drinking Water Standard established pursuant to Section 5 of the Safe Drinking Water Act, Act No. 399 of the Public Acts of 1976.
5) "L" denotes higher groundwater concentrations (up to 15 ug/L) may be acceptable if the soil concentration is less than 400 ppm and groundwater migrating off-site will not result in unacceptable exposures. Contact an ERD toxicologist if further explanation is needed.
6) "E" denotes criterion is aesthetic drinking water value.
7) "NS" denotes the well was not sampled for this constituient.
8) "J" denotes estimated concentration.
9) Bold type indicates concentration above MDEQ Part 201 Generic Industrial Drinking Water Criteria as listed in MDEQ RRD Operational Memorandum #1, dated January 23, 2006.

FIGURE B-1



N

LEGEND

- FORMER WWTP BUILDING
- FORMER WWTP BASIN
- MONITORING WELL
- APPROXIMATE LOCATION OF UNDERGROUND STORM SEWER LINE

NOTES:

1 - ANALYTICAL RESULTS IN ug/l.

2 - MDEQ PART 201 GENERIC NON-RESIDENTIAL DRINKING WATER CRITERIA:
ARSENIC - 10 ug/l
CYANIDE - 200 ug/l
LEAD - 4 ug/l
MANGANESE - 50 ug/l

RACER TRUST
COLDWATER ROAD
FORMER WWTP
FLINT, MICHIGAN

2008 ADDENDUM REPORT SAMPLE LOCATIONS AND GROUNDWATER CRITERIA EXCEEDANCES

0 12.5 25 50 75 100
Feet

NOVEMBER 2012
15388/48630-011

O'BRIEN & GERE ENGINEERS, INC.

Appendix C

ProUCL Site-Specific Background Calculations for the WWTP

RACER Trust
Coldwater Road Facility
Former Wastewater Treatment Plant
Background Data Set(Manganese)

Location	Sample Date	Mn Value
B-7	Nov-98	424
B-7	Nov-99	313
B-7	Nov-02	5.0
B-7	Nov-03	5.0
B-7	Dec-04	74
B-7	Jun-05	31
B-7	Dec-05	50
B-7	Jun-06	150
B-7	Jun-07	42
B-7	Jun-08	10
B-18A	Nov-97	62
B-18A	Nov-98	128
B-18A	Nov-99	155
B-18A	Nov-02	26
B-18A	Nov-03	2.5
B-18A	Dec-04	363
B-18A	Jun-05	80
B-18A	Dec-05	170
B-18A	Jun-06	50
B-18A	Jun-07	22
B-18A	Jun-08	5.0
B-19A	Nov-03	5.0
B-19A	Dec-04	11
B-19AR	Dec-04	5
B-19AR	Jun-05	228
B-19AR	Dec-05	10
B-19AR	Jun-06	210
B-19AR	Jun-07	21
B-19AR	Jun-08	9
B-24	Nov-98	120
B-24R	Jun-05	448
B-24R	Dec-05	210
B-24R	Jun-06	210
B-24R	Jun-07	194
B-24R	Jun-08	175
B-28	Jun-06	210
B-28	Jun-07	160
B-28	Jun-08	84

Number of Detected Data	31
Number of Non-Detect Data	7
Percent Non-Detect	18.42
Data Distribution	Gamma (Per Pro-UCL)

General Background Statistics for Data Sets with Non-Detects

User Selected Options	
From File	Mn Data (Current).wst
Full Precision	OFF
Confidence Coefficient	95%
Coverage	95%
Different or Future K Values	1
Number of Bootstrap Operations	2000

Mn

General Statistics

Number of Valid Data	38	Number of Detected Data	31
Number of Distinct Detected Data	27	Number of Non-Detect Data	7
Tolerance Factor	2.132	Percent Non-Detects	18.42%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	9	Minimum Detected	2.197
Maximum Detected	448	Maximum Detected	6.105
Mean of Detected	143.2	Mean of Detected	4.499
SD of Detected	120.4	SD of Detected	1.119
Minimum Non-Detect	2.5	Minimum Non-Detect	0.916
Maximum Non-Detect	10	Maximum Non-Detect	2.303

Data with Multiple Detection Limits	Single Detection Limit Scenario	
Note: Data have multiple DLs - Use of KM Method is recommended	Number treated as Non-Detect with Single DL	8
For all methods (except KM, DL/2, and ROS Methods),	Number treated as Detected with Single DL	30
Observations < Largest ND are treated as NDs	Single DL Non-Detect Percentage	21.05%

Background Statistics

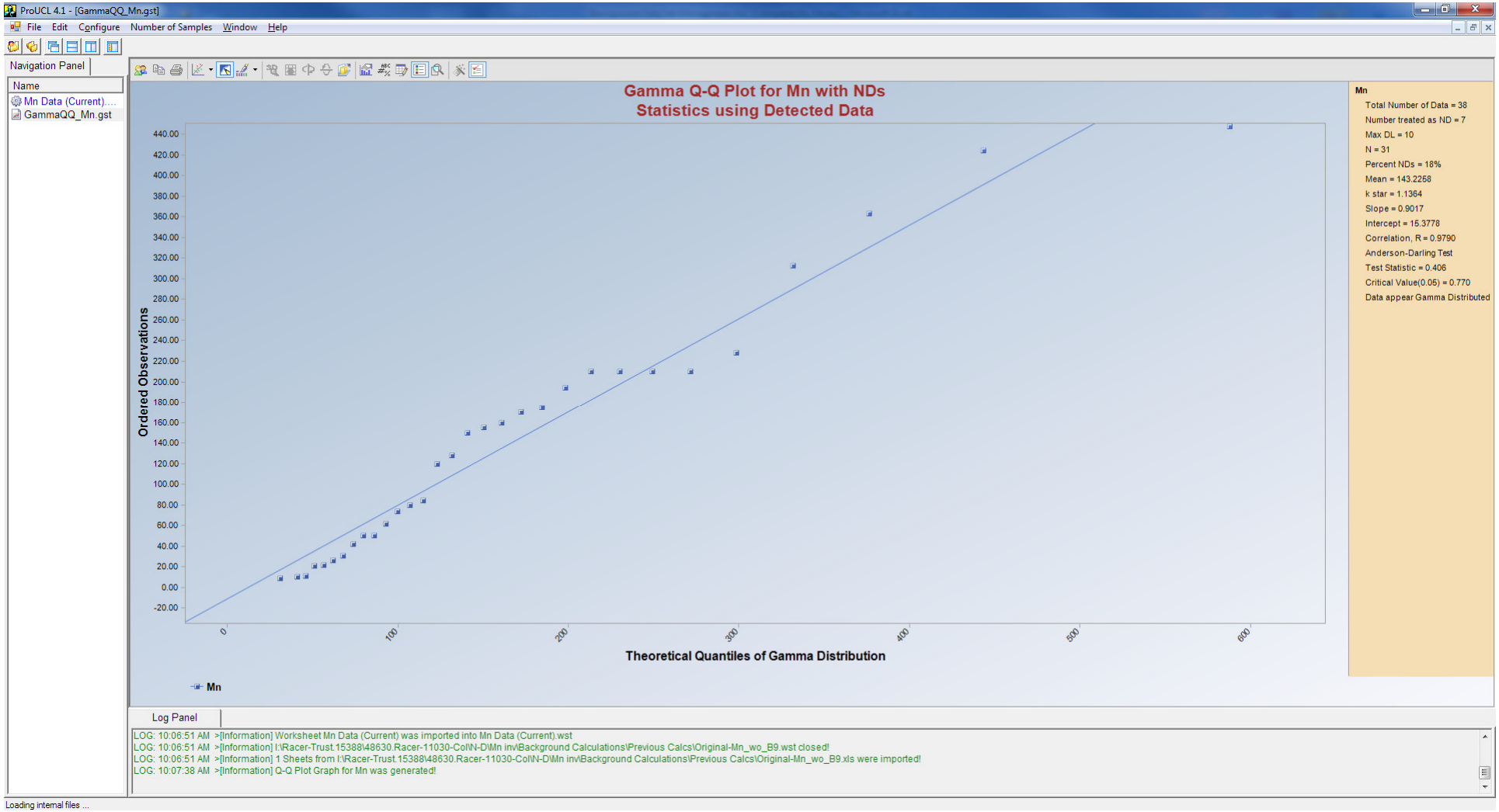
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.887	Shapiro Wilk Test Statistic	0.926
5% Shapiro Wilk Critical Value	0.929	5% Shapiro Wilk Critical Value	0.929
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	117.3	Mean (Log Scale)	3.839
SD	121.7	SD (Log Scale)	1.738
95% UTL 95% Coverage	376.8	95% UTL 95% Coverage	1893
95% UPL (t)	325.3	95% UPL (t)	907.4
90% Percentile (z)	273.3	90% Percentile (z)	431.5
95% Percentile (z)	317.5	95% Percentile (z)	811.4
99% Percentile (z)	400.4	99% Percentile (z)	2653
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	100.5	Mean in Original Scale	118.4
SD	142.8	SD in Original Scale	120.7
95% UTL with 95% Coverage	404.9	95% UTL with 95% Coverage	1131
		95% BCA UTL with 95% Coverage	448
		95% Bootstrap (%) UTL with 95% Coverage	448
95% UPL (t)	344.5	95% UPL (t)	626.3

90% Percentile (z)	283.5	90% Percentile (z)	344.6
95% Percentile (z)	335.3	95% Percentile (z)	572.5
99% Percentile (z)	432.6	99% Percentile (z)	1484
Gamma Distribution Test with Detected Values Only		**Data Distribution Test with Detected Values Only**	
k star (bias corrected)	1.119	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	128		
nu star	69.36		
A-D Test Statistic	0.406	**Nonparametric Statistics**	
5% A-D Critical Value	0.77	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.123	Mean	118.5
5% K-S Critical Value	0.162	SD	119
Data appear Gamma Distributed at 5% Significance Level		SE of Mean	19.62
		95% KM UTL with 95% Coverage	372.2
Assuming Gamma Distribution		95% KM Chebyshev UPL	644
Gamma ROS Statistics with Extrapolated Data		95% KM UPL (t)	321.9
Mean	116.8	90% Percentile (z)	271
Median	77	95% Percentile (z)	314.2
SD	122.2	99% Percentile (z)	395.3
k star	0.204		
Theta star	573.6	**Gamma ROS Limits with Extrapolated Data**	
Nu star	15.48	95% Wilson Hilferty (WH) Approx. Gamma UPL	496.3
95% Percentile of Chisquare (2k)	2.089	95% Hawkins Wixley (HW) Approx. Gamma UPL	665.6
		95% WH Approx. Gamma UTL with 95% Coverage	708.2
90% Percentile	353.4	95% HW Approx. Gamma UTL with 95% Coverage	1049
95% Percentile	599.2		
99% Percentile	1274		

Note: DL/2 is not a recommended method.

Pro-UCL Gamma Distribution Plot



Goodness-of-Fit Test Statistics for Data Sets with Non-Detects

User Selected Options	
From File	Mn Data (Current).wst
Full Precision	OFF
Confidence Coefficient	0.95

Mn

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	38	0	38	31	7	18.42%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	7	2.5	10	5.357	5	2.249
Statistics (Detects Only)	31	9	448	143.2	128	120.4
Statistics (All: NDs treated as DL value)	38	2.5	448	117.8	77	121.2
Statistics (All: NDs treated as DL/2 value)	38	1.25	448	117.3	77	121.7
Statistics (Normal ROS Estimated Data)	38	-210.3	448	93.35	77	153
Statistics (Gamma ROS Estimated Data)	38	1.0000E-6	448	116.8	77	122.2
Statistics (Lognormal ROS Estimated Data)	38	3.766	448	118.4	77	120.7

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	1.215	1.136	117.9	4.499	1.119	0.249
Statistics (NDs = DL)	0.747	0.705	157.8	3.967	1.526	0.385
Statistics (NDs = DL/2)	0.659	0.624	178.2	3.839	1.738	0.453
Statistics (Gamma ROS Estimates)	0.202	0.204	578.1	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	4.052	1.397	0.345

Normal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.947	0.925	0.926	0.988

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.887	0.929	Data Not Normal
Lilliefors (Detects Only)	0.14	0.159	Data Appear Normal
Shapiro-Wilks (NDs = DL)	0.844	0.938	Data Not Normal
Lilliefors (NDs = DL)	0.171	0.144	Data Not Normal
Shapiro-Wilks (NDs = DL/2)	0.848	0.938	Data Not Normal
Lilliefors (NDs = DL/2)	0.17	0.144	Data Not Normal
Shapiro-Wilks (Normal ROS Estimates)	0.971	0.938	Data Appear Normal
Lilliefors (Normal ROS Estimates)	0.106	0.144	Data Appear Normal

Gamma Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.979	0.972	0.967	0.872

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.406	0.77	
Kolmogorov-Smirnov (Detects Only)	0.123	0.162	Data Appear Gamma Distributed
Anderson-Darling (NDs = DL)	0.717	0.789	
Kolmogorov-Smirnov (NDs = DL)	0.121	0.149	Data Appear Gamma Distributed

Anderson-Darling (NDs = DL/2)	0.68	0.797	
Kolmogorov-Smirnov (NDs = DL/2)	0.126	0.15	Data Appear Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	5.839	0.901	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.291	0.158	Data Not Gamma Distributed

Lognormal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.97	0.963	0.953	0.967

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.926	0.929	Data Not Lognormal
Lilliefors (Detects Only)	0.16	0.159	Data Not Lognormal
Shapiro-Wilks (NDs = DL)	0.908	0.938	Data Not Lognormal
Lilliefors (NDs = DL)	0.152	0.144	Data Not Lognormal
Shapiro-Wilks (NDs = DL/2)	0.89	0.938	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.155	0.144	Data Not Lognormal
Shapiro-Wilks (Lognormal ROS Estimates)	0.916	0.938	Data Not Lognormal
Lilliefors (Lognormal ROS Estimates)	0.148	0.144	Data Not Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

Appendix D

Soil Boring Logs

O'BRIEN & GERE ENGINEERS, INC.

SOIL BORING LOG

REPORT OF BORING: OBG MW-9

CLIENT:	RACER Trust	**Boring Location:**	NW corner of Peregrine Property, near entrance gate to landfill
PROJECT NAME:	Former WWTP Investigation	**Drilling equipment:**	Mini Sonic track-mounted ATV rig
PROJECT LOCATION:	Coldwater Road Landfill, Flint	**Sampling equipment:**	4" x 5' sonic core
FILE NO.:	15388/47850	**Borehole Diameter:**	6"
		Total Depth:	15 ft bg
BORING COMPANY:	Boart Longyear	**Start date:**	10/10/2011
FOREMAN:	Walter Tidwell	**Completion date:**	10/10/2011
OBG GEOLOGIST:	Mike Robison		

Surface Elevation:
Northing:
Easting:
Depth to ground water:

LEGEND: / Cement/grout; === Screen; Sand Pack; Riser; Bentonite

DEPTH BELOW GRADE	No.	CORE INTERVAL (ft bg)	PENETRATION/ RECOVERY (ft bg)	Analytical Sample Interval (ft bg)	SAMPLE DESCRIPTION	STRATUM CHANGE GENERAL DESCRIPT	Equipment Installed	Field Testing: PID Reading	Field Testing: USCS symbol
0	1	0 - 5	5/5		Asphalt		/		
					Olive grey, damp, silty CLAY, little fine to medium sand and medium gravel	2"	/		CL
1							/		
							/		
2							Bentonite	0.0	
							Bentonite		
3							Bentonite		
							Bentonite		
4					same as above, changes to olive brown, some medium gravel	4'	Sand Pack	0.0	
							Sand Pack		
5	2	5 - 10	5/5		Olive grey, moist-wet, soft sandy CLAY with organics (thin roots)	5'	Sand Pack		CL
					same as above, wet		Sand Pack		
6					Olive grey, wet, silty SAND, little clay and small gravel	6'	Sand Pack	0.0	SM
						7'	Sand Pack		
7					Olive brown w/ orange mottling, damp, firm, silty CLAY, trace small gravel		Sand Pack		CL
							Sand Pack		
8							Sand Pack	0.0	
							Sand Pack		
9							Sand Pack		
							Sand Pack		
10	3	10 - 15	5/5				Sand Pack	0.0	
							Sand Pack		
11					same as above, stiff	11'	Sand Pack		
							Sand Pack		
12							Sand Pack	0.0	
							Sand Pack		
13							Sand Pack		
							Sand Pack		
14							Sand Pack	0.0	
					same as above, changes to olive grey	14.5'	Sand Pack		
15	4	15 - 20	5/5		EOB @ 15 ft bg				
16									
17									
18									
19									
20									
21									
22									
23									
24									

Notes:

PID (MiniRae) readings shown in parts per million. Background reading = 0.0 ppm.
Monitoring well OBG MW-9 constructed of 2" diameter schedule 40 PVC with 0.010" slot well screen extending from 5-15'. Well completed as stick-up with protective cover.

O'BRIEN & GERE ENGINEERS, INC.

SOIL BORING LOG

REPORT OF BORING: OBG MW-10

CLIENT:	RACER Trust
PROJECT NAME:	Former WWTP Investigation
PROJECT LOCATION:	Coldwater Road Landfill, Flint
FILE NO.:	15388/47850
BORING COMPANY:	Boart Longyear
FOREMAN:	Walter Tidwell
OBG GEOLOGIST:	Mike Robison
Boring Location:	NW area of Peregrine Property near fenceline along Horton, approx. 100 ft south of OBG-MW-9
Drilling equipment:	Mini Sonic track-mounted ATV rig
Sampling equipment:	4" x 5' sonic core
Borehole Diameter:	6"
Total Depth:	15 ft bg
Start date:	10/10/2011
Completion date:	10/10/2011
Surface Elevation:	
Northing:	
Easting:	
Depth to ground water:	

LEGEND: / Cement/grout; === Screen; Sand Pack; Riser; Bentonite

DEPTH BELOW GRADE	No.	CORE INTERVAL (ft bg)	PENETRATION/ RECOVERY (ft bg)	Analytical Sample Interval (ft bg)	SAMPLE DESCRIPTION	STRATUM CHANGE GENERAL DESCRIPT	Equipment Installed	Field Testing: PID Reading	Field Testing: USCS symbol
0	1	0 - 5	5/5		Asphalt		/		
					Dark brown, dry, silty SAND, some medium gravel	2"	/		SM
1					Moderate yellowish brown, damp, silty SAND, some medium gravel	1'	/		
							/		
2								0.0	
3									
					Moderate yellowish brown, moist, clayey SAND, little medium gravel	3.5'			SC
4								0.0	
5	2	5 - 10	5/5		same as above, wet	5'	===		
							===		
6					Moderate yellowish brown, wet, very fine SAND, some silt, trace small gravel	6'	===	0.0	SM
							===		
7							===		
							===		
8							===	0.0	
							===		
9							===		
					same as above, moist	9.5	===		
10	3	10 - 15	5/5		Moderate yellowish brown, damp, clayey SAND, trace small gravel	10'	===	0.0	SC
							===		
11							===		
							===		
12							===	0.0	
					Olive gray, damp, firm, silty CLAY, little fine sand, trace small gravel	12.5'	===		CL
13							===		
							===		
14					same as above, stiff	14'	===	0.0	
							===		
15	4	15 - 20	5/5		EOB @ 15 ft bg				
16									
17									
18									
19									
20									
21									
22									
23									
24									

Notes:

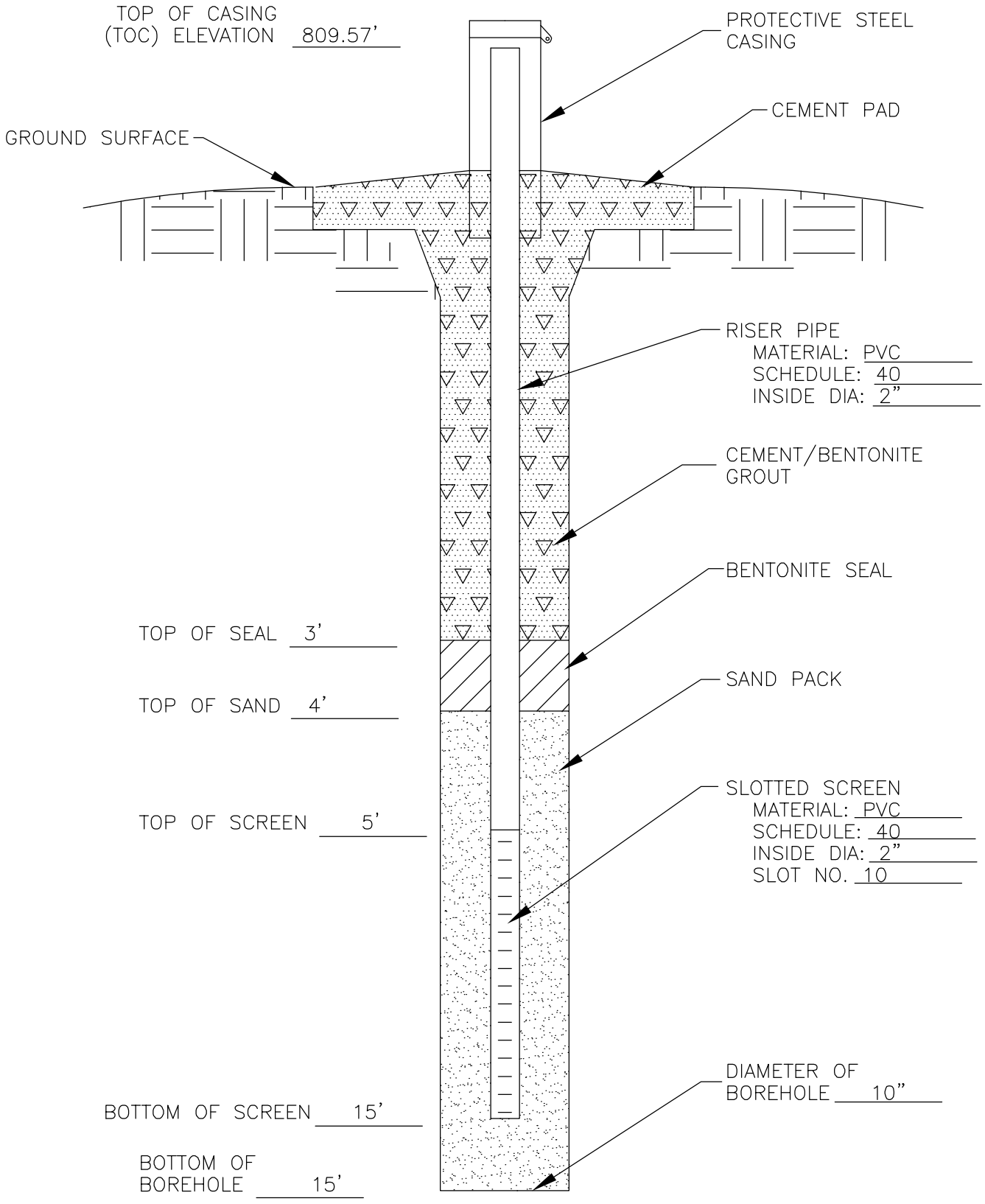
PID (MiniRae) readings shown in parts per million. Background reading = 0.0 ppm.

Monitoring well OBG MW-10 constructed of 2" diameter schedule 40 PVC with 0.010" slot well screen extending from 5-15'. Well completed as stick-up with protective cover.

Appendix E

Monitoring Well Construction Details

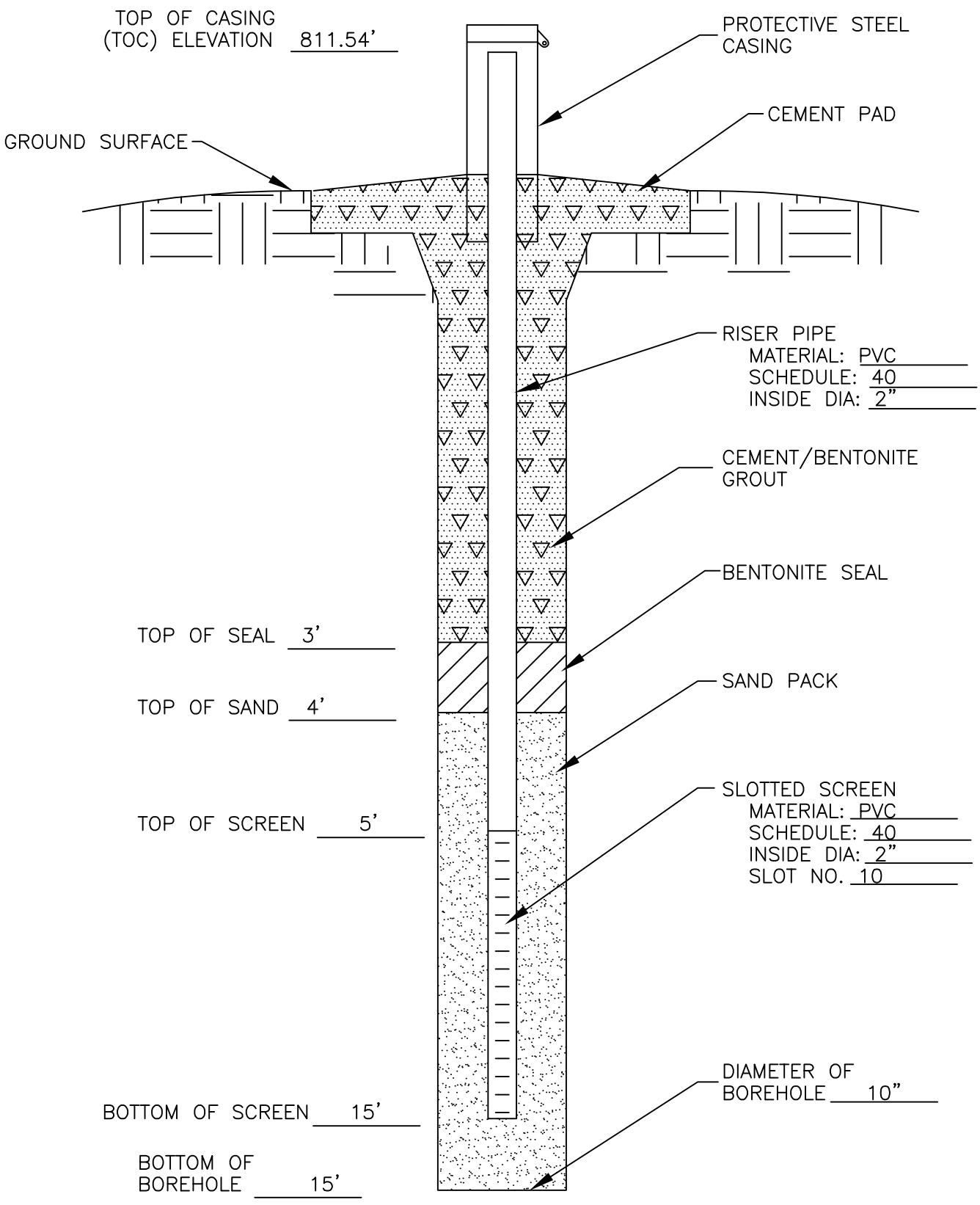
O'BRIEN & GERE
ENGINEERS INC.



RACER Trust–Coldwater Road
Flint, Michigan
MONITORING WELL OBG MW–9

i/novi/proj/15388/48630/DWG/OBG MW9 DET.dwg

O'BRIEN & GERE
ENGINEERS INC.



RACER Trust–Coldwater Road
Flint, Michigan
MONITORING WELL OBG MW–10

i/novi/proj/15388/48630/DWG/OBG MW9 DET.dwg

Appendix F

Data Validation Report – November 1, 2011

To: Tony Finch *cc:*
From: KA Storne
Re: Data Validation Results for the RACER Coldwater Road Landfill Site - Sampling Performed November 2011

File: 14774/47850.004.001
Date: December 30, 2011

This data validation memorandum provides the data validation results for the groundwater samples collected for the Revitalizing Auto Communities Environmental Response Trust (RACER) at the Coldwater Road Landfill site located in Flint, Michigan. O'Brien & Gere conducted sample collection activities in November 2011.

The following table summarizes the analysis performed for this sampling event.

Table 1. *Analytical method and references*

Parameter	Method	Reference
Metals (Total and Dissolved Manganese)	USEPA Methods 3015A/200.8	1, 2

Note:
1. USEPA. 2004. *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods, SW-846,* 3rd Edition, Update IIIB. Washington D.C.
2. USEPA. 2001. *40 CFR Part 136, Appendix A.* Washington, D.C.

Merit Laboratories, Inc. (Merit Labs) of East Lansing, Michigan performed the analyses. The laboratory package contained quality control analysis summary forms.

The list of samples that were submitted to the laboratory for this project is presented in Attachment A. Attachment B presents the specific data validation approach applied to data generated for this investigation. Attachment C presents the Laboratory QA/QC analyses definitions.

Full validation was performed for the samples collected for this sampling event.

The analytical data generated for this investigation were evaluated by O'Brien & Gere using the quality assurance/quality control (QA/QC) criteria presented in the method used by the laboratory and the following document for general guidance:

- O'Brien & Gere. 2007. *Quality Assurance Project Plan Former WWTP Coldwater Road Landfill, Flint Michigan (QAPP).* Farmington Hills, Michigan.

Data affected by excursions from these QA/QC criteria are qualified using the following USEPA data validation guidance and professional judgment:

- USEPA. 2010. *Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review,* EPA 540-R-10-011. Washington D.C.

The application of these validation guidelines has been modified to reflect the requirements of the methods utilized by Merit Labs.

The following parameters were reviewed in the validation for full validation:

- Chain-of-custody record
- Sample collection
- Sample preservation
- Holding times
- Calibration
- Blank analysis
- Matrix spike/matrix spike duplicate (MS/MSD) analysis
- Field duplicate and co-located sample analysis
- Laboratory Control Sample (LCS) analysis
- Internal standard performance
- Target analyte quantitation and quantitation limits (QLs)
- Documentation completeness

The following sections of this memorandum present the results of the comparison of the analytical data to the QA/QC criteria specified above. Based on the data validation, an overall evaluation of data usability is also presented in the final section.

METALS DATA EVALUATION SUMMARY

The following QA/QC parameters were found to meet method and validation criteria or did not result in additional qualification of sample results:

- Chain-of-custody record
- Sample collection
- Sample preservation
- Holding times
- Calibration
- Blank analysis
- MS/MSD) analysis
- Field duplicate and co-located sample analysis
- LCS analysis
- Internal standard performance
- Documentation completeness

Deviations from QA/QC criteria were not identified during the validation process. Additional observations are summarized below.

I. Target analyte quantitation and QLs
Sample results were reported using diluted analyses due to elevated concentrations of target analytes and matrix interferences present in the samples.

DATA USABILITY
Overall data usability with respect to completeness for the final sample results reported is 100 percent for the metals data. The data are usable for qualitative and quantitative purposes. Based on the validation performed, the completeness goal of 95 percent was met for these analyses.

Sample cross reference list

Samples collected and submitted for data validation

Laboratory Name	Date Collected	Laboratory Identfication	Client Identification	Matrix	Analysis Requested
Merit Labs	11/4/2011	S50670.01	OBG MW - 10	Groundwater	Manganese, Manganese, Dissolved
Merit Labs	11/4/2011	S50670.02	OBG MW - 10 MS	Groundwater	Manganese
Merit Labs	11/4/2011	S50670.03	OBG MW - 10 MSD	Groundwater	Manganese
Merit Labs	11/4/2011	S50670.04	OBG MW - 10 Co-located	Groundwater	Manganese
Merit Labs	11/4/2011	S50670.05	DUP-1 [OBG MW-10]	Groundwater	Manganese
Merit Labs	11/4/2011	S50670.06	OBG MW - 9	Groundwater	Manganese, Manganese, Dissolved
Merit Labs	11/4/2011	S50670.07	OBG MW - 9 MS	Groundwater	Manganese, Dissolved
Merit Labs	11/4/2011	S50670.08	OBG MW - 9 MSD	Groundwater	Manganese, Dissolved
Merit Labs	11/4/2011	S50670.09	OBG MW - 9 Co-Located	Groundwater	Manganese, Dissolved
Merit Labs	11/4/2011	S50670.10	DUP-2 [OBG ME-9]	Groundwater	Manganese, Dissolved
Merit Labs	11/4/2011	S50670.11	FB-1	Groundwater	Manganese

Note:

Merit Labs indicates Merit Laboratories of East Lansing, Michigan.

Sample in brackets indicates field duplicate location collected and submitted blind to the laboratory.

DUP indicates field duplicate.

MS, MSD indicates matrix spike, matrix spike duplicate.

Co-located samples are independent samples collected from the same location.

O'Brien & Gere Data validation approach using USEPA National Functional Guidelines for Non-Contract Laboratory Program Methods	
Laboratory Methods and Data Validation Approach	The O'Brien & Gere data validation approach utilizes the Project QAPP and methods applied by the laboratory to evaluate data. USEPA National Functional Guidelines address data validation of Contract Laboratory Program (CLP) methods. If excursions from the QAPP or method quality control requirements are identified, O'Brien & Gere applies a similar approach as used in the USEPA National Functional Guidelines to apply validation qualifiers to the data associated with the excursions.
General Validation Approach	The validation approach taken by O'Brien & Gere is a conservative one; qualifiers are applied to sample data to indicate both major and minor excursions so that data associated with any type of excursion are identified to the data user. Major excursions result in data being rejected (R), indicating that the data are considered unusable for either quantitative or qualitative purposes. Minor excursions result in sample data being qualified as approximate (J, UJ, JN) or non-detected (U) that is otherwise usable for quantitative or qualitative purposes.
	Excursions are subdivided into excursions that are within the laboratory's control and those that are a result of site conditions. Excursions involving laboratory control sample recovery, calibration response, method blank excursions, low or high spike recovery due to inaccurate spiking solutions or poor instrument response, holding times, interpretation errors, and quantitation errors are within the control of the laboratory. Excursions resulting from matrix spike recovery, serial dilution recovery, surrogate, and internal standard performance due to interference from the matrix of the samples are examples of those excursions that are due to site conditions and are not within the laboratory's control if the laboratory has followed proper method procedures, including performing appropriate cleanup techniques.
Applying professional judgment	USEPA National Functional Guidelines allow professional judgment to be used when applying qualifiers in some cases. When utilizing professional judgment, justification for actions taken will either be provided in the associated report or will be available upon request.
Validation Parameter	**O'Brien & Gere Data Validation Approach based on:** • **USEPA. 2010. Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review, EPA 540-R-10-011. Washington D.C.**
Validation Qualifiers – Inorganics	**U - The analyte was analyzed for, but was not detected at a level greater than or equal to the level of the quantitation limit (QL).** **J - The analyte was positively identified and the associated numerical value is the approximate concentration of the analyte in the sample (due either to the quality of the data generated because certain quality control criteria were not met, or the concentration of the analyte was below the QL).** **J+ - The result is an approximate concentration, but the result may be biased high.** **J- - The result is an approximate concentration, but the result may be biased low.** **R - The sample results are unusable due to the quality of the data generated because certain criteria were not met. The analyte may or may not be present in the sample.** **UJ - The analyte was not detected at a level greater than or equal to the QL. However, the QL is approximate and may be inaccurate or imprecise.**
Cooler Temperature	Results for samples submitted for organic and inorganic analyses that are impacted by coolers that did not contain ice, or if the ice melted upon receipt and the cooler temperatures are greater than 10°C, are qualified as approximate (UJ, J). If samples are delivered to the laboratory the same day as sample collection and samples did not have sufficient time to reach 10°C, samples are not qualified, unless proper preservation was not provided for samples between sample collection and sample receipt at the laboratory. Results for samples received at ambient temperature involved in extended shipment-day issues may be rejected, applying professional judgment.
Holding Time for Inorganics	Detected results for samples improperly preserved (without appropriate chemical or temperature) are qualified as approximate, biased low (J^-) and non-detected results are rejected (R), applying professional judgment. Non-detected and detected results for samples properly preserved and analyzed outside of but less than two times the holding time window established in the method or the QAPP for preparation and/or analysis are qualified as approximate, biased low (UJ, J^-). Non-detected results for samples properly preserved and analyzed greater than two times the holding time window for preparation and/or analysis are rejected (R). Detected results for samples properly preserved and analyzed greater than two times the holding time window for preparation and/or analysis are qualified as approximate, biased low (J^-).

O'Brien & Gere Data validation approach using USEPA National Functional Guidelines for Non-Contract Laboratory Program Methods	
Evaluation of Initial (ICV) and Calibration Verification (CCV) for Metals, Mercury and Inorganics	Metals are evaluated using the criteria for ICV and CCV of 90% to 110% of the expected value. Mercury is evaluated using the criteria for ICV of 90% to 110% of the expected value and 80% to 120% of the expected value for the CCV. Total Cyanide is evaluated using the criteria for ICV and CCV of 85% to 115% of the expected value. For analyses utilizing a calibration curve, the correlation coefficient for the first or second order curve must be ≥ 0.995.
ICV and CCV Actions for Metals, Mercury, Cyanide and Inorganics	For Metal and Mercury ICV and CCV recoveries outside of laboratory CLs: 1. Detected result associated with recovery of greater than upper CLs is qualified as approximate, biased high (J^+). Non-detected result is not qualified. 2. Detected result associated with recovery of greater than or equal to 75% but less than the lower laboratory CL is qualified as approximate, biased low (J^-). Non-detected result is qualified as approximate (UJ). 3. Detected result associated with recovery of less than 75% is qualified as approximate, biased low (J^-). Non-detected result is rejected (R). For Total Cyanide: 1. Detected result associated with recovery of greater than upper CLs is qualified as approximate, biased high (J^+). Non-detected result is not qualified. 2. Detected result associated with recovery of greater than or equal to 70% but less than the lower laboratory CL is qualified as approximate, biased low (J^-). Non-detected result is qualified as approximate (UJ). 3. Detected result associated with recovery of less than 70% is qualified as approximate, biased low (J^-). Non-detected result is rejected (R).
ICP-MS Instrument Performance Evaluation	ICP-MS data is evaluated using resolution of mass calibration of within 0.1 µ and the %RSD of less than 5%. If IP fails criteria, detected results are qualified as approximate (J) and non-detected results are qualified as approximate (UJ).
Evaluation of Internal Standards for ICP-MS	Internal standard recoveries are evaluated using control limits of percent relative intensity (%RI) from 60% to 125% of the response in the calibration blank. The results associated with internal standard %RI outside of CL, detected and non-detected results are qualified as approximate (J, UJ).
Metal and Inorganic MS/MSD, Laboratory/Field Duplicate, Serial Dilution	Qualification of sample results associated with MS/MSD, laboratory duplicate and field duplicate excursions is performed on samples for the same matrix, within the same preparation batch, within the same SDG group.
Evaluation of LCS Data for Metals and Inorganics	To apply qualifiers if LCS result is outside of laboratory CLs or 80 to 120%: Aqueous and soil samples: 1. Detected result associated with a recovery of less than 50% is qualified as approximate, biased low (J^-) and non-detected result is rejected (R). 2. Detected result associated with recovery between 50 and 79%, is qualified as approximate, biased low (J^-). Non-detected result is qualified as approximate (UJ). 3. Detected result associated with recoveries of greater than upper CL is qualified as approximate, biased high (J^+). 4. Detected result associated with recoveries of greater than 150% is rejected (R), applying professional judgment.

O'Brien & Gere Data validation approach using USEPA National Functional Guidelines for Non-Contract Laboratory Program Methods	
Evaluation of MS/MSD Data for Metals and Inorganics	To apply qualifiers if either MS or MSD result is outside of laboratory CL or 75 to 125% and if post-digestion spike evaluated for metals and post-distillation spike for Total Cyanide: Aqueous and soil sample: 1. Detected result associated with a recovery of less than 30% with a Post-Digestion spike recovery of less than 75% is qualified as approximate, biased low (J^-) and non-detected result is rejected (R). 2. Detected result associated with a recovery of less than 30% with a Post-Digestion spike recovery of greater than or equal to 75% is qualified as approximate (J) and non-detected result is qualified as approximate (UJ). 3. Detected result associated with a recovery of 30% to 74% with a Post-Digestion spike recovery of less than 75% is qualified as approximate, biased low (J^-) and non-detected result is qualified as approximate (UJ). 4. Detected result associated with a recovery of 30% to 74% with a Post-Digestion spike recovery of greater than 75% is qualified as approximate (J) and non-detected result is qualified as approximate (UJ). 5. Detected result associated with a recovery of greater than 125% with a Post-Digestion spike recovery of greater than 125% is qualified as approximate, biased high (J^+). 6. Detected result associated with a recovery of greater than 125% with a Post-Digestion spike recovery of less than or equal to 125% is qualified as approximate (J). 7. Detected result associated with a recovery of less than 30% without a Post-Digestion spike is qualified as approximate, biased low (J^-) and non-detected result is rejected (R). 8. Detected result associated with a recovery of 30% to 74% without a Post-Digestion spike is qualified as approximate, biased low (J^-) and non-detected result is qualified as approximate (UJ). 9. Detected result associated with a recovery of greater than 125% without a Post-Digestion spike is qualified as approximate, biased high (J^+).
Evaluation of Laboratory Duplicate for Metals and Mercury	To apply qualifiers if laboratory duplicate results are outside of RPD or difference criteria: Aqueous and soil sample with sample and duplicate values both greater than or equal to 5 times the QL: 1. Detected result greater than or equal to the QL, associated with an RPD of greater than 20 is qualified as approximate (J) and non-detected result is qualified as approximate (UJ). Aqueous and soil sample when either detected sample or duplicate value is less than 5 times the QL: 1. Detected results with absolute difference greater than two times the QL are qualified as approximate (J). Non-detected results are qualified as approximate (UJ).
Interference Check Sample (ICS) Evaluation and Actions for Metals	Metals are evaluated using the criteria for ICSA (Interferents) and ICSAB (Interferents and analytes) of ± two times the QL and of 80% to 120% of the expected value. For ICSA and ICSAB outside of CLs: 1. For recovery outside the upper CLs or for potential false positives (+two times the QL), detected results are qualified as approximate, biased high (J^+). 2. For recovery outside the lower CLs but greater than 50% or potential false negatives (- two times the QL), detected results are qualified as approximate, biased low (J^-). Non-detected result is qualified as approximate (UJ). 3. For recovery less than 50%, detected results are qualified as approximate, biased low (J^-). Non-detected result is rejected (R).
Evaluation of Field Duplicate for Metals and Mercury	Field duplicate data are evaluated against relative percent difference (RPD) criteria of less than 50 percent for aqueous samples and less than 100 percent for soils when both results are greater than or equal to five times the QL. When one field duplicate result is less than five times the QL, a control limit of plus or minus two times the QL (difference criterion) is applied. If RPDs or differences are outside of criterion, detected and non-detected results are qualified as approximate (UJ, J) to indicate minor excursions.
Evaluation of Metal and Mercury Blank Data	For calibration blanks and preparation blanks at concentrations greater than or equal to the laboratory MDLs but less than or equal to QLs: 1. Concentration in the associated samples of greater than or equal to the MDLs but less than or equal to QLs are revised to the QL level and qualified as non-detected (U).
	For calibration blanks, preparation blanks and field blanks at concentrations greater than laboratory QLs: 1. Concentrations in the associated samples of greater than or equal to the MDLs but less than or equal to QLs are revised to the QL level and are qualified as non-detected (U). 2. Concentration in the associated samples of greater than the QLs and less than the blank concentration are rejected (R) or qualified as non-detected (U), applying professional judgment.
	For calibration blanks and preparation blanks at concentrations equal to or between the negative value of the MDL and the QL: 1. Detects in the associated samples are qualified as approximate, biased low (J^-) and non-detects are qualified as approximate (UJ).

O'Brien & Gere Data validation approach using USEPA National Functional Guidelines for Non-Contract Laboratory Program Methods	
Evaluation of ICP Serial Dilution Data for Metals	Serial dilution results are evaluated for data with initial sample concentrations that are greater than 50 times the MDL. If the percent difference is greater than 10%, detected sample results are qualified as approximate (J) and non-detected results are qualified as approximate (UJ).
Source O'Brien & Gere	

Laboratory QA/QC analyses definitions.	
QA/QC Term	Definition
Accuracy	The closeness or agreement of the observed value or test response to the true or acceptable reference value or the test response from a reference method. It is influenced by both random error (precision) and systematic error (bias). The terms “bias” and “precision” are often used in lieu of “accuracy”.
Precision	A measure of mutual agreement between two or more individual measurements of the same property, obtained under similar conditions.
Representativeness	A measure of the degree to which data accurately and precisely characterize a population; the correspondence between the analytical result and the actual quality or condition experienced by a contaminant receptor.
Sensitivity	The capability of a method or instrument to discriminate between measurement responses representing different levels of a variable of interest.
Completeness	A measure of the amount of valid data obtained from a measurement system as compared to the planned amount, usually expressed as a percentage; also a measure of the degree to which the sampling scheme represents the available range in something, regardless of what was planned.
Detection limit	The lowest concentration or amount of the target analyte that can be determined to be different from zero by a single measurement at a stated level of probability.
Quantitation limit	The level above which numerical results may be obtained with a specified degree of confidence; the minimum concentration of an analyte in a specific matrix that can be identified and quantified above the method detection limit and within specified limits of precision and bias during routine analytical operating conditions.
Method detection limit	The minimum concentration of an analyte that undergoes preparation similar to the environmental samples and can be reported with a stated level of confidence that the analyte concentration is greater than zero.
Instrument detection limit	The lowest concentration of a metal target analyte that, when directly inputted and processed on a specific analytical instrument, produces a signal/response that is statistically distinct from the signal/response arising from equipment “noise” alone.
Gas chromatography/mass spectrometry (GC/MS) instrument performance check	Performed to verify mass resolution, identification, and to some degree, instrument sensitivity. These criteria are not sample specific; conformance is determined using standard materials.
Control limits	The variation in a process data set expressed as plus/minus standard deviations from the mean, generally placed on a chart to indicate the upper and lower acceptable ranges of process data and to judge whether the process is in or out of statistical limitations.
Calibration	Compliance requirements for satisfactory instrument calibration are established to verify that the instrument is capable of producing acceptable quantitative data. Initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of analysis and calibration verifications document satisfactory maintenance and adjustment of the instrument on a day-to-day basis.
Relative Response Factor	A measure of the relative mass spectral response of an analyte compared to its internal standard. Relative Response Factors are determined by analysis of standards and are used in the calculation of concentrations of analytes in samples.
Relative standard deviation	The standard deviation divided by the mean; a unit-free measure of variability.
Correlation coefficient	A measure of the strength of the relationship between two variables.
Relative Percent Difference	Used to compare two values; the relative percent difference is based on the mean of the two values, and is reported as an absolute value, i.e., always expressed as a positive number or zero.
Percent Difference	Used to compare two values; the percent difference indicates both the direction and the magnitude of the comparison, i.e., the percent difference may be either negative, positive, or zero.
Drift	The deviation in instrument response from its set or reference value over a period of time.
Percent Recovery	The act of determining whether or not the methodology measures all of the target analytes contained in a sample.
Blanks	Several types of blanks are analyzed by the laboratory. Corrective action procedures are implemented for blank analyses if target compounds are detected at concentrations greater than the method criteria. The criteria for evaluation of blanks apply to any blank associated with a group of samples. If problems with a blank exist, data associated with the project are evaluated to determine whether or not there is an inherent variability in the data for the project or if the problem is an isolated occurrence not affecting other data.
Reagent blank	Consists of laboratory target analyte-free water and any reagents added to a sample during analysis. This type of blank is analyzed to evaluate whether contamination occurred during the analysis of the sample due to reagent contamination. A reagent blank is usually analyzed following highly contaminated samples to assess the potential for cross-contamination during analysis.
Instrument blank	Consists of clean solvent spiked with the surrogates and analyzed on each GC column and instrument used for sample analysis by GC. This type of blank is analyzed to evaluate whether contamination occurred during the analysis of the sample due to instrument contamination.
Calibration blank	Consists of acids and reagent water used to prepare metal samples for analysis. This type of blank is analyzed to evaluate whether contamination is occurring during the preparation and analysis of the sample.
Method blank	A water or soil blank that undergoes the preparation procedures applied to a sample (i.e., extraction, digestion, clean-up). These samples are analyzed to examine whether sample preparation, clean-up,

Laboratory QA/QC analyses definitions.	
	and analysis techniques result in sample contamination.
Field/equipment	Collected and submitted for laboratory analysis, where appropriate. Field/equipment blanks are handled in the same manner as environmental samples. Equipment/field blanks are analyzed to assess contamination introduced during field sampling procedures.
Trip blank	Consist of samples of analyte-free water that have undergone shipment from the sampling site to the laboratory in coolers with the environmental samples submitted for volatile organic compound (VOC) analysis. Trip blanks will be analyzed for VOCs to determine if contamination has taken place during sample handling and/or shipment. Trip blanks will be utilized at a frequency of one each per cooler sent to the laboratory for VOC analysis.
Storage blank	Consists of sample vials filled with laboratory analyte-free water. The vials are stored at the laboratory with the samples collected for VOC analysis, under the same conditions as the samples. The storage blank is analyzed with the VOC samples to evaluate for contamination due to sample storage.
Internal standards performance	Compounds not found in environmental samples which are spiked into samples and quality control samples at the time of sample preparation for organic analyses. Internal standards must meet retention time and recovery criteria specified in the analytical method. Internal standards are used as the basis for quantitation of the target analytes.
Surrogate recovery	Compounds similar in nature to the target analytes but not expected to be detected in the environmental media which are spiked into environmental samples, blanks, and quality control samples prior to sample preparation for organic analyses. Surrogates are used to evaluate analytical efficiency by measuring recovery.
Laboratory control sample Matrix spike blank analyses	Standard solutions that consist of known concentrations of the target analytes spiked into laboratory analyte-free water or sand. They are prepared or purchased from a certified manufacturer from a source independent from the calibration standards to provide an independent verification of the calibration procedure. They are prepared and analyzed following the same procedures employed for environmental sample analysis to assess method accuracy independently of sample matrix effects.
Laboratory duplicate	Two or more representative portions taken from one homogeneous sample by the analyst and analyzed in the same laboratory.
Matrix	The material of which the sample is composed or the substrate containing the analyte of interest, such as drinking water, waste water, air, soil/sediment, biological material.
Matrix Spike (MS)	An aliquot of a matrix (water or soil) fortified (spiked) with known quantities of specific target analytes and subjected to the entire analytical procedure in order to indicate the appropriateness of the method for the matrix by measuring recovery.
Matrix spike duplicate (MSD)	A second aliquot of the same matrix as the matrix spike that is spiked in order to determine the precision of the method.
Retention time	The time a target analyte is retained on a GC column before elution. The identification of a target analyte is dependent on a target compound's retention time falling within the specified retention time window established for that compound.
Relative retention time	The ratio of the retention time of a compound to that of a standard.
Resolution	The separation between peaks on a chromatogram.
Interference	An element, compound, or other matrix effect present in a sample which disturbs the detection of a target analyte leading to inaccurate concentration results for the target analyte.
Raw data	The documentation generated during sampling and analysis which includes, but is not limited to, field notes, hardcopies of electronic data, disks, un-tabulated sample results, QC sample results, printouts of chromatograms, instrument outputs, and handwritten notes.
Source O'Brien & Gere	

Analytical Laboratory Report

Lab Sample ID: S50670.01
Sample Tag: OBG MW - 10
Collected Date/Time: 11/04/2011 10:45
Matrix: Groundwater
COC Reference: 65159

1:25

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
2	125ml Plastic	HNO3	Yes	4.6	IR

Analysis	Results	Units	RL	Method	Run Date/Time	Analyst	CAS #	Flags
Extraction / Prep.								
Metal Digestion	Completed			3015A	11/11/11 09:00	PER		
Metal Digestion	Completed			3015A	11/11/11 09:00	PER		
Metals								
Manganese, Dissolved	3.56	mg/L	0.05	200.8	11/11/11 12:45	PER	7439-96-5	
Manganese	3.69	mg/L	0.05	200.8	11/11/11 12:16	PER	7439-96-5	

0.002

Analytical Laboratory Report

Lab Sample ID: S50670.02
Sample Tag: OBG MW - 10 MS
Collected Date/Time: 11/04/2011 10:45
Matrix: Groundwater
COC Reference: 65159

1:25

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	125ml Plastic	HNO3	Yes	4.6	IR

Analysis	Results	Units	RL	Method	Run Date/Time	Analyst	CAS #	Flags
Extraction / Prep.								
Metal Digestion	Completed			3015A	11/11/11 09:00	PER		
Metals								
Manganese	4.91	mg/L	0.05	200.8	11/11/11 12:18	PER	7439-96-5	

Analytical Laboratory Report

Lab Sample ID: S50670.03
Sample Tag: OBG MW - 10 MSD
Collected Date/Time: 11/04/2011 10:45
Matrix: Groundwater
COC Reference: 65159

1:25

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	125ml Plastic	HNO3	Yes	4.6	IR

Analysis	Results	Units	RL	Method	Run Date/Time	Analyst	CAS #	Flags
Extraction / Prep.								
Metal Digestion	Completed			3015A	11/11/11 09:00	PER		
Metals								
Manganese	4.88	mg/L	0.05	200.8	11/11/11 12:20	PER	7439-96-5	

Analytical Laboratory Report

Lab Sample ID: S50670.04
Sample Tag: OBG MW - 10 Co-located
Collected Date/Time: 11/04/2011 10:45
Matrix: Groundwater
COC Reference: 65159

1:25

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	125ml Plastic	HNO3	Yes	4.6	IR

Analysis	Results	Units	RL	Method	Run Date/Time	Analyst	CAS #	Flags
Extraction / Prep.								
Metal Digestion	Completed			3015A	11/11/11 09:00	PER		
Metals								
Manganese	3.66	mg/L	0.05	200.8	11/11/11 12:21	PER	7439-96-5	

Analytical Laboratory Report

Lab Sample ID: S50670.05
Sample Tag: DUP-1
Collected Date/Time: 11/04/2011 00:01
Matrix: Groundwater
COC Reference: 65159

1:26

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	125ml Plastic	HNO3	Yes	4.6	IR

Analysis	Results	Units	RL	Method	Run Date/Time	Analyst	CAS #	Flags
Extraction / Prep.								
Metal Digestion	Completed			3015A	11/11/11 09:00	PER		
Metals								
Manganese	3.71	mg/L	0.05	200.8	11/11/11 12:23	PER	7439-96-5	

Analytical Laboratory Report

Lab Sample ID: S50670.06
Sample Tag: OBG MW - 9
Collected Date/Time: 11/04/2011 12:30
Matrix: Groundwater
COC Reference: 65159

1:5

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
2	125ml Plastic	HNO3	Yes	4.6	IR

Analysis	Results	Units	RL	Method	Run Date/Time	Analyst	CAS #	Flags
Extraction / Prep.								
Metal Digestion	Completed			3015A	11/11/11 09:00	PER		
Metal Digestion	Completed			3015A	11/11/11 09:00	PER		
Metals								
Manganese, Dissolved	0.570	mg/L	0.005	200.8	11/11/11 12:47	PER	7439-96-5	
Manganese	0.565	mg/L	0.005	200.8	11/11/11 12:44	PER	7439-96-5	

0.051

Analytical Laboratory Report

Lab Sample ID: S50670.07
Sample Tag: OBG MW - 9 MS
Collected Date/Time: 11/04/2011 12:30
Matrix: Groundwater
COC Reference: 65159

15

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	125ml Plastic	HNO3	Yes	4.6	IR

Analysis	Results	Units	RL	Method	Run Date/Time	Analyst	CAS #	Flags
Extraction / Prep.								
Metal Digestion	Completed			3015A	11/11/11 09:00	PER		
Metals								
Manganese, Dissolved	0.820	mg/L	0.005	200.8	11/11/11 12:49	PER	7439-96-5	

Analytical Laboratory Report

Lab Sample ID: S50670.08
Sample Tag: OBG MW - 9 MSD
Collected Date/Time: 11/04/2011 12:30
Matrix: Groundwater
COC Reference: 65159

1.6

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	125ml Plastic	HNO3	Yes	4.6	IR

Analysis	Results	Units	RL	Method	Run Date/Time	Analyst	CAS #	Flags
Extraction / Prep.								
Metal Digestion	Completed			3015A	11/11/11 09:00	PER		
Metals								
Manganese, Dissolved	0.823	mg/L	0.005	200.8	11/11/11 12:50	PER	7439-96-5	

Analytical Laboratory Report

Lab Sample ID: S50670.09
Sample Tag: OBG MW - 9 Co-Located
Collected Date/Time: 11/04/2011 12:30
Matrix: Groundwater
COC Reference: 65159

1i5

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	125ml Plastic	HNO3	Yes	4.6	IR

Analysis	Results	Units	RL	Method	Run Date/Time	Analyst	CAS #	Flags
Extraction / Prep.								
Metal Digestion	Completed			3015A	11/11/11 09:00	PER		
Metals								
Manganese, Dissolved	0.574	mg/L	0.005	200.8	11/11/11 12:52	PER	7439-96-5	

Analytical Laboratory Report

Lab Sample ID: S50670.10
Sample Tag: DUP-2
Collected Date/Time: 11/04/2011 00:01
Matrix: Groundwater
COC Reference: 65159

1:5

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	125ml Plastic	HNO3	Yes	4.6	IR

Analysis	Results	Units	RL	Method	Run Date/Time	Analyst	CAS #	Flags
Extraction / Prep.								
Metal Digestion	Completed			3015A	11/11/11 09:00	PER		
Metals								
Manganese, Dissolved	0.577	mg/L	0.005	200.8	11/11/11 12:53	PER	7439-96-5	

Analytical Laboratory Report

Lab Sample ID: S50670.11
Sample Tag: FB-1
Collected Date/Time: 11/04/2011 13:00
Matrix: Groundwater
COC Reference: 65159

1:2

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	125ml Plastic	HNO3	Yes	4.6	IR

Analysis	Results	Units	RL	Method	Run Date/Time	Analyst	CAS #	Flags
Extraction / Prep.								
Metal Digestion	Completed			3015A	11/11/11 09:00	PER		
Metals								
Manganese	Not detected	mg/L	0.005	200.8	11/11/11 12:13	PER	7439-96-5	

0.0025

Appendix G

Data Validation Report – April 5, 2012

To: Tony Finch *cc:*
From: KA Storne
Re: Data Validation Results for the RACER Coldwater Road Landfill Site - Sampling Performed April 2012

File: 14774/48630.004.001
Date: May 16, 2012

This data validation memorandum provides the data validation results for the groundwater samples collected for the Revitalizing Auto Communities Environmental Response Trust (RACER) at the Coldwater Road Landfill site located in Flint, Michigan. O'Brien & Gere conducted sample collection activities in April 2012.

The following table summarizes the analysis performed for this sampling event.

Table 1. *Analytical method and references*

Parameter	Method	Reference
Metals (Total and Dissolved Manganese)	USEPA Methods 3015A/200.8	1, 2

Note:
1. USEPA. 2004. *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods, SW-846,* 3rd Edition, Update IIIB. Washington D.C.
2. USEPA. 2001. *40 CFR Part 136, Appendix A.* Washington, D.C.

Merit Laboratories, Inc. (Merit Labs) of East Lansing, Michigan performed the analyses. The laboratory package contained quality control analysis summary forms.

The list of samples that were submitted to the laboratory for this project is presented in Attachment A. Attachment B presents the specific data validation approach applied to data generated for this investigation. Attachment C presents the Laboratory QA/QC analyses definitions.

Full validation was performed for the samples collected for this sampling event.

The analytical data generated for this investigation were evaluated by O'Brien & Gere using the quality assurance/quality control (QA/QC) criteria presented in the method used by the laboratory and the following document for general guidance:

- O'Brien & Gere. 2007. *Quality Assurance Project Plan Former WWTP Coldwater Road Landfill, Flint Michigan (QAPP).* Farmington Hills, Michigan.

Data affected by excursions from these QA/QC criteria are qualified using the following USEPA data validation guidance and professional judgment:

- USEPA. 2010. *Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review,* EPA 540-R-10-011. Washington D.C.

The application of these validation guidelines has been modified to reflect the requirements of the methods utilized by Merit Labs.

The following parameters were reviewed in the validation for full validation:

- Chain-of-custody record
- Sample collection
- Sample preservation
- Holding times
- Calibration
- Blank analysis
- Matrix spike/matrix spike duplicate (MS/MSD) analysis
- Field duplicate and co-located sample analysis
- Laboratory Control Sample (LCS) analysis
- Internal standard performance
- Target analyte quantitation and quantitation limits (QLs)
- Documentation completeness

The following sections of this memorandum present the results of the comparison of the analytical data to the QA/QC criteria specified above. Based on the data validation, an overall evaluation of data usability is also presented in the final section.

METALS DATA EVALUATION SUMMARY

The following QA/QC parameters were found to meet method and validation criteria or did not result in additional qualification of sample results:

- Chain-of-custody record
- Sample collection
- Sample preservation
- Holding times
- Calibration
- Blank analysis
- MS/MSD analysis
- Field duplicate and co-located sample analysis
- LCS analysis
- Internal standard performance
- Documentation completeness

Deviations from QA/QC criteria were not identified during the validation process. Additional observations are summarized below.

<u>I. Target analyte quantitation and QLs</u>
Sample results were reported using diluted analyses due to elevated concentrations of target analytes and matrix interferences present in the samples.

DATA USABILITY
Overall data usability with respect to completeness for the final sample results reported is 100 percent for the metals data. The data are usable for qualitative and quantitative purposes. Based on the validation performed, the completeness goal of 95 percent was met for these analyses.

Sample cross reference list

Laboratory Name	Date Collected	Laboratory Identification	Client Identification	Matrix	Analysis Requested
Merit	4/5/2012	S52100.01	OBG MW-10, MS/MSD	Groundwater	Total and Dissolved Manganese
Merit	4/5/2012	S52100.04	OBG MW-10 Co-located	Groundwater	Total Manganese
Merit	4/5/2012	S52100.05	DUP-1 [OBG MW-10]	Groundwater	Total Manganese
Merit	4/5/2012	S52100.06	O"BG MW-9, MS/MSD	Groundwater	Total and Dissolved Manganese
Merit	4/5/2012	S52100.09	OBG MW-9 Co-located	Groundwater	Dissolved Manganese
Merit	4/5/2012	S52100.10	DUP-2 [OBG MW-9]	Groundwater	Dissolved Manganese
Merit	4/5/2012	S52100.11	FB-1	Aqueous	Total Manganese

Note:

Merit indicates Merit Laboratories located in East Lansing, Michigan.

MS/MSD indicates matrix spike/matrix spike duplicate analyses.

DUP inidicates duplicate sample.

The sample identification utilized for field duplicate is shown in brackets.

Co-located samples are independent samples collected from the same location using same collection methods for the enviromental sample.

O'Brien & Gere Data validation approach using USEPA National Functional Guidelines for Non-Contract Laboratory Program Methods	
Laboratory Methods and Data Validation Approach	The O'Brien & Gere data validation approach utilizes the Project QAPP and methods applied by the laboratory to evaluate data. USEPA National Functional Guidelines address data validation of Contract Laboratory Program (CLP) methods. If excursions from the QAPP or method quality control requirements are identified, O'Brien & Gere applies a similar approach as used in the USEPA National Functional Guidelines to apply validation qualifiers to the data associated with the excursions.
General Validation Approach	The validation approach taken by O'Brien & Gere is a conservative one; qualifiers are applied to sample data to indicate both major and minor excursions so that data associated with any type of excursion are identified to the data user. Major excursions result in data being rejected (R), indicating that the data are considered unusable for either quantitative or qualitative purposes. Minor excursions result in sample data being qualified as approximate (J, UJ, JN) or non-detected (U) that is otherwise usable for quantitative or qualitative purposes.
	Excursions are subdivided into excursions that are within the laboratory's control and those that are a result of site conditions. Excursions involving laboratory control sample recovery, calibration response, method blank excursions, low or high spike recovery due to inaccurate spiking solutions or poor instrument response, holding times, interpretation errors, and quantitation errors are within the control of the laboratory. Excursions resulting from matrix spike recovery, serial dilution recovery, surrogate, and internal standard performance due to interference from the matrix of the samples are examples of those excursions that are due to site conditions and are not within the laboratory's control if the laboratory has followed proper method procedures, including performing appropriate cleanup techniques.
Applying professional judgment	USEPA National Functional Guidelines allow professional judgment to be used when applying qualifiers in some cases. When utilizing professional judgment, justification for actions taken will either be provided in the associated report or will be available upon request.
Validation Parameter	**O'Brien & Gere Data Validation Approach based on:** • **USEPA. 2010. Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review, EPA 540-R-10-011. Washington D.C.**
Validation Qualifiers – Inorganics	**U - The analyte was analyzed for, but was not detected at a level greater than or equal to the level of the quantitation limit (QL).** **J - The analyte was positively identified and the associated numerical value is the approximate concentration of the analyte in the sample (due either to the quality of the data generated because certain quality control criteria were not met, or the concentration of the analyte was below the QL).** **J+ - The result is an approximate concentration, but the result may be biased high.** **J- - The result is an approximate concentration, but the result may be biased low.** **R - The sample results are unusable due to the quality of the data generated because certain criteria were not met. The analyte may or may not be present in the sample.** **UJ - The analyte was not detected at a level greater than or equal to the QL. However, the QL is approximate and may be inaccurate or imprecise.**
Cooler Temperature	Results for samples submitted for organic and inorganic analyses that are impacted by coolers that did not contain ice, or if the ice melted upon receipt and the cooler temperatures are greater than 10°C, are qualified as approximate (UJ, J). If samples are delivered to the laboratory the same day as sample collection and samples did not have sufficient time to reach 10°C, samples are not qualified, unless proper preservation was not provided for samples between sample collection and sample receipt at the laboratory. Results for samples received at ambient temperature involved in extended shipment-day issues may be rejected, applying professional judgment.
Holding Time for Inorganics	Detected results for samples improperly preserved (without appropriate chemical or temperature) are qualified as approximate, biased low (J^-) and non-detected results are rejected (R), applying professional judgment. Non-detected and detected results for samples properly preserved and analyzed outside of but less than two times the holding time window established in the method or the QAPP for preparation and/or analysis are qualified as approximate, biased low (UJ, J^-). Non-detected results for samples properly preserved and analyzed greater than two times the holding time window for preparation and/or analysis are rejected (R). Detected results for samples properly preserved and analyzed greater than two times the holding time window for preparation and/or analysis are qualified as approximate, biased low (J^-).

O'Brien & Gere Data validation approach using USEPA National Functional Guidelines for Non-Contract Laboratory Program Methods	
Evaluation of Initial (ICV) and Calibration Verification (CCV) for Metals, Mercury and Inorganics	Metals are evaluated using the criteria for ICV and CCV of 90% to 110% of the expected value. Mercury is evaluated using the criteria for ICV of 90% to 110% of the expected value and 80% to 120% of the expected value for the CCV. Total Cyanide is evaluated using the criteria for ICV and CCV of 85% to 115% of the expected value. For analyses utilizing a calibration curve, the correlation coefficient for the first or second order curve must be ≥ 0.995.
ICV and CCV Actions for Metals, Mercury, Cyanide and Inorganics	For Metal and Mercury ICV and CCV recoveries outside of laboratory CLs: 1. Detected result associated with recovery of greater than upper CLs is qualified as approximate, biased high (J^+). Non-detected result is not qualified. 2. Detected result associated with recovery of greater than or equal to 75% but less than the lower laboratory CL is qualified as approximate, biased low (J^-). Non-detected result is qualified as approximate (UJ). 3. Detected result associated with recovery of less than 75% is qualified as approximate, biased low (J^-). Non-detected result is rejected (R). For Total Cyanide: 1. Detected result associated with recovery of greater than upper CLs is qualified as approximate, biased high (J^+). Non-detected result is not qualified. 2. Detected result associated with recovery of greater than or equal to 70% but less than the lower laboratory CL is qualified as approximate, biased low (J^-). Non-detected result is qualified as approximate (UJ). 3. Detected result associated with recovery of less than 70% is qualified as approximate, biased low (J^-). Non-detected result is rejected (R).
ICP-MS Instrument Performance Evaluation	ICP-MS data is evaluated using resolution of mass calibration of within 0.1 µ and the %RSD of less than 5%. If IP fails criteria, detected results are qualified as approximate (J) and non-detected results are qualified as approximate (UJ).
Evaluation of Internal Standards for ICP-MS	Internal standard recoveries are evaluated using control limits of percent relative intensity (%RI) from 60% to 125% of the response in the calibration blank. The results associated with internal standard %RI outside of CL, detected and non-detected results are qualified as approximate (J, UJ).
Metal and Inorganic MS/MSD, Laboratory/Field Duplicate, Serial Dilution	Qualification of sample results associated with MS/MSD, laboratory duplicate and field duplicate excursions is performed on samples for the same matrix, within the same preparation batch, within the same SDG group.
Evaluation of LCS Data for Metals and Inorganics	To apply qualifiers if LCS result is outside of laboratory CLs or 80 to 120%: Aqueous and soil samples: 1. Detected result associated with a recovery of less than 50% is qualified as approximate, biased low (J^-) and non-detected result is rejected (R). 2. Detected result associated with recovery between 50 and 79%, is qualified as approximate, biased low (J^-). Non-detected result is qualified as approximate (UJ). 3. Detected result associated with recoveries of greater than upper CL is qualified as approximate, biased high (J^+). 4. Detected result associated with recoveries of greater than 150% is rejected (R), applying professional judgment.

O'Brien & Gere Data validation approach using USEPA National Functional Guidelines for Non-Contract Laboratory Program Methods	
Evaluation of MS/MSD Data for Metals and Inorganics	To apply qualifiers if either MS or MSD result is outside of laboratory CL or 75 to 125% and if post-digestion spike evaluated for metals and post-distillation spike for Total Cyanide: Aqueous and soil sample: 1. Detected result associated with a recovery of less than 30% with a Post-Digestion spike recovery of less than 75% is qualified as approximate, biased low (J^-) and non-detected result is rejected (R). 2. Detected result associated with a recovery of less than 30% with a Post-Digestion spike recovery of greater than or equal to 75% is qualified as approximate (J) and non-detected result is qualified as approximate (UJ). 3. Detected result associated with a recovery of 30% to 74% with a Post-Digestion spike recovery of less than 75% is qualified as approximate, biased low (J^-) and non-detected result is qualified as approximate (UJ). 4. Detected result associated with a recovery of 30% to 74% with a Post-Digestion spike recovery of greater than 75% is qualified as approximate (J) and non-detected result is qualified as approximate (UJ). 5. Detected result associated with a recovery of greater than 125% with a Post-Digestion spike recovery of greater than 125% is qualified as approximate, biased high (J^+). 6. Detected result associated with a recovery of greater than 125% with a Post-Digestion spike recovery of less than or equal to 125% is qualified as approximate (J). 7. Detected result associated with a recovery of less than 30% without a Post-Digestion spike is qualified as approximate, biased low (J^-) and non-detected result is rejected (R). 8. Detected result associated with a recovery of 30% to 74% without a Post-Digestion spike is qualified as approximate, biased low (J^-) and non-detected result is qualified as approximate (UJ). 9. Detected result associated with a recovery of greater than 125% without a Post-Digestion spike is qualified as approximate, biased high (J^+).
Evaluation of Laboratory Duplicate for Metals and Mercury	To apply qualifiers if laboratory duplicate results are outside of RPD or difference criteria: Aqueous and soil sample with sample and duplicate values both greater than or equal to 5 times the QL: 1. Detected result greater than or equal to the QL, associated with an RPD of greater than 20 is qualified as approximate (J) and non-detected result is qualified as approximate (UJ). Aqueous and soil sample when either detected sample or duplicate value is less than 5 times the QL: 1. Detected results with absolute difference greater than two times the QL are qualified as approximate (J). Non-detected results are qualified as approximate (UJ).
Interference Check Sample (ICS) Evaluation and Actions for Metals	Metals are evaluated using the criteria for ICSA (Interferents) and ICSAB (Interferents and analytes) of ± two times the QL and of 80% to 120% of the expected value. For ICSA and ICSAB outside of CLs: 1. For recovery outside the upper CLs or for potential false positives (+two times the QL), detected results are qualified as approximate, biased high (J^+). 2. For recovery outside the lower CLs but greater than 50% or potential false negatives (- two times the QL), detected results are qualified as approximate, biased low (J^-). Non-detected result is qualified as approximate (UJ). 3. For recovery less than 50%, detected results are qualified as approximate, biased low (J^-). Non-detected result is rejected (R).
Evaluation of Field Duplicate for Metals and Mercury	Field duplicate data are evaluated against relative percent difference (RPD) criteria of less than 50 percent for aqueous samples and less than 100 percent for soils when both results are greater than or equal to five times the QL. When one field duplicate result is less than five times the QL, a control limit of plus or minus two times the QL (difference criterion) is applied. If RPDs or differences are outside of criterion, detected and non-detected results are qualified as approximate (UJ, J) to indicate minor excursions.
Evaluation of Metal and Mercury Blank Data	For calibration blanks and preparation blanks at concentrations greater than or equal to the laboratory MDLs but less than or equal to QLs: 1. Concentration in the associated samples of greater than or equal to the MDLs but less than or equal to QLs are revised to the QL level and qualified as non-detected (U).
	For calibration blanks, preparation blanks and field blanks at concentrations greater than laboratory QLs: 1. Concentrations in the associated samples of greater than or equal to the MDLs but less than or equal to QLs are revised to the QL level and are qualified as non-detected (U). 2. Concentration in the associated samples of greater than the QLs and less than the blank concentration are rejected (R) or qualified as non-detected (U), applying professional judgment.
	For calibration blanks and preparation blanks at concentrations equal to or between the negative value of the MDL and the QL: 1. Detects in the associated samples are qualified as approximate, biased low (J^-) and non-detects are qualified as approximate (UJ).

O'Brien & Gere Data validation approach using USEPA National Functional Guidelines for Non-Contract Laboratory Program Methods	
Evaluation of ICP Serial Dilution Data for Metals	Serial dilution results are evaluated for data with initial sample concentrations that are greater than 50 times the MDL. If the percent difference is greater than 10%, detected sample results are qualified as approximate (J) and non-detected results are qualified as approximate (UJ).
Source O'Brien & Gere	

Laboratory QA/QC analyses definitions.	
QA/QC Term	Definition
Accuracy	The closeness or agreement of the observed value or test response to the true or acceptable reference value or the test response from a reference method. It is influenced by both random error (precision) and systematic error (bias). The terms “bias” and “precision” are often used in lieu of “accuracy”.
Precision	A measure of mutual agreement between two or more individual measurements of the same property, obtained under similar conditions.
Representativeness	A measure of the degree to which data accurately and precisely characterize a population; the correspondence between the analytical result and the actual quality or condition experienced by a contaminant receptor.
Sensitivity	The capability of a method or instrument to discriminate between measurement responses representing different levels of a variable of interest.
Completeness	A measure of the amount of valid data obtained from a measurement system as compared to the planned amount, usually expressed as a percentage; also a measure of the degree to which the sampling scheme represents the available range in something, regardless of what was planned.
Detection limit	The lowest concentration or amount of the target analyte that can be determined to be different from zero by a single measurement at a stated level of probability.
Quantitation limit	The level above which numerical results may be obtained with a specified degree of confidence; the minimum concentration of an analyte in a specific matrix that can be identified and quantified above the method detection limit and within specified limits of precision and bias during routine analytical operating conditions.
Method detection limit	The minimum concentration of an analyte that undergoes preparation similar to the environmental samples and can be reported with a stated level of confidence that the analyte concentration is greater than zero.
Instrument detection limit	The lowest concentration of a metal target analyte that, when directly inputted and processed on a specific analytical instrument, produces a signal/response that is statistically distinct from the signal/response arising from equipment “noise” alone.
Gas chromatography/mass spectrometry (GC/MS) instrument performance check	Performed to verify mass resolution, identification, and to some degree, instrument sensitivity. These criteria are not sample specific; conformance is determined using standard materials.
Control limits	The variation in a process data set expressed as plus/minus standard deviations from the mean, generally placed on a chart to indicate the upper and lower acceptable ranges of process data and to judge whether the process is in or out of statistical limitations.
Calibration	Compliance requirements for satisfactory instrument calibration are established to verify that the instrument is capable of producing acceptable quantitative data. Initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of analysis and calibration verifications document satisfactory maintenance and adjustment of the instrument on a day-to-day basis.
Relative Response Factor	A measure of the relative mass spectral response of an analyte compared to its internal standard. Relative Response Factors are determined by analysis of standards and are used in the calculation of concentrations of analytes in samples.
Relative standard deviation	The standard deviation divided by the mean; a unit-free measure of variability.
Correlation coefficient	A measure of the strength of the relationship between two variables.
Relative Percent Difference	Used to compare two values; the relative percent difference is based on the mean of the two values, and is reported as an absolute value, i.e., always expressed as a positive number or zero.
Percent Difference	Used to compare two values; the percent difference indicates both the direction and the magnitude of the comparison, i.e., the percent difference may be either negative, positive, or zero.
Drift	The deviation in instrument response from its set or reference value over a period of time.
Percent Recovery	The act of determining whether or not the methodology measures all of the target analytes contained in a sample.
Blanks	Several types of blanks are analyzed by the laboratory. Corrective action procedures are implemented for blank analyses if target compounds are detected at concentrations greater than the method criteria. The criteria for evaluation of blanks apply to any blank associated with a group of samples. If problems with a blank exist, data associated with the project are evaluated to determine whether or not there is an inherent variability in the data for the project or if the problem is an isolated occurrence not affecting other data.
Reagent blank	Consists of laboratory target analyte-free water and any reagents added to a sample during analysis. This type of blank is analyzed to evaluate whether contamination occurred during the analysis of the sample due to reagent contamination. A reagent blank is usually analyzed following highly contaminated samples to assess the potential for cross-contamination during analysis.
Instrument blank	Consists of clean solvent spiked with the surrogates and analyzed on each GC column and instrument used for sample analysis by GC. This type of blank is analyzed to evaluate whether contamination occurred during the analysis of the sample due to instrument contamination.
Calibration blank	Consists of acids and reagent water used to prepare metal samples for analysis. This type of blank is analyzed to evaluate whether contamination is occurring during the preparation and analysis of the sample.
Method blank	A water or soil blank that undergoes the preparation procedures applied to a sample (i.e., extraction, digestion, clean-up). These samples are analyzed to examine whether sample preparation, clean-up,

Laboratory QA/QC analyses definitions.	
	and analysis techniques result in sample contamination.
Field/equipment	Collected and submitted for laboratory analysis, where appropriate. Field/equipment blanks are handled in the same manner as environmental samples. Equipment/field blanks are analyzed to assess contamination introduced during field sampling procedures.
Trip blank	Consist of samples of analyte-free water that have undergone shipment from the sampling site to the laboratory in coolers with the environmental samples submitted for volatile organic compound (VOC) analysis. Trip blanks will be analyzed for VOCs to determine if contamination has taken place during sample handling and/or shipment. Trip blanks will be utilized at a frequency of one each per cooler sent to the laboratory for VOC analysis.
Storage blank	Consists of sample vials filled with laboratory analyte-free water. The vials are stored at the laboratory with the samples collected for VOC analysis, under the same conditions as the samples. The storage blank is analyzed with the VOC samples to evaluate for contamination due to sample storage.
Internal standards performance	Compounds not found in environmental samples which are spiked into samples and quality control samples at the time of sample preparation for organic analyses. Internal standards must meet retention time and recovery criteria specified in the analytical method. Internal standards are used as the basis for quantitation of the target analytes.
Surrogate recovery	Compounds similar in nature to the target analytes but not expected to be detected in the environmental media which are spiked into environmental samples, blanks, and quality control samples prior to sample preparation for organic analyses. Surrogates are used to evaluate analytical efficiency by measuring recovery.
Laboratory control sample Matrix spike blank analyses	Standard solutions that consist of known concentrations of the target analytes spiked into laboratory analyte-free water or sand. They are prepared or purchased from a certified manufacturer from a source independent from the calibration standards to provide an independent verification of the calibration procedure. They are prepared and analyzed following the same procedures employed for environmental sample analysis to assess method accuracy independently of sample matrix effects.
Laboratory duplicate	Two or more representative portions taken from one homogeneous sample by the analyst and analyzed in the same laboratory.
Matrix	The material of which the sample is composed or the substrate containing the analyte of interest, such as drinking water, waste water, air, soil/sediment, biological material.
Matrix Spike (MS)	An aliquot of a matrix (water or soil) fortified (spiked) with known quantities of specific target analytes and subjected to the entire analytical procedure in order to indicate the appropriateness of the method for the matrix by measuring recovery.
Matrix spike duplicate (MSD)	A second aliquot of the same matrix as the matrix spike that is spiked in order to determine the precision of the method.
Retention time	The time a target analyte is retained on a GC column before elution. The identification of a target analyte is dependent on a target compound's retention time falling within the specified retention time window established for that compound.
Relative retention time	The ratio of the retention time of a compound to that of a standard.
Resolution	The separation between peaks on a chromatogram.
Interference	An element, compound, or other matrix effect present in a sample which disturbs the detection of a target analyte leading to inaccurate concentration results for the target analyte.
Raw data	The documentation generated during sampling and analysis which includes, but is not limited to, field notes, hardcopies of electronic data, disks, un-tabulated sample results, QC sample results, printouts of chromatograms, instrument outputs, and handwritten notes.
Source O'Brien & Gere	

Merit Laboratories, Inc.

Quality Control Cover Page

8 pgs.

Report ID: S52100.01(01)
Report Date: 04/06/2012
Project: Coldwater Road Former WWTP Area
Lab Sample ID(s): S52100.01-S52100.11

Report to:

Attention: Tony Finch
O'Brien & Gere Engineers, Inc.
37000 Grand River Ave.
Suite 260
Farmington, MI 48335

Sample ID	Sample Tag	Collected	Matrix	Analysis Departments
S52100.01	OBG MW-10	04/05/2012 09:55	Groundwater	Extraction / Prep., Metals
S52100.02	OBG MW-10 MS	04/05/2012 09:55	Groundwater	Extraction / Prep., Metals
S52100.03	OBG MW-10 MSD	04/05/2012 09:55	Groundwater	Extraction / Prep., Metals
S52100.04	OBG MW-10 Co-Located	04/05/2012 09:55	Groundwater	Extraction / Prep., Metals
S52100.05	Dup-1 [MW-10]	04/05/2012 00:01	Groundwater	Extraction / Prep., Metals
S52100.06	OBG MW-9	04/05/2012 11:05	Groundwater	Extraction / Prep., Metals
S52100.07	OBG MW-9 MS	04/05/2012 11:05	Groundwater	Extraction / Prep., Metals
S52100.08	OBG MW-9 MSD	04/05/2012 11:05	Groundwater	Extraction / Prep., Metals
S52100.09	OBG MW-9 Co-Located [MW-9]	04/05/2012 11:05	Groundwater	Extraction / Prep., Metals
S52100.10	Dup-2	04/05/2012 00:01	Groundwater	Extraction / Prep., Metals
S52100.11	FB-1	04/05/2012 11:25	Quality Control	Extraction / Prep., Metals

This QC package, to the best of my knowledge, is in compliance with all technical and administrative requirements. If you have any questions, please do not hesitate to contact me at 517-332-0167 (ext. 14) or email me at mayamurshak@meritlabs.com.

Sincerely,

Maya Murshak
Technical Director

Form 1: Metals Analysis Data Sheet

Data Set ID: MT-12-0406A
Analysis Date: 04/06/12

Instrument ID: HP ICP/MS
Analyst: SLR std id#: 0

Lab Sample ID: S52100.01
Date Collected: 04/05/2012

Sample Tag: OBG MW-10
Matrix: Groundwater

CAS #	Analyte	Result	RDL	Units	Dilute	Run Date	Notes
7439-96-5	Manganese	2.62	0.005	mg/L	5	04/06/2012	
7439-96-5	Manganese, Dissolved	2.57	0.005	mg/L	5	04/06/2012	

Form 1: Metals Analysis Data Sheet

Data Set ID: MT-12-0406A
Analysis Date: 04/06/12

Instrument ID: HP ICP/MS
Analyst: SLR std id#: 0

Lab Sample ID: S52100.04
Date Collected: 04/05/2012

Sample Tag: OBG MW-10 Co-Located
Matrix: Groundwater

CAS #	Analyte	Result	RDL	Units	Dilute	Run Date	Notes
7439-96-5	Manganese	2.87	0.005	mg/L	5	04/06/2012	

Form 1: Metals Analysis Data Sheet

Data Set ID: MT-12-0406A
Analysis Date: 04/06/12

Instrument ID: HP ICP/MS
Analyst: SLR std id#: 0

Lab Sample ID: S52100.05
Date Collected: 04/05/2012

Sample Tag: Dup-1 [MW-10]
Matrix: Groundwater

CAS #	Analyte	Result	RDL	Units	Dilute	Run Date	Notes
7439-96-5	Manganese	2.85	0.005	mg/L	5	04/06/2012	

Form 1: Metals Analysis Data Sheet

Data Set ID: MT-12-0406A
Analysis Date: 04/06/12

Instrument ID: HP ICP/MS
Analyst: SLR std id#: 0

Lab Sample ID: S52100.06
Date Collected: 04/05/2012

Sample Tag: OBG MW-9
Matrix: Groundwater

CAS #	Analyte	Result	RDL	Units	Dilute	Run Date	Notes
7439-96-5	Manganese	0.591	0.005	mg/L	5	04/06/2012	
7439-96-5	Manganese, Dissolved	0.562	0.005	mg/L	5	04/06/2012	

Form 1: Metals Analysis Data Sheet

Data Set ID: MT-12-0406A
Analysis Date: 04/06/12

Instrument ID: HP ICP/MS
Analyst: SLR std id#: 0

Lab Sample ID: S52100.09
Date Collected: 04/05/2012

Sample Tag: OBG MW-9 Co-Located
Matrix: Groundwater

CAS #	Analyte	Result	RDL	Units	Dilute	Run Date	Notes
7439-96-5	Manganese, Dissolved	0.599	0.005	mg/L	5	04/06/2012	

Form 1: Metals Analysis Data Sheet

Data Set ID: MT-12-0406A
Analysis Date: 04/06/12

Instrument ID: HP ICP/MS
Analyst: SLR std id#: 0

Lab Sample ID: S52100.10
Date Collected: 04/05/2012

Sample Tag: Dup-2 [MW-9 DIS]
Matrix: Groundwater

CAS #	Analyte	Result	RDL	Units	Dilute	Run Date	Notes
7439-96-5	Manganese, Dissolved	0.581	0.005	mg/L	5	04/06/2012	

Attachments

Attachment A

MDEQ Comments on September 12, 2008, Addendum to the June 1999 Closure Certification Report for the Former WWTP at the Coldwater Road Landfill Facility

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
LANSING

RICK SNYDER
GOVERNOR

DAN WYANT
DIRECTOR

September 26, 2011

RECEIVED
SEP 28 2011
O'BRIEN & GERE

Mr. Dave Favero
RACER Trust
2930 Ecorse Road
Ypsilanti, Michigan 48198

Dear Mr. Favero:

SUBJECT: Acceptance of Response to Resource Management Division (RMD) March 24, 2009, letter comments on the Addendum to the June 1999 Closure Certification Report for the Former WWTP; Coldwater Road Landfill Facility, Genesee Township, Michigan; MID 005 356 860

The Department of Environmental Quality (DEQ), RMD, has reviewed the subject document dated July 13, 2009, for the Coldwater Road Landfill Facility, prepared and submitted by O'Brien & Gere Engineers, Inc.

The July 13, 2009, document was reviewed for compliance with Waste Management Division (now RMD) Order No. 64-05-92, effective October 29, 1992, and Part 111, Hazardous Waste Management, and Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended.

Based on this review, the response to the RMD comments is acceptable, and the investigation work can continue.

Should you require further information, please contact me at 517-241-2108; confortir@michigan.gov or DEQ, P.O. Box 30241, Lansing, Michigan 48909-7741.

Sincerely,

Richard A. Conforti, Jr., P.E.
Hazardous Waste Section
Resource Management Division

cc: Mr. Grant Trigger, RACER Trust
Mr. Anthony Finch, O'Brien & Gere Engineers, Inc.
Mr. Jack Schinderle/Mr. John McCabe/Mr. Joe Rogers, DEQ
Mr. William Yocum, DEQ
Corrective Action File

Attachment B

Response to Comments – Addendum to the June Closure Certification Report for the Former WWTP

O'BRIEN & GERE

July 13, 2009

Mr. Richard A. Conforti, Jr., P.E
Environmental Engineer
Waste and Hazardous Materials Division
Department of Environmental Quality
PO Box 30241
Lansing, MI 48909-7741

Subject: REALM Coldwater Road Landfill
MID 005 356 860
Response to Comments- Addendum to the June 1999 Closure Certification Report for the Former WWTP

Dear Mr. Conforti:

This letter is in response to the Michigan Department of Environmental Quality (MDEQ) letter dated March 24, 2009 providing comments on the Addendum to the June 1999 Closure Certification Report for the Former Wastewater Treatment Plant (WWTP) submitted in September 2008 and the teleconference call with the MDEQ on May 4, 2009. The MDEQ indicated in their March 24, 2009 letter they were not in agreement with the facility's conclusion that closure of the former WWTP pursuant to Part 111 has been achieved. Please note that Motors Liquidation Company (MLC) will now be managing this site as of July10, 2009.

The MDEQ comments and responses are discussed below:

MDEQ comment 1:

> " ... there are iron and/or manganese concentrations in groundwater above Part 201 residential drinking water protection criteria in the six monitoring wells (MW-1, MW-2, MW-3, MW-6, MW-7 and MW-8) located within approximately 100 feet of the facility's western property boundary. The Report does not delineate the extent of this groundwater contamination or document that the contamination above the drinking water criteria is contained within the facility's property."

Response:

Section R 299.5707, R299.5706a(5)(b) of the MI Part 201 regulations allows for a background concentration to be substituted for the generic cleanup criterion when the cleanup criterion is less than background. Therefore, background values were calculated for iron and manganese in groundwater at the former WWTP area. The background groundwater quality

for iron and manganese were determined from the historical Coldwater Road Landfill Site (on-site) monitoring well data (dissolved concentrations).

The MDEQ Sampling Strategies and Statistics Training Materials for Part 201 Cleanup Criteria 2002 permits the mean plus three standard deviations (SD) for a site-specific background determination for groundwater if the data is normally or log normally distributed, and the 95% upper confidence limit (UCL) for non-parametric (not normally or log normally distributed) data. Groundwater data from the shallow (perched groundwater) wells B-7, B-9, B-18A, B-19Ar, B-24r, and B-28 (shown on Figure 1) for the Coldwater Road Landfill Site were selected to develop the site-specific background values for iron and manganese. These wells were selected since they are believed to represent background conditions at the Site, i.e., the metals concentrations which exist do not appear to be attributable to any release at or regionally proximate to the Site. Since only dissolved metals groundwater data is available for the landfill Site, this data was used as a conservative measure in developing the site-specific background concentrations. Monitoring wells B-14, B-29 and B-30 were excluded from the analysis because B-14 had questionable zinc results in the past and has been replaced by B-28, and wells B-29 and B-30 have also been abandoned, but were also located very close to B-28 and would have biased the analysis in this area of the site.

The dissolved iron data is close to being log normally distributed, but just fails the test for log normally distribution. Therefore, the iron data was analyzed using the U.S. EPA recommended ProUCL program to calculate the 95% UCL concentration (attached as Exhibit A) which resulted in a background value of 1,730 ug/l.

Using the same set of wells listed above, a site-specific background was also calculated for manganese. The dissolved manganese data is log normally distributed, therefore, the dissolved manganese background concentration was calculated using the mean plus three SD, which resulted in a value of 1,312 ug/l. The dissolved manganese background calculation worksheet is included in Exhibit B.

The enclosed Table 1 summarizes the iron and manganese ground water results from the last two quarters of the quarterly sampling program (December 2007 and March 2008) compared to the site specific background values and Residential Health-Based Drinking Water criteria. The comparison shows that the results of the quarterly groundwater sampling program at the former WWTP are below the site-specific background for iron, except for one sample collected during the December 2007 sampling event at well OBG MW-3 (1,780 ug/l). However, this detection of iron is below the Health-Based Drinking Water criterion (2,000 ug/l). Therefore, no additional sampling or investigation is necessary to assess the extent of iron detected in groundwater at the former WWTP area.

One well location (OBG MW-3) exhibited concentrations of manganese above the calculated background concentration for the last two quarterly sampling events. Therefore, we propose to use the background value as the criteria for which the extent of manganese in groundwater will be assessed.

MDEQ Comment 2:

"The facility's proposed approach of implementing a prohibition of on-site use of groundwater for drinking water through the filing of a Declaration of Restrictive Covenant is not acceptable since it does not address potential off-site exposure (i.e.,

drinking contaminated groundwater) issues. Final closure of the area cannot be approved until the facility can reliably document that no potential off-site exposure can ever occur or that no off-site migration of contaminated groundwater above applicable criteria is occurring."

Response:

Potential off-site exposure will be addressed through the installation and sampling of two monitoring wells at the west property boundary to determine the concentrations of manganese. The locations of the proposed monitoring wells are depicted on Figure 2. Fieldwork will be performed in accordance with the Post-Closure Care Plan and the MDEQ-approved December 2006 Work Plan. Groundwater samples will be collected using low-flow sampling methods for two quarterly groundwater events with samples collected and analyzed for total manganese. If the results indicate manganese concentrations are below the site-specific background, closure of the area will be pursued through an Addendum to the Closure Certification Report. The site deed restriction would be expanded to prohibit use of the groundwater at the entire site, including the former WWTP area. The current Declaration of Restrictive Covenant prohibits the construction of wells or other devices to extract groundwater for consumption, irrigation, dewatering or any other use at two areas of the Coldwater Road Landfill Site: the Remaining Materials Area (RMA) and the landfill.

MDEQ Comment 3:

"In addition, it should also be noted that the facility's conclusion that the shallow groundwater at the site is not an aquifer cannot be supported by the WHMD unless that designation is formally approved through submittal of a Groundwater Not In An Aquifer (GWNIAA) Determination."

Response:

It is our intent not to rely on a GWNIAA determination for Site closure, but instead document that there are no exceedances of the Residential Health-Based Drinking Water criteria or site-specific background values at the western property boundary, thus demonstrating no off-site exposure (i.e., drinking contaminated groundwater) issues.

Additional MDEQ Comment:

During our teleconference call on May 4, 2009, the MDEQ expressed concern that the detections of volatile organic compounds (VOCs) at well OBG MW-5 (included on Table 2) were not delineated vertically and could potentially migrate to the lower usable aquifer.

Response:

Therefore, MDEQ recommended a deep monitoring well be installed at the site to assess the potential vertical extent of VOC impact to groundwater. The Natural Resources and Environmental Protection Act (NREPA), 1994 PA 451 R299.5528 states that a remedial investigation shall define the nature and extent of contamination in excess of the applicable generic residential cleanup criteria. No VOCs were detected at OBG MW-5 (or at adjacent wells OBG MW-6 or OBG MW-8) above the Generic Residential Drinking Water criteria during four rounds of quarterly sampling. Therefore, no further investigation is required under NREPA R299.5528.

If you have any questions regarding this response letter, please call me at (248) 477-5701, ext. 13.

Very truly yours,

O'BRIEN & GERE ENGINEERS, INC.

Scott L. Cormier, PE
Vice President

cc: Joe Rogers – MDEQ
John McCabe – MDEQ
Tony Finch – O'Brien & Gere

TABLES

TABLE 1
REALM
Coldwater Road Facility
Ground Water Analytical Results- Third Quarter (December 2007)
Metals Method 200.8

Sample Location	OBG MW-1	OBG MW-2	OBG MW-3	OBG MW-4	OBG MW-5	OBG MW-6	OBG MW-7	OBG MW-8	MDEQ Part 201 Residential Health-Based Drinking Water Criteria	Site-Specific Background
Date Collected	12/11/2007	12/11/2007	12/11/2007	12/11/2007	12/11/2007	12/11/2007	12/11/2007	12/11/2007		
Parameter										
Total Inorganics										
Iron	440	630	1,780	420	1,490	990	970	520	2,000	1,730
Manganese	216	307	**5,080**	118	521	642	46	371	860	1,312
Dissolved Inorganics										
Iron	NS	NS	NS	NS	790	NS	NS	NS	2,000	1,730
Manganese	NS	NS	NS	NS	502	NS	NS	NS	860	1,312

Notes:

1) Results and criteria are shown in ug/l (ppb).

2) Samples analyzed by Merit Laboratories, Inc. of East Lansing, Michigan.

3) MDEQ Part 201 Residential Health-Based Drinking Water Protection Criteria as listed in Operational Memorandum #1, dated January 23, 2006.

4) "NS" denotes the well was not sampled for this constituient.

5) Bold type indicates concentration above Site-Specifc Background and Part 201 Residential Health-Based Drinking Water criteria.

6) Site-specific background calculated in accordance with MDEQ Sampling Strategies and Statistical Training Materials for Part 201 Cleanup Criteria dated 2002 using dissolved metals.

TABLE 1
REALM
Coldwater Road Facility
Ground Water Analytical Results- Fourth Quarter (March 2008)
Metals Method 200.8

Sample Location	OBG MW-1	OBG MW-2	OBG MW-3	OBG MW-4	OBG MW-5	OBG MW-6	OBG MW-7	OBG MW-8	MDEQ Part 201 Residential Health-Based Drinking Water Criteria	Site-Specific Background
Date Collected	03/18/2008	03/18/2008	03/18/2008	03/18/2008	03/18/2008	03/18/2008	03/18/2008	03/18/2008		
Parameter										
Total Inorganics										
Iron	160J	280J	1,180J	130J	1,770J	350J	560J	280J	2,000	1,730
Manganese	405	97	**5,050**	54	532	322	212	337	860	1,312
Dissolved Inorganics										
Iron	NS	NS	NS	NS	190	NS	NS	NS	2,000	1,730
Manganese	NS	NS	NS	NS	520	NS	NS	NS	860	1,312

Notes:
1) Results and criteria are shown in ug/l (ppb).
2) Samples analyzed by Merit Laboratories, Inc. of East Lansing, Michigan.
3) MDEQ Part 201 Residential Health-Based Drinking Water Protection Criteria as listed in Operational Memorandum #1, dated January 23, 2006.
4) "NS" denotes the well was not sampled for this constituient.
5) Bold type indicates concentration above Site-Specifc Background and Part 201 Residential Health-Based Drinking Water criteria.
6) "J" denotes estimated concentration.

FIGURES

I:\PROJECTS\4966\32223\NOTES\FEMN BG\001a.MXD

FIGURE 1

N

LEGEND

PERCHED MONITORING WELL LOCATION

REALM
COLDWATER ROAD
FLINT, MICHIGAN

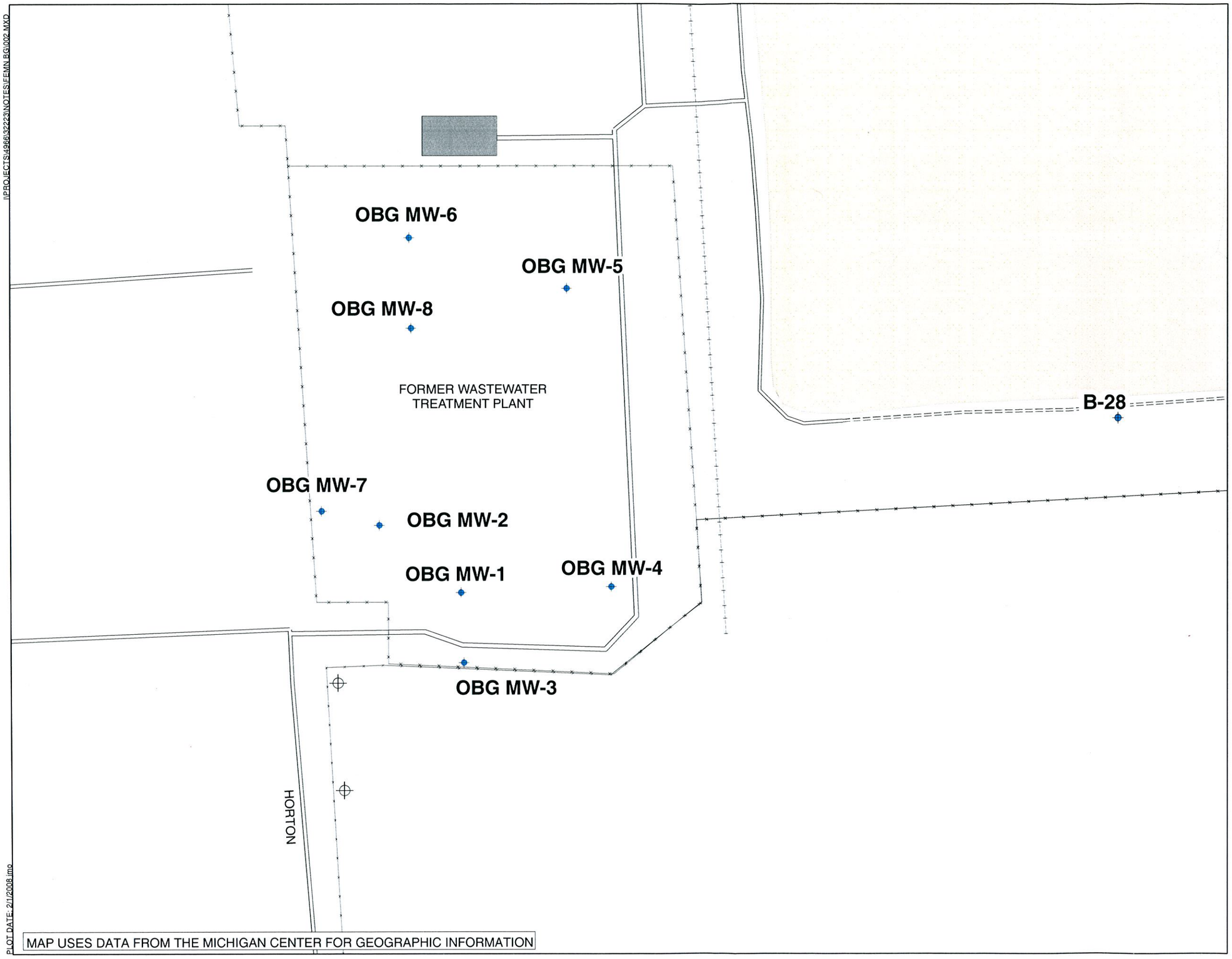
PERCHED WELL LOCATIONS

0 75 150 300 450 600
Feet

MAY 2009
4966/32223/NOTES/001a

O'BRIEN & GERE ENGINEERS, INC.

PLOT DATE: 2/1/2008 jmo



I:\PROJECTS\4966\32223\NOTES\FEMN BG\002.MXD

PLOT DATE: 2/1/2008 jmp

FIGURE 2

N

LEGEND

- PERCHED MONITORING WELL LOCATION
- PROPOSED PERCHED MONITORING WELL LOCATION

REALM
COLDWATER ROAD
FLINT, MICHIGAN

PROPOSED PERCHED WELL LOCATIONS

0 25 50 100 150 200
Feet

MAY 2009
4966/32223/NOTES/002

O'BRIEN & GERE ENGINEERS, INC.

Exhibit A

Site-Specific Background Calculation for Iron

REALM

Coldwater Road Landfill

Former Wastewater Treatment Plant

Groundwater Background Determination for Dissolved Iron

Iron			
Well	Date Collected	Concentration (ug/l)	Detection
B-7	Nov-98	10	D
B-7	Nov-99	260	D
B-7	Dec-00	50	D
B-7	Oct-01	330	D
B-7	Nov-02	250	D
B-7	Nov-03	190	D
B-7	Dec-04	180	D
B-7	Jun-05	170	D
B-7	Dec-05	150	D
B-7	Jun-06	190	D
B-7	Jun-07	130	D
B-7	Jun-08	350	D
B-9	Nov-97	650	D
B-9	Nov-99	610	D
B-9	Dec-00	50	D
B-9	Oct-01	940	D
B-9	Dec-04	570	D
B-9	Jun-05	480	D
B-9	Dec-05	320	D
B-9	Jun-06	390	D
B-9	Jun-07	320	D
B-9	Jul-08	780	D
B-18A	Nov-97	380	D
B-18A	Nov-98	240	D
B-18A	Nov-99	180	D
B-18A	Dec-00	10	*
B-18A	Dec-00	40	D
B-18A	Oct-01	350	D
B-18A	Nov-02	190	D
B-18A	Nov-03	160	D
B-18A	Dec-04	900	D
B-18A	Jun-05	170	D
B-18A	Dec-05	390	D
B-18A	Jun-06	170	D

Iron			
Well	Date Collected	Concentration (ug/l)	Detection
B-18A	Jun-07	110	D
B-18A	Jun-08	310	D
B-19AR	Nov-03	20	D
B-19AR	Dec-04	240	D
B-19AR	Dec-04	170	D
B-19AR	Jun-05	1,320	D
B-19AR	Dec-05	160	D
B-19AR	Dec-05	150	D
B-19AR	Jun-06	240	D
B-19AR	Jun-07	70	D
B-19AR	Jun-08	380	D
B-24R	Nov-98	60	D
B-24R	Jun-05	10,600	D
B-24R	Dec-05	3,180	D
B-24R	Jun-06	3,760	D
B-24R	Jun-07	2,400	D
B-24R	Jun-08	3,490	D
B-28	Jun-06	2,380	D
B-28	Jun-07	1,690	D
B-28	Jun-08	370	D

1) Iron data is nonparametric, so background concentration was determined by calculating the 95% Upper Confidence Limit (UCL) was calculated using USEPA approved ProUCL (see attached ProUCL output).

2) "*" denotes one half of the detection limit if non-detected.

3) "D" denotes concentration detected.

REALM
Coldwater Road Landfill
Former Wastewater Treatment Plant
95% UCL for Dissolved Iron (ProUCL Output)

General UCL Statistics for Data Sets with Non-Detects

User Selected Options	
From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Fe

General Statistics			
Number of Valid Data	54	Number of Detected Data	53
Number of Distinct Detected Data	38	Number of Non-Detect Data	1
		Percent Non-Detects	1.85%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	10	Minimum Detected	2.303
Maximum Detected	10600	Maximum Detected	9.269
Mean of Detected	785.7	Mean of Detected	5.721
SD of Detected	1628	SD of Detected	1.317
Minimum Non-Detect	10	Minimum Non-Detect	2.303
Maximum Non-Detect	10	Maximum Non-Detect	2.303
UCL Statistics			
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Lilliefors Test Statistic	0.326	Lilliefors Test Statistic	0.143
5% Lilliefors Critical Value	0.122	5% Lilliefors Critical Value	0.122
Data not Normal at 5% Significance Level		**Data not Lognormal at 5% Significance Level**	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	771.2	Mean	5.645
SD	1616	SD	1.419
95% DL/2 (t) UCL	1139	95% H-Stat (DL/2) UCL	1171
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	751.7	Mean in Log Scale	5.658
SD	1621	SD in Log Scale	1.384
95% MLE (t) UCL	1121	Mean in Original Scale	771.3
95% MLE (Tiku) UCL	1082	SD in Original Scale	1616
		95% Percentile Bootstrap UCL	1163
		95% BCA Bootstrap UCL	1324
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.622	**Data do not follow a Discernable Distribution (0.05)**	
Theta Star	1262		
nu star	65.98		
A-D Test Statistic	3.098	Nonparametric Statistics	
5% A-D Critical Value	0.802	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.802	Mean	771.3
5% K-S Critical Value	0.128	SD	1601
Data not Gamma Distributed at 5% Significance Level		SE of Mean	220
		95% KM (t) UCL	1140
Assuming Gamma Distribution		95% KM (z) UCL	1133
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	1139
Minimum	1.00E-09	95% KM (bootstrap t) UCL	1533
Maximum	10600	95% KM (BCA) UCL	1161
Mean	771.1	95% KM (Percentile Bootstrap) UCL	1164
Median	255	95% KM (Chebyshev) UCL	1730
SD	1616	97.5% KM (Chebyshev) UCL	2145
k star	0.442	99% KM (Chebyshev) UCL	2960
Theta star	1744		
Nu star	47.75	**Potential UCLs to Use**	
AppChi2	32.89	**95% KM (Chebyshev) UCL**	**Background= 1730 ug/l (ppb)**
95% Gamma Approximate UCL	1119		
95% Adjusted Gamma UCL	1131		

Note: DL/2 is not a recommended method.

Exhibit B

Site-Specific Background Calculation for Manganese

REALM
Coldwater Road Landfill
Former Wastewater Treatment Plant
Groundwater Background Determination for Dissolved Manganese

Manganese			
Well	Date Collected	Concentration (ug/l)	Detection
B-7	Nov-98	424	D
B-7	Nov-99	313	D
B-7	Nov-02	5	*
B-7	Nov-03	5	*
B-7	Dec-04	74	D
B-7	Jun-05	31	D
B-7	Dec-05	50	D
B-7	Jun-06	150	D
B-7	Jun-07	42	D
B-7	Jun-08	10	D
B-9	Nov-97	741	D
B-9	Nov-99	1280	D
B-9	Dec-04	248	D
B-9	Jun-05	701	D
B-9	Dec-05	410	D
B-9	Jun-06	330	D
B-9	Jun-07	1,900	D
B-9	Jul-08	812	D
B-18A	Nov-97	62	D
B-18A	Nov-98	128	D
B-18A	Nov-99	155	D
B-18A	Nov-02	26	D
B-18A	Nov-03	5	*
B-18A	Dec-04	363	D
B-18A	Jun-05	80	D
B-18A	Dec-05	170	D
B-18A	Jun-06	50	D
B-18A	Jun-07	22	D
B-18A	Jun-08	5	*
B-19AR	Nov-03	5	*
B-19AR	Dec-04	11	D
B-19AR	Dec-04	5	*
B-19AR	Jun-05	228	D
B-19AR	Dec-05	10	*
B-19AR	Jun-06	210	D
B-19AR	Jun-07	21	D
B-19AR	Jun-08	9	D
B-24R	Nov-98	120	D
B-24R	Jun-05	448	D
B-24R	Dec-05	210	D
B-24R	Jun-06	210	D
B-24R	Jun-07	194	D
B-24R	Jun-08	175	D
B-28	Jun-06	210	D
B-28	Jun-07	160	D
B-28	Jun-08	84	D

Manganese:	X =	237
	V =	125527.87
	SD =	358.21
	CV =	1.51
Background =	**ug/l (ppb)**	**1311.64**

where:
X = mean
V = variance
SD = standard deviation
CV = coefficient of variance
background = X + 3*SD

Notes:
1) Manganese data is lognormally distributed, so background concentration was determined by calculating the mean plus three standard deviations (see above).
2) "*" denotes one half of the detection limit if non-detected.
3) "D" denotes concentration detected.

Attachment C

Acceptance of Response to Resource Management Division (RMD) March 24, 2009, Letter Comments on the Addendum to the June 1999 Closure Certification Report for the Former WWTP at the Coldwater Road Landfill Facility

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
LANSING

RICK SNYDER
GOVERNOR

DAN WYANT
DIRECTOR

September 26, 2011

RECEIVED
SEP 28 2011
O'BRIEN & GERE

Mr. Dave Favero
RACER Trust
2930 Ecorse Road
Ypsilanti, Michigan 48198

Dear Mr. Favero:

SUBJECT: Acceptance of Response to Resource Management Division (RMD) March 24, 2009, letter comments on the Addendum to the June 1999 Closure Certification Report for the Former WWTP; Coldwater Road Landfill Facility, Genesee Township, Michigan; MID 005 356 860

The Department of Environmental Quality (DEQ), RMD, has reviewed the subject document dated July 13, 2009, for the Coldwater Road Landfill Facility, prepared and submitted by O'Brien & Gere Engineers, Inc.

The July 13, 2009, document was reviewed for compliance with Waste Management Division (now RMD) Order No. 64-05-92, effective October 29, 1992, and Part 111, Hazardous Waste Management, and Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended.

Based on this review, the response to the RMD comments is acceptable, and the investigation work can continue.

Should you require further information, please contact me at 517-241-2108; confortir@michigan.gov or DEQ, P.O. Box 30241, Lansing, Michigan 48909-7741.

Sincerely,

Richard A. Conforti, Jr., P.E.
Hazardous Waste Section
Resource Management Division

cc: Mr. Grant Trigger, RACER Trust
Mr. Anthony Finch, O'Brien & Gere Engineers, Inc.
Mr. Jack Schinderle/Mr. John McCabe/Mr. Joe Rogers, DEQ
Mr. William Yocum, DEQ
Corrective Action File

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