2018 Annual Groundwater Monitoring Report

DTE Electric Company
Sibley Quarry Coal Combustion Residual Landfill

801 Fort Street
Trenton, Michigan

January 2019

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Prepared For
DTE Electric Company

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Executive Summary

On April 17, 2015, the United States Environmental Protection Agency (USEPA) published the final rule for the regulation and management of Coal Combustion Residuals (CCR) under the Resource Conservation and Recovery Act (RCRA) (the CCR Rule), as amended July 30, 2018. The CCR Rule, which became effective on October 19, 2015 (amendment effective August 29, 2018), applies to the DTE Electric Company (DTE Electric) Sibley Quarry Landfill (SQLF) CCR unit. Pursuant to the CCR Rule, no later than January 31, 2018, and annually thereafter, the owner or operator of a CCR unit must prepare an annual groundwater monitoring and corrective action report for the CCR unit documenting the status of groundwater monitoring and corrective action for the preceding year in accordance with §257.90(e). On behalf of DTE Electric, TRC Engineers Michigan, Inc., the engineering entity of TRC Environmental Corporation (TRC), has prepared this Annual Groundwater Monitoring Report for calendar year 2018 activities at the SQLF CCR unit.

In the January 31, 2018 *Annual Groundwater Monitoring Report for the Sibley Quarry Landfill,* covering calendar year 2017 activities, DTE Electric reported that boron, chloride, sulfate and total dissolved solids (TDS) were observed within groundwater at one or more compliance wells at concentrations over background limits. TRC performed an alternate source demonstration (ASD) and determined the observation of constituents above background was a result of natural variability in groundwater quality and not attributable to the SQLF CCR unit. Therefore, DTE Electric continued semiannual detection monitoring at the SQLF CCR unit.

The semiannual detection monitoring events for 2018 were completed in April and October 2018 and included sampling and analyzing groundwater within the groundwater monitoring system for the indicator parameters listed in Appendix III to the CCR Rule. As part of the statistical evaluation, the data collected during detection monitoring events are evaluated to identify statistically significant increases (SSIs) in detection monitoring parameters to determine if concentrations in detection monitoring well samples exceed background levels. Detection monitoring data that has been collected and evaluated in 2018 are presented in this report.

Statistically significant results for Appendix III constituents were not confirmed in any downgradient wells during the March and October 2018 monitoring events that were not demonstrated through an ASD as being attributed to natural variability in groundwater quality. Based on the hydrogeology at the Site, the uppermost aquifer is in an area where pumping has been performed continuously since before CCR disposal began and will be continued to be dewatered, by which a continuous inward hydraulic gradient is maintained. As a result, the uppermost aquifer perimeter monitoring wells cannot have been affected by the SQLF CCR unit operations to date, nor could they be in the future under current pumping

conditions. Therefore, detection monitoring will be continued at the SQLF CCR unit in accordance with §257.94 of the CCR Rule.

Section 1
Introduction

1.1 Program Summary

On April 17, 2015, the United States Environmental Protection Agency (USEPA) published the final rule for the regulation and management of Coal Combustion Residuals (CCR) under the Resource Conservation and Recovery Act (RCRA) (the CCR Rule), as amended July 30, 2018. The CCR Rule, which became effective on October 19, 2015 (amendment effective August 29, 2018), applies to the DTE Electric Company (DTE Electric) Sibley Quarry Landfill Coal Combustion Residual Landfill (SQLF) CCR unit. Pursuant to the CCR Rule, no later than January 31, 2018, and annually thereafter, the owner or operator of a CCR unit must prepare an annual groundwater monitoring and corrective action report for the CCR unit documenting the status of groundwater monitoring and corrective action for the preceding year in accordance with §257.90(e). On behalf of DTE Electric, TRC Engineers Michigan, Inc., the engineering entity of TRC Environmental Corporation (TRC), has prepared this Annual Groundwater Monitoring Report for calendar year 2018 activities at the SQLF CCR unit (2018 Annual Report).

In the January 31, 2018 *Annual Groundwater Monitoring Report for the Sibley Quarry Landfill,* covering calendar year 2017 (2017 Annual Report), DTE Electric reported that while some natural variability was observed in compliance wells, there was no evidence of release from the CCR unit. TRC performed an alternate source demonstration (ASD) and concluded that the variability in boron, chloride, sulfate, and TDS concentrations was a result of natural variability in groundwater quality. The *Alternate Source Demonstration: 2017 Initial Detection Monitoring Sampling Event Sibley Quarry Coal Combustion Residual Landfill, Trenton, Michigan*, dated April 12, 2018, is included as Appendix A. Therefore, DTE Electric continued semiannual detection monitoring at the SQLF CCR unit.

This 2018 Annual Report presents the monitoring results and the statistical evaluation of the detection monitoring parameters (Appendix III to Part 257 of the CCR Rule) for the April and October 2018 semiannual groundwater monitoring events for the SQLF CCR unit. The semiannual detection monitoring events for 2018 were completed in April and October 2018 and included sampling and analyzing groundwater within the groundwater monitoring system for the indicator parameters listed in Appendix III to the CCR Rule. Detection monitoring for these events continued to be performed in accordance with the *CCR Groundwater Monitoring and Quality Assurance Project Plan – DTE Electric Company Sibley Quarry Coal Combustion Residual Landfill* (QAPP) (TRC, August 2016; revised March 2017) and statistically evaluated per the *Groundwater Statistical Evaluation Plan – DTE Electric Company Sibley Quarry Coal Combustion Residual Landfill* (Stats Plan) (TRC, October 2017). As part of the statistical evaluation, the data

collected during detection monitoring events are evaluated to identify SSIs of detection monitoring parameters compared to background levels.

1.2 Site Overview

The SQLF is located in Section 7, Township 4 South, Range 11 East, at 801 Fort Street (a.k.a. 502 Quarry Road) in Trenton, Wayne County, Michigan (Figure 1). The SQLF is located about two miles north of the DTE Electric Trenton Power Plant. The SQLF is bounded mostly by Fort Street to the west, Sibley Road to the north, the former Detroit and Toledo Shore Line Railroad and West Jefferson to the east, and the former Vulcan Mold & Iron Company (now owned by Danou Enterprises) and the DTE Electric Jefferson Substation to the south.

The SQLF is a licensed Type III solid waste disposal facility owned and operated by DTE Electric. The disposal facility currently receives the majority of CCR from the Trenton Channel and River Rouge Power Plants. In addition, a small amount of CCR is also received from the Monroe Power Plant. The SQLF is operated under the current operating license number 9394 in accordance with Michigan Part 115 of the Natural Resources and Environmental Protection Act (NREPA), PA 451 of 1994, as amended.

1.3 Geology/Hydrogeology

The SQLF CCR unit is located approximately one-half mile west of the Detroit River. The Sibley quarry was originally developed to mine limestone beginning in the mid-1800s and was mined to over 300 feet below ground surface (ft bgs) in some areas before becoming inactive. In 1951, Detroit Edison (now DTE Electric) acquired Sibley Quarry and began to manage CCR in the SQLF. As part of normal operations, beginning in 1951, the SQLF has been continuously dewatered to approximately 300 ft bgs maintaining a water level in the bottom of the quarry by pumping an average of approximately 1.5 million gallons per day.

The SQLF resides in an area characterized by near surface deposits of glacio-lacustrine clay and silt units on top of thick strata of dolomite and limestone bedrock. The SQLF is located in an area where the Dundee Formation (mostly limestone) and the Detroit River Group (limestone, dolostone and some sandstone) underlie the unconsolidated glacial drift and are the uppermost aquifer. At SQLF, the Dundee Formation is overlain by anywhere from less than 15 feet to more than 70 feet of unconsolidated material, most of which is clay-rich soil with some fill. The top of the Dundee Formation limestone/dolostone bedrock was encountered at depths ranging from 16.5 to 74.5 ft bgs and including the underlying Detroit River Group limestone/dolostone/ sandstone, extended to depths ranging from 235 to over 310 ft bgs. The underlying Sylvania Sandstone was encountered at depths ranging from 235 to 300 ft bgs in some locations at the SQLF.

As expected, data show that groundwater levels are significantly lower within the bedrock in monitoring wells that are the closest to the quarry where significant pumping is occurring, with water levels ranging from 120 to more than 210 ft bgs. Groundwater flow is consistently inward toward the base of the quarry due to continuous pumping at the quarry that hydraulically controls groundwater flow. The pumped water from the quarry is managed in accordance with a National Pollution Discharge Elimination System (NPDES) permit. Quarry dewatering results in all the perimeter uppermost aquifer CCR monitoring wells being upgradient of the SQLF CCR unit.

Because the uppermost aquifer is in an area where pumping has been performed continuously before CCR disposal began, and will be continued to be dewatered, a continuous inward hydraulic gradient is maintained. As a result, the uppermost aquifer perimeter monitoring wells cannot have been affected by the SQLF CCR unit operations to date, nor could they be in the future under current pumping conditions. Given that groundwater flow is inward toward the quarry, all of the perimeter monitoring wells in the groundwater monitoring system are located in an up gradient position relative to the landfill; therefore, monitoring of the SQLF CCR unit using interwell statistical methods (upgradient to downgradient) is not possible. Instead, based on these hydrogeologic conditions, intrawell statistical approaches are the appropriate method to evaluate groundwater data statistically. Consequently, intrawell statistical tests are being used during detection monitoring as outlined in the Stats Plan.

Section 2
Groundwater Monitoring

2.1 Monitoring Well Network

A groundwater monitoring system has been established for the SQLF CCR unit as detailed in the *Groundwater Monitoring System Summary Report – DTE Electric Company Sibley Quarry Coal Combustion Residual Landfill* (GWMS Report) (TRC, October 2017). The detection monitoring well network for the SQLF CCR unit currently consists of eight monitoring wells that are screened in the uppermost aquifer. The monitoring well locations are shown on Figure 2.

As discussed above and in the Stats Plan, intrawell statistical methods for the SQLF were selected because the uppermost aquifer is in an area where pumping has been performed continuously since before CCR disposal began, and will be continued to be dewatered, resulting in a maintained continuous inward hydraulic gradient. Given that groundwater flow is inward under pumping conditions toward the quarry, all of the perimeter monitoring wells in the groundwater monitoring system are located in an up gradient position relative to the landfill. Therefore, monitoring of the SQLF CCR unit using interwell statistical methods (upgradient to downgradient) is not possible. This also supports that the aquifer is unaffected by the CCR unit, where, as a result of the continuously maintained inward gradient, groundwater within the uppermost aquifer cannot have been affected by the SQLF CCR unit operations to date, nor could they be in the future under current pumping conditions.

An intrawell statistical approach requires that each of the monitoring wells double as background and compliance wells, where data from each individual well during a detection monitoring event is compared to a statistical limit developed using the background dataset from that same well. Monitoring wells MW-101 through MW-107 and MW-108A are located around the perimeter of the SQLF and provide data on both background and perimeter groundwater quality that has not been affected by the CCR unit (total of eight background/compliance monitoring wells).

2.2 Semiannual Groundwater Monitoring

The semiannual monitoring parameters for the detection groundwater monitoring program were selected per the CCR Rule's Appendix III to Part 257 – Constituents for Detection Monitoring. The Appendix III indicator parameters consist of boron, calcium, chloride, fluoride, pH (field reading), sulfate, and total dissolved solids (TDS) and were analyzed in accordance with the sampling and analysis plan included within the QAPP. In addition to pH, the collected field

parameters included dissolved oxygen, oxidation reduction potential, specific conductivity, temperature, and turbidity.

2.2.1 Data Summary

The first semiannual groundwater detection monitoring event for 2018 was performed during April 4 and April 5, 2018, by TRC personnel and samples were analyzed by TestAmerica in accordance with the QAPP. Static water elevation data were collected at all eight monitoring well locations. Groundwater samples were collected from the eight detection monitoring wells for the Appendix III indicator parameters and field parameters. A summary of the groundwater data collected during the April 2018 event is provided on Table 1 (static groundwater elevation data), Table 2 (field data), and Table 3 (analytical results).

The second semiannual groundwater detection monitoring event for 2018 was performed during October 10, 2018, by TRC personnel and samples were analyzed by TestAmerica in accordance with the QAPP. Static water elevation data were collected at all eight monitoring well locations. Groundwater samples were collected from the eight detection monitoring wells for the Appendix III indicator parameters and field parameters. A summary of the groundwater data collected during the October 2018 event is provided on Table 1 (static groundwater elevation data), Table 2 (field data), and Table 4 (analytical results).

2.2.2 Data Quality Review

Data from each round were evaluated for completeness, overall quality and usability, method-specified sample holding times, precision and accuracy, and potential sample contamination. The data were found to be complete and usable for the purposes of the CCR monitoring program. Data quality reviews are summarized in Appendix B.

2.2.3 Groundwater Flow Rate and Direction

Groundwater elevation data collected during the April and October 2018 sampling events continue to show that groundwater within the uppermost aquifer flows radially into the quarry as a result of continuous pumping/dewatering at the Site. Groundwater potentiometric surface elevations measured across the site during the April and October 2018 sampling events are provided on Table 1 and were used to construct the groundwater potentiometric surface maps shown on Figures 3 and 4, respectively.

The data indicates that current groundwater flow rates and direction are consistent with previous monitoring events. The average hydraulic gradient throughout the site during both 2018 monitoring events are estimated at 0.085 ft/ft, resulting in an estimated

average seepage velocity of approximately 5.8 ft/day or 2,100 ft/year, using the average hydraulic conductivity of 6.8 ft/day (Golder, 2015) and an assumed effective porosity of 0.1.

Given that groundwater flow is maintained inward toward the quarry under active pumping, all of the perimeter monitoring wells in the groundwater monitoring system are located in an upgradient position relative to the landfill. Therefore, there is no potential for groundwater to migrate away from the SQLF CCR unit.

Section 3
Statistical Evaluation

3.1 Establishing Background Limits

Per the Stats Plan, background limits were established for the Appendix III indicator parameters following the collection of at least eight background monitoring events using data collected from each of the eight established detection monitoring wells (MW-101 through MW-107 and MW-108A). The statistical evaluation of the background data is presented in the 2017 Annual Report. The Appendix III background limits for each monitoring well will be used throughout the detection monitoring period to determine whether groundwater has been impacted from the SQLF CCR unit by comparing concentrations in the detection monitoring wells to their respective background limits for each Appendix III indicator parameter.

3.2 Data Comparison to Background Limits – First Semiannual Event (March 2018)

The concentrations of the indicator parameters in each of the detection monitoring wells (MW-101 through MW-107 and MW-108A) were compared to their respective statistical background limits calculated from the background data collected from each individual well (i.e., monitoring data from MW-101 is compared to the background limit developed using the background dataset from MW-101, and so forth).

The comparisons for the April 2018 monitoring event are presented on Table 3. The statistical evaluation of the April 2018 Appendix III indicator parameters showed no concentrations of Appendix III constituents above background limits that were not addressed through the ASD (Appendix A) that demonstrated the observed concentrations were a result of natural variability in groundwater quality. Therefore, detection monitoring was continued in accordance with §257.94 of the CCR Rule.

3.3 Data Comparison to Background Limits – Second Semiannual Event (October 2018)

The comparisons for the October 2018 monitoring event are presented on Table 4. Based on the statistical evaluation of the October 2018 Appendix III indicator parameters a resample of the following was collected in accordance with the Stats Plan:

- Chloride at MW-106.

Verification resampling is performed per the Stats Plan and the *USEPA's Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance* (Unified Guidance, USEPA, 2009) to achieve performance standards as specified by §257.93(g) in the CCR rules. Per the

Stats Plan, if there is an exceedance of a prediction limit for one or more of the parameters, the well(s) of concern will be resampled within 30 days of the completion of the initial statistical analysis. Constituents that have been addressed through an ASD will not be analyzed for verification purposes.

3.4 Verification Resampling for the Second Semiannual Event

Verification resampling for the October 2018 event was conducted on November 15, 2018 by TRC personnel in accordance with the QAPP. A summary of the analytical results collected during the October 2018 resampling event is provided on Table 4. The associated data quality review is included in Appendix B.

The chloride verification result is below the prediction limit and no SSI exists for the October 2018 sampling event for this parameter in accordance with the Stats Plan and the Unified Guidance.

Section 4
Conclusions and Recommendations

SSIs over background limits were not confirmed for any Appendix III constituents in background monitoring wells during the April and October 2018 monitoring events that were not addressed through an ASD (Appendix A) that demonstrates the observed concentrations are a result of natural variability in groundwater quality.

As discussed above, and in the GWMS Report, because the uppermost aquifer is in an area where pumping has been performed continuously since before CCR disposal began and will be continued to be dewatered, a continuous inward hydraulic gradient is maintained. As a result, the uppermost aquifer perimeter monitoring wells cannot have been affected by the SQLF CCR unit operations to date, nor could they be in the future under current pumping conditions. Due to limitations on CCR Rule implementation timelines, the background data sets are of relatively short duration for capturing the occurrence of natural temporal changes in the aquifer being drawn inward toward the SQLF. Therefore, detection monitoring will be continued at the SQLF CCR unit in accordance with §257.94.

No corrective actions were performed in 2018. The next semiannual monitoring event at the SQLF CCR unit is scheduled for the second calendar quarter of 2019.

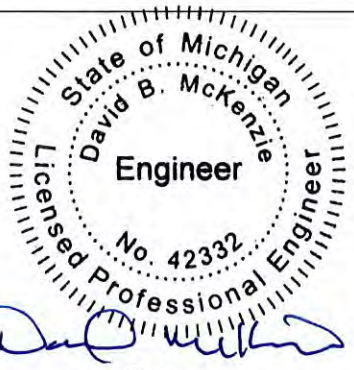
Section 5
Groundwater Monitoring Report Certification

The U.S. EPA's Disposal of Coal Combustion Residuals from Electric Utilities Final Rule Title 40 CFR Part 257 §257.90(e) requires that the owner or operator of an existing CCR unit prepare an annual groundwater monitoring and corrective action report.

Annual Groundwater Monitoring Report Certification
Sibley Quarry Coal Combustion Residual Landfill
Trenton, Michigan

CERTIFICATION

I hereby certify that the annual groundwater and corrective action report presented within this document for the SQLF CCR unit has been prepared to meet the requirements of Title 40 CFR §257.90(e) of the Federal CCR Rule. This document is accurate and has been prepared in accordance with good engineering practices, including the consideration of applicable industry standards, and with the requirements of Title 40 CFR §257.90(e).

Name: David B. McKenzie, P.E.	Expiration Date: October 31, 2019	 Stamp
Company: TRC Engineers Michigan, Inc.	Date: January 31, 2019	

Section 6
References

TRC Environmental Corporation. August 2016; Revised March 2017. CCR Groundwater Monitoring and Quality Assurance Project Plan – DTE Electric Company – Sibley Quarry Coal Combustion Residual Landfill, 801 Fort Street, Trenton, Michigan. Prepared for DTE Electric Company.

TRC Environmental Corporation. October 2017. Groundwater Monitoring System Summary Report – Sibley Quarry Coal Combustion Residual Landfill, 801 Fort Street, Trenton, Michigan. Prepared for DTE Electric Company.

TRC Environmental Corporation. October 2017. Groundwater Statistical Evaluation Plan – DTE Electric Company Sibley Quarry Coal Combustion Residual Landfill, 801 Fort Street, Trenton, Michigan. Prepared for DTE Electric Company.

TRC Environmental Corporation. January 2018. Annual Groundwater Monitoring Report – DTE Electric Company Sibley Quarry Coal Combustion Residual Landfill, 801 Fort Street, Trenton, Michigan. Prepared for DTE Electric Company.

TRC Environmental Corporation. April 12, 2018. Alternate Source Demonstration: 2017 Initial Detection Monitoring Sampling Event Sibley Quarry Coal Combustion Residual Landfill, Trenton, Michigan. Prepared for DTE Electric Company.

USEPA. 2009. Statistical Analysis of Groundwater Monitoring Data at RCRA facilities, Unified Guidance. Office of Conservation and Recovery. EPA 530/R-09-007.

USEPA. April 2015. 40 CFR Parts 257 and 261. Hazardous and Solid Waste Management System: Disposal of Coal Combustion Residuals from Electric Utilities; Final Rule. 80 Federal Register 74 (April 17, 2015), pp. 21301-21501 (80 FR 21301).

USEPA. July 2018. 40 CFR Part 257. Hazardous and Solid Waste Management System: Disposal of Coal Combustion Residuals from Electric Utilities; Amendments to the National Minimum Criteria (Phase One, Part One); Final Rule. 83 Federal Register 146 (July 30, 2018), pp. 36435-36456 (83 FR 36435).

USEPA. April 2018. Barnes Johnson (Office of Resource Conservation and Recovery) to James Roewer (c/o Edison Electric Institute) and Douglas Green, Margaret Fawal (Venable LLP). Re: Coal Combustion Residuals Rule Groundwater Monitoring Requirements. April 30, 2018. United States Environmental Protection Agency, Washington, D.C. 20460. Office of Solid Waste and Emergency Response, now the Office of Land and Emergency Management.

Tables

Table 1
Summary of Groundwater Elevation Data – April & October 2018
Sibley Quarry Landfill – RCRA CCR Monitoring Program
Trenton, Michigan

Well ID	MW-101		MW-102[(1)]		MW-103		MW-104		MW-105		MW-106		MW-107		MW-108A	
Date Installed	7/14/2015		7/16/2015		7/15/2015		7/16/2015		3/30/2016		3/28/2016		4/6/2016		1/24/2017	
TOC Elevation	617.67		615.03		607.23		608.39		593.28		606.75		610.03		594.06	
Geologic Unit of Screened Interval	Limestone Bedrock		Limestone Bedrock		Limestone Bedrock		Limestone Bedrock		Limestone Bedrock		Limestone Bedrock		Limestone Bedrock		Sandstone Bedrock	
Bottom of Open Hole Elevation	295.2		342.6		294.7		296.0		290.7		304.0		336.5		290.5	
Unit	ft BTOC	ft	ft BTOC	ft	ft BTOC	ft	ft BTOC	ft	ft BTOC	ft	ft BTOC	ft	ft BTOC	ft	ft BTOC	ft
Measurement Date	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation
4/4/2018	177.73	439.94	>200	<415.03	179.63	427.60	120.31	488.08	20.46	572.82	185.86	420.89	156.18	453.85	54.27	539.79
10/10/2018	177.95	439.72	234.97	380.06	175.83	431.40	120.20	488.19	21.86	571.42	184.40	422.35	156.34	453.69	50.30	543.76

Notes:

Elevations are reported in feet realative to the national geodetic vertical datum of 1929.

ft BTOC - feet below top of casing

(1) Project dedicated 300 foot water level indicator not functional at the time of April measurement, a 200 foot water level indicator was used. Monitoring well was dry at 200 ft BTOC on April 4th, 2018.

Table 2
Summary of Field Data – April & October 2018
Sibley Quarry Landfill – RCRA CCR Monitoring Program
Trenton, Michigan

Sample Location	Sample Date	Dissolved Oxygen (mg/L)	Oxidation Reduction Potential (mV)	pH (SU)	Specific Conductivity (umhos/cm)	Temperature (deg C)	Turbidity (NTU)
MW-101	4/5/2018	0.14	-155.5	7.0	1,953	10.77	10.5
	10/10/2018	0.20	-187.7	7.0	1,789	14.26	1.59
MW-102	4/4/2018	5.48	-73.0	7.0	1,577	9.46	11.2
	10/10/2018	3.89	-43.6	6.9	1,980	14.94	2.89
MW-103	4/4/2018	0.30	-320.1	6.8	3,472	10.51	1.18
	10/10/2018	0.30	-270.3	6.9	3,313	14.27	1.06
MW-104	4/4/2018	0.18	-295.9	7.0	3,395	11.14	1.03
	10/10/2018	0.24	-254.4	7.0	3,192	14.60	1.22
MW-105	4/4/2018	0.18	-215.6	6.8	11,445	11.05	1.29
	10/10/2018	1.38	27.1	6.8	9,516	14.43	1.00
MW-106	4/4/2018	0.28	-320.8	6.8	3,374	10.26	4.44
	10/10/2018	0.22	-287.3	6.8	3,265	15.61	4.71
MW-107	4/5/2018	0.43	-271.3	6.7	49,487	8.46	1.78
	10/10/2018	0.32	-286.0	6.7	47,761	14.73	1.45
MW-108A	4/5/2018	0.12	-31.8	6.9	7,486	11.37	4.47
	10/10/2018	1.45	-14.7	6.8	6,085	14.58	1.13

Notes:

mg/L - milligrams per liter.

mV - milliVolt.

SU - standard unit.

umhos/cm - micro-mhos per centimeter.

deg C - degrees celcius.

NTU - nephelometric turbidity units.

Table 3
Comparison of Appendix III Parameter Results to Background Limits – April 2018
Sibley Quarry Landfill – RCRA CCR Monitoring Program
Trenton, Michigan

Sample Location:		MW-101		MW-102		MW-103		MW-104		MW-105		MW-106		MW-107		MW-108A	
Sample Date:		4/5/2018	PL	4/4/2018	PL	4/4/2018	PL	4/4/2018	PL	4/4/2018	PL	4/4/2018	PL	4/5/2018	PL	4/5/2018	PL
Constituent	Unit	Data		Data		Data		Data		Data		Data		Data		Data	
Appendix III																	
Boron	ug/L	280	280	140	200	780	810	770	970	2,100	2,600	**1,100**(1)	810	1,400	1,500	1,300	1,400
Calcium	ug/L	240,000	270,000	220,000	310,000	600,000	630,000	490,000	530,000	660,000	830,000	600,000	650,000	1,400,000	1,500,000	440,000	470,000
Chloride	mg/L	170	200	140	270	150	160	240	800	3,500	4,800	130	130	20,000	21,000	**2,000**(1)	1,900
Fluoride	mg/L	1.9	2.1	0.98	1.9	1.8	2.1	1.6	2.8	1.1	5.8	1.7	3.0	2.3	2.5	1.2	2.5
pH, Field	SU	7.0	6.8 - 7.8	7.0	6.5 - 7.6	6.8	6.7 - 7.6	7.0	6.8 - 7.9	6.8	6.6 - 7.9	6.8	6.5 - 7.6	6.7	6.5 - 7.6	6.9	6.7 - 6.9
Sulfate	mg/L	570	740	290	770	1,900	2,100	1,900	1,900	1,800	2,000	1,800	2,100	3,400	3,800	1,100	1,100
Total Dissolved Solids	mg/L	1,400	1,400	1,100	1,800	3,100	3,700	2,800	4,100	6,800	9,700	3,000	3,200	33,000	41,000	4,200	4,900

Notes:

ug/L - micrograms per liter.

mg/L - milligrams per liter.

SU - standard units; pH is a field parameter.

-- = not applicable

All metals were analyzed as total unless otherwise specified.

Bold font indicates an exceedance of the Prediction Limit (PL).

RESULT Shading and bold font indicates a comfirmed exceedance of the Prediction Limit (PL).

(1) Concentration addressed through alternative source demonstration.

Table 4
Comparison of Appendix III Parameter Results to Background Limits – October 2018
Sibley Quarry Landfill – RCRA CCR Monitoring Program
Trenton, Michigan

Sample Location:		MW-101		MW-102		MW-103		MW-104		MW-105		MW-106			MW-107		MW-108A	
Sample Date:		10/10/2018	PL	10/10/2018	PL	10/10/2018	PL	10/10/2018	PL	10/10/2018	PL	10/10/2018	11/15/2018[1]	PL	10/10/2018	PL	10/10/2018	PL
Constituent	Unit	Data		Data		Data		Data		Data		Data			Data		Data	
Appendix III																		
Boron	ug/L	260	280	120	200	670	810	690	970	2,200	2,600	**2,200** [2]	--	810	1,400	1,500	1,200	1,400
Calcium	ug/L	180,000	270,000	230,000	310,000	630,000	630,000	430,000	530,000	650,000	830,000	490,000	--	650,000	1,200,000	1,500,000	390,000	470,000
Chloride	mg/L	150	200	140	270	140	160	220	800	3,500	4,800	**170**	130	130	18,000	21,000	**2,000**[2]	1,900
Fluoride	mg/L	1.8	2.1	1.6	1.9	1.7	2.1	1.5	2.8	1.1	5.8	1.6	--	3.0	< 2.5	2.5	1.1	2.5
pH, Field	SU	7.0	6.8 - 7.8	6.9	6.5 - 7.6	6.9	6.7 - 7.6	7.0	6.8 - 7.9	6.8	6.6 - 7.9	6.8	--	6.5 - 7.6	6.7	6.5 - 7.6	6.8	6.7 - 6.9
Sulfate	mg/L	590	740	630	770	2,000	2,100	1,800	1,900	1,800	2,000	1,800	--	2,100	3,100	3,800	1,100	1,100
Total Dissolved Solids	mg/L	1,300	1,400	1,400	1,800	2,700	3,700	2,500	4,100	7,800	9,700	2,700	--	3,200	22,000	41,000	4,400	4,900

Notes:

ug/L - micrograms per liter.

mg/L - milligrams per liter.

SU - standard units; pH is a field parameter.

-- = not applicable

All metals were analyzed as total unless otherwise specified.

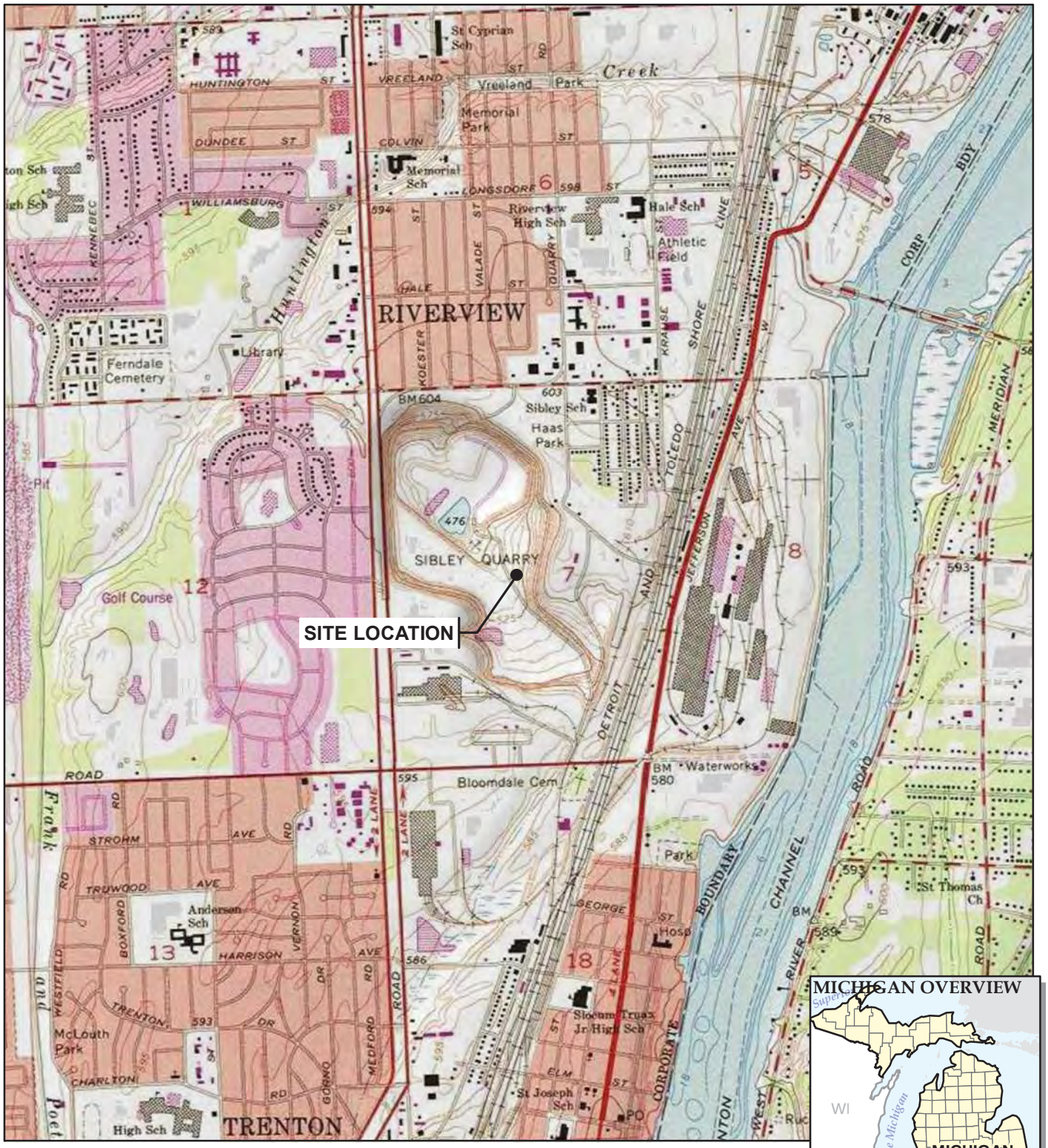
Bold font indicates an exceedance of the Prediction Limit (PL).

RESULT Shading and bold font indicates a comfirmed exceedance of the Prediction Limit (PL).

(1) Results shown for verification sampling performed on 11/15/18.

(2) Concentration addressed through alternative source demonstration.

Figures



BASE MAP FROM USGS 7.5 MINUTE TOPOGRAPHIC QUADRANGLE SERIES.

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1 " = 2,000 '
1:24,000

0 2,000 4,000
FEET

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PROJECT:
DTE ELECTRIC COMPANY
SIBLEY QUARRY LANDFILL
801 FORT STREET
TRENTON, MICHIGAN

TITLE:
SITE LOCATION MAP

DRAWN BY:	J. PAPEZ
CHECKED BY:	S HOLMSTROM
APPROVED BY:	V. BUENING
DATE:	OCTOBER 2017
PROJ. NO.:	265996.0002
FILE:	265996-SLMMB.mxd

FIGURE 1

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LEGEND

- MONITORING WELLS
- DECOMMISSIONED MONITORING WELL
- SIBLEY QUARRY PROPERTY LINE
- SOLID WASTE DISPOSAL AREA BOUNDARY
- 1 FILL AREA DESIGNATION

NOTES

1. BASE MAP IMAGERY FROM ESRI/MICROSOFT, "WORLD IMAGERY", WEB BASEMAP SERVICE LAYER, 2011.
2. SITE LAYOUT INFORMATION FROM GEOREFERENCED CAD FILE. FEATURES ARE APPROXIMATE.
3. SURVEY PERFORMED BY THE DTE SURVEY GROUP IN AUGUST 2015, MAY 2016 AND JANUARY 2017.

N

0 600 1,200 Feet

1 " = 600 '

1:7,200

PROJECT:

DTE ELECTRIC COMPANY
SIBLEY QUARRY LANDFILL
801 FORT STREET
TRENTON, MICHIGAN

TITLE:

MONITORING NETWORK AND SITE PLAN

DRAWN BY:	S. MAJOR	PROJ NO.:	265996.0002
CHECKED BY:	C. SCIESZKA		
APPROVED BY:	V. BUENING		**FIGURE 2**
DATE:	JANUARY 2019		

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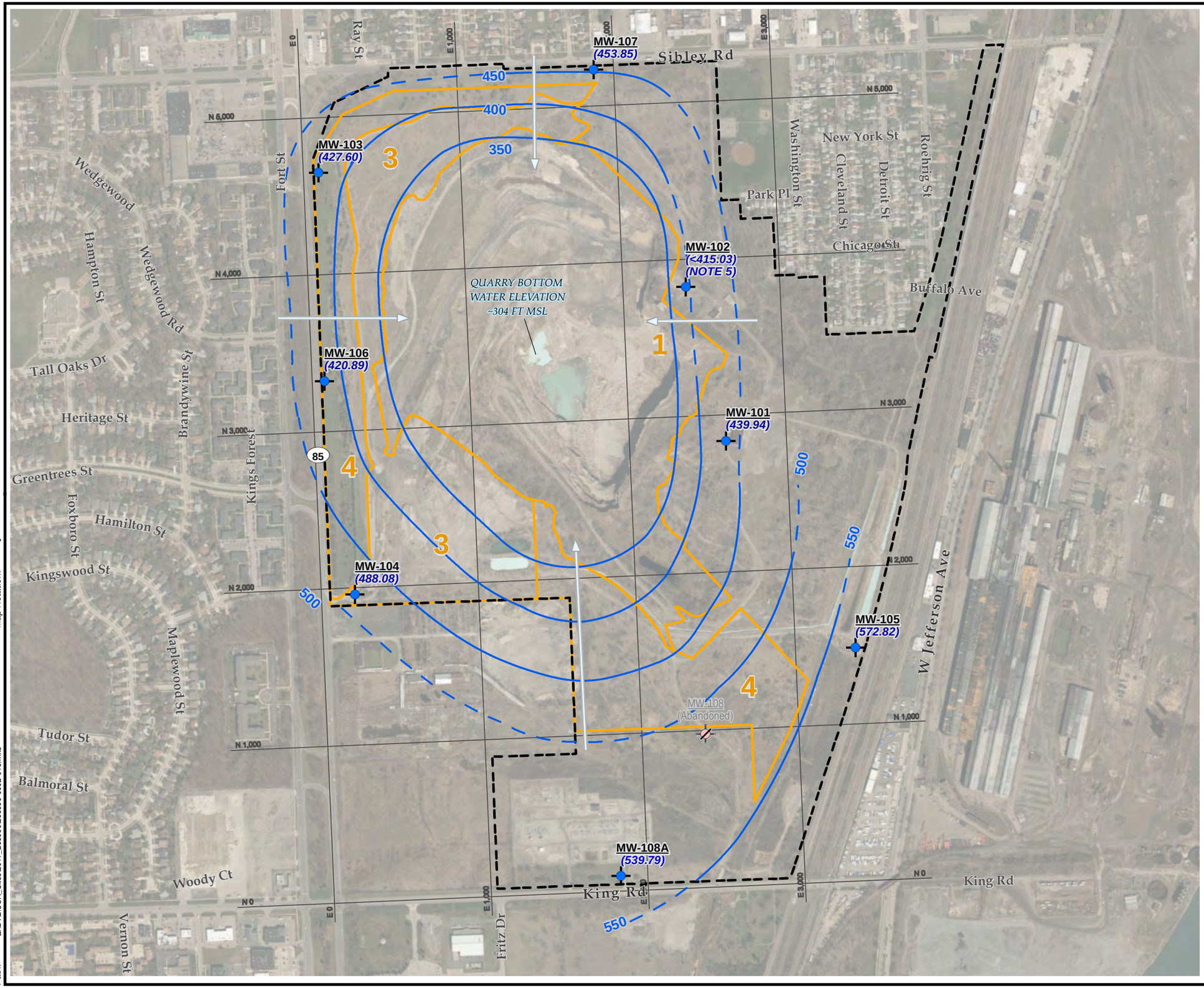
TRC - GIS



LEGEND

- MONITORING WELLS
- DECOMMISSIONED MONITORING WELL
- SIBLEY QUARRY PROPERTY LINE
- SOLID WASTE DISPOSAL AREA BOUNDARY
- 1 — FILL AREA DESIGNATION
- (439.08) — GROUNDWATER ELEVATION (FT NGVD 1929)
- POTENTIOMETRIC SURFACE CONTOUR (50-FT INTERVAL, DASHED WHERE INFERRED)
- INFERRED GROUNDWATER FLOW DIRECTION

NOTES

1. BASE MAP IMAGERY FROM ESRI/MICROSOFT, "WORLD IMAGERY", WEB BASEMAP SERVICE LAYER, 2011.
2. SITE LAYOUT INFORMATION FROM GEOREFERENCED CAD FILE. FEATURES ARE APPROXIMATE.
3. SURVEY PERFORMED BY THE DTE SURVEY GROUP IN AUGUST 2015, MAY 2016 AND JANURARY 2017.
4. GROUNDWATER ELEVATIONS DISPLAYED IN FEET RELATIVE TO THE NATIONAL GEODETIC VERTICAL DATUM OF 1929.
5. PROJECT DEDICATED 300 FT WATER LEVEL INDICATOR NOT FUNCTIONAL AT TIME OF MEASUREMENT, A 200 FT WATER LEVEL INDICATOR WAS USED. MONITORING WELL WAS DRY AT 200 FT BELOW TOP OF CASING.

0 600 1,200 Feet

1 " = 600 '

1:7,200

PROJECT:
DTE ELECTRIC COMPANY
SIBLEY QUARRY
801 FORT STREET
TRENTON, MICHIGAN

TITLE:
GROUNDWATER POTENTIOMETRIC SURFACE MAP APRIL 2018

DRAWN BY:	S. MAJOR	PROJ NO.:	265996.0002
CHECKED BY:	C.SCIESZKA		
APPROVED BY:	V. BUENING		**FIGURE 3**
DATE:	JANUARY 2019		

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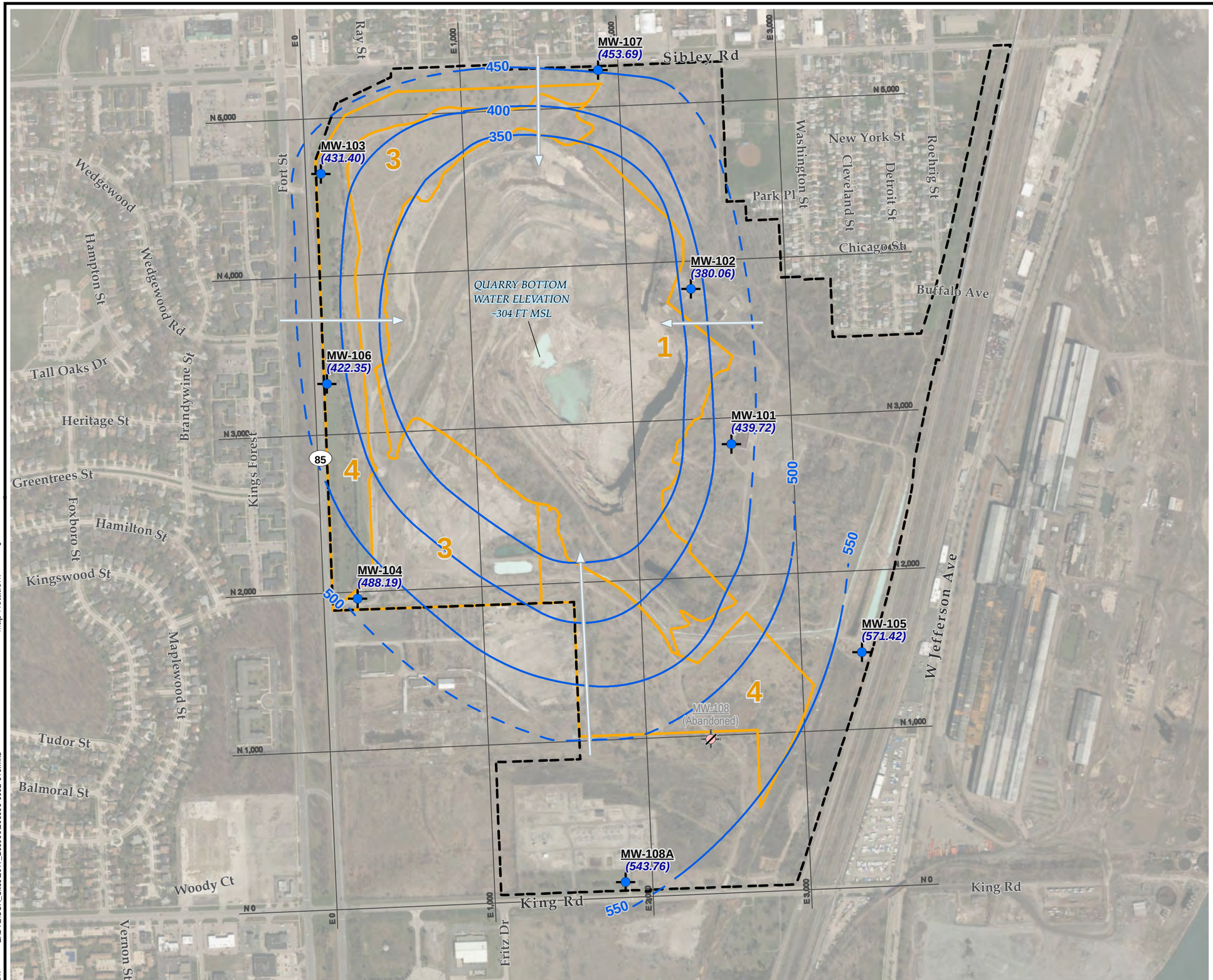

LEGEND

- MONITORING
- DECOMMISSIONED MONITORING WELL
- SIBLEY QUARRY PROPERTY LINE
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- POTENTIOMETRIC SURFACE CONTOUR (50-FT INTERVAL, DASHED WHERE INFERRED)
- INFERRED GROUNDWATER FLOW DIRECTION

NOTES

1. BASE MAP IMAGERY FROM ESRI/MICROSOFT, "WORLD IMAGERY", WEB BASEMAP SERVICE LAYER, 2011.
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4. GROUNDWATER ELEVATIONS DISPLAYED IN FEET RELATIVE TO THE NATIONAL GEODETIC VERTICAL DATUM OF 1929.

N

0 600 1,200 Feet

1 " = 600 '
1:7,200

PROJECT:	DTE ELECTRIC COMPANY SIBLEY QUARRY 801 FORT STREET TRENTON, MICHIGAN
TITLE:	GROUNDWATER POTENTIOMETRIC SURFACE MAP OCTOBER 2018
DRAWN BY:	S. MAJOR
CHECKED BY:	C.SCIESZKA
APPROVED BY:	V. BUENING
DATE:	JANUARY 2019
PROJ NO.:	265996.0002
	FIGURE 4

TRC
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Map Rotation: 0
TRC - GIS

Appendix A
Alternate Source Demonstration

Technical Memorandum

Date: April 12, 2018

To: Robert J. Lee
DTE Electric Company

From: Graham Crockford, TRC
David McKenzie, TRC

Project No.: 265996.0002.0000 Phase 002, Task 001

Subject: Alternate Source Demonstration: 2017 Initial Detection Monitoring Sampling Event
Sibley Quarry Coal Combustion Residual Landfill, Trenton, Michigan

Introduction

On April 17, 2015, the United States Environmental Protection Agency (USEPA) published the final rule for the regulation and management of Coal Combustion Residuals (CCR) under the Resource Conservation and Recovery Act (RCRA) (the CCR Rule). The CCR Rule, which became effective on October 19, 2015, applies to the DTE Electric Company (DTE Electric) Sibley Quarry Coal Combustion Residual Landfill (SQLF) CCR unit.

TRC Engineers Michigan, Inc. (TRC) prepared the 2017 Annual Groundwater Monitoring Report (Annual Report) (TRC, 2018) for the SQLF on behalf of DTE Electric in accordance with the requirements of §257.90(e). The Annual Report included the results of the September 2017 semiannual groundwater monitoring event for the SQLF CCR unit and the statistical evaluation of the detection monitoring parameters (Appendix III to Part 257 of the CCR Rule). This event was the initial detection monitoring event performed to comply with §257.94. As part of the statistical evaluation, the data collected during detection monitoring events are evaluated to identify statistically significant increases (SSIs) in detection monitoring parameters to determine if concentrations in detection monitoring well samples exceed background levels. The statistical analysis was performed pursuant to §257.93(f) and (g), and in accordance with the Groundwater Statistical Evaluation Plan (Stats Plan) (TRC, 2017).

The statistical evaluation of the September 2017 Appendix III indicator parameters showed potential SSIs over background for:

- Chloride and total dissolved solids (TDS) at MW-108A;
- Boron at MW-106; and
- Sulfate at MW-105.

Verification sampling conducted in January 2018 confirmed the SSIs for chloride at MW-108A, boron at MW-106, and sulfate at MW-105. All other Appendix III constituents were within the statistical background limits.

In accordance with §257.94(e)(2), DTE Electric may demonstrate that a source other than the CCR unit caused the SSI or that the SSI resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. This Alternate Source Demonstration (ASD) has been prepared to address the potential SSIs identified in the September 2017 detection monitoring event.

Background

The SQLF is located in Section 7, Township 4 South, Range 11 East, at 801 Fort Street in Trenton, Wayne County, Michigan. The site location is shown in Figure 1. The former limestone quarry began operations in the mid-1800s, and was mined to over 300 feet below ground surface (ft bgs). Quarry dewatering activities were necessary to facilitate limestone mining. The groundwater elevation is currently maintained at a depth of approximately 300 feet below ground surface. In 1951, Detroit Edison (now DTE Electric) acquired the quarry for the purpose of CCR landfilling. (TRC, January 2018). The SQLF is approximately 207 acres with 92.1 acres designated for CCR landfill development (TRC, October 2017).

The SQLF resides in an area characterized by near surface deposits of glacio-lacustrine clay and silt units on top of thick strata of dolomite and limestone bedrock. The clay-rich soil directly beneath the CCR unit ranges in thickness between 16.5 and 74.5 ft bgs. Limestone bedrock strata underlaying the clay-rich soil extends to over 310 ft bgs and is considered the uppermost aquifer at the site (TRC, January 2018). The CCR detection monitoring well network for the SQLF currently consists of eight monitoring wells installed in the uppermost aquifer, details for which can be found in the *Groundwater Monitoring System Summary Report – DTE Electric Sibley Quarry Coal Combustion Residual Landfill* (TRC, October 2017). Monitoring well locations are shown in Figure 2.

Due to the dewatering of the quarry, at a rate of approximately 1.5 million gallons per day (MGD), groundwater levels are significantly lower within the bedrock monitoring wells that are closest to the quarry. The pumping creates an inward hydraulic gradient, and prevents groundwater contact with the CCR material. All CCR monitoring network wells are therefore considered upgradient of the CCR disposal unit. Based on the site specific hydrogeological conditions, the uppermost aquifer cannot be affected by CCR disposal operations. A current potentiometric map of the site is provided in Figure 3 (TRC, October 2017).

Alternate Source Demonstration

Verification resampling was performed as recommended per the Statistical Evaluation Plan and the USEPA's Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance (Unified Guidance, USEPA, 2009) to achieve performance standards as specified by §257.93(g) in the CCR rules. Per the Statistical Evaluation Plan, if there is an exceedance of a prediction limit for one or

more of the parameters, the well(s) of concern will be resampled within 30 days of the completion of the initial statistical analysis. Only constituents that initially exceed their statistical limit (i.e., have no previously recorded SSIs) will be analyzed for verification purposes. As such, verification resampling was conducted on January 10, 2018, by TRC personnel. Groundwater samples were collected in accordance with the Quality Assurance Project Plan (TRC, August 2016; Revised March 2017). A summary of the groundwater data collected during the verification resampling event is provided on Table 1. The associated data quality review is included in Attachment A.

The verification resampling confirmed the exceedances for boron at MW-106, chloride at MW-108A, and sulfate at MW-105. The TDS verification result at MW-108A is within the prediction limit; consequently, the initial TDS SSI from the September 2017 event was not confirmed. Therefore, in accordance with the Stats Plan and the Unified Guidance, the initial exceedance is not statistically significant and no SSI will be recorded for TDS during the September 2017 monitoring event.

The following discussion presents the Alternative Source Demonstration (ASD) for the confirmed prediction limit exceedances for boron, chloride and sulfate. As mentioned above, quarry dewatering activities strongly support that Appendix III concentrations in groundwater are from a source other than the SQLF CCR unit. Prior to CCR landfilling operations beginning at the Sibley Quarry in 1951, dewatering has occurred via a sump in the bottom of the 300 foot deep excavation. The groundwater discharge rate is kept at approximately 1.5 MGD to maintain the water level at the bottom of the quarry at approximately 300 ft bgs. Dewatering operations are expected to continue, ensuring that no direct contact between the groundwater and the CCR waste occurs, and that an inward hydraulic gradient will be maintained, preventing CCR constituents from migrating off site in the event of a release. As a result of dewatering activities, the groundwater monitoring wells are all upgradient and it is likely that changes in groundwater constituent concentrations are derived from natural conditions within the aquifer. Additional supporting lines of evidence specific to each SSI are presented below.

Boron at MW-106: The SSI of boron in the groundwater at MW-106, shown graphically as data points greater than the prediction limit in Figure 4, is likely the result of natural variability or statistical error and not the release of CCR constituents from the SQLF CCR unit. Multiple lines of evidence are provided in support of this conclusion and are as follows:

- **Site-wide background concentrations of boron** – Considering all eight background monitoring events for the groundwater monitoring well network at the SQLF, boron concentrations fluctuate by two to three orders of magnitude. The lowest measured boron concentration, at MW-102 on September 29, 2016, is reported as 83 micrograms/liter (µg/L), the highest measured boron concentration, at MW-105 on August 10, 2016, is reported as 2,500 µg/L. The SSI concentration of boron measured in MW-106 during the September 2017 detection monitoring event is reported as 1,000 µg/L, within the range of site-wide background levels for boron.

- **Insufficient background sampling timeline to account for long-term trends** – Variability in boron concentrations observed in the groundwater at the SQLF during the background sampling events provides evidence of the heterogeneity of this constituent in groundwater. The short duration of the background sampling events limited the ability of the statistical analysis to capture temporal trends in the groundwater quality at the SQLF.

Chloride at MW-108A: The SSI of chloride in the groundwater at MW-108A, shown graphically as data points greater than the prediction limit in Figure 5, is likely the result of natural variability in groundwater quality or statistical error and not the release of CCR constituents from the SQLF CCR unit. Multiple lines of evidence are provided in support of this conclusion and are as follows:

- **Previous SPLP ash leaching study** – A 2015 ash leaching investigation was conducted with ash from the SQLF, which was collected at 12 different soil boring locations (Golder, October 2015). A modified SPLP leaching study was conducted using groundwater from the quarry as the extraction fluid. The results of the study showed concentrations of chloride, extracted from the ash, ranging from 220 to 280 mg/L (Golder, October 2015). The SSI concentration of chloride measured in MW-108A during the September 2017 detection monitoring event was 2,100 mg/L, which is greater than the leachable chloride concentration measured in the ash. Considering that the measured chloride at MW-108A is an order of magnitude higher than measured chloride in the leaching test results, it is unlikely that the SSI was caused by CCR constituent migration.
- **Insufficient background sampling timeline to account for long-term trends –** In January 2017, MW-108 was removed from the CCR groundwater monitoring network due to its proximity within the former CCR landfilling operations. MW-108 was properly decommissioned and on January 24, 2017, monitoring well MW-108A was installed as a side gradient background monitoring well (TRC, January 31, 2018). As a result, the background data set for MW-108A was collected from February 2017 to July 2017, instead of August 2016 to July 2017 like the rest of the monitoring wells. The reduced timeframe for establishing background groundwater quality, may have reduced the power of the statistical analysis to account for long term trends in the groundwater at MW-108A.

Sulfate at MW-105: The SSI of sulfate in the groundwater at MW-105, shown graphically as data points greater than the prediction limit in Figure 6, is likely the result of natural variability in the groundwater quality or statistical error and not the release of CCR constituents from the SQLF CCR unit. Multiple lines of evidence are provided in support of this conclusion and are as follows:

- **Dominant groundwater type** – Groundwater at the SQLF is from a fractured limestone and dolomite formation underlain by a sulfur-rich sandstone formation. This is apparent in the background monitoring data for the monitoring wells at the SQLF, which provide a reported range of sulfate concentrations from 540 mg/L to 3,800 mg/L. The SSI concentration of sulfate measured in MW-105 during the September 2017 detection monitoring event is reported as 2,200 mg/L, well within the range of background variation at the SQLF.

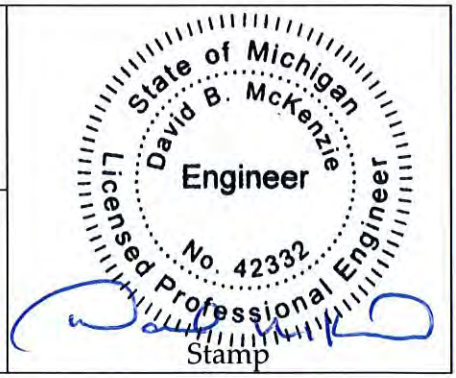
- **Insufficient background sampling timeline to account for long-term trends** – Variability in sulfate concentrations observed in the groundwater at SQLF during the background sampling events provides evidence of the heterogeneity of this constituent in groundwater. The short duration of the background sampling events limited the ability of the statistical analysis to capture the temporal trends in the groundwater quality at the SQLF.

Conclusions and Recommendations

The information provided in this report serves as the ASD for the DTE Electric SQLF CCR unit. This report was prepared in accordance with 40 CFR 257.94(e)(2) of the CCR Rule, and demonstrates that the SSIs detected during the first semiannual detection monitoring event performed in 2017 are not due to a release of CCR leachate into the groundwater. Therefore, based on the information provided in this ASD, DTE Electric will continue detection monitoring per 40 CFR 257.94 at the SQLF CCR unit.

Certification Statement

I hereby certify that the alternative source demonstration presented within this document for the SQLF CCR unit has been prepared to meet the requirements of Title 40 CFR §257.94(e) 2 of the Federal CCR Rule. This document is accurate and has been prepared in accordance with good engineering practices, including the consideration of applicable industry standards, and with the requirements of Title 40 CFR §257.94(e) 2.

Name: David B. McKenzie, P.E.	Expiration Date: October 31, 2019	 Stamp
Company: TRC Engineers Michigan, Inc.	Date: April 12, 2018	

References

Golder Associates. October 2015. Closure Evaluation Sibley Quarry – Trenton, Michigan. Prepared for DTE Electric.

Reeves, Howard W., Kirsten V. Wright, and J. R. Nicholas, 2004. Hydrogeology and Simulation of Regional Ground-Water-Level Declines in Monroe County, Michigan: U.S. Geological Survey Water-Resources Investigations Report 03-4312, 72 p. Date Posted: May 24, 2007

TRC Environmental Corporation. January 2018. Annual Groundwater Monitoring Report – DTE Electric Company Sibley Quarry Coal Combustion Residual Landfill, 801 Fort Street, Trenton, Michigan. Prepared for DTE Electric Company.

TRC Environmental. October 2017. Groundwater Monitoring System Summary Report – DTE Electric Company Sibley Quarry Coal Combustion Residual Landfill, 801 Fort Street, Trenton, Michigan. Prepared for DTE Electric Company.

TRC Environmental. January 31, 2018. Technical Memorandum – Sibley Quarry Landfill Background Data, RCRA CCR Monitoring, Trenton, Michigan.

Attachments

Table 1. Comparison of Verification Sampling Results to Background Limits

Figure 1. Site Location Map
Figure 2. Monitoring Network and Site Plan
Figure 3. Groundwater Potentiometric Surface Map – September 2017
Figure 4. MW-106 Boron Time Series Plot
Figure 5. MW-108A Chloride Time Series Plot
Figure 6. MW-105 Sulfate Time Series Plot

Attachment A. Data Quality Review

Table 1

Table 1
Comparison of Verification Sampling Results to Background Limits
Sibley Quarry Landfill – RCRA CCR Monitoring Program
Trenton, Michigan

Sample Location:		MW-105		MW-106		MW-108A	
Sample Date:		1/10/2018		1/10/2018		1/10/2018	
Constituent	Unit	Data	PL	Data	PL	Data	PL
Appendix III							
Boron	ug/L	NA	2,600	**900**	810	NA	1,400
Chloride	mg/L	NA	4,800	120	130	**2,000**	1,900
Sulfate	mg/L	**2,100**	2,000	NA	2,100	NA	1,100
Total Dissolved Solids	mg/L	NA	9,700	NA	3,200	4,300	4,900

Notes:

ug/L - micrograms per liter

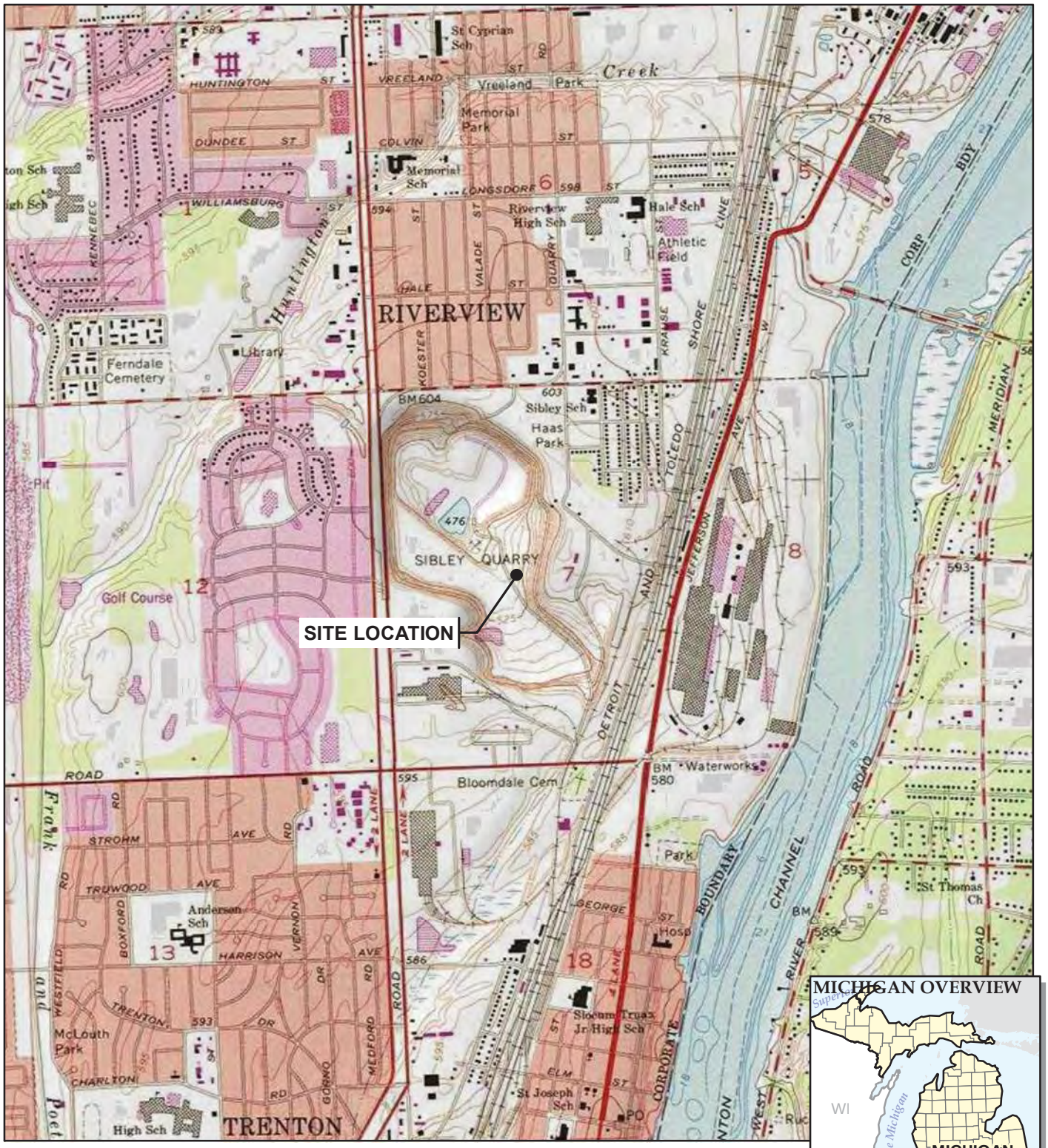
mg/L - milligrams per liter

NA - not analyzed

All metals were analyzed as total unless otherwise specified.

RESULT Shading and bold font indicates a confirmed exceedance of the Prediction Limits (PL).

Figures



BASE MAP FROM USGS 7.5 MINUTE TOPOGRAPHIC QUADRANGLE SERIES.

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1 " = 2,000 '
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TRENTON, MICHIGAN

TITLE:
SITE LOCATION MAP

DRAWN BY:	J. PAPEZ
CHECKED BY:	S HOLMSTROM
APPROVED BY:	V. BUENING
DATE:	OCTOBER 2017
PROJ. NO.:	265996.0002
FILE:	265996-SLMMB.mxd

FIGURE 1

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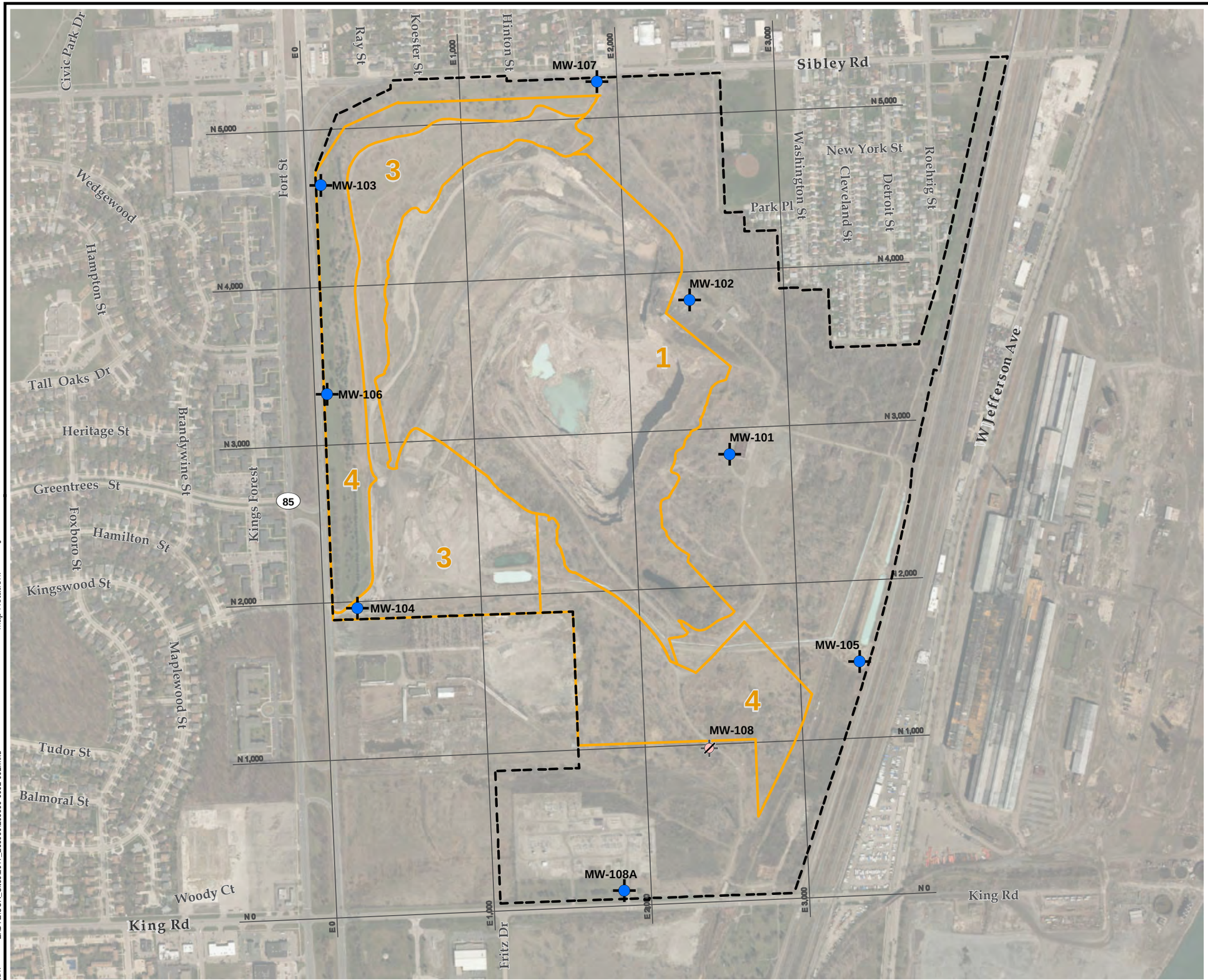

LEGEND

- MONITORING WELLS
- DECOMMISSIONED MONITORING WELL
- SIBLEY QUARRY PROPERTY LINE
- SOLID WASTE DISPOSAL AREA BOUNDARY
- 1 FILL AREA DESIGNATION

NOTES

1. BASE MAP IMAGERY FROM ESRI/MICROSOFT, "WORLD IMAGERY", WEB BASEMAP SERVICE LAYER, 2011.
2. SITE LAYOUT INFORMATION FROM GEOREFERENCED CAD FILE. FEATURES ARE APPROXIMATE.
3. SURVEY PERFORMED BY THE DTE SURVEY GROUP IN AUGUST 2015, MAY 2016 AND JANUARY 2017.

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0 600 1,200 Feet

1 " = 600 '

1:7,200

PROJECT:
DTE ELECTRIC COMPANY
SIBLEY QUARRY LANDFILL
801 FORT STREET
TRENTON, MICHIGAN

TITLE:
MONITORING NETWORK AND SITE PLAN

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CHECKED BY:	S HOLMSTROM		
APPROVED BY:	BUENING V		**FIGURE 2**
DATE:	JANUARY 2018		

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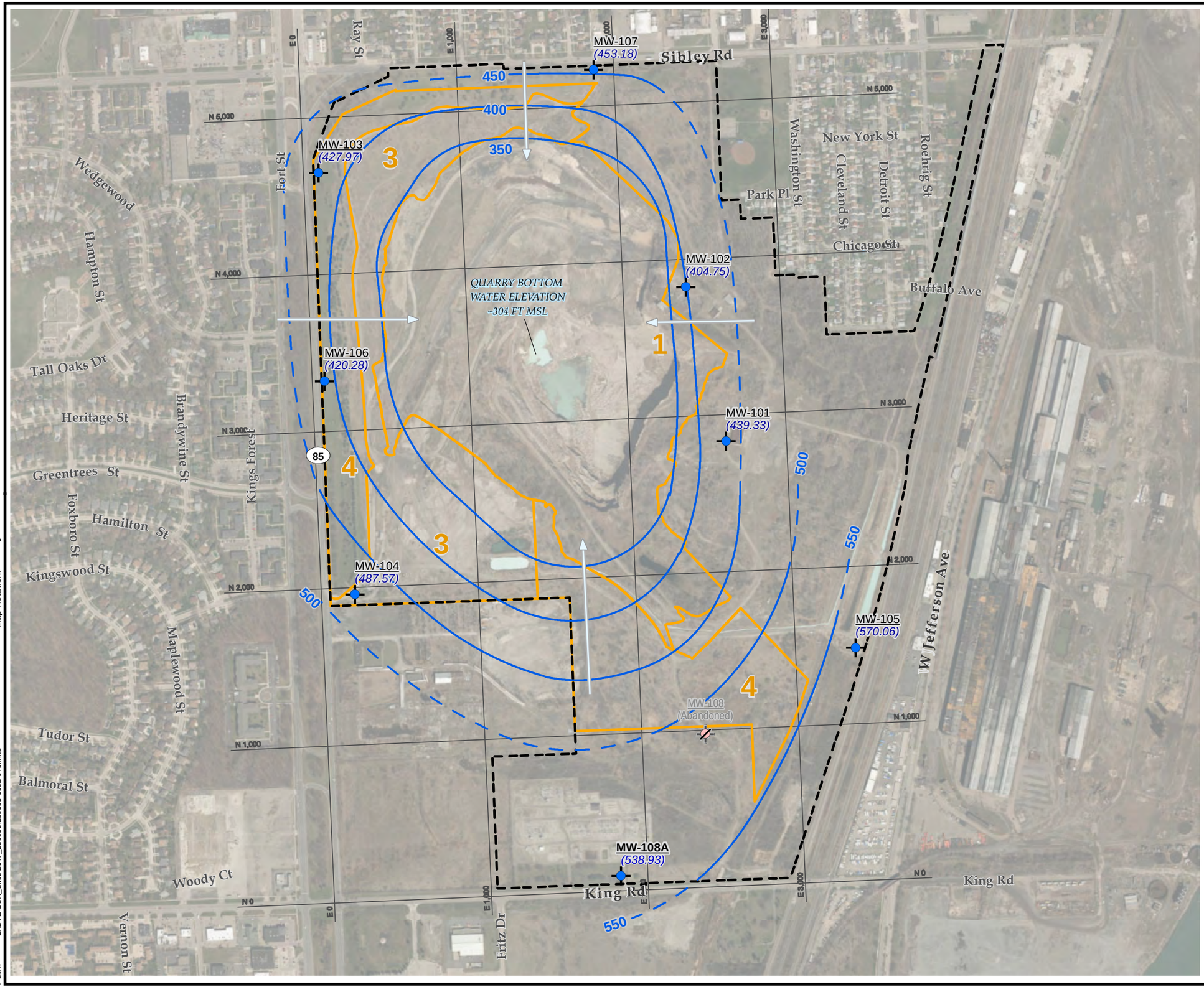
TRC - GIS



LEGEND

- MONITORING
- DECOMMISSIONED MONITORING WELL
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- 1 — FILL AREA DESIGNATION
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0 600 1,200 Feet

1 " = 600 '

1:7,200

PROJECT:
DTE ELECTRIC COMPANY
SIBLEY QUARRY
801 FORT STREET
TRENTON, MICHIGAN

TITLE:
GROUNDWATER POTENTIOMETRIC SURFACE MAP SEPTEMBER 2017

DRAWN BY:	S. MAJOR	PROJ NO.:	265996.0002
CHECKED BY:	C. SCIESZKA		
APPROVED BY:	V. BUENING		**FIGURE 3**
DATE:	JANUARY 2018		

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FILE NO.: 265996-0002-013.mxd

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Coordinate System: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl (Foot)
Map Rotation: 0
Plot Date: 1/15/2018, 09:50:15 AM by SMAJOR -- LAYOUT: ANSI B (11"x17")
Path: E:\DTE\CCR_Sites\2017_265996\265996-0002-013.mxd

FIGURE 4

MW-106 BORON TIME SERIES PLOT

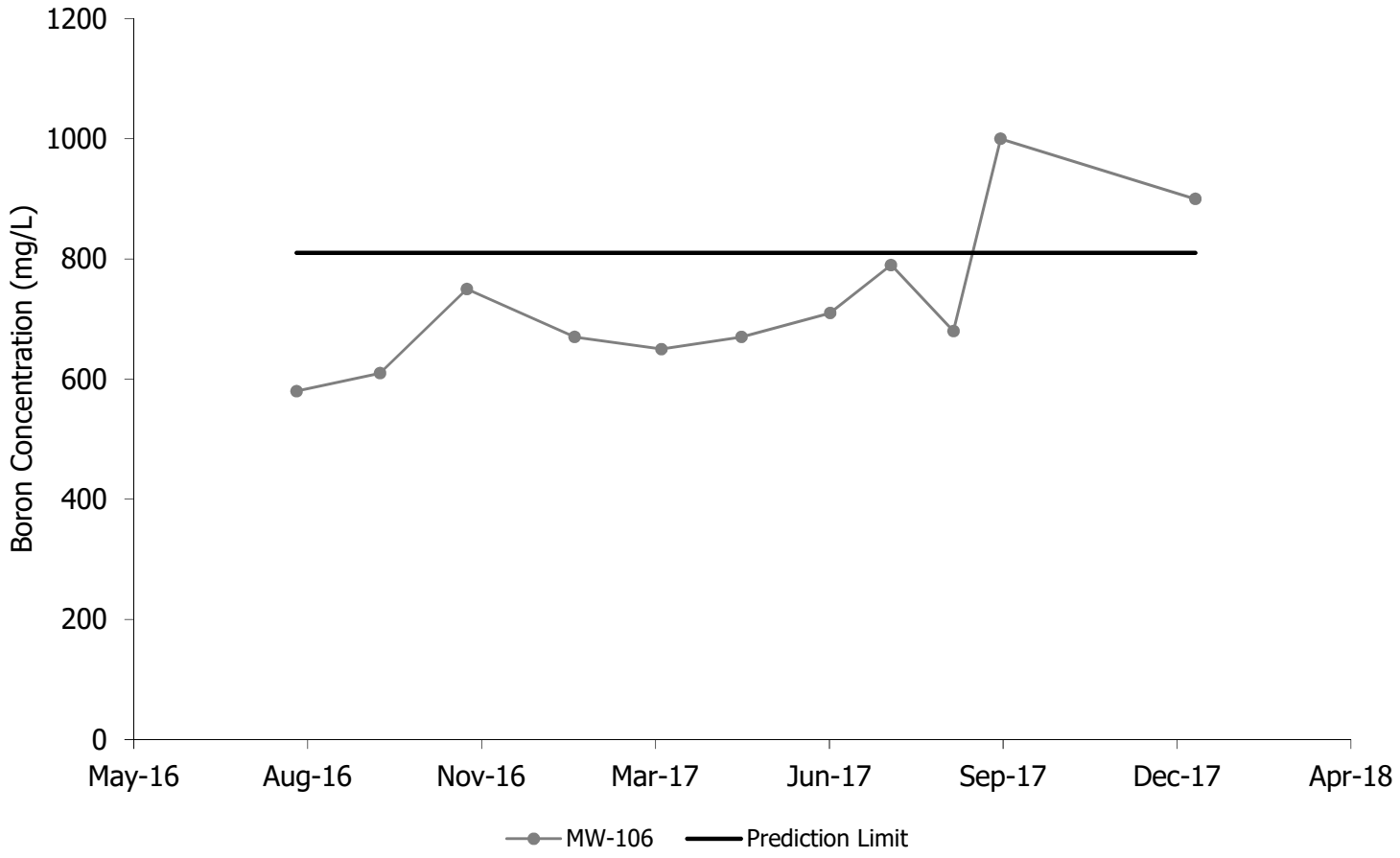


FIGURE 5
MW-108A CHLORIDE TIME SERIES PLOT

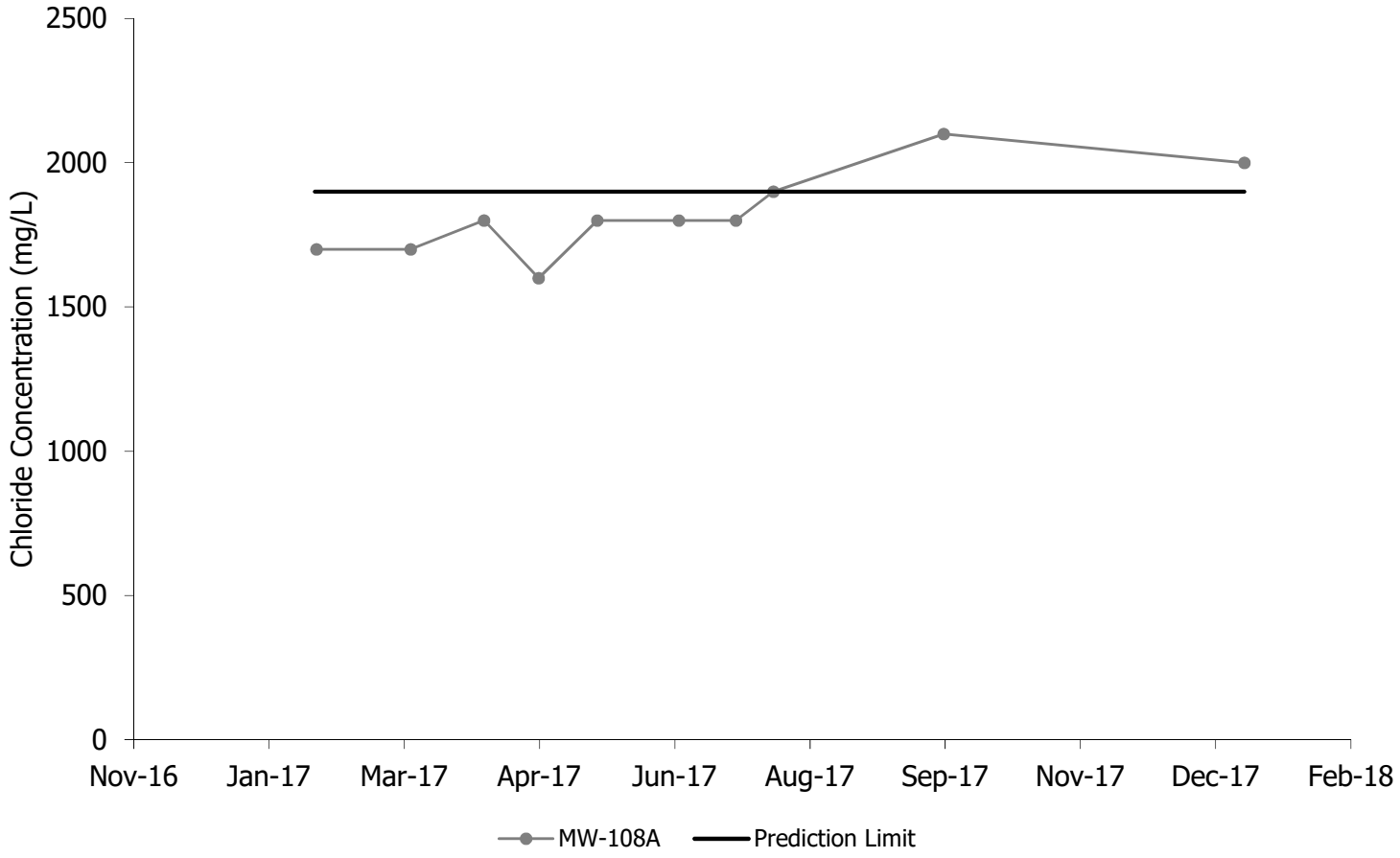
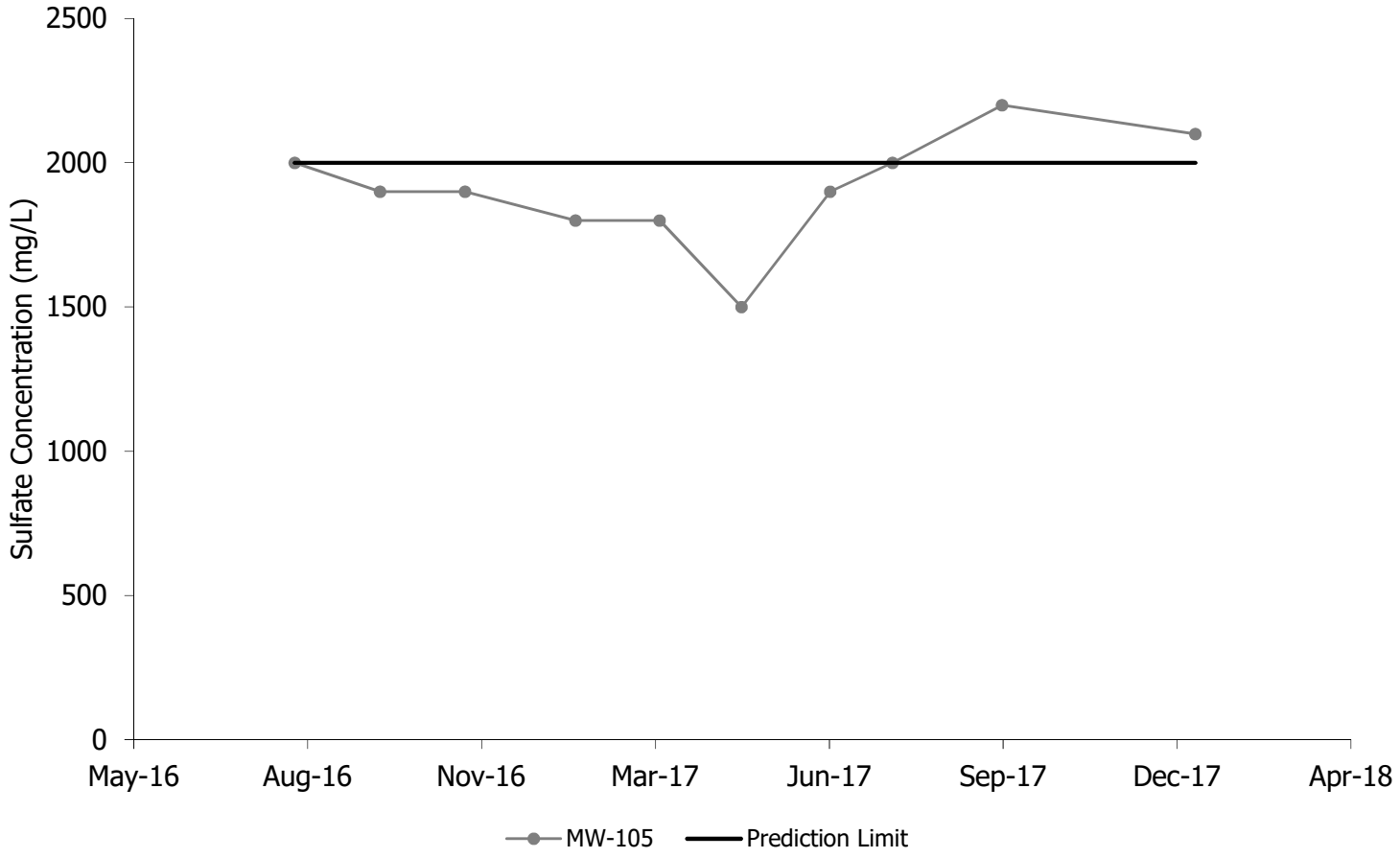


FIGURE 6

MW-105 SULFATE TIME SERIES PLOT



Attachment A
Data Quality Review

Laboratory Data Quality Review
Groundwater Monitoring Event January 2018 (Verification Resampling)
DTE Electric Company Sibley Quarry Landfill (DTE SQLF)

On January 10, 2018, TRC Environmental Corporation (TRC) collected groundwater samples at MW-105, MW-106, and MW-108A to verify analytical results that were outside of the prediction limits during the September 2017 detection monitoring event. Samples were analyzed by Test America Laboratories, Inc. (Test America), located in Canton, Ohio for metals (6010B), anions (9056A), and/or total dissolved solids (SM 2540C). The laboratory analytical results are reported in laboratory report J90328-1.

TRC reviewed the laboratory data to assess data usability. The following sections summarize the data review procedure and the results of the review.

Data Quality Review Procedure

The analytical data were reviewed using the USEPA National Functional Guidelines for Inorganic Superfund Data Review (USEPA, 2017). The following items were included in the evaluation of the data:

- Sample receipt, as noted in the cover page or case narrative;
- Technical holding times for analyses;
- Data for method blanks. Method blanks are used to assess potential contamination arising from laboratory sample preparation and/or analytical procedures;
- Reporting limits (RLs) compared to project-required RLs;
- Data for blind field duplicates. Field duplicate samples are used to assess variability introduced by the sampling and analytical processes;
- Data for laboratory control samples (LCSs). The LCSs are used to assess the accuracy of the analytical method using a clean matrix;
- Data for laboratory duplicates. The laboratory duplicates are replicate analyses of one sample and are used to assess the precision of the analytical method; and
- Overall usability of the data.

This data usability report addresses the following items:

  - Usability of the data if quality control (QC) results suggest potential problems with all or some of the data;
  - Actions regarding specific QC criteria exceedances.

Review Summary

The data quality objectives and laboratory completeness goals for the project were met, and the data are usable for their intended purpose. A summary of the data quality review, including non-conformances and issues identified in this evaluation are noted below.

QA/QC Sample Summary:

- Target analytes were not detected in the method blank.
- LCS recoveries were within laboratory control limits.
- Dup-01 corresponds with MW-105, Dup-02 corresponds with MW-106, and Dup-03 corresponds with MW-108A; relative percent differences (RPDs) between the parent and duplicate sample were within the QC limits.
- Laboratory duplicates were performed on sample MW-108A for total dissolved solids; RPDs between the parent and duplicate sample were within the QC limits.
- Data are usable for purposes of verification sampling.

Appendix B
Data Quality Reviews

Laboratory Data Quality Review
Groundwater Monitoring Event April 2018 (Detection Monitoring)
DTE Electric Company Sibley Quarry Landfill (DTE SQLF)

Groundwater samples were collected by TRC for the April 2018 sampling event. Samples were analyzed for anions, total metals, and total dissolved solids by Test America Laboratories, Inc. (Test America), located in Canton, Ohio. The laboratory analytical results are reported in laboratory report J93811-1.

During the April 2018 sampling event, a groundwater sample was collected from each of the following wells:

- MW-101
- MW-102
- MW-103
- MW-104
- MW-105
- MW-106
- MW-107
- MW-108A

Each sample was analyzed for the following constituents:

Analyte Group	Method
Anions (Chloride, Fluoride, Sulfate)	EPA 9056A
Total Metals	EPA 6010B, 6020
Total Dissolved Solids	SM 2540C

TRC reviewed the laboratory data to assess data usability. The following sections summarize the data review procedure and the results of the review.

Data Quality Review Procedure

The analytical data were reviewed using the USEPA National Functional Guidelines for Inorganic Superfund Data Review (USEPA, 2017). The following items were included in the evaluation of the data:

- Sample receipt, as noted in the cover page or case narrative;
- Technical holding times for analyses;
- Data for method blanks. Method blanks are used to assess potential contamination arising from laboratory sample preparation and/or analytical procedures;
- Reporting limits (RLs) compared to project-required RLs;
- Data for blind field duplicates. Field duplicate samples are used to assess variability introduced by the sampling and analytical processes;
- Data for laboratory control samples (LCSs). The LCSs are used to assess the accuracy of the analytical method using a clean matrix; and

- Overall usability of the data.

This data usability report addresses the following items:

  - Usability of the data if quality control (QC) results suggest potential problems with all or some of the data;
  - Actions regarding specific QC criteria exceedances.

Review Summary

The data quality objectives and laboratory completeness goals for the project were met, and the data are usable for their intended purpose. A summary of the data quality review, including non-conformances and issues identified in this evaluation are noted below.

- Appendix III constituents will be utilized for the purposes of a detection monitoring program.
- Data are usable for the purposes of the detection monitoring program.

QA/QC Sample Summary:

- Target analytes were not detected in the method blank.
- LCS recoveries were within laboratory control limits.
- Dup-01 corresponds with MW-108A; relative percent differences (RPDs) between the parent and duplicate sample were within the QC limits.
- The reporting limit for MW-107 fluoride was elevated due to dilution. The laboratory report has been revised to report the fluoride reanalysis at a lower dilution. Data is usable for purposes of a detection monitoring program.

Laboratory Data Quality Review
Groundwater Monitoring Event May 2018 (Verification Resampling)
DTE Electric Company Sibley Quarry Landfill (DTE SQLF)

Groundwater samples were collected by TRC for the May 2018 verification resampling event. Samples were analyzed for chloride and boron by Test America Laboratories, Inc. (TestAmerica), located in Canton, Ohio. The laboratory analytical results are reported in laboratory report J96220-1.

During the May 2018 sampling event, a groundwater sample was collected from each of the following wells:

- MW-106
- MW-108A

Each sample was analyzed for the following constituents:

Analyte Group	Method
Anions (Chloride)	EPA SW846 9056A
Total Metals (Boron)	EPA SW846 6010B

TRC reviewed the laboratory data to assess data usability. The following sections summarize the data review procedure and the results of the review.

Data Quality Review Procedure

The analytical data were reviewed using the USEPA National Functional Guidelines for Inorganic Superfund Data Review (USEPA, 2017). The following items were included in the evaluation of the data:

- Sample receipt, as noted in the cover page or case narrative;
- Technical holding times for analyses;
- Reporting limits (RLs) compared to project-required RLs;
- Data for method blanks. Method blanks are used to assess potential contamination arising from laboratory sample preparation and/or analytical procedures;
- Data for laboratory control samples (LCSs). The LCSs are used to assess the accuracy of the analytical method using a clean matrix; and
- Data for blind field duplicates. Field duplicate samples are used to assess variability introduced by the sampling and analytical processes;
- Overall usability of the data.

This data usability report addresses the following items:

- Usability of the data if quality control (QC) results suggest potential problems with all or some of the data;
- Actions regarding specific QC criteria exceedances.

Review Summary

The data quality objectives and laboratory completeness goals for the project were met, and the data are usable for their intended purpose. A summary of the data quality review, including non-conformances and issues identified in this evaluation are noted below.

- Appendix III constituents will be utilized for the purposes of a detection monitoring program.
- Data are usable for the purposes of the detection monitoring program.

QA/QC Sample Summary:

- Target analytes were not detected in the associated method blanks.
- LCS recoveries were within laboratory control limits.
- The field duplicate pairs were Dup-01 with MW-106 and Dup-02 with MW-108A; relative percent differences (RPDs) between the parent and duplicate samples were within the QC limits.

Laboratory Data Quality Review
Groundwater Monitoring Event October 2018 (Detection Monitoring)
DTE Electric Company Sibley Quarry Landfill (DTE SQLF)

Groundwater samples were collected by TRC for the October 2018 sampling event. Samples were analyzed for anions, total metals, and total dissolved solids by Test America Laboratories, Inc. (Test America), located in North Canton, Ohio. The laboratory analytical results are reported in laboratory report 240-102826-1.

During the October 2018 sampling event, a groundwater sample was collected from each of the following wells:

- MW-101
- MW-102
- MW-103
- MW-104
- MW-105
- MW-106
- MW-107
- MW-108A

Each sample was analyzed for the following constituents:

Analyte Group	Method
Anions (Chloride, Fluoride, Sulfate)	SW846 9056A
Total Boron	SW846 3005A/6010B
Total Calcium	SW846 3005A/6020
Total Dissolved Solids	SM 2540C

TRC reviewed the laboratory data to assess data usability. The following sections summarize the data review procedure and the results of the review.

Data Quality Review Procedure

The analytical data were reviewed using the USEPA National Functional Guidelines for Inorganic Superfund Data Review (USEPA, 2017). The following items were included in the evaluation of the data:

- Sample receipt, as noted in the cover page or case narrative;
- Technical holding times for analyses;
- Reporting limits (RLs) compared to project-required RLs;
- Data for method blanks and equipment blanks. Method blanks are used to assess potential contamination arising from laboratory sample preparation and/or analytical procedures. Equipment blanks are used to assess potential contamination arising from field procedures;
- Data for laboratory control samples (LCSs). The LCSs are used to assess the accuracy of the analytical method using a clean matrix;

- Data for matrix spike and matrix spike duplicate samples (MS.MSDs). The MS/MSDs are used to assess the accuracy and precision of the analytical method using a sample from the dataset;
- Data for laboratory duplicates. The laboratory duplicates are used to assess the precision of the analytical method using a sample from the dataset;
- Data for blind field duplicates. Field duplicate samples are used to assess variability introduced by the sampling and analytical processes; and
- Overall usability of the data.

This data usability report addresses the following items:

- Usability of the data if quality control (QC) results suggest potential problems with all or some of the data;
- Actions regarding specific QC criteria exceedances.

Review Summary

The data quality objectives and laboratory completeness goals for the project were met, and the data are usable for their intended purpose. A summary of the data quality review, including non-conformances and issues identified in this evaluation are noted below.

- Appendix III constituents will be utilized for the purposes of a detection monitoring program.
- Data are usable for the purposes of the detection monitoring program.

QA/QC Sample Summary:

- Target analytes were not detected in the method blanks.

- LCS recoveries for all target analytes were within laboratory control limits.

- Laboratory duplicate analysis was performed on sample MW-102 for TDS; all criteria were met.

- Dup-01 corresponds with MW-101; relative percent differences (RPDs) between the parent and duplicate sample were within the QC limits.

- The reporting limit (2.5 mg/L) for the nondetect fluoride result in sample MW-107 was above the QAPP-specified RL (0.05 mg/L) due to a 5-fold dilution as a result of a difficult matrix.

Laboratory Data Quality Review
Groundwater Monitoring Event November 2018 (Verification Resampling)
DTE Electric Company Sibley Quarry Landfill (DTE SQLF)

Groundwater samples were collected by TRC for the November 2018 DTE Sibley Quarry Coal Ash Landfill sampling event. Samples were analyzed for chloride by Test America located in North Canton, Ohio. The laboratory analytical results are reported in laboratory report 240-104667-1. During the November 2018 sampling event, a groundwater sample was collected from the following well:

- MW-106

Each sample was analyzed for the following constituents:

Analyte Group	Method
Chloride	SW 846 9056A

TRC reviewed the laboratory data to assess data usability. The following sections summarize the data review procedure and the results of the review.

Data Quality Review Procedure

The analytical data were reviewed using the USEPA National Functional Guidelines for Inorganic Superfund Data Review (USEPA, 2017). The following items were included in the evaluation of the data:

- Sample receipt, as noted in the cover page or case narrative
- Technical holding times for analyses
- Reporting limits (RLs) compared to project-required RLs.
- Data for method blanks, equipment blanks, and field blanks, where applicable. Method blanks are used to assess potential contamination arising from laboratory sample preparation and/or analytical procedures. Field and equipment blanks are used to assess potential contamination arising from field procedures.
- Data for laboratory control samples (LCSs). The LCSs are used to assess the accuracy of the analytical method using a clean matrix.
- Percent recoveries for matrix spike (MS) and matrix spike duplicates (MSD), when available. Percent recoveries are calculated for each analyte spiked and used to assess bias due to sample matrix effects.
- Data for laboratory duplicates, when available. The laboratory duplicates are replicate analyses of one sample and are used to assess the precision of the analytical method.

- Data for blind field duplicates, when available. Field duplicate samples are used to assess variability introduced by the sampling and analytical processes.
- Overall usability of the data which addressed the following items:
  - Usability of the data if quality control (QC) results suggest potential problems with all or some of the data
  - Actions regarding specific QC criteria exceedances

Findings

The data quality objectives and laboratory completeness goals for the project were met, and the data are usable, with the exceptions noted below. The discussion that follows describes the QA/QC results and evaluation.

Review Summary

The data quality objectives and laboratory completeness goals for the project were met, and the data are usable for their intended purpose. A summary of the data quality review, including non-conformances and issues identified in this evaluation, are noted below.

- The reviewed constituents will be utilized for the purposes of a detection monitoring program.
- Data are usable for the purposes of the detection monitoring program.
- When the data are evaluated through a detection monitoring statistical program, findings below may be used to support the removal of outliers.

QA/QC Sample Summary:

- A method blank was analyzed with the analytical batch. Chloride was not detected in the method blank.
- The LCS recovery was within laboratory control limit for chloride.
- The field duplicate pair samples were DUP-01 and MW-106. The relative percent difference (RPD) between the parent and duplicate sample was within the acceptance limit for chloride.
- Laboratory duplicate analyses were not performed with this data set for chloride even though the project QAPP indicates that laboratory duplicate analyses should be performed at a frequency of 1 in 20 samples when MS/MSD analyses are not performed. However, there was not impact on the data usability since a field duplicate pair was included with this data set and the precision was acceptable for chloride.