2019 Annual Groundwater Monitoring Report

DTE Electric Company
Range Road Coal Combustion Residual Landfill

3600 Range Road
China Township, Michigan

January 2020

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Prepared For
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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) Range Road Coal Combustion Residual Landfill (RRLF) 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 2019 activities at the RRLF CCR unit.

In the January 2019 *Annual Groundwater Monitoring Report for the Range Road Coal Combustion Residual Landfill* (2018 Annual Report), potential statistically significant increases (SSIs) over background limits were noted for a few Appendix III constituents in one or more downgradient wells during the March and October 2018 monitoring events. These potential SSIs were either not statistically significant (i.e. verification resampling did not confirm the exceedance) or were evaluated and determined to be a result of natural variability as documented in an alternative source demonstration (ASD) and not attributable to the RRLF CCR unit. Based on the hydrogeology at the Site including the presence of the vertically and horizontally extensive clay-rich confining till beneath the RRLF CCR unit, it is not possible for the uppermost aquifer to have been affected by CCR from site operations. Therefore, detection monitoring has continued at the RRLF CCR unit in accordance with §257.94 of the CCR Rule throughout the 2019 calendar year.

The semiannual detection monitoring events for 2019 were completed in March and September 2019 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 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 2019 are presented in this report.

Potential SSIs over background limits were noted for various Appendix III constituents in one or more downgradient wells during the March and September 2019 monitoring events. These potential SSIs were either not statistically significant (i.e. verification resampling did not confirm the exceedance) or were evaluated and determined to be a result of natural variability

as documented in an ASD and not attributable to the RRLF CCR unit. Based on the hydrogeology at the Site, with the presence of the vertically and horizontally extensive clay-rich confining till beneath the RRLF CCR unit, it is not possible for the uppermost aquifer to have been affected by CCR from operations. Therefore, detection monitoring will be continued at the RRLF 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) Range Road Coal Combustion Residual Landfill (RRLF) 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 2019 activities at the RRLF CCR unit (2019 Annual Report).

In the January 31, 2019 *Annual Groundwater Monitoring Report* for the Range Road Coal Combustion Residual Landfill, covering calendar year 2018 (2018 Annual Report), DTE Electric reported that Boron and Sulfate were observed within groundwater at one or more downgradient wells with potential statistically significant increases (SSIs) over background limits. TRC performed alternate source demonstrations (ASDs) for these constituents and concluded that the observation of constituents above background was a result of natural variability in groundwater quality and not a release from the RRLF CCR unit. The *Alternate Source Demonstration: First 2018 Semiannual Detection Monitoring Sampling Event for the Range Road Coal Combustion Residual Landfill, China Township, Michigan,* dated August 1, 2018 (August 2018 ASD) and the *Alternate Source Demonstration: 2017 Initial Detection Monitoring Sampling Event Range Road Coal Combustion Residual Landfill, China Township, Michigan*, dated April 12, 2018 (April 2018 ASD) were included in Appendix A of the 2018 Annual Report. Therefore, DTE Electric continued detection monitoring at the RRLF CCR unit pursuant to §257.94 of the CCR Rule.

This 2019 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 March and September 2019 semiannual groundwater monitoring events for the RRLF CCR unit. Detection monitoring for these events continued to be performed in accordance with the *CCR Groundwater Monitoring and Quality Assurance Project Plan – DTE Electric Company Range Road Landfill* (QAPP) (TRC, July 2016; revised August 2017) and statistically evaluated per the *Groundwater Statistical*

Evaluation Plan – DTE Electric Company Range Road 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 RRLF is located in Section 12, Township 4 North, Range 16 East, 3600 Range Road, China Township in St. Clair County, Michigan. The site occupies approximately 514 acres one-half mile west of the St. Clair River and one mile north of the Belle River Power Plant. Prior to Detroit Edison's operations commencing in the 1950s, the RRLF property was used as farmland. The property has been used continuously as a coal ash landfill since Detroit Edison Company (now DTE Electric) began coal ash landfilling operations at the RRLF in the 1950s and is constructed over a natural confining, low permeability clay-rich soil base that serves as an underlying soil barrier. The RRLF property consists of approximately 514 acres of which approximately 402 acres are designated for landfill development. CCR currently occupies approximately 200 acres of the RRLF and the landfill is estimated to have several decades of capacity remaining.

The RRLF is a licensed Type III solid waste disposal facility in accordance with Michigan's regulations, and is owned and operated by DTE Electric. The disposal facility currently accepts coal ash from DTE Electric's St. Clair and Belle River power plants, from the now inactive former DTE Electric Harbor Beach power plant and has historically accepted coal ash from the former DTE Electric Marysville power plant. The RRLF is operated under the current operating license number 9395 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 RRLF CCR unit is located approximately one-half mile west of the St. Clair River. In general, the RRLF is underlain by 86 to as much as 188 feet of laterally extensive low hydraulic conductivity silty clay-rich deposits, although on the eastern portion and northwest corner of RRLF some thin partially saturated silty sand near-surface deposits are present. These deposits are not laterally contiguous, are not in communication with the deeper uppermost aquifer, do not yield a useable quantity of groundwater, and thus are not considered an aquifer per the CCR Rule. On a significant portion of the RRLF, there is a bedrock valley that trends from the northeast corner to the south-central area of the site. The valley is incised in the Bedford and/or Antrim Shale bedrock and filled with unconsolidated glacial deposits consisting of clay, silt, sand and/or gravel. Based on historical oil well logs from the RRLF area, the bedrock valley extends to depths of up to 303 feet below ground surface (ft bgs). Along the western portion of the RRLF, clay-rich till is present continuously to the top of the underlying Bedford

or Antrim Shale bedrock in the area of SB-16-01 and SB-16-02 (Figure 1), creating a no flow boundary.

Groundwater within the uppermost aquifer sand/gravel is confined and protected from CCR constituents by the overlying clay-rich aquitard. The top of the sand/gravel uppermost aquifer encountered at each of the CCR monitoring wells and soil borings is at significantly different elevations across the RRLF that, where present, is first encountered at depths ranging from 86 to 196 ft bgs, immediately beneath the overlying clay-rich aquitard. The variability in boring/well depths is a consequence of the heterogeneity of the glacial deposits and is driven by the limited continuity of the coarse-grained sand and gravel outwash within the overlying/encapsulating fine-grained, silty clay till that confines the uppermost aquifer. In addition, there is an apparent lack of interconnection and/or significant vertical variation between the various uppermost aquifer sand and/or gravel units encountered across the RRLF CCR unit.

Given the horizontally expansive clay with substantial vertical thickness, the heterogeneity of the glacial deposits (with the top of the uppermost aquifer elevation across the RRLF CCR unit varying up to 100 feet vertically), the no-flow boundary to the west, and the lack of hydraulic interconnectedness of the uppermost aquifers encountered at the site in some areas, it is not appropriate to infer horizontal flow direction or gradients across the site. In addition, the elevation of leachate beneath the CCR within the RRLF and surface water managed in the perimeter ditch network is approximately 10 to 20 feet above the potentiometric surface elevations in the uppermost aquifer. This shows that if the leachate and/or potentially CCR affected groundwater were able to penetrate the clay-rich underlying confining till, that it would travel radially away from the RRLF. However, with the presence of the vertically and horizontally extensive clay-rich confining till beneath the RRLF CCR unit, it is not possible for the uppermost aquifer to have been affected by CCR from operations that began in the 1950s.

Because the uppermost aquifer is not uniformly present across the site, there are no apparent hydraulically upgradient wells, and the uppermost aquifer, where present, is isolated by a laterally contiguous silty-clay unit that significantly impedes vertical groundwater flow thus preventing the uppermost aquifer from potentially being affected by CCR, monitoring of the RRLF CCR unit using interwell statistical methods (upgradient to downgradient) is not likely appropriate. Instead, based on these hydrogeologic conditions, intrawell statistical approaches are a more 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 RRLF CCR unit as detailed in the *Groundwater Monitoring System Summary Report – DTE Electric Company Range Road Coal Combustion Residual Landfill* (GWMS Report) (TRC, October 2017). The detection monitoring well network for the RRLF CCR unit currently consists of seven monitoring wells that are screened in the uppermost aquifer. The monitoring well locations are shown on Figure 2.

As discussed in the Stats Plan, intrawell statistical methods for RRLF were selected based on the geology and hydrogeology at the Site (primarily the presence of clay/hydraulic barrier, the variability in the presence of the uppermost aquifer across the site, and presence of no flow boundary on the west side of the aquifer), in addition to other supporting lines of evidence that the aquifer is unaffected by the CCR unit (such as the consistency in concentrations of water quality data). An intrawell statistical approach requires that each of the downgradient wells doubles as a background and compliance well, 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-16-01 through MW-16-07 are located around the north, east and south perimeter of the RRLF and provide data on both background and downgradient groundwater quality that has not been affected by the CCR unit (total of seven background/downgradient 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 2019 was performed during March 18 to March 20, 2019 by TRC personnel and samples were analyzed by TestAmerica in accordance with the QAPP. Static water elevation data were collected at all seven monitoring well locations. Groundwater samples were collected from the seven

detection monitoring wells for the Appendix III indicator parameters and field parameters. A summary of the groundwater data collected during the March 2019 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 2019 was performed during September 16 to September 19, 2019 by TRC personnel and samples were analyzed by TestAmerica in accordance with the QAPP. Static water elevation data were collected at all seven monitoring well locations. Groundwater samples were collected from the seven detection monitoring wells for the Appendix III indicator parameters and field parameters. A summary of the groundwater data collected during the September 2019 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 C.

2.2.3 Groundwater Flow Rate and Direction

As presented in the GWMS Report, and mentioned above, given the horizontally expansive clay with substantial vertical thickness, the heterogeneity of the glacial deposits (with the top of the uppermost aquifer elevation across the RRLF CCR unit varying up to 100 feet vertically), the no-flow boundary to the west, and the lack of hydraulic interconnectedness of the uppermost aquifers encountered at the site in some areas, it is not appropriate to infer horizontal flow direction or gradients across the site. Groundwater elevations measured across the Site during the March 2019 sampling event are provided on Table 1 and are summarized in plan view on Figure 3. Groundwater elevations measured across the Site during the September 2019 sampling event are provided on Table 1 and are summarized in plan view on Figure 4.

Groundwater elevation data collected during the most recent sampling event show that groundwater conditions within the uppermost aquifer are consistent with previous monitoring events and continue to demonstrate that the downgradient wells are appropriately positioned to detect the presence of Appendix III parameters that could potentially migrate from the RRLF 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 seven established detection monitoring wells (MW-16-01 through MW-16-07). 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 RRLF 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 2019 Semiannual Event

For each semiannual monitoring event, the concentrations of the indicator parameters in each of the detection monitoring wells (MW-16-01 through MW-16-07) were compared to their respective statistical background limits calculated from the background data collected from each individual well (i.e., monitoring data from MW-16-01 is compared to the background limit developed using the background dataset from MW-16-01, and so forth).

The comparisons for the March 2019 monitoring event are presented on Table 3. The statistical evaluation of the March 2019 Appendix III indicator parameters showed potential initial SSIs over background for:

- Boron at MW-16-04; and
- Calcium at MW-16-06.

The chloride concentration at MW-16-07, boron concentration at MW-16-01, and sulfate concentration at MW-16-06 are continued exceedances of the prediction limits that have been demonstrated to be from natural variability and are not from the CCR unit as presented in the *Alternate Source Demonstration: 2017 Initial Detection Monitoring Sampling Event Range Road Coal Combustion Residual Landfill, China Township, Michigan*, dated April 12, 2018 (April 2018 ASD). There were no SSIs compared to background for fluoride, total dissolved solids (TDS), or pH.

3.3 Verification Resampling for the First 2019 Semiannual Event

Verification resampling is recommended 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 Rule. 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. Only constituents that initially exceed their statistical limit (i.e., have no previously recorded SSIs) will be analyzed for verification purposes.

Verification resampling for the March 2019 event was conducted on May 7 and May 8, 2019 by TRC personnel. Groundwater samples were collected for Boron at MW-16-04 in accordance with the QAPP. A summary of the analytical results collected during the May 2019 resampling event is provided on Table 3. The associated data quality review is included in the ASD in Appendix A.

The verification result for Boron (MW-16-04) is below the prediction limits. Consequently, the initial potential SSI from the March 2019 event is not confirmed at MW-16-04. Therefore, in accordance with the Stats Plan and the Unified Guidance, this initial exceedance is not statistically significant, and no SSI will be recorded for boron for the March 2019 monitoring event. However, the March 2019 verification resampling confirmed the SSI for Calcium at monitoring well MW-16-06. TRC reviewed the data and determined that calcium is a result of natural variability in groundwater quality and not attributable to the RRLF CCR unit as presented in the *Alternate Source Demonstration: First 2019 Semiannual Detection Monitoring Sampling Event for the Range Road Coal Combustion Residual Landfill, China Township, Michigan*, dated August 8, 2019 (August 2019 ASD) (Appendix A). As such, detection monitoring was continued in accordance with §257.94 of the CCR Rule.

3.4 Data Comparison to Background Limits – Second 2019 Semiannual Event

The data comparisons for the September 2019 groundwater monitoring event are presented on Table 4. The statistical evaluation of the September 2019 Appendix III indicator parameters shows potential initial SSIs over background for:

- Calcium at MW-16-01, MW-16-02, MW-16-03, and MW-16-04; and
- TDS at MW-16-04.

The chloride concentration at MW-16-07 is a continued exceedance of the prediction limit that has been demonstrated to be from natural variability and is not from the CCR unit as presented in the April 2018 ASD in the 2018 Annual Report. The boron concentration at MW-16-01 and the sulfate concentration at MW-16-06 are continued exceedances of the prediction limits that have been demonstrated to be from natural variability and are not from the CCR unit as presented in the August 2018 ASD in the 2018 Annual Report. The calcium concentration at MW-16-06 is a continued exceedance of the prediction limit that has been demonstrated to be from natural

variability and is not from the CCR unit as presented in the August 2019 ASD (Appendix A). There were no SSIs compared to background for fluoride, pH, and total dissolved solids.

3.5 Verification Resampling for the Second 2019 Semiannual Event

Verification resampling for the September 2019 event was conducted on November 11 and November 12, 2019 by TRC personnel. Groundwater samples were collected for calcium at MW-16-01 through MW-16-04 and TDS at MW-16-04. A summary of the analytical results collected during the November 2019 resampling event is provided on Table 4. The associated data quality review is included in Appendix C.

The calcium verification results at MW-16-01, MW-16-02, and MW-16-04, as well as the TDS verification results at MW-16-04 are below the prediction limits, consequently the initial potential SSIs for these constituents for the September 2019 event are not confirmed. Therefore, in accordance with the Stats Plan and the Unified Guidance, these initial exceedances are not statistically significant, and will not be recorded as SSIs for the September 2019 monitoring event. The calcium concentration at MW-16-03 was above the prediction limit, however the potential calcium SSI has been demonstrated to be from natural variability and is not due to a release from the CCR unit as presented in the January 2020 ASD (Appendix B) and no SSIs will be recorded for the September 2019 monitoring event.

Section 4
Conclusions and Recommendations

Potential SSIs over background limits were noted for a few Appendix III constituents in one or more downgradient wells during the March and September 2019 monitoring events. These potential SSIs were either not statistically significant (i.e. verification resampling did not confirm the exceedance) or were addressed through an ASD (Appendices A and B) that demonstrated the observed concentrations were a result of natural variability in groundwater quality and not attributable to the RRLF CCR unit. As discussed above, and in the GWMS Report, with the presence of the vertically and horizontally extensive clay-rich confining till beneath the RRLF CCR unit, it is not possible for the uppermost aquifer to have been affected by CCR from operations. In addition, 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. Therefore, detection monitoring will be continued at the RRLF CCR unit in accordance with §257.94.

No corrective actions were performed in 2019. The next semiannual monitoring event at the RRLF CCR unit is scheduled for the second calendar quarter of 2020.

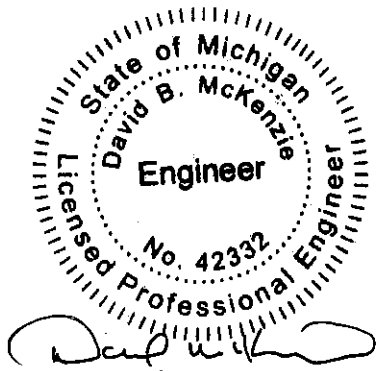
Section 5
Groundwater Monitoring Report Certification

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
Range Road Landfill
China Township, Michigan

CERTIFICATION

I hereby certify that the annual groundwater and corrective action report presented within this document for the RRLF 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, 2021	 Stamp
Company: TRC Engineers Michigan, Inc.	Date: January 30, 2020	

Section 6
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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 – March and September 2019
Range Road Landfill – RCRA CCR Monitoring Program
China Township, Michigan

Well ID	MW-16-01		MW-16-02		MW-16-03		MW-16-04		MW-16-05		MW-16-06		MW-16-07	
Date Installed	1/13/2016		1/27/2016		2/1/2016		5/24/2016		5/13/2016		5/10/2016		5/13/2016	
TOC Elevation	595.35		598.44		597.69		596.87		601.97		600.68		589.34	
Geologic Unit of Screened interval	Sand with Silt		Silty Sand with Gravel		Silty Gravel with Sand		Silty Sand		Gravel with Sand		Sand		Sand	
Screened Interval Elevation	390.7 to 385.7		393.8 to 388.8		432.1 to 427.1		414.1 to 409.1		476.6 to 471.6		508.0 to 503.0		494.4 to 489.4	
Unit	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
3/19/2019	18.45	576.90	20.90	577.54	20.90	576.79	19.50	577.37	27.75	574.22	23.83	576.85	19.65	569.69
9/17/2019	18.00	577.35	20.73	577.71	20.00	577.69	19.50	577.37	27.80	574.17	23.60	577.08	16.00	573.34

Notes:

Elevations are reported in feet relative to the North American Vertical Datum of 1988.

ft BTOC - feet below top of casing.

Table 2
Summary of Field Data – March and September 2019
Range Road Landfill – RCRA CCR Monitoring Program
China Township, 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-16-01	3/20/2019	1.25	-106.3	7.5	2,121	10.00	2.95
	9/18/2019	0.12	5.6	7.9	2,232	11.51	1.01
MW-16-02	3/20/2019	1.03	-232.3	8.2	2,024	9.20	1.60
	9/18/2019	0.10	-134.7	8.4	2,138	11.37	0.67
MW-16-03	3/20/2019	0.93	-186.2	8.0	1,760	10.00	2.81
	9/18/2019	0.09	1.5	8.1	1,849	12.04	1.00
MW-16-04	3/19/2019	1.26	-161.5	8.1	8,220	9.80	7.15
	9/17/2019	0.42	-216.5	8.3	9,655	12.60	0.55
MW-16-05	3/19/2019	1.13	-113.1	8.1	1,765	9.80	3.00
	9/19/2019	0.14	7.0	8.3	1,964	12.35	0.62
MW-16-06	3/19/2019	1.17	-115.5	7.7	1,687	9.90	2.84
	9/19/2019	0.20	9.7	8.0	1,868	11.61	0.42
MW-16-07	3/20/2019	1.02	-157.6	7.9	1,179	10.20	108
	9/17/2019	0.30	-195.3	8.2	1,355	12.20	48.9

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 – March and May 2019
Range Road Landfill – RCRA CCR Monitoring Program
China Township, Michigan

Sample Location:		MW-16-01		MW-16-02		MW-16-03		MW-16-04			MW-16-05		MW-16-06			MW-16-07	
Sample Date:		3/20/2019	PL	3/20/2019	PL	3/20/2019	PL	3/19/2019	5/8/2019[1]	PL	3/19/2019	PL	3/19/2019	5/8/2019[1]	PL	3/20/2019	PL
Constituent	Unit	Data		Data		Data		Data			Data		Data			Data	
Appendix III																	
Boron	ug/L	**600[2]**	560	1,100	1,100	1,200	1,200	**1,200**	1,100	1,100	1,300	1,400	1,100	--	1,200	910	950
Calcium	ug/L	79,000	89,000	22,000	24,000	20,000	21,000	63,000	--	67,000	18,000	19,000	**33,000**	**33,000[3]**	31,000	44,000	66,000
Chloride	mg/L	690	770	640	720	530	550	3,200	--	3,600	570	620	530	--	590	**350[2]**	330
Fluoride	mg/L	0.85	0.95	2.0	2.1	2.2	2.3	1.4	--	1.6	1.9	1.9	1.5	--	1.6	1.2	1.3
pH, Field	SU	7.5	7.1 - 8.4	8.2	8.2 - 9.0	8.0	8.0 - 8.8	8.1	8.2	7.5 - 8.5	8.1	8.0 - 8.9	7.7	7.7	7.6 - 8.4	7.9	7.2 - 8.3
Sulfate	mg/L	41	43	< 1.0	10	< 1.0	10	< 5.0	--	50	6.4	10	**44[4]**	--	31	5.0	120
Total Dissolved Solids	mg/L	1,200	1,300	1,100	1,200	1,100	1,200	4,800	--	5,300	1,100	1,200	1,000	--	1,100	710	770

Notes:

ug/L - micrograms per liter.

mg/L - milligrams per liter.

SU - standard units; pH is a field parameter.

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 confirmed exceedance of the Prediction Limit (PL).

(1) - Results shown for verification sampling performed on 5/8/2019.

(2) - Concentration addressed through first 2018 semiannual alternative source demonstration.

(3) - New successful alternative source demonstration was completed following confirmation of the initial statistically significant exceedance.

(4) - Concentration addressed through initial alternative source demonstration.

Table 4
Comparison of Appendix III Parameter Results to Background Limits – September 2019 and November 2019
Range Road Landfill – RCRA CCR Monitoring Program
China Township, Michigan

Sample Location:		MW-16-01			MW-16-02			MW-16-03			MW-16-04			MW-16-05		MW-16-06		MW-16-07	
Sample Date:		9/18/2019	11/11/2019[1]	PL	9/18/2019	11/11/2019[1]	PL	9/18/2019	11/11/2019[1]	PL	9/17/2019	11/12/2019[1]	PL	9/19/2019	PL	9/19/2019	PL	9/17/2019	PL
Constituent	Unit	Data			Data			Data			Data			Data		Data		Data	
Appendix III																			
Boron	ug/L	**580**[2]	--	560	1,100	--	1,100	1,100	--	1,200	1,100	--	1,100	1,200	1,400	1,100	1,200	870	950
Calcium	ug/L	**90,000**	77,000	89,000	**27,000**	21,000	24,000	**22,000**	**33,000**[3]	21,000	**69,000**	65,000	67,000	18,000	19,000	**34,000**[4]	31,000	45,000	66,000
Chloride	mg/L	690	--	770	630	--	720	530	--	550	3,200	--	3,600	560	620	530	590	**350**[5]	330
Fluoride	mg/L	0.86	--	0.95	2.0	--	2.1	2.2	--	2.3	1.5	--	1.6	1.9	1.9	1.5	1.6	1.3	1.3
pH, Field	SU	7.9	7.8	7.1 - 8.4	8.4	8.3	8.2 - 9.0	8.1	8.0	8.0 - 8.8	8.3	8.3	7.5 - 8.5	8.3	8.0 - 8.9	8.0	7.6 - 8.4	8.2	7.2 - 8.3
Sulfate	mg/L	32	--	43	1.1	--	10	< 10	--	10	< 5.0	--	50	2.4	10	**38**[2]	31	3.9	120
Total Dissolved Solids	mg/L	1,300	--	1,300	1,100	--	1,200	990	--	1,200	**5,700**	4,300	5,300	1,000	1,200	1,100	1,100	750	770

Notes:

ug/L - micrograms per liter.

mg/L - milligrams per liter.

SU - standard units; pH is a field parameter.

-- = not analyzed.

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 confirmed exceedance of the Prediction Limit (PL).

(1) - Results shown for verification sampling performed on 11/11/2019 and 11/12/2019.

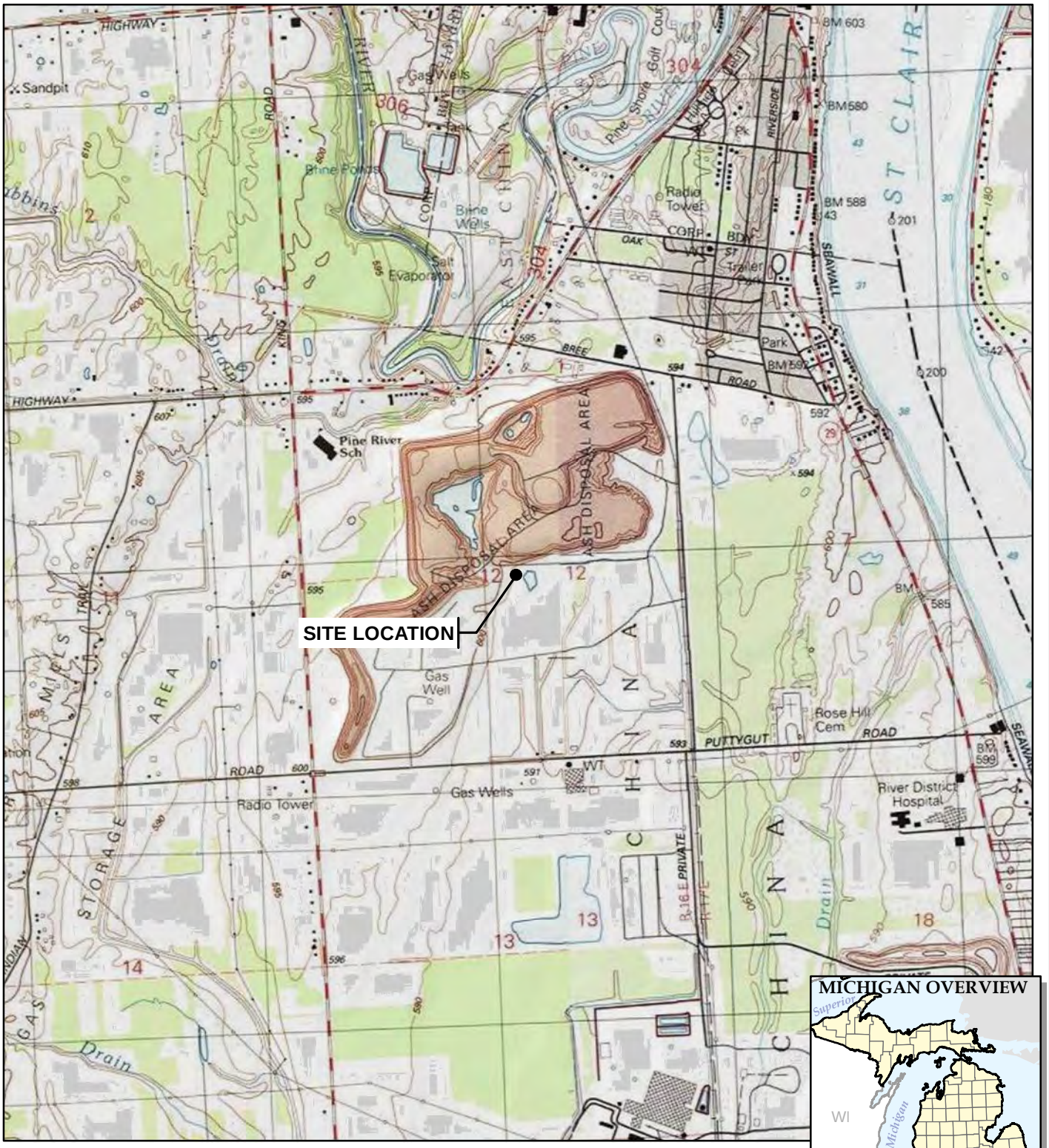
(2) - Concentration addressed through first 2018 semiannual alternative source demonstration.

(3) - New successful alternative source demonstration was completed following confirmation of the initial statistically significant exceedance.

(4) - Concentration addressed through first 2019 Semiannual alternative source demonstration.

(5) - Concentration addressed through initial 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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TRC - GIS

PROJECT:

DTE ELECTRIC COMPANY
RANGE ROAD LANDFILL
3600 RANGE ROAD
CHINA TOWNSHIP, MICHIGAN

TITLE:

SITE LOCATION MAP

DRAWN BY:	S. MAJOR
CHECKED BY:	B. YELEN
APPROVED BY:	V. BUENING
DATE:	JANUARY 2020
PROJ. NO.:	320511.0000
FILE:	320511-002slmMB.mxd

FIGURE 1

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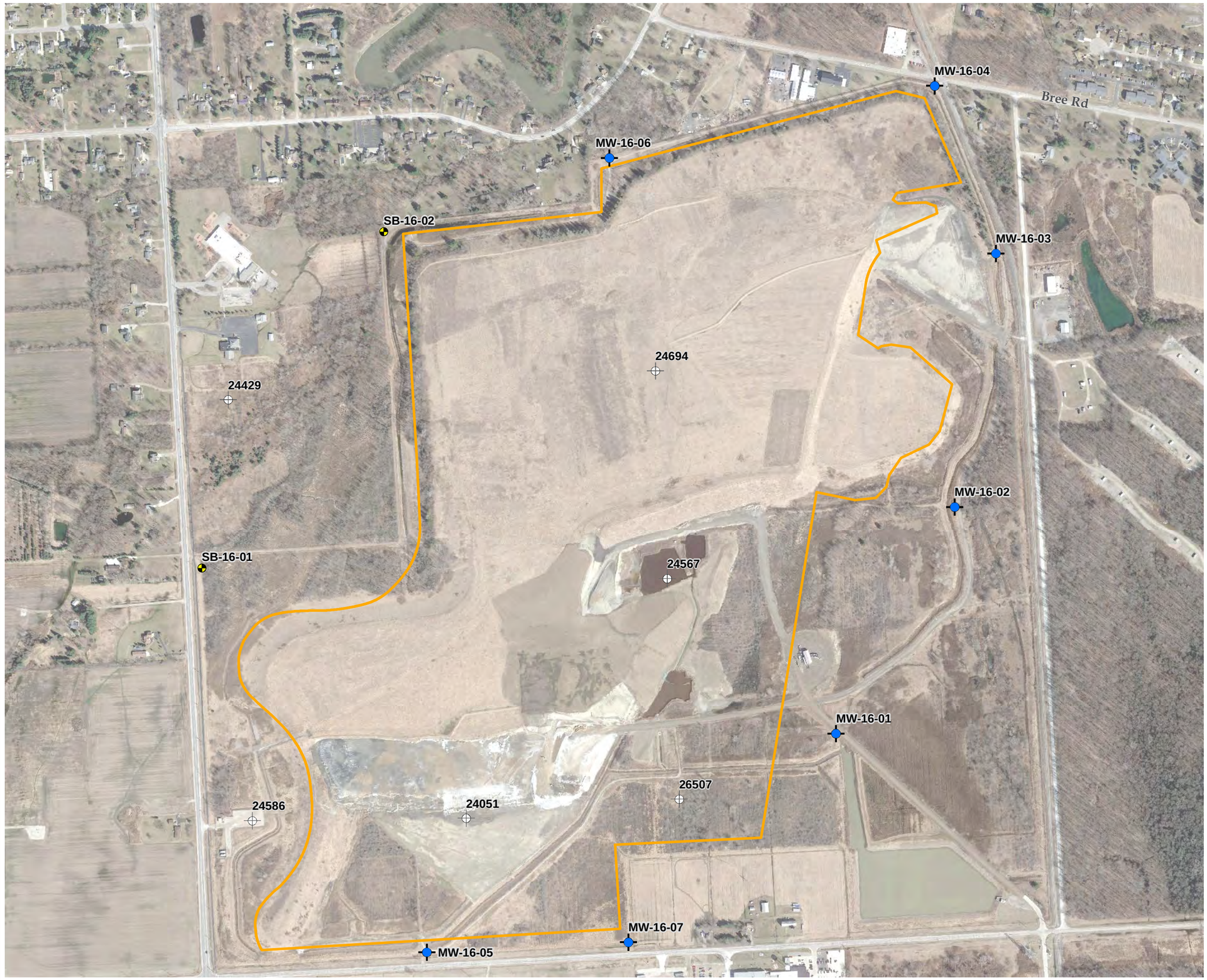

LEGEND

- MONITORING WELL
- SOIL BORING
- APPROXIMATE ANTICIPATED MAXIMUM LIMIT OF ASH FILL
- OIL/GAS WELL LOCATION

NOTES

1. BASE MAP IMAGERY FROM GOOGLE EARTH PRO,2019.
2. WELL LOCATIONS SURVEYED IN MARCH AND MAY 2016 BY BMJ ENGINEERS & SURVEYORS, INC.
3. OIL AND GAS WELL LOCATIONS FROM MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY, GEOWEBFACE.

N

0 600 1,200 Feet

1 " = 600 '
1:7,200

PROJECT:
DTE ELECTRIC COMPANY
RANGE ROAD LANDFILL
3600 RANGE ROAD
CHINA TOWNSHIP, MICHIGAN

TITLE:
MONITORING NETWORK AND SITE PLAN

DRAWN BY:	S. MAJOR	PROJ NO.:	320511.0000
CHECKED BY:	B. YELEN		
APPROVED BY:	V. BUENING		**FIGURE 2**
DATE:	JANUARY 2020		

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FILE NO.: 320511-0000-0013.mxd

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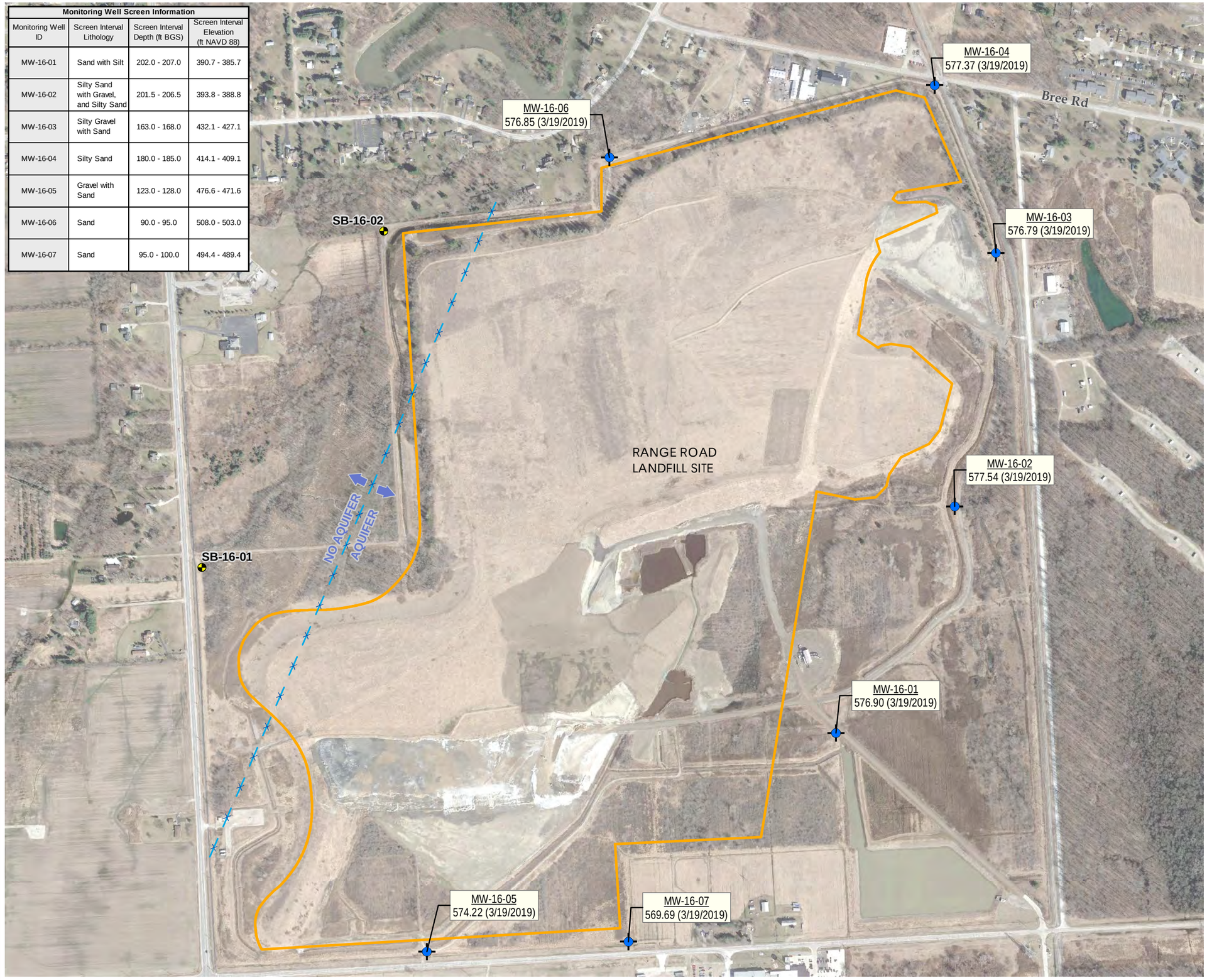
Path: E:\DTE\CCR_Sites\2017_265996\320511-0000-0013.mxd
Coordinate System: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl (Foot)
Map Rotation: 0

TRC - GIS

TRC - GIS

Monitoring Well Screen Information			
Monitoring Well ID	Screen Interval Lithology	Screen Interval Depth (ft BGS)	Screen Interval Elevation (ft NAVD 88)
MW-16-01	Sand with Silt	202.0 - 207.0	390.7 - 385.7
MW-16-02	Silty Sand with Gravel, and Silty Sand	201.5 - 206.5	393.8 - 388.8
MW-16-03	Silty Gravel with Sand	163.0 - 168.0	432.1 - 427.1
MW-16-04	Silty Sand	180.0 - 185.0	414.1 - 409.1
MW-16-05	Gravel with Sand	123.0 - 128.0	476.6 - 471.6
MW-16-06	Sand	90.0 - 95.0	508.0 - 503.0
MW-16-07	Sand	95.0 - 100.0	494.4 - 489.4



LEGEND

- MONITORING WELL
- SOIL BORING
- APPROXIMATE ANTICIPATED MAXIMUM LIMIT OF ASH FILL
- APPROXIMATE AQUIFER BOUNDARY

MW ID
GROUNDWATER ELEVATION (DATE)
GROUNDWATER ELEVATION (DATE)
etc...

FT BGS
FEET BELOW GROUND SURFACE
FT NAVD 88
FEET RELATIVE TO THE NORTH AMERICAN VERTICAL DATUM OF 1988

NOTES

1. BASE MAP IMAGERY FROM GOOGLE EARTH PRO, 2019.
2. WELL LOCATIONS SURVEYED IN MARCH AND MAY 2016 BY BMJ ENGINEERS & SURVEYORS, INC.

N

0 600 1,200 Feet

1 " = 600 '
1:7,200

PROJECT:
DTE ELECTRIC COMPANY
RANGE ROAD LANDFILL
3600 RANGE ROAD
CHINA TOWNSHIP, MICHIGAN

TITLE:
GROUNDWATER PONTENTIOMETRIC ELEVATION SUMMARY MARCH 2019

DRAWN BY:	M. VAPHIADIS	PROJ NO.:	320511.0000
CHECKED BY:	B. YELEN		**FIGURE 3**
APPROVED BY:	V. BUENING		
DATE:	JANUARY 2020		

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Map Rotation: 0

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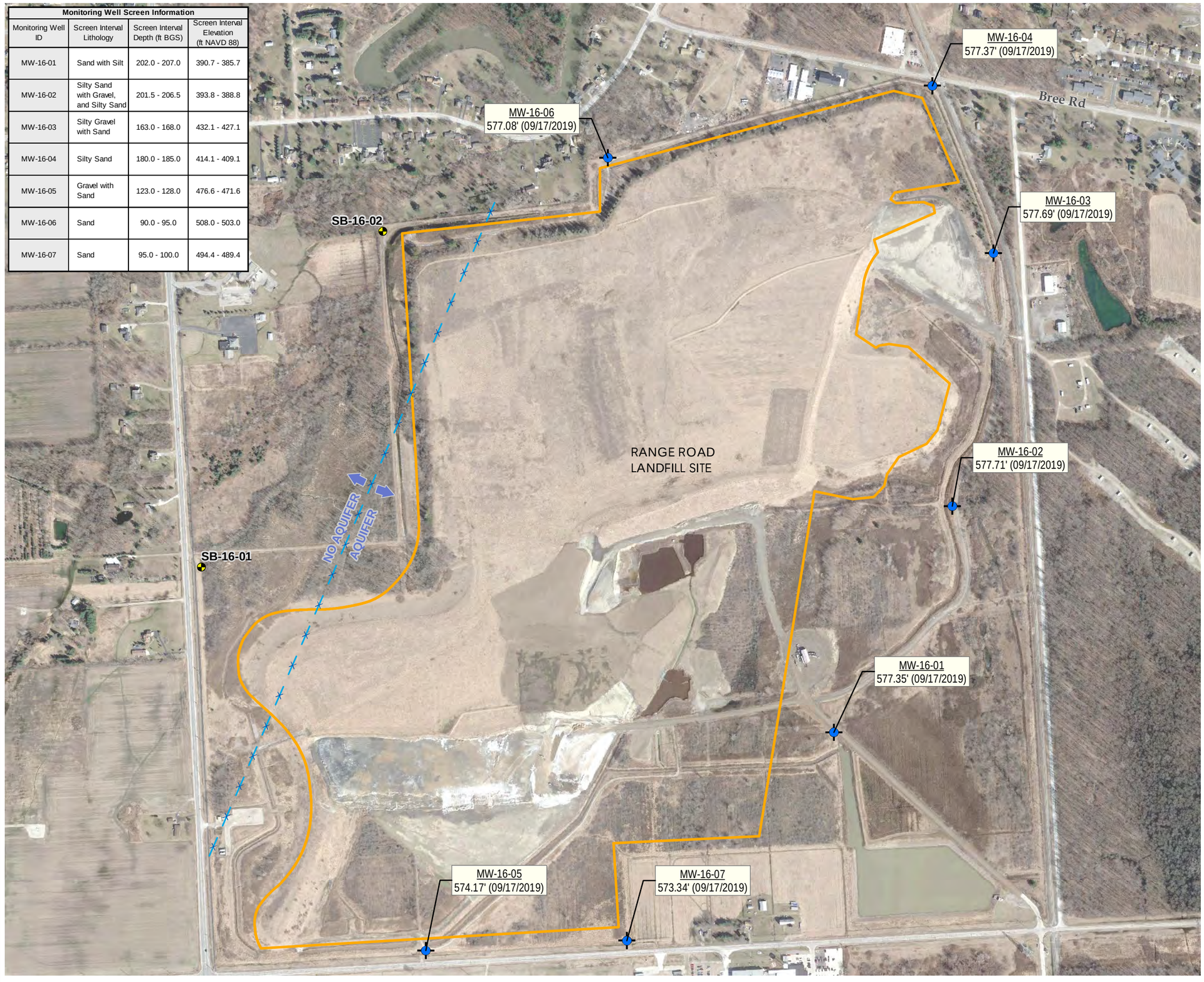
Coordinate System: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl (Foot)
Map Rotation: 0

Monitoring Well Screen Information			
Monitoring Well ID	Screen Interval Lithology	Screen Interval Depth (ft BGS)	Screen Interval Elevation (ft NAVD 88)
MW-16-01	Sand with Silt	202.0 - 207.0	390.7 - 385.7
MW-16-02	Silty Sand with Gravel, and Silty Sand	201.5 - 206.5	393.8 - 388.8
MW-16-03	Silty Gravel with Sand	163.0 - 168.0	432.1 - 427.1
MW-16-04	Silty Sand	180.0 - 185.0	414.1 - 409.1
MW-16-05	Gravel with Sand	123.0 - 128.0	476.6 - 471.6
MW-16-06	Sand	90.0 - 95.0	508.0 - 503.0
MW-16-07	Sand	95.0 - 100.0	494.4 - 489.4



LEGEND

- MONITORING WELL
- SOIL BORING
- APPROXIMATE ANTICIPATED MAXIMUM LIMIT OF ASH FILL
- APPROXIMATE AQUIFER BOUNDARY

MW ID
GROUNDWATER ELEVATION (DATE)
GROUNDWATER ELEVATION (DATE)
etc...

FT BGS
FEET BELOW GROUND SURFACE
FT NAVD 88
FEET RELATIVE TO THE NORTH AMERICAN VERTICAL DATUM OF 1988

NOTES

1. BASE MAP IMAGERY FROM GOOGLE EARTH PRO, 2019.
2. WELL LOCATIONS SURVEYED IN MARCH AND MAY 2016 BY BMJ ENGINEERS & SURVEYORS, INC .

N

0 600 1,200 Feet

1 " = 600 '
1:7,200

PROJECT:
DTE ELECTRIC COMPANY
RANGE ROAD LANDFILL
3600 RANGE ROAD
CHINA TOWNSHIP, MICHIGAN

TITLE:
GROUNDWATER PONTENTIOMETRIC ELEVATION SUMMARY SEPTEMBER 2019

DRAWN BY:	S. MAJOR	PROJ NO.:	320511.0000
CHECKED BY:	B. YELEN		
APPROVED BY:	V. BUENING		**FIGURE 4**
DATE:	JANUARY 2020		

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Appendix A
Alternate Source Demonstration: First 2019 Semiannual Detection Monitoring Sampling Event

1540 Eisenhower Pl.
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Technical Memorandum

Date: August 8, 2019

To: Chris P. Scieszka
DTE Electric Company

From: Graham Crockford, TRC
David McKenzie, TRC

Project No.: 320511.0000.0000 Phase 001, Task 001

Subject: Alternate Source Demonstration: First 2019 Semiannual Detection Monitoring Sampling Event for the Range Road Coal Combustion Residual Landfill, China Township, 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) Range Road Coal Combustion Residual Landfill (RRLF) CCR unit.

TRC Engineers Michigan, Inc. (TRC) conducted the first semiannual 2019 detection monitoring event at the RRLF on behalf of DTE Electric on March 18 through March 20, 2019, in accordance with the *CCR Groundwater Monitoring and Quality Assurance Project Plan – DTE Electric Company Range Road Landfill* (QAPP) (TRC, July 2016; revised August 2017). The semiannual groundwater monitoring event included the statistical evaluation of the detection monitoring parameters (Appendix III to Part 257 of the CCR Rule) for the RRLF CCR unit. This event was the fourth 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 March 2019 Appendix III indicator parameters showed potential SSIs over background for:

- Boron at MW-16-01 (600 µg/L) and MW-16-04 (1,200 µg/L);
- Calcium at MW-16-06 (33,000 µg/L);
- Chloride at MW-16-07 (350 mg/L); and
- Sulfate at MW-16-06 (44 mg/L).

However, as discussed in more detail below, verification sampling conducted in May 2019 only confirmed the SSI for calcium at MW-16-06. The chloride concentration at MW-16-07 is a continued exceedance of the prediction limit that has been demonstrated to be from natural variability and is not from the CCR unit as presented in the *Alternate Source Demonstration: 2017 Initial Detection Monitoring Sampling Event Range Road Coal Combustion Residual Landfill, China Township, Michigan*, dated April 12, 2018. Similarly, the boron concentration at MW-16-01 and the sulfate concentration at MW-16-06 are continued exceedances of the prediction limits and have been demonstrated to be from natural variability and are not from the CCR unit as presented in the *Alternate Source Demonstration: First 2018 Semiannual Detection Monitoring Sampling Event for the Range Road Coal Combustion Residual Landfill, China Township, Michigan*, dated August 1, 2018. 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 evaluate the potential SSIs identified in the March 2019 detection monitoring event.

Background

The RRLF is located in Section 12, Township 4 North, Range 16 East, 3600 Range Road, China Township in St. Clair County, Michigan. The site location is shown in Figure 1. The property has been used continuously as a coal ash landfill since Detroit Edison Company (now DTE Electric) began coal ash landfilling operations in the 1950s. The property consists of approximately 514 acres of which approximately 402 acres are designated for CCR landfill development, half of which is currently occupied with CCR (TRC, January 2018).

The RRLF CCR unit is initially underlain by 86 to 188 feet of laterally extensive, low hydraulic conductivity silty clay-rich deposits. A no flow boundary is formed across the western portion of the RRLF by clay-rich till which is present continuously to the top of bedrock in this area. Beneath the clay rich aquitard, a sand/gravel layer is encountered, which contains the uppermost aquifer present beneath the RRLF. This aquifer is encountered at different elevations beneath the RRLF between 86 and 196 feet below ground surface (ft bgs). As a result of site specific geologic and hydrogeologic conditions, downward migration of CCR leachate is not expected, and it is not appropriate to infer horizontal flow directions across the site. Please refer to the Annual Report for further details regarding site-specific hydrogeology (TRC, January 2018).

The detection monitoring well network for the RRLF currently consists of 7 monitoring wells that are screened in the uppermost aquifer, and are all considered to be downgradient monitoring wells. The monitoring well locations are shown in Figure 2. The *Groundwater Monitoring System Summary Report – DTE Electric Range Road Coal Combustion Residual Landfill* (GWMS Report) details the groundwater monitoring system (TRC, October 2017).

Alternate Source Demonstration

Verification resampling was performed as recommended 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. 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 May 8, 2019 by TRC personnel for wells MW-16-04 and MW-16-06. 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 calcium exceedance at MW-16-06. The verification results of all other Appendix III constituents were within the prediction limits; consequently, the initial SSI of boron at MW-16-04 from the March 2019 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 boron at MW-16-04 during the March 2019 monitoring event.

The following discussion presents the ASD for the confirmed prediction limit exceedance for calcium at MW-16-06.

Calcium at MW-16-06: The calcium concentrations at MW-16-06, shown graphically as data points greater than the prediction limit in Chart 1, is likely the result of natural spatial variability in groundwater quality at the site and a statistical false positive, and not the result of a release from the RRLF CCR unit. Multiple lines of evidence are provided in support of this conclusion and are as follows:

- **Spatial variability in groundwater quality** – After 8 background sampling events, the prediction limit calculated for each of the 7 monitoring wells range from 19,000 micrograms per liter (µg/L) to 89,000 µg/L. This variability in groundwater quality across the site provides evidence that the CCR unit is not the source of the confirmed calcium SSI at MW-16-06, but rather the result of regional variability.
- **Insufficient background sampling timeline to account for long-term trends** – Variability in calcium concentrations observed in the groundwater at RRLF during the background sampling events provides evidence of the heterogeneity of this constituent in groundwater. The short duration of the background sampling events limits the ability of the statistical analysis to capture the natural temporal trends in the groundwater quality at the RRLF. This is a limitation of the CCR Rule implementation timeline.
- **Lack of similar increase in other indicator parameters** – The lack of SSIs for any other parameters within the same monitoring well, and across the other wells within the monitoring

well network, also suggests a source other than CCR leachate for the observed sulfate SSI at this location.

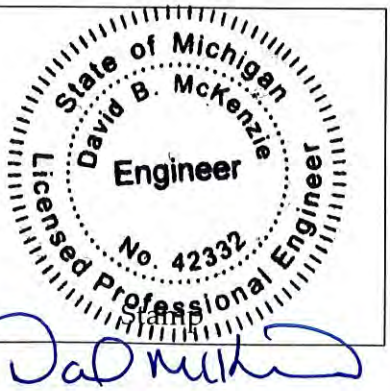
- **Time of travel analysis** – The clay formation immediately beneath the RRLF CCR unit provides a natural geologic barrier to migration of CCR constituents to the underlying aquifer. The vertical extent of the clay layer beneath the CCR unit is shown in Figures 4 through 6 as cross-sections. Figure 3 shows the cross-section locations in plan view. Conservatively calculating a time of travel for liquid from the base of the RRLF through a minimum of 86 feet of clay, to the underlying upper aquifer, yields over 1,300 years of travel time (TRC, October 2017). The RRLF began accepting coal ash in approximately 1950, so, based on this analysis, there is no potential for indicator parameters to have migrated to the upper aquifer.

Conclusions and Recommendations

The information provided in this report serves as the ASD for the DTE Electric RRLF, was prepared in accordance with 40 CFR 257.94(e)(2) of the CCR Rule, and demonstrates that the calcium SSI determined based on the first semiannual detection monitoring event performed in 2019 is 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 as per 40 CFR 257.94 at the RRLF CCR unit.

Certification Statement

I hereby certify that the alternative source demonstration presented within this document for the RRLF 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	
Company: TRC Engineers Michigan, Inc.	Date: 8/8/19	Stamp

References

Beth A. Apple and Howard W. Reeves. 2007. Summary of Hydrogeologic Conditions by County for the State of Michigan. U.S. Geologic Survey Open-File Report. pg. 66.

RMT. November 2008. Remedial Action Plan for Off-Site Groundwater – The Range Road Ash Landfill Site Belle River Power Plant. Revision 4 November 26, 2008.

TRC Environmental Corporation. October 2017. Groundwater Monitoring System Summary Report – DTE Electric Company Range Road Coal Combustion Residual Landfill, 3600 Range Road, China Township, Michigan. Prepared for DTE Electric Company.

TRC Environmental Corporation. January 2018. Annual Groundwater Monitoring Report – DTE Electric Company Range Road Coal Combustion Residual Landfill, 3600 Range Road, China Township, Michigan. Prepared for DTE Electric Company.

TRC Environmental Corporation. April 2018. Alternate Source Demonstration: 2017 Initial Detection Monitoring Sampling Event Range Road Coal Combustion Residual Landfill, China Township, Michigan. Prepared for DTE Electric Company.

Attachments

Table 1. Comparison of Verification Sampling Results to Background Limits

Chart 1. MW-16-06 Calcium Time Series Plot

Figure 1. Site Location Map
Figure 2. Monitoring Network and Site Plan
Figure 3. Cross-Section Locator Map
Figure 4. Generalized Geologic Cross-Section A-A'
Figure 5. Generalized Geologic Cross-Section B-B'
Figure 6. Generalized Geologic Cross-Section C-C'

Attachment A. Data Quality Review

Table 1

Table 1
Comparison of Verification Sampling Results to Background Limits – May 2019
Range Road Landfill – RCRA CCR Monitoring Program
China Township, Michigan

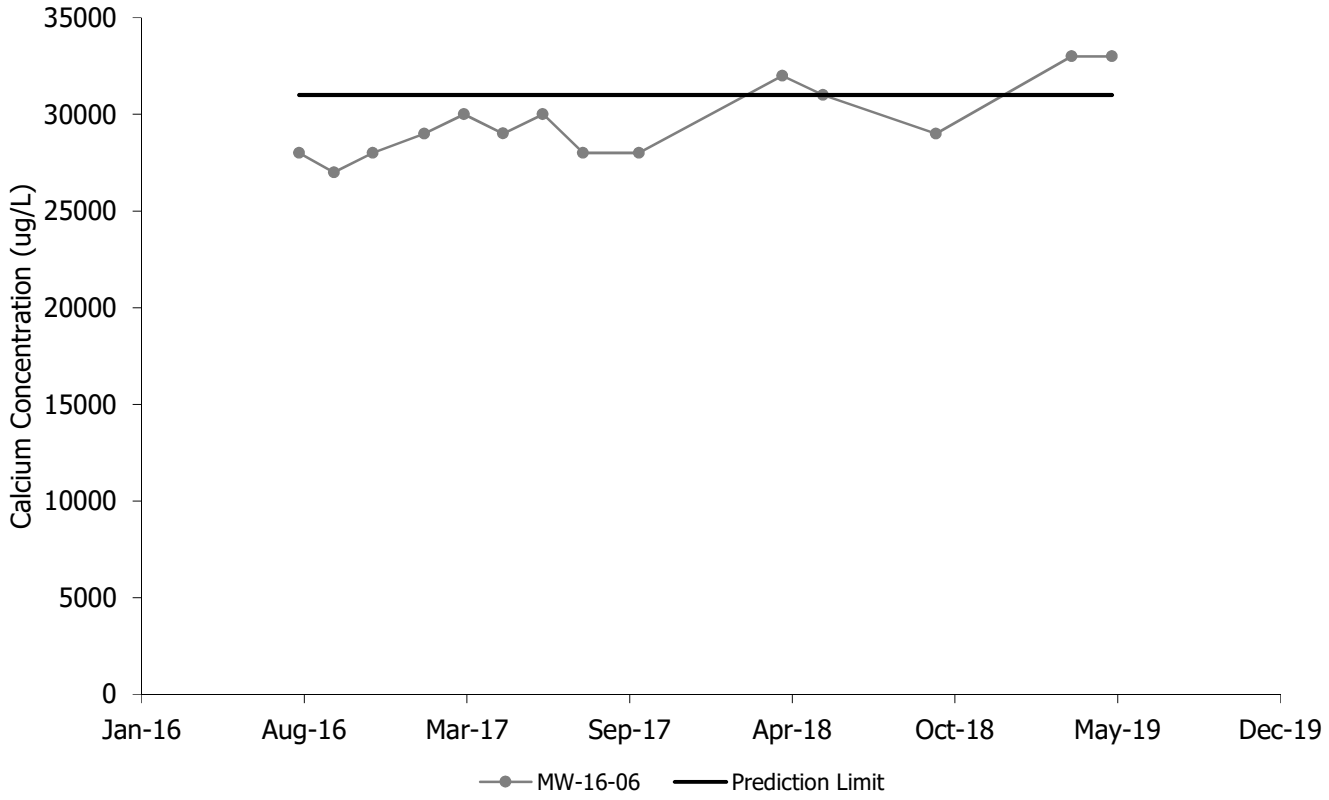
Sample Location:		MW-16-04		MW-16-06	
Sample Date:		5/8/2019		5/8/2019	
Constituent	Unit	Data	PL	Data	PL
Appendix III					
Boron	ug/L	1,100	1,100	--	1,200
Calcium	ug/L	--	67,000	**33,000**	31,000

Notes:
ug/L - micrograms per liter.
All metals were analyzed as total unless otherwise specified.
-- = not analyzed

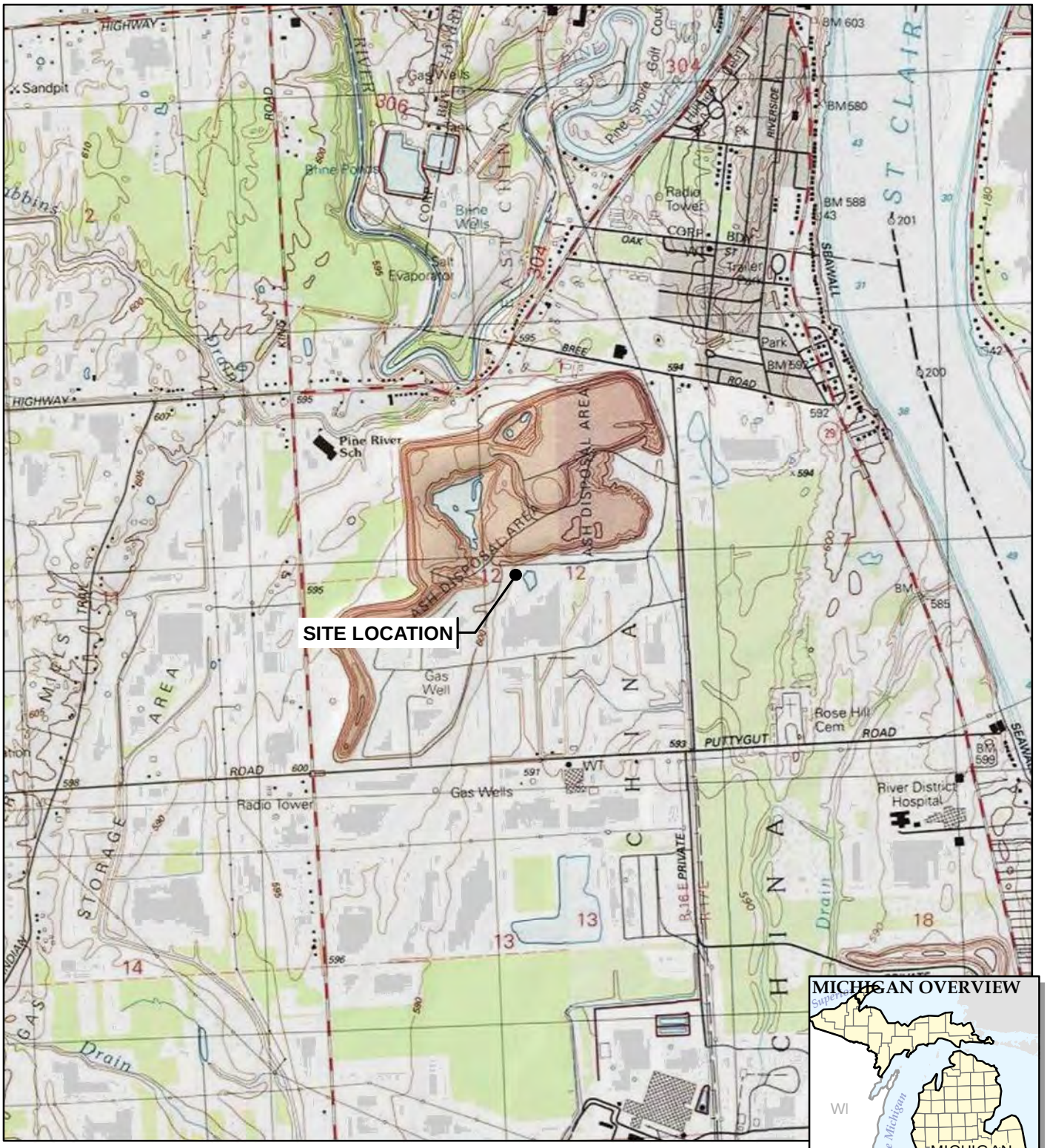
RESULT Shading and bold font indicates a confirmed exceedance of the Prediction Limit (PL).

Chart 1

Chart 1
MW-16-06 Calcium Time Series Plot
Range Road Landfill - RCRA CCR Monitoring Program



Figures



BASE MAP FROM USGS 7.5 MINUTE TOPOGRAPHIC QUADRANGLE SERIES.

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PROJECT:
DTE ELECTRIC COMPANY
RANGE ROAD LANDFILL
3600 RANGE ROAD
CHINA TOWNSHIP, MICHIGAN

TITLE:
SITE LOCATION MAP

DRAWN BY:	J PAPEZ
CHECKED BY:	S HOLMSTROM
APPROVED BY:	V BUENING
DATE:	AUGUST 2019
PROJ. NO.:	320511.0000.0000 P1 T1
FILE:	320511-001slmMB.mxd

FIGURE 1

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LEGEND

- MONITORING WELL
- SOIL BORING
- APPROXIMATE ANTICIPATED MAXIMUM LIMIT OF ASH FILL
- OIL/GAS WELL LOCATION

NOTES

1. BASE MAP IMAGERY FROM GOOGLE EARTH PRO. & PARTNERS, (3/24/2019).
2. WELL LOCATIONS SURVEYED IN MARCH AND MAY 2016 BY BMJ ENGINEERS & SURVEYORS, INC.
3. OIL AND GAS WELL LOCATIONS FROM MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY, GEOWEBFACE.

0 600 1,200 Feet

1 " = 600 '

1:7,200

PROJECT:
DTE ELECTRIC COMPANY
RANGE ROAD LANDFILL
3600 RANGE ROAD
CHINA TOWNSHIP, MICHIGAN

TITLE:
MONITORING NETWORK AND SITE PLAN

DRAWN BY:	J. PAPEZ	PROJ NO.:	320511.0000.0000 P1 T1
CHECKED BY:	S HOLMSTROM		
APPROVED BY:	V. BUENING		**FIGURE 2**
DATE:	AUGUST 2019		

1540 Eisenhower Place
Ann Arbor, MI 48108-3284
Phone: 734.971.7080
www.trccompanies.com

FILE NO.: 320511-0000-003.mxd

Plot Date: 8/6/2019, 11:30:48 AM by AADAIR -- LAYOUT: ANSI B (11"X17")
Path: E:\DTE\CCR_Sites\2017_265996\320511-0000-003.mxd
Coordinate System: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl (Foot)
Map Rotation: 0

TRC - GIS

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Coordinate System: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl (Foot)
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Plot Date: 8/6/2019, 11:36:17 AM by AADAIR -- LAYOUT: ANSI B(11"x17")
Path: E:\DTE\CCR_Sites\2017_265996\320511-0003-003.mxd

LEGEND

- MONITORING WELL
- SOIL BORING
- APPROXIMATE ANTICIPATED MAXIMUM LIMIT OF ASH FILL
- OIL/GAS WELL LOCATION
- CROSS SECTION LINES
- APPROXIMATE AQUIFER BOUNDARY
- APPROXIMATE EDGE OF BEDROCK VALLEY

NOTES

1. BASE MAP IMAGERY FROM GOOGLE EARTH PRO. & PARTNERS, (3/24/2019).
2. WELL LOCATIONS SURVEYED IN MARCH AND MAY 2016 BY BMJ ENGINEERS & SURVEYORS, INC.
3. OIL AND GAS WELL LOCATIONS FROM MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY, GEOWEBFACE.

N

0 600 1,200
Feet

1 " = 600 '
1:7,200

PROJECT:
DTE ELECTRIC COMPANY
RANGE ROAD LANDFILL
3600 RANGE ROAD
CHINA TOWNSHIP, MICHIGAN

TITLE:
CROSS SECTION LOCATOR MAP

DRAWN BY:	J. PAPEZ	PROJ NO.:	320511.0000.0000 P1 T1
CHECKED BY:	S HOLMSTROM		
APPROVED BY:	V BUENING		**FIGURE 3**
DATE:	AUGUST 2019		

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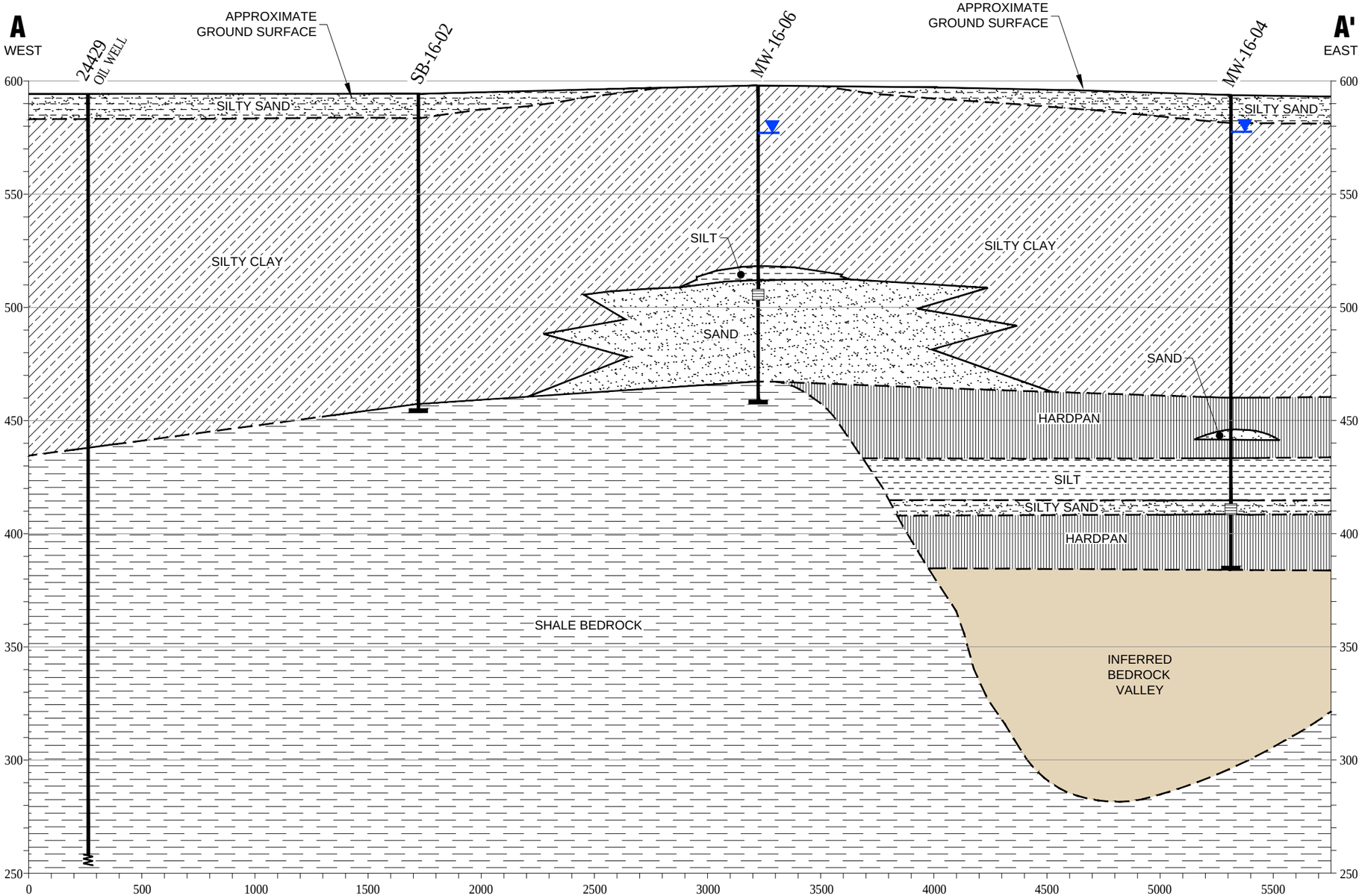
GENERALIZED GEOLOGIC CROSS-SECTION A-A'



LEGEND

- STRATEGRAPHIC BOUNDARY (DASHED WHERE INFERRED)
- GROUNDWATER ELEVATION
- SOIL BORING
- WELL SCREEN INTERVAL
- END OF BORING

Lithology Key

- SILT
- HARDPAN
- SILTY SAND
- SILTY CLAY
- SAND
- SHALE BEDROCK
- UNCONSOLIDATED BEDROCK VALLEY FILL

SCALE IN FEET
VERTICAL: 50, 0
HORIZONTAL: 0, 500

PROJECT:	DTE ELECTRIC COMPANY RANGE ROAD LANDFILL CHINA TOWNSHIP, MICHIGAN
TITLE:	GENERALIZED GEOLOGIC CROSS-SECTION A-A'
DRAWN BY: D.STEHLE	PROJ NO.: 320511.0000.01.01
CHECKED BY: S.HOLMSTROM	FIGURE 4
APPROVED BY: V.BUENING	
DATE: AUGUST 2019	

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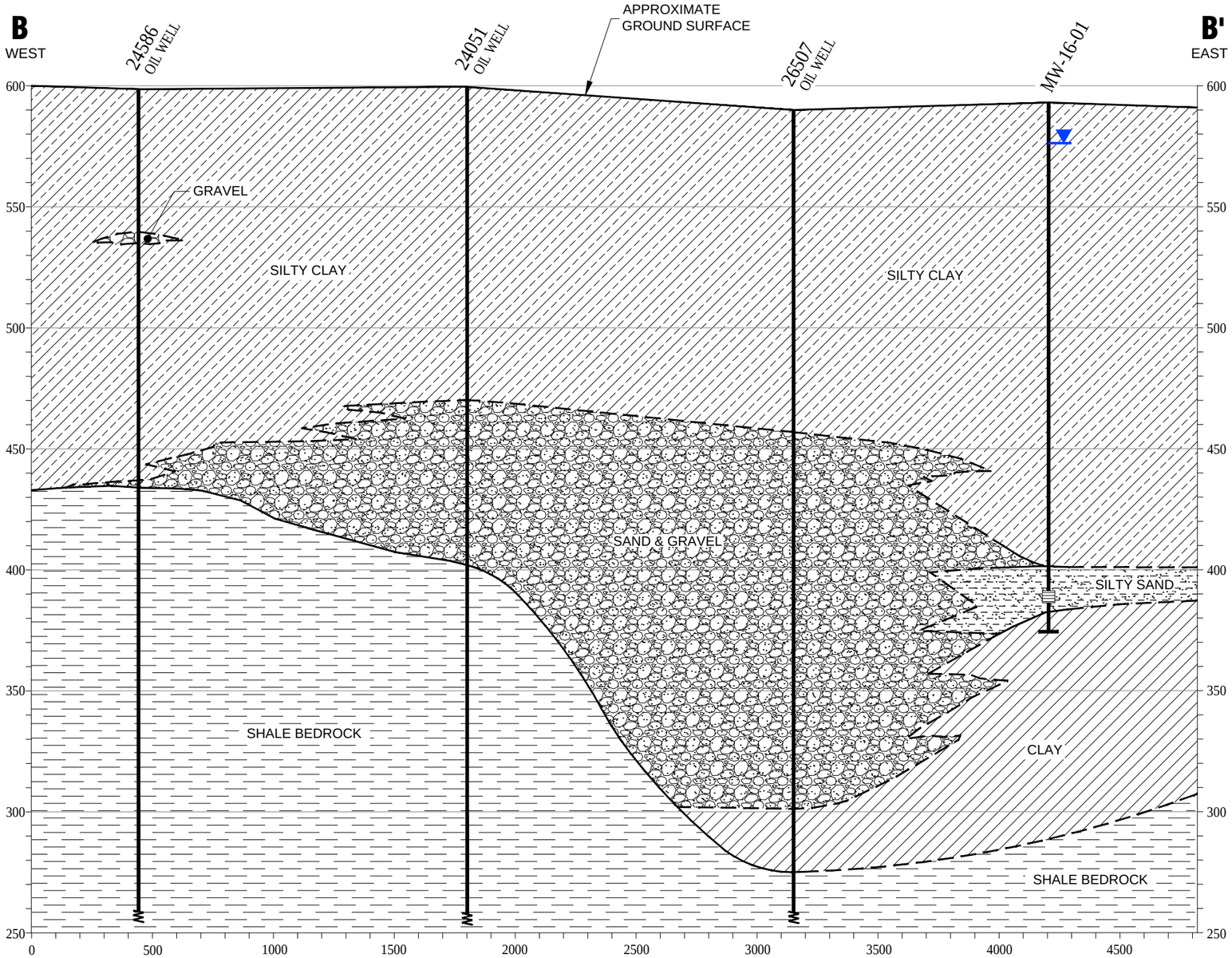
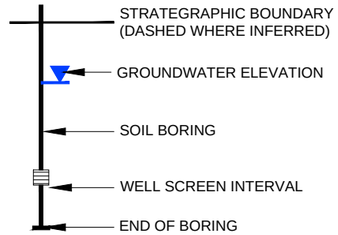
FILE NO.: 320511.0000.01.01.04-06.dwg

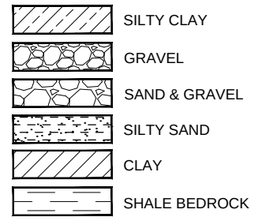
GENERALIZED GEOLOGIC CROSS-SECTION B-B'

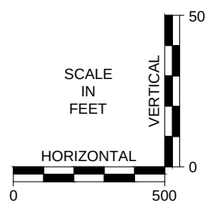


LEGEND



Lithology Key





PROJECT:
DTE ELECTRIC COMPANY
RANGE ROAD LANDFILL
CHINA TOWNSHIP, MICHIGAN

TITLE:
GENERALIZED
GEOLOGIC CROSS-SECTION B-B'

DRAWN BY:	D.STEHLE	PROJ NO.:	320511.0000.01.01
CHECKED BY:	S.HOLMSTROM		**FIGURE 5**
APPROVED BY:	V.BUENING		
DATE:	AUGUST 2019		

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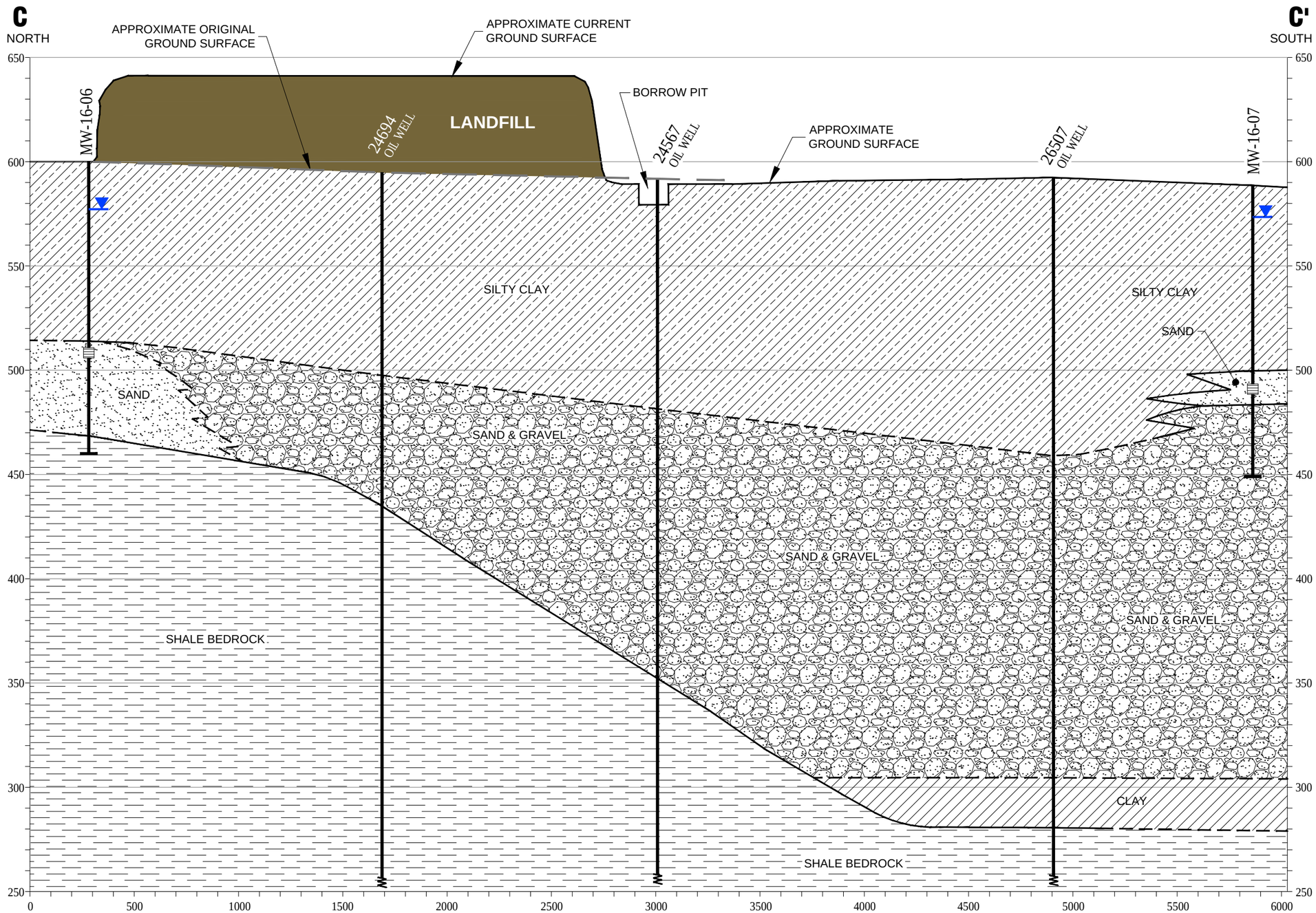
FILE NO.: 320511.0000.01.01.04-06.dwg

GENERALIZED GEOLOGIC CROSS-SECTION C-C'



LEGEND

- STRATEGRAPHIC BOUNDARY (DASHED WHERE INFERRED)
- GROUNDWATER ELEVATION
- SOIL BORING
- WELL SCREEN INTERVAL
- END OF BORING

Lithology Key

- SILTY CLAY
- SAND
- SAND & GRAVEL
- SILTY SAND
- CLAY
- SHALE BEDROCK

SCALE IN FEET
VERTICAL: 50 / 0
HORIZONTAL: 0 / 500

PROJECT:	DTE ELECTRIC COMPANY RANGE ROAD LANDFILL CHINA TOWNSHIP, MICHIGAN
TITLE:	GENERALIZED GEOLOGIC CROSS-SECTION C-C'
DRAWN BY:	D.STEHLE
CHECKED BY:	S.HOLMSTROM
APPROVED BY:	V.BUENING
DATE:	AUGUST 2019
PROJ NO.:	320511.0000.01.01
	FIGURE 6

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Attachment A
Data Quality Review

Laboratory Data Quality Review
Groundwater Monitoring Event May 2019 (Verification Sampling)
DTE Electric Company Range Road Landfill (DTE RRLF)

Groundwater samples were collected by TRC for the May 2019 sampling event. Samples were analyzed for total metals (boron, calcium) by Test America Laboratories, Inc. (Test America), located in Canton, Ohio. The laboratory analytical results are reported in laboratory report J95877-1.

During the May 2019 sampling event, a groundwater sample was collected from each of the following wells:

- MW-16-04
- MW-16-06

Each sample was analyzed for the one or more of the following constituents:

Analyte Group	Method
Total Metals	EPA 6020, EPA 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;
- 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;
- Percent recoveries for matrix spike (MS) and matrix spike duplicates (MSD). Percent recoveries are calculated for each analyte spiked and used to assess bias due to sample matrix effects;
- 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:

- Sample preparation and analysis holding time requirements were not met.
- Target analytes were not detected in the associated method blanks.
- Boron was detected in the equipment blank EB-01 (42 ug/L). Sample results for boron were >10x the equipment blank concentration; therefore, data usability was not affected.
- Dup-01 corresponds to MW-16-06 and Dup-02 corresponds to MW-16-04; RPDs between the parent and duplicate sample were within the QC limits.

Appendix B
Alternate Source Demonstration: Second 2019 Semiannual Detection Monitoring Sampling Event

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Technical Memorandum

Date: January 30, 2020

To: Chris P. Scieszka
DTE Electric Company

From: Graham Crockford, TRC
David McKenzie, TRC

Project No.: 320511.0000.0000 Phase 001, Task 001

Subject: Alternate Source Demonstration: Second 2019 Semiannual Detection Monitoring Sampling Event for the Range Road Coal Combustion Residual Landfill, China Township, 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) Range Road Coal Combustion Residual Landfill (RRLF) CCR unit.

TRC Engineers Michigan, Inc. (TRC) conducted the second 2019 semiannual detection monitoring event at the RRLF on behalf of DTE Electric on September 16through September 19, 2019, in accordance with the *CCR Groundwater Monitoring and Quality Assurance Project Plan – DTE Electric Company Range Road Landfill* (QAPP) (TRC, July 2016; revised August 2017). The semiannual groundwater monitoring event included the statistical evaluation of the detection monitoring parameters (Appendix III to Part 257 of the CCR Rule) for the RRLF CCR unit. This event was the fifth 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 2019 Appendix III indicator parameters showed potential SSIs over background for:

- Boron at MW-16-01 (580 µg/L);
- Calcium at MW-16-01 (90,000 µg/L), MW-16-02 (27,000 µg/L), MW-16-03 (22,000 µg/L), MW-16-04 (34,000 µg/L), and MW-16-06 (34,000 µg/L);

- Chloride at MW-16-07 (350 mg/L);
- Sulfate at MW-16-06 (38 mg/L); and
- Total Dissolved Solids (TDS) at MW-16-04.

However, as discussed in more detail below, verification sampling conducted in November 2019 only confirmed the SSI for calcium at MW-16-03. The calcium concentration at MW-16-06 is a continued exceedance of the prediction limit that has been demonstrated to be from natural variability and is not from the CCR unit as presented in the *Alternate Source Demonstration: First 2019 Semiannual Detection Monitoring Sampling Event for the Range Road Coal Combustion Residual Landfill, China Township, Michigan,* dated August 8, 2019. The chloride concentration at MW-16-07 is a continued exceedance of the prediction limit that has been demonstrated to be from natural variability and is not from the CCR unit as presented in the *Alternate Source Demonstration: 2017 Initial Detection Monitoring Sampling Event Range Road Coal Combustion Residual Landfill, China Township, Michigan*, dated April 12, 2018. Similarly, the boron concentration at MW-16-01 and the sulfate concentration at MW-16-06 are continued exceedances of the prediction limits and have been demonstrated to be from natural variability and are not from the CCR unit as presented in the *Alternate Source Demonstration: First 2018 Semiannual Detection Monitoring Sampling Event for the Range Road Coal Combustion Residual Landfill, China Township, Michigan*, dated August 1, 2018. 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 evaluate the potential SSIs identified in the September 2019 detection monitoring event.

Background

The RRLF is located in Section 12, Township 4 North, Range 16 East, 3600 Range Road, China Township in St. Clair County, Michigan. The site location is shown in Figure 1. The property has been used continuously as a coal ash landfill since Detroit Edison Company (now DTE Electric) began coal ash landfilling operations in the 1950s. The property consists of approximately 514 acres of which approximately 402 acres are designated for CCR landfill development, half of which is currently occupied with CCR (TRC, January 2018).

The RRLF CCR unit is initially underlain by 86 to 188 feet of laterally extensive, low hydraulic conductivity silty clay-rich deposits. A no flow boundary is formed across the western portion of the RRLF by clay-rich till which is present continuously to the top of bedrock in this area. Beneath the clay rich aquitard, a sand/gravel layer is encountered, which contains the uppermost aquifer present beneath the RRLF. This aquifer is encountered at different elevations beneath the RRLF between 86 and 196 feet below ground surface (ft bgs). As a result of site specific geologic and hydrogeologic conditions, downward migration of CCR leachate is not expected, and it is not appropriate to infer

horizontal flow directions across the site. Please refer to the Annual Report for further details regarding site-specific hydrogeology (TRC, January 2018).

The detection monitoring well network for the RRLF currently consists of 7 monitoring wells that are screened in the uppermost aquifer, and are all considered to be downgradient monitoring wells. The monitoring well locations are shown in Figure 2. The *Groundwater Monitoring System Summary Report – DTE Electric Range Road Coal Combustion Residual Landfill* (GWMS Report) details the groundwater monitoring system (TRC, October 2017).

Alternate Source Demonstration

Verification resampling was performed as recommended 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. 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 November 11 and November 12, 2019, by TRC personnel for wells MW-16-01 through MW-16-04. 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 calcium exceedance at MW-16-03. The verification results of all other Appendix III constituents were within the prediction limits; consequently, the initial SSIs of calcium at MW-16-01, MW-16-02, and MW-16-04 as well as the initial SSI of TDS at MW-16-04 from the September 2019 event were 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 calcium at MW-16-01, MW-16-02, and MW-16-04 during the September 2019 monitoring event. Similarly, no SSI will be recorded for total dissolved solids at MW-16-04.

The following discussion presents the ASD for the confirmed prediction limit exceedance for calcium at MW-16-03.

Calcium at MW-16-03: The calcium concentrations at MW-16-03, shown graphically as data points greater than the prediction limit in Chart 1, is likely the result of natural spatial variability in groundwater quality at the site and a statistical false positive, and not the result of a release from the RRLF CCR unit. Multiple lines of evidence are provided in support of this conclusion and are as follows:

- **Spatial variability in groundwater quality** – After 8 background sampling events, the prediction limit calculated for each of the 7 monitoring wells range from 19,000 micrograms per liter (µg/L) to 89,000 µg/L. This variability in groundwater quality across the site provides evidence that the

CCR unit is not the source of the confirmed calcium SSI at MW-16-03, but rather the result of regional variability.

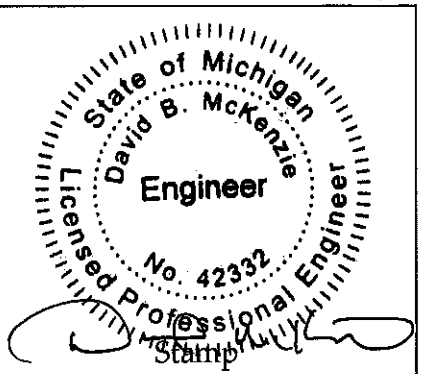
- **Insufficient background sampling timeline to account for long-term trends** – Variability in calcium concentrations observed in the groundwater at RRLF during the background sampling events provides evidence of the heterogeneity of this constituent in groundwater. The short duration of the background sampling events limits the ability of the statistical analysis to capture the natural temporal trends in the groundwater quality at the RRLF. This is a limitation of the CCR Rule implementation timeline.
- **Lack of similar increase in other indicator parameters** – The lack of SSIs for any other parameters within the same monitoring well, and across the other wells within the monitoring well network, also suggests a source other than CCR leachate for the observed sulfate SSI at this location.
- **Time of travel analysis** – The clay formation immediately beneath the RRLF CCR unit provides a natural geologic barrier to migration of CCR constituents to the underlying aquifer. The vertical extent of the clay layer beneath the CCR unit is shown in Figures 4 through 6 as cross-sections. Figure 3 shows the cross-section locations in plan view. Conservatively calculating a time of travel for liquid from the base of the RRLF through a minimum of 86 feet of clay, to the underlying upper aquifer, yields over 1,300 years of travel time (TRC, October 2017). The RRLF began accepting coal ash in approximately 1950, so, based on this analysis, there is no potential for indicator parameters to have migrated to the upper aquifer.

Conclusions and Recommendations

The information provided in this report serves as the ASD for the DTE Electric RRLF, was prepared in accordance with 40 CFR 257.94(e)(2) of the CCR Rule and demonstrates that the potential calcium SSI determined based on the second semiannual detection monitoring event performed in 2019 is 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 as per 40 CFR 257.94 at the RRLF CCR unit.

Certification Statement

I hereby certify that the alternative source demonstration presented within this document for the RRLF 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, 2021	
Company: TRC Engineers Michigan, Inc.	Date: January 30, 2020	

References

Beth A. Apple and Howard W. Reeves. 2007. Summary of Hydrogeologic Conditions by County for the State of Michigan. U.S. Geologic Survey Open-File Report. pg. 66.

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TRC Environmental Corporation. October 2017. Groundwater Monitoring System Summary Report – DTE Electric Company Range Road Coal Combustion Residual Landfill, 3600 Range Road, China Township, Michigan. Prepared for DTE Electric Company.

TRC Environmental Corporation. January 2018. Annual Groundwater Monitoring Report – DTE Electric Company Range Road Coal Combustion Residual Landfill, 3600 Range Road, China Township, Michigan. Prepared for DTE Electric Company.

TRC Environmental Corporation. April 2018. Alternate Source Demonstration: 2017 Initial Detection Monitoring Sampling Event Range Road Coal Combustion Residual Landfill, China Township, Michigan. Prepared for DTE Electric Company.

TRC Environmental Corporation. August 2018. Alternate Source Demonstration: First 2018 Semiannual Detection Monitoring Sampling Event for the Range Road Coal Combustion Residual Landfill, China Township, Michigan. Prepared for DTE Electric Company.

TRC Environmental Corporation. August 2019. Alternate Source Demonstration: First 2019 Semiannual Detection Monitoring Sampling Event for the Range Road Coal Combustion Residual Landfill, China Township, Michigan. Prepared for DTE Electric Company.

Attachments

Table 1. Comparison of Verification Sampling Results to Background Limits

Chart 1. MW-16-03 Calcium Time Series Plot

Figure 1. Site Location Map
Figure 2. Monitoring Network and Site Plan
Figure 3. Cross-Section Locator Map
Figure 4. Generalized Geologic Cross-Section A-A'
Figure 5. Generalized Geologic Cross-Section B-B'
Figure 6. Generalized Geologic Cross-Section C-C'

Attachment A. Data Quality Review

Table

Table 1
Comparison of Verification Sampling Results to Background Limits – November 2019
Range Road Landfill – RCRA CCR Monitoring Program
China Township, Michigan

Sample Location:		MW-16-01		MW-16-02		MW-16-03		MW-16-04	
Sample Date:		11/11/2019	PL	11/11/2019	PL	11/11/2019	PL	11/12/2019	PL
Constituent	Unit	Data		Data		Data		Data	
Appendix III									
Calcium	ug/L	77,000	89,000	21,000	24,000	**33,000**	21,000	65,000	67,000
Total Dissolved Solids	mg/L	--	1,300	--	1,200	--	1,200	4,300	5,300

Notes:

ug/L - micrograms per liter.

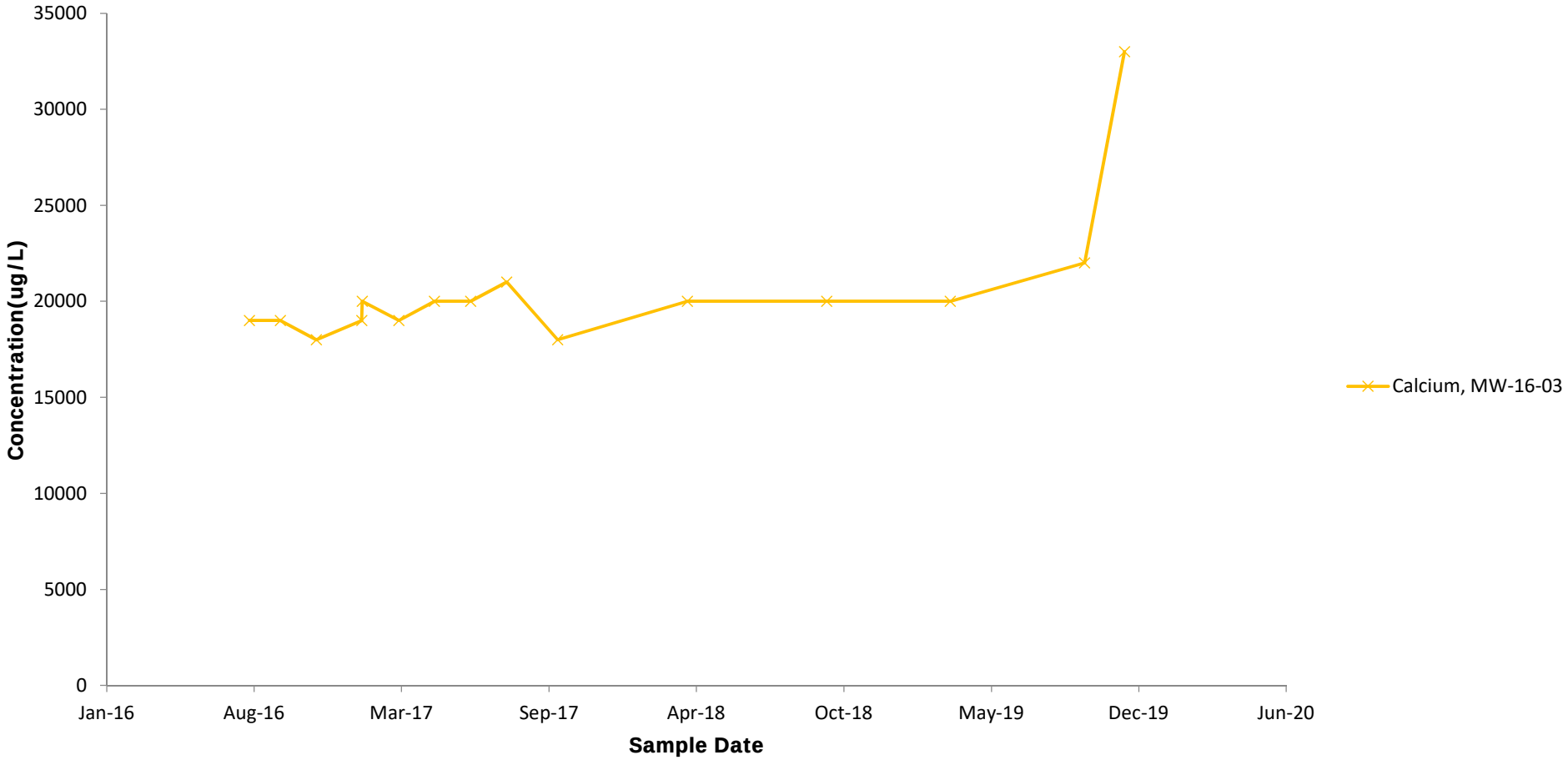
mg/L - milligrams per liter.

All metals were analyzed as total unless otherwise specified.

-- = not analyzed

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

Chart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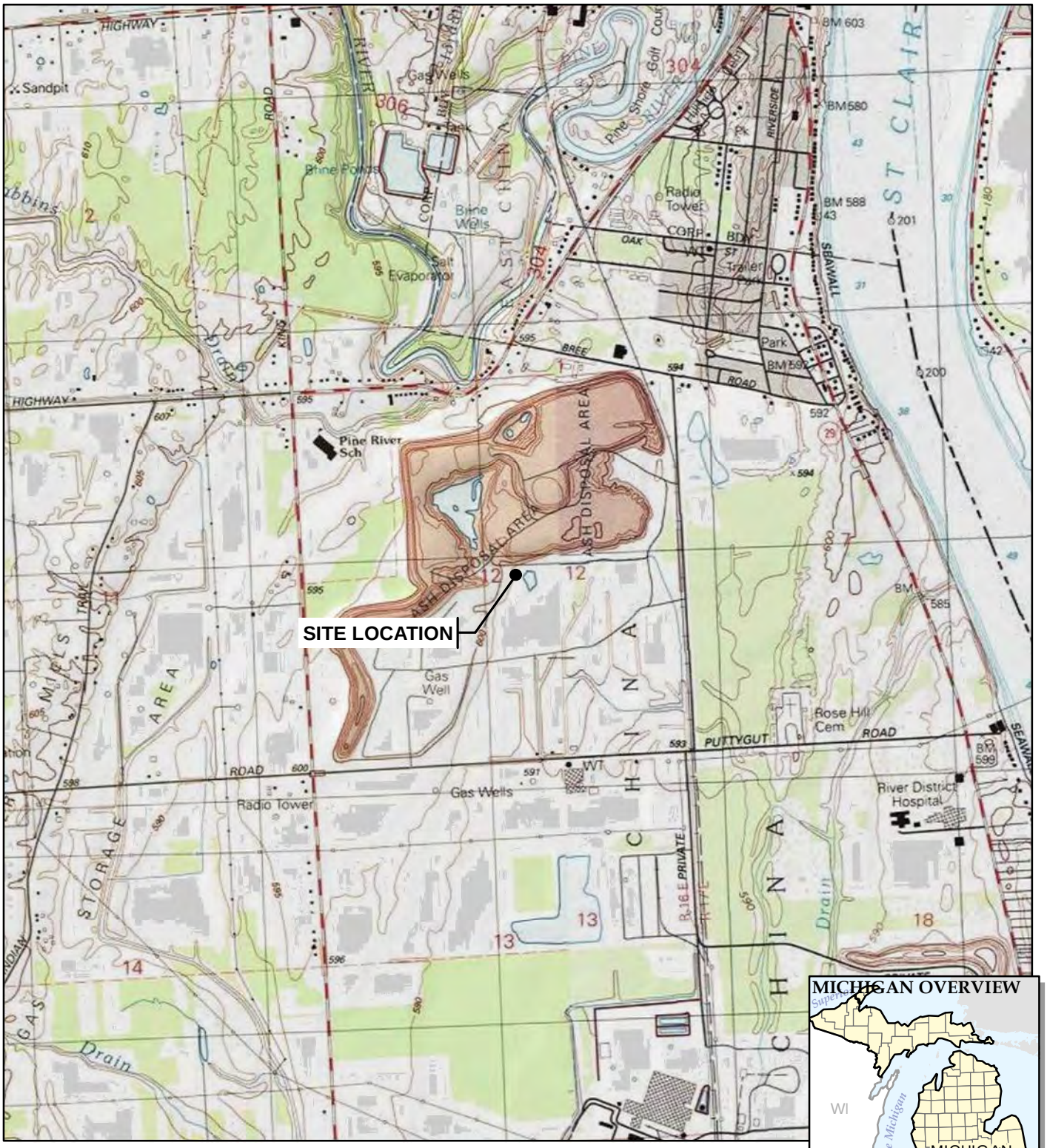
30000
25000
20000
15000
10000
5000
0
Concentration(ug/L)
Jan-16
Aug-16
Mar-17
Sep-17
Apr-18
Oct-18
May-19
Dec-19
Jun-20
Sample Date
Calcium, MW-16-03

Figures



BASE MAP FROM USGS 7.5 MINUTE TOPOGRAPHIC QUADRANGLE SERIES.

N

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

0 2,000 4,000
FEET

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TITLE:
SITE LOCATION MAP

DRAWN BY:	J PAPEZ
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APPROVED BY:	V BUENING
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FILE:	320511-001slmMB.mxd

FIGURE 1

E:\DTE\CCR_Sites\2016_231828\320511-001slmMB.mxd -- Saved By: AADAIR on 8/6/2019, 10:26:08 AM

LEGEND

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0 600 1,200 Feet

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CHECKED BY:	S HOLMSTROM		
APPROVED BY:	V. BUENING		**FIGURE 2**
DATE:	AUGUST 2019		

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2. WELL LOCATIONS SURVEYED IN MARCH AND MAY 2016 BY BMJ ENGINEERS & SURVEYORS, INC.
3. OIL AND GAS WELL LOCATIONS FROM MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY, GEOWEBFACE.

N

0 600 1,200
Feet

1 " = 600 '
1:7,200

PROJECT:
DTE ELECTRIC COMPANY
RANGE ROAD LANDFILL
3600 RANGE ROAD
CHINA TOWNSHIP, MICHIGAN

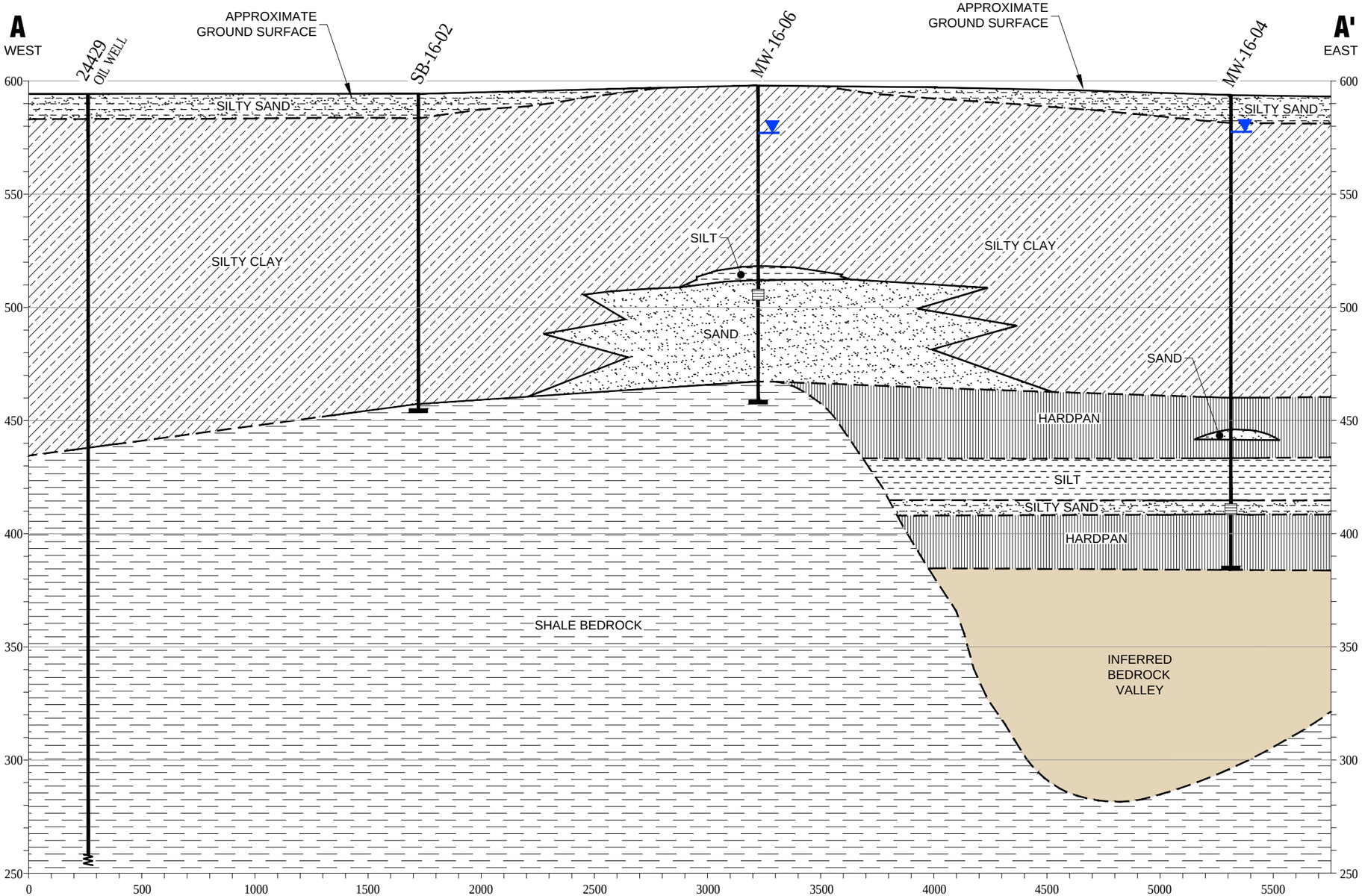
TITLE:
CROSS SECTION LOCATOR MAP

DRAWN BY:	J. PAPEZ	PROJ NO.:	320511.0000.0000 P1 T1
CHECKED BY:	S HOLMSTROM		
APPROVED BY:	V BUENING		**FIGURE 3**
DATE:	AUGUST 2019		

TRC
1540 Eisenhower Place
Ann Arbor, MI 48108-3284
Phone: 734.971.7080
www.trccompanies.com

FILE NO.: 320511-0003-003.mxd

GENERALIZED GEOLOGIC CROSS-SECTION A-A'



LEGEND

- STRATEGRAPHIC BOUNDARY (DASHED WHERE INFERRED)
- GROUNDWATER ELEVATION
- SOIL BORING
- WELL SCREEN INTERVAL
- END OF BORING

Lithology Key

- SILT
- HARDPAN
- SILTY SAND
- SILTY CLAY
- SAND
- SHALE BEDROCK
- UNCONSOLIDATED BEDROCK VALLEY FILL

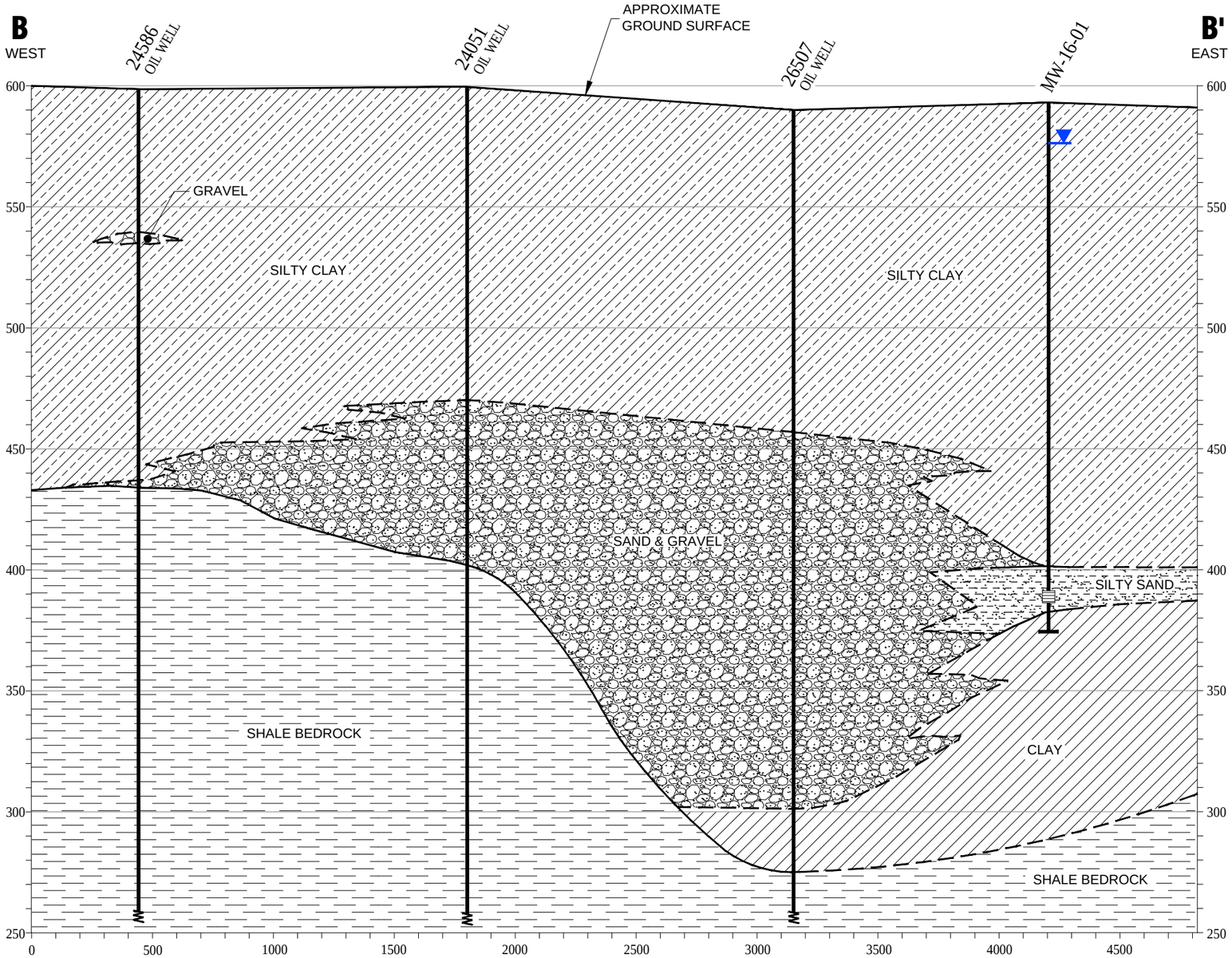
SCALE IN FEET
VERTICAL: 50, 0
HORIZONTAL: 0, 500

PROJECT:	DTE ELECTRIC COMPANY RANGE ROAD LANDFILL CHINA TOWNSHIP, MICHIGAN
TITLE:	GENERALIZED GEOLOGIC CROSS-SECTION A-A'
DRAWN BY: D.STEHLE	PROJ NO.: 320511.0000.01.01
CHECKED BY: S.HOLMSTROM	FIGURE 4
APPROVED BY: V.BUENING	
DATE: AUGUST 2019	

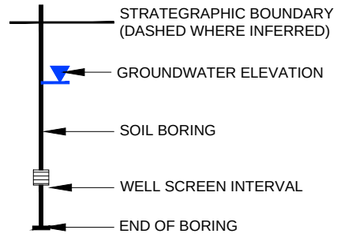
TRC
1540 Eisenhower Place
Ann Arbor, MI 48108
Phone: 734.971.7080
www.trccompanies.com

FILE NO.: 320511.0000.01.01.04-06.dwg

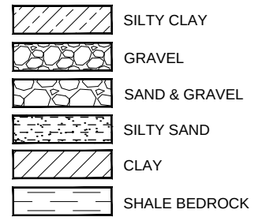
GENERALIZED GEOLOGIC CROSS-SECTION B-B'

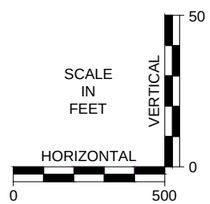


LEGEND



Lithology Key





PROJECT:
DTE ELECTRIC COMPANY
RANGE ROAD LANDFILL
CHINA TOWNSHIP, MICHIGAN

TITLE:
GENERALIZED
GEOLOGIC CROSS-SECTION B-B'

DRAWN BY:	D.STEHLE	PROJ NO.:	320511.0000.01.01
CHECKED BY:	S.HOLMSTROM		**FIGURE 5**
APPROVED BY:	V.BUENING		
DATE:	AUGUST 2019		

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Phone: 734.971.7080
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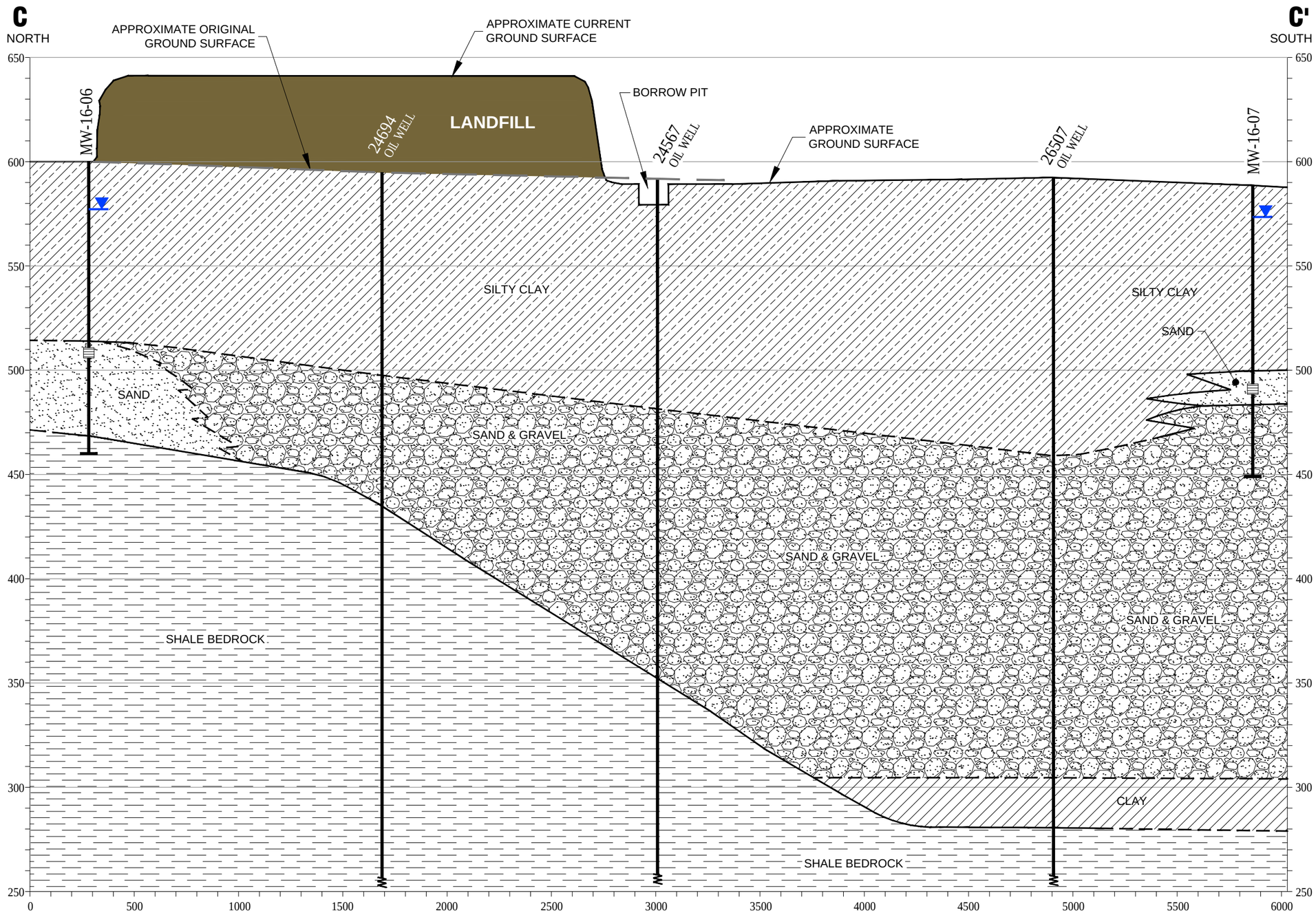
FILE NO.: 320511.0000.01.01.04-06.dwg

GENERALIZED GEOLOGIC CROSS-SECTION C-C'



LEGEND

- STRATEGRAPHIC BOUNDARY (DASHED WHERE INFERRED)
- GROUNDWATER ELEVATION
- SOIL BORING
- WELL SCREEN INTERVAL
- END OF BORING

Lithology Key

- SILTY CLAY
- SAND
- SAND & GRAVEL
- SILTY SAND
- CLAY
- SHALE BEDROCK

SCALE IN FEET
VERTICAL: 50 / 0
HORIZONTAL: 0 / 500

PROJECT:	DTE ELECTRIC COMPANY RANGE ROAD LANDFILL CHINA TOWNSHIP, MICHIGAN
TITLE:	GENERALIZED GEOLOGIC CROSS-SECTION C-C'
DRAWN BY:	D.STEHLE
CHECKED BY:	S.HOLMSTROM
APPROVED BY:	V.BUENING
DATE:	AUGUST 2019
PROJ NO.:	320511.0000.01.01
	FIGURE 6

TRC
1540 Eisenhower Place
Ann Arbor, MI 48108
Phone: 734.971.7080
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FILE NO.: 320511.0000.01.01.04-06.dwg

Attachment A
Data Quality Review

Laboratory Data Quality Review
Groundwater Monitoring Event 2nd Semiannual Verification
DTE Electric Company Range Road Landfill (DTE RRLF)

Groundwater samples were collected by TRC for the 2nd semiannual 2019 verification sampling event. Samples were analyzed for total calcium and total dissolved solids by Euorfins-Test America Laboratories, Inc. (Euorfins-TA), located in North Canton, Ohio. The laboratory analytical results are reported in laboratory report J122292-1.

During the 2nd semiannual verification sampling event, a groundwater sample was collected from each of the following wells:

- MW-16-01
- MW-16-02
- MW-16-03
- MW-16-04

Each sample was analyzed for the following constituents:

Analyte Group	Method
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), where applicable. 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, where applicable. 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:

- TDS was detected in the equipment blank (EB-01_20191111) at 61 mg/L. The concentration in the equipment blank was less than 10 times sample concentrations, therefore there is no false positive associated with the blank contamination.
- Target analytes were not detected in the method blanks.
- LCS recoveries for all target analytes were within laboratory control limits.
- MS/MSD analyses were not performed for the anions, or calcium analyses as required by the QAPP.
- Laboratory duplicates were not performed for the TDS analysis as required by the QAPP.
- Dup-01 corresponds with MW-16-04; relative percent differences (RPDs) between the parent and duplicate sample were within the QC limits.

Appendix C
Data Quality Reviews

Laboratory Data Quality Review
Groundwater Monitoring Event March 2019
DTE Electric Company Range Road Landfill (DTE RRLF)

Groundwater samples were collected by TRC for the March 2019 sampling event. Samples were analyzed for anions, boron, calcium, 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 240-109802-1.

During the March 2019 sampling event, a groundwater sample was collected from each of the following wells:

- MW-16-01
- MW-16-02
- MW-16-03
- MW-16-04
- MW-16-05
- MW-16-06
- MW-16-07

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), if applicable. 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, if applicable. 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:

- The holding time for TDS for samples MW-16-04, MW-16-05, MW-16-06, and DUP-01 exceeded the 7-day holding time criteria by approximately 30 minutes to 3 hours. These results are estimated and may be biased low.
- Target analytes were not detected in the equipment blank (EB-01_20190318).
- Target analytes were not detected in the method blanks.
- LCS recoveries for all target analytes were within laboratory control limits.
- Sample Dup-01 corresponds with sample MW-16-05; relative percent differences (RPDs) between the parent and duplicate sample were within the QC limits, except for calcium which had an RPD of 36%. The calcium results in all the samples in this data set, except sample EB-01_20190318, are estimated with an unknown directional bias (see Table 1).

- The reporting limit (5.0 mg/L) for the nondetect sulfate result in sample MW-16-04 was above the project QAPP-specified RL (1.0 mg/L) due to a 5-fold dilution which was performed because of a difficult matrix.
- MS/MSD analyses were not performed for boron, calcium, and anions in this SDG. Per the project QAPP, MS/MSD analyses are required for boron, calcium, and anions at a frequency of 1 per 20 samples.
- Laboratory duplicate analyses were not performed for TDS. Per the project QAPP, laboratory duplicate analyses are required for TDS at a frequency of 1 per 20 samples.

Laboratory Data Quality Review
Groundwater Monitoring Event May 2019 (Verification Sampling)
DTE Electric Company Range Road Landfill (DTE RRLF)

Groundwater samples were collected by TRC for the May 2019 sampling event. Samples were analyzed for total metals (boron, calcium) by Test America Laboratories, Inc. (Test America), located in Canton, Ohio. The laboratory analytical results are reported in laboratory report J95877-1.

During the May 2019 sampling event, a groundwater sample was collected from each of the following wells:

- MW-16-04
- MW-16-06

Each sample was analyzed for the one or more of the following constituents:

Analyte Group	Method
Total Metals	EPA 6020, EPA 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;
- 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;
- Percent recoveries for matrix spike (MS) and matrix spike duplicates (MSD). Percent recoveries are calculated for each analyte spiked and used to assess bias due to sample matrix effects;
- 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:

- Sample preparation and analysis holding time requirements were not met.
- Target analytes were not detected in the associated method blanks.
- Boron was detected in the equipment blank EB-01 (42 ug/L). Sample results for boron were >10x the equipment blank concentration; therefore, data usability was not affected.
- Dup-01 corresponds to MW-16-06 and Dup-02 corresponds to MW-16-04; RPDs between the parent and duplicate sample were within the QC limits.

Laboratory Data Quality Review
Groundwater Monitoring Event September 2019
DTE Electric Company Range Road Landfill (DTE RRLF)

Groundwater samples were collected by TRC for the September 2019 sampling event. Samples were analyzed for anions, total boron, total calcium, and total dissolved solids by Euorfins-Test America Laboratories, Inc. (Euorfins-TA), located in North Canton, Ohio. The laboratory analytical results are reported in laboratory reports 240-119144-1 and 240-119405-1.

During the September 2019 sampling event, a groundwater sample was collected from each of the following wells:

- MW-16-01
- MW-16-02
- MW-16-03
- MW-16-04
- MW-16-05
- MW-16-06
- MW-16-07

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), where applicable. 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, where applicable. 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 equipment blank (EB-01_20190916).
- Target analytes were not detected in the method blanks.
- LCS recoveries for all target analytes were within laboratory control limits.
- MS/MSD analyses were not performed for the anions, boron, or calcium analyses as required by the QAPP.
- Laboratory duplicates were not performed for the TDS analysis as required by the QAPP.
- Dup-01 corresponds with MW-16-01; relative percent differences (RPDs) between the parent and duplicate sample were within the QC limits.
- The nondetect reporting limits (RLs) for sulfate in samples MW-16-03 (10 mg/L) and MW-16-04 (5 mg/L) were above the project-specified RL (1 mg/L) due to dilutions required due

to the elevated concentration of chloride in these samples. The project-specified RL was not met for sulfate in these two samples.

Laboratory Data Quality Review
Groundwater Monitoring Event November 2019
DTE Electric Company Range Road Landfill (DTE RRLF)

Groundwater samples were collected by TRC for the November 2019 sampling event. Samples were analyzed for calcium 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 240-122292-1.

During the November 2019 sampling event, a groundwater sample was collected from each of the following wells:

- MW-16-01
- MW-16-02
- MW-16-03
- MW-16-04

Each sample was analyzed for the following constituents:

Analyte Group	Method
Total Recoverable 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:

- TDS were detected in the equipment blank (EB-01_20191111) but did not affect sample results.
- Target analytes were not detected in the method blanks.
- LCS recoveries for all target analytes were within laboratory control limits.
- MS/MSD analyses were not performed on a sample from the data set.
- Laboratory duplicate analyses were not performed for the TDS analysis as required by the QAPP.
- DUP-01 corresponds with MW-16-04; RPDs between the parent and duplicate sample were within the QC limits.