REPORT

2019 Annual Groundwater Monitoring & Corrective Action Report

JB Sims Generating Station

Submitted to:

Grand Haven Board of Light and Power

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Submitted by:

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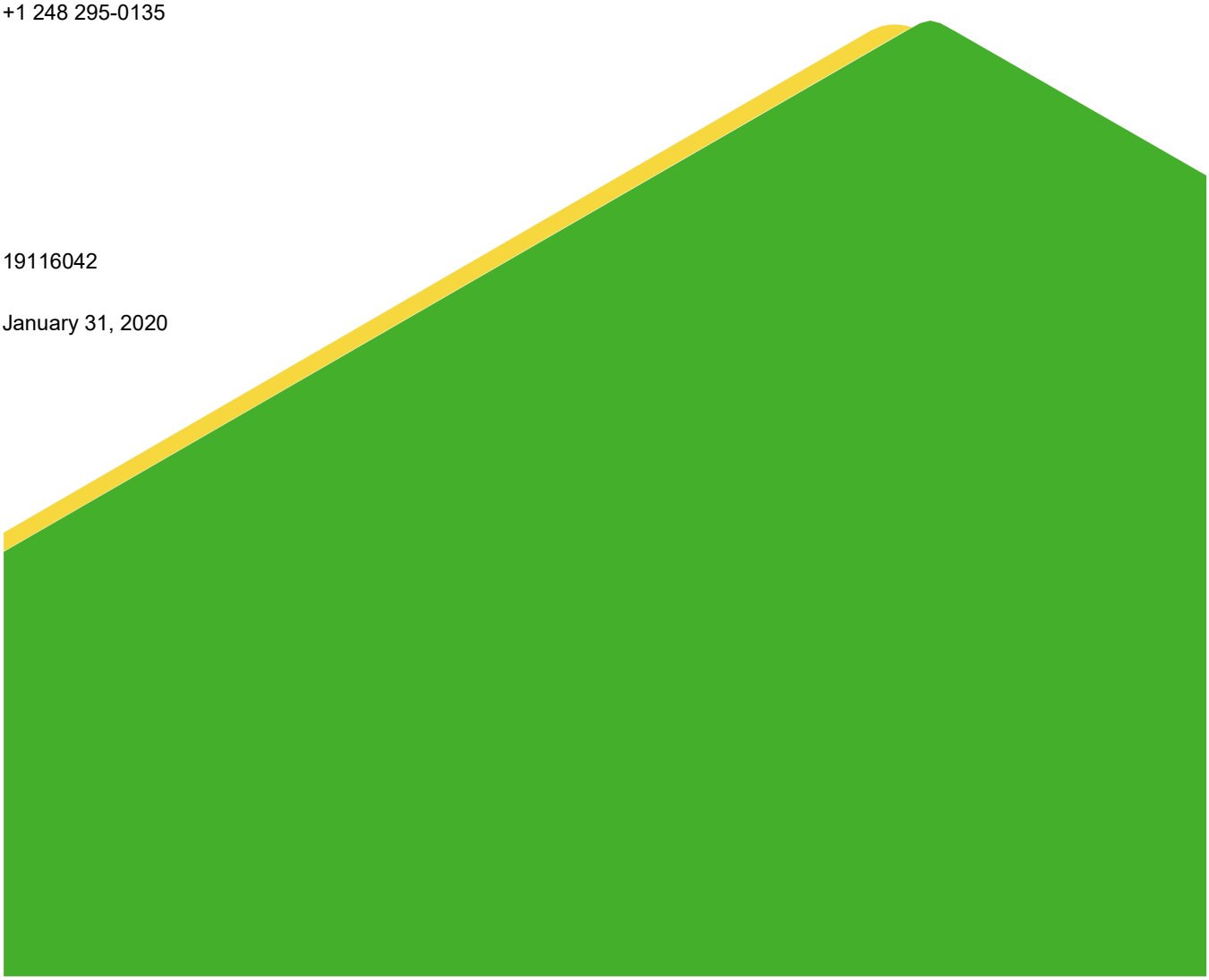

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January 31, 2020

Distribution List

Michigan Department of Environment, Great Lakes, and Energy

Grand Haven Board of Light and Power

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User Note: This Table of Contents section acts as a reference point for the Record of Issue, Executive Summary and Study Limitations sections as and when they might be required.

Certification

This *2019 Annual Groundwater Monitoring & Corrective Action Report, JB Sims Generating Station (JB Sims)* has been prepared to comply with the State of Michigan enacted Public Act No. 640 of 2018 (PA 640) to amend the Natural Resources and Environmental Protection Act, also known as Part 115 of PA 451 of 1994, as amended (Part 115 amendment) as well as the United States Environmental Protection Agency (USEPA) coal combustion residual (CCR) rule (40 Code of Federal Regulations [CFR] 257 Subpart D; published in 80 FR 21302-21501, April 17, 2015) under the direction of an Engineer licensed in the State of Michigan as well as a certified professional geologist with Golder Associates Inc. (Golder).

Golder Associates Inc.

Dawn L. Prell, CPG
Senior Hydrogeologist

I hereby certify that this *2019 Annual Groundwater Monitoring & Corrective Action Report, JB Sims Generating Station CCR Units 1/2 inactive Ash Impoundments and Unit 3 active East (A) and West (B) Bottom Ash Impoundments* located at 1231 North Third Street in Grand Haven, Michigan, has been prepared to meet the requirements of the Part 115 amendment and 40 CFR §257.90(e).

Golder Associates Inc.

STATE OF MICHIGAN
TIFFANY D. JOHNSON
ENGINEER NO. 49160
LICENSED PROFESSIONAL ENGINEER

January 31, 2020

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1.0 INTRODUCTION

In accordance with the United States Environmental Protection Agency (USEPA) coal combustion residual (CCR) rule (40 Code of Federal Regulations [CFR] 257 Subpart D; published in 80 FR 21302-21501, April 17, 2015) and the State of Michigan Public Act No. 640 of 2018 (PA 640) to amend the Natural Resources and Environmental Protection Act, also known as Part 115 of PA 451 of 1994, as amended (Part 115 amendment), this *2019 Annual Groundwater Monitoring and Corrective Action Report* has been prepared to document groundwater monitoring activities conducted at the JB Sims Generating Station CCR surface impoundment units, the inactive Unit 1/2 Ash Impoundments and the active Unit 3 East (A) and West (B) Bottom Ash impoundments (Bottom Ash Impoundments), and satisfies the requirements of 40 CFR §257.90(e) and the Part 115 amendment. Groundwater monitoring and reporting for the CCR units is performed in accordance with the requirements of 40 CFR §257.90 through §257.98 and the Part 115 amendment. This report documents the activities completed to establish the groundwater monitoring program and actions through the 2019 calendar year.

1.1 Site Description and Background

JB Sims Generating Station (Plant) is located on the southwestern portion of Harbor Island in Grand Haven, Michigan, and is operated by the Grand Haven Board of Light and Power (GHBLP). The Plant is situated on Harbor Island with the Grand River and South Channel of the Grand River surrounding the island. The flow of the Grand River and South Channel of the Grand River flow is a westerly direction towards Lake Michigan, which is about one mile west of the site. Figure 1, Site Location Map, depicts the location of the Plant relative to the surrounding area.

The Plant is a coal-fired power generation facility. CCRs are currently only placed into the active Bottom Ash Impoundments located onsite. The Bottom Ash Impoundments are located adjacent to each other and are formed by earthen embankments or ring dikes with a common embankment between them. The impoundment areas range from 175 to 190 feet long by 71 to 80 feet wide with an approximate surface area of 0.2 and 0.3 acres for the east and west impoundments, respectively. The Units 1/2 inactive Ash Impoundments no longer receive CCR. Figure 2, Site Plan and Monitoring Well Location Map depicts the general configuration of the CCR units and site monitoring wells.

The Plant is scheduled to cease operations in February/March 2020 and the CCR impoundments removed by the end of 2020.

1.2 Regional Geology and Hydrogeologic Setting

The following paragraphs include a general description of regional geologic and hydrogeologic characteristics of formations that occur beneath the site. Information presented in this section is based on published literature, and Golder's experience working in this geologic terrain.

As described in the Groundwater Monitoring System Certification, prepared by ERM dated November 2017, the Plant is located in an area of glacial drift (consisting of fine to medium sand with occasional beds of gravel) which is underlain by Marshall Sandstone. The glacial drift is between 100 to 200 feet thick in the area.

The CCR unit borings consist of unconsolidated fine sand with intervals of silt and sand within the first 20 feet below ground surface (bgs). The fine sand was underlain by silt and clay to the bottom of each boring. The silt and clay represent the confining unit beneath the CCR units (ERM, 2017).

Groundwater was encountered in the fine sand located above the silt and clay unit. As described in the Groundwater Monitoring System Certification, prepared by Environmental Resources Management Michigan, Inc. (ERM) (ERM, 2017), sand in the uppermost aquifer assumes an effective porosity of 30 percent (%) and consists of poorly-graded fine sand with an estimated hydraulic conductivity of 27 feet per day and well-graded fine sand with an estimated hydraulic conductivity of 53 feet per day.

1.3 Groundwater Monitoring Well Network

Pursuant to 40CFR §257.91 as well as the Part 115 amendment, GHBLP installed a groundwater monitoring system within the uppermost aquifer for CCR Units 1/2 inactive Ash Impoundments and Unit 3 active East (A) and West (B) Bottom Ash Impoundments. The multi-unit monitoring system is installed to monitor groundwater passing the CCR unit boundary of the ash impoundments within the uppermost aquifer. Wells are located to serve as upgradient, background, and downgradient wells based on groundwater flow direction as determined by the potentiometric surface elevation contour maps.

The original monitoring well network was certified by ERM in the Groundwater Monitoring System Certification, dated November 2017. A network of four monitoring wells was installed in January 2017 for groundwater monitoring near Unit 3 active East (A) and West (B) Bottom Ash Impoundments. It was later determined that in accordance with 40 CFR §257.90(a), Units 1/2 inactive Ash Impoundments are subject to the groundwater monitoring and corrective action requirements listed under 40 CFR §257.90 through §257.98. In response a multi-unit monitoring system has been identified for JB Sims. The revised network was established and is capable of detecting monitored constituents at the waste boundary of the CCR units.

In addition, GHBLP submitted a Hydrogeologic Monitoring Plan (HMP) for JB Sims that included additional wells to the multi-unit network in accordance 40CFR §257.91 as well as the Part 115 amendment. The HMP is currently being evaluated following the initial review and comments received by EGLE. The revised multi-unit monitoring well network consisting of six detection monitoring wells (one background and five downgradient), one assessment monitoring well, and three piezometers is in place for groundwater monitoring near Units 1/2 inactive Ash Impoundments and Unit 3 active East (A) and West (B) Bottom Ash Impoundments. Table 1, Monitoring Well Network Summary, includes the pertinent construction details for the CCR Units monitoring well network at JB Sims. The above described revised multi-unit monitoring well network is included in this annual report and therefore has been certified by an Engineer licensed in the State of Michigan to meet the requirements of 40 CFR §257.91.

2.0 GROUNDWATER MONITORING ACTIVITIES

In accordance with 40 CFR §257.90(e) and the Part 115 amendment, the following describes monitoring-related activities performed during the preceding year and discusses any change in status of the monitoring program. Groundwater sampling was performed in accordance with 40 CFR §257.93 and the Part 115 amendment. Samples were collected from each well in the certified monitoring system. The location of each of these monitoring wells is shown on Figure 2.

Table 2, Groundwater Sampling Event Summary, presents a summary of groundwater sampling events completed for CCR Units 1/2 inactive Ash Impoundments and Unit 3 active East (A) and West (B) Bottom Ash Impoundments. Sampling events were conducted in March and September 2019. Results of sampling activities conducted in 2019 are presented in Appendix A, Analytical Results and Field Sampling Forms.

2.1 Monitoring Well Installation and Maintenance

In accordance with 40 CFR §257.91, a groundwater monitoring system was installed that (1) consists of a sufficient number of wells, (2) installed at appropriate locations and depths to yield groundwater samples from the uppermost aquifer, and (3) meets the performance standards of 40 CFR §257.91(a). In summary, monitoring well-related activities included the following:

- Visual inspection of well conditions prior to sampling, recording the site conditions, and performing exterior maintenance to perform sampling under safe and clean conditions.
- Installation of additional site monitoring wells and piezometers. Specifically, monitoring wells MW-09 and MW-10 were installed to further evaluate the nature and extent of groundwater impacts and to supplement the groundwater monitoring well network. The additional site monitoring wells and pertinent construction details is presented on Table 1.
- Installation of staff gauges. Specifically, staff gauges SW-01 through SW-06 were installed to further evaluate the hydrogeologic conditions at the site. The staff gauges and pertinent construction details are presented in Table 1.
- Advancement of one soil boring in the vicinity of background monitoring well MW-07 identified as SB-01. As part of the assessment of corrective measures (ACM), a soil sample was submitted for a seven-step sequential extraction. In addition, soil samples were collected from the additional monitoring wells MW-09 and MW-10. Data collected as part of the ACM will be summarized and included in the *Response Action Plan*.
- Conducted a site wide survey of the monitoring wells and staff gauges located at the Site.

2.2 Assessment Monitoring

Pursuant to 40 CFR §257.94(e)(3), an assessment monitoring program has been established for the CCR units at JB Sims based on statistically significant increases originally documented in the *2017 Annual Groundwater Monitoring and Corrective Action Report,* (Golder, 2018). A notice of assessment monitoring was placed in the operation record on May 15, 2018.

As per the requirements of 40 CFR §257.95 and the Michigan Part 115 Amendment, sampling, analyses and statistical evaluation of assessment monitoring constituents was performed for each sampling event in 2019. Results of the assessment monitoring are discussed in Section 4.0 and presented in Appendix A.

2.3 Background & Additional Sampling

The revised multi-unit monitoring well network includes the addition of monitoring well MW-09 for assessment monitoring. The first sampling event was conducted in September 2019. Additionally, site monitoring wells were sampled for a subset of cations/anions to aid in geochemical fingerprinting of the site groundwater. Results of these analyses are provided in Appendix A. These data are being evaluated as part of the ACM.

3.0 SAMPLE METHODOLOGY & ANALYSIS

Sampling events completed during 2019 for the CCR units at JB Sims represent both background data collection and assessment monitoring events. The following sections discuss each of the sampling events conducted during 2019.

3.1 Groundwater Level Measurement

Prior to each sampling event, groundwater elevations were recorded from the certified well. Groundwater elevations are summarized in Table 3, 2019 Groundwater Elevation Summary. The March 27, 2019 and September 9, 2019 elevation data were used to develop potentiometric surface elevation contour maps (Figure 3, Potentiometric Surface Elevation Contour Map – March 2019 and Figure 4, Potentiometric Surface Elevation Contour Map – September 2019). The elevation data collected on September 27 and September 30 was not used to generate potentiometric surface elevation contour map, since the locations were not collected on the same day. JB Sims initiated additional water level measurements twice per month beginning with November 1, 2019. Therefore, in addition to the two semiannual monitoring events, JB Sims conducted four additional water level measurement events, provided in Appendix B. There is a groundwater contour ridge identified between Units 1/2 inactive Ash Impoundments and Unit 3 active East (A) and West (B) Bottom Ash Impoundments. The general direction of groundwater flow is from the ridge west toward the Grand River and from the ridge east, with the exception of the late summer early fall. The groundwater flow direction for the September 9, 2019 event, was the reverse of what was recorded for the remaining events.

In addition, Golder re-evaluated historical groundwater contour maps based on the new survey data. Results of the re-evaluated historical contour maps from events conducted in 2017 through 2019 are included in Appendix B. Similar to the September 9, 2019, the August 7, 2017 and July 30, 2018 events showed groundwater flow towards the ridge. The remaining events show the groundwater flow from the ridge toward the east and west of the site.

Therefore, the general groundwater flow is from the ridge west toward the Grand River and from the ridge east. During the heavy rainfall months of late summer early fall, shows groundwater flow towards the ridge

3.2 Groundwater Gradient and Flow Velocity

Groundwater flow rates at the site have been calculated based on hydraulic gradients, hydraulic conductivity, and an estimated effective porosity of the screened horizon provided in the Groundwater Monitoring System Certification, prepared by ERM dated November 2017. Based on the information provided in the Groundwater Monitoring System Certification, hydraulic conductivity ranges from 27 to 53 feet per day with an assumed effective porosity of 30%. The hydraulic gradient was calculated between site monitoring wells shown on Table 3, Groundwater Flow Velocity Calculations – 2019.

Horizontal flow velocity was calculated using the commonly-used derivative of Darcy's Law:

Specifically,

$$V = \frac{K * i}{n_e}$$

V = Groundwater flow velocity

K = Average Permeability of the aquifer

i = Horizontal hydraulic gradient

N_e = Effective porosity

Using this equation, groundwater flow velocities are calculated for various areas of the site and are tabulated on Table 3. Table 3 presents the velocities calculated using groundwater elevation data from the March and September 2019 sampling events.

As presented on Table 3 groundwater flow velocity at the site ranges from approximately 0.01 feet/day to 2.06 feet/day (or approximately 5 to 750 feet/year) on the eastside of the ridge and 0.02 feet/day to 0.45 feet/day (or approximately 6 to 165 feet/year) on the westside of the ridge. The following table is a summary of the groundwater flow paths at the site.

Summary of Groundwater Velocity Calculations 2019				
Flow Path (locations)	**Groundwater Flow Direction**	**Months**	**Groundwater Velocity (ft/day)**	**Groundwater Velocity (ft/yr)**
A (MW-08 to MW-06) on the eastern side of site	East from the Ridge	March 2019 November 2019 December 2019	0.06 to 0.25	23 to 90
	West toward the Ridge	September 2019	0.02 to 0.03	6 to 11
B (MW-01 to MW-02) on the western side of site	West toward the Grand River	March 2019 November 2019 December 2019	0.09 to 2.06	31 to 752
	East toward the Ridge	September 2019	0.01 to 0.03	5 to 9
C (SG-05 to MW-05) on the eastern side of site	East from the Ridge	November 2019 December 2019	0.10 to 0.45	35 to 165
	West toward the Ridge	September 2019	0.03 to 0.06	11 to 22

These calculated groundwater flow velocities across the site are different between the March and September 2019 events as is the groundwater flow direction. However, the groundwater flow velocities are consistent with historical calculations.

In addition, the difference between the maximum and minimum groundwater elevation collected between March 2017 and December 2019 has been as low as 0.1 feet (June 2018) and as high as 3.43 feet (November 2019). This variability is an indication that rainfall and surface elevations of the Grand River have a significant effect on the groundwater gradient across the site. The groundwater flow observed in 2019 monitoring events confirm that the overall groundwater monitoring system is sufficient to monitor the uppermost aquifer for CCR units at JB Sims. The calculated flow velocities are best estimates based on field data and default data for soils, and therefore, these velocities should not be taken as absolute values, but rather as estimated values that may vary with future data collected at the site.

3.3 Groundwater Sampling

Groundwater samples were collected in accordance with 40 CFR §257.93(a) and the Part 115 amendment. Monitoring wells were purged and sampled using a peristaltic pump following low-flow sampling procedures. A multi parameter meter was used to monitor field parameters, namely: pH, temperature, conductivity, dissolved oxygen (DO), and oxidation-reduction potential (ORP), during well purging to verify stabilization prior to sampling. Turbidity is also recorded during purging using a field meter to verify stabilization. Groundwater samples were collected when the following general stabilization criteria were met:

- 0.2 standard units for pH
- 5% for specific conductance
- 0.2 milligrams per liter (mg/L) or 10% for DO > 0.5 mg/L (whichever is greater)
- Turbidity measurements less than 5 Nephelometric Turbidity Units (NTU)

Any deviation from stabilization criteria, if applicable, is identified on field sampling forms. Following well stabilization, unfiltered samples were collected directly into appropriately preserved laboratory supplied sample containers, placed in iced coolers, and submitted to the laboratory following standard chain-of-custody protocol. Field information forms as well as chain-of-custody records are included in Appendix A.

3.4 Laboratory Analyses

Groundwater samples collected for each monitoring event included both detection and assessment monitoring constituents pursuant to 40 CFR §257.90 through 257.98 and Michigan Part 115 amendment. Analytical methods used for groundwater sample analysis are listed on the analytical laboratory reports included in Appendix A.

Laboratory analyses for the background events were performed by Trace Laboratories, Inc. (Trace) in Muskegon, Michigan with the radium laboratory analysis subcontracted to Summit Environmental Technologies, Inc. (Summit) in Cuyahoga Falls, Ohio. Groundwater data and chain of custody records for the monitoring events are presented in Appendix A.

3.5 Quality Assurance and Quality Control

Data validation generally consisted of reviewing sample integrity, holding times, laboratory method blanks, laboratory control samples, matrix spikes/matrix spike duplicate recoveries and relative percent differences, post digestions spikes, laboratory RPDs, and reporting limits. Where appropriate, validation qualifiers and flags are applied to the data using the procedures in USEPA National Functional Guidelines for Inorganic Data Review (USEPA, 2014), as guidance.

4.0 STATISTICAL ANALYSES

Statistical analysis of detection and assessment monitoring constituents was performed on samples collected from the certified groundwater monitoring network pursuant to 40 CFR §257.93 and the Michigan Part 115 Amendment and following the appropriate certified statistical methodology. The statistical methodology used for JB Sims was developed in accordance with 40 CFR §257.93(f) using methods presented in Statistical Analysis of Groundwater Data at RCRA Facilities, Unified Guidance, March 2009, EPA 530/R-09-007 (USEPA, 2009). Background data collection is underway for constituents added as part of the Part 115 amendment to capture the minimum number of data points required for statistical evaluation.

4.1 Statistical Methodology

The Sanitas™ groundwater statistical software was used to perform the statistical analyses on detection and assessment monitoring constituents in 2019. Sanitas™ is a decision support software package that incorporates the statistical tests required of Subtitle C and D facilities by USEPA regulations. Although assessment monitoring has been implemented, statistical evaluation of detection monitoring constituents is performed to determine if constituents have returned to background conditions. Analysis of assessment monitoring constituents is performed to determine if the site requires corrective measures.

4.1.1 Detection Monitoring Constituents

Groundwater quality data was evaluated through use of interwell prediction limits for detection monitoring constituents. Using these methods, upgradient well data was pooled to establish a background statistical limit. Data are compared to the statistical limit to determine whether any concentrations exceed background levels. The selected statistical methodology uses an optional 1-of-2 verification resample plan. When an initial statistically significant increase (SSI) or questionable result occurs, a second sample may be collected to verify the initial result or determine if the result was an outlier.

If resampling is performed and the initial finding is not verified by resampling, the resampled value replaced the initial finding. When the resample confirms the initial finding, both values remain in the database and an SSI is declared.

The following table provides a summary of the statistical methodology used at JB Sims for routine detection groundwater monitoring.

JB SIMS STATISTICAL METHODOLOGY SUMMARY		
Monitoring Well Network	Upgradient Wells (background)	MW-07
	Downgradient Wells	MW-02, MW-03, MW-04, MW-05, MW-06, MW-08, MW-09
CCR Monitoring Constituents	Detection Monitoring (Appendix III plus 115 Amendment)	Boron, Calcium, Chloride, Fluoride, Iron, pH, Sulfate, and TDS
	Assessment Monitoring (Appendix IV plus 115 Amendment)	Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium, Cobalt, Copper, combined Radium 226 + 228, Fluoride, Lead, Lithium, Nickel, Mercury, Molybdenum, Selenium, Silver, Thallium, Vanadium, and Zinc
Statistical Methodology	Data Screening on Proposed Background	Evaluate outliers, trends, and seasonality when sufficient data are available
	Statistical Limits	Interwell statistical limits will be applied on a constituent basis, depending on the appropriateness of the method as determined by the Analysis of Variance
	Prediction Limits	Parametric when data follow a normal or transformed normal distribution and when less than 50% non-detects, utilizing Kaplan Meier non-detect adjustment when applicable; nonparametric when data sets contain greater than 50% non-detects or when data are not normally or transformed-normally distributed.
	Confidence Intervals	Used in Assessment and Corrective Action monitoring.
	No Statistical Testing	Statistical testing is not required for constituents with 100% non-detects.
	Verification Resample Plan (Optional)	1-of-2 with minimum of 8 samples per well for interwell testing. ▪ Initial statistical exceedance warrants independent resampling within 90 days. ▪ If resample passes, well/constituents is not a confirmed statistically significant increase (SSI). ▪ If resample exceeds, well/constituents has a confirmed SSI. If no resample is collected, the original result is deem verified.

The following guidance is also applicable to the statistical analysis methods:

- Statistical analyses are not performed on analytes containing 100% non-detects (USEPA Unified Guidance, 2009, Chapter 6).
- When data contain less than or equal to 15% non-detects in background, simple substitution of one-half the reporting limit is utilized in the statistical analysis. The reporting limit utilized for non-detects is the practical quantitation limit (PQL) as reported by the laboratory.
- When data contain between 15-50% non-detects, a non-detect adjustment such as the Kaplan-Meier or Regression on Order Statistics (ROS) method for adjustment of the mean and standard deviation will be used prior to constructing a parametric prediction limit.
- Nonparametric prediction limits are used on data containing greater than 50% non-detects.

4.1.2 Assessment Monitoring Statistics

Following the above statistical methodology, groundwater protection standards (GWPS) have been established for statistical comparison of assessment monitoring constituents. Parametric tolerance limits were used to calculate background limits from pooled upgradient well data for assessment monitoring constituents with a target of 95% confidence and 95% coverage to determine the site specific background level. The confidence and coverage levels for nonparametric tolerance limits are dependent upon the number of background samples. These limits were used to identify the GWPS established under 40 CFR §257.95(h).

As described in 40 CFR §257.95(h)(1-3), the GWPS is:

- The maximum contaminant level (MCL) established under 40 CFR §141.62 and §141.66 of this title;
- Where an MCL has not been established, background concentration for the constituent established in accordance with 40 CFR §257.91; or a rule-identified GWPS specified for Cobalt, Lead, Lithium, or Molybdenum; or
- Michigan Part 201 Generic Cleanup Criteria and Screening Levels, Ground Surface Water Interface criteria.
- Background level for constituents were the background concentration is higher than the MCL or rule identified GWPS.

Following the above rule requirements, GWPS have been established for statistical comparison of assessment monitoring constituents. Summary of Background Levels and Groundwater Protection Standards summarizes the background limit established at each monitoring well and the GWPS used for statistical comparison.

Confidence intervals were then constructed on downgradient wells for each of the assessment monitoring constituents using the GWPS as discussed above. Only when the entire confidence interval is above a GWPS is the well/constituent pair considered to exceed its respective standard.

Summary of Site Specific Groundwater Protection Standards						
Analyte	Units	Screening Levels				
		RBSL	MCL	Michigan Part 201 GSI	Site Specific Background*	Groundwater Protection Standard (GWPS) Used for Assessment Monitoring
Antimony	mg/L	N/R	0.006	0.13	0.0016	0.13
Arsenic	mg/L	N/R	0.01	N/R	0.093	0.093
Barium	mg/L	N/R	2	N/R	0.60	2
Beryllium	mg/L	N/R	0.004	N/R	0.0010	0.004
Cadmium	mg/L	N/R	0.005	N/R	0.000051	0.005
Chromium	mg/L	N/R	0.1	0.011	0.0028	0.1
Cobalt	mg/L	0.006	N/R	0.1	0.0020	0.1
Copper	mg/L	N/R	1.3	N/R	N/R	1.3
Fluoride	mg/L	N/R	4	N/R	0.57	4
Lead	mg/L	0.015	N/R	N/R	0.0050	0.015
Lithium	mg/L	0.04	N/R	0.44	0.059	0.44
Mercury	mg/L	N/R	0.002	0.0000013	0.00014	0.002
Molybdenum	mg/L	0.100	N/R	3.2	0.011	3.2
Nickel	mg/L	N/R	N/R	N/R	N/R	N/R
Radium (226 + 228)	pCi/L	N/R	5	N/R	1.36	5
Selenium	mg/L	N/R	0.05	0.005	0.00028	0.05
Silver	mg/L	N/R	0.1	0.00006	N/R	0.1
Thallium	mg/L	N/R	0.002	0.0037	0.000087	0.0037
Vanadium	mg/L	N/R	N/R	0.027	N/R	0.027
Zinc	mg/L	N/R	5.0	N/R	N/R	5.0

Note: pCi/L = picocuries per liter, mg/L = milligram per liter
* = Updated to incorporate data through 2019.

4.2 Statistical Analysis Results

Analytical data from the two (2) sitewide 2019 monitoring events in March and September 2019 were statistically analyzed in accordance with the Statistical Analysis Plan. Statistical analysis on detection monitoring constituents was performed to determine if constituents have returned to background levels. Statistical analyses on assessment monitoring constituents were evaluated to determine if concentrations statistically exceeded the established groundwater protection standard.

Based on review of the detection monitoring statistical analysis presented in Appendix B, detection monitoring constituents have not returned to background levels and therefore assessment monitoring should continue pursuant to 40 CFR §257.95(f).

4.2.1 2019 Statistical Analyses

Analytical data from the 2019 monitoring events at JB Sims have been statistically analyzed in accordance with the site's certified statistical analysis methods.

Review of the Sanitas™ results indicates that the following verified SSIs were identified in 2019:

JB Sims Inter-Well Prediction Limit Statistically Significant Increase Summary	
Detection Monitoring Constituents	**JB Sims Monitoring Wells**
Boron	MW-2
Calcium	MW-2 (March only), MW-3, MW-4, MW-5, MW-6
Chloride	MW-2, MW-3, MW-4, MW-6, MW-8 (September only), and MW-9 (September only)
Fluoride	MW-2, MW-3, MW-4, MW-5, MW-6, MW-8, and MW-9 (September only)
Iron	N/A, insufficient data to calculate interwell prediction limit, developing background
pH	MW-2, MW-5 (March only), and MW-8 (September only)
Sulfate	MW-3 (March only), MW-4, MW-5, and MW-6 (March only)
Total Dissolved Solids	MW-2, MW-3, MW-4, MW-5, MW-6, and MW-9 (September only)

Pursuant to 40 CFR §257.94(e), following determination of an SSI, JB Sims has implemented assessment monitoring per 40 CFR §257.95.

JB Sims Confidence Interval Exceedance Summary	
Assessment Monitoring Constituents	**JB Sims Monitoring Wells**
Fluoride	MW-2 (no exceedance in the downgradient assessment well MW-9)
Lithium	MW-2 (no exceedance in the downgradient assessment well MW-9)

Pursuant to 40 CFR §257.95(g)(3), following determination of an SSL, JB Sims has implemented an assessment of corrective measures per 40 CFR §257.96.

5.0 MONITORING PROGRAM STATUS

In accordance with 40 CFR §257.94(e), JB Sims continued assessment monitoring in 2019 with the first groundwater sampling event conducted in March 2019 and the second groundwater sampling event with the additional assessment monitoring well MW-9 in September 2019. SSIs of detection monitoring constituents were identified for the multi-unit network. SSLs of assessment monitoring constituents were identified at detection monitoring wells (MW-2) during sampling events conducted in 2019. However, results from MW-9, located downgradient of MW-2, are below the established GWPS for assessment monitoring constituents.

In accordance with 40 CFR §257.95(g)(3) and Michigan 640 §11519b(2), JB Sims has implemented an assessment of corrective measures to further evaluate the identified constituents of concern.

6.0 CONCLUSIONS AND FUTURE ACTIONS

JB Sims is working with EGLE to further evaluate the multi-unit groundwater monitoring well network for the site. This report *2019 Annual Groundwater Monitoring and Corrective Action Report*, JB Sims Generating Station has been prepared to fulfill the requirements and deadlines for USEPA CCR rule 40 CFR 257 Subpart D.

Statistical evaluations of the groundwater monitoring data for the JB Sims identified SSIs of detection monitoring constituents above prediction limits and SSLs of assessment monitoring constituents above the GWPS at one monitoring well (MW-2). Groundwater quality data from assessment monitoring well (MW-9) installed downgradient of MW-2 does not exceed the GWPS. JB Sims will remain in assessment monitoring until the groundwater quality has returned to background conditions or is below GWPS at each of the detection monitoring wells.

The first 2020 semi-annual assessment monitoring event is currently planned for April 2020.

Following guidelines presented in 40 CFR §257.96, JB Sims has initiated an assessment of corrective measures. The objectives of the ACM will be to evaluate appropriate remedial alternatives to prevent further releases, to remediate releases of the CCR units and to remediate the CCR units.

7.0 REFERENCES

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TABLES AND FIGURES

TABLE 1.
MONITORING WELL NETWORK SUMMARY

Grand Haven Board of Light and Power
JB Sims Generating Station

Well Identification	Purpose	Hydraulic Location	Date Installed	Coordinates		Top of Casing (Staff Gauge) Elevation (feet MSL)	Total Well Depth (feet)	Screen Interval (feet)	Screen Length (feet)	Well Construction Material
				Northing	Easting					
Monitoring Wells										
MW-01	Piezometer	downgradient	1/18/2017	578100.82	12624468.08	587.29	12.32	4-9	5	PVC
MW-02	Detection	downgradient	1/18/2017	578241.92	12624222.64	595.64	23.37	15-20	5	PVC
MW-03	Detection	downgradient	1/18/2017	578125.03	12624180.41	593.08	20.34	12-17	5	PVC
MW-04	Detection	downgradient	1/18/2017	578003.97	12624165.24	591.49	18.00	10-15	5	PVC
MW-05	Piezometer	downgradient	5/22/2018	577970.06	12624634.16	587.67	11.50	4-9	5	PVC
MW-06	Detection	downgradient	5/22/2018	578229.40	12624525.24	590.40	16.55	9-14	5	PVC
MW-07	Detection	upgradient / background	5/22/2018	577585.76	12625513.56	586.49	18.80	11-16	5	PVC
MW-08	Detection	downgradient	5/22/2018	578261.15	12625341.27	585.40	11.85	4-9	5	PVC
MW-09	Assessment	downgradient	8/12/2019	578241.36	12624185.62	589.65	12.00	7-12	5	PVC
MW-10	Piezometer	downgradient	8/12/2019	578367.40	12624470.20	586.73	10.00	5-10	5	PVC
Staff Gauges										
SG-01	Water Level Gauging	NA	8/12/2019	578234.49	12624159.06	585.10	NA	NA	NA	PVC gauge
SG-02	Water Level Gauging	NA	8/12/2019	578287.85	12624784.61	583.43	NA	NA	NA	PVC gauge
SG-03	Water Level Gauging	NA	8/12/2019	578201.99	12624858.11	584.37	NA	NA	NA	PVC gauge
SG-04	Water Level Gauging	NA	8/12/2019	577984.43	12624649.47	584.53	NA	NA	NA	PVC gauge
SG-05	Water Level Gauging	NA	8/12/2019	577717.81	12624888.51	584.83	NA	NA	NA	PVC gauge
SG-06	Water Level Gauging	NA	8/12/2019	578227.56	12625365.56	584.88	NA	NA	NA	PVC gauge

Notes:
MSL = mean sea level.
NA = Not Available
PVC = polyvinyl chloride
Elevations referenced to NAVD 88. Elevations based on Driesenga & Associates, Inc. Monitoring Well Survey, Dated 8-28-2019.

TABLE 2.
Summary of Groundwater Elevations - 2019
Grand Haven Board of Light and Power - JB Sims Generating Station
Grand Haven, Michigan

Well ID	Hydraulic Location	Top of Casing Elevation[1]	Groundwater Elevations[2]							
			3/27/2019	9/9/2019	9/27/2019	9/30/2019	11/1/2019	11/15/2019	12/2/2019	12/16/2019
Monitoring Wells										
MW-01	downgradient	587.29	582.29	582.05	582.39	NM	583.21	582.96	583.27	582.62
MW-02	downgradient	595.64	581.37	582.09	581.94	NM	582.06	579.67	582.47	581.78
MW-03	downgradient	593.08	580.98	582.13	NM	582.43	582.26	581.89	582.87	582.23
MW-04	downgradient	591.49	581.14	582.14	NM	582.05	582.49	581.95	582.92	582.05
MW-05	downgradient	587.67	582.22	582.08	582.42	NM	583.18	583.02	583.20	582.96
MW-06	downgradient	590.40	582.18	582.03	582.40	NM	583.18	582.83	583.29	582.84
MW-07	upgradient / background	586.49	580.94	582.17	582.09	NM	582.24	581.91	582.72	582.11
MW-08	downgradient	585.40	580.96	582.18	NM	582.50	582.27	581.94	582.67	582.17
MW-09	downgradient	589.65	Installed August 2019	582.12	NM	582.25	582.28	582.09	582.68	582.31
MW-10	downgradient	586.73		582.14	NM	581.93	582.21	581.90	582.17	582.19
Staff Gauges										
SG-01	NA	585.10	Installed August 2019	582.20	NM	582.48	582.10	581.97	582.67	582.28
SG-02	NA	583.43		582.11	NM	581.67	582.90	582.81	583.14	582.81
SG-03	NA	584.37		582.13	NM	583.55	582.90	582.85	583.15	582.83
SG-04	NA	584.53		582.11	NM	582.73	584.23	583.10	583.19	583.08
SG-05	NA	584.83		582.21	NM	582.45	582.19	582.06	582.79	582.17
SG-06	NA	584.88		582.16	NM	582.54	582.18	582.07	582.44	581.77

Notes:

1 - Elevations based on Driesenga & Associates, Inc. Monitoring Well Survey, Dated 8-28-2019.

2 - Sampling events conducted by Trace Laboratories, Inc. (Trace)

TABLE 3.
Summary of Groundwater Velocity - 2019
Grand Haven Board of Light and Power - JB Sims Generating Station
Grand Haven, Michigan

Date	Groundwater Elevation (feet msl)	Δ h (feet)[2]	Δ l (feet)[3]	Hydraulic Gradient (Δ h/Δ l)	Average Hydraulic Conductivity, K (feet per day)[5]	Assumed Effective Porosity (n_e)	Average Linear Groundwater Velocity (feet per day)[4]	(feet per year)[4]
Flow Path A (MW-08 to MW-06)								
27-Mar-19	580.96 582.18	-1.22	871	-0.00140	27 to 53	0.3	-0.13 to -0.25	-46.0 to -90.3
9-Sep-19	582.18 582.03	0.15	871	0.00017	27 to 53	0.3	0.02 to 0.03	5.7 to 11.1
1-Nov-19	582.27 583.18	-0.91	871	-0.00104	27 to 53	0.3	-0.09 to -0.18	-34.3 to -67.4
15-Nov-19	581.94 582.83	-0.89	871	-0.00102	27 to 53	0.3	-0.09 to -0.18	-33.6 to -65.9
2-Dec-19	582.67 583.29	-0.62	871	-0.00071	27 to 53	0.3	-0.06 to -0.13	-23.4 to -45.9
16-Dec-19	582.17 582.84	-0.67	871	-0.00077	27 to 53	0.3	-0.07 to -0.14	-25.3 to -49.6
Flow Path B (MW-01 to MW-02)								
27-Mar-19	582.29 581.37	0.92	282	0.00326	27 to 53	0.3	0.29 to 0.58	107.2 to 210.4
9-Sep-19	582.05 582.09	-0.04	282	-0.00014	27 to 53	0.3	-0.01 to -0.03	-4.7 to -9.1
1-Nov-19	583.21 582.06	1.15	282	0.00408	27 to 53	0.3	0.37 to 0.72	134.0 to 263.0
15-Nov-19	582.96 579.67	3.29	282	0.01167	27 to 53	0.3	1.05 to 2.06	383.3 to 752.3
2-Dec-19	583.27 582.47	0.80	282	0.00284	27 to 53	0.3	0.26 to 0.50	93.2 to 182.9
16-Dec-19	582.62 581.78	0.84	871	0.00096	27 to 53	0.3	0.09 to 0.17	31.7 to 62.2
Flow Path C (SG-05 to MW-05)								
9-Sep-19	582.21 582.08	0.13	386	0.00034	27 to 53	0.3	0.03 to 0.06	11.1 to 21.7
1-Nov-19	582.19 583.18	-0.99	386	-0.00256	27 to 53	0.3	-0.23 to -0.45	-84.3 to -165.4
15-Nov-19	582.06 583.02	-0.96	386	-0.00249	27 to 53	0.3	-0.22 to -0.44	-81.7 to -160.4
2-Dec-19	582.79 583.20	-0.41	386	-0.00106	27 to 53	0.3	-0.10 to -0.19	-34.9 to -68.5
16-Dec-19	582.17 582.96	-0.79	386	-0.00205	27 to 53	0.3	-0.18 to -0.36	-67.2 to -132.0

GOLDER

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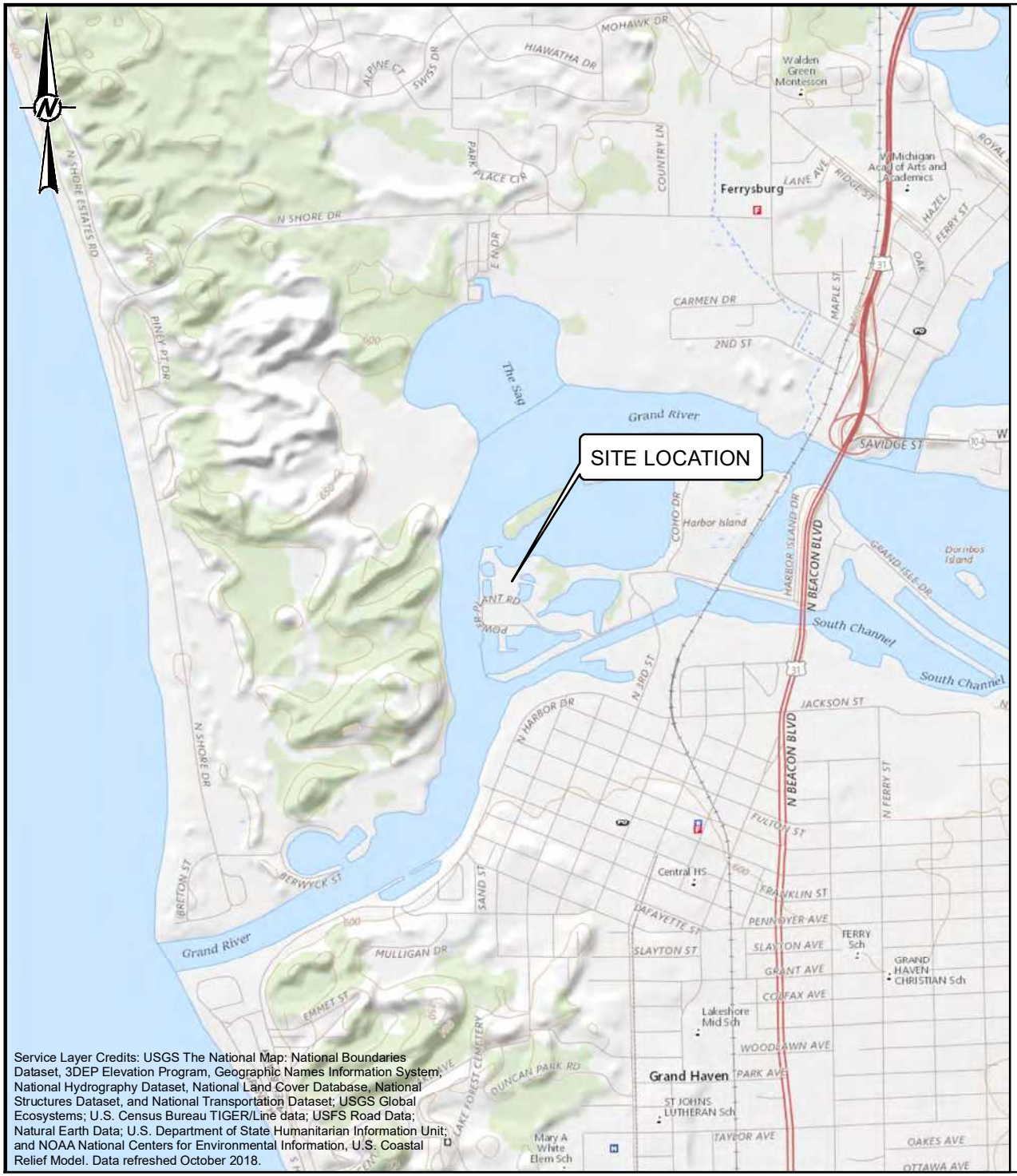
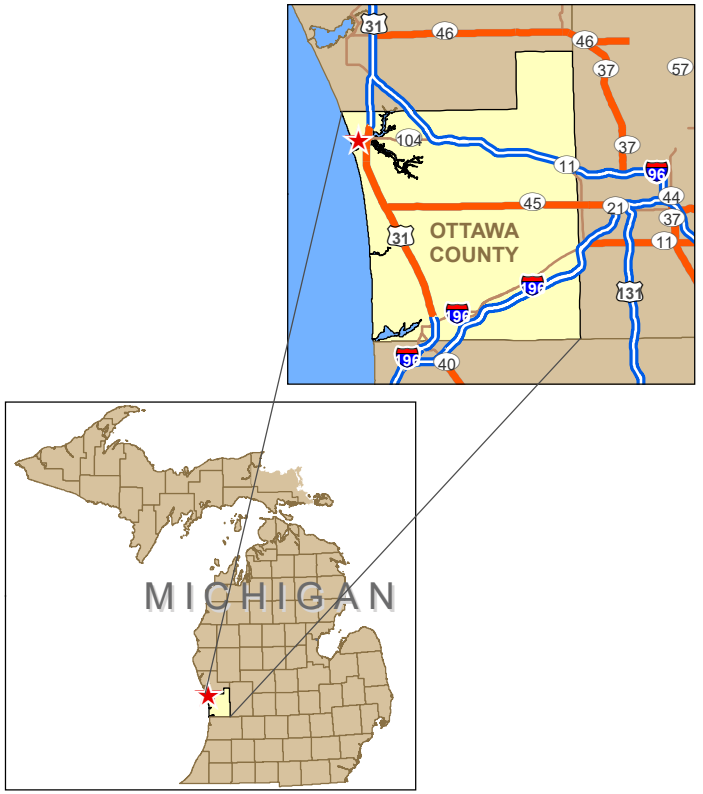


Service Layer Credits: USGS The National Map: National Boundaries Dataset, 3DEP Elevation Program, Geographic Names Information System; National Hydrography Dataset, National Land Cover Database, National Structures Dataset, and National Transportation Dataset; USGS Global Ecosystems; U.S. Census Bureau TIGER/Line data; USFS Road Data; Natural Earth Data; U.S. Department of State Humanitarian Information Unit; and NOAA National Centers for Environmental Information, U.S. Coastal Relief Model. Data refreshed October 2018.



CLIENT
GRAND HAVEN BOARD OF LIGHT AND POWER
GRAND HAVEN, MICHIGAN

PROJECT
JB SIMS GENERATING STATION
ANNUAL REPORT

TITLE
SITE LOCATION MAP

CONSULTANT
GOLDER

YYYY-MM-DD	2020-01-30
PREPARED	DJC
DESIGN	CEP
REVIEW	CEP
APPROVED	DLP

PROJECT No.	CONTROL	Rev.	FIGURE
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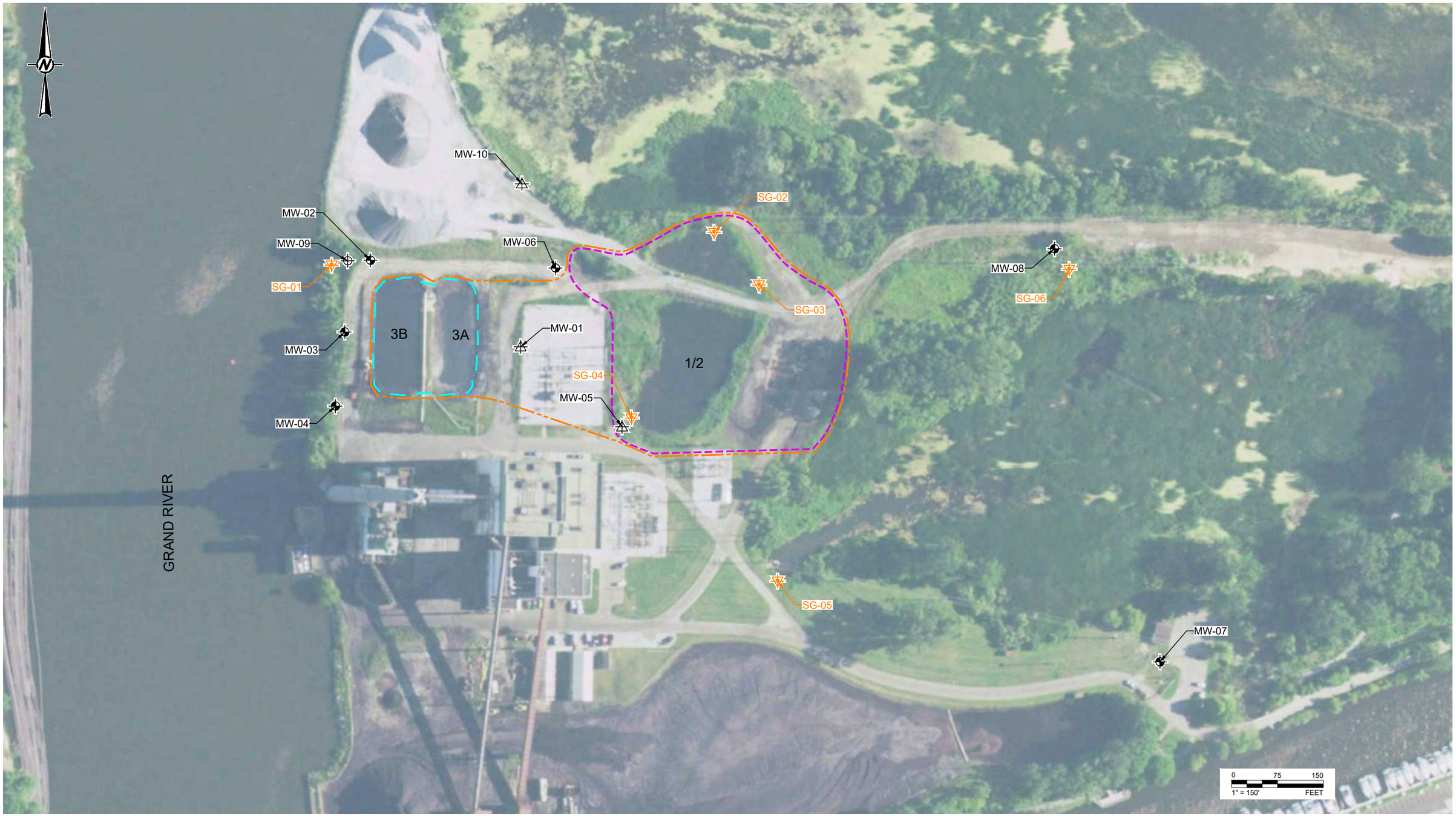
IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET HAS BEEN MODIFIED FROM: ANSI A



REFERENCE(S)

Service Layer Credits: Source: ESRI, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community. Date of imagery, 7/14/2016.

NOTE(S)

1. HORIZONTAL COORDINATE SYSTEM BASED ON MICHIGAN STATE PLANE SOUTH, INTERNATIONAL FEET. VERTICAL DATUM IS NAVD 1988.

LEGEND

- DETECTION MONITORING WELL
- ASSESSMENT MONITORING WELL
- PIEZOMETER
- STAFF GAUGE
- LIMIT OF UNITS 1/2 ASH PLACEMENT AFTER 1981
- UNIT 3 LIMITS OF ASH PLACEMENT
- MULTIUNIT NETWORK BOUNDARY

CLIENT
GRAND HAVEN BOARD OF LIGHT AND POWER
GRAND HAVEN, MICHIGAN

CONSULTANT
GOLDER

YYYY-MM-DD	2020-01-30
DESIGNED	CEP
PREPARED	DJC
REVIEWED	CEP
APPROVED	DLP

PROJECT
JB SIMS GENERATING STATION
ANNUAL REPORT

TITLE
SITE PLAN

PROJECT NO.	CONTROL	REV.	FIGURE
19116042	19116042D001.dwg	0	2

REFERENCE(S)

Service Layer Credits: Source: ESRI, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community. Date of imagery, 7/14/2016.

NOTE(S)

1. HORIZONTAL COORDINATE SYSTEM BASED ON MICHIGAN STATE PLANE SOUTH, INTERNATIONAL FEET. VERTICAL DATUM IS NAVD 1988.
2. BACKGROUND EVENT FOR MW-05 TO MW-08, THEREFORE MONITORING WELLS MW-01 TO MW-04 WERE NOT GAUGED.
3. MONITORING WELLS MW-09 & MW-10 & STAFF GAUGE SG-01 THROUGH SG-06 WERE INSTALLED PRIOR TO THIS EVENT.

LEGEND

- DETECTION MONITORING WELL
- ASSESSMENT MONITORING WELL
- PIEZOMETER
- STAFF GAUGE
- LIMIT OF UNITS 1/2 ASH PLACEMENT AFTER 1981
- UNIT 3 LIMITS OF ASH PLACEMENT
- MULTIUNIT NETWORK BOUNDARY

CLIENT
GRAND HAVEN BOARD OF LIGHT AND POWER
GRAND HAVEN, MICHIGAN

CONSULTANT
GOLDER

YYYY-MM-DD	2020-01-30
DESIGNED	CEP
PREPARED	DJC
REVIEWED	CEP
APPROVED	DLP

PROJECT
JB SIMS GENERATING STATION
ANNUAL REPORT

TITLE
GROUNDWATER CONTOUR MAP
MARCH 27, 2019

PROJECT NO.	CONTROL	REV.	FIGURE
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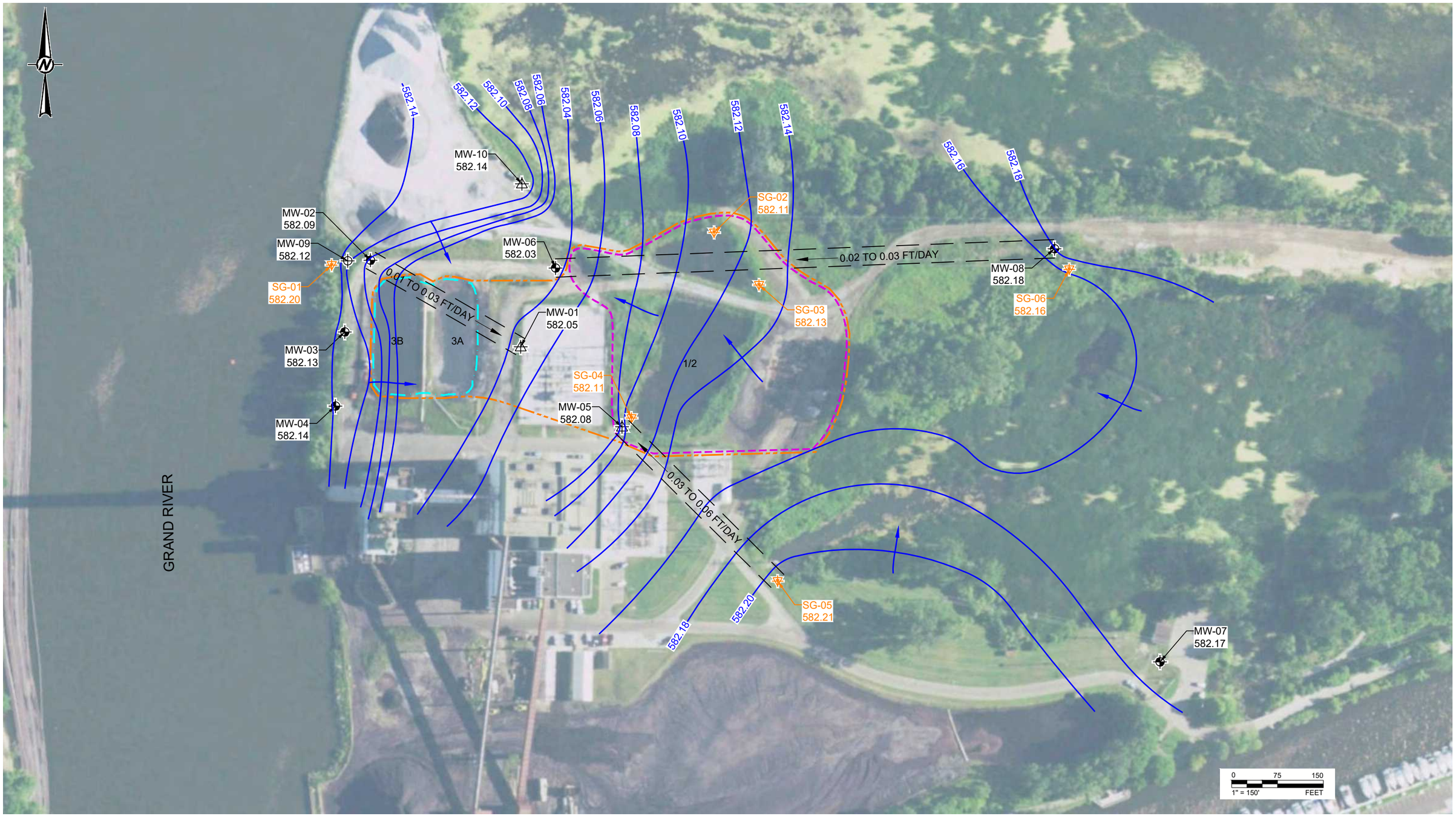

REFERENCE(S)

Service Layer Credits: Source: ESRI, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community. Date of imagery, 7/14/2016.

NOTE(S)

1. HORIZONTAL COORDINATE SYSTEM BASED ON MICHIGAN STATE PLANE SOUTH, INTERNATIONAL FEET. VERTICAL DATUM IS NAVD 1988.

LEGEND

- DETECTION MONITORING WELL WITH GROUNDWATER ELEVATION
- ASSESSMENT MONITORING WELL WITH GROUNDWATER ELEVATION
- PIEZOMETER WITH GROUNDWATER ELEVATION
- STAFF GAUGE WITH WATER ELEVATION
- LIMIT OF UNITS 1/2 ASH PLACEMENT AFTER 1981
- UNIT 3 LIMITS OF ASH PLACEMENT
- MULTIUNIT NETWORK BOUNDARY
- 582.18 GROUNDWATER CONTOURS
- FLOW DIRECTION

CLIENT
GRAND HAVEN BOARD OF LIGHT AND POWER
GRAND HAVEN, MICHIGAN

CONSULTANT
GOLDER

YYYY-MM-DD	2020-01-30
DESIGNED	CEP
PREPARED	DJC
REVIEWED	CEP
APPROVED	DLP

PROJECT
JB SIMS GENERATING STATION
ANNUAL REPORT

TITLE
GROUNDWATER CONTOUR MAP
SEPTEMBER 9, 2019

PROJECT NO.	CONTROL	REV.	FIGURE
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APPENDIX A

Laboratory Analytical & Field Sampling Reports

Trace Analytical Laboratories, Inc.
2241 Black Creek Road
Muskegon, MI 49444-2673

TRACE ANALYTICAL LABORATORIES, INC.

231-773-5998 Phone
888-979-4469 Fax
www.trace-labs.com

May 02, 2019

Mr. Paul Cederquist
Grand Haven Board of Light and Power-Monthly MWs
1700 Eaton Drive
Grand Haven, MI 49417

Phone: 616-607-1292
Fax: (616) 842-3511

RE: Trace Project T19C661
Client Project Monthly Monitoring Wells Sampling

Dear Mr. Cederquist:

Enclosed are your analytical results. The results of this report relate only to the samples listed in the body of this report.

All reports were examined through Trace's validation process to ensure that requirements for quality and completeness were satisfied. All reported analytical results were obtained in accordance with the methods referenced on the reports. Every practical effort was made to meet the reporting limit specifications for this work, however, some results may have raised reporting limits to correct for percent solids.

For clients that require NELAP Accreditation, Trace certifies that these test results meet all requirements of the NELAP Standard, except for those analytes with a "N" notation. These analytes have not been evaluated by NELAP at Trace's discretion and will not be reported unless requested by client.

If you have questions concerning this report, please contact me at 231.773.5998 or by email at jmink@trace-labs.com.

Sincerely,

Jon Mink
Senior Project Manager
Enclosures

ACCREDITED IN ACCORDANCE WITH nelac

NJDEP Accreditation No. MI008

Trace Analytical Laboratories, Inc.
2241 Black Creek Road
Muskegon, MI 49444-2673

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SAMPLE SUMMARY

Trace Project ID: T19C661
Client Project ID: Monthly Monitoring Wells Sampling

Trace ID	Sample ID	Matrix	Collected By	Date Collected	Date Received
T19C661-01	MW-1	Ground Water	eb	03/27/19 11:55	03/28/19 14:06
T19C661-02	MW-2	Ground Water	eb	03/27/19 11:00	03/28/19 14:06
T19C661-03	MW-3	Ground Water	eb	03/28/19 10:05	03/28/19 14:06
T19C661-04	MW-4	Ground Water	eb	03/28/19 09:10	03/28/19 14:06
T19C661-05	MW-5	Ground Water	eb	03/27/19 09:20	03/28/19 14:06
T19C661-06	MW-6	Ground Water	eb	03/27/19 10:10	03/28/19 14:06
T19C661-07	MW-7	Ground Water	eb	03/27/19 08:37	03/28/19 14:06
T19C661-08	MW-8	Ground Water	eb	03/28/19 10:40	03/28/19 14:06

CERTIFICATE OF ANALYSIS

Trace Analytical Laboratories, Inc.
2241 Black Creek Road
Muskegon, MI 49444-2673

231-773-5998 Phone
888-979-4469 Fax
www.trace-labs.com

AN EXPLANATION OF TERMS AND SYMBOLS WHICH MAY OCCUR IN THIS REPORT

DEFINITIONS

LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
MS	Matrix Spike
MSD	Matrix Spike Duplicate
RPD	Relative Percent Difference
DUP	Matrix Duplicate
RDL	Reporting Detection Limit
MCL	Maximum Contamination Limit
TIC	Tentatively Identified Compound
<, ND or U	Indicates the compound was analyzed for but not detected
*	Indicates a result that exceeds its associated MCL or Surrogate control limits
N	Indicates that the compound has not been evaluated by NELAC
NA	Indicates that the compound is not available.

NOTE: Samples for volatiles that have been extracted with a water miscible solvent were corrected for the total volume of the solvent/water mixture.
Solid matrices Method Blanks are at 100% solids as such results are the same wet or dry.

DATA QUALIFIERS

Trace ID: T086018-MS1

Analysis: EPA 6010D

Boron	Note 243 : The MS recovery was out of control. Because the background concentration of this analyte is greater than four times the spike amount, no data require qualification.
Calcium	Note 243 : The MS recovery was out of control. Because the background concentration of this analyte is greater than four times the spike amount, no data require qualification.

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ANALYTICAL RESULTS

Trace Project ID: T19C661
Client Project ID: Monthly Monitoring Wells Sampling

Trace ID: T19C661-01 Date Collected: 03/27/19 11:55 Matrix: Ground Water
Sample ID: MW-1 Date Received: 03/28/19 14:06

PARAMETERS	RESULTS	UNITS	RDL	DILUTION	PREPARED	BY	ANALYZED	BY	NOTES	MCL
METALS, TOTAL										
Analysis Method: EPA 7470A										
Batch: T085943										
Mercury	<0.00020	mg/L	0.00020	1	04/05/19	dcl	04/10/19	rl		
METALS, TOTAL										
Analysis Method: EPA 6010D										
Batch: T086018										
Beryllium	<0.0010	mg/L	0.0010	1	04/11/19	dcl	04/12/19	rl		
Boron	**110**	**mg/L**	**1.0**	**100**	**04/11/19**	**dcl**	**04/15/19**	**rl**		
Calcium	**150**	**mg/L**	**50**	**100**	**04/11/19**	**dcl**	**04/15/19**	**rl**		
Iron	<10	mg/L	10	100	04/11/19	jm	04/15/19	rl		
Lithium	**1.8**	**mg/L**	**0.010**	**1**	**04/11/19**	**dcl**	**04/12/19**	**rl**	**N**	
Zinc	<2.0	mg/L	2.0	100	04/11/19	jm	04/15/19	rl		
Analysis Method: EPA 6020B										
Batch: T086018										
Antimony	**0.00024**	**mg/L**	**0.00030**	**1**	**04/11/19**	**dcl**	**04/12/19**	**jbb**	**J**	
Arsenic	**0.00033**	**mg/L**	**0.0010**	**1**	**04/11/19**	**dcl**	**04/12/19**	**jbb**	**J**	
Barium	**0.30**	**mg/L**	**0.00060**	**1**	**04/11/19**	**dcl**	**04/12/19**	**jbb**		
Cadmium	<0.000040	mg/L	0.000040	1	04/11/19	dcl	04/12/19	jbb		
Chromium	**0.00042**	**mg/L**	**0.00080**	**1**	**04/11/19**	**dcl**	**04/12/19**	**jbb**	**J**	
Cobalt	**0.00034**	**mg/L**	**0.0016**	**1**	**04/11/19**	**dcl**	**04/12/19**	**jbb**	**J**	
Copper	**0.00031**	**mg/L**	**0.00080**	**1**	**04/11/19**	**jm**	**05/02/19**	**jbb**	**J**	
Lead	**0.00023**	**mg/L**	**0.00040**	**1**	**04/11/19**	**dcl**	**04/12/19**	**jbb**	**J**	
Molybdenum	**0.0014**	**mg/L**	**0.0010**	**1**	**04/11/19**	**dcl**	**04/12/19**	**jbb**	**N**	
Nickel	**0.00068**	**mg/L**	**0.00040**	**1**	**04/11/19**	**jm**	**05/02/19**	**jbb**		
Selenium	<0.00087	mg/L	0.00087	1	04/11/19	dcl	04/12/19	jbb		
Silver	**0.000013**	**mg/L**	**0.000040**	**1**	**04/11/19**	**jm**	**05/02/19**	**jbb**	**J**	
Thallium	<0.000087	mg/L	0.000087	1	04/11/19	dcl	04/12/19	jbb		
Vanadium	**0.00041**	**mg/L**	**0.00080**	**1**	**04/11/19**	**jm**	**05/02/19**	**jbb**	**J**	

CERTIFICATE OF ANALYSIS

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Muskegon, MI 49444-2673

231-773-5998 Phone
888-979-4469 Fax
www.trace-labs.com

ANALYTICAL RESULTS

Trace Project ID: T19C661
Client Project ID: Monthly Monitoring Wells Sampling

Trace ID: T19C661-01 Date Collected: 03/27/19 11:55 Matrix: Ground Water
Sample ID: MW-1 Date Received: 03/28/19 14:06

PARAMETERS	RESULTS	UNITS	RDL	DILUTION	PREPARED	BY	ANALYZED	BY	NOTES	MCL
WET CHEMISTRY										
Analysis Method: EPA 300.0 Rev. 2.1										
Batch: T085712										
Fluoride	**12**	**mg/L**	**1.0**	**50**	**03/29/19**	**dc**	**03/29/19**	**dc**		
Chloride	**110**	**mg/L**	**5.0**	**50**	**03/29/19**	**dc**	**03/29/19**	**dc**		
Sulfate as SO4	**240**	**mg/L**	**10**	**50**	**03/29/19**	**dc**	**03/29/19**	**dc**		
Analysis Method: SM 2540 C-11										
Batch: T085706										
Total Dissolved Solids	**1600**	**mg/L**	**10**	**1**	**03/29/19**	**dc**	**03/29/19**	**dc**		

CERTIFICATE OF ANALYSIS

Trace Analytical Laboratories, Inc.
2241 Black Creek Road
Muskegon, MI 49444-2673

TRACE ANALYTICAL LABORATORIES, INC.

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ANALYTICAL RESULTS

Trace Project ID: T19C661
Client Project ID: Monthly Monitoring Wells Sampling

Trace ID: T19C661-02 Date Collected: 03/27/19 11:00 Matrix: Ground Water
Sample ID: MW-2 Date Received: 03/28/19 14:06

PARAMETERS	RESULTS	UNITS	RDL	DILUTION	PREPARED	BY	ANALYZED	BY	NOTES	MCL
METALS, TOTAL										
Analysis Method: EPA 7470A										
Batch: T085943										
Mercury	<0.00020	mg/L	0.00020	1	04/05/19	dcl	04/10/19	rl		
METALS, TOTAL										
Analysis Method: EPA 6010D										
Batch: T086018										
Beryllium	<0.0010	mg/L	0.0010	1	04/11/19	dcl	04/12/19	rl		
Boron	**88**	**mg/L**	**1.0**	**100**	**04/11/19**	**dcl**	**04/15/19**	**rl**		
Calcium	**210**	**mg/L**	**50**	**100**	**04/11/19**	**dcl**	**04/15/19**	**rl**		
Iron	**21**	**mg/L**	**10**	**100**	**04/11/19**	**jm**	**04/15/19**	**rl**		
Lithium	**1.2**	**mg/L**	**0.010**	**1**	**04/11/19**	**dcl**	**04/12/19**	**rl**	**N**	
Zinc	<2.0	mg/L	2.0	100	04/11/19	jm	04/15/19	rl		
Analysis Method: EPA 6020B										
Batch: T086018										
Antimony	**0.00011**	**mg/L**	**0.00030**	**1**	**04/11/19**	**dcl**	**04/12/19**	**jbb**	**J**	
Arsenic	**0.0064**	**mg/L**	**0.0010**	**1**	**04/11/19**	**dcl**	**04/12/19**	**jbb**		
Barium	**0.41**	**mg/L**	**0.00060**	**1**	**04/11/19**	**dcl**	**04/12/19**	**jbb**		
Cadmium	**0.000047**	**mg/L**	**0.000040**	**1**	**04/11/19**	**dcl**	**04/12/19**	**jbb**		
Chromium	**0.020**	**mg/L**	**0.00080**	**1**	**04/11/19**	**dcl**	**04/12/19**	**jbb**		
Cobalt	**0.0034**	**mg/L**	**0.0016**	**1**	**04/11/19**	**dcl**	**04/12/19**	**jbb**		
Copper	**0.0012**	**mg/L**	**0.00080**	**1**	**04/11/19**	**jm**	**05/02/19**	**jbb**		
Lead	**0.00045**	**mg/L**	**0.00040**	**1**	**04/11/19**	**dcl**	**04/12/19**	**jbb**		
Molybdenum	**0.0076**	**mg/L**	**0.0010**	**1**	**04/11/19**	**dcl**	**04/12/19**	**jbb**	**N**	
Nickel	**0.017**	**mg/L**	**0.00040**	**1**	**04/11/19**	**jm**	**05/02/19**	**jbb**		
Selenium	**0.0012**	**mg/L**	**0.00087**	**1**	**04/11/19**	**dcl**	**04/12/19**	**jbb**		
Silver	<0.000040	mg/L	0.000040	1	04/11/19	jm	05/02/19	jbb		
Thallium	<0.000087	mg/L	0.000087	1	04/11/19	dcl	04/12/19	jbb		
Vanadium	**0.0013**	**mg/L**	**0.00080**	**1**	**04/11/19**	**jm**	**05/02/19**	**jbb**		

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ANALYTICAL RESULTS

Trace Project ID: T19C661
Client Project ID: Monthly Monitoring Wells Sampling

Trace ID: T19C661-02 Date Collected: 03/27/19 11:00 Matrix: Ground Water
Sample ID: MW-2 Date Received: 03/28/19 14:06

PARAMETERS	RESULTS	UNITS	RDL	DILUTION	PREPARED	BY	ANALYZED	BY	NOTES	MCL
WET CHEMISTRY										
Analysis Method: EPA 300.0 Rev. 2.1										
Batch: T085712										
Fluoride	**8.4**	**mg/L**	**1.0**	**50**	**03/29/19**	**dc**	**03/29/19**	**dc**		
Chloride	**130**	**mg/L**	**5.0**	**50**	**03/29/19**	**dc**	**03/29/19**	**dc**		
Sulfate as SO4	**0.95**	**mg/L**	**1.0**	**5**	**03/28/19**	**dc**	**03/28/19**	**dc**	**J**	
Analysis Method: SM 2540 C-11										
Batch: T085706										
Total Dissolved Solids	**1700**	**mg/L**	**10**	**1**	**03/29/19**	**dc**	**03/29/19**	**dc**		

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ANALYTICAL RESULTS

Trace Project ID: T19C661
Client Project ID: Monthly Monitoring Wells Sampling

Trace ID: T19C661-03 Date Collected: 03/28/19 10:05 Matrix: Ground Water
Sample ID: MW-3 Date Received: 03/28/19 14:06

PARAMETERS	RESULTS	UNITS	RDL	DILUTION	PREPARED	BY	ANALYZED	BY	NOTES	MCL
METALS, TOTAL										
Analysis Method: EPA 7470A										
Batch: T085943										
Mercury	<0.00020	mg/L	0.00020	1	04/05/19	dcl	04/10/19	rl		
METALS, TOTAL										
Analysis Method: EPA 6010D										
Batch: T086018										
Beryllium	<0.0010	mg/L	0.0010	1	04/11/19	dcl	04/12/19	rl		
Boron	**7.7**	**mg/L**	**1.0**	**100**	**04/11/19**	**dcl**	**04/15/19**	**rl**		
Calcium	**560**	**mg/L**	**50**	**100**	**04/11/19**	**dcl**	**04/15/19**	**rl**		
Iron	**20**	**mg/L**	**10**	**100**	**04/11/19**	**jm**	**04/15/19**	**rl**		
Lithium	**0.025**	**mg/L**	**0.010**	**1**	**04/11/19**	**dcl**	**04/12/19**	**rl**	**N**	
Zinc	<2.0	mg/L	2.0	100	04/11/19	jm	04/15/19	rl		
Analysis Method: EPA 6020B										
Batch: T086018										
Antimony	<0.00030	mg/L	0.00030	1	04/11/19	dcl	04/12/19	jbb		
Arsenic	**0.0019**	**mg/L**	**0.0010**	**1**	**04/11/19**	**dcl**	**04/12/19**	**jbb**		
Barium	**0.51**	**mg/L**	**0.00060**	**1**	**04/11/19**	**dcl**	**04/12/19**	**jbb**		
Cadmium	<0.000040	mg/L	0.000040	1	04/11/19	dcl	04/12/19	jbb		
Chromium	**0.0020**	**mg/L**	**0.00080**	**1**	**04/11/19**	**dcl**	**04/12/19**	**jbb**		
Cobalt	**0.00067**	**mg/L**	**0.0016**	**1**	**04/11/19**	**dcl**	**04/12/19**	**jbb**	**J**	
Copper	**0.00045**	**mg/L**	**0.00080**	**1**	**04/11/19**	**jm**	**05/02/19**	**jbb**	**J**	
Lead	**0.00012**	**mg/L**	**0.00040**	**1**	**04/11/19**	**dcl**	**04/12/19**	**jbb**	**J**	
Molybdenum	<0.0010	mg/L	0.0010	1	04/11/19	dcl	04/12/19	jbb	N	
Nickel	**0.0020**	**mg/L**	**0.00040**	**1**	**04/11/19**	**jm**	**05/02/19**	**jbb**		
Selenium	<0.00087	mg/L	0.00087	1	04/11/19	dcl	04/12/19	jbb		
Silver	<0.000040	mg/L	0.000040	1	04/11/19	jm	05/02/19	jbb		
Thallium	<0.000087	mg/L	0.000087	1	04/11/19	dcl	04/12/19	jbb		
Vanadium	**0.00081**	**mg/L**	**0.00080**	**1**	**04/11/19**	**jm**	**05/02/19**	**jbb**		

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ANALYTICAL RESULTS

Trace Project ID: T19C661
Client Project ID: Monthly Monitoring Wells Sampling

Trace ID: T19C661-03 Date Collected: 03/28/19 10:05 Matrix: Ground Water
Sample ID: MW-3 Date Received: 03/28/19 14:06

PARAMETERS	RESULTS	UNITS	RDL	DILUTION	PREPARED	BY	ANALYZED	BY	NOTES	MCL
WET CHEMISTRY										
Analysis Method: EPA 300.0 Rev. 2.1										
Batch: T085657										
Fluoride	**2.5**	**mg/L**	**0.10**	**5**	**03/28/19**	**dc**	**03/28/19**	**dc**		
Chloride	**430**	**mg/L**	**25**	**250**	**03/29/19**	**dc**	**03/29/19**	**dc**		
Sulfate as SO4	**280**	**mg/L**	**50**	**250**	**03/29/19**	**dc**	**03/29/19**	**dc**		
Analysis Method: SM 2540 C-11										
Batch: T085706										
Total Dissolved Solids	**2800**	**mg/L**	**10**	**1**	**03/29/19**	**dc**	**03/29/19**	**dc**		

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ANALYTICAL RESULTS

Trace Project ID: T19C661
Client Project ID: Monthly Monitoring Wells Sampling

Trace ID: T19C661-04 Date Collected: 03/28/19 09:10 Matrix: Ground Water
Sample ID: MW-4 Date Received: 03/28/19 14:06

PARAMETERS	RESULTS	UNITS	RDL	DILUTION	PREPARED	BY	ANALYZED	BY	NOTES	MCL
METALS, TOTAL										
Analysis Method: EPA 7470A										
Batch: T085943										
Mercury	<0.00020	mg/L	0.00020	1	04/05/19	dcl	04/10/19	rl		
METALS, TOTAL										
Analysis Method: EPA 6010D										
Batch: T086018										
Beryllium	<0.0010	mg/L	0.0010	1	04/11/19	dcl	04/12/19	rl		
Boron	**5.8**	**mg/L**	**1.0**	**100**	**04/11/19**	**dcl**	**04/15/19**	**rl**		
Calcium	**420**	**mg/L**	**50**	**100**	**04/11/19**	**dcl**	**04/15/19**	**rl**		
Iron	**8.7**	**mg/L**	**10**	**100**	**04/11/19**	**jm**	**04/15/19**	**rl**	**J**	
Lithium	**0.036**	**mg/L**	**0.010**	**1**	**04/11/19**	**dcl**	**04/12/19**	**rl**	**N**	
Zinc	<2.0	mg/L	2.0	100	04/11/19	jm	04/15/19	rl		
Analysis Method: EPA 6020B										
Batch: T086018										
Antimony	<0.00030	mg/L	0.00030	1	04/11/19	dcl	04/12/19	jbb		
Arsenic	**0.0013**	**mg/L**	**0.0010**	**1**	**04/11/19**	**dcl**	**04/12/19**	**jbb**		
Barium	**0.095**	**mg/L**	**0.00060**	**1**	**04/11/19**	**dcl**	**04/12/19**	**jbb**		
Cadmium	**0.000035**	**mg/L**	**0.000040**	**1**	**04/11/19**	**dcl**	**04/12/19**	**jbb**	**J**	
Chromium	**0.0019**	**mg/L**	**0.00080**	**1**	**04/11/19**	**dcl**	**04/12/19**	**jbb**		
Cobalt	**0.00022**	**mg/L**	**0.0016**	**1**	**04/11/19**	**dcl**	**04/12/19**	**jbb**	**J**	
Copper	**0.0015**	**mg/L**	**0.00080**	**1**	**04/11/19**	**jm**	**05/02/19**	**jbb**		
Lead	**0.00037**	**mg/L**	**0.00040**	**1**	**04/11/19**	**dcl**	**04/12/19**	**jbb**	**J**	
Molybdenum	<0.0010	mg/L	0.0010	1	04/11/19	dcl	04/12/19	jbb	N	
Nickel	**0.020**	**mg/L**	**0.00040**	**1**	**04/11/19**	**jm**	**05/02/19**	**jbb**		
Selenium	<0.00087	mg/L	0.00087	1	04/11/19	dcl	04/12/19	jbb		
Silver	**0.000015**	**mg/L**	**0.000040**	**1**	**04/11/19**	**jm**	**05/02/19**	**jbb**	**J**	
Thallium	<0.000087	mg/L	0.000087	1	04/11/19	dcl	04/12/19	jbb		
Vanadium	**0.00057**	**mg/L**	**0.00080**	**1**	**04/11/19**	**jm**	**05/02/19**	**jbb**	**J**	

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ANALYTICAL RESULTS

Trace Project ID: T19C661
Client Project ID: Monthly Monitoring Wells Sampling

Trace ID: T19C661-04 Date Collected: 03/28/19 09:10 Matrix: Ground Water
Sample ID: MW-4 Date Received: 03/28/19 14:06

PARAMETERS	RESULTS	UNITS	RDL	DILUTION	PREPARED	BY	ANALYZED	BY	NOTES	MCL
WET CHEMISTRY										
Analysis Method: EPA 300.0 Rev. 2.1										
Batch: T085657										
Fluoride	**1.0**	**mg/L**	**0.10**	**5**	**03/28/19**	**dc**	**03/28/19**	**dc**		
Chloride	**310**	**mg/L**	**12**	**125**	**03/29/19**	**dc**	**03/29/19**	**dc**		
Sulfate as SO4	**610**	**mg/L**	**25**	**125**	**03/29/19**	**dc**	**03/29/19**	**dc**		
Analysis Method: SM 2540 C-11										
Batch: T085706										
Total Dissolved Solids	**1900**	**mg/L**	**10**	**1**	**03/29/19**	**dc**	**03/29/19**	**dc**		

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ANALYTICAL RESULTS

Trace Project ID: T19C661
Client Project ID: Monthly Monitoring Wells Sampling

Trace ID: T19C661-05 Date Collected: 03/27/19 09:20 Matrix: Ground Water
Sample ID: MW-5 Date Received: 03/28/19 14:06

PARAMETERS	RESULTS	UNITS	RDL	DILUTION	PREPARED	BY	ANALYZED	BY	NOTES	MCL
METALS, TOTAL										
Analysis Method: EPA 7470A										
Batch: T085943										
Mercury	<0.00020	mg/L	0.00020	1	04/05/19	dcl	04/10/19	rl		
METALS, TOTAL										
Analysis Method: EPA 6010D										
Batch: T086018										
Beryllium	<0.0010	mg/L	0.0010	1	04/11/19	dcl	04/12/19	rl		
Boron	**4.1**	**mg/L**	**1.0**	**100**	**04/11/19**	**dcl**	**04/15/19**	**rl**		
Calcium	**630**	**mg/L**	**50**	**100**	**04/11/19**	**dcl**	**04/15/19**	**rl**		
Iron	**32**	**mg/L**	**10**	**100**	**04/11/19**	**jm**	**04/15/19**	**rl**		
Lithium	**0.11**	**mg/L**	**0.010**	**1**	**04/11/19**	**dcl**	**04/12/19**	**rl**	**N**	
Zinc	**0.22**	**mg/L**	**2.0**	**100**	**04/11/19**	**jm**	**04/15/19**	**rl**	**J**	
Analysis Method: EPA 6020B										
Batch: T086018										
Antimony	<0.00030	mg/L	0.00030	1	04/11/19	dcl	04/12/19	jbb		
Arsenic	**0.098**	**mg/L**	**0.0010**	**1**	**04/11/19**	**dcl**	**04/12/19**	**jbb**		
Barium	**0.082**	**mg/L**	**0.00060**	**1**	**04/11/19**	**dcl**	**04/12/19**	**jbb**		
Cadmium	**0.000018**	**mg/L**	**0.000040**	**1**	**04/11/19**	**dcl**	**04/12/19**	**jbb**	**J**	
Chromium	<0.00080	mg/L	0.00080	1	04/11/19	dcl	04/12/19	jbb		
Cobalt	**0.0060**	**mg/L**	**0.0016**	**1**	**04/11/19**	**dcl**	**04/12/19**	**jbb**		
Copper	**0.0027**	**mg/L**	**0.00080**	**1**	**04/11/19**	**jm**	**05/02/19**	**jbb**		
Lead	**0.00075**	**mg/L**	**0.00040**	**1**	**04/11/19**	**dcl**	**04/12/19**	**jbb**		
Molybdenum	**0.011**	**mg/L**	**0.0010**	**1**	**04/11/19**	**dcl**	**04/12/19**	**jbb**	**N**	
Nickel	**0.0063**	**mg/L**	**0.00040**	**1**	**04/11/19**	**jm**	**05/02/19**	**jbb**		
Selenium	<0.00087	mg/L	0.00087	1	04/11/19	dcl	04/12/19	jbb		
Silver	<0.000040	mg/L	0.000040	1	04/11/19	jm	05/02/19	jbb		
Thallium	<0.000087	mg/L	0.000087	1	04/11/19	dcl	04/12/19	jbb		
Vanadium	**0.0030**	**mg/L**	**0.00080**	**1**	**04/11/19**	**jm**	**05/02/19**	**jbb**		

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ANALYTICAL RESULTS

Trace Project ID: T19C661
Client Project ID: Monthly Monitoring Wells Sampling

Trace ID: T19C661-05 Date Collected: 03/27/19 09:20 Matrix: Ground Water
Sample ID: MW-5 Date Received: 03/28/19 14:06

PARAMETERS	RESULTS	UNITS	RDL	DILUTION	PREPARED	BY	ANALYZED	BY	NOTES	MCL
WET CHEMISTRY										
Analysis Method: EPA 300.0 Rev. 2.1										
Batch: T085657										
Fluoride	**2.7**	**mg/L**	**0.10**	**5**	**03/28/19**	**dc**	**03/28/19**	**dc**		
Chloride	**10**	**mg/L**	**0.50**	**5**	**03/28/19**	**dc**	**03/28/19**	**dc**		
Sulfate as SO4	**1300**	**mg/L**	**25**	**125**	**03/29/19**	**dc**	**03/29/19**	**dc**		
Analysis Method: SM 2540 C-11										
Batch: T085706										
Total Dissolved Solids	**2600**	**mg/L**	**10**	**1**	**03/29/19**	**dc**	**03/29/19**	**dc**		

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ANALYTICAL RESULTS

Trace Project ID: T19C661
Client Project ID: Monthly Monitoring Wells Sampling

Trace ID: T19C661-06 Date Collected: 03/27/19 10:10 Matrix: Ground Water
Sample ID: MW-6 Date Received: 03/28/19 14:06

PARAMETERS	RESULTS	UNITS	RDL	DILUTION	PREPARED	BY	ANALYZED	BY	NOTES	MCL
METALS, TOTAL										
Analysis Method: EPA 7470A										
Batch: T085943										
Mercury	<0.00020	mg/L	0.00020	1	04/05/19	dcl	04/10/19	rl		
METALS, TOTAL										
Analysis Method: EPA 6010D										
Batch: T086018										
Beryllium	<0.0010	mg/L	0.0010	1	04/11/19	dcl	04/12/19	rl		
Boron	**9.7**	**mg/L**	**1.0**	**100**	**04/11/19**	**dcl**	**04/15/19**	**rl**		
Calcium	**270**	**mg/L**	**50**	**100**	**04/11/19**	**dcl**	**04/15/19**	**rl**		
Iron	**13**	**mg/L**	**10**	**100**	**04/11/19**	**jm**	**04/15/19**	**rl**		
Lithium	**0.17**	**mg/L**	**0.010**	**1**	**04/11/19**	**dcl**	**04/12/19**	**rl**	**N**	
Zinc	<2.0	mg/L	2.0	100	04/11/19	jm	04/15/19	rl		
Analysis Method: EPA 6020B										
Batch: T086018										
Antimony	<0.00030	mg/L	0.00030	1	04/11/19	dcl	04/12/19	jbb		
Arsenic	**0.00097**	**mg/L**	**0.0010**	**1**	**04/11/19**	**dcl**	**04/12/19**	**jbb**	**J**	
Barium	**0.82**	**mg/L**	**0.00060**	**1**	**04/11/19**	**dcl**	**04/12/19**	**jbb**		
Cadmium	**0.000077**	**mg/L**	**0.000040**	**1**	**04/11/19**	**dcl**	**04/12/19**	**jbb**		
Chromium	**0.0016**	**mg/L**	**0.00080**	**1**	**04/11/19**	**dcl**	**04/12/19**	**jbb**		
Cobalt	**0.00058**	**mg/L**	**0.0016**	**1**	**04/11/19**	**dcl**	**04/12/19**	**jbb**	**J**	
Copper	**0.0034**	**mg/L**	**0.00080**	**1**	**04/11/19**	**jm**	**05/02/19**	**jbb**		
Lead	**0.00071**	**mg/L**	**0.00040**	**1**	**04/11/19**	**dcl**	**04/12/19**	**jbb**		
Molybdenum	<0.0010	mg/L	0.0010	1	04/11/19	dcl	04/12/19	jbb	N	
Nickel	**0.0019**	**mg/L**	**0.00040**	**1**	**04/11/19**	**jm**	**05/02/19**	**jbb**		
Selenium	<0.00087	mg/L	0.00087	1	04/11/19	dcl	04/12/19	jbb		
Silver	<0.000040	mg/L	0.000040	1	04/11/19	jm	05/02/19	jbb		
Thallium	**0.000064**	**mg/L**	**0.000087**	**1**	**04/11/19**	**dcl**	**04/12/19**	**jbb**	**J**	
Vanadium	**0.00029**	**mg/L**	**0.00080**	**1**	**04/11/19**	**jm**	**05/02/19**	**jbb**	**J**	

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ANALYTICAL RESULTS

Trace Project ID: T19C661
Client Project ID: Monthly Monitoring Wells Sampling

Trace ID: T19C661-06 Date Collected: 03/27/19 10:10 Matrix: Ground Water
Sample ID: MW-6 Date Received: 03/28/19 14:06

PARAMETERS	RESULTS	UNITS	RDL	DILUTION	PREPARED	BY	ANALYZED	BY	NOTES	MCL
WET CHEMISTRY										
Analysis Method: EPA 300.0 Rev. 2.1										
Batch: T085657										
Fluoride	**1.4**	**mg/L**	**0.10**	**5**	**03/28/19**	**dc**	**03/28/19**	**dc**		
Chloride	**250**	**mg/L**	**12**	**125**	**03/29/19**	**dc**	**03/29/19**	**dc**		
Sulfate as SO4	**160**	**mg/L**	**25**	**125**	**03/29/19**	**dc**	**03/29/19**	**dc**		
Analysis Method: SM 2540 C-11										
Batch: T085706										
Total Dissolved Solids	**1600**	**mg/L**	**10**	**1**	**03/29/19**	**dc**	**03/29/19**	**dc**		

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ANALYTICAL RESULTS

Trace Project ID: T19C661
Client Project ID: Monthly Monitoring Wells Sampling

Trace ID: T19C661-07 Date Collected: 03/27/19 08:37 Matrix: Ground Water
Sample ID: MW-7 Date Received: 03/28/19 14:06

PARAMETERS	RESULTS	UNITS	RDL	DILUTION	PREPARED	BY	ANALYZED	BY	NOTES	MCL
METALS, TOTAL										
Analysis Method: EPA 7470A										
Batch: T085943										
Mercury	<0.00020	mg/L	0.00020	1	04/05/19	dcl	04/10/19	rl		
METALS, TOTAL										
Analysis Method: EPA 6010D										
Batch: T086018										
Beryllium	<0.0010	mg/L	0.0010	1	04/11/19	dcl	04/12/19	rl		
Boron	**9.2**	**mg/L**	**1.0**	**100**	**04/11/19**	**dcl**	**04/15/19**	**rl**		
Calcium	**140**	**mg/L**	**50**	**100**	**04/11/19**	**dcl**	**04/15/19**	**rl**		
Iron	**19**	**mg/L**	**10**	**100**	**04/11/19**	**jm**	**04/15/19**	**rl**		
Lithium	**0.0094**	**mg/L**	**0.010**	**1**	**04/11/19**	**dcl**	**04/12/19**	**rl**	**J, N**	
Zinc	<2.0	mg/L	2.0	100	04/11/19	jm	04/15/19	rl		
Analysis Method: EPA 6020B										
Batch: T086018										
Antimony	<0.00030	mg/L	0.00030	1	04/11/19	dcl	04/12/19	jbb		
Arsenic	**0.00082**	**mg/L**	**0.0010**	**1**	**04/11/19**	**dcl**	**04/12/19**	**jbb**	**J**	
Barium	**0.28**	**mg/L**	**0.00060**	**1**	**04/11/19**	**dcl**	**04/12/19**	**jbb**		
Cadmium	<0.000040	mg/L	0.000040	1	04/11/19	dcl	04/12/19	jbb		
Chromium	**0.00037**	**mg/L**	**0.00080**	**1**	**04/11/19**	**dcl**	**04/12/19**	**jbb**	**J**	
Cobalt	**0.00088**	**mg/L**	**0.0016**	**1**	**04/11/19**	**dcl**	**04/12/19**	**jbb**	**J**	
Copper	**0.00059**	**mg/L**	**0.00080**	**1**	**04/11/19**	**jm**	**05/02/19**	**jbb**	**J**	
Lead	**0.000074**	**mg/L**	**0.00040**	**1**	**04/11/19**	**dcl**	**04/12/19**	**jbb**	**J**	
Molybdenum	**0.0043**	**mg/L**	**0.0010**	**1**	**04/11/19**	**dcl**	**04/12/19**	**jbb**	**N**	
Nickel	**0.00040**	**mg/L**	**0.00040**	**1**	**04/11/19**	**jm**	**05/02/19**	**jbb**		
Selenium	<0.00087	mg/L	0.00087	1	04/11/19	dcl	04/12/19	jbb		
Silver	**0.000034**	**mg/L**	**0.000040**	**1**	**04/11/19**	**jm**	**05/02/19**	**jbb**	**J**	
Thallium	<0.000087	mg/L	0.000087	1	04/11/19	dcl	04/12/19	jbb		
Vanadium	**0.00057**	**mg/L**	**0.00080**	**1**	**04/11/19**	**jm**	**05/02/19**	**jbb**	**J**	

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ANALYTICAL RESULTS

Trace Project ID: T19C661
Client Project ID: Monthly Monitoring Wells Sampling

Trace ID: T19C661-07 Date Collected: 03/27/19 08:37 Matrix: Ground Water
Sample ID: MW-7 Date Received: 03/28/19 14:06

PARAMETERS	RESULTS	UNITS	RDL	DILUTION	PREPARED	BY	ANALYZED	BY	NOTES	MCL
WET CHEMISTRY										
Analysis Method: EPA 300.0 Rev. 2.1										
Batch: T085657										
Fluoride	**0.092**	**mg/L**	**0.10**	**5**	**03/28/19**	**dc**	**03/28/19**	**dc**	**J**	
Chloride	**14**	**mg/L**	**0.50**	**5**	**03/28/19**	**dc**	**03/28/19**	**dc**		
Sulfate as SO4	**14**	**mg/L**	**1.0**	**5**	**03/28/19**	**dc**	**03/28/19**	**dc**		
Analysis Method: SM 2540 C-11										
Batch: T085706										
Total Dissolved Solids	**610**	**mg/L**	**10**	**1**	**03/29/19**	**dc**	**03/29/19**	**dc**		

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ANALYTICAL RESULTS

Trace Project ID: T19C661
Client Project ID: Monthly Monitoring Wells Sampling

Trace ID: T19C661-08 Date Collected: 03/28/19 10:40 Matrix: Ground Water
Sample ID: MW-8 Date Received: 03/28/19 14:06

PARAMETERS	RESULTS	UNITS	RDL	DILUTION	PREPARED	BY	ANALYZED	BY	NOTES	MCL
METALS, TOTAL										
Analysis Method: EPA 7470A										
Batch: T085943										
Mercury	<0.00020	mg/L	0.00020	1	04/05/19	dcl	04/10/19	rl		
METALS, TOTAL										
Analysis Method: EPA 6010D										
Batch: T086018										
Beryllium	**0.000089**	**mg/L**	**0.0010**	**1**	**04/11/19**	**dcl**	**04/12/19**	**rl**	**J**	
Boron	**0.90**	**mg/L**	**0.010**	**1**	**04/11/19**	**dcl**	**04/15/19**	**rl**		
Calcium	**95**	**mg/L**	**50**	**100**	**04/11/19**	**dcl**	**04/15/19**	**rl**		
Iron	**15**	**mg/L**	**10**	**100**	**04/11/19**	**jm**	**04/15/19**	**rl**		
Lithium	**0.024**	**mg/L**	**0.010**	**1**	**04/11/19**	**dcl**	**04/12/19**	**rl**	**N**	
Zinc	<2.0	mg/L	2.0	100	04/11/19	jm	04/15/19	rl		
Analysis Method: EPA 6020B										
Batch: T086018										
Antimony	<0.00030	mg/L	0.00030	1	04/11/19	dcl	04/12/19	jbb		
Arsenic	**0.0028**	**mg/L**	**0.0010**	**1**	**04/11/19**	**dcl**	**04/12/19**	**jbb**		
Barium	**0.50**	**mg/L**	**0.00060**	**1**	**04/11/19**	**dcl**	**04/12/19**	**jbb**		
Cadmium	<0.000040	mg/L	0.000040	1	04/11/19	dcl	04/12/19	jbb		
Chromium	**0.00050**	**mg/L**	**0.00080**	**1**	**04/11/19**	**dcl**	**04/12/19**	**jbb**	**J**	
Cobalt	**0.00022**	**mg/L**	**0.0016**	**1**	**04/11/19**	**dcl**	**04/12/19**	**jbb**	**J**	
Copper	**0.00094**	**mg/L**	**0.00080**	**1**	**04/11/19**	**jm**	**05/02/19**	**jbb**		
Lead	**0.00059**	**mg/L**	**0.00040**	**1**	**04/11/19**	**dcl**	**04/12/19**	**jbb**		
Molybdenum	**0.0045**	**mg/L**	**0.0010**	**1**	**04/11/19**	**dcl**	**04/12/19**	**jbb**	**N**	
Nickel	**0.0011**	**mg/L**	**0.00040**	**1**	**04/11/19**	**jm**	**05/02/19**	**jbb**		
Selenium	<0.00087	mg/L	0.00087	1	04/11/19	dcl	04/12/19	jbb		
Silver	**0.000028**	**mg/L**	**0.000040**	**1**	**04/11/19**	**jm**	**05/02/19**	**jbb**	**J**	
Thallium	<0.000087	mg/L	0.000087	1	04/11/19	dcl	04/12/19	jbb		
Vanadium	**0.00036**	**mg/L**	**0.00080**	**1**	**04/11/19**	**jm**	**05/02/19**	**jbb**	**J**	

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ANALYTICAL RESULTS

Trace Project ID: T19C661
Client Project ID: Monthly Monitoring Wells Sampling

Trace ID: T19C661-08 Date Collected: 03/28/19 10:40 Matrix: Ground Water
Sample ID: MW-8 Date Received: 03/28/19 14:06

PARAMETERS	RESULTS	UNITS	RDL	DILUTION	PREPARED	BY	ANALYZED	BY	NOTES	MCL
WET CHEMISTRY										
Analysis Method: EPA 300.0 Rev. 2.1										
Batch: T085657										
Fluoride	**0.40**	**mg/L**	**0.10**	**5**	**03/28/19**	**dc**	**03/28/19**	**dc**		
Chloride	**8.5**	**mg/L**	**0.50**	**5**	**03/28/19**	**dc**	**03/28/19**	**dc**		
Sulfate as SO4	**4.7**	**mg/L**	**1.0**	**5**	**03/28/19**	**dc**	**03/28/19**	**dc**		
Analysis Method: SM 2540 C-11										
Batch: T085706										
Total Dissolved Solids	**180**	**mg/L**	**10**	**1**	**03/29/19**	**dc**	**03/29/19**	**dc**		

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QUALITY CONTROL RESULTS

Trace Project ID: T19C661
Client Project ID: Monthly Monitoring Wells Sampling

QC Batch: T085943
QC Batch Method: EPA 7470A Prep
Analysis Description: Mercury, Total, EPA 7470/7471
Analysis Method: EPA 7470A

METHOD BLANK: T085943-BLK1

Parameter	Units	Blank Result	Reporting Limit	Notes
Mercury	mg/L	<0.00020	0.00020	

LABORATORY CONTROL SAMPLE: T085943-BS1

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limit	Notes
Mercury	mg/L	0.00200	0.00206	103	77-122	

Trace Project ID: T19C661
Client Project ID: Monthly Monitoring Wells Sampling

QC Batch: T086018
QC Batch Method: EPA 3015 Microwave Assisted Digestions for Liquids
Analysis Description: Zinc, Total
Analysis Method: EPA 6010D

METHOD BLANK: T086018-BLK1

Parameter	Units	Blank Result	Reporting Limit	Notes
Boron	mg/L	<0.010	0.010	
Beryllium	mg/L	<0.0010	0.0010	
Calcium	mg/L	<0.50	0.50	
Iron	mg/L	<0.10	0.10	
Lithium	**mg/L**	**0.0084**	**0.010**	**J**
Zinc	mg/L	<0.020	0.020	

LABORATORY CONTROL SAMPLE: T086018-BS1

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limit	Notes
Boron	mg/L	0.889	0.875	98	80-120	
Beryllium	mg/L	0.111	0.108	98	80-120	
Calcium	mg/L	8.89	9.41	106	80-120	
Iron	mg/L	8.89	9.38	105	80-120	
Lithium	mg/L	0.889	0.845	95	80-120	
Zinc	mg/L	0.889	0.928	104	80-120	

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MATRIX SPIKE: T086018-MS1 Original: **T19C661-01**

Parameter	Units	Original Result	Spike Conc.	MS Result	MS % Rec	% Rec Unit	Notes
Boron	**mg/L**	**108**	**0.889**	96.5	**-1260**	**75-125**	**243**
Beryllium	mg/L	0	0.111	0.113	102	75-125	
Calcium	**mg/L**	**147**	**8.89**	151	**48**	**75-125**	**243**
Iron	mg/L	0.331	8.89	9.15	99	75-125	
Lithium	mg/L	1.85	0.889	2.78	105	75-125	
Zinc	mg/L	0.0124	0.889	0.929	103	75-125	

Trace Project ID: T19C661
Client Project ID: Monthly Monitoring Wells Sampling

QC Batch: T086018
QC Batch Method: EPA 3015 Microwave Assisted Digestions for Liquids

Analysis Description: Vanadium, Total
Analysis Method: EPA 6020B

METHOD BLANK: T086018-BLK1

Parameter	Units	Blank Result	Reporting Limit	Notes
Silver	mg/L	<0.000040	0.000040	
Arsenic	mg/L	<0.0010	0.0010	
Barium	mg/L	<0.00060	0.00060	
Cadmium	mg/L	<0.000040	0.000040	
Cobalt	mg/L	<0.0016	0.0016	
Chromium	mg/L	<0.00080	0.00080	
Copper	**mg/L**	**0.00022**	**0.00080**	**J**
Molybdenum	mg/L	<0.0010	0.0010	
Nickel	mg/L	<0.00040	0.00040	
Lead	mg/L	<0.00040	0.00040	
Antimony	**mg/L**	**0.00010**	**0.00030**	**J**
Selenium	mg/L	<0.00087	0.00087	
Thallium	mg/L	<0.000087	0.000087	
Vanadium	mg/L	<0.00080	0.00080	

LABORATORY CONTROL SAMPLE: T086018-BS1

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limit	Notes
Silver	mg/L	0.0278	0.0304	110	80-120	
Arsenic	mg/L	0.0556	0.0527	95	80-120	
Barium	mg/L	0.889	0.865	97	80-120	
Cadmium	mg/L	0.0278	0.0233	84	80-120	
Cobalt	mg/L	0.889	0.824	93	80-120	
Chromium	mg/L	0.0278	0.0269	97	80-120	

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LABORATORY CONTROL SAMPLE: T086018-BS1

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limit	Notes
Copper	mg/L	0.889	0.822	93	80-120	
Molybdenum	mg/L	0.889	0.862	97	80-120	
Nickel	mg/L	0.889	0.837	94	80-120	
Lead	mg/L	0.0556	0.0541	97	80-120	
Antimony	mg/L	0.0556	0.0538	97	80-120	
Selenium	mg/L	0.0556	0.0524	94	80-120	
Thallium	mg/L	0.0556	0.0545	98	80-120	
Vanadium	mg/L	0.889	0.867	98	80-120	

MATRIX SPIKE: T086018-MS1 Original: **T19C661-01**

Parameter	Units	Original Result	Spike Conc.	MS Result	MS % Rec	% Rec Unit	Notes
Silver	mg/L	0.0000125	0.0278	0.0279	100	75-125	
Arsenic	mg/L	0.000328	0.0556	0.0550	98	75-125	
Barium	mg/L	0.303	0.889	1.19	99	75-125	
Cadmium	mg/L	0	0.0278	0.0232	83	75-125	
Cobalt	mg/L	0.000342	0.889	0.801	90	75-125	
Chromium	mg/L	0.000420	0.0278	0.0282	100	75-125	
Copper	mg/L	0.000309	0.889	0.761	86	75-125	
Molybdenum	mg/L	0.00137	0.889	0.927	104	75-125	
Nickel	mg/L	0.000684	0.889	0.777	87	75-125	
Lead	mg/L	0.000232	0.0556	0.0541	97	75-125	
Antimony	mg/L	0.000239	0.0556	0.0567	102	75-125	
Selenium	mg/L	0.000296	0.0556	0.0527	94	75-125	
Thallium	mg/L	0	0.0556	0.0563	101	75-125	
Vanadium	mg/L	0.000406	0.889	0.874	98	75-125	

Trace Project ID: T19C661
Client Project ID: Monthly Monitoring Wells Sampling

QC Batch: T085657
QC Batch Method: IC Prep W
Analysis Description: Sulfate
Analysis Method: EPA 300.0 Rev. 2.1

METHOD BLANK: T085657-BLK1

Parameter	Units	Blank Result	Reporting Limit	Notes
Chloride	**mg/L**	**0.047**	**0.10**	**J**
Fluoride	mg/L	<0.020	0.020	
Sulfate as SO4	mg/L	<0.20	0.20	

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LABORATORY CONTROL SAMPLE: T085657-BS1

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limit	Notes
Chloride	mg/L	1.00	1.04	104	90-110	
Fluoride	mg/L	0.500	0.543	109	90-110	
Sulfate as SO4	mg/L	2.50	2.35	94	90-110	

Trace Project ID: T19C661
Client Project ID: Monthly Monitoring Wells Sampling

QC Batch: T085712
QC Batch Method: IC Prep W
Analysis Description: Sulfate
Analysis Method: EPA 300.0 Rev. 2.1

METHOD BLANK: T085712-BLK1

Parameter	Units	Blank Result	Reporting Limit	Notes
Chloride	**mg/L**	**0.047**	**0.10**	**J**
Fluoride	mg/L	<0.020	0.020	
Sulfate as SO4	**mg/L**	**0.13**	**0.20**	**J**

LABORATORY CONTROL SAMPLE: T085712-BS1

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limit	Notes
Chloride	**mg/L**	**1.00**	**<10**	**104**	**90-110**	**J**
Fluoride	mg/L	0.500	0.520	104	90-110	
Sulfate as SO4	mg/L	2.50	2.40	96	90-110	

Trace Project ID: T19C661
Client Project ID: Monthly Monitoring Wells Sampling

QC Batch: T085706
QC Batch Method: SM 2540 C-11
Analysis Description: Total Dissolved Solids
Analysis Method: SM 2540 C-11

METHOD BLANK: T085706-BLK1

Parameter	Units	Blank Result	Reporting Limit	Notes
Total Dissolved Solids	mg/L	<10	10	

LABORATORY CONTROL SAMPLE: T085706-BS1

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limit	Notes
Total Dissolved Solids	mg/L	500	469	94	80-120	

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SAMPLE DUPLICATE: T085706-DUP1 Original: **T19C661-01**

Parameter	Units	Original Result	DUP Result	RPD	Max RPD	Notes
Total Dissolved Solids	mg/L	1590	1460	8	10	

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CHAIN-OF-CUSTODY RECORD

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Page 1 of

Trace ID No. T19C661

Report Results To:

Company Name: Grand Haven Board of Light and Power	
Report To: Paul Cederquist	
Mailing Address: 1700 Eaton Dr.	
City, State, Zip Code: Grand Haven, Mi. 49417	
Office Phone: 616-842-6355 Cell Phone:	
Email Address: pcederquist@ghblp.org	

Bill To:

PO #:
Contact Name:
Billing Address (if different):
City, State, Zip Code:
Phone Number:
Billing Email Address:

Trace Use:

Logged By: JS
Checked By: MB
Soil Volatiles Preserved (circle if applicable): MeOH Low Level Lab
Sampling Time:

Turnaround Requirements:

- [x] Standard
- [ ] 4 Day*
- [ ] 3 Day*
- [ ] 48 Hour*
- [ ] 24 Hour*

* *Requires Prior Approval*

Matrix Key:

S = Soil / Solid
W = Water
SL = Sludge
OI = Oil
WI = Wipes
LW = Liquid Waste
A = Air
D = Drinking Water

Project Name: Monthly Monitoring Wells Sampling

Sampled By: EB

Trace No.	Date Collected	Time Collected	Client Sample ID	Metals Field Filtered (Y / N)	Matrix	Number of Containers	Preservation: Cool	HCl	HNO_3	H_2SO_4	NaOH	Other	Analysis Requested: T-As, B, Ba, Be Ca, Cd +	Co, Cr, Hg, Li, Mo, Pb, Sb	Se, Tl, Chlorides, Fluoride	Sulfates, TDS +	Radium 226/228, & Combine Results	Remarks	Possible Health Hazards?
1	3-27-19	11:55	MW 1		GW	5	x		x				X	X	X	X		Radium Reporting:	
2	3-27-19	11:50	MW 2		GW	5	x		x				X	X	X	X		Combined Results	
3	3-27-19	10:05	MW 3		GW	5	x		x				X	X	X	X		J Values	
4	3-27-19	9:10	MW 4		GW	5	x		x				X	X	X	X		Excel Files	
5	3-27-19	9:20	MW 5		GW	5	x		x				X	X	X	X			
6	3-27-19	10:18	MW 6		GW	5	x		x				X	X	X	X			
7	3-27-19	8:37	MW 7		GW	5	x		x				X	X	X	X			
8	3-27-19	~~10:00~~	MW 8		GW	5	x		x				X	X	X	X			
		10:45																	
		EB																	

Please Sign	Released By	Received By	Date	Time	Released By	Received By	Date	Time
1)			3/28/19	14:06	2)			
3)					4)			

In executing this Chain of Custody, the client acknowledges the terms as set forth at www.trace-labs.com/terms-of-agreement.

☐ Check this box if you would not like your samples analyzed if received outside of the conditions outlined in the Trace Sample Acceptance Policy at www.trace-labs.com/downloads.

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Muskegon, MI 49444-2673

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231-773-5998 Phone
888-979-4469 Fax
www.trace-labs.com

Trace Analytical Laboratories: Low Flow Well Purging Field Measurements Form

Client: GHBLP | Date: 3-27-19 | Field Personnel: EB

Well No.: MW 1 | Depth to Point: 12.01' | Sample Tubing Depth: 10'

Depth to Water: 5.0 ft | Purge Start Time: 11:05 | Purge Rate: 300ml/1min

Reading Time	11:35	11:40	11:45	11:50					
Depth to Water	5.00	5.12	5.12	5.12					
Temperature (Celsius)	4.85	4.81	4.81	4.81					
Specific Conductivity	2.05	2.09	2.09	2.09					
Dissolved Oxygen	1.26	1.24	1.23	1.23					
ORP (mV)	-51	-68	-68	-68					
Turbidity(NTU)	2.52	1.51	.86	.79					
pH	7.61	7.61	7.61	7.60					

Stabilization Criteria:
Temperature: 3%
Spec. Conductivity: 3%
Dissolved Oxygen: 10%
ORP: +/- 10 mV
Turbidity: 10% or <1
pH: +/- 0.1

Notes:

Pump Used: Peristaltic

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Trace Analytical Laboratories: Low Flow Well Purging Field Measurements Form

Client: GHBLP | Date: 3-27-19 | Field Personnel: EB

Well No.: MW 2 | Depth to Point: 23.51' | Sample Tubing Depth: 20'

Depth to Water: 14.27 | Purge Start Time: 10:10 | Purge Rate: 300mL/1min

Reading Time	10:40	10:45	10:49	10:55					
Depth to Water	14.27	14.27	14.27	14.27					
Temperature (Celsius)	10.66	10.66	10.66	10.66					
Specific Conductivity	3.92	3.92	3.91	3.91					
Dissolved Oxygen	2.75	2.17	2.17	2.17					
ORP (mV)	-56	-56	-56	-56					
Turbidity(NTU)	2.93	1.22	.68	.62					
pH	7.44	7.47	7.49	7.52					

Stabilization Criteria:
Temperature: 3%
Spec. Conductivity: 3%
Dissolved Oxygen: 10%
ORP: +/- 10 mV
Turbidity: 10% or <1
pH: +/- 0.1

Notes:

Pump Used: Peristaltic

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Trace Analytical Laboratories: Low Flow Well Purging Field Measurements Form

Client: GHBLP | Date: 3-27-19 | Field Personnel: EB

Well No.: MW 5 | Depth to Point: 11.5' | Sample Tubing Depth: 10'

Depth to Water: 5.45 | Purge Start Time: 8:50 | Purge Rate: 300mLs/1min

Reading Time	9:10	9:15	9:20						
Depth to Water	5.45	5.45	5.45						
Temperature (Celsius)	4.41	4.40	4.41						
Specific Conductivity	2.98	2.98	2.98						
Dissolved Oxygen	5.23	5.25	5.23						
ORP (mV)	10	10	10						
Turbidity(NTU)	3.12	1.15	.79						
pH	7.97	7.96	7.97						

Stabilization Criteria:
Temperature: 3%
Spec. Conductivity: 3%
Dissolved Oxygen: 10%
ORP: +/- 10 mV
Turbidity: 10% or <1
pH: +/- 0.1

Notes:

Pump Used: Peristaltic

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Trace Analytical Laboratories: Low Flow Well Purging Field Measurements Form

Client: GHBLP | Date: 3-27-19 | Field Personnel: EB

Well No.: MW 6 | Depth to Point: 16.55' | Sample Tubing Depth: 14'

Depth to Water: 8.22 | Purge Start Time: 9:28 | Purge Rate: 300ml / 1min

Reading Time	9:55	10:00	10:05						
Depth to Water	8.22	8.22	8.22						
Temperature (Celsius)	7.69	7.68	7.67						
Specific Conductivity	2.58	2.58	2.59						
Dissolved Oxygen	1.19	1.19	1.19						
ORP (mV)	-66	-66	-65						
Turbidity(NTU)	4.12	1.17	.92						
pH	7.82	7.79	7.78						

Stabilization Criteria:
Temperature: 3%
Spec. Conductivity: 3%
Dissolved Oxygen: 10%
ORP: +/- 10 mV
Turbidity: 10% or <1
pH: +/- 0.1

Notes:

Pump Used: Peristaltic

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Trace Analytical Laboratories: Low Flow Well Purging Field Measurements Form

Client: GHBLP | Date: 3-27-19 | Field Personnel: EB

Well No.: MW 7 | Depth to Point: 18.81' | Sample Tubing Depth: 16'

Depth to Water: 5.55 | Purge Start Time: 8:15 | Purge Rate: 300ml/1min

Reading Time	8:25	8:30	8:35						
Depth to Water	5.55	5.55	5.55						
Temperature (Celsius)	7.96	8.21	8.21						
Specific Conductivity	1.369	1359	13.57						
Dissolved Oxygen	6.20	6.17	6.15						
ORP (mV)	16	16	16						
Turbidity(NTU)	1.23	.97	.96						
pH	8.02	8.04	8.05						

Stabilization Criteria:
Temperature: 3%
Spec. Conductivity: 3%
Dissolved Oxygen: 10%
ORP: +/- 10 mV
Turbidity: 10% or <1
pH: +/- 0.1

Notes:

Pump Used: Peristaltic

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Trace Analytical Laboratories: Low Flow Well Purging Field Measurements Form

Client: GHBLP | Date: 3-28-19 | Field Personnel: EB

Well No.: MW 3 | Depth to Point: 20.5' | Sample Tubing Depth: 18'

Depth to Water: 12.10 | Purge Start Time: 9:15 | Purge Rate: 300mL/1min

Reading Time	9:45	9:50	9:55						
Depth to Water	12.10	12.10	12.10						
Temperature (Celsius)	9.60	9.60	9.60						
Specific Conductivity	4.44	4.43	4.43						
Dissolved Oxygen	6.31	6.29	6.28						
ORP (mV)	-87	-87	-87						
Turbidity(NTU)	2.17	.92							
pH	7.82	7.81	7.81						

Stabilization Criteria:
Temperature: 3%
Spec. Conductivity: 3%
Dissolved Oxygen: 10%
ORP: +/- 10 mV
Turbidity: 10% or <1
pH: +/- 0.1

Notes:

Pump Used: Peristaltic

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Trace Analytical Laboratories: Low Flow Well Purging Field Measurements Form

Client: GHBLP | Date: 3-28-19 | Field Personnel: EB

Well No.: MW 4 | Depth to Point: 18.01' | Sample Tubing Depth: 16'

Depth to Water: 10.35 | Purge Start Time: 8:20 | Purge Rate: 300mL / 1min

Reading Time	8:55	9:00	9:05						
Depth to Water	10.35	10.35	10.35						
Temperature (Celsius)	7.18	7.18	7.18						
Specific Conductivity	2.97	2.96	296						
Dissolved Oxygen	4.04	4.01	4.06						
ORP (mV)	-51	-57	-58						
Turbidity(NTU)	3.21	1.02	.87						
pH	7.91	7.91	7.90						

Stabilization Criteria:
Temperature: 3%
Spec. Conductivity: 3%
Dissolved Oxygen: 10%
ORP: +/- 10 mV
Turbidity: 10% or <1
pH: +/- 0.1

Notes:

Pump Used: Peristaltic

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Trace Analytical Laboratories: Low Flow Well Purging Field Measurements Form

Client: GHBLP | Date: 3-28-19 | Field Personnel: EB

Well No.: MW 8 | Depth to Point: 11.85' | Sample Tubing Depth: 10'

Depth to Water: 4.44 | Purge Start Time: 9:55 | Purge Rate: 300 mL/1 min

Reading Time	10:20	10:25	10:30						
Depth to Water	4.44	4.44	4.44						
Temperature (Celsius)	6.99	6.99	6.98						
Specific Conductivity	.637	.637	.636						
Dissolved Oxygen	6.77	6.70	6.61						
ORP (mV)	-105	-105	~104						
Turbidity(NTU)	1.91	1.06	.25						
pH	7.79	7.82	7.81						

Stabilization Criteria:
Temperature: 3%
Spec. Conductivity: 3%
Dissolved Oxygen: 10%
ORP: +/- 10 mV
Turbidity: 10% or <1
pH: +/- 0.1

Notes:

Pump Used: Peristaltic

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SAMPLE LOG IN CHECKLIST

Trace ID #: T19C661 Date: 3-25-19 Package Description: Cooler Temperature: 2.1
Client Name: Grand Haven - BLP Time: 14:06 Logged in by: MB

Cooler Receipt

Cooler/samples delivered by: Trace courier [X]
Hand delivered [ ] Name of delivery person: _____
Commercial courier [ ] UPS [ ] FED EX [ ] US Mail [ ]

Tracking Number: [X] Not Applicable
Tracking #: _____

COC Seals present and intact on cooler? [X] Not Applicable [ ] No [ ] Yes
Custody seals signed by Client? [ ] No [ ] Yes Client custody seal # (if applicable): _____

Coolant and Temperature

Type of Coolant Used

Slurry w/ crushed, cubed, or chip ice? [X]
Multiple bags of ice around samples? [ ]
Ice Packs/ Blue Ice : [ ]
No Coolant Present: [ ]

Ice still present upon receipt (circle one): (Yes) No N/A

Cooler Temperature

Correction Factors: •Digital Stick Thermometer CF = -0.4°C
•IR Thermometer CF = -0.8°C

Representative Sample Temperature: 2.1 °C (check one below)
[ ] Temp Blank (Stick Thermometer)
[X] Client Sample (IR Thermometer)

Melt Water: N/A °C (Use Digital Stick Thermometer)

General

	Yes	No	NA	Comments
All bottles arrived unbroken with labels in good condition?	X			
Each sample point is in a sealed plastic bag?			X	
Labels filled out completely?	X			
All bottle labels agree with Chain of Custody (COC)?	X			
Sufficient sample to run tests requested?	X			
*pH checked and samples at correct pH?	X			
Correct preservative added to samples?	X			
Air bubbles absent from VOAs?		X		
COC filled out properly and signed by client?	X			
COC signed in by TRACE sample custodian?	X			
Was project manager called and samples discussed?			X	

Notes:

*EMD pH Test Strips Used:
[X] pH 0-2.5 Lot: HC862115 [ ] pH 11.0-13.0 Lot: HC600691
[ ] Other: _____

Form 70-A.26
Effective 3/14/19

TRACE Analytical Laboratories, Inc.

CERTIFICATE OF ANALYSIS

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October 24, 2019

Mr. Paul Cederquist
Grand Haven Board of Light and Power-Monthly MWs
1700 Eaton Drive
Grand Haven, MI 49417

Phone: 616-607-1292
Fax: (616) 842-3511

RE: Trace Project 19I0862
Client Project MW Sampling - September 2019

Dear Mr. Cederquist:

Enclosed are your analytical results. The results of this report relate only to the samples listed in the body of this report.

All reports were examined through Trace's validation process to ensure that requirements for quality and completeness were satisfied. All reported analytical results were obtained in accordance with the methods referenced on the reports. Every practical effort was made to meet the reporting limit specifications for this work, however, some results may have raised reporting limits to correct for percent solids.

For clients that require NELAP Accreditation, Trace certifies that these test results meet all requirements of the NELAP Standard, except for those analytes with a "N" notation. These analytes have not been evaluated by NELAP at Trace's discretion and will not be reported unless requested by client.

If you have questions concerning this report, please contact me at 231.773.5998 or by email at jmink@trace-labs.com.

Sincerely,

Jon Mink
Senior Project Manager
Enclosures

ACCREDITED IN ACCORDANCE WITH nelac

NJDEP Accreditation No. MI008

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SAMPLE SUMMARY

Trace Project ID: 19I0862
Client Project ID: MW Sampling - September 2019

Trace ID	Sample ID	Matrix	Collected By	Date Collected	Date Received
19I0862-01	MW-1	Ground Water	eb	09/27/19 12:55	09/27/19 15:24
19I0862-02	MW-2	Ground Water	eb	09/27/19 14:20	09/27/19 15:24
19I0862-03	MW-5	Ground Water	eb	09/27/19 12:20	09/27/19 15:24
19I0862-04	MW-6	Ground Water	eb	09/27/19 13:30	09/27/19 15:24
19I0862-05	MW-7	Ground Water	eb	09/27/19 11:40	09/27/19 15:24
19I0862-06	MW-3	Ground Water	eb	09/30/19 13:55	09/27/19 15:24
19I0862-07	MW-4	Ground Water	eb	09/30/19 14:35	09/27/19 15:24
19I0862-08	MW-8	Ground Water	eb	09/30/19 15:15	09/27/19 15:24
19I0862-09	MW-9	Ground Water	eb	09/30/19 13:20	09/27/19 15:24
19I0862-10	MW-10	Ground Water	eb	09/30/19 12:55	09/27/19 15:24

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AN EXPLANATION OF TERMS AND SYMBOLS WHICH MAY OCCUR IN THIS REPORT

DEFINITIONS

LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
MS	Matrix Spike
MSD	Matrix Spike Duplicate
RPD	Relative Percent Difference
DUP	Matrix Duplicate
RDL	Reporting Detection Limit
MCL	Maximum Contamination Limit
TIC	Tentatively Identified Compound
<, ND or U	Indicates the compound was analyzed for but not detected
*	Indicates a result that exceeds its associated MCL or Surrogate control limits
N	Indicates that the compound has not been evaluated by NELAC
NA	Indicates that the compound is not available.

NOTE: Samples for volatiles that have been extracted with a water miscible solvent were corrected for the total volume of the solvent/water mixture.
Solid matrices Method Blanks are at 100% solids as such results are the same wet or dry.

DATA QUALIFIERS

Trace ID: 19I0862-01

Analysis: EPA 6020B

Nickel	Note B : Analyte is found in the associated blank as well as in the sample (CLP B-flag).
Silver	Note B : Analyte is found in the associated blank as well as in the sample (CLP B-flag).

Analysis: SM 4500-H+ B-11

pH	Note SITE : The analysis was performed on site at the time of sampling.

Trace ID: 19I0862-02

Analysis: EPA 6020B

Nickel	Note B : Analyte is found in the associated blank as well as in the sample (CLP B-flag).
Silver	Note B : Analyte is found in the associated blank as well as in the sample (CLP B-flag).

Analysis: SM 4500-H+ B-11

pH	Note SITE : The analysis was performed on site at the time of sampling.

Trace ID: 19I0862-03

Analysis: EPA 6020B

Nickel	Note B : Analyte is found in the associated blank as well as in the sample (CLP B-flag).

CERTIFICATE OF ANALYSIS

Silver	Note B : Analyte is found in the associated blank as well as in the sample (CLP B-flag).
Analysis: SM 4500-H+ B-11	
pH	Note SITE : The analysis was performed on site at the time of sampling.

Trace ID: 19I0862-04

Analysis: EPA 6020B	
Nickel	Note B : Analyte is found in the associated blank as well as in the sample (CLP B-flag).
Silver	Note B : Analyte is found in the associated blank as well as in the sample (CLP B-flag).
Analysis: SM 4500-H+ B-11	
pH	Note SITE : The analysis was performed on site at the time of sampling.

Trace ID: 19I0862-05

Analysis: EPA 6020B	
Nickel	Note B : Analyte is found in the associated blank as well as in the sample (CLP B-flag).
Silver	Note B : Analyte is found in the associated blank as well as in the sample (CLP B-flag).
Analysis: SM 4500-H+ B-11	
pH	Note SITE : The analysis was performed on site at the time of sampling.

Trace ID: 19I0862-06

Analysis: EPA 6020B	
Nickel	Note B : Analyte is found in the associated blank as well as in the sample (CLP B-flag).
Silver	Note B : Analyte is found in the associated blank as well as in the sample (CLP B-flag).
Analysis: SM 2540 C-11	
Total Dissolved Solids	Note 623 : The relative percent difference between the sample and sample duplicate is out of control. The sample result should be considered estimated.
Analysis: SM 4500-H+ B-11	
pH	Note SITE : The analysis was performed on site at the time of sampling.

Trace ID: 19I0862-07

Analysis: EPA 6020B	
Nickel	Note B : Analyte is found in the associated blank as well as in the sample (CLP B-flag).
Silver	Note B : Analyte is found in the associated blank as well as in the sample (CLP B-flag).
Analysis: SM 4500-H+ B-11	
pH	Note SITE : The analysis was performed on site at the time of sampling.

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Trace ID: 19I0862-08

Analysis: EPA 6020B

Nickel	Note B : Analyte is found in the associated blank as well as in the sample (CLP B-flag).

Analysis: SM 4500-H+ B-11

pH	Note SITE : The analysis was performed on site at the time of sampling.

Trace ID: 19I0862-09

Analysis: EPA 6020B

Nickel	Note B : Analyte is found in the associated blank as well as in the sample (CLP B-flag).

Analysis: SM 4500-H+ B-11

pH	Note SITE : The analysis was performed on site at the time of sampling.

Trace ID: 19I0862-10

Analysis: EPA 6020B

Nickel	Note B : Analyte is found in the associated blank as well as in the sample (CLP B-flag).

Analysis: SM 4500-H+ B-11

pH	Note SITE : The analysis was performed on site at the time of sampling.

Trace ID: T091544-BS1

Analysis: EPA 6020B

Nickel	Note B : Analyte is found in the associated blank as well as in the sample (CLP B-flag).
Silver	Note B : Analyte is found in the associated blank as well as in the sample (CLP B-flag).

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ANALYTICAL RESULTS

Trace Project ID: 19I0862
Client Project ID: MW Sampling - September 2019

Trace ID: 19I0862-01 Date Collected: 09/27/19 12:55 Matrix: Ground Water
Sample ID: MW-1 Date Received: 09/27/19 15:24

PARAMETERS	RESULTS	UNITS	RDL	DILUTION	PREPARED	BY	ANALYZED	BY	NOTES	MCL
METALS, TOTAL										
Analysis Method: EPA 7470A										
Batch: T091542										
Mercury	<0.00020	mg/L	0.00020	1	10/01/19	gmr	10/02/19	ckd	N	
METALS, TOTAL										
Analysis Method: EPA 6010D										
Batch: T091544										
Beryllium	<0.0010	mg/L	0.0010	1	10/01/19	gmr	10/08/19	ckd		
Boron	**140**	**mg/L**	**0.10**	**10**	**10/01/19**	**gmr**	**10/09/19**	**ckd**		
Calcium	**110**	**mg/L**	**5.0**	**10**	**10/01/19**	**gmr**	**10/09/19**	**ckd**		
Iron	**0.26**	**mg/L**	**0.10**	**1**	**10/01/19**	**gmr**	**10/08/19**	**ckd**		
Lithium	**2.3**	**mg/L**	**0.010**	**1**	**10/01/19**	**gmr**	**10/08/19**	**ckd**	**N**	
Magnesium	**79**	**mg/L**	**2.0**	**10**	**10/01/19**	**gmr**	**10/09/19**	**ckd**		
Potassium	**70**	**mg/L**	**10**	**10**	**10/01/19**	**gmr**	**10/09/19**	**ckd**		
Sodium	**280**	**mg/L**	**5.0**	**10**	**10/01/19**	**gmr**	**10/09/19**	**ckd**		
Zinc	**0.0023**	**mg/L**	**0.020**	**1**	**10/01/19**	**gmr**	**10/08/19**	**ckd**	**J**	
Analysis Method: EPA 6020B										
Batch: T091544										
Antimony	**0.00013**	**mg/L**	**0.00030**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**	**J**	
Arsenic	**0.00057**	**mg/L**	**0.0010**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**	**J**	
Barium	**0.67**	**mg/L**	**0.00060**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**		
Cadmium	**0.00090**	**mg/L**	**0.000040**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**		
Chromium	**0.00068**	**mg/L**	**0.00080**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**	**J**	
Cobalt	**0.00092**	**mg/L**	**0.0016**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**	**J**	
Copper	**0.00078**	**mg/L**	**0.00080**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**	**J**	
Lead	**0.00074**	**mg/L**	**0.00040**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**		
Molybdenum	**0.0019**	**mg/L**	**0.0010**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**	**N**	
Nickel	**0.0012**	**mg/L**	**0.0020**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**	**J, B**	
Selenium	<0.00087	mg/L	0.00087	1	10/01/19	gmr	10/04/19	rl		
Silver	**0.000023**	**mg/L**	**0.000040**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**	**J, B**	
Thallium	<0.000087	mg/L	0.000087	1	10/01/19	gmr	10/04/19	rl		
Vanadium	**0.0012**	**mg/L**	**0.00080**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**		

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ANALYTICAL RESULTS

Trace Project ID: 19I0862
Client Project ID: MW Sampling - September 2019

Trace ID: 19I0862-01 | Date Collected: 09/27/19 12:55 | Matrix: Ground Water
Sample ID: MW-1 | Date Received: 09/27/19 15:24

PARAMETERS	RESULTS	UNITS	RDL	DILUTION	PREPARED	BY	ANALYZED	BY	NOTES	MCL
METALS, TOTAL										
WET CHEMISTRY										
Analysis Method: EPA 300.0 Rev. 2.1										
Batch: T091442										
Fluoride	**18**	**mg/L**	**0.10**	**5**	**09/27/19**	**dc**	**09/27/19**	**dc**		
Chloride	**120**	**mg/L**	**5.0**	**50**	**09/30/19**	**dc**	**09/30/19**	**jma**		
Sulfate as SO4	**3.7**	**mg/L**	**3.0**	**5**	**09/27/19**	**dc**	**09/27/19**	**dc**		
Analysis Method: SM 2320 B-11										
Batch: T091608										
Bicarbonate Alkalinity as CaCO3 at pH 4.5	**1000**	**mg/L**	**10**	**1**	**10/03/19**	**dc**	**10/03/19**	**dc**	**N**	
Carbonate Alkalinity as CaCO3 at pH 8.2	<10	mg/L	10	1	10/03/19	dc	10/03/19	dc	N	
Analysis Method: SM 2540 C-11										
Batch: T091536										
Total Dissolved Solids	**1700**	**mg/L**	**20**	**2**	**10/01/19**	**nw**	**10/01/19**	**nw**		
Analysis Method: SM 4500-H+ B-11										
Batch: T091465										
pH	**7.41**	**pH Units**		**1**	**09/27/19**	**tb**	**09/27/19**	**tb**	**SITE, N**	

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ANALYTICAL RESULTS

Trace Project ID: 19I0862
Client Project ID: MW Sampling - September 2019

Trace ID: 19I0862-02 Date Collected: 09/27/19 14:20 Matrix: Ground Water
Sample ID: MW-2 Date Received: 09/27/19 15:24

PARAMETERS	RESULTS	UNITS	RDL	DILUTION	PREPARED	BY	ANALYZED	BY	NOTES	MCL
METALS, TOTAL										
Analysis Method: EPA 7470A										
Batch: T091542										
Mercury	<0.00020	mg/L	0.00020	1	10/01/19	gmr	10/02/19	ckd	N	
METALS, TOTAL										
Analysis Method: EPA 6010D										
Batch: T091544										
Beryllium	**0.000061**	**mg/L**	**0.0010**	**1**	**10/01/19**	**gmr**	**10/08/19**	**ckd**	**J**	
Boron	**130**	**mg/L**	**0.10**	**10**	**10/01/19**	**gmr**	**10/09/19**	**ckd**		
Calcium	**200**	**mg/L**	**5.0**	**10**	**10/01/19**	**gmr**	**10/09/19**	**ckd**		
Iron	**18**	**mg/L**	**0.10**	**1**	**10/01/19**	**gmr**	**10/08/19**	**ckd**		
Lithium	**1.4**	**mg/L**	**0.010**	**1**	**10/01/19**	**gmr**	**10/08/19**	**ckd**	**N**	
Magnesium	**58**	**mg/L**	**2.0**	**10**	**10/01/19**	**gmr**	**10/09/19**	**ckd**		
Potassium	**56**	**mg/L**	**10**	**10**	**10/01/19**	**gmr**	**10/09/19**	**ckd**		
Sodium	**340**	**mg/L**	**5.0**	**10**	**10/01/19**	**gmr**	**10/09/19**	**ckd**		
Zinc	**0.0099**	**mg/L**	**0.020**	**1**	**10/01/19**	**gmr**	**10/08/19**	**ckd**	**J**	
Analysis Method: EPA 6020B										
Batch: T091544										
Antimony	**0.00050**	**mg/L**	**0.00030**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**		
Arsenic	**0.0085**	**mg/L**	**0.0010**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**		
Barium	**0.45**	**mg/L**	**0.00060**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**		
Cadmium	**0.0011**	**mg/L**	**0.000040**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**		
Chromium	**0.054**	**mg/L**	**0.00080**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**		
Cobalt	**0.0075**	**mg/L**	**0.0016**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**		
Copper	**0.0033**	**mg/L**	**0.00080**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**		
Lead	**0.0026**	**mg/L**	**0.00040**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**		
Molybdenum	**0.0070**	**mg/L**	**0.0010**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**	**N**	
Nickel	**0.028**	**mg/L**	**0.0020**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**	**B**	
Selenium	**0.0024**	**mg/L**	**0.00087**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**		
Silver	**0.000036**	**mg/L**	**0.000040**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**	**J, B**	
Thallium	<0.000087	mg/L	0.000087	1	10/01/19	gmr	10/04/19	rl		
Vanadium	**0.0059**	**mg/L**	**0.00080**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**		

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ANALYTICAL RESULTS

Trace Project ID: 19I0862
Client Project ID: MW Sampling - September 2019

Trace ID: 19I0862-02 | Date Collected: 09/27/19 14:20 | Matrix: Ground Water
Sample ID: MW-2 | Date Received: 09/27/19 15:24

PARAMETERS	RESULTS	UNITS	RDL	DILUTION	PREPARED	BY	ANALYZED	BY	NOTES	MCL
METALS, TOTAL										
WET CHEMISTRY										
Analysis Method: EPA 300.0 Rev. 2.1										
Batch: T091442										
Fluoride	**13**	**mg/L**	**0.10**	**5**	**09/27/19**	**dc**	**09/27/19**	**dc**		
Chloride	**150**	**mg/L**	**5.0**	**50**	**09/30/19**	**dc**	**09/30/19**	**jma**		
Sulfate as SO4	<3.0	mg/L	3.0	5	09/27/19	dc	09/27/19	dc		
Analysis Method: SM 2320 B-11										
Batch: T091608										
Bicarbonate Alkalinity as CaCO3 at pH 4.5	**2400**	**mg/L**	**10**	**2**	**10/03/19**	**dc**	**10/03/19**	**dc**	**N**	
Carbonate Alkalinity as CaCO3 at pH 8.2	<10	mg/L	10	1	10/03/19	dc	10/03/19	dc	N	
Analysis Method: SM 2540 C-11										
Batch: T091536										
Total Dissolved Solids	**2100**	**mg/L**	**19**	**1.923077**	**10/01/19**	**nw**	**10/01/19**	**nw**		
Analysis Method: SM 4500-H+ B-11										
Batch: T091465										
pH	**7.91**	**pH Units**		**1**	**09/27/19**	**tb**	**09/27/19**	**tb**	**SITE, N**	

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ANALYTICAL RESULTS

Trace Project ID: 19I0862
Client Project ID: MW Sampling - September 2019

Trace ID: 19I0862-03 Date Collected: 09/27/19 12:20 Matrix: Ground Water
Sample ID: MW-5 Date Received: 09/27/19 15:24

PARAMETERS	RESULTS	UNITS	RDL	DILUTION	PREPARED	BY	ANALYZED	BY	NOTES	MCL
METALS, TOTAL										
Analysis Method: EPA 7470A										
Batch: T091542										
Mercury	<0.00020	mg/L	0.00020	1	10/01/19	gmr	10/02/19	ckd	N	
METALS, TOTAL										
Analysis Method: EPA 6010D										
Batch: T091544										
Beryllium	<0.0010	mg/L	0.0010	1	10/01/19	gmr	10/08/19	ckd		
Boron	**2.8**	**mg/L**	**0.010**	**1**	**10/01/19**	**gmr**	**10/08/19**	**ckd**		
Calcium	**240**	**mg/L**	**5.0**	**10**	**10/01/19**	**gmr**	**10/09/19**	**ckd**		
Iron	**1.5**	**mg/L**	**0.10**	**1**	**10/01/19**	**gmr**	**10/08/19**	**ckd**		
Lithium	<0.010	mg/L	0.010	1	10/01/19	gmr	10/08/19	ckd	N	
Magnesium	**38**	**mg/L**	**1.0**	**1**	**10/01/19**	**gmr**	**10/08/19**	**ckd**		
Potassium	**10**	**mg/L**	**1.0**	**1**	**10/01/19**	**gmr**	**10/08/19**	**ckd**		
Sodium	**27**	**mg/L**	**1.0**	**1**	**10/01/19**	**gmr**	**10/08/19**	**ckd**		
Zinc	**0.0025**	**mg/L**	**0.020**	**1**	**10/01/19**	**gmr**	**10/08/19**	**ckd**	**J**	
Analysis Method: EPA 6020B										
Batch: T091544										
Antimony	<0.00030	mg/L	0.00030	1	10/01/19	gmr	10/04/19	rl		
Arsenic	**0.076**	**mg/L**	**0.0010**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**		
Barium	**0.14**	**mg/L**	**0.00060**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**		
Cadmium	<0.000040	mg/L	0.000040	1	10/01/19	gmr	10/04/19	rl		
Chromium	<0.00080	mg/L	0.00080	1	10/01/19	gmr	10/04/19	rl		
Cobalt	**0.00015**	**mg/L**	**0.0016**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**	**J**	
Copper	**0.00028**	**mg/L**	**0.00080**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**	**J**	
Lead	**0.00029**	**mg/L**	**0.00040**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**	**J**	
Molybdenum	**0.0029**	**mg/L**	**0.0010**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**	**N**	
Nickel	**0.00054**	**mg/L**	**0.0020**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**	**J, B**	
Selenium	<0.00087	mg/L	0.00087	1	10/01/19	gmr	10/04/19	rl		
Silver	**0.000016**	**mg/L**	**0.000040**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**	**J, B**	
Thallium	<0.000087	mg/L	0.000087	1	10/01/19	gmr	10/04/19	rl		
Vanadium	**0.0013**	**mg/L**	**0.00080**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**		

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ANALYTICAL RESULTS

Trace Project ID: 19I0862
Client Project ID: MW Sampling - September 2019

Trace ID: 19I0862-03 | Date Collected: 09/27/19 12:20 | Matrix: Ground Water
Sample ID: MW-5 | Date Received: 09/27/19 15:24

PARAMETERS	RESULTS	UNITS	RDL	DILUTION	PREPARED	BY	ANALYZED	BY	NOTES	MCL
METALS, TOTAL										
WET CHEMISTRY										
Analysis Method: EPA 300.0 Rev. 2.1										
Batch: T091442										
Fluoride	**2.4**	**mg/L**	**0.10**	**5**	**09/27/19**	**dc**	**09/27/19**	**dc**		
Chloride	**13**	**mg/L**	**0.50**	**5**	**09/30/19**	**dc**	**09/30/19**	**jma**		
Sulfate as SO4	**100**	**mg/L**	**3.0**	**5**	**09/27/19**	**dc**	**09/27/19**	**dc**		
Analysis Method: SM 2320 B-11										
Batch: T091608										
Bicarbonate Alkalinity as CaCO3 at pH 4.5	**690**	**mg/L**	**10**	**1**	**10/03/19**	**dc**	**10/03/19**	**dc**	**N**	
Carbonate Alkalinity as CaCO3 at pH 8.2	<10	mg/L	10	1	10/03/19	dc	10/03/19	dc	N	
Analysis Method: SM 2540 C-11										
Batch: T091536										
Total Dissolved Solids	**870**	**mg/L**	**20**	**2**	**10/01/19**	**nw**	**10/01/19**	**nw**		
Analysis Method: SM 4500-H+ B-11										
Batch: T091465										
pH	**7.29**	**pH Units**		**1**	**09/27/19**	**tb**	**09/27/19**	**tb**	**SITE, N**	

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ANALYTICAL RESULTS

Trace Project ID: 19I0862
Client Project ID: MW Sampling - September 2019

Trace ID: 19I0862-04 Date Collected: 09/27/19 13:30 Matrix: Ground Water
Sample ID: MW-6 Date Received: 09/27/19 15:24

PARAMETERS	RESULTS	UNITS	RDL	DILUTION	PREPARED	BY	ANALYZED	BY	NOTES	MCL
METALS, TOTAL										
Analysis Method: EPA 7470A										
Batch: T091542										
Mercury	<0.00020	mg/L	0.00020	1	10/01/19	gmr	10/02/19	ckd	N	
METALS, TOTAL										
Analysis Method: EPA 6010D										
Batch: T091544										
Beryllium	<0.0010	mg/L	0.0010	1	10/01/19	gmr	10/08/19	ckd		
Boron	**15**	**mg/L**	**0.010**	**1**	**10/01/19**	**gmr**	**10/08/19**	**ckd**		
Calcium	**210**	**mg/L**	**5.0**	**10**	**10/01/19**	**gmr**	**10/09/19**	**ckd**		
Iron	**11**	**mg/L**	**0.10**	**1**	**10/01/19**	**gmr**	**10/08/19**	**ckd**		
Lithium	**0.20**	**mg/L**	**0.010**	**1**	**10/01/19**	**gmr**	**10/08/19**	**ckd**	**N**	
Magnesium	**110**	**mg/L**	**2.0**	**10**	**10/01/19**	**gmr**	**10/09/19**	**ckd**		
Potassium	**40**	**mg/L**	**1.0**	**1**	**10/01/19**	**gmr**	**10/08/19**	**ckd**		
Sodium	**110**	**mg/L**	**5.0**	**10**	**10/01/19**	**gmr**	**10/09/19**	**ckd**		
Zinc	**0.011**	**mg/L**	**0.020**	**1**	**10/01/19**	**gmr**	**10/08/19**	**ckd**	**J**	
Analysis Method: EPA 6020B										
Batch: T091544										
Antimony	**0.00010**	**mg/L**	**0.00030**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**	**J**	
Arsenic	**0.00098**	**mg/L**	**0.0010**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**	**J**	
Barium	**1.1**	**mg/L**	**0.00060**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**		
Cadmium	<0.000040	mg/L	0.000040	1	10/01/19	gmr	10/04/19	rl		
Chromium	**0.0038**	**mg/L**	**0.00080**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**		
Cobalt	**0.00055**	**mg/L**	**0.0016**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**	**J**	
Copper	**0.0012**	**mg/L**	**0.00080**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**		
Lead	**0.0031**	**mg/L**	**0.00040**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**		
Molybdenum	<0.0010	mg/L	0.0010	1	10/01/19	gmr	10/04/19	rl	N	
Nickel	**0.0024**	**mg/L**	**0.0020**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**	**B**	
Selenium	<0.00087	mg/L	0.00087	1	10/01/19	gmr	10/04/19	rl		
Silver	**0.000024**	**mg/L**	**0.000040**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**	**J, B**	
Thallium	<0.000087	mg/L	0.000087	1	10/01/19	gmr	10/04/19	rl		
Vanadium	**0.00066**	**mg/L**	**0.00080**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**	**J**	

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ANALYTICAL RESULTS

Trace Project ID: 19I0862
Client Project ID: MW Sampling - September 2019

Trace ID: 19I0862-04 | Date Collected: 09/27/19 13:30 | Matrix: Ground Water
Sample ID: MW-6 | Date Received: 09/27/19 15:24

PARAMETERS	RESULTS	UNITS	RDL	DILUTION	PREPARED	BY	ANALYZED	BY	NOTES	MCL
METALS, TOTAL										
WET CHEMISTRY										
Analysis Method: EPA 300.0 Rev. 2.1										
Batch: T091442										
Fluoride	**1.7**	**mg/L**	**0.10**	**5**	**09/27/19**	**dc**	**09/27/19**	**dc**		
Chloride	**210**	**mg/L**	**10**	**100**	**09/30/19**	**dc**	**09/30/19**	**jma**		
Sulfate as SO4	<3.0	mg/L	3.0	5	09/27/19	dc	09/27/19	dc		
Analysis Method: SM 2320 B-11										
Batch: T091608										
Bicarbonate Alkalinity as CaCO3 at pH 4.5	**970**	**mg/L**	**10**	**1**	**10/03/19**	**dc**	**10/03/19**	**dc**	**N**	
Carbonate Alkalinity as CaCO3 at pH 8.2	<10	mg/L	10	1	10/03/19	dc	10/03/19	dc	N	
Analysis Method: SM 2540 C-11										
Batch: T091536										
Total Dissolved Solids	**1400**	**mg/L**	**20**	**2**	**10/01/19**	**nw**	**10/02/19**	**nw**		
Analysis Method: SM 4500-H+ B-11										
Batch: T091465										
pH	**7.16**	**pH Units**		**1**	**09/27/19**	**tb**	**09/27/19**	**tb**	**SITE, N**	

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ANALYTICAL RESULTS

Trace Project ID: 19I0862
Client Project ID: MW Sampling - September 2019

Trace ID: 19I0862-05 Date Collected: 09/27/19 11:40 Matrix: Ground Water
Sample ID: MW-7 Date Received: 09/27/19 15:24

PARAMETERS	RESULTS	UNITS	RDL	DILUTION	PREPARED	BY	ANALYZED	BY	NOTES	MCL
METALS, TOTAL										
Analysis Method: EPA 7470A										
Batch: T091542										
Mercury	<0.00020	mg/L	0.00020	1	10/01/19	gmr	10/02/19	ckd	N	
METALS, TOTAL										
Analysis Method: EPA 6010D										
Batch: T091544										
Beryllium	<0.0010	mg/L	0.0010	1	10/01/19	gmr	10/08/19	ckd		
Boron	**11**	**mg/L**	**0.010**	**1**	**10/01/19**	**gmr**	**10/08/19**	**ckd**		
Calcium	**140**	**mg/L**	**5.0**	**10**	**10/01/19**	**gmr**	**10/09/19**	**ckd**		
Iron	**21**	**mg/L**	**0.10**	**1**	**10/01/19**	**gmr**	**10/08/19**	**ckd**		
Lithium	<0.010	mg/L	0.010	1	10/01/19	gmr	10/08/19	ckd	N	
Magnesium	**34**	**mg/L**	**1.0**	**1**	**10/01/19**	**gmr**	**10/08/19**	**ckd**		
Potassium	**4.8**	**mg/L**	**1.0**	**1**	**10/01/19**	**gmr**	**10/08/19**	**ckd**		
Sodium	**46**	**mg/L**	**1.0**	**1**	**10/01/19**	**gmr**	**10/08/19**	**ckd**		
Zinc	**0.0023**	**mg/L**	**0.020**	**1**	**10/01/19**	**gmr**	**10/08/19**	**ckd**	**J**	
Analysis Method: EPA 6020B										
Batch: T091544										
Antimony	<0.00030	mg/L	0.00030	1	10/01/19	gmr	10/04/19	rl		
Arsenic	**0.00085**	**mg/L**	**0.0010**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**	**J**	
Barium	**0.35**	**mg/L**	**0.00060**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**		
Cadmium	<0.000040	mg/L	0.000040	1	10/01/19	gmr	10/04/19	rl		
Chromium	<0.00080	mg/L	0.00080	1	10/01/19	gmr	10/04/19	rl		
Cobalt	**0.00091**	**mg/L**	**0.0016**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**	**J**	
Copper	**0.00046**	**mg/L**	**0.00080**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**	**J**	
Lead	**0.000057**	**mg/L**	**0.00040**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**	**J**	
Molybdenum	<0.0010	mg/L	0.0010	1	10/01/19	gmr	10/04/19	rl	N	
Nickel	**0.00042**	**mg/L**	**0.0020**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**	**J, B**	
Selenium	<0.00087	mg/L	0.00087	1	10/01/19	gmr	10/04/19	rl		
Silver	**0.000022**	**mg/L**	**0.000040**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**	**J, B**	
Thallium	<0.000087	mg/L	0.000087	1	10/01/19	gmr	10/04/19	rl		
Vanadium	**0.00076**	**mg/L**	**0.00080**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**	**J**	

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ANALYTICAL RESULTS

Trace Project ID: 19I0862
Client Project ID: MW Sampling - September 2019

Trace ID: 19I0862-05 Date Collected: 09/27/19 11:40 Matrix: Ground Water
Sample ID: MW-7 Date Received: 09/27/19 15:24

PARAMETERS	RESULTS	UNITS	RDL	DILUTION	PREPARED	BY	ANALYZED	BY	NOTES	MCL
METALS, TOTAL										
WET CHEMISTRY										
Analysis Method: EPA 300.0 Rev. 2.1										
Batch: T091442										
Fluoride	**0.14**	**mg/L**	**0.10**	**5**	**09/27/19**	**dc**	**09/27/19**	**dc**		
Chloride	**14**	**mg/L**	**0.50**	**5**	**09/30/19**	**dc**	**09/30/19**	**jma**		
Sulfate as SO4	**26**	**mg/L**	**3.0**	**5**	**09/27/19**	**dc**	**09/27/19**	**dc**		
Analysis Method: SM 2320 B-11										
Batch: T091608										
Bicarbonate Alkalinity as CaCO3 at pH 4.5	**610**	**mg/L**	**10**	**1**	**10/03/19**	**dc**	**10/03/19**	**dc**	**N**	
Carbonate Alkalinity as CaCO3 at pH 8.2	<10	mg/L	10	1	10/03/19	dc	10/03/19	dc	N	
Analysis Method: SM 2540 C-11										
Batch: T091536										
Total Dissolved Solids	**690**	**mg/L**	**20**	**2**	**10/01/19**	**nw**	**10/02/19**	**nw**		
Analysis Method: SM 4500-H+ B-11										
Batch: T091465										
pH	**7.57**	**pH Units**		**1**	**09/27/19**	**tb**	**09/27/19**	**tb**	**SITE, N**	

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ANALYTICAL RESULTS

Trace Project ID: 19I0862
Client Project ID: MW Sampling - September 2019

Trace ID: 19I0862-06 | Date Collected: 09/30/19 13:55 | Matrix: Ground Water
Sample ID: MW-3 | Date Received: 09/27/19 15:24

PARAMETERS	RESULTS	UNITS	RDL	DILUTION	PREPARED	BY	ANALYZED	BY	NOTES	MCL
METALS, TOTAL										
Analysis Method: EPA 7470A										
Batch: T091542										
Mercury	<0.00020	mg/L	0.00020	1	10/01/19	gmr	10/02/19	ckd	N	
METALS, TOTAL										
Analysis Method: EPA 6010D										
Batch: T091544										
Beryllium	<0.0010	mg/L	0.0010	1	10/01/19	gmr	10/08/19	ckd		
Boron	**3.3**	**mg/L**	**0.010**	**1**	**10/01/19**	**gmr**	**10/08/19**	**ckd**		
Calcium	**500**	**mg/L**	**10**	**20**	**10/01/19**	**gmr**	**10/09/19**	**ckd**		
Iron	**8.1**	**mg/L**	**0.10**	**1**	**10/01/19**	**gmr**	**10/08/19**	**ckd**		
Lithium	<0.010	mg/L	0.010	1	10/01/19	gmr	10/08/19	ckd	N	
Magnesium	**210**	**mg/L**	**2.0**	**10**	**10/01/19**	**gmr**	**10/09/19**	**ckd**		
Potassium	**24**	**mg/L**	**1.0**	**1**	**10/01/19**	**gmr**	**10/08/19**	**ckd**		
Sodium	**140**	**mg/L**	**5.0**	**10**	**10/01/19**	**gmr**	**10/09/19**	**ckd**		
Zinc	**0.00081**	**mg/L**	**0.020**	**1**	**10/01/19**	**gmr**	**10/08/19**	**ckd**	**J**	
Analysis Method: EPA 6020B										
Batch: T091544										
Antimony	<0.00030	mg/L	0.00030	1	10/01/19	gmr	10/04/19	rl		
Arsenic	**0.0018**	**mg/L**	**0.0010**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**		
Barium	**0.51**	**mg/L**	**0.00060**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**		
Cadmium	<0.000040	mg/L	0.000040	1	10/01/19	gmr	10/04/19	rl		
Chromium	**0.0023**	**mg/L**	**0.00080**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**		
Cobalt	**0.00098**	**mg/L**	**0.0016**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**	**J**	
Copper	**0.00078**	**mg/L**	**0.00080**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**	**J**	
Lead	**0.000089**	**mg/L**	**0.00040**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**	**J**	
Molybdenum	<0.0010	mg/L	0.0010	1	10/01/19	gmr	10/04/19	rl	N	
Nickel	**0.0030**	**mg/L**	**0.0020**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**	**B**	
Selenium	<0.00087	mg/L	0.00087	1	10/01/19	gmr	10/04/19	rl		
Silver	**0.000026**	**mg/L**	**0.000040**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**	**J, B**	
Thallium	<0.000087	mg/L	0.000087	1	10/01/19	gmr	10/04/19	rl		
Vanadium	**0.0020**	**mg/L**	**0.00080**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**		

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ANALYTICAL RESULTS

Trace Project ID: 19I0862
Client Project ID: MW Sampling - September 2019

Trace ID: 19I0862-06 | Date Collected: 09/30/19 13:55 | Matrix: Ground Water
Sample ID: MW-3 | Date Received: 09/27/19 15:24

PARAMETERS	RESULTS	UNITS	RDL	DILUTION	PREPARED	BY	ANALYZED	BY	NOTES	MCL
METALS, TOTAL										
WET CHEMISTRY										
Analysis Method: EPA 300.0 Rev. 2.1										
Batch: T091520										
Fluoride	**0.61**	**mg/L**	**0.10**	**5**	**10/01/19**	**jma**	**10/01/19**	**jma**		
Chloride	**360**	**mg/L**	**20**	**200**	**10/01/19**	**jma**	**10/01/19**	**jma**		
Sulfate as SO4	**49**	**mg/L**	**3.0**	**5**	**10/01/19**	**jma**	**10/01/19**	**jma**		
Analysis Method: SM 2320 B-11										
Batch: T091608										
Bicarbonate Alkalinity as CaCO3 at pH 4.5	**1800**	**mg/L**	**10**	**1**	**10/03/19**	**dc**	**10/03/19**	**dc**	**N**	
Carbonate Alkalinity as CaCO3 at pH 8.2	<10	mg/L	10	1	10/03/19	dc	10/03/19	dc	N	
Analysis Method: SM 2540 C-11										
Batch: T091536										
Total Dissolved Solids	**2900**	**mg/L**	**20**	**2**	**10/01/19**	**nw**	**10/02/19**	**nw**	**623**	
Analysis Method: SM 4500-H+ B-11										
Batch: T091465										
pH	**7.74**	**pH Units**		**1**	**09/30/19**	**tb**	**09/30/19**	**tb**	**SITE, N**	

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ANALYTICAL RESULTS

Trace Project ID: 19I0862
Client Project ID: MW Sampling - September 2019

Trace ID: 19I0862-07 Date Collected: 09/30/19 14:35 Matrix: Ground Water
Sample ID: MW-4 Date Received: 09/27/19 15:24

PARAMETERS	RESULTS	UNITS	RDL	DILUTION	PREPARED	BY	ANALYZED	BY	NOTES	MCL
METALS, TOTAL										
Analysis Method: EPA 7470A										
Batch: T091542										
Mercury	<0.00020	mg/L	0.00020	1	10/01/19	gmr	10/02/19	ckd	N	
METALS, TOTAL										
Analysis Method: EPA 6010D										
Batch: T091544										
Beryllium	<0.0010	mg/L	0.0010	1	10/01/19	gmr	10/08/19	ckd		
Boron	**3.7**	**mg/L**	**0.010**	**1**	**10/01/19**	**gmr**	**10/08/19**	**ckd**		
Calcium	**440**	**mg/L**	**5.0**	**10**	**10/01/19**	**gmr**	**10/09/19**	**ckd**		
Iron	**7.4**	**mg/L**	**0.10**	**1**	**10/01/19**	**gmr**	**10/08/19**	**ckd**		
Lithium	<0.010	mg/L	0.010	1	10/01/19	gmr	10/08/19	ckd	N	
Magnesium	**110**	**mg/L**	**2.0**	**10**	**10/01/19**	**gmr**	**10/09/19**	**ckd**		
Potassium	**25**	**mg/L**	**1.0**	**1**	**10/01/19**	**gmr**	**10/08/19**	**ckd**		
Sodium	**79**	**mg/L**	**5.0**	**10**	**10/01/19**	**gmr**	**10/09/19**	**ckd**		
Zinc	**0.0030**	**mg/L**	**0.020**	**1**	**10/01/19**	**gmr**	**10/08/19**	**ckd**	**J**	
Analysis Method: EPA 6020B										
Batch: T091544										
Antimony	<0.00030	mg/L	0.00030	1	10/01/19	gmr	10/04/19	rl		
Arsenic	**0.0013**	**mg/L**	**0.0010**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**		
Barium	**0.14**	**mg/L**	**0.00060**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**		
Cadmium	<0.000040	mg/L	0.000040	1	10/01/19	gmr	10/04/19	rl		
Chromium	**0.0026**	**mg/L**	**0.00080**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**		
Cobalt	**0.00032**	**mg/L**	**0.0016**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**	**J**	
Copper	**0.00085**	**mg/L**	**0.00080**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**		
Lead	**0.00030**	**mg/L**	**0.00040**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**	**J**	
Molybdenum	**0.0017**	**mg/L**	**0.0010**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**	**N**	
Nickel	**0.017**	**mg/L**	**0.0020**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**	**B**	
Selenium	<0.00087	mg/L	0.00087	1	10/01/19	gmr	10/04/19	rl		
Silver	**0.000014**	**mg/L**	**0.000040**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**	**J, B**	
Thallium	<0.000087	mg/L	0.000087	1	10/01/19	gmr	10/04/19	rl		
Vanadium	**0.00088**	**mg/L**	**0.00080**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**		

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ANALYTICAL RESULTS

Trace Project ID: 19I0862
Client Project ID: MW Sampling - September 2019

Trace ID: 19I0862-07 | Date Collected: 09/30/19 14:35 | Matrix: Ground Water
Sample ID: MW-4 | Date Received: 09/27/19 15:24

PARAMETERS	RESULTS	UNITS	RDL	DILUTION	PREPARED	BY	ANALYZED	BY	NOTES	MCL
METALS, TOTAL										
WET CHEMISTRY										
Analysis Method: EPA 300.0 Rev. 2.1										
Batch: T091520										
Fluoride	**1.2**	**mg/L**	**0.10**	**5**	**10/01/19**	**jma**	**10/01/19**	**jma**		
Chloride	**250**	**mg/L**	**10**	**100**	**10/01/19**	**jma**	**10/01/19**	**jma**		
Sulfate as SO4	**700**	**mg/L**	**60**	**100**	**10/01/19**	**jma**	**10/01/19**	**jma**		
Analysis Method: SM 2320 B-11										
Batch: T091608										
Bicarbonate Alkalinity as CaCO3 at pH 4.5	**640**	**mg/L**	**10**	**1**	**10/03/19**	**dc**	**10/03/19**	**dc**	**N**	
Carbonate Alkalinity as CaCO3 at pH 8.2	<10	mg/L	10	1	10/03/19	dc	10/03/19	dc	N	
Analysis Method: SM 2540 C-11										
Batch: T091536										
Total Dissolved Solids	**2000**	**mg/L**	**20**	**2**	**10/01/19**	**nw**	**10/01/19**	**nw**		
Analysis Method: SM 4500-H+ B-11										
Batch: T091465										
pH	**7.69**	**pH Units**		**1**	**09/30/19**	**tb**	**09/30/19**	**tb**	**SITE, N**	

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ANALYTICAL RESULTS

Trace Project ID: 19I0862
Client Project ID: MW Sampling - September 2019

Trace ID: 19I0862-08 Date Collected: 09/30/19 15:15 Matrix: Ground Water
Sample ID: MW-8 Date Received: 09/27/19 15:24

PARAMETERS	RESULTS	UNITS	RDL	DILUTION	PREPARED	BY	ANALYZED	BY	NOTES	MCL
METALS, TOTAL										
Analysis Method: EPA 7470A										
Batch: T091542										
Mercury	<0.00020	mg/L	0.00020	1	10/01/19	gmr	10/02/19	ckd	N	
METALS, TOTAL										
Analysis Method: EPA 6010D										
Batch: T091544										
Beryllium	<0.0010	mg/L	0.0010	1	10/01/19	gmr	10/08/19	ckd		
Boron	**1.6**	**mg/L**	**0.010**	**1**	**10/01/19**	**gmr**	**10/08/19**	**ckd**		
Calcium	**130**	**mg/L**	**5.0**	**10**	**10/01/19**	**gmr**	**10/09/19**	**ckd**		
Iron	**21**	**mg/L**	**0.10**	**1**	**10/01/19**	**gmr**	**10/08/19**	**ckd**		
Lithium	<0.010	mg/L	0.010	1	10/01/19	gmr	10/08/19	ckd	N	
Magnesium	**16**	**mg/L**	**1.0**	**1**	**10/01/19**	**gmr**	**10/08/19**	**ckd**		
Potassium	**8.9**	**mg/L**	**1.0**	**1**	**10/01/19**	**gmr**	**10/08/19**	**ckd**		
Sodium	**22**	**mg/L**	**1.0**	**1**	**10/01/19**	**gmr**	**10/08/19**	**ckd**		
Zinc	**0.0026**	**mg/L**	**0.020**	**1**	**10/01/19**	**gmr**	**10/08/19**	**ckd**	**J**	
Analysis Method: EPA 6020B										
Batch: T091544										
Antimony	<0.00030	mg/L	0.00030	1	10/01/19	gmr	10/04/19	rl		
Arsenic	**0.0065**	**mg/L**	**0.0010**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**		
Barium	**0.68**	**mg/L**	**0.00060**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**		
Cadmium	<0.000040	mg/L	0.000040	1	10/01/19	gmr	10/04/19	rl		
Chromium	**0.00051**	**mg/L**	**0.00080**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**	**J**	
Cobalt	**0.00036**	**mg/L**	**0.0016**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**	**J**	
Copper	**0.00084**	**mg/L**	**0.00080**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**		
Lead	**0.00046**	**mg/L**	**0.00040**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**		
Molybdenum	**0.0046**	**mg/L**	**0.0010**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**	**N**	
Nickel	**0.0013**	**mg/L**	**0.0020**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**	**J, B**	
Selenium	<0.00087	mg/L	0.00087	1	10/01/19	gmr	10/04/19	rl		
Silver	<0.000040	mg/L	0.000040	1	10/01/19	gmr	10/04/19	rl		
Thallium	<0.000087	mg/L	0.000087	1	10/01/19	gmr	10/04/19	rl		
Vanadium	**0.00049**	**mg/L**	**0.00080**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**	**J**	

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ANALYTICAL RESULTS

Trace Project ID: 19I0862
Client Project ID: MW Sampling - September 2019

Trace ID: 19I0862-08 | Date Collected: 09/30/19 15:15 | Matrix: Ground Water
Sample ID: MW-8 | Date Received: 09/27/19 15:24

PARAMETERS	RESULTS	UNITS	RDL	DILUTION	PREPARED	BY	ANALYZED	BY	NOTES	MCL
METALS, TOTAL										
WET CHEMISTRY										
Analysis Method: EPA 300.0 Rev. 2.1										
Batch: T091520										
Fluoride	**0.57**	**mg/L**	**0.10**	**5**	**10/01/19**	**jma**	**10/01/19**	**jma**		
Chloride	**18**	**mg/L**	**0.50**	**5**	**10/01/19**	**jma**	**10/01/19**	**jma**		
Sulfate as SO4	<3.0	mg/L	3.0	5	10/01/19	jma	10/01/19	jma		
Analysis Method: SM 2320 B-11										
Batch: T091608										
Bicarbonate Alkalinity as CaCO3 at pH 4.5	**390**	**mg/L**	**10**	**1**	**10/03/19**	**dc**	**10/03/19**	**dc**	**N**	
Carbonate Alkalinity as CaCO3 at pH 8.2	<10	mg/L	10	1	10/03/19	dc	10/03/19	dc	N	
Analysis Method: SM 2540 C-11										
Batch: T091536										
Total Dissolved Solids	**480**	**mg/L**	**20**	**2**	**10/01/19**	**nw**	**10/02/19**	**nw**		
Analysis Method: SM 4500-H+ B-11										
Batch: T091465										
pH	**7.96**	**pH Units**		**1**	**09/30/19**	**tb**	**09/30/19**	**tb**	**SITE, N**	

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ANALYTICAL RESULTS

Trace Project ID: 19I0862
Client Project ID: MW Sampling - September 2019

Trace ID: 19I0862-09 Date Collected: 09/30/19 13:20 Matrix: Ground Water
Sample ID: MW-9 Date Received: 09/27/19 15:24

PARAMETERS	RESULTS	UNITS	RDL	DILUTION	PREPARED	BY	ANALYZED	BY	NOTES	MCL
METALS, TOTAL										
Analysis Method: EPA 7470A										
Batch: T091542										
Mercury	<0.00020	mg/L	0.00020	1	10/01/19	gmr	10/02/19	ckd	N	
METALS, TOTAL										
Analysis Method: EPA 6010D										
Batch: T091544										
Beryllium	<0.0010	mg/L	0.0010	1	10/01/19	gmr	10/08/19	ckd		
Boron	**6.9**	**mg/L**	**0.010**	**1**	**10/01/19**	**gmr**	**10/08/19**	**ckd**		
Calcium	**280**	**mg/L**	**5.0**	**10**	**10/01/19**	**gmr**	**10/09/19**	**ckd**		
Iron	**20**	**mg/L**	**0.10**	**1**	**10/01/19**	**gmr**	**10/08/19**	**ckd**		
Lithium	**0.16**	**mg/L**	**0.010**	**1**	**10/01/19**	**gmr**	**10/08/19**	**ckd**	**N**	
Magnesium	**55**	**mg/L**	**2.0**	**10**	**10/01/19**	**gmr**	**10/09/19**	**ckd**		
Potassium	**19**	**mg/L**	**1.0**	**1**	**10/01/19**	**gmr**	**10/08/19**	**ckd**		
Sodium	**39**	**mg/L**	**1.0**	**1**	**10/01/19**	**gmr**	**10/08/19**	**ckd**		
Zinc	**0.0064**	**mg/L**	**0.020**	**1**	**10/01/19**	**gmr**	**10/08/19**	**ckd**	**J**	
Analysis Method: EPA 6020B										
Batch: T091544										
Antimony	<0.00030	mg/L	0.00030	1	10/01/19	gmr	10/04/19	rl		
Arsenic	**0.0035**	**mg/L**	**0.0010**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**		
Barium	**1.8**	**mg/L**	**0.00060**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**		
Cadmium	<0.000040	mg/L	0.000040	1	10/01/19	gmr	10/04/19	rl		
Chromium	**0.0025**	**mg/L**	**0.00080**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**		
Cobalt	**0.0022**	**mg/L**	**0.0016**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**		
Copper	**0.0013**	**mg/L**	**0.00080**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**		
Lead	**0.0020**	**mg/L**	**0.00040**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**		
Molybdenum	**0.012**	**mg/L**	**0.0010**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**	**N**	
Nickel	**0.0015**	**mg/L**	**0.0020**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**	**J, B**	
Selenium	<0.00087	mg/L	0.00087	1	10/01/19	gmr	10/04/19	rl		
Silver	<0.000040	mg/L	0.000040	1	10/01/19	gmr	10/04/19	rl		
Thallium	<0.000087	mg/L	0.000087	1	10/01/19	gmr	10/04/19	rl		
Vanadium	**0.0021**	**mg/L**	**0.00080**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**		

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Trace Analytical Laboratories, Inc.
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ANALYTICAL RESULTS

Trace Project ID: 19I0862
Client Project ID: MW Sampling - September 2019

Trace ID: 19I0862-09 | Date Collected: 09/30/19 13:20 | Matrix: Ground Water
Sample ID: MW-9 | Date Received: 09/27/19 15:24

PARAMETERS	RESULTS	UNITS	RDL	DILUTION	PREPARED	BY	ANALYZED	BY	NOTES	MCL
METALS, TOTAL										
WET CHEMISTRY										
Analysis Method: EPA 300.0 Rev. 2.1										
Batch: T091520										
Fluoride	**2.3**	**mg/L**	**0.10**	**5**	**10/01/19**	**jma**	**10/01/19**	**jma**		
Chloride	**18**	**mg/L**	**0.50**	**5**	**10/01/19**	**jma**	**10/01/19**	**jma**		
Sulfate as SO4	**9.6**	**mg/L**	**3.0**	**5**	**10/01/19**	**jma**	**10/01/19**	**jma**		
Analysis Method: SM 2320 B-11										
Batch: T091608										
Bicarbonate Alkalinity as CaCO3 at pH 4.5	**920**	**mg/L**	**10**	**1**	**10/03/19**	**dc**	**10/03/19**	**dc**	**N**	
Carbonate Alkalinity as CaCO3 at pH 8.2	<10	mg/L	10	1	10/03/19	dc	10/03/19	dc	N	
Analysis Method: SM 2540 C-11										
Batch: T091536										
Total Dissolved Solids	**1100**	**mg/L**	**20**	**2**	**10/01/19**	**nw**	**10/02/19**	**nw**		
Analysis Method: SM 4500-H+ B-11										
Batch: T091465										
pH	**7.75**	**pH Units**		**1**	**09/30/19**	**tb**	**09/30/19**	**tb**	**SITE, N**	

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ANALYTICAL RESULTS

Trace Project ID: 19I0862
Client Project ID: MW Sampling - September 2019

Trace ID: 19I0862-10 Date Collected: 09/30/19 12:55 Matrix: Ground Water
Sample ID: MW-10 Date Received: 09/27/19 15:24

PARAMETERS	RESULTS	UNITS	RDL	DILUTION	PREPARED	BY	ANALYZED	BY	NOTES	MCL
METALS, TOTAL										
Analysis Method: EPA 7470A										
Batch: T091542										
Mercury	<0.00020	mg/L	0.00020	1	10/01/19	gmr	10/02/19	ckd	N	
METALS, TOTAL										
Analysis Method: EPA 6010D										
Batch: T091544										
Beryllium	<0.0010	mg/L	0.0010	1	10/01/19	gmr	10/08/19	ckd		
Boron	**46**	**mg/L**	**0.10**	**10**	**10/01/19**	**gmr**	**10/09/19**	**ckd**		
Calcium	**150**	**mg/L**	**5.0**	**10**	**10/01/19**	**gmr**	**10/09/19**	**ckd**		
Iron	**8.4**	**mg/L**	**0.10**	**1**	**10/01/19**	**gmr**	**10/08/19**	**ckd**		
Lithium	**1.2**	**mg/L**	**0.010**	**1**	**10/01/19**	**gmr**	**10/08/19**	**ckd**	**N**	
Magnesium	**71**	**mg/L**	**2.0**	**10**	**10/01/19**	**gmr**	**10/09/19**	**ckd**		
Potassium	**54**	**mg/L**	**10**	**10**	**10/01/19**	**gmr**	**10/09/19**	**ckd**		
Sodium	**400**	**mg/L**	**5.0**	**10**	**10/01/19**	**gmr**	**10/09/19**	**ckd**		
Zinc	**0.011**	**mg/L**	**0.020**	**1**	**10/01/19**	**gmr**	**10/08/19**	**ckd**	**J**	
Analysis Method: EPA 6020B										
Batch: T091544										
Antimony	**0.00018**	**mg/L**	**0.00030**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**	**J**	
Arsenic	**0.00097**	**mg/L**	**0.0010**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**	**J**	
Barium	**1.2**	**mg/L**	**0.00060**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**		
Cadmium	**0.000030**	**mg/L**	**0.000040**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**	**J**	
Chromium	**0.0078**	**mg/L**	**0.00080**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**		
Cobalt	**0.00076**	**mg/L**	**0.0016**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**	**J**	
Copper	**0.00087**	**mg/L**	**0.00080**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**		
Lead	**0.0039**	**mg/L**	**0.00040**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**		
Molybdenum	**0.011**	**mg/L**	**0.0010**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**	**N**	
Nickel	**0.0021**	**mg/L**	**0.0020**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**	**B**	
Selenium	<0.00087	mg/L	0.00087	1	10/01/19	gmr	10/04/19	rl		
Silver	<0.000040	mg/L	0.000040	1	10/01/19	gmr	10/04/19	rl		
Thallium	<0.000087	mg/L	0.000087	1	10/01/19	gmr	10/04/19	rl		
Vanadium	**0.0011**	**mg/L**	**0.00080**	**1**	**10/01/19**	**gmr**	**10/04/19**	**rl**		

CERTIFICATE OF ANALYSIS

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ANALYTICAL RESULTS

Trace Project ID: 19I0862
Client Project ID: MW Sampling - September 2019

Trace ID: 19I0862-10 | Date Collected: 09/30/19 12:55 | Matrix: Ground Water
Sample ID: MW-10 | Date Received: 09/27/19 15:24

PARAMETERS	RESULTS	UNITS	RDL	DILUTION	PREPARED	BY	ANALYZED	BY	NOTES	MCL
METALS, TOTAL										
WET CHEMISTRY										
Analysis Method: EPA 300.0 Rev. 2.1										
Batch: T091520										
Fluoride	**10**	**mg/L**	**0.10**	**5**	**10/01/19**	**jma**	**10/01/19**	**jma**		
Chloride	**550**	**mg/L**	**20**	**200**	**10/01/19**	**jma**	**10/01/19**	**jma**		
Sulfate as SO4	<3.0	mg/L	3.0	5	10/01/19	jma	10/01/19	jma		
Analysis Method: SM 2320 B-11										
Batch: T091608										
Bicarbonate Alkalinity as CaCO3 at pH 4.5	**730**	**mg/L**	**10**	**1**	**10/03/19**	**dc**	**10/03/19**	**dc**	**N**	
Carbonate Alkalinity as CaCO3 at pH 8.2	<10	mg/L	10	1	10/03/19	dc	10/03/19	dc	N	
Analysis Method: SM 2540 C-11										
Batch: T091536										
Total Dissolved Solids	**1700**	**mg/L**	**20**	**2**	**10/01/19**	**nw**	**10/01/19**	**nw**		
Analysis Method: SM 4500-H+ B-11										
Batch: T091465										
pH	**7.66**	**pH Units**		**1**	**09/30/19**	**tb**	**09/30/19**	**tb**	**SITE, N**	

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QUALITY CONTROL RESULTS

Trace Project ID: 19I0862
Client Project ID: MW Sampling - September 2019

QC Batch: T091542
QC Batch Method: EPA 7470A Prep
Analysis Description: Mercury, Total, EPA 7470/7471
Analysis Method: EPA 7470A

METHOD BLANK: T091542-BLK1

Parameter	Units	Blank Result	Reporting Limit	Notes
Mercury	mg/L	<0.00020	0.00020	

LABORATORY CONTROL SAMPLE: T091542-BS1

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limit	Notes
Mercury	mg/L	0.00200	0.00204	102	77-122	

MATRIX SPIKE / MATRIX SPIKE DUPLICATE: T091542-MSD1 Original: **19I0862-01**

Parameter	Units	Original Result	Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limit	RPD	Max RPD	Notes
Mercury	mg/L	0	0.00200	0.00210	0.00200	105	100	76-123	5	20	

Trace Project ID: 19I0862
Client Project ID: MW Sampling - September 2019

QC Batch: T091544
QC Batch Method: EPA 3015 Microwave Assisted Digestions for Liquids
Analysis Description: Beryllium, Total
Analysis Method: EPA 6010D

METHOD BLANK: T091544-BLK1

Parameter	Units	Blank Result	Reporting Limit	Notes
Boron	mg/L	<0.010	0.010	
Beryllium	mg/L	<0.0010	0.0010	
Calcium	mg/L	<0.50	0.50	
Iron	mg/L	<0.10	0.10	
Potassium	mg/L	<1.0	1.0	
Lithium	**mg/L**	**0.0063**	**0.010**	**J**
Magnesium	mg/L	<1.0	1.0	
Sodium	mg/L	<1.0	1.0	
Zinc	**mg/L**	**0.0016**	**0.020**	**J**

LABORATORY CONTROL SAMPLE: T091544-BS1

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limit	Notes

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LABORATORY CONTROL SAMPLE: T091544-BS1

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limit	Notes
Boron	mg/L	0.889	0.836	94	80-120	
Beryllium	mg/L	0.111	0.110	99	80-120	
Calcium	mg/L	8.89	8.47	95	80-120	
Iron	mg/L	8.89	8.80	99	80-120	
Potassium	mg/L	8.89	8.89	100	80-120	
Lithium	mg/L	0.889	0.899	101	80-120	
Magnesium	mg/L	8.89	8.96	101	80-120	
Sodium	mg/L	8.89	8.73	98	80-120	
Zinc	mg/L	0.889	0.871	98	80-120	

Trace Project ID: 19I0862
Client Project ID: MW Sampling - September 2019

QC Batch: T091544
QC Batch Method: EPA 3015 Microwave Assisted Digestions for Liquids

Analysis Description: Lead, Total
Analysis Method: EPA 6020B

METHOD BLANK: T091544-BLK1

Parameter	Units	Blank Result	Reporting Limit	Notes
Silver	mg/L	0.000062	0.000040	
Arsenic	mg/L	<0.0010	0.0010	
Barium	**mg/L**	**0.00047**	**0.00060**	**J**
Cadmium	mg/L	<0.000040	0.000040	
Cobalt	mg/L	<0.0016	0.0016	
Chromium	mg/L	<0.00080	0.00080	
Copper	**mg/L**	**0.00074**	**0.00080**	**J**
Molybdenum	mg/L	<0.0010	0.0010	
Nickel	mg/L	0.0015	0.00040	
Lead	**mg/L**	**0.000066**	**0.00040**	**J**
Antimony	mg/L	<0.00030	0.00030	
Selenium	mg/L	<0.00087	0.00087	
Thallium	mg/L	<0.000087	0.000087	
Vanadium	mg/L	<0.00080	0.00080	

LABORATORY CONTROL SAMPLE: T091544-BS1

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limit	Notes
Silver	**mg/L**	**0.0278**	**0.0298**	**107**	**80-120**	**B**
Arsenic	mg/L	0.0556	0.0562	101	80-120	
Barium	mg/L	0.889	0.920	103	80-120	

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LABORATORY CONTROL SAMPLE: T091544-BS1

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limit	Notes
Cadmium	mg/L	0.0278	0.0286	103	80-120	
Cobalt	mg/L	0.889	0.851	96	80-120	
Chromium	mg/L	0.0278	0.0284	102	80-120	
Copper	mg/L	0.889	0.828	93	80-120	
Molybdenum	mg/L	0.889	0.910	102	80-120	
Nickel	**mg/L**	**0.889**	**0.839**	**94**	**80-120**	**B**
Lead	mg/L	0.0556	0.0543	98	80-120	
Antimony	mg/L	0.0556	0.0560	101	80-120	
Selenium	mg/L	0.0556	0.0553	100	80-120	
Thallium	mg/L	0.0556	0.0554	100	80-120	
Vanadium	mg/L	0.889	0.909	102	80-120	

Trace Project ID: 19I0862
Client Project ID: MW Sampling - September 2019

QC Batch: T091442
QC Batch Method: IC Prep W
Analysis Description: Fluoride
Analysis Method: EPA 300.0 Rev. 2.1

METHOD BLANK: T091442-BLK1

Parameter	Units	Blank Result	Reporting Limit	Notes
Fluoride	mg/L	<0.020	0.020	
Sulfate as SO4	mg/L	<0.60	0.60	

LABORATORY CONTROL SAMPLE: T091442-BS1

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limit	Notes
Fluoride	mg/L	0.500	0.524	105	90-110	
Sulfate as SO4	mg/L	2.50	2.44	98	90-110	

Trace Project ID: 19I0862
Client Project ID: MW Sampling - September 2019

QC Batch: T091477
QC Batch Method: IC Prep W
Analysis Description: Chloride
Analysis Method: EPA 300.0 Rev. 2.1

METHOD BLANK: T091477-BLK1

Parameter	Units	Blank Result	Reporting Limit	Notes
Chloride	mg/L	<0.10	0.10	

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LABORATORY CONTROL SAMPLE: T091477-BS1

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limit	Notes
Chloride	mg/L	1.00	0.978	98	90-110	

Trace Project ID: 19I0862
Client Project ID: MW Sampling - September 2019

QC Batch: T091520
QC Batch Method: IC Prep W
Analysis Description: Sulfate
Analysis Method: EPA 300.0 Rev. 2.1

METHOD BLANK: T091520-BLK1

Parameter	Units	Blank Result	Reporting Limit	Notes
Chloride	mg/L	<0.10	0.10	
Fluoride	mg/L	<0.020	0.020	
Sulfate as SO4	mg/L	<0.60	0.60	

LABORATORY CONTROL SAMPLE: T091520-BS1

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limit	Notes
Chloride	mg/L	1.00	0.973	97	90-110	
Fluoride	mg/L	0.500	0.548	110	90-110	
Sulfate as SO4	mg/L	2.50	2.44	98	90-110	

Trace Project ID: 19I0862
Client Project ID: MW Sampling - September 2019

QC Batch: T091608
QC Batch Method: SM 2320 B-11
Analysis Description: Alkalinity, Carbonate
Analysis Method: SM 2320 B-11

METHOD BLANK: T091608-BLK1

Parameter	Units	Blank Result	Reporting Limit	Notes
Bicarbonate Alkalinity as CaCO3 at pH 4.5	mg/L	<5.0	5.0	
Carbonate Alkalinity as CaCO3 at pH 8.2	mg/L	<10	10	

LABORATORY CONTROL SAMPLE: T091608-BS1

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limit	Notes
Bicarbonate Alkalinity as CaCO3 at pH 4.5	mg/L	100	96.9	97	88-112	
Carbonate Alkalinity as CaCO3 at pH 8.2	mg/L	100	96.9	97	88-112	

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Trace Project ID: 19I0862
Client Project ID: MW Sampling - September 2019

QC Batch: T091536
QC Batch Method: SM 2540 C-11

Analysis Description: Total Dissolved Solids
Analysis Method: SM 2540 C-11

METHOD BLANK: T091536-BLK1

Parameter	Units	Blank Result	Reporting Limit	Notes
Total Dissolved Solids	mg/L	<10	10	

LABORATORY CONTROL SAMPLE: T091536-BS1

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limit	Notes
Total Dissolved Solids	mg/L	503	505	100	80-120	

SAMPLE DUPLICATE: T091536-DUP1 Original: **19I0862-04**

Parameter	Units	Original Result	DUP Result	RPD	Max RPD	Notes
Total Dissolved Solids	mg/L	1380	1380	0	10	

SAMPLE DUPLICATE: T091536-DUP2 Original: **19I0862-06**

Parameter	Units	Original Result	DUP Result	RPD	Max RPD	Notes
Total Dissolved Solids	mg/L	2870	2540	12	10	

Trace Project ID: 19I0862
Client Project ID: MW Sampling - September 2019

QC Batch: T091465
QC Batch Method: *** DEFAULT PREP ***

Analysis Description: pH, SM 4500
Analysis Method: SM 4500-H+ B-11

Summit Environmental Technologies, Inc.
3310 Win St.
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TEL: (330) 253-8211 FAX: (330) 253-4489
Website: http://www.settek.com

October 23, 2019

Jon Mink
Trace Analytical Laboratories, Inc.
2241 Black Creek Road
Muskegon, MI 49444
TEL: (231) 773-5998
FAX: (231) 773-6537

RE: 19I0862

Dear Jon Mink:

Order No.: 19100351

Summit Environmental Technologies, Inc. received 10 sample(s) on 10/2/2019 for the analyses presented in the following report.

There were no problems with the analytical events associated with this report unless noted in the Case Narrative.

Quality control data is within laboratory defined or method specified acceptance limits except where noted.

If you have any questions regarding these tests results, please feel free to call the laboratory.

Sincerely,

Holly Florea

Project Manager

3310 Win St.
Cuyahoga Falls, Ohio 44223

Summit Environmental Technologies, Inc.
3310 Win St.
Cuyahoga Falls, Ohio 44223
TEL: (330) 253-8211 FAX: (330) 253-4489
Website: http://www.settek.com

Case Narrative

WO#: **19100351**
Date: **10/23/2019**

CLIENT: Trace Analytical Laboratories, Inc.
Project: 19I0862

This report in its entirety consists of the following documents: Cover Letter, Case Narrative, Analytical Results, QC Summary Report, Applicable Accreditation Information, Chain-of-Custody, Cooler Receipt Form, and other applicable forms as necessary. All documents contain the Summit Environmental Technologies, Inc., Work Order Number assigned to this report.

Summit Environmental Technologies, Inc., holds the accreditations/certifications listed at the bottom of the cover letter that may or may not pertain to this report. Please refer to the "Accreditation Program Analytes Report" for accredited analytes list.

The information contained in this analytical report is the sole property of Summit Environmental Technologies, Inc. and that of the customer. It cannot be reproduced in any form without the consent of Summit Environmental Technologies, Inc. or the customer for which this report was issued. The results contained in this report are only representative of the samples received. Conditions can vary at different times and at different sampling conditions. Summit Environmental Technologies, Inc. is not responsible for use or interpretation of the data included herein.

All results for Solid Samples are reported on an "as received" or "wet weight" basis unless indicated as "dry weight" using the "-dry" designation on the reporting units.

This report is believed to meet all of the requirements of the accrediting agency, where applicable. Any comments or problems with the analytical events associated with this report are noted below.

Summit Environmental Technologies, Inc.
3310 Win St.
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TEL: (330) 253-8211 FAX: (330) 253-4489
Website: http://www.settek.com

Workorder Sample Summary

WO#: **19100351**

23-Oct-19

CLIENT: Trace Analytical Laboratories, Inc.
Project: 19I0862

Lab SampleID	Client Sample ID	Tag No	Date Collected	Date Received	Matrix
19100351-001	19I0862-01		9/27/2019 12:55:00 PM	10/2/2019 10:20:00 AM	Non-Potable Water
19100351-002	19I0862-02		9/27/2019 2:20:00 PM	10/2/2019 10:20:00 AM	Non-Potable Water
19100351-003	19I0862-03		9/27/2019 12:20:00 PM	10/2/2019 10:20:00 AM	Non-Potable Water
19100351-004	19I0862-04		9/27/2019 1:30:00 PM	10/2/2019 10:20:00 AM	Non-Potable Water
19100351-005	19I0862-05		9/27/2019 11:40:00 AM	10/2/2019 10:20:00 AM	Non-Potable Water
19100351-006	19I0862-06		9/30/2019 1:55:00 PM	10/2/2019 10:20:00 AM	Non-Potable Water
19100351-007	19I0862-07		9/30/2019 2:35:00 PM	10/2/2019 10:20:00 AM	Non-Potable Water
19100351-008	19I0862-08		9/30/2019 3:15:00 PM	10/2/2019 10:20:00 AM	Non-Potable Water
19100351-009	19I0862-09		9/30/2019 1:20:00 PM	10/2/2019 10:20:00 AM	Non-Potable Water
19100351-010	19I0862-10		9/30/2019 12:55:00 PM	10/2/2019 10:20:00 AM	Non-Potable Water

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Analytical Report

(consolidated)

WO#: **19100351**

Date Reported: **10/23/2019**

CLIENT: Trace Analytical Laboratories, Inc. **Collection Date:** 9/27/2019 12:55:00 PM

Project: 19I0862

Lab ID: 19100351-001 **Matrix:** NON-POTABLE WATER

Client Sample ID 19I0862-01

Analyses	Result	PQL	Qual	Units	Uncertainty	DF	Date Analyzed
RADIUM-226 (EPA 903.0)					**E903.0**	**E903-904**	Analyst: **BRD**
Radium-226	ND	1.00	U	pCi/L	± 0.07	1	10/23/2019 10:23:00 A
Yield	1.00					1	10/23/2019 10:23:00 A
RADIUM-228 (EPA 904.0)					**E904.0**	**E903-904**	Analyst: **BRD**
Radium-228	ND	1.00	U	pCi/L	± 0.33	1	10/22/2019 1:55:00 PM
Yield	1.00					1	10/22/2019 1:55:00 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	M	Manual Integration used to determine area response
MC	Value is below Minimum Compound Limit.	N	Tentatively identified compounds
ND	Not Detected	P	Second column confirmation exceeds
PL	Permit Limit	R	RPD outside accepted recovery limits

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Analytical Report

(consolidated)

WO#: **19100351**

Date Reported: **10/23/2019**

CLIENT: Trace Analytical Laboratories, Inc. **Collection Date:** 9/27/2019 2:20:00 PM

Project: 19I0862

Lab ID: 19100351-002 **Matrix:** NON-POTABLE WATER

Client Sample ID 19I0862-02

Analyses	Result	PQL	Qual	Units	Uncertainty	DF	Date Analyzed
RADIUM-226 (EPA 903.0)					**E903.0**	**E903-904**	Analyst: **BRD**
Radium-226	ND	1.00	U	pCi/L	± 0.1	1	10/23/2019 10:20:00 A
Yield	1.00					1	10/23/2019 10:20:00 A
RADIUM-228 (EPA 904.0)					**E904.0**	**E903-904**	Analyst: **BRD**
Radium-228	ND	1.00	U	pCi/L	± 0.21	1	10/22/2019 1:53:00 PM
Yield	1.00					1	10/22/2019 1:53:00 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	M	Manual Integration used to determine area response
MC	Value is below Minimum Compound Limit.	N	Tentatively identified compounds
ND	Not Detected	P	Second column confirmation exceeds
PL	Permit Limit	R	RPD outside accepted recovery limits

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Analytical Report

(consolidated)

WO#: **19100351**

Date Reported: **10/23/2019**

CLIENT: Trace Analytical Laboratories, Inc. **Collection Date:** 9/27/2019 12:20:00 PM

Project: 19I0862

Lab ID: 19100351-003 **Matrix:** NON-POTABLE WATER

Client Sample ID 19I0862-03

Analyses	Result	PQL	Qual	Units	Uncertainty	DF	Date Analyzed
RADIUM-226 (EPA 903.0)					**E903.0**	**E903-904**	Analyst: **BRD**
Radium-226	ND	1.00	U	pCi/L	± 0.1	1	10/23/2019 10:20:00 A
Yield	1.00					1	10/23/2019 10:20:00 A
RADIUM-228 (EPA 904.0)					**E904.0**	**E903-904**	Analyst: **BRD**
Radium-228	1.10	1.00		pCi/L	± 0.37	1	10/22/2019 1:53:00 PM
Yield	1.00					1	10/22/2019 1:53:00 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	M	Manual Integration used to determine area response
MC	Value is below Minimum Compound Limit.	N	Tentatively identified compounds
ND	Not Detected	P	Second column confirmation exceeds
PL	Permit Limit	R	RPD outside accepted recovery limits

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Analytical Report

(consolidated)

WO#: **19100351**

Date Reported: **10/23/2019**

CLIENT: Trace Analytical Laboratories, Inc. **Collection Date:** 9/27/2019 1:30:00 PM

Project: 19I0862

Lab ID: 19100351-004 **Matrix:** NON-POTABLE WATER

Client Sample ID 19I0862-04

Analyses	Result	PQL	Qual	Units	Uncertainty	DF	Date Analyzed
RADIUM-226 (EPA 903.0)					**E903.0**	**E903-904**	Analyst: **BRD**
Radium-226	ND	1.00	U	pCi/L	± 0.14	1	10/23/2019 10:20:00 A
Yield	1.00					1	10/23/2019 10:20:00 A
RADIUM-228 (EPA 904.0)					**E904.0**	**E903-904**	Analyst: **BRD**
Radium-228	ND	1.00		pCi/L	± 0.32	1	10/22/2019 1:53:00 PM
Yield	1.00					1	10/22/2019 1:53:00 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	M	Manual Integration used to determine area response
MC	Value is below Minimum Compound Limit.	N	Tentatively identified compounds
ND	Not Detected	P	Second column confirmation exceeds
PL	Permit Limit	R	RPD outside accepted recovery limits

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Analytical Report

(consolidated)

WO#: **19100351**

Date Reported: **10/23/2019**

CLIENT: Trace Analytical Laboratories, Inc. **Collection Date:** 9/27/2019 11:40:00 AM

Project: 19I0862

Lab ID: 19100351-005 **Matrix:** NON-POTABLE WATER

Client Sample ID 19I0862-05

Analyses	Result	PQL	Qual	Units	Uncertainty	DF	Date Analyzed
RADIUM-226 (EPA 903.0)					**E903.0**	**E903-904**	Analyst: **BRD**
Radium-226	ND	1.00	U	pCi/L	± 0.09	1	10/23/2019 10:20:00 A
Yield	1.00					1	10/23/2019 10:20:00 A
RADIUM-228 (EPA 904.0)					**E904.0**	**E903-904**	Analyst: **BRD**
Radium-228	ND	1.00		pCi/L	± 0.32	1	10/22/2019 1:53:00 PM
Yield	1.00					1	10/22/2019 1:53:00 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	M	Manual Integration used to determine area response
MC	Value is below Minimum Compound Limit.	N	Tentatively identified compounds
ND	Not Detected	P	Second column confirmation exceeds
PL	Permit Limit	R	RPD outside accepted recovery limits

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Analytical Report

(consolidated)

WO#: **19100351**

Date Reported: **10/23/2019**

CLIENT: Trace Analytical Laboratories, Inc. **Collection Date:** 9/30/2019 1:55:00 PM

Project: 19I0862

Lab ID: 19100351-006 **Matrix:** NON-POTABLE WATER

Client Sample ID 19I0862-06

Analyses	Result	PQL	Qual	Units	Uncertainty	DF	Date Analyzed
RADIUM-226 (EPA 903.0)					**E903.0**	**E903-904**	Analyst: **BRD**
Radium-226	ND	1.00	U	pCi/L	± 0.14	1	10/23/2019 10:21:00 A
Yield	1.00					1	10/23/2019 10:21:00 A
RADIUM-228 (EPA 904.0)					**E904.0**	**E903-904**	Analyst: **BRD**
Radium-228	ND	1.00	U	pCi/L	± 0.3	1	10/22/2019 1:53:00 PM
Yield	1.00					1	10/22/2019 1:53:00 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	M	Manual Integration used to determine area response
MC	Value is below Minimum Compound Limit.	N	Tentatively identified compounds
ND	Not Detected	P	Second column confirmation exceeds
PL	Permit Limit	R	RPD outside accepted recovery limits

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Analytical Report

(consolidated)

WO#: **19100351**

Date Reported: **10/23/2019**

CLIENT: Trace Analytical Laboratories, Inc. **Collection Date:** 9/30/2019 2:35:00 PM

Project: 19I0862

Lab ID: 19100351-007 **Matrix:** NON-POTABLE WATER

Client Sample ID 19I0862-07

Analyses	Result	PQL	Qual	Units	Uncertainty	DF	Date Analyzed
RADIUM-226 (EPA 903.0)					**E903.0**	**E903-904**	Analyst: **BRD**
Radium-226	ND	1.00	U	pCi/L	± 0.11	1	10/23/2019 10:21:00 A
Yield	1.00					1	10/23/2019 10:21:00 A
RADIUM-228 (EPA 904.0)					**E904.0**	**E903-904**	Analyst: **BRD**
Radium-228	ND	1.00	U	pCi/L	± 0.31	1	10/22/2019 1:53:00 PM
Yield	1.00					1	10/22/2019 1:53:00 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	M	Manual Integration used to determine area response
MC	Value is below Minimum Compound Limit.	N	Tentatively identified compounds
ND	Not Detected	P	Second column confirmation exceeds
PL	Permit Limit	R	RPD outside accepted recovery limits

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Analytical Report

(consolidated)

WO#: **19100351**

Date Reported: **10/23/2019**

CLIENT: Trace Analytical Laboratories, Inc. **Collection Date:** 9/30/2019 3:15:00 PM

Project: 19I0862

Lab ID: 19100351-008 **Matrix:** NON-POTABLE WATER

Client Sample ID 19I0862-08

Analyses	Result	PQL	Qual	Units	Uncertainty	DF	Date Analyzed
RADIUM-226 (EPA 903.0)					**E903.0**	**E903-904**	Analyst: **BRD**
Radium-226	ND	1.00	U	pCi/L	± 0.11	1	10/23/2019 10:21:00 A
Yield	1.00					1	10/23/2019 10:21:00 A
RADIUM-228 (EPA 904.0)					**E904.0**	**E903-904**	Analyst: **BRD**
Radium-228	1.08	1.00		pCi/L	± 0.37	1	10/22/2019 1:54:00 PM
Yield	1.00					1	10/22/2019 1:54:00 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	M	Manual Integration used to determine area response
MC	Value is below Minimum Compound Limit.	N	Tentatively identified compounds
ND	Not Detected	P	Second column confirmation exceeds
PL	Permit Limit	R	RPD outside accepted recovery limits

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Analytical Report

(consolidated)

WO#: **19100351**

Date Reported: **10/23/2019**

CLIENT: Trace Analytical Laboratories, Inc. **Collection Date:** 9/30/2019 1:20:00 PM

Project: 19I0862

Lab ID: 19100351-009 **Matrix:** NON-POTABLE WATER

Client Sample ID 19I0862-09

Analyses	Result	PQL	Qual	Units	Uncertainty	DF	Date Analyzed
RADIUM-226 (EPA 903.0)					**E903.0**	**E903-904**	Analyst: **BRD**
Radium-226	ND	1.00		pCi/L	± 0.23	1	10/23/2019 11:36:00 A
Yield	1.00					1	10/23/2019 11:36:00 A
RADIUM-228 (EPA 904.0)					**E904.0**	**E903-904**	Analyst: **BRD**
Radium-228	1.18	1.00		pCi/L	± 0.56	1	10/22/2019 2:31:00 PM
Yield	1.00					1	10/22/2019 2:31:00 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	M	Manual Integration used to determine area response
MC	Value is below Minimum Compound Limit.	N	Tentatively identified compounds
ND	Not Detected	P	Second column confirmation exceeds
PL	Permit Limit	R	RPD outside accepted recovery limits

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Analytical Report

(consolidated)

WO#: **19100351**

Date Reported: **10/23/2019**

CLIENT: Trace Analytical Laboratories, Inc. **Collection Date:** 9/30/2019 12:55:00 PM

Project: 19I0862

Lab ID: 19100351-010 **Matrix:** NON-POTABLE WATER

Client Sample ID 19I0862-10

Analyses	Result	PQL	Qual	Units	Uncertainty	DF	Date Analyzed
RADIUM-226 (EPA 903.0)					**E903.0**	**E903-904**	Analyst: **BRD**
Radium-226	ND	1.00	U	pCi/L	± 0.2	1	10/23/2019 11:35:00 A
Yield	1.00					1	10/23/2019 11:35:00 A
RADIUM-228 (EPA 904.0)					**E904.0**	**E903-904**	Analyst: **BRD**
Radium-228	ND	1.00	U	pCi/L	± 0.44	1	10/22/2019 2:31:00 PM
Yield	1.00					1	10/22/2019 2:31:00 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	M	Manual Integration used to determine area response
MC	Value is below Minimum Compound Limit.	N	Tentatively identified compounds
ND	Not Detected	P	Second column confirmation exceeds
PL	Permit Limit	R	RPD outside accepted recovery limits

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QC SUMMARY REPORT

WO#: **19100351**

23-Oct-19

Client: Trace Analytical Laboratories, Inc.
Project: 19I0862 **BatchID:** **40082**

Sample ID	**lcs-40082**	SampType:	**LCS**	TestCode:	**Radium-228_**	Units:	**pCi/L**	Prep Date:	**10/18/2019**	RunNo:	**104931**
Client ID:	**LCSW**	Batch ID:	**40082**	TestNo:	**E904.0**	**E903-904**		Analysis Date:	**10/22/2019**	SeqNo:	**2425890**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Radium-228	4.47	1.00	5.000	0	89.3	70	130				
Yield	0.790			0	0						

Sample ID	**lcsd-40082**	SampType:	**LCSD**	TestCode:	**Radium-228_**	Units:	**pCi/L**	Prep Date:	**10/18/2019**	RunNo:	**104931**
Client ID:	**LCSS02**	Batch ID:	**40082**	TestNo:	**E904.0**	**E903-904**		Analysis Date:	**10/22/2019**	SeqNo:	**2425891**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Radium-228	4.34	1.00	5.000	0	86.8	70	130	4.467	2.85	20	
Yield	0.770			0	0			0.7900	2.56		

Sample ID	**rlc-40082**	SampType:	**RLC**	TestCode:	**Radium-228_**	Units:	**pCi/L**	Prep Date:	**10/18/2019**	RunNo:	**104931**
Client ID:	**BatchQC**	Batch ID:	**40082**	TestNo:	**E904.0**	**E903-904**		Analysis Date:	**10/22/2019**	SeqNo:	**2425893**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Radium-228	ND	1.00	1.000	0	90.0	50	150				
Yield	0.920			0	0						

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analy
J	Analyte detected below quantitation limits	M	Manual Integration used to determine area response	MC	Value is below Minimum Compound
ND	Not Detected	P	Second column confirmation exceeds	PL	Permit Limit
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit	S	Spike Recovery outside accepted reco

Original

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QC SUMMARY REPORT

WO#: **19100351**

23-Oct-19

Client: Trace Analytical Laboratories, Inc.

Project: 19I0862 **BatchID:** **40082**

Sample ID **19100480-001aMS**	SampType: **MS**	TestCode: **Radium-228_**	Units: **pCi/L**	Prep Date: **10/18/2019**	RunNo: **104931**
Client ID: **BatchQC**	Batch ID: **40082**	TestNo: **E904.0**	**E903-904**	Analysis Date: **10/22/2019**	SeqNo: **2425894**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Radium-228	4.98	1.00	5.000	0	99.6	70	130				
Yield	0.700			0	0						

Sample ID **mb-40082**	SampType: **MBLK**	TestCode: **Radium-228_**	Units: **pCi/L**	Prep Date: **10/18/2019**	RunNo: **104931**
Client ID: **PBW**	Batch ID: **40082**	TestNo: **E904.0**	**E903-904**	Analysis Date: **10/22/2019**	SeqNo: **2425916**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Radium-228	ND	1.00		0	0						U
Yield	1.00			0	0						

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analy
J	Analyte detected below quantitation limits	M	Manual Integration used to determine area response	MC	Value is below Minimum Compound
ND	Not Detected	P	Second column confirmation exceeds	PL	Permit Limit
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit	S	Spike Recovery outside accepted reco

Original

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QC SUMMARY REPORT

WO#: **19100351**

23-Oct-19

Client: Trace Analytical Laboratories, Inc.
Project: 19I0862 **BatchID:** **40082**

Sample ID **mb-40082**	SampType: **MBLK**	TestCode: **Radium-226_**	Units: **pCi/L**	Prep Date: **10/18/2019**	RunNo: **104945**
Client ID: **PBW**	Batch ID: **40082**	TestNo: **E903.0**	**E903-904**	Analysis Date: **10/23/2019**	SeqNo: **2426409**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Radium-226	ND	1.00									U
Yield	1.00										

Sample ID **lcs-40082**	SampType: **LCS**	TestCode: **Radium-226_**	Units: **pCi/L**	Prep Date: **10/18/2019**	RunNo: **104945**
Client ID: **LCSW**	Batch ID: **40082**	TestNo: **E903.0**	**E903-904**	Analysis Date: **10/23/2019**	SeqNo: **2426410**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Radium-226	5.37	1.00	5.000	0	107	70	130				

Sample ID **lcsd-40082**	SampType: **LCSD**	TestCode: **Radium-226_**	Units: **pCi/L**	Prep Date: **10/18/2019**	RunNo: **104945**
Client ID: **LCSS02**	Batch ID: **40082**	TestNo: **E903.0**	**E903-904**	Analysis Date: **10/23/2019**	SeqNo: **2426411**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Radium-226	4.99	1.00	5.000	0	99.8	70	130	5.370	7.34	20	

Sample ID **rlc-40082**	SampType: **RLC**	TestCode: **Radium-226_**	Units: **pCi/L**	Prep Date: **10/18/2019**	RunNo: **104945**
Client ID: **BatchQC**	Batch ID: **40082**	TestNo: **E903.0**	**E903-904**	Analysis Date: **10/23/2019**	SeqNo: **2426413**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analy
J	Analyte detected below quantitation limits	M	Manual Integration used to determine area response	MC	Value is below Minimum Compound
ND	Not Detected	P	Second column confirmation exceeds	PL	Permit Limit
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit	S	Spike Recovery outside accepted reco

Original

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Website: http://www.settek.com

QC SUMMARY REPORT

WO#: **19100351**

23-Oct-19

Client: Trace Analytical Laboratories, Inc.

Project: 19I0862 **BatchID:** **40082**

Sample ID **rlc-40082**	SampType: **RLC**	TestCode: **Radium-226_**	Units: **pCi/L**	Prep Date: **10/18/2019**	RunNo: **104945**
Client ID: **BatchQC**	Batch ID: **40082**	TestNo: **E903.0**	**E903-904**	Analysis Date: **10/23/2019**	SeqNo: **2426413**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Radium-226	ND	1.00	1.000	0	70.0	50	150				
Yield	1.00										

Sample ID **19100480-001aMS**	SampType: **MS**	TestCode: **Radium-226_**	Units: **pCi/L**	Prep Date: **10/18/2019**	RunNo: **104945**
Client ID: **BatchQC**	Batch ID: **40082**	TestNo: **E903.0**	**E903-904**	Analysis Date: **10/23/2019**	SeqNo: **2426414**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Radium-226	4.90	1.00	5.000	0	98.0	70	130				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analy
J	Analyte detected below quantitation limits	M	Manual Integration used to determine area response	MC	Value is below Minimum Compound
ND	Not Detected	P	Second column confirmation exceeds	PL	Permit Limit
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit	S	Spike Recovery outside accepted reco

Original

Summit Environmental Technologies, In
3310 Win S
Cuyahoga Falls, Ohio 4422
TEL: (330) 253-8211 FAX: (330) 253-448
Website: http://www.settek.co

Qualifiers and Acronyms

WO#: **19100351**
Date: **10/23/2019**

These commonly used Qualifiers and Acronyms may or may not be present in this report.

Qualifiers

U	The compound was analyzed for but was not detected.
J	The reported value is greater than the Method Detection Limit but less than the Reporting Limit.
H	The hold time for sample preparation and/or analysis was exceeded.
D	The result is reported from a dilution.
E	The result exceeded the linear range of the calibration or is estimated due to interference.
MC	The result is below the Minimum Compound Limit.
*****	The result exceeds the Regulatory Limit or Maximum Contamination Limit.
m	Manual integration was used to determine the area response.
d	Manual integration in which peak was deleted
N	The result is presumptive based on a Mass Spectral library search assuming a 1:1 response.
P	The second column confirmation exceeded 25% difference.
C	The result has been confirmed by GC/MS.
X	The result was not confirmed when GC/MS Analysis was performed.
B/MB+	The analyte was detected in the associated blank.
G	The ICB or CCB contained reportable amounts of analyte.
QC-/+	The CCV recovery failed low (-) or high (+).
R/QDR	The RPD was outside of accepted recovery limits.
QL-/+	The LCS or LCSD recovery failed low (-) or high (+).
QLR	The LCS/LCSD RPD was outside of accepted recovery limits.
QM-/+	The MS or MSD recovery failed low (-) or high (+).
QMR	The MS/MSD RPD was outside of accepted recovery limits.
QV-/+	The ICV recovery failed low (-) or high (+).
S	The spike result was outside of accepted recovery limits.
Z	Deviation; A deviation from the method was performed; Please refer to the Case Narrative for additional information

Acronyms

ND	Not Detected	**RL**	Reporting Limit
QC	Quality Control	**MDL**	Method Detection Limit
MB	Method Blank	**LOD**	Level of Detection
LCS	Laboratory Control Sample	**LOQ**	Level of Quantitation
LCSD	Laboratory Control Sample Duplicate	**PQL**	Practical Quantitation Limit
QCS	Quality Control Sample	**CRQL**	Contract Required Quantitation Limit
DUP	Duplicate	**PL**	Permit Limit
MS	Matrix Spike	**RegLvl**	Regulatory Limit
MSD	Matrix Spike Duplicate	**MCL**	Maximum Contamination Limit
RPD	Relative Percent Different	**MinCL**	Minimum Compound Limit
ICV	Initial Calibration Verification	**RA**	Reanalysis
ICB	Initial Calibration Blank	**RE**	Reextraction
CCV	Continuing Calibration Verification	**TIC**	Tentatively Identified Compound
CCB	Continuing Calibration Blank	**RT**	Retention Time
RLC	Reporting Limit Check	**CF**	Calibration Factor
DF	Dilution Factor	**RF**	Response Factor

This list of Qualifiers and Acronyms reflects the most commonly utilized Qualifiers and Acronyms for reporting. Please refer to the Analytical Notes in the Case Narrative for any Qualifiers or Acronyms that do not appear in this list or for additional information regarding the use of these Qualifiers on reported data.

Trace Analytical Laboratories, Inc.
2241 Black Creek Road
Muskegon, MI 49444-2673

TRACE ANALYTICAL LABORATORIES, INC.

231-773-5998 Phone
888-979-4469 Fax
www.trace-labs.com

SUBCONTRACT ORDER

19I0862 19100351

SENDING LABORATORY:

Trace Analytical Laboratories, Inc.
2241 Black Creek Road
Muskegon, MI 49444
Phone: 231.773.5998
Fax: 888.979.4469
Project Manager: Jon Mink

RECEIVING LABORATORY:

Summit Environmental Technologies, Inc.
3310 Win Street
Cuyahoga Falls, OH 44223
Phone :(330) 253-8211
Fax: (330) 253-4489

PO # 09272019 I53

Accounting Code:

Sample ID: 19I0862-01 **Aqueous** **Sampled: 09/27/19 12:55** pH CPM

Subcontracted Work — Radium 226/228 to Summit 1,1,1 20,15,20

Containers Supplied:
1-PL1000 pH <2 w/ HNO 1-PL1000 pH <2 w/ HNO 1-PL1000 pH <2 w/ HNO

Sample ID: 19I0862-02 **Aqueous** **Sampled: 09/27/19 14:20**

Subcontracted Work — Radium 226/228 to Summit 2 2 2 ~~20~~ 24,22

Containers Supplied:
1-PL1000 pH <2 w/ HNO 1-PL1000 pH <2 w/ HNO 1-PL1000 pH <2 w/ HNO

Sample ID: 19I0862-03 **Aqueous** **Sampled: 09/27/19 12:20** 1,1,1 ~~24~~ 22,24

Subcontracted Work — Radium 226/228 to Summit

Containers Supplied:
1-PL1000 pH <2 w/ HNO 1-PL1000 pH <2 w/ HNO 1-PL1000 pH <2 w/ HNO

Sample ID: 19I0862-04 **Aqueous** **Sampled: 09/27/19 13:30** 1,1,1 ~~15~~ 15,22

Subcontracted Work — Radium 226/228 to Summit

Containers Supplied:
1-PL1000 pH <2 w/ HNO 1-PL1000 pH <2 w/ HNO 1-PL1000 pH <2 w/ HNO

Sample ID: 19I0862-05 **Aqueous** **Sampled: 09/27/19 11:40** 1,1,1 15,33,10

Subcontracted Work — Radium 226/228 to Summit

Containers Supplied:
1-PL1000 pH <2 w/ HNO 1-PL1000 pH <2 w/ HNO 1-PL1000 pH <2 w/ HNO

(Trace) 9/27/19 @ 15:45
Released By — Date — Received By — Date

Released By — Date — Received By — Date 10-2-19/1021

UPS / Cooler / 21.5 / 21.4

Trace Analytical Laboratories, Inc.
2241 Black Creek Road
Muskegon, MI 49444-2673

TRACE ANALYTICAL LABORATORIES, INC.

231-773-5998 Phone
888-979-4469 Fax
www.trace-labs.com

SUBCONTRACT ORDER

19I0862

19100351

			pH	CPM
Sample ID: 19I0862-06	**Aqueous**	**Sampled: 09/30/19 13:55**	6,6,4	16,17,17
Subcontracted Work		Radium 226/228 to Summit		
Containers Supplied:				
1-PL1000 pH <2 w/ HNO	1-PL1000 pH <2 w/ HNO	1-PL1000 pH <2 w/ HNO		
Sample ID: 19I0862-07	**Aqueous**	**Sampled: 09/30/19 14:35**	1,1,1	18,20,25
Subcontracted Work		Radium 226/228 to Summit		
Containers Supplied:				
1-PL1000 pH <2 w/ HNO	1-PL1000 pH <2 w/ HNO	1-PL1000 pH <2 w/ HNO		
Sample ID: 19I0862-08	**Aqueous**	**Sampled: 09/30/19 15:15**	1,1,1	24,15,20
Subcontracted Work		Radium 226/228 to Summit		
Containers Supplied:				
1-PL1000 pH <2 w/ HNO	1-PL1000 pH <2 w/ HNO	1-PL1000 pH <2 w/ HNO		
Sample ID: 19I0862-09	**Aqueous**	**Sampled: 09/30/19 13:20**	1,1,1	22,31,24
Subcontracted Work		Radium 226/228 to Summit		
Containers Supplied:				
1-PL1000 pH <2 w/ HNO	1-PL1000 pH <2 w/ HNO	1-PL1000 pH <2 w/ HNO		
Sample ID: 19I0862-10	**Aqueous**	**Sampled: 09/30/19 12:55**	1,1,1	35,18,16
Subcontracted Work		Radium 226/228 to Summit		
Containers Supplied:				
1-PL1000 pH <2 w/ HNO	1-PL1000 pH <2 w/ HNO	1-PL1000 pH <2 w/ HNO		

Released By	Date	Received By	Date
			10.2.19 / 1020
Released By	Date	Received By	Date

Page 2 of 2

Summit Environmental Technologies, Inc.
3310 Win St.
Cuyahoga Falls, Ohio 44223
TEL: (330) 253-8211 FAX: (330) 253-4489
Website: http://www.settek.com

Sample Log-In Check List

Client Name: **TRA-MI-49444** Work Order Number: **19100351** RcptNo: **1**

Logged by:	**Jacqueline Rasile**	**10/2/2019 10:20:00 AM**	
Completed By:	**Jacqueline Rasile**	**10/4/2019 9:19:21 AM**	
Reviewed By:	**Holly Florea**	**10/4/2019 9:44:11 AM**	

Chain of Custody

1.	Is Chain of Custody complete?	Yes ☑	No ☐	Not Present ☐
2.	How was the sample delivered?	UPS		

Log In

3.	Coolers are present?	Yes ☑	No ☐	NA ☐
4.	Shipping container/cooler in good condition?	Yes ☑	No ☐	
	Custody seals intact on shipping container/cooler?	Yes ☐	No ☐	Not Present ☑
	No. Seal Date:	Signed By:		
5.	Was an attempt made to cool the samples?	Yes ☐	No ☑	NA ☐
6.	Were all samples received at a temperature of >0° C to 6.0°C	Yes ☐	No ☑	NA ☐
		Not required		
7.	Sample(s) in proper container(s)?	Yes ☑	No ☐	
8.	Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
9.	Are samples (except VOA and ONG) properly preserved?	Yes ☑	No ☐	
10.	Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
11.	Is the headspace in the VOA vials less than 1/4 inch or 6 mm?	Yes ☐	No ☐	No VOA Vials ☑
12.	Were any sample containers received broken?	Yes ☐	No ☑	
13.	Does paperwork match bottle labels? (Note discrepancies on chain of custody)	Yes ☑	No ☐	
14.	Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
15.	Is it clear what analyses were requested?	Yes ☑	No ☐	
16.	Were all holding times able to be met? (If no, notify customer for authorization.)	Yes ☑	No ☐	

Special Handling (if applicable)

17. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☑

Person Notified: Date

By Whom: Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person

Regarding:

Client Instructions:

18. Additional remarks:

Cooler Information

Cooler No	Temp ºC	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	21.5	Good	Not Present			

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Muskegon, MI 49444-2673

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888-979-4469 Fax
www.trace-labs.com

TRACE
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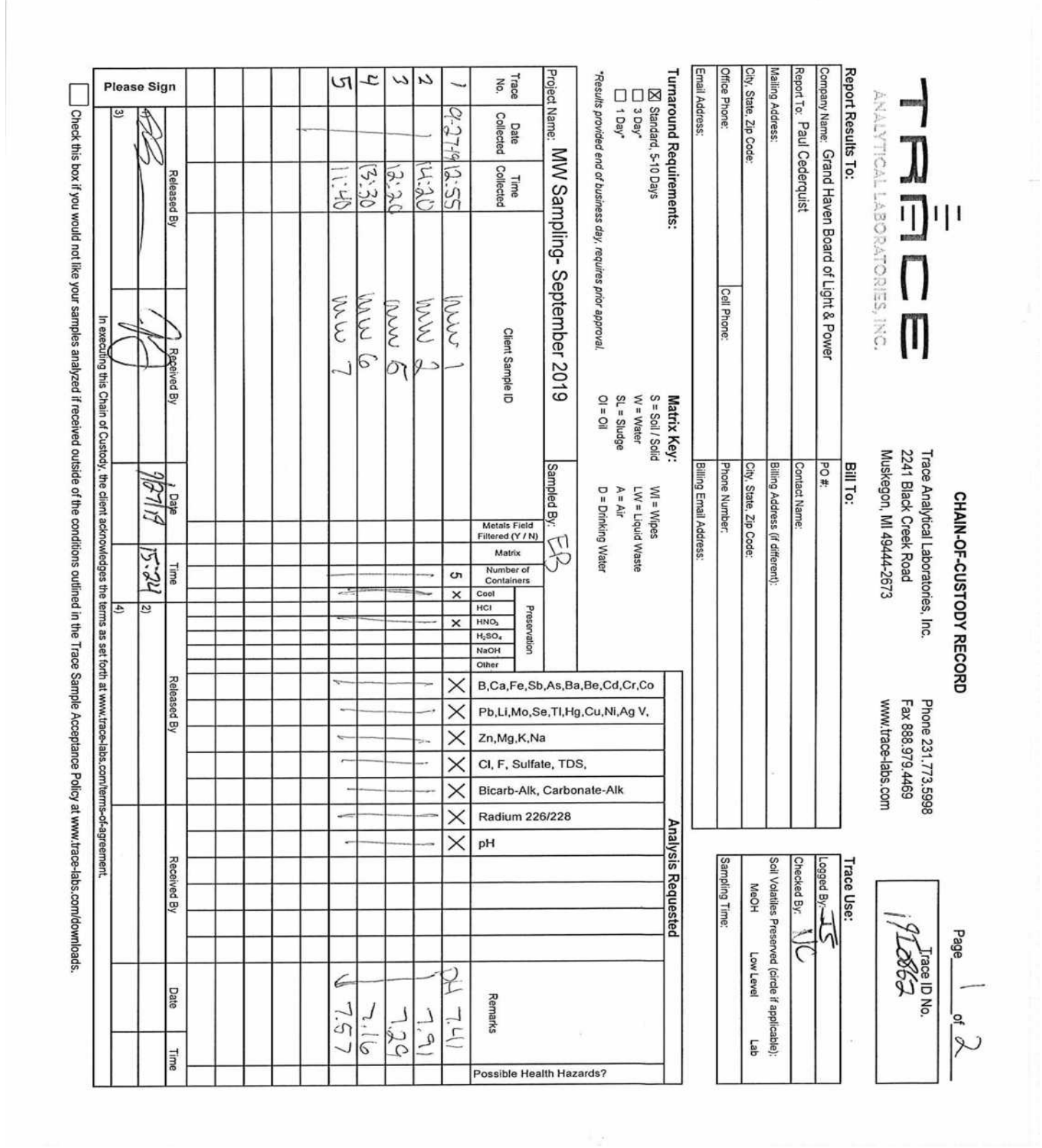

CHAIN-OF-CUSTODY RECORD

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Muskegon, MI 49444-2673

Phone 231.773.5998
Fax 888.979.4469
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Page 1 of 2

Trace ID No. 19I0862

Report Results To:

Company Name:	Grand Haven Board of Light & Power
Report To:	Paul Cederquist
Mailing Address:	
City, State, Zip Code:	
Office Phone:	Cell Phone:
Email Address:	

Bill To:

PO #:	
Contact Name:	
Billing Address (if different):	
City, State, Zip Code:	
Phone Number:	
Billing Email Address:	

Trace Use:

Logged By:	JS
Checked By:	VC
Soil Volatiles Preserved (circle if applicable): MeOH / Low Level / Lab	
Sampling Time:	

Turnaround Requirements:
- ☒ Standard, 5-10 Days
- ☐ 3 Day*
- ☐ 1 Day*

*Results provided end of business day, requires prior approval.

Matrix Key:
S = Soil / Solid, W = Water, SL = Sludge, OI = Oil, WI = Wipes, LW = Liquid Waste, A = Air, D = Drinking Water

Project Name: MW Sampling- September 2019

Sampled By: EB

Trace No.	Date Collected	Time Collected	Client Sample ID	Metals Field Filtered (Y / N)	Matrix	Number of Containers	Preservation: Cool	HCl	HNO_3	H_2SO_4	NaOH	Other	B,Ca,Fe,Sb,As,Ba,Be,Cd,Cr,Co	Pb,Li,Mo,Se,Tl,Hg,Cu,Ni,Ag V,	Zn,Mg,K,Na	Cl, F, Sulfate, TDS,	Bicarb-Alk, Carbonate-Alk	Radium 226/228	pH	Remarks	Possible Health Hazards?
1	9/27/19	12:55	MW 1			5	X		X				X	X	X	X	X	X	X	pH 7.41	
2		14:20	MW 3																	7.91	
3		13:20	MW 5																	7.29	
4		13:30	MW 6																	7.16	
5		11:40	MW 7																	7.57	

Please Sign	Released By	Received By	Date	Time	Released By	Received By	Date	Time
1)					2)			
3)				15:24	4)			

In executing this Chain of Custody, the client acknowledges the terms as set forth at www.trace-labs.com/terms-of-agreement.

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Muskegon, MI 49444-2673

231-773-5998 Phone
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TRACE ANALYTICAL LABORATORIES, INC.

Trace Analytical Laboratories: Low Flow Well Purging Field Measurements Form

Client: GHBLP

Date: 9-27-19

Field Personnel: EB

Well No.: MW 1

Depth to Point: 12.01'

Sample Tubing Depth: 10'

Depth to Water: 4.9

Purge Start Time: 12:20

Purge Rate: 300mL/min

Reading Time	12:45	12:50	12:53						
Depth to Water	4.9	4.9	4.9						
Temperature (Celsius)	18.70	18.70	18.70						
Specific Conductivity	226	2.27	2.28						
Dissolved Oxygen	7.14	6.47	6.70						
ORP (mV)	-208	-208	-208						
Turbidity(NTU)	3.54	1.19	.72						
pH	7.41	7.43	7.41						

Stabilization Criteria:
Temperature: 3%
Spec. Conductivity: 3%
Dissolved Oxygen: 10%
ORP: +/- 10 mV
Turbidity: 10% or <1
pH: +/- 0.1

Notes:

Pump Used: Peristaltic

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Trace Analytical Laboratories: Low Flow Well Purging Field Measurements Form

Client: GHBLP

Date: 9-27-19

Field Personnel: _____

Well No.: MW 2

Depth to Point: 23.51'

Sample Tubing Depth: 20'

Depth to Water: 13.70

Purge Start Time: 13:45

Purge Rate: _____

Reading Time	14:10	14:12	14:15	14:17					
Depth to Water	13.70	13.70	13.70	13.70					
Temperature (Celsius)	13.40	13.40	13.40	13.40					
Specific Conductivity	5.02	5.02	5.03	5.03					
Dissolved Oxygen	3.40	3.42	3.33	3.30					
ORP (mV)	-151	-151	-151	-151					
Turbidity(NTU)	3.71	2.20	1.17	.83					
pH	7.91	7.91	7.92	7.91					

Stabilization Criteria:
Temperature: 3%
Spec. Conductivity: 3%
Dissolved Oxygen: 10%
ORP: +/- 10 mV
Turbidity: 10% or <1
pH: +/- 0.1

Notes:

Pump Used: Peristaltic

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Muskegon, MI 49444-2673

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Trace Analytical Laboratories: Low Flow Well Purging Field Measurements Form

Client: GHBLP | Date: 9-27-19 | Field Personnel: EB

Well No.: MW 5 | Depth to Point: 11.5' | Sample Tubing Depth: 10'

Depth to Water: 5.25 | Purge Start Time: 11:45 | Purge Rate: 300mL/min

Reading Time	12:10	12:12	12:15	12:17					
Depth to Water	5.25	5.25	5.25						
Temperature (Celsius)	17.35	17.35	17.35						
Specific Conductivity	1.45	1.45	1.44						
Dissolved Oxygen	5.05	4.87	5.07	5.09					
ORP (mV)	475	-175	-175						
Turbidity(NTU)	2.34	1.19	.92						
pH	7.29	7.30	7.29						

Stabilization Criteria:
Temperature: 3%
Spec. Conductivity: 3%
Dissolved Oxygen: 10%
ORP: +/- 10 mV
Turbidity: 10% or <1
pH: +/- 0.1

Notes:

Pump Used: Peristaltic

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Muskegon, MI 49444-2673

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888-979-4469 Fax
www.trace-labs.com

Trace Analytical Laboratories: Low Flow Well Purging Field Measurements Form

Client: GHBLP | Date: 9-27-19 | Field Personnel: EB

Well No.: MW 6 | Depth to Point: 16.55' | Sample Tubing Depth: 14'

Depth to Water: 8ft | Purge Start Time: 13:10 | Purge Rate: 300mL/min

Reading Time	13:25	13:27	13:30						
Depth to Water	8ft	8ft	7.99ft						
Temperature (Celsius)	15.85	15.85	15.85						
Specific Conductivity	2.36	2.36	2.35						
Dissolved Oxygen	7.03	6.94	6.52						
ORP (mV)	-164	-164	-164						
Turbidity(NTU)	.97								
pH	7.12	7.14	7.16						

Stabilization Criteria:
Temperature: 3%
Spec. Conductivity: 3%
Dissolved Oxygen: 10%
ORP: +/- 10 mV
Turbidity: 10% or <1
pH: +/- 0.1

Notes:

Pump Used: Peristaltic

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TRACE ANALYTICAL LABORATORIES, INC.

Trace Analytical Laboratories: Low Flow Well Purging Field Measurements Form

Client: GHBLP | Date: 9-27-19 | Field Personnel: EB

Well No.: MW 7 | Depth to Point: 18.81' | Sample Tubing Depth: 16'

Depth to Water: 4.4 | Purge Start Time: 11:10 | Purge Rate: 300mL/min

Reading Time	11:35	11:37	11:40						
Depth to Water	4.41	4.5	4.5						
Temperature (Celsius)	14.6	14.6	14.6						
Specific Conductivity	1.270	1.270	1.271						
Dissolved Oxygen	2.08	2.05	1.93						
ORP (mV)	-93	-92	-92						
Turbidity(NTU)	1.27	1.07	.84						
pH	7.57	7.57	7.57						

Stabilization Criteria:
Temperature: 3%
Spec. Conductivity: 3%
Dissolved Oxygen: 10%
ORP: +/- 10 mV
Turbidity: 10% or <1
pH: +/- 0.1

Notes:

Pump Used: Peristaltic

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SAMPLE LOG IN CHECKLIST

Trace ID #: 19I0862 Date: 9/27/19 Package Description: Cooler Temperature: 0.0
Client Name: GHBLP Time: 17:00 Logged in by: NC

Cooler Receipt

Cooler/samples delivered by: Trace courier [X] Hand delivered [ ] Commercial courier [ ] UPS [ ] FED EX [ ] US Mail [ ]
Name of delivery person: Evan Brewer

Tracking Number: [X] Not Applicable
Tracking #: _____

COC Seals present and intact on cooler? [X] Not Applicable [ ] No [ ] Yes
Custody seals signed by Client? [ ] No [ ] Yes Client custody seal # (if applicable): _____

Coolant and Temperature

Type of Coolant Used

Slurry w/ crushed, cubed, or chip ice? [X]
Multiple bags of ice around samples? [ ]
Ice Packs/ Blue Ice : [ ]
No Coolant Present: [ ]
Ice still present upon receipt (circle one): (Yes) No N/A

Cooler Temperature

Correction Factors: •Digital Stick Thermometer CF = -0.5°C
•IR Thermometer CF = -0.6°C
Representative Sample Temperature: 9.6 °C (check one below)
[ ] Temp Blank (Stick Thermometer)
[X] Client Sample (IR Thermometer)
Melt Water: N/A °C (Use Digital Stick Thermometer)

General

	Yes	No	NA	Comments
All bottles arrived unbroken with labels in good condition?	X			
Each sample point is in a sealed plastic bag?		X		
Labels filled out completely?	X			
All bottle labels agree with Chain of Custody (COC)?	X			
Sufficient sample to run tests requested?	X			
*pH checked and samples at correct pH?	X			
Correct chemical preservative added to samples?	X			
Air bubbles absent from VOAs?			X	
COC filled out properly and signed by client?	X			
COC signed in by TRACE sample custodian?	X			
Was project manager called and samples discussed?		X		

Notes:

*EMD pH Test Strips Used:
[X] pH 0-2.5 Lot: HC982588
[ ] pH 11.0-13.0 Lot: HC600691
[ ] Other: _____

Form 70-A.29
Effective 9/12/19

TRACE Analytical Laboratories, Inc.

CERTIFICATE OF ANALYSIS

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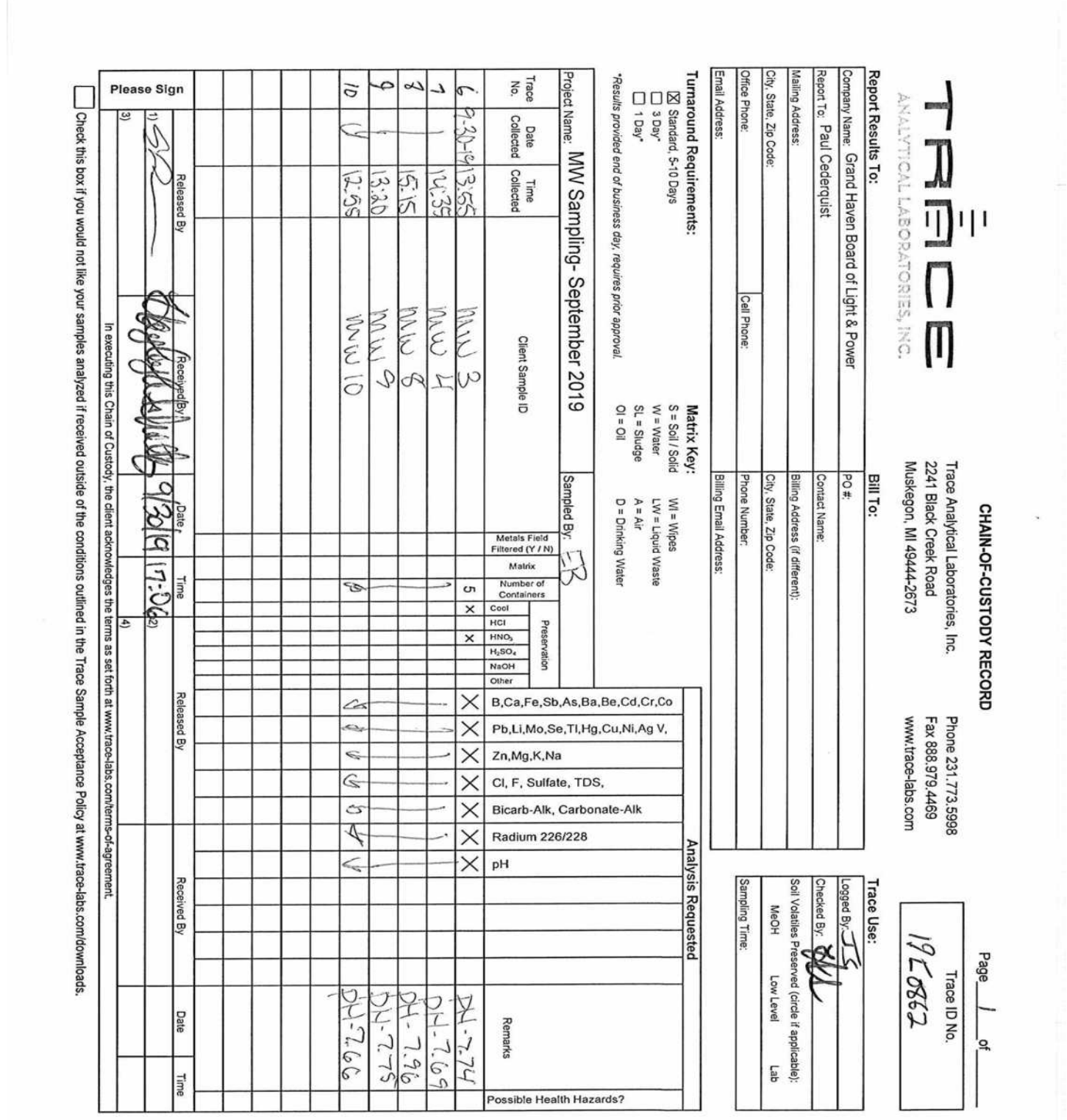

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CHAIN-OF-CUSTODY RECORD

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Muskegon, MI 49444-2673

Phone 231.773.5998
Fax 888.979.4469
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Page 1 of

Trace ID No. 19I0862

Report Results To:

Company Name: Grand Haven Board of Light & Power
Report To: Paul Cederquist
Mailing Address:
City, State, Zip Code:
Office Phone: Cell Phone:
Email Address:

Bill To:

PO #:
Contact Name:
Billing Address (if different):
City, State, Zip Code:
Phone Number:
Billing Email Address:

Trace Use:

Logged By: TS
Checked By: RHL
Soil Volatiles Preserved (circle if applicable): MeOH Low Level Lab
Sampling Time:

Turnaround Requirements:

☒ Standard, 5-10 Days
☐ 3 Day*
☐ 1 Day*
*Results provided end of business day, requires prior approval.

Matrix Key:

S = Soil / Solid
W = Water
SL = Sludge
OI = Oil
WI = Wipes
LW = Liquid Waste
A = Air
D = Drinking Water

Project Name: MW Sampling- September 2019
Sampled By: ER

Trace No.	Date Collected	Time Collected	Client Sample ID	Metals Field Filtered (Y / N)	Matrix	Number of Containers	Preservation: Cool	HCl	HNO_3	H_2SO_4	NaOH	Other	B,Ca,Fe,Sb,As,Ba,Be,Cd,Cr,Co	Pb,Li,Mo,Se,Tl,Hg,Cu,Ni,Ag V,	Zn,Mg,K,Na	Cl, F, Sulfate, TDS,	Bicarb-Alk, Carbonate-Alk	Radium 226/228	pH	Remarks	Possible Health Hazards?
6	9-30-19	13:55	MW 3			5	X		X				X	X	X	X	X	X	X	DH-7.74	
7		14:35	MW 4			1														DH-7.69	
8		15:15	MW 8			1														DH-7.96	
9		13:20	MW 9			1														DH-7.75	
10		12:55	MW 10			1														DH-7.66	

Please Sign

	Released By	Received By	Date	Time
1)				
2)			9/30/19	17:06
3)				
4)				

In executing this Chain of Custody, the client acknowledges the terms as set forth at www.trace-labs.com/terms-of-agreement.

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CERTIFICATE OF ANALYSIS

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TRACE ANALYTICAL LABORATORIES, INC.

231-773-5998 Phone
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Staff Gauge Measurements

MW	Ft
SG-01	1.38 ft
SG-02	2.24 ft
SG-03	3.18 ft
SG-04	2.20 ft
SG-05	1.62 ft
SG-06	1.66 ft

Trace Analytical Laboratories, Inc.
2241 Black Creek Road
Muskegon, MI 49444-2673

TRACE ANALYTICAL LABORATORIES, INC.

231-773-5998 Phone
888-979-4469 Fax
www.trace-labs.com

Trace Analytical Laboratories: Low Flow Well Purging Field Measurements Form

Client: GHBLP | Date: 9-30-19 | Field Personnel: EB

Well No.: MW 3 | Depth to Point: 20.5' | Sample Tubing Depth: 18'

Depth to Water: 10.65 | Purge Start Time: 13:20 | Purge Rate: 300ml

Reading Time	13:40	13:45	13:53						
Depth to Water	10.65	10.65	10.65						
Temperature (Celsius)	15.01	15.01	15.01						
Specific Conductivity	4.19	4.19	4.19						
Dissolved Oxygen	8.60	8.54	8.61						
ORP (mV)	-96	-96	-96						
Turbidity(NTU)	3.17	3.12	3.07						
pH	7.76	7.72	7.74						

Stabilization Criteria:
Temperature: 3%
Spec. Conductivity: 3%
Dissolved Oxygen: 10%
ORP: +/- 10 mV
Turbidity: 10% or <1
pH: +/- 0.1

Notes:

Pump Used: Peristaltic

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TRACE ANALYTICAL LABORATORIES, INC.

Trace Analytical Laboratories: Low Flow Well Purging Field Measurements Form

Client: GHBLP

Date: 9-30-19

Field Personnel: EB

Well No.: MW 4

Depth to Point: 18.01'

Sample Tubing Depth: 16'

Depth to Water: 10.25

Purge Start Time: 14:00

Purge Rate: 300mL/min

Reading Time	14:20	14:25	14:30						
Depth to Water	10.25	10.25	10.25						
Temperature (Celsius)	16.58	16.56	16.58						
Specific Conductivity	3.00	3.00	3.00						
Dissolved Oxygen	2.41	2.43	2.39						
ORP (mV)	-95	-95	-95						
Turbidity(NTU)	2.72	2.71	2.64						
pH	7.67	7.67	7.69						

Stabilization Criteria:
Temperature: 3%
Spec. Conductivity: 3%
Dissolved Oxygen: 10%
ORP: +/- 10 mV
Turbidity: 10% or <1
pH: +/- 0.1

Notes:

Pump Used: Peristaltic

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Trace Analytical Laboratories: Low Flow Well Purging Field Measurements Form

Client: GHBLP | Date: 9.30.19 | Field Personnel: EB

Well No.: MW 8 | Depth to Point: 11.85' | Sample Tubing Depth: 10'

Depth to Water: 2.9 | Purge Start Time: 14:40 | Purge Rate: 300mL/min

Reading Time	15:05	15:10	15:15						
Depth to Water	2.9	3.1	3.1						
Temperature (Celsius)	18.26	18.26	18.26						
Specific Conductivity	.879	~~.89~~ .99	.880						
Dissolved Oxygen	.90	.91	.92						
ORP (mV)	-108	-108	-109						
Turbidity(NTU)	.72								
pH	7.91	7.97	7.96						

Stabilization Criteria:
Temperature: 3%
Spec. Conductivity: 3%
Dissolved Oxygen: 10%
ORP: +/- 10 mV
Turbidity: 10% or <1
pH: +/- 0.1

Notes:

Pump Used: Peristaltic

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TRACE ANALYTICAL LABORATORIES, INC.

Trace Analytical Laboratories: Low Flow Well Purging Field Measurements Form

Client: C-4BL | Date: 9-20-13 | Field Personnel: EB

Well No. 9 | Depth to Point: 149 | Sample Tubing Depth: 10 Ft

Depth to Water: 7.4 | Purge Start Time: 12:55 | Purge Rate: 300mL/min

Reading Time	13:15	13:17	13:20						
Depth to Water	7.40	7.40	7.40						
Temperature (Celsius)	15.41	15.21	15.41						
Specific Conductivity	1.79	1.78	1.79						
Dissolved Oxygen	7.34	7.10	6.99						
ORP (mV)	-107	-107	-107						
Turbidity(NTU)	5.62	1.13	.89						
pH	7.72	7.79	7.75						

Stabilization Criteria:
Temperature: 3%
Spec. Conductivity: 3%
Dissolved Oxygen: 10%
ORP: +/- 10 mV
Turbidity: 10% or <1
pH: +/- 0.1

Notes:

Pump Used:

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TRACE ANALYTICAL LABORATORIES, INC.

Trace Analytical Laboratories: Low Flow Well Purging Field Measurements Form

Client: GHBL

Date: 9-30-19

Field Personnel: EB

Well No. 10

Depth to Point: 12.80

Sample Tubing Depth: 6ft

Depth to Water: 4.80

Purge Start Time: 12:25

Purge Rate: 300ml/min

Reading Time	12:45	12:47	12:50						
Depth to Water	4.8	4.8	4.8						
Temperature (Celsius)	18.70	18.70	18.71						
Specific Conductivity	3.24	3.23	3.23						
Dissolved Oxygen	4.48	4.49	4.32						
ORP (mV)	-226	-226	-226						
Turbidity(NTU)	3.74	3.72	3.69						
pH	7.61	7.64	7.66						

Stabilization Criteria:
Temperature: 3%
Spec. Conductivity: 3%
Dissolved Oxygen: 10%
ORP: +/- 10 mV
Turbidity: 10% or <1
pH: +/- 0.1

Notes:

Pump Used:

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Muskegon, MI 49444-2673

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SAMPLE LOG IN CHECKLIST

Trace ID #: 19I0862 Date: 9/30/19 Package Description: Cooler Temperature: -1.4
Client Name: GHBLP Time: 17:06 Logged in by: AL

Cooler Receipt

Cooler/samples delivered by: Trace courier [✓]
Hand delivered [ ] Name of delivery person: _____
Commercial courier [ ] UPS [ ] FED EX [ ] US Mail [ ]

Tracking Number: [✓] Not Applicable
Tracking #: _____

COC Seals present and intact on cooler? [✓] Not Applicable [ ] No [ ] Yes
Custody seals signed by Client? [ ] No [ ] Yes Client custody seal # (if applicable): _____

Coolant and Temperature

Type of Coolant Used

Slurry w/ crushed, cubed, or chip ice? [✓]
Multiple bags of ice around samples? [ ]
Ice Packs/ Blue Ice : [ ]
No Coolant Present: [ ]

Ice still present upon receipt (circle one): (Yes) No N/A

Cooler Temperature

Correction Factors: •Digital Stick Thermometer CF = -0.5°C
•IR Thermometer CF = -0.6°C

Representative Sample Temperature: 1.8 °C (check one below)
[ ] Temp Blank (Stick Thermometer)
[✓] Client Sample (IR Thermometer)

Melt Water: N/A °C (Use Digital Stick Thermometer)

General

	Yes	No	NA	Comments
All bottles arrived unbroken with labels in good condition?	✓			
Each sample point is in a sealed plastic bag?		✓		
Labels filled out completely?	✓			
All bottle labels agree with Chain of Custody (COC)?	✓			
Sufficient sample to run tests requested?	✓			
*pH checked and samples at correct pH?	✓			
Correct chemical preservative added to samples?	✓			
Air bubbles absent from VOAs?			✓	
COC filled out properly and signed by client?	✓			
COC signed in by TRACE sample custodian?	✓			
Was project manager called and samples discussed?		✓		

Notes:

*EMD pH Test Strips Used:
[✓] pH 0-2.5 Lot: HC982588 [ ] pH 11.0-13.0 Lot: HC600691
[ ] Other: _____

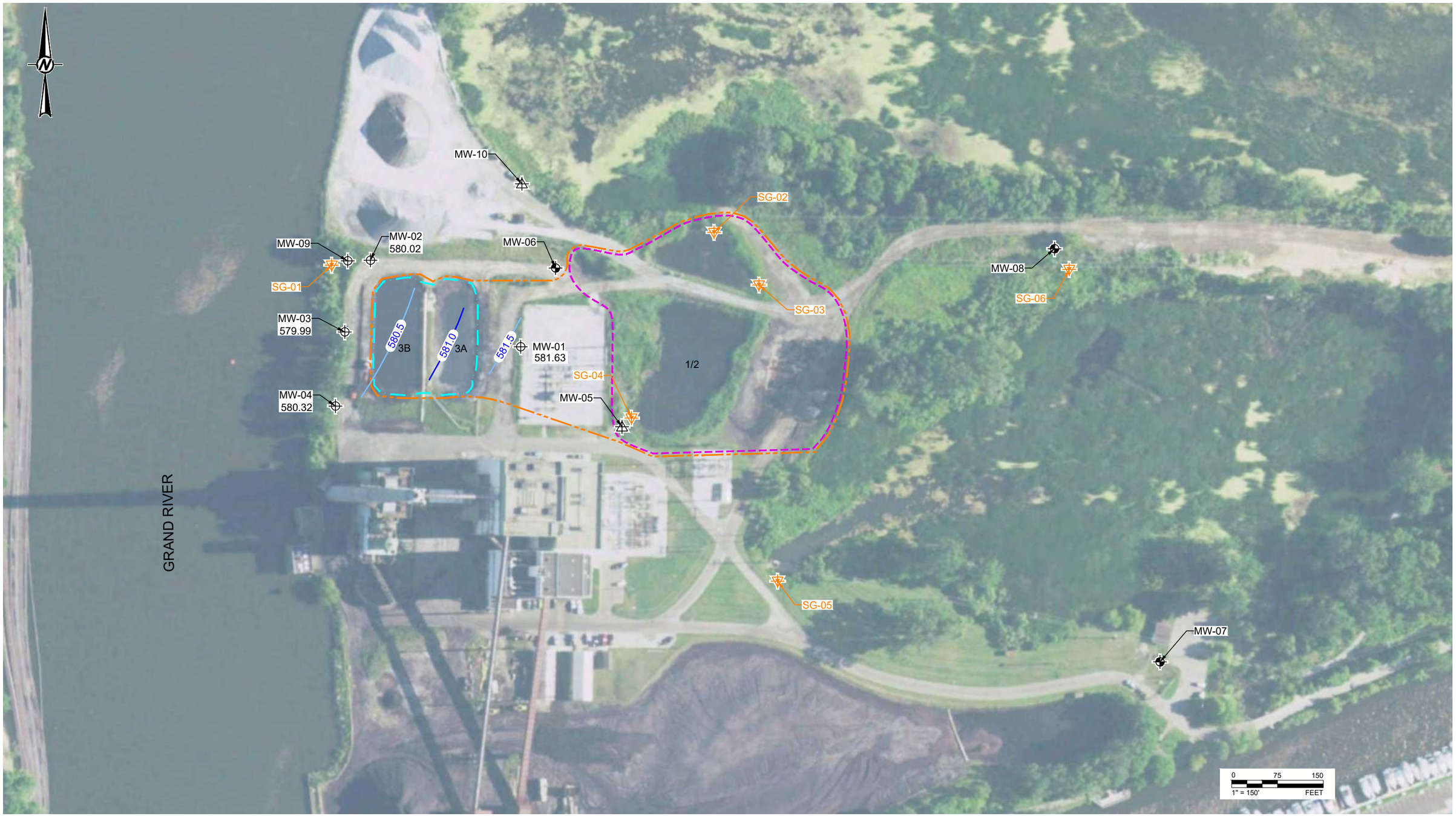
Form 70-A.29
Effective 9/12/19

TRACE Analytical Laboratories, Inc.

CERTIFICATE OF ANALYSIS

APPENDIX B

Historical Groundwater Contour Map



REFERENCE(S)

Service Layer Credits: Source: ESRI, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community. Date of imagery, 7/14/2016.

NOTE(S)

1. HORIZONTAL COORDINATE SYSTEM BASED ON MICHIGAN STATE PLANE SOUTH, INTERNATIONAL FEET. VERTICAL DATUM IS NAVD 1988.
2. MONITORING WELLS MW-05 TO MW-10 AND STAFF GAUGES SG-01 TO SG-06 WERE NOT INSTALLED PRIOR TO THIS EVENT.

LEGEND

- DETECTION MONITORING WELL
- ASSESSMENT MONITORING WELL
- PIEZOMETER
- STAFF GAUGE
- LIMIT OF UNITS 1/2 ASH PLACEMENT AFTER 1981
- UNIT 3 LIMITS OF ASH PLACEMENT
- MULTIUNIT NETWORK BOUNDARY

CLIENT
GRAND HAVEN BOARD OF LIGHT AND POWER
GRAND HAVEN, MICHIGAN

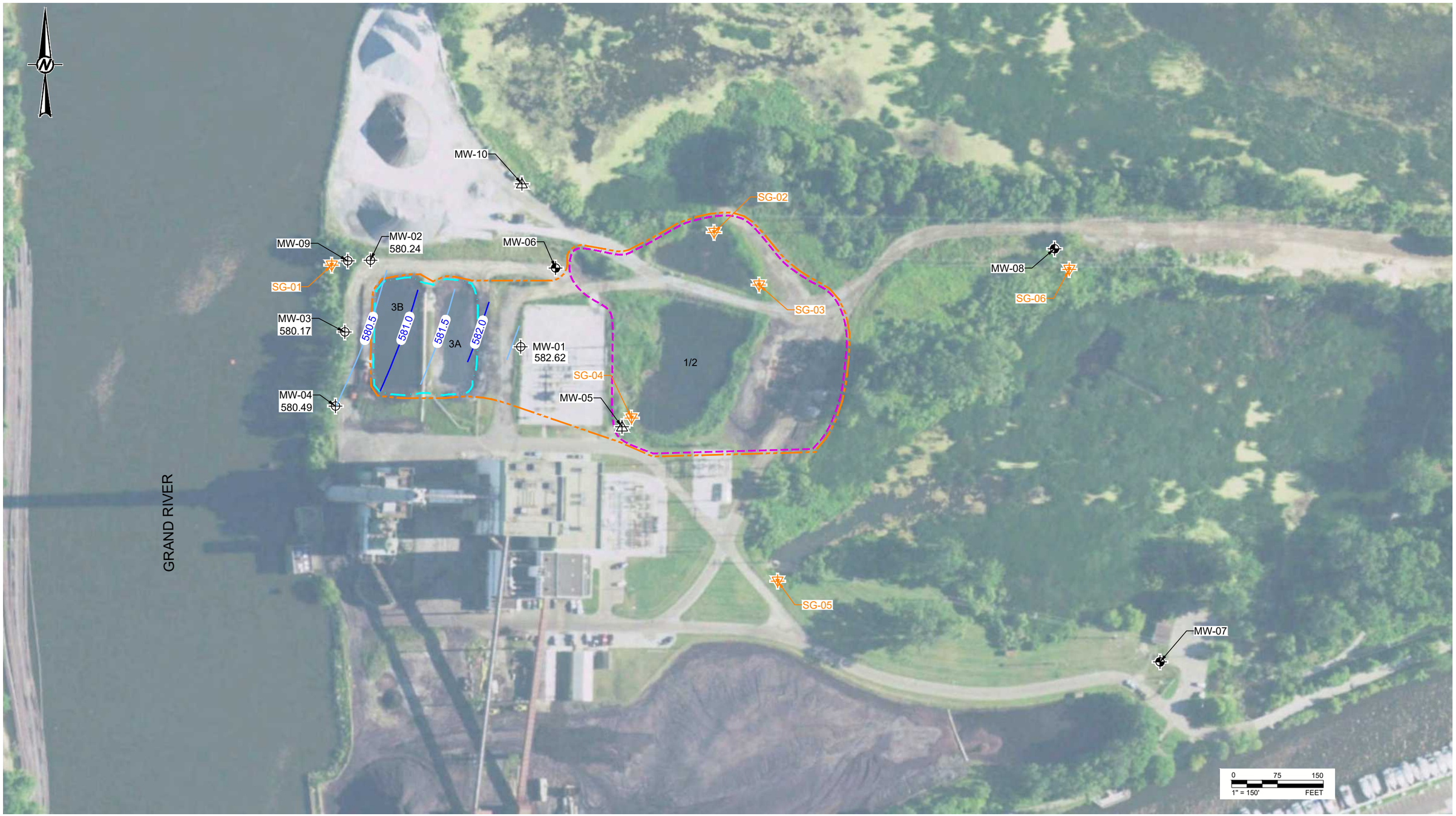
CONSULTANT
GOLDER

YYYY-MM-DD	2019-11-04
DESIGNED	CEP
PREPARED	ADR
REVIEWED	CEP
APPROVED	DLP

PROJECT
JB SIMS GENERATING STATION

TITLE
GROUNDWATER CONTOUR MAP
MARCH 13, 2017

PROJECT NO.	CONTROL	REV.	FIGURE
19116042	19116042B001.dwg	0	B-1



REFERENCE(S)

Service Layer Credits: Source: ESRI, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community. Date of imagery, 7/14/2016.

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CLIENT
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GRAND HAVEN, MICHIGAN

CONSULTANT
GOLDER

YYYY-MM-DD	2019-11-04
DESIGNED	CEP
PREPARED	ADR
REVIEWED	CEP
APPROVED	DLP

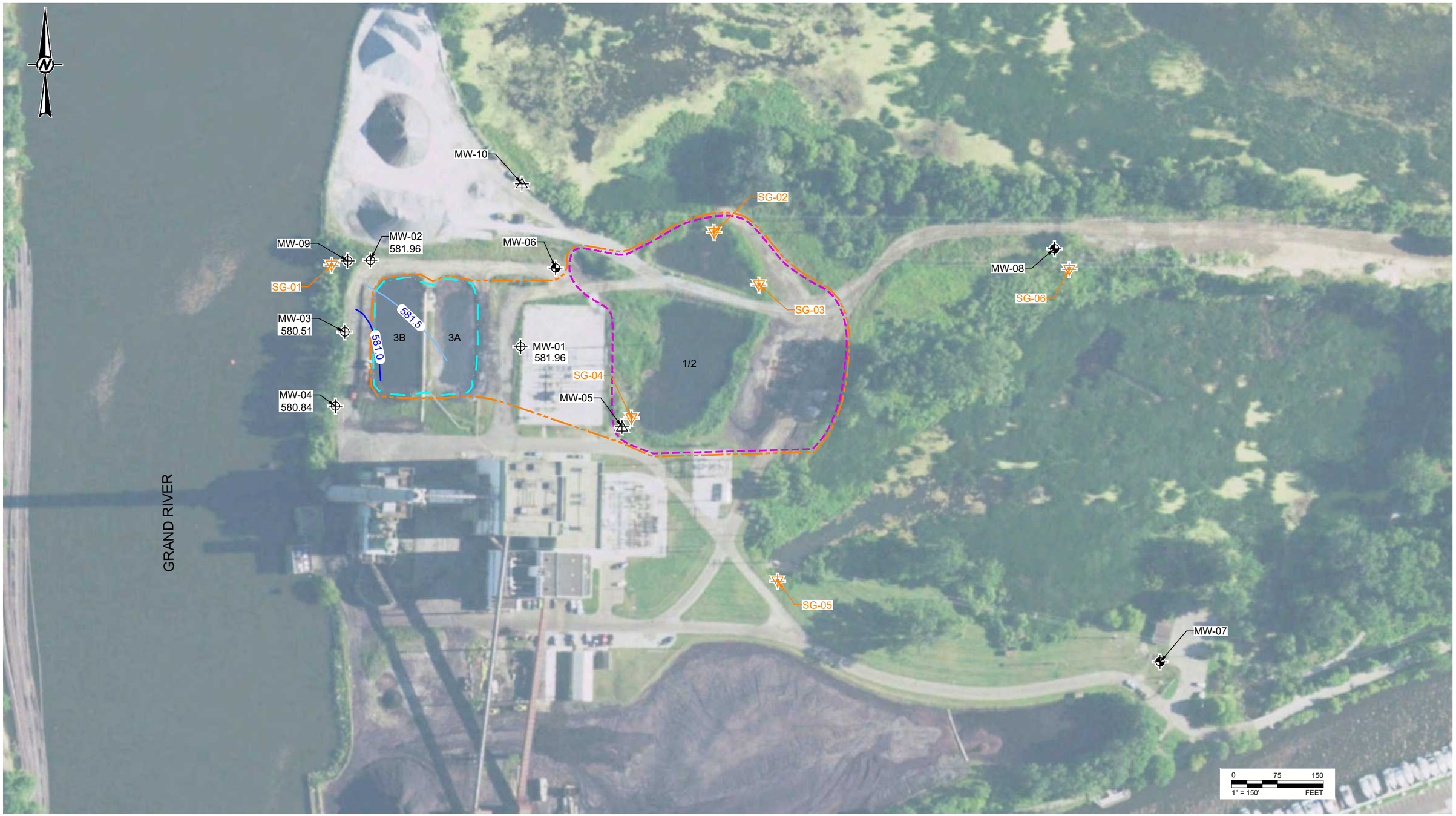
PROJECT
JB SIMS GENERATING STATION

TITLE
GROUNDWATER CONTOUR MAP
APRIL 5, 2017

PROJECT NO.	CONTROL	REV.	FIGURE
19116042	19116042B002.dwg	0	B-2

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

1 in
0



REFERENCE(S)

Service Layer Credits: Source: ESRI, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community. Date of imagery, 7/14/2016.

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LEGEND

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- MULTIUNIT NETWORK BOUNDARY

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GRAND HAVEN, MICHIGAN

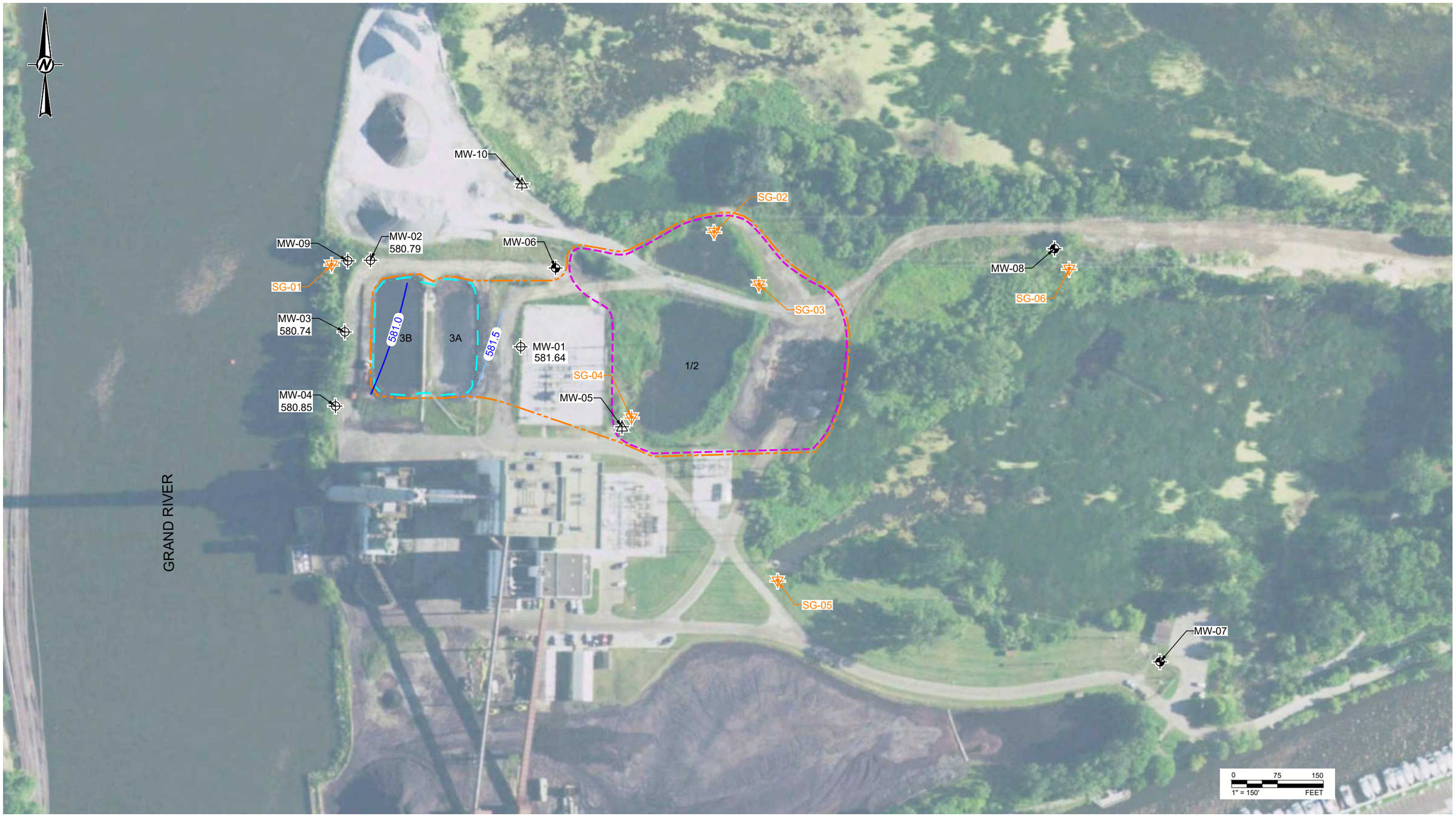
CONSULTANT
GOLDER

YYYY-MM-DD	2019-11-04
DESIGNED	CEP
PREPARED	ADR
REVIEWED	CEP
APPROVED	DLP

PROJECT
JB SIMS GENERATING STATION

TITLE
GROUNDWATER CONTOUR MAP
APRIL 24, 2017

PROJECT NO.	CONTROL	REV.	FIGURE
19116042	19116042B003.dwg	0	B-3



REFERENCE(S)

Service Layer Credits: Source: ESRI, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community. Date of imagery, 7/14/2016.

NOTE(S)

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LEGEND

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- ASSESSMENT MONITORING WELL
- PIEZOMETER
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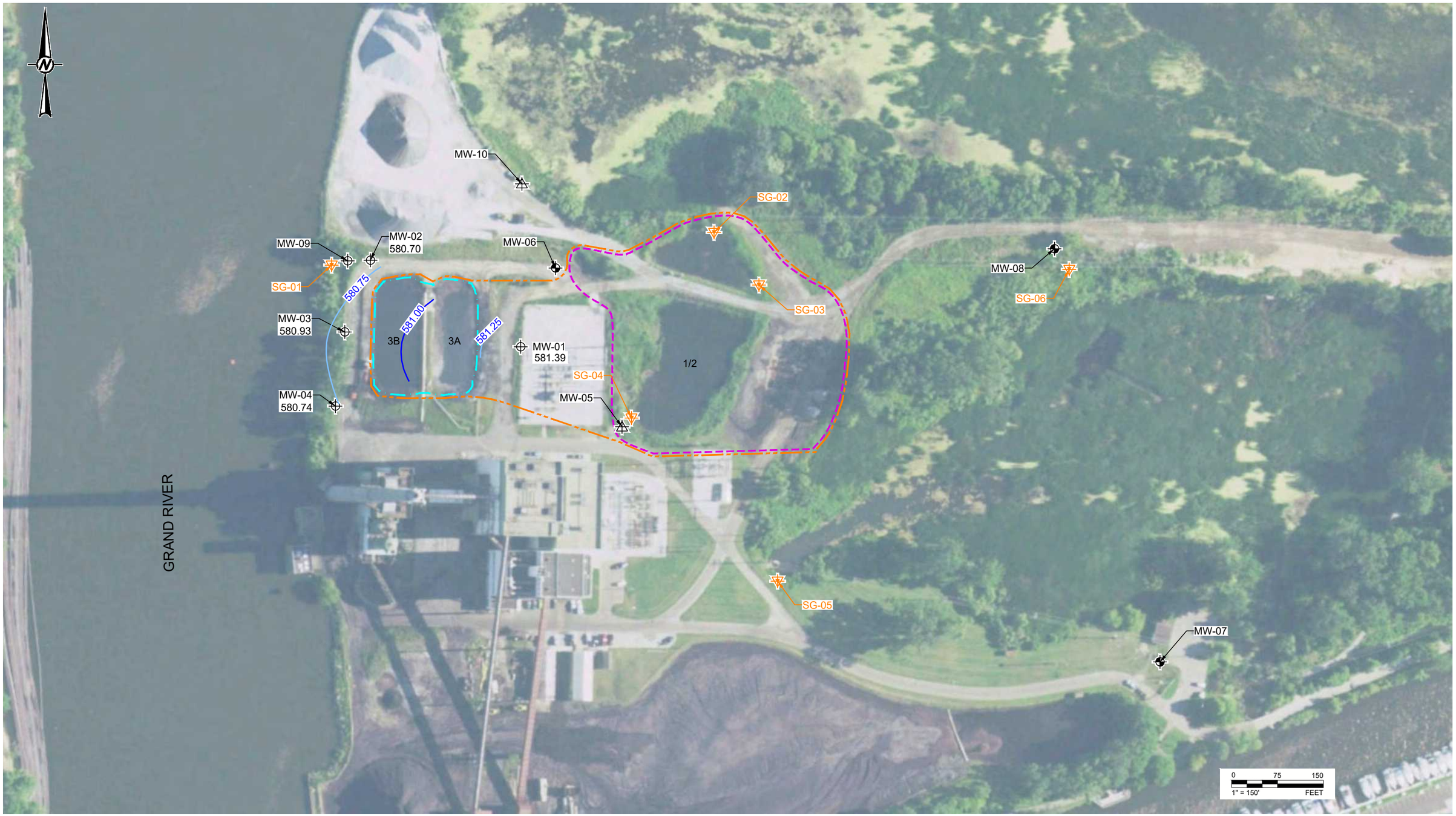
YYYY-MM-DD	2019-11-04
DESIGNED	CEP
PREPARED	ADR
REVIEWED	CEP
APPROVED	DLP

PROJECT
JB SIMS GENERATING STATION

TITLE
GROUNDWATER CONTOUR MAP
MAY 15, 2017

PROJECT NO.	CONTROL	REV.	FIGURE
19116042	19116042B004.dwg	0	B-4



REFERENCE(S)

Service Layer Credits: Source: ESRI, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community. Date of imagery, 7/14/2016.

NOTE(S)

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LEGEND

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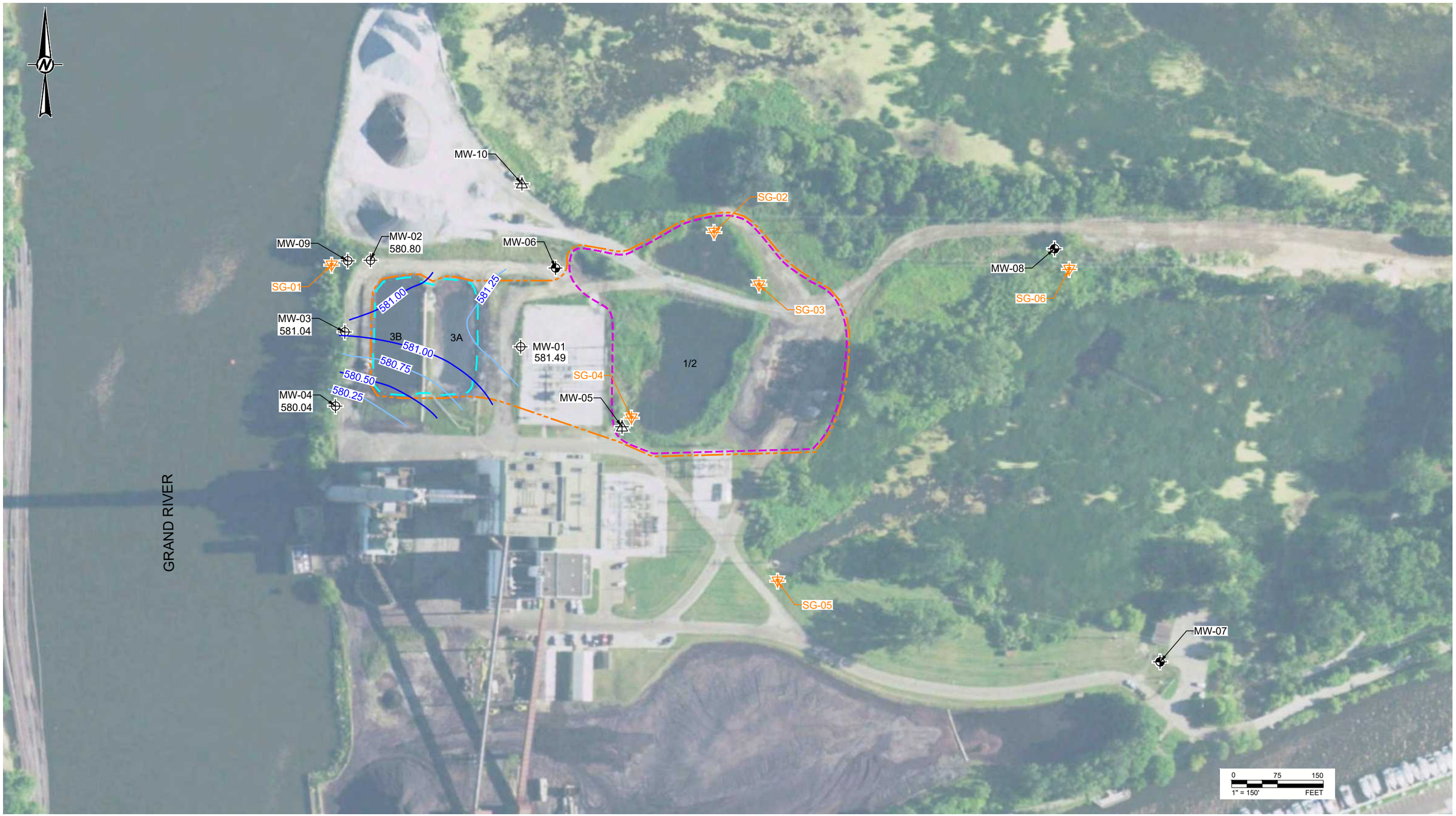
GOLDER

YYYY-MM-DD	2019-11-04
DESIGNED	CEP
PREPARED	ADR
REVIEWED	CEP
APPROVED	DLP

PROJECT
JB SIMS GENERATING STATION

TITLE
GROUNDWATER CONTOUR MAP
JUNE 5, 2017

PROJECT NO.	CONTROL	REV.	FIGURE
19116042	19116042B005.dwg	0	B-5



REFERENCE(S)

Service Layer Credits: Source: ESRI, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community. Date of imagery, 7/14/2016.

NOTE(S)

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LEGEND

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CLIENT
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GRAND HAVEN, MICHIGAN

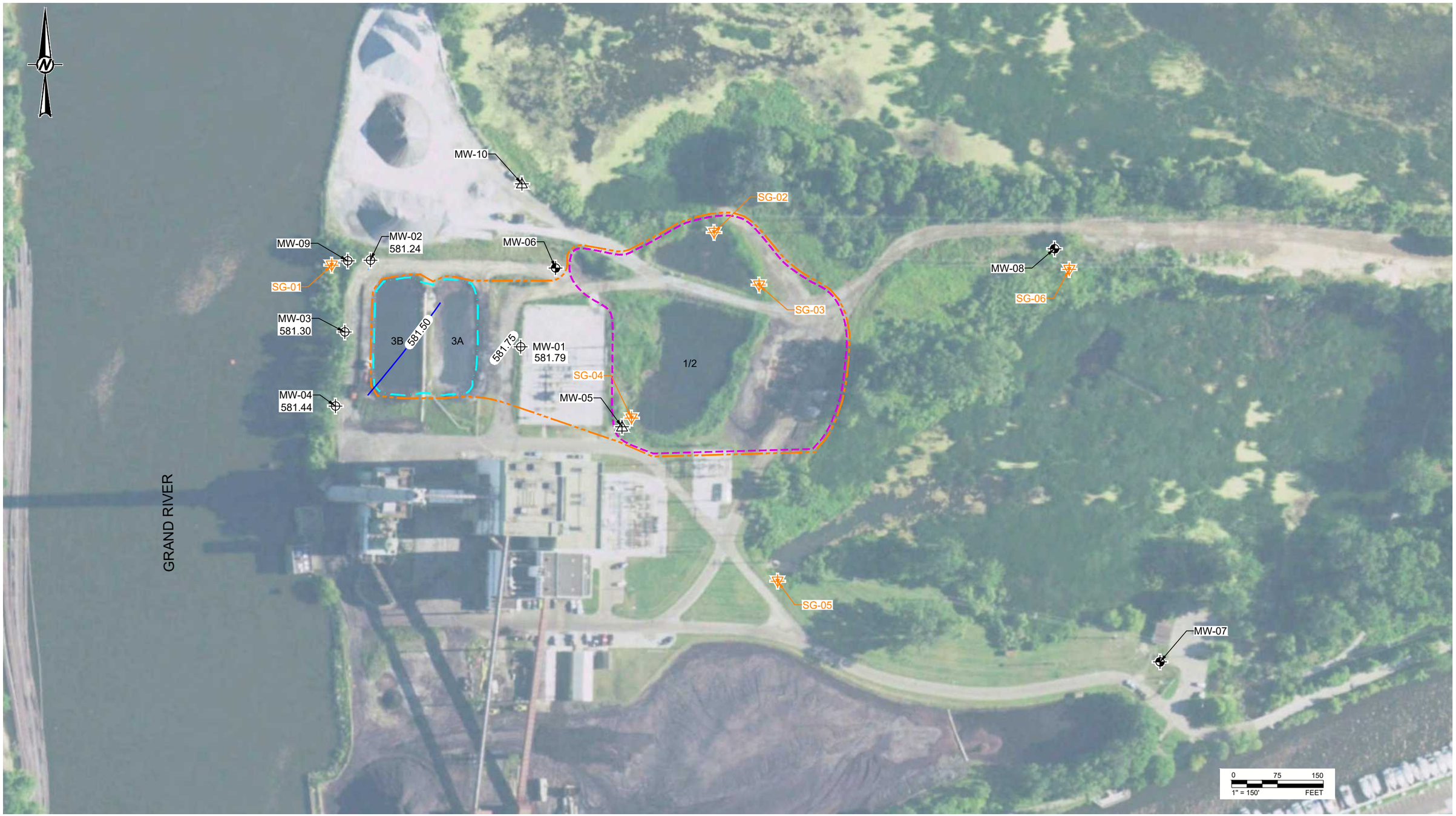
CONSULTANT
GOLDER

YYYY-MM-DD	2019-11-11
DESIGNED	CEP
PREPARED	ADR
REVIEWED	CEP
APPROVED	DLP

PROJECT
JB SIMS GENERATING STATION

TITLE
GROUNDWATER CONTOUR MAP
JUNE 26, 2017

PROJECT NO.	CONTROL	REV.	FIGURE
19116042	19116042B006.dwg	0	B-6



REFERENCE(S)

Service Layer Credits: Source: ESRI, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community. Date of imagery, 7/14/2016.

NOTE(S)

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LEGEND

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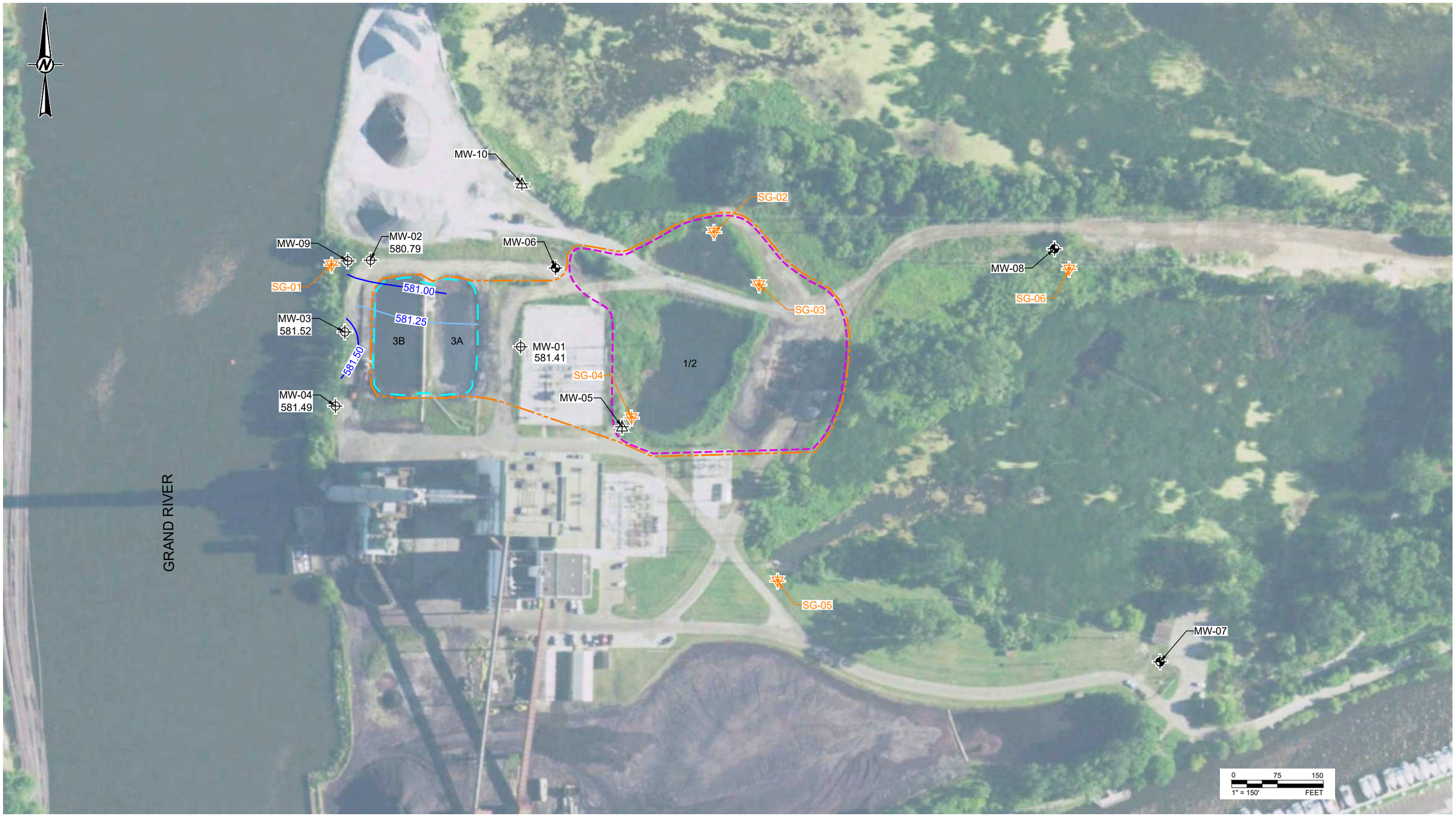
CONSULTANT
GOLDER

YYYY-MM-DD	2019-11-04
DESIGNED	CEP
PREPARED	ADR
REVIEWED	CEP
APPROVED	DLP

PROJECT
JB SIMS GENERATING STATION

TITLE
GROUNDWATER CONTOUR MAP
JULY 17, 2017

PROJECT NO.	CONTROL	REV.	FIGURE
19116042	19116042B007.dwg	0	B-7



REFERENCE(S)

Service Layer Credits: Source: ESRI, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community. Date of imagery, 7/14/2016.

NOTE(S)

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LEGEND

- DETECTION MONITORING WELL
- ASSESSMENT MONITORING WELL
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GRAND HAVEN, MICHIGAN

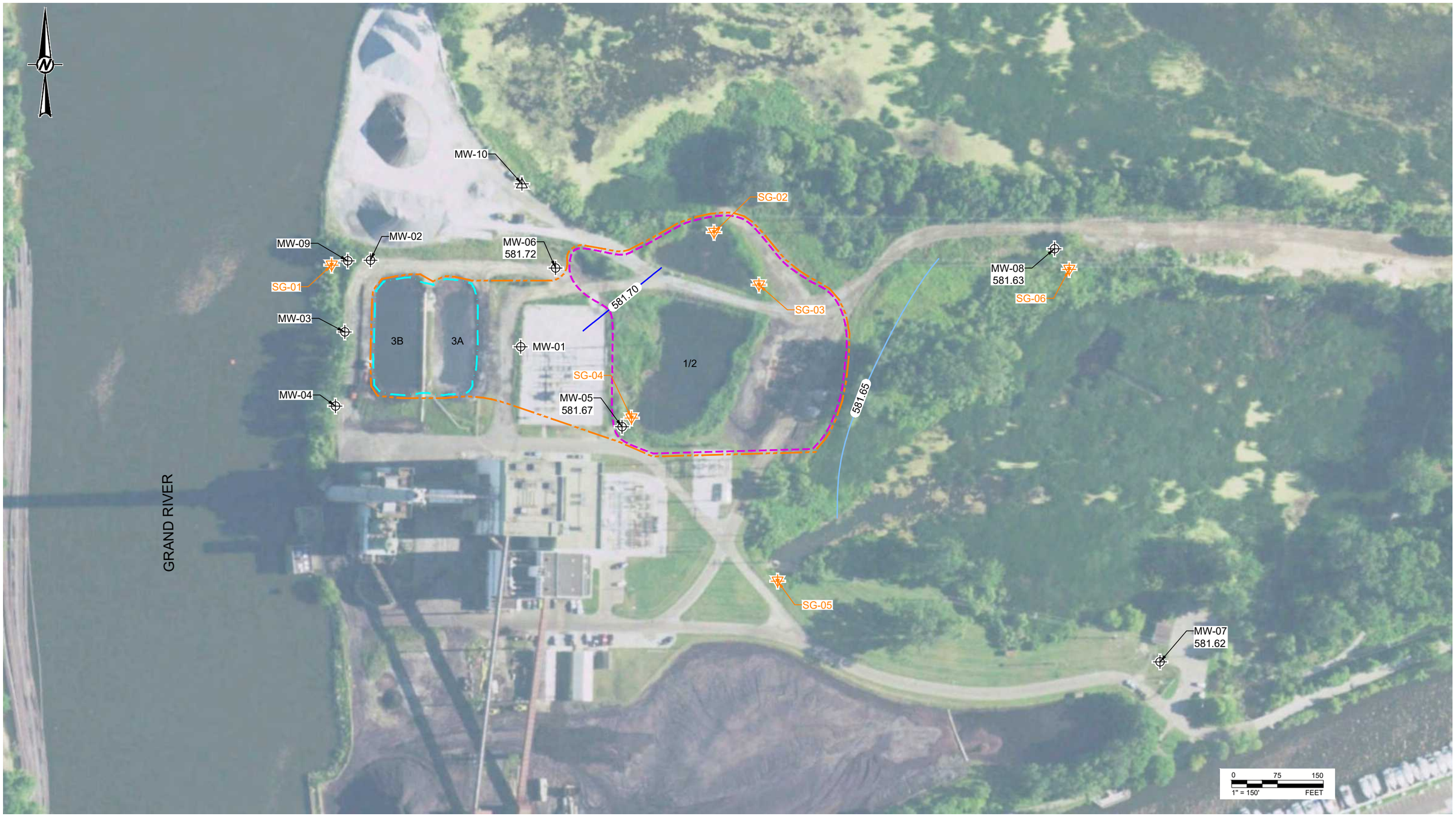
CONSULTANT
GOLDER

YYYY-MM-DD	2019-11-7
DESIGNED	CEP
PREPARED	ADR
REVIEWED	CEP
APPROVED	DLP

PROJECT
JB SIMS GENERATING STATION

TITLE
GROUNDWATER CONTOUR MAP
AUGUST 7, 2017

PROJECT NO.	CONTROL	REV.	FIGURE
19116042	19116042B008.dwg	0	B-8



REFERENCE(S)

Service Layer Credits: Source: ESRI, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community. Date of imagery, 7/14/2016.

NOTE(S)

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2. BACKGROUND EVENT FOR MW-05 TO MW-08, THEREFORE MONITORING WELLS MW-01 TO MW-04 WERE NOT GAUGED.
3. MONITORING WELLS MW-09 & MW-10 & STAFF GAUGE SG-01 THROUGH SG-06 WERE INSTALLED PRIOR TO THIS EVENT.

LEGEND

- DETECTION MONITORING WELL
- ASSESSMENT MONITORING WELL
- PIEZOMETER
- STAFF GAUGE
- LIMIT OF UNITS 1/2 ASH PLACEMENT AFTER 1981
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YYYY-MM-DD	2019-11-07
DESIGNED	CEP
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REVIEWED	CEP
APPROVED	DLP

PROJECT
JB SIMS GENERATING STATION

TITLE
GROUNDWATER CONTOUR MAP
JUNE 27, 2018

PROJECT NO.	CONTROL	REV.	FIGURE
19116042	19116042B009.dwg	0	B-9

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

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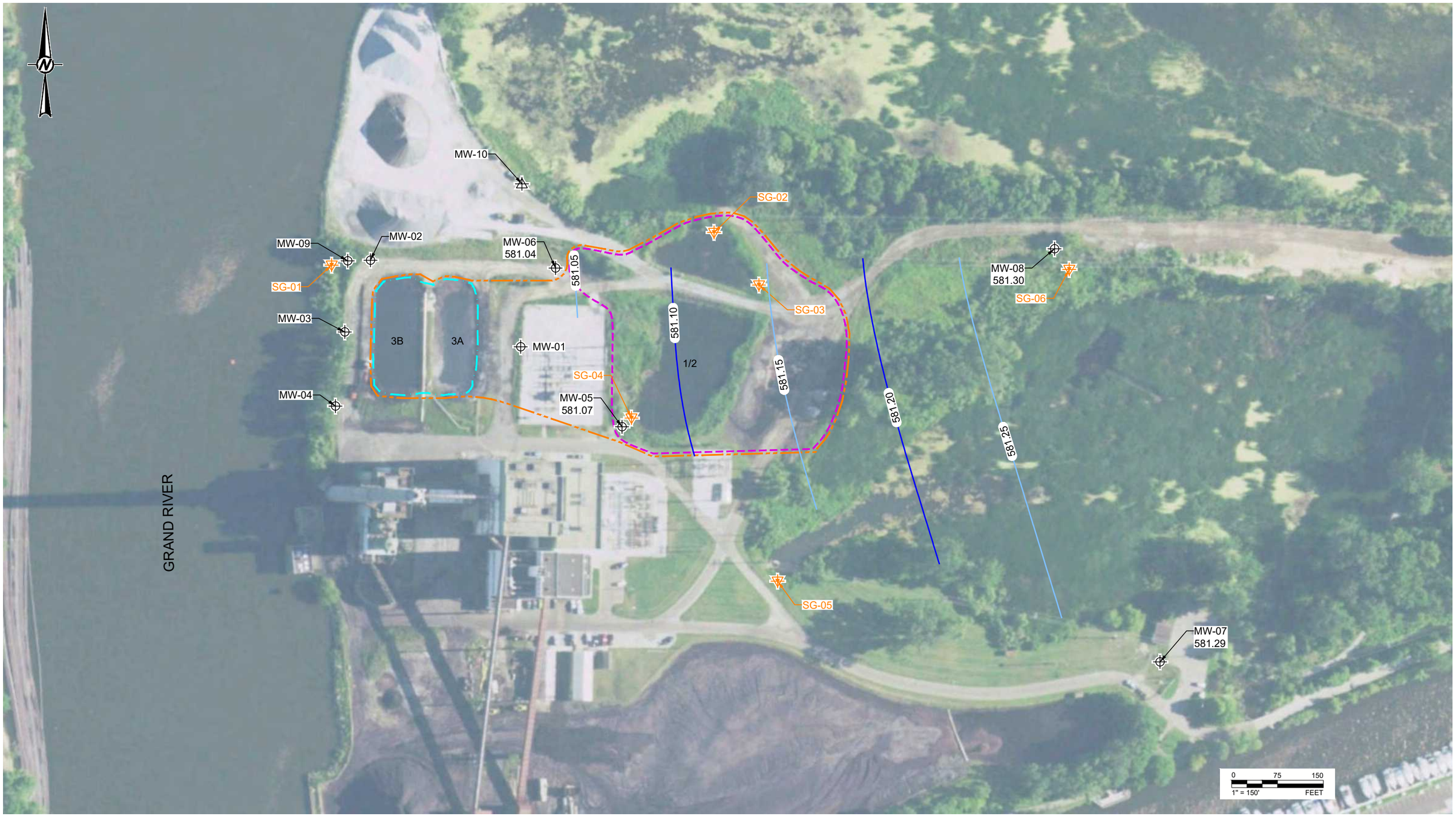

REFERENCE(S)

Service Layer Credits: Source: ESRI, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community. Date of imagery, 7/14/2016.

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LEGEND

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- STAFF GAUGE
- LIMIT OF UNITS 1/2 ASH PLACEMENT AFTER 1981
- UNIT 3 LIMITS OF ASH PLACEMENT
- MULTIUNIT NETWORK BOUNDARY

CLIENT
GRAND HAVEN BOARD OF LIGHT AND POWER
GRAND HAVEN, MICHIGAN

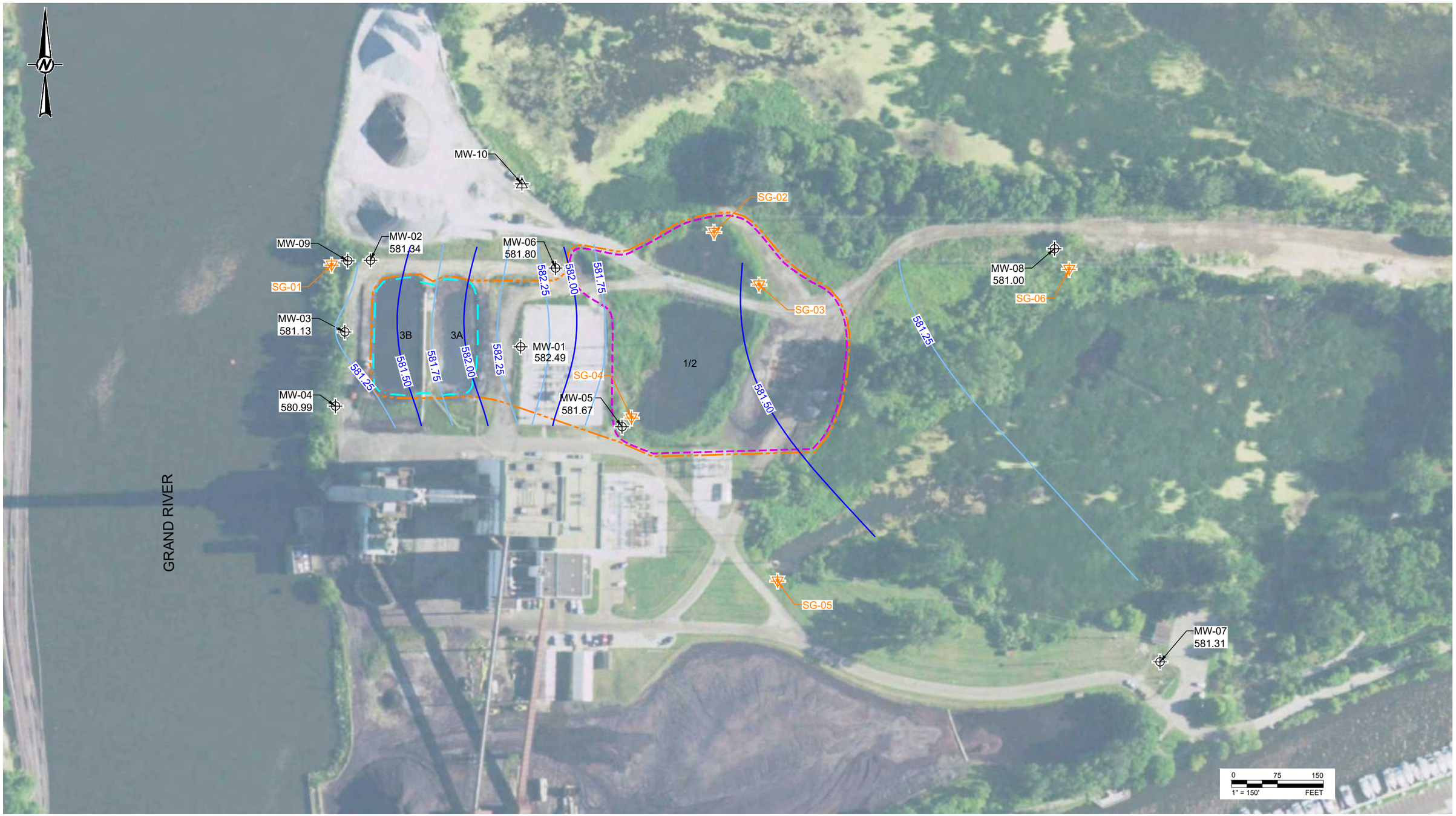
CONSULTANT
GOLDER

YYYY-MM-DD	2019-11-07
DESIGNED	CEP
PREPARED	ADR
REVIEWED	CEP
APPROVED	DLP

PROJECT
JB SIMS GENERATING STATION

TITLE
GROUNDWATER CONTOUR MAP
JULY 30, 2018

PROJECT NO.	CONTROL	REV.	FIGURE
19116042	19116042B010.dwg	0	B-10



REFERENCE(S)

Service Layer Credits: Source: ESRI, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community. Date of imagery, 7/14/2016.

NOTE(S)

1. HORIZONTAL COORDINATE SYSTEM BASED ON MICHIGAN STATE PLANE SOUTH, INTERNATIONAL FEET. VERTICAL DATUM IS NAVD 1988.
2. BACKGROUND EVENT FOR MW-05 TO MW-08, THEREFORE MONITORING WELLS MW-01 TO MW-04 WERE NOT GAUGED.
3. MONITORING WELLS MW-09 & MW-10 & STAFF GAUGE SG-01 THROUGH SG-06 WERE INSTALLED PRIOR TO THIS EVENT.

LEGEND

- DETECTION MONITORING WELL
- ASSESSMENT MONITORING WELL
- PIEZOMETER
- STAFF GAUGE
- LIMIT OF UNITS 1/2 ASH PLACEMENT AFTER 1981
- UNIT 3 LIMITS OF ASH PLACEMENT
- MULTIUNIT NETWORK BOUNDARY

CLIENT
GRAND HAVEN BOARD OF LIGHT AND POWER
GRAND HAVEN, MICHIGAN

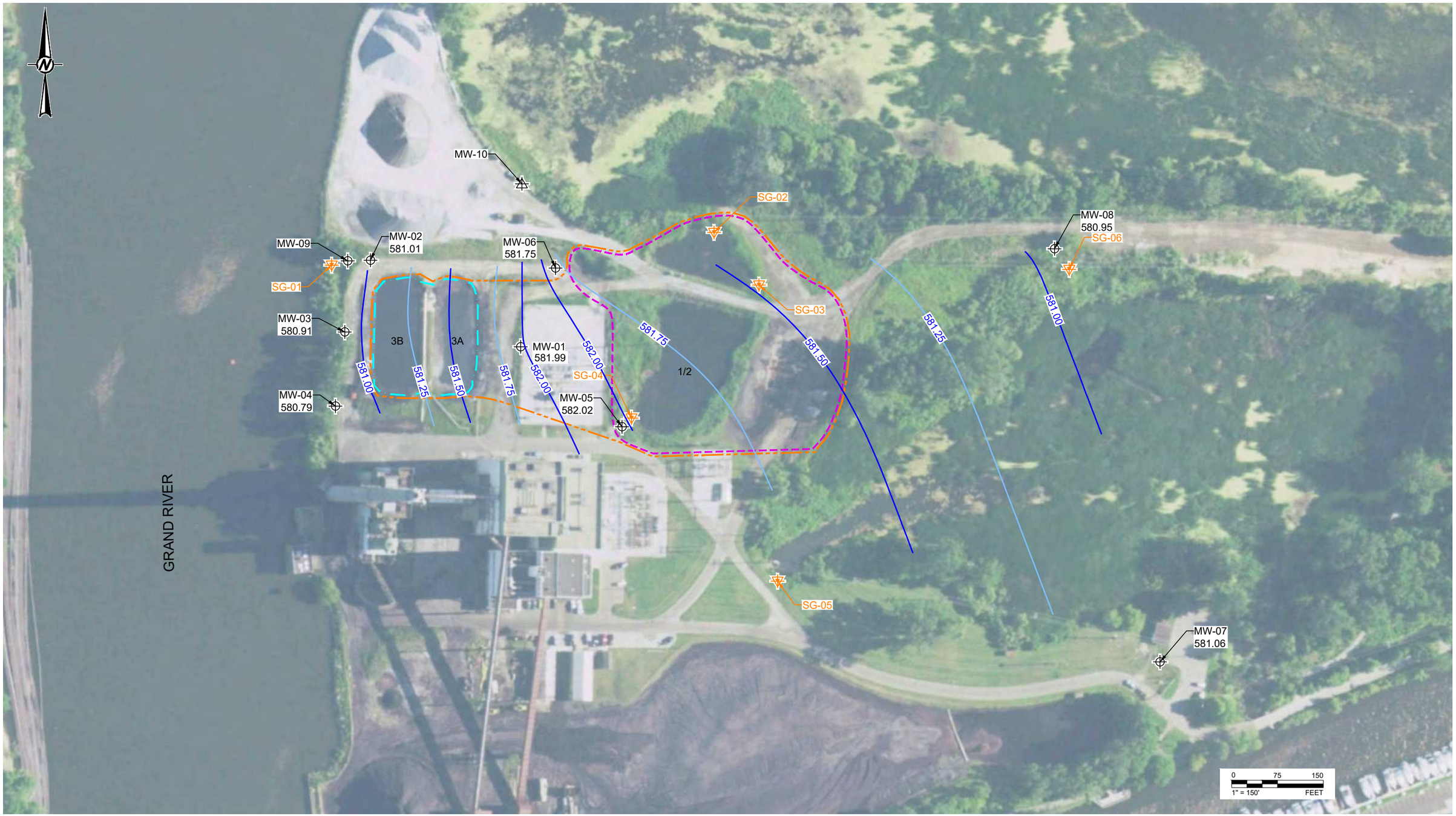
CONSULTANT
GOLDER

YYYY-MM-DD	2019-11-07
DESIGNED	CEP
PREPARED	ADR
REVIEWED	CEP
APPROVED	DLP

PROJECT
JB SIMS GENERATING STATION

TITLE
GROUNDWATER CONTOUR MAP
AUGUST 27, 2018

PROJECT NO.	CONTROL	REV.	FIGURE
19116042	19116042B011.dwg	0	B-11



REFERENCE(S)

Service Layer Credits: Source: ESRI, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community. Date of imagery, 7/14/2016.

NOTE(S)

1. HORIZONTAL COORDINATE SYSTEM BASED ON MICHIGAN STATE PLANE SOUTH, INTERNATIONAL FEET. VERTICAL DATUM IS NAVD 1988.
2. BACKGROUND EVENT FOR MW-05 TO MW-08, THEREFORE MONITORING WELLS MW-01 TO MW-04 WERE NOT GAUGED.
3. MONITORING WELLS MW-09 & MW-10 & STAFF GAUGE SG-01 THROUGH SG-06 WERE INSTALLED PRIOR TO THIS EVENT.

LEGEND

- DETECTION MONITORING WELL
- ASSESSMENT MONITORING WELL
- PIEZOMETER
- STAFF GAUGE
- LIMIT OF UNITS 1/2 ASH PLACEMENT AFTER 1981
- UNIT 3 LIMITS OF ASH PLACEMENT
- MULTIUNIT NETWORK BOUNDARY

CLIENT
GRAND HAVEN BOARD OF LIGHT AND POWER
GRAND HAVEN, MICHIGAN

CONSULTANT
GOLDER

YYYY-MM-DD	2019-11-07
DESIGNED	CEP
PREPARED	ADR
REVIEWED	CEP
APPROVED	DLP

PROJECT
JB SIMS GENERATING STATION

TITLE
GROUNDWATER CONTOUR MAP
SEPTEMBER 26, 2018

PROJECT NO.	CONTROL	REV.	FIGURE
19116042	19116042B012.dwg	0	B-12

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

1 in
0

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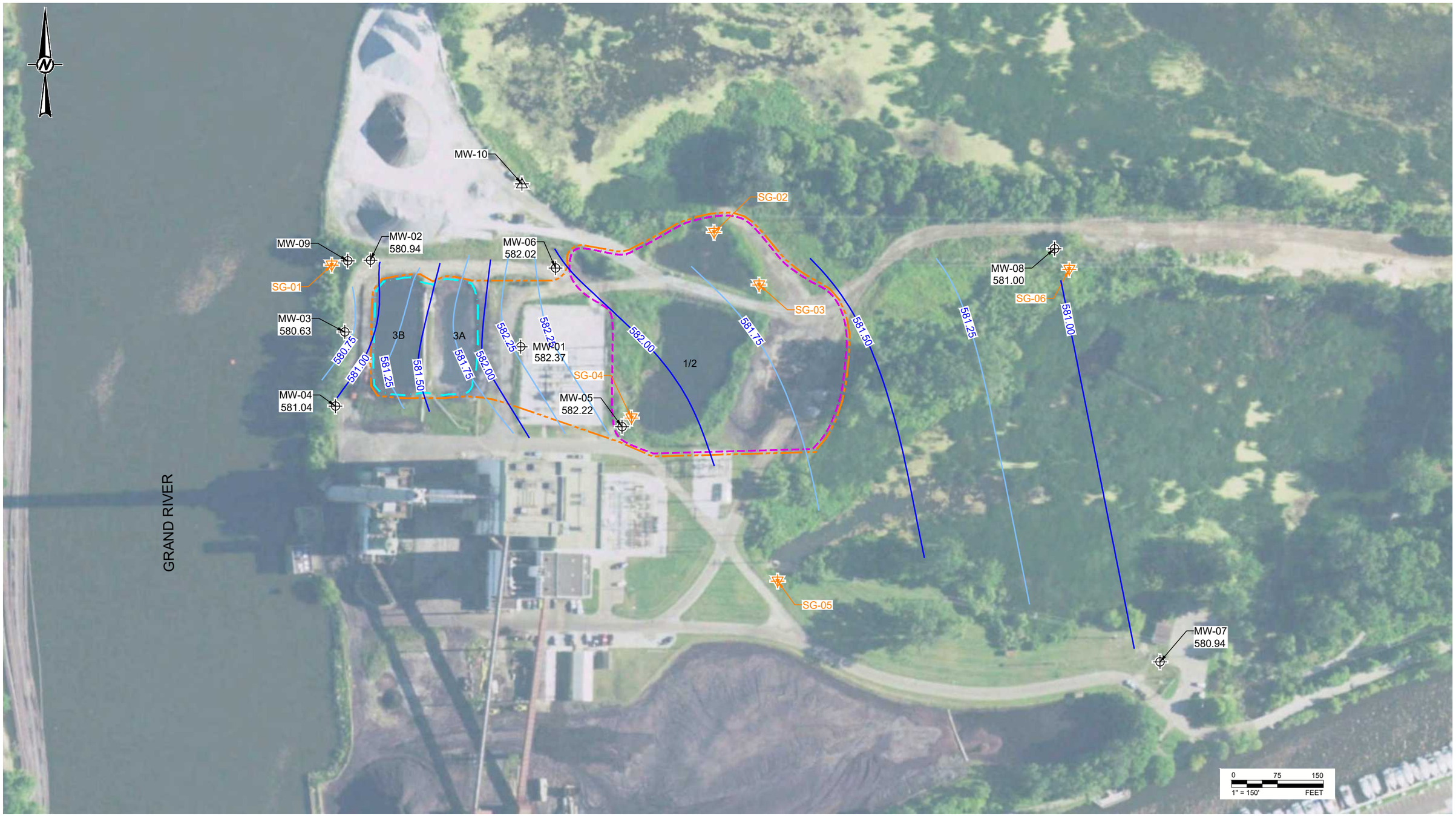

REFERENCE(S)

Service Layer Credits: Source: ESRI, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community. Date of imagery, 7/14/2016.

NOTE(S)

1. HORIZONTAL COORDINATE SYSTEM BASED ON MICHIGAN STATE PLANE SOUTH, INTERNATIONAL FEET. VERTICAL DATUM IS NAVD 1988.
2. BACKGROUND EVENT FOR MW-05 TO MW-08, THEREFORE MONITORING WELLS MW-01 TO MW-04 WERE NOT GAUGED.
3. MONITORING WELLS MW-09 & MW-10 & STAFF GAUGE SG-01 THROUGH SG-06 WERE INSTALLED PRIOR TO THIS EVENT.

LEGEND

- DETECTION MONITORING WELL
- ASSESSMENT MONITORING WELL
- PIEZOMETER
- STAFF GAUGE
- LIMIT OF UNITS 1/2 ASH PLACEMENT AFTER 1981
- UNIT 3 LIMITS OF ASH PLACEMENT
- MULTIUNIT NETWORK BOUNDARY

CLIENT
GRAND HAVEN BOARD OF LIGHT AND POWER
GRAND HAVEN, MICHIGAN

CONSULTANT
GOLDER

YYYY-MM-DD	2019-11-07
DESIGNED	CEP
PREPARED	ADR
REVIEWED	CEP
APPROVED	DLP

PROJECT
JB SIMS GENERATING STATION

TITLE
GROUNDWATER CONTOUR MAP
OCTOBER 22, 2018

PROJECT NO.	CONTROL	REV.	FIGURE
19116042	19116042B013.dwg	0	B-13

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

1 in

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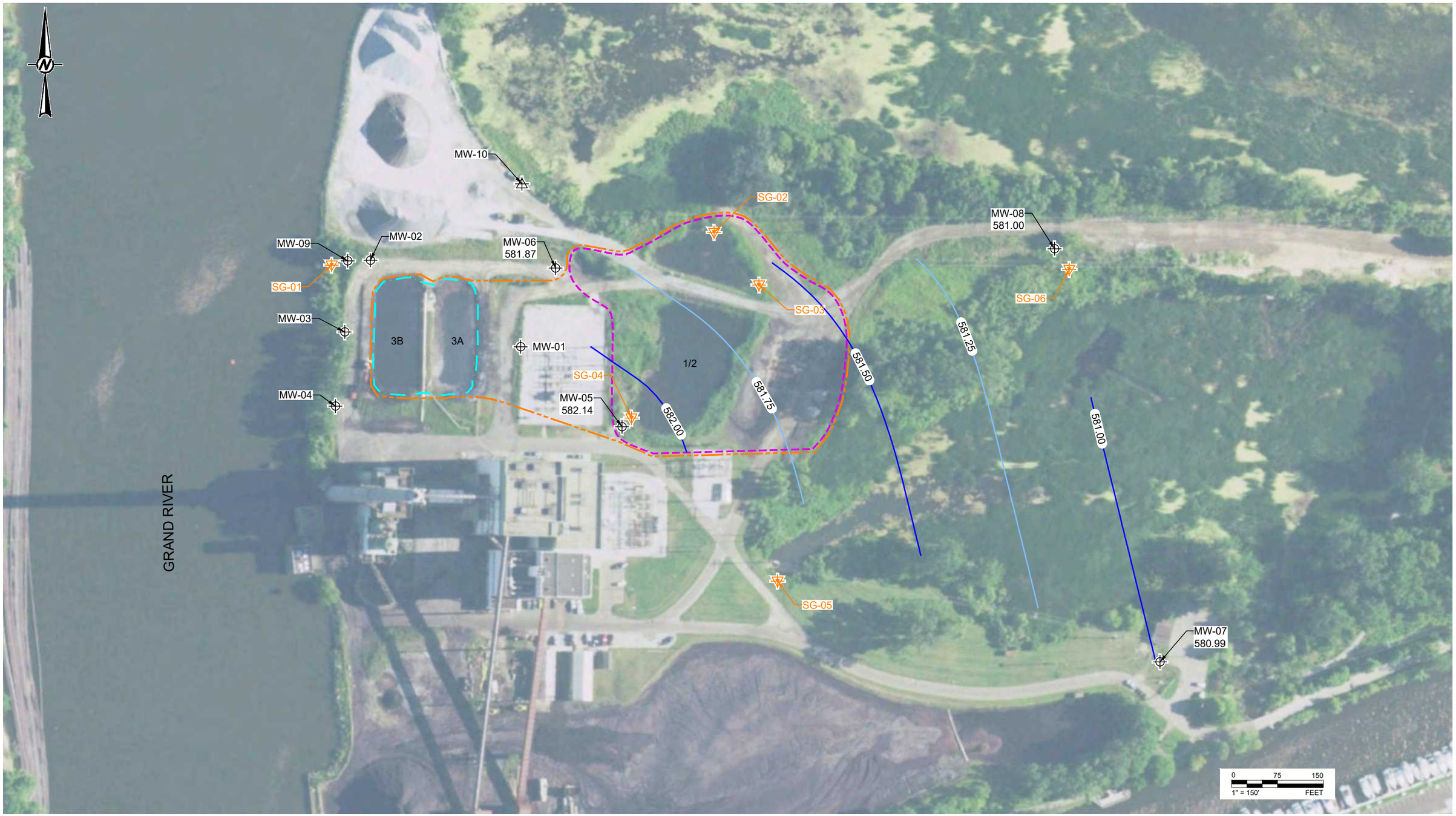


REFERENCE(S)

Service Layer Credits: Source: ESRI, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community. Date of imagery, 7/14/2016.

NOTE(S)

1. HORIZONTAL COORDINATE SYSTEM BASED ON MICHIGAN STATE PLANE SOUTH, INTERNATIONAL FEET. VERTICAL DATUM IS NAVD 1988.
2. BACKGROUND EVENT FOR MW-05 TO MW-08, THEREFORE MONITORING WELLS MW-01 TO MW-04 WERE NOT GAUGED.
3. MONITORING WELLS MW-09 & MW-10 & STAFF GAUGE SG-01 THROUGH SG-06 WERE INSTALLED PRIOR TO THIS EVENT.

LEGEND

- DETECTION MONITORING WELL
- ASSESSMENT MONITORING WELL
- PIEZOMETER
- STAFF GAUGE
- LIMIT OF UNITS 1/2 ASH PLACEMENT AFTER 1981
- UNIT 3 LIMITS OF ASH PLACEMENT
- MULTIUNIT NETWORK BOUNDARY

CLIENT
GRAND HAVEN BOARD OF LIGHT AND POWER
GRAND HAVEN, MICHIGAN

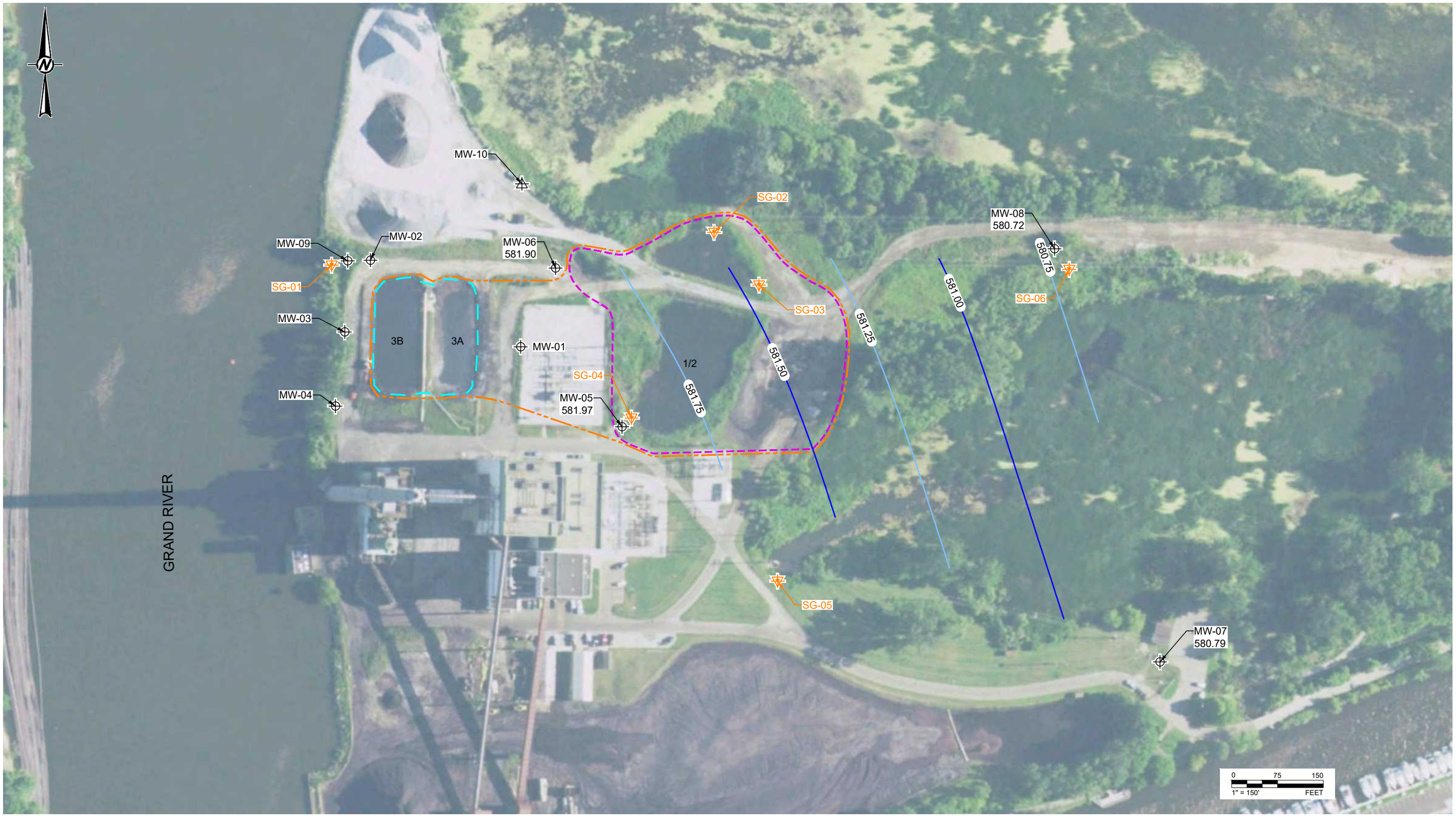
CONSULTANT
GOLDER

YYYY-MM-DD	2019-11-07
DESIGNED	CEP
PREPARED	DJC
REVIEWED	CEP
APPROVED	DLP

PROJECT
JB SIMS GENERATING STATION

TITLE
GROUNDWATER CONTOUR MAP
NOVEMBER 12, 2018

PROJECT NO.	CONTROL	REV.	FIGURE
19116042	19116042B014.dwg	0	B-14



REFERENCE(S)

Service Layer Credits: Source: ESRI, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community. Date of imagery, 7/14/2016.

NOTE(S)

1. HORIZONTAL COORDINATE SYSTEM BASED ON MICHIGAN STATE PLANE SOUTH, INTERNATIONAL FEET. VERTICAL DATUM IS NAVD 1988.
2. BACKGROUND EVENT FOR MW-05 TO MW-08, THEREFORE MONITORING WELLS MW-01 TO MW-04 WERE NOT GAUGED.
3. MONITORING WELLS MW-09 & MW-10 & STAFF GAUGE SG-01 THROUGH SG-06 WERE INSTALLED PRIOR TO THIS EVENT.

LEGEND

- DETECTION MONITORING WELL
- ASSESSMENT MONITORING WELL
- PIEZOMETER
- STAFF GAUGE
- LIMIT OF UNITS 1/2 ASH PLACEMENT AFTER 1981
- UNIT 3 LIMITS OF ASH PLACEMENT
- MULTIUNIT NETWORK BOUNDARY

CLIENT
GRAND HAVEN BOARD OF LIGHT AND POWER
GRAND HAVEN, MICHIGAN

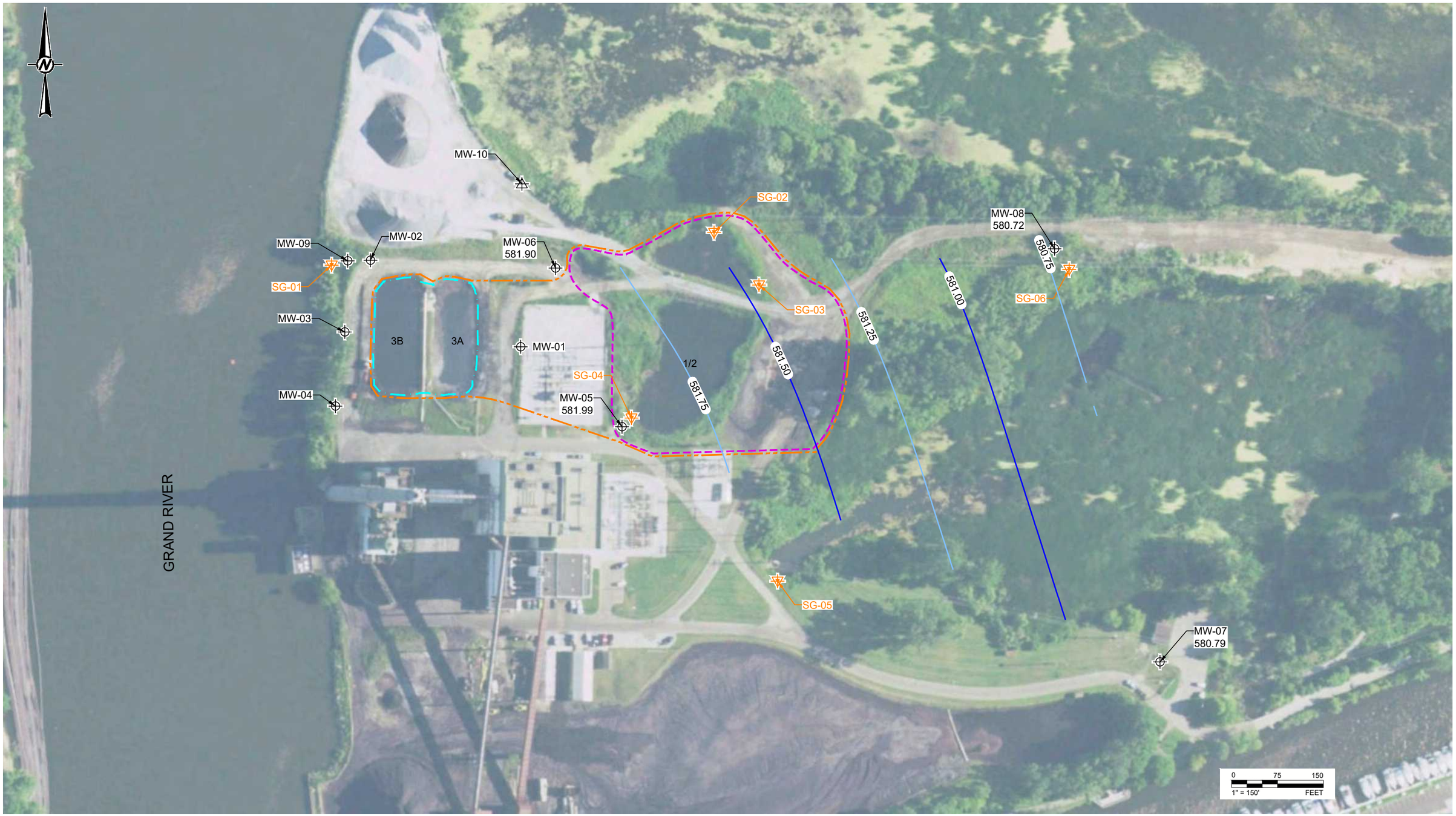
CONSULTANT
GOLDER

YYYY-MM-DD	2019-11-08
DESIGNED	CEP
PREPARED	ADR
REVIEWED	CEP
APPROVED	DLP

PROJECT
JB SIMS GENERATING STATION

TITLE
GROUNDWATER CONTOUR MAP
NOVEMBER 28, 2019

PROJECT NO.	CONTROL	REV.	FIGURE
19116042	19116042B015.dwg	0	B-15



REFERENCE(S)

Service Layer Credits: Source: ESRI, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community. Date of imagery, 7/14/2016.

NOTE(S)

1. HORIZONTAL COORDINATE SYSTEM BASED ON MICHIGAN STATE PLANE SOUTH, INTERNATIONAL FEET. VERTICAL DATUM IS NAVD 1988.
2. BACKGROUND EVENT FOR MW-05 TO MW-08, THEREFORE MONITORING WELLS MW-01 TO MW-04 WERE NOT GAUGED.
3. MONITORING WELLS MW-09 & MW-10 & STAFF GAUGE SG-01 THROUGH SG-06 WERE INSTALLED PRIOR TO THIS EVENT.

LEGEND

- DETECTION MONITORING WELL
- ASSESSMENT MONITORING WELL
- PIEZOMETER
- STAFF GAUGE
- LIMIT OF UNITS 1/2 ASH PLACEMENT AFTER 1981
- UNIT 3 LIMITS OF ASH PLACEMENT
- MULTIUNIT NETWORK BOUNDARY

CLIENT
GRAND HAVEN BOARD OF LIGHT AND POWER
GRAND HAVEN, MICHIGAN

CONSULTANT
GOLDER

YYYY-MM-DD	2019-11-08
DESIGNED	CEP
PREPARED	ADR
REVIEWED	CEP
APPROVED	DLP

PROJECT
JB SIMS GENERATING STATION

TITLE
GROUNDWATER CONTOUR MAP
DECEMBER 7, 2018

PROJECT NO.	CONTROL	REV.	FIGURE
19116042	19116042B016.dwg	0	B-16

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

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REFERENCE(S)

Service Layer Credits: Source: ESRI, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community. Date of imagery, 7/14/2016.

NOTE(S)

1. HORIZONTAL COORDINATE SYSTEM BASED ON MICHIGAN STATE PLANE SOUTH, INTERNATIONAL FEET. VERTICAL DATUM IS NAVD 1988.
2. BACKGROUND EVENT FOR MW-05 TO MW-08, THEREFORE MONITORING WELLS MW-01 TO MW-04 WERE NOT GAUGED.
3. MONITORING WELLS MW-09 & MW-10 & STAFF GAUGE SG-01 THROUGH SG-06 WERE INSTALLED PRIOR TO THIS EVENT.

LEGEND

- DETECTION MONITORING WELL
- ASSESSMENT MONITORING WELL
- PIEZOMETER
- STAFF GAUGE
- LIMIT OF UNITS 1/2 ASH PLACEMENT AFTER 1981
- UNIT 3 LIMITS OF ASH PLACEMENT
- MULTIUNIT NETWORK BOUNDARY

CLIENT
GRAND HAVEN BOARD OF LIGHT AND POWER
GRAND HAVEN, MICHIGAN

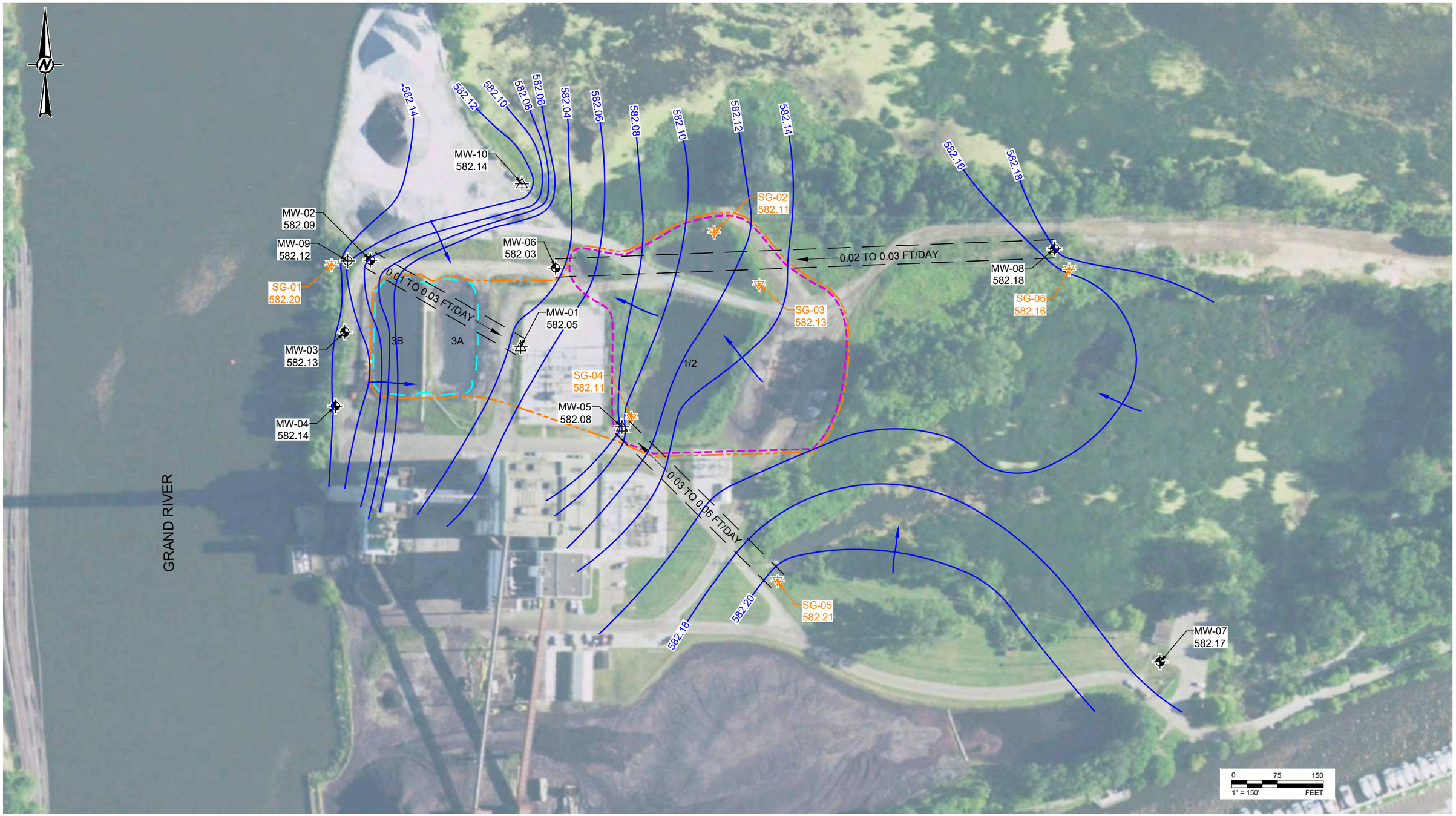
CONSULTANT
GOLDER

YYYY-MM-DD	2019-11-08
DESIGNED	CEP
PREPARED	ADR
REVIEWED	CEP
APPROVED	DLP

PROJECT
JB SIMS GENERATING STATION

TITLE
GROUNDWATER CONTOUR MAP
MARCH 27, 2019

PROJECT NO.	CONTROL	REV.	FIGURE
19116042	19116042B017.dwg	0	B-17



REFERENCE(S)

Service Layer Credits: Source: ESRI, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community. Date of imagery, 7/14/2016.

NOTE(S)

1. HORIZONTAL COORDINATE SYSTEM BASED ON MICHIGAN STATE PLANE SOUTH, INTERNATIONAL FEET. VERTICAL DATUM IS NAVD 1988.

LEGEND

- DETECTION MONITORING WELL WITH GROUNDWATER ELEVATION
- ASSESSMENT MONITORING WELL WITH GROUNDWATER ELEVATION
- PIEZOMETER WITH GROUNDWATER ELEVATION
- STAFF GAUGE WITH WATER ELEVATION
- LIMIT OF UNITS 1/2 ASH PLACEMENT AFTER 1981
- UNIT 3 LIMITS OF ASH PLACEMENT
- MULTIUNIT NETWORK BOUNDARY
- 582.18 GROUNDWATER CONTOURS
- FLOW DIRECTION

CLIENT
GRAND HAVEN BOARD OF LIGHT AND POWER
GRAND HAVEN, MICHIGAN

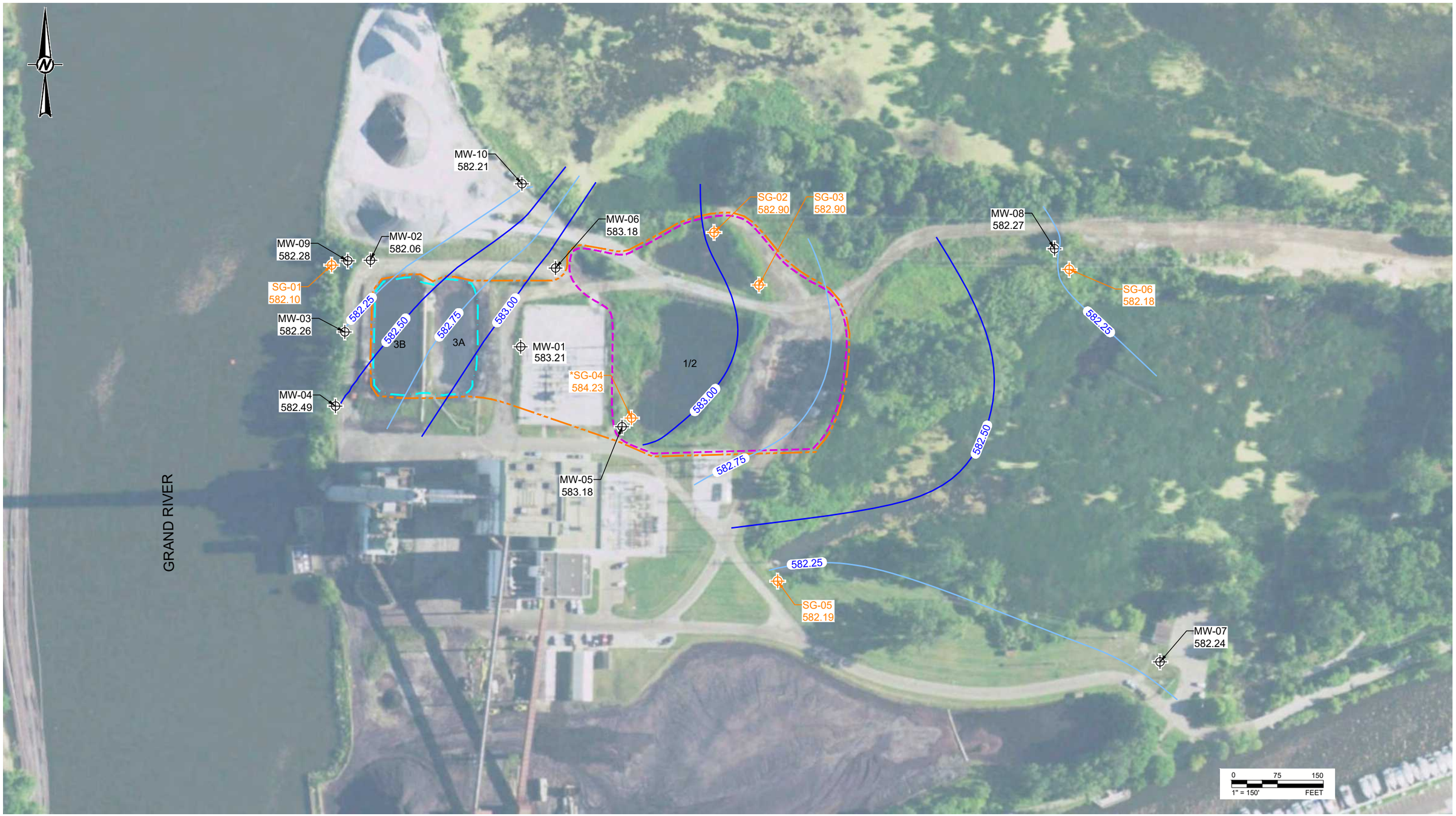
CONSULTANT
GOLDER

YYYY-MM-DD	2019-11-08
DESIGNED	CEP
PREPARED	ADR
REVIEWED	CEP
APPROVED	DLP

PROJECT
JB SIMS GENERATING STATION

TITLE
GROUNDWATER CONTOUR MAP
SEPTEMBER 9, 2019

PROJECT NO.	CONTROL	REV.	FIGURE
19116042	19116042B018.dwg	0	B-18



REFERENCE(S)

Service Layer Credits: Source: ESRI, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community. Date of imagery, 7/14/2016.

NOTE(S)

1. HORIZONTAL COORDINATE SYSTEM BASED ON MICHIGAN STATE PLANE SOUTH, INTERNATIONAL FEET. VERTICAL DATUM IS NAVD 1988.
2. * GROUNDWATER ELEVATION FOR SG-4 WAS NOT USED TO CREATE CONTOURS DUE TO ANOMALOUS ELEVATION DATA.
2. BACKGROUND EVENT FOR MW-05 TO MW-08, THEREFORE MONITORING WELLS MW-01 TO MW-04 WERE NOT GAUGED.
3. MONITORING WELLS MW-09 & MW-10 & STAFF GAUGE SG-01 THROUGH SG-06 WERE INSTALLED PRIOR TO THIS EVENT.

LEGEND

- DETECTION MONITORING WELL
- ASSESSMENT MONITORING WELL
- PIEZOMETER
- STAFF GAUGE
- LIMIT OF UNITS 1/2 ASH PLACEMENT AFTER 1981
- UNIT 3 LIMITS OF ASH PLACEMENT
- MULTIUNIT NETWORK BOUNDARY

CLIENT
GRAND HAVEN BOARD OF LIGHT AND POWER
GRAND HAVEN, MICHIGAN

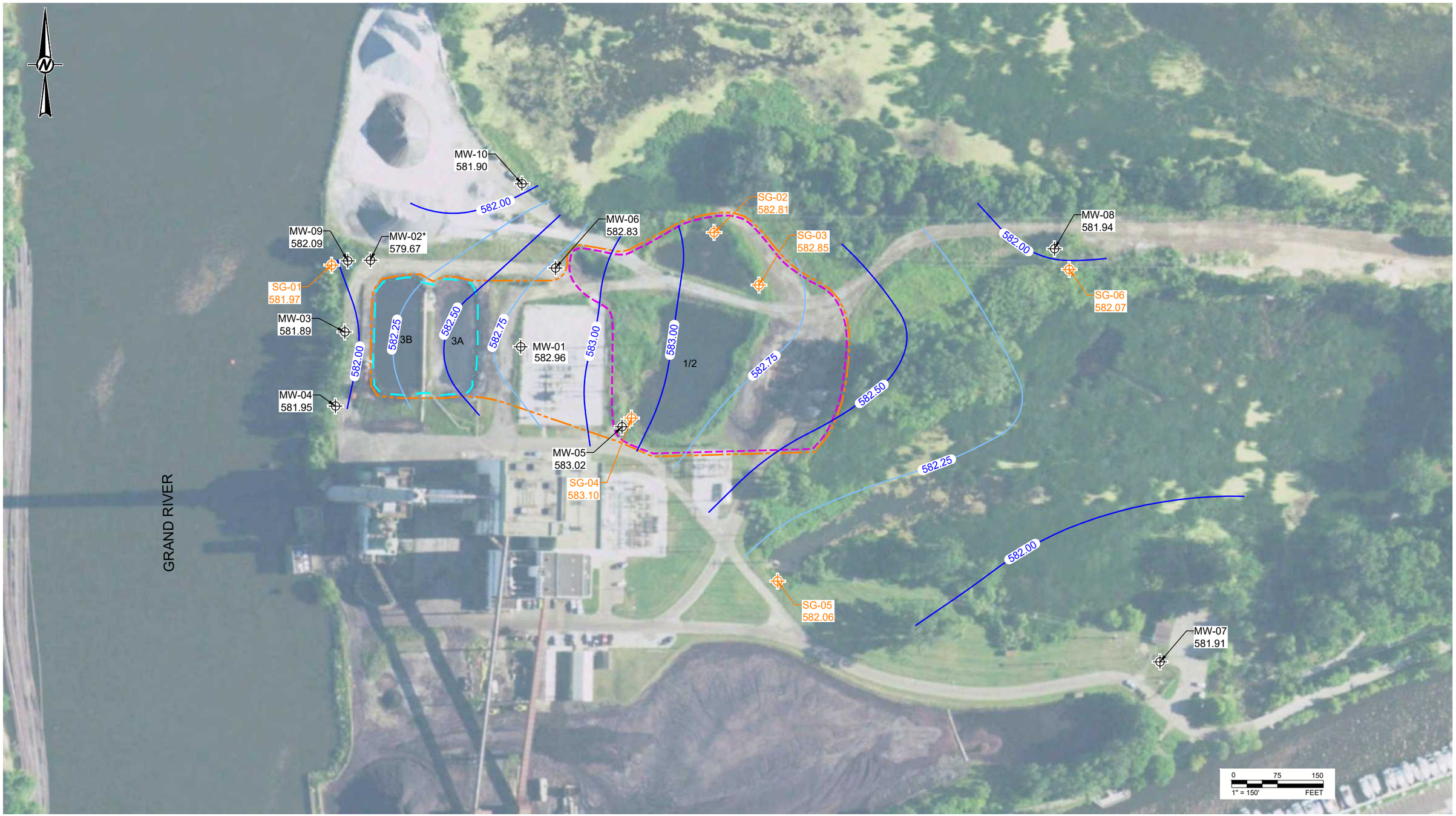
CONSULTANT
GOLDER

YYYY-MM-DD	2019-11-08
DESIGNED	CEP
PREPARED	ADR
REVIEWED	CEP
APPROVED	DLP

PROJECT
JB SIMS GENERATING STATION

TITLE
GROUNDWATER CONTOUR MAP
NOVEMBER 1, 2019

PROJECT NO.	CONTROL	REV.	FIGURE
19116042	19116042B019.dwg	0	B-19



REFERENCE(S)

Service Layer Credits: Source: ESRI, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community. Date of imagery, 7/14/2016.

NOTE(S)

1. HORIZONTAL COORDINATE SYSTEM BASED ON MICHIGAN STATE PLANE SOUTH, INTERNATIONAL FEET. VERTICAL DATUM IS NAVD 1988.
2. * GROUNDWATER ELEVATION FOR MW-02 WAS NOT USED TO CREATE CONTOURS DUE TO ANOMALOUS ELEVATION DATA.
3. BACKGROUND EVENT FOR MW-05 TO MW-08, THEREFORE MONITORING WELLS MW-01 TO MW-04 WERE NOT GAUGED.
4. MONITORING WELLS MW-09 & MW-10 & STAFF GAUGE SG-01 THROUGH SG-06 WERE INSTALLED PRIOR TO THIS EVENT.

LEGEND

- DETECTION MONITORING WELL
- ASSESSMENT MONITORING WELL
- PIEZOMETER
- STAFF GAUGE
- LIMIT OF UNITS 1/2 ASH PLACEMENT AFTER 1981
- UNIT 3 LIMITS OF ASH PLACEMENT
- MULTIUNIT NETWORK BOUNDARY

CLIENT
GRAND HAVEN BOARD OF LIGHT AND POWER
GRAND HAVEN, MICHIGAN

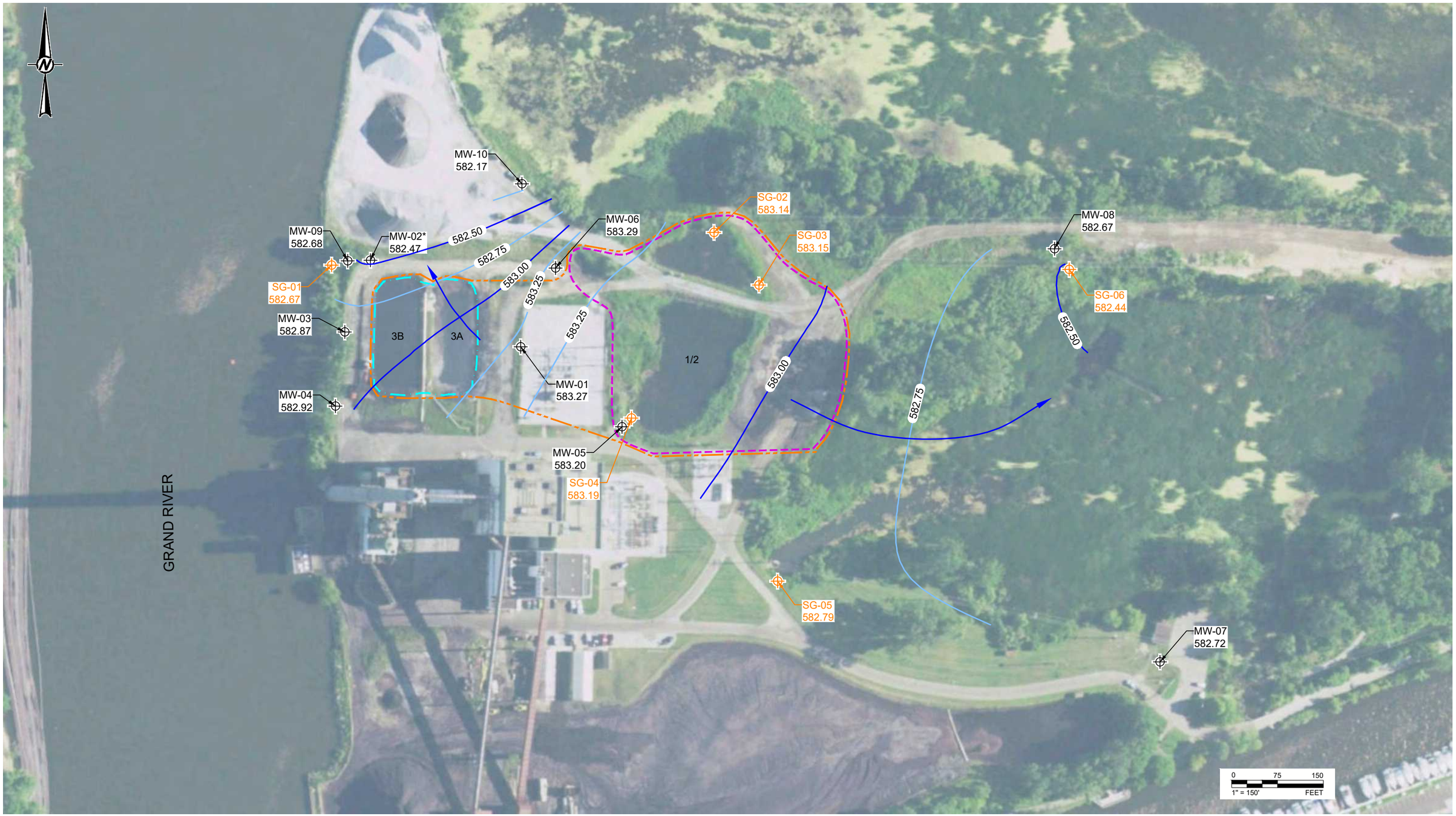
CONSULTANT
GOLDER

YYYY-MM-DD	2019-11-19
DESIGNED	CEP
PREPARED	ADR
REVIEWED	CEP
APPROVED	DLP

PROJECT
JB SIMS GENERATING STATION
HYDROGEOLOGIC MONITORING PLAN

TITLE
GROUNDWATER CONTOUR MAP
NOVEMBER 15, 2019

PROJECT NO.	CONTROL	REV.	FIGURE
19116042	19116042B020.dwg	0	B-20



REFERENCE(S)

Service Layer Credits: Source: ESRI, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community. Date of imagery, 7/14/2016.

NOTE(S)

1. HORIZONTAL COORDINATE SYSTEM BASED ON MICHIGAN STATE PLANE SOUTH, INTERNATIONAL FEET. VERTICAL DATUM IS NAVD 1988.
2. * GROUNDWATER ELEVATION FOR MW-02 WAS NOT USED TO CREATE CONTOURS DUE TO ANOMALOUS ELEVATION DATA.
3. BACKGROUND EVENT FOR MW-05 TO MW-08, THEREFORE MONITORING WELLS MW-01 TO MW-04 WERE NOT GAUGED.
4. MONITORING WELLS MW-09 & MW-10 & STAFF GAUGE SG-01 THROUGH SG-06 WERE INSTALLED PRIOR TO THIS EVENT.

LEGEND

- DETECTION MONITORING WELL
- ASSESSMENT MONITORING WELL
- PIEZOMETER
- STAFF GAUGE
- LIMIT OF UNITS 1/2 ASH PLACEMENT AFTER 1981
- UNIT 3 LIMITS OF ASH PLACEMENT
- MULTIUNIT NETWORK BOUNDARY

CLIENT
GRAND HAVEN BOARD OF LIGHT AND POWER
GRAND HAVEN, MICHIGAN

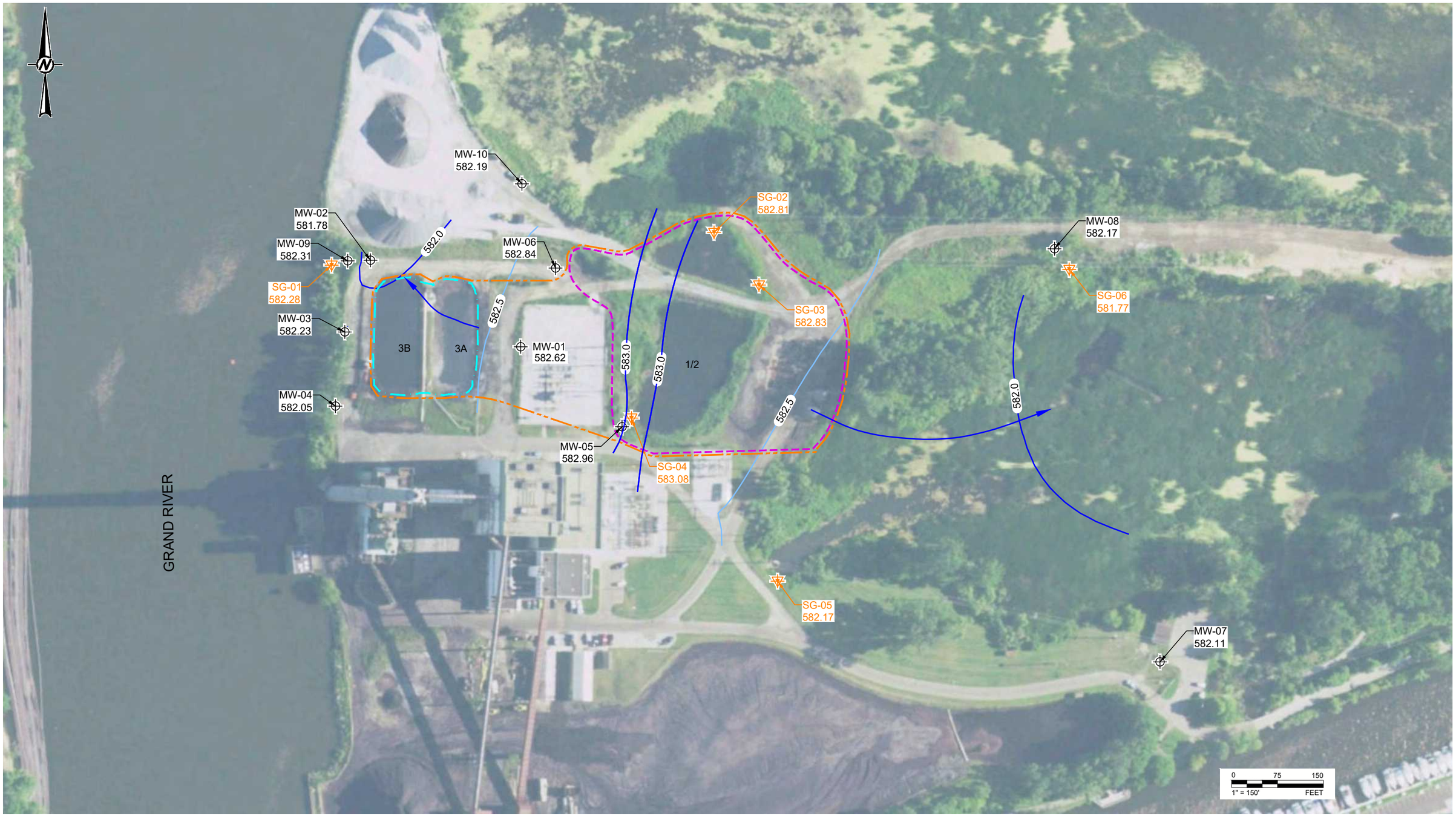
CONSULTANT
GOLDER

YYYY-MM-DD	2019-12-31
DESIGNED	CEP
PREPARED	ADR
REVIEWED	CEP
APPROVED	DLP

PROJECT
JB SIMS GENERATING STATION
HYDROGEOLOGIC MONITORING PLAN

TITLE
GROUNDWATER CONTOUR MAP
DECEMBER 2, 2019

PROJECT NO.	CONTROL	REV.	FIGURE
19116042	19116042B021.dwg	0	B-21



REFERENCE(S)

Service Layer Credits: Source: ESRI, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community. Date of imagery, 7/14/2016.

NOTE(S)

1. HORIZONTAL COORDINATE SYSTEM BASED ON MICHIGAN STATE PLANE SOUTH, INTERNATIONAL FEET. VERTICAL DATUM IS NAVD 1988.
2. MONITORING WELLS MW-05 TO MW-10 AND STAFF GAUGES SG-01 TO SG-06 WERE NOT INSTALLED PRIOR TO THIS EVENT.

LEGEND

- DETECTION MONITORING WELL
- ASSESSMENT MONITORING WELL
- PIEZOMETER
- STAFF GAUGE
- LIMIT OF UNITS 1/2 ASH PLACEMENT AFTER 1981
- UNIT 3 LIMITS OF ASH PLACEMENT
- MULTIUNIT NETWORK BOUNDARY

CLIENT
GRAND HAVEN BOARD OF LIGHT AND POWER
GRAND HAVEN, MICHIGAN

CONSULTANT
GOLDER

YYYY-MM-DD	2020-01-30
DESIGNED	CEP
PREPARED	DJC
REVIEWED	CEP
APPROVED	DLP

PROJECT
JB SIMS GENERATING STATION

TITLE
GROUNDWATER CONTOUR MAP
DECEMBER 16, 2019

PROJECT NO.	CONTROL	REV.	FIGURE
19116042	19116042B022.dwg	0	B-22

APPENDIX C

Statistical Analysis

APPENDIX C-1
Summary of Background Events
Grand Haven Board of Light and Power
JB Sims Generating Station

Analyte	Units		SCREENING/TARGET LEVELS							MW-1										
		RBSL	MCL	SMCL	MI Part 201 Criteria[9] DWC	MI Part 201 Criteria[9] GSI	Average Background Results	Limit Used for Assessment Monitoring Comparison	RL	Background Event #1	Background Event #2	Background Event #3	Background Event #4	Background Event #5	Background Event #6	Background Event #7	Background Event #8	Compliance Event	Compliance Event	Compliance Event
									Sample Date:	3/13/2017	4/5/2017	4/24/2017	5/15/2017	6/5/2017	6/26/2017	7/17/2017	8/7/2017	8/27/2018	9/26/2018	10/22/2018
Appendix III																				
BORON, TOTAL	mg/L	N/R	N/R	N/R	0.5	7.2	**11.8**	**11.8**	0.2	**83**	**77**	**67**	**76**	**110**	**110**	**120**	**120**	**130**	**140**	**120**
CALCIUM, TOTAL	mg/L	N/R	N/R	N/R	N/R	N/R	**149**	**149**	5	**170**	**180**	**200**	**190**	140	120	110	100	98	100	120
CHLORIDE, TOTAL	mg/L	N/R	N/R	**250**	250	(FF)	14.5	**250**	1	180	170	150	160	190	170	180	180	150	150	130
FLUORIDE, TOTAL	mg/L	N/R	**4**	2	N/R	N/R	0.1	**4**	0.25	**13**	**15**	**12**	**14**	**18**	**18**	**20**	**19**	**18**	**18**	**15**
IRON, TOTAL	mg/L	N/R	N/R	0.3	0.3	NA	**20**	**20**	10	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
pH	S.U.	N/R	N/R	6.5-8.5	6.5-8.5	**6.5-9.0**	6.99-7.65	**6.5-9.0**	N/R	**9.22**	8.46	7.51	7.7	8.17	8.04	8.02	8.38	7.82	7.81	7.47
SULFATE, TOTAL	mg/L	N/R	N/R	**250**	250	NA	46	**250**	1	**450**	**480**	**540**	**530**	**430**	190	22	13	1.9	5.4	38
TOTAL DISSOLVED SOLIDS	mg/L	N/R	N/R	500	500	500	**707**	**707**	20	**1,900**	**1,700**	**1,900**	**1,800**	**1,900**	**1,600**	**1,600**	**1,500**	**1,800**	**1,600**	**1,500**
Appendix IV																				
ANTIMONY, TOTAL	mg/L	N/R	0.006	N/R	0.006	**0.13**	0.00032	**0.13**	0.0020	0.00034 J	<0.0020	0.00084 J	0.00095 J	0.00064 J	<0.0020	<0.0020	<0.0020	0.00015 J	0.00017 J	<0.00009
ARSENIC, TOTAL	mg/L	N/R	0.01	N/R	0.01	**0.01**	0.0043	**0.01**	0.0050	0.00069 J	0.00055 J	0.00075 J	0.0016 J	0.0011 J	0.00080 J	<0.0050	0.00080 J	0.00043 J	0.00045 J	0.00013 J
BARIUM, TOTAL	mg/L	N/R	2	N/R	2	**1.3 (G)**	0.39	**1.3**	0.0050	0.34 B	0.32 B	0.22	0.27	0.27	0.29	0.56	0.63	0.69	0.82	0.83
BERYLLIUM, TOTAL	mg/L	N/R	0.004	N/R	0.004	**0.036 (G)**	0.00048	**0.036**	0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	< 0.000060	0.00016 J	0.000085 J
CADMIUM, TOTAL	mg/L	N/R	0.005	N/R	0.005	**0.0025 (G,X)**	0.00003	**0.0025**	0.0010	<0.0010	<0.0010	<0.0010	0.00076 J	<0.0010	<0.0010	<0.0010	<0.0010	< 0.000017	0.000023 J	0.000037 J
CHROMIUM, TOTAL	mg/L	N/R	0.1	N/R	0.1	**0.011**	0.00079	**0.011**	0.0020	0.00032 J	<0.0020	0.00041 J	0.0015 J	<0.0020	<0.0020	<0.0020	<0.0020	0.00046 J	< 0.00034	0.0013
COBALT, TOTAL	mg/L	0.006	N/R	N/R	0.04	**0.1**	0.0008	**0.1**	0.0010	0.00037 J	0.00030 J	0.00038 J	0.0012	0.00053 J	0.00042 J	0.00045 J	0.00050 J	0.00040 J	0.00038 J	0.00038 J
COPPER, TOTAL	mg/L	N/R	1.3	1.0	1	**0.021 (G)**	0.00053	**0.021**	0.0008	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
LEAD, TOTAL	mg/L	0.015	0.015	N/R	0.004	**0.014 (G,X)**	0.0004651	**0.014**	0.0010	0.00065 J	0.00026 J B	0.00059 J	0.0016	0.00057 J	<0.0010	<0.0010	0.00063 J	0.00021 J	0.00029 J	0.00075
LITHIUM, TOTAL	mg/L	0.04	N/R	N/R	0.17	**0.44**	0.01085	**0.44**	0.0080	**2.1 B**	**1.9**	**1.5 B**	**1.6**	**2.5**	**2.2**	**2.7**	**1.9**	**2**	**1.8**	**1.9**
MERCURY, TOTAL	mg/L	N/R	0.002	N/R	0.002	0.0000013	**0.0001024**	**0.0001024**	0.0002	**<0.0002**	**<0.0002**	**<0.0002**	**<0.0002**	**<0.0002**	**<0.00020**	**<0.00020**	**<0.00020**	**0.00012**	< 0.000041	<0.000041
MOLYBDENUM, TOTAL	mg/L	0.1	N/R	N/R	0.073	**3.2**	0.002849	**3.2**	0.010	0.0023 J	0.0017 J	0.0022 J	0.0023 J	0.0025 J	0.0026 J	0.0014 J	0.0013 J	0.0012	0.0014	0.0014
NICKEL, TOTAL	mg/L	N/R	N/R	N/R	0.1	**0.120 (G)**	0.00041	**0.12**	0.0004	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
RADIUM (226 + 228)	pCi/L	N/R	**5**	N/R	N/R	N/R	0.9482	**5**	Varies	0.308 U	0.181 U	0.346 U	0.458 U	0.0790 U	0.372 U	0.721	1.35 U	1.0 U	1.0 U	1.0 U
SELENIUM, TOTAL	mg/L	N/R	0.05	N/R	0.05	**0.005**	0.000398	**0.005**	0.0050	0.00073 J	0.00059 J	0.0011 J	0.0018 J	<0.0050	<0.0050	<0.0050	0.0017 J	<0.00028	<0.00028	<0.00028
SILVER, TOTAL	mg/L	N/R	N/R	0.1	0.034	**0.00006**	0.000028	**0.00006**	0.00004	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
THALLIUM, TOTAL	mg/L	N/R	0.002	N/R	0.002	**0.0037**	0.000058	**0.0037**	0.0010	<0.0010	<0.0010	<0.0010	0.00039 J	<0.0010	<0.0010	<0.0010	<0.0010	< 0.000029	< 0.000029	<0.000029
VANADIUM, TOTAL	mg/L	N/R	N/R	N/R	0.0045	**0.027**	0.000665	**0.027**	0.0008	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
ZINC, TOTAL	mg/L	N/R	N/R	5	2.4	0.270 (G)	**1.001**	**1.001**	2.0	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT

NOTES:

1. Shaded/Bold Data exceeds MCL/SMCL or internal standard.
2. mg/L - Milligrams per Liter
3. pCi/L - picocuries per Liter
4. N/R - Indicates consitiuent is not regulated by Hazardous Site Response Act
5. J - Result is an estimated value. The result is greater than or equal to the Method Detection Limit (MDL) and less than the Practical Quantitation Limit (PQL). Values are displayed as less that the PQL with a J.
6. < - Constituent was analyzed for, but was not detected above the MDL and is considered a non-detect. Value is displayed as less than the PQL.
7. MCL/SMCL - Maximum Contaminant Level/Secondary Contaminant Level - United States Environmental Protection Agency (USEPA) Table of Regulated Drinking Water Contaminants (updated June 2016). Available at https://www.epa.gov/ground-water- and-drinking-water/table-regulated-drinking-water-contaminants. USEPA Secondary Drinking Water Standards: Guidance for Nuisance Chemicals (updated January 2016). Available at https://www.epa.gov/dwstandardsregulations/secondary-drinking-water-standards-guidance-nuisance-chemicals.
8. Radium data is a combination of radium isotopes 226 and 228. When results are reported below the MDC (Minimum Detectable Concentration), data is displayed with an accompanying U. The MDC varies depending upon the sample amount and elapsed time of the measurement.
9. R 299.49 Footnotes for Generic Cleanup Criteria Tables. Cleanup Criteria Requirements for Response Activity (formerly the Part 201 Generic Cleanup Criteria and Screening Levels)

APPENDIX C-2
Summary of Background Events
Grand Haven Board of Light and Power
JB Sims Generating Station

Analyte	Units		SCREENING/TARGET LEVELS							MW-2										
		RBSL	MCL	SMCL	MI Part 201 Criteria[9] DWC	MI Part 201 Criteria[9] GSI	Average Background Results	Limit Used for Assessment Monitoring Comparison	RL	Background Event #1	Background Event #2	Background Event #3	Background Event #4	Background Event #5	Background Event #6	Background Event #7	Background Event #8	Compliance Event	Compliance Event	Compliance Event
									Sample Date:	3/13/2017	4/5/2017	4/24/2017	5/15/2017	6/5/2017	6/26/2017	7/17/2017	8/7/2017	8/27/2018	9/26/2018	10/22/2018
Appendix III																				
BORON, TOTAL	mg/L	N/R	N/R	N/R	0.5	7.2	**11.8**	**11.8**	0.2	**110**	**110**	**110**	**110**	**130**	**120**	**130**	**160**	**150**	**270**	**130**
CALCIUM, TOTAL	mg/L	N/R	N/R	N/R	N/R	N/R	**149**	**149**	5	**190**	**170**	**200**	**190**	**190**	**180**	**180**	**190**	**200**	**340**	**190**
CHLORIDE, TOTAL	mg/L	N/R	N/R	**250**	250	(FF)	14.5	**250**	1	140	150	130	140	150	160	150	160	150	150	150
FLUORIDE, TOTAL	mg/L	N/R	**4**	2	N/R	N/R	0.1	**4**	0.25	**10**	**12**	**11**	**14**	**12**	**14**	**14**	**12**	**14**	**15**	**14**
IRON, TOTAL	mg/L	N/R	N/R	0.3	0.3	NA	**20**	**20**	10	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
pH	S.U.	N/R	N/R	6.5-8.5	6.5-8.5	**6.5-9.0**	6.99-7.65	**6.5-9.0**	N/R	8.09	8.21	6.90	7.22	7.31	7.72	7.35	7.80	7.24	7.32	7.87
SULFATE, TOTAL	mg/L	N/R	N/R	**250**	250	NA	46	**250**	1	13 J	12	<20	<20	<5	<10	<20	<10	0.77	0.96 J	1.4
TOTAL DISSOLVED SOLIDS	mg/L	N/R	N/R	500	500	500	**707**	**707**	20	**2100**	**1900**	**2000**	**1900**	**2300**	**2000**	**2100**	**2400**	**2700**	**2500**	**2200**
Appendix IV																				
ANTIMONY, TOTAL	mg/L	N/R	0.006	N/R	0.006	**0.13**	0.00032	**0.13**	0.0020	0.00042 J	<0.0020	0.00060 J	<0.020	0.00068 J	<0.002	<0.002	<0.020	0.00033	0.00033	<0.00009
ARSENIC, TOTAL	mg/L	N/R	0.01	N/R	0.01	**0.01**	0.0043	**0.01**	0.0050	0.0079	0.0056	0.0059	**<0.050**	0.007	0.0067	0.0061	0.010 J	0.009	0.013	0.0097
BARIUM, TOTAL	mg/L	N/R	2	N/R	2	**1.3 (G)**	0.39	**1.3**	0.0050	0.48 B	0.45 B	0.47	0.44	0.47	0.45	0.44	0.48	0.43	0.48	0.51
BERYLLIUM, TOTAL	mg/L	N/R	0.004	N/R	0.004	**0.036 (G)**	0.00048	**0.036**	0.0010	<0.0010	<0.0010	<0.0010	**<0.010**	0.00077 J	<0.0010	<0.0010	**<0.010**	< 0.0010	0.0015	<0.00006
CADMIUM, TOTAL	mg/L	N/R	0.005	N/R	0.005	**0.0025 (G,X)**	0.00003	**0.0025**	0.0010	<0.0010	<0.0010	<0.0010	**<0.010**	0.00025 J	<0.0010	0.00021 J	**<0.010**	0.000082	0.00014	0.00012
CHROMIUM, TOTAL	mg/L	N/R	0.1	N/R	0.1	**0.011**	0.00079	**0.011**	0.0020	**0.046**	**0.037 B**	**0.043**	**0.048**	**0.06**	**0.053**	**0.053**	**0.073**	**0.047**	**0.076**	**0.053**
COBALT, TOTAL	mg/L	0.006	N/R	N/R	0.04	**0.1**	0.0008	**0.1**	0.0010	0.0092	0.0067	0.0074	0.0084 J	0.0087	0.0072	0.0068	0.0092 J	0.0086	0.0086	0.0066
COPPER, TOTAL	mg/L	N/R	1.3	1.0	1	**0.021 (G)**	0.00053	**0.021**	0.0008	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
LEAD, TOTAL	mg/L	0.015	0.015	N/R	0.004	**0.014 (G,X)**	0.0004651	**0.014**	0.0010	0.0038	0.0027 B	0.0026	0.01	0.0057	0.0042	0.0034	0.0084 J	0.0049	0.0052	0.0036
LITHIUM, TOTAL	mg/L	0.04	N/R	N/R	0.17	**0.44**	0.01085	**0.44**	0.0080	**1.6 B**	**1.5**	**1.6 B**	**1.3**	**1.7**	**1.6**	**1.2**	**1.5**	**1.4**	**1.4**	**1.6**
MERCURY, TOTAL	mg/L	N/R	0.002	N/R	0.002	0.0000013	**0.0001024**	**0.0001024**	0.0002	**<0.0002**	**<0.0002**	**<0.0002**	**<0.0002**	**<0.0002**	**<0.0002**	**<0.0002**	**<0.002**	0.00010 J	< 0.000041	<0.000041
MOLYBDENUM, TOTAL	mg/L	0.1	N/R	N/R	0.073	**3.2**	0.002849	**3.2**	0.010	0.017	0.014	0.012	<0.10	0.0069 J	0.0074 J	0.0051 J	<0.10	0.0053	0.0076	0.012
NICKEL, TOTAL	mg/L	N/R	N/R	N/R	0.1	**0.120 (G)**	0.00041	**0.12**	0.000	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
RADIUM (226 + 228)	pCi/L	N/R	**5**	N/R	N/R	N/R	0.9482	**5**	Varies	1.34	0.43	1.02	1.56	1.89	1.85	2.27	3.01	1.0 U	1.0 U	1.0 U
SELENIUM, TOTAL	mg/L	N/R	0.05	N/R	0.05	**0.005**	0.000398	**0.005**	0.0050	0.0025 J	0.0017 J	0.0022 J	**<0.050**	0.0027 J	0.0023 J	0.0028 J	**0.014 J**	0.0028	0.0038	0.0021
SILVER, TOTAL	mg/L	N/R	N/R	0.1	0.034	**0.00006**	0.000028	**0.00006**	0.00004	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
THALLIUM, TOTAL	mg/L	N/R	0.002	N/R	0.002	**0.0037**	0.000058	**0.0037**	0.0010	<0.0010	<0.0010	<0.0010	**<0.010**	<0.0010	<0.0010	<0.0010	**<0.010**	< 0.000029	< 0.000029	<0.000029
VANADIUM, TOTAL	mg/L	N/R	N/R	N/R	0.0045	**0.027**	0.000665	**0.027**	0.0008	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
ZINC, TOTAL	mg/L	N/R	N/R	5	2.4	0.270 (G)	**1.001**	**1.001**	2.0	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT

NOTES:

1. Shaded/Bold Data exceeds MCL/SMCL or internal standard.
2. mg/L - Milligrams per Liter
3. pCi/L - picocuries per Liter
4. N/R - Indicates consitiuent is not regulated by Hazardous Site Response Act
5. J - Result is an estimated value. The result is greater than or equal to the Method Detection Limit (MDL) and less than the Practical Quantitation Limit (PQL). Values are displayed as less that the PQL with a J.
6. < - Constituent was analyzed for, but was not detected above the MDL and is considered a non-detect. Value is displayed as less than the PQL.
7. MCL/SMCL - Maximum Contaminant Level/Secondary Contaminant Level - United States Environmental Protection Agency (USEPA) Table of Regulated Drinking Water Contaminants (updated June 2016). Available at https://www.epa.gov/ground-water- and-drinking-water/table-regulated-drinking-water-contaminants. USEPA Secondary Drinking Water Standards: Guidance for Nuisance Chemicals (updated January 2016). Available at https://www.epa.gov/dwstandardsregulations/secondary-drinking-water-standards-guidance-nuisance-chemicals.
8. Radium data is a combination of radium isotopes 226 and 228. When results are reported below the MDC (Minimum Detectable Concentration), data is displayed with an accompanying U. The MDC varies depending upon the sample amount and elapsed time of the measurement.
9. R 299.49 Footnotes for Generic Cleanup Criteria Tables. Cleanup Criteria Requirements for Response Activity (formerly the Part 201 Generic Cleanup Criteria and Screening Levels)

APPENDIX C-3
Summary of Background Events
Grand Haven Board of Light and Power
JB Sims Generating Station

Analyte	Units		SCREENING/TARGET LEVELS							MW-3										
		RBSL	MCL	SMCL	MI Part 201 Criteria[9]		Average Background Results	Limit Used for Assessment Monitoring Comparison	RL	Background Event #1	Background Event #2	Background Event #3	Background Event #4	Background Event #5	Background Event #6	Background Event #7	Background Event #8	Compliance Event	Compliance Event	Compliance Event
					DWC	GSI														
									Sample Date:	3/13/2017	4/5/2017	4/24/2017	5/15/2017	6/5/2017	6/26/2017	7/17/2017	8/7/2017	8/27/2018	9/26/2018	10/22/2018
Appendix III																				
BORON, TOTAL	mg/L	N/R	N/R	N/R	0.5	7.2	**11.8**	**11.8**	0.2	5	4.9	5.6	6.4	5.9	4.8	4.9	4.7	4.9	5.3	4.9
CALCIUM, TOTAL	mg/L	N/R	N/R	N/R	N/R	N/R	**149**	**149**	5	**660**	**620**	**600**	**620**	**590**	**540**	**590**	**520**	**530**	**560**	**550**
CHLORIDE, TOTAL	mg/L	N/R	N/R	**250**	250	(FF)	14.5	**250**	1	**570**	**620**	**450**	**480**	**450**	**370**	**400**	**370**	**340**	**340**	**660**
FLUORIDE, TOTAL	mg/L	N/R	**4**	2	N/R	N/R	0.1	**4**	0.25	0.74 J	0.97	1.3	1.9	1.7	1.6	1.2	1.2	1.1	0.88	0.84
IRON, TOTAL	mg/L	N/R	N/R	0.3	0.3	NA	**20**	**20**	10	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
pH	S.U.	N/R	N/R	6.5-8.5	6.5-8.5	**6.5-9.0**	6.99-7.65	**6.5-9.0**	N/R	7.91	7.14	**6.27**	6.92	7.07	7.70	7.44	7.61	7.02	7.01	7.19
SULFATE, TOTAL	mg/L	N/R	N/R	**250**	250	NA	46	**250**	1	**1,300**	**1,200**	**1,200**	**1,500**	**990**	**580**	**820**	**600**	**450**	**520**	**990**
TOTAL DISSOLVED SOLIDS	mg/L	N/R	N/R	500	500	500	**707**	**707**	20	**4,000**	**3,600**	**3,900**	**4,100**	**3,600**	**3,000**	**3,100**	**2,700**	**3,000**	**3,100**	**2,900**
Appendix IV																				
ANTIMONY, TOTAL	mg/L	N/R	0.006	N/R	0.006	**0.13**	0.00032	**0.13**	0.0020	<0.0020	<0.0020	0.00041 J	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.00012 J	< 0.00009	<0.00009
ARSENIC, TOTAL	mg/L	N/R	0.01	N/R	0.01	**0.01**	0.0043	**0.01**	0.0050	0.0024 J	0.0021 J	0.0017 J	0.0020 J	0.0027 J	0.0029 J	0.0025 J	0.0021 J	0.0017	0.0016	0.0013
BARIUM, TOTAL	mg/L	N/R	2	N/R	2	**1.3 (G)**	0.39	**1.3**	0.0050	0.31 B	0.36 B	0.25	0.21	0.31	0.37	0.41	0.4	0.4	0.4	0.44
BERYLLIUM, TOTAL	mg/L	N/R	0.004	N/R	0.004	**0.036 (G)**	0.00048	**0.036**	0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	< 0.000060	0.00031 J	<0.00006
CADMIUM, TOTAL	mg/L	N/R	0.005	N/R	0.005	**0.0025 (G,X)**	0.00003	**0.0025**	0.0010	<0.0010	<0.0010	<0.0010	0.00033 J	<0.0010	<0.0010	<0.0010	<0.0010	0.000024 J	< 0.000017	<0.000017
CHROMIUM, TOTAL	mg/L	N/R	0.1	N/R	0.1	**0.011**	0.00079	**0.011**	0.0020	0.0014 J	0.0014 J B	0.0014 J	0.0015 J	0.0018 J	0.0015 J	0.0014 J	0.0013 J	0.0013	0.00085	0.0014
COBALT, TOTAL	mg/L	0.006	N/R	N/R	0.04	**0.1**	0.0008	**0.1**	0.0010	0.00097 J	0.00097 J	0.00080 J	0.00099 J	0.0016	0.0013	0.00079 J	0.00081 J	0.00084 J	0.0007 J	0.00072 J
COPPER, TOTAL	mg/L	N/R	1.3	1.0	1	**0.021 (G)**	0.00053	**0.021**	0.0008	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
LEAD, TOTAL	mg/L	0.015	0.015	N/R	0.004	**0.014 (G,X)**	0.0004651	**0.014**	0.0010	0.00038 J	0.00045 J B	0.00026 J	0.00079 J	< 0.0010	< 0.0010	< 0.0010	< 0.0010	0.000094 J	< 0.00004	0.00019 J
LITHIUM, TOTAL	mg/L	0.04	N/R	N/R	0.17	**0.44**	0.01085	**0.44**	0.0080	0.079 B	0.064	0.081 B	0.097	0.076	0.066	0.057	0.054	0.064	0.069	0.026
MERCURY, TOTAL	mg/L	N/R	0.002	N/R	0.002	0.0000013	**0.0001024**	**0.0001024**	0.0002	**<0.0002**	**<0.0002**	**<0.0002**	**<0.0002**	**<0.0002**	**<0.0002**	**<0.0002**	**<0.0002**	**0.00011 J**	< 0.000041	<0.000041
MOLYBDENUM, TOTAL	mg/L	0.1	N/R	N/R	0.073	**3.2**	0.002849	**3.2**	0.010	0.0070 J	0.0049 J	0.0076 J	0.0099 J	0.0065 J	0.0034 J	0.0015 J	<0.010	<0.000093	<0.000093	<0.000093
NICKEL, TOTAL	mg/L	N/R	N/R	N/R	0.1	**0.120 (G)**	0.00041	**0.12**	0.000	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
RADIUM (226 + 228)	pCi/L	N/R	**5**	N/R	N/R	N/R	0.9482	**5**	Varies	0.731	0.392	0.190 U	0.666	0.502	0.874	1.38	1.96	1.0 U	1.0 U	1.0 U
SELENIUM, TOTAL	mg/L	N/R	0.05	N/R	0.05	**0.005**	0.000398	**0.005**	0.0050	0.0012 J	0.0012 J	0.0013 J	0.0016 J	0.0012 J	<0.0050	0.00094 J	0.0015 J	<0.00028	<0.00028	<0.00028
SILVER, TOTAL	mg/L	N/R	N/R	0.1	0.034	**0.00006**	0.000028	**0.00006**	0.00004	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
THALLIUM, TOTAL	mg/L	N/R	0.002	N/R	0.002	**0.0037**	0.000058	**0.0037**	0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	< 0.000029	< 0.000029	<0.000029
VANADIUM, TOTAL	mg/L	N/R	N/R	N/R	0.0045	**0.027**	0.000665	**0.027**	0.0008	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
ZINC, TOTAL	mg/L	N/R	N/R	5	2.4	0.270 (G)	**1.001**	**1.001**	2.0	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT

NOTES:

1. Shaded/Bold Data exceeds MCL/SMCL or internal standard.
2. mg/L - Milligrams per Liter
3. pCi/L - picocuries per Liter
4. N/R - Indicates consitiuent is not regulated by Hazardous Site Response Act
5. J - Result is an estimated value. The result is greater than or equal to the Method Detection Limit (MDL) and less than the Practical Quantitation Limit (PQL). Values are displayed as less that the PQL with a J.
6. < - Constituent was analyzed for, but was not detected above the MDL and is considered a non-detect. Value is displayed as less than the PQL.
7. MCL/SMCL - Maximum Contaminant Level/Secondary Contaminant Level - United States Environmental Protection Agency (USEPA) Table of Regulated Drinking Water Contaminants (updated June 2016). Available at https://www.epa.gov/ground-water- and-drinking-water/table-regulated-drinking-water-contaminants. USEPA Secondary Drinking Water Standards: Guidance for Nuisance Chemicals (updated January 2016). Available at https://www.epa.gov/dwstandardsregulations/secondary-drinking-water-standards-guidance-nuisance-chemicals.
8. Radium data is a combination of radium isotopes 226 and 228. When results are reported below the MDC (Minimum Detectable Concentration), data is displayed with an accompanying U. The MDC varies depending upon the sample amount and elapsed time of the measurement.
9. R 299.49 Footnotes for Generic Cleanup Criteria Tables. Cleanup Criteria Requirements for Response Activity (formerly the Part 201 Generic Cleanup Criteria and Screening Levels)

APPENDIX C-4
Summary of Background Events
Grand Haven Board of Light and Power
JB Sims Generating Station

Analyte	Units		SCREENING/TARGET LEVELS							MW-4										
		RBSL	MCL	SMCL	MI Part 201 Criteria[9]		Average Background Results	Limit Used for Assessment Monitoring Comparison	RL	Background Event #1	Background Event #2	Background Event #3	Background Event #4	Background Event #5	Background Event #6	Background Event #7	Background Event #8	Compliance Event	Compliance Event	Compliance Event
					DWC	GSI														
									Sample Date:	3/13/2017	4/5/2017	4/24/2017	5/15/2017	6/5/2017	6/26/2017	7/17/2017	8/7/2017	8/27/2018	9/26/2018	10/22/2018
Appendix III																				
BORON, TOTAL	mg/L	N/R	N/R	N/R	0.5	7.2	**11.8**	**11.8**	0.2	3.2	3.4	3.8	3.6	3.9	3.6	3.7	4	3.6	4.4	4.1
CALCIUM, TOTAL	mg/L	N/R	N/R	N/R	N/R	N/R	**149**	**149**	5	**480**	**470**	**500**	**450**	**450**	**460**	**510**	**470**	**430**	**490**	**440**
CHLORIDE, TOTAL	mg/L	N/R	N/R	**250**	250	(FF)	14.5	**250**	1	**360**	**390**	**350**	**370**	**360**	**360**	**340**	**280**	**260**	**270**	**280**
FLUORIDE, TOTAL	mg/L	N/R	**4**	2	N/R	N/R	0.1	**4**	0.25	0.84	1.3	1	1.2	1.4	1.2	1.3	1.3	1.1	1.2	1.3
IRON, TOTAL	mg/L	N/R	N/R	0.3	0.3	NA	**20**	**20**	10	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
pH	S.U.	N/R	N/R	6.5-8.5	6.5-8.5	**6.5-9.0**	6.99-7.65	**6.5-9.0**	N/R	8.34	8.10	**6.37**	7.20	7.36	7.76	7.51	7.72	7.11	7.13	7.35
SULFATE, TOTAL	mg/L	N/R	N/R	**250**	250	NA	46	**250**	1	890	**940**	**830**	**940**	**880**	**920**	**940**	**740**	**550**	**770**	**600**
TOTAL DISSOLVED SOLIDS	mg/L	N/R	N/R	500	500	500	**707**	**707**	20	2200	**2400**	**2500**	**2100**	**2400**	**3100**	**2600**	**2000**	**2300**	**2400**	**2200**
Appendix IV																				
ANTIMONY, TOTAL	mg/L	N/R	0.006	N/R	0.006	**0.13**	0.00032	**0.13**	0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.000090	< 0.00009	<0.000091
ARSENIC, TOTAL	mg/L	N/R	0.01	N/R	0.01	**0.01**	0.0043	**0.01**	0.0050	0.0013 J	0.0013 J	0.0012 J	0.0015 J	0.0019 J	0.0020 J	0.0020 J	0.0018 J	0.0016	0.0012	0.0012
BARIUM, TOTAL	mg/L	N/R	2	N/R	2	**1.3 (G)**	0.39	**1.3**	0.0050	0.13 B	0.13 B	0.14	0.14	0.16	0.18	0.17	0.19	0.17	0.15	0.16
BERYLLIUM, TOTAL	mg/L	N/R	0.004	N/R	0.004	**0.036 (G)**	0.00048	**0.036**	0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	< 0.0010	0.0005 J	<0.00006
CADMIUM, TOTAL	mg/L	N/R	0.005	N/R	0.005	**0.0025 (G,X)**	0.00003	**0.0025**	0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	< 0.000040	< 0.000017	0.000037 J
CHROMIUM, TOTAL	mg/L	N/R	0.1	N/R	0.1	**0.011**	0.00079	**0.011**	0.0020	0.0019 J	0.0018 J B	0.0021	0.0021	0.0021	0.0017 J	0.0019 J	0.0016 J	0.0013	0.0017	0.0021
COBALT, TOTAL	mg/L	0.006	N/R	N/R	0.04	**0.1**	0.0008	**0.1**	0.0010	0.00033 J	0.00033 J	0.00039 J	0.00031 J	0.00040 J	0.00058 J	0.00048 J	0.00045 J	0.00049 J	0.0003 J	0.00032 J
COPPER, TOTAL	mg/L	N/R	1.3	1.0	1	**0.021 (G)**	0.00053	**0.021**	0.0008	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
LEAD, TOTAL	mg/L	0.015	0.015	N/R	0.004	**0.014 (G,X)**	0.0004651	**0.014**	0.0010	0.00028 J	0.00032 J B	0.00019 J	0.00051 J	< 0.0010	< 0.0010	< 0.0010	< 0.0010	0.00014 J	0.00033 J	0.0004
LITHIUM, TOTAL	mg/L	0.04	N/R	N/R	0.17	**0.44**	0.01085	**0.44**	0.0080	0.053 B	0.047	0.058 B	0.051	0.049	0.051	0.048	0.046	0.056	0.073	0.026
MERCURY, TOTAL	mg/L	N/R	0.002	N/R	0.002	0.0000013	**0.0001024**	**0.0001024**	0.0002	<0.0002	**<0.0002**	**<0.0002**	**<0.0002**	**<0.0002**	**<0.0002**	**<0.0002**	**<0.0002**	0.00010 J	< 0.000041	< 0.000041
MOLYBDENUM, TOTAL	mg/L	0.1	N/R	N/R	0.073	**3.2**	0.002849	**3.2**	0.010	0.0014 J	0.0015 J	0.0017 J	0.0015 J	0.0012 J	0.0032 J	0.0016 J	<0.010	<0.000093	0.0011	0.0012
NICKEL, TOTAL	mg/L	N/R	N/R	N/R	0.1	**0.120 (G)**	0.00041	**0.12**	0.000	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
RADIUM (226 + 228)	pCi/L	N/R	**5**	N/R	N/R	N/R	0.9482	**5**	Varies	1.05	0.515	0.413	0.252 U	0.342	0.671	0.879	1.99	1.0 U	1.0 U	1.0 U
SELENIUM, TOTAL	mg/L	N/R	0.05	N/R	0.05	**0.005**	0.000398	**0.005**	0.0050	0.00063 J	< 0.0050	0.00065 J	< 0.0050	< 0.0050	<0.0050	<0.0050	0.0013 J	<0.00028	<0.00028	<0.00028
SILVER, TOTAL	mg/L	N/R	N/R	0.1	0.034	**0.00006**	0.000028	**0.00006**	0.00004	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
THALLIUM, TOTAL	mg/L	N/R	0.002	N/R	0.002	**0.0037**	0.000058	**0.0037**	0.0010	<0.0010	<0.0010	<0.0010	0.00039 J	<0.0010	<0.0010	<0.0010	<0.0010	< 0.000029	< 0.000029	<0.000029
VANADIUM, TOTAL	mg/L	N/R	N/R	N/R	0.0045	**0.027**	0.000665	**0.027**	0.0008	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
ZINC, TOTAL	mg/L	N/R	N/R	5	2.4	0.270 (G)	**1.001**	**1.001**	2.0	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT

NOTES:

1. Shaded/Bold Data exceeds MCL/SMCL or internal standard.
2. mg/L - Milligrams per Liter
3. pCi/L - picocuries per Liter
4. N/R - Indicates consitiuent is not regulated by Hazardous Site Response Act
5. J - Result is an estimated value. The result is greater than or equal to the Method Detection Limit (MDL) and less than the Practical Quantitation Limit (PQL). Values are displayed as less that the PQL with a J.
6. < - Constituent was analyzed for, but was not detected above the MDL and is considered a non-detect. Value is displayed as less than the PQL.
7. MCL/SMCL - Maximum Contaminant Level/Secondary Contaminant Level - United States Environmental Protection Agency (USEPA) Table of Regulated Drinking Water Contaminants (updated June 2016). Available at https://www.epa.gov/ground-water- and-drinking-water/table-regulated-drinking-water-contaminants. USEPA Secondary Drinking Water Standards: Guidance for Nuisance Chemicals (updated January 2016). Available at https://www.epa.gov/dwstandardsregulations/secondary-drinking-water-standards-guidance-nuisance-chemicals.
8. Radium data is a combination of radium isotopes 226 and 228. When results are reported below the MDC (Minimum Detectable Concentration), data is displayed with an accompanying U. The MDC varies depending upon the sample amount and elapsed time of the measurement.
9. R 299.49 Footnotes for Generic Cleanup Criteria Tables. Cleanup Criteria Requirements for Response Activity (formerly the Part 201 Generic Cleanup Criteria and Screening Levels)

APPENDIX C-5
Summary of Background Events
Grand Haven Board of Light and Power
JB Sims Generating Station

Analyte	Units		SCREENING/TARGET LEVELS							MW-5									
		RBSL	MCL	SMCL	MI Part 201 Criteria[9] DWC	MI Part 201 Criteria[9] GSI	Average Background Results	Limit Used for Assessment Monitoring Comparison	RL	Background Event #1	Background Event #2	Background Event #3	Background Event #4	Background Event #5	Background Event #6	Background Event #7	Background Event #8	Compliance Event	Compliance Event
									Sample Date:	6/27/2018	7/30/2018	8/27/2018	9/27/2018	10/22/2018	11/12/2018	11/28/2018	12/7/2018	3/27/2019	9/27/2019
Appendix III																			
BORON, TOTAL	mg/L	N/R	N/R	N/R	0.5	7.2	**11.8**	**11.8**	0.2	2.5	**14**	2.6	3.7	4.6	4.2	5	4.2	4.1	2.8
CALCIUM, TOTAL	mg/L	N/R	N/R	N/R	N/R	N/R	**149**	**149**	5	**210**	130	**190**	**310**	**510**	**460**	**540**	**530**	**630**	**240**
CHLORIDE, TOTAL	mg/L	N/R	N/R	**250**	250	(FF)	14.5	**250**	1	24	20	19	25	23	17	24	17	10	13
FLUORIDE, TOTAL	mg/L	N/R	**4**	2	N/R	N/R	0.1	**4**	0.25	1.8	2.6	1.7	2.3	2.8	1.8	2.3	2.1	2.7	2.4
IRON, TOTAL	mg/L	N/R	N/R	0.3	0.3	NA	**20**	**20**	10	NT	NT	NT	NT	NT	NT	NT	NT	**32**	1.5
pH	S.U.	N/R	N/R	6.5-8.5	6.5-8.5	**6.5-9.0**	6.99-7.65	**6.5-9.0**	N/R	8.2	7.66	7.30	7.31	7.46	7.54	7.62	7.90	7.97	7.29
SULFATE, TOTAL	mg/L	N/R	N/R	**250**	250	NA	46	**250**	1	45	83	29	**260**	**950**	**1000**	**1100**	**980**	**1300**	100
TOTAL DISSOLVED SOLIDS	mg/L	N/R	N/R	500	500	500	**707**	**707**	20	**780**	**820**	**810**	**1200**	**2200**	**2100**	**2400**	**2100**	**2600**	**870**
Appendix IV																			
ANTIMONY, TOTAL	mg/L	N/R	0.006	N/R	0.006	**0.13**	0.00032	**0.13**	0.0020	< 0.00009	0.00011 J	0.00010 J	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00030	< 0.00030
ARSENIC, TOTAL	mg/L	N/R	0.01	N/R	0.01	**0.01**	0.0043	**0.01**	0.0050	0.0086	0.0036	0.0014	**0.21**	**0.28**	**0.21**	**0.16**	**0.16**	**0.098**	**0.076**
BARIUM, TOTAL	mg/L	N/R	2	N/R	2	**1.3 (G)**	0.39	**1.3**	0.0050	0.3	0.42	0.28	0.45	0.35	0.3	0.16	0.23	0.082	0.14
BERYLLIUM, TOTAL	mg/L	N/R	0.004	N/R	0.004	**0.036 (G)**	0.00048	**0.036**	0.0010	< 0.00006	< 0.00006	< 0.000060	< 0.000060	< 0.000060	< 0.000060	< 0.000060	< 0.000060	< 0.0010	< 0.0010
CADMIUM, TOTAL	mg/L	N/R	0.005	N/R	0.005	**0.0025 (G,X)**	0.00003	**0.0025**	0.0010	< 0.000017	0.000035 J	< 0.000017	< 0.000017	0.000028 J	<0.000017	0.000032 J	<0.000017	0.000018 J	<0.000040
CHROMIUM, TOTAL	mg/L	N/R	0.1	N/R	0.1	**0.011**	0.00079	**0.011**	0.0020	0.00063 J	0.0008	< 0.00034	< 0.00034	0.00072 J	< 0.00034	< 0.00034	< 0.00034	< 0.0008	<0.00080
COBALT, TOTAL	mg/L	0.006	N/R	N/R	0.04	**0.1**	0.0008	**0.1**	0.0010	0.0002 J	0.00096 J	0.000089 J	0.00017 J	0.0025	0.003	0.0043	0.0041	0.006	0.00015 J
COPPER, TOTAL	mg/L	N/R	1.3	1.0	1	**0.021 (G)**	0.00053	**0.021**	0.0008	NT	NT	NT	NT	NT	NT	NT	NT	0.0027	0.00028 J
LEAD, TOTAL	mg/L	0.015	0.015	N/R	0.004	**0.014 (G,X)**	0.0004651	**0.014**	0.0010	0.00029 J	0.001	0.00028 J	0.00058	0.0052	**0.028**	0.00011 J	<0.00004	0.00075	0.00029 J
LITHIUM, TOTAL	mg/L	0.04	N/R	N/R	0.17	**0.44**	0.01085	**0.44**	0.0080	0.049	0.0016 J	0.051	0.099	0.0096	0.14	0.16	0.13	0.11	<0.010
MERCURY, TOTAL	mg/L	N/R	0.002	N/R	0.002	0.0000013	**0.0001024**	**0.0001024**	0.0002	< 0.000041	**0.00017**	**0.00011 J**	< 0.000041	< 0.000041	< 0.000041	< 0.000041	< 0.000041	**<0.0002**	**<0.0002**
MOLYBDENUM, TOTAL	mg/L	0.1	N/R	N/R	0.073	**3.2**	0.002849	**3.2**	0.010	< 0.000093	0.0044	< 0.000093	0.015	0.017	0.013	0.014	0.011	0.011	0.0029
NICKEL, TOTAL	mg/L	N/R	N/R	N/R	0.1	**0.120 (G)**	0.00041	**0.12**	0.000	NT	NT	NT	NT	NT	NT	NT	NT	0.0063	0.00054 JB
RADIUM (226 + 228)	pCi/L	N/R	**5**	N/R	N/R	N/R	0.9482	**5**	Varies	1.0 U	1.0 U	1.39	1.0 U	1.0 U	1.0 U	0.536 U	0.344 U	1.0 U	1.1
SELENIUM, TOTAL	mg/L	N/R	0.05	N/R	0.05	**0.005**	0.000398	**0.005**	0.0050	< 0.00028	< 0.00028	< 0.00028	< 0.00028	< 0.00028	< 0.00028	< 0.00028	< 0.00028	<0.00087	<0.00087
SILVER, TOTAL	mg/L	N/R	N/R	0.1	0.034	**0.00006**	0.000028	**0.00006**	0.00004	NT	NT	NT	NT	NT	NT	NT	NT	<0.000040	0.000016 J
THALLIUM, TOTAL	mg/L	N/R	0.002	N/R	0.002	**0.0037**	0.000058	**0.0037**	0.0010	< 0.000029	< 0.000029	< 0.000029	< 0.000029	< 0.000029	< 0.000029	< 0.000029	< 0.000029	<0.000087	<0.000087
VANADIUM, TOTAL	mg/L	N/R	N/R	N/R	0.0045	**0.027**	0.000665	**0.027**	0.0008	NT	NT	NT	NT	NT	NT	NT	NT	0.003	0.0013
ZINC, TOTAL	mg/L	N/R	N/R	5	2.4	0.270 (G)	**1.001**	**1.001**	2.0	NT	NT	NT	NT	NT	NT	NT	NT	0.22 J	0.0025 J

NOTES:

1. Shaded/Bold Data exceeds MCL/SMCL or internal standard.
2. mg/L - Milligrams per Liter
3. pCi/L - picocuries per Liter
4. N/R - Indicates consitiuent is not regulated by Hazardous Site Response Act
5. J - Result is an estimated value. The result is greater than or equal to the Method Detection Limit (MDL) and less than the Practical Quantitation Limit (PQL). Values are displayed as less that the PQL with a J.
6. < - Constituent was analyzed for, but was not detected above the MDL and is considered a non-detect. Value is displayed as less than the PQL.

7. MCL/SMCL - Maximum Contaminant Level/Secondary Contaminant Level - United States Environmental Protection Agency (USEPA) Table of Regulated Drinking Water Contaminants (updated June 2016). Available at https://www.epa.gov/ground-water- and-drinking-water/table-regulated-drinking-water-contaminants. USEPA Secondary Drinking Water Standards: Guidance for Nuisance Chemicals (updated January 2016). Available at https://www.epa.gov/dwstandardsregulations/secondary-drinking-water-standards-guidance-nuisance-chemicals.

8. Radium data is a combination of radium isotopes 226 and 228. When results are reported below the MDC (Minimum Detectable Concentration), data is displayed with an accompanying U. The MDC varies depending upon the sample amount and elapsed time of the measurement.

9. R 299.49 Footnotes for Generic Cleanup Criteria Tables. Cleanup Criteria Requirements for Response Activity (formerly the Part 201 Generic Cleanup Criteria and Screening Levels)

APPENDIX C-6
Summary of Background Events
Grand Haven Board of Light and Power
JB Sims Generating Station

Analyte	Units		SCREENING/TARGET LEVELS							MW-6									
		RBSL	MCL	SMCL	MI Part 201 Criteria[9]		Average Background Results	Limit Used for Assessment Monitoring Comparison	RL	Background Event #1	Background Event #2	Background Event #3	Background Event #4	Background Event #5	Background Event #6	Background Event #7	Background Event #8	Compliance Event	Compliance Event
					DWC	GSI													
									Sample Date:	6/27/2018	7/30/2018	8/27/2018	9/26/2018	10/22/2018	11/12/2018	11/28/2018	12/7/2018	3/27/2019	9/27/2019
Appendix III																			
BORON, TOTAL	mg/L	N/R	N/R	N/R	0.5	7.2	**11.8**	**11.8**	0.2	**13**	0.21	**14**	**14**	**12**	11	11	11	9.7	**15**
CALCIUM, TOTAL	mg/L	N/R	N/R	N/R	N/R	N/R	**149**	**149**	5	**250**	1.3	**190**	**220**	**250**	**220**	**250**	**260**	**270**	**210**
CHLORIDE, TOTAL	mg/L	N/R	N/R	**250**	250	(FF)	14.5	**250**	1	**310**	**310**	**260**	**290**	**300**	**280**	**300**	**280**	250	210
FLUORIDE, TOTAL	mg/L	N/R	**4**	2	N/R	N/R	0.1	**4**	0.25	1.7	1.7	1.8	1.8	1.7	1.4	1.3	1.3	1.4	1.7
IRON, TOTAL	mg/L	N/R	N/R	0.3	0.3	NA	**20**	**20**	10	NT	NT	NT	NT	NT	NT	NT	NT	13	11
pH	S.U.	N/R	N/R	6.5-8.5	6.5-8.5	**6.5-9.0**	6.99-7.65	**6.5-9.0**	N/R	8.41	7.89	7.46	7.42	7.50	7.89	7.10	7.16	7.78	7.16
SULFATE, TOTAL	mg/L	N/R	N/R	**250**	250	NA	46	**250**	1	110	**1500**	19	44	97	70	130	90	160	<3.0
TOTAL DISSOLVED SOLIDS	mg/L	N/R	N/R	500	500	500	**707**	**707**	20	**1600**	**820**	**1500**	**1600**	**1600**	**1500**	**1600**	**1600**	**1600**	**1400**
Appendix IV																			
ANTIMONY, TOTAL	mg/L	N/R	0.006	N/R	0.006	**0.13**	0.00032	**0.13**	0.0020	0.00012 J	0.00022 J	0.00014 J	0.00033	<0.00009	<0.00009	0.00037	<0.00009	<0.00030	0.00010 J
ARSENIC, TOTAL	mg/L	N/R	0.01	N/R	0.01	**0.01**	0.0043	**0.01**	0.0050	0.0011	0.00029 J	0.0016	0.0013	0.0011	0.0023	0.0014	0.0014	0.00097 J	0.00098 J
BARIUM, TOTAL	mg/L	N/R	2	N/R	2	**1.3 (G)**	0.39	**1.3**	0.0050	0.56	0.0054	0.89	1.1	1	1.1	1	1.1	0.82	1.1
BERYLLIUM, TOTAL	mg/L	N/R	0.004	N/R	0.004	**0.036 (G)**	0.00048	**0.036**	0.0010	< 0.00006	< 0.00006	< 0.000060	0.00021 J	< 0.000060	< 0.000060	< 0.000060	< 0.000060	< 0.0010	<0.0010
CADMIUM, TOTAL	mg/L	N/R	0.005	N/R	0.005	**0.0025 (G,X)**	0.00003	**0.0025**	0.0010	0.000089	< 0.000017	0.000034 J	< 0.000017	0.000057	0.000021 J	0.000017 J	0.000063	0.000077	<0.000040
CHROMIUM, TOTAL	mg/L	N/R	0.1	N/R	0.1	**0.011**	0.00079	**0.011**	0.0020	0.0017	0.00089	0.0017	0.0012	0.0014	0.0013	0.0012	0.0017	0.0016	0.0038
COBALT, TOTAL	mg/L	0.006	N/R	N/R	0.04	**0.1**	0.0008	**0.1**	0.0010	0.00062 J	0.00089 J	0.00050 J	0.0004 J	0.00036 J	0.00035 J	0.00031 J	0.00099 J	0.00058 J	0.00055 J
COPPER, TOTAL	mg/L	N/R	1.3	1.0	1	**0.021 (G)**	0.00053	**0.021**	0.0008	NT	NT	NT	NT	NT	NT	NT	NT	0.0034	0.0012
LEAD, TOTAL	mg/L	0.015	0.015	N/R	0.004	**0.014 (G,X)**	0.0004651	**0.014**	0.0010	0.0036	0.0016	0.0023	0.00056	0.0023	0.0018	0.00052	0.0033 J	0.00071	0.0031
LITHIUM, TOTAL	mg/L	0.04	N/R	N/R	0.17	**0.44**	0.01085	**0.44**	0.0080	0.24	< 0.00095	0.23	0.21	0.18	0.19	0.18	0.18	0.17	0.2
MERCURY, TOTAL	mg/L	N/R	0.002	N/R	0.002	0.0000013	**0.0001024**	**0.0001024**	0.0002	<0.000041	**0.00012**	**0.00013**	< 0.000041	< 0.000041	< 0.000041	< 0.000041	< 0.000041	**<0.0002**	**<0.0002**
MOLYBDENUM, TOTAL	mg/L	0.1	N/R	N/R	0.073	**3.2**	0.002849	**3.2**	0.010	< 0.000093	0.0016	0.0018	0.0015	0.0014	0.001	0.0011	0.0011	< 0.0010	<0.0010
NICKEL, TOTAL	mg/L	N/R	N/R	N/R	0.1	**0.120 (G)**	0.00041	**0.12**	0.000	NT	NT	NT	NT	NT	NT	NT	NT	0.0019	0.0024 B
RADIUM (226 + 228)	pCi/L	N/R	**5**	N/R	N/R	N/R	0.9482	**5**	Varies	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	0.86 U	0.931 U	0.71 U	0.87 J	1.0 U
SELENIUM, TOTAL	mg/L	N/R	0.05	N/R	0.05	**0.005**	0.000398	**0.005**	0.0050	< 0.00028	< 0.00028	< 0.00028	< 0.00028	< 0.00028	< 0.00028	< 0.00028	< 0.00028	< 0.00087	< 0.00087
SILVER, TOTAL	mg/L	N/R	N/R	0.1	0.034	**0.00006**	0.000028	**0.00006**	0.00004	NT	NT	NT	NT	NT	NT	NT	NT	<0.000040	0.000024 J
THALLIUM, TOTAL	mg/L	N/R	0.002	N/R	0.002	**0.0037**	0.000058	**0.0037**	0.0010	< 0.00028	< 0.000029	< 0.000029	< 0.000029	< 0.000029	< 0.000029	< 0.000029	< 0.000029	0.000064 J	<0.000087
VANADIUM, TOTAL	mg/L	N/R	N/R	N/R	0.0045	**0.027**	0.000665	**0.027**	0.0008	NT	NT	NT	NT	NT	NT	NT	NT	0.00029 J	0.00066 J
ZINC, TOTAL	mg/L	N/R	N/R	5	2.4	0.270 (G)	**1.001**	**1.001**	2.0	NT	NT	NT	NT	NT	NT	NT	NT	**<2.0**	0.011 J

NOTES:

1. Shaded/Bold Data exceeds MCL/SMCL or internal standard.
2. mg/L - Milligrams per Liter
3. pCi/L - picocuries per Liter
4. N/R - Indicates consitiuent is not regulated by Hazardous Site Response Act
5. J - Result is an estimated value. The result is greater than or equal to the Method Detection Limit (MDL) and less than the Practical Quantitation Limit (PQL). Values are displayed as less that the PQL with a J.
6. < - Constituent was analyzed for, but was not detected above the MDL and is considered a non-detect. Value is displayed as less than the PQL.
7. MCL/SMCL - Maximum Contaminant Level/Secondary Contaminant Level - United States Environmental Protection Agency (USEPA) Table of Regulated Drinking Water Contaminants (updated June 2016). Available at https://www.epa.gov/ground-water- and-drinking-water/table-regulated-drinking-water-contaminants. USEPA Secondary Drinking Water Standards: Guidance for Nuisance Chemicals (updated January 2016). Available at https://www.epa.gov/dwstandardsregulations/secondary-drinking-water-standards-guidance-nuisance-chemicals.
8. Radium data is a combination of radium isotopes 226 and 228. When results are reported below the MDC (Minimum Detectable Concentration), data is displayed with an accompanying U. The MDC varies depending upon the sample amount and elapsed time of the measurement.
9. R 299.49 Footnotes for Generic Cleanup Criteria Tables. Cleanup Criteria Requirements for Response Activity (formerly the Part 201 Generic Cleanup Criteria and Screening Levels)

APPENDIX C-7
Summary of Background Events
Grand Haven Board of Light and Power
JB Sims Generating Station

Analyte	Units		SCREENING/TARGET LEVELS							MW-7									
		RBSL	MCL	SMCL	MI Part 201 Criteria[9]		Average Background Results	Limit Used for Assessment Monitoring Comparison	RL	Background Event #1	Background Event #2	Background Event #3	Background Event #4	Background Event #5	Background Event #6	Background Event #7	Background Event #8	Compliance Event	Compliance Event
					DWC	GSI													
									Sample Date:	6/27/2018	7/30/2018	8/27/2018	9/26/2018	10/22/2018	11/12/2018	11/28/2018	12/7/2018	3/27/2019	9/27/2019
Appendix III																			
BORON, TOTAL	mg/L	N/R	N/R	N/R	0.5	7.2	**11.8**	**11.8**	0.2	**16**	2.4	9	**15**	**13**	**14**	**14**	**14**	9.2	11
CALCIUM, TOTAL	mg/L	N/R	N/R	N/R	N/R	N/R	**149**	**149**	5	**150**	**200**	**150**	**150**	140	130	140	**150**	140	140
CHLORIDE, TOTAL	mg/L	N/R	N/R	**250**	250	(FF)	14.5	**250**	1	15	15	13	15	15	14	15	15	14	14
FLUORIDE, TOTAL	mg/L	N/R	**4**	2	N/R	N/R	0.1	**4**	0.25	0.1	0.1	0.11	0.14	0.16	0.066 J	<0.055	<0.055	0.092 J	0.14
IRON, TOTAL	mg/L	N/R	N/R	0.3	0.3	NA	**20**	**20**	10	NT	NT	NT	NT	NT	NT	NT	NT	19	**21**
pH	S.U.	N/R	N/R	6.5-8.5	6.5-8.5	**6.5-9.0**	6.99-7.65	**6.5-9.0**	N/R	7.65	7.30	6.99	7.14	7.31	7.21	7.51	7.34	8.05	7.57
SULFATE, TOTAL	mg/L	N/R	N/R	**250**	250	NA	46	**250**	1	68	52	24	57	57	50	61	51	14	26
TOTAL DISSOLVED SOLIDS	mg/L	N/R	N/R	500	500	500	**707**	**707**	20	690	700	**750**	690	**740**	**800**	**720**	680	610	690
Appendix IV																			
ANTIMONY, TOTAL	mg/L	N/R	0.006	N/R	0.006	**0.13**	0.00032	**0.13**	0.0020	< 0.00009	0.0016	0.00017 J	< 0.00009	< 0.00009	< 0.00009	0.00013 J	< 0.00009	< 0.00030	<0.00030
ARSENIC, TOTAL	mg/L	N/R	0.01	N/R	0.01	**0.01**	0.0043	**0.01**	0.0050	0.0019	**0.029**	0.0048	0.0009 J	0.001	0.0009 J	0.0028	0.0004 J	0.00082 J	0.00085 J
BARIUM, TOTAL	mg/L	N/R	2	N/R	2	**1.3 (G)**	0.39	**1.3**	0.0050	0.47	0.3	0.36	0.42	0.41	0.43	0.44	0.45	0.28	0.35
BERYLLIUM, TOTAL	mg/L	N/R	0.004	N/R	0.004	**0.036 (G)**	0.00048	**0.036**	0.0010	< 0.00006	< 0.00006	< 0.000060	0.00016 J	< 0.000060	< 0.000060	< 0.000060	< 0.000060	< 0.0010	< 0.0010
CADMIUM, TOTAL	mg/L	N/R	0.005	N/R	0.005	**0.0025 (G,X)**	0.00003	**0.0025**	0.0010	0.000047	< 0.000017	0.000023 J	< 0.000017	< 0.000017	< 0.000017	< 0.000017	< 0.000017	< 0.00030	<0.000040
CHROMIUM, TOTAL	mg/L	N/R	0.1	N/R	0.1	**0.011**	0.00079	**0.011**	0.0020	0.00055 J	0.0028	< 0.00034	< 0.00034	0.00068 J	< 0.00034	0.00045 J	< 0.00034	0.00037 J	<0.00080
COBALT, TOTAL	mg/L	0.006	N/R	N/R	0.04	**0.1**	0.0008	**0.1**	0.0010	0.00079 J	0.0006 J	0.00099 J	0.0007 J	0.00075 J	0.0007 J	0.0007 J	0.00076 J	0.00088 J	0.00091 J
COPPER, TOTAL	mg/L	N/R	1.3	1.0	1	**0.021 (G)**	0.00053	**0.021**	0.0008	NT	NT	NT	NT	NT	NT	NT	NT	0.00059 J	0.00046 J
LEAD, TOTAL	mg/L	0.015	0.015	N/R	0.004	**0.014 (G,X)**	0.0004651	**0.014**	0.0010	0.00062	0.0029	0.000071 J	< 0.00004	0.00026 J	< 0.00004	< 0.00004	< 0.00004	0.000074 J	0.000057 J
LITHIUM, TOTAL	mg/L	0.04	N/R	N/R	0.17	**0.44**	0.01085	**0.44**	0.0080	0.0052 J	0.059	0.0074 J	0.0055 J	<0.00095	0.0034 J	0.0035 J	0.0061 J	0.0094 J	<0.010
MERCURY, TOTAL	mg/L	N/R	0.002	N/R	0.002	0.0000013	**0.0001024**	**0.0001024**	0.0002	< 0.000041	**0.00014**	**0.00012**	< 0.000041	0.00008 J	< 0.000041	< 0.000041	< 0.000041	**<0.0002**	**<0.0002**
MOLYBDENUM, TOTAL	mg/L	0.1	N/R	N/R	0.073	**3.2**	0.002849	**3.2**	0.010	< 0.000093	0.0054	0.0066	0.0027	0.004	0.0014	0.0019	0.0011	0.0043	<0.0010
NICKEL, TOTAL	mg/L	N/R	N/R	N/R	0.1	**0.120 (G)**	0.00041	**0.12**	0.000	NT	NT	NT	NT	NT	NT	NT	NT	0.0004	0.00042 JB
RADIUM (226 + 228)	pCi/L	N/R	**5**	N/R	N/R	N/R	0.9482	**5**	Varies	1.0 U	1.0 U	1.0 U	1.0 U	0.762 U	1.0 U	1.0 U	0.72 U	1.0 U	1.0 U
SELENIUM, TOTAL	mg/L	N/R	0.05	N/R	0.05	**0.005**	0.000398	**0.005**	0.0050	< 0.00028	< 0.00028	< 0.00028	< 0.00028	< 0.00028	< 0.00028	< 0.00028	< 0.00028	< 0.00087	<0.00087
SILVER, TOTAL	mg/L	N/R	N/R	0.1	0.034	**0.00006**	0.000028	**0.00006**	0.00004	NT	NT	NT	NT	NT	NT	NT	NT	0.000034 J	0.000022 J
THALLIUM, TOTAL	mg/L	N/R	0.002	N/R	0.002	**0.0037**	0.000058	**0.0037**	0.0010	< 0.000029	< 0.000029	< 0.000029	< 0.000029	< 0.000029	< 0.000029	< 0.000029	< 0.000029	< 0.000087	<0.000087
VANADIUM, TOTAL	mg/L	N/R	N/R	N/R	0.0045	**0.027**	0.000665	**0.027**	0.0008	NT	NT	NT	NT	NT	NT	NT	NT	0.00057 J	0.00076 J
ZINC, TOTAL	mg/L	N/R	N/R	5	2.4	0.270 (G)	**1.001**	**1.001**	2.0	NT	NT	NT	NT	NT	NT	NT	NT	**<2.0**	0.0023 J

NOTES:

1. Shaded/Bold Data exceeds MCL/SMCL or internal standard.
2. mg/L - Milligrams per Liter
3. pCi/L - picocuries per Liter
4. N/R - Indicates consitiuent is not regulated by Hazardous Site Response Act
5. J - Result is an estimated value. The result is greater than or equal to the Method Detection Limit (MDL) and less than the Practical Quantitation Limit (PQL). Values are displayed as less that the PQL with a J.
6. < - Constituent was analyzed for, but was not detected above the MDL and is considered a non-detect. Value is displayed as less than the PQL.

7. MCL/SMCL - Maximum Contaminant Level/Secondary Contaminant Level - United States Environmental Protection Agency (USEPA) Table of Regulated Drinking Water Contaminants (updated June 2016). Available at https://www.epa.gov/ground-water- and-drinking-water/table-regulated-drinking-water-contaminants. USEPA Secondary Drinking Water Standards: Guidance for Nuisance Chemicals (updated January 2016). Available at https://www.epa.gov/dwstandardsregulations/secondary-drinking-water-standards-guidance-nuisance-chemicals.

8. Radium data is a combination of radium isotopes 226 and 228. When results are reported below the MDC (Minimum Detectable Concentration), data is displayed with an accompanying U. The MDC varies depending upon the sample amount and elapsed time of the measurement.

9. R 299.49 Footnotes for Generic Cleanup Criteria Tables. Cleanup Criteria Requirements for Response Activity (formerly the Part 201 Generic Cleanup Criteria and Screening Levels)

APPENDIX C-8
Summary of Background Events
Grand Haven Board of Light and Power
JB Sims Generating Station

Analyte	Units		SCREENING/TARGET LEVELS							MW-8									
		RBSL	MCL	SMCL	MI Part 201 Criteria[9]		Average Background Results	Limit Used for Assessment Monitoring Comparison	RL	Background Event #1	Background Event #2	Background Event #3	Background Event #4	Background Event #5	Background Event #6	Background Event #7	Background Event #8	Compliance Event	Compliance Event
					DWC	GSI													
									Sample Date:	6/27/2018	7/30/2018	8/27/2018	9/26/2018	10/22/2018	11/12/2018	11/28/2018	12/7/2018	3/27/2019	9/30/2019
Appendix III																			
BORON, TOTAL	mg/L	N/R	N/R	N/R	0.5	7.2	**11.8**	**11.8**	0.2	6	6.2	4.4	3	2.1	1.4	1.2	1.3	0.9	1.6
CALCIUM, TOTAL	mg/L	N/R	N/R	N/R	N/R	N/R	**149**	**149**	5	140	**150**	140	130	120	120	120	120	95	130
CHLORIDE, TOTAL	mg/L	N/R	N/R	**250**	250	(FF)	14.5	**250**	1	94	110	78	41	23	17	15	14	8.5	18
FLUORIDE, TOTAL	mg/L	N/R	**4**	2	N/R	N/R	0.1	**4**	0.25	0.18	0.12	0.39	0.57	0.57	0.34	0.34	0.36	0.4	0.57
IRON, TOTAL	mg/L	N/R	N/R	0.3	0.3	NA	**20**	**20**	10	NT	NT	NT	NT	NT	NT	NT	NT	15	**21**
pH	S.U.	N/R	N/R	6.5-8.5	6.5-8.5	**6.5-9.0**	6.99-7.65	**6.5-9.0**	N/R	8.74	7.69	7.25	7.28	7.57	7.74	7.96	7.61	7.81	7.96
SULFATE, TOTAL	mg/L	N/R	N/R	**250**	250	NA	46	**250**	1	2.2	27	8.2	5.1	4.7	3.4	3.6	3.1	4.7	<3.0
TOTAL DISSOLVED SOLIDS	mg/L	N/R	N/R	500	500	500	**707**	**707**	20	**720**	**860**	**800**	490	490	410	290	420	180	480
Appendix IV																			
ANTIMONY, TOTAL	mg/L	N/R	0.006	N/R	0.006	**0.13**	0.00032	**0.13**	0.0020	<0.00009	0.00026 J	0.00012 J	< 0.00009	< 0.00009	< 0.00009	0.00012 J	< 0.00009	< 0.00030	<0.00030
ARSENIC, TOTAL	mg/L	N/R	0.01	N/R	0.01	**0.01**	0.0043	**0.01**	0.0050	0.0064	0.0041	0.008	0.0047	0.0047	0.004	0.0037	0.0041	0.0028	0.0065
BARIUM, TOTAL	mg/L	N/R	2	N/R	2	**1.3 (G)**	0.39	**1.3**	0.0050	0.42	0.38	0.48	0.51	0.62	0.61	0.69	0.62	0.5	0.68
BERYLLIUM, TOTAL	mg/L	N/R	0.004	N/R	0.004	**0.036 (G)**	0.00048	**0.036**	0.0010	<0.00006	< 0.00006	< 0.000060	< 0.00006	< 0.00006	< 0.00006	< 0.00006	< 0.00006	0.000089 J	<0.0010
CADMIUM, TOTAL	mg/L	N/R	0.005	N/R	0.005	**0.0025 (G,X)**	0.00003	**0.0025**	0.0010	0.000051	< 0.000017	0.000031 J	< 0.000017	< 0.000017	< 0.000017	< 0.000017	0.000079	< 0.000040	<0.000040
CHROMIUM, TOTAL	mg/L	N/R	0.1	N/R	0.1	**0.011**	0.00079	**0.011**	0.0020	0.00085	0.00049 J	0.00084	0.00059 J	0.00075 J	0.00065 J	0.00058 J	0.0009	0.00050 J	0.00051 J
COBALT, TOTAL	mg/L	0.006	N/R	N/R	0.04	**0.1**	0.0008	**0.1**	0.0010	0.0018	0.0019	0.002	0.00058 J	0.00044 J	0.00034 J	0.00032 J	0.00035 J	0.00022 J	0.00036 J
COPPER, TOTAL	mg/L	N/R	1.3	1.0	1	**0.021 (G)**	0.00053	**0.021**	0.0008	NT	NT	NT	NT	NT	NT	NT	NT	0.00094	0.00084
LEAD, TOTAL	mg/L	0.015	0.015	N/R	0.004	**0.014 (G,X)**	0.0004651	**0.014**	0.0010	0.002	0.0039	0.0015	0.00036 J	0.00067	0.00025 J	0.0003 J	0.00058	0.00059	0.00046
LITHIUM, TOTAL	mg/L	0.04	N/R	N/R	0.17	**0.44**	0.01085	**0.44**	0.0080	0.021	0.01	0.04	0.039	0.029	0.034	0.032	0.032	0.024	<0.010
MERCURY, TOTAL	mg/L	N/R	0.002	N/R	0.002	0.0000013	**0.0001024**	**0.0001024**	0.0002	< 0.000041	**0.00012**	0.000093 J	< 0.000041	< 0.000041	< 0.000041	< 0.000041	< 0.000041	**< 0.00020**	**< 0.00020**
MOLYBDENUM, TOTAL	mg/L	0.1	N/R	N/R	0.073	**3.2**	0.002849	**3.2**	0.010	< 0.000093	< 0.000093	0.0069	0.0034	0.0045	0.005	0.0053	0.0052	0.0045	0.0046
NICKEL, TOTAL	mg/L	N/R	N/R	N/R	0.1	**0.120 (G)**	0.00041	**0.12**	0.000	NT	NT	NT	NT	NT	NT	NT	NT	0.0011	0.0013 JB
RADIUM (226 + 228)	pCi/L	N/R	**5**	N/R	N/R	N/R	0.9482	**5**	Varies	1.0 U	1.36	1.0 U	1.0 U	1.0 U	1.0 U	0.952 U	0.8 U	1.0 U	1.08
SELENIUM, TOTAL	mg/L	N/R	0.05	N/R	0.05	**0.005**	0.000398	**0.005**	0.0050	< 0.00028	< 0.00028	< 0.00028	< 0.00028	< 0.00028	< 0.00028	< 0.00028	< 0.00028	< 0.00087	<0.00087
SILVER, TOTAL	mg/L	N/R	N/R	0.1	0.034	**0.00006**	0.000028	**0.00006**	0.00004	NT	NT	NT	NT	NT	NT	NT	NT	0.000028 J	<0.000040
THALLIUM, TOTAL	mg/L	N/R	0.002	N/R	0.002	**0.0037**	0.000058	**0.0037**	0.0010	< 0.000029	< 0.000029	< 0.000029	< 0.000029	< 0.000029	< 0.000029	< 0.000029	< 0.000029	< 0.000087	<0.000087
VANADIUM, TOTAL	mg/L	N/R	N/R	N/R	0.0045	**0.027**	0.000665	**0.027**	0.0008	NT	NT	NT	NT	NT	NT	NT	NT	0.00036 J	<0.00049 J
ZINC, TOTAL	mg/L	N/R	N/R	5	2.4	0.270 (G)	**1.001**	**1.001**	2.0	NT	NT	NT	NT	NT	NT	NT	NT	**<2.0**	0.0026 J

NOTES:

1. Shaded/Bold Data exceeds MCL/SMCL or internal standard.
2. mg/L - Milligrams per Liter
3. pCi/L - picocuries per Liter
4. N/R - Indicates consitiuent is not regulated by Hazardous Site Response Act
5. J - Result is an estimated value. The result is greater than or equal to the Method Detection Limit (MDL) and less than the Practical Quantitation Limit (PQL). Values are displayed as less that the PQL with a J.
6. < - Constituent was analyzed for, but was not detected above the MDL and is considered a non-detect. Value is displayed as less than the PQL.
7. MCL/SMCL - Maximum Contaminant Level/Secondary Contaminant Level - United States Environmental Protection Agency (USEPA) Table of Regulated Drinking Water Contaminants (updated June 2016). Available at https://www.epa.gov/ground-water- and-drinking-water/table-regulated-drinking-water-contaminants. USEPA Secondary Drinking Water Standards: Guidance for Nuisance Chemicals (updated January 2016). Available at https://www.epa.gov/dwstandardsregulations/secondary-drinking-water-standards-guidance-nuisance-chemicals.
8. Radium data is a combination of radium isotopes 226 and 228. When results are reported below the MDC (Minimum Detectable Concentration), data is displayed with an accompanying U. The MDC varies depending upon the sample amount and elapsed time of the measurement.
9. R 299.49 Footnotes for Generic Cleanup Criteria Tables. Cleanup Criteria Requirements for Response Activity (formerly the Part 201 Generic Cleanup Criteria and Screening Levels)

APPENDIX C-9
Summary of Background Events
Grand Haven Board of Light and Power
JB Sims Generating Station

Analyte	Units		SCREENING/TARGET LEVELS							MW-9
		RBSL	MCL	SMCL	MI Part 201 Criteria[9] DWC	MI Part 201 Criteria[9] GSI	Average Background Results	Limit Used for Assessment Monitoring Comparison	RL	Compliance Event
									Sample Date:	9/30/2019
Appendix III										
BORON, TOTAL	mg/L	N/R	N/R	N/R	0.5	7.2	**11.8**	**11.8**	0.2	6.9
CALCIUM, TOTAL	mg/L	N/R	N/R	N/R	N/R	N/R	**149**	**149**	5	**280**
CHLORIDE, TOTAL	mg/L	N/R	N/R	**250**	250	(FF)	14.5	**250**	1	18
FLUORIDE, TOTAL	mg/L	N/R	**4**	2	N/R	N/R	0.1	**4**	0.25	2.3
IRON, TOTAL	mg/L	N/R	N/R	0.3	0.3	NA	**20**	**20**	10	20
pH	S.U.	N/R	N/R	6.5-8.5	6.5-8.5	**6.5-9.0**	6.99-7.65	**6.5-9.0**	N/R	7.75
SULFATE, TOTAL	mg/L	N/R	N/R	**250**	250	NA	46	**250**	1	9.6
TOTAL DISSOLVED SOLIDS	mg/L	N/R	N/R	500	500	500	**707**	**707**	20	**1100**
Appendix IV										
ANTIMONY, TOTAL	mg/L	N/R	0.006	N/R	0.006	**0.13**	0.00032	**0.13**	0.0020	<0.00030
ARSENIC, TOTAL	mg/L	N/R	0.01	N/R	0.01	**0.01**	0.0043	**0.01**	0.0050	0.0035
BARIUM, TOTAL	mg/L	N/R	2	N/R	2	**1.3 (G)**	0.39	**1.3**	0.0050	**1.8**
BERYLLIUM, TOTAL	mg/L	N/R	0.004	N/R	0.004	**0.036 (G)**	0.00048	**0.036**	0.0010	<0.0010
CADMIUM, TOTAL	mg/L	N/R	0.005	N/R	0.005	**0.0025 (G,X)**	0.00003	**0.0025**	0.0010	<0.000040
CHROMIUM, TOTAL	mg/L	N/R	0.1	N/R	0.1	**0.011**	0.00079	**0.011**	0.0020	0.0025
COBALT, TOTAL	mg/L	0.006	N/R	N/R	0.04	**0.1**	0.0008	**0.1**	0.0010	0.0022
COPPER, TOTAL	mg/L	N/R	1.3	1.0	1	**0.021 (G)**	0.00053	**0.021**	0.0008	0.0013
LEAD, TOTAL	mg/L	0.015	0.015	N/R	0.004	**0.014 (G,X)**	0.0004651	**0.014**	0.0010	0.002
LITHIUM, TOTAL	mg/L	0.04	N/R	N/R	0.17	**0.44**	0.01085	**0.44**	0.0080	0.16
MERCURY, TOTAL	mg/L	N/R	0.002	N/R	0.002	0.0000013	**0.0001024**	**0.0001024**	0.0002	**<0.00020**
MOLYBDENUM, TOTAL	mg/L	0.1	N/R	N/R	0.073	**3.2**	0.002849	**3.2**	0.010	0.012
NICKEL, TOTAL	mg/L	N/R	N/R	N/R	0.1	**0.120 (G)**	0.00041	**0.12**	0.000	0.0015 JB
RADIUM (226 + 228)	pCi/L	N/R	**5**	N/R	N/R	N/R	0.9482	**5**	Varies	1.18
SELENIUM, TOTAL	mg/L	N/R	0.05	N/R	0.05	**0.005**	0.000398	**0.005**	0.0050	<0.00087
SILVER, TOTAL	mg/L	N/R	N/R	0.1	0.034	**0.00006**	0.000028	**0.00006**	0.00004	<0.000040
THALLIUM, TOTAL	mg/L	N/R	0.002	N/R	0.002	**0.0037**	0.000058	**0.0037**	0.0010	<0.000087
VANADIUM, TOTAL	mg/L	N/R	N/R	N/R	0.0045	**0.027**	0.000665	**0.027**	0.0008	0.0021
ZINC, TOTAL	mg/L	N/R	N/R	5	2.4	0.270 (G)	**1.001**	**1.001**	2.0	0.0064 J

NOTES:

1. Shaded/Bold Data exceeds MCL/SMCL or internal standard.
2. mg/L - Milligrams per Liter
3. pCi/L - picocuries per Liter
4. N/R - Indicates consitiuent is not regulated by Hazardous Site Response Act
5. J - Result is an estimated value. The result is greater than or equal to the Method Detection Limit (MDL) and less than the Practical Quantitation Limit (PQL). Values are displayed as less that the PQL with a J.
6. < - Constituent was analyzed for, but was not detected above the MDL and is considered a non-detect. Value is displayed as less than the PQL.
7. MCL/SMCL - Maximum Contaminant Level/Secondary Contaminant Level - United States Environmental Protection Agency (USEPA) Table of Regulated Drinking Water Contaminants (updated June 2016). Available at https://www.epa.gov/ground-water- and-drinking-water/table-regulated-drinking-water-contaminants. USEPA Secondary Drinking Water Standards: Guidance for Nuisance Chemicals (updated January 2016). Available at https://www.epa.gov/dwstandardsregulations/secondary-drinking-water-standards-guidance-nuisance-chemicals
8. Radium data is a combination of radium isotopes 226 and 228. When results are reported below the MDC (Minimum Detectable Concentration), data is displayed with an accompanying U. The MDC varies depending upon the sample amount and elapsed time of the measurement.
9. R 299.49 Footnotes for Generic Cleanup Criteria Tables. Cleanup Criteria Requirements for Response Activity (formerly the Part 201 Generic Cleanup Criteria and Screenir

APPENDIX C-10
Summary of Background Events
Grand Haven Board of Light and Power
JB Sims Generating Station

Analyte	Units		SCREENING/TARGET LEVELS							MW-10
		RBSL	MCL	SMCL	MI Part 201 Criteria[9]		Average Background Results	Limit Used for Assessment Monitoring Comparison	RL	Compliance Event
					DWC	GSI				
									Sample Date:	9/30/2019
Appendix III										
BORON, TOTAL	mg/L	N/R	N/R	N/R	0.5	7.2	**11.8**	**11.8**	0.2	**46**
CALCIUM, TOTAL	mg/L	N/R	N/R	N/R	N/R	N/R	**149**	**149**	5	**150**
CHLORIDE, TOTAL	mg/L	N/R	N/R	**250**	250	(FF)	14.5	**250**	1	**550**
FLUORIDE, TOTAL	mg/L	N/R	**4**	2	N/R	N/R	0.1	**4**	0.25	**10**
IRON, TOTAL	mg/L	N/R	N/R	0.3	0.3	NA	**20**	**20**	10	8.4
pH	S.U.	N/R	N/R	6.5-8.5	6.5-8.5	**6.5-9.0**	6.99-7.65	**6.5-9.0**	N/R	7.66
SULFATE, TOTAL	mg/L	N/R	N/R	**250**	250	NA	46	**250**	1	<3.0
TOTAL DISSOLVED SOLIDS	mg/L	N/R	N/R	500	500	500	**707**	**707**	20	**1700**
Appendix IV										
ANTIMONY, TOTAL	mg/L	N/R	0.006	N/R	0.006	**0.13**	0.00032	**0.13**	0.0020	0.00018 J
ARSENIC, TOTAL	mg/L	N/R	0.01	N/R	0.01	**0.01**	0.0043	**0.01**	0.0050	0.00097 J
BARIUM, TOTAL	mg/L	N/R	2	N/R	2	**1.3 (G)**	0.39	**1.3**	0.0050	1.2
BERYLLIUM, TOTAL	mg/L	N/R	0.004	N/R	0.004	**0.036 (G)**	0.00048	**0.036**	0.0010	<0.0010
CADMIUM, TOTAL	mg/L	N/R	0.005	N/R	0.005	**0.0025 (G,X)**	0.00003	**0.0025**	0.0010	0.000030 J
CHROMIUM, TOTAL	mg/L	N/R	0.1	N/R	0.1	**0.011**	0.00079	**0.011**	0.0020	0.0078
COBALT, TOTAL	mg/L	0.006	N/R	N/R	0.04	**0.1**	0.0008	**0.1**	0.0010	0.00076 J
COPPER, TOTAL	mg/L	N/R	1.3	1.0	1	**0.021 (G)**	0.00053	**0.021**	0.0008	0.00087
LEAD, TOTAL	mg/L	0.015	0.015	N/R	0.004	**0.014 (G,X)**	0.0004651	**0.014**	0.0010	0.0039
LITHIUM, TOTAL	mg/L	0.04	N/R	N/R	0.17	**0.44**	0.01085	**0.44**	0.0080	**1.2**
MERCURY, TOTAL	mg/L	N/R	0.002	N/R	0.002	0.0000013	**0.0001024**	**0.0001024**	0.0002	**<0.00020**
MOLYBDENUM, TOTAL	mg/L	0.1	N/R	N/R	0.073	**3.2**	0.002849	**3.2**	0.010	0.011
NICKEL, TOTAL	mg/L	N/R	N/R	N/R	0.1	**0.120 (G)**	0.00041	**0.12**	0.000	0.0021 B
RADIUM (226 + 228)	pCi/L	N/R	**5**	N/R	N/R	N/R	0.9482	**5**	Varies	1.0 U
SELENIUM, TOTAL	mg/L	N/R	0.05	N/R	0.05	**0.005**	0.000398	**0.005**	0.0050	<0.00087
SILVER, TOTAL	mg/L	N/R	N/R	0.1	0.034	**0.00006**	0.000028	**0.00006**	0.00004	<0.000040
THALLIUM, TOTAL	mg/L	N/R	0.002	N/R	0.002	**0.0037**	0.000058	**0.0037**	0.0010	<0.000087
VANADIUM, TOTAL	mg/L	N/R	N/R	N/R	0.0045	**0.027**	0.000665	**0.027**	0.0008	0.0011
ZINC, TOTAL	mg/L	N/R	N/R	5	2.4	0.270 (G)	**1.001**	**1.001**	2.0	0.011 J

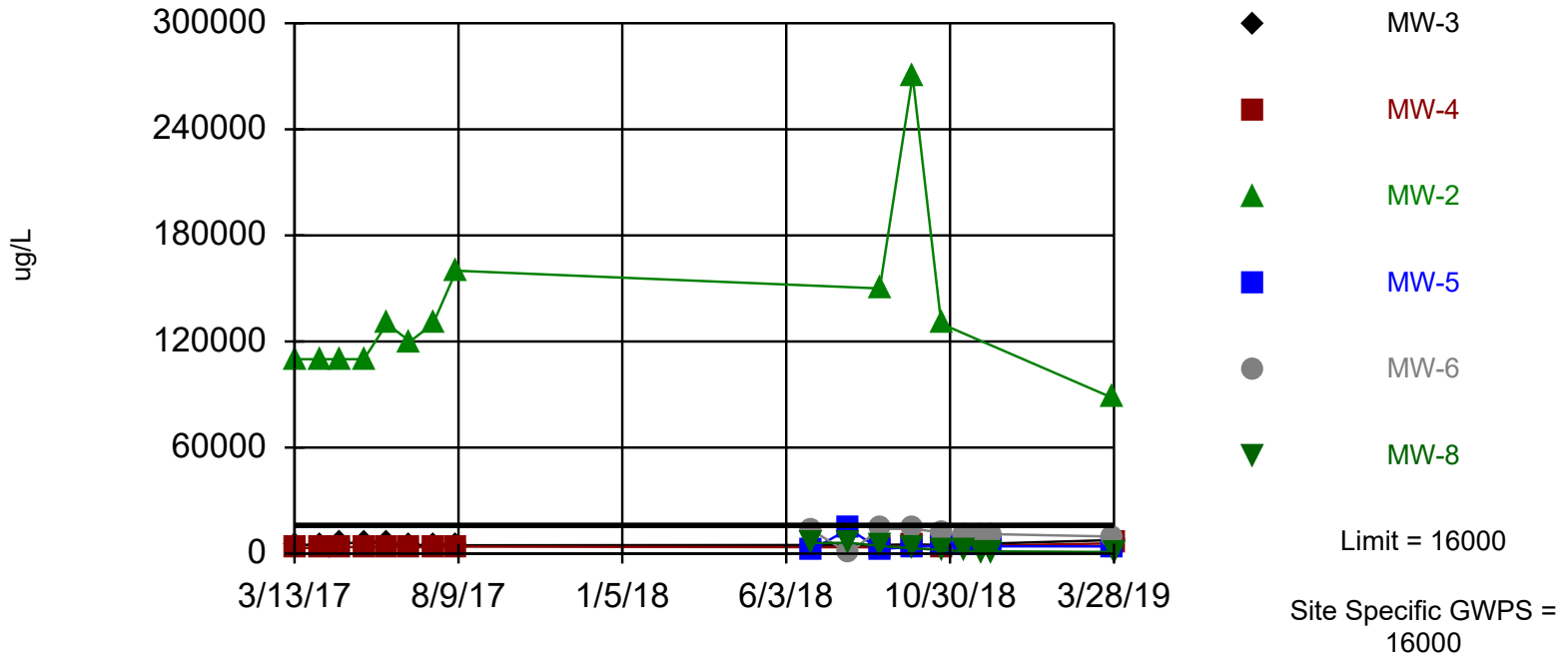
NOTES:

1. Shaded/Bold Data exceeds MCL/SMCL or internal standard.
2. mg/L - Milligrams per Liter
3. pCi/L - picocuries per Liter
4. N/R - Indicates consitiuent is not regulated by Hazardous Site Response Act
5. J - Result is an estimated value. The result is greater than or equal to the Method Detection Limit (MDL) and less than the Practical Quantitation Limit (PQL). Values are displayed as less that the PQL with a J.
6. < - Constituent was analyzed for, but was not detected above the MDL and is considered a non-detect. Value is displayed as less than the PQL.
7. MCL/SMCL - Maximum Contaminant Level/Secondary Contaminant Level - United States Environmental Protection Agency (USEPA) Table of Regulated Drinking Water Contaminants (updated June 2016). Available at https://www.epa.gov/ground-water- and-drinking-water/table-regulated-drinking-water-contaminants. USEPA Secondary Drinking Water Standards: Guidance for Nuisance Chemicals (updated January 2016). Available at https://www.epa.gov/dwstandardsregulations/secondary-drinking-water-standards-guidance-nuisance-chemicals
8. Radium data is a combination of radium isotopes 226 and 228. When results are reported below the MDC (Minimum Detectable Concentration), data is displayed with an accompanying U. The MDC varies depending upon the sample amount and elapsed time of the measurement.
9. R 299.49 Footnotes for Generic Cleanup Criteria Tables. Cleanup Criteria Requirements for Response Activity (formerly the Part 201 Generic Cleanup Criteria and Screening

Exceeds Limit: MW-2

Prediction Limit

Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.05 alpha level. Limit is highest of 9 background values. Report alpha = 0.4. Individual comparison alpha = 0.08161. Most recent point for each compliance well compared to limit. Insufficient data to test for seasonality; data will not be deseasonalized.

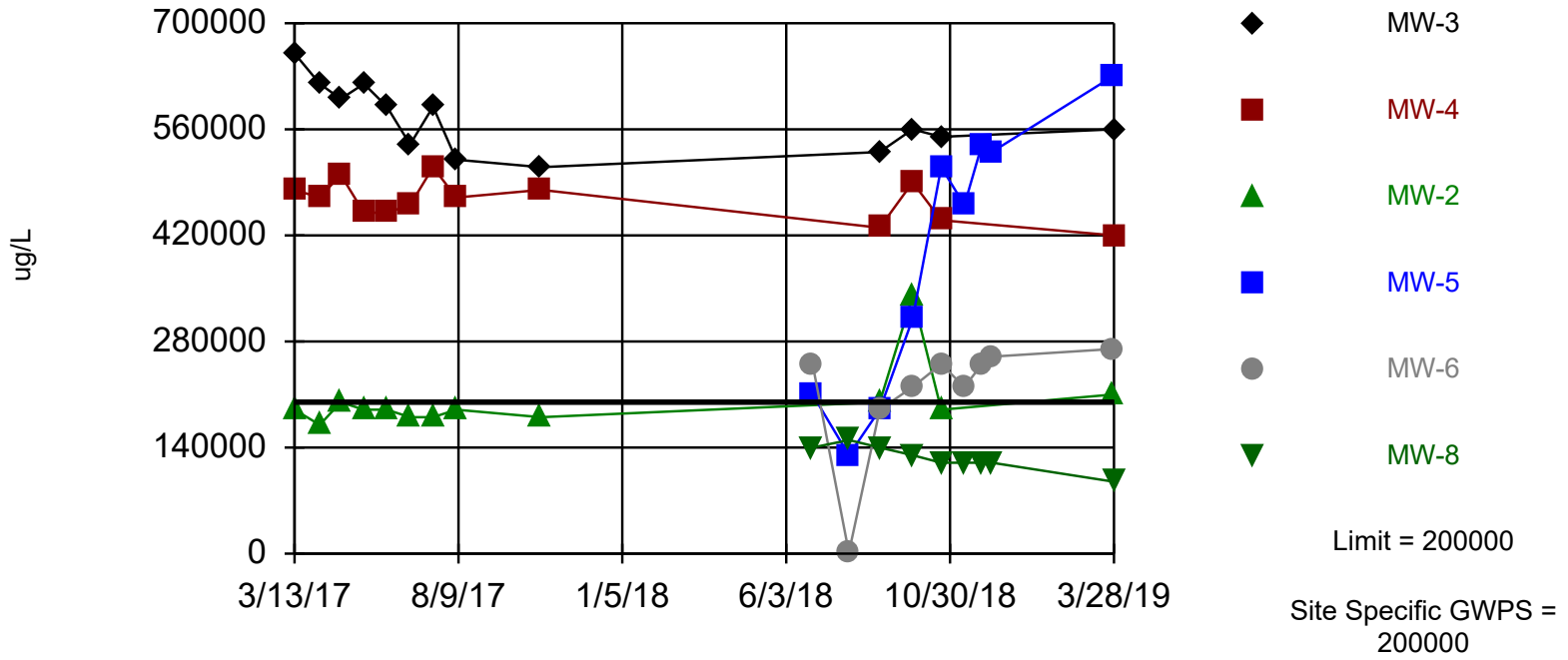
Constituent: Boron Analysis Run 1/29/2020 11:37 AM View: Appendix III

Grand Haven BLP Client: Golder Associates Data: DT-Grand Haven BLP

Exceeds Limit: MW-3, MW-4, MW-2, MW-5, MW-6

Prediction Limit

Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.05 alpha level. Limit is highest of 9 background values. Report alpha = 0.4. Individual comparison alpha = 0.08161. Most recent point for each compliance well compared to limit. Insufficient data to test for seasonality; data will not be deseasonalized.

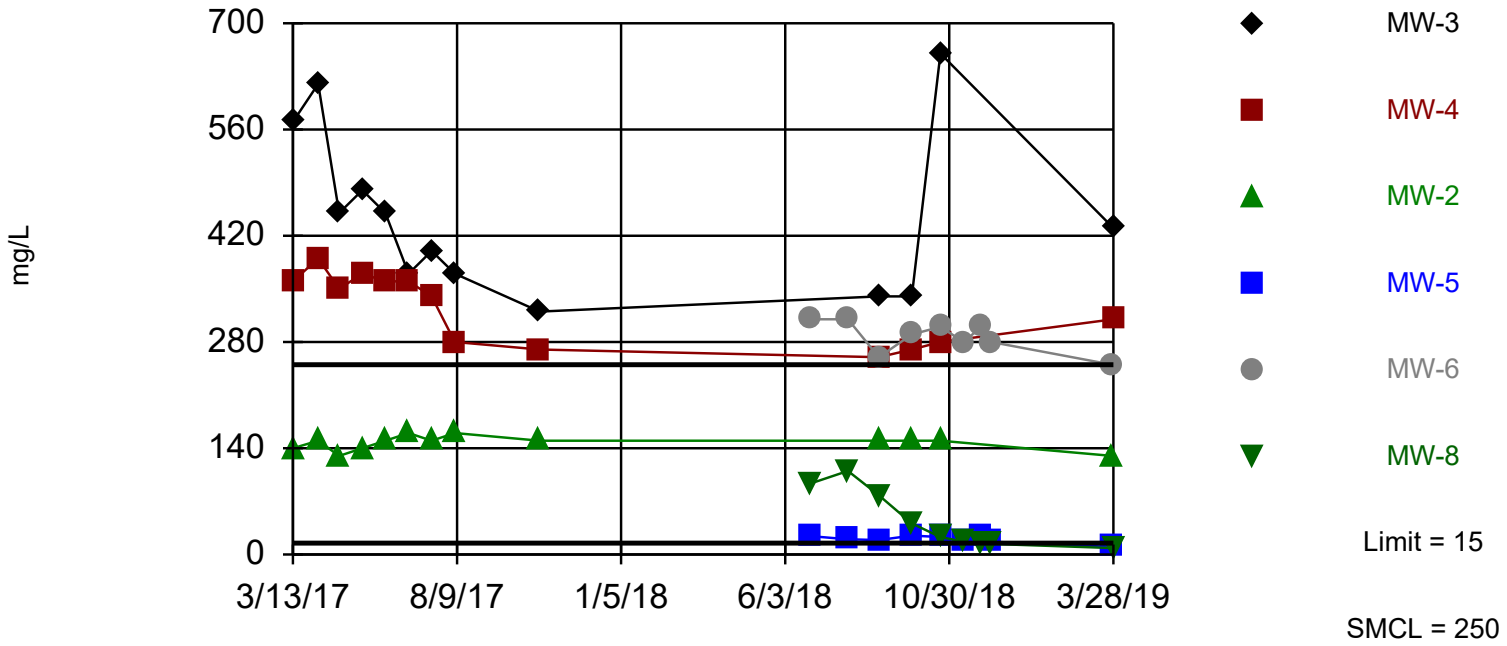
Constituent: Calcium Analysis Run 1/29/2020 11:37 AM View: Appendix III

Grand Haven BLP Client: Golder Associates Data: DT-Grand Haven BLP

Exceeds Limit: MW-3, MW-4, MW-2, MW-6

Prediction Limit

Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.05 alpha level. Limit is highest of 9 background values. Report alpha = 0.4. Individual comparison alpha = 0.08161. Most recent point for each compliance well compared to limit. Insufficient data to test for seasonality; data will not be deseasonalized.

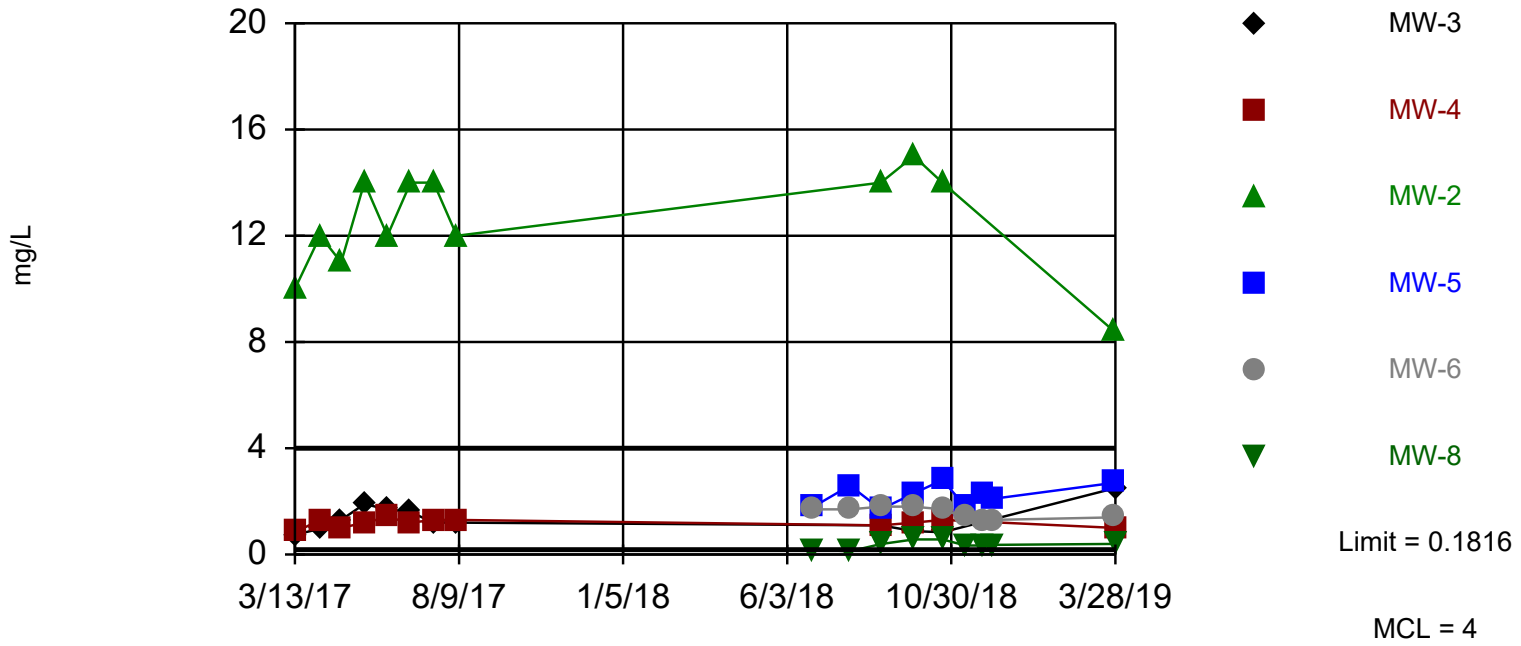
Constituent: Chloride Analysis Run 1/29/2020 11:37 AM View: Appendix III

Grand Haven BLP Client: Golder Associates Data: DT-Grand Haven BLP

Exceeds Limit: MW-3, MW-4, MW-2, MW-5, MW-6, MW-8

Prediction Limit

Interwell Parametric



Background Data Summary (after Cohen`s Adjustment): Mean=0.09205, Std. Dev.=0.04408, n=9, 22.22% NDs. Insufficient data to test for seasonality; not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9385, critical = 0.829. Report alpha = 0.2414. Individual comparison alpha = 0.045. Most recent point for each compliance well compared to limit.

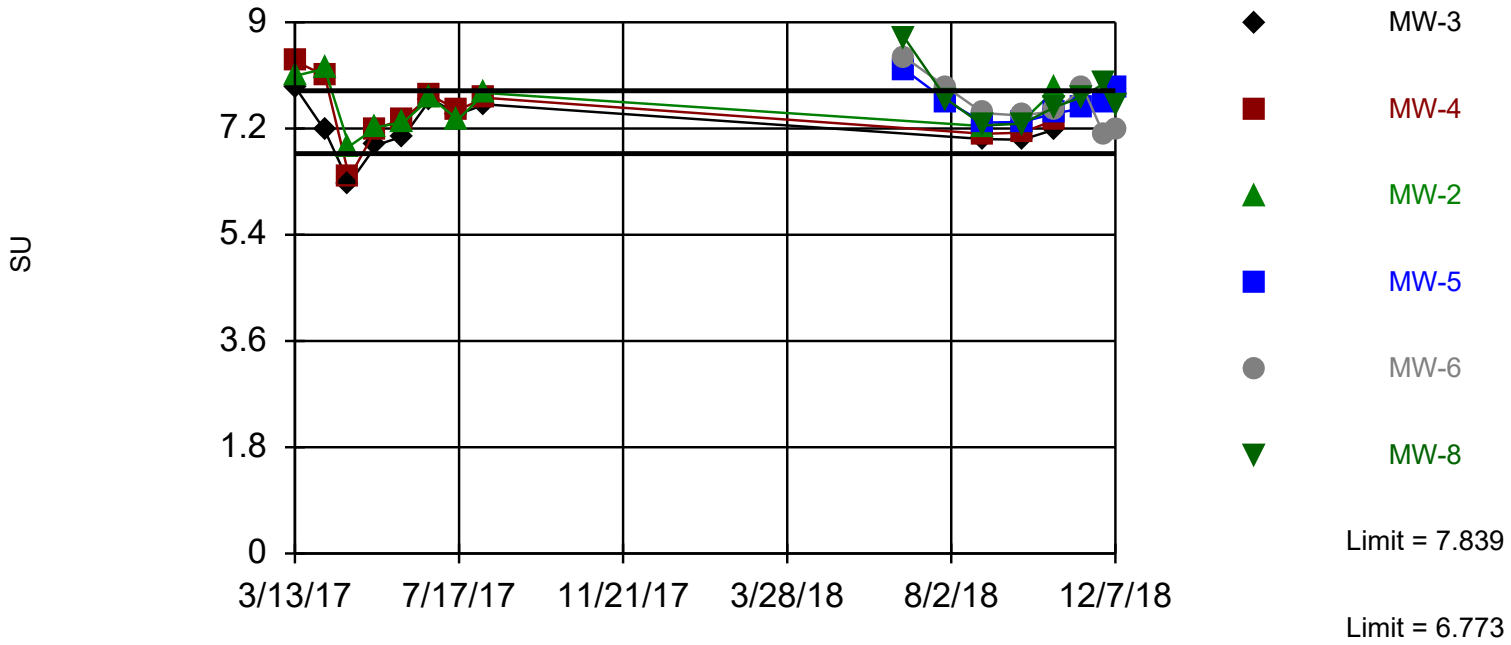
Constituent: Fluoride Analysis Run 1/29/2020 11:37 AM View: Appendix III

Grand Haven BLP Client: Golder Associates Data: DT-Grand Haven BLP

Exceeds Limits: MW-2, MW-5

Prediction Limit

Interwell Parametric



Background Data Summary: Mean=7.306, Std. Dev.=0.2063, n=8. Insufficient data to test for seasonality; not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9782, critical = 0.818. Report alpha = 0.2414. Individual comparison alpha = 0.0225. Most recent point for each compliance well compared to limit.

Constituent: pH Analysis Run 1/29/2020 11:37 AM View: Appendix III

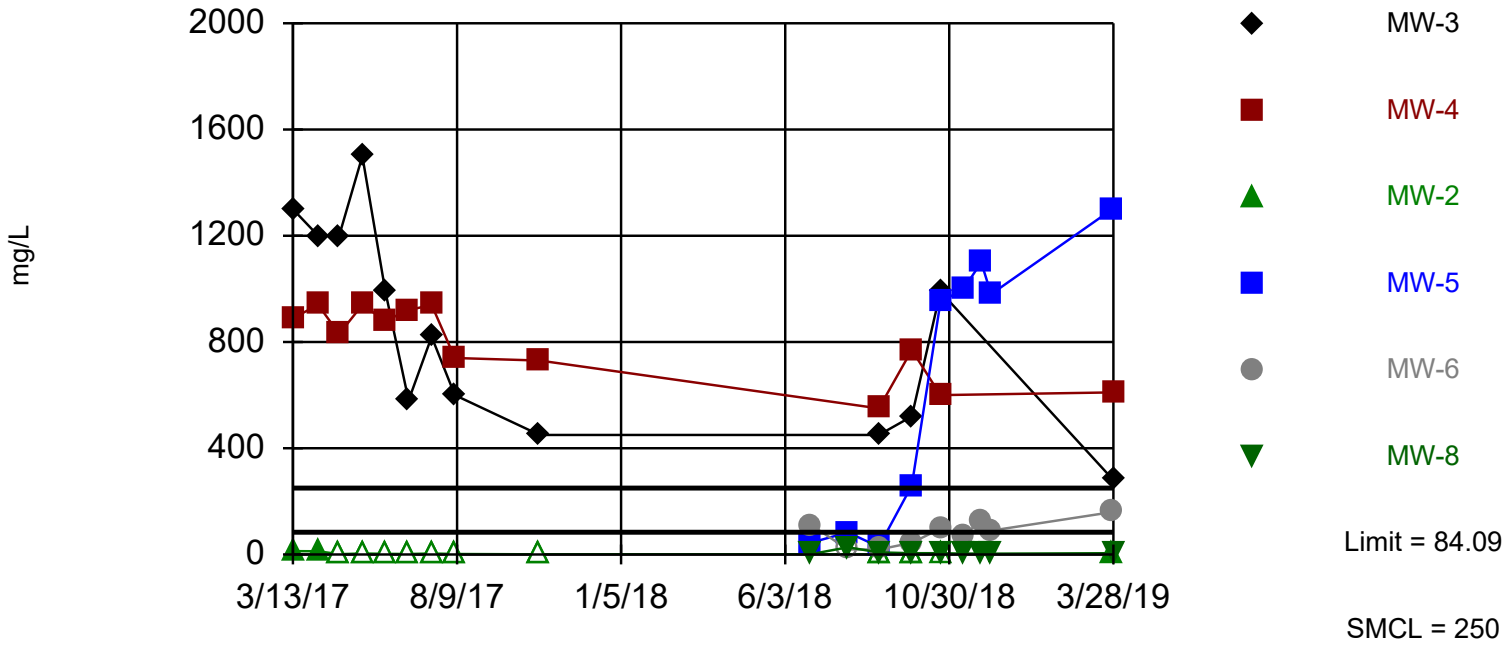
Grand Haven BLP Client: Golder Associates Data: DT-Grand Haven BLP

Sanitas™ v.9.6.25 For the statistical analyses of ground water by Golder Associates only. EPA
Hollow symbols indicate censored values.

Exceeds Limit: MW-3, MW-4, MW-5, MW-6

Prediction Limit

Interwell Parametric



Background Data Summary: Mean=48.22, Std. Dev.=17.65, n=9. Insufficient data to test for seasonality; not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.84, critical = 0.829. Report alpha = 0.2414. Individual comparison alpha = 0.045. Most recent point for each compliance well compared to limit.

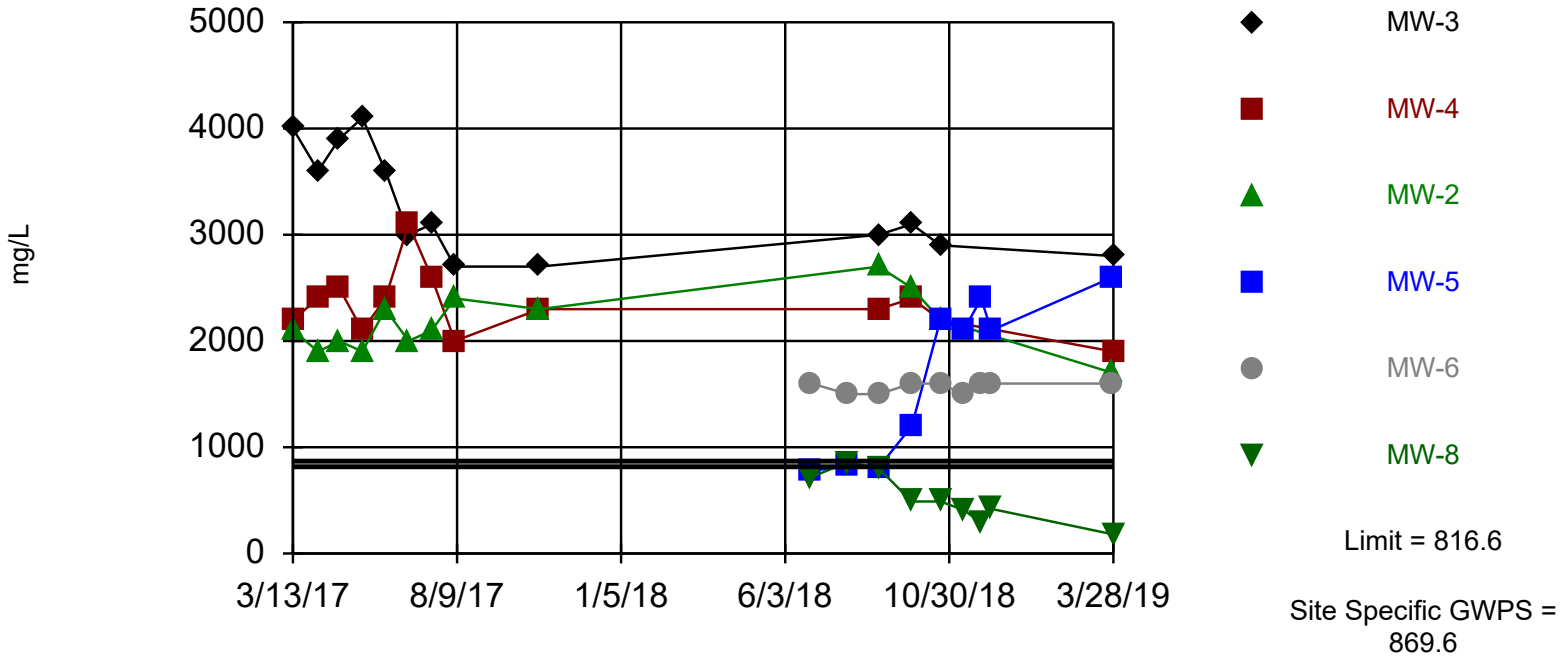
Constituent: Sulfate Analysis Run 1/29/2020 11:37 AM View: Appendix III

Grand Haven BLP Client: Golder Associates Data: DT-Grand Haven BLP

Exceeds Limit: MW-3, MW-4, MW-2, MW-5, MW-6

Prediction Limit

Interwell Parametric



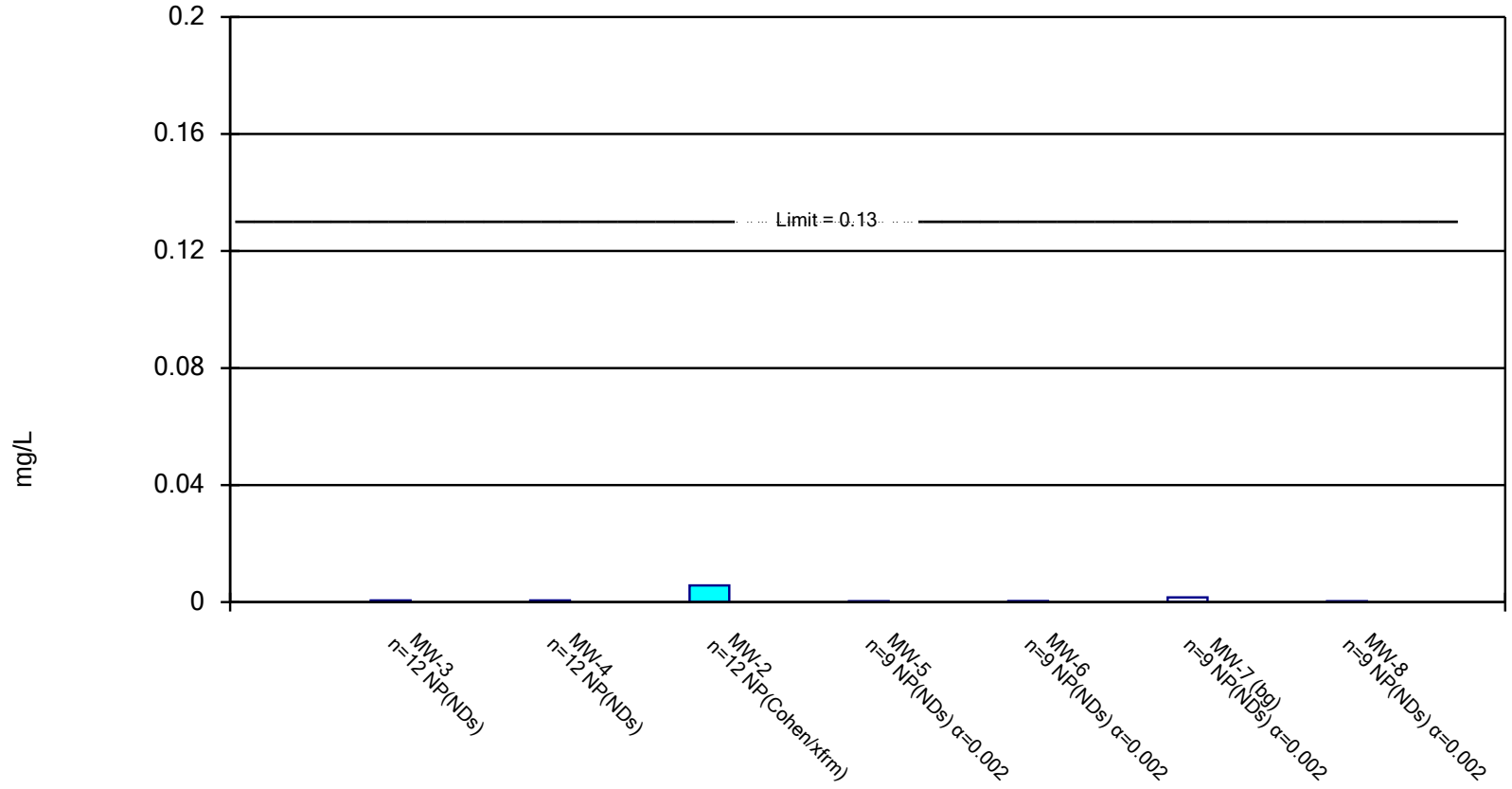
Background Data Summary: Mean=708.9, Std. Dev.=53.02, n=9. Insufficient data to test for seasonality; not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9648, critical = 0.829. Report alpha = 0.2414. Individual comparison alpha = 0.045. Most recent point for each compliance well compared to limit.

Constituent: Total Dissolved Solids Analysis Run 1/29/2020 11:37 AM View: Appendix III

Grand Haven BLP Client: Golder Associates Data: DT-Grand Haven BLP

Non-Parametric Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted.

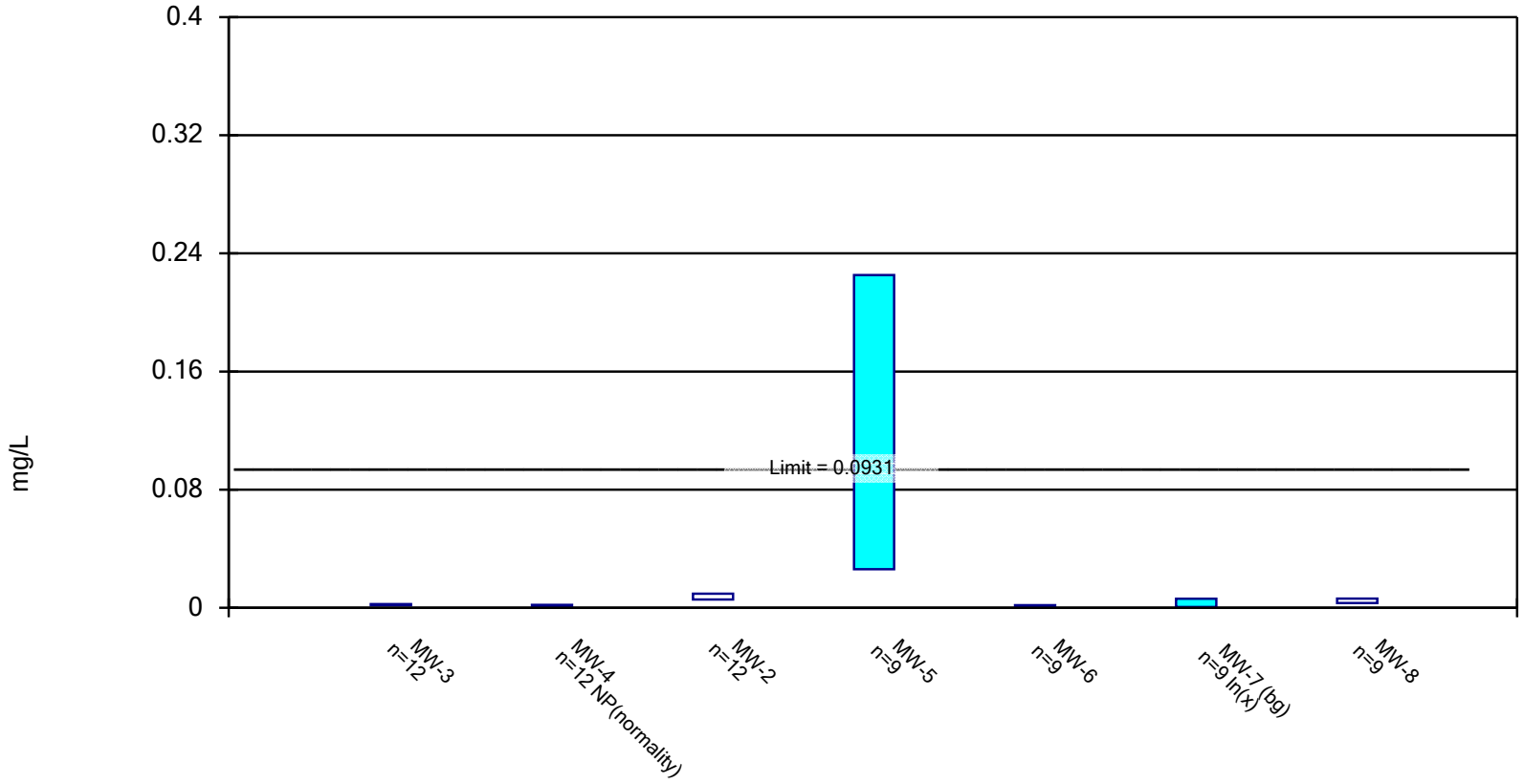


Constituent: Antimony Analysis Run 10/7/2019 2:20 PM View: Appendix IV

Grand Haven BLP Client: Golder Associates Data: DT-Grand Haven BLP

Parametric and Non-Parametric (NP) Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.

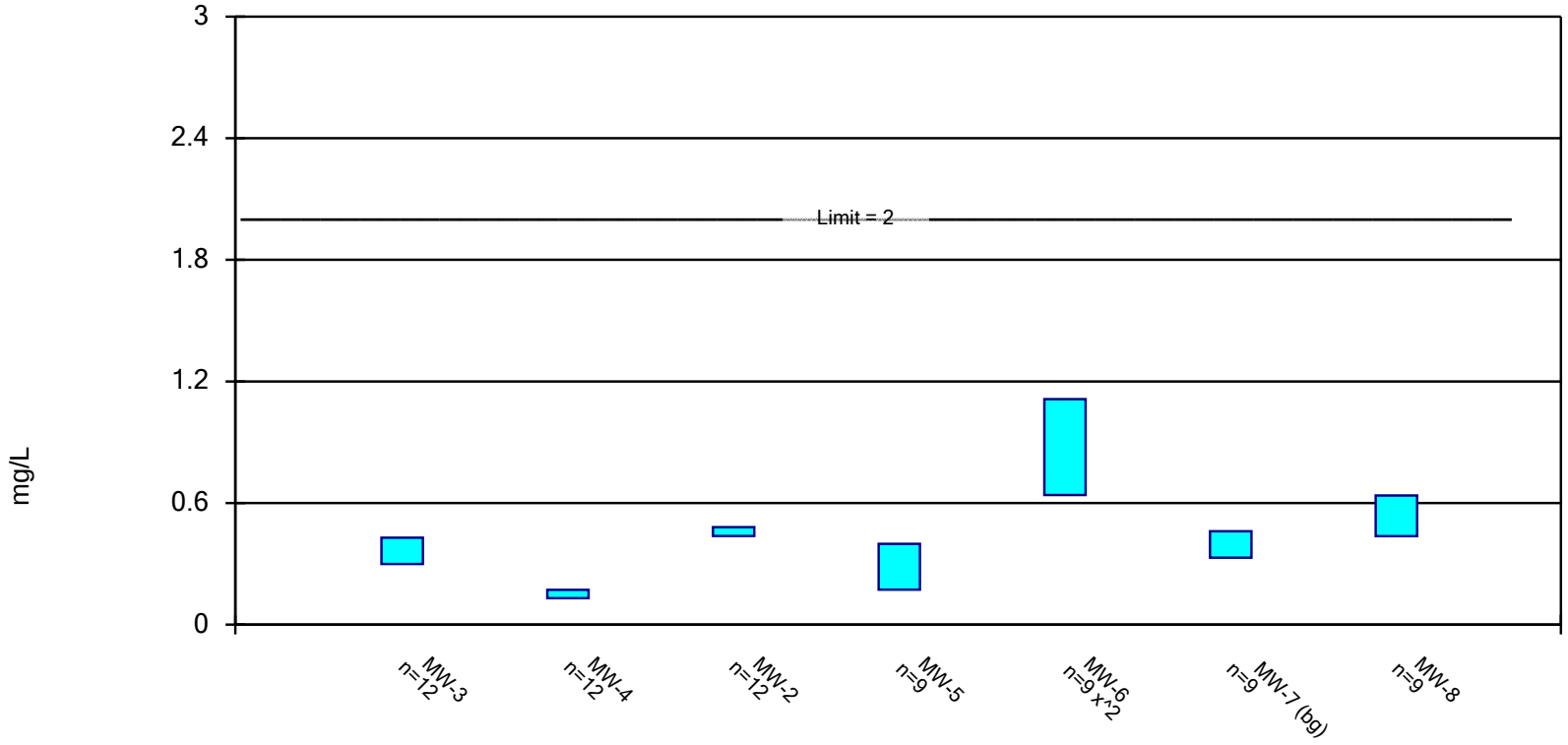


Constituent: Arsenic Analysis Run 10/7/2019 2:20 PM View: Appendix IV

Grand Haven BLP Client: Golder Associates Data: DT-Grand Haven BLP

Parametric Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.

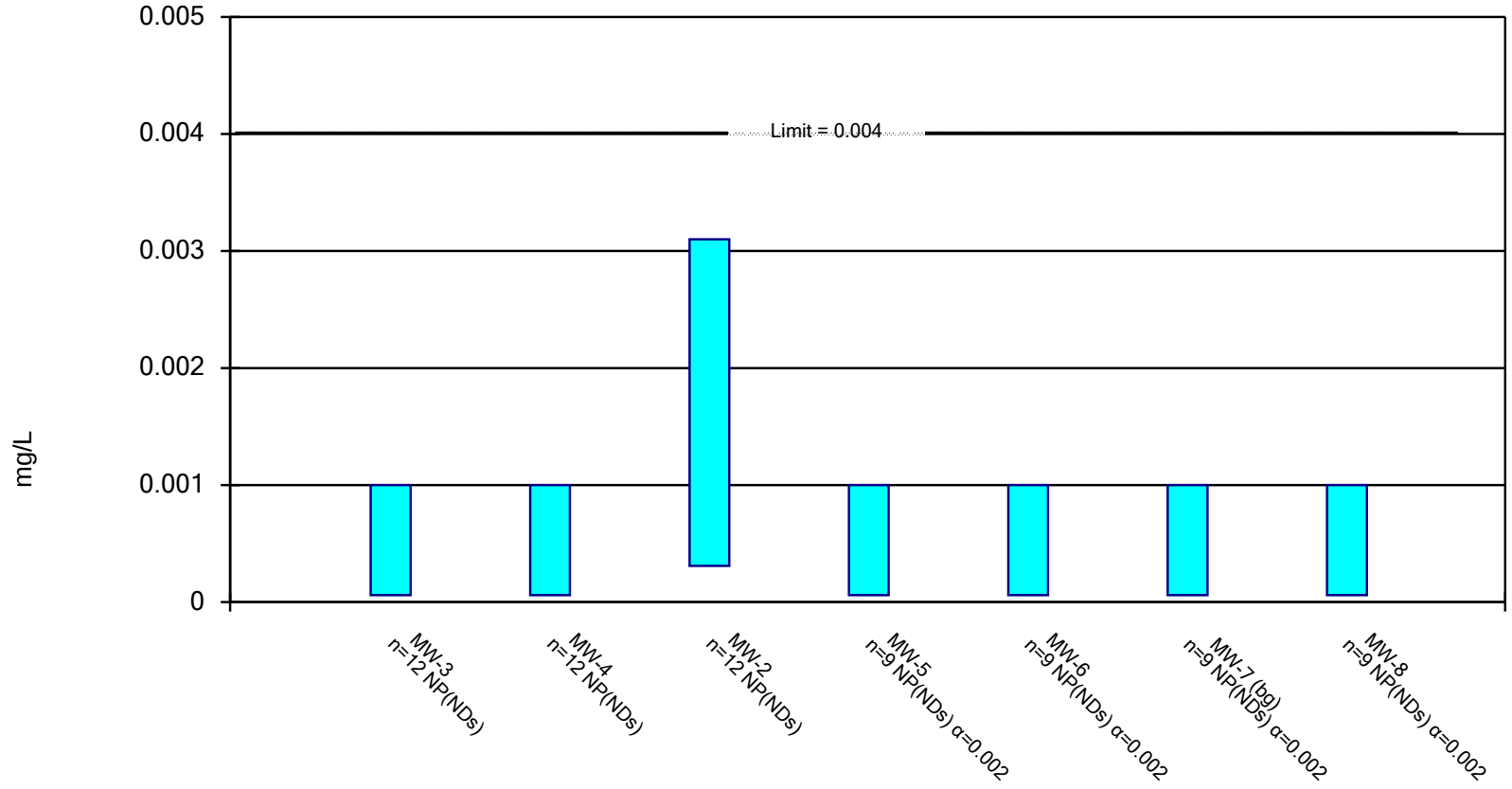


Constituent: Barium Analysis Run 10/7/2019 2:20 PM View: Appendix IV

Grand Haven BLP Client: Golder Associates Data: DT-Grand Haven BLP

Non-Parametric Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted.

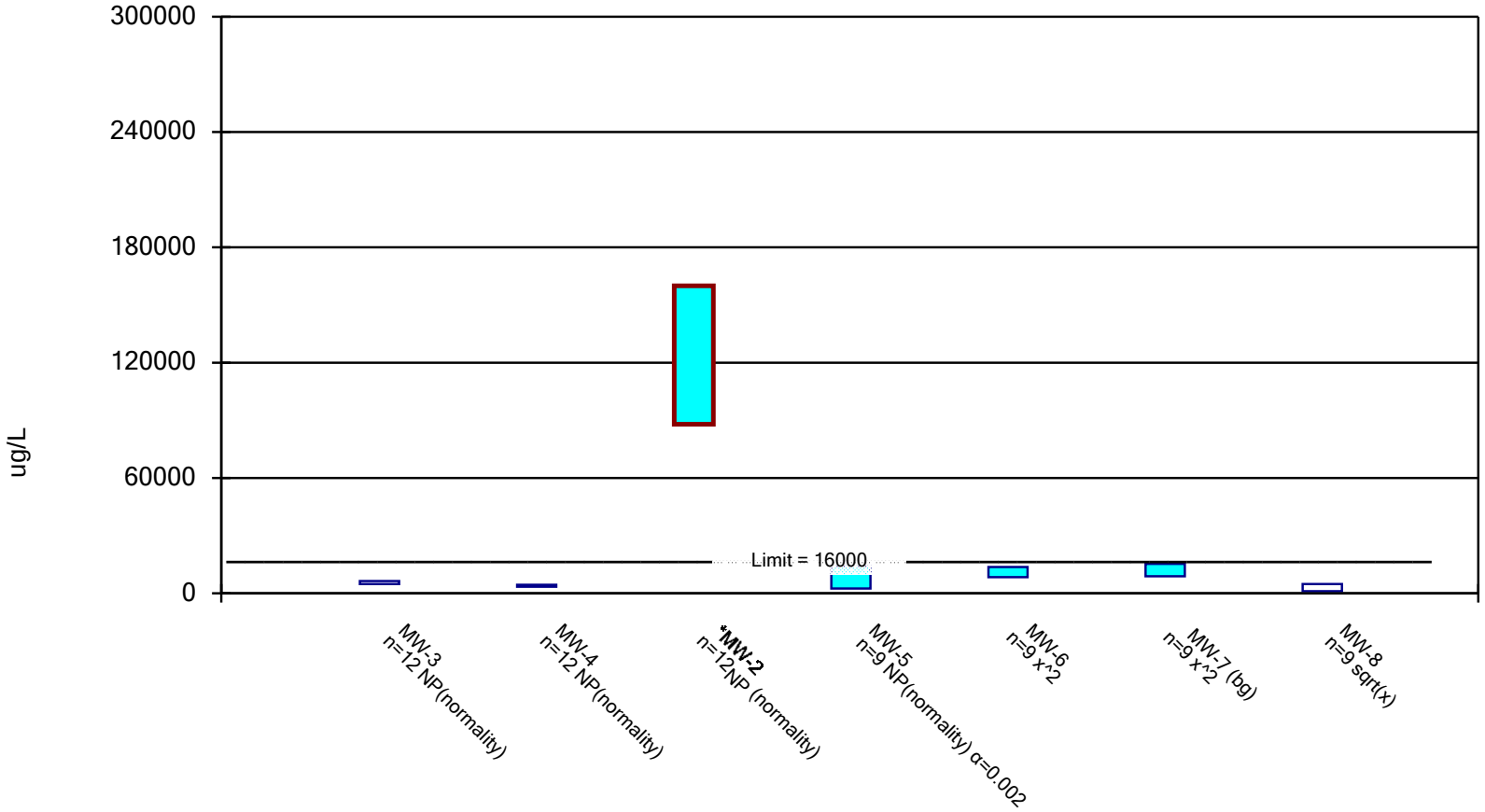


Constituent: Beryllium Analysis Run 10/7/2019 2:20 PM View: Appendix IV

Grand Haven BLP Client: Golder Associates Data: DT-Grand Haven BLP

Parametric and Non-Parametric (NP) Confidence Interval

Compliance limit is exceeded.* Per-well alpha = 0.01 except as noted. Normality Test: Shapiro Wilk, alpha based on n.

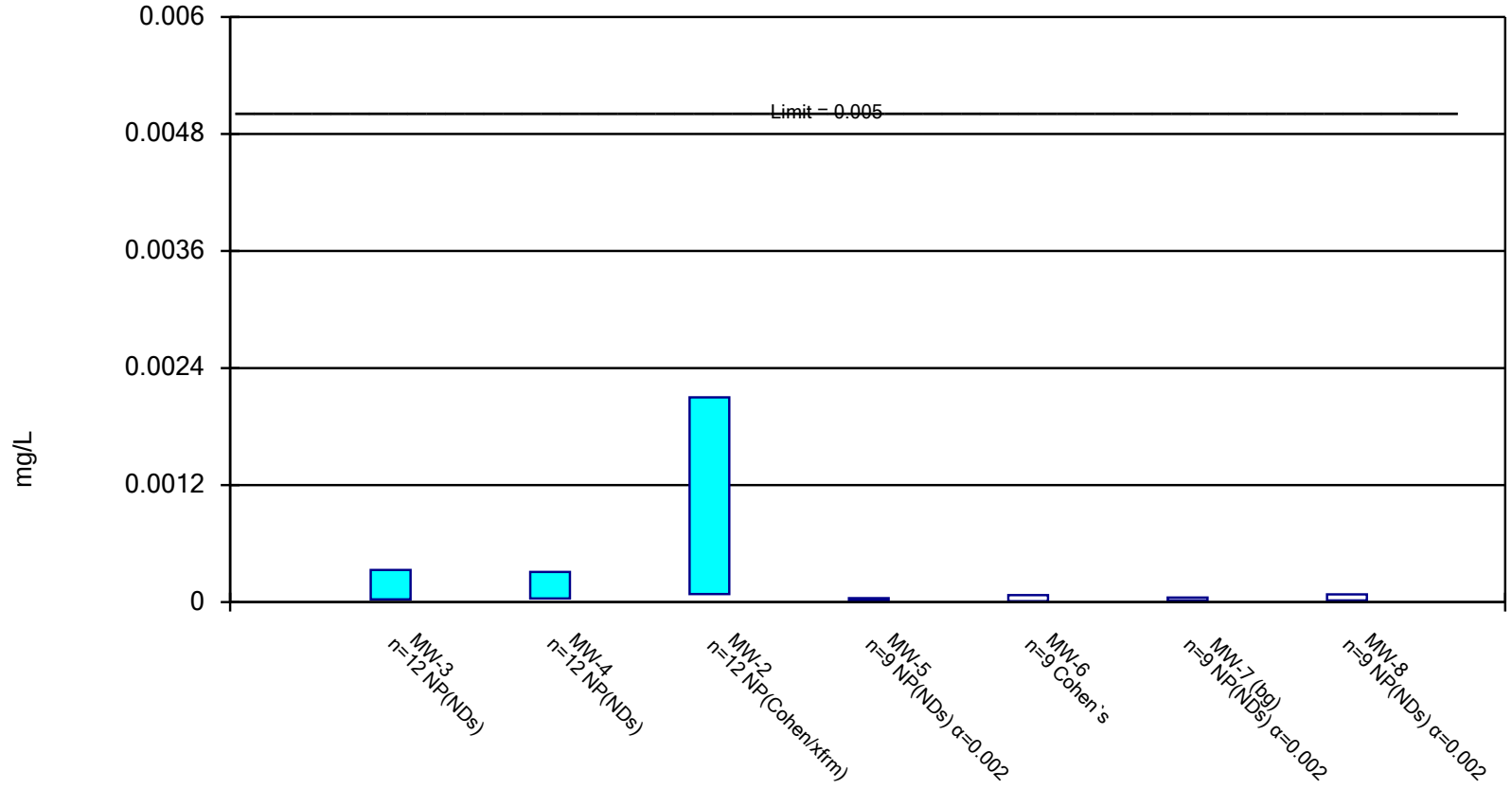


Constituent: Boron Analysis Run 10/7/2019 2:20 PM View: Appendix IV

Grand Haven BLP Client: Golder Associates Data: DT-Grand Haven BLP

Parametric and Non-Parametric (NP) Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted. Normality Test: Shapiro Wilk, alpha based on n.

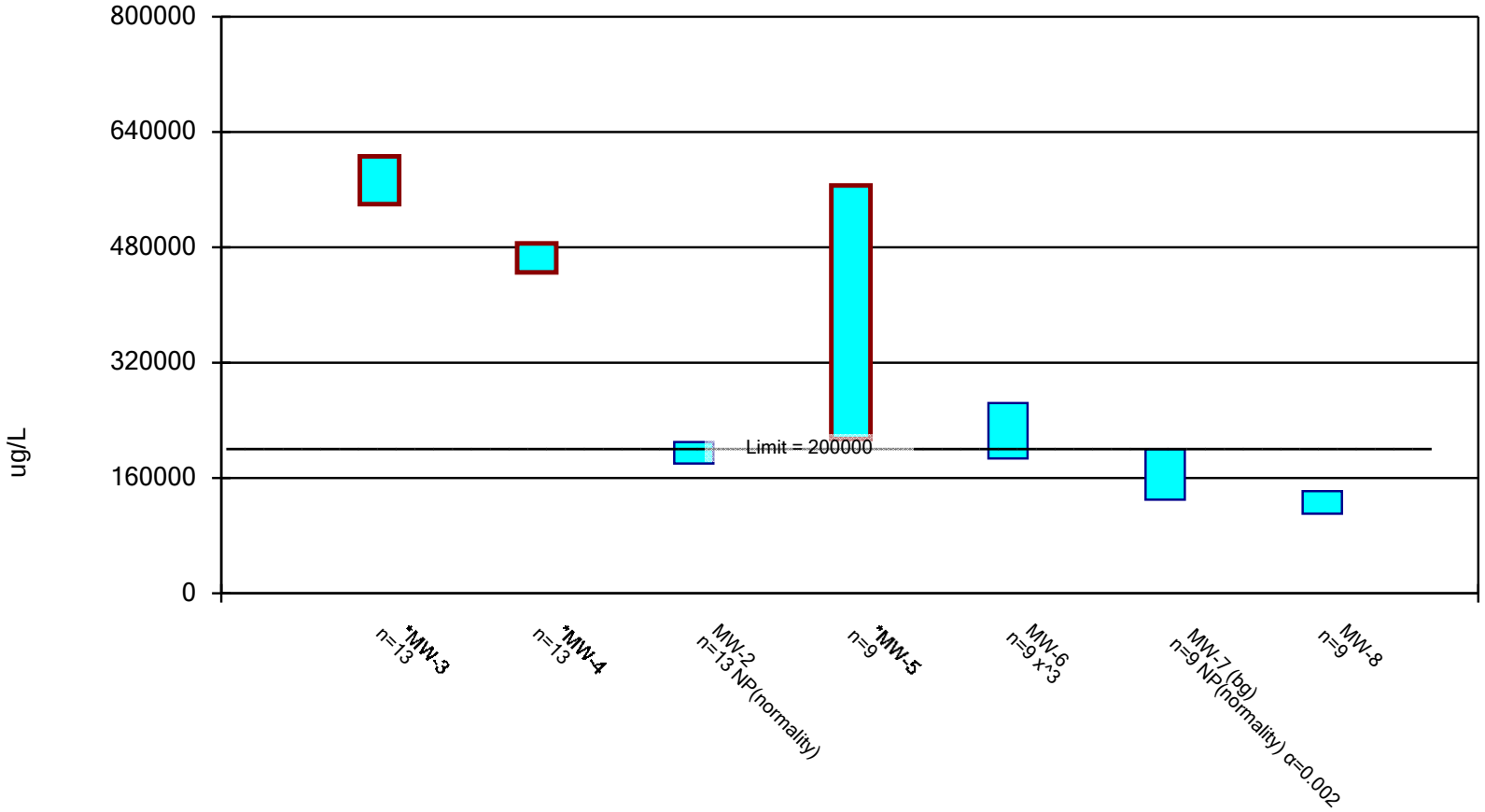


Constituent: Cadmium Analysis Run 10/7/2019 2:20 PM View: Appendix IV

Grand Haven BLP Client: Golder Associates Data: DT-Grand Haven BLP

Parametric and Non-Parametric (NP) Confidence Interval

Compliance limit is exceeded.* Per-well alpha = 0.01 except as noted. Normality Test: Shapiro Wilk, alpha based on n.

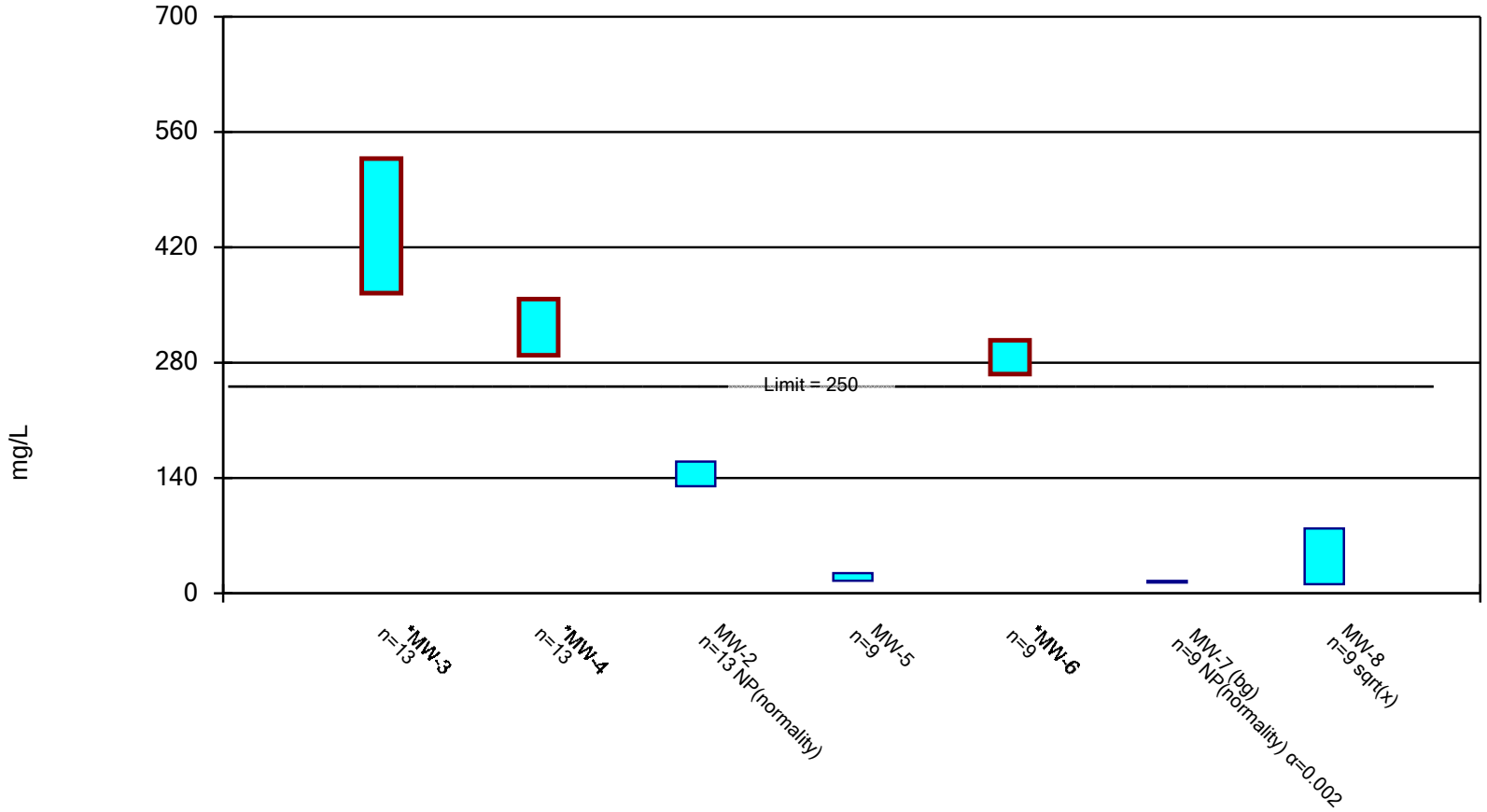


Constituent: Calcium Analysis Run 10/7/2019 2:20 PM View: Appendix IV

Grand Haven BLP Client: Golder Associates Data: DT-Grand Haven BLP

Parametric and Non-Parametric (NP) Confidence Interval

Compliance limit is exceeded.* Per-well alpha = 0.01 except as noted. Normality Test: Shapiro Wilk, alpha based on n.

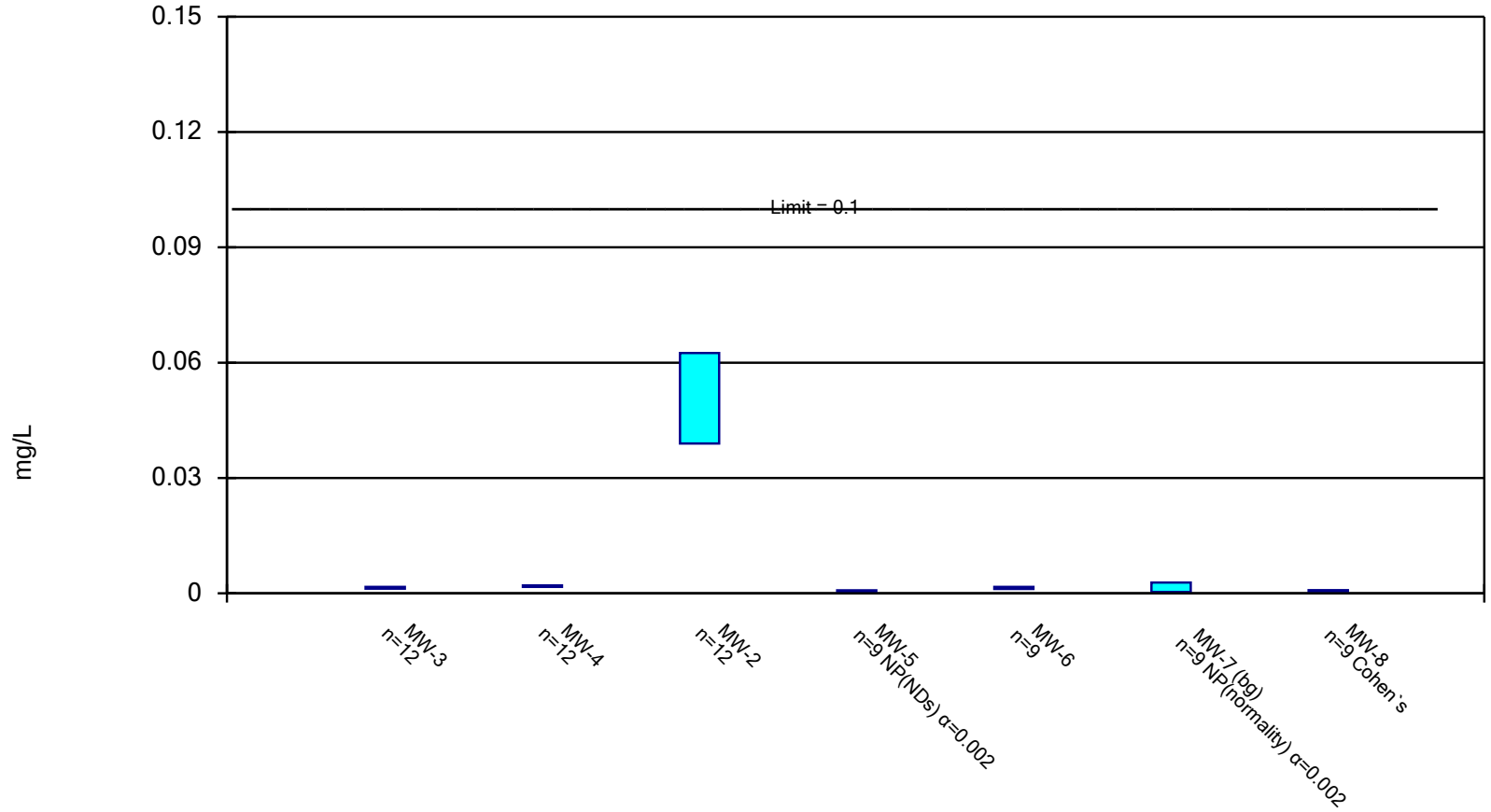


Constituent: Chloride Analysis Run 10/7/2019 2:20 PM View: Appendix IV

Grand Haven BLP Client: Golder Associates Data: DT-Grand Haven BLP

Parametric and Non-Parametric (NP) Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted. Normality Test: Shapiro Wilk, alpha based on n.

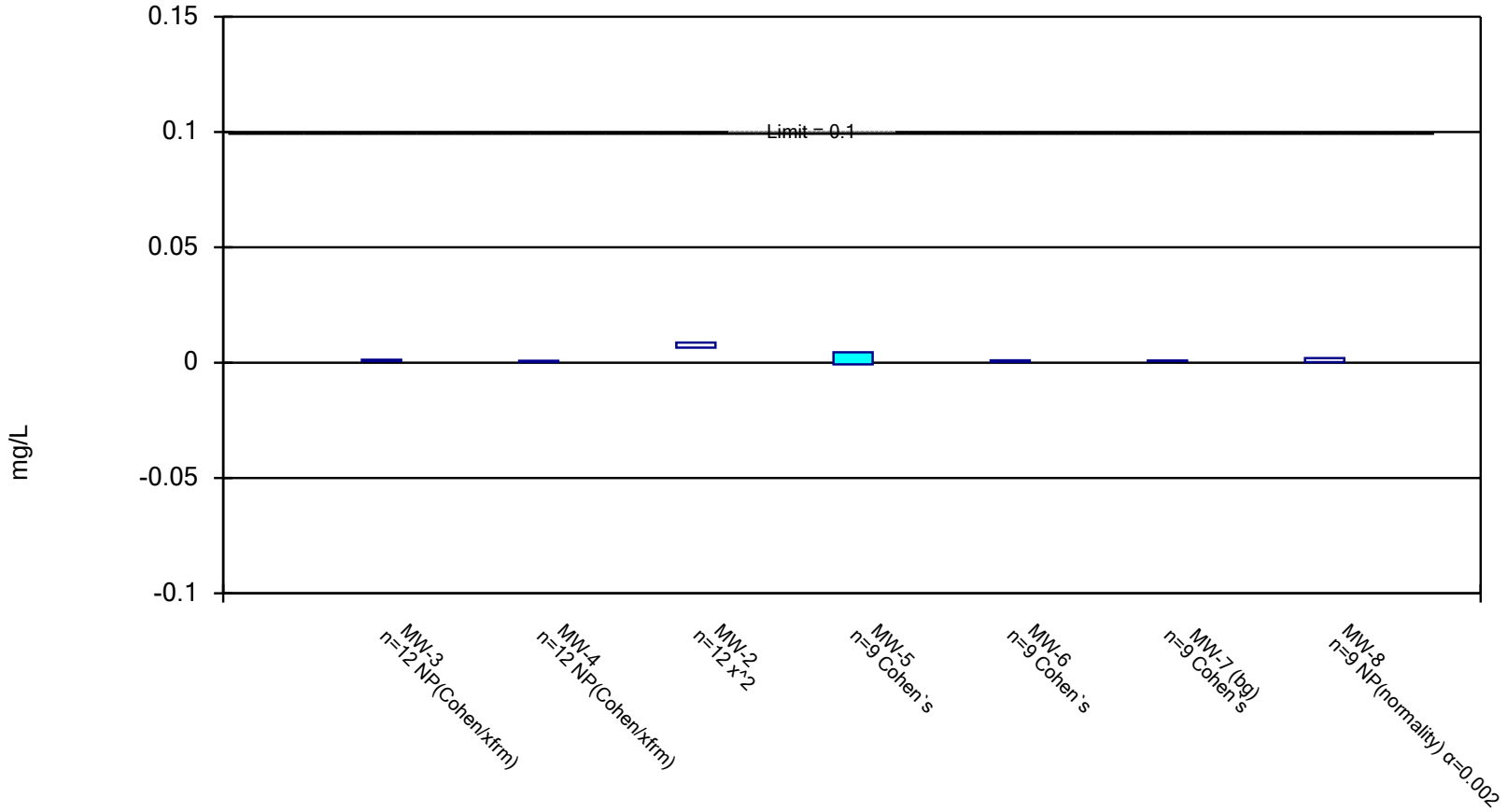


Constituent: Chromium Analysis Run 10/7/2019 2:21 PM View: Appendix IV

Grand Haven BLP Client: Golder Associates Data: DT-Grand Haven BLP

Parametric and Non-Parametric (NP) Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted. Normality Test: Shapiro Wilk, alpha based on n.

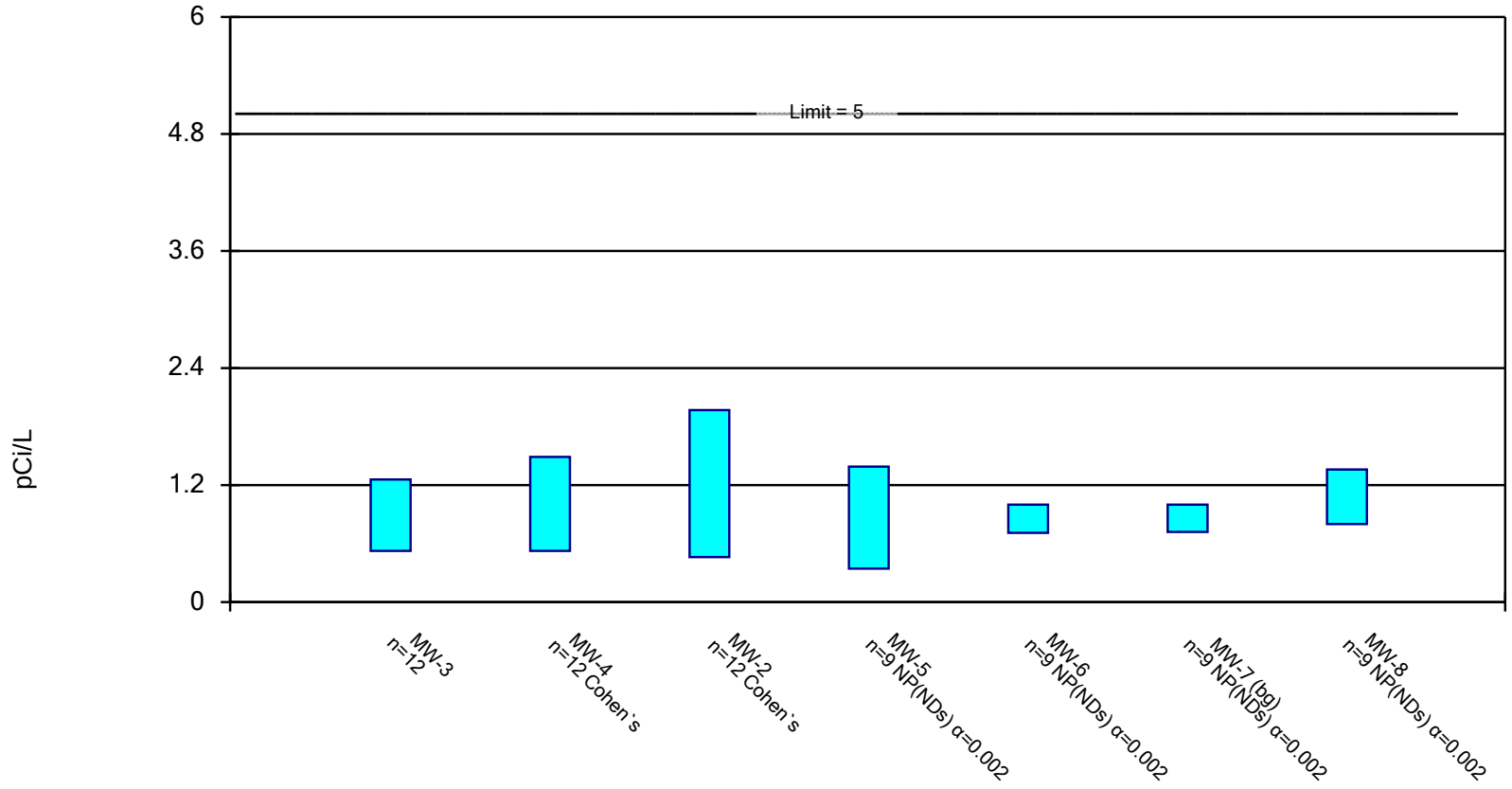


Constituent: Cobalt Analysis Run 10/7/2019 2:21 PM View: Appendix IV

Grand Haven BLP Client: Golder Associates Data: DT-Grand Haven BLP

Parametric and Non-Parametric (NP) Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted. Normality Test: Shapiro Wilk, alpha based on n.

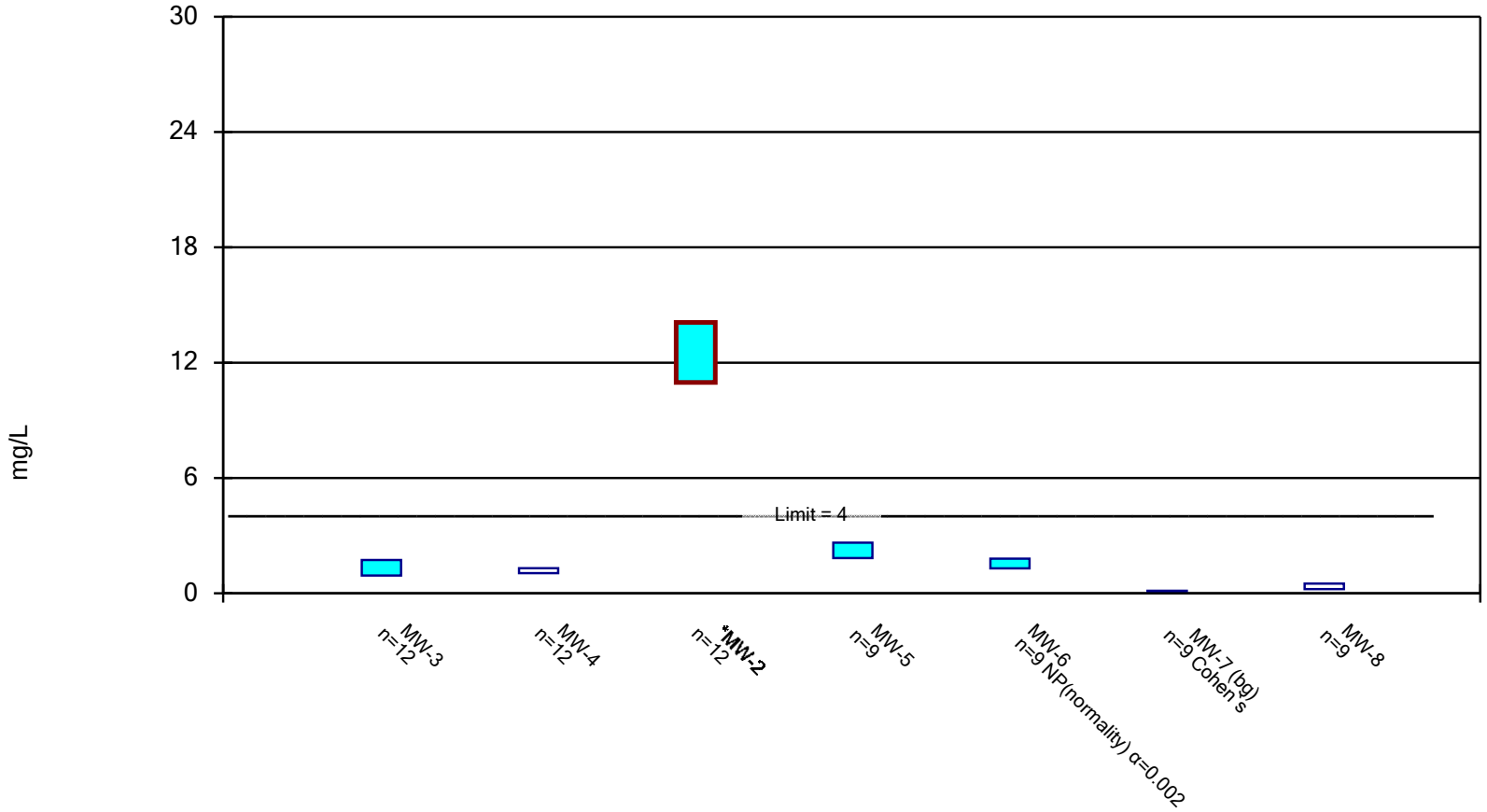


Constituent: Combined Radium 226 + 228 Analysis Run 10/7/2019 2:21 PM View: Appendix IV

Grand Haven BLP Client: Golder Associates Data: DT-Grand Haven BLP

Parametric and Non-Parametric (NP) Confidence Interval

Compliance limit is exceeded.* Per-well alpha = 0.01 except as noted. Normality Test: Shapiro Wilk, alpha based on n.

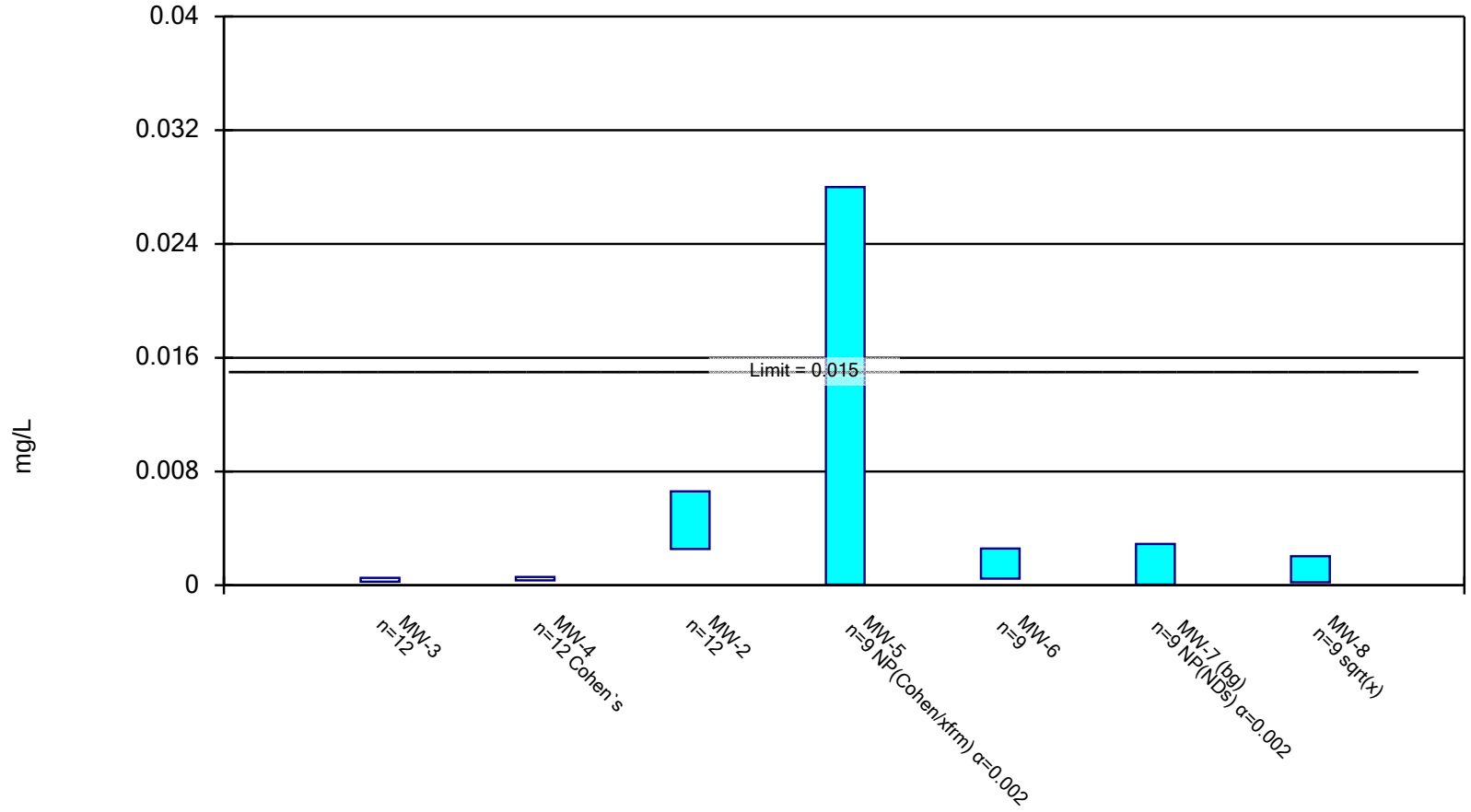


Constituent: Fluoride Analysis Run 10/7/2019 2:21 PM View: Appendix IV

Grand Haven BLP Client: Golder Associates Data: DT-Grand Haven BLP

Parametric and Non-Parametric (NP) Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted. Normality Test: Shapiro Wilk, alpha based on n.

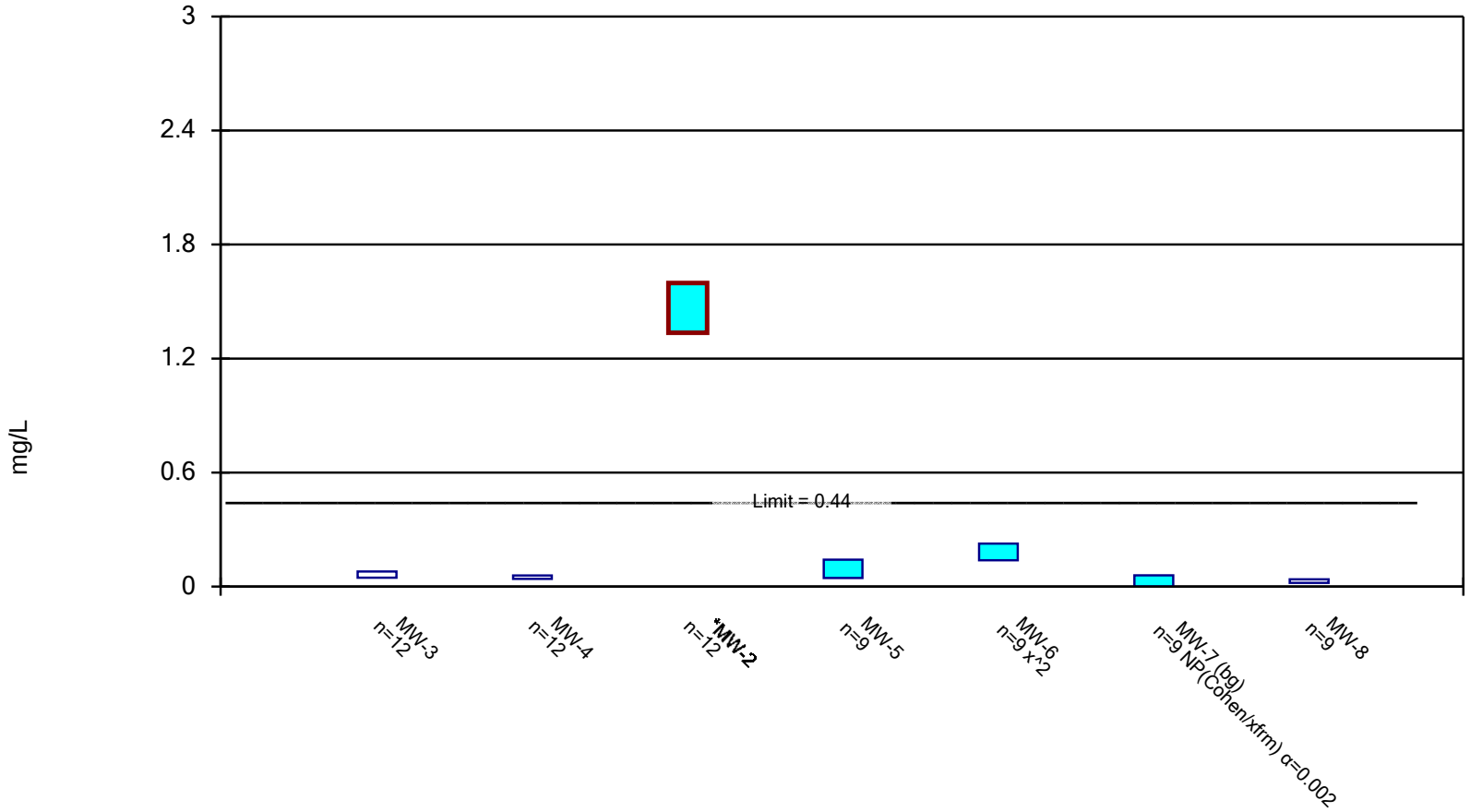


Constituent: Lead Analysis Run 10/7/2019 2:21 PM View: Appendix IV

Grand Haven BLP Client: Golder Associates Data: DT-Grand Haven BLP

Parametric and Non-Parametric (NP) Confidence Interval

Compliance limit is exceeded.* Per-well alpha = 0.01 except as noted. Normality Test: Shapiro Wilk, alpha based on n.

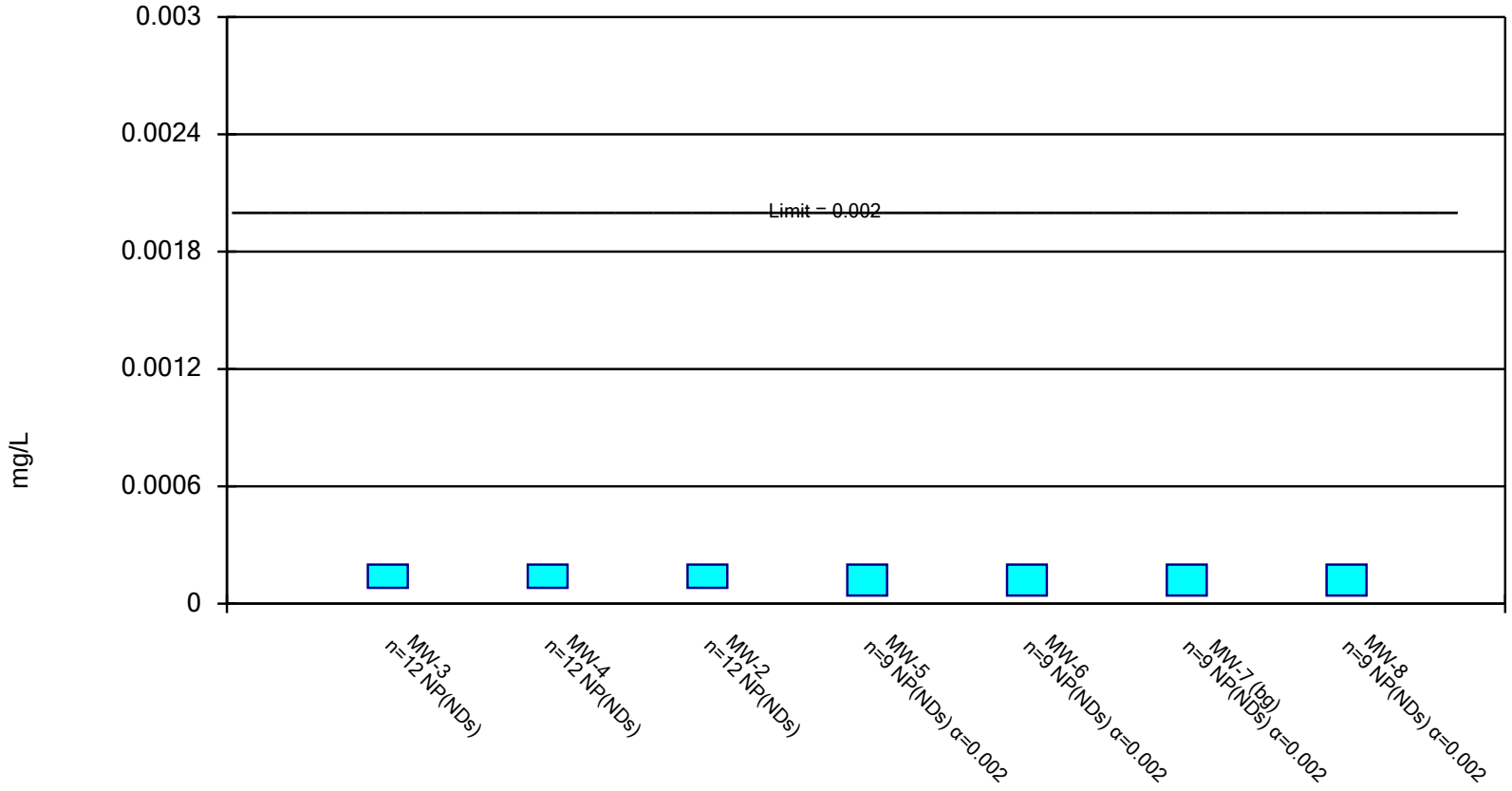


Constituent: Lithium Analysis Run 10/7/2019 2:21 PM View: Appendix IV

Grand Haven BLP Client: Golder Associates Data: DT-Grand Haven BLP

Non-Parametric Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted.

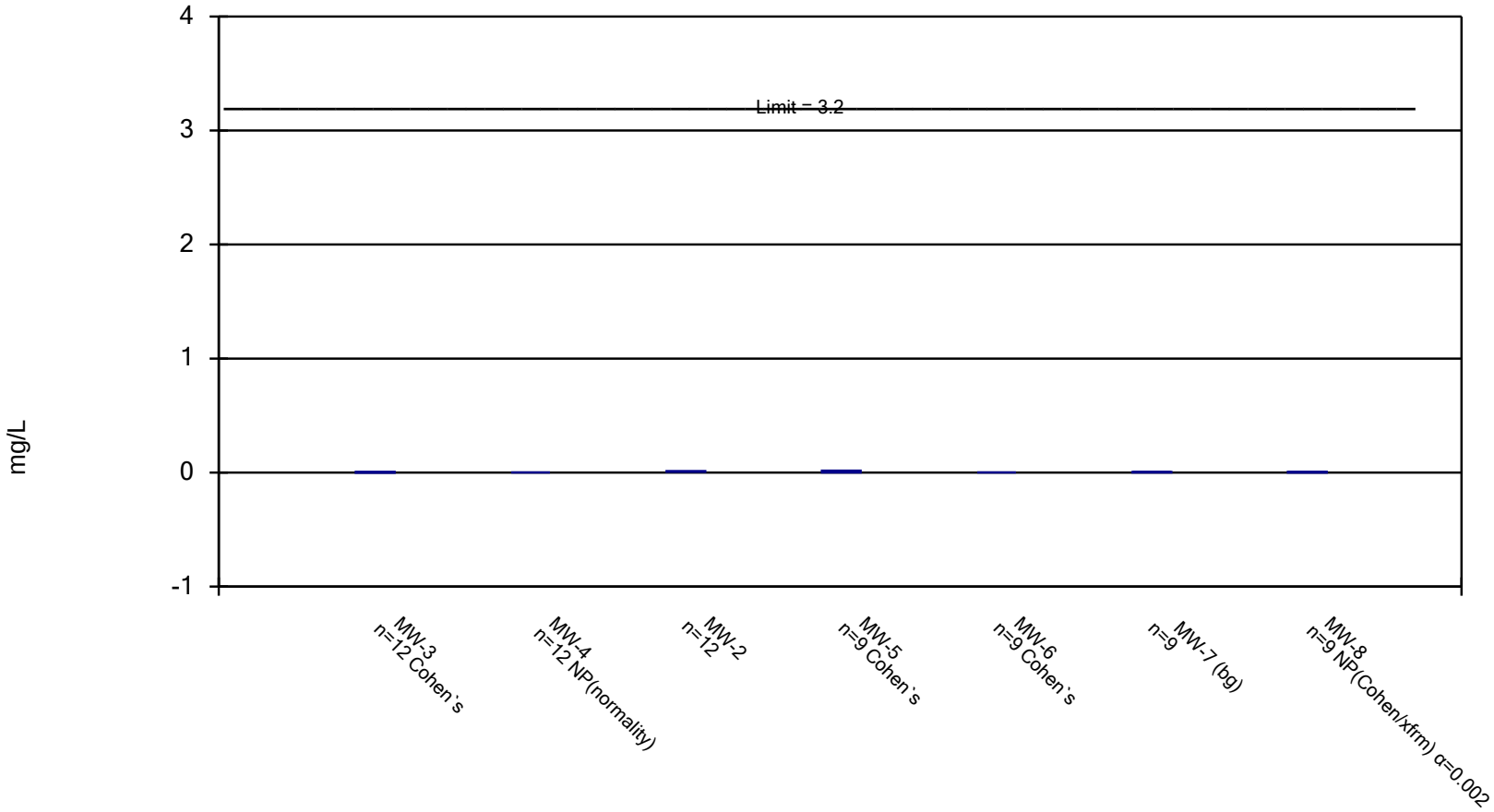


Constituent: Mercury Analysis Run 10/7/2019 2:21 PM View: Appendix IV

Grand Haven BLP Client: Golder Associates Data: DT-Grand Haven BLP

Parametric and Non-Parametric (NP) Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted. Normality Test: Shapiro Wilk, alpha based on n.

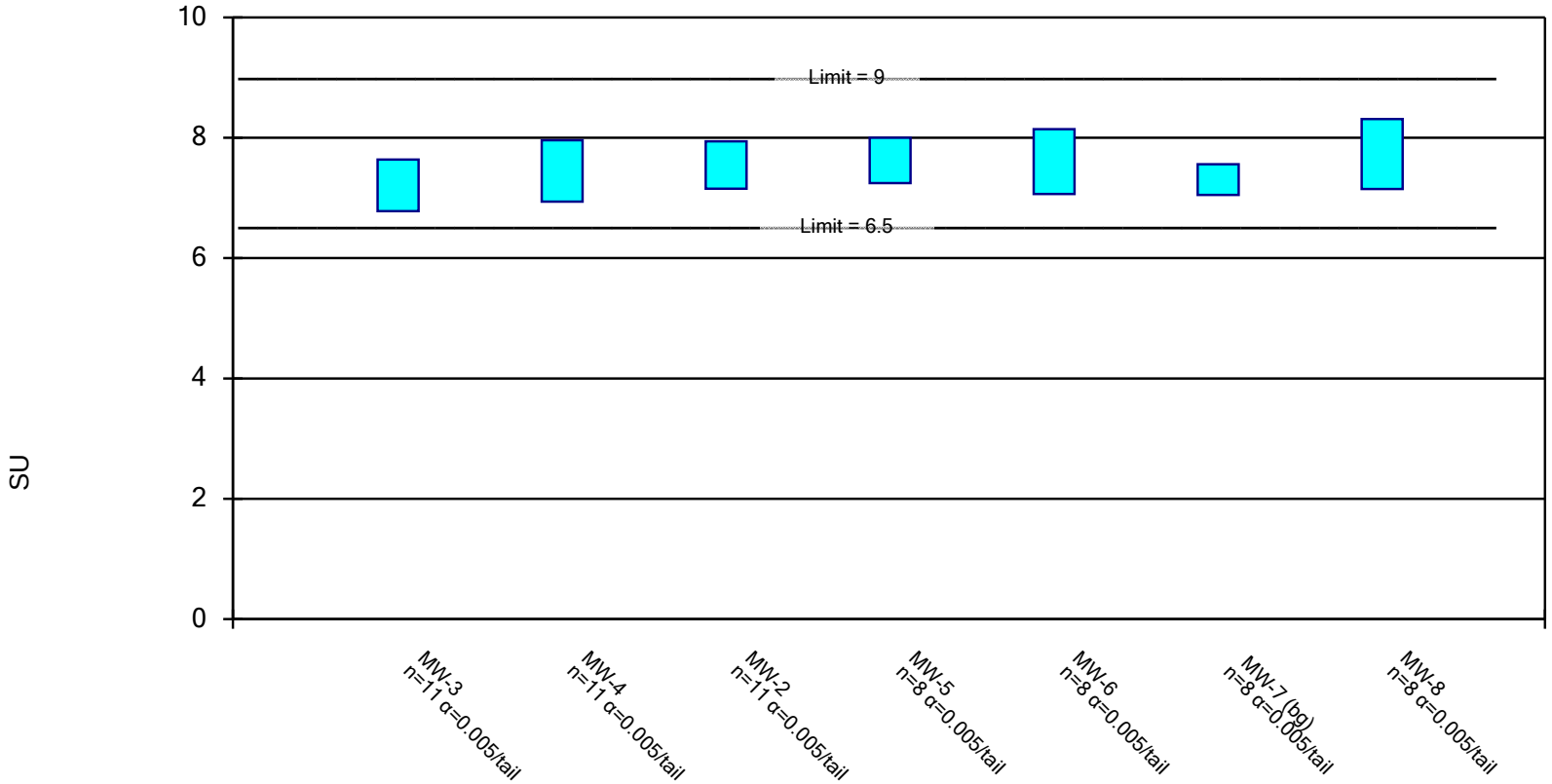


Constituent: Molybdenum Analysis Run 10/7/2019 2:21 PM View: Appendix IV

Grand Haven BLP Client: Golder Associates Data: DT-Grand Haven BLP

Parametric Confidence Interval

Compliance Limit is not exceeded. Normality Test: Shapiro Wilk, alpha based on n.

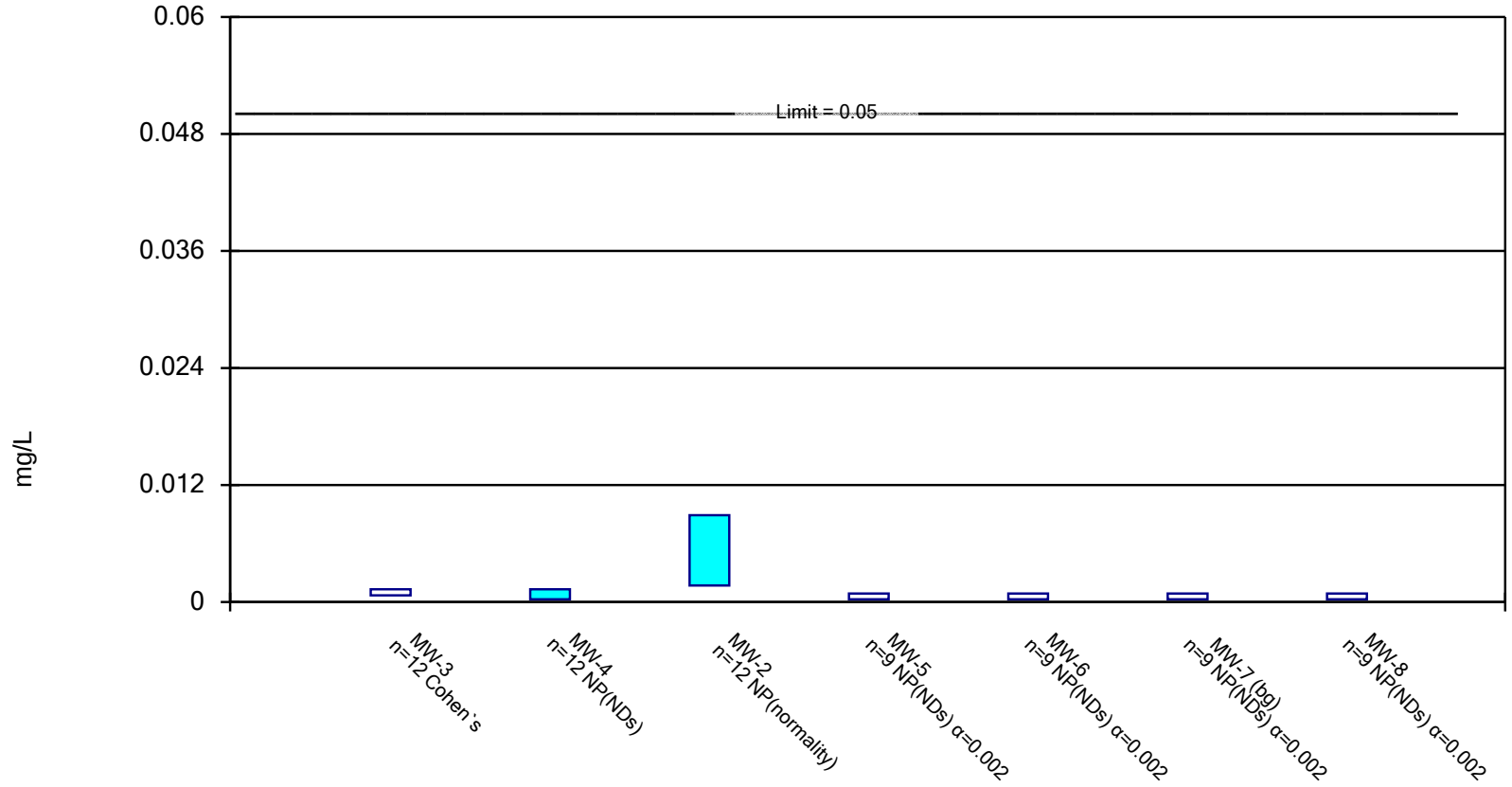


Constituent: pH Analysis Run 10/7/2019 2:21 PM View: Appendix IV

Grand Haven BLP Client: Golder Associates Data: DT-Grand Haven BLP

Parametric and Non-Parametric (NP) Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted. Normality Test: Shapiro Wilk, alpha based on n.

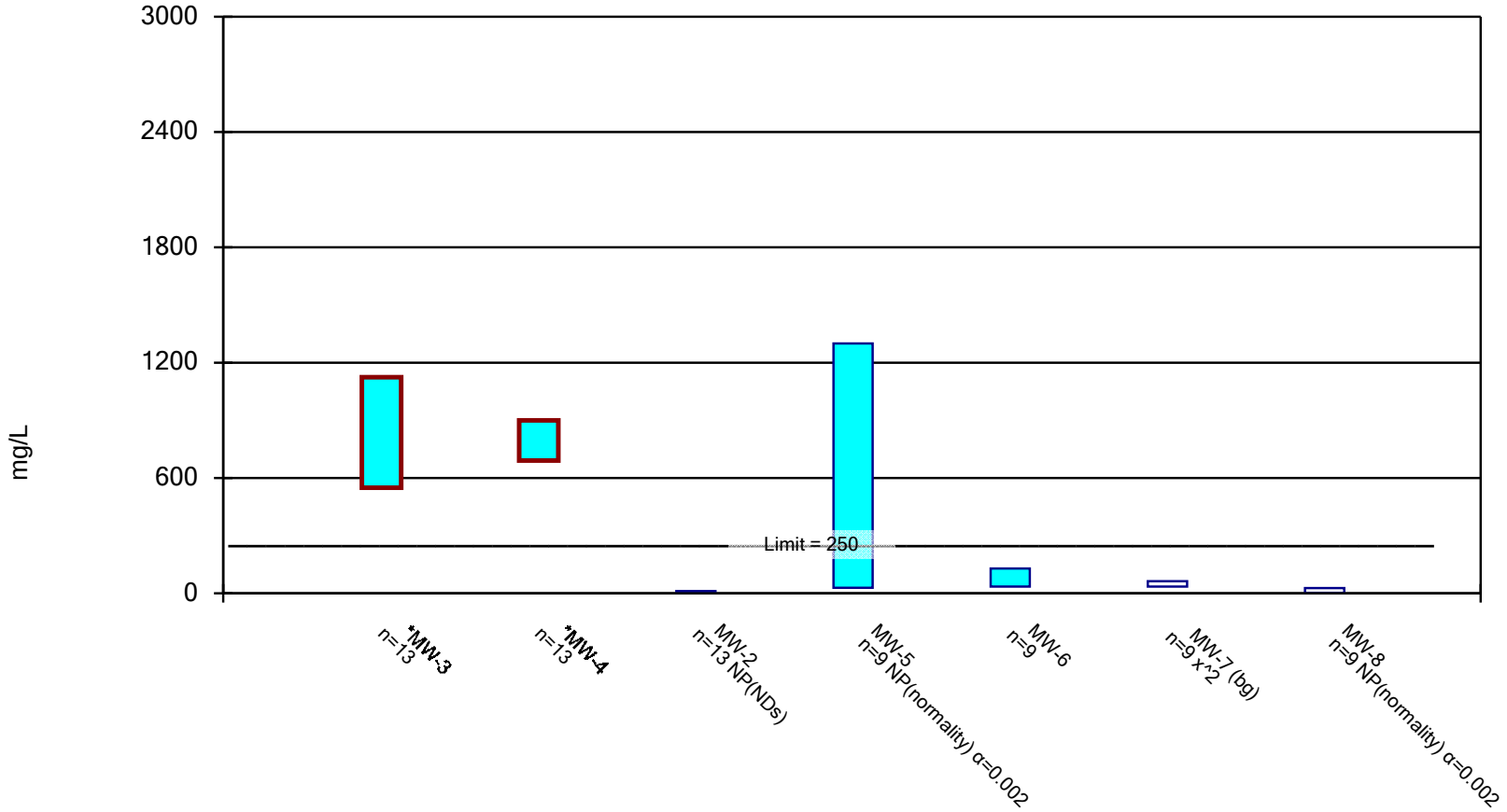


Constituent: Selenium Analysis Run 10/7/2019 2:21 PM View: Appendix IV

Grand Haven BLP Client: Golder Associates Data: DT-Grand Haven BLP

Parametric and Non-Parametric (NP) Confidence Interval

Compliance limit is exceeded.* Per-well alpha = 0.01 except as noted. Normality Test: Shapiro Wilk, alpha based on n.

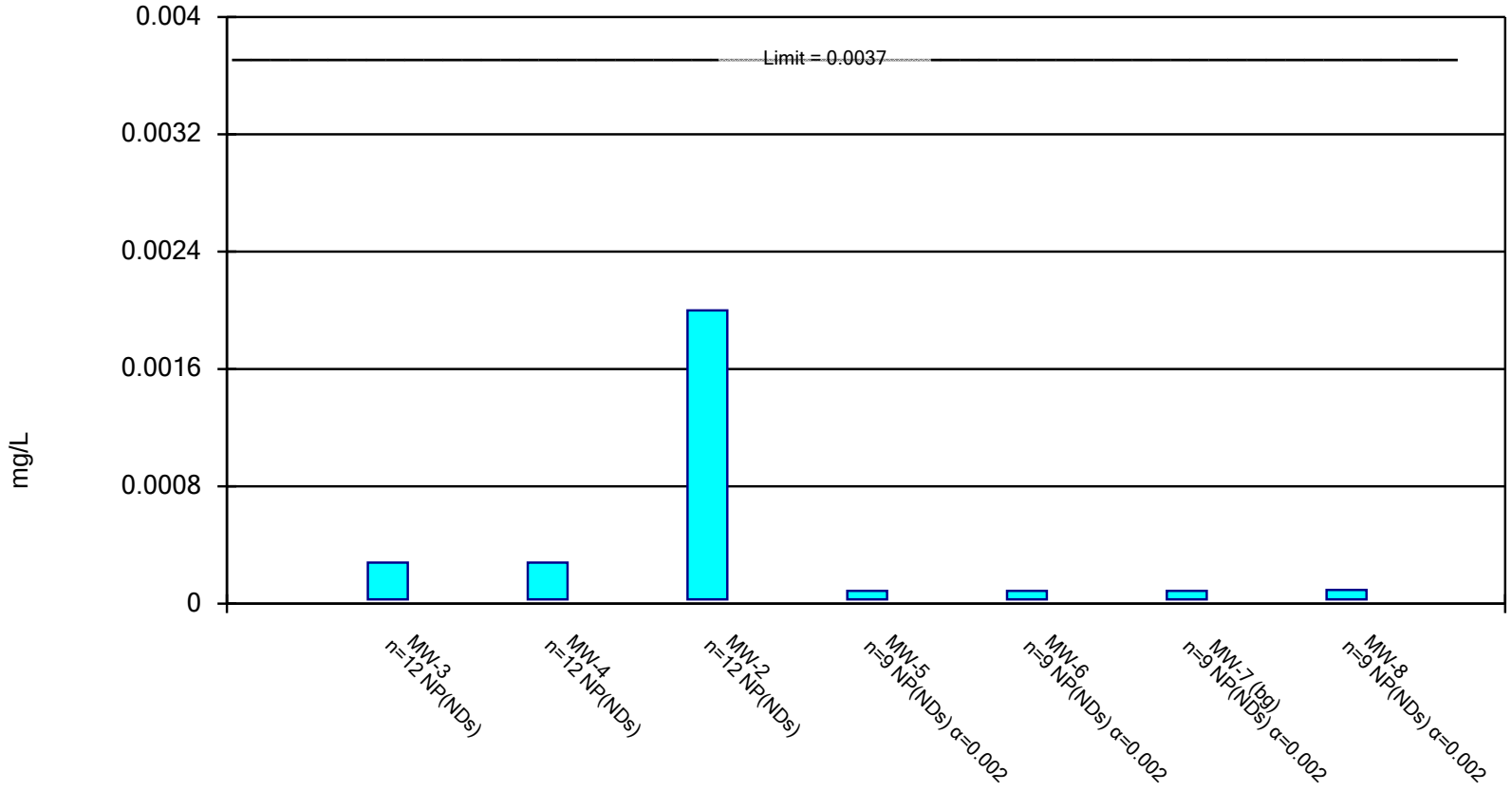


Constituent: Sulfate Analysis Run 10/7/2019 2:21 PM View: Appendix IV

Grand Haven BLP Client: Golder Associates Data: DT-Grand Haven BLP

Non-Parametric Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted.

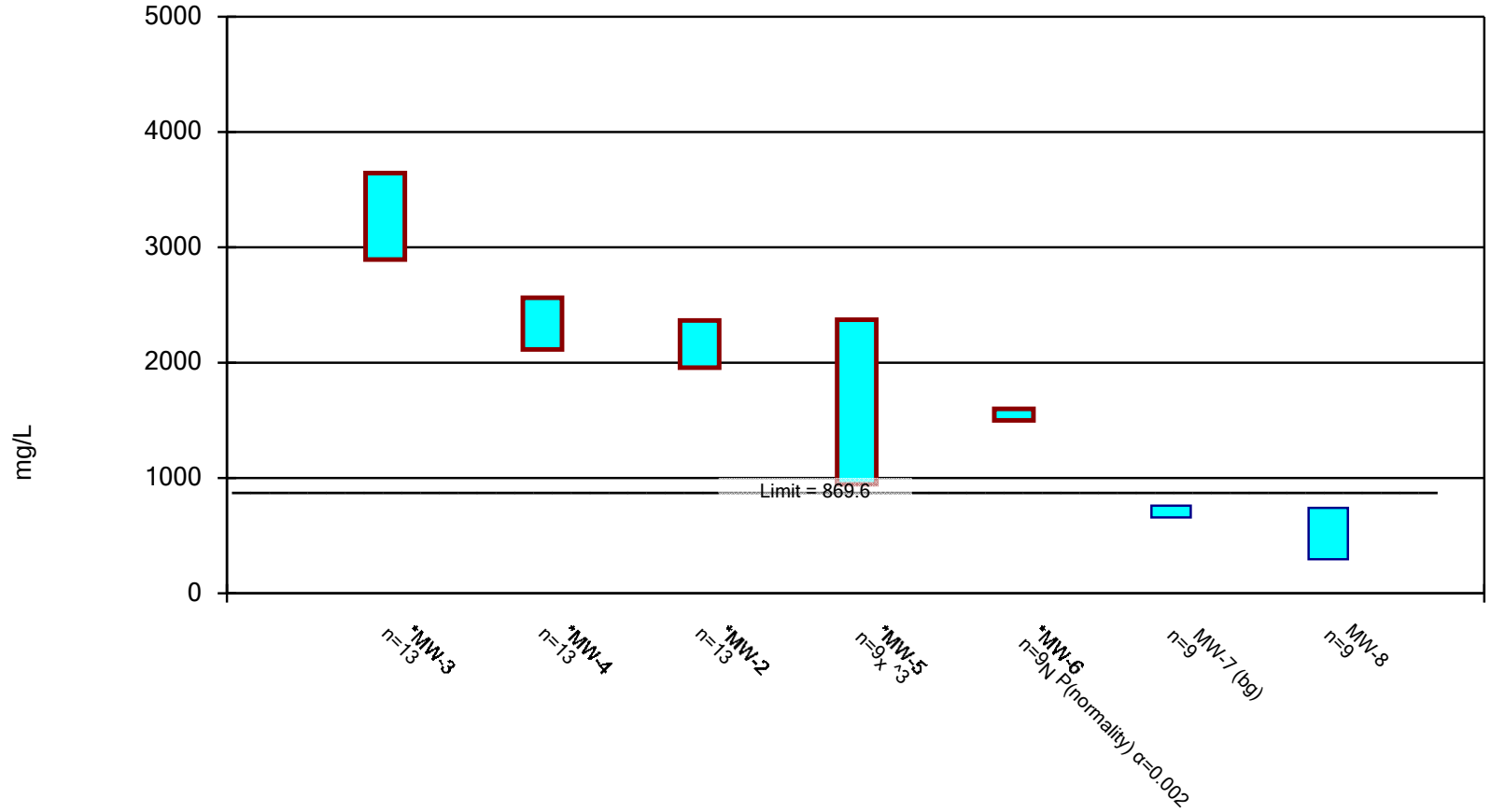


Constituent: Thallium Analysis Run 10/7/2019 2:21 PM View: Appendix IV

Grand Haven BLP Client: Golder Associates Data: DT-Grand Haven BLP

Parametric and Non-Parametric (NP) Confidence Interval

Compliance limit is exceeded.* Per-well alpha = 0.01 except as noted. Normality Test: Shapiro Wilk, alpha based on n.



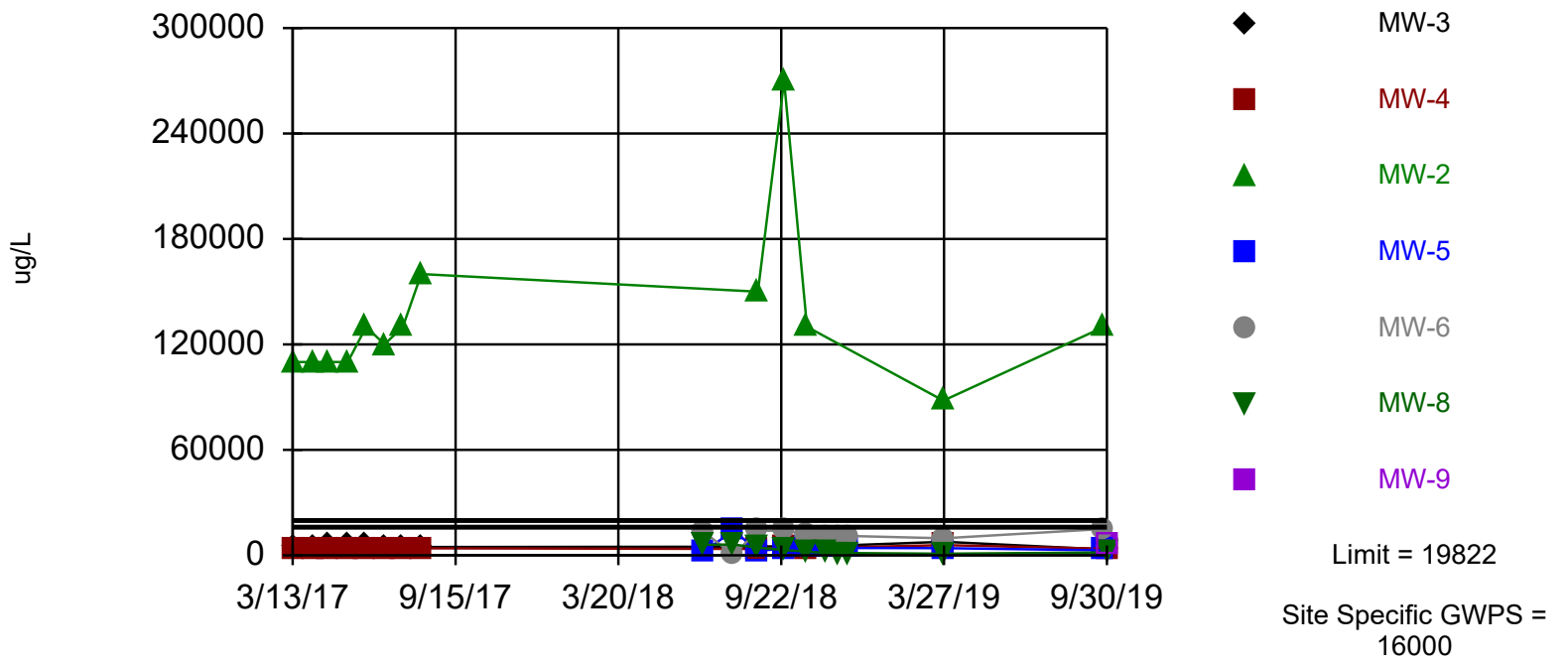
Constituent: Total Dissolved Solids Analysis Run 10/7/2019 2:21 PM View: Appendix IV

Grand Haven BLP Client: Golder Associates Data: DT-Grand Haven BLP

Exceeds Limit: MW-2

Prediction Limit

Interwell Parametric



Background Data Summary: Mean=11760, Std. Dev.=4047, n=10. Insufficient data to test for seasonality; not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.8531, critical = 0.842. Report alpha = 0.2755. Individual comparison alpha = 0.045. Most recent point for each compliance well compared to limit.

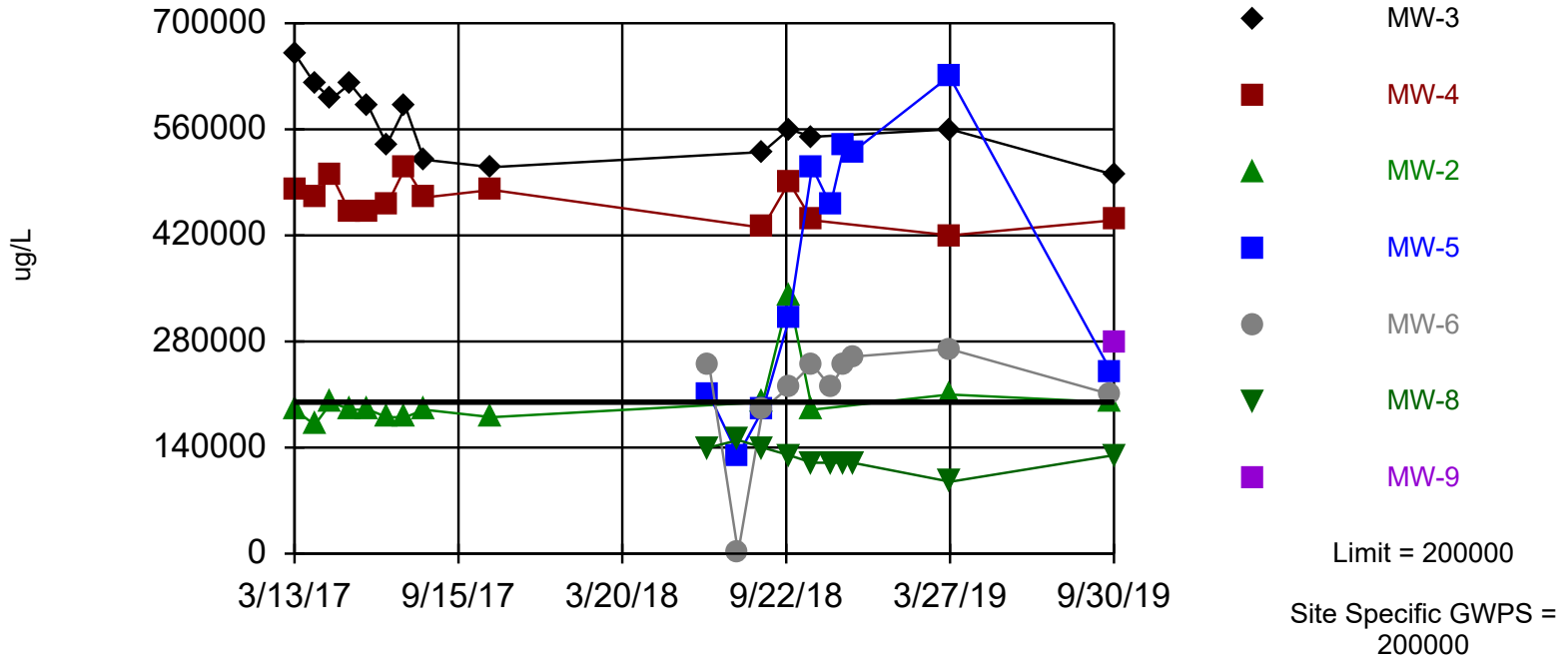
Constituent: Boron Analysis Run 1/29/2020 11:38 AM View: Appendix III

Grand Haven BLP Client: Golder Associates Data: DT-Grand Haven BLP

Exceeds Limit: MW-3, MW-4, MW-5, MW-6, MW-9

Prediction Limit

Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.05 alpha level. Limit is highest of 10 background values. Report alpha = 0.4118. Individual comparison alpha = 0.073. Most recent point for each compliance well compared to limit. Insufficient data to test for seasonality; data will not be deseasonalized.

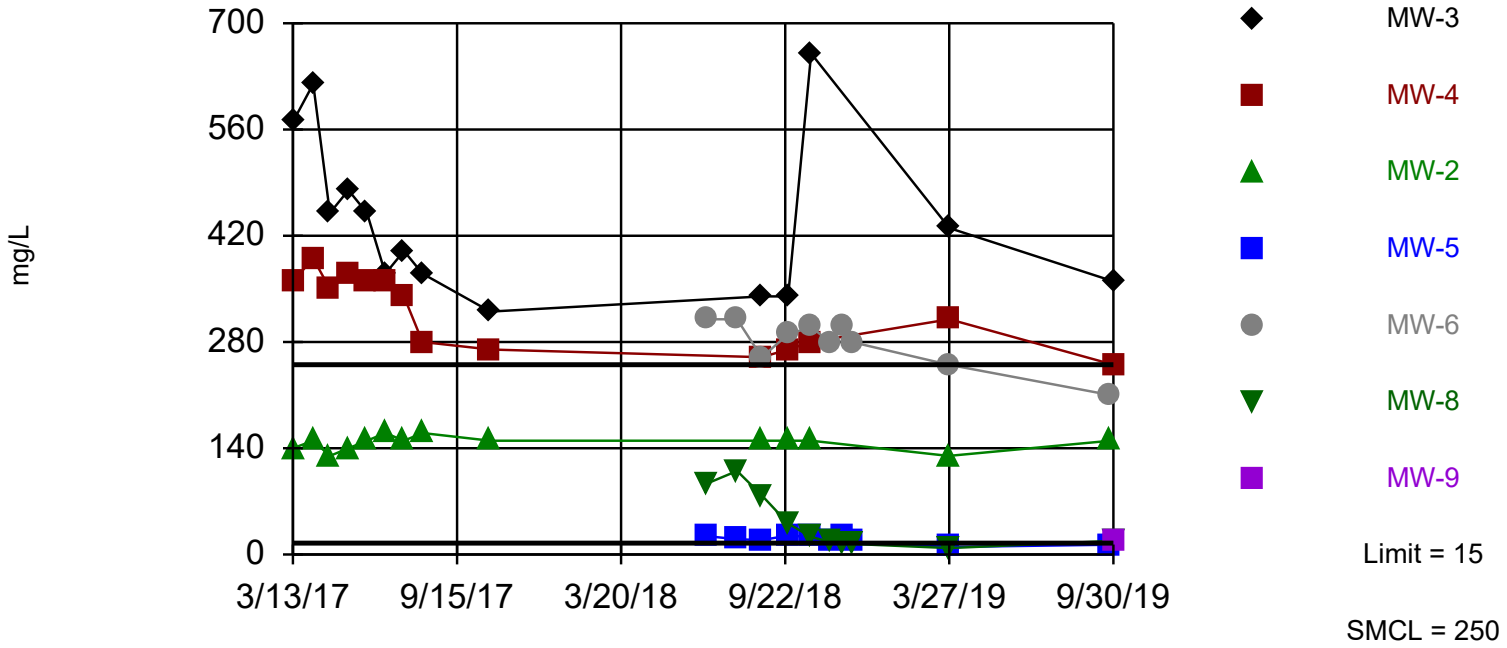
Constituent: Calcium Analysis Run 1/29/2020 11:38 AM View: Appendix III

Grand Haven BLP Client: Golder Associates Data: DT-Grand Haven BLP

Exceeds Limit: MW-3, MW-4, MW-2, MW-6, MW-8, MW-9

Prediction Limit

Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.05 alpha level. Limit is highest of 10 background values. Report alpha = 0.4118. Individual comparison alpha = 0.073. Most recent point for each compliance well compared to limit. Insufficient data to test for seasonality; data will not be deseasonalized.

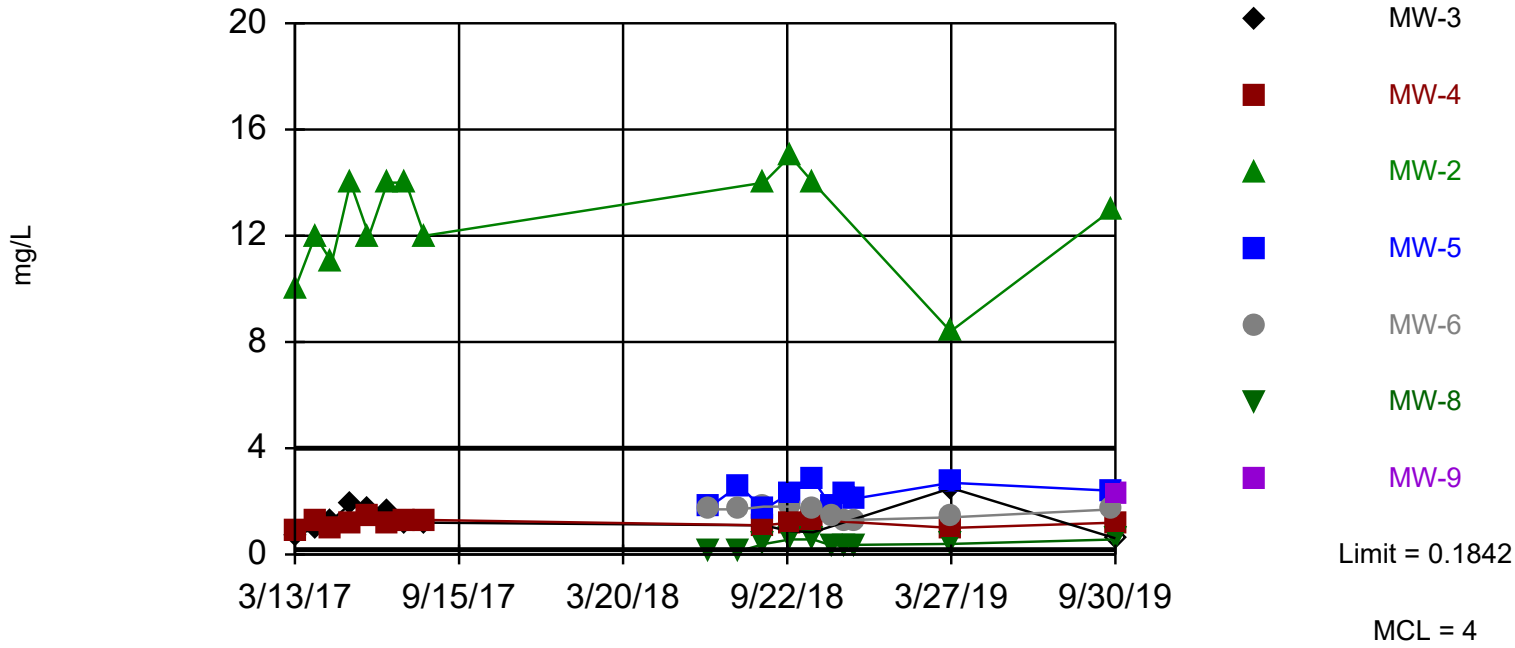
Constituent: Chloride Analysis Run 1/29/2020 11:38 AM View: Appendix III

Grand Haven BLP Client: Golder Associates Data: DT-Grand Haven BLP

Exceeds Limit: MW-3, MW-4, MW-2, MW-5, MW-6, MW-8, MW-9

Prediction Limit

Interwell Parametric



Background Data Summary (after Cohen`s Adjustment): Mean=0.09715, Std. Dev.=0.04368, n=10, 20% NDs. Insufficient data to test for seasonality; not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9294, critical = 0.842. Report alpha = 0.2755. Individual comparison alpha = 0.045. Most recent point for each compliance well compared to limit.

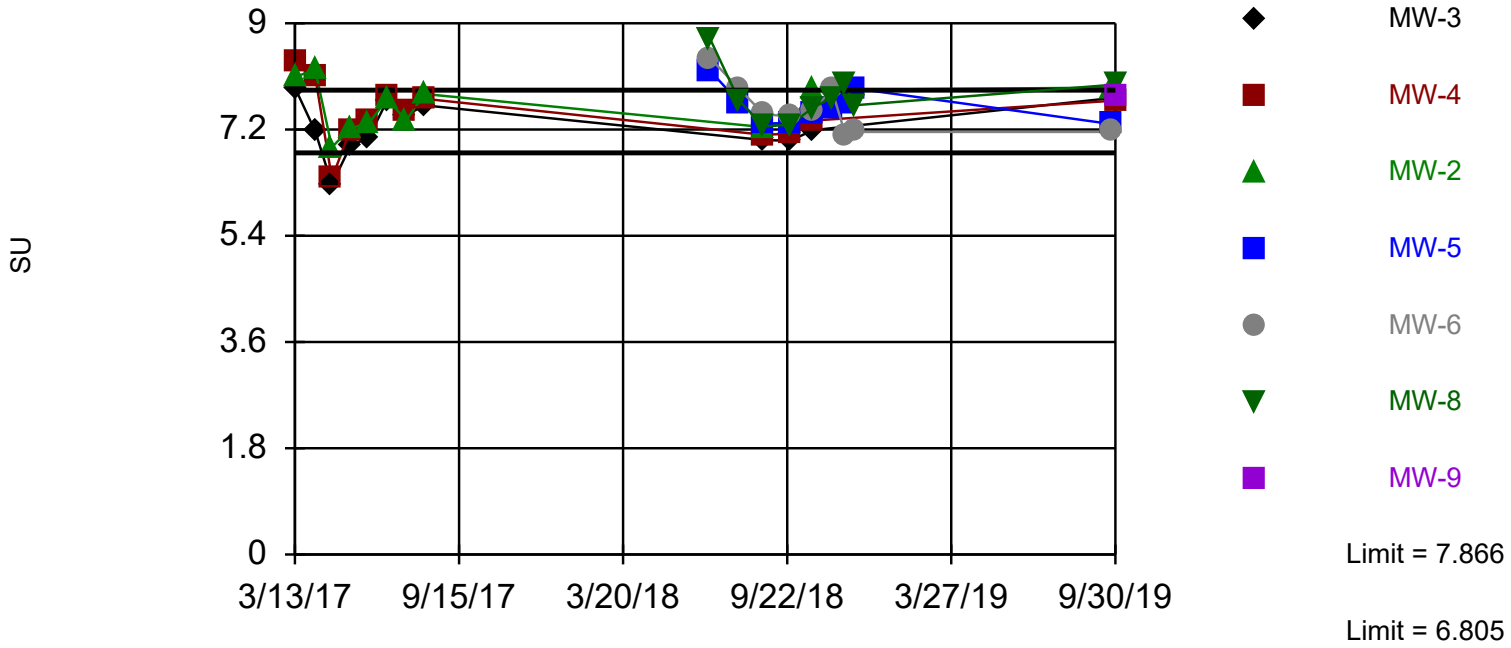
Constituent: Fluoride Analysis Run 1/29/2020 11:38 AM View: Appendix III

Grand Haven BLP Client: Golder Associates Data: DT-Grand Haven BLP

Exceeds Limits: MW-2, MW-8

Prediction Limit

Interwell Parametric



Background Data Summary: Mean=7.336, Std. Dev.=0.212, n=9. Insufficient data to test for seasonality; not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9718, critical = 0.829. Report alpha = 0.2755. Individual comparison alpha = 0.0225. Most recent point for each compliance well compared to limit.

Constituent: pH Analysis Run 1/29/2020 11:38 AM View: Appendix III

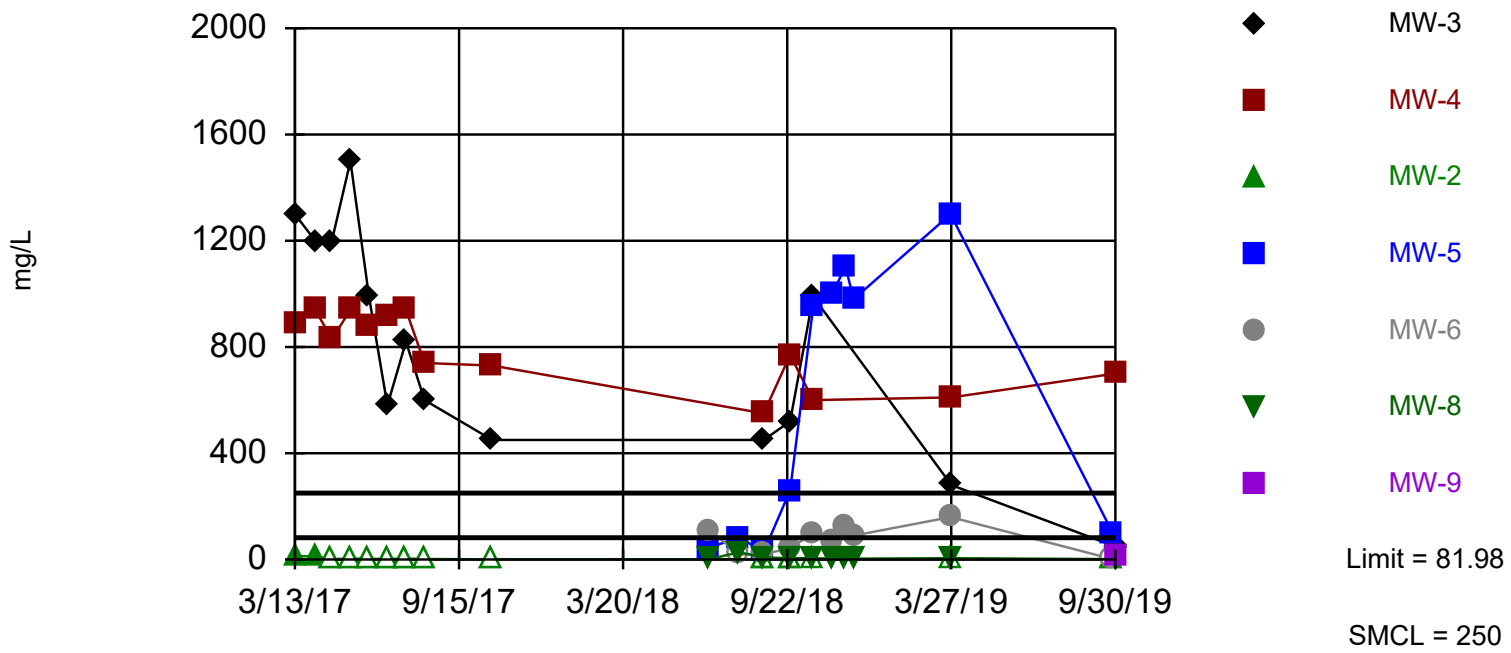
Grand Haven BLP Client: Golder Associates Data: DT-Grand Haven BLP

Sanitas™ v.9.6.25 For the statistical analyses of ground water by Golder Associates only. EPA
Hollow symbols indicate censored values.

Exceeds Limit: MW-4, MW-5

Prediction Limit

Interwell Parametric



Background Data Summary: Mean=46, Std. Dev.=18.06, n=10. Insufficient data to test for seasonality; not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.8755, critical = 0.842. Report alpha = 0.2755. Individual comparison alpha = 0.045. Most recent point for each compliance well compared to limit.

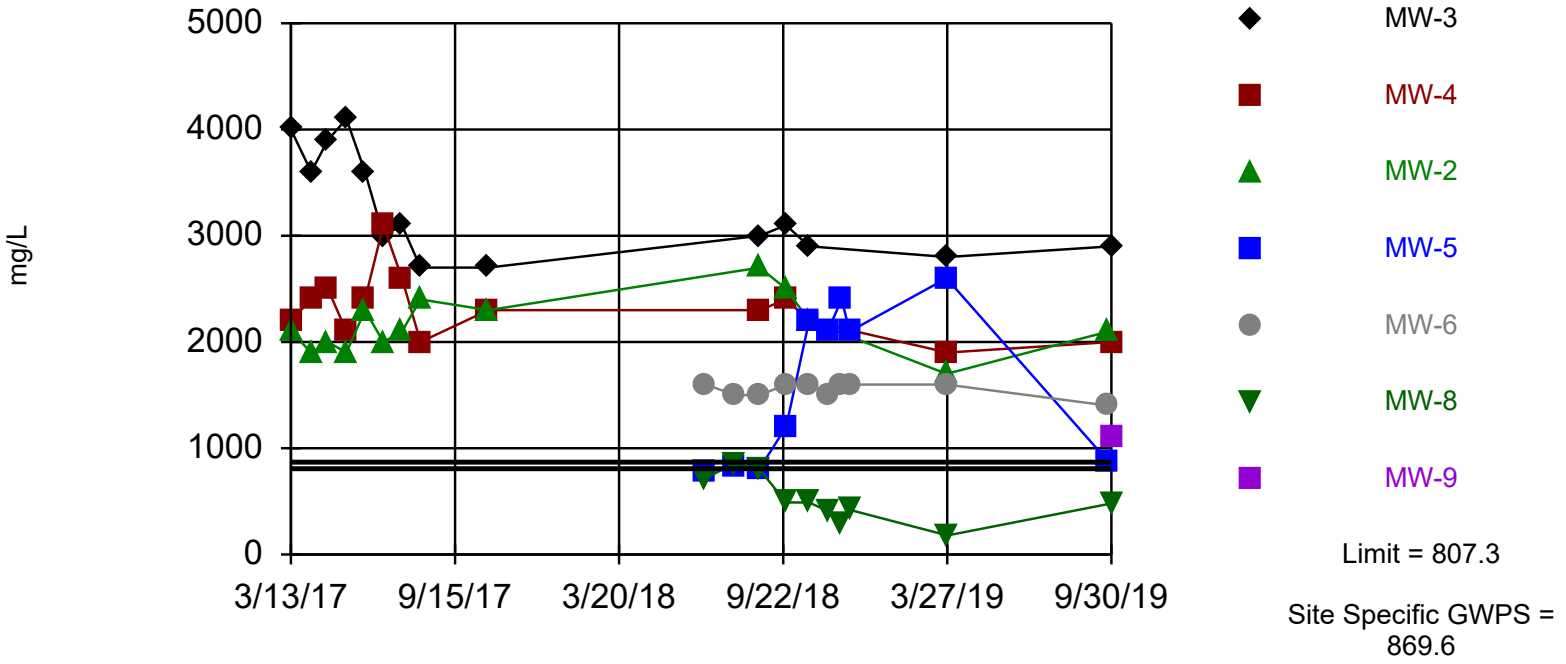
Constituent: Sulfate Analysis Run 1/29/2020 11:39 AM View: Appendix III

Grand Haven BLP Client: Golder Associates Data: DT-Grand Haven BLP

Exceeds Limit: MW-3, MW-4, MW-2, MW-5, MW-6, MW-9

Prediction Limit

Interwell Parametric



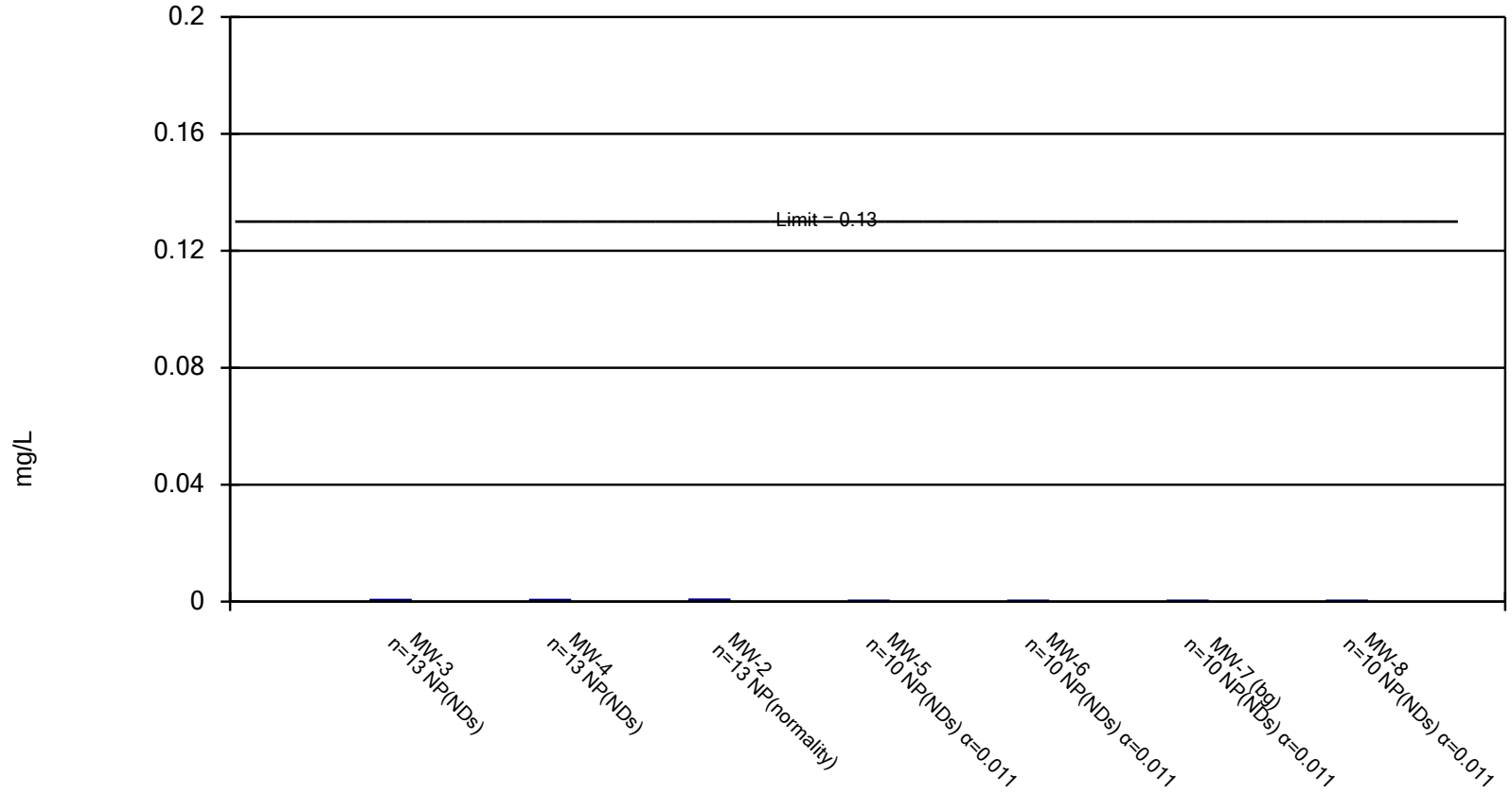
Background Data Summary: Mean=707, Std. Dev.=50.34, n=10. Insufficient data to test for seasonality; not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9455, critical = 0.842. Report alpha = 0.2755. Individual comparison alpha = 0.045. Most recent point for each compliance well compared to limit.

Constituent: Total Dissolved Solids Analysis Run 1/29/2020 11:39 AM View: Appendix III

Grand Haven BLP Client: Golder Associates Data: DT-Grand Haven BLP

Non-Parametric Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted.

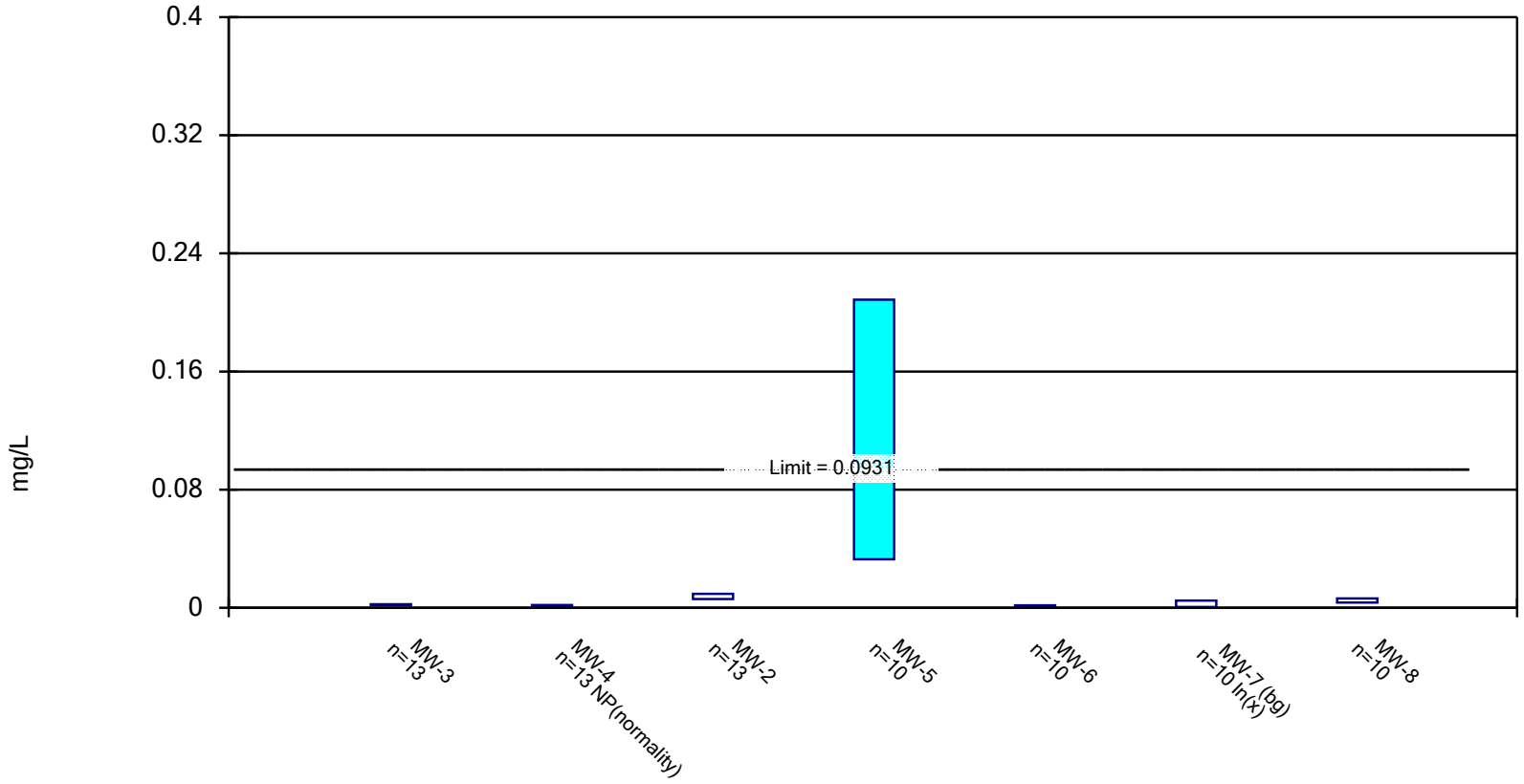


Constituent: Antimony Analysis Run 10/16/2019 11:26 AM View: Appendix IV

Grand Haven BLP Client: Golder Associates Data: DT-Grand Haven BLP

Parametric and Non-Parametric (NP) Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.

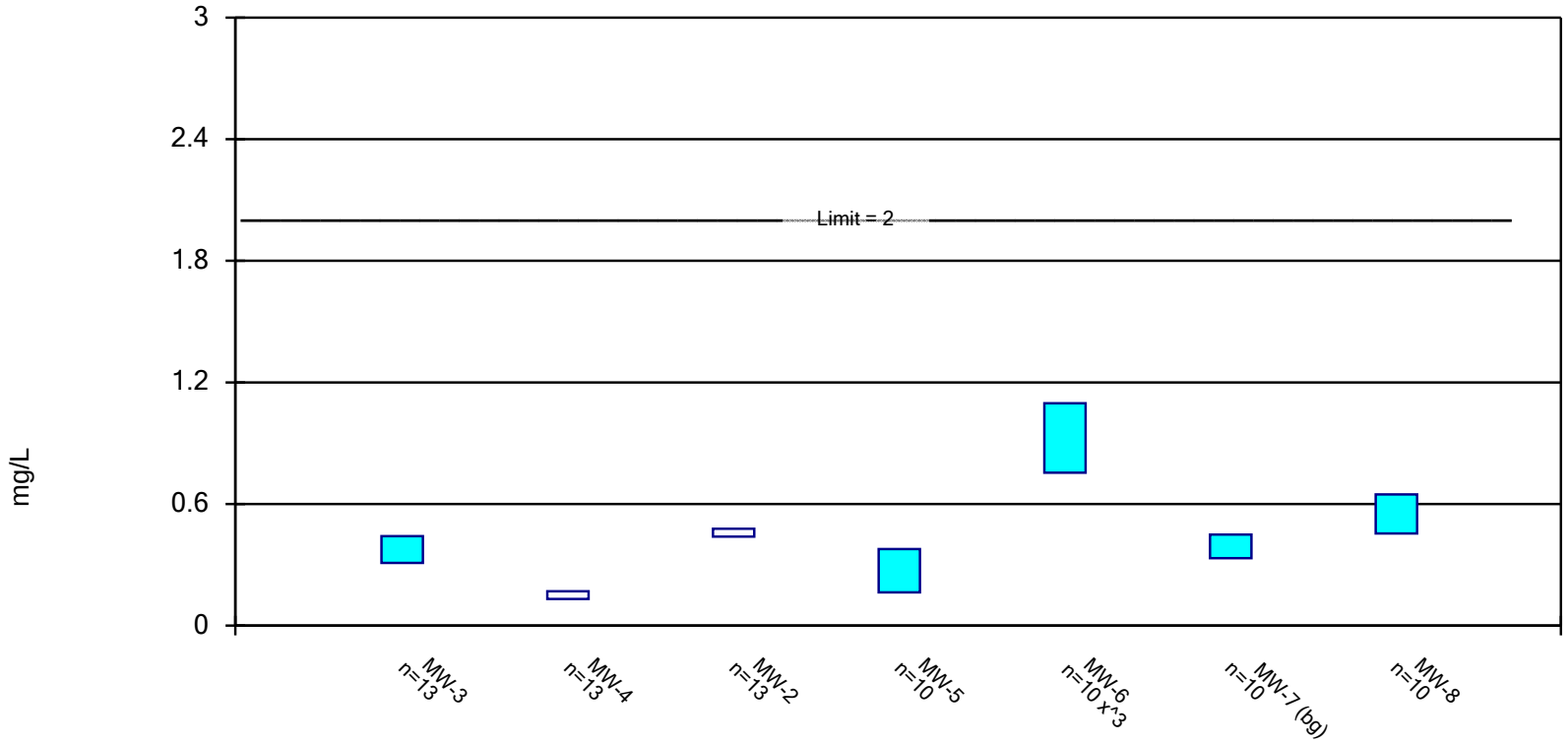


Constituent: Arsenic Analysis Run 10/16/2019 11:26 AM View: Appendix IV

Grand Haven BLP Client: Golder Associates Data: DT-Grand Haven BLP

Parametric Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.

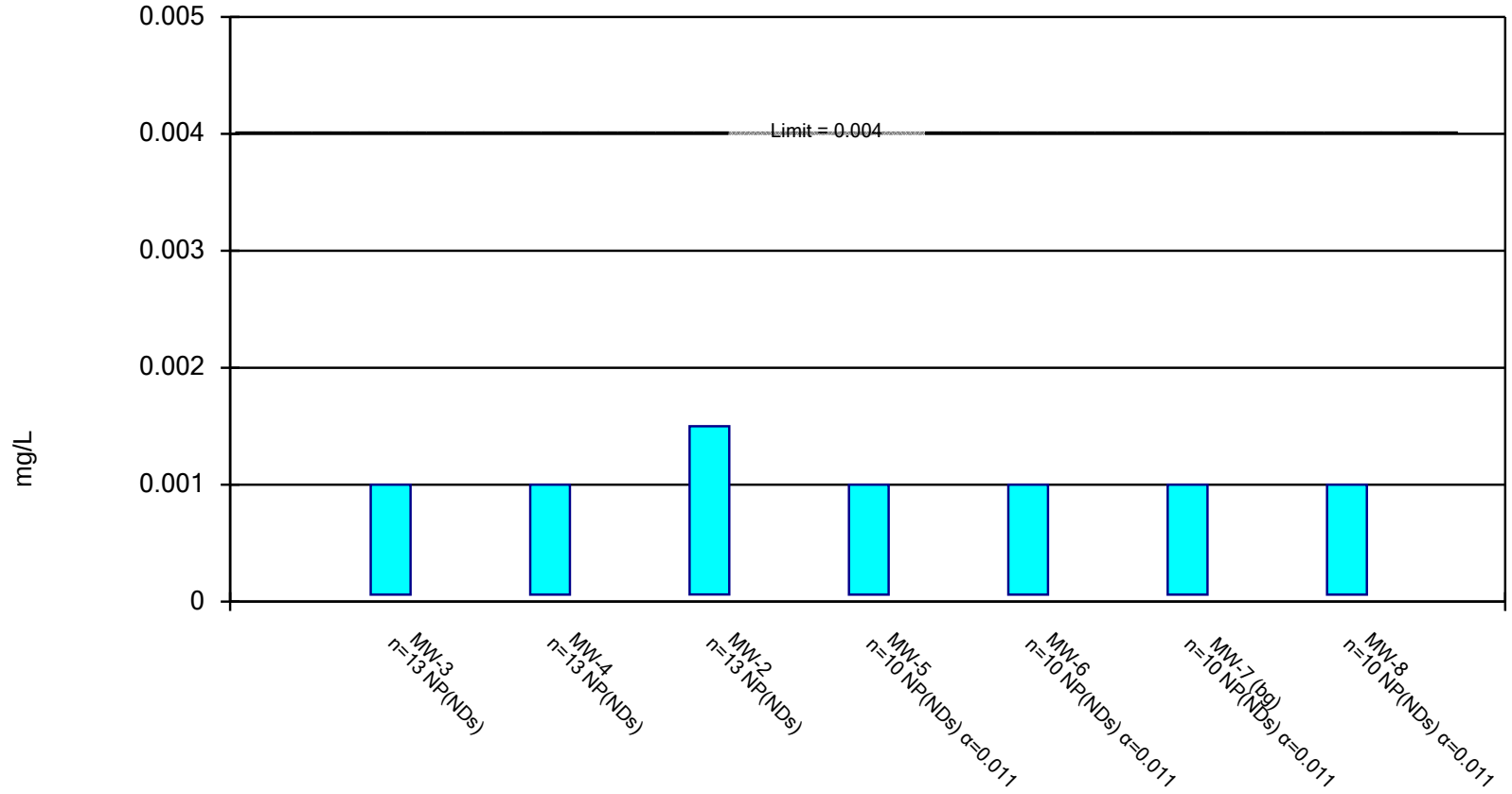


Constituent: Barium Analysis Run 10/16/2019 11:26 AM View: Appendix IV

Grand Haven BLP Client: Golder Associates Data: DT-Grand Haven BLP

Non-Parametric Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted.

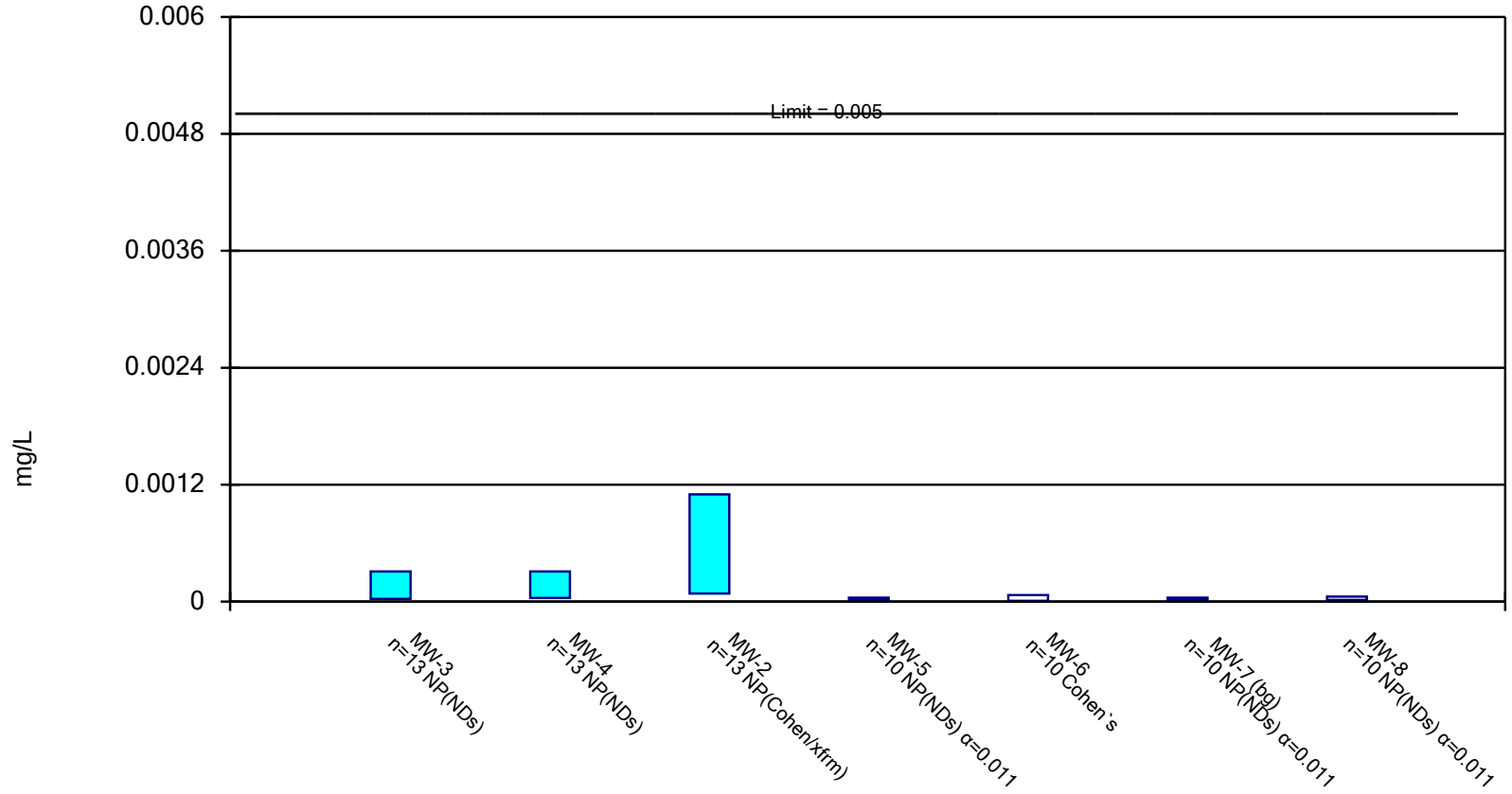


Constituent: Beryllium Analysis Run 10/16/2019 11:26 AM View: Appendix IV

Grand Haven BLP Client: Golder Associates Data: DT-Grand Haven BLP

Parametric and Non-Parametric (NP) Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted. Normality Test: Shapiro Wilk, alpha based on n.

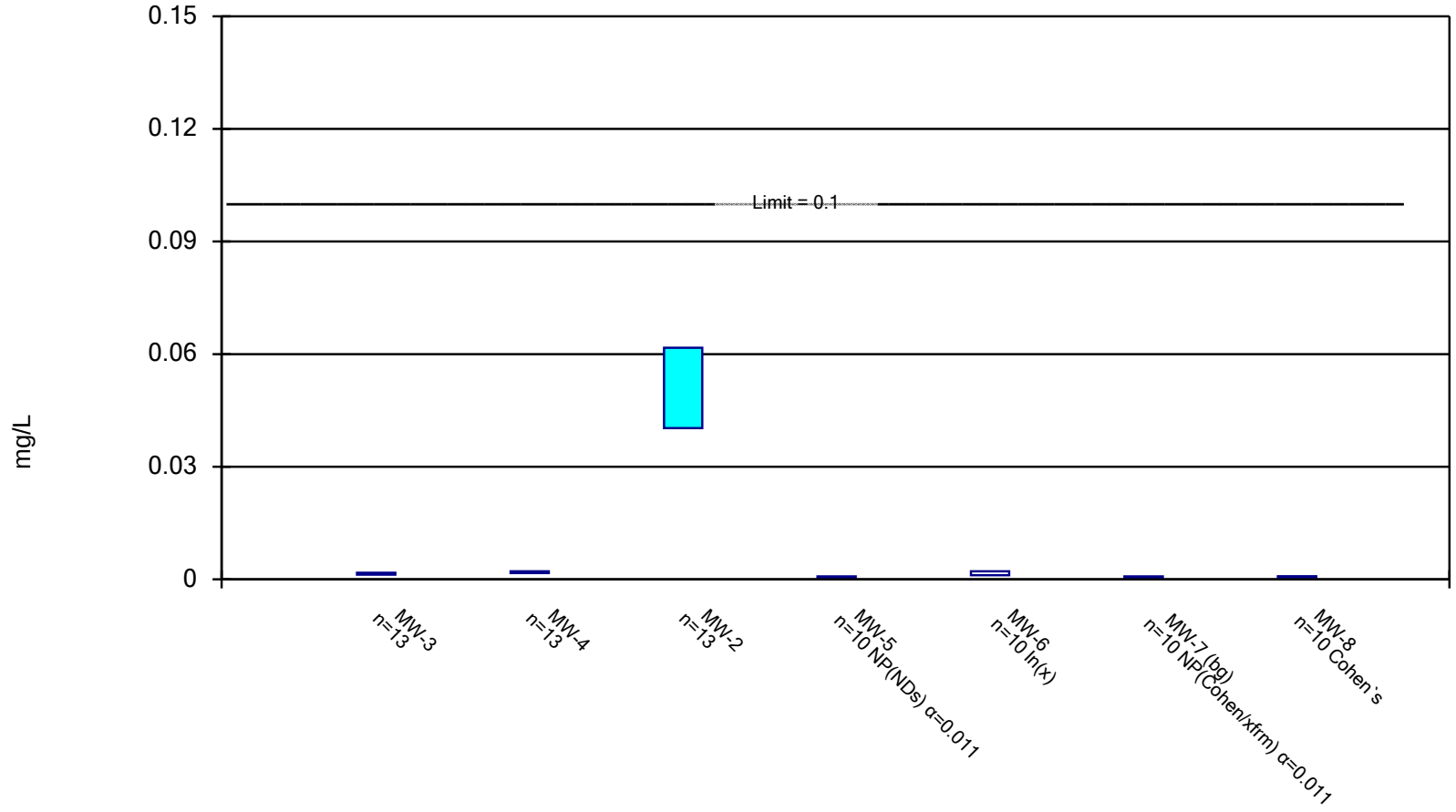


Constituent: Cadmium Analysis Run 10/16/2019 11:26 AM View: Appendix IV

Grand Haven BLP Client: Golder Associates Data: DT-Grand Haven BLP

Parametric and Non-Parametric (NP) Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted. Normality Test: Shapiro Wilk, alpha based on n.

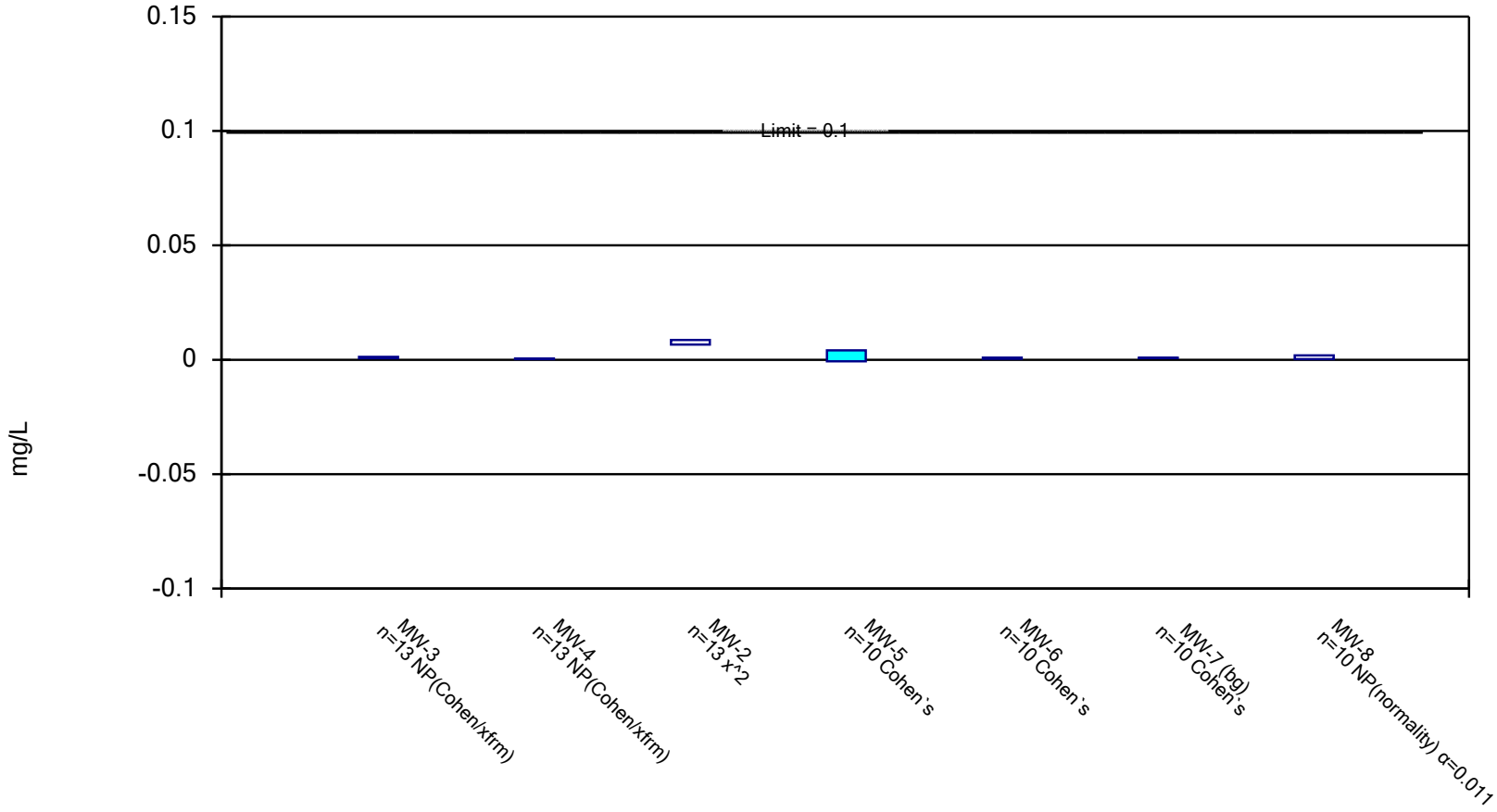


Constituent: Chromium Analysis Run 10/16/2019 11:26 AM View: Appendix IV

Grand Haven BLP Client: Golder Associates Data: DT-Grand Haven BLP

Parametric and Non-Parametric (NP) Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted. Normality Test: Shapiro Wilk, alpha based on n.

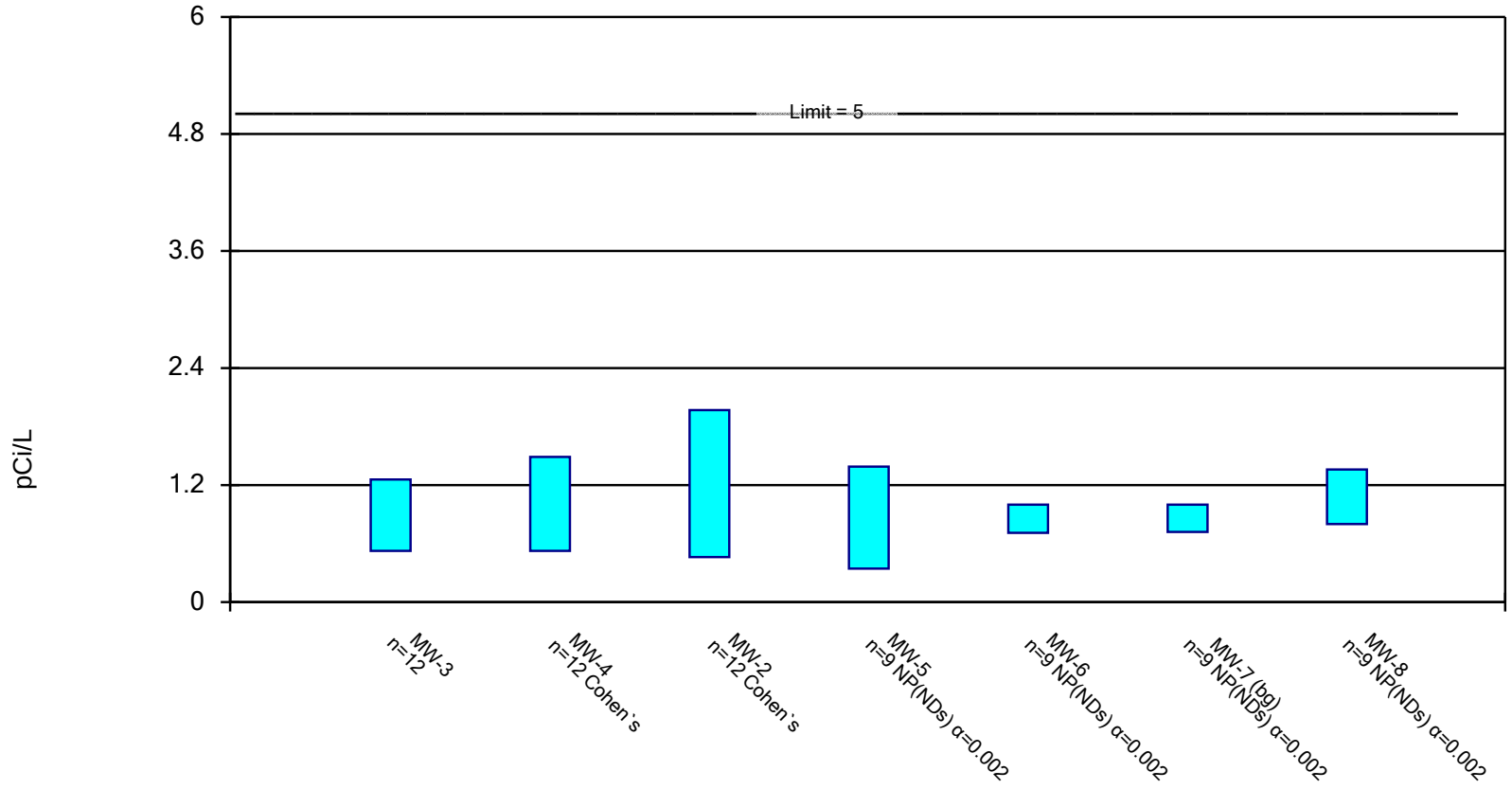


Constituent: Cobalt Analysis Run 10/16/2019 11:26 AM View: Appendix IV

Grand Haven BLP Client: Golder Associates Data: DT-Grand Haven BLP

Parametric and Non-Parametric (NP) Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted. Normality Test: Shapiro Wilk, alpha based on n.

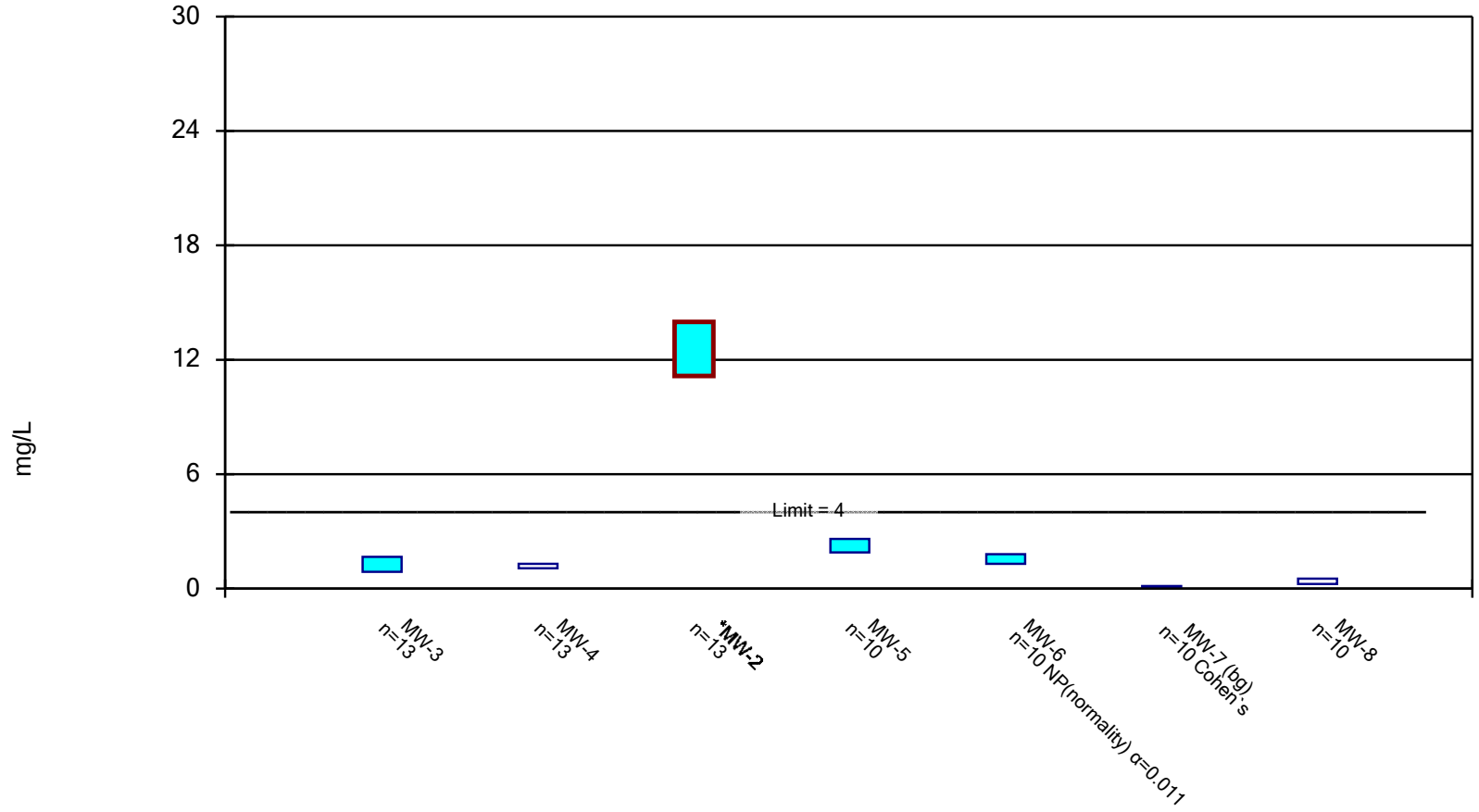


Constituent: Combined Radium 226 + 228 Analysis Run 10/16/2019 11:26 AM View: Appendix IV

Grand Haven BLP Client: Golder Associates Data: DT-Grand Haven BLP

Parametric and Non-Parametric (NP) Confidence Interval

Compliance limit is exceeded.* Per-well alpha = 0.01 except as noted. Normality Test: Shapiro Wilk, alpha based on n.

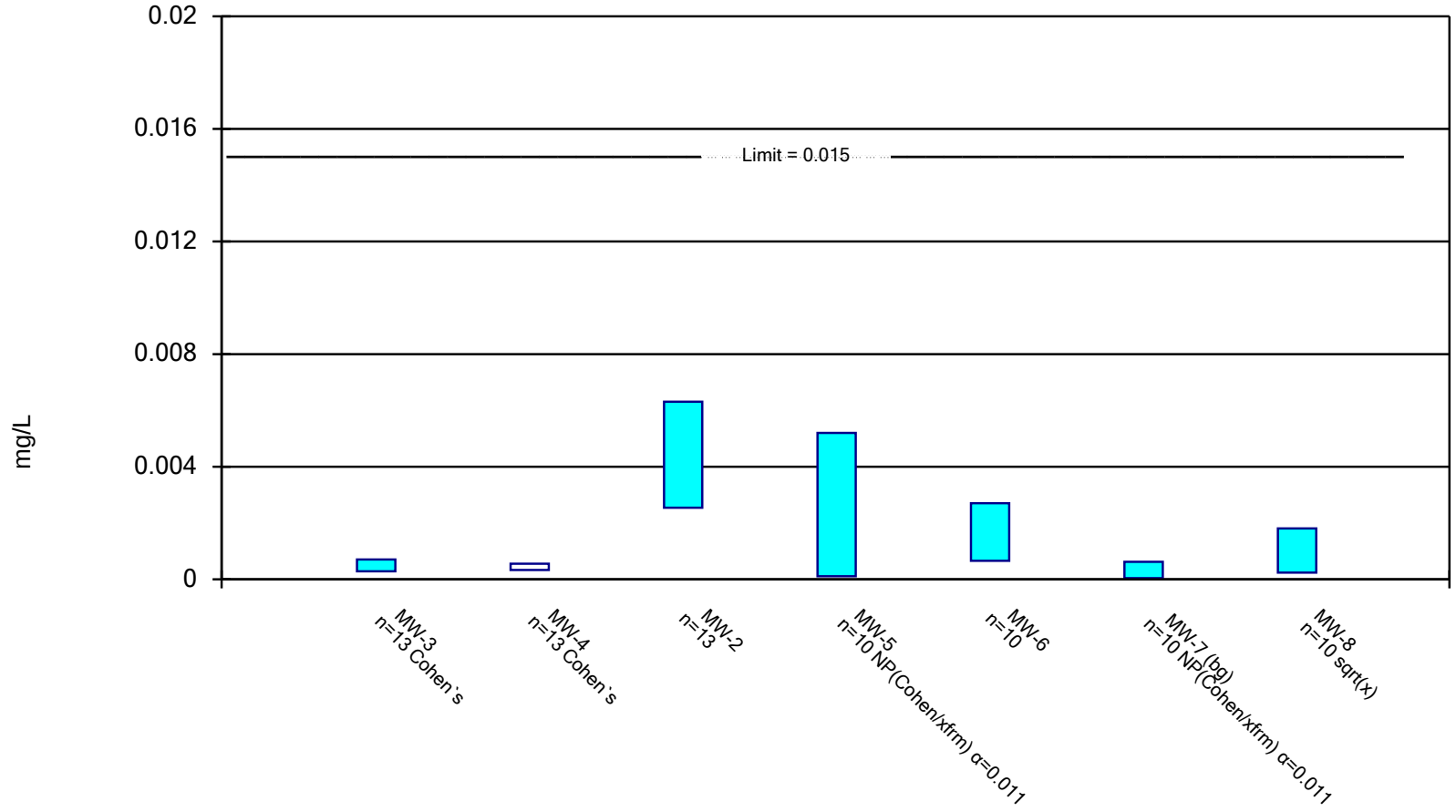


Constituent: Fluoride Analysis Run 10/16/2019 11:26 AM View: Appendix IV

Grand Haven BLP Client: Golder Associates Data: DT-Grand Haven BLP

Parametric and Non-Parametric (NP) Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted. Normality Test: Shapiro Wilk, alpha based on n.

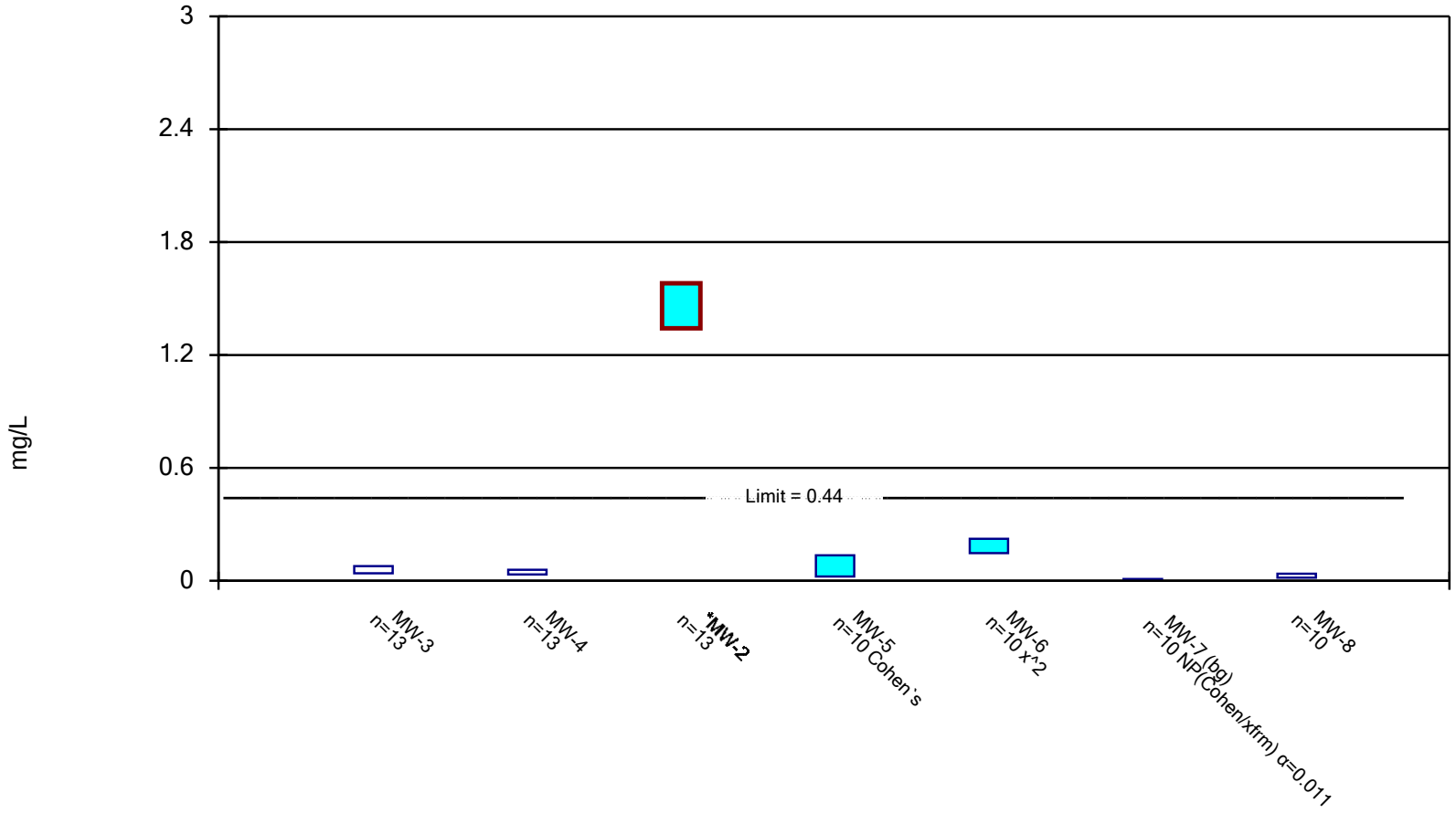


Constituent: Lead Analysis Run 10/16/2019 11:26 AM View: Appendix IV

Grand Haven BLP Client: Golder Associates Data: DT-Grand Haven BLP

Parametric and Non-Parametric (NP) Confidence Interval

Compliance limit is exceeded.* Per-well alpha = 0.01 except as noted. Normality Test: Shapiro Wilk, alpha based on n.

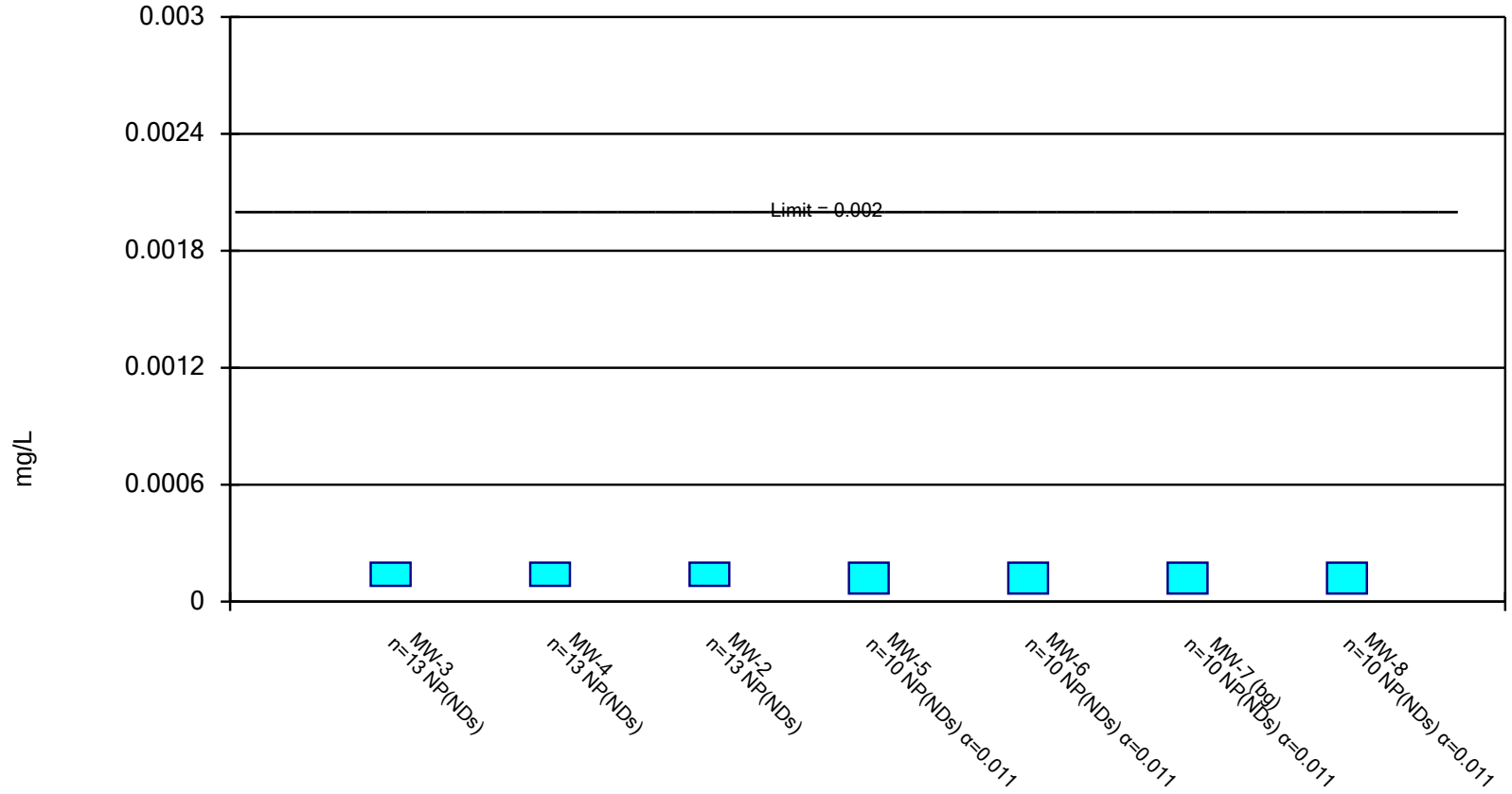


Constituent: Lithium Analysis Run 10/16/2019 11:26 AM View: Appendix IV

Grand Haven BLP Client: Golder Associates Data: DT-Grand Haven BLP

Non-Parametric Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted.

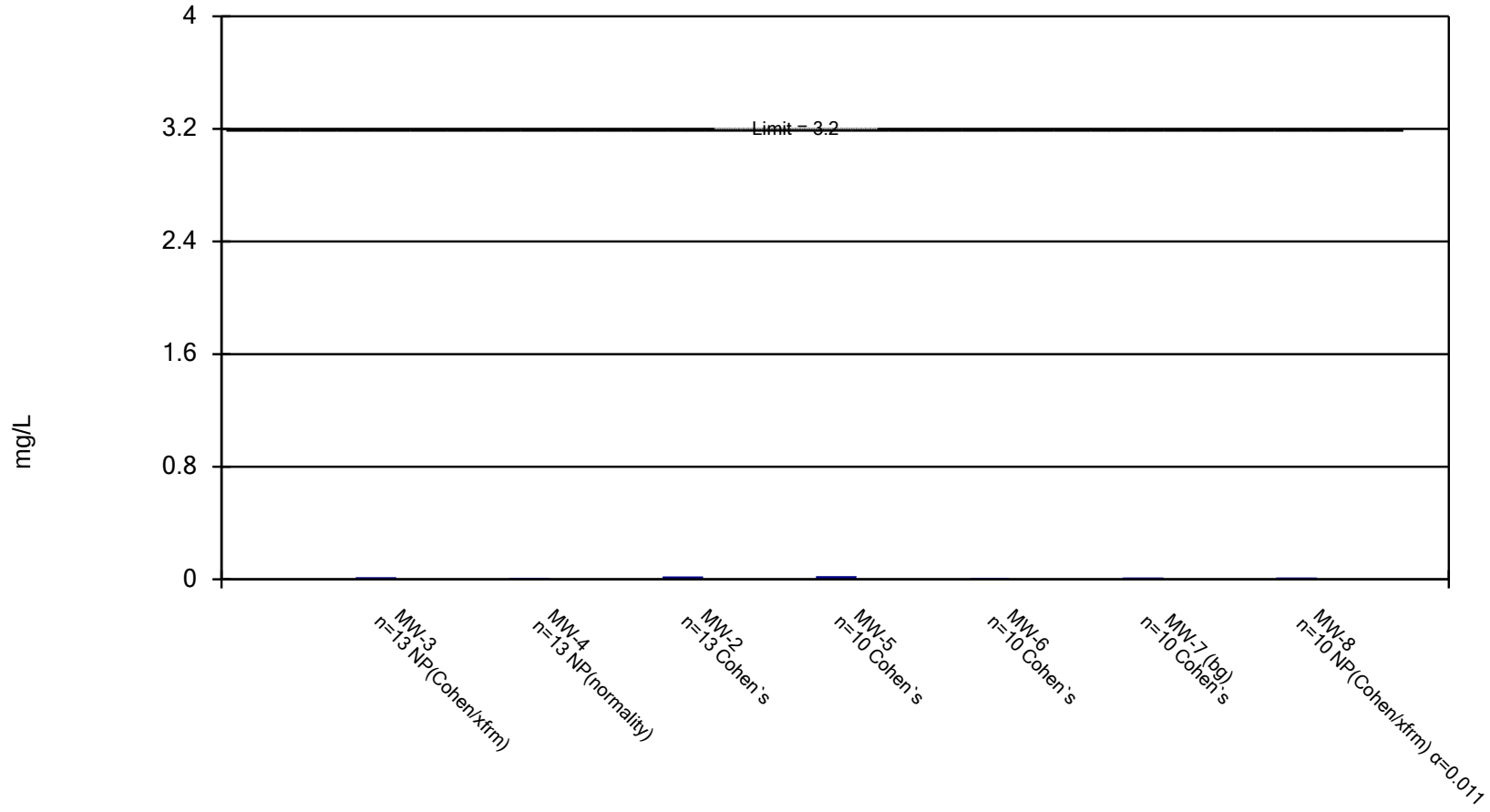


Constituent: Mercury Analysis Run 10/16/2019 11:26 AM View: Appendix IV

Grand Haven BLP Client: Golder Associates Data: DT-Grand Haven BLP

Parametric and Non-Parametric (NP) Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted. Normality Test: Shapiro Wilk, alpha based on n.

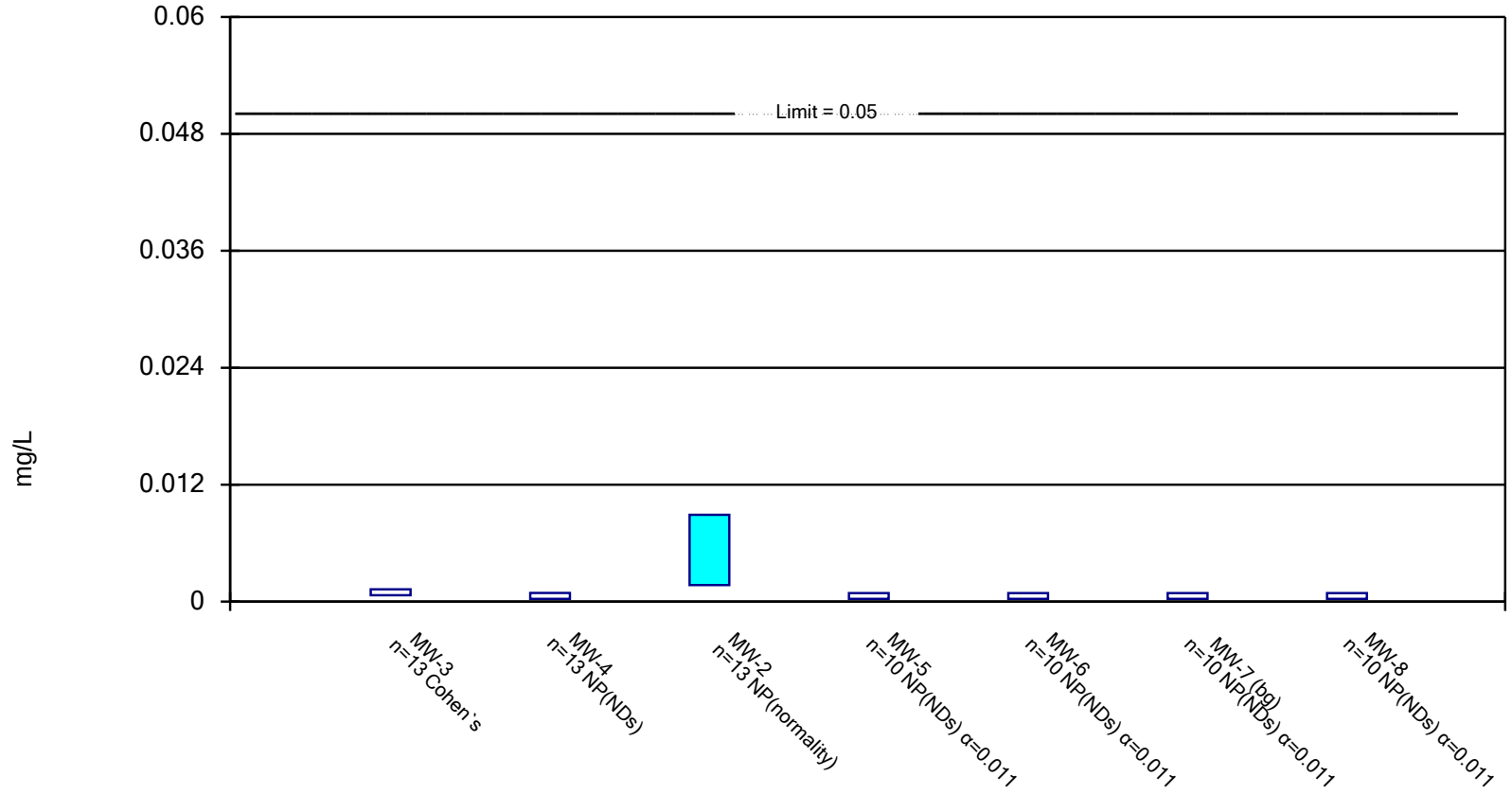


Constituent: Molybdenum Analysis Run 10/16/2019 11:26 AM View: Appendix IV

Grand Haven BLP Client: Golder Associates Data: DT-Grand Haven BLP

Parametric and Non-Parametric (NP) Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted. Normality Test: Shapiro Wilk, alpha based on n.

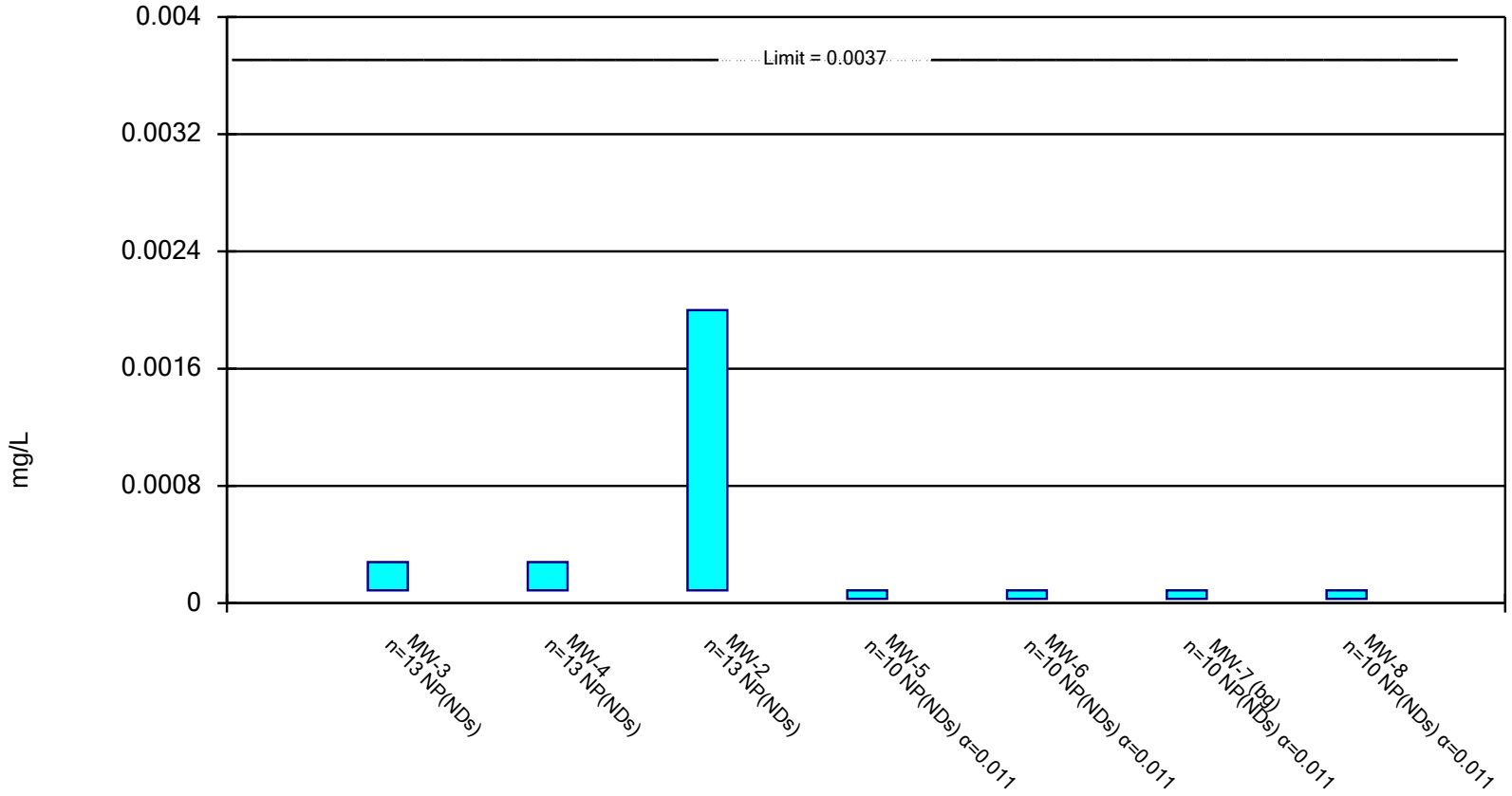


Constituent: Selenium Analysis Run 10/16/2019 11:26 AM View: Appendix IV

Grand Haven BLP Client: Golder Associates Data: DT-Grand Haven BLP

Non-Parametric Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted.



Constituent: Thallium Analysis Run 10/16/2019 11:26 AM View: Appendix IV

Grand Haven BLP Client: Golder Associates Data: DT-Grand Haven BLP

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