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Groundwater-Surface Water Interface Response Activity Plan Completion Report

Kent County, Michigan

August 19, 2024
File No. 16.0062961.51

PREPARED FOR:
Wolverine World Wide, Inc.
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ACRONYMS

BGT	Below Groundwater Table
CD	Consent Decree
CSM	Conceptual Site Model
DoD	United States Department of Defense
EDD	Electronic Data Deliverable
EGLE	Michigan Department of Environment, Great Lakes and Energy
FCV	Final Chronic Values
GSI	Groundwater-Surface Water Interface
HNDV	Human Health Non-Drinking Water Values
HSP	House Street Property
MDEQ	Michigan Department of Environmental Quality
MS/MSD	Matrix Spike/Matrix Spike Duplicate
NE	Northeast
ng/L	Nanogram per Liter
NIST	National Institute of Standards and Technology
NKSA	North Kent Study Area
ORP	Oxidation-Reduction Potential
PFAS	Per- and Polyfluoroalkyl Substances
PFBS	Perfluorobutane Sulfonic Acid
PFHxA	Perfluorohexanoic Acid
PFHxS	Perfluorohexane Sulfonic Acid
PFNA	Perfluorononanoic Acid
PFOA	Perfluorooctanoic Acid
PFOS	Perfluorooctane Sulfonate
PVC	Polyvinyl Chloride
QAPP	Quality Assurance Project Plan [*Former Wolverine Tannery, House Street Disposal Area, and Wolven/Jewell Area, Per- and Polyfluoroalkyl Substances Investigation Program*]
QA/QC	Quality Assurance/Quality Control
QSM	Quality Systems Manual
R&W/GZA	Rose & Westra, a Division of GZA GeoEnvironmental, Inc.
RAP	Response Activity Plan
SOP	Standard Operating Procedures
USGS	United States Geological Survey
VAP	Vertical Aquifer Profiling
Wolverine	Wolverine World Wide, Inc.
WV	Wildlife Values

1.0 INTRODUCTION

On behalf of Wolverine World Wide, Inc. (Wolverine), Rose & Westra, a Division of GZA GeoEnvironmental, Inc. (R&W/GZA), prepared this GSI RAP Completion Report (GSI CR) summarizing the activities completed associated with the *Groundwater-Surface Water Interface Response Activity Plan* dated September 23, 2020 (GSI RAP, **Appendix A)** and the *Revision to Groundwater-Surface Water Interface Investigation Summary and Work Plan* dated December 3, 2021 (Work Plan, **Appendix B**) and associated supplemental documentation. The GSI RAP and subsequent Work Plan were implemented as set forth in the Consent Decree No. 1:18-cv-00039, effective February 19, 2020 (CD).

Section 7.12(a)(viii) of the CD indicates this GSI CR shall be submitted no later than 180 days of completion of response activities and sampling associated with the Work Plan. Four quarters of groundwater sampling required by Section 7.10(d) of the CD was completed in January 2024, and the final laboratory data was received on February 21, 2024. Accordingly, August 19, 2024 is the due date for this GSI CR

The CD indicates the GSI CR:

> *demonstrates that Defendant has completed the Response Activities required by Paragraph 7.10 and analyzes the data collected pursuant to Paragraph 7.10.*

2.0 CONDITIONS OF CD PARAGRAPH 7.10

Section 7.10 of the CD:

(a) *Defendant shall conduct a study of the potential for groundwater contamination to discharge to surface water in accordance with Appendix S— Statement of Work for GSI Investigation and the Response Activity Plan in Paragraph 7.4(a) at the following three areas:*

- *(i) southeast of the House Street plume(s);*
- *(ii) from the Wolven/Jewell plume(s) and the House Street plume(s) to the northwest; and*
- *(iii) from the Wolven/Jewell plume(s) toward the Rogue River to the northeast and southeast.*

(b) *Within ninety (90) Days of completing the work required by Paragraph 7.10(a), Defendant shall submit a work plan for the installation of needed permanent GSI wells to MDEQ for its review and approval. The work plan shall provide for the installation of GSI wells at up to forty (40) locations with 1-3 wells per location with a cap of 80 wells total.*

(c) *Upon MDEQ's approval for the permanent GSI well work plan submitted hereunder, the Defendant shall initiate the work outlined in the plan in accordance with the approved implementation schedule.*

(d) *Defendant shall conduct quarterly sampling at the installed GSI wells for one (1) year.*

(e) *Based on the information gathered from the work conducted under Paragraphs 7.10(b), 7.10(c), and 7.10(d), Defendant may submit a work plan to MDEQ that proposes to install interceptor systems or undertake other Response Activities to stop the venting of contaminated groundwater containing PFAS Compounds above applicable criteria into surface water no later than two (2)*

years after approval of the Completion Report submitted pursuant to Paragraphs 7.12(a)(vii). Any work undertaken by Defendant under this Paragraph shall be conducted pursuant to a work plan reviewed and approved by MDEQ.

The GSI RAP outlines the implementation of the requirements identified in CD Section 7.10. The GSI RAP was due on and transmitted to EGLE on September 23, 2020. The Work Plan was addressed in Section 7.10(b) of the CD and within the approved Work Plan. A revised, final version of the Work Plan incorporating EGLE's Notice of Approval with Conditions of the Groundwater-Surface Water Interface Investigation Summary and Work Plan dated October 7, 2021 was submitted on December 3, 2021.

3.0 BACKGROUND

Based on interpretation of regional geology and hydrogeology, residential water well sampling data collected in the NKSA, and groundwater investigations performed associated with the HSP and Wolven/Jewell areas, a CSM was provided in the 2020 GSI RAP (R&W/GZA, 2020). Data collected during the implementation of GSI RAP activities and implementation of the Work Plan supports the CSM with only minor revisions associated with groundwater flow interpretation.

Groundwater potentiometric surface elevation contours were interpolated from the static water levels collected during the quarterly monitoring well network gauging. See **Figures 1A** through **D** and **2 A** through **D** for quarterly groundwater potentiometric surface elevation contours in the shallow and deep zones, respectively.

4.0 GSI RAP AND WORKPLAN OBJECTIVES

The purpose of the GSI RAP and Work Plan investigations was to further evaluate PFAS at the GSI. The data compiled under the GSI RAP and Work Plan is focused on the vicinity of identified potential surface water discharge areas for the PFAS-containing groundwater in the HSP and Wolven/Jewell study areas in accordance with the CD.

To fulfil the obligation under the CD to study the potential for groundwater contamination from the HSP to discharge to surface water, additional investigation was conducted as set forward in the Work Plan. In evaluating the potential discharge(s) to the Rogue River, this GSI CR summarizes the work done in accordance with the GSI RAP and Work Plan to address the following objectives:

- Groundwater elevation at the GSI;
- Gradient and flux at the GSI; and,
- PFAS compound concentrations in the groundwater discharging to the Rogue River.

The following sections provide a detailed investigation summary of activities completed to satisfy the project objectives required by Paragraph 7.10(a) and Appendix S of the CD as well as the GSI RAP and Work Plan.

5.0 INVESTIGATION METHODOLOGY

The previously listed objectives were met through investigative activities conducted from December 2020 through January 2024 under EGLE-approved submissions. Those activities included:

- Installation of 16 temporary piezometers to collect gradient and flux data at the GSI;
- Pore-water sampling at 28 locations to monitor the lateral extent of PFAS compound concentrations in the groundwater discharging to the Rogue River;
- Vertical aquifer profiling (VAP) at proposed monitoring well locations to collect geologic and analytical data to determine permanent monitoring well screen depths;
- Installation of 33 overburden groundwater monitoring wells to monitor the lateral extent of PFAS compound concentrations in the groundwater potentially discharging to the Rogue River and, in one instance, the Grand River;
- Quarterly water level measurements to provide data to interpret the groundwater elevation at the GSI; and
- Quarterly groundwater sampling to monitor PFAS compound concentrations in the groundwater potentially discharging to the Rogue River.

Monitoring locations are depicted on **Figure 3.**

5.1 PIEZOMETER INSTALLATION

In accordance with general procedures outlined in the GSI RAP, 1.25-inch diameter, stainless steel temporary piezometers were hand-driven into the groundwater on the riverbank via a fence post driver. The 4-foot stainless steel screens were threaded onto galvanized riser pipe as they were driven below grade. The top of the well screen was driven to an approximate depth of three feet below the bottom of the river sediment, where possible. Refer to **Section 6.1** for a discussion of sampling adjustments. See Appendix A of the Work Plan (**Appendix B)** for piezometer construction details and **Table 1A** for a summary of piezometer screen intervals.

The following GSI piezometers were installed in each study area:

- **Wolven/Jewell Northwest Study Area** (Two locations)
  - Downgradient of the northwest portion of the Wolven/Jewell plume along the Rogue River
    - WVNW-GSI-1 and WVNW-GSI-2
- **Wolven/Childsdale Study Area (Wolven/Jewell Northeast and Southeast)** (Five locations)
  - North Childsdale area, downgradient of the Wolven study area
    - WV/CH-GSI-1 and WV/CH-GSI-2
  - Downgradient of Wolven Northeast plume within the Rogue River
    - Area19-GSI-1 through Area19-GSI-3
- **HSP Study Area** (Nine locations)
  - Southeast downgradient of the HSP along the Rogue River
    - HS-GSI-1 through HS-GSI-5
  - Downgradient of the HSP near the Grand River
    - HS-GSI-6 through HS-GSI-8
  - Northwest of the HSP
    - HS-GSI-9

5.2 PORE-WATER SAMPLING

Pore-water sampling was conducted in accordance with procedures outlined in SOP A27, provided in the GSI RAP. A Henry Tube Sampler (i.e., stainless-steel probe) with 1.5-inch slotted screen was pushed into the sediment at discrete depths within the river bottom. A shallow-sample interval (minimum of 12 inches below the river bottom) and a deep-sample interval (minimum 6 inches below the shallow interval) were attempted at each pore-water sample location. Once the Henry Tube Sampler was pushed to depth for the shallow-sample interval, a vacuum gauge device (manometer) was connected to the Henry Tube Sampler and a peristaltic pump was used to draw water from the pore space. A second length of tubing was connected to the opposite side of the manometer in which river water was drawn into the tubing. A system of valves were closed to compare the pressure of pore-water to that of the river water. A higher gradient pressure within the pore-water tubing indicated that up-welling was occurring within the pore space and the pore-water was distinguishable from surface water. Upon confirmation, the manometer was removed and a multiparameter meter with a flow-through cell was connected to the Henry Tube Sampler.

Field parameters, including pH, temperature, conductivity, dissolved oxygen, and ORP were recorded and monitored from the river water which was then compared to the real-time readings of pore-water as an additional confirmation that pore-water, not surface water, was being drawn through the sample device. Pore-water readings were considered distinguishable from the river readings when the variance was greater than 10% for collected parameters from the multiparameter meter, with the exception of temperature. Following the stabilization of parameters, the flow-through cell was disconnected, and pore-water was pumped directly into laboratory-provided sampling containers.

As described in the GSI RAP, pore-water samples were collected from the following locations in each study area:

- **Wolven/Jewell Northwest Study Area**
  - Four pore-water sampling locations (WVNW-PW-1 through WVNW-PW-4) immediately downgradient of the Wolven northwest plume, along the Rogue River
- **Wolven/Childsdale Study Area (Wolven/Jewell Northeast and Southeast)**
  - Six pore-water sampling locations (WV/CH-PW-1 through WV/CH-PW-6) downgradient to the southeast of the Wolven study area
  - Seven pore-water sampling locations (Area19-PW-1 through Area19-PW-7) downgradient/northeast of the Area 19 plume within the Rogue River
- **HSP Study Area**
  - Nine pore-water sampling locations (HS-PW-1 through HS-PW-9), southeast downgradient of the HSP plume along the Rogue River
  - Two pore-water sampling locations (HS-PW-10 and HS-PW-11), northwest of the HSP

Piezometers AREA19-GSI 1 through 3, HS-MW-19S/D, HS-MW-29A, and a well from EGLE well series WV-DEQ-MW-9 were sampled concurrently with the pore-water sampling event in Q4 2020. Piezometer sampling was conducted in general accordance with procedures outlined in SOP A29 provided in the GSI RAP.

While not part of the GSI RAP, additional pore-water samples were collected to better delineate PFAS concentrations in HS-PW-3, located at the southeast downgradient portion of the HSP plume. A sample was advanced directly adjacent to the original HS-PW-3 location (HS-PW-3R). HS-PW-2.5 was advanced approximately 130 feet upstream of HS-PW-3; and HS-PW-3.5 was advanced 480 feet downstream of HS-PW-3. The re-sample event was completed eight weeks after the initial sample event. Samples were collected following the previously identified procedures.

To aid in locating step-out VAP locations (see **Section 5.3** below), additional porewater sampling was completed in the Wolven/Jewell Study Area (WVNW-PW-5 through WVNW-PW-7 and Area19-PW-8 through Area19-PW-10). Samples were collected in accordance with the previously identified procedures.

Table 5.2.1 Pore-Water Sample Locations

Area of Investigation	Sample I.D.	Pore-Water (ft)[1] Screen Depth	
		Shallow (A)[2]	Deep (B)[3]
Southeast downgradient of the HSP plume along Rogue River	HS-PW-1	2.00 - 2.13	2.50 -2.63
	HS-PW-2	1.00 - 1.13	NS
	HS-PW-2.5	0.50 - 0.63	1.00 - 1.13
	HS-PW-3	1.33 - 1.46	NS
	HS-PW-3R	0.50 - 0.63	NS
	HS-PW-3.5	0.83 - 0.96	NS
	HS-PW-4	0.75 - 0.88	NS
	HS-PW-5	1.33 - 1.46	NS
	HS-PW-6	1.00 - 1.13	NS
	HS-PW-7	1.50 - 1.63	NS
	HS-PW-8	1.00 - 1.13	NS
	HS-PW-9	1.00 - 1.13	NS
Northwest of the HSP	HS-PW-10	5.00 - 5.13	NS
	HS-PW-11	4.50 - 4.63	NS
Downgradient of Wolven Northeast plume within the Rogue River	Area19-PW-1	1.00 - 1.13	NS
	Area19-PW-2	1.00 - 1.13	1.42 - 1.54
	Area19-PW-3	1.00 - 1.13	NS
	Area19-PW-4	1.00 - 1.13	1.42 - 1.54
	Area19-PW-5	1.00 - 1.13	NS
	Area19-PW-6	1.50 - 1.63	2.00 - 2.13
	Area19-PW-7	5.00 - 5.13	NS
	Area19-PW-8	1.00 – 1.13	NS
	Area19-PW-9	1.00 - 1.13	1.5 – 1.63
	Area19-PW-10	1.00 - 1.13	NS
	WVNW-PW-1	3.00 - 3.13	4.00 - 4.13
	WVNW-PW-2	2.33 - 2.46	3.33 - 3.46

Area of Investigation	Sample I.D.	Pore-Water (ft)[1] Screen Depth	
		Shallow (A)[2]	Deep (B)[3]
Downgradient of the northwest portion of the Wolven/Jewell plume along the Rogue River	WVNW-PW-3	1.50 - 1.63	NS
	WVNW-PW-4	1.67 - 1.79	NS
	WVNW-PW-5	1.00 – 1.13	NS
	WVNW-PW-6	1.00 – 1.13	1.7 – 1.83
	WVNW-PW-7	1.3 - 1.43	NS
North Childsdale area, downgradient of the Wolven study area	WV/CH-PW-1	0.75 - 0.88	NS
	WV/CH-PW-2	0.75 - 0.88	NS
	WV/CH-PW-3	1.00 - 1.13	NS
	WV/CH-PW-4	1.00 - 1.13	NS
	WV/CH-PW-5	0.83 - 0.96	NS
	WV/CH-PW-6	1.00 -1.13	2.00 - 2.13

[1] – Measured in feet below the ground surface of the river bottom
[2] – "A" represents the shallow interval sample collected at each location which was advanced to a minimum of 12-inches below the sediment where conditions allowed.
[3] – "B" represents the deep interval sample collected at each location which was advanced to a minimum of 6-inches below the shallow sample where conditions allowed.
NS – Not Sampled. See **Section 6.2** for Sampling Deviations

Figure 3 summarizes pore-water sample locations in the NKSA. **Figures 4A** through **4C** provide a smaller scale overview of sample locations in each area.

5.3 VERTICAL AQUIFER PROFILING AND MONITORING WELL INSTALLATION

As stated in the Work Plan, monitoring wells located close to the Rogue River and screened in the shallow groundwater zone were proposed to monitor the GSI. The locations were positioned as close to the Rogue River as possible (i.e., 50 to 500 feet from the Rogue River shoreline) and screened in the top 50 feet of the saturated zone. Additionally, the two wells at HS-MW-266 are situated 690 feet from the Rogue River. This location was proposed to evaluate conditions northeast of the DNR fish ponds and hydraulically upgradient of HS-MW-261. Monitoring well locations are depicted on **Figure 3** (overview) and in detail on **Figures 4A** through **4C**.

GZA oversaw the advancement of the borings drilled by WWW's drilling contractor, Stearns Drilling Company (Stearns) of Dutton, Michigan. Hollow-stem auger drilling methods were utilized, and drilling activities occurred between January 31, 2022 and May 11, 2023. At each location, the soil boring was advanced to approximately 50 feet BGT. VAP sampling, in accordance with SOP A25, included in the project-specific QAPP, was then performed by setting a temporary 2-inch diameter PVC well screen and collecting groundwater samples at 10-foot intervals within the saturated zone. If fine-grained soil were present or groundwater column was discontinuous, the VAP intervals were adjusted based on field observations. Investigation derived waste was handled and disposed in accordance with the Work Plan.

The VAP data collected was evaluated and discussed with EGLE to determine the appropriate depth for permanent monitoring well screen interval placement. Specifically, upon the completion of soil boring and VAP sampling, one 2- inch monitoring well was installed within the top 10 feet of the saturated zone. The screen position of the deeper monitoring well(s), if applicable, were selected based on the distance of the monitoring well to the shoreline,

geology, and estimated groundwater flow path. After receiving VAP data, proposed monitoring well screen locations were communicated to EGLE and agreed upon before the monitoring well screens were installed.

As described in the Work Plan, VAP samples were collected from the following locations in each study area:

Table 5.3.1 Proposed Monitoring Location

Area	Well(s)	Purpose
Wolven/Jewell	WVNW-MW-200, 202, 203 and Area19-MW-225, 226	Delineate the lateral extent of PFOS concentrations exceeding the criterion upstream and downstream of the Wolven/Jewell Area
	WVNW-MW-201	Near the highest pore-water PFOS detection in this area (WVNW-PW-3)
Wolven/Childsdale (Wolven/Jewell Northeast and Southeast)	Area19-MW-7 (Area 19 RAP well), Area19-MW-221, 223, and 224, WV/CH-MW-240 and 242	Delineate the lateral extent of PFOS concentrations exceeding the criterion upstream and downstream of the Wolven/Childsdale Area
	Area19-MW-222 and WV/CH-MW-241	Near the highest pore-water PFOS detection in this area (Area19-PW-5 & WV/CH-PW-3)
HSP	HS-MW-260, 262, 263, 264, 265, 266 and HS-MW-29A (existing)	Delineate the lateral extent of PFOS concentrations exceeding the criterion upstream and downstream of the HSP plume area
	HS-MW-260, 261, and 262	Near the highest pore-water PFOS detection in this area (HS-PW-3)

See **Appendix D** for soil boring and monitoring well installation logs and **Table 1B** for a summary of the monitoring well screen intervals. **Figure 3** provides GSI final well installation locations.

5.4 GROUNDWATER AND SURFACE WATER GAUGING

Existing staff gauges of the Rogue River were utilized for water level comparison and groundwater flow evaluation in the following locations in the Rogue River:

- Rockford Dam Seawall;
- East Bridge Street Bridge;
- Rogue River Road Bridge; and,
- Jericho Avenue Bridge.

Additional staff gauge locations (11 Mile Bridge, Algoma Avenue Bridge, and 12 Mile Bridge) were added to pair with GSI piezometer locations where existing staff gauges were not present. The water levels measured from these locations were used in combination with USGS gauging station, USGS04118500, to evaluate surface water levels in the Rogue River.

Prior to pore-water sampling associated with the GSI RAP, water levels were collected from the newly installed piezometers and network of staff gauges. A total of nine groundwater gauging events were completed over a three week period between November 9 and November 27, 2020 and are summarized in the Work Plan.

Groundwater gauging events were also completed prior to quarterly groundwater sampling events (second quarter 2023 through first quarter 2024). Groundwater elevation readings were collected from monitoring wells throughout the NKSA and were not limited to GSI piezometers, wells, and staff gauges.

Groundwater and surface water gauging data and associated elevations for the quarterly gauging events are provided on **Table 2**.

GSI piezometer, monitoring well, and staff gauge locations are provided on **Figure 3.** The locations in each study area are further detailed on **Figures 4A** through **4C**.

5.5 GROUNDWATER SAMPLING

The GSI wells installed as described in **Section 5.3** and existing well HS-MW-29A and Area 19 well AREA19-MW-7A (situated near the Rogue River and screened in the shallow groundwater zone) were included in the GSI quarterly groundwater sampling events. Groundwater sampling was performed using adjustable rate, submersible pumps, peristaltic pumps, or bladder pumps and disposable tubing. For a detailed description of the procedure followed for low flow groundwater sampling, refer to SOP A16 included in the project-specific QAPP. Low-flow groundwater sampling logs are included in **Appendix E**.

5.5.1 GSI RAP Groundwater Sampling

As identified in the GSI RAP, existing well clusters HS-MW-19S/D and HS-MW-29A (located hydraulically downgradient of the House Street plume) and one existing well installed by EGLE (DEQ-MW9-57) were sampled concurrently during the pore-water sampling event. Newly installed piezometers (Area19-GSI-1, Area19-GSI-2, and Area19-GSI-3) were also sampled during the December 2020 pore-water sampling event. Piezometer sampling was conducted in general accordance with procedures outlined in SOP A29 included in the GSI RAP.

5.5.2 Quarterly Groundwater Sampling

Once VAP sampling was completed and monitoring wells were installed, GSI monitoring wells were sampled quarterly per Section 7.10(d) of the CD. GSI sampling events occurred:

- Q2 2023: May 22 through June 1, 2023.
- Q3 2023: August 7 through August 11, 2023.
- Q4 2023: October 16 through October 20, 2023.
- Q1 2024: January 9 through January 25, 2024.

Monitoring well sampling was conducted in general accordance with procedures outlined in SOP A16. Investigation derived waste was handled and disposed in accordance with the Work Plan.

GSI monitoring well locations are provided on **Figure 3.** The locations in each study area are further detailed on **Figures 4A** through **4C**.

6.0 GSI RAP AND WORK PLAN SAMPLING ADJUSTMENTS

The following sections describe adjustments made to the GSI RAP and Work Plan as necessary to complete the approved work under the circumstances and in accordance with standard operating practices and procedures referenced in the EGLE-approved GSI RAP.

6.1 PIEZOMETER INSTALLATION ADJUSTMENTS

The piezometers screens were planned to be installed to a depth of 3 feet below the bottom of the river sediment (**Section 5.1**), and adjustments were made to accommodate subsurface conditions (e.g., rocky substrate). **Table 1A** lists the screen intervals for the piezometers as installed. Eight of the 16 piezometers were installed with the top of screen shallower than 3 feet below ground surface (i.e., WVNW-GSI-1, WVNW-GSI-2, AREA19-GSI-1, AREA19-GSI-2, AREA19-GSI-3, WV/CH-GSI-1, WV/CH-GSI-2, HS-GSI-1, HS-GSI-2, HS-GSI-3, HS-GSI-4, and HS-GSI-5).

6.2 GSI RAP PORE-WATER SAMPLING ADJUSTMENTS

As previously mentioned in **Section 5.2**, in addition to the GSI RAP initial samples, pore-water samples were collected to delineate PFAS in HS-PW-3, located at the southeast downgradient portion of the HSP plume (HS-PW-2.5, 3R and 3.5). To further support the Work Plan VAP investigation, additional porewater sampling was completed in the Wolven/Jewell Study Area (WVNW-PW-5 through WVNW-PW-7 and Area19-PW-8 through Area19-PW-10).

The intervals at which pore-water samples were collected were based upon the results of the vacuum-gauge device and confirmation of up-welling groundwater gradient at each location. In some sample locations, the shallow intervals were at depths less than 12 inches due to refusal from rocky sediment. While certain shallow intervals were less than the minimum that was stated in the GSI RAP, SOP A27 allowed for the sampler inlet to be positioned as shallow as 6 inches below the base of the loose sediment. **Table 5.2.1** shows the depth interval in feet below the river bottom for each sample.

Subsurface conditions (rocky substrate, refusal, etc.) did not allow for the collection of the deep interval at every location. Refusal or inadequate groundwater gradient prevented the sampling deeper intervals at 23 pore-water sampling locations. Table 5.2.1 represents where a deep sample could not be collected as “NS”. Proposed pore-water sample locations in the study area northwest of the HSP (HS-PW-10 and HS-PW-11) were required to be moved further downstream due to impassable conditions of the Rogue River combined with limited private landowner access. With EGLE’s approval these locations were relocated upstream and downstream of GSI piezometer HS-GSI-9.

6.3 GSI VAP SAMPLING ADJUSTMENTS

Two locations (Area19-MW-226 step out in Q1 2023 and Area19-MW-225 step out in Q3 2022) were installed after the additional porewater sampling was conducted. These two step-out locations were placed at the approximate edge of the plume which was determined by evaluating the pore-water PFAS concentrations.

R&W/GZA had several rounds of communication with EGLE regarding possible changes in well locations based on inaccessibility, etc. No changes to the proposed locations identified in the Work Plan were made without EGLE concurrence.

The following wells were relocated:

- WVNW-MW-200: moved 500 ft east away from river
- Area19-MW-221: moved to the parcel north of proposed location
- Area19-MW-223: moved 300 ft southwest and into the Childsdale Avenue right-of-way
- HS-MW-263: moved 750 ft south
- HS-MW-265: moved 550 ft SE along river edge

These changes in location were minor, approved by EGLE, and did not materially affect the implementation of the GSI RAP or Work Plan.

6.4 GSI GROUNDWATER SAMPLING ADJUSTMENTS

There were no deviations or exclusions from the Work Plan during the quarterly groundwater sampling schedule.

7.0 ANALYTICAL METHOD AND PARAMETERS

Analyses of groundwater and porewater samples collected were conducted by Pace Analytical Services (Pace) of West Columbia, South Carolina. The samples were analyzed for PFAS using DoD QSM 5.3 guidelines for PFAS by isotope dilution methodology. The analyte list included the 28 PFAS compounds specified in the CD, and reporting limits are provided in Table A.7.7 of the project-specific QAPP.

8.0 GSI AND APPLICABLE RULE 57 WATER QUALITY STANDARDS

The potential environmental exposure pathways for impacted surface water in the Rogue River and applicable Part 4 Rule 57 Water Quality Values[1] are identified as follows:

- Human exposure via non-drinking water exposure route – Rule 57 HNDV;
- Aquatic life exposure to impacted water in the Rogue River – Rule 57 FCV; and
- Wildlife exposure to impacted water in the Rogue River – Rule 57 WV.

Parameter	Units	HNDV	FCV	WV
PFBS	µg/L	670	24,000	Not Applicable
PFHxS	µg/L	0.21	Literature Search Not Conducted	Not Applicable
PFNA	µg/L	0.03	Literature Search Not Conducted	Not Applicable
PFOA	µg/L	0.17	880	Not Applicable
PFOS	µg/L	0.012	140	Not Applicable

The human health drinking water value is not applicable to this GSI investigation. Rather, the applicable criteria are the generic groundwater GSI criteria[2], which are the lesser of HNDV, FCV, and WV. The GSI criteria are derived using surface water concentrations, but for the purpose of this evaluation they were used for the evaluation of pore-water data to aid in evaluating compliance at the surface water compliance point. This does not imply that GSI criteria are necessarily applicable to the pore-water concentrations.

[1] Michigan Part 4, Rule 57 Water Quality Values were last updated October 12, 2023.
[2] Michigan Part 201 Groundwater Cleanup Criteria are based on "Table 1, Groundwater: Residential and Nonresidential Part 201 Generic Cleanup Criteria and Screening Levels/Part 213 Tier I Risk Based Screening Levels," Michigan Administrative Code, Cleanup Criteria Requirements for Response Activity, Rules 299.44 and 299.49, effective December 30, 2013; last updated October 12, 2023.

Compound	Threshold Value (µg/L)	Basis for Value
PFBS	670	GSI
PFHxS	0.21	GSI
PFNA	0.03	GSI
PFOA	0.17	GSI
PFOS	0.012	GSI

9.0 SITE SAMPLING RESULTS

The following section provides a summary of the analytical results from pore-water samples collected during the investigation activities.

9.1 PORE-WATER SAMPLING

Pore-water was sampled according to the methods outlined in **Section 5.2**. Based on field observations and pressure differential measurements, there is no indication that surface water intrusion occurred during pore-water sampling. Refer to **Appendix C** for porewater sampling logs.

During pore-water sampling, 47 samples were collected from a total of 37 locations. Of those locations, 0 samples exceeded the GSI criterion for PFOA (0.17 µg/L). For PFOS, 27 samples were greater than the GSI criterion (0.012 µg/L). The PFOS concentrations of samples are further described below by each area:

- **Wolven/Jewell Study Area (downgradient of the Wolven Northwest plume)**

>0.012 µg/L	WVNW-PW-3(A) and WVNW-PW-4(A)
<0.012 µg/L	WVNW-PW-1(A), WVNW-PW-1(B), WVNW-PW-2(A), WVNW-PW-2(B), and WVNW-PW-5A
Non-Detect	WVNW-PW-6A, WVNW-PW-6B, and WVNW-PW-7A

- **Wolven/Jewell Study Area (downgradient/northeast of the Wolven plume)**

>0.012 µg/L	Area19-PW-1(A), Area19-PW-2(A), Area19-PW-2(B), Area19-PW-3(A), Area19-PW-4(A), Area19-PW-4(B), Area19-PW-5(A), Area19-PW-6(A), Area19-PW-6(B), Area19-PW-7(A), and Area19-PW-9B
<0.012 µg/L	Area19-PW-8A, Area19-PW-9A, and Area19-PW-10A
Non-Detect	None

- **Wolven/Childsdale Study Area (Wolven/Jewell Northeast and Southeast)**

>0.012 µg/L	WV/CH-PW-1(A), WV/CH-PW-2(A), WV/CH-PW-3(A), WV/CH-PW-4(A), WV/CH-PW-5(A), and WV/CH-PW-6(A)
<0.012 µg/L	None
Non-Detect	WV/CH-PW-6(B)

- **HSP Study Area (South/Southeast, downgradient of the HSP plume along Rogue River)**

>0.012 µg/L	HS-PW-2.5(A), HS-PW-2.5(B), HS-PW-3(A), HS-PW-3R(A), HS-PW-3.5(A), HS-PW-4(A), HS-PW-5(A), and HS-PW-8(A)

<0.012 µg/L	HS-PW-2(A), HS-PW-6(A), HS-PW-7(A), and HS-PW-9(A)
Non-Detect	HS-PW-1(A), HS-PW-1(B)

- **HSP Study Area (Northwest of the HSP)**

>0.012 µg/L	None
<0.012 µg/L	None
Non-Detect	HS-PW-10(A) and HS-PW-11(A)

Pore-water sample results are provided on **Table 3**. **Figures 5A** through **5C** depict pore-water PFOA and PFOS concentrations in each study area. A geological cross section plan view is presented on **Figure 6**. Geological cross sections through the approximate center lines of the plumes (interpolated with data from 2017 through 2019) and parallel to the Rogue River are provided as **Figures 6A** through **6F**. The isoconcentrations presented on **Figure 6** were interpolated from data collected in 2017 thru 2019 and do not represent the current state of groundwater conditions. In lieu of isoconcentration maps, **Figures 5A thru 5C** were prepared to more appropriately summarize the quarterly groundwater sampling events.

9.2 VAP GROUNDWATER SAMPLING

VAP groundwater samples were collected from a total of 20 locations. Each of the locations was sampled according to the methods outlined in **Section 5.3**. Of the 85 GSI VAP samples collected, zero exceeded GSI criterion for PFOA (0.17 µg/L). PFOS was measured over GSI criterion (0.012 µg/L) in 35 samples at 15 locations across the GSI study areas. Likewise, for PFOS, 50 samples were less than 0.012 µg/L or were non-detect in laboratory analysis. The PFOS concentrations per locations are further described below for each area and a summary of the data is presented in **Table 4**:

- **Wolven/Jewell Study Area (downgradient of the Wolven Northwest plume)**

>0.012 µg/L	WVNW-MW-200, WVNW-MW-201, WVNW-MW-202
<0.012 µg/L	None
Non-Detect	None

- **Wolven/Jewell Study Area (downgradient/northeast of the Wolven plume)**

>0.012 µg/L	AREA19-MW-7, AREA19-MW-221, AREA19-MW-222, AREA19-MW-223, AREA19-MW-224, AREA19-MW-225
<0.012 µg/L	AREA19-MW-226
Non-Detect	None

- **Wolven/Childsdale Study Area (Wolven/Jewell Northeast and Southeast)**

>0.012 µg/L	WV/CH-MW-240, WV/CH-MW-241
<0.012 µg/L	None
Non-Detect	WV/CH-MW-242

- **HSP Study Area (South/Southeast, downgradient of the HSP plume along Rogue River)**

>0.012 µg/L	HS-MW-260, HS-MW-261, HS-MW-262
<0.012 µg/L	HS-MW-263, HS-MW-265
Non-Detect	HS-MW-264, HS-MW-266

A geological cross section plan view is presented on **Figure 6**. Geological cross sections through the approximate center lines of the plumes (interpolated with data from 2017 through 2019) and parallel to the Rogue River are shown on **Figures 6A** through **6F**. Note, VAP results are not included on the appended figures (i.e., only permanent well data). Data from the VAP samples are included, however, on the cross sections.

9.3 GROUNDWATER SAMPLING

Groundwater samples were collected from a total of 33 locations in the GSI area once per quarter for four consecutive quarters (refer to **Section 5.5.2** for sample dates). In total there were 132 samples for quarterly GSI groundwater sampling. Additionally, 3 piezometers and 4 existing wells were sampled in Q4 2020, as discussed in **Section 5.1**. With those locations included, there are 39 groundwater sampling locations and 139 samples collected.

Out of the 139 groundwater samples, 1 sample (AREA19-MW-222 during Q2 of 2023) exceeded the GSI criterion for PFOA at a concentration of 0.18 µg/L (versus the GSI criterion of 0.17 µg/L).

PFOS was not detected over its GSI criterion in AREA19-MW-221B Q1 2024. PFOS was detected in 21 wells across the GSI study area. In total, over the 4 quarters, 83 samples were greater than the GSI criterion (0.012 µg/L). With the results from the 2020 sampling included, there were 87 samples above the criterion. 52 samples were less than 0.012 µg/L or were non-detect in laboratory analysis. The PFOS concentrations are further described by each area below based on the maximum value observed at each location:

- **Wolven/Jewell Study Area (downgradient of the Wolven Northwest plume)**

>0.012 µg/L	WVNW-MW-200A, WVNW-MW-200B, WVNW-MW-201A, WVNW-MW-201B, WVNW-MW-201C, WVNW-MW-202A, WVNW-MW-202B,
<0.012 µg/L	WVNW-MW-203
Non-Detect	None

- **Wolven/Jewell Study Area (downgradient/northeast of the Wolven plume)**

>0.012 µg/L	AREA19-GSI-1, AREA19-GSI-2, AREA19-GSI-3, AREA19-MW-221A, AREA19-MW-221B, AREA19-MW-222, AREA19-MW-223, AREA19-MW-224, AREA19-MW-225A, AREA19-MW-7A
<0.012 µg/L	None
Non-Detect	WV-DEQ-MW9-57, AREA19-MW-225B, AREA19-MW-226A, AREA19-MW-226B

- **Wolven/Childsdale Study Area (Wolven/Jewell Northeast and Southeast)**

>0.012 µg/L	WV/CH-MW-240, WV/CH-MW-241A, WV/CH-MW-241B
<0.012 µg/L	None
Non-Detect	WV/CH-MW-242A, WV/CH-MW-242B

- **HSP Study Area (South/Southeast, downgradient of the HSP plume along Rogue River)**

>0.012 µg/L	HS-MW-29A, HS-MW-260, HS-MW-261, HS-MW-262
<0.012 µg/L	HS-MW-263A, HS-MW-263B
Non-Detect	HS-MW-19S, HS-MW-19D, HS-MW-264, HS-MW-265, HS-MW-266A, HS-MW-266B

Groundwater sample results are summarized on **Table 5**. **Figures 5A** through **5C** depict PFOA and PFOS concentrations in each study area. A geological cross section plan view is presented on **Figure 6**. Geological cross sections through the approximate center lines of the plumes (interpolated with data from 2017 through 2019) and parallel to the Rogue River are shown on **Figures 6A** through **6F**.

9.4 RESULTS SUMMARY

Based on the results summarized above (**Sections 9.1-9.3**), the following summarizes the GSI investigation:

Wolven/Jewel Area is delineated laterally by pore-water samples. The furthest upstream and downstream samples were either non-detect for PFOS or below GSI criteria. The furthest upstream and downstream monitoring wells in the area have PFOS concentrations exceeding GSI criteria (**Figure 5A**).

Wolven/Childsdale Study Area (Wolven/Jewell Northeast and Southeast) is delineated upstream by the consistent non-detection for PFOS in the AREA19-MW-226 monitoring well cluster and the sample results that are less than criteria at pore-water location AREA-19-PW-10. The southern, downstream portion of this area is delineated by the non-detects for PFOS in the WV/CH-MW-242 cluster. However, there was an exceedance of GSI criteria in the shallow sample taken at pore-water location WV/CH-PW-6 (**Figure 5B**).

The HSP area is delineated on the northern, upstream side by consistent non-detects for PFOS in monitoring well cluster HS-MW-19 and the non-detect in both shallow and deep samples at pore-water location HS-PW-1. The southern and downstream end of the HSP area is well delineated for PFOS by monitoring wells and porewater samples that were either non-detects or below GSI criteria. All samples from HS-MW-263 support this (**Figure 5C**).

10.0 DATA QUALITY ASSURANCE AND CONTROL

QC samples (i.e., field blanks, field duplicates, and MS/MSDs) were collected at a rate of one per 20 samples in accordance with the project-specific QAPP and approved Work Plan. QA/QC samples were collected using the methods described in the SOPs and analyzed using the same analytical methods used for the primary sample.

Selected GSI data have been validated according to performance requirements and the QA/QC limits in Table D.1.1 of Revision 2 of the QAPP. In addition, R&W/GZA consulted the general guidance in the EPA Contract Laboratory Program National Functional Guidance for Organic and Inorganic Superfund Data Review and relevant analytical methods to assess data usability. Approximately 5% of all PFAS samples collected are included for data validation. Sample delivery group WA28027 (pore-water sampling), XG22049 (pore-water sampling), and YJ25065 (groundwater sampling) were included within the 5% PFAS samples selected for data validation. Adjustments to data qualifiers identified during data validation have been incorporated into the dataset and are included on the attached tables. Analytical data has been provided to EGLE via EDD. Stage 4 Data Validation Reports for GSI pore-water samples, produced by Environmental Standard, are included in **Appendix F**. YJ25065 Stage 4 data validation is expected to be completed in the fourth quarter of 2024.

FIELD PARAMETER QUALIFIERS

During validation of quarterly groundwater sampling data, field parameters were qualified for the following reasons:

- Temperature readings collected prior to July 27, 2023 were qualified because the meters were not checked with a NIST-certified thermometer.
- Specific conductivity readings were qualified when the meter was not calibrated and checked with different standards, or, when calibration was not required, the calibration was not verified and checked with different standards.
- The meter failed the end of day calibration check for a specific parameter.
- The parameter was not stable at the time of sampling and the 2-hour time limit was not reached.

Qualified readings may be used to determine stabilization (intended use) but may not be used for other purposes.

11.0 FINANCIAL ASSURANCE MECHANISM

As described above, the Response Activities for GSI under Paragraph 7.10 of the CD have been undertaken in accordance with the EGLE-approved work plans, and those obligations have been completed. Accordingly, no Financial Assurance Mechanism is required under Paragraph 7.12(a)(viii)(b)-(c) for this GSI CR. As provided in Section 7.10(e) of the CD, Wolverine may submit a work plan to EGLE to undertake Response Activities at the GSI within two years of approval of this report. The need for financial assurance for any Long-Term Response Activity Costs will be revisited and addressed as necessary during each five-year review under Paragraph 8.4 of the CD for any Response Activities proposed and undertaken under Paragraph 7.10(e) of the CD.

12.0 REFERENCES

R&W/GZA. 2018. *Conceptual Site Model Update and Status Report, Former House Street Disposal Area, Wolverine World Wide, Inc., Rockford, Michigan*.

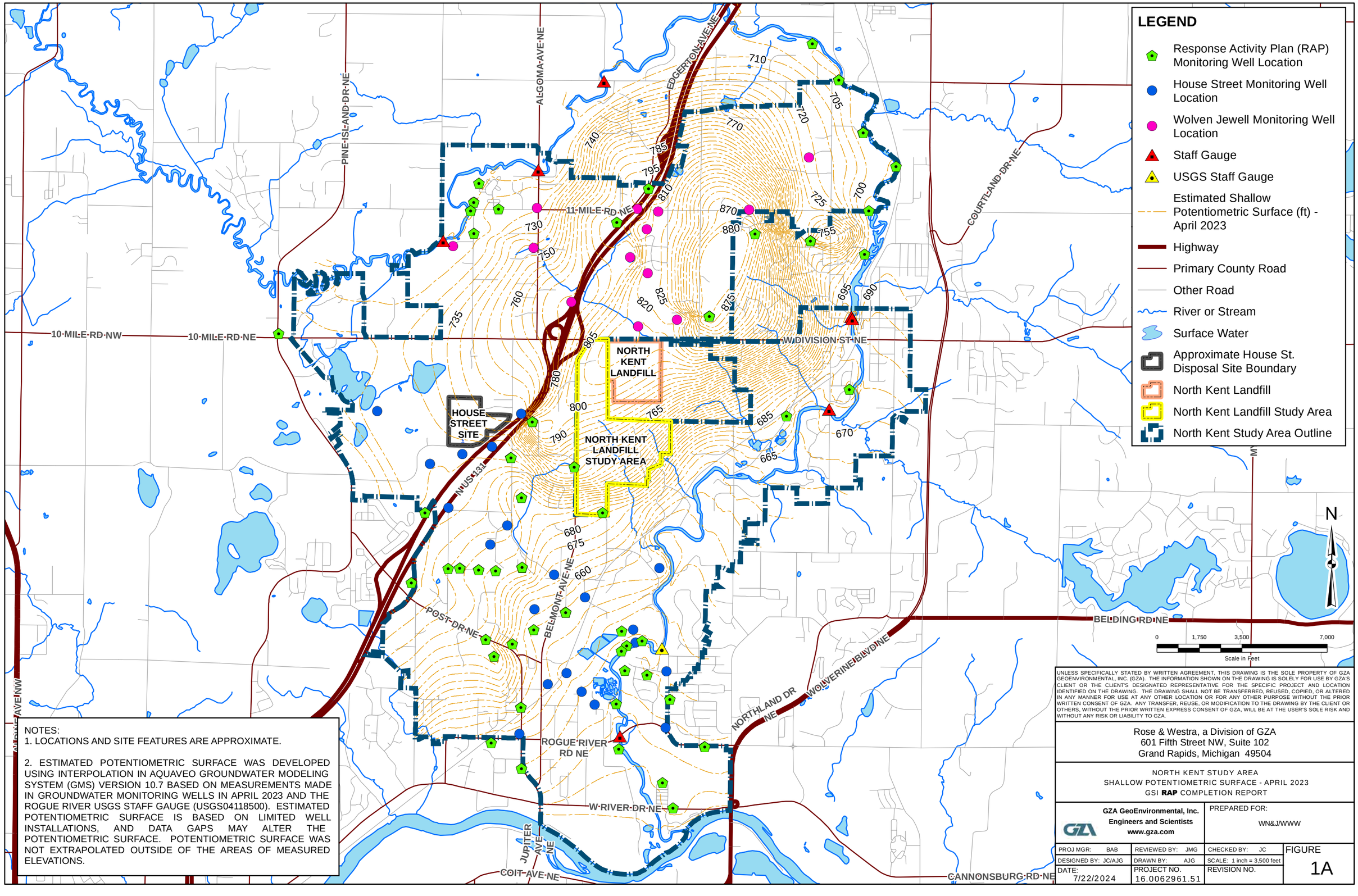
R&W/GZA. 2018. *Quality Assurance Project Plan, Former Wolverine Tannery and House Street Disposal Area, Revision 2.* Submitted to EPA August 29, 2018 with errata pages submitted October 31, 2018 and April 15, 2019.

R&W/GZA. 2019. *Implementation of 2018 Work Plan - Summary Report, Former Wolverine World Wide Tannery Facility*. Submitted to USEPA January 11, 2019.

R&W/GZA. 2020. *Groundwater-Surface Water Interface (GSI) Response Activity Plan, North Kent Study Area*. Submitted to Michigan Department of Environment, Great Lakes, and Energy (EGLE) September 23, 2020.

R&W/GZA. 2021. *Groundwater-Surface Water Interface (GSI) Investigation Summary and Work Plan, North Kent Study Area*. Submitted to Michigan Department of Environment, Great Lakes, and Energy (EGLE) April 26, 2021, revised December 3, 2021.

FIGURES



NOTES:
1. LOCATIONS AND SITE FEATURES ARE APPROXIMATE.

2. ESTIMATED POTENTIOMETRIC SURFACE WAS DEVELOPED USING INTERPOLATION IN AQUAVEO GROUNDWATER MODELING SYSTEM (GMS) VERSION 10.7 BASED ON MEASUREMENTS MADE IN GROUNDWATER MONITORING WELLS IN APRIL 2023 AND THE ROGUE RIVER USGS STAFF GAUGE (USGS04118500). ESTIMATED POTENTIOMETRIC SURFACE IS BASED ON LIMITED WELL INSTALLATIONS, AND DATA GAPS MAY ALTER THE POTENTIOMETRIC SURFACE. POTENTIOMETRIC SURFACE WAS NOT EXTRAPOLATED OUTSIDE OF THE AREAS OF MEASURED ELEVATIONS.

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NORTH KENT STUDY AREA
SHALLOW POTENTIOMETRIC SURFACE - APRIL 2023
GSI **RAP** COMPLETION REPORT

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PROJ MGR: BAB	REVIEWED BY: JMG	CHECKED BY: JC	FIGURE 1A
DESIGNED BY: JC/AJG	DRAWN BY: AJG	SCALE: 1 inch = 3,500 feet	
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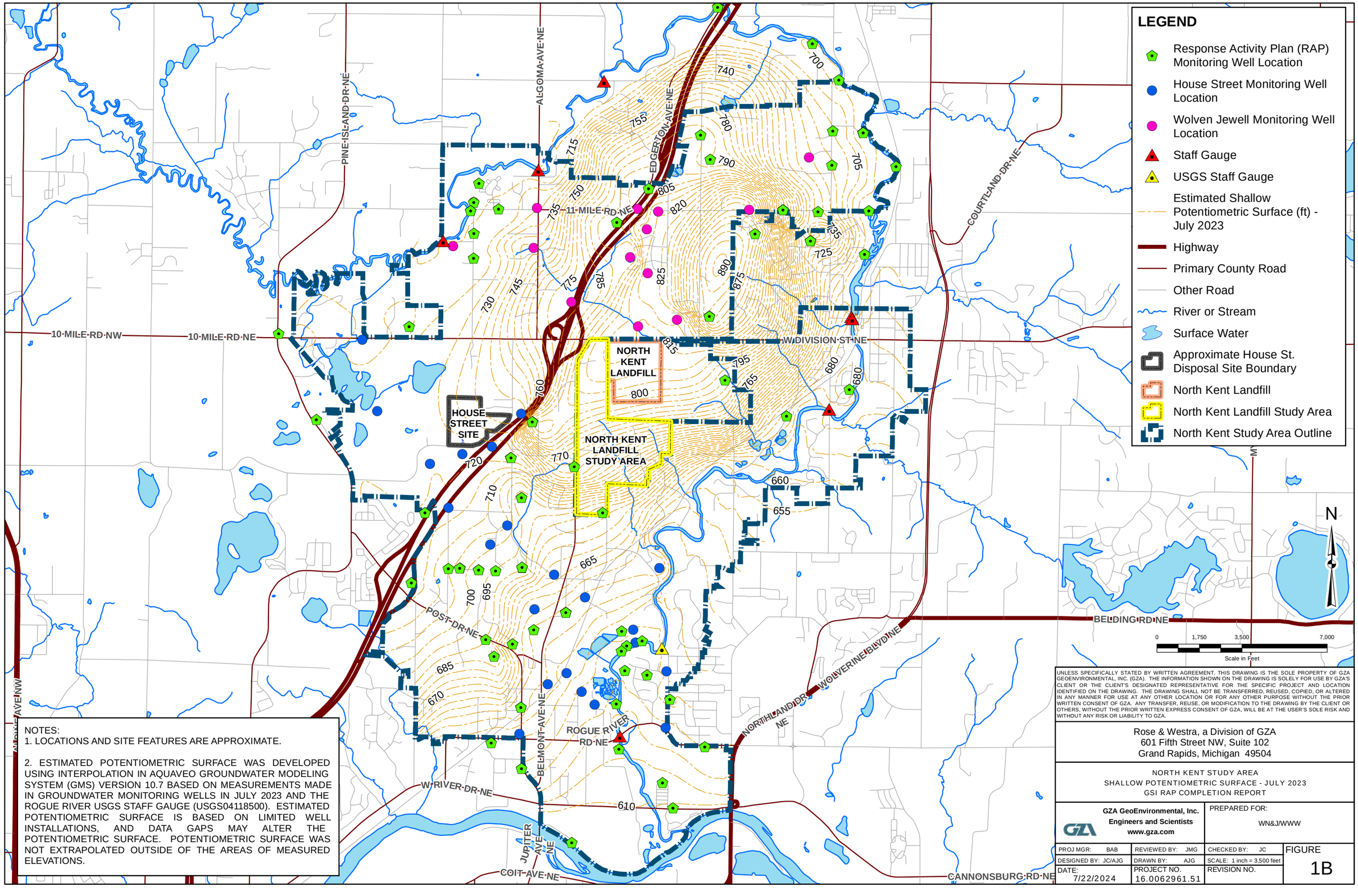

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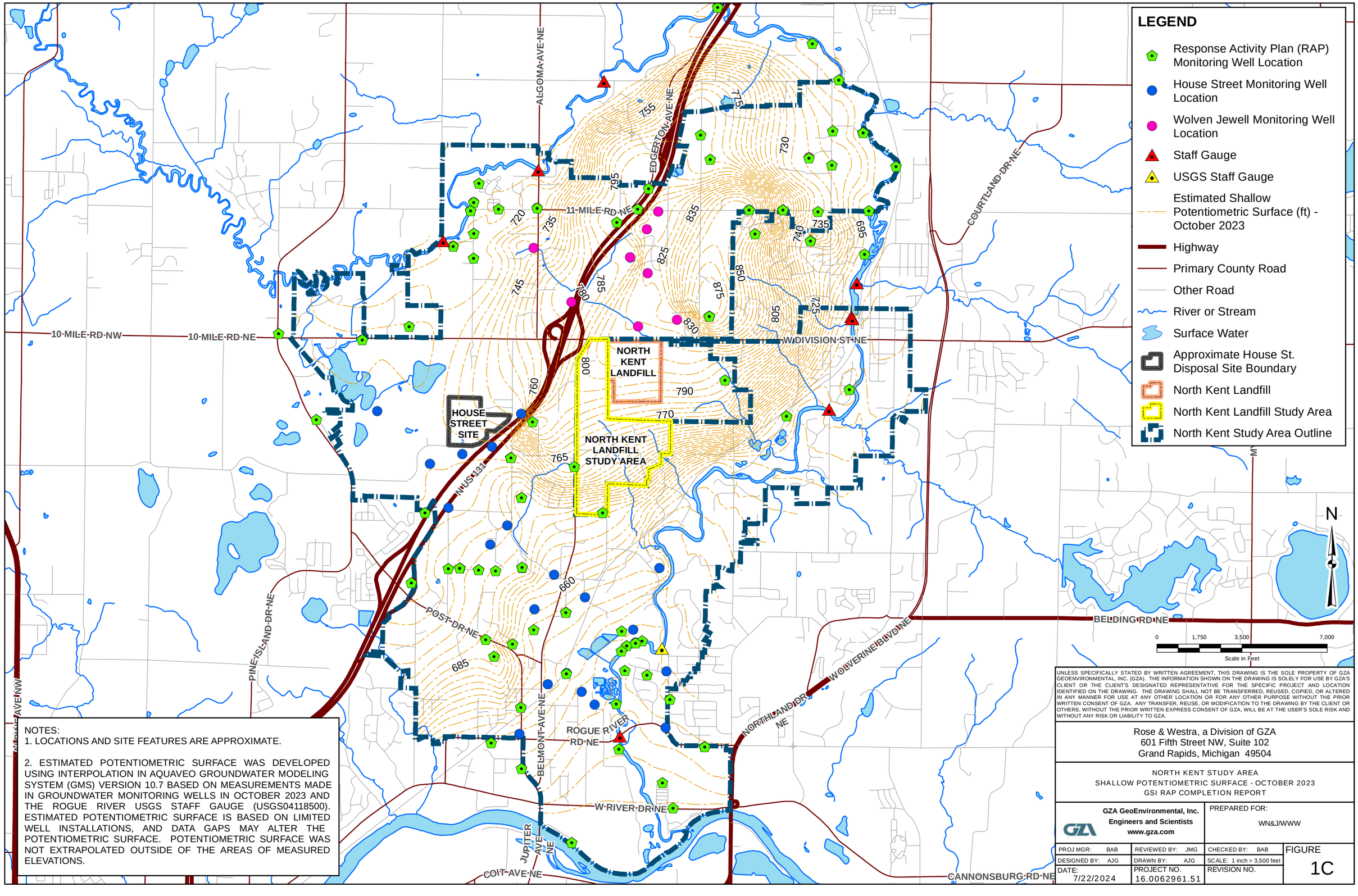

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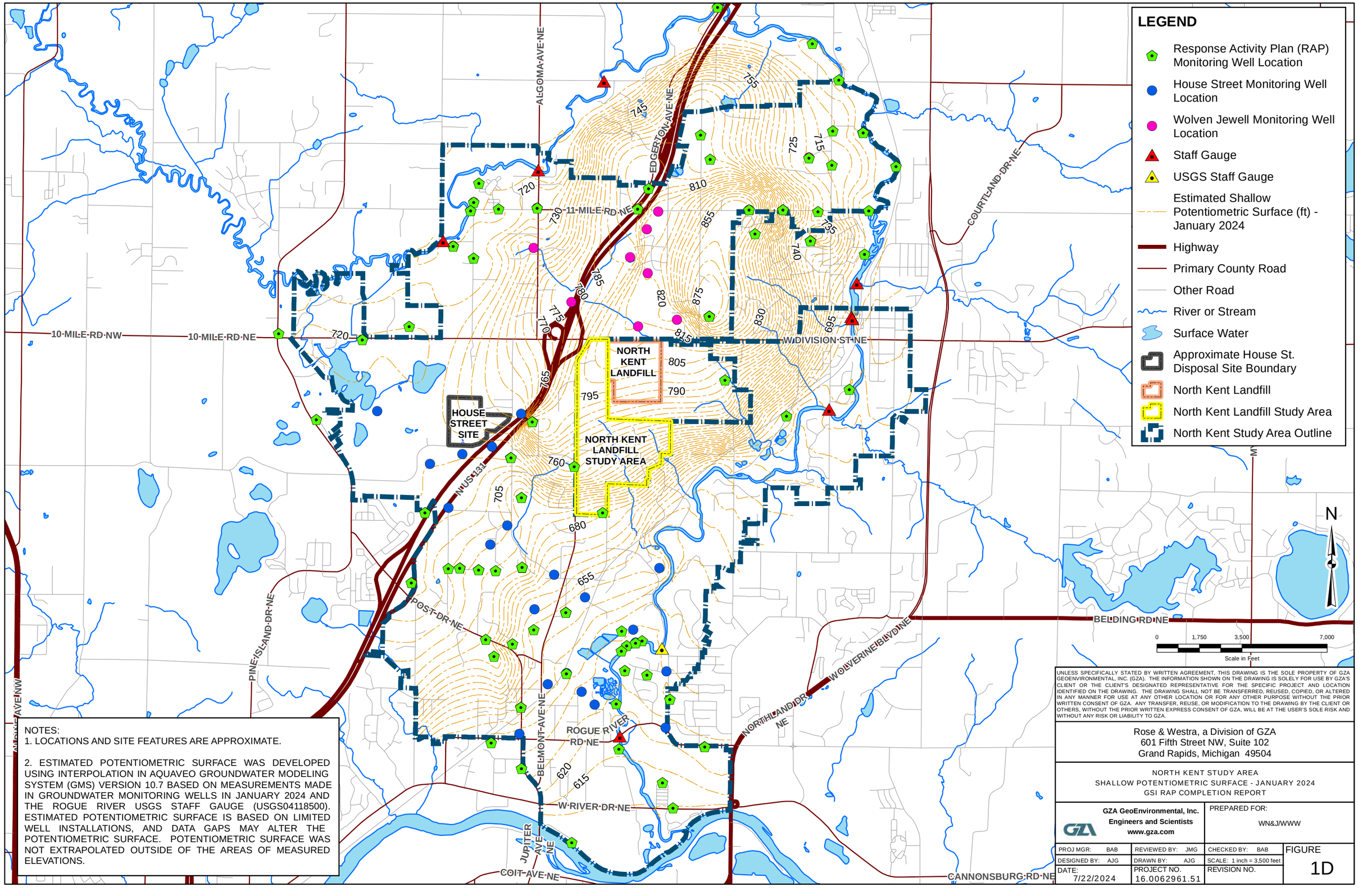

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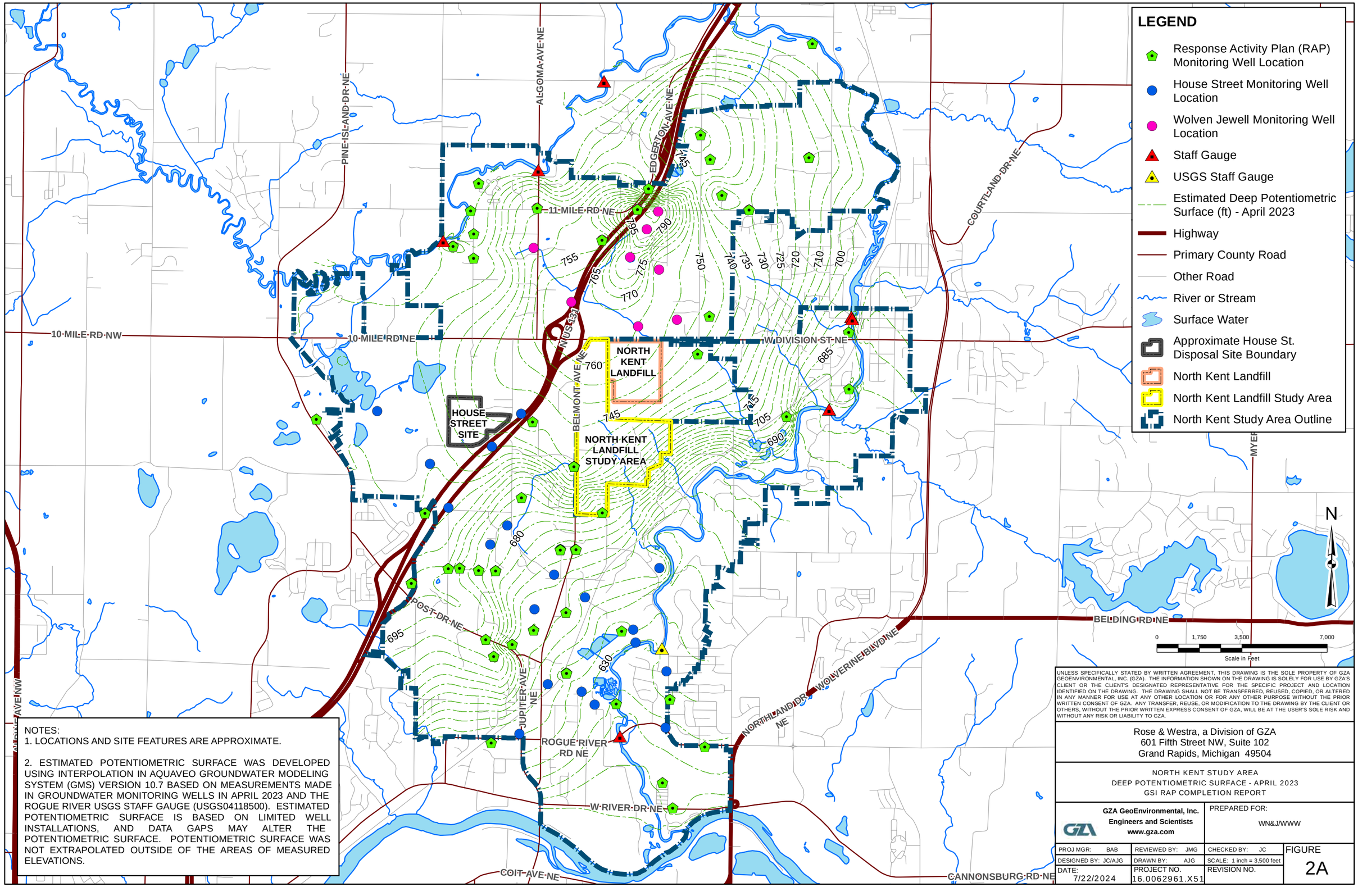

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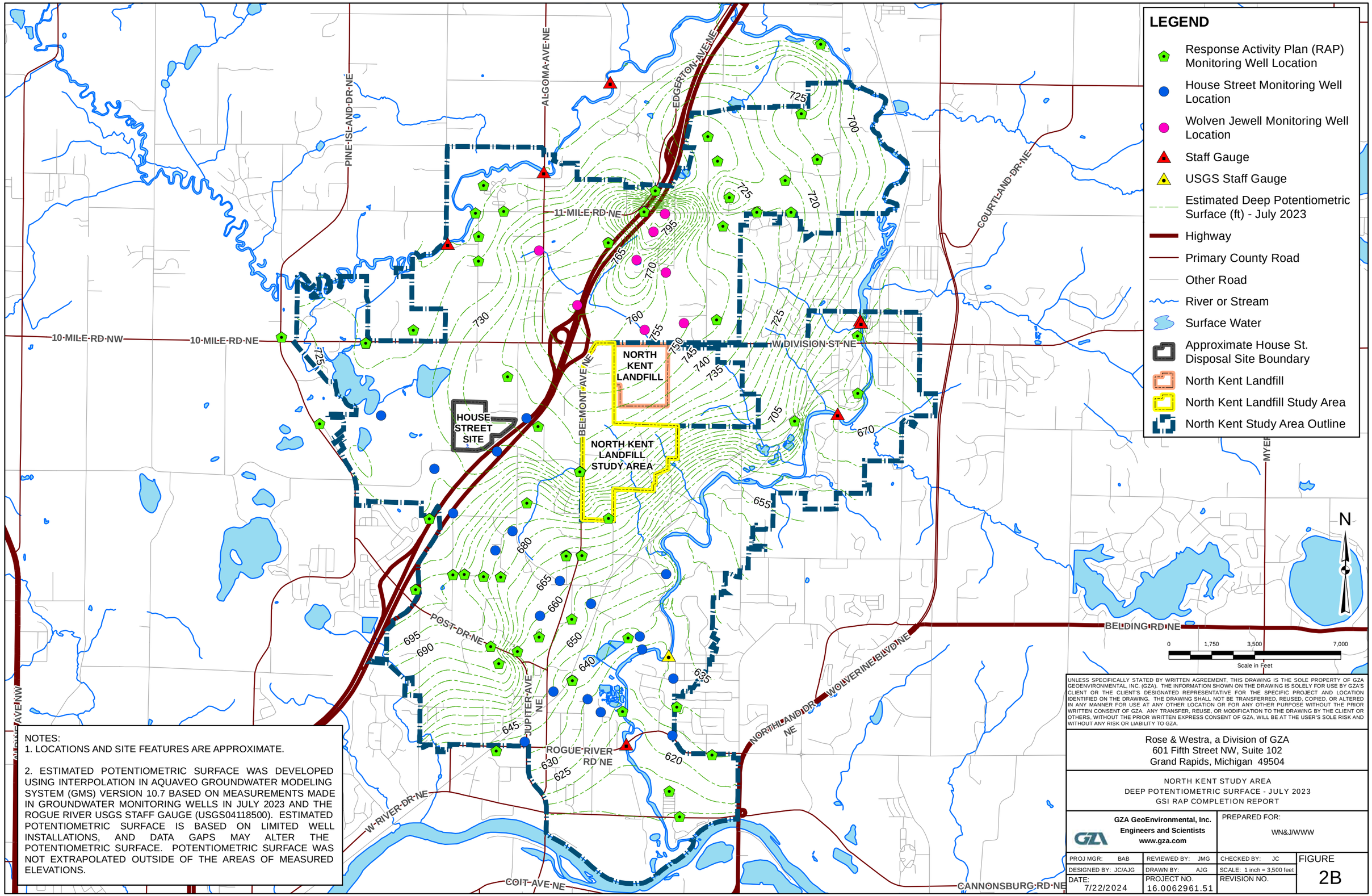

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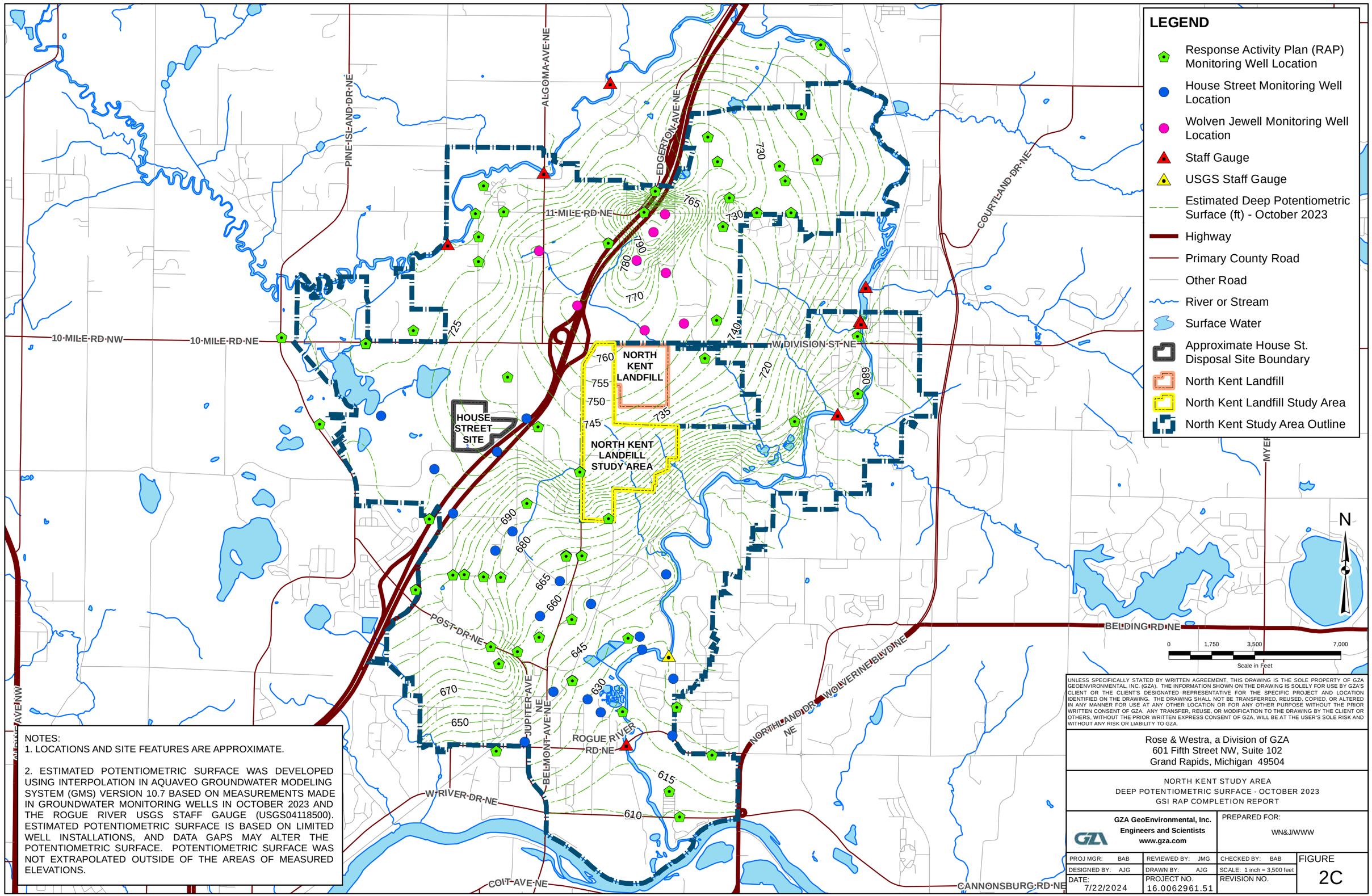

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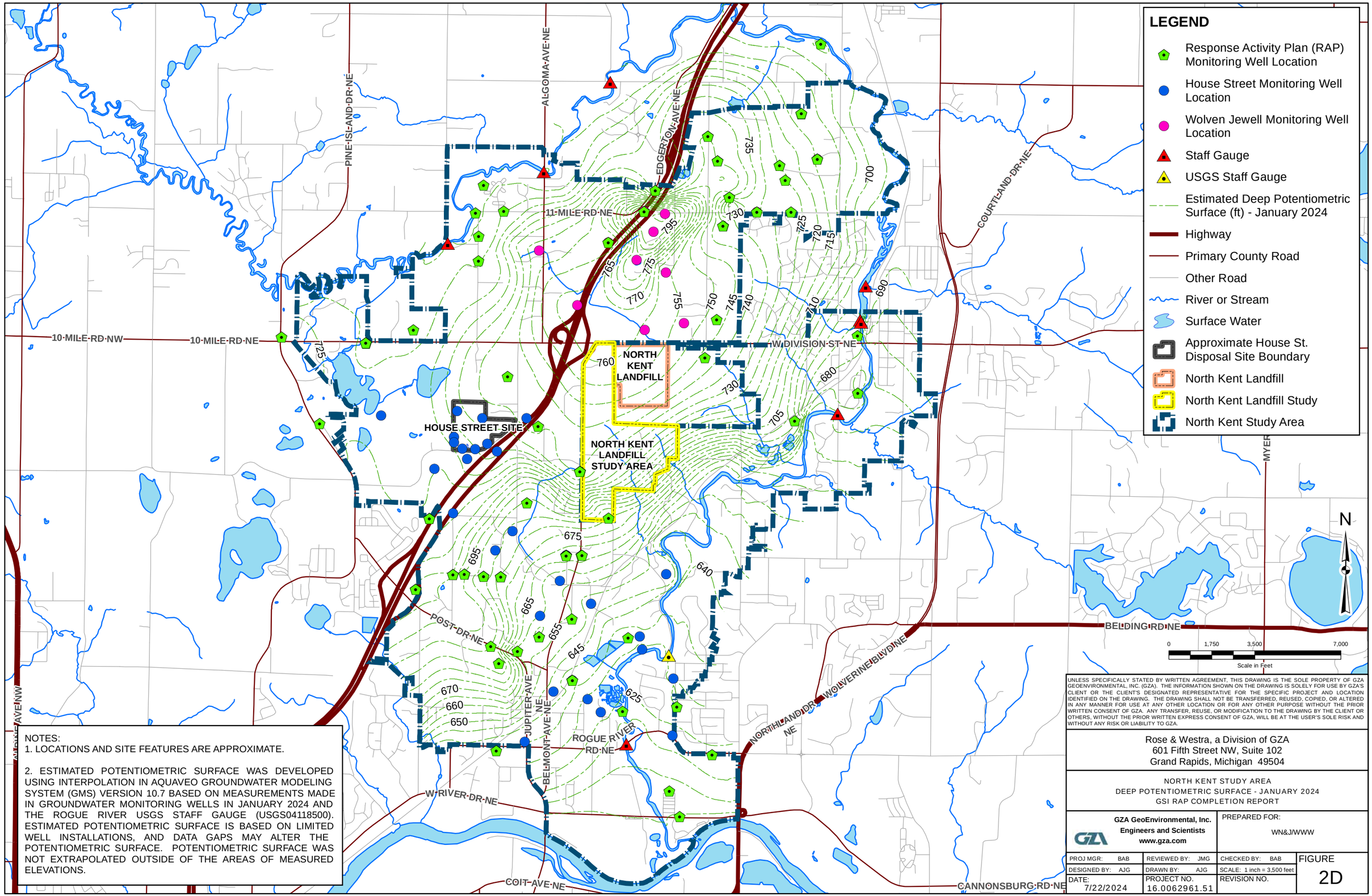

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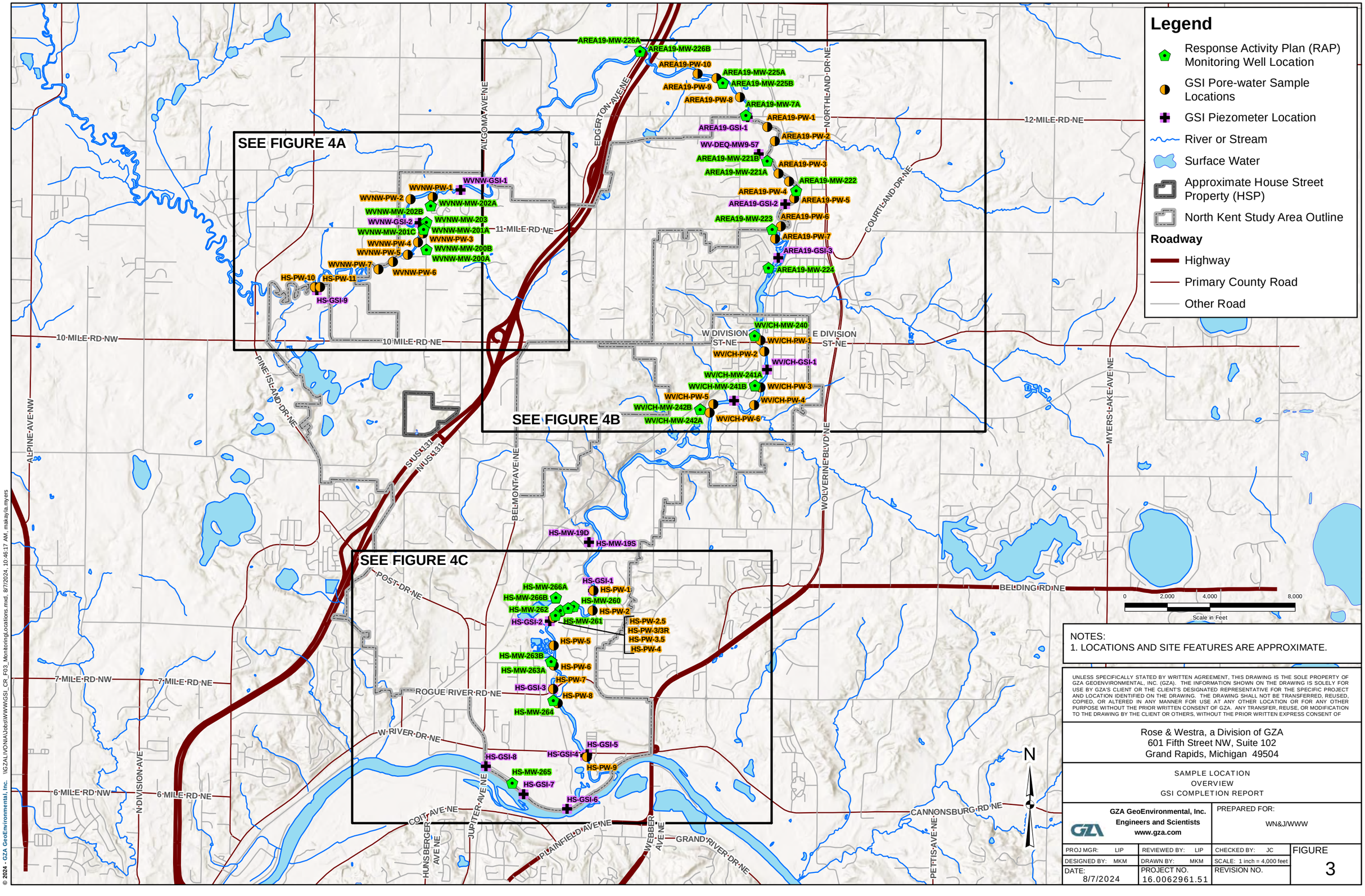


Legend

- Response Activity Plan (RAP) Monitoring Well Location
- GSI Pore-water Sample Locations
- GSI Piezometer Location
- River or Stream
- Surface Water
- Approximate House Street Property (HSP)
- North Kent Study Area Outline

Roadway

- Highway
- Primary County Road
- Other Road

NOTES:
1. LOCATIONS AND SITE FEATURES ARE APPROXIMATE.

Rose & Westra, a Division of GZA
601 Fifth Street NW, Suite 102
Grand Rapids, Michigan 49504

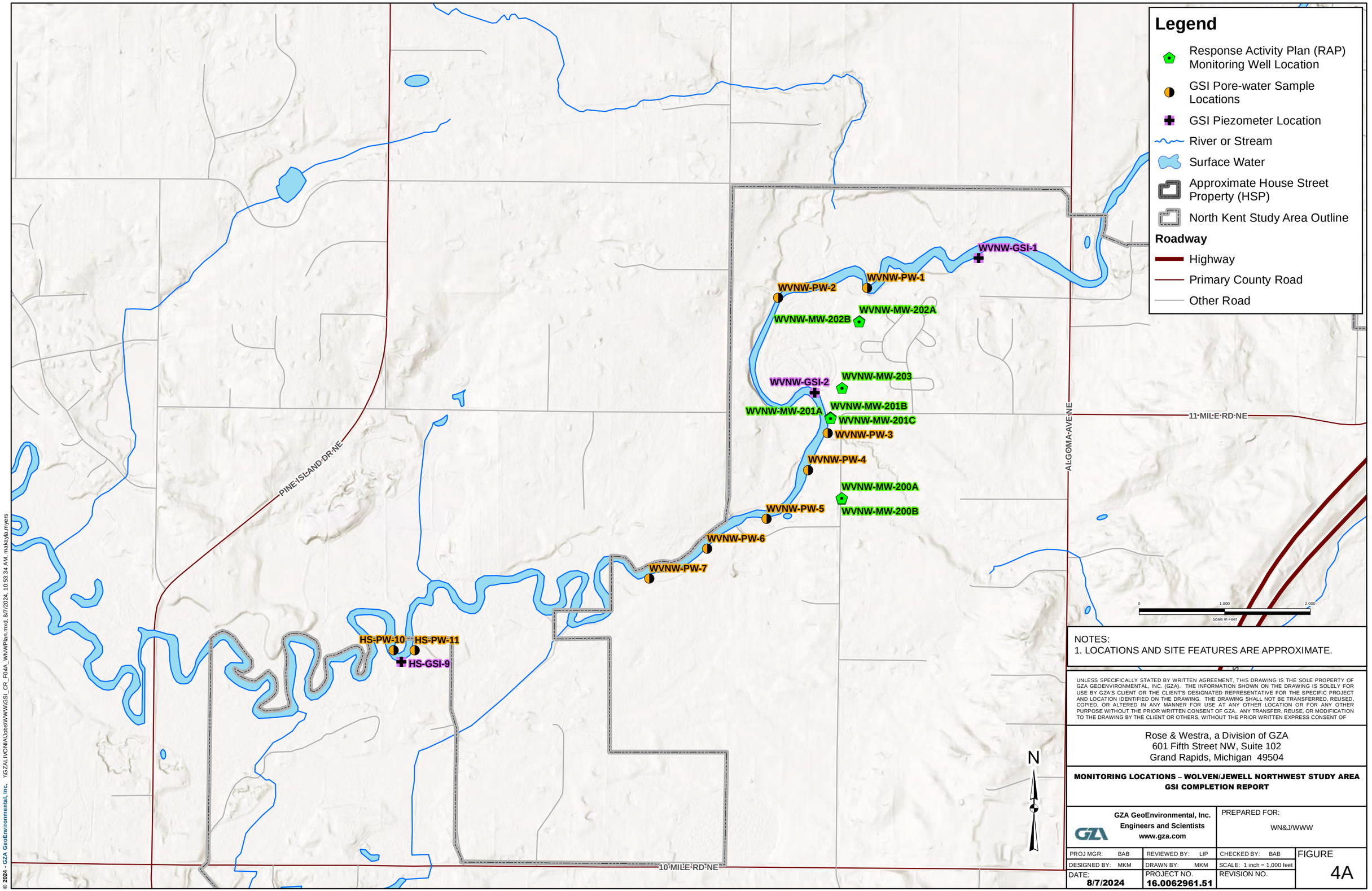
SAMPLE LOCATION
OVERVIEW
GSI COMPLETION REPORT

GZA GeoEnvironmental, Inc.
Engineers and Scientists
www.gza.com

PREPARED FOR: WN&J/WWW

PROJ MGR: LIP	REVIEWED BY: LIP	CHECKED BY: JC	FIGURE 3
DESIGNED BY: MKM	DRAWN BY: MKM	SCALE: 1 inch = 4,000 feet	
DATE: 8/7/2024	PROJECT NO. 16.0062961.51	REVISION NO.	

 \\GZALIVONIA\Jobs\WWW\GSI_CR_F03_MonitoringLocations.mxd, 8/7/2024, 10:46:17 AM, makayla.myers



Legend

- Response Activity Plan (RAP) Monitoring Well Location
- GSI Pore-water Sample Locations
- GSI Piezometer Location
- River or Stream
- Surface Water
- Approximate House Street Property (HSP)
- North Kent Study Area Outline

Roadway

- Highway
- Primary County Road
- Other Road

NOTES:
1. LOCATIONS AND SITE FEATURES ARE APPROXIMATE.

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MONITORING LOCATIONS – WOLVEN/JEWELL NORTHWEST STUDY AREA GSI COMPLETION REPORT

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PREPARED FOR: WN&J/WWW

PROJ MGR: BAB	REVIEWED BY: LIP	CHECKED BY: BAB	FIGURE 4A
DESIGNED BY: MKM	DRAWN BY: MKM	SCALE: 1 inch = 1,000 feet	
DATE: 8/7/2024	PROJECT NO. 16.0062961.51	REVISION NO.	

LEGEND

- MW_Locations_All
- Response Activity Plan (RAP) Monitoring Well Location
- GSI Pore Water Sample Locations
- GSI Piezometer Location
- River or Stream
- Surface Water
- Approximate House Street Property (HSP)
- North Kent Study Area Outline
- Highway
- Primary County Road
- Other Road

N

AREA19-MW-226
AREA19-PW-10
AREA19-PW-9
AREA19-MW-225
AREA19-PW-8
AREA19-MW-7
AREA19-GSI-1
AREA19-PW-1
AREA19-PW-2
WV-DEQ-MW9-57
AREA19-MW-221
AREA19-PW-3
AREA19-PW-4
AREA19-MW-222
AREA19-PW-5
AREA19-GSI-2
AREA19-PW-6
AREA19-MW-223
AREA19-PW-7
AREA19-GSI-3
AREA19-MW-224
WV/CH-MW-240
WV/CH-PW-1
WV/CH-PW-2
WV/CH-GSI-1
WV/CH-MW-241
WV/CH-PW-3
WV/CH-GSI-2
WV/CH-PW-4
WV/CH-PW-5
WV/CH-MW-242
WV/CH-PW-6

13 MILE RD NE
12 MILE RD NE
11 MILE RD NE
10 MILE RD NE
EDGERTON AVE NE
S US 131
N US 131
NORTHLAND DR NE
COURTLAND DR NE
WOLVERINE BLVD NE
W DIVISION ST NE
E DIVISION ST NE

NOTES:
1. LOCATIONS AND SITE FEATURES ARE APPROXIMATE.

Service Layer Credits: Sources: Esri, Airbus DS, USGS, NGA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, NMA, Geodatastyrelsen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap and the GIS user community

0 700 1,400 2,800
SCALE IN FEET

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MONITORING LOCATIONS – WOLVEN/CHILDSDALE STUDY AREA
GSI COMPLETION REPORT

PROJ MGR:	BAB	REVIEWED BY:	LJP	CHECKED BY:	BAB	FIG/DWG	4B
DESIGNED BY:	MKM	DRAWN BY:	MKM	SCALE:	1 in = 1,500 ft		
DATE:	08/07/2024	PROJECT NO:	16.0062961.51	REVISION NO:	REVISION NO	SHEET NO:	XX OF XX

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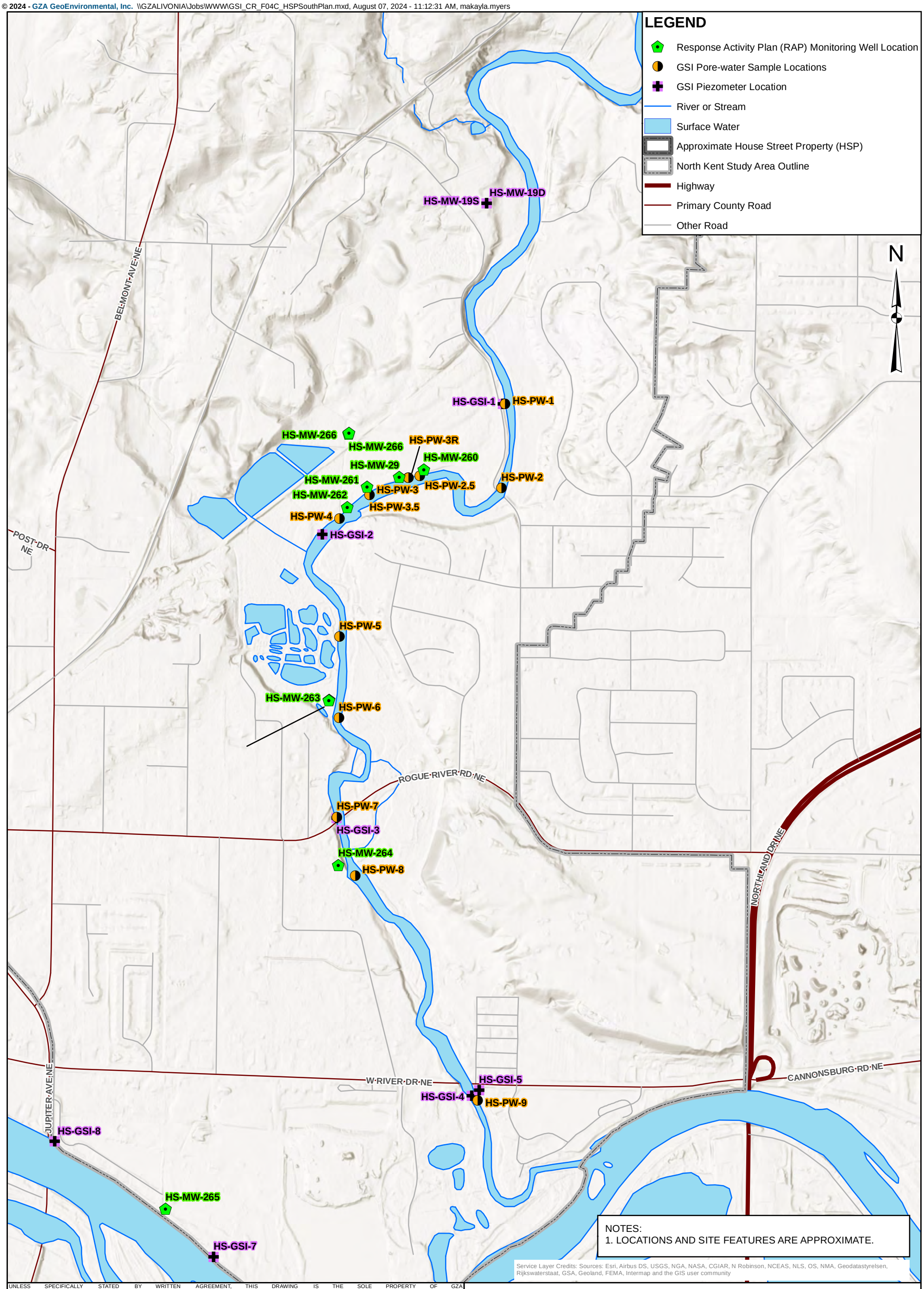

NOTES:
1. LOCATIONS AND SITE FEATURES ARE APPROXIMATE.

Service Layer Credits: Sources: Esri, Airbus DS, USGS, NGA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, NMA, Geodatastyrelsen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap and the GIS user community

0 500 1,000 2,000
SCALE IN FEET

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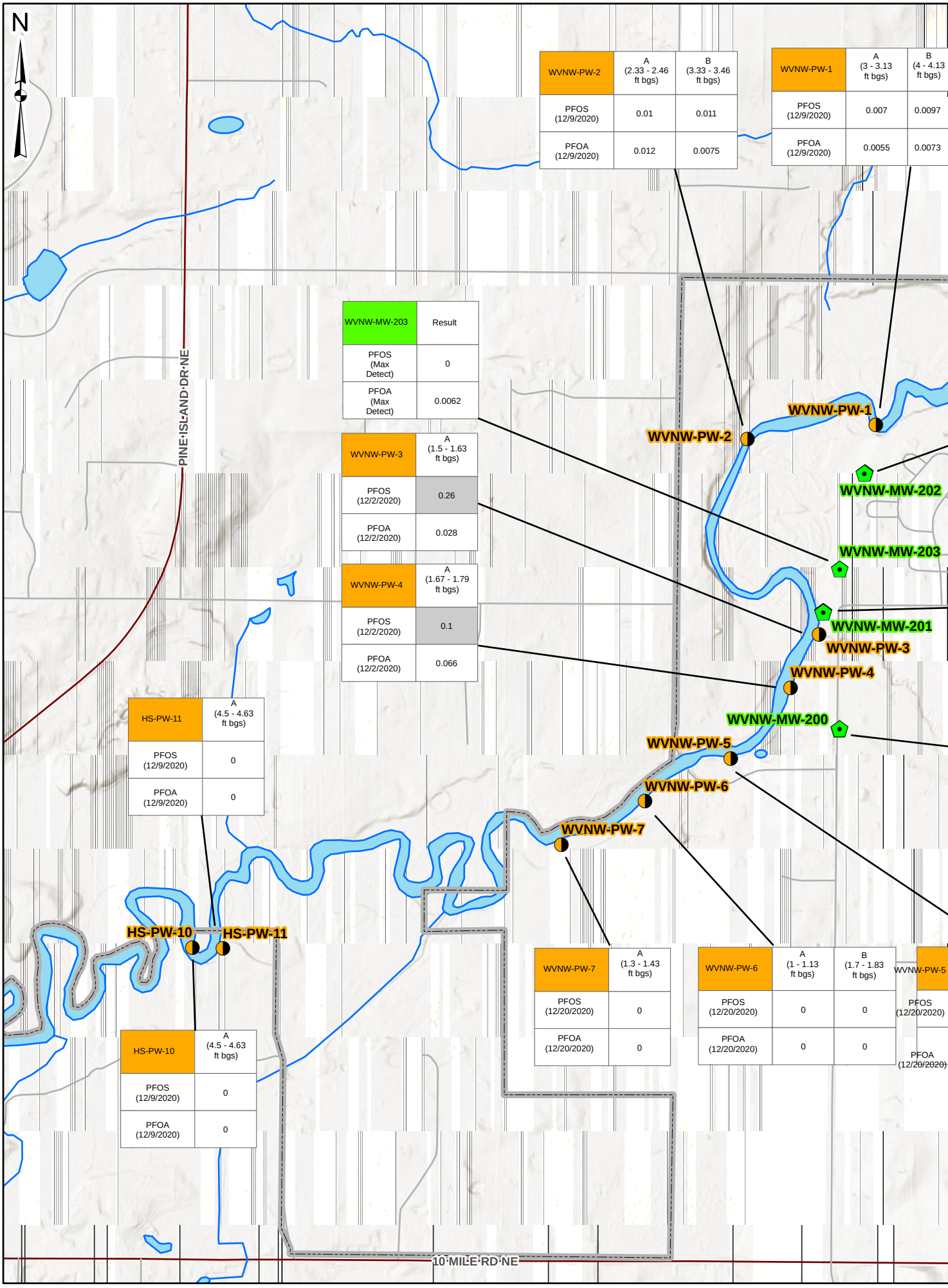
MONITORING LOCATIONS – HSP STUDY AREA
GSI COMPLETION REPORT

PROJ MGR:	BAB	REVIEWED BY:	LJP	CHECKED BY:	BAB	FIG 4C
DESIGNED BY:	MKM	DRAWN BY:	MKM	SCALE:	1 in = 1,000 ft	
DATE: 08/07/2024		PROJECT NO: 16.0062961.51		REVISION NO: REVISION NO		SHEET NO:



WVNW-PW-2	A (2.33 - 2.46 ft bgs)	B (3.33 - 3.46 ft bgs)
PFOS (12/9/2020)	0.01	0.011
PFOA (12/9/2020)	0.012	0.0075

WVNW-PW-1	A (3 - 3.13 ft bgs)	B (4 - 4.13 ft bgs)
PFOS (12/9/2020)	0.007	0.0097
PFOA (12/9/2020)	0.0055	0.0073

WVNW-MW-203	Result
PFOS (Max Detect)	0
PFOA (Max Detect)	0.0062

WVNW-PW-3	A (1.5 - 1.63 ft bgs)
PFOS (12/2/2020)	0.26
PFOA (12/2/2020)	0.028

WVNW-PW-4	A (1.67 - 1.79 ft bgs)
PFOS (12/2/2020)	0.1
PFOA (12/2/2020)	0.066

HS-PW-11	A (4.5 - 4.63 ft bgs)
PFOS (12/9/2020)	0
PFOA (12/9/2020)	0

HS-PW-10	A (4.5 - 4.63 ft bgs)
PFOS (12/9/2020)	0
PFOA (12/9/2020)	0

WVNW-PW-7	A (1.3 - 1.43 ft bgs)
PFOS (12/20/2020)	0
PFOA (12/20/2020)	0

WVNW-PW-6	A (1 - 1.13 ft bgs)	B (1.7 - 1.83 ft bgs)
PFOS (12/20/2020)	0	0
PFOA (12/20/2020)	0	0

WVNW-PW-5
PFOS (12/20/2020)
PFOA (12/20/2020)

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LEGEND

- Response Activity Plan (RAP) Monitoring Well Location
- GSI Pore-water Sample Locations
- GSI Piezometer Location
- River or Stream
- Surface Water
- Approximate House Street Property (HSP)
- North Kent Study Area Outline
- Highway
- Primary County Road
- Other Road

N

AREA19-MW-226

AREA19-MW-226B	Result
PFOS (Max Detect)	0
PFOA (Max Detect)	0

AREA19-MW-226A	Result
PFOS (Max Detect)	0
PFOA (Max Detect)	0

AREA19-PW-10	A (1 - 1.13 ft bgs)
PFOS (7/19/22)	0.0071
PFOA (7/19/22)	0

AREA19-PW-9	A (1 - 1.13 ft bgs)	B (1.5 - 1.63 ft bgs)
PFOS (7/19/22)	0.011	0.014
PFOA (7/19/22)	0.0051	0.0057

AREA19-PW-10

AREA19-PW-9

AREA19-MW-225

AREA19-PW-8	A (1 - 1.13 ft bgs)
PFOS (7/19/22)	0.0067
PFOA (7/19/22)	0.0063

AREA19-MW-225A	Result
PFOS (Max Detect)	0.023
PFOA (Max Detect)	0.01

AREA19-MW-225B	Result
PFOS (Max Detect)	0
PFOA (Max Detect)	0

AREA19-PW-8

AREA19-GSI-1	Result
PFOS (2020)	0.017
PFOA (2020)	0.016

AREA19-MW-7

AREA19-MW-7A	Result
PFOS (Max Detect)	0.017
PFOA (Max Detect)	0.013

AREA19-PW-1	A (1 - 1.13 ft bgs)
PFOS (11/30/20)	0.13
PFOA (11/30/20)	0.11

AREA19-GSI-1

AREA19-PW-1

AREA19-PW-2	A (1 - 1.13 ft bgs)	B (1.42 - 1.54 ft bgs)
PFOS (11/30/20)	0.03	0.024
PFOA (11/30/20)	0.03	0.019

AREA19-GSI-1	Result
PFOS (2020)	0
PFOA (2020)	0.0091

AREA19-PW-2

AREA19-PW-3	A (1 - 1.13 ft bgs)
PFOS (11/30/20)	0.089
PFOA (11/30/20)	0.033

WV-DEQ-MW9-57

AREA19-MW-221B	Result
PFOS (Max Detect)	0.015
PFOA (Max Detect)	0.013

AREA19-MW-221A	Result
PFOS (Max Detect)	0.058
PFOA (Max Detect)	0.041

AREA19-PW-4	A (1 - 1.13 ft bgs)	B (1.42 - 1.54 ft bgs)
PFOS (12/1/20)	0.067	0.064
PFOA (12/1/20)	0.031	0.029

AREA19-MW-221

AREA19-PW-3

AREA19-PW-4

AREA19-MW-222	Result
PFOS (Max Detect)	0.95
PFOA (Max Detect)	0.18

AREA19-MW-222

AREA19-PW-5

AREA19-GSI-2	Result
PFOS (2020)	0.17
PFOA (2020)	0.084

AREA19-GSI-2

AREA19-PW-5	A (1 - 1.13 ft bgs)
PFOS (12/1/20)	0.23
PFOA (12/1/20)	0.095

AREA19-PW-6	A (1.5 - 1.63 ft bgs)	B (2 - 2.125 ft bgs)
PFOS (12/3/20)	0.06	0.064
PFOA (12/3/20)	0.08	0.081

AREA19-PW-6

AREA19-PW-7	A (5 - 5.125 ft bgs)
PFOS (12/1/20)	0.02
PFOA (12/1/20)	0.084

AREA19-MW-223	Result
PFOS (Max Detect)	0.59
PFOA (Max Detect)	0.14

AREA19-MW-223

AREA19-PW-7

AREA19-GSI-3	Result
PFOS (2020)	0.13
PFOA (2020)	0.058

AREA19-GSI-3

AREA19-MW-224

AREA19-MW-224	Result
PFOS (Max Detect)	0.055
PFOA (Max Detect)	0.035

WV/CH-MW-240	Result
PFOS (Max Detect)	0.14
PFOA (Max Detect)	0.13

WV/CH-PW-1	A (0.75 - 0.88 ft bgs)
PFOS (12/7/20)	0.016
PFOA (12/7/20)	0.044

WV/CH-MW-240

WV/CH-PW-1

WV/CH-PW-2

WV/CH-PW-2	A (0.75 - 0.88 ft bgs)
PFOS (12/7/20)	0.079
PFOA (12/7/20)	0.043

WV/CH-MW-241B	Result
PFOS (Max Detect)	0.031
PFOA (Max Detect)	0.0053

WV/CH-MW-241A	Result
PFOS (Max Detect)	0.028
PFOA (Max Detect)	0.03

WV/CH-PW-5	A (0.83 - 0.96 ft bgs)
PFOS (12/8/20)	0.032
PFOA (12/8/20)	0.019

WV/CH-MW-241

WV/CH-PW-3

WV/CH-PW-3	A (1 - 1.13 ft bgs)
PFOS (12/7/20)	0.032
PFOA (12/7/20)	0.01

WV/CH-MW-242B	Result
PFOS (Max Detect)	0
PFOA (Max Detect)	0

WV/CH-MW-242A	Result
PFOS (Max Detect)	0
PFOA (Max Detect)	0

WV/CH-PW-5

WV/CH-PW-4

WV/CH-PW-6

WV/CH-MW-242

WV/CH-PW-6	A (1 - 1.125 ft bgs)	B (2 - 2.125 ft bgs)
PFOS (12/3/20)	0.015	0
PFOA (12/3/20)	0.01	0.008

WV/CH-PW-4	A (1 - 1.13 ft bgs)
PFOS (12/8/20)	0.02
PFOA (12/8/20)	0.024

Compound	Units	GSI
PFOS	µg/L	0.012
PFOA	µg/L	0.17

NOTES:

GSI = Groundwater Surface Water Interface Criteria
µg/L = Micrograms per Liter
ft bgs = feet below ground surface
Gray Shading Indicates that sample result is greater than GSI
PFOA = Perfluorooctanoic Acid
PFOS = Perfluorooctanesulfonic Acid

NOTES:
1. LOCATIONS AND SITE FEATURES ARE APPROXIMATE.

EDGERTON·AVE·NE
S·US·131
N·US·131
NORTHLAND·DR·NE
12·MILE·RD·NE
COURTLAND·DR·NE
11·MILE·RD·NE
WOLVERINE·BLVD·NE
W·DIVISION·ST·NE
E·DIVISION·ST·NE
10·MILE·RD·NE

Service Layer Credits: Sources: Esri, Airbus DS, USGS, NGA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, NMA, Geodatastyrelsen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap and the GIS user community

0 750 1,500 3,000
SCALE IN FEET

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PREPARED FOR:
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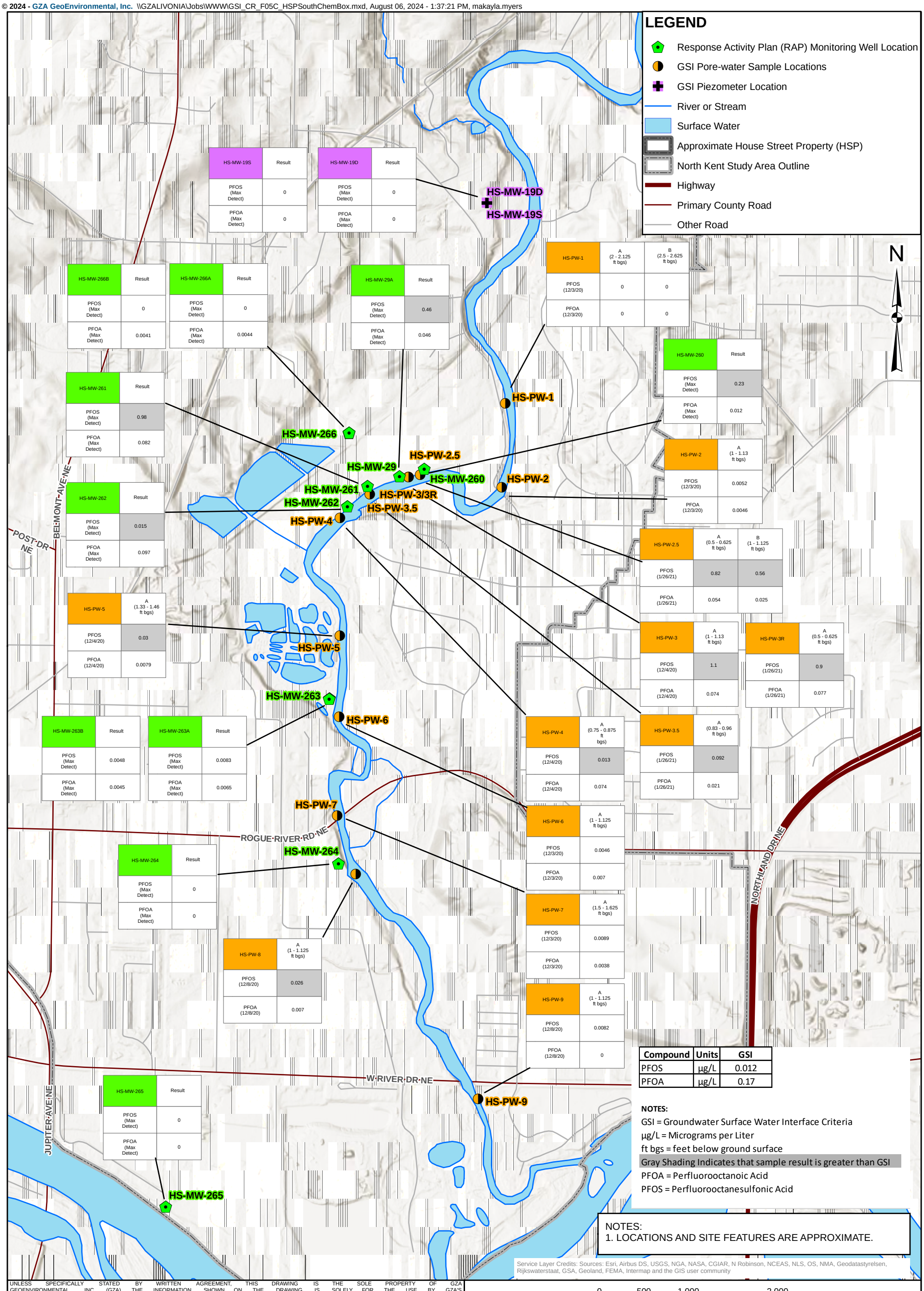
MONITORING LOCATIONS – WOLVEN/CHILDSDALE STUDY AREA
GSI COMPLETION REPORT

PROJ MGR:	BAB	REVIEWED BY:	LJP	CHECKED BY:	BAB	FIG	5B
DESIGNED BY:	MKM	DRAWN BY:	MKM	SCALE:	1 in = 1,500 ft		
DATE:	08/06/2024	PROJECT NO:	16.0062961.51	REVISION NO:	REVISION NO	SHEET NO:	



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PREPARED FOR:
WN&J/WWW

MONITORING LOCATIONS – HSP STUDY AREA
GSI COMPLETION REPORT

PROJ MGR:	BAB	REVIEWED BY:	LJP	CHECKED BY:	BAB	FIG/DWG	5C
DESIGNED BY:	MKM	DRAWN BY:	MKM	SCALE:	1 in = 1,000 ft		
DATE:	08/06/2024	PROJECT NO:	16.0062961.51	REVISION NO:	REVISION NO	SHEET NO:	

Legend

- GSI Pore-Water Sample Location
- GSI Piezometer Location
- Residential Water Well
- Monitoring Well
- Cross Section Line
- River or Stream
- Surface Water
- Approximate House Street Property (HSP)
- North Kent Study Area Outline
- Highway
- Primary County Road
- Other Road

Approximate Total PFAS Extent (nanograms per liter [ng/L])

- < 4 ng/L
- 4 - 10 ng/L
- 11 - 70 ng/L
- 71 - 1,000 ng/L
- 1,001 - 127,000 ng/L (MAX)

NOTES:
1. LOCATIONS AND SITE FEATURES ARE APPROXIMATE.

2. ACRONYMS
- (MAX) = MAXIMUM DETECTED CONCENTRATION IN THE SAMPLES.
- ng/L = NANOGRAM PER LITER
- PFAS = PER- AND POLY-FLUOROALKYL SUBSTANCES

3. NO TOTAL PFAS CRITERIA / SCREENING LEVELS.

4. 2017-2019 MAXIMUM CONCENTRATION FROM MONITORING AND RESIDENTIAL WELL SAMPLE RESULTS (INCLUDING THE NORTH KENT LANDFILL STUDY AREA) WERE USED TO DEVELOP CONCENTRATION ISOPLETHS.

5. CONCENTRATION ISOPLETHS WERE DEVELOPED USING NATURAL NEIGHBOR INTERPOLATION IN ARCGIS. CONCENTRATIONS WERE NOT EXTRAPOLATED OUTSIDE OF THE AREA OF KNOWN CONCENTRATIONS.

6. RESIDENTIAL WELL SAMPLES WERE ANALYZED FOR PFAS USEING EPA METHOD 537.1 WHICH REPORTS THE RESULTS FOR 14 COMPOUNDS.

7. MONITORING WELL SAMPLES WERE ANALYZED FOR PFAS USING DOD QSM BY ISOTOPE DILUTION, WHICH REPORTS THE RESULTS FOR 23 COMPOUNDS.

8. THE TOTAL PFAS PRESENTED ON THIS FIGURE ARE CALCULATED FROM THE SUM OF THE 12 PFAS COMPOUNDS THAT ARE COMMON BETWEEN EPA METHOD 537.1 AND THE ISOTOPE DILUTION, DOD QSM METHODOLOGY.

13 MILE RD NE · 11 MILE RD NE · 10 MILE RD NE · 7 MILE RD NW · 7 MILE RD NE · 6 MILE RD NW · 6 MILE RD NE · EDGERTON AVE NE · ALGOMA AVE NE · PINE ISLAND DR NE · ALPINE AVE NW · N DIVISION AVE · US 131 · W RIVER DR NE · COIT AVE NE · HUNSBERGER AVE NE · JUPITER AVE NE · PLAINFIELD AVE NE · WEBBER AVE NE · GRAND RIVER DR NE · CANNONSBURG RD NE · PETTIS AVE NE · WOLVERINE BLVD NE · E DIVISION ST NE · NORTHLAND DR NE · COURTLAND DR NE · MYERS LAKE AVE NE · BELDING RD NE · POST DR NE

0 2,000 4,000 8,000
Scale in Feet

N

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CROSS SECTIONS -
OVERVIEW
GSI RAP COMPLETION REPORT

GZA GeoEnvironmental, Inc.
Engineers and Scientists
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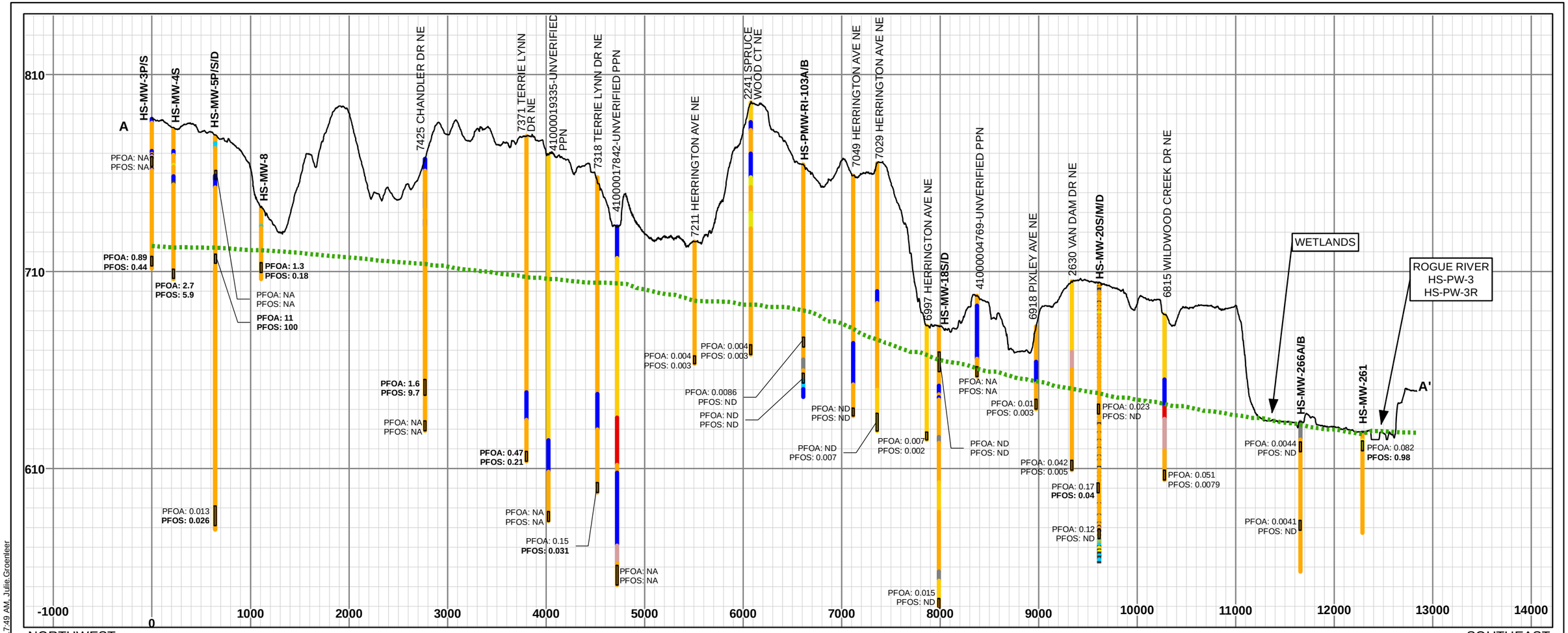
PREPARED FOR: WN&J/WWW

PROJ MGR: BAB	REVIEWED BY: BAB	CHECKED BY: LJP	FIGURE
DESIGNED BY: JMG	DRAWN BY: JMG	SCALE: 1 inch = 4,000 feet	6
DATE: 8/5/2024	PROJECT NO. 16.0062961.51	REVISION NO.	



CROSS SECTION LEGEND

- ESTIMATED POTENTIOMETRIC SURFACE (1/2024)
- GROUND SURFACE
- WELL SCREEN

BOREHOLE LITHOLOGY

- GRAVEL
- SAND AND GRAVEL
- SAND
- SAND/GRAVEL WITH CLAY/SILT
- CLAY/SILT WITH SAND/GRAVEL
- SILT
- CLAY AND SILT
- CLAY
- NOT AVAILABLE

OVERVIEW MAP LEGEND

- PORE-WATER SAMPLE LOCATION
- GSI PIEZOMETER LOCATION
- VERTICAL AQUIFER PROFILING BORING
- RESIDENTIAL WATER WELL
- MONITORING WELL
- CROSS SECTION LINE
- HIGHWAY
- PRIMARY COUNTY ROAD
- OTHER ROAD
- RIVER OR STREAM
- SURFACE WATER
- APPROXIMATE HOUSE STREET PROPERTY (HSP)
- NORTH KENT LANDFILL

NOTES:
1. LOCATIONS AND SITE FEATURES ARE APPROXIMATE.

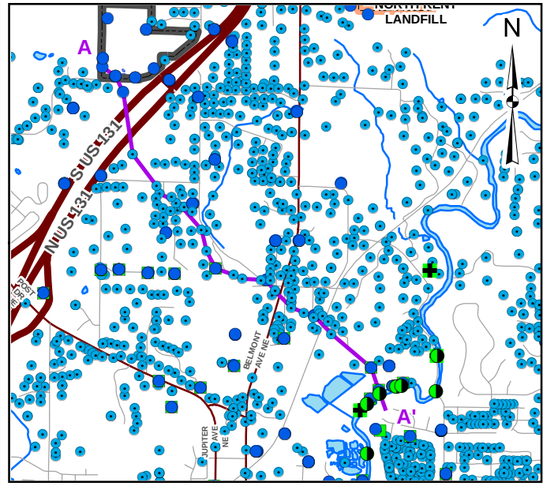
2. GROUND SURFACE ELEVATIONS ARE BASED ON DIGITAL RASTER FILES OF BARE EARTH DIGITAL ELEVATION MODELS (DEMS), GENERATED FROM LIDAR DATA WITH 1-METER HORIZONTAL ACCURACY AND 18.5-CENTIMETER VERTICAL ACCURACY. DIGITAL FILES OF DEMS AND LIDAR DATA WERE PROVIDED BY KENT COUNTY.

3. ESTIMATED POTENTIOMETRIC SURFACE WAS DEVELOPED BASED ON MEASUREMENTS MADE IN GROUNDWATER MONITORING WELLS IN JANUARY 2024. GROUNDWATER ELEVATIONS WERE NOT MEASURED FROM RESIDENTIAL WATER SUPPLY WELLS.

4. WELL SCREEN ELEVATIONS PROVIDED IN FEET ABOVE MEAN SEA LEVEL, NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88). RESIDENTIAL WELL SCREEN ELEVATIONS AND BOREHOLE LITHOLOGY ELEVATIONS WERE CALCULATED USING WELL INFORMATION PROVIDED BY THE STATE OF MICHIGAN'S WELLOGIC DATABASE AND GROUND SURFACE ELEVATIONS OF THE CENTER OF THE PPN GENERATED FROM LIDAR DATA PROVIDED BY KENT COUNTY. ELEVATIONS ARE ROUNDED TO THE NEAREST FOOT.

5. ONLY RESULTS FROM PERMANENT WELLS ARE SHOWN. RESULTS SHOWN ARE MAXIMUM DETECTIONS OF SAMPLES COLLECTED AT THE INDICATED LOCATION; THEREFORE, PFOA AND PFOS RESULTS SHOWN MAY BE FROM DIFFERENT SAMPLES. RESULTS IN BOLD TEXT ARE GREATER THAN PART 201 GENERIC GROUNDWATER CLEANUP CRITERIA - GROUNDWATER SURFACE WATER INTERFACE.

OVERVIEW MAP



0 2,000 4,000 8,000
OVERVIEW MAP SCALE IN FEET

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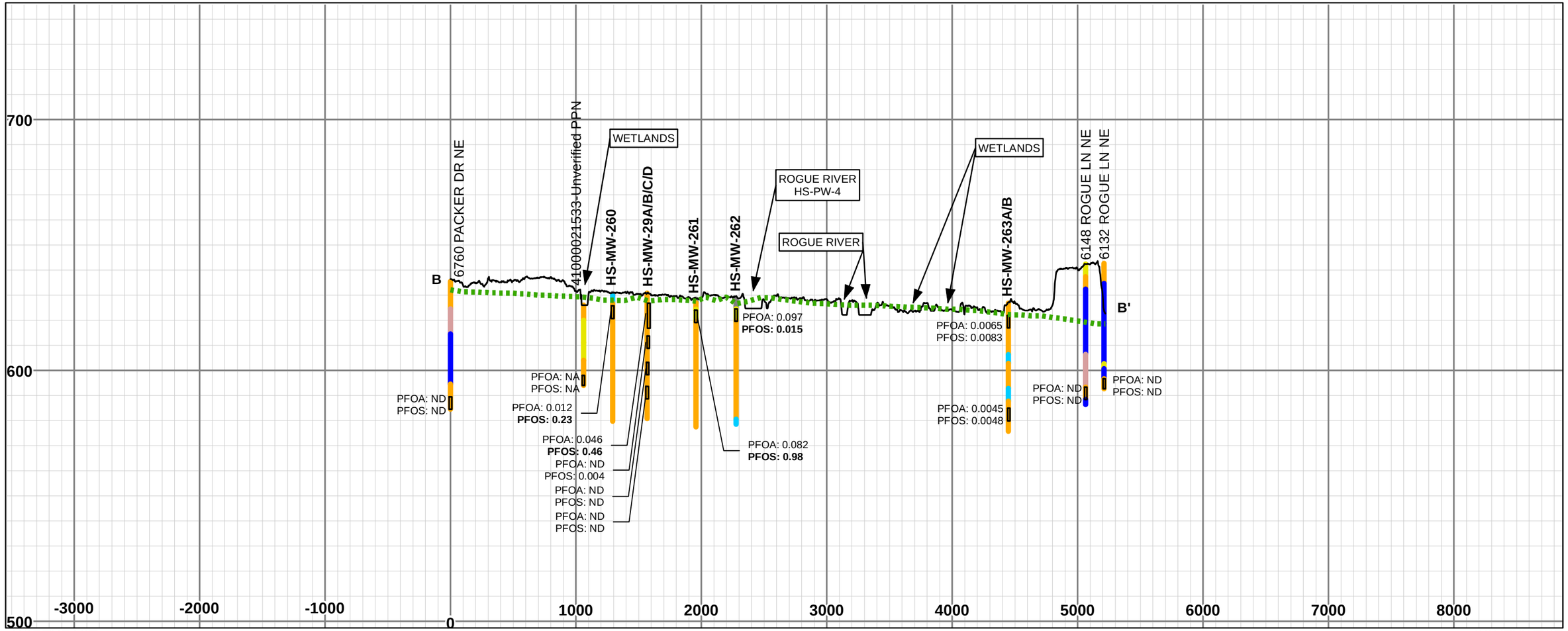
HOUSE STREET AREA
GEOLOGICAL CROSS SECTION A-A'
GSI RAP COMPLETION REPORT

PREPARED BY:		PREPARED FOR:	
GZA GeoEnvironmental, Inc. Engineers and Scientists www.gza.com		WN&J/WWW	
PROJ MGR: BAB	REVIEWED BY: LJP	CHECKED BY: BAB	FIGURE 6A
DESIGNED BY: JC/JMG	DRAWN BY: JMG	SCALE: 1 in = 4,000 ft	
DATE: 08/05/2024	PROJECT NO: 16.0062961.51	REVISION NO:	



CROSS SECTION LEGEND

- ESTIMATED POTENTIOMETRIC SURFACE (1/2024)
- GROUND SURFACE
- WELL SCREEN

BOREHOLE LITHOLOGY

- GRAVEL
- SAND
- CLAY/SILT WITH SAND/GRAVEL
- SILT
- CLAY AND SILT
- CLAY

OVERVIEW MAP LEGEND

- PORE-WATER SAMPLE LOCATION
- GSI PIEZOMETER LOCATION
- VERTICAL AQUIFER PROFILING BORING
- RESIDENTIAL WATER WELL
- MONITORING WELL
- CROSS SECTION LINE
- HIGHWAY
- PRIMARY COUNTY ROAD
- OTHER ROAD
- RIVER OR STREAM
- SURFACE WATER

NOTES:
1. LOCATIONS AND SITE FEATURES ARE APPROXIMATE.

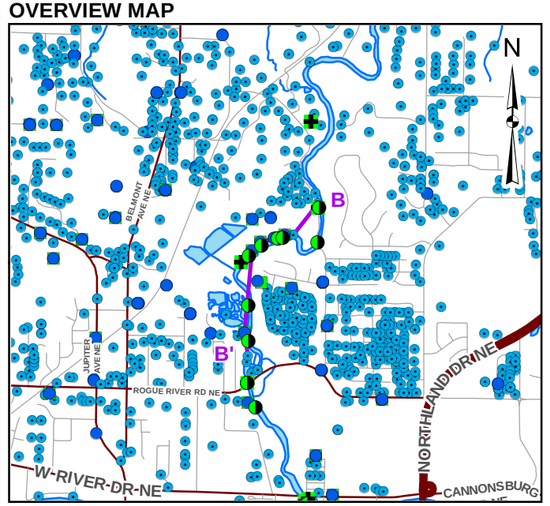
2. GROUND SURFACE ELEVATIONS ARE BASED ON DIGITAL RASTER FILES OF BARE EARTH DIGITAL ELEVATION MODELS (DEMS), GENERATED FROM LIDAR DATA WITH 1-METER HORIZONTAL ACCURACY AND 18.5-CENTIMETER VERTICAL ACCURACY. DIGITAL FILES OF DEMS AND LIDAR DATA WERE PROVIDED BY KENT COUNTY.

3. ESTIMATED POTENTIOMETRIC SURFACE WAS DEVELOPED BASED ON MEASUREMENTS MADE IN GROUNDWATER MONITORING WELLS IN JANUARY 2024. GROUNDWATER ELEVATIONS WERE NOT MEASURED FROM RESIDENTIAL WATER SUPPLY WELLS.

4. WELL SCREEN ELEVATIONS PROVIDED IN FEET ABOVE MEAN SEA LEVEL, NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88). RESIDENTIAL WELL SCREEN ELEVATIONS AND BOREHOLE LITHOLOGY ELEVATIONS WERE CALCULATED USING WELL INFORMATION PROVIDED BY THE STATE OF MICHIGAN'S WELLOGIC DATABASE AND GROUND SURFACE ELEVATIONS OF THE CENTER OF THE PPN GENERATED FROM LIDAR DATA PROVIDED BY KENT COUNTY. ELEVATIONS ARE ROUNDED TO THE NEAREST FOOT.

5. ONLY RESULTS FROM PERMANENT WELLS ARE SHOWN. RESULTS SHOWN ARE MAXIMUM DETECTIONS OF SAMPLES COLLECTED AT THE INDICATED LOCATION; THEREFORE, PFOA AND PFOS RESULTS SHOWN MAY BE FROM DIFFERENT SAMPLES. RESULTS IN BOLD TEXT ARE GREATER THAN PART 201 GENERIC GROUNDWATER CLEANUP CRITERIA - GROUNDWATER SURFACE WATER INTERFACE.

OVERVIEW MAP

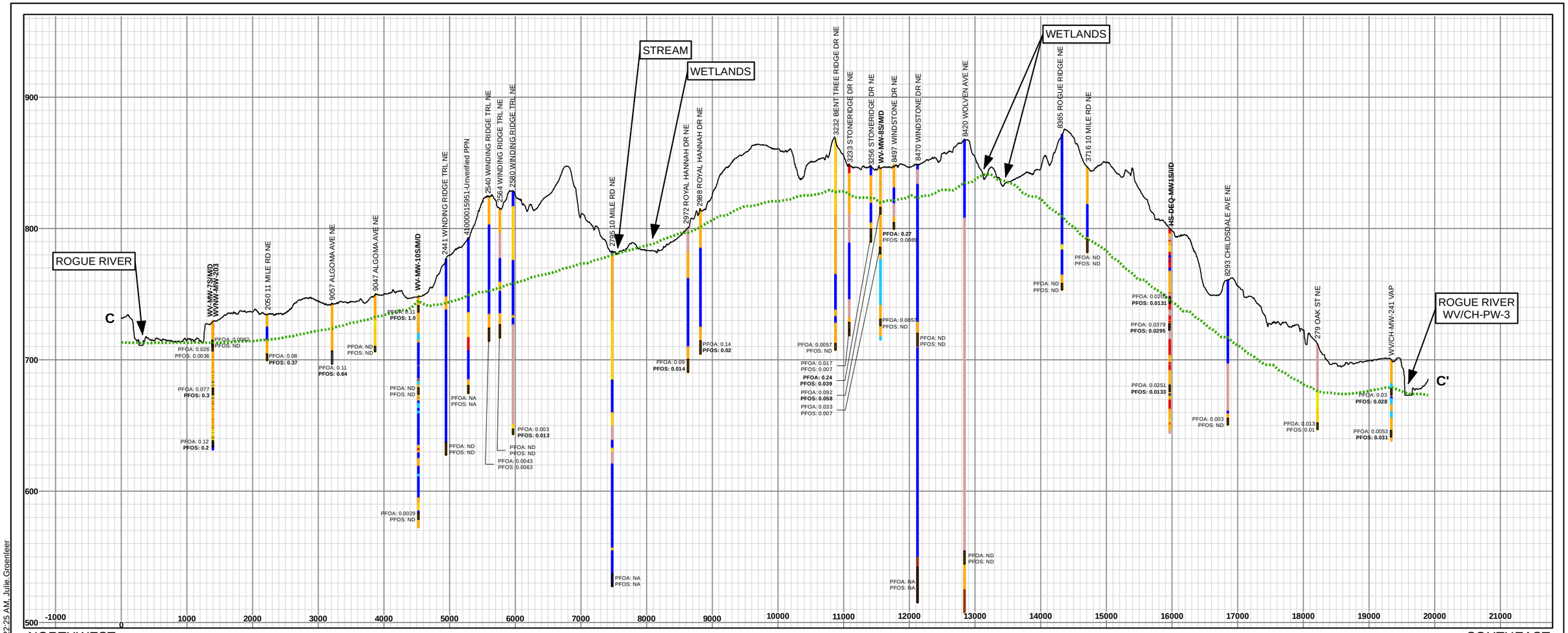


0 2,000 4,000 8,000
OVERVIEW MAP SCALE IN FEET

Rose & Westra, a Division of GZA
601 Fifth Street NW, Suite 102
Grand Rapids, Michigan 49504

HOUSE STREET AREA
GEOLOGICAL CROSS SECTION B-B'
GSI RAP COMPLETION REPORT

PREPARED BY:			PREPARED FOR:	
GZA GeoEnvironmental, Inc. Engineers and Scientists www.gza.com			WN&J/WWW	
PROJ MGR: BAB	REVIEWED BY: LJP	CHECKED BY: BAB	FIGURE	
DESIGNED BY: JC/JMG	DRAWN BY: JMG	SCALE: 1 in = 4,000 ft	6B	
DATE: 08/05/2024	PROJECT NO: 16.0062961.51	REVISION NO:		



CROSS SECTION LEGEND

- ESTIMATED POTENTIOMETRIC SURFACE (1/2024)
- GROUND SURFACE
- WELL SCREEN

BOREHOLE LITHOLOGY

- GRAVEL
- SAND AND GRAVEL
- SAND
- SAND/GRAVEL WITH CLAY/SILT
- CLAY/SILT WITH SAND/GRAVEL
- SILT
- CLAY AND SILT
- CLAY
- BEDROCK
- NOT AVAILABLE

OVERVIEW MAP LEGEND

- PORE-WATER SAMPLE LOCATION
- GSI PIEZOMETER LOCATION
- VERTICAL AQUIFER PROFILING BORING
- RESIDENTIAL WATER WELL
- MONITORING WELL
- CROSS SECTION LINE
- HIGHWAY
- PRIMARY COUNTY ROAD
- OTHER ROAD
- RIVER OR STREAM
- SURFACE WATER
- APPROXIMATE HOUSE STREET PROPERTY (HSP)
- NORTH KENT LANDFILL

NOTES:
1. LOCATIONS AND SITE FEATURES ARE APPROXIMATE.

2. GROUND SURFACE ELEVATIONS ARE BASED ON DIGITAL RASTER FILES OF BARE EARTH DIGITAL ELEVATION MODELS (DEMS), GENERATED FROM LIDAR DATA WITH 1-METER HORIZONTAL ACCURACY AND 18.5-CENTIMETER VERTICAL ACCURACY. DIGITAL FILES OF DEMS AND LIDAR DATA WERE PROVIDED BY KENT COUNTY.

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4. WELL SCREEN ELEVATIONS PROVIDED IN FEET ABOVE MEAN SEA LEVEL, NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88). RESIDENTIAL WELL SCREEN ELEVATIONS AND BOREHOLE LITHOLOGY ELEVATIONS WERE CALCULATED USING WELL INFORMATION PROVIDED BY THE STATE OF MICHIGAN'S WELLOGIC DATABASE AND GROUND SURFACE ELEVATIONS OF THE CENTER OF THE PPN GENERATED FROM LIDAR DATA PROVIDED BY KENT COUNTY. ELEVATIONS ARE ROUNDED TO THE NEAREST FOOT.

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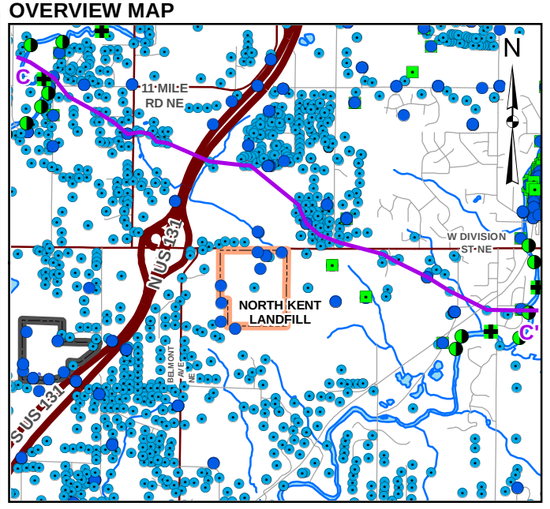
OVERVIEW MAP



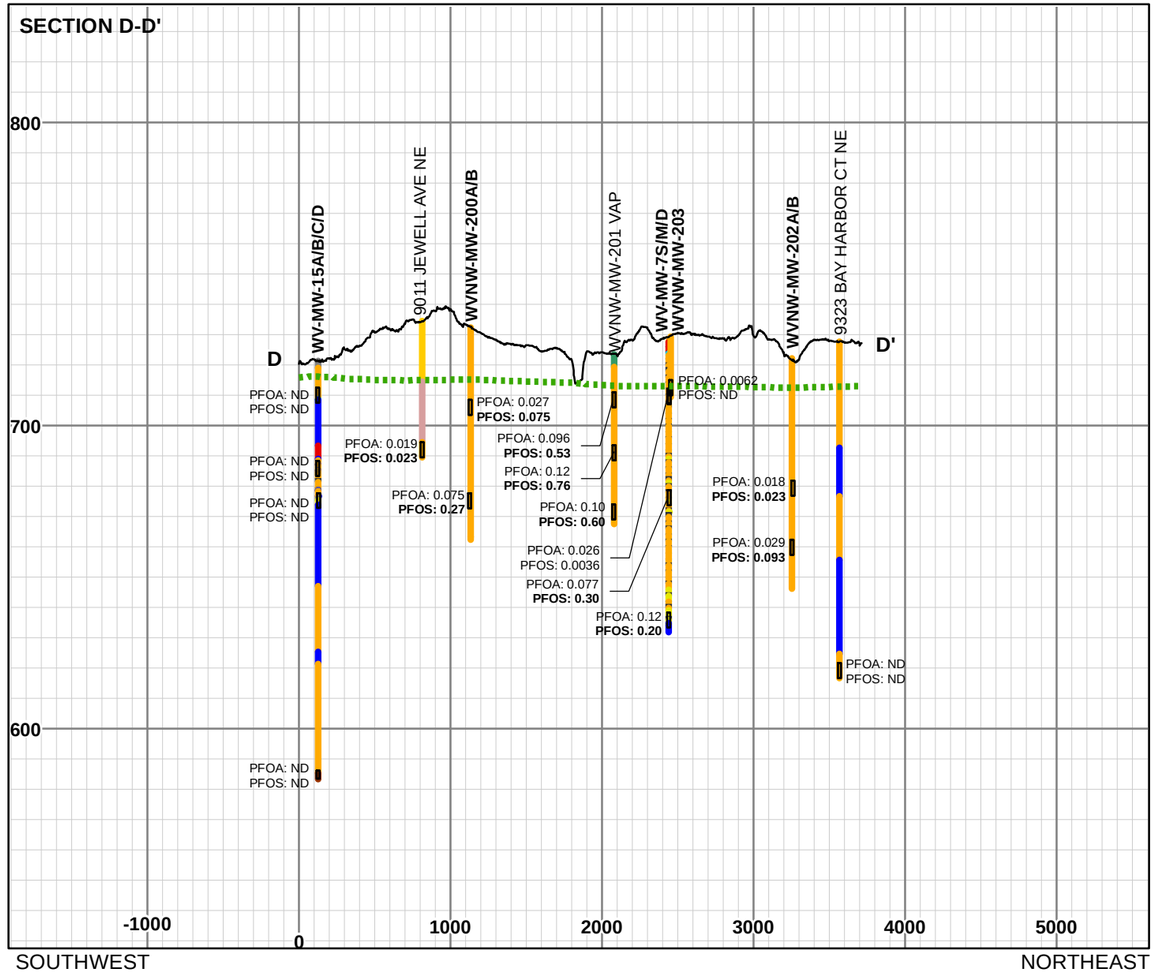
0 2,500 5,000 10,000
OVERVIEW MAP SCALE IN FEET

Rose & Westra, a Division of GZA
601 Fifth Street NW, Suite 102
Grand Rapids, Michigan 49504

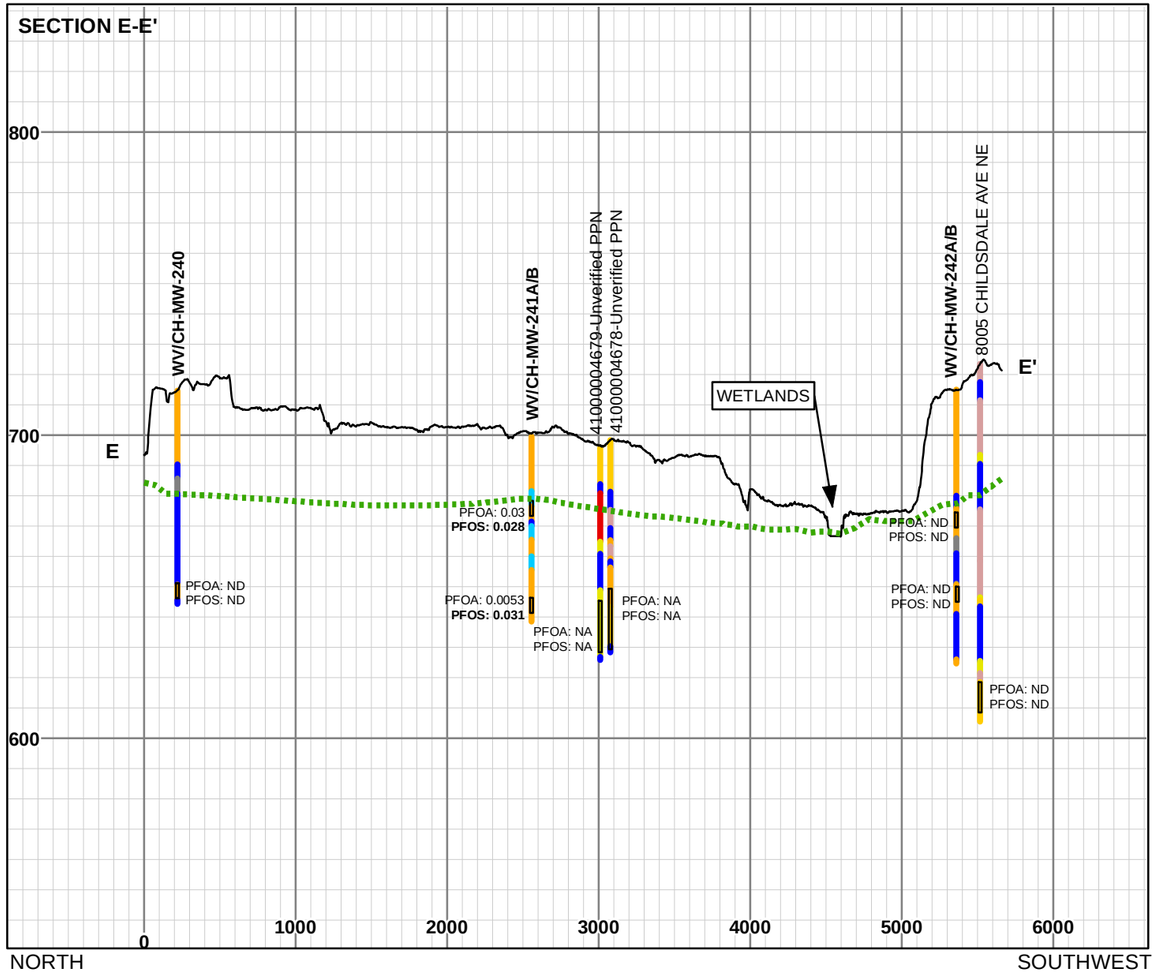
WOLVEN NORTHWEST AND WOLVEN/CHILDSDALE AREAS
GEOLOGICAL CROSS SECTION C-C'
GSI RAP COMPLETION REPORT

PREPARED BY: GZA GeoEnvironmental, Inc. Engineers and Scientists www.gza.com		PREPARED FOR: WN&J/WWW	
PROJ MGR: BAB	REVIEWED BY: LJP	CHECKED BY: BAB	FIGURE 6C
DESIGNED BY: JC/JMG	DRAWN BY: JMG	SCALE: 1 in = 5,000 ft	
DATE: 08/05/2024	PROJECT NO: 16.0062961.51	REVISION NO:	

SECTION D-D'



SECTION E-E'



CROSS SECTION LEGEND

- ESTIMATED POTENTIOMETRIC SURFACE (1/2024)
- GROUND SURFACE
- WELL SCREEN

BOREHOLE LITHOLOGY

- GRAVEL
- SAND AND GRAVEL
- SAND
- SAND/GRAVEL WITH CLAY/SILT
- CLAY/SILT WITH SAND/GRAVEL
- SILT
- CLAY AND SILT
- CLAY
- TOP SOIL
- BEDROCK
- NOT AVAILABLE

OVERVIEW MAP LEGEND

- PORE-WATER SAMPLE LOCATION
- GSI PIEZOMETER LOCATION
- VERTICAL AQUIFER PROFILING BORING
- RESIDENTIAL WATER WELL
- MONITORING WELL
- CROSS SECTION LINE
- HIGHWAY
- PRIMARY COUNTY ROAD
- OTHER ROAD
- RIVER OR STREAM
- SURFACE WATER
- APPROXIMATE HOUSE STREET PROPERTY (HSP)
- NORTH KENT LANDFILL

NOTES:
1. LOCATIONS AND SITE FEATURES ARE APPROXIMATE.

2. GROUND SURFACE ELEVATIONS ARE BASED ON DIGITAL RASTER FILES OF BARE EARTH DIGITAL ELEVATION MODELS (DEMS), GENERATED FROM LIDAR DATA WITH 1-METER HORIZONTAL ACCURACY AND 18.5-CENTIMETER VERTICAL ACCURACY. DIGITAL FILES OF DEMS AND LIDAR DATA WERE PROVIDED BY KENT COUNTY.

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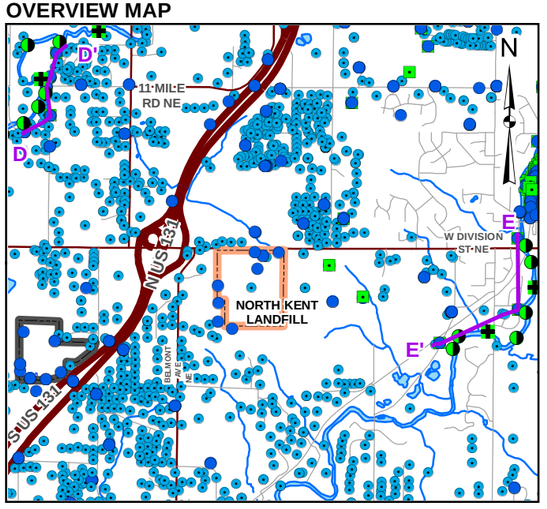
4. WELL SCREEN ELEVATIONS PROVIDED IN FEET ABOVE MEAN SEA LEVEL, NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88). RESIDENTIAL WELL SCREEN ELEVATIONS AND BOREHOLE LITHOLOGY ELEVATIONS WERE CALCULATED USING WELL INFORMATION PROVIDED BY THE STATE OF MICHIGAN'S WELLOGIC DATABASE AND GROUND SURFACE ELEVATIONS OF THE CENTER OF THE PPN GENERATED FROM LIDAR DATA PROVIDED BY KENT COUNTY. ELEVATIONS ARE ROUNDED TO THE NEAREST FOOT.

5. ONLY RESULTS FROM PERMANENT WELLS ARE SHOWN. RESULTS SHOWN ARE MAXIMUM DETECTIONS OF SAMPLES COLLECTED AT THE INDICATED LOCATION; THEREFORE, PFOA AND PFOS RESULTS SHOWN MAY BE FROM DIFFERENT SAMPLES. RESULTS IN BOLD TEXT ARE GREATER THAN PART 201 GENERIC GROUNDWATER CLEANUP CRITERIA - GROUNDWATER SURFACE WATER INTERFACE.

OVERVIEW MAP

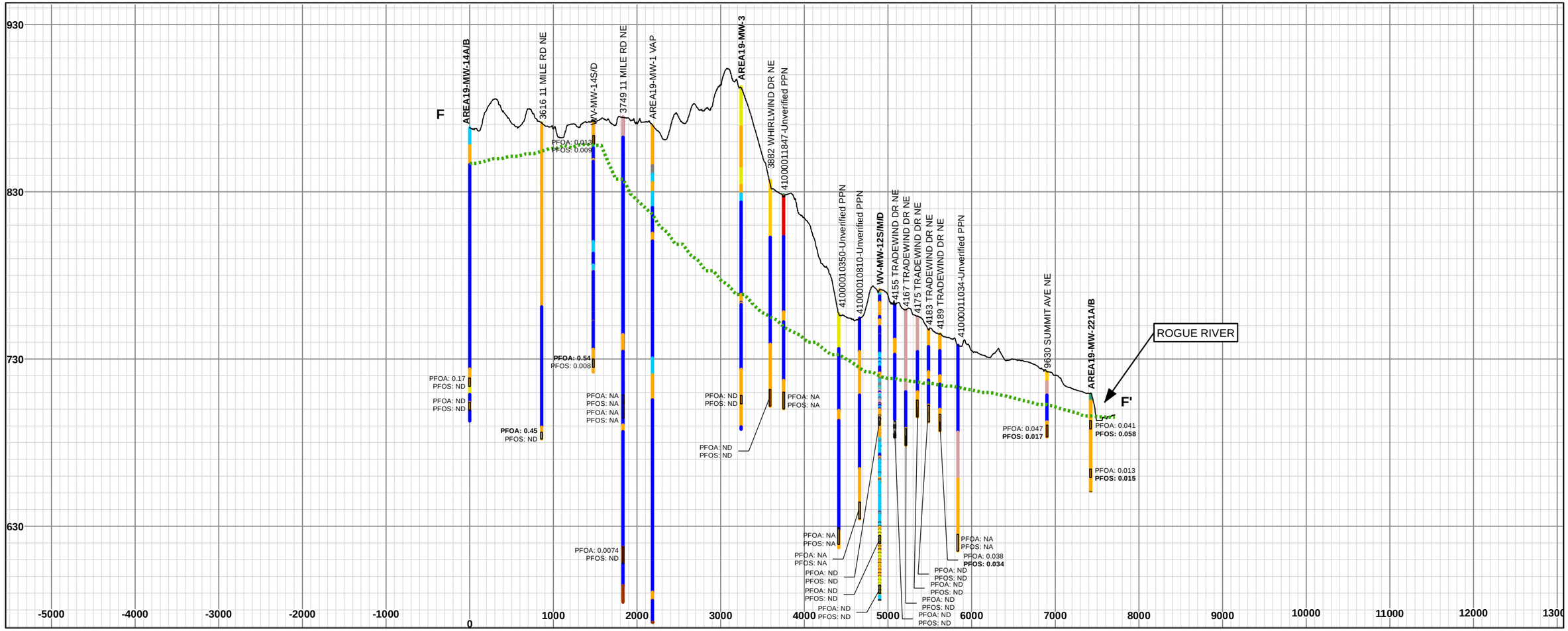


0 2,500 5,000 10,000
OVERVIEW MAP SCALE IN FEET

Rose & Westra, a Division of GZA
601 Fifth Street NW, Suite 102
Grand Rapids, Michigan 49504

WOLVEN NORTHWEST AND WOLVEN/CHILDSDALE AREAS
GEOLOGICAL CROSS SECTIONS D-D' AND E-E'
GSI RAP COMPLETION REPORT

PREPARED BY: GZA GeoEnvironmental, Inc. Engineers and Scientists www.gza.com		PREPARED FOR: WN&J/WWW	
PROJ MGR: BAB	REVIEWED BY: LJP	CHECKED BY: BAB	FIGURE 6D
DESIGNED BY: JC/JMG	DRAWN BY: JMG	SCALE: 1 in = 5,000 ft	
DATE: 08/05/2024	PROJECT NO: 16.0062961.51	REVISION NO:	



SOUTHWEST NORTHEAST

CROSS SECTION LEGEND

- ESTIMATED POTENTIOMETRIC SURFACE (1/2024)
- GROUND SURFACE
- WELL SCREEN

BOREHOLE LITHOLOGY

- GRAVEL
- SAND AND GRAVEL
- SAND
- SAND/GRAVEL WITH CLAY/SILT
- CLAY/SILT WITH SAND/GRAVEL
- SILT
- CLAY AND SILT
- CLAY
- TOP SOIL
- BEDROCK
- NOT AVAILABLE

OVERVIEW MAP LEGEND

- PORE-WATER SAMPLE LOCATION
- GSI PIEZOMETER LOCATION
- VERTICAL AQUIFER PROFILING BORING
- RESIDENTIAL WATER WELL
- MONITORING WELL
- CROSS SECTION LINE
- HIGHWAY
- PRIMARY COUNTY ROAD
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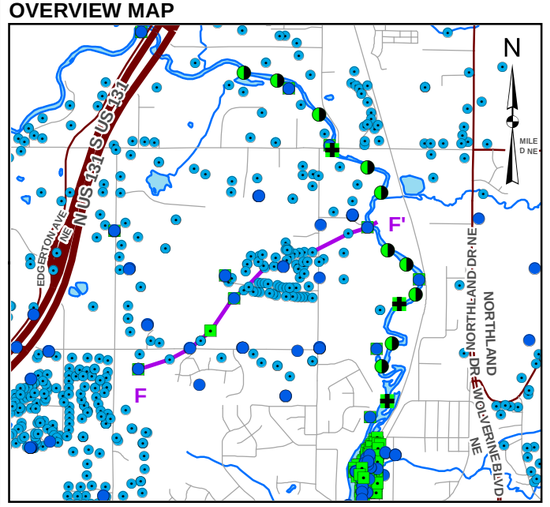
6. TEMPORARY WELLS INSTALLED AT THE AREA19-MW-1 VAP LOCATION PURGED DRY. NO SAMPLES WERE COLLECTED AND PERMANENT WELLS WERE NOT INSTALLED.

OVERVIEW MAP



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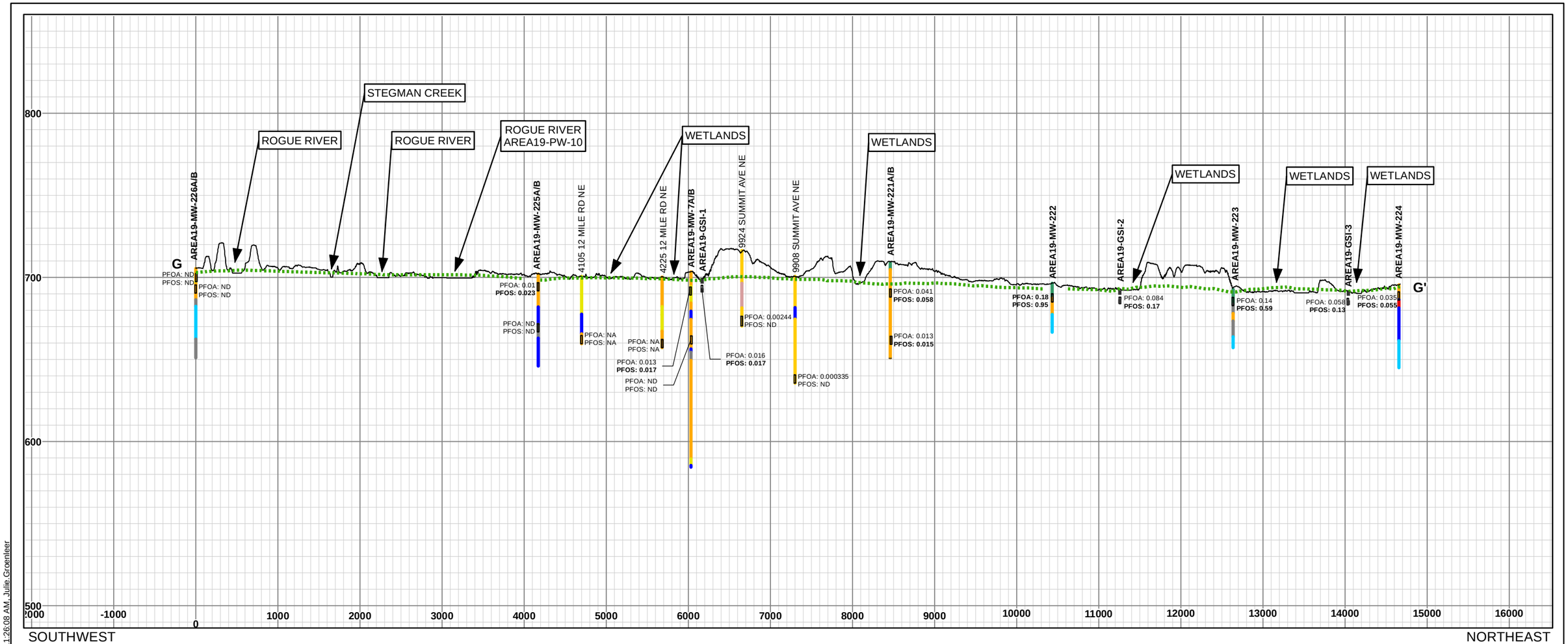
OVERVIEW MAP SCALE IN FEET

Rose & Westra, a Division of GZA
601 Fifth Street NW, Suite 102
Grand Rapids, Michigan 49504

WOLVEN NORTHEAST AND AREA 19
GEOLOGICAL CROSS SECTION F-F'
GSI RAP COMPLETION REPORT

PREPARED BY:		PREPARED FOR:	
GZA GeoEnvironmental, Inc. Engineers and Scientists www.gza.com		WN&J/WWW	
PROJ MGR: BAB	REVIEWED BY: LJP	CHECKED BY: BAB	FIGURE
DESIGNED BY: JC/JMG	DRAWN BY: JMG	SCALE: 1 in = 4,000 ft	6E
DATE: 08/05/2024	PROJECT NO: 16.0062961.51	REVISION NO:	



CROSS SECTION LEGEND

- ESTIMATED POTENTIOMETRIC SURFACE (1/2024)
- GROUND SURFACE
- WELL SCREEN

BOREHOLE LITHOLOGY

- GRAVEL
- SAND AND GRAVEL
- SAND
- SAND/GRAVEL WITH CLAY/SILT
- CLAY/SILT WITH SAND/GRAVEL
- SILT
- CLAY AND SILT
- CLAY
- TOP SOIL
- NOT AVAILABLE

OVERVIEW MAP LEGEND

- PORE-WATER SAMPLE LOCATION
- GSI PIEZOMETER LOCATION
- VERTICAL AQUIFER PROFILING BORING
- RESIDENTIAL WATER WELL
- MONITORING WELL
- CROSS SECTION LINE
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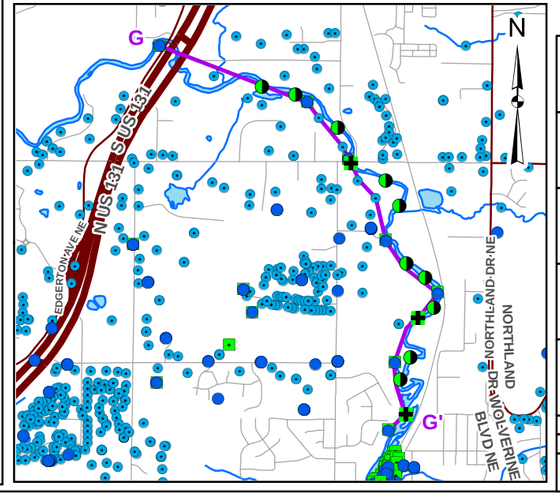
OVERVIEW MAP



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OVERVIEW MAP SCALE IN FEET

Rose & Westra, a Division of GZA
601 Fifth Street NW, Suite 102
Grand Rapids, Michigan 49504

WOLVEN NORTHEAST AND AREA 19
GEOLOGICAL CROSS SECTION G-G'
GSI RAP COMPLETION REPORT

PREPARED BY:		PREPARED FOR:	
GZA GeoEnvironmental, Inc. Engineers and Scientists www.gza.com		WN&J/WWW	
PROJ MGR: BAB	REVIEWED BY: LJP	CHECKED BY: BAB	FIGURE
DESIGNED BY: JC/JMG	DRAWN BY: JMG	SCALE: 1 in = 4,000 ft	6F
DATE: 08/05/2024	PROJECT NO: 16.0062961.51	REVISION NO:	

TABLES

TABLE 1A
PIEZOMETER SUMMARY
GSI Investigation
Algoma and Plainfield Townships, Kent County, MI

Area	Name	Completion Date	Easting (international feet)	Northing (international feet)	Ground Surface Elevation (feet amsl)	Top of Casing Elevation (feet amsl)	Screen Interval (feet bgs)	Screen Elevation (feet amsl)	Approximate Distance to River (feet)
Wolven Northwest	WVNW-GSI-1	10/29/2020	12,790,197.62	598,854.06	711.68	716.38	2.0 - 6.0	709.7 - 705.7	4
Wolven Northwest	WVNW-GSI-2	10/29/2020	12,788,280.45	597,285.30	715.49	719.58	5.8 - 9.8	709.7 - 705.7	6
Wolven Northeast	AREA19-GSI-1	10/29/2020	12,803,671.73	602,250.59	698.71	703.04	3.5 - 7.5	695.2 - 691.2	4
Wolven Northeast	AREA19-GSI-2	10/29/2020	12,805,441.24	598,178.39	692.09	695.90	4.1 - 8.1	688.0 - 684.0	4
Wolven Northeast	AREA19-GSI-3	10/29/2020	12,805,120.16	595,643.55	691.50	695.34	4.2 - 8.2	687.3 - 683.3	6.7
Wolven-North Childsdale	WV/CH-GSI-1	10/27/2020	12,804,580.97	590,400.63	675.75	679.59	1.1 - 5.1	674.7 - 670.7	3
Wolven-North Childsdale	WV/CH-GSI-2	10/27/2020	12,803,034.54	588,938.87	671.95	674.84	1.7 - 5.7	670.3 - 666.3	4
House Street Property South/Southeast	HS-GSI-1	10/27/2020	12,796,409.12	580,037.74	631.76	635.84	2.4 - 6.4	629.4 - 625.4	3
House Street Property South/Southeast	HS-GSI-2	10/27/2020	12,794,382.15	578,575.97	625.68	629.76	2.6 - 6.6	623.1 - 619.1	2
House Street Property South/Southeast	HS-GSI-3	10/27/2020	12,794,540.64	575,395.34	619.47	622.55	2.6 - 6.6	616.9 - 612.9	5
House Street Property South/Southeast	HS-GSI-4	10/26/2020	12,796,056.76	572,277.56	610.72	612.64	1.3 - 5.3	609.4 - 605.4	6.5
House Street Property South/Southeast	HS-GSI-5	10/26/2020	12,796,142.39	572,339.83	612.54	615.42	2.6 - 6.6	609.9 - 605.9	6
House Street Property South/Southeast	HS-GSI-6	10/26/2020	12,795,200.75	569,770.43	608.72	611.34	4.2 - 8.2	604.5 - 600.5	8
House Street Property South/Southeast	HS-GSI-7	10/26/2020	12,793,161.54	570,470.86	608.68	611.68	4.7 - 8.7	604.0 - 600.0	12.8
House Street Property South/Southeast	HS-GSI-8	10/26/2020	12,791,378.50	571,769.65	610.15	612.03	6.0 - 10.0	604.2 - 600.2	12
House Street Property South/Southeast	HS-GSI-9	10/29/2020	12,783,447.92	594,138.68	717.75	722.50	5.1 - 9.1	712.7 - 708.7	13

NOTES:

1) Easting and northing values are in North American Datum of 1983, Michigan State Plane South Zone, International Feet.
2) Abbreviaions Include:
"feet amsl" indicates feet above mean sea level (North American Vertical Datum of 1988).
"feet bgs" indicates approximate feet below ground surface.
3) Northing, easting, ground surface elevation, and top of casing elevation were surveyed by Exxel Engineering, Inc. of Grand Rapids, Michigan.
4) Screen intervals and elevations presented are based on field measurements from 7/11/2024.

TABLE 1B
MONITORING WELL SUMMARY
GSI Investigation
Algoma and Plainfield Townships, Kent County, MI

Area	Name	Completion Date	Northing (international feet)	Easting (international feet)	Ground Surface Elevation (feet amsl)	Top of Casing Elevation (feet amsl)	Screen Interval (feet bgs)	Screen Elevation (feet amsl)	Approximate Distance to River (feet)
Wolven Northwest	WVNW-MW-200A	7/8/2022	596,050.414	12,788,597.990	732.55	732.22	24.0 - 29.0	708.6 - 703.6	480
Wolven Northwest	WVNW-MW-200B	7/11/2022	596,045.218	12,788,597.970	732.66	732.35	55.1 - 60.1	677.6 - 672.6	480
Wolven Northwest	WVNW-MW-201A	4/8/2022	596,993.111	12,788,464.680	723.49	722.89	12.5 - 17.5	711.0 - 706.0	50
Wolven Northwest	WVNW-MW-201B	7/1/2022	596,993.151	12,788,469.173	723.44	723.09	30.0 - 35.0	693.4 - 688.4	50
Wolven Northwest	WVNW-MW-201C	7/6/2022	596,989.102	12,788,467.207	723.49	723.08	49.5 - 54.5	674.0 - 669.0	50
Wolven Northwest	WVNW-MW-202A	1/31/2023	598,120.564	12,788,806.091	721.93	724.40	40.1 - 45.1	681.8 - 676.8	350
Wolven Northwest	WVNW-MW-202B	1/31/2023	598,115.000	12,788,800.889	722.06	724.57	59.8 - 64.8	662.3 - 657.3	350
Wolven Northwest	WVNW-MW-203	2/2/2022	597,341.413	12,788,600.361	729.32	728.91	14.3 - 19.3	715.0 - 710.0	280
Wolven Northeast	AREA19-MW-7A	9/8/2022	602,370.836	12,803,599.833	703.44	703.09	9.1 - 14.1	694.3 - 689.3	30
Wolven Northeast	AREA19-MW-221A	2/16/2022	600,210.353	12,804,596.532	709.08	708.66	15.9 - 20.9	693.2 - 688.2	70
Wolven Northeast	AREA19-MW-221B	7/8/2022	600,203.621	12,804,600.216	709.30	708.81	45.0 - 50.0	664.3 - 659.3	70
Wolven Northeast	AREA19-MW-222	2/21/2022	598,820.703	12,805,960.401	696.52	699.41	6.4 - 11.4	690.1 - 685.1	25
Wolven Northeast	AREA19-MW-223	2/17/2022	596,990.335	12,804,834.348	692.82	695.85	4.9 - 9.9	687.9 - 682.9	280
Wolven Northeast	AREA19-MW-224	2/11/2022	595,199.272	12,804,662.607	695.46	698.37	4.2 - 9.2	691.3 - 686.3	100
Wolven Northeast	AREA19-MW-225A	2/2/2023	603,866.163	12,802,517.431	702.13	704.40	5.3 - 10.3	696.8 - 691.8	155
Wolven Northeast	AREA19-MW-225B	2/2/2023	603,871.954	12,802,519.658	701.99	704.71	30.2 - 35.2	671.8 - 666.8	155
Wolven Northeast	AREA19-MW-226A	5/11/2023	605,358.844	12,798,631.639	705.73	708.69	3.3 - 8.3	702.4 - 697.4	75
Wolven Northeast	AREA19-MW-226B	3/24/2023	605,364.606	12,798,625.073	705.56	708.32	10.0 - 15.0	695.6 - 690.6	75
Wolven-North Childsdale	WV/CH-MW-240	2/8/2022	591,991.606	12,804,009.774	714.70	714.28	63.4 - 68.4	651.3 - 646.3	135
Wolven-North Childsdale	WV/CH-MW-241A	2/9/2022	589,654.105	12,804,029.724	699.52	702.05	21.2 - 26.2	678.3 - 673.3	180
Wolven-North Childsdale	WV/CH-MW-241B	9/12/2022	589,655.301	12,804,025.721	699.94	702.25	53.6 - 58.6	646.3 - 641.3	180
Wolven-North Childsdale	WV/CH-MW-242A	3/31/2022	588,547.675	12,801,456.069	715.02	714.61	40.4 - 45.4	674.6 - 669.6	465
Wolven-North Childsdale	WV/CH-MW-242B	6/30/2022	588,539.744	12,801,452.219	714.84	714.43	64.8 - 69.8	650.0 - 645.0	465
House Street Property South/Southeast	HS-MW-29A	10/4/2019	579,220.116	12,795,245.435	630.30	633.13	3.5 - 13.5	626.8 - 616.8	40
House Street Property South/Southeast	HS-MW-260	6/21/2022	579,304.284	12,795,521.731	630.64	633.66	5.1 - 10.1	625.5 - 620.5	55
House Street Property South/Southeast	HS-MW-261	6/23/2022	579,110.918	12,794,886.375	628.42	631.19	4.4 - 9.4	624.0 - 619.0	65
House Street Property South/Southeast	HS-MW-262	6/27/2022	578,883.959	12,794,660.698	628.53	631.60	4.0 - 9.0	624.5 - 619.5	20
House Street Property South/Southeast	HS-MW-263A	2/24/2022	576,721.174	12,794,459.393	626.74	630.00	4.9 - 9.9	621.8 - 616.8	80
House Street Property South/Southeast	HS-MW-263B	7/13/2022	576,718.275	12,794,456.356	626.95	629.18	42.1 - 47.1	584.9 - 579.9	80
House Street Property South/Southeast	HS-MW-264	2/24/2022	574,868.368	12,794,561.297	638.61	638.18	25.4 - 30.4	613.2 - 608.2	100
House Street Property South/Southeast	HS-MW-265	2/1/2022	571,010.263	12,792,622.224	612.20	614.96	10.5 - 15.5	601.7 - 596.7	90
House Street Property South/Southeast	HS-MW-266A	6/20/2022	579,706.416	12,794,679.017	633.73	636.69	10.2 - 15.2	623.5 - 618.5	690
House Street Property South/Southeast	HS-MW-266B	9/14/2022	579,711.529	12,794,680.081	633.71	636.69	50.0 - 55.0	583.7 - 578.7	690

NOTES:
1) Northing and easting values are in North American Datum of 1983, Michigan State Plane South Zone, International Feet.
2) Abbreviaions Include:
"feet amsl" indicates feet above mean sea level (North American Vertical Datum of 1988).
"feet bgs" indicates approximate feet below ground surface.
3) Northing, easting, ground surface elevation, and top of casing elevation were surveyed by Exxel Engineering, Inc. of Grand Rapids, Michigan.
4) Screen intervals presented are based on field measurements of the completed monitoring well to the nearest tenth of a foot; therefore, readings may differ from the approximate depth interval recorded on the soil boring log.

TABLE 2
QUARTERLY GROUNDWATER AND SURFACE WATER GAUGING ELEVATIONS
GSI Investigation
Algoma and Plainfield Townships, Kent County, MI

Well	Q2 2023 4/10/2023	Q3 2023 7/10/2023	Q4 2023 10/2/2023	Q1 2024 1/8/2024
AREA11-RI-1A	624.02	[1]	623.52	622.82
AREA11-RI-1B	624.04	625.20	624.28	623.71
AREA11-RI-1C	624.09	625.17	624.26	623.70
AREA12-RI-1	626.41	625.20	624.92	625.03
AREA12-RI-3	629.68	629.00	628.58	628.35
AREA19-GSI-1	[2]	697.60	697.32	697.56
AREA19-GSI-2	[2]	691.19	690.77	691.04
AREA19-GSI-3	[2]	690.87	690.51	690.65
AREA19-MW-11C	[5]	714.93	714.25	714.23
AREA19-MW-12C	[5]	710.13	709.55	709.71
AREA19-MW-13A	759.82	761.05	761.29	760.48
AREA19-MW-13B	732.53	733.01	732.54	731.72
AREA19-MW-13C	732.43	732.91	732.45	731.62
AREA19-MW-14A	[4]	735.55	736.43	737.02
AREA19-MW-14B	[4]	758.95	736.49	737.20
AREA19-MW-15A	[4]	793.75	793.14	792.60
AREA19-MW-15B	[4]	738.36	742.19	744.64
AREA19-MW-15C	751.18	738.21	742.03	744.63
AREA19-MW-16A	[4]	783.54	781.99	781.92
AREA19-MW-16B	[4]	779.25	777.78	777.77
AREA19-MW-16C	[4]	728.76	727.84	727.86
AREA19-MW-2	874.39	869.61	869.63	870.95
AREA19-MW-221A	697.49	695.17	694.81	695.23
AREA19-MW-221B	697.64	695.97	695.76	695.98
AREA19-MW-222	693.43	691.62	691.41	692.00
AREA19-MW-223	693.46	691.02	690.63	690.93
AREA19-MW-224	695.15	693.19	692.65	694.00
AREA19-MW-225A	700.06	698.17	697.93	698.27
AREA19-MW-225B	700.84	699.01	698.74	699.13
AREA19-MW-226A	[4]	702.37	702.14	702.59
AREA19-MW-226B	704.24	702.46	702.27	702.67
AREA19-MW-3	[4]	726.24	725.86	725.43
AREA19-MW-4A	[4]	[4]	725.17	724.66
AREA19-MW-4B	[4]	[4]	725.20	724.70
AREA19-MW-5C	[5]	727.48	726.92	726.32
AREA19-MW-6A	[4]	714.91	713.97	713.13
AREA19-MW-6B	[4]	714.08	713.19	712.76
AREA19-MW-6C	[4]	713.93	713.06	712.72
AREA19-MW-7A	700.07	698.29	697.92	698.19
AREA19-MW-7B	706.67	Artesian	Artesian	Artesian
AREA19-MW-8A	[4]	800.96	799.73	799.08
AREA19-MW-8B	[4]	738.57	740.08	741.65
AREA19-MW-8C	725.71	717.98	719.93	722.55
AREA19-MW-9A	[4]	790.78	790.06	790.77
AREA19-MW-9B	[4]	738.66	742.46	744.90
AREA19-MW-9C	748.02	739.48	743.04	745.18
AREA5-RI-10A	701.46	702.27	702.25	701.79
AREA5-RI-10B	703.04	703.83	703.76	703.29
AREA5-RI-10C	693.78	694.40	694.18	693.78
AREA5-RI-10D	693.71	694.37	694.13	693.71
AREA5-RI-11A	696.56	697.37	697.29	697.24
AREA5-RI-11B	696.93	697.74	697.65	696.89
AREA5-RI-11C	687.75	688.28	688.00	687.65
AREA5-RI-11D	686.88	687.37	687.10	686.76
AREA5-RI-1A	649.51	649.10	648.16	648.26
AREA5-RI-1B	653.80	653.36	652.68	652.69
AREA5-RI-1C	659.09	658.62	658.18	657.94
AREA5-RI-2A	691.26	689.39	688.81	689.36
AREA5-RI-2B	691.48	689.60	689.02	689.57
AREA5-RI-3A	660.77	658.47	659.71	659.47
AREA5-RI-3B	659.40	658.96	658.44	658.25
AREA5-RI-4A	693.45	689.72	688.67	689.71
AREA5-RI-4B	692.28	689.39	688.68	689.44
AREA5-RI-5A	652.21	649.38	647.60	646.91

TABLE 2
QUARTERLY GROUNDWATER AND SURFACE WATER GAUGING ELEVATIONS
GSI Investigation
Algoma and Plainfield Townships, Kent County, MI

Well	Q2 2023 4/10/2023	Q3 2023 7/10/2023	Q4 2023 10/2/2023	Q1 2024 1/8/2024
AREA5-RI-5B	648.64	644.81	642.52	641.59
AREA5-RI-6	629.20	628.64	627.53	627.46
AREA5-RI-7A	636.18	635.03	633.43	632.69
AREA5-RI-7B	638.56	636.69	635.25	634.81
AREA5-RI-8A	704.72	705.56	705.49	704.99
AREA5-RI-8B	704.60	705.43	705.34	704.84
AREA5-RI-8C	700.62	701.35	701.20	700.71
AREA5-RI-9A	717.84	718.66	718.51	717.69
AREA5-RI-9B	703.63	704.41	704.29	703.73
AREA5-RI-9C	703.79	704.55	704.43	703.88
AREA6-RI-1A	681.02	681.46	681.18	680.56
AREA6-RI-1B	680.45	680.89	680.57	679.94
AREA6-RI-3A	708.88	709.06	708.67	708.27
AREA6-RI-3B	666.62	666.62	666.76	666.23
AREA6-RI-3C	666.64	667.06	666.79	666.26
AREA6-RI-3D	667.06	667.48	667.19	666.68
AREA6-RI-4A	757.95	757.27	757.35	756.47
AREA6-RI-4B	739.81	736.34	738.98	739.59
AREA6-RI-4C	735.18	736.19	738.82	739.43
AREA6-RI-4D	740.73	736.12	738.67	739.45
HS-GSI-1	631.40	630.57	630.40	630.58
HS-GSI-2	[2]	625.09	624.92	625.04
HS-GSI-3	618.60	617.79	617.65	617.84
HS-GSI-4	[2]	608.84	608.68	608.86
HS-GSI-5	[2]	608.95	608.77	609.05
HS-GSI-6	[2]	606.01	605.82	607.01
HS-GSI-7	[2]	605.74	605.52	606.80
HS-GSI-8	[2]	606.11	605.56	606.98
HS-GSI-9	[2]	716.25	715.83	716.78
HS-MW-10D	731.05	729.56	730.37	730.64
HS-MW-10M	722.47	723.09	722.66	722.19
HS-MW-10S	722.46	723.11	722.66	722.18
HS-MW-11D	716.03	716.65	716.33	715.83
HS-MW-11M	716.00	716.65	716.31	715.86
HS-MW-11S	716.89	717.36	717.02	716.57
HS-MW-12A	705.97	705.75	705.02	704.44
HS-MW-12B	702.38	702.16	701.63	701.12
HS-MW-12C	683.10	683.69	683.35	682.86
HS-MW-12D	683.45	684.04	683.69	683.20
HS-MW-12E	683.37	683.29	683.72	683.38
HS-MW-13A	667.80	668.24	667.88	667.43
HS-MW-13B	667.85	668.29	667.95	667.46
HS-MW-13C	668.36	668.78	668.44	667.97
HS-MW-14D	659.57	659.30	658.97	658.79
HS-MW-14M	655.73	660.43	660.06	660.01
HS-MW-14S	656.63	656.04	655.80	655.81
HS-MW-15D	635.57	634.74	634.34	634.38
HS-MW-15M	634.38	633.60	633.16	632.51
HS-MW-15S	630.89	629.61	629.21	629.38
HS-MW-17D	686.50	687.09	686.75	686.33
HS-MW-17M	686.57	687.14	686.83	686.39
HS-MW-17S	700.28	701.05	700.93	700.50
HS-MW-18D	662.26	662.37	661.92	656.61
HS-MW-18S	667.28	666.68	665.87	665.52
HS-MW-19D	652.51	649.95	649.11	649.25
HS-MW-19S	653.83	651.89	651.01	651.27
HS-MW-20D	648.62	648.73	648.24	647.81
HS-MW-20M	648.72	648.82	648.35	647.90
HS-MW-20S	648.74	648.86	648.38	647.94
HS-MW-21D	638.67	638.09	637.60	637.17
HS-MW-21M	637.56	637.31	636.83	636.46
HS-MW-21S	637.81	637.56	637.16	636.77
HS-MW-23A	720.62	721.10	720.74	720.32
HS-MW-23B	720.58	721.06	720.72	720.29

TABLE 2
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GSI Investigation
Algoma and Plainfield Townships, Kent County, MI

Well	Q2 2023 4/10/2023	Q3 2023 7/10/2023	Q4 2023 10/2/2023	Q1 2024 1/8/2024
HS-MW-23C	720.65	721.10	720.76	720.34
HS-MW-23D	720.57	721.02	720.68	720.26
HS-MW-24A	722.85	721.61	721.37	721.36
HS-MW-24B	721.81	721.57	721.32	721.33
HS-MW-25D	628.73	627.18	626.59	626.48
HS-MW-25S	628.83	627.28	626.67	626.57
HS-MW-260	628.37	627.46	627.28	627.45
HS-MW-261	627.67	626.91	626.73	626.87
HS-MW-262	626.74	626.21	625.03	626.14
HS-MW-263A	622.81	622.17	622.11	622.18
HS-MW-263B	623.78	622.62	622.39	622.54
HS-MW-264	617.98	616.18	615.94	616.04
HS-MW-265	[2]	605.77	605.58	606.81
HS-MW-266A	632.63	632.68	632.40	632.33
HS-MW-266B	632.70	632.76	632.45	632.40
HS-MW-26D	640.30	638.15	636.07	635.39
HS-MW-26M	640.18	637.97	635.90	635.20
HS-MW-26S	635.88	635.61	633.61	633.18
HS-MW-27A	Dry	Dry	Dry	Dry
HS-MW-27B	644.25	643.11	642.68	641.96
HS-MW-27C	645.28	643.94	643.59	642.87
HS-MW-27D	645.67	644.16	643.82	643.43
HS-MW-27E	645.63	644.17	643.77	643.07
HS-MW-28A	629.45	629.09	628.66	628.44
HS-MW-28B	629.48	629.12	[7]	628.47
HS-MW-28C	629.41	629.05	628.62	628.42
HS-MW-28D	630.37	629.94	629.43	629.18
HS-MW-28E	630.46	630.07	629.55	629.27
HS-MW-29A	627.70	626.88	626.69	626.83
HS-MW-29B	627.93	627.10	626.92	[5]
HS-MW-29C	627.79	626.97	626.78	626.91
HS-MW-29D	627.72	626.90	626.73	[5]
HS-MW-30A	630.85	630.53	630.04	629.78
HS-MW-30B	630.87	630.53	630.05	629.75
HS-MW-30C	631.14	631.02	630.55	630.18
HS-MW-30D	631.26	631.20	630.72	630.35
HS-MW-30E	631.24	631.22	630.74	630.34
HS-MW-31A	623.01	623.54	623.06	622.30
HS-MW-31B	623.22	623.77	622.85	622.30
HS-MW-31C	623.01	623.54	623.07	622.54
HS-MW-31D	622.87	623.40	622.52	622.18
HS-MW-31E	622.90	623.46	622.77	622.21
HS-MW-32A	[3]	719.35	719.05	719.47
HS-MW-32B	[3]	719.35	719.07	719.46
HS-MW-32C	[3]	719.49	719.22	719.64
HS-MW-32D	[3]	719.27	719.00	719.41
HS-MW-8	721.02	721.56	721.17	720.75
HS-MW-9D	741.47	737.52	740.28	740.88
HS-MW-9M	741.31	737.35	740.11	740.72
HS-MW-9S	793.28	792.74	792.84	792.50
HS-PMW-16A	691.94	693.01	692.61	691.97
HS-PMW-16B	692.13	693.20	692.79	692.14
HS-PMW-16C	689.29	690.19	689.96	689.22
HS-PMW-22	[4]	739.47	741.21	741.48
HS-PMW-RI-101A	[4]	720.14	719.65	720.21
HS-PMW-RI-101B	[4]	719.16	718.87	719.33
HS-PMW-RI-102A	718.29	718.58	718.22	717.79
HS-PMW-RI-102B	718.03	718.56	718.21	717.75
HS-PMW-RI-102C	718.01	718.55	718.20	717.74
HS-PMW-RI-102D	718.02	718.55	718.22	717.75
HS-PMW-RI-103A	691.16	691.58	691.35	691.11
HS-PMW-RI-103B	690.31	690.77	690.56	690.29
HS-PMW-RI-104A	648.81	648.67	648.23	647.86
HS-PMW-RI-104B	646.82	648.68	648.25	647.86

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HS-PMW-RI-104C	648.85	648.73	648.28	647.93
HS-PMW-RI-104D	655.16	654.99	654.59	654.33
HS-PMW-RI-105A	[4]	720.93	720.62	720.98
HS-PMW-RI-105B	732.13	730.68	729.50	731.61
HS-PMW-RI-106A	[4]	723.73	723.54	723.53
HS-PMW-RI-106B	723.17	722.97	722.77	722.80
HS-PMW-RI-107A	694.02	694.70	694.53	694.15
HS-PMW-RI-107B	680.12	680.48	680.18	679.84
HS-PMW-RI-107C	680.09	680.47	680.13	679.81
HS-PMW-RI-107D	678.44	678.81	678.50	678.17
HS-PMW-RI-108A	799.77	799.85	799.45	798.62
HS-PMW-RI-108B	740.50	737.36	[7]	740.55
HS-PMW-RI-108C	[6]	[6]	[6]	[6]
HS-PMW-RI-108D	741.43	737.51	740.16	740.81
HS-PMW-RI-109A	777.32	776.69	776.26	776.81
HS-PMW-RI-109B	720.82	721.85	721.38	720.86
HS-PMW-RI-109C	721.08	722.06	721.62	719.10
HS-PMW-RI-110A	630.21	631.00	630.45	629.82
HS-PMW-RI-110B	630.08	630.88	630.32	629.67
HS-PMW-RI-111A	616.04	613.44	612.99	613.14
HS-PMW-RI-111B	616.25	613.65	613.20	613.38
HS-PMW-RI-112A	616.30	609.52	609.20	609.74
HS-PMW-RI-112B	616.19	609.50	609.20	609.74
WV/CH-GSI-1	675.47	675.00	674.85	674.97
WV/CH-GSI-2	672.16	671.36	671.15	671.16
WV/CH-MW-240	684.56	683.27	682.92	682.73
WV/CH-MW-241A	685.05	682.31	681.39	679.63
WV/CH-MW-241B	684.54	682.13	681.29	679.83
WV/CH-MW-242A	678.89	678.23	677.76	677.77
WV/CH-MW-242B	697.74	695.95	696.71	696.79
WV-MW-1	757.30	754.20	755.89	755.76
WV-MW-10D	747.91	743.89	745.92	746.85
WV-MW-10M	746.75	743.00	744.99	745.60
WV-MW-10S	741.04	738.64	738.22	737.37
WV-MW-11D	743.96	Artesian	Artesian	Artesian
WV-MW-11S	724.46	724.54	723.16	722.60
WV-MW-12D	716.77	714.81	714.32	714.59
WV-MW-12M	716.71	714.74	714.29	714.52
WV-MW-12S	721.49	720.84	719.76	719.16
WV-MW-13D	800.15	801.14	800.63	800.03
WV-MW-13M	820.93	819.36	818.42	818.52
WV-MW-13S	820.73	819.32	818.44	818.66
WV-MW-14D	730.55	730.69	730.53	730.57
WV-MW-14S	861.84	859.80	859.45	859.95
WV-MW-15A	718.67	716.34	715.87	716.27
WV-MW-15B	718.50	716.18	715.74	716.11
WV-MW-15C	718.42	716.12	715.66	716.03
WV-MW-15D	729.09	Artesian	Artesian	Artesian
WV-MW-16D	759.83	756.81	758.35	759.14
WV-MW-16S	815.33	814.77	814.57	814.59
WV-MW-2D	784.65	783.73	783.90	783.98
WV-MW-2S	790.03	789.95	789.92	789.92
WV-MW-3D	799.00	799.89	799.41	798.87
WV-MW-3S	819.03	817.62	817.01	817.42
WV-MW-4	752.90	747.06	749.93	751.66
WV-MW-5D	799.24	800.35	799.82	799.22
WV-MW-5S	799.38	800.50	799.97	799.37
WV-MW-6D	764.06	759.83	760.38	760.88
WV-MW-6S	780.63	778.55	778.09	778.18
WV-MW-7D	715.07	713.03	712.49	713.06
WV-MW-7M	715.07	712.99	712.49	713.07
WV-MW-7S	715.07	712.98	712.46	713.02
WV-MW-8D	753.43	750.99	752.24	752.94
WV-MW-8M	819.81	820.58	820.12	819.31

TABLE 2
QUARTERLY GROUNDWATER AND SURFACE WATER GAUGING ELEVATIONS
GSI Investigation
Algoma and Plainfield Townships, Kent County, MI

Well	Q2 2023 4/10/2023	Q3 2023 7/10/2023	Q4 2023 10/2/2023	Q1 2024 1/8/2024
WV-MW-8S	819.77	820.56	820.08	819.27
WV-MW-9	822.51	822.48	822.27	821.28
WVNW-GSI-1	711.90	710.64	710.49	710.94
WVNW-GSI-2	[2]	712.09	711.67	712.42
WVNW-MW-200A	717.75	715.59	715.10	715.38 [8]
WVNW-MW-200B	717.69	715.56	715.04	715.25
WVNW-MW-201A	714.79	712.64	712.19	712.84
WVNW-MW-201B	714.79	712.61	712.15	712.81
WVNW-MW-201C	714.76	712.61	712.15	712.80
WVNW-MW-202A	714.32	712.37	711.89	712.46
WVNW-MW-202B	714.29	712.42	711.93	712.49
WVNW-MW-203	714.89	712.84	712.31	712.89
WV-PMW-RI-101A	801.26	802.41	801.73	801.04
WV-PMW-RI-101B	729.71	720.10	723.73	728.02
WV-PMW-RI-102	797.76	798.85	798.27	[5]
WV-PMW-RI-104A	[4]	715.65	714.98	715.13
WV-PMW-RI-104B	721.63	719.85	719.70	719.97
WV-PMW-RI-105A	[4]	716.81	716.25	716.52
WV-PMW-RI-105B	721.68	720.08	719.63	719.80
WV-PMW-RI-106A	880.89	878.53	877.72	878.85
WV-PMW-RI-106B	881.51	879.16	878.40	879.48
WV-PMW-RI-106C	881.48	879.14	878.34	879.41
WV-PMW-RI-106D	877.58	871.50	869.50	870.42
WV-PMW-RI-106E	747.15	746.05	746.47	747.07
WV-PMW-RI-107	743.87	740.37	742.12	743.39
WV-PMW-RI-108	[4]	789.39	788.19	787.88

Staff Gauge	Q2 2023 4/10/2023	Q3 2023 7/10/2023	Q4 2023 10/2/2023	Q1 2024 1/8/2024
11 Mile Road Bridge	714.85	712.97	712.72	713.13
12 Mile Road Bridge	707.44	705.84	705.62	706.02
Algoma Avenue Bridge	710.99	709.44	709.15	709.56
Jerico Avenue Bridge	671.11	670.23	670.03	670.23
Rogue River Road Bridge	617.95	617.50	617.34	617.45
Dam Seawall	680.16	679.04	678.80	679.06
East Bridge Street Bridge	679.72	678.86	678.64	678.83
TA-SG-RC	[5]	691.97	691.48	691.49
USGS04118500	629.75 [9]	628.49 [9]	628.21 [9]	629.18 [9]

Notes:

[1] indicates could not locate due to LGPA tour activity.
[2] indicates inaccessable due to high river level.
[3] inaccessalbe due to road closure.
[4] indicates not installed at time of measurement event.
[5] indicates not measured.
[6] indicates not measured because the well was damaged when grout blew into the screen.
[7] indicates recorded water depth was anomalous and was usable for contouring.
[8] indicates reading from 1/9/2024 because the reading entered during 1/8/2024 measurement event was anomalous.
[9] indicates readings were provided by the United States Geological Survey:
https://waterdata.usgs.gov/monitoring-location/04118500/#parameterCode=00065&period=P7D&showMedian=false

TABLE 3
SUMMARY OF PORE-WATER SAMPLE ANALYSIS - PFAS
GSI Investigation
Algoma and Plainfield Townships, Kent County, MI

Study Area	Part 201 Generic Groundwater Cleanup Criteria – Groundwater Surface Water Interface[2]	Wolven Northwest	Wolven Northwest	Wolven Northwest	Wolven Northwest	Wolven Northwest	Wolven Northwest	Wolven Northwest	Wolven Northwest	Wolven Northwest	Wolven Northwest	Wolven Northwest	Wolven Northwest	Wolven Northeast	Wolven Northeast	Wolven Northeast	Wolven Northeast
Location		WVNW-PW-1	WVNW-PW-1	WVNW-PW-2	WVNW-PW-2	WVNW-PW-3	WVNW-PW-4	WVNW-PW-4	WVNW-PW-5	WVNW-PW-5	WVNW-PW-6	WVNW-PW-6	WVNW-PW-7	AREA19-PW-1	AREA19-PW-2	AREA19-PW-2	AREA19-PW-3
Sample Name		WVNW-PW-1(A)	WVNW-PW-1(B)	WVNW-PW-2(A)	WVNW-PW-2(B)	WVNW-PW-3(A)	WVNW-PW-4(A)	WVNW-PW-4(A)-DUP	WVNW-PW-5A	WVNW-PW-5A DUP	WVNW-PW-6A	WVNW-PW-6B	WVNW-PW-7A	Area19-PW-1(A)	Area19-PW-2(A)	Area19-PW-2(B)	Area19-PW-3(A)
Sample Depth (feet below the ground surface of the river bottom)		3.00- 3.13	4.00 - 4.13	2.33 - 2.46	3.33 - 3.46	1.50 - 1.63	1.67 - 1.79	1.67 - 1.79	1.00 - 1.13	1.00 - 1.13	1.00 - 1.13	1.70 - 1.83	1.30 - 1.43	1.00 - 1.13	1.00 - 1.13	1.42 - 1.54	1.00 - 1.13
Laboratory Sample ID		VL11053-012	VL11053-014	VL11053-010	VL11053-011	VL06012-013	VL06012-011	VL06012-012	XG22049-005	XG22049-006	XG22049-007	XG22049-008	XG22049-009	VL06012-001	VL06012-002	VL06012-003	VL06012-004
Sample Date		12/09/2020	12/09/2020	12/09/2020	12/09/2020	12/02/2020	12/02/2020	12/02/2020	07/20/2022	07/20/2022	07/20/2022	07/20/2022	07/20/2022	11/30/2020	11/30/2020	11/30/2020	11/30/2020
Parameter (µg/L)																	
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	NCL	<0.0076	<0.0076	<0.0078	<0.0075	<0.0082	<0.0072	<0.0073	<0.0069	<0.0074	<0.0075	<0.0074	<0.0074	<0.0073	<0.011	<0.0077	<0.0075
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CL-PF3OUdS)	NCL	<0.0076	<0.0076	<0.0078	<0.0075	<0.0082	<0.0072	<0.0073	<0.0069	<0.0074	<0.0075	<0.0074	<0.0074	<0.0073	<0.011	<0.0077	<0.0075
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	NCL	<0.0076	<0.0076	<0.0078	<0.0075	<0.0082	<0.0072	<0.0073	<0.0069	<0.0074	<0.0075	<0.0074	<0.0074	<0.0073	<0.011	<0.0077	<0.0075
1H,1H,2H,2H-perfluorohexane sulfonate (4:2FTS)	NCL	<0.0076	<0.0076	<0.0078	<0.0075	<0.0082	<0.0072	<0.0073	<0.0069	<0.0074	<0.0075	<0.0074	<0.0074	<0.0073	<0.011	<0.0077	<0.0075
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	<0.0076	<0.0076	<0.0078	<0.0075	<0.0082	<0.0072	<0.0073	<0.0069	<0.0074	<0.0075	<0.0074	<0.0074	<0.0073	<0.011	<0.0077	<0.0075
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	<0.0076	<0.0076	<0.0078	<0.0075	<0.0082	<0.0072	<0.0073	<0.0069	<0.0074	<0.0075	<0.0074	<0.0074	<0.0073	<0.011	<0.0077	<0.0075
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	NCL	<0.0076	<0.0076	<0.0078	<0.0075	<0.0082	<0.0072	<0.0073	<0.0069	<0.0074	<0.0075	<0.0074	<0.0074	<0.0073	<0.011	<0.0077	<0.0075
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	NCL	<0.0076	<0.0076	<0.0078	<0.0075	<0.0082	<0.0072	<0.0073	<0.0069	<0.0074	<0.0075	<0.0074	<0.0074	<0.0073	<0.011	<0.0077	<0.0075
Perfluorobutane sulfonic acid (PFBS)	670	0.0038	0.0045	0.0046	<0.0037	0.0051	0.01	0.011	<0.0035	<0.0037	<0.0037	<0.0037	<0.0037	0.013	0.016	0.012	0.015
Perfluorodecane sulfonic acid (PFDS)	NCL	<0.0038	<0.0038	<0.0039	<0.0037	<0.0041	<0.0036	<0.0036	<0.0035	<0.0037	<0.0037	<0.0037	<0.0037	<0.0037	<0.0054	<0.0038	<0.0037
Perfluoroheptane sulfonic acid (PFHpS)	NCL	<0.0038	<0.0038	<0.0039	<0.0037	0.0054	0.0069	0.0061	<0.0035	<0.0037	<0.0037	<0.0037	<0.0037	0.0093	<0.0054	<0.0038	0.0041
Perfluorononane sulfonic acid (PFNS)	NCL	<0.0038	<0.0038	<0.0039	<0.0037	<0.0041	<0.0036	<0.0036	<0.0035	<0.0037	<0.0037	<0.0037	<0.0037	<0.0037	<0.0054	<0.0038	<0.0037
Perfluorooctane sulfonamide (FOSA)	NCL	<0.0038	<0.0038	<0.0039	<0.0037	<0.0041	<0.0036	<0.0036	<0.0035	<0.0037	<0.0037	<0.0037	<0.0037	<0.0037	<0.0054	<0.0038	<0.0037
Perfluoropentane sulfonic acid (PFPeS)	NCL	<0.0038	<0.0038	<0.0039	<0.0037	<0.0041	0.0053	0.0042	<0.0035	<0.0037	<0.0037	<0.0037	<0.0037	<0.0037	<0.0054	<0.0038	<0.0037
Perfluorohexane sulfonic acid (PFHxS)	0.21	<0.0038	<0.0038	<0.0039	<0.0037	0.0092	0.019	0.019	<0.0035	<0.0037	<0.0037	<0.0037	<0.0037	0.017	0.011	0.0083	0.011
Perfluorobutanoic acid (PFBA)	NCL	<0.0038	<0.0038	<0.0039	<0.0037	<0.0041	0.0063	0.0057	0.0041	0.0043	<0.0037	<0.0037	<0.0037	0.012	0.011	0.0075	0.0039
Perfluorodecanoic acid (PFDA)	NCL	<0.0038	<0.0038	<0.0039	<0.0037	<0.0041	<0.0036	<0.0036	<0.0035	<0.0037	<0.0037	<0.0037	<0.0037	<0.0037	<0.0054	<0.0038	<0.0037
Perfluorododecanoic acid (PFDoDA)	NCL	<0.0038	<0.0038	<0.0039	<0.0037	<0.0041	<0.0036	<0.0036	<0.0035	<0.0037	<0.0037	<0.0037	<0.0037	<0.0037	<0.0054	<0.0038	<0.0037
Perfluoroheptanoic acid (PFHpA)	NCL	<0.0038	<0.0038	<0.0039	<0.0037	<0.0041	0.0088	0.0092	<0.0035	<0.0037	<0.0037	<0.0037	<0.0037	0.015	<0.0054	<0.0038	0.004
Perfluorohexanoic acid (PFHxA)	NA	<0.0038	<0.0038	<0.0039	<0.0037	<0.0041	0.0068	0.0076	<0.0035	<0.0037	<0.0037	<0.0037	<0.0037	0.013	0.0069	0.0053	<0.0037
Perfluorononanoic acid (PFNA)	0.03	<0.0038	<0.0038	<0.0039	<0.0037	<0.0041	<0.0036	<0.0036	<0.0035	<0.0037	<0.0037	<0.0037	<0.0037	<0.0037	<0.0054	<0.0038	<0.0037
Perfluorooctanoic acid (PFOA)	0.17	0.0055	0.0073	0.012	0.0075	0.028	0.066	0.065	0.0073	0.0077	<0.0037	<0.0037	<0.0037	0.11	0.03	0.019	0.033
Perfluorooctane sulfonic acid (PFOS)	0.012	0.007	0.0097	0.01	0.011	***0.26***	***0.1***	***0.094***	0.0075	0.0085	<0.0037	<0.0037	<0.0037	***0.13***	***0.03***	***0.024***	***0.089***
PFOA + PFOS (Calculated)	NCL	0.013	0.017	0.022	0.019	0.29	0.17	0.16	0.015	0.016	ND	ND	ND	0.24	0.06	0.043	0.12
Perfluoropentanoic acid (PFPeA)	NCL	<0.0038	<0.0038	<0.0039	<0.0037	<0.0041	0.004	<0.0036	<0.0035	<0.0037	<0.0037	<0.0037	<0.0037	0.0055	<0.0054	<0.0038	<0.0037
Perfluorotetradecanoic acid (PFTeDA)	NCL	<0.0038	<0.0038	<0.0039	<0.0037	<0.0041	<0.0036	<0.0036	<0.0035	<0.0037	<0.0037	<0.0037	<0.0037	<0.0037	<0.0054	<0.0038	<0.0037
Perfluorotridecanoic acid (PFTrDA)	NCL	<0.0038	<0.0038	<0.0039	<0.0037	<0.0041	<0.0036	<0.0036	<0.0035	<0.0037	<0.0037	<0.0037	<0.0037	<0.0037	<0.0054	<0.0038	<0.0037
Perfluoroundecanoic acid (PFUnDA)	NCL	<0.0038	<0.0038	<0.0039	<0.0037	<0.0041	<0.0036	<0.0036	<0.0035	<0.0037	<0.0037	<0.0037	<0.0037	<0.0037	<0.0054	<0.0038	<0.0037
Tetrafluoro-2-(heptafluoropropoxy)propanoic acid (GenX)	NA	<0.0076	<0.0076	<0.0078	<0.0075	<0.0082	<0.0072	<0.0073	<0.0069	<0.0074	<0.0075	<0.0074	<0.0074	<0.0073	<0.011	<0.0077	<0.0075
Total PFAS (Calculated)	NCL	0.016	0.022	0.027	0.019	0.31	0.23	0.22	0.019	0.021	ND	ND	ND	0.32	0.1	0.076	0.16

TABLE 3
SUMMARY OF PORE-WATER SAMPLE ANALYSIS - PFAS
GSI Investigation
Algoma and Plainfield Townships, Kent County, MI

Study Area	Part 201 Generic Groundwater Cleanup Criteria – Groundwater Surface Water Interface[2]	Wolven Northeast	Wolven Northeast	Wolven Northeast	Wolven Northeast	Wolven Northeast	Wolven Northeast	Wolven Northeast	Wolven Northeast	Wolven Northeast	Wolven Northeast	Wolven-North Childsdale	Wolven-North Childsdale	Wolven-North Childsdale	Wolven-North Childsdale	Wolven-North Childsdale	Wolven-North Childsdale
Location		AREA19-PW-4	AREA19-PW-4	AREA19-PW-5	AREA19-PW-6	AREA19-PW-6	AREA19-PW-7	AREA19-PW-8	AREA19-PW-9	AREA19-PW-9	AREA19-PW-10	WV/CH-PW-1	WV/CH-PW-2	WV/CH-PW-3	WV/CH-PW-4	WV/CH-PW-5	WV/CH-PW-6
Sample Name		Area19-PW-4(A)	Area19-PW-4(B)	Area19-PW-5(A)	Area19-PW-6(A)	Area19-PW-6(B)	Area19-PW-7(A)	Area19-PW-8A	Area19-PW-9A	Area19-PW-9B	Area19-PW-10A	WV/CH-PW-1(A)	WV/CH-PW-2(A)	WV/CH-PW-3(A)	WV/CH-PW-4(A)	WV/CH-PW-5(A)	WV/CH-PW-6(A)
Sample Depth (feet below the ground surface of the river bottom)		1.00 - 1.13	1.42 - 1.54	1.00 - 1.13	1.50 - 1.63	2.00 - 2.13	5.00 - 5.13	1.00 - 1.13	1.00 - 1.13	1.50 - 1.63	1.00 - 1.13	0.75 - 0.88	0.75 - 0.88	1.00 - 1.13	1.00 - 1.13	0.83 - 0.96	1.00 - 1.13
Laboratory Sample ID		VL06012-005	VL06012-006	VL06012-007	VL06012-008	VL06012-009	VL06012-010	XG22049-001	XG22049-002	XG22049-003	XG22049-004	VL11053-001	VL11053-002	VL11053-003	VL11053-004	VL11053-005	VL11053-006
Sample Date		12/01/2020	12/01/2020	12/01/2020	12/01/2020	12/01/2020	12/01/2020	07/19/2022	07/19/2022	07/19/2022	07/19/2022	12/07/2020	12/07/2020	12/07/2020	12/07/2020	12/08/2020	12/08/2020
Parameter (µg/L)																	
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	NCL	<0.0074	<0.0074	<0.0075	<0.0074	<0.0074	<0.0075	<0.0073	<0.0071	<0.0075	<0.0069	<0.0078	<0.0077	<0.0077	<0.0078	<0.0076	<0.0076
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CL-PF3OUdS)	NCL	<0.0074	<0.0074	<0.0075	<0.0074	<0.0074	<0.0075	<0.0073	<0.0071	<0.0075	<0.0069	<0.0078	<0.0077	<0.0077	<0.0078	<0.0076	<0.0076
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	NCL	<0.0074	<0.0074	<0.0075	<0.0074	<0.0074	<0.0075	<0.0073	<0.0071	<0.0075	<0.0069	<0.0078	<0.0077	<0.0077	<0.0078	<0.0076	<0.0076
1H,1H,2H,2H-perfluorohexane sulfonate (4:2FTS)	NCL	<0.0074	<0.0074	<0.0075	<0.0074	<0.0074	<0.0075	<0.0073	<0.0071	<0.0075	<0.0069	<0.0078	<0.0077	<0.0077	<0.0078	<0.0076	<0.0076
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	<0.0074	<0.0074	<0.0075	<0.0074	<0.0074	<0.0075	<0.0073	<0.0071	<0.0075	<0.0069	<0.0078	<0.0077	<0.0077	<0.0078	<0.0076	<0.0076
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	<0.0074	<0.0074	<0.0075	<0.0074	<0.0074	<0.0075	<0.0073	<0.0071	<0.0075	<0.0069	<0.0078	<0.0077	<0.0077	<0.0078	<0.0076	<0.0076
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	NCL	<0.0074	<0.0074	<0.0075	<0.0074	<0.0074	<0.0075	<0.0073	<0.0071	<0.0075	<0.0069	<0.0078	<0.0077	<0.0077	<0.0078	<0.0076	<0.0076
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	NCL	<0.0074	<0.0074	<0.0075	<0.0074	<0.0074	<0.0075	<0.0073	<0.0071	<0.0075	<0.0069	<0.0078	<0.0077	<0.0077	<0.0078	<0.0076	<0.0076
Perfluorobutane sulfonic acid (PFBS)	670	0.015	0.013	0.022	0.017	0.016	0.022	0.0073	0.0081	0.0099	0.0039	0.031	0.011	0.0045	0.015	0.017	0.0098
Perfluorodecane sulfonic acid (PFDS)	NCL	<0.0037	<0.0037	<0.0038	<0.0037	<0.0037	<0.0037	<0.0036	<0.0036	<0.0038	<0.0035	<0.0039	<0.0038	<0.0038	<0.0039	<0.0038	<0.0038
Perfluoroheptane sulfonic acid (PFHpS)	NCL	0.0053	0.0054	0.013	0.0083	0.0086	0.0052	<0.0036	<0.0036	<0.0038	<0.0035	<0.0039	0.0054	<0.0038	<0.0039	<0.0038	<0.0038
Perfluorononane sulfonic acid (PFNS)	NCL	<0.0037	<0.0037	<0.0038	<0.0037	<0.0037	<0.0037	<0.0036	<0.0036	<0.0038	<0.0035	<0.0039	<0.0038	<0.0038	<0.0039	<0.0038	<0.0038
Perfluorooctane sulfonamide (FOSA)	NCL	<0.0037	<0.0037	<0.0038	<0.0037	<0.0037	<0.0037	<0.0036	<0.0036	<0.0038	<0.0035	<0.0039	<0.0038	<0.0038	<0.0039	<0.0038	<0.0038
Perfluoropentane sulfonic acid (PFPeS)	NCL	<0.0037	<0.0037	0.0043	0.0038	<0.0037	0.0049	<0.0036	<0.0036	<0.0038	<0.0035	0.014	<0.0038	<0.0038	0.0041	0.0038	<0.0038
Perfluorohexane sulfonic acid (PFHxS)	0.21	0.016	0.013	0.022	0.014	0.014	0.021	0.0068	0.0064	0.0077	<0.0035	0.018	0.011	<0.0038	0.012	0.012	0.0087
Perfluorobutanoic acid (PFBA)	NCL	<0.0037	<0.0037	0.0083	0.0053	0.0051	0.0071	<0.0036	0.0036	<0.0038	<0.0035	<0.0039	<0.0038	<0.0038	0.0059	<0.0038	<0.0038
Perfluorodecanoic acid (PFDA)	NCL	<0.0037	<0.0037	<0.0038	<0.0037	<0.0037	<0.0037	<0.0036	<0.0036	<0.0038	<0.0035	<0.0039	<0.0038	<0.0038	<0.0039	<0.0038	<0.0038
Perfluorododecanoic acid (PFDoDA)	NCL	<0.0037	<0.0037	<0.0038	<0.0037	<0.0037	<0.0037	<0.0036	<0.0036	<0.0038	<0.0035	<0.0039	<0.0038	<0.0038	<0.0039	<0.0038	<0.0038
Perfluoroheptanoic acid (PFHpA)	NCL	<0.0037	<0.0037	0.0076	0.01	0.0093	0.013	<0.0036	<0.0036	<0.0038	<0.0035	0.0086	<0.0038	<0.0038	<0.0039	<0.0038	<0.0038
Perfluorohexanoic acid (PFHxA)	NA	<0.0037	<0.0037	0.009	0.0084	0.0087	0.011	<0.0036	<0.0036	<0.0038	<0.0035	0.0068	0.0041	<0.0038	<0.0039	<0.0038	<0.0038
Perfluorononanoic acid (PFNA)	0.03	<0.0037	<0.0037	<0.0038	<0.0037	<0.0037	<0.0037	<0.0036	<0.0036	<0.0038	<0.0035	<0.0039	<0.0038	<0.0038	<0.0039	<0.0038	<0.0038
Perfluorooctanoic acid (PFOA)	0.17	0.031	0.029	0.095	0.08	0.081	0.084	0.0063	0.0051	0.0057	<0.0035	0.044	0.043	0.01	0.024	0.019	0.01
Perfluorooctane sulfonic acid (PFOS)	0.012	***0.067***	***0.064***	***0.23***	***0.06***	***0.064***	***0.02***	0.0067	0.011	***0.014***	0.0071	***0.016***	***0.079***	***0.032***	***0.02***	***0.032***	***0.015***
PFOA + PFOS (Calculated)	NCL	0.098	0.093	0.33	0.14	0.15	0.1	0.013	0.016	0.02	0.0071	0.06	0.12	0.042	0.044	0.051	0.025
Perfluoropentanoic acid (PFPeA)	NCL	<0.0037	<0.0037	0.0041	<0.0037	<0.0037	0.0051	<0.0036	<0.0036	<0.0038	<0.0035	<0.0039	<0.0038	<0.0038	<0.0039	<0.0038	<0.0038
Perfluorotetradecanoic acid (PFTeDA)	NCL	<0.0037	<0.0037	<0.0038	<0.0037	<0.0037	<0.0037	<0.0036	<0.0036	<0.0038	<0.0035	<0.0039	<0.0038	<0.0038	<0.0039	<0.0038	<0.0038
Perfluorotridecanoic acid (PFTrDA)	NCL	<0.0037	<0.0037	<0.0038	<0.0037	<0.0037	<0.0037	<0.0036	<0.0036	<0.0038	<0.0035	<0.0039	<0.0038	<0.0038	<0.0039	<0.0038	<0.0038
Perfluoroundecanoic acid (PFUnDA)	NCL	<0.0037	<0.0037	<0.0038	<0.0037	<0.0037	<0.0037	<0.0036	<0.0036	<0.0038	<0.0035	<0.0039	<0.0038	<0.0038	<0.0039	<0.0038	<0.0038
Tetrafluoro-2-(heptafluoropropoxy)propanoic acid (GenX)	NA	<0.0074	<0.0074	<0.0075	<0.0074	<0.0074	<0.0075	<0.0073	<0.0071	<0.0075	<0.0069	<0.0078	<0.0077	<0.0077	<0.0078	<0.0076	<0.0076
Total PFAS (Calculated)	NCL	0.13	0.12	0.42	0.21	0.21	0.19	0.027	0.034	0.037	0.011	0.14	0.15	0.047	0.081	0.084	0.044

TABLE 3
SUMMARY OF PORE-WATER SAMPLE ANALYSIS - PFAS
GSI Investigation
Algoma and Plainfield Townships, Kent County, MI

Study Area	Part 201 Generic Groundwater Cleanup Criteria – Groundwater Surface Water Interface[2]	Wolven-North Childsdale	House Street Property South/Southeast	House Street Property South/Southeast	House Street Property South/Southeast	House Street Property South/Southeast	House Street Property South/Southeast	House Street Property South/Southeast	House Street Property South/Southeast	House Street Property South/Southeast	House Street Property South/Southeast	House Street Property South/Southeast	House Street Property South/Southeast	House Street Property South/Southeast	House Street Property South/Southeast	House Street Property South/Southeast	House Street Property South/Southeast
Location		WV/CH-PW-6	HS-PW-1	HS-PW-1	HS-PW-2	HS-PW-2.5	HS-PW-2.5	HS-PW-3	HS-PW-3R	HS-PW-3R	HS-PW-3.5	HS-PW-4	HS-PW-5	HS-PW-6	HS-PW-7	HS-PW-8	HS-PW-9
Sample Name		WV/CH-PW-6(B)	HS-PW-1(A)	HS-PW-1(B)	HS-PW-2(A)	HS-PW-2.5 (A)	HS-PW-2.5 (B)	HS-PW-3(A)	HS-PW-3 (A)	HS-PW-3 (A) DUP	HS-PW-3.5 (A)	HS-PW-4(A)	HS-PW-5(A)	HS-PW-6(A)	HS-PW-7(A)	HS-PW-8(A)	HS-PW-9(A)
Sample Depth (feet below the ground surface of the river bottom)		2.00 - 2.13	2.00 - 2.13	2.50 - 2.63	1.00 - 1.13	0.50 - 0.63	1.00 - 1.13	1.33 - 1.46	0.50 - 0.63	0.50 - 0.63	0.83 - 0.96	0.75 - 0.88	1.33 - 1.46	1.00 - 1.13	1.50 - 1.63	1.00 - 1.13	1.00 - 1.13
Laboratory Sample ID		VL11053-007	VL06031-001	VL06031-002	VL06031-003	WA28027-001	WA28027-002	VL06031-006	WA28027-003	WA28027-004	WA28027-005	VL06031-007	VL06031-008	VL06031-009	VL06031-004	VL11053-008	VL11070-001
Sample Date		12/08/2020	12/03/2020	12/03/2020	12/03/2020	01/26/2021	01/26/2021	12/04/2020	01/26/2021	01/26/2021	01/26/2021	12/04/2020	12/04/2020	12/04/2020	12/03/2020	12/08/2020	12/08/2020
Parameter (µg/L)																	
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	NCL	<0.0077	<0.0076	<0.0073	<0.0077	<0.035	<0.0071	<0.0078	<0.037	<0.035	<0.0072	<0.0075	<0.0079	<0.0076	<0.0075	<0.0072	<0.0072
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CL-PF3OUdS)	NCL	<0.0077	<0.0076	<0.0073	<0.0077	<0.035	<0.0071	<0.0078	<0.037	<0.035	<0.0072	<0.0075	<0.0079	<0.0076	<0.0075	<0.0072	<0.0072
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	NCL	<0.0077	<0.0076	<0.0073	<0.0077	<0.035	<0.0071	<0.0078	<0.037	<0.035	<0.0072	<0.0075	<0.0079	<0.0076	<0.0075	<0.0072	<0.0072
1H,1H,2H,2H-perfluorohexane sulfonate (4:2FTS)	NCL	<0.0077	<0.0076	<0.0073	<0.0077	<0.035	<0.0071	<0.0078	<0.037	<0.035	<0.0072	<0.0075	<0.0079	<0.0076	<0.0075	<0.0072	<0.0072
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	<0.0077	<0.0076	<0.0073	<0.0077	<0.035	<0.0071	<0.0078	<0.037	<0.035	<0.0072	<0.0075	<0.0079	<0.0076	<0.0075	<0.0072	<0.0072
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	<0.0077	<0.0076	<0.0073	<0.0077	<0.035	<0.0071	<0.0078	<0.037	<0.035	<0.0072	<0.0075	<0.0079	<0.0076	<0.0075	<0.0072	<0.0072
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	NCL	<0.0077	<0.0076	<0.0073	<0.0077	<0.035	<0.0071	<0.0078	<0.037	<0.035	<0.0072	<0.0075	<0.0079	<0.0076	0.078	0.044	<0.0072
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	NCL	<0.0077	<0.0076	<0.0073	<0.0077	<0.035	<0.0071	<0.0078	<0.037	<0.035	<0.0072	<0.0075	<0.0079	<0.0076	<0.0075	<0.0072	<0.0072
Perfluorobutane sulfonic acid (PFBS)	670	0.0095	0.0087	0.0083	<0.0038	<0.018	0.0075	0.011	<0.019	<0.017	0.032	0.05	<0.0039	<0.0038	0.0095	<0.0036	<0.0036
Perfluorodecane sulfonic acid (PFDS)	NCL	<0.0038	<0.0038	<0.0036	<0.0038	<0.018	<0.0035	<0.0039	<0.019	<0.017	<0.0036	<0.0037	<0.0039	<0.0038	<0.0037	<0.0036	<0.0036
Perfluoroheptane sulfonic acid (PFHpS)	NCL	<0.0038	<0.0038	<0.0036	<0.0038	<0.018	0.0074	0.023	0.019	0.018	<0.0036	<0.0037	<0.0039	<0.0038	<0.0037	<0.0036	<0.0036
Perfluorononane sulfonic acid (PFNS)	NCL	<0.0038	<0.0038	<0.0036	<0.0038	<0.018	<0.0035	<0.0039	<0.019	<0.017	<0.0036	<0.0037	<0.0039	<0.0038	<0.0037	<0.0036	<0.0036
Perfluorooctane sulfonamide (FOSA)	NCL	<0.0038	<0.0038	<0.0036	<0.0038	<0.018	<0.0035	<0.0039	<0.019	<0.017	<0.0036	<0.0037	<0.0039	<0.0038	<0.0037	<0.0036	<0.0036
Perfluoropentane sulfonic acid (PFPeS)	NCL	<0.0038	<0.0038	<0.0036	<0.0038	<0.018	0.0056	0.0068	<0.019	<0.017	0.017	0.035	<0.0039	<0.0038	<0.0037	<0.0036	<0.0036
Perfluorohexane sulfonic acid (PFHxS)	0.21	0.0099	<0.0038	<0.0036	<0.0038	0.025	0.02	0.042	0.028	0.026	0.019	0.056	<0.0039	<0.0038	0.0058	<0.0036	<0.0036
Perfluorobutanoic acid (PFBA)	NCL	<0.0038	<0.0038	<0.0036	<0.0038	0.021	0.0091	0.022	0.021	0.02	0.0095	0.015	<0.0039	<0.0038	0.0047	<0.0036	<0.0036
Perfluorodecanoic acid (PFDA)	NCL	<0.0038	<0.0038	<0.0036	<0.0038	<0.018	<0.0035	<0.0039	<0.019	<0.017	<0.0036	<0.0037	<0.0039	<0.0038	<0.0037	<0.0036	<0.0036
Perfluorododecanoic acid (PFDoDA)	NCL	<0.0038	<0.0038	<0.0036	<0.0038	<0.018	<0.0035	<0.0039	<0.019	<0.017	<0.0036	<0.0037	<0.0039	<0.0038	<0.0037	<0.0036	<0.0036
Perfluoroheptanoic acid (PFHpA)	NCL	<0.0038	<0.0038	<0.0036	<0.0038	<0.018	0.0056	0.016	<0.019	<0.017	0.0072	0.022	<0.0039	<0.0038	<0.0037	<0.0036	<0.0036
Perfluorohexanoic acid (PFHxA)	NA	<0.0038	<0.0038	<0.0036	<0.0038	0.033	0.015	0.045	0.041	0.038	0.012	0.027	<0.0039	<0.0038	<0.0037	<0.0036	<0.0036
Perfluorononanoic acid (PFNA)	0.03	<0.0038	<0.0038	<0.0036	<0.0038	<0.018	<0.0035	<0.0039	<0.019	<0.017	<0.0036	<0.0037	<0.0039	<0.0038	<0.0037	<0.0036	<0.0036
Perfluorooctanoic acid (PFOA)	0.17	0.008	<0.0038	<0.0036	0.0046	0.054	0.025	0.074	0.077	0.071	0.021	0.074	0.0079	0.007	0.0038	0.007	<0.0036
Perfluorooctane sulfonic acid (PFOS)	0.012	<0.0038	<0.0038	<0.0036	0.0052	***0.82***	***0.56***	***1.1***	***0.9***	***0.9***	***0.092***	***0.013***	***0.03***	0.0046	0.0089	***0.026***	0.0082
PFOA + PFOS (Calculated)	NCL	0.008	ND	ND	0.0098	0.87	0.59	1.2	0.98	0.97	0.11	0.087	0.038	0.012	0.013	0.033	0.0082
Perfluoropentanoic acid (PFPeA)	NCL	<0.0038	<0.0038	<0.0036	<0.0038	0.027	0.011	0.027	0.023	0.022	0.006	0.015	<0.0039	<0.0038	<0.0037	<0.0036	<0.0036
Perfluorotetradecanoic acid (PFTeDA)	NCL	<0.0038	<0.0038	<0.0036	<0.0038	<0.018	<0.0035	<0.0039	<0.019	<0.017	<0.0036	<0.0037	<0.0039	<0.0038	<0.0037	<0.0036	<0.0036
Perfluorotridecanoic acid (PFTrDA)	NCL	<0.0038	<0.0038	<0.0036	<0.0038	<0.018	<0.0035	<0.0039	<0.019	<0.017	<0.0036	<0.0037	<0.0039	<0.0038	<0.0037	<0.0036	<0.0036
Perfluoroundecanoic acid (PFUnDA)	NCL	<0.0038	<0.0038	<0.0036	<0.0038	<0.018	<0.0035	<0.0039	<0.019	<0.017	<0.0036	<0.0037	<0.0039	<0.0038	<0.0037	<0.0036	<0.0036
Tetrafluoro-2-(heptafluoropropoxy)propanoic acid (GenX)	NA	<0.0077	<0.0076	<0.0073	<0.0077	<0.035	<0.0071	<0.0078	<0.037	<0.035	<0.0072	<0.0075	<0.0079	<0.0076	<0.0075	<0.0072	<0.0072
Total PFAS (Calculated)	NCL	0.027	0.0087	0.0083	0.0098	0.98	0.67	1.4	1.1	1.1	0.22	0.31	0.038	0.012	0.11	0.077	0.0082

TABLE 3
SUMMARY OF PORE-WATER SAMPLE ANALYSIS - PFAS
GSI Investigation
Algoma and Plainfield Townships, Kent County, MI

Study Area	Part 201 Generic Groundwater Cleanup Criteria – Groundwater Surface Water Interface[2]	House Street Property Northwest	House Street Property Northwest
Location		HS-PW-10	HS-PW-11
Sample Name		HS-PW-10(A)	HS-PW-11(A)
Sample Depth (feet below the ground surface of the river bottom)		5.00 - 5.13	4.50 - 4.63
Laboratory Sample ID		VL11070-010	VL11053-009
Sample Date		12/09/2020	12/09/2020
Parameter (µg/L)			
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	NCL	<0.0073	<0.0075
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CL-PF3OUdS)	NCL	<0.0073	<0.0075
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	NCL	<0.0073	<0.0075
1H,1H,2H,2H-perfluorohexane sulfonate (4:2FTS)	NCL	<0.0073	<0.0075
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	<0.0073	<0.0075
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	<0.0073	<0.0075
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	NCL	<0.0073	<0.0075
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	NCL	<0.0073	<0.0075
Perfluorobutane sulfonic acid (PFBS)	670	<0.0036	<0.0038
Perfluorodecane sulfonic acid (PFDS)	NCL	<0.0036	<0.0038
Perfluoroheptane sulfonic acid (PFHpS)	NCL	<0.0036	<0.0038
Perfluorononane sulfonic acid (PFNS)	NCL	<0.0036	<0.0038
Perfluorooctane sulfonamide (FOSA)	NCL	<0.0036	<0.0038
Perfluoropentane sulfonic acid (PFPeS)	NCL	<0.0036	<0.0038
Perfluorohexane sulfonic acid (PFHxS)	0.21	<0.0036	<0.0038
Perfluorobutanoic acid (PFBA)	NCL	<0.0036	<0.0038
Perfluorodecanoic acid (PFDA)	NCL	<0.0036	<0.0038
Perfluorododecanoic acid (PFDoDA)	NCL	<0.0036	<0.0038
Perfluoroheptanoic acid (PFHpA)	NCL	<0.0036	<0.0038
Perfluorohexanoic acid (PFHxA)	NA	<0.0036	<0.0038
Perfluorononanoic acid (PFNA)	0.03	<0.0036	<0.0038
Perfluorooctanoic acid (PFOA)	0.17	<0.0036	<0.0038
Perfluorooctane sulfonic acid (PFOS)	0.012	<0.0036	<0.0038
PFOA + PFOS (Calculated)	NCL	ND	ND
Perfluoropentanoic acid (PFPeA)	NCL	<0.0036	<0.0038
Perfluorotetradecanoic acid (PFTeDA)	NCL	<0.0036	<0.0038
Perfluorotridecanoic acid (PFTrDA)	NCL	<0.0036	<0.0038
Perfluoroundecanoic acid (PFUnDA)	NCL	<0.0036	<0.0038
Tetrafluoro-2-(heptafluoropropoxy)propanoic acid (GenX)	NA	<0.0073	<0.0075
Total PFAS (Calculated)	NCL	ND	ND

TABLE 3 NOTES
GSI Investigation
Algoma Township, Kent County, MI

NOTES:

1. Concentration and criteria units are micrograms per Liter (µg/L) or parts per billion (ppb). Calculated criteria and concentrations are rounded to two significant digits.
2. Michigan Part 201 Groundwater Cleanup Criteria are based on "Table 1, Groundwater: Residential and Nonresidential Part 201 Generic Cleanup Criteria and Screening Levels/Part 213 Tier I Risk Based Screening Levels," Michigan Administrative Code, Cleanup Criteria Requirements for Response Activity, Rules 299.44 and 299.49, effective December 30, 2013; last updated October 12, 2023.
   Abbreviations Include:
   "NCL" indicates no criterion listed in Michigan Part 201 Table 1.
   "NA" indicates not available.
3. The Groundwater Surface Water Interface (GSI) criteria are derived using surface water concentrations, but for the purpose of this evaluation they were used for the evaluation of pore-water data to aid in evaluating compliance at the surface water compliance point. This does not imply that GSI criteria are necessarily applicable to the pore-water concentrations.
4. Bold, italic number with thick line border or italic parameter name indicates that parameter was detected above the Michigan Part 201 Groundwater Cleanup Criteria listed.
5. Abbreviations include:
   "< LOQ" indicates the parameter was analyzed for but not detected above the limit of quantitation (LOQ).
   "DUP" indicates a duplicate sample.
   "ND" indicates the parameters used in the calculation were not detected.
6. Screen interval presented is the top of the screen to the bottom of the screen in feet below ground surface.

TABLE 4
SUMMARY OF VAP GROUNDWATER SAMPLE ANALYSIS - PFAS
GSI Investigation
Algoma and Plainfield Townships, Kent County, MI

Area	Part 201 Generic Groundwater Cleanup Criteria - Groundwater Surface Water Interface[2]	Wolven Northwest	Wolven Northwest	Wolven Northwest	Wolven Northwest	Wolven Northwest	Wolven Northwest	Wolven Northwest	Wolven Northwest	Wolven Northwest	Wolven Northwest	Wolven Northwest	Wolven Northwest	Wolven Northwest	Wolven Northwest	Wolven Northwest
Vertical Aquifer Profiling (VAP) Location		WVNW-MW-200	WVNW-MW-200	WVNW-MW-200	WVNW-MW-200	WVNW-MW-200	WVNW-MW-200	WVNW-MW-200	WVNW-MW-201	WVNW-MW-201	WVNW-MW-201	WVNW-MW-201	WVNW-MW-201	WVNW-MW-202	WVNW-MW-202	WVNW-MW-202	WVNW-MW-202
Sample Name		WVNW-MW-200 (14-19)	WVNW-MW-200 (14-19)DUP	WVNW-MW-200 (24-29)	WVNW-MW-200 (34-39)	WVNW-MW-200 (44-49)	WVNW-MW-200 (54-59)	WVNW-MW-200 (64-69)	WVNW-MW-201 (19-24)	WVNW-MW-201 (9-14)	WVNW-MW-201 (29-34)	WVNW-MW-201 (39-44)	WVNW-MW-201 (49-54)	WVNW-MW-202 (10-15)	WVNW-MW-202 (20-25)	WVNW-MW-202 (30-35)	WVNW-MW-202 (40-45)
Screen Interval (feet below ground surface)		14-19	14-19	24-29	34-39	44-49	54-59	64-69	19-24	9-14	29-34	39-44	49-54	10-15	20-25	30-35	40-45
Laboratory Sample ID		XD11006-001	XD11006-003	XD11006-004	XD11006-005	XD11006-006	XD11006-007	XD11006-008	XD11006-010	XD11006-009	XD11006-011	XD11006-012	XD11006-013	XI10007-001	XI10007-002	XI10007-003	XI10007-004
Sample Date		04/04/2022	04/04/2022	04/04/2022	04/04/2022	04/05/2022	04/05/2022	04/05/2022	04/06/2022	04/06/2022	04/07/2022	04/07/2022	04/07/2022	09/06/2022	09/06/2022	09/06/2022	09/07/2022
Parameter (µg/L)																	
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	NCL	<0.0078	<0.0076	<0.0072	<0.0076	<0.0074	<0.0078	<0.0072	<0.0072	<0.0077	<0.0078	<0.0074	<0.0079	<0.0069	<0.0071	<0.0071	<0.0073 [H]
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CL-PF3OUdS)	NCL	<0.0078	<0.0076	<0.0072	<0.0076	<0.0074	<0.0078	<0.0072	<0.0072	<0.0077	<0.0078	<0.0074	<0.0079	<0.0069	<0.0071	<0.0071	<0.0073 [H]
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	NCL	<0.0078	<0.0076	<0.0072	<0.0076	<0.0074	<0.0078	<0.0072	<0.0072	<0.0077	<0.0078	<0.0074	<0.0079	<0.0069	<0.0071	<0.0071	<0.0073 [H]
1H,1H,2H,2H-perfluorohexane sulfonate (4:2FTS)	NCL	<0.0078	<0.0076	<0.0072	<0.0076	<0.0074	<0.0078	<0.0072	<0.0072	<0.0077	<0.0078	<0.0074	<0.0079	<0.0069	<0.0071	<0.0071	<0.0073 [H]
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	<0.0078	<0.0076	<0.0072	<0.0076	<0.0074	<0.0078	<0.0072	<0.0072	<0.0077	<0.0078	<0.0074	<0.0079	<0.0069	<0.0071	<0.0071	<0.0073 [H]
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	<0.0078	<0.0076	<0.0072	<0.0076	<0.0074	<0.0078	<0.0072	<0.0072	<0.0077	<0.0078	<0.0074	<0.0079	<0.0069	<0.0071	<0.0071	<0.0073 [H]
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	NCL	<0.0078	<0.0076	<0.0072	<0.0076	<0.0074	<0.0078	<0.0072	<0.0072	<0.0077	<0.0078	<0.0074	<0.0079	<0.0069	<0.0071	<0.0071	<0.0073 [H]
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	NCL	<0.0078	<0.0076	<0.0072	<0.0076	<0.0074	<0.0078	<0.0072	<0.0072	<0.0077	<0.0078	<0.0074	<0.0079	<0.0069	<0.0071	<0.0071	<0.0073 [H]
Perfluorobutane sulfonic acid (PFBS)	670	<0.0039	<0.0038	0.0048	0.0085	0.0099	0.0097	0.0095	0.011	0.0068	0.0086	0.01	0.01	<0.0034	0.047	0.033	0.0052 [H]
Perfluorodecane sulfonic acid (PFDS)	NCL	<0.0039	<0.0038	<0.0036	<0.0038	<0.0037	<0.0039	<0.0036	<0.0036	<0.0038	<0.0039	<0.0037	<0.004	<0.0034	<0.0036	<0.0035	<0.0036 [H]
Perfluoroheptane sulfonic acid (PFHpS)	NCL	<0.0039	<0.0038	<0.0036	0.0046	0.007	0.01	0.0059	0.014	<0.0038	0.024	0.019	0.018	<0.0034	<0.0036	<0.0035	<0.0036 [H]
Perfluorononane sulfonic acid (PFNS)	NCL	<0.0039	<0.0038	<0.0036	<0.0038	<0.0037	<0.0039	<0.0036	<0.0036	<0.0038	<0.0039	<0.0037	<0.004	<0.0034	<0.0036	<0.0035	<0.0036 [H]
Perfluorooctane sulfonamide (FOSA)	NCL	<0.0039	<0.0038	<0.0036	<0.0038	<0.0037	<0.0039	<0.0036	<0.0036	<0.0038	<0.0039	<0.0037	<0.004	<0.0034	<0.0036	<0.0035	<0.0036 [H]
Perfluoropentane sulfonic acid (PFPeS)	NCL	<0.0039	<0.0038	<0.0036	<0.0038	<0.0037	0.0044	<0.0036	0.006	<0.0038	0.0048	0.0061	0.0058	<0.0034	<0.0036	<0.0035	<0.0036 [H]
Perfluorohexane sulfonic acid (PFHxS)	0.21	<0.0039	<0.0038	0.0066	0.01	0.014	0.019	0.013	0.031	0.015	0.031	0.029	0.037	<0.0034	<0.0036	<0.0035	0.0049 [H]
Perfluorobutanoic acid (PFBA)	NCL	<0.0039	<0.0038	<0.0036	0.0045	0.0062	0.009	0.0047	0.011	<0.0038	0.0063	<0.0037	0.0068	<0.0034	<0.0036	<0.0035	<0.0036 [H]
Perfluorodecanoic acid (PFDA)	NCL	<0.0039	<0.0038	<0.0036	<0.0038	<0.0037	<0.0039	<0.0036	<0.0036	<0.0038	<0.0039	<0.0037	<0.004	<0.0034	<0.0036	<0.0035	<0.0036 [H]
Perfluorododecanoic acid (PFDoDA)	NCL	<0.0039	<0.0038	<0.0036	<0.0038	<0.0037	<0.0039	<0.0036	<0.0036	<0.0038	<0.0039	<0.0037	<0.004	<0.0034	<0.0036	<0.0035	<0.0036 [H]
Perfluoroheptanoic acid (PFHpA)	NCL	<0.0039	<0.0038	<0.0036	0.0064	0.0088	0.011	0.0066	0.019	0.0077	0.0088	0.0061	0.01	<0.0034	<0.0036	<0.0035	<0.0036 [H]
Perfluorohexanoic acid (PFHxA)	NA	<0.0039	<0.0038	<0.0036	0.0068	0.0092	0.012	0.0056	0.011	0.0044	0.011	0.0053	0.0091	<0.0034	<0.0036	<0.0035	<0.0036 [H]
Perfluorononanoic acid (PFNA)	0.03	<0.0039	<0.0038	<0.0036	<0.0038	<0.0037	<0.0039	<0.0036	<0.0036	<0.0038	<0.0039	<0.0037	<0.004	<0.0034	<0.0036	<0.0035	<0.0036 [H]
Perfluorooctanoic acid (PFOA)	0.17	<0.0039	<0.0038	0.027	0.046	0.057	0.085	0.049	0.14	0.066	0.12	0.076	0.1	<0.0034	<0.0036	<0.0035	0.01 [H]
Perfluorooctane sulfonic acid (PFOS)	0.012	0.009	0.0093	***0.089***	***0.11***	***0.15***	***0.23***	***0.14***	***0.43***	***0.073***	***0.6***	***0.59***	***0.55***	<0.0034	<0.0036	<0.0035	***0.013 [H]***
PFOA + PFOS (Calculated)	NCL	0.009	0.0093	0.12	0.16	0.21	0.32	0.19	0.57	0.14	0.72	0.67	0.65	ND	ND	ND	0.023
Perfluoropentanoic acid (PFPeA)	NCL	<0.0039	<0.0038	<0.0036	0.0039	0.0061	0.0082	0.0036	0.0071	<0.0038	0.0065	<0.0037	0.0042	<0.0034	<0.0036	<0.0035	<0.0036 [H]
Perfluorotetradecanoic acid (PFTeDA)	NCL	<0.0039	<0.0038	<0.0036	<0.0038	<0.0037	<0.0039	<0.0036	<0.0036	<0.0038	<0.0039	<0.0037	<0.004	<0.0034	<0.0036	<0.0035	<0.0036 [H]
Perfluorotridecanoic acid (PFTrDA)	NCL	<0.0039	<0.0038	<0.0036	<0.0038	<0.0037	<0.0039	<0.0036	<0.0036	<0.0038	<0.0039	<0.0037	<0.004	<0.0034	<0.0036	<0.0035	<0.0036 [H]
Perfluoroundecanoic acid (PFUnDA)	NCL	<0.0039	<0.0038	<0.0036	<0.0038	<0.0037	<0.0039	<0.0036	<0.0036	<0.0038	<0.0039	<0.0037	<0.004	<0.0034	<0.0036	<0.0035	<0.0036 [H]
Tetrafluoro-2-(heptafluoropropoxy)propanoic acid (GenX)	NA	<0.0078	<0.0076	<0.0072	<0.0076	<0.0074	<0.0078	<0.0072	<0.0072	<0.0077	<0.0078	<0.0074	<0.0079	<0.0069	<0.0071	<0.0071	<0.0073 [H]
Total PFAS (Calculated)	NCL	0.009	0.0093	0.13	0.2	0.27	0.4	0.24	0.68	0.17	0.82	0.74	0.75	ND	0.047	0.033	0.033

TABLE 4
SUMMARY OF VAP GROUNDWATER SAMPLE ANALYSIS - PFAS
GSI Investigation
Algoma and Plainfield Townships, Kent County, MI

Area	Part 201 Generic Groundwater Cleanup Criteria - Groundwater Surface Water Interface[2]	Wolven Northwest	Wolven Northwest	Wolven Northwest	Wolven Northeast	Wolven Northeast	Wolven Northeast	Wolven Northeast	Wolven Northeast	Wolven Northeast	Wolven Northeast	Wolven Northeast	Wolven Northeast	Wolven Northeast	Wolven Northeast	Wolven Northeast	Wolven Northeast
Vertical Aquifer Profiling (VAP) Location		WVNW-MW-202	WVNW-MW-202	WVNW-MW-202	AREA19-MW-7	AREA19-MW-7	AREA19-MW-7	AREA19-MW-7	AREA19-MW-7	AREA19-MW-7	AREA19-MW-7	AREA19-MW-7	AREA19-MW-7	AREA19-MW-7	AREA19-MW-7	AREA19-MW-221	AREA19-MW-221
Sample Name		WVNW-MW-202 (50-55)	WVNW-MW-202 (60-65)	WVNW-MW-202 (70-75)	Area 19-MW-7 (9-14)	Area 19-MW-7 (19-24)	Area 19-MW-7 (29-34)	Area 19-MW-7 (39-44)	Area 19-MW-7 (54-59)	Area 19-MW-7 (64-69)	Area 19-MW-7 (74-79)	Area 19-MW-7 (84-89)	Area 19-MW-7 (94-99)	Area 19-MW-7 (104-109)	Area 19-MW-7 (114-119)	Area 19-MW-221 (14-19)	Area 19-MW-221 (24-29)
Screen Interval (feet below ground surface)		50-55	60-65	70-75	9-14	19-24	29-34	39-44	54-59	64-69	74-79	84-89	94-99	104-109	114-119	14-19	24-29
Laboratory Sample ID		XI10007-005	XI10007-006	XI10007-007	XD02008-001	XD02008-002	XD02008-003	XD02008-004	XD11008-001	XD11008-002	XD11008-003	XD11008-004	XD11008-005	XD11008-006	XD11008-007	XB19008-001	XB19008-002
Sample Date		09/07/2022	09/07/2022	09/07/2022	03/29/2022	03/29/2022	03/31/2022	03/31/2022	04/06/2022	04/06/2022	04/06/2022	04/07/2022	04/07/2022	04/07/2022	04/08/2022	02/14/2022	02/14/2022
Parameter (µg/L)																	
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	NCL	<0.008 [H]	<0.0074 [H]	<0.0073 [H]	<0.0071	<0.0071	<0.0071	<0.0072	<0.01	<0.007	<0.0073	<0.0072	<0.0075	<0.0071	<0.0072	<0.008	<0.0078
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CL-PF3OUdS)	NCL	<0.008 [H]	<0.0074 [H]	<0.0073 [H]	<0.0071	<0.0071	<0.0071	<0.0072	<0.01	<0.007	<0.0073	<0.0072	<0.0075	<0.0071	<0.0072	<0.008	<0.0078
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	NCL	<0.008 [H]	<0.0074 [H]	<0.0073 [H]	<0.0071	<0.0071	<0.0071	<0.0072	<0.01	<0.007	<0.0073	<0.0072	<0.0075	<0.0071	<0.0072	<0.008	<0.0078
1H,1H,2H,2H-perfluorohexane sulfonate (4:2FTS)	NCL	<0.008 [H]	<0.0074 [H]	<0.0073 [H]	<0.0071	<0.0071	<0.0071	<0.0072	<0.01	<0.007	<0.0073	<0.0072	<0.0075	<0.0071	<0.0072	<0.008	<0.0078
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	<0.008 [H]	<0.0074 [H]	<0.0073 [H]	<0.0071	<0.0071	<0.0071	<0.0072	<0.01	<0.007	<0.0073	<0.0072	<0.0075	<0.0071	<0.0072	<0.008	<0.0078
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	<0.008 [H]	<0.0074 [H]	<0.0073 [H]	<0.0071	<0.0071	<0.0071	<0.0072	<0.01	<0.007	<0.0073	<0.0072	<0.0075	<0.0071	<0.0072	<0.008	<0.0078
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	NCL	<0.008 [H]	<0.0074 [H]	<0.0073 [H]	<0.0071	<0.0071	<0.0071	<0.0072	<0.01	<0.007	<0.0073	<0.0072	<0.0075	<0.0071	<0.0072	<0.008	<0.0078
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	NCL	<0.008 [H]	<0.0074 [H]	<0.0073 [H]	<0.0071	<0.0071	<0.0071	<0.0072	<0.01	<0.007	<0.0073	<0.0072	<0.0075	<0.0071	<0.0072	<0.008	<0.0078
Perfluorobutane sulfonic acid (PFBS)	670	0.0084 [H]	0.009 [H]	0.0086 [H]	0.011	<0.0035	<0.0036	<0.0036	<0.0052	<0.0035	<0.0037	<0.0036	<0.0038	<0.0035	<0.0036	0.0055	0.0068
Perfluorodecane sulfonic acid (PFDS)	NCL	<0.004 [H]	<0.0037 [H]	<0.0036 [H]	<0.0035	<0.0035	<0.0036	<0.0036	<0.0052	<0.0035	<0.0037	<0.0036	<0.0038	<0.0035	<0.0036	<0.004	<0.0039
Perfluoroheptane sulfonic acid (PFHpS)	NCL	<0.004 [H]	<0.0037 [H]	<0.0036 [H]	<0.0035	<0.0035	<0.0036	<0.0036	<0.0052	<0.0035	<0.0037	<0.0036	<0.0038	<0.0035	<0.0036	<0.004	<0.0039
Perfluorononane sulfonic acid (PFNS)	NCL	<0.004 [H]	<0.0037 [H]	<0.0036 [H]	<0.0035	<0.0035	<0.0036	<0.0036	<0.0052	<0.0035	<0.0037	<0.0036	<0.0038	<0.0035	<0.0036	<0.004	<0.0039
Perfluorooctane sulfonamide (FOSA)	NCL	<0.004 [H]	<0.0037 [H]	<0.0036 [H]	<0.0035	<0.0035	<0.0036	<0.0036	<0.0052	<0.0035	<0.0037	<0.0036	<0.0038	<0.0035	<0.0036	<0.004	<0.0039
Perfluoropentane sulfonic acid (PFPeS)	NCL	<0.004 [H]	<0.0037 [H]	<0.0036 [H]	0.0036	<0.0035	<0.0036	<0.0036	<0.0052	<0.0035	<0.0037	<0.0036	<0.0038	<0.0035	<0.0036	<0.004	<0.0039
Perfluorohexane sulfonic acid (PFHxS)	0.21	0.0077 [H]	0.0091 [H]	0.0084 [H]	0.0079	<0.0035	<0.0036	<0.0036	<0.0052	<0.0035	<0.0037	<0.0036	<0.0038	<0.0035	<0.0036	0.0058	0.0061
Perfluorobutanoic acid (PFBA)	NCL	<0.004 [H]	<0.0037 [H]	<0.0036 [H]	0.0042	<0.0035	<0.0036	<0.0036	<0.0052	<0.0035	<0.0037	<0.0036	<0.0038	<0.0035	<0.0036	<0.004	<0.0039
Perfluorodecanoic acid (PFDA)	NCL	<0.004 [H]	<0.0037 [H]	<0.0036 [H]	<0.0035	<0.0035	<0.0036	<0.0036	<0.0052	<0.0035	<0.0037	<0.0036	<0.0038	<0.0035	<0.0036	<0.004	<0.0039
Perfluorododecanoic acid (PFDoDA)	NCL	<0.004 [H]	<0.0037 [H]	<0.0036 [H]	<0.0035	<0.0035	<0.0036	<0.0036	<0.0052	<0.0035	<0.0037	<0.0036	<0.0038	<0.0035	<0.0036	<0.004	<0.0039
Perfluoroheptanoic acid (PFHpA)	NCL	<0.004 [H]	<0.0037 [H]	<0.0036 [H]	0.0044	<0.0035	<0.0036	<0.0036	<0.0052	<0.0035	<0.0037	<0.0036	<0.0038	<0.0035	<0.0036	<0.004	<0.0039
Perfluorohexanoic acid (PFHxA)	NA	<0.004 [H]	<0.0037 [H]	<0.0036 [H]	0.0047	<0.0035	<0.0036	<0.0036	<0.0052	<0.0035	<0.0037	<0.0036	<0.0038	<0.0035	<0.0036	<0.004	<0.0039
Perfluorononanoic acid (PFNA)	0.03	<0.004 [H]	<0.0037 [H]	<0.0036 [H]	<0.0035	<0.0035	<0.0036	<0.0036	<0.0052	<0.0035	<0.0037	<0.0036	<0.0038	<0.0035	<0.0036	<0.004	<0.0039
Perfluorooctanoic acid (PFOA)	0.17	0.021 [H]	0.023 [H]	0.023 [H]	0.04	<0.0035	<0.0036	<0.0036	<0.0052	<0.0035	<0.0037	<0.0036	<0.0038	<0.0035	<0.0036	0.025	0.03
Perfluorooctane sulfonic acid (PFOS)	0.012	***0.06 [H]***	***0.085 [H]***	***0.082 [H]***	***0.099***	<0.0035	<0.0036	<0.0036	<0.0052	<0.0035	<0.0037	<0.0036	<0.0038	<0.0035	<0.0036	***0.042***	***0.026***
PFOA + PFOS (Calculated)	NCL	0.081	0.11	0.11	0.14	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.067	0.056
Perfluoropentanoic acid (PFPeA)	NCL	<0.004 [H]	<0.0037 [H]	<0.0036 [H]	<0.0035	<0.0035	<0.0036	<0.0036	<0.0052	<0.0035	<0.0037	<0.0036	<0.0038	<0.0035	<0.0036	<0.004	<0.0039
Perfluorotetradecanoic acid (PFTeDA)	NCL	<0.004 [H]	<0.0037 [H]	<0.0036 [H]	<0.0035	<0.0035	<0.0036	<0.0036	<0.0052	<0.0035	<0.0037	<0.0036	<0.0038	<0.0035	<0.0036	<0.004	<0.0039
Perfluorotridecanoic acid (PFTrDA)	NCL	<0.004 [H]	<0.0037 [H]	<0.0036 [H]	<0.0035	<0.0035	<0.0036	<0.0036	<0.0052	<0.0035	<0.0037	<0.0036	<0.0038	<0.0035	<0.0036	<0.004	<0.0039
Perfluoroundecanoic acid (PFUnDA)	NCL	<0.004 [H]	<0.0037 [H]	<0.0036 [H]	<0.0035	<0.0035	<0.0036	<0.0036	<0.0052	<0.0035	<0.0037	<0.0036	<0.0038	<0.0035	<0.0036	<0.004	<0.0039
Tetrafluoro-2-(heptafluoropropoxy)propanoic acid (GenX)	NA	<0.008 [H]	<0.0074 [H]	<0.0073 [H]	<0.0071	<0.0071	<0.0071	<0.0072	<0.01	<0.007	<0.0073	<0.0072	<0.0075	<0.0071	<0.0072	<0.008	<0.0078
Total PFAS (Calculated)	NCL	0.097	0.13	0.12	0.17	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.078	0.069

TABLE 4
SUMMARY OF VAP GROUNDWATER SAMPLE ANALYSIS - PFAS
GSI Investigation
Algoma and Plainfield Townships, Kent County, MI

Area	Part 201 Generic Groundwater Cleanup Criteria - Groundwater Surface Water Interface[2]	Wolven Northeast	Wolven Northeast	Wolven Northeast	Wolven Northeast	Wolven Northeast	Wolven Northeast	Wolven Northeast	Wolven Northeast	Wolven Northeast	Wolven Northeast	Wolven Northeast	Wolven Northeast	Wolven Northeast	North Childsdale	North Childsdale	North Childsdale
Vertical Aquifer Profiling (VAP) Location		AREA19-MW-221	AREA19-MW-221	AREA19-MW-221	AREA19-MW-222	AREA19-MW-222	AREA19-MW-223	AREA19-MW-223	AREA19-MW-224	AREA19-MW-225	AREA19-MW-225	AREA19-MW-225	AREA19-MW-226	AREA19-MW-226	WV/CH-MW-240	WV/CH-MW-241	WV/CH-MW-241
Sample Name		Area 19-MW-221 (34-39)	Area 19-MW-221 (44-49)	Area 19-MW-221 (53-58)	Area 19-MW-222 (4-9)	Area 19-MW-222 (14-19)	Area 19-MW-223 (4-9)	Area 19-MW-223 (14-19)	Area19-MW-224 (4-9)	Area19-MW-225 (5-10)	Area19-MW-225 (12.5-17.5)	Area19-MW-225 (30-35)	AREA 19-MW-226 (3-8)	AREA 19-MW-226 (13-18)	WV/CH-MW-240 (63-68)	WV/CH-MW-241 (18-23)	WV/CH-MW-241 (34-39)
Screen Interval (feet below ground surface)		34-39	44-49	53-58	4-9	14-19	4-9	14-19	4-9	5-10	12.5-17.5	30-35	3-8	13-18	63-68	18-23	34-39
Laboratory Sample ID		XB19008-003	XB19008-004	XB19008-005	XB19008-008	XB19008-009	XB19008-006	XB19008-007	XB12008-003	XI17015-001	XI17015-002	XI17015-003	YC25008-001	YC25008-002	XB12008-001	XB12008-002	XG01035-005
Sample Date		02/15/2022	02/15/2022	02/15/2022	02/18/2022	02/18/2022	02/16/2022	02/16/2022	02/10/2022	09/16/2022	09/16/2022	09/16/2022	03/23/2023	03/23/2023	02/07/2022	02/08/2022	06/29/2022
Parameter (µg/L)																	
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	NCL	<0.0075	<0.0088	<0.0079	<0.0083	<0.0097	<0.0084	<0.0075	<0.0076	<0.0078	<0.0072	<0.0075	<0.0074	<0.007	<0.0085	<0.0076	<0.0074
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CL-PF3OUdS)	NCL	<0.0075	<0.0088	<0.0079	<0.0083	<0.0097	<0.0084	<0.0075	<0.0076	<0.0078	<0.0072	<0.0075	<0.0074	<0.007	<0.0085	<0.0076	<0.0074
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	NCL	<0.0075	<0.0088	<0.0079	<0.0083	<0.0097	<0.0084	<0.0075	<0.0076	<0.0078	<0.0072	<0.0075	<0.0074	<0.007	<0.0085	<0.0076	<0.0074
1H,1H,2H,2H-perfluorohexane sulfonate (4:2FTS)	NCL	<0.0075	<0.0088	<0.0079	<0.0083	<0.0097	<0.0084	<0.0075	<0.0076	<0.0078	<0.0072	<0.0075	<0.0074	<0.007	<0.0085	<0.0076	<0.0074
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	<0.0075	<0.0088	<0.0079	<0.0083	<0.0097	<0.0084	<0.0075	<0.0076	<0.0078	<0.0072	<0.0075	<0.0074	<0.007	<0.0085	<0.0076	<0.0074
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	<0.0075	<0.0088	<0.0079	<0.0083	<0.0097	<0.0084	<0.0075	<0.0076	<0.0078	<0.0072	<0.0075	<0.0074	<0.007	<0.0085	<0.0076	<0.0074
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	NCL	<0.0075	<0.0088	<0.0079	<0.0083	<0.0097	<0.0084	<0.0075	<0.0076	<0.0078	<0.0072	<0.0075	<0.0074	<0.007	<0.0085	<0.0076	<0.0074
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	NCL	<0.0075	<0.0088	<0.0079	<0.0083	<0.0097	<0.0084	<0.0075	<0.0076	<0.0078	<0.0072	<0.0075	<0.0074	<0.007	<0.0085	<0.0076	<0.0074
Perfluorobutane sulfonic acid (PFBS)	670	0.0062	0.0072	0.0058	0.011	<0.0049	0.028	0.013	0.027	0.0071	0.0037	<0.0038	0.0065	<0.0035	0.034	0.0063	<0.0037
Perfluorodecane sulfonic acid (PFDS)	NCL	<0.0038	<0.0044	<0.004	<0.0041	<0.0049	<0.0042	<0.0037	<0.0038	<0.0039	<0.0036	<0.0038	<0.0037	<0.0035	<0.0042	<0.0038	<0.0037
Perfluoroheptane sulfonic acid (PFHpS)	NCL	<0.0038	<0.0044	<0.004	0.0074	<0.0049	0.0095	<0.0037	0.0093	<0.0039	<0.0036	<0.0038	<0.0037	<0.0035	0.018	<0.0038	<0.0037
Perfluorononane sulfonic acid (PFNS)	NCL	<0.0038	<0.0044	<0.004	<0.0041	<0.0049	<0.0042	<0.0037	<0.0038	<0.0039	<0.0036	<0.0038	<0.0037	<0.0035	<0.0042	<0.0038	<0.0037
Perfluorooctane sulfonamide (FOSA)	NCL	<0.0038	<0.0044	<0.004	<0.0041	<0.0049	<0.0042	<0.0037	<0.0038	<0.0039	<0.0036	<0.0038	<0.0037	<0.0035	<0.0042	<0.0038	<0.0037
Perfluoropentane sulfonic acid (PFPeS)	NCL	<0.0038	<0.0044	<0.004	<0.0041	<0.0049	0.01	0.0046	0.012	<0.0039	<0.0036	<0.0038	<0.0037	<0.0035	0.0071	<0.0038	<0.0037
Perfluorohexane sulfonic acid (PFHxS)	0.21	0.0047	0.0044	<0.004	0.012	<0.0049	0.036	0.013	0.027	<0.0039	<0.0036	<0.0038	<0.0037	<0.0035	0.029	<0.0038	<0.0037
Perfluorobutanoic acid (PFBA)	NCL	<0.0038	<0.0044	<0.004	<0.0041	<0.0049	0.0048	<0.0037	0.0087	0.0042	0.004	<0.0038	<0.0037	<0.0035	0.0065	<0.0038	<0.0037
Perfluorodecanoic acid (PFDA)	NCL	<0.0038	<0.0044	<0.004	<0.0041	<0.0049	<0.0042	<0.0037	<0.0038	<0.0039	<0.0036	<0.0038	<0.0037	<0.0035	<0.0042	<0.0038	<0.0037
Perfluorododecanoic acid (PFDoDA)	NCL	<0.0038	<0.0044	<0.004	<0.0041	<0.0049	<0.0042	<0.0037	<0.0038	<0.0039	<0.0036	<0.0038	<0.0037	<0.0035	<0.0042	<0.0038	<0.0037
Perfluoroheptanoic acid (PFHpA)	NCL	<0.0038	<0.0044	<0.004	0.0048	<0.0049	0.015	0.0079	0.012	<0.0039	<0.0036	<0.0038	<0.0037	<0.0035	0.013	<0.0038	<0.0037
Perfluorohexanoic acid (PFHxA)	NA	<0.0038	<0.0044	<0.004	0.0061	<0.0049	0.011	0.0059	0.012	<0.0039	<0.0036	<0.0038	<0.0037	<0.0035	0.014	<0.0038	<0.0037
Perfluorononanoic acid (PFNA)	0.03	<0.0038	<0.0044	<0.004	<0.0041	<0.0049	<0.0042	<0.0037	<0.0038	<0.0039	<0.0036	<0.0038	<0.0037	<0.0035	<0.0042	<0.0038	<0.0037
Perfluorooctanoic acid (PFOA)	0.17	0.0065	0.0096	0.0076	0.061	0.018	0.14	0.038	0.09	0.0071	0.0067	<0.0038	<0.0037	<0.0035	0.13	0.021	0.0073
Perfluorooctane sulfonic acid (PFOS)	0.012	***0.019***	***0.024***	***0.019***	***0.14***	***0.03***	***0.11***	***0.035***	***0.6***	***0.028***	***0.023***	<0.0038	0.0037	<0.0035	***0.11***	***0.028***	***0.021***
PFOA + PFOS (Calculated)	NCL	0.026	0.034	0.027	0.2	0.048	0.25	0.073	0.69	0.035	0.03	ND	0.0037	ND	0.24	0.049	0.028
Perfluoropentanoic acid (PFPeA)	NCL	<0.0038	<0.0044	<0.004	<0.0041	<0.0049	<0.0042	<0.0037	<0.0038	<0.0039	<0.0036	<0.0038	<0.0037	<0.0035	<0.0042	<0.0038	<0.0037
Perfluorotetradecanoic acid (PFTeDA)	NCL	<0.0038	<0.0044	<0.004	<0.0041	<0.0049	<0.0042	<0.0037	<0.0038	<0.0039	<0.0036	<0.0038	<0.0037	<0.0035	<0.0042	<0.0038	<0.0037
Perfluorotridecanoic acid (PFTrDA)	NCL	<0.0038	<0.0044	<0.004	<0.0041	<0.0049	<0.0042	<0.0037	<0.0038	<0.0039	<0.0036	<0.0038	<0.0037	<0.0035	<0.0042	<0.0038	<0.0037
Perfluoroundecanoic acid (PFUnDA)	NCL	<0.0038	<0.0044	<0.004	<0.0041	<0.0049	<0.0042	<0.0037	<0.0038	<0.0039	<0.0036	<0.0038	<0.0037	<0.0035	<0.0042	<0.0038	<0.0037
Tetrafluoro-2-(heptafluoropropoxy)propanoic acid (GenX)	NA	<0.0075	<0.0088	<0.0079	<0.0083	<0.0097	<0.0084	<0.0075	<0.0076	<0.0078	<0.0072	<0.0075	<0.0074	<0.007	<0.0085	<0.0076	<0.0074
Total PFAS (Calculated)	NCL	0.036	0.045	0.032	0.24	0.048	0.36	0.12	0.8	0.046	0.037	ND	0.01	ND	0.36	0.055	0.028

TABLE 4
SUMMARY OF VAP GROUNDWATER SAMPLE ANALYSIS - PFAS
GSI Investigation
Algoma and Plainfield Townships, Kent County, MI

Area	Part 201 Generic Groundwater Cleanup Criteria - Groundwater Surface Water Interface[2]	North Childsdale	North Childsdale	North Childsdale	North Childsdale	North Childsdale	North Childsdale	North Childsdale	House Street Property/Southeast	House Street Property/Southeast	House Street Property/Southeast	House Street Property/Southeast	House Street Property/Southeast	House Street Property/Southeast	House Street Property/Southeast	House Street Property/Southeast	House Street Property/Southeast
Vertical Aquifer Profiling (VAP) Location		WV/CH-MW-241	WV/CH-MW-241	WV/CH-MW-242	WV/CH-MW-242	WV/CH-MW-242	WV/CH-MW-242	WV/CH-MW-242	HS-MW-260	HS-MW-260	HS-MW-260	HS-MW-260	HS-MW-260	HS-MW-261	HS-MW-261	HS-MW-261	HS-MW-261
Sample Name		WV/CH-MW-241 (44-49)	WV/CH-MW-241 (54-59)	WV/CH-MW-242 (38-43)	WV/CH-MW-242 (48-53)	WV/CH-MW-242 (63-68)	WV/CH-MW-242 (73-78)	WV/CH-MW-242 (83-88)	HS-MW 260 (5-10)	HS-MW 260 (15-20)	HS-MW 260 (25-30)	HS-MW 260 (35-40)	HS-MW 260 (45-50)	HS-MW 261 (5-10)	HS-MW 261 (15-20)	HS-MW-261 (25-30)	HS-MW-261 (35-40)
Screen Interval (feet below ground surface)		44-49	54-59	38-43	48-53	63-68	73-78	83-88	5-10	15-20	25-30	35-40	45-50	5-10	15-20	25-30	35-40
Laboratory Sample ID		XG01035-006	XG01035-007	XD01011-001	XD01011-002	XD01011-003	XD01011-004	XD01011-005	XF25018-001	XF25018-002	XF25018-003	XF25018-004	XF25018-005	XF25018-006	XF25018-007	XF25014-001	XF25014-002
Sample Date		06/29/2022	06/29/2022	03/29/2022	03/29/2022	03/29/2022	03/30/2022	03/30/2022	06/20/2022	06/20/2022	06/21/2022	06/21/2022	06/21/2022	06/22/2022	06/22/2022	06/22/2022	06/23/2022
Parameter (µg/L)																	
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	NCL	<0.0071	<0.0073	<0.0079	<0.0079	<0.0077	<0.0075	<0.0075	<0.0069	<0.0072	<0.0071	<0.0069	<0.0071	<0.007	<0.007	<0.007	<0.0071
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CL-PF3OUdS)	NCL	<0.0071	<0.0073	<0.0079	<0.0079	<0.0077	<0.0075	<0.0075	<0.0069	<0.0072	<0.0071	<0.0069	<0.0071	<0.007	<0.007	<0.007	<0.0071
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	NCL	<0.0071	<0.0073	<0.0079	<0.0079	<0.0077	<0.0075	<0.0075	<0.0069	<0.0072	<0.0071	<0.0069	<0.0071	<0.007	<0.007	<0.007	<0.0071
1H,1H,2H,2H-perfluorohexane sulfonate (4:2FTS)	NCL	<0.0071	<0.0073	<0.0079	<0.0079	<0.0077	<0.0075	<0.0075	<0.0069	<0.0072	<0.0071	<0.0069	<0.0071	<0.007	<0.007	<0.007	<0.0071
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	<0.0071	<0.0073	<0.0079	<0.0079	<0.0077	<0.0075	<0.0075	<0.0069	<0.0072	<0.0071	<0.0069	<0.0071	<0.007	<0.007	<0.007	<0.0071
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	<0.0071	<0.0073	<0.0079	<0.0079	<0.0077	<0.0075	<0.0075	<0.0069	<0.0072	<0.0071	<0.0069	<0.0071	<0.007	<0.007	<0.007	<0.0071
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	NCL	<0.0071	<0.0073	<0.0079	<0.0079	<0.0077	<0.0075	<0.0075	<0.0069	<0.0072	<0.0071	<0.0069	<0.0071	<0.007	<0.007	<0.007	<0.0071
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	NCL	<0.0071	<0.0073	<0.0079	<0.0079	<0.0077	<0.0075	<0.0075	<0.0069	<0.0072	<0.0071	<0.0069	<0.0071	<0.007	<0.007	<0.007	<0.0071
Perfluorobutane sulfonic acid (PFBS)	670	<0.0036	<0.0036	<0.004	<0.004	<0.0038	<0.0037	<0.0037	0.0051	0.0067	0.0059	0.027	0.0077	0.012	0.01	0.016	0.045
Perfluorodecane sulfonic acid (PFDS)	NCL	<0.0036	<0.0036	<0.004	<0.004	<0.0038	<0.0037	<0.0037	<0.0035	<0.0036	<0.0036	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035
Perfluoroheptane sulfonic acid (PFHpS)	NCL	<0.0036	<0.0036	<0.004	<0.004	<0.0038	<0.0037	<0.0037	0.004	<0.0036	<0.0036	<0.0035	<0.0035	0.016	<0.0035	<0.0035	<0.0035
Perfluorononane sulfonic acid (PFNS)	NCL	<0.0036	<0.0036	<0.004	<0.004	<0.0038	<0.0037	<0.0037	<0.0035	<0.0036	<0.0036	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035
Perfluorooctane sulfonamide (FOSA)	NCL	<0.0036	<0.0036	<0.004	<0.004	<0.0038	<0.0037	<0.0037	<0.0035	<0.0036	<0.0036	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035
Perfluoropentane sulfonic acid (PFPeS)	NCL	<0.0036	<0.0036	<0.004	<0.004	<0.0038	<0.0037	<0.0037	<0.0035	<0.0036	<0.0036	0.018	<0.0035	0.01	<0.0035	0.011	0.039
Perfluorohexane sulfonic acid (PFHxS)	0.21	<0.0036	<0.0036	<0.004	<0.004	<0.0038	<0.0037	<0.0037	0.0071	<0.0036	<0.0036	0.017	<0.0035	0.045	<0.0035	0.014	0.039
Perfluorobutanoic acid (PFBA)	NCL	<0.0036	<0.0036	<0.004	<0.004	<0.0038	<0.0037	<0.0037	<0.0035	<0.0036	<0.0036	0.0052	<0.0035	0.0062	<0.0035	0.0052	0.0098
Perfluorodecanoic acid (PFDA)	NCL	<0.0036	<0.0036	<0.004	<0.004	<0.0038	<0.0037	<0.0037	<0.0035	<0.0036	<0.0036	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035
Perfluorododecanoic acid (PFDoDA)	NCL	<0.0036	<0.0036	<0.004	<0.004	<0.0038	<0.0037	<0.0037	<0.0035	<0.0036	<0.0036	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035
Perfluoroheptanoic acid (PFHpA)	NCL	<0.0036	<0.0036	<0.004	<0.004	<0.0038	<0.0037	<0.0037	<0.0035	<0.0036	<0.0036	<0.0035	<0.0035	0.0082	<0.0035	0.0071	0.02
Perfluorohexanoic acid (PFHxA)	NA	<0.0036	<0.0036	<0.004	<0.004	<0.0038	<0.0037	<0.0037	0.0063	<0.0036	<0.0036	<0.0035	<0.0035	0.0095	<0.0035	0.0078	0.025
Perfluorononanoic acid (PFNA)	0.03	<0.0036	<0.0036	<0.004	<0.004	<0.0038	<0.0037	<0.0037	<0.0035	<0.0036	<0.0036	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035
Perfluorooctanoic acid (PFOA)	0.17	0.0058	0.0091	0.0095	0.004	<0.0038	<0.0037	<0.0037	0.011	<0.0036	<0.0036	0.012	<0.0035	0.051	<0.0035	0.031	0.048
Perfluorooctane sulfonic acid (PFOS)	0.012	***0.026***	***0.034***	<0.004	<0.004	<0.0038	<0.0037	<0.0037	***0.31***	<0.0036	<0.0036	0.009	<0.0035	***0.39***	<0.0035	0.0051	0.0046
PFOA + PFOS (Calculated)	NCL	0.032	0.043	0.0095	0.004	ND	ND	ND	0.32	ND	ND	0.021	ND	0.44	ND	0.036	0.053
Perfluoropentanoic acid (PFPeA)	NCL	<0.0036	<0.0036	<0.004	<0.004	<0.0038	<0.0037	<0.0037	<0.0035	<0.0036	<0.0036	<0.0035	<0.0035	0.0063	<0.0035	0.0059	0.011
Perfluorotetradecanoic acid (PFTeDA)	NCL	<0.0036	<0.0036	<0.004	<0.004	<0.0038	<0.0037	<0.0037	<0.0035	<0.0036	<0.0036	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035
Perfluorotridecanoic acid (PFTrDA)	NCL	<0.0036	<0.0036	<0.004	<0.004	<0.0038	<0.0037	<0.0037	<0.0035	<0.0036	<0.0036	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035
Perfluoroundecanoic acid (PFUnDA)	NCL	<0.0036	<0.0036	<0.004	<0.004	<0.0038	<0.0037	<0.0037	<0.0035	<0.0036	<0.0036	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035
Tetrafluoro-2-(heptafluoropropoxy)propanoic acid (GenX)	NA	<0.0071	<0.0073	<0.0079	<0.0079	<0.0077	<0.0075	<0.0075	<0.0069	<0.0072	<0.0071	<0.0069	<0.0071	<0.007	<0.007	<0.007	<0.0071
Total PFAS (Calculated)	NCL	0.032	0.043	0.0095	0.004	ND	ND	ND	0.34	0.0067	0.0059	0.088	0.0077	0.55	0.01	0.1	0.24

TABLE 4
SUMMARY OF VAP GROUNDWATER SAMPLE ANALYSIS - PFAS
GSI Investigation
Algoma and Plainfield Townships, Kent County, MI

Area	Part 201 Generic Groundwater Cleanup Criteria - Groundwater Surface Water Interface[2]	House Street Property/Southeast	House Street Property/Southeast	House Street Property/Southeast	House Street Property/Southeast	House Street Property/Southeast	House Street Property/Southeast	House Street Property/Southeast	House Street Property/Southeast	House Street Property/Southeast	House Street Property/Southeast	House Street Property/Southeast	House Street Property/South	House Street Property/South	House Street Property/South	House Street Property/South	House Street Property/South
Vertical Aquifer Profiling (VAP) Location		HS-MW-261	HS-MW-262	HS-MW-262	HS-MW-262	HS-MW-262	HS-MW-262	HS-MW-262	HS-MW-263	HS-MW-263	HS-MW-263	HS-MW-264	HS-MW-265	HS-MW-265	HS-MW-265	HS-MW-265	HS-MW-265
Sample Name		HS-MW-261 (45-50)	HS-MW-262 (5-10)	HS-MW-262 (15-20)	HS-MW-262 (25-30)	HS-MS-262 (35-40)	HS-MS-262 (43-48)	HS-MS-262 (43-48)DUP	HS-MW-263 (3-8)	HS-MW-263 (13-18)	HS-MW-263 (42-47)	HS-MW-264 (24-29)	HS-MW-265 (4-9)	HS-MW-265 (14-19)	HS-MW-265 (24-29)	HS-MW-265 (34-39)	HS-MW-265 (44-49)
Screen Interval (feet below ground surface)		45-50	5-10	15-20	25-30	35-40	43-48	43-48	3-8	13-18	42-47	24-29	4-9	14-19	24-29	34-39	44-49
Laboratory Sample ID		XF25014-003	XF25014-004	XF25014-005	XF25014-006	XG01035-001	XG01035-002	XG01035-003	XB26003-001	XB26003-002	XB26003-003	XB26003-004	XB05003-001	XB05003-002	XB05003-003	XB05003-004	XB05003-005
Sample Date		06/23/2022	06/24/2022	06/24/2022	06/24/2022	06/27/2022	06/27/2022	06/27/2022	02/22/2022	02/23/2022	02/23/2022	02/24/2022	01/31/2022	01/31/2022	01/31/2022	02/01/2022	02/01/2022
Parameter (µg/L)																	
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	NCL	<0.0072	<0.0072	<0.0072	<0.0075	<0.0077	<0.0086	<0.0071	<0.0074	<0.0078	<0.0076	<0.0071	<0.0072	<0.0076	<0.0084	<0.007	<0.0073
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CL-PF3OUdS)	NCL	<0.0072	<0.0072	<0.0072	<0.0075	<0.0077	<0.0086	<0.0071	<0.0074	<0.0078	<0.0076	<0.0071	<0.0072	<0.0076	<0.0084	<0.007	<0.0073
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	NCL	<0.0072	<0.0072	<0.0072	<0.0075	<0.0077	<0.0086	<0.0071	<0.0074	<0.0078	<0.0076	<0.0071	<0.0072	<0.0076	<0.0084	<0.007	<0.0073
1H,1H,2H,2H-perfluorohexane sulfonate (4:2FTS)	NCL	<0.0072	<0.0072	<0.0072	<0.0075	<0.0077	<0.0086	<0.0071	<0.0074	<0.0078	<0.0076	<0.0071	<0.0072	<0.0076	<0.0084	<0.007	<0.0073
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	<0.0072	<0.0072	<0.0072	<0.0075	<0.0077	<0.0086	<0.0071	<0.0074	<0.0078	<0.0076	<0.0071	<0.0072	<0.0076	<0.0084	<0.007	0.015
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	<0.0072	<0.0072	<0.0072	<0.0075	<0.0077	<0.0086	<0.0071	<0.0074	<0.0078	<0.0076	<0.0071	<0.0072	<0.0076	<0.0084	<0.007	<0.0073
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	NCL	<0.0072	<0.0072	<0.0072	<0.0075	<0.0077	<0.0086	<0.0071	<0.0074	<0.0078	<0.0076	<0.0071	<0.0072	<0.0076	<0.0084	<0.007	<0.0073
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	NCL	<0.0072	<0.0072	<0.0072	<0.0075	<0.0077	<0.0086	<0.0071	<0.0074	<0.0078	<0.0076	<0.0071	<0.0072	<0.0076	<0.0084	<0.007	<0.0073
Perfluorobutane sulfonic acid (PFBS)	670	0.055	0.055	0.071	0.07	0.073	0.09	0.078	<0.0037	<0.0039	0.0075	0.004	0.0052	0.0071	0.0091	0.0088	0.0069
Perfluorodecane sulfonic acid (PFDS)	NCL	<0.0036	<0.0036	<0.0036	<0.0038	<0.0038	<0.0043	<0.0036	<0.0037	<0.0039	<0.0038	<0.0036	<0.0036	<0.0038	<0.0042	<0.0035	<0.0036
Perfluoroheptane sulfonic acid (PFHpS)	NCL	<0.0036	<0.0036	0.0038	<0.0038	<0.0038	<0.0043	<0.0036	<0.0037	<0.0039	<0.0038	<0.0036	<0.0036	<0.0038	<0.0042	<0.0035	<0.0036
Perfluorononane sulfonic acid (PFNS)	NCL	<0.0036	<0.0036	<0.0036	<0.0038	<0.0038	<0.0043	<0.0036	<0.0037	<0.0039	<0.0038	<0.0036	<0.0036	<0.0038	<0.0042	<0.0035	<0.0036
Perfluorooctane sulfonamide (FOSA)	NCL	<0.0036	<0.0036	<0.0036	<0.0038	<0.0038	<0.0043	<0.0036	<0.0037	<0.0039	<0.0038	<0.0036	<0.0036	<0.0038	<0.0042	<0.0035	<0.0036
Perfluoropentane sulfonic acid (PFPeS)	NCL	0.037	0.05	0.061	0.062	0.062	0.071	0.069	<0.0037	<0.0039	<0.0038	<0.0036	<0.0036	<0.0038	<0.0042	<0.0035	<0.0036
Perfluorohexane sulfonic acid (PFHxS)	0.21	0.028	0.071	0.076	0.083	0.08	0.085	0.066	<0.0037	<0.0039	0.0039	<0.0036	<0.0036	<0.0038	0.005	0.0036	<0.0036
Perfluorobutanoic acid (PFBA)	NCL	0.014	0.013	0.017	0.017	0.018	0.022	0.018	<0.0037	<0.0039	<0.0038	<0.0036	<0.0036	<0.0038	<0.0042	<0.0035	<0.0036
Perfluorodecanoic acid (PFDA)	NCL	<0.0036	<0.0036	<0.0036	<0.0038	<0.0038	<0.0043	<0.0036	<0.0037	<0.0039	<0.0038	<0.0036	<0.0036	<0.0038	<0.0042	<0.0035	<0.0036
Perfluorododecanoic acid (PFDoDA)	NCL	<0.0036	<0.0036	<0.0036	<0.0038	<0.0038	<0.0043	<0.0036	<0.0037	<0.0039	<0.0038	<0.0036	<0.0036	<0.0038	<0.0042	<0.0035	<0.0036
Perfluoroheptanoic acid (PFHpA)	NCL	0.025	0.02	0.034	0.034	0.036	0.035	0.03	<0.0037	<0.0039	<0.0038	<0.0036	<0.0036	<0.0038	<0.0042	<0.0035	<0.0036
Perfluorohexanoic acid (PFHxA)	NA	0.029	0.025	0.035	0.037	0.038	0.039	0.036	<0.0037	<0.0039	0.0048	<0.0036	<0.0036	<0.0038	<0.0042	<0.0035	<0.0036
Perfluorononanoic acid (PFNA)	0.03	<0.0036	<0.0036	<0.0036	<0.0038	<0.0038	<0.0043	<0.0036	<0.0037	<0.0039	<0.0038	<0.0036	<0.0036	<0.0038	<0.0042	<0.0035	<0.0036
Perfluorooctanoic acid (PFOA)	0.17	0.05	0.062	0.091	0.1	0.11	0.11	0.091	<0.0037	<0.0039	0.0086	0.0085	0.0042	<0.0038	<0.0042	<0.0035	<0.0036
Perfluorooctane sulfonic acid (PFOS)	0.012	0.0038	***0.017***	0.011	0.011	0.0091	0.0084	0.0066	0.0049	<0.0039	0.0075	<0.0036	0.0097	<0.0038	<0.0042	<0.0035	<0.0036
PFOA + PFOS (Calculated)	NCL	0.054	0.079	0.1	0.11	0.12	0.12	0.098	0.0049	ND	0.016	0.0085	0.014	ND	ND	ND	ND
Perfluoropentanoic acid (PFPeA)	NCL	0.014	0.01	0.016	0.018	0.018	0.023	0.017	<0.0037	<0.0039	0.0039	<0.0036	<0.0036	<0.0038	<0.0042	<0.0035	<0.0036
Perfluorotetradecanoic acid (PFTeDA)	NCL	<0.0036	<0.0036	<0.0036	<0.0038	<0.0038	<0.0043	<0.0036	<0.0037	<0.0039	<0.0038	<0.0036	<0.0036	<0.0038	<0.0042	<0.0035	<0.0036
Perfluorotridecanoic acid (PFTrDA)	NCL	<0.0036	<0.0036	<0.0036	<0.0038	<0.0038	<0.0043	<0.0036	<0.0037	<0.0039	<0.0038	<0.0036	<0.0036	<0.0038	<0.0042	<0.0035	<0.0036
Perfluoroundecanoic acid (PFUnDA)	NCL	<0.0036	<0.0036	<0.0036	<0.0038	<0.0038	<0.0043	<0.0036	<0.0037	<0.0039	<0.0038	<0.0036	<0.0036	<0.0038	<0.0042	<0.0035	<0.0036
Tetrafluoro-2-(heptafluoropropoxy)propanoic acid (GenX)	NA	<0.0072	<0.0072	<0.0072	<0.0075	<0.0077	<0.0086	<0.0071	<0.0074	<0.0078	<0.0076	<0.0071	<0.0072	<0.0076	<0.0084	<0.007	<0.0073
Total PFAS (Calculated)	NCL	0.26	0.32	0.42	0.43	0.44	0.48	0.41	0.0049	ND	0.036	0.013	0.019	0.0071	0.014	0.012	0.022

TABLE 4
SUMMARY OF VAP GROUNDWATER SAMPLE ANALYSIS - PFAS
GSI Investigation
Algoma and Plainfield Townships, Kent County, MI

Area	Part 201 Generic Groundwater Cleanup Criteria - Groundwater Surface Water Interface[2]	House Street Property/Southeast	House Street Property/Southeast	House Street Property/Southeast	House Street Property/Southeast	House Street Property/Southeast	House Street Property/Southeast	House Street Property/Southeast	House Street Property/Southeast
Vertical Aquifer Profiling (VAP) Location		HS-MW-266	HS-MW-266	HS-MW-266	HS-MW-266	HS-MW-266	HS-MW-266	HS-MW-266	HS-MW-266
Sample Name		HS-MW-266 (10-15)	HS-MW-266 (10-15)DUP	HS-MW-266 (20-25)	HS-MW-266 (30-35)	HS-MW-266 (40-45)	HS-MW-266 (50-55)	HS-MW-266 (60-65)	HS-MW-266 (70-75)
Screen Interval (feet below ground surface)		10-15	10-15	20-25	30-35	40-45	50-55	60-65	70-75
Laboratory Sample ID		XF20011-001	XF20011-002	XF20011-004	XF20011-005	XF20011-006	XF20011-007	XF20011-008	XF20011-009
Sample Date		06/15/2022	06/15/2022	06/15/2022	06/15/2022	06/16/2022	06/16/2022	06/16/2022	06/16/2022
Parameter (µg/L)									
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	NCL	<0.0071	<0.0072	<0.0069	<0.0071	<0.0067	<0.0078	<0.007	<0.007
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CL-PF3OUdS)	NCL	<0.0071	<0.0072	<0.0069	<0.0071	<0.0067	<0.0078	<0.007	<0.007
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	NCL	<0.0071	<0.0072	<0.0069	<0.0071	<0.0067	<0.0078	<0.007	<0.007
1H,1H,2H,2H-perfluorohexane sulfonate (4:2FTS)	NCL	<0.0071	<0.0072	<0.0069	<0.0071	<0.0067	<0.0078	<0.007	<0.007
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	<0.0071	<0.0072	<0.0069	<0.0071	<0.0067	<0.0078	<0.007	<0.007
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	<0.0071	<0.0072	<0.0069	<0.0071	<0.0067	<0.0078	<0.007	<0.007
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	NCL	<0.0071	<0.0072	<0.0069	<0.0071	<0.0067	<0.0078	<0.007	<0.007
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	NCL	<0.0071	<0.0072	<0.0069	<0.0071	<0.0067	<0.0078	<0.007	<0.007
Perfluorobutane sulfonic acid (PFBS)	670	0.011	0.011	0.011	0.01	0.0096	0.015	0.0097	<0.0035
Perfluorodecane sulfonic acid (PFDS)	NCL	<0.0036	<0.0036	<0.0035	<0.0036	<0.0033	<0.0039	<0.0035	<0.0035
Perfluoroheptane sulfonic acid (PFHpS)	NCL	<0.0036	<0.0036	<0.0035	<0.0036	<0.0033	<0.0039	<0.0035	<0.0035
Perfluorononane sulfonic acid (PFNS)	NCL	<0.0036	<0.0036	<0.0035	<0.0036	<0.0033	<0.0039	<0.0035	<0.0035
Perfluorooctane sulfonamide (FOSA)	NCL	<0.0036	<0.0036	<0.0035	<0.0036	<0.0033	<0.0039	<0.0035	<0.0035
Perfluoropentane sulfonic acid (PFPeS)	NCL	0.0062	0.0057	0.0065	0.0052	0.0049	0.0077	<0.0035	<0.0035
Perfluorohexane sulfonic acid (PFHxS)	0.21	0.0049	0.0049	0.0056	0.0049	0.0049	0.0052	<0.0035	<0.0035
Perfluorobutanoic acid (PFBA)	NCL	0.0039	0.0039	0.004	0.0038	0.0039	0.0059	0.0059	<0.0035
Perfluorodecanoic acid (PFDA)	NCL	<0.0036	<0.0036	<0.0035	<0.0036	<0.0033	<0.0039	<0.0035	<0.0035
Perfluorododecanoic acid (PFDoDA)	NCL	<0.0036	<0.0036	<0.0035	<0.0036	<0.0033	<0.0039	<0.0035	<0.0035
Perfluoroheptanoic acid (PFHpA)	NCL	0.0038	0.0042	<0.0035	<0.0036	<0.0033	0.0045	<0.0035	<0.0035
Perfluorohexanoic acid (PFHxA)	NA	0.005	0.0051	0.0051	0.0046	0.0048	0.0082	0.0043	<0.0035
Perfluorononanoic acid (PFNA)	0.03	<0.0036	<0.0036	<0.0035	<0.0036	<0.0033	<0.0039	<0.0035	<0.0035
Perfluorooctanoic acid (PFOA)	0.17	0.0047	0.0049	0.0045	0.0038	<0.0033	0.0051	<0.0035	<0.0035
Perfluorooctane sulfonic acid (PFOS)	0.012	<0.0036	<0.0036	<0.0035	<0.0036	<0.0033	<0.0039	<0.0035	<0.0035
PFOA + PFOS (Calculated)	NCL	0.0047	0.0049	0.0045	0.0038	ND	0.0051	ND	ND
Perfluoropentanoic acid (PFPeA)	NCL	<0.0036	<0.0036	<0.0035	<0.0036	<0.0033	0.005	0.0037	<0.0035
Perfluorotetradecanoic acid (PFTeDA)	NCL	<0.0036	<0.0036	<0.0035	<0.0036	<0.0033	<0.0039	<0.0035	<0.0035
Perfluorotridecanoic acid (PFTrDA)	NCL	<0.0036	<0.0036	<0.0035	<0.0036	<0.0033	<0.0039	<0.0035	<0.0035
Perfluoroundecanoic acid (PFUnDA)	NCL	<0.0036	<0.0036	<0.0035	<0.0036	<0.0033	<0.0039	<0.0035	<0.0035
Tetrafluoro-2-(heptafluoropropoxy)propanoic acid (GenX)	NA	<0.0071	<0.0072	<0.0069	<0.0071	<0.0067	<0.0078	<0.007	<0.007
Total PFAS (Calculated)	NCL	0.04	0.04	0.037	0.032	0.028	0.057	0.024	ND

TABLE 4 NOTES
GSI Investigation
Algoma and Plainfield Townships, Kent County, MI

NOTES:

1. Concentration and criteria units are micrograms per Liter (µg/L) or parts per billion (ppb). Calculated criteria and concentrations are rounded to two significant digits.
2. Michigan Part 201 Groundwater Cleanup Criteria are based on "Table 1, Groundwater: Residential and Nonresidential Part 201 Generic Cleanup Criteria and Screening Levels/Part 213 Tier I Risk Based Screening Levels," Michigan Administrative Code, Cleanup Criteria Requirements for Response Activity, Rules 299.44 and 299.49, effective December 30, 2013; last updated October 12, 2023.
   Abbreviations Include:
   "NCL" indicates no criterion listed in Michigan Part 201 Table 1.
   "NA" indicates not available.
3. Bold, italic number with thick line border or italic parameter name indicates that parameter was detected above the Michigan Part 201 Groundwater Cleanup Criteria listed.
4. Abbreviations include:
   "< LOQ" indicates the parameter was analyzed for but not detected above the limit of quantitation (LOQ).
   "DUP" indicates a duplicate sample.
   "H" indicates the parameter was analyzed out of hold time.
   "ND" indicates the parameters used in the calculation were not detected.
5. Screen interval presented is the top of the screen to the bottom of the screen in feet below ground surface.

TABLE 5
SUMMARY OF MONITORING WELL GROUNDWATER SAMPLE ANALYSIS - PFAS
GSI Investigation
Algoma and Plainfield Townships, Kent County, MI

Area	Part 201 Generic Groundwater Cleanup Criteria - Groundwater Surface Water Interface[2]	Wolven Northwest	Wolven Northwest	Wolven Northwest	Wolven Northwest	Wolven Northwest	Wolven Northwest	Wolven Northwest	Wolven Northwest	Wolven Northwest	Wolven Northwest	Wolven Northwest	Wolven Northwest	Wolven Northwest	Wolven Northwest	Wolven Northwest
Monitoring Well		WVNW-MW-200A	WVNW-MW-200A	WVNW-MW-200A	WVNW-MW-200A	WVNW-MW-200A	WVNW-MW-200B	WVNW-MW-200B	WVNW-MW-200B	WVNW-MW-200B	WVNW-MW-201A	WVNW-MW-201A	WVNW-MW-201A	WVNW-MW-201A	WVNW-MW-201A	WVNW-MW-201B
Sample Name		WVNW-MW-200A	WVNW-MW-200A	WVNW-MW-200A-DUP	WVNW-200A	WVNW-MW-200A	WVNW-MW-200B	WVNW-MW-200B	WVNW-200B	WVNW-MW-200B	WVNW-MW-201A	WVNW-MW-201A	WVNW-201A	WVNW-MW-201A	WVNW-MW-201A DUP	WVNW-MW-201B
Screen Interval (feet below ground surface)		24-29	24-29	24-29	24-29	24-29	55.1-60.1	55.1-60.1	55.1-60.1	55.1-60.1	12.5-17.5	12.5-17.5	12.5-17.5	12.5-17.5	12.5-17.5	30-35
Laboratory Sample ID		YE24026-005	YH09033-007	YH09033-008	YJ19021-001	ZA22017-001	YE24026-004	YH09033-005	YJ19021-002	ZA22017-002	YE24026-002	YH11018-003	YJ19021-003	ZA22017-006	ZA22017-007	YE24026-003
Sample Date		05/22/2023	08/08/2023	08/08/2023	10/16/2023	01/09/2024	05/22/2023	08/08/2023	10/16/2023	01/09/2024	05/22/2023	08/09/2023	10/16/2023	01/10/2024	01/10/2024	05/22/2023
Parameter (µg/L)																
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	NCL	<0.007	<0.007	<0.0069	<0.0078	<0.008 [H]	<0.007	<0.0069	<0.0076	<0.0072 [H]	<0.0072	<0.0068	<0.0077	<0.0078	<0.0075	<0.0071
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CL-PF3OUdS)	NCL	<0.007	<0.007	<0.0069	<0.0078	<0.008 [H]	<0.007	<0.0069	<0.0076	<0.0072 [H]	<0.0072	<0.0068	<0.0077	<0.0078	<0.0075	<0.0071
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	NCL	<0.007	<0.007	<0.0069	<0.0078	<0.008 [H]	<0.007	<0.0069	<0.0076	<0.0072 [H]	<0.0072	<0.0068	<0.0077	<0.0078	<0.0075	<0.0071
1H,1H,2H,2H-perfluorohexane sulfonate (4:2FTS)	NCL	<0.007	<0.007	<0.0069	<0.0078	<0.008 [H]	<0.007	<0.0069	<0.0076	<0.0072 [H]	<0.0072	<0.0068	<0.0077	<0.0078	<0.0075	<0.0071
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	<0.007	<0.007	<0.0069	<0.0078	<0.008 [H]	<0.007	<0.0069	<0.0076	<0.0072 [H]	<0.0072	<0.0068	<0.0077	<0.0078	<0.0075	<0.0071
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	<0.007	<0.007	<0.0069	<0.0078	<0.008 [H]	<0.007	<0.0069	<0.0076	<0.0072 [H]	<0.0072	<0.0068	<0.0077	<0.0078	<0.0075	<0.0071
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	NCL	<0.007	<0.007	<0.0069	<0.0078	<0.008 [H]	<0.007	<0.0069	<0.0076	<0.0072 [H]	<0.0072	<0.0068	<0.0077	<0.0078	<0.0075	<0.0071
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	NCL	<0.007	<0.007	<0.0069	<0.0078	<0.008 [H]	<0.007	<0.0069	<0.0076	<0.0072 [H]	<0.0072	<0.0068	<0.0077	<0.0078	<0.0075	<0.0071
Perfluorobutane sulfonic acid (PFBS)	670	0.0068	0.0077	0.008	0.0078	0.0069 [H]	0.0093	0.0093	0.0094	0.0084 [H]	0.01	0.0065	0.01	0.01	0.0097	0.0088
Perfluorodecane sulfonic acid (PFDS)	NCL	<0.0035	<0.0035	<0.0035	<0.0039	<0.004 [H]	<0.0035	<0.0034	<0.0038	<0.0036 [H]	<0.0036	<0.0034	<0.0038	<0.0039	<0.0038	<0.0035
Perfluoroheptane sulfonic acid (PFHpS)	NCL	<0.0035	<0.0035	<0.0035	<0.0039	<0.004 [H]	0.0093	0.0094	0.0081	0.0059 [H]	0.014	0.0081	0.0071	0.0089	0.0077	0.019
Perfluorononane sulfonic acid (PFNS)	NCL	<0.0035	<0.0035	<0.0035	<0.0039	<0.004 [H]	<0.0035	<0.0034	<0.0038	<0.0036 [H]	<0.0036	<0.0034	<0.0038	<0.0039	<0.0038	<0.0035
Perfluorooctane sulfonamide (FOSA)	NCL	<0.0035	<0.0035	<0.0035	<0.0039	<0.004 [H]	<0.0035	<0.0034	<0.0038	<0.0036 [H]	<0.0036	<0.0034	<0.0038	<0.0039	<0.0038	<0.0035
Perfluoropentane sulfonic acid (PFPeS)	NCL	<0.0035	<0.0035	<0.0035	<0.0039	<0.004 [H]	<0.0035	<0.0034	<0.0038	<0.0036 [H]	0.0052	<0.0034	0.0057	0.0048	0.0045	<0.0035
Perfluorohexane sulfonic acid (PFHxS)	0.21	0.0077	0.0083	0.0077	0.009	0.0075 [H]	0.018	0.017	0.014	0.014 [H]	0.025	0.014	0.028	0.025	0.025	0.029
Perfluorobutanoic acid (PFBA)	NCL	<0.0035	<0.0035	<0.0035	<0.0039	<0.004 [H]	0.0074	0.0049	0.0054	0.006 [H]	0.0041	<0.0034	<0.0038	0.015	0.015	0.0048
Perfluorodecanoic acid (PFDA)	NCL	<0.0035	<0.0035	<0.0035	<0.0039	<0.004 [H]	<0.0035	<0.0034	<0.0038	<0.0036 [H]	<0.0036	<0.0034	<0.0038	<0.0039	<0.0038	<0.0035
Perfluorododecanoic acid (PFDoDA)	NCL	<0.0035	<0.0035	<0.0035	<0.0039	<0.004 [H]	<0.0035	<0.0034	<0.0038	<0.0036 [H]	<0.0036	<0.0034	<0.0038	<0.0039	<0.0038	<0.0035
Perfluoroheptanoic acid (PFHpA)	NCL	<0.0035	<0.0035	0.0036	<0.0039	<0.004 [H]	0.009	0.0065	0.0058	0.0063 [H]	0.005	<0.0034	<0.0038	0.018	0.018	0.0051
Perfluorohexanoic acid (PFHxA)	NA	<0.0035	0.0038	<0.0035	<0.0039	<0.004 [H]	0.0099	0.0075	0.0055	0.0052 [H]	0.0037	<0.0034	<0.0038	0.018	0.018	0.0046
Perfluorononanoic acid (PFNA)	0.03	<0.0035	<0.0035	<0.0035	<0.0039	<0.004 [H]	<0.0035	<0.0034	<0.0038	<0.0036 [H]	<0.0036	<0.0034	<0.0038	<0.0039	<0.0038	<0.0035
Perfluorooctanoic acid (PFOA)	0.17	0.025	0.025	0.027	0.026	0.026 [H]	0.075	0.059	0.054	0.048 [H]	0.062	0.018	0.035	0.092	0.096	0.074
Perfluorooctane sulfonic acid (PFOS)	0.012	***0.066***	***0.067***	***0.075***	***0.07***	***0.065 [H]***	***0.23***	***0.27***	***0.25***	***0.22 [H]***	***0.39***	***0.31***	***0.43***	***0.53***	***0.53***	***0.76***
PFOA + PFOS (Calculated)	NCL	0.091	0.092	0.1	0.096	0.091	0.31	0.33	0.3	0.27	0.45	0.33	0.47	0.62	0.63	0.83
Perfluoropentanoic acid (PFPeA)	NCL	<0.0035	<0.0035	<0.0035	<0.0039	<0.004 [H]	0.0062	0.005	<0.0038	0.0037 [H]	<0.0036	<0.0034	<0.0038	0.0089	0.0088	<0.0035
Perfluorotetradecanoic acid (PFTeDA)	NCL	<0.0035	<0.0035	<0.0035	<0.0039	<0.004 [H]	<0.0035	<0.0034	<0.0038	<0.0036 [H]	<0.0036	<0.0034	<0.0038	<0.0039	<0.0038	<0.0035
Perfluorotridecanoic acid (PFTrDA)	NCL	<0.0035	<0.0035	<0.0035	<0.0039	<0.004 [H]	<0.0035	<0.0034	<0.0038	<0.0036 [H]	<0.0036	<0.0034	<0.0038	<0.0039	<0.0038	<0.0035
Perfluoroundecanoic acid (PFUnDA)	NCL	<0.0035	<0.0035	<0.0035	<0.0039	<0.004 [H]	<0.0035	<0.0034	<0.0038	<0.0036 [H]	<0.0036	<0.0034	<0.0038	<0.0039	<0.0038	<0.0035
Tetrafluoro-2-(heptafluoropropoxy)propanoic acid (GenX)	NA	<0.007	<0.007	<0.0069	<0.0078	<0.008 [H]	<0.007	<0.0069	<0.0076	<0.0072 [H]	<0.0072	<0.0068	<0.0077	<0.0078	<0.0075	<0.0071
Total PFAS (Calculated)	NCL	0.11	0.11	0.12	0.11	0.11	0.37	0.39	0.35	0.32	0.52	0.36	0.52	0.73	0.73	0.91

TABLE 5
SUMMARY OF MONITORING WELL GROUNDWATER SAMPLE ANALYSIS - PFAS
GSI Investigation
Algoma and Plainfield Townships, Kent County, MI

Area	Part 201 Generic Groundwater Cleanup Criteria - Groundwater Surface Water Interface[2]	Wolven Northwest	Wolven Northwest	Wolven Northwest	Wolven Northwest	Wolven Northwest	Wolven Northwest	Wolven Northwest	Wolven Northwest	Wolven Northwest	Wolven Northwest	Wolven Northwest	Wolven Northwest	Wolven Northwest	Wolven Northwest	Wolven Northwest
Monitoring Well		WVNW-MW-201B	WVNW-MW-201B	WVNW-MW-201B	WVNW-MW-201C	WVNW-MW-201C	WVNW-MW-201C	WVNW-MW-201C	WVNW-MW-202A	WVNW-MW-202A	WVNW-MW-202A	WVNW-MW-202A	WVNW-MW-202B	WVNW-MW-202B	WVNW-MW-202B	WVNW-MW-202B
Sample Name		WVNW-MW-201B	WVNW-201B	WVNW-MW-201B	WVNW-MW-201C	WVNW-MW-201C	WVNW-201C	WVNW-MW-201C	WVNW-MW-202A	WVNW-MW-202A	WVNW-MW-202A	WVNW-MW-202A	WVNW-MW-202B	WVNW-MW-202B	WVNW-MW-202B	WVNW-MW-202B
Screen Interval (feet below ground surface)		30-35	30-35	30-35	49.5-54.5	49.5-54.5	49.5-54.5	49.5-54.5	40.1-45.1	40.1-45.1	40.1-45.1	40.1-45.1	59.8-64.8	59.8-64.8	59.8-64.8	59.8-64.8
Laboratory Sample ID		YH11018-006	YJ19021-004	ZA22017-005	YE24026-001	YH11018-005	YJ19021-005	ZA22017-004	YE26014-016	YH11018-007	YJ19021-010	ZA22017-017	YE26014-014	YH11018-004	YJ19021-009	ZA22017-018
Sample Date		08/09/2023	10/16/2023	01/10/2024	05/22/2023	08/09/2023	10/16/2023	01/10/2024	05/24/2023	08/09/2023	10/17/2023	01/11/2024	05/24/2023	08/09/2023	10/17/2023	01/11/2024
Parameter (µg/L)																
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	NCL	<0.0072	<0.0077	<0.0074	<0.007	<0.0072	<0.0071	<0.0076	<0.0079	<0.0068	<0.0073	<0.0073	<0.0077	<0.0072	<0.0073	<0.0078
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CL-PF3OUdS)	NCL	<0.0072	<0.0077	<0.0074	<0.007	<0.0072	<0.0071	<0.0076	<0.0079	<0.0068	<0.0073	<0.0073	<0.0077	<0.0072	<0.0073	<0.0078
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	NCL	<0.0072	<0.0077	<0.0074	<0.007	<0.0072	<0.0071	<0.0076	<0.0079	<0.0068	<0.0073	<0.0073	<0.0077	<0.0072	<0.0073	<0.0078
1H,1H,2H,2H-perfluorohexane sulfonate (4:2FTS)	NCL	<0.0072	<0.0077	<0.0074	<0.007	<0.0072	<0.0071	<0.0076	<0.0079	<0.0068	<0.0073	<0.0073	<0.0077	<0.0072	<0.0073	<0.0078
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	<0.0072	<0.0077	<0.0074	<0.007	<0.0072	<0.0071	<0.0076	<0.0079	<0.0068	<0.0073	<0.0073	<0.0077	<0.0072	<0.0073	<0.0078
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	<0.0072	<0.0077	<0.0074	<0.007	<0.0072	<0.0071	<0.0076	<0.0079	<0.0068	<0.0073	<0.0073	<0.0077	<0.0072	<0.0073	<0.0078
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	NCL	<0.0072	<0.0077	<0.0074	<0.007	<0.0072	<0.0071	<0.0076	<0.0079	<0.0068	<0.0073	<0.0073	<0.0077	<0.0072	<0.0073	<0.0078
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	NCL	<0.0072	<0.0077	<0.0074	<0.007	<0.0072	<0.0071	<0.0076	<0.0079	<0.0068	<0.0073	<0.0073	<0.0077	<0.0072	<0.0073	<0.0078
Perfluorobutane sulfonic acid (PFBS)	670	0.013	0.01	0.011	0.011	0.0096	0.011	0.01	0.007	0.0056	0.0071	0.0043	0.0085	0.0081	0.0082	0.0081
Perfluorodecane sulfonic acid (PFDS)	NCL	<0.0036	<0.0038	<0.0037	<0.0035	<0.0036	<0.0036	<0.0038	<0.0039	<0.0034	<0.0037	<0.0036	<0.0038	<0.0036	<0.0036	<0.0039
Perfluoroheptane sulfonic acid (PFHpS)	NCL	0.01	0.013	0.012	0.017	0.016	0.014	0.014	<0.0039	<0.0034	<0.0037	<0.0036	<0.0038	<0.0036	<0.0036	<0.0039
Perfluorononane sulfonic acid (PFNS)	NCL	<0.0036	<0.0038	<0.0037	<0.0035	<0.0036	<0.0036	<0.0038	<0.0039	<0.0034	<0.0037	<0.0036	<0.0038	<0.0036	<0.0036	<0.0039
Perfluorooctane sulfonamide (FOSA)	NCL	<0.0036	<0.0038	<0.0037	<0.0035	<0.0036	<0.0036	<0.0038	<0.0039	<0.0034	<0.0037	<0.0036	<0.0038	<0.0036	<0.0036	<0.0039
Perfluoropentane sulfonic acid (PFPeS)	NCL	0.0074	0.0046	0.0049	0.0061	0.0054	0.0055	0.0056	<0.0039	<0.0034	<0.0037	<0.0036	<0.0038	<0.0036	<0.0036	<0.0039
Perfluorohexane sulfonic acid (PFHxS)	0.21	0.031	0.026	0.025	0.03	0.027	0.027	0.028	0.0066	0.0048	0.0067	0.0052	0.01	0.0081	0.0078	0.0069
Perfluorobutanoic acid (PFBA)	NCL	<0.0036	0.022	0.011	0.01	0.0082	0.005	0.0039	<0.0039	<0.0034	<0.0037	<0.0036	<0.0038	<0.0036	<0.0036	<0.0039
Perfluorodecanoic acid (PFDA)	NCL	<0.0036	<0.0038	<0.0037	<0.0035	<0.0036	<0.0036	<0.0038	<0.0039	<0.0034	<0.0037	<0.0036	<0.0038	<0.0036	<0.0036	<0.0039
Perfluorododecanoic acid (PFDoDA)	NCL	<0.0036	<0.0038	<0.0037	<0.0035	<0.0036	<0.0036	<0.0038	<0.0039	<0.0034	<0.0037	<0.0036	<0.0038	<0.0036	<0.0036	<0.0039
Perfluoroheptanoic acid (PFHpA)	NCL	<0.0036	0.01	0.016	0.01	0.011	0.0083	0.0062	<0.0039	<0.0034	<0.0037	<0.0036	<0.0038	<0.0036	<0.0036	<0.0039
Perfluorohexanoic acid (PFHxA)	NA	<0.0036	0.004	0.018	0.011	0.013	0.0091	0.0063	<0.0039	<0.0034	<0.0037	<0.0036	0.0038	<0.0036	<0.0036	<0.0039
Perfluorononanoic acid (PFNA)	0.03	<0.0036	<0.0038	<0.0037	<0.0035	<0.0036	<0.0036	<0.0038	<0.0039	<0.0034	<0.0037	<0.0036	<0.0038	<0.0036	<0.0036	<0.0039
Perfluorooctanoic acid (PFOA)	0.17	0.038	0.12	0.12	0.1	0.097	0.086	0.068	0.018	0.01	0.014	0.015	0.029	0.021	0.022	0.02
Perfluorooctane sulfonic acid (PFOS)	0.012	***0.66***	***0.72***	***0.56***	***0.6***	***0.48***	***0.53***	***0.49***	***0.018***	***0.015***	***0.021***	***0.023***	***0.093***	***0.075***	***0.078***	***0.079***
PFOA + PFOS (Calculated)	NCL	0.7	0.84	0.68	0.7	0.58	0.62	0.56	0.036	0.025	0.035	0.038	0.12	0.096	0.1	0.099
Perfluoropentanoic acid (PFPeA)	NCL	<0.0036	<0.0038	0.011	0.0048	0.0059	0.0044	0.0038	<0.0039	<0.0034	<0.0037	<0.0036	<0.0038	<0.0036	<0.0036	<0.0039
Perfluorotetradecanoic acid (PFTeDA)	NCL	<0.0036	<0.0038	<0.0037	<0.0035	<0.0036	<0.0036	<0.0038	<0.0039	<0.0034	<0.0037	<0.0036	<0.0038	<0.0036	<0.0036	<0.0039
Perfluorotridecanoic acid (PFTrDA)	NCL	<0.0036	<0.0038	<0.0037	<0.0035	<0.0036	<0.0036	<0.0038	<0.0039	<0.0034	<0.0037	<0.0036	<0.0038	<0.0036	<0.0036	<0.0039
Perfluoroundecanoic acid (PFUnDA)	NCL	<0.0036	<0.0038	<0.0037	<0.0035	<0.0036	<0.0036	<0.0038	<0.0039	<0.0034	<0.0037	<0.0036	<0.0038	<0.0036	<0.0036	<0.0039
Tetrafluoro-2-(heptafluoropropoxy)propanoic acid (GenX)	NA	<0.0072	<0.0077	<0.0074	<0.007	<0.0072	<0.0071	<0.0076	<0.0079	<0.0068	<0.0073	<0.0073	<0.0077	<0.0072	<0.0073	<0.0078
Total PFAS (Calculated)	NCL	0.76	0.93	0.79	0.8	0.67	0.7	0.64	0.05	0.035	0.049	0.048	0.14	0.11	0.12	0.11

TABLE 5
SUMMARY OF MONITORING WELL GROUNDWATER SAMPLE ANALYSIS - PFAS
GSI Investigation
Algoma and Plainfield Townships, Kent County, MI

Area	Part 201 Generic Groundwater Cleanup Criteria - Groundwater Surface Water Interface[2]	Wolven Northwest	Wolven Northwest	Wolven Northwest	Wolven Northwest	Wolven Northeast	Wolven Northeast	Wolven Northeast	Wolven Northeast	Wolven Northeast	Wolven Northeast	Wolven Northeast	Wolven Northeast	Wolven Northeast	Wolven Northeast
Monitoring Well		WVNW-MW-203	WVNW-MW-203	WVNW-MW-203	WVNW-MW-203	AREA19-GSI-1	AREA19-GSI-2	AREA19-GSI-3	WV-DEQ-MW9-57	AREA19-MW-221A	AREA19-MW-221A	AREA19-MW-221A	AREA19-MW-221A	AREA19-MW-221B	AREA19-MW-221B	AREA19-MW-221B
Sample Name		WVNW-MW-203	WVNW-MW-203	WVNW-MW-203	WVNW-MW-203	AREA19-GSI-1	AREA19-GSI-2	AREA19-GSI-3	DEQ-MW-9-57	Area19-MW-221A	Area19-MW-221A	AREA19-MW-221A	AREA19-MW-221A	Area19-MW-221B	Area19-MW-221B	AREA19-MW-221B
Screen Interval (feet below ground surface)		14.3-19.3	14.3-19.3	14.3-19.3	14.3-19.3	3.7-7.7	4-8	4.2-8.2	51.85-56.85	15.9-20.9	15.9-20.9	15.9-20.9	15.9-20.9	45-50	45-50	45-50
Laboratory Sample ID		YE26014-012	YH11018-010	YJ25065-014	ZA22017-010	VL11070-002	VL11070-003	VL11070-004	VL11070-007	YE26014-011	YH09033-003	YJ25065-002	ZA27002-020	YE26014-010	YH09033-001	YJ25065-003
Sample Date		05/24/2023	08/10/2023	10/19/2023	01/10/2024	12/08/2020	12/08/2020	12/08/2020	12/09/2020	05/24/2023	08/08/2023	10/18/2023	01/25/2024	05/24/2023	08/08/2023	10/18/2023
Parameter (µg/L)																
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	NCL	<0.0072	<0.0073	<0.0077	<0.008	<0.0071	<0.0073	<0.0074	<0.0069	<0.0069	<0.0073	<0.0077	<0.0078	<0.0075	<0.0072	<0.0078
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CL-PF3OUdS)	NCL	<0.0072	<0.0073	<0.0077	<0.008	<0.0071	<0.0073	<0.0074	<0.0069	<0.0069	<0.0073	<0.0077	<0.0078	<0.0075	<0.0072	<0.0078
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	NCL	<0.0072	<0.0073	<0.0077	<0.008	<0.0071	<0.0073	<0.0074	<0.0069	<0.0069	<0.0073	<0.0077	<0.0078	<0.0075	<0.0072	<0.0078
1H,1H,2H,2H-perfluorohexane sulfonate (4:2FTS)	NCL	<0.0072	<0.0073	<0.0077	<0.008	<0.0071	<0.0073	<0.0074	<0.0069	<0.0069	<0.0073	<0.0077	<0.0078	<0.0075	<0.0072	<0.0078
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	<0.0072	<0.0073	<0.0077	<0.008	<0.0071	<0.0073	<0.0074	<0.0069	<0.0069	<0.0073	<0.0077	<0.0078	<0.0075	<0.0072	<0.0078
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	<0.0072	<0.0073	<0.0077	<0.008	<0.0071	<0.0073	<0.0074	<0.0069	<0.0069	<0.0073	<0.0077	<0.0078	<0.0075	<0.0072	<0.0078
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	NCL	<0.0072	<0.0073	<0.0077	<0.008	<0.0071	<0.0073	<0.0074	<0.0069	<0.0069	<0.0073	<0.0077	<0.0078	<0.0075	<0.0072	<0.0078
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	NCL	<0.0072	<0.0073	<0.0077	<0.008	<0.0071	<0.0073	<0.0074	<0.0069	<0.0069	<0.0073	<0.0077	<0.0078	<0.0075	<0.0072	<0.0078
Perfluorobutane sulfonic acid (PFBS)	670	<0.0036	<0.0036	<0.0038	<0.004	0.012	0.021	0.017	0.0067	0.0062	0.007	0.0081	0.0058	0.0066	0.0056	0.0075
Perfluorodecane sulfonic acid (PFDS)	NCL	<0.0036	<0.0036	<0.0038	<0.004	<0.0035	<0.0036	<0.0037	<0.0035	<0.0035	<0.0036	<0.0039	<0.0039	<0.0038	<0.0036	<0.0039
Perfluoroheptane sulfonic acid (PFHpS)	NCL	<0.0036	<0.0036	<0.0038	<0.004	<0.0035	0.0079	0.0046	<0.0035	0.0037	<0.0036	<0.0039	<0.0039	<0.0038	<0.0036	<0.0039
Perfluorononane sulfonic acid (PFNS)	NCL	<0.0036	<0.0036	<0.0038	<0.004	<0.0035	<0.0036	<0.0037	<0.0035	<0.0035	<0.0036	<0.0039	<0.0039	<0.0038	<0.0036	<0.0039
Perfluorooctane sulfonamide (FOSA)	NCL	<0.0036	<0.0036	<0.0038	<0.004	<0.0035	<0.0036	<0.0037	<0.0035	<0.0035	<0.0036	<0.0039	<0.0039	<0.0038	<0.0036	<0.0039
Perfluoropentane sulfonic acid (PFPeS)	NCL	<0.0036	<0.0036	<0.0038	<0.004	<0.0035	0.0044	<0.0037	<0.0035	<0.0035	<0.0036	<0.0039	<0.0039	<0.0038	<0.0036	<0.0039
Perfluorohexane sulfonic acid (PFHxS)	0.21	<0.0036	<0.0036	<0.0038	<0.004	0.0076	0.018	0.013	0.0053	0.0045	0.0047	0.0048	0.0041	0.0049	0.0041	<0.0039
Perfluorobutanoic acid (PFBA)	NCL	<0.0036	<0.0036	<0.0038	<0.004	<0.0035	0.012	0.0052	<0.0035	<0.0035	<0.0036	<0.0039	<0.0039	<0.0038	<0.0036	<0.0039
Perfluorodecanoic acid (PFDA)	NCL	<0.0036	<0.0036	<0.0038	<0.004	<0.0035	<0.0036	<0.0037	<0.0035	<0.0035	<0.0036	<0.0039	<0.0039	<0.0038	<0.0036	<0.0039
Perfluorododecanoic acid (PFDoDA)	NCL	<0.0036	<0.0036	<0.0038	<0.004	<0.0035	<0.0036	<0.0037	<0.0035	<0.0035	<0.0036	<0.0039	<0.0039	<0.0038	<0.0036	<0.0039
Perfluoroheptanoic acid (PFHpA)	NCL	<0.0036	<0.0036	<0.0038	<0.004	<0.0035	0.0075	0.0074	<0.0035	0.0052	<0.0036	<0.0039	<0.0039	<0.0038	<0.0036	<0.0039
Perfluorohexanoic acid (PFHxA)	NA	<0.0036	<0.0036	<0.0038	<0.004	<0.0035	0.011	0.0074	<0.0035	0.0057	<0.0036	<0.0039	<0.0039	<0.0038	<0.0036	<0.0039
Perfluorononanoic acid (PFNA)	0.03	<0.0036	<0.0036	<0.0038	<0.004	<0.0035	<0.0036	<0.0037	<0.0035	<0.0035	<0.0036	<0.0039	<0.0039	<0.0038	<0.0036	<0.0039
Perfluorooctanoic acid (PFOA)	0.17	<0.0036	0.0041	0.0062	0.004	0.016	0.084	0.058	0.0091	0.041	0.024	0.016	0.0096	0.013	0.01	0.0083
Perfluorooctane sulfonic acid (PFOS)	0.012	<0.0036	<0.0036	<0.0038	<0.004	***0.017***	***0.17***	***0.13***	<0.0035	***0.05***	***0.039***	***0.058***	***0.044***	***0.015***	0.012	***0.014***
PFOA + PFOS (Calculated)	NCL	ND	0.0041	0.0062	0.004	0.033	0.25	0.19	0.0091	0.091	0.063	0.074	0.054	0.028	0.022	0.022
Perfluoropentanoic acid (PFPeA)	NCL	<0.0036	<0.0036	<0.0038	<0.004	<0.0035	0.0054	0.0039	<0.0035	<0.0035	<0.0036	<0.0039	<0.0039	<0.0038	<0.0036	<0.0039
Perfluorotetradecanoic acid (PFTeDA)	NCL	<0.0036	<0.0036	<0.0038	<0.004	<0.0035	<0.0036	<0.0037	<0.0035	<0.0035	<0.0036	<0.0039	<0.0039	<0.0038	<0.0036	<0.0039
Perfluorotridecanoic acid (PFTrDA)	NCL	<0.0036	<0.0036	<0.0038	<0.004	<0.0035	<0.0036	<0.0037	<0.0035	<0.0035	<0.0036	<0.0039	<0.0039	<0.0038	<0.0036	<0.0039
Perfluoroundecanoic acid (PFUnDA)	NCL	<0.0036	<0.0036	<0.0038	<0.004	<0.0035	<0.0036	<0.0037	<0.0035	<0.0035	<0.0036	<0.0039	<0.0039	<0.0038	<0.0036	<0.0039
Tetrafluoro-2-(heptafluoropropoxy)propanoic acid (GenX)	NA	<0.0072	<0.0073	<0.0077	<0.008	<0.0071	<0.0073	<0.0074	<0.0069	<0.0069	<0.0073	<0.0077	<0.0078	<0.0075	<0.0072	<0.0078
Total PFAS (Calculated)	NCL	ND	0.0041	0.0062	0.004	0.053	0.34	0.25	0.021	0.12	0.075	0.087	0.064	0.04	0.032	0.03

TABLE 5
SUMMARY OF MONITORING WELL GROUNDWATER SAMPLE ANALYSIS - PFAS
GSI Investigation
Algoma and Plainfield Townships, Kent County, MI

Area	Part 201 Generic Groundwater Cleanup Criteria - Groundwater Surface Water Interface[2]	Wolven Northeast	Wolven Northeast	Wolven Northeast	Wolven Northeast	Wolven Northeast	Wolven Northeast	Wolven Northeast	Wolven Northeast	Wolven Northeast	Wolven Northeast	Wolven Northeast	Wolven Northeast	Wolven Northeast	Wolven Northeast
Monitoring Well		AREA19-MW-221B	AREA19-MW-222	AREA19-MW-222	AREA19-MW-222	AREA19-MW-222	AREA19-MW-223	AREA19-MW-223	AREA19-MW-223	AREA19-MW-223	AREA19-MW-224	AREA19-MW-224	AREA19-MW-224	AREA19-MW-224	AREA19-MW-225A
Sample Name		AREA19-MW-221B	Area19-MW-222	Area19-MW-222	AREA19-MW-222	AREA19-MW-222	Area19-MW-223	Area19-MW-223	AREA19-MW-223	AREA19-MW-223	Area19-MW-224	Area19-MW-224 DUP	AREA19-MW-224	AREA19-MW-224	Area19-MW-225A
Screen Interval (feet below ground surface)		45-50	6.4-11.4	6.4-11.4	6.4-11.4	6.4-11.4	4.9-9.9	4.9-9.9	4.9-9.9	4.9-9.9	4.2-9.2	4.2-9.2	4.2-9.2	4.2-9.2	5.3-10.3
Laboratory Sample ID		ZA27003-005	YF02023-001	YH15005-001	YJ25065-005	ZA27003-013	YF02023-002	YH15005-002	YJ25065-004	ZA27003-003	YE26014-009	YE26014-015	YH11018-014	YJ25065-001	ZA27003-004	YE31016-002
Sample Date		01/25/2024	05/31/2023	08/11/2023	10/18/2023	01/25/2024	05/31/2023	08/11/2023	10/18/2023	01/24/2024	05/24/2023	05/24/2023	08/10/2023	10/18/2023	01/25/2024	05/26/2023
Parameter (µg/L)																
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	NCL	<0.0077	<0.0083	<0.0076	<0.0078	<0.0076	<0.0073	<0.0072	<0.0078	<0.0079	<0.0071	<0.0071	<0.0075	<0.0073	<0.0073	<0.0072
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CL-PF3OUdS)	NCL	<0.0077	<0.0083	<0.0076	<0.0078	<0.0076	<0.0073	<0.0072	<0.0078	<0.0079	<0.0071	<0.0071	<0.0075	<0.0073	<0.0073	<0.0072
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	NCL	<0.0077	<0.0083	<0.0076	<0.0078	<0.0076	<0.0073	<0.0072	<0.0078	<0.0079	<0.0071	<0.0071	<0.0075	<0.0073	<0.0073	<0.0072
1H,1H,2H,2H-perfluorohexane sulfonate (4:2FTS)	NCL	<0.0077	<0.0083	<0.0076	<0.0078	<0.0076	<0.0073	<0.0072	<0.0078	<0.0079	<0.0071	<0.0071	<0.0075	<0.0073	<0.0073	<0.0072
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	<0.0077	<0.0083	<0.0076	<0.0078	<0.0076	<0.0073	<0.0072	<0.0078	<0.0079	<0.0071	<0.0071	<0.0075	<0.0073	<0.0073	<0.0072
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	<0.0077	<0.0083	<0.0076	<0.0078	<0.0076	<0.0073	<0.0072	<0.0078	<0.0079	<0.0071	<0.0071	<0.0075	<0.0073	<0.0073	<0.0072
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	NCL	<0.0077	<0.0083	<0.0076	<0.0078	<0.0076	<0.0073	<0.0072	<0.0078	<0.0079	<0.0071	<0.0071	<0.0075	<0.0073	<0.0073	<0.0072
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	NCL	<0.0077	<0.0083	<0.0076	<0.0078	<0.0076	<0.0073	<0.0072	<0.0078	<0.0079	<0.0071	<0.0071	<0.0075	<0.0073	<0.0073	<0.0072
Perfluorobutane sulfonic acid (PFBS)	670	0.0057	0.019	0.0055	0.0076	0.0049	0.0072	0.022	0.028	0.013	0.011	0.012	0.01	0.013	0.0095	0.0077
Perfluorodecane sulfonic acid (PFDS)	NCL	<0.0039	<0.0041	<0.0038	<0.0039	<0.0038	<0.0036	<0.0036	<0.0039	<0.004	<0.0035	<0.0036	<0.0038	<0.0036	<0.0036	<0.0036
Perfluoroheptane sulfonic acid (PFHpS)	NCL	<0.0039	0.032	0.0051	0.0057	<0.0038	0.0051	0.014	0.014	0.017	<0.0035	<0.0036	<0.0038	<0.0036	<0.0036	<0.0036
Perfluorononane sulfonic acid (PFNS)	NCL	<0.0039	<0.0041	<0.0038	<0.0039	<0.0038	<0.0036	<0.0036	<0.0039	<0.004	<0.0035	<0.0036	<0.0038	<0.0036	<0.0036	<0.0036
Perfluorooctane sulfonamide (FOSA)	NCL	<0.0039	<0.0041	<0.0038	<0.0039	<0.0038	<0.0036	<0.0036	<0.0039	<0.004	<0.0035	<0.0036	<0.0038	<0.0036	<0.0036	<0.0036
Perfluoropentane sulfonic acid (PFPeS)	NCL	<0.0039	0.0058	<0.0038	<0.0039	<0.0038	<0.0036	0.0082	0.0094	<0.004	0.0074	0.0072	0.0065	0.0082	0.0057	<0.0036
Perfluorohexane sulfonic acid (PFHxS)	0.21	<0.0039	0.027	0.007	0.0075	0.0045	0.0079	0.03	0.041	0.019	0.023	0.019	0.019	0.024	0.016	0.004
Perfluorobutanoic acid (PFBA)	NCL	<0.0039	0.0068	<0.0038	<0.0039	<0.0038	<0.0036	0.0051	0.0055	0.0082	<0.0035	<0.0036	<0.0038	<0.0036	<0.0036	0.0068
Perfluorodecanoic acid (PFDA)	NCL	<0.0039	<0.0041	<0.0038	<0.0039	<0.0038	<0.0036	<0.0036	<0.0039	<0.004	<0.0035	<0.0036	<0.0038	<0.0036	<0.0036	<0.0036
Perfluorododecanoic acid (PFDoDA)	NCL	<0.0039	<0.0041	<0.0038	<0.0039	<0.0038	<0.0036	<0.0036	<0.0039	<0.004	<0.0035	<0.0036	<0.0038	<0.0036	<0.0036	<0.0036
Perfluoroheptanoic acid (PFHpA)	NCL	<0.0039	0.019	<0.0038	<0.0039	<0.0038	<0.0036	0.014	0.016	0.017	0.0052	0.0044	0.0043	0.0048	<0.0036	<0.0036
Perfluorohexanoic acid (PFHxA)	NA	<0.0039	0.017	<0.0038	0.0042	<0.0038	0.0051	0.011	0.012	0.016	<0.0035	0.0037	<0.0038	<0.0036	<0.0036	<0.0036
Perfluorononanoic acid (PFNA)	0.03	<0.0039	0.0055	<0.0038	<0.0039	<0.0038	<0.0036	<0.0036	<0.0039	<0.004	<0.0035	<0.0036	<0.0038	<0.0036	<0.0036	<0.0036
Perfluorooctanoic acid (PFOA)	0.17	0.006	***0.18***	0.03	0.047	0.024	0.046	0.13	0.13	0.14	0.035	0.031	0.025	0.029	0.023	0.0073
Perfluorooctane sulfonic acid (PFOS)	0.012	0.011	***0.95***	***0.1***	***0.12***	***0.069***	***0.11***	***0.4***	***0.28***	***0.59***	***0.055***	***0.05***	***0.036***	***0.045***	***0.027***	***0.021***
PFOA + PFOS (Calculated)	NCL	0.017	1.1	0.13	0.17	0.093	0.16	0.53	0.41	0.73	0.09	0.081	0.061	0.074	0.05	0.028
Perfluoropentanoic acid (PFPeA)	NCL	<0.0039	<0.0041	<0.0038	<0.0039	<0.0038	<0.0036	<0.0036	<0.0039	<0.004	<0.0035	<0.0036	<0.0038	<0.0036	<0.0036	<0.0036
Perfluorotetradecanoic acid (PFTeDA)	NCL	<0.0039	<0.0041	<0.0038	<0.0039	<0.0038	<0.0036	<0.0036	<0.0039	<0.004	<0.0035	<0.0036	<0.0038	<0.0036	<0.0036	<0.0036
Perfluorotridecanoic acid (PFTrDA)	NCL	<0.0039	<0.0041	<0.0038	<0.0039	<0.0038	<0.0036	<0.0036	<0.0039	<0.004	<0.0035	<0.0036	<0.0038	<0.0036	<0.0036	<0.0036
Perfluoroundecanoic acid (PFUnDA)	NCL	<0.0039	<0.0041	<0.0038	<0.0039	<0.0038	<0.0036	<0.0036	<0.0039	<0.004	<0.0035	<0.0036	<0.0038	<0.0036	<0.0036	<0.0036
Tetrafluoro-2-(heptafluoropropoxy)propanoic acid (GenX)	NA	<0.0077	<0.0083	<0.0076	<0.0078	<0.0076	<0.0073	<0.0072	<0.0078	<0.0079	<0.0071	<0.0071	<0.0075	<0.0073	<0.0073	<0.0072
Total PFAS (Calculated)	NCL	0.023	1.3	0.15	0.19	0.1	0.18	0.63	0.54	0.82	0.14	0.13	0.1	0.12	0.081	0.047

TABLE 5
SUMMARY OF MONITORING WELL GROUNDWATER SAMPLE ANALYSIS - PFAS
GSI Investigation
Algoma and Plainfield Townships, Kent County, MI

Area	Part 201 Generic Groundwater Cleanup Criteria - Groundwater Surface Water Interface[2]	Wolven Northeast	Wolven Northeast	Wolven Northeast	Wolven Northeast	Wolven Northeast	Wolven Northeast	Wolven Northeast	Wolven Northeast	Wolven Northeast	Wolven Northeast	Wolven Northeast	Wolven Northeast	Wolven Northeast	Wolven Northeast
Monitoring Well		AREA19-MW-225A	AREA19-MW-225A	AREA19-MW-225A	AREA19-MW-225A	AREA19-MW-225B	AREA19-MW-225B	AREA19-MW-225B	AREA19-MW-225B	AREA19-MW-226A	AREA19-MW-226A	AREA19-MW-226A	AREA19-MW-226A	AREA19-MW-226B	AREA19-MW-226B	AREA19-MW-226B
Sample Name		AREA19-MW-225A	AREA19-MW-225A	AREA19-MW-225A DUP	AREA19-MW-225A	Area19-MW-225B	AREA19-MW-225B	AREA19-MW-225B	AREA19-MW-225B	Area19-MW-226A	AREA19-MW-226A	AREA19-MW-226A	AREA19-MW-226A	Area19-MW-226B	AREA19-MW-226B	AREA19-MW-226B
Screen Interval (feet below ground surface)		5.3-10.3	5.3-10.3	5.3-10.3	5.3-10.3	30.2-35.2	30.2-35.2	30.2-35.2	30.2-35.2	3.3-8.3	3.3-8.3	3.3-8.3	3.3-8.3	10-15	10-15	10-15
Laboratory Sample ID		YH11018-009	YJ25065-009	YJ25065-010	ZA27003-002	YE31016-001	YH11018-002	YJ25065-013	ZA27003-012	YE31016-003	YH09029-004	YJ25065-007	ZA22017-013	YE31016-004	YH09029-003	YJ25065-008
Sample Date		08/09/2023	10/19/2023	10/19/2023	01/25/2024	05/26/2023	08/09/2023	10/19/2023	01/25/2024	05/30/2023	08/07/2023	10/19/2023	01/11/2024	05/30/2023	08/07/2023	10/19/2023
Parameter (µg/L)																
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	NCL	<0.0072	<0.0078	<0.008	<0.0076	<0.007	<0.0074	<0.007	<0.0078	<0.0075	<0.0075	<0.0081	<0.0074	<0.0072	<0.007	<0.0077
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CL-PF3OUdS)	NCL	<0.0072	<0.0078	<0.008	<0.0076	<0.007	<0.0074	<0.007	<0.0078	<0.0075	<0.0075	<0.0081	<0.0074	<0.0072	<0.007	<0.0077
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	NCL	<0.0072	<0.0078	<0.008	<0.0076	<0.007	<0.0074	<0.007	<0.0078	<0.0075	<0.0075	<0.0081	<0.0074	<0.0072	<0.007	<0.0077
1H,1H,2H,2H-perfluorohexane sulfonate (4:2FTS)	NCL	<0.0072	<0.0078	<0.008	<0.0076	<0.007	<0.0074	<0.007	<0.0078	<0.0075	<0.0075	<0.0081	<0.0074	<0.0072	<0.007	<0.0077
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	<0.0072	<0.0078	<0.008	<0.0076	<0.007	<0.0074	<0.007	<0.0078	<0.0075	<0.0075	<0.0081	<0.0074	<0.0072	<0.007	<0.0077
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	<0.0072	<0.0078	<0.008	<0.0076	<0.007	<0.0074	<0.007	<0.0078	<0.0075	<0.0075	<0.0081	<0.0074	<0.0072	<0.007	<0.0077
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	NCL	<0.0072	<0.0078	<0.008	<0.0076	<0.007	<0.0074	<0.007	<0.0078	<0.0075	<0.0075	<0.0081	<0.0074	<0.0072	<0.007	<0.0077
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	NCL	<0.0072	<0.0078	<0.008	<0.0076	<0.007	<0.0074	<0.007	<0.0078	<0.0075	<0.0075	<0.0081	<0.0074	<0.0072	<0.007	<0.0077
Perfluorobutane sulfonic acid (PFBS)	670	0.012	0.0095	0.0095	<0.0038	<0.0035	<0.0037	<0.0035	<0.0039	<0.0037	<0.0037	<0.0041	<0.0037	0.0049	0.004	0.0046
Perfluorodecane sulfonic acid (PFDS)	NCL	<0.0036	<0.0039	<0.004	<0.0038	<0.0035	<0.0037	<0.0035	<0.0039	<0.0037	<0.0037	<0.0041	<0.0037	<0.0036	<0.0035	<0.0039
Perfluoroheptane sulfonic acid (PFHpS)	NCL	<0.0036	<0.0039	<0.004	<0.0038	<0.0035	<0.0037	<0.0035	<0.0039	<0.0037	<0.0037	<0.0041	<0.0037	<0.0036	<0.0035	<0.0039
Perfluorononane sulfonic acid (PFNS)	NCL	<0.0036	<0.0039	<0.004	<0.0038	<0.0035	<0.0037	<0.0035	<0.0039	<0.0037	<0.0037	<0.0041	<0.0037	<0.0036	<0.0035	<0.0039
Perfluorooctane sulfonamide (FOSA)	NCL	<0.0036	<0.0039	<0.004	<0.0038	<0.0035	<0.0037	<0.0035	<0.0039	<0.0037	<0.0037	<0.0041	<0.0037	<0.0036	<0.0035	<0.0039
Perfluoropentane sulfonic acid (PFPeS)	NCL	<0.0036	<0.0039	<0.004	<0.0038	<0.0035	<0.0037	<0.0035	<0.0039	<0.0037	<0.0037	<0.0041	<0.0037	<0.0036	<0.0035	<0.0039
Perfluorohexane sulfonic acid (PFHxS)	0.21	0.006	0.0063	0.0054	<0.0038	<0.0035	<0.0037	<0.0035	<0.0039	<0.0037	<0.0037	<0.0041	<0.0037	<0.0036	<0.0035	<0.0039
Perfluorobutanoic acid (PFBA)	NCL	0.0075	0.011	0.01	<0.0038	<0.0035	<0.0037	<0.0035	<0.0039	<0.0037	<0.0037	<0.0041	<0.0037	<0.0036	<0.0035	<0.0039
Perfluorodecanoic acid (PFDA)	NCL	<0.0036	<0.0039	<0.004	<0.0038	<0.0035	<0.0037	<0.0035	<0.0039	<0.0037	<0.0037	<0.0041	<0.0037	<0.0036	<0.0035	<0.0039
Perfluorododecanoic acid (PFDoDA)	NCL	<0.0036	<0.0039	<0.004	<0.0038	<0.0035	<0.0037	<0.0035	<0.0039	<0.0037	<0.0037	<0.0041	<0.0037	<0.0036	<0.0035	<0.0039
Perfluoroheptanoic acid (PFHpA)	NCL	<0.0036	<0.0039	<0.004	<0.0038	<0.0035	<0.0037	<0.0035	<0.0039	<0.0037	<0.0037	<0.0041	<0.0037	<0.0036	<0.0035	<0.0039
Perfluorohexanoic acid (PFHxA)	NA	<0.0036	<0.0039	<0.004	<0.0038	<0.0035	<0.0037	<0.0035	<0.0039	<0.0037	<0.0037	<0.0041	<0.0037	<0.0036	<0.0035	<0.0039
Perfluorononanoic acid (PFNA)	0.03	<0.0036	<0.0039	<0.004	<0.0038	<0.0035	<0.0037	<0.0035	<0.0039	<0.0037	<0.0037	<0.0041	<0.0037	<0.0036	<0.0035	<0.0039
Perfluorooctanoic acid (PFOA)	0.17	0.0062	0.01	0.0088	0.0039	<0.0035	<0.0037	<0.0035	<0.0039	<0.0037	<0.0037	<0.0041	<0.0037	<0.0036	<0.0035	<0.0039
Perfluorooctane sulfonic acid (PFOS)	0.012	***0.022***	***0.023***	***0.021***	***0.015***	<0.0035	<0.0037	<0.0035	<0.0039	<0.0037	<0.0037	<0.0041	<0.0037	<0.0036	<0.0035	<0.0039
PFOA + PFOS (Calculated)	NCL	0.028	0.033	0.03	0.019	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Perfluoropentanoic acid (PFPeA)	NCL	<0.0036	<0.0039	<0.004	<0.0038	<0.0035	<0.0037	<0.0035	<0.0039	<0.0037	<0.0037	<0.0041	<0.0037	<0.0036	<0.0035	<0.0039
Perfluorotetradecanoic acid (PFTeDA)	NCL	<0.0036	<0.0039	<0.004	<0.0038	<0.0035	<0.0037	<0.0035	<0.0039	<0.0037	<0.0037	<0.0041	<0.0037	<0.0036	<0.0035	<0.0039
Perfluorotridecanoic acid (PFTrDA)	NCL	<0.0036	<0.0039	<0.004	<0.0038	<0.0035	<0.0037	<0.0035	<0.0039	<0.0037	<0.0037	<0.0041	<0.0037	<0.0036	<0.0035	<0.0039
Perfluoroundecanoic acid (PFUnDA)	NCL	<0.0036	<0.0039	<0.004	<0.0038	<0.0035	<0.0037	<0.0035	<0.0039	<0.0037	<0.0037	<0.0041	<0.0037	<0.0036	<0.0035	<0.0039
Tetrafluoro-2-(heptafluoropropoxy)propanoic acid (GenX)	NA	<0.0072	<0.0078	<0.008	<0.0076	<0.007	<0.0074	<0.007	<0.0078	<0.0075	<0.0075	<0.0081	<0.0074	<0.0072	<0.007	<0.0077
Total PFAS (Calculated)	NCL	0.054	0.06	0.055	0.019	ND	ND	ND	ND	ND	ND	ND	ND	0.0049	0.004	0.0046

TABLE 5
SUMMARY OF MONITORING WELL GROUNDWATER SAMPLE ANALYSIS - PFAS
GSI Investigation
Algoma and Plainfield Townships, Kent County, MI

Area	Part 201 Generic Groundwater Cleanup Criteria - Groundwater Surface Water Interface[2]	Wolven Northeast	Wolven Northeast	Wolven Northeast	Wolven Northeast	Wolven Northeast	Wolven-North Childsdale	Wolven-North Childsdale	Wolven-North Childsdale	Wolven-North Childsdale	Wolven-North Childsdale	Wolven-North Childsdale	Wolven-North Childsdale	Wolven-North Childsdale	Wolven-North Childsdale	Wolven-North Childsdale
Monitoring Well		AREA19-MW-226B	AREA19-MW-7A	AREA19-MW-7A	AREA19-MW-7A	AREA19-MW-7A	WV/CH-MW-240	WV/CH-MW-240	WV/CH-MW-240	WV/CH-MW-240	WV/CH-MW-241A	WV/CH-MW-241A	WV/CH-MW-241A	WV/CH-MW-241A	WV/CH-MW-241B	WV/CH-MW-241B
Sample Name		AREA19-MW-226B	Area19-MW-7A	AREA19-MW-7A	AREA19-MW-7A	Area19-MW-7A	WV/CH-MV-240	WV/CH-MW-240	WV/CH-MW-240	WV/CH-MW-240	WV/CH-MW-241A	WV/CH-MW-241A	WV/CH-MW-241A	WV/CH-MW-241A	WV/CH-MW-241B	WV/CH-MW-241B
Screen Interval (feet below ground surface)		10-15	9.1-14.1	9.1-14.1	9.1-14.1	9.1-14.1	63.4-68.4	63.4-68.4	63.4-68.4	63.4-68.4	21.2-26.2	21.2-26.2	21.2-26.2	21.2-26.2	53.6-58.6	53.6-58.6
Laboratory Sample ID		ZA22017-014	YE26014-013	YH11018-011	YJ25065-006	ZA22017-003	YF02023-007	YH15005-004	YJ25065-019	ZA22017-020	YE24026-009	YH09033-004	YJ25065-012	ZA22017-021	YE24026-008	YH09033-002
Sample Date		01/11/2024	05/24/2023	08/10/2023	10/18/2023	01/09/2024	06/01/2023	08/11/2023	10/20/2023	01/11/2024	05/23/2023	08/08/2023	10/19/2023	01/17/2024	05/23/2023	08/08/2023
Parameter (µg/L)																
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	NCL	<0.0074	<0.0071	<0.0074	<0.0075	<0.0073 [H]	<0.0072	<0.0067	<0.0074	<0.0077	<0.0084	<0.0072	<0.0079	<0.0079	<0.0072	<0.0069
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CL-PF3OUdS)	NCL	<0.0074	<0.0071	<0.0074	<0.0075	<0.0073 [H]	<0.0072	<0.0067	<0.0074	<0.0077	<0.0084	<0.0072	<0.0079	<0.0079	<0.0072	<0.0069
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	NCL	<0.0074	<0.0071	<0.0074	<0.0075	<0.0073 [H]	<0.0072	<0.0067	<0.0074	<0.0077	<0.0084	<0.0072	<0.0079	<0.0079	<0.0072	<0.0069
1H,1H,2H,2H-perfluorohexane sulfonate (4:2FTS)	NCL	<0.0074	<0.0071	<0.0074	<0.0075	<0.0073 [H]	<0.0072	<0.0067	<0.0074	<0.0077	<0.0084	<0.0072	<0.0079	<0.0079	<0.0072	<0.0069
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	<0.0074	<0.0071	<0.0074	<0.0075	<0.0073 [H]	<0.0072	<0.0067	<0.0074	<0.0077	<0.0084	<0.0072	<0.0079	<0.0079	<0.0072	<0.0069
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	<0.0074	<0.0071	<0.0074	<0.0075	<0.0073 [H]	<0.0072	<0.0067	<0.0074	<0.0077	<0.0084	<0.0072	<0.0079	<0.0079	<0.0072	<0.0069
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	NCL	<0.0074	<0.0071	<0.0074	<0.0075	<0.0073 [H]	<0.0072	<0.0067	<0.0074	<0.0077	<0.0084	<0.0072	<0.0079	<0.0079	<0.0072	<0.0069
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	NCL	<0.0074	<0.0071	<0.0074	<0.0075	<0.0073 [H]	<0.0072	<0.0067	<0.0074	<0.0077	<0.0084	<0.0072	<0.0079	<0.0079	<0.0072	<0.0069
Perfluorobutane sulfonic acid (PFBS)	670	0.0042	0.011	0.008	0.0098	0.0085 [H]	0.024	0.022	0.027	0.02	0.0057	0.0043	0.0057	0.0044	<0.0036	<0.0034
Perfluorodecane sulfonic acid (PFDS)	NCL	<0.0037	<0.0035	<0.0037	<0.0038	<0.0036 [H]	<0.0036	<0.0034	<0.0037	<0.0038	<0.0042	<0.0036	<0.004	<0.0039	<0.0036	<0.0034
Perfluoroheptane sulfonic acid (PFHpS)	NCL	<0.0037	<0.0035	<0.0037	<0.0038	<0.0036 [H]	0.02	0.017	0.023	0.018	<0.0042	<0.0036	<0.004	<0.0039	<0.0036	<0.0034
Perfluorononane sulfonic acid (PFNS)	NCL	<0.0037	<0.0035	<0.0037	<0.0038	<0.0036 [H]	<0.0036	<0.0034	<0.0037	<0.0038	<0.0042	<0.0036	<0.004	<0.0039	<0.0036	<0.0034
Perfluorooctane sulfonamide (FOSA)	NCL	<0.0037	<0.0035	<0.0037	<0.0038	<0.0036 [H]	<0.0036	<0.0034	<0.0037	<0.0038	<0.0042	<0.0036	<0.004	<0.0039	<0.0036	<0.0034
Perfluoropentane sulfonic acid (PFPeS)	NCL	<0.0037	0.0062	<0.0037	<0.0038	<0.0036 [H]	0.0044	0.0038	0.0047	0.004	<0.0042	<0.0036	<0.004	<0.0039	<0.0036	<0.0034
Perfluorohexane sulfonic acid (PFHxS)	0.21	<0.0037	0.0052	0.0044	0.0048	0.0037 [H]	0.022	0.019	0.023	0.019	0.0043	0.0037	0.0052	<0.0039	<0.0036	<0.0034
Perfluorobutanoic acid (PFBA)	NCL	<0.0037	<0.0035	<0.0037	<0.0038	<0.0036 [H]	0.0045	0.0045	0.0061	0.0043	<0.0042	<0.0036	<0.004	<0.0039	<0.0036	<0.0034
Perfluorodecanoic acid (PFDA)	NCL	<0.0037	<0.0035	<0.0037	<0.0038	<0.0036 [H]	<0.0036	<0.0034	<0.0037	<0.0038	<0.0042	<0.0036	<0.004	<0.0039	<0.0036	<0.0034
Perfluorododecanoic acid (PFDoDA)	NCL	<0.0037	<0.0035	<0.0037	<0.0038	<0.0036 [H]	<0.0036	<0.0034	<0.0037	<0.0038	<0.0042	<0.0036	<0.004	<0.0039	<0.0036	<0.0034
Perfluoroheptanoic acid (PFHpA)	NCL	<0.0037	<0.0035	<0.0037	<0.0038	<0.0036 [H]	0.0092	0.0078	0.0092	0.009	<0.0042	0.0036	<0.004	<0.0039	<0.0036	<0.0034
Perfluorohexanoic acid (PFHxA)	NA	<0.0037	<0.0035	<0.0037	<0.0038	<0.0036 [H]	0.011	0.0081	0.0098	0.009	<0.0042	<0.0036	<0.004	<0.0039	<0.0036	<0.0034
Perfluorononanoic acid (PFNA)	0.03	<0.0037	<0.0035	<0.0037	<0.0038	<0.0036 [H]	<0.0036	<0.0034	<0.0037	<0.0038	<0.0042	<0.0036	<0.004	<0.0039	<0.0036	<0.0034
Perfluorooctanoic acid (PFOA)	0.17	<0.0037	0.013	0.012	0.013	0.0099 [H]	0.12	0.11	0.13	0.096	0.028	0.023	0.03	0.019	0.0053	0.0036
Perfluorooctane sulfonic acid (PFOS)	0.012	<0.0037	***0.013***	***0.014***	***0.017***	0.012 [H]	***0.13***	***0.12***	***0.14***	***0.12***	***0.026***	***0.023***	***0.028***	***0.023***	***0.031***	***0.025***
PFOA + PFOS (Calculated)	NCL	ND	0.026	0.026	0.03	0.022	0.25	0.23	0.27	0.22	0.054	0.046	0.058	0.042	0.036	0.029
Perfluoropentanoic acid (PFPeA)	NCL	<0.0037	<0.0035	<0.0037	<0.0038	<0.0036 [H]	<0.0036	<0.0034	<0.0037	<0.0038	<0.0042	<0.0036	<0.004	<0.0039	<0.0036	<0.0034
Perfluorotetradecanoic acid (PFTeDA)	NCL	<0.0037	<0.0035	<0.0037	<0.0038	<0.0036 [H]	<0.0036	<0.0034	<0.0037	<0.0038	<0.0042	<0.0036	<0.004	<0.0039	<0.0036	<0.0034
Perfluorotridecanoic acid (PFTrDA)	NCL	<0.0037	<0.0035	<0.0037	<0.0038	<0.0036 [H]	<0.0036	<0.0034	<0.0037	<0.0038	<0.0042	<0.0036	<0.004	<0.0039	<0.0036	<0.0034
Perfluoroundecanoic acid (PFUnDA)	NCL	<0.0037	<0.0035	<0.0037	<0.0038	<0.0036 [H]	<0.0036	<0.0034	<0.0037	<0.0038	<0.0042	<0.0036	<0.004	<0.0039	<0.0036	<0.0034
Tetrafluoro-2-(heptafluoropropoxy)propanoic acid (GenX)	NA	<0.0074	<0.0071	<0.0074	<0.0075	<0.0073 [H]	<0.0072	<0.0067	<0.0074	<0.0077	<0.0084	<0.0072	<0.0079	<0.0079	<0.0072	<0.0069
Total PFAS (Calculated)	NCL	0.0042	0.048	0.038	0.045	0.034	0.35	0.31	0.37	0.3	0.064	0.058	0.069	0.046	0.036	0.029

TABLE 5
SUMMARY OF MONITORING WELL GROUNDWATER SAMPLE ANALYSIS - PFAS
GSI Investigation
Algoma and Plainfield Townships, Kent County, MI

Area	Part 201 Generic Groundwater Cleanup Criteria - Groundwater Surface Water Interface[2]	Wolven-North Childsdale	Wolven-North Childsdale	Wolven-North Childsdale	Wolven-North Childsdale	Wolven-North Childsdale	Wolven-North Childsdale	Wolven-North Childsdale	Wolven-North Childsdale	Wolven-North Childsdale	Wolven-North Childsdale	House Street Property South/Southeast	House Street Property South/Southeast	House Street Property South/Southeast	House Street Property South/Southeast	House Street Property South/Southeast
Monitoring Well		WV/CH-MW-241B	WV/CH-MW-241B	WV/CH-MW-242A	WV/CH-MW-242A	WV/CH-MW-242A	WV/CH-MW-242A	WV/CH-MW-242B	WV/CH-MW-242B	WV/CH-MW-242B	WV/CH-MW-242B	HS-MW-19S	HS-MW-19D	HS-MW-29A	HS-MW-29A	HS-MW-29A
Sample Name		WV/CH-MW-241B	WV/CH-MW-241B	WV/CH-MW-242A	WV/CHW-MW-242A	WV/CH-MW-242A	WV/CH-MW-242A	WV/CH-MW-242B	WV/CH-MW-242B	WV/CH-MW-242B	WV/CH-MW-242B	HS-MW-19S	HS-MW-19D	HS-MW-29A	HS-MW-29A-DUP	HS-MW-29A
Screen Interval (feet below ground surface)		53.6-58.6	53.6-58.6	40.4-45.4	40.4-45.4	40.4-45.4	40.4-45.4	64.8-69.8	64.8-69.8	64.8-69.8	64.8-69.8	58.4-61.4	85.9-95.9	3.5-13.5	3.5-13.5	3.5-13.5
Laboratory Sample ID		YJ25065-011	ZA22017-022	YE24026-006	YH11018-008	YJ19021-017	ZA22017-011	YE24026-007	YH11018-001	YJ19021-018	ZA22017-012	VL11070-008	VL11070-009	VL11070-005	VL11070-006	YE26014-004
Sample Date		10/19/2023	01/17/2024	05/23/2023	08/09/2023	10/18/2023	01/10/2024	05/23/2023	08/09/2023	10/18/2023	01/10/2024	12/09/2020	12/09/2020	12/09/2020	12/09/2020	05/25/2023
Parameter (µg/L)																
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	NCL	<0.0079	<0.008	<0.007	<0.0072	<0.0069	<0.0078	<0.0076	<0.0072	<0.0072	<0.0074	<0.007	<0.0067	<0.0072	<0.0072	<0.0078
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CL-PF3OUdS)	NCL	<0.0079	<0.008	<0.007	<0.0072	<0.0069	<0.0078	<0.0076	<0.0072	<0.0072	<0.0074	<0.007	<0.0067	<0.0072	<0.0072	<0.0078
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	NCL	<0.0079	<0.008	<0.007	<0.0072	<0.0069	<0.0078	<0.0076	<0.0072	<0.0072	<0.0074	<0.007	<0.0067	<0.0072	<0.0072	<0.0078
1H,1H,2H,2H-perfluorohexane sulfonate (4:2FTS)	NCL	<0.0079	<0.008	<0.007	<0.0072	<0.0069	<0.0078	<0.0076	<0.0072	<0.0072	<0.0074	<0.007	<0.0067	<0.0072	<0.0072	<0.0078
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	<0.0079	<0.008	<0.007	<0.0072	<0.0069	<0.0078	<0.0076	<0.0072	<0.0072	<0.0074	<0.007	<0.0067	<0.0072	<0.0072	<0.0078
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	<0.0079	<0.008	<0.007	<0.0072	<0.0069	<0.0078	<0.0076	<0.0072	<0.0072	<0.0074	<0.007	<0.0067	<0.0072	<0.0072	<0.0078
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	NCL	<0.0079	<0.008	<0.007	<0.0072	<0.0069	<0.0078	<0.0076	<0.0072	<0.0072	<0.0074	<0.007	<0.0067	<0.0072	<0.0072	<0.0078
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	NCL	<0.0079	<0.008	<0.007	<0.0072	<0.0069	<0.0078	<0.0076	<0.0072	<0.0072	<0.0074	<0.007	<0.0067	<0.0072	<0.0072	<0.0078
Perfluorobutane sulfonic acid (PFBS)	670	<0.004	<0.004	<0.0035	<0.0036	<0.0035	<0.0039	<0.0038	<0.0036	<0.0036	<0.0037	<0.0035	<0.0034	0.012	0.012	0.011
Perfluorodecane sulfonic acid (PFDS)	NCL	<0.004	<0.004	<0.0035	<0.0036	<0.0035	<0.0039	<0.0038	<0.0036	<0.0036	<0.0037	<0.0035	<0.0034	<0.0036	<0.0036	<0.0039
Perfluoroheptane sulfonic acid (PFHpS)	NCL	<0.004	<0.004	<0.0035	<0.0036	<0.0035	<0.0039	<0.0038	<0.0036	<0.0036	<0.0037	<0.0035	<0.0034	0.0066	0.0058	0.013
Perfluorononane sulfonic acid (PFNS)	NCL	<0.004	<0.004	<0.0035	<0.0036	<0.0035	<0.0039	<0.0038	<0.0036	<0.0036	<0.0037	<0.0035	<0.0034	<0.0036	<0.0036	<0.0039
Perfluorooctane sulfonamide (FOSA)	NCL	<0.004	<0.004	<0.0035	<0.0036	<0.0035	<0.0039	<0.0038	<0.0036	<0.0036	<0.0037	<0.0035	<0.0034	<0.0036	<0.0036	<0.0039
Perfluoropentane sulfonic acid (PFPeS)	NCL	<0.004	<0.004	<0.0035	<0.0036	<0.0035	<0.0039	<0.0038	<0.0036	<0.0036	<0.0037	<0.0035	<0.0034	0.0036	0.0036	0.0064
Perfluorohexane sulfonic acid (PFHxS)	0.21	<0.004	<0.004	<0.0035	<0.0036	<0.0035	<0.0039	<0.0038	<0.0036	<0.0036	<0.0037	<0.0035	<0.0034	0.02	0.023	0.035
Perfluorobutanoic acid (PFBA)	NCL	<0.004	<0.004	<0.0035	<0.0036	<0.0035	<0.0039	<0.0038	<0.0036	<0.0036	<0.0037	<0.0035	<0.0034	0.01	0.01	0.0082
Perfluorodecanoic acid (PFDA)	NCL	<0.004	<0.004	<0.0035	<0.0036	<0.0035	<0.0039	<0.0038	<0.0036	<0.0036	<0.0037	<0.0035	<0.0034	<0.0036	<0.0036	<0.0039
Perfluorododecanoic acid (PFDoDA)	NCL	<0.004	<0.004	<0.0035	<0.0036	<0.0035	<0.0039	<0.0038	<0.0036	<0.0036	<0.0037	<0.0035	<0.0034	<0.0036	<0.0036	<0.0039
Perfluoroheptanoic acid (PFHpA)	NCL	<0.004	<0.004	<0.0035	<0.0036	<0.0035	<0.0039	<0.0038	<0.0036	<0.0036	<0.0037	<0.0035	<0.0034	0.0056	0.0053	0.0063
Perfluorohexanoic acid (PFHxA)	NA	<0.004	<0.004	<0.0035	<0.0036	<0.0035	<0.0039	<0.0038	<0.0036	<0.0036	<0.0037	<0.0035	<0.0034	0.017	0.017	0.015
Perfluorononanoic acid (PFNA)	0.03	<0.004	<0.004	<0.0035	<0.0036	<0.0035	<0.0039	<0.0038	<0.0036	<0.0036	<0.0037	<0.0035	<0.0034	<0.0036	<0.0036	<0.0039
Perfluorooctanoic acid (PFOA)	0.17	<0.004	<0.004	<0.0035	<0.0036	<0.0035	<0.0039	<0.0038	<0.0036	<0.0036	<0.0037	<0.0035	<0.0034	0.03	0.029	0.046
Perfluorooctane sulfonic acid (PFOS)	0.012	***0.023***	***0.022***	<0.0035	<0.0036	<0.0035	<0.0039	<0.0038	<0.0036	<0.0036	<0.0037	<0.0035	<0.0034	***0.28***	***0.29***	***0.46***
PFOA + PFOS (Calculated)	NCL	0.023	0.022	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.31	0.32	0.51
Perfluoropentanoic acid (PFPeA)	NCL	<0.004	<0.004	<0.0035	<0.0036	<0.0035	<0.0039	<0.0038	<0.0036	<0.0036	<0.0037	<0.0035	<0.0034	0.0099	0.011	0.0078
Perfluorotetradecanoic acid (PFTeDA)	NCL	<0.004	<0.004	<0.0035	<0.0036	<0.0035	<0.0039	<0.0038	<0.0036	<0.0036	<0.0037	<0.0035	<0.0034	<0.0036	<0.0036	<0.0039
Perfluorotridecanoic acid (PFTrDA)	NCL	<0.004	<0.004	<0.0035	<0.0036	<0.0035	<0.0039	<0.0038	<0.0036	<0.0036	<0.0037	<0.0035	<0.0034	<0.0036	<0.0036	<0.0039
Perfluoroundecanoic acid (PFUnDA)	NCL	<0.004	<0.004	<0.0035	<0.0036	<0.0035	<0.0039	<0.0038	<0.0036	<0.0036	<0.0037	<0.0035	<0.0034	<0.0036	<0.0036	<0.0039
Tetrafluoro-2-(heptafluoropropoxy)propanoic acid (GenX)	NA	<0.0079	<0.008	<0.007	<0.0072	<0.0069	<0.0078	<0.0076	<0.0072	<0.0072	<0.0074	<0.007	<0.0067	<0.0072	<0.0072	<0.0078
Total PFAS (Calculated)	NCL	0.023	0.022	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.39	0.41	0.61

TABLE 5
SUMMARY OF MONITORING WELL GROUNDWATER SAMPLE ANALYSIS - PFAS
GSI Investigation
Algoma and Plainfield Townships, Kent County, MI

Area	Part 201 Generic Groundwater Cleanup Criteria - Groundwater Surface Water Interface[2]	House Street Property South/Southeast	House Street Property South/Southeast	House Street Property South/Southeast	House Street Property South/Southeast	House Street Property South/Southeast	House Street Property South/Southeast	House Street Property South/Southeast	House Street Property South/Southeast	House Street Property South/Southeast	House Street Property South/Southeast	House Street Property South/Southeast	House Street Property South/Southeast	House Street Property South/Southeast	House Street Property South/Southeast
Monitoring Well		HS-MW-29A	HS-MW-29A	HS-MW-29A	HS-MW-260	HS-MW-260	HS-MW-260	HS-MW-260	HS-MW-261	HS-MW-261	HS-MW-261	HS-MW-261	HS-MW-262	HS-MW-262	HS-MW-262
Sample Name		HS-MW-29A	HS-MW-29A	HS-MW-29A	HS-MW-260	HS-MW-260	HS-MW-260	HS-MW-260	HS-MW-261	HS-MW-261	HS-MW-261	HS-MW-261	HS-MW-262	HS-MW-262	HS-MW-262	HS-MW-262
Screen Interval (feet below ground surface)		3.5-13.5	3.5-13.5	3.5-13.5	5.1-10.1	5.1-10.1	5.1-10.1	5.1-10.1	4.4-9.4	4.4-9.4	4.4-9.4	4.4-9.4	4-9	4-9	4-9	4-9
Laboratory Sample ID		YH11018-012	YJ25065-015	ZA22017-019	YE26014-003	YH11018-013	YJ19021-013	ZA22017-016	YE26014-005	YH11018-015	YJ19021-011	ZA27003-009	YE26014-006	YH11018-016	YJ19021-012	ZA27003-006
Sample Date		08/10/2023	10/19/2023	01/11/2024	05/25/2023	08/10/2023	10/17/2023	01/11/2024	05/25/2023	08/10/2023	10/17/2023	01/22/2024	05/25/2023	08/10/2023	10/17/2023	01/22/2024
Parameter (µg/L)																
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	NCL	<0.0068	<0.0077	<0.0077	<0.007	<0.007	<0.0077	<0.0073	<0.0071	<0.0068	<0.0073	<0.0076	<0.0071	<0.0071	<0.0073	<0.0079
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CL-PF3OUdS)	NCL	<0.0068	<0.0077	<0.0077	<0.007	<0.007	<0.0077	<0.0073	<0.0071	<0.0068	<0.0073	<0.0076	<0.0071	<0.0071	<0.0073	<0.0079
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	NCL	<0.0068	<0.0077	<0.0077	<0.007	<0.007	<0.0077	<0.0073	<0.0071	<0.0068	<0.0073	<0.0076	<0.0071	<0.0071	<0.0073	<0.0079
1H,1H,2H,2H-perfluorohexane sulfonate (4:2FTS)	NCL	<0.0068	<0.0077	<0.0077	<0.007	<0.007	<0.0077	<0.0073	<0.0071	<0.0068	<0.0073	<0.0076	<0.0071	<0.0071	<0.0073	<0.0079
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	<0.0068	<0.0077	<0.0077	<0.007	<0.007	<0.0077	<0.0073	<0.0071	<0.0068	<0.0073	<0.0076	<0.0071	<0.0071	<0.0073	<0.0079
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	<0.0068	<0.0077	<0.0077	<0.007	<0.007	<0.0077	<0.0073	<0.0071	<0.0068	<0.0073	<0.0076	<0.0071	<0.0071	<0.0073	<0.0079
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	NCL	<0.0068	<0.0077	<0.0077	<0.007	<0.007	<0.0077	<0.0073	<0.0071	<0.0068	<0.0073	<0.0076	<0.0071	<0.0071	<0.0073	<0.0079
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	NCL	<0.0068	<0.0077	<0.0077	<0.007	<0.007	<0.0077	<0.0073	<0.0071	<0.0068	<0.0073	<0.0076	<0.0071	<0.0071	<0.0073	<0.0079
Perfluorobutane sulfonic acid (PFBS)	670	0.01	0.012	0.0097	0.0072	0.0069	0.0067	0.01	0.015	0.019	0.021	0.018	0.06	0.065	0.074	0.044
Perfluorodecane sulfonic acid (PFDS)	NCL	<0.0034	<0.0039	<0.0038	<0.0035	<0.0035	<0.0039	<0.0036	<0.0036	<0.0034	<0.0036	<0.0038	<0.0035	<0.0036	<0.0037	<0.0039
Perfluoroheptane sulfonic acid (PFHpS)	NCL	0.0096	0.0093	0.0062	<0.0035	<0.0035	<0.0039	0.0048	0.035	0.013	0.019	0.023	<0.0035	<0.0036	<0.0037	<0.0039
Perfluorononane sulfonic acid (PFNS)	NCL	<0.0034	<0.0039	<0.0038	<0.0035	<0.0035	<0.0039	<0.0036	<0.0036	<0.0034	<0.0036	<0.0038	<0.0035	<0.0036	<0.0037	<0.0039
Perfluorooctane sulfonamide (FOSA)	NCL	<0.0034	<0.0039	<0.0038	<0.0035	<0.0035	<0.0039	<0.0036	<0.0036	<0.0034	<0.0036	<0.0038	<0.0035	<0.0036	<0.0037	<0.0039
Perfluoropentane sulfonic acid (PFPeS)	NCL	0.0068	0.0076	0.0064	<0.0035	0.0036	0.0039	0.004	0.014	0.015	0.016	0.015	0.057	0.062	0.061	0.04
Perfluorohexane sulfonic acid (PFHxS)	0.21	0.03	0.035	0.027	0.0095	0.0064	0.014	0.013	0.099	0.048	0.057	0.064	0.082	0.078	0.072	0.061
Perfluorobutanoic acid (PFBA)	NCL	0.0074	0.0077	0.006	<0.0035	<0.0035	0.0043	<0.0036	0.0085	0.0066	0.0079	0.0079	0.016	0.016	0.016	0.012
Perfluorodecanoic acid (PFDA)	NCL	<0.0034	<0.0039	<0.0038	<0.0035	<0.0035	<0.0039	<0.0036	<0.0036	<0.0034	<0.0036	<0.0038	<0.0035	<0.0036	<0.0037	<0.0039
Perfluorododecanoic acid (PFDoDA)	NCL	<0.0034	<0.0039	<0.0038	<0.0035	<0.0035	<0.0039	<0.0036	<0.0036	<0.0034	<0.0036	<0.0038	<0.0035	<0.0036	<0.0037	<0.0039
Perfluoroheptanoic acid (PFHpA)	NCL	0.0057	0.0049	0.005	<0.0035	<0.0035	<0.0039	<0.0036	0.011	0.0063	0.0071	0.0097	0.028	0.035	0.031	0.023
Perfluorohexanoic acid (PFHxA)	NA	0.012	0.012	0.0091	0.0072	0.0053	0.0077	0.0048	0.017	0.0098	0.012	0.014	0.029	0.034	0.036	0.022
Perfluorononanoic acid (PFNA)	0.03	<0.0034	<0.0039	<0.0038	<0.0035	<0.0035	<0.0039	<0.0036	<0.0036	<0.0034	<0.0036	<0.0038	<0.0035	<0.0036	<0.0037	<0.0039
Perfluorooctanoic acid (PFOA)	0.17	0.041	0.036	0.034	0.0082	0.0049	0.011	0.012	0.082	0.036	0.044	0.056	0.081	0.097	0.09	0.084
Perfluorooctane sulfonic acid (PFOS)	0.012	***0.39***	***0.36***	***0.31***	***0.19***	***0.1***	***0.17***	***0.23***	***0.98***	***0.4***	***0.64***	***0.71***	***0.014***	0.012	0.012	***0.015***
PFOA + PFOS (Calculated)	NCL	0.43	0.4	0.34	0.2	0.1	0.18	0.24	1.1	0.44	0.68	0.77	0.095	0.11	0.1	0.099
Perfluoropentanoic acid (PFPeA)	NCL	0.0066	0.0066	0.006	<0.0035	<0.0035	0.0039	<0.0036	0.009	0.0049	0.0056	0.0078	0.013	0.018	0.017	0.013
Perfluorotetradecanoic acid (PFTeDA)	NCL	<0.0034	<0.0039	<0.0038	<0.0035	<0.0035	<0.0039	<0.0036	<0.0036	<0.0034	<0.0036	<0.0038	<0.0035	<0.0036	<0.0037	<0.0039
Perfluorotridecanoic acid (PFTrDA)	NCL	<0.0034	<0.0039	<0.0038	<0.0035	<0.0035	<0.0039	<0.0036	<0.0036	<0.0034	<0.0036	<0.0038	<0.0035	<0.0036	<0.0037	<0.0039
Perfluoroundecanoic acid (PFUnDA)	NCL	<0.0034	<0.0039	<0.0038	<0.0035	<0.0035	<0.0039	<0.0036	<0.0036	<0.0034	<0.0036	<0.0038	<0.0035	<0.0036	<0.0037	<0.0039
Tetrafluoro-2-(heptafluoropropoxy)propanoic acid (GenX)	NA	<0.0068	<0.0077	<0.0077	<0.007	<0.007	<0.0077	<0.0073	<0.0071	<0.0068	<0.0073	<0.0076	<0.0071	<0.0071	<0.0073	<0.0079
Total PFAS (Calculated)	NCL	0.52	0.49	0.42	0.22	0.13	0.22	0.28	1.3	0.56	0.83	0.93	0.38	0.42	0.41	0.31

TABLE 5
SUMMARY OF MONITORING WELL GROUNDWATER SAMPLE ANALYSIS - PFAS
GSI Investigation
Algoma and Plainfield Townships, Kent County, MI

Area	Part 201 Generic Groundwater Cleanup Criteria - Groundwater Surface Water Interface[2]	House Street Property South/Southeast	House Street Property South/Southeast	House Street Property South/Southeast	House Street Property South/Southeast	House Street Property South/Southeast	House Street Property South/Southeast	House Street Property South/Southeast	House Street Property South/Southeast	House Street Property South/Southeast	House Street Property South/Southeast	House Street Property South/Southeast	House Street Property South/Southeast	House Street Property South/Southeast	House Street Property South/Southeast	House Street Property South/Southeast
Monitoring Well		HS-MW-263A	HS-MW-263A	HS-MW-263A	HS-MW-263A	HS-MW-263B	HS-MW-263B	HS-MW-263B	HS-MW-263B	HS-MW-264	HS-MW-264	HS-MW-264	HS-MW-264	HS-MW-264	HS-MW-265	HS-MW-265
Sample Name		HS-MW-263A	HS-MW-263A	HS-MW-263A	HS-MW-263A	HS-MW-263B	HS-MW-263B	HS-MW-263B	HS-MW-263B	HS-MW-264	HS-MW-264	HS-MW-264	HS-MW-264	HS-MW-264-DUP	HS-MW-265	HS-MW-265
Screen Interval (feet below ground surface)		4.9-9.9	4.9-9.9	4.9-9.9	4.9-9.9	42.1-47.1	42.1-47.1	42.1-47.1	42.1-47.1	25.4-30.4	25.4-30.4	25.4-30.4	25.4-30.4	25.4-30.4	10.5-15.5	10.5-15.5
Laboratory Sample ID		YE31016-005	YH09033-009	YJ25065-017	ZA27002-030	YE31016-006	YH09033-006	YJ25065-018	ZA27003-001	YE24026-010	YH15005-003	YJ19021-007	ZA27003-011	ZA27003-007	YE31016-007	YH11018-017
Sample Date		05/30/2023	08/08/2023	10/20/2023	01/24/2024	05/30/2023	08/08/2023	10/20/2023	01/24/2024	05/23/2023	08/11/2023	10/17/2023	01/25/2024	01/25/2024	05/30/2023	08/10/2023
Parameter (µg/L)																
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	NCL	<0.0081	<0.0071	<0.0075	<0.0074	<0.0068	<0.0074	<0.0081	<0.0076	<0.0071	<0.0072	<0.0077	<0.0073	<0.0072	<0.0075	<0.0072
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CL-PF3OUdS)	NCL	<0.0081	<0.0071	<0.0075	<0.0074	<0.0068	<0.0074	<0.0081	<0.0076	<0.0071	<0.0072	<0.0077	<0.0073	<0.0072	<0.0075	<0.0072
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	NCL	<0.0081	<0.0071	<0.0075	<0.0074	<0.0068	<0.0074	<0.0081	<0.0076	<0.0071	<0.0072	<0.0077	<0.0073	<0.0072	<0.0075	<0.0072
1H,1H,2H,2H-perfluorohexane sulfonate (4:2FTS)	NCL	<0.0081	<0.0071	<0.0075	<0.0074	<0.0068	<0.0074	<0.0081	<0.0076	<0.0071	<0.0072	<0.0077	<0.0073	<0.0072	<0.0075	<0.0072
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	<0.0081	<0.0071	<0.0075	<0.0074	<0.0068	<0.0074	<0.0081	<0.0076	<0.0071	<0.0072	<0.0077	<0.0073	<0.0072	<0.0075	<0.0072
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	<0.0081	<0.0071	<0.0075	<0.0074	<0.0068	<0.0074	<0.0081	<0.0076	<0.0071	<0.0072	<0.0077	<0.0073	<0.0072	<0.0075	<0.0072
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	NCL	<0.0081	<0.0071	<0.0075	<0.0074	<0.0068	<0.0074	<0.0081	<0.0076	<0.0071	<0.0072	<0.0077	<0.0073	<0.0072	<0.0075	<0.0072
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	NCL	<0.0081	<0.0071	<0.0075	<0.0074	<0.0068	<0.0074	<0.0081	<0.0076	<0.0071	<0.0072	<0.0077	<0.0073	<0.0072	<0.0075	<0.0072
Perfluorobutane sulfonic acid (PFBS)	670	0.0044	0.005	0.0042	<0.0037	0.0065	0.0051	0.0062	0.0052	0.0039	0.0039	0.0042	0.0037	0.0043	0.011	0.0071
Perfluorodecane sulfonic acid (PFDS)	NCL	<0.004	<0.0036	<0.0038	<0.0037	<0.0034	<0.0037	<0.004	<0.0038	<0.0035	<0.0036	<0.0038	<0.0037	<0.0036	<0.0038	<0.0036
Perfluoroheptane sulfonic acid (PFHpS)	NCL	<0.004	<0.0036	<0.0038	<0.0037	<0.0034	<0.0037	<0.004	<0.0038	<0.0035	<0.0036	<0.0038	<0.0037	<0.0036	<0.0038	<0.0036
Perfluorononane sulfonic acid (PFNS)	NCL	<0.004	<0.0036	<0.0038	<0.0037	<0.0034	<0.0037	<0.004	<0.0038	<0.0035	<0.0036	<0.0038	<0.0037	<0.0036	<0.0038	<0.0036
Perfluorooctane sulfonamide (FOSA)	NCL	<0.004	<0.0036	<0.0038	<0.0037	<0.0034	<0.0037	<0.004	<0.0038	<0.0035	<0.0036	<0.0038	<0.0037	<0.0036	<0.0038	<0.0036
Perfluoropentane sulfonic acid (PFPeS)	NCL	<0.004	<0.0036	<0.0038	<0.0037	<0.0034	<0.0037	<0.004	<0.0038	<0.0035	<0.0036	<0.0038	<0.0037	<0.0036	<0.0038	<0.0036
Perfluorohexane sulfonic acid (PFHxS)	0.21	<0.004	<0.0036	<0.0038	<0.0037	<0.0034	<0.0037	<0.004	<0.0038	0.0052	0.0039	0.0039	<0.0037	<0.0036	<0.0038	<0.0036
Perfluorobutanoic acid (PFBA)	NCL	0.004	<0.0036	<0.0038	<0.0037	<0.0034	0.0037	0.0046	<0.0038	<0.0035	<0.0036	<0.0038	<0.0037	<0.0036	<0.0038	<0.0036
Perfluorodecanoic acid (PFDA)	NCL	<0.004	<0.0036	<0.0038	<0.0037	<0.0034	<0.0037	<0.004	<0.0038	<0.0035	<0.0036	<0.0038	<0.0037	<0.0036	<0.0038	<0.0036
Perfluorododecanoic acid (PFDoDA)	NCL	<0.004	<0.0036	<0.0038	<0.0037	<0.0034	<0.0037	<0.004	<0.0038	<0.0035	<0.0036	<0.0038	<0.0037	<0.0036	<0.0038	<0.0036
Perfluoroheptanoic acid (PFHpA)	NCL	<0.004	<0.0036	<0.0038	<0.0037	<0.0034	<0.0037	<0.004	<0.0038	<0.0035	<0.0036	<0.0038	<0.0037	<0.0036	<0.0038	<0.0036
Perfluorohexanoic acid (PFHxA)	NA	<0.004	<0.0036	<0.0038	<0.0037	<0.0034	<0.0037	<0.004	<0.0038	<0.0035	<0.0036	<0.0038	<0.0037	<0.0036	<0.0038	<0.0036
Perfluorononanoic acid (PFNA)	0.03	<0.004	<0.0036	<0.0038	<0.0037	<0.0034	<0.0037	<0.004	<0.0038	<0.0035	<0.0036	<0.0038	<0.0037	<0.0036	<0.0038	<0.0036
Perfluorooctanoic acid (PFOA)	0.17	<0.004	0.0065	0.0041	<0.0037	0.0045	<0.0037	<0.004	<0.0038	<0.0035	<0.0036	<0.0038	<0.0037	<0.0036	<0.0038	<0.0036
Perfluorooctane sulfonic acid (PFOS)	0.012	0.0064	0.0083	0.0081	0.0051	0.0048	0.0038	<0.004	<0.0038	<0.0035	<0.0036	<0.0038	<0.0037	<0.0036	<0.0038	<0.0036
PFOA + PFOS (Calculated)	NCL	0.0064	0.015	0.012	0.0051	0.0093	0.0038	ND	ND	ND	ND	ND	ND	ND	ND	ND
Perfluoropentanoic acid (PFPeA)	NCL	<0.004	<0.0036	<0.0038	<0.0037	<0.0034	<0.0037	<0.004	<0.0038	<0.0035	<0.0036	<0.0038	<0.0037	<0.0036	<0.0038	<0.0036
Perfluorotetradecanoic acid (PFTeDA)	NCL	<0.004	<0.0036	<0.0038	<0.0037	<0.0034	<0.0037	<0.004	<0.0038	<0.0035	<0.0036	<0.0038	<0.0037	<0.0036	<0.0038	<0.0036
Perfluorotridecanoic acid (PFTrDA)	NCL	<0.004	<0.0036	<0.0038	<0.0037	<0.0034	<0.0037	<0.004	<0.0038	<0.0035	<0.0036	<0.0038	<0.0037	<0.0036	<0.0038	<0.0036
Perfluoroundecanoic acid (PFUnDA)	NCL	<0.004	<0.0036	<0.0038	<0.0037	<0.0034	<0.0037	<0.004	<0.0038	<0.0035	<0.0036	<0.0038	<0.0037	<0.0036	<0.0038	<0.0036
Tetrafluoro-2-(heptafluoropropoxy)propanoic acid (GenX)	NA	<0.0081	<0.0071	<0.0075	<0.0074	<0.0068	<0.0074	<0.0081	<0.0076	<0.0071	<0.0072	<0.0077	<0.0073	<0.0072	<0.0075	<0.0072
Total PFAS (Calculated)	NCL	0.015	0.02	0.016	0.0051	0.016	0.013	0.011	0.0052	0.0091	0.0078	0.0081	0.0037	0.0043	0.011	0.0071

TABLE 5
SUMMARY OF MONITORING WELL GROUNDWATER SAMPLE ANALYSIS - PFAS
GSI Investigation
Algoma and Plainfield Townships, Kent County, MI

Area	Part 201 Generic Groundwater Cleanup Criteria - Groundwater Surface Water Interface[2]	House Street Property South/Southeast	House Street Property South/Southeast	House Street Property South/Southeast	House Street Property South/Southeast	House Street Property South/Southeast	House Street Property South/Southeast	House Street Property South/Southeast	House Street Property South/Southeast	House Street Property South/Southeast	House Street Property South/Southeast
Monitoring Well		HS-MW-265	HS-MW-265	HS-MW-266A	HS-MW-266A	HS-MW-266A	HS-MW-266A	HS-MW-266B	HS-MW-266B	HS-MW-266B	HS-MW-266B
Sample Name		HS-MW-265	HS-MW-265	HS-MW-266A	HS-MW-266A	HS-MW-266A	HS-MW-266A	HS-MW-266B	HS-MW-266B	HS-MW-266B	HS-MW-266B
Screen Interval (feet below ground surface)		10.5-15.5	10.5-15.5	10.2-15.2	10.2-15.2	10.2-15.2	10.2-15.2	50-55	50-55	50-55	50-55
Laboratory Sample ID		YJ25065-020	ZA22017-015	YE26014-002	YH09029-001	YJ19021-006	ZA27003-008	YE26014-001	YH09029-002	YJ19021-008	ZA27003-010
Sample Date		10/20/2023	01/11/2024	05/25/2023	08/07/2023	10/17/2023	01/23/2024	05/25/2023	08/07/2023	10/17/2023	01/23/2024
Parameter (µg/L)											
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	NCL	<0.0075	<0.0079	<0.0072	<0.0073	<0.0073	<0.007	<0.0072	<0.007	<0.0075	<0.007
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CL-PF3OUdS)	NCL	<0.0075	<0.0079	<0.0072	<0.0073	<0.0073	<0.007	<0.0072	<0.007	<0.0075	<0.007
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	NCL	<0.0075	<0.0079	<0.0072	<0.0073	<0.0073	<0.007	<0.0072	<0.007	<0.0075	<0.007
1H,1H,2H,2H-perfluorohexane sulfonate (4:2FTS)	NCL	<0.0075	<0.0079	<0.0072	<0.0073	<0.0073	<0.007	<0.0072	<0.007	<0.0075	<0.007
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	<0.0075	<0.0079	<0.0072	<0.0073	<0.0073	<0.007	<0.0072	<0.007	<0.0075	<0.007
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	<0.0075	<0.0079	<0.0072	<0.0073	<0.0073	<0.007	<0.0072	<0.007	<0.0075	<0.007
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	NCL	<0.0075	<0.0079	<0.0072	<0.0073	<0.0073	<0.007	<0.0072	<0.007	<0.0075	<0.007
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	NCL	<0.0075	<0.0079	<0.0072	<0.0073	<0.0073	<0.007	<0.0072	<0.007	<0.0075	<0.007
Perfluorobutane sulfonic acid (PFBS)	670	0.01	0.0085	0.01	0.0097	0.0095	0.0099	0.0085	0.011	0.0096	0.008
Perfluorodecane sulfonic acid (PFDS)	NCL	<0.0038	<0.004	<0.0036	<0.0037	<0.0036	<0.0035	<0.0036	<0.0035	<0.0037	<0.0035
Perfluoroheptane sulfonic acid (PFHpS)	NCL	<0.0038	<0.004	<0.0036	<0.0037	<0.0036	<0.0035	<0.0036	<0.0035	<0.0037	<0.0035
Perfluorononane sulfonic acid (PFNS)	NCL	<0.0038	<0.004	<0.0036	<0.0037	<0.0036	<0.0035	<0.0036	<0.0035	<0.0037	<0.0035
Perfluorooctane sulfonamide (FOSA)	NCL	<0.0038	<0.004	<0.0036	<0.0037	<0.0036	<0.0035	<0.0036	<0.0035	<0.0037	<0.0035
Perfluoropentane sulfonic acid (PFPeS)	NCL	<0.0038	<0.004	0.0052	0.0053	0.0048	0.0057	0.0045	0.0057	0.005	0.004
Perfluorohexane sulfonic acid (PFHxS)	0.21	<0.0038	<0.004	0.0047	0.0045	0.004	<0.0035	0.0046	0.0041	0.0038	0.0038
Perfluorobutanoic acid (PFBA)	NCL	<0.0038	<0.004	0.004	<0.0037	<0.0036	<0.0035	<0.0036	0.0044	<0.0037	<0.0035
Perfluorodecanoic acid (PFDA)	NCL	<0.0038	<0.004	<0.0036	<0.0037	<0.0036	<0.0035	<0.0036	<0.0035	<0.0037	<0.0035
Perfluorododecanoic acid (PFDoDA)	NCL	<0.0038	<0.004	<0.0036	<0.0037	<0.0036	<0.0035	<0.0036	<0.0035	<0.0037	<0.0035
Perfluoroheptanoic acid (PFHpA)	NCL	<0.0038	<0.004	0.0038	<0.0037	<0.0036	<0.0035	<0.0036	0.0042	<0.0037	<0.0035
Perfluorohexanoic acid (PFHxA)	NA	<0.0038	<0.004	0.0057	0.0048	0.0044	0.0046	0.0044	0.0071	0.0049	<0.0035
Perfluorononanoic acid (PFNA)	0.03	<0.0038	<0.004	<0.0036	<0.0037	<0.0036	<0.0035	<0.0036	<0.0035	<0.0037	<0.0035
Perfluorooctanoic acid (PFOA)	0.17	<0.0038	<0.004	0.0044	0.0039	<0.0036	0.0038	<0.0036	0.0041	<0.0037	<0.0035
Perfluorooctane sulfonic acid (PFOS)	0.012	<0.0038	<0.004	<0.0036	<0.0037	<0.0036	<0.0035	<0.0036	<0.0035	<0.0037	<0.0035
PFOA + PFOS (Calculated)	NCL	ND	ND	0.0044	0.0039	ND	0.0038	ND	0.0041	ND	ND
Perfluoropentanoic acid (PFPeA)	NCL	<0.0038	<0.004	<0.0036	<0.0037	<0.0036	<0.0035	<0.0036	0.0037	<0.0037	<0.0035
Perfluorotetradecanoic acid (PFTeDA)	NCL	<0.0038	<0.004	<0.0036	<0.0037	<0.0036	<0.0035	<0.0036	<0.0035	<0.0037	<0.0035
Perfluorotridecanoic acid (PFTrDA)	NCL	<0.0038	<0.004	<0.0036	<0.0037	<0.0036	<0.0035	<0.0036	<0.0035	<0.0037	<0.0035
Perfluoroundecanoic acid (PFUnDA)	NCL	<0.0038	<0.004	<0.0036	<0.0037	<0.0036	<0.0035	<0.0036	<0.0035	<0.0037	<0.0035
Tetrafluoro-2-(heptafluoropropoxy)propanoic acid (GenX)	NA	<0.0075	<0.0079	<0.0072	<0.0073	<0.0073	<0.007	<0.0072	<0.007	<0.0075	<0.007
Total PFAS (Calculated)	NCL	0.01	0.0085	0.038	0.028	0.023	0.024	0.022	0.044	0.023	0.016

TABLE 5 NOTES
GSI Investigation
Algoma and Plainfield Townships, Kent County, MI

NOTES:

1. Concentration and criteria units are micrograms per Liter (µg/L) or parts per billion (ppb). Calculated criteria and concentrations are rounded to two significant digits.
2. Michigan Part 201 Groundwater Cleanup Criteria are based on "Table 1, Groundwater: Residential and Nonresidential Part 201 Generic Cleanup Criteria and Screening Levels/Part 213 Tier I Risk Based Screening Levels," Michigan Administrative Code, Cleanup Criteria Requirements for Response Activity, Rules 299.44 and 299.49, effective December 30, 2013; last updated October 12, 2023.
   Abbreviations Include:
   "NCL" indicates no criterion listed in Michigan Part 201 Table 1.
   "NA" indicates not available.
3. Bold, italic number with thick line border or italic parameter name indicates that parameter was detected above the Michigan Part 201 Groundwater Cleanup Criteria listed.
4. Abbreviations include:
   "< LOQ" indicates the parameter was analyzed for but not detected above the limit of quantitation (LOQ).
   "DUP" indicates a duplicate sample.
   "H" indicates the parameter was analyzed out of hold time.
   "ND" indicates the parameters used in the calculation were not detected.
5. Screen interval presented is the top of the screen to the bottom of the screen in feet below ground surface.


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