Appendix R

AREA R-1 (19) STATEMENT OF WORK
North Kent Study Area

January 31, 2020
File No. 16.0062335.60

PREPARED FOR:
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Rockford, Michigan

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1.0 INTRODUCTION

On behalf of Wolverine World Wide, Inc. (Wolverine), Rose & Westra, a Division of GZA GeoEnvironmental, Inc. (R&W/GZA), prepared this Statement of Work (SOW) summarizing the approach and rationale for the proposed remedial investigation monitoring wells set forth in the Consent Decree (CD) for Area R-1 (sometimes referred to as Area 19) in Algoma Township, Kent County, Michigan. The purpose of this SOW is to determine the location of groundwater monitoring wells and provide an outline for a Response Activity Plan to define the vertical and horizontal extent of per- and polyfluoroalkyl substances (PFAS) at Area R-1 (19) in compliance with Part 201 of the Michigan Natural Resources and Environmental Protection Act. Following completion of the tasks in this SOW, R&W/GZA will evaluate the data in consultation with EGLE and determine appropriate next steps.

2.0 GENERAL APPROACH

The monitoring wells were proposed after evaluating the extent of PFAS and evaluating their potential transport in groundwater. The following data was compiled and evaluated:

- The estimated extent of perfluorooctane sulfonic acid (PFOS) and perfluorooctanoic acid (PFOA) exceeding 70 nanograms per liter (ng/L) and the extent of total PFAS, based on the test results for the residential drinking water wells, the vertical aquifer profiling samples, and the groundwater monitoring well samples.

- To evaluate potential future PFOA+ PFOS and total PFAS migration, the estimated extent of PFOA+PFOS exceeding 10 ng/L and the estimated extent of seven PFAS compounds greater than the proposed maximum contaminant levels (MCLs) for those compounds based on the test results for the residential drinking water wells, the vertical aquifer profiling samples, and the groundwater monitoring well samples.

- Soil boring logs for the vertical aquifer profiling locations and available residential water well logs.

- Groundwater contours and interpreted groundwater flow direction based on the November 2019 static water levels measured at groundwater monitoring wells and at the staff gages installed in the Rogue River.

3.0 AREA R-1 (19) BACKGROUND

Elevated PFOS+PFOA concentrations were measured in the Wellington Ridge neighborhood, located between 10 Mile and 11 Mile Roads, west of Wolven Avenue. Based on the groundwater contours, there appears to be a groundwater mound in the Wellington Ridge area. Groundwater appears to flow radially from the mound. The transport of PFOA+PFOS appears generally limited to the relatively permeable formations. The groundwater monitoring data and residential well data indicated flow paths from Wellington Ridge to the northeast (Area R-1/19).

A groundwater mound may present in the southwest corner of Area R-1 (19) where the PFOA+PFOS concentration was 350 ng/L. PFOA+PFOS were also detected in a few other residential wells located in that area. Groundwater contours suggest flow from the groundwater mound radially outward from this mound. The PFOA+PFOS in residential wells located northeast or east of 11 Mile Road and Wolven Avenue likely results from PFOA+PFOS migrating from that area to those hydraulically downgradient residences. PFOA+PFOS were generally not detected in the residential wells located west, northwest, and north of this area, likely due to the presence of fine-grained soil strata in that area and well screens positioned in different water bearing units.

PFOA+PFOS concentrations range from approximately 90 to 110 ng/L at the west end of Whirlwind Road where groundwater flows northeasterly.

4.0 PROPOSED MONITORING WELLS

The following provides a summary of proposed remedial investigation wells, and the rationale for this initial phase. See Figure 1 for the proposed well locations. Note that Figure 1 shows piezometer and pore water sample locations within/near the Rogue River. These are shown for reference in this scope of work and discussed in detail in the Groundwater/Surface Water Interface SOW submitted under separate cover.

- To monitor for migration from the Wellington Ridge area (Area 7) toward Area R-1 (19), four monitoring well locations, Area19-MW-13, Area19-MW-14, Area19-MW-15 and Area19-MW-16, are proposed. Existing monitoring well clusters WV-MW-14 and WV-MW-12 will be included as part of the monitoring network for Area R-1 (19).

- Three remedial investigation well nest locations (Area19-MW-1, Area19-MW-2 and Area19-MW-10) are proposed immediately downgradient of the potential groundwater mound near the southwestern corner of Area R-1 (19). The purpose is to further evaluate the PFOA+PFOS extent and groundwater elevations in this area and the PFAS distribution east of the potential groundwater mound. Currently, one nested well set (MW-WV-14S/14D) has been installed east of this area. Area19-MW-10, Area19-MW-1 and Area19-MW-2 are proposed north, northeast and south of MW-WV-14S/14D (northeast and southeast of the potential mound) to assess downgradient PFAS concentrations and groundwater elevations.

- Two additional monitoring well nests (Area19-MW-8 and Area19-MW-9) are proposed west-northwest, and north of the intersection of 11 Mile Road and Wolven to provide detection monitoring for the downgradient area, north and northwest of that area. Groundwater contours indicate potential migration from the groundwater mound area to the north. These monitoring well nests will also provide better understanding of groundwater elevations and groundwater flow north and northwest of the apparent groundwater mound.

- Two remedial investigation well nest locations (Area19-MW-3 and Area19-MW-4) are proposed near Whirlwind Road to further evaluate the PFOA+PFOS extent (PFOA+PFOS plume width).

- Another three remedial investigation well nest locations (Area19-MW-6 and Area19-MW-7) are proposed northwest and north of the estimated 10 ppt PFOA+PFOS contour in the east side of Area R-1 (19). The purpose is to further delineate the extent of PFOA+PFOS in the area. Based on current information, Area19-MW-6 and Area19-MW-7 are also perimeter monitoring wells for the north and west edges of the PFOA+PFOS plume.

- Three additional remedial investigation well nest locations (Area19-MW-5, Area19-MW-11 and Area19-MW-12) are proposed near Summit Avenue. The purpose of these well is to further characterize the PFOA+PFOS plume in the area.

5.0 METHODOLOGY

The tasks completed under this SOW will be completed in accordance with the *Quality Assurance Project Plan, Former Wolverine Tannery, House Street Disposal Area, and Wolven/Jewell Area, Per- and Polyfluoroalkyl Substances Investigation Program, Revision 2* (QAPP) prepared for Wolverine World Wide, Inc. by R&W GZA and

dated November 1, 2018. A Conceptual Site Model including additional background and methodology will be provided in a Response Activity Plan that will be prepared following the Effective Date of the CD (see Section 9.0 below).

6.0 WELL INSTALLATION PROCEDURES

The proposed well nest locations will be drilled using either hollow-stem auger or rotosonic methods in accordance with SOPs A03 through A06 of the QAPP. When possible, the initial boring at each location will be drilled to the top of bedrock or refusal. The borehole terminal depth will also be evaluated based on the depths of adjacent water wells and the presence of confining strata.

As the original borings are drilled at each location, vertical aquifer profiling samples will be collected from water-bearing and permeable formation(s) at an interval of 10 feet for PFAS analysis. Vertical Aquifer Profiling will be completed in accordance with *SOP A25, Vertical Aquifer Profiling* included in the QAPP. The turn-around time for laboratory samples will be approximately 3 weeks.

Based on the profiling data and the encountered geology, R&W/GZA will determine the depth(s) of wells installed at each nest location. The monitoring wells will be developed in accordance with *SOP A13, Well Development* in the QAPP and surveyed by a licensed surveyor.

7.0 SAMPLING

Wells will be sampled as follows:

Well Type	Initial Sampling Post Installation/ Development (at least 2 weeks post development)	Annual Sampling Until Substantial Completion of Perimeter Well Network*	Quarterly sampling For One Year Once Perimeter Well Network is Substantially Complete*
Perimeter Wells**	X	X	X
RI Wells	X		

*Substantial Completion will be agreed upon by R&W/GZA and EGLE.
**Perimeter wells are defined as the wells installed at the perimeter of areas where municipal water will be installed.

The sampling will be conducted using methods established in SOPs A14, A15, A16, and B01 of the QAPP. The samples will be analyzed using method EPA Method 537.1, modified isotope dilution.

8.0 INVESTIGATION DERIVED WASTE

Soil cuttings and development/purge water from the well installations and sampling will be containerized and transported to the former Wolverine House Street property for staging/storage until off-site treatment/disposal can be arranged.

9.0 ANTICIPATED SCHEDULE

A formal Response Activity Plan will be prepared for this work and submitted to EGLE within 120 days following the date of the CD between EGLE and Wolverine.

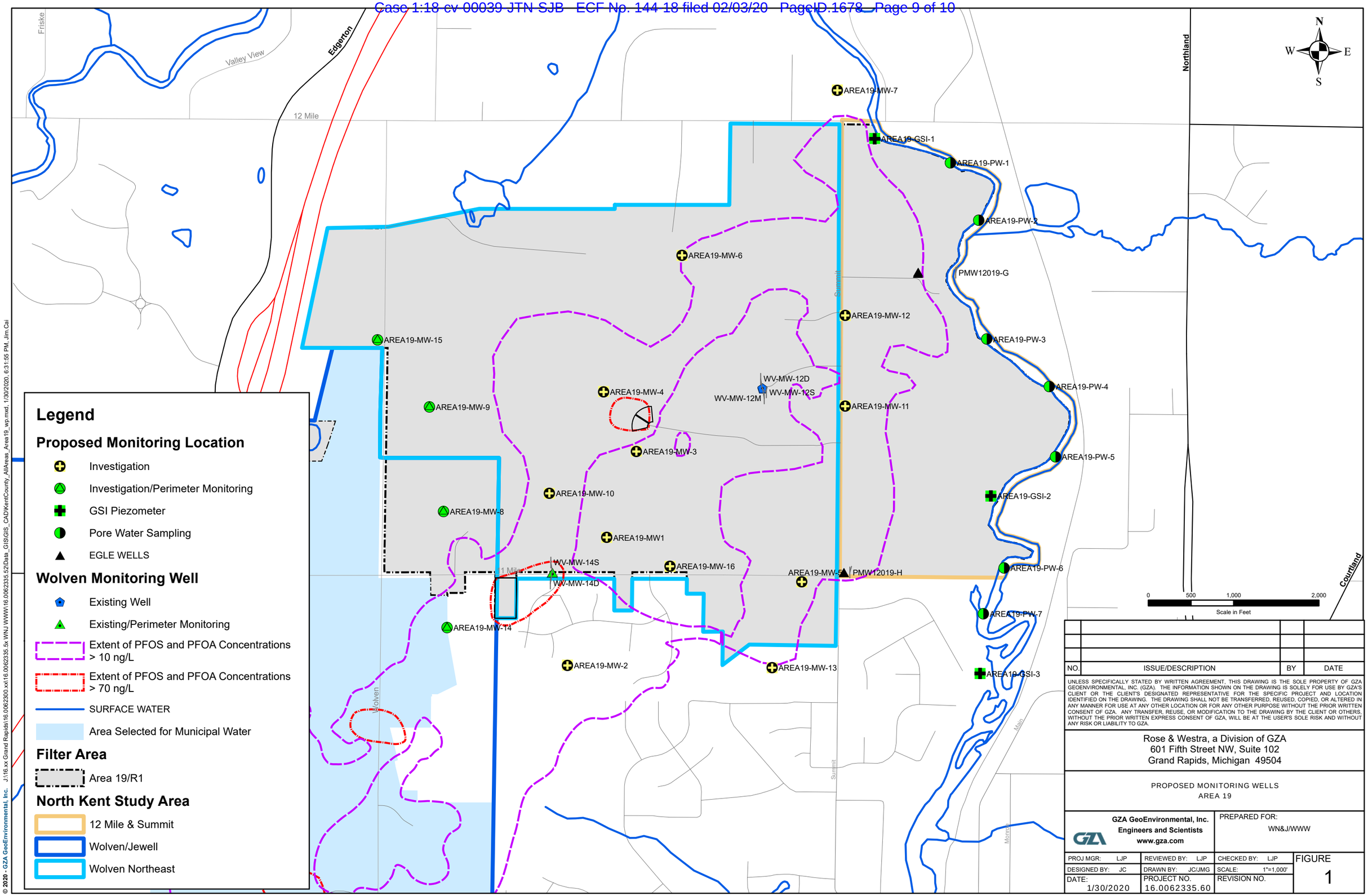
The schedule for installation of the well nest locations will depend on R&W/GZA's ability to obtain access to the desired locations or proximate alternate locations. The following table outlines R&W/GZA's current estimates of the steps and approximate timeframes for the work in this SOW.

Task	Estimated Timeframe per Location
Access	1 to 3 months
Drilling	2 to 3 weeks
VAP analysis	3 weeks
Monitoring Well Installation	1 to 2 weeks
Development wait time	2 weeks
First Groundwater Sampling	1 week
First Laboratory Analysis	3 weeks

Assuming one month per location, R&W/GZA estimates this SOW will require 16 months to complete drilling, vertical aquifer profiling and monitoring well installation. This work will be completed in conjunction with the other SOWs submitted under the CD. R&W/GZA will coordinate with EGLE to prioritize drilling locations if access is obtained to multiple locations throughout the SOWs simultaneously. Because access will likely be obtained piecemeal, the actual well installation schedule will likely exceed 16 months.

For the perimeter wells only, after the four quarters of sampling, the wells will be tied into the perimeter well SOW and the long-term monitoring plan will be included with those wells.

FIGURE



Legend

Proposed Monitoring Location

- Investigation
- Investigation/Perimeter Monitoring
- GSI Piezometer
- Pore Water Sampling
- EGLE WELLS

Wolven Monitoring Well

- Existing Well
- Existing/Perimeter Monitoring
- Extent of PFOS and PFOA Concentrations > 10 ng/L
- Extent of PFOS and PFOA Concentrations > 70 ng/L
- SURFACE WATER
- Area Selected for Municipal Water

Filter Area

- Area 19/R1

North Kent Study Area

- 12 Mile & Summit
- Wolven/Jewell
- Wolven Northeast

NO.	ISSUE/DESCRIPTION	BY	DATE

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PROPOSED MONITORING WELLS
AREA 19

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PREPARED FOR:
WN&J/WWW

PROJ MGR: LJP	REVIEWED BY: LJP	CHECKED BY: LJP	FIGURE 1
DESIGNED BY: JC	DRAWN BY: JC/JMG	SCALE: 1"=1,000'	
DATE: 1/30/2020	PROJECT NO. 16.0062335.60	REVISION NO.	

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