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A Division of GZA

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MEMORANDUM

To: Abby Hendershott, EGLE

From: Leslie Nelson, Rose & Westra, a Division of GZA GeoEnvironmental, Inc.

Date: March 2, 2020

File No.: 16.0062335.02 Task 002

Re: Wolverine World Wide, Inc. (Wolverine) – Former Tannery
Monthly Progress Report

This Monthly Progress Report (MPR) is being provided at the request of EGLE to support the June 18, 2018 Source Investigation Task Summary (SITS) in response EGLE's request for regular progress updates.

This MPR summarizes the progress for the period December 27, 2019 through February 24, 2020. This will be the final MPR submitted pursuant to the 2018 letter. Future submissions will be governed by the Consent Decree entered on February 19, 2020.

ACTIONS PERFORMED

During this period, December 27, 2019 through February 24, 2020, GZA has done the following:

1) On-Going: Continued layout and design and preparation of permit submissions for the groundwater pump and treat system. Receipt of one preliminary bid for system construction.

2) Completed the 4th quarter 2019 groundwater sampling event.

3) Conducted activities in response to the October 28, 2019 U.S. EPA Region 5 Administrative Settlement Agreement and Order on Consent for Removal Actions[1] (AOC).

ANALYTICAL DATA RECIEVED

PFAS data received since the last update is summarized on the attached table. This is limited to the Quarter 4 groundwater monitoring. Future monitoring will be conducted in accordance with the Consent Decree.

J:\62000\623xx\62335.02 - WWW Tannery 2017_2018 Work\002 - Implementation of 2018 Work Plan\MDEQ Monthly Progress Reports\March 2, 2020 EGLE report\Tannery-EGLE-MonthlyUpdate-030220.docx

[1] CERCLA Docket No. V-W-20-C-002.

An Equal Opportunity Employer M/F/V/H

TABLE 1
SUMMARY OF GROUNDWATER SAMPLE ANALYSIS - PFAS
Former Tannery
Rockford, Kent Co, MI

Sample Location	Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water[2]	Part 201 Generic Groundwater Cleanup Criteria – Groundwater Surface Water Interface[2]	Part 201 Generic Residential Groundwater Cleanup Criteria – Groundwater Volatilization to Indoor Air Inhalation[2]	EGLE Residential Recommended Volatilization to Indoor Air Interim Action Screening Level - Groundwater[3]	U.S. EPA Residential Tap Water Regional Removal Management Levels[4]	TA-GW-01	TA-GW-03	TA-GW-04	TA-GW-06	TA-GW-07	TA-GW-08	TA-MW-2	TA-MW-3	TA-MW-4	TA-MW-301B	TA-MW-301C	TA-MW-301D	TA-MW-302A
Sample Name						TA-GW-GW-01	TA-GW-GW-03	TA-GW-GW-04	TA-GW-GW-06	TA-GW-GW-07	TA-GW-GW-08	TA-GW-MW-2	TA-GW-MW-3	TA-GW-MW-4	TA-GW-MW-301B	TA-GW-MW-301C	TA-GW-MW-301D	TA-GW-MW-302A
Laboratory Sample ID(s)						VA09002-016	VA15036-017	VA15036-016	VA15036-023	VA15036-005	VA15036-008	VA15036-021	VA15036-010	VA15036-022	VA15036-004	VA15036-003	VA15036-002	VA09002-013
Sample Date						01/08/2020	01/15/2020	01/15/2020	01/16/2020	01/13/2020	01/14/2020	01/16/2020	01/14/2020	01/16/2020	01/13/2020	01/13/2020	01/13/2020	01/08/2020
Parameter (µg/L)																		
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NCL	NCL	NCL	NCL	<0.19	<0.02	<0.075	0.011 [J]	<0.0036	<0.0038	0.0096 [J]	<0.0039	<0.037	<0.019	<0.19	<0.0038	<0.0038
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NCL	NCL	NCL	NCL	<0.19	<0.02	0.35	<0.019	<0.0036	<0.0038	<0.019	0.011	0.24	<0.019	<0.19	<0.0038	<0.0038
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NCL	NCL	NCL	NCL	<0.19	<0.02	<0.075	<0.019	<0.0036	<0.0038	<0.019	<0.0039	0.19	<0.019	<0.19	<0.0038	<0.0038
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NCL	NCL	NCL	NCL	<0.39	<0.04	<0.15	<0.038	<0.0072	<0.0077	<0.038	<0.0078	<0.075	<0.038	<0.37	<0.0077	<0.0076
Perfluorobutane sulfonic acid (PFBS)	NCL	NCL	NCL	NCL	1,200	10	2	5.9	0.73	0.19	0.08	0.26	0.27	7.7	0.57	0.85	<0.0038	0.91
Perfluorodecane sulfonic acid (PFDS)	NCL	NCL	NCL	NCL	NCL	<0.19	<0.02	<0.075	<0.019	<0.0036	<0.0038	<0.019	0.002 [J]	0.026 [J]	<0.019	<0.19	<0.0038	0.013
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NCL	NCL	NCL	NCL	4.3	0.22	0.95	0.17	0.047	0.045	0.1	0.07	0.54	0.27	1.7	<0.0038	0.062
Perfluorononane sulfonic acid (PFNS)	NCL	NCL	NCL	NCL	NCL	0.11 [J]	0.09	0.044 [J]	<0.038	0.0051 [J]	0.0054 [J]	<0.038	0.002 [J]	<0.075	0.16	1.9	<0.0077	0.0066 [J]
Perfluorooctane sulfonamide (FOSA)	NCL	NCL	NCL	NCL	NCL	0.94	0.18	<0.075	0.39	<0.0036	0.018	0.47	0.14	1.9	0.11	0.097 [J]	<0.0038	0.47
Perfluoropentane sulfonic acid (PFPeS)	NCL	NCL	NCL	NCL	NCL	0.96	0.25	2.2	0.14	0.036	0.022	0.055	0.039	0.92	0.22	0.79	<0.0038	0.064
Perfluorohexane sulfonic acid (PFHxS)	NCL	NCL	NCL	NCL	NCL	4.6	0.88	6.6	0.65	0.13	0.1	0.27	0.3	3.1	1.1	9.9	0.0011 [J]	0.25
Perfluorobutanoic acid (PFBA)	NCL	NCL	NCL	NCL	NCL	0.71	0.25	1.6	0.15	0.034	0.018	0.052	0.06	3	0.25	0.74	<0.0038	0.084
Perfluorodecanoic acid (PFDA)	NCL	NCL	NCL	NCL	NCL	<0.19	0.3	<0.075	0.18	<0.0036	<0.0038	0.077	0.011	<0.037	0.055	0.064 [J]	<0.0038	0.057
Perfluorododecanoic acid (PFDoDA)	NCL	NCL	NCL	NCL	NCL	<0.19	<0.02	<0.075	<0.019	<0.0036	<0.0038	<0.019	<0.0039	<0.037	<0.019	<0.19	<0.0038	0.0016 [J]
Perfluoroheptanoic acid (PFHpA)	NCL	NCL	NCL	NCL	NCL	<0.19	0.56	4.9	0.33	0.072	0.039	0.1	0.16	3.6	1.6	15	0.0013 [J]	0.11
Perfluorohexanoic acid (PFHxA)	NCL	NCL	NCL	NCL	NCL	1.1	0.66	6.1	0.38	0.073	0.033	0.11	0.13	6.3	1.6	15	0.0018 [J]	0.1
Perfluorononanoic acid (PFNA)	NCL	NCL	NCL	NCL	NCL	0.22	0.089	0.27	0.15	0.018	0.019	0.042	0.029	0.23	0.058	0.15 [J]	<0.0038	0.031
Perfluorooctanoic acid (PFOA)	0.07 (JJ)	0.42 (X)	NCL	NCL	NCL	***15***	***4.7***	***40***	***2.2***	***0.7***	***0.5***	***0.83***	***1.9***	***19***	***21***	***150***	0.018	***0.82***
Perfluorooctane sulfonic acid (PFOS)	0.07 (JJ)	0.011 (X)	NCL	NCL	NCL	***540***	***17***	***63***	***21***	***4.3***	***5.7***	***22***	***3.4***	***37***	***37***	***310***	***0.046***	***4.7***
PFOA + PFOS (Calculated)	0.07	NCL	NCL	NCL	NCL	***560***	***22***	***100***	***23***	***5***	***6.2***	***23***	***5.3***	***56***	***58***	***460***	0.064	***5.5***
Perfluoropentanoic acid (PFPeA)	NCL	NCL	NCL	NCL	NCL	0.7	0.25	2.1	0.18	0.028	0.021	0.055	0.064	2.3	0.45	1.9	<0.0038	0.07
Perfluorotetradecanoic acid (PFTeDA)	NCL	NCL	NCL	NCL	NCL	<0.19	<0.02	<0.075	<0.019	<0.0036	<0.0038	<0.019	<0.0039	<0.037	<0.019	<0.19	<0.0038	<0.0038
Perfluorotridecanoic acid (PFTrDA)	NCL	NCL	NCL	NCL	NCL	<0.19	<0.02	<0.075	<0.019	<0.0036	<0.0038	<0.019	0.0085	<0.037	<0.019	<0.19	<0.0038	<0.0038
Perfluoroundecanoic acid (PFUnDA)	NCL	NCL	NCL	NCL	NCL	<0.19	<0.02	<0.075	<0.019	<0.0036	<0.0038	<0.019	<0.0039	<0.037	<0.019	<0.19	<0.0038	<0.0038
Total PFAS (Calculated)	NCL	NCL	NCL	NCL	NCL	580	27	130	27	5.6	6.6	24	6.6	86	64	510	0.068	7.7

TABLE 1
SUMMARY OF GROUNDWATER SAMPLE ANALYSIS - PFAS
Former Tannery
Rockford, Kent Co, MI

Sample Location	Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water[2]	Part 201 Generic Groundwater Cleanup Criteria – Groundwater Surface Water Interface[2]	Part 201 Generic Residential Groundwater Cleanup Criteria – Groundwater Volatilization to Indoor Air Inhalation[2]	EGLE Residential Recommended Volatilization to Indoor Air Interim Action Screening Level - Groundwater[3]	U.S. EPA Residential Tap Water Regional Removal Management Levels[4]	TA-MW-302B	TA-MW-302B	TA-MW-303A	TA-MW-303B	TA-MW-303C	TA-MW-303D	TA-MW-303E	TA-MW-304A	TA-MW-304B	TA-MW-307A	TA-MW-307B	TA-MW-309A	TA-MW-309B
Sample Name						TA-GW-MW-302B	TA-GW-MW-302B DUP	TA-GW-MW-303A	TA-GW-MW-303B	TA-GW-MW-303C	TA-GW-MW-303D	TA-GW-MW-303E	TA-GW-MW-304A	TA-GW-MW-304B	TA-GW-MW-307A	TA-GW-ME-307B	TA-GW-MW-309A	TA-GW-MW-309B
Laboratory Sample ID(s)						VA09002-014	VA09002-015	VA11008-007	VA11008-004	VA11008-009	VA11008-006	VA11008-008	VA15036-011	VA15036-009	VA11008-003	VA11008-002	UL19062-021	UL19062-027
Sample Date						01/08/2020	01/08/2020	01/10/2020	01/09/2020	01/10/2020	01/10/2020	01/10/2020	01/14/2020	01/14/2020	01/09/2020	01/09/2020	12/19/2019	12/20/2019
Parameter (µg/L)																		
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NCL	NCL	NCL	NCL	<0.0038	<0.0036	<0.019	<0.019	<0.036	<0.0037	<0.0037	<0.019	<0.0038	<0.0036	<0.0038	<0.004	<0.0037
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NCL	NCL	NCL	NCL	0.011	0.011	<0.019	<0.019	0.053	<0.0037	<0.0037	<0.019	0.01	0.014	<0.0038	<0.004	<0.0037
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NCL	NCL	NCL	NCL	<0.0038	<0.0036	<0.019	<0.019	<0.036	<0.0037	<0.0037	<0.019	<0.0038	<0.0036	<0.0038	<0.004	<0.0037
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NCL	NCL	NCL	NCL	<0.0076	<0.0073	<0.038	<0.038	<0.073	<0.0074	<0.0075	<0.038	<0.0076	<0.0073	<0.0077	<0.0079	<0.0074
Perfluorobutane sulfonic acid (PFBS)	NCL	NCL	NCL	NCL	1,200	2	1.9	6.7	6.6	5.7	0.067	<0.0037	0.61	0.58	0.79	0.19	0.2	0.22
Perfluorodecane sulfonic acid (PFDS)	NCL	NCL	NCL	NCL	NCL	<0.0038	<0.0036	<0.019	<0.019	<0.036	<0.0037	<0.0037	<0.019	<0.0038	<0.0036	<0.0038	<0.004	<0.0037
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NCL	NCL	NCL	NCL	0.14	0.14	0.32	0.3	0.26	<0.0037	<0.0037	0.16	0.036	0.21	0.0028 [J]	0.16	0.14
Perfluorononane sulfonic acid (PFNS)	NCL	NCL	NCL	NCL	NCL	0.0034 [J]	0.0037 [J]	0.017 [J]	<0.038	0.032 [J]	<0.0074	<0.0075	0.05	<0.0076	<0.0073	<0.0077	<0.0079	<0.0074
Perfluorooctane sulfonamide (FOSA)	NCL	NCL	NCL	NCL	NCL	0.61	0.63	0.5	0.13	0.16	0.002 [J]	<0.0037	0.076	0.01	<0.0036	<0.0038	0.15	0.026
Perfluoropentane sulfonic acid (PFPeS)	NCL	NCL	NCL	NCL	NCL	0.39	0.41	0.28	0.6	0.36	0.0024 [J]	<0.0037	0.16	0.14	0.24	0.021	0.042	0.066
Perfluorohexane sulfonic acid (PFHxS)	NCL	NCL	NCL	NCL	NCL	1.1	1.1	0.98	2.5	1.4	0.0052	<0.0037	1.1	0.42	0.84	0.039	0.25	0.28
Perfluorobutanoic acid (PFBA)	NCL	NCL	NCL	NCL	NCL	0.47	0.47	0.27	0.61	0.84	0.0086	<0.0037	0.067	0.3	0.26	0.077	0.042	0.051
Perfluorodecanoic acid (PFDA)	NCL	NCL	NCL	NCL	NCL	0.011	0.012	0.049	0.016 [J]	0.0095 [J]	<0.0037	<0.0037	0.027	0.0053	0.0099	<0.0038	<0.004	0.0039
Perfluorododecanoic acid (PFDoDA)	NCL	NCL	NCL	NCL	NCL	<0.0038	<0.0036	<0.019	<0.019	<0.036	<0.0037	<0.0037	<0.019	<0.0038	<0.0036	<0.0038	<0.004	<0.0037
Perfluoroheptanoic acid (PFHpA)	NCL	NCL	NCL	NCL	NCL	0.63	0.63	0.44	0.8	0.84	0.005	<0.0037	0.24	0.22	0.55	0.073	0.091	0.1
Perfluorohexanoic acid (PFHxA)	NCL	NCL	NCL	NCL	NCL	0.66	0.68	0.36	0.97	1.6	0.012	<0.0037	0.19	0.58	0.68	0.16	0.071	0.099
Perfluorononanoic acid (PFNA)	NCL	NCL	NCL	NCL	NCL	0.034	0.032	0.068	0.05	0.11	<0.0037	<0.0037	0.032	0.016	0.052	0.0011 [J]	0.035	0.045
Perfluorooctanoic acid (PFOA)	0.07 (JJ)	0.42 (X)	NCL	NCL	NCL	***5.4***	***5.3***	***3.3***	***4.8***	***5.3***	0.022	<0.0019	***2.2***	***0.98***	***4.1***	***0.27***	***1.2***	***1.5***
Perfluorooctane sulfonic acid (PFOS)	0.07 (JJ)	0.011 (X)	NCL	NCL	NCL	***8.1***	***8.4***	***27***	***18***	***19***	***0.013***	<0.0037	***18***	***1.4***	***3.8***	***0.014***	***5.1***	***9.4***
PFOA + PFOS (Calculated)	0.07	NCL	NCL	NCL	NCL	***14***	***14***	***30***	***23***	***24***	0.035	ND	***20***	***2.4***	***7.9***	***0.28***	***6.3***	***11***
Perfluoropentanoic acid (PFPeA)	NCL	NCL	NCL	NCL	NCL	0.26	0.26	0.21	0.39	0.5	0.005	<0.0037	0.069	0.17	0.25	0.062	0.057	0.063
Perfluorotetradecanoic acid (PFTeDA)	NCL	NCL	NCL	NCL	NCL	<0.0038	<0.0036	<0.019	<0.019	<0.036	<0.0037	<0.0037	<0.019	<0.0038	<0.0036	<0.0038	<0.004	<0.0037
Perfluorotridecanoic acid (PFTrDA)	NCL	NCL	NCL	NCL	NCL	<0.0038	<0.0036	<0.019	<0.019	<0.036	<0.0037	<0.0037	<0.019	<0.0038	<0.0036	<0.0038	<0.004	<0.0037
Perfluoroundecanoic acid (PFUnDA)	NCL	NCL	NCL	NCL	NCL	<0.0038	<0.0036	<0.019	<0.019	<0.036	<0.0037	<0.0037	<0.019	<0.0038	<0.0036	<0.0038	0.33	<0.0037
Total PFAS (Calculated)	NCL	NCL	NCL	NCL	NCL	20	20	40	36	36	0.14	ND	23	4.9	12	0.91	7.7	12

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Former Tannery
Rockford, Kent Co, MI

Sample Location	Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water[2]	Part 201 Generic Groundwater Cleanup Criteria – Groundwater Surface Water Interface[2]	Part 201 Generic Residential Groundwater Cleanup Criteria – Groundwater Volatilization to Indoor Air Inhalation[2]	EGLE Residential Recommended Volatilization to Indoor Air Interim Action Screening Level - Groundwater[3]	U.S. EPA Residential Tap Water Regional Removal Management Levels[4]	TA-MW-309C	TA-MW-309D	TA-MW-310A	TA-MW-310B	TA-MW-310C	TA-MW-311A	TA-MW-311B	TA-MW-311C	TA-MW-312	TA-MW-313A	TA-MW-313B	TA-MW-313C	TA-MW-314A
Sample Name						TA-GW-MW-309C	TA-GW-MW-309D	TA-GW-MW-310A	TA-GW-MW-310B	TA-GW-MW-310C	TA-GW-MW-311A	TA-GW-MW-311B	TA-GW-MW-311C	TA-GW-MW-312	TA-GW-MW-313A	TA-GW-MW-313B	TA-GW-MW-313C	TA-GW-MW-314A
Laboratory Sample ID(s)						UL19062-019	UL19062-017	UL19062-016	UL19062-018	UL19062-020	UL19062-008	UL19062-009	UL19062-010	UL19062-005	UL19062-024	UL19062-026	UL19062-025	VA09002-004
Sample Date						12/19/2019	12/19/2019	12/19/2019	12/19/2019	12/19/2019	12/17/2019	12/17/2019	12/17/2019	12/18/2019	12/20/2019	12/20/2019	12/20/2019	01/06/2020
Parameter (µg/L)																		
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NCL	NCL	NCL	NCL	<0.0036	<0.0034	<0.0038	<0.0039	<0.004	<0.0039	<0.0039	<0.0038	<0.0036	<0.0036	<0.0039	<0.0036	<0.0037
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NCL	NCL	NCL	NCL	<0.0036	<0.0034	<0.0038	<0.0039	<0.004	<0.0039	<0.0039	<0.0038	<0.0036	<0.0036	<0.0039	<0.0036	<0.0037
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NCL	NCL	NCL	NCL	<0.0036	<0.0034	<0.0038	<0.0039	<0.004	<0.0039	<0.0039	<0.0038	<0.0036	<0.0036	<0.0039	<0.0036	<0.0037
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NCL	NCL	NCL	NCL	<0.0072	<0.0069	<0.0075	<0.0079	<0.0079	<0.0078	<0.0077	<0.0076	<0.0072	<0.0073	<0.0078	<0.0071	<0.0074
Perfluorobutane sulfonic acid (PFBS)	NCL	NCL	NCL	NCL	1,200	0.29	0.047	0.42	0.17	0.17	0.016	<0.0039	<0.0038	0.018	0.14	0.074	0.034	0.011
Perfluorodecane sulfonic acid (PFDS)	NCL	NCL	NCL	NCL	NCL	<0.0036	<0.0034	<0.0038	<0.0039	<0.004	<0.0039	<0.0039	<0.0038	<0.0036	<0.0036	<0.0039	<0.0036	<0.0037
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NCL	NCL	NCL	NCL	0.2	<0.0034	0.039	<0.0039	<0.004	0.014	<0.0039	<0.0038	0.021	0.043	0.011	0.0046	0.0026 [J]
Perfluorononane sulfonic acid (PFNS)	NCL	NCL	NCL	NCL	NCL	<0.0072	<0.0069	<0.0075	<0.0079	<0.0079	<0.0078	<0.0077	<0.0076	<0.0072	<0.0073	<0.0078	<0.0071	<0.0074
Perfluorooctane sulfonamide (FOSA)	NCL	NCL	NCL	NCL	NCL	<0.0036	<0.0034	0.54	<0.0039	<0.004	<0.0039	<0.0039	<0.0038	<0.0036	<0.0036	<0.0039	<0.0036	<0.0037
Perfluoropentane sulfonic acid (PFPeS)	NCL	NCL	NCL	NCL	NCL	0.1	<0.0034	0.11	0.0097	0.068	<0.0039	<0.0039	<0.0038	0.0043	0.097	0.022	0.013	0.0013 [J]
Perfluorohexane sulfonic acid (PFHxS)	NCL	NCL	NCL	NCL	NCL	0.49	<0.0034	0.33	0.02	0.039	0.018	<0.0039	<0.0038	0.025	0.36	0.092	0.034	0.0057
Perfluorobutanoic acid (PFBA)	NCL	NCL	NCL	NCL	NCL	0.068	0.0078	0.072	<0.0039	0.14	0.0053	<0.0039	<0.0038	0.004	0.045	0.022	0.012	0.0068
Perfluorodecanoic acid (PFDA)	NCL	NCL	NCL	NCL	NCL	<0.0036	<0.0034	0.049	<0.0039	<0.004	<0.0039	<0.0039	<0.0038	<0.0036	<0.0036	<0.0039	<0.0036	<0.0037
Perfluorododecanoic acid (PFDoDA)	NCL	NCL	NCL	NCL	NCL	<0.0036	<0.0034	<0.0038	<0.0039	<0.004	<0.0039	<0.0039	<0.0038	<0.0036	<0.0036	<0.0039	<0.0036	<0.0037
Perfluoroheptanoic acid (PFHpA)	NCL	NCL	NCL	NCL	NCL	0.19	0.0094	0.15	0.063	0.14	0.0074	<0.0039	<0.0038	0.0098	0.16	0.03	0.027	0.0033 [J]
Perfluorohexanoic acid (PFHxA)	NCL	NCL	NCL	NCL	NCL	0.18	0.047	0.17	0.21	0.26	0.012	<0.0039	<0.0038	0.0089	0.14	0.041	0.037	0.005
Perfluorononanoic acid (PFNA)	NCL	NCL	NCL	NCL	NCL	0.057	<0.0034	0.0087	0.0046	<0.004	<0.0039	<0.0039	<0.0038	<0.0036	<0.0036	<0.0039	<0.0036	0.0024 [J]
Perfluorooctanoic acid (PFOA)	0.07 (JJ)	0.42 (X)	NCL	NCL	NCL	***2.5***	0.013	***0.77***	***0.12***	***0.22***	***0.079***	<0.0019	<0.0019	***0.11***	***1.6***	***0.28***	***0.13***	0.027
Perfluorooctane sulfonic acid (PFOS)	0.07 (JJ)	0.011 (X)	NCL	NCL	NCL	***14***	<0.0034	***1.2***	<0.0039	0.0064	***0.84***	<0.0039	<0.0038	***0.4***	***0.28***	***0.074***	***0.042***	***0.26***
PFOA + PFOS (Calculated)	0.07	NCL	NCL	NCL	NCL	***17***	0.013	***2***	***0.12***	***0.23***	***0.92***	ND	ND	***0.51***	***1.9***	***0.35***	***0.17***	***0.29***
Perfluoropentanoic acid (PFPeA)	NCL	NCL	NCL	NCL	NCL	0.088	0.028	0.17	0.037	0.16	0.007	<0.0039	<0.0038	0.0049	0.076	0.032	0.024	0.005
Perfluorotetradecanoic acid (PFTeDA)	NCL	NCL	NCL	NCL	NCL	<0.0036	<0.0034	<0.0038	<0.0039	<0.004	<0.0039	<0.0039	<0.0038	<0.0036	<0.0036	<0.0039	<0.0036	<0.0037
Perfluorotridecanoic acid (PFTrDA)	NCL	NCL	NCL	NCL	NCL	<0.0036	<0.0034	<0.0038	<0.0039	<0.004	<0.0039	<0.0039	<0.0038	<0.0036	<0.0036	<0.0039	<0.0036	<0.0037
Perfluoroundecanoic acid (PFUnDA)	NCL	NCL	NCL	NCL	NCL	0.019	<0.0034	<0.0038	<0.0039	<0.004	<0.0039	<0.0039	<0.0038	<0.0036	<0.0036	<0.0039	<0.0036	<0.0037
Total PFAS (Calculated)	NCL	NCL	NCL	NCL	NCL	18	0.15	4	0.63	1.2	1	ND	ND	0.61	2.9	0.68	0.36	0.33

TABLE 1
SUMMARY OF GROUNDWATER SAMPLE ANALYSIS - PFAS
Former Tannery
Rockford, Kent Co, MI

Sample Location	Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water[2]	Part 201 Generic Groundwater Cleanup Criteria – Groundwater Surface Water Interface[2]	Part 201 Generic Residential Groundwater Cleanup Criteria – Groundwater Volatilization to Indoor Air Inhalation[2]	EGLE Residential Recommended Volatilization to Indoor Air Interim Action Screening Level - Groundwater[3]	U.S. EPA Residential Tap Water Regional Removal Management Levels[4]	TA-MW-314B	TA-MW-314C	TA-MW-314D	TA-MW-315D	TA-MW-315S	TA-MW-316D	TA-MW-316M	TA-MW-316S	TA-MW-317A	TA-MW-317B	TA-MW-317C	TA-MW-317C	TA-MW-317D
Sample Name						TA-GW-MW-314B	TA-GW-MW-314C	TA-GW-MW-314D	TA-GW-MW-315D	TA-GW-MW-315S	TA-GW-MW-316D	TA-GW-MW-316M	TA-GW-MW-316S	TA-GW-MW-317A	TA-GW-MW-317B	TA-GW-MW-317C	TA-GW-MW-317C DUP	TA-GW-MW-317D
Laboratory Sample ID(s)						VA09002-001	VA09002-003	VA09002-002	UL19062-001	UL19062-002	VA09002-008	VA09002-009	VA09002-007	UL19062-003	UL19062-004	UL19062-012	UL19062-013	UL19062-011
Sample Date						01/06/2020	01/06/2020	01/06/2020	12/18/2019	12/18/2019	01/07/2020	01/07/2020	01/07/2020	12/18/2019	12/18/2019	12/17/2019	12/17/2019	12/17/2019
Parameter (µg/L)																		
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NCL	NCL	NCL	NCL	<0.0037	<0.0036	<0.0038	<0.004	<0.0038	<0.0039	<0.0035	<0.0037	<0.0039	<0.0038	<0.0037	<0.0038	<0.0038
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NCL	NCL	NCL	NCL	<0.0037	<0.0036	<0.0038	<0.004	<0.0038	<0.0039	<0.0035	<0.0037	<0.0039	<0.0038	<0.0037	<0.0038	<0.0038
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NCL	NCL	NCL	NCL	<0.0037	<0.0036	<0.0038	<0.004	<0.0038	<0.0039	<0.0035	<0.0037	<0.0039	<0.0038	<0.0037	<0.0038	<0.0038
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NCL	NCL	NCL	NCL	<0.0075	<0.0072	<0.0076	<0.0081	<0.0077	<0.0078	<0.007	<0.0075	<0.0078	<0.0076	<0.0075	<0.0076	<0.0077
Perfluorobutane sulfonic acid (PFBS)	NCL	NCL	NCL	NCL	1,200	0.021	0.18	<0.0038	<0.004	0.054	<0.0039	0.043	0.013	0.024	<0.0038	<0.0037	<0.0038	<0.0038
Perfluorodecane sulfonic acid (PFDS)	NCL	NCL	NCL	NCL	NCL	<0.0037	<0.0036	<0.0038	<0.004	<0.0038	<0.0039	<0.0035	<0.0037	<0.0039	<0.0038	<0.0037	<0.0038	<0.0038
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NCL	NCL	NCL	NCL	0.0077	0.059	<0.0038	<0.004	0.075	<0.0039	0.011	0.00094 [J]	0.015	<0.0038	<0.0037	<0.0038	<0.0038
Perfluorononane sulfonic acid (PFNS)	NCL	NCL	NCL	NCL	NCL	<0.0075	<0.0072	<0.0076	<0.0081	<0.0077	<0.0078	<0.007	<0.0075	<0.0078	<0.0076	<0.0075	<0.0076	<0.0077
Perfluorooctane sulfonamide (FOSA)	NCL	NCL	NCL	NCL	NCL	<0.0037	<0.0036	<0.0038	<0.004	<0.0038	<0.0039	<0.0035	<0.0037	<0.0039	<0.0038	<0.0037	<0.0038	<0.0038
Perfluoropentane sulfonic acid (PFPeS)	NCL	NCL	NCL	NCL	NCL	0.0026 [J]	0.031	<0.0038	<0.004	0.0096	<0.0039	0.0075	<0.0037	<0.0039	<0.0038	<0.0037	<0.0038	<0.0038
Perfluorohexane sulfonic acid (PFHxS)	NCL	NCL	NCL	NCL	NCL	0.01	0.18	<0.0038	<0.004	0.078	<0.0039	0.036	0.0022 [J]	0.024	<0.0038	<0.0037	<0.0038	<0.0038
Perfluorobutanoic acid (PFBA)	NCL	NCL	NCL	NCL	NCL	0.0081	0.017	<0.0038	<0.004	0.013	<0.0039	0.012	<0.0037	0.014	<0.0038	<0.0037	<0.0038	<0.0038
Perfluorodecanoic acid (PFDA)	NCL	NCL	NCL	NCL	NCL	<0.0037	<0.0036	<0.0038	<0.004	<0.0038	<0.0039	<0.0035	0.0016 [J]	<0.0039	<0.0038	<0.0037	<0.0038	<0.0038
Perfluorododecanoic acid (PFDoDA)	NCL	NCL	NCL	NCL	NCL	<0.0037	<0.0036	<0.0038	<0.004	<0.0038	<0.0039	<0.0035	<0.0037	<0.0039	<0.0038	<0.0037	<0.0038	<0.0038
Perfluoroheptanoic acid (PFHpA)	NCL	NCL	NCL	NCL	NCL	0.0041	0.063	<0.0038	<0.004	0.026	<0.0039	0.018	<0.0037	0.016	<0.0038	<0.0037	<0.0038	<0.0038
Perfluorohexanoic acid (PFHxA)	NCL	NCL	NCL	NCL	NCL	0.007	0.068	<0.0038	<0.004	0.027	<0.0039	0.028	0.00096 [J]	0.03	<0.0038	<0.0037	<0.0038	<0.0038
Perfluorononanoic acid (PFNA)	NCL	NCL	NCL	NCL	NCL	0.0016 [J]	0.0035 [J]	<0.0038	<0.004	0.0076	<0.0039	0.00087 [J]	<0.0037	0.0078	<0.0038	<0.0037	<0.0038	<0.0038
Perfluorooctanoic acid (PFOA)	0.07 (JJ)	0.42 (X)	NCL	NCL	NCL	0.036	***0.63***	<0.0019	0.0047	***0.35***	<0.0019	***0.14***	0.0043	***0.085***	<0.0019	<0.0019	<0.0019	<0.0019
Perfluorooctane sulfonic acid (PFOS)	0.07 (JJ)	0.011 (X)	NCL	NCL	NCL	***0.5***	***0.83***	<0.0038	***0.024***	***2.1***	<0.0039	***0.071***	***0.13***	***1.9***	<0.0038	<0.0037	<0.0038	<0.0038
PFOA + PFOS (Calculated)	0.07	NCL	NCL	NCL	NCL	***0.54***	***1.5***	ND	0.029	***2.5***	ND	***0.21***	***0.13***	***2***	ND	ND	ND	ND
Perfluoropentanoic acid (PFPeA)	NCL	NCL	NCL	NCL	NCL	0.0049	0.015	<0.0038	<0.004	0.016	<0.0039	0.024	<0.0037	0.013	<0.0038	<0.0037	<0.0038	<0.0038
Perfluorotetradecanoic acid (PFTeDA)	NCL	NCL	NCL	NCL	NCL	<0.0037	<0.0036	<0.0038	<0.004	<0.0038	<0.0039	<0.0035	<0.0037	<0.0039	<0.0038	<0.0037	<0.0038	<0.0038
Perfluorotridecanoic acid (PFTrDA)	NCL	NCL	NCL	NCL	NCL	<0.0037	<0.0036	<0.0038	<0.004	<0.0038	<0.0039	<0.0035	<0.0037	<0.0039	<0.0038	<0.0037	<0.0038	<0.0038
Perfluoroundecanoic acid (PFUnDA)	NCL	NCL	NCL	NCL	NCL	<0.0037	<0.0036	<0.0038	<0.004	<0.0038	<0.0039	<0.0035	<0.0037	<0.0039	<0.0038	<0.0037	<0.0038	<0.0038
Total PFAS (Calculated)	NCL	NCL	NCL	NCL	NCL	0.6	2.1	ND	0.029	2.8	ND	0.39	0.15	2.1	ND	ND	ND	ND

TABLE 1
SUMMARY OF GROUNDWATER SAMPLE ANALYSIS - PFAS
Former Tannery
Rockford, Kent Co, MI

Sample Location	Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water[2]	Part 201 Generic Groundwater Cleanup Criteria – Groundwater Surface Water Interface[2]	Part 201 Generic Residential Groundwater Cleanup Criteria – Groundwater Volatilization to Indoor Air Inhalation[2]	EGLE Residential Recommended Volatilization to Indoor Air Interim Action Screening Level - Groundwater[3]	U.S. EPA Residential Tap Water Regional Removal Management Levels[4]	TA-P-1	TA-P-2	TA-P-4	TA-P-5	TA-TMW-101	TA-TMW-102	TA-TMW-104	TA-TMW-105	TA-TMW-105
Sample Name						TA-GW-P-1	TA-GW-P-2	TA-GW-P-4	TA-GW-P-5	TA-GW-TMW-101	TA-GW-TMW-102	TA-GW-TMW-104	TA-GW-TMW-105	TA-GW-TMW-105 DUP
Laboratory Sample ID(s)						VA09002-017	VA15036-024	VA15036-020	VA09002-010	VA15036-001	VA11008-001	VA15036-013	VA15036-014	VA15036-015
Sample Date						01/08/2020	01/16/2020	01/16/2020	01/07/2020	01/13/2020	01/09/2020	01/15/2020	01/15/2020	01/15/2020
Parameter (µg/L)														
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NCL	NCL	NCL	NCL	<0.0039	<0.019	<0.017	0.043	<0.074	<0.0039	<0.019	<0.019	<0.019
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NCL	NCL	NCL	NCL	0.011	0.022	0.011 [J]	0.032	<0.074	0.0051	0.025	<0.019	<0.019
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NCL	NCL	NCL	NCL	<0.0039	<0.019	<0.017	0.019 [J]	<0.074	<0.0039	<0.019	<0.019	<0.019
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NCL	NCL	NCL	NCL	<0.0078	<0.038	<0.035	<0.039	<0.15	<0.0078	<0.038	<0.038	<0.037
Perfluorobutane sulfonic acid (PFBS)	NCL	NCL	NCL	NCL	1,200	2	3.2	0.82	1.3	0.16	0.53	0.65	1.3	1.3
Perfluorodecane sulfonic acid (PFDS)	NCL	NCL	NCL	NCL	NCL	0.0032 [J]	<0.019	<0.017	0.0083 [J]	<0.074	<0.0039	<0.019	<0.019	<0.019
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NCL	NCL	NCL	NCL	0.17	0.65	0.16	0.56	0.29	0.23	0.23	0.31	0.3
Perfluorononane sulfonic acid (PFNS)	NCL	NCL	NCL	NCL	NCL	0.0028 [J]	<0.038	0.03 [J]	0.043	0.12 [J]	<0.0078	<0.038	0.029 [J]	0.023 [J]
Perfluorooctane sulfonamide (FOSA)	NCL	NCL	NCL	NCL	NCL	0.23	0.061	0.82	0.69	<0.074	<0.0039	<0.019	0.41	0.4
Perfluoropentane sulfonic acid (PFPeS)	NCL	NCL	NCL	NCL	NCL	0.46	0.36	0.11	0.17	0.11	0.2	0.25	0.22	0.21
Perfluorohexane sulfonic acid (PFHxS)	NCL	NCL	NCL	NCL	NCL	1.1	2.1	0.63	0.87	0.87	0.83	0.79	0.93	0.88
Perfluorobutanoic acid (PFBA)	NCL	NCL	NCL	NCL	NCL	0.41	0.35	0.13	0.23	0.11	0.12	0.069	0.21	0.21
Perfluorodecanoic acid (PFDA)	NCL	NCL	NCL	NCL	NCL	0.0093	0.0072 [J]	0.1	0.15	0.025 [J]	0.011	0.018 [J]	0.12	0.13
Perfluorododecanoic acid (PFDoDA)	NCL	NCL	NCL	NCL	NCL	<0.0039	<0.019	<0.017	<0.02	<0.074	<0.0039	<0.019	<0.019	<0.019
Perfluoroheptanoic acid (PFHpA)	NCL	NCL	NCL	NCL	NCL	0.74	0.59	0.24	0.43	1.5	0.41	0.24	0.44	0.49
Perfluorohexanoic acid (PFHxA)	NCL	NCL	NCL	NCL	NCL	1.1	0.65	0.26	0.64	1.3	0.38	0.19	0.5	0.54
Perfluorononanoic acid (PFNA)	NCL	NCL	NCL	NCL	NCL	0.031	0.093	0.045	0.073	0.034 [J]	0.055	0.062	0.079	0.078
Perfluorooctanoic acid (PFOA)	0.07 (JJ)	0.42 (X)	NCL	NCL	NCL	***5.7***	***6.9***	***2***	***4.1***	***21***	***3.4***	***3.5***	***4***	***3.8***
Perfluorooctane sulfonic acid (PFOS)	0.07 (JJ)	0.011 (X)	NCL	NCL	NCL	***6.5***	***20***	***17***	***36***	***80***	***5.1***	***16***	***18***	***18***
PFOA + PFOS (Calculated)	0.07	NCL	NCL	NCL	NCL	***12***	***27***	***19***	***40***	***100***	***8.5***	***20***	***22***	***22***
Perfluoropentanoic acid (PFPeA)	NCL	NCL	NCL	NCL	NCL	0.37	0.26	0.13	0.34	0.24	0.14	0.091	0.22	0.21
Perfluorotetradecanoic acid (PFTeDA)	NCL	NCL	NCL	NCL	NCL	<0.0039	<0.019	<0.017	<0.02	<0.074	<0.0039	<0.019	<0.019	<0.019
Perfluorotridecanoic acid (PFTrDA)	NCL	NCL	NCL	NCL	NCL	<0.0039	<0.019	<0.017	<0.02	<0.074	<0.0039	<0.019	<0.019	<0.019
Perfluoroundecanoic acid (PFUnDA)	NCL	NCL	NCL	NCL	NCL	<0.0039	<0.019	<0.017	<0.02	<0.074	<0.0039	<0.019	<0.019	<0.019
Total PFAS (Calculated)	NCL	NCL	NCL	NCL	NCL	19	35	22	46	110	11	22	27	27

TABLE 1
NOTES
Former Tannery
Rockford, Kent County, Michigan

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. "ND" indicates the parameters used in the calculation were not detected. "NC" indicates not calculated.
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; updated June 25, 2018.
   Abbreviations Include:
   "ID" indicates insufficient data to develop criterion.
   "NA" indicates a criterion or value is not available or, in the case of background, not applicable.
   "NCL" indicates no criterion listed in MDEQ Table 1.
   "NLV" indicates the substance is not likely to volatilize under most conditions.
   Footnotes Include:
   (X) - For groundwater discharge to the Great Lakes and their connecting waters or discharge in close proximity to a water supply intake in inland surface waters, the generic GSI criterion shall be the surface water human drinking water value (HDV) listed in the table of this
   (JJ) - Compliance with the drinking water criteria shall require comparing the sum of the PFOA and PFOS groundwater concentrations to the drinking water criterion of 0.07 µg/L.
3. Residential Recommended Interim Action Screening Levels for shallow groundwater were based on MDEQ's Toxics Steering Group's "Media-Specific Interim Action Screening Levels," published in August 2017.
   Abbreviations Include:
   "NCL" indicates no value listed in the Media-Specific Interim Action Screening Levels table.
4. U.S. EPA Residential Tap Water Regional Removal Management Levels (RMLs) were based on "Generic RML Tables," updated November 2018.
5. Bold, italic number with thick line border or italic parameter name indicates that parameter was detected above the Michigan Part 201 Groundwater Cleanup Criteria or Media-Specific Interim Action Screening Levels. U.S. EPA RMLs are provided for reference only and results detected above the EPA RMLs are not bolded or italicized.
6. Abbreviations include:
   "< RL" indicates the parameter was analyzed for but not detected above the method detection limit; RL = Reporting Limit.
   "DUP" indicates a duplicate sample.
   "J" indicates the parameter was detected at a concentration greater than the limit of quantitation (LOQ) but less than the detection limit (DL) and the result is estimated.