



Rose & Westra  
A Division of GZA



GEOTECHNICAL  
ENVIRONMENTAL  
ECOLOGICAL  
WATER  
CONSTRUCTION  
MANAGEMENT

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## MEMORANDUM

To: Abby Hendershott, EGLE

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

Date: September 30, 2019

File No.: 16.0062677.81 Task 001

Re: Wolverine World Wide, Inc. (Wolverine) – Wolven/Jewell RI – Monthly Progress Report

This Monthly Progress Report (MPR) is being provided at the request of EGLE to provide an update regarding the implementation of the December 13, 2017 Source Area Investigation Work Plan (WP) related to per- and polyfluorinated alkyl substances (PFAS) detected in residential wells in the Wolven/Jewell study area.

## ACTIONS PERFORMED

During this period, August 24, 2019 through September 23, 2019, GZA has done the following:

1. Completed the 3<sup>rd</sup> Quarter Groundwater sampling event.
2. Completed drilling at WV-PMW-15 and installed four monitoring wells (boring logs attached).
3. Continued work to obtain access to additional drilling locations.
4. Surveyed new monitoring well locations.

## ANALYTICAL DATA RECEIVED

Some analytical data for the 3<sup>rd</sup> quarter groundwater sampling event was received during this reporting period. This data will be submitted next month once all the data is received.

## ANTICIPATED ACTIONS AND SCHEDULE FOR NEXT REPORTING PERIOD

During the next reporting period, September 24, 2019 to October 23, 2019, R&W/GZA anticipates the following activities:

- 1) Continue to work for access to other drilling locations for additional monitoring wells. Conduct additional drilling if access is obtained.
- 2) Evaluate and summarize 3<sup>rd</sup> quarter groundwater sampling data.

J:\62000\626xx\62677.81 - Wolven-Jewell Investigation\DEQ Monthly Updates\September 30, 2019 EGLE Monthly Report\Wolven\_Jewell Monthly



**GZA**  
**GeoEnvironmental, Inc.**  
*Engineers and Scientists*

Wolverine World Wide

Wolven Avenue Area

Algoma Twp, Kent County, Michigan

Boring No.: WV-MW-15A

Page: 1 of 1

File No.: 16.0062677.81

Check: Kate McDonald

Contractor: Stearns Drilling Company

Foreman: Jerry Huntoon

Logged by: John Morehouse

Date Start/Finish: 8-28-19 / 8-30-19

Boring Location: North Side of Property

GS Elev.: NM Datum: M State Plane S Zone NAD 83

Auger/  
Casing

Sampler

Type: Hollow Stem Auger

Split Spoon

O.D. / I.D.: 12.25" / 4.25"

2.0" / 1 3/8"

Hammer Wt.: NA

140lbs

Hammer Fall: NA

30.0"

TOC Elev.: NA

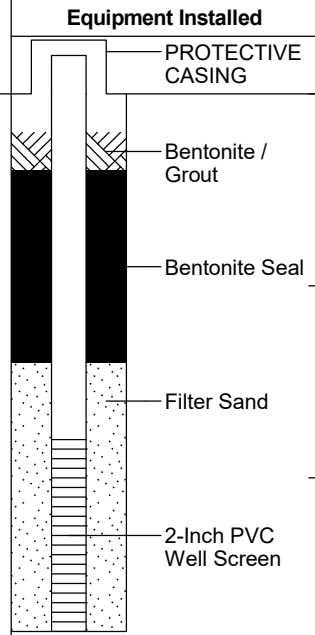
NA

**GROUNDWATER READINGS**

Date	Time	Depth	Casing	Stab
NM	NM	NM	NM	NM

Surveyed By: NA Survey Date:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				PROTECTIVE CASING	
1						See MW-WV-15D boring log for soil descriptions.		1	PROTECTIVE CASING	
2									Bentonite / Grout	
3									Bentonite Seal	
4										
5										
6										
7										
8									Filter Sand	
9										
10										
11										
12										
13										
14									Bottom of Borehole at 14.0 Feet	
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										



**REMARKS**

1. Monitoring well was installed in borehole upon completion. Well screen set from 9.0 to 14.0 feet below ground surface.

BORING WELL 6267781 WWW.WOLVEN AVENUE.GPJ GZA CORP.GDT 9/27/19



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Wolverine World Wide

Wolven Avenue Area

Algoma Twp, Kent County, Michigan

Boring No.: WV-MW-15B

Page: 1 of 1

File No.: 16.0062677.81

Check: Kate McDonald

Contractor: Stearns Drilling Company

Foreman: Jerry Huntoon

Logged by: John Morehouse

Date Start/Finish: 8-28-19 / 8-30-19

Boring Location: North Side of Property

GS Elev.: NM Datum: MLL State Plane S Zone NAD 83

Auger/  
Casing

Sampler

Type: Hollow Stem Auger

Split Spoon

O.D. / I.D.: 12.25" / 4.25"

2.0" / 1 3/8"

Hammer Wt.: NA

140lbs

Hammer Fall: NA

30.0"

TOC Elev.: NA

NA

**GROUNDWATER READINGS**

Date	Time	Depth	Casing	Stab
NM	NM	NM	NM	NM

Surveyed By: NA Survey Date:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				PROTECTIVE CASING	
1						See MW-WV-15D boring log for soil descriptions.				
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
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28										
29										
30										
31										
32										
33										
34										
35										
36										
37										
38										
39										
						Bottom of Borehole at 38.0 Feet		1		

**REMARKS**

1. Monitoring well was installed in borehole upon completion. Well screen set from 33.0 to 38.0 feet below ground surface.

BORING WELL 6267781 WWW.WOLVENAVENUE.GPJ GZA CORP.GDT 9/27/19



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Wolverine World Wide

Wolven Avenue Area

Algoma Twp, Kent County, Michigan

Boring No.: WV-MW-15C

Page: 1 of 2

File No.: 16.0062677.81

Check: Kate McDonald

Contractor: Stearns Drilling Company

Foreman: Jerry Huntoon

Logged by: John Morehouse

Date Start/Finish: 8-21-19 / 8-21-19

Boring Location: North Side of Property

GS Elev.: NM Datum: MLL State Plane S Zone NAD 83

Auger/  
Casing

Sampler

Type: Hollow Stem Auger

Split Spoon

O.D. / I.D.: 12.25" / 4.25"

2.0" / 1 3/8"

Hammer Wt.: NA

140lbs

Hammer Fall: NA

30.0"

TOC Elev.: NA

NA

**GROUNDWATER READINGS**

Date	Time	Depth	Casing	Stab
NM	NM	NM	NM	NM

Surveyed By: NA Survey Date:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					PROTECTIVE CASING
1						See MW-WV-15D boring log for soil descriptions.				
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
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26										
27										
28										
29										

Bentonite / Grout

**R  
E  
M  
A  
R  
K  
S**

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: WV-MW-15C

BORING WELL 6267781 WWW.WOLVEN AVENUE.GPJ GZA CORP.GDT 9/27/19



Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
31									<p>Filter Sand</p> <p>2-Inch PVC Well Screen</p>	
32										
33										
34										
35										
36										
37										
38										
39										
40										
41										
42										
43										
44										
45										
46										
47										
48										
49										
50						Bottom of Borehole at 50.0 Feet		1		
51										
52										
53										
54										
55										
56										
57										
58										
59										
60										
61										
62										
63										
64										

**R  
E  
M  
A  
R  
K  
S**

1. Monitoring well was installed in borehole upon completion. Well screen set from 37.8 to 42.6 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

BORING WELL 6267781 WWW.WOLVENAVENUE.GPJ GZA CORP.GDT 9/27/19



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 Engineers and Scientists

Wolverine World Wide

Wolven Avenue Area

Algoma Twp, Kent County, Michigan

Boring No.: WV-MW-15D

Page: 1 of 8

File No.: 16.0062677.81

Check: Kate McDonald

Contractor: Stearns Drilling Company

Foreman: Jerry Huntoon

Logged by: John Morehouse

Date Start/Finish: 8-9-19 / 8-19-19

Boring Location: North Side of Property

GS Elev.: NM Datum: M State Plane S Zone NAD 83

Auger/  
Casing Sampler

Type: Hollow Stem Auger Split Spoon

O.D. / I.D.: 12.25" / 4.25" 2.0" / 1 3/8"

Hammer Wt.: NA 140lbs

Hammer Fall: NA 30.0"

TOC Elev.: NA NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab
NM	NM	NM	NM	NM

Surveyed By: NA Survey Date:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					PROTECTIVE CASING
1	1	24/14	0-2	3-6 6-9		Very dark grayish-brown, SILT, some fine Sand, trace Gravel, moist. Changing at 0.6 feet to: Yellowish-brown, SILT, some Sand, trace Gravel, moist. Changing at 1.2 feet to: NO RECOVERY.	SILT 1.2' NO RECOVERY			
2	2	24/14	2-4	7-6 3-5		Yellowish-brown, SILT, some Sand, trace Gravel, moist. Changing at 2.4 feet to: Brownish-yellow, fine to medium SAND, trace Silt, moist. Changing at 2.8 feet to: Dark yellowish-brown, fine to medium SAND, trace Silt, moist. Changing at 3.2 feet to: NO RECOVERY.	SILT 2.4' SAND			
3	3	24/11	4-6	4-9 8-13		Brown, fine to coarse SAND, trace Gravel, trace Silt, wet. Changing at 4.9 feet to: NO RECOVERY.	NO RECOVERY SAND 4.9' NO RECOVERY			
4	4	24/11	6-8	3-6 7-6		Brown, fine to coarse SAND, trace Gravel, trace Silt, grading to medium to coarse SAND, trace Gravel, trace Silt, wet. Changing at 6.9 feet to: NO RECOVERY.	SAND 6.9' NO RECOVERY			
5	5	24/4	8-10	2-10 9-4		Brown, medium to coarse SAND, trace Gravel, trace Silt, wet. Changing at 8.3 feet to: NO RECOVERY.	8' SAND 8.3' NO RECOVERY			
6	6	24/12	10-12	2-4 3-4		Brown, medium to coarse SAND, trace Gravel, trace Silt, wet. Changing at 11.0 feet to: NO RECOVERY.	10' SAND			
7	7	24/17	12-14	3-9 8-10		Brown, medium to coarse SAND, trace Gravel, trace Silt, wet. Changing at 12.7 feet to: Dark grayish-brown, SILT & CLAY, moderately plastic, cohesive, moist. Changing at 12.8 feet to: Dark grayish-brown, Silty CLAY, plastic, cohesive, moist. Changing at 13.4 feet to: NO RECOVERY.	12.7' SILT & CLAY Silty CLAY 13.4' NO RECOVERY			
8	8	24/13	14-16	9-12 11-10		Dark grayish-brown, Silty CLAY, plastic, cohesive, moist. Changing at 15.1 feet to: NO RECOVERY.	14' Silty CLAY 15.1' NO RECOVERY			

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: WV-MW-15D

BORING WELL 6267781 WWW.WOLVEN AVENUE.GPJ GZA CORP.GDT 9/27/19



Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
17	9	24/17	16-18	3-6 6-6		Dark grayish-brown, Silty CLAY, plastic, cohesive, moist, occasional very thin lenses of fine grained Sand, moist. Changing at 17.4 feet to: NO RECOVERY.	Silty CLAY 17.4' NO RECOVERY			
18	10	24/18	18-20	2-5 6-9		Dark grayish-brown, Silty CLAY, plastic, cohesive, occasional very thin lenses of fine Sand, moist. Changing at 18.6 feet to: Brown, fine SAND, trace Silt, wet. Changing at 18.9 feet to: Dark grayish-brown, Silty CLAY, plastic, cohesive, moist. Changing at 19.5 feet to: NO RECOVERY.	Silty CLAY 18.6' 18.9' SAND 19.5' NO RECOVERY			
20	11	24/23	20-22	4-10 12-15		Dark grayish-brown, Silty CLAY, plastic, cohesive, bedded, occasional very thin lenses of fine Sand, moist. Changing at 21.9 feet to: NO RECOVERY.	Silty CLAY 20' NO RECOVERY			
22	12	24/19	22-24	4-9 10-13		Dark grayish-brown, Silty CLAY, plastic, cohesive, bedded, occasional very thin lenses of fine Sand, moist. Changing at 23.6 feet to: NO RECOVERY.	21.9' 22' NO RECOVERY Silty CLAY			
24	13	24/24	24-26	2-13 13-13		Dark grayish-brown, Silty CLAY, plastic, cohesive, bedded, occasional very thin lenses of fine Sand, moist. Changing at 24.5 feet to: Brown, fine SAND, trace Silt, wet. Changing at 24.9 feet to: Dark grayish-brown, Silty CLAY, plastic, cohesive, bedded, moist. Changing at 25.3 feet to: Brown, fine SAND, trace Silt, wet. Changing at 25.6 feet to: Dark grayish-brown, Silty CLAY, plastic, cohesive, bedded, moist.	23.6' 24' NO RECOVERY 24.5' Silty CLAY 24.9' SAND 25.3' Silty CLAY 25.6' SAND Silty CLAY			
26	14	24/24	26-28	1-8 11-11		Brown, fine SAND, trace Silt, wet. Changing at 25.6 feet to: Dark grayish-brown, Silty CLAY, plastic, cohesive, bedded, moist.	26.2' SILT			
28	15	24/20	28-30	WOH		Dark grayish-brown, Silty CLAY, plastic, cohesive, bedded, moist. Changing at 26.2 feet to: Brown, SILT, little Sand, cohesive, non-plastic, moist. Changing at 27.4 feet to: Dark grayish-brown, Silty CLAY, plastic, cohesive, bedded, moist.	27.4' Silty CLAY 28' SAND / SILT / Silty CLAY	1		
30	16	24/24	30-32	1-2 3-3		Brown, fine SAND, Silt and Silty Clay, moist to wet. Changing at 29.7 feet to: NO RECOVERY.	29.7' 30' NO RECOVERY SAND			
31						Grayish-brown to brown, fine SAND, some Silt, wet. Changing at 30.8 feet to: Grayish-brown to brown, SAND, Silt and Silty Clay, moist to wet. Changing at 30.9 feet to: Grayish-brown to brown, fine SAND, some Silt, wet.	30.8' 30.9' SAND / SILT / Silty CLAY SAND			
32	17	24/18	32-34	2-6 5-5		Brown to grayish-brown, fine SAND, little Silt, wet. Changing at 32.4 feet to: Dark grayish-brown, Silty CLAY, plastic, cohesive, moist. Changing at 32.8 feet to: Brown to grayish-brown, fine SAND, little Silt, wet.	32.4' 32.8' Silty CLAY SAND			
34	18	24/14	34-36	1-2 4-4		Brown to grayish-brown, fine SAND, little Silt, wet.	34.2' 34.3' Silty CLAY			

1. Groundwater was encountered at approximately 28.0 feet below ground surface.

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.





Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
35						Silt, wet. Changing at 34.2 feet to: Dark grayish-brown, Silty CLAY, plastic, cohesive, moist. Changing at 34.3 feet to: Brown to grayish-brown, fine SAND, little Silt, wet.	SAND SAND			
36	19	24/22	36-38	4-10 13-11		Brown to grayish-brown, fine SAND, little Silt, wet. Changing at 36.1 feet to: Dark grayish-brown, fine SAND, little Silt, wet. Changing at 36.3 feet to: Brown to grayish-brown, fine SAND, little Silt, wet. Changing at 36.8 feet to: Brown, SILT, cohesive, non-plastic, moist. Changing at 37.0 feet to: Brown to grayish-brown, fine SAND, little Silt, wet. Changing at 37.5 feet to: Brown, SILT, cohesive, non-plastic, moist. Changing at 37.6 feet to: Brown to grayish-brown, fine SAND, little Silt, wet. Brown, fine to coarse SAND, trace Gravel, trace Silt, wet. Changing at 38.7 feet to: NO RECOVERY.	36.1' 36.3' Silty CLAY 36.8' SAND 37' SILT 37.5' SAND 37.6' SILT SAND			
37										
38	20	24/8	38-40	2-5 10-12			38.7' NO RECOVERY			
39										
40	21	24/22	40-42	1-2 6-9			40' SAND			
41										
42	22	24/19	42-44	1-5 7-9			41.8' 42' NO RECOVERY 42.5' SAND 42.6' Silty CLAY 42.9' GRAVEL 43' Silty CLAY 43.6' SAND			
43										
44	23	24/22	44-46	4-6 9-12			44' NO RECOVERY 44.6' SAND 44.7' Silty CLAY SAND			
45							45.4' SILT 45.8' NO RECOVERY GRAVEL			
46	24	24/24	46-48	6-14 24-31			46' NO RECOVERY GRAVEL			
47							47.3' 47.5' Sandy CLAY Silty CLAY			
48	25	24/24	48-50	14-30 30-30						
49										
50		60					50' NO SAMPLE COLLECTED			
51										
52										
53										

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

BORING WELL: 6267781 WWW.WOLVENAVENUE.GPJ GZA CORP.GDT 9/27/19





Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
54							NO SAMPLE COLLECTED			
55	26	12/12	55-56	7-9		Dark grayish-brown, Silty CLAY, plastic, cohesive, bedded, moist.	55' Silty CLAY			
56	27	24/24	56-58	7-18 20-29		Dark grayish-brown, Silty CLAY, plastic, cohesive, bedded, moist. Changing at 57.6 feet to: Dark grayish-brown, Silty CLAY, trace Gravel, plastic, cohesive, some bedding, moist.				
57										
58	28	24/24	58-60	40-39 22-22		Dark grayish-brown, Silty CLAY, trace Gravel, plastic, cohesive, some bedding, moist.				
59										
60	29	24/24	60-62	19-21 30-44		Dark grayish-brown, Silty CLAY, trace Gravel, plastic, cohesive, moist.				
61										
62	30	24/24	62-64	3-11 17-23		Dark grayish-brown, Silty CLAY, trace Gravel, plastic, cohesive, moist.				
63										
64	31	24/24	64-66	12-29 32-50		Dark grayish-brown, Silty CLAY, trace Gravel, plastic, cohesive, moist.				
65										
66	32	24/24	66-68	12-20 26-40		Dark grayish-brown, Silty CLAY, trace Gravel, plastic, cohesive, moist.				Bentonite / Grout
67										
68	33	24/5	68-70	17-50		Dark grayish-brown, Silty CLAY, trace Gravel, plastic, cohesive, moist.	68.4' NO RECOVERY			
69										
70	34	24/24	70-72	9-19 31-42		Dark grayish-brown, Silty CLAY, trace Gravel, plastic, cohesive, moist.	70' Silty CLAY			
71										

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.



Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
73	35	10/8	72-72.8	30-50/4"		Dark grayish-brown, Silty CLAY, trace Gravel, plastic, cohesive, moist. Changing at 72.7 feet to: NO RECOVERY.	Silty CLAY 72.7' NO RECOVERY			
74	36	17/12	74-75.4	15-39-50/5"		Dark grayish-brown, Silty CLAY, trace Gravel, plastic, cohesive, moist. Changing at 74.3 feet to: Dark grayish-brown to brown, fine to medium SAND, little to some Silt, slightly cohesive, non-plastic, moist to wet. Changing at 74.6 feet to: Dark grayish-brown, fine SAND, some Silt, little Clay, trace Gravel, non to slightly plastic, cohesive, moist. Changing at 75.0 feet to: NO RECOVERY.	74' 74.3' Silty CLAY SAND 75' NO RECOVERY			
76	37	8/5	76-76.7	30-50/2"		Dark grayish-brown, fine SAND, some Silt, little Clay, trace Gravel, non to slightly plastic, cohesive, moist. Changing at 75.0 feet to: NO RECOVERY.	76' SAND 76.4' NO RECOVERY			
78	38	10/10	78-78.8	20-50/4"		Dark grayish-brown, fine SAND, some Silt, little Clay, trace Gravel, non to slightly plastic, cohesive, moist. Changing at 76.4 feet to: NO RECOVERY.	78' SAND 78.8' NO RECOVERY			
80	39	10/8	80-80.8	34-50/4"		Dark grayish-brown, fine SAND, some Silt, little Clay, trace Gravel, non to slightly plastic, cohesive, moist. Changing at 80.7 feet to: NO RECOVERY.	80' SAND 80.7' NO RECOVERY			
82	40	10/8	82-82.8	15-50/4"		Dark grayish-brown, fine SAND, some Silt, little Clay, trace Gravel, non to slightly plastic, cohesive, moist. Changing at 82.7 feet to: NO RECOVERY.	82' SAND 82.7' NO RECOVERY			
84	41	11/12	84-84.9	32-50/5"		Dark grayish-brown, fine SAND, some Silt, little Clay, trace Gravel, non to slightly plastic, cohesive, moist. Changing at 85.0 feet to: NO RECOVERY.	84' SAND 85' NO RECOVERY			
86	42	11/11	86-86.9	31-50/5"		Dark grayish-brown, fine SAND, some Silt, little Clay, trace Gravel, non to slightly plastic, cohesive, moist. Changing at 86.9 feet to: NO RECOVERY.	86' SAND 86.9' NO RECOVERY			
88	43	12/12	88-89	33-50		Dark grayish-brown, fine SAND, some Silt, little Clay, trace Gravel, non to slightly plastic, cohesive, moist. Changing at 88.5 feet to: Dark grayish-brown to dark yellowish-brown, fine to medium SAND, little to some Silt, moist to wet. Changing at 89.0 feet to: NO RECOVERY.	88' SAND 89' NO RECOVERY			
90	44	11/12	90-90.9	38-50/4.5"		Dark grayish-brown, fine SAND, some Silt,	90' SAND			

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: WV-MW-15D

BORING WELL 6267781 WWW.WOLVENAVENUE.GPJ GZA CORP.GDT 9/27/19



Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
91						little Clay, trace Gravel, non to slightly plastic, cohesive, moist. Changing at 91.0 feet to: NO RECOVERY.	91' SAND NO RECOVERY			
92	45	12/12	92-93	27-50		Dark grayish-brown, fine SAND, some Silt, little Clay, trace Gravel, non to slightly plastic, cohesive, moist. Changing at 93.0 feet to: NO RECOVERY.	92' SAND			
93							93' NO RECOVERY			
94	46	12/12	94-95	27-50		Dark grayish-brown, fine SAND, some Silt, little Clay, trace Gravel, non to slightly plastic, cohesive, moist. Changing at 95.0 feet to: NO RECOVERY.	94' SAND			
95							95' NO RECOVERY			
96	47	17/18	96-97.4	29-47-50/5"		Dark grayish-brown, Silty CLAY, plastic, cohesive, moist. Changing at 97.5 feet to: NO RECOVERY.	96' Silty CLAY			
97							97.5' NO RECOVERY			
98	48	18/18	98-99.5	23-43-50		Brown, fine to medium SAND, little Silt, trace Gravel, moist to wet. Changing at 98.4 feet to: Dark grayish-brown, Silty CLAY, plastic, cohesive, moist.	98' SAND 98.4' Silty CLAY			
99										
100	49	8/7	100-100.7	48-50/2"		Dark grayish-brown, fine to medium SAND, little Silt, trace Gravel, slightly cohesive, moist to wet. Changing at 100.4 feet to: Dark grayish-brown, fine SAND, some Silt, little Clay, trace Gravel, non to slightly plastic, cohesive, moist. Changing at 100.9 feet to: NO RECOVERY.	100' SAND			
101							100.9' NO RECOVERY			
102	50	10/7	102-102.8	37-50/3.5"		Grayish-brown to brown, fine to medium SAND, little Silt, trace Gravel, slightly cohesive, moist to wet. Changing at 102.6 feet to: NO RECOVERY.	102' SAND			
103							102.6' NO RECOVERY			
104	51	10/8	104-104.8	37-50/4"		Dark grayish-brown, fine SAND, some Silt, little Clay, trace Gravel, non to slightly plastic, cohesive, moist. Changing at 104.7 feet to: NO RECOVERY.	104' SAND			
105							104.7' NO RECOVERY			
106	52	9/8	106-106.8	41-50/3"		Dark grayish-brown, fine SAND, some Silt, little Clay, trace Gravel, non to slightly plastic, cohesive, moist. Changing at 106.9 feet to: NO RECOVERY.	106' SAND			
107							106.9' NO RECOVERY			
108	53	11/8	108-108.9	44-50/4.5"		Dark grayish-brown, fine SAND, some Silt, little Clay, trace Gravel, non to slightly plastic, cohesive, moist. Changing at 108.9 feet to: NO RECOVERY.	108' SAND			
109							108.9'			

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: WV-MW-15D

BORING WELL 6267781 WWW.WOLVENAVENUE.GPJ GZA CORP.GDT 9/27/19



Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
110	54	11/14	110-110.9	38-50/5"		Dark grayish-brown, fine SAND, some Silt, little Clay, trace Gravel, non to slightly plastic, cohesive, moist. Changing at 111.3 to 112.0 feet to: NO RECOVERY.	110' NO RECOVERY SAND			
111					111.3' NO RECOVERY					
112	55	11/12	112-112.9	31-50/5"		Dark grayish-brown, fine SAND, some Silt, little Clay, trace Gravel, non to slightly plastic, cohesive, moist. Changing at 113.0 feet to: NO RECOVERY.	112' NO RECOVERY SAND			
113					113' NO RECOVERY					
114	56	17/17	114-115.4	11-36-50/5"		Dark grayish-brown, fine SAND, some Silt, little Clay, trace Gravel, non to slightly plastic, cohesive, moist. Changing at 115.4 feet to: NO RECOVERY.	114' NO RECOVERY SAND			
115					115.4' NO RECOVERY					
116	57	12/8	116-117	48-50/5.5"		Dark grayish-brown, fine SAND, some Silt, little Clay, trace Gravel, non to slightly plastic, cohesive, moist. Changing at 116.9 feet to: NO RECOVERY.	116' NO RECOVERY SAND			
117					116.9' NO RECOVERY					
118	58	18/18	118-119.5	26-49-50		Dark grayish-brown, fine SAND, some Silt, little Clay, trace Gravel, non to slightly plastic, cohesive, moist. Changing at 119.5 feet to: NO RECOVERY.	118' NO RECOVERY SAND			
119					119.5' NO RECOVERY					
120	59	21/22	120-121.8	23-37 40-50/3"		Dark grayish-brown, fine SAND, some Silt, little Clay, trace Gravel, non to slightly plastic, cohesive, moist.	120' NO RECOVERY SAND			
121					121' NO RECOVERY					
122	60	5/0	122-122.4	50/5"		NO RECOVERY.	122' NO RECOVERY			
123							123' NO RECOVERY			
124	61	11/10	124-124.9	33-50/5"		Dark grayish-brown, fine SAND, some Silt, little Clay, trace Gravel, non to slightly plastic, cohesive, moist. Changing at 124.8 feet to: NO RECOVERY.	124' NO RECOVERY SAND			
125					124.8' NO RECOVERY					
126	62	10/9	126-126.8	48-50/4"		Dark grayish-brown, fine SAND, some Silt, little Clay, trace Gravel, non to slightly plastic, cohesive, moist. Changing at 126.9 feet to: NO RECOVERY.	126' NO RECOVERY SAND			
127					126.9' NO RECOVERY					
							127' NO RECOVERY			
							128'			

REMARKS

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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
129	63	10/9	128-128.8	40-50/4"		Dark grayish-brown, fine SAND, some Silt, little Clay, trace Gravel, non to slightly plastic, cohesive, moist. Changing at 128.9 feet to: NO RECOVERY.	SAND 128.9' NO RECOVERY		
130	64	11/11	130-130.9	33-50/5"		Dark grayish-brown, fine SAND, some Silt, little Clay, trace Gravel, non to slightly plastic, cohesive, moist. Changing at 131.2 feet to: NO RECOVERY.	130' SAND 131.2' NO RECOVERY		
131							132' SAND 132.6' NO RECOVERY		
132	65	9/9	132-132.8	46-50/3"		Brown, fine to medium SAND, little Silt, moist to wet. Changing at 132.6 feet to: Dusky red to dark yellowish-brown to gray, fine to medium SAND, little Silt moist to wet (weathered Sandstone). Changing at 135.4 feet to: NO RECOVERY.	133.4' NO RECOVERY		
133							134.2' SAND NO RECOVERY		
134	66	2/2	134-134.2	50/2"		Brown, fine to coarse SAND, little Gravel, trace Silt, wet (weathered Sandstone). Changing at 134.2 feet to: NO RECOVERY.	136' SHALE		
135									
136	67	3/4	136-136.3	50/3"		Dark gray, weathered SHALE, moist.			
137									
138						Bottom of Borehole at 138.0 Feet	2		
139									
140									
141									
142									
143									
144									
145									
146									

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2. Monitoring well was installed in borehole upon completion. Well screen set from 134.9 to 137.6 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.