Surface Water and Sediment Sample Collection Form

Site: Grand Ledge AASF

Date: 11/5/19
Time: 1550
Staff: S. Kalemba

Loc ID: AOI 1-21
Northing:
Easting:

Site Conditions

Water depth (ft): 0-0.5'
Flowing: (Yes) / No
Channel width (ft): NA
Notes (not covered in Habitat Form):

SRB outlet on North side

Field Data

Meter Type: YSI/Turbidity
Meter ID: 4392/6802

Water Quality Parameters:	Middle of Water Column
Measurement Depth (ft)	0-0.5'
Temperature (deg. C)	5.5
Sp. Conductance (uS/cm)	543.1
Dissolved Oxygen (mg/L)	10.01
Dissolved Oxygen (% sat)	87.1
pH (S.U.)	7.46
Turbidity	4.10
ORP	148.4

Surface water sample collection:

Sample ID: SW-AOI 1-21-0-0.5 (circle if collected: FD MS/MSD)
Sample Time: 1600
Type of Sample: (Grab) / Pump / Other
Sample depth (inches): 6"
No. of samples collected: 1
No. of samples rejected: 0
Analyses Collected: PFAS by Lab SOP Table B-15
Rationale: NA

Sheen: Yes / No
Odor: Yes / (No)
Notes (not covered in Habitat Form):

Sediment collection:

Sample ID: AOI 1-21-SD-0-0.5 (circle if collected: FD MS/MSD)
Sample Time: 1625
Core penetration depth (inches): 6"
Number of cores collected: 1
Number of cores rejected: 0
Analyses Collected: PFAS by Lab SOP Table B-15
Rationale: NA

Sheen: Yes / (No)
Odor: Yes / (No)
Notes and material description (include sediment type, texture color, layering, entrained debris, biota):

Tan/sh-red clay, high plasticity, medium soft. Water draining at steady rate.

Surface Water and Sediment Sample Collection Form

Site: Grand Ledge AASF

Date 11/21/19
Time 1405
Staff S. Tjon

Loc ID AOI 1-21
Northing
Easting

Site Conditions
Water depth (ft): 0-0.5'
Flowing: (Yes) / No
Channel width (ft): NA
Notes (not covered in Habitat Form):

SRB outlet on North side, qualifying rain event ~0.2 inches at time of sampling

Field Data Meter Type: YSI Quatro/ Turbidity Meter Meter ID: 4392/6802

Water Quality Parameters:	Middle of Water Column
Measurement Depth (ft)	0-0.5'
Temperature (deg. C)	7.1
Sp. Conductance (uS/cm)	365.2
Dissolved Oxygen (mg/L)	7.88
Dissolved Oxygen (% sat)	—
pH (S.U.)	7.60
Turbidity	8.78
ORP	260.10

Surface water sample collection: (circle if collected: FD, MS/MSD)
Sample ID: AOI 1-21-SW-0-0.5-W1
Sample Time: 1405
Type of Sample (Grab) / Pump / Other
Sample depth (inches): 6"
No. of samples collected: 2
No. of samples rejected: 0
Rationale: NA
Analyses Collected: PFAS by LCMSMS Table B-15

Sheen Yes / (No) Odor Yes / (No)
Notes (not covered in Habitat Form):

Sediment collection: (circle if collected: FD, MS/MSD)
Sample ID:
Sample Time:
Core penetration depth (inches):
Number of cores collected:
Number of cores rejected:
Rationale:
Analyses Collected:

Sheen Yes / No Odor Yes / No
Notes and material description (include sediment type, texture color, layering, entrained debris, biota):

Surface Water and Sediment Sample Collection Form

Site: Grand Ledge AASF

Date: 10/5/19
Time: 1045
Staff: S. Kalemba

Loc ID: AOI 1-22
Northing:
Easting:

Site Conditions
Water depth (ft): 0-0.5'
Channel width (ft): NA
Flowing: Yes / No SW
Notes (not covered in Habitat Form):
SRB inlet on East end.

Field Data
Meter Type: YSI Quatro/ Turbidity Meter
Meter ID: 18H100988 4392/6802

Water Quality Parameters:	Middle of Water Column
Measurement Depth (ft)	0-0.5'
Temperature (deg. C)	12.6
Sp. Conductance (uS/cm)	809
Dissolved Oxygen (mg/L)	8.17
Dissolved Oxygen (% sat)	8.13
pH (S.U.)	76.5
Turbidity	1.82
ORP	152.1

Surface water sample collection:
Sample ID: AOI1-22-SW-0-0.5
Sample Time: 1100
Type of Sample: Grab / Pump / Other
Sample depth (inches): 6"
No. of samples collected: 2 SW
No. of samples rejected: 0
Analyses Collected: PFAs by LCMSMS Table B-15.
circle if collected: FD MS/MSD
Rationale: NA
Sheen: Yes / No SW
Odor: Yes / No
Notes (not covered in Habitat Form):
Water flowing slowly.

Sediment collection:
Sample ID: AOI 1-22-SD-0-0.5
Sample Time: 1220
Core penetration depth (inches): 6"
Number of cores collected: 2
Number of cores rejected: 3
Analyses Collected: PFAs by LCMSMS Table B-15
circle if collected: FD MS/MSD
Rationale: Nothing but roots
Sheen: Yes / No
Odor: Yes / No
Notes and material description (include sediment type, texture color, layering, entrained debris, biota):
Organics, roots, tall grass, fragmites, decomposition odor, Black, trace clay and fine sand.

Surface Water and Sediment Sample Collection Form

Site: Grand Ledge AAFB

Date 11/21/19
Time 1430
Staff S. Tjan

Loc ID AOI 1-22
Northing
Easting

Site Conditions
Water depth (ft): 0 - 0.5' Flowing: (Yes) / No
Channel width (ft): NA
Notes (not covered in Habitat Form):

SRB inlet on East end, Qualifying rain event ~0.2 inches at time of sampling

Field Data Meter Type: YSI Quatro / Turbidity Meter Meter ID: 18H100988 4392/6802

Water Quality Parameters:	Middle of Water Column
Measurement Depth (ft)	0-0.5'
Temperature (deg. C)	8.1
Sp. Conductance (uS/cm)	138.9
Dissolved Oxygen (mg/L)	8.57
Dissolved Oxygen (% sat)	—
pH (S.U.)	7.83
Turbidity	9.38
ORP	255.1

Surface water sample collection: circle if collected: FD MS/MSD
Sample ID: AOI 1-22-SW-0-0.5-W1
Sample Time: 1430
Type of Sample (Grab) / Pump / Other
Sample depth (inches): 6"
No. of samples collected: 2
No. of samples rejected: 0 Rationale: NA
Analyses Collected: PFAS by LCMSMS Table B-15

Sheen ~~Yes~~ / No Odor Yes / (No)
Notes (not covered in Habitat Form):

Stagnant water, some bubbles

Sediment collection: circle if collected: FD MS/MSD
Sample ID:
Sample Time:
Core penetration depth (inches):
Number of cores collected:
Number of cores rejected: Rationale:
Analyses Collected:

Sheen Yes / No Odor Yes / No
Notes and material description (include sediment type, texture color, layering, entrained debris, biota):

Surface Water and Sediment Sample Collection Form

Site: Grand Ledge AASF

Date: 11/5/19
Time: 1425
Staff: S. Kalemba

Loc ID: AOI 1-23
Northing:
Easting:

Site Conditions

Water depth (ft): 0-0.5'
Channel width (ft): NA
Flowing: Yes / No SK

Notes (not covered in Habitat Form):

SRB on South west end.

Field Data

Meter Type: YSI / Turbidity
Meter ID: 4342/6802

Water Quality Parameters:	Middle of Water Column
Measurement Depth (ft)	0-0.5'
Temperature (deg. C)	9.3
Sp. Conductance (uS/cm)	381.0
Dissolved Oxygen (mg/L)	9.36
Dissolved Oxygen (% sat)	81.3
pH (S.U.)	9.95
Turbidity	12.4
ORP	145.2

Surface water sample collection:

Sample ID: AOI 1-23-SW-0-0.5 (circle if collected: FD / MS/MSD)
Sample Time: 1440
Type of Sample: Grab / Pump / Other
Sample depth (inches): 6"
No. of samples collected: 3
No. of samples rejected: 0 Rationale: NA
Analyses Collected: PFAS by Lemsm Table B-15.

Sheen: Yes / No Odor: Yes / No

Notes (not covered in Habitat Form):

Water flowing slowly.

Sediment collection:

Sample ID: AOI 1-23-SD-0-0.5 (circle if collected: FD / MS/MSD)
Sample Time: 1520
Core penetration depth (inches): 6"
Number of cores collected: 3
Number of cores rejected: 0 Rationale: NA
Analyses Collected: PFAS by Lemsm Table B-15.

Sheen: Yes / No Odor: Yes / No

Notes and material description (include sediment type, texture color, layering, entrained debris, biota):

Clay - high Plasticity, tan-Red, ~~trace fine sand~~, medium ~~stiff~~ SK soft. 5Y 5/1

Surface Water and Sediment Sample Collection Form

Site: Grand Ledge AASF

Date: 11/21/19
Time: 1350
Staff: S. Tjan

Loc ID: AOI 1-23
Northing:
Easting:

Site Conditions

Water depth (ft): 0-0.5'
Flowing: (Yes) / No
Channel width (ft): NA
Notes (not covered in Habitat Form):

SRB on southwest end, Qualifying rain event ~0.2 inches at time of sampling

Field Data

Meter Type: YSI Quatro / Turbidity Meter Meter ID: 4392 / 16802

Water Quality Parameters:	Middle of Water Column
Measurement Depth (ft)	0-0.5'
Temperature (deg. C)	8.2
Sp. Conductance (uS/cm)	108.2
Dissolved Oxygen (mg/L)	9.69
Dissolved Oxygen (% sat)	—
pH (S.U.)	9.41
Turbidity	17.3
ORP	222.1

Surface water sample collection:

Sample ID: AOI 1-23-SW-0-0.5-W1 (circle if collected: FD MS/MSD)
Sample Time: 1350
Type of Sample: (Grab) / Pump / Other
Sample depth (inches): 6"
No. of samples collected: 2
No. of samples rejected: 0
Rationale: NA
Analyses Collected: PFAS by LCMSMS Table B-15

Sheen: (Yes) / No
Odor: Yes / (No)
Notes (not covered in Habitat Form):

Stagnant / flowing slowly, some bubbles

Sediment collection:

Sample ID: (circle if collected: FD MS/MSD)
Sample Time:
Core penetration depth (inches):
Number of cores collected:
Number of cores rejected:
Rationale:
Analyses Collected:

Sheen: Yes / No
Odor: Yes / No
Notes and material description (include sediment type, texture color, layering, entrained debris, biota):

Surface Water and Sediment Sample Collection Form

Site: Grand Ledge

Date: 11/5/19
Time: 1230
Staff: J. Kalemba

Loc ID: AOI 1-24
Northing:
Easting:

Site Conditions

Water depth (ft): 0-0.5'
Channel width (ft): NA
Flowing: Yes / No SK

Notes (not covered in Habitat Form):

SRB on South East side.

Field Data Meter Type: YSI/Turbidity Meter ID: 4392/6802

Water Quality Parameters:	Middle of Water Column
Measurement Depth (ft)	0-0.5'
Temperature (deg. C)	10.7
Sp. Conductance (uS/cm)	530.9
Dissolved Oxygen (mg/L)	10.21
Dissolved Oxygen (% sat)	93.6
pH (S.U.)	8.23
Turbidity	2.19
ORP	153.3

Surface water sample collection:

Sample ID: AOI 1-24-SW-0-0.5 (circle if collected: FD MS/MSD)
Sample Time: 1245
Type of Sample: (Grab) / Pump / Other
Sample depth (inches): 6"
No. of samples collected: 1
No. of samples rejected: 0 NA SK Rationale: NA
Analyses Collected: PFAS by LCMSMS Table B-15.

Sheen: Yes / (No) SK Odor: Yes / (No)

Notes (not covered in Habitat Form):

water flowing slowly.

Sediment collection:

Sample ID: AOI 1-24-SD-0-0.5 (circle if collected: FD MS/MSD)
Sample Time: ~~1405~~ SK 1310
Core penetration depth (inches): 6"
Number of cores collected: 2
Number of cores rejected: 0 Rationale: NA
Analyses Collected:

Sheen: Yes / (No) Odor: Yes / (No)

Notes and material description (include sediment type, texture color, layering, entrained debris, biota):

Gray clay, med-plasticity, med-stiff,

Surface Water and Sediment Sample Collection Form

Site: Grand Ledge AASF

Date: 11/21/19
Time: 1420
Staff: S. Tjan

Loc ID: AOI 1-24
Northing:
Easting:

Site Conditions

Water depth (ft): 0-0.5'
Flowing: (Yes) / No
Channel width (ft): NA
Notes (not covered in Habitat Form):

SRB inlet on Southeast side, Qualifying rain event ~0.2 inches at time of sampling

Field Data

Meter Type: YSI Quatro/Turbidity Meter
Meter ID: 4392/6802

Water Quality Parameters:	Middle of Water Column
Measurement Depth (ft)	0-0.5'
Temperature (deg. C)	6.16
Sp. Conductance (uS/cm)	173.8
Dissolved Oxygen (mg/L)	9.50
Dissolved Oxygen (% sat)	
pH (S.U.)	7.89
Turbidity	7.81
ORP	256.2

Surface water sample collection:

Sample ID: AOI 1-24-SW-0-0.5-W1
Sample Time: 1420
Type of Sample: (Grab) / Pump / Other
Sample depth (inches): 6"
No. of samples collected: 2
No. of samples rejected: 0
Rationale: NA
Analyses Collected: PFAS by LCMSMS Table B-15

circle if collected: FD MS/MSD

Sheen: (Yes) / No
Odor: Yes / (No)
Notes (not covered in Habitat Form):

Foaming observed

Sediment collection:

Sample ID:
Sample Time:
Core penetration depth (inches):
Number of cores collected:
Number of cores rejected:
Rationale:
Analyses Collected:

circle if collected: FD MS/MSD

Sheen: Yes / No
Odor: Yes / No
Notes and material description (include sediment type, texture color, layering, entrained debris, biota):

Surface Water and Sediment Sample Collection Form

Site: Grand Ledge AASF

Date: 11/6/19
Time: 1645
Staff: S. Kalemba

Loc ID: AOI 1-25
Northing:
Easting:

Site Conditions

Water depth (ft): Flowing: Yes / No
Channel width (ft):
Notes (not covered in Habitat Form):

Field Data Meter Type: Meter ID:

Water Quality Parameters:	Middle of Water Column
Measurement Depth (ft)	
Temperature (deg. C)	
Sp. Conductance (uS/cm)	
Dissolved Oxygen (mg/L)	
Dissolved Oxygen (% sat)	
pH (S.U.)	
Turbidity	
ORP	

Surface water sample collection: circle if collected FD MS/MSD

Sample ID:
Sample Time:
Type of Sample Grab / Pump / Other
Sample depth (inches):
No. of samples collected:
No. of samples rejected: Rationale:
Analyses Collected:

Sheen Yes / No Odor Yes / No
Notes (not covered in Habitat Form):

Sediment collection: circle if collected FD MS/MSD

Sample ID: AOI 1-25-SD-0-0.5
Sample Time: 1700
Core penetration depth (inches): 0-0.5
Number of cores collected: 1
Number of cores rejected: 0 Rationale: NA
Analyses Collected: PFAS by LCMS Table B-15

Sheen Yes / (No) Odor Yes / (No)
Notes and material description (include sediment type, texture color, layering, entrained debris, biota):

Clay, med-stiff, gray, med-plasticity.

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Appendix B3
Survey Data

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Completed by AECOM Personnel

AECOM Project Name:	GRAND LEDGE, MI
AECOM Site Name:	ARNG PFAS GRAND LEDGE
Survey Company:	AECOM
Job Number:	60552172
Date:	January 14, 2020

Scope of Services: Establish coordinates and elevation of (7) new monitoring well locations
Monitoring Well Northing and Easting established using GPS, top of casing and ground elevations established using Automatic Level, elevation within 0.01'.

Notes:

Coordinate System :	Michigan State Plane South International Feet		
Horizontal :	GNSS RTK Solution Via Michigan CORS Network Solution	GPS First Order	Accuracy: 1 cm + 2 ppm
Vertical Datum :	NAVD 88		Geoid 12A
Vertical Datum Method :	Initial GPS derived Benchmark		Accuracy: 2 cm + 2 ppm
Vertical Method I strument :	Automatic Level	2nd Order Class II	Accuracy: +/- 0.01'

Surveyor: Ted Stremmell / Scott Kalemba Checked By: Luke Heide

BENCH MARK # #	NORTHING (INT FT)	EASTING (INT FT)	GROUND ELEV
BM 100	463258.92	13023568.19	838.57
BM 101	463218.21	13025331.68	859.85

MONITORING WELL #	NORTHING (INT FT)	EASTING (INT FT)	GROUND ELEV	TOC ELEV
AOI 1-10	463461.05	13024496.14	845.41	844.86
AOI 1-11	464250.05	13024374.67	842.43	842.08
AOI 1-12	464235.80	13025733.63	842.91	842.63
AOI 1-13	463821.28	13025868.19	845.52	845.09
AOI 1-14	463236.23	13025828.79	861.39	861.11
AOI 1-15	463225.07	13024952.05	854.50	853.99
AOI 2-4	463202.42	13023428.67	839.67	839.22

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Appendix C
Photographic Log

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Appendix C - Photographic Log

Army National Guard, Preliminary Assessment for PFAS	Grand Ledge AASF and Armory	Grand Ledge, MI

Photograph No. 01

Date 5/7/2019
Time 12:07

Description:
Grand Ledge AASF and Armory SI - Mobilization 1

Stormwater retention basin outlet location

Orientation:
Not available

Photograph No. 02

Date 5/7/2019
Time 13:50

Description:
Grand Ledge AASF and Armory SI - Mobilization 1

AOI 1-9, location at stormwater retention basin

Orientation:
Not available

Appendix C - Photographic Log

Army National Guard, Preliminary Assessment for PFAS	Grand Ledge AASF and Armory	Grand Ledge, MI

Photograph No. 03

Date 5/9/2019
Time 15:10

Description:
Grand Ledge AASF and Armory SI - Mobilization 1

AOI 1-6, post-drilling conditions prior to well completion

Orientation:
Not available

Photograph No. 04

Date 5/8/2019
Time 2:04

Description:
Grand Ledge AASF and Armory SI - Mobilization 1

Formation of an artesian well at temporary monitoring well AOI 1-6

Orientation:
Not available