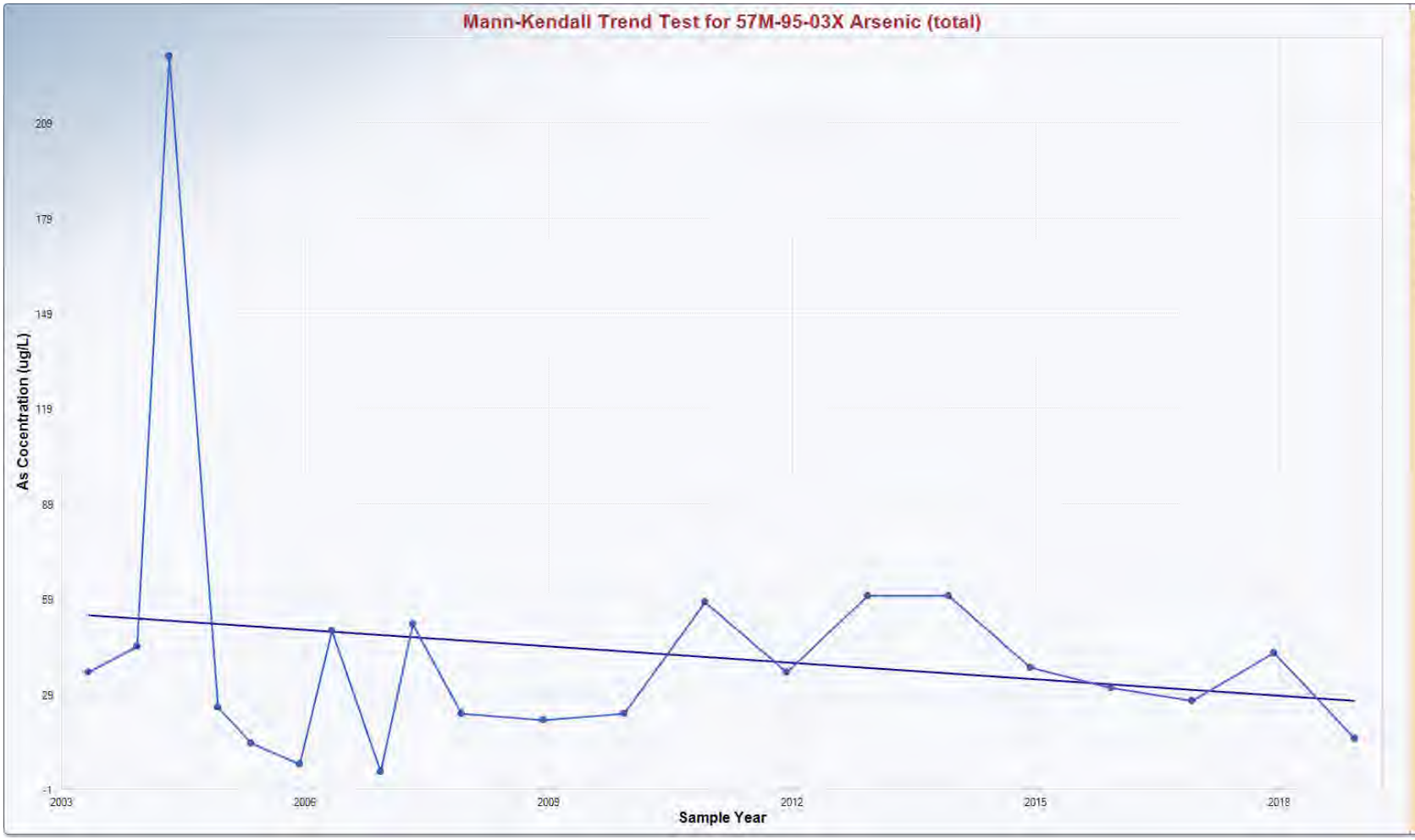
APPENDIX D
DATA TREND ANALYSES

AOC 57

AOC 57
Total Arsenic



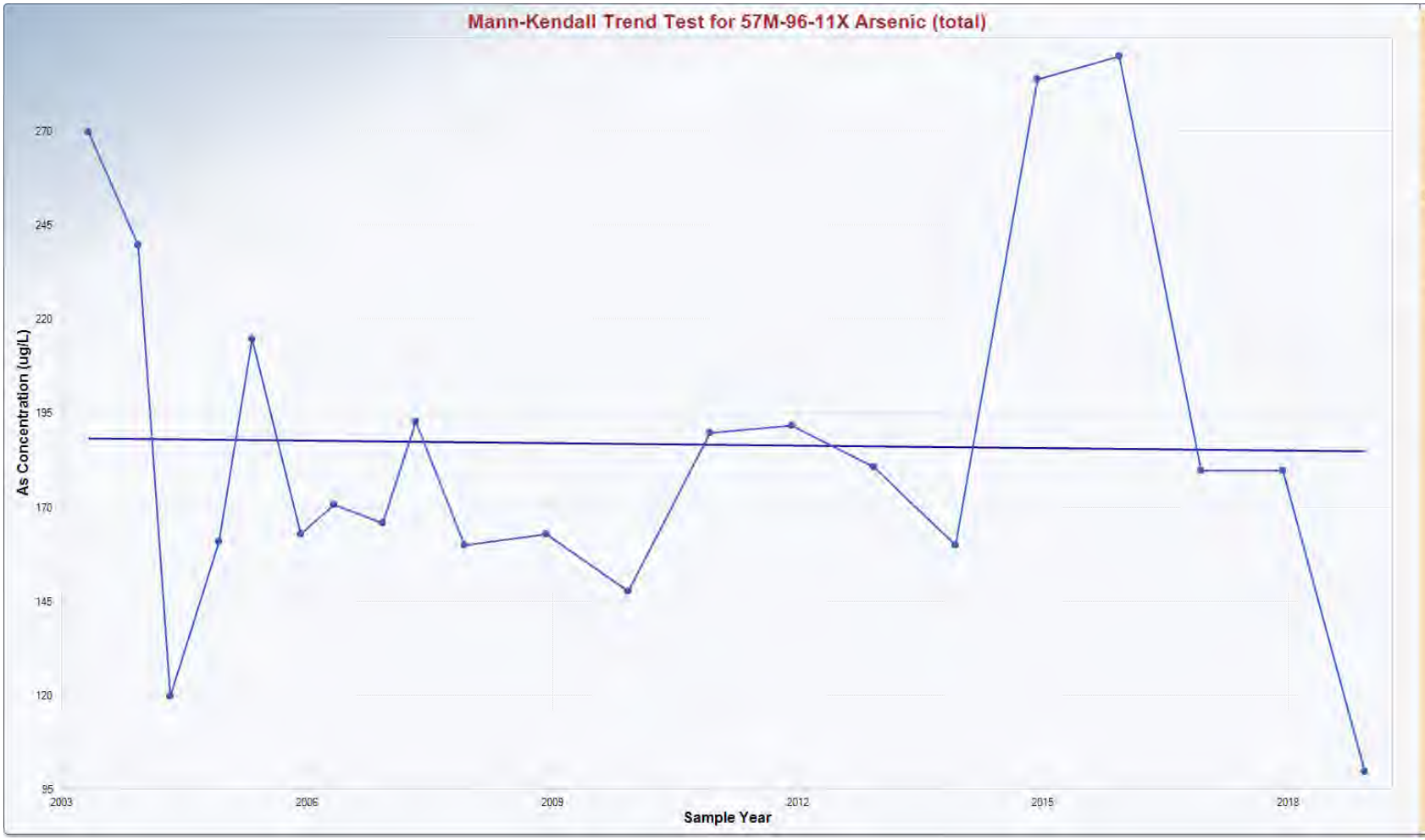
Mann-Kendall Trend Analysis

n	21
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	33.0706
Standardized Value of S	0.1814
M-K Test Value (S)	7
Tabulated p-value	0.4410
Approximate p-value	0.4280

OLS Regression Line (Blue)

OLS Regression Slope	-1.7379
OLS Regression Intercept	3,536.5653

Insufficient statistical evidence of a significant trend at the specified level of significance.



Mann-Kendall Trend Analysis

n	21
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	33.0706
Standardized Value of S	-0.2419
M-K Test Value (S)	-9
Tabulated p-value	0.4170
Approximate p-value	0.4044

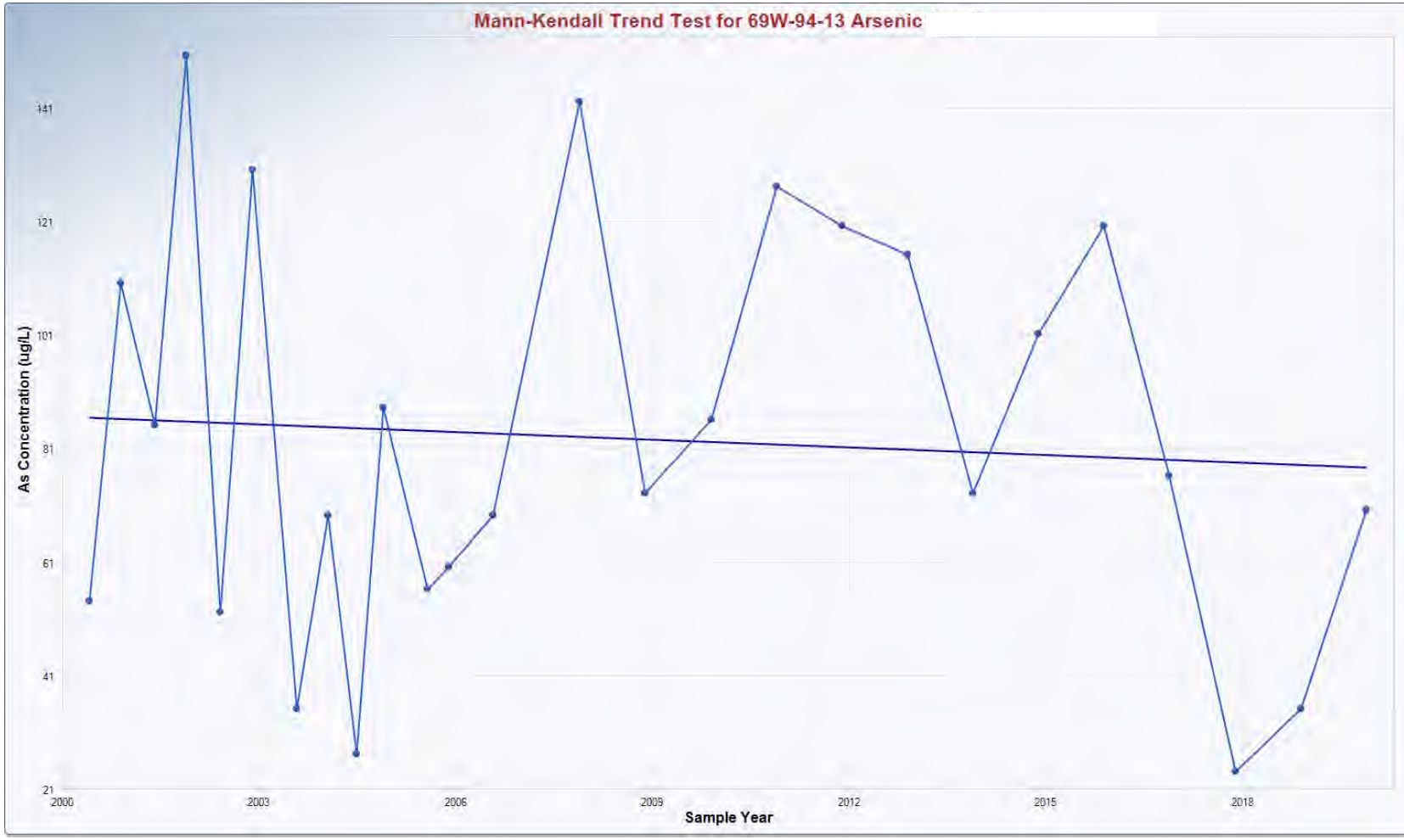
OLS Regression Line (Blue)

OLS Regression Slope	-0.2204
OLS Regression Intercept	630.1753

Insufficient statistical evidence of a significant trend at the specified level of significance.

AOC 69W

AOC 69W
Dissolved Arsenic



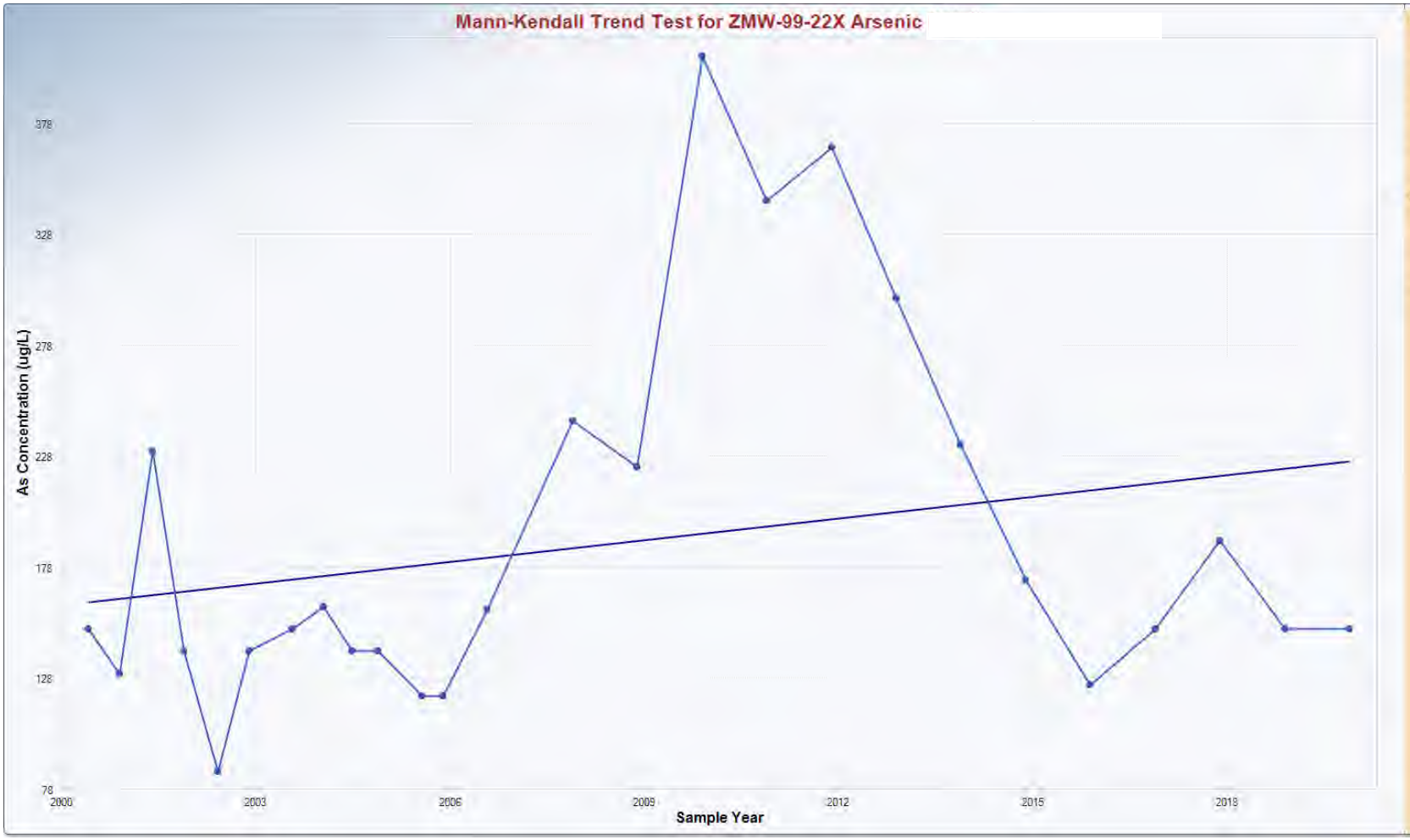
Mann-Kendall Trend Analysis

n	26
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	45.3248
Standardized Value of S	0.0000
M-K Test Value (S)	1
Appx. Critical Value (0.05)	1.6449
Approximate p-value	0.5000

OLS Regression Line (Blue)

OLS Regression Slope	-0.4470
OLS Regression Intercept	980.4420

Insufficient statistical evidence of a significant trend at the specified level of significance.



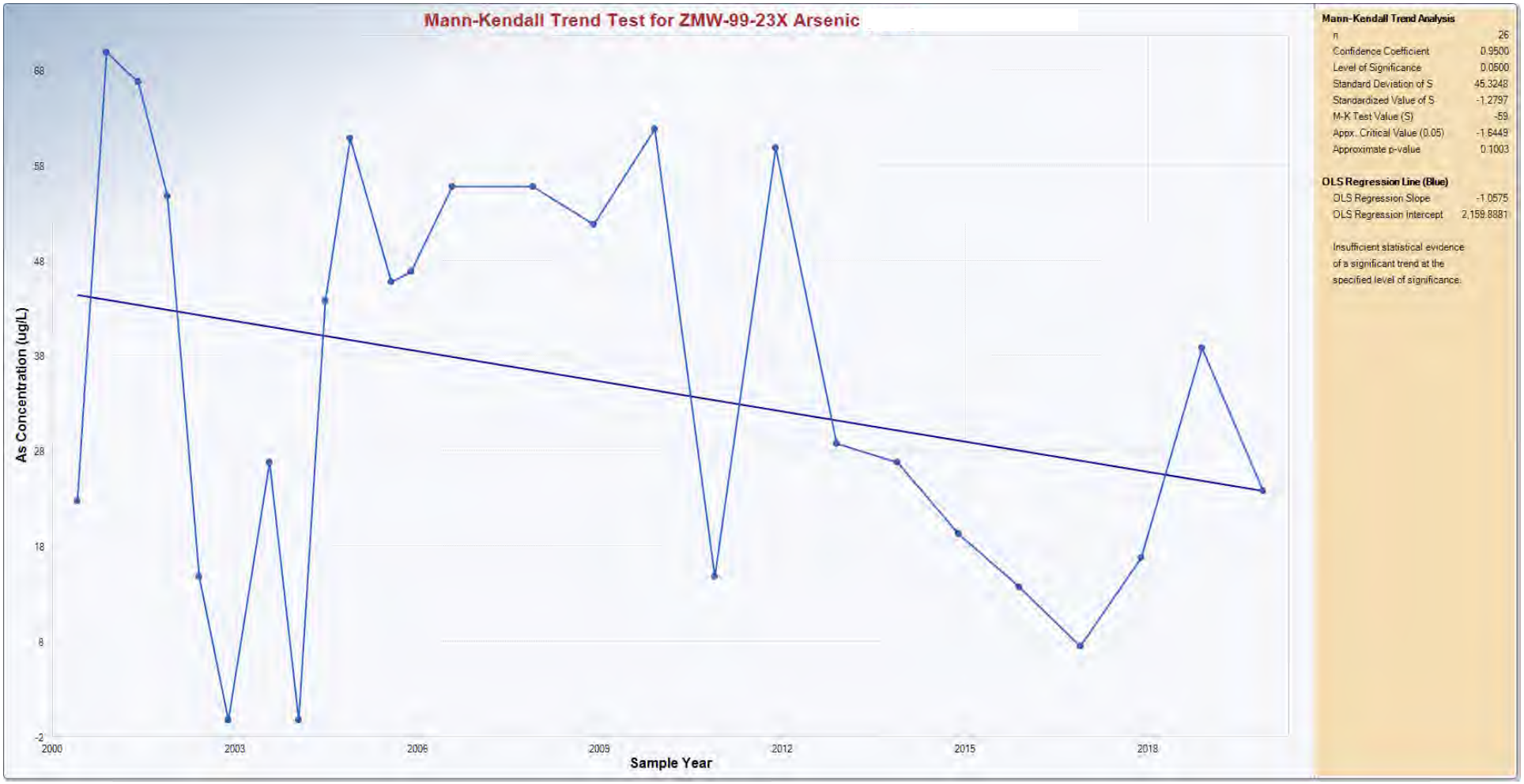
Mann-Kendall Trend Analysis

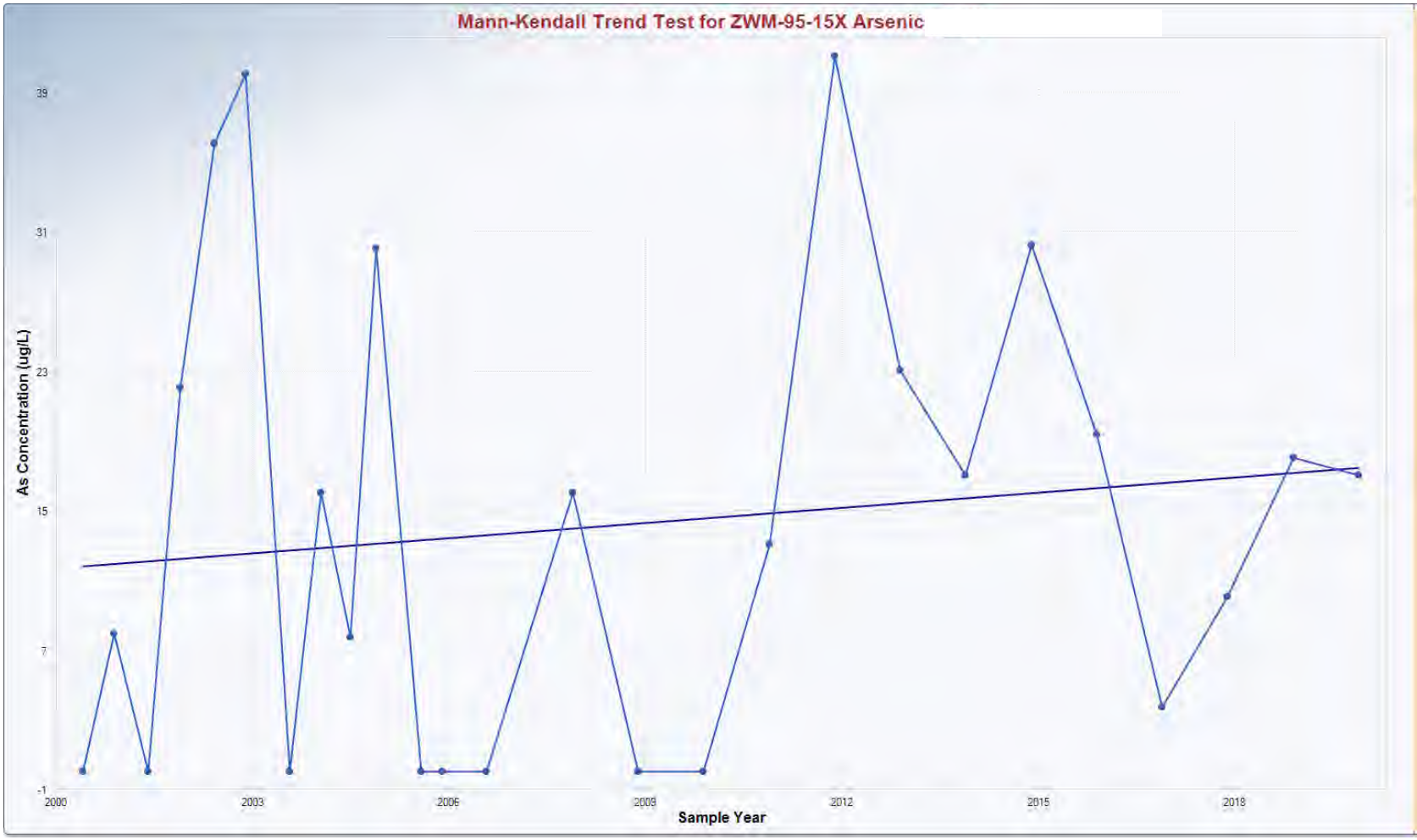
n	26
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	45.0777
Standardized Value of S	1.4863
M-K Test Value (S)	68
Appx. Critical Value (0.05)	1.6449
Approximate p-value	0.0686

OLS Regression Line (Blue)

OLS Regression Slope	3.2661
OLS Regression Intercept	-6,370.9448

Insufficient statistical evidence of a significant trend at the specified level of significance.


Mann-Kendall Trend Test for ZMW-99-23X Arsenic
As Concentration (ug/L)
68
58
48
38
28
18
8
-2
2000
2003
2006
2009
2012
2015
2018
Sample Year
Mann-Kendall Trend Analysis
n 26
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 45.3248
Standardized Value of S -1.2797
M-K Test Value (S) -59
Appx. Critical Value (0.05) -1.6449
Approximate p-value 0.1003
OLS Regression Line (Blue)
OLS Regression Slope -1.0575
OLS Regression Intercept 2,159.8881
Insufficient statistical evidence
of a significant trend at the
specified level of significance.



Mann-Kendall Trend Analysis

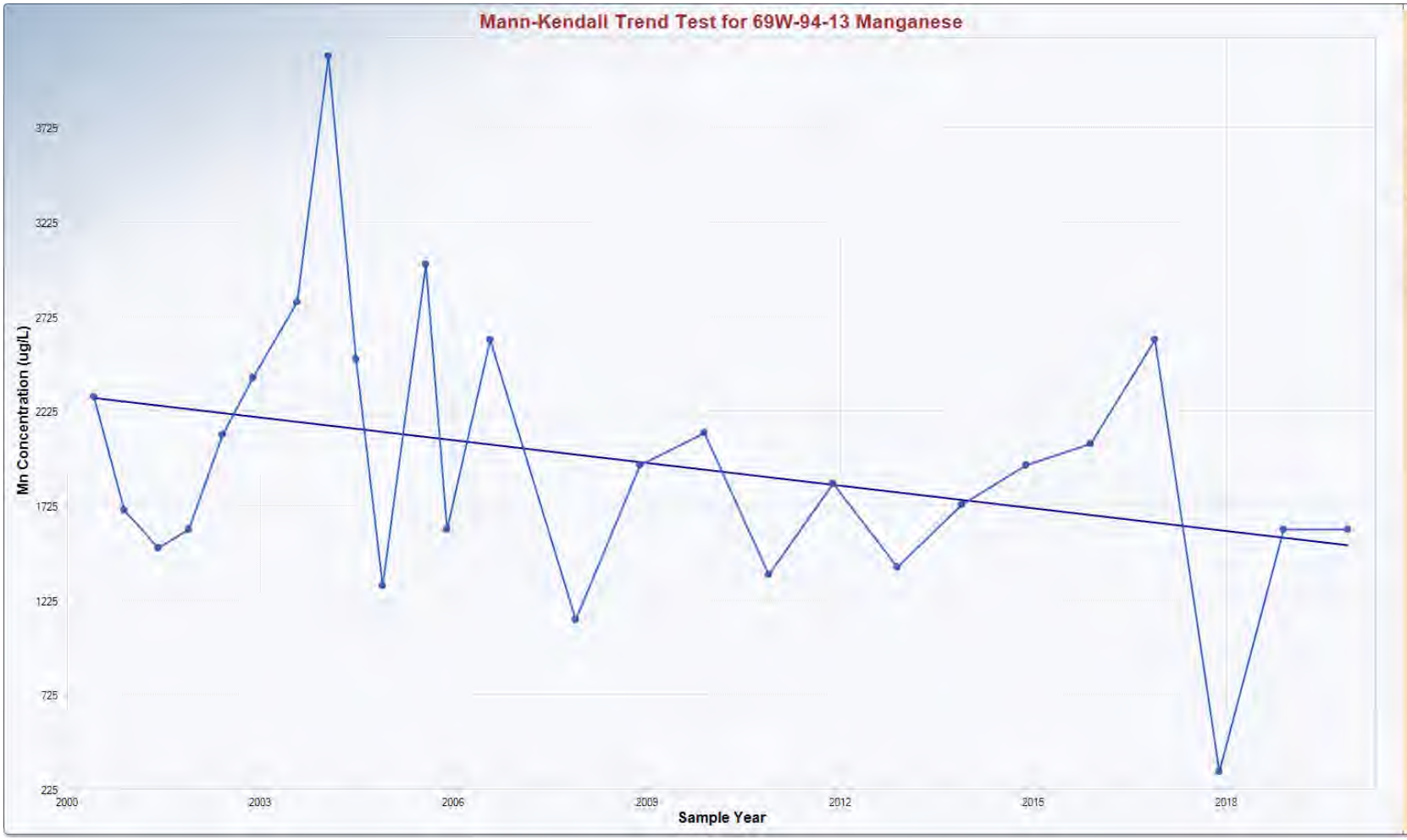
n	26
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	44.6206
Standardized Value of S	0.9861
M-K Test Value (S)	45
Appx. Critical Value (0.05)	1.6449
Approximate p-value	0.1620

OLS Regression Line (Blue)

OLS Regression Slope	0.2891
OLS Regression Intercept	-566.4554

Insufficient statistical evidence of a significant trend at the specified level of significance.

AOC 69W
Total Manganese



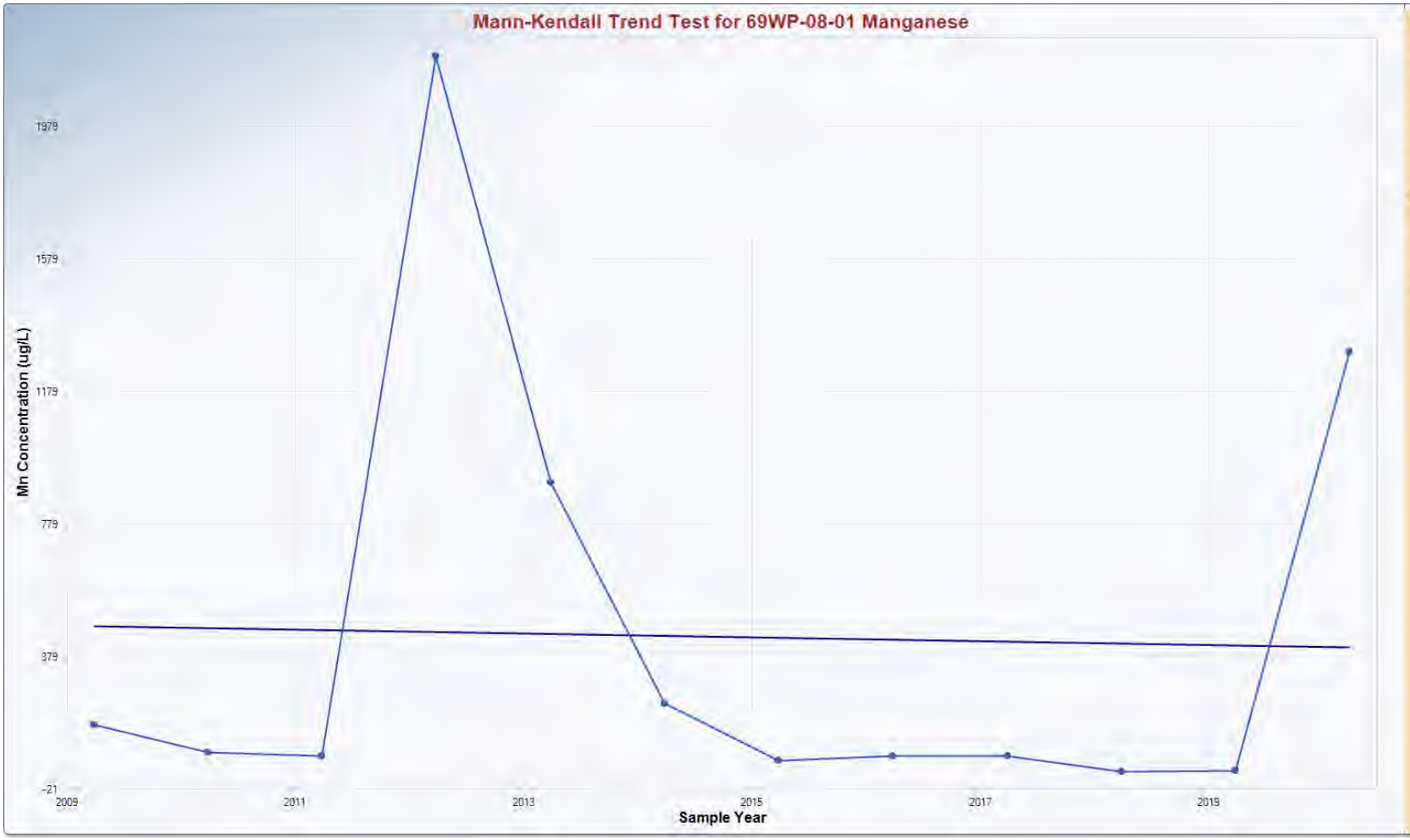
Mann-Kendall Trend Analysis

n	26
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	45.2512
Standardized Value of S	-1.0607
M-K Test Value (S)	-49
Appx. Critical Value (0.05)	-1.6449
Approximate p-value	0.1444

OLS Regression Line (Blue)

OLS Regression Slope	-39.9384
OLS Regression Intercept	82,185.2907

Insufficient statistical evidence of a significant trend at the specified level of significance.



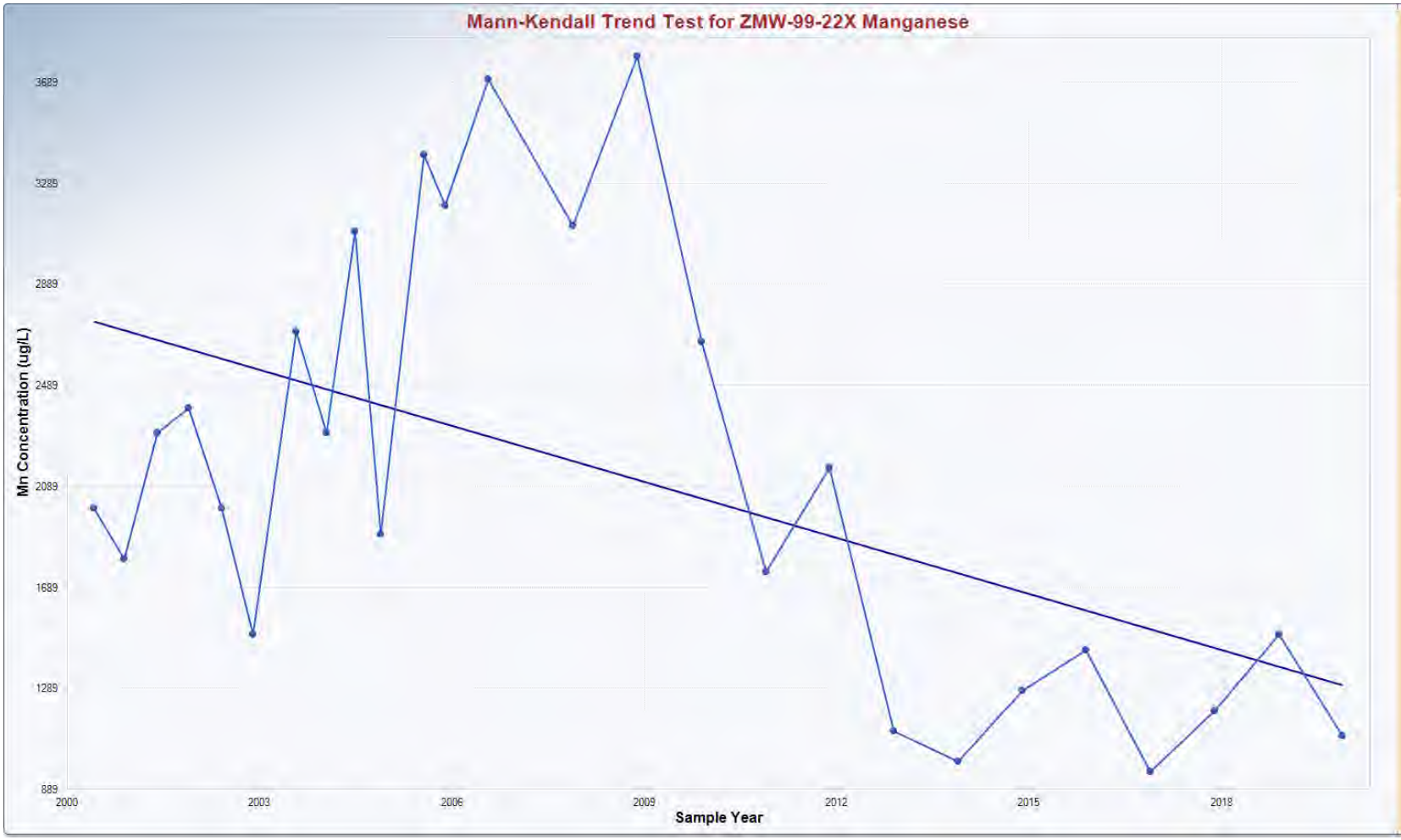
Mann-Kendall Trend Analysis

n	12
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	14.5831
Standardized Value of S	-1.0286
M-K Test Value (S)	-15
Tabulated p-value	0.1550
Approximate p-value	0.1518

OLS Regression Line (Blue)

OLS Regression Slope	-5.6619
OLS Regression Intercept	11,843.2329

Insufficient statistical evidence of a significant trend at the specified level of significance.



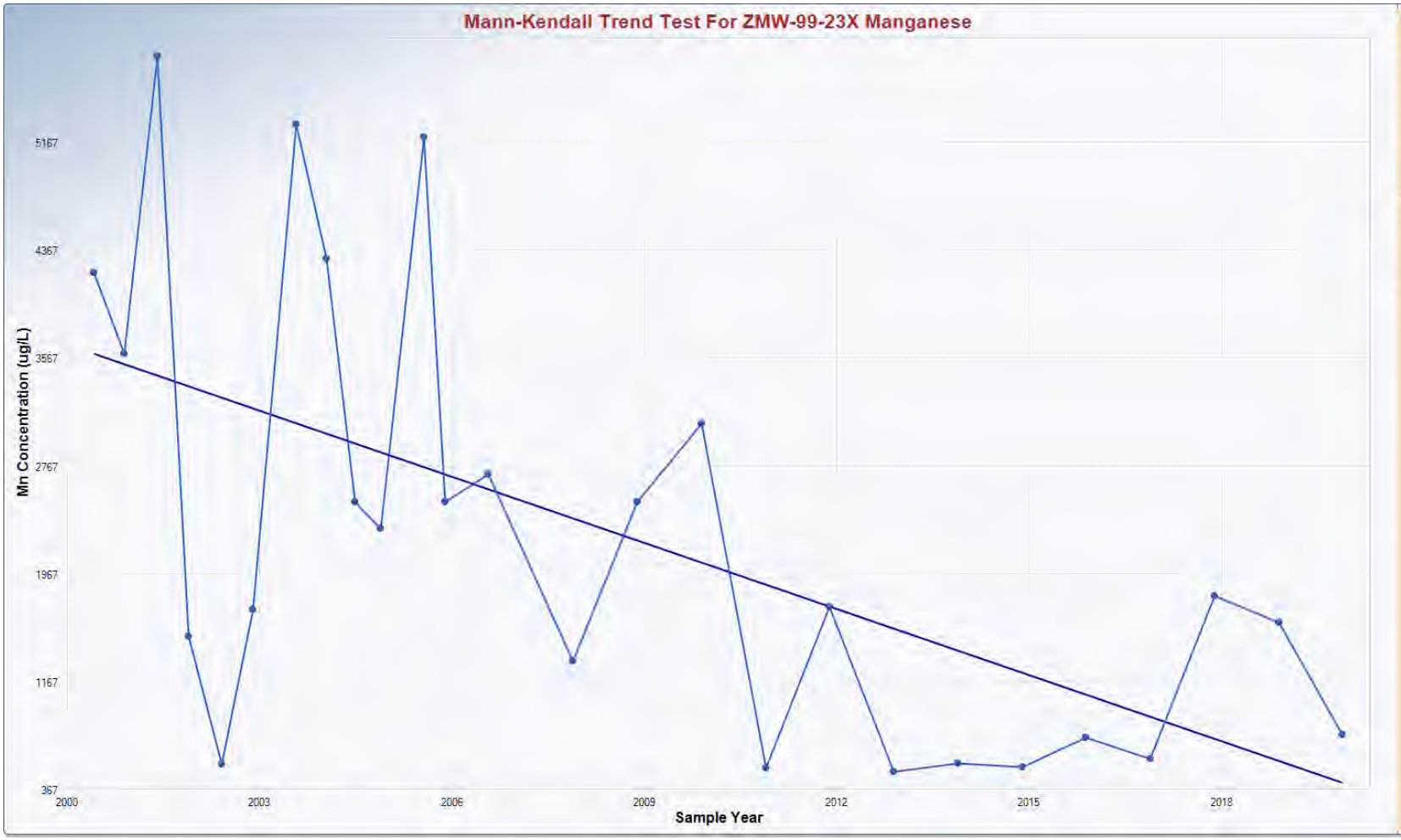
Mann-Kendall Trend Analysis

n	26
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	45.3358
Standardized Value of S	-2.0955
M-K Test Value (S)	-96
Appx. Critical Value (0.05)	-1.6449
Approximate p-value	0.0181

OLS Regression Line (Blue)

OLS Regression Slope	-73.8317
OLS Regression Intercept	150,427.0911

Statistically significant evidence of a decreasing trend at the specified level of significance.



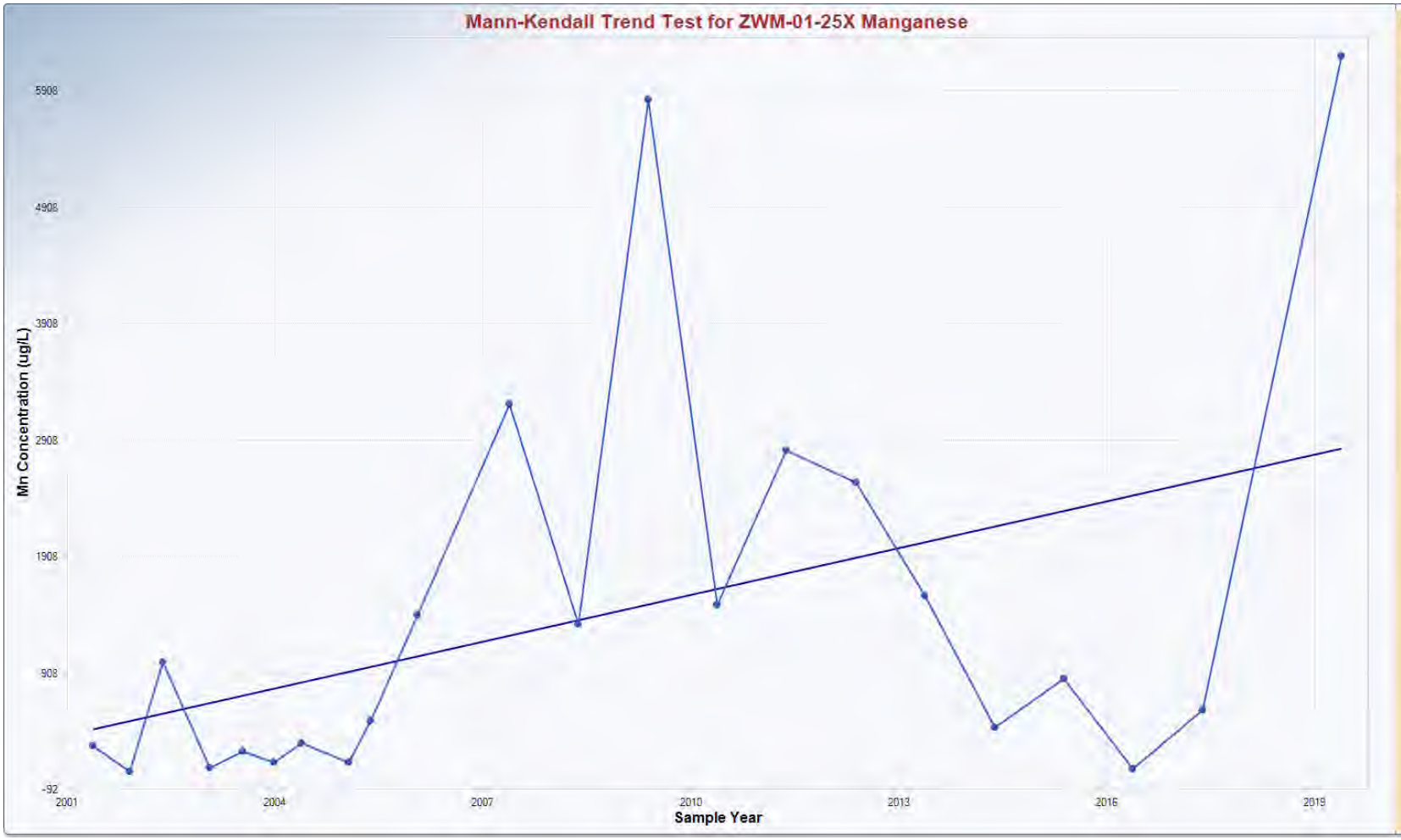
Mann-Kendall Trend Analysis

n	26
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	45.3284
Standardized Value of S	-2.6694
M-K Test Value (S)	-122
Appx. Critical Value (0.05)	-1.6449
Approximate p-value	0.0038

OLS Regression Line (Blue)

OLS Regression Slope	-163.3265
OLS Regression Intercept	330,300.7041

Statistically significant evidence of a decreasing trend at the specified level of significance.



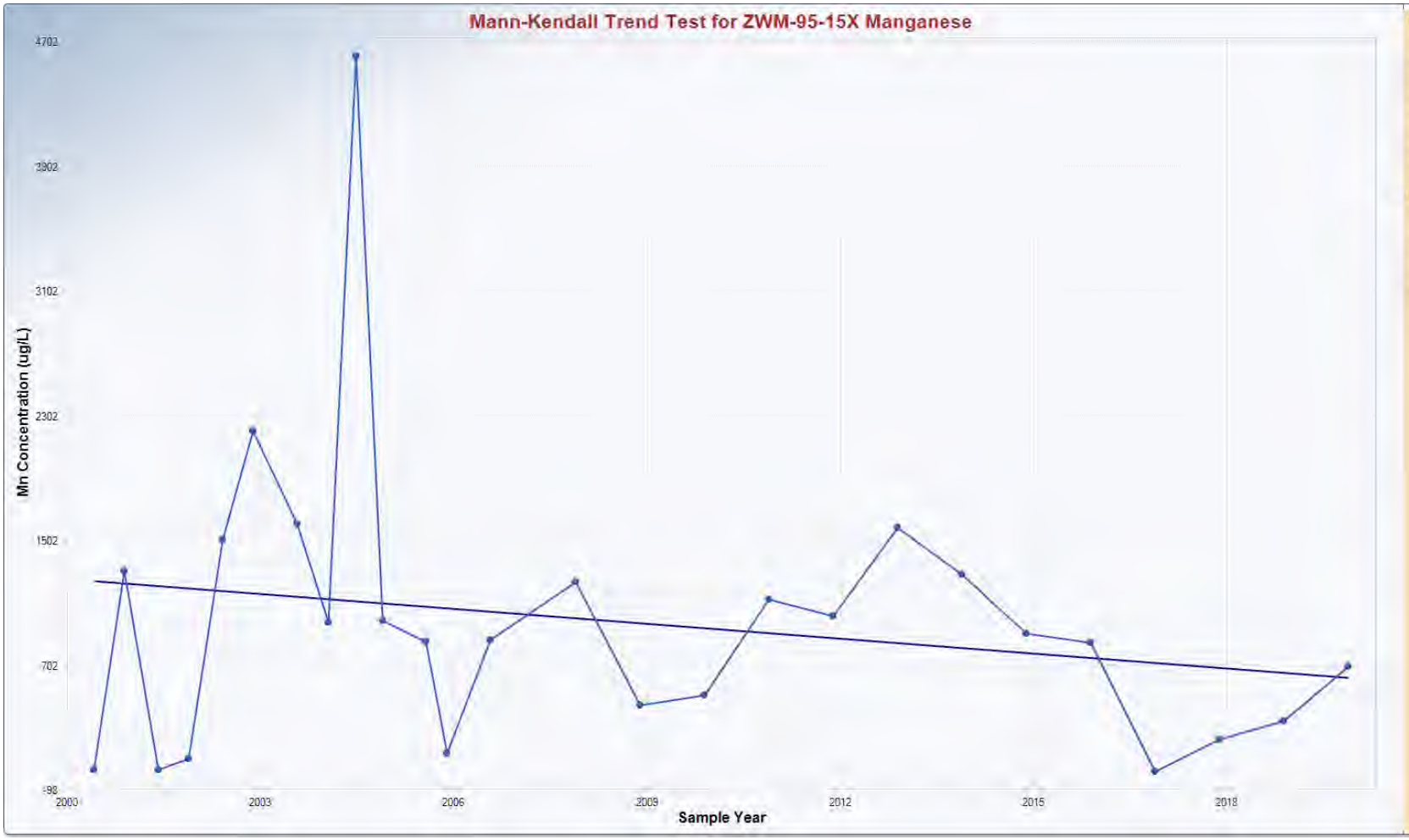
Mann-Kendall Trend Analysis

n	22
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	35.4495
Standardized Value of S	2.2849
M-K Test Value (S)	82
Tabulated p-value	0.0100
Approximate p-value	0.0112

OLS Regression Line (Blue)

OLS Regression Slope	133.8885
OLS Regression Intercept	-267,593.4430

Statistically significant evidence of an increasing trend at the specified level of significance.



Mann-Kendall Trend Analysis

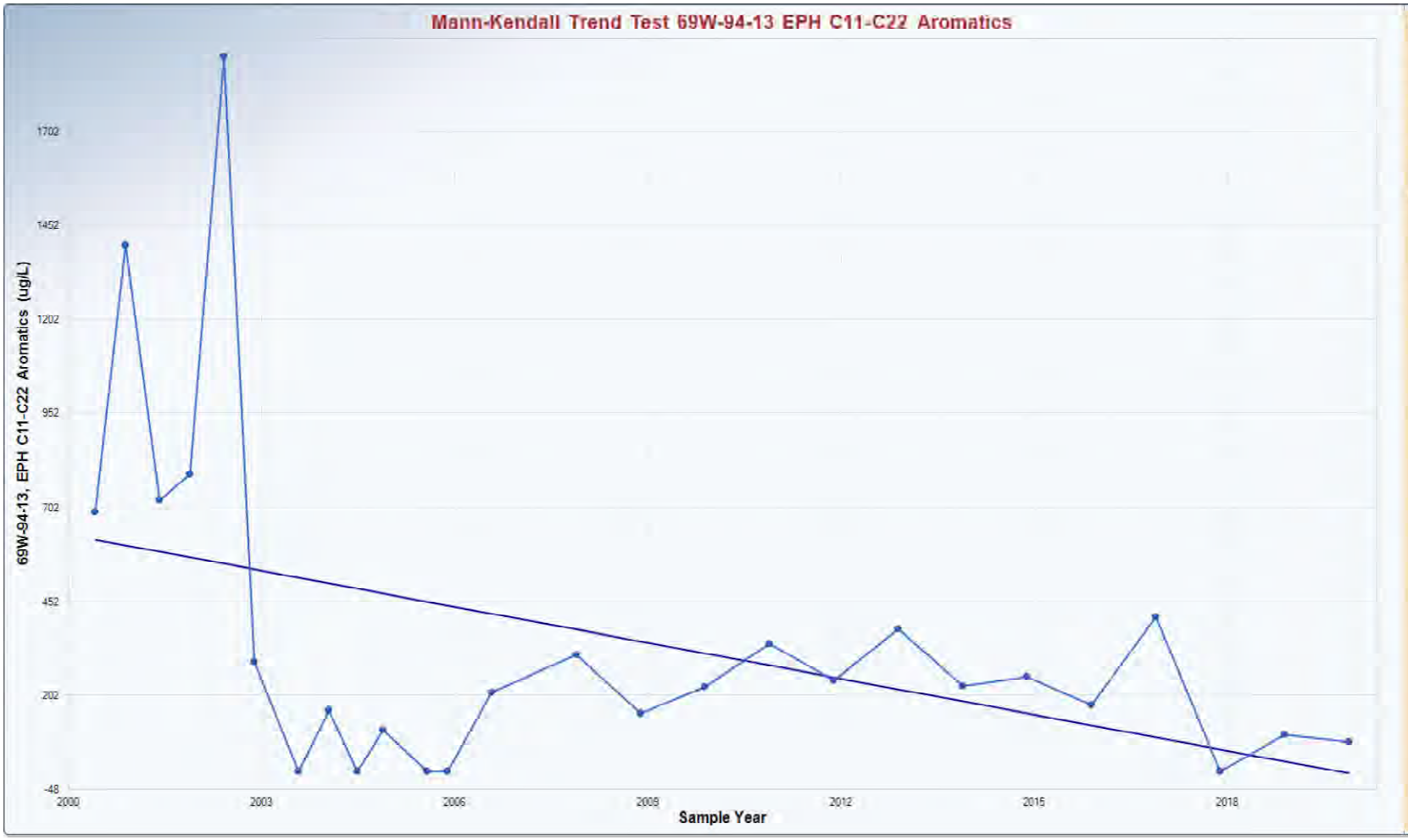
n	26
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	45.3689
Standardized Value of S	-0.8817
M-K Test Value (S)	-41
Appx. Critical Value (0.05)	-1.6449
Approximate p-value	0.1890

OLS Regression Line (Blue)

OLS Regression Slope	-31.8619
OLS Regression Intercept	64,970.9032

Insufficient statistical evidence of a significant trend at the specified level of significance.

AOC 69W
EPH C_{11}-C_{22}



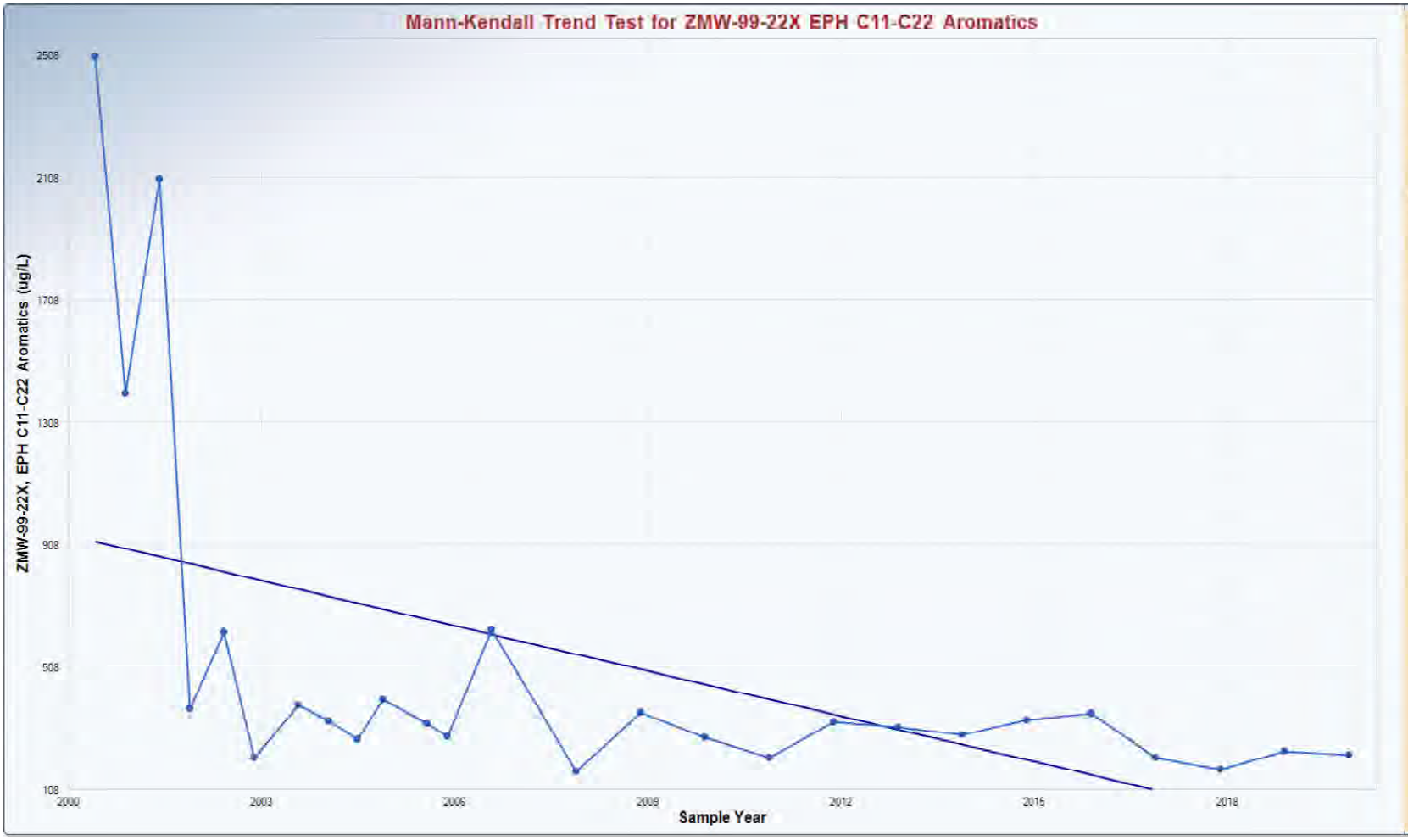
Mann-Kendall Trend Analysis

n	26
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	45.1848
Standardized Value of S	-1.4164
M-K Test Value (S)	-65
Appr. Critical Value (0.05)	-1.6449
Approximate p-value	0.0783

OLS Regression Line (Blue)

OLS Regression Slope	-31.9264
OLS Regression Intercept	64,479.0806

Insufficient statistical evidence of a significant trend at the specified level of significance.



Mann-Kendall Trend Analysis

n	26
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	45.3578
Standardized Value of S	-3.1968
M-K Test Value (S)	-146
Appr. Critical Value (0.05)	-1.6449
Approximate p-value	0.0007

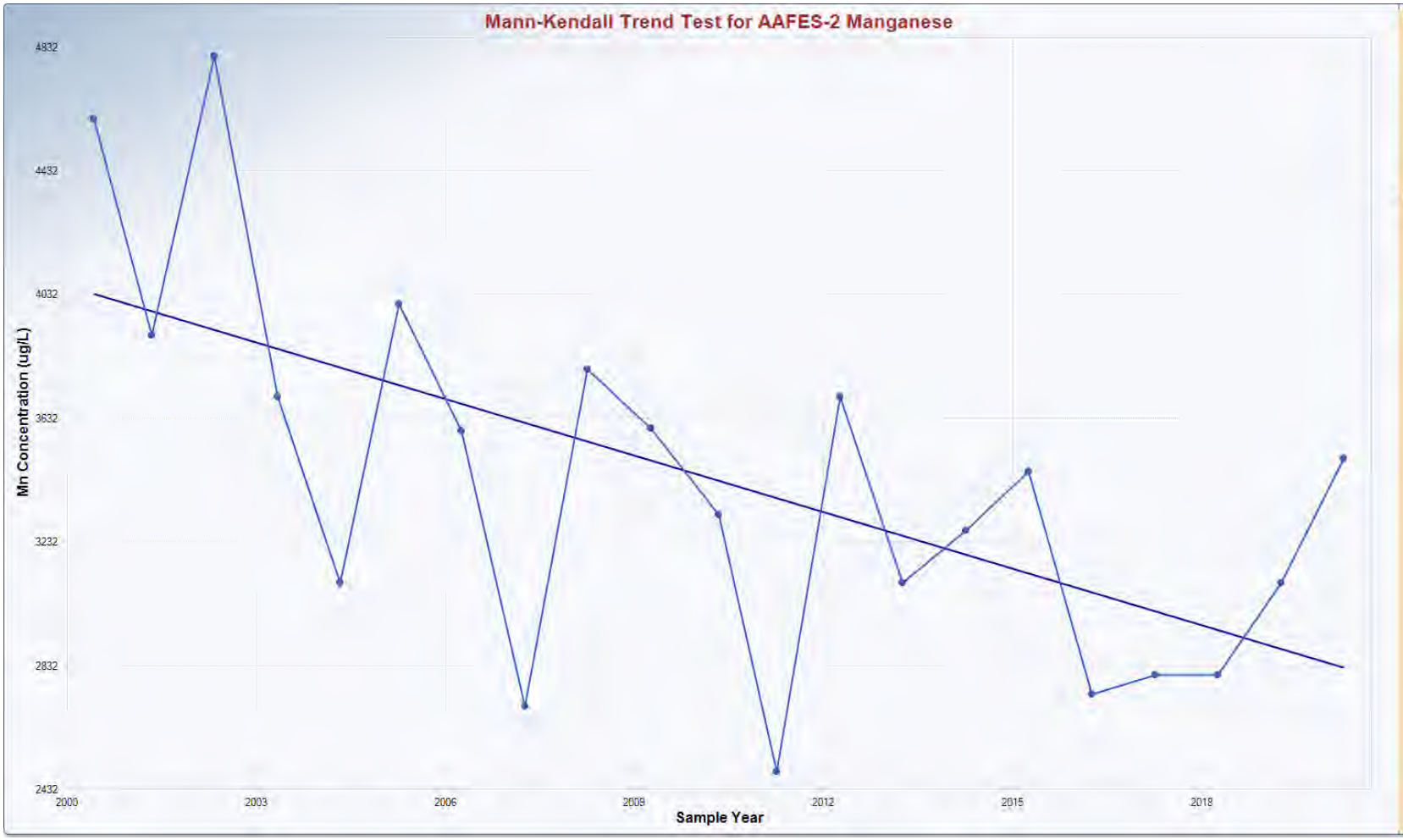
OLS Regression Line (Blue)

OLS Regression Slope	-49.4003
OLS Regression Intercept	99,734.1657

Statistically significant evidence of a decreasing trend at the specified level of significance.

AOC 43G

AOC 43G
Total Manganese



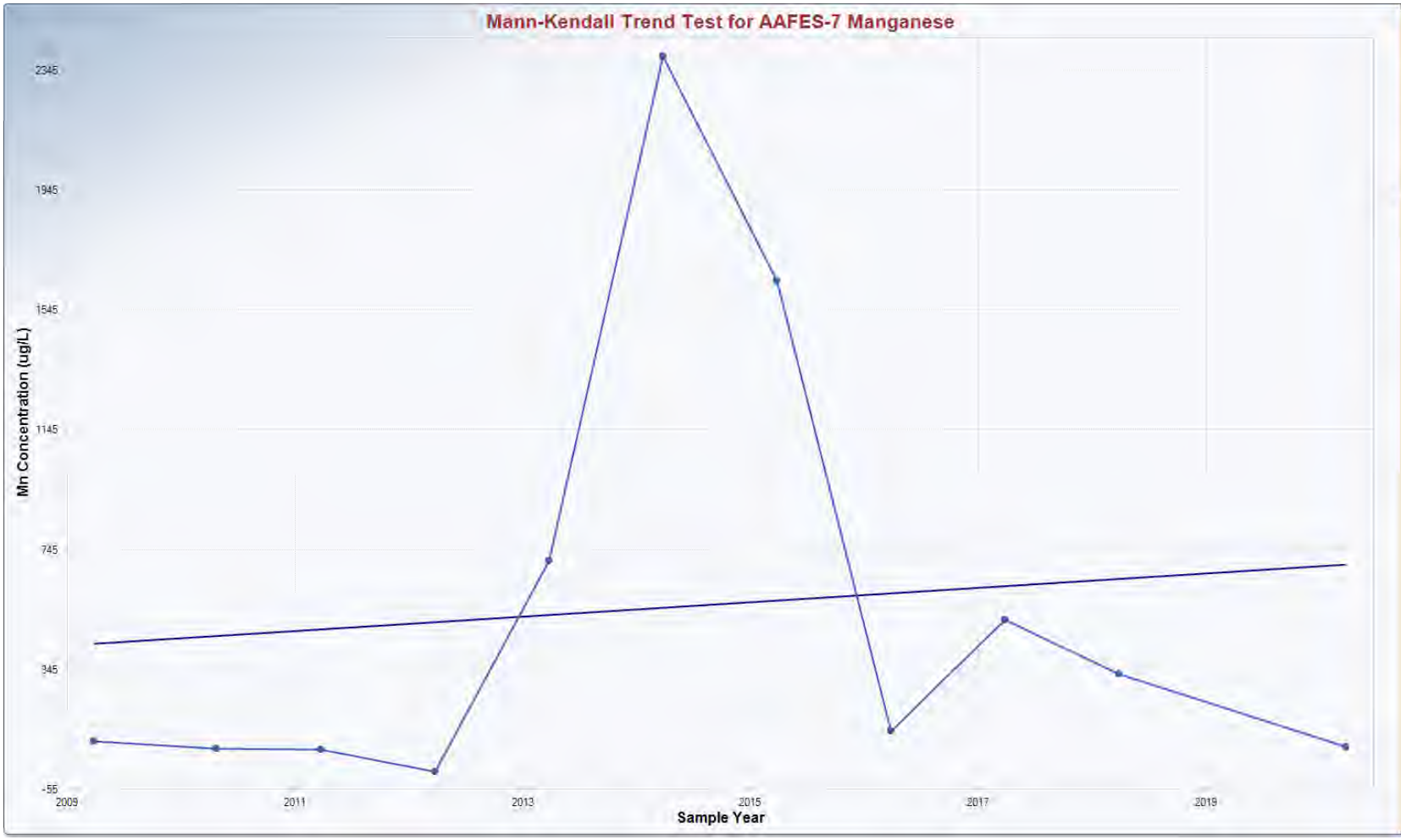
Mann-Kendall Trend Analysis

n	21
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	33.0303
Standardized Value of S	-2.7248
M-K Test Value (S)	-91
Tabulated p-value	0.0030
Approximate p-value	0.0032

OLS Regression Line (Blue)

OLS Regression Slope	-60.9021
OLS Regression Intercept	125,834.0967

Statistically significant evidence of a decreasing trend at the specified level of significance.



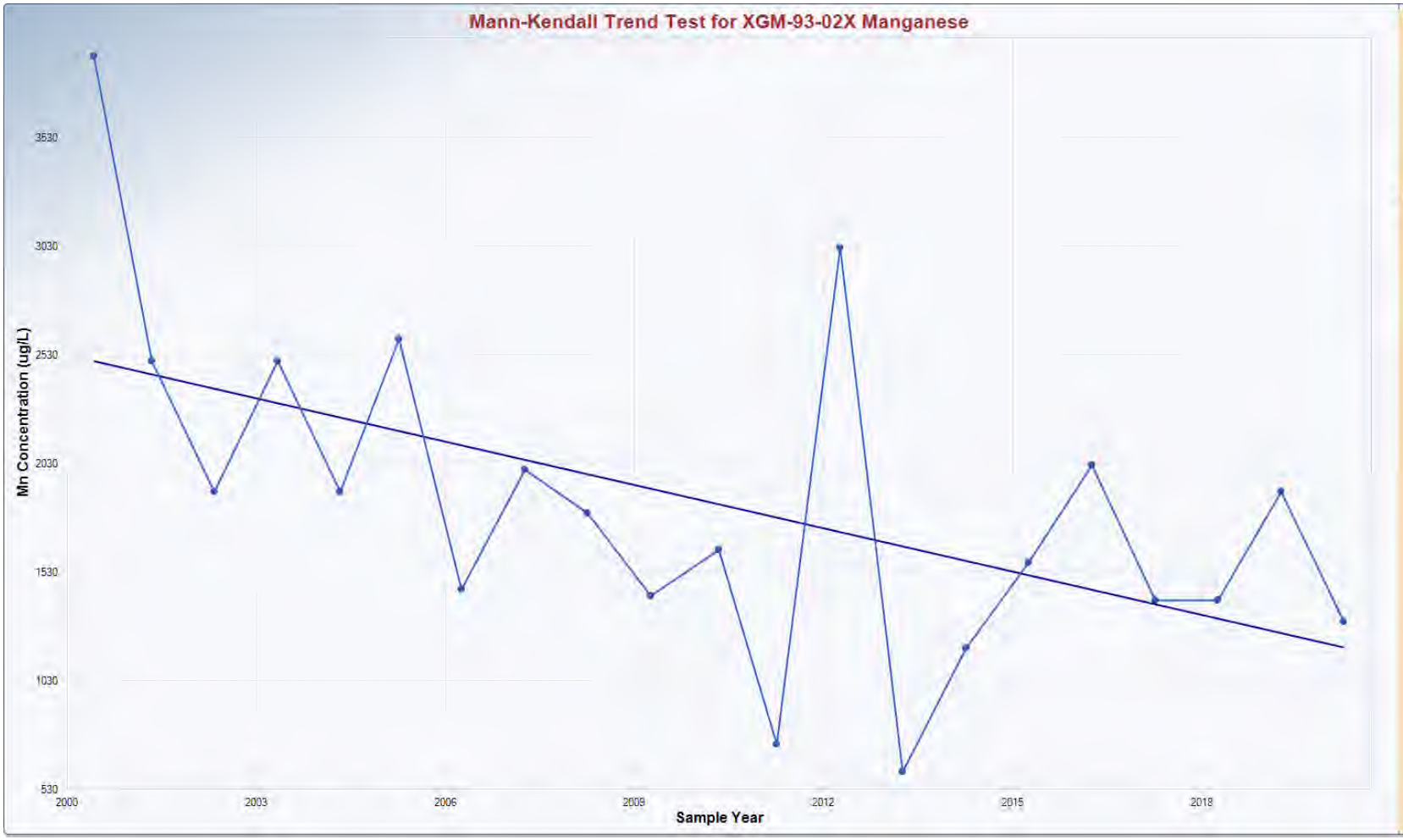
Mann-Kendall Trend Analysis

n	11
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	12.8452
Standardized Value of S	0.4671
M-K Test Value (S)	7
Tabulated p-value	0.3240
Approximate p-value	0.3202

OLS Regression Line (Blue)

OLS Regression Slope	24.0089
OLS Regression Intercept	-47,799.4961

Insufficient statistical evidence of a significant trend at the specified level of significance.



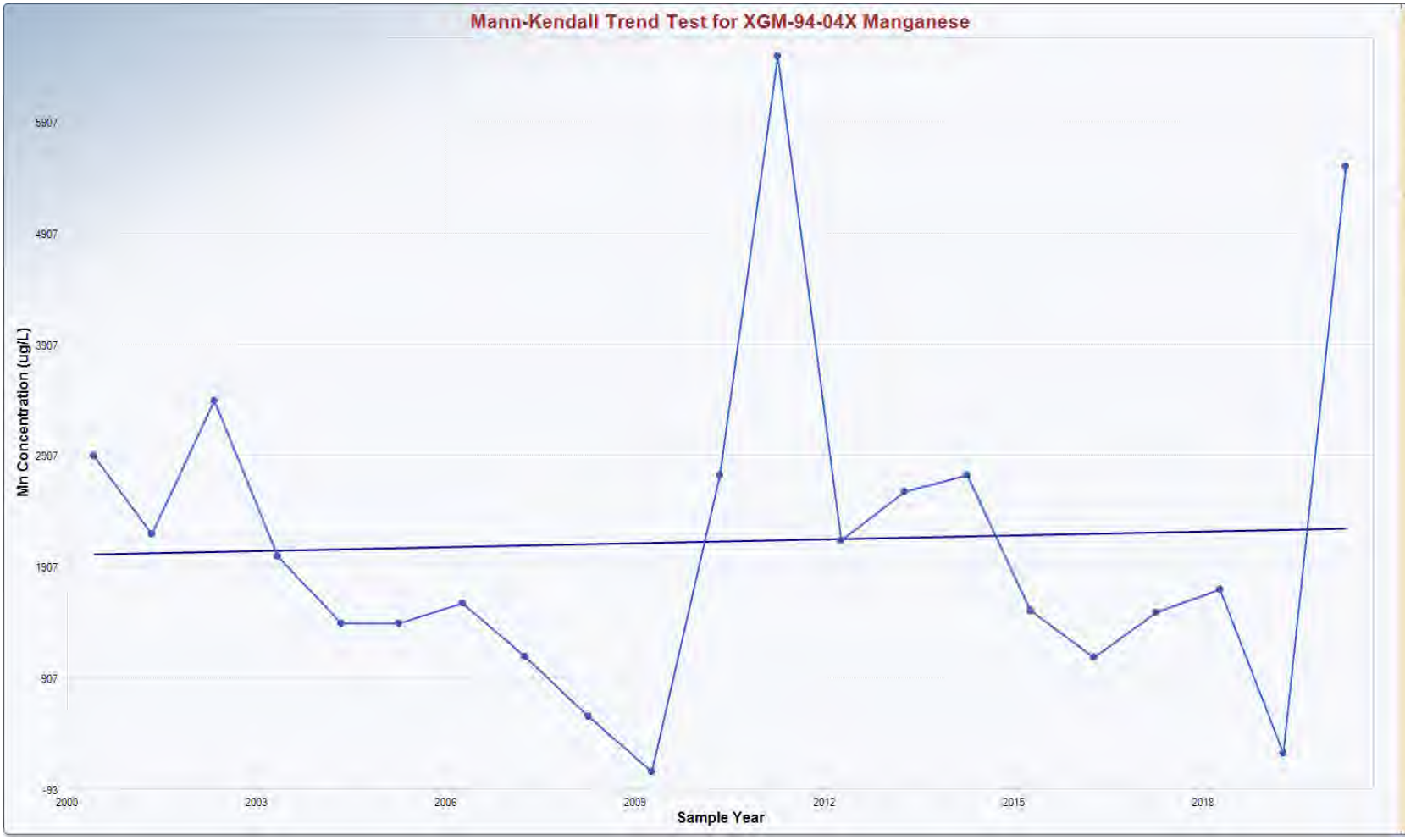
Mann-Kendall Trend Analysis

n	21
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	33.0303
Standardized Value of S	-2.6037
M-K Test Value (S)	-87
Tabulated p-value	0.0050
Approximate p-value	0.0046

OLS Regression Line (Blue)

OLS Regression Slope	-66.3895
OLS Regression Intercept	135,276.1239

Statistically significant evidence of a decreasing trend at the specified level of significance.



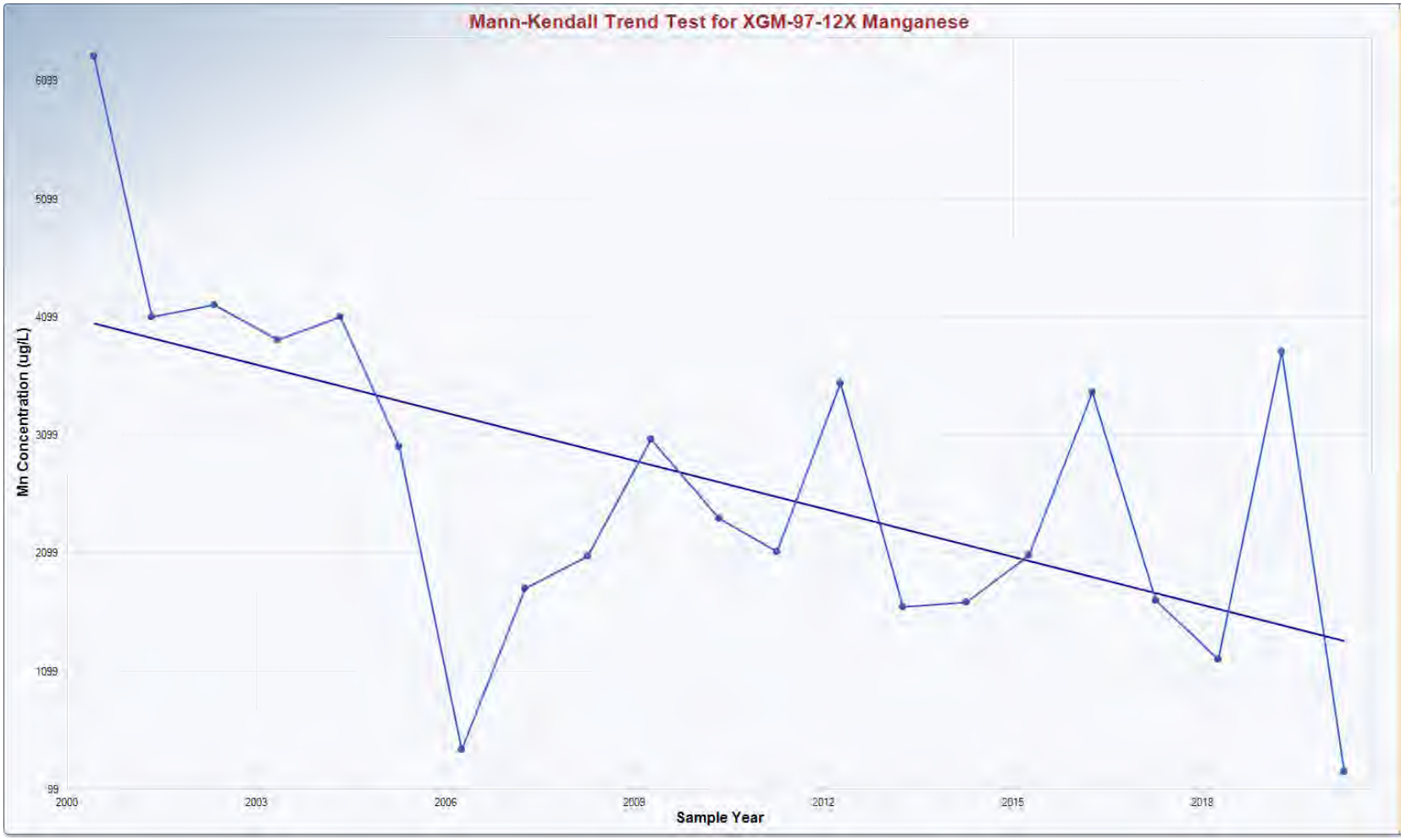
Mann-Kendall Trend Analysis

n	21
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	33.0857
Standardized Value of S	-0.7556
M-K Test Value (S)	-25
Tabulated p-value	0.2280
Approximate p-value	0.2249

OLS Regression Line (Blue)

OLS Regression Slope	11.4056
OLS Regression Intercept	-20,789.5934

Insufficient statistical evidence of a significant trend at the specified level of significance.



Mann-Kendall Trend Analysis

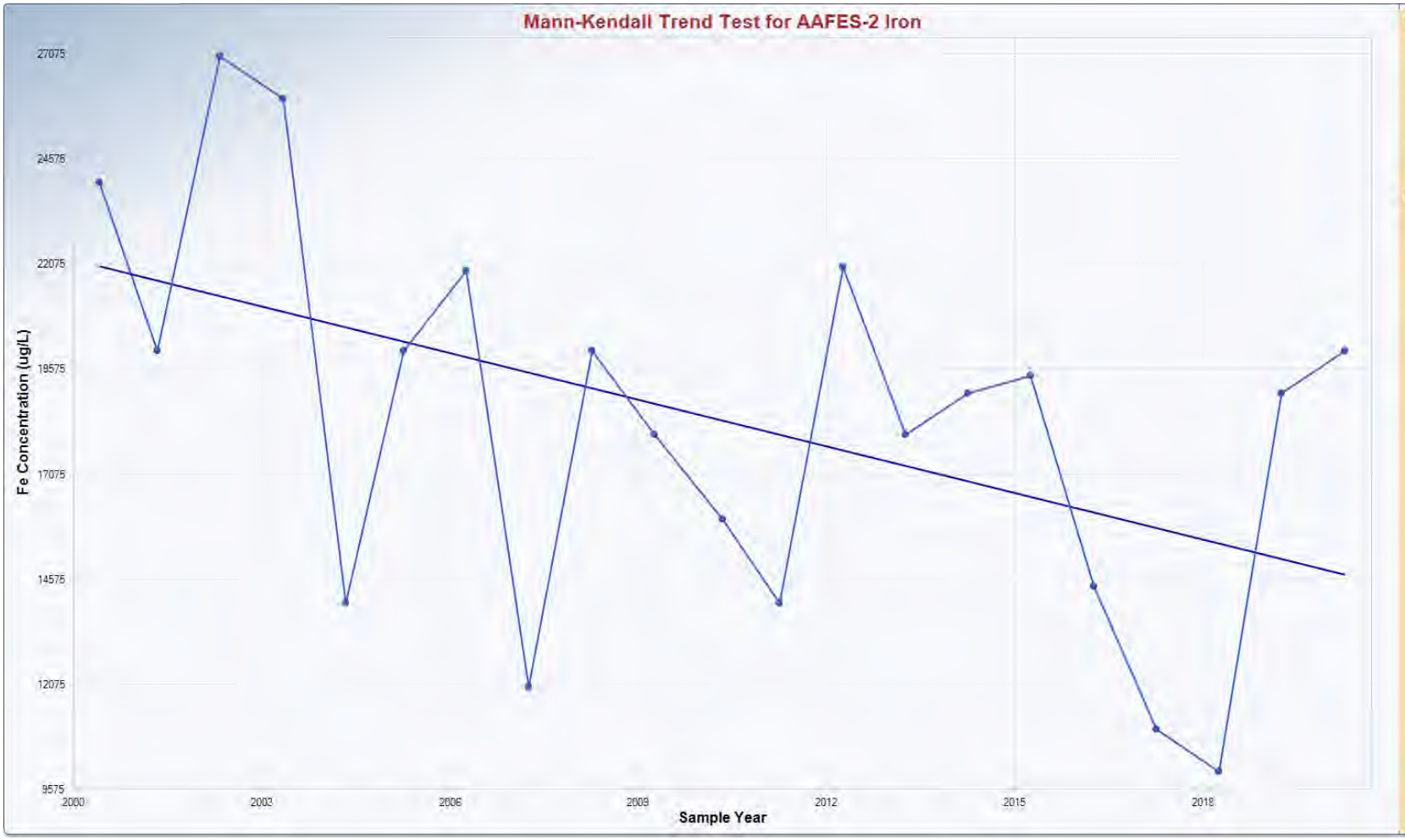
n	21
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	33.1009
Standardized Value of S	-2.7794
M-K Test Value (S)	-93
Tabulated p-value	0.0020
Approximate p-value	0.0027

OLS Regression Line (Blue)

OLS Regression Slope	-135.9109
OLS Regression Intercept	275,862.9630

Statistically significant evidence of a decreasing trend at the specified level of significance.

AOC 43G
Total Iron



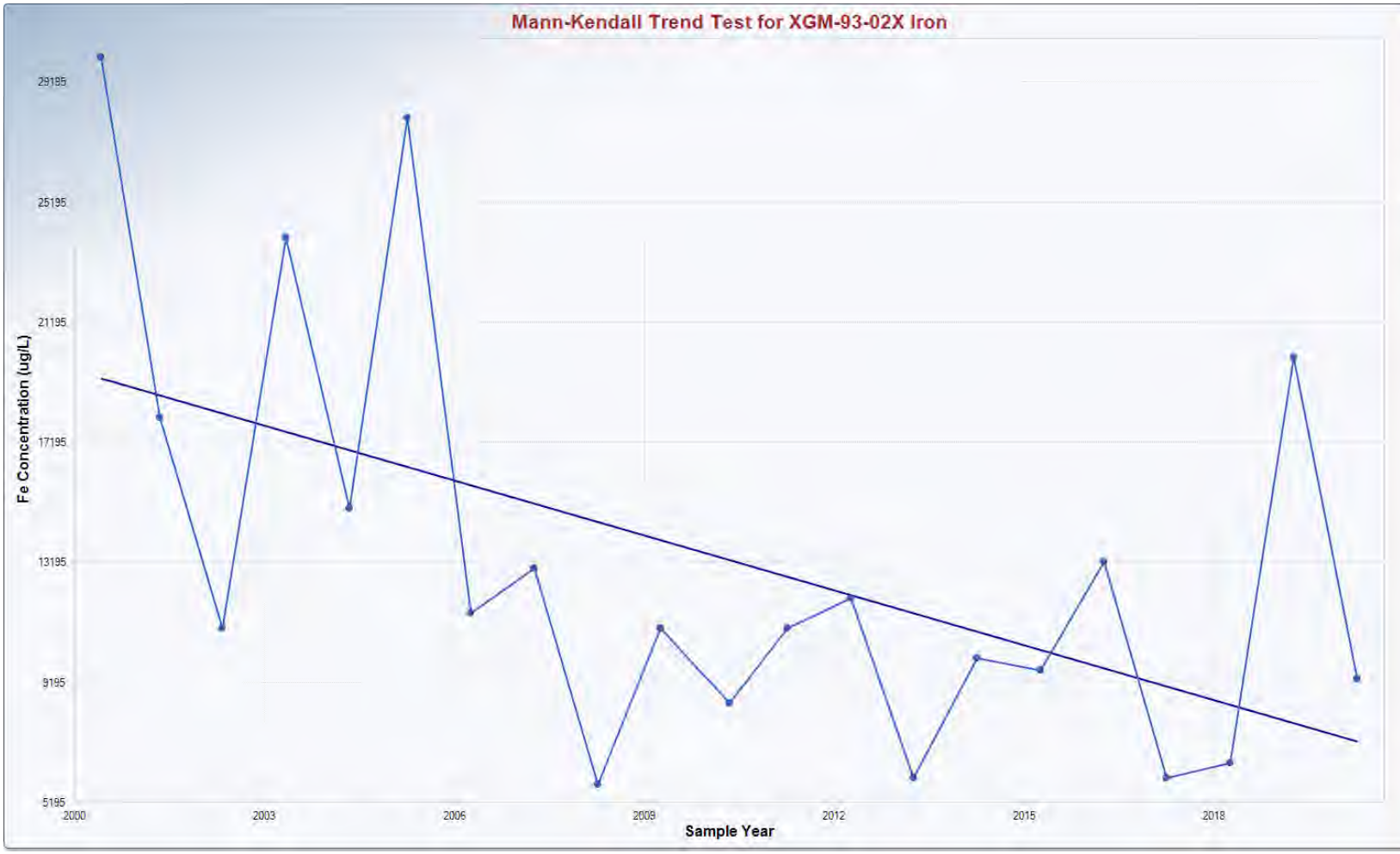
Mann-Kendall Trend Analysis

n	21
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	32.9393
Standardized Value of S	-2.1251
M-K Test Value (S)	-71
Tabulated p-value	0.0180
Approximate p-value	0.0168

OLS Regression Line (Blue)

OLS Regression Slope	-370.5899
OLS Regression Intercept	763,188.1768

Statistically significant evidence of a decreasing trend at the specified level of significance.



Mann-Kendall Trend Analysis

n	21
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	33.0454
Standardized Value of S	-2.3906
M-K Test Value (S)	-80
Tabulated p-value	0.0080
Approximate p-value	0.0084

OLS Regression Line (Blue)

OLS Regression Slope	-610.2416
OLS Regression Intercept	1,239,783.6429

Statistically significant evidence of a decreasing trend at the specified level of significance.

Mann-Kendall Trend Analysis

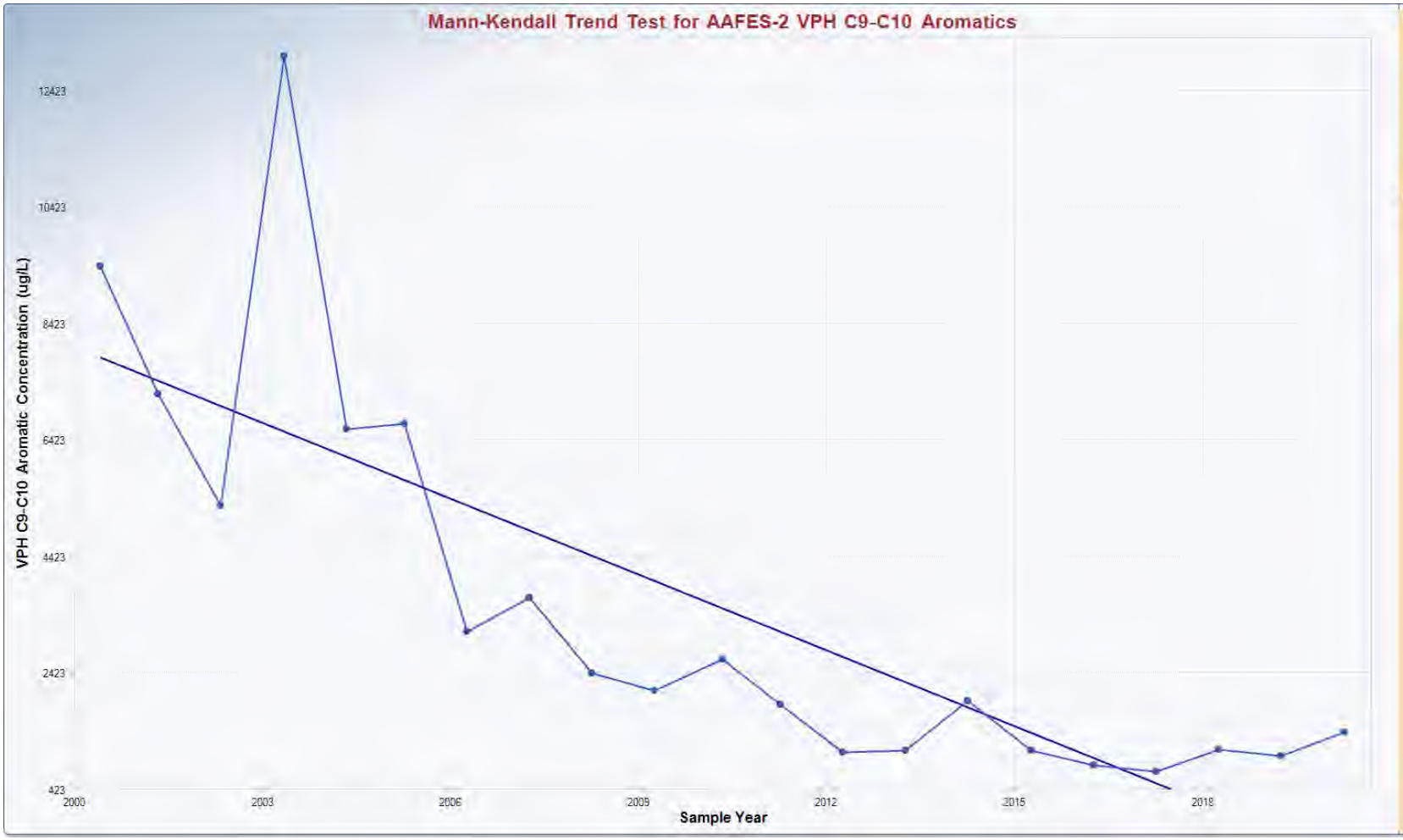
n	21
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	33.0000
Standardized Value of S	-1.7576
M-K Test Value (S)	-59
Tabulated p-value	0.0430
Approximate p-value	0.0394

OLS Regression Line (Blue)

OLS Regression Slope	-672.8197
OLS Regression Intercept	1,377,746.2525

Statistically significant evidence of a decreasing trend at the specified level of significance.

AOC 43G
VPH C_9-C_{10}



Mann-Kendall Trend Analysis

n	21
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	33.1009
Standardized Value of S	-4.5920
M-K Test Value (S)	-153
Tabulated p-value	0.0000
Approximate p-value	0.0000

OLS Regression Line (Blue)

OLS Regression Slope	-434.8513
OLS Regression Intercept	877,515.1437

Statistically significant evidence of a decreasing trend at the specified level of significance.

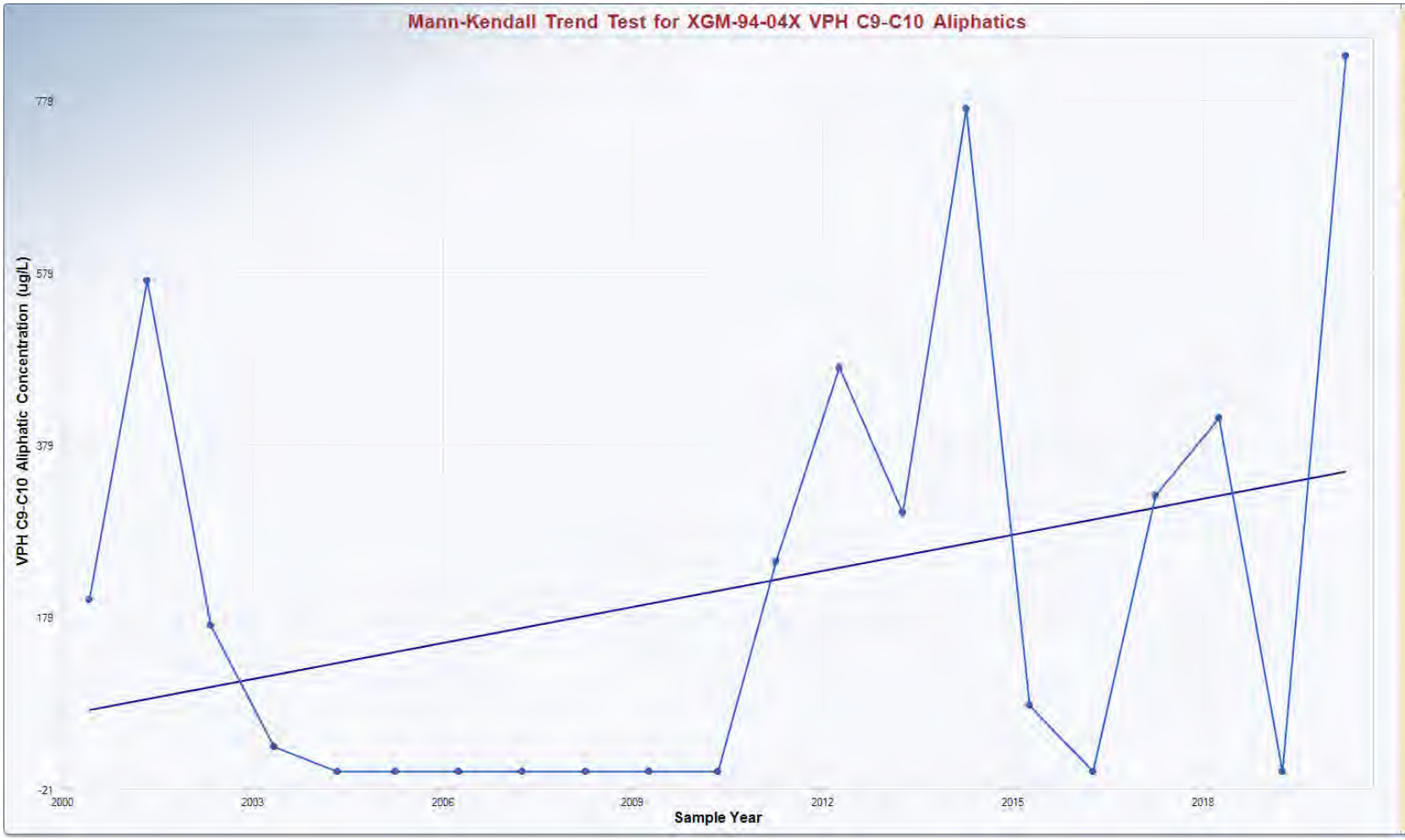
Mann-Kendall Trend Analysis

n	21
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	32.9848
Standardized Value of S	-3.6077
M-K Test Value (S)	-120
Tabulated p-value	0.0000
Approximate p-value	0.0002

OLS Regression Line (Blue)

OLS Regression Slope	-119.6812
OLS Regression Intercept	241,282.8862

Statistically significant evidence of a decreasing trend at the specified level of significance.



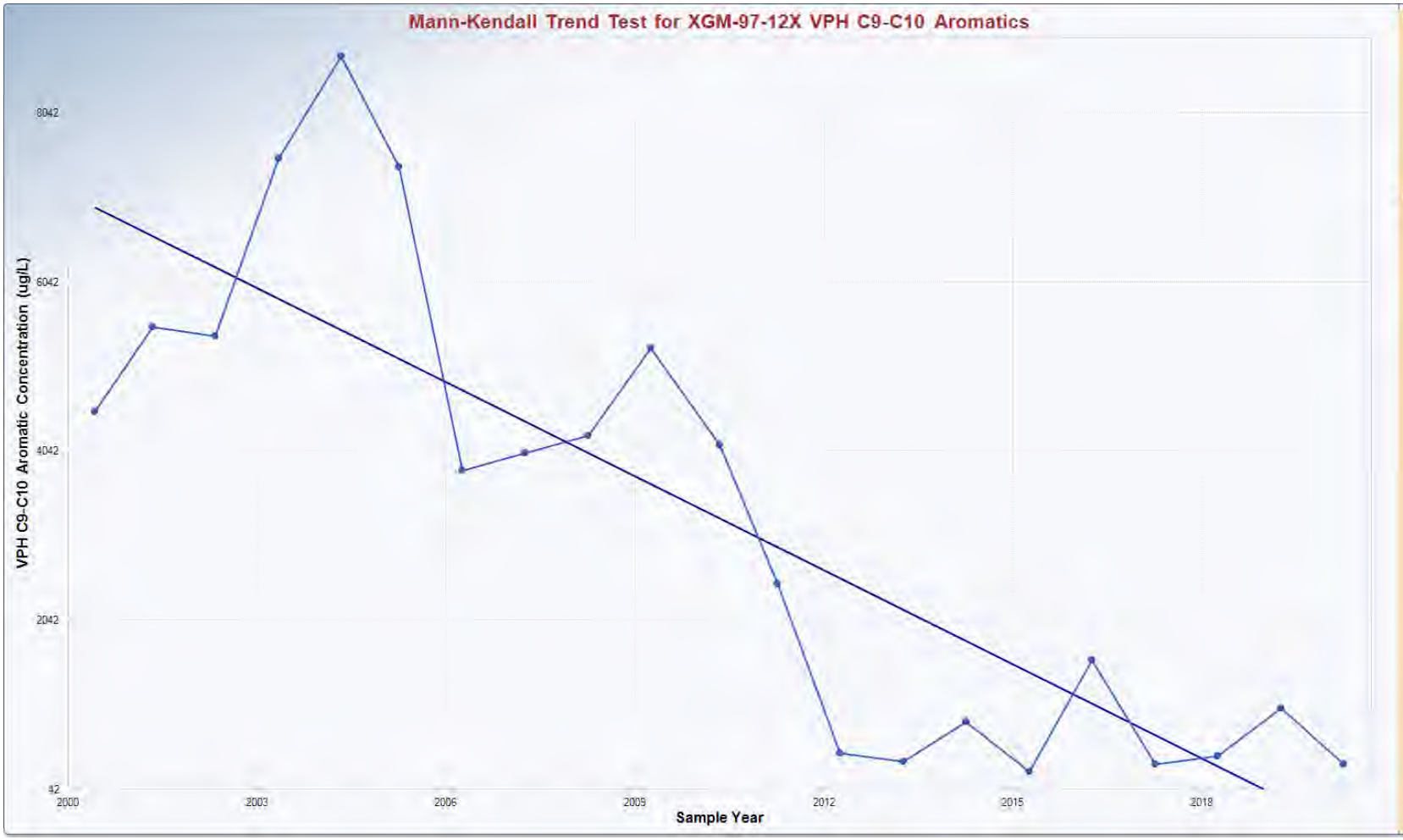
Mann-Kendall Trend Analysis

n	21
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	31.6965
Standardized Value of S	1.0411
M-K Test Value (S)	34
Tabulated p-value	0.1620
Approximate p-value	0.1489

OLS Regression Line (Blue)

OLS Regression Slope	13.9775
OLS Regression Intercept	-27,883.5942

Insufficient statistical evidence of a significant trend at the specified level of significance.



Mann-Kendall Trend Analysis

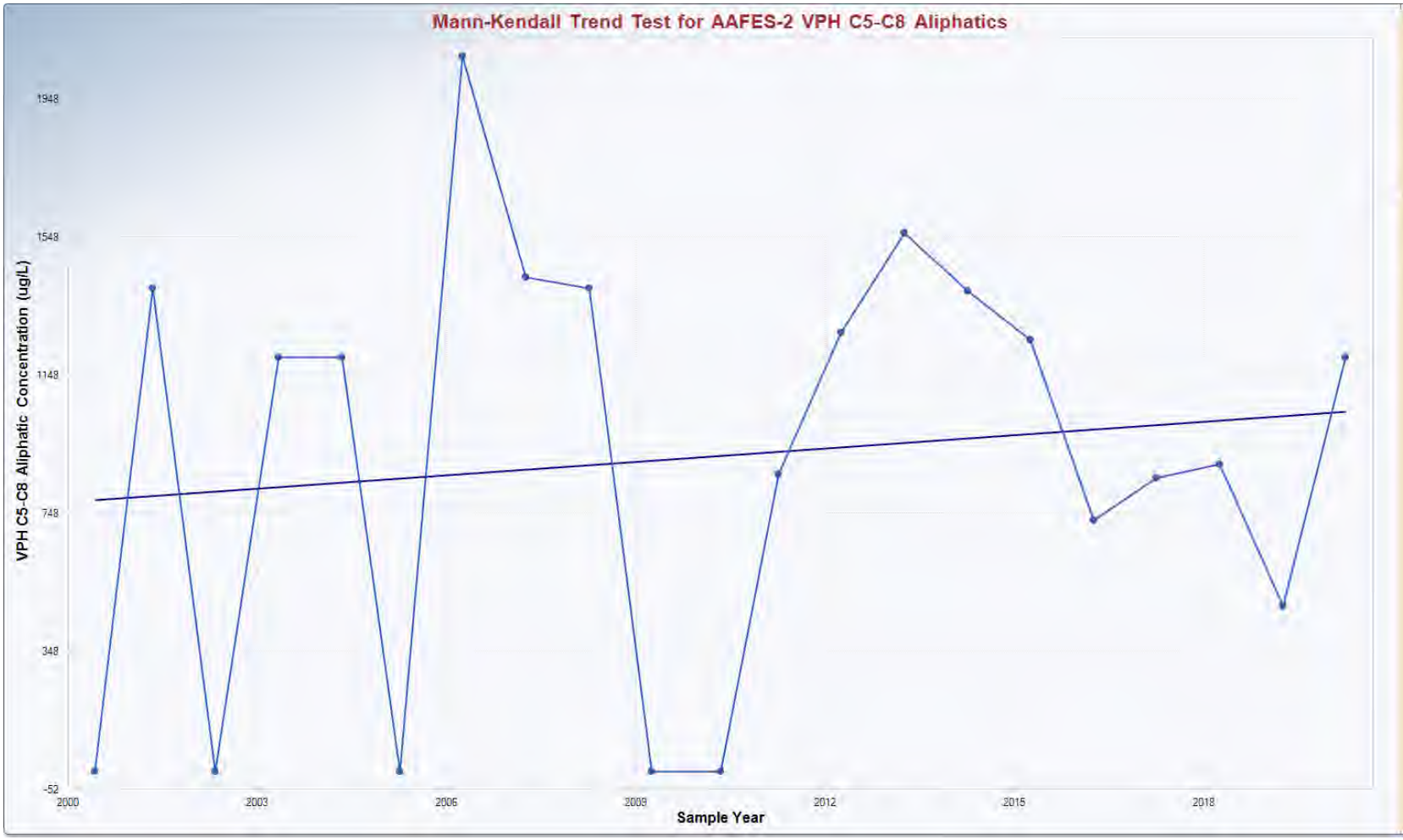
n	21
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	33.1009
Standardized Value of S	-3.9878
M-K Test Value (S)	-133
Tabulated p-value	0.0000
Approximate p-value	0.0000

OLS Regression Line (Blue)

OLS Regression Slope	-370.4217
OLS Regression Intercept	747,744.0471

Statistically significant evidence of a decreasing trend at the specified level of significance.

AOC 43G
VPH C_5-C_8



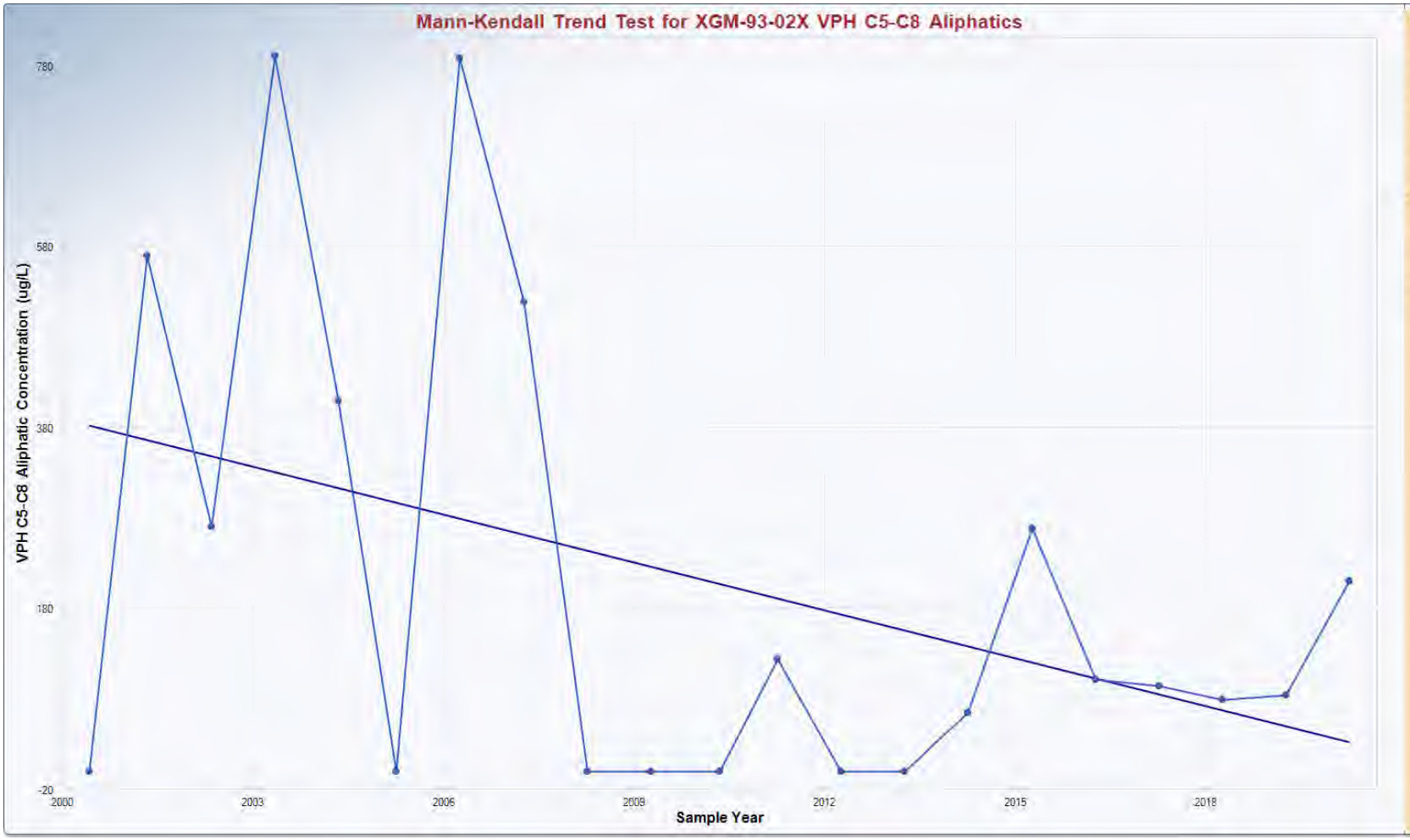
Mann-Kendall Trend Analysis

n	21
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	32.7923
Standardized Value of S	
M-K Test Value (S)	0
Tabulated p-value	0.5120
Approximate p-value	

OLS Regression Line (Blue)

OLS Regression Slope	12.9515
OLS Regression Intercept	-25,117.1264

Insufficient statistical evidence of a significant trend at the specified level of significance.



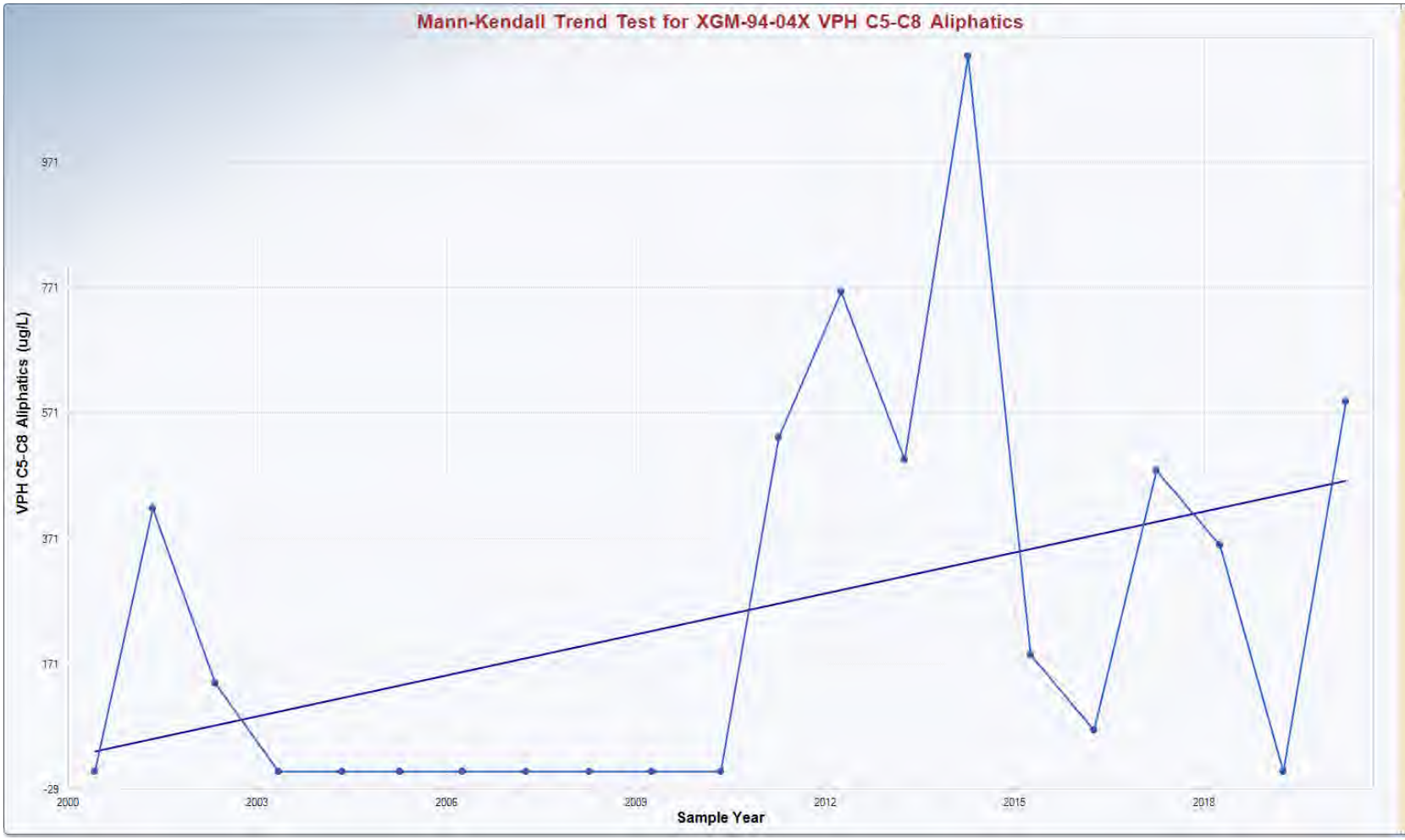
Mann-Kendall Trend Analysis

n	21
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	32.4397
Standardized Value of S	-0.6782
M-K Test Value (S)	-23
Tabulated p-value	0.2650
Approximate p-value	0.2488

OLS Regression Line (Blue)

OLS Regression Slope	-17.6714
OLS Regression Intercept	35,724.7097

Insufficient statistical evidence of a significant trend at the specified level of significance.



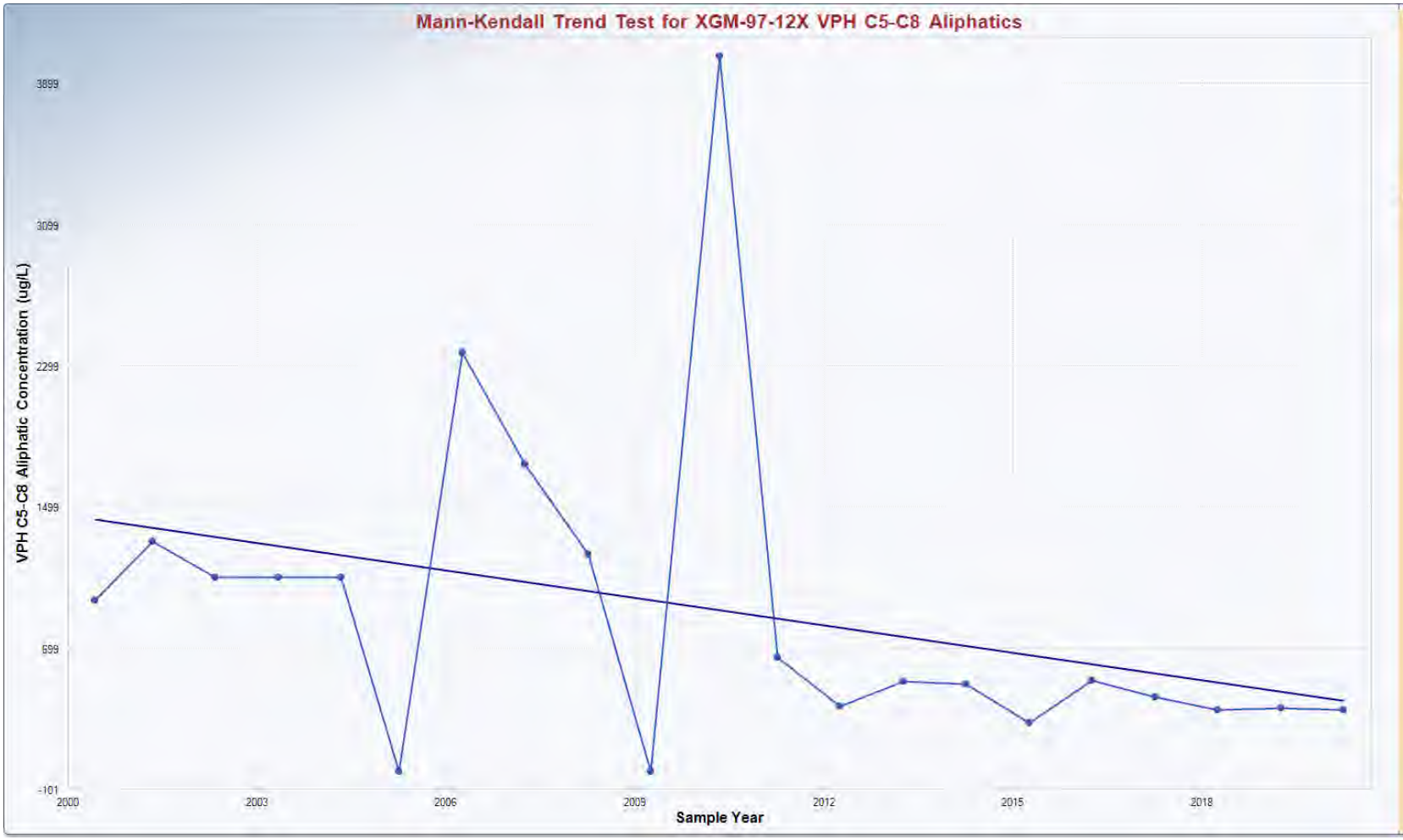
Mann-Kendall Trend Analysis

n	21
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	31.1716
Standardized Value of S	1.8607
M-K Test Value (S)	58
Tabulated p-value	0.0430
Approximate p-value	0.0314

OLS Regression Line (Blue)

OLS Regression Slope	21.7583
OLS Regression Intercept	-43,483.9891

Statistically significant evidence of an increasing trend at the specified level of significance.



Mann-Kendall Trend Analysis

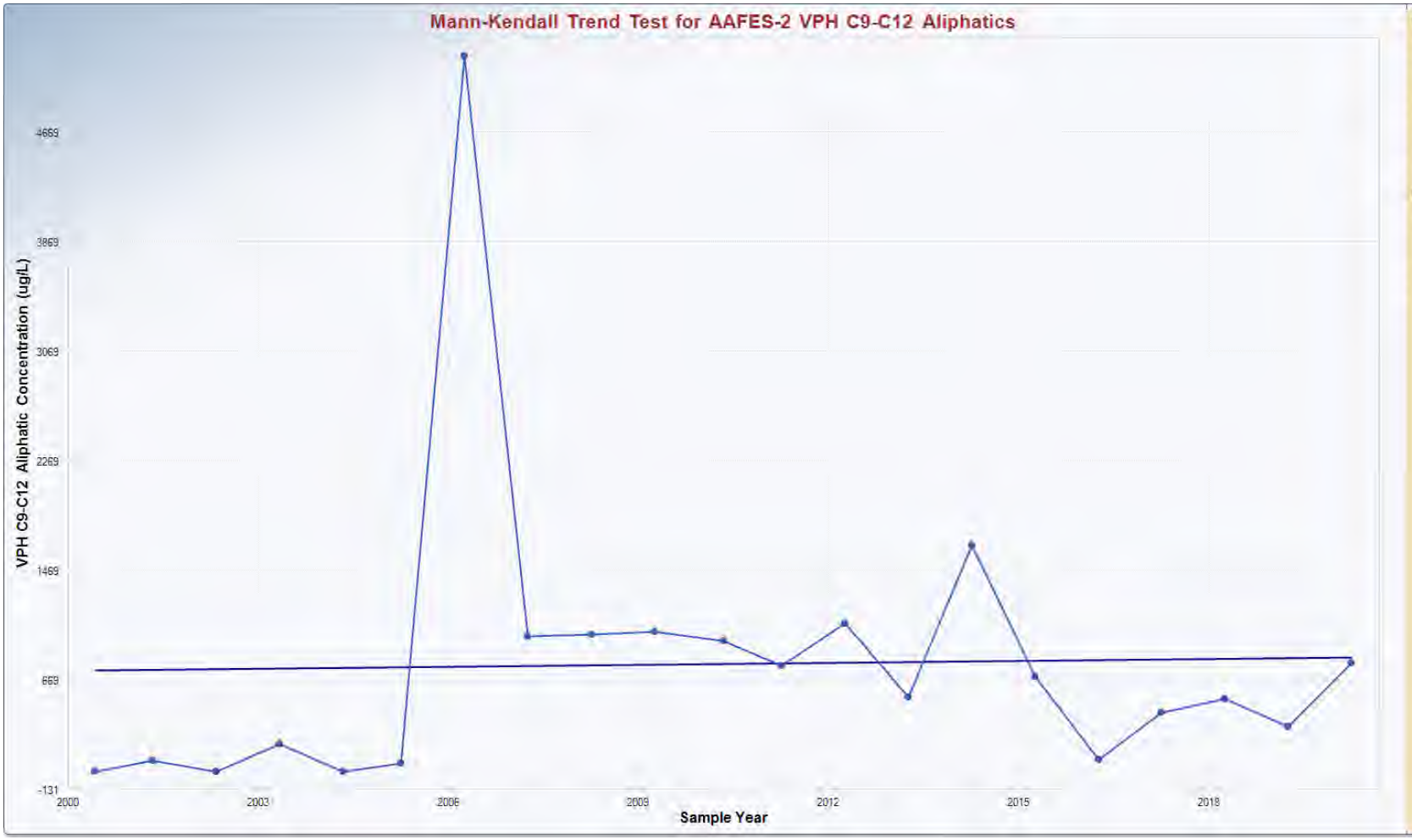
n	21
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	33.0303
Standardized Value of S	-2.3615
M-K Test Value (S)	-79
Tabulated p-value	0.0090
Approximate p-value	0.0091

OLS Regression Line (Blue)

OLS Regression Slope	-51.8617
OLS Regression Intercept	105,149.2017

Statistically significant evidence of a decreasing trend at the specified level of significance.

AOC 43G
VPH C_9-C_{12}



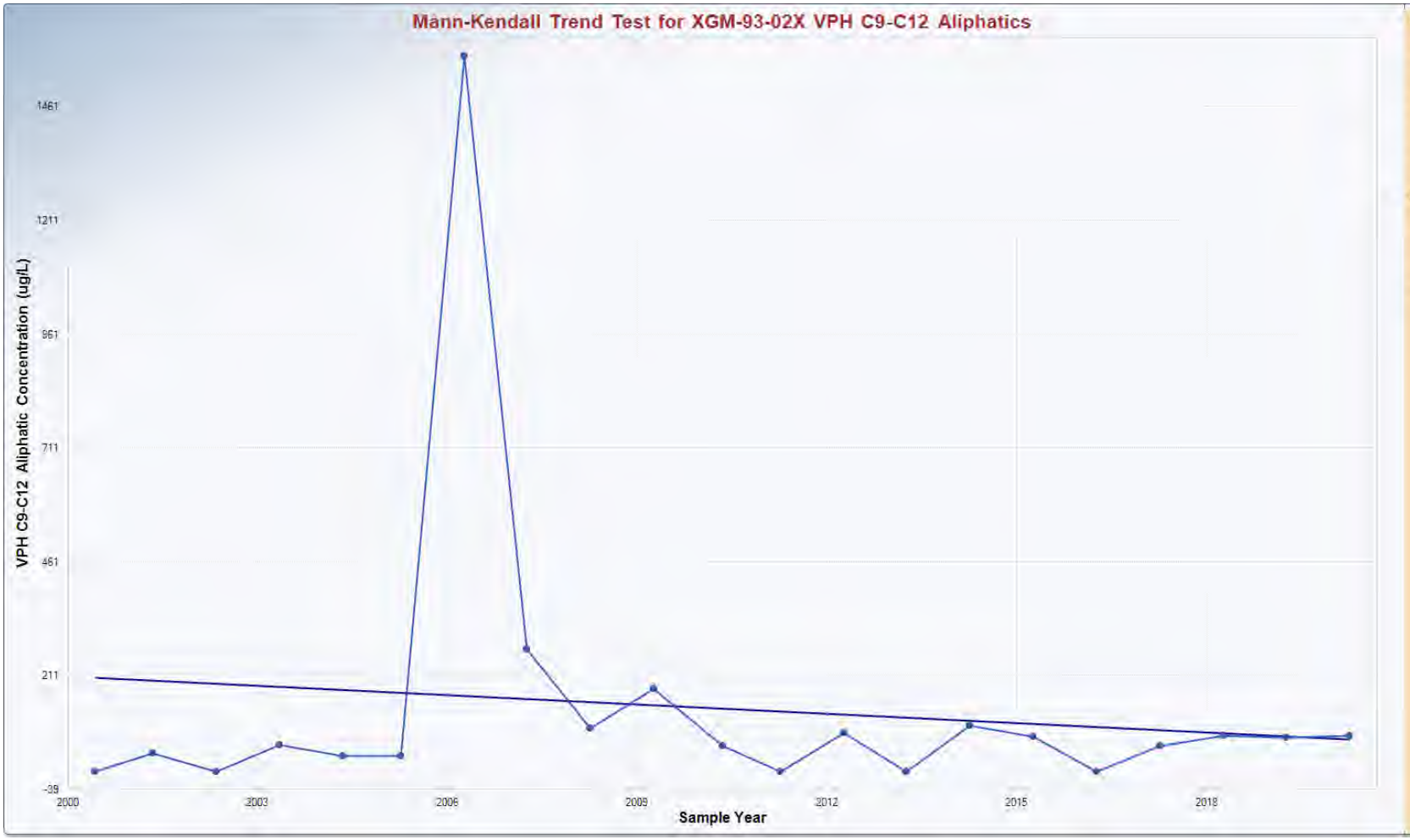
Mann-Kendall Trend Analysis

n	21
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	33.0606
Standardized Value of S	1.1494
M-K Test Value (S)	39
Tabulated p-value	0.1340
Approximate p-value	0.1252

OLS Regression Line (Blue)

OLS Regression Slope	4.7427
OLS Regression Intercept	-8,750.5721

Insufficient statistical evidence of a significant trend at the specified level of significance.



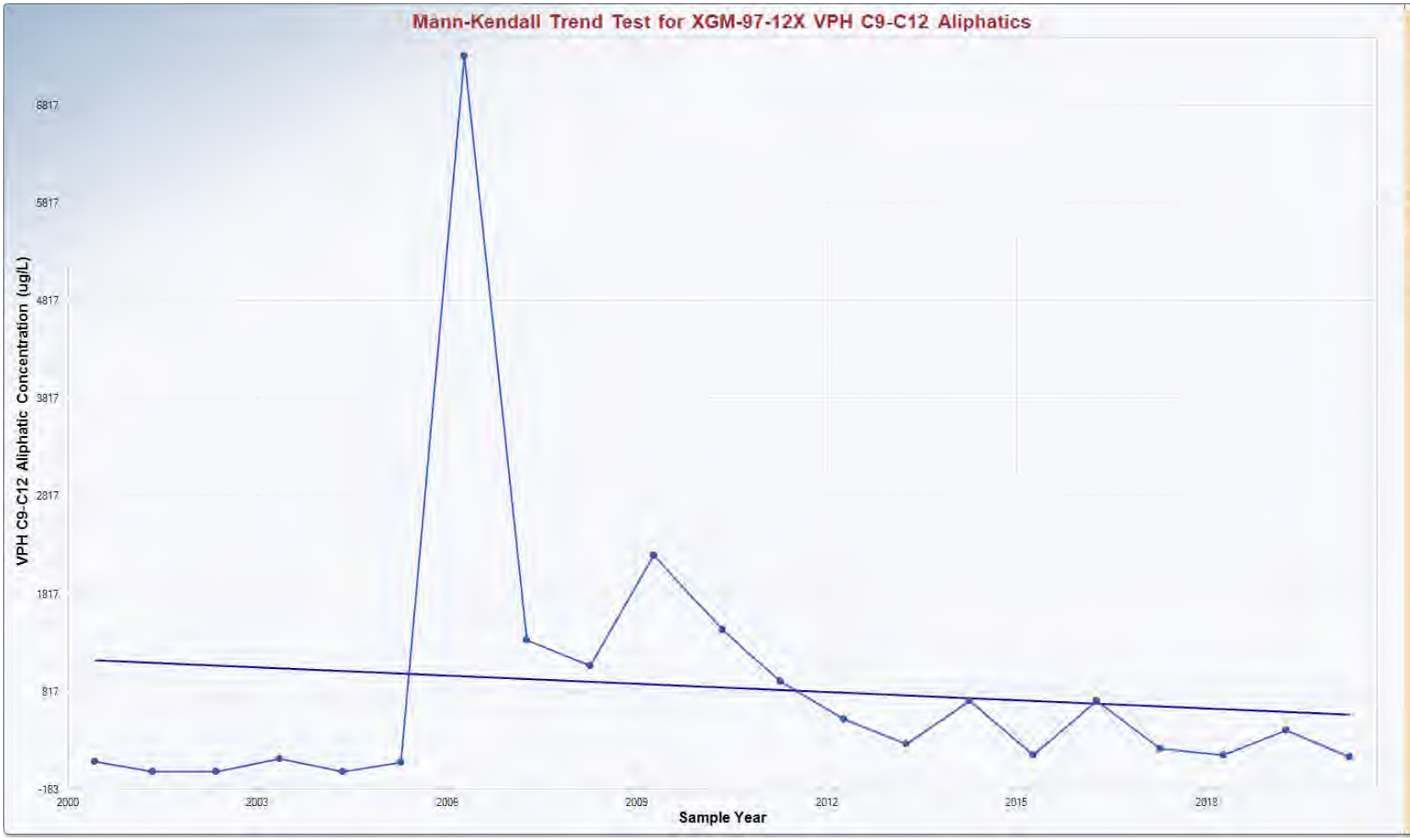
Mann-Kendall Trend Analysis

n	21
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	32.8634
Standardized Value of S	0.7607
M-K Test Value (S)	26
Tabulated p-value	0.2280
Approximate p-value	0.2234

OLS Regression Line (Blue)

OLS Regression Slope	-6.8327
OLS Regression Intercept	13,869.9339

Insufficient statistical evidence of a significant trend at the specified level of significance.



Mann-Kendall Trend Analysis

n	21
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	33.0606
Standardized Value of S	0.4235
M-K Test Value (S)	15
Tabulated p-value	0.3490
Approximate p-value	0.3360

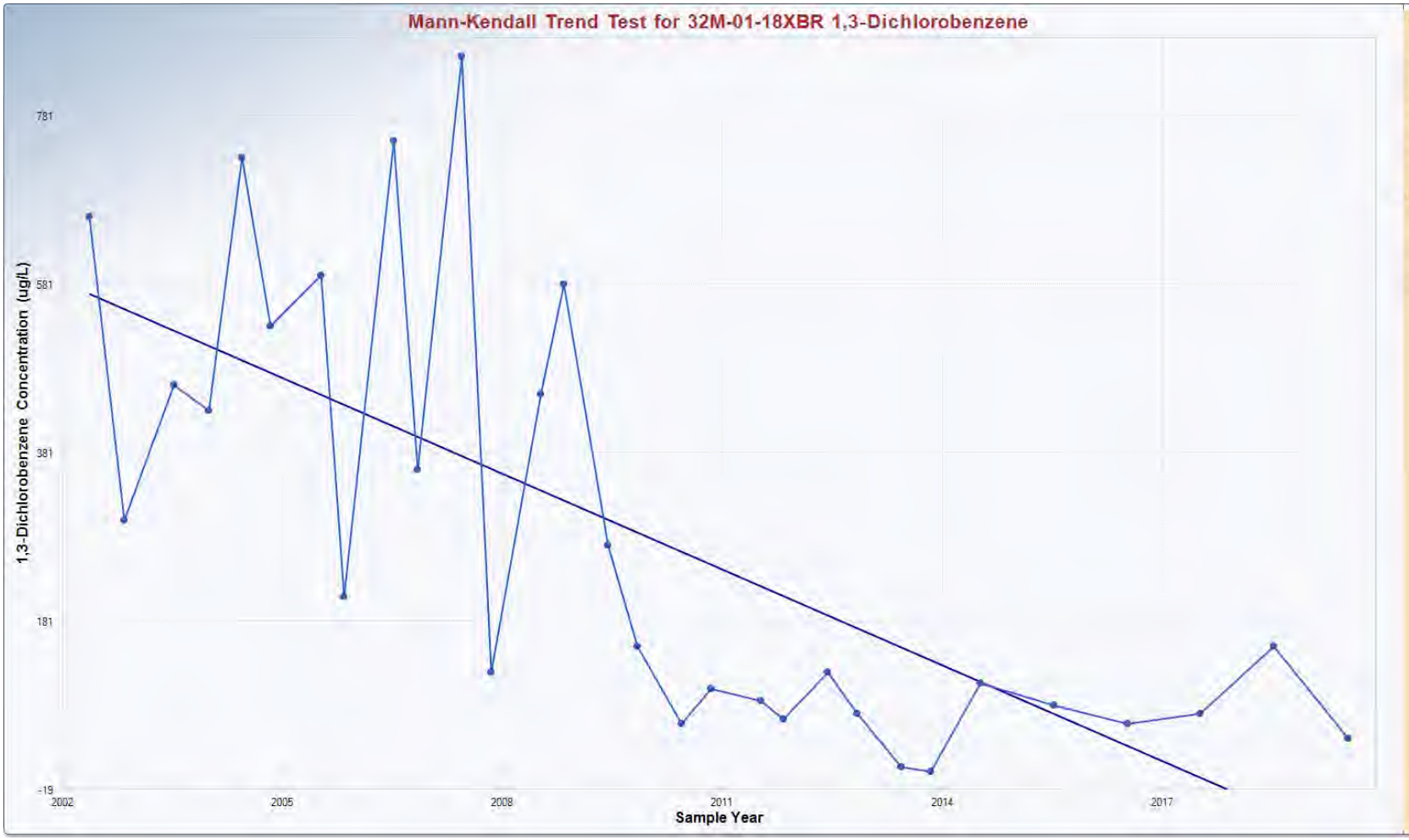
OLS Regression Line (Blue)

OLS Regression Slope	-27.8299
OLS Regression Intercept	56,790.9599

Insufficient statistical evidence of a significant trend at the specified level of significance.

AOCs 32 & 43A

AOC 32 & 43A
1,3-Dichlorobenzene



Mann-Kendall Trend Analysis

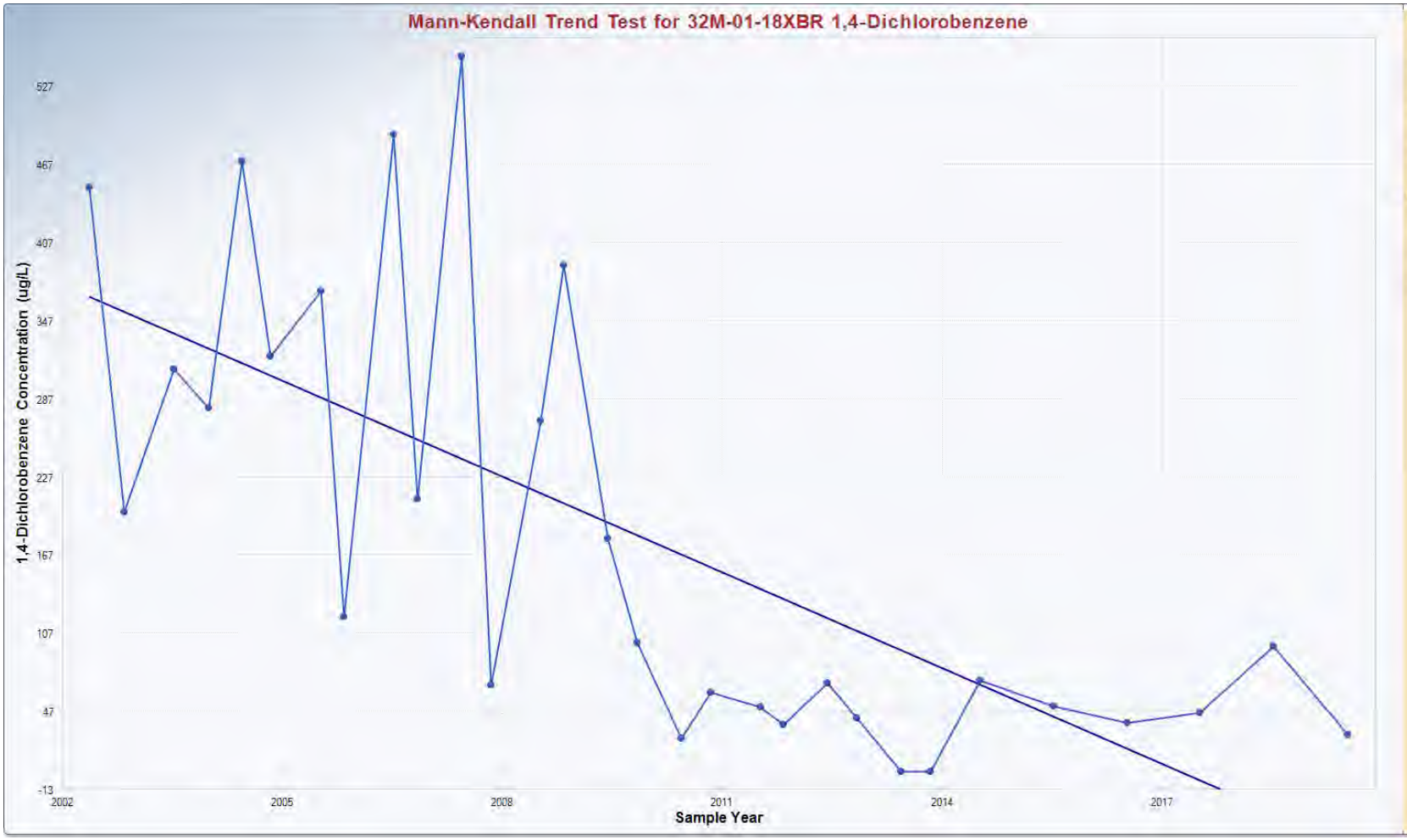
n	30
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	56.0238
Standardized Value of S	-4.4088
M-K Test Value (S)	-248
Appx. Critical Value (0.05)	-1.6449
Approximate p-value	0.0000

OLS Regression Line (Blue)

OLS Regression Slope	-37.9334
OLS Regression Intercept	76,523.8617

Statistically significant evidence of a decreasing trend at the specified level of significance.

AOC 32 & 43A
1,4-Dichlorobenzene



Mann-Kendall Trend Analysis

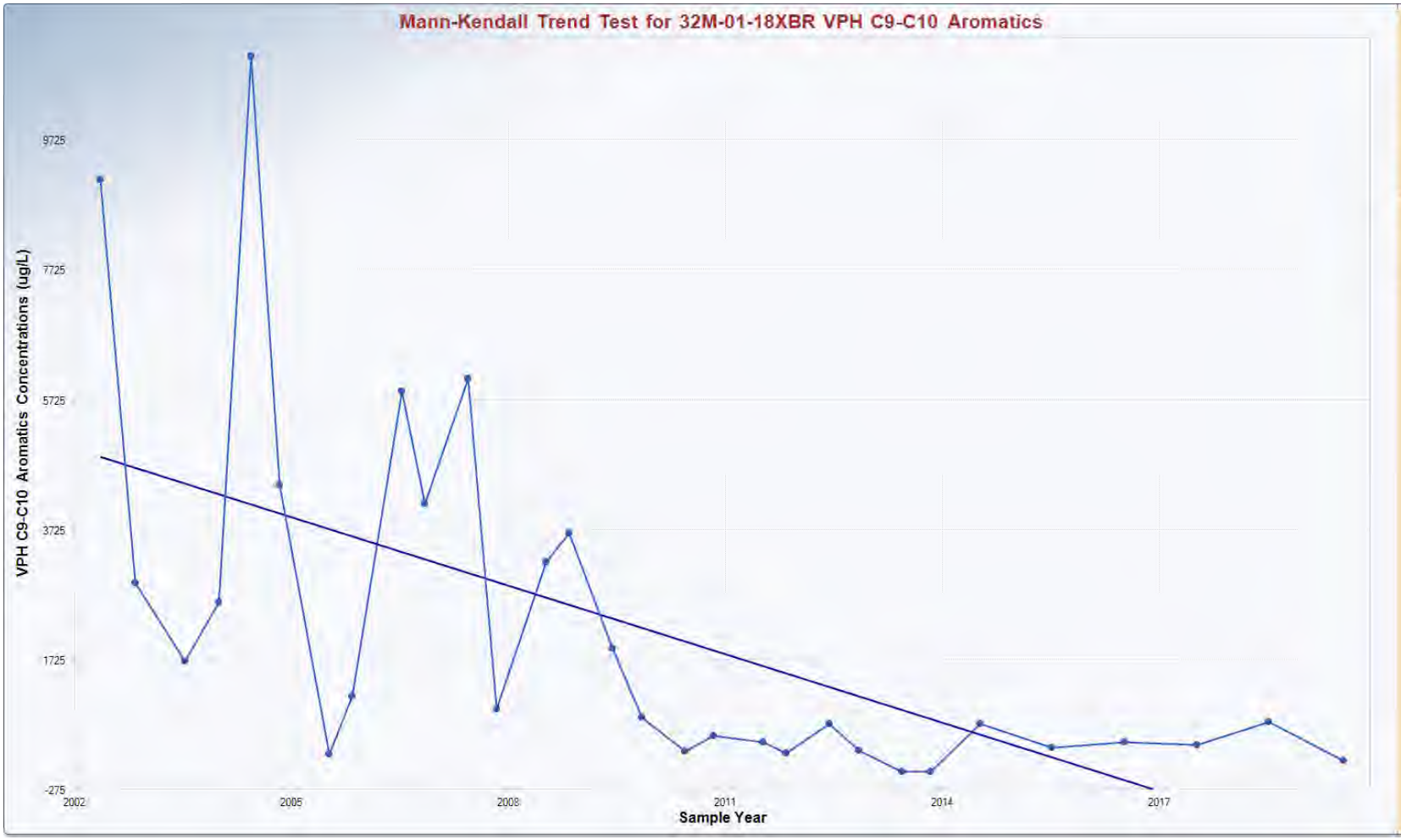
n	30
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	56.0506
Standardized Value of S	-4.1748
M-K Test Value (S)	-235
Appx. Critical Value (0.05)	-1.6449
Approximate p-value	0.0000

OLS Regression Line (Blue)

OLS Regression Slope	-24.5519
OLS Regression Intercept	49,526.6681

Statistically significant evidence of a decreasing trend at the specified level of significance.

AOC 32 & 43A
VPH C_9-C_{10}



Mann-Kendall Trend Analysis

n	30
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	56.0417
Standardized Value of S	-3.9435
M-K Test Value (S)	-222
Appx. Critical Value (0.05)	-1.6449
Approximate p-value	0.0000

OLS Regression Line (Blue)

OLS Regression Slope	-352.3320
OLS Regression Intercept	710,322.0530

Statistically significant evidence of a decreasing trend at the specified level of significance.

AOC 32 & 43A
Total Arsenic

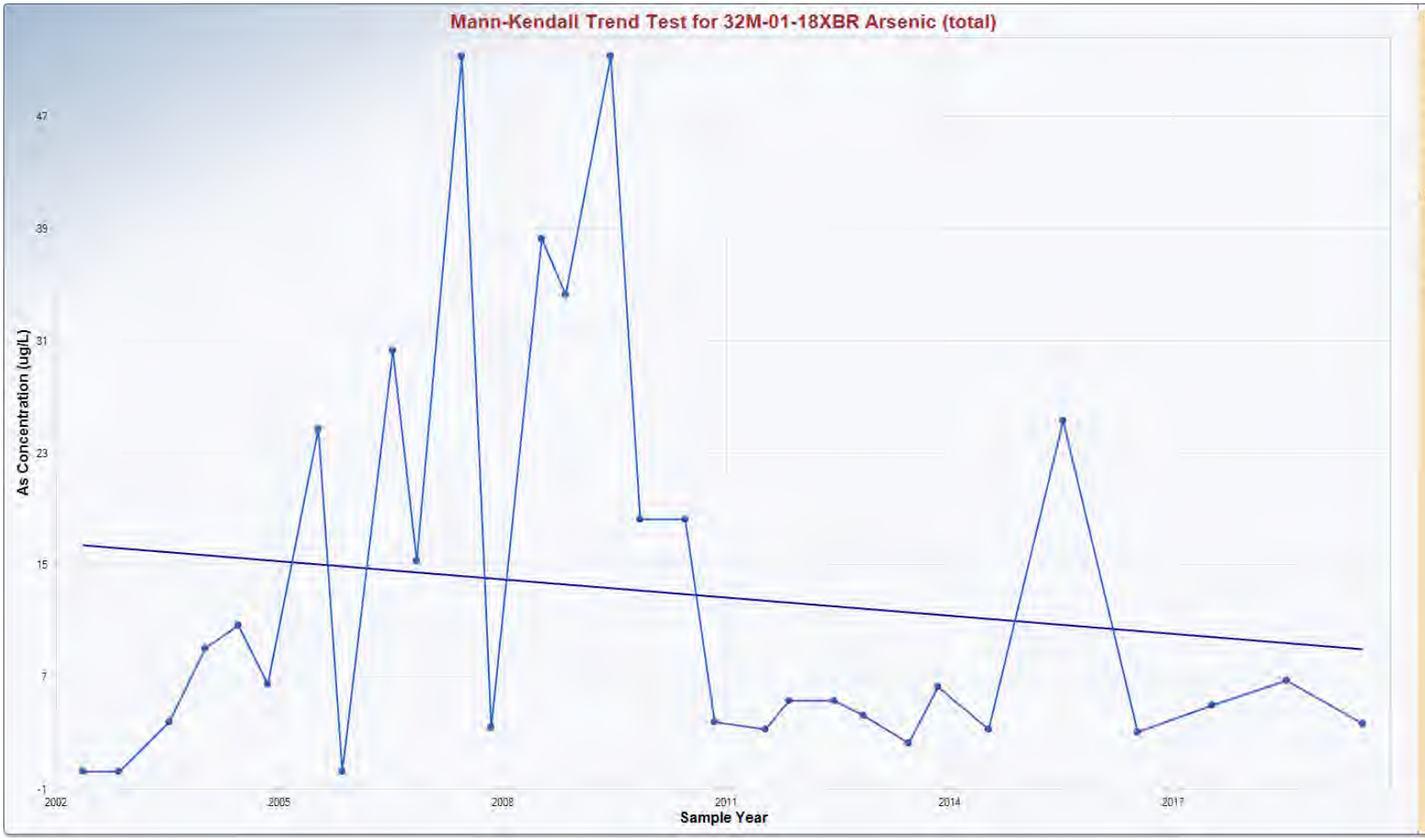
Mann-Kendall Trend Analysis

n	17
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	24.2559
Standardized Value of S	-1.1544
M-K Test Value (S)	-29
Tabulated p-value	0.1350
Approximate p-value	0.1242

OLS Regression Line (Blue)

OLS Regression Slope	-1.8351
OLS Regression Intercept	3,745.8408

Insufficient statistical evidence of a significant trend at the specified level of significance.



Mann-Kendall Trend Analysis

n	30
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	55.9732
Standardized Value of S	-0.3216
M-K Test Value (S)	-19
Appx. Critical Value (0.05)	-1.6449
Approximate p-value	0.3739

OLS Regression Line (Blue)

OLS Regression Slope	-0.4318
OLS Regression Intercept	880.6804

Insufficient statistical evidence of a significant trend at the specified level of significance.

APPENDIX E
ANNUAL LAND-USE CONTROL PLAN CHECKLIST FORMS

Annual Land Use Control Plan Checklist for AOC 57

This checklist has been developed from the USEPA guidance document Comprehensive Five Year Review Guidance dated June 2001 (OSWER No. 9355.7-03B-P) and from Section 4.0 of the 2015 Long-Term Monitoring Plan, Devens, Massachusetts. The Checklist was modified to site-specific conditions as recommended by the guidance document. The checklist will be completed annually and submitted with the Main Post annual long-term monitoring report. The checklist will also be used to assist in compiling information for the five-year review.

I. Site Information	
Site Name/Location: AOC 57 Area 2 and Area 3 Harvard, MA	**Name/Affiliation:** Laurie Ekes/KGS
Remedy Includes: Long Term Monitoring, Institutional Controls, Wetlands protection	
Inspection: AOC 57 site was inspected in December 2019.	
Inspectors: Melissa Miller - KGS	

II. Documentation and Records			
Item	Yes	No	Comments
Any related notices filed with Devens Enterprise Commission?		X	
Any related Department of Public Works permits found?		X	Some brush cutting and wood chipping to maintain Devens trail.
Any related zoning permits or variances found?		X	
Any related Conservation Commission findings, proposals or notices of intent found?		X	

III. Physical On-Site Inspection			
Item	Yes	No	Comments
Any evidence of new construction or excavation present in the area of the remedy?		X	
Is there evidence of damage to the remedy?		X	
Any groundwater extraction wells present?		X	
Is there sufficient access to the site for monitoring?	X		
Any signs of increased exposure potential?		X	

Annual Land Use Control Plan Checklist for AOC 57

IV. Interview			
Site Name/Location: AOC 57 Area 2 and Area 3 Harvard, MA			
Name of Interviewer: Laurie Ekes/KGS			
Name of Interviewee: Roy Herzig (MassDevelopment), Neil Angus (Devens Enterprise Commission), Ron Ostrowski (MassDevelopment), and Robert Carley (MassDevelopment)			
Date/Location of Interview: 12/27/2019: Emailed 2018 AR appendices to Roy Herzig, Jessica Strunkin, and Neil Angus for review. On 1/21/2020 performed interview with Roy Herzig, Neil Angus, Ron Ostrowski, and Robert Carley at 33 Andrews Parkway, Devens MA.			
Site Update: The Army is currently investigating PFAS which have been detected at Former Fort Devens. A record of decision has not been completed for PFAS.			
Item	Yes	No	Comments
Is interviewee familiar with the land use controls imposed upon the property & documentation of these controls?	X		
Are there any extraction wells at the property?		X	No extraction wells on property but an irrigation well was installed at 78 Barmum Rd in 2016 and is directly east of AOC 57. Unknown if irrigation well has been used since installation.
Are there any proposed plans for property sale, future development, construction, or demolition activities at the property?		X	The privately owned parcel (Nypro) has expanded ownership within the inside of the building only. No exterior expansion.
Are there any issues with site access for monitoring?		X	Devens walking trail provides partial access to AOC 57.
V. Response Actions			
Item	Yes	No	Comments
Were violations of the LUCs present ?		X	
Are there Response Actions necessary based on the violations?		X	
Are modifications/ terminations of LUC's necessary?		X	
Have Enforcement Actions been taken during this reporting period?		X	

If any response above are "Yes", please provide comments.
NA = Not applicable.

Annual Land Use Control Plan Checklist for AOC 69W

This checklist has been developed from the USEPA guidance document Comprehensive Five Year Review Guidance dated June 2001 (OSWER No. 9355.7-03B-P) and from Section 4.0 of the 2015 Long-Term Monitoring Plan, Devens, Massachusetts. The Checklist was modified to site-specific conditions as recommended by the guidance document. The checklist will be completed annually and submitted with the Main Post annual long-term monitoring report. The checklist will also be used to assist in compiling information for the five-year review.

I. Site Information	
Site Name/Location: AOC 69W	**Name/Affiliation**: Laurie Ekes/KGS
Remedy Includes: Long Term Monitoring, Institutional Controls	
Inspectors: AOC69W was inspected in December 2019.	
Participants: Melissa Miller-KGS	

II. Documentation and Records			
Item	Yes	No	Comments
Any related notices filed with Devens Enterprise Commission?		X	
Any related Department of Public Works permits found?		X	
Any related zoning permits or variances found?		X	
Any related Conservation Commission findings, proposals, or notices of intent found?		X	

II. Physical On-Site Inspection			
Item	Yes	No	Comments
Any evidence of new penetrations or repaved cut marks present in the ESMA?		X	
Is there evidence of damage to the remedy?		X	
Any groundwater extraction wells present?		X	
Is there sufficient access to the site for monitoring?	X		
Any signs of increased exposure potential?		X	

Annual Land Use Control Plan Checklist for AOC 69W

IV. Interview			
Name of Interviewer: Laurie Ekes			
Name of Interviewee: Roy Herzig (MassDevelopment), Neil Angus (Devens Enterprise Commission), Ron Ostrowski (MassDevelopment), and Robert Carley (MassDevelopment)			
Date of Interview: 12/27/2019: Emailed 2018 AR appendices to Roy Herzig, Jessica Strunkin, and Neil Angus for review. On 1/21/2020 interview was performed with Ron Herzig, Neil Angus, Ron Ostrowski, and Robert Carley at 33 Andews Parkway, Devens, MA.			
Site Update: The Army is currently investigating PFAS which have been detected at Former Fort Devens. A record of decision has not been completed for PFAS.			
Item	Yes	No	Comments
Is interviewee familiar with the land use controls imposed upon the property & documentation of these controls?	X		
Are there any extraction wells at the property?		X	Only monitoring wells are present at AOC 69W.
Are there any proposed plans for property sale, future development, construction, or demolition activities at the property?		X	
Any excavations, planned or emergency, that may have extended to soils below two feet in depth in ESMA?		X	No soil disturbance in 2019. Abutting business potentially may erect a fence in 2020.
Are there any issues with site access for monitoring?		X	
V. Response Actions			
Item	Yes	No	Comments
Were violations of the LUCs present ?		X	
Are there Response Actions necessary based on the violations?		X	
Are modifications/ terminations of LUC's necessary?		X	
Have Enforcement Actions been taken during this reporting period?		X	

Annual Land Use Control Plan Checklist for AOC 69W

IV. Interview			
Name of Interviewer: Laurie Ekes			
Name of Interviewee: Michelle McKenna, Phone: (978)772-3293			
Position: Business Manager, Francis W. Parker Charter Essential School			
Date of Interview: 1/9/2020- Emailed LUCs questions to Ms. McKenna at mmckenna@theparkerschool.org. **1/10/2020**-received email response from Ms. McKenna; her responses are entered below.			
Item	Yes	No	Comments
Is interviewee familiar with the land use controls imposed upon the property & documentation of these controls?	X		Ms. McKenna has been in this position for 14 years and is familiar with the LUC requirements.
Are there any extraction wells at the property?		X	
Are there any proposed plans for property sale, future development, construction, or demolition activities at the property?	X		There is internal HVAC and sidewalk/retaining wall work in corner of building near the ESMA.
Any excavations, planned or emergency, that may have extended to soils below two feet in depth in ESMA?	X		See above…but work will not go below 2 feet.
Are there any issues with site access for monitoring?		X	

ESMA = excavated soils management area
If any response above are "Yes", please provide coments.

Annual Land Use Control Plan Checklist for AOC 43G

This checklist has been developed from the USEPA guidance document Comprehensive Five Year Review Guidance dated June 2001 (OSWER No. 9355.7-03B-P) and from Section 4.0 of the 2015 Long-Term Monitoring Plan, Devens, Massachusetts. The Checklist was modified to site-specific conditions as recommended by the guidance document. The checklist will be completed annually and submitted with the Main Post annual long-term monitoring report. The checklist will also be used to assist in compiling information for the five-year review.

I. Site Information	
Site Name/Location: AOC 43G; Harvard, MA	Name/Affiliation: Laurie Ekes/KGS
Remedy Includes: Long Term Monitoring, Institutional Controls, Intrinsic Bioremediation	
Inspection: AOC 43G site was inspected in December 2019.	
Inspectors: Melissa Miller - KGS	

II. Documentation and Records			
Item	Yes	No	Comments
Any related notices filed with Harvard, MA?		X	
Any related Department of Public Works permits found?		X	
Any related zoning permits or variances found?		X	
Any related Conservation Commission findings, proposals, or notices of intent found?		X	

III. Physical On-Site Inspection			
Item	Yes	No	Comments
Any evidence of development present in the area of the remedy?		X	
Is there evidence of damage to the remedy?		X	
Any groundwater extraction wells present?		X	
Is there sufficient access to the site for monitoring?	X		New Piezometers were installed as part of ongoing PFAS RI activities in 2019.
Any signs of increased exposure potential?		X	

Annual Land Use Control Plan Checklist for AOC 43G

IV. Interview			
Name of Interviewer: Laurie Ekes/KGS			
Name of Interviewee: Robert Simeone, BRAC Environmental Coordinator			
Position: BRAC Environmental Coordinator			
Contact Information: Email: robert.j.simeone.civ@mail.mil			
Interview Notes: January 10, 2020 - sent email to Bob Simeone with interview questions. January 13, 2019 - Bob Simeone responded in an email "nothing has changed since 2018." On 1/21/2020 verified with MassDevelopment that AOC 43G is inside the Army Garison Fort Devens property and MassDevelopment does not own the property and has no knowledge of AOC 43G conditions.			
Site Update: The Army is currently investigating PFAS which have been detected at Former Fort Devens. A record of decision has not been completed for PFAS.			
Item	Yes	No	Comments
Is interviewee familiar with the land use controls imposed upon the property & documentation of these controls?	X		As documented in the ROD and the Installation Master Plan.
Are there any extraction wells at the property?		X	
Are there any proposed plans for property sale, future development, construction, or demolition activities at the property?		X	Property remains part of Army Garrison Fort Devens.
Are there any issues with site access for monitoring?		X	
V. Response Actions			
Item	Yes	No	Comments
Were violations of the LUCs present ?		X	
Are there Response Actions necessary based on the violations?		X	
Are modifications/ terminations of LUC's necessary?		X	
Have Enforcement Actions been taken during this reporting period?		X	

If any response above are "Yes", please provide comments.
NA = Not applicable.

Annual Land Use Control Plan Checklist for AOC 32 and 43A

This checklist has been developed from the USEPA guidance document Comprehensive Five Year Review Guidance dated June 2001 (OSWER No. 9355.7-03B-P) and from Section 4.0 of the 2015 Draft Long-Term Monitoring Plan, Devens, Massachusetts. The Checklist was modified to site-specific conditions as recommended by the guidance document. The checklist will be completed annually and submitted with the Main Post annual long-term monitoring report. The checklist will also be used to assist in compiling information for the five-year review.

I. Site Information			
Site Name/Location: AOC 32/43A		Name/Affiliation: Laurie Ekes/KGS	
Remedy Includes: Long Term Monitoring, Institutional Controls			
Inspection: AOC 32/43A site was inspected in December 2019.			
Participants: Melissa Miller - KGS			
II. Documentation and Records			
Item	Yes	No	Comments
Any related notices filed with Devens Enterprise Commission?		X	
Any related Department of Public Works permits found?		X	
Any related zoning permits or variances found?		X	
Any related Conservation Commission findings, proposals or notices of intent found?		X	
III. Physical On-Site Inspection			
Item	Yes	No	Comments
Any evidence of new construction or excavation present in the area of the		X	
Is there evidence of damage to the remedy?		X	
Any groundwater extraction wells present?		X	
Is there sufficient access to the site for monitoring?	X		
Any signs of increased exposure potential?		X	

Annual Land Use Control Plan Checklist for AOC 32 and 43A

IV. Interview

Name of Interviewer: Laurie Ekes/KGS

Name of Interviewee: Roy Herzig (MassDevelopment) and Neil Angus (Devens Enterprise Commission)

Date of Interview: 12/27/2019: Emailed 2018 AR appendices to Roy Herzig, Jessica Strunkin and Neil Angus for review. Performed Interview on 1/21/2020 with Roy Herzig, Neil Angus, Ron Ostrowski and Robert Carley.

Site Update: The Army is currently investigating PFAS which have been detected at Former Fort Devens. A record of decision has not been completed for PFAS.

Position: MassDevelopment and Devens Enterprise Commission

Contact information: Email Rherzig@Massdevelopment.com Phone: (978)784-2917

Interview Notes: January 21, 2020 - Interviewer conducted the interview at MassDevelopment, 33 Andrew Parkway, Devens, MA.

Item	Yes	No	Comments
Is interviewee familiar with the land use controls imposed upon the property & documentation of these controls?	X		
Are there any extraction wells at the property?		X	Several wells are monitored by the Army and two wells are monitored by O'Reilly and MassDevelopment. The two wells were required to be installed for monitoring of petroleum and solvent products stored within the O'Reilly building for Zone II water protection zone requirements.
Are there any proposed plans for property sale, future development, construction or demolition activities at the property?		X	None at this time.
Are there any issues with site access for monitoring?		X	

V. Response Actions

Item	Yes	No	Comments
Were violations of the LUCs present ?		X	
Are there Response Actions necessary based on the violations?		X	
Are modifications/ terminations of LUC's necessary?		X	
Have Enforcement Actions been taken during this reporting period?		X	

O'Reilly Auto Parts Warehouse is located within the foot print of AOC 32/43A. They are required to submit an annual Stormwater Management O&M Report to Devens Enterprise Commission. The facility also has two monitoring wells which are sampled annually: APEX-MW-OB-1 and APEX-MW-BR-2. The identity of the O'Reilly wells have been included at the request of the USACE. The annual reports are submitted to MassDEP and Devens Enterprise Commission.

Annual Land Use Control Plan Checklist for AOC 32 and 43A

IV. Interview			
Name of Interviewer: Laurie Ekes/KGS			
Name of Interviewee: Jason Pahl			
Position: Distribution Center Manager, O'Reilly Auto Parts, 15 Independence Drive, Devens, MA			
Contact information: Email jpahl@oreillyauto.com Phone: (978)784-3134			
Interview Notes: January 9, 2020 - Sent email to Jason Pahl with interview questions. January 14, 2020 - Jason Pahl responded to the email; his responses are entered below.			
Item	Yes	No	Comments
Is interviewee familiar with the land use controls imposed upon the property & documentation of these controls?	X		
Are there any extraction wells at the property?		X	There are several wells that are monitored by Devens as well as two that are monitored by O'Reilly. The two wells that are monitored by O'Reilly are: APEX-MW-OB-1 and APEX-MW-BR-2.
Are there any proposed plans for property sale, future development, construction or demolition activities at the property?		X	None at this time.
Are there any issues with site access for monitoring?		X	
V. Response Actions			
Item	Yes	No	Comments
Were violations of the LUCs present ?		X	
Are there Response Actions necessary based on the violations?		X	
Are modifications/ terminations of LUC's necessary?		X	
Have Enforcement Actions been taken during this reporting period?		X	

If any response above are "Yes", please provide comments.
NA = Not applicable.

Annual Land Use Control Plan Checklist for DCL

This checklist has been developed from the USEPA guidance document Comprehensive Five Year Review Guidance dated June 2001 (OSWER No. 9355.7-03B-P) and from Section 4.0 of the 2015 Long-Term Monitoring Plan, Devens, Massachusetts. The Checklist was modified to site-specific conditions as recommended by the guidance document. The checklist will be completed annually and submitted with the Main Post annual long-term monitoring report. The checklist will also be used to assist in compiling information for the five-year review.

I. Site Information	
Site Name/Location: DCL; Harvard, MA	Name/Affiliation: Laurie Ekes/KGS
Remedy Includes: Long Term Monitoring, Institutional Controls	
Inspection: December 16, 2019	
Inspectors: Melissa Miller/KGS	

II. Documentation and Records			
Item	Yes	No	Comments
Any related notices filed with Devens Enterprise Commission?		X	
Any related Department of Public Works permits found?		X	DPW approved and performed oversight of repaving of DCL driveway apron. Street trees installed and loam application/reseeding performed at construction staging area for Taravista with DPW oversight. Gate and fence repair to entrance of DCL installed by Taravista contractors in 2019.
Any related zoning permits or variances found?		X	
Any related Conservation Commission findings, proposals, or notices of intent found?		X	

III. Physical On-Site Inspection			
KGS personel visited the site on December 16, 2019; observations are noted below.			
Item	Yes	No	Comments
Any evidence of development present in the area of the remedy?		X	
Is there evidence of damage to the remedy?		X	
Any groundwater extraction wells present?		X	
Is there sufficient access to the site for monitoring?	X		
Any signs of increased exposure potential?		X	

IV. Interview			
Name of Interviewer: Laurie Ekes			
Name of Interviewee: Roy Herzig (MassDevelopment), Neil Angus (Devens Enterprise Commission), Ron Ostrowski (MassDevelopment), and Robert Carley (MassDevelopment)			
Date/Location of Interview: 12/27/2019: Emailed 2018 AR appendices to Roy Herzig, Jessica Strunkin, and Neil Angus for review. On 1/21/2020 performed interviews with Roy Herzig, Neil Angus, Ron Ostrowski, and Robert Carley at 33 Andews Parkway, Devens MA.			
Site Update: The Army is currently investigating PFAS which have been detected at Former Fort Devens. A record of decision has not been completed for PFAS.			
Item	Yes	No	Comments
Is interviewee familiar with the land use controls imposed upon the property & documentation of these controls?	X		
Are there any extraction wells at the property?		X	Only monitoring wells installed by the Army are present at DCL.
Are there any proposed plans for property sale, future development, construction, or demolition activities at the property?		X	
Are there any issues with site access for monitoring?		X	Entry is through secured gate.
V. Response Actions			
Item	Yes	No	Comments
Were violations of the LUCs present ?		X	
Are there Response Actions necessary based on the violations?		X	
Are modifications/terminations of LUC's necessary?		X	
Have Enforcement Actions been taken during this reporting period?		X	

If any response above are "Yes", please provide comments.
NA = Not applicable

Inspection Checklist for DCL Contributor Sites

This checklist has been developed from the USEPA guidance document Comprehensive Five Year Review Guidance dated June 2001 (OSWER No. 9355.7-03B-P) and from Section 4.0 of the 2015 Long-Term Monitoring Plan, Devens, Massachusetts. The Checklist was modified to site-specific conditions as recommended by the guidance document. The checklist will also be used to assist in compiling information for the five-year review.

I. Site Information	
Site Name/Location: DCL Contributor Site AOC 9 Filter Bed Road, Ayer, MA	**Name/Affiliation:** Laurie Ekes/KGS
Remedy Includes: No further Action. The site was transferred from the Army to MassDevelopment in 2006 as defined in the Finding of Suitability to Transfer (FOST) dated February 2005. Inspections are conducted to verify no change in site conditions since remedial action completion in 2002.	
Use Restrictions: AOC 9 (Lease parcel A2A) is limited to commecial and industrial uses.	
Date/Location of Interview: 12/27/2019: Emailed 2018 AR appendices to Roy Herzig, Jessica Strunkin, and Neil Angus for review. On 1/21/2020 performed interviews with Roy Herzig, Neil Angus, Ron Ostrowski, and Robert Carley at 33 Andews Parkway, Devens MA.	
Site Update: The Army is currently investigating PFAS which have been detected at Former Fort Devens. A record of decision has not been completed for PFAS.	

II. Documentation and Records			
Item	Yes	No	Comments
Any related notices filed with Devens Enterprise Commission?		X	
Any related Department of Public Works permits found?		X	
Any related zoning permits or variances found?		X	Little Leaf Farms located on Walker Rd plans to install water and sewer lines adjacent AOC 9 along WWTP access road in 2020. Coordination with MassDevelopment and National Heritage is ongoing.
Any related Conservation Commission findings, proposals or notices of intent found?		X	Residential restrictions apply to AOC 9.

II. Physical On-Site Inspection			
Inspection/Date: December 16, 2019			
Inspectors: Melissa Miller, KGS			
Item	Yes	No	Comments
Any evidence of new construction or excavation present in the area of the remedy?		X	
Is there evidence of damage to the remedy?		X	
Any groundwater extraction wells present?		X	
Is there sufficient access to the site for monitoring?	X		Access from Filter bed road off Walker Rd.
Any signs of increased exposure potential?		X	

Inspection Checklist for DCL Contributor Sites

This checklist has been developed from the USEPA guidance document Comprehensive Five Year Review Guidance dated June 2001 (OSWER No. 9355.7-03B-P) and from Section 4.0 of the 2015 Long-Term Monitoring Plan, Devens, Massachusetts. The Checklist was modified to site-specific conditions as recommended by the guidance document. The checklist will also be used to assist in compiling information for the five-year review.

I. Site Information	
Site Name/Location: DCL Contributor Site AOC 40 Patton Road, Ayer, MA	**Name/Affiliation:** Laurie Ekes/KGS
Remedy Includes: No further Action. The site was transferred from the Army to MassDevelopment in 2006 as defined in the Finding of Suitability to Transfer (FOST) dated February 2005. Inspections are conducted to verify no change in site conditions since remedial action completion in 2002.	
Use Restrictions: AOC 40 (Lease parcel A4) is limited to open space and recreational uses.	
Date/Location of Interview: 12/27/2019: Emailed 2018 AR appendices to Roy Herzig, Jessica Strunkin and Neil Angus for review. On 1/21/2020 performed interviews with Roy Herzig, Neil Angus, Ron Ostrowski and Robert Carley at 33 Andews Parkway, Devens MA.	
Site Update: The Army is currently investigating PFAS which have been detected at Former Fort Devens. A record of decision has not been completed for PFAS.	

II. Documentation and Records			
Item	Yes	No	Comments
Any related notices filed with Devens Enterprise Commission?		X	
Any related Department of Public Works permits found?		X	
Any related zoning permits or variances found?		X	
Any related Conservation Commission findings, proposals, or notices of intent found?		X	

II. Physical On-Site Inspection			
Inspection/Date: December 16, 2019			
Inspectors: Melissa Miller, KGS			
Item	Yes	No	Comments
Any evidence of new construction or excavation present in the area of the remedy?		X	
Is there evidence of damage to the remedy?		X	
Any groundwater extraction wells present?		X	1" PVC stickups
Is there sufficient access to the site for monitoring?	X		Access from Patton road
Any signs of increased exposure potential?		X	

Inspection Checklist for DCL Contributor Sites

This checklist has been developed from the USEPA guidance document Comprehensive Five Year Review Guidance dated June 2001 (OSWER No. 9355.7-03B-P) and from Section 4.0 of the 2015 Long-Term Monitoring Plan, Devens, Massachusetts. The Checklist was modified to site-specific conditions as recommended by the guidance document. The checklist will also be used to assist in compiling information for the five-year review.

I. Site Information	
Site Name/Location: DCL Contributor Site SA13 Lake George Street, Harvard, MA	**Name/Affiliation:** Laurie Ekes/KGS
Remedy Includes: No further Action. The site was transferred from the Army to MassDevelopment in 2006 as defined in the Finding of Suitability to Transfer (FOST) dated February 2005. Inspections are conducted to verify no change in site conditions since remedial action completion in 2001.	
Use Restrictions: SA13 (Lease parcel A8) is limited to commecial and industrial uses.	
Date/Location of Interview: 12/27/2019: Emailed 2018 AR appendices to Roy Herzig, Jessica Strunkin, and Neil Angus for review. On 1/21/2020 performed interviews with Roy Herzig, Neil Angus, Ron Ostrowski, and Robert Carley at 33 Andews Parkway, Devens MA.	
Site Update: The Army is currently investigating PFAS which have been detected at Former Fort Devens. A record of decision has not been completed for PFAS.	

II. Documentation and Records			
Item	Yes	No	Comments
Any related notices filed with Devens Enterprise Commission?		X	West of SA13 is the Patton well pumphouse which is undergoing PFAS treatment in 2019.
Any related Department of Public Works permits found?		X	
Any related zoning permits or variances found?		X	
Any related Conservation Commission findings, proposals or notices of intent found?		X	

II. Physical On-Site Inspection			
Inspection/Date: December 16, 2019			
Inspectors: Melissa Miller, KGS			
Item	Yes	No	Comments
Any evidence of new construction or excavation present in the area of the remedy?		X	
Is there evidence of damage to the remedy?		X	
Any groundwater extraction wells present?		X	Two 2" monitoring wells in wetland
Is there sufficient access to the site for monitoring?	X		Access from Patton Road
Any signs of increased exposure potential?		X	

Grant HA and Impact Area Annual Review Checklist		
LUCs for Grant Housing Area and 37-mm Impact Area are defined in the 2011 LUCIP. The Grant HA is currently zoned for residential reuse and the Impact Area is restricted for future use.		
check√	*task*	*notes*
√	Interview of municipal personnel as to the discovery, reporting, and disposal of UXO	Name(s) and title(s) of person(s) interviewed: Roy Herzig/Environmental Engineer - MassDevelopment Phone: (978) 784-2917 Neil Angus/Environmental Planner - Devens Enterprise Commission Phone: 978) 772-8831 X3334 Timothy Kelly/Fire Chief - MassDevelopment Phone: (978) 772-4600 Date(s) of interview: 1/21/2020 Any UXO discovered? **X No** □ Yes. (if "yes", provide detail regarding objects discovered, dates and locations of discovery, and information regarding reporting and disposal)
Impact Area only		
check√	*task*	*notes*
√	Physical Inspection of Impact Area	Date conducted: October 13, 2019 Inspections: Melissa Miller, Joe Kendall - KGS **Condition of fencing, signage, and vegetation:** A UXO sweep of the 37mm impact area was performed. A **Schonstedt XT Metal Detector** was used to sweep the Impact Area for potential MEC items. No distinct hits for UXO items were identified. No new washouts or exposed UXO were observed in the site surface areas. It is noted that immediately inside the main entrance a large section of tree prevents the gate from swinging inward. Signage was clearly visible and present all along the perimeter of the Impact Area fence line. Evidence of unauthorized access? **X No.** Yes. (if "yes", describe): Any surface or near surface UXO? **X No.** No exposed items were observed on or near surface. □ Yes. (if "yes", provide detail regarding objects discovered, dates and locations of discovery, and information regarding reporting and disposal)
√	Interview current owner regarding utility repair or emergency work	MassDevelopment is the current owner of the Impact Area. Name(s) and title(s) of person(s)interviewed: Roy Herzig/Environmental Engineer - MassDevelopment, Neil Angus/Environmental Planner Date of interview: 1/21/2020 Work conducted? **X No.** Offsite movie filming has been authorized at Grant HA but access to Impact Area is restricted. □ Yes. (if "yes", provide detail information of the work including the date(s) of performance and the discovery of UXO)

Grant HA only		
The Grant Housing Area continues to be developed for residential use in accordance with the LUCIP.		
check√	*task*	*notes*
√	Verify existence of website and content	The Soil Management Plan and UXO information pamphlet (utility insert) are available on the website (http://www.devensec.com/development). In general, verification of notice of soil management policy and UXO awareness is provided at the time of application, when permits are issued, and on the website.
√	Verify the inclusion of required utility bill inserts	Spoke to Roy Herzig, Neil Angus, and Ron Ostrowski: A copy of the UXO utility bill letter insert is sent when a transfer of utility bill is requested and annually to existing Grant HA utility bill recipients.
√	Verify posting of utility bill insert in a conspicuous location	Spoke to Roy Herzig, Ron Ostrowski, and Neil Angus. Posting of utility bill insert is verified at 5 locations near Grant/Oak/Maple housing areas and is available on the Website (www.devensec.com).
√	Verify distribution of current soils management policy to construction	Spoke to Roy Herzig, Ron Ostrowski, and Neil Angus. Soils management policy has been provided to the current (2019) construction contractor. Policy information is available on the Website (www.devensec.com).
√	Verify that awareness training is being conducted	(1) Did ground intrusive construction activities occur during the reporting period in the Grant HA? Yes. Under a Phase II, 17 homes are being constructed during the reporting period. (2) At the time of application for the building permit, were contractors who were applying to conduct ground intrusive construction activities in the Grant HA provided a current copy of the Devens Soil Management Policy? Yes. Contractors were provided a current copy of the Devens Soil Management Policy. (3) Were all contractors who applied for a building permit required to attend UXO awareness training prior to commencing ground intrusive construction activities? Yes. Contractors were required to attend UXO awareness training provided and documented by the Devens Fire Department.
√	Verify that supplemental deed notice has been included in deeds conveying portions of the Grant HA	Yes. Verified in some deeds. In deed discussions, a supplemental deed notice is included to contractors.
√	Physical Inspection (to be conducted only if deemed necessary)	**X No.** A physical inspection of the Grant Housing Area development was not necessary. Monitoring of construction activities is performed weekly. The completion of construction deadline is market driven. The Phase III of construction will begin once the Phase II is completed. □ Yes. (if "yes", provide date of inspection, the areas that were inspected and whether any surface or near surface UXO were discovered)

Former Oak and Maple HA Property		
The remedy for the Oak and Maple Housing Area was incorporated into the Grant HA and Impact Area site via a 2014 Explanation of Differences (ESD). The remedy included LUC interviews. Oak and Maple HA is zoned for commercial construction.		
check√	*task*	*notes*
X	Interview of municipal personnel as to the discovery, reporting, and disposal of UXO	Name(s) and title(s) of person(s) interviewed: Roy Herzig/Environmental Engineer - MassDevelopment Phone: (978) 784-2917 Neil Angus/Environmental Planner - Devens Enterprise Commission Phone: 978) 772-8831 X3334 Date(s) of interview: 1/21/2020 An Oak and Maple Land Use Control Implementation Plan (LUCIP) addendum is in process. It will be finalized in 2020. Any UXO discovered? **X No** □ Yes. (if "yes", provide detail regarding objects discovered, dates and locations of discovery, and information regarding reporting and disposal)
X	Verify existence of website and content	Website is www.devensec.com
X	Verify the inclusion of required utility bill inserts	NA
X	Verify posting of utility bill insert in a conspicuous location	NA
X	Verify distribution of current soils management policy to construction	A Soil Management Plan for the Former Oak and Maple Housing Areas has been prepared by the US Army Corps of Engineers (dated December 2018).
X	Verify that awareness training is being conducted	(1) Did ground intrusive construction activities occur during the reporting period? **No -** No development in 2019. Motion picture permits have been issued at the former Oak and Maple housing areas but access is restricted at Impact Area. Ground disturbance is restricted and permit requires UXO awareness training for film crew. (2) At the time of application for the building permit, were contractors who were applying to conduct ground intrusive construction activities in provided a current copy of the Devens Soil Management Policy? **NA** (3) Were all contractors who applied for a building permit required to attend UXO awareness training prior to commencing ground intrusive construction activities? **NA** Muck Fest (5K mudder/obstacle course event) was granted access through Grant housing area in May.
X	Verify that deed notice has been included in deeds conveying portions of the Oak and Maple HA	NA
X	Physical Inspection (Required for Oak and Maple HAs)	**X No.** □ Yes. (if "yes", describe)
X	Physical Inspection	Were intrusive activities undertaken in Former Oak and Maple Areas? **X No.** □ Yes. (if "yes", describe) If intrusive activities were conducted, were they conducted with MEC construction support in accordance with the LUCIP? **NA** □ No. □ Yes. (if "yes", describe)

NA = Not Applicable

Feb 10 , 2018

Dear Devens Residents:

This informational fact sheet is presented to you as a reminder of the unexploded Ordnance (UXO) history, here at Devens. The fact sheet will provide you a brief but comprehensive time line of the studies and work accomplished in identifying and removing UXO from Devens property.

All residents in the Grant Road Housing area will receive this notice in their first utility bill and yearly thereafter. This is part of the educational program on UXO as required by the Army's Land Use Control Implementation Plan (LUCIP) and supported by the EPA and DEP.

If you have any questions or comments on this program, please feel free to call me at 978-784-2936 for further information.

Sincerely,

Thatcher W. Kezer III
Senior Vice President, Devens

IMPORTANT INFORMATION ABOUT UNEXPLODED ORDNANCE (UXO)
FOR DEVENS RESIDENTS, EMPLOYEES, AND VISITORS

Devens is located on land once owned by the U.S. Army. For nearly 80 years from World War I until 1996, Devens' 4,400 acres were used for housing, research, education, administration, and military training purposes.

What parts of Devens were used for military training?
The Army used a 130-acre parcel called the Grant Road Housing Area for a firing range (including a firing point) and the adjacent Oak/Maple Housing areas (32 acres) principally for 37-millimeter anti-tank shells between World War I and World War II. A firing point is an area from which Army personnel fired artillery and other weapons at a target for training purposes. A firing range is the area between the firing point and the target. The Army stopped using the firing range in the 1930s. From the 1960s until the base closed in 1996, the area was occupied by approximately 260 homes for military families.

Where was the firing range?
The firing point was located at the northern end of the Grant Road Housing Area. Targets were located in an "impact area" on the northern slope of Oak Hill that is now surrounded by a fence.

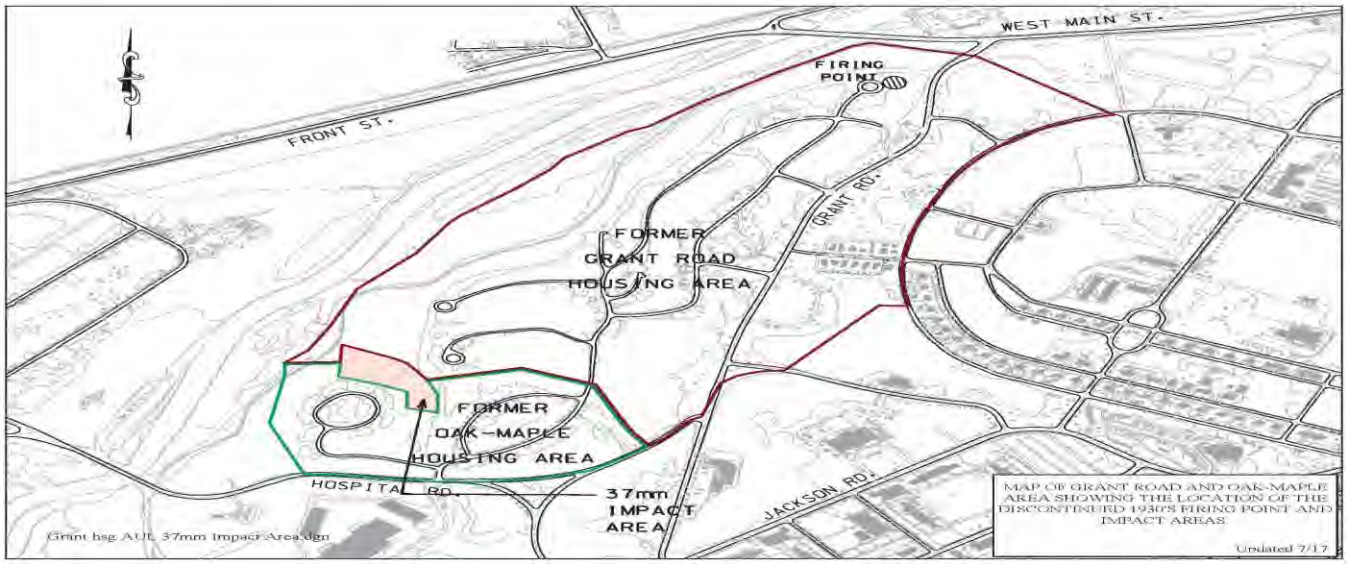


Figure 1. Map of Grant Road and Oak/Maple Housing Areas showing the location of the discontinued 1930's firing range impact area relative to now-demolished 1960's era military housing.

Was UXO found and removed?
In 1995 and 1996, as the base prepared to close, Army performed a munitions response investigation and subsequent removal action at portions of the Grant and Oak Housing Areas. Significant amounts of unexploded ordnance (UXO) and UXO scrap were found on the Oak Housing Area hillside (i.e. 37-mm Impact Area), located to the southwest of the Grant HA. In 2004 and 2005, the Army conducted a Preliminary Assessment/Site Inspection (PA/SI) and Supplemental Site Investigation (SSI) within the Grant HA and 37-mm Impact Area to assess whether military activities resulted in the release of munitions-related chemicals to soil and groundwater. Although no chemicals potentially related to UXO (i.e. munitions constituents) were detected, the 2008 PA/SI/SSI Report recommended that response alternatives involving land-use controls (LUCs) be considered for the 37-mm Impact Area and portions of the Grant HA to reduce explosive safety hazards and that a Munitions and Explosives of Concern (MEC) investigation be performed at the former Oak and Maple HAs to characterize potential MEC safety hazards and determine if additional removals and/or LUCs are warranted within these areas.

In 2006, to address concerns regarding potential remnant UXO within the 37-mm Impact Area and Grant HA, Mass Development issued results of a digital and analog ("mag, flag, and dig") geophysical survey and removal action conducted throughout the entire Grant Housing Area (HA) (former 37-mm artillery range) and northern portions of Oak and Maple HAs (located within the 37-mm firing fan/impact area). In total, an additional 31 UXO items and 17 other ordnance items were located and removed.

In 2010/2011, per recommendations detailed in the 2008 PA/SI/SSI Report, a MEC investigation was conducted at the former Oak and Maple HAs. Similar to the geophysical techniques utilized in 2006, a combination of digital and analog

methods were deployed to evaluate a portion (14 of 37 acres) of the former Oak and Maple HA property thought to have the greatest likelihood of MEC discovery . Although munitions debris (MD) was found scattered across several areas within both HAs, of the 3,647 anomalies investigated only 1 MEC item was found. The investigation concluded that the probability of encountering MEC within the previously developed former Oak and Maple HAs is considered to be low. In 2016, an additional 10 (100' X 100') grids and 13 concrete building slab footprints within the former Oak HA were surveyed using an analog, hand-held instrument. No MEC was recovered during this investigation.

Do I need to be concerned about unexploded shells or other ordnance?
UXO could remain in the housing and impact areas. However, the Army and MassDevelopment have taken all steps recommended by the U.S. Environmental Protection Agency (EPA) with the review and comment of the Massachusetts Department of Environmental Protection (DEP) to identify and remove UXO from the housing and impact areas. The Army and EPA, with the review and comment of DEP, concluded that (a) all identified UXO in the top 18 inches of the surface have been removed and (b) the presence of UXO deeper than 18 inches is unlikely given the primary type of UXO found—37-millimeter shells—the angle of penetration, soil conditions, and decades of frost heaves. Since technology cannot guarantee complete detection, the possibility remains of additional finds of UXO that could pose explosive safety hazards.

What does UXO look like and what should I do if I suspect I have found it?
UXO may appear as corroded bullets, shells of various sizes, or grenades. Below are pictures of UXO that might be found in Devens.

Figures 2 and 3. Pictured above is (at left) an intact 37mm anti-tank shell and (at right) a hand grenade. Both are shown with a standard 12-ounce beverage can.

The Department of Defense recommends that everyone—including children, family members, and landscapers—learn the three R's of UXO safety: recognize, retreat, and report.

• **RECOGNIZE** – When you may have encountered UXO.
• **RETREAT –** Do not touch, disturb, or move the UXO. Leave the area.
• **REPORT –** Call Devens Emergency Dispatch Center at (978) 772-7200 and report what you saw and where you saw it.

If you are conducting any activity that requires a building permit, call:
• Devens Enterprise Commission: (978) 772-8831

Awareness Briefings:
The Devens Fire Department conducts awareness briefings for contractors and other construction and utility personnel who intend to conduct ground-intrusive activities (such as digging) in Devens. These briefings instruct personnel on the steps both to recognize UXO and to follow should suspect UXO be encountered. Devens residents are also invited to attend an awareness briefing. To receive an awareness briefing, contact the Devens Fire Department at (978) 772-4600.

Where can I get more information?
For information on UXO and UXO removal, call:
• Devens Fire Department: (978) 772-4600
• MassDevelopment: (978) 784-2900

For additional information on the land use controls and implementation plan as well as the Devens Soil Management Policy and its related regulations, visit the Devens Enterprise Commission website at www.devensec.com or call the Devens Enterprise Commission at (978) 772-8831.

APPENDIX F

DEVENS CONSOLIDATION LANDFILL INSPECTION REPORT

2019 GEOTECHNICAL ENGINEERING ANNUAL INSPECTION REPORT

DEVENS CONSOLIDATION LANDFILL

FORMER FORT DEVENS ARMY INSTALLATION, DEVENS, MA

JANUARY 2021

Prepared for:
U.S. Army Corps of Engineers
New England District
696 Virginia Road
Concord, Massachusetts

Prepared by:

KOMAN Government Solutions, LLC
293 Boston Post Road West, Suite 100
Marlborough, MA 01752
Contract No.: W912WJ-18-C-0011

1.0 INTRODUCTION

The Resource Conservation and Recovery Act (RCRA) (Subtitle C) Devens Consolidation Landfill (DCL) cap was constructed to eliminate the potential risk to human health and the environment associated with exposure to wastes; minimize off-site migration of contaminants; and limit infiltration to the underlying waste within the landfill area, thereby minimizing leachate generation. The RCRA cap consists of the following layers (working from the waste to the top of the cap): 12-inch thick subgrade/leveling layer immediately above the waste materials; geocomposite gas collection/vent layer; 40 mil very flexible polyethylene (VFPE) geomembrane; geocomposite drainage layer; and a 12-inch thick protective layer overlaid by an 18-inch thick vegetative support layer capped with 6 inches of topsoil. The landfill cap system was completed during fall 2002 and restoration of site staging areas was completed during spring 2003. The DCL landfill general plan is presented in Figure 1. Landfill features are seen in the attached Photograph Log.

Post closure monitoring objectives and procedures are specified in the Operations and Maintenance (O&M) Manual included in the Post Closure Report. The United States Army is responsible for operating, monitoring, and inspecting the facility. Operations features include the routine site entry, gas monitoring, groundwater and surface water sampling, operation of monitoring equipment, scheduled operating events, and unscheduled operating events. Leachate wastewater is permitted to discharge to the Devens Wastewater Sewer System through the authorized industrial wastewater discharge permit.

2.0 LANDFILL CAP INSPECTION

Personnel from KOMAN Government Solutions, LLC (KGS) and U.S. Army Corps of Engineers (USACE), New England District (NAE) inspected the DCL on 13 November 2019. Observations were made regarding the site entry, vegetative cover, erosion, settlement, and general condition of the various features. Appendix A of this report contains the Inspection and Maintenance Checklists and Appendix B contains the Landfill Gas Summary Table, which summarizes the findings of these inspections.

During the November inspection, the overall landfill cap was found to be in good condition, with no apparent overall settlement or significant erosion (Photos 1 through 6). Riprap along the toe of the landfill is in good condition. An area on the eastern slope located north of gas vent #7 (Photo 4) which may have settled slightly since the original construction appears to be unchanged since the last inspection and can continue to be monitored (i.e., no action required at this time as there are no apparent adverse impacts to the landfill cap or nearby gas vents). A small erosional area (6 feet long by 4 feet wide by 6 inches deep) was present just above the riprap toe east of gas vent #8; this area should be filled in with topsoil and reseeded to prevent further erosion.

In general, the cap vegetation appeared healthy and provides good coverage of the cap. Selected areas of the upper cap that were reseeded and fertilized in May 2018 still appear to be growing well overall (Photos 5 and 6). The cap and adjacent area vegetation were mowed on 23 October

2019. As noted during previous inspections, some small, woody shrub species have invaded into the cap area. The woody vegetation gets cut low to the ground as part of the annual mowing program. Extensive reworking and reseeding of the topsoil is not recommended at this time as there appears to be sufficient grass cover with no significant topsoil erosion. However, the shrub stalks should be cut as flush to the ground (or removed) as feasible during the annual maintenance program in order to promote growth of the grass cover and to prevent deep rooted vegetation from forming. A 5-foot shrub growing on the cap approximately 100 feet north of gas vent #4 should be cut down to prevent deep roots damaging the cap.

Two groundhog burrows were present on the landfill cap (approximately 50 feet northeast of gas vent #1 and approximately 30 feet east of gas vent #8). The burrows should be backfilled to prevent erosion and water infiltration into the cap.

2.1 Entries and Exit Inspection

The access roads are located on private property owned by MassDevelopment. The security gate at the Patton Road (southern) entrance has been repaired since last year's inspection (Photo 7). The access road from the entry gate extending to the leachate pump station was in good condition. There were no significant ruts, potholes, or eroded areas.

2.2 Fence Inspection

The perimeter fence is in good condition. The fence and entry gates, rock features (e.g., drainage swales and riprap), and the site's inherent relief help to minimize entry onto the site by motor vehicles. These access limitations appear to be adequate at the present time with no signs of vandalism or other unauthorized entry around the west, north, or east perimeter of the landfill.

3.0 DRAINAGE SYSTEM INSPECTION

The drainage system is designed to drain surface water and infiltrated water off the cap system. It consists of the following components: a geocomposite drainage layer, grass bench drains on the cap with gabion slope drains, a perimeter stone drain along the toe-of-slope, perimeter drainage channels, and a sediment detention basin with a riprap lined outlet area (located at the northeast corner of the landfill). The DCL general plan is presented in Figure 1. Observations were made regarding the vegetative cover, vegetation types, erosion, and general condition of the drainage system. No maintenance activities were performed during the inspection. Appendix A of this report contains the Inspection and Maintenance Checklist, which summarizes the findings of this inspection.

The cap drainage system was in good condition. Drainage channels were overall free of sediment and debris, with no significant settlement or stone displacement. Some sediment has accumulated in a small area (approximately 6 feet wide by 10 feet long) of the riprap on the southeast side of the landfill (Photo 8) but does not appear to have substantially increased since last year's inspection and no action is required at this time.

A minor amount of vegetation is present within the riprap along the southern toe of the landfill (last removed in March 2018) and instances of larger shrubs/saplings (e.g., 4 feet or taller) should be cut down prior to the next inspection. No significant vegetation was present in the riprap along the eastern and western portions of the landfill. During the inspection on 13 November, a greater amount of vegetation was observed to be present in the rip rap along the northern toe of the landfill (e.g., tall grasses, shrubs, saplings) and was recommended to be cut down to prevent potential clogging/displacement of the riprap. KGS returned and cut down the vegetation in the northern riprap during 19-20 December 2019. No further action is required at this time.

Gabion slope drains were in good condition with minimal vegetation present (Photo 9).

The detention pond northeast of the DCL was in good condition overall. Pond drains and outfall areas were in good condition and generally free of debris and vegetative growth. Shrub growth at the toe of the riprap in the overflow area in the northeast corner of the pond should be cut at ground level. Vehicle tire ruts (1 to 2 inches deep) were present on the eastern and southern slopes of the pond, presumably from the recent grass mowing equipment (Photo 10). No action is required at this time as it is outside of the landfill cap area and the grass cover is preventing any significant erosion, but the area should continue to be monitored for potential future erosion. If significant erosion occurs, then the area should be regraded and reseeded as part of the annual landfill maintenance program.

The perimeter toe drains were in good condition and appeared to be functioning properly, with no visible signs of erosion or developing slope stability problems.

The flow meter at the leachate pump station was recalibrated on 30 December 2019. The leachate pump was inspected monthly. The leachate pump area remains in good condition (Photo 11). The deteriorating storage shed (Conex box) that was noted during previous year's inspections was removed by KGS on 25 October 2019.

4.0 GAS VENT SYSTEM INSPECTION

The DCL includes a passive gas venting system that was installed to facilitate the ventilation of any gases generated from the degrading waste material beneath the landfill cap system. The passive system consists of eleven 6-inch diameter gas vents integrated into the geocomposite gas collection layer immediately beneath the 40-mil VFPE geomembrane. Appendix A and B of this report contain the Inspection and Maintenance Check List and the Landfill Gas Monitoring table, respectively.

The gas vent system is in good condition. The gas vents are stable and upright (Photo 12). The gas vents' labels and bird/insect screens were in good condition, although label tags are missing from gas vents #5, #6, and #9.

On 11 November 2019, a GEM 2000 gas monitor was used to monitor the gas vents for methane (CH_4), carbon dioxide (CO_2), oxygen (O_2), and % lower explosive limit (LEL). A MultiRAE+

was used to check levels of volatile organic compounds (VOCs), hydrogen sulfide (H_2S), carbon monoxide (CO), oxygen, and %LEL. Gas monitoring showed non-detect (zero) readings for VOCs, H_2S, and LEL. Oxygen levels ranged from 18.9% to 22.6% and CO_2 ranged from 0.5% to 3.2%. Low levels (1 ppm) of CO were detected in gas vent #9 and were non-detect in the other gas vents. Low levels of methane (0.1 %) were detected in gas vents #1, #3, and #6 and were non-detect in the other gas vents. Gas vent sample results are acceptable.

5.0 OTHER OBSERVATIONS

- None.

6.0 RECOMMENDATIONS AND CORRECTIVE ACTIONS

The following recommendations and corrective actions should be conducted for future maintenance of the landfill cap:

1. Continue annual inspections of landfill cap components. The inspection should continue to be performed in the fall, soon after mowing (i.e., within 1-2 weeks), and preferably within 48 hours after a precipitation event to help inspect the effectiveness of surface runoff in the drainage swales. Landfill gas monitoring should be performed on a dry day.

2. Continue mowing the landfill cap to control vegetative growth, as well as the adjacent field (stormwater detention pond) to prevent woody and wetland plant species from encroaching onto the cap. Mowing should not take place until after late August when ground-nesting songbirds are mature enough to avoid being harmed.

3. Continue general landfill maintenance, such as clearing large/woody vegetative growth from the cap, drainage channels, and riprap. Small shrubs growing on the landfill cap should continue to be cut low during the annual mowing, and/or cut as flush to the ground as feasible during the annual maintenance program.

4. A small erosional area (6 feet long by 4 feet wide by 6 inches deep) located just above the riprap toe east of gas vent #8 should be filled in with topsoil and reseeded to prevent further erosion.

5. Backfill the two groundhog burrows on the landfill cap (located approximately 50 feet northeast of gas vent #1 and approximately 30 feet east of gas vent #8).

6. A 5-foot shrub growing on the cap approximately 100 feet north of gas vent #4 should be cut down.

7. Confirm the presence of label tags on each gas vent and replace any missing label tags.

8. Since the cap was completed in 2002, post-closure inspection and monitoring has been performed for 18 years. Planning should commence for the performance time and

metrics to reduce long-term monitoring and sampling activities, or to perform them at a reduced frequency, after 30 years, in accordance with RCRA Subtitle C landfill cap regulations for post-closure monitoring periods of performance.

FIGURE

Figure F-1
Site Layout
Devens Consolidation Landfill

Legend

- LTM Sample Well
- LTM Well - Gauge Only
- Gas Vent
- Monitoring Well - Destroyed
- Landfill Gas Monitoring Well
- LFM-03-07 Well/Vent Identification
- Topographic Contour (ft AMSL)

Notes:

LFM-03-07 was paved over by asphalt during parking lot construction for the neighboring Building. In July 2017 LFM-03-07 was uncovered.

LFM-99-06A was replaced by LFM-99-06ARP in September 2015.

Gas vent locations were approximated based upon the locations displayed in Figure 2 of USACE New England District's Devens Consolidation Landfill 2004 Annual Report.

ft AMSL = feet above mean sea level
LTM = long term monitoring

Aerial Sources: Esri, DigitalGlobe, GeoEye, i-cubed, USDA FSA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

2019 Main Post Annual Report
Devens Consolidation Landfill

Former Fort Devens Army Installation
Devens, Massachusetts

KOMAN Government Solutions, LLC
293 Boston Post Road West, Suite 100, Marlborough, MA 01752

0 75 150
Feet

Date: 05/02/2019

Figure F-1

File: AR2018_MP_F6-1_DCL_SITE.mxd

PHOTOGRAPH LOG

Photo 1 – Landfill cap (southern slope)

Photo 2 – Landfill cap (western slope)

Photo 3 – Landfill cap (northern slope)

Photo 4 – Landfill cap (eastern slope north of gas vent 7)

Photo 5 – Landfill peak (looking north)

Photo 6 – Reseeded area

Photo 7 – New entrance gate on Patton Road

Photo 8 – Soil accumulated in riprap on southeast end of landfill.

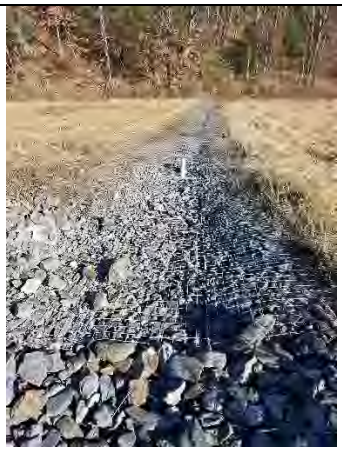


Photo 9 – Riprap/gabion drainage channel at northern end of the landfill

Photo 10 – Stormwater detention pond (looking northeast)

Photo 11 – Leachate pump area

Photo 12 – Gas vent 11

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New England District

APPENDIX A

Inspection & Maintenance Check List

US Army Corps of Engineers
New England District

Inspection & Maintenance Check List
Devens Consolidation Landfill

Inspectors: J. Ropp (KGS), B. Smith (USACE) Date: 13 November 2019

Item	Description of Inspection Items	Checked (X)	Comments
Landfill Cap	Inspect for Eroded Areas	X	No significantly eroded areas were observed. A small erosional area (6 feet long by 4 feet wide by 6 inches deep) located just above the riprap toe east of gas vent #8 should be filled in with topsoil and reseeded to prevent further erosion.
	Inspect for Settlement and Ponded Water	X	No ponded water was observed. No significant settlement was observed, although an area north of gas vent #7 should continue to be monitored for potential settlement.
	Inspect for Wetland Species Encroachment	X	No encroachments of wetland species were observed
	Inspect Vegetated Areas	X	Last mowed on 23 October 2019. Vegetation is well established but tends to be sparser in the upper portion of the landfill. The upper area which was reseeded and fertilized in spring 2018, still appears to be growing well. Small, woody shrub species are present across large areas of the landfill and are mowed close to the ground surface each year. Mowing should continue to control the growth of these shrubs and the leftover stalks should be cut as flush to the ground as feasible or removed as part of the annual maintenance program. A 5-foot shrub located approx. 100 feet north of gas vent #4 should be cut down.
Drainage System	Inspect Stone Toe Drain	X	Toe drains are in good condition and appear to be functioning well.
	Inspect Gabion Slope Drains	X	The gabion slope drains are in good condition and appear to be functioning well.
	Inspect for Eroded Areas	X	No significant erosion noted.
	Inspect for Debris & Unwanted Vegetation in Drainage Channels	X	No debris observed. No significant vegetation present.
	Inspect Rip-Rap Areas	X	Riprap is in good condition, with no significant settlement or displacement. Riprap areas are generally free of excess vegetation, but instances of larger shrubs/saplings in the southern riprap should be cut down/removed as feasible.

Item	Description of Inspection Items	Checked (X)	Comments
Gas Vent System	Gas Monitoring Vents 1 through 11	X	Landfill gas concentrations were acceptable.
	Inspect Vent Pipe and Bird Screen	X	The vent pipes and bird/insect screens are in good condition. Replace missing label tags on gas vents #5, #6, and #9.
Security Fence	Inspect for Damage to or Breeches in Fencing	X	Perimeter security fence and gates are in good condition where present.
Access Road	Inspect for Erosion, Potholes and Rutting	X	The access road from the entrance to the leachate pump station is in good condition.
Description of Maintenance Activities Performed (as necessary): No maintenance activities were performed during the inspection.			
The following maintenance and monitoring activities are recommended: See landfill inspection report Section 6.			

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New England District

APPENDIX B

Landfill Gas Monitoring

Landfill Gas Monitoring
Devens Consolidated Landfill Devens, Massachusetts

Sampler(s): Melissa Miller - KGS

Date: 11/11/2019

Weather: Cool/ Overcast

Temperature (F): not recorded

Barometer (in-Hg): 30.13 **Time:** 0955

30.12 1100

30.10 1200

Vent Number	Time	VOC	H_2S	CO	LEL	O_2	O_2	CO_2	CH_4	LEL	Remarks
		ppm Multi RAE+	ppm Multi RAE+	ppm Multi RAE+	% Multi RAE+	% Multi RAE+	% GEM 5000+	% GEM 5000+	% GEM 5000+	% GEM 5000+	
V-1	1200	0.0	0.0	0.0	0.0	19.9	20.0	2.6	0.1	0.0	No tag
V-2	1112	0.0	0.0	0.0	0.0	19.0	19.4	2.8	0.0	0.0	
V-3	1123	0.0	0.0	0.0	0.0	18.9	19.0	3.2	0.1	0.0	
V-4	1100	0.0	0.0	0.0	0.0	20.8	21.9	0.9	0.0	0.0	
V-5	1135	0.0	0.0	0.0	0.0	19.0	19.4	2.8	0.0	0.0	
V-6	1147	0.0	0.0	0.0	0.0	19.0	19.5	3.0	0.1	0.0	No tag
V-7	1012	0.0	0.0	0.0	0.0	21.6	22.6	0.5	0.0	0.0	
V-8	1000	0.0	0.0	0.0	0.0	21.9	22.5	0.7	0.0	0.0	
V-9	1025	0.0	0.0	1.0	0.0	19.2	19.5	2.7	0.0	0.0	
V-10	1048	0.0	0.0	0.0	0.0	21.5	22.1	1.2	0.0	0.0	
V-11	1037	0.0	0.0	0.0	0.0	19.9	21.0	1.8	0.0	0.0	

Notes:

NA – Not Analyzed

CALIBRATION INFORMATION:

1. Instrument: **MultiRAE+:** Calibrated by: Pine Environmental (11/5/19), All gas Ok

Calibrated With: 50 ppm CO, 10 ppm H2S, 50% LEL (CH4), 20.9% O2, VOC 100 ppm isobutylene (R.F. = 1.0)

Calibration Check Performed by: Melissa Miller (11/11/19), All gas Ok

2. Instrument: **Landtec GEM 5000+:** Calibrated by: Pine Environmental (11/5/19), All gas Ok

Calibrated With: 15% CH4, 15% CO2, 20.9% O2

Calibration Check Performed by: Melissa Miller (11/11/19), All gas Ok

APPENDIX G
SUPPLEMENTAL SAMPLING
AOC 43G AND AOC 57

SUPPLEMENTAL SAMPLING REPORT TO SUPPORT THE 2020 FIVE YEAR REVIEW AREAS OF CONTAMINATION 43G AND 57

FORMER FORT DEVENS ARMY INSTALLATION, DEVENS, MA

MARCH 2021

Prepared for:
U.S. Army Corps of Engineers
New England District
696 Virginia Road
Concord, Massachusetts 01742

Prepared by:
KOMAN Government Solutions, LLC
293 Boston Post Road West, Suite 100
Marlborough, Massachusetts 01752
Contract No.: W912WJ-18-C-0011

TABLE OF CONTENTS

EXECUTIVE SUMMARY ES-1
1.0 INTRODUCTION 1
1.1 GROUNDWATER SAMPLING 1
1.1.1 Preparation for Sampling 1
1.1.2 Sampling 2
1.1.3 Equipment Decontamination 2
1.1.4 Investigation Derived Waste 2
1.1.5 Monitoring Well Network Inspection and Repairs 2
1.2 LABORATORY TESTING 2
1.5.1 Analyses 2
1.5.2 Analytical Results 3
1.6 QUALITY CONTROL 3
1.6.1 Field Quality Control 3
1.6.2 Data Evaluation for 2020 Supplemental Sampling Event 3
1.6.3 Chemical Analytical Quality Assurance/Quality Control 3
2.0 AREA OF CONTAMINATION 57 5
2.1 SITE BACKGROUND 5
2.2 Groundwater Hydrology 5
2.3 Groundwater Sampling 7
2.4 Analytical Results 7
2.4.1 AOC 57 Area 2 Data Summary 7
2.4.2 AOC 57 Area 3 Data Summary 8
2.4.3 AOC 57 Data Trends 9
2.4.3.1 Area 2 9
2.4.3.2 Area 3 10
2.5 DATA quality EVALUATION 12
2.6 CONCLUSIONS 12
2.6.1 Area 2 12
2.6.2 Area 3 13
3.0 AREA OF CONTAMINATION 43G 16
3.1 SITE BACKGROUND 16

3.2 GROUNDWATER HYDROLOGY 16
3.3 GROUNDWATER SAMPLING 17
3.4 ANALYTICAL RESULTS 17
3.4.1 Winter 2020 Data Summary 17
3.5 DATA EVALUATION 18
3.7 CONCLUSIONS 18
4.0 REFERENCES 19

LIST OF APPENDICES

Attachment A Groundwater Field Forms
Winter 2020 Supplemental Sampling Event

Attachment B Laboratory Analytical Reports
Winter 2020 Supplemental Sampling Event

Attachment C Analytical Data Validation Reports
Winter 2020 Supplemental Sampling Event

LIST OF FIGURES

Figure 1-1 Site Location, Former Fort Devens Army Installation
Figure 2-1 Site Layout, Area of Contamination 57 – Area 1, 2 & 3
Figure 2-2 Site Layout, Area of Contamination 57 – Area 2
Figure 2-3 Site Layout, Area of Contamination 57 – Area 3
Figure 2-4 Shallow Water Table Elevation, Area of Contamination 57 – Area 2, March 2020
Figure 2-5 Deep Water Table Elevation, Area of Contamination 57 – Area 2, March 2020
Figure 2-6 Shallow Water Table Elevation, Area of Contamination 57 – Area 3, March 2020
Figure 2-7 Deep Water Table Elevation, Area of Contamination 57 – Area 3, March 2020
Figure 2-8 Shallow Water Table Elevation, Area of Contamination 57 – Area 2 and Area 3, March 2020
Figure 2-9 Metals Concentrations in Groundwater, Area of Contamination 57 – Area 2, March 2020
Figure 2-10 Metals Concentrations in Groundwater, Area of Contamination 57 – Area 3, March 2020
Figure 3-1 Site Layout, Area of Contamination 43G
Figure 3-2 Water Table Elevation, Area of Contamination 43G, February 2020
Figure 3-3 Metals Concentrations, Area of Contamination 43G, February 2020

LIST OF TABLES

Table ES-1	AOC 57, Contaminant of Concern Cleanup Goal and Background Level Exceedances, Winter 2020
Table ES-2	AOC 43G, Contaminant of Concern Cleanup Goal and Background Level Exceedances, Winter 2020
Table 1-1	Analytical Methods, Containers, Holding Times, and Preservatives
Table 1-2	Monitoring Wells, Well Points, Piezometers, and Staff Gauges Selected for Winter 2020 Supplemental Sampling Event
Table 1-3	AOC-Specific Action Levels
Table 1-4	Groundwater Elevations Winter 2020 Supplemental Sampling Event Monitoring Wells, Well Points, and Piezometers Selected for Winter 2020 Supplemental Sampling Event.
Table 2-1	Vertical Groundwater Gradients – AOC 57
Table 2-2	AOC 57 Area 2 Groundwater Analytical Results - Winter 2020 Supplemental Sampling
Table 2-3	AOC 57 Area 3 Groundwater Analytical Results - Winter 2020 Supplemental Sampling
Table 2-4	AOC 57 Vertical Profile Groundwater Analytical Results for Select Metals, April 2020 Supplemental Sampling.
Table 2-5	AOC 57 Area 3 Arsenic Exceedances in Groundwater, 2003 to 2020
Table 3-1	AOC 43G Groundwater Analytical Results - Winter 2020 Supplemental Sampling

LIST OF ACRONYMS AND ABBREVIATIONS

%	Percent
AAFES	Army Air Force Exchange Service
AOC	Area of Contamination
API	American Petroleum Institute
Army	United States Army
BRAC	Base Realignment and Closure
BTOR	Below Top of Riser
CCV	Continuing Calibration Verification
COC	Contaminant of Concern
CSM	Conceptual Site Model
Devens	Main Post of the former Fort Devens Army Installation
DO	Dissolved Oxygen
DoD	Department of Defense
ELAP	Environmental Laboratory Accreditation Program
Eurofins/TA	Eurofins/TestAmerica Laboratories, Inc.
ft/ft	Feet per foot
Harding	Harding Environmental Science & Engineering, Inc.
HGL	HydroGeoLogic, Inc.
HLA	Harding Lawson Associates, Inc.
J	Estimated
KGS	KOMAN Government Solutions, LLC
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
LTM	Long-Term Monitoring
LTMMP	Long-Term Monitoring and Maintenance Plan
LUC	Land Use Control
MassDEP	Massachusetts Department of Environmental Protection
MCL	Maximum Contaminant Level
mg/L	Milligrams per Liter
MS	Matrix Spike
MSD	Matrix Spike Duplicate
mV	Millivolt
NA	Not Analyzed
ND	Non-Detect
NELAP	National Environmental Laboratory Accreditation Program
NS	No Standard
NTU	Nephelometric Turbidity Unit
ORP	Oxidation Reduction Potential
PAH	Polycyclic Aromatic Hydrocarbon

PARCCS	Precision, Accuracy, Representativeness, Completeness, Comparability, and Sensitivity
PFAS	Per- and Polyfluoroalkyl Substances
QAPP	Quality Assurance Project Plan
QC	Quality Control
QSM	Quality Systems Manual
ROD	Record of Decision
RI	Remedial Investigation
U	Non-Detect
UJ	Qualified Non-Detect
USACE-NAE	United States Army Corps of Engineers, New England District
USEPA	United States Environmental Protection Agency
UST	Underground Storage Tank
µg/L	Micrograms per liter
VOC	Volatile Organic Compound

EXECUTIVE SUMMARY

KOMAN Government Solutions, LLC (KGS) has prepared this Supplemental Sampling Appendix to the 2019 Main Post Annual Report on behalf of the United States Army Corps of Engineers (USACE) North Atlantic Division, New England District (NAE) to document the result of supplemental sampling activities at Area of Contamination (AOC) 57 and AOC 43G at the Main Post of the former Fort Devens Army Installation (Devens), located in Devens, Massachusetts. The supplemental sampling activities described within this report were performed in accordance with the *Amended Supplemental Sampling to Support the 2020 Five-Year Review* (KGS, 2020) and the *Long Term Monitoring and Maintenance Plan* (LTMMP; Sovereign/ HydroGeoLogic, Inc. [HGL], 2015). The supplemental sampling was initiated by requests from EPA for the Army to obtain additional groundwater data regarding the extent of COCs in groundwater at AOCs 57 and 43G in order to support the ongoing 2020 Five-Year Review for Fort Devens. EPA has indicated that the additional data are needed to facilitate the Five Year Review's protectiveness evaluations of the remedial actions implemented at AOCs 57 and 43G in accordance with their site-specific Records of Decision (RODs).

<u>AOC 57</u>

The AOC 57 ROD (Harding, 2001) selected a Remedial Action that included soil excavation and treatment/disposal at an off-site facility, wetlands protection, institutional controls, long-term environmental monitoring of groundwater and surface water, institutional control inspections, and five-year reviews.

Since completion of the source area removal, the Army has been conducting a long-term groundwater monitoring program for approximately the past 20 years. Most of the contaminant of concern (COC) concentrations in groundwater have attenuated since the source area removal. Only arsenic remains above the cleanup goal in a limited number of wells at the site. These dissolved metals concentrations in groundwater are believed to be elevated due to the mobilization of naturally-occurring metals in the site soils to groundwater, resulting from the reducing conditions (low DO, low ORP) that occurs with the degradation of a carbon source such as the original hydrocarbon release at the site. It is expected that dissolved metals concentrations will decrease downgradient of the fuel release where more oxidizing conditions are present, which causes dissolved metals to precipitate out of solution. EPA has also indicated that further data are needed to support the conceptual site model (CSM) which indicates that the extent of the dissolved phase contamination is limited in extent and is controlled (bounded) by the discharge of shallow site groundwater into Cold Spring Brook. Therefore, the supplemental sampling event was performed (1) to verify that metal concentrations (arsenic, iron, manganese) are decreasing or stable and/or are attenuating over time per the CSM, (2) to further delineate the extent of elevated metal concentrations in shallow and deep groundwater, (3) to confirm that shallow groundwater discharges to Cold Spring Brook, and (4) to describe the flow pattern of deep groundwater toward Cold Spring Brook. The Army conducted the supplemental sampling event in January and February 2020 at AOC 57. In addition, as part of the ongoing Remedial Investigation (RI) of per- and polyfluoroalkyl substances (PFAS) at Fort Devens, vertical profile

transects were installed in areas downgradient of AOC 57 and into the wetlands bordering Cold Spring Brook. Groundwater samples from these transects were also analyzed for dissolved arsenic, iron, and manganese to support the supplemental sampling effort. The purpose of including the metals data from the Cold Spring Brook vertical profile sampling program was to further evaluate the vertical and horizontal extent of metals in groundwater and to evaluate whether redox zone boundaries could be established.

Samples that contained COC at concentrations exceeding the criteria set forth in the RODs for AOC 57 are summarized below.

- AOC 57 (Area 2) – During the winter 2020 supplemental sampling event, groundwater samples were collected from 15 monitoring wells and one well point. In addition, in April 2020 groundwater samples were collected from four vertical profile sites located along a linear transect downgradient of Area 2. Dissolved arsenic at two wells (Table ES-1) exceeded the 10 microgram per liter (µg/L) cleanup goal established in the 2001 ROD (Harding Environmental Science & Engineering [Harding], 2001). Arsenic was not detected at concentrations greater than the cleanup goal of 10 µg/L for 33 of the 34 vertical profile samples collected along the transect downgradient of Area 2. One sample, with an arsenic concentration of 13 µg/L, was identified at a depth of 40 to 44 feet below ground surface. Arsenic concentrations for samples collected from this vertical profile at seven depth intervals above this one sample were less than the cleanup goal.
- AOC 57 (Area 3) – During the winter 2020 supplemental sampling event, groundwater samples were collected from eight monitoring wells and three piezometers. In addition, groundwater samples were collected from four vertical profile sites located along a linear transect downgradient of Area 3 in April 2020. Dissolved arsenic at four wells (Table ES-1) exceeded the 10 µg/L cleanup goal established in the 2001 ROD (Harding, 2001). Arsenic was not detected at concentrations greater than the cleanup goal of 10 µg/L for any of the 22 samples collected from the vertical profiles along the transect downgradient of Area 3.

The sampling results were consistent with the CSM for the site. The following sections summarize the key conclusions associated with the winter 2020 supplemental sampling program. The Army will utilize the supplemental sampling data as well as the annual LTM sampling results to assist in the evaluation of the effectiveness of the remedial action as part of the 2020 Five-Year Review. Further review of the LTM program at AOC 57 will be conducted during the next LTMMP update.

AOC 57 Conclusions

- For Area 2, dissolved arsenic (13 µg/L**)** was only slightly above the cleanup goal (10 µg/L) at shallow well 57M-03-05X located adjacent to the southeastern limit of the 2003 soil excavation effort and in deeper well 5702MW-20-01B. Upward vertical groundwater gradients were identified at well clusters located along the southern (downgradient) margin of Area 2, indicating that deep groundwater at Area 2 flows upward toward Cold Spring Brook. Dissolved arsenic concentrations at the four vertical profile sites located downgradient of Area 2 and in the wetlands associated with Cold Spring Brook were less than the cleanup goal with one exception in the 34 sample

dataset. The supplemental sampling data indicate that arsenic has not been transported into and beyond Cold Spring Brook at levels greater than the cleanup goal and that the extent of the contamination has been adequately delineated.

- For Area 3, dissolved arsenic was detected at concentrations above the cleanup goal at LTM monitoring wells 57M-95-03X and 57M-96-11X and at supplemental sampling points 5703MW-20-01B and 5703PZ-19-01. The winter 2020 sampling results for dissolved arsenic at shallow downgradient well 57M-96-11X reflect a downward trend for the past four years. The winter 2020 results for shallow source area well 57M-95-03X indicate that the arsenic level has remained relatively stable over the past several years. An upward vertical groundwater gradient identified at a well pair located at downgradient well 57M-96-11X indicates that the deep groundwater flows upward toward Cold Spring Brook. Dissolved arsenic concentrations at the four vertical profile sites located downgradient of Area 3 and in the wetlands associated with Cold Spring Brook were less than the cleanup goal, indicating that arsenic has not been transported into and beyond Cold Spring Brook at levels greater than the cleanup goal and that the extent of the contamination has been adequately delineated. Dissolved manganese was detected at a number of monitoring points within Area 3 at levels greater than the background value developed in 2000 (HLA, 2000); however, the distribution of elevated manganese with respect to the former source area and the relationship with associated ORP and DO data do not present a definable pattern. The data may indicate that the range of background levels of manganese in the groundwater is wider than the data used to calculate the 2000 background level.

<u>AOC 43G</u>

The AOC 43G ROD (Army, 1996) selected intrinsic bioremediation, data collection and groundwater modeling to support assessment of intrinsic bioremediation, installation of additional groundwater monitoring wells, long-term groundwater monitoring, annual data reports, and five-year reviews.

Since signing of the ROD, the Army has been conducting an annual long-term monitoring program at AOC 43G to verify the attenuation of the residual site COCs in groundwater. Elevated concentrations of manganese above the site-specific cleanup goal currently remain in some site wells. Similar to AOC 57, it is expected that the residual dissolved-phase metals concentrations at AOC 43G will decrease as the site groundwater becomes more oxic as the hydrocarbon source becomes depleted. As such, the objectives of the supplemental sampling effort were to verify that manganese and iron concentrations in groundwater are stable or decreasing and/or are attenuating over time within the initial impacted area, and are not migrating beyond the downgradient point of compliance for the site, as indicated by the CSM. The supplemental sampling results at AOC 43G were reviewed to confirm that the horizontal extent of manganese concentrations greater than the site-specific cleanup goal (375 µg/L) downgradient of the fuel release has been determined. The Army conducted the supplemental sampling event in in February 2020 at AOC 43G.

Samples that contained COC at concentrations exceeding the criteria set forth in the ROD for AOC 43G are summarized below.

- AOC 43G – During the winter 2020 supplemental sampling event, groundwater was sampled from three monitoring wells and one piezometer. Manganese exceeded the site-specific cleanup goal (375 µg/L) at one well, and the background level (291 µg/L) at a second well (Table ES-2) established by the 1996 ROD (Army, 1996).

Overall, the sampling results were consistent with the CSM for the site. The following summarizes the key conclusions for AOC 43G associated with the winter 2020 supplemental sampling program. The Army will utilize the supplemental sampling data as well as the annual LTM sampling results to assist in the evaluation of the effectiveness of the remedial action as part of the 2020 Five-Year Review. Further review of the LTM program at AOC 43G will be conducted during the next LTMMP update.

AOC 43G Conclusions

- Dissolved manganese concentrations exceeded the cleanup goal (375 µg/L) at one of three new monitoring wells installed in 2020 to monitor downgradient groundwater flow to areas northeast of the former underground storage tank (UST) area. The detected concentration at XGM-20-03A (400 µg/L) was slightly above the cleanup goal. However, the dissolved manganese concentrations at the two additional downgradient wells installed in the northeastern flow path was less than the cleanup goal. In addition, the total manganese concentration at sentinel well AAFES-7, located to the east of the former UST area and downgradient of XGM-20-03A, was less than the cleanup goal during the fall 2019 LTM event at AOC 43G. These data indicate that the downgradient transport of groundwater with manganese concentrations greater than the cleanup goal to offsite areas is not likely.

  Dissolved manganese at upgradient monitoring point 43GPZ-19-03 at a concentration (1.5 J µg/L) less than the cleanup goal indicates that the upgradient extent of manganese impacts from the former UST area has been delineated.

Table ES-1
AOC 57 Contaminant of Concern Cleanup Goal and Background Level Exceedances, Winter 2020
Main Post, Former Fort Devens Army Installation, Massachusetts

Well Identification	Analyte	Cleanup Goal (µg/L) [1]	Background (µg/L)	Detected Result (µg/L)
Groundwater - Area 2				
57M-03-05X	Arsenic (Dissolved)	10	--	13
	Manganese (Dissolved)	--	291[2]	590
5702MW-20-01B	Arsenic (Dissolved)	10	--	17
5702MW-20-03A	Manganese (Dissolved)	--	291[2]	490
5702MW-20-04A	Manganese (Dissolved)	--	291[2]	310
5702MW-20-05A	Manganese (Dissolved)	--	291[2]	600
5702MW-20-06A	Manganese (Dissolved)	--	291[2]	450
5702VP-20-01-5-9	Manganese (Dissolved)	--	291[2]	400
5702VP-20-01-15-19	Manganese (Dissolved)	--	291[2]	680
5702VP-20-01-20-24	Manganese (Dissolved)	--	291[2]	300
5702VP-20-01-35-39	Manganese (Dissolved)	--	291[2]	540
5702VP-20-01-44-44	Arsenic (Dissolved)	10	--	13
5702VP-20-01-50-54	Manganese (Dissolved)	--	291[2]	530
5702VP-20-02-5-9	Manganese (Dissolved)	--	291[2]	320
5702VP-20-02-15-19	Manganese (Dissolved)	--	291[2]	340
5702VP-20-03-25-29	Manganese (Dissolved)	--	291[2]	820 J
5702VP-20-03-30-34	Manganese (Dissolved)	--	291[2]	510
5702VP-20-04-25-27	Manganese (Dissolved)	--	291[2]	710
5702VP-20-04-30-32	Manganese (Dissolved)	--	291[2]	300

Table ES-1 (cont.)
AOC 57 Contaminant of Concern Cleanup Goal and Background Level Exceedances, Winter 2020
Main Post, Former Fort Devens Army Installation, Massachusetts

Groundwater - Area 3				
5703MW-20-01B	Arsenic (Dissolved)	10	--	11
	Manganese (Dissolved)	**--**	291[2]	1,200
5703MW-20-02A	Manganese (Dissolved)	**--**	291[2]	920
5703PZ-19-01	Arsenic (Dissolved)	10	--	64
57M-95-03X	Arsenic (Dissolved)	10	--	30
57P-98-03X	Manganese (Dissolved)	**--**	291[2]	11,000
57P-98-04X	Manganese (Dissolved)	**--**	291[2]	370
57M-96-11X	Arsenic (Dissolved)	10	--	67
	Iron (Dissolved)	--	9,100[2]	31,000
	Manganese (Dissolved)	**--**	291[2]	3,300
5703VP-20-01-5-7	Manganese (Dissolved)	--	291[2]	3,100
5703VP-20-01-10-12	Manganese (Dissolved)	--	291[2]	3,500

Notes:
[1] The Cleanup Goal for arsenic in groundwater is the Maximum Contaminant Level (MCL) standard.
[2] The background values for total iron and manganese in groundwater are from the Final Remediation Report, Area of Contamination (AOC) 57, Devens, Massachusetts (Harding Lawson Associates, 2000).

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Table ES-2
AOC 43G Contaminant of Concern Cleanup Goal and Background Level Exceedances, Winter 2020
Main Post, Former Fort Devens Army Installation, Massachusetts

Well Identification	Analyte	Cleanup Goal (µg/L) [1]	Background (µg/L)[2]	Detected Result (µg/L)
XGM-20-02A	Manganese (Dissolved)	375	291	360
XGM-20-03A	Manganese (Dissolved)	375	291	400 J

Notes:

[1] The cleanup goal for manganese is a site-specific goal based on an AOC 43G risk evaluation (HGL, 2008).

[2] Manganese is the background concentration determined from selected locations within AOC 43G (US Army 1996).

1.0 INTRODUCTION

KOMAN Government Solutions, LLC (KGS) prepared this Supplemental Sampling summary as part of the 2019 Annual Long-Term Monitoring (LTM) Report to detail the performance of supplemental sampling conducted at AOC 57 and AOC 43G at the former Fort Devens Army Installation (Devens) site, located in Devens, Massachusetts (Figure 1-1). Supplemental sampling activities were performed in accordance with the *Amended Supplemental Sampling to Support the 2020 Five-Year Review* (KGS, 2020) and the *Long-Term Monitoring and Maintenance Plan* (LTMMP; Sovereign/HydroGeoLogic, Inc. [HGL], 2015).

The sampling design was based on the presentations and discussions at the Base Realignment and Closure (BRAC) Cleanup Team meeting conducted on 25 July 2019 and subsequent follow-up communications with the United States Environmental Protection Agency (USEPA).

USEPA had indicated the need for additional groundwater data in advance of the 2020 Five-Year Review to support the protectiveness evaluation for the remedial actions implemented in accordance with the site-specific Records of Decision (RODs) for AOCs 57 and 43G. An initial supplemental sampling plan was submitted on 28 September 2019. USEPA review and further discussions with the Army indicated the need for additional data relative to that proposed in the initial plan. The amended sampling plan issued on December 16, 2019 provided additional proposed sampling to address this request.

1.1 GROUNDWATER SAMPLING

The overall Devens Main Post LTM program is conducted to monitor contaminant of concern (COC) trends over time for the respective AOCs. During winter 2020, the supplemental sampling activities consisted of:

- Additional groundwater sampling in January and February 2020 at AOC 57
- Additional groundwater sampling from vertical profile transects in April 2020 at AOC 57
- Additional groundwater sampling in February 2000 at AOC 43G

1.1.1 Preparation for Sampling

Sampling activities were coordinated with the United States Army Corps of Engineers (USACE) – North Atlantic Division, New England District (NAE), BRAC Environmental Coordinator office, and the contracted analytical laboratory. The laboratory provided the sampling supplies (sample containers, packing material, custody seals, and coolers) to the sampling team per the specific sample requirements identified in Table 1-1.

During the groundwater sampling activities, the sampling team used YSI water quality meters, LaMotte turbidity meters, MP10 pump controllers, QED Sample Pro bladder pumps, Geopump peristaltic pumps, and Solinst water levels indicators (or similar). Dedicated submersible bladder pumps were used in select wells. Sampling equipment was tested to ensure that it was functional prior to sampling. The well construction details for each groundwater monitoring well were reviewed prior to the sampling events for determination of non-dedicated well pump placement. The well construction diagrams were maintained on site during the sample events to confirm well screen interval information as needed.

Well construction details, location, and other pertinent information are presented in Table 1-2. AOC-specific actions levels are summarized in Table 1-3. Boring logs and well construction

logs for new wells installed to support the supplemental sampling event are provided in Attachment A.

1.1.2 Sampling

Groundwater monitoring wells were purged and sampled in accordance with the USEPA Region 1 guidance document, "Low Stress (low flow) Purging and Sampling Procedure for the Collection of Groundwater Samples from Monitoring Wells" (USEPA Region 1, 2017a). Low-flow bladder or peristaltic pumps were used, as described in the Long-Term Monitoring and Maintenance Plan (LTMMP)(Sovereign/HGL, 2015). Samples submitted for dissolved metals analyses were field filtered through 0.45-micron filters directly into preserved sample bottles.

Sample preparation and analysis methods, containers, holding times, and preservatives for each AOC site parameter are summarized in Table 1-1.

The recorded groundwater elevation data from the supplemental sampling events for AOC 57 and AOC 43G are summarized in Table 1-4. The field sampling logs are presented in Attachment A.

1.1.3 Equipment Decontamination

Non-dedicated sampling and monitoring equipment was decontaminated between sampling locations in accordance with the Annual LTMMP Quality Assurance Project Plan (QAPP) (KGS, 2016a) to prevent cross-contamination among samples.

1.1.4 Investigation Derived Waste

Investigation-derived waste was not generated during the supplemental sampling activities. Total headspace volatile organic compound (VOC) readings for purge water from prior LTM events conducted since 2015 do not indicate the need to containerize purge water. Purge water from wells was returned to the ground in proximity to the sample collection area following low-flow sampling.

1.1.5 Monitoring Well Network Inspection and Survey

The condition of the monitoring well network at each AOC was inspected during the supplemental event. Observations, if noted, are contained within the field sampling logs provided in Attachment A. Monitoring wells were observed to be in good overall condition.

The new and existing monitoring wells and piezometers at AOC 57 were surveyed in March 2020. The new monitoring wells and piezometers at AOC 43G were surveyed.

1.2 LABORATORY TESTING

Eurofins/TestAmerica Laboratories, Inc. (Eurofins/TA), using facilities in Savannah, Georgia, was the primary contract laboratory for the analysis of water samples for the 2020 supplemental sampling event. Eurofins/TA is compliant with the Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, version 5.3 (DoD, 2019) under the DoD Environmental Laboratory Accreditation Program (ELAP) and holds current accreditation in accordance with the National Environmental Laboratory Accreditation Program (NELAP) for all applicable analytical methods.

1.5.1 Analyses

Samples were analyzed for the following AOC-specific sets of COCs:

- AOC 57 – Dissolved metals (for arsenic, iron, and manganese) in groundwater

- AOC 43G – Dissolved metals (for iron and manganese) in groundwater

1.5.2 Analytical Results

The analytical results for each AOC were compared to the respective monitoring criteria or cleanup goals established in the ROD. Arsenic results in groundwater at AOC 57 were compared to the 10 micrograms per liter (µg/L) maximum contaminant level (MCL) that was promulgated in 2006, which is lower than the cleanup standard that was previously established in the site-specific RODs. As a result, the MCL is used as the cleanup goal for arsenic. Site-specific COCs and the associated cleanup goals or monitoring criteria for the AOCs, as identified in each site-specific ROD, are presented in Table 1-3**.**

Laboratory analytical results for water samples collected during the 2020 supplemental sampling event are discussed in Sections 2.0 and 3.0. Laboratory analytical reports are presented in Attachment B. The effects of contamination in laboratory and field blanks, as well as the effects of other quality control (QC) issues associated with the analytical results, are discussed in the data validation reports presented in Attachment C.

1.6 QUALITY CONTROL

Analytical data were provided by a properly accredited laboratory (Eurofins/TA) and the data analyses, collection, and validation were performed per the approved LTMMP QAPP (KGS, 2016a). The data from the supplemental sampling event are acceptable for use with minimal QC deviations.

1.6.1 Field Quality Control

Field duplicate samples were collected during sampling events at each AOC, at the rate of 10 percent (i.e., 1 per 10 samples), to evaluate field precision. Matrix spike (MS)/matrix spike duplicate (MSD) pairs (one set per AOC) were also submitted to evaluate matrix effects on field and analytical precision and accuracy.

The field instruments used to measure water quality parameters (temperature, dissolved oxygen [DO], pH, oxidation-reduction potential (ORP), specific conductance, and turbidity) were calibrated twice daily (prior to, and following field use) in accordance with the manufacturer's instructions and in accordance with the USEPA Calibration of Field Instruments Standard Operating Procedure (USEPA Region 1, 2017b). Calibration log forms are presented in Attachment A. No instrument error was noted during the winter 2020 supplemental sampling event.

1.6.2 Data Evaluation for 2020 Supplemental Sampling Event

The analytical results from the 2020 supplemental sampling event were evaluated for data acceptability in accordance with the USEPA Region 1 data validation guidelines (USEPA Region 1, 2013), the DoD QSM version 5.3 (DoD, 2019), and the laboratory's defined acceptance limits. The method requirements for the USEPA SW-846 QC guidance were also used as supplemental information. The data validation reports for the supplemental sampling events are presented in Attachment C, and the general findings are summarized below.

1.6.3 Chemical Analytical Quality Assurance/Quality Control

Data qualification was typically the result of one or more of the following: holding time exceedances, continuing calibration verification (CCV) outliers for blank contamination, laboratory control sample (LCS) and/or laboratory control sample duplicate (LCSD) recovery

and precision exceedances, MS/MSD recovery and precision exceedances; and field duplicate precision exceedances. Specific QC deviations requiring qualification in the 2020 data for the supplemental metals sampling event are provided in the data discussion section for each AOC.

Analyses were performed in general compliance with the precision, accuracy, representativeness, completeness, comparability, and sensitivity (PARCCS) requirements listed in the QAPP (KGS, 2016a). Good analytical practices and method requirements were followed and the laboratory was determined to be performing properly. No significant QC deficiencies were noted. Analytical results reported for the 2020 AOC 57 and AOC 43G supplemental sampling event samples were deemed usable.

2.0 AREA OF CONTAMINATION 57

2.1 SITE BACKGROUND

AOC 57 is located between Barnum Road and Cold Spring Brook on the northeast side of what was formerly the Main Post of Devens in the town of Harvard, Massachusetts (Figure 2-1). AOC 57 is located within a Zone II aquifer protection area for the Town of Ayer Grove Pond public water supply wells. The portion of the former Devens site that includes AOC 57 was used primarily as a storage and maintenance area for military vehicles. AOC 57 consists of three sub-areas (Area 1, Area 2, and Area 3) that are located south to southeast of Building 3713 and former Buildings 3756, 3757, and 3758 (Figure 2-1). The sub-areas received storm water runoff and waste from vehicle maintenance at former vehicle storage yards related to former Building 3713 and former Buildings 3757 and 3758. A "No Further Action" ROD was completed for Area 1 (Harding, 2001) following the removal of polycyclic aromatic hydrocarbon (PAH)-contaminated soil in 1997.

Each sub-area includes an upland area that slopes downward to a delineated wetland area bordering Cold Spring Brook. Areas 2 and 3 are depicted on Figure 2-2 and Figure 2-3, respectively.

The annual LTM events at AOC 57 Area 3, in accordance with the LTMMP (2015), are conducted in the spring of each year. The next LTM event at AOC 57 Area 3 is scheduled for spring 2020. The winter 2020 supplemental sampling event was conducted at both AOC 57 Areas 2 and 3 at the request of USEPA to provide additional data to support the 2020 Five-Year Review by addressing potential data gaps in the understanding of groundwater flow and the extent of arsenic contamination at AOC 57.

2.2 GROUNDWATER HYDROLOGY

During the winter 2020 supplemental sampling event, groundwater water levels were collected from the following 34 wells and piezometers at AOC 57:

<u>Area 2</u>

57M-03-01X	57M-95-06X	5702MW-20-03A
57M-03-02X	57M-95-07X	5702MW-20-04A
57M-03-03X	57WP-06-02	5702MW-20-05A
57M-03-04X	5702MW-20-01A	5702MW-20-05B
57M-03-05X	5702MW-20-01B	5702MW-20-06A
57M-03-06X	5702MW-20-02A	5702MW-20-07A
57M-95-03X	5702MW-20-02B	

Area 3

57M-95-03X	57P-98-04X	57MW-20-02A
57M-96-11X	57WP-06-03	57MW-20-03A
57M-96-12X	57MW-20-01A	57MW-20-04A
57M-96-13X	57MW-20-01B	5703PZ-19-01
57P-98-03X		

In addition to the wells measured within AOC 57 Area 3, the following wells associated with AOC 74, located immediately to the northeast of Area 3 were measured to provide more detail to the shallow groundwater flow conditions within AOC57:

AOC 74

74PZ-19-01	74PZ-19-03	74PZ-20-02
74PZ-19-02	74PZ-19-04	

Measured water levels at AOC 57 Areas 2 and 3 for the winter 2020 supplemental sampling event are presented in Table 1-4. Shallow and deep groundwater elevations for AOC 57 Area 2 are presented on Figure 2-4 and Figure 2-5, respectively. Shallow and deep groundwater elevations for AOC 57 Area 3 are presented on Figure 2-6 and Figure 2-7, respectively. Shallow groundwater elevations for AOC 57 Area 2 and AOC 57 Area 3 and northeast of AOC 57 Area 3 are shown on Figure 2-8. Data from the winter 2020 event at AOC 57 indicate that the shallow and deep groundwater flow in a south/southeast direction, toward Cold Spring Brook, which is consistent with historical observations of groundwater flow patterns in this area.

Horizontal groundwater gradients for the shallow and deep groundwater in Area 2, using the flow lines shown in Figure 2-4 and Figure 2-5, were calculated to be 0.011 feet per foot (ft/ft) (Gradient Line A-A', Figure 2-4) and 0.0056 ft/ft (Gradient Line A-A', Figure 2-5), respectively.

Horizontal groundwater gradients for the shallow and deep groundwater in Area 3, using the flow lines shown in Figure 2-6 and Figure 2-7, were calculated to be 0.02 ft/ft (Gradient Line A-A', Figure 2-6) and 0.0127 ft/ft (Gradient Line A-A', Figure 2-7), respectively.

The supplemental sampling event at AOC 57 generated a number of well pairs and well triplets at which vertical groundwater gradients have been calculated (Table 2-1). For Area 2, three well pairs and two well triplets were created. For Area 3, two well pairs and one well triplet were created.

For Area 2, downward vertical gradients in the groundwater were identified at Well Pairs 1 and 2 located at the northern margin of the site (Table 2-1). Upward vertical gradients in the groundwater at Well Triplets 1 and 2 (Table 2-1) and Well Pair 3 located at the southern margin of the site, adjacent to the Cold Spring Brook wetlands. For the well triplets, upward vertical gradients were identified between the deep and shallow wells, between the deep and mid-depth wells, and between the mid-depth and shallow wells. These upward gradients suggest that deep groundwater at Area 2 moves upward toward Cold Spring Brook, consistent with the current conceptual site model (CSM).

For Area 3, downward vertical gradients were identified in the groundwater at Well Pairs 1 and 2 (Table 2-1) located on the western and eastern margins of the area of the original hydrocarbon release. Upward vertical gradients were identified at Well Triplet 1 located at the southern margin of the site, adjacent to the Cold Spring Brook wetlands. Upward vertical gradients were identified between the deep and shallow wells, between the deep and mid-depth wells, and between the mid-depth and shallow wells at this well triplet. These upward gradients suggest that deep groundwater at Area 3 moves upward toward Cold Spring Brook, consistent with the current CSM.

2.3 GROUNDWATER SAMPLING

Groundwater samples were collected from 15 monitoring wells and one well point at Area 2, and eight monitoring wells and three piezometers at Area 3. In addition, groundwater samples were collected from a total of eight vertical profile site along two linear transects (four vertical profiles per transect) downgradient of Area 2 and Area 3. The locations of the transects are shown on Figures 2-2 and 2-3. The current LTM program (LTMMP, 2015) specifies the analysis of total metals for the AOC 57 groundwater. Samples collected during the supplement sampling event were analyzed for the select dissolved metals, arsenic, iron, and manganese. Dissolved metals fractions are the form that can be transported in groundwater, and therefore their use in assessments represents a more realistic means to evaluate the potential for site impacts to affect downgradient areas.

General water quality chemistry parameters (pH, temperature, specific conductivity, ORP, DO, and turbidity) were measured at each of the sampled wells during the winter 2020 sampling event. These parameters were measured concurrently with low-flow sampling and used to determine groundwater stabilization within each well prior to sampling. Final field readings taken prior to collection of each groundwater sample are presented in Tables 2-2 and 2-3 for Areas 2 and 3, respectively.

2.4 ANALYTICAL RESULTS

Groundwater analytical results (dissolved arsenic, iron, and manganese analyses) for AOC 57 Areas 2 and 3 from the supplemental sampling event are summarized in Tables 2-2 and 2-3, respectively. The analytical results for the vertical profile sites are presented in Table 2-4. The analytical results for Areas 2 and 3 are shown on Figures 2-9 and 2-10, respectively.

2.4.1 AOC 57 Area 2 Data Summary

- Arsenic – Dissolved arsenic was detected at 11 of the 16 monitoring well and piezometer sampling points in Area 2 (Table 2-2). Arsenic at concentrations greater than the cleanup goal of 10 µg/L was identified at two of 16 monitoring points (13 percent [%]), at two of the three wells forming a triplet located adjacent to the southeastern corner of the 2003 soil excavation limit (Figure 2-9). Arsenic was detected at a concentration of 13 µg/L at shallow well 57M-03-05X (depth to well screen 3.9 to 13.9 feet below top of riser [BTOR]), was not detected at mid-depth well 5702MW-20-1A (depth to well screen 30 to 40 feet BTOR), and was detected at a concentration of 17 µg/L at deep well 5702MW-20-01B (depth to well screen 70 to 80 feet BTOR). Arsenic was detected at a concentration greater than the cleanup goal in one sample out of a total of 34 samples collected from the vertical profile sites (Table 2-4). Arsenic in sample 5702-20-01-40-44 (40 to 44 feet bgs) was detected at a concentration of 13 µg/L, slightly greater than the

cleanup goal. However, arsenic concentrations in samples from seven depth intervals above this sample were non-detect or detected at trace, estimated values.

- Iron – Dissolved iron was detected (Table 2-2, Figure 2-9) at six of the 16 monitoring well and piezometer sampling points in Area 2 (38%). Each of the detected concentrations were less than the background level of 9,100 µg/L, established for total iron. Iron was not detected at concentrations greater than the background level in any of the 34 vertical profile samples (Table 2-4).

- Manganese – Dissolved manganese was detected (Table 2-2, Figure 2-9) at each of the 16 monitoring well and piezometer sampling points in Area 2. Manganese concentrations greater than the background level of 291 µg/L, established for total manganese, were detected at five of the 16 monitoring points (31%). Manganese concentrations greater than the background level were detected at two deep monitoring wells, one located at the northeastern margin of the original source area (5702MW-20-04A, 310 µg/L) and one located at the southwestern margin of the source area (5702MW 20-06A, 490 µg/L). Manganese concentrations greater than the background level were detected at three shallow monitoring wells, two located at the western-southwestern margin of source area (5702MW-20-03A, 490 µg/L; 5702MW-20-05A, 600 µg/L) and one (57M-03-05X, 590 µg/L) located at the well triplet adjacent to the southeastern corner of the 2003 soil excavation limit (Figure 2-9). Dissolved manganese was detected in 11 of 34 vertical profile samples at concentrations greater than the background level (Table 2-4).

2.4.2 AOC 57 Area 3 Data Summary

- Arsenic – Dissolved arsenic was detected (Table 2-3, Figure 2-10) at seven of the 11 well and piezometer monitoring points (64%) at Area 3. Arsenic concentrations greater than the cleanup goal of 10 µg/L were detected at four of the 11 monitoring points (36%). Consistent with previous LTM sampling results, arsenic concentrations greater than the cleanup goal were detected at shallow source area well 57M-95-03X (30 µg/L) and shallow well 57M-96-11X (67 µg/L) downgradient of the source area. In addition, elevated arsenic was detected at deep piezometer 5703PZ-19-01 (64 µg/L) paired with downgradient well 57M-96-11X (67 µg/L). Arsenic was detected at a concentration of 11 µg/L at deep monitoring well 5703MW-20-01B located at the eastern margin of the source area. Arsenic was not detected at concentrations greater than the cleanup goal in any of the 22 vertical profile samples collected from transect sites downgradient of Area 3 (Table 2-4). For 17 of the 22 vertical profile samples, arsenic was non-detect.
- Iron – Dissolved iron was detected at each of the 11 well and piezometer monitoring points (Table 2-3, Figure 2-10). Iron greater than the background level of 9,100 µg/L, established for total iron, was detected at one of the 11 monitoring points (9%). Iron at a concentration of 31,000 µg/L was detected at downgradient well 57M-96-11X, collocated with an elevated arsenic concentration. Dissolved iron concentrations for all 22 vertical profile samples were less than the background level (Table 2-4).
- Manganese – Dissolved manganese was detected (Table 2-3, Figure 2-10) at each of the 11 well/piezometer monitoring points. Manganese greater than the background level of

291 µg/L, established for total manganese, was detected at five of the 11 monitoring points (45%). Manganese was detected at shallow well 5703MW-20-02A (920 µg/L) located within the original source area (Figure 2-10) and at deep well 5703MW-20-01B (1,200 µg/L) located at the eastern margin of the source area. The remainder of the exceedances of the manganese background level were identified in areas downgradient of the southern extent of the source area, shallow well 57M-96-11X (3,300 µg/L) and shallow piezometers 57P-98-04X (370 µg/L and 57-98-03X (11,000 µg/L). Dissolved manganese was detected in 4 of 22 vertical profile samples at concentration greater than the background level (Table 2-4).

2.4.3 AOC 57 Data Trends

2.4.3.1 Area 2

Groundwater sampling at Area 2 as part of the annual LTM program was discontinued in 2015, therefore a trend analysis cannot be performed from 2015 to winter 2020. However, the winter 2020 data do indicate that the cleanup goal for total arsenic (10 µg/L), which is a secondary site contaminant resulting from the degradation of the original hydrocarbon release, has been achieved with the exception of one monitoring point in the shallow ground water. Dissolved arsenic at shallow monitoring well 57M-03-05X (13 µg/L) is slightly above the cleanup goal of 10 µg/L and is associated with a low detected value of DO (0.31 milligrams per liter [mg/L]) and an ORP value of 67 millivolts (mV). The DO value is in the range (less than 1 mg/L) indicating a reducing environment while the ORP is in the lower end of the range (greater than 50 mV) indicating a mildly oxidizing environment.

Consistent with the current CSM for AOC 57, it has been expected that after the removal of the source area soils impacted by the original release of hydrocarbon compounds, and the onset of natural attenuation processes by which residual concentrations of the hydrocarbon compounds were reduced to below their respective remediation goals, reducing conditions in the groundwater would result as a byproduct of the biodegradation of the released hydrocarbons. The reducing conditions generated by the degradation of the hydrocarbons would be expected to result in the mobilization of naturally occurring arsenic and manganese known to be present in site soil into groundwater. Based on observations at other fuel-contaminated sites, once the fuel products have been attenuated, the dissolved metals in the groundwater can be expected to come out of solution (precipitate) and revert to their pre-existing stable geochemistry and dissolved-phase concentrations will decrease (American Petroleum Institute [API], 2011). The winter 2020 shallow groundwater data indicate that the dissolved arsenic concentration at 57M-03-05X, at a level marginally greater than the cleanup goal, is attributable to the ongoing transition of the groundwater environment toward the oxidizing range (i.e., reducing range DO with oxidizing range ORP). As the transition to a more oxidizing condition in the groundwater occurs, the concentration of dissolved arsenic is expected to decrease to levels less than the cleanup goal.

The concentration of dissolved arsenic at new deep well 5702MW-20-01B (17 µg/L) is associated with DO (0.46 mg/L) and ORP (-185 mV) levels that are strongly in the reducing range. In addition, the upward vertical groundwater gradient identified (Table 2-1) at the well triplet that this well is coupled to, and the relatively low dissolved arsenic at new mid depth well 5702MW-20-01A (2.2 µg/L), further indicate that the detected level of arsenic is associated with a naturally-occurring reducing zone in the deeper groundwater and not the result of any downward transport of arsenic from shallow groundwater from the source area.

Dissolved arsenic was detected in only one vertical profile sample (5702-20-01-40-44), out of a total of 34 samples collected, at a concentration (13 µg/L) that was slightly greater that the cleanup goal (Table 2-4). Arsenic concentrations in vertical profiles samples from seven sample depths above this sample were non-detect or less than the cleanup goal. These data indicate that arsenic in sample 5702-20-01-40-44 is representative of natural arsenic levels at that depth interval and not the result of vertical migration of arsenic associated with the original hydrocarbon release at the land surface.

Dissolved iron was not detected at concentrations greater than the background level for any of the well and piezometer monitoring points. In addition, dissolved iron concentrations for all 34 vertical profile samples were less than the background level (Table 2-4).

The distribution of dissolved manganese at concentrations greater than the background level (291 µg/L) and their relationship with DO and ORP threshold values is not consistent throughout Area 2. In addition, the spatial relationship between elevated manganese levels and proximity to the original source area is not consistent. Elevated manganese levels at three shallow wells (5702MW-03-06A, 5702MW-03-02A, and 5702MW-03-05A) located in cross gradient areas on the western margin of Area 2 are associated with levels of DO and ORP well into the oxidizing range. Based on their distance from the source area, and their cross-gradient location, these wells have not likely been impacted by the release with Area 2. At other well locations, such as new well 5702MW-20-01B, where naturally occurring reducing conditions result in an arsenic concentration greater than the cleanup goal, the manganese concentration is well below the background level. These variable relationships between manganese and DO/ORP may suggest the range of background concentrations is larger than that used to develop the site-specific background level in 2000 (Harding Lawson Associates [HLA], 2000). This is a reasonable consequence of an enlarged dataset developed with additional samples from unimpacted areas.

Dissolved manganese was detected in 11 of 34 vertical profile samples at concentration greater than the background level. The relationships between these manganese levels and the associated DO/ORP levels are inconsistent, in line with the inconsistency noted for the monitoring wells and piezometer manganese data.

2.4.3.2 Area 3

The data generated by the supplemental sampling event allows for additional assessment of the metals concentrations at two wells within Area 3, 57M-96-11X and 57M-95-03X, which have been part of the current LTM program (LTMMP, 2015).

The trend of total arsenic concentrations at source area well 57M-95-03X (Table 2-5) indicate that the total arsenic concentrations at this well have been relatively stable, at or below 60 µg/L since 2005. Following a decrease in the arsenic concentration to 15 µg/L in spring 2019, dissolved arsenic was detected at a concentration of 30 µg/L for the winter 2020 supplemental sampling event. This value for dissolved arsenic is consistent with the historical average for total arsenic (32 µg/L since 2005), although the comparison of total versus dissolved arsenic concentration is not completely correlative. The spring 2018 ORP and DO values (+58.7 mV and 1.94 mg/L, respectively) indicated that the groundwater was in a marginally oxidizing state,

but the spring 2019 ORP and DO values (+6.0 mV and 0.60 mg/L, respectively) indicated that reducing conditions had returned. For winter 2020, the ORP value (-72.2 mV) represents a measurable decrease further into the reducing range, while the DO value (1.27 mg/L) increased into the lower end of the oxidizing range. The increase in the arsenic concentration from spring 2019 to the winter 2020 value, suggests that the ORP level has a significant impact on the solubility of arsenic at this well location.

Total arsenic concentrations at 57M-96-11X have varied more broadly over time. However, over the past several years, the total arsenic concentration has incrementally decreased from spring 2016 (290 µg/L) through spring 2017 and 2018 (180 µg/L), with 100 µg/L recorded in spring 2019. The winter 2020 dissolved arsenic concentration (67 µg/L) strongly indicates that the decreasing trend is continuing. The associated ORP and DO data for the period including spring 2018 (+39.7 mV and 0.59 mg/L, respectively), spring 2019 (+8.0 mV and 0.85 mg/L, respectively), and winter 2020 (+0.2 mV and 1.12 mg/L, respectively) may indicate a trend toward an oxidizing environment, with the DO level increasing incrementally to greater than the 1.0 mg/L threshold while ORP levels remain in the reducing range. This transition toward a more oxidizing environment is likely a causative factor in the observed incremental decrease in the arsenic concentration over the past several years. The dissolved arsenic detected at deep piezometer 5703PZ-19-01 (64 µg/L) located adjacent to 57M-96-11X is the result of a strongly reducing environment in the deeper groundwater; the measured upward gradient at this well pair indicates shallow groundwater with elevated arsenic has not migrated downward.

Arsenic was detected at one additional monitoring point, deep monitoring well 5703MW-20-01B, at a concentration (11 µg/L) only marginally above the cleanup goal of 10 µg/L. This well is situated to the east of the former source area in a cross-gradient location. The ORP and DO data at this well were in the reducing range.

Arsenic was not detected at concentrations greater than the cleanup goal in any of the 22 vertical profile samples collected along the transect downgradient of Area 3 (Table 2-4). Arsenic concentrations in 17 of the 22 samples collected were non-detect.

The winter 2020 arsenic data for Area 3, in combination with the data from LTM events in spring 2018 and 2019, are consistent with the current CSM. Following the excavation of soils impacted by the original release of hydrocarbon compounds, the subsequent natural attenuation of residual levels of hydrocarbons, and the creation of a reducing environment in the groundwater, recovery of arsenic concentrations to levels less than the cleanup goal has been expected to occur over a number of years as the reducing environment transitions to a more oxidizing environment.

Dissolved iron (3,900 µg/L) at source area well 57M-95-03X in winter 2020 decreased from the spring 2019 level (5,600 µg/L) and dissolved iron (31,000 µg/L) at downgradient well 57M-96-11X decreased marginally in winter 2020 from the spring 2019 value (36,000 µg/L) associated with the trend to a more oxidizing environment indicated by the ORP and DO data. Through the remainder of the winter 2020 dataset for iron, no consistency was noted for its relationship with ORP and DO. For example, at deep piezometer 5703PZ-19-01, collocated with shallow well 57M-96-11X, the ORP and DO indicate a strongly reducing environmental with the dissolved iron concentration (28 µg/L) representing the low detected concentration in the 2020 dataset

Dissolved iron concentrations for all 22 vertical profile samples were less than the background level (Table 2-4).

The dissolved manganese concentration at 57M-96-11X (3,300 µg/L) increased marginally relative to spring 2019 (3,000 µg/L) while the ORP level decreased (8.0 to 0.2 mV) and DO increased (0.85 to 1.12 mg/L). At other monitoring points within Area 3, the relationship of dissolved manganese to ORP and DO is inconsistent. At downgradient piezometer 57P-98-03X, located at the edge of the Cold Spring Brook wetlands, the dissolved manganese concentration (11,000 µg/L) was elevated while the ORP and DO levels (139.9 mV and 8.7 mg/L) were strongly in the oxidizing range. Conversely, at well 5702MW-20-04A, located at the eastern edge of the source area, the dissolved manganese concentration was well below the background level although the OPR and DO data (-97.7 mV and 0.46 mg/L) were in the reducing range.

Dissolved manganese was detected in 4 of 22 vertical profile samples at concentration greater than the background level (Table 2-4). The relationships between these manganese levels and the associated DO/ORP levels are inconsistent, in line with the inconsistency noted for the monitoring wells and piezometer manganese data.

2.5 DATA QUALITY EVALUATION

Groundwater samples were collected from 15 monitoring wells, one well point, and 34 vertical profile sampling depths at AOC 57 Area 2 and eight monitoring wells, three piezometers, and 22 vertical profile sampling depths at AOC 57 Area 3. Samples were submitted to the Eurofins/TA, Savannah, Georgia facility for dissolved arsenic, iron, and manganese analyses. The AOC 57 supplemental metals analytical results are presented in Tables 2-2, 2-3, and 2-4.

Based on the data evaluation elements reviewed (including holding times, blank sample results, field duplicate results, LCS/LCSD recoveries, and MS/MSD recoveries), the dissolved metals results for all AOC 57 groundwater samples were acceptable as reported. No qualifications were needed.

2.6 CONCLUSIONS

Groundwater at Areas 2 and 3 was sampled for dissolved metals (arsenic, iron, and manganese) from an expanded network of previously existing wells, well points and piezometers in addition to a number of newly installed wells and piezometers and vertical profile sampling sites. The expanded monitoring network was designed to evaluate the horizontal and vertical extent of metals impacts, their interaction with ORP and DO levels in the groundwater, and the potential for offsite transport of site contaminants.

2.6.1 Area 2

Area 2 had been removed from the annual LTM program as of 2015, because the site primary hydrocarbon COCs resulting from the original release COCs had decreased to less than cleanup goals and the secondary COCs (arsenic, iron, and manganese) had reduced to levels considered to be limited in areal extent and not likely to pose a risk of offsite transport. The supplemental sampling at Area 2 was designed to provide data to support the conclusions developed in 2015 regarding the extent of metals impacts at Area 2.

The winter 2020 data for metals at Area 2 indicate that dissolved arsenic was detected at one shallow monitoring well (57M-03-05X) at a concentration (13 µg/L) only marginally greater than the cleanup goal. Arsenic levels were either non-detect or were below the cleanup goal at the other monitoring points within Area 2 with one exception. At deep monitoring well 5702MW-20-01B, dissolved arsenic was detected at a concentration (17 µg/L) greater than the cleanup goal. However, the ORP and DO levels at this well were in the reducing range, and a

upward vertical gradient in this well indicate that the detected arsenic level is representative of naturally-occurring arsenic levels in the deeper groundwater and the upward vertical gradient indicates that the detected arsenic level is not the result of the downward transport of elevated arsenic associated with the shallow source area. In addition, the concentration of arsenic at mid-depth well 5702MW-20-01A (2.2 µg/L) further supports that downward migration of elevated arsenic levels is not occurring at this location. Upward vertical gradients identified at additional well sites at the western and southern margins, topographically upslope from the Cold Spring Brook wetlands, indicate that the deeper groundwater moves upward toward Cold Spring Brook, consistent with the current CSM for AOC 57. Groundwater data generated by the sampling of four vertical profile sites (34 total samples) located downgradient of Area 2 and extending into the wetlands associated with Cold Spring Brook, indicate that arsenic concentrations, with one exception, were non-detect or less than the cleanup goal. These data further indicate that arsenic at levels greater than the cleanup goal has not been transported into or beyond Cold Spring Brook.

Dissolved manganese was also detected at 57M-03-05X at a concentration (590 µg/L) greater than the background level of 291 µg/L. Shallow groundwater with levels of dissolved manganese greater than the background level was identified at a number of additional monitoring wells, situated in western and eastern margins of Area 2 in locations cross-gradient to the original source area. These manganese data indicate that the detected concentrations are representative of a wider range of background values than that defined by the 291 µg/L value developed in 2000 (HLA, 2000).

The combined arsenic and manganese dataset developed by the winter 2020 supplemental sampling event confirms the conclusion in 2015 that site COCs have decreased to less than cleanup goals or are limited in aerial extent and do not pose a risk of offsite migration. .

The winter 2020 data will be used to facilitate development of the 2020 Five-Year Review, and to maintain the current LTM program conclusion to exclude Area 2 from annual LTM sampling.

2.6.2 Area 3

The winter 2020 supplemental sampling at Area 3 sampled current LTM monitoring wells and 57M-96-11X, a number of other previously existing wells and well points, several newly installed shallow and deep monitoring wells and piezometers and four vertical profile groundwater sampling sites.

The winter 2020 data for source area well 57M-95-03X identified dissolved arsenic at a concentration (30 µg/L) greater than the cleanup goal, consistent with previous LTM sampling results. The winter 2020 concentration was greater than that identified in the previous spring 2019 LTM sampling event but was consistent with the longer-term average value (32 µg/L since 2005). ORP and DO values at 57M-95-03X over the past several years have fluctuated from values representing a reducing environment in the groundwater to values representing a weakly oxidizing environment. Variation in arsenic levels have generally followed the variations in the oxidation-reduction state of the groundwater. Dissolved arsenic was also detected at a level greater than the cleanup goal at shallow downgradient well 57M-96-11X, consistent with results from previous LTM sampling. The detected value of dissolved arsenic in winter 2020 (67 µg/L) represents another incremental reduction in arsenic concentration at this well, starting with 290 µg/L (total arsenic) in spring 2016, 180 µg/L (total arsenic) in spring 2017 and 2018, and 100 µg/L (total arsenic) in spring 2019. Fluctuating ORP and DO values at 57M-96-11X are an

indication of the groundwater transitioning from a reducing state to a weakly oxidizing state, and this is reflected in the incremental reduction is arsenic levels over the past four years.

Arsenic was detected at one additional monitoring point, deep monitoring well 5703MW-20-01B, at a concentration (11 µg/L) only marginally greater than the cleanup goal. This well is situated to the east of the former source area in a cross-gradient location. The ORP and DO data at this well were in the reducing range.

Groundwater data generated by the sampling of four vertical profile sites (22 total samples) located downgradient of Area 3 and extending into the wetlands associated with Cold Spring Brook, indicate that arsenic concentrations were non-detect or less than the cleanup goal.

Dissolved manganese was detected at a number of monitoring points within Area 3 at levels greater than the background value developed in 2000 (HLA, 2000). However, the distribution of elevated manganese with respect to the former source area and the relationship with associated ORP and DO data do not present a definable pattern. Elevated manganese levels were identified in groundwater in both reducing and oxidizing states, as well as low levels of manganese also in groundwater in both reducing and oxidizing states. The data may indicate that the range of background levels of manganese in the groundwater is wider than the data used to generate the 2000 background level (HLA, 2000).

The winter 2020 groundwater sampling results at 57M-96-11X indicate that arsenic concentrations are decreasing incrementally as the groundwater transitions to a more oxidizing state. The data for source area well 57M-96-03X indicate that arsenic concentrations are relatively stable, associated with fluctuating ORP and DO levels indicative of variation between weakly reducing and weakly oxidizing states in the groundwater. As indicated by the current literature, metals can be expected to come out of solution (precipitate) when the aquifer reverts to more permanent oxidizing state within the impacted area, or when the impacted groundwater reaches and expands into an oxidizing environment. The shallow groundwater at AOC 57 flows toward Cold Spring Brook; the identification of an upward vertical gradient at 57M-96-11X indicates that deeper groundwater also flows toward Cold Spring Brook. The chemical status of the groundwater and the presence of the upward vertical gradient at the wetlands margin are consistent with the current CSM for AOC 57. The CSM also acknowledges that naturally occurring subsurface zones can occur and that the concentrations of metals in those zones that are greater than site cleanup levels or background levels can be naturally occurring.

The Remedial Action selected in the ROD included the implementation of land use controls (LUCs) to limit potential exposure to contaminated soil and groundwater under both existing and future site use. Although access to the site is not restricted, the site is remote and the building on the property blocks direct access, thereby making the site less accessible. As a result, exposure to potential site users is effectively controls by the existing LUCs

The Army will continue to conduct LTM sampling at Area 3 until conditions warrant discontinuation of sampling and change in LUC implementation. The next LTM sampling event is planned for spring 2020. The winter 2020 data will be used to support the 2020 Five-Year Review by addressing former data gaps in the understanding of groundwater flow and the extent of groundwater impacts at Area 3.

3.0 AREA OF CONTAMINATION 43G

3.1 SITE BACKGROUND

AOC 43G is located in the central portion of the former Main Post of Fort Devens (Figure 1-1) at the southwestern corner of Feinburg Road and Queenstown Street. The layout of AOC 43G is depicted on Figure 3-1. AOC 43G consists of the former Army Air Force Exchange Service (AAFES) gas station (Areas 2 and 3) and historical Gas Station G (Area 1) and has been the subject of Remedial Investigations (RIs) associated with petroleum contamination resulting from the past operations. The former gas station was used as a motor pool fueling station during the World War II era. The Army has removed the identified underground storage tanks USTs at AOC 43G.

In 1996, the Army conducted a Feasibility Study to evaluate potential remedial alternatives and signed a ROD to document the selected remedy. The selected Remedial Action for AOC 43G relies on intrinsic bioremediation, groundwater and contaminant modeling, and long-term groundwater monitoring to evaluate the effectiveness of the alternative at controlling groundwater contamination and site risk. Intrinsic remediation is a remedial approach that relies on natural attenuation to remediate contaminants in the subsurface. The remedy will mitigate existing groundwater contamination through natural attenuation and bioremediation and reduce the potential risk of future commercial/industrial exposure to contaminated groundwater. Components of the selected remedy included assessment, data collection, groundwater modeling, LTM, annual reporting to USEPA and the Massachusetts Department of Environmental Protection (MassDEP), and performing five-year reviews. Groundwater sampling results and modeling indicated that intrinsic remediation is a viable remedial option for AOC 43G.

AOC 43G is sampling annually in the fall in accordance with the current LTM program (LTMMP, 2015). As part of the fall 2019 sampling event, additional existing monitoring wells were sampled in addition to the wells included in the LTM program. A number of these monitoring wells (XGM-94-06X, XGM-94-07X, and XGM-94-08X) (Figure 3-1) were removed from the LTM program in 2015 because the concentrations of the site-specific COCs, iron and manganese, although greater than the cleanup goals had remained constant or had decreased over a number of years of LTM sampling prior to 2015. In addition, the concentrations of these COCs at downgradient sentinel well AAFES-7 were less than the cleanup goals, indicating that off-site migration of site COCs was not occurring. With the availability of additional groundwater elevation data derived from monitoring wells in areas to the north-northeast of AOC 43G, and additional monitoring points derived from a separate chemical investigation within this portion of the former Fort Devens, resultant groundwater contours indicated that a portion of the groundwater from the former UST area at AOC 43G flows to the northeast, rather than solely to the east. As a result, three additional monitoring wells (XGM-20-01A, XGM-20-02A, and XGM-20-3A) were installed in the area to the northeast of AOC 43G, and to the north of sentinel well AAFES-7. Existing piezometer 43GPZ-19-03, located upgradient (northwest) of the former UST area, was sampling during the winter 2020 event to evaluate the COC concentrations in the area upgradient of the former UST area.

3.2 GROUNDWATER HYDROLOGY

During the winter 2020 supplemental sampling event, water levels were collected from the following 21 wells and piezometers at AOC 43G:

XGM-94-04X	XGM-20-02A	43GPZ-19-02
XGM-94-06X	XGM-20-03A	43GPZ-19-03
XGM-94-07X	AAFES-2	43GPZ-19-04
XGM-94-08X	AAFES-5	43GPZ-19-05
XGM-94-10X	AAFES-6R	43GPZ-19-06
XGM-94-12X	AAFES-7	43GPZ-19-07
XGM-20-01A	43GPZ-19-01	43GPZ-19-08

Measured water levels at AOC 43G for the winter 2020 supplemental sampling event are presented in Table 1-4. Water-table elevations for the winter 2020 gauging event at AOC 43G are presented on Figure 3-2. The 2020 groundwater elevation data identified groundwater flow to be in a west-to-east direction, which is consistent with the site's surface topography and historical flow patterns. Additional groundwater elevation data for monitoring points to the northeast of AOC 43G suggest that the shallow groundwater in the northern portions of AOC 43G trends slightly toward the northeast. The shallow groundwater flow pattern in the central portion of AOC 43G is generally toward the Robbins Pond drainage area, located approximately 450 feet to the east of sentinel well AAFES-7. A groundwater gradient of 0.0452 ft/ft (Gradient Line A-A', Figure 3-2) was calculated for the winter 2020 supplemental sampling event. The flow line used to calculate the gradient is believed to be representative of groundwater flow at the site.

3.3 GROUNDWATER SAMPLING

Groundwater sampling activities at AOC 43G conducted in February 2020 consisted of the sampling of three monitoring wells and one piezometer:

- XGM-20-01A
- XGM-20-02A
- XGM-20-03A
- 43GPZ-19-03

The monitoring points were sampled for dissolved iron and manganese and submitted to the Eurofins/TA, Savannah, Georgia facility for analysis.

3.4 ANALYTICAL RESULTS

The analytical results for the winter 2020 event at AOC 43G are summarized in Table 3-1. Dissolved metals results are illustrated on Figure 3-3.

3.4.1 Winter 2020 Data Summary

- Iron – Dissolved iron was detected in two of the four monitoring points sampled (50%) but the maximum detected concentration (210 µg/L) was well below the cleanup goal (9,100 µg/L).
- Manganese - Dissolved manganese was detected in each of the four monitoring points sampled with concentrations ranging from 1.5 µg/L at piezometer 43GPZ-19-03 to 400 µg/L at new monitoring well XGM-20-03A. Dissolved manganese concentrations

exceeded the cleanup goal of 375 µg/L, established for total manganese, in groundwater at only one of the monitoring points sampled (25%). Dissolved manganese was detected above the 375 µg/L cleanup goal level at monitoring well XGM-20-03A (400 µg/L). The concentration of dissolved manganese at upgradient monitoring point 43GPZ-19-03 was less than the cleanup goal.

The ORP and DO data for all of the monitoring points sampled in winter 2020 (Table 3-1) indicate strongly oxidizing conditions in the groundwater in the area of the three downgradient wells (XGM-20-01A, XGM-20-02A, and XGM-20-03A) as well as at the upgradient piezometer 43PZ-19-03. The concentration of dissolved manganese at XGM-20-03A (400 µg/L) was the only value greater than the cleanup goal. The relationship between the dissolved manganese concentrations in these monitoring wells and ORP and DO appears to be inconsistent.

3.5 DATA EVALUATION

Groundwater samples were collected from four AOC 43G monitoring points in February 2020. The samples were analyzed at the Eurofins/TA Savannah, Georgia facility for dissolved iron and manganese analyses. The AOC 43G supplemental metals analytical results are presented in Table 3-1.

Based on the data evaluation elements reviewed (including holding times, blank sample results, field duplicate results, surrogate recoveries, LCS/LCSD recoveries, and MS/MSD recoveries), result for dissolved manganese in sample XGM-20-03A_FEB20 was qualified as estimated (J) due to MS/MSD percent recovery outliers. No other qualifications to the data were needed and the AOC 43G sample results are acceptable for use.

3.7 CONCLUSIONS

The ROD identifies site-specific groundwater cleanup goals for the COCs iron and manganese at AOC 43G.

The dissolved manganese concentration at a single new downgradient well (400 J µg/L at XGM-20-03A) was slightly above the cleanup goal (375 µg/L). This coupled with dissolved manganese concentrations less than the cleanup goal at two additional downgradient monitoring wells, and the continued identification of total manganese concentrations less than the cleanup goal at sentinel well AAFES-7, indicate that offsite migration of manganese to the east and northeast at concentrations greater than the cleanup goal is unlikely. These conclusions are consistent with the current CSM for AOC 43G.

The identification of dissolved manganese at upgradient monitoring point 43GPZ-19-01 at a concentration of 1.5 J µg/L, which is less than the cleanup goal indicates that the upgradient extent of manganese impacts from the former UST area has been delineated.

The ROD-designated remedy includes LUCs to limit potential exposure to contaminated soil and groundwater under both existing and future site use. The Army will evaluate the performance of the remedy to date and the existing LUCs and the need to continue to conduct LTM sampling as part of the 2020 Five Year Review.

4.0 REFERENCES

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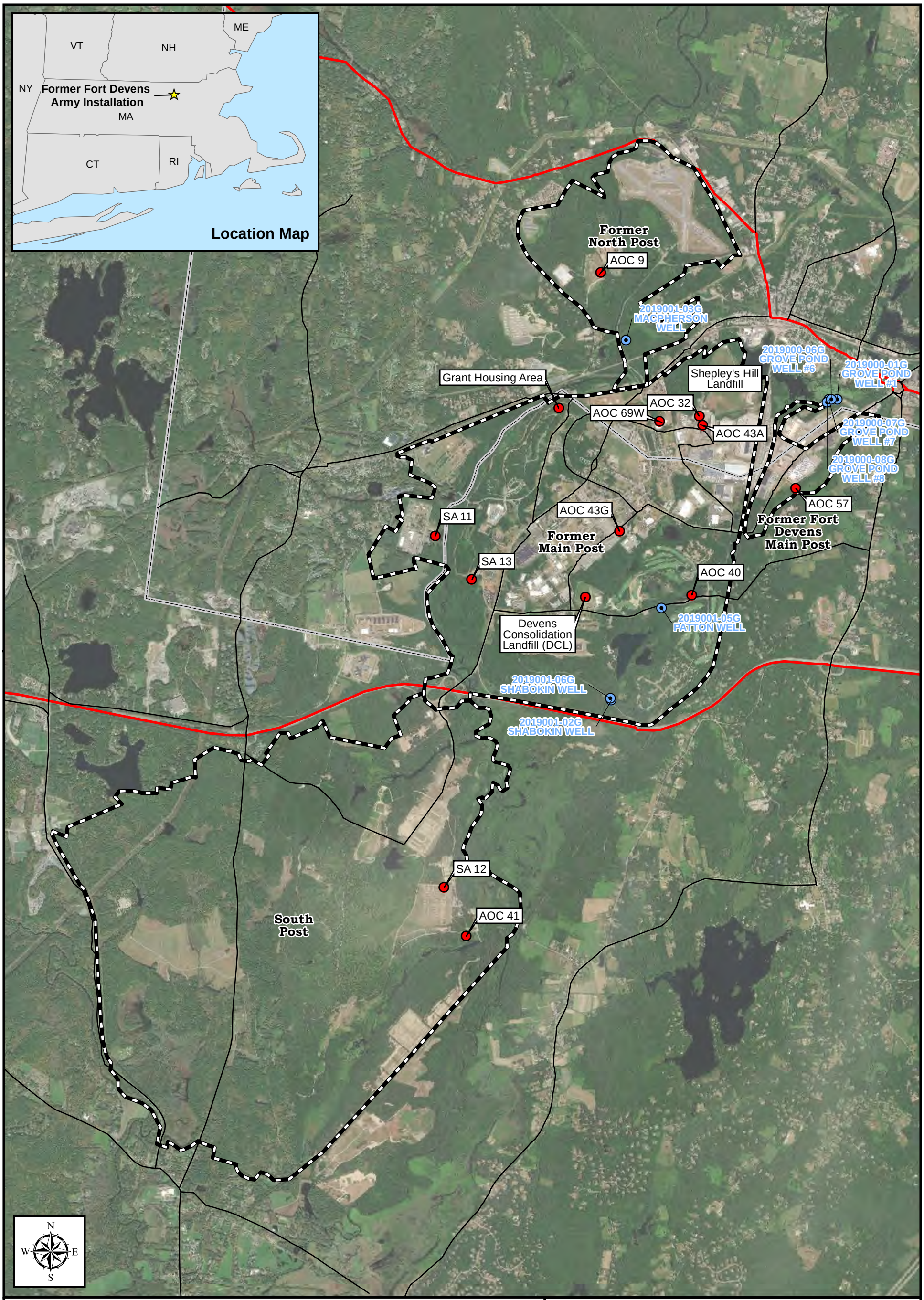
FIGURES



Legend

- Area of Contamination (AOC)
- Water Supply Well
- Highway
- Major Road
- County Line
- Former Fort Devens Boundary

Aerial Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Site Location
Devens Supplemental Sampling Report

Former Fort Devens Army Installation
Devens, Massachusetts

KOMAN Government Solutions, LLC
293 Boston Post Road West, Suite 100, Marlborough, MA 01752

0 1,750 3,500
Feet

Date: 04/13/2020

Figure 1-1

File: MP_SuppSampling_F1-1_Sites.mxd

Legend

- Irrigation Well (Approximate Location)
- Stream
- Topographic Contour (Ft AMSL)
- AOC 57 Sub Area
- Former Fort Devens Boundary

Note:
AOC 57 lies within the MassDEP Zone II Wellhead Protection Area.

Aerial Sources: UGSS, MassGIS Orthoimagery 2019

Site Layout
Area of Contamination 57 Area 1, 2, & 3
Devens Supplemental Sampling Report

Former Fort Devens Army Installation
Devens, Massachusetts

KOMAN Government Solutions, LLC
293 Boston Post Road West, Suite 100, Marlborough, MA 01752

0 125 250
Feet

Date:
04/13/2020

Figure
2-1

File: MP_SuppSampling_F2-1_AOC57.mxd

Legend

- Monitoring Well Location
- Vertical Profiling Location
- Stream
- Topographic Contour (Ft AMSL)
- Final Excavation Limit (2003)
- Conti Excavation Limit (2002)
- Flagged Wetland Limits
- Surface Water Flow Direction
- Approximate Historical Extent of Groundwater Contamination in Exceedance of Cleanup Goals (based on Fall 2003 to Spring 2011 analytical data)
- Containment Dam
- Former Fort Devens Boundary

Aerial Source: USGS, MassGIS Orthoimagery 2019

Site Layout
Area of Contamination 57 - Area 2
March 2020
Devens Supplemental Sampling Report

Former Fort Devens Army Installation
Devens, Massachusetts

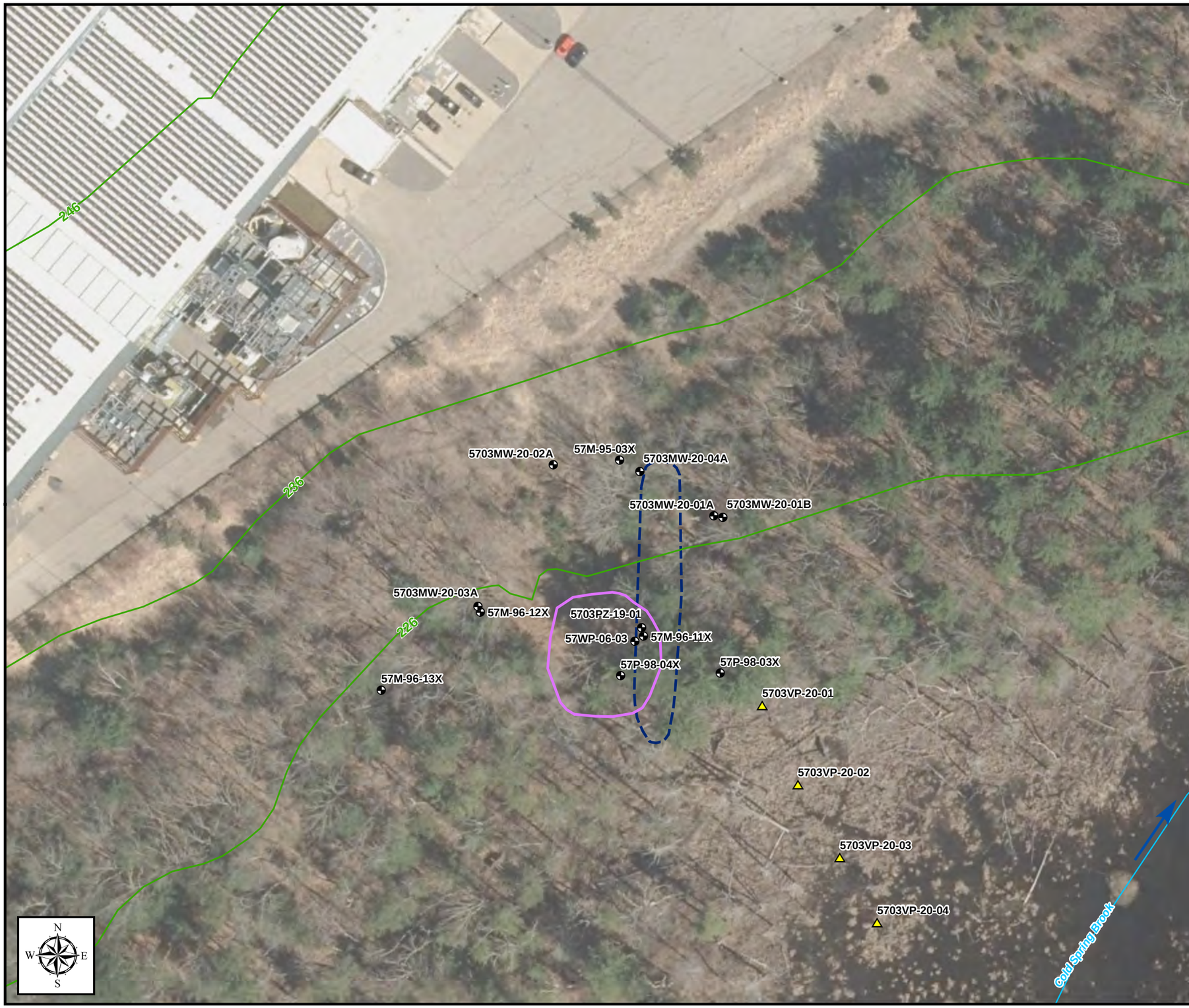
KOMAN Government Solutions, LLC
293 Boston Post Road West, Suite 100, Marlborough, MA 01752

0 30 60
Feet

Date:
10/19/2020

Figure
2-2

File: MP_SuppSampling_F2-2_AOC57-2_SiteLayout.mxd



Legend

- Monitoring Well Location
- Vertical Profiling Location
- Cold Spring Brook
- Surface Water Flow Direction
- Topographic Contour (Ft AMSL)
- Approximate Historical Extent of Groundwater Contamination in Exceedance of Cleanup Goals (based on Fall 2003 to Spring 2011 analytical data)
- Alternate III-2a Estimated Soil Excavation Area

Aerial Sources: UGSS, MassGIS Orthoimagery 2019

Site Layout
Area of Contamination 57 - Area 3
Devens Supplemental Sampling Report

Former Fort Devens Army Installation
Devens, Massachusetts

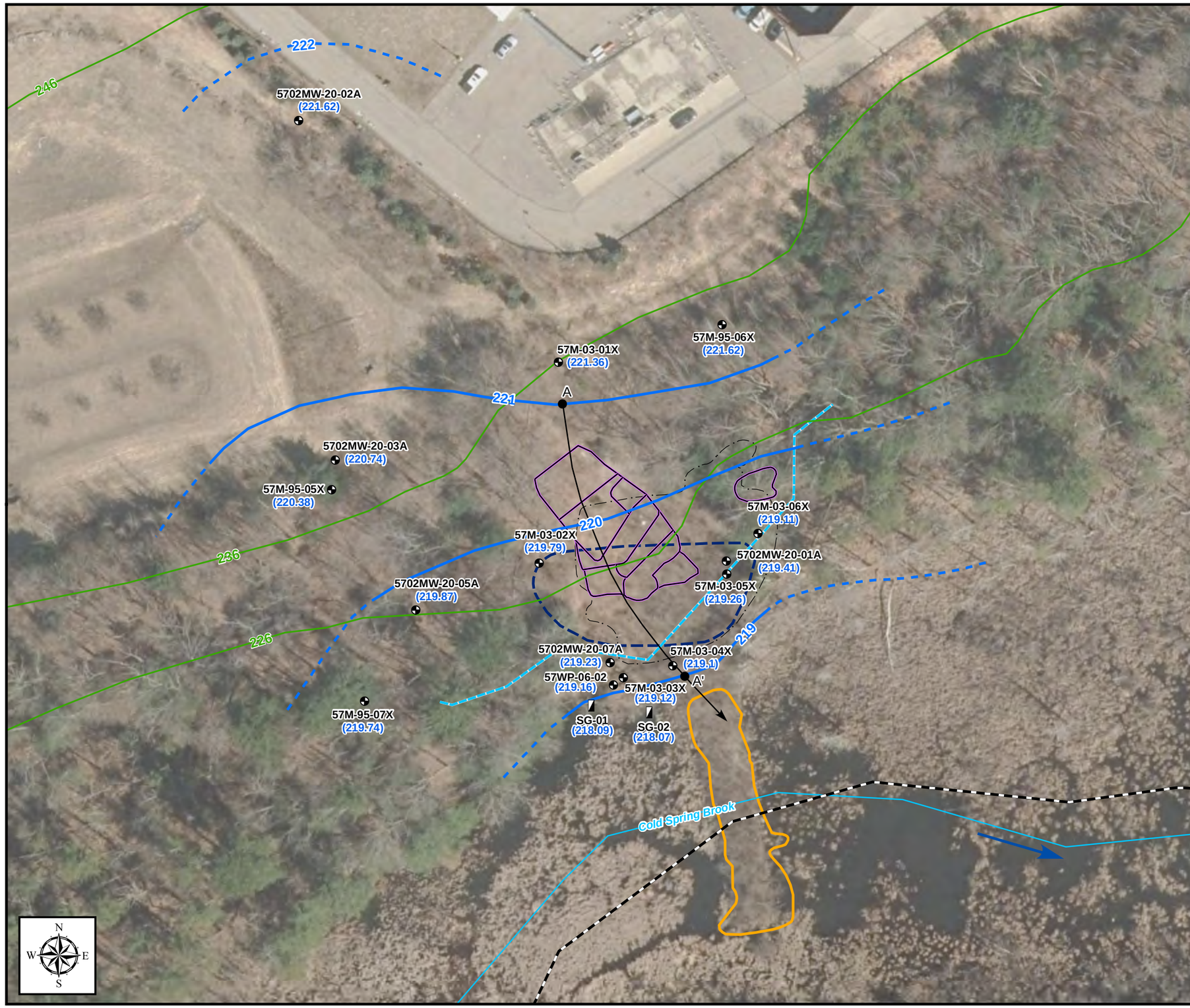
KOMAN Government Solutions, LLC
293 Boston Post Road West, Suite 100, Marlborough, MA 01752

0 30 60
Feet

Date:
10/19/2020

Figure
2-3

File: MP_SuppSampling_F2-3_AOC57-3_SiteLayout.mxd



Legend

- Monitoring Well Location
- Staff Gauge
- (219.52) Shallow Groundwater Elevation (Feet)
- Shallow Groundwater Contour (ft NAVD88) (Contour Interval = 1 ft)
- Inferred Shallow Groundwater Contour (fft NAVD88) (Contour Interval = 1 ft)
- Groundwater Flow Direction
- Stream
- Surface Water Flow Direction
- Topographic Contour (Ft
- Final Excavation Limit (2003)
- Conti Excavation Limit (2002)
- Flagged Wetland Limits
- Approximate Historical Extent of Groundwater Contamination in Exceedance of Cleanup Goals (based on Fall 2003 to Spring 2011 analytical data)
- Containment Dam
- Former Fort Devens Boundary

Aerial Source: USGS, MassGIS Orthoimagery 2019

Shallow Water Table Elevation
Area of Contamination 57 - Area 2
March 2020
Devens Supplemental Sampling Report

Former Fort Devens Army Installation
Devens, Massachusetts

KOMAN Government Solutions, LLC
293 Boston Post Road West, Suite 100, Marlborough, MA 01752

0 30 60
Feet

Date:
11/23/2020

Figure
2-4

File: MP_SuppSampling_F2-4_AOC57-2_Shallow_GWC0320.mxd

Legend

- Monitoring Well Location
- (232.84) Deep Groundwater Elevation (Feet)
- Deep Groundwater Contour (ft NAVD88) (Contour Interval = 0.5 ft)
- Inferred Deep Groundwater Contour (ft NAVD88) (Contour Interval = 0.5 ft)
- Groundwater Flow Direction
- Stream
- Surface Water Flow Direction
- Topographic Contour (Ft AMSL)
- Final Excavation Limit (2003)
- Conti Excavation Limit (2002)
- Flagged Wetland Limits
- Approximate Historical Extent of Groundwater Contamination in Exceedance of Cleanup Goals (based on Fall 2003 to Spring 2011 analytical data)
- Containment Dam
- Former Fort Devens Boundary

Aerial Source: USGS, MassGIS Orthoimagery 2019

Deep Water Table Elevation
Area of Contamination 57 - Area 2
March 2020
Devens Supplemental Sampling Report

Former Fort Devens Army Installation
Devens, Massachusetts

KOMAN Government Solutions, LLC
293 Boston Post Road West, Suite 100, Marlborough, MA 01752

0 30 60
Feet

Date:
11/15/2020

Figure
2-5

File: MP_SuppSampling_F2-5_AOC57-2_Deep_GWC0320.mxd

Legend

- Monitoring Well Location
- (219.52) Shallow Groundwater Elevation (Feet)
- Shallow Groundwater Contour (ft NAVD88) (Contour Interval = 1 ft)
- Inferred Shallow Groundwater Contour (ft NAVD88) (Contour Interval = 1 ft)
- Groundwater Flow Direction
- Stream
- Topographic Contour (Ft AMSL)
- Surface Water Flow Direction
- Approximate Historical Extent of Groundwater Contamination in Exceedance of Cleanup Goals (based on Fall 2003 to Spring 2011 analytical data)
- Alternate III-2a Estimated Soil Excavation Area

Aerial Sources: UGSS, MassGIS Orthoimagery 2019

Shallow Water Table Elevation
Area of Contamination 57 - Area 3
March 2020
Devens Supplemental Sampling Report

Former Fort Devens Army Installation
Devens, Massachusetts

KOMAN Government Solutions, LLC
293 Boston Post Road West, Suite 100, Marlborough, MA 01752

0 30 60
Feet

Date:
11/19/2020

Figure
2-6

File: MP_SuppSampling_F2-6_AOC57-3_Shallow_GWC0320.mxd

Legend

- Monitoring Well Location
- (232.84) Deep Groundwater Elevation (Feet)
- Deep Groundwater Contour (ft NAVD88) (Contour Interval = 0.5 ft)
- Inferred Deep Groundwater Contour (ft NAVD88) (Contour Interval = 0.5 ft)
- Groundwater Flow Direction
- Stream
- Surface Water Flow Direction
- Topographic Contour (Ft AMSL)
- Approximate Historical Extent of Groundwater Contamination in Exceedance of Cleanup Goals (based on Fall 2003 to Spring 2011 analytical data)
- Alternate III-2a Estimated Soil Excavation Area
- Former Fort Devens Boundary

Aerial Source: USGS, MassGIS Orthoimagery 2019

Deep Water Table Elevation
Area of Contamination 57 - Area 3
March 2020
Devens Supplemental Sampling Report

Former Fort Devens Army Installation
Devens, Massachusetts

KOMAN Government Solutions, LLC
293 Boston Post Road West, Suite 100, Marlborough, MA 01752

0 30 60
Feet

Date: 11/15/2020

Figure 2-7

File: MP_SuppSampling_F2-7_AOC57-3_Deep_GWC0320.mxd

Legend

- Monitoring Well/Piezometer
- Staff Gauge
- (222.85) Groundwater Elevation (Feet)
- Groundwater Contour (Contour Interval = 1 Foot) (ft NAVD88)
- Inferred Groundwater Contour (Contour Interval = 1 Foot) (ft NAVD88)
- Surface Water Flow Direction
- Former Fort Devens Boundary

Shallow Water Table Elevation
AOC 74 and AOC 57 Areas 2 and 3
March 12, 2020

Former Fort Devens Army Installation
Devens, Massachusetts

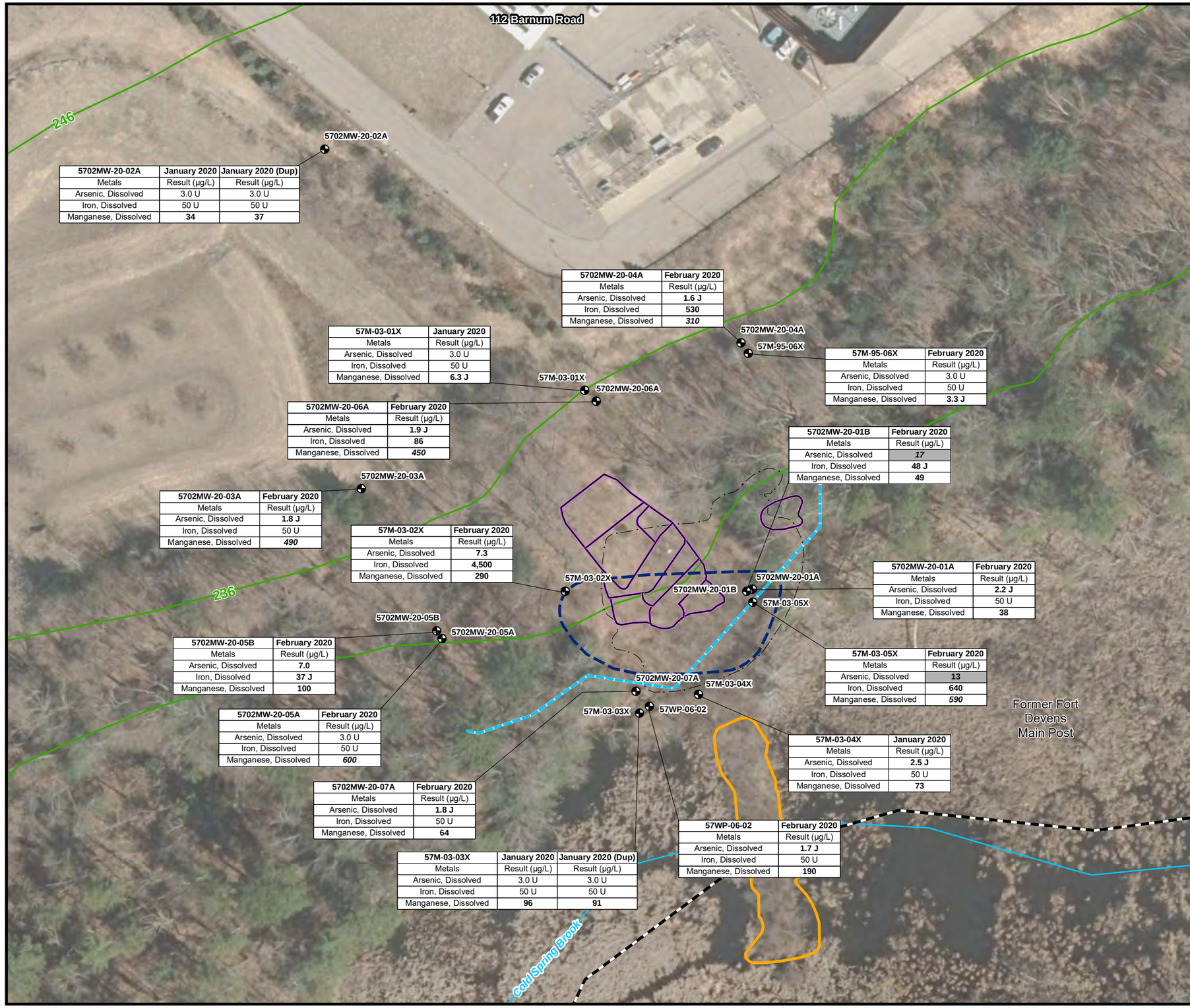
KOMAN Government Solutions, LLC
293 Boston Post Road West, Suite 100, Marlborough, MA 01752

0 150 300
Feet

Date:
11/02/2020

Figure
2-8

File: AR2019_MP_F2-8_AOC74_57-2-3_GWC031220.mxd



5702MW-20-02A	January 2020	January 2020 (Dup)
Metals	Result (µg/L)	Result (µg/L)
Arsenic, Dissolved	3.0 U	3.0 U
Iron, Dissolved	50 U	50 U
Manganese, Dissolved	**34**	**37**

5702MW-20-04A	February 2020
Metals	Result (µg/L)
Arsenic, Dissolved	**1.6 J**
Iron, Dissolved	**530**
Manganese, Dissolved	***310***

57M-03-01X	January 2020
Metals	Result (µg/L)
Arsenic, Dissolved	3.0 U
Iron, Dissolved	50 U
Manganese, Dissolved	**6.3 J**

57M-95-06X	February 2020
Metals	Result (µg/L)
Arsenic, Dissolved	3.0 U
Iron, Dissolved	50 U
Manganese, Dissolved	**3.3 J**

5702MW-20-06A	February 2020
Metals	Result (µg/L)
Arsenic, Dissolved	**1.9 J**
Iron, Dissolved	**86**
Manganese, Dissolved	***450***

5702MW-20-01B	February 2020
Metals	Result (µg/L)
Arsenic, Dissolved	***17***
Iron, Dissolved	**48 J**
Manganese, Dissolved	**49**

5702MW-20-03A	February 2020
Metals	Result (µg/L)
Arsenic, Dissolved	**1.8 J**
Iron, Dissolved	50 U
Manganese, Dissolved	***490***

57M-03-02X	February 2020
Metals	Result (µg/L)
Arsenic, Dissolved	**7.3**
Iron, Dissolved	**4,500**
Manganese, Dissolved	**290**

5702MW-20-01A	February 2020
Metals	Result (µg/L)
Arsenic, Dissolved	**2.2 J**
Iron, Dissolved	50 U
Manganese, Dissolved	**38**

5702MW-20-05B	February 2020
Metals	Result (µg/L)
Arsenic, Dissolved	**7.0**
Iron, Dissolved	**37 J**
Manganese, Dissolved	**100**

57M-03-05X	February 2020
Metals	Result (µg/L)
Arsenic, Dissolved	**13**
Iron, Dissolved	**640**
Manganese, Dissolved	***590***

5702MW-20-05A	February 2020
Metals	Result (µg/L)
Arsenic, Dissolved	3.0 U
Iron, Dissolved	50 U
Manganese, Dissolved	***600***

57M-03-04X	January 2020
Metals	Result (µg/L)
Arsenic, Dissolved	**2.5 J**
Iron, Dissolved	50 U
Manganese, Dissolved	**73**

5702MW-20-07A	February 2020
Metals	Result (µg/L)
Arsenic, Dissolved	**1.8 J**
Iron, Dissolved	50 U
Manganese, Dissolved	**64**

57WP-06-02	February 2020
Metals	Result (µg/L)
Arsenic, Dissolved	**1.7 J**
Iron, Dissolved	50 U
Manganese, Dissolved	**190**

57M-03-03X	January 2020	January 2020 (Dup)
Metals	Result (µg/L)	Result (µg/L)
Arsenic, Dissolved	3.0 U	3.0 U
Iron, Dissolved	50 U	50 U
Manganese, Dissolved	**96**	**91**

Legend

- Monitoring Well Location
- Final Excavation Limit (2003)
- Conti Excavation Limit (2002)
- Flagged Wetland Limits
- Stream
- Topographic Contour (Ft AMSL)
- Approximate Historical Extent of Groundwater Contamination in Exceedance of Cleanup Goals (based on Fall 2003 to Spring 2008 analytical data) (2008 Annual Report, HGL, 2009)
- Containment Dam
- Former Fort Devens Boundary

Notes:

1.5	= Detection
1.5	= Above background or monitoring criteria
1.5	= Above cleanup goal

1) Cleanup Goal for arsenic is the MCL standard.
2) From the RI. (Final Remediation Investigation Report, Area of Contamination (AOC) 57, Devens, Massachusetts, HLA, 2000b)

1. Cleanup Goal	
Metals	Result (µg/L)
Arsenic	10 (T)
Iron	NS
Manganese	NS

2. Background	
Metals	Result (µg/L)
Arsenic	10.5(T)
Iron	9,100 (T)
Manganese	291(T)

µg/L = micrograms per liter
NS = No Standard
J = Estimated Result
U = Non-detect
(T) = Cleanup Goal or Background Level for Total Metals

Service Layer Credits: Mass GIS Orthoimagery, 2019

Metals Concentrations in Groundwater
Area of Contamination 57 - Area 2
March 2020
Devens Supplemental Sampling Report

Former Fort Devens Army Installation
Devens, Massachusetts

KOMAN Government Solutions, LLC
293 Boston Post Road West, Suite 100, Marlborough, MA 01752

0 30 60
Feet

Date: 04/13/2020

Figure 2-9

File: MP_SuppSampling_F2-8_AOC57-2_Metals0220.mxd

57M-95-03X	February 2020	February 2020 (Dup)
Metals	Result (µg/L)	Result (µg/L)
Arsenic, Dissolved	**30**	**29**
Iron, Dissolved	**3,900**	**3,800**
Manganese, Dissolved	**120**	**120**

5703MW-20-04A	February 2020
Metals	Result (µg/L)
Arsenic, Dissolved	**7.6**
Iron, Dissolved	**2,300**
Manganese, Dissolved	**270**

5703MW-20-02A	February 2020
Metals	Result (µg/L)
Arsenic, Dissolved	**2.2 J**
Iron, Dissolved	**740**
Manganese, Dissolved	***920***

5703MW-20-01A	February 2020
Metals	Result (µg/L)
Arsenic, Dissolved	3.0 U
Iron, Dissolved	**450**
Manganese, Dissolved	**110**

5703MW-20-03A	February 2020
Metals	Result (µg/L)
Arsenic, Dissolved	3.0 U
Iron, Dissolved	**91**
Manganese, Dissolved	**130**

5703MW-20-01B	February 2020
Metals	Result (µg/L)
Arsenic, Dissolved	***11***
Iron, Dissolved	**83**
Manganese, Dissolved	***1,200***

57M-96-12X	February 2020
Metals	Result (µg/L)
Arsenic, Dissolved	3.0 U
Iron, Dissolved	**41 J**
Manganese, Dissolved	**85**

5703PZ-19-01	February 2020
Metals	Result (µg/L)
Arsenic, Dissolved	**64**
Iron, Dissolved	**28 J**
Manganese, Dissolved	**160**

57P-98-03X	February 2020
Metals	Result (µg/L)
Arsenic, Dissolved	**3.3**
Iron, Dissolved	**1,400**
Manganese, Dissolved	***11,000***

57P-98-04X	February 2020
Metals	Result (µg/L)
Arsenic, Dissolved	3.0 U
Iron, Dissolved	**270**
Manganese, Dissolved	***370***

57M-96-11X	February 2020
Metals	Result (µg/L)
Arsenic, Dissolved	**67**
Iron, Dissolved	***31,000***
Manganese, Dissolved	***3,300***

Legend

- Monitoring Well Location
- Approximate Historical Extent of Groundwater Contamination in Exceedance of Cleanup Goals (based on Fall 2003 to Spring 2008 analytical data) (2008 Annual Report, HGL, 2009)
- Alternate III-2a Estimated Soil Excavation
- Stream
- Topographic Contour (Ft AMSL)

Notes:

1.5	= Detection
1.5	= Above background or monitoring criteria
1.5	= Above cleanup goal

1) Cleanup Goal for arsenic is the MCL standard.
2) From the RI. (Final Remediation Investigation Report, Area of Contamination (AOC) 57, Devens, Massachusetts, HLA, 2000b)

1. Cleanup Goal	
Metals	Result (µg/L)
Arsenic	10 (T)
Iron	NS
Manganese	NS

2. Background	
Metals	Result (µg/L)
Arsenic	10.5(T)
Iron	9,100 (T)
Manganese	291(T)

µg/L = micrograms per liter
NS = No Standard
J = Estimated Result
U = Non-detect
(T) = Cleanup Goal or Background Level for Total Metals

Service Layer Credits: Mass GIS Orthoimagery, 2019

Metals Concentrations in Groundwater
Area of Contamination 57 - Area 3
March 2020
Devens Supplemental Sampling Report

Former Fort Devens Army Installation
Devens, Massachusetts

KOMAN Government Solutions, LLC
293 Boston Post Road West, Suite 100, Marlborough, MA 01752

0 30 60
Feet

Date: 04/13/2020

Figure 2-10

File: MP_SuppSampling_F2-9_AOC57-3_Metals0220.mxd

Legend

- Monitoring Well
- Approximate Historical Extent of Groundwater Contamination in Exceedance of Cleanup Goals (based on 1999 to 2008 analytical data) (2008 Annual Report, HGL, 2009)
- Area 1
- Former Gasoline UST(s)
- Former Waste Oil UST
- Former Waste Oil AST
- Former UST Area

Service Layer Credits: MassGIS Orthoimagery 2019

Site Layout
Area of Contamination 43G
Devens Supplemental Sampling Report

Former Fort Devens Army Installation
Devens, Massachusetts

KOMAN Government Solutions, LLC
293 Boston Post Road West, Suite 100, Marlborough, MA 01752

0 40 80
Feet

Date:
04/10/2020

Figure
3-1

File: MP_SuppSampling_F3-1_AOC43G_SiteLayout.mxd

Legend

- Monitoring Well
- (281.48) Groundwater Elevation (ft NAVD88)
- Deep Groundwater Contour (ft NAVD88) (Contour Interval = 2 ft)
- Inferred Deep Groundwater Contour (ft NAVD88) (Contour Interval = 2 ft)
- Groundwater Flow Direction

Aerial Source: USGS, MassGIS Orthoimagery 2019

Water Table Elevation
Area of Contmination 43G
February 2020
Devens Supplemental Sampling Report

Former Fort Devens Army Installation
Devens, Massachusetts

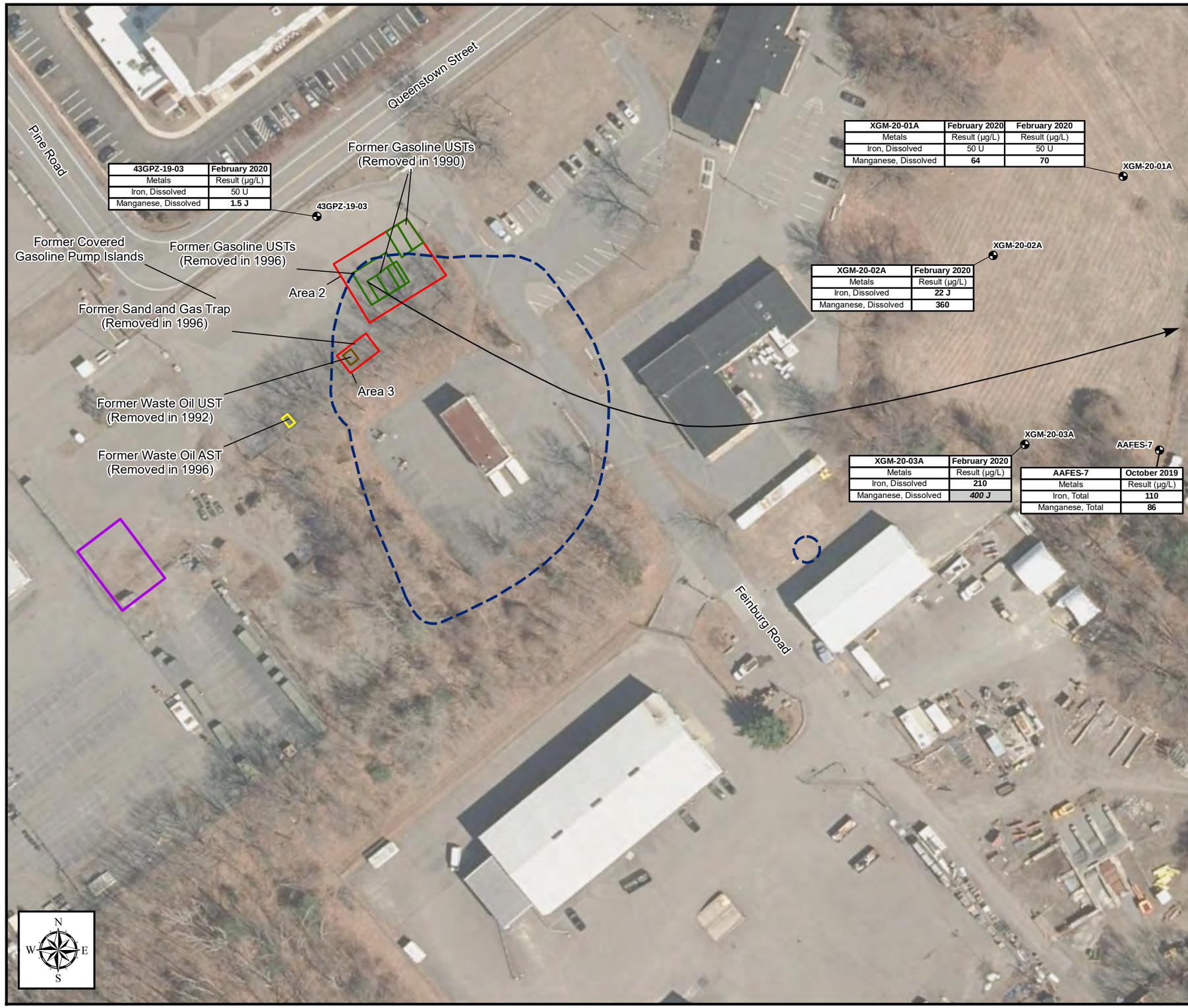
KOMAN Government Solutions, LLC
293 Boston Post Road West, Suite 100, Marlborough, MA 01752

0 75 150
Feet

Date:
11/16/2020

Figure
3-2

File: MP_SuppSampling_F3-2_AOC43G_GWC0220.mxd



43GPZ-19-03	February 2020
Metals	Result (µg/L)
Iron, Dissolved	50 U
Manganese, Dissolved	**1.5 J**

XGM-20-01A	February 2020	February 2020
Metals	Result (µg/L)	Result (µg/L)
Iron, Dissolved	50 U	50 U
Manganese, Dissolved	**64**	**70**

XGM-20-02A	February 2020
Metals	Result (µg/L)
Iron, Dissolved	**22 J**
Manganese, Dissolved	**360**

XGM-20-03A	February 2020
Metals	Result (µg/L)
Iron, Dissolved	**210**
Manganese, Dissolved	***400 J***

AAFES-7	October 2019
Metals	Result (µg/L)
Iron, Total	**110**
Manganese, Total	**86**

Legend

- Monitoring Well Location
- Groundwater Flow Direction
- Approximate Historical Extent of Groundwater Contamination in Exceedance of Cleanup Goals (based on 1999 to 2008 analytical data) (2008 Annual Report, HGL, 2009)
- Area 1
- Former Gasoline UST(s)
- Former Waste Oil UST
- Former Waste Oil
- Former UST Area

Notes:

1.5	= Detection
1.5	= Above background or monitoring criteria
1.5	= Above cleanup goal

1) The cleanup goal for iron is the background level. The cleanup goal for manganese is a site-specific goal determined in 2008 (Long-Term Monitoring Plan Former Fort Devens Army Installation, HGL, 2008).
2) The monitoring criteria for iron and manganese is the background from the RI (Final Remedial Investigation Report Area of Contamination (AOC) 43G, ABB Environmental Services, Inc., 1996).

1. Cleanup Goal	
Metals	Result (µg/L)
Manganese	375

2. Monitoring Criteria	
Metals	Result (µg/L)
Iron	9,100
Manganese	291

µg/L = micrograms per liter
NS = No Standard
J = Estimated Result
U = Non-detect
-- = Not analyzed

Service Layer Credits: MassGIS Orthoimagery 2019

Metals Concentrations in Groundwater
Area of Contamination 43G
February 2020
Devens Supplemental Sampling Report

Former Fort Devens Army Installation
Devens, Massachusetts

KOMAN Government Solutions, LLC
293 Boston Post Road West, Suite 100, Marlborough, MA 01752

0 40 80
Feet

Date:
05/22/2020

Figure
3-3

File: MP_SuppSampling_F3-3_AOC43G_Metals0220_v2.mxd

TABLES

Table 1-1
Analytical Methods, Containers, Holding Times, and Preservatives
Main Post, Former Fort Devens Army Installation, Massachusetts

Site/Events	Parameter	Analytical Method[1]	Contaminant of Concern	Sample Container[2]	Preservative	Holding Time
AOC 57 (Spring)	Dissolved Metals*	SW6010C/6020A	As, Fe, Mn	1 x 250-ml Polyethylene	HNO3 to pH < 2; 4°± 2°C	180 Days
	Total Metals	SW6010C/6020A	As, Fe, Mn	1 x 250-ml Polyethylene	HNO3 to pH < 2; 4°± 2°C	180 Days
AOC 32/43A (Spring)	VOCs	SW8260B	TAL	3 x 40-ml vials with teflon septa screw caps; no headspace	HCl to pH < 2; 4°± 2°C	14 Days
	VPH	MADEP-VPH-04-1.1	VPH/BTEX	3 x 40-ml vials with teflon septa screw caps; no headspace	HCl to pH < 2; 4°± 2°C	14 Days
	Total Metals	SW6010C/6020A	As, Mn	1 x 250-ml Polyethylene	HNO3 to pH < 2; 4°± 2°C	180 Days
	Dissolved Metals*	SW6010C/6020A	As, Mn	1 x 250-ml Polyethylene	HNO3 to pH < 2; 4°± 2°C	180 Days
AOC 69W (Fall)	EPH	MADEP-EPH-04-1.1	EPH	2 x 1-Liter Glass Amber with Teflon- lined lid	HCl to pH < 2; 4°± 2°C	7 Days (extraction) 40 Days (analyses)
	Dissolved Metals*	SW6010C/6020A	As, Fe, Mn	1 x 250-ml Polyethylene	HNO3 to pH < 2; 4°± 2°C	180 Days
AOC 43G (Fall)	VPH	MADEP-VPH-04-1.1	VPH/BTEX	3 x 40-ml vials with teflon septa screw caps; no headspace	HCl to pH < 2; 4°± 2°C	14 Days
	Total Metals	SW6010C/6020A	Fe, Mn	1 x 250-ml Polyethylene	HNO3 to pH < 2; 4°± 2°C	180 Days
	Alkalinity	SM2320B	None	1 x 250-ml Polyethylene	Store at 4°± 2°C	14 Days
DCL (GW) (Spring/Fall)	VPH	MADEP-VPH-04-1.1	VPH/BTEX	3 x 40-ml vials with teflon septa screw caps; no headspace	HCl to pH < 2; 4°± 2°C	14 Days
	EPH	MADEP-EPH-04-1.1	EPH	2 x 1-Liter Glass Amber with Teflon- lined lid	HCl to pH < 2; 4°± 2°C	7 Days (extraction) 40 Days (analyses)
	Pesticides	SW8081A	TAL	2 x 1-Liter Glass Amber with Teflon- lined lid	Store at 4°± 2°C	7 Days (extraction) 40 Days (analyses)
	Select Metals (Total)	SW6010C/6020A	Select Metals for DCL Groundwater: As, Ba, Cd, Cr, Cu, Fe, Pb, Mn, Se, Ag	1 x 250-ml Polyethylene	HNO3 to pH < 2; 4°± 2°C	180 Days
	Mercury	SW7470A	Hg			28 days
	Cyanide (Total)	SW9012B	Cyanide (Total)	1 x 250-ml Polyethylene	NAOH to pH > 12; 4°± 2°C	14 Days

Table 1-1
Analytical Methods, Containers, Holding Times, and Preservatives
Main Post, Former Fort Devens Army Installation, Massachusetts

Site/Events	Parameter	Analytical Method[1]	Contaminant of Concern	Sample Container[2]	Preservative	Holding Time
DCL (GW) (Spring/Fall) Cont.	TDS	SM2540C-11	None	1 x 500-ml Polyethylene	Store at 4°± 2°C	7 days
	Anions	SW9056A	Chloride, Sulfate	1 x 125-ml Polyethylene	Store at 4°± 2°C	28 days
	Alkalinity	SM2320B	None	1 x 250-ml Polyethylene	Store at 4°± 2°C	14 Days
	COD	410.4	None	1 x 250-ml Polyethylene	H2SO4 to pH < 2; 4°± 2°C	28 Days
	Nitrate/Nitrite as N	E353.2	Nitrate/Nitrite as N	1 x 500-ml Polyethylene	H2SO4 to pH < 2; 4°± 2°C	28 Days
DCL (Leachate) (Fall)	Select Metals (Total)	SW6010C/6020A	Select Metals for DCL Leachate: Al, As, Cd, Cr, Cu, Pb, Ni, Ag, Zn	1 x 250-ml Polyethylene	HNO3 to pH < 2; 4°± 2°C	180 Days
	Mercury	SW7470A	Hg	1 x 250-ml Polyethylene	HNO3 to pH < 2; 4°± 2°C	28 days
	Cyanide (Total)	SW9012B	Cyanide (Total)	1 x 250-ml Polyethylene	NAOH to pH > 12; 4°± 2°C	14 Days
	TSS/pH	SM2540D/SW9040C		1 x 1-liter Polyethylene	Store at 4°± 2°C	7 days
	TPH as DRO	SW8015B	DRO	2 x 1-Liter Glass Amber with Teflon- lined lid	Store at 4°± 2°C	7 Days (extraction) 40 Days (analyses)
	Total Phenolics	SW9065	Total Phenols	1 x 250-ml amber	H2SO4 to pH < 2; 4°± 2°C	28 days
	TTO (VOCs)	624.00	VOCs	3 x 40-ml vials with teflon septa screw caps; no headspace	HCl to pH < 2; 4°± 2°C	14 Days
	TTO (SVOCs)	625.00	SVOCs	2 x 1-liter amber	Store at 4°± 2°C	7 Days (extraction) 40 Days (analyses)
	TTO (Pesticides/PCBs)	SW8081B/8082A	Pesticides/PCBs	2 x 1-liter amber	Store at 4°± 2°C	7 Days (extraction) 40 Days (analyses)

Notes:
* Samples submitted for dissolved metals are field filtered.
1 "Methods for Chemical Analysis of Water and Wastes", Cincinnati, OH, March 1979, EPA 600-4-7
"Test Methods for Evaluating Solid Waste, Physical and Chemical Methods", U.S. EPA SW-846, Update 8, 2014.
2 Additional sample containers/volumes are required for matrix quality control samples.

DCL = Devens Consolidation Landfill
GW = Groundwater

Table 1-2
Monitoring Wells, Well Points, Piezometers, and Staff Gauges Selected for Winter 2020 Supplemental Sampling Event.
Main Post, Former Fort Devens Army Installation, Massachusetts

Monitoring Well/ Piezometer	Location	Rationale	Bottom of Screen Interval	Top of Screen Interval	Well Screen Intervals	Top of Casing Elevation	Ground Surface Elevation	Sample Pump Intake Depth
			(ft NAVD88)	(ft NAVD88)	(ft bgs)	(ft NAVD88)	(ft NAVD88)	(ft bgs)
AOC 57 - Area 2 (Winter 2020 Supplemental Sampling Event)								
5702MW-20-01A	AOC5702 MW installed near 57M-03-05X	AOC5702 MW installed near 57M-03-05X	179.59	189.59	30 - 40	222.23	219.59	35.00
5702MW-20-01B	AOC5702 MW installed near 57M-03-05X	AOC5702 MW installed near 57M-03-05X	139.70	149.70	70 - 80	222.27	219.70	75.00
5702MW-20-02A	AOC5702 MW installed near 5702VP-18-01	AOC5702 MW installed near 5702VP-18-01	201.65	211.65	30 - 40	244.32	241.65	35.00
5702MW-20-03A	Area 2 - Cross-gradient shallow well	Monitor well to support PFAS investigation	198.78	208.78	26 - 36	237.70	234.78	31.00
5702MW-20-04A	AOC5702 MW installed near 57M-95-06X	AOC5702 MW installed near 57M-95-06X	152.69	162.69	70 - 80	235.62	232.69	75.00
5702MW-20-05A	Area 2 - At western margin of area of investigation	New well forming pair with 5702MW-19-05B for PFAS investigation. Address EPA concern re: metals concentrations, redox conditions at depth and vertical gradients.	183.25	193.25	30 - 40	226.09	223.25	35.00
5702MW-20-05B	Area 2 - At western margin of area of investigation	New well forming pair with 5702MW-19-05A for PFAS investigation. Address EPA concern re: metals concentrations, redox conditions at depth and vertical gradients	143.29	153.29	70 - 80	226.07	223.29	75.00
5702MW-20-06A	AOC5702 MW installed near 57M-03-01X	AOC5702 MW installed near 57M-03-01X	154.10	164.10	70 - 80	236.52	234.10	75.00
5702MW-20-07A	AOC5702 MW installed near 57M-03-03X	AOC5702 MW installed near 57M-03-03X	179.42	189.42	30 - 40	221.71	219.42	35.00
57M-03-01X	Area 2 - Upgradient location.	LTM water level only.	214.45	224.45	10 - 20	235.73	234.45	--
57M-03-02X	Area 2 - On west fringe of remedial excavation.	LTM water level only.	212.50	222.50	2 - 12	224.84	224.5	--
57M-03-03X	Area 2 - On southern fringe of remedial excavation and at wetland limit.	LTM water level only.	206.99	216.99	2 - 12	220.00	218.99	--
57M-03-04X	Area 2 – On southern fringe of remedial excavation and at wetland limit.	LTM water level only.	207.46	217.46	2 - 12	221.39	219.46	--
57M-03-05X	Area 2 - On southeastern fringe of remedial excavation and at wetland limit.	LTM water level only.	207.58	217.58	2 - 12	221.88	219.58	--
57M-03-06X	Area 2 – On east fringe of remedial excavation.	LTM water level only.	208.26	218.26	2 - 12	221.87	220.26	--
57M-95-05X	Area 2 - West of and upgradient of excavation limit.	LTM water level only.	212.99	222.99	10 - 20	235.15	232.99	--
57M-95-06X	Area 2 – West of and cross gradient of excavation limit.	LTM water level only.	210.77	220.77	11.87-21.87	234.39	232.64	--
57M-95-07X	Area 2 – East of and cross gradient of excavation limit.	LTM water level only.	208.50	218.50	3 - 13	222.36	221.50	--
57WP-05-01	Area 2 – Southwest of Staff Gauge 01.	LTM water level only.	--	--	0 - 2	--	--	--
57WP-06-02	Area 2 - Adjacent to monitoring well 57M-03-03X.	LTM water level only.	195.25	200.25	18.92 - 23.92	220.29	219.17	22.50
SG-01	Area 2 - Staff gauge	Water level only.	--	--	--	220.72	--	--
SG-02	Area -2 Staff gauge	Water level only.	--	--	--	220.65	--	--
AOC 57 - Area 3 (Winter 2020 Supplemental Sampling Event)								
5703MW-20-01A	AOC5703 MW installed near 57M-96-10X	AOC5703 MW installed near 57M-96-10X	213.25	223.25	2 - 12	228.18	225.25	7.00
5703MW-20-01B	AOC5703 MW installed near 57M-96-10X	AOC5703 MW installed near 57M-96-10X	165.10	175.10	50 - 60	228.10	225.1	55.00
5703MW-20-02A	Area 3 - Central area of original hydrocarbon release	Monitor well to support PFAS investigation. Address EPA concern re: extent of metals concentrations.	213.46	223.46	10 - 20	235.75	233.46	15.00
5703MW-20-03A	Area 3 – At western margin of area of investigation.	New well forming pair with 57M-96-11X to address EPA concern re: metals concentrations, redox conditions at depth and vertical gradients.	162.95	172.95	50 - 60	225.80	222.95	55.00
5703MW-20-04A	Area 3 - Deep Well downgradient of source	New well forming pair with 57M-95-03X to address EPA concern re: metals concentrations and redox conditions at depth.	159.21	169.21	60 - 70	231.74	229.21	65.00
5703PZ-19-01	Area 3 – Downgradient piezometer	New piezometer forming pair with 57M-96-11X installed for the PFAS investigation for hydraulic gradient assessment. Address EPA concern re: metals concentrations, redox conditions at depth and vertical gradients.	152.66	157.66	62.5 - 67.5	222.93	220.16	65.00

Table 1-2
Monitoring Wells, Well Points, Piezometers, and Staff Gauges Selected for Winter 2020 Supplemental Sampling Event.
Main Post, Former Fort Devens Army Installation, Massachusetts

Monitoring Well/ Piezometer	Location	Rationale	Bottom of Screen Interval	Top of Screen Interval	Well Screen Intervals	Top of Casing Elevation	Ground Surface Elevation	Sample Pump Intake Depth
			(ft NAVD88)	(ft NAVD88)	(ft bgs)	(ft NAVD88)	(ft NAVD88)	(ft bgs)
57M-95-03X	Area 3 - Downgradient of source.	Source area well. Monitor for decrease in COC concentration and decrease in the potential for off-site migration.	213.80	223.80	9.49 - 19.49	232.79	230.80	15.30
57M-96-10X	Area 3 – On west fringe of 1999 excavation area.	LTM water level only.	213.29	223.29	5.46 - 15.46	228.75	226.29	--
57M-96-11X	Area 3 – Downgradient well.	Monitor for decrease in COC concentration and decrease in the potential for off-site migration.	208.05	218.05	2 - 12	222.20	220.05	9.20
57M-96-12X	Area 3 – West of and cross gradient of excavation limit.	Monitor COC concentrations	210.78	220.78	2 - 12	225.80	222.78	--
57M-96-13X	Area 3 - West of and cross gradient of excavation limit.	LTM water level only.	211.23	221.23	4.67 - 14.67	225.58	223.23	--
57P-98-03X	Area 3 – Southeast of monitoring well 57M-96-11X.	Monitor downgradient COC concentrations	213.12	216.12	2.5 - 5.5	220.39	218.62	--
57P-98-04X	Area 3 - Southwest of monitoring well 57M-96-11X.	Monitor downgradient COC concentrations	213.24	216.24	2 - 5	221.75	218.24	--
57WP-06-03	Area 3 – Adjacent to monitoring well 57M-96-11X.	LTM water level only.	200.46	205.46	13.85 - 18.85	220.51	219.31	--
AOC 74								
74PZ-19-01	AOC 74, Barnum Road Firefighting Exercise Site	Water level only.	215.51	225.51	16-26	244.37	241.51	--
74PZ-19-02	AOC 74, Barnum Road Firefighting Exercise Site	Water level only.	216.67	226.67	18 - 28	244.41	244.67	--
74PZ-19-03	AOC 74, Barnum Road Firefighting Exercise Site	Water level only.	210.64	220.64	26 - 36	246.48	246.64	--
74PZ-19-04	AOC 74, Barnum Road Firefighting Exercise Site	Water level only.	206.70	216.70	6 - 16	246.48	222.70	--
74PZ-20-02	AOC 74, Barnum Road Firefighting Exercise Site	Water level only.	207.58	217.58	20.5 - 30.5	240.92	238.08	--
AOC 43G (Winter 2020 Supplemental Sampling Event)								
43GPZ-19-01	AOC 43G	Installed for the PFAS RI at AOC 43G	261.31	271.31	9.83 - 19.83	280.67	281.14	--
43GPZ-19-02	AOC 43G	Installed for the PFAS RI at AOC 43G	261.06	271.06	19.33 - 29.33	290.09	290.39	--
43GPZ-19-03	AOC 43G	Installed for the PFAS RI at AOC 43G	283.22	293.22	15 - 25	307.99	308.22	--
43GPZ-19-04	AOC 43G	Installed for the PFAS RI at AOC 43G	242.20	252.20	2 - 12	256.75	254.20	--
43GPZ-19-05	AOC 43G	Installed for the PFAS RI at AOC 43G	239.09	249.09	6 - 16	254.82	255.09	--
43GPZ-19-06	AOC 43G	Installed for the PFAS RI at AOC 43G	235.05	245.05	10 - 20	254.86	255.05	--
43GPZ-19-07	AOC 43G	Installed for the PFAS RI at AOC 43G	233.73	243.73	3 - 13	246.59	246.73	--
43GPZ-19-08	AOC 43G	Installed for the PFAS RI at AOC 43G	234.85	244.85	13 - 23	257.69	257.85	--
AAFES-2	East-southeast of former gasoline USTs.	Source well. Monitor intrinsic remediation.	266.17	281.17	18.30 - 33.30	301.72	299.47	25.80
AAFES-5	East of former gasoline USTs.	LTM water level only.	269.79	284.79	15.22 - 30.22	299.80	300.01	--
AAFES-6R	South of well XGM-93-02X.	LTM water level only.	269.80	279.80	16.97 - 26.97	298.74	296.77	--
AAFES-7	Approx. 620 feet southeast of former gasoline USTs.	Monitor potential for manganese off-site migration.	272.80	249.40	6.70 -16.70	258.80	256.10	11.70
XGM-20-01A	Downgradient Sentinel Well	Sentinel Well to address EPA concern re: extent of Mn along NE GW flow path.	237.41	247.41	10.5 - 20.5	257.50	257.91	15.50
XGM-20-02A	Downgradient Monitoring Well	Monitoring well to address EPA concern re: extent of Mn > cleanup level along NE GW flow path.	242.36	252.36	13 - 23	265.10	265.36	18.00
XGM-20-03A	Downgradient Monitoring Well	Monitoring well to address EPA concern re: extent of Mn > cleanup level along E GW flow path.	238.88	248.88	20 - 30	268.69	268.88	25.00
XGM-94-04X	Approx. 100 feet south of former gasoline USTs.	Sentry well. Monitor potential for off-site migration.	270.10	280.10	20.50 - 30.50	300.69	298.30	25.50
XGM-94-06X	Supplemental SI location from KGS	Supplemental SI location from KGS	254.40	264.40	17 - 27	284.07	281.40	22.00
XGM-94-07X	Approx. 180 feet east southeast of former gasoline USTs.	LTM water level only.	265.20	275.20	19.60 - 29.60	294.82	292.20	--
XGM-94-08X	Approx. 230 feet southeast of former gasoline USTs.	LTM water level only.	262.90	272.90	26.10 - 36.10	298.98	296.40	--
XGM-94-10X	Approx. 250 feet south of former gasoline USTs.	LTM water level only.	268.10	278.10	23.80 - 33.80	301.96	299.60	--
XGM-97-12X	At location of former gasoline USTs.	Source well. Monitor intrinsic remediation.	275.26	285.26	24.00 - 34.00	308.70	309.26	29.00

Notes:
bgs = below ground surface
ft = feet

Table 1-3
AOC - Specific Action Levels
Main Post, Former Fort Devens Army Installation, Massachusetts

Chemical of Concern	MCP GW-1[1] (µg/L)	Background[2] (µg/L)	MCL [3] (µg/L)	Cleanup Goal[4] (µg/L)	Monitoring Criteria[4] (µg/L)
AOC 57 Area 3 - Building 3713 Fuel Oil Spill Site					
Arsenic	10	10.5	10	10	NS
AOC 43G - Historical Gas Station Motor Pool Fueling Station Site					
Iron	NS	9,100	NS	9,100	NS
Manganese	NS	291	NS	375[5]	NS
VOCs					
Benzene	5.0	ND	5.0	5.0	NS
Toluene	1,000	ND	1,000	1,000	NS
Ethylbenzene	700	ND	700	700	NS
Xylenes (total)	10,000	ND	10,000	10,000	NS
VPH [5]					
C5-C8 Aliphatic Hydrocarbons	300	NS	NS	NS	300
C9-C12 Aliphatic Hydrocarbons	700	NS	NS	NS	700
C9-C10 Aromatic Hydrocarbons	200	NS	NS	NS	200

Notes:
NS = No standard.
MCL = Maximum Contaminant Level.
[1]MassDEP MCL GW-1 Standards: 310.CMR 40.0000, 2014.
[2]Background concentrations determined from selected locations in each AOC.
[3]Drinking Water Standards and Health Advisories", Spring 2012, USEPA Office of Water.
[4]Clean up goals were established by respecitve AOC RODs; Monitoirng Criteria are used if the ROD did not include cleanup goals for listed analytes.
[5] The cleanup goal for manganese is a site-specific goal determined in 2008 (Long-Term Monitoring Plan Former Fort Devens Army Installation, HGL, 2008).

Table 1-4
Groundwater Elevations, Winter 2020 Supplemental Sampling
Main Post, Former Fort Devens Army Installation, Massachusetts

Site Name	Location Identification	Date of Gauging	DTW (ft BTOR)	Elevation (ft NAVD 88)	
				Measuring Point	Groundwater
Supplemental Sampling Event - 3/12/2020 Synoptic Gauging Event					
AOC 57, Area 2	SG-01	3/12/2020	2.63	220.72	218.09
	SG-02	3/12/2020	2.58	220.65	218.07
	57M-03-01X	3/12/2020	14.37	235.73	221.36
	57M-03-02X	3/12/2020	5.05	224.84	219.79
	57M-03-03X	3/12/2020	0.88	220.00	219.12
	57M-03-04X	3/12/2020	2.29	221.39	219.10
	57M-03-05X	3/12/2020	2.62	221.88	219.26
	57M-03-06X	3/12/2020	2.76	221.87	219.11
	57M-95-03X	3/12/2020	10.74	232.79	222.05
	57M-95-05X	3/12/2020	14.77	235.15	220.38
	57M-95-06X	3/12/2020	12.77	234.39	221.62
	57M-95-07X	3/12/2020	2.62	222.36	219.74
	57WP-06-02	3/12/2020	1.13	220.29	219.16
	5702MW-20-01A	3/12/2020	2.82	222.23	219.41
	5702MW-20-01B	3/12/2020	1.82	222.27	220.45
	5702MW-20-02A	3/12/2020	22.70	244.32	221.62
	5702MW-20-03A	3/12/2020	16.96	237.70	220.74
	5702MW-20-04A	3/12/2020	14.41	235.62	221.21
	5702MW-20-05A	3/12/2020	6.22	226.09	219.87
	5702MW-20-05B	3/12/2020	4.87	226.07	221.20
	5702MW-20-06A	3/12/2020	15.21	236.52	221.31
	5702MW-20-07A	3/12/2020	2.48	221.71	219.23
AOC 57, Area 3	57M-95-03X	3/12/2020	10.74	232.79	222.05
	57M-96-11X	3/12/2020	2.68	222.20	219.52
	57M-96-12X	3/12/2020	4.80	225.80	221.00
	57M-96-13X	3/12/2020	4.55	225.58	221.03
	57P-98-03X	3/12/2020	2.28	220.39	218.11
	57P-98-04X	3/12/2020	3.58	221.75	218.17
	57WP-06-03	3/12/2020	0.76	220.51	219.75
	5703MW-20-01A	3/12/2020	7.33	228.18	220.85
	5703MW-20-01B	3/12/2020	7.62	228.10	220.48
	5703MW-20-02A	3/12/2020	13.44	235.75	222.31
	5703MW-20-03A	3/12/2020	5.08	225.80	220.72
	5703MW-20-04A	3/12/2020	10.65	231.74	221.09
	5703PZ-19-01	3/12/2020	3.08	222.93	219.85

Table 1-4
Groundwater Elevations, Winter 2020 Supplemental Sampling
Main Post, Former Fort Devens Army Installation, Massachusetts

Site Name	Location Identification	Date of Gauging	DTW (ft BTOR)	Elevation (ft NAVD 88)	
				Measuring Point	Groundwater
AOC 74	74PZ-19-01	3/12/2020	4.81	244.37	222.85
	74PZ-19-02	3/12/2020	21.52	244.41	225.18
	74PZ-19-03	3/12/2020	19.23	246.48	224.86
	74PZ-19-04	3/13/2020	4.81	225.13	220.32
	74PZ-20-02	3/12/2020	16.71	240.92	224.21
Supplemental Sampling Event - 2/20/2020 Synoptic Gauging Event					
AOC 43G	XGM-94-04X	2/20/2020	19.21	300.69	281.48
	XGM-94-06X	2/20/2020	20.30	284.07	263.77
	XGM-94-07X	2/20/2020	19.55	294.82	275.27
	XGM-94-08X	2/20/2020	25.79	298.98	273.19
	XGM-94-10X	2/20/2020	24.60	301.96	277.36
	XGM-97-12X	2/20/2020	24.66	308.70	284.04
	XGM-20-01A	2/20/2020	7.23	257.50	250.27
	XGM-20-02A	2/20/2020	12.11	265.10	252.99
	XGM-20-03A	2/20/2020	14.67	268.69	254.02
	AAFES-2	2/20/2020	22.60	301.72	279.12
	AAFES-5	2/20/2020	21.97	299.80	277.83
	AAFES-6R	2/20/2020	19.78	298.74	278.96
	AAFES-7	2/20/2020	7.82	258.80	250.98
	43GPZ-19-01	2/20/2020	18.74	280.67	261.93
	43GPZ-19-02	2/20/2020	27.91	290.09	262.18
	43GPZ-19-03	2/20/2020	22.55	307.99	285.44
	43GPZ-19-04	2/20/2020	7.18	256.75	249.57
	43GPZ-19-05	2/20/2020	7.42	254.82	247.40
	43GPZ-19-06	2/20/2020	9.09	254.86	245.77
	43GPZ-19-07	2/20/2020	1.25	246.59	245.34
	43GPZ-19-08	2/20/2020	11.26	257.69	246.43

Notes:
DTW = Depth to Water
ft BTOR = feet below top of riser
ft = Feet
AOC = Area of Concern

Table 2-1
Vertical Groundwater Gradients for AOC 57 Area 2 and Area 3, Winter 2020 Supplemental Sampling
Main Post, Former Fort Devens Army Installation, Massachusetts

Monitoring Well/ Piezometer/ Surface Water ID	Location	Screen Interval	Measuring Point Elevation	Bottom of Screen Interval	Top of Screen Interval	Mid-Point of Screen	Difference Between Mid-Screen	Groudwater Elevation	Difference GW Elevation	Downward Gradient	Upward Gradient
		(ft bgs)	(ft NAVD88)	(ft NAVD88)	(ft NAVD88)	(ft NAVD88)	(ft)	(ft NAVD88)	(ft)	(unitless)	(unitless)
AOC 57 - Area 2											
AOC 57 - Area 2 - Well Triplet 1											
57M-03-05X	Shallow Well at Eastern Margin	2-12	221.88	207.58	217.58	212.58		219.26			
5702MW-20-01A	Mid-Depth Well	30-40	222.23	179.59	189.59	184.59		219.41			
5702MW-20-01B	Deep Well	70-80	222.27	139.69	149.69	144.69		220.45			
	57M-03-05X Shallow						67.89		1.19	--	-0.0175
	5702MW-20-01B Deep										
	57M-03-05X Shallow						27.99		0.15	--	-0.0054
	5702MW-20-01A Mid-Depth										
	5702MW-20-01A Mid-Depth						39.90		1.04	--	-0.0261
	5702MW-20-01B Deep										
AOC 57 - Area 2 - Well Pair 1											
57M-03-01X	Shallow Well at Northern Margin	10-20	235.73	214.45	224.45	219.45	60.35	221.36	0.05	+0.0008	--
5702MW-20-06A	Deep Well	70-80	236.52	154.10	164.10	159.10		221.31			
AOC 57 - Area 2 - Well Pair 2											
57M-95-06X	Shallow Well at Northeastern Margin	11.87-21.87	234.39	210.77	220.77	215.77	58.08	221.62	0.41	+0.0071	--
5702MW-20-04A	Deep Well	70-80	235.62	152.69	162.69	157.69		221.21			
AOC 57 - Area 2 - Well Pair 3											
5702MW-20-05A	Mid-Depth at Western Margin	30-40	226.09	183.25	193.25	188.25	39.96	219.87	1.33	--	-0.0333
5702MW-20-05B	Deep Well	70-80	226.07	143.29	153.29	148.29		221.20			
AOC 57 - Area 2 - Well Triplet 2											
57M-03-03X	Shallow Well at Southern Margin	2-12	220.00	206.99	216.99	211.99		219.12			
57WP-06-02	Mid-Depth Well	18.92-23.92	220.29	195.25	200.25	197.75		219.16			
5702MW-20-07A	Deep Well	30-40	221.71	179.42	189.42	184.42		219.23			
	57M-03-03X Shallow						27.57		0.11	--	-0.0040
	5702MW-20-07A Deep										
	57M-03-03X Shallow						14.24		0.04	--	-0.0028
	57WP-06-02 Mid-Depth										
	57WP-06-02 Mid-Depth						13.33		0.07	--	-0.0053
	5702MW-20-07A Deep										

Table 2-1
Vertical Groundwater Gradients for AOC 57 Area 2 and Area 3, Winter 2020 Supplemental Sampling
Main Post, Former Fort Devens Army Installation, Massachusetts

Monitoring Well/ Piezometer/ Surface Water ID	Location	Screen Interval	Measuring Point Elevation	Bottom of Screen Interval	Top of Screen Interval	Mid-Point of Screen	Difference Between Mid-Screen	Groudwater Elevation	Difference GW Elevation	Downward Gradient	Upward Gradient
		(ft bgs)	(ft NAVD88)	(ft NAVD88)	(ft NAVD88)	(ft NAVD88)	(ft)	(ft NAVD88)	(ft)	(unitless)	(unitless)
AOC 57 - Area 3											
AOC 57 - Area 3 - Well Pair 1											
57M-96-12X	Shallow Well at Western Margin	2 - 12	225.80	210.78	220.78	215.78	47.83	221.00	0.28	+0.0059	--
5703MW-20-03A	Deep Well	50-60	225.80	162.95	175.80	167.95		220.72			
AOC 57 - Area 3 - Well Triplet 1											
57M-96-11X	Shallow Well at Southern Margin	2 - 12	222.20	208.05	218.05	213.05		219.52			
57WP-06-03	Mid-Depth Well	13.85-18.85	220.51	200.46	205.46	202.96		219.75			
5703PZ-19-01	Deep Well	62.5-67.5	222.93	152.66	157.66	155.16		219.85			
	57M-96-11X Shallow						57.89		0.33	--	-0.0057
	5703PZ-19-01 Deep										
	57M-96-11X Shallow						10.09		0.23	--	-0.0228
	57WP-06-03 Mid-Depth										
	57WP-06-03 Mid-Depth						47.80		0.10	--	-0.0021
	5703PZ-19-01 Deep										
AOC 57 - Area 3 - Well Pair 2											
5703MW-20-01A	Shallow Well at Eastern Margin	2-12	228.18	213.24	223.24	218.24	48.12	220.85	0.37	+0.0077	--
5703MW-20-01B	Deep Well	50-60	228.10	165.12	175.12	170.12		220.48			

Table 2-2
AOC 57 Area 2 Groundwater Analytical Results, Winter 2020 Supplemental Sampling
Main Post, Former Fort Devens Army Installation, Massachusetts

	Units	Cleanup Goal[1]	Background[2]	57M-03-01X		57M-03-02X		57M-03-03X		DUP01 57M-03-03X		57M-03-04X		57M-03-05X		57M-95-06X		57WP-06-02		5702MW-20-01A	
				1/28/2020	Q	2/5/2020	Q	1/28/2020	Q	1/28/2020	Q	1/27/2020	Q	2/5/2020	Q	2/5/2020	Q	2/6/2020	Q	2/7/2020	Q
Dissolved Metals																					
Arsenic, Dissolved	µg/L	10 (T)	10.5 (T)	3.0	U	**7.3**		3.0	U	3.0	U	**2.5**	**J**	**13**		3.0	U	**1.7**	**J**	**2.2**	**J**
Iron, Dissolved	µg/L	NS	9,100 (T)	50	U	**4,500**		50	U	50	U	50	U	**640**		50	U	50	U	50	U
Manganese, Dissolved	µg/L	NS	291 (T)	**6.3**	**J**	**290**		**96**		**91**		**73**		***590***		**3.3**	**J**	**190**		**38**	
Field Parameters																					
Temperature	°C	NS	NS	11.25		5.20		9.77		--		8.70		4.02		10.56		8.35		9.77	
pH	Std Units	NS	NS	6.44		5.73		6.32		--		6.36		6.26		6.06		6.08		6.77	
Specific Conductance	µS/cm	NS	NS	2.675		187		1.013		--		0.506		361		472		411		379	
ORP	mV	NS	50 [3]	231.4		56.1		235.6		--		188.8		67		146.2		-19.6		98.6	
Dissolved Oxygen	mg/L	NS	1 [3]	9.69		9.7		1.42		--		1.29		0.31		1.5		0.07		7.35	
Turbidity	NTU	NS	NS	1.84		2.5		2.03		--		1.87		3.5		2.77		10.7		3.3	

Notes:

0.333	= Detection
0.333	= Above background or monitoring criteria
0.333	= Above cleanup goal

µg/L = microgram per liter
mg/L = milligram per liter
NS = No Standard

Q = Qualifier
J = Estimated result
U = Non-detect
[1] Cleanup Goal for arsenic is the MCL standard.
[2] From the RI. (Final Remediation Investigation Report, Area of Contamination (AOC) 57, Devens, Massachusetts, HLA, 2000b)
[3] Literature-based values representing boundary between reducing versus oxidizing environments
(T) = Value for Total Metals
-- Not recorded for duplicate sample

Table 2-2
AOC 57 Area 2 Groundwater Analytical Results, Winter 2020 Supplemental Sampling
Main Post, Former Fort Devens Army Installation, Massachusetts

	Units	Cleanup Goal[1]	Background[2]	5702MW-20-01B		5702MW-20-02A		DUP-01 5702MW-20-02A		5702MW-20-03A		5702MW-20-04A		5702MW-20-05A		5702MW-20-05B		5702MW-20-06A		5702MW-20-07A	
				2/7/2020	Q	2/10/2020	Q	2/10/2020	Q	2/24/2020	Q	2/10/2020	Q	2/24/2020	Q	2/28/2020	Q	2/10/2020	Q	03/06/2020	Q
Dissolved Metals																					
Arsenic, Dissolved	µg/L	10 (T)	10.5 (T)	***17***		3.0	U	3.0	U	**1.8**	**J**	**1.6**	**J**	3.0	U	**7.0**		**1.9**	**J**	**1.8**	**J**
Iron, Dissolved	µg/L	NS	9,100 (T)	**48**	**J**	50	U	50	U	50	U	**530**		50	U	**37**	**J**	**86**		50	U
Manganese, Dissolved	µg/L	NS	291 (T)	**49**		**34**		**37**		***490***		***310***		***600***		**100**		***450***		**64**	
Field Parameters																					
Temperature	°C	NS	NS	6.29		9.43		--		9.92		11.48		11.31		11.08		10.14		9.06	
pH	Std Units	NS	NS	8.27		6.35		--		6.58		6.80		6.02		9.16		6.97		6.68	
Specific Conductance	µS/cm	NS	NS	303		852		--		0.485		238		1.642		0.239		498		640	
ORP	mV	NS	50 [3]	-185		177.6		--		55.5		107.3		191.9		-98.4		162.4		-0.9	
Dissolved Oxygen	mg/L	NS	1 [3]	0.46		10.29		--		5.02		2.82		6.62		0.1		4.88		1.72	
Turbidity	NTU	NS	NS	4.21		0.80		--		10.42		4.51		3.1		864		1.5		3.3	

Notes:

0.333	= Detection
0.333	= Above background or monitoring criteri
0.333	= Above cleanup goal

µg/L = microgram per liter
mg/L = milligram per liter
NS = No Standard

Q = Qualifier
J = Estimated result
U = Non-detect
[1] Cleanup Goal for arsenic is the MCL standard.
[2] From the RI. (Final Remediation Investigation Report, Area of Contamination (AOC) 57, Devens, Massachusetts, HLA, 2000b)
[3] Literature-based values representing boundary between reducing versus oxidizing environments
(T) = Value for Total Metals
-- Not recorded for duplicate sample

Table 2-3
AOC 57 Area 3 Groundwater Analytical Results, Winter 2020 Supplemental Sampling
Main Post, Former Fort Devens Army Installation, Massachusetts

	Units	Cleanup Goal[1]	Back-ground[2]	57M-95-03X		DUP01 57M-95-03X		57M-96-11X		57M-96-12X		57P-98-03X		57P-98-04X		5703MW-20-01A		5703MW-20-01B		5703MW-20-02A		5703MW-20-03A		5703MW-20-04A		5703PZ-19-01	
				2/11/2020	Q	2/11/2020	Q	2/13/2020	Q	2/13/2020	Q	2/13/2020	Q	2/13/2020	Q	2/11/2020	Q	2/18/2020	Q	2/13/2020	Q	2/11/2020	Q	2/11/2020	Q	2/18/2020	Q
Dissolved Metals																											
Arsenic, Dissolved	µg/L	10 (T)	10.5 (T)	**30**		**29**		**67**		3.0	U	**3.3**		3.0	U	3.0	U	***11***		**2.2**	**J**	3.0	U	**7.6**		**64**	
Iron, Dissolved	µg/L	NS	9,100 (T)	**3,900**		**3,800**		***31,000***		**41**	**J**	**1,400**		**270**		**450**		**83**		**740**		**91**		**2,300**		**28**	**J**
Manganese, Dissolved	µg/L	NS	291 (T)	**120**		**120**		***3,300***		**85.0**		***11,000***		***370***		**110**		***1,200***		***920***		**130**		**270**		**160**	
Field Parameters																											
Temperature	°C	NS	NS	6.53		--		6.13		5.35		5.88		4.00		5.95		8.72		7.98		9.95		8.49		9.12	
pH	Std Units	NS	NS	6.68		--		6.12		5.13		5.50		5.43		5.40		7.12		6.47		6.69		6.71		8.11	
Specific Conductance	µS/cm	NS	NS	712		--		1,062		0.59		0.766		928		426		0.169		3.363		0.248		447		0.182	
ORP	mV	NS	50 [3]	-72.2		--		0.2		210		136.9		187.2		110.7		5.5		95.1		208.7		-97.7		-68.1	
Dissolved Oxygen	mg/L	NS	1 [3]	1.27		--		1.12		0.21		8.7		2.6		1.21		0.58		0.78		0.12		0.46		0.45	
Turbidity	NTU	NS	NS	3.84		--		4.1		2.24		3.4		3.92		3.2		over range		2.63		2,263		10.9		27.8	

Notes:

0.333	= Detection
0.333	= Above background or monitoring criteria
0.333	= Above cleanup goal

µg/L = microgram per liter
mg/L = milligram per liter
NS = No Standard

Q = Qualifier
J = Estimated result
U = Non-detect
[1] Cleanup Goal for arsenic is the MCL standard.
[2] From the RI. (Final Remediation Investigation Report, Area of Contamination (AOC) 57, Devens, Massachusetts, HLA, 2000b)
[3] Literature-based values representing boundary between reducing versus oxidizing environments
(T) = Value for Total Metals

Table 2-4
AOC 57 Vertical Profile Groundwater Analytical Results for Select Metals, April 2020 Supplemental Sampling
Main Post, Former Fort Devens Army Installation, Massachusetts

							Dissolved Metals			Field Parameters					
						Analyte	Arsenic	Iron	Manganese	Dissolved Oxygen	ORP	pH	Specific Conductivity	Temperature	Turbidity
	Sample	Elevation (ft NAVD88)				Units	µg/L	µg/L	µg/L	mg/L	mv	pH Units	µS/cm	°C	NTU
	Interval	Ground	Sample	Sample		Cleanup Goal[1]	10 (T)	NS	NS	NS	NS	NS	NS	NS	NS
Location ID	(ft bgs)	Surface	Interval	Type	Sample Field ID	Background Level[2]	10.5 (T)	9,100 (T)	291 (T)	NS	NS	NS	NS	NS	NS
Area of Concern 57, Area 2															
5702VP-20-01	5 - 9	220.44	211.44 - 215.44	Grab	5702VP-20-01-5-9	04/22/2020	**2.1 J**	**910**	***400***	3.46	61.5	7.60	623	9.09	18.1
				Dup	A1-VP-DUP-1-42220	04/22/2020	**2.0 J**	**900**	***400***	3.46	61.5	7.60	623	9.09	18.1
	10 - 14	220.44	206.44 - 210.44	Grab	5702VP-20-01-10-14	04/23/2020	3.0 U	**110**	**240 J**	3.18	42.6	7.40	603	9.31	9.70
	15 - 19	220.44	201.44 - 205.44	Grab	5702VP-20-01-15-19	04/23/2020	**3.4 J**	**2,200 J**	***680***	4.91	41.6	7.39	629	10.5	37.1
				Dup	A1-VP-DUP-1-42320	04/23/2020	**1.8 J**	**1,400 J**	***550***	4.91	41.6	7.39	629	10.5	37.1
	20 - 24	220.44	196.44 - 200.44	Grab	5702VP-20-01-20-24	04/23/2020	3.0 U	**600**	***300***	5.21	46.2	6.81	574	11.4	720
	25 - 29	220.44	191.44 - 195.44	Grab	5702VP-20-01-25-29	04/23/2020	3.0 U	**360**	**180**	4.01	47.9	6.67	547	11.3	703
	30 - 34	220.44	186.44 - 190.44	Grab	5702VP-20-01-30-34	04/23/2020	**1.6 J**	**140**	**81**	4.90	59.3	6.62	401	12.4	4,000 J(OR)
	35 - 39	220.44	181.44 - 185.44	Grab	5702VP-20-01-35-39	04/23/2020	**1.9 J**	**830**	***540***	4.92	61.7	6.59	398	12.5	17.6
	40 - 44	220.44	176.44 - 180.44	Grab	5702VP-20-01-40-44	04/24/2020	***13***	**110**	**130**	5.01	70.3	6.69	283	9.87	980
	50 - 54	220.44	166.44 - 170.44	Grab	5702VP-20-01-50-54	04/24/2020	**5.1**	**320**	***530***	3.29	61.1	6.73	271	9.99	4,000 J(OR)
5702VP-20-02	5 - 9	220.71	211.71 - 215.71	Grab	5702VP-20-02-5-9	04/21/2020	**3.3**	**1,400**	***320***	3.76	-74.3	6.66	600	10.2	11.2
				Dup	A1-VP-DUP-1-42120	04/21/2020	**4.2**	**1,500**	***360***	3.76	-74.3	6.66	600	10.2	11.2
	10 - 14	220.71	206.71 - 210.71	Grab	5702VP-20-02-10-14	04/21/2020	3.0 U	**260**	**290**	3.17	-21.6	6.69	503	10.3	108
	15 - 19	220.71	201.71 - 205.71	Grab	5702VP-20-02-15-19	04/21/2020	3.0 U	**700**	***340***	2.30	-17.1	6.47	429	10.2	1900
	20 - 24	220.71	196.71 - 200.71	Grab	5702VP-20-02-20-24	04/21/2020	3.0 U	**650**	**290**	2.80	-0.900	6.40	531	10.0	1300
	25 - 29	220.71	191.71 - 195.71	Grab	5702VP-20-02-25-29	04/22/2020	3.0 U	**320**	**210**	2.30	2.60	6.59	560	9.87	2730
	30 - 34	220.71	186.71 - 190.71	Grab	5702VP-20-02-30-34	04/22/2020	**4.4**	**190**	**170**	6.19	38.7	6.69	407	10.5	1300
	35 - 39	220.71	181.71 - 185.71	Grab	5702VP-20-02-35-39	04/22/2020	**8.0**	**760**	**120**	3.93	29.6	6.78	327	10.3	3350
	40 - 44	220.71	176.71 - 180.71	Grab	5702VP-20-02-40-44	04/22/2020	**2.9 J**	**780**	**190**	4.95	14.7	6.90	307	9.89	4,000 J(OR)
	50 - 54	220.71	166.71 - 170.71	Grab	5702VP-20-02-50-54	04/22/2020	3.0 U	**2,300**	**170**	4.30	11.1	6.77	281	10.0	3260
5702VP-20-03	5 - 9	220.15	213.15 - 215.15	Grab	5702VP-20-03-5-7	04/17/2020	3.0 U	**200**	**49**	6.84	81.1	7.16	778	9.59	3250
	10 - 14	220.15	206.15 - 210.15	Grab	5702VP-20-03-10-14	04/17/2020	3.0 U	**210**	**97**	8.77	42.8	6.76	804	9.97	2050
	15 - 19	220.15	201.15 - 205.15	Grab	5702VP-20-03-15-19	04/17/2020	3.0 U	**550**	**160**	4.97	33.5	6.84	9.37	11.3	497
				Dup	A1-VP-DUP-1-41720	04/17/2020	3.0 U	**670**	**190**	4.97	33.5	6.84	9.37	11.3	497
	20 - 24	220.15	196.15 - 200.15	Grab	5702VP-20-03-20-24	04/17/2020	**1.5 J**	**180**	**73**	(EF)	(EF)	(EF)	(EF)	(EF)	4,000 J(OR)
	25 - 29	220.15	191.15 - 195.15	Grab	5702VP-20-03-25-29	04/20/2020	**5.0 J**	**1,700 J**	***820 J***	2.57	6.30	7.80	268	11.7	36.2
				Dup	A1-VP-DUP-1-42020	04/20/2020	3.0 U	**340 J**	**190 J**	2.57	6.30	7.80	268	11.7	36.2
	30 - 34	220.15	186.15 - 190.15	Grab	5702VP-20-03-30-34	04/20/2020	**4.3**	**5,600**	***510***	2.99	29.7	7.30	386	11.5	432
	35 - 39	220.15	181.15 - 185.15	Grab	5702VP-20-03-35-39	04/20/2020	**5.9**	**4,100**	**190**	3.27	46.1	7.12	399	11.4	4,000 J(OR)
	40 - 44	220.15	176.15 - 180.15	Grab	5702VP-20-03-40-44	04/20/2020	3.0 U	**3,700**	**150**	3.09	50.7	7.06	421	11.7	80.3
	45 - 49	220.15	171.15 - 175.15	Grab	5702VP-20-03-45-49	04/20/2020	3.0 U	**1,200**	**170**	3.03	18.7	6.77	244	11.8	4,000 J(OR)
	50 - 54	220.15	166.15 - 170.15	Grab	5702VP-20-03-50-54	04/20/2020	**3.3**	**440**	**180**	2.97	29.9	6.69	307	11.6	731

Table 2-4
AOC 57 Vertical Profile Groundwater Analytical Results for Select Metals, April 2020 Supplemental Sampling
Main Post, Former Fort Devens Army Installation, Massachusetts

							Dissolved Metals			Field Parameters					
						Analyte	Arsenic	Iron	Manganese	Dissolved Oxygen	ORP	pH	Specific Conductivity	Temperature	Turbidity
		Elevation (ft NAVD88)				Units	µg/L	µg/L	µg/L	mg/L	mv	pH Units	µS/cm	°C	NTU
	Sample Interval	Ground	Sample	Sample		Cleanup Goal[1]	10 (T)	NS	NS	NS	NS	NS	NS	NS	NS
Location ID	(ft bgs)	Surface	Interval	Type	Sample Field ID	Background Level[2]	10.5 (T)	9,100 (T)	291 (T)	NS	NS	NS	NS	NS	NS
5702VP-20-04	10 - 12	219.62	207.62 - 209.62	Grab	5702VP-20-04-10-12	04/16/2020	3.0 U	**190**	**170**	5.79	102	6.63	450	9.63	988
	15 - 17	219.62	202.62 - 204.62	Grab	5702VP-20-04-15-17	04/16/2020	**8.4 J**	**450 J**	**77**	6.44	48.0	7.10	261	10.4	60.7
				Dup	A1-VP-DUP-1-41620	04/16/2020	**5.2 J**	**97 J**	**74**	6.44	48.0	7.10	261	10.4	60.7
	20 - 22	219.62	197.62 - 199.62	Grab	5702VP-20-04-20-22	04/16/2020	**5.3**	**1,400**	**50**	5.80	37.6	7.02	229	10.5	68.7
	25 - 27	219.62	192.62 - 194.62	Grab	5702VP-20-04-25-27	04/16/2020	**8.1**	**4,700**	***710***	4.98	21.7	6.93	361	10.6	2590
	30 - 32	219.62	187.62 - 189.62	Grab	5702VP-20-04-30-32	04/16/2020	**2.8 J**	**250**	***300***	5.99	64.7	6.87	421	10.5	4,000 J(OR)
	35 - 37	219.62	182.62 - 184.62	Grab	5702VP-20-04-35-37	04/16/2020	**2.2 J**	**180**	**110**	4.20	87.6	6.73	518	10.2	4,000 J(OR)
Area of Concern 57, Area 3															
5703VP-20-01	5 - 7	218.74	211.74 - 213.74	Grab	5703VP-20-01-5-7	04/07/2020	3.0 U	**1,700**	***3,100***	6.74	113	6.23	734	11.1	6.23
	10 - 12	218.74	206.74 - 208.74	Grab	5703VP-20-01-10-12	04/07/2020	3.0 U	**790**	***3,500***	(EF)	(EF)	(EF)	(EF)	(EF)	1120
				Dup	A1-VP-DUP-1-4720	04/07/2020	3.0 U	**600**	***3,500***	(EF)	(EF)	(EF)	(EF)	(EF)	1120
	15 - 17	218.74	201.74 - 203.74	Grab	5703VP-20-01-15-17	04/07/2020	3.0 U	**260**	**34**	(EF)	(EF)	(EF)	(EF)	(EF)	769
	20 - 22	218.74	196.74 - 198.74	Grab	5703VP-20-01-20-22	04/07/2020	3.0 U	**130**	**63**	(EF)	(EF)	(EF)	(EF)	(EF)	2900
	25 - 27	218.74	191.74 - 193.74	Grab	5703VP-20-01-25-27	04/07/2020	**1.8 J**	**75**	3.0 U	(EF)	(EF)	(EF)	(EF)	(EF)	4,000 J(OR)
	30 - 32	218.74	186.74 - 188.74	Grab	5703VP-20-01-30-32	04/08/2020	**1.9 J**	**190**	**19**	(EF)	(EF)	(EF)	(EF)	(EF)	1290
5703VP-20-02	5 - 7	218.4	211.40 - 213.40	Grab	5703VP-20-02-5-7	04/08/2020	3.0 U	**1,000**	**28**	(EF)	(EF)	(EF)	(EF)	(EF)	38.9
	10 - 12	218.4	206.40 - 208.40	Grab	5703VP-20-02-10-12	04/08/2020	3.0 U	**460**	**41**	3.17	58.9	8.03	447	9.55	1970
	15 - 17	218.4	201.40 - 203.40	Grab	5703VP-20-02-15-17	04/08/2020	3.0 U	**130**	**41**	3.05	78.7	5.99	211	10.4	4,000 J(OR)
	20 - 22	218.4	196.40 - 198.40	Grab	5703VP-20-02-20-22	04/08/2020	3.0 U	**480**	**25**	3.68	69.2	6.37	210	10.6	66.0
	25 - 27	218.4	191.40 - 193.40	Grab	5703VP-20-02-25-27	04/09/2020	3.0 U	**150**	**37**	2.66	55.1	6.39	193	10.3	2470
	30 - 32	218.4	186.40 - 188.40	Grab	5703VP-20-02-30-32	04/09/2020	**3.5**	**37 J**	**19**	2.50	48.9	6.40	185	10.4	4,000 J(OR)
5703VP-20-03	5 - 7	218.33	211.33 - 213.33	Grab	5703VP-20-03-5-7	04/09/2020	**2.4 J**	**1,100**	**41**	(EF)	(EF)	(EF)	(EF)	(EF)	845
	10 - 12	218.33	206.33 - 208.33	Grab	5703VP-20-03-10-12	04/09/2020	3.0 U	**160**	**15**	5.05	62.0	6.64	268	9.18	2120
	15 - 17	218.33	201.33 - 203.33	Grab	5703VP-20-03-15-17	04/09/2020	3.0 U	50 U	**31**	3.97	69.7	6.73	318	9.24	1930
	20 - 22	218.33	196.33 - 198.33	Grab	5703VP-20-03-20-22	04/10/2020	3.0 U	**200**	**52**	4.02	117	6.11	163	11.3	2710
				Dup	A1-VP-DUP-41020	04/10/2020	3.0 U	**200**	**45**	4.02	117	6.11	163	11.3	2710
	25 - 27	218.33	191.33 - 193.33	Grab	5703VP-20-03-25-27	04/10/2020	3.0 U	**61**	**33**	2.68	66.7	6.53	172	10.9	4,000 J(OR)
	30 - 32	218.33	186.33 - 188.33	Grab	5703VP-20-03-30-32	04/10/2020	**3.9**	**250**	**50**	2.27	89.7	6.41	168	10.8	4,000 J(OR)
5703VP-20-04	5 - 7	218.42	211.42 - 213.42	Grab	5703VP-20-04-5-7	04/15/2020	3.0 U	**160**	**8.8 J**	8.47	92.3	6.72	73.0	9.26	109
	10 - 12	218.42	206.42 - 208.42	Grab	5703VP-20-04-10-12	04/15/2020	3.0 U	**89**	**9.7 J**	7.99	68.7	6.89	107	9.40	4,000 J(OR)
	15 - 17	218.42	201.42 - 203.42	Grab	5703VP-20-04-15-17	04/15/2020	3.0 U	**370**	**26**	6.20	107	6.97	156	9.87	2430
	20 - 22	218.42	196.42 - 198.42	Grab	5703VP-20-04-20-22	04/15/2020	3.0 U	**52**	**19**	5.16	70.9	6.66	131	11.7	2930

Notes:

0.333	= Detection
0.333	= Above background or monitoring criteria
0.333	= Above cleanup goal

NS = No Standard

[1] Cleanup Goal for arsenic is the MCL standard.

[2] From the RI. (Final Remediation Investigation Report, Area of Contamination (AOC) 57, Devens, Massachusetts, HLA, 2000)

ORP = Oxidation Reduction Potential
ft bgs = feet below ground surface
ft NAVD = North American Vertical Datum (1988), in feet
(T) = Cleanup Goal or Background Level for Total Metals
µg/L = microgram per liter

mg/L = milligram per liter
mv = millivolts
pH Units = pH Standard Units
µS/cm = microSeimens per centimeter
°C = degrees Celsius
NTU = Nephalometric Turbidity Units

Results Qualifiers and Notes:
J = Estimated result
U = Non-detect
(OR) = Turbidity Over Range (4,000 NTU)
(EF) - Equipment failure

Table 2-5
AOC 57 Area 3 Arsenic Exceedences in Groundwater 2003-2020
Main Post, Former Fort Devens Army Installation, Massachusetts

Sample Location	Fall 2003	Spring 2004	Fall 2004	Spring 2005	Fall 2005	Spring 2006	Fall 2006	Spring 2007	Fall 2007	Spring 2008	Spring 2009	Spring 2010	Spring 2011	Spring 2012	Spring 2013	Spring 2014	Spring 2015	Spring 2016	Spring 2017	Spring 2018	Spring 2019	Winter 2020
Groundwater																						
Arsenic (Total) - 10 µg/L Cleanup Goal																						
57M-95-03X	**36**	**44**	**230**	**25**	**14**	**7.0**	**49**	**4.8**	**51**	**23**	**21**	**23**	**58**	**36**	**60**	**60**	**38**	**31**	**27**	**42**	**15**	NA
57M-96-11X	**270**	**240**	**120**	**161**	**215**	**163**	**171**	**166**	**193**	**160**	**163**	**148**	**190**	**192**	**181**	**160**	**284**	**290**	**180**	**180**	**100**	NA
Arsenic (Dissolved) - 10 µg/L Cleanup Goal for Arsenic (Total)																						
57M-95-03X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**30**
57M-96-11X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**67**

Notes:

0.333	= Detection
0.333	= Above background or monitoring criteria
0.333	= Above cleanup goal

J = Estimated result
NA = Not analyzed
ND = non-detect
µg/L = microgram per liter

Table 3-1
AOC 43G Groundwater Analytical Results - Winter 2020 Supplemental Sampling
Main Post, Former Fort Devens Army Installation, Massachusetts

	Units	Cleanup Goal[1]	43GPZ-19-03		XGM-20-01A		Dup-01 XGM-20-01A		XGM-20-02A		XGM-20-03A	
			2/24/2020	Q	2/21/2020	Q	2/21/2020	Q	2/21/2020	Q	2/21/2020	Q
Dissolved Metals (Select List)												
Iron, Dissolved	µg/L	9,100	50	U	50	U	50	U	**22**	**J**	**210**	
Manganese, Dissolved	µg/L	375	**1.5**	**J**	**64**		**70**		**360**		***400***	**J**
Field Parameters												
Temperature	°Celsius	NS	11.87		7.55		--		9.61		10.05	
pH	Std units	NS	6.77		6.69		--		6.83		6.40	
Specific Conductance	µS/cm	NS	1.881		1.79		--		1.832		1.796	
ORP	mV	NS	223		210.8		--		190.3		170.5	
Dissolved Oxygen	mg/L	NS	6.58		8.67		--		6.09		4.76	
Turbidity	NTU	NS	2.41		3.36		--		6.03		5.27	

Notes:

0.333	= Detection
0.333	= Above cleanup goal

µg/L = microgram per liter
mg/L = milligram per liter
NS = No Standard
Q = Qualifier

J = Estimated result
U = Non-detect

[1]The cleanup goal for iron is the background level. The cleanup goal for manganese is a site-specific goal determined in 2008 (Long-Term Monitoring Plan Former Fort Devens Army Installation, HGL, 2008).

ATTACHMENT A
GROUNDWATER FIELD FORMS

AREA OF CONTAMINATION 57

SYNOPTIC FIELD SHEETS

116A

KGS

Groundwater Water Level Measurement Sheet

Project/Site Name: Fort Devens - AOC 57 Area 2 **Date :** 3/12/20

Field Team Member: [illegible] **Weather:** clear

Water Level Meter Model: Solinst Lap 2 (100')

T = tubing

Area	Well ID	Time	DTW (ft bTOR)	DTB (ft bTOR)	Lock Y/N	Bolts Y/N	Cap Y/N	Well Condition	Notes
5702	5702MW-19-01A	935	23.55	29.50	N/A	Y	Y	Flush 2"	T
	5702MW-19-01B	932	23.76	49.46	N/A	Y	Y	Flush 2"	T
	5702MW-20-02A	731	21.70	43.49	Y	N/A	Y	Stickup 2"	T
	5702MW-20-03A	853	16.96	39.21	N	N/A	Y	Stickup 2"	
	57M-95-05X	848	14.77	22.65	N	N/A	Y	Stickup 4"	
	5702MW-20-05A	845	6.22	43.03	Y	N/A	Y	Stickup 2"	
	5702MW-20-05B	918	4.88	82.11	Y	N/A	Y	Stickup 2" (Pur Cut down)	locks now
	57M-95-07X	831	2.62	14.02	N	N/A	Y	Stickup 4"	
	57WP-05-01	—	unable	to locate		—	—	—	Might be destroyed don't spend too much time looking
	57M-03-03X	807	0.88	11.54	N	N/A	Y	Stickup 2"	T
	57WP-06-02	809	1.13	24.31	N	N/A	Y	Stickup 1.5	Steel
	5702MW-20-07A	802	2.48	41.78	Y	N/A	Y	Stickup 2"	
	57M-03-04X	805	2.29	12.62	N	N/A	N	Stickup 2"	
	57M-03-05X	758	2.62	12.16	N	N/A	N	Stickup 2"	
	5702MW-20-01A	752	2.82	34.86	Y	N/A	Y	Stickup 2"	
	5702MW-20-01B	754	1.82	75.31	Y	N/A	Y	Stickup 2"	
	57M-03-02X	923	5.05	13.77	N	N/A	Y	Stickup 2"	
	57M-03-06X	750	2.76	14.26	N	N/A	N	Stickup 2"	
	57M-03-01X	742	14.37	21.02	N	N/A	Y	Stickup 2"	
	5702MW-20-06A	746	15.21	77.19	Y	N/A	Y	Stickup 2"	T
	5702MW-20-04A	736	14.41	80.61	Y	N/A	Y	Stickup 2"	
	SG01	813	0.70	—	—	—	—	Staff gauge	—
	SG02	814	0.75	—	—	—	—	Staff gauge	—
	SG03	823	0.40	☆ Mud/not standing water				—	—
	57M-95-06X	739	12.77	24.54	N	N/A	Y	Stickup 4"	

25

BA

KGS

Groundwater Water Level Measurement Sheet

Project/Site Name: Fort Devens - AOC 57 Area 3 **Date :** 3/12/2010

Field Team Member: BrA **Weather:** Overcast, 40°F

Water Level Meter Model: Heron Dipper-T

Area	Well ID	Time	DTW (ft bTOR)	DTB (ft bTOR)	Lock Y/N	Bolts Y/N	Cap Y/N	Well Condition	Notes
5703	5703MW-20-02A	0851	13.44	20.52	Y	-	Y	Good.	
	57M-95-03X	0854	10.74	19.56	Y	-	Y	Good.	
	5703MW-20-04A	0856	10.65	64.10	Y	-	Y	Good. Soft bottom!	
	5703MW-20-01A	0859	7.33	14.82	Y	-	Y	Good.	
	5703MW-20-01B	0901	7.62	56.30	Y	-	Y	Good SOFT BOTTOM!	
	5703PZ-19-01	0906	3.08	66.92	Y	-	Y	Good.	
	57M-96-11X	0909	2.68	14.60	Y	-	Y	Good.	
	57P-98-03X	0904	2.88	7.05	-	-	Y	Good - pvc slv.	
	57P-98-04X	0912	3.58	6.97	-	-	N	Good pvc slv	
	57WP-06-03	0915	0.76	19.28	-	-	Y	Good. steel slv, green cap	
	5703MW-20-03A	0923	5.08	55.54	Y	-	Y	Good. SOFT BOTTOM!	
	57M-96-12X	0920	4.80	15.14	N	-	Y	Good.	
	57M-96-13X	0926	4.55	15.10	N	-	Y	Good.	
AOC 74	74PZ-19-01	0845	21.52	28.69	N	-	Y	Good.	shown on AOC 74 Figure

14

MS

KGS

Groundwater Water Level Measurement Sheet

Project/Site Name: Fort Devens - Grove Pond and AOC 74 **Date :** 3/12/2020

Field Team Member: Michael Stanley **Weather:** 35 - Clear

Water Level Meter Model: Solinst 101 200'

Area	Well ID	Time	DTW (ft bTOR)	DTB (ft bTOR)	Lock Y/N	Bolts Y/N	Cap Y/N	Well Condition	Notes
	GF-4 - Labeled EX-2	0842	12.44	84.48	N - 48 no locks	—	Y	good 2" PVC lock 48 broken	Pipe Wrench?
MS	~~GF-1~~ Pushed / Slot 0744	~~0744~~	~~9.50~~	~~32.00~~	—	—	Y	~~broken~~	Pipe Wrench?
	GF-2	0836	8.54	121.31	N	—	Y	good 2" PVC	"Survey M/H"
	GF-3A	0825	5.07	105.07	N	—	Y	Sealed	2" PVC MW w/ Survey M/H
	GF-3B	0820	4.51	11.78	N	—	Y	Sealed	2" PVC MW no Survey M/H
	92-1	0804	8.57	46.78	—	—	Y	well 1" by pipe DTB/DTW measured from 4" 5.08	
	92-2	0737	well cap	hit / [illegible]	[illegible]	by	equipment		
location on map wrong	92-3 - [illegible]	0830	4.87	46.92	—	—	Y	good 2" PVC	Located North of GF-3A
	92-4	0850	39.74	67.78	—	—	Y	2" SA PVC good	
OVE POND	CSMS-11-02	1240	36.65	42.30	N	—	Y	good	unable to cut lock AL ONLY
	MNG-3R	no 1230	38.94	68.56	N	—	Y	good	[illegible] AL ONLY
	CSMS-11-01	1050	37.34	41.84	N	—	Y	good	lock cut off
	GPMW-19-01A	~~[illegible]~~ 1035	DTB 57.56	DTW 37.58	N	—	Y	Sand no Survey M/H	Silt Sand from [illegible]
	GPPZ-19-01	1044	37.64	113.05	N	—	Y	good 1" pvc	
	GPMW-19-01BR	1037	37.65	157.95	N	—	Y	good no Survey M/H	
	MNG-2R	1300	19.10	26.94	N	—	Y	good no Survey M/H	AL ONLY
	MNG-5R	1253	16.79	22.44	N	—	Y	good No Survey M/H	cannot cut lock American lock [illegible]
	MNG-6R	1001	35.67	42.34	N donut lock	—	Y	good	Dave Stanley ok to cut existing lock
74	74PZ-19-07	1333	37.67	39.48	—	Y	Y	good	
	74PZ-19-06	1215	26.77	41.34	—	Y	Y	good	
	74PZ-19-03	1315	21.62	35.57	—	Y	Y	Sealed	
	GF-1 2" PVC	0815	9.13	122.80	N	—	Y	good	

MS

Motor Pool Area
Dave Stanley 508-958-5515
ok to cut locks

21

BA

Groundwater Water Level Measurement Sheet

Project/Site Name: Fort Devens - AOC 74 **Date :** 3/12/2020

Field Team Member: BA **Weather:** Overcast, 40°F

Water Level Meter Model: Heron Dipper T

Area	Well ID	Time	DTW (ft bTOR)	DTB (ft bTOR)	Lock Y/N	Bolts Y/N	Cap Y/N	Well Condition	Notes
74	74PZ-19-08	0955	28.81	34.82	—	Y	Y	Good.	
	74PZ-19-09	0730	18.02	27.82	—	Y	Y	Good	
	74PZ-20-01	0735	18.41	28.58	N	-	Y	Good	
	74PZ-20-03	0743	21.57	26.0	—	Y	Y	Good.	
	74PZ-20-05	0755	14.62	23.91	—	Y	Y	Good	
	74PZ-19-05	0750	19.21	29.32	—	Y	Y	Good.	
	74PZ-20-04	0816	19.57	26.65	—	Y	Y	Good	
	74PZ-20-02	0821	16.71	32.66	Y	—	Y	good.	
	74PZ-19-10	0801	7.04	41.50	N	-	Y	Good.	
	74MW-19-04A	0804	4.81	24.80	N	-	Y	Good	
	74PZ-19-04	0759	4.81	17.94	N	-	Y	Good.	
	74PZ-19-02	0830	19.23	27.92	—	Y	Y	Good.	
	74PZ-19-01	0845	21.52	28.69	N	-	Y	Good	

LOW FLOW FORM FIELD SHEETS

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

KGS

Well Identification: 57M-03-01X

Project: Former Cons Dev Water 2020 Sampling
Location: 57M-03-01X
Date: 1/28/20
Sampler: MS

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)		✓	

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	14.14
Depth to bottom (ft BTOR)	21.08
Pump Set Depth (ft BTOR)	~17ft
Screen Interval (ft BTOR)	10 - 20ft
Total volume purged (gal)	~3 gal

Sampling Type

Purging Method: Peristaltic
Purge start/stop time: 1045
Tubing type: HDPE
Tubing diameter: 1/4"
Dedicated pump (Y/N): N
Air source: [illegible]

Field Instrument (Model/S/N): YSI 650 MDS
11J100750

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm^c)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1045	300	14.15	10.35	6.49	2.954	10.25	240.2	1.29	Clear
1050	225	14.15	10.75	6.48	2.634	10.46	235.3	1.15	Clear
1055	200	14.15	11.00	6.47	2.565	9.91	233.9	1.78	Clear
1100	200	14.15	11.12	6.46	2.570	9.67	233.6	1.23	Clear
1105	200	14.15	11.14	6.46	2.596	9.64	232.9	1.41	Clear
1110	200	14.15	11.19	6.45	2.598	9.50	232.4	1.08	Clear
1115	200	14.15	11.15	6.45	2.628	9.42	231.7	1.00	Clear
1120	200	14.15	11.22	6.45	2.654	9.52	232.0	0.97	Clear
1125	200	14.15	11.25	6.44	2.675	9.69	231.4	1.84	Clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):									

Sampling Details

Sampling ID: 57M-03-01X_JAN20
Sample Time: 1125
Duplicate (Y/N): N
MS/MSD (Y/N): N
Field Filtered (Y/N): Y
Dup ID: N/A
Filter Size: 0.45um
Dup Time: N/A

Comments

[signature]
Signature

1/28/20
Date

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

KGS

Well Identification: 57M-03-02X

Project: Dewees AFB Supplemental Sampling Date: 2/5/2020
Location: Dewees AFB, MA / 80C57 Sampler: C. Miller

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)		✓	

Well Information

Diameter	2
Material	Sch 40 PVC
Depth to water (ft BTOR)	4.97
Depth to bottom (ft BTOR)	13.66
Pump Set Depth (ft BTOR)	8.50
Screen Interval (ft BTOR)	2-12
Total volume purged (gal)	6.0

Sampling Type
Purging Method PP Tubing type HDPE Dedicated pump (Y/N) N
Purge start/stop time 1258/1318 Tubing diameter 3/16 x 0.17" x 0.25" Air source —
Field Instrument (Model/S/N) 481650 12B100185 / Lamotte 1828-0412

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm^c)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1318	250	5.17	5.59	5.68	151	0.19	72.5	13.4	clear
1323	250	5.27	5.58	5.70	157	0.15	70.3	7.83	clear
1328	250	5.27	5.40	5.69	161	0.13	67.8	7.16	clear
1333	250	5.27	5.30	5.68	170	0.12	65.9	7.58	clear
1338	250	5.27	5.34	5.69	172	0.10	64.7	5.61	clear
1343	250	5.27	5.24	5.68	186	0.7	63.2	5.11	clear
1348	250	5.27	5.18	5.72	186	0.7	57.7	3.91	clear
1353	250	5.27	5.20	5.72	186	0.7	57.0	3.00	clear
1358	250	5.27	5.20	5.73	187	0.7	56.1	2.50	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume =
Post Cal. Check Varience Observed (Y/N):				N	N	N	N	N	0.163 gal/ft or 616 ml/ft

Sampling Details

Sampling ID: 57M-03-02X-JAN20
Sample Time: 1358 Duplicate (Y/N) N MS/MSD (Y/N) N
Field Filtered (Y/N) Y Dup ID: —
Filter Size: 0.45 Dup Time: —

Comments

[signature] 2/5/2020
Signature **Date**

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: 57M-03-03X

Project: Former Fort Devens Winter 2020 Sampling
Date: 1/28/20
Location: 57M-03-03X
Sampler: MS

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)		✓	

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	0.80
Depth to bottom (ft BTOR)	11.63
Pump Set Depth (ft BTOR)	~8ft
Screen Interval (ft BTOR)	2-12
Total volume purged (gal)	~1.5

Sampling Type

Purging Method: Peristaltic
Tubing type: HDPE
Dedicated pump (Y/N): N
Purge start/stop time: 0810 / 0900
Tubing diameter: 1/4"
Air source: N/A
Field Instrument (Model/S/N): YSI 650 MDS 11J100750

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
0810	200	0.84	9.11	6.39	1.168	2.68	248.8	4.94	Clear w/ debris
0815	200	0.82	9.28	6.26	1.130	2.10	248.5	3.44	Clear w/ debris
0820	200	0.82	9.39	6.25	1.098	1.42	247.7	2.49	Clear
0825	200	0.82	9.46	6.27	1.067	1.09	246.5	2.03	Clear
0830	200	0.82	9.48	6.28	1.057	1.11	246.1	2.03	Clear
0835	200	0.82	9.55	6.29	1.044	1.23	245.4	1.82	Clear
0840	200	0.82	9.65	6.30	1.030	1.28	244.3	1.75	Clear
0845	200	0.82	9.67	6.31	1.023	1.33	243.4	1.75	Clear
0850	200	0.82	9.70	6.32	1.019	1.49	241.9	1.56	Clear
0855	200	0.82	9.77	6.32	1.013	1.42	235.6	2.03	Clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	Y	N	N	Y	

Sampling Details

Sampling ID: 57M-03-03X_JAN20
Sample Time: 0855
Duplicate (Y/N): Y
MS/MSD (Y/N): N
Field Filtered (Y/N): Y
Dup ID: 57M-DUP01_JAN20
Filter Size: 0.45um
Dup Time: 0900

Comments Teflon lined tubing removed before purging

Signature

1/28/20
Date

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: 57M-03-04X

Project: Former Fort Devens Area 1 sampling
Location: 57M-03-04X
Date: 1/27/20
Sampler: MS

Well Integrity

	Yes	No	N/A
Casing Secure		✓	
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present		✓	
Bolts present			✓
Locked (stickup wells)		✓	

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	2.16
Depth to bottom (ft BTOR)	12.66
Pump Set Depth (ft BTOR)	~9 ft
Screen Interval (ft BTOR)	2 - 12 ft
Total volume purged (gal)	6 gal

Sampling Type

Purging Method: Peristaltic
Purge start/stop time: 1330 / 1440
Tubing type: 1/4" HDPE
Tubing diameter: 1/4"
Dedicated pump (Y/N): N
Air source: N/A
Field Instrument (Model/S/N): YSI 650 MDS / 11J100750

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm^c)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1330	200	2.34	8.01	6.19	0.517	2.69	224.5	7.62	clear w/ odors
1335	200	2.26	8.71	6.27	0.506	1.66	224.6	6.87	clear w/ odors
1340	200	2.26	8.61	6.23	0.507	1.70	223.0	5.20	clear
1345	200	2.26	8.51	6.22	0.507	1.53	219.5	3.46	clear
1350	200	2.26	8.57	6.22	0.509	1.44	215.0	4.72	clear
1355	200	2.26	8.44	6.24	0.507	1.47	212.2	2.47	clear
1400	200	2.26	8.33	6.26	0.508	1.41	210.7	2.71	clear
1405	200	2.26	8.52	6.33	0.507	1.36	194.6	2.47	clear
1415	200	2.26	8.55	6.33	0.506	1.36	194.3	2.17	clear
1430	200	2.26	8.85	6.38	0.508	1.30	187.4	1.89	clear
1435	200	2.26	8.79	6.38	0.507	1.30	186.6	2.16	clear
1440	200	2.26	8.70	6.36	0.506	1.29	188.8	1.87	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	N	N	N		

Sampling Details

Sampling ID: 57M-03-04X_JAN20
Sample Time: 1440
Duplicate (Y/N): N
MS/MSD (Y/N): N
Field Filtered (Y/N): Y
Dup ID: N/A
Filter Size: 0.45 µm
Dup Time: N/A

Comments

Signature

1/27/20
Date

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: STM-03-05X

Project: Devens MTBE Supplemental Sampling Date: 2/5/2020

Location: CON Devens MED. GW BIOCS 7 Sampler: K. Mellen

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact	✓		
Well gripper present	~~✓~~ NA	✓	
Bolts present			✓
Locked (stickup wells)		✓	

Well Information

Diameter	2
Material	Sch 40 PVC
Depth to water (ft BTOR)	2.51
Depth to bottom (ft BTOR)	13.42
Pump Set Depth (ft BTOR)	7.50
Screen Interval (ft BTOR)	2-12
Total volume purged (gal)	6.0

Sampling Type

Purging Method: PP Tubing type: HDPE Dedicated pump (Y/N): —

Purge start/stop time: 1117/1217 Tubing diameter: ~~3/16"~~ 0.17"x0.25" Air source: —

Field Instrument (Model/S/N): YSI 650 11B100185 / Lamotte 1828-0412

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1137	250	2.61	4.21	6.35	380	0.52	83.6	7.03	clear
1142	250	2.61	4.20	6.36	377	0.50	77.4	6.42	clear
1147	250	2.61	3.96	6.34	373	0.47	72.5	5.54	clear
1152	250	2.61	3.91	6.32	368	0.38	69.9	4.62	clear
1157	250	2.61	3.90	6.30	367	0.36	67.9	4.34	clear
1202	250	2.61	3.80	6.29	365	0.29	65.6	3.42	clear
1207	250	2.61	4.02	6.28	361	0.30	63.3	3.54	clear
1212	250	2.61	4.05	6.27	361	0.31	62.8	3.63	clear
1217	250	2.61	4.02	6.26	361	0.31	62.0	3.50	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	N	N	N	N	

Sampling Details

Sampling ID: STM-03-05X_SA020

Sample Time: 1217 Duplicate (Y/N): MS/MSD (Y/N): —

Field Filtered (Y/N): Dup ID: —

Filter Size: 0.45 Dup Time: —

Comments

Signature: [signature] Date: 2/5/2020

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

KGS

Well Identification: 57M-95-03X_FEB20

Project: Devens Supplemental Sampling
Location: AOC57
Date: 2/11/2020
Sampler: C. Miller

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	4"
Material	PVC Sch 40
Depth to water (ft BTOR)	10.57
Depth to bottom (ft BTOR)	14.66
Pump Set Depth (ft BTOR)	13.5
Screen Interval (ft BTOR)	7-17
Total volume purged (gal)	7.7

Sampling Type

Purging Method: PP
Tubing type: HDPE
Dedicated pump (Y/N): N
Purge start/stop time: 0935/1057
Tubing diameter: 0.17" x 0.25"
Air source: —

Field Instrument (Model/S/N): YSI 650 115100750 / Lamotte 1828-0412

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm^c)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1017	250	10.58	7.18	6.60	957	1.28	-94.4	8.52	Clear
1022	250	10.78	6.65	6.65	636	1.11	-91.2	4.60	Clear
1027	250	10.78	6.52	6.63	594	1.24	-80.0	6.53	Clear
1032	250	10.78	6.60	6.64	678	1.07	-79.6	5.64	Clear
1037	250	10.78	6.54	6.65	704	1.09	-79.6	3.42	Clear
1042	250	10.78	6.54	6.66	711	1.20	-72.0	3.80	Clear
1047	250	10.78	6.51	6.66	718	1.28	-73.9	3.78	Clear
1052	250	10.78	6.53	6.68	712	1.27	-72.2	3.84	Clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	N	N	N	N	

Sampling Details

Sampling ID: 57M-95-03X_FEB20
Sample Time: 1052
Duplicate (Y/N): Yes
MS/MSD (Y/N): No
Field Filtered (Y/N): Yes
Dup ID: 57M-DUP01_FEB20
Filter Size: 0.45
Dup Time: 1057

Comments

[signature]
Signature

2/11/2020
Date

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: 57M-95-06X

Project: Former Fort Devens Water 2020 Sampling
Location: 57M-95-06X
Date: 1/28/20
Sampler: MS

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)		✓	

Well Information

Diameter	4"
Material	PVC
Depth to water (ft BTOR)	12.55
Depth to bottom (ft BTOR)	24.61
Pump Set Depth (ft BTOR)	~18
Screen Interval (ft BTOR)	21 11.57-21.87
Total volume purged (gal)	~4 gal

Sampling Type

Purging Method: Peristaltic
Purge start/stop time: 1245
Tubing type: HDPE
Tubing diameter: 1/4"
Dedicated pump (Y/N): N
Air source: N/A

Field Instrument (Model/S/N): YSI 650 MDS
11J100750

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1245	200	12.60	9.57	6.40	0.888	4.53	200.8	2.00	clear w/ debris
1250	200	12.59	10.43	6.20	0.626	3.82	204.1	2.19	Clear
1255	200	12.59	10.44	6.13	0.589	3.41	206.8	1.99	Clear
1300	200	12.59	10.54	6.06	0.557	3.30	212.3	1.41	Clear
1305	200	12.59	10.51	6.04	0.555	3.17	214.7	1.86	Clear
1310	200	12.59	10.46	6.02	0.553	3.12	218.5	1.13	Clear
1315	200	12.59	10.49	6.01	0.552	3.08	221.2	0.80	Clear
1320	200	12.59	10.86	5.99	0.560	3.04	223.1	0.95	clear
1325	200	12.59	10.89	5.98	0.564	3.04	225.2	1.06	Clear
1330	200	12.59	11.03	5.98	0.577	3.09	227.0	1.70	clear
1335	200	12.59	11.10	5.96	0.585	3.86	229.3	0.47	clear
1340	200	12.59	11.12	5.96	0.587	4.03	230.2	0.70	Clear
Acceptance Criteria:		**<0.3ft**	**±3%**	**±0.1**	**±3%**	**±10%**	**± 10mv**	**10%**	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):									

Sampling Details

Sampling ID: 57M-95-06X_JAN20
Sample Time: ~~1330~~ 1340
Duplicate (Y/N): N
MS/MSD (Y/N): Y
Field Filtered (Y/N): Y
Dup ID: N/A
Filter Size: 0.45 µm
Dup Time: N/A

Comments

Signature

1/28/20
Date

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

KGS

Well Identification: 57MW-95-06x

Project: Dover AFB Supplemental Sampling Date: 2/5/2020
Location: ~~Dover AFB, FLA~~ AOC 57 Sampler: C. Miller

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)		✓	

Well Information

Diameter	2
Material	SCH 40 PVC
Depth to water (ft BTOR)	12.21
Depth to bottom (ft BTOR)	23.51
Pump Set Depth (ft BTOR)	16.75
Screen Interval (ft BTOR)	11.87-21.87
Total volume purged (gal)	7.50

Sampling Type

Purging Method: DP Tubing type: HDPE Dedicated pump (Y/N): N
Purge start/stop time: 0915/ Tubing diameter: 3/16" ~ 0.17" x 0.25" Air source: —

Field Instrument (Model/S/N): 611650 118100185 / Landfill 1828-0412

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm^c)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
0955	250	12.71	10.48	6.40	462	1.59	154.7	2.35	Clear
1000	250	12.71	10.45	6.35	462	1.63	153.2	2.42	Clear
1005	250	12.71	10.50	6.27	463	1.59	151.6	2.72	Clear
1010	250	12.71	10.60	6.20	464	1.52	149.7	2.58	Clear
1015	250	12.71	10.56	6.17	466	1.60	148.9	2.22	Clear
1020	250	12.71	10.54	6.12	468	1.50	147.0	2.56	Clear
1025	250	12.71	10.57	6.09	470	1.49	146.7	2.99	Clear
1030	250	12.71	10.56	6.06	472	1.50	146.2	2.77	Clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	N	N	N	N	

Sampling Details

Sampling ID: 57M-95-06x-JAN20
Sample Time: 1030 Duplicate (Y/N): N MS/MSD (Y/N): N
Field Filtered (Y/N): Y Dup ID:
Filter Size: 0.45 Dup Time:

Comments Sampled for 6010F, Field Filtered

[signature] 2/5/2020
Signature Date

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

KGS

Well Identification: 57M-96-11X

Project: Devens Supplemented Sampling
Location: AVE 57
Date: 7/13/2020
Sampler: C Miller

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	2.88
Depth to bottom (ft BTOR)	14.60
Pump Set Depth (ft BTOR)	7.50
Screen Interval (ft BTOR)	2-12
Total volume purged (gal)	6.0

Sampling Type
Purging Method: PP
Purge start/stop time: 0912/1012
Tubing type: HDPE
Tubing diameter: 0.17×0.25"
Dedicated pump (Y/N): NO
Air source: —

Field Instrument (Model/S/N): 41650 115100750 / Lalhotte 1028-0412

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm^c)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
0932	250	4.42	5.85	6.02	1113	2.77	17.1	61.2	lightly cloudy
0942	250	4.45	5.99	6.08	1097	7.91	15.7	66.1	lightly cloudy
0947	250	4.45	6.19	6.07	1090	2.29	9.3	4.24	clear
0952	250	4.45	6.24	6.09	1081	1.73	5.8	4.71	clear
0957	250	4.45	6.08	6.10	1076	1.37	3.9	4.10	clear
1002	250	4.45	6.11	6.11	1067	1.16	0.3	3.98	clear
1007	250	4.45	6.18	6.13	1066	1.18	0.3	4.21	clear
1012	250	4.45	6.13	6.12	1062	1.12	0.2	4.09	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	N	N	N	N	

Sampling Details

Sampling ID: 57M-95-11X-FEB20
Sample Time: 1012
Duplicate (Y/N): NO
MS/MSD (Y/N): Yes
Field Filtered (Y/N): Yes
Dup ID: —
Filter Size: 0.45
Dup Time: —

Comments light Rain

[signature]
Signature

7/13/2020
Date

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: 57M-96-12X

Project: ~~LTM - Fall 2019~~ Sudbury A7 Date: 2/13/2020

Location: Fort Devens, Massachusetts Sampler: Michael Spaulding

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)		✓	

Well Information

Diameter	2"
Material	pvc
Depth to water (ft BTOR)	4.39
Depth to bottom (ft BTOR)	15.19
Pump Set Depth (ft BTOR)	~8 ft
Screen Interval (ft BTOR)	2-12
Total volume purged (gal)	~4 gal

Sampling Type

Purging Method peristaltic Tubing type HDPE Dedicated pump (Y/N) N

Purge start/stop time 1400 Tubing diameter 1/4" Air source N/A

Field Instrument (Model/S/N) YSI 556 MPS 15F101567

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm^c)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1400	250	5.00	5.55	5.57	0.536	2.20	175.2	14.5	clear w/ solids
1405	200	4.90	5.26	5.47	0.537	1.14	160.2	12.4	clear w/ solids
1410	150	4.79	5.29	5.34	0.537	0.75	186.6	10.34	clear
1415	150	4.89	5.21	5.39	0.543	0.55	184.4	9.18	clear
1420	150	4.90	5.20	5.26	0.550	0.52	185.7	7.70	clear
1425	150	4.94	5.43	5.22	0.565	0.58	192.4	5.12	clear
1430	150	4.98	5.33	5.20	0.573	0.33	203.5	3.72	clear
1435	150	4.98	5.44	5.12	0.583	0.26	206.7	2.94	clear
1440	150	4.98	5.47	5.12	0.588	0.24	209.0	2.98	clear
1445	150	4.98	5.35	5.15	0.592	[illegible]	[illegible]	2.21	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):									

Sampling Details

Sampling ID: 57M-96-12X_FEB20

Sample Time: 1445 Duplicate (Y/N): N MS/MSD (Y/N): Y

Field Filtered (Y/N): Y Dup ID: N/A

Filter Size: 0.45µm Dup Time: N/A

Comments

Signature

2-13-2020

Date

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: 57P-88-03X

Page 1 of 2

Project: ~~LTM - Fall 2019~~ Date: 2/13/20

Location: Fort Devens, Massachusetts Sampler: Michael Sprinkling

Well Integrity

	Yes	No	N/A
Casing Secure			✓
Concrete Pad intact			✓
PVC casing intact	✓		
Well gripper present		✓	
Bolts present			✓
Locked (stickup wells)			✓

no casing

Well Information

Diameter	1"
Material	PVC
Depth to water (ft BTOR)	2.38
Depth to bottom (ft BTOR)	7.06
Pump Set Depth (ft BTOR)	~5.0
Screen Interval (ft BTOR)	2.5-5.5
Total volume purged (gal)	~3.5 gal

Sampling Type

Purging Method: peristaltic Tubing type: HDPE Dedicated pump (Y/N): N

Purge start/stop time: 1140 - 1300 Tubing diameter: 1/4" Air source: NA

Field Instrument (Model/S/N): YSI 556 MPS 15F101567

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm^c)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1140	100	4.46	5.35	5.87	0.584	8.03	124.6	40.1	Cloudy tan
1145	100	4.41	5.44	5.77	0.604	5.36	132.2	28.5	Cloudy tan
1150	100	4.40	5.52	5.82	0.629	6.70	133.9	24.0	Cloudy tan
1155	125	4.55	5.56	5.81	0.646	7.21	136.0	16.9	Cloudy
1200	125	4.68	5.73	5.56	0.684	5.80	135.1	11.3	clear
1205	125	4.67	5.25	5.62	0.707	6.67	132.2	11.24	Clear
1210	125	4.68	5.87	5.54	0.720	7.77	[illegible]	8.20	Clear
1215	125	4.68	5.95	5.54	0.723	8.08	[illegible]	8.26	Clear
1220	125	4.68	5.80	5.54	0.732	8.33	134.9	5.85	Clear
1225	125	4.68	5.69	5.48	0.737	8.38	136.8	6.21	Clear
1230	125	4.68	5.75	5.49	0.741	8.50	136.5	6.35	Clear
1235	125	4.68	[illegible]	5.47	0.7[illegible]	8.36	137.2	4.54	Clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):									

Sampling Details

Sampling ID: 57P-88-03X_FEB20

Sample Time: 1300 Duplicate (Y/N): N MS/MSD (Y/N): NA

Field Filtered (Y/N): Y Dup ID: NA

Filter Size: 0.45um Dup Time: NA

Comments: no casing, Has endcap

Signature: [signature] Date: 2-13-2020

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: 57P-98-03X

Page 2 of 2

Project: ~~LTM - Fall 2019~~

Location: Fort Devens, Massachusetts

Date: 2/13/2020

Sampler: Michael Spaulding

Well Integrity

	Yes	No	N/A
Casing Secure			✓
Concrete Pad intact			✓
PVC casing intact	✓		
Well gripper present		✓	
Bolts present			✓
Locked (stickup wells)			✓

no casing

HGS

LAD

Well Information

Diameter	1"
Material	PVC
Depth to water (ft BTOR)	2.38
Depth to bottom (ft BTOR)	7.08
Pump Set Depth (ft BTOR)	~5ft
Screen Interval (ft BTOR)	2.5–5.5
Total volume purged (gal)	~3.5 gal

Sampling Type

Purging Method: Peristaltic

Tubing type: HDPE

Dedicated pump (Y/N): N

Purge start/stop time: 1140-1300

Tubing diameter: 1/4"

Air source: N/A

Field Instrument (Model/S/N): YSI 556 MPS ISF 101567

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm^c)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1240	125	4.68	5.81	5.49	0.752	8.54	137.0	4.47	clear
1245	125	4.68	5.83	5.47	0.753	8.57	136.3	5.02	clear
1250	125	4.68	5.87	5.50	0.757	8.58	136.4	4.74	clear
1255	125	4.68	5.86	5.50	0.763	8.55	137.3	4.74	clear
1300	125	4.68	5.88	5.50	0.766	8.70	138.9	3.43	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):									

Sampling Details

Sampling ID: 57P-98-03X_FEB20

Sample Time: 1300

Duplicate (Y/N): N

MS/MSD (Y/N): NA

Field Filtered (Y/N): Y

Dup ID: NA

Filter Size: 0.45um

Dup Time: NA

Comments no casing, has end cap

Signature

2-13-2020

Date

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

KGS

Well Identification: 57P-98-04X

Project: Devine Supplemental Sampling
Location: MOC57
Date: 2/13/2020
Sampler: C Miller

Well Integrity

	Yes	No	N/A
Casing Secure			✓
Concrete Pad intact			✓
PVC casing intact	✓		
Well gripper present		✓	
Bolts present			✓
Locked (stickup wells)		✓	

Well Information

Diameter	1"
Material	PVC
Depth to water (ft BTOR)	3.60
Depth to bottom (ft BTOR)	6.95
Pump Set Depth (ft BTOR)	4.25
Screen Interval (ft BTOR)	2-5
Total volume purged (gal)	8 cm

Sampling Type
Purging Method PP
Purge start/stop time 1110/1375
Tubing type HDPE
Tubing diameter 0.17x0.25"
Dedicated pump (Y/N) NO
Air source —
Field Instrument (Model/S/N) YSI 650 YSI 6050 / Lamotte 1878-0412

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1200	250	5.90	4.46	6.54	913	3.86	157.9	42.0	cloudy
1210	250	5.35	4.24	5.44	910	3.29	169.5	39.6	cloudy
1220	200	5.70	4.16	5.43	918	3.30	172.3	22.1	clear
1235	200	5.90	3.96	5.42	919	3.17	175.4	13.71	clear
1240	200	5.90	3.94	5.41	919	3.13	178.1	5.77	clear
1245	200	6.01	4.34	5.40	922	3.92	179.5	6.41	clear
1250	200	6.01	4.33	5.39	923	4.07	181.6	6.10	clear
1255	200	6.05	4.31	5.39	921	3.76	185.7	4.40	clear
1300	Battery Pivot.			Not recovered					→ CM
1325	200	4.55	3.96	5.42	927	2.68	187.3	3.29	clear
1330	200	4.57	4.00	5.43	926	2.65	185.1	3.62	clear
1335	200	4.60	4.00	5.43	928	2.60	187.2	3.92	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	N	N	N	N	

Sampling Details

Sampling ID: 57P-98-04X-FEB20
Sample Time: 1375
Duplicate (Y/N): NO
MS/MSD (Y/N): NO
Field Filtered (Y/N): YES
Dup ID: —
Filter Size: 0.45
Dup Time: —

Comments

Signature

2/13/2020
Date

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

KGS

Well Identification: 57WP-06-02

Project: Devens Supplemental Sampling
Location: ~~Devens MA~~ AOC57
Date: 2/6/2020
Sampler: C. Miller

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact			✓
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)		✓	

Well Information

Diameter	1.5
Material	Steel
Depth to water (ft BTOR)	0.82
Depth to bottom (ft BTOR)	24.40
Pump Set Depth (ft BTOR)	21.50
Screen Interval (ft BTOR)	18.92-23.92
Total volume purged (gal)	12.0

Sampling Type
Purging Method: DP
Tubing type: HDPE
Dedicated pump (Y/N): —
Purge start/stop time: 0846 / 1047
Tubing diameter: ~~3/16"~~ 0.17" x 0.25"
Air source: —
Field Instrument (Model/S/N): 451650 11B100182 / 18 month 1828-0412

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm^c)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
0910	250	0.83	7.49	6.40	1904	0.46	-95.0	-34	Dark Black
0915	250	0.84	8.41	6.69	956	-0.17	-113.1	>4000	
0922	250	0.84	8.56	6.79	781	-0.21	-119.2	>4000	
0927	250	0.84	8.67	6.79	768	-0.20	-119.7	>4000	
0932	250	0.84	8.93	6.73	723	0.00	-113.0	>2000	
0937	250	0.84	9.22	6.69	712	0.02	-111.3	>4000	
0942	250	0.84	9.24	6.53	648	0.23	-99.6	>2000	
0947	250	0.84	9.28	6.45	563	0.25	-84.0	1894	
0957	250	0.84	9.30	6.37	518	0.17	-71.7	967	
1002	250	0.84	9.32	6.38	515	0.12	-68.2	~~798~~ 798	
1007	250	0.84	8.97	6.23	463	0.09	-48.4	497	
1012	250	0.84	9.07	6.19	446	0.09	-42.7	13.6	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	N	N	N	N	

Sampling Details

Sampling ID: 57WP-06-02-JAN20
Sample Time: 1047
Duplicate (Y/N): —
MS/MSD (Y/N): —
Field Filtered (Y/N): —
Dup ID: —
Filter Size: —
Dup Time: —

Comments

[signature]
Signature

2/6/2020
Date

2 of 2

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

KGS

Well Identification: 57WP-04-02

Project: Dulins MFR Supplemental Sampling
Location: ~~[illegible]~~ HOCS7
Date: 2/6/2020
Sampler: C. Mikle

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact			✓
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)		✓	

Well Information

Diameter	1.5
Material	Steel
Depth to water (ft BTOR)	0.82
Depth to bottom (ft BTOR)	24.40
Pump Set Depth (ft BTOR)	21.50
Screen Interval (ft BTOR)	18.42-23.92
Total volume purged (gal)	12.0

Sampling Type

Purging Method: PP
Purge start/stop time: 0844/1047
Tubing type: HDPE
Tubing diameter: ~~[illegible]~~ 0.17"x0.25"
Dedicated pump (Y/N): N
Air source: —
Field Instrument (Model/S/N): YSI pro

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
~~[illegible]~~									
1022	250	0.84	8.52	6.15	417	0.08	-31.6	12.4	clear
1027	250	0.84	8.47	6.14	414	0.08	-29.6	10.67	clear
1032	250	0.84	8.36	6.08	415	0.07	-21.7	10.77	clear
1037	250	0.84	8.36	6.07	413	0.07	-20.4	10.73	clear
1042	250	0.84	8.34	6.08	410	0.07	-19.8	10.68	clear
1047	250	0.84	8.35	6.08	411	0.07	-19.6	10.67	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	N	N	N	N	

Sampling Details

Sampling ID: 57WP-04-02JAN20
Sample Time: 1047
Duplicate (Y/N): —
MS/MSD (Y/N): N
Field Filtered (Y/N): N
Dup ID: —
Filter Size: —
Dup Time: —

Comments

Signature

2/6/19
Date

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

KGS

Well Identification: 5201MW-20-01A

Project: Denver Supplemental Sampling
Location: IAOC 57
Date: 2/7/2020
Sampler: C. Miller

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	2
Material	PVC
Depth to water (ft BTOR)	2.70
Depth to bottom (ft BTOR)	38.84
Pump Set Depth (ft BTOR)	35
Screen Interval (ft BTOR)	30-40
Total volume purged (gal)	6.0

Sampling Type

Purging Method: PP
Purge start/stop time: 1030 / 1130
Tubing type: HDPE
Tubing diameter: 0.17"x0.25"
Dedicated pump (Y/N): N
Air source: —

Field Instrument (Model/S/N): YSI 650 113100150 / Lamotte 1828-0912

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm^c)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1050	250	2.87	9.65	7.18	384	6.58	44.9	6.91	Clear
1055	250	2.87	9.65	7.08	381	7.01	58.2	3.62	Clear
1100	250	2.87	9.50	6.97	381	7.22	73.1	2.86	Clear
1105	250	2.87	9.59	6.89	380	7.01	82.0	4.31	Clear
1110	250	2.87	9.57	6.86	381	6.95	87.0	3.58	Clear
1115	250	2.87	9.82	6.83	380	7.20	92.7	3.57	Clear
1120	250	2.87	9.77	6.82	380	7.36	96.2	4.02	Clear
1125	250	2.87	9.79	6.78	379	7.40	100.2	2.61	Clear
1130	250	2.89	9.77	6.77	379	7.35	98.6	3.30	Clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	N	N	N	N	

Sampling Details

Sampling ID: 5201MW-20-01A_JAN20
Sample Time: 1130
Duplicate (Y/N): N
MS/MSD (Y/N): N
Field Filtered (Y/N): 0.45
Dup ID: —
Filter Size: 0.45
Dup Time: —

Comments Light Rain

[signature]
Signature

2/7/2020
Date

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

KGS

Well Identification: 5702MW-20-01B

Project: Devens Supplemental Sampling
Location: MWCS7
Date: 2/7/2020
Sampler: C. Miller

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	2
Material	PVC Sch 40
Depth to water (ft BTOR)	1.49
Depth to bottom (ft BTOR)	~~[illegible]~~ 78.25'
Pump Set Depth (ft BTOR)	75
Screen Interval (ft BTOR)	70-80
Total volume purged (gal)	~~78.25~~ 6.0

Sampling Type

Purging Method: PP
Tubing type: HDPE
Dedicated pump (Y/N): N
Purge start/stop time: 0849 / 0944
Tubing diameter: 0.17"×0.25"
Air source: —

Field Instrument (Model/S/N): YSI 650 11F100150 / LaMotte 1828-0412

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
0909	250	1.50	5.55	7.96	396	0.94	-138.3	12.7	Clear
0914	250	1.50	5.12	8.07	390	1.34	-136.5	12.1	Clear
0919	250	1.50	5.39	8.10	366	0.83	-130.1	10.88	Clear
0924	250	1.50	6.50	8.15	352	0.53	-166.6	9.99	Clear
0929	250	1.50	6.75	8.22	335	0.52	-174.9	7.81	Clear
0934	250	1.50	6.55	8.23	308	0.46	-177.3	6.64	Clear
0939	250	1.50	6.27	8.23	301	0.46	-186.1	4.53	Clear
0944	250	1.50	6.29	8.23	305	0.45	-184.9	3.83	Clear
0949	250	1.50	6.24	8.27	303	0.46	-185.0	4.21	Clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	N	N	N	N	

Sampling Details

Sampling ID: 5702MW-20-01B_JAN20
Sample Time: 0949
Duplicate (Y/N): N
MS/MSD (Y/N): N
Field Filtered (Y/N): Y
Dup ID: —
Filter Size: 0.45
Dup Time: —

Comments light rain

Signature

2/7/2020
Date

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

KGS

Well Identification: 5702MW-20-02A

Project: Tenaya Supplemental Sampling
Location: TAOC 57
Date: 2/10/2020
Sampler: C. Miller

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	2
Material	PVC Sinkers
Depth to water (ft BTOR)	21.24
Depth to bottom (ft BTOR)	41.75
Pump Set Depth (ft BTOR)	35
Screen Interval (ft BTOR)	30-40
Total volume purged (gal)	7.6

Sampling Type

Purging Method: PP
Tubing type: HDPE
Dedicated pump (Y/N): N
Purge start/stop time: 1056 / 1126
Tubing diameter: 0.17" x 0.25"
Air source: —

Field Instrument (Model/S/N): YSI 556 15E1015167 / Lamotte 3590-3513

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm^c)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1051	250	21.46	8.84	7.03	917	11.29	169.8	2.69	Clear
1056	250	21.46	9.08	6.77	897	11.24	170.8	1.47	Clear
1101	250	21.46	9.33	6.71	891	10.97	170.4	0.88	Clear
1106	250	21.46	9.28	6.64	890	10.96	170.6	1.72	Clear
1111	250	21.46	9.25	6.49	874	10.27	173.2	0.86	Clear
1116	250	21.46	9.36	6.44	868	10.23	174.1	0.79	Clear
1121	250	21.46	9.45	6.38	853	10.26	176.1	0.84	Clear
1126	250	21.46	9.43	6.35	852	10.29	177.6	0.80	Clear
									~~cle~~ cm
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	N	N	N	N	

Sampling Details

Sampling ID: 5702MW-20-02A_JAN20
Sample Time: 1126
Duplicate (Y/N): Yes
MS/MSD (Y/N): NO
Field Filtered (Y/N): Yes
Dup ID: 5702MW-DUP01_JAN20
Filter Size: 0.45
Dup Time: 1131

Comments

[signature]
Signature

2/10/2020
Date

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: ~~[illegible]~~ - 5702-MW-20-03A

Project: [illegible] Date: 2-24-2020

Location: 5702-MW-20-03A Sampler: [illegible]

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)		✓	

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	16.94
Depth to bottom (ft BTOR)	39.35
Pump Set Depth (ft BTOR)	~35 ft
Screen Interval (ft BTOR)	26-36
Total volume purged (gal)	~35 gal

[illegible] survey on R

Sampling Type

Purging Method [illegible] Tubing type HDPE Dedicated pump (Y/N) N

Purge start/stop time 0925 / 1010 Tubing diameter 1/4" Air source N/A

Field Instrument (Model/S/N) YST 556 MPS 15F101567

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm^c)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
0925	500	16.93	9.46	7.79	0.463	3.32	73.2	71.4	cloudy
0930	200	16.89	9.90	7.31	0.432	3.13	15.8	34.3	cloudy
0935	200	16.88	9.64	7.14	0.418	4.37	33.1	19.5	slightly cloudy
0940	150	16.88	9.58	6.93	0.418	4.50	48.8	16.2	slightly cloudy
0945	150	16.88	9.38	6.82	0.425	4.79	57.1	11.8	slightly cloudy
0950	150	16.88	9.67	6.74	0.418	4.96	58.2	14.3	clear w/debris
0955	150	16.88	9.76	6.65	0.462	4.96	60.4	12.8	clear w/debris
1000	150	16.88	9.82	6.62	0.475	5.04	60.2	9.97	Clear
1005	150	16.88	9.92	6.59	0.485	5.06	57.8	10.14	Clear
1010	150	16.88	9.92	6.58	0.485	5.02	55.5	10.42	Clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	N	N	N	Y	

Sampling Details

Sampling ID: 5702-MW-20-03A_FB320

Sample Time: 1010 Duplicate (Y/N): N MS/MSD (Y/N): N

Field Filtered (Y/N): Y Dup ID: N/A

Filter Size: 0.45 µm Dup Time: N/A

Comments 1.91 NTU post filter

[signature]

Signature

2-24-2020

Date

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: 5702HW-20-04A

Project: Devens Supplemental Sampling
Location: AOC 57
Date: 2/10/2020
Sampler: C. Miller

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	2
Material	Sch 40 PVC
Depth to water (ft BTOR)	14.27
Depth to bottom (ft BTOR)	80.40
Pump Set Depth (ft BTOR)	75
Screen Interval (ft BTOR)	70-80
Total volume purged (gal)	6.0

Sampling Type

Purging Method: BP
Purge start/stop time: 1434 / 1534
Tubing type: HDPE
Tubing diameter: 0.17" x 0.25"
Dedicated pump (Y/N): N
Air source: —

Field Instrument (Model/S/N): 451556 11F1015167 / Lamotte 3170-3513

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1454	250	14.42	11.31	6.88	237	3.94	173.9	4.69	Clear
1459	250	14.42	11.43	6.87	237	3.59	175.1	4.94	Clear
1504	250	14.42	11.49	6.87	237	3.22	173.3	4.48	Clear
1509	250	14.44	11.55	6.84	237	3.06	162.0	4.43	Clear
1514	250	14.44	11.70	6.83	238	2.90	148.7	4.80	Clear
1519	250	14.44	11.59	6.80	241	2.84	121.3	4.40	Clear
1524	250	14.44	11.51	6.80	240	2.81	104.7	4.55	Clear
1529	250	14.44	11.45	6.80	239	2.83	106.1	4.46	Clear
1534	250	14.44	11.48	6.80	238	2.82	107.3	4.51	Clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	N	N	N	N	

Sampling Details

Sampling ID: 5702HW-20-04A-JAN20
Sample Time: 1534
Duplicate (Y/N): N
MS/MSD (Y/N): N
Field Filtered (Y/N): N
Dup ID: —
Filter Size: 0.45
Dup Time: —

Comments

Signature

2/10/2020
Date

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

KGS

Well Identification: 5702 MW-20-05A

Project: Ft Stevens AOC 57
Location: 5702 MW-20-05A
Date: 2-24-2020
Sampler: Michael Spadding

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	6.09 — no survey, mk
Depth to bottom (ft BTOR)	43.11
Pump Set Depth (ft BTOR)	~35
Screen Interval (ft BTOR)	30-40
Total volume purged (gal)	~2

Sampling Type

Purging Method: Peristaltic
Tubing type: HDPE
Dedicated pump (Y/N): N
Purge start/stop time: 1105 1140
Tubing diameter: 1/4"
Air source: N/A
Field Instrument (Model/S/N): YSI 556 MPS 15F101567

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm^c)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1105	225	6.13	10.04	6.84	0.963	11.09	172.4	3.36	clear
1110	150	6.13	11.23	6.29	1.263	6.99	187.2	3.06	clear
1115	175	6.13	11.31	6.20	1.542	6.80	184.1	2.80	clear
1120	150	6.13	11.25	6.08	1.606	6.62	188.9	2.66	clear
1125	150	6.13	11.22	6.05	1.629	6.62	189.4	2.87	clear
1130	150	6.13	11.15	6.04	1.638	6.62	190.4	2.99	clear
1135	150	6.13	11.21	6.03	1.641	6.63	191.1	2.24	clear
1140	150	6.13	11.31	~~5.99~~	1.642	6.62	191.9	3.10	clear pH! 6.02
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	N	N	N	Y	

Sampling Details

Sampling ID: 5702 MW-20-05A_FEB20
Sample Time: 1140
Duplicate (Y/N): N
MS/MSD (Y/N): N
Field Filtered (Y/N): Y
Dup ID: NA
Filter Size: 0.45 cm
Dup Time: NA

Comments 2.03 NTU post filter

[signature]
Signature

2-24-2020
Date

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: 5708MW-20-05B (Resample) (1/2)

Project: LTM - Fall 2019 | Date: 02/28/2020

Location: Fort Devens, Massachusetts | Sampler: BrA

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)		✓	

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	4.90
Depth to bottom (ft BTOR)	87.90
Pump Set Depth (ft BTOR)	75
Screen Interval (ft BTOR)	70-80
Total volume purged (gal)	4.9

Sampling Type

Purging Method peri | Tubing type HDPE | Dedicated pump (Y/N) N

Purge start/stop time 0730-0910 | Tubing diameter 1/4" OD | Air source n/a

Field Instrument (Model/S/N) YSI 600XL 11J100750

Lamotte 2020wi 1828-0412

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
0745	300	5.25	9.04	8.58	214	3.61	70.7	1156	Light brown
0750	300	5.25	9.15	8.71	207	1.57	-52.6	956	"
0755	300	5.25	9.41	8.73	203	1.52	-161.2	663	"
0800	300	5.25	9.26	8.73	201	1.55	-162.3	660	"
0805	300	5.25	9.44	8.68	198	1.56	-167.4	62	"
0810	300	5.25	9.46	8.69	195	1.55	-175.0	65	"
0815	300	5.25	9.57	8.67	195	1.55	-175.6	42	"
0820	300	5.25	9.63	8.63	191	1.58	-180.1	52	"
0825	300	5.25	9.49	8.59	189	1.54	-183.0	53.3	"
0830	300	5.25	9.42	8.54	186	1.59	-177.8	61.6	"
0835	300	5.25	9.39	8.50	186	1.51	-182.0	61.1	"
0840	300	5.25	9.38	8.51	186	1.46	-187.0	51.9	"
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):									

Sampling Details

Sampling ID: 5708MW-20-05B-FEB20

Sample Time: 0910 | Duplicate (Y/N) N | MS/MSD (Y/N) Y

Field Filtered (Y/N) Y | Dup ID -

Filter Size: 0.45 µm | Dup Time -

Comments PFAS + FF metals

Signature | Date 02/28/20

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: 5703MW-20-05B (Rexnight) (2/2)

Project: ~~LTM-Fall 2019~~ RI+LTM Supp.

Date: 02/05/20

Location: Fort Devens, Massachusetts

Sampler: BJA

Well Integrity

	Yes	No	N/A
Casing Secure			
Concrete Pad intact			
PVC casing intact			
Well gripper present			
Bolts present			
Locked (stickup wells)			

Well Information

Diameter	
Material	
Depth to water (ft BTOR)	
Depth to bottom (ft BTOR)	
Pump Set Depth (ft BTOR)	
Screen Interval (ft BTOR)	
Total volume purged (gal)	

Sampling Type

Purging Method _____ Tubing type _____ Dedicated pump (Y/N) _____

Purge start/stop time _____ Tubing diameter _____ Air source _____

Field Instrument (Model/S/N) _____

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
0845	300	5.25	9.39	8.47	185	1.47	-185.9	60.2	"
0850	300	5.25	9.45	8.41	182	1.37	-187.0	47.7	"
0855	300	5.25	9.44	8.44	183	1.47	-185.8	47.5	"
0900	300	5.25	9.46	8.43	184	1.57	-185.1	48.0	"
0910	300	5.25	9.45	8.45	186	1.50	-184.9	47.2	"
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):									

Sampling Details

Sampling ID _____

Sample Time _____ Duplicate (Y/N) _____ MS/MSD (Y/N): _____

Field Filtered (Y/N) _____ Dup ID _____

Filter Size _____ Dup Time _____

Comments _____

_____ **Signature**

_____ **Date**

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: 5702MW-20-05B

Page 1 of 2

Project: Ft Devens AOC 52

Location: 5702MW-20-05B

Date: 2-24-2020

Sampler: [signature]

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)		✓	

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	5.00
Depth to bottom (ft BTOR)	81.95
Pump Set Depth (ft BTOR)	~ 75 ft
Screen Interval (ft BTOR)	20-80
Total volume purged (gal)	~ 4.5 gal

- Bottom of Sump unit

Sampling Type

Purging Method: Peristaltic

Tubing type: HDPE

Dedicated pump (Y/N): N

Purge start/stop time: 1300 / 1435

Tubing diameter: 1/4"

Air source: NA

Field Instrument (Model/S/N): YSI 556 MPS 15F101567

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm^c)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1300	300	5.35	10.31	8.80	0.386	3.12	83.0	1488	opaque tan
1305	250	5.35	10.82	9.08	0.327	0.97	6.0	1479	opaque tan
1310	150	5.25	10.70	9.19	0.315	0.57	-29.5	1406	opaque tan
1315	150	5.23	10.66	9.37	0.308	0.43	-62.5	1423	opaque tan
1320	150	5.23	10.66	9.30	0.302	0.36	-73.1	1370	opaque tan
1325	150	5.23	11.11	9.29	0.299	0.35	-77.4	1382	opaque tan
1330	150	5.23	11.19	9.33	0.297	0.32	-85.3	1496	opaque tan
1335	150	5.23	11.00	9.37	0.288	0.28	-103.8	1667	opaque tan
1340	150	5.23	10.91	9.34	0.280	0.28	-105.3	1587	opaque grey
1345	150	5.23	10.97	9.30	0.273	0.21	-105.3	1547	opaque tan
1350	150	5.23	11.06	9.28	0.266	0.17	-107.7	1420	opaque tan
1355	150	5.23	11.12	9.31	0.263	0.15	-107.3	1364	opaque tan
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):									

Sampling Details

Sampling ID: 5702MW-20-05B-FB1320

Sample Time: 1435

Duplicate (Y/N): N

MS/MSD (Y/N): N

Field Filtered (Y/N): Y

Dup ID: NA

Filter Size: 0.45 um

Dup Time: NA

Comments Riser too tall to allow for cap/gripper + lock, 600 NTU post filter

[signature]

Signature

2-24-2020

Date

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

page 2 of 2

Well Identification: 5702MW-20-05B

Project: At Devens A0057 | Date: 2-24-2020

Location: 5702MW-20-05B | Sampler: Michael Spaulding

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)		✓	

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	5.00
Depth to bottom (ft BTOR)	81.95
Pump Set Depth (ft BTOR)	~75ft
Screen Interval (ft BTOR)	70-80
Total volume purged (gal)	~45 gal

Sampling Type

Purging Method: peristaltic | Tubing type: HDPE | Dedicated pump (Y/N): ~~Y~~ N

Purge start/stop time: 1300 / 1435 | Tubing diameter: 1/4" | Air source: NA

Field Instrument (Model/S/N): YSI 556 MPS 15F101367

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm^c)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1400	150	5.23	11.24	9.29	0.258	0.16	-107.1	1326	opaque tan
1405	150	~~5.23~~ 5.23	11.21	9.30	0.257	0.15	-109.2	1205	opaque tan
1410	150	5.23	11.08	9.28	0.254	0.13	-108.6	1202	opaque tan
1415	150	5.23	10.97	9.24	0.250	0.12	-112.7	1090	opaque tan
1420	150	5.23	10.99	9.20	0.248	0.13	-108.5	1009	milky tan
1425	150	5.23	11.08	9.19	0.246	0.13	-105.4	876	milky green
1430	150	5.23	11.09	9.18	0.242	0.10	-101.1	855	milky grey
1435	150	5.23	11.08	9.16	0.239	0.10	-98.4	864	milky gray
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				✓	✓	✓	✓	Y	

Sampling Details

Sampling ID: 5702MW-20-05B_FEB20

Sample Time: 1435 | Duplicate (Y/N): N | MS/MSD (Y/N): N

Field Filtered (Y/N): Y | Dup ID: NA

Filter Size: 0.45 um | Dup Time: NA

Comments 600 NTU post filter, PVC Riser too tall to allow for cap/gripper to lock

Signature | Date: 2-24-2020

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

KGS

Well Identification: 5702MW 20-Clek

Project: Venous Supplemental Sampling
Location: AOC 57
Date: 2/10/2020
Sampler: C Miller

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	2
Material	PVC SCH 40
Depth to water (ft BTOR)	4.98
Depth to bottom (ft BTOR)	99.12
Pump Set Depth (ft BTOR)	75
Screen Interval (ft BTOR)	70-80
Total volume purged (gal)	6.0

Sampling Type

Purging Method: LP
Purge start/stop time: 1230/1330
Tubing type: HDPE
Tubing diameter: 0.17"x0.25"
Dedicated pump (Y/N): N
Air source:
Field Instrument (Model/S/N): 451552 11F1015167 / Lowmotic 3570-3513

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1250	250	15.22	10.01	6.93	514	5.38	212.4	2.13	Clear
1255	250	15.22	9.42	6.95	514	6.18	214.1	1.57	Clear
1300	250	15.22	9.49	6.96	511	5.57	213.0	1.60	Clear
1305	250	15.22	9.81	6.96	511	5.37	212.7	1.56	Clear
1310	250	15.11	9.73	6.96	511	5.57	213.6	1.48	Clear
1315	250	15.22	10.10	6.98	507	5.14	196.0	1.53	Clear
1320	250	15.22	10.08	6.98	503	4.94	168.6	1.46	Clear
1325	250	15.22	10.12	6.98	500	4.87	164.6	1.50	Clear
1330	250	15.22	10.14	6.97	498	4.88	162.4	1.52	Clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	N	N	N	N	

Sampling Details

Sampling ID: 5702MW-20-Clek-JAN20
Sample Time: 1330
Duplicate (Y/N): N
MS/MSD (Y/N): N
Field Filtered (Y/N): Y
Dup ID: —
Filter Size: 0.45
Dup Time: —

Comments

Signature

2/10/2020
Date

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: 5702MW-20-074

Project: Devens MFB Supplemental Sampling
Location: Monitoring Well AOC57
Date: 2/6/2020
Sampler: C. Miller

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	2
Material	SS 40 PVC
Depth to water (ft BTOR)	2.37
Depth to bottom (ft BTOR)	41.72
Pump Set Depth (ft BTOR)	35
Screen Interval (ft BTOR)	30-40
Total volume purged (gal)	6.0

Sampling Type

Purging Method: PP
Purge start/stop time: 1152/1252
Tubing type: HDPE
Tubing diameter: ~~3/16" 0.17"~~ 0.25"
Dedicated pump (Y/N): —
Air source: —

Field Instrument (Model/S/N): YSI 650 11B100185 / Lamotte 1828-04112

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1212	250	2.40	8.75	6.50	1054	0.66	-0.5	4.47	clear
1217	250	2.40	8.75	6.52	1055	0.75	0.0	4.46	clear
1222	250	2.40	8.77	6.56	1050	0.78	0.1	3.57	clear
1227	250	2.40	8.82	6.58	1049	1.06	0.8	4.19	clear
1232	250	2.40	8.73	6.62	1047	1.38	-0.5	3.26	clear
1237	250	2.40	8.76	6.63	1046	1.48	-0.1	3.50	clear
1242	250	2.40	8.89	6.65	1044	1.72	-0.9	3.41	clear
1247	250	2.40	9.03	6.66	1042	1.74	-1.0	3.31	clear
1252	250	2.40	9.06	6.68	1040	1.72	-0.9	3.30	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	N	N	N	N	

Sampling Details

Sampling ID: 5702MW-20-074-JAN20
Sample Time: 1252
Duplicate (Y/N): —
MS/MSD (Y/N): —
Field Filtered (Y/N): Y
Dup ID: —
Filter Size: 0.45
Dup Time: —

Comments

Signature

2/6/2020
Date

KOMAN GOVERNMENT SOLU

Low Flow/ Low Stress Groundwater Sampling Log

KGS

Well Identification: 5703MW-20-01A - FEB20

Project: Devons Supplemental Sampling
Location: AOC 57

Date: 2/11/2020
Sampler: C. Miller

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	2
Material	PVC screen
Depth to water (ft BTOR)	7.00
Depth to bottom (ft BTOR)	14.84
Pump Set Depth (ft BTOR)	9.50
Screen Interval (ft BTOR)	2-12
Total volume purged (gal)	60.0

Sampling Type

Purging Method: PP
Purge start/stop time: 1324 / 1424
Tubing type: HDPE
Tubing diameter: 0.17x0.25"
Dedicated pump (Y/N): No
Air source: —

Field Instrument (Model/S/N): 401650 11J100750 / Lamotte 1828-0412

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1344	250	7.74	10.03	5.43	447	1.11	98.7	10.190	clear
1349	250	7.74	5.99	5.42	439	1.06	99.7	5.99	clear
1354	250	7.74	5.95	5.41	433	1.07	101.0	5.60	clear
1359	250	7.74	5.93	5.41	428	1.04	102.6	4.82	clear
1404	250	7.74	5.96	5.41	430	1.16	104.8	3.78	clear
1409	250	7.74	5.88	5.40	435	1.21	107.8	3.62	clear
1414	250	7.74	5.88	5.40	422	1.22	107.6	3.12	clear
1419	250	7.74	5.93	5.40	434	1.22	110.1	3.22	clear
1424	250	7.74	5.95	5.40	426	1.21	110.7	3.18	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	N	N	N	N	

Sampling Details

Sampling ID: 5703MW-20-01A - FEB20
Sample Time: 1424
Field Filtered (Y/N): Yes
Filter Size: 0.45
Duplicate (Y/N): NO
Dup ID: —
Dup Time: —
MS/MSD (Y/N): NO

Comments

Signature

2/11/2020
Date

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

KGS

Well Identification: 5703MW-20-01B

PAGE 1

Project: Devens Supplemental Sampling
Location: AOC 57
Date: 2/12/2020
Sampler: C. Miller

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	2"
Material	PVC Sch 40
Depth to water (ft BTOR)	7.32
Depth to bottom (ft BTOR)	60.11
Pump Set Depth (ft BTOR)	55
Screen Interval (ft BTOR)	50-60
Total volume purged (gal)	15.7

Sampling Type

Purging Method: PP
Tubing type: HDPE
Dedicated pump (Y/N): No
Purge start/stop time: 0944/1221
Tubing diameter: 0.17"x0.25"
Air source: —

Field Instrument (Model/S/N): 451650 115100750 / Lamotte 1828-0412

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm^c)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1009	250	12.40	8.28	6.55	472	1.27	69.0	38.0	lightly cloudy
1014	250	12.39	8.32	6.55	473	1.16	66.0	35.0	lightly cloudy
1019	250	12.40	8.16	6.54	473	1.06	62.1	43.4	lightly cloudy
1024	250	12.40	8.29	6.54	474	1.00	60.0	661	cloudy
1029	250	12.40	8.13	6.52	479	3.14	62.3	753	cloudy
1034	250	12.65	8.56	6.71	317	1.12	46.2	>1000	very cloudy/Grey
1039	250	13.00	8.91	6.91	217	2.98	30.0	>1000	very cloudy/Grey
1050	250	13.30	8.60	7.77	146	0.95	-71.6	>1000	very cloudy/Grey
~~1100~~	~~250~~		~~7.77~~	~~6.61~~	~~495~~	cm - Cleaning out Flow cell			
water still very turbid, Grey and fine silt and very cloudy >1000 —									
1114	250	12.90	8.32	7.41	140	1.74	-37.4	>1000	" "
1119	250	12.90	8.66	7.98	106	1.35	-104.6	>1000	" "
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	N	N	N	N	

Sampling Details

Sampling ID: 5703MW-20-01B-FEB20
Sample Time: 1221
Duplicate (Y/N): No
MS/MSD (Y/N): ~~Yes~~ No cm
Field Filtered (Y/N): Yes
Dup ID: —
Filter Size: 0.45
Dup Time: —

Comments ~~Collected MS/MSD and FER~~ cm

[signature]
Signature

2/12/2020
Date

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

KGS

Well Identification: 5203MW-20-01B_FEB20

PAGE 2

Project: Devens Supplemental Sampling
Location: AOC 57
Date: 2/12/2020
Sampler: C. Miller

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	7.32
Depth to bottom (ft BTOR)	60.11
Pump Set Depth (ft BTOR)	55
Screen Interval (ft BTOR)	50-60
Total volume purged (gal)	15.7

Sampling Type

Purging Method: PP
Tubing type: HDPE
Dedicated pump (Y/N): NO
Purge start/stop time: 0944/1221
Tubing diameter: 0.17" x 0.25"
Air source: —

Field Instrument (Model/S/N): YSI 650 11J100750/Comoth 1828-0412

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm^c)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1124	250	12.88	8.85	8.11	169	1.18	-125.9	>1000	very cloudy/Grey F silt
1129	250	12.88	8.69	7.69	168	1.16	-69.8	>1000	
1134	250	12.87	8.62	7.47	175	1.10	-49.7	>1000	
1144	250	12.99	8.48	6.74	452	1.71	33.8	>1000	
1156	250	12.94	8.51	6.94	176	0.19	1.0	>1000	
1201	250	12.90	8.57	7.00	169	0.12	-8.9	>1000	
1206	250	12.90	8.76	6.98	189	0.11	-8.8	>1000	
1211	250	12.90	8.56	6.99	175	0.12	-10.1	>1000	
1216	250	12.90	8.58	6.99	176	0.12	-10.4	>1000	
1221	250	12.89	8.64	6.99	176	0.12	-10.5	>1000	
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	N	N	N	N	

Sampling Details

Sampling ID: 5203MW-20-01B_FEB20
Sample Time: 1221
Duplicate (Y/N): NO
MS/MSD (Y/N): NO
Field Filtered (Y/N): Yes
Dup ID: NO
Filter Size: 0.45
Dup Time: NO

Comments Post filter Turbidity - >1000 NTU's

[signature]
Signature

2/12/2020
Date

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: 5703MW-20-01B

page 1 of 5

Project: Ft Dennis AOC 57 | Date: 2-18-2020

Location: 5703MW-20-01B | Sampler: [illegible]

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	7.61
Depth to bottom (ft BTOR)	56.49
Pump Set Depth (ft BTOR)	~55ft
Screen Interval (ft BTOR)	~~60-70~~ 50-60
Total volume purged (gal)	~8 gal

Sampling Type

Purging Method: [illegible] | Tubing type: HDPE | Dedicated pump (Y/N): N

Purge start/stop time: 8 1315 | Tubing diameter: 1/4" | Air source: [illegible]

Field Instrument (Model/S/N): YSI 650 MDS 11J100750

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm^c)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
0930	200	7.61	7.96	7.27	0.465	12.14	196.3	1369	grey
0935	150	10.00	8.87	7.04	0.469	[illegible]	[illegible]	[illegible]	
0940	150	10.43	8.90	6.58	0.426	5.37	[illegible]	[illegible]	[illegible]
0945	160	10.69	8.95	6.63	0.398	4.77	92.6	[illegible]	[illegible]
0950	150	10.69	8.71	6.80	0.312	3.38	64.1	[illegible]	[illegible]
0955	100	10.68	8.68	6.90	0.267	3.42	44.2	overrange	milky grey/tan
1000	100	10.68	8.43	7.03	0.203	3.21	28.6	overrange	grey
0905	100	10.65	8.50	7.12	0.187	2.94	15.0	overrange	grey
0910	100	10.65	8.56	7.20	0.170	2.80	0.7	overrange	grey
0915	100	10.75	8.88	7.16	0.189	2.73	3.0	overrange	grey
0920	85	10.73	8.68	7.19	0.175	2.62	0.0	overrange	grey
0925	85	10.68	8.66	7.28	0.158	2.45	-13.7	overrange	grey
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	Y	Y	N	N	

off by 1hr 0835 0835 0845 0855 0900

Sampling Details

Sampling ID: 5703MW-20-01B-FEB20

Sample Time: 1315 | Duplicate (Y/N): N | MS/MSD (Y/N): N

Field Filtered (Y/N): Y | Dup ID: NA

Filter Size: 0.45 µm | Dup Time: NA

Comments 1.24 NTU After filter train 10-5-0.45

[signature] 2-18-2020

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: 5703MW-20-01B

page 2 of 5

Project: Ft Devens 40157

Location: 5703MW-20-01B

Date: 2-18-2020

Sampler: [illegible]

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	7.61
Depth to bottom (ft BTOR)	56.49
Pump Set Depth (ft BTOR)	~55
Screen Interval (ft BTOR)	50-60
Total volume purged (gal)	~8 gal

Sampling Type

Purging Method: Peristaltic

Purge start/stop time: 0830 1315

Tubing type: HDPE

Tubing diameter: 1/4"

Dedicated pump (Y/N): N

Air source: NA

Field Instrument (Model/S/N): YSI 650MDS 11J 100750

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm^c)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
0930	85	10.66	8.79	7.32	0.157	2.39	-20.5	overrange	Grey
0935	85	10.74	8.77	7.22	0.178	2.38	-10.0	overrange	Grey
0940	85	10.79	8.82	7.22	0.168	2.33	-9.3	overrange	Grey
0950	85	10.68	8.84	7.31	0.151	2.19	-21.4	overrange	Grey
0955	85	10.65	8.86	7.33	0.148	2.15	-23.5	overrange	Grey
1000	85	10.68	8.87	7.26	0.165	2.14	-16.2	overrange	Grey
1005	85	10.66	8.92	7.29	0.148	2.10	-20.3	overrange	Grey
1010	85	10.69	9.06	7.26	0.155	2.05	-17.8	overrange	Grey
1015	85	10.65	8.95	7.27	0.149	2.02	-18.4	overrange	Grey
1020	85	10.65	8.89	7.28	0.149	1.99	-20.4	overrange	Grey
1025	85	10.65	9.07	7.25	0.156	1.97	-17.0	overrange	Grey
1030	85	10.68	9.11	7.23	0.158	2.03	-15.7	overrange	Grey
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	Y	Y	N	N	

Sampling Details

Sampling ID: 5703MW-20-01B_FEB20

Sample Time: 1315

Duplicate (Y/N): N

MS/MSD (Y/N): N

Field Filtered (Y/N): Y

Dup ID: NA

Filter Size: 0.45 µm

Dup Time: NA

Comments 1.24 NTU After filter train 10-5 - 0.45 µm

[signature]

2-18-2020

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: 5703MW-20-01B

page 3 of 5

Project: Ft Devens AOC 57 | Date: 2-18-2020

Location: 5703MW-20-01B | Sampler: [illegible]

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	7.61
Depth to bottom (ft BTOR)	56.49
Pump Set Depth (ft BTOR)	~55.21
Screen Interval (ft BTOR)	50-60
Total volume purged (gal)	~8 gal

Sampling Type

Purging Method: Peristaltic | Tubing type: HDPE | Dedicated pump (Y/N): N

Purge start/stop time: 0830-1315 | Tubing diameter: 1/4" | Air source: N/A

Field Instrument (Model/S/N): YSI 650 MDS / 115 100-250

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm^c)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1035	85	10.68	9.04	7.26	0.150	2.06	-14.7	Overrange	Grey
1040	85	10.66	9.03	7.25	0.157	2.06	-18.6	Overrange	Grey
1045	85	10.64	9.09	7.28	0.142	2.22	-23.0	Overrange	Grey
5 gal 1050	85	10.71	9.24	7.19	0.171	2.59	-14.0	Overrange	Grey
1055	85	10.71	9.06	7.21	0.152	2.46	-15.9	Overrange	Grey
1100	85	10.68	9.07	7.26	0.144	2.38	-20.9	Overrange	Grey
1105	85	10.68	9.12	7.25	0.152	2.22	-20.1	Overrange	Grey
1110	85	10.65	9.25	7.32	0.139	2.13	-27.2	Overrange	Grey
1115	85	10.65	9.11	7.23	0.162	2.00	-18.2	Overrange	Grey
1120	85	10.40	8.85	7.68	0.113	1.76	-64.2	Overrange	Grey
1125	85	10.29	8.90	7.72	0.124	1.60	-67.11	Overrange	Grey
1135	85	10.12	8.74	7.64	0.142	2.75	-40.6	Overrange	Grey
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	Y	Y	N	N	

Sampling Details

Sampling ID: 5703MW-20-01B-FEB20

Sample Time: 1315 | Duplicate (Y/N): N | MS/MSD (Y/N): N

Field Filtered (Y/N): Y | Dup ID: N/A

Filter Size: 0.45 µm | Dup Time: N/A

Comments 1.24 NTU after filter train 10-5-0.45 µm

[signature] 2-18-2020

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: S703MW-20-01B

page 4 of 5

Project: Ft Devens ACC 57

Location: S703MW-20-01B

Date: 2-18-2020

Sampler: [illegible]

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)			

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	7.61
Depth to bottom (ft BTOR)	56.49
Pump Set Depth (ft BTOR)	~55ft
Screen Interval (ft BTOR)	20-60
Total volume purged (gal)	~5gal

Sampling Type

Purging Method: Peristaltic

Purge start/stop time: 0930 / 1315

Tubing type: HDPE

Tubing diameter: 1/4"

Dedicated pump (Y/N): N

Air source: NA

Field Instrument (Model/S/N): YSI 650 MDS 11J 100 250

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm[c])	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1140	85	10.12	8.75	7.39	0.163	1.13	-21.4	overrange	Grey
1145	85	10.09	8.79	7.36	0.152	1.05	-20.4	overrange	Grey
1150	85	10.00	8.60	7.37	0.147	0.92	-22.5	overrange	Grey
1155	85	10.00	8.69	7.31	0.156	[illegible]	-20.2	overrange	[illegible]
1200	85	10.00	8.53	7.36	0.146	0.72	-21.2	overrange	[illegible]
1205	85	10.00	[illegible]	7.47	0.122	0.70	-40.0	overrange	[illegible]
1210	85	10.00	8.53	7.25	0.186	0.64	[illegible]	[illegible]	[illegible]
1215	[illegible]	10.00	8.30	7.25	0.1851	[illegible]	[illegible]	[illegible]	[illegible]
1220	85	10.00	[illegible]	7.25	0.1441	0.54	[illegible]	[illegible]	[illegible]
1225	85	10.00	[illegible]	7.29	0.136	0.41	[illegible]	overrange	Grey
1230	85	10.00	[illegible]	7.27	1.146	0.36	[illegible]	[illegible]	[illegible]
[illegible]	85	10.00	8.43	[illegible]	0.134	0.73	-7.0	overrange	Grey
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):			N	Y	Y	N	N		

Sampling Details

Sampling ID: S703MW-20-01B-FEB20

Sample Time: 1315

Duplicate (Y/N): N

MS/MSD (Y/N): N

Field Filtered (Y/N): Y

Dup ID: NA

Filter Size: 0.45

Dup Time: NA

Comments 1.24 NTU after filter train 10-5-0.45 um

[illegible]

2-18-2020

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: 5703MW-20-01B

Page 5 of 5

Project: Ft Devens ARC57
Location: 5703MW-20-01B
Date: 2-18-2020
Sampler: [illegible]

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	7.61
Depth to bottom (ft BTOR)	56.49
Pump Set Depth (ft BTOR)	~55ft
Screen Interval (ft BTOR)	50-60
Total volume purged (gal)	~8gal

Sampling Type

Purging Method: Peristaltic
Purge start/stop time: 0830 / 1315
Tubing type: HDPE
Tubing diameter: 1/4"
Dedicated pump (Y/N): N
Air source: NA
Field Instrument (Model/S/N): YSI 650 MDS / 11J100 250

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1250	85	10.00	8.73	7.29	0.176	1.68	2.9	overrange	grey
1255	85	10.00	8.74	7.24	0.167	0.82	2.7	overrange	grey
1300	85	10.00	8.80	7.15	0.178	0.62	5.9	overrange	grey
1305	85	[illegible]	8.75	7.14	0.171	0.56	6.1	overrange	grey
1310	85	10.00	[illegible]	7.13	0.170	0.56	5.7	overrange	grey
1315	85	10.00	8.72	7.16	0.169	0.58	5.5	overrange	grey
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	Y	Y	N	N	

Sampling Details

Sampling ID: 5703MW-20-01B_FEB20
Sample Time: 1315
Duplicate (Y/N): N
MS/MSD (Y/N): N
Field Filtered (Y/N): Y
Dup ID: NA
Filter Size: 0.45 µm
Dup Time: NA

Comments ~~3.78~~ [illegible]
1.24 NTU after filter train 10→5 → 0.45 µm

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: 5703 MW-20-02A

Project: LTM - Fall 2019
Location: Fort Devens, Massachusetts
Date: 2/13/2020
Sampler: [illegible] - Colling

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	13.28
Depth to bottom (ft BTOR)	20.27
Pump Set Depth (ft BTOR)	~15.7
Screen Interval (ft BTOR)	10-20
Total volume purged (gal)	~4 gal

Sampling Type

Purging Method: Peristaltic
Tubing type: HDPE
Dedicated pump (Y/N): N
Purge start/stop time: 0850-0945
Tubing diameter: 1/4"
Air source: N/A

Field Instrument (Model/S/N): YSI 556MPS 15F101507

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
0850	125/300	13.52	5.12	6.60	2.822	2.30	157.1	8.72	clear
0855	200	13.52	8.55	6.46	3.992	2.58	142.8	5.85	clear
0900	175	13.51	8.35	6.40	3.557	1.50	143.2	3.71	clear
0905	175	13.51	8.19	6.39	3.680	1.12	135.0	3.24	clear
0910	175	13.51	8.27	6.36	3.559	1.06	126.4	2.96	clear
0915	175	13.51	8.20	6.37	3.503	1.00	118.0	2.53	clear
0920	175	13.51	8.16	6.37	3.470	0.90	113.2	2.74	clear
0925	175	13.51	8.15	6.38	3.404	0.90	108.3	2.95	clear
0930	175	13.51	8.15	6.42	3.382	0.82	101.8	2.50	clear
0935	175	13.51	8.06	6.44	3.373	0.77	98.5	2.84	clear
0940	175	13.51	2.98	6.47	3.363	0.78	95.1	2.63	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):									

Sampling Details

Sampling ID: 5703MW-20-02A_FEB20
Sample Time: 0940
Duplicate (Y/N): Y
MS/MSD (Y/N): N
Field Filtered (Y/N): Y
Dup ID: ~~0945~~
Filter Size: 0.45um
Dup Time: ~~5703MW-DUP02-FEB20~~

Comments Dup not to be sent to lab

[signature]
Signature

2-13-2020
Date

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

KGS

Well Identification: S703MW-20-03A

1 of 2

Project: ~~LTM - Fall 2019 Sudbury A7~~
Location: Fort Devens, Massachusetts

Date: 2/11/20
Sampler: [illegible]

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	~~4.96~~ 5.18
Depth to bottom (ft BTOR)	56.20 Set Bottom
Pump Set Depth (ft BTOR)	~50 ft
Screen Interval (ft BTOR)	50-60
Total volume purged (gal)	~5 gal

Sampling Type

Purging Method: [illegible]
Purge start/stop time: 1125 - 1255
Tubing type: HDPE
Tubing diameter: 1/4"
Dedicated pump (Y/N): N
Air source: N/A

Field Instrument (Model/S/N): YSI 556 MPS
15F101567

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm^c)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1135	250	5.70	9.75	8.12	0.368	2.54	85.0	67.3	Cloudy
1140	300	5.76	9.59	8.18	0.319	1.11	79.1	26.0	Cloudy
1145	300	5.80	9.44	8.13	0.295	0.58	103.5	715 AU	Opaque Tan
1150	225	5.70	9.82	8.08	0.259	0.29	116.7	Overrange	Opaque Tan
1155	200	5.60	9.59	7.68	0.249	0.28	138.0	3727 AU	Opaque tan
1200	200	5.60	9.55	7.45	0.248	0.24	150.5	2982 AU	Opaque tan
1205	200	5.60	9.62	7.26	0.248	0.20	161.4	2837 AU	Opaque tan
1210	200	5.60	9.70	7.12	0.248	0.18	168.1	2074 AU	Opaque tan
1215	200	5.60	9.74	7.01	0.248	0.17	176.8	1655 AU	Cloudy Tan
1220	200	5.60	9.75	6.92	0.248	0.15	184.5	1444	Opaque Tan
Continued on Sheet 2									
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	Y	Y	N	Y	

Sampling Details

Sampling ID: S703MW-20-03A_FEB20
Sample Time: 1255
Duplicate (Y/N): N
MS/MSD (Y/N): N
Field Filtered (Y/N): Y
Dup ID:
Filter Size: 0.45 um
Dup Time:

Comments post filter turbidity 1.67 NTU

[signature]
Signature

2/11/2020
Date

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: 5703 MW-20-03A

2022

Project: ~~LTM - Fall 2019 Sudbury A7~~

Location: Fort Devens, Massachusetts

Date: 2/11/2020

Sampler: Michael Sprague

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	5.18
Depth to bottom (ft BTOR)	56.20 - soft bottom
Pump Set Depth (ft BTOR)	~50 ft
Screen Interval (ft BTOR)	50-60
Total volume purged (gal)	~55.1

Sampling Type

Purging Method: Peristaltic

Tubing type: HDPE

Dedicated pump (Y/N): N

Purge start/stop time: 1135-1335

Tubing diameter: 1/4"

Air source: N/A

Field Instrument (Model/S/N): YSI 556MPS 15F101567

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1225	200	5.60	9.78	6.83	0.249	0.16	190.2	1303	cloudy tan
1230	200	5.60	9.90	6.78	0.249	0.13	195.2	1475	cloudy tan
1235	200	5.60	9.98	6.74	0.248	0.17	198.2	1395	cloudy tan
1240	200	5.60	10.02	6.66	0.248	0.14	202.0	1738	Cloudy tan
1245	200	5.60	10.04	6.68	0.248	0.11	204.8	2091	opaque tan
1250	200	5.60	10.09	6.70	0.248	0.13	205.9	2110	opaque tan
1255	200	5.60	9.95	6.69	0.248	0.12	208.7	2263	opaque tan
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):									

Sampling Details

Sampling ID: 5703MW-20-03A_FEB20

Sample Time: 1255

Duplicate (Y/N): N

MS/MSD (Y/N): N

Field Filtered (Y/N): Y

Dup ID:

Filter Size: 0.45µm

Dup Time:

Comments Post Filter turbidity 1.67 NTU

Signature

2/11/2020

Date

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

KGS

Well Identification: 5703MW-20-04A

Project: Devens Supplemental Sampling
Location: IAOC 57

Date: 2/11/2020
Sampler: C Miller

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	2"
Material	PVC Screen
Depth to water (ft BTOR)	10.73
Depth to bottom (ft BTOR)	69.60
Pump Set Depth (ft BTOR)	65
Screen Interval (ft BTOR)	60-70
Total volume purged (gal)	4.50

Sampling Type

Purging Method: PP
Purge start/stop time: 1177/1302
Tubing type: HDPE
Tubing diameter: 0.17"x0.25"
Dedicated pump (Y/N): No
Air source: —

Field Instrument (Model/S/N): YSI 650 11J100750/Lamotte 1828.0412

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1177	250	15.25	8.80	6.80	443	0.39	-72.8	12.7	clear
1232	250	15.50	8.78	6.78	443	0.50	-82.7	14.4	clear
1237	250	15.56	8.84	6.77	443	0.61	-88.1	13.0	clear
1242	250	15.89	8.61	6.75	444	0.39	-90.8	13.4	clear
1247	250	16.03	8.55	6.73	445	0.49	-94.2	11.4	clear
1252	250	16.05	8.52	6.72	445	0.46	-95.1	11.2	clear
1257	250	16.07	8.51	6.72	446	0.49	-97.5	11.6	clear
1302	250	16.10	8.49	6.71	447	0.46	-97.7	10.9	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):									

Sampling Details

Sampling ID: 5703MW-20-04A_FEB20
Sample Time: 1302
Duplicate (Y/N): No
MS/MSD (Y/N): NO
Field Filtered (Y/N): Y
Dup ID: —
Filter Size: 0.45
Dup Time: —

Comments

Signature

2/11/2020
Date

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: 5703PZ-14-01 Page 1 of 2

Project: QF Owens AOC57 Date: 2-18-2020

Location: 5703PZ-14-01 Sampler: Michael Spagnoly

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	1"
Material	PVC
Depth to water (ft BTOR)	3.11
Depth to bottom (ft BTOR)	64.99
Pump Set Depth (ft BTOR)	~65
Screen Interval (ft BTOR)	62.5 - 67.5
Total volume purged (gal)	~3.5 gal

Sampling Type

Purging Method: Peristaltic Tubing type: HDPE Dedicated pump (Y/N): N

Purge start/stop time: Per 1410 Tubing diameter: 1/4" Air source: NA

Field Instrument (Model/S/N): YSI 650 MDS
HJ 100 750

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm[c])	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1410	150	3.20	8.22	~~5.88~~	0.202	5.14	363	over range	gray/tan
1415	150	3.19	8.65	8.10	0.140	2.15	16.1	over range	gray/tan
1420	150	3.19	8.49	8.09	0.187	0.92	2.0	689	milky gray
1425	150	3.20	8.73	8.08	0.184	0.53	-15.9	621	milky gray
1430	150	3.20	8.90	8.07	0.183	0.53	-22	618	milky
1435	150	3.20	9.06	8.10	0.182	0.48	-43.5	44.2	slightly milky
1440	150	3.20	9.11	8.11	0.182	0.45	-49.9	62.9	milky
1445	150	3.20	8.91	8.12	0.187	0.43	-54.4	6.96	milky
1450	150	3.20	8.92	8.11	0.182	0.42	-58.6	43.8	milky
1455	150	3.20	8.92	8.11	0.182	0.41	-59.5	36.2	milky
1500	150	3.20	8.86	8.11	0.182	0.43	-57.0	33.7	slightly milky
1505	150	3.20	8.91	8.11	0.182	0.51	-51.4	38.4	milky
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):									

Sampling Details

Sampling ID: 5703PZ-14-01_FEB20

Sample Time: 1525 Duplicate (Y/N): N MS/MSD (Y/N): N

Field Filtered (Y/N): Y Dup ID: NA

Filter Size: 0.45 um Dup Time: NA

Comments

[signature] 2-18-2020

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

KGS

Well Identification: 5703 PZ-19-01

Page 2 of 2

Project: At Dennis AOC57 Date: 2-18-2020

Location: 5703 PZ-19-01 Sampler: Michael Sparkey

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	1"
Material	PVC
Depth to water (ft BTOR)	3.11
Depth to bottom (ft BTOR)	69.99
Pump Set Depth (ft BTOR)	~65
Screen Interval (ft BTOR)	62.5-67.5
Total volume purged (gal)	~3.5 gal

Sampling Type

Purging Method: Peristaltic Tubing type: HDPE Dedicated pump (Y/N): N

Purge start/stop time: 1410-1525 Tubing diameter: 1/4" Air source: N/A

Field Instrument (Model/S/N): YSS 650 MDS 11J100750

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm^c)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1510	150	3.20	8.97	8.10	0.182	0.48	-61.3	46.8	milky
1515	150	3.20	9.00	8.11	0.182	0.43	-66.9	26.3	milky
1520	150	3.20	8.98	8.11	0.182	0.38	-68.7	27.4	milky
1525	150	3.20	9.12	8.11	0.182	0.45	-68.1	27.8	milky
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):									

Sampling Details

Sampling ID: 5703 PZ-19-01_FEB20

Sample Time: 1525 Duplicate (Y/N): N MS/MSD (Y/N): N

Field Filtered (Y/N): Y Dup ID: NA

Filter Size: 0.45um Dup Time: NA

Comments

[signature] 2-18-2020

WELL DEVELOPMENT FIELD SHEETS

KGS

WELL DEVELOPMENT RECORD

SITE:	Former Fort Devens Devens MA	WELL IDENTIFICATION NO.	S702MW-20-01A	TOTAL DEPTH (FT)	40 ft bgs
SITE ADDRESS:	AOC57	DATE INSTALLED:	1/3/2020	CASING ID (IN):	2
PROJECT NAME:	Devens PFAS RI	DATE DEVELOPED:	2/4/2020	DEPTH TO BOTTOM (FT)	41.00 ft BTOR
PROJECT NUMBER:	1082-0011-515	DEVELOPMENT METHOD	Pump + Surge	STATIC WATER LEVEL IN FEET BEFORE DEVELOPMENT:	2.71'
PERSONNEL:	C Miller	SUBMERSIBLE PUMP TYPE	N/A	STATIC WATER LEVEL IN FEET AFTER DEVELOPMENT	4.03'
COMPANY:	KOMAN Government Solutions, LLC	Turbity Meter Type/ID:	1878-0412	Water Quality Meter Type/ID:	115 100 185

TIME (every 10 min)	ZONE OF DEVELOPMENT (FT BGS)	CUMULATIVE WATER VOLUME (GALS).	WATER LEVEL READINGS (FT. BELOW TOR)	TURBIDITY (NTU)	TEMPERATURE C	pH	DO	ORP	SP. COND. (UNITS uS/cm)	REMARKS (odor, color, sediment thickness)
1045	30-40	15	3.90	1096	12.10	8.71	6.83	109.1	383	cloudy, Fine silt, no odor
1055	30-40	25	3.97	710	12.18	7.79	6.90	107.4	380	" "
1105	30-40	35	4.00	696	12.22	7.45	6.96	108.5	379	" "
1115	30-40	45	4.00	706	12.24	7.37	6.97	108.1	376	" "
1125	contacted	PM								CM 2020
1135	30-40	65	4.03	692	12.23	7.36	7.03	108.3	375	" "
1145	30-40	75	4.03	692	12.22	6.97	7.04	107.0	376	" "
1155	30-40	85	4.03	700	12.19	6.96	7.06	109.8	377	" "
1205	30-40	95	4.03	698	12.21	6.96	7.02	107.5	375	" "
— Purged for 1.5 hours										CM 2020

4. Move tools sequentially once particular zone is developed

1 Each zone developed until turbidity is constant for 20 min and turb < 5 NTUs
2 Or when stable for 20 min if 5 NTU is not achieved
3. Or when a zone has been developed for min of 1 hr

KGS

WELL DEVELOPMENT RECORD

SITE:	Former Fort Devens, Devens, MA	WELL IDENTIFICATION NO.	5702MW-20-013	TOTAL DEPTH (FT):	
SITE ADDRESS:	Nypro-Barnum Rd. Devens | AOC 57	DATE INSTALLED:		CASING ID (IN):	2" PVC
PROJECT NAME:	Devens PFAS RI	DATE DEVELOPED:	01/28/2020	DEPTH TO BOTTOM (FT):	Before: 70.40 (soft)
PROJECT NUMBER:	1082-0011-515	DEVELOPMENT METHOD:	Pump + Surge Waterra	STATIC WATER LEVEL IN FEET BEFORE DEVELOPMENT:	1.80 ft bTOR
PERSONNEL:	Brett Anchukaitis	SUBMERSIBLE PUMP TYPE:	N/A	STATIC WATER LEVEL IN FEET AFTER DEVELOPMENT:	1.80 ft bTOR
COMPANY:	KOMAN Government Solutions, LLC	Turbity Meter Type/ID:	Lamotte 2020we	Water Quality Meter Type/ID:	~~Heron Dipper T~~ YSI 600XL 11B100185

TIME (every 10 min)	ZONE OF DEVELOPMENT (FT BGS)	CUMULATIVE WATER VOLUME (GALS).	WATER LEVEL READINGS (FT. BELOW TOR)	TURBIDITY (NTU)	TEMPERATURE C	pH	DO	ORP	SP. COND. (UNITS)	REMARKS (odor, color, sediment thickness)
0800	70-80	10	5.25	>4,000	10.70	8.76	1.70	152.8	183	Gray, fine sandy silt, soft bottom, thick sed, no odor
0810	70-80	20	4.30	1208 AU	11.31	8.60	1.02	135.0	163	Gray, fine sandy silt, thick sed. no odor
0820	70-80	30	4.30	1001 AU	11.43	8.49	1.76	125.2	162	"
0830	70-80	40	4.30	785 AU	11.43	8.51	1.58	100.6	159	Gray fine sandy silt. no odor
0840	70-80	50	4.30	691 AU	11.43	8.53	1.23	93.8	157	Gray fine sandy silt no odor
0850	70-80	60	4.30	51	11.45	8.58	1.20	82.4	156	Gray fine sand (sed) no odor
8HR 0900	70-80	70	4.30	30	11.48	8.53	1.28	75.4	156	Gray fine sand (sed) no odor
0910	70-80	80	4.30	30	11.50	8.58	0.88	68.7	155	"
0920	70-80	90	4.30	18	11.42	8.58	0.54	63.0	157	"
0930	70-80	100	4.30	8.0	11.50	8.61	0.80	57.8	155	" clearing up.
0940	70-80	110	4.30	2.8	11.42	8.61	0.81	52.3	157	clear
0950	70-80	120	4.30	3.0	11.45	8.60	0.70	50.1	157	clear
2HR 1000	70-80	130	4.30	2.5	11.41	8.60	0.72	47.7	157	clear
			STOP - STABLE READINGS							

4. Move tools sequentially once particular zone is developed

1 Each zone developed until turbidity is constant for 20 min and turb < 5 NTUs
2 Or when stable for 20 min if 5 NTU is not achieved
3 Or when a zone has been developed for min of 1 hr

KGS

WELL DEVELOPMENT RECORD

SITE:	Former Fort Devens Devens MA	WELL IDENTIFICATION NO.	572MW-20-02A	TOTAL DEPTH (FT):	43.50
SITE ADDRESS:	AOC 57	DATE INSTALLED:	01/17/20	CASING ID (IN)	2" PVC
PROJECT NAME	Devens PFAS RI	DATE DEVELOPED	1/24/20	DEPTH TO BOTTOM (FT)	43.50
PROJECT NUMBER	1082-0011-515	DEVELOPMENT METHOD	Pump & surge	STATIC WATER LEVEL IN FEET BEFORE DEVELOPMENT:	21.60
PERSONNEL	Melissa Miller	SUBMERSIBLE PUMP TYPE:	N/A	STATIC WATER LEVEL IN FEET AFTER DEVELOPMENT:	21.60
COMPANY:	KOMAN Government Solutions, LLC	Turbity Meter Type/ID:	Lamotte 2020we	Water Quality Meter Type/ID:	YSI 650 MDS

TIME (every 10 min)	ZONE OF DEVELOPMENT (FT BGS)	CUMULATIVE WATER VOLUME (GALS).	WATER LEVEL READINGS (FT. BELOW TOR)	TURBIDITY (NTU)	TEMPERATURE C	pH	DO	ORP	SP. COND. (UNITS uS)	REMARKS (odor, color, sediment thickness)
0930	30-40	2.0	21.60	936	9.89	8.16	10.69	17.3	1099	No odor, Light Brown, Slight Sed
0940	30-40	4.0	21.60	over ange	10.41	9.00	12.75	10.0	~~[illegible]~~	No odor, Dark Brown (SP C 990)
0950	30-40	6.0	21.60	overnight	10.73	8.95	11.10	19.8	900	No odor, Dark Brown
1000	30-40	8.0	21.60	925	10.75	8.98	12.20	39.0	925	No odor Light brown
1010	30-40	10.0	21.60	900	10.76	8.50	12.25	32.1	900	No odor cloudy Brown
1020	30-40	12.0	21.60	915	10.79	7.77	12.20	23.4	897	No odor light Brow
1030	30-40	14.0	21.60	525	11.00	7.63	12.73	34.0	886	No odor, cloudy
1040	30-40	16.0	21.60	227	10.85	7.63	12.75	54.0	877	No odor, cloudy
1050	30-40	18.0	21.60	75.0	11.15	7.58	12.17	65.6	877	No odor, cloudy
1100	30-40	20.0	21.60	35.20	11.00	7.65	12.20	67.3	876	No odor clear
1110	30-40	22.0	21.60	11.58	10.89	7.66	12.42	73.4	875	No odor clear
1120	30-40	24.0	21.60	10.00	11.05	7.65	12.00	70.9	870	No odor clear
1130	30-40	26.0	21.60	9.95	11.08	7.64	11.95	70.1	869	No odor clear
1140	30-40	28.0	21.60	8.90	11.10	7.63	11.90	69.5	866	No odor clear

1 well volume = 3.50 gallons.

Hit bottom Hard

Depth to Bottom: 43.50

1 Each zone developed until turbidity is constant for 20 min and turb < 5 NTUs
2. Or when stable for 20 min if 5 NTU is not achieved
3 Or when a zone has been developed for min of 1 hr

4 Move tools sequentially once particular zone is developed

KGS

WELL DEVELOPMENT RECORD

SITE:	Former Tim Hanna Dealership, MA	WELL IDENTIFICATION NO.	5703MW 20-01A	TOTAL DEPTH (FT):	20.58
SITE ADDRESS:	AOC 57	DATE INSTALLED:	1/3/2020	CASING ID (IN):	2
PROJECT NAME:	Camp Pirie RI	DATE DEVELOPED:	2/4/2020	DEPTH TO BOTTOM (FT):	20.58
PROJECT NUMBER:	1182-0811-514	DEVELOPMENT METHOD:	Surge + pump	STATIC WATER LEVEL IN FEET BEFORE DEVELOPMENT:	5.26
PERSONNEL:	C. Mills	SUBMERSIBLE PUMP TYPE:	n/a	STATIC WATER LEVEL IN FEET AFTER DEVELOPMENT:	15.61
COMPANY:	KORAN Government Services, LLC	Turbidity Meter Type/ID:	1822.0412	Water Quality Meter Type/ID:	113100 IE5

TIME (every 10 min)	ZONE OF DEVELOPMENT (FT BGS)	CUMULATIVE WATER VOLUME (GALS)	WATER LEVEL READINGS (FT. BELOW TOR)	TURBIDITY (NTU)	TEMPERATURE C	pH	DO	ORP	SP. COND. (UNITS S/m)	REMARKS (odor, color, sediment thickness)
1330	10-20	15	15.70	2725	9.37	6.69	8.62	-73.9	2420	Dark cloudy, none, fine silt
1340	10-20	30	15.30	1247	9.34	6.68	4.39	-42.2	2968	" "
1400	0-20	30	15.45	1379	9.31	6.70	4.37	-42.2	2851	" "
1410	10-20	40	15.60	960	9.32	6.72	3.49	-67.9	2409	" "
1420	10-20	50	15.60	842	9.33	6.72	2.85	-60.1	2901	cloudy, none, fine silt
1430	0-20	60	15.61	811	9.32	6.65	3.36	-47.6	2850	" "
1440	0-20	70	15.61	748	9.38	6.63	3.35	-70.5	2853	" "
1450	10-20	80	15.61	733	9.37	6.61	3.38	-68.6	2838	" "
1500	10-20	90	15.61	730	9.35	6.57	3.34	-69.0	2845	" "

1. Each zone developed until turbidity is constant for 20 min and turb < 5 NTUs
2. Or when stable for 20 min if 5 NTU is not achieved
3. Or when a zone has been developed for min of 1 hr

4. Move tools sequentially once particular zone is developed

FR: 1.6 L/min

WELL DEVELOPMENT RECORD

SITE:	Former Fort Devens Devens MA	WELL IDENTIFICATION NO	5702MW-20-03A	TOTAL DEPTH (FT):	
SITE ADDRESS	AOC 5702	DATE INSTALLED:		CASING ID (IN):	3/2" Steel, 2" PVC
PROJECT NAME	Devens PFAS RI	DATE DEVELOPED	02/19/2020	DEPTH TO BOTTOM (FT):	39.14 ft bTOR
PROJECT NUMBER	1082-0011-515	DEVELOPMENT METHOD	Pump + Surge Packers	STATIC WATER LEVEL IN FEET BEFORE DEVELOPMENT	16.72 ft bTOR
PERSONNEL	Brett Anchukaitis	SUBMERSIBLE PUMP TYPE:	N/A	STATIC WATER LEVEL IN FEET AFTER DEVELOPMENT	16.70 ft bTOR
COMPANY:	KOMAN Government Solutions, LLC	Turbity Meter Type/ID:	Lamotte 2020we	Water Quality Meter Type/ID:	YSI 556 MPS 15F101567

	TIME (every 10 min)	ZONE OF DEVELOPMENT (FT BGS)	CUMULATIVE WATER VOLUME (GALS).	WATER LEVEL READINGS (FT. BELOW TOR)	TURBIDITY (NTU)	TEMPERATURE C	pH	DO	ORP	SP. COND. (UNITS)	REMARKS (odor, color, sediment thickness)
	1100	30-40	4.23	17.00	>4,000	8.87	8.98	1.70	-205.4	471	Brown, silty no odor
	1120		12.69	17.00	>4,000	8.85	8.67	4.95	-157.6	587	"
	1130		16.92	17.00	3836	9.28	8.50	5.81	-125.3	599	"
	1140		21.15	17.00	2757	9.45	8.08	5.74	-97.2	598	"
1 HR	1200		29.61	17.00	1853	9.66	7.67	7.28	-84.4	590	"
	1210		33.84	17.00	1562	10.08	7.60	5.84	-67.5	581	"
	1220		38.07	17.00	1474	9.92	7.47	6.40	-58.1	579	"
	1230		42.30	17.00	1408	9.97	7.40	6.71	-58.4	577	"
	1240		46.53	17.00	1324	10.02	7.33	6.58	-59.0	575	"
	1250		50.76	17.00	1248	9.41	7.24	6.30	-51.7	566	"
2 HR	1300		54.99	17.00	1019	8.99	7.24	6.28	-47.3	563	"
	1310		59.22	17.00	1132	8.03	7.20	6.49	-38.7	558	"
	1320		63.45	17.00	1049	8.28	7.19	6.80	-36.2	555	"
	1330		67.68	17.00	1031	8.35	7.19	7.10	-35.7	553	"
	1340		71.91	17.00	958	8.62	7.18	6.99	-38.1	554	"
	1350		76.14	17.00	946	8.97	7.15	7.04	-39.7	559	"
3 HR	1400		80.37	17.00	931	9.08	7.12	7.28	-41.6	563	"

4 Move tools sequentially once particular zone is developed

1 Each zone developed until turbidity is constant for 20 min and turb < 5 NTUs
2 Or when stable for 20 min if 5 NTU is not achieved
3 Or when a zone has been developed for min of 1 hr

(Page 2 of 2)

WELL DEVELOPMENT RECORD

SITE:	Former Fort Devens, Devens, MA	WELL IDENTIFICATION NO	ST02MW-20-03A	TOTAL DEPTH (FT) :	39.06
SITE ADDRESS:		DATE INSTALLED:		CASING ID (IN):	2"
PROJECT NAME:	Devens PFAS RI	DATE DEVELOPED	2/20/2020	DEPTH TO BOTTOM (FT):	39.18
PROJECT NUMBER	1082-0011-515	DEVELOPMENT METHOD:	water	STATIC WATER LEVEL IN FEET BEFORE DEVELOPMENT:	16.68
PERSONNEL:	[illegible]	SUBMERSIBLE PUMP TYPE:	N/A	STATIC WATER LEVEL IN FEET AFTER DEVELOPMENT:	
COMPANY:	KOMAN Government Solutions, LLC	Turbity Meter Type/ID:	LaMotte 2020WE	Water Quality Meter Type/ID:	YSI 650XL

TIME (every 10 min)	ZONE OF DEVELOPMENT (FT BGS)	CUMULATIVE WATER VOLUME (GALS).	WATER LEVEL READINGS (FT. BELOW TOR)	TURBIDITY (NTU)	TEMPERATURE C	pH	DO	ORP	SP. COND. (UNITS ____)	REMARKS (odor, color, sediment thickness)
Final reading from 2/19 @1400 ☆			17.00	931	9.08	7.12	7.28	-41.6	563	
			[illegible]							
800			17.14	3021	8.97	7.60	9.21	181.6	662	
810			17.14	2100	8.96	6.90	9.37	138.7	629	
820			17.14	1904	8.92	6.86	9.40	114.4	549	
830			17.14	1102	8.91	6.78	9.47	101.6	547	
840			17.14	839	8.94	6.69	9.66	94.1	539	
850			17.14	664	8.97	6.66	9.80	87.2	533	
900			17.14	396	8.93	6.73	9.78	86.2	526	
910			17.14	194	8.92	6.71	9.79	84.1	531	
920			17.14	80.1	8.99	6.70	9.77	79.6	530	
930			17.14	67.1	9.01	6.66	9.60	77.7	530	
940			17.14	49.6	8.96	6.70	9.47	76.4	536	
950			17.14	31.7	8.94	6.69	9.38	75.9	532	
1000			17.14	24.1	8.93	6.69	9.29	73.2	531	

4. Move tools sequentially once particular zone is developed

1 Each zone developed until turbidity is constant for 20 min and turb < 5 NTUs
2 Or when stable for 20 min if 5 NTU is not achieved
3 Or when a zone has been developed for min of 1 hr

WELL DEVELOPMENT RECORD

SITE:	Former Fort Devens, Devens, MA	WELL IDENTIFICATION NO.	5702MW-20-04A	TOTAL DEPTH (FT)	
SITE ADDRESS:	AOC 57	DATE INSTALLED		CASING ID (IN)	2" PVC
PROJECT NAME	Devens PFAS RI	DATE DEVELOPED:	01/29/2020	DEPTH TO BOTTOM (FT):	83.52
PROJECT NUMBER:	1082-0011-515	DEVELOPMENT METHOD:	Pump + Surge Waterra	STATIC WATER LEVEL IN FEET BEFORE DEVELOPMENT:	14.22
PERSONNEL:	Brett Anchukaitis	SUBMERSIBLE PUMP TYPE	N/A	STATIC WATER LEVEL IN FEET AFTER DEVELOPMENT:	14.10
COMPANY:	KOMAN Government Solutions, LLC	Turbity Meter Type/ID:	Lamotte 2020we	Water Quality Meter Type/ID:	YSI 600XL

TIME (every 10 min)	ZONE OF DEVELOPMENT (FT BGS)	CUMULATIVE WATER VOLUME (GALS).	WATER LEVEL READINGS (FT. BELOW TOR)	TURBIDITY (NTU)	TEMPERATURE C	pH	DO	ORP	SP. COND. (UNITS)	REMARKS (odor, color, sediment thickness)
0800	70-80	10	16.50	>4,000	12.08	7.82	1.18	126.8	273	Brown-light brown very fine silt, no odor
0810	70-80	20	16.50	>4,000	12.13	7.44	1.12	85.6	276	"
Σ	Pumping continued while BrA worked w/ WSP Surveying in Area 1 + 2 of Devens.									
1040	70-80	170	16.50	>4,000	11.32	7.16	1.81	-24.8	281	
1050	70-80	180	16.50	>4,000	11.30	7.14	1.50	-26.1	283	
1100	70-80	190	16.50	>4,000	11.36	7.14	1.84	-25.7	283	
			STOP DEVELOPMENT							

No change in turbidity, all other readings within LE stable parameters.
Sediment described as brown-light brown silt.

1 Each zone developed until turbidity is constant for 20 min and turb < 5 NTUs
2. Or when stable for 20 min if 5 NTU is not achieved
3 Or when a zone has been developed for min of 1 hr

4. Move tools sequentially once particular zone is developed

WELL DEVELOPMENT RECORD

SITE	Former Fort Devens, Devens, MA	WELL IDENTIFICATION NO.	5702MW-20-05A	TOTAL DEPTH (FT)	
SITE ADDRESS		DATE INSTALLED		CASING ID (IN)	2"
PROJECT NAME	Devens PFAS RI	DATE DEVELOPED	2/21/20	DEPTH TO BOTTOM (FT)	42.95
PROJECT NUMBER	1082-0011-515	DEVELOPMENT METHOD	Waters	STATIC WATER LEVEL IN FEET BEFORE DEVELOPMENT	6.03
PERSONNEL	KWA	SUBMERSIBLE PUMP TYPE	N/A	STATIC WATER LEVEL IN FEET AFTER DEVELOPMENT	
COMPANY	KOMAN Government Solutions, LLC	Turbidity Meter Type/ID	LaMotte 2020WE	Water Quality Meter Type/ID	YSI 650 XL 116100387

TIME (every 10 min)	ZONE OF DEVELOPMENT (FT BGS)	CUMULATIVE WATER VOLUME (GALS)	WATER LEVEL READINGS (FT. BELOW TOR)	TURBIDITY (NTU)	TEMPERATURE C	pH	DO	ORP	SP. COND. (UNITS ___)	REMARKS (odor, color, sediment thickness)
1000			6.21	48.5	8.78	7.17	9.99	185.4	1155	
1010			6.21	46.3	9.00	7.07	10.00	176.1	1147	
1020			6.21	44.2	9.07	7.03	9.97	165.7	1143	
1030			6.21	39.7	9.18	7.00	9.93	147.3	1132	
1040			6.21	26.4	9.27	6.47	9.90	132.6	1128	
1050			6.21	13.4	9.30	6.09	9.86	121.9	1117	
1100			6.21	12.7	9.21	5.87	9.77	122.7	1132	
1110			6.21	11.6	9.80	5.93	9.89	138.1	1146	
1120			6.21	10.9	9.29	5.99	9.63	136.2	1137	
1130			6.21	9.97	9.32	6.06	9.50	121.3	1123	
1140			6.21	9.32	9.40	6.02	9.73	119.6	1121	
1150			6.21	9.11	9.59	6.12	9.80	121.7	1118	
1200			6.21	8.99	9.62	6.02	9.91	128.1	1140	
1210			6.21	8.96	9.74	6.00	10.03	132.5	1161	
~~1220~~	~~KWA~~		~~6.21~~							
~~1230~~	~~KWA~~		~~6.21~~							
~~1240~~	~~KWA~~		~~6.21~~							
~~1250~~	~~KWA~~		~~6.21~~							
1300			6.21	6.93	9.30	5.89	9.77	122.6	1120	
1310			6.21	6.72	9.23	5.93	9.78	121.7	1117	
1320		180	6.21	6.70	9.18	5.97	9.83	120.9	1118	
~~1330~~			~~6.21~~							

Lunch + MBR

4. Move tools sequentially once particular zone is developed

1 Each zone developed until turbidity is constant for 20 min and turb < 5 NTUs
2 Or when stable for 20 min if 5 NTU is not achieved
3 Or when a zone has been developed for min of 1 hr

1016

Page ___ of ___

Page 9 (1 of 2)

WELL DEVELOPMENT RECORD

SITE:	Former Fort Devens Devens MA	WELL IDENTIFICATION NO	5702MW20-05B	TOTAL DEPTH (FT)	
SITE ADDRESS		DATE INSTALLED:		CASING ID (IN):	2"
PROJECT NAME	Devens PFAS RI	DATE DEVELOPED:	2/20/ 2/21	DEPTH TO BOTTOM (FT):	
PROJECT NUMBER:	1082-0011-515	DEVELOPMENT METHOD	Waterra	STATIC WATER LEVEL IN FEET BEFORE DEVELOPMENT	5.23
PERSONNEL:	[illegible]	SUBMERSIBLE PUMP TYPE:	N/A	STATIC WATER LEVEL IN FEET AFTER DEVELOPMENT:	
COMPANY:	KOMAN Government Solutions, LLC	Turbity Meter Type/ID:	LaMotte 2020WE	Water Quality Meter Type/ID:	YSI 650XL 116100 387

TIME (every 10 min)	ZONE OF DEVELOPMENT (FT BGS)	CUMULATIVE WATER VOLUME (GALS).	WATER LEVEL READINGS (FT. BELOW TOR)	TURBIDITY (NTU)	TEMPERATURE C	pH	DO	ORP	SP. COND. (UNITS ___)	REMARKS (odor, color, sediment thickness)
1020			☆ 9.43	74,000	9.97	8.67	9.81	21.6	321	
1030			9.45	74,000	9.86	8.66	9.80	4.7	300	
1040			9.45	74,000	9.83	8.69	9.72	3.2	289	
1050			9.45	74,000	9.81	8.70	9.58	1.6	279	
1100			9.53	74,000	9.79	8.60	9.52	0.9	247	
1110			9.52	74,000	9.77	8.47	9.48	0.3	246	
1120			9.48	74,000	9.73	8.46	9.42	-1.0	242	
1130			9.50	74,000	9.82	8.33	9.31	-2.6	240	
1140			9.57	74,000	9.64	8.21	9.19	-4.7	237	
1150			9.57	3972	9.62	7.95	8.71	-5.5	235	
1200			9.56	3420	9.53	7.93	8.66	-6.1	236	
1210			9.56	3106	9.49	7.90	8.67	-6.0	237	
1220			9.59	2973	9.47	7.99	8.68	[illegible].2	240	
1230			9.59	2300	9.49	7.92	8.74	1.0	229	
1240			9.57	2202	9.50	7.52	8.86	2.3	231	
1250			9.57	1949	9.52	7.40	9.70	7.6	226	
1300			9.57	1896	9.53	7.33	9.97	12.6	221	
1310			9.60	1820	9.51	7.31	9.86	12.3	220	
1320			9.60	1780	9.60	7.29	9.83	11.6	218	
1330			9.60	1638	9.69	7.32	9.80	9.9	217	
1340			9.60	1590	9.49	7.28	9.71	9.3	220	

2/20

☆ Moisture on tubing is affected DTW measurements

4. Move tools sequentially once particular zone is developed

1 Each zone developed until turbidity is constant for 20 min and turb < 5 NTUs
2 Or when stable for 20 min if 5 NTU is not achieved
3 Or when a zone has been developed for min of 1 hr

(Page 2 of)

WELL DEVELOPMENT RECORD

SITE:	Former Fort Devens, Devens, MA	WELL IDENTIFICATION NO.	5702MW20.05B	TOTAL DEPTH (FT)	81.93
SITE ADDRESS:		DATE INSTALLED:		CASING ID (IN):	2"
PROJECT NAME:	Devens PFAS RI	DATE DEVELOPED:	2/20/2/21	DEPTH TO BOTTOM (FT):	81.93
PROJECT NUMBER:	1082-0011-515	DEVELOPMENT METHOD:	water	STATIC WATER LEVEL IN FEET BEFORE DEVELOPMENT:	5.23
PERSONNEL:	[illegible]	SUBMERSIBLE PUMP TYPE:	N/A	STATIC WATER LEVEL IN FEET AFTER DEVELOPMENT:	—
COMPANY:	KOMAN Government Solutions LLC	Turbity Meter Type/ID:	LaMotte 2020WE	Water Quality Meter Type/ID:	YSI 650X 11600387

	TIME (every 10 min)	ZONE OF DEVELOPMENT (FT BGS)	CUMULATIVE WATER VOLUME (GALS).	WATER LEVEL READINGS (FT. BELOW TOR)	TURBIDITY (NTU)	TEMPERATURE C	pH	DO	ORP	SP. COND. (UNITS ___)	REMARKS (odor, color, sediment thickness)
	1350			9.55	1345	9.60	7.31	9.70	10.1	227	
2/20	1400			9.54	1297	9.57	7.27	9.63	11.6	224	
	1410			9.54	1207	9.53	7.30	9.58	10.3	223	
	1420			9.54	1046	9.50	7.29	9.62	10.7	221	
2/21	720			8.45	74,000	8.78	7.51	10.01	39.1	306	
	730			8.47	74,000	8.90	7.50	10.03	36.1	302	
	740			8.46	3937	8.93	7.47	9.63	32.7	270	
	750			8.45	3407	9.20	7.43	9.58	29.8	264	
	800			8.45	2938	9.18	7.45	9.50	29.0	263	
	810			8.45	2300	9.32	7.46	9.63	24.6	262	
	820			8.45	1903	9.30	7.49	9.50	23.7	259	
	830			8.45	1330	9.39	7.47	9.49	22.6	260	
	840			8.45	1203	9.41	7.45	9.43	19.0	252	
	850			8.45	1140	9.43	7.46	9.41	19.1	250	
	900			8.45	987	9.39	7.41	9.42	18.7	251	
	910			8.45	640	9.45	7.43	9.43	18.6	247	
	920			8.45	621	9.46	7.47	9.47	18.4	249	

4. Move tools sequentially once particular zone is developed

1 Each zone developed until turbidity is constant for 20 min and turb < 5 NTUs
2 Or when stable for 20 min if 5 NTU is not achieved
3 Or when a zone has been developed for min of 1 hr

KGS

WELL DEVELOPMENT RECORD

SITE	Former Fort Devens, Devens, MA	WELL IDENTIFICATION NO	5702MW-20-06A	TOTAL DEPTH (FT):	82.71
SITE ADDRESS:	AOC57	DATE INSTALLED	1/15/20	CASING ID (IN):	2" PVC
PROJECT NAME:	Devens PFAS RI	DATE DEVELOPED	1/24/20	DEPTH TO BOTTOM (FT)	82.71
PROJECT NUMBER:	1082-0011-515	DEVELOPMENT METHOD:	Pump & Surge	STATIC WATER LEVEL IN FEET BEFORE DEVELOPMENT:	15.10
PERSONNEL	Melissa Miller	SUBMERSIBLE PUMP TYPE:	N/A	STATIC WATER LEVEL IN FEET AFTER DEVELOPMENT:	15.32
COMPANY:	KOMAN Government Solutions, LLC	Turbity Meter Type/ID:	Lamotte 2020we	Water Quality Meter Type/ID:	YSI 650 MDS

TIME (every 10 min)	ZONE OF DEVELOPMENT (FT BGS)	CUMULATIVE WATER VOLUME (GALS).	WATER LEVEL READINGS (FT. BELOW TOR)	TURBIDITY (NTU)	TEMPERATURE C	pH	DO	ORP	SP. COND. (UNITS cls)	REMARKS (odor, color, sediment thickness)
1220	70-80	5.0	16.75	overange	11.57	7.61	12.57	96.5	446	no odor, Dark Brown, thick
1230	70-80	10.0 +5.0	16.90	overrange	11.84	7.66	12.10	77.9	424	no odor, Dark Brown, Thick
1240	70-80	20+5.0	16.65	overange	12.00	7.67	12.12	83.7	420	no odor, Dark Brown sed. T
1250	70-80	30.0+5.0	16.60	overange	11.63	7.81	7.15	100.6	415	no odor, Dark Brown sed. T
1300	70-80	40.0	16.65	overange	11.70	7.80	7.20	116.0	410	no odor Dark Brown. sed. T
1310	70-80	50.0	16.60	overange	11.52	7.85	7.00	110.2	413	no odor D. Brown Sediment thic
1320	70-80	60.0	16.60	overange	11.47	7.91	6.72	108.1	416	no odor, D Brown, sed. T
1330	70-80	70.0	16.60	overange	11.43	7.93	5.76	100.2	420	no odor D. Brown. sed T
1340	70-80	80.0	16.60	overange	11.39	7.95	5.41	98.0	426	no odor D. Brown. Sed T
1350	70-80	90.0	16.60	overange	11.37	7.96	5.40	95.3	423	no odor D. Brown sed T
1400	70-80	100.0	16.60	overange	11.35	7.95	5.38	91.2	420	no odor D. Brown sed T
~~1410~~	~~70-80~~									
~~1420~~	~~70-80~~									
~~1430~~	~~70-80~~									

1 Well volume = 10.81

Hit soft Bottom

Final Depth: 81.0 FT

4. Move tools sequentially once particular zone is developed

1 Each zone developed until turbidity is constant for 20 min and turb < 5 NTUs
2 Or when stable for 20 min if 5 NTU is not achieved
3 Or when a zone has been developed for min of 1 hr

KGS

WELL DEVELOPMENT RECORD

SITE:	Former Fort Devens, Devens, MA	WELL IDENTIFICATION NO.	S702MW20-06A	TOTAL DEPTH (FT)	
SITE ADDRESS	Nyan - Barym Rd.	DATE INSTALLED:		CASING ID (IN):	2" PVC
PROJECT NAME	Devens PFAS RI	DATE DEVELOPED:	01/27/2020	DEPTH TO BOTTOM (FT):	before: 80.90 bTOR
PROJECT NUMBER:	1082-0011-515	DEVELOPMENT METHOD:	Waterra Surge Pump	STATIC WATER LEVEL IN FEET BEFORE DEVELOPMENT	14.95 bTOR
PERSONNEL	Brett Anchulcaitis	SUBMERSIBLE PUMP TYPE	N/A	STATIC WATER LEVEL IN FEET AFTER DEVELOPMENT:	15.15 ft bTOR
COMPANY:	KOMAN Government Solutions, LLC	Turbity Meter Type/ID:	Lamotte 2020we	Water Quality Meter Type/ID	Solinst

TIME (every 10 min)	ZONE OF DEVELOPMENT (FT BGS)	CUMULATIVE WATER VOLUME (GALS).	WATER LEVEL READINGS (FT. BELOW TOR)	TURBIDITY (NTU)	TEMPERATURE C	pH	DO	ORP	SP. COND. (UNITS µS/cm)	REMARKS (odor, color, sediment thickness)
0820	70-80	10	16.15	>4,000	11.53	8.03	2.25	46.8	516	Dk brown, no odor, thick sed.
0830	70-80	20	16.15	>4,000	11.86	7.86	2.03	-19.8	435	"
0840	70-80	30	16.25	>4,000	11.88	7.71	1.96	-0.8	437	"
0850	70-80	40	16.30	>4,000	11.94	7.58	1.71	5.0	426	"
0900	70-80	50	16.30	>4,000	11.97	7.54	1.59	6.4	435	"
0910	70-80	60	16.45	>4,000	11.95	7.47	1.74	7.8	426	"
0920	70-80	70	16.50	>4,000	11.97	7.44	1.75	8.6	451	"
0930	70-80	80	16.50	>4,000	11.94	7.38	1.83	7.7	469	"
0940	70-80	90	16.65	>4,000	11.98	7.40	1.88	1.7	483	"
0950	70-80	100	16.80	>4,000	12.01	7.37	1.83	-2.4	486	"
1000	70-80	110	16.75	>4,000	11.96	7.35	1.80	-6.6	474	"
1010	STOP TO REFUEL GENERATOR									
1020	70-80	120	16.75	>4000	11.94	7.29	1.82	-6.8	489	"
1030	70-80	130	16.75	>4,000	11.95	7.30	1.84	-12.8	495	"
1040	70-80	140	16.75	>4,000	11.96	7.32	1.86	-15.0	499	"
1050	70-80	150	16.75	>4,000	11.96	7.31	1.80	-15.5	501	"
1100	70-80	160	16.75	>4,000	11.95	7.30	1.86	-16.1	508	"
				STOP Per RM						

Sediment from WS is very fine grained, gray sand/silt. Estimated purged 3.5-4.0 gallons of sediment during 01/27 phase of development. Manually surging at bottom to remove settled solids. After development, soft bottom still exists. Sediment grain size fine (mud) than 10-slot screen

1 Each zone developed until turbidity is constant for 20 min and turb < 5 NTUs
2. Or when stable for 20 min if 5 NTU is not achieved
3 Or when a zone has been developed for min of 1 hr

4 Move tools sequentially once particular zone is developed

KGS

WELL DEVELOPMENT RECORD

SITE	Former Fort Devens Devens MA	WELL IDENTIFICATION NO	5702MW-20-87A	TOTAL DEPTH (FT)	
SITE ADDRESS:	Nypro-Bognum Road	DATE INSTALLED:		CASING ID (IN):	2" PVC, 3 1/2" steel outer casing
PROJECT NAME	Devens PFAS RI	DATE DEVELOPED:	01/27/2020	DEPTH TO BOTTOM (FT):	41.70 ft bTOR before / 41.81 ft bTOR after
PROJECT NUMBER	1082-0011-515	DEVELOPMENT METHOD	Pump + Surge Waterra	STATIC WATER LEVEL IN FEET BEFORE DEVELOPMENT	2.25 bTOR
PERSONNEL:	Brett Anchukaitis	SUBMERSIBLE PUMP TYPE	N/A	STATIC WATER LEVEL IN FEET AFTER DEVELOPMENT:	2.25 ft bTOR
COMPANY:	KOMAN Government Solutions LLC	Turbity Meter Type/ID	Lamotte 2020we	Water Quality Meter Type/ID:	YSI 600XL 11B100135

TIME (every 10 min)	(Screen Interval) ZONE OF DEVELOPMENT (FT BGS)	CUMULATIVE WATER VOLUME (GALS).	WATER LEVEL READINGS (FT. BELOW TOR)	TURBIDITY (NTU)	TEMPERATURE C	pH	DO	ORP	SP. COND. (UNITS)	REMARKS (odor, color, sediment thickness)
1150	30-40	10	2.50	2272 AU	11.25	7.35	5.63	23.0	698	light brown, no odor light sed.
1200	30-40	20	2.50	1103 AU	11.54	7.30	6.43	-17.7	644	"
1210	30-40	30	2.50	14.0	11.46	7.15	6.29	6.7	646	"
1220	30-40	40	2.50	14.0	11.54	7.06	7.39	23.4	643	"
1230	30-40	50	2.50	10.0	11.71	6.98	6.50	29.7	640	"
1240	30-40	60	2.50	9.8	11.79	6.92	6.41	35.8	640	"
1250	30-40	70	2.50	9.6	11.67	6.87	6.38	42.3	639	clear, slight sed, no odor
1300	30-40	80	2.50	8.1	11.68	6.81	6.47	45.0	635	clear, no sed, no odor
1310	30-40	90	2.50	6.3	11.68	6.80	6.60	48.4	631	clear, no sed, no odor
1320	30-40	100	2.50	6.1	11.60	6.81	6.60	51.3	632	clear, no sed, no odor
1330	30-40	110	2.50	5.8	11.58	6.76	6.62	57.3	635	clear, no sed, no odor
1340	30-40	120	2.50	5.3	11.83	6.75	7.10	63.7	625	
1350	30-40	130	2.50	5.0	11.71	6.74	7.01	65.1	626	
1400	30-40	140	2.50	4.8	11.63	6.73	6.59	67.9	627	
1410	30-40	150	2.50	4.9	11.60	6.74	6.60	68.0	628	

STOP AT 1410

purged 150 gal at ~ 1.0 gpm

Brown (Fe-like) sediment was very fine grained, almost silty.

Semi-soft bottom before development

Hard bottom after development.

4 Move tools sequentially once particular zone is developed

1. Each zone developed until turbidity is constant for 20 min and turb < 5 NTUs
2 Or when stable for 20 min if 5 NTU is not achieved
3 Or when a zone has been developed for min of 1 hr

WELL DEVELOPMENT RECORD

SITE:	Former Fort Devens, Devens, MA	WELL IDENTIFICATION NO.	S7034W-20-03A	TOTAL DEPTH (FT):	
SITE ADDRESS:		DATE INSTALLED:		CASING ID (IN):	2" PVC
PROJECT NAME:	Devens PFAS RI	DATE DEVELOPED:		DEPTH TO BOTTOM (FT):	Before : 63 ft bTOR
PROJECT NUMBER:	1082-0011-515	DEVELOPMENT METHOD:		STATIC WATER LEVEL IN FEET BEFORE DEVELOPMENT:	4.90 ft bTOR
PERSONNEL:		SUBMERSIBLE PUMP TYPE:	N/A	STATIC WATER LEVEL IN FEET AFTER DEVELOPMENT:	
COMPANY:	KOMAN Government Solutions, LLC	Turbity Meter Type/ID:	Lamotte 2020we	Water Quality Meter Type/ID:	YSI 600 XL

	TIME (every 10 min)	ZONE OF DEVELOPMENT (FT BGS)	CUMULATIVE WATER VOLUME (GALS).	WATER LEVEL READINGS (FT. BELOW TOR)	TURBIDITY (NTU)	TEMPERATURE C	pH	DO	ORP	SP. COND. (UNITS_____)	REMARKS (odor, color, sediment thickness)
	1200		10	13.00	>4,000	9.95	7.04	1.55	-62.6	277	Brown very fine silt. Soft bottom
	1210		20	13.00	>4,000	10.41	7.03	1.81	-77.3	234	"
	1220		30	13.00	>4,000	10.57	6.99	2.04	-86.6	253	"
	1230		40	13.00	>4,000	10.40	6.88	1.28	-87.1	253	"
	1240		50	13.00	>4,000	10.38	6.86	1.35	-80.3	253	"
	1250		60	13.00	>4,000	10.26	6.84	1.40	-81.6	253	"
1 HR	1300		70	13.00	>4,000	9.95	6.84	1.32	-82.7	253	"
	1310		80	13.00	>4000	10.01	6.86	1.30	-78.5	253	"
	1320		90	13.00	>4000	10.50	6.86	1.34	-68.6	236	"
	1330		100	13.00	>4,000	10.61	6.86	1.08	-65.4	229	"
	1340		110	13.00	>4,000	10.64	6.85	1.08	-59.5	220	"
	1350		120	13.00	>4,000	10.67	6.85	1.23	-59.0	219	"
2 HR	1400		130	13.00	>4,000	10.69	6.84	1.50	-60.1	220	"
			STOP								

1. Each zone developed until turbidity is constant for 20 min and turb < 5 NTUs
2. Or when stable for 20 min if 5 NTU is not achieved
3. Or when a zone has been developed for min of 1 hr

4. Move tools sequentially once particular zone is developed

KuS

WELL DEVELOPMENT RECORD

SITE:	Former Fort Devens, Devens, MA	WELL IDENTIFICATION NO	5703MW-20-04A	TOTAL DEPTH (FT)	
SITE ADDRESS:	AOC 57	DATE INSTALLED:		CASING ID (IN)	2" PVC
PROJECT NAME	Devens PFAS RI	DATE DEVELOPED:	02/03/2020	DEPTH TO BOTTOM (FT):	73.30 ft bTOR
PROJECT NUMBER	1082-0011-515	DEVELOPMENT METHOD	Pump + Surge	STATIC WATER LEVEL IN FEET BEFORE DEVELOPMENT	11.22 ft bTOR
PERSONNEL:	Brett Anchukaitis	SUBMERSIBLE PUMP TYPE:	N/A	STATIC WATER LEVEL IN FEET AFTER DEVELOPMENT:	
COMPANY	KOMAN Government Solutions, LLC	Turbity Meter Type/ID	Lamotte 2020we	Water Quality Meter Type/ID:	YSI 600XL 11B100185

TIME (every 10 min)	ZONE OF DEVELOPMENT (FT BGS)	CUMULATIVE WATER VOLUME (GALS).	WATER LEVEL READINGS (FT. BELOW TOR)	TURBIDITY (NTU)	TEMPERATURE C	pH	DO	ORP	SP. COND. (UNITS ____)	REMARKS (odor, color, sediment thickness)
0800	60-70	10	21.70	>4,000	9.56	8.19	2.60	51.4	210	Dk gray, fine silt. no odor
0810	60-70	20	21.70	>4,000	10.14	8.07	0.59	-89.5	~~222~~ 225	"
0820	60-70	30	21.70	>4,000	10.16	8.13	0.62	-105.1	216	"
0850	60-70	~~40~~ 60	21.70	74,000	9.91	8.46	0.20	-125.5	157	"
0900	60-70	~~50~~ 70	21.70	>4,000	10.29	8.43	1.68	-121.6	173	"
0910	60-70	80	21.70	>4,000	10.10	8.51	0.19	-125.6	180	"
0920	60-70	90	21.70	>4,000	10.07	8.53	0.26	-125.3	178	"
0940	60-70	110	21.70	>4,000	10.07	8.56	0.39	-125.9	164	"
0950	60-70	120	21.70	>4,000	10.01	8.61	0.23	-117.9	162	"
1000	60-70	130	21.70	>4,000	10.04	8.60	0.12	-122.0	161	"
			STOP AT 2 HRS							

Turbidity remained >4,000 NTU throughout the 2-hr well development. Periodic breaks in readings between 0820-0850 and 0920-0940 occurred to check on other sites at Devens. All other necessary readings stabilized. Sediment described as dark-gray silt, fine enough to flow through sand pack and screen.

1 Each zone developed until turbidity is constant for 20 min and turb < 5 NTUs
2. Or when stable for 20 min if 5 NTU is not achieved
3 Or when a zone has been developed for min of 1 hr
4 Move tools sequentially once particular zone is developed

SOIL BORING LOGS

KOMAN Government Solutions, LLC
SOIL BORING LOG

Project: Devens PFAS RI	Boring No.: 5702MW-19-01
Project No.: 1082	Drilling Co.: Cascade Drilling LP
Address: Devens	Driller: Rob Maillet
Logger: Kevin Anderson	Drilling Method: Terrasonic
Date: 12/10/19 - 12/13/19	Drilling Equip: Terrasonic 150CC, 4"/6" diameter core barrel
Total Boring Depth: 160	Static Water: ~22 ft

Date/Time	Interval (ft)	Recovery (ft)	Depth (ft)	GEOLOGIC LOG	REMARKS
12/10/19, 1358	20-30	4	20-24	SAND (SP) - medium to coarse grained, light brown, color where saturated, saturated last 2'	
12/10/19, 1414	30-40	10	30-34	SAND (SP) - medium to coarse grained, light brown/gray, wet.	
			34-36	SAND (SP) - medium to coarse grained, light brown/gray changes to a 6 inch layer of medium to fine grained, orange/light brown, damp.	
			36-40	SAND (SP) - fine grained, light brown/gray, damp.	
12/10/19, 1426	40-50	10	40-46	SAND (SP) - fine grained, with trace medium grained sand, light brown.	
			46-50	SAND to SILT (SM/ML) - fine grained, light brown.	
12/10/19, 1444	50-60	10	50-60	SAND (SP) - fine grained, light brown/gray, trace medium grained orange banding throughout.	
12/10/19, 1500	60-70	10	60-70	SAND (SP) - fine to medium grained, light brown, becoming silty and more competent in the last 6".	

Notes:

Sample from 20-30 ft bgs submitted for total organic carbon and grain size analysis.

Sample from 40-50 ft bgs submitted for total organic carbon and grain size analysis.

QC'd 4/3/2020

KGS

KOMAN Government Solutions, LLC
293 Boston Post Road, Marlborough, MA

KOMAN Government Solutions, LLC
SOIL BORING LOG

Project: Devens PFAS RI	Boring No.: 5702MW-19-01
Project No.: 1082	Drilling Co.: Cascade Drilling LP
Address: Devens	Driller: Rob Maillet
Logger: Kevin Anderson	Drilling Method: Terrasonic
Date: 12/10/19 - 12/13/19	Drilling Equip: Terrasonic 150CC, 4"/6" diameter core barrel
Total Boring Depth: 160	Static Water: ~22 ft

Date/Time	Interval (ft)	Recovery (ft)	Depth (ft)	GEOLOGIC LOG	REMARKS
12/10/19, 1522	70-80	8	70-78	SAND (SP) - fine to medium grained, light brown/gray, with some fine sand, light orange present throughout.	
12/10/19, 1545	80-90	8	80-88	SAND (SP) - fine grained, light brown/gray, final 10" transitions to fine grained, gray sand.	
12/11/19, 0802	90-100	9	90-93	SILT (SM) - light brown, wet.	
			93-99	SAND to SILT (SM/ML) - fine grained, gray, compact.	
12/11/19, 0832	100-110	10	100-110	SILT to CL (ML/CL) - Gray, compact, damp.	
12/11/19, 1320	110-120	4	110-116	No Recovery	
			116-120	SILT to Clay (ML/CL)- Gray.	

Notes:

Sample from 90-100 ft bgs submitted for total organic carbon and grain size analysis.

QC'd 4/3/2020

KGS

KOMAN Government Solutions, LLC
293 Boston Post Road, Marlborough, MA

KOMAN Government Solutions, LLC
SOIL BORING LOG

Project: Devens PFAS RI	Boring No.: 5702MW-19-01
Project No.: 1082	Drilling Co.: Cascade Drilling LP
Address: Devens	Driller: Rob Maillet
Logger: Kevin Anderson	Drilling Method: Terrasonic
Date: 12/10/19 - 12/13/19	Drilling Equip: Terrasonic 150CC, 4"/6" diameter core barrel
Total Boring Depth: 160	Static Water: ~22 ft

Date/Time	Interval (ft)	Recovery (ft)	Depth (ft)	GEOLOGIC LOG	REMARKS
12/11/19, 1344	121-126	5	121-126	SAND to SILT (SM/ML) - fine grained, gray, trace fine to coarse sand, orange.	
12/12/19, 0826	126-136	8	126-136	SILT to CLAY (ML/CL) - Gray, uniform, wet.	
12/12/19, 1245	136-144	7	136-142	SAND (SP) - fine grained, gray, some medium grained, gray sand.	
			142-144	GRAVEL and CLAY (GC/CL) - large, subangular cobbles, gray, dry, with several 2-3" solid pieces, dry, till.	
12/13/19, 0910	144-150	0	144-150	No Recovery	
12/13/19, 1020	150-160	5	150-160	Confirmed bedrock, competent.	

Notes:

QC'd 4/3/2020

KGS

KOMAN Government Solutions, LLC
293 Boston Post Road, Marlborough, MA

Project: Devens PFAS RI	Boring No.: 5702MW-20-01
Project No.: 1082	Drilling Co.: TDS
Address: 112 Barnum	Driller: Jay Jumanville
Logger: Garrett Hazebrouck, Kristen Esser	Drilling Method: Drive and Wash
Date: 01/03/20 - 01/10/20	Drilling Equip: Geoprobe 7822DT, MacroCore and split spoon
Total Boring Depth: 115	Static Water: ~0.5 ft

Date	Interval (ft)	Recovery (ft)	Depth (ft)	GEOLOGIC LOG	REMARKS
1/3/2020	0-5	2	0-2	SAND (SP) - medium to coarse grained, brown, saturated, with few pebbles, soft, low density, low plasticity.	
1/3/2020	5-10	5	5-7.5	SAND (SP) - medium to coarse grained, brown, saturated, with few pebbles, soft, low density, low plasticity.	
			7.5-8.5	SAND (SP) - fine to medium grained, brown, low density and plasticity, some red oxidation	
			8.5-10	SAND (SM) - fine to medium grained, brown, saturated, low density, low plasticity, with some silt.	
1/3/2020	10-15	4.5	10-14.5	SAND (SM) - fine to medium grained, brown, saturated, low density, low plasticity, with some silt.	
1/3/2020	15-20	5	15-17	SAND (SP) - medium to coarse grained, brown, saturated, with some pebbles.	
			17-20	SAND (SP) - fine to medium grained, brown, soft, low density, low plasticity.	
1/3/2020	20-25	2	20-22	SAND (SP) - medium grained, brown, soft, medium density, with some fine grained sand.	

Notes:

QC'd 4/3/2020

KGS

KOMAN Government Solutions, LLC
293 Boston Post Road, Marlborough, MA

Project: Devens PFAS RI	Boring No.: 5702MW-20-01
Project No.: 1082	Drilling Co.: TDS
Address: 112 Barnum	Driller: Jay Jumanville
Logger: Garrett Hazebrouck, Kristen Esser	Drilling Method: Drive and Wash
Date: 01/03/20 - 01/10/20	Drilling Equip: Geoprobe 7822DT, MacroCore and split spoon
Total Boring Depth: 115	Static Water: ~0.5 ft

Date	Interval (ft)	Recovery (ft)	Depth (ft)	GEOLOGIC LOG	REMARKS
01/03/20	25-30	2	25-27	SAND (SP) - fine to medium grained, brown, low density.	
01/03/20	30-35	2	30-32	SAND (SP) - fine to medium grained, brown, medium density, oxidation at 32'.	
01/03/20	35-40	3.5	35-38.5	SAND (SP) - fine to medium grained, brown, medium density.	
01/03/20	40-45	2	40-40.5	SAND (SM) - fine grained, brown, wet, with little silt.	
			40.5-41.5	SILTY SAND (SM) - fine grained, brown, wet, poorly graded, oxidation at 41.5'.	
			41.5-42	SILT (ML) - trace fine sand and trace clay, gray, wet .	
			42-45	No Recovery	
01/03/20	45-50	2	45-47	SILTY SAND (SM) - fine grained, gray, wet, poorly graded.	

Notes:

Sample from 30-40 ft bgs submitted for total organic carbon and grain size analysis.

QC'd 4/3/2020

KGS

KOMAN Government Solutions, LLC
293 Boston Post Road, Marlborough, MA

Project: Devens PFAS RI	Boring No.: 5702MW-20-01
Project No.: 1082	Drilling Co.: TDS
Address: 112 Barnum	Driller: Jay Jumanville
Logger: Garrett Hazebrouck, Kristen Esser	Drilling Method: Drive and Wash
Date: 01/03/20 - 01/10/20	Drilling Equip: Geoprobe 7822DT, MacroCore and split spoon
Total Boring Depth: 115	Static Water: ~0.5 ft

Date	Interval (ft)	Recovery (ft)	Depth (ft)	GEOLOGIC LOG	REMARKS
1/6/2020	50-55	1	50-51	Sandy SILT (SP/SM) - fine grained, light gray, wet.	
1/6/2020	55-60	2	55-57	SILT (ML) - gray, wet, with trace clay.	
1/6/2020	60-65	2	60-62	Silty SAND (SM) - fine grained, gray, wet.	
1/6/2020	65-70	2	65-67	SAND with SILT (SM/ML) - fine grained, gray, wet.	
1/6/2020	70-72	1	70-72	SAND with SILT (SM/ML) - fine grained, gray, wet.	

Notes:

Sample from 30-40 ft bgs submitted for total organic carbon and grain size analysis.

QC'd 4/3/2020

KGS

KOMAN Government Solutions, LLC
293 Boston Post Road, Marlborough, MA

Project: Devens PFAS RI	Boring No.: 5702MW-20-01
Project No.: 1082	Drilling Co.: TDS
Address: 112 Barnum	Driller: Jay Jumanville
Logger: Garrett Hazebrouck, Kristen Esser	Drilling Method: Drive and Wash
Date: 01/03/20 - 01/10/20	Drilling Equip: Geoprobe 7822DT, MacroCore and split spoon
Total Boring Depth: 115	Static Water: ~0.5 ft

Date	Interval (ft)	Recovery (ft)	Depth (ft)	GEOLOGIC LOG	REMARKS
1/7/2020	72-74	2	72-74	SAND with SILT (SM/ML) - fine grained, gray, wet.	
1/7/2020	74-76	2	74-76	SAND with SILT (SM/ML) - fine grained, gray, wet.	
1/7/2020	76-78	2	76-78	SAND with SILT (SM/ML) - fine grained, gray, wet.	
1/7/2020	78-80	2	78-79	SAND with SILT (SM/ML) - fine grained, gray, wet.	
			79-80	SAND with SILT (SM/ML) - fine grained, trace clay, gray, wet.	
1/7/2020	80-85	1.75	80-82	SAND with SILT (SM/ML) - fine grained, gray, wet.	

Notes:

Sample from 30-40 ft bgs submitted for total organic carbon and grain size analysis.

QC'd 4/3/2020

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KOMAN Government Solutions, LLC
293 Boston Post Road, Marlborough, MA

Project: Devens PFAS RI	Boring No.: 5702MW-20-01
Project No.: 1082	Drilling Co.: TDS
Address: 112 Barnum	Driller: Jay Jumanville
Logger: Garrett Hazebrouck, Kristen Esser	Drilling Method: Drive and Wash
Date: 01/03/20 - 01/10/20	Drilling Equip: Geoprobe 7822DT, MacroCore and split spoon
Total Boring Depth: 115	Static Water: ~0.5 ft

Date	Interval (ft)	Recovery (ft)	Depth (ft)	GEOLOGIC LOG	REMARKS
1/8/2020	85-90	2	85-87	SAND with SILT (SM/ML) - fine grained, trace clay, gray, wet.	
1/8/2020	90-95	2	90-92	SAND (SM) - fine grained, some silt, gray, wet.	
1/8/2020	95-97	2	95-96 96-97	SAND (SM) - fine grained, some silt, gray, wet. SANDY SILT (ML) - fine sand, trace clay, grey, wet.	
1/8/2020	97-100	0			
1/8/2020	95-100	5	98-100	SAND and SILT (SM/ML) - fine sand, grey, wet.	

Notes:

Sample from 30-40 ft bgs submitted for total organic carbon and grain size analysis.

QC'd 4/3/2020

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KOMAN Government Solutions, LLC
293 Boston Post Road, Marlborough, MA

Project: Devens PFAS RI	Boring No.: 5702MW-20-01
Project No.: 1082	Drilling Co.: TDS
Address: 112 Barnum	Driller: Jay Jumanville
Logger: Garrett Hazebrouck, Kristen Esser	Drilling Method: Drive and Wash
Date: 01/03/20 - 01/10/20	Drilling Equip: Geoprobe 7822DT, MacroCore and split spoon
Total Boring Depth: 115	Static Water: ~0.5 ft

Date	Interval (ft)	Recovery (ft)	Depth (ft)	GEOLOGIC LOG	REMARKS
1/10/2020	100-105	3.5	100-105	SAND and SILT (SM/ML) - fine grained, gray, wet.	
1/10/2020	105-110	5	105-108.5	SAND and SILT (SM/ML) - fine grained, gray, wet.	
			108.5-109.5	CLAY and SILT (CL/ML) - trace fine sand, grey, wet.	
			109.5-110	SAND and SILT (SM/ML) - fine grained, gray, wet.	
1/10/2020	110-115	5	110-112.5	SAND and SILT (SM/ML) - fine grained, gray.	
			112.5-113	CLAY with SILT and SAND (CL/ML) - fine grained sand, grey, wet.	
			113-114	SAND and SILT (SM/ML) - fine grained, grey, wet.	
			114-115	CLAY (CL) - some rock fragments, black, wet.	

Notes:

Sample from 30-40 ft bgs submitted for total organic carbon and grain size analysis.

QC'd 4/3/2020

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KOMAN Government Solutions, LLC
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KOMAN Government Solutions, LLC
SOIL BORING LOG

Project: Devens PFAS RI	Boring No.: 5702MW-20-03
Project No.: 1082	Drilling Co.: Cascade Drilling LP
Address: Devens	Driller: Rob Maillet
Logger: Kevin Anderson	Drilling Method: Rotosonic
Date: 2/6/2020 - 2/10/2020	Drilling Equip: Terrasonic 150CC, 4"/6" diameter core barrel
Total Boring Depth: 150 ft	Static Water: ~13 ft

Date/Time	Interval (ft)	Recovery (ft)	Depth (ft)	GEOLOGIC LOG	REMARKS
2/6/20, 0800	10-20	7	10-20	SAND (SP) - medium to coarse grained, light brown, damp.	
2/6/20, 0812	20-30	9	20-30	SAND (SP) - medium to coarse grained, light brown with some light gray medium sand, wet.	
2/6/20, 0829	30-40	8	30-34	SAND (SP) - medium to coarse grained, light gray, wet.	
			34-40	SAND (SP) - medium grained, light gray and light brown, wet.	
2/6/20, 0848	40-50	10	40-50	SAND (SP) - fine grained, light brown to light gray, wet.	
2/6/20, 0905	50-60	10	50-56	SAND (SP) - fine grained, light brown to light gray, wet.	
			56-60	SAND and SILT (SM/ML) - fine grained sand, light gray (wet).	

Notes:

QC'd 4/3/2020

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KOMAN Government Solutions, LLC
293 Boston Post Road, Marlborough, MA

KOMAN Government Solutions, LLC
SOIL BORING LOG

Project: Devens PFAS RI	Boring No.: 5702MW-20-03
Project No.: 1082	Drilling Co.: Cascade Drilling LP
Address: Devens	Driller: Rob Maillet
Logger: Kevin Anderson	Drilling Method: Rotosonic
Date: 2/6/2020 - 2/10/2020	Drilling Equip: Terrasonic 150CC, 4"/6" diameter core barrel
Total Boring Depth: 150 ft	Static Water: ~13 ft

Date/Time	Interval (ft)	Recovery (ft)	Depth (ft)	GEOLOGIC LOG	REMARKS
2/6/20, 0925	60-70	8	60-70	SAND and SILT (SM/ML) - fine grained sand, light gray (wet).	
2/6/20, 0947	70-80	9	70-80	SILT (ML) - light gray, wet.	
2/6/20, 1016	80-90	9	80-90	SILT (ML) - light gray, wet.	
2/6/20, 1037	90-100	9	90-100	SILT (ML) - light gray, wet.	
2/6/20, 1107	100-110	10	100-110	SILT (ML) - light gray, wet.	

Notes:

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KOMAN Government Solutions, LLC
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KOMAN Government Solutions, LLC
SOIL BORING LOG

Project: Devens PFAS RI	Boring No.: 5702MW-20-03
Project No.: 1082	Drilling Co.: Cascade Drilling LP
Address: Devens	Driller: Rob Maillet
Logger: Kevin Anderson	Drilling Method: Rotosonic
Date: 2/6/2020 - 2/10/2020	Drilling Equip: Terrasonic 150CC, 4"/6" diameter core barrel
Total Boring Depth: 150 ft	Static Water: ~13 ft

Date/Time	Interval (ft)	Recovery (ft)	Depth (ft)	GEOLOGIC LOG	REMARKS
2/7/20, 0752	110-120	9	110-120	SILT (ML) - light gray, wet.	
2/7/20, 1101	120-130	6	120-130	SILT (ML) - light gray, wet.	
2/7/20, 1430	130-140	9	130-140	SILT (ML) - light gray, wet.	
2/10/20, 1125	140-150	9	140-144	SILT (ML) - light gray, damp.	
			144-148	GRAVEL with SILT/CLAY (GM/ML/CL) - subangular gravel, dark grey, dry, till.	
			148-150	Rock, competent, dark gray phyllite, dry.	

Notes:

QC'd 4/3/2020

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KOMAN Government Solutions, LLC
SOIL BORING LOG

Project: Devens PFAS RI	Boring No.: 5702MW-20-05
Project No.: 1082	Drilling Co.: Cascade Drilling LP
Address: Devens	Driller: Rob Maillet
Logger: Kevin Anderson	Drilling Method: Rotosonic
Date: 01/27/2020 - 02/05/2020	Drilling Equip: Terrasonic 150CC, 4"/6" diameter core barrel
Total Boring Depth: 140	Static Water: ~10 ft

Date/Time	Interval (ft)	Recovery (ft)	Depth (ft)	GEOLOGIC LOG	REMARKS
01/27/20 1435	10-20	10	10-20	SAND (SP) - coarse to medium grained, light brown, damp.	
01/27/20 1451	20-30	9	20-29	SAND (SP) - medium grained, light brown, wet, with trace coarse grained sand.	
01/27/20 1516	30-40	10	30-32	SAND (SP) - coarse to medium grained, light brown, damp.	
			32-40	SAND (SP) - fine to medium grained, light gray damp, with fine sand, brown, banded throughout.	
01/27/20 1537	40-50	10	40-50	SAND (SP) - fine grained, light gray, wet, with some fine grained sand, light brown present.	
01/28/20 0750	50-60	9	50-59	SILT and SAND (SM/ML) - fine grained, light gray, wet.	

Notes:

Sample from 32-40 ft bgs submitted for total organic carbon and grain size analysis.

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KOMAN Government Solutions, LLC
SOIL BORING LOG

Project: Devens PFAS RI	Boring No.: 5702MW-20-05
Project No.: 1082	Drilling Co.: Cascade Drilling LP
Address: Devens	Driller: Rob Maillet
Logger: Kevin Anderson	Drilling Method: Rotosonic
Date: 01/27/2020 - 02/05/2020	Drilling Equip: Terrasonic 150CC, 4"/6" diameter core barrel
Total Boring Depth: 140	Static Water: ~10 ft

Date/Time	Interval (ft)	Recovery (ft)	Depth (ft)	GEOLOGIC LOG	REMARKS
01/28/20 0805	60-70	7	60-67	SAND (SP) - fine grained, light gray, wet, with trace silt.	
01/28/20 0822	70-80	8	70-78	SILT and SAND (SM/ML) - fine grained, light gray, wet.	
01/28/20 0841	80-90	9	80-89	SILT and SAND (SM/ML) - fine grained, light gray, wet.	
01/28/20, 0905	90-100	9	90-99	SILT and SAND (SM/ML) - fine grained, light gray, wet.	
01/28/20, 1304	100-110	8	100-108	SILT (ML) - light gray, damp, with trace sand.	

Notes:

Sample from 70-80 ft bgs submitted for total organic carbon and grain size analysis.

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KOMAN Government Solutions, LLC
SOIL BORING LOG

Project: Devens PFAS RI	Boring No.: 5702MW-20-05
Project No.: 1082	Drilling Co.: Cascade Drilling LP
Address: Devens	Driller: Rob Maillet
Logger: Kevin Anderson	Drilling Method: Rotosonic
Date: 01/27/2020 - 02/05/2020	Drilling Equip: Terrasonic 150CC, 4"/6" diameter core barrel
Total Boring Depth: 140	Static Water: ~10 ft

Date/Time	Interval (ft)	Recovery (ft)	Depth (ft)	GEOLOGIC LOG	REMARKS
01/30/20, 0838	110-120	8.5	110-118.5	SILT (ML) - light gray, wet.	
01/31/20, 1150	120-130	10	120-122	Silty SAND (SM), very fine grained, gray, uniform, moist	
			122-126	Sandy SILT (ML), very fine grained silty, gray, uniform, moist	
			126-128	Clayey SILT (ML), gray, uniform, moist.	
			128-130	Block till (cobbles in fine grained to medicum grained matrix, uniform, slightly moist	
02/05/20, 0807	130-140	9	130-134	GRAVEL with SILT/CLAY (GM/ML/CL) - coarse-grained gravel, dark grey, damp, till.	
			134-140	Dark gray phylittic roack, competent rock, mostly pulverized.	

Notes:

Sample from 70-80 ft bgs submitted for total organic carbon and grain size analysis.

QC'd 4/3/2020

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293 Boston Post Road, Marlborough, MA

VERTICAL PROFILE FIELD SHEETS

AOC 57 AREA 2

KOMAN Gover. .t Solutions, LLC
Vertical Groundwater Profiling Log

Project: CSB Vertical Profiling, Former Fort Devens, MA	Boring No.: 5702VP-20-01 Date: 4/22/20
Project No.: 1082	Drilling Co.: TDS
AOC: 1	Driller: Kyle, Ari
Depth to Surface Water: Dry (on land bridge)	Depth to Sediment: N/A (Dry)
Logger: MA	Drilling Method: Geoprobe SP22/SP-16 (inner) Pump type: geotech
Height of Stickup Above Water/Ground (ft) DTW O.C.* = Standpipe ht above dry ground surface	Development Method/PSI: Nitrogen purge /
Total Boring Depth: 54	Drilling Equip: Geoprobe 6712 DT Tubing: HDPE
Turbidimeter (model/serial number): Lamotte 2020we	YSI (model/serial number): YSI 600XL 11B100185

	Sample Interval (ft bgs)	DTW I.C.	DTW. O.C.*	Minimum Purge Volume	Total Volume Purged	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Sample Time	Sample Identifier - Interval	Remarks Filter
4/22	5-9	0.99	0.30	0.24	1.0	9.09	7.60	623	3.46	61.5	18.1	1495	5702VP-20-01-5-9	0.45
4/23	10-14	0.87	0.30	0.39	1.5	9.31	7.40	603	3.18	42.6	9.7	805	5702VP-20-01-10-14	0.45 MS/MSD
	15-19	0.90	0.30	0.54	1.5	10.49	7.39	629	4.91	41.6	37.1	845	5702VP-20-01-15-19	0.45 DVP-1
4/23	20-24	0.91	0.32	0.69	1.5	11.37	6.81	574	5.21	46.2	720	952	5702VP-20-01-20-24	0.45
	25-29	1.39	0.30	0.84	1.5	11.26	6.67	547	4.01	47.9	703	1026	5702VP-20-01-25-29	0.45
	30-34	1.18	0.30	0.99	1.75	12.40	6.62	401	4.90	59.3	74,000	1128	5702VP-20-01-30-34	10 -> 0.45
	35-39	2.06	0.30	1.14	2.0	12.49	6.59	398	4.92	61.7	17.6	1330	5702VP-20-01-35-39	0.45
	40-44	3.01	0.30	1.29	2.0	9.87	6.69	283	5.01	70.3	980	810	5702VP-20-01-40-44	0.45
4/24	50-54	1.87	0.30	1.59	2.5	9.99	6.73	271	3.29	61.1	74,000	934	5702VP-20-01-50-54	10 -> 0.45

Post Cal. Check Varience Observed (Y/N):

Mill Slot (1-inch I.D) casing purge volume (x2) = 0.0408 gal/ft or 154.44 ml per foot
SP16 = 0.03

Notes: I.C. denotes inside casing O.C. dentoes outside of casing.

5-9 A1-VP-DVP-1-42220 @ 1410
10-14 MS/MSD
15-19 - A1-VP-DVP-1-42320 @ 850
30-34 - used two (10) filters and (1) 0.45 filter

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293 Boston Post Road, Marlborough, MA

KOMAN Gover[illegible]t Solutions, LLC
Vertical Groundwater Profiling Log

Project: CSB Vertical Profiling, Former Fort Devens, MA	Boring No.: 5702VP-20-02 Date: 4/21/20
Project No.: 1082	Drilling Co.: TDS
AOC:	Driller: Kyle, Ari
Depth to Surface Water: Dry (on load bridge)	Depth to Sediment: N/A (Dry)
Logger: WJL	Drilling Method: Geoprobe 5282 / SP-16 inner Pump type: Geotech
Height of Stickup Above Water/Ground (ft) DTW O.C.* = Standpipe ht above dry ground surface	Development Method/PSI: Nitrogen purge /
Total Boring Depth: 54'	Drilling Equip: Geoprobe 6712DT Tubing: MDPE
Turbidimeter (model/serial number): Hach 2100Q	YSI (model/serial number): YSI 600XL 11B100185

	Sample Interval (ft bgs)	DTW I.C.	DTW. O.C.*	Minimum Purge Volume	Total Volume Purged	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Sample Time	Sample Identifier - Interval	Remarks
4/21	5-9	4.19	0.32	0.15	1.5	10.21	6.66	600	3.76	-74.3	11.2	1010	5702VP-20-02-5-9	Filter 0.45 (DVP-1)
	10-14	5.06	0.30	0.30	1.5	10.30	6.69	503	3.17	-21.6	107.6	1055	5702VP-20-02-10-14	0.45
	15-19	1.97	0.30	0.45	1.5	10.18	6.47	429	2.30	-17.1	1904	1310	5702VP-20-02-15-19	10 → 0.45
	20-24	2.39	0.32	0.60	1.5	10.03	6.40	531	2.80	-0.9	1296	1355	5702VP-20-02-20-24	10 → 0.45
4/22	25-29	2.09	0.30	0.75	1.5	9.87	6.59	560	2.30	2.6	2732	820	5702VP-20-02-25-29	10 → 0.45
	30-34	4.21	0.31	0.90	1.5	10.53	6.69	407	6.19	38.7	1302	914	5702VP-20-02-30-34	0.45 (X2)
	35-39	4.68	0.30	1.05	2.0	10.32	6.78	327	3.97	29.6	3351	1010	5702VP-20-02-35-39	10 → 0.45
	40-44	5.99	0.30	1.20	1.5	9.89	6.90	307	4.95	14.7	74,000	1146	5702VP-20-02-40-44	10 → 0.45
	50-54	6.39	0.30	1.50	2.0	10.01	6.77	281	4.30	11.1	3260	1255	5702VP-20-02-50-54	10 → 0.45

Post Cal. Check Variance Observed [Y/N]: [illegible]

Vim Slot (1-inch) [illegible] SP-16 = 0.0[illegible]

Notes: I.C. denotes inside casing O.C. dentoes outside of casing.

5-9 A1-VP DVP-1-4/21/20 @ 1015

34-34 0.45 filter slowed/stopped pump, new 0.45 filter added (2) total, poor recharge

KGS

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[illegible] Post Road, Marlborough, MA

4/21	4/22
Sb-01 0.88	Sb-01 0.86
Sb-02 0.96	Sb-02 0.96
Sb-03 0.44	Sb-03 0.44

KOMAN Gover. t Solutions, LLC
Vertical Groundwater Profiling Log

Project: CSB Vertical Profiling, Former Fort Devens, MA	Boring No.: 570VP-20-03 Date: 4/17/20
Project No.: 1082	Drilling Co.: IDS
AL#:	Driller: Kyle, Ari
Depth to Surface Water: N/A Dry	Depth to Sediment: Dry (on land / bridge) ☆
Logger: WH	Drilling Method: geoprobe SP-22 / SP-16 ● Pump type: geotech
Height of Stickup Above Water/Ground (ft) DTW O.C.* = Standpipe ht above dry ground surface	Development Method/PSI: Nitrogen purge /
Total Boring Depth: 54'	Drilling Equip: geoprobe 6712 DT Tubing: HDPE
Turbidimeter (model/serial number): Lamotte 2020 we	YSI (model/serial number) YSI 109XL

Sample Interval (ft bgs)	DTW I.C.	★ DTW O.C.* Dry	Minimum Purge Volume	Total Volume Purged	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Sample Time	Sample Identifier - Interval	Remarks Filter
5-9	4.94	4.74	0.12	1.5	9.58	7.16	778	6.84	81.1	3248	1018	570VP-20-03-5-9	10 → 0.45
4/17 10-14	4.50	4.83	0.13	1.5	9.97	6.76	804	8.77	42.8	2045	1158	570VP-20-03-10-14	10 → 0.45 (MS/MSD)
15-19	5.48	4.86	0.32	2.0	11.27	6.84	937	4.97	33.5	497	1300	570VP-20-03-15-19	0.45 DVP-1
20-24	5.80	4.55	0.45	2.0	Solid	Solid	Motor	glycol	—	74,000	1400	570VP-20-03-20-24	10 → 0.45
25-29	5.73	0.37	0.60	2.5	11.68	7.80	268	2.57	6.3	36.2	820	570VP-20-03-25-29	0.45 DVP-1
4/20 30-34	4.37	0.40	0.75	2.0	11.54	7.30	387	2.97	29.7	932	915	570VP-20-03-30-34	0.45 (1.5 gallons)
35-39	3.27	0.36	0.90	2.0	11.39	7.12	399	3.27	46.1	71,000	1005	570VP-20-03-35-39	0.45 (Overday)
40-44	3.61	0.38	1.05	2.0	11.69	7.06	421	3.09	50.7	80.3	1055	570VP-20-03-40-44	0.45
45-49	0.98	0.37	1.20	1.5	11.82	6.77	244	3.03	18.7	74,000	1235	570VP-20-03-45-49	0.45
50-54	0.07	0.36		2.0	11.63	6.69	307	2.97	29.9	73.1	1342	570VP-20-03-50-54	0.45

Post Cal. Check Variance Observed (Y/N): N

Notes: I.C. denotes inside casing O.C. dentoes outside of casing.

SP-16 - 0.3 gallons/foot

☆ Dry OC Depth to ground surface

KGS

15-19 - A1-VP-DVP-1-4/17/20 @ 1305

20-24 (5) 10 Micron filters and (1) 0.45 Filter (solid 1.5 gallons of [illegible] Drum Sml.

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25-29 - A1-VP-DVP-1-4/20/20 @ 825

Blank
SB-01 0.86
SB-02 0.94
SB-03 0.42

KOMAN Gover[illegible]t Solutions, LLC
Vertical Groundwater Profiling Log

Project: CSB Vertical Profiling, Former Fort Devens, MA	Boring No.: 5702VP-20-04 Date: 4/16/20
Project No.: 1082	Drilling Co.: TDI
AOC:	Driller: Kyle, Ari
Depth to Surface Water: N/A	Depth to Sediment: Dry (on land / [illegible]) ☆
Logger: [illegible]	Drilling Method: Jackhamer Dump type: [illegible]
Height of Stickup Above Water/Ground (ft) DTW O.C.* = Standpipe ht above ground surface	Development Method/PSI: Nitrogen purge /
Total Boring Depth: 52'	Drilling Equip: Jackhamer Tubing: MDPE
Turbidimeter (model/serial number): LaMotte 2020WE	YSI (model/serial number): YSI 6080

Sample Interval (ft bgs)	DTW I.C.	☆ DTW O.C.*	Minimum Purge Volume	Total Volume Purged	Temp (°C)	pH (STD)	SPC (µS/cm³)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Sample Time	Sample Identifier - Interval	Remarks Filters
5-7	8.40	2.89	Ran dry immediately, will allow recharge and sample								928	5702VP-20-04-5-7	PFAS only (1) Bottle
10-12	2.87	1.77	0.36	1.5	9.63	6.63	450	5.79	101.8	988	1010	5702VP-20-04-10-12	10 → 0.45 ☆ [illegible]
4/16 15-17	2.12	0.78	0.60	1.5	10.43	7.10	261	6.44	48.0	60.7	1050	5702VP-20-04-15-17	0.45 ☆ DVP
20-22	1.48	0.30	0.80	1.5	10.52	7.02	229	5.80	37.6	687	1158	5702VP-20-04-20-22	10 → 0.45
25-27	3.72	2.82	0.92	1.5	10.62	6.93	361	4.98	21.7	2591	1245	5702VP-20-04-25-27	10 → 0.45
30-32	3.23	1.64	1.16	1.5	10.47	6.87	421	5.99	64.7	>4,000	1335	5702VP-20-04-30-32	10 → 0.45
35-37	3.76	0.98	1.32	1.5	10.21	6.73	518	4.20	87.6	>4,000	1415	5702VP-20-04-35-37	10 → 0.45
40-42	2.47	0.15	1.5	1.5	9.70	6.50	430	3.20	121.7	>4,000	750	5702VP-20-04-40-42	~~10 → 0.45~~ PFAS only
4/17 50-52	3.78	1.54	—	Ran dry immediately, very poor recharge					—	>4,000	905	5702VP-20-04-50-52	PFAS only

Post Cal. Check Varience Observed (Y/N): Mill Slot (1 inch I.D.) casing purge volume (x2) = 0.0408 gal/ft or 154.44 ml per foot

Notes: I.C. denotes inside casing O.C. dentoes outside of casing.

15-17 – A1-VP-DVP-1-41620 @ 1055

30-32 – (10) filter replaced twice = 3 (10) filters and (1) .45 used

☆ Dry, or Depth to ground surface

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35-37 (10) filter replaced twice = 3 (10) filters and (1) 0.45 used

40-42 poor flow rate (thick dark brown sand/silt) unable to sample vessels due to turbidity

4/16		4/17	
SG-01	0.90	SG-01	0.86
SG-02	0.93	SG-02	0.92
SG-03	0.43	SG-03	0.42

AOC 57 AREA 3

KOMAN Government Solutions, LLC
Vertical Groundwater Profiling Log

Project: CSB Vertical Profiling, Former Fort Devens, MA	Boring No: 5703VP-20-01 Date: 4/7/2020
Project No.: 1082	Drilling Co.: IDS
NOC	Driller: Kyle, Art
Depth to Surface Water: Dry	Depth to Sediment: not 0.01
Logger: Nat	Drilling Method: Jackhammer Pump type: Geotech
Height of Stickup Above Water/Ground (ft)	Development Method/PSI: Nitrogen purge /
Total Boring Depth: 37	Drilling Equip: Jackhammer Tubing: HDPE
Turbidimeter (model/serial number): LaMotte 2020WE	YSI (model/serial number): YSI 650XL 11610038 7

	Sample Interval (ft bgs)	DTW I.C.	DTW. O.C	Minimum Purge Volume	Total Volume Purged	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Sample Time	Sample Identifier - Interval	Filters used
	5-7	0.63	2.73	0.25	0.5	11.13	6.23	734	6.74	113.4	6.22	10:23	5703VP-20-01-5-7	0.45
4/7	10-12	0.92	1.60	0.44	1.5	YSI failure		—	—	—	1120*	1105	5703VP-20-01-10-12 (DUP)	10 -> 0.45
	15-17	0.89	0.98	0.64	1.5	YSI	Failure	—	—	—	769	1255	5703VP-20-01-15-17	10 -> 0.45
	20-22	0.15	0.30	0.56	1.5	YSI	failure	—	—	—	2896	1405	5703VP-20-01-20-22	10 -> 0.45
L	25-27	3.28	2.77	0.96	1.5	YSI	failure	—	—	—	74,000	1455	5703VP-20-01-25-27	10 -> 5 -> 0.45
	30-32	3.81	1.71	1.16	1.5	YSI	failure	—	—	—	1285	810	5703VP-20-01 30-32	5 -> 0.45
4/8	35-37	0.00	0.70	Sample	dry	Heavy	dry	silt /	unable	to	pump	—	—	Not

Post Cal. Check Variance Observed (Y/N):

Min Sto (1-4x) 1.5) casing purge volume (G) = 0.0408 gal/ft or 154.44 ml per foot

Notes: I.C. denotes inside casing O.C. dentoes outside of casing.

- 5-7 = very slow recharge
- 10-12 = turbidity further cleared up during PFAS bottle fill (still used 10 & .45 Filters) / AT-VP-DUP-1-4/7/2020
- 25-27 = used an additional "10" filter as the first one plugged after 150 ml

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KOMAN Government Solutions, LLC
Vertical Groundwater Profiling Log

Project: CSB Vertical Profiling, Former Fort Devens, MA	Boring No.: 5703VP-20-02 Date: 4/8/2020
Project No : 1082	Drilling Co.: TDS
WDS:	Driller: Kyle, Ant
Depth to Surface Water:	Depth to Sediment: 12"
Logger: Matt	Drilling Method: Jackhammer Pump type: Geotech
Height of Stickup Above Water/Ground (ft)	Development Method/PSI: Nitrogen purge /
Total Boring Depth: 37'	Drilling Equip: Jackhammer Tubing: HDPE
Turbidimeter (model/serial number): LaMotte 2020WR	YSI (model/serial number): ~~[illegible]~~

	Sample Interval (ft bgs)	DTW I.C.	DTW. O.C.	Minimum Purge Volume	Total Volume Purged	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Sample Time	Sample Identifier - Interval	Remarks Filter
	5-7	4.22	2.80	0.1	0.25	Pumped dry on [illegible]	4.4	[illegible]	[illegible]	[illegible]	0(38.9)	1010	5703VP-20-02-5-7	0.45
4/8	10-12	0.68	1.58	0.46	1.5	9.55	5.03	447	3.17	58.9	177	1113	5703VP-20-02-10-12	5 → 0.45
4/8	15-17	0.78	0.82	0.64	1.5	10.42	5.99	211	3.05	78.7	74,000	1230	5703VP-20-02-15-17	10 → 0.45
4/8	20-22	0.48	0.20	0.86	1.5	10.62	6.37	210	3.68	69.2	66	1335	5703VP-20-02-20-22	0.45
4/9	25-27	3.71	2.92	1.0	1.5	10.33	6.39	193	2.66	55.1	246	810	5703VP-20-02-25-27	5 → 0.45
4/9	30-32	3.08	1.74	1.46	1.5	10.43	6.40	185	2.50	48.9	74,000	915	5703VP-20-02-30-32	10 → 0.45
	35-37	1.78	0.87	—	0.25	Ran dry, slow recharge			—	—		1035	5703VP-20-02-35-37	—

Post Cal. Check Variance Observed (Y/N):

Mill Slot (1 inch LTV) casing purge volume (2) = 0.0408 gal/ft or 154.44 ml per foot

Notes: I.C. denotes inside casing O.C. dentoes outside of casing.

5-7 slow / steady recharge, returned clear (intermittent flow)
30-32 slow recharge / intermittent flow Dark brown fine sand.
35-37 gray fine sand / silt, ran dry during sampling (NO METALS collected)

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Vertical Groundwater Profiling Log

Project: CSB Vertical Profiling, Former Fort Devens, MA	Boring No.: 5703VP-20-03 Date: 4/9/20
Project No.: 1082	Drilling Co.: IDS
AOC: 1	Driller: Kyle, Ari
Depth to Surface Water:	Depth to Sediment: 24"
Logger: KGA	Drilling Method: Jackhammer Pump type: geotech
Height of Stickup Above Water/Ground (ft)	Development Method/PSI: Nitrogen purge /
Total Boring Depth: 37'	Drilling Equip: Jackhammer Tubing: HDPE
Turbidimeter (model/serial number): Lamotte 2020	YSI (model/serial number): 4SS-100X1

	Sample Interval (ft bgs)	DTW I.C.	DTW. O.C.	Minimum Purge Volume	Total Volume Purged	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Sample Time	Sample Identifier - Interval	~~Remarks~~ Filter
4/9	5-7	4.62	2.80	0.1	0.25	Ran	dry -	poor	recharge	—	845	1110	5703VP-20-03-5-7	0.45
	10-12	2.80	1.52	0.36	1.5	9.18	6.64	268	5.05	62.0	2122	1240	5703VP-20-03-10-12	5 → 0.45
	15-17	2.35	0.80	0.58	1.5	9.24	6.73	318	3.97	69.7	1927	1320	5703VP-20-03-15-17	5 → 0.45
4/10	20-22	0.87	0.15		1.5	11.30	6.11	163	4.02	117.3	2706	908/913	5703VP-20-03-20-22	10 → 0.45
	25-27	4.16	2.99		1.5	10.89	6.53	172	2.68	66.7	>4,000	1016	5703VP-20-03-25-27	10 → 0.45
	30-32	3.88	1.76		1.5	10.79	6.41	168	2.27	89.7	74090	1125	5703VP-20-03-30-32	~~[illegible]~~ Seeblow
	35-37	4.51	0.72	Ran	dry	immediately	no recharge		~5' of solids came in /				visible to remove	

Post Cal. Check Variance Observed (Y/N):

Mill Slot (1-inch I.D) casing purge volume (x2) = 0.0408 gal/ft or 154.44 ml per foot

Notes: I.C. denotes inside casing O.C. denotes outside of casing

5-7 ran dry during sample ~~[illegible]~~ KGA

20-22 A1-VP-DVP-1-41020 @913

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30-32 10 → 0.45, clogged → replaced with (5) then (10) then (5) = 2(10)'s and 2(5's) + (.45) solid brown silt

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Vertical Groundwater Profiling Log

Project: CSB Vertical Profiling, Former Fort Devens, MA	Boring No.: 5703VP-20-04 Date: 4/14/20
Project No.: 1082	Drilling Co.: TDS
Ack.:	Driller: Kyle, Ari
Depth to Surface Water:	Depth to Sediment:
Logger: MA	Drilling Method: Jackhammer Pump type: geotech
Height of Stickup Above Water/Ground (ft)	Development Method/PSI: Nitrogen purge /
Total Boring Depth: 37'	Drilling Equip: Jackhammer Tubing: HDPE
Turbidimeter (model/serial number): Lamotte 2020WE	YSI (model/serial number): YSI 6000 11B100185

Sample Interval (ft bgs)	DTW I.C.	DTW. O.C.	Minimum Purge Volume	Total Volume Purged	Temp (°C)	pH (STD)	SPC (µS/cm²)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Sample Time	Sample Identifier - Interval	Remarks Filters
5-7	3.39	2.87	0.14	1.0	9.26	6.72	73	8.47	92.3	109.3	915	5703VP-20-04-5-7	0.45
10-12	2.03	1.88	0.40	1.5	9.40	6.89	107	7.99	68.7	74,000	950	5703VP-20-04-10-12	5 → 0.45
15-17	1.22	0.87	0.62	1.5	9.87	6.97	156	6.20	107.3	2430	1025	5703VP-20-04-15-17	5 → 0.45
20-22	0.32	0.34	0.80	1.5	11.70	6.66	131	5.16	70.9	2930	1238	5703VP-20-04-20-22	5 → 0.45
25-27	[illegible]	3.02	—	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Dark	brown / gray silt	No sample
30-32	6.45	1.86	—	0.25	Ran dry	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1410	5703VP-20-04-30-32	PFAS only
35-37	6.41	0.63	—	0.25	Ran dry	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	815	5703VP-20-04-35-37	PFAS only

Post Cal. Check Variance Observed (Y/N):

Mill Slot (1-inch I.D) casing purge volume (x2) = 0.0408 gal/ft or 154.44 ml per foot

Notes: I.C. denotes inside casing O.C. dentoes outside of casing.

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CALIBRATION FIELD SHEETS

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Field Instrument Calibration Log

Date: 1/24/20 **Weather:** 25°F cold

Project/Site Name: PFAS RI Devens MA **Instrument:** YSI 650 MDS

Calibrated By: Melissa Miller **Serial Number:** 11B100125

Parameters	Solution Expiration Date	AM Calibration Time 0700		Cal. Temp. (°C)	PM Post Cal. Check Time 1450	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1,413 µS/cm°)	10/20	1410	1413	14.13	1410	11.80	±10 µS/cm	N
pH (7)	02/21	6.98	7.0	14.17	6.95	11.57	± 0.3 Ph *	N
pH (4)	10/21	3.90	4.0	14.23	3.89	11.63	± 0.3 Ph *	N
pH (10)	02/21	9.95	10.0	14.20	9.87	11.70	± 0.3 Ph *	N
ORP (240 mv)	05/26	235.5	240.0	14.32	235.1	11.77	±10 mv	N
Dissolved Oxygen (%)	NA	98.7	100.0	16.72	98.9	7.81	-	N
Dissolved Oxygen (mg/L)	NA	9.73	9.94	16.72	9.57	7.81	± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	N
Barometric Pressure (mmHg)	NA	764.5	—	NA	—	—	-	NA

Notes:

*** Ph Unit with Ph 7 Buffer**

(Mark Noted Variences on Field Forms)

Signature: Melissa Miller **Date:** 1/24/20

KGS

Turbidity Instrument Calibration Log

Project/Site Name: PFAS RI Devens MA

Instrument: Lamotte 2020we

Calibrated By: Melissa Miller

Serial Number: 1828 - 0412

Date	AM Calibration				PM Post Calibration Check		Variance Noted
	Pre-Cal 0 NTU	Post-Cal 0 NTU	Pre-Cal 10 NTU	Post-Cal 10 NTU	0 NTU	10 NTU	
1/24/20	0.5	0.0	9.12	9.99	0.3	9.90	N

Notes: Mark Noted Variences on Field Forms

Post Calibration Criteria	
-	± 0.5

Signature: [signature]

Date: 1/24/20

KGS

Field Instrument Calibration Log

Date: 1/27/20 **Weather:** Partly Cloudy 35-40°F

Project/Site Name: ft [illegible] winter 2020 [illegible] **Instrument:** YSI 650 MDS

Calibrated By: Michael [illegible] **Serial Number:** 11J 100750

Parameters	Solution Expiration Date	AM Calibration Time 1145		Cal. Temp. (°C)	PM Post Cal. Check Time 1615	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1.413 µS/cm°)	3/2020	1.333	1.413	17.34	1.419 / 1.413	16.08	±10 µS/cm	N
pH (7)	2/2021	7.09	7.00	18.40	7.13 / 6.99	15.83	± 0.3 Ph *	N
pH (4)	3/2021	3.88	4.01	17.97	4.03 / 3.99	16.40	± 0.3 Ph *	N
pH (10)	2/2021	10.04	10.02	18.06	10.00 / 10.01	16.61	± 0.3 Ph *	N
ORP (240 mv)	10/2019	252.6	240.0	17.12	240.5 / 240.0	16.24	±10 mv	N
Dissolved Oxygen (%)		98.4	100.0	15.65	102.6 / 100.0	16.16	-	N
Dissolved Oxygen (mg/L)		9.83	9.92	15.65	10.13 / 9.84	16.16	± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	N
Barometric Pressure (mmHg)		760	760	15.65	760	16.16	-	

Notes:

*** Ph Unit with Ph 7 Buffer** **(Mark Noted Variences on Field Forms)**

Signature: [signature] **Date:** 1/27/20

KGS

Field Instrument Calibration Log

Date: 1/28/20 **Weather:** overcast 25-35°F

Project/Site Name: Ft Dennis Area 1 Sampling Winter 2020 **Instrument:** YSI 650 MDS

Calibrated By: Michael Sheridan **Serial Number:** 11J100 750

Parameters	Solution Expiration Date	AM Calibration Time 0615		Cal. Temp. (°C)	PM Post Cal. Check Time 1605	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1,413 µS/cm°)	3/2020	1.389	1.413	15.45	1.426 / 1.413	16.62	±10 µS/cm	Y
pH (7)	2/2021	6.92	7.00	15.75	7.05 / 7.01	16.17	± 0.3 Ph *	N
pH (4)	3/2021	4.02	4.00	15.63	4.02 / 4.00	16.56	± 0.3 Ph *	N
pH (10)	2/2021	10.03	10.00	15.45	10.11 / 10.02	16.73	± 0.3 Ph *	N
ORP (240 mv)	10/2019	239.8	240.0	15.72	239.1 / 240.0	16.77	±10 mv	N
Dissolved Oxygen (%)		99.7	100.1	14.59	99.9 / 100.2	13.84	-	N
Dissolved Oxygen (mg/L)		10.15	10.18	14.59	10.34 / 10.37	13.841	± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	N
Barometric Pressure (mmHg)		760	760	14.59	760	13.84	-	N

Notes:

*** Ph Unit with Ph 7 Buffer** **(Mark Noted Variences on Field Forms)**

Signature: [signature] **Date:** 1/28/20

KGS

Turbidity Instrument Calibration Log

Project/Site Name: _____

Instrument: Lamotte 2020we

Calibrated By: Matthew Spreckling

Serial Number: 5083 - 5014

Date	AM Calibration				PM Post Calibration Check		Variance Noted
	Pre-Cal 0 NTU	Post-Cal 0 NTU	Pre-Cal 10 NTU	Post-Cal 10 NTU	0 NTU	10 NTU	
1/28/20	1.69	1.69	12.66	10.00	1.74	6.87	Y

Notes: Mark Noted Variences on Field Forms

Post Calibration Criteria	
-	± 0.5

Signature: [signature]

Date: 1/28/20

KGS

Field Instrument Calibration Log

Date: 01/27/2020 **Weather:** Cloudy, 37°F

Project/Site Name: Devens R1 MW Install **Instrument:** YSI 600XL

Calibrated By: BrA **Serial Number:** 11B100185

Parameters	Solution Expiration Date	AM Calibration Time 0600		Cal. Temp. (°C)	PM Post Cal. Check Time 1500	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1,413 µS/cm°)	10/20	1366	1413	14.27	1409	15.12	±10 µS/cm	N
pH (7)	02/21	7.54	7.00	14.29	7.12	15.88	± 0.3 Ph *	
pH (4)	10/21	3.33	4.00	14.24	4.08	14.96	± 0.3 Ph *	
pH (10)	02/21	10.04	10.00	13.97	10.01	15.30	± 0.3 Ph *	
ORP (240 mv)	05/20	255.3	240.0	14.16	238.6	15.27	±10 mv	
Dissolved Oxygen (%)	—	125.4	100	14.29	96.1	14.90	-	
Dissolved Oxygen (mg/L)	—	12.85	8.97		8.79	14.90	± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	
Barometric Pressure (mmHg)	—	742.0	742.0		742.1	14.90	-	

Notes:

*** Ph Unit with Ph 7 Buffer**

(Mark Noted Variences on Field Forms)

Signature: [signature] **Date:** 01/27/2020

KGS

Field Instrument Calibration Log

Date: 01/28/2020 **Weather:** Overcast, 37°F

Project/Site Name: Devens RI MW **Instrument:** YSI 600XL

Calibrated By: B/A **Serial Number:** 11B100185

Parameters	Solution Expiration Date	AM Calibration Time 0600		Cal. Temp. (°C)	PM Post Cal. Check Time 1530	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1,413 µS/cm°)	10/20	1375	1413	15.52	1420	16.12	±10 µS/cm	N
pH (7)	02/21	6.96	7.00	15.32	6.91	15.94	± 0.3 Ph *	
pH (4)	10/21	4.10	4.00	15.74	4.01	15.92	± 0.3 Ph *	
pH (10)	02/21	10.16	10.00	15.30	10.08	16.04	± 0.3 Ph *	
ORP (240 mv)	05/20	238.5	240	14.98	239.0	15.88	±10 mv	
Dissolved Oxygen (%)	-	100.2	100	15.63	99.1	16.01	-	
Dissolved Oxygen (mg/L)	-	9.99	9.97		9.80	16.01	± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	
Barometric Pressure (mmHg)	-	745.2	745.2		744.0	"	-	

Notes:

*** Ph Unit with Ph 7 Buffer**

(Mark Noted Variences on Field Forms)

Signature: [signature] **Date:** 01/28/2020

KGS

Field Instrument Calibration Log

Date: 01/29/2020

Weather: Overcast, clearing, 32°F

Project/Site Name: Devers Rd MLU Development

Instrument: YSI 600XL

Calibrated By: BrA

Serial Number: 11B100185

Parameters	Solution Expiration Date	AM Calibration Time 0600		Cal. Temp. (°C)	PM Post Cal. Check Time 1545	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1,413 µS/cm°)	10/20	1461	1413	16.68	1415	17.20	±10 µS/cm	N
pH (7)	02/21	6.98	7.00	16.69	7.13	16.91	± 0.3 Ph *	
pH (4)	10/21	4.04	4.00	16.81	4.04	17.08	± 0.3 Ph *	
pH (10)	02/21	10.05	10.00	16.59	9.88	17.10	± 0.3 Ph *	
ORP (240 mv)	05/20	239.9	240	16.50	238.6	17.15	±10 mv	
Dissolved Oxygen (%)	–	100.6	100	17.61	103.5	16.81	-	
Dissolved Oxygen (mg/L)	–	9.77	9.62	↓	9.68	16.81	± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	
Barometric Pressure (mmHg)	–	752.7 →			753.1	16.81	-	

Notes:

*** Ph Unit with Ph 7 Buffer**

(Mark Noted Variences on Field Forms)

Signature: BrA

Date: 01/29/2020

KGS

Field Instrument Calibration Log

Date: 01/30/2020 **Weather:** 22°F, clear

Project/Site Name: MW Installation R1 **Instrument:** YSI 1000 XL

Calibrated By: B/A **Serial Number:** 11B100185

Parameters	Solution Expiration Date	AM Calibration Time 0600		Cal. Temp. (°C)	PM Post Cal. Check Time 1500	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1,413 µS/cm°)	10/20	1394	1413	16.72	418	17.21	±10 µS/cm	N
pH (7)	02/21	6.98	7.00	16.54	6.81	17.05	± 0.3 Ph *	
pH (4)	10/21	4.05	4.00	16.91	3.92	17.13	± 0.3 Ph *	
pH (10)	02/21	10.06	10.00	16.11	9.90	16.98	± 0.3 Ph *	
ORP (240 mv)	05/20	239.9	240.	16.28	241.6	17.12	±10 mv	
Dissolved Oxygen (%)	–	113.2	100	17.26	98.1	16.90	-	
Dissolved Oxygen (mg/L)	–	10.88	9.62	17.26	9.53	16.90	± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	
Barometric Pressure (mmHg)	–	760.9	760.9	17.26	763.0	16.90	-	

Notes:

*** Ph Unit with Ph 7 Buffer**

(Mark Noted Variences on Field Forms)

Signature: [signature] **Date:** 01/30/2020

KGS

Field Instrument Calibration Log

Date: 02/03/2020 **Weather:** Overcast, 35°F.

Project/Site Name: Devers A1 MW Development **Instrument:** YSI 6000XL

Calibrated By: BrA **Serial Number:** 11B100185

Parameters	Solution Expiration Date	AM Calibration Time 0900		Cal. Temp. (°C)	PM Post Cal. Check Time 1500	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1,413 µS/cm°)	10/20	1485	1413	15.37	1411	17.10	±10 µS/cm	N
pH (7)	02/21 ~~02/20~~	7.20	7.00	15.22	7.14	16.71	± 0.3 Ph *	
pH (4)	10/21	3.90	4.00	14.99	3.99	16.48	± 0.3 Ph *	
pH (10)	02/21	9.86	10.00	14.43	10.06	17.05	± 0.3 Ph *	
ORP (240 mv)	05/20	240.0	240.0	14.44	241.7	16.90	±10 mv	
Dissolved Oxygen (%)	-	96.4	98.0	15.43	102.6	16.30	-	
Dissolved Oxygen (mg/L)	-	9.63	9.75	15.43	9.82	16.30	± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	
Barometric Pressure (mmHg)	-	744.3	744.3	15.43	752.1	16.30	-	

Notes:

*** Ph Unit with Ph 7 Buffer**

(Mark Noted Variences on Field Forms)

Signature: [signature] **Date:** 02/03/2020

KGS

Turbidity Instrument Calibration Log

Project/Site Name: Devens R1 MW Install

Instrument: Lamotte 2020we

Calibrated By: BMA

Serial Number: 1828-0412

Date	AM Calibration				PM Post Calibration Check		Variance Noted
	Pre-Cal 0 NTU	Post-Cal 0 NTU	Pre-Cal 10 NTU	Post-Cal 10 NTU	0 NTU	10 NTU	
01/27/2020	0.81	0.25	10.08	10.00	0.28	10.20	N
01/28/2020	0.72	0.51	10.61	10.00	0.59	10.10	N
01/29/2020	0.91	0.43	10.10	10.00	0.60	10.04	N
01/30/2020	1.20	0.40	10.28	10.00	0.57	10.01	N
02/03/2020	1.03	0.58	9.42	9.99	0.62	9.90	N

Notes: Mark Noted Variences on Field Forms

Post Calibration Criteria	
-	±0.5

Signature: [signature]

Date: 01/27/20
01/28/20
01/29/20
01/30/20
02/03/20

KGS

Field Instrument Calibration Log

Date: 2/4/2020 **Weather:** 30° Sunny

Project/Site Name: Devens AFB **Instrument:** YSI 650

Calibrated By: C. Miller **Serial Number:** 13100185

Parameters	Solution Expiration Date	AM Calibration Time 0700		Cal. Temp. (°C)	PM Post Cal. Check Time 1520	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1,413 µS/cm°)	10/2020	1468	1413	15.68	1413	16.32	±10 µS/cm	N
pH (7)	~~7.11~~ 2/21 cm	7.11	6.99	15.78	7.00	16.32	± 0.3 Ph *	↓
pH (4)	10/21	3.94	4.00	15.62	4.00	16.17	± 0.3 Ph *	↓
pH (10)	02/21	9.74	9.96	15.53	10.00	15.94	± 0.3 Ph *	↓
ORP (240 mv)	05/2020	239.9	240.0	15.57	240.0	15.95	±10 mv	↓
Dissolved Oxygen (%)	—	105.0	99.3	14.68	98.9	15.26	-	~~98.9~~ Tcm ↓
Dissolved Oxygen (mg/L)	—	9.97	10.00	14.77	10.00	15.26	± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	↓
Barometric Pressure (mmHg)	—	749.9	749.8	14.88	744.7	~~744.7~~ cm 15.26	-	↓

Notes:

*** Ph Unit with Ph 7 Buffer** **(Mark Noted Variences on Field Forms)**

Signature: [signature] **Date:** 2/4/2020

KGS

Field Instrument Calibration Log

Date: 2/5/2020 **Weather:** 30° Cloudy

Project/Site Name: Devens AFB **Instrument:** YSI 650 MDS

Calibrated By: C. Miller **Serial Number:** 11B100185

Parameters	Solution Expiration Date	AM Calibration Time 0700		Cal. Temp. (°C)	PM Post Cal. Check Time 1430	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1,413 µS/cm°)	10/2020	1556	1413	15.80	1413	16.20	±10 µS/cm	N
pH (7)	02/21	7.13	6.99	~~15.80~~ 1806	7.00	16.02	± 0.3 Ph *	
pH (4)	10/21	3.93	3.99	15.76	3.99	16.16	± 0.3 Ph *	
pH (10)	02/21	9.89	10.01	15.67	10.03	14.17	± 0.3 Ph *	
ORP (240 mv)	05/2020	242.0	240.1	15.67	240.1	14.11	±10 mv	
Dissolved Oxygen (%)	–	108.7	99.0	14.64	98.9	14.80	-	
Dissolved Oxygen (mg/L)	–	9.99	10.00	14.64	10.01	14.82	± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	
Barometric Pressure (mmHg)	–	757.6	751.7	14.10	752.0	14.42	-	

Notes:

*** Ph Unit with Ph 7 Buffer** **(Mark Noted Variences on Field Forms)**

Signature: C. Miller **Date:** 2/5/2020

KGS

Field Instrument Calibration Log

Date: 2/6/2020 **Weather:** 30° Snowing

Project/Site Name: Dennis AFB **Instrument:** YSI 600 H Cm

Calibrated By: C. Miller **Serial Number:** 11B160125

Parameters	Solution Expiration Date	AM Calibration Time 0700		Cal. Temp. (°C)	PM Post Cal. Check Time 1415	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1,413 µS/cm°)	10/2020	1520	1413	16.88	1413	13.16	±10 µS/cm	N
pH (7)	02/21	7.20	7.00	16.45	7.00	15.44	± 0.3 Ph *	
pH (4)	10/21	3.89	3.99	16.33	3.99	15.83	± 0.3 Ph *	
pH (10)	02/21	9.85	9.98	16.13	10.01	15.61	± 0.3 Ph *	
ORP (240 mv)	05/2020	241.5	240.1	16.08	240.1	15.94	±10 mv	
Dissolved Oxygen (%)	—	94.8	99.1	15.75	99.4	15.16	-	
Dissolved Oxygen (mg/L)	—	9.80	10.00	15.75	10.00	15.16	± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	
Barometric Pressure (mmHg)	—	750.2	750.3	15.93	740.4	14.84	-	

Notes:

*** Ph Unit with Ph 7 Buffer**

(Mark Noted Variences on Field Forms)

Signature: C. M. **Date:** 2/6/2020

KGS

Field Instrument Calibration Log

Date: 2/7/2020 **Weather:** 35° light rain

Project/Site Name: Devens supplemental sampling **Instrument:** YSI 650

Calibrated By: C. Miller **Serial Number:** 11J100156

Parameters	Solution Expiration Date	AM Calibration Time 0700		Cal. Temp. (°C)	PM Post Cal. Check Time 1400	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1,413 µS/cm°)	10/2020	1503	1413	24.43	1.413	17.77	±10 µS/cm	N
pH (7)	02/21	6.87	7.00	24.68	7.00	20.21	± 0.3 Ph *	
pH (4)	10/21	4.09	4.00	24.18	4.00	20.66	± 0.3 Ph *	
pH (10)	2/21	10.00	10.00	24.21	10.01	20.48	± 0.3 Ph *	
ORP (240 mv)	5/2020	230.8	240.0	23.40	240.0	20.04	±10 mv	
Dissolved Oxygen (%)	—	101.0	100.0	22.38	100.0	13.08	-	
Dissolved Oxygen (mg/L)	—	8.65	10.00	22.36	10.00	13.03	± 0.5 mg/L < 0 5 mg/L for 0 mg/L solution, no negative value	
Barometric Pressure (mmHg)	-	760	760	22.38	760	13.03	-	↓

Notes:

*** Ph Unit with Ph 7 Buffer** **(Mark Noted Variences on Field Forms)**

Signature: Cy Miller **Date:** 2/7/2020

KGS

Field Instrument Calibration Log

Date: 02/10/2020 **Weather:** 30° Rain

Project/Site Name: Devens Supplemental Sampling **Instrument:** YSI 650

Calibrated By: C. Miller **Serial Number:** 11F101516-7

Parameters	Solution Expiration Date	AM Calibration Time 0845		Cal. Temp. (°C)	PM Post Cal. Check Time 1610	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1,413 µS/cm°)	3/2020	1584	1413	20.85	1413	17.35	±10 µS/cm	N
pH (7)	2/21	6.97	6.99	21.14	7.00	18.59	± 0.3 Ph *	
pH (4)	3/21	4.05	4.00	21.24	4.00	18.87	± 0.3 Ph *	
pH (10)	2/21	9.99	10.00	21.20	10.00	18.78	± 0.3 Ph *	
ORP (240 mv)	5/20	234.1	240.1	21.02	240.0	18.61	±10 mv	
Dissolved Oxygen (%)	—	118.4	100.0	19.79	100.0	16.50	-	
Dissolved Oxygen (mg/L)	—	9.08	10.00	19.84	10.00	16.67	± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	
Barometric Pressure (mmHg)	—	759	760	19.79	760	16.50	-	

Notes:

*** Ph Unit with Ph 7 Buffer**

(Mark Noted Variences on Field Forms)

Signature: [signature] **Date:** 2/10/2020

KGS

Field Instrument Calibration Log

Date: 2/11/2020 **Weather:** 35° light rain

Project/Site Name: Devens SS **Instrument:** YSI 650

Calibrated By: C. Miller **Serial Number:** 11J100750

Parameters	Solution Expiration Date	AM Calibration Time 0705		Cal. Temp. (°C)	PM Post Cal. Check Time 1445	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1,413 µS/cm°)	3/2020	1338	1413	14.75	1413	9.06	±10 µS/cm	N
pH (7)	2/21	7.05	7.00	15.26	7.00	10.22	± 0.3 Ph *	
pH (4)	3/21	3.92	4.00	15.35	4.00	10.62	± 0.3 Ph *	
pH (10)	2/21	10.02	10.01	15.32	10.03	10.63	± 0.3 Ph *	
ORP (240 mv)	5/2020	250.1	240.0	15.05	239.9	9.72	±10 mv	
Dissolved Oxygen (%)	—	113.3	100.0	15.40	100.1	13.33	-	
Dissolved Oxygen (mg/L)	—	9.96	10.00	15.48	10.00	13.18	± 0.5 mg/L < 0 5 mg/L for 0 mg/L solution, no negative value	
Barometric Pressure (mmHg)	—	760	760	15.05	760	13.33	-	

Notes:

*** Ph Unit with Ph 7 Buffer**

(Mark Noted Variences on Field Forms)

Signature: [signature] **Date:** 2/11/2020

KGS

Field Instrument Calibration Log

Date: 2/12/2020 **Weather:** 30° Sunny

Project/Site Name: Pecans SS **Instrument:** YSI 650

Calibrated By: C. Miller **Serial Number:** 451650 11T100750

Parameters	Solution Expiration Date	AM Calibration Time 0700		Cal. Temp. (°C)	PM Post Cal. Check Time 1400	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1,413 µS/cm°)	3/20	1453	1413	14.65	1413	14.32	±10 µS/cm	N
pH (7)	2/21	6.94	7.00	14.81	7.00	15.24	± 0.3 Ph *	
pH (4)	3/21	3.96 ~~10.06~~	4.00 ~~10.00~~	14.83	4.00	15.15	± 0.3 Ph *	
pH (10)	2/21	10.06	10.00	14.82	10.01	15.19	± 0.3 Ph *	
ORP (240 mv)	5/20	234.6	240.0	14.76	239.9	15.16	±10 mv	
Dissolved Oxygen (%)	—	84.0	100.0	14.33	100.0	15.11	-	
Dissolved Oxygen (mg/L)	—	10.12	10.00	14.63	10.00	15.20	± 0 5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	
Barometric Pressure (mmHg)	—	759	760	14.32	760	~~760~~ 15.11 cm	-	

Notes:

*** Ph Unit with Ph 7 Buffer** **(Mark Noted Variences on Field Forms)**

Signature: [signature] **Date:** 2/12/2020

KGS

Field Instrument Calibration Log

Date: 2/13/2020 **Weather:** 30° Snowing

Project/Site Name: Devens Supplemental Sampling **Instrument:** YSI 650

Calibrated By: C. Miller **Serial Number:** 11J100750

Parameters	Solution Expiration Date	AM Calibration Time 0730		Cal. Temp. (°C)	PM Post Cal. Check Time 1515	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1,413 µS/cm°)	3/20	1406	1413	15.70	1413	6.92	±10 µS/cm	N
pH (7)	2/21	6.90	7.00	15.76	7.00	7.92	± 0.3 Ph *	↓
pH (4)	3/21	4.06	4.00	15.60	4.00	8.69	± 0.3 Ph *	↓
pH (10)	2/21	10.12	10.01	15.68	10.03	8.93	± 0.3 Ph *	↓
ORP (240 mv)	5/20	238.7	240.0	15.66	240.1	7.48	±10 mv	↓
Dissolved Oxygen (%)	—	103.6	100.0	15.48	100.0	11.22	-	↓
Dissolved Oxygen (mg/L)	—	99.98	10.00	15.49	10.00	11.42	± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	↓
Barometric Pressure (mmHg)	—	760	760	15.48	760	11.22	-	✓

Notes:

*** Ph Unit with Ph 7 Buffer** **(Mark Noted Variences on Field Forms)**

Signature: [signature] **Date:** 2/13/2020

KGS

Turbidity Instrument Calibration Log

Project/Site Name: Dearcas well development

Instrument: Lamotte

Calibrated By: C. Miller

Serial Number: 1822-0412/1590-3573

Date	AM Calibration Pre-Cal 0 NTU	AM Calibration Post-Cal 0 NTU	AM Calibration Pre-Cal 10 NTU	AM Calibration Post-Cal 10 NTU	PM Post Calibration Check 0 NTU	PM Post Calibration Check 10 NTU	Variance Noted
2/4/2020	1.93	1.38	7.68	10.00	1.52	10.00	N
2/5/2020	2.23	1.59	8.83	10.00	0.98	10.00	N
2/6/2020	1.49	1.18	8.01	10.00	1.21	10.00	N
2/7/2020	2.03	1.49	8.02	10.00	1.01	10.00	N
* 2/10/2020	0.96	0.70	8.09	10.00	0.90	10.00	N
2/11/2020	1.89	1.47	8.29	10.00	1.40	10.00	N
2/12/2020	2.36	1.89	8.27	10.00	2.23	10.00	N
2/13/2020	~~2.03~~ 1.26	1.07	7.75	10.00	1.27	10.00	N

Post Calibration Criteria

-	± 0.5

Notes: Mark Noted Variences on Field Forms

Signature: [signature]

Date: 2/13/2020

KGS

Field Instrument Calibration Log

Date: 2/13/2020 **Weather:** 30-40 Snow/Rain mix overcast

Project/Site Name: Fort Devens **Instrument:** YSI 556 MPS

Calibrated By: Michael Spaulding **Serial Number:** 15F101567

Parameters	Solution Expiration Date	AM Calibration Time 0630		Cal. Temp. (°C)	PM Post Cal. Check Time 1545	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1,413 µS/cm°)	3/2020	1.419	1.413	15.26	1.350 / 1.413	15.46	±10 µS/cm	Y
pH (7)	2/2021	7.16	7.00	15.37	6.85 / 7.00	15.60	± 0.3 Ph *	N
pH (4)	3/2021	3.86	4.00	15.50	3.95 / 4.00	15.29	± 0.3 Ph *	N
pH (10)	2/2021	9.62	10.00	15.53	10.07 / 10.01	15.31	± 0.3 Ph *	N
ORP (240 mv)	5/2020	250.6	240.0	16.14	243.6 / 240.0	14.88	±10 mv	N
Dissolved Oxygen (%)		114.0	100.0	16.51	90.4 / 100.1	10.13	-	
Dissolved Oxygen (mg/L)		16.80	9.76	16.51	10.11 / 11.20	10.13	± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	Y
Barometric Pressure (mmHg)		760		16.51	760	10.13	-	

Notes:

*** Ph Unit with Ph 7 Buffer** **(Mark Noted Variences on Field Forms)**

Signature: [signature] **Date:** 2-13-2020

KGS

Field Instrument Calibration Log

Date: 2-14-2020 **Weather:** 20-30 °F Partly cloudy

Project/Site Name: Ft Devens **Instrument:** YSI 556 MPS

Calibrated By: Michael Spaulding **Serial Number:** 15F101567

Parameters	Solution Expiration Date	AM Calibration Time 0630		Cal. Temp. (°C)	PM Post Cal. Check Time ~~[illegible]~~ 1510		Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1.413 µS/cm°)	3/2020	1.425	1.413	15.10	1.451		17.11	±10 µS/cm	Y
pH (7)	3/2021	4.10	3.99	15.08	7.00	7.00	15.74	± 0.3 Ph *	✓
pH (4)	2/2021	6.97	7.00	1530	4.12	4.00	16.65	± 0.3 Ph *	✓
pH (10)	2/2021	9.90	9.99	1516	9.82		17.21	± 0.3 Ph *	✓
ORP (240 mv)	5/2020	242.2	240.0	15.10	236.3		17.44	±10 mv	✓
Dissolved Oxygen (%)		101.4	99.9	16.52	~~101.0~~ 96.5 / 99.9		11.63	-	
Dissolved Oxygen (mg/L)		10.05	9.75	16.52	~~11.11~~ 10.69 / 11.03		11.03	± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	Y
Barometric Pressure (mmHg)		760		16.52			11.63	-	

Notes:

*** Ph Unit with Ph 7 Buffer** **(Mark Noted Variences on Field Forms)**

Signature: [signature] **Date:** 2-14-2020

KGS

Turbidity Instrument Calibration Log

Project/Site Name: ft Dennis

Instrument: LaMotte 2020 wi

Calibrated By: MS

Serial Number: 3590 - 3513

Date	AM Calibration				PM Post Calibration Check		Variance Noted
	Pre-Cal 0 NTU	Post-Cal 0 NTU	Pre-Cal 10 NTU	Post-Cal 10 NTU	0 NTU	10 NTU	
2/11/2020	0.68	0.86	8.40	10.0	3.96	11.9 / 10	Y
2/13/2020	1.04	1.00	8.47	9.98	1.76 / 1.49	8.42 / 10.0	Y
2/14/2020	1.15	1.03	8.50	9.99	1.14	9.85	Y

Notes: Mark Noted Variences on Field Forms

Post Calibration Criteria	
-	± 0.5

Signature: [signature]

Date: 2/11/2020
2/13/2020
2-14-2020

KGS

Field Instrument Calibration Log

Date: 2-18-2020 **Weather:** 25-30, cloudy, snow-rain

Project/Site Name: Ft Quinns **Instrument:** YSI 650 MDS

Calibrated By: Michael Spaulding **Serial Number:** 17 100750

Parameters	Solution Expiration Date	AM Calibration Time 0615		Cal. Temp. (°C)	PM Post Cal. Check Time 1700	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1,413 µS/cm°)	3/2020	1387	1413	16.04	1432 / 1413	20.77	±10 µS/cm	Y
pH (7)	2/2021	6.40	7.00	16.50	7.04 / 7.00	20.25	± 0.3 Ph *	N
pH (4)	3/2021	4.08	4.00	16.52	4.15 / 4.00	20.40	± 0.3 Ph *	N
pH (10)	2/2021	10.11	10.02	16.54	10.24 / 10.00	20.68	± 0.3 Ph *	N
ORP (240 mv)	5/2020	224.7	240.1	16.39	231.9 / 239.9	20.96	±10 mv	N
Dissolved Oxygen (%)		109.9 ~~109.9~~	100.0	15.80	58.2 / 100.0	16.51	-	Y
Dissolved Oxygen (mg/L)		10.50	9.63	15.80	5.77 / 9.79	16.51	± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	Y
Barometric Pressure (mmHg)		760		15.80	760	16.51	-	N

Notes:

*** Ph Unit with Ph 7 Buffer**

(Mark Noted Variences on Field Forms)

Signature: [signature] **Date:** 2-18-2020

KGS

Turbidity Instrument Calibration Log

Project/Site Name: Ft Deering

Instrument: Lamotte 2020we

Calibrated By: Michael Strawbridge

Serial Number: 1829-0412

	AM Calibration				PM Post Calibration Check		
Date	Pre-Cal 0 NTU	Post-Cal 0 NTU	Pre-Cal 10 NTU	Post-Cal 10 NTU	0 NTU	10 NTU	Variance Noted
2-18-20	1.49	1.14	7.77	10.00	2.11	9.90	N

Notes: Mark Noted Variences on Field Forms

Post Calibration Criteria	
-	± 0.5

Signature: [signature]

Date: 2-18-2020

RGS

Field Instrument Calibration Log

Date: [illegible] Weather: [illegible]

Projection Name: [illegible] Instrument: [illegible]

Calibrated By: [illegible] Serial Number: [illegible]

Parameters	Solution Expiration Date	AM Calibration Time [illegible]		Cal. Temp. (°C)	PM Post Cal. Check Time [illegible]	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Variance Noted (Y/N)
Specific Conductivity (1,413 µS/cm)	[illegible]	1453	1413	20.97	1421	20.52	±10 µS/cm	N
pH (7)	[illegible]	[illegible]	7.00	21.11	[illegible]	21.58	[illegible]	
pH (4)	[illegible]	4.00	4.00	21.01	4.01	20.91	[illegible]	
pH (10)	[illegible]	[illegible]	10.00	[illegible]	10.14	21.20	[illegible]	
ORP (240 mv)	[illegible]	[illegible]	240.0	[illegible]	[illegible]	[illegible]	[illegible]	
Dissolved Oxygen (%)	—	[illegible]	100	[illegible]	[illegible]	[illegible]		
Dissolved Oxygen (mg/L)	—	[illegible]	9.00	[illegible]	[illegible]	[illegible]	[illegible]	
Barometric Pressure (mmHg)	—	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		

Notes:

* Pk Unit with Pk 7 Buffer

(Mark Noted Variance on Field Forms)

Signature: [illegible] [illegible]

KGS

Turbidity Instrument Calibration Log

Project/Site Name: Dewey Hill

Instrument: Lamotte 2020we

Calibrated By: B.A

Serial Number: 3590-3513

Date	AM Calibration				PM Post Calibration Check		Variance Noted
	Pre-Cal 0 NTU	Post-Cal 0 NTU	Pre-Cal 10 NTU	Post-Cal 10 NTU	0 NTU	10 NTU	
02/15/20	1.82	0.61	10.08	10.00	0.80	10.20	N
02/15/20	1.71	0.57	10.13	10.00	0.78	10.09	N

Notes: Mark Noted Variences on Field Forms

Post Calibration Criteria	
	±0.5

Signature: [signature]

Date: 02/16/20
02/15/20

KGS

Field Instrument Calibration Log

Date: 2/20/20 **Weather:** 20's

Project/Site Name: Deers **Instrument:** YSI 650X2

Calibrated By: WH **Serial Number:** 11600387

Parameters	Solution Expiration Date	AM Calibration Time 630		Cal. Temp. (°C)	PM Post Cal. Check Time 1500	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1.413 µS/cm*)	3/20	1.401	1.413	16.20°	1.410	16.47°	±10 µS/cm	N
pH (7)	2/21	7.13	7.00	16.47°	7.06	16.32°	± 0.3 Ph *	N
pH (4)	3/21	3.91	4.00	16.48°	3.97	15.91°	± 0.3 Ph *	N
pH (10)	2/21	9.79	10.00	16.43°	10.02	15.86°	± 0.3 Ph *	N
ORP (240 mv)	5/20	226.1	240.0	16.41°	241.1	16.04°	±10 mv	N
Dissolved Oxygen (%)	N/A	90.2%	100.0%	16.37°	103.2%	16.18°	-	N
Dissolved Oxygen (mg/L)	N/A	9.47	10.00	16.38°	10.11	16.23°	± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	N
Barometric Pressure (mmHg)	N/A	—	760	—	760	—	-	N

Notes:

* Ph Unit with Ph 7 Buffer

(Mark Noted Variences on Field Forms)

Signature: [signature] **Date:** 2/20/20

KGS

Field Instrument Calibration Log

Date: 2/21/20 **Weather:** Dary

Project/Site Name: Dwas **Instrument:** YSI 650xl

Calibrated By: [illegible] **Serial Number:** 116100387

Parameters	Solution Expiration Date	AM Calibration Time 635		Cal. Temp. (°C)	PM Post Cal. Check Time _____	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1.413 µS/cm°)	3/20	1.422	1.413	15.28°	1.412	16.02	±10 µS/cm	N
pH (7)	2/21	7.33	7.00	15.37°	7.01	16.11	± 0.3 Ph *	N
pH (4)	3/21	4.11	4.00	15.40°	4.03	16.27	± 0.3 Ph *	N
pH (10)	2/21	10.42	10.00	15.37°	10.11	16.09	± 0.3 Ph *	N
ORP (240 mv)	5/20	213.6	240.0	15.41°	241.7	16.00	±10 mv	N
Dissolved Oxygen (%)	N/A	81.7%	100.0%	15.23	96.1%	15.87	-	N
Dissolved Oxygen (mg/L)	N/A	10.30	10.00	15.21°	9.90	15.91	± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	N
Barometric Pressure (mmHg)	N/A	—	760	—	760	—	-	N

Notes:

*** Ph Unit with Ph 7 Buffer**

(Mark Noted Variences on Field Forms)

Signature: [signature] **Date:** 2/21/20

KGS

Turbidity Instrument Calibration Log

Project/Site Name: Davis

Instrument: Lamotte 2020we

Calibrated By: WL / MM

Serial Number: B 4416-2014

Date	AM Calibration				PM Post Calibration Check		Variance Noted
	Pre-Cal 0 NTU	Post-Cal 0 NTU	Pre-Cal 10 NTU	Post-Cal 10 NTU	0 NTU	10 NTU	
2/13	0.00	0.00	10.31	10.00	0.00	10.03	N
2/14	0.03	0.00	10.18	10.00	0.02	10.10	N
2/20	0.19	0.00	10.09	10.00	0.03	10.11	N
2/21/20	0.21	0.00	10.01	10.00	0.02	10.01	N
2/25/20	0.19	0.00	10.21	10.00	0.09	9.17	~~N~~ Y
2/27/20	0.21	0.00	10.32	10.00	0.08	9.63	N
2/28/20	0.13	0.00	10.12	10.00	0.13	9.73	N
3/2/2020	0.02	0.00	10.31	10.00	0.02	10.11	N

Post Calibration Criteria	
-	± 0.5

Notes: Mark Noted Variences on Field Forms

Signature: [illegible]

Date: 2/14/20
2/21/20
2/27/20
2/28/20
3/2/20

KGS

Field Instrument Calibration Log

Date: 2-24-2020 **Weather:** 25-35°F Clear

Project/Site Name: Ft Dennis **Instrument:** YSI 556 MPS

Calibrated By: Michael Spaulding **Serial Number:** 15F101567

Parameters	Solution Expiration Date	AM Calibration Time 0615		Cal. Temp. (°C)	PM Post Cal. Check Time 1535	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1.413 µS/cm°)	3/2026	1.416	1.413	15:34	1.404 / 1.413	18.01	±10 µS/cm	N
pH (7)	2/2021	6.96	7.00	15:38	7.25 / 7.00	17.92	± 0.3 Ph *	N
pH (4)	3/2021	3.98	3.99	15:61	4.03 / 4.00	18.38	± 0.3 Ph *	N
pH (10)	2/2021	9.95	10.00	15:55	9.93 / 9.99	17.94	± 0.3 Ph *	N
ORP (240 mv)	5/2020	245.2	240.0	15.68	234.2 / 240.0	18.03	±10 mv	N
Dissolved Oxygen (%)		99.4	100.0	15:51	101.4 / 99.3	15:22	-	
Dissolved Oxygen (mg/L)		9.96	9.83	15:51	10.19 / 9.42	15:22	± 0.5 mg/L < 0 5 mg/L for 0 mg/L solution, no negative value	N
Barometric Pressure (mmHg)		760		15:51	760	15:22	-	

Notes:

*** Ph Unit with Ph 7 Buffer**

(Mark Noted Variences on Field Forms)

Signature: [signature] **Date:** 2-24-2020

KGS

Turbidity Instrument Calibration Log

Project/Site Name: Ft Dearborn ACC 436

Instrument: Lamotte 2020we

Calibrated By: Michael Spaulding

Serial Number: 2636262

Date	AM Calibration				PM Post Calibration Check		Variance Noted
	Pre-Cal 0 NTU	Post-Cal 0 NTU	Pre-Cal 10 NTU	Post-Cal 10 NTU	0 NTU	10 NTU	
2-21-2020	2.16	2.011	10.22	10.00	2.52 / 2.48	9.74 / 10.00	N
2-24-2020	2.64	2.55	9.77	9.99	2.72 / 2.91	9.06 / 10.00	Y
2-25-2020	2.99	2.89	9.80	10.00	3.04 / 3.06	10.14 / 10.00	N

Notes: Mark Noted Variences on Field Forms

Post Calibration Criteria	
-	± 0.5

Signature:

Date: 2-21-2020
2-24-2020
2-25-2020

KGS

Field Instrument Calibration Log

Date

Weather

Project Site Name

Instrument

Calibrated By

Serial Number

Parameter	Solution Expiration Date	Calibration Time	Cal. Temp.	Pre Post Cal Check Temp	Pre Cal Check Value	Post Cal Check Value	Verified Match (Y/N)
Specific Conductance							
pH							
pH							
pH							
Turbidity							
Turbidity							
Dissolved Oxygen							
Dissolved Oxygen							

Notes

Pull Sample Time

Water Sample Temperature and Color

Signature

Date

KGS

Turbidity Instrument Calibration Log

Project/Site Name: Devens RI VP A2

Instrument: Lamotte 2020we

Calibrated By: BA

Serial Number: 1828-0412

Date	AM Calibration				PM Post Calibration Check		Variance Noted
	Pre-Cal 0 NTU	Post-Cal 0 NTU	Pre-Cal 10 NTU	Post-Cal 10 NTU	0 NTU	10 NTU	
02/24/20	0.92	0.80	10.26	10.00	0.8	10.14	N
02/25/20	1.81	0.79	10.91	10.00	0.99	10.03	N
02/26/20	1.50	0.92	11.28	10.00	0.90	10.20	N
02/28/20	1.23	0.80	10.90	10.00	0.88	10.14	N

Notes: Mark Noted Variences on Field Forms

Post Calibration Criteria	
-	±0.5

Signature: [signature]

Date: 02/24/20
02/25/20
02/26/20
02/28/20

KGS

Field Instrument Calibration Log

Date: 4/7/20

Weather: 40's

Project/Site Name: Pevey

Instrument: YSI 650XL

Calibrated By: WGA

Serial Number: 116100 387

Parameters	Solution Expiration Date	AM Calibration Time 610		Cal. Temp. (°C)	PM Post Cal. Check Time _____	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1.413 µS/cm°)	10/20	1.430	1.413	16.29°			±10 µS/cm	
pH (7)	2/21	7.37	7.00	16.37°	WGA		± 0.3 Ph *	
pH (4)	10/21	3.87	4.00	16.37°			± 0.3 Ph *	
pH (10)	10/21	9.72	10.00	16.29°			± 0.3 Ph *	
ORP (240 mv)	5/20	250.9	240.0	16.40°			±10 mv	
Dissolved Oxygen (%)	N/A	82.6%	100.0%	16.38°			-	
Dissolved Oxygen (mg/L)	N/A	9.63	10.00	16.39°			± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	
Barometric Pressure (mmHg)	N/A	—	760	—			-	

Notes:

* Ph Unit with Ph 7 Buffer unit failure no PM post cal

(Mark Noted Variences on Field Forms)

Signature: [signature]

Date: 4/7/20

KGS

Field Instrument Calibration Log

Date: 4/8/20

Weather: 50's

Project/Site Name: Devaru

Instrument: YSI 600XL

Calibrated By: [illegible]

Serial Number: 11B100185

Parameters	Solution Expiration Date	AM Calibration Time 1030		Cal. Temp. (°C)	PM Post Cal. Check Time 1405	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1.413 µS/cm°)	10/20	1.420	1.413	17.03	1.413	16.59	±10 µS/cm	N
pH (7)	2/21	7.11	7.00	17.02	7.03	16.67	± 0.3 Ph *	N
pH (4)	10/21	4.03	4.00	16.97	4.10	16.71	± 0.3 Ph *	N
pH (10)	10/21	9.80	10.00	16.87	9.90	16.80	± 0.3 Ph *	N
ORP (240 mv)	5/20	237.1	240.0	17.03	242.6	16.73	±10 mv	N
Dissolved Oxygen (%)	N/A	96.7%	100.0%	17.14	97.6%	16.69	-	N
Dissolved Oxygen (mg/L)	N/A	9.96	10.00	17.03	10.09	16.90	± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	N
Barometric Pressure (mmHg)	N/A	—	760	—	760	—	-	N

Notes:

* Ph Unit with Ph 7 Buffer

(Mark Noted Variences on Field Forms)

Signature: [signature]

Date: 4/8/20

KGS

Field Instrument Calibration Log

Date: 4/9/20

Weather: 40's Heavy Rain

Project/Site Name: Devon

Instrument: YSI 600XL

Calibrated By: MA

Serial Number: 11B100185

Parameters	Solution Expiration Date	AM Calibration Time 615		Cal. Temp. (°C)	PM Post Cal. Check Time 1400	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1.413 µS/cm°)	10/20	1.432	1.413	16.89	1.410	15.21	±10 µS/cm	N
pH (7)	2/21	7.31	7.00	16.32	7.20	14.99	± 0.3 Ph *	N
pH (4)	10/21	4.07	4.00	16.41	4.00	15.11	± 0.3 Ph *	N
pH (10)	10/21	10.10	10.00	16.39	9.87	15.20	± 0.3 Ph *	N
ORP (240 mv)	5/20	256.1	240.0	16.59	241.1	15.30	±10 mv	N
Dissolved Oxygen (%)	N/A	132.7%	100.0%	16.31	96.7%	15.41	-	N
Dissolved Oxygen (mg/L)	N/A	9.60	10.00	15.97	9.80	15.30	± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	N
Barometric Pressure (mmHg)	N/A	—	760	—	760	—	-	N

Notes:

* Ph Unit with Ph 7 Buffer

(Mark Noted Variences on Field Forms)

Signature:

Date: 4/9/20

KGS

Field Instrument Calibration Log

Date: 4/10/20

Weather: 40's

Project/Site Name: Dans

Instrument: YSI 600XL

Calibrated By: MA

Serial Number: 11B100185

Parameters	Solution Expiration Date	AM Calibration Time 605		Cal. Temp. (°C)	PM Post Cal. Check Time 1420	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1.413 µS/cm°)	10/20	1.439	1.413	18.27°	~~1.419~~ 1.419	16.93°	±10 µS/cm	N
pH (7)	2/21	7.51	7.00	18.41	7.03	16.87	± 0.3 Ph *	N
pH (4)	10/21	4.47	4.00	18.39	4.21	16.79	± 0.3 Ph *	N
pH (10)	10/21	9.81	10.00	18.56	10.19	16.89	± 0.3 Ph *	N
ORP (240 mv)	5/20	259.9	240.0	18.59	247.1	16.47	±10 mv	N
Dissolved Oxygen (%)	N/A	131.6%	100.0%	18.70	98.7%	16.59	-	N
Dissolved Oxygen (mg/L)	N/A	9.32	10.00	18.27	9.87	16.69°	± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	N
Barometric Pressure (mmHg)	N/A	—	760	—	760	—	-	N

Notes:

* Ph Unit with Ph 7 Buffer

(Mark Noted Variences on Field Forms)

Signature:

Date: ~~4/10~~ 4/10/20

KGS

Turbidity Instrument Calibration Log

Project/Site Name: Dams

Instrument: LaMotte 2020e

Calibrated By: VBN

Serial Number:

Date	AM Calibration				PM Post Calibration Check		Variance Noted
	Pre-Cal 0 NTU	Post-Cal 0 NTU	Pre-Cal 10 NTU	Post-Cal 10 NTU	0 NTU	10 NTU	
3/30/2020	0.27	0.00	10.20	10.00	0.06	10.11	N
3/31/2020	0.20	0.00	9.93	10.00	0.07	10.03	N
4/1/2020	0.18	0.00	10.20	10.00	0.11	9.92	N
4/2/2020	0.09	0.00	10.47	10.00	0.06	10.13	N
4/3/2020	0.03	0.00	10.37	10.00	0.20	10.07	N
4/6/2020	0.21	0.00	10.18	10.00	0.17	10.21	N
4/7/2020	0.38	0.00	10.19	10.21	0.13	10.19	N
4/8/2020	0.23	0.00	10.18	10.00	0.07	~~0.0~~ 10.03	N
					Post Calibration Criteria		
					-	± 0.5	

Notes: Mark Noted Variences on Field Forms

Signature:

Date: 4/3/20

4/9/2020	0.17	0.00	10.13	10.00	0.07	10.00	N
4/10/20	0.09	0.00	10.18	10.00	0.09	10.07	N

KGS

Field Instrument Calibration Log

Date: 4/15/20 Weather: 40's

Project/Site Name: Davis Instrument: YSI 600xl

Calibrated By: VGA Serial Number: 11B100185

Parameters	Solution Expiration Date	AM Calibration Time 605		Cal. Temp. (°C)	PM Post Cal. Check Time 1305	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1.413 µS/cm°)	10/20	1.472	1.413	16.21	1.410	17.81	±10 µS/cm	N
pH (7)	2/21	7.43	7.00	16.37	7.03	17.77	± 0.3 Ph *	N
pH (4)	10/21	4.17	4.00	16.46	4.00	17.39	± 0.3 Ph *	N
pH (10)	10/21	9.73	10.00	16.59	10.15	17.64	± 0.3 Ph *	N
ORP (240 mv)	5/20	243.6	240.0	16.37	241.2	17.73	±10 mv	N
Dissolved Oxygen (%)	N/A	83.7%	100.0%	16.33	107.6%	17.87	-	N
Dissolved Oxygen (mg/L)	N/A	9.70	10.00	16.29	9.70	17.81	± 0 5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	N
Barometric Pressure (mmHg)	N/A	—	760	—	760	—	-	N

Notes:

* Ph Unit with Ph 7 Buffer (Mark Noted Variences on Field Forms)

Signature: Date: 4/15/20

KGS

Field Instrument Calibration Log

Date: 4/16/20

Weather: 40's snow am

Project/Site Name: Devons

Instrument: YSI 600XL

Calibrated By: N/A

Serial Number: 11B100185

Parameters	Solution Expiration Date	AM Calibration Time 600		Cal. Temp. (°C)	PM Post Cal. Check Time 1500	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1.413 µS/cm°)	10/20	1.430	1.413	16.93	1.413	15.26	±10 µS/cm	N
pH (7)	2/21	7.47	7.00	16.87	7.06	15.30	± 0.3 Ph *	N
pH (4)	10/21	4.29	4.00	16.42	4.21	15.29	± 0.3 Ph *	N
pH (10)	10/21	9.83	10.00	16.97	9.87	15.47	± 0.3 Ph *	N
ORP (240 mv)	5/20	221.7	240.0	16.32	239.2	15.29	±10 mv	N
Dissolved Oxygen (%)	N/A	79.6%	100.0%	16.18	107.2%	15.46	-	N
Dissolved Oxygen (mg/L)	N/A	9.32	10.00	16.00	10.11	15.18	± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	N
Barometric Pressure (mmHg)	N/A	—	760	—	760	—	-	N

Notes:

* Ph Unit with Ph 7 Buffer

(Mark Noted Variences on Field Forms)

Signature:

Date: 4/16/20

KGS

Field Instrument Calibration Log

Date: 4/17/20

Weather: Dewy

Project/Site Name: Dennis

Instrument: YSI 600XL

Calibrated By: WA

Serial Number: 11B100185

Parameters	Solution Expiration Date	AM Calibration Time 600		Cal. Temp. (°C)	PM Post Cal. Check Time 1520	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1.413 µS/cm°)	10/20	1.397	1.413	16.39°	1.410	18.71°	±10 µS/cm	N
pH (7)	2/21	6.83	7.00	16.23°	7.06	17.69°	± 0.3 Ph *	N
pH (4)	10/21	3.86	4.00	16.56°	4.03	17.63°	± 0.3 Ph *	N
pH (10)	10/21	9.63	10.00	16.66°	9.90	17.50°	± 0.3 Ph *	N
ORP (240 mv)	5/20	231.7	240.0	16.73°	246.3	17.78°	±10 mv	N
Dissolved Oxygen (%)	N/A	91.1%	100.0%	16.83°	93.1%	17.62°	-	N
Dissolved Oxygen (mg/L)	N/A	9.42	10.00	16.79°	9.90	17.53°	± 0 5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	N
Barometric Pressure (mmHg)	N/A	—	760	—	760	—	-	N

Notes:

* Ph Unit with Ph 7 Buffer

(Mark Noted Variences on Field Forms

Signature: [signature]

Date: 4/17/20

KGS

Field Instrument Calibration Log

Date: 4/20/20

Weather: 40's

Project/Site Name: Dover

Instrument: YSI 600XL

Calibrated By: [illegible]

Serial Number: 11B100185

Parameters	Solution Expiration Date	AM Calibration Time 6:00		Cal. Temp. (°C)	PM Post Cal. Check Time 1445	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1.413 µS/cm°)	10/20	1.501	1.413	17.30	1.412	16.27°	±10 µS/cm	N
pH (7)	2/21	7.43	7.00	17.18	7.03	17.38°	± 0.3 Ph *	N
pH (4)	10/21	3.87	4.00	17.21	4.01	17.45	± 0.3 Ph *	N
pH (10)	10/21	9.80	10.00	16.97	10.21	17.50	± 0.3 Ph *	N
ORP (240 mv)	5/20	227.1	240.0	16.86	242.2	17.44	±10 mv	N
Dissolved Oxygen (%)	N/A	96.2%	100.0%	17.30	91.1%	17.43	-	N
Dissolved Oxygen (mg/L)	N/A	9.80	10.00	17.06	10.11	17.40	± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	N
Barometric Pressure (mmHg)	N/A	—	760	—	760	—	-	N

Notes:

* Ph Unit with Ph 7 Buffer

(Mark Noted Variences on Field Forms

Signature: [illegible]

Date: 4/20/20

KGS

Field Instrument Calibration Log

Date: 4/21/20

Weather: 40's

Project/Site Name: Dover

Instrument: YSI 600XL

Calibrated By: MA

Serial Number: 11B100185

Parameters	Solution Expiration Date	AM Calibration Time 600		Cal. Temp. (°C)	PM Post Cal. Check Time 1445	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1.413 µS/cm°)	6/20	1.467	1.413	16.27	1.420	17.21	±10 µS/cm	N
pH (7)	2/21	7.41	7.00	16.09	7.30	17.18	± 0.3 Ph *	N
pH (4)	6/21	4.37	4.00	16.07	4.18	17.09	± 0.3 Ph *	N
pH (10)	10/21	9.80	10.00	16.23	10.09	17.23	± 0.3 Ph *	N
ORP (240 mv)	5/20	231.1	240.0	16.47	241.1	17.00	±10 mv	N
Dissolved Oxygen (%)	NA	136.7%	100.0%	16.18	103.6%	17.00	-	N
Dissolved Oxygen (mg/L)	NA	9.41	10.00	16.23	9.90	16.83	± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	N
Barometric Pressure (mmHg)	NA	—	760	—	760	—	-	N

Notes:

* Ph Unit with Ph 7 Buffer

(Mark Noted Variences on Field Forms)

Signature:

Date: 4/21/20

KGS

Field Instrument Calibration Log

Date: 4/22/20

Weather: Rain

Project/Site Name: Dana

Instrument: YSI 600XL

Calibrated By: MA

Serial Number: 11B100185

Parameters	Solution Expiration Date	AM Calibration Time 610		Cal. Temp. (°C)	PM Post Cal. Check Time 1515	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1.413 µS/cm°)	10/20	1.389	1.413	15.20	1.410	14.39	±10 µS/cm	N
pH (7)	2/21	6.63	7.00	15.07	7.20	14.47	± 0.3 Ph *	N
pH (4)	10/21	4.11	4.00	15.19	4.18	14.50	± 0.3 Ph *	N
pH (10)	10/21	9.78	10.00	15.38	9.91	14.53	± 0.3 Ph *	N
ORP (240 mv)	5/20	256.1	240.0	15.37	243.7	14.16	±10 mv	N
Dissolved Oxygen (%)	N/A	~~9.64~~ 91.1	~~10.00~~ 100.0%	15.21	109.7%	14.21	-	N
Dissolved Oxygen (mg/L)	N/A	9.64	10.00	14.99	10.18	14.20	± 0 5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	N
Barometric Pressure (mmHg)	N/A	—	760	—	760	—	-	N

Notes:

* Ph Unit with Ph 7 Buffer

(Mark Noted Variences on Field Forms

Signature:

Date: 4/22/20

KGS

Field Instrument Calibration Log

Date: 4/23/20

Weather: 30's

Project/Site Name: Devas

Instrument: YSI 600XL

Calibrated By: MA

Serial Number: 11B100185

Parameters	Solution Expiration Date	AM Calibration Time 615		Cal. Temp. (°C)	PM Post Cal. Check Time 1405	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1.413 µS/cm°)	10/20	1.379	1.413	15.38	1.411	16.78	±10 µS/cm	N
pH (7)	2/21	6.78	7.00	15.49	7.06	16.89	± 0.3 Ph *	N
pH (4)	10/21	3.90	4.00	15.28	4.03	17.21	± 0.3 Ph *	N
pH (10)	10/21	10.15	10.00	15.33	10.11	17.06	± 0.3 Ph *	N
ORP (240 mv)	5/20	237.1	240.0	15.50	241.7	16.99	±10 mv	N
Dissolved Oxygen (%)	N/A	91.6%	100.0%	15.49	103.6%	17.03	-	N
Dissolved Oxygen (mg/L)	N/A	10.11	10.00	15.21	9.80	17.00	± 0 5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	N
Barometric Pressure (mmHg)	N/A	—	760	—	760	—	-	N

Notes:

* Ph Unit with Ph 7 Buffer

(Mark Noted Variences on Field Forms)

Signature: [signature]

Date: 4/23/20

KGS

Turbidity Instrument Calibration Log

Project/Site Name: Dewey

Instrument: Lomotte 2020WE

Calibrated By: [illegible]

Serial Number: 4416-2016

Date	AM Calibration				PM Post Calibration Check		Variance Noted
	Pre-Cal 0 NTU	Post-Cal 0 NTU	Pre-Cal 10 NTU	Post-Cal 10 NTU	0 NTU	10 NTU	
4/14/2020	0.37	0.00	9.63	10.00	0.07	10.09	N
4/15/20	0.20	0.00	9.80	10.00	0.09	10.07	N
4/16/20	0.39	0.00	10.18	10.00	0.31	10.40	N
4/17/20	0.28	0.00	9.93	10.00	0.17	10.03	N
4/20/20	0.47	0.00	10.39	10.00	0.02	10.10	N
4/21/20	0.30	0.00	9.90	10.00	0.03	10.09	N
4/22/20	0.09	0.00	10.38	10.00	0.09	10.20	N
4/23/20	0.12	0.00	10.15	10.00	0.06	10.06	N
					Post Calibration Criteria		
					-	± 0.5	

Notes: Mark Noted Variences on Field Forms

Signature: [signature]

Date: 4/17/20

4/24/20	0.16	0.00	10.27	10.00	0.09	10.18	N

[signature] 4/24/20

AREA OF CONTAMINATION 43G

SYNOPTIC FIELD SHEETS

KGS

Project/Site Name: Fort Devens/AOC 43G Winter 2020 **Date :** 2-20-2020
Field Team Member: Michael Spaulding **Weather:** 20-30°F clear / partly cloudy
Water Level Meter Model: Solinst 101
250289

Well ID	Time	2020 DTW (ft bTOR)	2020 DTB (ft bTOR)	Lock Y/N	Bolts Y/N	Cap Y/N	Well Condition/Notes	Notes
AAFES-2	1010	22.60 *	33.39 *	Y	—	Y	riser needs repair - removed	Cap + ~18" riser missing
AAFES-5	1120	21.97	37.00	—	N	Y	2" good	
AAFES-6R	1040	14.78	27.30	✓	—	✓	dbd tubing good	2" PVC
AAFES-7	1220	7.82	17.23	✓	—	N	2" PVC	
XGM-93-02X	1320						Road to X heavily damaged by flood	[illegible]
XGM-94-04X	1050	14.21	31.19	✓	—	✓	4" dbd tubing	
XGM-94-06X	1145	20.30	30.21	✓	—	✓	good 4" PVC	
XGM-94-07X	1111	19.95	30.10	✓		✓	good 4" PVC dbd Tub	
XGM-94-08X	1103	25.79	35.73	✓	—	✓	4" + dbd good	
XGM-94-10X	1055	24.60	34.05	✓	—	✓	4" dbd tub good	
XGM-97-12X	0936	24.66	33.90	—	1/2	Y	good dbd tub.	4" PVC
43GPZ-19-03	0952	22.55	24.59	—	✓	✓	good	
43GPZ-19-02	1245	27.91	28.80	—	✓	✓	good	
43GPZ-19-01	1155	18.74	18.90	—	✓	✓	good	
43GPZ-19-04	0726	7.18	13.56	Y	NA	Y	good	
43GPZ-19-05	0735	7.42	14.96	NA	Y	Y	good	
43GPZ-19-06	0741	9.09	18.56	—	Y	Y	good	
43GPZ-19-07	1420	1.25	10.10	—	✓	✓	good	
43GPZ-19-08	1410	11.26	21.10	—	—	✓	good	Soft Bottom
XGM-20-01A	1235	7.23	20.05	—	✓	✓	good 2"	no screw cap
XGM-20-02A	1230	12.11	22.92	—	✓	✓	good 2"	no screw cap
XGM-20-03A	1210	14.61	29.49	—	✓	✓	good 2" PVC	no screw cap
1-D-1 ~~XGM-93-01X~~	1440	2.50 top of riser	10.08 TOC	—	—	✓	near shore good 1D-1	2" PVC Might not exist
1D-5 ~~XGM-94-09X~~	1445	2.49 TOC	48.31 TOC	—	—	—	away from shore good 1D-5	2" PVC Might not exist
RPSG-01	0658	1.80					Pond frozen	
76PZ-19-01	0805	21.23	30.77	—	Y	Y	good	
76PZ-19-03	0830	12.21	23.74	—	✓	✓	good	
76PZ-19-18	0750	4.30	15.79	—	Y			
76PZ-19-05	0815	19.71	22.84	—	✓	✓	good	DTB ~22.84
76PZ-19-15	0846	2.48	13.80	—	✓	—	good	
76PZ-19-04	0907	5.64	14.53	—	✓	—		[illegible]
75MW-19-01 BR	1570	15.25	44.60	—	—	✓	good	no screw cap

Notes:
DTW - depth to water (water table)
DTB - depth to bottom of well
' - feet
bTOR - below top of riser

LOW FLOW FORM FIELD SHEETS

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: 43GPZ-19-03

Project: Ft Devens AOC 43G
Location: 43GPZ-19-03
Date: 2-24-2020
Sampler: Michael Sparkling

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present	✓		
Bolts present	✓		
Locked (stickup wells)			✓

Well Information

Diameter	1"
Material	PVC
Depth to water (ft BTOR)	22.54
Depth to bottom (ft BTOR)	24.85
Pump Set Depth (ft BTOR)	~23
Screen Interval (ft BTOR)	15-25
Total volume purged (gal)	~3 gal

Sampling Type

Purging Method: Peristaltic
Purge start/stop time: 0730 / 0825
Tubing type: HDPE
Tubing diameter: 1/4"
Dedicated pump (Y/N): N
Air source: NA
Field Instrument (Model/S/N): YSI 556 MPS / 15F101567

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm^c)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
0730	200	22.61	8.26	7.36	1.000	10.41	237.6	1002	opaque tan
0735	150	22.62	10.76	7.36	1.892	6.30	234.0	62.6	cloudy tan
0740	150	22.61	10.87	7.14	1.888	6.47	234.2	15.3	clear w/ floating solids
0745	175	22.62	11.02	7.03	1.887	6.45	232.1	7.43	clear
0750	150	22.62	11.09	6.95	1.885	6.75	228.1	4.92	clear
0755	150	22.62	11.19	6.89	1.885	6.54	226.0	3.20	clear
0800	150	22.62	11.24	6.85	1.885	6.54	225.4	4.46	clear
0805	150	22.62	11.47	6.82	1.880	6.53	224.2	123	cloudy
0810	150	22.62	11.62	6.80	1.883	6.59	225.3	5.87	clear
0815	150	22.62	11.63	6.80	1.882	6.54	226.2	3.28	clear
0820	150	22.62	11.85	6.78	1.879	6.60	224.5	3.43	clear
0825	150	22.62	11.87	6.77	1.881	6.58	223.0	2.41	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	N	N	N	Y	

Sampling Details

Sampling ID: 43GPZ-19-03_FEB20
Sample Time: 0825
Duplicate (Y/N): N
MS/MSD (Y/N): N
Field Filtered (Y/N): Y
Dup ID: NA
Filter Size: 0.45 um
Dup Time: NA

Comments 1.83 NTU post filter

[signature]
Signature

2-24-2020
Date

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: XGM-20-01 A

Project: [illegible] A0C43C
Location: XGM-20-01A
Date: 2-21-2020
Sampler: [illegible]

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present	✓		
Bolts present	✓		
Locked (stickup wells)			✓

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	7.26
Depth to bottom (ft BTOR)	20.79
Pump Set Depth (ft BTOR)	~18 ft
Screen Interval (ft BTOR)	12-22
Total volume purged (gal)	~3.5 gal

Sampling Type

Purging Method: Peristaltic
Purge start/stop time: 0745 / 0835
Tubing type: HDPE
Tubing diameter: 1/4"
Dedicated pump (Y/N): N
Air source: NA
Field Instrument (Model/S/N): YSI 556 MPS 15F101567

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm^c)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
0745	275	7.27	7.50	7.98	1.790	12.48	233.3	16.9	Cloudy
0750	250	7.28	8.38	7.46	1.803	9.27	235.9	14.5	slightly cloudy
0755	150	7.27	7.93	7.20	1.802	8.90	232.4	10.09	clear
0800	150	7.27	7.72	6.99	1.800	8.42	225.0	5.70	Clear
0805	150	7.27	7.42	6.90	1.803	8.68	222.6	4.64	clear
0810	150	7.27	7.30	6.86	1.802	8.70	225.1	4.68	clear
0815	150	7.27	7.20	6.80	1.801	[illegible]	[illegible]	5.72	Clear
0820	150	7.27	7.43	[illegible]	1.794	8.51	214.8	4.94	clear
0825	150	7.27	7.48	6.73	1.792	8.64	213.1	4.14	clear
0830	150	7.27	7.55	6.69	1790	8.67	210.8	3.36	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	Y	Y	N	N	

Sampling Details

Sampling ID: XGM-20-01A_FEB20
Sample Time: 0830
Duplicate (Y/N): Y
MS/MSD (Y/N): N
Field Filtered (Y/N): Y
Dup ID: YBGMW-DUP01_FEB20
Filter Size: 0.45 um
Dup Time: 0835

Comments 2.61 NTU post filter

[signature]
Signature

2-21-2020
Date

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: XGM-20-02A

Project: [illegible] Date: 2-21-2020

Location: XGM-20-02A Sampler: [illegible]

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present	✓		
Bolts present	✓		
Locked (stickup wells)			✓

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	12.18
Depth to bottom (ft BTOR)	22.91
Pump Set Depth (ft BTOR)	~18.7
Screen Interval (ft BTOR)	12-22
Total volume purged (gal)	~3 gal

Sampling Type

Purging Method: Peristaltic Tubing type: HDPE Dedicated pump (Y/N): [illegible]

Purge start/stop time: 0945 Tubing diameter: [illegible] Air source: [illegible]

Field Instrument (Model/S/N): YSI 556 MPS 15F101587

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm^c)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
0945	250	12.39	9.12	7.13	1,620	7.37	176.3	14.0	Slightly Cloudy
0950	175	12.38	9.53	7.02	1,703	5.85	180.9	14.7	Slightly Cloudy
0955	150	12.33	9.28	6.98	1,727	5.85	184.5	18.4	Slightly Cloudy
1000	150	12.36	9.17	6.91	1,727	5.68	186.8	16.2	Some floating [illegible]
1005	150	12.34	9.29	6.94	1,752	5.64	188.4	11.5	Clear
1010	150	12.35	9.54	6.91	1,784	5.83	189.1	11.9	Clear
1015	150	12.38	9.65	6.95	1,817	5.60	189.6	6.51	Clear
1020	150	12.38	9.54	6.86	1,817	6.02	190.0	5.77	Clear
1025	150	12.38	9.54	6.85	1,833	5.93	191.1	6.20	[illegible]
1030	150	12.38	9.61	6.83	1,832	6.09	190.3	6.03	Clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	Y	[illegible]	N	N	

Sampling Details

Sampling ID: XGM-20-02A_FEB20

Sample Time: 1030 Duplicate (Y/N): N MS/MSD (Y/N): N

Field Filtered (Y/N): Y Dup ID: N/A

Filter Size: 0.45 µm Dup Time: N/A

Comments: 2.61 NTU Post Filter

[illegible] 2-21-2020

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: XGM-20-03A

Page 1 of 2

Project: Ft Dennis AOC 436

Location:

Date: 2-21-2020

Sampler: [illegible]

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present	✓		
Bolts present	✓		
Locked (stickup wells)			✓

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	14.68
Depth to bottom (ft BTOR)	24.72
Pump Set Depth (ft BTOR)	~20 ft
Screen Interval (ft BTOR)	12-22
Total volume purged (gal)	~4.25

Sampling Type

Purging Method: peristaltic

Purge start/stop time: 1130 / 1300

Tubing type: HDPE

Tubing diameter: 1/4"

Dedicated pump (Y/N): N

Air source: NA

Field Instrument (Model/S/N): YSI 556 MPS 15F101563

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm^c)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
130	350	14.72	10.05	6.87	1,716	7.62	150.5	67.8	cloudy
1139	270	14.71	10.64	6.63	1730	5.87	152.7	45.0	cloudy
1140	175	14.70	10.71	6.53	1,746	5.77	151.6	41.4	cloudy
1145	150	14.70	10.30	6.52	1,750	5.59	151.7	42.9	cloudy
1150	150	14.70	10.19	6.48	1.757	5.34	153.1	44.4	cloudy
1155	150	14.70	10.32	6.46	1,761	5.11	153.6	24.8	slightly cloudy
1200	150	14.70	10.08	6.50	1.768	5.06	155.8	32.0	slightly cloudy
1205	150	14.70	10.12	6.45	1.788	4.81	158.4	18.7	slightly cloudy
1210	150	14.70	9.94	6.41	1,789	4.56	159.6	14.3	clear
1215	150	14.70	10.06	6.42	1.784	4.67	160.4	17.8	clear
1220	150	14.70	9.97	6.42	1,785	4.74	161.3	15.5	clear
1225	150	14.70	9.93	6.41	1,783	4.67	164.3	12.1	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	Y	Y	N	N	

put cell in shade

Sampling Details

Sampling ID: XGM-20-03A_FE1320

Sample Time: 1300

Duplicate (Y/N): N

MS/MSD (Y/N): Y

Field Filtered (Y/N): Y

Dup ID: NA

Filter Size: 0.45um

Dup Time: NA

Comments: 2.29 NTU post filter

[signature]

2-21-2020

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

KGS

Well Identification: XGM-20-03A

Page 2 of 2

Project: Ft Devens AOC 43G
Location: XGM-20-03A
Date: 2-21-2020
Sampler: Michael Stanley

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present	✓		
Bolts present	✓		
Locked (stickup wells)			✓

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	14.68
Depth to bottom (ft BTOR)	29.72
Pump Set Depth (ft BTOR)	~20
Screen Interval (ft BTOR)	12-22
Total volume purged (gal)	~4.25 gal

Sampling Type

Purging Method: peristaltic
Purge start/stop time: 1130 / 1300
Tubing type: HDPE
Tubing diameter: 1/4"
Dedicated pump (Y/N): N
Air source: NA
Field Instrument (Model/S/N): YSI 556 MPS / 15E101567

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm^c)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1230	150	14.70	10.00	6.40	1.783	4.95	165.1	8.55	Clear
1235	150	14.70	10.26	6.42	1.775	5.59	166.9	13.1	clear
1240	150	14.70	10.22	6.41	1.778	5.17	168.9	6.11	clear
1245	150	14.70	10.22	6.41	1.786	4.76	170.5	6.39	clear
1250	150	14.70	10.12	6.40	1.794	4.51	171.5	5.14	clear
1255	150	14.70	9.96	6.40	1.796	4.59	170.7	5.14	clear
1300	150	14.70	10.05	6.40	1.796	4.76	170.5	5.27	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	Y	Y	N	N	

4 gal

Sampling Details

Sampling ID: XGM-20-03A FEB20
Sample Time: 1300
Duplicate (Y/N): N
MS/MSD (Y/N): Y
Field Filtered (Y/N): Y
Dup ID: NA
Filter Size: 0.45 um
Dup Time: NA

Comments 2.29 NTU post filter

[signature]
Signature

2-21-2020
Date

SOIL BORING LOGS

KOMAN Government Solutions, LLC
SOIL BORING LOG

Project: Devens PFAS RI	Boring No.: 436SB-19-01 Page 1 of 2
Project No.: 1082	Drilling Co.: Technical Drilling Services
Address: AOC 436	Driller: Jay Jumonville
Logger: Dave Kortjohn	Drilling Method: Direct Push
Date: 11/5/19	Drilling Equip: Geoprobe 6712DT
Total Boring Depth: 25 ft. bgs	Static Water: 25 ft. bgs

QC'd 4/7/2020 [illegible]

Core Section	Recovery (ft)	Interval (ft)	USCS ~~PID (ppm)~~	GEOLOGIC LOG	REMARKS
		0-0.5	—	Asphalt	
0-5'	3.7/5.0	0.5-5'	SP	Dry, brown, poorly graded, fine SAND, little medium sand, little angular gravel	436SB-19-01-0-0.5 @1230 436SB-19-01-0.5-3 @1235
5-10'	4.3/5.0	5-10'	SP	Dry, brown, poorly graded, fine SAND, some subangular gravel, trace medium sand	436SB-19-01-3-7 @1240 436SB-19-01-7-15 @1245
10-15'	3.9/5.0	10-15'	SP	Dry, brown, poorly graded, fine and medium SAND, some subangular gravel	
15-20'	1.0/5.0	15-20'	SM	Dry, brown, poorly graded, fine silty SAND, little subangular gravel	

Notes:

KGS

KOMAN Government Solutions, LLC 293 Boston Post Road, Marlborough, MA

KOMAN Government Solutions, LLC
SOIL BORING LOG

Project: Devens PFAS RI	Boring No.: 436SB-19-01 Page 2 of 2
Project No.: 1082	Drilling Co.: Technical Drilling Services
Address: AOC 436	Driller: Jay Jumonville
Logger: Dave Kortjohn	Drilling Method: Direct Push
Date: 11/5/19	Drilling Equip: Geoprobe 6712DT
Total Boring Depth: 25 ft.	Static Water: 25 ft.

QC'd 4/7/2019 [illegible]

Core Section	Recovery (ft)	Interval (ft)	USCS ~~PID (ppm)~~	GEOLOGIC LOG	REMARKS
20-25'	2.5/5.0	20-25'	SM	Dry to moist @ 23', brown with green tint and black pockets, poorly graded, fine silty SAND, strong petroleum odor	436SB-19-01-23-25 @1250

Notes:

KOMAN Government Solutions, LLC 293 Boston Post Road, Marlborough, MA

KOMAN Government Solutions, LLC
SOIL BORING LOG

Project: Devens PFAS RI	Boring No.: 436SB-19-02 — Page 1 of 2
Project No.: 1082	Drilling Co.: Technical Drilling Services
Address: AOC 436	Driller: Jay Jumonville
Logger: Dave Kortjohn	Drilling Method: Direct Push
Date: 11/4/19	Drilling Equip: Geoprobe 6712DT
Total Boring Depth: 29 ft. bgs (refusal) ~~(refusal)~~ (LW)	Static Water: ~~Not encountered~~ (DK) 25 ft. bgs

QC'd 4/7/2020 (LW)

Core Section	Recovery (ft)	Interval (ft)	USCS ~~PID (ppm)~~	GEOLOGIC LOG	REMARKS
(DK)	~~0-0.5'~~	0-0.5'	—	Asphalt	
0-5'	3.0/5.0	0.5-5'	SP	Dry, tan with orange tint, poorly graded, fine SAND, little subrounded gravel	436SB-19-02-0-0.5 @1210 436SB-19-02-0.5-3 @1215
5-10'	3.1/5.0	5-10'	SP	Dry, tan, poorly graded, fine SAND, few subrounded gravel	436SB-19-02-3-7 @1220 A3-SB-DUP01-110419 ~~436~~ @1225 (LW)
10-15'	3.3/5.0	10-12'	SP	Dry, brown, poorly graded, fine SAND, few angular gravel	436SB-19-02-7-15 @1230
		12-15'	SP	Dry, tan, poorly graded fine and medium SAND, little subrounded gravel	
15-20'	5.0/5.0	15-18'	SP GP	Dry, brown, poorly graded, fine SAND, some subangular gravel, trace coarse sand	
		18-20'	SP	Dry, brown, poorly graded, fine silty SAND, little subangular gravel	

Notes:

KGS

KOMAN Government Solutions, LLC 293 Boston Post Road, Marlborough, MA

KOMAN Government Solutions, LLC
SOIL BORING LOG

Project: Devens PFAS RI	Boring No.: 436SB-19-02 Page 2 of 2
Project No.: 1082	Drilling Co.: Technical Drilling Services
Address: AOC 436	Driller: Jay Jumonville
Logger: Dave Kortjohn	Drilling Method: Direct Push
Date: 11/4/19	Drilling Equip: Geoprobe 6712DT
Total Boring Depth: 29 ft. bgs (refusal)	Static Water: ~~Not encountered~~ DK 25 ft. bgs

QC'd 4/7/2020 [illegible]

Core Section	Recovery (ft)	Interval (ft)	USCS ~~PID (ppm)~~	GEOLOGIC LOG	REMARKS
20-25'	5.0/5.0	20-25'	SM	Moist ~~Dry~~, dark brown, poorly graded, fine silty SAND, little subrounded gravel	436SB-19-02-23-25 @1400 on 11/5/19
DK ~~25-30'~~ 25-29'	~~5.0/5.0~~ DK 3.5/5.0	DK ~~25-30'~~ 25-29'	SM	~~Dry to~~ moist, dark brown, poorly graded, fine silty SAND, little subangular gravel	~~436SB-19-02-27-29 @1235~~ DK

Notes:

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KOMAN Government Solutions, LLC
SOIL BORING LOG

Project: Devens PFAS RI	Boring No.: 436SB-19-03 Page 1 of 2
Project No.: 1082	Drilling Co.: Technical Drilling Services
Address: AOC 436	Driller: Jay Jumonville
Logger: Dave Kortjohn	Drilling Method: Direct Push
Date: 11/5/19	Drilling Equip: Geoprobe 6712DT
Total Boring Depth: 28 ft. bgs (refusal)	Static Water: 25 ft. bgs

QC'd 4/7/2020 LMW

Core Section	Recovery (ft)	Interval (ft)	USCS ~~PID (ppm)~~	GEOLOGIC LOG	REMARKS
0-5'	2.5/5.0	0-0.5'	—	Asphalt	436SB-19-03-0-0.5 @945
		0.5-5'	SP	Dry, brown, poorly graded, fine SAND, little subangular gravel	436SB-19-03-0.5-3 @950
5-10'	3.7/5.0	5-10'	SP	Dry, brown, poorly graded, fine SAND, few medium sand, little subangular gravel, trace cobble	436SB-19-03-3-7 @955 436SB-19-03-7-15 @1000 A3-SB-DUP01-110519 @1005
10-15'	3.9/5.0	10-11'	SP	Same as 5-10' bgs	
		11-13'	SM	Dry, tan w/ orange tint, poorly graded, fine silty SAND, trace subangular gravel	
		13-15'	SP	Dry, tan, poorly graded, fine SAND, some subrounded gravel	
15-20'	4.5/5.0	15-20'	SW	Dry, brown to tan, well graded, medium SAND, some subrounded gravel, trace fine sand	

Notes:

KGS

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KOMAN Government Solutions, LLC
SOIL BORING LOG

Project: Devens PFAS RI	Boring No.: 4365B-19-03 — Page 2 of 2
Project No.: 1082	Drilling Co.: Technical Drilling Services
Address: AOC 436B	Driller: Jay Jumonville
Logger: Dave Kortjohn	Drilling Method: Direct Push
Date: 11/5/19	Drilling Equip: Geoprobe 6712 DT
Total Boring Depth: 28 ft. bgs (refusal)	Static Water: 25 ft. bgs

QC'd 4/7/2020 [illegible]

Core Section	Recovery (ft)	Interval (ft)	USCS ~~PID (ppm)~~	GEOLOGIC LOG	REMARKS
20-25'	3.3/5.0 ~~4.0/5.0~~ DK	20-22'	SW	Same as 15-20' bgs	
		22-25'	SM	Dry to moist, brown, poorly graded, fine silty SAND, few subrounded gravel	
25 ~~30'~~ 28'	1.0/3.0 ~~2.5/5.0~~ DK	25-28' ~~25-30~~ DK	SM	Moist to wet, brown, poorly graded, fine silty SAND, trace subrounded gravel	4365B-19-03-23-25 @1035

Notes:

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KOMAN Government Solutions, LLC
SOIL BORING LOG

Project: Devens PFAS Soil Borings	Boring No.: 43GSB-19-04
Project No.: 02082-0011-5330	Drilling Co.: TDS
Address: AOC 43G	Driller: Jay Jumonville
Logger: Kristen Esner	Drilling Method: DPT
Date: 11/1/19	Drilling Equip: Geoprobe 6712 DT
Total Boring Depth: 19'	Static Water: NA

QC'd 4/7/2020 [illegible]

Core Section	Recovery ~~(ft)~~ in	Interval ~~(ft)~~ in	USCC ~~PID (ppm)~~ SVM.	GEOLOGIC LOG	REMARKS
0-5'	24	0-5.5 5.5-17 17-19 19-24	ML-SP SP ML SP	0-5.5: Dark brown-black SILT with some sub. angular gravel, little organics 5.5-17: Brown poorly graded med-coarse SAND, few sub-angular gravel 17-19: light brown SILT, trace fine sand 19-24: brown poorly graded med-coarse SAND, trace sub ang gravel	little fine SAND
5-10'	32	0-9 9-14 14-23	ML-SP SW-GW ML-CL SW	0-9: Brown poorly graded med-coarse SAND, trace sub ang gravel Black SILT layer @ 7" - dry 9-14: Brown well graded med-coarse SAND and GRAVEL 14-23: light brown SILT with little CLAY, trace sub round fine gravel 14-23: Brown well graded med-coarse SAND trace sub ang gravel	
10-15'	14	0-2 2-6 6-14	ML-CL SM ML-G	0-2: light brown SILT with little CLAY, trace coarse sand 2-6: brown med SAND with SILT, trace sub round gravel 6-14: brown SILT trace CLAY with little sub. round gravel	
15-19'	20	0-13 13-20	ML-S ML-G	0-13: brown SILT with some fine SAND, trace sub round gravel 13-20: brown SILT and gravel, fine, bedrock shattered	

Notes: Refusal @ 19' - bedrock present, no water table. Will sample 15-19' interval

Samples @ 0-0.5, 0.5-3, 3-7, 7-15, 15-19

KGS

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KOMAN Government Solutions, LLC
SOIL BORING LOG

Project: Devens PFAS RI	Boring No.: 436SB-19-05 Page 1 of 1
Project No.: 1082	Drilling Co.: Technical Drilling Services
Address: AOC 436	Driller: Jay Jumonville
Logger: Dave Kortjohn	Drilling Method: Direct Push
Date: 11/4/19	Drilling Equip: Geoprobe 6712DT
Total Boring Depth: 15 ft. bgs	Static Water:

QC'd 4/7/2020 [illegible]

Core Section	Recovery (ft)	Interval (ft)	USCS ~~PID (ppm)~~	GEOLOGIC LOG	REMARKS
0-5'	~~0-1'~~ 4.2/5.0	0-1'	SP	Dry, dark brown, poorly graded, fine SAND, little roots/wood chips	436SB-19-05-0-0.5 @920
		1-5'	SP	Dry, light brown, poorly graded, fine SAND, little medium sand, little subangular gravel, trace wood chips	436SB-19-05-0.5-3 @925
5-10'	2.5/5.0	5-8'	SW GW	Dry, light brown, ~~poorly~~ well graded, medium SAND and subrounded gravel	436SB-19-05-3-7 @930
		8-10'	SP	Dry, light brown, poorly graded, fine SAND, some subangular gravel	436SB-19-05-7-15 @935
10-15'	3.7/5.0	10-15'	SP	Dry, tan, poorly graded, fine SAND, little subangular gravel, trace silt	

Notes:

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KOMAN Government Solutions, LLC
SOIL BORING LOG

Project: Devens PFAS RI	Boring No.: 436SB-19-06 Page 1 of 1
Project No.: 1082	Drilling Co.: Technical Drilling Services
Address: AOC 436	Driller: Jay Jumonville
Logger: Dave Kortjohn	Drilling Method: Direct Push
Date: 11/4/19	Drilling Equip: Geoprobe 6712DT
Total Boring Depth: 15 ft. bgs	Static Water:

QC'd 4/7/2020 [illegible]

Core Section	Recovery (ft)	Interval (ft)	USCS ~~PID (ppm)~~	GEOLOGIC LOG	REMARKS
0-5'	3.3/5.0	0-0.5'	–	Asphalt	
		0.5-3'	SW	Dry, tan, ~~poorly~~ well graded ~~det~~, medium SAND, little subangular gravel, trace coarse sand	436SB-19-06-0-0.5 @ 1405
		3-5'	SM	Dry, brown, poorly graded, fine silty SAND, little subangular gravel	
5-10'	4.0/5.0	5-10'	SP	Dry, light brown/tan, poorly graded fine and medium SAND, little subangular gravel, trace coarse sand	436SB-19-06-0.5-3 @ 1410 436SB-19-06-3-7 @ 1415
10-15'	5.0/5.0	10-12' ~~10-12'~~	SP	Same as 5-10' bgs	436SB-19-06-7-15 @ 1420 → MS/MSD
		12-15'	SM	Dry, brown, poorly graded, fine silty SAND, trace subangular gravel	

Notes:

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KOMAN Government Solutions, LLC
SOIL BORING LOG

Project: Devens PFAS Soil Boring	Boring No.: 43GSB-19-07
Project No.: 02082-0011-533	Drilling Co.: TDS
Address: AOC 43G	Driller: Jay Jumonville
Logger: Kristen Eisner	Drilling Method: DPT
Date: 11/1/19	Drilling Equip: Geoprobe 6712
Total Boring Depth: 15'	Static Water: NA

QC'd 4/7/2020 LSW

Core Section	Recovery ~~(ft)~~ in	Interval ~~(ft)~~ m	USCS ~~PID (ppm)~~ SVM	GEOLOGIC LOG	REMARKS
0-5'	32	0-3.5 3.5-8 8-13.5 13.5-32	– SP-GP SP SP	0-3.5: asphalt/concrete 3.5-8: dry brown poorly graded med SAND with some sub-angular gravel 8-13.5: dry light brown med-coarse SAND poorly graded 13.5-32: dry tan poorly graded fine-med SAND	
5-10'	38	0-9 9-22 22-26 26-32 32-38	SP SP SW SM SM-GW	0-9: dry tan-light brown poorly graded fine-med SAND 9-22: dry tan poorly graded fine-med SAND 22-26: dry tan well graded med-coarse SAND, few sub rounded gravel 26-32: dry light brown fine SAND with little SILT 32-38: dry brown well graded coarse SAND and sub ang GRAVEL, little SILT	
10-15'	33 ~~47~~ (E)	0-33	GM	0-33: brown SILT and sub angular dry GRAVEL, little clay	

Notes: Samples @ 0-0.5, 0.5-3, 3-7, 7-15
field Dup @ 7-15 MS/MSD @ 3-7

KGS
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KOMAN Government Solutions, LLC
SOIL BORING LOG

Project: Devens PFAS Soil Borings	Boring No.: 43GSB-19-08
Project No.: 02082-0011-5330	Drilling Co.: TDS
Address: AOC 43G	Driller: Jay Jumonville
Logger: Kristen Baker	Drilling Method: DPT
Date: 11/1/19	Drilling Equip: Geoprobe 6712 DT
Total Boring Depth: 15'	Static Water: NA

QC'd 4/7/2020 LSW

Core Section	Recovery ~~(ft)~~ in	Interval ~~(ft)~~ in	USCS ~~PID (ppm)~~ Sym	GEOLOGIC LOG	REMARKS
0-5'	34	0-13.5 13.5-34	ML-O SP	0-13.5: Dark brown SILT with little fine SAND, dry organics in top 6", few subrounded gravel 13.5-34: Orange-brown poorly graded fine-med SAND, dry little sub. rounded gravel	
5-10'	46	0-36 36-46	SW-ML ML-G	0-36: Brown well graded med-coarse SAND, dry few sub angular gravel, dark brown SILT layer @ 21-22" 36-46: Dark brown SILT, dry few sub. angular gravel	
10-15'	44	0-10 10-12 12-25 25-35 35-44	~~SP~~ (W) ML-SW G SP SW-GW SM	0-10: Brown, dry well graded med-coarse SAND and SILT 10-12: dry coarse gravel (1-2 in) 12-25: dry poorly graded fine-med SAND 25-35: dry med-coarse well graded SAND with sub ang GRAVEL 35-44: Dark brown, dry fine SANDY SILT with few sub round gravel	

Notes: Samples @ 0-0.5, 0.5-3, 3-7, 7-15
Field dup @ 7-15 MS/MSD @ 0.5-3

KGS
KOMAN Government Solutions, LLC 293 Boston Post Road, Marlborough, MA

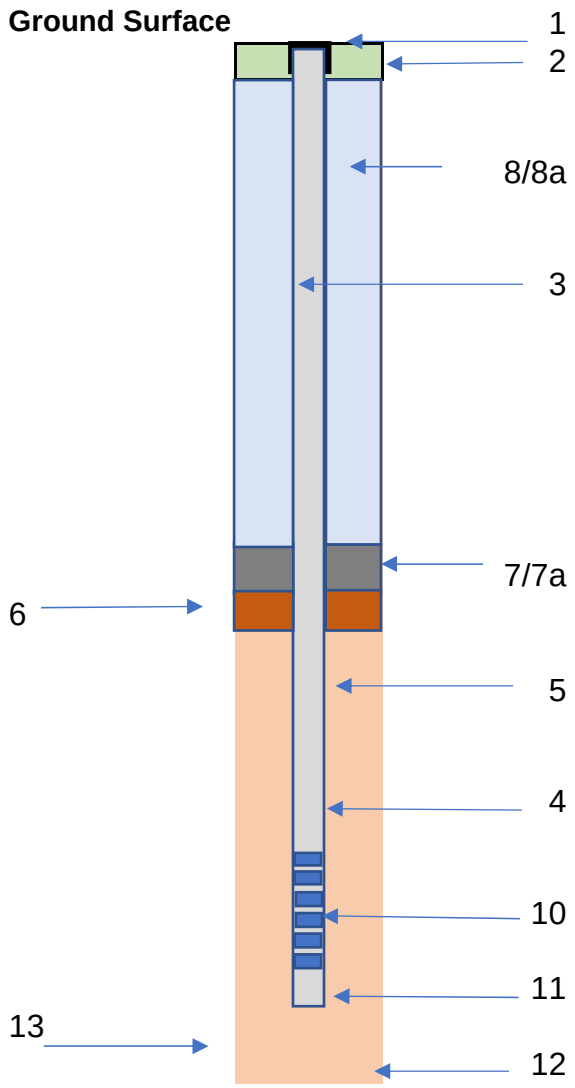
WELL CONSTRUCTION FORM

Koman Government Solutions, LLC

Project: Devens PFAS RI	Well Identification:
Project Number: 1082-0011-544	XGM-20-01A

WELL CONSTRUCTION DIAGRAM

Client: USACE	Location: Behind 11 Feinburg Road, along drainage ditch in open field.
Drilling Company: Cascade Drilling, Inc.	
Drilling Method/Equipment: Sonic Rotary/MiniSonic -RC100, 6-inch casing x 4.8-inch PQ core barrel	
Drilling Date(s): 2/10/2020	Well Construction Date: 2/10/2020
Potable Water Used: (Y) Source: Devens Hydrant #839	Drums of IDW: N/A
KGS Field Personnel: BRA	Associated Soil/Rock Boring Log: XGM-20-01A
Ground Elevation (ft NAVD88): 257.91	Top of PVC Elevation (ft NAVD88): 257.50
Easting (State Plane NAD83 [FT]): 626682.572	Northing (State Plane NAD83 [FT]: 3021077.412
	Depth to Static Water (ft BGS:) 12



1. Well Protection Type:	Flushmount roadbox
2. Concrete Pad Depth:	0.5'
3. Diameter/Type of well casing:	2" PVC Schedule 40
4. Type/Screen Slot:	PVC Schedule 40/#10 Slot
5. Type of Screen Filter Sand:	#1 Silica Sand
Quantity Used:	1.90 cu.ft. - calculated
Top/Bottom of Pack:	8' - 22.5'
6. Type of Filter Sand:	#0 Choker Sand
Quanity Used:	0.33 cu.ft. - calculated
Top/Bottom of Pack:	6' - 8'
7. Type of Seal:	Bentonite
7a.Top/Bottom of Seal:	2' - 6'
8. Grout Mixture Used:	See 7.
8a. Placement Method:	
Top/Bottom of Grout:	
9. Screen length:	10'
10. Screen interval:	10.5' - 20.5'
11. Sump Length:	4'''
12. Bottom of Boring:	22.5'
13. Diameter of borehole:	6"-OB/4.8" -BR

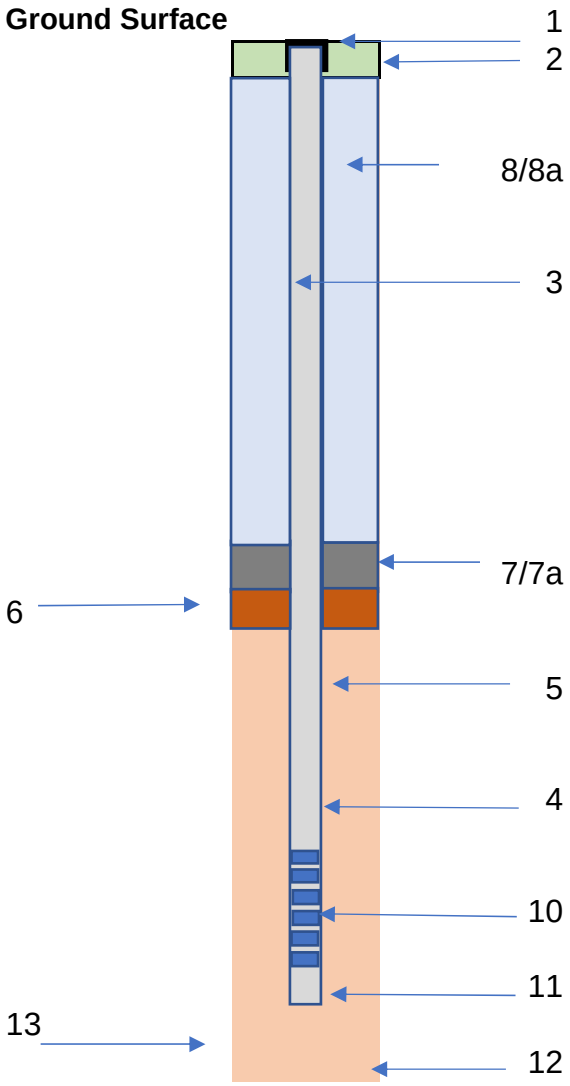
Comments: #1 Sand placed in Roadbox and under pad for drainage.
Bedrock encountered at 15 feet bgs. Hybrid well.

Koman Government Solutions, LLC

KGS	Project: Devens PFAS RI	Well Identification:
	Project Number: 1082-0011-544	XGM-20-02A

WELL CONSTRUCTION DIAGRAM

Client: USACE	Location: Behind 11 Feinburg Road, in open field.
Drilling Company: Cascade Drilling, Inc.	
Drilling Method/Equipment: Sonic Rotary/MiniSonic -RC100, 6-inch casing x 4.8-inch PQ core barrel	
Drilling Date(s): 2/11/2020	Well Construction Date: 2/11/2020
Potable Water Used: (Y) Source: Devens Hydrant #839	Drums of IDW: N/A
KGS Field Personnel: BRA	Associated Soil Boring Log: XGM-20-02A
Ground Elevation (ft NAVD88): 265.36	Top of PVC Elevation (ft NAVD88): 265.10
Easting (State Plane NAD83 [FT]): 626578.516	Northing (State Plane NAD83 [FT]: 3021013.897
	Depth to Static Water (ft BGS:) 12



1. Well Protection Type:	Flushmount roadbox
2. Concrete Pad Depth:	0.5'
3. Diameter/Type of well casing:	2" PVC Schedule 40
4. Type/Screen Slot:	PVC Schedule 40/#10 Slot
5. Type of Screen Filter Sand:	#1 Silica Sand
Quantity Used:	1.39 cu.ft. - calculated
Top/Bottom of Pack:	11' - 25'
6. Type of Filter Sand:	#0 Choker Sand
Quanity Used:	0.33 cu.ft. - calculated
Top/Bottom of Pack:	9' - 11'
7. Type of Seal:	Bentonite
7a.Top/Bottom of Seal:	9' - 11'
8. Grout Mixture Used:	Cement-Bentonite
8a. Placement Method:	Bucket
Top/Bottom of Grout:	2' - 9'
9. Screen length:	10'
10. Screen interval:	13' - 23'
11. Sump Length:	3"
12. Bottom of Boring:	25'
13. Diameter of borehole:	6"-OB/4.8" -BR

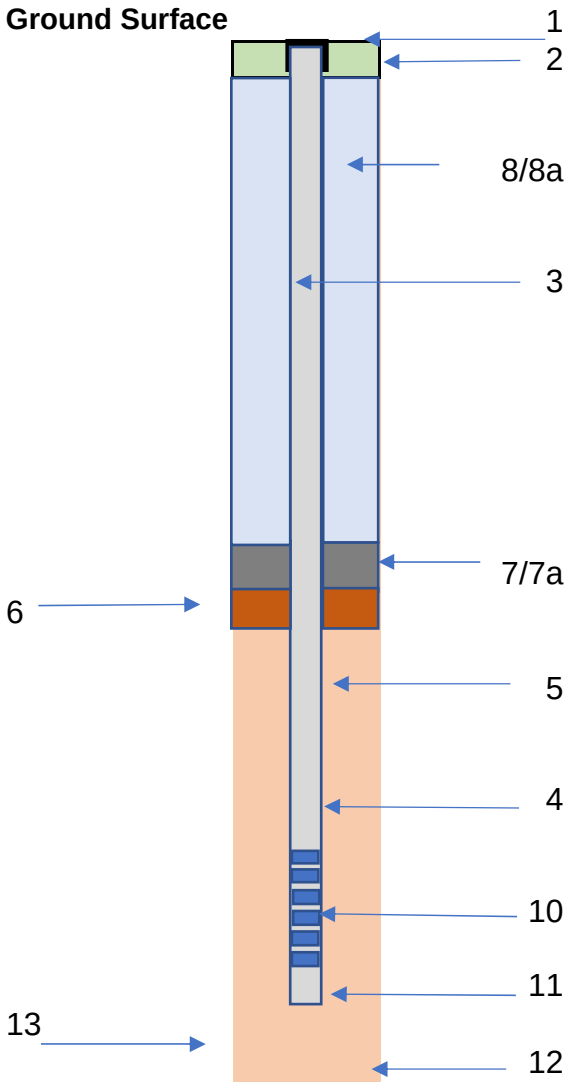
Comments: #1 Sand placed in Roadbox and under pad for drainage.
Bedrock encountered at 11 feet bgs. Bedroock well.

Koman Government Solutions, LLC

Project: Devens PFAS RI	Well Identification:
Project Number: 1082-0011-544	XGM-20-03A

WELL CONSTRUCTION DIAGRAM

Client: USACE	Location: Behind 11 Feinburg Road, at base of slope.
Drilling Company: Cascade Drilling, Inc.	
Drilling Method/Equipment: Sonic Rotary/MiniSonic -RC100, 6-inch casing x 4.8-inch PQ core barrel	
Drilling Date(s): 2/12/2020	Well Construction Date: 2/12/2020
Potable Water Used: (Y) Source: Devens Hydrant #839	Drums of IDW: N/A
KGS Field Personnel: BRA	Associated Soil Boring Log: XGM-20-03A
Ground Elevation (ft NAVD88): 268.89	Top of PVC Elevation (ft NAVD88): 268.69
Easting (State Plane NAD83 [FT]): 626603.923	Northing (State Plane NAD83 [FT]: 3020862.352
	Depth to Static Water (ft BGS:) 20



1. Well Protection Type:	Flushmount roadbox
2. Concrete Pad Depth:	0.5'
3. Diameter/Type of well casing:	2" PVC Schedule 40
4. Type/Screen Slot:	PVC Schedule 40/#10 Slot
5. Type of Screen Filter Sand:	#1 Silica Sand
Quantity Used:	1.66 cu.ft. - calculated
Top/Bottom of Pack:	18' - 30.5'
6. Type of Filter Sand:	#0 Choker Sand
Quanity Used:	0.33 cu.ft. - calculated
Top/Bottom of Pack:	16' - 18'
7. Type of Seal:	Bentonite
7a.Top/Bottom of Seal:	14.2' - 16'
8. Grout Mixture Used:	Cement-Bentonite
8a. Placement Method:	Tremie
Top/Bottom of Grout:	1.5' - 14.2'
9. Screen length:	10'
10. Screen interval:	20' - 30'
11. Sump Length:	3"
12. Bottom of Boring:	30.5'
13. Diameter of borehole:	6"-OB/4.8" -BR

Comments: #1 Sand placed in Roadbox and under pad for drainage.
Bedrock encountered at 25 feet bgs. Hybrid well.

WELL DEVELOPMENT FIELD SHEETS

KuS

FR = 1.6 L/min

WELL DEVELOPMENT RECORD

SITE	Former Fort Devens, Devens, MA	WELL IDENTIFICATION NO.	XGM-20-01A	TOTAL DEPTH (FT)	
SITE ADDRESS	90C43G	DATE INSTALLED	02/10/2020	CASING ID (IN)	2" PVC
PROJECT NAME	Devens PFAS RI	DATE DEVELOPED	02/15/2020	DEPTH TO BOTTOM (FT)	19.90 ft bTOR
PROJECT NUMBER	1082-0011-311	DEVELOPMENT METHOD	Pump + Surge Waterra	STATIC WATER LEVEL IN FEET BEFORE DEVELOPMENT	7.23 ft bTOR
PERSONNEL	Brett Anshulewicz	SUBMERSIBLE PUMP TYPE	NA	STATIC WATER LEVEL IN FEET AFTER DEVELOPMENT	7.20 ft bTOR
COMPANY	KEMMA/ Government Solutions, LLC	Turbidity Meter Type/ID	Lamotte 2020WE	Water Quality Meter Type/ID	YSI 556 MPS

TIME (every 10 min)	ZONE OF DEVELOPMENT (FT BGS)	CUMULATIVE WATER VOLUME (GALS)	WATER LEVEL READINGS (FT. BELOW TOR)	TURBIDITY (NTU)	TEMPERATURE C	pH	DO	ORP	SP. COND. (UNITS µS/cm)	REMARKS (odor, color, sediment thickness)
0740	10-20	4.23	7.30	>4,000	8.89	7.39	8.96	172.0	1677	Brown, silty, no odor, soft [illegible]
0750	10-20	8.46	7.30	1345	8.41	6.91	10.21	111.6	1774	Light brown, silty, no odor
0800	10-20	12.69	7.30	950	8.54	6.73	9.81	98.5	1793	"
0810	10-20	16.92	7.30	86.4	8.54	6.68	9.65	89.5	1792	"
0820	10-20	21.15	7.30	61.9	8.46	6.64	9.43	91.4	1789	Light brown, opaque,
0830	10-20	25.38	7.30	35.7	8.49	6.65	9.51	94.5	1794	"
1 HR 0840	10-20	29.61	7.30	38.1	8.68	6.63	9.40	97.1	1790	Clear, slight floating Lt brown silt
0850	10-20	33.84	7.30	40.3	8.68	6.64	9.61	98.9	1788	"
0900	10-20	38.07	7.30	28.8	8.70	6.63	9.65	100.5	1788	clear
0910	10-20	42.30	7.30	29.3	8.77	6.64	9.60	103.9	1789	clear
0920	10-20	46.53	7.30	30.1	8.67	6.62	9.63	107.3	1787	clear
0930	10-20	50.76	7.30	27.9	8.71	6.62	9.65	107.3	1789	clear
2 HR 0940	10-20	54.99	7.30	28.2	8.72	6.63	9.70	107.5	1790	clear
~	~		~	~	~	~	~	~	~	

1 Each zone developed until turbidity is constant for 20 min and turb < 5 NTUs
2 Or when stable for 20 min if 5 NTU is not achieved
3 Or when a zone has been developed for min of 1 hr

4. Move tools sequentially once particular zone is developed

FR = 1.4 L/min
0750 start

Page ___ of ___

WELL DEVELOPMENT RECORD

SITE	Former Fort Devens, Devens, MA	WELL IDENTIFICATION NO.	XGM-20-02A	TOTAL DEPTH (FT)	22.45 ft bTOR
SITE ADDRESS	AOC 43 G	DATE INSTALLED	02/11/2020	CASING ID (IN)	2" PVC
PROJECT NAME	Devens FFAS RI	DATE DEVELOPED	02/18/2020	DEPTH TO BOTTOM (FT)	22.45 ft bTOR
PROJECT NUMBER	1000-0011-515	DEVELOPMENT METHOD	Pump + Surge Lockers	STATIC WATER LEVEL IN FEET BEFORE DEVELOPMENT	11.95 ft bTOR
PERSONNEL	Brett Anchulaitis	SUBMERSIBLE PUMP TYPE	N/A	STATIC WATER LEVEL IN FEET AFTER DEVELOPMENT	
COMPANY	KOMAN Government Solutions, LLC	Turbidity Meter Type/ID	Lamotte 2020we	Water Quality Meter Type/ID	YSI 556 MPS

TIME (every 10 min)	ZONE OF DEVELOPMENT (FT BGS)	CUMULATIVE WATER VOLUME (GALS)	WATER LEVEL READINGS (FT. BELOW TOR)	TURBIDITY (NTU)	TEMPERATURE C	pH	DO	ORP	SP. COND. (UNITS ___)	REMARKS (odor, color, sediment thickness)
0800	12-22		13.50	24,000	8.28	7.16	4.09	-58.3	1559	Brown, silty, no odor
0810	12-22		14.42	3053	9.83	6.47	6.28	-21.4	1781	Light brown, silty, no odor
0820	12-22		14.42	2530	10.20	6.94	7.70	-15.3	1794	Light brown, silty no odor
0830	12-22		14.42	1843	10.08	6.84	6.81	-9.1	1804	
0840	12-22		14.42	1691	10.05	6.88	6.77	-0.2	1797	
0850	12-22		14.42	1225	10.19	6.90	6.84	-1.3	1805	
1HR 0900			14.42	1104	10.19	6.87	6.92	0.3	1810	
0910			14.42	919	10.19	6.84	7.01	5.8	1817	clearing up, opaque, no odor
0920			14.42	752	10.06	6.82	7.13	12.5	1824	"
0930			14.42	130 ~~840~~ 644	10.12	6.88	7.08	14.8	1819	"
0940			14.42	658	10.26	6.90	6.99	17.9	1817	"
0950			14.42	98	10.31	6.90	7.02	25.4	1826	"
2HR 1000			14.42	106	10.34	6.83	7.44	32.1	1836	"
1010			14.42	100	10.18	6.90	7.28	34.8	1828	"
1020			14.42	60.0	10.32	6.96	7.30	39.0	1826	"
1030			14.42	59.3	10.30	6.90	7.20	40.6	1830	"
1040			14.42	57.1	10.25	6.86	7.14	43.3	1835	"
1050			14.42	58.4	10.32	6.85	7.01	48.0	1840	"
3HR 1100			14.42	59.8	10.27	6.82	7.20	51.4	1845	"
			STOP DEVELOPMENT							

1 Each zone developed until turbidity is constant for 20 min and turb < 5 NTUs
2 Or when stable for 20 min if 5 NTU is not achieved
3 Or when a zone has been developed for min of 1 hr

4. Move tools sequentially once particular zone is developed

GS

FR = 1.06 L/min

WELL DEVELOPMENT RECORD

SITE:	Former Fort Devens, Devens, MA	WELL IDENTIFICATION NO:	KGW20-03A	TOTAL DEPTH (FT):	29.50
SITE ADDRESS:	AOC-436	DATE INSTALLED:	02/12/2020	CASING ID (IN):	2" PVC
PROJECT NAME:	Devens PFAS RI	DATE DEVELOPED:	02/18/2020	DEPTH TO BOTTOM (FT):	29.50 ft btoc
PROJECT NUMBER:	1045 and 1515	DEVELOPMENT METHOD:	Pump + Surge Low flow	STATIC WATER LEVEL IN FEET BEFORE DEVELOPMENT:	14.65 ft btoc
PERSONNEL:	Brett Anderson	SUBMERSIBLE PUMP TYPE:	NA	STATIC WATER LEVEL IN FEET AFTER DEVELOPMENT:	14.65 ft btoc
COMPANY:	KOMAN Environmental Services, LLC	TURBIDIMETER TYPE/ID:	Lamotte 2020-2	WQM Quality Meter Type/ID:	YSI 556 MPS

TIME (every 10 min)	ZONE OF DEVELOPMENT (FT BGS)	CUMULATIVE WATER VOLUME (GALS)	WATER LEVEL READINGS (FT. BELOW TOR)	TURBIDITY (NTU)	TEMPERATURE C	pH	DO	ORP	SP. COND. (UNITS ____)	REMARKS (odor, color, sediment thickness)
1200	20-30		14.65	>4,000	10.69	6.76	5.04	11.8	1947	Brown, silt, soft bottom
1210	20-30		14.65	>4,000	11.40	6.71	3.25	-8.9	2078	"
1220	20-30		14.65	3560	11.41	6.75	3.70	-12.6	2081	"
1230	20-30		14.65	2413	11.38	6.78	3.81	-23.1	2096	"
1240	20-30		14.65	2274	11.42	6.74	3.61	-23.6	2103	"
1250	20-30		14.65	1980	11.45	6.71	3.42	-24.8	2109	"
1300	20-30		14.65	1211	11.55	6.72	3.28	-24.6	2119	"
1310	20-30		14.65	1065	11.50	6.68	3.01	-24.5	2120	"
1320	20-30		14.65	904	11.48	6.63	2.58	-25.5	2123	"
1330	20-30		14.65	821	11.53	6.64	2.58	-25.5	2124	"
1340	20-30		14.65	670	11.59	6.67	2.60	-25.7	2125	Cleared up, Light brown
1350	20-30		14.65	97	11.62	6.66	2.50	-25.8	2127	"
1400	20-30		14.65	101	11.64	6.68	2.60	-19.2	2132	"
1410	20-30		14.65	76	11.65	6.67	2.54	-19.6	2134	"
1420	20-30		14.65	41	11.65	6.64	2.53	-19.8	2136	"
1430	20-30		14.65	20	11.64	6.65	2.58	-19.7	2139	"
1440	20-30		14.65	23	11.66	6.65	2.57	-20.1	2143	"
1450	20-30		14.65	21	11.67	6.64	2.59	-21.3	2138	"
1500	20-30		14.65	22	11.65	6.63	2.58	-20.2	2140	"

1 Each zone developed until turbidity is constant for 20 min and turb < 5 NTUs
2 Or when stable for 20 min if 5 NTU is not achieved
3 Or when a zone has been developed for min of 1 hr

4. Move tools sequentially once particular zone is developed

CALIBRATION FIELD SHEETS

KGS

Field Instrument Calibration Log

Date: 02/18/2020 **Weather:** Snow, 32°F

Project/Site Name: Devens S RI MW Installation **Instrument:** YSI 556 MPS

Calibrated By: BrA **Serial Number:** 15F101567

Parameters	Solution Expiration Date	AM Calibration Time 0600		Cal. Temp. (°C)	PM Post Cal. Check Time 1530	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1,413 µS/cm°)	03/20	1464	1413	16.00	1420	16.20	±10 µS/cm	N
pH (7)	02/21	7.00	7.00	15.84	7.00	15.80	± 0.3 Ph *	
pH (4)	03/21	3.68	4.00	15.77	4.20	15.55	± 0.3 Ph *	
pH (10)	02/21	9.78	10.00	15.90	10.18	17.01	± 0.3 Ph *	
ORP (240 mv)	05/20	248.5	240.0	16.31	230.8	16.98	±10 mv	
Dissolved Oxygen (%)	—	100.6	100	16.44	98.6	17.01	-	
Dissolved Oxygen (mg/L)	—	9.84	9.78	16.44	9.65	17.01	± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	
Barometric Pressure (mmHg)	—	760	760	—	760	17.01	-	

Notes:

*** Ph Unit with Ph 7 Buffer**

(Mark Noted Variences on Field Forms)

Signature: Brett Q **Date:** 02/18/20

KGS

Field Instrument Calibration Log

Date: [illegible] Weather: [illegible]

Project/Site Name: [illegible] Instrument: [illegible]

Calibrated By: [illegible] Serial Number: [illegible]

Parameters	Solution Expiration Date	AM Calibration Time (Hour)		Cal. Temp. (°C)	PM Post Cal. Check Time (Hour)	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Variance Noted (Y/N)
Specific Conductivity (1,413 uS/cm)	03/24	1433	1433	20.97	1421	20.97	±10 µS/cm	N
pH (7)	02/21	6.90	7.00	21.11	7.08	21.17	±0.03 Pa*	
pH (4)	03/21	4.00	4.00	21.01	4.01	20.97	±0.03 Pa*	
pH (10)	02/21	10.04	10.04	20.94	10.14	21.20	±0.03 Pa*	
ORP (240 mv)	05/20	244.9	240.0	20.57	239.7	21.14	±10 mv	
Dissolved Oxygen (%)	—	95.6	100	20.52	103.6	21.09		
Dissolved Oxygen (mg/L)	—	8.87	9.00	20.52	9.14	21.03	±0.3 mg/L, ±0.2 mg/L for 2 mg/L solution, as negative value	
Barometric Pressure (mmHg)	—	7.00	7.0	20.52	7.00	21.00	—	

Notes:

* Pa. Unit with Pa. 7 Buffer

(Mark Noted Variances on Field Forms)

Signature: [illegible] Date: [illegible]

KGS

Turbidity Instrument Calibration Log

Project/Site Name: Devens MW

Instrument: Lamotte 2020we

Calibrated By: B.A

Serial Number: 3590-3519

Date	AM Calibration				PM Post Calibration Check		Variance Noted
	Pre-Cal 0 NTU	Post-Cal 0 NTU	Pre-Cal 10 NTU	Post-Cal 10 NTU	0 NTU	10 NTU	
02/18/20	1.82	0.61	10.01	10.00	0.80	10.20	N
02/19/20	1.71	0.57	10.13	10.00	0.78	10.09	N

Notes: Mark Noted Varieances on Field Forms

Post Calibration Criteria	
-	±0.5

Signature: [signature]

Date: 02/18/20
02/19/20

1 of 1

Field Instrument Calibration Log

Date: 2-21-2020 **Weather:** 15-26°F Clear

Project/Site Name: Ft Devens AOC 436 **Instrument:** YSI 556 MPS

Calibrated By: Michael Spaulding **Serial Number:** 15F101567

Parameters	Solution Expiration Date	AM Calibration Time 0615		Cal. Temp. (°C)	PM Post Cal. Check Time 1515		Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1.413 µS/cm°)	3/2020	1,456	1413	15.53	1,390		15.80	±10 µS/cm	Y
pH (7)	2/2021	6.76	7.00	15.44	7.03	7.00	15.18	± 0.3 Ph *	N
pH (4)	3/2021	4.20	4.00	15.48	4.22		15.88	± 0.3 Ph *	N
pH (10)	2/2021	10.25	10.05	15.73	10.06		15.74	± 0.3 Ph *	N
ORP (240 mv)	5/2020	238.9	240.0	15.32	237.4		16.24	±10 mv	N
Dissolved Oxygen (%)		100.7	100.2	14.47	101.4	99.9	9.47	-	
Dissolved Oxygen (mg/L)		10.90	10.18	14.47	11.54	11.42	9.47	± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	Y
Barometric Pressure (mmHg)		760		14.47	760		9.47	-	

Notes:

*** Ph Unit with Ph 7 Buffer** **(Mark Noted Variences on Field Forms)**

Signature: [signature] **Date:** 2-21-2020

KGS

Field Instrument Calibration Log

Date: 2-24-2020 **Weather:** 25-35°F Clear

Project/Site Name: Ft Dennis **Instrument:** YSI 556 MPS

Calibrated By: Michael Spaulding **Serial Number:** 15F101567

Parameters	Solution Expiration Date	AM Calibration Time 0615		Cal. Temp. (°C)	PM Post Cal. Check Time 1535	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1.413 µS/cm°)	3/2026	1.416	1.413	15:34	1.404 / 1.413	18.01	±10 µS/cm	N
pH (7)	2/2021	6.96	7.00	15:38	7.25 / 7.00	17.92	± 0.3 Ph *	N
pH (4)	3/2021	3.98	3.99	15:61	4.03 / 4.00	18.38	± 0.3 Ph *	N
pH (10)	2/2021	9.95	10.00	15:55	9.93 / 9.99	17.94	± 0.3 Ph *	N
ORP (240 mv)	5/2020	245.2	240.0	15.68	234.2 / 240.0	18.03	±10 mv	N
Dissolved Oxygen (%)		99.4	100.0	15:51	101.4 / 99.3	15:22	-	
Dissolved Oxygen (mg/L)		9.96	9.83	15:51	10.19 / 9.42	15:22	± 0.5 mg/L < 0 5 mg/L for 0 mg/L solution, no negative value	N
Barometric Pressure (mmHg)		760		15:51	760	15:22	-	

Notes:

*** Ph Unit with Ph 7 Buffer**

(Mark Noted Variences on Field Forms)

Signature: [signature] **Date:** 2-24-2020

KGS

Turbidity Instrument Calibration Log

Project/Site Name: Ft Devens AOC 43G

Instrument: Lamotte 2020we

Calibrated By: Michael Spa-Ioline

Serial Number: 2636262

Date	AM Calibration				PM Post Calibration Check		Variance Noted
	Pre-Cal 0 NTU	Post-Cal 0 NTU	Pre-Cal 10 NTU	Post-Cal 10 NTU	0 NTU	10 NTU	
2-21-2020	2.16	2.04	10.22	10.00	2.52 / 2.45	9.74 / 10.00	N
2-24-2020	2.64	2.59	9.77	9.99	2.72 / 2.51	9.06 / 10.00	Y
2-25-2020	2.89	2.89	9.80	10.00	3.04 / 3.06	10.14 / 10.00	N

Notes: Mark Noted Variences on Field Forms

Post Calibration Criteria	
-	± 0.5

Signature: [signature]

Date: 2-21-2020
2-24-2020
2-25-2020

ATTACHMENT B
LABORATORY ANALYTICAL REPORTS

eurofins | Environment Testing TestAmerica

ANALYTICAL REPORT

Eurofins TestAmerica, Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Tel: (912)354-7858

Laboratory Job ID: 680-179801-1
Client Project/Site: LTM - AOC 57 Supplemental MW

For:
KOMAN Government Solutions, LLC
293 Boston Post Road West
Suite 100
Marlborough, Massachusetts 01752

Attn: Laurie Ekes

Authorized for release by:
2/5/2020 4:29:08 PM

Jerry Lanier, Project Manager I
(912)250-0281
jerry.lanier@testamericainc.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

Table of Contents

Cover Page 1
Table of Contents 2
Case Narrative 3
Sample Summary 4
Method Summary 5
Definitions/Glossary 6
Client Sample Results 7
QC Sample Results 8
QC Association Summary 9
Lab Chronicle 10
Chain of Custody 11
Receipt Checklists 12
Certification Summary 13

Job ID: 680-179801-1

Laboratory: Eurofins TestAmerica, Savannah

Narrative

CASE NARRATIVE

Client: KOMAN Government Solutions, LLC

Project: LTM - AOC 57 Supplemental MW

Report Number: 680-179801-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

RECEIPT
The samples were received on 01/30/2020; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 2.2 C.

METALS (ICP) - DISSOLVED
Samples 57M-03-04X_JAN20 (680-179801-1), 57M-03-03X_JAN20 (680-179801-2), 57M-DUP01_JAN20 (680-179801-3) and 57M-03-01X_JAN20 (680-179801-5) were analyzed for Metals (ICP) - Dissolved in accordance with EPA SW-846 Method 6010C. The samples were prepared and analyzed on 02/03/2020.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

METALS (ICPMS) - DISSOLVED
Samples 57M-03-04X_JAN20 (680-179801-1), 57M-03-03X_JAN20 (680-179801-2), 57M-DUP01_JAN20 (680-179801-3) and 57M-03-01X_JAN20 (680-179801-5) were analyzed for Metals (ICPMS) - Dissolved in accordance with EPA SW-846 Method 6020A. The samples were prepared and analyzed on 02/03/2020.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Sample Summary

Client: KOMAN Government Solutions, LLC
Project/Site: LTM - AOC 57 Supplemental MW

Job ID: 680-179801-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
680-179801-1	57M-03-04X_JAN20	Water	01/27/20 14:40	01/30/20 08:50	
680-179801-2	57M-03-03X_JAN20	Water	01/28/20 08:55	01/30/20 08:50	
680-179801-3	57M-DUP01_JAN20	Water	01/28/20 09:00	01/30/20 08:50	
680-179801-5	57M-03-01X_JAN20	Water	01/28/20 11:25	01/30/20 08:50	

Method Summary

Client: KOMAN Government Solutions, LLC
Project/Site: LTM - AOC 57 Supplemental MW

Job ID: 680-179801-1

Method	Method Description	Protocol	Laboratory
6010C	Metals (ICP)	SW846	TAL SAV
6020A	Metals (ICP/MS)	SW846	TAL SAV
3005A	Preparation, Total Recoverable or Dissolved Metals	SW846	TAL SAV

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL SAV = Eurofins TestAmerica, Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

Definitions/Glossary

Client: KOMAN Government Solutions, LLC
Project/Site: LTM - AOC 57 Supplemental MW

Job ID: 680-179801-1

Qualifiers

Metals

Qualifier	Qualifier Description
J	Estimated: The analyte was positively identified; the quantitation is an estimation
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Client Sample Results

Client: KOMAN Government Solutions, LLC
Project/Site: LTM - AOC 57 Supplemental MW

Job ID: 680-179801-1

Client Sample ID: 57M-03-04X_JAN20

Lab Sample ID: 680-179801-1
Date Collected: 01/27/20 14:40
Matrix: Water
Date Received: 01/30/20 08:50

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	50	U	50	50	17	ug/L		02/03/20 20:46	1
Manganese	**73**		10	3.0	1.0	ug/L		02/03/20 20:46	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	**2.5**	**J**	3.0	3.0	1.5	ug/L		02/03/20 17:43	1

Client Sample ID: 57M-03-03X_JAN20

Lab Sample ID: 680-179801-2
Date Collected: 01/28/20 08:55
Matrix: Water
Date Received: 01/30/20 08:50

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	50	U	50	50	17	ug/L		02/03/20 20:51	1
Manganese	**96**		10	3.0	1.0	ug/L		02/03/20 20:51	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	3.0	U	3.0	3.0	1.5	ug/L		02/03/20 17:47	1

Client Sample ID: 57M-DUP01_JAN20

Lab Sample ID: 680-179801-3
Date Collected: 01/28/20 09:00
Matrix: Water
Date Received: 01/30/20 08:50

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	50	U	50	50	17	ug/L		02/03/20 20:26	1
Manganese	**91**		10	3.0	1.0	ug/L		02/03/20 20:26	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	3.0	U	3.0	3.0	1.5	ug/L		02/03/20 17:28	1

Client Sample ID: 57M-03-01X_JAN20

Lab Sample ID: 680-179801-5
Date Collected: 01/28/20 11:25
Matrix: Water
Date Received: 01/30/20 08:50

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	50	U	50	50	17	ug/L		02/03/20 20:31	1
Manganese	**6.3**	**J**	10	3.0	1.0	ug/L		02/03/20 20:31	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	3.0	U	3.0	3.0	1.5	ug/L		02/03/20 17:32	1

QC Sample Results

Client: KOMAN Government Solutions, LLC
Project/Site: LTM - AOC 57 Supplemental MW

Job ID: 680-179801-1

Method: 6010C - Metals (ICP)

Lab Sample ID: MB 680-605924/1-A
Matrix: Water
Analysis Batch: 606117

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 605924

Analyte	MB Result	MB Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	50	U	50	50	17	ug/L		02/03/20 19:22	1
Manganese	3.0	U	10	3.0	1.0	ug/L		02/03/20 19:22	1

Lab Sample ID: LCS 680-605924/2-A
Matrix: Water
Analysis Batch: 606117

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 605924

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Iron	5010	4860		ug/L		97	87 - 115
Manganese	400	394		ug/L		99	90 - 114

Method: 6020A - Metals (ICP/MS)

Lab Sample ID: MB 680-605920/1-A
Matrix: Water
Analysis Batch: 606057

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 605920

Analyte	MB Result	MB Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	3.0	U	3.0	3.0	1.5	ug/L		02/03/20 16:36	1

Lab Sample ID: LCS 680-605920/2-A
Matrix: Water
Analysis Batch: 606057

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 605920

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	100	92.7		ug/L		93	84 - 116

QC Association Summary

Client: KOMAN Government Solutions, LLC
Project/Site: LTM - AOC 57 Supplemental MW

Job ID: 680-179801-1

Metals

Prep Batch: 605920

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-179801-1	57M-03-04X_JAN20	Dissolved	Water	3005A	
680-179801-2	57M-03-03X_JAN20	Dissolved	Water	3005A	
680-179801-3	57M-DUP01_JAN20	Dissolved	Water	3005A	
680-179801-5	57M-03-01X_JAN20	Dissolved	Water	3005A	
MB 680-605920/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 680-605920/2-A	Lab Control Sample	Total Recoverable	Water	3005A	

Prep Batch: 605924

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-179801-1	57M-03-04X_JAN20	Dissolved	Water	3005A	
680-179801-2	57M-03-03X_JAN20	Dissolved	Water	3005A	
680-179801-3	57M-DUP01_JAN20	Dissolved	Water	3005A	
680-179801-5	57M-03-01X_JAN20	Dissolved	Water	3005A	
MB 680-605924/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 680-605924/2-A	Lab Control Sample	Total Recoverable	Water	3005A	

Analysis Batch: 606057

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-179801-1	57M-03-04X_JAN20	Dissolved	Water	6020A	605920
680-179801-2	57M-03-03X_JAN20	Dissolved	Water	6020A	605920
680-179801-3	57M-DUP01_JAN20	Dissolved	Water	6020A	605920
680-179801-5	57M-03-01X_JAN20	Dissolved	Water	6020A	605920
MB 680-605920/1-A	Method Blank	Total Recoverable	Water	6020A	605920
LCS 680-605920/2-A	Lab Control Sample	Total Recoverable	Water	6020A	605920

Analysis Batch: 606117

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-179801-1	57M-03-04X_JAN20	Dissolved	Water	6010C	605924
680-179801-2	57M-03-03X_JAN20	Dissolved	Water	6010C	605924
680-179801-3	57M-DUP01_JAN20	Dissolved	Water	6010C	605924
680-179801-5	57M-03-01X_JAN20	Dissolved	Water	6010C	605924
MB 680-605924/1-A	Method Blank	Total Recoverable	Water	6010C	605924
LCS 680-605924/2-A	Lab Control Sample	Total Recoverable	Water	6010C	605924

Lab Chronicle

Client: KOMAN Government Solutions, LLC
Project/Site: LTM - AOC 57 Supplemental MW

Job ID: 680-179801-1

Client Sample ID: 57M-03-04X_JAN20

Lab Sample ID: 680-179801-1

Date Collected: 01/27/20 14:40

Matrix: Water

Date Received: 01/30/20 08:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	605924	02/03/20 08:54	AJR	TAL SAV
Dissolved	Analysis	6010C		1			606117	02/03/20 20:46	BCB	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	605920	02/03/20 08:54	AJR	TAL SAV
Dissolved	Analysis	6020A		1			606057	02/03/20 17:43	BWR	TAL SAV
	Instrument ID:	ICPMSC								

Client Sample ID: 57M-03-03X_JAN20

Lab Sample ID: 680-179801-2

Date Collected: 01/28/20 08:55

Matrix: Water

Date Received: 01/30/20 08:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	605924	02/03/20 08:54	AJR	TAL SAV
Dissolved	Analysis	6010C		1			606117	02/03/20 20:51	BCB	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	605920	02/03/20 08:54	AJR	TAL SAV
Dissolved	Analysis	6020A		1			606057	02/03/20 17:47	BWR	TAL SAV
	Instrument ID:	ICPMSC								

Client Sample ID: 57M-DUP01_JAN20

Lab Sample ID: 680-179801-3

Date Collected: 01/28/20 09:00

Matrix: Water

Date Received: 01/30/20 08:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	605924	02/03/20 08:54	AJR	TAL SAV
Dissolved	Analysis	6010C		1			606117	02/03/20 20:26	BCB	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	605920	02/03/20 08:54	AJR	TAL SAV
Dissolved	Analysis	6020A		1			606057	02/03/20 17:28	BWR	TAL SAV
	Instrument ID:	ICPMSC								

Client Sample ID: 57M-03-01X_JAN20

Lab Sample ID: 680-179801-5

Date Collected: 01/28/20 11:25

Matrix: Water

Date Received: 01/30/20 08:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	605924	02/03/20 08:54	AJR	TAL SAV
Dissolved	Analysis	6010C		1			606117	02/03/20 20:31	BCB	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	605920	02/03/20 08:54	AJR	TAL SAV
Dissolved	Analysis	6020A		1			606057	02/03/20 17:32	BWR	TAL SAV
	Instrument ID:	ICPMSC								

Laboratory References:

TAL SAV = Eurofins TestAmerica, Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

CHAIN-OF-CUSTODY RECORD

KOMAN Government Services, LLC
Laurie Sykes
293 Boston Post Road West, Suite 100, Marlborough, MA 01752
(508) 508-368-7442, lekes@komangs.com

Boston #215

Boston #215

COC # AOC57_SUPP20

KGS

Project Name: Long Term Monitoring	Laboratory: TestAmerica Laboratories, Inc., Savannah, GA	Event: KOMAN, Long Term Monitoring, AOC 57 Supplemental MW Winter 2020
Project Number: DEVNS-LTM	POC: Jerry Lanier 912.354.7858 jerry.lanier@testamericainc.com	
WBS Code: Purchase Order 18-706	Ship to: 5102 LaRoche Avenue, Savannah, GA 31404	

Comments:
SW6010C/FLDFLT (B) = Fe Mn
SW6020A/FLDFLT = As

Equipment:

Code	Matrix
WG	Ground Water

Code	Container/Preservative
9	1 x 250mL, plastic, HNO3, pH < 2; Cool < 4degC

680-179801 Chain of Custody

Event: KOMAN, Long Term Monitoring, AOC 57 Supplemental MW

	Sample ID	Matrix	Date	Time	Samp Init.	SW6010C/FLDFLT (B)	SW6020A/FLDFLT (B)	Location ID	Sample Type	Depth (ft bgs) Top	Depth (ft bgs) Bottom	Comments	Cooler
1	57M-03-04X_JAN20	WG	1/27/20	1440	MS	X	X	57M-03-04X	N1	0.00	0.00		1
2	57M-03-03X_JAN20	WG	1/28/20	0855	MS	X	X	57M-03-03X	N1				
3	57M-DUP01_JAN20	WG	1/28/20	0900	MS	X	X	57M-03-03X	~~N1~~	FD	B4		
4	57M-95-06X_JAN20	WG	1/28/20	1340	MS	X	X	57M-95-06X	N1				
5	57M-03-01X_JAN20	WG	1/28/20	1125	MS	X	X	57M-03-01X	N1				
6													
7													
8													
9													
10													
11													

Relinquished by: *(Signature)*	Date	Time
[illegible]	1/28/20	1715
BHA	1/29/20	1500
[illegible]	1-29-20	180

Received by: *(Signature)*	Date	Time
BHA	1/29/20	0600
[illegible]	1-29-20	1500

Shipping Date / Carrier / Airbill Number

Received by Laboratory: *(Signature, Date, Time)* & condition
[illegible] 1-30-2020 0850 1.8/2.2

Page 1 of 2

Login Sample Receipt Checklist

Client: KOMAN Government Solutions, LLC

Job Number: 680-179801-1

Login Number: 179801

List Source: Eurofins TestAmerica, Savannah

List Number: 1

Creator: Laughlin, Paul D

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Accreditation/Certification Summary

Client: KOMAN Government Solutions, LLC
Project/Site: LTM - AOC 57 Supplemental MW

Job ID: 680-179801-1

Laboratory: Eurofins TestAmerica, Savannah

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
ANAB	Dept. of Defense ELAP	L2463	09-22-22

eurofins | Environment Testing TestAmerica

ANALYTICAL REPORT

Eurofins TestAmerica, Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Tel: (912)354-7858

Laboratory Job ID: 680-180059-1
Client Project/Site: Long Term Monitoring AOC57 Supplemental

For:
KOMAN Government Solutions, LLC
293 Boston Post Road West
Suite 100
Marlborough, Massachusetts 01752

Attn: Laurie Ekes

Authorized for release by:
2/14/2020 5:18:15 PM

Jerry Lanier, Project Manager I
(912)250-0281
jerry.lanier@testamericainc.com

LINKS

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The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

Table of Contents

Cover Page 1
Table of Contents 2
Case Narrative 3
Sample Summary 4
Method Summary 5
Definitions/Glossary 6
Client Sample Results 7
QC Sample Results 8
QC Association Summary 10
Lab Chronicle 11
Chain of Custody 12
Receipt Checklists 13
Certification Summary 14

Job ID: 680-180059-1

Laboratory: Eurofins TestAmerica, Savannah

Narrative

CASE NARRATIVE

Client: KOMAN Government Solutions, LLC

Project: Long Term Monitoring AOC57 Supplemental

Report Number: 680-180059-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

RECEIPT
The samples were received on 02/06/2020; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 0.8 C.

METALS (ICP) - DISSOLVED
Samples 57M-95-06X_JAN20 (680-180059-1), 57M-03-05X_JAN20 (680-180059-2) and 57M-03-02X_JAN20 (680-180059-3) were analyzed for Metals (ICP) - Dissolved in accordance with EPA SW-846 Method 6010C. The samples were prepared on 02/07/2020 and 02/12/2020 and analyzed on 02/11/2020 and 02/13/2020.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

METALS (ICPMS) - DISSOLVED
Samples 57M-95-06X_JAN20 (680-180059-1), 57M-03-05X_JAN20 (680-180059-2) and 57M-03-02X_JAN20 (680-180059-3) were analyzed for Metals (ICPMS) - Dissolved in accordance with EPA SW-846 Method 6020A. The samples were prepared and analyzed on 02/07/2020 and 02/12/2020.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Sample Summary

Client: KOMAN Government Solutions, LLC
Project/Site: Long Term Monitoring AOC57 Supplemental

Job ID: 680-180059-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
680-180059-1	57M-95-06X_JAN20	Water	02/05/20 10:30	02/06/20 09:15	
680-180059-2	57M-03-05X_JAN20	Water	02/05/20 12:17	02/06/20 09:15	
680-180059-3	57M-03-02X_JAN20	Water	02/05/20 13:58	02/06/20 09:15	

Method Summary

Client: KOMAN Government Solutions, LLC
Project/Site: Long Term Monitoring AOC57 Supplemental

Job ID: 680-180059-1

Method	Method Description	Protocol	Laboratory
6010C	Metals (ICP)	SW846	TAL SAV
6020A	Metals (ICP/MS)	SW846	TAL SAV
3005A	Preparation, Total Recoverable or Dissolved Metals	SW846	TAL SAV

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL SAV = Eurofins TestAmerica, Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

Definitions/Glossary

Client: KOMAN Government Solutions, LLC
Job ID: 680-180059-1
Project/Site: Long Term Monitoring AOC57 Supplemental

Qualifiers

Metals

Qualifier	Qualifier Description
J	Estimated: The analyte was positively identified; the quantitation is an estimation
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Client Sample Results

Client: KOMAN Government Solutions, LLC
Project/Site: Long Term Monitoring AOC57 Supplemental

Job ID: 680-180059-1

Client Sample ID: 57M-95-06X_JAN20

Lab Sample ID: 680-180059-1
Date Collected: 02/05/20 10:30
Matrix: Water
Date Received: 02/06/20 09:15

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	50	U	50	50	17	ug/L		02/11/20 20:25	1
Manganese	**3.3**	**J**	10	3.0	1.0	ug/L		02/11/20 20:25	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	3.0	U	3.0	3.0	1.5	ug/L		02/07/20 16:21	1

Client Sample ID: 57M-03-05X_JAN20

Lab Sample ID: 680-180059-2
Date Collected: 02/05/20 12:17
Matrix: Water
Date Received: 02/06/20 09:15

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	**640**		50	50	17	ug/L		02/11/20 20:30	1
Manganese	**590**		10	3.0	1.0	ug/L		02/11/20 20:30	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	**13**		3.0	3.0	1.5	ug/L		02/07/20 16:25	1

Client Sample ID: 57M-03-02X_JAN20

Lab Sample ID: 680-180059-3
Date Collected: 02/05/20 13:58
Matrix: Water
Date Received: 02/06/20 09:15

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	**4500**		50	50	17	ug/L		02/13/20 01:36	1
Manganese	**290**		10	3.0	1.0	ug/L		02/13/20 01:36	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	**7.3**		3.0	3.0	1.5	ug/L		02/12/20 21:21	1

QC Sample Results

Client: KOMAN Government Solutions, LLC
Project/Site: Long Term Monitoring AOC57 Supplemental

Job ID: 680-180059-1

Method: 6010C - Metals (ICP)

Lab Sample ID: MB 680-606584/1-A — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total Recoverable**
Analysis Batch: 607038 — **Prep Batch: 606584**

Analyte	MB Result	MB Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	50	U	50	50	17	ug/L		02/11/20 19:51	1
Manganese	3.0	U	10	3.0	1.0	ug/L		02/11/20 19:51	1

Lab Sample ID: LCS 680-606584/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total Recoverable**
Analysis Batch: 607038 — **Prep Batch: 606584**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Iron	5010	4700		ug/L		94	87 - 115
Manganese	400	385		ug/L		96	90 - 114

Lab Sample ID: MB 680-607070/1-A — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total Recoverable**
Analysis Batch: 607259 — **Prep Batch: 607070**

Analyte	MB Result	MB Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	50	U	50	50	17	ug/L		02/13/20 00:32	1
Manganese	3.0	U	10	3.0	1.0	ug/L		02/13/20 00:32	1

Lab Sample ID: LCS 680-607070/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total Recoverable**
Analysis Batch: 607259 — **Prep Batch: 607070**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Iron	5010	5110		ug/L		102	87 - 115
Manganese	400	419		ug/L		105	90 - 114

Method: 6020A - Metals (ICP/MS)

Lab Sample ID: MB 680-606582/1-A — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total Recoverable**
Analysis Batch: 606787 — **Prep Batch: 606582**

Analyte	MB Result	MB Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	3.0	U	3.0	3.0	1.5	ug/L		02/07/20 14:28	1

Lab Sample ID: LCS 680-606582/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total Recoverable**
Analysis Batch: 606787 — **Prep Batch: 606582**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	100	100		ug/L		100	84 - 116

Lab Sample ID: MB 680-607069/1-A — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total Recoverable**
Analysis Batch: 607274 — **Prep Batch: 607069**

Analyte	MB Result	MB Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	3.0	U	3.0	3.0	1.5	ug/L		02/12/20 20:33	1

Method: 6020A - Metals (ICP/MS) (Continued)

Lab Sample ID: LCS 680-607069/2-A
Client Sample ID: Lab Control Sample
Matrix: Water
Prep Type: Total Recoverable
Analysis Batch: 607274
Prep Batch: 607069

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Arsenic			100	109		ug/L		109	84 - 116		

QC Association Summary

Client: KOMAN Government Solutions, LLC
Project/Site: Long Term Monitoring AOC57 Supplemental

Job ID: 680-180059-1

Metals

Prep Batch: 606582

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-180059-1	57M-95-06X_JAN20	Dissolved	Water	3005A	
680-180059-2	57M-03-05X_JAN20	Dissolved	Water	3005A	
MB 680-606582/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 680-606582/2-A	Lab Control Sample	Total Recoverable	Water	3005A	

Prep Batch: 606584

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-180059-1	57M-95-06X_JAN20	Dissolved	Water	3005A	
680-180059-2	57M-03-05X_JAN20	Dissolved	Water	3005A	
MB 680-606584/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 680-606584/2-A	Lab Control Sample	Total Recoverable	Water	3005A	

Analysis Batch: 606787

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-180059-1	57M-95-06X_JAN20	Dissolved	Water	6020A	606582
680-180059-2	57M-03-05X_JAN20	Dissolved	Water	6020A	606582
MB 680-606582/1-A	Method Blank	Total Recoverable	Water	6020A	606582
LCS 680-606582/2-A	Lab Control Sample	Total Recoverable	Water	6020A	606582

Analysis Batch: 607038

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-180059-1	57M-95-06X_JAN20	Dissolved	Water	6010C	606584
680-180059-2	57M-03-05X_JAN20	Dissolved	Water	6010C	606584
MB 680-606584/1-A	Method Blank	Total Recoverable	Water	6010C	606584
LCS 680-606584/2-A	Lab Control Sample	Total Recoverable	Water	6010C	606584

Prep Batch: 607069

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-180059-3	57M-03-02X_JAN20	Dissolved	Water	3005A	
MB 680-607069/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 680-607069/2-A	Lab Control Sample	Total Recoverable	Water	3005A	

Prep Batch: 607070

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-180059-3	57M-03-02X_JAN20	Dissolved	Water	3005A	
MB 680-607070/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 680-607070/2-A	Lab Control Sample	Total Recoverable	Water	3005A	

Analysis Batch: 607259

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-180059-3	57M-03-02X_JAN20	Dissolved	Water	6010C	607070
MB 680-607070/1-A	Method Blank	Total Recoverable	Water	6010C	607070
LCS 680-607070/2-A	Lab Control Sample	Total Recoverable	Water	6010C	607070

Analysis Batch: 607274

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-180059-3	57M-03-02X_JAN20	Dissolved	Water	6020A	607069
MB 680-607069/1-A	Method Blank	Total Recoverable	Water	6020A	607069
LCS 680-607069/2-A	Lab Control Sample	Total Recoverable	Water	6020A	607069

Lab Chronicle

Client: KOMAN Government Solutions, LLC
Project/Site: Long Term Monitoring AOC57 Supplemental

Job ID: 680-180059-1

Client Sample ID: 57M-95-06X_JAN20

Lab Sample ID: 680-180059-1

Date Collected: 02/05/20 10:30

Matrix: Water

Date Received: 02/06/20 09:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	606584	02/07/20 08:59	AJR	TAL SAV
Dissolved	Analysis	6010C		1			607038	02/11/20 20:25	BWR	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	606582	02/07/20 08:59	AJR	TAL SAV
Dissolved	Analysis	6020A		1			606787	02/07/20 16:21	BJB	TAL SAV
	Instrument ID:	ICPMSD								

Client Sample ID: 57M-03-05X_JAN20

Lab Sample ID: 680-180059-2

Date Collected: 02/05/20 12:17

Matrix: Water

Date Received: 02/06/20 09:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	606584	02/07/20 08:59	AJR	TAL SAV
Dissolved	Analysis	6010C		1			607038	02/11/20 20:30	BWR	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	606582	02/07/20 08:59	AJR	TAL SAV
Dissolved	Analysis	6020A		1			606787	02/07/20 16:25	BJB	TAL SAV
	Instrument ID:	ICPMSD								

Client Sample ID: 57M-03-02X_JAN20

Lab Sample ID: 680-180059-3

Date Collected: 02/05/20 13:58

Matrix: Water

Date Received: 02/06/20 09:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	607070	02/12/20 09:10	AJR	TAL SAV
Dissolved	Analysis	6010C		1			607259	02/13/20 01:36	BWR	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	607069	02/12/20 09:10	AJR	TAL SAV
Dissolved	Analysis	6020A		1			607274	02/12/20 21:21	BJB	TAL SAV
	Instrument ID:	ICPMSD								

Laboratory References:

TAL SAV = Eurofins TestAmerica, Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

CHAIN-OF ISTODY RECORD

KOMAN Government Services, LLC
Laurie Ekes
293 Boston Post Road West, Suite 100, Marlborough, MA 01752
(508) 508.366.7442, lekes@komangs.com

Boston #215

COC # AOC57_SUPP20

KGS

Project Name: Long Term Monitoring	Laboratory: TestAmerica Laboratories, Inc., Savannah, GA	Event: KOMAN, Long Term Monitoring, AOC 57 Supplemental MW Winter 2020
Project Number: DEVNS-LTM	POC: Jerry Lanier 912.354.7858 jerry.lanier@testamericainc.com	
WBS Code: Purchase Order 18-706	Ship to: 5102 LaRoche Avenue, Savannah, GA 31404	

Comments:
SW6010C/FLDFLT (B) = Fe Mn
SW6020A/FLDFLT = As

Equipment:
YSI 650 - 11B100185
Lamotte Turbidimeter 1848-0212

Code	Matrix
WG	Ground Water

Code	Container/Preservative
9	1 x 250mL, plastic, HNO3, pH < 2; Cool < 4degC

	Sample ID	Matrix	Date	Time	Samp Init.	SW6010C/FLDFLT (B)	SW6020A/FLDFLT (B)	Location ID	Sample Type	Depth (ft bgs) Top	Depth (ft bgs) Bottom	Comments	Cooler
	Event: KOMAN, Long Term Monitoring, AOC 57 Supplemental MW					9	9						
1		WG				X	X		N1	0.00	0.00		1
2	57M-95-06X_JAN20	WG	2/5/2020	1030	CM	X	X		N1	0	~~0.00~~	CM 2020	
3	57M-03-05X_JAN20	WG	2/5/2020	1217	CM	X	X		N1				
4	57M-03-02X_JAN20	WG	2/5/2020	1358	CM	X	X		N1				
5													
6													
7													
8													
9													
10													
11													

680-180059 Chain of Custody

Relinquished by: *(Signature)*	Date	Time	Received by: *(Signature)*	Date	Time
[signature]	2/5/2020	1500	[signature]	2-5-20	1500
[signature]	2-5-20	180	[signature]	2-6-2020	0915

Shipping Date / Carrier / Airbill Number

Received by Laboratory: *(Signature, Date, Time)* **& condition**
04/0.8

Page 1 of 2

Login Sample Receipt Checklist

Client: KOMAN Government Solutions, LLC

Job Number: 680-180059-1

Login Number: 180059

List Source: Eurofins TestAmerica, Savannah

List Number: 1

Creator: Laughlin, Paul D

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Accreditation/Certification Summary

Client: KOMAN Government Solutions, LLC
Job ID: 680-180059-1
Project/Site: Long Term Monitoring AOC57 Supplemental

Laboratory: Eurofins TestAmerica, Savannah

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
ANAB	Dept. of Defense ELAP	L2463	09-22-22

eurofins | Environment Testing TestAmerica

ANALYTICAL REPORT

Eurofins TestAmerica, Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Tel: (912)354-7858

Laboratory Job ID: 680-180174-1
Client Project/Site: LTM/AOC 57 Supplemental MW

For:
KOMAN Government Solutions, LLC
293 Boston Post Road West
Suite 100
Marlborough, Massachusetts 01752

Attn: Laurie Ekes

Authorized for release by:
2/13/2020 11:22:36 AM

Jerry Lanier, Project Manager I
(912)250-0281
jerry.lanier@testamericainc.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

Table of Contents

Cover Page 1
Table of Contents 2
Case Narrative 3
Sample Summary 4
Method Summary 5
Definitions/Glossary 6
Client Sample Results 7
QC Sample Results 8
QC Association Summary 9
Lab Chronicle 10
Chain of Custody 11
Receipt Checklists 12
Certification Summary 13

Job ID: 680-180174-1

Laboratory: Eurofins TestAmerica, Savannah

Narrative

CASE NARRATIVE

Client: KOMAN Government Solutions, LLC

Project: LTM/AOC 57 Supplemental MW

Report Number: 680-180174-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

RECEIPT
The samples were received on 02/08/2020; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 1.5 C.

METALS (ICP) - DISSOLVED
Samples 57WP-06-02_JAN20 (680-180174-1), 5702MW-20-01B_JAN20 (680-180174-2) and 5702MW-20-01A_JAN20 (680-180174-3) were analyzed for Metals (ICP) - Dissolved in accordance with EPA SW-846 Method 6010C. The samples were prepared on 02/11/2020 and analyzed on 02/12/2020.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

METALS (ICPMS) - DISSOLVED
Samples 57WP-06-02_JAN20 (680-180174-1), 5702MW-20-01B_JAN20 (680-180174-2) and 5702MW-20-01A_JAN20 (680-180174-3) were analyzed for Metals (ICPMS) - Dissolved in accordance with EPA SW-846 Method 6020A. The samples were prepared and analyzed on 02/11/2020.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Sample Summary

Client: KOMAN Government Solutions, LLC
Project/Site: LTM/AOC 57 Supplemental MW

Job ID: 680-180174-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
680-180174-1	57WP-06-02_JAN20	Water	02/06/20 10:47	02/08/20 10:00	
680-180174-2	5702MW-20-01B_JAN20	Water	02/07/20 09:49	02/08/20 10:00	
680-180174-3	5702MW-20-01A_JAN20	Water	02/07/20 11:30	02/08/20 10:00	

Method Summary

Client: KOMAN Government Solutions, LLC
Project/Site: LTM/AOC 57 Supplemental MW

Job ID: 680-180174-1

Method	Method Description	Protocol	Laboratory
6010C	Metals (ICP)	SW846	TAL SAV
6020A	Metals (ICP/MS)	SW846	TAL SAV
3005A	Preparation, Total Recoverable or Dissolved Metals	SW846	TAL SAV

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL SAV = Eurofins TestAmerica, Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

Definitions/Glossary

Client: KOMAN Government Solutions, LLC
Project/Site: LTM/AOC 57 Supplemental MW

Job ID: 680-180174-1

Qualifiers

Metals

Qualifier	Qualifier Description
J	Estimated: The analyte was positively identified; the quantitation is an estimation
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Client Sample Results

Client: KOMAN Government Solutions, LLC
Project/Site: LTM/AOC 57 Supplemental MW

Job ID: 680-180174-1

Client Sample ID: 57WP-06-02_JAN20

Lab Sample ID: 680-180174-1

Date Collected: 02/06/20 10:47
Matrix: Water
Date Received: 02/08/20 10:00

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	50	U	50	50	17	ug/L		02/12/20 06:18	1
Manganese	**190**		10	3.0	1.0	ug/L		02/12/20 06:18	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	**1.7**	**J**	3.0	3.0	1.5	ug/L		02/11/20 20:53	1

Client Sample ID: 5702MW-20-01B_JAN20

Lab Sample ID: 680-180174-2

Date Collected: 02/07/20 09:49
Matrix: Water
Date Received: 02/08/20 10:00

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	**48**	**J**	50	50	17	ug/L		02/12/20 06:28	1
Manganese	**49**		10	3.0	1.0	ug/L		02/12/20 06:28	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	**17**		3.0	3.0	1.5	ug/L		02/11/20 21:00	1

Client Sample ID: 5702MW-20-01A_JAN20

Lab Sample ID: 680-180174-3

Date Collected: 02/07/20 11:30
Matrix: Water
Date Received: 02/08/20 10:00

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	50	U	50	50	17	ug/L		02/12/20 06:23	1
Manganese	**38**		10	3.0	1.0	ug/L		02/12/20 06:23	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	**2.2**	**J**	3.0	3.0	1.5	ug/L		02/11/20 20:57	1

QC Sample Results

Client: KOMAN Government Solutions, LLC
Project/Site: LTM/AOC 57 Supplemental MW

Job ID: 680-180174-1

Method: 6010C - Metals (ICP)

Lab Sample ID: MB 680-606961/1-A
Matrix: Water
Analysis Batch: 607038

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 606961

Analyte	MB Result	MB Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	50	U	50	50	17	ug/L		02/12/20 05:44	1
Manganese	3.0	U	10	3.0	1.0	ug/L		02/12/20 05:44	1

Lab Sample ID: LCS 680-606961/2-A
Matrix: Water
Analysis Batch: 607038

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 606961

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Iron	5010	4790		ug/L		96	87 - 115
Manganese	400	394		ug/L		99	90 - 114

Method: 6020A - Metals (ICP/MS)

Lab Sample ID: MB 680-606960/1-A
Matrix: Water
Analysis Batch: 607067

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 606960

Analyte	MB Result	MB Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	3.0	U	3.0	3.0	1.5	ug/L		02/11/20 20:06	1

Lab Sample ID: LCS 680-606960/2-A
Matrix: Water
Analysis Batch: 607067

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 606960

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	100	102		ug/L		102	84 - 116

QC Association Summary

Client: KOMAN Government Solutions, LLC
Project/Site: LTM/AOC 57 Supplemental MW

Job ID: 680-180174-1

Metals

Prep Batch: 606960

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-180174-1	57WP-06-02_JAN20	Dissolved	Water	3005A	
680-180174-2	5702MW-20-01B_JAN20	Dissolved	Water	3005A	
680-180174-3	5702MW-20-01A_JAN20	Dissolved	Water	3005A	
MB 680-606960/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 680-606960/2-A	Lab Control Sample	Total Recoverable	Water	3005A	

Prep Batch: 606961

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-180174-1	57WP-06-02_JAN20	Dissolved	Water	3005A	
680-180174-2	5702MW-20-01B_JAN20	Dissolved	Water	3005A	
680-180174-3	5702MW-20-01A_JAN20	Dissolved	Water	3005A	
MB 680-606961/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 680-606961/2-A	Lab Control Sample	Total Recoverable	Water	3005A	

Analysis Batch: 607038

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-180174-1	57WP-06-02_JAN20	Dissolved	Water	6010C	606961
680-180174-2	5702MW-20-01B_JAN20	Dissolved	Water	6010C	606961
680-180174-3	5702MW-20-01A_JAN20	Dissolved	Water	6010C	606961
MB 680-606961/1-A	Method Blank	Total Recoverable	Water	6010C	606961
LCS 680-606961/2-A	Lab Control Sample	Total Recoverable	Water	6010C	606961

Analysis Batch: 607067

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-180174-1	57WP-06-02_JAN20	Dissolved	Water	6020A	606960
680-180174-2	5702MW-20-01B_JAN20	Dissolved	Water	6020A	606960
680-180174-3	5702MW-20-01A_JAN20	Dissolved	Water	6020A	606960
MB 680-606960/1-A	Method Blank	Total Recoverable	Water	6020A	606960
LCS 680-606960/2-A	Lab Control Sample	Total Recoverable	Water	6020A	606960

Lab Chronicle

Client: KOMAN Government Solutions, LLC
Project/Site: LTM/AOC 57 Supplemental MW

Job ID: 680-180174-1

Client Sample ID: 57WP-06-02_JAN20

Lab Sample ID: 680-180174-1

Date Collected: 02/06/20 10:47

Matrix: Water

Date Received: 02/08/20 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	606961	02/11/20 11:57	AJR	TAL SAV
Dissolved	Analysis	6010C		1			607038	02/12/20 06:18	BWR	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	606960	02/11/20 11:57	AJR	TAL SAV
Dissolved	Analysis	6020A		1			607067	02/11/20 20:53	BJB	TAL SAV
	Instrument ID:	ICPMSD								

Client Sample ID: 5702MW-20-01B_JAN20

Lab Sample ID: 680-180174-2

Date Collected: 02/07/20 09:49

Matrix: Water

Date Received: 02/08/20 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	606961	02/11/20 11:57	AJR	TAL SAV
Dissolved	Analysis	6010C		1			607038	02/12/20 06:28	BWR	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	606960	02/11/20 11:57	AJR	TAL SAV
Dissolved	Analysis	6020A		1			607067	02/11/20 21:00	BJB	TAL SAV
	Instrument ID:	ICPMSD								

Client Sample ID: 5702MW-20-01A_JAN20

Lab Sample ID: 680-180174-3

Date Collected: 02/07/20 11:30

Matrix: Water

Date Received: 02/08/20 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	606961	02/11/20 11:57	AJR	TAL SAV
Dissolved	Analysis	6010C		1			607038	02/12/20 06:23	BWR	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	606960	02/11/20 11:57	AJR	TAL SAV
Dissolved	Analysis	6020A		1			607067	02/11/20 20:57	BJB	TAL SAV
	Instrument ID:	ICPMSD								

Laboratory References:

TAL SAV = Eurofins TestAmerica, Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

CHAIN-OF-CUSTODY RECORD

Boston #215

KOMAN Government Services, LLC
Laurie Ekes
293 Boston Post Road West, Suite 100, Marlborough, MA 01752
(508) 508.366.7442, lekes@komangs.com

Boston #215

COC # AOC57_SUPP20

RGS

Project Name: Long Term Monitoring	Laboratory: TestAmerica Laboratories, Inc., Savannah, GA	Event: KOMAN, Long Term Monitoring, AOC 57 Supplemental MW Winter 2020
Project Number: DEVNS-LTM	POC: Jerry Lanier 912.354.7858 jerry.lanier@testamericainc.com	
WBS Code: Purchase Order 18-706	Ship to: 5102 LaRoche Avenue, Savannah, GA 31404	

Comments:
SW6010C/FLDFLT (B) = Fe Mn
SW6020A/FLDFLT = As

Equipment: YSI 650
Lamotte Turbidimeter
Peri pump

Code	Matrix
WG	Ground Water

Code	Container/Preservative
9	1 x 250mL, plastic, HNO3, pH < 2; Cool < 4degC

	Sample ID	Matrix	Date	Time	Samp Init.	SW6010C/FLDFLT (B)	SW6020A/FLDFLT (B)	Location ID	Sample Type	Depth (ft bgs) Top	Depth (ft bgs) Bottom	Comments	Cooler
	Event: KOMAN, Long Term Monitoring, AOC 57 Supplemental MW					9	9						
1	57WP-06-02-JAN'20	WG	2/6/2020	1047	CM	X	X		N1	0.00	0.00		1
2	5702MW-20-01B-JAN20	WG	2/7/2020	0949	CM	X	X		N1				
3	5702MW-20-01A-JAN20	WG	2/7/2020	1130	CM	X	X		N1				
4													
5													
6													
7													
8													
9													
10													
11													

680-180174 Chain of Custody

Relinquished by: *(Signature)*	Date	Time	Received by: *(Signature)*	Date	Time
[signature]	2/7/2020	1500	[signature]	2-7-20	150
[signature]	2-7-2020	1500	[signature]	2-8-20	1000

Shipping Date / Carrier / Airbill Number

Received by Laboratory: *(Signature, Date, Time)* **& condition**

[signature] 2-8-20 1000 1.1/1.5

Login Sample Receipt Checklist

Client: KOMAN Government Solutions, LLC

Job Number: 680-180174-1

Login Number: 180174

List Source: Eurofins TestAmerica, Savannah

List Number: 1

Creator: Sims, Robert D

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Accreditation/Certification Summary

Client: KOMAN Government Solutions, LLC
Project/Site: LTM/AOC 57 Supplemental MW

Job ID: 680-180174-1

Laboratory: Eurofins TestAmerica, Savannah

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
ANAB	Dept. of Defense ELAP	L2463	09-22-22

eurofins | Environment Testing TestAmerica

ANALYTICAL REPORT

Eurofins TestAmerica, Savannah
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Tel: (912)354-7858

Laboratory Job ID: 680-180364-1
Client Project/Site: LTM/AOC 57 Supplemental MW

For:
KOMAN Government Solutions, LLC
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Attn: Laurie Ekes

Authorized for release by:
2/27/2020 2:14:19 PM

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LINKS

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The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

Table of Contents

Cover Page 1
Table of Contents 2
Case Narrative 3
Sample Summary 4
Method Summary 5
Definitions/Glossary 6
Client Sample Results 7
QC Sample Results 10
QC Association Summary 12
Lab Chronicle 14
Chain of Custody 17
Receipt Checklists 19
Certification Summary 20

Job ID: 680-180364-1

Laboratory: Eurofins TestAmerica, Savannah

Narrative

CASE NARRATIVE

Client: KOMAN Government Solutions, LLC

Project: LTM/AOC 57 Supplemental MW

Report Number: 680-180364-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

RECEIPT
The samples were received on 02/13/2020; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 4.0 C.

METALS (ICP) - DISSOLVED
Samples 5702MW-20-02A_FEB 20 (680-180364-1), 5702MW-DUP01_FEB 20 (680-180364-2), 5702MW-20-06A_FEB 20 (680-180364-3), 5702MW-20-04A_FEB 20 (680-180364-4), 57M-95-03x_FEB 20 (680-180364-5), 57M-DUP01_FEB 20 (680-180364-6), 5703MW-20-04A_FEB 20 (680-180364-7), 5703MW-20-01A_FEB 20 (680-180364-8) and 5703MW-20-03A_FEB 20 (680-180364-12) were analyzed for Metals (ICP) - Dissolved in accordance with EPA SW-846 Method 6010C. The samples were prepared on 02/14/2020 and analyzed on 02/18/2020.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

METALS (ICPMS) - DISSOLVED
Samples 5702MW-20-02A_FEB 20 (680-180364-1), 5702MW-DUP01_FEB 20 (680-180364-2), 5702MW-20-06A_FEB 20 (680-180364-3), 5702MW-20-04A_FEB 20 (680-180364-4), 57M-95-03x_FEB 20 (680-180364-5), 57M-DUP01_FEB 20 (680-180364-6), 5703MW-20-04A_FEB 20 (680-180364-7), 5703MW-20-01A_FEB 20 (680-180364-8) and 5703MW-20-03A_FEB 20 (680-180364-12) were analyzed for Metals (ICPMS) - Dissolved in accordance with EPA SW-846 Method 6020A. The samples were prepared on 02/14/2020 and analyzed on 02/17/2020.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Sample Summary

Client: KOMAN Government Solutions, LLC
Project/Site: LTM/AOC 57 Supplemental MW

Job ID: 680-180364-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
680-180364-1	5702MW-20-02A_FEB 20	Water	02/10/20 11:26	02/13/20 09:20	
680-180364-2	5702MW-DUP01_FEB 20	Water	02/10/20 11:31	02/13/20 09:20	
680-180364-3	5702MW-20-06A_FEB 20	Water	02/10/20 13:30	02/13/20 09:20	
680-180364-4	5702MW-20-04A_FEB 20	Water	02/10/20 15:34	02/13/20 09:20	
680-180364-5	57M-95-03x_FEB 20	Water	02/11/20 10:52	02/13/20 09:20	
680-180364-6	57M-DUP01_FEB 20	Water	02/11/20 10:57	02/13/20 09:20	
680-180364-7	5703MW-20-04A_FEB 20	Water	02/11/20 13:02	02/13/20 09:20	
680-180364-8	5703MW-20-01A_FEB 20	Water	02/11/20 14:24	02/13/20 09:20	
680-180364-12	5703MW-20-03A_FEB 20	Water	02/11/20 12:55	02/13/20 09:20	

Method Summary

Client: KOMAN Government Solutions, LLC
Project/Site: LTM/AOC 57 Supplemental MW

Job ID: 680-180364-1

Method	Method Description	Protocol	Laboratory
6010C	Metals (ICP)	SW846	TAL SAV
6020A	Metals (ICP/MS)	SW846	TAL SAV
3005A	Preparation, Total Recoverable or Dissolved Metals	SW846	TAL SAV

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL SAV = Eurofins TestAmerica, Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

Definitions/Glossary

Client: KOMAN Government Solutions, LLC
Project/Site: LTM/AOC 57 Supplemental MW

Job ID: 680-180364-1

Qualifiers

Metals

Qualifier	Qualifier Description
J	Estimated: The analyte was positively identified; the quantitation is an estimation
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Client Sample Results

Client: KOMAN Government Solutions, LLC
Project/Site: LTM/AOC 57 Supplemental MW

Job ID: 680-180364-1

Client Sample ID: 5702MW-20-02A_FEB 20

Lab Sample ID: 680-180364-1
Date Collected: 02/10/20 11:26
Matrix: Water
Date Received: 02/13/20 09:20

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	50	U	50	50	17	ug/L		02/18/20 14:41	1
Manganese	**34**		10	3.0	1.0	ug/L		02/18/20 14:41	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	3.0	U	3.0	3.0	1.5	ug/L		02/17/20 19:33	1

Client Sample ID: 5702MW-DUP01_FEB 20

Lab Sample ID: 680-180364-2
Date Collected: 02/10/20 11:31
Matrix: Water
Date Received: 02/13/20 09:20

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	50	U	50	50	17	ug/L		02/18/20 14:26	1
Manganese	**37**		10	3.0	1.0	ug/L		02/18/20 14:26	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	3.0	U	3.0	3.0	1.5	ug/L		02/17/20 19:23	1

Client Sample ID: 5702MW-20-06A_FEB 20

Lab Sample ID: 680-180364-3
Date Collected: 02/10/20 13:30
Matrix: Water
Date Received: 02/13/20 09:20

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	**86**		50	50	17	ug/L		02/18/20 14:31	1
Manganese	**450**		10	3.0	1.0	ug/L		02/18/20 14:31	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	**1.9**	**J**	3.0	3.0	1.5	ug/L		02/17/20 19:26	1

Client Sample ID: 5702MW-20-04A_FEB 20

Lab Sample ID: 680-180364-4
Date Collected: 02/10/20 15:34
Matrix: Water
Date Received: 02/13/20 09:20

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	**530**		50	50	17	ug/L		02/18/20 14:56	1
Manganese	**310**		10	3.0	1.0	ug/L		02/18/20 14:56	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	**1.6**	**J**	3.0	3.0	1.5	ug/L		02/17/20 19:36	1

Client Sample Results

Client: KOMAN Government Solutions, LLC
Project/Site: LTM/AOC 57 Supplemental MW

Job ID: 680-180364-1

Client Sample ID: 57M-95-03x_FEB 20

Lab Sample ID: 680-180364-5
Date Collected: 02/11/20 10:52
Matrix: Water
Date Received: 02/13/20 09:20

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	3900		50	50	17	ug/L		02/18/20 14:11	1
Manganese	120		10	3.0	1.0	ug/L		02/18/20 14:11	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	30		3.0	3.0	1.5	ug/L		02/17/20 19:06	1

Client Sample ID: 57M-DUP01_FEB 20

Lab Sample ID: 680-180364-6
Date Collected: 02/11/20 10:57
Matrix: Water
Date Received: 02/13/20 09:20

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	3800		50	50	17	ug/L		02/18/20 15:01	1
Manganese	120		10	3.0	1.0	ug/L		02/18/20 15:01	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	29		3.0	3.0	1.5	ug/L		02/17/20 19:40	1

Client Sample ID: 5703MW-20-04A_FEB 20

Lab Sample ID: 680-180364-7
Date Collected: 02/11/20 13:02
Matrix: Water
Date Received: 02/13/20 09:20

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	2300		50	50	17	ug/L		02/18/20 14:16	1
Manganese	270		10	3.0	1.0	ug/L		02/18/20 14:16	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	7.6		3.0	3.0	1.5	ug/L		02/17/20 19:09	1

Client Sample ID: 5703MW-20-01A_FEB 20

Lab Sample ID: 680-180364-8
Date Collected: 02/11/20 14:24
Matrix: Water
Date Received: 02/13/20 09:20

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	450		50	50	17	ug/L		02/18/20 13:27	1
Manganese	110		10	3.0	1.0	ug/L		02/18/20 13:27	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	3.0	U	3.0	3.0	1.5	ug/L		02/17/20 18:49	1

Client Sample Results

Client: KOMAN Government Solutions, LLC
Project/Site: LTM/AOC 57 Supplemental MW

Job ID: 680-180364-1

Client Sample ID: 5703MW-20-03A_FEB 20

Lab Sample ID: 680-180364-12

Date Collected: 02/11/20 12:55

Matrix: Water

Date Received: 02/13/20 09:20

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	91		50	50	17	ug/L		02/18/20 14:36	1
Manganese	130		10	3.0	1.0	ug/L		02/18/20 14:36	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	3.0	U	3.0	3.0	1.5	ug/L		02/17/20 19:30	1

QC Sample Results

Client: KOMAN Government Solutions, LLC
Project/Site: LTM/AOC 57 Supplemental MW

Job ID: 680-180364-1

Method: 6010C - Metals (ICP)

Lab Sample ID: MB 680-607499/1-A — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total Recoverable**
Analysis Batch: 607853 — **Prep Batch: 607499**

Analyte	MB Result	MB Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	50	U	50	50	17	ug/L		02/18/20 13:17	1
Manganese	3.0	U	10	3.0	1.0	ug/L		02/18/20 13:17	1

Lab Sample ID: LCS 680-607499/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total Recoverable**
Analysis Batch: 607853 — **Prep Batch: 607499**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Iron	5010	4950		ug/L		99	87 - 115
Manganese	400	410		ug/L		103	90 - 114

Lab Sample ID: 680-180364-8 MS — **Client Sample ID: 5703MW-20-01A_FEB 20**
Matrix: Water — **Prep Type: Dissolved**
Analysis Batch: 607853 — **Prep Batch: 607499**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Iron	450		5010	5390		ug/L		99	87 - 115
Manganese	110		400	519		ug/L		101	90 - 114

Lab Sample ID: 680-180364-8 MSD — **Client Sample ID: 5703MW-20-01A_FEB 20**
Matrix: Water — **Prep Type: Dissolved**
Analysis Batch: 607853 — **Prep Batch: 607499**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Iron	450		5010	5480		ug/L		100	87 - 115	2	20
Manganese	110		400	532		ug/L		104	90 - 114	3	20

Method: 6020A - Metals (ICP/MS)

Lab Sample ID: MB 680-607498/1-A — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total Recoverable**
Analysis Batch: 607794 — **Prep Batch: 607498**

Analyte	MB Result	MB Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	3.0	U	3.0	3.0	1.5	ug/L		02/17/20 18:42	1

Lab Sample ID: LCS 680-607498/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total Recoverable**
Analysis Batch: 607794 — **Prep Batch: 607498**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	100	102		ug/L		102	84 - 116

Lab Sample ID: 680-180364-8 MS — **Client Sample ID: 5703MW-20-01A_FEB 20**
Matrix: Water — **Prep Type: Dissolved**
Analysis Batch: 607794 — **Prep Batch: 607498**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	3.0	U	100	101		ug/L		101	84 - 116

Method: 6020A - Metals (ICP/MS) (Continued)

Lab Sample ID: 680-180364-8 MSD
Matrix: Water
Analysis Batch: 607794

Client Sample ID: 5703MW-20-01A_FEB 20
Prep Type: Dissolved
Prep Batch: 607498

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Arsenic	3.0	U	100	105		ug/L		105	84 - 116	4	20

QC Association Summary

Client: KOMAN Government Solutions, LLC
Project/Site: LTM/AOC 57 Supplemental MW

Job ID: 680-180364-1

Metals

Prep Batch: 607498

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-180364-1	5702MW-20-02A_FEB 20	Dissolved	Water	3005A	
680-180364-2	5702MW-DUP01_FEB 20	Dissolved	Water	3005A	
680-180364-3	5702MW-20-06A_FEB 20	Dissolved	Water	3005A	
680-180364-4	5702MW-20-04A_FEB 20	Dissolved	Water	3005A	
680-180364-5	57M-95-03x_FEB 20	Dissolved	Water	3005A	
680-180364-6	57M-DUP01_FEB 20	Dissolved	Water	3005A	
680-180364-7	5703MW-20-04A_FEB 20	Dissolved	Water	3005A	
680-180364-8	5703MW-20-01A_FEB 20	Dissolved	Water	3005A	
680-180364-12	5703MW-20-03A_FEB 20	Dissolved	Water	3005A	
MB 680-607498/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 680-607498/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
680-180364-8 MS	5703MW-20-01A_FEB 20	Dissolved	Water	3005A	
680-180364-8 MSD	5703MW-20-01A_FEB 20	Dissolved	Water	3005A	

Prep Batch: 607499

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-180364-1	5702MW-20-02A_FEB 20	Dissolved	Water	3005A	
680-180364-2	5702MW-DUP01_FEB 20	Dissolved	Water	3005A	
680-180364-3	5702MW-20-06A_FEB 20	Dissolved	Water	3005A	
680-180364-4	5702MW-20-04A_FEB 20	Dissolved	Water	3005A	
680-180364-5	57M-95-03x_FEB 20	Dissolved	Water	3005A	
680-180364-6	57M-DUP01_FEB 20	Dissolved	Water	3005A	
680-180364-7	5703MW-20-04A_FEB 20	Dissolved	Water	3005A	
680-180364-8	5703MW-20-01A_FEB 20	Dissolved	Water	3005A	
680-180364-12	5703MW-20-03A_FEB 20	Dissolved	Water	3005A	
MB 680-607499/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 680-607499/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
680-180364-8 MS	5703MW-20-01A_FEB 20	Dissolved	Water	3005A	
680-180364-8 MSD	5703MW-20-01A_FEB 20	Dissolved	Water	3005A	

Analysis Batch: 607794

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-180364-1	5702MW-20-02A_FEB 20	Dissolved	Water	6020A	607498
680-180364-2	5702MW-DUP01_FEB 20	Dissolved	Water	6020A	607498
680-180364-3	5702MW-20-06A_FEB 20	Dissolved	Water	6020A	607498
680-180364-4	5702MW-20-04A_FEB 20	Dissolved	Water	6020A	607498
680-180364-5	57M-95-03x_FEB 20	Dissolved	Water	6020A	607498
680-180364-6	57M-DUP01_FEB 20	Dissolved	Water	6020A	607498
680-180364-7	5703MW-20-04A_FEB 20	Dissolved	Water	6020A	607498
680-180364-8	5703MW-20-01A_FEB 20	Dissolved	Water	6020A	607498
680-180364-12	5703MW-20-03A_FEB 20	Dissolved	Water	6020A	607498
MB 680-607498/1-A	Method Blank	Total Recoverable	Water	6020A	607498
LCS 680-607498/2-A	Lab Control Sample	Total Recoverable	Water	6020A	607498
680-180364-8 MS	5703MW-20-01A_FEB 20	Dissolved	Water	6020A	607498
680-180364-8 MSD	5703MW-20-01A_FEB 20	Dissolved	Water	6020A	607498

Analysis Batch: 607853

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-180364-1	5702MW-20-02A_FEB 20	Dissolved	Water	6010C	607499
680-180364-2	5702MW-DUP01_FEB 20	Dissolved	Water	6010C	607499
680-180364-3	5702MW-20-06A_FEB 20	Dissolved	Water	6010C	607499

Metals (Continued)

Analysis Batch: 607853 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-180364-4	5702MW-20-04A_FEB 20	Dissolved	Water	6010C	607499
680-180364-5	57M-95-03x_FEB 20	Dissolved	Water	6010C	607499
680-180364-6	57M-DUP01_FEB 20	Dissolved	Water	6010C	607499
680-180364-7	5703MW-20-04A_FEB 20	Dissolved	Water	6010C	607499
680-180364-8	5703MW-20-01A_FEB 20	Dissolved	Water	6010C	607499
680-180364-12	5703MW-20-03A_FEB 20	Dissolved	Water	6010C	607499
MB 680-607499/1-A	Method Blank	Total Recoverable	Water	6010C	607499
LCS 680-607499/2-A	Lab Control Sample	Total Recoverable	Water	6010C	607499
680-180364-8 MS	5703MW-20-01A_FEB 20	Dissolved	Water	6010C	607499
680-180364-8 MSD	5703MW-20-01A_FEB 20	Dissolved	Water	6010C	607499

Lab Chronicle

Client: KOMAN Government Solutions, LLC
Project/Site: LTM/AOC 57 Supplemental MW

Job ID: 680-180364-1

Client Sample ID: 5702MW-20-02A_FEB 20

Lab Sample ID: 680-180364-1
Date Collected: 02/10/20 11:26
Matrix: Water
Date Received: 02/13/20 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	607499	02/14/20 12:29	AJR	TAL SAV
Dissolved	Analysis	6010C		1			607853	02/18/20 14:41	BCB	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	607498	02/14/20 12:29	AJR	TAL SAV
Dissolved	Analysis	6020A		1			607794	02/17/20 19:33	BWR	TAL SAV
	Instrument ID:	ICPMSD								

Client Sample ID: 5702MW-DUP01_FEB 20

Lab Sample ID: 680-180364-2
Date Collected: 02/10/20 11:31
Matrix: Water
Date Received: 02/13/20 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	607499	02/14/20 12:29	AJR	TAL SAV
Dissolved	Analysis	6010C		1			607853	02/18/20 14:26	BCB	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	607498	02/14/20 12:29	AJR	TAL SAV
Dissolved	Analysis	6020A		1			607794	02/17/20 19:23	BWR	TAL SAV
	Instrument ID:	ICPMSD								

Client Sample ID: 5702MW-20-06A_FEB 20

Lab Sample ID: 680-180364-3
Date Collected: 02/10/20 13:30
Matrix: Water
Date Received: 02/13/20 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	607499	02/14/20 12:29	AJR	TAL SAV
Dissolved	Analysis	6010C		1			607853	02/18/20 14:31	BCB	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	607498	02/14/20 12:29	AJR	TAL SAV
Dissolved	Analysis	6020A		1			607794	02/17/20 19:26	BWR	TAL SAV
	Instrument ID:	ICPMSD								

Client Sample ID: 5702MW-20-04A_FEB 20

Lab Sample ID: 680-180364-4
Date Collected: 02/10/20 15:34
Matrix: Water
Date Received: 02/13/20 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	607499	02/14/20 12:29	AJR	TAL SAV
Dissolved	Analysis	6010C		1			607853	02/18/20 14:56	BCB	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	607498	02/14/20 12:29	AJR	TAL SAV
Dissolved	Analysis	6020A		1			607794	02/17/20 19:36	BWR	TAL SAV
	Instrument ID:	ICPMSD								

Lab Chronicle

Client: KOMAN Government Solutions, LLC
Project/Site: LTM/AOC 57 Supplemental MW

Job ID: 680-180364-1

Client Sample ID: 57M-95-03x_FEB 20

Lab Sample ID: 680-180364-5
Date Collected: 02/11/20 10:52
Matrix: Water
Date Received: 02/13/20 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	607499	02/14/20 12:29	AJR	TAL SAV
Dissolved	Analysis	6010C		1			607853	02/18/20 14:11	BCB	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	607498	02/14/20 12:29	AJR	TAL SAV
Dissolved	Analysis	6020A		1			607794	02/17/20 19:06	BWR	TAL SAV
	Instrument ID:	ICPMSD								

Client Sample ID: 57M-DUP01_FEB 20

Lab Sample ID: 680-180364-6
Date Collected: 02/11/20 10:57
Matrix: Water
Date Received: 02/13/20 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	607499	02/14/20 12:29	AJR	TAL SAV
Dissolved	Analysis	6010C		1			607853	02/18/20 15:01	BCB	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	607498	02/14/20 12:29	AJR	TAL SAV
Dissolved	Analysis	6020A		1			607794	02/17/20 19:40	BWR	TAL SAV
	Instrument ID:	ICPMSD								

Client Sample ID: 5703MW-20-04A_FEB 20

Lab Sample ID: 680-180364-7
Date Collected: 02/11/20 13:02
Matrix: Water
Date Received: 02/13/20 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	607499	02/14/20 12:29	AJR	TAL SAV
Dissolved	Analysis	6010C		1			607853	02/18/20 14:16	BCB	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	607498	02/14/20 12:29	AJR	TAL SAV
Dissolved	Analysis	6020A		1			607794	02/17/20 19:09	BWR	TAL SAV
	Instrument ID:	ICPMSD								

Client Sample ID: 5703MW-20-01A_FEB 20

Lab Sample ID: 680-180364-8
Date Collected: 02/11/20 14:24
Matrix: Water
Date Received: 02/13/20 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	607499	02/14/20 12:29	AJR	TAL SAV
Dissolved	Analysis	6010C		1			607853	02/18/20 13:27	BCB	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	607498	02/14/20 12:29	AJR	TAL SAV
Dissolved	Analysis	6020A		1			607794	02/17/20 18:49	BWR	TAL SAV
	Instrument ID:	ICPMSD								

Lab Chronicle

Client: KOMAN Government Solutions, LLC
Project/Site: LTM/AOC 57 Supplemental MW

Job ID: 680-180364-1

Client Sample ID: 5703MW-20-03A_FEB 20

Date Collected: 02/11/20 12:55
Date Received: 02/13/20 09:20

Lab Sample ID: 680-180364-12

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	607499	02/14/20 12:29	AJR	TAL SAV
Dissolved	Analysis	6010C		1			607853	02/18/20 14:36	BCB	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	607498	02/14/20 12:29	AJR	TAL SAV
Dissolved	Analysis	6020A		1			607794	02/17/20 19:30	BWR	TAL SAV
	Instrument ID:	ICPMSD								

Laboratory References:

TAL SAV = Eurofins TestAmerica, Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

CHAIN-OF-CUSTODY RECORD

KOMAN Government Services, LLC
Laurie Ekes
293 Boston Post Road West, Suite 100, Marlborough, MA 01752
(508) 508.366.7442, lekes@komangs.com

COC # AOC57_SUPP20

KGS

Boston #215

Project Name: Long Term Monitoring	Laboratory: TestAmerica Laboratories, Inc., Savannah, GA	Event: KOMAN, Long Term Monitoring, AOC 57 Supplemental MW Winter 2020
Project Number: DEVNS-LTM	POC: Jerry Lanier 912.354.7858 jerry.lanier@testamericainc.com	
WBS Code: Purchase Order 18-706	Ship to: 5102 LaRoche Avenue, Savannah, GA 31404	

Comments:
SW6010C/FLDFLT (B) = Fe Mn
SW6020A/FLDFLT = As

Equipment:

Code	Matrix
WG	Ground Water

Code	Container/Preservative
9	1 x 250mL, plastic, HNO3, pH < 2; Cool < 4degC

Event: KOMAN, Long Term Monitoring, AOC 57 Supplemental MW

	Sample ID	Matrix	Date	Time	Samp Init.	SW6010C/FLDFLT (B)	SW6020A/FLDFLT (B)	Location ID	Sample Type	Depth (ft bgs) Top	Depth (ft bgs) Bottom	Comments	Cooler
1	5702MW-20-02A-FEB20	WG	2/10/2020	1126	CM	X	X		N1	0.00	0.00		1
2	5702MW-DUP01-FEB20	WG	2/10/2020	1131	CM	X	X		FD				
3	5702MW-20-06A-FEB20	WG	2/10/2020	1330	CM	X	X		N1				
4	5702MW-20-04A-FEB20	WG	2/10/2020	1534	CM	X	X		N1				
5	57M-05-03X-FEB20	WG	2/11/2020	1052	CM	X	X		N1				
6	57M-DUP01-FEB20	WG	2/11/2020	1057	CM	X	X		FD				
7	5703MW-20-04A-FEB20	WG	2/11/2020	1302	CM	X	X		N1				
8	5703MW-20-01A-FEB20	WG	2/11/2020	1424	CM	X	X		N1				
9	5703MW-20-[illegible]-FEB20	WG	2/12/2020	1221	CM	X	X		N1				
10													
11													

680-180364-01 Chain of Custody

Relinquished by: *(Signature)*	Date	Time
[signature]	2/12/2020	1500
[signature]	2/12/2020	1FB

Received by: *(Signature)*	Date	Time
[signature]	2-12-20	1500

Shipping Date / Carrier / Airbill Number

Received by Laboratory: *(Signature, Date, Time)* **& condition**

[signature] 36/40 2-13-2020/0920

CHAIN-OF-CUSTODY RECORD

KOMAN Government Services, LLC
Laurie Ekes
293 Boston Post Road West, Suite 100, Marlborough, MA 01752
(508) 508.366.7442, lekes@komangs.com

Boston #215

COC # AOC57_SUPP20

KGS

Project Name: Long Term Monitoring	Laboratory: TestAmerica Laboratories, Inc., Savannah, GA	Event: KOMAN, Long Term Monitoring, AOC 57 Supplemental MW Winter 2020
Project Number: DEVNS-LTM	POC: Jerry Lanier 912.354.7858 jerry.lanier@testamericainc.com	
WBS Code: Purchase Order 18-706	Ship to: 5102 LaRoche Avenue, Savannah, GA 31404	

Comments:
SW6010C/FLDFLT (B) = Fe Mn
SW6020A/FLDFLT = As

Equipment:

Code	Matrix
WG	Ground Water

Code	Container/Preservative
9	1 x 250mL, plastic, HNO3, pH < 2; Cool < 4degC

Boston #215

	Sample ID	Matrix	Date	Time	Samp Init.	SW6010C/FLDFLT (B)	SW6020A/FLDFLT (B)	Location ID	Sample Type	Depth (ft bgs) Top	Depth (ft bgs) Bottom	Comments	Cooler
	Event: KOMAN, Long Term Monitoring, AOC 57 Supplemental MW					9	9						
1	S703MW-20-02A_FEB20	WG	2/12/2020	0940	MS	X	X		N1	0.00	0.00		1
2	S703MW-DUP02_FEB20	WG	2/12/2020	0945	MS	X	X		FD				
3	S703MW-20-03A_FEB20	WG	2/12/2020	1255	MS	X	X		N1				
4													
5													
6													
7													
8													
9													
10													
11													

680-180364-02 Chain of Custody

Relinquished by: *(Signature)*	Date	Time	Received by: *(Signature)*	Date	Time
[signature]	2/12/2020	1500	[signature]	2/12/2020	1500
[signature]	2-12-20	1500			

Shipping Date / Carrier / Airbill Number

Received by Laboratory: *(Signature, Date, Time)* **& condition**

RW 3.6/40 2-13-2020/0920

Login Sample Receipt Checklist

Client: KOMAN Government Solutions, LLC

Job Number: 680-180364-1

Login Number: 180364
List Number: 1
Creator: Mooken, Darmal

List Source: Eurofins TestAmerica, Savannah

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Accreditation/Certification Summary

Client: KOMAN Government Solutions, LLC
Project/Site: LTM/AOC 57 Supplemental MW

Job ID: 680-180364-1

Laboratory: Eurofins TestAmerica, Savannah

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
ANAB	Dept. of Defense ELAP	L2463	09-22-22

eurofins | Environment Testing TestAmerica

ANALYTICAL REPORT

Eurofins TestAmerica, Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Tel: (912)354-7858

Laboratory Job ID: 680-180452-1
Client Project/Site: LTM, AOC 57 Supplemental MW

For:
KOMAN Government Solutions, LLC
293 Boston Post Road West
Suite 100
Marlborough, Massachusetts 01752

Attn: Laurie Ekes

Authorized for release by:
2/24/2020 8:51:49 AM

Jerry Lanier, Project Manager I
(912)250-0281
jerry.lanier@testamericainc.com

LINKS

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Visit us at: www.testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

Table of Contents

Cover Page 1
Table of Contents 2
Case Narrative 3
Sample Summary 4
Method Summary 5
Definitions/Glossary 6
Client Sample Results 7
QC Sample Results 9
QC Association Summary 12
Lab Chronicle 14
Chain of Custody 16
Receipt Checklists 17
Certification Summary 18

Job ID: 680-180452-1

Laboratory: Eurofins TestAmerica, Savannah

Narrative

CASE NARRATIVE

Client: KOMAN Government Solutions, LLC

Project: LTM, AOC 57 Supplemental MW

Report Number: 680-180452-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

RECEIPT
The samples were received on 02/15/2020; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 3.7 C.

METALS (ICP) - DISSOLVED
Samples 57M-96-11X_FEB20 (680-180452-1), 57P-98-04X_FEB20 (680-180452-2), 5703MW-20-02A_FEB20 (680-180452-3), 57P-98-03X_FEB20 (680-180452-4) and 57M-96-12X_FEB20 (680-180452-5) were analyzed for Metals (ICP) - Dissolved in accordance with EPA SW-846 Method 6010C. The samples were prepared on 02/17/2020 and 02/18/2020 and analyzed on 02/20/2020 and 02/21/2020.

The presence of the '4' qualifier indicates analytes where the concentration in the unspiked sample exceeded four times the spiking amount.

Refer to the QC report for details.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

METALS (ICPMS) - DISSOLVED
Samples 57M-96-11X_FEB20 (680-180452-1), 57P-98-04X_FEB20 (680-180452-2), 5703MW-20-02A_FEB20 (680-180452-3), 57P-98-03X_FEB20 (680-180452-4) and 57M-96-12X_FEB20 (680-180452-5) were analyzed for Metals (ICPMS) - Dissolved in accordance with EPA SW-846 Method 6020A. The samples were prepared on 02/17/2020 and 02/18/2020 and analyzed on 02/19/2020.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Sample Summary

Client: KOMAN Government Solutions, LLC
Project/Site: LTM, AOC 57 Supplemental MW

Job ID: 680-180452-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
680-180452-1	57M-96-11X_FEB20	Water	02/13/20 10:12	02/15/20 10:00	
680-180452-2	57P-98-04X_FEB20	Water	02/13/20 13:35	02/15/20 10:00	
680-180452-3	5703MW-20-02A_FEB20	Water	02/13/20 08:40	02/15/20 10:00	
680-180452-4	57P-98-03X_FEB20	Water	02/13/20 13:00	02/15/20 10:00	
680-180452-5	57M-96-12X_FEB20	Water	02/13/20 14:55	02/15/20 10:00	

Method Summary

Client: KOMAN Government Solutions, LLC
Project/Site: LTM, AOC 57 Supplemental MW

Job ID: 680-180452-1

Method	Method Description	Protocol	Laboratory
6010C	Metals (ICP)	SW846	TAL SAV
6020A	Metals (ICP/MS)	SW846	TAL SAV
3005A	Preparation, Total Recoverable or Dissolved Metals	SW846	TAL SAV

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL SAV = Eurofins TestAmerica, Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

Qualifiers

Metals

Qualifier	Qualifier Description
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.
J	Estimated: The analyte was positively identified; the quantitation is an estimation
J1	Estimated: The quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Client Sample Results

Client: KOMAN Government Solutions, LLC
Project/Site: LTM, AOC 57 Supplemental MW

Job ID: 680-180452-1

Client Sample ID: 57M-96-11X_FEB20

Lab Sample ID: 680-180452-1
Date Collected: 02/13/20 10:12
Matrix: Water
Date Received: 02/15/20 10:00

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	31000		50	50	17	ug/L		02/20/20 18:22	1
Manganese	3300	J1	10	3.0	1.0	ug/L		02/20/20 18:22	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	67		3.0	3.0	1.5	ug/L		02/19/20 18:25	1

Client Sample ID: 57P-98-04X_FEB20

Lab Sample ID: 680-180452-2
Date Collected: 02/13/20 13:35
Matrix: Water
Date Received: 02/15/20 10:00

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	270		50	50	17	ug/L		02/21/20 02:54	1
Manganese	370		10	3.0	1.0	ug/L		02/21/20 02:54	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	3.0	U	3.0	3.0	1.5	ug/L		02/19/20 15:56	1

Client Sample ID: 5703MW-20-02A_FEB20

Lab Sample ID: 680-180452-3
Date Collected: 02/13/20 08:40
Matrix: Water
Date Received: 02/15/20 10:00

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	740		50	50	17	ug/L		02/21/20 02:58	1
Manganese	920		10	3.0	1.0	ug/L		02/21/20 02:58	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	2.2	J	3.0	3.0	1.5	ug/L		02/19/20 16:00	1

Client Sample ID: 57P-98-03X_FEB20

Lab Sample ID: 680-180452-4
Date Collected: 02/13/20 13:00
Matrix: Water
Date Received: 02/15/20 10:00

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	1400		50	50	17	ug/L		02/21/20 02:50	1
Manganese	11000		10	3.0	1.0	ug/L		02/21/20 02:50	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	3.3		3.0	3.0	1.5	ug/L		02/19/20 15:52	1

Client Sample Results

Client: KOMAN Government Solutions, LLC
Project/Site: LTM, AOC 57 Supplemental MW

Job ID: 680-180452-1

Client Sample ID: 57M-96-12X_FEB20

Lab Sample ID: 680-180452-5

Date Collected: 02/13/20 14:55

Matrix: Water

Date Received: 02/15/20 10:00

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	41	J	50	50	17	ug/L		02/20/20 18:42	1
Manganese	85		10	3.0	1.0	ug/L		02/20/20 18:42	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	3.0	U	3.0	3.0	1.5	ug/L		02/19/20 18:43	1

QC Sample Results

Client: KOMAN Government Solutions, LLC
Project/Site: LTM, AOC 57 Supplemental MW

Job ID: 680-180452-1

Method: 6010C - Metals (ICP)

Lab Sample ID: MB 680-607736/1-A — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total Recoverable**
Analysis Batch: 608286 — **Prep Batch: 607736**

Analyte	MB Result	MB Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	50	U	50	50	17	ug/L		02/21/20 02:00	1
Manganese	3.0	U	10	3.0	1.0	ug/L		02/21/20 02:00	1

Lab Sample ID: LCS 680-607736/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total Recoverable**
Analysis Batch: 608286 — **Prep Batch: 607736**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Iron	5010	5560		ug/L		111	87 - 115
Manganese	400	413		ug/L		103	90 - 114

Lab Sample ID: MB 680-607827/1-A — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total Recoverable**
Analysis Batch: 608286 — **Prep Batch: 607827**

Analyte	MB Result	MB Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	50	U	50	50	17	ug/L		02/20/20 18:05	1
Manganese	3.0	U	10	3.0	1.0	ug/L		02/20/20 18:05	1

Lab Sample ID: LCS 680-607827/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total Recoverable**
Analysis Batch: 608286 — **Prep Batch: 607827**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Iron	5010	5110		ug/L		102	87 - 115
Manganese	400	409		ug/L		102	90 - 114

Lab Sample ID: 680-180452-1 MS — **Client Sample ID: 57M-96-11X_FEB20**
Matrix: Water — **Prep Type: Dissolved**
Analysis Batch: 608286 — **Prep Batch: 607827**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Iron	31000		5010	35900	4	ug/L		101	87 - 115
Manganese	3300	J1	400	3650	4	ug/L		95	90 - 114

Lab Sample ID: 680-180452-1 MSD — **Client Sample ID: 57M-96-11X_FEB20**
Matrix: Water — **Prep Type: Dissolved**
Analysis Batch: 608286 — **Prep Batch: 607827**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Iron	31000		5010	36000	4	ug/L		103	87 - 115	0	20
Manganese	3300	J1	400	3680	4	ug/L		104	90 - 114	1	20

Lab Sample ID: 680-180452-5 MS — **Client Sample ID: 57M-96-12X_FEB20**
Matrix: Water — **Prep Type: Dissolved**
Analysis Batch: 608286 — **Prep Batch: 607827**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Iron	41	J	5010	5100		ug/L		101	87 - 115
Manganese	85		400	482		ug/L		99	90 - 114

QC Sample Results

Client: KOMAN Government Solutions, LLC
Project/Site: LTM, AOC 57 Supplemental MW

Job ID: 680-180452-1

Method: 6010C - Metals (ICP)

Lab Sample ID: 680-180452-5 MSD — **Client Sample ID: 57M-96-12X_FEB20**
Matrix: Water — **Prep Type: Dissolved**
Analysis Batch: 608286 — **Prep Batch: 607827**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Iron	41	J	5010	5060		ug/L		100	87 - 115	1	20
Manganese	85		400	483		ug/L		99	90 - 114	0	20

Method: 6020A - Metals (ICP/MS)

Lab Sample ID: MB 680-607734/1-A — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total Recoverable**
Analysis Batch: 608057 — **Prep Batch: 607734**

Analyte	MB Result	MB Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	3.0	U	3.0	3.0	1.5	ug/L		02/19/20 14:24	1

Lab Sample ID: LCS 680-607734/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total Recoverable**
Analysis Batch: 608057 — **Prep Batch: 607734**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	100	107		ug/L		107	84 - 116

Lab Sample ID: MB 680-607825/1-A — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total Recoverable**
Analysis Batch: 608057 — **Prep Batch: 607825**

Analyte	MB Result	MB Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	3.0	U	3.0	3.0	1.5	ug/L		02/19/20 18:17	1

Lab Sample ID: LCS 680-607825/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total Recoverable**
Analysis Batch: 608057 — **Prep Batch: 607825**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	100	106		ug/L		106	84 - 116

Lab Sample ID: 680-180452-1 MS — **Client Sample ID: 57M-96-11X_FEB20**
Matrix: Water — **Prep Type: Dissolved**
Analysis Batch: 608057 — **Prep Batch: 607825**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	67		100	173		ug/L		106	84 - 116

Lab Sample ID: 680-180452-1 MSD — **Client Sample ID: 57M-96-11X_FEB20**
Matrix: Water — **Prep Type: Dissolved**
Analysis Batch: 608057 — **Prep Batch: 607825**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Arsenic	67		100	177		ug/L		109	84 - 116	2	20

Method: 6020A - Metals (ICP/MS) (Continued)

Lab Sample ID: 680-180452-5 MS — **Client Sample ID: 57M-96-12X_FEB20**
Matrix: Water — **Prep Type: Dissolved**
Analysis Batch: 608057 — **Prep Batch: 607825**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Arsenic	3.0	U	100	107		ug/L		107	84 - 116		

Lab Sample ID: 680-180452-5 MSD — **Client Sample ID: 57M-96-12X_FEB20**
Matrix: Water — **Prep Type: Dissolved**
Analysis Batch: 608057 — **Prep Batch: 607825**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Arsenic	3.0	U	100	106		ug/L		106	84 - 116	1	20

QC Association Summary

Client: KOMAN Government Solutions, LLC
Project/Site: LTM, AOC 57 Supplemental MW

Job ID: 680-180452-1

Metals

Prep Batch: 607734

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-180452-2	57P-98-04X_FEB20	Dissolved	Water	3005A	
680-180452-3	5703MW-20-02A_FEB20	Dissolved	Water	3005A	
680-180452-4	57P-98-03X_FEB20	Dissolved	Water	3005A	
MB 680-607734/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 680-607734/2-A	Lab Control Sample	Total Recoverable	Water	3005A	

Prep Batch: 607736

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-180452-2	57P-98-04X_FEB20	Dissolved	Water	3005A	
680-180452-3	5703MW-20-02A_FEB20	Dissolved	Water	3005A	
680-180452-4	57P-98-03X_FEB20	Dissolved	Water	3005A	
MB 680-607736/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 680-607736/2-A	Lab Control Sample	Total Recoverable	Water	3005A	

Prep Batch: 607825

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-180452-1	57M-96-11X_FEB20	Dissolved	Water	3005A	
680-180452-5	57M-96-12X_FEB20	Dissolved	Water	3005A	
MB 680-607825/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 680-607825/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
680-180452-1 MS	57M-96-11X_FEB20	Dissolved	Water	3005A	
680-180452-1 MSD	57M-96-11X_FEB20	Dissolved	Water	3005A	
680-180452-5 MS	57M-96-12X_FEB20	Dissolved	Water	3005A	
680-180452-5 MSD	57M-96-12X_FEB20	Dissolved	Water	3005A	

Prep Batch: 607827

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-180452-1	57M-96-11X_FEB20	Dissolved	Water	3005A	
680-180452-5	57M-96-12X_FEB20	Dissolved	Water	3005A	
MB 680-607827/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 680-607827/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
680-180452-1 MS	57M-96-11X_FEB20	Dissolved	Water	3005A	
680-180452-1 MSD	57M-96-11X_FEB20	Dissolved	Water	3005A	
680-180452-5 MS	57M-96-12X_FEB20	Dissolved	Water	3005A	
680-180452-5 MSD	57M-96-12X_FEB20	Dissolved	Water	3005A	

Analysis Batch: 608057

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-180452-1	57M-96-11X_FEB20	Dissolved	Water	6020A	607825
680-180452-2	57P-98-04X_FEB20	Dissolved	Water	6020A	607734
680-180452-3	5703MW-20-02A_FEB20	Dissolved	Water	6020A	607734
680-180452-4	57P-98-03X_FEB20	Dissolved	Water	6020A	607734
680-180452-5	57M-96-12X_FEB20	Dissolved	Water	6020A	607825
MB 680-607734/1-A	Method Blank	Total Recoverable	Water	6020A	607734
MB 680-607825/1-A	Method Blank	Total Recoverable	Water	6020A	607825
LCS 680-607734/2-A	Lab Control Sample	Total Recoverable	Water	6020A	607734
LCS 680-607825/2-A	Lab Control Sample	Total Recoverable	Water	6020A	607825
680-180452-1 MS	57M-96-11X_FEB20	Dissolved	Water	6020A	607825
680-180452-1 MSD	57M-96-11X_FEB20	Dissolved	Water	6020A	607825
680-180452-5 MS	57M-96-12X_FEB20	Dissolved	Water	6020A	607825
680-180452-5 MSD	57M-96-12X_FEB20	Dissolved	Water	6020A	607825

QC Association Summary

Client: KOMAN Government Solutions, LLC
Project/Site: LTM, AOC 57 Supplemental MW

Job ID: 680-180452-1

Metals

Analysis Batch: 608286

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-180452-1	57M-96-11X_FEB20	Dissolved	Water	6010C	607827
680-180452-2	57P-98-04X_FEB20	Dissolved	Water	6010C	607736
680-180452-3	5703MW-20-02A_FEB20	Dissolved	Water	6010C	607736
680-180452-4	57P-98-03X_FEB20	Dissolved	Water	6010C	607736
680-180452-5	57M-96-12X_FEB20	Dissolved	Water	6010C	607827
MB 680-607736/1-A	Method Blank	Total Recoverable	Water	6010C	607736
MB 680-607827/1-A	Method Blank	Total Recoverable	Water	6010C	607827
LCS 680-607736/2-A	Lab Control Sample	Total Recoverable	Water	6010C	607736
LCS 680-607827/2-A	Lab Control Sample	Total Recoverable	Water	6010C	607827
680-180452-1 MS	57M-96-11X_FEB20	Dissolved	Water	6010C	607827
680-180452-1 MSD	57M-96-11X_FEB20	Dissolved	Water	6010C	607827
680-180452-5 MS	57M-96-12X_FEB20	Dissolved	Water	6010C	607827
680-180452-5 MSD	57M-96-12X_FEB20	Dissolved	Water	6010C	607827

Lab Chronicle

Client: KOMAN Government Solutions, LLC
Project/Site: LTM, AOC 57 Supplemental MW

Job ID: 680-180452-1

Client Sample ID: 57M-96-11X_FEB20

Lab Sample ID: 680-180452-1

Date Collected: 02/13/20 10:12

Matrix: Water

Date Received: 02/15/20 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	607827	02/18/20 12:43	AJR	TAL SAV
Dissolved	Analysis	6010C		1			608286	02/20/20 18:22	BCB	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	607825	02/18/20 12:43	AJR	TAL SAV
Dissolved	Analysis	6020A		1			608057	02/19/20 18:25	BWR	TAL SAV
	Instrument ID:	ICPMSC								

Client Sample ID: 57P-98-04X_FEB20

Lab Sample ID: 680-180452-2

Date Collected: 02/13/20 13:35

Matrix: Water

Date Received: 02/15/20 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	607736	02/17/20 15:25	AJR	TAL SAV
Dissolved	Analysis	6010C		1			608286	02/21/20 02:54	BCB	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	607734	02/17/20 15:25	AJR	TAL SAV
Dissolved	Analysis	6020A		1			608057	02/19/20 15:56	BWR	TAL SAV
	Instrument ID:	ICPMSC								

Client Sample ID: 5703MW-20-02A_FEB20

Lab Sample ID: 680-180452-3

Date Collected: 02/13/20 08:40

Matrix: Water

Date Received: 02/15/20 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	607736	02/17/20 15:25	AJR	TAL SAV
Dissolved	Analysis	6010C		1			608286	02/21/20 02:58	BCB	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	607734	02/17/20 15:25	AJR	TAL SAV
Dissolved	Analysis	6020A		1			608057	02/19/20 16:00	BWR	TAL SAV
	Instrument ID:	ICPMSC								

Client Sample ID: 57P-98-03X_FEB20

Lab Sample ID: 680-180452-4

Date Collected: 02/13/20 13:00

Matrix: Water

Date Received: 02/15/20 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	607736	02/17/20 15:25	AJR	TAL SAV
Dissolved	Analysis	6010C		1			608286	02/21/20 02:50	BCB	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	607734	02/17/20 15:25	AJR	TAL SAV
Dissolved	Analysis	6020A		1			608057	02/19/20 15:52	BWR	TAL SAV
	Instrument ID:	ICPMSC								

Lab Chronicle

Client: KOMAN Government Solutions, LLC
Project/Site: LTM, AOC 57 Supplemental MW

Job ID: 680-180452-1

Client Sample ID: 57M-96-12X_FEB20

Date Collected: 02/13/20 14:55
Date Received: 02/15/20 10:00

Lab Sample ID: 680-180452-5

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	607827	02/18/20 12:43	AJR	TAL SAV
Dissolved	Analysis	6010C		1			608286	02/20/20 18:42	BCB	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	607825	02/18/20 12:43	AJR	TAL SAV
Dissolved	Analysis	6020A		1			608057	02/19/20 18:43	BWR	TAL SAV
	Instrument ID:	ICPMSC								

Laboratory References:

TAL SAV = Eurofins TestAmerica, Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

CHAIN-OF-CUSTODY RECORD

KOMAN Government Services, LLC
Laurie Ekes
293 Boston Post Road West, Suite 100, Marlborough, MA 01752
(508) 508.366.7442, lekes@komangs.com

Boston #215

Boston #215

COC # AOC57_SUPP20

KGS

Project Name: Long Term Monitoring	Laboratory: TestAmerica Laboratories, Inc., Savannah, GA	Event: KOMAN, Long Term Monitoring, AOC 57 Supplemental MW Winter 2020
Project Number: DEVNS-LTM	POC: Jerry Lanier 912.354.7858 jerry.lanier@testamericainc.com	
WBS Code: Purchase Order 18-706	Ship to: 5102 LaRoche Avenue, Savannah, GA 31404	

Comments:
SW6010C/FLDFLT (B) = Fe Mn
SW6020A/FLDFLT = As

3X Sample volume from 57M-95-11X_FEB20 for MS/MSD

3x Sample Volume form 57M-96-12X_FEB20 for MS/MSD

Equipment:

Code	Matrix
WG	Ground Water

Code	Container/Preservative
9	1 x 250mL, plastic, HNO3, pH < 2; Cool < 4degC

Event: KOMAN, Long Term Monitoring, AOC 57 Supplemental MW

	Sample ID	Matrix	Date	Time	Samp Init.	SW6010C/FLDFLT (B)	SW6020A/FLDFLT (B)	Location ID	Sample Type	Depth (ft bgs) Top	Depth (ft bgs) Bottom	Comments	Cooler
1	57M-95-11x_FEB20	WG	2/13/2020	1012	CM	X	X		N1	0.00	0.00		1
2	57M-98-04x_FEB20	WG	2/13/2020	1335	CM	X	X		N1				
3	5703MW-20-02A_FEB20	WG	2-13-2020	0840	MS	X	X	5703MW-20-02A	N1				
4	57P-98-03X_FEB20	WG	2-13-2020	1300	MS	X	X	57P-98-03X	N1				
5	57M-96-12X_FEB20	WG	2-13-2020	1455	MS	X	X	57M-96-12X	N1				
6													
7													
8													
9													
10													
11													

680-180452 Chain of Custody

Relinquished by: *(Signature)*	Date	Time
[signature]	2/13/2020	
[signature]	2-13-2020	
[signature]	2-14-2020	1000

Received by: *(Signature)*	Date	Time
[signature]	2-14-20	1150
DW 3.3/3.7	2-15-2020	1000

Shipping Date / Carrier / Airbill Number

Received by Laboratory: *(Signature, Date, Time)* **& condition**

Login Sample Receipt Checklist

Client: KOMAN Government Solutions, LLC

Job Number: 680-180452-1

Login Number: 180452

List Source: Eurofins TestAmerica, Savannah

List Number: 1

Creator: Mooken, Darmal

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Accreditation/Certification Summary

Client: KOMAN Government Solutions, LLC
Project/Site: LTM, AOC 57 Supplemental MW

Job ID: 680-180452-1

Laboratory: Eurofins TestAmerica, Savannah

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
ANAB	Dept. of Defense ELAP	L2463	09-22-22

eurofins | Environment Testing TestAmerica

ANALYTICAL REPORT

Eurofins TestAmerica, Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Tel: (912)354-7858

Laboratory Job ID: 680-180592-1
Client Project/Site: LTM/AOC57 Supplement MW

For:
KOMAN Government Solutions, LLC
293 Boston Post Road West
Suite 100
Marlborough, Massachusetts 01752

Attn: Laurie Ekes

Authorized for release by:
2/26/2020 9:26:11 AM

Jerry Lanier, Project Manager I
(912)250-0281
jerry.lanier@testamericainc.com

LINKS

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The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

Table of Contents

Cover Page 1
Table of Contents 2
Sample Summary 3
Method Summary 4
Definitions/Glossary 5
Client Sample Results 6
QC Sample Results 7
QC Association Summary 8
Lab Chronicle 9
Chain of Custody 10
Receipt Checklists 11
Certification Summary 12

Sample Summary

Client: KOMAN Government Solutions, LLC
Project/Site: LTM/AOC57 Supplement MW

Job ID: 680-180592-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
680-180592-1	5703MW-20-01B_FEB20	Water	02/18/20 13:15	02/20/20 09:25	
680-180592-2	5703PZ-19-01_FEB20	Water	02/18/20 15:25	02/20/20 09:25	

Method Summary

Client: KOMAN Government Solutions, LLC
Project/Site: LTM/AOC57 Supplement MW

Job ID: 680-180592-1

Method	Method Description	Protocol	Laboratory
6010C	Metals (ICP)	SW846	TAL SAV
6020A	Metals (ICP/MS)	SW846	TAL SAV
3005A	Preparation, Total Recoverable or Dissolved Metals	SW846	TAL SAV

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL SAV = Eurofins TestAmerica, Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

Definitions/Glossary

Client: KOMAN Government Solutions, LLC
Project/Site: LTM/AOC57 Supplement MW

Job ID: 680-180592-1

Qualifiers

Metals

Qualifier	Qualifier Description
J	Estimated: The analyte was positively identified; the quantitation is an estimation
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Client Sample Results

Client: KOMAN Government Solutions, LLC
Project/Site: LTM/AOC57 Supplement MW

Job ID: 680-180592-1

Client Sample ID: 5703MW-20-01B_FEB20

Lab Sample ID: 680-180592-1

Date Collected: 02/18/20 13:15

Matrix: Water

Date Received: 02/20/20 09:25

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	83		50	50	17	ug/L		02/24/20 23:24	1
Manganese	1200		10	3.0	1.0	ug/L		02/24/20 23:24	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	11		3.0	3.0	1.5	ug/L		02/24/20 20:05	1

Client Sample ID: 5703PZ-19-01_FEB20

Lab Sample ID: 680-180592-2

Date Collected: 02/18/20 15:25

Matrix: Water

Date Received: 02/20/20 09:25

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	28	J	50	50	17	ug/L		02/24/20 23:28	1
Manganese	160		10	3.0	1.0	ug/L		02/24/20 23:28	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	64		3.0	3.0	1.5	ug/L		02/24/20 21:23	1

QC Sample Results

Client: KOMAN Government Solutions, LLC
Project/Site: LTM/AOC57 Supplement MW

Job ID: 680-180592-1

Method: 6010C - Metals (ICP)

Lab Sample ID: MB 680-608399/1-A
Matrix: Water
Analysis Batch: 608634

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 608399

Analyte	MB Result	MB Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	50	U	50	50	17	ug/L		02/24/20 22:41	1
Manganese	3.0	U	10	3.0	1.0	ug/L		02/24/20 22:41	1

Lab Sample ID: LCS 680-608399/2-A
Matrix: Water
Analysis Batch: 608634

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 608399

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Iron	5010	4910		ug/L		98	87 - 115
Manganese	400	401		ug/L		100	90 - 114

Method: 6020A - Metals (ICP/MS)

Lab Sample ID: MB 680-608397/1-A
Matrix: Water
Analysis Batch: 608614

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 608397

Analyte	MB Result	MB Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	3.0	U	3.0	3.0	1.5	ug/L		02/24/20 19:39	1

Lab Sample ID: LCS 680-608397/2-A
Matrix: Water
Analysis Batch: 608614

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 608397

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	100	109		ug/L		109	84 - 116

QC Association Summary

Client: KOMAN Government Solutions, LLC
Project/Site: LTM/AOC57 Supplement MW

Job ID: 680-180592-1

Metals

Prep Batch: 608397

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-180592-1	5703MW-20-01B_FEB20	Dissolved	Water	3005A	
680-180592-2	5703PZ-19-01_FEB20	Dissolved	Water	3005A	
MB 680-608397/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 680-608397/2-A	Lab Control Sample	Total Recoverable	Water	3005A	

Prep Batch: 608399

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-180592-1	5703MW-20-01B_FEB20	Dissolved	Water	3005A	
680-180592-2	5703PZ-19-01_FEB20	Dissolved	Water	3005A	
MB 680-608399/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 680-608399/2-A	Lab Control Sample	Total Recoverable	Water	3005A	

Analysis Batch: 608614

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-180592-1	5703MW-20-01B_FEB20	Dissolved	Water	6020A	608397
680-180592-2	5703PZ-19-01_FEB20	Dissolved	Water	6020A	608397
MB 680-608397/1-A	Method Blank	Total Recoverable	Water	6020A	608397
LCS 680-608397/2-A	Lab Control Sample	Total Recoverable	Water	6020A	608397

Analysis Batch: 608634

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-180592-1	5703MW-20-01B_FEB20	Dissolved	Water	6010C	608399
680-180592-2	5703PZ-19-01_FEB20	Dissolved	Water	6010C	608399
MB 680-608399/1-A	Method Blank	Total Recoverable	Water	6010C	608399
LCS 680-608399/2-A	Lab Control Sample	Total Recoverable	Water	6010C	608399

Lab Chronicle

Client: KOMAN Government Solutions, LLC
Project/Site: LTM/AOC57 Supplement MW

Job ID: 680-180592-1

Client Sample ID: 5703MW-20-01B_FEB20

Lab Sample ID: 680-180592-1

Date Collected: 02/18/20 13:15

Matrix: Water

Date Received: 02/20/20 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	608399	02/22/20 14:05	BJB	TAL SAV
Dissolved	Analysis	6010C		1			608634	02/24/20 23:24	BCB	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	608397	02/22/20 14:05	BJB	TAL SAV
Dissolved	Analysis	6020A		1			608614	02/24/20 20:05	BWR	TAL SAV
	Instrument ID:	ICPMSC								

Client Sample ID: 5703PZ-19-01_FEB20

Lab Sample ID: 680-180592-2

Date Collected: 02/18/20 15:25

Matrix: Water

Date Received: 02/20/20 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	608399	02/22/20 14:05	BJB	TAL SAV
Dissolved	Analysis	6010C		1			608634	02/24/20 23:28	BCB	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	608397	02/22/20 14:05	BJB	TAL SAV
Dissolved	Analysis	6020A		1			608614	02/24/20 21:23	BWR	TAL SAV
	Instrument ID:	ICPMSC								

Laboratory References:

TAL SAV = Eurofins TestAmerica, Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

Boston #215

CHAIN-OF-CUSTODY RECORD

KOMAN Government Services, LLC
Laurie Ekes
293 Boston Post Road West, Suite 100, Marlborough, MA 01752
(508) 508.366.7442, lekes@komangs.com

COC # AOC57_SUPP20

Boston KGS #215

Project Name: Long Term Monitoring	Laboratory: TestAmerica Laboratories, Inc., Savannah, GA	Event: KOMAN, Long Term Monitoring, AOC 57 Supplemental MW Winter 2020
Project Number: DEVNS-LTM	POC: Jerry Lanier 912.354.7858 jerry.lanier@testamericainc.com	
WBS Code: Purchase Order 18-706	Ship to: 5102 LaRoche Avenue, Savannah, GA 31404	

Comments:
SW6010C/FLDFLT (B) = Fe Mn
SW6020A/FLDFLT = As

Equipment:

Code	Matrix
WG	Ground Water

Code	Container/Preservative
9	1 x 250mL, plastic, HNO3, pH < 2; Cool < 4degC

Event: KOMAN, Long Term Monitoring, AOC 57 Supplemental MW

	Sample ID	Matrix	Date	Time	Samp Init.	SW6010C/FLDFLT (B)	SW6020A/FLDFLT (B)	Location ID	Sample Type	Depth (ft bgs) Top	Depth (ft bgs) Bottom	Comments	Cooler
						9	9						
1	5203MW-20-013_FEB20	WG	2-18-2020	1315	MS	X	X	5203MW20-013	N1	0.00	0.00		1
2	5203PZ-19-01_FEB20	WG	2-18-2020	1525	MS	X	X	5203PZ19-01	N1				
3													
4													
5													
6													
7													
8													
9													
10													
11													

680-180592 Chain of Custody

Relinquished by: *(Signature)*	Date	Time	Received by: *(Signature)*	Date	Time
	2-18-2020	1800		2/18/20	1800
	2/19/20	1500		2-19-20	1450
	2-19-20	1600	DM 4.1/4.5	2-20-2020	0925

Shipping Date / Carrier / Airbill Number

Received by Laboratory: *(Signature, Date, Time)* & condition

Login Sample Receipt Checklist

Client: KOMAN Government Solutions, LLC

Job Number: 680-180592-1

Login Number: 180592

List Source: Eurofins TestAmerica, Savannah

List Number: 1

Creator: Mooken, Darmal

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Accreditation/Certification Summary

Client: KOMAN Government Solutions, LLC
Project/Site: LTM/AOC57 Supplement MW

Job ID: 680-180592-1

Laboratory: Eurofins TestAmerica, Savannah

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
ANAB	Dept. of Defense ELAP	L2463	09-22-22

eurofins | Environment Testing TestAmerica

ANALYTICAL REPORT

Eurofins TestAmerica, Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Tel: (912)354-7858

Laboratory Job ID: 680-180685-1
Client Project/Site: LTM/ AOC57 Supplemental MW

For:
KOMAN Government Solutions, LLC
293 Boston Post Road West
Suite 100
Marlborough, Massachusetts 01752

Attn: Laurie Ekes

Authorized for release by:
2/27/2020 11:15:05 AM

Jerry Lanier, Project Manager I
(912)250-0281
jerry.lanier@testamericainc.com

LINKS

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The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

Table of Contents

Cover Page 1
Table of Contents 2
Case Narrative 3
Sample Summary 4
Method Summary 5
Definitions/Glossary 6
Client Sample Results 7
QC Sample Results 8
QC Association Summary 9
Lab Chronicle 10
Chain of Custody 11
Receipt Checklists 12
Certification Summary 13

Job ID: 680-180685-1

Laboratory: Eurofins TestAmerica, Savannah

Narrative

CASE NARRATIVE

Client: KOMAN Government Solutions, LLC

Project: LTM/ AOC57 Supplemental MW

Report Number: 680-180685-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

RECEIPT
The samples were received on 02/22/2020; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 4.2 C.

METALS (ICP) - DISSOLVED
Samples XGM-20-01A_FEB20 (680-180685-1), 436-MW-DUP01_FEB20 (680-180685-2), XGM-20-02A_FEB20 (680-180685-3) and XGM-20-03A_FEB20 (680-180685-4) were analyzed for Metals (ICP) - Dissolved in accordance with EPA SW-846 Method 6010C. The samples were prepared on 02/24/2020 and analyzed on 02/25/2020.

Manganese failed the recovery criteria low for the MS of sample XGM-20-03A_FEB20MS (680-180685-4) in batch 680-608799.

Manganese failed the recovery criteria high for the MSD of sample XGM-20-03A_FEB20MSD (680-180685-4) in batch 680-608799.

Refer to the QC report for details.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Sample Summary

Client: KOMAN Government Solutions, LLC
Project/Site: LTM/ AOC57 Supplemental MW

Job ID: 680-180685-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
680-180685-1	XGM-20-01A_FEB20	Water	02/21/20 08:30	02/22/20 10:05	
680-180685-2	436-MW-DUP01_FEB20	Water	02/21/20 08:35	02/22/20 10:05	
680-180685-3	XGM-20-02A_FEB20	Water	02/21/20 10:30	02/22/20 10:05	
680-180685-4	XGM-20-03A_FEB20	Water	02/21/20 13:00	02/22/20 10:05	

Method Summary

Client: KOMAN Government Solutions, LLC
Project/Site: LTM/ AOC57 Supplemental MW

Job ID: 680-180685-1

Method	Method Description	Protocol	Laboratory
6010C	Metals (ICP)	SW846	TAL SAV
3005A	Preparation, Total Recoverable or Dissolved Metals	SW846	TAL SAV

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL SAV = Eurofins TestAmerica, Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

Definitions/Glossary

Client: KOMAN Government Solutions, LLC
Project/Site: LTM/ AOC57 Supplemental MW

Job ID: 680-180685-1

Qualifiers

Metals

Qualifier	Qualifier Description
J	Estimated: The analyte was positively identified; the quantitation is an estimation
J1	Estimated: The quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Client Sample Results

Client: KOMAN Government Solutions, LLC
Project/Site: LTM/ AOC57 Supplemental MW

Job ID: 680-180685-1

Client Sample ID: XGM-20-01A_FEB20

Lab Sample ID: 680-180685-1
Date Collected: 02/21/20 08:30
Matrix: Water
Date Received: 02/22/20 10:05

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	50	U	50	50	17	ug/L		02/25/20 23:18	1
Manganese	**64**		10	3.0	1.0	ug/L		02/25/20 23:18	1

Client Sample ID: 436-MW-DUP01_FEB20

Lab Sample ID: 680-180685-2
Date Collected: 02/21/20 08:35
Matrix: Water
Date Received: 02/22/20 10:05

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	50	U	50	50	17	ug/L		02/25/20 23:14	1
Manganese	**70**		10	3.0	1.0	ug/L		02/25/20 23:14	1

Client Sample ID: XGM-20-02A_FEB20

Lab Sample ID: 680-180685-3
Date Collected: 02/21/20 10:30
Matrix: Water
Date Received: 02/22/20 10:05

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	**22**	**J**	50	50	17	ug/L		02/25/20 23:23	1
Manganese	**360**		10	3.0	1.0	ug/L		02/25/20 23:23	1

Client Sample ID: XGM-20-03A_FEB20

Lab Sample ID: 680-180685-4
Date Collected: 02/21/20 13:00
Matrix: Water
Date Received: 02/22/20 10:05

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	**210**		50	50	17	ug/L		02/25/20 22:50	1
Manganese	**400**	**J1**	10	3.0	1.0	ug/L		02/25/20 22:50	1

QC Sample Results

Client: KOMAN Government Solutions, LLC
Project/Site: LTM/ AOC57 Supplemental MW

Job ID: 680-180685-1

Method: 6010C - Metals (ICP)

Lab Sample ID: MB 680-608559/1-A
Matrix: Water
Analysis Batch: 608799

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 608559

Analyte	MB Result	MB Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	50	U	50	50	17	ug/L		02/25/20 22:31	1
Manganese	3.0	U	10	3.0	1.0	ug/L		02/25/20 22:31	1

Lab Sample ID: LCS 680-608559/2-A
Matrix: Water
Analysis Batch: 608799

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 608559

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Iron	5010	4670		ug/L		93	87 - 115
Manganese	400	375		ug/L		94	90 - 114

Lab Sample ID: 680-180685-4 MS
Matrix: Water
Analysis Batch: 608799

Client Sample ID: XGM-20-03A_FEB20
Prep Type: Dissolved
Prep Batch: 608559

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Iron	210		5010	4960		ug/L		95	87 - 115
Manganese	400	J1	400	756	J1	ug/L		89	90 - 114

Lab Sample ID: 680-180685-4 MSD
Matrix: Water
Analysis Batch: 608799

Client Sample ID: XGM-20-03A_FEB20
Prep Type: Dissolved
Prep Batch: 608559

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Iron	210		5010	5250		ug/L		101	87 - 115	6	20
Manganese	400	J1	400	896	J1	ug/L		124	90 - 114	17	20

QC Association Summary

Client: KOMAN Government Solutions, LLC
Project/Site: LTM/ AOC57 Supplemental MW

Job ID: 680-180685-1

Metals

Prep Batch: 608559

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-180685-1	XGM-20-01A_FEB20	Dissolved	Water	3005A	
680-180685-2	436-MW-DUP01_FEB20	Dissolved	Water	3005A	
680-180685-3	XGM-20-02A_FEB20	Dissolved	Water	3005A	
680-180685-4	XGM-20-03A_FEB20	Dissolved	Water	3005A	
MB 680-608559/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 680-608559/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
680-180685-4 MS	XGM-20-03A_FEB20	Dissolved	Water	3005A	
680-180685-4 MSD	XGM-20-03A_FEB20	Dissolved	Water	3005A	

Analysis Batch: 608799

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-180685-1	XGM-20-01A_FEB20	Dissolved	Water	6010C	608559
680-180685-2	436-MW-DUP01_FEB20	Dissolved	Water	6010C	608559
680-180685-3	XGM-20-02A_FEB20	Dissolved	Water	6010C	608559
680-180685-4	XGM-20-03A_FEB20	Dissolved	Water	6010C	608559
MB 680-608559/1-A	Method Blank	Total Recoverable	Water	6010C	608559
LCS 680-608559/2-A	Lab Control Sample	Total Recoverable	Water	6010C	608559
680-180685-4 MS	XGM-20-03A_FEB20	Dissolved	Water	6010C	608559
680-180685-4 MSD	XGM-20-03A_FEB20	Dissolved	Water	6010C	608559

Lab Chronicle

Client: KOMAN Government Solutions, LLC
Project/Site: LTM/ AOC57 Supplemental MW

Job ID: 680-180685-1

Client Sample ID: XGM-20-01A_FEB20 — Lab Sample ID: 680-180685-1

Date Collected: 02/21/20 08:30 — **Matrix: Water**
Date Received: 02/22/20 10:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	608559	02/24/20 14:27	BCB	TAL SAV
Dissolved	Analysis	6010C		1			608799	02/25/20 23:18	BCB	TAL SAV
	Instrument ID:	ICPE								

Client Sample ID: 436-MW-DUP01_FEB20 — Lab Sample ID: 680-180685-2

Date Collected: 02/21/20 08:35 — **Matrix: Water**
Date Received: 02/22/20 10:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	608559	02/24/20 14:27	BCB	TAL SAV
Dissolved	Analysis	6010C		1			608799	02/25/20 23:14	BCB	TAL SAV
	Instrument ID:	ICPE								

Client Sample ID: XGM-20-02A_FEB20 — Lab Sample ID: 680-180685-3

Date Collected: 02/21/20 10:30 — **Matrix: Water**
Date Received: 02/22/20 10:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	608559	02/24/20 14:27	BCB	TAL SAV
Dissolved	Analysis	6010C		1			608799	02/25/20 23:23	BCB	TAL SAV
	Instrument ID:	ICPE								

Client Sample ID: XGM-20-03A_FEB20 — Lab Sample ID: 680-180685-4

Date Collected: 02/21/20 13:00 — **Matrix: Water**
Date Received: 02/22/20 10:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	608559	02/24/20 14:27	BCB	TAL SAV
Dissolved	Analysis	6010C		1			608799	02/25/20 22:50	BCB	TAL SAV
	Instrument ID:	ICPE								

Laboratory References:

TAL SAV = Eurofins TestAmerica, Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

Boston #215 Boston #215

CHAIN-OF-CUSTODY RECORD

KOMAN Government Services, LLC
Laurie Ekes
293 Boston Post Road West, Suite 100, Marlborough, MA 01752
(508) 508.366.7442, lekes@komangs.com

COC # AOC57_SUPP20

KGS

Project Name: Long Term Monitoring	Laboratory: TestAmerica Laboratories, Inc., Savannah, GA	Event: KOMAN, Long Term Monitoring, AOC 57 Supplemental MW Winter 2020
Project Number: DEVNS-LTM	POC: Jerry Lanier 912.354.7858 jerry.lanier@testamericainc.com	
WBS Code: Purchase Order 18-706	Ship to: 5102 LaRoche Avenue, Savannah, GA 31404	

Comments:
SW6010C/FLDFLT (B) = Fe Mn
SW6020A/FLDFLT = As
3X Sample volume from XGM-20-03A_FEB20 for MS/MSD

Equipment:

Code	Matrix
WG	Ground Water

Code	Container/Preservative
9	1 x 250mL, plastic, HNO3, pH < 2; Cool < 4degC

Event: KOMAN, Long Term Monitoring, AOC 57 Supplemental MW

	Sample ID	Matrix	Date	Time	Samp Init.	SW6010C/FLDFLT (B)	SW6020A/FLDFLT (B)	Location ID	Sample Type	Depth (ft bgs) Top	Depth (ft bgs) Bottom	Comments	Cooler
1	XGM-20-01A_FEB20	WG	2-21-2020	0830	MS	X	~~X~~	XGM-20-01A_FEB20	N1	0.00	0.00	no SW6020A	1
2	43GMW-DUPOI_FEB20	WG	2-21-2020	0835	MS	X		XGM-20-01A	N1				
3	XGM-20-02A_FEB20	WG	2-21-2020	1030	MS	X		XGM-20-02A	N1				
4	XGM-20-03A_FEB20	WG	2-21-2020	1300	MS	X		XGM-20-03A	N1				
5													
6													
7													
8													
9													
10													
11													

680-180685 Chain of Custody

Relinquished by: *(Signature)*	Date	Time	Received by: *(Signature)*	Date	Time
[signature]	2-21-2020	1510	[signature]	2-21-20	1510
[signature]	2-21-20	1600			

Shipping Date / Carrier / Airbill Number

Received by Laboratory: *(Signature, Date, Time)* **& condition**

[signature] 2.22-20 1005 3.8/42

TM

Page 1 of 2

Login Sample Receipt Checklist

Client: KOMAN Government Solutions, LLC

Job Number: 680-180685-1

Login Number: 180685
List Number: 1
Creator: Sims, Robert D

List Source: Eurofins TestAmerica, Savannah

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Accreditation/Certification Summary

Client: KOMAN Government Solutions, LLC
Project/Site: LTM/ AOC57 Supplemental MW

Job ID: 680-180685-1

Laboratory: Eurofins TestAmerica, Savannah

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
ANAB	Dept. of Defense ELAP	L2463	09-22-22

eurofins | Environment Testing TestAmerica

ANALYTICAL REPORT

Eurofins TestAmerica, Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Tel: (912)354-7858

Laboratory Job ID: 680-180846-1
Client Project/Site: LTM/AOC 57 Supplemental MW

For:
KOMAN Government Solutions, LLC
293 Boston Post Road West
Suite 100
Marlborough, Massachusetts 01752

Attn: Laurie Ekes

Authorized for release by:
3/5/2020 8:24:21 AM

Jerry Lanier, Project Manager I
(912)250-0281
jerry.lanier@testamericainc.com

LINKS

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

Table of Contents

Cover Page 1
Table of Contents 2
Case Narrative 3
Sample Summary 4
Method Summary 5
Definitions/Glossary 6
Client Sample Results 7
QC Sample Results 8
QC Association Summary 9
Lab Chronicle 10
Chain of Custody 11
Receipt Checklists 12
Certification Summary 13

Job ID: 680-180846-1

Laboratory: Eurofins TestAmerica, Savannah

Narrative

CASE NARRATIVE

Client: KOMAN Government Solutions, LLC

Project: LTM/AOC 57 Supplemental MW

Report Number: 680-180846-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

RECEIPT
The samples were received on 02/27/2020; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 3.7 C.

METALS (ICP) - DISSOLVED
Samples 43GPZ-19-03_FEB20 (680-180846-1), 5702MW-20-03A_FEB20 (680-180846-2) and 5702MW-20-05A_FEB20 (680-180846-3) were analyzed for Metals (ICP) - Dissolved in accordance with EPA SW-846 Method 6010C. The samples were prepared on 03/02/2020 and analyzed on 03/04/2020.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

METALS (ICPMS) - DISSOLVED
Samples 5702MW-20-03A_FEB20 (680-180846-2) and 5702MW-20-05A_FEB20 (680-180846-3) were analyzed for Metals (ICPMS) - Dissolved in accordance with EPA SW-846 Method 6020A. The samples were prepared and analyzed on 03/02/2020.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Sample Summary

Client: KOMAN Government Solutions, LLC
Project/Site: LTM/AOC 57 Supplemental MW

Job ID: 680-180846-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
680-180846-1	43GPZ-19-03_FEB20	Water	02/24/20 08:25	02/27/20 09:10	
680-180846-2	5702MW-20-03A_FEB20	Water	02/24/20 10:10	02/27/20 09:10	
680-180846-3	5702MW-20-05A_FEB20	Water	02/24/20 11:40	02/27/20 09:10	

Method Summary

Client: KOMAN Government Solutions, LLC
Project/Site: LTM/AOC 57 Supplemental MW

Job ID: 680-180846-1

Method	Method Description	Protocol	Laboratory
6010C	Metals (ICP)	SW846	TAL SAV
6020A	Metals (ICP/MS)	SW846	TAL SAV
3005A	Preparation, Total Recoverable or Dissolved Metals	SW846	TAL SAV

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL SAV = Eurofins TestAmerica, Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

Definitions/Glossary

Client: KOMAN Government Solutions, LLC
Project/Site: LTM/AOC 57 Supplemental MW

Job ID: 680-180846-1

Qualifiers

Metals

Qualifier	Qualifier Description
J	Estimated: The analyte was positively identified; the quantitation is an estimation
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Client Sample Results

Client: KOMAN Government Solutions, LLC
Project/Site: LTM/AOC 57 Supplemental MW

Job ID: 680-180846-1

Client Sample ID: 43GPZ-19-03_FEB20

Lab Sample ID: 680-180846-1
Date Collected: 02/24/20 08:25
Matrix: Water
Date Received: 02/27/20 09:10

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	50	U	50	50	17	ug/L		03/04/20 00:58	1
Manganese	**1.5**	**J**	10	3.0	1.0	ug/L		03/04/20 00:58	1

Client Sample ID: 5702MW-20-03A_FEB20

Lab Sample ID: 680-180846-2
Date Collected: 02/24/20 10:10
Matrix: Water
Date Received: 02/27/20 09:10

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	50	U	50	50	17	ug/L		03/04/20 01:11	1
Manganese	**490**		10	3.0	1.0	ug/L		03/04/20 01:11	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	**1.8**	**J**	3.0	3.0	1.5	ug/L		03/02/20 19:16	1

Client Sample ID: 5702MW-20-05A_FEB20

Lab Sample ID: 680-180846-3
Date Collected: 02/24/20 11:40
Matrix: Water
Date Received: 02/27/20 09:10

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	50	U	50	50	17	ug/L		03/04/20 00:48	1
Manganese	**600**		10	3.0	1.0	ug/L		03/04/20 00:48	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	3.0	U	3.0	3.0	1.5	ug/L		03/02/20 19:13	1

QC Sample Results

Client: KOMAN Government Solutions, LLC
Project/Site: LTM/AOC 57 Supplemental MW

Job ID: 680-180846-1

Method: 6010C - Metals (ICP)

Lab Sample ID: MB 680-609352/1-A
Matrix: Water
Analysis Batch: 609695

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 609352

Analyte	MB Result	MB Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	50	U	50	50	17	ug/L		03/03/20 23:48	1
Manganese	3.0	U	10	3.0	1.0	ug/L		03/03/20 23:48	1

Lab Sample ID: LCS 680-609352/2-A
Matrix: Water
Analysis Batch: 609695

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 609352

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Iron	5010	4930		ug/L		98	87 - 115
Manganese	400	400		ug/L		100	90 - 114

Method: 6020A - Metals (ICP/MS)

Lab Sample ID: MB 680-609350/1-A
Matrix: Water
Analysis Batch: 609447

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 609350

Analyte	MB Result	MB Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	3.0	U	3.0	3.0	1.5	ug/L		03/02/20 18:43	1

Lab Sample ID: LCS 680-609350/2-A
Matrix: Water
Analysis Batch: 609447

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 609350

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	100	107		ug/L		107	84 - 116

QC Association Summary

Client: KOMAN Government Solutions, LLC
Project/Site: LTM/AOC 57 Supplemental MW

Job ID: 680-180846-1

Metals

Prep Batch: 609350

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-180846-2	5702MW-20-03A_FEB20	Dissolved	Water	3005A	
680-180846-3	5702MW-20-05A_FEB20	Dissolved	Water	3005A	
MB 680-609350/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 680-609350/2-A	Lab Control Sample	Total Recoverable	Water	3005A	

Prep Batch: 609352

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-180846-1	43GPZ-19-03_FEB20	Dissolved	Water	3005A	
680-180846-2	5702MW-20-03A_FEB20	Dissolved	Water	3005A	
680-180846-3	5702MW-20-05A_FEB20	Dissolved	Water	3005A	
MB 680-609352/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 680-609352/2-A	Lab Control Sample	Total Recoverable	Water	3005A	

Analysis Batch: 609447

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-180846-2	5702MW-20-03A_FEB20	Dissolved	Water	6020A	609350
680-180846-3	5702MW-20-05A_FEB20	Dissolved	Water	6020A	609350
MB 680-609350/1-A	Method Blank	Total Recoverable	Water	6020A	609350
LCS 680-609350/2-A	Lab Control Sample	Total Recoverable	Water	6020A	609350

Analysis Batch: 609695

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-180846-1	43GPZ-19-03_FEB20	Dissolved	Water	6010C	609352
680-180846-2	5702MW-20-03A_FEB20	Dissolved	Water	6010C	609352
680-180846-3	5702MW-20-05A_FEB20	Dissolved	Water	6010C	609352
MB 680-609352/1-A	Method Blank	Total Recoverable	Water	6010C	609352
LCS 680-609352/2-A	Lab Control Sample	Total Recoverable	Water	6010C	609352

Lab Chronicle

Client: KOMAN Government Solutions, LLC
Project/Site: LTM/AOC 57 Supplemental MW

Job ID: 680-180846-1

Client Sample ID: 43GPZ-19-03_FEB20

Lab Sample ID: 680-180846-1

Date Collected: 02/24/20 08:25

Matrix: Water

Date Received: 02/27/20 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	609352	03/02/20 10:36	AJR	TAL SAV
Dissolved	Analysis	6010C		1			609695	03/04/20 00:58	BCB	TAL SAV
	Instrument ID:	ICPE								

Client Sample ID: 5702MW-20-03A_FEB20

Lab Sample ID: 680-180846-2

Date Collected: 02/24/20 10:10

Matrix: Water

Date Received: 02/27/20 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	609352	03/02/20 10:36	AJR	TAL SAV
Dissolved	Analysis	6010C		1			609695	03/04/20 01:11	BCB	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	609350	03/02/20 10:36	AJR	TAL SAV
Dissolved	Analysis	6020A		1			609447	03/02/20 19:16	BWR	TAL SAV
	Instrument ID:	ICPMSC								

Client Sample ID: 5702MW-20-05A_FEB20

Lab Sample ID: 680-180846-3

Date Collected: 02/24/20 11:40

Matrix: Water

Date Received: 02/27/20 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	609352	03/02/20 10:36	AJR	TAL SAV
Dissolved	Analysis	6010C		1			609695	03/04/20 00:48	BCB	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	609350	03/02/20 10:36	AJR	TAL SAV
Dissolved	Analysis	6020A		1			609447	03/02/20 19:13	BWR	TAL SAV
	Instrument ID:	ICPMSC								

Laboratory References:

TAL SAV = Eurofins TestAmerica, Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

CHAIN-OF-CUSTODY RECORD

KOMAN Government Services, LLC
Laurie Ekes
293 Boston Post Road West, Suite 100, Marlborough, MA 01752
(508) 508.366.7442, lekes@komangs.com

COC # AOC57_SUPP20

KGS

Project Name: Long Term Monitoring	Laboratory: TestAmerica Laboratories, Inc., Savannah, GA	Event: KOMAN, Long Term Monitoring, AOC 57 Supplemental MW Winter 2020
Project Number: DEVNS-LTM	POC: Jerry Lanier 912.354.7858 jerry.lanier@testamericainc.com	
WBS Code: Purchase Order 18-706	Ship to: 5102 LaRoche Avenue, Savannah, GA 31404	

Comments:
SW6010C/FLDFLT (B) = Fe Mn
SW6020A/FLDFLT = As

Equipment:

Code	Matrix
WG	Ground Water

Code	Container/Preservative
9	1 x 250mL, plastic, HNO3, pH < 2; Cool < 4degC

Event: KOMAN, Long Term Monitoring, AOC 57 Supplemental MW

	Sample ID	Matrix	Date	Time	Samp Init.	SW6010C/FLDFLT (B)	SW6020A/FLDFLT (B)	Location ID	Sample Type	Depth (ft bgs) Top	Depth (ft bgs) Bottom	Comments	Cooler
1	43GPZ-19-03_FEB20	WG	2-24-2020	0825	MS	X	X	43GPZ-19-03	N1	0.00	0.00	no SW6020A	1
2	5702MW-20-03A_FEB20	WG	2-24-2020	1010	MS	X	X	5702MW-20-03A	N1				
3	5702MW-20-05A_FEB20	WG	2-24-2020	1140	MS	X	X	5702MW-20-05A	N1				
4	5702MW-20-05B_FEB20	WG	2-24-2020	1435	MS	X	X	5702MW-20-05B	N1				
5													
6													
7													
8													
9													
10													
11													

680-180846 Chain of Custody

Relinquished by: *(Signature)*	Date	Time
[signature]	2-24-2020	1630
[signature]	2/26/20	1300
[signature]	2-26-20	[illegible]

Received by: *(Signature)*	Date	Time
[signature]	2/26/20	1200
[signature]	2-26-20	1300
[signature] 3.3/3.7	2-27-2020	0910

Shipping Date / Carrier

Received by Laboratory: *(Signature, Date, Time)* **& condition**

[signature] 3.3/3.7 2-27-2020/0910

Login Sample Receipt Checklist

Client: KOMAN Government Solutions, LLC

Job Number: 680-180846-1

Login Number: 180846

List Source: Eurofins TestAmerica, Savannah

List Number: 1

Creator: Mooken, Darmal

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Accreditation/Certification Summary

Client: KOMAN Government Solutions, LLC
Project/Site: LTM/AOC 57 Supplemental MW

Job ID: 680-180846-1

Laboratory: Eurofins TestAmerica, Savannah

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
ANAB	Dept. of Defense ELAP	L2463	09-22-22

eurofins | Environment Testing TestAmerica

ANALYTICAL REPORT

Eurofins TestAmerica, Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Tel: (912)354-7858

Laboratory Job ID: 680-180950-1
Client Project/Site: LTM/AOC 57 Supplemental MW

For:
KOMAN Government Solutions, LLC
293 Boston Post Road West
Suite 100
Marlborough, Massachusetts 01752

Attn: Laurie Ekes

Authorized for release by:
3/9/2020 8:42:44 AM

Jerry Lanier, Project Manager I
(912)250-0281
jerry.lanier@testamericainc.com

LINKS

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The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

Table of Contents

Cover Page 1
Table of Contents 2
Case Narrative 3
Sample Summary 4
Method Summary 5
Definitions/Glossary 6
Client Sample Results 7
QC Sample Results 8
QC Association Summary 10
Lab Chronicle 11
Chain of Custody 12
Receipt Checklists 13
Certification Summary 14

Job ID: 680-180950-1

Laboratory: Eurofins TestAmerica, Savannah

Narrative

CASE NARRATIVE

Client: KOMAN Government Solutions, LLC

Project: LTM/AOC 57 Supplemental MW

Report Number: 680-180950-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

RECEIPT
The samples were received on 02/29/2020; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 2.2 C.

METALS (ICP) - DISSOLVED
Sample 5702MW-20-05B_FEB20 (680-180950-1) was analyzed for Metals (ICP) - Dissolved in accordance with EPA SW-846 Method 6010C. The samples were prepared on 03/04/2020 and analyzed on 03/05/2020.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

METALS (ICPMS) - DISSOLVED
Sample 5702MW-20-05B_FEB20 (680-180950-1) was analyzed for Metals (ICPMS) - Dissolved in accordance with EPA SW-846 Method 6020A. The samples were prepared and analyzed on 03/04/2020.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Sample Summary

Client: KOMAN Government Solutions, LLC
Project/Site: LTM/AOC 57 Supplemental MW

Job ID: 680-180950-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
680-180950-1	5702MW-20-05B_FEB20	WG	02/28/20 09:10	02/29/20 09:25	

Method Summary

Client: KOMAN Government Solutions, LLC
Project/Site: LTM/AOC 57 Supplemental MW

Job ID: 680-180950-1

Method	Method Description	Protocol	Laboratory
6010C	Metals (ICP)	SW846	TAL SAV
6020A	Metals (ICP/MS)	SW846	TAL SAV
3005A	Preparation, Total Recoverable or Dissolved Metals	SW846	TAL SAV

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL SAV = Eurofins TestAmerica, Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

Definitions/Glossary

Client: KOMAN Government Solutions, LLC
Project/Site: LTM/AOC 57 Supplemental MW

Job ID: 680-180950-1

Qualifiers

Metals

Qualifier	Qualifier Description
J	Estimated: The analyte was positively identified; the quantitation is an estimation
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Client Sample Results

Client: KOMAN Government Solutions, LLC
Project/Site: LTM/AOC 57 Supplemental MW

Job ID: 680-180950-1

Client Sample ID: 5702MW-20-05B_FEB20

Lab Sample ID: 680-180950-1

Date Collected: 02/28/20 09:10

Matrix: WG

Date Received: 02/29/20 09:25

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	37	J	50	50	17	ug/L		03/05/20 22:08	1
Manganese	100		10	3.0	1.0	ug/L		03/05/20 22:08	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	7.0		3.0	3.0	1.5	ug/L		03/04/20 15:26	1

QC Sample Results

Client: KOMAN Government Solutions, LLC
Project/Site: LTM/AOC 57 Supplemental MW

Job ID: 680-180950-1

Method: 6010C - Metals (ICP)

Lab Sample ID: MB 680-609619/1-A — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total Recoverable**
Analysis Batch: 610002 — **Prep Batch: 609619**

Analyte	MB Result	MB Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	50	U	50	50	17	ug/L		03/05/20 21:59	1
Manganese	3.0	U	10	3.0	1.0	ug/L		03/05/20 21:59	1

Lab Sample ID: LCS 680-609619/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total Recoverable**
Analysis Batch: 610002 — **Prep Batch: 609619**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Iron	5010	5110		ug/L		102	87 - 115
Manganese	400	407		ug/L		102	90 - 114

Lab Sample ID: 680-180950-1 MS — **Client Sample ID: 5702MW-20-05B_FEB20**
Matrix: WG — **Prep Type: Dissolved**
Analysis Batch: 610002 — **Prep Batch: 609619**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Iron	37	J	5010	5220		ug/L		103	87 - 115
Manganese	100		400	491		ug/L		97	90 - 114

Lab Sample ID: 680-180950-1 MSD — **Client Sample ID: 5702MW-20-05B_FEB20**
Matrix: WG — **Prep Type: Dissolved**
Analysis Batch: 610002 — **Prep Batch: 609619**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Iron	37	J	5010	4910		ug/L		97	87 - 115	6	20
Manganese	100		400	484		ug/L		95	90 - 114	2	20

Method: 6020A - Metals (ICP/MS)

Lab Sample ID: MB 680-609617/1-A — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total Recoverable**
Analysis Batch: 609742 — **Prep Batch: 609617**

Analyte	MB Result	MB Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	3.0	U	3.0	3.0	1.5	ug/L		03/04/20 15:19	1

Lab Sample ID: LCS 680-609617/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total Recoverable**
Analysis Batch: 609742 — **Prep Batch: 609617**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	100	98.9		ug/L		99	84 - 116

Lab Sample ID: 680-180950-1 MS — **Client Sample ID: 5702MW-20-05B_FEB20**
Matrix: WG — **Prep Type: Dissolved**
Analysis Batch: 609742 — **Prep Batch: 609617**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	7.0		100	113		ug/L		106	84 - 116

Method: 6020A - Metals (ICP/MS) (Continued)

Lab Sample ID: 680-180950-1 MSD
Matrix: WG
Analysis Batch: 609742

Client Sample ID: 5702MW-20-05B_FEB20
Prep Type: Dissolved
Prep Batch: 609617

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Arsenic	7.0		100	106		ug/L		99	84 - 116	7	20

QC Association Summary

Client: KOMAN Government Solutions, LLC
Project/Site: LTM/AOC 57 Supplemental MW

Job ID: 680-180950-1

Metals

Prep Batch: 609617

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-180950-1	5702MW-20-05B_FEB20	Dissolved	WG	3005A	
MB 680-609617/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 680-609617/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
680-180950-1 MS	5702MW-20-05B_FEB20	Dissolved	WG	3005A	
680-180950-1 MSD	5702MW-20-05B_FEB20	Dissolved	WG	3005A	

Prep Batch: 609619

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-180950-1	5702MW-20-05B_FEB20	Dissolved	WG	3005A	
MB 680-609619/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 680-609619/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
680-180950-1 MS	5702MW-20-05B_FEB20	Dissolved	WG	3005A	
680-180950-1 MSD	5702MW-20-05B_FEB20	Dissolved	WG	3005A	

Analysis Batch: 609742

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-180950-1	5702MW-20-05B_FEB20	Dissolved	WG	6020A	609617
MB 680-609617/1-A	Method Blank	Total Recoverable	Water	6020A	609617
LCS 680-609617/2-A	Lab Control Sample	Total Recoverable	Water	6020A	609617
680-180950-1 MS	5702MW-20-05B_FEB20	Dissolved	WG	6020A	609617
680-180950-1 MSD	5702MW-20-05B_FEB20	Dissolved	WG	6020A	609617

Analysis Batch: 610002

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-180950-1	5702MW-20-05B_FEB20	Dissolved	WG	6010C	609619
MB 680-609619/1-A	Method Blank	Total Recoverable	Water	6010C	609619
LCS 680-609619/2-A	Lab Control Sample	Total Recoverable	Water	6010C	609619
680-180950-1 MS	5702MW-20-05B_FEB20	Dissolved	WG	6010C	609619
680-180950-1 MSD	5702MW-20-05B_FEB20	Dissolved	WG	6010C	609619

Lab Chronicle

Client: KOMAN Government Solutions, LLC
Project/Site: LTM/AOC 57 Supplemental MW

Job ID: 680-180950-1

Client Sample ID: 5702MW-20-05B_FEB20

Lab Sample ID: 680-180950-1

Date Collected: 02/28/20 09:10

Matrix: WG

Date Received: 02/29/20 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	609619	03/04/20 10:06	AJR	TAL SAV
Dissolved	Analysis	6010C		1			610002	03/05/20 22:08	BCB	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	609617	03/04/20 10:06	AJR	TAL SAV
Dissolved	Analysis	6020A		1			609742	03/04/20 15:26	BWR	TAL SAV
	Instrument ID:	ICPMSC								

Laboratory References:

TAL SAV = Eurofins TestAmerica, Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

CHAIN-OF-CUSTODY RECORD

KOMAN Government Services, LLC
Laurie Ekes
293 Boston Post Road West, Suite 100, Marlborough, MA 01752
(508) 508.366.7442, lekes@komangs.com

COC # AOC57_SUPP20

KGS

Project Name: Long Term Monitoring	Laboratory: TestAmerica Laboratories, Inc., Savannah, GA	Event: KOMAN, Long Term Monitoring, AOC 57 Supplemental MW Winter 2020
Project Number: DEVNS-LTM	POC: Jerry Lanier 912.354.7858 jerry.lanier@testamericainc.com	
WBS Code: Purchase Order 18-706	Ship to: 5102 LaRoche Avenue, Savannah, GA 31404	

Comments:
SW6010C/FLDFLT (B) = Fe Mn
SW6020A/FLDFLT = As

Equipment:

Code	Matrix
WG	Ground Water

Code	Container/Preservative
9	1 x 250mL, plastic, HNO3, pH < 2; Cool < 4degC

Boston #215

	Sample ID	Matrix	Date	Time	Samp Init.	SW6010C/FLDFLT (B)	SW6020A/FLDFLT (B)	Location ID	Sample Type	Depth (ft bgs) Top	Depth (ft bgs) Bottom	Comments	Cooler
	Event: KOMAN, Long Term Monitoring, AOC 57 Supplemental MW					9	9						
1	S702MW-20-05B-FEB20	WG	2/28/20	0910	BJA	X	X	S702MW-20-05B	N1	0.00	0.00	MS/MSD	1
2													
3													
4													
5													
6													
7													
8													
9													
10													
11													

680-180950 Chain of Custody

Relinquished by: *(Signature)*	Date	Time
[signature]	2/28/20	1400
[signature]	2/28/20	1450
[signature]	2/29/20	1612

Received by: *(Signature)*	Date	Time
[signature]	2/28/20	1400
[signature]	2/28/20	14.5

Shipping Date / Carrier / Airbill Number

Received by Laboratory: *(Signature, Date, Time)* & condition
[signature] 2-29-20 925 1.8/22

Page 1 of 2

Login Sample Receipt Checklist

Client: KOMAN Government Solutions, LLC

Job Number: 680-180950-1

Login Number: 180950

List Source: Eurofins TestAmerica, Savannah

List Number: 1

Creator: Sims, Robert D

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Accreditation/Certification Summary

Client: KOMAN Government Solutions, LLC
Project/Site: LTM/AOC 57 Supplemental MW

Job ID: 680-180950-1

Laboratory: Eurofins TestAmerica, Savannah

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
ANAB	Dept. of Defense ELAP	L2463	09-22-22

eurofins | Environment Testing TestAmerica

ANALYTICAL REPORT

Eurofins TestAmerica, Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Tel: (912)354-7858

Laboratory Job ID: 680-181275-1
Client Project/Site: Fort Devens Army Installation

For:
KOMAN Government Solutions, LLC
293 Boston Post Road West
Suite 100
Marlborough, Massachusetts 01752

Attn: Laurie Ekes

Authorized for release by:
3/11/2020 3:07:57 PM

Jerry Lanier, Project Manager I
(912)250-0281
jerry.lanier@testamericainc.com

LINKS

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The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

Table of Contents

Cover Page 1
Table of Contents 2
Case Narrative 3
Sample Summary 4
Method Summary 5
Definitions/Glossary 6
Client Sample Results 7
QC Sample Results 8
QC Association Summary 9
Lab Chronicle 10
Chain of Custody 11
Receipt Checklists 12
Certification Summary 13

Job ID: 680-181275-1

Laboratory: Eurofins TestAmerica, Savannah

Narrative

CASE NARRATIVE

Client: KOMAN Government Solutions, LLC

Project: Fort Devens Army Installation

Report Number: 680-181275-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

RECEIPT
The samples were received on 03/07/2020; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 0.7 C.

METALS (ICP) - DISSOLVED
Sample 5702MW-20-07A_MAR20 (680-181275-1) was analyzed for Metals (ICP) - Dissolved in accordance with EPA SW-846 Method 6010C. The samples were prepared and analyzed on 03/09/2020.

The method blank for preparation batch 680-610233 contained iron (Fe) above the reporting limit (RL). None of the samples associated with this method blank contained the target compound; therefore, re-extraction and/or re-analysis of samples were not performed.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

METALS (ICPMS) - DISSOLVED
Sample 5702MW-20-07A_MAR20 (680-181275-1) was analyzed for Metals (ICPMS) - Dissolved in accordance with EPA SW-846 Method 6020A. The samples were prepared and analyzed on 03/09/2020.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Sample Summary

Client: KOMAN Government Solutions, LLC
Project/Site: Fort Devens Army Installation

Job ID: 680-181275-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
680-181275-1	5702MW-20-07A_MAR20	Water	03/06/20 12:05	03/07/20 10:00	

Method Summary

Client: KOMAN Government Solutions, LLC
Project/Site: Fort Devens Army Installation

Job ID: 680-181275-1

Method	Method Description	Protocol	Laboratory
6010C	Metals (ICP)	SW846	TAL SAV
6020A	Metals (ICP/MS)	SW846	TAL SAV
3005A	Preparation, Total Recoverable or Dissolved Metals	SW846	TAL SAV

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL SAV = Eurofins TestAmerica, Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

Definitions/Glossary

Client: KOMAN Government Solutions, LLC
Project/Site: Fort Devens Army Installation

Job ID: 680-181275-1

Qualifiers

Metals

Qualifier	Qualifier Description
J	Estimated: The analyte was positively identified; the quantitation is an estimation
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Client Sample Results

Client: KOMAN Government Solutions, LLC
Project/Site: Fort Devens Army Installation

Job ID: 680-181275-1

Client Sample ID: 5702MW-20-07A_MAR20

Lab Sample ID: 680-181275-1

Date Collected: 03/06/20 12:05

Matrix: Water

Date Received: 03/07/20 10:00

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	50	U	50	50	17	ug/L		03/09/20 18:32	1
Manganese	**64**		10	3.0	1.0	ug/L		03/09/20 18:32	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	**1.8**	**J**	3.0	3.0	1.5	ug/L		03/09/20 18:55	1

QC Sample Results

Client: KOMAN Government Solutions, LLC
Project/Site: Fort Devens Army Installation

Job ID: 680-181275-1

Method: 6010C - Metals (ICP)

Lab Sample ID: MB 680-610233/1-A — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total Recoverable**
Analysis Batch: 610345 — **Prep Batch: 610233**

Analyte	MB Result	MB Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	226		50	50	17	ug/L		03/09/20 17:51	1
Manganese	3.0	U	10	3.0	1.0	ug/L		03/09/20 17:51	1

Lab Sample ID: LCS 680-610233/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total Recoverable**
Analysis Batch: 610345 — **Prep Batch: 610233**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Iron	5010	5100		ug/L		102	87 - 115
Manganese	400	418		ug/L		104	90 - 114

Method: 6020A - Metals (ICP/MS)

Lab Sample ID: MB 680-610231/1-A — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total Recoverable**
Analysis Batch: 610361 — **Prep Batch: 610231**

Analyte	MB Result	MB Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	3.0	U	3.0	3.0	1.5	ug/L		03/09/20 17:14	1

Lab Sample ID: LCS 680-610231/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total Recoverable**
Analysis Batch: 610361 — **Prep Batch: 610231**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	100	101		ug/L		101	84 - 116

QC Association Summary

Client: KOMAN Government Solutions, LLC
Project/Site: Fort Devens Army Installation

Job ID: 680-181275-1

Metals

Prep Batch: 610231

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-181275-1	5702MW-20-07A_MAR20	Dissolved	Water	3005A	
MB 680-610231/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 680-610231/2-A	Lab Control Sample	Total Recoverable	Water	3005A	

Prep Batch: 610233

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-181275-1	5702MW-20-07A_MAR20	Dissolved	Water	3005A	
MB 680-610233/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 680-610233/2-A	Lab Control Sample	Total Recoverable	Water	3005A	

Analysis Batch: 610345

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-181275-1	5702MW-20-07A_MAR20	Dissolved	Water	6010C	610233
MB 680-610233/1-A	Method Blank	Total Recoverable	Water	6010C	610233
LCS 680-610233/2-A	Lab Control Sample	Total Recoverable	Water	6010C	610233

Analysis Batch: 610361

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-181275-1	5702MW-20-07A_MAR20	Dissolved	Water	6020A	610231
MB 680-610231/1-A	Method Blank	Total Recoverable	Water	6020A	610231
LCS 680-610231/2-A	Lab Control Sample	Total Recoverable	Water	6020A	610231

Lab Chronicle

Client: KOMAN Government Solutions, LLC
Project/Site: Fort Devens Army Installation

Job ID: 680-181275-1

Client Sample ID: 5702MW-20-07A_MAR20

Date Collected: 03/06/20 12:05
Date Received: 03/07/20 10:00

Lab Sample ID: 680-181275-1

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	610233	03/09/20 11:00	AJR	TAL SAV
Dissolved	Analysis	6010C		1			610345	03/09/20 18:32	BWR	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	610231	03/09/20 11:00	AJR	TAL SAV
Dissolved	Analysis	6020A		1			610361	03/09/20 18:55	BWR	TAL SAV
	Instrument ID:	ICPMSC								

Laboratory References:

TAL SAV = Eurofins TestAmerica, Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

Boston #215

CHAIN-OF-CUSTODY RECORD Boston #215

KOMAN Government Services, LLC
Laurie Ekes
293 Boston Post Road West, Suite 100, Marlborough, MA 01752
(508) 366.7442, lekes@komangs.com

COC # TEST TOC

Savannah GA

K Long Term Monitoring AOC 57

Project Name: PFAS Remedial Investigation	Laboratory: TestAmerica Laboratories, Inc., ~~West Sacramento~~,	Event: KOMAN, ~~PFAS RI, Soil Boring Samples-Area 3~~
Project Number: DEVNS-PFAS RI	~~David Alltucker, (916) 374-4389~~ Jerry Lanier	
WBS Code: Purchase Order ~~18-738~~ 18-706	Ship to: ~~880 Riverside Parkway, West Sacramento, CA 95605~~	5102 LaRoche Ave, Savannah, GA, 31404

Comments:
250ml HDPE @4°C

Equipment:

Analytical Test Method ~~SW9060A - TOC~~ Dissolved Metals

Code	Matrix
~~SO~~	~~Soil~~ GW

Code	Container/Preservative
2	~~4 x 4-ounce glass, jar, Cool to 4 ± 2°C~~

(1) HNO_3

Event: KOMAN, PFAS RI, Soil Samples-Area 3

	Sample ID	Matrix	Date	Time	Samp Init.		Location ID	Sample Type	Depth (ft bgs) Top - Bottom		Comments	Cooler
1		SO				X		N1	0.00	0.00	[illegible]	1
2	5702MW-20-07A	GW	3/6/20	1205	[illegible]	1	—	—	—	—	[illegible]	
3												
4												
5												
6												
7												
8												
9												
		Turnaround Time:										

680-181275 Chain of Custody

Relinquished by: *(Signature)*	Date	Time
[signature]	3/6/20	1415
[signature]	3-6-20	1810

Received by: *(Signature)*	Date	Time
[signature]	3-6-20	1415

Shipping Date / Carrier / Airbill Number

Received by Laboratory: *(Signature, Date, Time)* & condition
[signature] 0.3/0.7 3-7-2020/10:00

Page 1 of 1

Login Sample Receipt Checklist

Client: KOMAN Government Solutions, LLC

Job Number: 680-181275-1

Login Number: 181275

List Source: Eurofins TestAmerica, Savannah

List Number: 1

Creator: Mooken, Darmal

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Accreditation/Certification Summary

Client: KOMAN Government Solutions, LLC
Project/Site: Fort Devens Army Installation

Job ID: 680-181275-1

Laboratory: Eurofins TestAmerica, Savannah

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
ANAB	Dept. of Defense ELAP	L2463	09-22-22

eurofins | Environment Testing TestAmerica

ANALYTICAL REPORT

Eurofins TestAmerica, Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Tel: (912)354-7858

Laboratory Job ID: 680-182593-1
Client Project/Site: Koman, LTM AOC57 Supplemental MW Winter

For:
KOMAN Government Solutions, LLC
293 Boston Post Road West
Suite 100
Marlborough, Massachusetts 01752

Attn: Laurie Ekes

Kathryn Smith

Authorized for release by:
4/15/2020 12:43:36 PM
Kathryn Smith, Client Service Manager
(912)250-0275
kathy.smith@testamericainc.com

Designee for

Jerry Lanier, Project Manager I
(912)250-0281
jerry.lanier@testamericainc.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

Table of Contents

Cover Page 1
Table of Contents 2
Case Narrative 3
Sample Summary 4
Method Summary 5
Definitions/Glossary 6
Client Sample Results 7
QC Sample Results 10
QC Association Summary 12
Lab Chronicle 14
Chain of Custody 17
Receipt Checklists 19
Certification Summary 20

Job ID: 680-182593-1

Laboratory: Eurofins TestAmerica, Savannah

Narrative

CASE NARRATIVE
Client: KOMAN Government Solutions, LLC
Project: Koman, LTM AOC57 Supplemental MW Winter

Report Number: 680-182593-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

RECEIPT

The samples were received on 04/09/2020; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 2.0 C.

METALS (ICP) - DISSOLVED

Samples 5703VP-20-01-5-7 (680-182593-1), 5703VP-20-01-10-12 (680-182593-2), 5703VP-20-01-15-17 (680-182593-3), A1-VP-DUP-4720 (680-182593-4), 5703VP-20-01-20-22 (680-182593-5), 5703VP-20-01-25-27 (680-182593-6), 5703VP-20-01-30-32 (680-182593-7), 5703VP-20-02-5-7 (680-182593-8), 5703VP-20-02-10-12 (680-182593-9), 5703VP-20-02-15-17 (680-182593-10) and 5703VP-20-02-20-22 (680-182593-11) were analyzed for Metals (ICP) - Dissolved in accordance with EPA SW-846 Method 6010C. The samples were prepared on 04/10/2020 and analyzed on 04/14/2020.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

METALS (ICPMS) - DISSOLVED

Samples 5703VP-20-01-5-7 (680-182593-1), 5703VP-20-01-10-12 (680-182593-2), 5703VP-20-01-15-17 (680-182593-3), A1-VP-DUP-4720 (680-182593-4), 5703VP-20-01-20-22 (680-182593-5), 5703VP-20-01-25-27 (680-182593-6), 5703VP-20-01-30-32 (680-182593-7), 5703VP-20-02-5-7 (680-182593-8), 5703VP-20-02-10-12 (680-182593-9), 5703VP-20-02-15-17 (680-182593-10) and 5703VP-20-02-20-22 (680-182593-11) were analyzed for Metals (ICPMS) - Dissolved in accordance with EPA SW-846 Method 6020A. The samples were prepared and analyzed on 04/10/2020.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Sample Summary

Client: KOMAN Government Solutions, LLC
Project/Site: Koman, LTM AOC57 Supplemental MW Winter

Job ID: 680-182593-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
680-182593-1	5703VP-20-01-5-7	Water	04/07/20 10:23	04/09/20 09:10	
680-182593-2	5703VP-20-01-10-12	Water	04/07/20 11:05	04/09/20 09:10	
680-182593-3	5703VP-20-01-15-17	Water	04/07/20 12:55	04/09/20 09:10	
680-182593-4	A1-VP-DUP-4720	Water	04/07/20 11:10	04/09/20 09:10	
680-182593-5	5703VP-20-01-20-22	Water	04/07/20 14:05	04/09/20 09:10	
680-182593-6	5703VP-20-01-25-27	Water	04/07/20 14:55	04/09/20 09:10	
680-182593-7	5703VP-20-01-30-32	Water	04/08/20 08:10	04/09/20 09:10	
680-182593-8	5703VP-20-02-5-7	Water	04/08/20 10:10	04/09/20 09:10	
680-182593-9	5703VP-20-02-10-12	Water	04/08/20 11:13	04/09/20 09:10	
680-182593-10	5703VP-20-02-15-17	Water	04/08/20 12:30	04/09/20 09:10	
680-182593-11	5703VP-20-02-20-22	Water	04/08/20 13:35	04/09/20 09:10	

Method Summary

Client: KOMAN Government Solutions, LLC
Project/Site: Koman, LTM AOC57 Supplemental MW Winter

Job ID: 680-182593-1

Method	Method Description	Protocol	Laboratory
6010C	Metals (ICP)	SW846	TAL SAV
6020A	Metals (ICP/MS)	SW846	TAL SAV
3005A	Preparation, Total Recoverable or Dissolved Metals	SW846	TAL SAV

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL SAV = Eurofins TestAmerica, Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

Definitions/Glossary

Client: KOMAN Government Solutions, LLC
Project/Site: Koman, LTM AOC57 Supplemental MW Winter

Job ID: 680-182593-1

Qualifiers

Metals

Qualifier	Qualifier Description
J	Estimated: The analyte was positively identified; the quantitation is an estimation
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Client Sample Results

Client: KOMAN Government Solutions, LLC
Project/Site: Koman, LTM AOC57 Supplemental MW Winter

Job ID: 680-182593-1

Client Sample ID: 5703VP-20-01-5-7

Lab Sample ID: 680-182593-1
Date Collected: 04/07/20 10:23
Matrix: Water
Date Received: 04/09/20 09:10

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	1700		50	50	17	ug/L		04/14/20 03:34	1
Manganese	3100		10	3.0	1.0	ug/L		04/14/20 03:34	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	3.0	U	3.0	3.0	1.5	ug/L		04/10/20 17:23	1

Client Sample ID: 5703VP-20-01-10-12

Lab Sample ID: 680-182593-2
Date Collected: 04/07/20 11:05
Matrix: Water
Date Received: 04/09/20 09:10

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	790		50	50	17	ug/L		04/14/20 04:22	1
Manganese	3500		10	3.0	1.0	ug/L		04/14/20 04:22	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	3.0	U	3.0	3.0	1.5	ug/L		04/10/20 18:00	1

Client Sample ID: 5703VP-20-01-15-17

Lab Sample ID: 680-182593-3
Date Collected: 04/07/20 12:55
Matrix: Water
Date Received: 04/09/20 09:10

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	260		50	50	17	ug/L		04/14/20 04:07	1
Manganese	34		10	3.0	1.0	ug/L		04/14/20 04:07	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	3.0	U	3.0	3.0	1.5	ug/L		04/10/20 17:49	1

Client Sample ID: A1-VP-DUP-4720

Lab Sample ID: 680-182593-4
Date Collected: 04/07/20 11:10
Matrix: Water
Date Received: 04/09/20 09:10

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	600		50	50	17	ug/L		04/14/20 04:27	1
Manganese	3500		10	3.0	1.0	ug/L		04/14/20 04:27	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	3.0	U	3.0	3.0	1.5	ug/L		04/10/20 18:04	1

Client Sample Results

Client: KOMAN Government Solutions, LLC
Project/Site: Koman, LTM AOC57 Supplemental MW Winter

Job ID: 680-182593-1

Client Sample ID: 5703VP-20-01-20-22

Lab Sample ID: 680-182593-5
Date Collected: 04/07/20 14:05
Matrix: Water
Date Received: 04/09/20 09:10

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	130		50	50	17	ug/L		04/14/20 03:58	1
Manganese	63		10	3.0	1.0	ug/L		04/14/20 03:58	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	3.0	U	3.0	3.0	1.5	ug/L		04/10/20 17:41	1

Client Sample ID: 5703VP-20-01-25-27

Lab Sample ID: 680-182593-6
Date Collected: 04/07/20 14:55
Matrix: Water
Date Received: 04/09/20 09:10

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	75		50	50	17	ug/L		04/14/20 04:03	1
Manganese	8.8	J	10	3.0	1.0	ug/L		04/14/20 04:03	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	1.8	J	3.0	3.0	1.5	ug/L		04/10/20 17:45	1

Client Sample ID: 5703VP-20-01-30-32

Lab Sample ID: 680-182593-7
Date Collected: 04/08/20 08:10
Matrix: Water
Date Received: 04/09/20 09:10

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	190		50	50	17	ug/L		04/14/20 03:10	1
Manganese	19		10	3.0	1.0	ug/L		04/14/20 03:10	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	1.9	J	3.0	3.0	1.5	ug/L		04/10/20 17:05	1

Client Sample ID: 5703VP-20-02-5-7

Lab Sample ID: 680-182593-8
Date Collected: 04/08/20 10:10
Matrix: Water
Date Received: 04/09/20 09:10

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	1000		50	50	17	ug/L		04/14/20 04:17	1
Manganese	28		10	3.0	1.0	ug/L		04/14/20 04:17	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	3.0	U	3.0	3.0	1.5	ug/L		04/10/20 17:56	1

Client Sample Results

Client: KOMAN Government Solutions, LLC
Project/Site: Koman, LTM AOC57 Supplemental MW Winter

Job ID: 680-182593-1

Client Sample ID: 5703VP-20-02-10-12

Lab Sample ID: 680-182593-9
Date Collected: 04/08/20 11:13
Matrix: Water
Date Received: 04/09/20 09:10

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	460		50	50	17	ug/L		04/14/20 04:12	1
Manganese	41		10	3.0	1.0	ug/L		04/14/20 04:12	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	3.0	U	3.0	3.0	1.5	ug/L		04/10/20 17:53	1

Client Sample ID: 5703VP-20-02-15-17

Lab Sample ID: 680-182593-10
Date Collected: 04/08/20 12:30
Matrix: Water
Date Received: 04/09/20 09:10

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	130		50	50	17	ug/L		04/14/20 03:43	1
Manganese	41		10	3.0	1.0	ug/L		04/14/20 03:43	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	3.0	U	3.0	3.0	1.5	ug/L		04/10/20 17:30	1

Client Sample ID: 5703VP-20-02-20-22

Lab Sample ID: 680-182593-11
Date Collected: 04/08/20 13:35
Matrix: Water
Date Received: 04/09/20 09:10

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	480		50	50	17	ug/L		04/14/20 03:39	1
Manganese	25		10	3.0	1.0	ug/L		04/14/20 03:39	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	3.0	U	3.0	3.0	1.5	ug/L		04/10/20 17:27	1

QC Sample Results

Client: KOMAN Government Solutions, LLC
Project/Site: Koman, LTM AOC57 Supplemental MW Winter

Job ID: 680-182593-1

Method: 6010C - Metals (ICP)

Lab Sample ID: MB 680-614727/1-A — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total Recoverable**
Analysis Batch: 615116 — **Prep Batch: 614727**

Analyte	MB Result	MB Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	50	U	50	50	17	ug/L		04/14/20 03:00	1
Manganese	3.0	U	10	3.0	1.0	ug/L		04/14/20 03:00	1

Lab Sample ID: LCS 680-614727/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total Recoverable**
Analysis Batch: 615116 — **Prep Batch: 614727**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Iron	5010	4610		ug/L		92	87 - 115
Manganese	400	373		ug/L		93	90 - 114

Lab Sample ID: 680-182593-7 MS — **Client Sample ID: 5703VP-20-01-30-32**
Matrix: Water — **Prep Type: Dissolved**
Analysis Batch: 615116 — **Prep Batch: 614727**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Iron	190		5010	4950		ug/L		95	87 - 115
Manganese	19		400	406		ug/L		97	90 - 114

Lab Sample ID: 680-182593-7 MSD — **Client Sample ID: 5703VP-20-01-30-32**
Matrix: Water — **Prep Type: Dissolved**
Analysis Batch: 615116 — **Prep Batch: 614727**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Iron	190		5010	4770		ug/L		92	87 - 115	4	20
Manganese	19		400	395		ug/L		94	90 - 114	3	20

Method: 6020A - Metals (ICP/MS)

Lab Sample ID: MB 680-614726/1-A — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total Recoverable**
Analysis Batch: 614821 — **Prep Batch: 614726**

Analyte	MB Result	MB Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	3.0	U	3.0	3.0	1.5	ug/L		04/10/20 16:57	1

Lab Sample ID: LCS 680-614726/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total Recoverable**
Analysis Batch: 614821 — **Prep Batch: 614726**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	100	99.7		ug/L		100	84 - 116

Lab Sample ID: 680-182593-7 MS — **Client Sample ID: 5703VP-20-01-30-32**
Matrix: Water — **Prep Type: Dissolved**
Analysis Batch: 614821 — **Prep Batch: 614726**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	1.9	J	100	111		ug/L		109	84 - 116

Method: 6020A - Metals (ICP/MS) (Continued)

Lab Sample ID: 680-182593-7 MSD
Client Sample ID: 5703VP-20-01-30-32
Matrix: Water
Prep Type: Dissolved
Analysis Batch: 614821
Prep Batch: 614726

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Arsenic	1.9	J	100	111		ug/L		109	84 - 116	1	20

QC Association Summary

Client: KOMAN Government Solutions, LLC
Project/Site: Koman, LTM AOC57 Supplemental MW Winter

Job ID: 680-182593-1

Metals

Prep Batch: 614726

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-182593-1	5703VP-20-01-5-7	Dissolved	Water	3005A	
680-182593-2	5703VP-20-01-10-12	Dissolved	Water	3005A	
680-182593-3	5703VP-20-01-15-17	Dissolved	Water	3005A	
680-182593-4	A1-VP-DUP-4720	Dissolved	Water	3005A	
680-182593-5	5703VP-20-01-20-22	Dissolved	Water	3005A	
680-182593-6	5703VP-20-01-25-27	Dissolved	Water	3005A	
680-182593-7	5703VP-20-01-30-32	Dissolved	Water	3005A	
680-182593-8	5703VP-20-02-5-7	Dissolved	Water	3005A	
680-182593-9	5703VP-20-02-10-12	Dissolved	Water	3005A	
680-182593-10	5703VP-20-02-15-17	Dissolved	Water	3005A	
680-182593-11	5703VP-20-02-20-22	Dissolved	Water	3005A	
MB 680-614726/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 680-614726/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
680-182593-7 MS	5703VP-20-01-30-32	Dissolved	Water	3005A	
680-182593-7 MSD	5703VP-20-01-30-32	Dissolved	Water	3005A	

Prep Batch: 614727

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-182593-1	5703VP-20-01-5-7	Dissolved	Water	3005A	
680-182593-2	5703VP-20-01-10-12	Dissolved	Water	3005A	
680-182593-3	5703VP-20-01-15-17	Dissolved	Water	3005A	
680-182593-4	A1-VP-DUP-4720	Dissolved	Water	3005A	
680-182593-5	5703VP-20-01-20-22	Dissolved	Water	3005A	
680-182593-6	5703VP-20-01-25-27	Dissolved	Water	3005A	
680-182593-7	5703VP-20-01-30-32	Dissolved	Water	3005A	
680-182593-8	5703VP-20-02-5-7	Dissolved	Water	3005A	
680-182593-9	5703VP-20-02-10-12	Dissolved	Water	3005A	
680-182593-10	5703VP-20-02-15-17	Dissolved	Water	3005A	
680-182593-11	5703VP-20-02-20-22	Dissolved	Water	3005A	
MB 680-614727/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 680-614727/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
680-182593-7 MS	5703VP-20-01-30-32	Dissolved	Water	3005A	
680-182593-7 MSD	5703VP-20-01-30-32	Dissolved	Water	3005A	

Analysis Batch: 614821

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-182593-1	5703VP-20-01-5-7	Dissolved	Water	6020A	614726
680-182593-2	5703VP-20-01-10-12	Dissolved	Water	6020A	614726
680-182593-3	5703VP-20-01-15-17	Dissolved	Water	6020A	614726
680-182593-4	A1-VP-DUP-4720	Dissolved	Water	6020A	614726
680-182593-5	5703VP-20-01-20-22	Dissolved	Water	6020A	614726
680-182593-6	5703VP-20-01-25-27	Dissolved	Water	6020A	614726
680-182593-7	5703VP-20-01-30-32	Dissolved	Water	6020A	614726
680-182593-8	5703VP-20-02-5-7	Dissolved	Water	6020A	614726
680-182593-9	5703VP-20-02-10-12	Dissolved	Water	6020A	614726
680-182593-10	5703VP-20-02-15-17	Dissolved	Water	6020A	614726
680-182593-11	5703VP-20-02-20-22	Dissolved	Water	6020A	614726
MB 680-614726/1-A	Method Blank	Total Recoverable	Water	6020A	614726
LCS 680-614726/2-A	Lab Control Sample	Total Recoverable	Water	6020A	614726
680-182593-7 MS	5703VP-20-01-30-32	Dissolved	Water	6020A	614726
680-182593-7 MSD	5703VP-20-01-30-32	Dissolved	Water	6020A	614726

QC Association Summary

Client: KOMAN Government Solutions, LLC
Project/Site: Koman, LTM AOC57 Supplemental MW Winter

Job ID: 680-182593-1

Metals

Analysis Batch: 615116

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-182593-1	5703VP-20-01-5-7	Dissolved	Water	6010C	614727
680-182593-2	5703VP-20-01-10-12	Dissolved	Water	6010C	614727
680-182593-3	5703VP-20-01-15-17	Dissolved	Water	6010C	614727
680-182593-4	A1-VP-DUP-4720	Dissolved	Water	6010C	614727
680-182593-5	5703VP-20-01-20-22	Dissolved	Water	6010C	614727
680-182593-6	5703VP-20-01-25-27	Dissolved	Water	6010C	614727
680-182593-7	5703VP-20-01-30-32	Dissolved	Water	6010C	614727
680-182593-8	5703VP-20-02-5-7	Dissolved	Water	6010C	614727
680-182593-9	5703VP-20-02-10-12	Dissolved	Water	6010C	614727
680-182593-10	5703VP-20-02-15-17	Dissolved	Water	6010C	614727
680-182593-11	5703VP-20-02-20-22	Dissolved	Water	6010C	614727
MB 680-614727/1-A	Method Blank	Total Recoverable	Water	6010C	614727
LCS 680-614727/2-A	Lab Control Sample	Total Recoverable	Water	6010C	614727
680-182593-7 MS	5703VP-20-01-30-32	Dissolved	Water	6010C	614727
680-182593-7 MSD	5703VP-20-01-30-32	Dissolved	Water	6010C	614727

Lab Chronicle

Client: KOMAN Government Solutions, LLC
Project/Site: Koman, LTM AOC57 Supplemental MW Winter

Job ID: 680-182593-1

Client Sample ID: 5703VP-20-01-5-7
Lab Sample ID: 680-182593-1
Date Collected: 04/07/20 10:23
Matrix: Water
Date Received: 04/09/20 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	614727	04/10/20 10:40	AJR	TAL SAV
Dissolved	Analysis	6010C		1			615116	04/14/20 03:34	BCB	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	614726	04/10/20 10:40	AJR	TAL SAV
Dissolved	Analysis	6020A		1			614821	04/10/20 17:23	BJB	TAL SAV
	Instrument ID:	ICPMSC								

Client Sample ID: 5703VP-20-01-10-12
Lab Sample ID: 680-182593-2
Date Collected: 04/07/20 11:05
Matrix: Water
Date Received: 04/09/20 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	614727	04/10/20 10:40	AJR	TAL SAV
Dissolved	Analysis	6010C		1			615116	04/14/20 04:22	BCB	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	614726	04/10/20 10:40	AJR	TAL SAV
Dissolved	Analysis	6020A		1			614821	04/10/20 18:00	BJB	TAL SAV
	Instrument ID:	ICPMSC								

Client Sample ID: 5703VP-20-01-15-17
Lab Sample ID: 680-182593-3
Date Collected: 04/07/20 12:55
Matrix: Water
Date Received: 04/09/20 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	614727	04/10/20 10:40	AJR	TAL SAV
Dissolved	Analysis	6010C		1			615116	04/14/20 04:07	BCB	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	614726	04/10/20 10:40	AJR	TAL SAV
Dissolved	Analysis	6020A		1			614821	04/10/20 17:49	BJB	TAL SAV
	Instrument ID:	ICPMSC								

Client Sample ID: A1-VP-DUP-4720
Lab Sample ID: 680-182593-4
Date Collected: 04/07/20 11:10
Matrix: Water
Date Received: 04/09/20 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	614727	04/10/20 10:40	AJR	TAL SAV
Dissolved	Analysis	6010C		1			615116	04/14/20 04:27	BCB	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	614726	04/10/20 10:40	AJR	TAL SAV
Dissolved	Analysis	6020A		1			614821	04/10/20 18:04	BJB	TAL SAV
	Instrument ID:	ICPMSC								

Lab Chronicle

Client: KOMAN Government Solutions, LLC
Project/Site: Koman, LTM AOC57 Supplemental MW Winter

Job ID: 680-182593-1

Client Sample ID: 5703VP-20-01-20-22 — Lab Sample ID: 680-182593-5

Date Collected: 04/07/20 14:05 — **Matrix: Water**
Date Received: 04/09/20 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	614727	04/10/20 10:40	AJR	TAL SAV
Dissolved	Analysis	6010C		1			615116	04/14/20 03:58	BCB	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	614726	04/10/20 10:40	AJR	TAL SAV
Dissolved	Analysis	6020A		1			614821	04/10/20 17:41	BJB	TAL SAV
	Instrument ID:	ICPMSC								

Client Sample ID: 5703VP-20-01-25-27 — Lab Sample ID: 680-182593-6

Date Collected: 04/07/20 14:55 — **Matrix: Water**
Date Received: 04/09/20 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	614727	04/10/20 10:40	AJR	TAL SAV
Dissolved	Analysis	6010C		1			615116	04/14/20 04:03	BCB	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	614726	04/10/20 10:40	AJR	TAL SAV
Dissolved	Analysis	6020A		1			614821	04/10/20 17:45	BJB	TAL SAV
	Instrument ID:	ICPMSC								

Client Sample ID: 5703VP-20-01-30-32 — Lab Sample ID: 680-182593-7

Date Collected: 04/08/20 08:10 — **Matrix: Water**
Date Received: 04/09/20 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	614727	04/10/20 10:40	AJR	TAL SAV
Dissolved	Analysis	6010C		1			615116	04/14/20 03:10	BCB	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	614726	04/10/20 10:40	AJR	TAL SAV
Dissolved	Analysis	6020A		1			614821	04/10/20 17:05	BJB	TAL SAV
	Instrument ID:	ICPMSC								

Client Sample ID: 5703VP-20-02-5-7 — Lab Sample ID: 680-182593-8

Date Collected: 04/08/20 10:10 — **Matrix: Water**
Date Received: 04/09/20 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	614727	04/10/20 10:40	AJR	TAL SAV
Dissolved	Analysis	6010C		1			615116	04/14/20 04:17	BCB	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	614726	04/10/20 10:40	AJR	TAL SAV
Dissolved	Analysis	6020A		1			614821	04/10/20 17:56	BJB	TAL SAV
	Instrument ID:	ICPMSC								

Lab Chronicle

Client: KOMAN Government Solutions, LLC
Project/Site: Koman, LTM AOC57 Supplemental MW Winter

Job ID: 680-182593-1

Client Sample ID: 5703VP-20-02-10-12

Lab Sample ID: 680-182593-9
Date Collected: 04/08/20 11:13
Matrix: Water
Date Received: 04/09/20 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	614727	04/10/20 10:40	AJR	TAL SAV
Dissolved	Analysis	6010C		1			615116	04/14/20 04:12	BCB	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	614726	04/10/20 10:40	AJR	TAL SAV
Dissolved	Analysis	6020A		1			614821	04/10/20 17:53	BJB	TAL SAV
	Instrument ID:	ICPMSC								

Client Sample ID: 5703VP-20-02-15-17

Lab Sample ID: 680-182593-10
Date Collected: 04/08/20 12:30
Matrix: Water
Date Received: 04/09/20 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	614727	04/10/20 10:40	AJR	TAL SAV
Dissolved	Analysis	6010C		1			615116	04/14/20 03:43	BCB	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	614726	04/10/20 10:40	AJR	TAL SAV
Dissolved	Analysis	6020A		1			614821	04/10/20 17:30	BJB	TAL SAV
	Instrument ID:	ICPMSC								

Client Sample ID: 5703VP-20-02-20-22

Lab Sample ID: 680-182593-11
Date Collected: 04/08/20 13:35
Matrix: Water
Date Received: 04/09/20 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	614727	04/10/20 10:40	AJR	TAL SAV
Dissolved	Analysis	6010C		1			615116	04/14/20 03:39	BCB	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	614726	04/10/20 10:40	AJR	TAL SAV
Dissolved	Analysis	6020A		1			614821	04/10/20 17:27	BJB	TAL SAV
	Instrument ID:	ICPMSC								

Laboratory References:

TAL SAV = Eurofins TestAmerica, Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

CHAIN-OF-CUSTODY RECORD

KOMAN Government Services, LLC
Laurie Ekes
293 Boston Post Road West, Suite 100, Marlborough, MA 01752
(508) 508.366.7442, lekes@komangs.com

Boston COC# MARCH2020
#215 Page (1 of 2)

KGS

Project Name: Long Term Monitoring	Laboratory: TestAmerica Laboratories, Inc., Savannah, GA	Event: KOMAN, Long Term Monitoring,
Project Number: DEVNS-LTM	POC: Jerry Lanier912.354.7858jerry.lanier@testamericainc.com	
WBS Code: Purchase Order 18-706	Ship to: 5102 LaRoche Avenue, Savannah, GA 31404	

Comments:
SW6010C/FLDFLT (B) = Fe Mn
SW6020A/FLDFLT (B) = As

Equipment:

Code	Matrix
WG	Ground Water

Code	Container/Preservative
9	1x 250mL, plastic, HNO3, pH < 2, Cool < 6degC

680-182593 Chain of Custody

Boston #215

Event: KOMAN, Long Term Monitoring, AOC 57 Supplemental MW Winter

	Sample ID	Matrix	Date	Time	Samp Init.	SW6010C/FLDFLT (B)	SW6020A/FLDFLT (B)	Location ID	Sample Type	Depth (ft bgs) Top	Depth (ft bgs) Bottom	Cooler	Comments
	~~5703VP-20-01-5~~	WG				X	X		N1			1	
2	5703VP-20-01-5-7		4/7/20	1023		X	X	5703VP-20-01	N1	5	7		
3	5703VP-20-01-10-12		4/7/20	1105		X	X	5703VP-20-01	N1	10	12		
4	5703VP-20-01-15-17		4/7/20	~~1010~~ 1255		X	X	5703VP-20-01	N1	15	17		
5	A1-VP DUP1-4720		4/7/20	~~1255~~ 1110		X	X	5703VP-20-01	N1	10	12		
6	5703VP-20-01-20-22		4/7/20	1405		X	X	5703VP-20-01	N1	20	22		
7	5703VP-20-01-25-27		4/7/20	1455		X	X	5703VP-20-01	N1	25	27		
8	5703VP-20-01-30-32		4/15/20	810		X	X	5703VP-20-01	N1	30	32		MS/MSD
9													

Turnaround Time: 21 days

Relinquished by: *(Signature)*	Date	Time	Received by: *(Signature)*	Date	Time
[signature]	4/8/20	1400	[signature]	4/8/20	1400
[signature]	4/8/20	1600			

Shipping Date / Carrier / Airbill Number
Shipping Date: 3/6/2020
1.6(CF) 2.0°

Received by Laboratory: *(Signature, Date, Time)* **& condition**
[signature] 04-09-20 0910

ENV.COC_Field
March 27, 2020

Page 1 of 1

CHAIN-OF USTODY RECORD

KOMAN Government Services, LLC
Laurie Ekes
293 Boston Post Road West, Suite 100, Marlborough, MA 01752
(508) 508.366.7442, lekes@komangs.com

Boston #215

COC # MARCH2020

Page 2 of 2

KGS

Project Name: Long Term Monitoring	Laboratory: TestAmerica Laboratories, Inc., Savannah, GA	Event: KOMAN, Long Term Monitoring,
Project Number: DEVNS-LTM	POC: Jerry Lanier912.354.7858jerry.lanier@testamericainc.com	
WBS Code: Purchase Order 18-706	Ship to: 5102 LaRoche Avenue, Savannah, GA 31404	

Comments:
SW6010C/FLDFLT (B) = Fe Mn
SW6020A/FLDFLT (B) = As

Equipment:

Code	Matrix
WG	Ground Water

Code	Container/Preservative
9	1x 250mL, plastic, HNO3, pH < 2; Cool < 6degC

Boston #215

	Sample ID	Matrix	Date	Time	Samp Init.	SW6010C/FLDFLT (B)	SW6020A/FLDFLT (B)	Location ID	Sample Type	Depth (ft bgs) Top	Depth (ft bgs) Bottom	Cooler	Comments
	Event: KOMAN, Long Term Monitoring, AOC 57 Supplemental MW Winter					9	9						
	5703VP-20-02-5-7	WG	4/8/20	1010	[illegible]	X	X	5703VP-20-02	N1	5	7	1	
2	5703VP-20-02-10-12		4/8/20	1113	[illegible]	X	X	5703VP-20-02	N1	10	12		
3	5703VP-20-02-15-17		4/8/20	1230	[illegible]	X	X	5703VP-20-02	N1	15	17		
4	5703VP-20-02-20-22		4/8/20	1335	[illegible]	X	X	5703VP-20-02	N1	20	22		
5													
6													
7													
8													
9													

Turnaround Time: 21 days

Relinquished by: *(Signature)*	Date	Time	Received by: *(Signature)*	Date	Time
[signature]	4/8/20	1409	[signature]	4/8/20	[illegible]
[signature]	4/8/20	1615			

Shipping Date / Carrier / Airbill Number
Shipping Date: 3/6/2020
1.6(CF) 2.0°C

Received by Laboratory: *(Signature, Date, Time)* **& condition**
[signature] 04-09-20 0910

ENV.COC_Field
March 27, 2020

Page 1 of 1

Login Sample Receipt Checklist

Client: KOMAN Government Solutions, LLC

Job Number: 680-182593-1

Login Number: 182593
List Number: 1
Creator: Banda, Christy S

List Source: Eurofins TestAmerica, Savannah

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Accreditation/Certification Summary

Client: KOMAN Government Solutions, LLC
Job ID: 680-182593-1
Project/Site: Koman, LTM AOC57 Supplemental MW Winter

Laboratory: Eurofins TestAmerica, Savannah

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
ANAB	Dept. of Defense ELAP	L2463	09-22-22

eurofins | Environment Testing TestAmerica

ANALYTICAL REPORT

Eurofins TestAmerica, Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Tel: (912)354-7858

Laboratory Job ID: 680-182711-1
Client Project/Site: Fort Devens - LTM

For:
KOMAN Government Solutions, LLC
293 Boston Post Road West
Suite 100
Marlborough, Massachusetts 01752

Attn: Laurie Ekes

Kathryn Smith

Authorized for release by:
4/16/2020 9:04:53 AM
Kathryn Smith, Client Service Manager
(912)250-0275
kathy.smith@testamericainc.com

Designee for

Jerry Lanier, Project Manager I
(912)250-0281
jerry.lanier@testamericainc.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

Table of Contents

Cover Page 1
Table of Contents 2
Case Narrative 3
Sample Summary 4
Method Summary 5
Definitions/Glossary 6
Client Sample Results 7
QC Sample Results 10
QC Association Summary 12
Lab Chronicle 14
Chain of Custody 17
Receipt Checklists 18
Certification Summary 19

Job ID: 680-182711-1

Laboratory: Eurofins TestAmerica, Savannah

Narrative

CASE NARRATIVE
Client: KOMAN Government Solutions, LLC
Project: Fort Devens - LTM

Report Number: 680-182711-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

RECEIPT

The samples were received on 04/11/2020; the samples arrived in good condition, properly preserved and on ice. The temperature of the cooler at receipt was 1.9º C.

METALS (ICP) - DISSOLVED

Samples 5703VP-20-02-25-27 (680-182711-1), 5703VP-20-02-30-32 (680-182711-2), 5703VP-20-03-5-7 (680-182711-3), 5703VP-20-03-10-12 (680-182711-4), 5703VP-20-03-15-17 (680-182711-5), 5703VP-20-03-20-22 (680-182711-6), A1-VP-DUP-41020 (680-182711-7), 5703VP-20-03-25-27 (680-182711-8) and 5703VP-20-03-30-32 (680-182711-9) were analyzed for Metals (ICP) - Dissolved in accordance with EPA SW-846 Method 6010C. The samples were prepared on 04/13/2020 and analyzed on 04/15/2020.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

METALS (ICPMS) - DISSOLVED

Samples 5703VP-20-02-25-27 (680-182711-1), 5703VP-20-02-30-32 (680-182711-2), 5703VP-20-03-5-7 (680-182711-3), 5703VP-20-03-10-12 (680-182711-4), 5703VP-20-03-15-17 (680-182711-5), 5703VP-20-03-20-22 (680-182711-6), A1-VP-DUP-41020 (680-182711-7), 5703VP-20-03-25-27 (680-182711-8) and 5703VP-20-03-30-32 (680-182711-9) were analyzed for Metals (ICPMS) - Dissolved in accordance with EPA SW-846 Method 6020A. The samples were prepared on 04/13/2020 and analyzed on 04/14/2020.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Sample Summary

Client: KOMAN Government Solutions, LLC
Project/Site: Fort Devens - LTM

Job ID: 680-182711-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
680-182711-1	5703VP-20-02-25-27	Water	04/09/20 08:10	04/11/20 10:00	
680-182711-2	5703VP-20-02-30-32	Water	04/09/20 09:15	04/11/20 10:00	
680-182711-3	5703VP-20-03-5-7	Water	04/09/20 11:10	04/11/20 10:00	
680-182711-4	5703VP-20-03-10-12	Water	04/09/20 12:40	04/11/20 10:00	
680-182711-5	5703VP-20-03-15-17	Water	04/09/20 13:35	04/11/20 10:00	
680-182711-6	5703VP-20-03-20-22	Water	04/10/20 09:08	04/11/20 10:00	
680-182711-7	A1-VP-DUP-41020	Water	04/10/20 09:13	04/11/20 10:00	
680-182711-8	5703VP-20-03-25-27	Water	04/10/20 10:16	04/11/20 10:00	
680-182711-9	5703VP-20-03-30-32	Water	04/10/20 11:25	04/11/20 10:00	

Method Summary

Client: KOMAN Government Solutions, LLC
Project/Site: Fort Devens - LTM

Job ID: 680-182711-1

Method	Method Description	Protocol	Laboratory
6010C	Metals (ICP)	SW846	TAL SAV
6020A	Metals (ICP/MS)	SW846	TAL SAV
3005A	Preparation, Total Recoverable or Dissolved Metals	SW846	TAL SAV

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL SAV = Eurofins TestAmerica, Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

Definitions/Glossary

Client: KOMAN Government Solutions, LLC
Project/Site: Fort Devens - LTM

Job ID: 680-182711-1

Qualifiers

Metals

Qualifier	Qualifier Description
J	Estimated: The analyte was positively identified; the quantitation is an estimation
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Client Sample Results

Client: KOMAN Government Solutions, LLC
Project/Site: Fort Devens - LTM

Job ID: 680-182711-1

Client Sample ID: 5703VP-20-02-25-27

Lab Sample ID: 680-182711-1
Date Collected: 04/09/20 08:10
Matrix: Water
Date Received: 04/11/20 10:00

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	150		50	50	17	ug/L		04/15/20 03:41	1
Manganese	37		10	3.0	1.0	ug/L		04/15/20 03:41	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	3.0	U	3.0	3.0	1.5	ug/L		04/14/20 19:59	1

Client Sample ID: 5703VP-20-02-30-32

Lab Sample ID: 680-182711-2
Date Collected: 04/09/20 09:15
Matrix: Water
Date Received: 04/11/20 10:00

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	37	J	50	50	17	ug/L		04/15/20 03:22	1
Manganese	19		10	3.0	1.0	ug/L		04/15/20 03:22	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	3.5		3.0	3.0	1.5	ug/L		04/14/20 19:43	1

Client Sample ID: 5703VP-20-03-5-7

Lab Sample ID: 680-182711-3
Date Collected: 04/09/20 11:10
Matrix: Water
Date Received: 04/11/20 10:00

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	1100		50	50	17	ug/L		04/15/20 03:32	1
Manganese	41		10	3.0	1.0	ug/L		04/15/20 03:32	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	2.4	J	3.0	3.0	1.5	ug/L		04/14/20 19:51	1

Client Sample ID: 5703VP-20-03-10-12

Lab Sample ID: 680-182711-4
Date Collected: 04/09/20 12:40
Matrix: Water
Date Received: 04/11/20 10:00

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	160		50	50	17	ug/L		04/15/20 03:03	1
Manganese	15		10	3.0	1.0	ug/L		04/15/20 03:03	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	3.0	U	3.0	3.0	1.5	ug/L		04/14/20 19:26	1

Client Sample Results

Client: KOMAN Government Solutions, LLC
Project/Site: Fort Devens - LTM

Job ID: 680-182711-1

Client Sample ID: 5703VP-20-03-15-17

Lab Sample ID: 680-182711-5
Date Collected: 04/09/20 13:35
Matrix: Water
Date Received: 04/11/20 10:00

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	50	U	50	50	17	ug/L		04/15/20 02:34	1
Manganese	**31**		10	3.0	1.0	ug/L		04/15/20 02:34	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	3.0	U	3.0	3.0	1.5	ug/L		04/14/20 19:02	1

Client Sample ID: 5703VP-20-03-20-22

Lab Sample ID: 680-182711-6
Date Collected: 04/10/20 09:08
Matrix: Water
Date Received: 04/11/20 10:00

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	**200**		50	50	17	ug/L		04/15/20 03:08	1
Manganese	**52**		10	3.0	1.0	ug/L		04/15/20 03:08	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	3.0	U	3.0	3.0	1.5	ug/L		04/14/20 19:30	1

Client Sample ID: A1-VP-DUP-41020

Lab Sample ID: 680-182711-7
Date Collected: 04/10/20 09:13
Matrix: Water
Date Received: 04/11/20 10:00

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	**200**		50	50	17	ug/L		04/15/20 02:58	1
Manganese	**45**		10	3.0	1.0	ug/L		04/15/20 02:58	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	3.0	U	3.0	3.0	1.5	ug/L		04/14/20 19:22	1

Client Sample ID: 5703VP-20-03-25-27

Lab Sample ID: 680-182711-8
Date Collected: 04/10/20 10:16
Matrix: Water
Date Received: 04/11/20 10:00

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	**61**		50	50	17	ug/L		04/15/20 03:27	1
Manganese	**33**		10	3.0	1.0	ug/L		04/15/20 03:27	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	3.0	U	3.0	3.0	1.5	ug/L		04/14/20 19:47	1

Client Sample Results

Client: KOMAN Government Solutions, LLC
Project/Site: Fort Devens - LTM

Job ID: 680-182711-1

Client Sample ID: 5703VP-20-03-30-32

Lab Sample ID: 680-182711-9

Date Collected: 04/10/20 11:25

Matrix: Water

Date Received: 04/11/20 10:00

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	250		50	50	17	ug/L		04/15/20 03:36	1
Manganese	50		10	3.0	1.0	ug/L		04/15/20 03:36	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	3.9		3.0	3.0	1.5	ug/L		04/14/20 19:55	1

QC Sample Results

Client: KOMAN Government Solutions, LLC
Project/Site: Fort Devens - LTM

Job ID: 680-182711-1

Method: 6010C - Metals (ICP)

Lab Sample ID: MB 680-614950/1-A — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total Recoverable**
Analysis Batch: 615305 — **Prep Batch: 614950**

Analyte	MB Result	MB Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	50	U	50	50	17	ug/L		04/15/20 02:24	1
Manganese	3.0	U	10	3.0	1.0	ug/L		04/15/20 02:24	1

Lab Sample ID: LCS 680-614950/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total Recoverable**
Analysis Batch: 615305 — **Prep Batch: 614950**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Iron	5010	4790		ug/L		96	87 - 115
Manganese	400	386		ug/L		97	90 - 114

Lab Sample ID: 680-182711-5 MS — **Client Sample ID: 5703VP-20-03-15-17**
Matrix: Water — **Prep Type: Dissolved**
Analysis Batch: 615305 — **Prep Batch: 614950**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Iron	50	U	5010	4890		ug/L		98	87 - 115
Manganese	31		400	423		ug/L		98	90 - 114

Lab Sample ID: 680-182711-5 MSD — **Client Sample ID: 5703VP-20-03-15-17**
Matrix: Water — **Prep Type: Dissolved**
Analysis Batch: 615305 — **Prep Batch: 614950**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Iron	50	U	5010	4760		ug/L		95	87 - 115	3	20
Manganese	31		400	414		ug/L		96	90 - 114	2	20

Method: 6020A - Metals (ICP/MS)

Lab Sample ID: MB 680-614948/1-A — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total Recoverable**
Analysis Batch: 615183 — **Prep Batch: 614948**

Analyte	MB Result	MB Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	3.0	U	3.0	3.0	1.5	ug/L		04/14/20 18:54	1

Lab Sample ID: LCS 680-614948/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total Recoverable**
Analysis Batch: 615183 — **Prep Batch: 614948**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	100	109		ug/L		109	84 - 116

Lab Sample ID: 680-182711-5 MS — **Client Sample ID: 5703VP-20-03-15-17**
Matrix: Water — **Prep Type: Dissolved**
Analysis Batch: 615183 — **Prep Batch: 614948**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	3.0	U	100	101		ug/L		101	84 - 116

Method: 6020A - Metals (ICP/MS) (Continued)

Lab Sample ID: 680-182711-5 MSD
Matrix: Water
Analysis Batch: 615183

Client Sample ID: 5703VP-20-03-15-17
Prep Type: Dissolved
Prep Batch: 614948

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Arsenic	3.0	U	100	100		ug/L		100	84 - 116	0	20

QC Association Summary

Client: KOMAN Government Solutions, LLC
Project/Site: Fort Devens - LTM

Job ID: 680-182711-1

Metals

Prep Batch: 614948

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-182711-1	5703VP-20-02-25-27	Dissolved	Water	3005A	
680-182711-2	5703VP-20-02-30-32	Dissolved	Water	3005A	
680-182711-3	5703VP-20-03-5-7	Dissolved	Water	3005A	
680-182711-4	5703VP-20-03-10-12	Dissolved	Water	3005A	
680-182711-5	5703VP-20-03-15-17	Dissolved	Water	3005A	
680-182711-6	5703VP-20-03-20-22	Dissolved	Water	3005A	
680-182711-7	A1-VP-DUP-41020	Dissolved	Water	3005A	
680-182711-8	5703VP-20-03-25-27	Dissolved	Water	3005A	
680-182711-9	5703VP-20-03-30-32	Dissolved	Water	3005A	
MB 680-614948/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 680-614948/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
680-182711-5 MS	5703VP-20-03-15-17	Dissolved	Water	3005A	
680-182711-5 MSD	5703VP-20-03-15-17	Dissolved	Water	3005A	

Prep Batch: 614950

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-182711-1	5703VP-20-02-25-27	Dissolved	Water	3005A	
680-182711-2	5703VP-20-02-30-32	Dissolved	Water	3005A	
680-182711-3	5703VP-20-03-5-7	Dissolved	Water	3005A	
680-182711-4	5703VP-20-03-10-12	Dissolved	Water	3005A	
680-182711-5	5703VP-20-03-15-17	Dissolved	Water	3005A	
680-182711-6	5703VP-20-03-20-22	Dissolved	Water	3005A	
680-182711-7	A1-VP-DUP-41020	Dissolved	Water	3005A	
680-182711-8	5703VP-20-03-25-27	Dissolved	Water	3005A	
680-182711-9	5703VP-20-03-30-32	Dissolved	Water	3005A	
MB 680-614950/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 680-614950/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
680-182711-5 MS	5703VP-20-03-15-17	Dissolved	Water	3005A	
680-182711-5 MSD	5703VP-20-03-15-17	Dissolved	Water	3005A	

Analysis Batch: 615183

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-182711-1	5703VP-20-02-25-27	Dissolved	Water	6020A	614948
680-182711-2	5703VP-20-02-30-32	Dissolved	Water	6020A	614948
680-182711-3	5703VP-20-03-5-7	Dissolved	Water	6020A	614948
680-182711-4	5703VP-20-03-10-12	Dissolved	Water	6020A	614948
680-182711-5	5703VP-20-03-15-17	Dissolved	Water	6020A	614948
680-182711-6	5703VP-20-03-20-22	Dissolved	Water	6020A	614948
680-182711-7	A1-VP-DUP-41020	Dissolved	Water	6020A	614948
680-182711-8	5703VP-20-03-25-27	Dissolved	Water	6020A	614948
680-182711-9	5703VP-20-03-30-32	Dissolved	Water	6020A	614948
MB 680-614948/1-A	Method Blank	Total Recoverable	Water	6020A	614948
LCS 680-614948/2-A	Lab Control Sample	Total Recoverable	Water	6020A	614948
680-182711-5 MS	5703VP-20-03-15-17	Dissolved	Water	6020A	614948
680-182711-5 MSD	5703VP-20-03-15-17	Dissolved	Water	6020A	614948

Analysis Batch: 615305

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-182711-1	5703VP-20-02-25-27	Dissolved	Water	6010C	614950
680-182711-2	5703VP-20-02-30-32	Dissolved	Water	6010C	614950
680-182711-3	5703VP-20-03-5-7	Dissolved	Water	6010C	614950

Metals (Continued)

Analysis Batch: 615305 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-182711-4	5703VP-20-03-10-12	Dissolved	Water	6010C	614950
680-182711-5	5703VP-20-03-15-17	Dissolved	Water	6010C	614950
680-182711-6	5703VP-20-03-20-22	Dissolved	Water	6010C	614950
680-182711-7	A1-VP-DUP-41020	Dissolved	Water	6010C	614950
680-182711-8	5703VP-20-03-25-27	Dissolved	Water	6010C	614950
680-182711-9	5703VP-20-03-30-32	Dissolved	Water	6010C	614950
MB 680-614950/1-A	Method Blank	Total Recoverable	Water	6010C	614950
LCS 680-614950/2-A	Lab Control Sample	Total Recoverable	Water	6010C	614950
680-182711-5 MS	5703VP-20-03-15-17	Dissolved	Water	6010C	614950
680-182711-5 MSD	5703VP-20-03-15-17	Dissolved	Water	6010C	614950

Lab Chronicle

Client: KOMAN Government Solutions, LLC
Project/Site: Fort Devens - LTM

Job ID: 680-182711-1

Client Sample ID: 5703VP-20-02-25-27
Lab Sample ID: 680-182711-1

Date Collected: 04/09/20 08:10
Date Received: 04/11/20 10:00
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	614950	04/13/20 13:25	AJR	TAL SAV
Dissolved	Analysis	6010C		1			615305	04/15/20 03:41	BCB	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	614948	04/13/20 13:25	AJR	TAL SAV
Dissolved	Analysis	6020A		1			615183	04/14/20 19:59	BJB	TAL SAV
	Instrument ID:	ICPMSD								

Client Sample ID: 5703VP-20-02-30-32
Lab Sample ID: 680-182711-2

Date Collected: 04/09/20 09:15
Date Received: 04/11/20 10:00
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	614950	04/13/20 13:25	AJR	TAL SAV
Dissolved	Analysis	6010C		1			615305	04/15/20 03:22	BCB	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	614948	04/13/20 13:25	AJR	TAL SAV
Dissolved	Analysis	6020A		1			615183	04/14/20 19:43	BJB	TAL SAV
	Instrument ID:	ICPMSD								

Client Sample ID: 5703VP-20-03-5-7
Lab Sample ID: 680-182711-3

Date Collected: 04/09/20 11:10
Date Received: 04/11/20 10:00
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	614950	04/13/20 13:25	AJR	TAL SAV
Dissolved	Analysis	6010C		1			615305	04/15/20 03:32	BCB	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	614948	04/13/20 13:25	AJR	TAL SAV
Dissolved	Analysis	6020A		1			615183	04/14/20 19:51	BJB	TAL SAV
	Instrument ID:	ICPMSD								

Client Sample ID: 5703VP-20-03-10-12
Lab Sample ID: 680-182711-4

Date Collected: 04/09/20 12:40
Date Received: 04/11/20 10:00
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	614950	04/13/20 13:25	AJR	TAL SAV
Dissolved	Analysis	6010C		1			615305	04/15/20 03:03	BCB	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	614948	04/13/20 13:25	AJR	TAL SAV
Dissolved	Analysis	6020A		1			615183	04/14/20 19:26	BJB	TAL SAV
	Instrument ID:	ICPMSD								

Lab Chronicle

Client: KOMAN Government Solutions, LLC
Project/Site: Fort Devens - LTM

Job ID: 680-182711-1

Client Sample ID: 5703VP-20-03-15-17 — Lab Sample ID: 680-182711-5

Date Collected: 04/09/20 13:35 — **Matrix: Water**
Date Received: 04/11/20 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	614950	04/13/20 13:25	AJR	TAL SAV
Dissolved	Analysis	6010C		1			615305	04/15/20 02:34	BCB	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	614948	04/13/20 13:25	AJR	TAL SAV
Dissolved	Analysis	6020A		1			615183	04/14/20 19:02	BJB	TAL SAV
	Instrument ID:	ICPMSD								

Client Sample ID: 5703VP-20-03-20-22 — Lab Sample ID: 680-182711-6

Date Collected: 04/10/20 09:08 — **Matrix: Water**
Date Received: 04/11/20 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	614950	04/13/20 13:25	AJR	TAL SAV
Dissolved	Analysis	6010C		1			615305	04/15/20 03:08	BCB	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	614948	04/13/20 13:25	AJR	TAL SAV
Dissolved	Analysis	6020A		1			615183	04/14/20 19:30	BJB	TAL SAV
	Instrument ID:	ICPMSD								

Client Sample ID: A1-VP-DUP-41020 — Lab Sample ID: 680-182711-7

Date Collected: 04/10/20 09:13 — **Matrix: Water**
Date Received: 04/11/20 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	614950	04/13/20 13:25	AJR	TAL SAV
Dissolved	Analysis	6010C		1			615305	04/15/20 02:58	BCB	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	614948	04/13/20 13:25	AJR	TAL SAV
Dissolved	Analysis	6020A		1			615183	04/14/20 19:22	BJB	TAL SAV
	Instrument ID:	ICPMSD								

Client Sample ID: 5703VP-20-03-25-27 — Lab Sample ID: 680-182711-8

Date Collected: 04/10/20 10:16 — **Matrix: Water**
Date Received: 04/11/20 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	614950	04/13/20 13:25	AJR	TAL SAV
Dissolved	Analysis	6010C		1			615305	04/15/20 03:27	BCB	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	614948	04/13/20 13:25	AJR	TAL SAV
Dissolved	Analysis	6020A		1			615183	04/14/20 19:47	BJB	TAL SAV
	Instrument ID:	ICPMSD								

Lab Chronicle

Client: KOMAN Government Solutions, LLC
Project/Site: Fort Devens - LTM

Job ID: 680-182711-1

Client Sample ID: 5703VP-20-03-30-32

Date Collected: 04/10/20 11:25
Date Received: 04/11/20 10:00

Lab Sample ID: 680-182711-9

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	614950	04/13/20 13:25	AJR	TAL SAV
Dissolved	Analysis	6010C		1			615305	04/15/20 03:36	BCB	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	614948	04/13/20 13:25	AJR	TAL SAV
Dissolved	Analysis	6020A		1			615183	04/14/20 19:55	BJB	TAL SAV
	Instrument ID:	ICPMSD								

Laboratory References:

TAL SAV = Eurofins TestAmerica, Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

CHAIN-OF-CUSTODY RECORD

KOMAN Government Services, LLC
Laurie Ekes
293 Boston Post Road West, Suite 100, Marlborough, MA 01752
(508) 508.366.7442, lekes@komangs.com

Boston #215 COC# MARCH2020

KGS

Project Name: Long Term Monitoring	Laboratory: TestAmerica Laboratories, Inc., Savannah, GA	Event: KOMAN, Long Term Monitoring,
Project Number: DEVNS-LTM	POC: Jerry Lanier912.354.7858jerry.lanier@testamericainc.com	
WBS Code: Purchase Order 18-706	Ship to: 5102 LaRoche Avenue, Savannah, GA 31404	

Comments:
SW6010C/FLDFLT (B) = Fe Mn
SW6020A/FLDFLT (B) = As

Equipment:

Code	Matrix
WG	Ground Water

Code	Container/Preservative
9	1x 250mL, plastic, HNO3, pH < 2; Cool < 6degC

Event: KOMAN, Long Term Monitoring, AOC 57 Supplemental MW Winter

	Sample ID	Matrix	Date	Time	Samp Init.	SW6010C/FLDFLT (B) (Analytical Test Method)	SW6020A/FLDFLT (B) (Analytical Test Method)	Location ID	Sample Type	Depth (ft bgs) Top	Depth (ft bgs) Bottom	Cooler
						9	9					
	5703VP-20-02-25-27	WG	4/9/20	810	WA	X	X	5703VP-20-02	N1	25	27	1
2	5703VP-20-02-30-32		4/9/20	915	WA	X	X	5703VP-20-02	N1	30	32	
3	5703VP-20-03-5-7		4/9/20	1110	WA	X	X	5703VP-20-03	N1	5	7	
4	5703VP-20-03-10-12		4/9/20	1240	WA	X	X	5703VP-20-03	N1	10	12	
5	5703VP-20-03-15-17		4/9/20	1335	WA	X	X	5703VP-20-03	N1	15	17	
6	5703VP-20-03-20-22		4/10/20	908	WA	X	X	5703VP-20-03	N1	20	22	
7	A1-VP-DUP-4/1020		4/10/20	913	WA	X	X	5703VP-20-03	N1	20	22	
8	5703VP-20-03-25-27		4/10/20	1016	WA	X	X	5703VP-20-03	N1	25	27	
9	5703VP-20-03-30-32		4/10/20	1125	WA	X	X	5703VP-20-03	N1	30	32	

Turnaround Time: 21 days

680-182711 Chain of Custody

Relinquished by: *(Signature)*	Date	Time	Received by: *(Signature)*	Date	Time
[signature]	4/10/20		[signature]	4-10-20	1500
[signature]	4-10-20	1500			

Shipping Date / Carrier / Airbill Number
Shipping Date: 3/6/2020

Received by Laboratory: *(Signature, Date, Time)* **& condition**
[signature] 1.5/1.9
4-11-2020 / 10:00

ENV.COC_Field
March 27, 2020

Login Sample Receipt Checklist

Client: KOMAN Government Solutions, LLC

Job Number: 680-182711-1

Login Number: 182711
List Number: 1
Creator: Laughlin, Paul D

List Source: Eurofins TestAmerica, Savannah

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Accreditation/Certification Summary

Client: KOMAN Government Solutions, LLC
Job ID: 680-182711-1
Project/Site: Fort Devens - LTM

Laboratory: Eurofins TestAmerica, Savannah

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
ANAB	Dept. of Defense ELAP	L2463	09-22-22

eurofins | Environment Testing TestAmerica

ANALYTICAL REPORT

Eurofins TestAmerica, Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Tel: (912)354-7858

Laboratory Job ID: 680-182840-1
Client Project/Site: LTM - AOC 57 Supplemental MW Winter

For:
KOMAN Government Solutions, LLC
293 Boston Post Road West
Suite 100
Marlborough, Massachusetts 01752

Attn: Laurie Ekes

Authorized for release by:
4/22/2020 4:54:22 PM

Jerry Lanier, Project Manager I
(912)250-0281
jerry.lanier@testamericainc.com

LINKS

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The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

Table of Contents

Cover Page 1
Table of Contents 2
Case Narrative 3
Sample Summary 5
Method Summary 6
Definitions/Glossary 7
Client Sample Results 8
QC Sample Results 9
QC Association Summary 10
Lab Chronicle 11
Chain of Custody 12
Receipt Checklists 13
Certification Summary 14

Job ID: 680-182840-1

Laboratory: Eurofins TestAmerica, Savannah

Narrative

Job Narrative
680-182840-1

Comments
No additional comments.

Receipt
The samples were received on 4/16/2020 9:00 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 4.2º C.

Metals
Method 6020A:

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

CASE NARRATIVE

Client: KOMAN Government Solutions, LLC

Project: LTM - AOC 57 Supplemental MW Winter

Report Number: 680-182840-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

RECEIPT
The samples were received on 04/16/2020; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 4.2 C.

METALS (ICP) - DISSOLVED
Samples 5703VP-20-04-5-7 (680-182840-1), 5703VP-20-04-10-12 (680-182840-2), 5703VP-20-04-15-17 (680-182840-3) and 5703VP-20-04-20-22 (680-182840-4) were analyzed for Metals (ICP) - Dissolved in accordance with EPA SW-846 Method 6010C. The samples were prepared on 04/17/2020 and analyzed on 04/21/2020.

The interference check standard solution (ICSA) associated with the following samples showed results for Cobalt at a level greater than 2 times the limit of detection (LOD). It is believed that the solution contains trace impurities of this element / these elements and the results are not due to matrix interference. These results are consistent with those found by the manufacturer of the ICSA solution.
5703VP-20-04-5-7 (680-182840-1), 5703VP-20-04-10-12 (680-182840-2), 5703VP-20-04-15-17 (680-182840-3) and 5703VP-20-04-20-22 (680-182840-4)

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

METALS (ICPMS) - DISSOLVED
Samples 5703VP-20-04-5-7 (680-182840-1), 5703VP-20-04-10-12 (680-182840-2), 5703VP-20-04-15-17 (680-182840-3) and 5703VP-20-04-20-22 (680-182840-4) were analyzed for Metals (ICPMS) - Dissolved in accordance with EPA SW-846 Method 6020A. The samples were prepared and analyzed on 04/17/2020.

Job ID: 680-182840-1 (Continued)

Laboratory: Eurofins TestAmerica, Savannah (Continued)

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Sample Summary

Client: KOMAN Government Solutions, LLC
Project/Site: LTM - AOC 57 Supplemental MW Winter

Job ID: 680-182840-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
680-182840-1	5703VP-20-04-5-7	Water	04/15/20 09:15	04/16/20 09:00	
680-182840-2	5703VP-20-04-10-12	Water	04/15/20 09:50	04/16/20 09:00	
680-182840-3	5703VP-20-04-15-17	Water	04/15/20 10:25	04/16/20 09:00	
680-182840-4	5703VP-20-04-20-22	Water	04/15/20 12:38	04/16/20 09:00	

Method Summary

Client: KOMAN Government Solutions, LLC
Project/Site: LTM - AOC 57 Supplemental MW Winter

Job ID: 680-182840-1

Method	Method Description	Protocol	Laboratory
6010C	Metals (ICP)	SW846	TAL SAV
6020A	Metals (ICP/MS)	SW846	TAL SAV
3005A	Preparation, Total Recoverable or Dissolved Metals	SW846	TAL SAV

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL SAV = Eurofins TestAmerica, Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

Definitions/Glossary

Client: KOMAN Government Solutions, LLC
Job ID: 680-182840-1
Project/Site: LTM - AOC 57 Supplemental MW Winter

Qualifiers

Metals

Qualifier	Qualifier Description
J	Estimated: The analyte was positively identified; the quantitation is an estimation
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Client Sample Results

Client: KOMAN Government Solutions, LLC
Project/Site: LTM - AOC 57 Supplemental MW Winter

Job ID: 680-182840-1

Client Sample ID: 5703VP-20-04-5-7

Lab Sample ID: 680-182840-1
Date Collected: 04/15/20 09:15
Matrix: Water
Date Received: 04/16/20 09:00

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	160		50	50	17	ug/L		04/21/20 00:37	1
Manganese	8.8	J	10	3.0	1.0	ug/L		04/21/20 00:37	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	3.0	U	3.0	3.0	1.5	ug/L		04/17/20 17:15	1

Client Sample ID: 5703VP-20-04-10-12

Lab Sample ID: 680-182840-2
Date Collected: 04/15/20 09:50
Matrix: Water
Date Received: 04/16/20 09:00

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	89		50	50	17	ug/L		04/21/20 00:42	1
Manganese	9.7	J	10	3.0	1.0	ug/L		04/21/20 00:42	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	3.0	U	3.0	3.0	1.5	ug/L		04/17/20 17:19	1

Client Sample ID: 5703VP-20-04-15-17

Lab Sample ID: 680-182840-3
Date Collected: 04/15/20 10:25
Matrix: Water
Date Received: 04/16/20 09:00

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	370		50	50	17	ug/L		04/21/20 00:47	1
Manganese	26		10	3.0	1.0	ug/L		04/21/20 00:47	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	3.0	U	3.0	3.0	1.5	ug/L		04/17/20 17:23	1

Client Sample ID: 5703VP-20-04-20-22

Lab Sample ID: 680-182840-4
Date Collected: 04/15/20 12:38
Matrix: Water
Date Received: 04/16/20 09:00

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	52		50	50	17	ug/L		04/21/20 00:51	1
Manganese	19		10	3.0	1.0	ug/L		04/21/20 00:51	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	3.0	U	3.0	3.0	1.5	ug/L		04/17/20 17:27	1

QC Sample Results

Client: KOMAN Government Solutions, LLC
Project/Site: LTM - AOC 57 Supplemental MW Winter

Job ID: 680-182840-1

Method: 6010C - Metals (ICP)

Lab Sample ID: MB 680-615539/1-A
Matrix: Water
Analysis Batch: 615989

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 615539

Analyte	MB Result	MB Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	50	U	50	50	17	ug/L		04/20/20 23:54	1
Manganese	3.0	U	10	3.0	1.0	ug/L		04/20/20 23:54	1

Lab Sample ID: LCS 680-615539/2-A
Matrix: Water
Analysis Batch: 615989

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 615539

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Iron	5010	4660		ug/L		93	87 - 115
Manganese	400	373		ug/L		93	90 - 114

Method: 6020A - Metals (ICP/MS)

Lab Sample ID: MB 680-615537/1-A
Matrix: Water
Analysis Batch: 615743

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 615537

Analyte	MB Result	MB Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	3.0	U	3.0	3.0	1.5	ug/L		04/17/20 15:42	1

Lab Sample ID: LCS 680-615537/2-A
Matrix: Water
Analysis Batch: 615743

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 615537

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	100	106		ug/L		106	84 - 116

QC Association Summary

Client: KOMAN Government Solutions, LLC
Project/Site: LTM - AOC 57 Supplemental MW Winter

Job ID: 680-182840-1

Metals

Prep Batch: 615537

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-182840-1	5703VP-20-04-5-7	Dissolved	Water	3005A	
680-182840-2	5703VP-20-04-10-12	Dissolved	Water	3005A	
680-182840-3	5703VP-20-04-15-17	Dissolved	Water	3005A	
680-182840-4	5703VP-20-04-20-22	Dissolved	Water	3005A	
MB 680-615537/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 680-615537/2-A	Lab Control Sample	Total Recoverable	Water	3005A	

Prep Batch: 615539

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-182840-1	5703VP-20-04-5-7	Dissolved	Water	3005A	
680-182840-2	5703VP-20-04-10-12	Dissolved	Water	3005A	
680-182840-3	5703VP-20-04-15-17	Dissolved	Water	3005A	
680-182840-4	5703VP-20-04-20-22	Dissolved	Water	3005A	
MB 680-615539/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 680-615539/2-A	Lab Control Sample	Total Recoverable	Water	3005A	

Analysis Batch: 615743

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-182840-1	5703VP-20-04-5-7	Dissolved	Water	6020A	615537
680-182840-2	5703VP-20-04-10-12	Dissolved	Water	6020A	615537
680-182840-3	5703VP-20-04-15-17	Dissolved	Water	6020A	615537
680-182840-4	5703VP-20-04-20-22	Dissolved	Water	6020A	615537
MB 680-615537/1-A	Method Blank	Total Recoverable	Water	6020A	615537
LCS 680-615537/2-A	Lab Control Sample	Total Recoverable	Water	6020A	615537

Analysis Batch: 615989

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-182840-1	5703VP-20-04-5-7	Dissolved	Water	6010C	615539
680-182840-2	5703VP-20-04-10-12	Dissolved	Water	6010C	615539
680-182840-3	5703VP-20-04-15-17	Dissolved	Water	6010C	615539
680-182840-4	5703VP-20-04-20-22	Dissolved	Water	6010C	615539
MB 680-615539/1-A	Method Blank	Total Recoverable	Water	6010C	615539
LCS 680-615539/2-A	Lab Control Sample	Total Recoverable	Water	6010C	615539

Lab Chronicle

Client: KOMAN Government Solutions, LLC
Project/Site: LTM - AOC 57 Supplemental MW Winter

Job ID: 680-182840-1

Client Sample ID: 5703VP-20-04-5-7

Lab Sample ID: 680-182840-1
Date Collected: 04/15/20 09:15
Matrix: Water
Date Received: 04/16/20 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	615539	04/17/20 10:27	AJR	TAL SAV
Dissolved	Analysis	6010C		1			615989	04/21/20 00:37	BCB	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	615537	04/17/20 10:27	AJR	TAL SAV
Dissolved	Analysis	6020A		1			615743	04/17/20 17:15	BJB	TAL SAV
	Instrument ID:	ICPMSD								

Client Sample ID: 5703VP-20-04-10-12

Lab Sample ID: 680-182840-2
Date Collected: 04/15/20 09:50
Matrix: Water
Date Received: 04/16/20 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	615539	04/17/20 10:27	AJR	TAL SAV
Dissolved	Analysis	6010C		1			615989	04/21/20 00:42	BCB	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	615537	04/17/20 10:27	AJR	TAL SAV
Dissolved	Analysis	6020A		1			615743	04/17/20 17:19	BJB	TAL SAV
	Instrument ID:	ICPMSD								

Client Sample ID: 5703VP-20-04-15-17

Lab Sample ID: 680-182840-3
Date Collected: 04/15/20 10:25
Matrix: Water
Date Received: 04/16/20 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	615539	04/17/20 10:27	AJR	TAL SAV
Dissolved	Analysis	6010C		1			615989	04/21/20 00:47	BCB	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	615537	04/17/20 10:27	AJR	TAL SAV
Dissolved	Analysis	6020A		1			615743	04/17/20 17:23	BJB	TAL SAV
	Instrument ID:	ICPMSD								

Client Sample ID: 5703VP-20-04-20-22

Lab Sample ID: 680-182840-4
Date Collected: 04/15/20 12:38
Matrix: Water
Date Received: 04/16/20 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	615539	04/17/20 10:27	AJR	TAL SAV
Dissolved	Analysis	6010C		1			615989	04/21/20 00:51	BCB	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	615537	04/17/20 10:27	AJR	TAL SAV
Dissolved	Analysis	6020A		1			615743	04/17/20 17:27	BJB	TAL SAV
	Instrument ID:	ICPMSD								

Laboratory References:

TAL SAV = Eurofins TestAmerica, Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

CHAIN-OF-CUSTODY RECORD

KOMAN Government Services, LLC
Laurie Ekes
293 Boston Post Road West, Suite 100, Marlborough, MA 01752
(508) 508.366.7442, lekes@komangs.com

COC # MARCH2020

KGS

Project Name: Long Term Monitoring	Laboratory: TestAmerica Laboratories, Inc., Savannah, GA	Event: KOMAN, Long Term Monitoring,
Project Number: DEVNS-LTM	POC: Jerry Lanier912.354.7858jerry.lanier@testamericainc.com	
WBS Code: Purchase Order 18-706	Ship to: 5102 LaRoche Avenue, Savannah, GA 31404	

Comments:
SW6010C/FLDFLT (B) = Fe Mn
SW6020A/FLDFLT (B) = As

Equipment:

Code	Matrix
WG	Ground Water

Code	Container/Preservative
9	1x 250mL, plastic, HNO3, pH < 2; Cool < 6degC

	Sample ID	Matrix	Date	Time	Samp Init.	SW6010C/FLDFLT (B)	SW6020A/FLDFLT (B)	Location ID	Sample Type	Depth (ft bgs) Top	Depth (ft bgs) Bottom	Cooler	Comments
	Event: KOMAN, Long Term Monitoring, AOC 57 Supplemental MW Winter					9	9						
	5703VP-20-04-5-7	WG	4/15/20	915	[illegible]	X	X	5703VP-20-04	N1	5	7	1	
2	5703VP-20-04-10-12		4/15/20	950	[illegible]	X	X	5703VP-20-04	N1	10	12		
3	5703VP-20-04-15-17		4/15/20	1025	[illegible]	X	X	5703VP-20-04	N1	15	17		
4	5703VP-20-04-20-22		4/15/20	1238	[illegible]	X	X	5703VP-20-04	N1	20	22		
5													
6													
7													
8													
9													

Turnaround Time: 21 days

680-182840 Chain of Custody

Relinquished by: *(Signature)*	Date	Time	Received by: *(Signature)*	Date	Time
[signature]	4/15/20	1440	[signature]	4/15/20	1500
[signature]	4/15/20	1700			

Shipping Date / Carrier / Airbill Number
Shipping Date: 3/6/2020

Received by Laboratory: *(Signature, Date, Time)* **& condition**
DW 4-16-2020 / 0900
3.8/4.2

ENV.COC_Field
March 27, 2020

Page 1 of 1

Login Sample Receipt Checklist

Client: KOMAN Government Solutions, LLC

Job Number: 680-182840-1

Login Number: 182840

List Source: Eurofins TestAmerica, Savannah

List Number: 1

Creator: Laughlin, Paul D

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Accreditation/Certification Summary

Client: KOMAN Government Solutions, LLC
Job ID: 680-182840-1
Project/Site: LTM - AOC 57 Supplemental MW Winter

Laboratory: Eurofins TestAmerica, Savannah

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
ANAB	Dept. of Defense ELAP	L2463	09-22-22

eurofins | Environment Testing TestAmerica

ANALYTICAL REPORT

Eurofins TestAmerica, Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Tel: (912)354-7858

Laboratory Job ID: 680-182934-1
Client Project/Site: LTM - AOC 57 Supplemental MW Winter

For:
KOMAN Government Solutions, LLC
293 Boston Post Road West
Suite 100
Marlborough, Massachusetts 01752

Attn: Laurie Ekes

Authorized for release by:
4/24/2020 2:50:31 PM

Jerry Lanier, Project Manager I
(912)250-0281
jerry.lanier@testamericainc.com

LINKS

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The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

Table of Contents

Cover Page 1
Table of Contents 2
Case Narrative 3
Sample Summary 4
Method Summary 5
Definitions/Glossary 6
Client Sample Results 7
QC Sample Results 10
QC Association Summary 12
Lab Chronicle 14
Chain of Custody 17
Receipt Checklists 19
Certification Summary 20

Job ID: 680-182934-1

Laboratory: Eurofins TestAmerica, Savannah

Narrative

CASE NARRATIVE

Client: KOMAN Government Solutions, LLC

Project: LTM - AOC 57 Supplemental MW Winter

Report Number: 680-182934-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

RECEIPT
The samples were received on 04/18/2020; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 0.7 C.

METALS (ICP) - DISSOLVED
Samples A1-VP-EB-41620 (680-182934-1), 5702VP-20-04-10-12 (680-182934-2), 5702VP-20-04-15-17 (680-182934-3), 5702VP-20-04-25-27 (680-182934-5), 5702VP-20-04-30-32 (680-182934-6), 5702VP-20-04-35-37 (680-182934-7), A1-VP-DUP-1-41620 (680-182934-8), 5702VP-20-03-5-7 (680-182934-9), 5702VP-20-03-10-14 (680-182934-10), 5702VP-20-03-15-19 (680-182934-11), 5702VP-20-03-20-24 (680-182934-12) and A1-VP-DUP-1-41720 (680-182934-13) were analyzed for Metals (ICP) - Dissolved in accordance with EPA SW-846 Method 6010C. The samples were prepared on 04/21/2020 and analyzed on 04/22/2020.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

METALS (ICPMS) - DISSOLVED
Samples A1-VP-EB-41620 (680-182934-1), 5702VP-20-04-10-12 (680-182934-2), 5702VP-20-04-15-17 (680-182934-3), 5702VP-20-04-25-27 (680-182934-5), 5702VP-20-04-30-32 (680-182934-6), 5702VP-20-04-35-37 (680-182934-7), A1-VP-DUP-1-41620 (680-182934-8), 5702VP-20-03-5-7 (680-182934-9), 5702VP-20-03-10-14 (680-182934-10), 5702VP-20-03-15-19 (680-182934-11), 5702VP-20-03-20-24 (680-182934-12) and A1-VP-DUP-1-41720 (680-182934-13) were analyzed for Metals (ICPMS) - Dissolved in accordance with EPA SW-846 Method 6020A. The samples were prepared on 04/21/2020 and analyzed on 04/22/2020.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Sample Summary

Client: KOMAN Government Solutions, LLC
Project/Site: LTM - AOC 57 Supplemental MW Winter

Job ID: 680-182934-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
680-182934-1	A1-VP-EB-41620	Water	04/16/20 08:00	04/18/20 09:50	
680-182934-2	5702VP-20-04-10-12	Water	04/16/20 10:10	04/18/20 09:50	
680-182934-3	5702VP-20-04-15-17	Water	04/16/20 10:50	04/18/20 09:50	
680-182934-5	5702VP-20-04-25-27	Water	04/16/20 12:45	04/18/20 09:50	
680-182934-6	5702VP-20-04-30-32	Water	04/16/20 13:35	04/18/20 09:50	
680-182934-7	5702VP-20-04-35-37	Water	04/16/20 14:15	04/18/20 09:50	
680-182934-8	A1-VP-DUP-1-41620	Water	04/16/20 10:55	04/18/20 09:50	
680-182934-9	5702VP-20-03-5-7	Water	04/17/20 10:18	04/18/20 09:50	
680-182934-10	5702VP-20-03-10-14	Water	04/17/20 11:58	04/18/20 09:50	
680-182934-11	5702VP-20-03-15-19	Water	04/17/20 13:00	04/18/20 09:50	
680-182934-12	5702VP-20-03-20-24	Water	04/17/20 14:00	04/18/20 09:50	
680-182934-13	A1-VP-DUP-1-41720	Water	04/17/20 13:05	04/18/20 09:50	

Method Summary

Client: KOMAN Government Solutions, LLC
Project/Site: LTM - AOC 57 Supplemental MW Winter

Job ID: 680-182934-1

Method	Method Description	Protocol	Laboratory
6010C	Metals (ICP)	SW846	TAL SAV
6020A	Metals (ICP/MS)	SW846	TAL SAV
3005A	Preparation, Total Recoverable or Dissolved Metals	SW846	TAL SAV

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL SAV = Eurofins TestAmerica, Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

Definitions/Glossary

Client: KOMAN Government Solutions, LLC
Job ID: 680-182934-1
Project/Site: LTM - AOC 57 Supplemental MW Winter

Qualifiers

Metals

Qualifier	Qualifier Description
J	Estimated: The analyte was positively identified; the quantitation is an estimation
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Client Sample Results

Client: KOMAN Government Solutions, LLC
Project/Site: LTM - AOC 57 Supplemental MW Winter

Job ID: 680-182934-1

Client Sample ID: A1-VP-EB-41620

Lab Sample ID: 680-182934-1
Date Collected: 04/16/20 08:00
Matrix: Water
Date Received: 04/18/20 09:50

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	50	U	50	50	17	ug/L		04/22/20 03:00	1
Manganese	3.0	U	10	3.0	1.0	ug/L		04/22/20 03:00	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	3.0	U	3.0	3.0	1.5	ug/L		04/22/20 17:05	1

Client Sample ID: 5702VP-20-04-10-12

Lab Sample ID: 680-182934-2
Date Collected: 04/16/20 10:10
Matrix: Water
Date Received: 04/18/20 09:50

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	**190**		50	50	17	ug/L		04/22/20 02:07	1
Manganese	**170**		10	3.0	1.0	ug/L		04/22/20 02:07	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	3.0	U	3.0	3.0	1.5	ug/L		04/22/20 16:24	1

Client Sample ID: 5702VP-20-04-15-17

Lab Sample ID: 680-182934-3
Date Collected: 04/16/20 10:50
Matrix: Water
Date Received: 04/18/20 09:50

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	**450**		50	50	17	ug/L		04/22/20 03:05	1
Manganese	**77**		10	3.0	1.0	ug/L		04/22/20 03:05	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	**8.4**		3.0	3.0	1.5	ug/L		04/22/20 17:09	1

Client Sample ID: 5702VP-20-04-25-27

Lab Sample ID: 680-182934-5
Date Collected: 04/16/20 12:45
Matrix: Water
Date Received: 04/18/20 09:50

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	**4700**		50	50	17	ug/L		04/22/20 03:19	1
Manganese	**710**		10	3.0	1.0	ug/L		04/22/20 03:19	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	**8.1**		3.0	3.0	1.5	ug/L		04/22/20 17:13	1

Client Sample Results

Client: KOMAN Government Solutions, LLC
Project/Site: LTM - AOC 57 Supplemental MW Winter

Job ID: 680-182934-1

Client Sample ID: 5702VP-20-04-30-32

Lab Sample ID: 680-182934-6
Date Collected: 04/16/20 13:35
Matrix: Water
Date Received: 04/18/20 09:50

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	250		50	50	17	ug/L		04/22/20 03:24	1
Manganese	300		10	3.0	1.0	ug/L		04/22/20 03:24	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	2.8	J	3.0	3.0	1.5	ug/L		04/22/20 17:16	1

Client Sample ID: 5702VP-20-04-35-37

Lab Sample ID: 680-182934-7
Date Collected: 04/16/20 14:15
Matrix: Water
Date Received: 04/18/20 09:50

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	180		50	50	17	ug/L		04/22/20 02:31	1
Manganese	110		10	3.0	1.0	ug/L		04/22/20 02:31	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	2.2	J	3.0	3.0	1.5	ug/L		04/22/20 16:43	1

Client Sample ID: A1-VP-DUP-1-41620

Lab Sample ID: 680-182934-8
Date Collected: 04/16/20 10:55
Matrix: Water
Date Received: 04/18/20 09:50

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	97		50	50	17	ug/L		04/22/20 02:36	1
Manganese	74		10	3.0	1.0	ug/L		04/22/20 02:36	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	5.2		3.0	3.0	1.5	ug/L		04/22/20 16:47	1

Client Sample ID: 5702VP-20-03-5-7

Lab Sample ID: 680-182934-9
Date Collected: 04/17/20 10:18
Matrix: Water
Date Received: 04/18/20 09:50

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	200		50	50	17	ug/L		04/22/20 02:41	1
Manganese	49		10	3.0	1.0	ug/L		04/22/20 02:41	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	3.0	U	3.0	3.0	1.5	ug/L		04/22/20 16:50	1

Client Sample Results

Client: KOMAN Government Solutions, LLC
Project/Site: LTM - AOC 57 Supplemental MW Winter

Job ID: 680-182934-1

Client Sample ID: 5702VP-20-03-10-14

Lab Sample ID: 680-182934-10
Date Collected: 04/17/20 11:58
Matrix: Water
Date Received: 04/18/20 09:50

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	210		50	50	17	ug/L		04/22/20 01:43	1
Manganese	97		10	3.0	1.0	ug/L		04/22/20 01:43	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	3.0	U	3.0	3.0	1.5	ug/L		04/22/20 16:06	1

Client Sample ID: 5702VP-20-03-15-19

Lab Sample ID: 680-182934-11
Date Collected: 04/17/20 13:00
Matrix: Water
Date Received: 04/18/20 09:50

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	550		50	50	17	ug/L		04/22/20 02:46	1
Manganese	160		10	3.0	1.0	ug/L		04/22/20 02:46	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	3.0	U	3.0	3.0	1.5	ug/L		04/22/20 16:54	1

Client Sample ID: 5702VP-20-03-20-24

Lab Sample ID: 680-182934-12
Date Collected: 04/17/20 14:00
Matrix: Water
Date Received: 04/18/20 09:50

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	180		50	50	17	ug/L		04/22/20 02:55	1
Manganese	73		10	3.0	1.0	ug/L		04/22/20 02:55	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	1.5	J	3.0	3.0	1.5	ug/L		04/22/20 17:02	1

Client Sample ID: A1-VP-DUP-1-41720

Lab Sample ID: 680-182934-13
Date Collected: 04/17/20 13:05
Matrix: Water
Date Received: 04/18/20 09:50

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	670		50	50	17	ug/L		04/22/20 02:50	1
Manganese	190		10	3.0	1.0	ug/L		04/22/20 02:50	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	3.0	U	3.0	3.0	1.5	ug/L		04/22/20 16:58	1

QC Sample Results

Client: KOMAN Government Solutions, LLC
Project/Site: LTM - AOC 57 Supplemental MW Winter

Job ID: 680-182934-1

Method: 6010C - Metals (ICP)

Lab Sample ID: MB 680-615966/1-A — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total Recoverable**
Analysis Batch: 616163 — **Prep Batch: 615966**

Analyte	MB Result	MB Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	50	U	50	50	17	ug/L		04/22/20 01:34	1
Manganese	3.0	U	10	3.0	1.0	ug/L		04/22/20 01:34	1

Lab Sample ID: LCS 680-615966/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total Recoverable**
Analysis Batch: 616163 — **Prep Batch: 615966**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Iron	5010	4680		ug/L		93	87 - 115
Manganese	400	376		ug/L		94	90 - 114

Lab Sample ID: 680-182934-2 MS — **Client Sample ID: 5702VP-20-04-10-12**
Matrix: Water — **Prep Type: Dissolved**
Analysis Batch: 616163 — **Prep Batch: 615966**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Iron	190		5010	4900		ug/L		94	87 - 115
Manganese	170		400	552		ug/L		96	90 - 114

Lab Sample ID: 680-182934-2 MSD — **Client Sample ID: 5702VP-20-04-10-12**
Matrix: Water — **Prep Type: Dissolved**
Analysis Batch: 616163 — **Prep Batch: 615966**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Iron	190		5010	4950		ug/L		95	87 - 115	1	20
Manganese	170		400	579		ug/L		103	90 - 114	5	20

Lab Sample ID: 680-182934-10 MS — **Client Sample ID: 5702VP-20-03-10-14**
Matrix: Water — **Prep Type: Dissolved**
Analysis Batch: 616163 — **Prep Batch: 615966**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Iron	210		5010	4950		ug/L		95	87 - 115
Manganese	97		400	470		ug/L		93	90 - 114

Lab Sample ID: 680-182934-10 MSD — **Client Sample ID: 5702VP-20-03-10-14**
Matrix: Water — **Prep Type: Dissolved**
Analysis Batch: 616163 — **Prep Batch: 615966**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Iron	210		5010	4910		ug/L		94	87 - 115	1	20
Manganese	97		400	468		ug/L		93	90 - 114	0	20

QC Sample Results

Client: KOMAN Government Solutions, LLC
Project/Site: LTM - AOC 57 Supplemental MW Winter

Job ID: 680-182934-1

Method: 6020A - Metals (ICP/MS)

Lab Sample ID: MB 680-615965/1-A
Matrix: Water
Analysis Batch: 616228

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 615965

Analyte	MB Result	MB Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	3.0	U	3.0	3.0	1.5	ug/L		04/22/20 15:59	1

Lab Sample ID: LCS 680-615965/2-A
Matrix: Water
Analysis Batch: 616228

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 615965

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	100	102		ug/L		102	84 - 116

Lab Sample ID: 680-182934-2 MS
Matrix: Water
Analysis Batch: 616228

Client Sample ID: 5702VP-20-04-10-12
Prep Type: Dissolved
Prep Batch: 615965

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	3.0	U	100	109		ug/L		109	84 - 116

Lab Sample ID: 680-182934-2 MSD
Matrix: Water
Analysis Batch: 616228

Client Sample ID: 5702VP-20-04-10-12
Prep Type: Dissolved
Prep Batch: 615965

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Arsenic	3.0	U	100	106		ug/L		106	84 - 116	3	20

Lab Sample ID: 680-182934-10 MS
Matrix: Water
Analysis Batch: 616228

Client Sample ID: 5702VP-20-03-10-14
Prep Type: Dissolved
Prep Batch: 615965

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	3.0	U	100	107		ug/L		107	84 - 116

Lab Sample ID: 680-182934-10 MSD
Matrix: Water
Analysis Batch: 616228

Client Sample ID: 5702VP-20-03-10-14
Prep Type: Dissolved
Prep Batch: 615965

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Arsenic	3.0	U	100	111		ug/L		111	84 - 116	3	20

QC Association Summary

Client: KOMAN Government Solutions, LLC
Project/Site: LTM - AOC 57 Supplemental MW Winter

Job ID: 680-182934-1

Metals

Prep Batch: 615965

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-182934-1	A1-VP-EB-41620	Dissolved	Water	3005A	
680-182934-2	5702VP-20-04-10-12	Dissolved	Water	3005A	
680-182934-3	5702VP-20-04-15-17	Dissolved	Water	3005A	
680-182934-5	5702VP-20-04-25-27	Dissolved	Water	3005A	
680-182934-6	5702VP-20-04-30-32	Dissolved	Water	3005A	
680-182934-7	5702VP-20-04-35-37	Dissolved	Water	3005A	
680-182934-8	A1-VP-DUP-1-41620	Dissolved	Water	3005A	
680-182934-9	5702VP-20-03-5-7	Dissolved	Water	3005A	
680-182934-10	5702VP-20-03-10-14	Dissolved	Water	3005A	
680-182934-11	5702VP-20-03-15-19	Dissolved	Water	3005A	
680-182934-12	5702VP-20-03-20-24	Dissolved	Water	3005A	
680-182934-13	A1-VP-DUP-1-41720	Dissolved	Water	3005A	
MB 680-615965/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 680-615965/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
680-182934-2 MS	5702VP-20-04-10-12	Dissolved	Water	3005A	
680-182934-2 MSD	5702VP-20-04-10-12	Dissolved	Water	3005A	
680-182934-10 MS	5702VP-20-03-10-14	Dissolved	Water	3005A	
680-182934-10 MSD	5702VP-20-03-10-14	Dissolved	Water	3005A	

Prep Batch: 615966

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-182934-1	A1-VP-EB-41620	Dissolved	Water	3005A	
680-182934-2	5702VP-20-04-10-12	Dissolved	Water	3005A	
680-182934-3	5702VP-20-04-15-17	Dissolved	Water	3005A	
680-182934-5	5702VP-20-04-25-27	Dissolved	Water	3005A	
680-182934-6	5702VP-20-04-30-32	Dissolved	Water	3005A	
680-182934-7	5702VP-20-04-35-37	Dissolved	Water	3005A	
680-182934-8	A1-VP-DUP-1-41620	Dissolved	Water	3005A	
680-182934-9	5702VP-20-03-5-7	Dissolved	Water	3005A	
680-182934-10	5702VP-20-03-10-14	Dissolved	Water	3005A	
680-182934-11	5702VP-20-03-15-19	Dissolved	Water	3005A	
680-182934-12	5702VP-20-03-20-24	Dissolved	Water	3005A	
680-182934-13	A1-VP-DUP-1-41720	Dissolved	Water	3005A	
MB 680-615966/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 680-615966/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
680-182934-2 MS	5702VP-20-04-10-12	Dissolved	Water	3005A	
680-182934-2 MSD	5702VP-20-04-10-12	Dissolved	Water	3005A	
680-182934-10 MS	5702VP-20-03-10-14	Dissolved	Water	3005A	
680-182934-10 MSD	5702VP-20-03-10-14	Dissolved	Water	3005A	

Analysis Batch: 616163

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-182934-1	A1-VP-EB-41620	Dissolved	Water	6010C	615966
680-182934-2	5702VP-20-04-10-12	Dissolved	Water	6010C	615966
680-182934-3	5702VP-20-04-15-17	Dissolved	Water	6010C	615966
680-182934-5	5702VP-20-04-25-27	Dissolved	Water	6010C	615966
680-182934-6	5702VP-20-04-30-32	Dissolved	Water	6010C	615966
680-182934-7	5702VP-20-04-35-37	Dissolved	Water	6010C	615966
680-182934-8	A1-VP-DUP-1-41620	Dissolved	Water	6010C	615966
680-182934-9	5702VP-20-03-5-7	Dissolved	Water	6010C	615966
680-182934-10	5702VP-20-03-10-14	Dissolved	Water	6010C	615966

Metals (Continued)

Analysis Batch: 616163 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-182934-11	5702VP-20-03-15-19	Dissolved	Water	6010C	615966
680-182934-12	5702VP-20-03-20-24	Dissolved	Water	6010C	615966
680-182934-13	A1-VP-DUP-1-41720	Dissolved	Water	6010C	615966
MB 680-615966/1-A	Method Blank	Total Recoverable	Water	6010C	615966
LCS 680-615966/2-A	Lab Control Sample	Total Recoverable	Water	6010C	615966
680-182934-2 MS	5702VP-20-04-10-12	Dissolved	Water	6010C	615966
680-182934-2 MSD	5702VP-20-04-10-12	Dissolved	Water	6010C	615966
680-182934-10 MS	5702VP-20-03-10-14	Dissolved	Water	6010C	615966
680-182934-10 MSD	5702VP-20-03-10-14	Dissolved	Water	6010C	615966

Analysis Batch: 616228

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-182934-1	A1-VP-EB-41620	Dissolved	Water	6020A	615965
680-182934-2	5702VP-20-04-10-12	Dissolved	Water	6020A	615965
680-182934-3	5702VP-20-04-15-17	Dissolved	Water	6020A	615965
680-182934-5	5702VP-20-04-25-27	Dissolved	Water	6020A	615965
680-182934-6	5702VP-20-04-30-32	Dissolved	Water	6020A	615965
680-182934-7	5702VP-20-04-35-37	Dissolved	Water	6020A	615965
680-182934-8	A1-VP-DUP-1-41620	Dissolved	Water	6020A	615965
680-182934-9	5702VP-20-03-5-7	Dissolved	Water	6020A	615965
680-182934-10	5702VP-20-03-10-14	Dissolved	Water	6020A	615965
680-182934-11	5702VP-20-03-15-19	Dissolved	Water	6020A	615965
680-182934-12	5702VP-20-03-20-24	Dissolved	Water	6020A	615965
680-182934-13	A1-VP-DUP-1-41720	Dissolved	Water	6020A	615965
MB 680-615965/1-A	Method Blank	Total Recoverable	Water	6020A	615965
LCS 680-615965/2-A	Lab Control Sample	Total Recoverable	Water	6020A	615965
680-182934-2 MS	5702VP-20-04-10-12	Dissolved	Water	6020A	615965
680-182934-2 MSD	5702VP-20-04-10-12	Dissolved	Water	6020A	615965
680-182934-10 MS	5702VP-20-03-10-14	Dissolved	Water	6020A	615965
680-182934-10 MSD	5702VP-20-03-10-14	Dissolved	Water	6020A	615965

Lab Chronicle

Client: KOMAN Government Solutions, LLC
Project/Site: LTM - AOC 57 Supplemental MW Winter

Job ID: 680-182934-1

Client Sample ID: A1-VP-EB-41620

Lab Sample ID: 680-182934-1
Date Collected: 04/16/20 08:00
Matrix: Water
Date Received: 04/18/20 09:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	615966	04/21/20 13:11	BJB	TAL SAV
Dissolved	Analysis	6010C		1			616163	04/22/20 03:00	BCB	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	615965	04/21/20 13:11	BJB	TAL SAV
Dissolved	Analysis	6020A		1			616228	04/22/20 17:05	BWR	TAL SAV
	Instrument ID:	ICPMSC								

Client Sample ID: 5702VP-20-04-10-12

Lab Sample ID: 680-182934-2
Date Collected: 04/16/20 10:10
Matrix: Water
Date Received: 04/18/20 09:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	615966	04/21/20 13:11	BJB	TAL SAV
Dissolved	Analysis	6010C		1			616163	04/22/20 02:07	BCB	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	615965	04/21/20 13:11	BJB	TAL SAV
Dissolved	Analysis	6020A		1			616228	04/22/20 16:24	BWR	TAL SAV
	Instrument ID:	ICPMSC								

Client Sample ID: 5702VP-20-04-15-17

Lab Sample ID: 680-182934-3
Date Collected: 04/16/20 10:50
Matrix: Water
Date Received: 04/18/20 09:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	615966	04/21/20 13:11	BJB	TAL SAV
Dissolved	Analysis	6010C		1			616163	04/22/20 03:05	BCB	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	615965	04/21/20 13:11	BJB	TAL SAV
Dissolved	Analysis	6020A		1			616228	04/22/20 17:09	BWR	TAL SAV
	Instrument ID:	ICPMSC								

Client Sample ID: 5702VP-20-04-25-27

Lab Sample ID: 680-182934-5
Date Collected: 04/16/20 12:45
Matrix: Water
Date Received: 04/18/20 09:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	615966	04/21/20 13:11	BJB	TAL SAV
Dissolved	Analysis	6010C		1			616163	04/22/20 03:19	BCB	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	615965	04/21/20 13:11	BJB	TAL SAV
Dissolved	Analysis	6020A		1			616228	04/22/20 17:13	BWR	TAL SAV
	Instrument ID:	ICPMSC								

Lab Chronicle

Client: KOMAN Government Solutions, LLC
Project/Site: LTM - AOC 57 Supplemental MW Winter

Job ID: 680-182934-1

Client Sample ID: 5702VP-20-04-30-32 — Lab Sample ID: 680-182934-6

Date Collected: 04/16/20 13:35 — **Matrix: Water**
Date Received: 04/18/20 09:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	615966	04/21/20 13:11	BJB	TAL SAV
Dissolved	Analysis	6010C		1			616163	04/22/20 03:24	BCB	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	615965	04/21/20 13:11	BJB	TAL SAV
Dissolved	Analysis	6020A		1			616228	04/22/20 17:16	BWR	TAL SAV
	Instrument ID:	ICPMSC								

Client Sample ID: 5702VP-20-04-35-37 — Lab Sample ID: 680-182934-7

Date Collected: 04/16/20 14:15 — **Matrix: Water**
Date Received: 04/18/20 09:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	615966	04/21/20 13:11	BJB	TAL SAV
Dissolved	Analysis	6010C		1			616163	04/22/20 02:31	BCB	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	615965	04/21/20 13:11	BJB	TAL SAV
Dissolved	Analysis	6020A		1			616228	04/22/20 16:43	BWR	TAL SAV
	Instrument ID:	ICPMSC								

Client Sample ID: A1-VP-DUP-1-41620 — Lab Sample ID: 680-182934-8

Date Collected: 04/16/20 10:55 — **Matrix: Water**
Date Received: 04/18/20 09:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	615966	04/21/20 13:11	BJB	TAL SAV
Dissolved	Analysis	6010C		1			616163	04/22/20 02:36	BCB	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	615965	04/21/20 13:11	BJB	TAL SAV
Dissolved	Analysis	6020A		1			616228	04/22/20 16:47	BWR	TAL SAV
	Instrument ID:	ICPMSC								

Client Sample ID: 5702VP-20-03-5-7 — Lab Sample ID: 680-182934-9

Date Collected: 04/17/20 10:18 — **Matrix: Water**
Date Received: 04/18/20 09:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	615966	04/21/20 13:11	BJB	TAL SAV
Dissolved	Analysis	6010C		1			616163	04/22/20 02:41	BCB	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	615965	04/21/20 13:11	BJB	TAL SAV
Dissolved	Analysis	6020A		1			616228	04/22/20 16:50	BWR	TAL SAV
	Instrument ID:	ICPMSC								

Lab Chronicle

Client: KOMAN Government Solutions, LLC
Project/Site: LTM - AOC 57 Supplemental MW Winter

Job ID: 680-182934-1

Client Sample ID: 5702VP-20-03-10-14
Date Collected: 04/17/20 11:58
Date Received: 04/18/20 09:50

Lab Sample ID: 680-182934-10
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	615966	04/21/20 13:11	BJB	TAL SAV
Dissolved	Analysis	6010C		1			616163	04/22/20 01:43	BCB	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	615965	04/21/20 13:11	BJB	TAL SAV
Dissolved	Analysis	6020A		1			616228	04/22/20 16:06	BWR	TAL SAV
	Instrument ID:	ICPMSC								

Client Sample ID: 5702VP-20-03-15-19
Date Collected: 04/17/20 13:00
Date Received: 04/18/20 09:50

Lab Sample ID: 680-182934-11
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	615966	04/21/20 13:11	BJB	TAL SAV
Dissolved	Analysis	6010C		1			616163	04/22/20 02:46	BCB	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	615965	04/21/20 13:11	BJB	TAL SAV
Dissolved	Analysis	6020A		1			616228	04/22/20 16:54	BWR	TAL SAV
	Instrument ID:	ICPMSC								

Client Sample ID: 5702VP-20-03-20-24
Date Collected: 04/17/20 14:00
Date Received: 04/18/20 09:50

Lab Sample ID: 680-182934-12
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	615966	04/21/20 13:11	BJB	TAL SAV
Dissolved	Analysis	6010C		1			616163	04/22/20 02:55	BCB	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	615965	04/21/20 13:11	BJB	TAL SAV
Dissolved	Analysis	6020A		1			616228	04/22/20 17:02	BWR	TAL SAV
	Instrument ID:	ICPMSC								

Client Sample ID: A1-VP-DUP-1-41720
Date Collected: 04/17/20 13:05
Date Received: 04/18/20 09:50

Lab Sample ID: 680-182934-13
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	615966	04/21/20 13:11	BJB	TAL SAV
Dissolved	Analysis	6010C		1			616163	04/22/20 02:50	BCB	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	615965	04/21/20 13:11	BJB	TAL SAV
Dissolved	Analysis	6020A		1			616228	04/22/20 16:58	BWR	TAL SAV
	Instrument ID:	ICPMSC								

Laboratory References:

TAL SAV = Eurofins TestAmerica, Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

CHAIN-OF JSTODY RECORD

KOMAN Government Services, LLC
Laurie Ekes
293 Boston Post Road West, Suite 100, Marlborough, MA 01752
(508) 508.366.7442, lekes@komangs.com

Boston #215

COC # MARCH2020

Page 1 of 2

KGS

Project Name: Long Term Monitoring	Laboratory: TestAmerica Laboratories, Inc., Savannah, GA	Event: KOMAN, Long Term Monitoring,
Project Number: DEVNS-LTM	POC: Jerry Lanier912.354.7858jerry.lanier@testamericainc.com	
WBS Code: Purchase Order 18-706	Ship to: 5102 LaRoche Avenue, Savannah, GA 31404	

Comments:
SW6010C/FLDFLT (B) = Fe Mn
SW6020A/FLDFLT (B) = As

Equipment:

Code	Matrix
WG	Ground Water

Code	Container/Preservative
9	1x 250mL, plastic, HNO3, pH < 2; Cool < 6degC

Event: KOMAN, Long Term Monitoring, AOC 57 Supplemental MW Winter

	Sample ID	Matrix	Date	Time	Samp Init.	SW6010C/FLDFLT (B)	SW6020A/FLDFLT (B)		Total Metals						Location ID	Sample Type	Depth (ft bgs) Top	Depth (ft bgs) Bottom	Cooler	Comments
						9	9													
	A1-VP-EB-41620	WG	4/16/20	800	VA	~~X~~	~~X~~	VA							Mill Slot Screen	N1	—	—	1	
2	5702VP-20-04-10-12		4/16/20	1010	VA	X	X			MS/MSD	VA				5702VP-20-04	N1	10	12		MS/MSD ☆
3	5702VP-20-04-15-17		4/16/20	1050	VA	X	X								5702VP-20-04	N1	15	17		
4	5702VP-20-04-20-22		4/16/20	1158	VA	X	X								5702VP-20-04	N1	20	22		
5	5702VP-20-04-25-27		4/16/20	1245	VA	X	X								5702VP-20-04	N1	25	27		
6	5702VP-20-04-30-32		4/16/20	1335	VA	X	X								5702VP-20-04	N1	30	32		
7	5702VP-20-04-35-37		4/16/20	1415	VA	X	X								5702VP-20-04	N1	35	37		
8	A1-VP-DUP-1-41620		4/16/20	1055	VA	X	X								5702VP-20-04	N1	15	17		
9																				

Turnaround Time: 21 days

Relinquished by: *(Signature)*	Date	Time	Received by: *(Signature)*	Date	Time
[signature]	4/17/20	1500	[signature]	4-17-20	1500
[signature]	4-17-20	1800	[signature] a3/0.7	4-18-2020	0950

Shipping Date / Carrier / Airbill Number
Shipping Date: 3/6/2020

Received by Laboratory: *(Signature, Date, Time)* & condition

680-182934 Chain of Custody

ENV.COC_Field
March 27, 2020

Page 1 of 1

CHAIN-OF 'STODY RECORD

KOMAN Government Services, LLC
Laurie Ekes
293 Boston Post Road West, Suite 100, Marlborough, MA 01752
(508) 508.366.7442, lekes@komangs.com

DUSIO
#2

COC # MARCH2020

Page 1 of 2

KGS

Project Name: Long Term Monitoring	Laboratory: TestAmerica Laboratories, Inc., Savannah, GA	Event: KOMAN, Long Term Monitoring,
Project Number: DEVNS-LTM	POC: Jerry Lanier912.354.7858jerry.lanier@testamericainc.com	
WBS Code: Purchase Order 18-706	Ship to: 5102 LaRoche Avenue, Savannah, GA 31404	

Comments:
SW6010C/FLDFLT (B) = Fe Mn
SW6020A/FLDFLT (B) = As

Equipment:

Code	Matrix
WG	Ground Water

Code	Container/Preservative
9	1x 250mL, plastic, HNO3, pH < 2; Cool < 6degC

	Sample ID	Matrix	Date	Time	Samp Init.	SW6010C/FLDFLT (B)	SW6020A/FLDFLT (B)	Location ID	Sample Type	Depth (ft bgs) Top	Depth (ft bgs) Bottom	Cooler	Comments
	Event: KOMAN, Long Term Monitoring, AOC 57 Supplemental MW Winter					9	9						
	5702VP-20-04-5-9	WG	4/17/20	1018	WA	X	X	5702VP-20-04-5-9	N1	5	9	1	
2	5702VP-20-04-10-14		4/17/20	1158	WA	X	X	5702VP-20-04-10-14	N1	10	14		MS/MSD
3	5702VP-20-04-15-19		4/17/20	1399	WA	X	X	5702VP-20-04-15-19	N1	15	19		
4	5702VP-20-04-20-24		4/17/20	1499	WA	X	X	5702VP-20-04-20-24	N1	20	24		
5	AT-VP-DUP-1-41720		4/17/20	1305	WA	X	X	5702VP-20-04-15-19	N1	15	19		
6													
7													
8													
9													

Turnaround Time: 21 days

Relinquished by: *(Signature)*	Date	Time	Received by: *(Signature)*	Date	Time
[signature]	4/17/20	1500	[signature]	4-17-20	150
[signature]	4-17-20	[illegible]	[signature] 0.3/0.7	4-18-2020	0950

Shipping Date / Carrier / Airbill Number
Shipping Date: 3/6/2020

Received by Laboratory: *(Signature, Date, Time)* & condition

ENV.COC_Field
March 27, 2020

Page 1 of 1

Login Sample Receipt Checklist

Client: KOMAN Government Solutions, LLC

Job Number: 680-182934-1

Login Number: 182934
List Number: 1
Creator: Laughlin, Paul D

List Source: Eurofins TestAmerica, Savannah

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	False	Refer to Job Narrative for details.
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Accreditation/Certification Summary

Client: KOMAN Government Solutions, LLC
Job ID: 680-182934-1
Project/Site: LTM - AOC 57 Supplemental MW Winter

Laboratory: Eurofins TestAmerica, Savannah

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
ANAB	Dept. of Defense ELAP	L2463	09-22-22

eurofins | Environment Testing TestAmerica

ANALYTICAL REPORT

Eurofins TestAmerica, Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Tel: (912)354-7858

Laboratory Job ID: 680-183056-1
Client Project/Site: LTM - AOC 57 Supplement MW Winter
Revision: 1

For:
KOMAN Government Solutions, LLC
293 Boston Post Road West
Suite 100
Marlborough, Massachusetts 01752

Attn: Laurie Ekes

Kathryn Smith

Authorized for release by:
4/29/2020 8:01:35 PM
Kathryn Smith, Client Service Manager
(912)250-0275
kathy.smith@testamericainc.com

Designee for

Jerry Lanier, Project Manager I
(912)250-0281
jerry.lanier@testamericainc.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

Table of Contents

Cover Page 1
Table of Contents 2
Case Narrative 3
Sample Summary 4
Method Summary 5
Definitions/Glossary 6
Client Sample Results 7
QC Sample Results 12
QC Association Summary 13
Lab Chronicle 15
Chain of Custody 20
Receipt Checklists 23
Certification Summary 24

Job ID: 680-183056-1

Laboratory: Eurofins TestAmerica, Savannah

Narrative

CASE NARRATIVE
Client: KOMAN Government Solutions, LLC
Project: LTM - AOC 57 Supplement MW Winter

Report Number: 680-183056-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

RECEIPT

The samples were received on 04/23/2020; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 2.9 C.

METALS (ICP) - DISSOLVED

Samples 5702VP-20-03-25-29 (680-183056-1), A1-VP-DUP-1-42020 (680-183056-2), 5702VP-20-03-30-34 (680-183056-3), 5702VP-20-03-35-39 (680-183056-4), 5702VP-20-03-40-44 (680-183056-5), 5702VP-20-03-45-49 (680-183056-6), 5702VP-20-03-50-54 (680-183056-7), 5702VP-20-02-5-9 (680-183056-8), A1-VP-DUP-1-42120 (680-183056-9), 5702VP-20-02-15-19 (680-183056-10), 5702VP-20-02-10-14 (680-183056-11), 5702VP-20-02-20-24 (680-183056-12), 5702VP-20-04-20-22 (680-183056-13), 5702VP-20-02-25-29 (680-183056-14), 5702VP-20-02-30-34 (680-183056-15), 5702VP-20-02-35-39 (680-183056-16), 5702VP-20-02-40-44 (680-183056-17), 5702VP-20-02-50-54 (680-183056-18), 5702VP-20-01-5-9 (680-183056-19) and A1-VP-DUP-1-42220 (680-183056-20) were analyzed for Metals (ICP) - Dissolved in accordance with EPA SW-846 Method 6010C. The samples were prepared on 04/24/2020 and analyzed on 04/27/2020.

Iron and Manganese were detected in method blank MB 680-616410/1-A at levels that were above the method detection limit but below the reporting limit. The values should be considered estimates, and have been flagged. If the associated sample reported a result above the MDL and/or RL, the result has been flagged. Refer to the QC report for details.

Iron and Manganese recovered low for the MSD of sample 5702VP-20-03-40-44MSD (680-183056-5) in batch 680-616712.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

METALS (ICPMS) - DISSOLVED

Samples 5702VP-20-03-25-29 (680-183056-1), A1-VP-DUP-1-42020 (680-183056-2), 5702VP-20-03-30-34 (680-183056-3), 5702VP-20-03-35-39 (680-183056-4), 5702VP-20-03-40-44 (680-183056-5), 5702VP-20-03-45-49 (680-183056-6), 5702VP-20-03-50-54 (680-183056-7), 5702VP-20-02-5-9 (680-183056-8), A1-VP-DUP-1-42120 (680-183056-9), 5702VP-20-02-15-19 (680-183056-10), 5702VP-20-02-10-14 (680-183056-11), 5702VP-20-02-20-24 (680-183056-12), 5702VP-20-04-20-22 (680-183056-13), 5702VP-20-02-25-29 (680-183056-14), 5702VP-20-02-30-34 (680-183056-15), 5702VP-20-02-35-39 (680-183056-16), 5702VP-20-02-40-44 (680-183056-17), 5702VP-20-02-50-54 (680-183056-18), 5702VP-20-01-5-9 (680-183056-19) and A1-VP-DUP-1-42220 (680-183056-20) were analyzed for Metals (ICPMS) - Dissolved in accordance with EPA SW-846 Method 6020A. The samples were prepared on 04/24/2020 and analyzed on 04/27/2020.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Sample Summary

Client: KOMAN Government Solutions, LLC
Project/Site: LTM - AOC 57 Supplement MW Winter

Job ID: 680-183056-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
680-183056-1	5702VP-20-03-25-29	Water	04/20/20 08:20	04/23/20 09:55	
680-183056-2	A1-VP-DUP-1-42020	Water	04/20/20 08:25	04/23/20 09:55	
680-183056-3	5702VP-20-03-30-34	Water	04/20/20 09:15	04/23/20 09:55	
680-183056-4	5702VP-20-03-35-39	Water	04/20/20 10:05	04/23/20 09:55	
680-183056-5	5702VP-20-03-40-44	Water	04/20/20 10:55	04/23/20 09:55	
680-183056-6	5702VP-20-03-45-49	Water	04/20/20 12:35	04/23/20 09:55	
680-183056-7	5702VP-20-03-50-54	Water	04/20/20 13:42	04/23/20 09:55	
680-183056-8	5702VP-20-02-5-9	Water	04/21/20 10:10	04/23/20 09:55	
680-183056-9	A1-VP-DUP-1-42120	Water	04/21/20 10:15	04/23/20 09:55	
680-183056-10	5702VP-20-02-15-19	Water	04/21/20 13:10	04/23/20 09:55	
680-183056-11	5702VP-20-02-10-14	Water	04/21/20 10:55	04/23/20 09:55	
680-183056-12	5702VP-20-02-20-24	Water	04/21/20 13:55	04/23/20 09:55	
680-183056-13	5702VP-20-04-20-22	Water	04/16/20 11:58	04/23/20 09:55	
680-183056-14	5702VP-20-02-25-29	Water	04/22/20 08:20	04/23/20 09:55	
680-183056-15	5702VP-20-02-30-34	Water	04/22/20 09:14	04/23/20 09:55	
680-183056-16	5702VP-20-02-35-39	Water	04/22/20 10:10	04/23/20 09:55	
680-183056-17	5702VP-20-02-40-44	Water	04/22/20 11:06	04/23/20 09:55	
680-183056-18	5702VP-20-02-50-54	Water	04/22/20 12:55	04/23/20 09:55	
680-183056-19	5702VP-20-01-5-9	Water	04/22/20 14:05	04/23/20 09:55	
680-183056-20	A1-VP-DUP-1-42220	Water	04/22/20 14:10	04/23/20 09:55	

Method Summary

Client: KOMAN Government Solutions, LLC
Project/Site: LTM - AOC 57 Supplement MW Winter

Job ID: 680-183056-1

Method	Method Description	Protocol	Laboratory
6010C	Metals (ICP)	SW846	TAL SAV
6020A	Metals (ICP/MS)	SW846	TAL SAV
3005A	Preparation, Total Recoverable or Dissolved Metals	SW846	TAL SAV

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL SAV = Eurofins TestAmerica, Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

Definitions/Glossary

Client: KOMAN Government Solutions, LLC
Job ID: 680-183056-1
Project/Site: LTM - AOC 57 Supplement MW Winter

Qualifiers

Metals

Qualifier	Qualifier Description
J	Estimated: The analyte was positively identified; the quantitation is an estimation
J1	Estimated: The quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Client Sample Results

Client: KOMAN Government Solutions, LLC
Project/Site: LTM - AOC 57 Supplement MW Winter

Job ID: 680-183056-1

Client Sample ID: 5702VP-20-03-25-29

Lab Sample ID: 680-183056-1
Date Collected: 04/20/20 08:20
Matrix: Water
Date Received: 04/23/20 09:55

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	1700		50	50	17	ug/L		04/27/20 17:11	1
Manganese	820		10	3.0	1.0	ug/L		04/27/20 17:11	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	5.0		3.0	3.0	1.5	ug/L		04/27/20 16:10	1

Client Sample ID: A1-VP-DUP-1-42020

Lab Sample ID: 680-183056-2
Date Collected: 04/20/20 08:25
Matrix: Water
Date Received: 04/23/20 09:55

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	340		50	50	17	ug/L		04/27/20 17:40	1
Manganese	190		10	3.0	1.0	ug/L		04/27/20 17:40	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	3.0	U	3.0	3.0	1.5	ug/L		04/27/20 16:38	1

Client Sample ID: 5702VP-20-03-30-34

Lab Sample ID: 680-183056-3
Date Collected: 04/20/20 09:15
Matrix: Water
Date Received: 04/23/20 09:55

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	5600		50	50	17	ug/L		04/27/20 17:45	1
Manganese	510		10	3.0	1.0	ug/L		04/27/20 17:45	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	4.3		3.0	3.0	1.5	ug/L		04/27/20 16:42	1

Client Sample ID: 5702VP-20-03-35-39

Lab Sample ID: 680-183056-4
Date Collected: 04/20/20 10:05
Matrix: Water
Date Received: 04/23/20 09:55

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	4100		50	50	17	ug/L		04/27/20 17:21	1
Manganese	190		10	3.0	1.0	ug/L		04/27/20 17:21	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	5.9		3.0	3.0	1.5	ug/L		04/27/20 16:17	1

Client Sample Results

Client: KOMAN Government Solutions, LLC
Project/Site: LTM - AOC 57 Supplement MW Winter

Job ID: 680-183056-1

Client Sample ID: 5702VP-20-03-40-44

Lab Sample ID: 680-183056-5
Date Collected: 04/20/20 10:55
Matrix: Water
Date Received: 04/23/20 09:55

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	3700	J1	50	50	17	ug/L		04/27/20 15:50	1
Manganese	150	J1	10	3.0	1.0	ug/L		04/27/20 15:50	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	3.0	U	3.0	3.0	1.5	ug/L		04/27/20 15:16	1

Client Sample ID: 5702VP-20-03-45-49

Lab Sample ID: 680-183056-6
Date Collected: 04/20/20 12:35
Matrix: Water
Date Received: 04/23/20 09:55

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	1200		50	50	17	ug/L		04/27/20 16:52	1
Manganese	170		10	3.0	1.0	ug/L		04/27/20 16:52	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	3.0	U	3.0	3.0	1.5	ug/L		04/27/20 16:03	1

Client Sample ID: 5702VP-20-03-50-54

Lab Sample ID: 680-183056-7
Date Collected: 04/20/20 13:42
Matrix: Water
Date Received: 04/23/20 09:55

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	440		50	50	17	ug/L		04/27/20 18:09	1
Manganese	180		10	3.0	1.0	ug/L		04/27/20 18:09	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	3.3		3.0	3.0	1.5	ug/L		04/27/20 16:53	1

Client Sample ID: 5702VP-20-02-5-9

Lab Sample ID: 680-183056-8
Date Collected: 04/21/20 10:10
Matrix: Water
Date Received: 04/23/20 09:55

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	1400		50	50	17	ug/L		04/27/20 16:24	1
Manganese	320		10	3.0	1.0	ug/L		04/27/20 16:24	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	3.3		3.0	3.0	1.5	ug/L		04/27/20 15:34	1

Client Sample Results

Client: KOMAN Government Solutions, LLC
Project/Site: LTM - AOC 57 Supplement MW Winter

Job ID: 680-183056-1

Client Sample ID: A1-VP-DUP-1-42120

Lab Sample ID: 680-183056-9
Date Collected: 04/21/20 10:15
Matrix: Water
Date Received: 04/23/20 09:55

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	1500		50	50	17	ug/L		04/27/20 17:50	1
Manganese	360		10	3.0	1.0	ug/L		04/27/20 17:50	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	4.2		3.0	3.0	1.5	ug/L		04/27/20 16:45	1

Client Sample ID: 5702VP-20-02-15-19

Lab Sample ID: 680-183056-10
Date Collected: 04/21/20 13:10
Matrix: Water
Date Received: 04/23/20 09:55

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	700		50	50	17	ug/L		04/27/20 16:47	1
Manganese	340		10	3.0	1.0	ug/L		04/27/20 16:47	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	3.0	U	3.0	3.0	1.5	ug/L		04/27/20 15:59	1

Client Sample ID: 5702VP-20-02-10-14

Lab Sample ID: 680-183056-11
Date Collected: 04/21/20 10:55
Matrix: Water
Date Received: 04/23/20 09:55

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	260		50	50	17	ug/L		04/27/20 17:07	1
Manganese	290		10	3.0	1.0	ug/L		04/27/20 17:07	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	3.0	U	3.0	3.0	1.5	ug/L		04/27/20 16:06	1

Client Sample ID: 5702VP-20-02-20-24

Lab Sample ID: 680-183056-12
Date Collected: 04/21/20 13:55
Matrix: Water
Date Received: 04/23/20 09:55

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	650		50	50	17	ug/L		04/27/20 16:38	1
Manganese	290		10	3.0	1.0	ug/L		04/27/20 16:38	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	3.0	U	3.0	3.0	1.5	ug/L		04/27/20 15:52	1

Client Sample Results

Client: KOMAN Government Solutions, LLC
Project/Site: LTM - AOC 57 Supplement MW Winter

Job ID: 680-183056-1

Client Sample ID: 5702VP-20-04-20-22

Lab Sample ID: 680-183056-13
Date Collected: 04/16/20 11:58
Matrix: Water
Date Received: 04/23/20 09:55

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	1400		50	50	17	ug/L		04/27/20 16:28	1
Manganese	50		10	3.0	1.0	ug/L		04/27/20 16:28	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	5.3		3.0	3.0	1.5	ug/L		04/27/20 15:38	1

Client Sample ID: 5702VP-20-02-25-29

Lab Sample ID: 680-183056-14
Date Collected: 04/22/20 08:20
Matrix: Water
Date Received: 04/23/20 09:55

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	320		50	50	17	ug/L		04/27/20 16:33	1
Manganese	210		10	3.0	1.0	ug/L		04/27/20 16:33	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	3.0	U	3.0	3.0	1.5	ug/L		04/27/20 15:41	1

Client Sample ID: 5702VP-20-02-30-34

Lab Sample ID: 680-183056-15
Date Collected: 04/22/20 09:14
Matrix: Water
Date Received: 04/23/20 09:55

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	190		50	50	17	ug/L		04/27/20 18:04	1
Manganese	170		10	3.0	1.0	ug/L		04/27/20 18:04	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	4.4		3.0	3.0	1.5	ug/L		04/27/20 16:49	1

Client Sample ID: 5702VP-20-02-35-39

Lab Sample ID: 680-183056-16
Date Collected: 04/22/20 10:10
Matrix: Water
Date Received: 04/23/20 09:55

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	760		50	50	17	ug/L		04/27/20 17:26	1
Manganese	120		10	3.0	1.0	ug/L		04/27/20 17:26	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	8.0		3.0	3.0	1.5	ug/L		04/27/20 16:20	1

Client Sample Results

Client: KOMAN Government Solutions, LLC
Project/Site: LTM - AOC 57 Supplement MW Winter

Job ID: 680-183056-1

Client Sample ID: 5702VP-20-02-40-44 — Lab Sample ID: 680-183056-17

Date Collected: 04/22/20 11:06
Date Received: 04/23/20 09:55
Matrix: Water

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	780		50	50	17	ug/L		04/27/20 16:43	1
Manganese	190		10	3.0	1.0	ug/L		04/27/20 16:43	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	2.9	J	3.0	3.0	1.5	ug/L		04/27/20 15:56	1

Client Sample ID: 5702VP-20-02-50-54 — Lab Sample ID: 680-183056-18

Date Collected: 04/22/20 12:55
Date Received: 04/23/20 09:55
Matrix: Water

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	2300		50	50	17	ug/L		04/27/20 17:16	1
Manganese	170		10	3.0	1.0	ug/L		04/27/20 17:16	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	3.0	U	3.0	3.0	1.5	ug/L		04/27/20 16:13	1

Client Sample ID: 5702VP-20-01-5-9 — Lab Sample ID: 680-183056-19

Date Collected: 04/22/20 14:05
Date Received: 04/23/20 09:55
Matrix: Water

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	910		50	50	17	ug/L		04/27/20 17:30	1
Manganese	400		10	3.0	1.0	ug/L		04/27/20 17:30	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	2.1	J	3.0	3.0	1.5	ug/L		04/27/20 16:24	1

Client Sample ID: A1-VP-DUP-1-42220 — Lab Sample ID: 680-183056-20

Date Collected: 04/22/20 14:10
Date Received: 04/23/20 09:55
Matrix: Water

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	900		50	50	17	ug/L		04/27/20 17:35	1
Manganese	400		10	3.0	1.0	ug/L		04/27/20 17:35	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	2.0	J	3.0	3.0	1.5	ug/L		04/27/20 16:35	1

QC Sample Results

Client: KOMAN Government Solutions, LLC
Project/Site: LTM - AOC 57 Supplement MW Winter

Job ID: 680-183056-1

Method: 6010C - Metals (ICP)

Lab Sample ID: MB 680-616410/1-A
Matrix: Water
Analysis Batch: 616712

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 616410

Analyte	MB Result	MB Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	24.8	J	50	50	17	ug/L		04/27/20 15:41	1
Manganese	2.83	J	10	3.0	1.0	ug/L		04/27/20 15:41	1

Lab Sample ID: LCS 680-616410/2-A
Matrix: Water
Analysis Batch: 616712

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 616410

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Iron	5010	4660		ug/L		93	87 - 115
Manganese	400	372		ug/L		93	90 - 114

Method: 6020A - Metals (ICP/MS)

Lab Sample ID: MB 680-616409/1-A
Matrix: Water
Analysis Batch: 616745

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 616409

Analyte	MB Result	MB Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	3.0	U	3.0	3.0	1.5	ug/L		04/27/20 15:09	1

Lab Sample ID: LCS 680-616409/2-A
Matrix: Water
Analysis Batch: 616745

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 616409

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	100	91.9		ug/L		92	84 - 116

QC Association Summary

Client: KOMAN Government Solutions, LLC
Project/Site: LTM - AOC 57 Supplement MW Winter

Job ID: 680-183056-1

Metals

Prep Batch: 616409

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-183056-1	5702VP-20-03-25-29	Dissolved	Water	3005A	
680-183056-2	A1-VP-DUP-1-42020	Dissolved	Water	3005A	
680-183056-3	5702VP-20-03-30-34	Dissolved	Water	3005A	
680-183056-4	5702VP-20-03-35-39	Dissolved	Water	3005A	
680-183056-5	5702VP-20-03-40-44	Dissolved	Water	3005A	
680-183056-6	5702VP-20-03-45-49	Dissolved	Water	3005A	
680-183056-7	5702VP-20-03-50-54	Dissolved	Water	3005A	
680-183056-8	5702VP-20-02-5-9	Dissolved	Water	3005A	
680-183056-9	A1-VP-DUP-1-42120	Dissolved	Water	3005A	
680-183056-10	5702VP-20-02-15-19	Dissolved	Water	3005A	
680-183056-11	5702VP-20-02-10-14	Dissolved	Water	3005A	
680-183056-12	5702VP-20-02-20-24	Dissolved	Water	3005A	
680-183056-13	5702VP-20-04-20-22	Dissolved	Water	3005A	
680-183056-14	5702VP-20-02-25-29	Dissolved	Water	3005A	
680-183056-15	5702VP-20-02-30-34	Dissolved	Water	3005A	
680-183056-16	5702VP-20-02-35-39	Dissolved	Water	3005A	
680-183056-17	5702VP-20-02-40-44	Dissolved	Water	3005A	
680-183056-18	5702VP-20-02-50-54	Dissolved	Water	3005A	
680-183056-19	5702VP-20-01-5-9	Dissolved	Water	3005A	
680-183056-20	A1-VP-DUP-1-42220	Dissolved	Water	3005A	
MB 680-616409/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 680-616409/2-A	Lab Control Sample	Total Recoverable	Water	3005A	

Prep Batch: 616410

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-183056-1	5702VP-20-03-25-29	Dissolved	Water	3005A	
680-183056-2	A1-VP-DUP-1-42020	Dissolved	Water	3005A	
680-183056-3	5702VP-20-03-30-34	Dissolved	Water	3005A	
680-183056-4	5702VP-20-03-35-39	Dissolved	Water	3005A	
680-183056-5	5702VP-20-03-40-44	Dissolved	Water	3005A	
680-183056-6	5702VP-20-03-45-49	Dissolved	Water	3005A	
680-183056-7	5702VP-20-03-50-54	Dissolved	Water	3005A	
680-183056-8	5702VP-20-02-5-9	Dissolved	Water	3005A	
680-183056-9	A1-VP-DUP-1-42120	Dissolved	Water	3005A	
680-183056-10	5702VP-20-02-15-19	Dissolved	Water	3005A	
680-183056-11	5702VP-20-02-10-14	Dissolved	Water	3005A	
680-183056-12	5702VP-20-02-20-24	Dissolved	Water	3005A	
680-183056-13	5702VP-20-04-20-22	Dissolved	Water	3005A	
680-183056-14	5702VP-20-02-25-29	Dissolved	Water	3005A	
680-183056-15	5702VP-20-02-30-34	Dissolved	Water	3005A	
680-183056-16	5702VP-20-02-35-39	Dissolved	Water	3005A	
680-183056-17	5702VP-20-02-40-44	Dissolved	Water	3005A	
680-183056-18	5702VP-20-02-50-54	Dissolved	Water	3005A	
680-183056-19	5702VP-20-01-5-9	Dissolved	Water	3005A	
680-183056-20	A1-VP-DUP-1-42220	Dissolved	Water	3005A	
MB 680-616410/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 680-616410/2-A	Lab Control Sample	Total Recoverable	Water	3005A	

Analysis Batch: 616712

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-183056-1	5702VP-20-03-25-29	Dissolved	Water	6010C	616410

Metals (Continued)

Analysis Batch: 616712 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-183056-2	A1-VP-DUP-1-42020	Dissolved	Water	6010C	616410
680-183056-3	5702VP-20-03-30-34	Dissolved	Water	6010C	616410
680-183056-4	5702VP-20-03-35-39	Dissolved	Water	6010C	616410
680-183056-5	5702VP-20-03-40-44	Dissolved	Water	6010C	616410
680-183056-6	5702VP-20-03-45-49	Dissolved	Water	6010C	616410
680-183056-7	5702VP-20-03-50-54	Dissolved	Water	6010C	616410
680-183056-8	5702VP-20-02-5-9	Dissolved	Water	6010C	616410
680-183056-9	A1-VP-DUP-1-42120	Dissolved	Water	6010C	616410
680-183056-10	5702VP-20-02-15-19	Dissolved	Water	6010C	616410
680-183056-11	5702VP-20-02-10-14	Dissolved	Water	6010C	616410
680-183056-12	5702VP-20-02-20-24	Dissolved	Water	6010C	616410
680-183056-13	5702VP-20-04-20-22	Dissolved	Water	6010C	616410
680-183056-14	5702VP-20-02-25-29	Dissolved	Water	6010C	616410
680-183056-15	5702VP-20-02-30-34	Dissolved	Water	6010C	616410
680-183056-16	5702VP-20-02-35-39	Dissolved	Water	6010C	616410
680-183056-17	5702VP-20-02-40-44	Dissolved	Water	6010C	616410
680-183056-18	5702VP-20-02-50-54	Dissolved	Water	6010C	616410
680-183056-19	5702VP-20-01-5-9	Dissolved	Water	6010C	616410
680-183056-20	A1-VP-DUP-1-42220	Dissolved	Water	6010C	616410
MB 680-616410/1-A	Method Blank	Total Recoverable	Water	6010C	616410
LCS 680-616410/2-A	Lab Control Sample	Total Recoverable	Water	6010C	616410

Analysis Batch: 616745

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-183056-1	5702VP-20-03-25-29	Dissolved	Water	6020A	616409
680-183056-2	A1-VP-DUP-1-42020	Dissolved	Water	6020A	616409
680-183056-3	5702VP-20-03-30-34	Dissolved	Water	6020A	616409
680-183056-4	5702VP-20-03-35-39	Dissolved	Water	6020A	616409
680-183056-5	5702VP-20-03-40-44	Dissolved	Water	6020A	616409
680-183056-6	5702VP-20-03-45-49	Dissolved	Water	6020A	616409
680-183056-7	5702VP-20-03-50-54	Dissolved	Water	6020A	616409
680-183056-8	5702VP-20-02-5-9	Dissolved	Water	6020A	616409
680-183056-9	A1-VP-DUP-1-42120	Dissolved	Water	6020A	616409
680-183056-10	5702VP-20-02-15-19	Dissolved	Water	6020A	616409
680-183056-11	5702VP-20-02-10-14	Dissolved	Water	6020A	616409
680-183056-12	5702VP-20-02-20-24	Dissolved	Water	6020A	616409
680-183056-13	5702VP-20-04-20-22	Dissolved	Water	6020A	616409
680-183056-14	5702VP-20-02-25-29	Dissolved	Water	6020A	616409
680-183056-15	5702VP-20-02-30-34	Dissolved	Water	6020A	616409
680-183056-16	5702VP-20-02-35-39	Dissolved	Water	6020A	616409
680-183056-17	5702VP-20-02-40-44	Dissolved	Water	6020A	616409
680-183056-18	5702VP-20-02-50-54	Dissolved	Water	6020A	616409
680-183056-19	5702VP-20-01-5-9	Dissolved	Water	6020A	616409
680-183056-20	A1-VP-DUP-1-42220	Dissolved	Water	6020A	616409
MB 680-616409/1-A	Method Blank	Total Recoverable	Water	6020A	616409
LCS 680-616409/2-A	Lab Control Sample	Total Recoverable	Water	6020A	616409

Lab Chronicle

Client: KOMAN Government Solutions, LLC
Project/Site: LTM - AOC 57 Supplement MW Winter

Job ID: 680-183056-1

Client Sample ID: 5702VP-20-03-25-29 — Lab Sample ID: 680-183056-1

Date Collected: 04/20/20 08:20
Date Received: 04/23/20 09:55
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	616410	04/24/20 12:21	AJR	TAL SAV
Dissolved	Analysis	6010C		1			616712	04/27/20 17:11	BWR	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	616409	04/24/20 12:21	AJR	TAL SAV
Dissolved	Analysis	6020A		1			616745	04/27/20 16:10	BJB	TAL SAV
	Instrument ID:	ICPMSD								

Client Sample ID: A1-VP-DUP-1-42020 — Lab Sample ID: 680-183056-2

Date Collected: 04/20/20 08:25
Date Received: 04/23/20 09:55
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	616410	04/24/20 12:21	AJR	TAL SAV
Dissolved	Analysis	6010C		1			616712	04/27/20 17:40	BWR	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	616409	04/24/20 12:21	AJR	TAL SAV
Dissolved	Analysis	6020A		1			616745	04/27/20 16:38	BJB	TAL SAV
	Instrument ID:	ICPMSD								

Client Sample ID: 5702VP-20-03-30-34 — Lab Sample ID: 680-183056-3

Date Collected: 04/20/20 09:15
Date Received: 04/23/20 09:55
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	616410	04/24/20 12:21	AJR	TAL SAV
Dissolved	Analysis	6010C		1			616712	04/27/20 17:45	BWR	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	616409	04/24/20 12:21	AJR	TAL SAV
Dissolved	Analysis	6020A		1			616745	04/27/20 16:42	BJB	TAL SAV
	Instrument ID:	ICPMSD								

Client Sample ID: 5702VP-20-03-35-39 — Lab Sample ID: 680-183056-4

Date Collected: 04/20/20 10:05
Date Received: 04/23/20 09:55
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	616410	04/24/20 12:21	AJR	TAL SAV
Dissolved	Analysis	6010C		1			616712	04/27/20 17:21	BWR	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	616409	04/24/20 12:21	AJR	TAL SAV
Dissolved	Analysis	6020A		1			616745	04/27/20 16:17	BJB	TAL SAV
	Instrument ID:	ICPMSD								

Lab Chronicle

Client: KOMAN Government Solutions, LLC
Project/Site: LTM - AOC 57 Supplement MW Winter

Job ID: 680-183056-1

Client Sample ID: 5702VP-20-03-40-44 — Lab Sample ID: 680-183056-5

Date Collected: 04/20/20 10:55
Date Received: 04/23/20 09:55
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	616410	04/24/20 12:21	AJR	TAL SAV
Dissolved	Analysis	6010C		1			616712	04/27/20 15:50	BWR	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	616409	04/24/20 12:21	AJR	TAL SAV
Dissolved	Analysis	6020A		1			616745	04/27/20 15:16	BJB	TAL SAV
	Instrument ID:	ICPMSD								

Client Sample ID: 5702VP-20-03-45-49 — Lab Sample ID: 680-183056-6

Date Collected: 04/20/20 12:35
Date Received: 04/23/20 09:55
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	616410	04/24/20 12:21	AJR	TAL SAV
Dissolved	Analysis	6010C		1			616712	04/27/20 16:52	BWR	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	616409	04/24/20 12:21	AJR	TAL SAV
Dissolved	Analysis	6020A		1			616745	04/27/20 16:03	BJB	TAL SAV
	Instrument ID:	ICPMSD								

Client Sample ID: 5702VP-20-03-50-54 — Lab Sample ID: 680-183056-7

Date Collected: 04/20/20 13:42
Date Received: 04/23/20 09:55
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	616410	04/24/20 12:21	AJR	TAL SAV
Dissolved	Analysis	6010C		1			616712	04/27/20 18:09	BWR	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	616409	04/24/20 12:21	AJR	TAL SAV
Dissolved	Analysis	6020A		1			616745	04/27/20 16:53	BJB	TAL SAV
	Instrument ID:	ICPMSD								

Client Sample ID: 5702VP-20-02-5-9 — Lab Sample ID: 680-183056-8

Date Collected: 04/21/20 10:10
Date Received: 04/23/20 09:55
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	616410	04/24/20 12:21	AJR	TAL SAV
Dissolved	Analysis	6010C		1			616712	04/27/20 16:24	BWR	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	616409	04/24/20 12:21	AJR	TAL SAV
Dissolved	Analysis	6020A		1			616745	04/27/20 15:34	BJB	TAL SAV
	Instrument ID:	ICPMSD								

Lab Chronicle

Client: KOMAN Government Solutions, LLC
Project/Site: LTM - AOC 57 Supplement MW Winter

Job ID: 680-183056-1

Client Sample ID: A1-VP-DUP-1-42120

Lab Sample ID: 680-183056-9
Date Collected: 04/21/20 10:15
Matrix: Water
Date Received: 04/23/20 09:55

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	616410	04/24/20 12:21	AJR	TAL SAV
Dissolved	Analysis	6010C		1			616712	04/27/20 17:50	BWR	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	616409	04/24/20 12:21	AJR	TAL SAV
Dissolved	Analysis	6020A		1			616745	04/27/20 16:45	BJB	TAL SAV
	Instrument ID:	ICPMSD								

Client Sample ID: 5702VP-20-02-15-19

Lab Sample ID: 680-183056-10
Date Collected: 04/21/20 13:10
Matrix: Water
Date Received: 04/23/20 09:55

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	616410	04/24/20 12:21	AJR	TAL SAV
Dissolved	Analysis	6010C		1			616712	04/27/20 16:47	BWR	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	616409	04/24/20 12:21	AJR	TAL SAV
Dissolved	Analysis	6020A		1			616745	04/27/20 15:59	BJB	TAL SAV
	Instrument ID:	ICPMSD								

Client Sample ID: 5702VP-20-02-10-14

Lab Sample ID: 680-183056-11
Date Collected: 04/21/20 10:55
Matrix: Water
Date Received: 04/23/20 09:55

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	616410	04/24/20 12:21	AJR	TAL SAV
Dissolved	Analysis	6010C		1			616712	04/27/20 17:07	BWR	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	616409	04/24/20 12:21	AJR	TAL SAV
Dissolved	Analysis	6020A		1			616745	04/27/20 16:06	BJB	TAL SAV
	Instrument ID:	ICPMSD								

Client Sample ID: 5702VP-20-02-20-24

Lab Sample ID: 680-183056-12
Date Collected: 04/21/20 13:55
Matrix: Water
Date Received: 04/23/20 09:55

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	616410	04/24/20 12:21	AJR	TAL SAV
Dissolved	Analysis	6010C		1			616712	04/27/20 16:38	BWR	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	616409	04/24/20 12:21	AJR	TAL SAV
Dissolved	Analysis	6020A		1			616745	04/27/20 15:52	BJB	TAL SAV
	Instrument ID:	ICPMSD								

Lab Chronicle

Client: KOMAN Government Solutions, LLC
Project/Site: LTM - AOC 57 Supplement MW Winter

Job ID: 680-183056-1

Client Sample ID: 5702VP-20-04-20-22 — Lab Sample ID: 680-183056-13

Date Collected: 04/16/20 11:58 — **Matrix: Water**
Date Received: 04/23/20 09:55

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	616410	04/24/20 12:21	AJR	TAL SAV
Dissolved	Analysis	6010C		1			616712	04/27/20 16:28	BWR	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	616409	04/24/20 12:21	AJR	TAL SAV
Dissolved	Analysis	6020A		1			616745	04/27/20 15:38	BJB	TAL SAV
	Instrument ID:	ICPMSD								

Client Sample ID: 5702VP-20-02-25-29 — Lab Sample ID: 680-183056-14

Date Collected: 04/22/20 08:20 — **Matrix: Water**
Date Received: 04/23/20 09:55

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	616410	04/24/20 12:21	AJR	TAL SAV
Dissolved	Analysis	6010C		1			616712	04/27/20 16:33	BWR	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	616409	04/24/20 12:21	AJR	TAL SAV
Dissolved	Analysis	6020A		1			616745	04/27/20 15:41	BJB	TAL SAV
	Instrument ID:	ICPMSD								

Client Sample ID: 5702VP-20-02-30-34 — Lab Sample ID: 680-183056-15

Date Collected: 04/22/20 09:14 — **Matrix: Water**
Date Received: 04/23/20 09:55

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	616410	04/24/20 12:21	AJR	TAL SAV
Dissolved	Analysis	6010C		1			616712	04/27/20 18:04	BWR	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	616409	04/24/20 12:21	AJR	TAL SAV
Dissolved	Analysis	6020A		1			616745	04/27/20 16:49	BJB	TAL SAV
	Instrument ID:	ICPMSD								

Client Sample ID: 5702VP-20-02-35-39 — Lab Sample ID: 680-183056-16

Date Collected: 04/22/20 10:10 — **Matrix: Water**
Date Received: 04/23/20 09:55

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	616410	04/24/20 12:21	AJR	TAL SAV
Dissolved	Analysis	6010C		1			616712	04/27/20 17:26	BWR	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	616409	04/24/20 12:21	AJR	TAL SAV
Dissolved	Analysis	6020A		1			616745	04/27/20 16:20	BJB	TAL SAV
	Instrument ID:	ICPMSD								

Lab Chronicle

Client: KOMAN Government Solutions, LLC
Project/Site: LTM - AOC 57 Supplement MW Winter

Job ID: 680-183056-1

Client Sample ID: 5702VP-20-02-40-44 — Lab Sample ID: 680-183056-17

Date Collected: 04/22/20 11:06 — **Matrix: Water**
Date Received: 04/23/20 09:55

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	616410	04/24/20 12:21	AJR	TAL SAV
Dissolved	Analysis	6010C		1			616712	04/27/20 16:43	BWR	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	616409	04/24/20 12:21	AJR	TAL SAV
Dissolved	Analysis	6020A		1			616745	04/27/20 15:56	BJB	TAL SAV
	Instrument ID:	ICPMSD								

Client Sample ID: 5702VP-20-02-50-54 — Lab Sample ID: 680-183056-18

Date Collected: 04/22/20 12:55 — **Matrix: Water**
Date Received: 04/23/20 09:55

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	616410	04/24/20 12:21	AJR	TAL SAV
Dissolved	Analysis	6010C		1			616712	04/27/20 17:16	BWR	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	616409	04/24/20 12:21	AJR	TAL SAV
Dissolved	Analysis	6020A		1			616745	04/27/20 16:13	BJB	TAL SAV
	Instrument ID:	ICPMSD								

Client Sample ID: 5702VP-20-01-5-9 — Lab Sample ID: 680-183056-19

Date Collected: 04/22/20 14:05 — **Matrix: Water**
Date Received: 04/23/20 09:55

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	616410	04/24/20 12:21	AJR	TAL SAV
Dissolved	Analysis	6010C		1			616712	04/27/20 17:30	BWR	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	616409	04/24/20 12:21	AJR	TAL SAV
Dissolved	Analysis	6020A		1			616745	04/27/20 16:24	BJB	TAL SAV
	Instrument ID:	ICPMSD								

Client Sample ID: A1-VP-DUP-1-42220 — Lab Sample ID: 680-183056-20

Date Collected: 04/22/20 14:10 — **Matrix: Water**
Date Received: 04/23/20 09:55

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	616410	04/24/20 12:21	AJR	TAL SAV
Dissolved	Analysis	6010C		1			616712	04/27/20 17:35	BWR	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	616409	04/24/20 12:21	AJR	TAL SAV
Dissolved	Analysis	6020A		1			616745	04/27/20 16:35	BJB	TAL SAV
	Instrument ID:	ICPMSD								

Laboratory References:

TAL SAV = Eurofins TestAmerica, Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

CHAIN-OF ISTODY RECORD

KOMAN Government Services, LLC
Laurie Ekes
293 Boston Post Road West, Suite 100, Marlborough, MA 01752
(508) 508.366.7442, lekes@komangs.com

COC # MARCH2020

Page 1 of 3

Bostc #2 KGS

Project Name: Long Term Monitoring	Laboratory: TestAmerica Laboratories, Inc., Savannah, GA	Event: KOMAN, Long Term Monitoring,
Project Number: DEVNS-LTM	POC: Jerry Lanier912.354.7858jerry.lanier@testamericainc.com	
WBS Code: Purchase Order 18-706	Ship to: 5102 LaRoche Avenue, Savannah, GA 31404	

Comments:
SW6010C/FLDFLT (B) = Fe Mn
SW6020A/FLDFLT (B) = As

Equipment:

Code	Matrix
WG	Ground Water

Code	Container/Preservative
9	1x 250mL, plastic, HNO3, pH < 2, Cool < 6degC

680-183056 Chain of Custody

Event: KOMAN, Long Term Monitoring, AOC 57 Supplemental MW Winter

	Sample ID	Matrix	Date	Time	Samp Init.	SW6010C/FLDFLT (B)	SW6020A/FLDFLT (B)	Location ID	Sample Type	Depth (ft bgs) Top	Depth (ft bgs) Bottom	Cooler	Comments
	5702VP-20-03-25-29	WG	4/20/20	820	[illegible]	X	X	5702VP-20-03	N1	25	29	1	
2	A1-VP-DVP-1-42020		4/20/20	825	[illegible]	X	X	5702VP-20-03	N1	25	29		
3	5702VP-20-03-30-34		4/20/20	915	[illegible]	X	X	5702VP-20-03	N1	30	34		
4	5702VP-20-03-35-39		4/20/20	1005	[illegible]	X	X	5702VP-20-03	N1	35	39		
5	5702VP-20-03-40-44		4/20/20	1055	[illegible]	X	X	5702VP-20-03	N1	40	44		
6	5702VP-20-03-45-49		4/20/20	1235	[illegible]	X	X	5702VP-20-03	N1	45	49		
7	5702VP-20-03-50-54		4/20/20	1342	[illegible]	X	X	5702VP-20-03	N1	50	54		
8	5702VP-20-02-5-9		4/21/20	1010	[illegible]	X	X	5702VP-20-02	N1	5	9		
9	A1-VP-DVP-1-42120		4/21/20	1015	[illegible]	X	X	5702VP-20-02	N1	5	9		

Turnaround Time: 21 days

Relinquished by: *(Signature)*	Date	Time	Received by: *(Signature)*	Date	Time
[signature]	4/22/20	1500	[signature]	4/22-20	1500
[signature]	4-22-20	1800			

Shipping Date / Carrier / Airbill Number
Shipping Date: 3/6/2020
2.5 (4) 2.9°

Received by Laboratory: *(Signature, Date, Time)* **& condition**
[signature] 04-23.20 0955

ENV.COC_Field
March 27, 2020

Page 1 of 1

CHAIN-OF-CUSTODY RECORD

KOMAN Government Services, LLC
Laurie Ekes
293 Boston Post Road West, Suite 100, Marlborough, MA 01752
(508) 508.366.7442, lekes@komangs.com

COC # MARCH2020

Page 2 of 3

Boston KGS #215

Project Name: Long Term Monitoring	Laboratory: TestAmerica Laboratories, Inc., Savannah, GA	Event: KOMAN, Long Term Monitoring,
Project Number: DEVNS-LTM	POC: Jerry Lanier912.354.7858jerry.lanier@testamericainc.com	
WBS Code: Purchase Order 18-706	Ship to: 5102 LaRoche Avenue, Savannah, GA 31404	

Comments:
SW6010C/FLDFLT (B) = Fe Mn
SW6020A/FLDFLT (B) = As

Equipment:

Code	Matrix
WG	Ground Water

Code	Container/Preservative
9	1x 250mL, plastic, HNO3, pH < 2; Cool < 6degC

Event: KOMAN, Long Term Monitoring, AOC 57 Supplemental MW Winter

	Sample ID	Matrix	Date	Time	Samp Init.	SW6010C/FLDFLT (B)	SW6020A/FLDFLT (B)	Location ID	Sample Type	Depth (ft bgs) Top	Depth (ft bgs) Bottom	Cooler	Comments
	Analytical Test Method					9	9						
	570LVP-20-02-15-19	WG	4/21/20	1310	VGL	X	X	570LVP-20-02	N1	15	19	1	
2	570LVP-20-02-10-14		4/21/20	1055	VGL	X	X	570LVP-20-02	N1	10	14		
3	570LVP-20-02-20-24		4/21/20	1355	VGL	X	X	570LVP-20-02	N1	20	24		
4	570LVP-20-04-20-22		4/16/20	1158	VGL	X	X	570LVP-20-04	N1	20	22		
5	570LVP-20-02-25-29		4/22/20	820	VGL	X	X	570LVP-20-02	N1	25	29		
6	570LVP-20-02-30-34		4/22/20	914	VGL	X	X	570LVP-20-02	N1	30	34		
7	570LVP-20-02-35-39		4/22/20	1010	VGL	X	X	570LVP-20-02	N1	35	39		
8	570LVP-20-02-40-44		4/22/20	1106	VGL	X	X	570LVP-20-02	N1	40	44		
9	570LVP-20-02-50-54		4/22/20	1255	VGL	X	X	570LVP-20-02	N1	50	54		

Turnaround Time: 21 days

Relinquished by: *(Signature)*	Date	Time	Received by: *(Signature)*	Date	Time
	4/22/20	1500			1500
	4-22-20	1500			

Shipping Date / Carrier / Airbill Number
Shipping Date: 3/6/2020
2.5(CF) 2.9°C

Received by Laboratory: *(Signature, Date, Time)* **& condition**
04-23-20 0955

ENV.COC_Field
March 27, 2020

Page 1 of 1

CHAIN-OF-CUSTODY RECORD

KOMAN Government Services, LLC
Laurie Ekes
293 Boston Post Road West, Suite 100, Marlborough, MA 01752
(508) 508.366.7442, lekes@komangs.com

COC # MARCH2020 Page 3 of 3

Boston KGS #215

Project Name: Long Term Monitoring	Laboratory: TestAmerica Laboratories, Inc., Savannah, GA	Event: KOMAN, Long Term Monitoring,
Project Number: DEVNS-LTM	POC: Jerry Lanier912.354.7858jerry.lanier@testamericainc.com	
WBS Code: Purchase Order 18-706	Ship to: 5102 LaRoche Avenue, Savannah, GA 31404	

Comments:
SW6010C/FLDFLT (B) = Fe Mn
SW6020A/FLDFLT (B) = As

Equipment:

Code	Matrix
WG	Ground Water

Code	Container/Preservative
9	1x 250mL, plastic, HNO3, pH < 2; Cool < 6degC

	Sample ID	Matrix	Date	Time	Samp Init.	SW6010C/FLDFLT (B)	SW6020A/FLDFLT (B)	Location ID	Sample Type	Depth (ft bgs) Top	Depth (ft bgs) Bottom	Cooler	Comments
	Event: KOMAN, Long Term Monitoring, AOC 57 Supplemental MW Winter					9	9						
	5702VP-20-01-5-9	WG	4/22/20	1405	[illegible]	X	X	5702VP-20-01	N1	5	9	1	
2	A1-VP-DVP-1-4220	"	4/22/20	1410	[illegible]	X	X	5702VP-20-01	N1	5	9		
3													
4													
5													
6													
7													
8													
9													

Turnaround Time: 21 days

Relinquished by: *(Signature)*	Date	Time	Received by: *(Signature)*	Date	Time
[signature]	4/22/20	1500	[signature]	4-22-20	1500
[signature]	4-22-20	1800			

Shipping Date / Carrier / Airbill Number
Shipping Date: 3/6/2020
2.5 (CF) 2.9°C

Received by Laboratory: *(Signature, Date, Time)* **& condition**
[signature] 04-23-20 0955

ENV.COC_Field
March 27, 2020

Page 1 of 1

Login Sample Receipt Checklist

Client: KOMAN Government Solutions, LLC

Job Number: 680-183056-1

Login Number: 183056
List Number: 1
Creator: Laughlin, Paul D

List Source: Eurofins TestAmerica, Savannah

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Accreditation/Certification Summary

Client: KOMAN Government Solutions, LLC
Job ID: 680-183056-1
Project/Site: LTM - AOC 57 Supplement MW Winter

Laboratory: Eurofins TestAmerica, Savannah

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
ANAB	Dept. of Defense ELAP	L2463	09-22-22

eurofins | Environment Testing America

ANALYTICAL REPORT

Eurofins TestAmerica, Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Tel: (912)354-7858

Laboratory Job ID: 680-183132-1
Client Project/Site: LTM - AOC 57 Supplemental MW Winter
Revision: 1

For:
KOMAN Government Solutions, LLC
293 Boston Post Road West
Suite 100
Marlborough, Massachusetts 01752

Attn: Laurie Ekes

Authorized for release by:
5/7/2020 4:59:59 PM

Jerry Lanier, Project Manager I
(912)250-0281
jerry.lanier@testamericainc.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.eurofinsus.com/Env

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

Table of Contents

Cover Page 1
Table of Contents 2
Case Narrative 3
Sample Summary 5
Method Summary 6
Definitions/Glossary 7
Client Sample Results 8
QC Sample Results 11
QC Association Summary 13
Lab Chronicle 15
Chain of Custody 18
Receipt Checklists 19
Certification Summary 20

Job ID: 680-183132-1

Laboratory: Eurofins TestAmerica, Savannah

Narrative

CASE NARRATIVE
Client: KOMAN Government Solutions, LLC
Project: LTM - AOC 57 Supplemental MW Winter

Report Number: 680-183132-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

RECEIPT
The samples were received on 04/25/2020; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 2.0 C.

The fina lreport was revised to repot the equipment blanks as total metals per client request.

METALS (ICP)
Sample A1-VP-EB-42320 (680-183132-10) was analyzed for Metals (ICP) in accordance with EPA SW-846 Method 6010C. The samples were prepared on 04/27/2020 and analyzed on 04/28/2020.

Iron was detected in method blank MB 680-616624/1-A at a level that was above the method detection limit but below the reporting limit. The value should be considered an estimate, and has been flagged. If the associated sample reported a result above the MDL and/or RL, the result has been flagged. Refer to the QC report for details.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

METALS (ICP) - DISSOLVED
Samples 5702VP-20-01-10-14 (680-183132-1), 5702VP-20-01-15-19 (680-183132-2), AI-VP-DUP-1-42320 (680-183132-3), 5702VP-20-01-20-24 (680-183132-4), 5702VP-20-01-25-29 (680-183132-5), 5702VP-20-01-30-34 (680-183132-6), 5702VP-20-01-35-39 (680-183132-7), 5702VP-20-01-40-44 (680-183132-8), and 5702VP-20-01-50-54 (680-183132-9) were analyzed for Metals (ICP) - Dissolved in accordance with EPA SW-846 Method 6010C. The samples were prepared on 04/27/2020 and analyzed on 04/28/2020.

Iron was detected in method blank MB 680-616624/1-A at a level that was above the method detection limit but below the reporting limit. The value should be considered an estimate, and has been flagged. If the associated sample reported a result above the MDL and/or RL, the result has been flagged. Refer to the QC report for details.

Manganese recovered high for the MSD of sample 5702VP-20-01-10-14MSD (680-183132-1) in batch 680-616949.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

METALS (ICP)
Sample A1-VP-EB-42320 (680-183132-10) was analyzed for Metals (ICP) in accordance with EPA SW-846 Method 6010C. The samples were prepared on 04/27/2020 and analyzed on 04/28/2020.

Iron was detected in method blank MB 680-616624/1-A at a level that was above the method detection limit but below the reporting limit. The value should be considered an estimate, and has been flagged. If the associated sample reported a result above the MDL and/or RL, the result has been flagged. Refer to the QC report for details.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

METALS (ICPMS) - DISSOLVED

Job ID: 680-183132-1 (Continued)

Laboratory: Eurofins TestAmerica, Savannah (Continued)

Samples 5702VP-20-01-10-14 (680-183132-1), 5702VP-20-01-15-19 (680-183132-2), AI-VP-DUP-1-42320 (680-183132-3), 5702VP-20-01-20-24 (680-183132-4), 5702VP-20-01-25-29 (680-183132-5), 5702VP-20-01-30-34 (680-183132-6), 5702VP-20-01-35-39 (680-183132-7), 5702VP-20-01-40-44 (680-183132-8), and 5702VP-20-01-50-54 (680-183132-9) were analyzed for Metals (ICPMS) - Dissolved in accordance with EPA SW-846 Method 6020A. The samples were prepared on 04/27/2020 and analyzed on 04/28/2020.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Sample Summary

Client: KOMAN Government Solutions, LLC
Project/Site: LTM - AOC 57 Supplemental MW Winter

Job ID: 680-183132-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
680-183132-1	5702VP-20-01-10-14	Water	04/23/20 08:05	04/25/20 09:20	
680-183132-2	5702VP-20-01-15-19	Water	04/23/20 08:45	04/25/20 09:20	
680-183132-3	A1-VP-DUP-1-42320	Water	04/23/20 08:50	04/25/20 09:20	
680-183132-4	5702VP-20-01-20-24	Water	04/23/20 09:52	04/25/20 09:20	
680-183132-5	5702VP-20-01-25-29	Water	04/23/20 10:26	04/25/20 09:20	
680-183132-6	5702VP-20-01-30-34	Water	04/23/20 11:28	04/25/20 09:20	
680-183132-7	5702VP-20-01-35-39	Water	04/23/20 13:30	04/25/20 09:20	
680-183132-8	5702VP-20-01-40-44	Water	04/24/20 08:10	04/25/20 09:20	
680-183132-9	5702VP-20-01-50-54	Water	04/24/20 09:34	04/25/20 09:20	
680-183132-10	A1-VP-EB-42320	Water	04/23/20 10:05	04/25/20 09:20	

Method Summary

Client: KOMAN Government Solutions, LLC
Project/Site: LTM - AOC 57 Supplemental MW Winter

Job ID: 680-183132-1

Method	Method Description	Protocol	Laboratory
6010C	Metals (ICP)	SW846	TAL SAV
6020A	Metals (ICP/MS)	SW846	TAL SAV
3005A	Preparation, Total Recoverable or Dissolved Metals	SW846	TAL SAV

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL SAV = Eurofins TestAmerica, Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

Qualifiers

Metals

Qualifier	Qualifier Description
J	Estimated: The analyte was positively identified; the quantitation is an estimation
J1	Estimated: The quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Client Sample Results

Client: KOMAN Government Solutions, LLC
Project/Site: LTM - AOC 57 Supplemental MW Winter

Job ID: 680-183132-1

Client Sample ID: 5702VP-20-01-10-14

Lab Sample ID: 680-183132-1
Date Collected: 04/23/20 08:05
Matrix: Water
Date Received: 04/25/20 09:20

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	110		50	50	17	ug/L		04/28/20 15:47	1
Manganese	240	J1	10	3.0	1.0	ug/L		04/28/20 15:47	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	3.0	U	3.0	3.0	1.5	ug/L		04/28/20 16:06	1

Client Sample ID: 5702VP-20-01-15-19

Lab Sample ID: 680-183132-2
Date Collected: 04/23/20 08:45
Matrix: Water
Date Received: 04/25/20 09:20

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	2200		50	50	17	ug/L		04/28/20 17:12	1
Manganese	680		10	3.0	1.0	ug/L		04/28/20 17:12	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	3.4		3.0	3.0	1.5	ug/L		04/28/20 17:43	1

Client Sample ID: A1-VP-DUP-1-42320

Lab Sample ID: 680-183132-3
Date Collected: 04/23/20 08:50
Matrix: Water
Date Received: 04/25/20 09:20

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	1400		50	50	17	ug/L		04/28/20 16:44	1
Manganese	550		10	3.0	1.0	ug/L		04/28/20 16:44	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	1.8	J	3.0	3.0	1.5	ug/L		04/28/20 17:14	1

Client Sample ID: 5702VP-20-01-20-24

Lab Sample ID: 680-183132-4
Date Collected: 04/23/20 09:52
Matrix: Water
Date Received: 04/25/20 09:20

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	600		50	50	17	ug/L		04/28/20 16:49	1
Manganese	300		10	3.0	1.0	ug/L		04/28/20 16:49	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	3.0	U	3.0	3.0	1.5	ug/L		04/28/20 17:25	1

Client Sample Results

Client: KOMAN Government Solutions, LLC
Project/Site: LTM - AOC 57 Supplemental MW Winter

Job ID: 680-183132-1

Client Sample ID: 5702VP-20-01-25-29

Lab Sample ID: 680-183132-5
Date Collected: 04/23/20 10:26
Matrix: Water
Date Received: 04/25/20 09:20

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	360		50	50	17	ug/L		04/28/20 16:58	1
Manganese	180		10	3.0	1.0	ug/L		04/28/20 16:58	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	3.0	U	3.0	3.0	1.5	ug/L		04/28/20 17:32	1

Client Sample ID: 5702VP-20-01-30-34

Lab Sample ID: 680-183132-6
Date Collected: 04/23/20 11:28
Matrix: Water
Date Received: 04/25/20 09:20

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	140		50	50	17	ug/L		04/28/20 17:03	1
Manganese	81		10	3.0	1.0	ug/L		04/28/20 17:03	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	1.6	J	3.0	3.0	1.5	ug/L		04/28/20 17:35	1

Client Sample ID: 5702VP-20-01-35-39

Lab Sample ID: 680-183132-7
Date Collected: 04/23/20 13:30
Matrix: Water
Date Received: 04/25/20 09:20

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	830		50	50	17	ug/L		04/28/20 17:08	1
Manganese	540		10	3.0	1.0	ug/L		04/28/20 17:08	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	1.9	J	3.0	3.0	1.5	ug/L		04/28/20 17:39	1

Client Sample ID: 5702VP-20-01-40-44

Lab Sample ID: 680-183132-8
Date Collected: 04/24/20 08:10
Matrix: Water
Date Received: 04/25/20 09:20

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	110		50	50	17	ug/L		04/28/20 16:39	1
Manganese	130		10	3.0	1.0	ug/L		04/28/20 16:39	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	13		3.0	3.0	1.5	ug/L		04/28/20 17:11	1

Client Sample Results

Client: KOMAN Government Solutions, LLC
Project/Site: LTM - AOC 57 Supplemental MW Winter

Job ID: 680-183132-1

Client Sample ID: 5702VP-20-01-50-54

Lab Sample ID: 680-183132-9

Date Collected: 04/24/20 09:34
Matrix: Water
Date Received: 04/25/20 09:20

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	320		50	50	17	ug/L		04/28/20 16:34	1
Manganese	530		10	3.0	1.0	ug/L		04/28/20 16:34	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	5.1		3.0	3.0	1.5	ug/L		04/28/20 17:07	1

Client Sample ID: A1-VP-EB-42320

Lab Sample ID: 680-183132-10

Date Collected: 04/23/20 10:05
Matrix: Water
Date Received: 04/25/20 09:20

Method: 6010C - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	27	J	50	50	17	ug/L		04/28/20 16:53	1
Manganese	1.8	J	10	3.0	1.0	ug/L		04/28/20 16:53	1

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	3.0	U	3.0	3.0	1.5	ug/L		04/28/20 17:28	1

QC Sample Results

Client: KOMAN Government Solutions, LLC
Project/Site: LTM - AOC 57 Supplemental MW Winter

Job ID: 680-183132-1

Method: 6010C - Metals (ICP)

Lab Sample ID: MB 680-616624/1-A — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total Recoverable**
Analysis Batch: 616949 — **Prep Batch: 616624**

Analyte	MB Result	MB Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	22.7	J	50	50	17	ug/L		04/28/20 15:37	1
Manganese	3.0	U	10	3.0	1.0	ug/L		04/28/20 15:37	1

Lab Sample ID: LCS 680-616624/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total Recoverable**
Analysis Batch: 616949 — **Prep Batch: 616624**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Iron	5010	4770		ug/L		95	87 - 115
Manganese	400	382		ug/L		96	90 - 114

Lab Sample ID: 680-183132-1 MS — **Client Sample ID: 5702VP-20-01-10-14**
Matrix: Water — **Prep Type: Dissolved**
Analysis Batch: 616949 — **Prep Batch: 616624**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Iron	110		5010	4910		ug/L		96	87 - 115
Manganese	240	J1	400	676		ug/L		110	90 - 114

Lab Sample ID: 680-183132-1 MSD — **Client Sample ID: 5702VP-20-01-10-14**
Matrix: Water — **Prep Type: Dissolved**
Analysis Batch: 616949 — **Prep Batch: 616624**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Iron	110		5010	4860		ug/L		95	87 - 115	1	20
Manganese	240	J1	400	705	J1	ug/L		117	90 - 114	4	20

Method: 6020A - Metals (ICP/MS)

Lab Sample ID: MB 680-616622/1-A — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total Recoverable**
Analysis Batch: 616874 — **Prep Batch: 616622**

Analyte	MB Result	MB Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	3.0	U	3.0	3.0	1.5	ug/L		04/28/20 15:59	1

Lab Sample ID: LCS 680-616622/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total Recoverable**
Analysis Batch: 616874 — **Prep Batch: 616622**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	100	103		ug/L		103	84 - 116

Lab Sample ID: 680-183132-1 MS — **Client Sample ID: 5702VP-20-01-10-14**
Matrix: Water — **Prep Type: Dissolved**
Analysis Batch: 616874 — **Prep Batch: 616622**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	3.0	U	100	103		ug/L		103	84 - 116

Method: 6020A - Metals (ICP/MS) (Continued)

Lab Sample ID: 680-183132-1 MSD
Matrix: Water
Analysis Batch: 616874

Client Sample ID: 5702VP-20-01-10-14
Prep Type: Dissolved
Prep Batch: 616622

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Arsenic	3.0	U	100	108		ug/L		108	84 - 116	5	20

QC Association Summary

Client: KOMAN Government Solutions, LLC
Project/Site: LTM - AOC 57 Supplemental MW Winter

Job ID: 680-183132-1

Metals

Prep Batch: 616622

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-183132-1	5702VP-20-01-10-14	Dissolved	Water	3005A	
680-183132-2	5702VP-20-01-15-19	Dissolved	Water	3005A	
680-183132-3	A1-VP-DUP-1-42320	Dissolved	Water	3005A	
680-183132-4	5702VP-20-01-20-24	Dissolved	Water	3005A	
680-183132-5	5702VP-20-01-25-29	Dissolved	Water	3005A	
680-183132-6	5702VP-20-01-30-34	Dissolved	Water	3005A	
680-183132-7	5702VP-20-01-35-39	Dissolved	Water	3005A	
680-183132-8	5702VP-20-01-40-44	Dissolved	Water	3005A	
680-183132-9	5702VP-20-01-50-54	Dissolved	Water	3005A	
680-183132-10	A1-VP-EB-42320	Total Recoverable	Water	3005A	
MB 680-616622/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 680-616622/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
680-183132-1 MS	5702VP-20-01-10-14	Dissolved	Water	3005A	
680-183132-1 MSD	5702VP-20-01-10-14	Dissolved	Water	3005A	

Prep Batch: 616624

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-183132-1	5702VP-20-01-10-14	Dissolved	Water	3005A	
680-183132-2	5702VP-20-01-15-19	Dissolved	Water	3005A	
680-183132-3	A1-VP-DUP-1-42320	Dissolved	Water	3005A	
680-183132-4	5702VP-20-01-20-24	Dissolved	Water	3005A	
680-183132-5	5702VP-20-01-25-29	Dissolved	Water	3005A	
680-183132-6	5702VP-20-01-30-34	Dissolved	Water	3005A	
680-183132-7	5702VP-20-01-35-39	Dissolved	Water	3005A	
680-183132-8	5702VP-20-01-40-44	Dissolved	Water	3005A	
680-183132-9	5702VP-20-01-50-54	Dissolved	Water	3005A	
680-183132-10	A1-VP-EB-42320	Total Recoverable	Water	3005A	
MB 680-616624/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 680-616624/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
680-183132-1 MS	5702VP-20-01-10-14	Dissolved	Water	3005A	
680-183132-1 MSD	5702VP-20-01-10-14	Dissolved	Water	3005A	

Analysis Batch: 616874

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-183132-1	5702VP-20-01-10-14	Dissolved	Water	6020A	616622
680-183132-2	5702VP-20-01-15-19	Dissolved	Water	6020A	616622
680-183132-3	A1-VP-DUP-1-42320	Dissolved	Water	6020A	616622
680-183132-4	5702VP-20-01-20-24	Dissolved	Water	6020A	616622
680-183132-5	5702VP-20-01-25-29	Dissolved	Water	6020A	616622
680-183132-6	5702VP-20-01-30-34	Dissolved	Water	6020A	616622
680-183132-7	5702VP-20-01-35-39	Dissolved	Water	6020A	616622
680-183132-8	5702VP-20-01-40-44	Dissolved	Water	6020A	616622
680-183132-9	5702VP-20-01-50-54	Dissolved	Water	6020A	616622
680-183132-10	A1-VP-EB-42320	Total Recoverable	Water	6020A	616622
MB 680-616622/1-A	Method Blank	Total Recoverable	Water	6020A	616622
LCS 680-616622/2-A	Lab Control Sample	Total Recoverable	Water	6020A	616622
680-183132-1 MS	5702VP-20-01-10-14	Dissolved	Water	6020A	616622
680-183132-1 MSD	5702VP-20-01-10-14	Dissolved	Water	6020A	616622

QC Association Summary

Client: KOMAN Government Solutions, LLC
Project/Site: LTM - AOC 57 Supplemental MW Winter

Job ID: 680-183132-1

Metals

Analysis Batch: 616949

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-183132-1	5702VP-20-01-10-14	Dissolved	Water	6010C	616624
680-183132-2	5702VP-20-01-15-19	Dissolved	Water	6010C	616624
680-183132-3	A1-VP-DUP-1-42320	Dissolved	Water	6010C	616624
680-183132-4	5702VP-20-01-20-24	Dissolved	Water	6010C	616624
680-183132-5	5702VP-20-01-25-29	Dissolved	Water	6010C	616624
680-183132-6	5702VP-20-01-30-34	Dissolved	Water	6010C	616624
680-183132-7	5702VP-20-01-35-39	Dissolved	Water	6010C	616624
680-183132-8	5702VP-20-01-40-44	Dissolved	Water	6010C	616624
680-183132-9	5702VP-20-01-50-54	Dissolved	Water	6010C	616624
680-183132-10	A1-VP-EB-42320	Total Recoverable	Water	6010C	616624
MB 680-616624/1-A	Method Blank	Total Recoverable	Water	6010C	616624
LCS 680-616624/2-A	Lab Control Sample	Total Recoverable	Water	6010C	616624
680-183132-1 MS	5702VP-20-01-10-14	Dissolved	Water	6010C	616624
680-183132-1 MSD	5702VP-20-01-10-14	Dissolved	Water	6010C	616624

Lab Chronicle

Client: KOMAN Government Solutions, LLC
Project/Site: LTM - AOC 57 Supplemental MW Winter

Job ID: 680-183132-1

Client Sample ID: 5702VP-20-01-10-14

Lab Sample ID: 680-183132-1

Date Collected: 04/23/20 08:05
Matrix: Water
Date Received: 04/25/20 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	616624	04/27/20 13:39	AJR	TAL SAV
Dissolved	Analysis	6010C		1			616949	04/28/20 15:47	BCB	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	616622	04/27/20 13:39	AJR	TAL SAV
Dissolved	Analysis	6020A		1			616874	04/28/20 16:06	BJB	TAL SAV
	Instrument ID:	ICPMSD								

Client Sample ID: 5702VP-20-01-15-19

Lab Sample ID: 680-183132-2

Date Collected: 04/23/20 08:45
Matrix: Water
Date Received: 04/25/20 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	616624	04/27/20 13:39	AJR	TAL SAV
Dissolved	Analysis	6010C		1			616949	04/28/20 17:12	BCB	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	616622	04/27/20 13:39	AJR	TAL SAV
Dissolved	Analysis	6020A		1			616874	04/28/20 17:43	BJB	TAL SAV
	Instrument ID:	ICPMSD								

Client Sample ID: A1-VP-DUP-1-42320

Lab Sample ID: 680-183132-3

Date Collected: 04/23/20 08:50
Matrix: Water
Date Received: 04/25/20 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	616624	04/27/20 13:39	AJR	TAL SAV
Dissolved	Analysis	6010C		1			616949	04/28/20 16:44	BCB	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	616622	04/27/20 13:39	AJR	TAL SAV
Dissolved	Analysis	6020A		1			616874	04/28/20 17:14	BJB	TAL SAV
	Instrument ID:	ICPMSD								

Client Sample ID: 5702VP-20-01-20-24

Lab Sample ID: 680-183132-4

Date Collected: 04/23/20 09:52
Matrix: Water
Date Received: 04/25/20 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	616624	04/27/20 13:39	AJR	TAL SAV
Dissolved	Analysis	6010C		1			616949	04/28/20 16:49	BCB	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	616622	04/27/20 13:39	AJR	TAL SAV
Dissolved	Analysis	6020A		1			616874	04/28/20 17:25	BJB	TAL SAV
	Instrument ID:	ICPMSD								

Lab Chronicle

Client: KOMAN Government Solutions, LLC
Project/Site: LTM - AOC 57 Supplemental MW Winter

Job ID: 680-183132-1

Client Sample ID: 5702VP-20-01-25-29

Lab Sample ID: 680-183132-5

Date Collected: 04/23/20 10:26
Matrix: Water
Date Received: 04/25/20 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	616624	04/27/20 13:39	AJR	TAL SAV
Dissolved	Analysis	6010C		1			616949	04/28/20 16:58	BCB	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	616622	04/27/20 13:39	AJR	TAL SAV
Dissolved	Analysis	6020A		1			616874	04/28/20 17:32	BJB	TAL SAV
	Instrument ID:	ICPMSD								

Client Sample ID: 5702VP-20-01-30-34

Lab Sample ID: 680-183132-6

Date Collected: 04/23/20 11:28
Matrix: Water
Date Received: 04/25/20 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	616624	04/27/20 13:39	AJR	TAL SAV
Dissolved	Analysis	6010C		1			616949	04/28/20 17:03	BCB	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	616622	04/27/20 13:39	AJR	TAL SAV
Dissolved	Analysis	6020A		1			616874	04/28/20 17:35	BJB	TAL SAV
	Instrument ID:	ICPMSD								

Client Sample ID: 5702VP-20-01-35-39

Lab Sample ID: 680-183132-7

Date Collected: 04/23/20 13:30
Matrix: Water
Date Received: 04/25/20 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	616624	04/27/20 13:39	AJR	TAL SAV
Dissolved	Analysis	6010C		1			616949	04/28/20 17:08	BCB	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	616622	04/27/20 13:39	AJR	TAL SAV
Dissolved	Analysis	6020A		1			616874	04/28/20 17:39	BJB	TAL SAV
	Instrument ID:	ICPMSD								

Client Sample ID: 5702VP-20-01-40-44

Lab Sample ID: 680-183132-8

Date Collected: 04/24/20 08:10
Matrix: Water
Date Received: 04/25/20 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	616624	04/27/20 13:39	AJR	TAL SAV
Dissolved	Analysis	6010C		1			616949	04/28/20 16:39	BCB	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	616622	04/27/20 13:39	AJR	TAL SAV
Dissolved	Analysis	6020A		1			616874	04/28/20 17:11	BJB	TAL SAV
	Instrument ID:	ICPMSD								

Lab Chronicle

Client: KOMAN Government Solutions, LLC
Project/Site: LTM - AOC 57 Supplemental MW Winter

Job ID: 680-183132-1

Client Sample ID: 5702VP-20-01-50-54

Lab Sample ID: 680-183132-9

Date Collected: 04/24/20 09:34

Matrix: Water

Date Received: 04/25/20 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	616624	04/27/20 13:39	AJR	TAL SAV
Dissolved	Analysis	6010C		1			616949	04/28/20 16:34	BCB	TAL SAV
	Instrument ID:	ICPE								
Dissolved	Prep	3005A			50 mL	250 mL	616622	04/27/20 13:39	AJR	TAL SAV
Dissolved	Analysis	6020A		1			616874	04/28/20 17:07	BJB	TAL SAV
	Instrument ID:	ICPMSD								

Client Sample ID: A1-VP-EB-42320

Lab Sample ID: 680-183132-10

Date Collected: 04/23/20 10:05

Matrix: Water

Date Received: 04/25/20 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	616624	04/27/20 13:39	AJR	TAL SAV
Total Recoverable	Analysis	6010C		1			616949	04/28/20 16:53	BCB	TAL SAV
	Instrument ID:	ICPE								
Total Recoverable	Prep	3005A			50 mL	250 mL	616622	04/27/20 13:39	AJR	TAL SAV
Total Recoverable	Analysis	6020A		1			616874	04/28/20 17:28	BJB	TAL SAV
	Instrument ID:	ICPMSD								

Laboratory References:

TAL SAV = Eurofins TestAmerica, Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

CHAIN-OF-CUSTODY RECORD

KOMAN Government Services, LLC
Laurie Ekes
293 Boston Post Road West, Suite 100, Marlborough, MA 01752
(508) 508.366.7442, lekes@komangs.com

Boston #215 MARCH2020

KGS

Project Name: Long Term Monitoring	Laboratory: TestAmerica Laboratories, Inc., Savannah, GA	Event: KOMAN, Long Term Monitoring,
Project Number: DEVNS-LTM	POC: Jerry Lanier912.354.7858jerry.lanier@testamericainc.com	
WBS Code: Purchase Order 18-706	Ship to: 5102 LaRoche Avenue, Savannah, GA 31404	

Comments:
SW6010C/FLDFLT (B) = Fe Mn
SW6020A/FLDFLT (B) = As

Equipment:

Code	Matrix
WG	Ground Water

Code	Container/Preservative
9	1x 250mL, plastic, HNO3, pH < 2; Cool < 6degC

Event: KOMAN, Long Term Monitoring, AOC 57 Supplemental MW Winter

	Sample ID	Matrix	Date	Time	Samp Init.	SW6010C/FLDFLT (B)	SW6020A/FLDFLT (B)	Total Metals	Location ID	Sample Type	Depth (ft bgs) Top	Depth (ft bgs) Bottom	Cooler	Comments
						9	9							
	5702VP-20-01-10-14	WG	4/23/20	805	LGA	X	X		5702VP-20-01	N1	10	14	1	MS/MSD
2	5702VP-20-01-15-19		4/23/20	845	LGA	X	X		5702VP-20-01	N1	15	19		
3	A1-VP-DUP-1-42320		4/23/20	850	LGA	X	X		5702VP-20-01	N1	15	19		
4	5702VP-20-01-20-24		4/23/20	952	LGA	X	X		5702VP-20-01	N1	20	24		
5	5702VP-20-01-25-29		4/23/20	1026	LGA	X	X		5702VP-20-01	N1	25	29		
6	5702VP-20-01-30-34		4/23/20	1128	LGA	X	X		5702VP-20-01	N1	30	34		
7	5702VP-20-01-35-39		4/23/20	1330	LGA	X	X		5702VP-20-01	N1	35	39		
8	5702VP-20-01-40-44		4/24/20	810	LGA	X	X		5702VP-20-01	N1	40	44		
9	5702VP-20-01-50-54		4/24/20	934	LGA	X	X		5702VP-20-01	N1	50	54		
10	A1-VP-EB-42320		4/23/20	1005	LGA		X		(EB off of SP-16 screen)					

Turnaround Time: 21 days

Relinquished by: *(Signature)*	Date	Time	Received by: *(Signature)*	Date	Time
[signature]	4/24/20	1130	[signature]	4-24-20	1130
[signature]	4/24-20	1800			

Shipping Date / Carrier / Airbill Number
Shipping Date: 3/6/2020

Received by Laboratory: *(Signature, Date, Time)* **& condition**
[signature] 1.6/2.0
4-25-2020/0920

680-183132 Chain of Custody

ENV.COC_Field
March 27, 2020

Login Sample Receipt Checklist

Client: KOMAN Government Solutions, LLC

Job Number: 680-183132-1

Login Number: 183132

List Source: Eurofins TestAmerica, Savannah

List Number: 1

Creator: Laughlin, Paul D

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Accreditation/Certification Summary

Client: KOMAN Government Solutions, LLC
Job ID: 680-183132-1
Project/Site: LTM - AOC 57 Supplemental MW Winter

Laboratory: Eurofins TestAmerica, Savannah

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
ANAB	Dept. of Defense ELAP	L2463	09-22-22

ATTACHMENT C
ANALYTICAL DATA VALIDATION REPORTS

Data Validation Report for 6801798011

Facility:	Long Term Monitoring
Event:	KOMAN, Long Term Monitoring, AOC 57 Supplemental MW Winter 2020
SDG:	6801798011
Guidance Document:	Quality Assurance Project Plan, Long Term Monitoring Program, Former Fort Devens, 2018
Prime Contractor:	KOMAN Government Services, LLC
Project Manager:	Jim Ropp
Contract Laboratory(ies):	TestAmerica Laboratories, Inc., Savannah, GA
Data Review Contractor:	KOMAN Government Solutions, LLC
Data Review Level:	2B
Primary Data Reviewer:	Sherri Pullar, Data Validation Chemist
Second Reviewer:	Laurie Ekes, Senior Scientist
Date Submitted:	March 09, 2020

Field Sample ID	Lab Sample ID	Matrix	Type/Type Code	SW6010C - Dissolved	SW6020A - Dissolved
57M-03-01X_JAN20	680-179801-5	Water	Field Sample/N	X	X
57M-03-03X_JAN20	680-179801-2	Water	Field Sample/N	X	X
57M-03-04X_JAN20	680-179801-1	Water	Field Sample/N	X	X
57M-DUP01_JAN20	680-179801-3	Water	Field Duplicate/FD	X	X

This report assesses the analytical data quality associated with the analyses listed on the preceding cover page at 2B data validation level. This assessment has been made through a combination of automated data review (ADR) and supplemental manual review, the details of which are described below. The approach taken in the review of this data set is consistent with the requirements contained in the Quality Assurance Project Plan, Long Term Monitoring Program, Former Fort Devens, 2018 and the additional guidance documents incorporated by reference to the extent possible. Where definitive guidance is not provided, results have been evaluated in a conservative manner using professional judgment.

Sample collection was managed and directed by KOMAN Government Services, LLC; analyses were performed by TestAmerica Laboratories, Inc., Savannah, GA and were reported under sample delivery group (SDG) 6801798011. Data have been evaluated electronically based on electronic data deliverables (EDDs) provided by the laboratory, and hard copy data summary forms have also been reviewed during this effort and compared to the automated review output by the reviewers whose signatures appear on the following page. Findings based on the automated data submission and manual data verification processes are detailed in the ADR narrative and throughout this report.

All quality control (QC) elements associated with this SDG have been reviewed by a project chemist in accordance with the requirements defined for the project. This review is documented in the attached Data Review Checklists. The QC elements listed below were supported by the electronic deliverable and were evaluated using ADR processes.

- Blank - Negative
- Calibration Blank
- Calibration Blank - Negative
- Continuing Calibration Verification
- Field Duplicate RPD
- Interference Check Sample A
- Interference Check Sample A - Negative
- Interference Check Sample AB
- Lab Blank
- LCS Recovery
- Prep Hold Time
- Test Hold Time

Results of the ADR process were subsequently reviewed and updated as applicable by the data review chemists identified on the signature page. Quality control elements that were not included in the electronic deliverable were reviewed manually and findings are documented within this report. Summaries of findings and associated qualified results are documented throughout this report.

A total of 0 results (0.00%) out of the 12 results (sample and field QC samples) reported are qualified based on review and 0 results (0.00%) have been rejected or deemed a serious deficiency. Trace values, defined as results that are qualified as estimated because they fall between the detection limit and the reporting limit/limit of quantitation, are not counted as qualified results in the above count. The qualified results are detailed throughout this report and discussed in the narrative below, where appropriate.

Narrative Comments

This SDG contains 3 GW samples and 1 FD.

Analytical Method	Data Reviewer Comment
SW6010C	No additional comments; see Checklist for detail.
SW6020A	No additional comments; see Checklist for detail.

Sherri A Pullar

March 06, 2020

Reviewed by Sherri Pullar, Data Validation Chemist, KOMAN Government Solutions, LLC

As the First Reviewer, I certify that I have performed a data review process in accordance with the requirements of the project guidance document, and have compared the electronic data to the laboratory's hard copy report and have verified the consistency of a minimum of 10% of the reported sample results and method quality control data between the two deliverables.

Laurie Ekes

March 09, 2020

Reviewed by Laurie Ekes, Senior Scientist, KOMAN Government Solutions, LLC

As the Second Reviewer, I certify that I have performed a quality assurance review of the report generated by the First Reviewer.

No Outliers were associated with this sample delivery group.

Qualified Results

No results associated with this sample delivery group required qualification.

Results with Modified Qualifiers

No qualifiers associated with this sample delivery group were modified manually.

Reason Code Definitions

Code	Definition
TR	Trace Level Detect

Flag Code and Definitions

Flag	Definition
U	Undetected: The analyte was analyzed for, but not detected.
UJ	The analyte was not detected; however, the result is estimated due to discrepancies in meeting certain analyte-specific quality control criteria.
J	Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.
R	The data are rejected due to deficiencies in meeting QC criteria and may not be used for decision making.
B	Blank contamination: The analyte was found in an associated blank above one half the RL, as well as in the sample.
UB	The analyte was also detected in an associated laboratory or field blank at a concentration comparable to the concentration in the sample. The reported result has been requalified as not detected.

X	The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and to meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided. Acceptance or rejection of the data should be decided by the project team (which should include a project chemist), but exclusion of the data is recommended.

Review Questions

Method: SW6010C (Trace Metals by Inductively Coupled Plasma/Atomic Emission Spectrometry)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?	•			
Were target analytes reported in the field blank(s) less than MDL?			•	
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			LCS only
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?			•	
Was a MS/MSD pair prepared with each batch?		•		
Were MS/MSD recoveries within project acceptance limits?			•	
Was the MS/MSD RPD within project acceptance limits?			•	
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?	•			Spls -2/-3 were the FD pair. See FD report.
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

Review Questions

Method: SW6020A (Trace Metals by Inductively Coupled Plasma/Mass Spectrometry)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?	•			
Were field blanks (EBs or FBs) submitted with these samples?		•		
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			LCS only
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?			•	
Was a MS/MSD pair prepared with each batch?		•		
Were MS/MSD recoveries within project acceptance limits?			•	
Was the MS/MSD RPD within project acceptance limits?			•	
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?	•			Spls -2/-3 were the FD pair. See FD report.
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

Field Duplicate Report By SDG
Long Term Monitoring
KOMAN, Long Term Monitoring, AOC 57 Supplemental MW Winter 2020
Field Duplicates for SDG: 6801798011

Location	Analysis
57M-03-03X	SW6010C

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
57M-03-03X_JAN20 / 57M-DUP01_JAN20	680-179801-2 / 680-179801-3	Iron (FLDFLT)	ND	ND	50.0	NA	30	NA	OK
57M-03-03X_JAN20 / 57M-DUP01_JAN20	680-179801-2 / 680-179801-3	Manganese (FLDFLT)	96.0	91.0	10.0	5.35	30	OK	NA

Location	Analysis
57M-03-03X	SW6020A

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
57M-03-03X_JAN20 / 57M-DUP01_JAN20	680-179801-2 / 680-179801-3	Arsenic (FLDFLT)	ND	ND	3.00	NA	30	NA	OK

FD = Field Duplicate
RL = Reporting Limit
RPD = Relative Percent Difference

RL Check = If either the primary sample or field duplicate result is less than 5 times the RL then the criteria used to determine if the field duplicate is outside QC limits is +/- RL for Water and +/- 2 times RL for Soil"

Data Validation Report for 6801800591

Facility:	Long Term Monitoring
Event:	KOMAN, Long Term Monitoring, AOC 57 Supplemental MW Winter 2020
SDG:	6801800591
Guidance Document:	Quality Assurance Project Plan, Long Term Monitoring Program, Former Fort Devens, 2018
Prime Contractor:	KOMAN Government Services, LLC
Project Manager:	Jim Ropp
Contract Laboratory(ies):	TestAmerica Laboratories, Inc., Savannah, GA
Data Review Contractor:	KOMAN Government Solutions, LLC
Data Review Level:	2B
Primary Data Reviewer:	Sherri Pullar, Data Validation Chemist
Second Reviewer:	Laurie Ekes, Senior Scientist
Date Submitted:	March 09, 2020

Field Sample ID	Lab Sample ID	Matrix	Type/Type Code	SW6010C - Dissolved	SW6020A - Dissolved
57M-03-02X_JAN20	680-180059-3	Water	Field Sample/N	X	X
57M-03-05X_JAN20	680-180059-2	Water	Field Sample/N	X	X
57M-95-06X_JAN20	680-180059-1	Water	Field Sample/N	X	X

This report assesses the analytical data quality associated with the analyses listed on the preceding cover page at 2B data validation level. This assessment has been made through a combination of automated data review (ADR) and supplemental manual review, the details of which are described below. The approach taken in the review of this data set is consistent with the requirements contained in the Quality Assurance Project Plan, Long Term Monitoring Program, Former Fort Devens, 2018 and the additional guidance documents incorporated by reference to the extent possible. Where definitive guidance is not provided, results have been evaluated in a conservative manner using professional judgment.

Sample collection was managed and directed by KOMAN Government Services, LLC; analyses were performed by TestAmerica Laboratories, Inc., Savannah, GA and were reported under sample delivery group (SDG) 6801800591. Data have been evaluated electronically based on electronic data deliverables (EDDs) provided by the laboratory, and hard copy data summary forms have also been reviewed during this effort and compared to the automated review output by the reviewers whose signatures appear on the following page. Findings based on the automated data submission and manual data verification processes are detailed in the ADR narrative and throughout this report.

All quality control (QC) elements associated with this SDG have been reviewed by a project chemist in accordance with the requirements defined for the project. This review is documented in the attached Data Review Checklists. The QC elements listed below were supported by the electronic deliverable and were evaluated using ADR processes.

- Blank - Negative
- Calibration Blank
- Calibration Blank - Negative
- Continuing Calibration Verification
- Interference Check Sample A
- Interference Check Sample A - Negative
- Interference Check Sample AB
- Lab Blank
- LCS Recovery
- Prep Hold Time
- Test Hold Time

Results of the ADR process were subsequently reviewed and updated as applicable by the data review chemists identified on the signature page. Quality control elements that were not included in the electronic deliverable were reviewed manually and findings are documented within this report. Summaries of findings and associated qualified results are documented throughout this report.

A total of 0 results (0.00%) out of the 9 results (sample and field QC samples) reported are qualified based on review and 0 results (0.00%) have been rejected or deemed a serious deficiency. Trace values, defined as results that are qualified as estimated because they fall between the detection limit and the reporting limit/limit of quantitation, are not counted as qualified results in the above count. The qualified results are detailed throughout this report and discussed in the narrative below, where appropriate.

Narrative Comments

This SDG contains 3 GW samples.

Analytical Method	Data Reviewer Comment
SW6010C	No additional comments; see Checklist for detail.
SW6020A	No additional comments; see Checklist for detail.

Sherri A Pullar

March 06, 2020

Reviewed by Sherri Pullar, Data Validation Chemist, KOMAN Government Solutions, LLC

As the First Reviewer, I certify that I have performed a data review process in accordance with the requirements of the project guidance document, and have compared the electronic data to the laboratory's hard copy report and have verified the consistency of a minimum of 10% of the reported sample results and method quality control data between the two deliverables.

Laurie Ekes

March 09, 2020

Reviewed by Laurie Ekes, Senior Scientist, KOMAN Government Solutions, LLC

As the Second Reviewer, I certify that I have performed a quality assurance review of the report generated by the First Reviewer.

No Outliers were associated with this sample delivery group.

Qualified Results

No results associated with this sample delivery group required qualification.

Results with Modified Qualifiers

No qualifiers associated with this sample delivery group were modified manually.

Reason Code Definitions

Code	Definition
TR	Trace Level Detect

Flag Code and Definitions

Flag	Definition
U	Undetected: The analyte was analyzed for, but not detected.
UJ	The analyte was not detected; however, the result is estimated due to discrepancies in meeting certain analyte-specific quality control criteria.
J	Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.
R	The data are rejected due to deficiencies in meeting QC criteria and may not be used for decision making.
B	Blank contamination: The analyte was found in an associated blank above one half the RL, as well as in the sample.
UB	The analyte was also detected in an associated laboratory or field blank at a concentration comparable to the concentration in the sample. The reported result has been requalified as not detected.

X	The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and to meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided. Acceptance or rejection of the data should be decided by the project team (which should include a project chemist), but exclusion of the data is recommended.

Review Questions

Method: SW6010C (Trace Metals by Inductively Coupled Plasma/Atomic Emission Spectrometry)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?	•			
Were target analytes reported in the field blank(s) less than MDL?			•	
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			LCS only
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?			•	
Was a MS/MSD pair prepared with each batch?		•		
Were MS/MSD recoveries within project acceptance limits?			•	
Was the MS/MSD RPD within project acceptance limits?			•	
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?			•	
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

Review Questions

Method: SW6020A (Trace Metals by Inductively Coupled Plasma/Mass Spectrometry)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?	•			
Were field blanks (EBs or FBs) submitted with these samples?		•		
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			LCS only
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?			•	
Was a MS/MSD pair prepared with each batch?		•		
Were MS/MSD recoveries within project acceptance limits?			•	
Was the MS/MSD RPD within project acceptance limits?			•	
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?			•	
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

Data Validation Report for 6801801741

Facility:	Long Term Monitoring
Event:	KOMAN, Long Term Monitoring, AOC 57 Supplemental MW Winter 2020
SDG:	6801801741
Guidance Document:	Quality Assurance Project Plan, Long Term Monitoring Program, Former Fort Devens, 2018
Prime Contractor:	KOMAN Government Services, LLC
Project Manager:	Jim Ropp
Contract Laboratory(ies):	TestAmerica Laboratories, Inc., Savannah, GA
Data Review Contractor:	KOMAN Government Solutions, LLC
Data Review Level:	2B
Primary Data Reviewer:	Sherri Pullar, Data Validation Chemist
Second Reviewer:	Laurie Ekes, Senior Scientist
Date Submitted:	March 09, 2020

Field Sample ID	Lab Sample ID	Matrix	Type/Type Code	SW6010C - Dissolved	SW6020A - Dissolved
5702MW-20-01A_JAN20	680-180174-3	Water	Field Sample/N	X	X
5702MW-20-01B_JAN20	680-180174-2	Water	Field Sample/N	X	X
57WP-06-02_JAN20	680-180174-1	Water	Field Sample/N	X	X

This report assesses the analytical data quality associated with the analyses listed on the preceding cover page at 2B data validation level. This assessment has been made through a combination of automated data review (ADR) and supplemental manual review, the details of which are described below. The approach taken in the review of this data set is consistent with the requirements contained in the Quality Assurance Project Plan, Long Term Monitoring Program, Former Fort Devens, 2018 and the additional guidance documents incorporated by reference to the extent possible. Where definitive guidance is not provided, results have been evaluated in a conservative manner using professional judgment.

Sample collection was managed and directed by KOMAN Government Services, LLC; analyses were performed by TestAmerica Laboratories, Inc., Savannah, GA and were reported under sample delivery group (SDG) 6801801741. Data have been evaluated electronically based on electronic data deliverables (EDDs) provided by the laboratory, and hard copy data summary forms have also been reviewed during this effort and compared to the automated review output by the reviewers whose signatures appear on the following page. Findings based on the automated data submission and manual data verification processes are detailed in the ADR narrative and throughout this report.

All quality control (QC) elements associated with this SDG have been reviewed by a project chemist in accordance with the requirements defined for the project. This review is documented in the attached Data Review Checklists. The QC elements listed below were supported by the electronic deliverable and were evaluated using ADR processes.

- Blank - Negative
- Calibration Blank
- Calibration Blank - Negative
- Continuing Calibration Verification
- Interference Check Sample A
- Interference Check Sample A - Negative
- Interference Check Sample AB
- Lab Blank
- LCS Recovery
- Prep Hold Time
- Test Hold Time

Results of the ADR process were subsequently reviewed and updated as applicable by the data review chemists identified on the signature page. Quality control elements that were not included in the electronic deliverable were reviewed manually and findings are documented within this report. Summaries of findings and associated qualified results are documented throughout this report.

A total of 0 results (0.00%) out of the 9 results (sample and field QC samples) reported are qualified based on review and 0 results (0.00%) have been rejected or deemed a serious deficiency. Trace values, defined as results that are qualified as estimated because they fall between the detection limit and the reporting limit/limit of quantitation, are not counted as qualified results in the above count. The qualified results are detailed throughout this report and discussed in the narrative below, where appropriate.

Narrative Comments

This SDG contained 3 GW samples.

Analytical Method	Data Reviewer Comment
SW6010C	No additional comments; see Checklist for detail.
SW6020A	No additional comments; see Checklist for detail.

Sherri A Pullar

March 06, 2020

Reviewed by Sherri Pullar, Data Validation Chemist, KOMAN Government Solutions, LLC

As the First Reviewer, I certify that I have performed a data review process in accordance with the requirements of the project guidance document, and have compared the electronic data to the laboratory's hard copy report and have verified the consistency of a minimum of 10% of the reported sample results and method quality control data between the two deliverables.

Laurie Ekes

March 09, 2020

Reviewed by Laurie Ekes, Senior Scientist, KOMAN Government Solutions, LLC

As the Second Reviewer, I certify that I have performed a quality assurance review of the report generated by the First Reviewer.

No Outliers were associated with this sample delivery group.

Qualified Results

No results associated with this sample delivery group required qualification.

Results with Modified Qualifiers

No qualifiers associated with this sample delivery group were modified manually.

Reason Code Definitions

Code	Definition
TR	Trace Level Detect

Flag Code and Definitions

Flag	Definition
U	Undetected: The analyte was analyzed for, but not detected.
UJ	The analyte was not detected; however, the result is estimated due to discrepancies in meeting certain analyte-specific quality control criteria.
J	Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.
R	The data are rejected due to deficiencies in meeting QC criteria and may not be used for decision making.
B	Blank contamination: The analyte was found in an associated blank above one half the RL, as well as in the sample.
UB	The analyte was also detected in an associated laboratory or field blank at a concentration comparable to the concentration in the sample. The reported result has been requalified as not detected.

X	The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and to meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided. Acceptance or rejection of the data should be decided by the project team (which should include a project chemist), but exclusion of the data is recommended.

Review Questions

Method: SW6010C (Trace Metals by Inductively Coupled Plasma/Atomic Emission Spectrometry)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?	•			
Were target analytes reported in the field blank(s) less than MDL?			•	
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			LCS only
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?			•	
Was a MS/MSD pair prepared with each batch?		•		
Were MS/MSD recoveries within project acceptance limits?			•	
Was the MS/MSD RPD within project acceptance limits?			•	
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?			•	
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

Review Questions

Method: SW6020A (Trace Metals by Inductively Coupled Plasma/Mass Spectrometry)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?	•			
Were field blanks (EBs or FBs) submitted with these samples?		•		
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			LCS only
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?			•	
Was a MS/MSD pair prepared with each batch?		•		
Were MS/MSD recoveries within project acceptance limits?			•	
Was the MS/MSD RPD within project acceptance limits?			•	
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?			•	
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

Data Validation Report for 6801803641

Facility:	Long Term Monitoring
Event:	KOMAN, Long Term Monitoring, AOC 57 Supplemental MW Winter 2020
SDG:	6801803641
Guidance Document:	Quality Assurance Project Plan, Long Term Monitoring Program, Former Fort Devens, 2018
Prime Contractor:	KOMAN Government Services, LLC
Project Manager:	Jim Ropp
Contract Laboratory(ies):	TestAmerica Laboratories, Inc., Savannah, GA
Data Review Contractor:	KOMAN Government Solutions, LLC
Data Review Level:	2B
Primary Data Reviewer:	Sherri Pullar, Data Validation Chemist
Second Reviewer:	Laurie Ekes, Senior Scientist
Date Submitted:	March 09, 2020

Field Sample ID	Lab Sample ID	Matrix	Type/Type Code	SW6010C - Dissolved	SW6020A - Dissolved
5702MW-20-02A_FEB 20	680-180364-1	Water	Field Sample/N	X	X
5702MW-20-04A_FEB 20	680-180364-4	Water	Field Sample/N	X	X
5702MW-20-06A_FEB 20	680-180364-3	Water	Field Sample/N	X	X
5702MW-DUP01_FEB 20	680-180364-2	Water	Field Duplicate/FD	X	X
5703MW-20-01A_FEB 20	680-180364-8	Water	Field Sample/N	X	X
5703MW-20-03A_FEB 20	680-180364-12	Water	Field Sample/N	X	X
5703MW-20-04A_FEB 20	680-180364-7	Water	Field Sample/N	X	X
57M-95-03x_FEB 20	680-180364-5	Water	Field Sample/N	X	X
57M-DUP01_FEB 20	680-180364-6	Water	Field Duplicate/FD	X	X

This report assesses the analytical data quality associated with the analyses listed on the preceding cover page at 2B data validation level. This assessment has been made through a combination of automated data review (ADR) and supplemental manual review, the details of which are described below. The approach taken in the review of this data set is consistent with the requirements contained in the Quality Assurance Project Plan, Long Term Monitoring Program, Former Fort Devens, 2018 and the additional guidance documents incorporated by reference to the extent possible. Where definitive guidance is not provided, results have been evaluated in a conservative manner using professional judgment.

Sample collection was managed and directed by KOMAN Government Services, LLC; analyses were performed by TestAmerica Laboratories, Inc., Savannah, GA and were reported under sample delivery group (SDG) 6801803641. Data have been evaluated electronically based on electronic data deliverables (EDDs) provided by the laboratory, and hard copy data summary forms have also been reviewed during this effort and compared to the automated review output by the reviewers whose signatures appear on the following page. Findings based on the automated data submission and manual data verification processes are detailed in the ADR narrative and throughout this report.

All quality control (QC) elements associated with this SDG have been reviewed by a project chemist in accordance with the requirements defined for the project. This review is documented in the attached Data Review Checklists. The QC elements listed below were supported by the electronic deliverable and were evaluated using ADR processes.

- Blank - Negative
- Calibration Blank
- Calibration Blank - Negative
- Continuing Calibration Verification
- Field Duplicate RPD
- Interference Check Sample A
- Interference Check Sample A - Negative
- Interference Check Sample AB
- Lab Blank
- LCS Recovery
- MS Recovery
- MS RPD
- Prep Hold Time
- Test Hold Time

Results of the ADR process were subsequently reviewed and updated as applicable by the data review chemists identified on the signature page. Quality control elements that were not included in the electronic deliverable were reviewed manually and findings are documented within this report. Summaries of findings and associated qualified results are documented throughout this report.

A total of 0 results (0.00%) out of the 27 results (sample and field QC samples) reported are qualified based on review and 0 results (0.00%) have been rejected or deemed a serious deficiency. Trace values, defined as results that are qualified as estimated because they fall between the detection limit and the reporting limit/limit of quantitation, are not counted as qualified results in the above count. The qualified results are detailed throughout this report and discussed in the narrative below, where appropriate.

Narrative Comments

This SDG contained 7 GW samples and 2 FD samples.

Analytical Method	Data Reviewer Comment
SW6010C	No additional comments; see Checklist for detail.
SW6020A	No additional comments; see Checklist for detail.

Sherri A Pullar

March 06, 2020

Reviewed by Sherri Pullar, Data Validation Chemist, KOMAN Government Solutions, LLC

As the First Reviewer, I certify that I have performed a data review process in accordance with the requirements of the project guidance document, and have compared the electronic data to the laboratory's hard copy report and have verified the consistency of a minimum of 10% of the reported sample results and method quality control data between the two deliverables.

Laurie Ekes

March 09, 2020

Reviewed by Laurie Ekes, Senior Scientist, KOMAN Government Solutions, LLC

As the Second Reviewer, I certify that I have performed a quality assurance review of the report generated by the First Reviewer.

No Outliers were associated with this sample delivery group.

Qualified Results

No results associated with this sample delivery group required qualification.

Results with Modified Qualifiers

No qualifiers associated with this sample delivery group were modified manually.

Reason Code Definitions

Code	Definition
TR	Trace Level Detect

Flag Code and Definitions

Flag	Definition
U	Undetected: The analyte was analyzed for, but not detected.
UJ	The analyte was not detected; however, the result is estimated due to discrepancies in meeting certain analyte-specific quality control criteria.
J	Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.
R	The data are rejected due to deficiencies in meeting QC criteria and may not be used for decision making.
B	Blank contamination: The analyte was found in an associated blank above one half the RL, as well as in the sample.
UB	The analyte was also detected in an associated laboratory or field blank at a concentration comparable to the concentration in the sample. The reported result has been requalified as not detected.

X	The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and to meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided. Acceptance or rejection of the data should be decided by the project team (which should include a project chemist), but exclusion of the data is recommended.

Review Questions

Method: SW6010C (Trace Metals by Inductively Coupled Plasma/Atomic Emission Spectrometry)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?	•			
Were target analytes reported in the field blank(s) less than MDL?			•	
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			LCS only
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?			•	
Was a MS/MSD pair prepared with each batch?	•			Spl-8 was prepared and analyzed for MS/MSD.
Were MS/MSD recoveries within project acceptance limits?	•			
Was the MS/MSD RPD within project acceptance limits?	•			
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?	•			Spl pairs -1/-2 and -5/-6 were FD. See FD report.
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

Review Questions

Method: SW6020A (Trace Metals by Inductively Coupled Plasma/Mass Spectrometry)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?	•			
Were target analytes reported in the field blank(s) less than MDL?			•	
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			LCS only
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?			•	
Was a MS/MSD pair prepared with each batch?	•			Spl-8 was prepared and analyzed for MS/MSD.
Were MS/MSD recoveries within project acceptance limits?	•			
Was the MS/MSD RPD within project acceptance limits?	•			
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?	•			Spl pairs -1/-2 and -5/-6 were FD. See FD report.
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

Field Duplicate Report By SDG
Long Term Monitoring
KOMAN, Long Term Monitoring, AOC 57 Supplemental MW Winter 2020
Field Duplicates for SDG: 6801803641

Location	Analysis
5702MW-20-02A	SW6010C

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
5702MW-20-02A_FEB 20 / 5702MW-DUP01_FEB 20	680-180364-1 / 680-180364-2	Iron (FLDFLT)	ND	ND	50.0	NA	30	NA	OK
5702MW-20-02A_FEB 20 / 5702MW-DUP01_FEB 20	680-180364-1 / 680-180364-2	Manganese (FLDFLT)	34.0	37.0	10.0	8.45	30	NA	OK

Location	Analysis
5702MW-20-02A	SW6020A

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
5702MW-20-02A_FEB 20 / 5702MW-DUP01_FEB 20	680-180364-1 / 680-180364-2	Arsenic (FLDFLT)	ND	ND	3.00	NA	30	NA	OK

Location	Analysis
57M-95-03X	SW6010C

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
57M-95-03x_FEB 20 / 57M-DUP01_FEB 20	680-180364-5 / 680-180364-6	Iron (FLDFLT)	3900	3800	50.0	2.60	30	OK	NA
57M-95-03x_FEB 20 / 57M-DUP01_FEB 20	680-180364-5 / 680-180364-6	Manganese (FLDFLT)	120	120	10.0	0.00	30	OK	NA

Location	Analysis
57M-95-03X	SW6020A

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
57M-95-03x_FEB 20 / 57M-DUP01_FEB 20	680-180364-5 / 680-180364-6	Arsenic (FLDFLT)	30.0	29.0	3.00	3.39	30	OK	NA

FD = Field Duplicate
RL = Reporting Limit
RPD = Relative Percent Difference

RL Check = If either the primary sample or field duplicate result is less than 5 times the RL then the criteria used to determine if the field duplicate is outside QC limits is +/- RL for Water and +/- 2 times RL for Soil"

Data Validation Report for 6801804521

Facility:	Long Term Monitoring
Event:	KOMAN, Long Term Monitoring, AOC 57 Supplemental MW Winter 2020
SDG:	6801804521
Guidance Document:	Quality Assurance Project Plan, Long Term Monitoring Program, Former Fort Devens, 2018
Prime Contractor:	KOMAN Government Services, LLC
Project Manager:	Jim Ropp
Contract Laboratory(ies):	TestAmerica Laboratories, Inc., Savannah, GA
Data Review Contractor:	KOMAN Government Solutions, LLC
Data Review Level:	2B
Primary Data Reviewer:	Sherri Pullar, Data Validation Chemist
Second Reviewer:	Laurie Ekes, Senior Scientist
Date Submitted:	March 09, 2020

Field Sample ID	Lab Sample ID	Matrix	Type/Type Code	SW6010C - Dissolved	SW6020A - Dissolved
5703MW-20-02A_FEB20	680-180452-3	Water	Field Sample/N	X	X
57M-96-11X_FEB20	680-180452-1	Water	Field Sample/N	X	X
57M-96-12X_FEB20	680-180452-5	Water	Field Sample/N	X	X
57P-98-03X_FEB20	680-180452-4	Water	Field Sample/N	X	X
57P-98-04X_FEB20	680-180452-2	Water	Field Sample/N	X	X

This report assesses the analytical data quality associated with the analyses listed on the preceding cover page at 2B data validation level. This assessment has been made through a combination of automated data review (ADR) and supplemental manual review, the details of which are described below. The approach taken in the review of this data set is consistent with the requirements contained in the Quality Assurance Project Plan, Long Term Monitoring Program, Former Fort Devens, 2018 and the additional guidance documents incorporated by reference to the extent possible. Where definitive guidance is not provided, results have been evaluated in a conservative manner using professional judgment.

Sample collection was managed and directed by KOMAN Government Services, LLC; analyses were performed by TestAmerica Laboratories, Inc., Savannah, GA and were reported under sample delivery group (SDG) 6801804521. Data have been evaluated electronically based on electronic data deliverables (EDDs) provided by the laboratory, and hard copy data summary forms have also been reviewed during this effort and compared to the automated review output by the reviewers whose signatures appear on the following page. Findings based on the automated data submission and manual data verification processes are detailed in the ADR narrative and throughout this report.

All quality control (QC) elements associated with this SDG have been reviewed by a project chemist in accordance with the requirements defined for the project. This review is documented in the attached Data Review Checklists. The QC elements listed below were supported by the electronic deliverable and were evaluated using ADR processes.

- Blank - Negative
- Calibration Blank
- Calibration Blank - Negative
- Continuing Calibration Verification
- Interference Check Sample A
- Interference Check Sample A - Negative
- Interference Check Sample AB
- Lab Blank
- LCS Recovery
- MS Recovery
- MS RPD
- Prep Hold Time
- Test Hold Time

Results of the ADR process were subsequently reviewed and updated as applicable by the data review chemists identified on the signature page. Quality control elements that were not included in the electronic deliverable were reviewed manually and findings are documented within this report. Summaries of findings and associated qualified results are documented throughout this report.

A total of 0 results (0.00%) out of the 15 results (sample and field QC samples) reported are qualified based on review and 0 results (0.00%) have been rejected or deemed a serious deficiency. Trace values, defined as results that are qualified as estimated because they fall between the detection limit and the reporting limit/limit of quantitation, are not counted as qualified results in the above count. The qualified results are detailed throughout this report and discussed in the narrative below, where appropriate.

Narrative Comments

This SDG contained 5 GW samples.

Analytical Method	Data Reviewer Comment
SW6010C	No additional comments; see Checklist for detail.
SW6020A	No additional comments; see Checklist for detail.

Sherri A Pullar

March 06, 2020

Reviewed by Sherri Pullar, Data Validation Chemist, KOMAN Government Solutions, LLC

As the First Reviewer, I certify that I have performed a data review process in accordance with the requirements of the project guidance document, and have compared the electronic data to the laboratory's hard copy report and have verified the consistency of a minimum of 10% of the reported sample results and method quality control data between the two deliverables.

Laurie Ekes

March 09, 2020

Reviewed by Laurie Ekes, Senior Scientist, KOMAN Government Solutions, LLC

As the Second Reviewer, I certify that I have performed a quality assurance review of the report generated by the First Reviewer.

Quality Control Outliers for test method SW6010C, Dissolved, MS Recovery

Data for matrix spikes/matrix spike duplicates (MS/MSD) are generated to determine long-term precision and accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. These data alone cannot be used to evaluate the precision and accuracy of individual samples. However, when exercising professional judgment, MS/MSD data can be used in conjunction with other available QC information. Reported results were evaluated to determine compliance with the required acceptance criteria, and summary forms were evaluated and compared to electronic data deliverables. Findings of this review, and any associated qualified results, are listed below.

Sample ID/ Lab Sample ID	Analyte	Result	Warning Limits	Control Limits	Units	Qualifier	Reason Code	Comment
57M-96-11X_FEB20 (MS)/ 680-180452-1	Manganese	87.50	90 - 114	10 - 125	percent	J/UJ	M	Spike amount Insignificant

Where two qualifiers are listed, such as 'J/UJ', the first applies to positive results, and the second to non-detect results.
Upper and Lower Warning and Control Limits are abbreviated UWL, LWL, UCL, and LCL in the Comment field.

No results associated with this QC element required qualification.

Qualified Results

No results associated with this sample delivery group required qualification.

Results with Modified Qualifiers

No qualifiers associated with this sample delivery group were modified manually.

Reason Code Definitions

Code	Definition
M	MS Recovery
TR	Trace Level Detect

Flag Code and Definitions

Flag	Definition
U	Undetected: The analyte was analyzed for, but not detected.
UJ	The analyte was not detected; however, the result is estimated due to discrepancies in meeting certain analyte-specific quality control criteria.
J	Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.
R	The data are rejected due to deficiencies in meeting QC criteria and may not be used for decision making.
B	Blank contamination: The analyte was found in an associated blank above one half the RL, as well as in the sample.
UB	The analyte was also detected in an associated laboratory or field blank at a concentration comparable to the concentration in the sample. The reported result has been requalified as not detected.
X	The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and to meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided. Acceptance or rejection of the data should be decided by the project team (which should include a project chemist), but exclusion of the data is recommended.

Review Questions

Method: SW6010C (Trace Metals by Inductively Coupled Plasma/Atomic Emission Spectrometry)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?	•			
Were target analytes reported in the field blank(s) less than MDL?			•	
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			LCS only
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?			•	
Was a MS/MSD pair prepared with each batch?	•			Spls -1 and -5 were prepared and analyzed for MS/MSD.
Were MS/MSD recoveries within project acceptance limits?	•			
Was the MS/MSD RPD within project acceptance limits?	•			
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?			•	
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

Review Questions

Method: SW6020A (Trace Metals by Inductively Coupled Plasma/Mass Spectrometry)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?	•			
Were field blanks (EBs or FBs) submitted with these samples?		•		
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			LCS only
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?			•	
Was a MS/MSD pair prepared with each batch?	•			Spls -1 and -5 were prepared and analyzed for MS/MSD.
Were MS/MSD recoveries within project acceptance limits?	•			
Was the MS/MSD RPD within project acceptance limits?	•			
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?			•	
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

Data Validation Report for 6801805921

Facility:	Long Term Monitoring
Event:	KOMAN, Long Term Monitoring, AOC 57 Supplemental MW Winter 2020
SDG:	6801805921
Guidance Document:	Quality Assurance Project Plan, Long Term Monitoring Program, Former Fort Devens, 2018
Prime Contractor:	KOMAN Government Services, LLC
Project Manager:	Jim Ropp
Contract Laboratory(ies):	TestAmerica Laboratories, Inc., Savannah, GA
Data Review Contractor:	KOMAN Government Solutions, LLC
Data Review Level:	2B
Primary Data Reviewer:	Sherri Pullar, Data Validation Chemist
Second Reviewer:	Laurie Ekes, Senior Scientist
Date Submitted:	March 09, 2020

Field Sample ID	Lab Sample ID	Matrix	Type/Type Code	SW6010C - Dissolved	SW6020A - Dissolved
5703MW-20-01B_FEB20	680-180592-1	Water	Field Sample/N	X	X
5703PZ-19-01_FEB20	680-180592-2	Water	Field Sample/N	X	X

This report assesses the analytical data quality associated with the analyses listed on the preceding cover page at 2B data validation level. This assessment has been made through a combination of automated data review (ADR) and supplemental manual review, the details of which are described below. The approach taken in the review of this data set is consistent with the requirements contained in the Quality Assurance Project Plan, Long Term Monitoring Program, Former Fort Devens, 2018 and the additional guidance documents incorporated by reference to the extent possible. Where definitive guidance is not provided, results have been evaluated in a conservative manner using professional judgment.

Sample collection was managed and directed by KOMAN Government Services, LLC; analyses were performed by TestAmerica Laboratories, Inc., Savannah, GA and were reported under sample delivery group (SDG) 6801805921. Data have been evaluated electronically based on electronic data deliverables (EDDs) provided by the laboratory, and hard copy data summary forms have also been reviewed during this effort and compared to the automated review output by the reviewers whose signatures appear on the following page. Findings based on the automated data submission and manual data verification processes are detailed in the ADR narrative and throughout this report.

All quality control (QC) elements associated with this SDG have been reviewed by a project chemist in accordance with the requirements defined for the project. This review is documented in the attached Data Review Checklists. The QC elements listed below were supported by the electronic deliverable and were evaluated using ADR processes.

- Blank - Negative
- Calibration Blank
- Calibration Blank - Negative
- Continuing Calibration Verification
- Interference Check Sample A
- Interference Check Sample A - Negative
- Interference Check Sample AB
- Lab Blank
- LCS Recovery
- Prep Hold Time
- Test Hold Time

Results of the ADR process were subsequently reviewed and updated as applicable by the data review chemists identified on the signature page. Quality control elements that were not included in the electronic deliverable were reviewed manually and findings are documented within this report. Summaries of findings and associated qualified results are documented throughout this report.

A total of 0 results (0.00%) out of the 6 results (sample and field QC samples) reported are qualified based on review and 0 results (0.00%) have been rejected or deemed a serious deficiency. Trace values, defined as results that are qualified as estimated because they fall between the detection limit and the reporting limit/limit of quantitation, are not counted as qualified results in the above count. The qualified results are detailed throughout this report and discussed in the narrative below, where appropriate.

Narrative Comments

This SDG contains two GW samples.

Analytical Method	Data Reviewer Comment
SW6020A	No additional comments; see Checklist for detail.
SW6010C	No additional comments; see Checklist for detail.

Sherri A Pullar

March 06, 2020

Reviewed by Sherri Pullar, Data Validation Chemist, KOMAN Government Solutions, LLC

As the First Reviewer, I certify that I have performed a data review process in accordance with the requirements of the project guidance document, and have compared the electronic data to the laboratory's hard copy report and have verified the consistency of a minimum of 10% of the reported sample results and method quality control data between the two deliverables.

Laurie Ekes

March 09, 2020

Reviewed by Laurie Ekes, Senior Scientist, KOMAN Government Solutions, LLC

As the Second Reviewer, I certify that I have performed a quality assurance review of the report generated by the First Reviewer.

No Outliers were associated with this sample delivery group.

Qualified Results

No results associated with this sample delivery group required qualification.

Results with Modified Qualifiers

No qualifiers associated with this sample delivery group were modified manually.

Reason Code Definitions

Code	Definition
TR	Trace Level Detect

Flag Code and Definitions

Flag	Definition
U	Undetected: The analyte was analyzed for, but not detected.
UJ	The analyte was not detected; however, the result is estimated due to discrepancies in meeting certain analyte-specific quality control criteria.
J	Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.
R	The data are rejected due to deficiencies in meeting QC criteria and may not be used for decision making.
B	Blank contamination: The analyte was found in an associated blank above one half the RL, as well as in the sample.
UB	The analyte was also detected in an associated laboratory or field blank at a concentration comparable to the concentration in the sample. The reported result has been requalified as not detected.

X	The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and to meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided. Acceptance or rejection of the data should be decided by the project team (which should include a project chemist), but exclusion of the data is recommended.

Review Questions

Method: SW6010C (Trace Metals by Inductively Coupled Plasma/Atomic Emission Spectrometry)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?	•			
Were target analytes reported in the field blank(s) less than MDL?			•	
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			LCS only
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?			•	
Was a MS/MSD pair prepared with each batch?		•		
Were MS/MSD recoveries within project acceptance limits?			•	
Was the MS/MSD RPD within project acceptance limits?			•	
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?			•	
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

Review Questions

Method: SW6020A (Trace Metals by Inductively Coupled Plasma/Mass Spectrometry)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?	•			
Were field blanks (EBs or FBs) submitted with these samples?		•		
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			LCS only
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?			•	
Was a MS/MSD pair prepared with each batch?		•		
Were MS/MSD recoveries within project acceptance limits?			•	
Was the MS/MSD RPD within project acceptance limits?			•	
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?			•	
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

Data Validation Report for 6801806851

Facility:	Long Term Monitoring
Event:	KOMAN, Long Term Monitoring, AOC 57 Supplemental MW Winter 2020
SDG:	6801806851
Guidance Document:	Quality Assurance Project Plan, Long Term Monitoring Program, Former Fort Devens, 2018
Prime Contractor:	KOMAN Government Services, LLC
Project Manager:	Jim Ropp
Contract Laboratory(ies):	TestAmerica Laboratories, Inc., Savannah, GA
Data Review Contractor:	KOMAN Government Solutions, LLC
Data Review Level:	2B
Primary Data Reviewer:	Sherri Pullar, Data Validation Chemist
Second Reviewer:	Laurie Ekes, Senior Scientist
Date Submitted:	March 09, 2020

Field Sample ID	Lab Sample ID	Matrix	Type/Type Code	SW6010C - Dissolved
436-MW-DUP01_FEB20	680-180685-2	Water	Field Duplicate/FD	X
XGM-20-01A_FEB20	680-180685-1	Water	Field Sample/N	X
XGM-20-02A_FEB20	680-180685-3	Water	Field Sample/N	X
XGM-20-03A_FEB20	680-180685-4	Water	Field Sample/N	X

This report assesses the analytical data quality associated with the analyses listed on the preceding cover page at 2B data validation level. This assessment has been made through a combination of automated data review (ADR) and supplemental manual review, the details of which are described below. The approach taken in the review of this data set is consistent with the requirements contained in the Quality Assurance Project Plan, Long Term Monitoring Program, Former Fort Devens, 2018 and the additional guidance documents incorporated by reference to the extent possible. Where definitive guidance is not provided, results have been evaluated in a conservative manner using professional judgment.

Sample collection was managed and directed by KOMAN Government Services, LLC; analyses were performed by TestAmerica Laboratories, Inc., Savannah, GA and were reported under sample delivery group (SDG) 6801806851. Data have been evaluated electronically based on electronic data deliverables (EDDs) provided by the laboratory, and hard copy data summary forms have also been reviewed during this effort and compared to the automated review output by the reviewers whose signatures appear on the following page. Findings based on the automated data submission and manual data verification processes are detailed in the ADR narrative and throughout this report.

All quality control (QC) elements associated with this SDG have been reviewed by a project chemist in accordance with the requirements defined for the project. This review is documented in the attached Data Review Checklists. The QC elements listed below were supported by the electronic deliverable and were evaluated using ADR processes.

- Blank - Negative
- Calibration Blank
- Calibration Blank - Negative
- Continuing Calibration Verification
- Field Duplicate RPD
- Interference Check Sample A
- Interference Check Sample A - Negative
- Interference Check Sample AB
- Lab Blank
- LCS Recovery
- MS Recovery
- MS RPD
- Prep Hold Time
- Test Hold Time

Results of the ADR process were subsequently reviewed and updated as applicable by the data review chemists identified on the signature page. Quality control elements that were not included in the electronic deliverable were reviewed manually and findings are documented within this report. Summaries of findings and associated qualified results are documented throughout this report.

A total of 1 results (12.50%) out of the 8 results (sample and field QC samples) reported are qualified based on review and 0 results (0.00%) have been rejected or deemed a serious deficiency. Trace values, defined as results that are qualified as estimated because they fall between the detection limit and the reporting limit/limit of quantitation, are not counted as qualified results in the above count. The qualified results are detailed throughout this report and discussed in the narrative below, where appropriate.

Narrative Comments

This SDG contains three GW samples and one field duplicate from AOC43G. These samples were submitted for dissolved Fe, Mn analysis by SW6010.

Analytical Method	Data Reviewer Comment
SW6010C	No additional comments; see Checklist for detail.

Sherri A Pullar

March 06, 2020

Reviewed by Sherri Pullar, Data Validation Chemist, KOMAN Government Solutions, LLC

As the First Reviewer, I certify that I have performed a data review process in accordance with the requirements of the project guidance document, and have compared the electronic data to the laboratory's hard copy report and have verified the consistency of a minimum of 10% of the reported sample results and method quality control data between the two deliverables.

Laurie Ekes

March 09, 2020

Reviewed by Laurie Ekes, Senior Scientist, KOMAN Government Solutions, LLC

As the Second Reviewer, I certify that I have performed a quality assurance review of the report generated by the First Reviewer.

Quality Control Outliers for test method SW6010C, Dissolved, MS Recovery

Data for matrix spikes/matrix spike duplicates (MS/MSD) are generated to determine long-term precision and accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. These data alone cannot be used to evaluate the precision and accuracy of individual samples. However, when exercising professional judgment, MS/MSD data can be used in conjunction with other available QC information. Reported results were evaluated to determine compliance with the required acceptance criteria, and summary forms were evaluated and compared to electronic data deliverables. Findings of this review, and any associated qualified results, are listed below.

Sample ID/ Lab Sample ID	Analyte	Result	Warning Limits	Control Limits	Units	Qualifier	Reason Code	Comment
XGM-20-03A_FEB20 (SD)/ 680-180685-4	Manganese	124.0	90 - 114	10 - 125	percent	J/None	M	
XGM-20-03A_FEB20 (MS)/ 680-180685-4	Manganese	89.00	90 - 114	10 - 125	percent	J/UJ	M	

Where two qualifiers are listed, such as 'J/UJ', the first applies to positive results, and the second to non-detect results.
Upper and Lower Warning and Control Limits are abbreviated UWL, LWL, UCL, and LCL in the Comment field.

Qualified Results associated with the MS Recovery for SW6010C, Dissolved

FieldSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
XGM-20-03A_FEB20	N	Manganese	10.0	400 J1	400 J		ug/l	M

Analytes not found in project samples are reported as not detected at the limit of detection (LOD).
In instances where no LOD is provided, results are reported down to the LOQ.

Table of All Qualified Results

Test Method: SW6010C Extraction Method: , Dissolved

FieldSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
XGM-20-03A_FEB20	N	Manganese	10.0	400 J1	400 J		ug/l	M

Analytes not found in project samples are reported as not detected at the limit of detection (LOD).
In instances where no LOD is provided, results are reported down to the LOQ.
Trace values are not included in the qualified results table unless additional reason codes are associated.

Results with Modified Qualifiers

No qualifiers associated with this sample delivery group were modified manually.

Reason Code Definitions

Code	Definition
M	MS Recovery
TR	Trace Level Detect

Flag Code and Definitions

Flag	Definition
U	Undetected: The analyte was analyzed for, but not detected.
UJ	The analyte was not detected; however, the result is estimated due to discrepancies in meeting certain analyte-specific quality control criteria.
J	Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.
R	The data are rejected due to deficiencies in meeting QC criteria and may not be used for decision making.
B	Blank contamination: The analyte was found in an associated blank above one half the RL, as well as in the sample.
UB	The analyte was also detected in an associated laboratory or field blank at a concentration comparable to the concentration in the sample. The reported result has been requalified as not detected.
X	The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and to meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided. Acceptance or rejection of the data should be decided by the project team (which should include a project chemist), but exclusion of the data is recommended.

Review Questions

Method: SW6010C (Trace Metals by Inductively Coupled Plasma/Atomic Emission Spectrometry)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?	•			
Were field blanks (EBs or FBs) submitted with these samples?		•		
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			LCS only
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?			•	
Was a MS/MSD pair prepared with each batch?	•			Spl -4 was prepared and analyzed for MS/MSD
Were MS/MSD recoveries within project acceptance limits?		•		See outlier report.
Was the MS/MSD RPD within project acceptance limits?	•			
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?	•			Spl pair -1/-2 were the FD. See FD report.
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

Field Duplicate Report By SDG
Long Term Monitoring
KOMAN, Long Term Monitoring, AOC 57 Supplemental MW Winter 2020
Field Duplicates for SDG: 6801806851

Location	Analysis
XGM-20-01A	SW6010C

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
XGM-20-01A_FEB20 / 436-MW-DUP01_FEB20	680-180685-1 / 680-180685-2	Iron (FLDFLT)	ND	ND	50.0	NA	30	NA	OK
XGM-20-01A_FEB20 / 436-MW-DUP01_FEB20	680-180685-1 / 680-180685-2	Manganese (FLDFLT)	64.0	70.0	10.0	8.96	30	OK	NA

FD = Field Duplicate
RL = Reporting Limit
RPD = Relative Percent Difference

RL Check = If either the primary sample or field duplicate result is less than 5 times the RL then the criteria used to determine if the field duplicate is outside QC limits is +/- RL for Water and +/- 2 times RL for Soil"

Data Validation Report for 6801808461

Facility:	Long Term Monitoring
Event:	KOMAN, Long Term Monitoring, AOC 57 Supplemental MW Winter 2020
SDG:	6801808461
Guidance Document:	Quality Assurance Project Plan, Long Term Monitoring Program, Former Fort Devens, 2018
Prime Contractor:	KOMAN Government Services, LLC
Project Manager:	Jim Ropp
Contract Laboratory(ies):	TestAmerica Laboratories, Inc., Savannah, GA
Data Review Contractor:	KOMAN Government Solutions, LLC
Data Review Level:	2B
Primary Data Reviewer:	Sherri Pullar, Data Validation Chemist
Second Reviewer:	Laurie Ekes, Senior Scientist
Date Submitted:	March 09, 2020

Field Sample ID	Lab Sample ID	Matrix	Type/Type Code	SW6010C - Dissolved	SW6020A - Dissolved
43GPZ-19-03_FEB20	680-180846-1	Water	Field Sample/N	X	
5702MW-20-03A_FEB20	680-180846-2	Water	Field Sample/N	X	X
5702MW-20-05A_FEB20	680-180846-3	Water	Field Sample/N	X	X

This report assesses the analytical data quality associated with the analyses listed on the preceding cover page at 2B data validation level. This assessment has been made through a combination of automated data review (ADR) and supplemental manual review, the details of which are described below. The approach taken in the review of this data set is consistent with the requirements contained in the Quality Assurance Project Plan, Long Term Monitoring Program, Former Fort Devens, 2018 and the additional guidance documents incorporated by reference to the extent possible. Where definitive guidance is not provided, results have been evaluated in a conservative manner using professional judgment.

Sample collection was managed and directed by KOMAN Government Services, LLC; analyses were performed by TestAmerica Laboratories, Inc., Savannah, GA and were reported under sample delivery group (SDG) 6801808461. Data have been evaluated electronically based on electronic data deliverables (EDDs) provided by the laboratory, and hard copy data summary forms have also been reviewed during this effort and compared to the automated review output by the reviewers whose signatures appear on the following page. Findings based on the automated data submission and manual data verification processes are detailed in the ADR narrative and throughout this report.

All quality control (QC) elements associated with this SDG have been reviewed by a project chemist in accordance with the requirements defined for the project. This review is documented in the attached Data Review Checklists. The QC elements listed below were supported by the electronic deliverable and were evaluated using ADR processes.

- Blank - Negative
- Calibration Blank
- Calibration Blank - Negative
- Continuing Calibration Verification
- Interference Check Sample A
- Interference Check Sample A - Negative
- Interference Check Sample AB
- Lab Blank
- LCS Recovery
- Prep Hold Time
- Test Hold Time

Results of the ADR process were subsequently reviewed and updated as applicable by the data review chemists identified on the signature page. Quality control elements that were not included in the electronic deliverable were reviewed manually and findings are documented within this report. Summaries of findings and associated qualified results are documented throughout this report.

A total of 0 results (0.00%) out of the 8 results (sample and field QC samples) reported are qualified based on review and 0 results (0.00%) have been rejected or deemed a serious deficiency. Trace values, defined as results that are qualified as estimated because they fall between the detection limit and the reporting limit/limit of quantitation, are not counted as qualified results in the above count. The qualified results are detailed throughout this report and discussed in the narrative below, where appropriate.

Narrative Comments

This SDG contained 3 GW samples.

Analytical Method	Data Reviewer Comment
SW6020A	No additional comments; see Checklist for detail.
SW6010C	No additional comments; see Checklist for detail.

Sherri A Pullar

March 06, 2020

Reviewed by Sherri Pullar, Data Validation Chemist, KOMAN Government Solutions, LLC

As the First Reviewer, I certify that I have performed a data review process in accordance with the requirements of the project guidance document, and have compared the electronic data to the laboratory's hard copy report and have verified the consistency of a minimum of 10% of the reported sample results and method quality control data between the two deliverables.

Laurie Ekes

March 09, 2020

Reviewed by Laurie Ekes, Senior Scientist, KOMAN Government Solutions, LLC

As the Second Reviewer, I certify that I have performed a quality assurance review of the report generated by the First Reviewer.

No Outliers were associated with this sample delivery group.

Qualified Results

No results associated with this sample delivery group required qualification.

Results with Modified Qualifiers

No qualifiers associated with this sample delivery group were modified manually.

Reason Code Definitions

Code	Definition
TR	Trace Level Detect

Flag Code and Definitions

Flag	Definition
U	Undetected: The analyte was analyzed for, but not detected.
UJ	The analyte was not detected; however, the result is estimated due to discrepancies in meeting certain analyte-specific quality control criteria.
J	Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.
R	The data are rejected due to deficiencies in meeting QC criteria and may not be used for decision making.
B	Blank contamination: The analyte was found in an associated blank above one half the RL, as well as in the sample.
UB	The analyte was also detected in an associated laboratory or field blank at a concentration comparable to the concentration in the sample. The reported result has been requalified as not detected.

X	The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and to meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided. Acceptance or rejection of the data should be decided by the project team (which should include a project chemist), but exclusion of the data is recommended.

Review Questions

Method: SW6010C (Trace Metals by Inductively Coupled Plasma/Atomic Emission Spectrometry)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?	•			
Were target analytes reported in the field blank(s) less than MDL?			•	
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			LCS only
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?			•	
Was a MS/MSD pair prepared with each batch?		•		
Were MS/MSD recoveries within project acceptance limits?			•	
Was the MS/MSD RPD within project acceptance limits?			•	
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?			•	
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

Review Questions

Method: SW6020A (Trace Metals by Inductively Coupled Plasma/Mass Spectrometry)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?	•			
Were field blanks (EBs or FBs) submitted with these samples?		•		
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			LCS only
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?			•	
Was a MS/MSD pair prepared with each batch?		•		
Were MS/MSD recoveries within project acceptance limits?			•	
Was the MS/MSD RPD within project acceptance limits?			•	
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?			•	
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

Data Validation Report for 6801809501

Facility:	Long Term Monitoring
Event:	KOMAN, Long Term Monitoring, AOC 57 Supplemental MW Winter 2020
SDG:	6801809501
Guidance Document:	Quality Assurance Project Plan, Long Term Monitoring Program, Former Fort Devens, 2018
Prime Contractor:	KOMAN Government Services, LLC
Project Manager:	Jim Ropp
Contract Laboratory(ies):	TestAmerica Laboratories, Inc., Savannah, GA
Data Review Contractor:	Koman Government Solutions, LLC
Data Review Level:	2B
Primary Data Reviewer:	Laurie Ekes, Senior Project Chemist
Second Reviewer:	Sherri Pullar, Senior Scientist
Date Submitted:	March 13, 2020

Field Sample ID	Lab Sample ID	Matrix	Type/Type Code	SW6010C - Dissolved	SW6020A - Dissolved
5702MW-20-05B_FEB20	680-180950-1	Water	Field Sample/N	X	X

This report assesses the analytical data quality associated with the analyses listed on the preceding cover page at 2B data validation level. This assessment has been made through a combination of automated data review (ADR) and supplemental manual review, the details of which are described below. The approach taken in the review of this data set is consistent with the requirements contained in the Quality Assurance Project Plan, Long Term Monitoring Program, Former Fort Devens, 2018 and the additional guidance documents incorporated by reference to the extent possible. Where definitive guidance is not provided, results have been evaluated in a conservative manner using professional judgment.

Sample collection was managed and directed by KOMAN Government Services, LLC; analyses were performed by TestAmerica Laboratories, Inc., Savannah, GA and were reported under sample delivery group (SDG) 6801809501. Data have been evaluated electronically based on electronic data deliverables (EDDs) provided by the laboratory, and hard copy data summary forms have also been reviewed during this effort and compared to the automated review output by the reviewers whose signatures appear on the following page. Findings based on the automated data submission and manual data verification processes are detailed in the ADR narrative and throughout this report.

All quality control (QC) elements associated with this SDG have been reviewed by a project chemist in accordance with the requirements defined for the project. This review is documented in the attached Data Review Checklists. The QC elements listed below were supported by the electronic deliverable and were evaluated using ADR processes.

- Blank - Negative
- Calibration Blank
- Calibration Blank - Negative
- Continuing Calibration Verification
- Interference Check Sample A
- Interference Check Sample A - Negative
- Interference Check Sample AB
- Lab Blank
- LCS Recovery
- MS Recovery
- MS RPD
- Prep Hold Time
- Test Hold Time

Results of the ADR process were subsequently reviewed and updated as applicable by the data review chemists identified on the signature page. Quality control elements that were not included in the electronic deliverable were reviewed manually and findings are documented within this report. Summaries of findings and associated qualified results are documented throughout this report.

A total of 0 results (0.00%) out of the 3 results (sample and field QC samples) reported are qualified based on review and 0 results (0.00%) have been rejected or deemed a serious deficiency. Trace values, defined as results that are qualified as estimated because they fall between the detection limit and the reporting limit/limit of quantitation, are not counted as qualified results in the above count. The qualified results are detailed throughout this report and discussed in the narrative below, where appropriate.

Narrative Comments

This SDG contains one GW sample.

Analytical Method	Data Reviewer Comment
SW6010C	No additional comments; see Checklist for detail.
SW6020A	No additional comments; see Checklist for detail.

March 13, 2020

Reviewed by Laurie Ekes, Senior Project Chemist, Koman Government Solutions, LLC

As the First Reviewer, I certify that I have performed a data review process in accordance with the requirements of the project guidance document, and have compared the electronic data to the laboratory's hard copy report and have verified the consistency of a minimum of 10% of the reported sample results and method quality control data between the two deliverables.

March 13, 2020

Reviewed by Sherri Pullar, Senior Scientist, Koman Government Solutions, LLC

As the Second Reviewer, I certify that I have performed a quality assurance review of the report generated by the First Reviewer.

No Outliers were associated with this sample delivery group.

Qualified Results

No results associated with this sample delivery group required qualification.

Results with Modified Qualifiers

No qualifiers associated with this sample delivery group were modified manually.

Reason Code Definitions

Code	Definition
TR	Trace Level Detect

Flag Code and Definitions

Flag	Definition
U	Undetected: The analyte was analyzed for, but not detected.
UJ	The analyte was not detected; however, the result is estimated due to discrepancies in meeting certain analyte-specific quality control criteria.
J	Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.
R	The data are rejected due to deficiencies in meeting QC criteria and may not be used for decision making.
B	Blank contamination: The analyte was found in an associated blank above one half the RL, as well as in the sample.
UB	The analyte was also detected in an associated laboratory or field blank at a concentration comparable to the concentration in the sample. The reported result has been requalified as not detected.

X	The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and to meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided. Acceptance or rejection of the data should be decided by the project team (which should include a project chemist), but exclusion of the data is recommended.

Review Questions

Method: SW6010C (Trace Metals by Inductively Coupled Plasma/Atomic Emission Spectrometry)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?		•		
Were target analytes reported in the field blank(s) less than MDL?			•	
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			LCS only
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?			•	
Was a MS/MSD pair prepared with each batch?	•			Sample -1 was spiked and analyzed as MS/MSD.
Were MS/MSD recoveries within project acceptance limits?	•			
Was the MS/MSD RPD within project acceptance limits?	•			
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?			•	
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

Review Questions

Method: SW6020A (Trace Metals by Inductively Coupled Plasma/Mass Spectrometry)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?		•		
Were field blanks (EBs or FBs) submitted with these samples?		•		
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			LCS only
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?			•	
Was a MS/MSD pair prepared with each batch?	•			Sample -1 was spiked and analyzed as MS/MSD
Were MS/MSD recoveries within project acceptance limits?	•			
Was the MS/MSD RPD within project acceptance limits?	•			
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?			•	
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

Data Validation Report for 6801812751

Facility:	Long Term Monitoring
Event:	KOMAN, Long Term Monitoring, AOC 57 Supplemental MW Winter 2020
SDG:	6801812751
Guidance Document:	Quality Assurance Project Plan, Long Term Monitoring Program, Former Fort Devens, 2018
Prime Contractor:	KOMAN Government Services, LLC
Project Manager:	Jim Ropp
Contract Laboratory(ies):	TestAmerica Laboratories, Inc., Savannah, GA
Data Review Contractor:	Koman Government Solutions, LLC
Data Review Level:	2B
Primary Data Reviewer:	Laurie Ekes, Senior Project Chemist
Second Reviewer:	Sherri Pullar, Senior Scientist
Date Submitted:	March 13, 2020

Field Sample ID	Lab Sample ID	Matrix	Type/Type Code	SW6010C - Dissolved	SW6020A - Dissolved
5702MW-20-07A_MAR20	680-181275-1	Water	Field Sample/N	X	X

This report assesses the analytical data quality associated with the analyses listed on the preceding cover page at 2B data validation level. This assessment has been made through a combination of automated data review (ADR) and supplemental manual review, the details of which are described below. The approach taken in the review of this data set is consistent with the requirements contained in the Quality Assurance Project Plan, Long Term Monitoring Program, Former Fort Devens, 2018 and the additional guidance documents incorporated by reference to the extent possible. Where definitive guidance is not provided, results have been evaluated in a conservative manner using professional judgment.

Sample collection was managed and directed by KOMAN Government Services, LLC; analyses were performed by TestAmerica Laboratories, Inc., Savannah, GA and were reported under sample delivery group (SDG) 6801812751. Data have been evaluated electronically based on electronic data deliverables (EDDs) provided by the laboratory, and hard copy data summary forms have also been reviewed during this effort and compared to the automated review output by the reviewers whose signatures appear on the following page. Findings based on the automated data submission and manual data verification processes are detailed in the ADR narrative and throughout this report.

All quality control (QC) elements associated with this SDG have been reviewed by a project chemist in accordance with the requirements defined for the project. This review is documented in the attached Data Review Checklists. The QC elements listed below were supported by the electronic deliverable and were evaluated using ADR processes.

- Blank - Negative
- Calibration Blank
- Calibration Blank - Negative
- Continuing Calibration Verification
- Interference Check Sample A
- Interference Check Sample A - Negative
- Interference Check Sample AB
- Lab Blank
- LCS Recovery
- Prep Hold Time
- Test Hold Time

Results of the ADR process were subsequently reviewed and updated as applicable by the data review chemists identified on the signature page. Quality control elements that were not included in the electronic deliverable were reviewed manually and findings are documented within this report. Summaries of findings and associated qualified results are documented throughout this report.

A total of 0 results (0.00%) out of the 3 results (sample and field QC samples) reported are qualified based on review and 0 results (0.00%) have been rejected or deemed a serious deficiency. Trace values, defined as results that are qualified as estimated because they fall between the detection limit and the reporting limit/limit of quantitation, are not counted as qualified results in the above count. The qualified results are detailed throughout this report and discussed in the narrative below, where appropriate.

Narrative Comments

This SDG contains one GW sample.

Analytical Method	Data Reviewer Comment
SW6010C	No additional comments; see Checklist for detail.
SW6020A	No additional comments; see Checklist for detail.

March 13, 2020

Reviewed by Laurie Ekes, Senior Project Chemist, Koman Government Solutions, LLC

As the First Reviewer, I certify that I have performed a data review process in accordance with the requirements of the project guidance document, and have compared the electronic data to the laboratory's hard copy report and have verified the consistency of a minimum of 10% of the reported sample results and method quality control data between the two deliverables.

March 13, 2020

Reviewed by Sherri Pullar, Senior Scientist, Koman Government Solutions, LLC

As the Second Reviewer, I certify that I have performed a quality assurance review of the report generated by the First Reviewer.

Quality Control Outliers for test method SW6010C, Dissolved, Lab Blank

The purpose of laboratory blanks is to determine the existence and magnitude of cross-contamination problems resulting from laboratory activities. Reported results were evaluated to determine compliance with the required acceptance criteria. Summary forms were evaluated and compared to electronic data deliverables. Findings of this review, and contaminants found in laboratory blanks are listed below along with any associated qualified results.

Sample ID/ Lab Sample ID	Analyte	Result	Warning Limits	Control Limits	Units	Qualifier	Reason Code	Comment
MB 680-610233/1-A (LB)/ MB 680-610233/1-A	Iron	226.0	< 17	< 50	ug/l	U/None	L	Blank is over 3X RL

Where two qualifiers are listed, such as 'J/UJ', the first applies to positive results, and the second to non-detect results.
Upper and Lower Warning and Control Limits are abbreviated UWL, LWL, UCL, and LCL in the Comment field.

No results associated with this QC element required qualification.

Qualified Results

No results associated with this sample delivery group required qualification.

Results with Modified Qualifiers

No qualifiers associated with this sample delivery group were modified manually.

Reason Code Definitions

Code	Definition
L	Lab Blank
TR	Trace Level Detect

Flag Code and Definitions

Flag	Definition
U	Undetected: The analyte was analyzed for, but not detected.
UJ	The analyte was not detected; however, the result is estimated due to discrepancies in meeting certain analyte-specific quality control criteria.
J	Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.
R	The data are rejected due to deficiencies in meeting QC criteria and may not be used for decision making.
B	Blank contamination: The analyte was found in an associated blank above one half the RL, as well as in the sample.
UB	The analyte was also detected in an associated laboratory or field blank at a concentration comparable to the concentration in the sample. The reported result has been requalified as not detected.
X	The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and to meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided. Acceptance or rejection of the data should be decided by the project team (which should include a project chemist), but exclusion of the data is recommended.

Review Questions

Method: SW6010C (Trace Metals by Inductively Coupled Plasma/Atomic Emission Spectrometry)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?		•		See outlier report. Fe was detected in the MB; Fe was ND in the associated sample.
Were field blanks (EBs or FBs) submitted with these samples?		•		
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			LCS only
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?			•	
Was a MS/MSD pair prepared with each batch?		•		
Were MS/MSD recoveries within project acceptance limits?			•	
Was the MS/MSD RPD within project acceptance limits?			•	
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?			•	
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

Review Questions

Method: SW6020A (Trace Metals by Inductively Coupled Plasma/Mass Spectrometry)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?		•		
Were field blanks (EBs or FBs) submitted with these samples?		•		
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			LCS only
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?			•	
Was a MS/MSD pair prepared with each batch?		•		
Were MS/MSD recoveries within project acceptance limits?			•	
Was the MS/MSD RPD within project acceptance limits?			•	
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?			•	
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

Data Validation Report for 6801825931

Facility:	Long Term Monitoring
Event:	KOMAN, Long Term Monitoring, AOC 57 Vertical Profile Metals-Spring 2020
SDG:	6801825931
Guidance Document:	Quality Assurance Project Plan, Long Term Monitoring Program, Former Fort Devens, 2018
Prime Contractor:	KOMAN Government Services, LLC
Project Manager:	Jim Ropp
Contract Laboratory(ies):	TestAmerica Laboratories, Inc., Savannah, GA
Data Review Contractor:	KOMAN Government Solutions, LLC
Data Review Level:	2B
Primary Data Reviewer:	Laurie Ekes, Senior Project Chemist
Second Reviewer:	Sherri Pullar, Senior Scientist
Date Submitted:	May 11, 2020

Field Sample ID	Lab Sample ID	Matrix	Type/Type Code	SW6010C - Dissolved	SW6020A - Dissolved
5703VP-20-01-10-12	680-182593-2	Water	Field Sample/N	X	X
5703VP-20-01-15-17	680-182593-3	Water	Field Sample/N	X	X
5703VP-20-01-20-22	680-182593-5	Water	Field Sample/N	X	X
5703VP-20-01-25-27	680-182593-6	Water	Field Sample/N	X	X
5703VP-20-01-30-32	680-182593-7	Water	Field Sample/N	X	X
5703VP-20-01-5-7	680-182593-1	Water	Field Sample/N	X	X
5703VP-20-02-10-12	680-182593-9	Water	Field Sample/N	X	X
5703VP-20-02-15-17	680-182593-10	Water	Field Sample/N	X	X
5703VP-20-02-20-22	680-182593-11	Water	Field Sample/N	X	X
5703VP-20-02-5-7	680-182593-8	Water	Field Sample/N	X	X
A1-VP-DUP-1-4720	680-182593-4	Water	Field Duplicate/FD	X	X

This report assesses the analytical data quality associated with the analyses listed on the preceding cover page at 2B data validation level. This assessment has been made through a combination of automated data review (ADR) and supplemental manual review, the details of which are described below. The approach taken in the review of this data set is consistent with the requirements contained in the Quality Assurance Project Plan, Long Term Monitoring Program, Former Fort Devens, 2018 and the additional guidance documents incorporated by reference to the extent possible. Where definitive guidance is not provided, results have been evaluated in a conservative manner using professional judgment.

Sample collection was managed and directed by KOMAN Government Services, LLC; analyses were performed by TestAmerica Laboratories, Inc., Savannah, GA and were reported under sample delivery group (SDG) 6801825931. Data have been evaluated electronically based on electronic data deliverables (EDDs) provided by the laboratory, and hard copy data summary forms have also been reviewed during this effort and compared to the automated review output by the reviewers whose signatures appear on the following page. Findings based on the automated data submission and manual data verification processes are detailed in the ADR narrative and throughout this report.

All quality control (QC) elements associated with this SDG have been reviewed by a project chemist in accordance with the requirements defined for the project. This review is documented in the attached Data Review Checklists. The QC elements listed below were supported by the electronic deliverable and were evaluated using ADR processes.

- Blank - Negative
- Calibration Blank
- Calibration Blank - Negative
- Continuing Calibration Verification
- Field Duplicate RPD
- Interference Check Sample A
- Interference Check Sample A - Negative
- Interference Check Sample AB
- Lab Blank
- LCS Recovery
- MS Recovery
- MS RPD
- Prep Hold Time
- Test Hold Time

Results of the ADR process were subsequently reviewed and updated as applicable by the data review chemists identified on the signature page. Quality control elements that were not included in the electronic deliverable were reviewed manually and findings are documented within this report. Summaries of findings and associated qualified results are documented throughout this report.

A total of 1 results (3.03%) out of the 33 results (sample and field QC samples) reported are qualified based on review and 0 results (0.00%) have been rejected or deemed a serious deficiency. Trace values, defined as results that are qualified as estimated because they fall between the detection limit and the reporting limit/limit of quantitation, are not counted as qualified results in the above count. The qualified results are detailed throughout this report and discussed in the narrative below, where appropriate.

Narrative Comments

This SDG contains 10 Area 57 vertical profile samples and one FD sample collected and submitted for dissolved As, Fe and Mn.

Analytical Method	Data Reviewer Comment
SW6010C	No additional comments; see Checklist for detail.
SW6020A	No additional comments; see Checklist for detail.

May 04, 2020

Reviewed by Laurie Ekes, Senior Project Chemist, KOMAN Government Solutions, LLC

As the First Reviewer, I certify that I have performed a data review process in accordance with the requirements of the project guidance document, and have compared the electronic data to the laboratory's hard copy report and have verified the consistency of a minimum of 10% of the reported sample results and method quality control data between the two deliverables.

May 11, 2020

Reviewed by Sherri Pullar, Senior Scientist, KOMAN Government Solutions, LLC

As the Second Reviewer, I certify that I have performed a quality assurance review of the report generated by the First Reviewer.

Quality Control Outliers for test method SW6010C, Dissolved, Calibration Blank

The purpose of calibration blanks is to determine the existence and magnitude of cross-contamination problems resulting from laboratory activities. Reported results were evaluated to determine compliance with the required acceptance criteria. Summary forms were evaluated and compared to electronic data deliverables. Findings of this review, and contaminants found in calibration blanks are listed below along with any associated qualified results.

Sample ID/ Lab Sample ID	Analyte	Result	Warning Limits	Control Limits	Units	Qualifier	Reason Code	Comment
CCB 680-615116/135 (CB)/ CCB 680-615116/135	Manganese	1.820	< 1	< 10	ug/l	U/None	B2	
CCB 680-615116/147 (CB)/ CCB 680-615116/147	Manganese	1.810	< 1	< 10	ug/l	U/None	B2	
CCB 680-615116/159 (CB)/ CCB 680-615116/159	Manganese	1.800	< 1	< 10	ug/l	U/None	B2	

Where two qualifiers are listed, such as 'J/UJ', the first applies to positive results, and the second to non-detect results.
Upper and Lower Warning and Control Limits are abbreviated UWL, LWL, UCL, and LCL in the Comment field.

Qualified Results associated with the Calibration Blank for SW6010C, Dissolved

FieldSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
5703VP-20-01-25-27	N	Manganese	10.0	8.80 J	10.0 U		ug/l	B2

Analytes not found in project samples are reported as not detected at the limit of detection (LOD).
In instances where no LOD is provided, results are reported down to the LOQ.

Table of All Qualified Results

Test Method: SW6010C Extraction Method: , Dissolved

FieldSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
5703VP-20-01-25-27	N	Manganese	10.0	8.80 J	10.0 U		ug/l	B2

Analytes not found in project samples are reported as not detected at the limit of detection (LOD).
In instances where no LOD is provided, results are reported down to the LOQ.
Trace values are not included in the qualified results table unless additional reason codes are associated.

Results with Modified Qualifiers

No qualifiers associated with this sample delivery group were modified manually.

Reason Code Definitions

Code	Definition
B2	CCB
TR	Trace Level Detect

Flag Code and Definitions

Flag	Definition
U	Undetected: The analyte was analyzed for, but not detected.
UJ	The analyte was not detected; however, the result is estimated due to discrepancies in meeting certain analyte-specific quality control criteria.
J	Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.
R	The data are rejected due to deficiencies in meeting QC criteria and may not be used for decision making.
B	Blank contamination: The analyte was found in an associated blank above one half the RL, as well as in the sample.
UB	The analyte was also detected in an associated laboratory or field blank at a concentration comparable to the concentration in the sample. The reported result has been requalified as not detected.
X	The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and to meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided. Acceptance or rejection of the data should be decided by the project team (which should include a project chemist), but exclusion of the data is recommended.

Review Questions

Method: SW6010C (Trace Metals by Inductively Coupled Plasma/Atomic Emission Spectrometry)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?		•		See outlier report for CCB detections.
Were field blanks (EBs or FBs) submitted with these samples?		•		
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			LCS only
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?			•	
Was a MS/MSD pair prepared with each batch?	•			Sample -7 was spiked and analyzed as MS/MSD.
Were MS/MSD recoveries within project acceptance limits?	•			
Was the MS/MSD RPD within project acceptance limits?	•			
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?	•			Samples -2/-4 were FD samples. See FD report.
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

Review Questions

Method: SW6020A (Trace Metals by Inductively Coupled Plasma/Mass Spectrometry)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?		•		
Were field blanks (EBs or FBs) submitted with these samples?		•		
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			LCS only
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?			•	
Was a MS/MSD pair prepared with each batch?	•			Sample -7 was spiked and analyzed as MS/MSD.
Were MS/MSD recoveries within project acceptance limits?	•			
Was the MS/MSD RPD within project acceptance limits?	•			
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?			•	Samples -2/-4 were FD samples. See FD report. As was ND in the FD sample pair.
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

Field Duplicate Report By SDG
Long Term Monitoring
KOMAN, Long Term Monitoring, AOC 57 Vertical Profile Metals-Spring 2020
Field Duplicates for SDG: 6801825931

Location	Analysis
5703VP-20-01	SW6010C

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
5703VP-20-01-10-12 / A1-VP-DUP-1-4720	680-182593-2 / 680-182593-4	Iron (FLDFLT)	790	600	50.0	27.3	30	OK	NA
5703VP-20-01-10-12 / A1-VP-DUP-1-4720	680-182593-2 / 680-182593-4	Manganese (FLDFLT)	3500	3500	10.0	0.00	30	OK	NA

Location	Analysis
5703VP-20-01	SW6020A

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
5703VP-20-01-10-12 / A1-VP-DUP-1-4720	680-182593-2 / 680-182593-4	Arsenic (FLDFLT)	ND	ND	3.00	NA	30	NA	OK

FD = Field Duplicate
RL = Reporting Limit
RPD = Relative Percent Difference

RL Check = If either the primary sample or field duplicate result is less than 5 times the RL then the criteria used to determine if the field duplicate is outside QC limits is +/- RL for Water and +/- 2 times RL for Soil"

Data Validation Report for 6801827111

Facility:	Long Term Monitoring
Event:	KOMAN, Long Term Monitoring, AOC 57 Vertical Profile Metals-Spring 2020
SDG:	6801827111
Guidance Document:	Quality Assurance Project Plan, Long Term Monitoring Program, Former Fort Devens, 2018
Prime Contractor:	KOMAN Government Services, LLC
Project Manager:	Jim Ropp
Contract Laboratory(ies):	TestAmerica Laboratories, Inc., Savannah, GA
Data Review Contractor:	Koman Government Solutions, LLC
Data Review Level:	2B
Primary Data Reviewer:	Laurie Ekes, Senior Project Chemist
Second Reviewer:	Sherri Pullar, Senior Scientist
Date Submitted:	May 11, 2020

Field Sample ID	Lab Sample ID	Matrix	Type/Type Code	SW6010C - Dissolved	SW6020A - Dissolved
5703VP-20-02-25-27	680-182711-1	Water	Field Sample/N	X	X
5703VP-20-02-30-32	680-182711-2	Water	Field Sample/N	X	X
5703VP-20-03-10-12	680-182711-4	Water	Field Sample/N	X	X
5703VP-20-03-15-17	680-182711-5	Water	Field Sample/N	X	X
5703VP-20-03-20-22	680-182711-6	Water	Field Sample/N	X	X
5703VP-20-03-25-27	680-182711-8	Water	Field Sample/N	X	X
5703VP-20-03-30-32	680-182711-9	Water	Field Sample/N	X	X
5703VP-20-03-5-7	680-182711-3	Water	Field Sample/N	X	X
A1-VP-DUP-41020	680-182711-7	Water	Field Duplicate/FD	X	X

This report assesses the analytical data quality associated with the analyses listed on the preceding cover page at 2B data validation level. This assessment has been made through a combination of automated data review (ADR) and supplemental manual review, the details of which are described below. The approach taken in the review of this data set is consistent with the requirements contained in the Quality Assurance Project Plan, Long Term Monitoring Program, Former Fort Devens, 2018 and the additional guidance documents incorporated by reference to the extent possible. Where definitive guidance is not provided, results have been evaluated in a conservative manner using professional judgment.

Sample collection was managed and directed by KOMAN Government Services, LLC; analyses were performed by TestAmerica Laboratories, Inc., Savannah, GA and were reported under sample delivery group (SDG) 6801827111. Data have been evaluated electronically based on electronic data deliverables (EDDs) provided by the laboratory, and hard copy data summary forms have also been reviewed during this effort and compared to the automated review output by the reviewers whose signatures appear on the following page. Findings based on the automated data submission and manual data verification processes are detailed in the ADR narrative and throughout this report.

All quality control (QC) elements associated with this SDG have been reviewed by a project chemist in accordance with the requirements defined for the project. This review is documented in the attached Data Review Checklists. The QC elements listed below were supported by the electronic deliverable and were evaluated using ADR processes.

- Blank - Negative
- Calibration Blank
- Calibration Blank - Negative
- Continuing Calibration Verification
- Field Duplicate RPD
- Interference Check Sample A
- Interference Check Sample A - Negative
- Interference Check Sample AB
- Lab Blank
- LCS Recovery
- MS Recovery
- MS RPD
- Prep Hold Time
- Test Hold Time

Results of the ADR process were subsequently reviewed and updated as applicable by the data review chemists identified on the signature page. Quality control elements that were not included in the electronic deliverable were reviewed manually and findings are documented within this report. Summaries of findings and associated qualified results are documented throughout this report.

A total of 0 results (0.00%) out of the 27 results (sample and field QC samples) reported are qualified based on review and 0 results (0.00%) have been rejected or deemed a serious deficiency. Trace values, defined as results that are qualified as estimated because they fall between the detection limit and the reporting limit/limit of quantitation, are not counted as qualified results in the above count. The qualified results are detailed throughout this report and discussed in the narrative below, where appropriate.

Narrative Comments

This SDG contains 8 Area 57 vertical profile samples and one FD sample collected and submitted for dissolved As, Fe and Mn.

Analytical Method	Data Reviewer Comment
SW6010C	No additional comments; see Checklist for detail.
SW6020A	No additional comments; see Checklist for detail.

May 04, 2020

Reviewed by Laurie Ekes, Senior Project Chemist, Koman Government Solutions, LLC

As the First Reviewer, I certify that I have performed a data review process in accordance with the requirements of the project guidance document, and have compared the electronic data to the laboratory's hard copy report and have verified the consistency of a minimum of 10% of the reported sample results and method quality control data between the two deliverables.

May 11, 2020

Reviewed by Sherri Pullar, Senior Scientist, Koman Government Solutions, LLC

As the Second Reviewer, I certify that I have performed a quality assurance review of the report generated by the First Reviewer.

No Outliers were associated with this sample delivery group.

Qualified Results

No results associated with this sample delivery group required qualification.

Results with Modified Qualifiers

No qualifiers associated with this sample delivery group were modified manually.

Reason Code Definitions

Code	Definition
TR	Trace Level Detect

Flag Code and Definitions

Flag	Definition
U	Undetected: The analyte was analyzed for, but not detected.
UJ	The analyte was not detected; however, the result is estimated due to discrepancies in meeting certain analyte-specific quality control criteria.
J	Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.
R	The data are rejected due to deficiencies in meeting QC criteria and may not be used for decision making.
B	Blank contamination: The analyte was found in an associated blank above one half the RL, as well as in the sample.
UB	The analyte was also detected in an associated laboratory or field blank at a concentration comparable to the concentration in the sample. The reported result has been requalified as not detected.

X	The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and to meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided. Acceptance or rejection of the data should be decided by the project team (which should include a project chemist), but exclusion of the data is recommended.

Review Questions

Method: SW6010C (Trace Metals by Inductively Coupled Plasma/Atomic Emission Spectrometry)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?		•		
Were field blanks (EBs or FBs) submitted with these samples?		•		
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			LCS only
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?			•	
Was a MS/MSD pair prepared with each batch?	•			Sample -5 was spiked and analyzed as MS/MSD.
Were MS/MSD recoveries within project acceptance limits?	•			
Was the MS/MSD RPD within project acceptance limits?	•			
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?	•			Samples -6/-7 wee FD samples. See FD report.
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

Review Questions

Method: SW6020A (Trace Metals by Inductively Coupled Plasma/Mass Spectrometry)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?		•		
Were field blanks (EBs or FBs) submitted with these samples?		•		
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			LCS only
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?			•	
Was a MS/MSD pair prepared with each batch?	•			Sample -5 was spiked and analyzed as MS/MSD.
Were MS/MSD recoveries within project acceptance limits?	•			
Was the MS/MSD RPD within project acceptance limits?	•			
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?	•			Samples -6/-7 were FD samples. As was ND in the FD samples. See FD report.
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

Field Duplicate Report By SDG
Long Term Monitoring
KOMAN, Long Term Monitoring, AOC 57 Vertical Profile Metals-Spring 2020
Field Duplicates for SDG: 6801827111

Location	Analysis
5703VP-20-03	SW6010C

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
5703VP-20-03-20-22 / A1-VP-DUP-41020	680-182711-6 / 680-182711-7	Iron (FLDFLT)	200	200	50.0	0.00	30	NA	OK
5703VP-20-03-20-22 / A1-VP-DUP-41020	680-182711-6 / 680-182711-7	Manganese (FLDFLT)	52.0	45.0	10.0	14.4	30	NA	OK

Location	Analysis
5703VP-20-03	SW6020A

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
5703VP-20-03-20-22 / A1-VP-DUP-41020	680-182711-6 / 680-182711-7	Arsenic (FLDFLT)	ND	ND	3.00	NA	30	NA	OK

FD = Field Duplicate
RL = Reporting Limit
RPD = Relative Percent Difference

RL Check = If either the primary sample or field duplicate result is less than 5 times the RL then the criteria used to determine if the field duplicate is outside QC limits is +/- RL for Water and +/- 2 times RL for Soil"

Data Validation Report for 6801828401

Facility:	Long Term Monitoring
Event:	KOMAN, Long Term Monitoring, AOC 57 Vertical Profile Metals-Spring 2020
SDG:	6801828401
Guidance Document:	Quality Assurance Project Plan, Long Term Monitoring Program, Former Fort Devens, 2018
Prime Contractor:	KOMAN Government Services, LLC
Project Manager:	Jim Ropp
Contract Laboratory(ies):	TestAmerica Laboratories, Inc., Savannah, GA
Data Review Contractor:	Koman Government Solutions, LLC
Data Review Level:	2B
Primary Data Reviewer:	Laurie Ekes, Senior Project Chemist
Second Reviewer:	Sherri Pullar, Senior Scientist
Date Submitted:	May 11, 2020

Field Sample ID	Lab Sample ID	Matrix	Type/Type Code	SW6010C - Dissolved	SW6020A - Dissolved
5703VP-20-04-10-12	680-182840-2	Water	Field Sample/N	X	X
5703VP-20-04-15-17	680-182840-3	Water	Field Sample/N	X	X
5703VP-20-04-20-22	680-182840-4	Water	Field Sample/N	X	X
5703VP-20-04-5-7	680-182840-1	Water	Field Sample/N	X	X

This report assesses the analytical data quality associated with the analyses listed on the preceding cover page at 2B data validation level. This assessment has been made through a combination of automated data review (ADR) and supplemental manual review, the details of which are described below. The approach taken in the review of this data set is consistent with the requirements contained in the Quality Assurance Project Plan, Long Term Monitoring Program, Former Fort Devens, 2018 and the additional guidance documents incorporated by reference to the extent possible. Where definitive guidance is not provided, results have been evaluated in a conservative manner using professional judgment.

Sample collection was managed and directed by KOMAN Government Services, LLC; analyses were performed by TestAmerica Laboratories, Inc., Savannah, GA and were reported under sample delivery group (SDG) 6801828401. Data have been evaluated electronically based on electronic data deliverables (EDDs) provided by the laboratory, and hard copy data summary forms have also been reviewed during this effort and compared to the automated review output by the reviewers whose signatures appear on the following page. Findings based on the automated data submission and manual data verification processes are detailed in the ADR narrative and throughout this report.

All quality control (QC) elements associated with this SDG have been reviewed by a project chemist in accordance with the requirements defined for the project. This review is documented in the attached Data Review Checklists. The QC elements listed below were supported by the electronic deliverable and were evaluated using ADR processes.

- Blank - Negative
- Calibration Blank
- Calibration Blank - Negative
- Continuing Calibration Verification
- Interference Check Sample A
- Interference Check Sample A - Negative
- Interference Check Sample AB
- Lab Blank
- LCS Recovery
- Prep Hold Time
- Test Hold Time

Results of the ADR process were subsequently reviewed and updated as applicable by the data review chemists identified on the signature page. Quality control elements that were not included in the electronic deliverable were reviewed manually and findings are documented within this report. Summaries of findings and associated qualified results are documented throughout this report.

A total of 0 results (0.00%) out of the 12 results (sample and field QC samples) reported are qualified based on review and 0 results (0.00%) have been rejected or deemed a serious deficiency. Trace values, defined as results that are qualified as estimated because they fall between the detection limit and the reporting limit/limit of quantitation, are not counted as qualified results in the above count. The qualified results are detailed throughout this report and discussed in the narrative below, where appropriate.

Narrative Comments

This SDG contains 4 Area 57 vertical profile samples collected and submitted for dissolved As, Fe and Mn.

Analytical Method	Data Reviewer Comment
SW6010C	No additional comments; see Checklist for detail.
SW6020A	No additional comments; see Checklist for detail.

May 04, 2020

Reviewed by Laurie Ekes, Senior Project Chemist, Koman Government Solutions, LLC

As the First Reviewer, I certify that I have performed a data review process in accordance with the requirements of the project guidance document, and have compared the electronic data to the laboratory's hard copy report and have verified the consistency of a minimum of 10% of the reported sample results and method quality control data between the two deliverables.

May 11, 2020

Reviewed by Sherri Pullar, Senior Scientist, Koman Government Solutions, LLC

As the Second Reviewer, I certify that I have performed a quality assurance review of the report generated by the First Reviewer.

No Outliers were associated with this sample delivery group.

Qualified Results

No results associated with this sample delivery group required qualification.

Results with Modified Qualifiers

No qualifiers associated with this sample delivery group were modified manually.

Reason Code Definitions

Code	Definition
TR	Trace Level Detect

Flag Code and Definitions

Flag	Definition
U	Undetected: The analyte was analyzed for, but not detected.
UJ	The analyte was not detected; however, the result is estimated due to discrepancies in meeting certain analyte-specific quality control criteria.
J	Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.
R	The data are rejected due to deficiencies in meeting QC criteria and may not be used for decision making.
B	Blank contamination: The analyte was found in an associated blank above one half the RL, as well as in the sample.
UB	The analyte was also detected in an associated laboratory or field blank at a concentration comparable to the concentration in the sample. The reported result has been requalified as not detected.

X	The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and to meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided. Acceptance or rejection of the data should be decided by the project team (which should include a project chemist), but exclusion of the data is recommended.

Review Questions

Method: SW6010C (Trace Metals by Inductively Coupled Plasma/Atomic Emission Spectrometry)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?		•		
Were field blanks (EBs or FBs) submitted with these samples?		•		
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			LCS only
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?			•	
Was a MS/MSD pair prepared with each batch?		•		
Were MS/MSD recoveries within project acceptance limits?			•	
Was the MS/MSD RPD within project acceptance limits?			•	
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?			•	
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

Review Questions

Method: SW6020A (Trace Metals by Inductively Coupled Plasma/Mass Spectrometry)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?		•		
Were field blanks (EBs or FBs) submitted with these samples?		•		
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			LCS only
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?			•	
Was a MS/MSD pair prepared with each batch?		•		
Were MS/MSD recoveries within project acceptance limits?			•	
Was the MS/MSD RPD within project acceptance limits?			•	
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?			•	
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

Data Validation Report for 6801829341

Facility:	Long Term Monitoring
Event:	KOMAN, Long Term Monitoring, AOC 57 Vertical Profile Metals-Spring 2020
SDG:	6801829341
Guidance Document:	Quality Assurance Project Plan, Long Term Monitoring Program, Former Fort Devens, 2018
Prime Contractor:	KOMAN Government Services, LLC
Project Manager:	Jim Ropp
Contract Laboratory(ies):	TestAmerica Laboratories, Inc., Savannah, GA
Data Review Contractor:	Koman Government Solutions, LLC
Data Review Level:	2B
Primary Data Reviewer:	Laurie Ekes, Senior Project Chemist
Second Reviewer:	Sherri Pullar, Senior Scientist
Date Submitted:	

Field Sample ID	Lab Sample ID	Matrix	Type/Type Code	SW6010C - Dissolved	SW6020A - Dissolved
5702VP-20-03-10-14	680-182934-10	Water	Field Sample/N	X	X
5702VP-20-03-15-19	680-182934-11	Water	Field Sample/N	X	X
5702VP-20-03-20-24	680-182934-12	Water	Field Sample/N	X	X
5702VP-20-03-5-7	680-182934-9	Water	Field Sample/N	X	X
5702VP-20-04-10-12	680-182934-2	Water	Field Sample/N	X	X
5702VP-20-04-15-17	680-182934-3	Water	Field Sample/N	X	X
5702VP-20-04-25-27	680-182934-5	Water	Field Sample/N	X	X
5702VP-20-04-30-32	680-182934-6	Water	Field Sample/N	X	X
5702VP-20-04-35-37	680-182934-7	Water	Field Sample/N	X	X
A1-VP-DUP-1-41620	680-182934-8	Water	Field Duplicate/FD	X	X
A1-VP-DUP-1-41720	680-182934-13	Water	Field Duplicate/FD	X	X
A1-VP-EB-41620	680-182934-1	Water	Equipment Blank/EB	X	X

This report assesses the analytical data quality associated with the analyses listed on the preceding cover page at 2B data validation level. This assessment has been made through a combination of automated data review (ADR) and supplemental manual review, the details of which are described below. The approach taken in the review of this data set is consistent with the requirements contained in the Quality Assurance Project Plan, Long Term Monitoring Program, Former Fort Devens, 2018 and the additional guidance documents incorporated by reference to the extent possible. Where definitive guidance is not provided, results have been evaluated in a conservative manner using professional judgment.

Sample collection was managed and directed by KOMAN Government Services, LLC; analyses were performed by TestAmerica Laboratories, Inc., Savannah, GA and were reported under sample delivery group (SDG) 6801829341. Data have been evaluated electronically based on electronic data deliverables (EDDs) provided by the laboratory, and hard copy data summary forms have also been reviewed during this effort and compared to the automated review output by the reviewers whose signatures appear on the following page. Findings based on the automated data submission and manual data verification processes are detailed in the ADR narrative and throughout this report.

All quality control (QC) elements associated with this SDG have been reviewed by a project chemist in accordance with the requirements defined for the project. This review is documented in the attached Data Review Checklists. The QC elements listed below were supported by the electronic deliverable and were evaluated using ADR processes.

- Blank - Negative
- Calibration Blank
- Calibration Blank - Negative
- Continuing Calibration Verification
- Equipment Blank
- Field Duplicate RPD
- Interference Check Sample A
- Interference Check Sample A - Negative
- Interference Check Sample AB
- Lab Blank
- LCS Recovery
- MS Recovery
- MS RPD
- Prep Hold Time
- Test Hold Time

Results of the ADR process were subsequently reviewed and updated as applicable by the data review chemists identified on the signature page. Quality control elements that were not included in the electronic deliverable were reviewed manually and findings are documented within this report. Summaries of findings and associated qualified results are documented throughout this report.

A total of 4 results (11.11%) out of the 36 results (sample and field QC samples) reported are qualified based on review and 0 results (0.00%) have been rejected or deemed a serious deficiency. Trace values, defined as results that are qualified as estimated because they fall between the detection limit and the reporting limit/limit of quantitation, are not counted as qualified results in the above count. The qualified results are detailed throughout this report and discussed in the narrative below, where appropriate.

Narrative Comments

This SDG contains 9 Area 57 vertical profile samples, 1 EB sample and 2 FD samples collected and submitted for dissolved As, Fe and Mn.

Analytical Method	Data Reviewer Comment
SW6010C	No additional comments; see Checklist for detail.
SW6020A	No additional comments; see Checklist for detail.

May 05, 2020

Reviewed by Laurie Ekes, Senior Project Chemist, Koman Government Solutions, LLC

As the First Reviewer, I certify that I have performed a data review process in accordance with the requirements of the project guidance document, and have compared the electronic data to the laboratory's hard copy report and have verified the consistency of a minimum of 10% of the reported sample results and method quality control data between the two deliverables.

May 11, 2020

Reviewed by Sherri Pullar, Senior Scientist, Koman Government Solutions, LLC

As the Second Reviewer, I certify that I have performed a quality assurance review of the report generated by the First Reviewer.

Quality Control Outliers for test method SW6010C, Dissolved, Calibration Blank

The purpose of calibration blanks is to determine the existence and magnitude of cross-contamination problems resulting from laboratory activities. Reported results were evaluated to determine compliance with the required acceptance criteria. Summary forms were evaluated and compared to electronic data deliverables. Findings of this review, and contaminants found in calibration blanks are listed below along with any associated qualified results.

Sample ID/ Lab Sample ID	Analyte	Result	Warning Limits	Control Limits	Units	Qualifier	Reason Code	Comment
CCB 680-616163/108 (CB)/ CCB 680-616163/108	Iron	17.70	< 17	< 50	ug/l	U/None	B2	

Where two qualifiers are listed, such as 'J/UJ', the first applies to positive results, and the second to non-detect results.
Upper and Lower Warning and Control Limits are abbreviated UWL, LWL, UCL, and LCL in the Comment field.

No results associated with this QC element required qualification.

Quality Control Outliers for test method SW6010C, Dissolved, Field Duplicate RPD

Field duplicate analyses are performed in order to assess sample collection/laboratory precision for each sample matrix. Summary forms were evaluated and compared to electronic data deliverables. Field duplicate results that were outside of the acceptance criteria are listed below.

Sample ID/ Lab Sample ID	Analyte	Result	Warning Limits	Control Limits	Units	Qualifier	Reason Code	Comment
5702VP-20-04-15-17 (N)/ 680-182934-8	Iron	353.0	< 50	< 50	ug/l	J/None	D3	

Where two qualifiers are listed, such as 'J/UJ', the first applies to positive results, and the second to non-detect results.
Upper and Lower Warning and Control Limits are abbreviated UWL, LWL, UCL, and LCL in the Comment field.

Qualified Results associated with the Field Duplicate RPD for SW6010C, Dissolved

FieldSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
5702VP-20-04-15-17	N	Iron	50.0	450	450 J		ug/l	D3
A1-VP-DUP-1-41620	FD	Iron	50.0	97.0	97.0 J		ug/l	D3

Analytes not found in project samples are reported as not detected at the limit of detection (LOD).
In instances where no LOD is provided, results are reported down to the LOQ.

Quality Control Outliers for test method SW6020A, Dissolved, Field Duplicate RPD

Field duplicate analyses are performed in order to assess sample collection/laboratory precision for each sample matrix. Summary forms were evaluated and compared to electronic data deliverables. Field duplicate results that were outside of the acceptance criteria are listed below.

Sample ID/ Lab Sample ID	Analyte	Result	Warning Limits	Control Limits	Units	Qualifier	Reason Code	Comment
5702VP-20-04-15-17 (N)/ 680-182934-8	Arsenic	3.200	< 3	< 3	ug/l	J/None	D3	

Where two qualifiers are listed, such as 'J/UJ', the first applies to positive results, and the second to non-detect results.
Upper and Lower Warning and Control Limits are abbreviated UWL, LWL, UCL, and LCL in the Comment field.

Qualified Results associated with the Field Duplicate RPD for SW6020A, Dissolved

FieldSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
5702VP-20-04-15-17	N	Arsenic	3.00	8.40	8.40 J		ug/l	D3
A1-VP-DUP-1-41620	FD	Arsenic	3.00	5.20	5.20 J		ug/l	D3

Analytes not found in project samples are reported as not detected at the limit of detection (LOD).
In instances where no LOD is provided, results are reported down to the LOQ.

Table of All Qualified Results

Test Method: SW6010C Extraction Method: , Dissolved

FieldSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
5702VP-20-04-15-17	N	Iron	50.0	450	450 J		ug/l	D3
A1-VP-DUP-1-41620	FD	Iron	50.0	97.0	97.0 J		ug/l	D3

Test Method: SW6020A Extraction Method: , Dissolved

FieldSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
5702VP-20-04-15-17	N	Arsenic	3.00	8.40	8.40 J		ug/l	D3
A1-VP-DUP-1-41620	FD	Arsenic	3.00	5.20	5.20 J		ug/l	D3

Analytes not found in project samples are reported as not detected at the limit of detection (LOD).
In instances where no LOD is provided, results are reported down to the LOQ.
Trace values are not included in the qualified results table unless additional reason codes are associated.

Results with Modified Qualifiers

No qualifiers associated with this sample delivery group were modified manually.

Reason Code Definitions

Code	Definition
B2	CCB
D3	Field Duplicate RPD
TR	Trace Level Detect

Flag Code and Definitions

Flag	Definition
U	Undetected: The analyte was analyzed for, but not detected.
UJ	The analyte was not detected; however, the result is estimated due to discrepancies in meeting certain analyte-specific quality control criteria.
J	Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.
R	The data are rejected due to deficiencies in meeting QC criteria and may not be used for decision making.
B	Blank contamination: The analyte was found in an associated blank above one half the RL, as well as in the sample.
UB	The analyte was also detected in an associated laboratory or field blank at a concentration comparable to the concentration in the sample. The reported result has been requalified as not detected.
X	The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and to meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided. Acceptance or rejection of the data should be decided by the project team (which should include a project chemist), but exclusion of the data is recommended.

Review Questions

Method: SW6010C (Trace Metals by Inductively Coupled Plasma/Atomic Emission Spectrometry)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?		•		See outlier report for Fe detect in CCB. Sample results were greater than 5X the EB; qualifications were not needed.
Were field blanks (EBs or FBs) submitted with these samples?	•			Sample -1 was an EB sample.
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			LCS only
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?			•	
Was a MS/MSD pair prepared with each batch?	•			Samples -2 and -10 were spiked and analyzed as MS/MSD samples.
Were MS/MSD recoveries within project acceptance limits?	•			
Was the MS/MSD RPD within project acceptance limits?	•			
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?		•		Samples -3/-8 and -11/-13 were FD sample pairs. The RPDs for As and Fe were above 30% in the FD pair -3/-8. The results for As and Fe in these samples were qualified as estimated (J). See FD report.
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

Review Questions

Method: SW6020A (Trace Metals by Inductively Coupled Plasma/Mass Spectrometry)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?				
Were samples preserved properly and received in good condition?				
Were holding times met?				
Were all requested target analytes reported?				
Was the Calibration within acceptance criteria?				
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?				
Were all reported analytes for the ICV within the required criteria?				
Were CCVs run at the required frequency and within acceptance criteria?				
Was a method blank prepared and analyzed with each batch?				
Were target analytes in the method blank less than MDL?				
Were field blanks (EBs or FBs) submitted with these samples?				
Was an LCS/LCSD pair prepared and analyzed with each batch?				
Were LCS/LCSD recoveries within project acceptance limits?				
Was the LCS/LCSD RPD within project acceptance limits?				
Was a MS/MSD pair prepared with each batch?				
Were MS/MSD recoveries within project acceptance limits?				
Was the MS/MSD RPD within project acceptance limits?				
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?				
Were QAPP specified laboratory LOQs/RLs achieved?				
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?				
Were any data rejected during the verification process?				

Field Duplicate Report By SDG
Long Term Monitoring
KOMAN, Long Term Monitoring, AOC 57 Vertical Profile Metals-Spring 2020
Field Duplicates for SDG: 6801829341

Location	Analysis
5702VP-20-03	SW6010C

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
5702VP-20-03-15-19 / A1-VP-DUP-1-41720	680-182934-11 / 680-182934-13	Iron (FLDFLT)	550	670	50.0	19.7	30	OK	NA
5702VP-20-03-15-19 / A1-VP-DUP-1-41720	680-182934-11 / 680-182934-13	Manganese (FLDFLT)	160	190	10.0	17.1	30	OK	NA

Location	Analysis
5702VP-20-03	SW6020A

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
5702VP-20-03-15-19 / A1-VP-DUP-1-41720	680-182934-11 / 680-182934-13	Arsenic (FLDFLT)	ND	ND	3.00	NA	30	NA	OK

Location	Analysis
5702VP-20-04	SW6010C

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
5702VP-20-04-15-17 / A1-VP-DUP-1-41620	680-182934-3 / 680-182934-8	Iron (FLDFLT)	450	97.0	50.0	129	30	NA	353
5702VP-20-04-15-17 / A1-VP-DUP-1-41620	680-182934-3 / 680-182934-8	Manganese (FLDFLT)	77.0	74.0	10.0	3.97	30	OK	NA

Location	Analysis
5702VP-20-04	SW6020A

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
5702VP-20-04-15-17 / A1-VP-DUP-1-41620	680-182934-3 / 680-182934-8	Arsenic (FLDFLT)	8.40	5.20	3.00	47.1	30	NA	3.2

FD = Field Duplicate
RL = Reporting Limit
RPD = Relative Percent Difference

RL Check = If either the primary sample or field duplicate result is less than 5 times the RL then the criteria used to determine if the field duplicate is outside QC limits is +/- RL for Water and +/- 2 times RL for Soil"

Data Validation Report for 6801830561a

Facility:	Long Term Monitoring
Event:	KOMAN, Long Term Monitoring, AOC 57 Vertical Profile Metals-Spring 2020
SDG:	6801830561a
Guidance Document:	Quality Assurance Project Plan, Long Term Monitoring Program, Former Fort Devens, 2018
Prime Contractor:	KOMAN Government Services, LLC
Project Manager:	Jim Ropp
Contract Laboratory(ies):	TestAmerica Laboratories, Inc., Savannah, GA
Data Review Contractor:	Koman Government Solutions, LLC
Data Review Level:	2B
Primary Data Reviewer:	Laurie Ekes, Senior Project Chemist
Second Reviewer:	Sherri Pullar, Senior Scientist
Date Submitted:	May 11, 2020

Field Sample ID	Lab Sample ID	Matrix	Type/Type Code	SW6010C - Dissolved	SW6020A - Dissolved
5702VP-20-01-5-9	680-183056-19	Water	Field Sample/N	X	X
5702VP-20-02-10-14	680-183056-11	Water	Field Sample/N	X	X
5702VP-20-02-15-19	680-183056-10	Water	Field Sample/N	X	X
5702VP-20-02-20-24	680-183056-12	Water	Field Sample/N	X	X
5702VP-20-02-25-29	680-183056-14	Water	Field Sample/N	X	X
5702VP-20-02-30-34	680-183056-15	Water	Field Sample/N	X	X
5702VP-20-02-35-39	680-183056-16	Water	Field Sample/N	X	X
5702VP-20-02-40-44	680-183056-17	Water	Field Sample/N	X	X
5702VP-20-02-50-54	680-183056-18	Water	Field Sample/N	X	X
5702VP-20-02-5-9	680-183056-8	Water	Field Sample/N	X	X
5702VP-20-03-25-29	680-183056-1	Water	Field Sample/N	X	X
5702VP-20-03-30-34	680-183056-3	Water	Field Sample/N	X	X
5702VP-20-03-35-39	680-183056-4	Water	Field Sample/N	X	X
5702VP-20-03-40-44	680-183056-5	Water	Field Sample/N	X	X
5702VP-20-03-45-49	680-183056-6	Water	Field Sample/N	X	X
5702VP-20-03-50-54	680-183056-7	Water	Field Sample/N	X	X
5702VP-20-04-20-22	680-183056-13	Water	Field Sample/N	X	X
A1-VP-DUP-1-42020	680-183056-2	Water	Field Duplicate/FD	X	X
A1-VP-DUP-1-42120	680-183056-9	Water	Field Duplicate/FD	X	X

Field Sample ID	Lab Sample ID	Matrix	Type/Type Code	SW6010C - Dissolved	SW6020A - Dissolved
A1-VP-DUP-1-42220	680-183056-20	Water	Field Duplicate/FD	X	X

This report assesses the analytical data quality associated with the analyses listed on the preceding cover page at 2B data validation level. This assessment has been made through a combination of automated data review (ADR) and supplemental manual review, the details of which are described below. The approach taken in the review of this data set is consistent with the requirements contained in the Quality Assurance Project Plan, Long Term Monitoring Program, Former Fort Devens, 2018 and the additional guidance documents incorporated by reference to the extent possible. Where definitive guidance is not provided, results have been evaluated in a conservative manner using professional judgment.

Sample collection was managed and directed by KOMAN Government Services, LLC; analyses were performed by TestAmerica Laboratories, Inc., Savannah, GA and were reported under sample delivery group (SDG) 6801830561a. Data have been evaluated electronically based on electronic data deliverables (EDDs) provided by the laboratory, and hard copy data summary forms have also been reviewed during this effort and compared to the automated review output by the reviewers whose signatures appear on the following page. Findings based on the automated data submission and manual data verification processes are detailed in the ADR narrative and throughout this report.

All quality control (QC) elements associated with this SDG have been reviewed by a project chemist in accordance with the requirements defined for the project. This review is documented in the attached Data Review Checklists. The QC elements listed below were supported by the electronic deliverable and were evaluated using ADR processes.

- Blank - Negative
- Calibration Blank
- Calibration Blank - Negative
- Continuing Calibration Verification
- Field Duplicate RPD
- Interference Check Sample A
- Interference Check Sample A - Negative
- Interference Check Sample AB
- Lab Blank
- LCS Recovery
- Prep Hold Time
- Test Hold Time

Results of the ADR process were subsequently reviewed and updated as applicable by the data review chemists identified on the signature page. Quality control elements that were not included in the electronic deliverable were reviewed manually and findings are documented within this report. Summaries of findings and associated qualified results are documented throughout this report.

A total of 5 results (8.33%) out of the 60 results (sample and field QC samples) reported are qualified based on review and 0 results (0.00%) have been rejected or deemed a serious deficiency. Trace values, defined as results that are qualified as estimated because they fall between the detection limit and the reporting limit/limit of quantitation, are not counted as qualified results in the above count. The qualified results are detailed throughout this report and discussed in the narrative below, where appropriate.

Narrative Comments

This SDG contains 17 Area 57 vertical profile samples and 3 FD samples collected and submitted for dissolved As, Fe and Mn.

Analytical Method	Data Reviewer Comment
SW6010C	No additional comments; see Checklist for detail.
SW6020A	No additional comments; see Checklist for detail.

May 05, 2020

Reviewed by Laurie Ekes, Senior Project Chemist, Koman Government Solutions, LLC

As the First Reviewer, I certify that I have performed a data review process in accordance with the requirements of the project guidance document, and have compared the electronic data to the laboratory's hard copy report and have verified the consistency of a minimum of 10% of the reported sample results and method quality control data between the two deliverables.

May 12, 2020

Reviewed by Sherri Pullar, Senior Scientist, Koman Government Solutions, LLC

As the Second Reviewer, I certify that I have performed a quality assurance review of the report generated by the First Reviewer.

Quality Control Outliers for test method SW6010C, Dissolved, Field Duplicate RPD

Field duplicate analyses are performed in order to assess sample collection/laboratory precision for each sample matrix. Summary forms were evaluated and compared to electronic data deliverables. Field duplicate results that were outside of the acceptance criteria are listed below.

Sample ID/ Lab Sample ID	Analyte	Result	Warning Limits	Control Limits	Units	Qualifier	Reason Code	Comment
5702VP-20-03-25-29 (N)/ 680-183056-2	Manganese	124.8	< 30	< 30	rpd	J/None	D3	
5702VP-20-03-25-29 (N)/ 680-183056-2	Iron	133.3	< 30	< 30	rpd	J/None	D3	

Where two qualifiers are listed, such as 'J/UJ', the first applies to positive results, and the second to non-detect results.
Upper and Lower Warning and Control Limits are abbreviated UWL, LWL, UCL, and LCL in the Comment field.

Qualified Results associated with the Field Duplicate RPD for SW6010C, Dissolved

FieldSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
5702VP-20-03-25-29	N	Iron	50.0	1700	1700 J		ug/l	D3
5702VP-20-03-25-29	N	Manganese	10.0	820	820 J		ug/l	D3
A1-VP-DUP-1-42020	FD	Iron	50.0	340	340 J		ug/l	D3
A1-VP-DUP-1-42020	FD	Manganese	10.0	190	190 J		ug/l	D3

Analytes not found in project samples are reported as not detected at the limit of detection (LOD).
In instances where no LOD is provided, results are reported down to the LOQ.

Quality Control Outliers for test method SW6010C, Dissolved, Lab Blank

The purpose of laboratory blanks is to determine the existence and magnitude of cross-contamination problems resulting from laboratory activities. Reported results were evaluated to determine compliance with the required acceptance criteria. Summary forms were evaluated and compared to electronic data deliverables. Findings of this review, and contaminants found in laboratory blanks are listed below along with any associated qualified results.

Sample ID/ Lab Sample ID	Analyte	Result	Warning Limits	Control Limits	Units	Qualifier	Reason Code	Comment
MB 680-616410/1-A (LB)/ MB 680-616410/1-A	Manganese	2.830	< 1	< 10	ug/l	U/None	L	
MB 680-616410/1-A (LB)/ MB 680-616410/1-A	Iron	24.80	< 17	< 50	ug/l	U/None	L	

Where two qualifiers are listed, such as 'J/UJ', the first applies to positive results, and the second to non-detect results.
Upper and Lower Warning and Control Limits are abbreviated UWL, LWL, UCL, and LCL in the Comment field.

No results associated with this QC element required qualification.

Quality Control Outliers for test method SW6020A, Dissolved, Field Duplicate RPD

Field duplicate analyses are performed in order to assess sample collection/laboratory precision for each sample matrix. Summary forms were evaluated and compared to electronic data deliverables. Field duplicate results that were outside of the acceptance criteria are listed below.

Sample ID/ Lab Sample ID	Analyte	Result	Warning Limits	Control Limits	Units	Qualifier	Reason Code	Comment
5702VP-20-03-25-29 (N)/ 680-183056-2	Arsenic	5.000	< 3	< 3	ug/l	J/None	D3	

Where two qualifiers are listed, such as 'J/UJ', the first applies to positive results, and the second to non-detect results.
Upper and Lower Warning and Control Limits are abbreviated UWL, LWL, UCL, and LCL in the Comment field.

Qualified Results associated with the Field Duplicate RPD for SW6020A, Dissolved

FieldSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
5702VP-20-03-25-29	N	Arsenic	3.00	5.00	5.00 J		ug/l	D3

Analytes not found in project samples are reported as not detected at the limit of detection (LOD).
In instances where no LOD is provided, results are reported down to the LOQ.

Table of All Qualified Results

Test Method: SW6010C Extraction Method: , Dissolved

FieldSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
5702VP-20-03-25-29	N	Iron	50.0	1700	1700 J		ug/l	D3
5702VP-20-03-25-29	N	Manganese	10.0	820	820 J		ug/l	D3
A1-VP-DUP-1-42020	FD	Iron	50.0	340	340 J		ug/l	D3
A1-VP-DUP-1-42020	FD	Manganese	10.0	190	190 J		ug/l	D3

Test Method: SW6020A Extraction Method: , Dissolved

FieldSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
5702VP-20-03-25-29	N	Arsenic	3.00	5.00	5.00 J		ug/l	D3

Analytes not found in project samples are reported as not detected at the limit of detection (LOD).
In instances where no LOD is provided, results are reported down to the LOQ.
Trace values are not included in the qualified results table unless additional reason codes are associated.

Results with Modified Qualifiers

No qualifiers associated with this sample delivery group were modified manually.

Reason Code Definitions

Code	Definition
D3	Field Duplicate RPD
L	Lab Blank
TR	Trace Level Detect

Flag Code and Definitions

Flag	Definition
U	Undetected: The analyte was analyzed for, but not detected.
UJ	The analyte was not detected; however, the result is estimated due to discrepancies in meeting certain analyte-specific quality control criteria.
J	Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.
R	The data are rejected due to deficiencies in meeting QC criteria and may not be used for decision making.
B	Blank contamination: The analyte was found in an associated blank above one half the RL, as well as in the sample.
UB	The analyte was also detected in an associated laboratory or field blank at a concentration comparable to the concentration in the sample. The reported result has been requalified as not detected.
X	The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and to meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided. Acceptance or rejection of the data should be decided by the project team (which should include a project chemist), but exclusion of the data is recommended.

Review Questions

Method: SW6010C (Trace Metals by Inductively Coupled Plasma/Atomic Emission Spectrometry)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?		•		See outlier report. Fe and Mn were detected in the MB associated with these samples.Native samples results for both analytes were greater than 5X these levels. Qualifications were not needed.
Were field blanks (EBs or FBs) submitted with these samples?		•		
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			LCS only
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?			•	
Was a MS/MSD pair prepared with each batch?	•			Sample -5 was spiked and analyzed as MS/MSD.
Were MS/MSD recoveries within project acceptance limits?	•			
Was the MS/MSD RPD within project acceptance limits?	•			
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?		•		Samples -1/-2, -8/-9 and -19/-20 were FD samples. The RPDs for FD sample pairs -8/-9 and -19/-20 were within control limits. The RPDs for the FD sample pair -1/-2 were above 30% for all analytes; this discrepancy is likely due to the nature of the VP samples which contain particulate matter!
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

Review Questions

Method: SW6020A (Trace Metals by Inductively Coupled Plasma/Mass Spectrometry)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?		•		
Were field blanks (EBs or FBs) submitted with these samples?		•		
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			LCS Only
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?			•	
Was a MS/MSD pair prepared with each batch?	•			Sample-5 was spiked and analyzed as MS/MSD.
Were MS/MSD recoveries within project acceptance limits?	•			
Was the MS/MSD RPD within project acceptance limits?	•			
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?		•		Samples -1/-2, -8/-9 and -19/-20 were FD samples. The RPDs for FD sample pairs -8/-9 and -19/-20 were within control limits. Arsenic was detected in the native sample at 5 ug/L but was ND in the FD sample. This discrepancy is likely due to the nature of the VP samples which contain particulate matter!
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

Field Duplicate Report By SDG
Long Term Monitoring
KOMAN, Long Term Monitoring, AOC 57 Vertical Profile Metals-Spring 2020
Field Duplicates for SDG: 6801830561a

Location	Analysis
5702VP-20-01	SW6010C

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
5702VP-20-01-5-9 / A1-VP-DUP-1-42220	680-183056-19 / 680-183056-20	Iron (FLDFLT)	910	900	50.0	1.10	30	OK	NA
5702VP-20-01-5-9 / A1-VP-DUP-1-42220	680-183056-19 / 680-183056-20	Manganese (FLDFLT)	400	400	10.0	0.00	30	OK	NA

Location	Analysis
5702VP-20-01	SW6020A

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
5702VP-20-01-5-9 / A1-VP-DUP-1-42220	680-183056-19 / 680-183056-20	Arsenic (FLDFLT)	2.10	2.00	3.00	4.88	30	NA	OK

Location	Analysis
5702VP-20-02	SW6010C

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
5702VP-20-02-5-9 / A1-VP-DUP-1-42120	680-183056-8 / 680-183056-9	Iron (FLDFLT)	1400	1500	50.0	6.90	30	OK	NA
5702VP-20-02-5-9 / A1-VP-DUP-1-42120	680-183056-8 / 680-183056-9	Manganese (FLDFLT)	320	360	10.0	11.8	30	OK	NA

Location	Analysis
5702VP-20-02	SW6020A

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
5702VP-20-02-5-9 / A1-VP-DUP-1-42120	680-183056-8 / 680-183056-9	Arsenic (FLDFLT)	3.30	4.20	3.00	24.0	30	NA	OK

FD = Field Duplicate
RL = Reporting Limit
RPD = Relative Percent Difference

RL Check = If either the primary sample or field duplicate result is less than 5 times the RL then the criteria used to determine if the field duplicate is outside QC limits is +/- RL for Water and +/- 2 times RL for Soil"

Field Duplicate Report By SDG
Long Term Monitoring
KOMAN, Long Term Monitoring, AOC 57 Vertical Profile Metals-Spring 2020
Field Duplicates for SDG: 6801830561a

Location	Analysis
5702VP-20-03	SW6010C

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
5702VP-20-03-25-29 / A1-VP-DUP-1-42020	680-183056-1 / 680-183056-2	Iron (FLDFLT)	1700	340	50.0	133	30	Out	NA
5702VP-20-03-25-29 / A1-VP-DUP-1-42020	680-183056-1 / 680-183056-2	Manganese (FLDFLT)	820	190	10.0	125	30	Out	NA

Location	Analysis
5702VP-20-03	SW6020A

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
5702VP-20-03-25-29 / A1-VP-DUP-1-42020	680-183056-1 / 680-183056-2	Arsenic (FLDFLT)	5.00	ND	3.00	NA	30	NA	5.0

FD = Field Duplicate
RL = Reporting Limit
RPD = Relative Percent Difference

RL Check = If either the primary sample or field duplicate result is less than 5 times the RL then the criteria used to determine if the field duplicate is outside QC limits is +/- RL for Water and +/- 2 times RL for Soil"

Data Validation Report for 6801831321

Facility:	Long Term Monitoring
Event:	KOMAN, Long Term Monitoring, AOC 57 Vertical Profile Metals-Spring 2020
SDG:	6801831321
Guidance Document:	Quality Assurance Project Plan, Long Term Monitoring Program, Former Fort Devens, 2018
Prime Contractor:	KOMAN Government Services, LLC
Project Manager:	Jim Ropp
Contract Laboratory(ies):	TestAmerica Laboratories, Inc., Savannah, GA
Data Review Contractor:	Koman Government Solutions, LLC
Data Review Level:	2B
Primary Data Reviewer:	Laurie Ekes, Senior Project Chemist
Second Reviewer:	Sherri Pullar, Senior Scientist
Date Submitted:	May 11, 2020

Field Sample ID	Lab Sample ID	Matrix	Type/Type Code	SW6010C	SW6010C - Dissolved	SW6020A	SW6020A - Dissolved
5702VP-20-01-10-14	680-183132-1	Water	Field Sample/N		X		X
5702VP-20-01-15-19	680-183132-2	Water	Field Sample/N		X		X
5702VP-20-01-20-24	680-183132-4	Water	Field Sample/N		X		X
5702VP-20-01-25-29	680-183132-5	Water	Field Sample/N		X		X
5702VP-20-01-30-34	680-183132-6	Water	Field Sample/N		X		X
5702VP-20-01-35-39	680-183132-7	Water	Field Sample/N		X		X
5702VP-20-01-40-44	680-183132-8	Water	Field Sample/N		X		X
5702VP-20-01-50-54	680-183132-9	Water	Field Sample/N		X		X
A1-VP-DUP-1-42320	680-183132-3	Water	Field Duplicate/FD		X		X
A1-VP-EB-42320	680-183132-10	Water	Equipment Blank/EB	X		X	

This report assesses the analytical data quality associated with the analyses listed on the preceding cover page at 2B data validation level. This assessment has been made through a combination of automated data review (ADR) and supplemental manual review, the details of which are described below. The approach taken in the review of this data set is consistent with the requirements contained in the Quality Assurance Project Plan, Long Term Monitoring Program, Former Fort Devens, 2018 and the additional guidance documents incorporated by reference to the extent possible. Where definitive guidance is not provided, results have been evaluated in a conservative manner using professional judgment.

Sample collection was managed and directed by KOMAN Government Services, LLC; analyses were performed by TestAmerica Laboratories, Inc., Savannah, GA and were reported under sample delivery group (SDG) 6801831321. Data have been evaluated electronically based on electronic data deliverables (EDDs) provided by the laboratory, and hard copy data summary forms have also been reviewed during this effort and compared to the automated review output by the reviewers whose signatures appear on the following page. Findings based on the automated data submission and manual data verification processes are detailed in the ADR narrative and throughout this report.

All quality control (QC) elements associated with this SDG have been reviewed by a project chemist in accordance with the requirements defined for the project. This review is documented in the attached Data Review Checklists. The QC elements listed below were supported by the electronic deliverable and were evaluated using ADR processes.

- Blank - Negative
- Calibration Blank
- Calibration Blank - Negative
- Continuing Calibration Verification
- Equipment Blank
- Field Duplicate RPD
- Interference Check Sample A
- Interference Check Sample A - Negative
- Interference Check Sample AB
- Lab Blank
- LCS Recovery
- MS Recovery
- MS RPD
- Prep Hold Time
- Test Hold Time

Results of the ADR process were subsequently reviewed and updated as applicable by the data review chemists identified on the signature page. Quality control elements that were not included in the electronic deliverable were reviewed manually and findings are documented within this report. Summaries of findings and associated qualified results are documented throughout this report.

A total of 6 results (20.00%) out of the 30 results (sample and field QC samples) reported are qualified based on review and 0 results (0.00%) have been rejected or deemed a serious deficiency. Trace values, defined as results that are qualified as estimated because they fall between the detection limit and the reporting limit/limit of quantitation, are not counted as qualified results in the above count. The qualified results are detailed throughout this report and discussed in the narrative below, where appropriate.

Narrative Comments

This SDG contains 8 Area 57 vertical profile samples, 1 FD sample collected and submitted for dissolved As, Fe and Mn. One EB samples was also collected and submitted for total As, Fe, and Mn.

Analytical Method	Data Reviewer Comment
SW6010C	No additional comments; see Checklist for detail.
SW6020A	No additional comments; see Checklist for detail.

May 08, 2020

Reviewed by Laurie Ekes, Senior Project Chemist, Koman Government Solutions, LLC

As the First Reviewer, I certify that I have performed a data review process in accordance with the requirements of the project guidance document, and have compared the electronic data to the laboratory's hard copy report and have verified the consistency of a minimum of 10% of the reported sample results and method quality control data between the two deliverables.

May 12, 2020

Reviewed by Sherri Pullar, Senior Scientist, Koman Government Solutions, LLC

As the Second Reviewer, I certify that I have performed a quality assurance review of the report generated by the First Reviewer.

Quality Control Outliers for test method SW6010C, Dissolved, Calibration Blank

The purpose of calibration blanks is to determine the existence and magnitude of cross-contamination problems resulting from laboratory activities. Reported results were evaluated to determine compliance with the required acceptance criteria. Summary forms were evaluated and compared to electronic data deliverables. Findings of this review, and contaminants found in calibration blanks are listed below along with any associated qualified results.

Sample ID/ Lab Sample ID	Analyte	Result	Warning Limits	Control Limits	Units	Qualifier	Reason Code	Comment
CCB 680-616949/8 (CB)/ CCB 680-616949/8	Iron	20.20	< 17	< 50	ug/l	U/None	B2	

Where two qualifiers are listed, such as 'J/UJ', the first applies to positive results, and the second to non-detect results.
Upper and Lower Warning and Control Limits are abbreviated UWL, LWL, UCL, and LCL in the Comment field.

Qualified Results associated with the Calibration Blank for SW6010C, Dissolved

FieldSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
A1-VP-EB-42320	EB	Iron	50.0	27.0 J	50.0 U		ug/l	B2

Analytes not found in project samples are reported as not detected at the limit of detection (LOD).
In instances where no LOD is provided, results are reported down to the LOQ.

Quality Control Outliers for test method SW6010C, Dissolved, Field Duplicate RPD

Field duplicate analyses are performed in order to assess sample collection/laboratory precision for each sample matrix. Summary forms were evaluated and compared to electronic data deliverables. Field duplicate results that were outside of the acceptance criteria are listed below.

Sample ID/ Lab Sample ID	Analyte	Result	Warning Limits	Control Limits	Units	Qualifier	Reason Code	Comment
5702VP-20-01-15-19 (N)/ 680-183132-3	Iron	44.44	< 30	< 30	rpd	J/None	D3	

Where two qualifiers are listed, such as 'J/UJ', the first applies to positive results, and the second to non-detect results.
Upper and Lower Warning and Control Limits are abbreviated UWL, LWL, UCL, and LCL in the Comment field.

Qualified Results associated with the Field Duplicate RPD for SW6010C, Dissolved

FieldSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
5702VP-20-01-15-19	N	Iron	50.0	2200	2200 J		ug/l	D3
A1-VP-DUP-1-42320	FD	Iron	50.0	1400	1400 J		ug/l	D3

Analytes not found in project samples are reported as not detected at the limit of detection (LOD).
In instances where no LOD is provided, results are reported down to the LOQ.

Quality Control Outliers for test method SW6010C, Dissolved, Lab Blank

The purpose of laboratory blanks is to determine the existence and magnitude of cross-contamination problems resulting from laboratory activities. Reported results were evaluated to determine compliance with the required acceptance criteria. Summary forms were evaluated and compared to electronic data deliverables. Findings of this review, and contaminants found in laboratory blanks are listed below along with any associated qualified results.

Sample ID/ Lab Sample ID	Analyte	Result	Warning Limits	Control Limits	Units	Qualifier	Reason Code	Comment
MB 680-616624/1-A (LB)/ MB 680-616624/1-A	Iron	22.70	< 17	< 50	ug/l	U/None	L	

Where two qualifiers are listed, such as 'J/UJ', the first applies to positive results, and the second to non-detect results.
Upper and Lower Warning and Control Limits are abbreviated UWL, LWL, UCL, and LCL in the Comment field.

No results associated with this QC element required qualification.

Quality Control Outliers for test method SW6010C, Dissolved, MS Recovery

Data for matrix spikes/matrix spike duplicates (MS/MSD) are generated to determine long-term precision and accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. These data alone cannot be used to evaluate the precision and accuracy of individual samples. However, when exercising professional judgment, MS/MSD data can be used in conjunction with other available QC information. Reported results were evaluated to determine compliance with the required acceptance criteria, and summary forms were evaluated and compared to electronic data deliverables. Findings of this review, and any associated qualified results, are listed below.

Sample ID/ Lab Sample ID	Analyte	Result	Warning Limits	Control Limits	Units	Qualifier	Reason Code	Comment
5702VP-20-01-10-14 (SD)/ 680-183132-1	Manganese	116.3	90 - 114	10 - 125	percent	J/None	M	

Where two qualifiers are listed, such as 'J/UJ', the first applies to positive results, and the second to non-detect results.
Upper and Lower Warning and Control Limits are abbreviated UWL, LWL, UCL, and LCL in the Comment field.

Qualified Results associated with the MS Recovery for SW6010C, Dissolved

FieldSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
5702VP-20-01-10-14	N	Manganese	10.0	240 J1	240 J	+	ug/l	M

Analytes not found in project samples are reported as not detected at the limit of detection (LOD).
In instances where no LOD is provided, results are reported down to the LOQ.

Quality Control Outliers for test method SW6010C, Total, Equipment Blank

The purpose of equipment blanks is to determine the existence and magnitude of cross-contamination problems resulting from the process during sampling. Reported results were evaluated to determine compliance with the required acceptance criteria. Summary forms were evaluated and compared to electronic data deliverables. Findings of this review, and contaminants found in equipment blanks are listed below along with any associated qualified results.

Sample ID/ Lab Sample ID	Analyte	Result	Warning Limits	Control Limits	Units	Qualifier	Reason Code	Comment
A1-VP-EB-42320 (EB)/ 680-183132-10	Manganese	1.800	< 1	< 10	ug/l	U/None	V	
A1-VP-EB-42320 (EB)/ 680-183132-10	Iron	27.00	< 17	< 50	ug/l	U/None	V	

Where two qualifiers are listed, such as 'J/UJ', the first applies to positive results, and the second to non-detect results.
Upper and Lower Warning and Control Limits are abbreviated UWL, LWL, UCL, and LCL in the Comment field.

No results associated with this QC element required qualification.

Table of All Qualified Results

Test Method: SW6010C	**Extraction Method: , Dissolved**							
FieldSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
5702VP-20-01-10-14	N	Manganese	10.0	240 J1	240 J	+	ug/l	M
5702VP-20-01-15-19	N	Iron	50.0	2200	2200 J		ug/l	D3
A1-VP-DUP-1-42320	FD	Iron	50.0	1400	1400 J		ug/l	D3

Test Method: SW6010C	**Extraction Method: , Dissolved**							
FieldSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
A1-VP-EB-42320	EB	Iron	50.0	27.0 J	50.0 U		ug/l	B2

Analytes not found in project samples are reported as not detected at the limit of detection (LOD).
In instances where no LOD is provided, results are reported down to the LOQ.
Trace values are not included in the qualified results table unless additional reason codes are associated.

Table of Results with Modified Qualifiers

Modified Qualifiers for test method SW6010C, Dissolved

FieldSample ID	Type	Analyte	LOQ	Lab Result	ADR Result	Modified Result	Reason
5702VP-20-01-10-14	N	Iron	50.0	110	110 J	110	
5702VP-20-01-40-44	N	Iron	50.0	110	110 J	110	

Modified Qualifiers for test method SW6020A, Dissolved

FieldSample ID	Type	Analyte	LOQ	Lab Result	ADR Result	Modified Result	Reason
5702VP-20-01-15-19	N	Arsenic	3.00	3.40	3.40	3.40 J	D3
A1-VP-DUP-1-42320	FD	Arsenic	3.00	1.80 J	1.80 J	1.80 J	TR/D3

Analytes not found in project samples are reported as not detected at the limit of detection (LOD).
In instances where no LOD is provided, results are reported down to the LOQ.
Trace values are not included in the qualified results table unless additional reason codes are associated.

Reason Code Definitions

Code	Definition
B2	CCB
D3	Field Duplicate RPD
L	Lab Blank
M	MS Recovery
TR	Trace Level Detect
V	Equipment Blank

Flag Code and Definitions

Flag	Definition
U	Undetected: The analyte was analyzed for, but not detected.
UJ	The analyte was not detected; however, the result is estimated due to discrepancies in meeting certain analyte-specific quality control criteria.
J	Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.
R	The data are rejected due to deficiencies in meeting QC criteria and may not be used for decision making.
B	Blank contamination: The analyte was found in an associated blank above one half the RL, as well as in the sample.
UB	The analyte was also detected in an associated laboratory or field blank at a concentration comparable to the concentration in the sample. The reported result has been requalified as not detected.
X	The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and to meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided. Acceptance or rejection of the data should be decided by the project team (which should include a project chemist), but exclusion of the data is recommended.

Review Questions

Method: SW6010C (Trace Metals by Inductively Coupled Plasma/Atomic Emission Spectrometry)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?		•		See outlier report. Fe was reported in the CCB.
Were field blanks (EBs or FBs) submitted with these samples?	•			Sample-10 was an EB sample.
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			LCS only
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?			•	
Was a MS/MSD pair prepared with each batch?	•			Sample -1 was spiked and analyzed as MS/MSD.
Were MS/MSD recoveries within project acceptance limits?		•		See outlier report.
Was the MS/MSD RPD within project acceptance limits?	•			
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?		•		Samples -2/-3 were FD samples. The RPD for the FD sample pair was above 30% for iron; this discrepancy is likely due to the nature of the VP samples which contain particulate matter!
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

Review Questions

Method: SW6020A (Trace Metals by Inductively Coupled Plasma/Mass Spectrometry)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?		•		
Were field blanks (EBs or FBs) submitted with these samples?	•			Sample -10 was an EB sample.
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			LCS only
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?			•	
Was a MS/MSD pair prepared with each batch?	•			Sample -1 was spiked and analyzed as MS/MSD.
Were MS/MSD recoveries within project acceptance limits?	•			
Was the MS/MSD RPD within project acceptance limits?	•			
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?		•		Samples -2/-3 were FD samples. See FD report. The RPD between the native and the FD sample was 61%; As results were qualified as estimated (J). As noted for the 6010 discrepancy, sample results are likely affected by the sample matrix.
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

Field Duplicate Report By SDG
Long Term Monitoring
KOMAN, Long Term Monitoring, AOC 57 Vertical Profile Metals-Spring 2020
Field Duplicates for SDG: 6801831321

Location	Analysis
5702VP-20-01	SW6010C

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
5702VP-20-01-15-19 / A1-VP-DUP-1-42320	680-183132-2 / 680-183132-3	Iron (FLDFLT)	2200	1400	50.0	44.4	30	Out	NA
5702VP-20-01-15-19 / A1-VP-DUP-1-42320	680-183132-2 / 680-183132-3	Manganese (FLDFLT)	680	550	10.0	21.1	30	OK	NA

Location	Analysis
5702VP-20-01	SW6020A

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
5702VP-20-01-15-19 / A1-VP-DUP-1-42320	680-183132-2 / 680-183132-3	Arsenic (FLDFLT)	3.40	1.80	3.00	61.5	30	NA	OK

FD = Field Duplicate
RL = Reporting Limit
RPD = Relative Percent Difference

RL Check = If either the primary sample or field duplicate result is less than 5 times the RL then the criteria used to determine if the field duplicate is outside QC limits is +/- RL for Water and +/- 2 times RL for Soil"

APPENDIX H
RESPONSES TO COMMENTS

U.S. ARMY RESPONSES TO U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA) COMMENTS ON THE DRAFT 2019 ANNUAL OPERATIONS, MAINTENANCE, AND MONITORING REPORT, MAIN POST FORMER FORT DEVENS ARMY INSTALLATION, DEVENS, MASSACHUSETTS

The following U.S. Army responses pertain to the U.S. Environmental Protection Agency (EPA) comments, dated 30 September 2020, on the Draft *2019 Annual Operations, Maintenance, and Monitoring Report, Main Post, Former Fort Devens Army Installation*, dated May 2020.

GENERAL COMMENTS

Comment 1 – The following comments are offered with regards to the above-referenced document and reflect discussions related to the 2018 Annual Report (AR), Supplemental Sampling Plan (SSP) for AOCs 57 and 43G (amended December 16, 2019), and PFAS Field Sampling Plan (FSP) Addendum (July 2019). As you may recall, although EPA had identified several unresolved issues in Army's June 12, 2020 response to comments on the draft final 2018 AR, EPA agreed to Army's issuance of the final document, with the remaining issues to addressed in the 2019 AR and 2020 Devens Five-Year Review (FYR) Report.

Response: Comment noted.

Comment 2 – In comments on previous ARs, EPA requested that Zone II Wellhead Protection Areas be shown on certain figures to correspond with discussions in the text. In the 2019 Annual Report, Figure 1-1 shows the public well or wells for which each of the Zone IIs is drawn but not the Zone IIs themselves. Please restore the Zone II areas to Figure 1-1 in the 2019 AR. Because Zone IIs are wellhead protection areas for public wells and represent areas from which contaminants might be drawn to a public drinking water well, extra scrutiny should be given to contaminant concentrations, groundwater flow directions, and potential contaminant transport to a public well. At present, it appears that contaminated groundwater occurs within a Zone II at Area 3 of AOC 57, AOC 69W, and just outside the edge of a Zone II at AOC 32. Site-specific data are especially important where there is a particularly sensitive receptor such as a public well. (See Page-Specific Comment (PSC) 7.)

Response: Comment noted. Zone II delineations were added to Figure 1-1.

Comment 3 – As discussed in comments on the 2018 AR and elsewhere, Army implemented the 2015 LTMMP update without EPA concurrence. (See PSCs 1, 2, and 17.) It is important that the next LTMMP be developed with consensus of the Devens BRAC Cleanup Team (BCT) and that Army obtain EPA concurrence, in accordance with the Devens Federal Facility Agreement (FFA) before finalizing and implementing the LTMMP. The LTMMP should be updated prior to commencement of the Spring 2021 sampling event to address comments on the 2018 and 2019 ARs and 2020 FYR.

Response: The Army addressed EPA comments (and rebuttal comments) on the 2015 Draft Final LTMMP for over one year and then finalized the LTMMP in accordance with the FFA. A future (updated) LTMMP will be prepared in accordance with the FFA document review and finalization requirements. In addition, the Army will not implement any changes to the updated LTMMP until a formal EPA concurrence letter is received on the final submittal.

Comment 4 – In recent comments on the above-referenced documents (for example, PSC 1 on the 2018 AR), EPA pointed out the need to expand monitoring networks at AOC 57 and AOC 43G to obtain site-specific information to assure that contamination is not migrating off-site. This is especially important for AOC 57, Area 3, considering its location within Zone II for a public drinking water well.

For AOC 57, comments on the 2018 AR identified four monitoring plan elements that are needed:

a. New wells or piezometers screened deeper in the aquifer are needed to determine if there are site-related contaminants at depth and to determine deeper groundwater flow direction;

b. New wells are needed to determine the down-gradient limit of certain contaminant occurrences;

c. New data are needed to establish the limits of reducing (low ORP) groundwater conditions; and

d. New wells or piezometers on the far side of Cold Spring Brook and other investigations are needed to determine whether the Brook is hydraulically connected to the aquifer and to determine groundwater flow and contaminant transport paths. Army agreed (3/26/20) to install monitoring wells on the far (southeast) side of Cold Spring Brook in 2020 but this work has yet to be performed (See PSC 8 and "SS" comments on the Supplemental Sampling Report (Appendix G) below.)

For AOC 43G, sampling was performed of wells listed in the 2015 LTMMP during the October sampling round. New piezometers have been installed but were not sampled until February 2020; results are presented in Appendix G (see Comment SS19 below). Future sampling of existing wells and new piezometers will be a required component of the new LTMMP. (See PSC 17).

Response: Army will prepare a work plan for AOC 57 and a work plan for AOC 43G to address EPA recommendations. Based on these additional investigations, historical site data and updated CSMs, Army will prepare focused feasibility studies to evaluate changes to the remedies and any applicable ROD amendments.

Comment 5 - Depending on the location, depth, and type (overburden vs. bedrock) of the irrigation well at 78 Barnum Road, pumping could potentially alter groundwater flow at AOC 57. EPA had requested in comments on the 2018 AR (PSC 16) that additional information on the irrigation well be collected (i.e. pumping volume and frequency) and included in the 2019 AR. Please include this information in the draft final 2019 AR.

Response: The property manager was contacted and indicated there is no flow meter present to measure volume of water usage for the irrigation system. The irrigation well is used daily for lawn care from spring to fall. The well was added on Figure 2-1. Under Section 2.1, prior to the last paragraph, the following new paragraph was inserted:

"There is an irrigation well located on the adjacent property of 78 Barnum Road (Figure 2-1). The well is 505 feet deep and is believed to be an open borehole bedrock well. The property manager has indicated the well is used for lawn care for the property from spring to fall and there is no flow meter to record the daily flow rate or volume of water used."

Comment 6 - At the Devens Consolidation Landfill (DCL), EPA noted in the past that both the April and October 2018 water elevations for overburden well LFM-99-6A-RP, when projected into the cross sections, occur above the bedrock water levels (blue line on cross sections) and only a few feet below the base of the landfill. EPA has advocated in the past for use of overburden wells instead of bedrock wells as water-level triggers for more monitoring because the potentiometric surface shown in blue on the profiles does not indicate, directly, whether saturated overburden is in contact with the base of the landfill. However, Army has maintained that overburden in some portions of the site is unsaturated, making replacement of the current bedrock trigger wells by overburden wells infeasible. EPA, once again,

strongly recommends that overburden well LFM-99-6A-RP be added as a trigger well, while also retaining the existing bedrock wells as trigger wells.

Response: Overburden well LFM-99-6A-RP is sampled during each event. As explained in the draft report "If the depth to water was less than the "trigger" depth (viz., higher water table elevation), there is a potential that groundwater may have come into contact with the landfill triggering the requirement to sample these locations along with the LTM wells." The action taken after the "trigger" criteria is met is to sample the well, but because LFM-99-6A-RP is sampled during each event, a "trigger" criterion for LFM-99-6A-RP is not necessary.

Comment 7 - All figures showing brooks, especially where impacted groundwater flows toward the brook and/or where the AOC is within a Zone II for a public well, should include arrows showing the direction of brook flow.

Response: Comment noted. Figures were revised to include surface water directional flow arrows to brooks within a Zone II area.

PAGE-SPECIFIC COMMENTS

Comment 1 – Page 1, § 1.1, last ¶ before bullets – Relative to the 2015 LTMMP, Army references "2019 revisions incorporated." To EPA's knowledge, there have been no formal "revisions" to the 2015 LTMMP. Please explain. The "2019 revisions" should be discussed in the context of the 2021 LTMMP update/revision (see EPA comments on the draft 2020 FYR).

Response: The sentence was revised to:

"Sampling at AOC 57, AOC 69W, AOC 43G, AOCs 32/43A, and the DCL in 2019 was conducted per the LTMMP (Sovereign/HGL, 2015) as follows:"

Comment 2 – Figures 2-4 – What is the significance of the four sumps shown in this figure? Please discuss in the text. Also, what is the condition of the containment dam? Is it believed to impede the flow of either groundwater or surface water?

Response: As part of remedial activities conducted in 2002, the sumps were installed to aid in observing the petroleum product sheen on the groundwater surface. In 2003, the product recovery system was operating in some of sumps. The sumps were sampled on a semiannual basis until the 2008 LTMMP eliminated sampling of the sumps. The sumps were visually inspected for petroleum sheen as part of LTM activities after 2008.

The following text was added after the second sentence of the fifth paragraph of Section 2.1:

"As part of excavation and product removal activities in Area 2, four sumps were installed to aid in observing the petroleum product sheen on the groundwater surface."

Additional details on the excavations and product recovery activities are detailed in the *Removal Action Completion Report Area of Contamination 57* (Conti, 2004).

The containment dam was constructed in 1977 to aid in the product recovery efforts of the fuel spill where fuel was discharged through the Area 1 outfall. The contaminant dam is intact. The contaminant dam is not believed to impede groundwater flow. The contaminant dam extends into the wetland on the west side of Cold Spring Brook. The main channel of Cold Spring Brook flows to the south of the dam. The impacts of the dam on surface water flow are minimal. The third and fourth paragraphs of Section 2.1 was revised as follows:

"In September 1992, an investigation was performed to determine the presence or absence of environmental contamination at AOC 57 that may have occurred following a February 1977 fuel oil spill. An estimated 50- to 100-gallon spill of No. 4 fuel was discharged through the Area 1 outfall in 1977. Approximately 3,000 gallons of mixed oil and water were recovered through the use of a contaminant dike (Figure 2-2) and absorbent booms in 1977, and approximately 25 cy of petroleum contaminated soil were removed in 1997. The investigation revealed the presence of groundwater, soil, and sediment contaminated with oil, VOCs, SVOCs, pesticides, metals, and PCBs.

Based on the results of the investigation, the Army proposed that a limited soil removal action be conducted at Area 2. The removal action began at Area 2 in August 1994 and continued until September 1994, when it was discovered that contamination extended beyond the limits originally estimated. Approximately 1,300 cubic yards of soil were removed and the site was transferred to the remedial investigation (RI)/feasibility study (FS) process. During spring 1999, a soil removal action focusing on PCBs and EPH in soil was performed at Area 3 based on data obtained from the RI and a total of 1,860 cubic yards of soil was removed from Area 3."

Comment 3 – Page 7, § 2.1 – Please include a brief discussion of the large area of buried drum carcasses and spent containers discovered during EPA's temperature profiling work along Cold Spring Brook on March 18, 2019. As discussed during the next (March 25, 2019) BCT meeting, the buried wastes were discovered essentially between Areas 2 and 3 in an area estimated to be at least 200 feet X 30 feet X 6 feet. Please provide details regarding the investigation, removal and subsequent characterization of potentially impacted soils and include a corresponding figure, data summary table and laboratory data package in Section 8.0.

Response: The following paragraph was added to Section 2.1:

"In March 2019, multiple debris areas were identified at AOC 57 between Areas 2 and 3, southeast of the walking path located behind 112 Barnum Road. The observable debris areas were a total of approximately 650 feet by 60 feet (Figure 2-1). The debris areas are characterized mostly as rusted vehicle parts (metal debris, tires, and bumpers) and other smaller piles of rusted scrap metal (empty drums and containers). The majority of drums observed were partially buried. The former contents of many of the drums and containers is unknown; however, some of the drum labels are legible enough to identify the bulk contents, with some labeled as "antifreeze and gasoline. Large concrete slabs were also found. The Army will address the buried waste in a work plan that is under review and will be available for BCT review in December 2020."

Comment 4 – Page 11, § 2.7 - Prior to any proposed construction, Nypro would need to obtain approval from MassDevelopment. If the proposed lies within or encroaches upon property within the AOC 57 LUC boundaries, MassDevelopment must obtain approval from the Devens BCT prior to commencement of any construction-related and/or intrusive soil activities.

Response: The following text was added as the penultimate sentence of the last paragraph of Section 2.7.1:

"*If the proposed construction lies within or encroaches upon property within the AOC 57 LUC boundaries, MassDevelopment must obtain approval from the Devens BCT prior to commencement of any construction-related and/or intrusive soil activities."*

Comment 5 – Page 11, § 2.8, 1st ¶, last sentence - Words are missing or the sentence needs to be re-written.

Response: Comment noted. The last sentence in this paragraph was revised to:

"With the LUCs in place, AOC 57 does not pose an exposure risk to current site users and is not expected to pose a risk to human health in the future."

Comment 6 – Page 11, § 2.8, ¶ 1 – Army's unilateral decision to eliminate Area 2 from the ROD-specified LTMMP is unacceptable and will undoubtedly delay future decisions regarding remedial action/construction completion for the AOC 57 site. The deficiency (i.e. failure to comply with ROD-specified remedy (Alternative II-3, Excavation (For Possible Future Use), *Groundwater Monitoring, Surface Water Monitoring* and Institutional Controls, March 2004 ESD (which expanded the list of ROD COCs to include EPH C11-C12 aromatics and PCBs) and the Devens FFA) and the activities required to adequately evaluate the protectiveness of the AOC 57 remedy will be discussed (and resolved) as part of the draft Devens 2020 FYR review/concurrence process. In the interim, EPA recommends that Army reinstate sampling at AOC 57 and other CERCLA AOCs where modifications were made to ROD/ESD-required LTMMPs without EPA and BCT approval.

Response: See response to General Comment Nos. 3 and 4 above.

Comment 7 – Page 12, § 2.8, ¶ 3, 1st sentence – This sentence refers to the Conceptual Site Model (CSM), but there is discussion of a CSM for AOC 57 in this report. Please either present the elements of the proposed CSM or provide a reference to another (previously approved) document that includes the CSM.

Response: The first sentence was revised to:

"*The 2019 monitoring results are consistent with the conceptual site model (HGL, 2008).*"

Comment 8 – Page 12, § 2.8, ¶ 4, 2nd sentence – This sentence presents a broad, historical conclusion that is unsupported by information presented in this report. Please provide the necessary supporting documentation/data to support the conclusion, provide references, or narrow the conclusion to reflect information presented in the 2019 AR.

Response: The comment was interpreted to refer to the following sentence from the annual report: "After the removal of the source area in soil, natural attenuation processes have effectively reduced the remaining concentrations of site COCs (tetrachloroethene [PCE], cadmium, 1,4-dichlorobenzene, PCBs, and extractable petroleum hydrocarbon C_{11}-C_{22} aromatic carbon range) to below their respective remediation goals without offsite migration."

As documented in previous annual reports and in previous FYRs, groundwater monitoring results indicated concentrations of PCE, cadmium, 1,4-dichlorobenzene, PCBs, and EPH extractable petroleum hydrocarbon concentrations have decreased below the cleanup levels.

Comment 9 – Page 12, § 2.8, ¶ 4, 3rd and 4th sentences – These sentences provide generalizations regarding aquifer reducing conditions and metals concentrations that are unsupported by site-specific data. These data are critical because the site is within a Zone II for a public well and site-specific information is needed to evaluate current and potential human health risks. Also, there are other Fort Devens AOCs (e.g. AOC 69W in the 2018 AR) that have shown poor correlation between reducing conditions and metals concentrations. This indicates that relying on general rules is not always appropriate when a critical receptor such as a public drinking water well is present. As stated above and on numerous occasions, site-

specific data must be collected to support Army's hypotheses. Please refer to EPA's comments on the draft Devens 2020 FYR for a detailed description of ongoing deficiencies and the Additional Work required to adequately evaluate current and long-term protectiveness of the AOC 57 remedy.

Response: The referenced text is from the American Petroleum Institute (API), 2011, *Groundwater Arsenic Manual, Attenuation of Naturally-Occurring Arsenic at Petroleum Impacted Sites*, to provide the reader with information on observations from other fuel-contaminated sites.

Site-specific data from 2019 is provided in Section 2.5. Trends of site-specific data are provided in Section 2.6.

Comment 10 – Pages 12–13, § 2.8, last ¶ – This paragraph references supplemental sampling investigations performed in January – March 2020 but refers the reader to Appendix G for these results. A review of these data reveal that they were not considered in the conclusions presented in Section 2.8 and do not address the larger questions surrounding groundwater flow and contaminant transport at AOC 57. (See "SS" comments below.)

Response: The supplemental sampling was performed in addition to the current LTMMP and was performed outside of the reporting period for the 2019 annual report. As noted, Appendix G provides the detailed report of the supplemental sampling results, which was designed to remain separate from the main body of the 2019 annual report.

Comment 11 - Pages 18-19, § 3.6.1 – The draft report indicates that details regarding recent internal HVAC and sidewalk/retaining wall work was discussed with Michelle McKenna, Business Manager at the Francis W. Parker Charter Essential School during a January 21, 2020 interview. Is this the same sidewalk/retaining wall repair work proposed/discussed in Ms. McKenna's March 4, 2020 email to Army, MassDEP and EPA? Did Army review and approve the LSP's HASP and SMP prior to commencement of field activities as required per the existing deed restriction (see March 5, 2020 email from R Simeone)?

LUCs were established in the September 2001 ROD to restrict exposure to the contaminated soil and groundwater under both existing and future site conditions. The controls are intended to prevent residential exposure to any remaining contaminated soils beneath the site and prohibit extraction of groundwater for industrial or potable water supply. The third sentence of Section 3.6 states, "The LUCs ensure that the remaining contaminated soils beneath and adjacent to the building are not excavated." The second paragraph on page 19 (Section 3.6.1) states, "Ms. McKenna indicated that internal HVAC and sidewalk/retaining wall work has been done *in the corner of the building near the ESMA* as planned, but all work did not extend below 2-feet" but there do not appear to be any depth-specific exclusions/restriction in the deed (i.e. "The Grantee, its successors and assigns, shall not excavate soil from areas of the Property identified as the Soil Management Area for any purpose without the prior written approval of the Grantor, the EPA, and the DEP.") Does Army believe that this excavation was fully compliant with the ROD-required LUCs? Were samples of the excavated soils collected and analyzed? What was the fate of excavated soils?

Response: This is the same work as in Ms. McKenna's March 4, 2020 email. The text was revised to indicate the work was planned at the time of the interview.

> *"Ms. McKenna indicated that internal HVAC and sidewalk/retaining wall work is planned in the corner of the building near the ESMA as planned, but all work is not planned to extend below 2-feet."*

There is no evidence the LUCs in the deed restriction were violated. Per the deed restriction, the Parker School indicated an LSP and CIH wrote a soil management and health and safety plan before commencement of the work. Also, per the deed restriction, written approval of the work was obtained by the Parker School from the Army, EPA, and MassDEP prior to commencement of the work. There is no requirement in the ROD or the deed restriction to submit a completion report.

Comment 12 – Page 19, § 3.6.2, ¶ 2 – The second sentence states that, "There were no excavations or penetrations *greater than 2-feet through pavement* within the ESMA observed during 2019." Please explain the relevance (and source) of the reference to "*greater than 2-feet through pavement*." EPA has reviewed the 2001 ROD and "Soil Excavation Restriction" deed language and could not find any reference to the *greater than 2-feet through pavement* language. Please explain. Unless a plausible explanation is provided, this discussion is indicative of a breakdown in IC communication that should be identified and discussed here (and included in the Devens 2020 FYR).

Response: The reference to excavations greater than 2-feet was inadvertently carried forward from the 2000 long-term monitoring plan. Reference to 2 feet excavation depth will be removed from Section 3.6.1 and 3.6.2. The LUCs checklist will be revised to eliminate the references to excavations greater than 2 feet.

Comment 13 – Page 19, § 3.7 – Please confirm that the discussion of long-term monitoring results includes all ROD-specified COCs and monitoring locations identified in the post ROD (pre-2015) LTMMP (i.e. has having detections above ROD-specified cleanup levels).

Response: The ROD did not specify COCs. The ROD indicated that long-term groundwater monitoring will be conducted to verify that elevated arsenic concentrations will continue to decrease over time and not migrate downgradient. The ROD did specify that arsenic and EPH/VPH would be monitored. The ROD did not specify cleanup levels. The first LTM plan (HLA, 2000) did identify specific compounds that would be monitored, specifically contaminants that contributed greater than or equal to a hazard quotient of 1.0 (child and adult resident Reasonable Maximum Exposure) as arsenic, iron, manganese, and VPH. The LTM plan also indicated that VPH and EPH analyses for carbon fraction would be performed to observe the reduction in fuel related compounds over time. The results of all the sampling conducted in 2019 are discussed in Section 3.7 (i.e., arsenic, iron, manganese, EPH). Analysis for VPH has not been conducted at the site since 2013. Results of VPH analyses were below the monitoring criteria from 2009 through 2013.

Unrelated to EPA's comments it was identified that a monitoring criterion of 291 µg/L for manganese (background level) was incorrectly identified for AOC 69W in some areas of the report. The report was revised to indicate the appropriate monitoring criteria of 375 µg/L for manganese at AOC 69W.

Comment 14 – Page 20, § 3.7 – Much of this discussion is inconsistent with statements/findings in the draft 2020 Devens FYR. Specifically, Section 8.4.2 states that "There does not seem to be a significant correlation between ORP and arsenic or manganese." Unless there is site-specific field data available to support Army's theories/predictions, these statements are purely speculative and should be deleted.

Response: The discussions of reducing conditions in the Final 2020 Devens FYR and the 2019 Main Post annual report are congruous. The Final 2020 Devens FYR indicates there is not a significant correlation between ORP and manganese concentrations due to variability in geochemistry. The discussion in Section 3.7 of the 2019 Main Post annual report indicates the geochemistry mentioned in the Final 2020 Devens FYR is related to variability in the presence of metal oxyhydroxides. As noted in the 2019 Main Post annual report, "For specific areas/wells

where elevated metals remain although aquifer conditions have progressed to a more oxidizing state, it is appropriate to note that the re-adsorption of metals by soil particles is controlled by the adsorptive ability of the soil as well as by the oxidizing state of the groundwater."

(**Note:** EPA comment numbering sequence revised for remainder of "Page-Specific Comments" section starting with Comment 15)

Comment 15 – Page 21, § 3.7, last ¶, 2nd sentence – While there may have been "No evidence of increased exposure potential" observed during the December 2019 site inspection or January 2020 site interviews, internal HVAC and sidewalk/retaining wall work performed in March 2020 appears to have violated ROD-specified LUCs. As requested in EPA's comments on the draft Devens 2020 FYR report, Army must develop and implement an improved communication strategy to ensure that the apparent breach in ICs does not occur in the future.

Response: There is no evidence the LUCs in the deed restriction were violated. Per the deed restriction, an LSP and CIH wrote a soil management and health and safety plan before commencement of the work. Also, per the deed restriction, written approval of the work was obtained from the Army, EPA, and MassDEP prior to commencement of the work.

Comment 16 – Page 22, § 4.1, ¶ 2 – Please amend the beginning of the second sentence to read, "The October 1996 ROD selected …."

Response: Comment noted. The second sentence was amended as requested.

Comment 17 – Page 22, § 4.2, ¶ 2 – Please delete the last sentence. While groundwater sampling results and modeling performed in 1999 may have indicated that intrinsic remediation was a viable remedial option for AOC 43G, more recent sampling results and an updated modeling effort will likely produce different results.

Response: The modeling discussed in Section 4.1 Site Background is referencing the work conducted in support of the feasibility study and the ROD and is appropriate site background information.

Comment 18 – Page 22, § 4.2, ¶ 1 – Please confirm that water level measurements were collected from all monitoring locations (wells and piezometers) with COC detections above cleanup goals in the ROD-specified cleanup levels and identified for evaluation in the AOC 43G LTMMP.

Response: The 11 wells listed in Table 3.1 of the 2008 and 2015 LTMMP for AOC 43G were gauged and water level measurements recorded for the 2019 LTM event. Additionally, six piezometers installed in 2019 were gauged as part of the LTM synoptic round and water level measurements recorded.

Comment 19 – Page 22, § 4.2, ¶ 2 – Please explain reference to "interpretative" water-table elevations? Actual water table elevations (i.e., site-specific data) should be collected, evaluated and presented to support field-based conclusions regarding remedy performance. Also, in light of ongoing problems/discrepancies surrounding water level measurements at other CERCLA LTM sites, EPA is recommending that a separate round of water table / levels measurement collection be performed in

conjunction with (or in addition to) fall 2021 and spring 2021 LTM sampling events at all LTM sites, including AOC 43G.

Response: The adjective "interpretive" was removed from Section 4.2, second paragraph and other sections in the report.

Comment 20 – Page 25, § 4.4.3, last sentence – High metals concentrations at source area well AAFES-2 have an unclear relationship to redox conditions in the shallow overburden. Could this be due to poor soil adsorptive characteristics, as discussed in Section 3.7 (see Page-Specific Comment 11)? Interestingly, dissolved oxygen (2.6 mg/L (Table 4-1)) suggested oxidizing conditions, whereas this parameter was significantly lower (0.45 mg/L (2018 AR, Table 4-1)) in 2018. Please continue to track and comment on these relationships.

Response: Variability in geochemistry could be the reason for the unclear relationship between redox conditions and high metals at AAFES-2. Monitoring at the site is planned to continue to track concentrations.

Comment 21 – Page 30, Section 5.3, 2nd paragraph, last sentence – The text references Table 5-4 for results of October 2019 sampling, but there is no Table 5-4; please correct the reference or add the table.

Response: Page 30, Section 5.3, 2nd paragraph, last sentence was revised *from "Table 5-4"* to *"Table 5-1".*

Comment 22 – Page 32, Section 5.4.3, Arsenic paragraph – In the second sentence, re-wording is needed after the semicolon.

Response: The paragraph was revised as follows:

"Arsenic has been periodically detected above the 10 µg/L cleanup goal at AOCs 32 and 43A wells since monitoring began in 2006 (Table 5-2). The current arsenic concentration in well 32M-01-14XOB (29 µg/L) is greater than the cleanup goal, but is well below the historical high of 90 µg/L in 2015. Based on 2019 Mann-Kendall statistical analysis showing p=0.124, there is no statistically significant trend in the arsenic concentration data for 32M-01-14XOB. Arsenic at source well 32M-01-18XBR (3.4 µg/L) was below the cleanup goal in 2019; no statistically significant trend (p=0.374) was identified in the long-term dataset."

Comment 23 – Page 33, Section 5.5 – There appear to be an unusually large number of data quality issues; can steps be taken to reduce these in the future?

Response: The data quality issues (other than the holding time issue) identified in these samples do not adversely affect the sample results. The VPH surrogate recoveries were just below the lower limit of 70%; it is not uncommon to see variations in the surrogate recoveries. The holding time issue was a laboratory fault due to instrument failure. Other outliers were for non-target VOCs and are likely due to instrument variations and sample matrices. Army will continue to coordinate with the laboratory to ensure that data quality objectives are met, and errors are minimized.

Comment 24 – Page 34, Section 5.7, 1st paragraph – The paragraph describes one-time sampling of 32M-01-15XBR and 32M-01-16XBR at EPA's request (Page-Specific Comment 5 on the 2018 AR) in November 2019. Section 5.3 says that the sampling was done in October 2019; please correct (October vs. November) as needed. EPA appreciates Army's sampling these wells and notes the statement in the last sentence that these wells "will not be included in future LTM events." EPA agrees regarding 32M-01-16XBR. However, 32M-01-15XBR was sampled through 2014, with sampling presumably

discontinued based on the 2015 LTMMP, which was never approved. Sampling in this well should only be discontinued by agreement, and EPA will consider Army's proposal to stop monitoring this well if presented in an upcoming LTMMP revision. In the meantime, sampling should continue/resume in this well for 3 reasons. First, it is located only a short distance down-gradient from 32M-01-18XBR, which is still impacted. Second, the well is located in Zone II of a public drinking water well. Third, discontinuation of monitoring was probably never approved. Also, EPA's request (2018 AR Page-Specific Comment 5) to add monitoring for this well specified both 2019 and 2020.

Response: Comment noted. The reference to November 2019 was changed to "October 2019". The last sentence of the first paragraph of Section 5.7 was deleted. The Army will consider EPA's comments on the annual report during development of a revised LTMMP.

Comment 25 – Page 36, Section 6.2 – The text refers to survey results in Appendix A, but EPA cannot find the survey results there. Please add survey results to Appendix A or change the reference if the survey results are located elsewhere.

Response: The survey results were previously reported in the 2018 Main Post Annual Report and the survey report was included in Appendix A of the 2018 Main Post Annual Report. The text referencing the survey report was deleted. Note 2 was deleted from Table 6-2 as well LFM-03-07 was resurveyed.

Comment 26 – Page 36, Section 6.4, 2nd paragraph – When listing the wells gauged, the other overburden well, LFM-99-05A, should also be listed. (Water level is presented for this well on the figures.)

Response: The list of wells gauged is presented in Section 6.3. Section 6.4 was revised to indicate which wells are sampled as part of each event and how if the water level is too shallow at three specific wells it would trigger that well/s to be sampled. Section 6.4 was revised as follows:

"Groundwater at the DCL is sampled semi-annually as part of the spring and fall LTM events. Wells sampled during the spring and fall 2019 LTM events consisted of LFM-99-02B, LFM-99-05A, LFM-99-06ARP, and LFM-03-07. These four wells are sampled during each LTM event.

Water level readings were collected from monitoring wells LFM-99-01B, LFM-99-03B, and LFM-99-05B during the spring and fall LTM events to evaluate if these wells should also be sampled during the LTM event. *The depth to water for each of these wells was evaluated against shallow "trigger" depths listed in Table 6-2. If the depth to water was less than the "trigger" depth (viz., higher water table elevation), there is a potential that groundwater may have come into contact with the landfill triggering the requirement to sample these locations along with the four LTM wells that are sampled during each event. The depth to water/groundwater elevations from the spring and fall 2019 LTM events compared to the trigger depths are summarized in Table 6-2. The water table remained below the trigger values during 2019 and no additional sampling was required. Analytical results for the spring and fall 2019 LTM wells are presented in Table 6-3 and Table 6-4."*

Unrelated to EPA's comments it was identified that the results PCB sampling at DCL was not included in the annual report. The following text was added to Section 6.9.2.

- *"PCBs were non-detect."*

Table 6-4 was revised to include the PCB results.

Comment 27 – Page 37, Section 6.4, 1st full sentence on page – The text states, "… triggering the requirement to sample these locations along with LTM wells." Please specify what is meant by "these locations."

Response: The text in Section 6.4 was revised for clarity. Refer to Page-Specific Comment No. 26 for the revised text.

Comment 28 – Page 40, Section 6.10.1, 2nd paragraph - There appear to be an unusually large number of data quality issues; can steps be taken to reduce these in the future?

Response: See response to Page-Specific Comment No. 23. The identified data quality issues discussed do not adversely affect the reported sample results for target analytes.

Comment 29 – Page 47, Section 7.3, 2nd paragraph – For the 2018 AR, Page-Specific Comment 6 requested dates for finalization of draft Oak and Maple Housing Areas LUCIP, NAUL, and site-specific Soil Management Plan (SMP). According to Section 7.3 in the 2019 AR, finalization still has not occurred. Who needs to take action to finalize these items and when will this occur?

Response: MassDev needs to finalize the NAUL, which is anticipated to occur by the end of 2020.

Comment 30 – Figure 2-1 – Please label the red dashed feature in the northeast and add a flow arrow to Cold Spring Brook.

Response: Figure 2-1 was revised as requested.

Comment 31 – Figure 3-1 – Please add a flow arrow to Willow Brook.

Response: Figure 3-1 was revised as requested.

APPENDIX G
SUPPLEMENTAL SAMPLING
AOC 43G AND AOC 57

GENERAL COMMENT

Comment 1 – Army conducted supplemental sampling at AOC 43G and AOC 57 in February – April 2020 in support of the 2020 Five Year Review (FYR) and in accordance with an Amended Supplemental Sampling Plan (cited as KGS, 2020). EPA also understands that this work was coordinated with ongoing PFAS investigation and sampling. The work reported adds to understanding of groundwater flow and contaminant transport at the two AOCs and satisfies some of the additional requirements that EPA has communicated in comments on recent annual reports, sampling plans, and related documents. However, for AOC 57, some required investigations remain to be completed. (See General Comment (GC) 3, above, and Page-Specific Comments (PSC) 3, 5, 6, 7, 9, and 10, below.).

Response: Comment noted.

PAGE-SPECIFIC COMMENTS

Comment 1 - Page ES-1, ¶ 2nd (AOC 57) - Army indicates that elevated metals concentrations in site groundwater are due to reducing conditions resulting from former degradation of site COCs. Please identify these COCs and provide a reference for the annual report in which degradation of these COCs was confirmed.

Response: The AOC 57 supplemental work was focused on concentrations of COCs that were observed at concentrations greater than the cleanup levels (i.e., arsenic). Previous annual reports and five-year reviews provide discussions as COC concentrations have decreased over time.

The second sentence of the second paragraph under AOC 57 was revised as follows:

"Most of the contaminant of concern (COC) concentrations in groundwater have attenuated since the source area removal. Only arsenic remains above the cleanup goals in a limited number of wells at the site."

Subsequent text in the second paragraph under AOC 57 was revised as follows to indicate iron and manganese were also analyzed even though they are not COCs:

"Therefore, the supplemental sampling event was performed (1) to verify that metal concentrations (arsenic, iron, manganese) are decreasing or stable and/or are attenuating over time per the CSM, (2) to further delineate the extent of elevated metal concentrations in shallow and deep groundwater, (3) to confirm that shallow groundwater discharges to Cold Spring Brook, and (4) to describe the flow pattern of deep groundwater toward Cold Spring Brook."

Comment 2 – Page ES-1, ¶ 2 (AOC 57) - Army states that shallow groundwater discharges to Cold Spring Brook, but this has yet to be confirmed (with site-specific data). Flow data show that shallow groundwater flows toward Cold Spring Brook, but flow towards the brook does not necessarily mean that the groundwater discharges to the brook. The brook could be perched on low permeability deposits that provide partial or total hydraulic isolation from the aquifer beneath. Water level observations from a pair of nested piezometers at the brook bank and/or hand borings into the brook bed to determine whether the brook is underlain by permeable or low-permeability deposits would indicate whether shallow groundwater discharges to Cold Spring Brook.

Response: See response to General Comment No. 4 above.

Comment 3 – Page ES-1, ¶ 2 (AOC 57) - EPA acknowledges that water levels measured in couplets and triplets in Areas 2 and 3 are consistent with shallow groundwater discharging to the brook but not conclusive, for three reasons. First, only one data set has been obtained so far; vertical gradients might reverse at other times of the year or under different weather conditions. Second, the calculated vertical gradients are so small as to be nearly zero and may or may not drive vertical flow. Third, the couplets and triplets in question are located at the edge of the wetland, not the edge of the brook. Groundwater may discharge to the wetland and not to the brook. Please continue the water level measurements and vertical gradient calculations. Site-specific data from piezometer couplets and borings are needed at the brook bank to confirm/deny Army's statements regarding groundwater discharges to the Brook.

Response: See response General Comment No. 4 above.

Comment 4 – Page ES-2, last full ¶ - Army refers to an upcoming LTMMP update; EPA recently identified issuance of amended LTMMP as Additional Work required to address deficiencies in the 2020 Devens FYR. (See GC 2 (above) on the Main Post 2019 AR).

Response: See response General Comment No. 4 above.

Comment 5 – Page ES-3, Area 3 bullet, 4th sentence - The conclusion that an upward vertical gradient indicates that deep groundwater beneath AOC 57, Area 3 discharges to Cold Spring Brook is premature at best. The most that can be said is that the vertical gradient (observed once) does not disprove deep groundwater discharge to the brook. More measurements at the existing couplet and triplet locations are needed to determine whether upward gradients persist with changing seasons and weather conditions. Measurements are still needed closer to the brook and on the far side of the brook; data gathered to date do not rule out the possibility that groundwater flows beneath the brook

Response: See response to General Comment No. 4 above.

Comment 6- Page 1, Section 1, 3rd ¶, last sentence - EPA agrees with the statement that the December 16, 2019 sampling plan amendment provided additional proposed sampling to address EPA's request for more information on AOC 57. EPA notes that discussions (comments and responses) continued during and beyond the sampling period and that on March 26, 2020, Army stated, in response to EPA Comment 2, "It is anticipated that the work for the east side of Cold Spring Brook will be planned and executed in 2020." The results obtained in February – April 2020 represent good steps forward but do not remove the need for work on the far side of the brook. When in 2020 does Army plan to do the work? Please provide EPA with an informal submittal as to the details for this work (i.e. proposed boring, piezometer, and well locations) in time for discussion prior to mobilization.

Response: See response to General Comment No. 4 above.

Comment 7 - Figures with Unjustified Contours – Please amend these figures, as requested, and resubmit with the draft final AR:

- **Figure 2-4** - This contour map of shallow groundwater for AOC 57, Area 2 shows a 218-foot contour in the southeast that is not supported by any data points. If there is a water level measurement(s) to justify this contour line, expand the figure to show the data point(s). If this figure is an inset to a larger figure on which that contour line is shown, the larger figure should be referenced. More importantly, as shown, the potentiometric surface contours suggest that shallow groundwater flows southeastward across (beneath) Cold Spring Brook, contrary to the

interpretation in the text. EPA assumes that the contour line was included unintentionally (though possibly correct); if a mistake, please remove it from the figure;

Response: The 218-foot contour line across the far side of Cold Spring Brook from AOC 57, Area 2 was removed.

- **Figure 2-4** - The 222 contour is beyond the last data point shown and should be dashed or omitted;

  Response: The 222-foot contour line was dashed to represent an inferred shallow groundwater contour. The horizontal gradient was recalculated. The third paragraph of Section 2.2 Groundwater Hydrology on page 6 will be revised as follows:

  "Horizontal groundwater gradients for the shallow and deep groundwater in Area 2, using the flow lines shown in Figure 2-4 and Figure 2-5, were calculated to be 0.011 feet per foot (ft/ft) (Gradient Line A-A', Figure 2-4) and 0.0056 ft/ft (Gradient Line A-A', Figure 2-5), respectively."

- **Figure 2-5** - The three northwesternmost contours are not justified by any data shown. The data should be added (expand the figure if necessary) or the contours should be removed. The 221.5 contour is beyond the last data point and should be dashed. The horizontal gradient calculation is not reliable, as it is based on questionable contours;

  Response: The three northwesterly most contours were removed, and the 221.5-foot contour line was dashed to represent an inferred deep groundwater contour. The horizontal gradient was recalculated. The applicable revised text is shown in the previous response to Figure 2-4.

  Unrelated to EPA's comments it was identified that some screen depths and elevations were incorrect in Tables 1-2 and 2-1. The tables were corrected. The corrections had minor changes on the values of the gradients but the directions of the gradients did not change. No changes to the text with respect to the vertical gradients needed to be revised. The following text was added to the Section 1.1.5, which was retitled "Monitoring Well Network Inspection and Survey"

  "The new and existing monitoring wells and piezometers at AOC 57 were surveyed in March 2020. The new monitoring wells and piezometers at AOC 43G were surveyed."

- **Figure 2-6** - The 224 contour is based on no data and should be removed. The 223 contour is beyond the last data point and should be dashed or omitted. The horizontal gradient calculation is thus unreliable;

  Response: The 224-foot contour line was removed, and the 223-foot contour line was dashed to represent an inferred shallow groundwater contour. The horizontal gradient calculation was recalculated. The fourth paragraph of Section 2.2 Groundwater Hydrology on page 6 will be revised as follows:

  "Horizontal groundwater gradients for the shallow and deep groundwater in Area 3, using the flow lines shown in Figure 2-6 and Figure 2-7, were calculated to be 0.027

ft/ft (Gradient Line A-A', Figure 2-6) and 0.0127 ft/ft (Gradient Line A-A', Figure 2-7), respectively".

- **Figure 2-7** - The 221.5 contour is not based on any data shown but is presumably extended northeastward from Area 2 (Figure 2-5); it should be dashed or omitted; and,

  Response: The 221.5-foot contour line was removed from Figure 2-7.

- **Figure 3-2** - The 244 contour in the northeast is not justified by data.

  Response: The 244-foot contour line was removed.

Comment 8 – Page 6, Section 2.2, top of page - The list of wells that were gauged shows several wells in AOC 74. Please show these on the groundwater contour map figures.

Response: A new figure (Figure 2-8 Shallow Water Table Elevation, Area of Contamination 57 – Area 2 and Area 3, March 2020) was added that includes the piezometers at AOC 74. The following text will be added to Section 2.2:

"Shallow groundwater elevations for AOC 57 Area 2 and AOC 57 Area 3 and northeast of AOC 57 Area 3 are shown on Figure 2-8."

Comment 9 – Pages 6-7, Section 2.2 - The paragraphs at the bottom of page 6 and the top of page 7 discuss vertical gradient calculations at well pairs and triplet in AOC 57, Areas 2 and 3 and refer to the actual results in Table 2-1. The new wells and piezometers are excellent additions, and the vertical gradient calculations are good additions to the understanding of the site. However, the conclusions that "deep groundwater at Area 2 moves upward toward Cold Spring Brook" and that "deep groundwater at Area 3 moves upward toward Cold Spring Brook" are not currently justified by data, though they may be shown to be true; additional measurements at existing couplets and triplets will be necessary as will measurements at new monitoring points closer to, and on the far side of, Cold Spring Brook. These will be needed to support or refute the above conclusions.

Table 2-1 shows all vertical gradients as less than 0.01 ft/ft downward or less than 0.04 ft/ft upward. Such low gradients may well reverse at different times of the year or under different weather conditions. Even if the upward gradients consistently drive upward flow at the site, Army has shown that deep groundwater could discharge into the wetland, but it is still unknown if deep groundwater discharges into the brook. Deep groundwater flow beneath Cold Spring Brook or off site in some other direction has not yet been ruled out. Promised investigations on the far side of Cold Spring Brook are still needed.

Response: See response to General Comment No. 4 above.

Comment 10 – Pages 7-9, Sections 2.4.1 and 2.4.2 - Shallow downgradient well 57M-96-11X had exceedances for arsenic, iron, and manganese, but most of the vertical profile samples in downgradient locations for both Area 2 and Area 3 did not show significant exceedances. If these results can be repeated, it may be possible to delineate bounds for exceedances of some or all of the metals of concern. Note other concerns, however, per Page-Specific Comments SS13, SS16, and SS18.

Response: See response to General Comment No. 4 above.

Comment 11 – Page 9, Section 2.4.3.1, ¶ 1 - The first sentence is missing a word or needs re-wording.

Response: The first sentence of Section 2.4.3.1 was revised to:

"Sampling for arsenic in groundwater at Area 2 was discontinued after 2015 and therefore a trend analysis cannot be performed from 2015 to winter 2020."

Unrelated to EPA's comments it was identified that a monitoring criteria for manganese (291 µg/L) and iron (9,100 µg/L) were incorrectly identified for AOC 57 in some areas of the report. The report was revised to reference background levels for manganese (291 µg/L) and iron (9,100 µg/L) at AOC 57. It was also identified that a monitoring criterion for iron (9,100 µg/L) was incorrectly identified for AOC 43G in some areas of the report. The report was revised to reference the cleanup level for iron (9,100 µg/L).

Comment 12 - Page 9, Section 2.4.3.1, ¶ 2 - Army cites elevated arsenic at well 57M-03-05, still transitioning from reducing to oxidizing conditions. Please continue to track the arsenic levels and oxidation condition indicators for this well in future reports. The vertical profile transect for Area 2, is obliquely down-gradient; there are no monitoring points directly down-gradient from this well. Additional monitoring wells are needed downgradient of 57M-03-05 to delineate the extent of arsenic concentrations and monitor arsenic concentrations and attainment of ROD-specified RAOs and cleanup goals in this area of the AOC 57 site. This will continue to be an unresolved data gap until additional, downgradient monitoring points are installed and site-specific data collected (See PSC 15 regarding the location of the vertical profile transect and EPA's September 29, 2020, FYR Summary of Additional Work Requirements.)

Response: See response to General Comment No. 4 above.

Comment 13 - Pages 9 and 10 (bottom of pages) - EPA appreciates the integration of vertical gradient results and arsenic concentrations in well triplet 57M-03-05X/5702M-20-01A/5702M-20-01B. EPA also notes that only one set of vertical gradient measurements has been made, and the vertical gradient is small and could change with seasonal or other conditions. (See PSC 3.) Please continue to assess vertical gradients in conjunction with arsenic levels at this well triplet to see if the conclusion is justified.

Response: See response to General Comment No. 4 above.

Comment 14 – <u>Page 11, 1st two full ¶s</u> - The last sentence of each paragraph concludes that upward gradients preclude site related impacts to deep groundwater. These sentences are premature and unsupported by available site-specific data. Under other conditions, the vertical gradients at the locations in question could be zero or downward. Please delete.

Response: See response to General Comment No. 4 above. The last sentence of the first full paragraph was revised as follows:

"The dissolved arsenic detected at deep piezometer 5703PZ-19-01 (64 µg/L) located adjacent to 57M-96-11X is the result of a strongly reducing environment in the deeper groundwater; the measured upward gradient at this well pair indicates shallow groundwater with elevated arsenic has not migrated downward."

The second full paragraph on page 11 was revised as follows:

"Arsenic was detected at one additional monitoring point, deep monitoring well 5703MW-20-01B, at a concentration (11 µg/L) only marginally greater than the cleanup goal. This well is situated to the east of the former source area in a cross-gradient location. The ORP and DO data at this well were in the reducing range."

Comment 15 – Figure 2-8 - Please add the containment dam to this figure. Also, where are the Area 2 vertical profile transects located relative to the containment dam? It appears that the locations may be on or just southwest (up-gradient?) of the containment dam. If so, are sampling results from these locations representative of the aquifer at Area 2 and down-gradient of Area 2? If not representative, lack of metals impacts at these locations does not prove that site impacts have not reached Cold Spring Brook or beyond. Contaminant migration could be occurring to the southeast (down-gradient) from the 57M-03-05X area and to the east of the containment dam. (See EPA's September 29, 2020, FYR Summary of Additional Work Requirements.)

Response: See response to General Comment No. 4 above.

Appendix G Figures 2-2 and 2-3 were revised to show both the containment dam at Area 2 and location of the 2020 vertical profile transects in Areas 2 and 3. Appropriate revisions were made to the text. Appendix G Figure 2-8 AOC 57 Vertical Profile Transects, Area 2 and Area 3 was removed

Comment 16 – Pages 12-13, Section 2.6.1 - The Area 2 conclusions are unsupported by available site-specific data and should be deleted. EPA reminds Army that the discontinuation of sampling was not approved by EPA and as such, must be reinstated (and data collected) prior to consideration of the omission of these monitoring locations in the LTMMP updated required per EPA's September 29, 2020, FYR Summary of Additional Work Requirements. While EPA appreciates that supplemental sampling performed in 2020 has contributed significantly to Area 2 site knowledge, Army's conclusion at the bottom of the first full paragraph on page 13, "These data indicate that arsenic greater than the cleanup goal has not been transported into or beyond Cold Spring Brook" is not justified/supported by available data.

Response: See response to General Comment No. 4 above.

Comment 17 – Page 14, Section 2.6.2, 1st full ¶ paragraph – Once again, statements are made, conclusions are reached, that are unsupported by available site-specific data. While the reported results expand site knowledge and are encouraging, arsenic concentrations are considerably higher and more widespread in this area. The vertical profile results are encouraging along one flow line but do not prove that elevated metals have not reached Cold Spring Brook and beyond. Additional investigations must be conducted to support Army's claims and conclusions.

Response: See response to General Comment No. 4 above.

The first full paragraph on page 14 was revised as follows:

> *"Arsenic was detected at one additional monitoring point, deep monitoring well 5703MW-20-01B, at a concentration (11 µg/L) only marginally greater than the cleanup goal. This well is situated to the east of the former source area in a cross-gradient location. The ORP and DO data at this well were in the reducing range.*
>
> *Groundwater data generated by the sampling of four vertical profile sites (22 total samples) located downgradient of Area 3 and extending into the wetlands associated with Cold Spring Brook, indicate that arsenic concentrations were non-detect or less than the cleanup goal."*

U.S. ARMY RESPONSES TO MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION (MADEP) COMMENTS ON THE DRAFT 2019 ANNUAL OPERATIONS, MAINTENANCE, AND MONITORING REPORT, MAIN POST, FORMER FORT DEVENS ARMY INSTALLATION, DEVENS, MASSACHUSETTS

The following U.S. Army responses pertain to the Massachusetts Department of Environmental Protection (MAEP) comments, dated 10 July 2020, on the Draft *2019 Annual Operations, Maintenance, and Monitoring Report, Main Post, Former Fort Devens Army Installation*, dated May 2019.

AOC 32/43A

Comment 1, Section 5.4.1 – The VOCs summary should note that samples were analyzed outside of specified holding times (Section 5.5), indicating that reported concentrations may be biased low.

> **Response:** The penultimate sentence of the second paragraph of Section 5.5 was revised as follows:
>
> *"The samples submitted for VOC analysis were analyzed outside the 14-day holding time due to laboratory instrument failure and sample dilutions; the VOC results in these samples are potentially biased low."*

Comment 2 , Table 1-5 – To avoid confusion, the second "AOCs 32 and 43A (Annual Sampling)" heading should be deleted.

> **Response:** The second heading was deleted.

Comment 3, Table 1-6 – Chlorobenzene should be listed as a chemical of concern at AOCs 32 and 43A.

> **Response:** Chlorobenzene was added to Table 1-6 for AOC 32/43A.

DEVENS CONSOLIDATION LANDFILL

Comment 4, Section 6-2 – Please confirm/correct the statement indicating that results from the 2018 well survey are presented in Appendix A.

> **Response:** The survey results were previously reported in the 2018 Main Post Annual Report and the survey report was included in Appendix A of the 2018 Main Post Annual Report. The text referencing the survey report was deleted. Note 2 was deleted from Table 6-2 as well LFM-03-07 was resurveyed.

Comment 5, Section 6-3 – The description of flow directions and gradients should be qualified by noting that conclusions are based on water levels measured in two aquifers (overburden and bedrock).

> **Response:** The following text will be added after the second sentence of Section 6.3:
>
> ***"****The wells are screened in overburden and bedrock (Table 6-1); however, there are no data that indicate that there is an aquitard/aquiclude hydrogeologically separating the two zones."*

Comment 6, Appendix F (Landfill Inspection Report) – The missing vent tags listed in the text of the inspection report are inconsistent with the missing vent tags identified in Appendix B of the inspection report. Please confirm/clarify/correct as appropriate.

> **Response:** The reason for the discrepancy between the landfill inspector's observations and the gas vent sampler's notes is unclear. Bullet 7 in Section 6 of the landfill inspection report was changed to:
>
> > *"Confirm the presence of label tags on each gas vent and replace any missing label tags."*

HOUSING AREAS AND 37-MM IMPACT AREA

Comment 7, Section 7-1 Next to Last Paragraph, and Section 8.0 – Text concerning the cited Land Use Control Implementation Plan (LUCIP) Addendum for Oak and Maple Housing Areas should be corrected; the final LUCIP Addendum has not been prepared and approved.

> **Response:** The text and references will be corrected to delete the word "Final" from the title of the LUCIP document.

Comment 8, Appendix E: Please confirm that a copy of the utility bill letter insert was mailed to Grant Housing Area residents during 2019 in accordance with the LUCIP (the cover letter presented here has a 2018 mailing date).

> **Response:** It was confirmed with Roy Herzig during the LUC interviews that copies of the utility bill inserts were mailed to the Grant Area residents. The letter included in the appendix is a sample of the letter that is sent.

APPENDIX G – SUPPLEMENTAL SAMPLING REPORT – AOCs 43 AND 57

Comment 9 – Attachment A should include field notes documenting water levels measured at AOC 57 (tabulated in Table 1-4).

> **Response:** Field notes will be included in the revised Attachment A.

Comment 10 – The supplemental sampling report should include or cite a document that includes copies of field notes and laboratory reports associated with the April 2020 vertical profile sampling work conducted at AOC 57.

> **Response:** Field notes and laboratory reports will be included in the revised Appendix G.

James Ropp

From: Chaffin, David (DEP) <david.chaffin@state.ma.us>
Sent: Thursday, December 24, 2020 10:39 AM
To: James Ropp; Reddy, Penelope W CIV (USA); 'Bob Simeone'; 'Carol Keating'; Roy Herzig - MassDevelopment (RHerzig@Massdevelopment.com)
Subject: RE: Fort Devens Main Post LTM Sites 2019 Annual Report Responses to EPA-DEP comments

Categories: Devens LTM

The responses to MassDEP comments and the associated report revisions are acceptable.

David Chaffin
Massachusetts Department of Environmental Protection
One Winter Street, 3rd Floor
Boston, MA 02108

From: James Ropp <jropp@Komangs.com>
Sent: Monday, December 14, 2020 2:00 PM
To: Reddy, Penelope W CIV (USA) <PENELOPE.W.REDDY@usace.army.mil>; 'Bob Simeone' <robert.j.simeone.civ@mail.mil>; 'Carol Keating' <Keating.Carol@epa.gov>; Chaffin, David (DEP) <david.chaffin@mass.gov>; Roy Herzig - MassDevelopment (RHerzig@Massdevelopment.com) <RHerzig@Massdevelopment.com>; 'Julie Corenzwit' <julia.corenzwit@verizon.net>; 'Richard Doherty' <rdoherty@ecr-consulting.com>; Laurie Nehring <nehring_laurie@msn.com>; Liyang Chu (LChu@nobis-group.com) <LChu@nobis-group.com>; Jennifer Lambert <jlambert@nobis-group.com>; Jim Vernon (jvernon@nobis-group.com) <jvernon@nobis-group.com>; mmckenna@theparkerschool.org; jpahl@oreillyauto.com; Nathan Mullens <nrmullens@seres-es.com>; 'Vitolins, Andy' <Andy.Vitolins@arcadis.com>; 'Therriault, Brian' <Brian.Therriault@arcadis.com>
Cc: Laurie Ekes <LEkes@komangs.com>; Katherine Thomas <KThomas@Komangs.com>; Larry Pannell <lpannell@komangs.com>
Subject: Fort Devens Main Post LTM Sites 2019 Annual Report Responses to EPA-DEP comments

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

KGS is pleased to provide the Army's responses to EPA's and MassDEP's comments, dated September 30 and July 10, 2020, respectively, on the draft *2019 Annual Operations, Maintenance, and Monitoring Report* for the Main Post sites at the Former Fort Devens Army Installation, Devens, MA, dated May 2020.

To assist your review, a redline/strikeout version of the report text and changed figures/tables/appendices is also available to be downloaded using the following link:

https://hsenv.sharefile.com/d-sda1f00987a794e99a7c829496857d5fb

The draft final Annual Report is planned to be submitted within 45 days (January 28, 2021).

Let me know if you have any questions or require additional information.
thanks

Jim Ropp, P.E.
Project Manager

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EPA FOLLOW-ON COMMENTS ON
ARMY'S DECEMBER 14, 2020 RESPONSES TO EPA'S SEPTEMBER 30, 2020 COMMENTS ON THE
DRAFT 2019 ANNUAL OPERATIONS, MAINTENANCE, AND MONITORING REPORT, MAIN POST, FORMER FORT DEVENS ARMY INSTALLATION, DEVENS, MA

The following comments reflect issues/concerns left unresolved by Army's response to comments (RTCs). EPA accepts and/or acknowledges those RTCs not referenced below.

General Comments

Comment 2 – In comments on previous ARs, EPA requested that Zone II Wellhead Protection Areas be shown on certain figures to correspond with discussions in the text. In the 2019 Annual Report, Figure 1-1 shows the public well or wells for which each of the Zone IIs is drawn but not the Zone IIs themselves. Please restore the Zone II areas to Figure 1-1 in the 2019 AR. Because Zone IIs are wellhead protection areas for public wells and represent areas from which contaminants might be drawn to a public drinking water well, extra scrutiny should be given to contaminant concentrations, groundwater flow directions, and potential contaminant transport to a public well. At present, it appears that contaminated groundwater occurs within a Zone II at Area 3 of AOC 57, AOC 69W, and just outside the edge of a Zone II at AOC 32. Site-specific data are especially important where there is a particularly sensitive receptor such as a public well. (See Page-Specific Comment (PSC) 7.)

Response: Comment noted. Zone II delineations were added to Figure 1-1.

EPA Follow-on Comment: *Zone II delineations were added to revised Figure 1-2; please be sure to include the Zone IIs and the associated public wells in future Annual Reports.*

Comment 3 – As discussed in comments on the 2018 AR and elsewhere, Army implemented the 2015 LTMMP update without EPA concurrence. (See PSCs 1, 2, and 17.) It is important that the next LTMMP be developed with consensus of the Devens BRAC Cleanup Team (BCT) and that Army obtain EPA concurrence, in accordance with the Devens Federal Facility Agreement (FFA) before finalizing and implementing the LTMMP. The LTMMP should be updated prior to commencement of the Spring 2021 sampling event to address comments on the 2018 and 2019 ARs and 2020 FYR.

Response: The Army addressed EPA comments (and rebuttal comments) on the 2015 Draft Final LTMMP for over one year and then finalized the LTMMP in accordance with the FFA. A future (updated) LTMMP will be prepared in accordance with the FFA document review and finalization requirements. In addition, the Army will not implement any changes to the updated LTMMP until a formal EPA concurrence letter is received on the final submittal.

EPA Follow-on Comment: *Army's preparation/submittal of draft AOC/OU-specific LTMMP Updates will be addressed/resolved as part of ongoing 2020 FYR / Additional Work informal dispute resolution discussions. Please note: the Devens FFA precludes EPA concurrence/approval of final submittals.*

Comment 4 – In recent comments on the above-referenced documents (for example, PSC 1 on the 2018 AR), EPA pointed out the need to expand monitoring networks at AOC 57 and AOC 43G to obtain site-specific information to assure that contamination is not migrating off-site. This is especially important for AOC 57, Area 3, considering its location within Zone II for a public drinking water well.

For AOC 57, comments on the 2018 AR identified four monitoring plan elements that are needed:

a. New wells or piezometers screened deeper in the aquifer are needed to determine if there are site-related contaminants at depth and to determine deeper groundwater flow direction;

b. New wells are needed to determine the down-gradient limit of certain contaminant occurrences;

c. New data are needed to establish the limits of reducing (low ORP) groundwater conditions; and

d. New wells or piezometers on the far side of Cold Spring Brook and other investigations are needed to determine whether the Brook is hydraulically connected to the aquifer and to determine groundwater flow and contaminant transport paths. Army agreed (3/26/20) to install monitoring wells on the far (southeast) side of Cold Spring Brook in 2020 but this work has yet to be performed. (See PSC 8 and "SS" comments on the Supplemental Sampling Report (Appendix G) below.)

For AOC 43G, sampling was performed on wells listed in the 2015 LTMMP during the October sampling round. New piezometers have been installed but were not sampled until February 2020; results are presented in Appendix G (see Comment SS19 below). Future sampling of existing wells and new piezometers will be a required component of the new LTMMP. (See PSC 17).

Response: Army will prepare a work plan for AOC 57 and a work plan for AOC 43G to address EPA recommendations. Based on these additional investigations, historical site data and updated CSMs, Army will prepare focused feasibility studies to evaluate changes to the remedies and any applicable ROD amendments.

EPA Follow-on Comment: *Army's response is inconsistent with its March 26, 2020 commitment to install monitoring wells on the far side of Cold Spring Brook. Although Army's December 11, 2020 draft SOW to address EPA's September 29, 2020 Additional Work letter proposes performance of a supplemental RI/FFS prior to updating the LTMMPs for AOCs 43G and 57 LTMMP, Army has agreed to complete much of this work as part of the ongoing PFAS RI. Further discussion is warranted to clarify Army's intentions specifically with regards to the installation of monitoring wells on the far side of Cold Spring Brook (CSB) at these two AOCs. As stated previously, the nature and extent of ROD-specified COCs and/or PFAS in these areas cannot be defined/determined without this information.*

Comment 5 - Depending on the location, depth, and type (overburden vs. bedrock) of the irrigation well at 78 Barnum Road, pumping could potentially alter groundwater flow at AOC 57. EPA had requested in comments on the 2018 AR (PSC 16) that additional information on the irrigation well be collected (i.e. pumping volume and frequency) and included in the 2019 AR. Please include this information in the draft final 2019 AR.

Response: The property manager was contacted and indicated there is no flow meter present to measure volume of water usage for the irrigation system. The irrigation well is used daily for lawn care from spring to fall. The well was added on Figure 2-1. Under Section 2.1, prior to the last paragraph, the following new paragraph was inserted:

"There is an irrigation well located on the adjacent property of 78 Barnum Road (Figure 2-1). The well is 505 feet deep and is believed to be an open borehole bedrock well. The property manager has indicated the well is used for lawn care for the property from spring to fall and there is no flow meter to record the daily flow rate or volume of water used."

EPA Follow-on Comment: *Please provide a copy of the pump curve for the irrigation well or include the make, model, and specifications for the irrigation well pump in the draft 2020 Annual Report. This will provide an estimate of the number of gallons pumped from this well.*

Also, while EPA understands that the well is not metered, the property manager should be able to specify/estimate the number of hours per day or per week the irrigation well typically pumps during the irrigation season. Please include this information in the draft 2020 Annual Report.

Comment 6 - At the Devens Consolidation Landfill (DCL), EPA noted in the past that both the April and October 2018 water elevations for overburden well LFM-99-6A-RP, when projected into the cross sections, occur above the bedrock water levels (blue line on cross sections) and only a few feet below the base of the landfill. EPA has advocated in the past for use of overburden wells instead of bedrock wells as water-level triggers for more monitoring because the potentiometric surface shown in blue on the profiles does not indicate, directly, whether saturated overburden is in contact with the base of the landfill. However, Army has maintained that overburden in some portions of the site is unsaturated, making replacement of the current bedrock trigger wells by overburden wells infeasible. EPA, once again, strongly recommends that overburden well LFM-99-6A-RP be added as a trigger well, while also retaining the existing bedrock wells as trigger wells.

Response: Overburden well LFM-99-6A-RP is sampled during each event. As explained in the draft report "If the depth to water was less than the "trigger" depth (viz., higher water table elevation), there is a potential that groundwater may have come into contact with the landfill triggering the requirement to sample these locations along with the LTM wells." The action taken after the "trigger" criteria is met is to sample the well, but because LFM-99-6A-RP is sampled during each event, a "trigger" criterion for LFM-99-6A-RP is not necessary.

EPA Follow-on Comment: *While EPA understands Army's position that naming LFM-99-6A-RP as a trigger well is unnecessary [since the response to a trigger threshold is sampling and this well is already sampled during each monitoring event], there are still two reasons for adding this well to the list of trigger wells. First, if a future LTMMP were to eliminate or reduce the frequency of sampling for this well, the trigger would become important. Second, if the well is a trigger well, records of triggering events would presumably be kept, and this information could assist in evaluating the range of groundwater level fluctuations and the effectiveness of the remedy in future five-year reviews. Further discussion is warranted to address/resolve this issue.*

Page-Specific Comments

Comment 2 – Figures 2-4 – What is the significance of the four sumps shown in this figure? Please discuss in the text. Also, what is the condition of the containment dam? Is it believed to impede the flow of either groundwater or surface water?

Response: As part of remedial activities conducted in 2002, the sumps were installed to aid in observing the petroleum product sheen on the groundwater surface. In 2003, the product recovery system was operating in some of sumps. The sumps were sampled on a semiannual basis until the 2008 LTMMP eliminated sampling of the sumps. The sumps were visually inspected for petroleum sheen as part of LTM activities after 2008.

The following text was added after the second sentence of the fifth paragraph of Section 2.1:

"As part of excavation and product removal activities in Area 2, four sumps were installed to aid in observing the petroleum product sheen on the groundwater surface."

Additional details on the excavations and product recovery activities are detailed in the *Removal Action Completion Report Area of Contamination 57* (Conti, 2004).

The containment dam was constructed in 1977 to aid in the product recovery efforts of the fuel spill where fuel was discharged through the Area 1 outfall. The contaminant dam is intact. The contaminant dam is not believed to impede groundwater flow. The contaminant dam extends into the wetland on the west side of Cold Spring Brook. The main channel of Cold Spring Brook flows to the south of the dam. The impacts of the dam on surface water flow are minimal. The third and fourth paragraphs of Section 2.1 was revised as follows:

> *"In September 1992, an investigation was performed to determine the presence or absence of environmental contamination at AOC 57 that may have occurred following a February 1977 fuel oil spill. An estimated 50- to 100-gallon spill of No. 4 fuel was discharged through the Area 1 outfall in 1977. Approximately 3,000 gallons of mixed oil and water were recovered through the use of a contaminant dike (Figure 2-2) and absorbent booms in 1977, and approximately 25 cy of petroleum contaminated soil were removed in 1997. The investigation revealed the presence of groundwater, soil, and sediment contaminated with oil, VOCs, SVOCs, pesticides, metals, and PCBs.*
>
> *Based on the results of the investigation, the Army proposed that a limited soil removal action be conducted at Area 2. The removal action began at Area 2 in August 1994 and continued until September 1994, when it was discovered that contamination extended beyond the limits originally estimated. Approximately 1,300 cubic yards of soil were removed and the site was transferred to the remedial investigation (RI)/feasibility study (FS) process. During spring 1999, a soil removal action focusing on PCBs and EPH in soil was performed at Area 3 based on data obtained from the RI and a total of 1,860 cubic yards of soil was removed from Area 3."*

EPA Follow-on Comment: *Please reference Conti (2004) in the 5th paragraph and add it to the list of references in Section 8.0. Also, in both the comment response and the inserted text, it appears that the word "contaminant' was sometimes used, where the word "containment" is intended. Please investigate and correct as needed.*

Comment 3 – Page 7, § 2.1 – Please include a brief discussion of the large area of buried drum carcasses and spent containers discovered during EPA's temperature profiling work along Cold Spring Brook on March 18, 2019. As discussed during the next (March 25, 2019) BCT meeting, the buried wastes were discovered essentially between Areas 2 and 3 in an area estimated to be at least 200 feet X 30 feet X 6 feet. Please provide details regarding the investigation, removal and subsequent characterization of potentially impacted soils and include a corresponding figure, data summary table and laboratory data package in Section 8.0.

Response: The following paragraph was added to Section 2.1:

> *"In March 2019, multiple debris areas were identified at AOC 57 between Areas 2 and 3, southeast of the walking path located behind 112 Barnum Road. The observable debris areas were a total of approximately 650 feet by 60 feet (Figure 2-1). The debris areas are characterized mostly as rusted vehicle parts (metal debris, tires, and bumpers) and other smaller piles of rusted scrap metal (empty drums and containers). The majority of drums observed were partially buried. The former contents of many of the drums and containers is unknown; however, some of the drum labels are legible enough to identify the bulk contents, with some labeled as "antifreeze and gasoline. Large concrete slabs were also found. The Army will address the buried waste in a work plan that is under review and will be available for BCT review in December 2020."*

EPA Follow-On Comment: *Please amend the last sentence to reflect Army's submittal of the draft Debris Removal Work Plan for BCT review on December 16, 2020. Also, please include the requested information (Figure, data summary table, laboratory data package) in the 2020 Annual Report.*

Comment 5 – Page 11, § 2.8, 1st ¶, last sentence - Words are missing or the sentence needs to be re-written.

Response: Comment noted. The last sentence in this paragraph was revised to:

"With the LUCs in place, AOC 57 does not pose an exposure risk to current site users and is not expected to pose a risk to human health in the future."

EPA Follow-On Comment: *EPA notes the added wording but disagrees with the conclusion. The statement regarding lack of risk to human health is not justified until the CSM is developed sufficiently to determine how much (if any) impacted groundwater discharges to Cold Spring Brook (CSB) and how much (if any) passes beneath CSB or flows elsewhere. Specifically, fate and transport must be sufficiently characterized to rule out the Grove Pond Wells as receptors before Army's conclusion is justified. AOC 57's location within a Zone II requires more diligence and site-specific characterization than might otherwise be applied.*

Comment 6 – Page 11, § 2.8, ¶ 1 – Army's unilateral decision to eliminate Area 2 from the ROD-specified LTMMP is unacceptable and will undoubtedly delay future decisions regarding remedial action/construction completion for the AOC 57 site. The deficiency (i.e. failure to comply with ROD-specified remedy (Alternative II-3, Excavation (For Possible Future Use), *Groundwater Monitoring, Surface Water Monitoring* and Institutional Controls, March 2004 ESD (which expanded the list of ROD COCs to include EPH C11-C12 aromatics and PCBs) and the Devens FFA) and the activities required to adequately evaluate the protectiveness of the AOC 57 remedy will be discussed (and resolved) as part of the draft Devens 2020 FYR review/concurrence process. In the interim, EPA recommends that Army reinstate sampling at AOC 57 and other CERCLA AOCs where modifications were made to ROD/ESD-required LTMMPs without EPA and BCT approval.

Response: See response to General Comment Nos. 3 and 4 above.

EPA Follow-On Comment: *Army's responses to General Comments 3 and 4 are brief, generalized, and lacking in schedule commitments. As such, the responses to do not adequately address Page-Specific Comment 6.*

Comment 7 – Page 12, § 2.8, ¶ 3, 1st sentence – This sentence refers to the Conceptual Site Model (CSM), but there is discussion of a CSM for AOC 57 in this report. Please either present the elements of the proposed CSM or provide a reference to another (previously approved) document that includes the CSM.

Response: The first sentence was revised to:

"*The 2019 monitoring results are consistent with the conceptual site model (HGL, 2008).*"

EPA Follow-On Comment: *The HGL, 2008 reference should also be included in the reference list in Section 8.*

Comment 8 – Page 12, § 2.8, ¶ 4, 2nd sentence – This sentence presents a broad, historical conclusion that is unsupported by information presented in this report. Please provide the necessary supporting documentation/data to support the conclusion, provide references, or narrow the conclusion to reflect information presented in the 2019 AR.

Response: The comment was interpreted to refer to the following sentence from the annual report: "After the removal of the source area in soil, natural attenuation processes have effectively reduced the remaining concentrations of site COCs (tetrachloroethene [PCE], cadmium, 1,4-dichlorobenzene, PCBs, and extractable petroleum hydrocarbon C_{11}-C_{22} aromatic carbon range) to below their respective remediation goals without offsite migration."

As documented in previous annual reports and in previous FYRs, groundwater monitoring results indicated concentrations of PCE, cadmium, 1,4-dichlorobenzene, PCBs, and EPH extractable petroleum hydrocarbon concentrations have decreased below the cleanup levels.

EPA Follow-on Comment: *Army correctly identified the sentence to which EPA referred in the previous draft. Army's RTC indicates that Army is making a broader historical conclusion than could be justified by data in the 2019 AR alone, however, it failed to include specific references to the annual report(s) and/or FYR(s) in the text and in Section 8.0. This would allow the reader to evaluate the information and determine whether he/she agrees or disagrees with the conclusion. Alternatively, the sentence can be deleted and conclusions confined to those justified by data presented in the 2019 AR.*

Comment 9 – Page 12, § 2.8, ¶ 4, 3rd and 4th sentences – These sentences provide generalizations regarding aquifer reducing conditions and metals concentrations that are unsupported by site-specific data. These data are critical because the site is within a Zone II for a public well and site-specific information is needed to evaluate current and potential human health risks. Also, there are other Fort Devens AOCs (e.g. AOC 69W in the 2018 AR) that have shown poor correlation between reducing conditions and metals concentrations. This indicates that relying on general rules is not always appropriate when a critical receptor such as a public drinking water well is present. As stated above and on numerous occasions, site-specific data must be collected to support Army's hypotheses. Please refer to EPA's comments on the draft Devens 2020 FYR for a detailed description of ongoing deficiencies and the Additional Work required to adequately evaluate current and long-term protectiveness of the AOC 57 remedy.

Response: The referenced text is from the American Petroleum Institute (API), 2011, *Groundwater Arsenic Manual, Attenuation of Naturally-Occurring Arsenic at Petroleum Impacted Sites,* to provide the reader with information on observations from other fuel-contaminated sites.

Site-specific data from 2019 is provided in Section 2.5. Trends of site-specific data are provided in Section 2.6.

EPA Follow-On Comment: *The API referenced information is relevant for discussion but does not constitute a site-specific conclusion. If Army wishes to present a conclusion regarding arsenic in groundwater at the site, the conclusion should be tied to data presented in Sections 2.5 and 2.6.*

Comment 10 – Pages 12–13, § 2.8, last ¶ – This paragraph references supplemental sampling investigations performed in January – March 2020 but refers the reader to Appendix G for these results. A review of these data reveal that they were not considered in the conclusions presented in Section 2.8 and do not address the larger questions surrounding groundwater flow and contaminant transport at AOC 57. (See "SS" comments below.)

Response: The supplemental sampling was performed in addition to the current LTMMP and was performed outside of the reporting period for the 2019 annual report. As noted, Appendix G provides the detailed report of the supplemental sampling results, which was designed to remain separate from the main body of the 2019 annual report.

EPA Follow-On Comment: *Please specify how/if the information in Appendix G will be integrated with 2020 results and considered in conclusions in the 2020 Annual Report.*

Comment 11 - Pages 18-19, § 3.6.1 – The draft report indicates that details regarding recent internal HVAC and sidewalk/retaining wall work was discussed with Michelle McKenna, Business Manager at the Francis W. Parker Charter Essential School during a January 21, 2020 interview. Is this the same sidewalk/retaining wall repair work proposed/discussed in Ms. McKenna's March 4, 2020 email to Army, MassDEP and EPA? Did Army review and approve the LSP's HASP and SMP prior to commencement of field activities as required per the existing deed restriction (see March 5, 2020 email from R Simeone)?

LUCs were established in the September 2001 ROD to restrict exposure to the contaminated soil and groundwater under both existing and future site conditions. The controls are intended to prevent residential exposure to any remaining contaminated soils beneath the site and prohibit extraction of groundwater for industrial or potable water supply. The third sentence of Section 3.6 states, "The LUCs ensure that the remaining contaminated soils beneath and adjacent to the building are not excavated." The second paragraph on page 19 (Section 3.6.1) states, "Ms. McKenna indicated that internal HVAC and sidewalk/retaining wall work has been done *in the corner of the building near the ESMA* as planned, but all work did not extend below 2-feet" but there do not appear to be any depth-specific exclusions/restriction in the deed (i.e. "The Grantee, its successors and assigns, shall not excavate soil from areas of the Property identified as the Soil Management Area for any purpose without the prior written approval of the Grantor, the EPA, and the DEP.") Does Army believe that this excavation was fully compliant with the ROD-required LUCs? Were samples of the excavated soils collected and analyzed? What was the fate of excavated soils?

Response: This is the same work as in Ms. McKenna's March 4, 2020 email. The text was revised to indicate the work was planned at the time of the interview.

> *"Ms. McKenna indicated that internal HVAC and sidewalk/retaining wall work is planned in the corner of the building near the ESMA as planned, but all work is not planned to extend below 2-feet."*

There is no evidence the LUCs in the deed restriction were violated. Per the deed restriction, the Parker School indicated an LSP and CIH wrote a soil management and health and safety plan before commencement of the work. Also, per the deed restriction, written approval of the work was obtained by the Parker School from the Army, EPA, and MassDEP prior to commencement of the work. There is no requirement in the ROD or the deed restriction to submit a completion report.

EPA Follow-On Comment: *Once again, EPA did not approve the work plan prior to commencement of this work. With that being said, because this issue is the subject of ongoing informal dispute resolution discussions on the 2020 Devens FYR (and EPA's September 29, 2020 Additional Work letter), EPA will refrain from requiring further discussion/revisions in the context of the 2019 Annual Report. With that being said, since Army has refused to prepare/submit the requested completion report, EPA requests that it provide a written response to the two questions in EPA's comment (i.e. Does Army believe that this excavation was fully compliant with the ROD-required LUCs? Were samples of the excavated soils collected and analyzed? What was the fate of excavated soils?).*

Comment 12 – Page 19, § 3.6.2, ¶ 2 – The second sentence states that, "There were no excavations or penetrations *greater than 2-feet through pavement* within the ESMA observed during 2019." Please explain the relevance (and source) of the reference to "*greater than 2-feet through pavement*." EPA has reviewed the 2001 ROD and "Soil Excavation Restriction" deed language and could not find any reference to the *greater than 2-feet through pavement* language. Please explain. Unless a plausible explanation is provided, this discussion is indicative of a breakdown in IC communication that should be identified and discussed here (and included in the Devens 2020 FYR).

Response: The reference to excavations greater than 2-feet was inadvertently carried forward from the 2000 long-term monitoring plan. Reference to 2 feet excavation depth will be removed from Section 3.6.1 and 3.6.2. The LUCs checklist will be revised to eliminate the references to excavations greater than 2 feet.

EPA Follow-on Comment: *While EPA accepts Army's proposed elimination of references to "greater than 2 feet" from the existing LUC checklist, it disagrees with Army's proposed edits to Sections 3.6.2 and 3.6.1. Since discussion/reporting of the telephone interviews in Section 3.6.1 needs to be accurate, the bulleted text should remain unchanged. In addition, EPA requests that an explanation of the inadvertent inclusion of this item from the 2000 LTMMP and the subsequent correction of the LUC checklist, be inserted in the final 2019 Annual Report.*

Comment 13 – Page 19, § 3.7 – Please confirm that the discussion of long-term monitoring results includes all ROD-specified COCs and monitoring locations identified in the post ROD (pre-2015) LTMMP (i.e. has having detections above ROD-specified cleanup levels).

Response: The ROD did not specify COCs. The ROD indicated that long-term groundwater monitoring will be conducted to verify that elevated arsenic concentrations will continue to decrease over time and not migrate downgradient. The ROD did specify that arsenic and EPH/VPH would be monitored. The ROD did not specify cleanup levels. The first LTM plan (HLA, 2000) did identify specific compounds that would be monitored, specifically contaminants that contributed greater than or equal to a hazard quotient of 1.0 (child and adult resident Reasonable Maximum Exposure) as arsenic, iron, manganese, and VPH. The LTM plan also indicated that VPH and EPH analyses for carbon fraction would be performed to observe the reduction in fuel related compounds over time. The results of all the sampling conducted in 2019 are discussed in Section 3.7 (i.e., arsenic, iron, manganese, EPH). Analysis for VPH has not been conducted at the site since 2013. Results of VPH analyses were below the monitoring criteria from 2009 through 2013.

Unrelated to EPA's comments it was identified that a monitoring criterion of 291 µg/L for manganese (background level) was incorrectly identified for AOC 69W in some areas of the report. The report was revised to indicate the appropriate monitoring criteria of 375 µg/L for manganese at AOC 69W.

EPA Follow-On Comment *– The highlight text is Army's response is unacceptable/inaccurate based on text in the 1999 ROD:*

"ROD did not specify COCs" or "cleanup goals"

→ Page 9 – "Fuel-related VOCs, SVOCs, TPHC, and inorganics comprise the observed groundwater contaminants at AOC 69W."

→ Page 15 – "The remedial action objectives (RAOs) for the site are:

- *Restore the aquifer to drinking water standards within a reasonable time frame;*
- *Monitor potential future migration of ground water contamination;*
- *Eliminate risk from potential consumption of groundwater; and*
- *Reduce or eliminate the direct contact threat of contaminated soils."*

→ Page 16 – "The Limited Action alternative for AOC 69W includes…. development of a "Long-Term Groundwater Monitoring Plan to monitor for any potential off-site migration of contaminants and to verify that elevated concentrations decrease over time"

→ Page 17 – "The expected outcome of this [Limited Action] alternative is to restore the aquifer to drinking water standards within a reasonable time frame and to prevent exposure to contaminants remaining at the site through the establishment of Institutional Controls.

While EPA acknowledges that Army, along with the USEPA and MADEP, agreed in 1999 that the site posed no unacceptable risks to human health or the environment under current conditions and uses, the parties also agreed that a "Limited Action" remedy was necessary to address potential, future risks and ensure attainment of ROD-specified RAOs/cleanup goals. Specifically, institutional controls were required to "ensure that current/future exposure to remaining contaminated soils beneath and adjacent to the building are controlled and that extraction of groundwater from the site for potable and/or industrial uses would not be permitted" and long-term groundwater monitoring was required to "verify that elevated arsenic concentration will continue to decrease over time and not migrate downgradient."

"The ROD did specify that arsenic and EPH/VPH would be monitored [in the LTM Plan]"

→ Page 16 – The ROD "anticipated" not specified that "arsenic and MADEP EPH/VPH will be the monitored analytes."

Because the AOC 69W LTMMP is the subject of ongoing EPA/Army informal dispute resolution negotiations on the 2020 Devens FYR and September 29, 2020 EPA Additional Work letter, further discussion/resolution of these issues is not required in the context of the 2019 Annual Report. EPA However, EPA expects that the draft 2020 Annual Report will include a more accurate description of AOC 69W ROD specifications/requirements.

Comment 14 – Page 20, § 3.7 – Much of this discussion is inconsistent with statements/findings in the draft 2020 Devens FYR. Specifically, Section 8.4.2 states that "There does not seem to be a significant correlation between ORP and arsenic or manganese." Unless there is site-specific field data available to support Army's theories/predictions, these statements are purely speculative and should be deleted.

Response: The discussions of reducing conditions in the Final 2020 Devens FYR and the 2019 Main Post annual report are congruous. The Final 2020 Devens FYR indicates there is not a significant correlation between ORP and manganese concentrations due to variability in geochemistry. The discussion in Section 3.7 of the 2019 Main Post annual report indicates the geochemistry mentioned in the Final 2020 Devens FYR is related to variability in the presence of metal oxyhydroxides. As noted in the 2019 Main Post annual report, "For specific areas/wells where elevated metals remain although aquifer conditions have progressed to a more oxidizing state, it is appropriate to note that the re-adsorption of metals by soil particles is controlled by the adsorptive ability of the soil as well as by the oxidizing state of the groundwater."

EPA Follow-On Comment - *Because this site is the subject of ongoing EPA/Army informal dispute resolution negotiations on the 2020 Devens FYR and September 29, 2020 EPA Additional Work letter, further discussion/resolution of these issues is not required in the context of the 2019 Annual Report. However, EPA expects that the draft 2020 Annual Report will include a more accurate description of AOC 69W ROD specifications/requirements.*

Comment 15 – Page 21, § 3.7, last ¶, 2nd sentence – While there may have been "No evidence of increased exposure potential" observed during the December 2019 site inspection or January 2020 site interviews, internal HVAC and sidewalk/retaining wall work performed in March 2020 appears to have violated ROD-specified LUCs. As requested in EPA's comments on the draft Devens 2020 FYR report, Army must develop and implement an improved communication strategy to ensure that the apparent breach in ICs does not occur in the future.

Response: There is no evidence the LUCs in the deed restriction were violated. Per the deed restriction, an LSP and CIH wrote a soil management and health and safety plan before commencement of the work. Also, per the deed restriction, written approval of the work was obtained from the Army, EPA, and MassDEP prior to commencement of the work.

EPA Follow-on Comment: *Please refer to Page-Specific Comment 11 above.*

Comment 17 – Page 22, § 4.2, ¶ 2 – Please delete the last sentence. While groundwater sampling results and modeling performed in 1999 may have indicated that intrinsic remediation was a viable remedial option for AOC 43G, more recent sampling results and an updated modeling effort will likely produce different results.

Response: The modeling discussed in Section 4.1 Site Background is referencing the work conducted in support of the feasibility study and the ROD and is appropriate site background information.

EPA Follow-on Comment: *If the sentence is to be retained, please clarify it to show that the sentence refers to historical background information. EPA suggests the following: "Groundwater sampling results (insert the dates here) and modeling (reference the FS or whatever report documents the model) indicated at the time that intrinsic remediation would be a viable remedial option for AOC 43G."*

Comment 18 – Page 22, § 4.2, ¶ 1 – Please confirm that water level measurements were collected from all monitoring locations (wells and piezometers) with COC detections above cleanup goals in the ROD-specified cleanup levels and identified for evaluation in the AOC 43G LTMMP.

Response: The 11 wells listed in Table 3.1 of the 2008 and 2015 LTMMP for AOC 43G were gauged and water level measurements recorded for the 2019 LTM event. Additionally, six piezometers installed in 2019 were gauged as part of the LTM synoptic round and water level measurements recorded.

EPA Follow-on Comment: *Please confirm inclusion of all wells and piezometers with detections above ROD-specified cleanup levels.*

Comment 19 – Page 22, § 4.2, ¶ 2 – Please explain reference to "interpretative" water-table elevations? Actual water table elevations (i.e., site-specific data) should be collected, evaluated and presented to support field-based conclusions regarding remedy performance. Also, in light of ongoing problems/discrepancies surrounding water level measurements at other CERCLA LTM sites, EPA is recommending that a separate round of water table / levels measurement collection be performed in conjunction with (or in addition to) fall 2021 and spring 2021 LTM sampling events at all LTM sites, including AOC 43G.

Response: The adjective "interpretive" was removed from Section 4.2, second paragraph and other sections in the report.

EPA Follow-on Comment: *Please confirm that water level measurements will be collected during spring and fall 2021 monitoring events.*

Comment 24 – Page 34, Section 5.7, 1st paragraph – The paragraph describes one-time sampling of 32M-01-15XBR and 32M-01-16XBR at EPA's request (Page-Specific Comment 5 on the 2018 AR) in November 2019. Section 5.3 says that the sampling was done in October 2019; please correct (October vs. November) as needed. EPA appreciates Army's sampling these wells and notes the statement in the last sentence that these wells "will not be included in future LTM events." EPA agrees regarding 32M-

01-16XBR. However, 32M-01-15XBR was sampled through 2014, with sampling presumably discontinued based on the 2015 LTMMP, which was never approved. Sampling in this well should only be discontinued by agreement, and EPA will consider Army's proposal to stop monitoring this well if presented in an upcoming LTMMP revision. In the meantime, sampling should continue/resume in this well for 3 reasons. First, it is located only a short distance down-gradient from 32M-01-18XBR, which is still impacted. Second, the well is located in Zone II of a public drinking water well. Third, discontinuation of monitoring was probably never approved. Also, EPA's request (2018 AR Page-Specific Comment 5) to add monitoring for this well specified both 2019 and 2020.

Response: Comment noted. The reference to November 2019 was changed to "October 2019". The last sentence of the first paragraph of Section 5.7 was deleted. The Army will consider EPA's comments on the annual report during development of a revised LTMMP.

EPA Follow-on Comment: *The last sentence of Army's RTC is not unacceptable. Sampling of 32M-01-15XBR needs to continue until or unless it is removed in an upcoming LTMMP or discontinued by other agreement. EPA's three reasons for this were not adequately addressed by Army. Army has not submitted a proposal to discontinue this monitoring nor provided a rationale for doing so.*

Comment 28 – Page 40, Section 6.10.1, 2nd paragraph - There appear to be an unusually large number of data quality issues; can steps be taken to reduce these in the future?

Response: See response to Page-Specific Comment No. 23. The identified data quality issues discussed do not adversely affect the reported sample results for target analytes.

Comment 29 – Page 47, Section 7.3, 2nd paragraph – For the 2018 AR, Page-Specific Comment 6 requested dates for finalization of draft Oak and Maple Housing Areas LUCIP, NAUL, and site-specific Soil Management Plan (SMP). According to Section 7.3 in the 2019 AR, finalization still has not occurred. Who needs to take action to finalize these items and when will this occur?

Response: MassDev needs to finalize the NAUL, which is anticipated to occur by the end of 2020.

EPA Follow-On Comment: *Please document the finalization or provide an update in the 2020 AR.*

APPENDIX G
SUPPLEMENTAL SAMPLING
AOC 43G AND AOC 57

PAGE-SPECIFIC COMMENTS

Comment 1 - Page ES-1, ¶ 2nd (AOC 57) - Army indicates that elevated metals concentrations in site groundwater are due to reducing conditions resulting from former degradation of site COCs. Please identify these COCs and provide a reference for the annual report in which degradation of these COCs was confirmed.

Response: The AOC 57 supplemental work was focused on concentrations of COCs that were observed at concentrations greater than the cleanup levels (i.e., arsenic). Previous annual reports and five-year reviews provide discussions as COC concentrations have decreased over time.

The second sentence of the second paragraph under AOC 57 was revised as follows:

> *"Most of the contaminant of concern (COC) concentrations in groundwater have attenuated since the source area removal. Only arsenic remains above the cleanup goals in a limited number of wells at the site."*

Subsequent text in the second paragraph under AOC 57 was revised as follows to indicate iron and manganese were also analyzed even though they are not COCs:

> *"Therefore, the supplemental sampling event was performed (1) to verify that metal concentrations (arsenic, iron, manganese) are decreasing or stable and/or are attenuating over time per the CSM, (2) to further delineate the extent of elevated metal concentrations in shallow and deep groundwater, (3) to confirm that shallow groundwater discharges to Cold Spring Brook, and (4) to describe the flow pattern of deep groundwater toward Cold Spring Brook."*

EPA Follow-On Comment: *Army's RTC does not address the main point of EPA's comment, which was the relationship between former COC degradation and reducing conditions and is unsupported by currently available/provided information. Because this site is the subject of ongoing EPA/Army informal dispute resolution negotiations on the 2020 Devens FYR and September 29, 2020 EPA Additional Work letter, further discussion/resolution of these issues is not required in the context of the 2019 Annual Report.*

Comment 2 – Page ES-1, ¶ 2 (AOC 57) - Army states that shallow groundwater discharges to Cold Spring Brook, but this has yet to be confirmed (with site-specific data). Flow data show that shallow groundwater flows toward Cold Spring Brook, but flow towards the brook does not necessarily mean that the groundwater discharges to the brook. The brook could be perched on low permeability deposits that provide partial or total hydraulic isolation from the aquifer beneath. Water level observations from a pair of nested piezometers at the brook bank and/or hand borings into the brook bed to determine whether the brook is underlain by permeable or low-permeability deposits would indicate whether shallow groundwater discharges to Cold Spring Brook.

Response: See response to General Comment No. 4 above.

EPA Follow-On Comment: *Army's response to General Comment 4 above was brief and general and does not address Supplemental Sampling (SS) Comment 2. Because this site is the subject of ongoing EPA/Army informal dispute resolution negotiations on the 2020 Devens FYR and September 29, 2020 EPA Additional Work letter, further discussion/resolution of these issues is not required in the context of the 2019 Annual Report.*

Comment 3 – Page ES-1, ¶ 2 (AOC 57) - EPA acknowledges that water levels measured in couplets and triplets in Areas 2 and 3 are consistent with shallow groundwater discharging to the brook but not conclusive, for three reasons. First, only one data set has been obtained so far; vertical gradients might reverse at other times of the year or under different weather conditions. Second, the calculated vertical gradients are so small as to be nearly zero and may or may not drive vertical flow. Third, the couplets and triplets in question are located at the edge of the wetland, not the edge of the brook. Groundwater may discharge to the wetland and not to the brook. Please continue the water level measurements and vertical gradient calculations. Site-specific data from piezometer couplets and borings are needed at the brook bank to confirm/deny Army's statements regarding groundwater discharges to the Brook.

Response: See response General Comment No. 4 above.

EPA Follow-On Comment: *As discussed above, Army's RTC for General Comment 4 is inadequate. SS Comment 3 has not yet been addressed. Because this site is the subject of ongoing EPA/Army informal dispute resolution negotiations on the 2020 Devens FYR and September 29, 2020 EPA Additional Work letter, further discussion/resolution of these issues is not required in the context of the 2019 Annual Report.*

Comment 4 – Page ES-2, last full ¶ - Army refers to an upcoming LTMMP update; EPA recently identified issuance of amended LTMMP as Additional Work required to address deficiencies in the 2020 Devens FYR. (See GC 2 (above) on the Main Post 2019 AR).

Response: See response General Comment No. 4 above.

EPA Follow-on Comment: *Army's RTC for General Comment 4 makes no mention of the LTMMP update. However, because this site is the subject of ongoing EPA/Army informal dispute resolution negotiations on the 2020 Devens FYR and September 29, 2020 EPA Additional Work letter, further discussion/resolution of these issues is not required in the context of the 2019 Annual Report.*

Comment 5 – Page ES-3, Area 3 bullet, 4th sentence - The conclusion that an upward vertical gradient indicates that deep groundwater beneath AOC 57, Area 3 discharges to Cold Spring Brook is premature at best. The most that can be said is that the vertical gradient (observed once) does not disprove deep groundwater discharge to the brook. More measurements at the existing couplet and triplet locations are needed to determine whether upward gradients persist with changing seasons and weather conditions. Measurements are still needed closer to the brook and on the far side of the brook; data gathered to date do not rule out the possibility that groundwater flows beneath the brook

Response: See response to General Comment No. 4 above.

EPA Follow-on Comment: *As discussed regarding SS Comment 2, Army's RTC for General Comment 4 is inadequate. SS Comment 5 has not yet been addressed. Because this site is the subject of ongoing EPA/Army informal dispute resolution negotiations on the 2020 Devens FYR and September 29, 2020 EPA Additional Work letter, further discussion/resolution of these issues is not required in the context of the 2019 Annual Report.*

Comment 6 - Page 1, Section 1, 3rd ¶, last sentence - EPA agrees with the statement that the December 16, 2019 sampling plan amendment provided additional proposed sampling to address EPA's request for more information on AOC 57. EPA notes that discussions (comments and responses) continued during and beyond the sampling period and that on March 26, 2020, Army stated, in response to EPA Comment 2, "It is anticipated that the work for the east side of Cold Spring Brook will be planned and executed in 2020." The results obtained in February – April 2020 represent good steps forward but do not remove the need for work on the far side of the brook. When in 2020 does Army plan to do the work? Please provide EPA with an informal submittal as to the details for this work (i.e. proposed boring, piezometer, and well locations) in time for discussion prior to mobilization.

Response: See response to General Comment No. 4 above.

EPA Follow-on Comment*: Army's RTC for General Comment 4 does not address SS Comment 6. Because this site is the subject of ongoing EPA/Army informal dispute resolution negotiations on the 2020 Devens FYR and September 29, 2020 EPA Additional Work letter, further discussion/resolution of these issues is not required in the context of the 2019 Annual Report.*

- **Figure 2-6** - The 224 contour is based on no data and should be removed. The 223 contour is beyond the last data point and should be dashed or omitted. The horizontal gradient calculation is thus unreliable;

  Response: The 224-foot contour line was removed, and the 223-foot contour line was dashed to represent an inferred shallow groundwater contour. The horizontal gradient calculation was recalculated. The fourth paragraph of Section 2.2 Groundwater Hydrology on page 6 will be revised as follows:

"Horizontal groundwater gradients for the shallow and deep groundwater in Area 3, using the flow lines shown in Figure 2-6 and Figure 2-7, were calculated to be 0.02 ft/ft (Gradient Line A-A', Figure 2-6) and 0.127ft/ft (Gradient Line A-A', Figure 2-7, respectively".

EPA Follow-on Comment: *The revised text says 0.027 for the shallow gradient, not 0.02. Please confirm which is correct and amend, if necessary.*

Comment 9 – Pages 6-7, Section 2.2 - The paragraphs at the bottom of page 6 and the top of page 7 discuss vertical gradient calculations at well pairs and triplet in AOC 57, Areas 2 and 3 and refer to the actual results in Table 2-1. The new wells and piezometers are excellent additions, and the vertical gradient calculations are good additions to the understanding of the site. However, the conclusions that "deep groundwater at Area 2 moves upward toward Cold Spring Brook" and that "deep groundwater at Area 3 moves upward toward Cold Spring Brook" are not currently justified by data, though they may be shown to be true; additional measurements at existing couplets and triplets will be necessary as will measurements at new monitoring points closer to, and on the far side of, Cold Spring Brook. These will be needed to support or refute the above conclusions.

Table 2-1 shows all vertical gradients as less than 0.01 ft/ft downward or less than 0.04 ft/ft upward. Such low gradients may well reverse at different times of the year or under different weather conditions. Even if the upward gradients consistently drive upward flow at the site, Army has shown that deep groundwater could discharge into the wetland, but it is still unknown if deep groundwater discharges into the brook. Deep groundwater flow beneath Cold Spring Brook or off site in some other direction has not yet been ruled out. Promised investigations on the far side of Cold Spring Brook are still needed.

Response: See response to General Comment No. 4 above.

EPA Follow-on Comment: *Army's response is unacceptable. However, because this site is the subject of ongoing EPA/Army informal dispute resolution negotiations on the 2020 Devens FYR and September 29, 2020 EPA Additional Work letter, further discussion/resolution of these issues is not required in the context of the 2019 Annual Report.*

Comment 10 – Pages 7-9, Sections 2.4.1 and 2.4.2 – Shallow downgradient well 57M-96-11X had exceedances for arsenic, iron, and manganese, but most of the vertical profile samples in downgradient locations for both Area 2 and Area 3 did not show significant exceedances. If these results can be repeated, it may be possible to delineate bounds for exceedances of some or all of the metals of concern. Note other concerns, however, per Page-Specific Comments SS13, SS16, and SS18.

Response: See response to General Comment No. 4 above.

EPA Follow-on Comment: *Army's RTC for General Comment 4 does not address SS Comment 10; however, because this site is the subject of ongoing EPA/Army informal dispute resolution negotiations on the 2020 Devens FYR and September 29, 2020 EPA Additional Work letter, further discussion/resolution of these issues is not required in the context of the 2019 Annual Report.*

Comment 12 – Page 9, Section 2.4.3.1, ¶ 2 – Army cites elevated arsenic at well 57M-03-05, still transitioning from reducing to oxidizing conditions. Please continue to track the arsenic levels and oxidation condition indicators for this well in future reports. The vertical profile transect for Area 2, is obliquely down-gradient; there are no monitoring points directly down-gradient from this well. Additional monitoring wells are needed downgradient of 57M-03-05 to delineate the extent of arsenic concentrations and monitor arsenic concentrations and attainment of ROD-specified RAOs and cleanup goals in this area of the AOC 57 site. This will continue to be an unresolved data gap until additional, downgradient monitoring points are installed and site-specific data collected (See PSC 15 regarding the location of the

vertical profile transect and EPA's September 29, 2020, FYR Summary of Additional Work Requirements.)

Response: See response to General Comment No. 4 above.

EPA Follow-on Comment: *Army's response is unacceptable. Because this site is the subject of ongoing EPA/Army informal dispute resolution negotiations on the 2020 Devens FYR and September 29, 2020 EPA Additional Work letter, further discussion/resolution of these issues is not required in the context of the 2019 Annual Report.*

Comment 13 - Pages 9 and 10 (bottom of pages) - EPA appreciates the integration of vertical gradient results and arsenic concentrations in well triplet 57M-03-05X/5702M-20-01A/5702M-20-01B. EPA also notes that only one set of vertical gradient measurements has been made, and the vertical gradient is small and could change with seasonal or other conditions. (See PSC 3.) Please continue to assess vertical gradients in conjunction with arsenic levels at this well triplet to see if the conclusion is justified.

Response: See response to General Comment No. 4 above.

EPA Follow-on Comment: *Army's response is unacceptable. Because this site is the subject of ongoing EPA/Army informal dispute resolution negotiations on the 2020 Devens FYR and September 29, 2020 EPA Additional Work letter, further discussion/resolution of these issues is not required in the context of the 2019 Annual Report.*

Comment 14 – <u>Page 11, 1st two full ¶s</u> - The last sentence of each paragraph concludes that upward gradients preclude site related impacts to deep groundwater. These sentences are premature and unsupported by available site-specific data. Under other conditions, the vertical gradients at the locations in question could be zero or downward. Please delete.

Response: See response to General Comment No. 4 above. The last sentence of the first full paragraph was revised as follows:

> *"The dissolved arsenic detected at deep piezometer 5703PZ-19-01 (64 µg/L) located adjacent to 57M-96-11X is the result of a strongly reducing environment in the deeper groundwater; the measured upward gradient at this well pair indicates shallow groundwater with elevated arsenic has not migrated downward."*

The second full paragraph on page 11 was revised as follows:

> *"Arsenic was detected at one additional monitoring point, deep monitoring well 5703MW-20-01B, at a concentration (11 µg/L) only marginally greater than the cleanup goal. This well is situated to the east of the former source area in a cross-gradient location. The ORP and DO data at this well were in the reducing range."*

EPA Follow-on Comment: *Army's response is unacceptable. Continued references to the very brief and general RTC for General Comment 4 are not helpful and effectively postpone progress on serious technical concerns raised by EPA. In addition, the proposed revised sentence for the end of the first paragraph is still not justified by the data currently available. It would be simplest to hold off on making such conclusions until additional vertical gradients are calculated under varying conditions to see if upward gradients persist or not. If Army wishes to make a conclusion after this first gradient measurement, the last phrase could be altered to – "….the measured upward gradient at this well pair, if shown to persist over time and a range of conditions, would indicate that shallow groundwater with elevated arsenic has not migrated downward at this location." Because this site is the subject of ongoing EPA/Army informal dispute resolution negotiations on the 2020 Devens FYR and September 29, 2020 EPA Additional Work letter, further discussion/resolution of these issues is not required in the context of the 2019 Annual Report.*

Comment 15 – Figure 2-8 - Please add the containment dam to this figure. Also, where are the Area 2 vertical profile transects located relative to the containment dam? It appears that the locations may be on or just southwest (up-gradient?) of the containment dam. If so, are sampling results from these locations representative of the aquifer at Area 2 and down-gradient of Area 2? If not representative, lack of metals impacts at these locations does not prove that site impacts have not reached Cold Spring Brook or beyond. Contaminant migration could be occurring to the southeast (down-gradient) from the 57M-03-05X area and to the east of the containment dam. (See EPA's September 29, 2020, FYR Summary of Additional Work Requirements.)

Response: See response to General Comment No. 4 above.

Appendix G Figures 2-2 and 2-3 were revised to show both the containment dam at Area 2 and location of the 2020 vertical profile transects in Areas 2 and 3. Appropriate revisions were made to the text. Appendix G Figure 2-8 AOC 57 Vertical Profile Transects, Area 2 and Area 3 was removed

EPA Follow-on Comment: *Army's RTC for General Comment 4 has nothing to do with SS Comment 15. The questions posed in SS Comment 15 have not been answered. EPA sees the containment dam on Appendix G, Figure 2-2 but not on Figure 2-3; EPA does not see the transect locations on either figure. The PDF pages for Appendix G seem out of order, with the bookmarking correspondingly confused; EPA might have missed the figures that show the profile locations.*

Comment 16 – Pages 12-13, Section 2.6.1 - The Area 2 conclusions are unsupported by available site-specific data and should be deleted. EPA reminds Army that the discontinuation of sampling was not approved by EPA and as such, must be reinstated (and data collected) prior to consideration of the omission of these monitoring locations in the LTMMP updated required per EPA's September 29, 2020, FYR Summary of Additional Work Requirements. While EPA appreciates that supplemental sampling performed in 2020 has contributed significantly to Area 2 site knowledge, Army's conclusion at the bottom of the first full paragraph on page 13, "These data indicate that arsenic greater than the cleanup goal has not been transported into or beyond Cold Spring Brook" is not justified/supported by available data.

Response: See response to General Comment No. 4 above.

EPA Follow-on Comments: *Army's RTC for General Comment 4 does not address SS Comment 16. Because this site is the subject of ongoing EPA/Army informal dispute resolution negotiations on the 2020 Devens FYR and September 29, 2020 EPA Additional Work letter, further discussion/resolution of these issues is not required in the context of the 2019 Annual Report.*

From: Keating, Carol <Keating.Carol@epa.gov>
Sent: Friday, February 26, 2021 11:17 AM
To: robert.j.simeone.civ@mail.mil
Cc: James Ropp <jropp@Komangs.com>; Chaffin, David (DEP) (David.Chaffin@MassMail.State.MA.US) <David.Chaffin@MassMail.State.MA.US>; Roy Herzig (RHerzig@Massdevelopment.com) <RHerzig@Massdevelopment.com>; Liyang Chu <LChu@nobis-group.com>; Jennifer Lambert <jlambert@nobis-group.com>; Jim Vernon <jvernon@nobis-group.com>
Subject: RE: Fort Devens 2019 Main Post Annual Report (draft final)

EPA has reviewed Army's December 14, 2020 responses to EPA's comments on the above-referenced document and December 2020 redline/strikeout (RLSO) draft final report to verify incorporation of previously-agreed upon edits to the text, figures, and other components of the report. Although Army has yet to address/respond to EPA's January 27, 2021 Follow-On Comments, all of previously-raised concerns and agreed-upon changes appear to have been adequately addressed with the exception of the following:

- Page-Specific Comments (PSCs) 11 and 12 – EPA's comment focused specifically on the January 21, 2020 statements of Ms. Michelle McKenna, Business Manager at the Francis W. Parker Charter Essential School, as recounted in the annual report (i.e. "Ms. McKenna indicated that internal HVAC and sidewalk/retaining wall work has been done in the corner of the building near the ESMA as planned, but all work did not extend below 2-feet.") EPA raised concern about the statement because according to language in Section 3.6, the LUCs (as discussed in the deed) prohibiting excavation of contaminated soils beneath and adjacent to the building (without the prior written approval of the Grantor, the EPA, and the DEP), applies to soils at any depth. EPA raised concern that her statement might be indicative of a potential breach in LUCs and requested that Army provide evidence to support its claims that LUCs were not in fact violated.

Instead of providing the requested evidence, Army's decision to revise details of the McKenna interview and LUC inspection instead of providing the requested supportive documentation, is unacceptable. Specifically, in Response to Comment 11 (re McKenna interview), Army changed its account (in Section 3.6.1) of the interview from past tense ("has been done") to future tense ("is planned"). Reporting of the McKenna interview should be factual, not something to be changed in response to an EPA comment, unless a mistake was discovered in the earlier draft. The revised account of the interview seems to focus on events prior to project implementation, whereas EPA's concern had been that the Charter School and its contractors may not have known about or followed ROD-specified requirements. What started as a request to Army for information regarding activities by others, has led to inaccuracies/discrepancies in Army's reporting of the McKenna interview.

Even more troubling is Army's removal of references to the 2-foot excavation limit, in response to Comment 12, in its account of both the McKenna interview (Section 3.6.1) and the LUC inspection (Section 3.6.2). (As noted below, Army's RLSO version of the report still retains one reference to the 2-foot excavation.) Simply removing references to the excavation depth does not address EPA's comments. Does Army no longer believe that all excavations were shallower than 2 feet? Army's edit in Section 3.6.2 (RTC #12) completely changes the meaning. In the previous draft of the report, Army stated, "There were no excavations or penetrations greater than two feet through pavement ….". In the RLSO version, Army stated, "There were no excavations or penetrations through pavement….". Is Army saying that excavation through pavement did not happen at all or that it did happen and may have been greater than 2 feet? EPA questions whether either of these statements can be made from the LUC inspection unless Army was present during the construction project. Otherwise, the information may have come from the McKenna interview, not the LUC inspection. The complete change in meaning in response to EPA's comments casts doubt on reported accounts. The underlying problem of how to develop better communication between the various stakeholders as well as whether or not a ROD violation occurred in this case remains unanswered.

- PSC 12 – Regarding the Francis W. Parker Charter Essential School construction project at AOC 69W, Army's RTC indicated it had removed references to the 2-foot excavation depth. However, one such reference remains in the second paragraph of Section 3.6.1.

- PSC 19 – Referring to groundwater contours, Army's RTC stated that they removed the word "interpretive" from the second paragraph of Section 4.2 and throughout the report. While EPA was able to confirm the removal of "interpretive" from Section 4.2, Army should confirm deletion of the work

through the entire report.

- Appendix G, PSC 7, Figure 2-6 – The 224-foot contour was removed as promised, but the 223-foot contour (Army said it was dashed) was not present on the revised figure.

- Appendix G, PSC 15, Figures 2-2, 2-3, and 2-8; text – As promised, Figure 2-2 shows the containment dam, but the promised edit to the show the transect was not made (or not shown on the associated PDF). Figure 2-3 does not show the transect, as Army indicated. Also, Army said that "appropriate revisions to text" were made in light of EPA's comment 15, but did not say where these revisions were made. Please specify.

- Appendix G, Revised Figure 2-8 – The revised figure is an excellent addition that shows groundwater contours for all three AOC 57 sub-areas and AOC 74. EPA notes, however, that conclusions cannot be confirmed until water level data is collected from the far side of Cold Spring Brook. The contours shown on Figure 2-8 are not consistent with a typical V-downstream pattern that one sees when groundwater discharges to a stream. If anything, the existing contours might support a V-upstream pattern, but that cannot be determined without data from the far side of the Brook. If the V-downstream pattern is not present when there is a full data set, this would indicate that groundwater may flow beneath the stream instead of discharging to it.

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From: James Ropp <jropp@Komangs.com>
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To: Reddy, Penelope W CIV (USA) <PENELOPE.W.REDDY@usace.army.mil>;

robert.j.simeone.civ@mail.mil; Keating, Carol <Keating.Carol@epa.gov>; David Chaffin - MassDEP Bureau of Waste Site Cleanup (david.chaffin@state.ma.us) <david.chaffin@state.ma.us>; Roy Herzig - MassDevelopment (RHerzig@Massdevelopment.com) <RHerzig@Massdevelopment.com>
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Subject: Fort Devens 2019 Main Post Annual Report (draft final)

KGS is pleased to provide the draft final *2019 Annual Operations, Maintenance, and Monitoring Report* for the Main Post sites at the Former Fort Devens Army Installation, Devens, MA.
Please see the attached transmittal letter for additional details.
A copy of the draft final annual report can be downloaded from the following link:
https://hsenv.sharefile.com/d-s2260e0be3db74b9d95f4361e5dc5c841
A hardcopy can be provided upon request.
Thanks

Jim Ropp, P.E.
Project Manager

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From: Chaffin, David (DEP) <david.chaffin@state.ma.us>
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To: James Ropp <jropp@Komangs.com>; Reddy, Penelope W CIV (USA) <PENELOPE.W.REDDY@usace.army.mil>; 'Bob Simeone' <robert.j.simeone.civ@mail.mil>
Cc: 'Carol Keating' <Keating.Carol@epa.gov>; Roy Herzig - MassDevelopment (RHerzig@Massdevelopment.com) <RHerzig@Massdevelopment.com>
Subject: RE: Fort Devens 2019 Main Post Annual Report (draft final)

One comment on the draft final report:

1. The field notes and lab reports included in the RLSO preview in response to MassDEP Comments 9 and 10 on the draft report should be included in the final report.

David Chaffin
Massachusetts Department of Environmental Protection
One Winter Street, 3rd Floor
Boston, MA 02108

From: James Ropp <jropp@Komangs.com>
Sent: Thursday, January 28, 2021 5:33 PM
To: Reddy, Penelope W CIV (USA) <PENELOPE.W.REDDY@usace.army.mil>; 'Bob Simeone' <robert.j.simeone.civ@mail.mil>; 'Carol Keating' <Keating.Carol@epa.gov>; Chaffin, David (DEP) <david.chaffin@mass.gov>; Roy Herzig - MassDevelopment (RHerzig@Massdevelopment.com) <RHerzig@Massdevelopment.com>
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<MMiller@komangs.com>; Lynne Klosterman <LKlosterman@komangs.com>
Subject: Fort Devens 2019 Main Post Annual Report (draft final)

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

KGS is pleased to provide the draft final *2019 Annual Operations, Maintenance, and Monitoring Report* for the Main Post sites at the Former Fort Devens Army Installation, Devens, MA.
Please see the attached transmittal letter for additional details.
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https://hsenv.sharefile.com/d-s2260e0be3db74b9d95f4361e5dc5c841
A hardcopy can be provided upon request.
Thanks

Jim Ropp, P.E.
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APPENDIX I

78 BARNUM ROAD IRRIGATION WELL INFORMATION

Sontag Pump Company, L.L.C.

YOUR WATER NEEDS ARE OUR PRIORITY!

Devens Enterprise Commission
APR 11 2016
Received

April 6, 2016

Neil Angus
Devens Enterprise Commission
33 Andrews Parkway
Devens, MA 01434

RE: 78 Barnum Road; Irrigation well

To Whom it May Concern,

An irrigation well was drilled as permitted of right rear corner of building. Well was drilled 505' deep, rated at 10 gallons per minute by the drilling company. A 1 H.P. pump was set in the well on 2/26/16 at 400'. A flowmeter was installed and pump test started at 10:00 am. Water level at 20' from the top of casing at the start of test. All water level measurements taken from top of casing. Meter start 2804 gallons at 10:00 am. Pump 13 gallons per minute.

11:00 am - 85', 12.5 gpm
12:00 pm - 96', 12.5 gpm
1:00 pm - 98', 12.5 gpm
2:00 pm - 100', 12.5 gpm
3:00 pm - 101', 12.5 gpm
4:00 pm - 103', 12.5 gpm

Meter end 7220 gallons, total pumped 4416 gallons.
Well volume 505'x1.58 gallons per foot = 797.9 gallons.
Required to pump 4 well volumes (3191.6)
Water level in well fully recovered in less than 1 hour. Well will easily meet needs of an irrgation system, not yet installed, but will be designed around wells capability. Water sampled for required testing.

Steven P. Sontag
MA Lic. #865

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Nashoba Analytical, LLC
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Tel: 978-391-4428 Fax: 978-391-4643
Website: http://www.NashobaAnalytical.com

LabNumber: **163936**
Use this number with all correspondence

Client:
Sontag Pump
177 Rowley Hill Road
Sterling, MA 01564

ReportDate: 3/24/2016

Certificate of Analysis

Parameter	Method		Result	MCL	MRL	Date of Analysis	Analyst
Hakala Construction, 78 Barnham Rd., Devens, MA, Well Head							
Sampled: 2/26/2016 4:00:00 PM by S. Sontag							
Total Coliform Bacteria, /100ml	ENZ. SUB. SM9223		Absent	Absent	Absent	2/26/2016 4:30:00 PM	M-MA1118
Arsenic, Total, MG/L	SM 3113B	#	0.063	0.01	0.001	2/29/2016	M-MA1118
Calcium, MG/L	EPA 200.7		28.1	Not Spec	0.2	2/29/2016	M-MA1118
Copper, MG/L	EPA 200.7		0.006	1.3	0.003	2/29/2016	M-MA1118
Iron, MG/L	EPA 200.7		0.3	0.3	0.003	2/29/2016	M-MA1118
Lead, MG/L	SM 3113B		ND	0.015	0.001	2/29/2016	M-MA1118
Magnesium, MG/L	EPA 200.7		10.3	Not Spec	0.1	2/29/2016	M-MA1118
Manganese, MG/L	EPA 200.7	#	0.2	0.05	0.002	2/29/2016	M-MA1118
Potassium, MG/L	EPA 200.7		0.6	Not Spec	0.1	2/29/2016	M-MA1118
Sodium, MG/L	EPA 200.7		36.2	See Note	0.2	2/29/2016	M-MA1118
Alkalinity, MG/L	SM 2320B		188	Not Spec	1	2/26/2016	M-MA1118
Ammonia as N, MG/L	SM 4500-NH3-D		0.12	Not Spec	0.1	2/26/2016	M-MA1118
Chloride, MG/L	EPA 300.0		1.8	250	1	2/26/2016	M-MA1118
Chlorine, Free Residual, MG/L	SM 4500-CL-G		ND	Not Spec	0.02	2/26/2016	M-MA1118
Color Apparent, CU	SM 2120B		5	15	0	2/26/2016	M-MA1118
Conductivity, UMHOS/CM	SM 2510B		430	Not Spec	1	2/26/2016	M-MA1118
Fluoride, MG/L	EPA 300.0		0.2	4	0.1	2/26/2016	M-MA1118
Hardness, Total, MG/L	SM 2340B		113	Not Spec	1	2/29/2016	M-MA1118
Nitrate as N, MG/L	EPA 300.0		ND	10	0.05	2/26/2016	M-MA1118
Nitrite as N, MG/L	EPA 300.0		ND	1	0.02	2/26/2016	M-MA1118
Odor, TON	SM 2150B		2	3	0	2/26/2016	RPM
pH, PH AT 25C	SM 4500-H-B		7.4	6.5 - 8.5	NA	2/26/2016	M-MA1118
Sediment, pos/neg	----------		NEG	------	NEG	2/26/2016	RPM
Sulfate, MG/L	EPA 300.0		13.8	250	1	2/26/2016	M-MA1118
Turbidity, NTU	EPA 180.1		1.7	Not Spec	0.1	2/26/2016	M-MA1118
Gross Alpha, PCI/L	EPA 900.0	#	59 +/- 2.7	15	1.1	3/6/2016	KNL
Radium 226, PCI/L	EPA 903.1		3.7 +/- 0.8		0.5	3/16/2016	KNL
Radium 228, PCI/L	EPA RA-05		1.5 +/- 0.5		0.7	3/21/2016	KNL
Radon, PCI/L	EPA 913.0		940	10000	100	3/2/2016	M-NH003
Uranium, UG/L	EPA 200.8		5.2	30	0.67	3/9/2016	M-NH003

MCL=Maximum Contaminant Level (EPA Limit), MRL = Minimum Reporting Level
Sodium Guidelines- Mass 20, EPA 250, # = Result Exceeds Limit or Guideline
ND = None Detected (<MRL), * = Background Bacteria Noted

Massachusetts Certified
Laboratory #M-MA1118

David L. Knowlton
Laboratory Director