FINAL

2018 ANNUAL OPERATIONS, MAINTENANCE, AND MONITORING REPORT

MAIN POST

FORMER FORT DEVENS ARMY INSTALLATION

JULY 2020

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2018 ANNUAL REPORT

LONG-TERM MONITORING – MAIN POST

FORMER FORT DEVENS ARMY INSTALLATION

DEVENS, MASSACHUSETTS

JULY 2020

CERTIFICATION:

I hereby certify that the enclosed Report, shown and marked in this submittal, is that proposed to be incorporated with Contract Number W912WJ-18-C-0011. This document was prepared in accordance with the U.S. Army Corps of Engineers (USACE) Scope of Work and is hereby submitted for Government Approval.

Reviewed By:

6/29/2020

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LIST OF ACRONYMS AND ABBREVIATIONS

1,2-DCB	1,2-dichlorobenzene
1,3-DCB	1,3-dichlorobenzene
1,4-DCB	1,4-dichlorobenzene
AAFES	Army Air Force Exchange Service
AOC	Area of Concern
AST	Above-Ground Storage Tank
BRAC	Base Realignment and Closure
BTEX	Benzene, Toluene, Ethylbenzene, Xylene
CCB	Continuing Calibration Blank
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act

CMR	Code of Massachusetts Regulations
COC	Contaminant of Concern
COD	Chemical Oxygen Demand
CY	Calendar Year
DCB	Dichlorobenzene
DCL	Devens Consolidation Landfill
Devens	Main Post of the former Fort Devens Army Installation
DGM	Digital Geophysical Mapping
DO	Dissolved Oxygen
DoD	Department of Defense
DRFTA	Devens Reserve Forces Training Area
DRMO	Defense Reutilization and Marketing
DRO	Diesel Range Organic
DPW	Department of Public Works
EBS	Environmental Baseline Study
ECSM	Expanded Conceptual Site Model
ELAP	Environmental Laboratory Accreditation Program
EPH	Extractable Petroleum Hydrocarbon
ESD	Explanation of Significant Difference
ESMA	Excavated Soils Management Area
FFS	Focused Feasibility Study
FOST	Finding of Suitability to Transfer
FS	Feasibility Study
ft/ft	Feet per foot
HA	Housing Area
Harding	Harding Environmental, Science & Engineering, Inc.
HGL	HydroGeoLogic, Inc.
HLA	Harding Lawson Associates, Inc.
IC	Institutional Control
IDW	Investigation Derived Waste
J	Estimated
KGS	KOMAN Government Solutions, LLC
LCRS	Leachate Collection and Recovery System
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
LEL	Lower Explosive Limit
LIFOC	Lease in Furtherance of Conveyance
LTM	Long-Term Monitoring
LTMMP	Long-Term Monitoring and Maintenance Plan
LUC	Land Use Control
LUCIP	Land Use Control Implementation Plan

MAROS	Monitoring and Remediation Optimization System
MassDEP	Massachusetts Department of Environmental Protection
MassDevelopment	Massachusetts Development and Finance Agency
MCL	Maximum Contaminant Level
MCP	Massachusetts Contingency Plan
MEC	Munitions and Explosives of Concern
mg/L	Milligrams per Liter
mm	Millimeter
MNA	Monitored Natural Attenuation
MS	Matrix Spike
MSD	Matrix Spike Duplicate
mv	Millivolt
NA	Not Analyzed
ND	Non-Detect
NELAP	National Environmental Laboratory Accreditation Program
NOAA	National Oceanic and Atmospheric Administration
NS	No Standard
NTU	Nephelometric Turbidity Unit
O&M	Operations and Maintenance
ORP	Oxidation Reduction Potential
OER	Ordnance and Explosive Remediation, Inc.
PAH	Polycyclic Aromatic Hydrocarbon
PCB	Polychlorinated Biphenyl
PARCCS	Precision, Accuracy, Representativeness, Completeness, Comparability, and Sensitivity
PASI/SSI	Preliminary Assessment/Site Inspection and Supplemental Site Investigation Comprehensive Report
PCE	Tetrachloroethene
POL	Petroleum, Oils, and Lubricants
ppm	Parts per million
Q	Qualifier
QAPP	Quality Assurance Project Plan
QC	Quality Control
QSM	Quality Systems Manual
RAO	Remedial Action Objective
ROD	Record of Decision
RPD	Relative Percent Difference
RI	Remedial Investigation
SA	Study Area
SVOC	Semi-Volatile Organic Compound
TAL	Target Analyte List

TCE	Trichloroethene
TDS	Total Dissolved Solids
TestAmerica	TestAmerica Laboratories, Inc.
TPH	Total Petroleum Hydrocarbon
TSS	Total Suspended Solids
TTO	Total Toxic Organics
U	Non-Detect
UJ	Qualified Non-Detect
USEPA	United States Environmental Protection Agency
USACE-NAE	United States Army Corps of Engineers, New England District
UST	Underground Storage Tank
UXO	Unexploded Ordnance
µg/L	Micrograms per liter
µS/cm	MicroSiemens per centimeter
VOC	Volatile Organic Compound
VPH	Volatile Petroleum Hydrocarbons
Weston	Weston Solutions, Inc.

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EXECUTIVE SUMMARY

KOMAN Government Solutions, LLC (KGS) has prepared this 2018 Annual Report on behalf of the United States Army Corps of Engineers (USACE) North Atlantic Division, New England District (NAE) to document the ongoing Long-Term Monitoring (LTM) activities in several areas of concern (AOC) at the Main Post of the former Fort Devens Army Installation (Devens), located in Devens, Massachusetts. The LTM activities described within this report were performed to fulfill requirements of site-specific Records of Decision (ROD) and were performed in accordance with the 2015 *Long Term Monitoring and Maintenance Plan* (LTMMP; Sovereign/ HydroGeoLogic, Inc. [HGL], 2015).

The scope of this document details the 2018 LTM activities conducted at AOC 57, AOC 69W, AOC 43G, AOCs 32 and 43A, the Devens Consolidation Landfill (DCL), and the Grant Housing Area (HA) and 37-mm Impact Area (**Figure 1-1**).

The Army conducted the spring LTM event in April/May 2018 at AOC 57, AOCs 32/43A, and the DCL. Ten monitoring wells and one surface water location were sampled during the spring LTM event. The Army conducted the fall LTM event in October 2018 at AOC 43G, AOC 69W, and the DCL (with an additional DCL leachate sample in December 2018), and consisted of samples from sixteen groundwater monitoring wells, two well points, and one leachate sample. Samples that contained contaminants of concern (COCs) at concentrations exceeding the criteria set forth in the respective RODs are summarized below.

- AOC 57 (Area 3) – During the spring 2018 LTM event, groundwater samples were collected from two monitoring wells and one surface water location. Total arsenic in both groundwater wells exceeded the 10 microgram per liter (µg/L) cleanup goal established in the 2001 ROD. The dissolved iron results from the surface water sample exceeded the 1,000 µg/L benchmark based on United States Environmental Protection Agency (USEPA) water quality criteria (**Table ES-1**).
- AOC 69W – Groundwater was sampled from eight monitoring wells and two well points during the fall LTM event. Arsenic exceeded the 10 µg/L cleanup goal in four wells and iron (one well) and manganese (five wells) exceeded the site-specific monitoring criterion (**Table ES-2**).
- AOC 43G – Groundwater was sampled from four monitoring wells during the fall LTM event. Concentrations of benzene, ethylbenzene, and xylenes did not exceed the cleanup goals. Arsenic (two wells), iron (three wells), and manganese (three wells) exceeded the site-specific cleanup goals and volatile petroleum hydrocarbons (VPH) (two wells) exceeded the monitoring criteria (**Table ES-3**).
- AOCs 32 and 43A – Groundwater was sampled from four monitoring wells during the spring LTM event. Arsenic (one well), manganese (one well) and 1,2-dichlorobenzene (1,2-DCB)/1,3-dichlorobenzene (1,3-DCB)/1,4-dichlorobenzene (1,4-DCB) exceeded the site-specific cleanup goals in the sample from one well. VPH and chlorobenzene exceeded the site-specific monitoring criteria in one well (**Table ES-4**).
- DCL – Four monitoring wells were sampled during the spring and fall LTM events. There were no exceedances of the site-specific cleanup goals and monitoring criteria. The December 2018 leachate sample results did not exceed the discharge permit limits.

The following sections summarize the key conclusions associated with the 2018 LTM program. Recommendations for changes to the LTM program are not provided in this report; instead, such

LTMMP to be prepared on an as-needed basis. Remedial duration assessments are also not provided in this LTM report. Remedial duration assessments were presented in the *2015 Five-Year Review Report* (H&S Environmental, 2015) for sites with (AOC 43G and AOCs 32/43A) and without (AOC 69W and AOC 57) ROD-established remedial timeframes. These assessments indicated that the remedial durations established in the respective RODs will be met with continued long-term monitoring and Institutional Controls (ICs). The Army will evaluate remedial durations again as part of the 2020 Five-Year Review.

AOC 57 Conclusions

- Total arsenic was detected at concentrations above the cleanup goal at monitoring wells 57M-95-03X and 57M-96-11X during the spring 2018 LTM event. The 2018 groundwater sampling results for arsenic remain consistent with previous events. Graphical and statistical analysis of the data trends over time indicate that the total arsenic concentrations at wells 57M-95-03X and 57M-96-11X are remaining relatively stable with no statistically significant trends ($p < 0.05$).
- Dissolved iron was detected above the USEPA Water Quality Criterion at surface water sampling location 57-AREA3-SW1 during the spring 2018 LTM event.
- Land Use Controls (LUCs) remain effective at AOC 57.

AOC 69W Conclusions

- Dissolved arsenic remains above the cleanup goal at monitoring wells 69W-94-13, ZWM-95-15X, ZWM-99-22X, and ZWM-99-23X. The arsenic concentrations continue to fluctuate over the period of record. Manganese was detected at 69W-94-13, 69W-94-14, ZMW-95-15X, ZWM-99-22X, and ZWM-99-23X above the 291 µg/L monitoring criterion. Manganese concentrations continued to fluctuate with no apparent trend from 2000 to 2018, except for well ZWM-99-23X, which has a statistically significant downward trend ($p = 0.005$), even with an increased detected concentration value in 2018.
- Extractable petroleum hydrocarbon (EPH) Massachusetts Department of Environmental Protection (MassDEP) concentrations were less than the laboratory detection limits or less than the monitoring criteria in 2018 with the exception of the detection of EPH C_{11}-C_{22} aromatics at one well (ZMW-99-22X) that exceeded the 200 µg/L monitoring criterion.
- LUCs remain effective at AOC 69W.

AOC 43G Conclusions

- Concentrations of benzene, ethylbenzene, and xylenes at AOC 43G were below the cleanup goals established in the ROD. Total arsenic concentrations exceed the cleanup goal at two wells (AAFES-2 and XGM-93-02X). Total iron concentrations exceeded the cleanup goal at wells AAFES-2 (with a downward trend), XGM-93-02X (with a downward trend), and XGM-97-12X (with no apparent trend). Total manganese concentrations exceeded the cleanup goal at AAFES-2 (downward trend), XGM-93-02X (downward trend), XGM-94-04X (no trend), and XGM-97-12X (downward trend). This is likely attributable to a reducing groundwater environment that is low in dissolved oxygen (DO) and high in turbidity, thereby generating more soluble and mobile forms of arsenic, iron, and manganese from the aquifer formation.

- VPH C_5-C_8 aliphatics and C_9-C_{10} aromatics were detected above the monitoring criteria at two wells: AAFES-2 and XGM-97-12X. These wells are located downgradient of the former UST tanks. VPH concentrations are evaluated against Massachusetts Contingency Plan (MCP) standards for comparison purposes, but the standards are not considered cleanup goals under the ROD. For VPH C_5-C_8 aliphatics, statistically significant downward data trends were noted for wells AAFES-2, XGM-93-02X, and XGM-97-12X. Although 2018 results were non-detect for well XGM-94-04X, a longer-term statistically significantly upward trend was noted for the well for the complete LTM dataset. For VPH C_9-C_{10} aromatics, concentrations were above the monitoring criteria at two wells, with an increase at XGM-97-12X from 2016 to 2018, and a slight decrease at AAFES-2 from 2017 to 2018. However, overall, three of the wells (AAFES-2, XGM-93-02X, and XGM-97-12X) have statistically significant decreasing trends and one well (XGM-94-04X) does not have a statistically significant trend. In 2018, the VPH C_9-C_{12} concentrations in the sampled AOC 43G wells were below the 700 µg/L monitoring criterion.
- The Army will continue to evaluate the trend of C5-C8 aliphatic concentrations at current LTM wells following receipt of the fall 2019 sampling data. VPH will be sampled for the wells identified by the current LTM program. The additional existing downgradient monitoring wells to be sampled in fall 2019 to supplement the current LTM wells will be sampled for manganese and iron, with the objective to more fully support Army current understanding of the downgradient extent of site impacts from ROD-specified COCs.
- LUCs remain effective at AOC 43G.

AOCs 32 and 43A Conclusions

- COCs at AOC 32 and 43A include arsenic, manganese, VPH, and volatile organic compounds (VOCs); in particular, the dichlorobenzene (DCB) isomers. Total arsenic exceeded the cleanup goal at monitoring well 32M-01-14XOB and manganese and 1,2-DCB/1,3-DCB/1,4-DCB exceeded the cleanup goal at the source area well 32M-01-18XBR. VPH C_9-C_{10} aromatics also exceeded the monitoring criterion in the source area well 32M-01-18XBR. The DCB isomers and VPH C_9-C_{10} concentrations at 32M-01-18XBR show overall statistically significant downward trends. VPH concentrations are evaluated against MCP standards for comparison purposes, but the standards are not considered cleanup goals under the ROD. Chlorobenzene was detected (440 µg/L) above the monitoring criteria (100 µg/L) at 32M-01-18XBR.
- Based on the groundwater flow direction identified in 2018, wells 32M-01-15XBR and 32M-01-16XBR will be included in the fall 2019 LTM sampling program as a supplement to the currently planned LTM program. Results from the supplemental data will indicate if continued sampling in subsequent sampling events is warranted.
- Maintenance activities to the monitoring well network during 2018 included the repair of the road box for monitoring well 32Z-01-09XOB which was presumably damaged by a snow plow over the winter.
- LUCs remain effective at AOCs 32 and 43A.

DCL Conclusions

- The groundwater sampling results from the DCL monitoring wells have maintained non-detections or low-level detections below the monitoring benchmarks.

- The DCL leachate sample results were within the discharge permit limits.
- LUCs remain effective at DCL.
- The LUC inspections of the DCL contributor sites (AOC 9, AOC 40, and Study Area 13) revealed no changes in land use at the individual contributor sites. Per the requirements of the 2006 transfer deed, these contributor sites are not being used or are intended to be used for residential purposes.
- Maintenance activities at the DCL during 2018 included landfill mowing, leachate pump flow meter calibration, survey of repaired monitoring well LFM-03-07, clearing of vegetation from the riprap along the toe of the landfill, flush-cutting of larger vegetation on the landfill cap, repair of landfill gas vent labels and screens, reseeding and fertilizing selected areas of the landfill cap, monthly inspections of the leachate pump system, and repairs to the leachate pump controller.
- Three soil gas probes were installed in the overburden soil in between the DCL and the new building to the east. Soil gas sampling results were acceptable (no anticipated risks associated with the soil gas concentrations).

Grant, Oak, Maple Housing Areas, and 37-mm Impact Area Conclusions

- Results of the annual compliance monitoring indicate that no deviations or deficiencies to the LUCs were evident and corrective action(s) were not necessary.
- No significant anomalies were detected during the annual UXO screening.
- In March 2017, the Army submitted a Land Use Control Implemental Plan (LUCIP) for the Oak and Maple Housing Areas for regulatory agency approval. On 2 October 2018, EPA requested that the LUCIP be put on hold pending completion of a Massachusetts Notice of Activity and Use Limitation (NAUL) between MassDEP and MassDevelopment. Regulatory agency concurrence of the NAUL is pending.

Table ES-1
AOC 57 Area 3 Contaminant of Concern Cleanup Goal Exceedances, May 2018
Main Post, Former Fort Devens Army Installation, Massachusetts

Well Identification	Analyte	Cleanup Goal (µg/L) [1]	Benchmark (µg/L)	Detected Result (µg/L)
Groundwater				
57M-95-03X [2]	Arsenic (total)	10	--	42
57M-96-11X [3]	Arsenic (total)	10	--	180
Surface Water				
57M-SW-1	Iron (dissolved)	--	1,000 [4]	4,000

Notes:

[1] The Cleanup Goal for arsenic in groundwater is the Maximum Contaminant Level (MCL) standard.

[2] Sentry Well

[3] Source Area Well

[4] The monitoring benchmark for iron in surface water is the USEPA Water Quality Criterion.

Table ES-2
AOC 69W Contaminant of Concern Monitoring Criteria Exceedances, October 2018
Main Post, Former Fort Devens Army Installation, Massachusetts

Well Identification	Analyte	Cleanup Goal (µg/L) [1]	Benchmark (µg/L) [4]	Detected Result (µg/L)
69W-94-13[2]	Arsenic (dissolved)	10	--	35
	Manganese (dissolved)	--	291	1,600
ZWM-94-14	Manganese (dissolved)	--	291	320
ZWM-95-15X[3]	Arsenic (dissolved)	10	--	18
	Manganese (dissolved)	--	291	340
ZWM-99-22X[2]	Arsenic (dissolved)	10	--	150
	Iron (dissolved)	--	9,100	19,000
	Manganese (dissolved)	--	291	1,500
	EPH C_{11}-C_{22} Aromatics	--	200	230
ZWM-99-23X[3]	Arsenic (dissolved)	10	--	39
	Manganese (dissolved)	--	291	1,600

Notes:

1 Cleanup Goal for arsenic in groundwater is the MCL standard.

[2] Source Area Well

[3] Sentry Well

[4] EPH concentrations are evaluated against Massachusetts Contingency Plan (MCP) standards for comparison purposes, but the standards are not considered cleanup goals under the ROD. The monitoring criteria for iron and manganese are background levels.

Table ES-3
AOC 43G Contaminant of Concern Cleanup Goal Exceedances, October 2018
Main Post, Former Fort Devens Army Installation, Massachusetts

Well Identification	Analyte	Cleanup Goal (µg/L) [1]	Benchmark (µg/L)[4]	Detected Result (µg/L)
AAFES-2[2]	Arsenic (total)	10	--	20
	Iron (total)	9,100	9,100	19,000
	Manganese (total)	375	291	3,100
	VPH C_5-C_8 Aliphatics	--	300	480 J
	VPH C_9-C_{10} Aromatics	--	200	990
XGM-93-02X[2]	Arsenic (total)	10	--	11
	Iron (total)	9,100	9,100	20,000
	Manganese (total)	375	291	1,900
XGM-97-12X[2]	Iron (total)	9,100	9,100	27,000
	Manganese (total)	375	291	3,800
	VPH C_5-C_8 Aliphatics	--	300	360
	VPH C_9-C_{10} Aromatics	--	200	1,000

Notes:

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

[2] Source Area Well

[3] Sentry Well

[4] VPH concentrations are evaluated against MCP standards for comparison purposes, but the standards are not considered cleanup goals under the ROD.

Table ES-4
AOCs 32 and 43A Contaminant of Concern Cleanup Goal Exceedances, June 2018
Main Post, Former Fort Devens Army Installation, Massachusetts

Well Identification	Analyte	Cleanup Goal (µg/L) [1]	Benchmark (µg/L)[4]	Detected Result (µg/L)
32M-01-14XOB[2]	Arsenic (total)	10	--	32
32M-01-18XBR[3]	Manganese (total)	3,500	--	8,400
	1,2-dichlorobenzene	600	--	840
	1,3-dichlorobenzene	100	--	150
	1,4-dichlorobenzene	5.0	--	97
	Chlorobenzene	--	100	440
	VPH[4] C_9-C_{10} aromatics	--	200	760

Notes:

[1] Cleanup Goals for arsenic and 1,4-DCB are the MCL standards.

[2] Downgradient Well

[3] Source Area Well

[4] VPH concentrations are evaluated against MassDEP GW-1 standards for comparison purposes but are not considered cleanup goals under the ROD.

1.0 INTRODUCTION

KOMAN Government Solutions, LLC (KGS) prepared this 2018 Annual Long-Term Monitoring (LTM) Report to detail the performance of ongoing LTM activities required at the former Fort Devens Army Installation (Devens) site, located in Devens, Massachusetts (**Figure 1-1**). LTM activities were performed in accordance with the *Long-Term Monitoring and Maintenance Plan* (LTMMP; Sovereign/HydroGeoLogic, Inc. [HGL], 2015).

1.1 LONG-TERM MONITORING PROGRAM BACKGROUND

The overall LTM program instituted at Devens is a result of the individual Records of Decision (RODs) issued for each area of concern (AOC) referenced in this report. These AOCs consist of:

- AOC 57 – Building 3713 Fuel Oil Spill [Harding Environmental, Science & Engineering (Harding), 2001]
- AOC 69W – Fort Devens Elementary School (Building 215) Fuel Oil Spill Site (Harding Lawson Associates [HLA], 1999a)
- AOC 43G – Historical Gas Station G (United States Environmental Protection Agency [USEPA], 1996)
- AOCs 32 and 43A – Defense Reutilization and Marketing Office (DRMO) Yard and former Petroleum, Oils, and Lubricants (POL) Storage Area (Horne Environmental Services, Inc. 2001);
- The Devens Consolidation Landfill (DCL) (HLA, 1999b)
- Grant Housing Area (HA) and 37-millimeter (mm) Impact Area (Weston Solutions, Inc. [Weston], 2009)

The RODs established site-specific Remedial Actions for each AOC, as well as the LTM program, Land Use Controls (LUCs), and, in some cases, removal actions. The Army and USEPA evaluate the effectiveness of the Remedial Actions as part of the Five-Year Review reports (HLA, 2000a; Nobis Engineering, 2005; HGL, 2010; and H&S Environmental, 2015).

Since the inception of the LTM program, the monitoring requirements at some of the AOCs have been modified or removed. Sampling at AOC 57, AOC 69W, AOC 43G, AOCs 32 and 43A, and the DCL in 2018 was conducted per the LTMMP (Sovereign/HGL, 2015), as follows:

- AOC 57 LTMMP activities include hydraulic monitoring at 19 locations and groundwater sampling for metals at two monitoring wells and one surface water location every five years (although the Army has been collecting additional, annual samples from AOC 57 since the LTMMP was issued). The LTMMP includes decommissioning of sumps at Area 2.
- AOC 69W LTMMP activities include annual hydraulic monitoring at 17 locations and groundwater sampling at 12 wells. Samples from eight wells are analyzed for EPH, samples from 10 wells are analyzed for metals, and water quality is measured at two wells.
- AOC 43G LTMMP activities include annual hydraulic monitoring at 10 wells and groundwater sampling at five wells. Samples from four of the wells are analyzed for VPH, alkalinity, and metals. The sample from one well is analyzed for metals.
- AOCs 32 and 43A LTMMP activities include annual hydraulic monitoring at 26 locations and groundwater sampling at four wells for volatile organic compounds (VOC), VPH, EPH, and metals.

- The DCL LTM and O&M activities consist of annual landfill gas vent monitoring, monthly O&M of the leachate pump station, annual sampling of the leachate, annual landfill cap inspection, semi-annual hydraulic monitoring at seven locations, and semi-annual groundwater sampling at four locations for VPH, EPH, pesticides, metals, total dissolved solids, anions, nitrate/nitrite, alkalinity, cyanide, and chemical oxygen demand (COD). Samples are analyzed for polychlorinated biphenyls (PCBs) every five years. The DCL leachate sampling consists of one sample collected and analyzed for VOCs, SVOCs, organochlorine pesticides/PCB, total petroleum hydrocarbons (TPH), total metals (select metals), and wet chemistry parameters (total suspended solids [TSS], pH, total phenolics, and total cyanide).
- Per the Final LTMPP, sampling using HydraSleeve™ technology was utilized at AOC 57 and AOCs 32/43A along with low-low flow sampling methods in 2016 to determine if it was a viable alternative to low-flow sampling. However, as discussed in the 2016 annual report, due to the large discrepancies between results and the limited volume of sample obtained from the HydraSleeve™ sampler; it appeared that the use of HydraSleeve™ technology was not a viable alternative to established low-flow sampling procedures. The Army continues to sample using the low-flow sampling procedures.

1.2 SITE DESCRIPTION AND HISTORY

The former Fort Devens is located in the towns of Ayer and Shirley in Middlesex County, and Harvard and Lancaster in Worcester County, Massachusetts, approximately 35 miles northwest of Boston, Massachusetts. The installation occupied approximately 9,260 acres and was comprised of the North Post, the Main Post, and the South Post (Figure 1-1). Route 2 divides the South Post from the Main Post. The Nashua River runs through the North, Main, and South Posts. The area surrounding Devens is largely residential property.

Camp Devens was established in 1917 as a temporary training area for soldiers during World War I. Prior to 1917, the area was occupied by residential homes and farmland. In 1932, the site was named Fort Devens and made a permanent installation with the primary mission of commanding, training, and providing logistical support for non-divisional troop units. The installation also supported the Army Readiness Regional and National Guard units in the New England area. Devens was used for a variety of training missions between 1917 and 1990. Pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986, Devens was placed on the National Priorities List on November 21, 1989, due to environmental contamination at several sites.

Devens was identified for cessation of operations and closure under Public Law 101-510, the Defense Base Realignment and Closure (BRAC) Act of 1990, and officially closed in March 1996. As part of the Devens BRAC program, portions of the property formerly occupied by Fort Devens were retained by the Army for reserve forces training and renamed the Devens Reserve Forces Training Area (DRFTA). Areas not retained as part of DRFTA have been either transferred or are in the process of being transferred to Massachusetts Development and Finance Agency (MassDevelopment) for reuse and redevelopment in addition to other federal agencies as noted below.

A total of 5,181.64 acres (344.94 acres of the Main Post enclave and 4,836.70 acres of the South Post) were retained for DRFTA. From 1996 through present, the Army has transferred 2,712

acres to the MassDevelopment. A total of 1,079.62 acres was transferred to other federal agencies, including 836 acres to the Department of the Interior, US Fish and Wildlife Agency, 221.62 acres to the Department of Justice Bureau of Prisons and 22 acres to the Department of Labor Job Corps Center.

1.3 GROUNDWATER HYDROLOGY

Devens is located in eastern Massachusetts, approximately 35 miles northwest of Boston, Massachusetts. The proximity of the Atlantic Ocean, Long Island Sound, and the Berkshire Hills plays an important role in determining the weather and climate of the Devens area.

The depth to groundwater was recorded within a 24-hour period at monitoring wells within each AOC as part of the 2018 LTM Program. Plotting the synoptic groundwater elevation data allows a determination of groundwater flow directions, which is essential in understanding contaminant migration pathways and evaluating the effectiveness of the monitoring well network. Groundwater elevations at monitoring wells were determined by subtracting the depth to water from the elevation of a reference point on the top of the well riser. The surface water elevation at staff gauges was determined by adding the observed water level to the elevation of a reference point on the staff gauge. Water level elevations for the spring and fall 2018 events are shown in **Table 1-1** and **Table 1-2**, respectively. Groundwater gradients present at each AOC, as determined from the available groundwater elevation data, are expressed as feet per foot (ft/ft) of change in water table elevation and are presented in the section specific to each AOC.

Annual precipitation data for 2004 through 2018, as reported from the Fitchburg, Massachusetts, weather station, is presented in **Table 1-3**. The precipitation data indicate greater precipitation across the Devens area in August and September prior to the October (fall) 2018 LTM event (17.89 inches total, above the average total for that period of 7.48 inches) compared to the amount of precipitation in May prior to the June (spring) 2018 LTM event (1.61 inches, below the average May precipitation of 3.62 inches) (National Oceanic and Atmospheric Administration [NOAA, 2018]). As shown in Table 1-3, the overall precipitation in 2018 (57.63 inches) was higher than in most years (average of 44.06 inches since 2004).

1.4 GROUNDWATER SAMPLING

The LTM program was conducted in accordance with the LTMMP (Sovereign/HGL, 2015) to monitor COC trends over time for the respective AOCs. During 2018, the LTM program included:

- Annual groundwater and surface water LTM event in May 2018 at AOC 57;
- Annual groundwater LTM event in October 2018 at AOC 69W;
- Annual groundwater LTM event in October 2018 at AOC 43G;
- Annual groundwater LTM event in April 2018 at AOCs 32/43A;
- Semi-annual groundwater LTM events at the DCL in April and October 2018; and
- Annual DCL leachate LTM event in December 2018.

1.4.1 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 1-4**.

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) that were rented from Pine Environmental, Inc. of Woburn, Massachusetts. 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 and other pertinent information are presented in **Table 1-5**. AOC-specific actions levels are summarized in **Table 1-6**. DCL leachate discharge limits are summarized in **Table 1-7**.

1.4.2 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, 2017b). Low-flow bladder or peristaltic pumps were used, as described in the 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 1-4. Location and construction details for each groundwater monitoring well, well point, sump, and surface water location are summarized in Table 1-5.

The groundwater elevation data for the spring and fall 2018 sampling events are summarized in Table 1-1 and Table 1-2, respectively. The field sampling logs are presented in **Appendix A**.

1.4.3 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.

1.4.4 Investigation Derived Waste

Investigation-derived waste (IDW) was not generated during the 2018 LTM activities. Purge water collected during the 2018 LTM did not have total headspace volatile organic compound (VOC) readings conducted based on purge water results from prior LTM events since 2015. Purge water from wells was returned to the ground in proximity to the sample collection area following low-flow sampling.

1.4.5 Monitoring Well Network Inspection and Repairs

The condition of the monitoring well network at each LTM site was inspected during the 2018 sampling events. Observations, if noted, are contained within the field sampling logs provided in Appendix A. Monitoring wells were found to be in good overall condition. At AOC 32, the roadbox for monitoring well 32Z-01-09XOB (presumably damaged by a snow plow over the winter) was repaired on 23 May 2018.

1.5 LABORATORY TESTING

TestAmerica Laboratories, Inc. (Savannah, Georgia and Arvada, Colorado facilities) (TestAmerica) was the primary contract laboratory used for the analysis of water samples for the spring and fall 2018 LTM events. TestAmerica is compliant with the Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, version 5.0 (DoD, 2013) under the DoD Environmental Laboratory Accreditation Program (ELAP) and holds current National Environmental Laboratory Accreditation Program (NELAP) accreditation for all applicable analytical methods. TestAmerica subcontracted to Katahdin Analytical Services of Westbrook, Maine to perform the required VPH and extractable petroleum hydrocarbon (EPH) analyses, using the MassDEP analytical methods. Katahdin holds MassDEP certification for these analyses.

1.5.1 Analyses

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

- AOC 57 – total metals in groundwater (for arsenic, iron, and manganese) and dissolved metals in surface water;
- AOC 69W – EPH and dissolved metals (arsenic, iron, and manganese) in groundwater;
- AOC 43G – VPH (including benzene, toluene, ethylbenzene, and xylenes [BTEX]), total alkalinity, and total metals (arsenic, iron, and manganese) in groundwater;
- AOC 32/43A – VOCs, VPH, and total metals (arsenic and manganese) in groundwater;
- DCL Groundwater – VPH including BTEX, EPH including target polycyclic aromatic hydrocarbons (PAHs), organochlorine pesticides, selected total metals (including mercury), and the following general chemistry parameters: total dissolved solids (TDS), chloride, sulfate, nitrate/nitrite-as-N, total alkalinity, total cyanide, and chemical oxygen demand (COD); and,
- DCL Leachate – VOCs/Total Toxic Organics (TTO), semi-volatile organic compounds (SVOCs), organochlorine pesticides/polychlorinated biphenyls (PCBs), total petroleum hydrocarbons (TPH), select total metals, and wet chemistry parameters (total suspended solids [TSS], pH, total phenolics, and total cyanide).

Metals analyses were performed for total or dissolved metals on an AOC-specific basis as described above. The laboratory methods used to analyze groundwater samples from each AOC and the DCL leachate are listed in Table 1-4.

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 were compared to the 10 micrograms per liter (µg/L) MCL that was promulgated in 2006, which is lower than the cleanup standard that was previously established in the site-specific RODs. Site-specific COCs and the associated cleanup goals or comparison criteria for the AOCs, as identified in each site-specific ROD, are presented in Table 1-6**.** The DCL leachate discharge limits are presented in Table 1-7. Laboratory analytical results for water samples collected during the 2018 LTM events are discussed in Sections 2.0 through 6.0. Laboratory analytical reports are present in **Appendix 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 **Appendix C**.

1.6 QUALITY CONTROL

Analytical data were provided by a properly accredited laboratory (TestAmerica) and the data analyses, collection, and validation were performed per the LTMMP Quality Assurance Project Plan (KGS, 2016a). There were no outstanding quality control issues identified with the analytical results for any of the 2018 LTM samples.

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 USEPA's Calibration of Field Instruments Standard Operating Procedure (USEPA Region 1, 2017). Calibration log forms are presented in Appendix A. Minor drift in pre- and post-calibration readings for the turbidity meter in the spring LTM (<10%) and fall LTM (<15%) events were recorded. The water quality and turbidity meters were checked for drift in the fall LTM event, and readings were marked with a "J" qualifier in the Devens database if drift exceeded acceptable ranges. The turbidimeter was calibrated using four standards and during instrument checks at the end of each day. Because of the low percentage of drift in comparison to the four standards used, the drift did not have a significant effect on measurement of turbidity during purging. No instrument error was noted during the spring or fall LTM events.

1.6.2 Data Evaluation for 2018 Long-Term Monitoring Events

The analytical results from the 2018 LTM events were evaluated for data acceptability in accordance with the USEPA Region 1 data validation guidelines (USEPA Region 1, 2013), the DoD QSM version 5.0 (DoD, 2013), and the laboratory's defined acceptance limits. The method requirements for the USEPA SW-846 QC guidance and the MassDEP VPH and EPH methods were also used as supplemental information. The data validation reports for the spring and fall 2018 LTM events are presented in Appendix 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: blank contamination, including laboratory method blanks, and trip blanks (for VOC analysis only); laboratory control sample (LCS) and/or laboratory control sample duplicate (LCSD) recovery and precision exceedances; low matrix spike (MS)/matrix spike duplicate (MSD) recovery exceedances; surrogate recovery exceedances; and field duplicate precision exceedances. Specific QC deviations requiring qualification in the 2018 data sets are provided in the data discussion section for each AOC.

Appropriate qualifiers have been added to the 2018 analytical data.

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 laboratories were determined to be performing properly. No significant QC deficiencies were noted. With required qualifications based on the typical issues noted above; analytical results reported for the 2018 LTM events samples were deemed usable.

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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 1-1). AOC 57 is located within a Zone II aquifer protection area for the Town of Ayer Grove Pond public water supply wells [1]. 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 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.

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. 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. Prior to the soil removal action, the Army installed a containment dam (Figure 2-2) to mitigate the potential migration of contamination from Area 2 following the observation of a petroleum sheen by Cold Spring Brook. 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.

In June 2000, the Army completed an RI at AOC 57 Areas 2 and 3 that revealed the presence of residual contamination at both sites. A ROD for Areas 2 and 3 was issued in September 2001. The ROD selected Alternative II-3, Excavation (For Possible Future Use) and LUCs for Area 2 and Alternative III-2a, Excavation (To Accelerate Groundwater Cleanup) and LUCs for Area 3. Data obtained and observations made at Area 2 between 2002 and 2003 (during the soil excavation activities and subsequent investigations) prompted an Explanation of Significant Differences (ESD) in March 2004. The 2004 ESD expanded LTM activities to include EPH C11-C12 as a COC for Area 2 soils to monitor the presence of petroleum waste encountered during contaminated soil removal, and to include EPH C11-C12 and PCBs as COCs for Area 2 groundwater in the September 2001 AOC 57 ROD. Based on evaluation of LTM data through 2014, groundwater sampling at Area 2 was discontinued in 2015 and groundwater monitoring was reduced to every five years at Area 3 for dissolved-phase arsenic, iron, and manganese.

[1] MassDEP establishes public water supply protection areas in accordance with the Drinking Water Regulations at 310 CMR 22.02. In part, a Zone II groundwater protection area is defined as the area of an aquifer which contributes water to a well under the most severe pumping and recharge conditions that can be realistically anticipated.

No soil remediation activities necessitating soil sampling have been conducted at AOC 57 since 2003; therefore, no soil sampling has been conducted since issuance of the 2004 ESD..

Construction of a solar panel manufacturing facility between Areas 2 and 3 and Barnum Road (112 Barnum Road, Figure 2-1) began in 2008 and was completed in 2009. The solar panel manufacturing facility has since been closed but the building has been taken over by another company, Nypro, which conducts plastics manufacturing. The same building footprint and infrastructure remain in place.

The next monitoring event is planned for spring 2019. A supplemental sampling event is also planned for fall 2019 in order to support the upcoming 2020 five-year review by addressing potential data gaps in the understanding of groundwater flow and the extent of contamination at AOC 57. The results of the spring and fall 2019 sampling events will be presented in the 2019 Annual Report.

2.2 GROUNDWATER HYDROLOGY

Measured water levels at AOC 57 Areas 2 and 3 for the May 2018 LTM event are presented in Table 1-1. Interpretive water-table elevations for the May 2018 LTM event at AOC 57 Areas 2 and 3 are presented on **Figure 2-4** (Area 2) and **Figure 2-5** (Area 3). Data from the spring 2018 LTM event at AOC 57 indicates shallow groundwater flowing in a south/southeast direction, toward Cold Spring Brook, which is consistent with historical observations of groundwater flow patterns in this area. A groundwater gradient of 0.015 ft/ft was calculated in Area 2 (57M-03-01X to 57WP-06-02) and 0.024 ft/ft in Area 3 (57M-95-03X to 57P-98-03X)) using the May 2018 LTM event data. Although the groundwater gradient typically varies across each site based on topography and seasonal variations in groundwater elevations, the selected flow paths are deemed as generally representative of site conditions and indicate that shallow groundwater flows to the south-southeast and discharges to Cold Spring Brook.

2.3 GROUNDWATER SAMPLING

Beginning in 2008, groundwater at AOC 57 Area 3 has been sampled in the spring on an annual basis. As described in Section 1.1, the sampling program was modified in 2015 to suspend sampling at Area 2 but continue gauging Area 2 wells as part of the sampling event at Area 3. Wells sampled as part of the LTM program in May 2018 consisted of Area 3 wells 57M-95-03X and 57M-96-11X.

2.4 SURFACE WATER SAMPLING

During the spring 2018 LTM sample event, a surface water sample was collected from location 57-AREA3-SW1 within Area 3. A discrete grab sample was collected as close to the bottom of the water column as possible, without allowing bottom sediment to enter the sample container.

2.5 ANALYTICAL RESULTS

Groundwater analytical results (total arsenic, iron, and manganese analyses) for Area 3 from the spring 2018 LTM event are summarized in **Table 2-1**. Surface water analytical results (dissolved arsenic, iron, and manganese analyses) from the spring 2018 LTM event are summarized in **Table 2-2**. Groundwater and surface water results are presented on **Figure 2-6**.

2.5.1 May 2018 Data Summary

- Arsenic – Total arsenic concentrations exceeded the MCL of 10 µg/L in both wells: 57M-95-03X (42 µg/L) and 57M-96-11X (180 µg/L). Arsenic concentrations did not

exceed the monitoring benchmark for surface water of 150 µg/L at sample location 57-AREA3-SW1 (dissolved arsenic of 5.2 µg/L).

- Iron – Source area well 57M-96-11X had a total iron concentration of 37,000 µg/L, which was above the 9,100 µg/L background level. The dissolved iron concentration in surface water sample 57M-AREA3-SW-1 (4,000 µg/L) was above the monitoring benchmark of 1,000 µg/L.
- Manganese – Total manganese was above the 291 µg/L background level at source area well 57M-96-11X (2,700 µg/L). Manganese was detected in the surface water sample; however, no benchmark has been established for manganese in surface water.

2.5.2 AOC 57 Data Trends

The results of the 2018 LTM event at AOC 57 were compared to results from previous sampling events. Historical exceedances of the cleanup goals for AOC 57 Area 3 from 2003 through 2018 are summarized in **Table 2-3**.

Total arsenic concentrations in Area 3 groundwater remained above the MCL (10 µg/L) at wells 57M-96-11X (180 µg/L) and 57M-95-03X (42 µg/L). Graphical and statistical analysis of the data trends over time (**Appendix D**) indicate that the total arsenic concentrations at source area well 57M-95-03X have been relatively stable, at or below 60 µg/L since 2005 (average of 33 µg/L since 2005). Arsenic concentrations at 57M-96-11X have varied more broadly over time from higher concentrations between 240 and 290 µg/L during 2003/2004 and 2015/2016 to lower concentrations in other years ranging from 148 µg/L to 192 µg/L (with 180 µg/L recorded most recently in 2017 and 2018). No statistically significant trends were identified at wells 57M-96-11X ($p = 0.387$) or 57M-95-03X ($p = 0.271$) at the selected 95% confidence level. Field monitoring data indicates a reducing environment is present in the aquifer (low DO and ORP), which tend to promote the mobilization of metals such as arsenic from native soils.

2.5.3 Water Quality Parameters

General water quality chemistry parameters (pH, temperature, specific conductivity, ORP, DO, and turbidity) were measured at each of the sampled wells during the 2018 sampling event. These parameters are measured concurrently with low-flow sampling and are 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 Table 2-1. The ORP and DO data are used to determine whether reducing or oxidizing conditions are present at a specific well. Low ORP values (below 50 millivolts) and DO concentrations below 1 milligram per liter (mg/L) are generally associated with reducing conditions and therefore elevated arsenic, iron, and manganese concentrations. While reducing conditions may facilitate the breakdown of petroleum hydrocarbons, they can also cause naturally occurring arsenic in the soils to mobilize by reducing the relatively insoluble arsenic (V) oxidation state to soluble arsenic (III). Such reducing conditions also yield higher concentrations of dissolved iron and manganese in groundwater. The ORP level at 57M-96-11X (+39.7 mV) and low DO level (0.59 mg/L) are indicative of reducing conditions. The ORP and DO levels at 57M-95-03X were slightly higher (+58.7 mV and 1.94 mg/L, respectively), indicating a less reductive state within the groundwater at this well location relative to that at downgradient well 57M-96-11X. Arsenic and manganese concentrations detected at 57M-95-03X were lower than those at 57M-96-11X where reducing conditions were greater.

2.6 DATA EVALUATION FOR 2018 LONG-TERM MONITORING EVENTS

Groundwater samples were collected from two AOC 57 wells and one surface water location in May 2018. Samples were submitted to TestAmerica for total metals (groundwater) and dissolved metals (surface water) analyses.

Based on the data evaluation elements reviewed (including holding times, blank sample results, field duplicate results, LCS/LCSD recoveries, and MS/MSD recoveries), the metals results for all AOC 57 groundwater and surface water samples were acceptable as reported.

2.7 LAND-USE CONTROLS

AOC 57 is owned by the Army but leased to MassDevelopment per a Lease in Furtherance of Conveyance (LIFOC) agreement. Under the lease agreement, MassDevelopment must comply with the LUCs included within the LIFOC. Per the ROD signed in September 2001, LUCs were established to limit the potential exposure to the residual contaminated soil and groundwater under both the existing and future site conditions. The LUCs ensure that exposure to any remaining contaminated soils beneath the site is controlled. The LUCs also prohibit the extraction of groundwater from the site for industrial or potable water supply use. These LUCs are to be incorporated either in full or by reference into all deeds, easements, mortgages, leases, or any other instruments of transfer prior to the transfer of the property to MassDevelopment, until such time that soil and groundwater concentrations reach cleanup levels. During the Five-Year Review process, existing land-use is evaluated to ensure control requirements are being met. A site-specific annual LUC checklist, including physical on-site inspection and interview components, was developed in 2007 for use during LUC verification activities. The checklist is presented in **Appendix E**.

2.7.1 Land-Use Control Interviews

Interviews were conducted with Mr. Ron Ostrowski of MassDevelopment and Mr. Neil Angus of the Devens Enterprise Commission, regarding the following items:

- Familiarity with the LUCs imposed upon the property and documentation of these controls;
- Excavations (planned or emergency) that may involve soils and groundwater in Areas 2 or 3; and
- Proposed plans for property sale, future redevelopment and construction, or demolition activities at the site.

Mr. Angus had previously stated that the building at 112 Barnum Road was transferred to a new owner in 2015 and is now owned by an LLC. Mr. Angus confirmed that the current tenant remains Nypro, a provider in the precision manufacturing of plastic products. There were no other changes to the site in 2018. Prior to any construction, Nypro would need to obtain approval from MassDevelopment.

An irrigation well (marked as non-potable water) was installed in January 2016 adjacent to the property at 78 Barnum Road (Figure 2-1). This well was completed in bedrock to a depth of 505 feet and is permitted by MassDEP or non-potable water use to support landscaping/irrigation purposes. This well is not within the boundaries of AOC 57.

2.7.2 Land-Use Control On-Site Inspection

LUCs at AOC 57 were visually verified during annual groundwater sampling events. During sampling activities, a LUC inspection was performed to identify the following:

- Any signs of increased exposure potential to the public from soil and/or surface water contaminants;
- Any evidence that groundwater extraction wells were installed at the site; and
- Any evidence of site use changes.

No evidence of increased exposure potential was observed during the spring 2018 sampling event.

2.8 CONCLUSIONS

Based on the previous remedial activities performed at AOC 57 and evaluation of the available monitoring data, monitoring of Area 2 was eliminated in the 2015 spring sampling event (Sovereign/HGL, 2015) and monitoring was reduced at Area 3 to every five years following the 2017 sampling event. 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.

Groundwater at Area 3 were sampled for total metals (arsenic, iron, and manganese). The total arsenic concentrations were consistent with previous LTM results. The presence of arsenic above the cleanup level at both wells appears to be related to high iron and manganese concentrations, as well as low ORP readings and low DO readings, which are associated with varying degrees of reducing conditions within the aquifer at Area 3. Groundwater at upgradient well 57M-95-03X was noted to have ORP and DO levels slightly greater than their general thresholds defining reducing conditions; the detected arsenic concentrations historically have been less than those identified at downgradient well 57M-96-11X. ORP and DO levels identified at downgradient well 57M-96-11X are less than the reducing environment thresholds and the arsenic level is greater than at upgradient well 57M-95-03X, indicating an active relationship between ORP and DO levels and arsenic concentrations in the groundwater at Area 3.

Groundwater sampling results over time indicate that arsenic concentrations are generally steady, with no statistically significant trends detected. The metals are expected to come out of solution (precipitate) when the aquifer reverts to an oxidizing state within the impacted area, or when the impacted groundwater reaches and expands into an oxidizing environment; therefore, there is no anticipated adverse impact to the public drinking water wells in the Zone II area (Grove Pond wellfield). As the AOC 57 shallow groundwater is discharging to Cold Spring Brook and the history of below-MCL arsenic concentrations detected in the surface water at Area 3, support the lack of anticipated adverse impact to the public drinking water wells in the Zone II.

Dissolved iron concentrations in the Area 3 surface water (57-AREA3-SW-1) have been consistently above the USEPA Water Quality Criterion (monitoring benchmark) since spring 2011. Iron concentrations in the groundwater within Area 3 adjacent to Cold Spring Brook have also been greater historically than the monitoring criterion suggesting some contribution to the adjacent surface water; however upstream, area-wide contribution of iron to the surface water from natural sources may also be likely.

The monitoring results are consistent with the conceptual site model. 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. Reducing conditions in the aquifer (low DO and

ORP) are a typical byproduct of the biodegradation of fuel products, which can cause naturally occurring arsenic and manganese in soil to mobilize into groundwater. As with many other fuel-contaminated sites, once the fuel products have been attenuated, the metals in the aquifer formation are expected to revert to their pre-existing stable geochemistry and dissolved-phase concentrations will decrease (American Petroleum Institute [API], 2011). Arsenic concentrations in groundwater at AOC 57 have decreased or remained steady since removal of the source of contamination. Downgradient of the site, the arsenic concentrations in surface water do not exceed the USEPA Water Quality Criterion and most of the samples (14 of 20 samples) at the longest sampled surface water location at Area 3 (57-AREA 3-SW-1) were below the MCL, including during the 2018 sampling event. Also, historical results from AOC 57 Area 2 surface water sampling indicate a decrease in arsenic concentrations in surface water to below the MCL in 2008 through 2014 (KGS, 2016b).

The Remedial Action selected in the ROD included the implementation of LUCs to limit potential exposure to contaminated soil and groundwater under both existing and future site use. During 2018, observations were made to identify any signs of increased exposure potential. No evidence of increased exposure potential was observed. 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.

The Army will continue to perform LTM and LUC inspections of the site until conditions warrant discontinuation of sampling and change in LUC implementation. The next monitoring event is planned for spring 2019. A supplemental sampling event is also planned for fall 2019 in order to support the upcoming 2020 five-year review by addressing potential data gaps in the understanding of groundwater flow and the extent of contamination at AOC 57. The results of the spring and fall 2019 sampling events will be presented in the 2019 Annual Report.

3.0 AREA OF CONTAMINATION 69W

3.1 SITE BACKGROUND

AOC 69W is located by the northeast corner of the intersection of Jackson Road and Antietam Street on the northern portion of what was formerly the Main Post at Devens (Figure 1-1). AOC 69W consists of the former Devens Elementary School (Building 215), its associated parking lot, and the adjacent lawn extending approximately 300 feet northwest to Willow Brook (**Figure 3-1**). The building is currently home to the Francis W. Parker Charter Essential School. Impacts at AOC 69W are attributed to two separate releases of No. 2 heating oil in 1972 and 1978. It is estimated that 7,000 to 8,000 gallons of No. 2 heating oil were released into soil from each event.

The 1972 release occurred during the installation of a new 10,000-gallon underground storage tank (UST). The release was addressed, in part, by the installation of an oil skimmer near the release point to recover the released heating oil. A secondary control measure involved the installation of a 250-gallon underground concrete collection vault placed approximately 250 feet to the northwest to capture oily water. It is not clear how many gallons of heating oil or oily water were recovered, although it is estimated that the 250-gallon vault was pumped out every three months for a period of time (HLA, 1999a).

The 1978 release resulted from a failed piping joint in the oil pipes that led to the old boiler. A large excavation was completed on the north side of the school adjacent to the loading dock to locate the source of the release. Reports indicate that residual oil was collected from the excavation for one month before the damaged piping was found and replaced (HLA, 1999a). Shortly after the release, an oily sheen was reported in Willow Brook and the associated wetlands north of the school. More than 2,000 gallons of residual oil was captured with the oil recovery system. A removal action was performed in 1998 that included the removal of approximately 3,500 cubic yards of petroleum-contaminated soil, the oil recovery system's 250-gallon underground vault and its associated piping, and the 10,000-gallon UST. The soil removal action was limited by the presence of the building.

Several investigations have been performed to identify impacts to surface and subsurface soil and groundwater at AOC 69W. The ROD issued for AOC 69W in June 1999 selected "Limited Action" as the remedy for subsurface soils and groundwater and included LTM, LUCs, and five-year reviews. The intent of the ROD was primarily to address soil and groundwater contaminated with fuel oil. The LTM was developed to monitor for any potential off-site migration of contaminants and to verify that elevated concentrations decreased over time. The 1999 ROD listed arsenic and MassDEP EPH and VPH as the monitored analytes. Sampling for VPH was discontinued in 2014.

Based on detections of manganese in groundwater at the wellpoint 69WP-08-01 installed in 2008, the Army installed an additional downgradient wellpoint 69WP-13-01 in 2013 to monitor for potential manganese migration.

The construction of a modular building expansion for the rear portion of the Frances W. Parker Charter Essential School was completed in 2009. The AOC 69W remedy and sampling program were not impacted by the construction activities.

3.2 GROUNDWATER HYDROLOGY

During the fall 2018 LTM event, water levels were collected from 17 vicinity wells and piezometers at AOC 69W:

69W-94-12	ZWM-95-16X	ZWP-95-01X
69W-94-13	ZWM-95-17X	ZWP-95-02X
69W-94-14	ZWM-95-18X	69WP-08-01
ZWM-01-25X	ZWM-99-22X	69WP-13-01
ZWM-01-26X	ZWM-99-23X	Willow Brook piezometer
ZWM-95-15X	ZWM-99-24X	

Measured water levels at AOC 69W are presented in Table 1-2. Interpretive water-table elevations for the 2018 LTM gauging event at AOC 69W are presented on **Figure 3-2**.

Data from the fall 2018 LTM event at AOC 69W indicate that groundwater flows in a north-northwestern direction. For the central and eastern portions of AOC 69W, groundwater flows approximately parallel to Willow Brook, which flows along the western boundary of the site. For the southwestern most portion of the site, which includes the Excavated Soils Management Area (ESMA), shallow groundwater flows toward Willow Brook. This flow pattern is consistent with historical groundwater flow patterns in this area. The groundwater gradient of 0.0068 ft/ft (ZWM-95-17X to 69WP-08-01) was calculated for the 2018 LTM event. The flow lines used to calculate the gradient are believed to be representative of groundwater flow at the site.

3.3 GROUNDWATER SAMPLING

Groundwater at AOC 69W is sampled annually in the fall. The following wells and wellpoints were sampled for the fall 2018 LTM event during 8-9 October 2018:

69W-94-13	ZWM-99-22X	69WP-08-01
69W-94-14	ZWM-99-23X	69WP-13-01
ZWM-95-15X	ZWM-99-24X	
ZWM-95-18X	ZWM-01-25X	

3.4 ANALYTICAL RESULTS

The fall 2018 sampling event consisted of collecting eight groundwater monitoring well samples, two wellpoint samples, and one field duplicate sample. The samples were analyzed for MassDEP EPH and dissolved metals (arsenic, iron, and manganese), except for the sample from wellpoint 69WP-08-01, which was analyzed for dissolved metals only, and wellpoint 69WP-13-01, which was analyzed for dissolved manganese only, in accordance with the 2015 LTMMP. Samples were analyzed at TestAmerica for dissolved metals and submitted to Katahdin Analytical Services for EPH analysis.

The fall 2018 analytical results are summarized in **Table 3-1** and on **Figure 3-3** and **Figure 3-4**.

3.4.1 October 2018 Data Summary

- Dissolved Metals – Dissolved arsenic concentrations exceeded the 10 µg/L MCL standard in samples from 4 of 8 wells (50%): 69W-94-13 (35 µg/L), ZWM-95-15X (18 µg/L), ZWM-99-22X (150 µg/L), and ZWM-99-23X (39 µg/L). The other arsenic results were non-detect or were detected at concentrations below the MCL. Manganese concentrations exceeded the background level of 291 µg/L in 5 of 9 wells (56%): 69W-94-13 (1,600 µg/L), 69W-94-14 (320 µg/L), 69W-95-15X (340 µg/L), ZWM-99-22X (1,500 µg/L), and ZWM-99-23X (1,600 µg/L). Manganese was detected below the background in the other sampled wells. Iron was detected above the 9,100 µg/L background level in only 1 of 9 wells (11%), in source area well ZWM-99-22X (19,000 µg/L). The other iron results were below the background value.
- EPH MassDEP – EPH results were non-detect or if detected below benchmark levels, with the exception of the C_{11}-C_{22} concentration at source area well ZMW-99-22X (230 µg/L). EPH concentrations are evaluated against the MassDEP GW-1 standard for comparison purposes only.

3.4.2 AOC 69W Data Trends

The results of the 2018 sampling event at AOC 69W were compared to results from previous sampling events. Historical exceedances of the monitoring criteria at AOC 69W from 2000 through 2018 are presented in **Table 3-2**. Graphical and statistical analyses of selected wells are presented in Appendix D.

During the fall 2018 LTM event, dissolved arsenic concentrations were detected above the 10 µg/L MCL at four wells: 69W-94-13 (35 µg/L), ZWM-95-15X (18 µg/L), ZWM-99-22X (150 µg/L), and ZWM-99-23X (39 µg/L). The arsenic concentrations at well 69W-94-13 have been variable over time and no statistically significant trend was observed ($p = 0.454$) at the selected 95% confidence level. A statistically significant upward trend was noted at well ZWM-99-22X ($p = 0.034$) for the dataset collected from spring 2000 to spring 2017; however, arsenic concentrations have been consistently decreasing from 2009 to 2015, with minor increases in 2016, 2017, and 2018. The dataset through 2018 has no significant trends ($p = 0.050$). The arsenic concentrations at ZWM-01-25X have remained below the MCL in the six sampling rounds since 2013 (2 J µg/L in 2018). The arsenic concentrations at well ZWM-95-15X have been variable, with minor increases in 2017 and 2018, with no statistically significant trend observed ($p = 0.183$). The arsenic concentrations at well ZWM-99-23X have been variable, with increases in both 2017 and 2018; no statistically significant trend is observed ($p = 0.117$).

Manganese concentrations continued to fluctuate with no apparent trend from 2000 to 2018, except for well ZWM-99-23X; with higher concentration values in 2017 (1,800 µg/L) and 2018 (1,600 µg/L) compared to 590 µg/L in 2016, has an overall, statistically significant downward trend ($p = 0.005$). The manganese concentrations at well point 69WP-08-01 have been variable, with minor decreases in 2017 and 2018; a statistically significant downward trend was observed ($p = 0.031$). Well ZWM-01-25X had a statistically significant upward trend for the overall dataset from 2000 to 2017 ($p = 0.034$); however, manganese concentrations have been on an overall downward trend since fall 2009. Manganese was not analyzed in 2018. No statistically significant trends were observed at wells 69W-94-13 ($p = 0.187$) and ZWM-95-15X ($p = 0.220$). A statistically significant downward trend was identified for ZWM-99-22X ($p = 0.042$). The

2018 results for wells 69W-94-13 (1,600 µg/L), ZWM-99-22X (1,500 µg/L), and ZWM-99-23X (1,600 µg/L) continue to exceed the 291 µg/L benchmark for manganese.

Dissolved iron was detected at one monitoring well (ZWM-99-22X) at a concentration (24,000 µg/L) greater than the monitoring criterion of 9,100 µg/L.

The EPH concentrations, specifically the C_{11}-C_{22} aromatic fraction, have generally decreased over time. The C_{11}-C_{22} aromatic results from well 69W-94-13 decreased from 410 µg/L in 2016 and to non-detect (100 µg/L U) in 2017 and 98 µg/L in 2018. The 2017 and 2018 results, while lower than previous results, are consistent with historical results, which have ranged from non-detect to 410 µg/L since fall 2002 (from a maximum of 1,900 µg/L in spring 2002), but do not show a statistically significant trend ($p = 0.125$). The C_{11}-C_{22} results from well ZWM-95-15X have decreased to non-detect levels in 2017 and 2018, consistent with historic results from 2010 to 2015.

The C_{11}-C_{22} results for ZWM-99-23X have fluctuated from non-detect to levels slightly greater than the laboratory detection limits during the period of record. The C_{11}-C_{22} results for well ZWM-99-22X decreased to 170 µg/L in 2017, which is below the monitoring criterion of 200 µg/L but increased in 2018 (230 µg/L) to greater than the criterion. C_{11}-C_{22} results for well ZWM-99-22X show a statistically significant downward trend over time ($p = 0.001$).

3.4.3 Water Quality Parameters

General water quality chemistry parameters (pH, temperatures, specific conductivity, ORP, DO, and turbidity) were measured at each of the wells during the 2018 sampling events. These parameters are measured concurrently with low-flow sampling and are 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 Table 3-1. The ORP and DO data are used to determine whether reducing or oxidizing conditions are present at a specific well. Low ORP values (below +50 mV) and DO concentrations below 1 mg/L are generally associated with reducing conditions and thus, elevated dissolved arsenic, iron, and manganese concentrations in groundwater. While reductive conditions may facilitate the breakdown of some petroleum hydrocarbons, they can also cause naturally occurring arsenic in the soils to mobilize by reducing the relatively insoluble arsenic (V) oxidation state to soluble arsenic (III). Such reducing conditions also yield higher concentrations of iron and manganese. Overall, the ORP, DO, and metals data indicate that reducing conditions are present at well ZWM-99-23X, source area well ZWM-99-22X, and well 69WP-13-01.

3.5 DATA EVALUATION FOR 2018 LONG-TERM MONITORING EVENTS

Groundwater samples were collected from eight monitoring wells and two wellpoints in 2018. Samples were analyzed at TestAmerica for dissolved metals and submitted to Katahdin Analytical Services for EPH analysis.

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), the results for the samples were acceptable as reported. No qualifications were needed.

3.6 LAND-USE CONTROLS

Ownership of AOC 69W was transferred from the Army to MassDevelopment in August 2007. MassDevelopment later transferred ownership of AOC 69W to the Francis W. Parker Charter Essential School, the current owner of the property. LUCs were implemented to limit potential

exposure to contaminated soil and groundwater under existing and future site conditions, per the 1999 ROD and a subsequent deed (Deed, 2007). The LUCs ensure that the remaining contaminated soils beneath and adjacent to the building are not excavated. The LUCs also prohibit the extraction of groundwater from the site for industrial or potable water supply use. Existing land use is evaluated as part of the Five-Year Review process to ensure control requirements are being met. A site-specific annual LUC checklist, including physical onsite inspection and interview components, was developed in 2007 for use during LUC verification activities. The checklist is presented in Appendix E.

3.6.1 Land-Use Control Interviews

Interviews were conducted with Ms. Michelle McKenna of the Francis W. Parker Charter Essential School, Mr. Ron Ostrowski of MassDevelopment, and Mr. Neil Angus of the Devens Enterprise Commission, regarding the following items:

- Familiarity with the LUCs imposed upon the property and documentation of these controls;
- Excavations (planned or emergency) that may have extended to soil below 2 feet in depth north of the school within the ESMA delineated on Figure 3-1;
- The source of public drinking water for the property; and
- Proposed plans for property sale, future redevelopment, and construction or demolition activities at the site.

Ms. McKenna, Mr. Angus, and Mr. Ostrowski stated that there were no changes to the property in 2018.

3.6.2 Land-Use Control On-Site Inspection

LUCs were visually verified during annual groundwater sampling events. During sampling activities, a LUC inspection was performed to identify the following:

- Any signs of increased exposure potential to the public from soil and/or surface water contaminants;
- Any evidence (repaved cut marks or penetrations in the pavement) within the ESMA that have not been otherwise identified and properly documented by the property owner;
- Any evidence that groundwater extraction wells had been installed at the site; and
- Any evidence of site use changes.

The Francis W. Parker Charter Essential School currently occupies the property; and MassDevelopment supplies potable water to the school. There were no excavations or penetrations through pavement within the ESMA observed during 2018. No groundwater extraction wells have been installed on the site and no evidence of increased exposure potential was observed during the 2018 LTM sampling event.

3.7 CONCLUSIONS

The cleanup level for arsenic is the MCL (10 µg/L) and the monitoring criteria for iron (9,100 µg/L) and manganese (291 µg/L) were set at background levels. EPH concentrations are evaluated against MCP standards for comparison purposes, but the MCP standards are not considered cleanup goals under the ROD.

Arsenic levels remain above the 10 µg/L cleanup level in groundwater at wells 69W-94-13 (35 µg/L), ZWM-95-15X (18 µg/L), ZWM-99-22X (150 µg/L), and ZWM-99-23X (39 µg/L).

Arsenic was non-detect in the 2018 samples from the downgradient well point 69WP-08-01 and wells ZMW-94-14 and ZWM-95-18X.

Iron was detected at one well (ZWM-99-22X) at a concentration (24,000 µg/L) greater than the monitoring criterion.

The manganese criterion of 291 µg/L was exceeded at wells 69W-94-13 (1,600 µg/L), 69W-94-14 (320 µg/L), ZWM-99-15X (340 µg/L), ZWM-99-22X (1,500 µg/L), and ZWM-99-23X (1,600 µg/L). Manganese was below the monitoring criterion at monitoring wells ZWM-95-18X, ZWM-99-24X and downgradient well point 69WP-08-01 and 69WP-13-01.

Elevated dissolved metals, including arsenic and manganese, are believed to be attributable to reducing conditions resulting from the degradation of hydrocarbon compounds in groundwater. The metals dissolution is self-limiting once the hydrocarbon source is mitigated and is not expected to migrate a significant distance beyond the original hydrocarbon release point. As indicated in Figure 3-4, metals concentrations greater than the cleanup goals or monitoring criteria have not migrated to downgradient wells ZWM-95-18X, 69WP-08-01, or 69W-13-01. Over time, as the reducing conditions return to oxidizing conditions, the concentrations of elevated dissolved metals are anticipated to decrease, as evidenced at 69W-94-13. As shown below, decreases in arsenic and manganese concentrations were observed several years prior to 2018 as more oxidizing conditions were present in the aquifer. Increases were noted for 2018, although no statistically significant concentrations trends were noted for the dataset at the selected confidence interval.

Recent Results from 69W-94-13

Sample Year	Arsenic (µg/L)	Manganese (µg/L)	Dissolved Oxygen (mg/L)	ORP (mV)
2014	101	1,940	0.2	-53.7
2015	120	2,050	0.21	-85.9
2016	76	2,600	1.79	-103.7
2017	24	320	2.66	140.2
2018	35	1,600	9.1	0.7

EPH C_{11}-C_{22} aromatics were detected in groundwater at wells 69W-94-13 (98 µg/L), ZWM-99-23X (130 µg/L) and ZWM-99-24X (89 J µg/L) at concentrations below the 200 µg/L benchmark. The detected concentration at ZWM-99-22X (230 µg/L) was greater than the benchmark. The EPH C_9-C_{18} and C_{19}-C_{36} aliphatic hydrocarbon results from all wells were non-detect in 2018.

Groundwater sampling results indicate that, overall, COC concentrations have remained consistent with minor fluctuations since 2009 and the potential for EPH off-site migration has decreased over time. Sampling results at AOC 69W sentry wells indicate that EPH and arsenic are not migrating offsite in groundwater at concentrations above the cleanup level and monitoring criteria.

Current literature (e.g., API Groundwater Arsenic Manual, API Publication 4761, February 2011) describing the relationships among inorganic analytes and petroleum hydrocarbon releases in groundwater clearly supports the linking of ORP, pH, and adsorptive characteristics of aquifer materials with concentrations of inorganic analytes such as arsenic and manganese. The projection that elevated metals will decrease over time, as described for AOC 69W, is a position supported by the literature as well as the data for a number of wells at this AOC, some of which have up to 18 years of monitoring. For specific areas/wells where elevated metals remain although aquifer conditions have progressed to a more aerobic 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. The presence of metal oxyhydroxides that can adsorb and bind metals such as arsenic and manganese is required to support the attenuation of metals. The specific mineral composition of the soils across the AOC varies, indicating that their adsorptive ability would be similarly variable. Therefore, the timeframes within which dissolved metals concentrations decrease will vary similarly at specific areas within individual AOC 69W. The LTM program, as designed, allows for continued monitoring to evaluate the progression of changes in the dissolved metals concentrations.

The ROD remedy includes LUCs to limit potential exposure to contaminated soil and groundwater under both existing and future site use. Observations were made during sampling to identify any signs of increased exposure potential. No evidence of increased exposure potential was observed during the fall 2018 LTM event. The Army will continue LTM activities and LUC inspections until conditions warrant a change in LTM activities. LUCs are likely to remain in place at AOC 69W for the near future.

4.0 AREA OF CONTAMINATION 43G

4.1 SITE BACKGROUND

AOC 43G is in the central portion of the former Main Post of Fort Devens (Figure 1-1). It is located at the southwestern corner of Feinburg Road and Queenstown Street. The layout of AOC 43G is depicted on **Figure 4-1**. 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 RIs due to 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 identified USTs at AOC 43G have been removed.

In 1996, the Army conducted a FS 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 and groundwater modeling, LTM, annual reporting to USEPA and MassDEP, and performing 5-year reviews. Groundwater sampling results and modeling indicated that intrinsic remediation is a viable remedial option for AOC 43G.

4.2 GROUNDWATER HYDROLOGY

Measured water levels at AOC 43G for the fall 2018 LTM event are presented in Table 1-2. Interpretive water-table elevations for the 2018 LTM gauging event at AOC 43G are presented on **Figure 4-2**. An analysis of data from the fall 2018 LTM event shows groundwater flow to be in a west-to-east/southeast direction, which is consistent with the site's surficial topography and historical flow patterns. The shallow groundwater flow pattern is toward the Robbins Pond drainage area, located approximately 600 feet to the east of downgradient well XGM-94-06X. A groundwater gradient of 0.052 ft/ft (XGM-97-12X and AAFES-7) was calculated for the fall 2018 LTM event. The flow lines used to calculate the gradient are believed to be representative of groundwater flow at the site.

4.3 GROUNDWATER SAMPLING

Groundwater sampling activities at AOC 43G were conducted in October 2018. Wells sampled at AOC 43G consisted of AAFES-2, XGM-93-02X, XGM-94-04X, and XGM-97-12X.

4.4 ANALYTICAL RESULTS

The analytical results for the 2018 LTM event at AOC 43G are summarized in **Table 4-1**. A summary of the exceedances over time at AOC 43G from 1999 to 2018 is presented in **Table 4-2**. The VPH and alkalinity data for the 2018 LTM event are summarized on **Figure 4-3**. Total metals results are summarized on **Figure 4-4**.

4.4.1 October 2018 Data Summary

- VOCs – Target VOCs; benzene, ethylbenzene, *m,p*-xylenes, *o*-xylene and toluene were either non-detect or were below the applicable cleanup goals and monitoring criteria in each of the sampled wells.
- Metals – Total manganese was detected in each of the sampled monitoring wells with concentrations ranging from 230 µg/L at well XGM-94-04X to 3,800 µg/L at XGM-97-12X. Total manganese concentrations exceeded the cleanup goal of 375 µg/L in groundwater at 3 of the 4 (75%) monitoring wells sampled. Total iron was detected above the 9,100 µg/L cleanup goal level at 3 of the 4 (75%) monitoring wells: AAFES-2 (19,000 µg/L), XGM-93-02X (20,000 µg/L), and XGM-97-12X (27,000 µg/L). Arsenic was not identified as a COC for remediation in the ROD, although total arsenic detections were compared to the MCL for informational purposes. Total arsenic was detected at concentrations above the 10 µg/L MCL in 2 of 4 (50%) of the sampled wells: AAFES-2 (20 µg/L) and XGM-93-02X (11 µg/L).
- VPH Carbon Fractions – VPH concentrations are evaluated against MCP standards for purposes of comparison. The C_5-C_8 aliphatics result for source area well AAFES-2 (480 J µg/L) and the C_9-C_{10} aromatics result (990 µg/L) were greater than the respective monitoring criteria. The C_5-C_8 aliphatics result for the source area well XGM-97-12X (350 µg/L) and the C_9-C_{10} aromatics result (1,000 µg/L) were greater than the respective monitoring criteria. VPH concentrations at sentry wells XGM-94-07X and XGM-94-08X remain below the benchmarks.
- Alkalinity measured in samples from each of the wells ranged from 130 to 220 mg/L (calcium carbonate equivalents). No monitoring criterion is established for this parameter.

4.4.2 AOC 43G Data Trends

The 2018 LTM results were compared to previous sampling events. Historical exceedances of the cleanup goals from 1999 through 2018 are presented in Table 4-2. Graphical and statistical analyses of selected wells are presented in Appendix D. Statistical analyses were compared to a 95% confidence level.

Benzene concentrations at wells AAFES-2, XGM-93-02X, and XGM-97-12X, have remained below the cleanup goal (5 µg/L) for the five sampling events since 2014. Toluene concentrations at well XGM-97-12X have remained below the cleanup goal since 2003.

The manganese concentrations at AOC 43G wells exceeded the 375 µg/L cleanup level, corresponding with high total iron concentrations. For manganese, statistically significant downward trends were identified for three of the four wells (75%) sampled in 2018: AAFES-2 ($p = 0.001$), XGM-93-02X ($p = 0.010$), and XGM-97-12X ($p = 0.010$). No statistically significant trends were identified for manganese at well XGM-94-04X ($p = 0.082$). Statistically significant downward trends in iron concentrations were identified for two wells in 2018: AAFES-2 ($p = 0.006$) and XGM-93-02X ($p = 0.012$). No statistically significant trend was identified for iron at well XGM-97-12X ($p = 0.117$).

VPH monitoring criteria were established by the Army to evaluate intrinsic remediation at AOC 43G. The ROD does not include VPH as a cleanup goal, but the analysis is used to gauge the cleanup of the site and to determine whether a risk-based standard needs to be developed. VPH concentrations are evaluated against MCP standards for comparison purposes. The 2018 data for wells located in the source area and in the area of the historical extent of groundwater impacts indicated an increase in VPH C_9-C_{10} aromatics concentration at well AAFES-2 from 730 µg/L in 2016 to 1,100 J µg/L in 2017, followed by a decrease to 990 µg/L in 2018. For well XGM-97-12X C_9-C_{10} aromatics increased from 340 µg/L in 2016 to 1,000 µg/L in 2018. At well XGM-94-04X C_9-C_{10} aromatics increased from 320 µg/L in 2016 to 410 J µg/L in 2017 but decreased to non-detect in 2018. No statistically significant trend was identified for VPH C_9-C_{10} aromatics at well XGM-94-04X ($p = 0.339$). However, the overall trend shows statistically significant decreasing trends for wells AAFES-2 ($p < 0.001$), XGM-97-12X ($p < 0.001$), and XGM-93-02X ($p < 0.001$).
Data for the VPH C_5-C_8 aliphatic carbon fractions appear to indicate a general downward trend for some monitoring wells since the historical highs observed in November 2005; however, fluctuations periodically occur. This cyclic pattern may be caused by seasonal fluctuations of the water table with extreme high or low precipitation events. For the 2018 sampling event, groundwater at wells AAFES-2 (480 J µg/L) and XGM-97-12X (360 µg/L) contained VPH C_5-C_8 aliphatic hydrocarbon above the 300 µg/L monitoring criterion. Statistically significant downward data trends since the beginning of the monitoring program were noted for wells AAFES-2 ($p = 0.487$), XGM-93-02X ($p = 0.193$), and XGM-97-12X ($p = 0.017$). Well XGM-94-04X ($p = 0.093$) was noted with a statistically significant upward data trend since the beginning of the monitoring program.

The VPH C_9-C_{12} aliphatic concentrations have fluctuated since 1999. In 2018, the VPH C_9-C_{12} concentrations were below the 700 µg/L monitoring criterion.

VPH concentrations at sentry wells XGM-94-07X and XGM-94-08X, located at the downgradient extent of the area historically impacted by the original release, remained well below the benchmarks or were non-detect throughout the monitoring period (Table 4-2).

4.4.3 Water Quality Parameters

General water quality chemistry parameters (pH, initial and final temperatures, specific conductivity, ORP, DO, and turbidity) were measured at each of the wells during the 2018 sampling event. These parameters are measured concurrently with low-flow sampling and are used to determine groundwater stabilization within each well prior to sampling. The final field readings taken prior to collection of each groundwater sample at AOC 43G are reported in Table 4-1. The ORP and DO data are used to determine whether reducing or oxidizing conditions are present at a specific well. Low ORP values (below 50 millivolts) and DO concentrations below 1 mg/L are generally associated with elevated arsenic, iron, and manganese concentrations. While reductive conditions may facilitate the breakdown of petroleum hydrocarbons, they can also cause naturally occurring arsenic in the soils to mobilize by reducing the relatively insoluble arsenic (V) oxidation state to soluble arsenic (III). Such reducing conditions also yield higher concentrations of iron and manganese. The ORP, DO, and metals data in Table 4-1 indicate that reducing conditions are still prevalent in groundwater at the central AOC 43G wells.

4.5 DATA EVALUATION FOR 2018 LONG-TERM MONITORING EVENTS

Groundwater samples were collected from four AOC 43G wells in October 2018. The samples were analyzed at TestAmerica for total metals and total alkalinity and were analyzed at Katahdin Analytical Services for VPH fractions.

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), the data may be used without qualification.

4.6 LAND-USE CONTROLS

AOC 43G is currently under Army ownership. Per the October 1996 ROD, substantive requirements of LUCs that restrict access to contaminated groundwater and soil are in place at AOC 43G. The September 2007 *Addendum to the Real Property Master Plan* (U.S. Army, 2007) included supplemental information on LUCs established under BRAC and CERCLA programs that are applicable to the former AAFES Gas station. The LUCs were designed to protect the integrity and effectiveness of the remedy. Any proposed actions that affect the AOC 43G property must consider following the ROD requirements, which include:

- Ensure that the property is not used for residential purposes and prohibit the use of groundwater beneath the site;
- If the Army transfers the property by lease or deed, an Environmental Baseline Survey will be conducted to ensure that the remedy remains protective by incorporating all necessary environmental protection provisions within the FOST and the property transfer deed; and
- Any intrusive construction work must consider that residual soil and groundwater contamination has been documented for AOC 43G, and such actions should be coordinated with the Department of Public Works (DPW), and the BRAC.

In addition to the above LUCs, a site-specific annual LUC checklist, including physical on-site inspection and interview components, was developed in 2007 for use during LUC verification activities. The checklist is presented in Appendix E.

4.6.1 Land-Use Control Interviews

Mr. Robert Simeone, the BRAC Environmental Coordinator, was contacted via email regarding the following items:

- Familiarity with the LUCs imposed upon the property and documentation of these controls;
- The source of public drinking water for the property; and
- Proposed plans for property sale, future redevelopment and construction or demolition activities at the site.

Mr. Simeone stated in his email response that there were no changes to the property during 2018.

4.6.2 Land-Use Control On-Site Inspection

LUCs were visually verified during annual groundwater sampling events. During sampling activities, a LUC inspection was performed to identify the following:

- Any signs of increased exposure potential to the public from soil and/or surface water contaminants;
- Any evidence that groundwater extraction wells had been installed at the site; and
- Any evidence of site use changes.

No evidence of increased exposure potential was observed during the fall 2018 sampling event.

4.7 CONCLUSIONS

The ROD identifies site-specific groundwater cleanup goals for COCs at AOC 43G including benzene, ethylbenzene, xylene, manganese, and iron. Toluene and VPH monitoring criteria were not included in the ROD. For purposes of monitoring, toluene is compared to its MCL and VPH is compared to MCP standards. The Army uses the VPH concentrations to evaluate intrinsic remediation at AOC 43G and determine whether risk-based standards need to be developed.

Benzene, ethylbenzene, and xylenes results are either non-detect or below the cleanup goals in each of the sampled wells.

Manganese exceedances were noted in three of the four wells sampled in 2018, although statistically significant downward trends in manganese concentrations were identified in three of the four wells sampled in 2018. Iron exceedances were noted in three of the four wells sampled in 2018. Statistically significant downward trends in total iron concentrations were identified in two wells in 2018. Manganese and iron trends will continue to be monitored in future LTM events.

Detected concentrations of C_5-C_8 aliphatics and C_9-C_{10} aromatics exceed the monitoring criteria at source area wells AAFES-2 and XGM-97-12X. C_9-C_{12} aliphatics concentrations were less than the monitoring criteria. VPH concentrations are expected to be present within this area. Each of the C_5-C_8 aliphatic, C_9-C_{10} aromatic and C_5-C_8 aliphatic compounds were non-detect at sentry well XGM-94-04X in 2018, indicating a significant reduction in concentration in 2018 for these compounds relative to those detected in 2017. VPH trends at well XGM-94-04X will continue to be monitored in future LTM events.

VPH concentrations at sentry wells XGM-94-07X and XGM-94-08X, located at the downgradient extent of the area historically impacted by the original release, remained well below the benchmarks or were non-detect. In accordance with the VPH monitoring protocol

provided in *Final Intrinsic Remediation Assessment Report, Area of Contamination 43G, Historic Gas Station, Devens, Massachusetts* (Stone & Webster Environmental Technology and Services/HLA, 1999), the development of risk-based VPH concentrations is not warranted as VPH concentrations at sentry wells XGM-94-07X and XGM-94-08X, located approximately 800 feet upgradient of the boundary/compliance point for AOC 43 (i.e., the eastern boundary of the former Fort Devens property retained for Army Reserve operations), remain well below the MCP GW-1 benchmarks.

The ROD remedy includes LUCs to limit potential exposure to contaminated soil and groundwater under both existing and future site use. During LTM sampling, observations were made to identify any signs of increased exposure potential. No evidence of increased exposure potential was observed during the 2018 LTM event. The Army will continue to perform LTM and LUC inspections until site conditions warrant discontinuation of sampling and change in LUC implementation.

5.0 AREAS OF CONCERN 32 AND 43A

5.1 SITE BACKGROUND

AOCs 32 and 43A are located east of Cook Street and north of Independence Drive (**Figure 5-1**). A portion of AOC 32 intersects a Zone II aquifer protection area[2]. Three Grove Pond wells (PWS IDs 2019001-06G, 2019001-07G, and 2019001-08G) are located within this Zone II protection area. AOC 32 (DRMO Yard) was an active materials storage facility from approximately 1964 to 1995. It consisted of three fenced areas where various materials were processed and stored, and contained a former waste oil UST (UST #13). The tank was removed in 1992; and contaminated soils were excavated and disposed of off-site. COCs historically have included VOCs, petroleum hydrocarbons, and lead. Arsenic and manganese have also exceeded site criterion. Monitored Natural Attenuation (MNA) was the selected remedy for addressing the groundwater contamination. Figure 5-1 shows the new warehouse overlying the footprint of the former AOC features.

AOC 43A (POL Storage Area) served as the central distribution point for all gasoline stations at Fort Devens during the 1940s and 1950s and was subsequently used to store fuels for various purposes. The distribution facility consisted of a main gasoline station, a pump house, four 12,000-gallon USTs, one 10,000-gallon UST, two 12,000-gallon above-ground storage tanks (AST), and two 8,000-gallon ASTs. Gasoline was delivered by rail car and transferred to the tanks. The POL Storage Area consisted of a fenced lot within a developed industrial area of buildings, roads, and grass lots. The site investigation indicated that a low level of xylene and an elevated level of petroleum hydrocarbons existed in the subsurface soils. The RI concluded that groundwater contamination required a remedial action evaluation. After the FS was completed, MNA was chosen as the selected remedy for groundwater and incorporated into the sites' 1998 ROD.

Quarterly groundwater sampling conducted between January and October 1999 at AOCs 32/43A demonstrated that the plume was not migrating, and semi-annual sampling rounds were implemented to monitor the downward trend of concentrations over time (Stone and Webster Environmental Technology & Services, 2000a and 2000b). It was concluded that additional sampling was needed to determine if the future warehouse installation would influence the migration of contaminants or groundwater hydraulics. Groundwater sampling was discontinued at AOC 43A in fall 2005 because cleanup goal exceedances had not been observed at AOC 43A wells since 2002. Wells SHL-15 and 32M-92-01X were removed from the sampling program in 2007 because they are located hydraulically cross-gradient/upgradient of historical source areas and are not likely to be influenced by either source area. Each well was retained for the collection of groundwater level data. A Remedial Action consisting of injection of a persulfate oxidant was implemented in February 2009 to augment the MNA remedy at AOC 32 in the vicinity of the former USTs. The remedial action targeted the remaining site COCs, including the dichlorobenzene isomers, at well 32M-01-18XBR. The findings and conclusions for this Remedial Action are reported in the 2009 *AOCs 32 & 43A Persulfate Injection Letter Report* (HGL, 2009).

[2] MassDEP establishes public water supply protection areas in accordance with the Drinking Water Regulations at 310 CMR 22.02. In part, a Zone II groundwater protection area is defined as the area of an aquifer which contributes water to a well under the most severe pumping and recharge conditions that can be realistically anticipated.

5.2 GROUNDWATER HYDROLOGY

Measured water levels at AOC 32/43A for the April 2018 LTM event are presented in Table 1-1. Interpretive overburden and bedrock water table elevation maps prepared for AOCs 32 and 43A show that groundwater generally flows to the south/southwest in the overburden and the bedrock, with a component of southeasterly flow on the east side of the area (**Figure 5-2** and **Figure 5-3**, respectively) which is consistent with the site's historical flow patterns. The eastern edge of AOC 32 and 43A overlaps the western edge of the Zone II for the Grove Pond wells, and the mapped groundwater flow direction in both overburden and bedrock is toward Zone II. The south-southwesterly groundwater flow that was observed in April 2018 does not have nearby surface water receptors; however, the groundwater flow directions observed in April 2017, which were to the southeast, indicated that shallow groundwater was flowing in the direction of Cold Spring Brook [approximately 4,200 feet from the southeastern most monitoring well (32Z-01-09XOB)] and bedrock groundwater was flowing in the direction of Grove Pond [approximately 2,400 feet from the eastern most bedrock monitoring well (32M-01-14XBR)].

The groundwater gradient 0.014 ft/ft to the south-southwest for overburden wells (32M-92-01XOB to 43M-01-20XOB) was calculated during the May 2018 monitoring event. The groundwater gradient for bedrock wells was calculated to be 0.016 ft/ft (32Z-01-06XBR to 43M-01-20XBR) to the south-southwest and 0.064 ft/ft (32Z-01-06XBR to 32M-01-14XBR) for flow from the northeastern portion of the site to the southeast. The flow lines used to calculate the gradient are believed to be representative of groundwater flow at the site.

Three sets of overburden and bedrock well pairs were assessed with respect to the presence of vertical gradients. Vertical gradients (unitless) calculated from the shallow wells to the deeper wells represent the differences in hydraulic head (in feet) divided by the distances between the midpoints of the screened intervals for the wells (in feet). The results of the assessment are presented in the following table.

Monitoring Well	Groundwater Elevation	Screened Interval	Mid-Point of Well Screen	Downward Gradient	Upward Gradient
43M-01-16-XOB	232.31	223.9-233.9	228.9	0.0076	--
43M-01-16-XBR	232.13	200.3-210.3	205.3		
43M-01-17-XOB	231.86	225.9-235.9	230.9	0.0041	--
43M-01-17-XBR	231.76	201.8-211.8	206.8		
43M-01-20-XOB	231.33	224.7-234.7	229.7	--	0.0014
43M-01-20-XBR	231.39	180.4-190.4	185.4		

* All elevations in Feet MSL.

The bedrock in this area, as described by core samples obtained from the borings at well locations 32Z-01-06XBR and 43M-01-20XBR, is comprised of a metamorphic suite of rock types, with mottled white-gray fine to coarse grained gneiss and gray aphanitic to medium

grained quartzite present at 32Z-01-06XBR and light gray aphanitic to coarse grained conglomerate with gneissic foliation at 43M-01-20-XBR.

5.3 GROUNDWATER SAMPLING

Groundwater sampling at AOCs 32 and 43A was reduced to an annual event in the 2015 LTMMP (Sovereign/HGL, 2015). Wells sampled during the 2018 LTM event consisted of 32M-01-13XBR, 32M-01-14XOB, 32M-01-17XBR, and 32M-01-18XBR.

On 23 May 2018, the roadbox for monitoring well 32Z-01-09XOB (presumably damaged by a snow plow over the winter) was repaired.

5.4 ANALYTICAL RESULTS

The 2018 LTM event consisted of four monitoring well samples from AOC 32/43A. The groundwater analytical results for the LTM event are summarized in **Table 5-1**. VPH concentrations from the 2018 LTM event are summarized on **Figure 5-4**. Dissolved metal concentrations for the 2018 LTM event are on **Figure 5-5**.

5.4.1 2018 Data Summary

- VOCs – Groundwater collected at source area monitoring well 32M-01-18XBR contained concentrations of 1,4-dichlorobenzene (1,4-DCB) (97 µg/L) above the cleanup goal of 5 µg/L, 1,3-dichlorobenzene (1,3-DCB) (150 µg/L) above the cleanup goal of 100 µg/L, 1,2-dichlorobenzene (1,2-DCB) (840 µg/L) above the cleanup goal of 600 µg/L, and chlorobenzene (440 µg/L) above the monitoring criteria of 100 µg/L. The other VOC results for 32M-01-18XBR were either below respective cleanup goals and monitoring criteria or were non-detect. VOCs were all non-detect at the other three downgradient wells sampled.
- Total Metals – Total arsenic was detected in groundwater at a concentration above the 10 µg/L cleanup goal at downgradient monitoring well 32M-01-14XOB (32 µg/L). The other total arsenic results were either non-detect or detected were below 10 µg/L. Manganese was detected at source area well 32M-01-18XBR at a concentration (8,400 µg/L) greater than the cleanup goal of 3,500 µg/L. Manganese results for the other three wells were either non-detect or were below the cleanup goal.
- VPH Carbon Fractions – The C_9-C_{10} aromatic results for source area well 32M-01-18XBR (760 µg/L) exceeded the monitoring criterion of 200 µg/L. The other VPH carbon fraction groundwater sample results were non-detect or less than the monitoring criteria.
- VPH Target Analytes – VPH target analyte (BTEX) groundwater sample results were non-detect except for benzene, which was detected at trace levels (0.81 J µg/L) at source area well 32M-01-18XBR.

5.4.2 AOCs 32 and 43A Data Trends

Results from the 2018 LTM event at AOCs 32 and 43A were compared to results from previous sampling events. Historical exceedances of the cleanup goals from 2006 through 2018 for AOCs 32 and 43A are summarized in **Table 5-2**, and a summary of the cleanup goal exceedances from 2002 to 2018 for source area well 32M-01-18XBR is presented in **Table 5-3**. Graphical and statistical analyses of selected wells are presented in Appendix D. Statistical analyses were compared to a 95% confidence level.

A major contributor to the decrease in COC concentrations in groundwater is the February 2009 sodium persulfate injection performed near source area monitoring well 32M-01-18XBR. Prior to the 2009 injection, COC concentrations, primarily dichlorobenzene (DCB) isomers, exhibited seasonal fluctuations and no definitive concentration trend. Post injection monitoring reveals COC concentration reductions with values below pre-injection levels. The spring 2018 data indicate increases in DCB concentrations, but these are still below historical concentration levels. DCB concentration trends will continue to be monitored in future LTM events. No additional persulfate injections are currently planned because of the overall, long-term trend of diminishing COC concentrations. As shown in Table 5-3, trichloroethene (TCE) concentrations at source area well 32M-01-18XBR have remained below the monitoring criterion since fall 2004 and have largely remained non-detect or detected at trace levels (estimated values below the laboratory detection limit) since October 2007. Bromodichloromethane at well 32M-01-18XBR has been non-detect since October 2006.

The target VOCs 1,2-DCB, 1,3-DCB, and 1,4-DCB had been detected above their respective cleanup levels in groundwater at well 32M-01-18XBR from 2002 to 2009. Following the February 2009 sodium persulfate injection, the three isomers have exhibited concentration declines. Prior to the 2018 LTM event, concentrations of the three isomers exhibited inter-related trends that fluctuated from event to event that is likely the result of sequential microbial dechlorination and degradation reactions. 1,2-DCB had been at or below the monitoring criterion since May 2010. 1,3-DCB had been below the criterion since June 2014 and had shown a statistically significant downward concentration trend ($p = 0.035$) following the injection in 2009 through 2017. Only 1,4-DCB was detected consistently above its cleanup goal (5 µg/L) at source well 32M-01-18XBR. Since the 2009 injection through 2017, 1,4-DCB concentrations had shown a general downward trend, although not statistically significant at the selected confidence interval ($p = 0.094$). For the 2018 LTM event, concentrations of each DCB isomer increased markedly, in contrast to the longer-term pattern of concentration decline. In spite of the 2018 increases in concentrations, 1,3-DCB ($p < 0.001$) and 1,4-DCB ($p < 0.001$) were found to have overall statistically significant downward trends.

Prior to the 2018 LTM event, the VPH C_9-C_{10} aromatics concentrations at well 32M-01-18XBR had demonstrated an overall downward trend. An increase in concentration in 2018 did not affect this overall trend, with a statistically significant downward trend confirmed ($p < 0.001$). Similarly, the VPH C_9-C_{12} aliphatic concentrations had decreased to below the monitoring criteria by 2005; the detected concentration in 2018 remains below the monitoring criterion. VPH concentration trends will continue to be monitored in future LTM events.

Arsenic has been periodically detected above the 10 µg/L cleanup goal in AOCs 32 and 43A wells since monitoring began in 2006 (Table 5-2); however, since the fall 2010 sampling event, the only well with arsenic detections above the cleanup goal has been sentry well 32M-01-14XOB. The current arsenic concentration in well 32M-01-14XOB (32 µg/L) is well below the historical high of 90 µg/L in 2015; however, there is no overall statistically significant trend in the arsenic concentration data in this well ($p = 0.264$).

Manganese concentrations have remained below the cleanup goal (background level) since 2012, although an elevated level of manganese (8,400 µg/L) was detected in source area well 32M-01-18XBR during 2018 (Table 5-2). The sampling results prior to 2018 had suggested that groundwater at well 32M-01-18XBR had reverted to an oxidized environment. For 2018, continued increases in both DO and ORP (Table 5-1**)** suggest that further sequestration of arsenic

and manganese back into the aquifer soils should be maintained; and the increase in manganese concentration in 2018 is likely to be anomalous. These concentration trends will continue to be monitored in future LTM events, and any potential continued increasing trend for manganese detected in this well in 2019 will be evaluated, and discussed in the 2019 Annual Report.

5.4.3 Water Quality Parameters

General water quality chemistry parameters (pH, temperature, specific conductivity, ORP, DO, and turbidity) were measured at each of the four wells during the 2018 LTM event. These parameters are measured concurrently with low-flow sampling and are used to verify groundwater stabilization within each well prior to sampling. The final field readings for water quality parameters at AOCs 32 and 43A during the 2018 LTM event are summarized in Table 5-1. The ORP and DO data indicate that the area is returning to an oxidizing environment with the lowest ORP and DO values present at downgradient well 32M-01-14XOB. A comparison of the 2010 through 2018 field results indicates that aquifer conditions at source well 32M-01-18XBR has reverted to an oxidizing environment (Table 5-3).

5.5 DATA EVALUATION FOR 2018 LONG-TERM MONITORING EVENTS

Groundwater samples were collected from four AOCs 32 and 43A wells in 2018. Samples were analyzed at TestAmerica for VOCs and dissolved metals and submitted to Katahdin Analytical Services for VPH analysis.

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), the data may be used without qualification, as noted below:

Volatile Organic Compound Analysis

- VOC results for the AOCs 32 and 43A groundwater samples were acceptable, as reported. No qualifications were needed.

Volatile Petroleum Hydrocarbon Analysis

- VPH results for the AOCs 32 and 43A groundwater samples were acceptable, as reported. No qualifications were needed.

Total Metals Analysis

- Total metals results for the AOCs 32 and 43A groundwater samples were acceptable as reported. No qualifications were needed.

5.6 LAND-USE CONTROLS

Ozark Automotive Distributers, Inc. (a division of O'Reilly Automotive, Inc.) currently operates the property at AOCs 32/43A. LUCs were established to limit the potential exposure to the contaminated soil and groundwater under both the existing and future site conditions, per the 1998 ROD, and was incorporated into the deed upon transfer to MassDevelopment. The LUCs were included in the deed when O'Reilly Automotive purchased the property. The LUCs ensure that exposure to any remaining contaminated soils beneath the site is controlled and the extraction of groundwater from the site for industrial or potable water supply is not permitted. LUCs are verified during annual sampling events. Existing land-use is evaluated as part of the Five-Year Review process to ensure control requirements are being met. A site-specific annual LUC checklist, including physical on-site inspection and interview components, was developed in 2007 for use during LUC verification activities. The checklist is presented in Appendix E.

5.6.1 Land-Use Control Interviews

Interviews were conducted with Mr. Ron Ostrowski and Mr. Neil Angus of MassDevelopment, and Mr. Jason Pahl of O'Reilly Automotive, regarding the following:

- Familiarity with the LUCs imposed upon the property and documentation of these controls;
- Excavations (planned or emergency) that may involve soils and groundwater; and
- Proposed plans for property sale, future redevelopment, and construction or demolition activities at the site.

Mr. Ostrowski and Mr. Angus confirmed that the building remains owned and operated by O'Reilly Automotive. The contact for O'Reilly Automotive is Facilities Manager, Jason Pahl. Mr. Pahl confirmed that there have been no changes at the facility and no ground disturbance at the site during 2018.

5.6.2 Land-Use Control On-Site Inspection

LUCs were verified during annual groundwater sampling events performed. During sampling activities, a LUC inspection was performed to identify the following:

- Any signs of increased exposure potential to the public from soil and/or surface water contaminants;
- Any evidence that groundwater extraction wells had been installed at the site; and
- Any evidence of site use changes.

MassDevelopment supplies potable water to the large warehouse that currently occupies the property. No evidence of increased exposure potential was observed during the 2018 sampling events.

5.7 CONCLUSIONS

In source area well 32M-01-18XBR, the concentrations of manganese, 1,2-DCB, 1,3-DCB, 1,4-DCB, chlorobenzene, and VPH C_9-C_{10} exceeded their respective cleanup goals or monitoring criteria in 2018. The detected concentrations of these COCs in 2018 were higher than the concentrations detected during the multiple sampling events since the 2009 persulfate injection (Table 5-3) and is therefore likely to be a temporary increase. COC concentrations in the source area will continue to be monitored during the next annual LTM event.

In the other wells sampled during the 2018 LTM event, only arsenic in downgradient well 32M-01-14XOB (32 µg/L) exceeded its cleanup goal of 10 µg/L (Table 5-1). There were no other exceedances of cleanup goals/monitoring criteria during the 2018 sampling event.

The ROD remedy includes LUCs to limit potential exposure to contaminated soil and groundwater under both existing and future site use. During sampling, observations were made to identify any signs of increased exposure potential. No evidence of increased exposure potential was observed during the 2018 LTM event. The Army will continue to perform LTM and LUC inspections until site conditions warrant discontinuation of sampling and change in LUC implementation.

6.0 DEVENS CONSOLIDATION LANDFILL (DCL)

6.1 SITE BACKGROUND

The DCL was constructed on the former Fort Devens golf course driving range to accommodate excavated material from seven remedial areas consisting of two SAs, four AOCs, and one pesticide removal project at three Devens HAs. The DCL is shown on **Figure 6-1**. The seven DCL contributor sites were:

1. SA 12: A 0.5-acre location where construction debris and yard waste were deposited (approximately 8,700 cubic yards);
2. SA 13: A 1-acre area used from 1965 to the mid-1990s for yard-waste (approximately 10,000 cubic yards);
3. AOC 9: An area used for storing wood, concrete, asphalt, metal, brick, glass, and tree stumps (approximately 121,000 cubic yards);
4. AOC 11: A former landfill used from 1975 to 1980 for disposal of wood-frame hospital demolition debris (approximately 35,000 cubic yards);
5. AOC 40: 4 acres used for construction debris, ash, stumps, and logs (approximately 125,400 cubic yards);
6. AOC 41: A 0.25-acre landfill in the South Post Impact Area that was used up to the 1950s for disposal of non-explosive material and household debris (approximately 1,500 cubic yards); and,
7. HAs Grant, Locust, and Cavite: Soils and walling material contaminated with VOCs or pesticides (approximately 2,290 tons of soil and approximately 1,240 tons of concrete).

The ROD included provisions for either on-site or off-site disposal options. The on-site landfill construction alternative was selected as the preferred alternative. Construction of the DCL commenced in September 2000 and was completed in November 2002. *The Remedial Action Closure Report* prepared by Shaw Environmental (formerly Stone & Webster, Inc.) in September 2003 was accepted, certifying that the DCL was constructed and capped in accordance with the ROD, and met the performance standards and/or response objectives in the ROD. The ROD required the collection of samples from groundwater monitoring wells in accordance with 310 CMR 19-132 to assess the effectiveness of the remedy. LTM activities have been performed since the completion of the landfill construction.

The Closure Report provides the operations and maintenance manual for the DCL (Shaw Environmental, Inc., 2003). In 2017, USACE operated and inspected the landfill facility and KGS conducted the groundwater and leachate discharge sampling in 2017. Landfill leachate is discharged to the Devens sewage system under an industrial wastewater discharge permit. Effluent criteria and reporting requirements are specified in the leachate discharge permit, which was updated August 21, 2006. MassDevelopment established new effluent criteria beginning in 2009.

In addition to the monitoring activities and the installation of new soil gas probes (Section 6.5), maintenance activities at the DCL during 2018 included the following:

- survey of monitoring well LFM-03-07 (which had been repaired in 2017) (January 2018)
- clearing of vegetation from the riprap along the toe of the landfill and flush-cutting of larger vegetation on the landfill cap (March 6, 2018)

- repair of landfill gas vent labels and screens (May 3, 2018)
- reseeding and fertilizing selected areas of the landfill cap (May 10, 2018)
- landfill mowing (October 17, 2018)
- leachate pump flow meter calibration (October 19, 2018)
- repairs to the leachate pump controller (October/November 2018)
- landfill inspection (November 14, 2017)
- monthly inspections of the leachate pump system.

6.2 WELL INSPECTION

Wells inspected during the spring and fall 2018 LTM events were found to be in good condition. Because of construction activities in 2017 in the vicinity of monitoring well LFM-03-07 (Figure 6-1), the elevation for the well had to be resurveyed in January 2018. Monitoring well LFM-99-06A-RP was also resurveyed to confirm its elevations and coordinates. Survey results are presented in Appendix A. **Table 6-1** provides well construction information for current LTM wells presently gauged or sampled at the DCL, including 2 overburden groundwater monitoring wells, 4 bedrock groundwater monitoring wells and 3 overburden gas monitoring wells.

6.3 GROUNDWATER HYDROLOGY

Measured water levels at the DCL during the spring and fall 2018 LTM events are presented in Table 1-1 and Table 1-2, respectively. Groundwater flow patterns at the DCL show a northeasterly flow pattern for the spring and fall 2018 LTM events as indicated on **Figure 6-2** and **Figure 6-3**, respectively. Groundwater elevations were generally higher (approximately 1.05 to 4.17 feet higher) during the fall 2018 event relative to the spring 2018 LTM event; however, the overall groundwater flow pattern remained consistent between the two monitoring events. Groundwater gradients were calculated using elevation measurements recorded for the April and October 2018 LTM events. A gradient of 0.046 ft/ft was calculated for wells LFM-99-02B to LFM-99-05B for the April event, and a gradient of 0.045 ft/ft was calculated for wells LFM-99-01B to LFM-99-05B for the October event.

Analysis of the groundwater levels in monitoring wells located in the overburden (LFM-99-5A and LFM-99-6A-RP) and Profiles 1 and 2 (**Figure 6-4)** indicate that the groundwater level in the overburden remained lower than the elevation of the landfill liner (i.e., the shallow groundwater table was not in contact with the landfill); therefore, overburden well LFM-99-6A-RP will be added as a trigger well, while also retaining the existing bedrock wells as trigger wells, per EPA.

6.4 GROUNDWATER SAMPLING

Groundwater at the DCL is sampled semi-annually as part of the spring and fall LTM events. Wells sampled during the spring and fall 2018 LTM events consisted of LFM-99-02B, LFM-99-05A, LFM-99-06A-RP, and LFM-03-07.

Water level readings are collected from overburden monitoring well LFM-99-6A-RP and bedrock monitoring wells LFM-99-01B, LFM-99-03B, and LFM-05B during the spring and fall LTM events. The depth to water for each well is evaluated against shallow "trigger" depths listed in **Table 6-2.** If the depth to water is less than the "trigger" depth (viz., higher water table elevation), there is a potential that groundwater may come into contact with the landfill and these locations would need to be sampled along with the LTM wells. The depth to water/groundwater elevations from the spring and fall 2018 LTM events compared to the trigger depths to water/groundwater elevations are summarized in Table 6-2**.** The water table remained below the

trigger values during 2018 and no additional sampling was required. Analytical results for the spring and fall 2018 LTM wells are presented in **Table 6-3** and **Table 6-4.**

6.5 LANDFILL GAS MONITORING

In 2016, a building was constructed at 85 Patton Road, Devens, Massachusetts, a location approximately 150 feet east of the southeastern edge of the landfill. MassDEP had requested that gas probes be installed between the landfill and the new structure and that landfill gas monitoring be conducted to evaluate whether landfill gas is migrating from the landfill through soil and/or in groundwater that could create hazardous condition in the area of the new structure.

The Army prepared the *Work Plan for Installation of Perimeter Landfill Gas Monitoring Wells* (KGS, 2018) and installed and sampled three gas probes on 7 December 2018 (Figure 6-1). Well construction logs for gas probes LFGM-18-01, LFGM-18-02 LFGM-18-03, and photographs of their locations, are provided in **Appendix G**, and the results of the location survey are included in Appendix A. Results of sampling of the three gas probes conducted on 18 December 2018 are presented in **Table 6-5**. Methane, the primary explosive landfill gas constituent of concern that could be generated from the DCL landfill, was not detected (0% LEL). VOC results ranged from 0.9 to 1.3 parts per million (ppm), carbon monoxide ranged from non-detect to 1.0 ppm, and carbon dioxide ranged from 0.1 to 0.7%. Hydrogen sulfide was not detected. Therefore, no soil gas hazard for occupants of the new building was identified.

6.6 LEACHATE SAMPLING

The DCL is permitted to discharge industrial wastewater to the Devens Sewerage System in accordance with Industrial Discharge Permit No. 017 granted by MassDevelopment. The permit legally binds the DCL effluent to meet the specified permit conditions. Penalties can be applied if the effluent discharge exceeds the conditions specified in the permit. Leachate monitoring was performed on a quarterly and semi-annual frequency until August 2006 when MassDevelopment approved a reduction in the leachate monitoring to an annual event. Sampling is performed each year between October 1 and December 31, and self-monitoring reports are due to MassDevelopment by January 5 of the following year. **Table 6-6** summarizes the DCL leachate analytical results from sampling on December 7, 2018. There were no exceedences of the effluent limits in 2018. Further details of the DCL leachate analytical results are presented in Section 6.9.3.

6.7 DEVENS CONSOLIDATION LANDFILL LEACHATE DISCHARGE QUANTITY MONITORING

DCL leachate discharge quantity monitoring was historically performed monthly by MassDevelopment. Operation and maintenance (O&M) of the leachate pumping station began in March 2008. Monitoring results are used to calculate leachate discharge quantities for comparison with historical discharge data. Leachate discharge quantities are summarized in **Table 6-7.** Leachate discharge quantities have decreased substantially since the landfill cap was completed. The increase in leachate volume in 2018 compared to recent years is believed to be attributable to higher precipitation rates in 2018 (Table 1-3).

6.8 LANDFILL INSPECTIONS

Since its completion, the DCL has been inspected annually to ensure it continues to be protective of human health and the environment. The inspection frequency was changed from semi-annual (spring and fall) to annual in 2008 based on recommendations in the LTMMP (HGL, 2008).

The DCL landfill cap was inspected on November 14, 2018, by KGS and USACE personnel. Observations were made regarding the vegetative cover, vegetation types, erosion, settlement, and general condition of the various features. The full report for the November 2018 inspection is presented in **Appendix F** and the following list summarizes the findings of the fall inspection:

- The landfill cap was in good condition, with no settlement or significant erosion. In general, the cap vegetation appeared healthy and provides good coverage of most areas of the cap. Some of the original perennial grasses and clover are being replaced over large areas of the cap with invading weedy and some woody species. The woody vegetative growth gets cut during each annual mowing; however, the stalks are left over, and should be removed, and the areas reseeded. Maintenance activities conducted during 2018 to re-establish growth of the designed grass cover included re-seeding and fertilizing the upper portion of the landfill cap (during May 2018) where the most gaps in grass cover had been present. The reseeded/fertilized areas were observed to be growing well during the November 2018 inspection. The cap and adjacent area vegetation were mowed during fall 2018.
- A green, sheet-metal storage shed located next to the leachate pump station has a broken swinging door which is currently braced closed. The Army plans to repair or remove the shed in fall 2019.
- The site and access roads are located on private property owned by MassDevelopment. Gates at the south end of the landfill were originally included in the construction of the landfill to restrict access but were absent at the time of the inspection. Gates at the south end of the landfill appears to have been dislocated, damaged, and deposited in the shrubs on the west side of the access from Patton Road. The gate was later repaired in July 2019.
- The access road from the entry gate around to the leachate pump station was in good condition. There were no ruts, potholes, or eroded areas.
- The perimeter fence is in good condition. The fence and entry gates, rock features (such as 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 perimeter of the landfill.
- The cap drainage system was in good condition. Drainage channels were free of sediment and debris. The vegetation on the side slopes of the landfill was healthy and dense. A minimal amount of grass was growing in the gabion slope drains, but there were no species that appeared to have extensive root systems that would disrupt the function of the system. Some woody vegetation has begun to establish in the drainage channel around the northern perimeter of the landfill and should be removed. Woody vegetation was flush-cut in some drainage channels in March 2018.
- The perimeter toe drain was showing signs of vegetation beginning to establish. The toe drain appeared to be functioning properly, and there were no visible signs of erosion or developing slope stability problems. Toe drains should continue to be monitored for vegetation, which should be removed to extent feasible.
- Landfill gas was monitored as part of the annual event. The gas vent system is in good condition. Vent screens repaired in May 2018 were found to remain in good condition during the November inspection.

- Landfill gas vent monitoring results (Appendix F) and gas probe monitoring results (Table 6-4) were acceptable.

Routine maintenance activities that should continue to be performed include annual mowing and control of encroaching vegetation in the drainage system. The annual mowing of the cap should be done in early fall to avoid harming ground-nesting songbirds. Mowing should also include the adjacent open field and detention pond areas.

6.9 ANALYTICAL RESULTS

Groundwater analytical results for the spring and fall 2018 DCL LTM events are presented in Table 6-3 and Table 6-4, respectively, and are summarized below. The spring and fall LTM events consisted of collecting four groundwater monitoring well samples and one field duplicate sample. There were no exceedences of the monitoring program benchmark criteria.

The fall 2018 leachate sampling event consisted of a single landfill effluent leachate sample collected on December 7, 2018 to fulfill the requirements of MassDevelopment Industrial Wastewater Discharge Permit No. 017. The leachate monitoring results are presented in Table 6-5.

6.9.1 Spring 2018 LTM Data Summary

- EPH fractions and target PAH compounds were non-detect.
- VPH fractions and target VOC compounds (BTEX) were non-detect.
- Organochlorine pesticides were non-detect.
- Target total metals were either non-detect or detected below the respective monitoring criteria.
- Total cyanide results were either non-detect or detected below the monitoring criterion.
- Wet chemistry parameters TDS, chloride, sulfate, nitrate/nitrite and total alkalinity were reported in groundwater. TDS concentrations ranged from 380 to 670 mg/L; chloride concentrations ranged from 160 mg/L to 350 mg/L; sulfate concentrations ranged from 19 to 28 mg/L; total alkalinity concentrations ranged from 48 to 79 mg/L and nitrate/nitrite concentrations ranged from 0.60 to 1.8 mg/L. COD concentrations ranged from non-detect to 10 J mg/L.

6.9.2 Fall 2018 LTM Data Summary

- EPH fractions and target PAH compounds were non-detect.
- VPH fractions and target VOCs compounds were non-detect.
- Organochlorine pesticides were non-detect.
- Target total metals were either non-detect or detected below respective monitoring criteria.
- Total cyanide results either non-detect or below the monitoring criteria.
- Wet chemistry parameters TDS, chloride, sulfate, nitrate/nitrite, total alkalinity were reported in groundwater. TDS concentrations ranged from 420 to 630 mg/L; chloride concentrations ranged from 180 to 310 mg/L; sulfate concentrations ranged from 25 to 34 mg/L; nitrate/nitrite concentrations ranged from 0.69 to 1.3 mg/L; and total alkalinity concentrations ranged from 87 to 110 mg/L. COD concentrations were all non-detect.

6.9.3 2018 Leachate Analytical Data Summary

- SVOCs, organochlorine pesticides and PCBs were non-detect in the leachate sample.
- TTO is defined as the sum of all detected VOCs, SVOCs, organochlorine pesticides and PCBs. The TTO concentration for the leachate sample were non-detect.
- Cyanide and phenols were non-detect.
- TPH was detected in the leachate sample at 0.37 J mg/L.
- Target metal results per the Wastewater Discharge Permit No. 017 were non-detect, except for arsenic at 0.0044 mg/L and nickel at 0.0026 J mg/L.
- Wet chemistry parameters indicated the leachate pH was 8.2, which is within the permit range of 5.5-9.5. TSS was reported at 19 mg/L, below the 400 mg/L limit established in MassDevelopment Industrial Wastewater Discharge Permit No. 017.

6.9.4 DCL Data Trends

Historical analytical results for the DCL wells are summarized in Table 6-7, **Table 6-8**, **Table 6-9** and **Table 6-10**. Groundwater samples from wells LFM-99-02B, LFM-99-05A, and LFM-03-07 have remained at trace or non-detect levels for EPH and organochlorine pesticides since monitoring began in 2003. Similarly, metals concentrations have been consistently non-detect or below the respective cleanup levels in groundwater at these three DCL monitoring wells since November 2003. The 2018 wet chemistry parameters also remained generally consistent with past data.

6.9.5 Water Quality Parameters

General water quality chemistry parameters (pH, temperature, specific conductivity, ORP, DO, and turbidity) were measured during the 2018 LTM events. These parameters are measured concurrently with low-flow sampling and are used to determine groundwater stabilization within each well prior to sampling.

The final field readings taken prior to collection of each groundwater sample are reported in Table 6-3 and Table 6-4. Any COC detection at the DCL wells is sporadic and low in concentration; therefore, no definitive correlation can be established between the measured groundwater quality parameters and the presence or absence of contamination in the sampled wells.

6.10 DATA EVALUATION FOR 2018 LONG-TERM MONITORING EVENTS

6.10.1 Spring 2018 Groundwater Analytical Data Review

Groundwater samples were collected from four DCL wells in April 2018. The samples were analyzed at TestAmerica for organochlorine pesticides, total metals, cyanide and wet chemistry parameters (TDS, alkalinity, chloride, sulfate, nitrite/nitrate, and COD). The samples were submitted to Katahdin Analytical Services for VPH and EPH analyses.

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), the data are acceptable as reported with the following notations:

Pesticides Analysis

- Sample LFM-99-02B was re-extracted and re-analyzed because of low surrogate recovery percentages. The re-extraction was outside of the seven-day extraction holding time; the pesticide results were reported as qualified non-detects (UJ).

Total Metals Analysis

- Total metals results were acceptable as reported. No qualifications were needed.

Total Cyanide Analysis

- Total cyanide results for sample LFM-99-05A and its duplicate were J qualified because of a high relative percent difference (RPD) value.

Wet Chemistry Analysis

- Results for the nitrate/nitrite, chloride, sulfate, alkalinity, and TDS analyses were acceptable as reported. No qualifications were needed.

VPH Analysis

- Results for VPH analysis were acceptable as reported. No qualifications were needed.

6.10.2 Fall 2018 Groundwater Analytical Data Review

Groundwater samples were collected from three wells in October 2018. Samples were analyzed at TestAmerica for organochlorine pesticides, total metals, cyanide, and wet chemistry parameters (TDS, alkalinity, chloride, sulfate, nitrite/nitrate, and COD). Samples were submitted to Katahdin Analytical Services for VPH and EPH analyses.

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), the data are acceptable and may be used without qualification, with the following notations:

Pesticide Analysis

- The MS % recoveries for several pesticide compounds were outside of control limits. The ND results for the pesticide compounds were qualified as estimated (UJ).

Select Metals Analysis

- Barium, chromium, copper, iron and manganese were reported at low levels in associated continuing calibration blanks (CCBs). The estimated results for barium were less than five times the blank level (1.84 ug/L) and were qualified as non-detect (ND). The results for chromium, copper, iron and manganese were greater than 5 times the blank levels and no qualification was needed.

Alkalinity Analysis

- Alkalinity was detected in associated blanks from 3.2 to 4 mg/L. Sample results were greater than 5 times blank levels; qualifications were not required.

6.10.3 2018 Leachate Analytical Data Review

One leachate sample was collected in December 2018. The leachate sample was submitted to TestAmerica for total metals, cyanide, TPH (diesel range organic [DRO]), total phenol, pesticides/PCBs and wet chemistry parameters. Samples were submitted to Katahdin Analytical Services for VOC and SVOC analyses. The data were found to be usable as reported and may be used for its intended purpose.

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), the data are acceptable and may be used without qualification.:

6.11 LAND-USE CONTROLS

MassDevelopment maintains ownership of the DCL property and agreed to grant the Army a permanent easement in 2001 to build and operate the landfill (Easement Agreement, 2001). DCL contributor sites AOC 9, AOC 40, and SA 13 were transferred from the Army to MassDevelopment in March 2006. The March 2006 deed included use restrictions on the contributor sites to prevent residential development of the properties (Deed, 2006).

The 1999 ROD had indicated LUCs "were planned for the proposed Consolidation Landfill." LUC inspections are conducted per the "LUC Monitoring Plan" included in the 2008 LTMMP. A site-specific annual LUC checklist, including physical on-site inspection and interview components, was developed in 2007 for use during LUC verification activities. The LUC checklists for DCL and the DCL contributor sites are included in Appendix E.

6.11.1 Land-Use Control Interview

An interview was conducted with Mr. Ron Ostrowski of MassDevelopment regarding the following items:

- Familiarity with the LUCs imposed upon the property and documentation of these controls;
- Excavations (planned or emergency) that may involve soils and groundwater; and
- Proposed plans for property sale, future redevelopment and construction or demolition activities at the site.

Mr. Ostrowski stated that soil tests (physical property tests) were conducted in SA13 (Lease Parcel 8) to evaluate the soils for potential construction. The findings indicated that the soil was not suitable for construction, and no further work is planned.

6.11.2 Land-Use Control On-Site Inspection

LUCs at the DCL were verified during annual groundwater and landfill leachate sampling events performed. During sampling activities, a LUC inspection was performed to identify the following:

- Any signs of increased exposure potential to the public from soil and/or surface water contaminants;
- Any evidence that groundwater extraction wells had been installed at the site; and
- Any evidence of site use changes.

No groundwater extraction wells have been installed on the site.

In addition to the on-site DCL inspection, a LUC inspection of the DCL contributor sites (AOC 9, AOC 40, and SA 13) was performed. The findings of the contributor site inspections revealed no abnormalities or changes in land-use at the individual contributor sites and there was no evidence of residential development

6.12 CONCLUSIONS

The 2018 results for the DCL groundwater monitoring wells remained consistent with groundwater results from previous LTM events. EPH and organochlorine pesticide results have been non-detect or detected below the associated analytical reporting limits since 2004. Metals results have been below monitoring criteria in the DCL monitoring wells groundwater samples since 2003 and the 2018 results were consistent with the historical results. The 2018 wet chemistry parameters were generally consistent with previous results. There were no

exceedances of the DCL Wastewater Discharge Permit No. 017 in the December 2018 sampling of the DCL leachate.

Methane, the primary explosive landfill gas constituent of concern that could be generated from the DCL landfill, was not detected (0% LEL). Other soil gas constituents were either detected at normal concentrations (oxygen) or trace levels that do not present a hazard to the new building (VOC, CO_2). No soil gas hazard for occupants of the new building was identified.

The ROD remedy includes LUCs to limit potential exposure to contaminated soil and groundwater under both existing and future site use. During the 2018 LTM event no evidence of increased exposure potential or changes in land use were observed during the LUC inspections of DCL contributor sites (AOC 9, AOC 40, and SA 13). Per the requirements of the 2006 transfer deed, these contributor sites are not being used, or under development, for residential purposes. The Army will continue to perform LTM and LUC inspections until site conditions warrant discontinuation of sampling and change in LUC implementation

7.0 HOUSING AREAS AND 37-MM IMPACT AREA

7.1 SITE BACKGROUND

The Grant HA, Oak HA, Maple HA, and 37-mm Impact Area are located within the Main Post, located between Hospital Road, El Carney Street, and the Nashua River. A map illustrating the location of the HAs and 37-mm Impact Area is presented on **Figure 7-1.** Historical records indicate that training was conducted within the then wooded HAs from 1917 until a multi-family housing development was constructed in the late 1950s. A 37-mm range was located along the western boundary of the Grant HA with an impact area, which occupies approximately 2 acres, on the northern slope of Oak Hill.

In 1994/1995, USACE completed a study to document the locations of all the training areas and ranges at Devens. Based on the findings of this study, the Archive Search Report several former weapons training ranges within the former installation were identified. Several potential munitions and explosives of concern (MEC) sites were identified. Grant HA, along with portions of the Oak and Maple Housing Areas, were designated as Area 11. A 1995 munitions response investigation confirmed the presence of MEC throughout Area 11 with a clustering of MEC located at the southern end of Area 11, north of the former Oak Housing Area (USACE, 1995). In 1996, MEC removal actions were performed at the 37-mm Impact Area and extending into the former Oak and Maple HAs. Over fifty unexploded 37-mm projectiles and many 37-mm fragments were located and disposed. Most of the ordnance that was discovered was found in the two dense clusters indicating former target locations. This removal action was summarized in the Final Removal Action Report (Human Factors Applications, Inc., 1996).

Following the removal action in 1996, concerns regarding the potential for remnant unexploded ordnance (UXO) to exist in the soil within the 37-mm Impact Area and the potential for similar conditions at the Grant HA resulted in MassDevelopment contracting Ordnance and Explosive Remediation, Inc. (OER) to conduct a survey of the area. Digital geophysical surveying was completed to evaluate whether MEC existed. The 1996 MEC investigation by USACE and the 2004/2005 MEC survey and removal action by OER removed all identified UXO located within 18 inches of the surface over the Grant HA and portions of the surrounding HAs. The OER removal action found and destroyed 31 UXO (20 37-mm practice round projectiles, four mines, one rifle grenade, and six stokes mortars), and 17 other ordnance items. Most the UXO were found within an estimated 2-acre area associated with the target Impact Areas and the north slope of Oak Hill. This area is located on the southwest edge of the Grant HA. The survey and removal action results were presented in the *Site Specific Final Report, Digital Geophysical Mapping (DGM) & Unexploded Ordnance (UXO) Removal, Grant Housing Area, Former Ft. Devens, Harvard, Worcester, Massachusetts* (OER, 2006).

Based on the findings of the previous investigations and removal actions, an Expanded Conceptual Site Model (ECSM) (USACE, 2006) was developed for the former Grant HA that extended to portions of the Oak and Maple Housing Areas. The report identified three ranges within the Grant HA and adjacent Oak HA. LUCs were identified by the report as the preferred response action to address the former ranges within the Grant Housing Area.

In addition to the UXO removal, the Army conducted a pesticide removal action in 2002. It was determined that in the late 1950s and early 1960s, the Army had applied pesticides around the housing units for a means of pest control. The removal action resulted in the excavation and disposal of more than 150,000 tons of soil and concrete from the Grant HA. The excavated soil

and concrete were hauled and placed in the DCL landfill. The Army also conducted a PCB Time Critical Removal Action from 2002 to 2005 within the Grant HA. Approximately 12,000 tons of soil were excavated and disposed. MEC was not encountered during either of the removal actions.

These efforts were documented in the Preliminary Assessment/Site Inspection and Supplemental Site Investigation Comprehensive Report (PASI/SSI Report). The PASI/SSI also provided a detailed summary of land-use, habitat survey, and sampling efforts, which concluded that the Grant HA did not pose unacceptable hazards to ecological receptors. However, the PASI/SSI Report recommended a Focused Feasibility Study (FFS) be prepared to evaluate the alternatives involving LUCs for the Impact Area (Weston, 2008b).

The Army then performed an FFS comparing the remedial alternatives addressing potential residual UXO at the Grant HA and the 37-mm Impact Area. The FFS evaluated potential remedial alternatives and was completed in 2008 (Weston, 2008a). Along with the FFS, a Proposed Plan was created in accordance with section 117 CERCLA, which gave the public the opportunity to participate in the remedial action.

A ROD for the Grant HA and Impact Area was signed in 2009. The Remedial Action Objective (RAO) for the Grant HA and 37-mm Impact Area is to prevent direct contact with UXO, which may remain in the soils at the site. As noted in the ROD, the LUCs are "preventative for direct contact as they educate the contractor and resident as to the potential presence of UXO and the actions to be taken if presumed UXO is encountered, which included not handling the UXO" (Weston, 2009).

Pursuant to the ROD, a Land-Use Control Implementation Plan (LUCIP) was issued in May 2011 (U.S. Army BRAC Environmental Division, Army Garrison Fort Devens, 2011). LUCs for Grant HA are addressed through affirmative actions which include:

(1) public education to property owners, residents, as well as any construction and/or utility contractors via utility bill inserts, educational materials posted on a community website and training for contractors conducting ground intrusive activities on the property; and
(2) a deed notice that will be inserted into any Grant HA deeds by MassDevelopment to convey there is no evidence of additional UXO present at the site, but that the possibility does remain that UXO could be discovered in the future.

Additionally, the LUCIP indicates that LUCs for the Impact Area are addressed through institutional controls, access restrictions, affirmative measures and prohibitive directives including:

(1) institutional controls (IC) to be implemented through a Grant of Environmental Restrictions and Easements
(2) access controls would be implemented using signage and fencing to restrict public access
(3) public education to property owners, residents, as well as any construction and/or utility contractors conducting ground intrusive activities on the property
(4) prohibitive directives to include restrictions on all ground intrusive activities
(5) annual site inspections to evaluate the access controls, monitor the potential presence of surficial UXO, and evaluate the overall effectiveness of the LUCs

The Army conducts annual reviews to confirm the overall effectiveness and compliance with the established LUCs in the Grant HA and the Impact Area. The reviews include interviews with personnel of MassDevelopment and Devens Enterprise Commission (or successor municipal authority) as to the discovery, reporting, and disposal of UXO in the Grant HA and the Impact Area during the prior year. The annual review includes a physical inspection at the Impact Area to evaluate access controls and monitoring for the presence of surface and near surface UXO. The reviews include interviews with MassDevelopment (or the then current owner of the Impact Area) to determine if any utility repair or emergency work was conducted in the Impact Area during the prior year. The annual review of the LUCs at Grant HA includes verification that the website, utility bill inserts, UXO awareness training, inclusion of the Supplemental Deed Notice in deeds conveying the Grant HA (or portions thereof) and other requirements set forth in this LUCIP are being properly implemented. If deemed necessary, the annual review of the LUCs at the Grant HA may also include a physical inspection.

A MEC RI was conducted at former Oak and Maple Housing Areas in 2010/2011 based on recommendations in the PASI/SSI Report (Weston, 2008b). The investigation revealed that the probability of encountering MEC within the previously developed former Oak and Maple Housing Areas was considered to be extremely low (HGL, 2012). An FFS Addendum to the Grant HA and 37-mm Impact Area FFS was prepared to address the former Oak and Maple Housing Areas (Sovereign/HGL, 2013). The FFS Addendum recommended LUCs for the former Oak and Maple HAs. The RAO for the former Oak and Maple HAs was the same as the Grant HA and 37-mm Impact Area (prevent direct contact with UXO/MEC, which may remain in soils) (Weston, 2009). The remedy for the former Oak and Maple HAs was incorporated within the Grant HA and 37-mm Impact Area site via an Explanation of Significant Differences (Sovereign/HGL, 2014). The additions to the ROD selected remedy, for application to the Oak and Maple Housing Areas, consist of inclusion of:

(1) pre-construction clearance of selected grids at the Oak Housing Area
(2) a MEC physical preview of any proposed construction footprint
(3) future MEC construction support for all intrusive activities in areas where construction support has not previously been conducted
(4) the inclusion of a deed notice for the prohibition of residential reuse within the LUCs
(5) LUC affirmative measures for public education

The application of LUCs was specified by the *Final Land Use Control Implementation Plan Addendum, Former Oak and Maple Housing Areas, Former Fort Devens Army Installation, Devens, MA* (USACE, 2017).

The pre-construction clearance of selected grids at the Oak Housing Area was conducted in 2016 and the housing area foundation slabs were removed (USACE, 2017).

The Grant HA is currently zoned for residential reuse per the Devens Reuse Plan. MassDevelopment executed and properly recorded a Grant of Environmental Restrictions and Easements for the Grant HA, which was recorded at the Worcester Registry of Deeds on December 19, 2011, book 48291, page 138. The Oak and Maple HA is zoned for commercial construction and the Impact area is restricted for future reuse.

7.2 LAND-USE CONTROLS

Ownership of Grant, Oak, and Maple HAs and 37-mm Impact Area was transferred from the Army to MassDevelopment in 1996 and 1999. LUCs were implemented to ensure that public education to property owners, residents, as well as any construction and/or utility contractors conducting ground intrusive activities on the property was completed through distribution of education materials and development of a web-based visual and audio media. Another LUC details that a deed notice will be inserted by MassDevelopment into any Grant, Oak, and Maple HAs and 37-mm Impact Area deeds in which conveys that there is no evidence of additional UXO present at the site, but that the possibility does remain that UXO could be discovered in the future. A site-specific annual LUC checklist for the Grant HA and Impact Area, including physical on-site inspection (if deemed necessary) and interview components, were developed in 2011 for use during LUC verification activities. The completed checklists for the 2018 LUC inspections are presented in Appendix E and are summarized below.

7.2.1 Land-Use Control Interviews

An interview was conducted with Mr. Ron Ostrowski of MassDevelopment and Mr. Neil Angus of the Devens Enterprise Commission on October 17, 2018, to discuss compliance with the LUCs at Grant, Oak and Maple HAs. The following items were evaluated:

- Any reports during the reporting year of any objects discovered on the site, including any findings of UXO;
- Verify the existence of an educational website for the public;
- Verify the inclusion of required utility bill inserts;
- Verify the posting of utility bill insert in a conspicuous location;
- Verify distribution of current soils management policy to construction;
- Verify that awareness training is being conducted (if construction activities occurred during the reporting year); and
- Verify that supplemental deed notice has been included in deeds conveying portion of the Grant HA.

Interview notes for the Grant and Oak and Maple HAs are presented in Appendix E. The LUC requirements are being met. There were no objects discovered on the site during 2018, including any findings of UXO. Proper signage remains in-place and all contractors are required to attend pre-construction meetings where UXO awareness information is presented. Copies of the Soils Management Plan and UXO information are available on the Devens Enterprise Commission website, www.devensec.com. Within the Grant HA, condominiums have been constructed on Chance Road and sold to individuals, and the second phase of the development project is proceeding with groundbreaking and utility installation. Deeds have been transferred to individual home owners in accordance with the LUC provisions. Copies of the deed notice and utility bill insert are provided in Appendix E. No intrusive activity has occurred in the Oak and Maple HA in 2018.

7.2.2 Land-Use Control On Site Inspection

LUCs were verified during the Impact Area property site visit. A LUC inspection was performed to identify the following:

- Land-use conditions (fencing, signage, and vegetation);

- Any areas of UXO concern, performed by sweeping 10% of the site with a metal detector; and
- Any evidence of site use changes.

A visual inspection and UXO screening was conducted on October 17, 2018. The fence around the Impact Area was inspected for damage and a metal detector was used to sweep the ground. No damage to the fence was noted. Steep areas and high brush within the center of the fenced area were avoided during the evaluation for UXO. The other areas were searched using a sweeping back and forth motion with the metal detector. Suspect points that were identified by the metal detector in previous years' sweeps and which were marked with orange flagging remain in place. At the time of the 2018 inspection, no UXO was found in exposed surface soils. It was noted that a large section of tree immediately inside the main entrance prevents the gate from swinging inward. Overall, the findings of the site inspection revealed no abnormalities within the fenced, 37-mm Impact Area.

7.3 CONCLUSIONS

The RAO for the HAs and 37-mm Impact Area is to prevent direct contact with UXO that may remain in the soils at the site. The selected Remedial Action included LUCs in order to provide overall protectiveness of public health and welfare or the environment. During the 2018 review period, the former Grant, Oak and Maple Housing Areas, and the 37-mm Impact Area were subject to annual LUC interviews, on-site inspections, as well as other affirmative measures and prohibitive directives (e.g., distribution of educational materials, providing awareness courses for site workers and residents, implementing deed notices, and maintaining signage). An additional LUC provision states that upon future transfer of the property from MassDevelopment, a deed notice will be provided to the new owners detailing the property's history. This notice will convey additional information on UXO investigations and removal actions conducted at HAs and 37-mm Impact Area, and include the conclusion of the ROD that the property with LUCs in place is suitable for the proposed future use and that there is no evidence of additional UXO present at the site, but that the possibility does remain that UXO could be discovered in the future.

The Grant Housing and 37-mm Impact Area LUCIP was issued in May 2011 and the draft final LUCIP Addendum for the Oak and Maple Housing Areas is under review by EPA and MassDEP. Although implementation of the LUCs required per the 2014 Explanation of Significant Differences for the former Oak and Maple Housing Areas has yet to be memorialized in a final LUCIP, the specific actions undertaken by Army to ensure protectiveness of human health and the environment in the short-term are described herein.

The site-specific annual LUC checklist, including physical on-site inspection and interview components, was utilized during this reporting year and interviews with knowledgeable personnel confirmed the overall effectiveness and compliance with the established LUCs. Results of the annual compliance monitoring indicate that no deviations or deficiencies to the LUCs were evident and corrective action(s) were not necessary.

Compliance with the LUCs was verified through the physical on-site inspection and interviews. Specifically, the following was verified:

- No deeds were conveyed.
- The electric utility distributes education inserts to new residents.
- Education information is displayed on a community website.

- No work permits or zoning permits were found indicating intrusive activity at the site and the land use has not changed.
- A fence and signage were maintained to restrict public access.
- There was no evidence of site use change during the inspection.

The LUCs have been effective in preventing direct contact with UXO/MEC, which may remain in soils.

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8.0 REFERENCES

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FIGURES

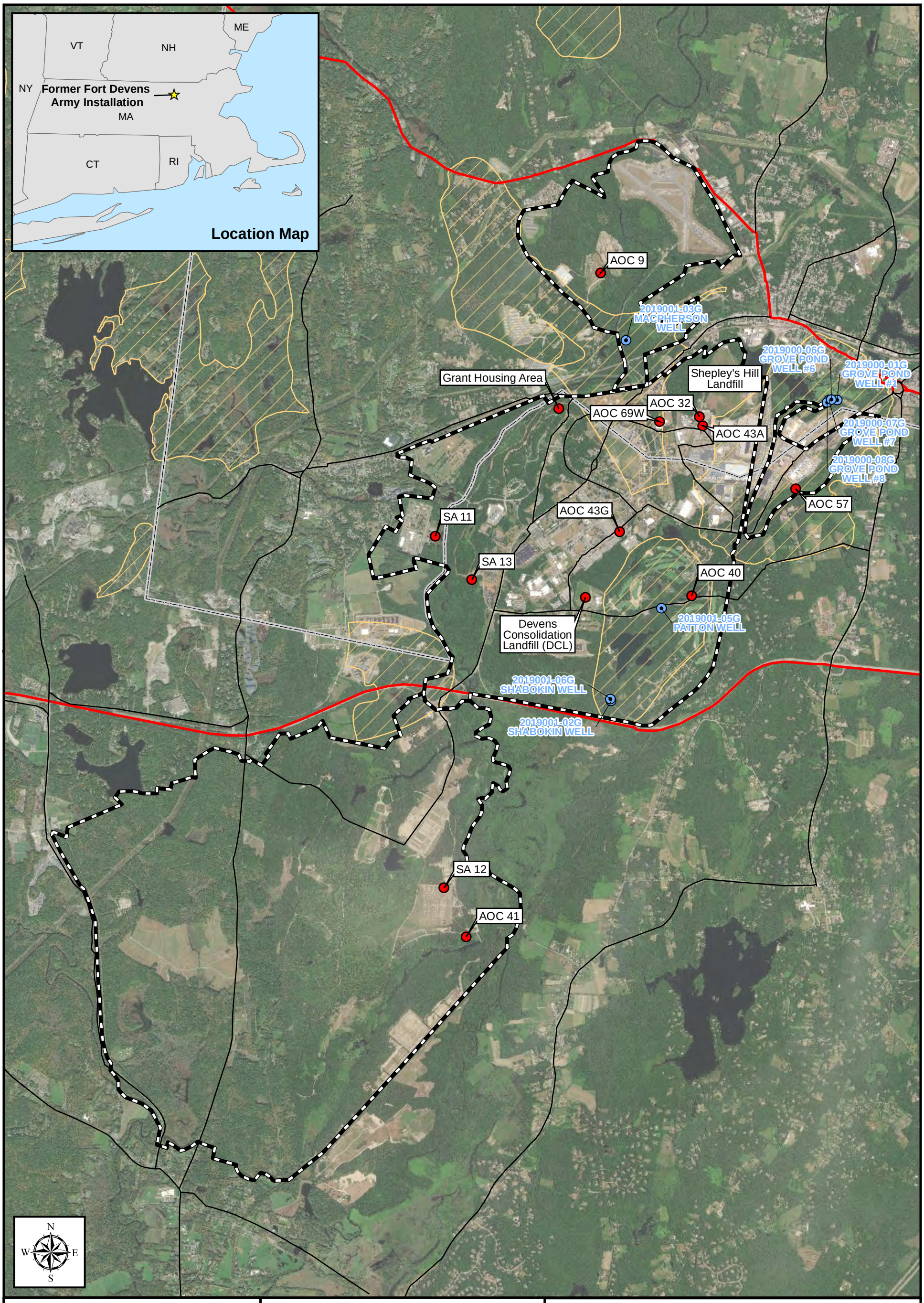

Figure 1-1
Site Location
Former Fort Devens
Army Installation

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

Legend

- Area of Contamination (AOC)
- Water Supply Well
- Highway
- Major Road
- County Line
- MassDEP Zone II Wellhead Protection Area
- Former Fort Devens Boundary

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Former Fort Devens Army Installation

Former Fort Devens Army Installation
Devens, Massachusetts

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

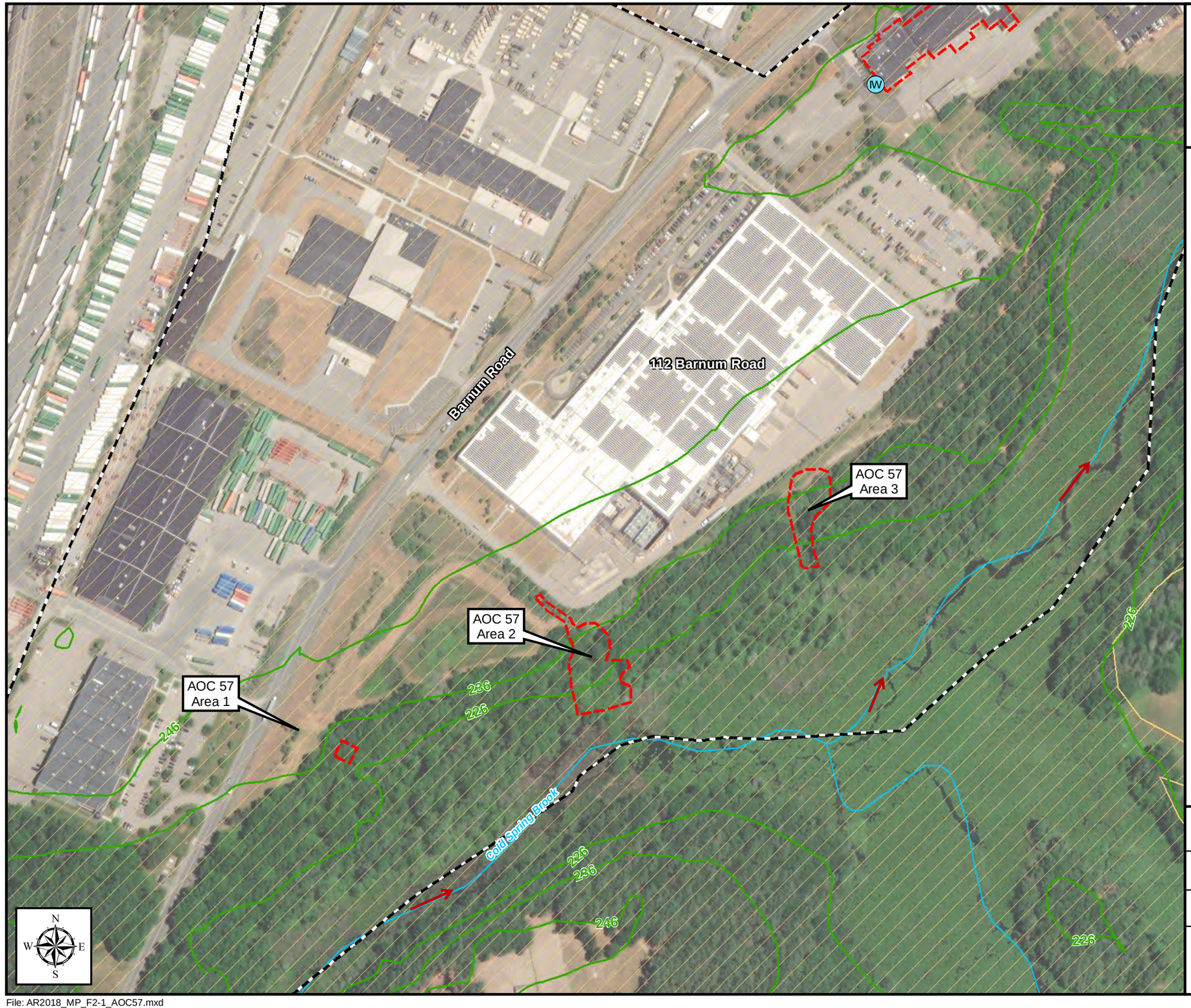
0 1,750 3,500
Feet

Date: 09/12/2019

Figure 1-1

File: AR2018_MP_F1-1_Site.mxd

Figure 2-1
Site Layout
Area of Contamination 57
Area 1, 2 & 3



Legend

- Irrigation Well
- Former Fort Devens Boundary
- Area of Contamination (AOC)
- Stream
- Topographic Contour (Ft AMSL)
- MassDEP Zone II Wellhead Protection Area
- Stream Flow Direction

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

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

2018 Main Post Annual Report
AOC 57 - Area 1, 2 & 3

Former Fort Devens Army Installation
Devens, Massachusetts

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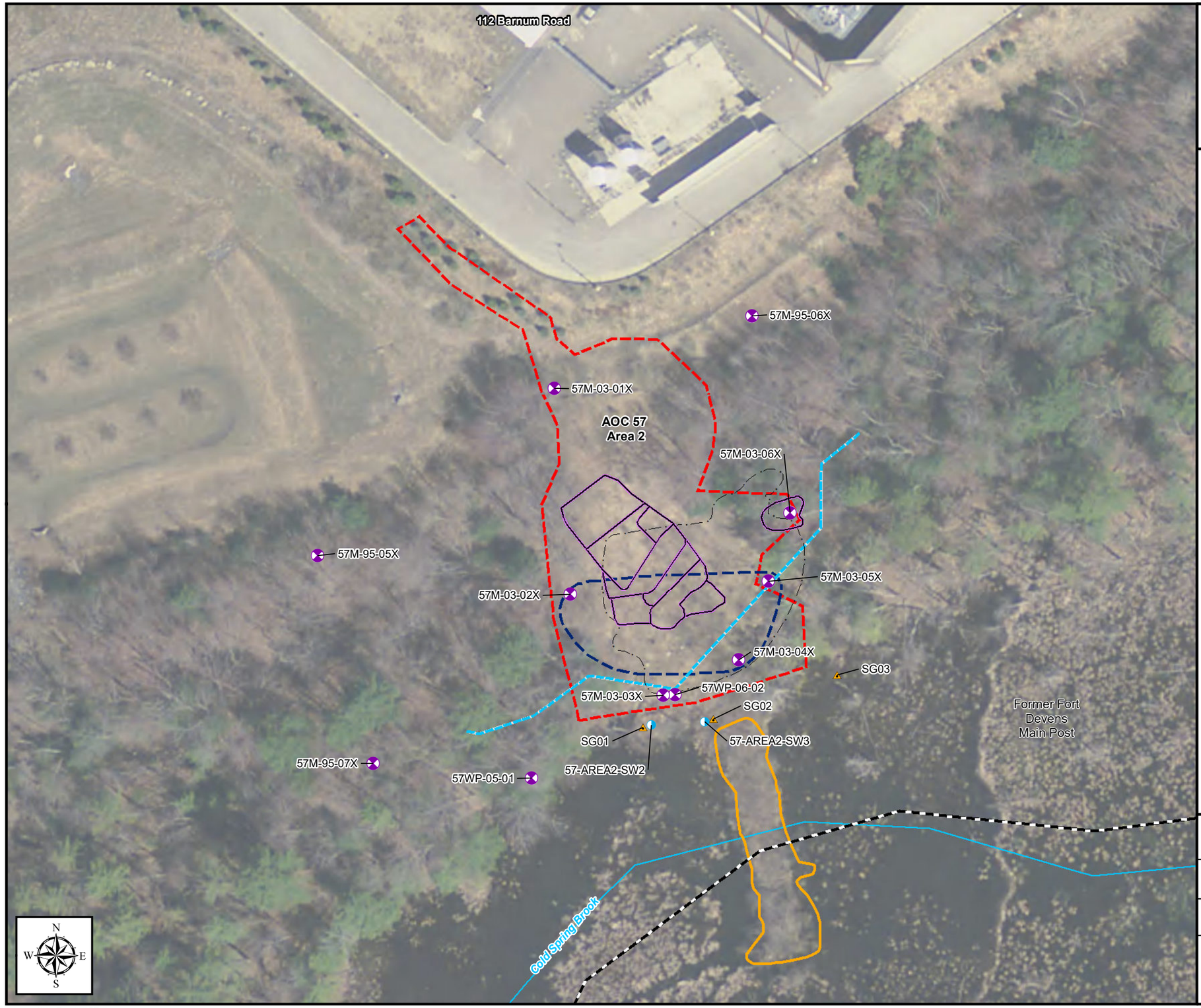
0 125 250
Feet

Date: 09/12/2019

Figure 2-1

File: AR2018_MP_F2-1_AOC57.mxd

Figure 2-2
Site Layout
Area of Contamination 57 - Area 2



Legend

- LTM Well - Gauge Only
- Staff Gauge
- Surface Water Sample Location
- 57M-03-06X — Well/Piezometer/Sample Location Identification
- Final Excavation Limit (2003)
- Conti Excavation Limit (2002)
- Former Fort Devens Boundary
- Flagged Wetland Limits
- 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
- Area of Contamination (AOC)
- Stream

Note:
AOC 57 lies within the MassDEP Zone II Wellhead Protection Area of the Grove Pond Wellfield.

Aerial Sources: 2013, USGS, MassGIS

2018 Main Post Annual Report
AOC 57 - Area 2

Former Fort Devens Army Installation
Devens, Massachusetts

KOMAN Government Solutions, LLC
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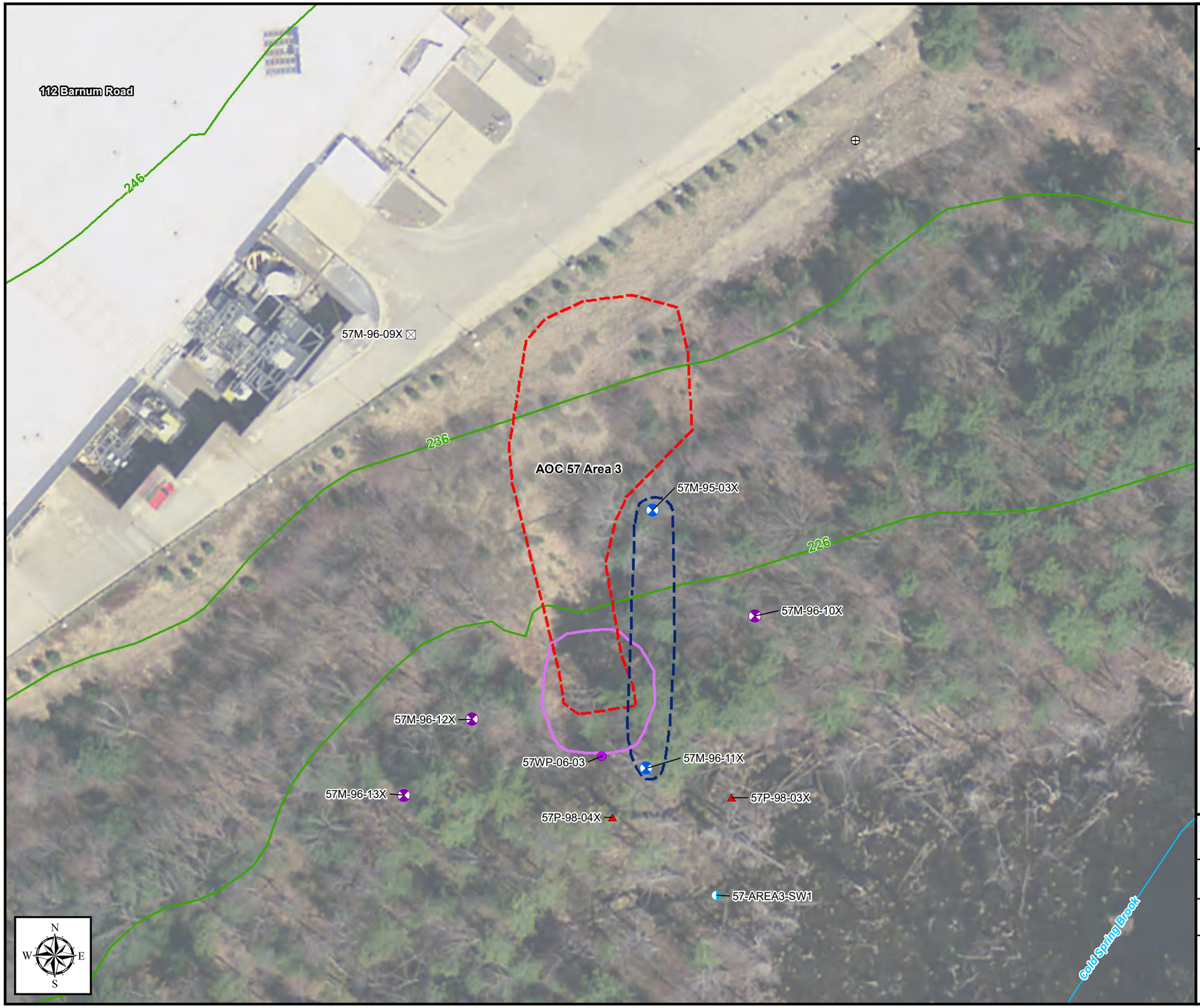
0 30 60
Feet

Date: 02/13/2018

Figure 2-2

File: AR2017_AOC57-2.mxd

Figure 2-3
Site Layout
Area of Contamination 57 - Area 3



Legend

- LTM Sample Well
- LTM Well - Gauge Only
- Well Point - Gauge Only
- LTM Piezometer
- Surface Water Sample Location
- Monitoring Well - Abandoned (2012)
- Monitoring Well - Destroyed
- 57M-95-03X — Well/Piezometer/Sample Location Identification
- 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)
- Area of Contamination (AOC)
- Alternate III-2a Estimated Soil Excavation Area
- Stream
- Topographic Contour (Ft AMSL)

Notes:
AOC 57 lies within the MassDEP Zone II Wellhead Protection Area of the Grove Pond Wellfield.

Well 57M-96-09X buried by construction.
LTM = Long-term monitoring

Aerial Sources: 2013, USGS, MassGIS

2018 Main Post Annual Report
AOC 57 - Area 3

Former Fort Devens Army Installation
Devens, Massachusetts

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0 30 60
Feet

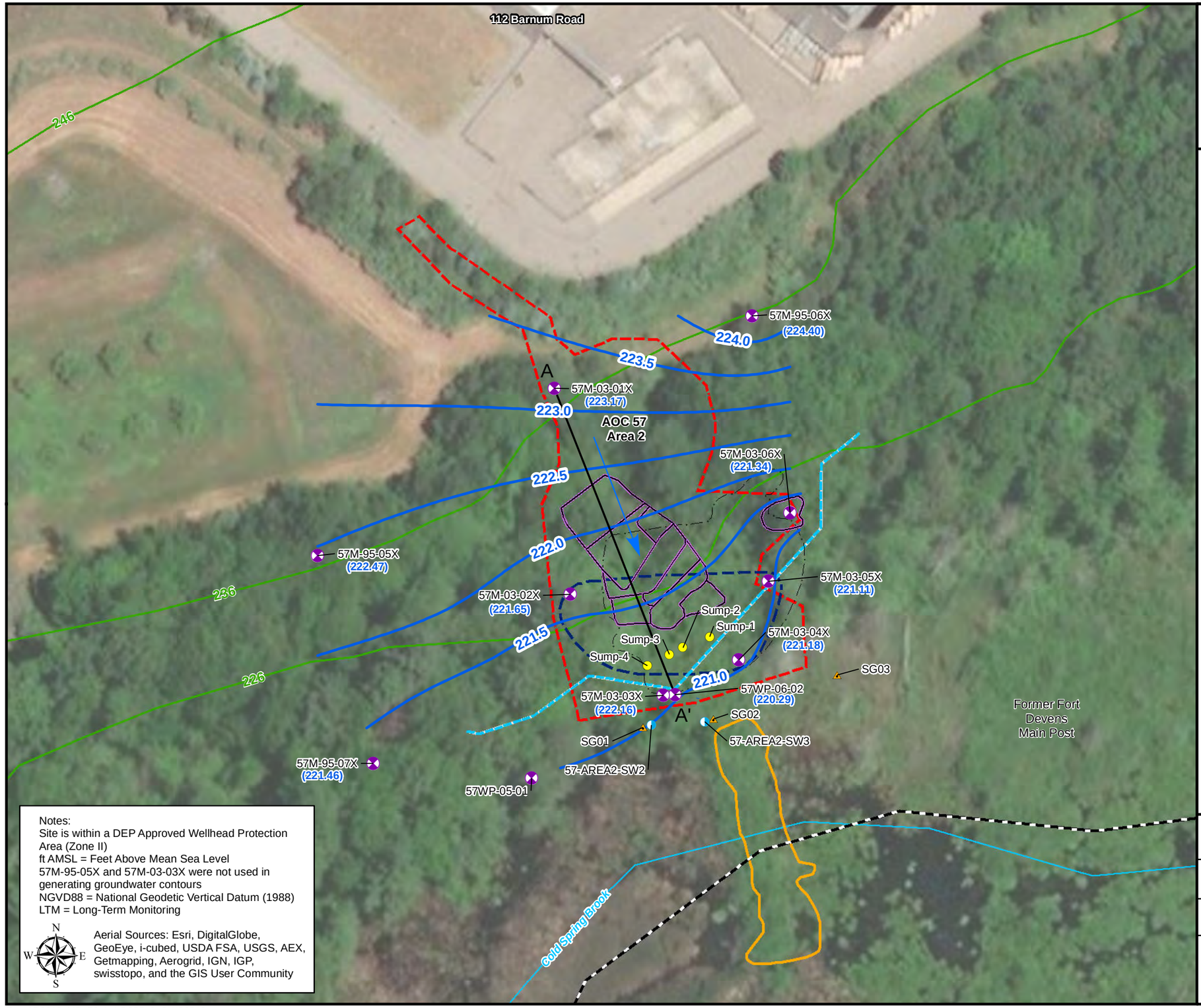
Date: 02/13/2018

Figure 2-3

KGS

File: AR2017_AOC57-3.mxd

Figure 2-4
Interpretive Water Table Elevation
Area of Contamination 57 - Area 2
May 2018



Notes:
Site is within a DEP Approved Wellhead Protection Area (Zone II)
ft AMSL = Feet Above Mean Sea Level
57M-95-05X and 57M-03-03X were not used in generating groundwater contours
NGVD88 = National Geodetic Vertical Datum (1988)
LTM = Long-Term Monitoring

N W E S

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

Legend

- LTM Well - Gauge Only
- Staff Gauge
- Former Surface Water Sample Location
- Sump
- Groundwater Elevation Contour (ft NGVD88) (Contour Interval = 0.5 ft)
- Groundwater Flow Direction
- (221.65) Groundwater Elevation (ft NGVD88)
- A—A' Groundwater Gradient Calculation Location
- 57M-03-06X Well/Piezometer/Sump/Sample Location Identification
- Final Excavation Limit (2003)
- Conti Excavation Limit (2002)
- Former Fort Devens Boundary
- Flagged Wetland Limits
- 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
- Area of Contamination (AOC)
- Stream
- Topographic Contour (Ft AMSL)

2018 Main Post Annual Report
AOC 57 - Area 2

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: 09/12/2019

Figure 2-4

File: AR2018_MP_F2-4_AOC57_2_GWC0518.mxd

Notes:
Site is within a DEP Approved Wellhead Protection Area (Zone II)
Well 57M-96-09X buried by construction.
ft AMSL = Feet Above Mean Sea Level
NGVD88 = National Geodetic Vertical Datum (1988)
LTM = Long-Term Monitoring

N
W E
S

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

Figure 2-5
Interpretive Water Table Elevation
Area of Contamination 57 - Area 3
May 2018

Legend

- LTM Sample Well
- LTM Well - Gauge Only
- Well Point - Gauge Only
- LTM Piezometer
- Surface Water Sample Location
- Monitoring Well - Abandoned (2012)
- Monitoring Well - Destroyed
- Groundwater Elevation Contour (ft NGVD88) (Contour Interval = 1 ft)
- Groundwater Flow Direction
- (222.21) Groundwater Elevation (ft NGVD88)
- A—A' Groundwater Gradient Calculation Location
- 57M-95-03X Well/Piezometer/Sample Location Identification
- 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)
- Area of Contamination (AOC)/ 1999 Excavation Area
- Alternate III-2a Estimated Soil Excavation Area (approximate location)
- Stream
- Topographic Contour (Ft AMSL)

G3M-93-09X
57M-96-09X
AOC 57
Area 3
A
57M-95-03X
(223.79)
A'
57M-96-10X
(222.21)
57M-96-12X
(222.56)
57WP-06-03
(221.31)
57M-96-11X
(220.77)
57M-96-13X
(222.50)
57P-98-03X
(219.51)
57P-98-04X
(219.37)
57-AREA3-SW1
246
236
226
223
222
221
220
Cold Spring Brook

2018 Main Post Annual Report
AOC 57 - Area 3

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: 04/24/2019

Figure 2-5

KGS

File: AR2018_MP_F2-5_AOC57_3_GWC0518.mxd

Figure 2-6
Metal Concentrations in Groundwater and Surface Water
Area of Contamination 57 - Area 3
May 2018

Notes:

GW Cleanup Goal	
Metals	Result (µg/L)
Arsenic	**10**
Iron	**NS**
Manganese	**NS**

SW Benchmark	
Metals	Result (µg/L)
Arsenic	***150***
Iron	***1,000***
Manganese	**NS**

Only exceedances of the groundwater cleanup goal and surface benchmark are posted on the figure
Bold, italicized, concentrations indicate detected parameter above Benchmark
Shaded and bold concentrations indicate detection above Cleanup Goal
µg/L = micrograms per liter
NS = No Standard
ft AMSL = feet above mean sea level
LTM = long term monitoring
AOC 57 lies within the MassDEP Zone II Wellhead Protection Area.

N W E S

Aerial Sources: 2013, USGS, MassGIS

AOC 57
Area 3

57M-95-03X	May 2018
Metals	Result (µg/L)
Arsenic, Total	**42**
Iron, Total	**8,400**
Manganese, Total	**110**

57M-96-11X	May 2018	May 2018 (Dup)
Metals	Result (µg/L)	Result (µg/L)
Arsenic, Total	**180**	**200**
Iron, Total	***37,000***	***36,000***
Manganese, Total	***2,700***	***2,500***

57-AREA3-SW1	May 2018	May 2018 (Dup)
Metals	Result (µg/L)	Result (µg/L)
Arsenic, Dissolved	**5.2**	**4.9**
Iron, Dissolved	***4,000***	***4,700***
Manganese, Dissolved	**800**	**910**

Legend

- LTM Sample Well
- LTM Well - Gauge Only
- Well Point - Gauge Only
- LTM Piezometer
- Surface Water Sample Location
- 57M-95-03X — Well/Piezometer/Sample Location Identification
- 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)
- Area of Contamination (AOC)
- Alternate III-2a Estimated Soil Excavation Area
- Stream
- Topographic Contour (Ft AMSL)

2018 Main Post Annual Report
AOC 57 - Area 3

Former Fort Devens Army Installation
Devens, Massachusetts

KOMAN Government Solutions, LLC
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0 30 60
Feet

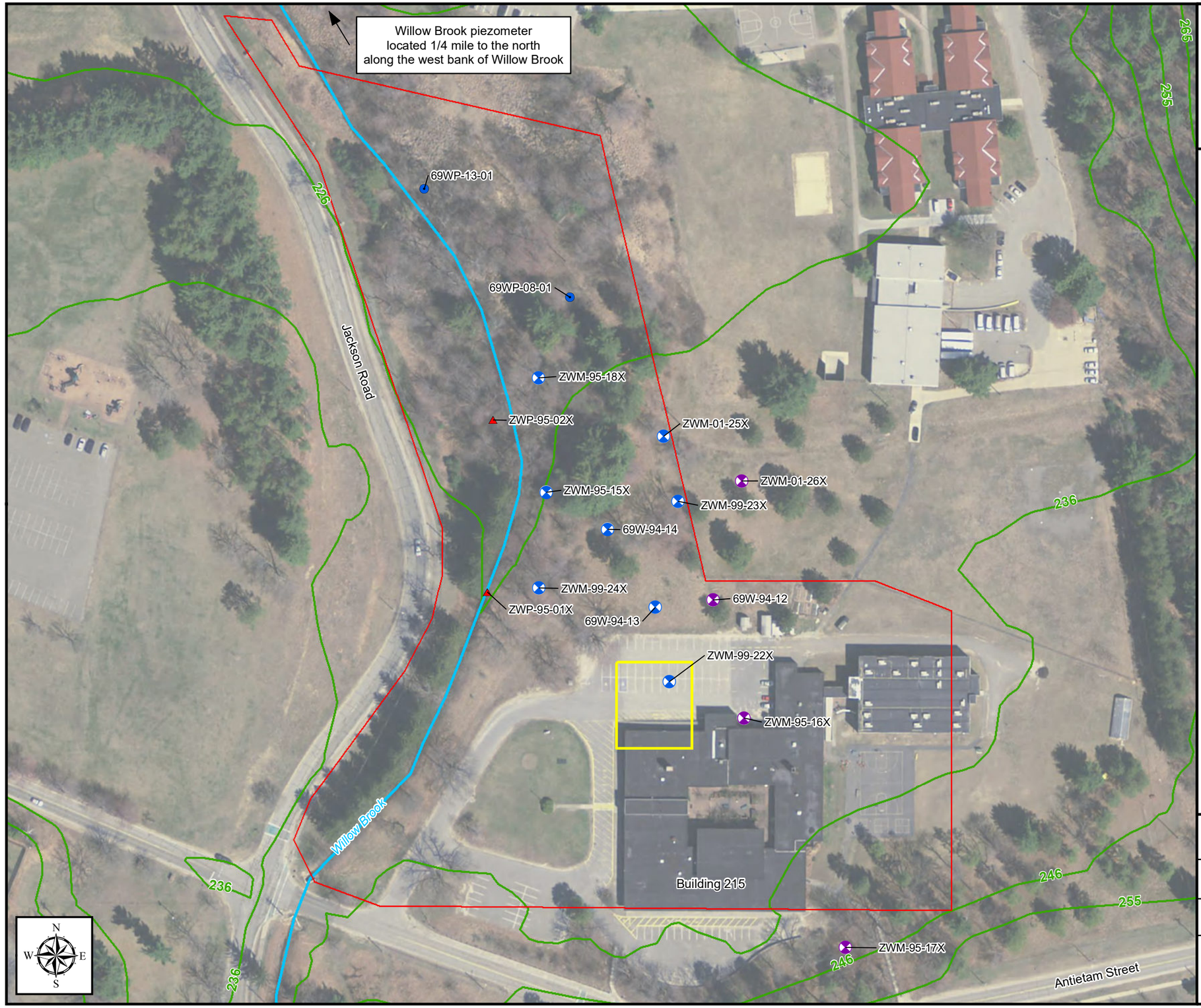
Date: 02/12/2019

Figure 2-6

KGS

File: AR2018_MP_F2-6_AOC57_3_Metals_May2018.mxd

Figure 3-1
Site Layout
Area of Contamination 69W



Legend

- LTM Sample Well
- LTM Sample Well Point
- LTM Well - Gauge Only
- LTM Piezometer
- ZWM-01-26X — Well/Piezometer/Surface Water Elevation Location
- Parcel Boundary
- Surface Water Course
- Excavated Soils Management Area
- Topographic Contour (Ft AMSL)

Notes:
LTM = Long-term monitoring

Aerial Sources: 2013, USGS, MassGIS

AOC 69W lies within the MassDEP Zone II Wellhead Protection Area for the MacPherson well.

2018 Main Post Annual Report
AOC 69W

Former Fort Devens Army Installation
Devens, Massachusetts

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

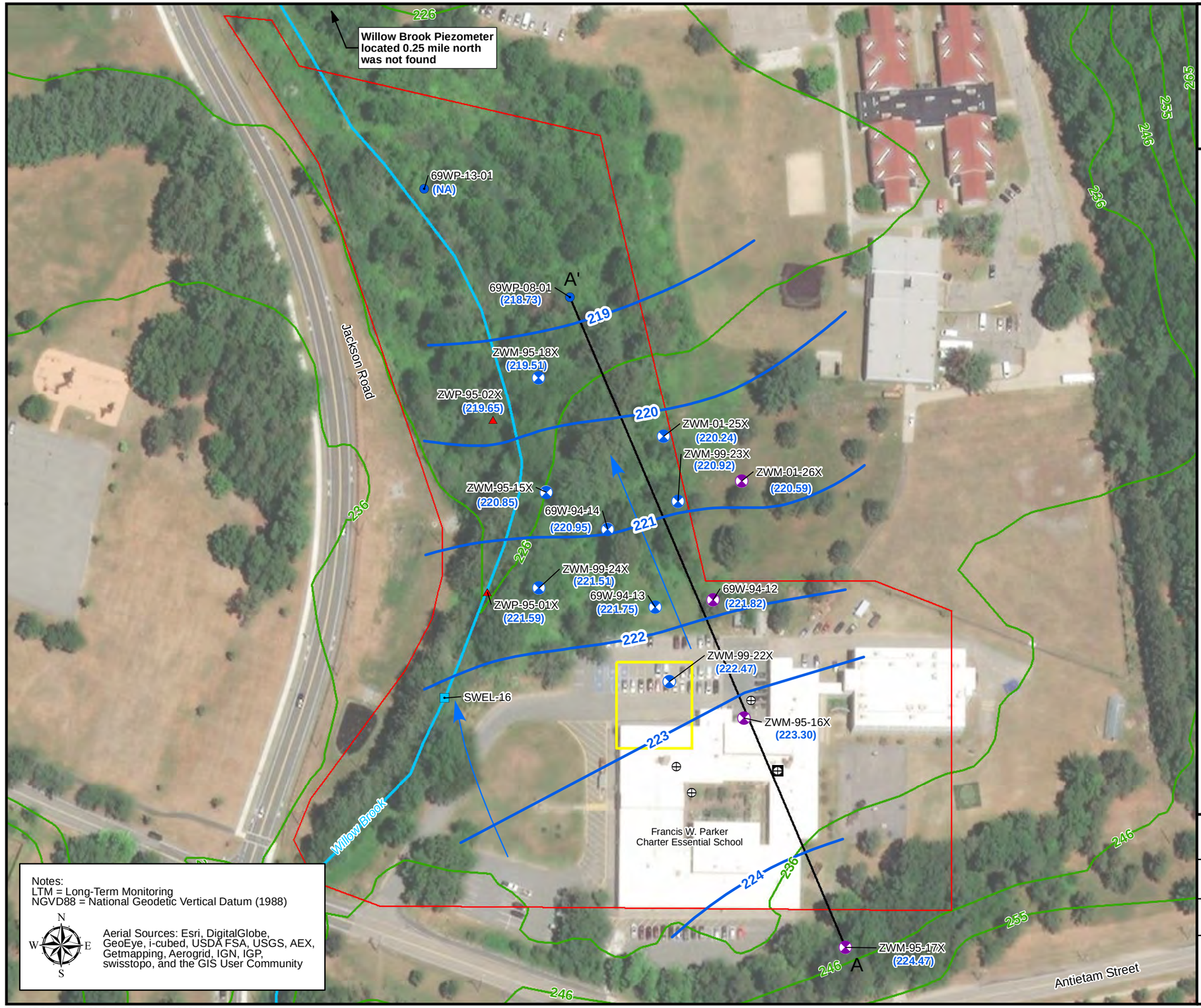
0 60 120
Feet

Date: 02/13/2018

Figure 3-1

File: AR2017_AOC69W.mxd

Figure 3-2
Interpretive Water Table Elevation
Area of Contamination 69W
October 2018



Notes:
LTM = Long-Term Monitoring
NGVD88 = National Geodetic Vertical Datum (1988)

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

Legend

- LTM Sample Well
- LTM Sample Well Point
- LTM Well - Gauge Only
- LTM Piezometer
- Monitoring Well - Abandoned (2012)
- Monitoring Well - Presumed Destroyed
- Surface Water Elevation Location
- Groundwater Contour (ft NGVD88) (Interval = 1 ft)
- Groundwater Flow Direction
- (221.75) Groundwater Elevation (ft NGVD88)
- A—A' Groundwater Gradient Calculation Location
- ZWM-01-26X Well/Piezometer/Surface Water Elevation Location
- Parcel Boundary
- Surface Water Course
- Excavated Soils Management Area
- Topographic Contour (ft AMSL)

AOC 69W lies within the MassDEP Zone II Wellhead Protection Area for the MacPherson well.

2018 Main Post Annual Report
AOC 69W

Former Fort Devens Army Installation
Devens, Massachusetts

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

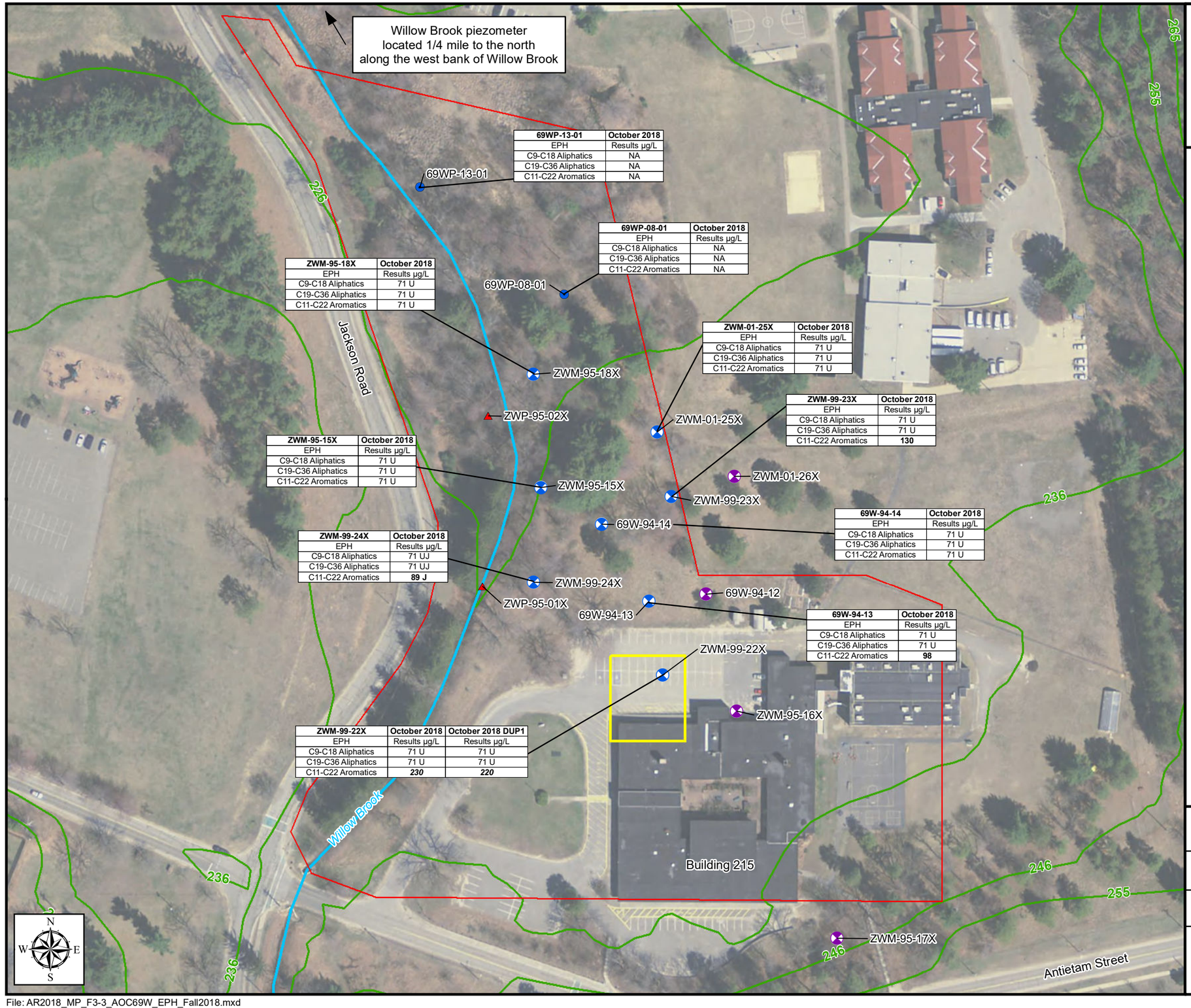
0 60 120
Feet

Date: 09/12/2019

Figure 3-2

File: AR2018_MP_F3-2_AOC69W_GWC1018.mxd

Figure 3-3
EPH Concentrations in Groundwater
Area of Contamination 69W
October 2018



69WP-13-01	October 2018
EPH	Results µg/L
C9-C18 Aliphatics	NA
C19-C36 Aliphatics	NA
C11-C22 Aromatics	NA

69WP-08-01	October 2018
EPH	Results µg/L
C9-C18 Aliphatics	NA
C19-C36 Aliphatics	NA
C11-C22 Aromatics	NA

ZWM-95-18X	October 2018
EPH	Results µg/L
C9-C18 Aliphatics	71 U
C19-C36 Aliphatics	71 U
C11-C22 Aromatics	71 U

ZWM-01-25X	October 2018
EPH	Results µg/L
C9-C18 Aliphatics	71 U
C19-C36 Aliphatics	71 U
C11-C22 Aromatics	71 U

ZWM-99-23X	October 2018
EPH	Results µg/L
C9-C18 Aliphatics	71 U
C19-C36 Aliphatics	71 U
C11-C22 Aromatics	**130**

ZWM-95-15X	October 2018
EPH	Results µg/L
C9-C18 Aliphatics	71 U
C19-C36 Aliphatics	71 U
C11-C22 Aromatics	71 U

ZWM-99-24X	October 2018
EPH	Results µg/L
C9-C18 Aliphatics	71 UJ
C19-C36 Aliphatics	71 UJ
C11-C22 Aromatics	**89 J**

69W-94-14	October 2018
EPH	Results µg/L
C9-C18 Aliphatics	71 U
C19-C36 Aliphatics	71 U
C11-C22 Aromatics	71 U

69W-94-13	October 2018
EPH	Results µg/L
C9-C18 Aliphatics	71 U
C19-C36 Aliphatics	71 U
C11-C22 Aromatics	**98**

ZWM-99-22X	October 2018	October 2018 DUP1
EPH	Results µg/L	Results µg/L
C9-C18 Aliphatics	71 U	71 U
C19-C36 Aliphatics	71 U	71 U
C11-C22 Aromatics	***230***	***220***

Legend

- LTM Sample Well
- LTM Sample Well Point
- LTM Well - Gauge Only
- LTM Piezometer
- ZWM-01-26X — Well/Piezometer/Surface Water Elevation Location
- Parcel Boundary
- Surface Water Course
- Excavated Soils Management Area
- Topographic Contour (ft AMSL)

AOC69W lies within the MassDEP Zone II Wellhead Protectoin Area for the MacPherson Well.

Notes:

Monitoring Criteria (µg/L)	
C9-C18 Aliphatics	**700**
C19-C36 Aromatics	**14,000**
C11-C22 Aromatics	**200**

U = Not Detected
Bold concentrations indicate detected parameter
µg/L = micrograms per liter
EPH = Extractable Petroleum Hydrocarbon
LTM = Long-term monitoring

Aerial Sources: 2013, USGS, MassGIS

2018 Main Post Annual Report
AOC 69W

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Devens, Massachusetts

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0 60 120
Feet

Date: 02/10/2019

Figure 3-3

File: AR2018_MP_F3-3_AOC69W_EPH_Fall2018.mxd

Figure 3-4
Metal Concentrations in Groundwater
Area of Contamination 69W
October 2018

Willow Brook piezometer located 1/4 mile to the north along the west bank of Willow Brook

69WP-13-01	October 2018
Metals	Results µg/L
Arsenic (dissolved)	NA
Iron (dissolved)	NA
Manganese (dissolved)	**33**

ZWM-95-18X	October 2018
Metals	Results µg/L
Arsenic (dissolved)	3.0 U
Iron (dissolved)	50 U
Manganese (dissolved)	**81**

69WP-08-01	October 2018
Metals	Results µg/L
Arsenic (dissolved)	3.0 U
Iron (dissolved)	**6,000**
Manganese (dissolved)	**35**

ZWM-01-25X	October 2018
Metals	Results µg/L
Arsenic (dissolved)	2.0 J
Iron (dissolved)	**130**
Manganese (dissolved)	***1,400***

ZWM-95-15X	October 2018
Metals	Results µg/L
Arsenic (dissolved)	**18**
Iron (dissolved)	**1,800**
Manganese (dissolved)	***340***

ZWM-99-23X	October 2018
Metals	Results µg/L
Arsenic (dissolved)	**39**
Iron (dissolved)	**4,700**
Manganese (dissolved)	***1,600***

69W-94-14	October 2018
Metals	Results µg/L
Arsenic (dissolved)	3.8 U
Iron (dissolved)	910 U
Manganese (dissolved)	***320***

69W-94-13	October 2018
Metals	Results µg/L
Arsenic (dissolved)	**35**
Iron (dissolved)	**4,500**
Manganese (dissolved)	***1,600***

ZWM-99-24X	October 2018
Metals	Results µg/L
Arsenic (dissolved)	**3.4**
Iron (dissolved)	**700**
Manganese (dissolved)	**68**

ZWM-99-22X	October 2018	October 2018 DUP1
Metals	Results µg/L	Results µg/L
Arsenic (dissolved)	**150**	**140**
Iron (dissolved)	***19,000***	***19,000***
Manganese (dissolved)	***1,500***	***1,300***

69WP-13-01, 69WP-08-01, ZWM-95-18X, ZWP-95-02X, ZWM-01-25X, ZWM-95-15X, ZWM-01-26X, ZWM-99-23X, 69W-94-14, ZWM-99-24X, ZWP-95-01X, 69W-94-13, 69W-94-12, ZWM-99-22X, ZWM-95-16X, ZWM-95-17X

Jackson Road, Willow Brook, Antietam Street, Building 215

226, 235, 236, 246, 255

N W E S

Legend

- LTM Sample Well
- LTM Sample Well Point
- LTM Well - Gauge Only
- LTM Piezometer
- ZWM-01-26X — Well/Piezometer/Surface Water Elevation Location
- Parcel Boundary
- Surface Water Course
- Excavated Soils Management Area
- Topographic Contour (ft AMSL)

Notes:

Cleanup Goal (µg/L)	
Arsenic	**10**
Monitoring Criteria (µg/L)	
Iron	***9,100***
Manganese	***291***

NA = Not Analyzed
U = Not Detected
Bold concentrations indicate detected parameter
Italics and bold concentrations indicate detection above Background
Shaded and bold concentrations indicate detection above Cleanup Goal
µg/L = micrograms per liter
LTM = Long-term monitoring

Aerial Sources: 2013, USGS, MassGIS

AOC 69W lies within the MassDEP Zone II Wellhead Protection Area for the MacPherson well.

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AOC 69W

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0 60 120
Feet

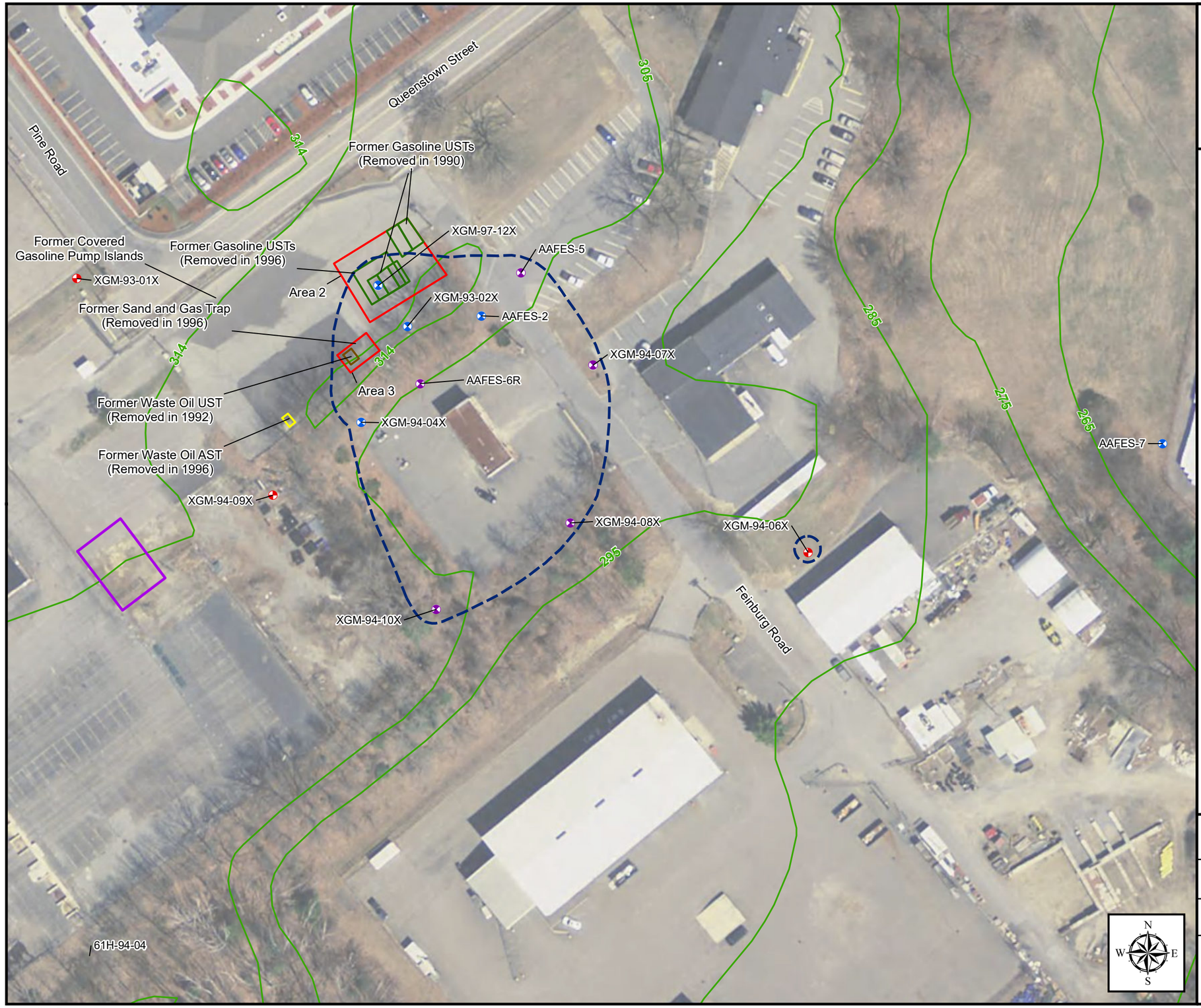
Date: 09/12/2019

Figure 3-4

KGS

File: AR2018_MP_F3-4_AOC69W_Metals_Fall2018.mxd

Figure 4-1
Site Layout
Area of Contamination 43G



Legend

- LTM Sample Well
- LTM Well - Gauge Only
- Monitoring Well
- XGP-94-04X — Well/Piezometer Identification
- 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
- Topographic Contour (Ft AMSL)

Notes:
AST = Above ground storage tank
UST = Underground storage Tank
LTM = Long-term monitoring

Aerial Sources: 2013, USGS, MassGIS

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AOC 43G

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Devens, Massachusetts

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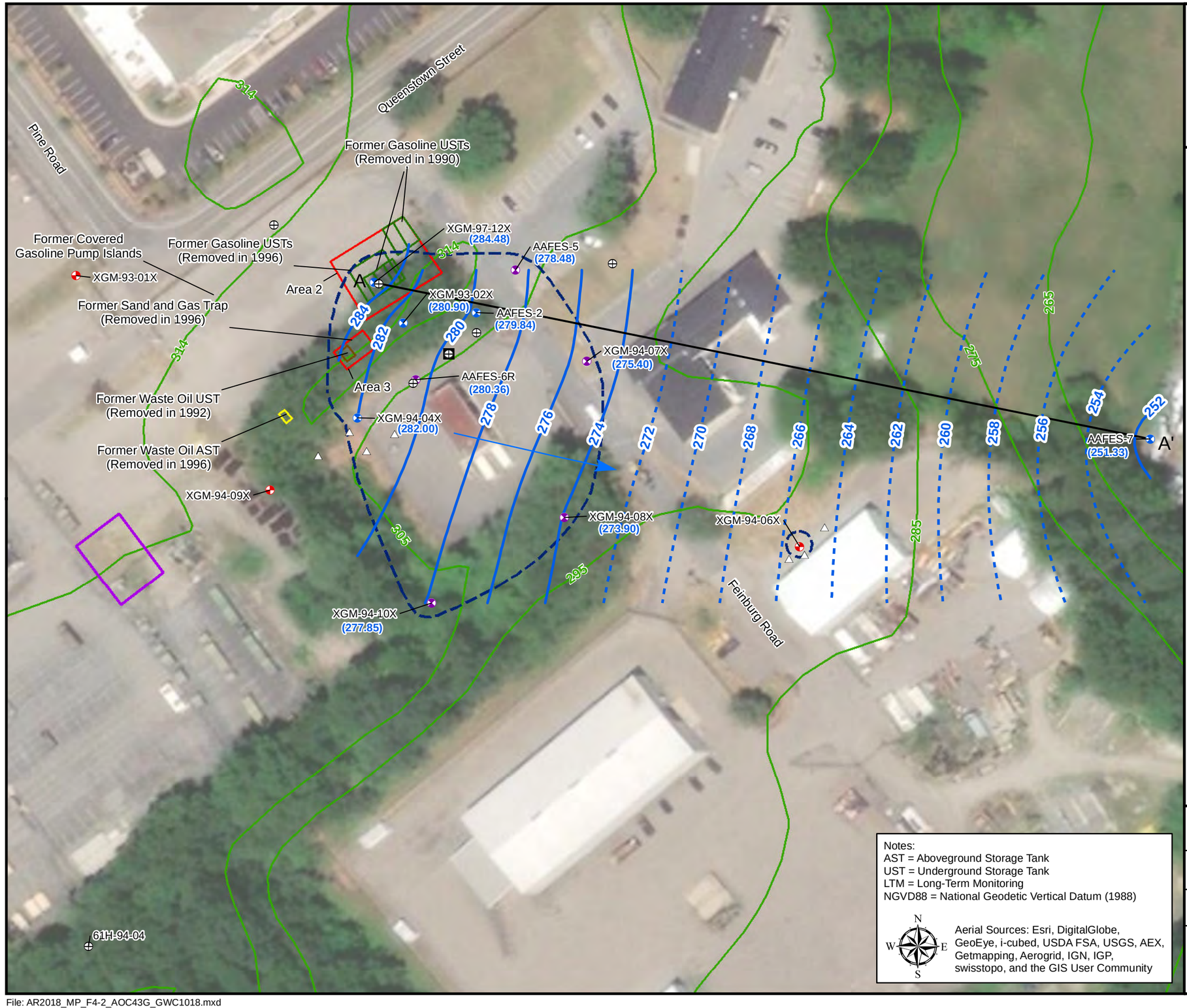
0 40 80
Feet

Date: 02/13/2018

Figure 4-1

File: AR2017_AOC43G.mxd

Figure 4-2
Interpretive Water Table Elevation
Area of Contamination 43G
October 2018



Legend

- LTM Sample Well
- LTM Well - Gauge Only
- Piezometer - Abandoned
- Monitoring Well
- Monitoring Well - Abandoned
- Monitoring Well - Presumed Destroyed
- XGP-94-04X — Well/Piezometer Identification
- Groundwater Elevation Contour (ft NGVD88) (Contour Interval = 2 ft)
- Inferred Groundwater Elevation Contour
- Groundwater Flow Direction
- (275.99) — Groundwater Elevation (ft NGVD88)
- A—A' — Groundwater Gradient Calculation Location
- 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
- Topographic Contour (Ft AMSL)

Notes:
AST = Aboveground Storage Tank
UST = Underground Storage Tank
LTM = Long-Term Monitoring
NGVD88 = National Geodetic Vertical Datum (1988)

N W E S

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

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Devens, Massachusetts

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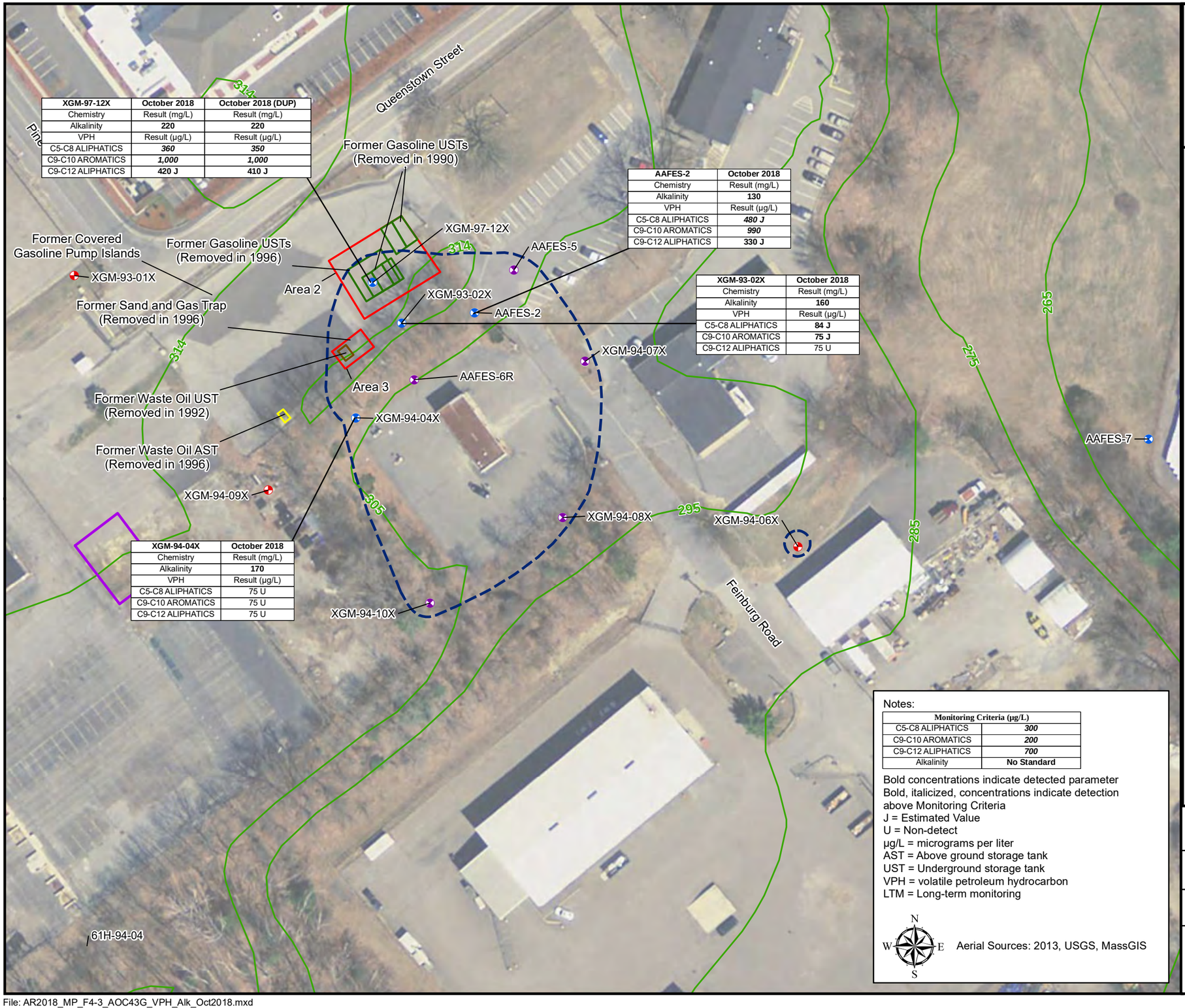
0 40 80
Feet

Date: 04/12/2019

Figure 4-2

File: AR2018_MP_F4-2_AOC43G_GWC1018.mxd

Figure 4-3
VPH and Alkalinity Concentrations
Area of Contamination 43G
October 2018



XGM-97-12X	October 2018	October 2018 (DUP)
Chemistry	Result (mg/L)	Result (mg/L)
Alkalinity	**220**	**220**
VPH	Result (µg/L)	Result (µg/L)
C5-C8 ALIPHATICS	***360***	***350***
C9-C10 AROMATICS	***1,000***	***1,000***
C9-C12 ALIPHATICS	**420 J**	**410 J**

AAFES-2	October 2018
Chemistry	Result (mg/L)
Alkalinity	**130**
VPH	Result (µg/L)
C5-C8 ALIPHATICS	***480 J***
C9-C10 AROMATICS	***990***
C9-C12 ALIPHATICS	**330 J**

XGM-93-02X	October 2018
Chemistry	Result (mg/L)
Alkalinity	**160**
VPH	Result (µg/L)
C5-C8 ALIPHATICS	**84 J**
C9-C10 AROMATICS	**75 J**
C9-C12 ALIPHATICS	75 U

XGM-94-04X	October 2018
Chemistry	Result (mg/L)
Alkalinity	**170**
VPH	Result (µg/L)
C5-C8 ALIPHATICS	75 U
C9-C10 AROMATICS	75 U
C9-C12 ALIPHATICS	75 U

Legend

- LTM Sample Well
- LTM Well - Gauge Only
- Monitoring Well
- XGP-94-04X Well/Piezometer Identification
- 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
- Topographic Contour (ft AMSL)

Notes:

Monitoring Criteria (µg/L)	
C5-C8 ALIPHATICS	***300***
C9-C10 AROMATICS	***200***
C9-C12 ALIPHATICS	***700***
Alkalinity	**No Standard**

Bold concentrations indicate detected parameter
Bold, italicized, concentrations indicate detection above Monitoring Criteria
J = Estimated Value
U = Non-detect
µg/L = micrograms per liter
AST = Above ground storage tank
UST = Underground storage tank
VPH = volatile petroleum hydrocarbon
LTM = Long-term monitoring

N W E S

Aerial Sources: 2013, USGS, MassGIS

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AOC 43G

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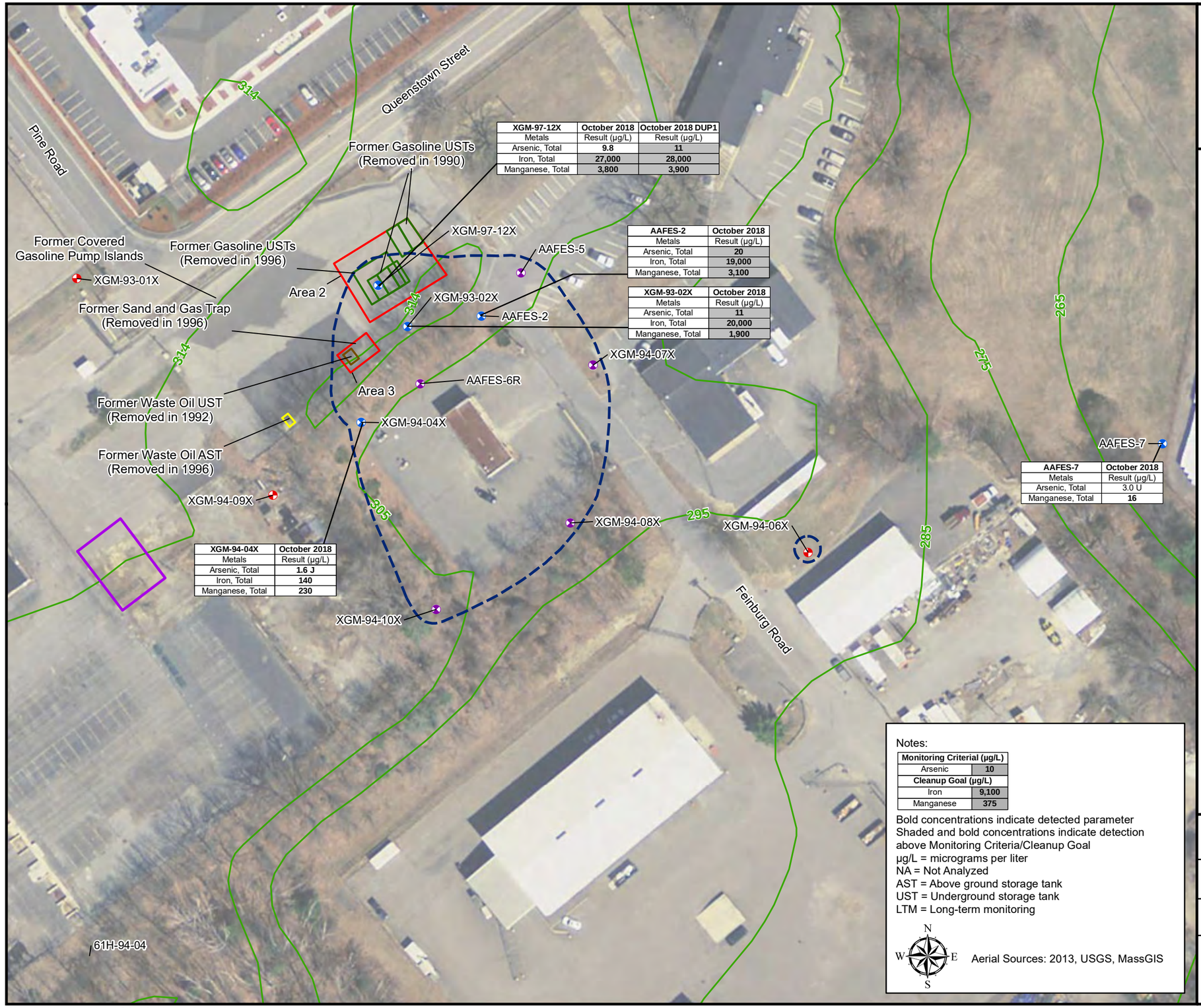
0 40 80 Feet

Date: 02/11/2019

Figure 4-3

File: AR2018_MP_F4-3_AOC43G_VPH_Alk_Oct2018.mxd

Figure 4-4
Metal Concentrations
Area of Contamination 43G
October 2018



XGM-97-12X	October 2018	October 2018 DUP1
Metals	Result (µg/L)	Result (µg/L)
Arsenic, Total	**9.8**	**11**
Iron, Total	**27,000**	**28,000**
Manganese, Total	**3,800**	**3,900**

AAFES-2	October 2018
Metals	Result (µg/L)
Arsenic, Total	**20**
Iron, Total	**19,000**
Manganese, Total	**3,100**

XGM-93-02X	October 2018
Metals	Result (µg/L)
Arsenic, Total	**11**
Iron, Total	**20,000**
Manganese, Total	**1,900**

AAFES-7	October 2018
Metals	Result (µg/L)
Arsenic, Total	3.0 U
Manganese, Total	**16**

XGM-94-04X	October 2018
Metals	Result (µg/L)
Arsenic, Total	**1.6 J**
Iron, Total	**140**
Manganese, Total	**230**

Legend

- LTM Sample Well
- LTM Well - Gauge Only
- Monitoring Well
- XGP-94-04X Well/Piezometer Identification
- Area 1
- Approximate Historical Extent of Groundwater Contamination in Exceedance of Cleanup Goals (based on 1999 to 2008 analytical data) (2008 Annual Report, HGL, 2009)
- Former Gasoline UST(s)
- Former Waste Oil UST
- Former Waste Oil AST
- Former UST Area
- Topographic Contour (ft AMSL)

Notes:

Monitoring Criterial (µg/L)	
Arsenic	**10**
Cleanup Goal (µg/L)	
Iron	**9,100**
Manganese	**375**

Bold concentrations indicate detected parameter
Shaded and bold concentrations indicate detection above Monitoring Criteria/Cleanup Goal
µg/L = micrograms per liter
NA = Not Analyzed
AST = Above ground storage tank
UST = Underground storage tank
LTM = Long-term monitoring

N W E S

Aerial Sources: 2013, USGS, MassGIS

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AOC 43G

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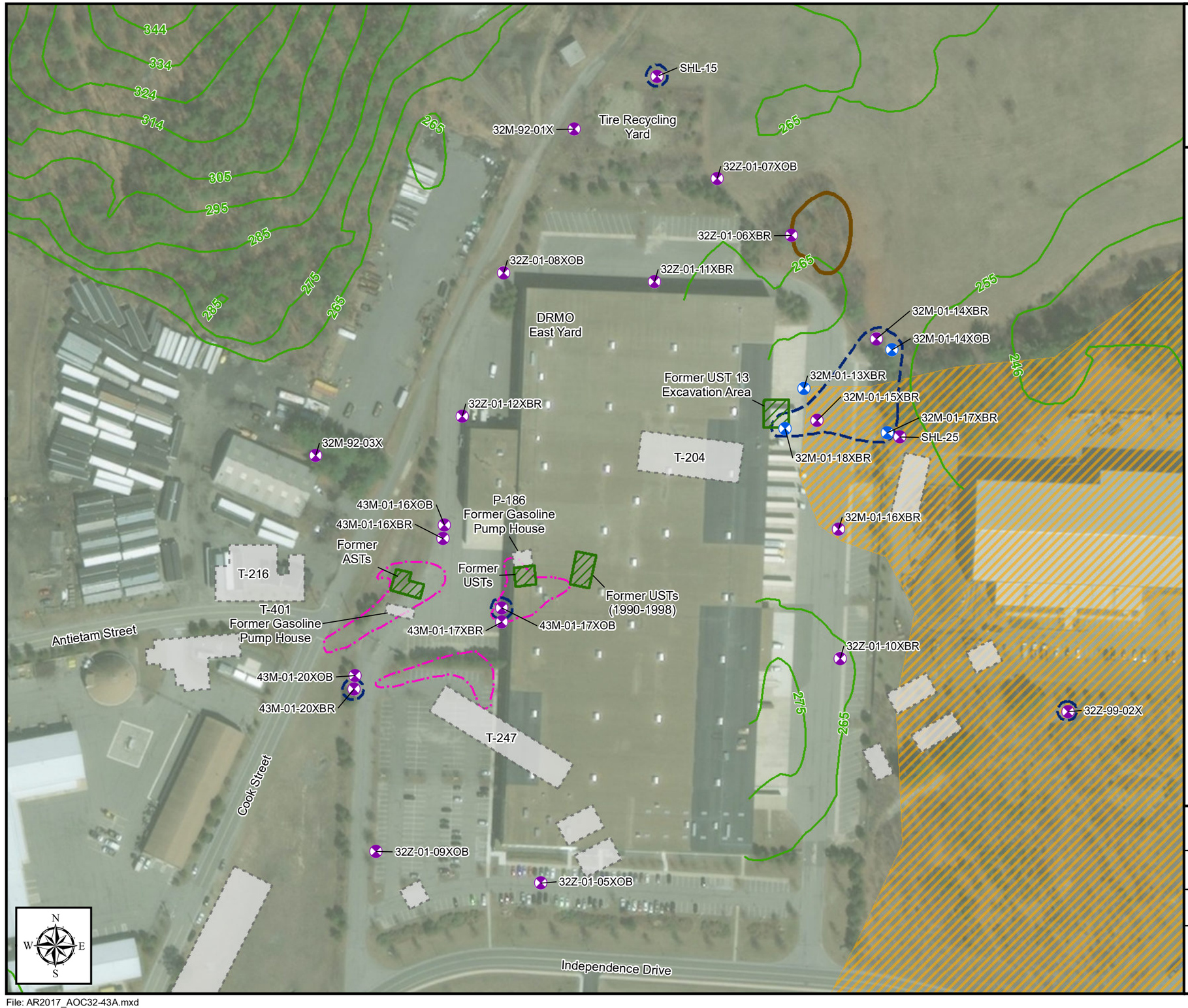
0 40 80
Feet

Date: 09/12/2019

Figure 4-4

File: AR2018_MP_F4-4_AOC43G_Metals_Oct2018.mxd

Figure 5-1
Site Layout
Area of Contamination 32 and 43A



Legend

- LTM Sample Well
- LTM Well - Periodic Gauge Only
- DEP Approved Wellhead Protection Areas (Zone II) for Grove Pond wellfield
- 32M-92-01X — Well Identification
- Former Storage Tank(s)
- Former Building
- T-247 — Former Building Number
- Approximate Historical Extent of Groundwater Contamination in Exceedance of Cleanup Goals (based on April 2002 to October 2008 analytical data) (2008 Annual Report, HGL, 2009)
- TPHC Soil Contamination
- Remaining Bedrock Outcrop
- Topographic Contour (Ft AMSL)

Notes:
AST = Above ground storage tank
UST = Underground storage Tank
DRMO = Defense Reutilization and Marketing Office
LTM = Long-term monitoring
TPHC = Total petroleum hydrocarbons

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

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AOC 32 and 43A

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0 80 160
Feet

Date: 02/13/2018

Figure 5-1

KGS

File: AR2017_AOC32-43A.mxd

Notes:
32Z-01-05XOB not used in contouring
AST = Aboveground Storage Tank
UST = Underground Storage Tank
DRMO = Defense Reutilization and Marketing Office
LTM = Long-Term Monitoring
TPHC = Total Petroleum Hydrocarbons
ft AMSL = Feet Above Mean Sea Level
NGVD88 = National Geodetic Vertical Datum (1988)

Aerial Sources: Esri, DigitalGlobe, GeoEye, i-cubed, USDA FSA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP,

Figure 5-2
Interpretive Water Table Elevation Overburden Wells
Areas of Contamination 32 and 43A
April 2018

SHL-15 (243.57)
32M-92-01XOB (244.26)
32Z-01-07XOB (246.01)
32Z-01-06XBR
32Z-01-08XOB (243.83)
32Z-01-11XBR
32Z-01-12XBR
32M-92-03X (233.17)
43M-01-16XOB (232.31)
43M-01-16XBR
43M-01-17XOB (231.86)
43M-01-17XBR
43M-01-20XOB (231.33)
43M-01-20XBR
32Z-01-09XOB (231.33)
32Z-01-05XOB (231.51)
32M-01-14XBR
32M-01-14XOB (233.09)
32M-01-13XBR
32M-01-15XBR
32M-01-17XBR
32M-01-18XBR
SHL-25 (232.58)
32M-01-16XBR
32Z-01-10XBR
32Z-99-02X (236.21)
A
A'
Former Tire Recycling Yard
Shepley's Hill Landfill
DRMO West Yard
DRMO East Yard
O'Reillys Auto Parts
Former UST 13 Excavation Area
T-204
Building 214
Recycling Center
P-186 Former Gasoline Pump House
Former ASTs
Former USTs
Former USTs (1990-1998)
T-216
T-401 Former Gasoline Pump House
T-247
Antietam Street
Cook Street
Independence Drive
295
285
275
265
255
244
243
242
240
238
236
234
232
247

Legend

- LTM Sample Well
- LTM Well - Periodic Gauge Only
- Monitoring Well - Paved Over
- Groundwater Contour (ft NGVD88) (Interval = 2 ft)
- Groundwater Flow Direction
- (243.83) Groundwater Elevation (ft NGVD88)
- A—A' Groundwater Gradient Calculation Location
- 32M-92-01X Well Identification
- DEP Approved Wellhead Protection Areas (Zone II)
- Former Storage Tank(s)
- Former Building
- T-247 Former Building Number
- Approximate Historical Extent of Groundwater Contamination in Exceedance of Cleanup Goals (based on April 2002 to October 2008 analytical data) (2008 Annual Report, HGL, 2009)
- Remaining Bedrock Outcrop
- Topographic Contour (Ft AMSL)

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AOC 32 and 43A

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0 80 160
Feet

Date: 04/12/2019

Figure 5-2

File: AR2018_MP_F5-2_AOC32-43A_GWC-OB_0418.mxd

Notes:
AST = Aboveground Storage Tank
UST = Underground Storage Tank
DRMO = Defense Reutilization and Marketing Office
LTM = Long-Term Monitoring
TPHC = Total Petroleum Hydrocarbons
ft AMSL = Feet Above Mean Sea Level
NGVD88 = National Geodetic Vertical Datum (1988)

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

Figure 5-3
Interpretive Water Table Elevation
Bedrock Wells
Areas of Contamination 32 and 43A
April 2018

Legend

- LTM Sample Well
- LTM Well - Periodic Gauge Only
- Monitoring Well - Paved Over
- Groundwater Elevation Contour (ft NGVD) (Contour Interval = 2.0 ft)
- Inferred Groundwater Elevation Contour
- Groundwater Flow Direction
- (233.04) Groundwater Elevation (ft NGVD)
- A—A' Groundwater Gradient Calculation Location
- DEP Approved Wellhead Protection Areas (Zone II)
- 32M-92-01X Well Identification
- Former Storage Tank(s)
- Former Building
- T-247 Former Building Number
- Approximate Historical Extent of Groundwater Contamination in Exceedance of Cleanup Goals (based on April 2002 to October 2008 analytical data) (2008 Annual Report, HGL, 2009)
- TPHC Soil Contamination
- Remaining Bedrock Outcrop
- Topographic Contour (Ft AMSL)

2018 Main Post Annual Report
AOC 32 and 43A

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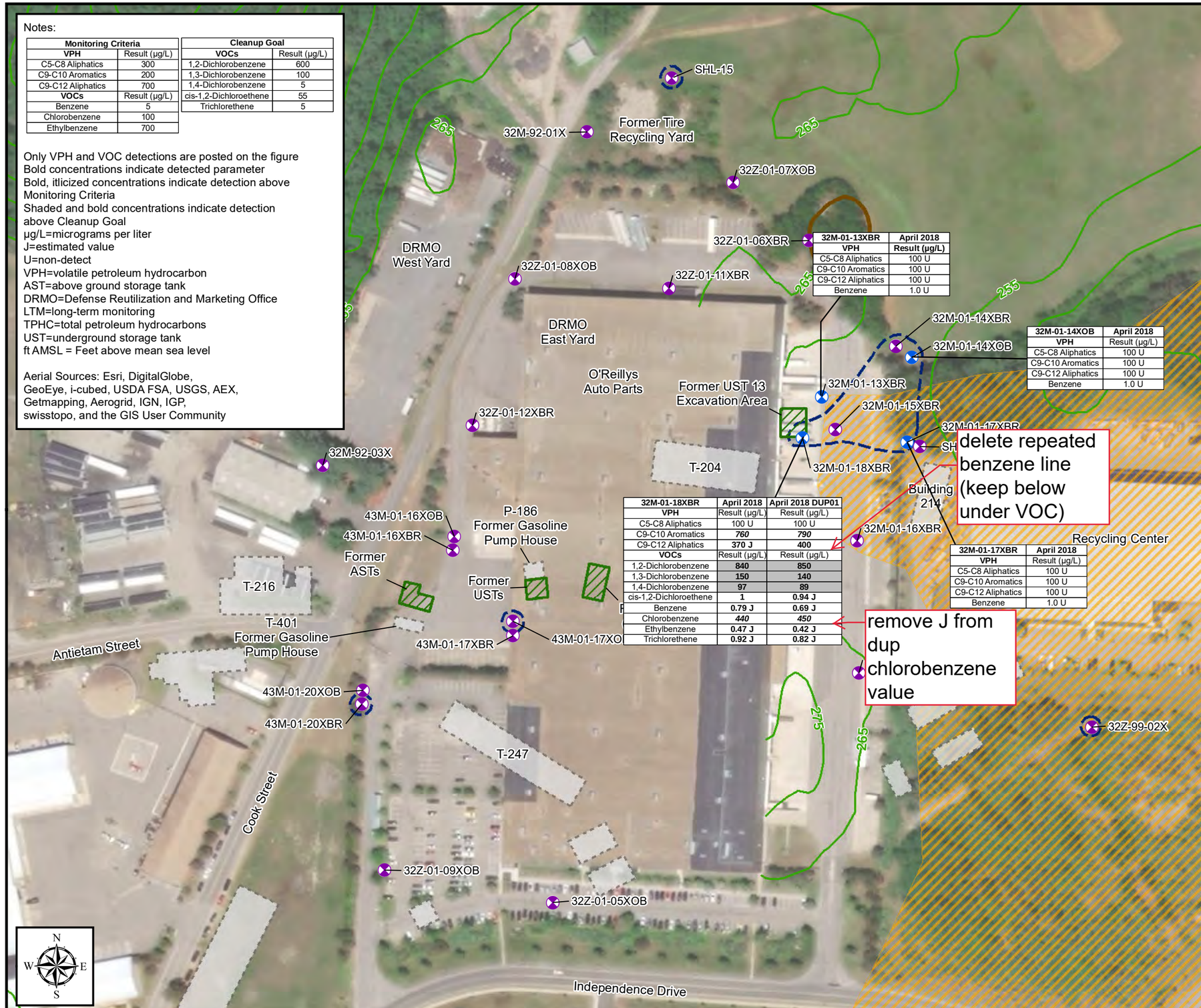
0 80 160
Feet

Date: 04/12/2019

Figure 5-3

File: AR2018_MP_F5-3_AOC32-43A_GWC-BR_0418.mxd

Figure 5-4
VPH and VOCs Concentrations
Area of Contamination 32 and 43A
April 2018



Notes:

Monitoring Criteria	
VPH	Result (µg/L)
C5-C8 Aliphatics	300
C9-C10 Aromatics	200
C9-C12 Aliphatics	700
VOCs	Result (µg/L)
Benzene	5
Chlorobenzene	100
Ethylbenzene	700

Cleanup Goal	
VOCs	Result (µg/L)
1,2-Dichlorobenzene	600
1,3-Dichlorobenzene	100
1,4-Dichlorobenzene	5
cis-1,2-Dichloroethene	55
Trichlorethene	5

Only VPH and VOC detections are posted on the figure
Bold concentrations indicate detected parameter
Bold, itlicized concentrations indicate detection above Monitoring Criteria
Shaded and bold concentrations indicate detection above Cleanup Goal
µg/L=micrograms per liter
J=estimated value
U=non-detect
VPH=volatile petroleum hydrocarbon
AST=above ground storage tank
DRMO=Defense Reutilization and Marketing Office
LTM=long-term monitoring
TPHC=total petroleum hydrocarbons
UST=underground storage tank
ft AMSL = Feet above mean sea level

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

32M-01-13XBR	April 2018
VPH	Result (µg/L)
C5-C8 Aliphatics	100 U
C9-C10 Aromatics	100 U
C9-C12 Aliphatics	100 U
Benzene	1.0 U

32M-01-14XOB	April 2018
VPH	Result (µg/L)
C5-C8 Aliphatics	100 U
C9-C10 Aromatics	100 U
C9-C12 Aliphatics	100 U
Benzene	1.0 U

32M-01-18XBR	April 2018	April 2018 DUP01
VPH	Result (µg/L)	Result (µg/L)
C5-C8 Aliphatics	100 U	100 U
C9-C10 Aromatics	***760***	***790***
C9-C12 Aliphatics	**370 J**	**400**
VOCs	Result (µg/L)	Result (µg/L)
1,2-Dichlorobenzene	**840**	**850**
1,3-Dichlorobenzene	**150**	**140**
1,4-Dichlorobenzene	**97**	**89**
cis-1,2-Dichloroethene	**1**	**0.94 J**
Benzene	**0.79 J**	**0.69 J**
Chlorobenzene	***440***	***450***
Ethylbenzene	**0.47 J**	**0.42 J**
Trichlorethene	**0.92 J**	**0.82 J**

32M-01-17XBR	April 2018
VPH	Result (µg/L)
C5-C8 Aliphatics	100 U
C9-C10 Aromatics	100 U
C9-C12 Aliphatics	100 U
Benzene	1.0 U

delete repeated benzene line (keep below under VOC)

remove J from dup chlorobenzene value

Legend

- LTM Sample Well
- LTM Well - Periodic Gauge Only
- DEP Approved Wellhead Protection Areas (Zone II)
- 32M-92-01X — Well Identification
- Former Storage Tank(s)
- Former Building
- T-247 — Former Building Number
- Approximate Historical Extent of Groundwater Contamination in Exceedance of Cleanup Goals (based on April 2002 to October 2008 analytical data) (2008 Annual Report, HGL, 2009)
- Remaining Bedrock Outcrop
- Topographic Contour (Ft AMSL)

2018 Main Post Annual Report
AOC 32 and 43A

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Devens, Massachusetts

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0 80 160
Feet

Date: 04/11/2019

Figure 5-4

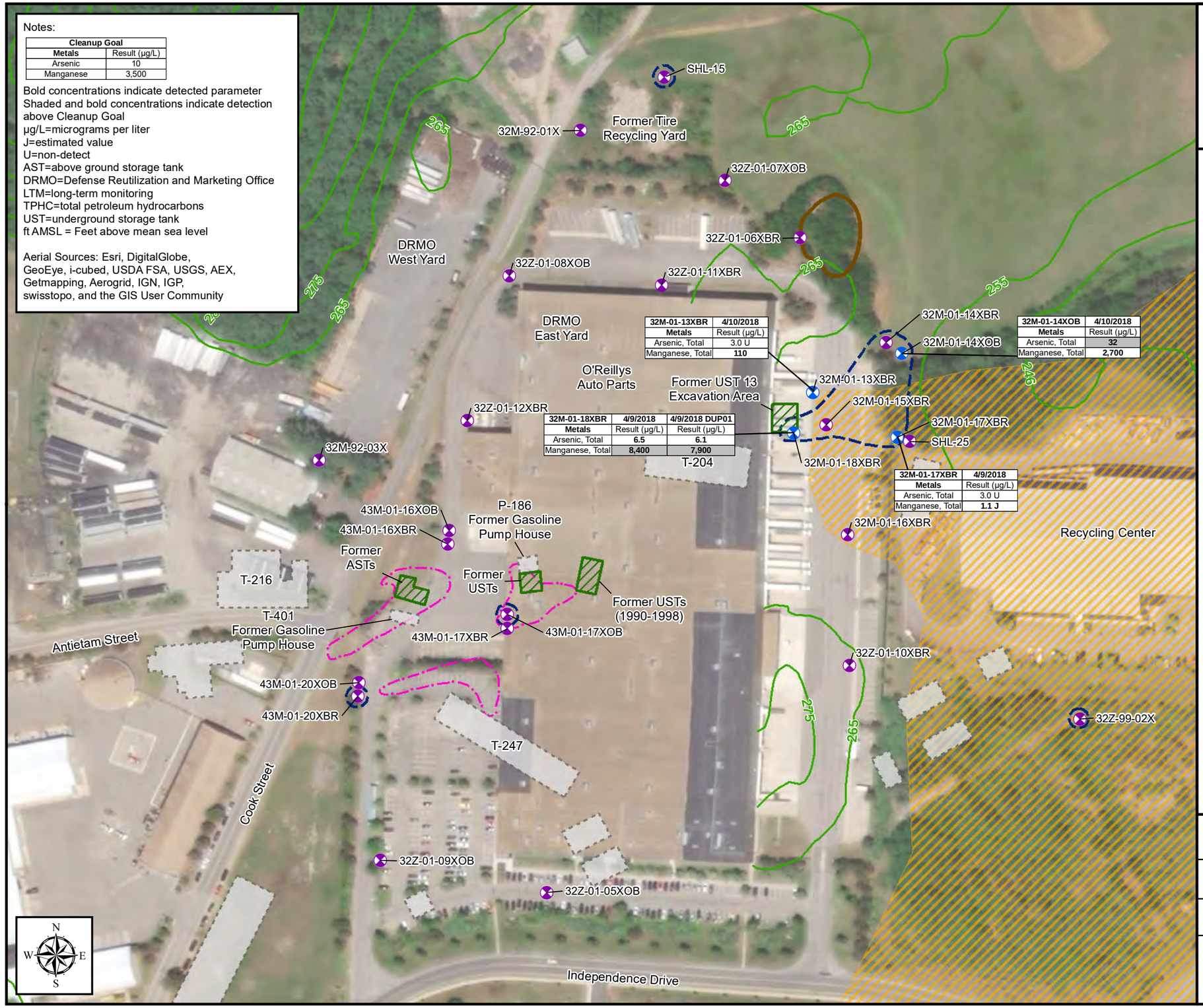
File: AR2018_MP_F5-4_AOC32-43A_VPH_April2018.mxd

Notes:

Cleanup Goal	
Metals	Result (µg/L)
Arsenic	10
Manganese	3,500

Bold concentrations indicate detected parameter
Shaded and bold concentrations indicate detection above Cleanup Goal
µg/L=micrograms per liter
J=estimated value
U=non-detect
AST=above ground storage tank
DRMO=Defense Reutilization and Marketing Office
LTM=long-term monitoring
TPHC=total petroleum hydrocarbons
UST=underground storage tank
ft AMSL = Feet above mean sea level

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



32M-01-13XBR	4/10/2018
Metals	Result (µg/L)
Arsenic, Total	3.0 U
Manganese, Total	**110**

32M-01-14XOB	4/10/2018
Metals	Result (µg/L)
Arsenic, Total	**32**
Manganese, Total	**2,700**

32M-01-18XBR	4/9/2018	4/9/2018 DUP01
Metals	Result (µg/L)	Result (µg/L)
Arsenic, Total	**6.5**	**6.1**
Manganese, Total	**8,400**	**7,900**

32M-01-17XBR	4/9/2018
Metals	Result (µg/L)
Arsenic, Total	3.0 U
Manganese, Total	**1.1 J**

Figure 5-5
Metal Concentrations
Area of Contamination 32 and 43A
April 2018

Legend

- LTM Sample Well
- LTM Well - Periodic Gauge Only
- DEP Approved Wellhead Protection Areas (Zone II)
- 32M-92-01X — Well Identification
- Former Storage Tank(s)
- Former Building
- T-247 — Former Building Number
- Approximate Historical Extent of Groundwater Contamination in Exceedance of Cleanup Goals (based on April 2002 to October 2008 analytical data) (2008 Annual Report, HGL, 2009)
- TPHC Soil Contamination
- Remaining Bedrock Outcrop
- Topographic Contour (Ft AMSL)

2018 Main Post Annual Report
AOC 32 and 43A

Former Fort Devens Army Installation
Devens, Massachusetts

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

0 80 160
Feet

Date: 02/12/2019

Figure 5-5

File: AR2018_MP_F5-5_AOC32-43A_Metals_April2018.mxd

DRAFT SURVEY RESULTS FOR DEVENS CONSOLIDATION LANDFILL					
WELL ID	NORTHING (FT)	EASTING (FT)	ELEVATION (FT)		
			GROUND	RIM	PVC
LFGM-18-01	3018370.8	624998.3	333.82	333.82	333.6
LFGM-18-02	3018304.1	625016.9	329.74	329.74	329.48
LFGM-18-03	3018244	625033.3	328.75	328.75	328.62



Figure 6-1
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-99-06A-RP 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

2018 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: 04/24/2019

Figure 6-1

KGS

File: AR2018_MP_F6-1_DCL_SITE.mxd

Figure 6-2
Interpretive Water Table Elevation
Devens Consolidation Landfill
April 2018

Notes:
LFM-99-06A was replaced by LFM-99-06A-RP 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
NGVD88 = National Geodetic Vertical Datum (1988)

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

LFM-99-03B (303.57)
LFM-99-05B (296.10)
LFM-99-05A (299.10)
A'
A
LFM-99-01B (325.90)
LFM-99-02B (337.93)
LFM-03-07 (298.67)
LFM-99-06A-RP (323.45)
LFM-99-06A
V-1
V-2
V-3
V-4
V-5
V-6
V-7
V-8
V-9
V-10
V-11
Queenstown Street
300
305
310
315
320
325
330
335
340
350
360
370
380
390
400
410

Legend

- LTM Sample Well
- LTM Well - Gauge Only
- Gas Vent
- Monitoring Well - Destroyed
- Groundwater Contour (ft NGVD88) (Interval = 5 ft)
- Inferred Groundwater Elevation Contour
- Groundwater Flow Direction
- (303.11) Groundwater Elevation (ft NGVD88)
- LFM-03-07 Well/Vent Identification
- A——A' Groundwater Gradient Calculation Location
- Topographic Contour (ft AMSL)

Note:

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

2018 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 60 120
Feet

Date: 02/15/2019

Figure 6-2

File: AR2018_MP_F6-2_DCL_GWC0418.mxd

Notes:
LFM-99-06A was replaced by LFM-99-06A-RP 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
NGVD88 = National Geodetic Vertical Datum (1988)

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

LFM-99-03B (302.08)
LFM-99-05B (297.83)
LFM-99-05A (294.93)
LFM-99-01B (324.85)
LFM-03-07 (297.31)
LFM-99-06A
LFM-99-06A-RP (323.02)
LFM-99-02B (336.13)
V-1
V-2
V-3
V-4
V-5
V-6
V-7
V-8
V-9
V-10
V-11
A
A'
Queenstown Street

Figure 6-3
Interpretive Water Table Elevation
Devens Consolidation Landfill
October 2018

Legend

- LTM Sample Well
- LTM Well - Gauge Only
- Gas Vent
- Monitoring Well - Destroyed
- Groundwater Contour (ft NGVD88) (Interval = 5 ft)
- Inferred Groundwater Elevation Contour
- Groundwater Flow Direction
- (303.11) Groundwater Elevation (ft NGVD88)
- A——A' Groundwater Gradient Calculation Location
- LFM-03-07 Well/Vent Identification
- Topographic Contour (ft AMSL)

Note:

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

2018 Main Post Annual Report
Devens Consolidation Landfill

Former Fort Devens Army Installation
Devens, Massachusetts

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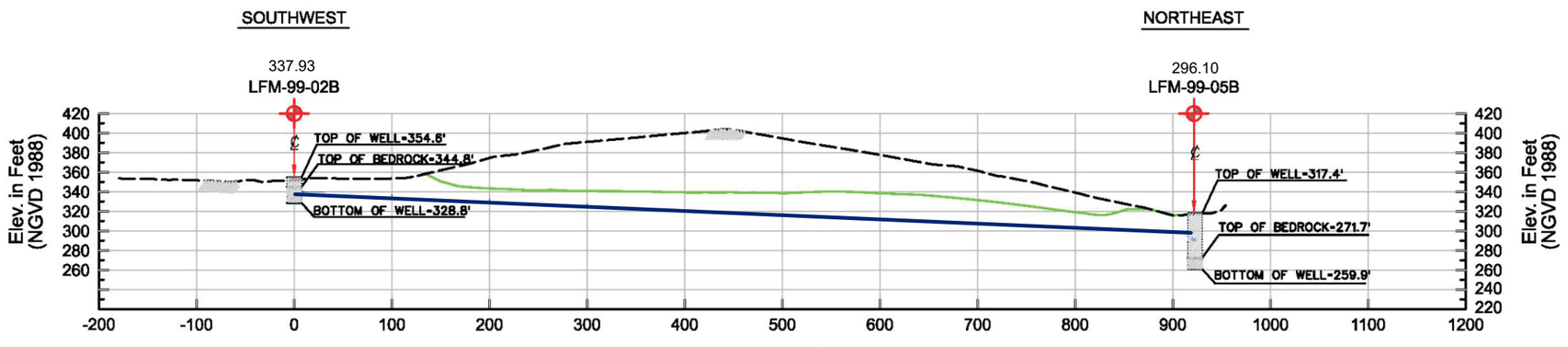
0 60 120
Feet

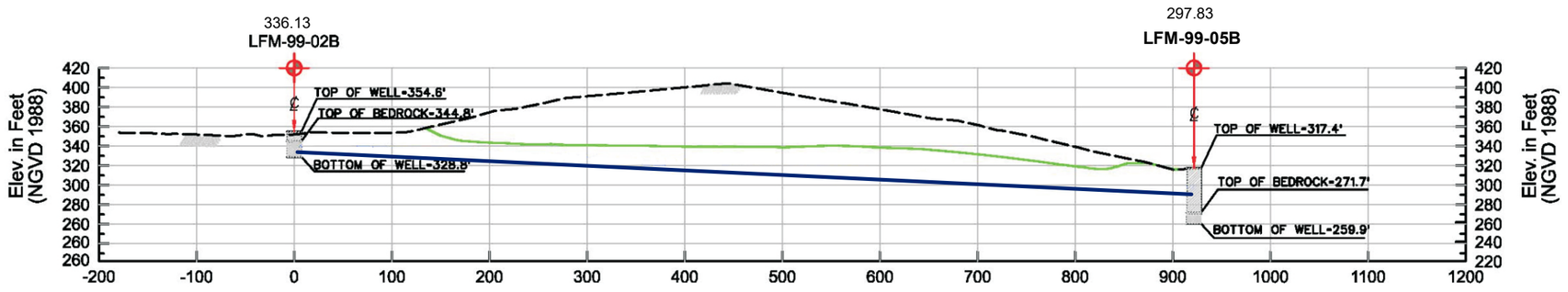
Date: 09/12/2019

Figure 6-3

File: AR2018_MP_F6-3_DCL_GWC1018.mxd



PROFILE 1 (April 2018)



PROFILE 2 (October 2018)

Figure 6-4
Devens Consolidation Landfill Profiles
LFM-99-02B to LFM-99-05B

Legend

- Existing Ground Surface
- Liner
- Bedrock Groundwater Levels
- Monitoring Well

Notes:

1. Horizontal and vertical scales as shown. No vertical exaggeration.

2. Existing ground surface and liner elevations based on figures from the remedial action closure report by Shaw Environmental, Inc. September 2003.

3. Bedrock wells water table elevations based on contours generated from April and October 2018 measurements.

NGVD = National Geodetic Vertical Datum (1988)

2018 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

Date:	Figure
02/13/2018	6-4

File: AR2017_DCL_Profiles.mxd

Figure 7-1
Site Location
Grant Housing Area/
Oak and Maple Housing Area/
37-mm Impact Area



Legend

- Former Grant Housing Area
- Former Maple Housing Area
- 37-mm Impact Area
- Approximate Former Firing Location
- Road

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

2018 Main Post Annual Report
Housing Areas

Former Fort Devens Army Installation
Devens, Massachusetts

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

0 250 500
Feet

Date: 02/13/2019

Figure 7-1

File: AR2017_GrantHousingAreas.mxd



TABLES

Table 1-1
Groundwater Elevations, Spring 2018 LTM Event
Main Post, Former Fort Devens Army Installation, Massachusetts

Site Name	Well Identification	Date of Gauging	DTW (ft bTOR)	TOR Elevation (ft NAVD 88)	*	GW Elevation (ft NAVD 88)
DCL	LFM-99-01B	4/05/2018	24.77	350.67	*	325.90
	LFM-99-02B	4/05/2018	15.90	353.83	*	337.93
	LFM-99-03B	4/05/2018	38.51	342.08	*	303.57
	LFM-99-05A	4/05/2018	17.48	316.58	*	299.10
	LFM-99-05B	4/05/2018	20.48	316.58	*	296.10
	LFM-99-06ARP	4/05/2018	14.39	337.84		323.45
	LFM-03-07	4/05/2018	16.47	315.14		298.67
AOC 57, Area 2	57M-03-01X	5/8/2018	13.93	237.10	*	223.17
	57M-03-02X	5/8/2018	4.65	226.30	*	221.65
	57M-03-03X	5/8/2018	0.68	222.84	*	222.16
	57M-03-04X	5/8/2018	2.04	223.22	*	221.18
	57M-03-05X	5/8/2018	2.42	223.53	*	221.11
	57M-03-06X	5/8/2018	2.42	223.76	*	221.34
	57M-95-05X	5/8/2018	14.04	236.51	*	222.47
	57M-95-06X	5/8/2018	11.36	235.76	*	224.40
	57M-95-07X	5/8/2018	2.31	223.77	*	221.46
	57WP-05-01	5/8/2018	--	--		--
	57WP-06-02	5/8/2018	1.82	222.11	*	220.29
AOC 57, Area 3	57M-95-03X	5/8/2018	10.38	234.17	*	223.79
	57M-96-10X	5/8/2018	6.54	228.75	*	222.21
	57M-96-11X	5/8/2018	2.81	216.38	*	213.57
	57M-96-12X	5/8/2018	4.51	227.07	*	222.56
	57M-96-13X	5/8/2018	4.43	226.93	*	222.50
	57P-98-03X	5/8/2018	2.27	221.78	*	219.51
	57P-98-04X	5/8/2018	3.55	222.92	*	219.37
	57WP-06-03	5/8/2018	0.58	221.89	*	221.31
AOC 32/43A Overburden Wells	SHL-15	4/9/2018	16.35	259.92		243.57
	32M-92-01X	4/9/2018	15.91	260.17		244.26
	32Z-99-02X (32M-92-02X)	4/9/2018	23.50	259.71		236.21
	32M-01-14XOB	4/9/2018	23.47	256.56		233.09
	32M-92-03X	4/9/2018	26.85	260.02		233.17
	SHL-25	4/9/2018	25.43	258.01		232.58
	32Z-01-05XOB	4/9/2018	29.09	260.60	*	231.51
	32Z-01-07XOB	4/9/2018	13.47	259.48		246.01
	32Z-01-08XOB	4/9/2018	16.66	260.49		243.83
	32Z-01-09XOB	4/9/2018	26.04	257.37	*	231.33
	43M-01-16XOB	4/9/2018	24.57	256.88		232.31
	43M-01-17XOB	4/9/2018	26.22	258.08		231.86
	43M-01-20XOB	4/9/2018	26.07	257.40		231.33

Table 1-1
Groundwater Elevations, Spring 2018 LTM Event
Main Post, Former Fort Devens Army Installation, Massachusetts

Site Name	Well Identification	Date of Gauging	DTW (ft bTOR)	TOR Elevation (ft NAVD 88)	*	GW Elevation (ft NAVD 88)
AOC 32/43A Bedrock Wells	32M-01-13XBR	4/9/2018	14.00	257.08	*	243.08
	32M-01-14XBR	4/9/2018	21.63	255.26	*	233.63
	32M-01-15XBR	4/9/2018	19.18	257.70		238.52
	32M-01-16XBR	4/9/2018	20.37	257.50		237.13
	32M-01-17XBR	4/9/2018	23.65	259.11		235.46
	32M-01-18XBR	4/9/2018	15.34	258.32		242.98
	32Z-01-06XBR	4/9/2018	14.42	261.90	*	247.48
	32Z-01-10XBR	4/9/2018	14.43	257.41		242.98
	32Z-01-11XBR	4/9/2018	Dry	260.70	*	--
	32Z-01-12XBR	4/9/2018	18.23	257.85		239.62
	43M-01-16XBR	4/9/2018	24.71	256.84		232.13
	43M-01-17XBR	4/9/2018	26.53	258.29		231.76
	43M-01-20XBR	4/9/2018	25.91	257.30		231.39

Notes:
AOC = Area of Contamination
DCL = Devens Consolidation Landfill
DTW = Distance to Water
ft = Feet
ft BTOR = feet below top of riser
GW = Groundwater
TOR = Top of Riser
* - TOR elevation converted from NVDG 29 to NAVD 88 by subtracting 0.8 feet at these locations (other locations used recent 2017/2018 survey NAVD 88 datum).

Table 1-2
Groundwater Elevations, Fall 2018 LTM Event
Main Post, Former Fort Devens Army Installation, Massachusetts

Site Name	Well Identification	Date of Gauging	DTW (ft bTOR)	TOR Elevation (ft NAVD 88)	GW Elevation (ft NAVD 88)
43G	XGM-93-02X	10/10/2018	27.9	308.80	280.90
	XGM-94-04X	10/10/2018	18.70	300.70	282.00
	XGM-94-07X	10/10/2018	19.40	294.80	275.40
	XGM-94-08X	10/10/2018	25.10	299.00	273.90
	XGM-94-10X	10/10/2018	24.05	301.90	277.85
	XGM-97-12X	10/10/2018	24.35	308.83	284.48
	AAFES-2	10/10/2018	22.16	302.00	279.84
	AAFES-5	10/10/2018	21.64	300.12	278.48
	AAFES-6R	10/10/2018	18.38	298.74	280.36
	AAFES-7	10/10/2018	7.38	258.71	251.33
DCL	LFM-03-07	10/11/2018	17.83	315.14	297.31
	LFM-99-01B	10/11/2018	25.82	350.67	324.85
	LFM-99-02B	10/11/2018	17.70	353.83	336.13
	LFM-99-03B	10/11/2018	40.00	342.08	302.08
	LFM-99-05A	10/11/2018	21.65	316.58	294.93
	LFM-99-05B	10/11/2018	18.75	316.58	297.83
	LFM-99-06A-RP	10/11/2018	14.82	337.84	323.02
69W	ZWM-01-25X	10/08/2018	4.47	224.71	220.24
	ZWM-01-26X	10/08/2018	6.22	226.81	220.59
	ZWM-95-15X	10/08/2018	4.16	225.01	220.85
	ZWM-95-16X	10/08/2018	4.28	227.58	223.30
	ZWM-95-17X	10/08/2018	13.36	237.83	224.47
	ZWM-95-18X	10/08/2018	2.64	222.15	219.51
	ZWM-99-22X	10/08/2018	4.25	226.72	222.47
	ZWM-99-23X	10/09/2018	4.16	225.08	220.92
	ZWM-99-24X	10/08/2018	4.34	225.85	221.51
	ZWP-95-01X	10/08/2018	4.45	226.04	221.59
	ZWP-95-02X	10/08/2018	3.18	222.83	219.65
	69W-94-12	10/08/2018	6.32	228.14	221.82
	69W-94-13	10/08/2018	5.24	226.99	221.75
	69W-94-14	10/08/2018	6.27	227.22	220.95
	69WP-08-01	10/08/2018	1.97	220.70	218.73
	69WP-13-01	10/08/2018	1.75	NA	NA

Notes:

AOC = Area of Contamination
DCL = Devens Consolidation Landfill
DTW = Distance to Water
TOR = Top of Riser
ft = Feet
ft BTOR = feet below top of riser
GW = Groundwater

TOR elevation converted from NVDG 29 to NAVD 88 by subtracting 0.8 feet.

Table 1-3
Monthly Precipitation Data
Main Post, Former Fort Devens Army Installation, Massachusetts

	Year															
Month	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**Average**
January	0.75	3.46	4.58	2.72	2.38	2.49	3.31	3.66	2.18	1.38	2.18	2.73	1.48	3.00	2.19	2.57
February	1.32	2.17	2.28	1.21	8.85	2.51	6.05	4.11	1.12	2.91	3.16	0.55	3.36	2.34	3.07	3.00
March	2.97	4.08	0.53	3.97	5.28	2.40	10.61	4.08	1.25	2.31	4.16	1.03	3.12	3.86	2.88	3.50
April	7.67	5.47	2.21	7.09	3.61	4.00	1.43	5.05	2.87	1.62	3.25	0.33	1.89	4.85	5.25	3.77
May	3.43	4.25	7.32	4.37	1.99	3.97	3.37	3.81	3.13	5.38	3.29	0.10	2.04	6.21	1.61	3.62
June	1.67	3.87	9.31	1.56	4.02	6.41	3.53	5.69	4.03	8.53	1.76	2.76	1.04	3.97	4.71	4.19
July	4.72	1.67	1.71	6.25	6.35	9.61	4.01	2.27	1.46	3.46	4.10	1.73	1.92	3.37	3.49	3.74
August	2.77	2.56	4.38	1.40	4.66	2.64	3.58	10.99	4.92	2.09	2.25	1.17	2.55	1.83	10.10	3.86
September	7.35	1.67	2.87	2.25	8.05	1.28	2.48	6.94	3.06	1.64	1.07	3.23	0.05	4.54	7.79	3.62
October	1.91	13.46	6.10	3.35	1.81	3.99	6.17	7.12	5.12	1.28	5.22	3.60	4.58	9.12	4.12	5.13
November	3.42	4.40	6.38	2.67	3.66	3.43	3.92	3.94	0.47	2.66	3.60	1.66	3.27	1.22	8.81	3.57
December	3.89	3.79	1.77	3.67	3.78	3.69	4.08	4.84	3.39	3.46	4.44	2.10	3.40	2.50	3.61	3.49
TOTAL	**41.87**	**50.85**	**49.44**	**40.51**	**54.44**	**46.42**	**52.54**	**62.50**	**33.00**	**36.72**	**38.48**	**20.99**	**28.70**	**46.81**	**57.63**	**44.06**

Notes:
2018 monthly data retrieved from the National Oceanic and Atmospheric Administration (NOAA) data inventory.
Total Inches of Precipitation Per Month
Fitchburg, Massachusetts Weather Station

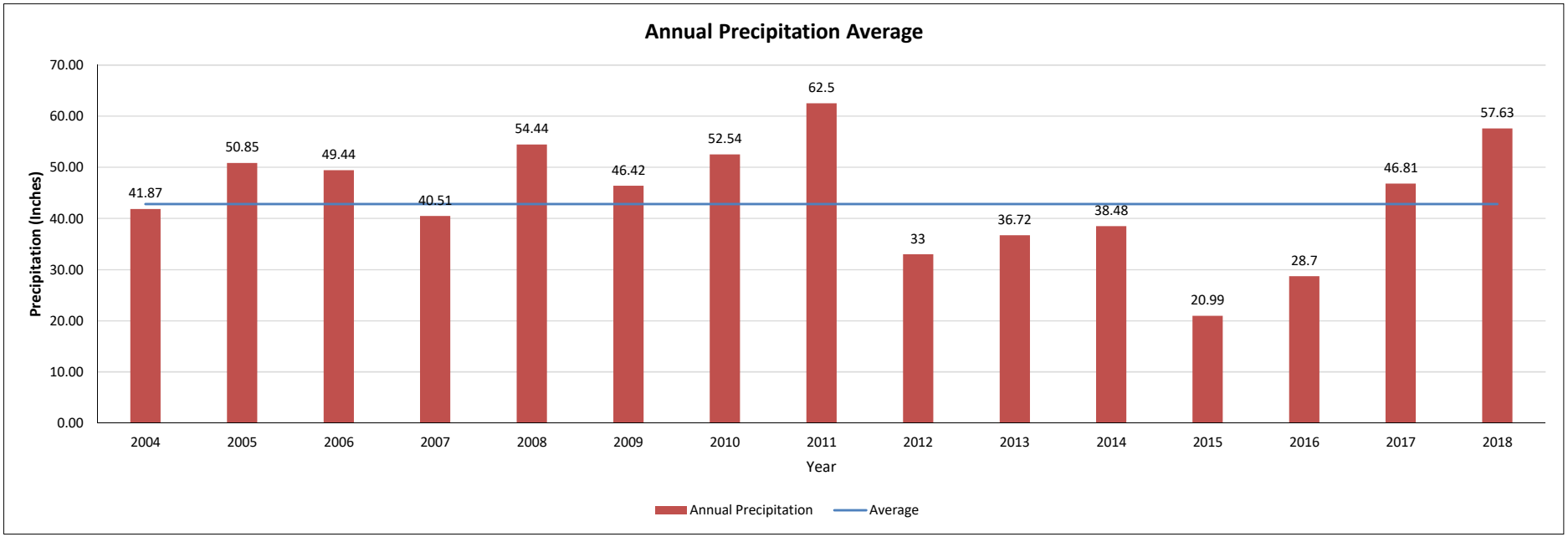


Table 1-4
Analytical Methods, Containers, Holding Times, and Preservatives
Main Post, Former Fort Devens Army Installation, Massachusetts

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	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 1-4
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	Total Metals include: 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	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 600-4-79-020.
"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 1-5
Monitoring Wells, Well Points, Piezometers, and Surface Water Locations Selected for Long-Term Monitoring
Main Post, Former Fort Devens Army Installation, Massachusetts

Monitoring Well/ Piezometer/ Surface Water ID	Location	Rationale	Bottom of Screen Interval	Top of Screen Interval	Well Screen Intervals	Top of Casing Elevation	Ground Surface Elevation	Sample Pump Intake Depth	Dedicated Bladder Pump
			(ft NAVD88)	(ft NAVD88)	(ft BTOR)	(ft NAVD88)	(ft NAVD88)	(ft BTOR)	(Yes/No)
AOC 57 Sampling (Annual Sampling)									
57M-03-01X	Area 2 - Upgradient location.	LTM water level only.	214.70	224.70	12.40 - 22.40	237.10	234.70	--	--
57M-03-02X	Area 2 - On west fringe of remedial excavation.	LTM water level only.	212.50	222.50	3.80 - 13.80	226.30	224.50	--	NO
57M-03-03X	Area 2 - On southern fringe of remedial excavation and at wetland limit.	LTM water level only.	209.54	219.54	3.30 - 13.30	222.84	221.54	--	NO
57M-03-04X	Area 2 – On southern fringe of remedial excavation and at wetland limit.	LTM water level only.	209.42	219.42	3.80 - 13.80	223.22	221.42	--	NO
57M-03-05X	Area 2 - On southeastern fringe of remedial excavation and at wetland limit.	LTM water level only.	209.63	219.63	3.90 - 13.90	223.53	221.63	--	NO
57M-03-06X	Area 2 – On east fringe of remedial excavation.	LTM water level only.	210.26	220.26	3.50 - 13.50	223.76	222.26	--	--
57M-95-05X	Area 2 - West of and upgradient of excavation limit.	LTM water level only.	214.07	224.07	12.44 - 22.44	236.51	234.07	--	--
57M-95-06X	Area 2 – West of and cross gradient of excavation limit.	LTM water level only.	211.54	221.54	14.22 - 24.22	235.76	233.62	--	--
57M-95-07X	Area 2 – East of and cross gradient of excavation limit.	LTM water level only.	209.56	219.56	4.21 - 14.21	223.77	222.56	--	--
57WP-05-01	Area 2 – Southwest of Staff Gauge 01.	LTM water level only.	0 – 2 bgs*	0 – 2 bgs*	--	--	--	≈1.5 bgs*	--
57WP-06-02	Area 2 - Adjacent to monitoring well 57M-03-03X.	LTM water level only.	19 – 24 bgs*	19 – 24 bgs*	20.0 - 25.0	222.11	--	≈21.5 bgs*	--
57M-95-03X	Area 3 - Downgradient of source.	Sentry well. Monitor for decrease in COC concentration and decrease in the potential for off-site migration.	214.68	224.68	9.49 - 19.49	234.17	231.68	15.30	NO
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.	209.38	219.38	4.20 - 14.20	223.58	221.38	9.20	NO
57M-96-12X	Area 3 – West of and cross gradient of excavation limit.	LTM water level only.	212.02	222.02	5.05 - 15.05	227.07	224.02	--	--
57M-96-13X	Area 3 - West of and cross gradient of excavation limit.	LTM water level only.	212.26	222.26	4.67 - 14.67	226.93	224.26	--	--
57P-98-03X	Area 3 – Southeast of monitoring well 57M-96-11X.	LTM water level only.	--	--	--	221.78	--	--	--
57P-98-04X	Area 3 - Southwest of monitoring well 57M-96-11X.	LTM water level only.	--	--	--	222.92	--	--	--
57WP-06-03	Area 3 – Adjacent to monitoring well 57M-96-11X.	LTM water level only.	201.89	206.89	15.0 – 20.0	221.89	--	--	--
SW-1	Area 3 – At downgradient fringe of excavation. Active seeps seem likely to be temporal.	Monitor for decrease in COC concentration and decrease in the potential for off-site migration.	--	--	--	--	--	--	--

Table 1-5
Monitoring Wells, Well Points, Piezometers, and Surface Water Locations Selected for Long-Term Monitoring
Main Post, Former Fort Devens Army Installation, Massachusetts

Monitoring Well/ Piezometer/ Surface Water ID	Location	Rationale	Bottom of Screen Interval	Top of Screen Interval	Well Screen Intervals	Top of Casing Elevation	Ground Surface Elevation	Sample Pump Intake Depth	Dedicated Bladder Pump
			(ft NAVD88)	(ft NAVD88)	(ft BTOR)	(ft NAVD88)	(ft NAVD88)	(ft BTOR)	(Yes/No)
AOC 69W (Annual Sampling)									
69W-94-13	North of paved area near source area.	Source area well. Monitor for decrease in COC concentrations.	210.50	220.50	9.09 - 19.09	226.99	224.50	14.09	NO
			(approximate)	(approximate)					
69W-94-14	Approx. 30 feet upgradient of Willow Brook wetlands.	Monitor for decrease in COC concentration and decrease in the potential for off-site migration.	211.73	221.73	5.49 - 15.49	227.22	224.73	11.09	NO
			(approximate)	(approximate)					
ZWM-95-15X	Near former underground concrete vault.	Sentry well. Monitor for decrease in COC concentration and decrease in the potential for off-site	209.14	219.14	8.74 - 18.74	225.01	222.14	13.74	NO
			(approximate)	(approximate)					
ZWM-95-18X	Approx. 120 feet downgradient of the concrete vault.	Sentry well. Monitor for off-site migration	206.93	216.93	7.44 - 17.44	222.15	219.93	12.44	NO
			(approximate)	(approximate)					
ZWM-99-22X	Paved source area.	Replacement of destroyed well 69W-94-10. Monitor for decrease in COC concentrations.	212.09	222.09	4.66 - 14.66	226.72	226.89	9.66	NO
ZWM-99-23X	Downgradient well east of Willow Brook and northeast of 69W-94-14.	Sentry well. Monitor for decrease in COC concentration and decrease in the potential for off-site migration.	210.40	220.40	6.63 - 16.63	225.08	223.40	9.63	NO
ZWM-99-24X	Downgradient well east of Willow Brook and southwest of 69W-94-14.	Sentry well. Monitor for decrease in COC concentration and decrease in the potential for off-site migration.	210.33	220.33	8.54 - 18.54	225.85	222.83	13.54	NO
ZWM-01-25X	Downgradient well northeast of ZWM-95-15X.	Sentry well.	208.58	218.58	6.13 - 16.13	224.71	222.58	11.13	NO
ZWM-95-17X	Southeast of school.	Background well. Water level and quality	213.07	223.07	14.76 - 24.76	237.83	235.27	19.76	NO
			(approximate)	(approximate)					
ZWM-01-26X	Northeast of ZWM-99-23.	Sentry well. Water level and quality parameters only.	210.36	220.36	6.45 - 16.45	226.81	224.36	11.48	NO
ZWP-95-01X	Along Willow Brook, west of ZWM-99-24X.	LTM water level only.	211.63	213.63	12.41 - 14.41	226.04	223.63	--	--
			(approximate)	(approximate)					
ZWP-95-02X	West side of Willow Brook, northwest of ZWM-95-15X.	LTM water level only.	208.41	210.41	12.42 - 14.42	222.83	219.91	--	--
			(approximate)	(approximate)					
69W-94-12	East of 69W-94-13.	LTM water level only.	--	--	--	228.14	225.65	--	--
ZWM-95-16X	Southeast of ZWM-99-22X, near loading dock.	LTM water level only.	211.91	221.91	5.67 - 15.67	227.58	228.21	--	--
			(approximate)	(approximate)					
Willow Brook Piezometer	Approximately ¼ mile north of site along Willow Brook.	LTM water level only.	--	--	--	218.17	216.80	--	--
69WP-08-01	Downgradient of ZWM-01-25X.	Sentry well point for manganese delineation.	207.70	210.70	10.0 - 13.0 bgs*	220.7	--	11.5 bgs*	NO
69WP-13-01	Downgradient of 69WP-08-01.	Sentry well point for manganese delineation.	207.68 (estimated)	210.68 (estimated)	10.02-13.02 bgs*	220.70 (estimated)	--	12.15 bgs*	NO

Table 1-5
Monitoring Wells, Well Points, Piezometers, and Surface Water Locations Selected for Long-Term Monitoring
Main Post, Former Fort Devens Army Installation, Massachusetts

Monitoring Well/ Piezometer/ Surface Water ID	Location	Rationale	Bottom of Screen Interval	Top of Screen Interval	Well Screen Intervals	Top of Casing Elevation	Ground Surface Elevation	Sample Pump Intake Depth	Dedicated Bladder Pump
			(ft NAVD88)	(ft NAVD88)	(ft BTOR)	(ft NAVD88)	(ft NAVD88)	(ft BTOR)	(Yes/No)
AOC 43G (Annual Sampling)									
AAFES-2	East-southeast of former gasoline USTs.	Source well. Monitor intrinsic remediation.	268.70	283.70	18.30 - 33.30	302.00	299.90	25.80	NO
AAFES-5	East of former gasoline USTs.	LTM water level only.	269.90	284.90	15.22 - 30.22	300.12	300.40	--	NO
AAFES-6R	South of well XGM-93-02X.	LTM water level only.	269.80	279.80	16.97 - 26.97	298.74	296.77	--	NO
XGM-93-02X	South of former gasoline USTs.	Source well. Monitor intrinsic remediation.	271.80	281.80	28.00 - 39.00	308.80	309.80	33.00	NO
XGM-94-04X	Approx. 100 feet south of former gasoline USTs.	Sentry well. Monitor potential for off-site migration.	270.20	280.20	20.50 - 30.50	300.70	298.30	25.50	NO
XGM-94-07X	Approx. 180 feet east southeast of former gasoline USTs.	LTM water level only.	265.20	275.20	19.60 - 29.60	294.80	292.20	--	NO
XGM-94-08X	Approx. 230 feet southeast of former gasoline USTs.	LTM water level only.	262.90	272.90	26.10 - 36.10	299.00	296.40	--	NO
XGM-94-10X	Approx. 250 feet south of former gasoline USTs.	LTM water level only.	268.10	278.10	23.80 - 33.80	301.90	299.60	--	NO
XGM-97-12X	At location of former gasoline USTs.	Source well. Monitor intrinsic remediation.	274.83	284.83	24.00 - 34.00*	308.83	--	29.00*	NO
					(bgs, approx.)			(bgs, approx.)	
AAFES-7	Approx. 620 feet southeast of former gasoline USTs.	Monitor potential for manganese off-site migration.	242.01	252.01	6.70 -16.70	258.71	256.10	11.70	NO
AOCs 32 and 43A (Annual Sampling)									
32M-92-01X	North of the building on west edge of former Tire Recycling Yard.	LTM water level only.	233.90	243.90	16.23 - 26.23	260.13	257.60	--	--
32M-92-03X	West of the building and just north of former DRMO Warehouse.	LTM water level only.	225.00	235.00	25.19 - 35.19	260.19	258.00	--	--
32Z-99-02X (32M-92-02X)	East of the building.	LTM water level only.	228.10	243.10	16.89 - 31.89	259.99	257.60	--	--
32Z-01-05XOB	Western end of parking lot to the south of the building.	LTM water level only.	225.50	235.50	25.10 - 35.10	260.60	260.95	--	--
32Z-01-06XBR	In vegetation north of northeast corner of the building.	LTM water level only.	233.30	243.30	18.60 - 28.60	261.90	260.00	--	--
32Z-01-07XOB	North of the building on southeast corner of former Tire Recycling Yard.	LTM water level only.	234.50	244.50	15.01 - 25.01	259.51	257.20	--	--
32Z-01-08XOB	Slightly northwest of the building.	LTM water level only.	236.00	246.00	14.53 - 24.53	260.53	258.00	--	--
32Z-01-09XOB	Western edge of parking lot near southwest corner of the building.	LTM water level only.	224.30	234.30	23.07 - 33.07	257.37	257.75	--	--
32Z-01-10XBR	In paved access road east of the building.	LTM water level only.	235.30	245.30	12.12 - 22.12	257.42	257.82	--	--
32Z-01-11XBR	In paved access road north of the building.	LTM water level only.	243.00	253.00	8.42 - 18.42	261.42	262.04	--	--
32Z-01-12XBR	In paved access road just north of truck bays on west side of the building.	LTM water level only.	220.10	230.10	27.78 - 37.78	257.88	258.28	--	--

Table 1-5
Monitoring Wells, Well Points, Piezometers, and Surface Water Locations Selected for Long-Term Monitoring
Main Post, Former Fort Devens Army Installation, Massachusetts

Monitoring Well/ Piezometer/ Surface Water ID	Location	Rationale	Bottom of Screen Interval	Top of Screen Interval	Well Screen Intervals	Top of Casing Elevation	Ground Surface Elevation	Sample Pump Intake Depth	Dedicated Bladder Pump
			(ft NAVD88)	(ft NAVD88)	(ft BTOR)	(ft NAVD88)	(ft NAVD88)	(ft BTOR)	(Yes/No)
AOCs 32 and 43A (Annual Sampling)									
SHL-15	North of the building on north edge of former Tire	LTM water level only.	233.20	243.20	16.30 - 26.30	258.30	258.20	--	--
					(from metal casing)				
SHL-25	Outside of perimeter fence on east side of the building;	LTM water level only.	223.30	233.30	25.00 - 35.00	259.50	256.30	--	--
					(from metal casing)				
32M-01-13XBR	Between truck bays 33 and 34 on east side of the building.	Source area well.	234.60	244.60	13.25 - 23.25	257.85	258.27	18.25	YES (Broken)
32M-01-14XOB	Outside of perimeter fence northeast of 32M-01-13XBR.	Downgradient well.	227.10	237.10	19.52 - 29.52	256.62	254.40	24.52	YES
32M-01-14XBR	Outside of perimeter fence northeast of 32M-01- 13XBR.	LTM water level only.	210.30	220.30	35.81 - 45.81	256.11	254.30	43.81	YES
32M-01-15XBR	Southeast of 32M-01-13XBR in paved access road on east side of the building.	LTM water level only.	213.40	223.40	34.16 - 44.16	257.56	257.91	43.00	NO
32M-01-16XBR	Opposite from bay 20 on east side of the building	LTM water level only.	226.70	236.70	20.79 - 30.79	257.49	257.72	29.00	NO
32M-01-17XBR (32M-01-17X)	Just inside perimeter fence on east side of the building.	Downgradient well.	204.90	214.90	43.79 - 53.79	258.69	256.30	48.79	YES
32M-01-18XBR	Just east of the building at truck bay 29.	Source area well.	234.60	244.60	13.74 - 23.74	258.34	258.63	18.74	NO
43M-01-16XOB	Opposite door B5 on west side of the building.	LTM water level only.	223.10	233.10	23.75 - 33.75	256.85	257.12	--	--
43M-01-16XBR	Opposite door B5 on west side of the building.	LTM water level only.	199.50	209.50	47.27 - 57.27	256.77	257.04	--	--
43M-01-17XOB	Near door B4 on west side of the building.	LTM water level only.	225.10	235.10	22.97 - 32.97	258.07	258.57	--	--
43M-01-17XBR	Near door B4 on west side of the building.	LTM water level only.	201.00	211.00	47.25 - 57.25	258.25	258.54	--	--
43M-01-20XOB	Western edge of paved access road on west side of the building.	LTM water level only.	223.90	233.90	23.76 - 33.76	257.66	257.86	--	--
43M-01-20XBR	Western edge of paved access road on west side of the building.	LTM water level only.	179.60	189.60	67.71 - 77.71	257.31	257.86	--	--

Table 1-5
Monitoring Wells, Well Points, Piezometers, and Surface Water Locations Selected for Long-Term Monitoring
Main Post, Former Fort Devens Army Installation, Massachusetts

Monitoring Well/ Piezometer/ Surface Water ID	Location	Rationale	Bottom of Screen Interval	Top of Screen Interval	Well Screen Intervals	Top of Casing Elevation	Ground Surface Elevation	Sample Pump Intake Depth	Dedicated Bladder Pump
			(ft NAVD88)	(ft NAVD88)	(ft BTOR)	(ft NAVD88)	(ft NAVD88)	(ft BTOR)	(Yes/No)
Devens Consolidation Landfill (Semi-Annual Sampling)									
LFM-99-01B	West edge of property between landfill and Queenstown St.	LTM water level only.	316.60	325.90	24.77 - 34.07	350.67	326.2	--	--
LFM-99-02B	Southwest edge of property near intersection of Queenstown St. and Patton Rd.	Monitor for changes in downgradient conditions.	327.33	337.33	16.50 - 26.50	353.83	353.03	21.50	NO
LFM-99-03B	Northern edge of property.	LTM water level only.	292.20	301.50	40.58 - 49.88	342.08	341.28	--	--
LFM-99-05A	Near northeast toe of landfill.	Monitor for changes in downgradient conditions.	285.88	295.88	20.70 - 30.70	316.58	315.78	25.70	NO
LFM-99-05B	Near northeast toe of landfill.	LTM water level only.	259.10	263.40	53.18 - 57.48	316.58	315.78	--	--
LFM-99-06ARP	East of landfill and south of LFM-03-07.	Monitor for changes in downgradient conditions.	302.64	317.64	20.20 - 35.20	337.84	337.04	27.70	NO
LFM-03-07	East of the landfill and south of the channel to the collection pond.	Monitor for changes in downgradient conditions.	294.24	304.24	10.90 - 20.90 bgs*	315.14	315.68	18.95 bgs*	NO

Notes:
NA = Not available
NGVD = National Geodetic Vertical Datum (converted to 1988)
bgs = below ground surface
ft = feet
TOR = top of riser
ft BTOR = feet below top of riser

Table 1-6
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 69W - Fort Devens Elementary School Fuel Oil Spill Site					
Arsenic	10	10.5	10	10	NS
Iron	NS	9,100	NS	NS	9,100
Manganese	NS	291	NS	NS	291
EPH [5]					
C9-C18 Aliphatic Hydrocarbons	700	NS	NS	NS	700
C19-C36 Aliphatic Hydrocarbons	14,000	NS	NS	NS	14,000
C11-C22 Aromatic Hydrocarbons	200	NS	NS	NS	200
AOC 43G - Historical Gas Station Motor Pool Fueling Station Site					
Iron	NS	9,100	NS	9,100	NS
Manganese	NS	291	NS	375[6]	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
AOCs 32 and 43A - Former POL Storage Area					
Arsenic	10	10.5	10	10	NS
Manganese	NS	3,500	NS	3,500	NS
VOCs					
Vinyl Chloride	2.0	NS	2.0	2.0	NS
1,2-dichloroethene (trans)	100	NS	100	100	NS
1,2-dichloroethene (cis)	55	NS	70	55	NS
1,1,1-trichloroethane	200	NS	200	NS	5.0
Trichloroethene	5.0	NS	5.0	5.0	NS
1,2-dichlorobenzene	600	NS	600	600	NS
1,3-dichlorobenzene	100	NS	NS	600	NS
1,4-dichlorobenzene	5.0	NS	75	5.0	NS
VPH [5]					
Benzene	5.0	NS	5.0	NS	5.0
Ethylbenzene	700	NS	700	NS	700
Xylenes, total	10,000	NS	10,000	NS	10,000
Toluene	1,000	NS	1,000	NS	1,000
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
EPH [5]					
C9-C18 Aliphatic Hydrocarbons	700	NS	NS	NS	700
C19-C36 Aliphatic Hydrocarbons	14,000	NS	NS	NS	5,000
C11-C22 Aromatic Hydrocarbons	200	NS	NS	NS	200

Table 1-6
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)
Devens Consolidation Landfill (DCL) - Landfilling Waste From SAs and AOCs					
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
Methyl tert-butyl ether	70	NS	NS	NS	70
Benzene	5.0	NS	5.0	NS	5.0
Toluene	1,000	NS	1,000	NS	1,000
Ethylbenzene	700	NS	700	NS	700
Xylenes, total	10,000	NS	10,000	NS	10,000
Naphthalene	140	NS	NS	NS	140
EPH [5]					
C9-C18 Aliphatic Hydrocarbons	700	NS	NS	NS	700
C19-C36 Aliphatic Hydrocarbons	5,000	NS	NS	NS	5,000
C11-C22 Aromatic Hydrocarbons	200	NS	NS	NS	200
Target PAH Analytes					
2-Methylnaphthalene	10	NS	NS	NS	10
Acenaphthene	20	NS	NS	NS	20
Acenaphthylene	30	NS	NS	NS	30
Anthracene	60	NS	NS	NS	60
Benzo(a)anthracene	1.0	NS	NS	NS	1.0
Benzo(a)pyrene	0.20	NS	0.2	NS	0.2
Benzo(b)fluoranthene	1.0	NS	NS	NS	1.0
Benzo(g,h,i)perylene	50	NS	NS	NS	50
Benzo(k)fluoranthene	1.0	NS	NS	NS	1.0
Chrysene	2.0	NS	NS	NS	2.0
Dibenzo(a,h)anthracene	0.50	NS	NS	NS	0.50
Fluoranthene	90	NS	NS	NS	90
Fluorene	30	NS	NS	NS	30
Indeno(1,2,3-cd)pyrene	0.50	NS	NS	NS	0.50
Naphthalene	140	NS	NS	NS	140
Phenanthrene	40	NS	NS	NS	40
Pyrene	60	NS	NS	NS	60
Pesticides					
Hexachlorobenzene	1.0	NS	1.0	NS	1.0
4,4'-DDD	0.20	NS	NS	NS	0.20
4,4'-DDE	0.05	NS	NS	NS	0.05
4,4'-DDT	0.30	NS	NS	NS	0.3
Aldrin	0.50	NS	NS	NS	0.5
alpha-BHC	500	NS	NS	NS	500
beta-BHC	2.0	NS	NS	NS	2.0
delta-BHC	100	NS	NS	NS	100
Dieldrin	0.10	NS	NS	NS	0.10
Endosulfan	10	NS	NS	NS	10
Endrin	2.0	NS	2.0	NS	2.0
Gamma-BHC (Lindane)	0.20	NS	0.20	NS	0.20
Heptachlor	0.40	NS	0.40	NS	0.40

Table 1-6
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)
Heptachlor epoxide	0.20	NS	0.20	NS	0.20
Methoxychlor	40	NS	40	NS	40
Total Chlordane	2.0	NS	2.0	NS	2.0
Toxaphene	100	NS	3.0	NS	100
Metals					
Arsenic	10	NS	10	NS	10
Barium	2,000	NS	2,000	NS	2,000
Cadmium	5.0	NS	5.0	NS	5.0
Chromium	100	NS	100	NS	100
Copper	NS	NS	1,300	NS	1,300
Iron	NS	NS	NS	NS	NS
Lead	15	NS	15	NS	15
Manganese	NS	NS	NS	NS	NS
Silver	100	NS	NS	NS	100
Selenium	50	NS	50	NS	50
Mercury	2.0	NS	2.0	NS	2.0
Wet Chemistry					
Solids, Total Dissolved	NS	NS	NS	NS	500,000
Anions					
Chloride	NS	NS	NS	NS	250,000
Sulfate	NS	NS	NS	NS	250,000
Nitrate/Nitrite					
Nitrate/Nitrite (as N)	NS	NS	10,000	NS	10,000
Alkalinity, Total					
As CaCO3	NS	NS	NS	NS	NS
Cyanide					
Cyanide, total	200	NS	200	NS	200
COD					
Chemical Oxygen Demand	NS	NS	NS	NS	NS

Notes:

[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]EPH and VPH concentrations are evaluated against MCP standards for comparison purposes, but the standards are not considered cleanup goals under the ROD.

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

NS = No standard.

MCL = Maximum Contaminant Level.

Table 1-7
DCL Leachate Discharge Permit No.17 Limits
Main Post, Former Fort Devens Army Installation, Massachusetts

Analytical Fraction	Parameter	Discharge Limitation (mg/L)*
Metals Composite	Arsenic	0.20
	Chromium (total)	0.40
	Cadmium	0.045
	Copper	0.75
	Lead	0.20
	Nickel	0.60
	Silver	0.30
	Zinc	0.70
	Mercury	0.001
TSS	Total Suspended Solids	400
TTO	Total Toxic Organics	5.0
pH	pH (units)	5.5 - 9.5
Cyanide	Cyanide (Total)	NL
TPH	Total Petroleum Hydrocarbons	NL
Heptachlor-Pesticide		NL
Phenolics		NL

Notes:
* = Discharge Limit from Industrial Wastewater Permit No. 17
mg/L = milligrams per liter
NL = No limit; for monitoring purposes only
TTO = Total Organics (Sum of VOC's, SVOC's, Pesticides and PCB's)
VOCs = Volatile Organic Compounds
SVOCs = Semi Volatile Organic Compounds
PCBs = Polychlorinated Biphenyls

Table 2-1
AOC 57 Area 3 Groundwater Analytical Results, May 2018
Main Post, Former Fort Devens Army Installation, Massachusetts

	Units	Cleanup Goal[1]	Background[2]	57M-95-03X	Q	57M-96-11X	Q	DUP-1 57M-96-11X	Q
				5/8/2018		5/8/2018		5/8/2018	
Dissolved Metals									
Arsenic, Dissolved	µg/L	10	10.5	**42**		**180**		**200**	
Iron, Dissolved	µg/L	NS	9,100	**8,400**		***37,000***		***36,000***	
Manganese, Dissolved	µg/L	NS	291	**110**		***2,700***		***2,500***	
Field Parameters									
Temperature	°C	NS	NS	**11.06**		**10.33**		--	
ORP	mV	NS	NS	**58.7**		**39.7**		--	
pH	Std Units	NS	NS	**5.31**		**5.18**		--	
Specific Conductance	µS/cm	NS	NS	**154**		**571**		--	
Dissolved Oxygen	mg/L	NS	NS	**1.94**		**0.59**		--	
Turbidity	NTU	NS	NS	**3.27**		**85.6**		--	

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)
-- Not recorded for duplicate sample

Table 2-2
AOC 57 Area 3 Surface Water Analytical Results, May 2018
Main Post, Former Fort Devens Army Installation, Massachusetts

	Units	Surface Water Benchmark[1]	57M-SW-1	Q	57M-SWDUP	Q
			5/8/2018		5/8/2018	
Total Metals						
Arsenic, Total	µg/L	150	**5.2**		**4.9**	
Iron, Total	µg/L	1,000	***4,000***		***4,700***	
Manganese, Total	µg/L	NS	**800**		**910**	
Field Parameters						
ORP	mV	NS	--		--	
pH	Std Units	NS	--		--	
Specific Conductance	µS/cm	NS	--		--	
Dissolved Oxygen	mg/L	NS	--		--	
Temperature	°C	NS	--		--	
Turbidity	NTU	NS	--		--	

Notes:

0.333	= Detection
0.333	= Above background or monitoring criteria

µg/L = microgram per liter
mg/L = milligram per liter
NS = No Standard
Q = Qualifier
J = Estimated result
U = Non-detect
-- Not recorded for surface water

[1] USEPA Aquatic Life Water Quality Criterion for Surface Water benchmarks for iron and arsenic (USEPA, 2018).

Table 2-3
AOC 57 Area 3 Exceedances Over Time, 2003 to 2018
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
Groundwater																				
Arsenic (Total) - 10 µg/L Cleanup Goal																				
57M-95-03X	**36**	**44**	**230**	**25**	**13.6**	**7.0**	**49.0**	**4.8**	**51.0**	**23.0**	**21.0**	**23.0**	**58.0**	**36.0**	**60.0**	**60.0**	**37.5**	**31.0**	**27**	**42**
57M-96-11X	**270**	**240**	**120**	**161**	**215**	**163**	**171**	**166**	**193**	**160**	**163**	**148**	**190**	**192**	**181**	**160**	**284**	**290**	**180**	**180**
1,4-Dichlorobenzene - 5 µg/L Cleanup Goal																				
57M-95-03X	**1.4**	**2.2**	**13**	**0.5**	**0.8**	**1.4**	**4.5**	**1.4**	**13**	**0.9**	**2.4 J**	**1.4 J**	**5.1**	**2.4 J**	**3.13**	**3.27**	NA	NA	NA	NA
57M-96-11X	**3.4**	**3.8**	**2.4**	**3.3**	**1.4**	**3.7**	**2.4**	**4.4**	**1.6**	**5.1**	**7.5**	**2.1 J**	**2.3 J**	**0.92 J**	**1.05 J**	**1.22**	NA	NA	NA	NA
Surface Water																				
Arsenic - 150 µg/L Water Quality Criteria																				
57-AREA 3-SW-1	**35**	**3.1 J**	**4.9J**	ND	**5.2**	**34 J**	**6**	**2.7 J**	**9**	**11**	ND	ND	**18**	**8.0**	**8.0**	ND	**9.9**	**23**	**31**	**5.2**
Iron - 1,000 µg/L Water Quality Criteria																				
57-AREA 3-SW-1	NA	NA	NA	NA	NA	**600**	***4,500***	520	***7,100***	***6,800***	***2,500***	240	***20,000***	***8,300***	***10,000***	***10,000***	***4,140***	***19,000***	***21,000***	***4,000***
Lead - 2.5 µg/L Water Quality Criteria																				
57-AREA 3-SW-1	***34***	ND	**0.81**	***3.4***	ND	**2.3**	ND	**1.8**	***14***	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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
NS = No Standard
µg/L = microgram per liter

Table 3-1
AOC 69W Groundwater Analytical Results, October 2018
Main Post, Former Fort Devens Army Installation, Massachusetts

	Units	Cleanup Goal[1]	Monitoring Criteria[2]	69W-94-13	Q	69W-94-14	Q	ZWM-95-15X	Q	ZWM-95-18X	Q	ZWM-99-22X	Q	69W-DUP1 ZWM-99-22X	Q	ZWM-99-23X	Q	ZWM-99-24X	Q	ZWM-01-25X	Q	69WP-08-01	Q	69WP-13-01	Q
				10/8/2018		10/9/2018		10/9/2018		10/9/2018		10/8/2018		10/8/2018		10/9/2018		10/8/2018		10/9/2018		10/9/2018		10/9/2018	
Metals (SW6010B)																									
Arsenic (dissolved)	µg/L	10	NS	**35**		3.8	U	**18**		3.0	U	**150**		**140**		**39**		**3.4**		**2.0**	J	3.0	U	NA	
Iron (dissolved)	µg/L	NS	9,100	**4,500**		910	U	**1,800**		50	U	***19,000***		***19,000***		**4,700**		**700**		**130**		**6,000**		NA	
Manganese (dissolved)	µg/L	NS	291	***1,600***		***320***		***340***		**81**		***1,500***		***1,300***		***1,600***		**68**		***1,400***		**35**		**33**	
EPH[3] (MADEP)																									
C_9-C_{18} Aliphatics	µg/L	NS	700	71	U	71	U	71	U	71	U	71	U	71	U	71	U	71	UJ	71	U	NA		NA	
C_{19}-C_{36} Aliphatics	µg/L	NS	14,000	71	U	71	U	71	U	71	U	71	U	71	U	71	U	71	UJ	71	U	NA		NA	
C_{11}-C_{22} Aromatics	µg/L	NS	200	**98**		71	U	71	U	71	U	***230***		***220***		**130**		**89**	**J**	71	U	NA		NA	
Field Parameters																									
Temperature	°Celsius	NS	NS	17.3		17.3		15.7		15.4		19.2		--		17.5		15.9		17.2		16.3		13.9	
pH	Std units	NS	NS	6.61		5.73		5.52		5.80		6.64		--		6.22		5.59		5.88		6.22		6.30	
Specific Conductance	µS/cm	NS	NS	2,050		1,160		491		1,000		2,090		--		1,090		245		1,410		1,350		1,030	
ORP/Eh	mV	NS	NS	0.700		100		114		163		-48.1		--		29.5		70.2		90.6		1.00		18.1	
Dissolved Oxygen	mg/L	NS	NS	9.10		0.360		7.90		29.8		0.260		--		0.320		0.780		0.460		7.00		27.8	
Turbidity	NTU	NS	NS	3.54		4.61		5.31		3.28		8.38				6.27		2.19		3.20		69.3		16.1	

Notes:

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

J = Estimated result
NA = Not analyzed
NS = No Standard
Q = Qualifier
U = Non-detect
UJ = Estimated non-detect because of QC outliers.
µg/L = microgram per liter
Water quality parameters were meant to be collected from wells ZWM-95-17X and ZWM-01-26X but were mistakenly omitted during the Fall 2017 LTM event.
[1] Cleanup Goal for arsenic is the MCL standard.
[2] Monitoring criteria for iron and manganese are background levels from the RI (Final Remediation Investigation Report, Area of Contamination (AOC) 57, Devens, Massachusetts, HLA, 2000b).
[3] EPH MADEP concentrations are evaluated against Massachusetts Contingency Plan standards for comparison purposes

Table 3-2
AOC 69W Exceedances Over Time, 2000 to 2018
Main Post, Former Fort Devens Army Installation, Massachusetts

Sample Location	Spring 2000	Fall 2000	Spring 2001	Fall 2001	Spring 2002	Fall 2002	Spring 2003	Fall 2003	Spring 2004	Fall 2004	Spring 2005	Fall 2005	Spring 2006	Fall 2007	Fall 2008	Fall 2009	Fall 2010	Fall 2011	Fall 2012	Fall 2013	Fall 2014	Fall 2015	Fall 2016	Fall 2017	Fall 2018
Arsenic, dissolved - 10 µg/l Cleanup Goal																									
69W-94-13	**54**	**110**	**85**	**150**	**52**	**130**	**35**	**69**	**27**	**88**	**56**	**60**	**69**	**142**	**73**	**86**	**127**	**120**	**115**	**73**	**101**	**120**	**76**	**24**	**35**
ZWM-95-15X	ND	**7.9**	ND	**22**	**36**	**40**	ND	**16**	**7.7**	**30**	ND	ND	ND	**16**	ND	ND	**13**	**41**	**23**	**17**	**30.2**	**19.3**	**3.7**	**10**	**18**
ZWM-99-22X	**150**	**130**	**230**	**140**	**86**	**140**	**150**	**160**	**140**	**140**	**120**	**120**	**159**	**244**	**223**	**408**	**343**	**367**	**299**	**233 J**	**172**	**125**	**150**	**190**	**150**
ZWM-99-23X	**23**	**70**	**67**	**55**	**15**	ND	**27**	ND	**44**	**61**	**46**	**47**	**56**	**56**	**52**	**62**	**15**	**60**	**29**	**27**	**19.5**	**13.9**	**7.7**	**17**	**39**
ZWM-01-25X	NA	NA	NA	**4.1 J**	ND	ND	**2.3 J**	ND	ND	**3.4 J**	ND	ND	**3 J**	**5**	**2.3 J**	**2 J**	ND	**13**	**19**	**5**	ND	ND	ND	**4.5**	NA
Manganese, dissolved - 291 µg/l Monitoring Criteria																									
69WP-08-01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**174**	**89**	**78**	***2,190***	***904***	**237**	**64.5**	**78.4**	**79**	**33**	**35**
69W-94-13	***2,300***	***1,700***	***1,500***	***1,600***	***2,100***	***2,400***	***2,800***	***4,100***	***2,500***	***1,300***	***3,000***	***1,600***	***2,600***	***1,120***	***1,940***	***2,110***	***1,360***	***1,840***	***1,400***	***1,730***	***1,940***	***2,050***	***2,600***	***320***	***1,600***
ZWM-95-15X	**28**	***1,300***	**25**	**100**	***1,500***	***2,200***	***1,600***	***970***	***4,600***	***980***	***850***	**130**	***860***	***1,230***	***438***	***502***	***1,120***	***1,010***	***1,580***	***1,280***	***900***	***843***	**17**	**220**	***340***
ZWM-99-22X	***2,000***	***1,800***	***2,300***	***2,400***	***2,000***	***1,500***	***2,700***	***2,300***	***3,100***	***1,900***	***3,400***	***3,200***	***3,700***	***3,120***	***3,790***	***2,660***	***1,750***	***2,160***	***1,120***	***998***	***1,280***	***1,440***	***960***	***1,200***	***1,500***
ZWM-99-23X	***4,200***	***3,600***	***5,800***	***1,500***	***550***	***1,700***	***5,300***	***4,300***	***2,500***	***2,300***	***5,200***	***2,500***	***2,700***	***1,320***	***2,500***	***3,080***	***523***	***1,720***	***500***	***556***	***533***	***749***	***590***	***1,800***	***1,600***
ZWM-01-25X	NA	NA	NA	**280**	**61**	***1,000***	**89**	**230**	**140**	***300***	**140**	***490***	***1,400***	***3,210***	***1,320***	***5,830***	***1,490***	***2,820***	***2,540***	***1,570***	***435***	***859***	**78**	***590***	NA
EPH C_{11}-C_{22} Aromatics - 200 µg/l Monitoring Criteria																									
69W-94-13	***690***	***1,400***	***720***	***790***	***1,900***	***290***	ND	**160**	ND	**110**	ND	ND	***209***	***311***	**152**	***225***	***339***	***242***	***379***	***227***	***252***	**175**	***410***	ND	**98**
ZWM-95-15X	ND	ND	ND	ND	**1,400**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	ND	ND	ND	ND	ND	**100**	ND	ND
ZWM-99-22X	***2,500***	***1,400***	***2,100***	***370***	***620***	***210***	***380***	***330***	***270***	***400***	***320***	***280***	***627***	**166**	***356***	***276***	***209***	***327***	***308***	***286***	***332***	***354***	***210***	**170**	***230***
ZWM-99-23X	**170**	***520***	***200***	**140**	**140**	ND	ND	ND	ND	ND	ND	ND	**174**	**107**	**80**	ND	ND	ND	ND	ND	ND	ND	**110**	ND	**130**
VPH C_9-C_{10} Aromatics - 200 µg/l Monitoring Criteria																									
69W-94-13	**120**	***270***	**160**	***320***	**150**	***200***	**62**	**140**	**130**	***230***	**110**	**140**	**84**	**144**	**81**	**105**	**142**	**66.7**	**63 J**	**87.6**	NA	NA	NA	NA	NA
ZWM-99-22X	***620***	**150**	***550***	**83**	**88**	**150**	***840***	***450***	***650***	***600***	***460***	***460***	***330***	**113**	***217***	**120**	**76.4**	**114**	**55.5 J**	**119**	NA	NA	NA	NA	NA
ZWM-99-23X	**46**	**62**	**40**	**34**	ND	ND	**53**	**59**	ND	ND	**100**	ND	ND	ND	**28**	**35.2**	ND	ND	ND	ND	NA	NA	NA	NA	NA

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 4-1
AOC 43G Groundwater Analytical Results - October 2018
Main Post, Former Fort Devens Army Installation, Massachusetts

	Units	Cleanup Goal[1]	Monitoring Criteria[2]	XGM-94-04X	Q	AAFES-2		AAFES-7	Q	XGM-93-02X	Q	XGM-97-12X	Q	XGM-DUP1 XGM-97-12X	Q
				10/10/2018		10/10/2018		10/10/2018		10/10/2018		10/10/2018		10/10/2018	
Total Metals (Select List)															
Arsenic, Total	µg/L	NS	10	**1.6**	**J**	**20**		3.0	U	**11**		**9.8**		**11**	
Iron, Total	µg/L	9,100	9,100	**140**		**19,000**		NS		**20,000**		**27,000**		**28,000**	
Manganese, Total	µg/L	375	291	**230**		**3,100**		**16**		**1,900**		**3,800**		**3,900**	
MassDEP Volatile Petroleum Hydrocarbons (VPH)															
C_5-C_8 Aliphatics[3]	µg/L	NS	300	75	U	***480***		NS		**84**	**J**	***360***		***350***	
C_9-C_{10} Aromatics[3]	µg/L	NS	200	75	U	***990***		NS		**75**	**J**	***1,000***		***1,000***	
C_9-C_{12} Aliphatics[3]	µg/L	NS	700	75	U	**330**		NS		75	U	**420**	**J**	**410**	**J**
								NS							
Methyl tert-butyl ether	µg/L	NS	NS	3.8	U	3.8		NS		**4.7**	**J**	3.8	U	3.8	U
Benzene	µg/L	5.0	NS	2.0	U	2.0		NS		**0.60**	**J**	**4.0**		**4.0**	
Ethylbenzene	µg/L	700	NS	**0.87**	**J**	**23**		NS		3.8	U	**230**		**220**	
Naphthalene	µg/L	NS	NS	3.8	U	**20**		NS		3.8	U	**88**		**88**	
m,p -Xylene	µg/L	10,000	NS	7.5	U	**5.4**		NS		7.5	U	**180**		**170**	
o -Xylene	µg/L	10,000	NS	3.8	U	**4.7**		NS		3.8	U	**93**		**90**	
Toluene	µg/L	1,000	NS	3.8	U	3.8		NS		**0.46**	**J**	**5.1**		**4.9**	**J**
General Chemistry															
Alkalinity, Total	mg/L	NS	NS	**170**		**130**		NS		**160**		**220**		**220**	
Field Parameters															
Temperature	°Celsius	NS	NS	16.3		16.3		15.7		16.1		17.2		NA	
pH	Std units	NS	NS	6.46		6.57		6.12		6.64		6.64		NA	
Specific Conductance	µS/cm	NS	NS	2,319		2,110		1,730		2,620		2,270		NA	
ORP	mV	NS	NS	180		-63.8		193		63.1		-79.1		NA	
Dissolved Oxygen	mg/L	NS	NS	0.44		0.45		0.57		2.39		3.06		NA	
Turbidity	NTU	NS	NS	8.05		23.6		5.18		34.1		7.11		NA	

Notes:

0.333	= Detection	µg/L = microgram per liter	J = Estimated result
0.333	= Above background or monitoring criteria	mg/L = milligram per liter	U = Non-detect
0.333	= Above cleanup goal	NS = No Standard	NA = Not analyzed
		Q = Qualifier	

[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). Benzene, ethylbenzene, xylenes, and toluene are not contaminants of concern but the cleanup goals are the Maximum Contaminant Levels (MCLs).

[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). The monitoring criterion for arsenic is the MCL.

[3]The VPH carbon ranges are not contaminants of concern and are evaluated against Massachusetts Contingency Plan GW-1 standards for comparison purposes.

Table 4-2
AOC 43G Exceedances Over Time, 1999 to 2018
Main Post, Former Fort Devens Army Installation, Massachusetts

Sample Location	Fall 1999	Fall 2000	Fall 2001	Fall 2002	Fall 2003	Fall 2004	Fall 2005	Fall 2006	Fall 2007	Fall 2008	Fall 2009	Fall 2010	Fall 2011	Fall 2012	Fall 2013	Fall 2014	Fall 2015	Fall 2016	Fall 2017	Fall 2018
Benzene- 5 µg/L Cleanup Goal																				
AAFES-2	**62**	**36**	**43**	**26**	**9.0**	**6.6**	**6.1**	**1.3**	ND	ND	**3.93 J**	ND	ND	**6.60 J**	**5.04**	**3.7**	**4.2**	ND	ND	ND
XGM-93-02X	**81**	**32**	**12**	**140**	**24**	**39**	**29**	**18.5**	**8.8**	**2.6**	**0.997 J**	ND	ND	ND	ND	**0.77 J**	ND	ND	**0.38 J**	**0.60 J**
XGM-97-12X	**270**	**550**	**700**	**780**	**290**	**260**	**35.6**	**129**	**22.8**	**13.7 J**	**27.4 J**	ND	**13.8**	**3.03 J**	**3.87**	**1.5**	**3.8**	ND	ND	**4.0**
Toluene- 1,000 µg/L Cleanup Goal																				
XGM-97-12X	**390**	**1,100**	**870**	**1,000**	**610**	**460**	**53.4**	**239**	**15.9**	**11.4 J**	**5.3 J**	ND	ND	ND	**2.54**	ND	**7.4**	ND	ND	**5.1**
Iron, total - 9,100 µg/L Cleanup Goal																				
AAFES-2	**24,000**	**20,000**	**27,000**	**26,000**	**14,000**	**20,000**	**21,900**	**12,000**	**20,000**	**18,000**	**16,000**	**14,000**	**22,000**	**18,000**	**19,000**	**19,400**	**14,400**	**11,000**	**10,000**	**19,000**
AAFES-6/6R	**11,000**	**9,200**	**13,000**	**9,400**	NS	NS	NS	**11,000**	**11,000**	**6,500**	**4,300**	**3,300**	**1,100**	**6,900**	**9,200**	**8,240**	NA	NA	NA	NS
XGM-93-02X	**30,000**	**18,000**	**11,000**	**24,000**	**15,000**	**28,000**	**11,500**	**13,000**	**5,800**	**11,000**	**8,500**	**11,000**	**12,000**	**6,000**	**10,000**	**9,580**	**13,200**	**6,000**	**6,500**	**20,000**
XGM-94-07X	**3,500**	**2,900**	**5,800**	**2,300**	**1,000**	**300**	**1,610**	**1,400**	**4,500**	**9,300**	**8,800**	**12,000**	**13,000**	**23,000**	**10,000**	**6,820**	NS	NS	NS	NS
XGM-94-08X	**4,800**	**13,000**	**4,500**	**4,600**	**3,200**	**2,500**	**4,520**	**6,100**	**4,600**	**2,200**	**1,300**	**1,000**	**750**	**2,300**	**910**	**147**	NS	NS	NS	NS
XGM-97-12X	**32,000**	**26,000**	**33,000**	**46,000**	**33,000**	**32,000**	**20,100**	**18,000**	**22,000**	**25,000**	**25,000**	**16,000**	**27,000**	**20,000**	**24,000**	**25,800**	**34,300**	**25,000**	**18,000**	**27,000**
Manganese, total - 375 µg/L Cleanup Goal																				
AAFES-2	**4,600**	**3,900**	**4,800**	**3,700**	**3,100**	**4,000**	**3,590**	**2,700**	**3,790**	**3,600**	**3,320**	**2,490**	**3,700**	**3,100**	**3,270**	**3,460**	**2,740**	**2,800**	**2,800**	**3,100**
AAFES-5	**710**	**180***	**190**	**27**	**21**	**89**	**118**	**50**	**34**	ND	ND	**244**	**36**	**206**	**127**	**32.5**	NS	NS	NS	NS
AAFES-6/6R	**2,900**	**9,200**	**3,400**	**3,000**	NS	NS	NS	**2,900**	**3,090**	**3,630**	**907**	**1,670**	**1,830**	**3,220**	**2,820**	**3,000**	NS	NS	NS	NS
AAFES-7	NS	NS	NS	NS	NS	NS	NS	NS	NS	**106**/ND	**81**	**79**	**5 J**	**706**	**2,390**	**1,640**	**139**	**510**	***330***	NS
XGM-93-02X	**3,900**	**2,500**	**1,900**	**2,500**	**1,900**	**2,600**	**1,450**	**2,000**	**1,800**	**1,420**	**1,630**	**737**	**3,020**	**612**	**1,180**	**1,570**	**2,020**	**1,400**	**1,400**	**1,900**
XGM-94-04X	**2,900**	**2,200**	**3,400**	**2,000**	**1,400**	**1,400**	**1,580**	**1,100**	**559**	**68**	**2,730**	**6,490**	**2,140**	**2,580**	**2,730**	**1,510**	**1,090**	**1,500**	**1,700 J**	**230**
XGM-94-07X	**5,700**	**3,700**	**6,100**	**4,500**	**3,600**	**1,000**	**6,120**	**5,100**	**4,120**	**5,100**	**4,990**	**3,870**	**6,060**	**5,560**	**5,380**	**6,940**	NS	NS	NS	NS
XGM-94-08X	**4,500**	**4,600**	**4,900**	**3,600**	**3,600**	**3,800**	**7,260**	**4,200**	**3,380**	**3,100**	**2,150**	**2,070**	**2,780**	**4,620**	**2,300**	**3,210**	NS	NS	NS	NS
XGM-97-12X	**6,300**	**4,100**	**4,200**	**3,900**	**4,100**	**3,000**	**437**	**1,800**	**2,070**	**3,060**	**2,390**	**2,110**	**3,540**	**1,640**	**1,680**	**2,080**	**3,460**	**1,700**	**1,200**	**3,800**
C_5-C_8 Aliphatics - 300 µg/L VPH Standards																				
AAFES-2	ND	***1,400***	ND	***1,200***	***1,200***	ND	***2,070***	***1,430***	***1,400***	ND	ND	***859***	***1,270***	***1,560 J***	***1,390***	***1,250***	***728***	***850***	***890***	***480 J***
AAFES-6/6R	***370***	***420***	**290**	ND	NA	NA	NA	***305***	ND	ND	ND	**114**	ND	**215**	**287**	**188**	NS	NS	NS	NS
XGM-93-02X	ND	***570***	**270**	***790***	***410***	ND	***788***	***519***	ND	ND	ND	**124**	ND	ND	**65**	**268**	**101**	**94**	**79 J**	**84 J**
XGM-94-04X	ND	***420***	**140**	ND	ND	ND	ND	ND	ND	ND	ND	***533***	***765***	***497 J***	***1,140***	**186**	**65**	***480***	***360***	ND
XGM-94-07X	ND	ND B	ND	ND	ND	ND	ND	**113**	ND	ND	ND	**159**	ND	**66**	**120**	**58.8**	NS	NS	NS	NS
XGM-94-08X	**120**	**150 B**	**100**	**140**	**120**	ND	ND	**125**	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	NS	NS
XGM-97-12X	***970***	***1,300***	***1,100***	***1,100***	***1,100***	ND	***2,370***	***1,740***	***1,230***	ND	***4,050***	***644***	***367***	***507 J***	***494***	**272**	***515***	***420***	***350***	***360***
C_9-C_{12} Aliphatics - 700 µg/L VPH Standards																				
AAFES-2	ND	**81**	ND	**200**	ND	**57**	***5,220***	***987***	***1,000***	***1,020***	***950***	***768***	***1,080***	**542 J**	***1,650***	**688**	**85.7**	**430**	**530 J**	**330 J**
XGM-93-02X	ND	**39**	ND	**58**	**33**	**34**	***1,570***	**268**	**94**	**182**	**55.5**	ND	**85.1**	ND	**100**	**76.6**	**ND**	**56**	**78 J**	ND
XGM-94-07X	`	ND	ND	ND	ND	ND	ND	ND	ND	ND	**89.1**	**54.5**	**90.5**	ND	**66.8**	ND	NS	NS	NS	NS
XGM-94-08X	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**6.19 J**	ND	ND	ND	ND	ND	NS	NS	NS	NS
XGM-97-12X	**96**	ND	ND	**130**	ND	**90**	***7,310***	***1,340***	***1,080***	***2,210***	***1,450***	***922***	**535**	**275 J**	***724***	**162**	***718***	**230**	**170 J**	**420 J**
C_9-C_{10} Aromatics - 200 µg/L VPH Standards																				
AAFES-2	***9,400***	***7,200***	***5,300***	***13,000***	***6,600***	***6,700***	***3,130***	***3,710***	***2,420***	***2,120***	***2,660***	***1,870***	***1,050***	***1,090***	***1,940***	***1,090***	***827***	***730***	***1,100 J***	***990***
XGM-93-02X	***510***	***2,300***	***1,100***	***3,600***	***1,600***	***3,700***	***918***	***766***	***228***	***325***	**110**	**73.4**	ND	ND	ND	**113**	**62.3**	ND	ND	**75 J**
XGM-94-04X	***200***	***570***	**170**	**28**	ND	ND	ND	ND	ND	ND	ND	***243***	***469***	***300 J***	***769***	**76.8**	ND	***320***	***410 J***	ND
XGM-94-07X	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**45.1 J**	**76.4**	**77.8**	ND	ND	ND	ND	NS	NS	NS	NS
XGM-94-08X	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	NS	NS
XGM-97-12X	***4,500***	***5,500***	***5,400***	***7,500***	***8,700***	***7,400***	***3,810***	***4,010***	***4,220***	***5,260***	***4,110***	***2,470 J***	***463***	***367 J***	***840***	***253***	***1,560***	***340***	***430 J***	***1,000***

Notes:

0.333	= Detection	µg/L = microgram per liter	NA = Not analyzed
0.333	= Above background or monitoring criteria	J = Estimated result	ND = Non-detect
0.333	= Above cleanup goal	B = Blank Qualified	NS = not sampled

`

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).
The VPH carbon ranges are not contaminants of concern and are evaluated against MCP GW-1 standards for comparison purposes. Benzene, ethylbenzene, xylenes, and toluene are not contaminants of concern but the cleanup goals are the Maximum Contaminant Levels.

Table 5-1
AOCs 32/43A Groundwater Analytical Results, April 2018
Main Post, Former Fort Devens Army Installation, Massachusetts

	Units	Cleanup Goal [1]	Monitoring Criteria	32M-01-13XBR		32M-01-14XOB		32M-01-17XBR		32M-01-18XBR		32M-DUP01 32M-01-18XBR	
				4/10/2018	Q	4/10/2018	Q	4/9/2018	Q	4/9/2018	Q	4/9/2018	Q
Total Metals (SW6020A)													
Arsenic, Total	µg/L	10	NS	3.0	U	**32**		3.0	U	**6.5**		**6.1**	
Total Metals (SW6010B)													
Manganese, Total	µg/L	3,500	NS	**110**		**2,700**		**1.1**	J	**8,400**		**7,900**	
VOCs (SW8260B)													
1,1,1-Trichloroethane	µg/L	NS	5.0	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,1,2-Trichloroethane	µg/L	NS	5.0	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,2-Dichlorobenzene	µg/L	600	NS	1.0	U	1.0	U	1.0	U	**840**		**850**	
1,3-Dichlorobenzene	µg/L	100	NS	1.0	U	1.0	U	1.0	U	**150**		**140**	
1,4-Dichlorobenzene	µg/L	5.0	NS	1.0	U	1.0	U	1.0	U	**97**		**89**	
cis -1,2-Dichloroethene	µg/L	55	NS	1.0	U	1.0	U	1.0	U	**1.0**		**0.94**	**J**
trans -1,2-Dichloroethene	µg/L	100	NS	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Benzene	µg/L	NS	5.0	1.0	U	1.0	U	1.0	U	**0.79**	**J**	**0.69**	**J**
Chlorobenzene	µg/L	NS	100	0.50	U	0.50	U	0.50	U	***440***		***450***	
Ethylbenzene	µg/L	NS	700	0.50	U	0.50	U	0.50	U	**0.47**	**J**	**0.42**	**J**
Tetrachloroethene	µg/L	5.0	NS	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Toluene	µg/L	1,000	NS	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Trichlorethene	µg/L	5.0	NS	1.0	U	1.0	U	1.0	U	**0.92**	**J**	**0.82**	**J**
Vinyl Chloride	µg/L	NS	2.0	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
VPH (MADEP)[2]													
C_5-C_8 Aliphatics	µg/L	NS	300	100	U	100	U	100	U	100	U	100	U
C_9-C_{10} Aromatics	µg/L	NS	200	100	U	100	U	100	U	***760***		***790***	
C_9-C_{12} Aliphatics	µg/L	NS	700	100	U	100	U	100	U	**370**	**J**	**400**	
Benzene	µg/L	NS	5.0	3.0	U	3.0	U	3.0	U	**0.81**	**J**	**0.78**	**J**
Ethylbenzene	µg/L	NS	700	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Toluene	µg/L	NS	1,000	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
m,p -Xylene[3]	µg/L	NS	NS	10	U	10	U	10	U	10	U	10	U
o -Xylene[3]	µg/L	NS	NS	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U

Table 5-1
AOCs 32/43A Groundwater Analytical Results, April 2018
Main Post, Former Fort Devens Army Installation, Massachusetts

	Units	Cleanup Goal [1]	Monitoring Criteria	32M-01-13XBR		32M-01-14XOB		32M-01-17XBR		32M-01-18XBR		32M-DUP01 32M-01-18XBR	
				4/10/2018	Q	4/10/2018	Q	4/9/2018	Q	4/9/2018	Q	4/9/2018	Q
Field Parameters													
Temperature	°Celsius	NS	NS	**9.42**		**10.10**		**11.49**		**10.67**		**10.67**	
pH	pH	NS	NS	**6.52**		**6.09**		**7.01**		**6.51**		**6.51**	
Specific Conductance	us/cm	NS	NS	**1,568**		**545**		**1,081**		**1,333**		**1,333**	
ORP	mV	NS	NS	**112.9**		**77.1**		**129.4**		**128.1**		**128.1**	
Dissolved Oxygen	mg/L	NS	NS	**5.10**		**1.24**		**1.36**		**4.63**		**4.63**	
Turbidity	NTU	NS	NS	**4.88**		**1.29**		**1.91**		**4.22**		**4.22**	

Notes:

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

J = Estimated result
NS = No Standard
Q = Qualifier
U = Non-detect
µg/L = microgram per liter

[1] The cleanup goal for arsenic and select VOCs is the MCL; the cleanup goal for manganese is the background level.
[2] VPH carbon range concentrations are evaluated against MassDEP standards for comparison purposes.
[3] The monitoring criteria for total xylenes is 10,000 µg/L.

Table 5-2
AOCs 32/43A Exceedances Over Time, 2006 to 2018
Main Post, Former Fort Devens Army Installation, Massachusetts

Sample Location	Spring 2006	Fall 2006	Spring 2007	Fall 2007	Spring 2008	Fall 2008	Spring 2009	Fall 2009	Spring 2010	Fall 2010	Spring 2011	Fall 2011	Spring 2012	Fall 2012	Spring 2013	Fall 2013	Spring 2014	Spring 2015*	Spring 2016*	Spring 2017 (T/D)	Spring 2018
Arsenic (Total) - 10 µg/L Cleanup Goal																					
32M-01-18XBR (Source well)	**30**	**15**	**51**	**3.1 J**	**38**	**34**	**51**	**18**	**18**	**3.5 J**	**3.0 J**	**5.0**	**5.0**	**4.0 J**	**2.0 J**	**6.0**	**3.0 J**	**4.0**	**2.8 J**	**4.7/2.4 J**	**6.5**
32M-01-14XBR (Sentry well)	ND	ND	ND	ND	ND	NS	ND	NS	ND	NS	ND	NS	ND	NS	ND	NS	ND	NS	NS	NS	NS
32M-01-14XOB (Sentry well)	**59**	**49**	**45**	**69**	**50**	**70**	**66**	NS	**43**	NS	**62**	NS	**80**	NS	**58**	NS	**62 J**	**90**	**13**	**33/30**	**32**
32M-01-15XBR	ND	ND	ND	ND	ND	ND	**180**	NA	**9.0**	**2.9 J**	ND	**3.0 J**	**2.0 J**	ND	ND	**2.0 J**	ND	NS	NS	NS	NS
32M-01-17XBR	**2.8 J**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**3.1**	ND	**2.6J/ND**	ND
32Z-99-02X (Distant sentry well)	ND	ND	**2.1 J**	**3.2 J**	ND	NS	ND	NS	ND	NS	ND	NS	ND	NS	ND	NS	ND	NS	NS	NS	NS
SHL-15	**9.0**	**11**	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Manganese (Total) - 3,500 µg/L Cleanup Goal																					
32M-01-18XBR (Source well)	**18,000**	**16,000**	**18,200**	**10,200**	**14,800**	**18,900**	**29,400**	**6,970**	**2,360**	**4,510**	**2,300**	**1,150**	**4,100**	**1,540**	**270**	**137**	**1,990**	**1,720**	**1,100**	**2,300/2,700**	**8,400**
32M-01-14XOB (Sentry well)	**2,800**	**3,200**	**1,500**	**3,420**	**2,760**	**5,050**	**3,660**	NS	**2,460**	NS	**1,740**	NS	**1,950**	NS	**1,650**	NS	**2,550**	**3,390**	**1,800**	**2,900/2,900**	**2,700**
1,4-Dichlorobenzene - 5 µg/L Cleanup Goal																					
32M-01-18XBR (Source well)	**490**	**210 J**	**550**	**67**	**270**	**390**	**180**	**100**	**26**	**62**	**50**	**37**	**69**	**42**	**1.2 J**	**1.1 J**	**71**	**51**	**38**	**46**	**97**
32M-01-15XBR	ND	**5.5**	**0.78 J**	**5.1 J**	**7.9**	**5.7 J**	ND	ND	**0.55 J**	ND	ND	ND	ND	**0.33 J**	ND	ND	ND	NS	NS	NS	NS
32M-01-17XBR	**3.0**	**5.1**	**2.1 J**	**4.2**	**1.0 J**	**1.8 J**	**3.4**	**8.2 J**	**7.1 J**	**0.33 J**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene - 100 µg/L Cleanup Goal																					
32M-01-18XBR (Source well)	**900**	**480**	**1,200**	**110**	**850**	**1,600**	**540**	**200**	**88**	**210**	**78**	**49**	**280**	**82**	**0.88 J**	**0.97 J**	**131**	**88**	**81**	**170**	**440**
VPH C_9- C_{10} Aromatics - 200 µg/L Monitoring Criteria																					
32M-01-18XBR (Source well)	***5,850***	***4,120***	***6,050***	***952***	***3,230***	***3,660***	***1,890***	***837***	***300***	***541***	***444***	***272***	***728***	***322***	ND	ND	***730***	***360***	***450***	***410***	***760***

Notes:

0.333	= Detection	J = Estimated result	µg/L = microgram per liter
0.333	= Above monitoring criteria	NA = Not analyzed	
0.333	= Above cleanup goal	ND = non-detect	
		NS = not sampled	

* = Spring 2015 and 2016 metals results are for dissolved metals.

T/D = Total and dissolved metals results are reported for Spring 2017 results.

Table 5-3
AOCs 32/43A Summary of Cleanup Goal Exceedances, Well 32M-01-18XBR
Main Post, Former Fort Devens Army Installation, Massachusetts

	Units	Cleanup Goal [1]	Monitoring Criteria [2]	April 2002	October 2002	June 2003	December 2003	May 2004	October 2004	June 2005	October 2005	June 2006	October 2006	May 2007	October 2007	June 2008	October 2008	May 2009
Arsenic, Total	µg/L	10	NS	ND	ND	**3.5**	**8.8**	**10**	**6.2**	**24.4**	ND	**30**	**15**	**51**	**3.1**	**38**	**34**	**51**
Arsenic, Dissolved	µg/L	10	NS	ND	ND	**3.0**	NA	**10**	**6.3**	NA	NA	**33**	NA	NA	NA	NA	NA	NA
Manganese, Total	µg/L	3,500	NS	**7,730**	**9,260**	**14,100**	**11,000**	**17,400**	**13,400**	**16,700**	**11,600**	**18,000**	**16,000**	**18,200**	**10,200**	**14,800**	**18,900**	**29,400**
Manganese, Dissolved	µg/L	3,500	NS	**7,500**	**8,960**	**14,200**	**13,900**	**18,100**	**12,500**	NA	NA	**19,000**	NA	NA	NA	NA	NA	NA
1,2-Dichlorobenzene	µg/L	600	NS	**5,900**	**2,500**	**3,800**	**3,900**	**6,200**	**4,200**	**4,500**	**1,450**	**5,900**	**2,800**	**6,100**	**690**	**2,700**	**4,100**	**1,700**
1,3-Dichlorobenzene	µg/L	100	NS	**660**	**300**	**460**	**430**	**730**	**530**	**590**	**209**	**750**	**360**	**850**	**120**	**450**	**580**	**270**
1,4-Dichlorobenzene	µg/L	5.0	NS	**450**	**200**	**310**	**280**	**470**	**320**	**370**	**120**	**490**	**210**	**550**	**67**	**270**	**390**	**180**
Trichloroethene (TCE)	µg/L	5.0	NS	**19**	ND	ND	**3.4**	**5.2**	**3.4**	ND	**0.6**	ND	ND	**4.2**	ND	ND	ND	ND
Bromodichloromethane	µg/L	3.0	NS	NA	NA	NA	ND	ND	ND	ND	ND	**19**	ND	ND	ND	ND	ND	ND
VPH C_9-C_{12} Aliphatics	µg/L	NS	700	***5,000***	ND	**350**	**511**	***5,100***	***4,480***	**470**	**686**	ND	ND	**2.5**	ND	ND	ND	**132 J**
VPH C_9-C_{10} Aromatics	µg/L	NS	200	***9,100***	***2,900***	***1,700***	***2,600***	***11,000***	***4,400***	***260***	***1,150***	***5,850***	***4,120***	***6,050***	***952***	***3,230***	***3,660***	***1,890***
EPH C_9-C_{18} Alphatics	µg/L	NS	700	***920***	**240**	**620**	***940***	***2,300***	***1,100***	***1,400***	**228**	***1,340***	***785***	***854***	**158**	**430**	**455**	**470**
Field Paramters - ORP	mV	NS	NS	**120.4**	**216.3**	**111.9**	**45.1**	NA	**17.6**	**24.7**	**33.8**	**-2.0**	**14.9**	**-30.9**	**1.5**	**-40.1**	**60.9**	**437.7**
Field Paramters - Turbidity	NTU	NS	NS	NA	NA	NA	**0.91**	NA	**1.63**	**0.51**	**0.50**	**0.10**	**0.65**	**1.9**	**0.40**	**0**	**3**	**17.7**

Notes:

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

J = Estimated result

NA = Not analyzed

ND = Non-detect

NS = No Standard

µg/L = microgram per liter

[1] The cleanup goal for arsenic and the VOC compounds is the MCL.

[2] VPH/EPH concentrations are evaluated against MassDEP standards for comparison purposes.

Table 5-3
AOCs 32/43A Summary of Cleanup Goal Exceedances, Well 32M-01-18XBR
Main Post, Former Fort Devens Army Installation, Massachusetts

	Units	Cleanup Goal [1]	Monitoring Criteria [2]	October 2009	May 2010	October 2010	June 2011	October 2011	May 2012	October 2012	May 2013	October 2013	June 2014	June 2015	June 2016	June 2017	April 2018
Arsenic, Total	µg/L	10	NS	**18**	**18**	**3.5 J**	**3 J**	**5**	**5**	**4 J**	**2 J**	**6.0**	**3 J**	**25**	NA	**4.7**	**6.5**
Arsenic, Dissolved	µg/L	10	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**4.0**	**2.8**	**2.4**	NA
Manganese, Total	µg/L	3,500	NS	**6,970**	**2,360**	**4,510**	**2,300**	**1,150**	**4,100**	**1,540**	**27**	**137**	**1,990 J**	**2,140**	NA	**2,300**	**8,400**
Manganese, Dissolved	µg/L	3,500	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**1,720**	**1,100**	**2,700**	NA
1,2-Dichlorobenzene	µg/L	600	NS	**730**	**300**	**570**	**340**	**260**	**640 J**	**340**	**7.46 J**	**7.30**	**598**	**407**	**340**	**390**	**840**
1,3-Dichlorobenzene	µg/L	100	NS	**150**	**59**	**100**	**86**	**64**	**120 J**	**70**	**7.10 J**	**2.12 J**	**106**	**80**	**58**	**70**	**150**
1,4-Dichlorobenzene	µg/L	5.0	NS	**100**	**26**	**62**	**50**	**37**	**69**	**42**	**1.19 J**	**1.14 J**	**71**	**51**	**38**	**46**	**97**
Trichloroethene (TCE)	µg/L	5.0	NS	ND	ND	ND	ND	ND	**0.60**	ND	ND	ND	ND	ND	ND	ND	**0.92 J**
Bromodichloromethane	µg/L	3.0	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
VPH C_9-C_{12} Aliphatics	µg/L	NS	700	**250**	ND	ND	**104**	**108**	**486**	ND	ND	ND	ND	ND	**190**	ND	**370**
VPH C_9-C_{10} Aromatics	µg/L	NS	200	***837***	***300***	***541***	***444***	***272***	***728***	***322***	ND	ND	***730***	***360***	***450***	***410***	***760***
EPH C_9-C_{18} Alphatics	µg/L	NS	700	NA	ND	ND	ND	ND	**175**	ND	ND	ND	ND	112	NA	NA	NA
Field Paramters - ORP	mV	NS	NS	**120.7**	**-177.8**	**137.2**	**408.1**	**158.8**	**163.4**	**223.8**	**298.8**	**192**	**111.1**	**113.5**	**162.7**	**134.4**	**128.1**
Field Paramters - Turbidity	NTU	NS	NS	**2.4**	**244.0**	**3.07**	**2.68**	**3.53**	**2.22**	**1.26**	**1.36**	**3.5**	**1.21**	**2.0**	**12.9**	**11.9**	**4.22**

Notes:

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

J = Estimated result

NA = Not analyzed

ND = Non-detect

NS = No Standard

µg/L = microgram per liter

[1] The cleanup goal for arsenic and the VOC compounds is the MCL.

[2] VPH/EPH concentrations are evaluated against MassDEP standards for comparison purposes.

Table 6-1
Monitoring Well Construction Data Summary - Devens Consolidation Landfill
Main Post, Former Fort Devens Army Installation, Massachusetts

Monitoring Well Identification	Monitoring Well Type	Surveyed Location[1] and Elevation[2]			Well Construction					
		Northing	Easting	Elevation (TOR)	Screened Interval (ft bgs)[3]		Screen Construction			Percent Open Hole
					Top	Bottom	Material[4]	Diameter (inches)	Slot Size (inches)	
LFM-03-07	groundwater	3018603.2	625050.7	315.14	10.9	20.9	PVC	2	0.01	0
LFM-99-01B	groundwater	3018613.31	624305.81	350.67	23.3	32.6	PVC	2	0.01	0
LFM-99-02B	groundwater	3018229.31	624305.59	353.83	14.5	23.8	PVC	2	0.01	0
LFM-99-03B	groundwater	3019102.62	624498.69	342.08	38.2	47.5	PVC	2	0.01	0
LFM-99-05A	groundwater	3018947.95	624886.54	316.58	19	28.3	PVC	2	0.01	0
LFM-99-05B	groundwater	3018950.88	624874.17	316.58	51.5	55.8	PVC	2	0.01	0
LFM-99-06ARP	groundwater	3018434.71	624996.87	337.84	10.09	19.39	PVC	2	0.01	0
LFM-18-01	landfill gas	3018370.8	624998.3	333.6	3	12	PVC	2	0.01	0
LFM-18-02	landfill gas	3018304.1	625016.9	329.48	3	7	PVC	2	0.01	0
LFM-18-03	landfill gas	3018244.0	625033.3	328.62	3	6	PVC	2	0.01	0

Source: USACE Fort Devens Database

Notes:

[1]Location is presented in Massachusetts State Planar Coordinate System (U.S. Survey Feet).

[2]Elevations are for observed measurement point (top of riser = TOR) converted from NGVD27 to NGVD88. NGVD is North American Vertical Datum (1988).

[3]ft bgs: feet below ground surface

[4]Material: PVC indicates polyvinyl chloride.

Table 6-2
Trigger Groundwater Elevations for Analytical Testing at Devens Consolidation Landfill
Main Post, Former Fort Devens Army Installation, Massachusetts

Well Identification	Top of Casing Elevation (ft NGVD88)	GW Elevation (DTW) for Required Sampling (ft NGVD)	GW Elevation (DTW) Spring 2018 (ft NGVD88)	GW Elevation (DTW) Fall 2018 (ft NGVD88)
LFM-99-01B	350.67	345 or above (6.47 or less)	325.90 (24.77)	324.85 (25.82)
LFM-99-02B[1]	353.83	*any*	337.93 (15.90)	336.13 (17.70)
LFM-99-03B	342.08	335 or above (7.88 or less)	303.57 (38.51)	302.08 (40.00)
LFM-99-05A[1]	316.58	*any*	299.10 917.48)	294.93 (21.65)
LFM-99-05B	316.58	315 or above (2.38 or less)	296.10 920.48)	297.83 (18.75)
LFM-99-06A-RP[1]	337.84	*any*	323.45 (14.39)	323.02 (14.82)
LFM-03-07[2]	315.14	*any*	298.67 (315.14)	297.31 (17.83)

Notes:
[1] Monitoring well included on LTM sampling list.
[2] Monitoring well was paved over and will be resurveyed.
NA = not available
NGVD = National Geodetic Vertical Datum
GW = Groundwater
DTW = Depth to water (feet) in feet below top of casing
This table evaluates the DTW at monitoring wells located around the DCL. If the DTW is less than the "trigger" levels for the three wells noted above; it indicates that the water table is shallow and the well(s) should be sampled along with wells on the LTM sampling list.

Table 6-3
Devens Consolidation Landfill Groundwater Analytical Results, April 2018
Main Post, Former Devens Army Installation, Massachusetts

	Units	Monitoring Criteria	LFM-99-02B	Q	LFM-99-05A	Q	LFM-DUP01 (LFM-99-05A)	Q	LFM-99-06A RP	Q	LFM-03-07	Q
			4/6/2018		4/5/2018		4/5/2018		4/5/2018		4/6/2018	
MADEP Extractable Petroleum Hydrocarbons (EPH) and Target PAH												
C_9-C_{18} Aliphatic Hydrocarbons	µg/L	700	99	U	110	U	97	U	96	U	95	U
C_{19}-C_{36} Aliphatic Hydrocarbons	µg/L	14,000	99	U	110	U	97	U	96	U	95	U
C_{11}-C_{22} Aromatic Hydrocarbons	µg/L	200	99	U	110	U	97	U	96	U	95	U
PAH All Compounds	µg/L		ND	U	ND	U	ND	U	ND	U	ND	U
MADEP Volatile Petroleum Hydrocarbons (VPH) and BTEX												
C_5-C_8 Aliphatics	µg/L	300	100	U	100	U	100	U	100	U	100	U
C_9-C_{12} Aliphatics	µg/L	700	100	U	100	U	100	U	100	U	100	U
C_9-C_{10} Aromatics	µg/L	200	100	U	100	U	100	U	100	U	100	U
Methyl tert-butyl ether	µg/L	70	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Benzene	µg/L	5.0	3.0	U	3.0	U	3.0	U	3.0	U	3.0	U
Toluene	µg/L	1,000	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Ethylbenzene	µg/L	700	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
m,p -Xylenes	µg/L	10,000	10	U	10	U	10	U	10	U	10	U
o -Xylene	µg/L	10,000	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Naphthalene	µg/L	140	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Pesticides (SW846 8081B)												
All Compounds			ND	U	ND	U	ND	U	ND	U	ND	U
Total Metals (Select List)												
Arsenic, Total	µg/L	10	3.0	U	3.0	U	3.0	U	3.0	U	3.0	U
Barium, Total	µg/L	2,000	**22**		**10**		**11**		**4.3**		**11**	
Cadmium, Total	µg/L	5.0	3.0	U	3.0	U	3.0	U	3.0	U	3.0	U
Chromium, Total	µg/L	100	4.0	U	4.0	U	4.0	U	4.0	U	4.0	U
Copper, Total	µg/L	1,300	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Iron, Total	µg/L	NS	50	U	**25**	J	50	U	50	U	50	U
Lead, Total	µg/L	15	10	U	10	U	10	U	10	U	10	U
Manganese, Total	µg/L	NS	3.0	U	**2.2**	J	3.0	U	3.0	U	3.0	U
Selenium, Total	µg/L	50	20	U	20	U	20	U	20	U	20	U
Silver, Total	µg/L	100	1.5	U	1.5	U	1.5	U	1.5	U	1.5	U
Mercury	µg/L	2.0	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U

Table 6-3
Devens Consolidation Landfill Groundwater Analytical Results, April 2018
Main Post, Former Devens Army Installation, Massachusetts

	Units	Monitoring Criteria	LFM-99-02B	Q	LFM-99-05A	Q	LFM-DUP01 (LFM-99-05A)	Q	LFM-99-06A RP	Q	LFM-03-07	Q
			4/6/2018		4/5/2018		4/5/2018		4/5/2018		4/6/2018	
General Chemistry												
Cyanide, Total	mg/L	0.20	**0.0048**	**J**	**0.0032**	**J**	0.020	J	0.005	U	**0.0048**	**J**
Nitrate/Nitrite (as N)	mg/L	NS	**0.60**		**1.3**		**1.3**		**1.1**		**1.8**	
Chemical Oxygen Demand	mg/L	NS	**10**	**J**	10	U	10	U	**7.0**	**J**	**5.0**	**J**
Chloride	mg/L	NS	**350**		**160**		**160**		**340**		**220**	
Sulfate	mg/L	NS	**20**		**19**		**19**		**27**		**28**	
Alkalinity as CaCO3	mg/L	NS	**48**		**79**		**86**		**75**		**76**	
TDS	mg/L	NS	**660**		**380**		**390**		**670**		**480**	
Water Quality Parameters												
Temperature	°Celcius	NS	**7.83**		**10.57**		**10.57**		**10.39**		**7.53**	
ORP	mV	NS	**80.9**		**74.7**		**74.7**		**82.3**		**68.0**	
pH	Std units	NS	**6.27**		**6.42**		**6.42**		**6.42**		**6.23**	
Specific Conductance	µS/cm	NS	**1,196**		**682**		**682**		**1,199**		**863**	
Dissolved Oxygen	mg/L	NS	**8.13**		**5.89**		**5.89**		**5.88**		**7.15**	
Turbidity	NTU	NS	**2.91**		**2.29**		**2.29**		**4.22**		**3.15**	

Notes:

0.333	= Detection
0.333	= Above monitoring criteria

J = Estimated Result
NS = No Standard
Q = Qualifier
U = The target analyte was not detected at or above the laboratory reporting limit.
ND = non-detect
µg/L = microgram per liter
mg/L = milligram per lter
mV = millivolts

Table 6-4
Devens Consolidation Landfill Groundwater Analytical Results, October 2018
Main Post, Former Devens Army Installation, Massachusetts

	Units	Monitoring Criteria	LFM-99-02B	Q	LFM-99-05A	Q	LFM-DUP01 LFM-99-05A	Q	LFM-99-06RP	Q	LFM-03-07	Q
			10/12/2018		10/12/2018		10/12/2018		10/11/2018		10/11/2018	
MADEP Extractable Petroleum Hydrocarbons (EPH) and Target PAHs												
C_9-C_{18} Aliphatic Hydrocarbons	µg/L	700	71	U	71	U	71	U	71	U	71	U
C_{19}-C_{36} Aliphatic Hydrocarbons	µg/L	14,000	71	U	71	U	71	U	71	U	71	U
C_{11}-C_{22} Aromatic Hydrocarbons	µg/L	200	71	U	71	U	71	U	71	U	71	U
PAH - All Compounds	µg/L		ND	U	ND	U	ND	U	ND	U	ND	U
MADEP Volatile Petroleum Hydrocarbons (VPH) and BTEX												
C_5-C_8 Aliphatics	µg/L	300	100	U	75	U	75	U	75	U	75	U
C_9-C_{12} Aliphatics	µg/L	700	100	U	75	U	75	U	75	U	75	U
C_9-C_{10} Aromatics	µg/L	200	100	U	75	U	75	U	75	U	75	U
Methyl tert-butyl ether	µg/L	70	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Benzene	µg/L	5.0	3.0	U	3.0	U	3.0	U	3.0	U	3.0	U
Toluene	µg/L	1,000	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Ethylbenzene	µg/L	700	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
m,p -Xylenes	µg/L	10,000	10	U	10	U	10	U	10	U	10	U
o -Xylene	µg/L	10,000	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Naphthalene	µg/L	140	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Pesticides (SW846 8081B)												
Pesticides - All Compounds	ND		ND	U	ND	U	ND	U	ND	U	ND	U
Metals (Select List)												
Arsenic, Dissolved	µg/L	10	3.0	U	3.0	U	3.0	U	3.0	U	3.0	U
Barium, Dissolved	µg/L	2,000	5.0	U	**9.8**	**J**	**10**		5.0	U	**11**	
Cadmium, Dissolved	µg/L	5.0	3.0	U	3.0	U	3.0	U	3.0	U	3.0	U
Chromium, Dissolved	µg/L	100	4.0	U	4.0	U	4.0	U	4.0	U	4.0	U
Copper, Dissolved	µg/L	NS	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Iron, Dissolved	µg/L	NS	50	U	50	U	50	U	50	U	50	U

Table 6-4
Devens Consolidation Landfill Groundwater Analytical Results, October 2018
Main Post, Former Devens Army Installation, Massachusetts

	Units	Monitoring Criteria	LFM-99-02B	Q	LFM-99-05A	Q	LFM-DUP01 LFM-99-05A	Q	LFM-99-06RP	Q	LFM-03-07	Q
			10/12/2018		10/12/2018		10/12/2018		10/11/2018		10/11/2018	
Lead, Dissolved	µg/L	15	10	U	10	U	10	U	10	U	10	U
Manganese, Dissolved	µg/L	NS	3.0	U	3.0	U	3.0	U	3.0	U	3.0	U
Selenium, Dissolved	µg/L	50	20	U	20	U	20	U	20	U	20	U
Silver, Dissolved	µg/L	100	1.5	U	1.5	U	1.5	U	1.5	U	1.5	U
Mercury	µg/L	2.0	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U
General Chemistry												
Cyanide, Total	mg/L	0.20	**0.0044**	**J**	0.0050	U	**0.0029**	**J**	**0.0025**	**J**	0.0050	U
Nitrate/Nitrite (as N)	mg/L	NS	**0.69**		**0.92**		**0.92**		**1.1**		**1.3**	
Chemical Oxygen Demand	mg/L	NS	10	U	10	U	10	U	10	U	10	U
Chloride	mg/L	NS	**250**		**180**		**180**		**310**		**260**	
Sulfate	mg/L	NS	**25**		**25**		**25**		**34**		**34**	
Alkalinity as CaCO3	mg/L	NS	**87**		**99**		**96**		**100**		**110**	
TDS	mg/L	NS	**540**		**420**		**410**		**630**		**560**	
Field Parameters												
Temperature	°Celcius	NS	**12.1**		**11.4**		**11.4**		**12.6**		**16.3**	
ORP	mV	NS	**1040**		**776**		**776**		**1240**		**1090**	
pH	Std units	NS	**5.95**		**6.38**		**6.38**		**5.96**		**5.71**	
Specific Conductance	µS/cm	NS	**226**		**213**		**213**		**173**		**182**	
Dissolved Oxygen	mg/L	NS	**3.89**		**1.41**		**1.41**		**5.18**		**2.82**	
Turbidity	NTU	NS	**2.47**		**12.9**		**12.9**		**1.21**		**1.95**	

Notes:

0.333	= Detection
0.333	= Above monitoring criteria

J = Estimated Result
NS = No Standard
Q = Qualifier
U = The target analyte was not detected at or above the laboratory reporting limit.
ND = non-detect
µg/L = microgram per liter
mg/L = milligram per lter
mV = millivolts

Table 6-5
Devens Consolidation Landfill Gas Probe Monitoring Results
Devens Consolidation Landfill
Devens, Massachusetts

Sampler(s): Melissa Miller **Date:** 12/18/2018
Weather: Partial Clouds/Sun, Humidity 49% **Temperature (F):** 23°
Barometer (in-Hg): 30.0 inches Hg **Time:** 0905 hrs
Nearest Monitoring Well (LFM-99-06A-RP) Depth to Water (ft btoc): 15.71

Gas Monitoring Well ID	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 2000	% GEM 2000	% GEM 2000	% GEM 2000	
LFGM-18-01	1100	0.9	0.0	0.0	0.0	NA	21.1	0.7	0.0	0.0	Frozen grout covers cap.
LFGM-18-02	1050	1.3	0.0	0.0	0.0	NA	22.0	0.1	0.0	0.0	Grout covers cap.
LFGM-18-03	1040	0.9	0.0	1.0	0.0	NA	21.1	0.7	0.0	0.0	Road box frozen

Notes:
Ran each individual gas meter for a minimun of 5 minutes before collecting a gas reading from each well port.
NA – Not Analyzed due to Multi RAE+ equipment failure of the O2 sensor discovered during field calibration check. Used GEM 2000 instead.

CALIBRATION INFORMATION:
1. Instrument: MultiRAE+ Calibrated by: Pine Environmental Services (12/12/18)
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 - KGS (12/18/18). 4 of 5 gases OK. O2 sensor malfunctioned during calibration check.
2. Instrument: Landtec GEM 2000 Calibrated by: Pine Environmental Services (12/14/18)
Calibrated With: 15% CH4, 15% CO2, 20.9% O2
Calibration Check Performed by: Melissa Miller - KGS (12/18/18). 4 of 4 gases OK.

VOC - Volatile Organic Compounds
H_2S - Hydrogen Sulfide
CO - Carbon Monoxide
LEL - Lower Explosive Limit
O_2 - Oxygen
CO_2 - Carbon Dioxide
CH_4 - Methane

Table 6-6
Devens Consolidation Landfill Leachate Analytical Results, December 2018
Main Post, Former Fort Devens Army Installation, Massachusetts

MassDevelopment Industrial Wastewater Discharge Permit No. 017 (Summary)

Analytical Fraction	Parameter	Limitations (mg/L)	Fall 2018 - Annual Sampling Event
			Date Sampled: 12/07/2018
			Concentrations (mg/L)
Metals composite	Arsenic	0.20	**0.0044**
	Cadmium	0.045	0.003 U
	Chromium	0.40	0.004 U
	Copper	0.75	0.005 U
	Lead	0.20	0.010 U
	Nickel	0.60	**0.0026 J**
	Silver	0.30	0.015 U
	Zinc	0.70	0.020 U
	Mercury	0.001	0.0002 U
TTO	Total Toxic Organics	5.00	ND
TSS	Total Suspended Solids	400	**19**
Cyanide	Cyanide (total)	NL	0.005 U
TPH	TPH (DRO)	NL	**0.37 J**
Phenols	Phenols (total)	NL	0.05 U
pH *grab sample*	pH (units)	5.5 – 9.5	**8.2**

Notes:
Detections are bolded.
mg/L = milligram per liter
ND = non-detect
NL = No limit
U = The target analyte was not detected at or above the laboratory reporting limit.
J = Estimated result
TTO = Total Toxic Organics (sum of VOCs, SVOCs, Pesticides and PCBs)
VOCs = Volatile Organic Compounds
SVOCs = SemiVolatile Organic Compounds
PCBs = Polychlorinated Biphenyls
TSS = Total Suspended Solids
TPH = Total Petroleum Hydrocarbons

Table 6-7
Devens Consolidation Landfill Leachate Annual Discharge Quantities
Main Post, Former Fort Devens Army Installation, Massachusetts

Period	Discharge Quantities (Gallons)																
	2002	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Annual Total	1,259,866	960,394	473,802	414,858	390,085	277,626	304,547	237,983	217,155	353,618	204,483	225,768	237,752	190,403	209,849	261,989	320,357
Total Leachate Discharge Quantity (2002-2018)																	**6,540,535**

Notes:
In 2002, startup was during the April to June period.
During 2003, the April to June period is estimated due to a broken flow meter.

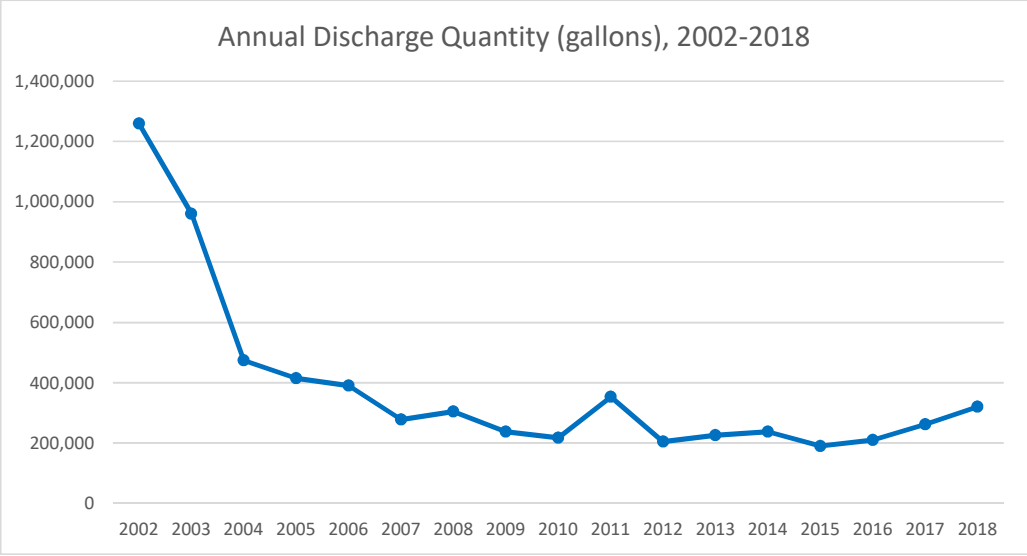


Table 6-8
Devens Consolidation Landfill Historical Groundwater Data, LFM-99-02B
Main Post, Former Devens Army Installation, Massachusetts

LFM-99-02B	Units	Monitoring Criteria	Spring 2003	Q	Fall 2003	Q	Spring 2004	Q	Fall 2004	Q	Spring 2005	Q	Fall 2005	Q	Spring 2006	Q	Spring 2007	Q	Spring 2008	Q	Fall 2008	Q	Spring 2009	Q	Fall 2009	Q	Spring 2010	Q	Fall 2010	Q	Spring 2011	Q
Extractable Petroleum Hydrocarbons (EPH)																																
Naphthalene	µg/L	140	1.0	U	5.1	U	2.4	U	2.1	U	10.0	U	0.400	U	0.2	U	0.46	U	0.412	U	0.430	U	10	U	NA		0.419	U	0.400	U	0.400	U
Pesticides																																
Aldrin	µg/L	0.50	0.0064	U	0.0067	U	0.0076	U	0.0076	U	0.05	UJ	0.200	UJ	0.05	U	0.0217	U	0.021	UJ	0.021	UJ	0.200	UJ	NA		0.020	U	0.020	U	0.020	U
Dieldrin	µg/L	0.10	0.013	U	0.0013	U	0.015	U	0.014	U	0.1	U	0.040	UJ	0.05	U	0.0435	U	0.043	UJ	0.042	UJ	0.040	UJ	NA		0.040	U	0.040	U	0.040	U
alpha-Chlordane	µg/L	2.0	0.0064	U	0.0067	U	0.0076	U	0.071	U	0.05	U	0.020	UJ	0.05	U	0.0217	U	0.021	UJ	0.021	UJ	0.020	UJ	NA		0.020	U	0.020	U	0.020	U
gamma-Chlordane	µg/L	2.0	0.0064	U	**0.0053**	**J**	0.0076	U	0.071	U	0.05	U	0.020	UJ	0.05	U	0.0217	U	0.021	UJ	0.021	UJ	0.020	UJ	NA		0.020	U	0.020	U	0.020	U
Chlordane	µg/L	2.0	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
gamma-BHC (Lindane)	µg/L	0.20	0.0064	U	0.0067	U	0.0076	U	0.0076	U	0.05	U	0.020	UJ	0.05	U	0.0217	U	0.021	UJ	0.021	UJ	0.020	UJ	NA		0.020	U	0.020	U	0.020	U
Dissolved Metals																																
Arsenic	µg/L	10	5.0	U	50.0	U	5.0	U	5.0	U	4.2	U	**5.0**	**J**	2.5	U	5.0	U	5.0	U	5.0	U	5	U	5	U	5	U	5	U	5	U
Chromium	µg/L	100	**28**		**1.7**	**J**	**0.96**	**J**	**1.07**	**J**	12.0	U	NA		10.0	U	10.0	U	10	U	10	U	5	U	**40**		10	U	10	U	10	U
Iron	µg/L	NS	NA		100	U	**17**	**J**	100	U	38.0	U	**32**	**J**	50.0	U	50.0	U	50	U	**28**	**J**	50	U	**380**		50	U	50	U	50	U
Lead	µg/L	15	5.0	U	**8.5**	**J**	5.0	U	5.0	U	**3.1**		10	U	2.5	U	10.0	U	10	U	10	U	**10**	**J**	10	U	10	U	10	U	10	U
Manganese	µg/L	NS	NA		**2.4**	**J**	**1.5**	**J**	**12.7**	**J**	**5.2**	**J**	10	U	10.0	U	**1.1**	**J**	10	U	10	U	10	U	**9.1**	**J**	10	U	10	U	10	U
General Chemistry																																
Total Cyanide	mg/L	0.20	0.01	U	**0.004**	**J**	0.01	U	**0.005**	**J**	0.01	U	0.005	U	0.05	U	0.01	UJ	0.005	U	0.005	U	0.005	U	NA		**0.0011**	**J**	0.005	U	0.005	U
Nitrate/Nitrite (as N)	mg/L	NS	**0.21**		**1.4**		**0.66**		**0.796**		**0.36**	**J**	0.64	U	**0.45**		**0.5**		**0.43**	**J**	**1.9**		**0.92**		NA		**0.41**		**0.54**		**0.43**	
Chemical Oxygen Demand	mg/L	NS	**170**		50.0	U	**15**	**J**	50.0	U	20.0	U	20	U	10.0	U	20.0	U	20	U	**12**	**J**	20	U	NA		**20**		20	U	**8**	**J**
Water Quality Parameters																																
pH	std	NS	**6.20**		**6.38**		**6.09**		**6.38**		**5.97**		**6.17**		**6.32**		**6.15**		**6.32**		**7.00**		**5.57**		**6.22**		**6.71**		**6.35**		**6.10**	
Oxidation-Reduction Potential	mV	NS	NA		**204.7**		**243.3**		**308.4**		**266.3**		**311.3**		**223.6**		**200.8**		**160.7**		**55.2**		**215.4**		**113**		**-232.2**		**163.6**		**150.1**	
Turbidity	NTU	NS	NA		**0.40**		**0.80**		**0.55**		**0.37**		**3.8**		**0.18**		**0.00**		**2.80**		**2.0**		**0.0**		**0.0**		**2.2**		**0.39**		**0.00**	

Notes:

0.333	= Detection
0.333	= Above monitoring criteria

J = Estimated result
NA = Not analyzed
NS = No Standard
Q = Qualifier
U = The target analyte was not detected at or above the laboratory reporting limit.
UJ = Estimated non-detect
ND = non-detect
µg/L = microgram per liter
mg/L = milligram per liter
mV = millivolts
µS/cm = microSiemens per centimeter
NTU - nephelometric turbidity units

Table 6-8
Devens Consolidation Landfill Historical Groundwater Data, LFM-99-02B
Main Post, Former Devens Army Installation, Massachusetts

LFM-99-02B	Units	Monitoring Criteria	Fall 2011	Q	Spring 2012	Q	Fall 2012	Q	Spring 2013	Q	Fall 2013	Q	Spring 2014	Q	Fall 2014	Q	Spring 2015	Q	Fall 2015	Q	Spring 2016	Q	Fall 2016	Q	Spring 2017	Q	Fall 2017	Q	Spring 2018	Q	Fall 2018	Q
Extractable Petroleum Hydrocarbons (EPH)																																
Naphthalene	µg/L	140	0.400	U	0.400	U	**0.148**	**J**	0.400	U	0.400	U	0.400	U	1.0	U	5.100	U	4.300	U	2.0	U	2.3	U	1.9	U	1.9	U	1.9	U	1.4	U
Pesticides																																
Aldrin	µg/L	0.50	0.020	U	0.020	U	0.020	U	0.020	U	0.020	U	0.020	U	0.010	U	0.026	U	0.051	U	0.013	U	0.019	U	0.017	U	0.017	U	0.019	UJ	0.017	UJ
Dieldrin	µg/L	0.10	0.040	U	0.040	U	0.040	U	0.040	U	0.040	U	0.040	U	0.010	U	0.026	U	0.051	U	0.007	U	0.010	U	0.0096	U	0.0096	U	0.0110	UJ	0.0096	UJ
alpha-Chlordane	µg/L	2.0	0.020	U	0.020	U	0.020	U	0.020	U	0.020	U	0.020	U	0.054	U	NA		NA		NA		NA		NA		NA		NA		NA	
gamma-Chlordane	µg/L	2.0	0.020	U	0.020	U	0.020	U	0.020	U	0.020	U	0.020	U	0.054	U	NA		NA		NA		NA		NA		NA		NA		NA	
Chlordane	µg/L	2.0	NA		NA		NA		NA		NA		NA		NA		0.130	U	0.530	U	0.16	U	0.31	U	0.29	U	0.29	U	0.32	UJ	0.29	UJ
gamma-BHC (Lindane)	µg/L	0.20	0.020	U	0.020	U	0.020	U	0.020	U	0.020	U	0.020	U	0.011	U	0.026	U	0.051	U	0.007	U	0.010	U	0.0096	U	0.0096	U	0.0110	UJ	0.0096	UJ
Dissolved Metals																																
Arsenic	µg/L	10	**2**	**J**	5	U	5	U	5	U	5	U	3	U	3	U	2.0	U	4.0	U	3.0	U	3.0	U	3.0	U	3.0	U	3.0	U	3.0	U
Chromium	µg/L	100	10	U	10	U	10	U	10	U	10	U	10	U	10	U	5.0	U	10	U	4.0	U	**6.0**	**J**	4.0	U	4.0	U	4.0	U	4.0	U
Iron	µg/L	NS	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	100	U	50	U	**28**		50	U	75	U	50	U	50	U
Lead	µg/L	15	**3**	**J**	10	U	10	U	10	U	10	U	10	U	10	U	2.5	U	5.0	U	10	U	10	U	10	U	2.5	U	10	U	15	U
Manganese	µg/L	NS	10	U	10	U	10	U	10	U	10	U	10	U	10	U	7.5	U	15	U	3.0	U	**2.0**	**J**	3.0	U	5.0	U	3.0	U	3.0	U
General Chemistry																																
Total Cyanide	mg/L	0.20	0.005	U	**0.002**	**J**	**0.002**	**J**	0.005	U	0.005	U	**0.0001**	**J**	0.0041	U	0.0011	U	**0.0082**	**J**	0.005	U	**0.0082**	**J**	0.005	U	0.005	U	**0.0048**	**J**	**0.0044**	**J**
Nitrate/Nitrite (as N)	mg/L	NS	**0.76**		0.22	U	**0.49**		**0.069**	**J**	**0.51**		**0.52**		**0.36**		**0.390**		**0.630**		**0.60**		**0.630**		**0.47**		**0.78**		**0.60**		**0.69**	
Chemical Oxygen Demand	mg/L	NS	20	U	20	U	20	U	**15**	**J**	20	U	**4.1**	**J**	10	U	15	U	20	U	10	U	20	U	**5.4**	**J**	10	U	**10**	**J**	10	U
Water Quality Parameters																																
pH	std	NS	**6.03**		**6.25**		**6.29**		**5.87**		**6.45**		**6.00**		**6.51**		**6.07**				**6.16**		**6.44**		**6.55**		**6.72**		**6.27**		**5.95**	
Oxidation-Reduction Potential	mV	NS	**142.2**		**135.5**		**196.3**		**303.3**		**101.8**		**200.3**		**113.3**		**248.5**				**197.0**		**77.8**		**172.6**		**111.1**		**80.9**		**226**	
Turbidity	NTU	NS	**2.57**		**0.33**		**0.00**		**0.00**		**0.79**		**0.69**		**0.88**		**1.65**				**0.36**		**1.73**		**7.57**		**2.59**		**2.91**		**2.47**	

Notes:

0.333	= Detection
0.333	= Above monitoring criteria

J = Estimated result
NA = Not analyzed
NS = No Standard
Q = Qualifier
U = The target analyte was not detected at or above the laboratory reporting limit.
UJ = Estimated non-detect
ND = non-detect
µg/L = microgram per liter
mg/L = milligram per liter
mV = millivolts
µS/cm = microSiemens per centimeter
NTU - nephelometric turbidity units

Table 6-9
Devens Consolidation Landfill Historical Groundwater Data, LFM-99-05A
Main Post, Former Fort Devens Army Installation, Massachusetts

LFM-99-05A	Units	Monitoring Criteria	Spring 2003	Q	Fall 2003	Q	Spring 2004	Q	Fall 2004	Q	Spring 2005	Q	Spring 2006	Q	Spring 2007	Q	Spring 2008	Q	Fall 2008	Q	Spring 2009	Q	Fall 2009	Q	Winter 2010	Q	Spring 2010	Q	Fall 2010	Q	Spring 2011	Q
Extractable Petroleum Hydrocarbons (EPH)																																
Naphthalene	µg/L	140	1.0	U	5.1	U	2.4	U	2.1	U	10.0	U	0.2	BJ	0.421	U	0.408	U	0.430	U	0.4	U	0.421	U	NA		0.426	U	0.400	U	0.400	U
Pesticides																																
Aldrin	µg/L	0.50	0.0064	U	0.0067	U	0.0072	U	0.0072	U	0.05	U	0.05	U	0.0215	U	0.020	UJ	0.021	U	0.022	U	0.022	U	NA		0.021	U	0.021	U	0.020	U
Dieldrin	µg/L	0.10	0.013	U	0.013	U	0.014	U	0.014	U	0.1	U	0.05	U	0.043	U	0.040	UJ	0.042	U	0.044	U	0.044	U	NA		0.043	U	0.041	U	0.040	U
alpha-Chlordane	µg/L	2.0	0.0064	U	0.0067	U	0.0072	U	0.0072	U	0.05	U	0.05	U	0.0215	U	0.020	UJ	0.021	U	0.022	UJ	0.022	UJ	NA		0.021	U	0.021	U	0.020	U
gamma-Chlordane	µg/L	2.0	0.0064	U	0.0067	U	0.0072	U	0.0072	U	0.05	U	0.05	U	0.0215	U	0.020	UJ	0.021	U	0.022	U	0.022	U	NA		0.021	U	0.021	U	0.020	U
Chlordane	µg/L	2.0	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
gamma BHC (Lindane)	µg/L	0.20	0.0064	U	0.0067	U	0.0072	U	0.0072	U	0.05	U	0.05	U	0.0215	U	0.020	UJ	0.021	U	0.022	U	0.022	U	NA		0.021	U	0.021	U	0.020	U
Metals (Total)																																
Arsenic	µg/L	10	**7.5**		**6.9**	**J**	5.0	U	5.0	U	**4.2**	**J**	2.5	U	**2.4**	**J**	5.0	U	5.0	U	**2**	**J**	5.0	U	5	U	5	U	**4.6**	**J**	5	U
Chromium	µg/L	100	10.0	U	**1.6**	**J**	**7.7**	**J**	**1.37**	**J**	**6**	**J**	10.0	U	10.0	U	10	U	10	U	**20**		NA		**40**		10	U	10	U	10	U
Iron	µg/L	NS	NA		**96**	**J**	**130**		**33.3**	**J**	**666**		**93.2**		**70**		50	U	**70**		**510**		**20**	**J**	**380**		**70**		**480**		**50**	**J**
Lead	µg/L	15	**9.3**		**9.5**	**J**	5.0	U	5.0	U	2.9	U	2.5	U	10.0	U	10	U	10	U	**2**	**J**	10	U	10	U	10	U	10	U	10	U
Manganese	µg/L	NS	NA		**3.6**	**J**	**8.5**	**J**	**2.1**	**J**	**33.9**		10.0	U	**3.9**	**J**	10	U	**2.4**	**J**	**21**		10	U	**9.1**	**J**	10	U	**12.0**		10	U
General Chemistry																																
Total Cyanide	mg/L	0.20	0.01	U	**0.004**	**J**	0.01	U	**0.009**	**J**	0.01	U	0.05	U	0.01	UJ	0.005	U	0.005	UJ	**0.002**	**J**	0.005	U	NA		0.005	U	0.005	U	0.005	U
Nitrate/Nitrite (as N)	mg/L	NS	**1.6**		**1.4**		**1.4**		**1.34**		**1**		**0.4**		**0.46**		**0.60**	**J**	**0.57**		**0.55**		**0.46**	**J**	NA		**0.64**		**0.49**	**J**	**0.51**	
Chemical Oxygen Demand	mg/L	NS	**100**		50.0	U	**13**	**J**	**12**	**J**	20.0	U	10.0	U	11.0	U	20	U	20	U	**8.1**	**J**	20	U	NA		20	U	24	U	**34**	
Water Quality Parameters																																
pH	std units	NS	**6.10**		**6.11**		**5.97**		**5.84**		**6.17**		**6.24**		**5.81**		**6.09**		**6.93**		**6.08**		**5.89**		**6.37**		**6.23**		**6.05**		**5.56**	
Oxidation-Reduction Potential	mV	NS	NA		**231.2**		**199.2**		**154.7**		**141.3**		**205.9**		**220.0**		**116.1**		**61.8**		**122**		**173.7**		**68.7**		**-223**		**180.6**		**238**	
Turbidity	NTU	NS	NA		**4.43**		**2.59**		**2.50**		**26.2**		**2.51**		**3.60**		**0.58**		**2.33**		**4.1**		**4.67**		**6.2**		**1.7**		**2.8**		**3.1**	

Notes:

0.333	= Detection
0.333	= Above monitoring criteria

J = Estimated result
NA = Not analyzed
NS = No Standard
Q = Qualifier
U = The target analyte was not detected at or above the laboratory reporting limit.
UJ = Estimated non-detect
ND = non-detect
µg/L = microgram per liter
mg/L = milligram per liter
mV = millivolts
µS/cm = microSiemens per
NTU - nephelometric turbidity units

Table 6-9
Devens Consolidation Landfill Historical Groundwater Data, LFM-99-05A
Main Post, Former Fort Devens Army Installation, Massachusetts

LFM-99-05A	Units	Monitoring Criteria	Fall 2011	Q	Spring 2012	Q	Fall 2012	Q	Spring 2013	Q	Fall 2013	Q	Spring 2014	Q	Fall 2014	Q	Spring 2015	Q	Fall 2015	Q	Spring 2016	Q	Fall 2016	Q	Spring 2017	Q	Fall 2017	Q	Spring 2018	Q	Fall 2018	Q
Extractable Petroleum Hydrocarbons (EPH)																																
Naphthalene	µg/L	140	0.400	U	0.400	U	0.400	U	0.400	U	0.400	U	4.000	U	1.000	U	3.300	U	4.00	U	1.9	U	**3.20**		1.9	U	2.1	U	2.1	U	5.0	U
Pesticides																																
Aldrin	µg/L	0.50	0.020	U	0.020	U	0.020	U	0.020	U	0.020	U	0.020	U	0.010	U	0.026	U	0.050	U	0.012	U	0.019	U	0.017	U	0.018	U	0.017	U	0.017	U
Dieldrin	µg/L	0.10	0.040	U	0.040	U	0.040	U	0.040	U	0.040	U	0.040	U	0.010	U	0.026	U	0.050	U	0.007	U	0.011	U	0.0096	U	0.010	U	0.0095	U	0.0096	U
alpha-Chlordane	µg/L	2.0	0.020	U	0.200	U	0.200	U	0.200	U	0.020	U	0.020	U	0.051	U	NA		NA		NA		NA		NA		NA		NA		NA	
gamma-Chlordane	µg/L	2.0	0.020	U	0.020	U	0.020	U	0.020	U	0.020	U	0.020	U	0.051	U	NA		NA		NA		NA		NA		NA		NA		NA	
Chlordane	µg/L	2.0	NA		NA		NA		NA		NA		NA		NA		0.130	U	0.500	U	0.15	U	0.32	U	0.29	U	0.30	U	0.29	U	0.29	U
gamma BHC (Lindane)	µg/L	0.20	0.020	U	0.020	U	0.020	U	0.020	U	0.020	U	0.020	U	0.010	U	0.026	U	0.050	U	0.007	U	0.011	U	0.0096	U	0.010	U	0.0095	U	0.0096	U
Metals (Total)																																
Arsenic	µg/L	10	**3**	**J**	5	U	5.0	U	5	U	5.0	U	5	U	3	U	**2.3**	J	4.0	U	**1.7**	**J**	3.0	U	3.0	U	3.0	UJ	3.0	U	3.0	U
Chromium	µg/L	100	10	U	10	U	10	U	10	U	10	U	10	U	5	U	5.0	U	10.0	U	4.0	U	4.0	U	4.0	U	4.0	UJ	4.0	U	4.0	U
Iron	µg/L	NS	**20**	**J**	50	U	**110**		50	U	**80**		**260**	**J**	50	U	**118**		**378**		**300**		**94**		50	U	**64**	**J**	**25**	**J**	50	U
Lead	µg/L	15	**2**	**J**	10	U	10	U	10	U	10	U	**2**	**J**	2.5	U	2.5	U	5.0	U	10	U	10.0	U	10	U	2.5	UJ	10	U	10.0	U
Manganese	µg/L	NS	10	U	10	U	**6.0**	**J**	10	U	**3.0**	**J**	**20**		7.5	U	7.5	U	**10.4**	**J**	**11**		**5.1**	**J**	3.0	U	**2.7**	**J**	**2.2**	**J**	3.0	U
General Chemistry																																
Total Cyanide	mg/L	0.20	0.005	U	**0.002**	**J**	**0.004**	**J**	0.005	U	0.005	U	**0.0020**	**J**	0.0041	U	0.0011	U	0.0100	U	0.005	U	0.0050	U	0.0050	U	0.0050	U	**0.0032**	**J**	0.0050	U
Nitrate/Nitrite (as N)	mg/L	NS	**0.42**		**0.38**		**0.38**		**0.43**		**0.47**		**0.6**		**0.46**		**1.1**		**1.9**		**2.9**		**3.8**		**2.1**		**3.3**		**1.3**		**0.92**	
Chemical Oxygen Demand	mg/L	NS	20	U	20	U	**11**	**J**	**13**	**J**	20	U	20	U	10	U	15	U	20	U	10	U	10	U	10	U	10	U	10	U	10	U
Water Quality Parameters																																
pH	std units	NS	**6.16**		**6.51**		**6.44**		**6.3**		**6.46**		**4.83**		**6.43**		**6.21**		**6.40**		**8.11**		**6.35**		**5.86**		**6.42**		**6.42**		**6.38**	
Oxidation-Reduction Potential	mV	NS	**-255.1**		**106.4**		**195.9**		**219.6**		**145.4**		**235.6**		**181**		**218**		**134**		**-173.9**		**81.4**		**209.7**		**138.9**		**74.7**		**213.1**	
Turbidity	NTU	NS	**2.40**		**3.02**		**3.90**		**2.4**		**3.70**		**18.90**		**3.21**		**131**		**15**		**7.4**		**8.5**		**8.7**		**4.4**		**2.29**		**12.9**	

Notes:

0.333	= Detection
0.333	= Above monitoring criteria

J = Estimated result
NA = Not analyzed
NS = No Standard
Q = Qualifier
U = The target analyte was not detected at or above the laboratory reporting limit.
UJ = Estimated non-detect
ND = non-detect
µg/L = microgram per liter
mg/L = milligram per liter
mV = millivolts
µS/cm = microSiemens per
NTU - nephelometric turbidity units

Table 6-10
Devens Consolidation Landfill Historical Groundwater Data - LFM-03-07
Main Post, Former Fort Devens Army Installation, Massachusetts

LFM-99-07/ LFM-03-07 (5/22/06)	Units	Monitoring Criteria	Spring 2003	Q	Fall 2003	Q	Spring 2004	Q	Fall 2004	Q	Spring 2005	Q	Spring 2006	Q	Spring 2007	Q	Spring 2008	Q	Fall 2008	Q	Spring 2009	Q	Fall 2009	Q	Spring 2010	Q	Fall 2010	Q	Spring 2011	Q	Fall 2011	Q
Extractable Petroleum Hydrocarbons (EPH)																																
Naphthalene	µg/L	140	1.0	U	5.4	U	2.4	U	2.1	U	10.0	U	0.2	BJ	0.46	U	0.417	U	0.426	U	10	U	NA		0.412	U	0.400	U	0.400	U	0.400	U
Pesticides																																
Aldrin	µg/L	0.50	0.0064	U	0.0067	U	0.0067	U	0.0070	U	0.05	UJ	0.05	U	0.020	U	0.024	UJ	0.021	U	0.023	U	NA		0.021	U	0.020	U	0.020	U	0.020	U
Dieldrin	µg/L	0.10	0.013	U	0.0013	U	0.015	U	0.014	U	0.1	U	0.05	U	0.040	U	0.048	UJ	0.043	U	0.046	U	NA		0.042	U	0.040	U	0.040	U	0.040	U
alpha-Chlordane	µg/L	2.0	0.0064	U	0.0067	U	0.0067	U	0.0070	U	0.05	U	0.05	U	0.020	U	0.024	UJ	0.021	U	0.023	U	NA		0.021	U	0.020	U	0.020	U	0.020	U
gamma-Chlordane	µg/L	2.0	0.0064	U	**0.0053**	**J**	0.0067	U	0.0070	U	0.05	U	0.05	U	0.020	U	0.024	UJ	0.021	U	0.023	U	NA		0.021	U	0.020	U	0.020	U	0.020	U
Chlordane	µg/L	2.0	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
gamma-BHC (Lindane)	µg/L	0.20	0.0064	U	0.0067	U	0.0067	U	0.0070	U	0.05	U	0.05	U	0.020	U	0.024	UJ	0.021	U	0.023	U	NA		0.021	U	0.020	U	0.020	U	0.020	U
Metals (Total)																																
Arsenic	µg/L	10	**7.9**		***29.0***	***J***	5.0	U	**1.7**	**J**	4.2	U	2.5	U	**2.3**	**J**	5.0	U	5.0	U	5.0	U	NA		**3.3**	**J**	**2.5**	**J**	5	U	**4.0**	**J**
Chromium	µg/L	100	10	U	**35.0**		**8.10**	**J**	**5.38**	**J**	**7.4**	**J**	10.0	U	10.0	U	10	U	10	U	**2**	**J**	NA		**4.0**	**J**	**2.0**		10	U	10	U
Iron	µg/L	NS	NA		**17000**	**J**	**620**		25	U	**630.0**		50.0	U	50.0	U	50	U	50	U	50	U	NA		**230**		**730**		**20**	**J**	50	U
Lead	µg/L	15	13.0	U	***17.0***	***J***	5.0	U	5.0	U	2.9	U	2.5	U	10.0	U	10	U	10	U	**1.9**	**J**	NA		10	U	10	U	10	U	**3.0**	**J**
Manganese	µg/L	NS	NA		**200.0**	**J**	**14.0**	**J**	**10.0**	**J**	**22.8**		**0.7**	**J**	**0.7**	**J**	10	U	10	U	10	U	NA		**4.4**	**J**	**10**		10	U	10	U
General Chemistry																																
Total Cyanide	mg/L	0.20	0.01	U	**0.004**	**J**	0.01	U	0.010	B	0.01	U	0.05	U	0.01	UJ	0.005	U	0.005	U	0.005	U	NA		**0.0001**	**J**	0.005	U	0.005	U	0.005	U
Nitrate/Nitrite (as N)	mg/L	NS	**1.30**		**2.0**		**0.90**		**1.80**		**1.20**	**J**	**1.47**		**0.9**		**1.30**	**J**	**0.9**		**1.00**		NA		**1.10**		**0.98**		**0.96**		**0.93**	
Chemical Oxygen Demand	mg/L	NS	**86**		**26.0**	**J**	**18**	**J**	50.0	U	31.0	U	10.0	U	18.0	UJ	12	J	20	U	20	U	NA		**9.2**	**J**	20	U	20	U	26	U
Water Quality Parameters																																
pH	std units	NS	**6.00**		**6.27**		**5.54**		**6.15**		**6.15**		**6.22**		**6.06**		**8.14**		**5.95**		**5.96**		NA		**6.37**		**6.38**		**5.84**		**6.14**	
Oxidation-Reduction Potential	mV	NS	NA		**365.5**		**345.3**		**279.0**		**237.5**		**230.3**		**169.0**		**130.0**		**146.0**		**125.1**		NA		**-249.8**		**109.0**		**372.9**		**121.5**	
Turbidity	NTU	NS	NA		**10.90**		**3.52**		**11.70**		**0.25**		**0.49**		**0.50**		**2.00**		**3.4**		**3.2**		NA		**2.0**		**13.90**		**0.59**		**0.46**	

Notes:

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0.333	= Above monitoring criteria

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NA = Not analyzed
NS = No Standard
Q = Qualifier
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UJ = Estimated non-detect
ND = non-detect
µg/L = microgram per liter
mg/L = milligram per liter

Table 6-10
Devens Consolidation Landfill Historical Groundwater Data - LFM-03-07
Main Post, Former Fort Devens Army Installation, Massachusetts

LFM-99-07/ LFM-03-07 (5/22/06)	Units	Monitoring Criteria	Spring 2012	Q	Fall 2012	Q	Spring 2013	Q	Fall 2013	Q	Spring 2014	Q	Fall 2014	Q	Spring 2015	Q	Fall 2015	Q	Spring 2016	Q	Fall 2016	Q	Spring 2017	Q	Fall 2017	Q	Spring 2018	Q	Fall 2018	Q
Extractable Petroleum Hydrocarbons (EPH)																														
Naphthalene	µg/L	140	0.400	U	NS		0.400	U	NS		0.400	U	NS		5.1	U	NS/Dry		NS/Dry		NS/Dry		1.9	U	1.9	U	1.9	U	5.0	U
Pesticides																														
Aldrin	µg/L	0.50	0.020	U	NS		0.020	U	NS		0.020	U	NS		0.026	U	NS/Dry		NS/Dry		NS/Dry		0.017	U	0.017	U	0.019	U	0.017	U
Dieldrin	µg/L	0.10	0.040	U			0.040	U			0.040	U			0.026	U							0.0096	U	0.0096	U	0.0110	U	0.0096	U
alpha-Chlordane	µg/L	2.0	0.020	U			0.020	U			0.020	U			NA								NA		NA		NA		NA	
gamma-Chlordane	µg/L	2.0	0.020	U			0.020	U			0.020	U			NA								NA		NA		NA		NA	
Chlordane	µg/L	2.0	NA				NA				NA				0.130	U							0.29	U	0.29	U	0.32	U	0.29	U
gamma-BHC (Lindane)	µg/L	0.20	0.020	U			0.020	U			0.020	U			0.026	U							0.0096	U	0.0096	U	0.0110	U	0.0096	U
Metals (Total)																														
Arsenic	µg/L	10	5	U	NS		5	U	NS		3	U	NS		**2.7**	**J**	NS/Dry		NS/Dry		NS/Dry		3.0	U	3.0	U	3.0	U	3.0	U
Chromium	µg/L	100	10	U			10	U			10	U			5.0	U							4.0	U	4.0	U	4.0	U	4.0	U
Iron	µg/L	NS	50	U			50	U			**20**	**J**			50	U							**1,900**		75	U	50	U	50	U
Lead	µg/L	15	10	U			10	U			10	U			2.5	U							10	U	2.5	U	10	U	10.0	U
Manganese	µg/L	NS	10	U			10	U			10	U			7.5	U							**110**		**2.3**	J	3.0	U	3.0	U
General Chemistry																														
Total Cyanide	mg/L	0.20	0.005	U	NS		0.005	U	NS		**0.0001**	**J**	NS		**0.0018**	**J**	NS/Dry		NS/Dry		NS/Dry		**0.0033**	**J**	0.0050	U	**0.0048**	**J**	0.0050	U
Nitrate/Nitrite (as N)	mg/L	NS	**1.0**				**0.87**				**0.99**				**0.930**								**1.7**		**2.7**		**1.8**		**1.3**	
Chemical Oxygen Demand	mg/L	NS	20	U			**18**	**J**			**11**				15	U							**7.5**	**J**	**6.2**	**J**	**5.0**	**J**	10	**U**
Water Quality Parameters																														
pH	std units	NS	**6.52**		NS		**5.76**		NS		**6.27**		NS		**6.16**		NS/Dry		NS/Dry		NS/Dry		**6.04**		**6.17**		**6.23**		**5.71**	
Oxidation-Reduction Potential	mV	NS	**105.6**				**284.3**				**198.7**				**135.5**								**57.9**		**115.0**		**68.0**		**181.5**	
Turbidity	NTU	NS	**0.00**				**0.25**				**0.80**				**0.94**								**4.88**		**3.80**		**3.15**		**1.95**	

Notes:

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J = Estimated result
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Q = Qualifier
U = The target analyte was not detected at or above the laboratory reporting limit.
UJ = Estimated non-detect
ND = non-detect
µg/L = microgram per liter
mg/L = milligram per liter



APPENDIX A
GROUNDWATER FIELD ANALYSIS FORMS

155 Main Dunstable Road
Suites 120 125
Nashua, NH 03060
www.wspgroup.com

SHEPLEY'S HILL LANDFILL
DEVENS CONSOLIDATION LANDFILL
DEVENS, MASSACHUSETTS
MONITORING WELL SURVEY

Project No: 190048B

Date Printed: January 23, 2018
Client: KOMAN Government Solutions, LLC

Horizontal Datum: Massachusetts State Plane Coordinate System NAD83*
Vertical Datum: NAVD88

Instruments: Total Station - Leica TS06
Automatic Level - Nikon AP-8
Data Collector - Leica Viva

Field Crew: C. Parker
D. Dwyer

Project Manager: M. Soucy

Project Benchmark: **Shepley Landfill**	S-127S N: 3,024,425.23' E: 629,110.69' EL: 260.07'	Concrete Bound Drill Hole
Project Benchmark: **Devens Consolidation Landfill**	S104-SM N: 3,017,804.08' E: 625,518.44' EL: 300.74'	Concrete Bound Drill Hole

Darren J. Hardy, P.L.S. January 23, 2018
Reg. No. 48385
WSP USA

155 Main Dunstable Road
Suites 120 125
Nashua, NH 03060
www.wspgroup.com

SURVEY PROJECT DESCRIPTION

WSP conducted this monitoring well survey utilizing a combination of GPS and on the ground field survey using the latest in conventional survey equipment. All coordinate values are reported in relationship to the Devens, MA Control Network and Geographic System (GIS). Reference is made to the control survey and report entitled, "Survey Control Report Fort Devens, Massachusetts" prepared for Massachusetts Development Finance Agency, by Chas. H. Sells, Inc. dated April 8, 2002. All coordinates are on the Massachusetts State Plane Coordinate System of NAD 1983 and vertically on NAVD 1988. WSP used horizontal and vertical control points previously established by this office to perform the survey. Control Point S127-S was used as the reference benchmark for all elevations throughout the Shepley Landfill. S104-SM was used as the rerference benchmark for all elevations throughout the Devens Consolidation Landfill.

Differential leveling was implemented to ensure accurate elevations were established on all survey control to be used and the ground, rim and pvc elevation for each well. All vertical locations were collected using a Nikon AP-8 Automatic Level. All data obtained by differential leveling are reported to the 0.01' elevation. A peg test was performed prior to each visit on site to ensure the accuracy of the equipment being used.

The horizontal positions for the monitoring wells were collected using a Leica TS06 Total Station and Leica Viva Data Collector and/or with a Leica GS15 Real Time Kinematic GPS Unit. All data are reported to the nearest 0.1' horizontally.

All set up information, level notes and sketches were recorded in a field book at the time of the survey. At the end of each day the field crew downloaded the data collector and made copies of all field book pages.

155 Main Dunstable Road
Suites 120 125
Nashua, NH 03060
www.wspgroup.com

SHEPLEY LANDFILL

WELL ID	NORTHING (FT)	EASTING (FT)	ELEVATION (FT)		
			GROUND	RIM	PVC
N6-P1	3,026,338.6	630,017.1	256.06	258.91	258.60
SHM-05-40X	3,028,514.2	629,636.8	223.48	223.48	223.19
SHM-07-05X	3,028,513.3	629,632.1	223.66	223.66	223.40
SHM-13-14D	3,029,016.6	629,391.9	207.48	210.73	210.48
SHM-13-14S	3,029,020.6	629,392.3	207.67	210.90	210.55
SHP-99-35X	3,026,547.2	629,722.7	256.70	258.42	258.23
MW 16	3,027,110.9	629,182.2	267.71	270.23	270.23
MW 22	3,027,213.7	629,196.9	265.53	267.64	267.64
SHP-2017-1	3,027,948.0	629,939.7	227.22	229.94	229.63
SHP-2017-2	3,027,978.8	629,893.6	227.26	230.21	230.05

DEVENS CONSOLIDATION LANDFILL

WELL ID	NORTHING (FT)	EASTING (FT)	ELEVATION (FT)		
			GROUND	RIM	PVC
LFM-99-06A-RP	3,018,340.6	624,993.4	335.31	338.02	337.84
LFM-03-07	3,018,603.2	625,050.7	315.68	315.68	315.14

A.1

Spring 2018 LTM Event



AOC 57

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

Well Identification: 57M-95-03X

Project: Devens AOC 57 Spring 2018 Date: 5/8/18
Location: Fort Devens Massachusetts Sampler: MH

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)	10.38
Depth to bottom (ft BTOR)	19.58
Screen Interval (ft BTOR)	9.49 → 19.49
Total volume purged (gal)	4.0

Sampling Type

Purging Method peristaltic Tubing type poly Dedicated pump (Y/N) N
Purge start/stop time _____ Tubing diameter 1/4" Air source N/A

Field Instrument (Model/S/N) YSI 556 MPS 11E101554
Mach 2 Meg 17060C059049

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
1215	200	10.58	10.57	4.96	146	2.13	87.3	4.84	Gray
1220	↓	↓	10.41	5.07	145	1.82	79.3	3.62	↓
1225			10.9	5.20	148	1.90	66.7	3.34	
1230			11.23	5.30	153	1.92	57.7	3.32	
1235			11.07	5.32	152	1.93	58.9	3.29	
1240	↓	↓	11.06	5.31	154	1.94	58.7	3.27	↓
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	

2" Screen Volume = 0.163 gal/ft or 616 ml per foot

Sampling Details

Field Filtered (Y/N): N Duplicate (Y/N): N MS/MSD (Y/N): Y
Filter Size: N/A Dup ID/Time: N/A Sample Collection Time: 1245

Comments 57M-95-03X-SPR18 @ 1245

Signature

5/18/18
Date

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: 57M-96-11X

Project: Devens AOC 57 Spring 2018 Date: 5/8/18

Location: Fort Devens Massachusetts Sampler: MG

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)	2.81
Depth to bottom (ft BTOR)	14.67
Screen Interval (ft BTOR)	4.2 → 14.2
Total volume purged (gal)	3.0

Sampling Type

Purging Method grotpal Tubing type poly Dedicated pump (Y/N) N

Purge start/stop time 1045/1130 Tubing diameter 1/4" Air source N/A

Field Instrument (Model/S/N) YSI 556 MPS 11E101554

Mass 21002 17060859049

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	100	3.84	10.32	5.05	578	0.91	121.8	120	Cloudy
1050			10.45	5.17	577	0.70	92.6	110	
1055			10.73	5.20	575	0.61	71.0	99.9	
1100			10.66	5.18	572	0.66	57.5	97.4	
1105			10.47	5.17	576	0.61	47.8	84.5	
1110			10.46	5.18	574	0.59	41.6	86.5	
1115			10.39	5.18	572	0.60	40.9	85.9	
1120	↓	↓	10.33	5.18	571	0.59	39.7	85.6	↓
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	

2" Screen Volume = 0.163 gal/ft or 616 ml per foot

Sampling Details

Field Filtered (Y/N): ~~Y~~ N Duplicate (Y/N): Y MS/MSD (Y/N): N

Filter Size: N/A Dup ID/Time: 57M-DUP01-SPR18 @ 1130 Sample Collection Time: 1125

Comments 57M-96-11X-SPR18 @ 1125

Signature

5/8/18
Date

KGS

Field Instrument Calibration Log

Date: 5/8/18 **Weather:** 70's

Project/Site Name: AOC57 **Instrument:** YSI 556 MPS

Calibrated By: MA **Serial Number:** 11E101554

Parameters	Solution Expiration Date	Morning Calibration Time 950		Cal. Temperature °C	Afternoon Calibration Time 1310		Cal. Temperature °C	Post Cal. Criteria
Specific Conductivity (1.413 µS/cm°)	7/18	1.429	1.413	21.43	1.430	1.413	26.19	±10 µS/cm
pH (7)	1/21	7.14	7.00	~~21.43~~ 21.43	6.97	7.00	~~25.96~~	± 0.3 Ph *
pH (4)	10/31/2019	4.04	4.00	21.68	4.12	4.00	27.13	± 0.3 Ph *
pH (10)	12/31/2019	9.87	10.00	21.87	9.93	10.00	25.89	± 0.3 Ph *
ORP (240 mv)	10/31/2022	241.7	240.0	21.82	232.6	240.0	27.46	±10 mv
Dissolved Oxygen (%)	N/A	102.4	100.0%	25.51	106.9%	100.0%	28.70	-
Dissolved Oxygen (mg/L)	—							± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value
Barometric Pressure (mmHg)	—							-

Notes:

*** Ph Unit with Ph 7 Buffer**

Variance Noted:

Signature: [signature] **Date:** 5/8/18

Turbidity Instrument Calibration Log

Project/Site Name: A0057

Instrument: Hach 2100Q

Calibrated By: MA

Serial Number: 17060C059049

	AM				PM			
Date	**Pre/Post - Cal 10 NTU**	**Pre/Post - Cal 20 NTU**	**Pre/Post - Cal 100 NTU**	**Pre/Post - Cal 800 NTU**	**Pre/Post - Cal 10 NTU**	**Pre/Post - Cal 20 NTU**	**Pre/Post - Cal 100 NTU**	**Pre/Post - Cal 800 NTU**
5/8/18	10.0 | 10.0	19.9 | 20.0	107 | 100	800 | 800	9.56 | 10.00	21.6 | 20.0	103 | 100	799 | 800

	Post Calibration Criteria			
Variance Noted:	± 0.5	± 1	± 5	± 40

Signature: [signature]

Date: 5/8/18



AOC 32/43A

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: 32M-01-13xBR

Project: Devens AOC 32/43A Spring 2018 Date: 4/10/18

Location: Fort Devens Massachusetts Sampler: WG

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)	14.00
Depth to bottom (ft BTOR)	22.98
Screen Interval (ft BTOR)	13.25 - 23.25
Total volume purged (gal)	3.0

Sampling Type

Purging Method geotech Tubing type teflon Dedicated pump (Y/N) Pump pulled (no tubing)

Purge start/stop time 1210 / 1240 Tubing diameter 1/4" Air source N/A

Field Instrument (Model/S/N) YSI 556 MPS 17J102411

LaMotte 2020 WE 2759-4512

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
1210	100	16.19	9.37	6.45	1527	5.28	126.1	6.97	clear
1215	↓	16.43	9.39	6.47	1547	5.20	121.7	5.31	↓
1220		16.62	9.38	6.50	1551	5.18	117.6	5.29	
1225		16.71	9.39	6.51	1560	5.14	114.7	4.91	
1230		16.79	9.41	6.52	1562	5.13	113.6	4.90	
1235	↓	16.87	9.42	6.52	1568	5.10	112.9	4.88	↓ ✓
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	

2" Screen Volume = 0.163 gal/ft or 616 ml per foot

Sampling Details

Field Filtered (Y/N): N Duplicate (Y/N): N MS/MSD (Y/N): N

Filter Size: N/A Dup ID/Time: N/A

Comments 32M-01-13xBR-SP18 @ 1240

Signature

4/10/18

Date

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

Well Identification: 32M-01-14X0B

Project: Devens AOC 32/43A Spring 2018
Location: Fort Devens Massachusetts
Date: 4/10/18
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)	23.47
Depth to bottom (ft BTOR)	29.96
Screen Interval (ft BTOR)	19.52 → 29.52
Total volume purged (gal)	3.0

Sampling Type

Purging Method: Bladder pump
Purge start/stop time: 1315 / 1340
Tubing type: Teflon banded
Tubing diameter: 1/4" x 1/4"
Dedicated pump (Y/N): Y
Air source: N

Field Instrument (Model/S/N): YSI 556 MPS 11J102411
LaMotte 2020WE 2759-4512

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
1315	~~[illegible]~~ 150	24.31	10.02	6.14	544	1.58	82.2	1.97	Clear
1320	↓	24.59	10.07	6.12	549	1.39	79.4	1.37	↓
1325	↓	24.70	10.03	6.11	547	1.33	77.5	1.32	↓
1330	↓	24.89	10.09	6.10	546	1.27	77.3	1.30	↓
1335	↓	25.09	10.10	6.09	545	1.24	77.1	1.29	↓
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	

2" Screen Volume = 0.163 gal/ft or 616 ml per foot

Sampling Details

Field Filtered (Y/N): N
Filter Size: N/A
Duplicate (Y/N): N
Dup ID/Time: N/A
MS/MSD (Y/N): N

Comments 32M-01-14X0B - SPR18 @ 1340

[signature]
Signature

4/10/18
Date

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: 32M-01-17XBR

Project: Devens AOC 32/43A Spring 2018 Date: 4/9/18

Location: Fort Devens Massachusetts Sampler: MR

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)	26.53
Depth to bottom (ft BTOR)	57.37
Screen Interval (ft BTOR)	43.79 → 53.79
Total volume purged (gal)	4.0

Sampling Type

Purging Method geotech Tubing type Teflon Dedicated pump (Y/N) Pump removed

Purge start/stop time 1205 / 1235 Tubing diameter 1/4" Air source N/A

Field Instrument (Model/S/N) YSI 556 MPS 11J102411

Lamotte 2020we 2759-4512

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
1205	100	23.84	11.61	7.13	1097	1.86	109.1	4.71	Clear
1210	↓	↓	11.56	7.09	1090	1.64	115.7	3.06	
1215			11.50	7.05	1088	1.49	124.2	2.07	
1220			11.47	7.03	1085	1.42	126.9	1.96	
1225			11.48	7.03	1084	1.38	128.7	1.94	
1230	↓	↓	11.49	7.01	1081	1.36	129.4	1.91	✓
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	

2" Screen Volume = 0.163 gal/ft or 616 ml per foot

Sampling Details

Field Filtered (Y/N): N Duplicate (Y/N): N MS/MSD (Y/N): Y

Filter Size: N/A Dup ID/Time: N/A

Comments 32M-01-17XBR-SPR18 @ 1235

Signature

4/9/18 Date

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: 32M-01-18XBR

Project: Devens AOC 32/43A Spring 2018 Date: 4/9/18

Location: Fort Devens Massachusetts Sampler:

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)	15.34
Depth to bottom (ft BTOR)	29.74
Screen Interval (ft BTOR)	13.74 – 29.74
Total volume purged (gal)	4.0

Sampling Type

Purging Method: geotech — Tubing type: Teflon lined poly — Dedicated pump (Y/N): Tubing

Purge start/stop time: 1330 / 1405 — Tubing diameter: 1/4" — Air source: N/A

Field Instrument (Model/S/N): YSI 556 MPS 15J102411

Lamotte 2020we 2759-4512

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
1330	100	16.12	10.87	6.75	1250	5.57	114.2	7.88	Clear
1335		16.23	10.79	6.60	1279	5.39	119.7	5.11	
1340		16.34	10.73	6.55	1289	4.79	124.3	4.90	
1345		16.49	10.69	6.53	1309	4.68	125.9	4.27	
1350		16.58	10.68	6.52	1320	4.66	127.3	4.24	
1355	↓	16.69	10.67	6.51	1333	4.63	128.1	4.22	↓
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	

2" Screen Volume = 0.163 gal/ft or 616 ml per foot

Sampling Details

Field Filtered (Y/N): N — Duplicate (Y/N): Y — MS/MSD (Y/N): N

Filter Size: MA — Dup ID/Time: 32M-DUP01-SPR18 @ 1405

Comments 32M-01-18XBR-SPR18 @ 1400

Signature

4/9/18
Date

Field Instrument Calibration Log

Date: 4/9/18 **Weather:** 30's

Project/Site Name: AOC 32/43b **Instrument:** [redacted]02441 YSI 556MPS

Calibrated By: WA **Serial Number:** 17J102411

Parameters	Solution Expiration Date	Morning Calibration Time 720		Cal. Temperature °C	Afternoon Calibration Time 1425		Cal. Temperature °C	Post Cal. Criteria
Specific Conductivity (1.413 µS/cm°)	11/31/18	1.402	1.413	15.21°	1.411	1.413	14.97	±10 µS/cm
pH (7)	11/19	7.21	7.00		7.03	7.00		± 0.3 Ph *
pH (4)	6/31/19	4.19	4.00		4.02	4.00		± 0.3 Ph *
pH (10)	10/18	10.14	10.00		9.97	10.00		± 0.3 Ph *
ORP (240 mv)	5/22	246.1	240.0		237.6	240.0		±10 mv
Dissolved Oxygen (%)	N/A	102.7%	100.0%		98.2%	100.0%		-
Dissolved Oxygen (mg/L)	~							± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value
Barometric Pressure (mmHg)	~							-

Notes:

*** Ph Unit with Ph 7 Buffer**

Variance Noted:

Signature: [signature] **Date:** 4/9/18

Field Instrument Calibration Log

Date: 4/10/18 **Weather:** 30's

Project/Site Name: AOC 32/436 **Instrument:** YSI 556 MPS

Calibrated By: MA **Serial Number:** 15102411

Parameters	Solution Expiration Date	Morning Calibration Time 730		Cal. Temperature °C	Afternoon Calibration Time 1415		Cal. Temperature °C	Post Cal. Criteria
Specific Conductivity (1.413 µS/cm°)	11/31/18	1.421	1.413	14.60°	1.410	1.413	15.21°	±10 µS/cm
pH (7)	11/19	7.13	7.00		7.13	7.00		± 0.3 Ph *
pH (4)	6/31/19	4.10	4.00		4.02	4.00		± 0.3 Ph *
pH (10)	10/18	10.07	10.00		9.92	10.00		± 0.3 Ph *
ORP (240 mv)	5/22	246.1	240.0		232.1	240.0		±10 mv
Dissolved Oxygen (%)	N/A	103.2%	100.0%		103.6%	100.0%		-
Dissolved Oxygen (mg/L)								± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value
Barometric Pressure (mmHg)								-

Notes:

*** Ph Unit with Ph 7 Buffer**

Variance Noted:

Signature: [signature] **Date:** 4/10/18

Turbidity Instrument Calibration Log

Project/Site Name: AOC 32/43b

Instrument: LaMotte 2020we

Calibrated By: WA

Serial Number: 2759-4512

Date	Pre-Cal 0 NTU AM	Post-Cal 0 NTU AM	Pre-Cal 10 NTU AM	Post-Cal 10 NTU AM	Pre-Cal 0 NTU PM	Post-Cal 0 NTU PM	Pre-Cal 10 NTU PM	Post-Cal 10 NTU PM
4/9/18	0.13	0.00	9.92	10.00	0.03	0.00	10.11	10.00
4/10/18	0.09	0.00	10.11	10.00	0.00	0.00	10.12	10.00

Post Calibration Criteria			
-	-	± 0.5	Variance Noted:

Signature: [signature]

Date: 4/10/18


KGS
DCL

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: LFM-99-02B

Project: Devens DCL - Spring 2018 LTM
Location: Fort Devens Massachusetts

Date: 4/6/18
Sampler: MA

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)	15.90
Depth to bottom (ft BTOR)	26.28
Screen Interval (ft BTOR)	16.50 → 26.50
Total volume purged (gal)	4.0

Sampling Type

Purging Method: geotech pump
Purge start/stop time: 935 / 1005
Tubing type: Teflon
Tubing diameter: 1/4"
Dedicated pump (Y/N): N
Air source: N/A

Field Instrument (Model/S/N): YSI 556 MPS 17J102411
Lamotte 2020we 2759-4512

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
935	200	16.01	7.74	6.34	1186	8.97	65.5	3.21	clear
940	↓	↓	7.81	6.26	1189	8.49	71.6	2.99	↓
945			7.81	6.26	1190	8.32	76.1	2.97	
950			7.82	6.26	1192	8.19	79.7	2.94	
955			7.82	6.27	1194	8.17	80.2	2.93	
1000	↓	↓	7.83	6.27	1196	8.13	80.9	2.91	↓ ✓
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	

2" Screen Volume = 0.163 gal/ft or 616 ml per foot

Sampling Details

Field Filtered (Y/N): N
Filter Size: N/A
Duplicate (Y/N): N
Dup ID/Time: N/A
MS/MSD (Y/N): N

Dedicated Tubing (Y/N): Y

Comments: LFM-99-02B-SPR18-D 1005

Signature

4/6/18
Date

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

KGS

Well Identification: LFM-99-05A

Project: Devens DCL - Spring 2018 LTM
Location: Fort Devens Massachusetts

Date: 4/5/18
Sampler: VGA

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)	17.48
Depth to bottom (ft BTOR)	58.64
Screen Interval (ft BTOR)	20.70 → 30.70
Total volume purged (gal)	4.0

Sampling Type

Purging Method: geotech pump
Purge start/stop time: 1355 / 1425
Tubing type: teflon
Tubing diameter: 1/4"
Dedicated pump (Y/N): N
Air source: N/A

Field Instrument (Model/S/N): YSI 556 MPS MJ102411
Vanolle 20LWA 2759-4512

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
1355	200	20.52	10.49	6.39	682	6.30	65.6	9.76	clear
1400	↓	↓	10.39	6.40	681	5.97	69.7	4.73	↓
1405	↓	↓	10.54	6.41	681	5.94	71.9	2.49	↓
1410	↓	↓	10.59	6.42	682	5.88	73.1	2.32	↓
1415	↓	↓	10.57	6.42	682	5.89	74.7	2.29	↓ ✓
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	

2" Screen Volume = 0.163 gal/ft or 616 ml per foot

Sampling Details

Field Filtered (Y/N): N
Filter Size: N/A
Duplicate (Y/N): LFM-DUP01-SPR18
Dup ID/Time: @ 1425
MS/MSD (Y/N): N

Dedicated Tubing (Y/N): N

Comments: LFM-99-05A-SPR18 @ 1420

[signature]
Signature

4/5/18
Date

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: LFM-99-06A-RP

Project: Devens DCL - Spring 2018 LTM
Location: Fort Devens Massachusetts

Date: 4/5/18
Sampler: MA

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)	14.39
Depth to bottom (ft BTOR)	34.92
Screen Interval (ft BTOR)	20.20 → 35.20
Total volume purged (gal)	4.0

Sampling Type

Purging Method: geotech pump
Purge start/stop time: 1600/1630
Tubing type: Teflon
Tubing diameter: 1/4"
Dedicated pump (Y/N): Y
Air source: N/A
Field Instrument (Model/S/N): YSI 556 MPS 11F102411
LaMotte 2020WE 2759-4512

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
1600	200	14.54	10.32	6.48	1188	6.77	82.6	6.25	clear
1605			10.35	6.43	1190	6.47	82.7	4.97	
1610			10.37	6.43	1194	6.03	82.5	4.29	
1615			10.39	6.43	1197	5.92	82.3	4.20	
1620			10.38	6.43	1198	5.90	82.2	4.19	
1625	↓	↓	10.39	6.42	1199	5.88	82.3	4.22	↓
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	

2" Screen Volume = 0.163 gal/ft or 616 ml per foot

Sampling Details

Field Filtered (Y/N): Y
Filter Size: N/A
Duplicate (Y/N): N
Dup ID/Time: N/A
MS/MSD (Y/N): N
Dedicated Tubing (Y/N): N

Comments: LFM-99-06A-RP-SPR18 @ 1630

Signature

4/5/18
Date

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: LFM-03-07

Project: Devens DCL - Spring 2018 LTM
Location: Fort Devens Massachusetts

Date: 4/6/18
Sampler: VMP

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)	16.47
Depth to bottom (ft BTOR)	23.22
Screen Interval (ft BTOR)	10.7 - 20.7
Total volume purged (gal)	4.0

Sampling Type

Purging Method: geotech pump
Purge start/stop time: 735 / 805
Tubing type: Teflon
Tubing diameter: 1/4"
Dedicated pump (Y/N): N
Air source: N/A

Field Instrument (Model/S/N): YSI 556 MPS 15J102411
LaMotte 2020wE 2759-4512

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
735	150	16.78	7.82	6.40	861	8.18	55.2	4.21	Clear
740			7.59	6.24	861	7.79	59.9	3.45	
745			7.46	6.22	861	7.39	66.2	3.29	
750			7.48	6.23	863	7.20	67.3	3.19	
755			7.51	6.23	~~863~~ 864	7.17	67.7	3.17	
800	✓	✓	7.53	6.23	863	7.15	68.0	3.15	✓
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	

2" Screen Volume = 0.163 gal/ft or 616 ml per foot

Sampling Details

Field Filtered (Y/N): N
Filter Size: N/A
Duplicate (Y/N): N
Dup ID/Time: N/A
MS/MSD (Y/N): N

Dedicated Tubing (Y/N): N

Comments: LFM-03-07-SPR18 @805

Signature

4/6/18
Date

Field Instrument Calibration Log

Date: 4/5/18 **Weather:** clear

Project/Site Name: DCL **Instrument:** YSI 556 MPS

Calibrated By: WA **Serial Number:** 11J102911

Parameters	Solution Expiration Date	Morning Calibration Time 1235		Cal. Temperature °C	Afternoon Calibration Time 1745		Cal. Temperature °C	Post Cal. Criteria
Specific Conductivity (1.413 µS/cm°)	11/31/18	1.409	1.413	15.11	1.420	1.413	14.99°	±10 µS/cm
pH (7)	11/2019	7.03	7.00		7.03	7.00		± 0.3 Ph *
pH (4)	6/31/19	4.02	4.00		3.92	4.00		± 0.3 Ph *
pH (10)	10/18	9.99	10.00		9.93	10.00		± 0.3 Ph *
ORP (240 mv)	5/22	241.2	240.0		244.7	240.0		±10 mv
Dissolved Oxygen (%)	N/A	102.1%	100.0%		97.6%	100.0%		-
Dissolved Oxygen (mg/L)								± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value
Barometric Pressure (mmHg)								-

Notes:

*** Ph Unit with Ph 7 Buffer**

Variance Noted:

Signature: [signature] **Date:** 4/5/18

KGS

Field Instrument Calibration Log

Date: 4/6/18 **Weather:** clear

Project/Site Name: DCL **Instrument:** YSI 556 MPS

Calibrated By: MBA **Serial Number:** 16F102411

Parameters	Solution Expiration Date	Morning Calibration Time 640		Cal. Temperature °C	Afternoon Calibration Time 1320		Cal. Temperature °C	Post Cal. Criteria
Specific Conductivity (1.413 µS/cm°)	11/31/18	1.420	1.413	14.47°	1.407	1.413	14.91°	±10 µS/cm
pH (7)	1/2019	7.03	7.00		7.04	7.00		± 0.3 Ph *
pH (4)	6/31/19	3.96	4.00		3.97	4.00		± 0.3 Ph *
pH (10)	10/18	10.10	10.00		10.01	10.09		± 0.3 Ph *
ORP (240 mv)	5/22	239.1	240.0		237.6	240.0		±10 mv
Dissolved Oxygen (%)	N/A	98.6%	100.0%		97.2%	100.0%		-
Dissolved Oxygen (mg/L)								± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value
Barometric Pressure (mmHg)								-

Notes:

*** Ph Unit with Ph 7 Buffer**

Variance Noted:

Signature: _____ **Date:** 4/6/18

Turbidity Instrument Calibration Log

Project/Site Name: DCL

Instrument: LaMotte 2020e

Calibrated By: KA

Serial Number: 2759-4512

Date	Pre-Cal 0 NTU AM	Post-Cal 0 NTU AM	Pre-Cal 10 NTU AM	Post-Cal 10 NTU AM	Pre-Cal 0 NTU PM	Post-Cal 0 NTU PM	Pre-Cal 10 NTU PM	Post-Cal 10 NTU PM
4/5/18	0.03	0.00	9.99	10.00	0.07	0.00	10.00	10.00
4/6/18	0.12	0.00	10.03	10.00	0.09	0.00	10.03	10.00

Post Calibration Criteria			
-	-	± 0.5	Variance Noted:

Signature: [signature]

Date: 4/6/18

A.2

Fall 2018 LTM Event



DCL

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

Well Identification: LFM-03-07

Project: Devens DCL - Fall 2018 LTM
Location: Fort Devens Massachusetts
Date: 10/11/18
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)	17.83
Depth to bottom (ft BTOR)	22.50
Screen Interval (ft BTOR)	10.9-20.9
Total volume purged (gal)	4.0

Sampling Type

Purging Method: Peristaltic
Purge start/stop time: 0840 - 0950
Tubing type: Teflon
Tubing diameter: 1/4" OD
Dedicated pump (Y/N): —
Air source: MA
Field Instrument (Model/S/N): YSI 556MPS 09G100102
Hach 2100Q:

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
0903	250	18.20	16.48	5.90	1090	3.17	192.7	3.85	clear
0908	300	18.23	16.42	5.84	1087	3.16	189.7	2.99	↓
0917	300	18.25	16.32	5.79	1086	2.20	184.9	2.85	
0922	300	18.25	16.30	5.77	1086	2.79	184.7	3.05	
0927	300	↓	16.27	5.74	1086	2.87	183.9	2.10	
0932	300		16.25	5.72	1087	2.84	182.0	2.01	
0937	300	↓	16.25	5.71	1087	2.82	181.5	1.95	↓
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	

2" Screen Volume = 0.163 gal/ft or 616 ml per foot

Sampling Details

Field Filtered (Y/N): N
Filter Size: —
Duplicate (Y/N): —
Dup ID/Time: —
MS/MSD (Y/N): —

Dedicated Tubing (Y/N): Y

Comments Sampled LFM-03-07-FALL8 @ 0940

Signature

10/11/18
Date

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

Well Identification: LFM-99-06ARP

Project: Devens DCL - Fall 2018 LTM
Location: Fort Devens Massachusetts
Date: 10/11/18
Sampler: B.A

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)	14.82
Depth to bottom (ft BTOR)	35.21
Screen Interval (ft BTOR)	20.20 - 35.20
Total volume purged (gal)	5 gal

Sampling Type

Purging Method: Peristaltic
Purge start/stop time: 1040-1150
Tubing type: Teflon
Tubing diameter: 1/4" OD
Dedicated pump (Y/N): —
Air source: —
Field Instrument (Model/S/N): YSI 556MPS 09G100102

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
1050	300	15.00	12.51	6.49	1236	1.25	141.1	2.38	
1055	300	15.00	12.74	6.47	1239	1.37	141.7	2.68	
1100	↓	↓	12.66	5.96	1240	1.61	170.5	2.15	
1105			12.60	5.97	1240	5.68	171.3	1.97	
1120			12.59	5.99	1240	5.23	170.8	1.18	
1125			12.52	5.96	1240	5.13	173.2	1.84	
1130	↓	↓	12.58	5.96	1240	5.18	172.7	1.21	
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	

2" Screen Volume = 0.163 gal/ft or 616 ml per foot

Sampling Details

Field Filtered (Y/N): N
Filter Size: —
Duplicate (Y/N): —
Dup ID/Time: —
MS/MSD (Y/N): —

Dedicated Tubing (Y/N):
Comments Sampled LFM-99-06ARP-FALL @ 1200

Signature

10/11/18
Date

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: LFM-99-05A

Project: Devens DCL - Fall 2018 LTM
Location: Fort Devens Massachusetts

Date: 10/12/18
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)	21.25
Depth to bottom (ft BTOR)	30.92
Screen Interval (ft BTOR)	20.7-30.7
Total volume purged (gal)	2.0

Sampling Type

Purging Method: Peristaltic
Purge start/stop time: 0745-0845
Tubing type: Teflon
Tubing diameter: 1/4"OD
Dedicated pump (Y/N): —
Air source: —
Field Instrument (Model/S/N): YSI 556MPS 09G100102

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
0800	250	21.29	11.67	6.93	.782	3.12	200.6	17.6	
0805	250	21.29	11.45	6.53	780	1.63	208.3	13.7	
0810	↓	↓	11.43	6.48	779	1.48	211.3	13.4	
0815			11.38	6.35	779	1.65	218.2	13.1	
0820	↓	↓	11.35	6.38	776	1.41	213.1	12.9	
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	

2" Screen Volume = 0.163 gal/ft or 616 ml per foot

Sampling Details

Field Filtered (Y/N): N
Filter Size: —
Duplicate (Y/N): Yes
Dup ID/Time: LFM-DUP01-FALL8 @ 0850
MS/MSD (Y/N): —

Dedicated Tubing (Y/N):

Comments Sampled LFM-99-05A-FALL8 @ 0840

Signature

10/12/18
Date

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

Well Identification: LFM-99-02B

Project: Devens DCL - Fall 2018 LTM
Location: Fort Devens Massachusetts
Date: 10/12/18
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)	17.70
Depth to bottom (ft BTOR)	26.37
Screen Interval (ft BTOR)	16.5-26.5'
Total volume purged (gal)	2.0

Sampling Type

Purging Method: Peristaltic
Purge start/stop time: 1015-1230
Tubing type: Teflon
Tubing diameter: 1/4" OD
Dedicated pump (Y/N): —
Air source: —
Field Instrument (Model/S/N): YSI 556 MPS 09G100102

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
1030	250	17.65	12.14	6.02	1033	3.82	224.3	4.51	
1035	↓	↓	12.12	5.98	1026	3.49	224.9	3.19	
1040			12.11	5.96	1023	3.06	225.7	2.90	
1045			12.13	5.95	1038	3.94	225.5	2.51	
1050			12.09	5.95	1036	3.82	225.6	2.43	
1100	↓	↓	12.11	5.95	1038	3.85	225.8	2.47	
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	

2" Screen Volume = 0.163 gal/ft or 616 ml per foot

Sampling Details

Field Filtered (Y/N): —
Filter Size: —
Duplicate (Y/N): —
Dup ID/Time: —
MS/MSD (Y/N): Y

Dedicated Tubing (Y/N):
Comments Sample LFM-99-02B-FALIER 1130

Signature

10/12/18
Date

KGS

Field Instrument Calibration Log

Date: 10/11/18 **Weather:** Rain, 60°F

Project/Site Name: DCL Fall 2018 Sampling **Instrument:** YSI 556 MPS

Calibrated By: B.A **Serial Number:** 09G100102

Parameters	Solution Expiration Date	Morning Calibration Time 0630		Cal. Temperature °C	Afternoon Calibration Time 1500		Cal. Temperature °C	Post Cal. Criteria
Specific Conductivity (1.413 µS/cm^c)		1397	1413	23.01	1410	1413	14.31	±10 µS/cm
pH (7)		7.16	7.00	23.15	7.04	7.00	14.20	± 0.3 Ph *
pH (4)		4.10	4.00	22.85	3.98	4.00	14.07	± 0.3 Ph *
pH (10)		9.99	10.00	23.~~50~~ 37	9.96	10.00	14.50	± 0.3 Ph *
ORP (240 mv)		233.9	240.0	20.62	241.7	240.0	14.28	±10 mv
Dissolved Oxygen (%)		103.6	100.0	20.62	96.4	99.9	12.97	-
Dissolved Oxygen (mg/L)		9.29	8.98	20.62	8.89	9.01	12.97	± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value
Barometric Pressure (mmHg)		760	760	—	760	760	12.97	-

Notes:

*** Ph Unit with Ph 7 Buffer**

Variance Noted: ✓

Signature: [signature] **Date:** 10/11/18

Field Instrument Calibration Log

Date: 10/12/18 **Weather:** Cloudy, 57°F

Project/Site Name: DCL Fall 2018 Sampling **Instrument:** YSI 556 MPS

Calibrated By: B.A **Serial Number:** 09G100102

Parameters	Solution Expiration Date	Morning Calibration Time 0650		Cal. Temperature °C	Afternoon Calibration Time 1430		Cal. Temperature °C	Post Cal. Criteria
Specific Conductivity (1.413 µS/cm°)		1438	1413	20.09	1408	1413	16.20	±10 µS/cm
pH (7)		7.06	7.00	19.55	7.03	7.00	16.12	± 0.3 Ph *
pH (4)		3.93	4.00	19.16	4.05	4.00	15.92	± 0.3 Ph *
pH (10)		9.84	9.97	18.91	10.07	9.98	16.10	± 0.3 Ph *
ORP (240 mv)		247.7	240.0	18.73	239.8	240.0	15.87	±10 mv
Dissolved Oxygen (%)		102.5	100.0	16.25	98.9	100.0	14.81	-
Dissolved Oxygen (mg/L)		10.05	9.82	16.25	9.78	9.85	14.81	± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value
Barometric Pressure (mmHg)		760	760	—	760	760	14.81	-

Notes:

*** Ph Unit with Ph 7 Buffer**

Variance Noted:

Signature: **Date:** 10/12/18

Turbidity Instrument Calibration Log

Project/Site Name: DCL Fall 2018 Sampling
Calibrated By: BrA

Instrument: Hach 2100Q
Serial Number: 1109DC012349

	AM				PM			
Date	**Pre/Post - Cal 10 NTU**	**Pre/Post - Cal 20 NTU**	**Pre/Post - Cal 100 NTU**	**Pre/Post - Cal 800 NTU**	**Pre/Post - Cal 10 NTU**	**Pre/Post - Cal 20 NTU**	**Pre/Post - Cal 100 NTU**	**Pre/Post - Cal 800 NTU**
10/11/18	10.2/10	20.1/20	104/100	809/800	10.1/10	20.2/20	101/100	799/800
10/12/18	9.07/10	22.1/20	107/100	811/800	9.81/10	19.6/20	98/100	801/800

Signature: Brett Cox

Date: 10/12/18



AOC 69W

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: ZWM-99-22X

Project: Devens AOC 69W - Fall 2018 LTM
Location: Fort Devens Massachusetts

Date: 10/8/18
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)	4.25
Depth to bottom (ft BTOR)	14.35
Screen Interval (ft BTOR)	
Total volume purged (gal)	3.5 gal

Sampling Type

Purging Method: Peristaltic
Purge start/stop time: ~~1300~~ 1300 - 1330
Tubing type: ~~LDPE~~ LDPE
Tubing diameter: 1/4" OD
Dedicated pump (Y/N)
Air source: —
Field Instrument (Model/S/N): 556MPS 09G100702

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
1223	150	4.35	19.67	6.82	4810	0.27	-67.2	13.9	clear
1229	150	4.35	19.51	6.79	3864	0.27	-67.2	12.9	clear
1236	150	4.35	19.35	6.76	3229	0.30	-65.4	12.8	clear
1242	150	4.36	19.34	6.73	2959	0.28	-62.2	9.05	clear
1247	150	4.36	19.39	6.70	2631	0.39	-58.7	8.27	clear
1252	150	4.36	19.34	6.68	2399	0.23	-59.5	8.52	clear
1257	150	4.36	19.33	6.66	2210	0.28	-56.8	8.41	clear
1305	150	4.36	19.24	6.65	2124	0.22	-49.1	8.39	clear
1310	150	4.36	19.21	6.63	2040	0.28	-47.5	8.36	clear
1315	150	4.35	19.23	6.64	2090	0.26	-48.1	8.38	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	

2" Screen Volume = 0.163 gal/ft or 616 ml per foot

Sampling Details

Field Filtered (Y/N):
Filter Size: 0.45 µm
Duplicate (Y/N): 69W-DUP1-FALL8
Dup ID/Time: 1330
MS/MSD (Y/N):

Dedicated Tubing in Well (Y/N):

Comments Sample ZWM-99-22X-FALL8 @ 1320

Signature

10/8/18
Date

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: ZWM-99-24X

Project: Devens AOC 69W - Fall 2018 LTM
Location: Fort Devens Massachusetts

Date: 10/8/18
Sampler: B.A

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)	4.34
Depth to bottom (ft BTOR)	15.57
Screen Interval (ft BTOR)	
Total volume purged (gal)	2.5

Sampling Type

Purging Method: Peristaltic
Purge start/stop time: 1400-1447
Tubing type: LDPE
Tubing diameter: 1/4" OD
Dedicated pump (Y/N): —
Air source: —
Field Instrument (Model/S/N): YSI556 MPS 09B100702

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	4.36	15.78	5.84	269	1.54	57.1	6.55	clear
1415	170	4.38	15.86	5.67	248	1.67	68.7	3.08	clear
1420	170	4.37	15.88	5.64	246	1.36	70.5	3.83	clear
1425	170	4.37	15.89	5.61	245	0.93	71.3	2.92	clear
1430	170	4.37	15.94	5.60	245	0.78	70.7	2.20	clear
1435	170	4.37	15.95	5.59	245	0.79	70.3	2.18	clear
1440	170	4.37	15.94	5.59	245	0.78	70.2	2.19	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	

2" Screen Volume = 0.163 gal/ft or 616 ml per foot

Sampling Details

Field Filtered (Y/N): Y
Filter Size: 0.45 µm
Duplicate (Y/N): —
Dup ID/Time: —
MS/MSD (Y/N): —

Dedicated Tubing in Well (Y/N): Y

Comments Sample ZWM-99-24X-FALL18 @ 1445

Signature

10/8/18
Date

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

KGS

Well Identification: 69W-94-13

Project: Devens AOC 69W - Fall 2018 LTM
Location: Fort Devens Massachusetts

Date: 10/8/18
Sampler: Owen Jackson

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)	5.15
Depth to bottom (ft BTOR)	16.28
Screen Interval (ft BTOR)	
Total volume purged (gal)	.75 gal

Sampling Type

Purging Method: Peristaltic
Purge start/stop time: 1320/1335
Tubing type: LDPE
Tubing diameter: 1/4"
Dedicated pump (Y/N): N
Air source: N/A
Field Instrument (Model/S/N): YSI 600XL (06G2302) Hach 2100P (13110C029665)

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
1340	175	5.20	17.22	6.65	1.878	10.4	34.7	3.70	clear
1345	200	5.20	17.27	6.63	1.934	10.2	20.9	5.31	clear
1350	210	5.19	17.22	6.63	1.967	9.8	14.3	4.35	clear
1355	225	5.19	17.24	6.62	2.015	9.5	8.4	3.42	clear
1400	225	5.20	17.29	6.61	2.030	9.4	2.2	4.05	clear
1405	225	5.21	17.30	6.61	2.050	9.1	0.7	3.54	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	

2" Screen Volume = 0.163 gal/ft or 616 ml per foot

Sampling Details

Field Filtered (Y/N): Y
Filter Size: 0.45µm
Duplicate (Y/N): N
Dup ID/Time: N/A
MS/MSD (Y/N): N
Sample time: 1410

Dedicated Tubing in Well (Y/N): Y

Comments 69W-94-13 FAL18 @ 1410

Signature

10/8/18
Date

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: 69W-94-14

Project: Devens AOC 69W - Fall 2018 LTM
Location: Fort Devens Massachusetts

Date: 10/9/18
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)	6.30
Depth to bottom (ft BTOR)	15.18
Screen Interval (ft BTOR)	
Total volume purged (gal)	3.0

Sampling Type

Purging Method: Peristaltic
Purge start/stop time: 0700-0840
Tubing type: LDPE
Tubing diameter: 1/4" OD
Dedicated pump (Y/N): —
Air source: —
Field Instrument (Model/S/N): YSI 556 MPS 09B100702

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
0730	150	6.34	17.15	5.84	1136	2.11	183.5	6.70	clear
0735	150	6.34	17.20	5.81	1149	1.65	191.4	7.27	clear
0740	160	6.35	17.24	5.79	1162	0.76	194.0	5.25	clear
0745	160	6.35	17.24	5.77	1165	0.54	191.0	5.09	clear
0750	160	6.35	17.24	5.77	1169	0.55	175.8	5.64	clear
0755	160	6.35	17.25	5.76	1172	0.50	163.4	5.89	clear
0800	160	6.35	17.26	5.76	1172	0.43	148.7	6.02	clear
0805	160	6.35	17.27	5.75	1172	0.45	142.7	5.81	clear
0810	160	6.35	17.26	5.75	1171	0.41	135.1	4.78	clear
0815	160	6.35	17.27	5.73	1160	0.36	109.5	4.59	clear
0820	160	6.35	17.28	5.73	1156	0.36	100.9	4.58	clear
0825	160	6.35	17.28	5.73	1155	0.36	100.3	4.61	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	

2" Screen Volume = 0.163 gal/ft or 616 ml per foot

Sampling Details

Field Filtered (Y/N): Y
Filter Size: 0.45 µm
Duplicate (Y/N): —
Dup ID/Time: —
MS/MSD (Y/N): —

Dedicated Tubing in Well (Y/N): Y

Comments Sample 69W-94-14-FALIS @ 0830

Signature

10/9/18
Date

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: ZWM-99-23X

Project: Devens AOC 69W - Fall 2018 LTM
Location: Fort Devens Massachusetts
Date: 10/9/18
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)	4.19
Depth to bottom (ft BTOR)	15.30
Screen Interval (ft BTOR)	
Total volume purged (gal)	

Sampling Type

Purging Method: Peristaltic
Purge start/stop time: 0905-1010
Tubing type: LDPE
Tubing diameter: 1/4" OD
Dedicated pump (Y/N): —
Air source: —
Field Instrument (Model/S/N): YSI 556 MPS 09G100702

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
0915	160	4.23	17.43	6.26	1089	0.56	60.9	31.5	clear
0920	160	4.23	17.45	6.26	1090	0.31	52.4	13.8	clear
0925	160	4.24	17.49	6.26	1091	0.31	43.9	10.4	clear
0930	170	4.24	17.51	6.22	1089	0.30	42.2	7.41	clear
0935	160	4.23	17.51	6.23	1090	0.40	38.6	8.60	clear
0940	160	4.23	17.52	6.22	1090	0.39	34.9	5.64	clear
0945	160	4.23	17.51	6.22	1093	0.30	32.4	6.33	clear
0950	160	4.23	17.52	6.22	1093	0.33	30.0	6.29	clear
0955	160	4.23	17.52	6.22	1093	0.32	29.5	6.27	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	

2" Screen Volume = 0.163 gal/ft or 616 ml per foot

Sampling Details

Field Filtered (Y/N): Y
Filter Size: 0.45µm
Duplicate (Y/N): —
Dup ID/Time: —
MS/MSD (Y/N): —

Dedicated Tubing in Well (Y/N): Y

Comments Sample ZWM-99-23X-FAL18 @ 1000

Signature

10/9/18
Date

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: 2WM-01-25X

Project: Devens AOC 69W - Fall 2018 LTM
Location: Fort Devens Massachusetts

Date: 10/9/18
Sampler: B.A

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)	4.52
Depth to bottom (ft BTOR)	16.20
Screen Interval (ft BTOR)	
Total volume purged (gal)	2.5

Sampling Type

Purging Method: Peristaltic
Purge start/stop time: 1035-1125
Tubing type: LDPE
Tubing diameter: 1/4" OD
Dedicated pump (Y/N): —
Air source: —
Field Instrument (Model/S/N): YSI 556 MPS 09G100702

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
1042	170	4.55	17.26	5.90	1319	0.75	70.4	4.14	clear
1047	170	4.55	17.26	5.89	1354	0.53	82.3	3.43	clear
1052	170	4.55	17.19	5.88	1384	0.47	84.2	4.05	clear
1057	180	4.56	17.19	5.88	1405	0.40	86.6	3.72	clear
1102	180	4.56	17.20	5.88	1413	0.41	88.0	3.14	clear
~~1107~~ 1107	180	4.56	17.20	5.88	1413	0.44	89.5	3.25	clear
1112	180	4.56	17.20	5.84	1410	0.46	90.6	3.20	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	

2" Screen Volume = 0.163 gal/ft or 616 ml per foot

Sampling Details

Field Filtered (Y/N): N
Filter Size: 0.45 µm
Duplicate (Y/N): —
Dup ID/Time: —
MS/MSD (Y/N): —

Dedicated Tubing in Well (Y/N): Y

Comments Sample 2WM-01-25X-FALL8 @ 1115

Signature

10/9/18
Date

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

KGS

Well Identification: ZWM-95-15X

Project: Devens AOC 69W - Fall 2018 LTM
Location: Fort Devens Massachusetts

Date: 10/9/18
Sampler: Owen Jackson

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)	4.15
Depth to bottom (ft BTOR)	14.88
Screen Interval (ft BTOR)	
Total volume purged (gal)	3.25gal

Sampling Type

Purging Method: Peristaltic
Purge start/stop time: 0730/0820
Tubing type: 1/4" LDPE
Tubing diameter: 1/4"
Dedicated pump (Y/N): N
Air source: N/A
Field Instrument (Model/S/N): YSI C001L (06G2302) Hach 2100Q (131106 029663)

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
0750	180	4.21	15.64	5.48	0.468	11.6	128.0	10.30	cloudy
0755	180	4.20	15.65	5.49	0.469	10.6	126.4	7.50	clear
0800	180	4.22	15.64	5.51	0.471	10.1	125.9	6.29	clear
0805	190	4.23	15.67	5.51	0.479	8.7	120.9	5.27	clear
0810	190	4.23	15.69	5.52	0.483	8.4	119.5	5.62	clear
0815	190	4.21	15.70	5.52	0.488	8.0	116.5	5.50	clear
0820	190	4.22	15.70	5.52	0.491	7.9	113.5	5.31	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	

2" Screen Volume = 0.163 gal/ft or 616 ml per foot

Sampling Details

Field Filtered (Y/N): Y
Filter Size: 0.45µm
Duplicate (Y/N): N
Dup ID/Time: N/A
MS/MSD (Y/N): Y, 0820

Dedicated Tubing in Well (Y/N): Y

Comments ZWM-95-15X sampled @ 0820

Signature

10/9/18
Date

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

Well Identification: ZWM-95-18X

Project: Devens AOC 69W - Fall 2018 LTM
Location: Fort Devens Massachusetts
Date: 10/9/18
Sampler: Owen Jackson

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)	2.54
Depth to bottom (ft BTOR)	15.39
Screen Interval (ft BTOR)	
Total volume purged (gal)	2.75gal

Sampling Type

Purging Method: Peristaltic
Purge start/stop time: 0940/1020
Tubing type: LDPE
Tubing diameter: 1/4"
Dedicated pump (Y/N): N
Air source: N/A
Field Instrument (Model/S/N): YSI ProDSS/16G2304, Hach 21000(131060296613)

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
1000	175	2.60	15.44	5.78	1.011	34.5	161.3	3.12	clear
1005	190	2.61	15.43	5.79	1.008	31.7	161.2	1.42	↓
1010	190	2.61	15.47	5.79	1.006	31.3	161.7	4.99	
1015	190	2.60	15.44	5.79	1.005	30.8	162.2	2.65	
1020	190	2.60	15.44	5.80	1.003	29.8	162.7	3.28	
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	

2" Screen Volume = 0.163 gal/ft or 616 ml per foot

Sampling Details

Field Filtered (Y/N): Y
Filter Size: 0.45µm
Duplicate (Y/N): No
Dup ID/Time: N/A
MS/MSD (Y/N): No

Dedicated Tubing in Well (Y/N): Yes

Comments ZWM-95-18X FALL8 sampled @ 1025

Signature

10/9/18
Date

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

KGS

Well Identification: 69WP-13-01

Project: Devens AOC 69W - Fall 2018 LTM
Location: Fort Devens Massachusetts
Date: 10/9/18
Sampler: Owen Jackson

1 of 2

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	steel
Depth to water (ft BTOR)	1.51
Depth to bottom (ft BTOR)	12.22
Screen Interval (ft BTOR)	
Total volume purged (gal)	5 gal

Sampling Type

Purging Method: Peristaltic
Purge start/stop time: 1145/1325
Tubing type: LDPE
Tubing diameter: 1/4"
Dedicated pump (Y/N): N
Air source: N/A
Field Instrument (Model/S/N): YSI 600XL (06G2302) Hach 2100Q (13110C024663)

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
1145	175	2.70	14.11	6.40	0.986	7.9	19.2	>1000	black
1150		2.72	14.05	6.43	1.010	6.8	0.5	>1000	black
1155		2.65	13.97	6.43	1.015	7.3	-9.5	528	black
1200		2.64	13.97	6.41	1.015	9.6	-10.4	405	black
1205		2.72	13.82	6.39	1.015	31.0	-5.5	230	dark
1210		2.65	14.01	6.33	1.018	24.2	-2.1	167	dark
1215		2.62	13.88	6.33	1.019	22.9	0.1	343	dark
1220		2.64	13.73	6.32	1.018	19.5	0.0	352	dark
1225		2.69	13.78	6.33	1.020	19.7	-1.1	489	dark
1230		2.63	13.82	6.33	1.025	20.0	-0.1	320	dark
1235		2.62	13.83	6.33	1.027	22.2	1.1	80.5	cloudy
1240		2.59	13.86	6.33	1.028	24.2	3.0	72.6	cloudy
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	

2" Screen Volume = 0.163 gal/ft or 616 ml per foot

Sampling Details

Field Filtered (Y/N): Y
Filter Size: 0.45 µm
Duplicate (Y/N): N
Dup ID/Time: N/A
MS/MSD (Y/N): N

Dedicated Tubing in Well (Y/N): Y

Comments 69WP-13-01 FAL18 sampled @ 1330

Signature

10/9/18
Date

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: 69WP-13-01

Project: Devens AOC 69W - Fall 2018 LTM
Location: Fort Devens Massachusetts

Date: 10/9/18
Sampler: Owen Jackson

2 of 2

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	steel
Depth to water (ft BTOR)	1.51
Depth to bottom (ft BTOR)	12.21
Screen Interval (ft BTOR)	
Total volume purged (gal)	5gal

Sampling Type

Purging Method: Peristaltic
Purge start/stop time: 1145/1325
Tubing type: LDPE
Tubing diameter: 1/4"
Dedicated pump (Y/N): N
Air source: N/A
Field Instrument (Model/S/N): YSI (20A)(06G23022)

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
1245	175	2.59	13.96	6.33	1.027	25.3	5.7	81.7	cloudy
1250	↓	2.63	13.80	6.33	1.028	25.5	7.8	77.2	↓
1255		2.61	13.89	6.32	1.025	26.5	10.0	65.8	
1300		2.63	13.90	6.31	1.026	27.0	12.3	56.1	↓
1305		2.62	13.87	6.31	1.028	27.6	13.1	52.5	clear
1310		2.61	13.92	6.31	1.028	28.0	14.3	23.8	↓
1315		2.62	13.94	6.31	1.028	28.1	15.2	16.9	
1320		2.64	13.90	6.30	1.029	27.8	17.1	15.6	
1325	↓	2.66	13.89	6.30	1.025	27.8	18.1	16.1	↓
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	

2" Screen Volume = 0.163 gal/ft or 616 ml per foot

Sampling Details

Field Filtered (Y/N): Y
Filter Size: 0.45µm
Duplicate (Y/N): N
Dup ID/Time: N/A
MS/MSD (Y/N): N

Dedicated Tubing in Well (Y/N): Y

Comments 69WP-13-01 FALIB sampled @ 1330

Signature

10/9/18
Date

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: 69WP-08-01

Project: Devens AOC 69W - Fall 2018 LTM
Location: Fort Devens Massachusetts
Date: 10/9/18
Sampler: Owen Jackson

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	steel
Depth to water (ft BTOR)	2.01
Depth to bottom (ft BTOR)	12.41
Screen Interval (ft BTOR)	
Total volume purged (gal)	

Sampling Type

Purging Method: Peristaltic
Purge start/stop time: 1350/
Tubing type: LDPE
Tubing diameter: 1/4"
Dedicated pump (Y/N): N
Air source: N/A
Field Instrument (Model/S/N): YSI 600XL (CG23021) Hach 2100Q (13110602966 3)

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
1405	175	2.63	16.36	6.45	1.331	9.7	-54.7	220	dark
1410	↓	2.67	16.22	6.41	1.345	8.5	-98.1	210	↓
1415		2.65	16.36	6.38	1.347	8.1	-32.3	189	
1420		2.64	16.36	6.38	1.347	7.7	-30.2	187	
1425		2.67	16.26	6.38	1.353	7.5	-24.4	138	
1430		2.59	16.22	6.40	1.350	7.1	-18.8	137	
1435		2.61	16.23	6.38	1.350	7.1	-13.5	127	↓
1440		2.61	16.26	6.38	1.353	7.1	-8.4	121	cloudy
1445		2.65	16.36	6.24	1.351	7.0	-4.4	70.4	↓
1450		2.65	16.30	6.22	1.355	7.0	-2.0	67.0	
1455	↓	2.63	16.40	6.22	1.352	7.0	1.0	69.3	
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	

2" Screen Volume = 0.163 gal/ft or 616 ml per foot

Sampling Details

Field Filtered (Y/N): Y
Filter Size: 0.45µm
Duplicate (Y/N): N
Dup ID/Time: N/A
MS/MSD (Y/N): N

Dedicated Tubing in Well (Y/N): Y

Comments 69WP-08-01 sampled @ 1500

Signature

10/9/18
Date

KGS

Field Instrument Calibration Log

Date: 10/8/18 **Weather:** 57° Cloudy, light rain

Project/Site Name: AOC 69W Fall 2018 Sampling **Instrument:** YSI 600XL

Calibrated By: Owen Jackson **Serial Number:** 06G2302

Parameters	Solution Expiration Date	Morning Calibration Time 0700		Cal. Temperature °C	Afternoon Calibration Time 1500		Cal. Temperature °C
Specific Conductivity (1.413 µS/cm°)	12/31/18	1.389	1.413	19.59	1.377	1.413	15.90
pH (7)	02/29/20	7.02	7.00	20.18	7.13	7.00	16.05
pH (4)	09/30/19	3.58	4.00	19.78	4.24	4.00	15.42
pH (10)	12/31/19	9.99	10.00	19.42	9.96	10.00	15.60
ORP (240 mv)	2021	240.8	240.0	18.80	243.6	240.0	16.12
Dissolved Oxygen (%)	-	90.2	100.0	14.04	89.6	100.0	14.71
Dissolved Oxygen (mg/L)	-	9.28	10.27	-	8.63	10.27	-
Barometric Pressure (mmHg)	-	760	-	-	760	-	-

Notes:

Signature: [signature] **Date:** 10/8/18

KGS

Field Instrument Calibration Log

Date: 10/9/18 **Weather:** 70° sunny

Project/Site Name: AOC 69W Fall 2018 Sampling **Instrument:** YSI 600XL

Calibrated By: Owen Jackson **Serial Number:** 06G2302

Parameters	Solution Expiration Date	Morning Calibration Time 0630		Cal. Temperature °C	Afternoon Calibration Time 1545		Cal. Temperature °C
Specific Conductivity (1.413 µS/cm°)	12/31/18	1.441	14.13	20.37	1408	1.413	20.81
pH (7)	02/29/20	6.99	7.00	19.97	6.99	7.00	20.58
pH (4)	09/30/19	4.04	4.00	19.85	4.10	4.00	20.58
pH (10)	12/31/19	9.99	10.00	19.74	9.94	10.00	20.68
ORP (240 mv)	2022	238.7	240.0	19.85	238.5	240.0	20.97
Dissolved Oxygen (%)	-	119.1	100.0	19.11	127.3	100.0	21.20
Dissolved Oxygen (mg/L)	-	-	-	-	11.28	8.86	-
Barometric Pressure (mmHg)	-	760	-	-	760	-	-

Notes:

Signature: [signature] **Date:** 10/9/18

KGS

Turbidity Instrument Calibration Log

Project/Site Name: AOC 69W Fall 2018 Sampling
Calibrated By: Owen Jackson

Instrument: Hach 2100Q
Serial Number: 13110C024663

	AM				PM			
Date	**Pre/Post - Cal 10 NTU**	**Pre/Post - Cal 20 NTU**	**Pre/Post - Cal 100 NTU**	**Pre/Post - Cal 800 NTU**	**Pre/Post - Cal 10 NTU**	**Pre/Post - Cal 20 NTU**	**Pre/Post - Cal 100 NTU**	**Pre/Post - Cal 800 NTU**
10/8/18	9.80/10.0	19.5/20.0	100/100	795/800	12.4/10.0	21.5/20.0	100/100	804/800
~~10/9/18~~	~~21.2/20.0~~	~~99.9/100.0~~	OJ					
10/9/18	9.44/10.0	21.2/20.0	99.9/100.0	801/800	~~21.7/20.0~~ 11.3/10.0	21.7/20.0	113/100	808/800

Signature: [signature]

Date: 10/9/18

Field Instrument Calibration Log

Date: 10/9/2018 **Weather:** Overcast, 60s

Project/Site Name: Devens/AOC 69 **Instrument:** YSI

Calibrated By: B. Anchukaitis **Serial Number:** S/N 09G100702

Parameters	Solution Expiration Date	Morning Calibration Time _____		Cal. Temperature °C	Afternoon Calibration Time _____		Cal. Temperature °C	Post Cal. Criteria
Specific Conductivity (1.413 µS/cm[c])	-	1.39	1.413	17.83	1.41	1.413	23.85	±10 µS/cm
pH (7)	-	7.17	7.00	17.41	4.06	7.00	24.03	± 0.3 Ph *
pH (4)	-	3.98	4.00	17.93	4.00	4.00	24.55	± 0.3 Ph *
pH (10)	-	9.96	9.99	17.88	9.92	9.99	25.77	± 0.3 Ph *
ORP (240 mv)	-	244.4	240.0	17.44	226.30	240.0	24.95	±10 mv
Dissolved Oxygen (%)	-	97.9	100	16.97	98.70	100	23.88	-
Dissolved Oxygen (mg/L)	-	9.46	9.67	16.97	8.33	8.43	23.88	± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value
Barometric Pressure (mmHg)	-	-	-	-	-	-	-	-

Notes:

*** Ph Unit with Ph 7 Buffer**

Variance Noted: ORP and DO

Signature: B. Anchukaitis **Date:** 10/9/2018

Turbidity Instrument Calibration Log

Project/Site Name: AOC 69W Fall 2018 Sampling
Calibrated By: B. Anchukaitis
Instrument: Hach
Serial Number: 1109DC012349

	AM				PM			
Date	**Pre/Post - Cal 10 NTU**	**Pre/Post - Cal 20 NTU**	**Pre/Post - Cal 100 NTU**	**Pre/Post - Cal 800 NTU**	**Pre/Post - Cal 10 NTU**	**Pre/Post - Cal 20 NTU**	**Pre/Post - Cal 100 NTU**	**Pre/Post - Cal 800 NTU**
10/9/2018	9.04/10.0	19.9/20.0	104/100	816/800	9.45	19.60	104.0	816.0
10/10/2018	9.62/10	18.7/20	98/100	804/800	--	--	--	--
10/11/2018	10.2/10	20.1/20	104/100	809/800	--	--	--	--
10/12/2018	9.07/10	22.1/20	107/100	811/800	--	--	--	--

Signature: B. Anchukaitis
Date: 10/12/2018



AOC 43G

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: XGM-93-02X

Project: Devens AOC 43G - Fall 2018 LTM
Location: Fort Devens Massachusetts

Date: 10/10/18
Sampler: Melissa Miller

Well Integrity

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

Well Information

Diameter	4"
Material	PVC
Depth to water (ft BTOR)	27.90
Depth to bottom (ft BTOR)	37.42
Screen Interval (ft ~~BTOR~~)	28-38 BTOR
Total volume purged (gal)	2.50

Sampling Type

Purging Method: Peristaltic
Purge start/stop time: 1035/1100
Tubing type: Teflon Lined
Tubing diameter: 1/4"
Dedicated pump (Y/N): N
Air source: NA
Field Instrument (Model/S/N): Hach 2100Q (13110C02966); YSI 650 MDS (06G2302A1)

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	150	28.10	16.25	6.64	2 641	2.37	-56.1	71.7	cloudy
1110	150	28.10	16.37	6.63	2,622	2.42	-56.8	65.4	Cloudy
1115	150	28.10	16.29	6.63	2.621	2.44	-61.9	64.2	Cloudy
1120	125	28.09	16.15	6.63	2,628	2.36	-62.7	43.7	Cloudy/Clear
1125	125	28.10	16.14	6.64	2,622	2.39	-62.7	34.6	Cloudy/Clear
1130	125	28.09	16.15	6.64	2,620	2.40	-63.0	34.3	Cloudy/Clear
1135	125	28.09	16.14	6.64	2,622	2.39	-63.1	34.1	Cloudy/Clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	

2" Screen Volume = 0.163 gal/ft or 616 ml per foot

XGM-93-02X-FAL18

Sampling Details

Field Filtered (Y/N): N
Duplicate (Y/N): N
MS/MSD (Y/N): N
Filter Size: _____
Dup ID/Time: _____
@ 1140

Dedicated Tubing in Well (Y/N): Y, Teflon lined

Comments _____

Melissa Miller
Signature

10/10/18
Date

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: XGM-97-12X

Project: Devens AOC 43G - Fall 2018 LTM
Location: Fort Devens Massachusetts

Date: 10/10/18
Sampler: Melissa Miller

Well Integrity

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

Well Information

Diameter	4"
Material	PVC
Depth to water (ft BTOR)	24.35
Depth to bottom (ft BTOR)	33.80
Screen Interval (ft BTOR)	24-34
Total volume purged (gal)	3.25

Sampling Type

Purging Method: Peristaltic
Purge start/stop time: 1200/1255
Tubing type: Teflon lined
Tubing diameter: 1/4"
Dedicated pump (Y/N): N
Air source: NA
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
1220	200	25.20	16.25	6.61	2,292	2.97	-75.5	8.87	Clear
1225	150	25.15	16.75	6.59	2,285	3.02	-75.8	8.81	Clear
1230	150	25.10	16.98	6.64	2,279	2.98	-78.6	7.67	Clear
1235	150	25.05	17.20	6.65	2,281	3.16	-79.6	7.22	Clear
1240	150	25.05	17.22	6.64	2,276	3.06	-78.9	7.14	Clear
1245	150	25.05	17.24	6.64	2,275	3.07	-79.0	7.13	Clear
1250	150	25.05	17.22	6.64	2,274	3.06	-79.1	7.11	Clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	

2" Screen Volume = 0.163 gal/ft or 616 ml per foot

XGM-97-12X_FAL18
Field Filtered (Y/N): N
Filter Size: NA
@ 1255

Sampling Details

Duplicate (Y/N): Y
Dup ID/Time: XGM-DUP1-FAL18 @ 1300
MS/MSD (Y/N): N

Dedicated Tubing in Well (Y/N): Y

Comments

Melissa A. Miller
Signature

10/10/18
Date

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

Well Identification: AAFES-2

Project: Devens AOC 43G - Fall 2018 LTM
Location: Fort Devens Massachusetts
Date: 10/10/18
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)	22.16
Depth to bottom (ft BTOR)	33.40
Screen Interval (ft BTOR)	
Total volume purged (gal)	2.0

Sampling Type

Purging Method: Peristaltic
Purge start/stop time: 1155-1250
Tubing type: Teflon
Tubing diameter: 1/4" OD
Dedicated pump (Y/N): —
Air source: —
Field Instrument (Model/S/N): YSI 556 MPS 09161100702

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	120	23.80	16.84	6.89	2164	1.65	-71.8	25.9	clear
1205	120	22.92	17.00	6.73	2137	0.56	-78.2	22.2	
1210	100	23.05	16.41	6.66	2121	0.41	-77.5	22.5	
1215	100	23.15	16.25	6.63	2117	0.43	-74.7	22.7	
1220	↓	23.25	16.42	6.59	2106	0.50	-67.6	23.5	
1225		23.35	16.45	6.57	2107	0.54	-65.9	23.1	
1229		23.42	16.28	6.57	2112	0.45	-63.8	23.6	↓
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	

2" Screen Volume = 0.163 gal/ft or 616 ml per foot

Sampling Details

Field Filtered (Y/N): —
Filter Size: —
Duplicate (Y/N): —
Dup ID/Time: —
MS/MSD (Y/N): —

Dedicated Tubing in Well (Y/N):

Comments: Sample AAFES-2-FALL18 @ 1230

Signature

10/10/18
Date

9

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

Well Identification: XGM-94-04X

Project: Devens AOC 43G - Fall 2018 LTM
Location: Fort Devens Massachusetts
Date: 10/10/18
Sampler: BvA

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)	18.70
Depth to bottom (ft BTOR)	31.10
Screen Interval (ft BTOR)	
Total volume purged (gal)	2.0

Sampling Type

Purging Method: Peristaltic
Purge start/stop time: 1030-1130
Tubing type: PTFE
Tubing diameter: 1/4" OD
Dedicated pump (Y/N): —
Air source: —
Field Instrument (Model/S/N): YSI 556 MPS 09160100702

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	120	19.11	17.08	6.90	2303	2.00	171.4	8.56	clear
1040	↓	19.12	16.90	6.53	2311	1.58	192.0	7.01	↓
1045		19.14	16.41	6.45	2325	0.60	192.5	8.11	
1050		19.14	16.04	6.46	2327	0.52	187.9	8.02	
1055		19.14	16.18	6.46	2324	0.46	183.7	8.25	
1100		19.14	16.26	6.46	2320	0.44	180.7	8.18	
1105	↓	19.14	16.29	6.46	2319	0.44	179.8	8.05	↓
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	

2" Screen Volume = 0.163 gal/ft or 616 ml per foot

Sampling Details

Field Filtered (Y/N): N
Filter Size: —
Duplicate (Y/N): N — —
Dup ID/Time: —
MS/MSD (Y/N): Y

Dedicated Tubing in Well (Y/N): Y

Comments: Sample XGM-94-04X-FAL18 (MS/MSD) @ 1115

Signature

10/10/18
Date

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

Well Identification: AAFES-7

Project: Devens AOC 43G - Fall 2018 LTM
Location: Fort Devens Massachusetts
Date: 10/10/18
Sampler: BA

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)	7.38
Depth to bottom (ft BTOR)	17.28
Screen Interval (ft BTOR)	
Total volume purged (gal)	2.0

Sampling Type

Purging Method: Peristaltic
Purge start/stop time: 0930-1015
Tubing type: ~~Sil~~ Teflon
Tubing diameter: 1/4" OD
Dedicated pump (Y/N): —
Air source: —
Field Instrument (Model/S/N): YSI 556 MPS 09G100702

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
0935	120	7.45	15.55	6.28	1739	2.85	185.0	25.1	cloudy
0940	120	7.46	15.60	6.27	1734	3.00	184.7	15.0	clear
0945	120	7.45	15.65	6.19	1718	1.07	141.6	9.75	↓
0950	120	7.45	15.68	6.13	1716	0.66	194.1	5.86	
0955	120	7.46	15.66	6.13	1721	0.53	193.5	5.19	
1000	120	7.45	15.74	6.12	1724	0.68	193.6	5.21	
1005	120	7.45	15.68	6.12	1730	0.57	192.8	5.18	
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	

2" Screen Volume = 0.163 gal/ft or 616 ml per foot

Sampling Details

Field Filtered (Y/N): N
Filter Size: N
Duplicate (Y/N): —
Dup ID/Time: —
MS/MSD (Y/N): —

Dedicated Tubing in Well (Y/N):

Comments: Sample AAFES-7_FALL8 @ 1015

Signature

10/10/18
Date

KGS

Field Instrument Calibration Log

Date: 10/10/18 **Weather:** 80°F warm, sunny

Project/Site Name: Devens, FALL LTM'18 -43G **Instrument:** YSI 650 MDS

Calibrated By: Melissa Miller **Serial Number:** 06G2302A1

Parameters	Solution Expiration MM Date YY	Morning Calibration Time 0850		Cal. Temperature °C	Afternoon Calibration Time 1320 (check)		Cal. Temperature °C	Post Cal. Criteria
Specific Conductivity (1,413 µS/cm°)	02/19	1308	1,413	20.34	1.420	—	23.24	±10 µS/cm
pH (7)	02/20	7.08	7.00	20.43	6.93	—	22.45	± 0.3 Ph *
pH (4)	09/19	4.00	4.00	20.59	4.10	—	22.46	± 0.3 Ph *
pH (10)	12/19	8.98	10.00	20.54	9.93	—	21.77	± 0.3 Ph *
ORP (240 mv)	02/19	243.5	240.0	20.32	232.2	—	22.77	±10 mv
Dissolved Oxygen (%)	—	88.9	100.0	20.43	95.3	—	23.30	-
Dissolved Oxygen (mg/L)	—	8.00	8.97	20.43	8.53	—	23.30	± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value
Barometric Pressure (mmHg)	757.6	—	—	—	757.6	—	—	-

Notes:

*** Ph Unit with Ph 7 Buffer**

Variance Noted: NO

Signature: Melissa A. Miller **Date:** 10/10/18

Turbidity Instrument Calibration Log

Project/Site Name: Devens, Fall '18 LTM - 43G

Instrument: HACH 2100Q

Calibrated By: Melissa Miller

Serial Number: 13116C029663

20 NTU / 100 NTU / 800 NTU / 10 NTU / 20 NTU / 100 NTU / 800 NTU / 10 NTU

Date	~~Pre-Cal 0~~ NTU AM	~~Post-Cal 0~~ NTU AM	~~Pre-Cal 10~~ NTU AM	~~Post-Cal 10~~ NTU AM	Pre-Cal 0 NTU PM	Post-Cal 0 NTU PM	Pre-Cal 10 NTU PM	Post-Cal 10 NTU PM
10/10/18	12.6 ; 20.0	87.4 ; 100	779 ; 800	9.73 ; 10.00	20.3	102	806	9.69

Post Calibration Criteria			
-	-	± 0.5	Variance Noted: ND

Signature: Melissa A. Miller

Date: 10/10/18

APPENDIX B

LABORATORY ANALYTICAL REPORTS (on CD)

B.1

Spring 2018 LTM Event

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING



ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Tel: (912)354-7858

TestAmerica Job ID: 680-150816-1
Client Project/Site: Devens / DCL

For:
KOMAN Government Solutions, LLC
293 Boston Post Road
Suite 100
Marlborough, Massachusetts 01752

Attn: Laurie Ekes

Jerry Lanier

Authorized for release by:
4/23/2018 4:32:19 PM

Jerry Lanier, Project Manager I
(912)354-7858 e.3410
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.

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Job ID: 680-150816-1

Laboratory: TestAmerica Savannah

Narrative

CASE NARRATIVE

Client: KOMAN Government Solutions, LLC

Project: Devens / DCL

Report Number: 680-150816-1

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 04/07/2018; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 0.2º C, 0.3º C, 0.6º C and 1.3º C.

PESTICIDES AND PCBS

Samples LFM-99-02B_SPR18 (680-150816-1), LFM-99-05A_SPR18 (680-150816-2), LFM-DUP01_SPR18 (680-150816-3), LFM-99-06A RP_SPR18 (680-150816-4) and LFM-03-07_SPR18 (680-150816-5) were analyzed for Pesticides and PCBs in accordance with EPA SW-846 Method 8081B_8082A. The samples were prepared on 04/10/2018, 04/11/2018 and 04/16/2018 and analyzed on 04/11/2018, 04/12/2018 and 04/17/2018.

Surrogate recovery for the following sample was outside control limits: LFM-99-02B_SPR18 (680-150816-1). Re-extraction was performed outside of holding time with acceptable results.

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)

Samples LFM-99-02B_SPR18 (680-150816-1), LFM-99-05A_SPR18 (680-150816-2), LFM-DUP01_SPR18 (680-150816-3), LFM-99-06A RP_SPR18 (680-150816-4) and LFM-03-07_SPR18 (680-150816-5) were analyzed for Metals (ICP) in accordance with EPA SW-846 Method 6010C. The samples were prepared on 04/10/2018 and analyzed on 04/11/2018.

Barium failed the recovery criteria low for the MS of sample LFM-99-02B_SPR18MS (680-150816-1) in batch 680-519787.

Barium and Selenium failed the recovery criteria low for the MSD of sample LFM-99-02B_SPR18MSD (680-150816-1) in batch 680-519787.

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

Samples LFM-99-02B_SPR18 (680-150816-1), LFM-99-05A_SPR18 (680-150816-2), LFM-DUP01_SPR18 (680-150816-3), LFM-99-06A RP_SPR18 (680-150816-4) and LFM-03-07_SPR18 (680-150816-5) were analyzed for Metals in accordance with EPA SW-846 Method 6020. The samples were prepared on 04/10/2018 and analyzed on 04/12/2018.

Job ID: 680-150816-1 (Continued)

Laboratory: TestAmerica Savannah (Continued)

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

MERCURY

Samples LFM-99-02B_SPR18 (680-150816-1), LFM-99-05A_SPR18 (680-150816-2), LFM-DUP01_SPR18 (680-150816-3), LFM-99-06A RP_SPR18 (680-150816-4) and LFM-03-07_SPR18 (680-150816-5) were analyzed for mercury in accordance with EPA SW-846 Method 7470A. The samples were prepared on 04/09/2018 and analyzed on 04/12/2018.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

ALKALINITY

Samples LFM-99-02B_SPR18 (680-150816-1), LFM-99-05A_SPR18 (680-150816-2), LFM-DUP01_SPR18 (680-150816-3), LFM-99-06A RP_SPR18 (680-150816-4) and LFM-03-07_SPR18 (680-150816-5) were analyzed for alkalinity in accordance with SM 2320B. The samples were analyzed on 04/10/2018 and 04/11/2018.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

TOTAL DISSOLVED SOLIDS

Samples LFM-99-02B_SPR18 (680-150816-1), LFM-99-05A_SPR18 (680-150816-2), LFM-DUP01_SPR18 (680-150816-3), LFM-99-06A RP_SPR18 (680-150816-4) and LFM-03-07_SPR18 (680-150816-5) were analyzed for total dissolved solids in accordance with SM 2540C. The samples were analyzed on 04/12/2018.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

NITRATE-NITRITE AS NITROGEN

Samples LFM-99-02B_SPR18 (680-150816-1), LFM-99-05A_SPR18 (680-150816-2), LFM-DUP01_SPR18 (680-150816-3), LFM-99-06A RP_SPR18 (680-150816-4) and LFM-03-07_SPR18 (680-150816-5) were analyzed for nitrate-nitrite as nitrogen in accordance with EPA Method 353.2. The samples were analyzed on 04/16/2018.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

CHEMICAL OXYGEN DEMAND

Samples LFM-99-02B_SPR18 (680-150816-1), LFM-99-05A_SPR18 (680-150816-2), LFM-DUP01_SPR18 (680-150816-3), LFM-99-06A RP_SPR18 (680-150816-4) and LFM-03-07_SPR18 (680-150816-5) were analyzed for chemical oxygen demand in accordance with EPA Method 410.4. The samples were analyzed on 04/18/2018.

Chemical Oxygen Demand failed the recovery criteria low for the MSD of sample LFM-99-02B_SPR18MSD (680-150816-1) in batch 280-411708.

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.

CYANIDE

Samples LFM-99-02B_SPR18 (680-150816-1), LFM-99-05A_SPR18 (680-150816-2), LFM-DUP01_SPR18 (680-150816-3), LFM-99-06A RP_SPR18 (680-150816-4) and LFM-03-07_SPR18 (680-150816-5) were analyzed for cyanide in accordance with EPA SW-846 Method 9012B. The samples were prepared and analyzed on 04/12/2018.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

ANIONS BY ION CHROMATOGRAPHY (28 DAY)

Samples LFM-99-02B_SPR18 (680-150816-1), LFM-99-05A_SPR18 (680-150816-2), LFM-DUP01_SPR18 (680-150816-3), LFM-99-06A RP_SPR18 (680-150816-4) and LFM-03-07_SPR18 (680-150816-5) were analyzed for Anions by Ion Chromatography (28 Day) in accordance with SW 846 9056A. The samples were analyzed on 04/11/2018 and 04/12/2018.

Job ID: 680-150816-1 (Continued)

Laboratory: TestAmerica Savannah (Continued)

Samples LFM-99-02B_SPR18 (680-150816-1)[10X], LFM-99-05A_SPR18 (680-150816-2)[10X], LFM-DUP01_SPR18 (680-150816-3)[10X], LFM-99-06A RP_SPR18 (680-150816-4)[10X] and LFM-03-07_SPR18 (680-150816-5)[10X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

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: Devens / DCL

TestAmerica Job ID: 680-150816-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
680-150816-1	LFM-99-02B_SPR18	Water	04/06/18 10:05	04/07/18 09:42
680-150816-2	LFM-99-05A_SPR18	Water	04/05/18 14:20	04/07/18 09:42
680-150816-3	LFM-DUP01_SPR18	Water	04/05/18 14:25	04/07/18 09:42
680-150816-4	LFM-99-06A RP_SPR18	Water	04/05/18 16:30	04/07/18 09:42
680-150816-5	LFM-03-07_SPR18	Water	04/06/18 08:05	04/07/18 09:42
680-150816-6	Trip Blank2_040518	Water	04/05/18 00:00	04/07/18 09:42

Method Summary

Client: KOMAN Government Solutions, LLC
Project/Site: Devens / DCL

TestAmerica Job ID: 680-150816-1

Method	Method Description	Protocol	Laboratory
8081B 8082A	Organochlorine Pesticides & PCBs (GC)	SW846	TAL SAV
9056A	Anions, Ion Chromatography	SW846	TAL SAV
6010C	Metals (ICP)	SW846	TAL SAV
6020A	Metals (ICP/MS)	SW846	TAL SAV
7470A	Mercury (CVAA)	SW846	TAL SAV
353.2	Nitrogen, Nitrate-Nitrite	MCAWW	TAL DEN
410.4	COD	MCAWW	TAL DEN
9012B	Cyanide, Total and/or Amenable	EPA	TAL SAV
SM 2320B	Alkalinity	SM	TAL DEN
SM 2540C	Solids, Total Dissolved (TDS)	SM	TAL DEN
MA-EPH	MADEP EPH (Extractable Petroleum Hydroca	MA DEP	
MA-VPH	MADEP VPH Volatile Petroleum Hydrocarbon	MA DEP	
3010A	Preparation, Total Metals	SW846	TAL SAV
3520C	Liquid-Liquid Extraction (Continuous)	SW846	TAL SAV
7470A	Preparation, Mercury	SW846	TAL SAV
9012B	Cyanide, Total and/or Amenable, Distillation	SW846	TAL SAV

Protocol References:

EPA = US Environmental Protection Agency

MA DEP = Massachusetts Department Of Environmental Protection

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

SM = "Standard Methods For The Examination Of Water And Wastewater"

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

= Katahdin Analytical Services Inc, PO BOX 540, 600 Technology Way, Scarborough, ME 04074

TAL DEN = TestAmerica Denver, 4955 Yarrow Street, Arvada, CO 80002, TEL (303)736-0100

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

Qualifiers

GC Semi VOA

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.
M	Manual integrated compound.
Q	One or more quality control criteria failed.
H	Sample was prepped or analyzed beyond the specified holding time

HPLC/IC

Qualifier	Qualifier Description
M	Manual integrated compound.
D	The reported value is from a dilution.
U	Undetected at the Limit of Detection.

Metals

Qualifier	Qualifier Description
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.
J	Estimated: The analyte was positively identified; the quantitation is an estimation

General Chemistry

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 ID: LFM-99-02B_SPR18
Date Collected: 04/06/18 10:05
Date Received: 04/07/18 09:42

Lab Sample ID: 680-150816-1
Matrix: Water

Method: 8081B 8082A - Organochlorine Pesticides & PCBs (GC)

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Aldrin	0.018	U	0.050	0.018	0.0072	ug/L		04/12/18 19:25	1
alpha-BHC	0.010	U	0.050	0.010	0.0034	ug/L		04/12/18 19:25	1
beta-BHC	0.018	U	0.050	0.018	0.0091	ug/L		04/12/18 19:25	1
Chlordane (technical)	0.30	U M	0.50	0.30	0.095	ug/L		04/12/18 19:25	1
4,4'-DDD	0.010	U	0.050	0.010	0.0063	ug/L		04/12/18 19:25	1
4,4'-DDE	0.010	U	0.050	0.010	0.0051	ug/L		04/12/18 19:25	1
4,4'-DDT	0.018	U	0.050	0.018	0.0070	ug/L		04/12/18 19:25	1
delta-BHC	0.018	U	0.050	0.018	0.0075	ug/L		04/12/18 19:25	1
Dieldrin	0.010	U	0.050	0.010	0.0038	ug/L		04/12/18 19:25	1
Endosulfan I	0.010	U	0.050	0.010	0.0035	ug/L		04/12/18 19:25	1
Endosulfan II	0.010	U	0.050	0.010	0.0042	ug/L		04/12/18 19:25	1
Endosulfan sulfate	0.010	U	0.050	0.010	0.0051	ug/L		04/12/18 19:25	1
Endrin	0.010	U	0.050	0.010	0.0053	ug/L		04/12/18 19:25	1
Endrin aldehyde	0.010	U M	0.050	0.010	0.0061	ug/L		04/12/18 19:25	1
Endrin ketone	0.010	U	0.050	0.010	0.0046	ug/L		04/12/18 19:25	1
gamma-BHC (Lindane)	0.010	U	0.050	0.010	0.0036	ug/L		04/12/18 19:25	1
Heptachlor	0.018	U	0.050	0.018	0.0071	ug/L		04/12/18 19:25	1
Heptachlor epoxide	0.010	U	0.050	0.010	0.0037	ug/L		04/12/18 19:25	1
Methoxychlor	0.018	U	0.050	0.018	0.0098	ug/L		04/12/18 19:25	1
Toxaphene	0.80	U	5.0	0.80	0.40	ug/L		04/12/18 19:25	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl	*38*		*14 - 130*	*04/11/18 15:10*	*04/12/18 19:25*	*1*
Tetrachloro-m-xylene	*37*	*Q*	*44 - 124*	*04/11/18 15:10*	*04/12/18 19:25*	*1*

Method: 8081B 8082A - Organochlorine Pesticides & PCBs (GC) - RE

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Aldrin	0.019	U H	0.053	0.019	0.0077	ug/L		04/17/18 22:44	1
alpha-BHC	0.011	U M H	0.053	0.011	0.0036	ug/L		04/17/18 22:44	1
beta-BHC	0.019	U H	0.053	0.019	0.0097	ug/L		04/17/18 22:44	1
Chlordane (technical)	0.32	U M H	0.53	0.32	0.10	ug/L		04/17/18 22:44	1
4,4'-DDD	0.011	U H	0.053	0.011	0.0067	ug/L		04/17/18 22:44	1
4,4'-DDE	0.011	U M H	0.053	0.011	0.0054	ug/L		04/17/18 22:44	1
4,4'-DDT	0.019	U H	0.053	0.019	0.0075	ug/L		04/17/18 22:44	1
delta-BHC	0.019	U M H	0.053	0.019	0.0080	ug/L		04/17/18 22:44	1
Dieldrin	0.011	U H	0.053	0.011	0.0041	ug/L		04/17/18 22:44	1
Endosulfan I	0.011	U H	0.053	0.011	0.0037	ug/L		04/17/18 22:44	1
Endosulfan II	0.011	U H	0.053	0.011	0.0045	ug/L		04/17/18 22:44	1
Endosulfan sulfate	0.011	U H	0.053	0.011	0.0054	ug/L		04/17/18 22:44	1
Endrin	0.011	U H	0.053	0.011	0.0057	ug/L		04/17/18 22:44	1
Endrin aldehyde	0.011	U M H	0.053	0.011	0.0065	ug/L		04/17/18 22:44	1
Endrin ketone	0.011	U H	0.053	0.011	0.0049	ug/L		04/17/18 22:44	1
gamma-BHC (Lindane)	0.011	U H	0.053	0.011	0.0038	ug/L		04/17/18 22:44	1
Heptachlor	0.019	U H	0.053	0.019	0.0076	ug/L		04/17/18 22:44	1
Heptachlor epoxide	0.011	U H	0.053	0.011	0.0039	ug/L		04/17/18 22:44	1
Methoxychlor	0.019	U H	0.053	0.019	0.010	ug/L		04/17/18 22:44	1
Toxaphene	0.85	U H	5.3	0.85	0.43	ug/L		04/17/18 22:44	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl	*61*		*14 - 130*	*04/16/18 14:26*	*04/17/18 22:44*	*1*

Client Sample ID: LFM-99-02B_SPR18

Lab Sample ID: 680-150816-1

Date Collected: 04/06/18 10:05

Matrix: Water

Date Received: 04/07/18 09:42

Method: 8081B 8082A - Organochlorine Pesticides & PCBs (GC) - RE (Continued)

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Tetrachloro-m-xylene	65		44 - 124	04/16/18 14:26	04/17/18 22:44	1

Method: 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Chloride	**350**	**D**	5.0	5.0	2.0	mg/L		04/12/18 14:11	10
Sulfate	**20**	**M**	1.0	1.0	0.40	mg/L		04/11/18 11:29	1

Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Barium	**22**	**J1**	10	5.0	1.7	ug/L		04/11/18 21:56	1
Cadmium	3.0	U	5.0	3.0	1.0	ug/L		04/11/18 21:56	1
Chromium	4.0	U	10	4.0	1.6	ug/L		04/11/18 21:56	1
Copper	5.0	U	20	5.0	1.8	ug/L		04/11/18 21:56	1
Iron	50	U	50	50	17	ug/L		04/11/18 21:56	1
Lead	10	U	10	10	3.9	ug/L		04/11/18 21:56	1
Manganese	3.0	U	10	3.0	1.0	ug/L		04/11/18 21:56	1
Selenium	20	U J1	20	20	9.9	ug/L		04/11/18 21:56	1
Silver	1.5	U	10	1.5	0.60	ug/L		04/11/18 21:56	1

Method: 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	3.0	U J1	3.0	3.0	1.5	ug/L		04/12/18 16:30	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Mercury	0.20	U	0.20	0.20	0.080	ug/L		04/12/18 09:55	1

General Chemistry

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Nitrate/Nitrite-N	**0.60**		0.10	0.050	0.019	mg/L		04/16/18 19:02	1
Chemical Oxygen Demand	**10**	**J J1**	20	10	4.1	mg/L		04/18/18 07:56	1
Cyanide, Total	**0.0048**	**J**	0.010	0.0050	0.0025	mg/L		04/12/18 10:28	1
Alkalinity	**48**		5.0	3.2	1.1	mg/L		04/11/18 18:05	1
Total Dissolved Solids (TDS)	**660**		10	10	4.7	mg/L		04/12/18 12:32	1

Client Sample ID: LFM-99-05A_SPR18

Lab Sample ID: 680-150816-2

Date Collected: 04/05/18 14:20

Matrix: Water

Date Received: 04/07/18 09:42

Method: 8081B 8082A - Organochlorine Pesticides & PCBs (GC)

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Aldrin	0.017	U	0.048	0.017	0.0069	ug/L		04/11/18 19:05	1
alpha-BHC	0.0095	U	0.048	0.0095	0.0032	ug/L		04/11/18 19:05	1
beta-BHC	0.017	U	0.048	0.017	0.0087	ug/L		04/11/18 19:05	1
Chlordane (technical)	0.29	U M	0.48	0.29	0.091	ug/L		04/11/18 19:05	1
4,4'-DDD	0.0095	U	0.048	0.0095	0.0060	ug/L		04/11/18 19:05	1
4,4'-DDE	0.0095	U	0.048	0.0095	0.0049	ug/L		04/11/18 19:05	1
4,4'-DDT	0.017	U	0.048	0.017	0.0067	ug/L		04/11/18 19:05	1
delta-BHC	0.017	U	0.048	0.017	0.0072	ug/L		04/11/18 19:05	1
Dieldrin	0.0095	U	0.048	0.0095	0.0036	ug/L		04/11/18 19:05	1

Client: KOMAN Government Solutions, LLC
Project/Site: Devens / DCL

TestAmerica Job ID: 680-150816-1

Client Sample ID: LFM-99-05A_SPR18
Date Collected: 04/05/18 14:20
Date Received: 04/07/18 09:42

Lab Sample ID: 680-150816-2
Matrix: Water

Method: 8081B 8082A - Organochlorine Pesticides & PCBs (GC) (Continued)

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Endosulfan I	0.0095	U	0.048	0.0095	0.0033	ug/L		04/11/18 19:05	1
Endosulfan II	0.0095	U M	0.048	0.0095	0.0040	ug/L		04/11/18 19:05	1
Endosulfan sulfate	0.0095	U	0.048	0.0095	0.0049	ug/L		04/11/18 19:05	1
Endrin	0.0095	U	0.048	0.0095	0.0051	ug/L		04/11/18 19:05	1
Endrin aldehyde	0.0095	U M	0.048	0.0095	0.0058	ug/L		04/11/18 19:05	1
Endrin ketone	0.0095	U	0.048	0.0095	0.0044	ug/L		04/11/18 19:05	1
gamma-BHC (Lindane)	0.0095	U	0.048	0.0095	0.0034	ug/L		04/11/18 19:05	1
Heptachlor	0.017	U	0.048	0.017	0.0068	ug/L		04/11/18 19:05	1
Heptachlor epoxide	0.0095	U	0.048	0.0095	0.0035	ug/L		04/11/18 19:05	1
Methoxychlor	0.017	U	0.048	0.017	0.0094	ug/L		04/11/18 19:05	1
Toxaphene	0.76	U	4.8	0.76	0.38	ug/L		04/11/18 19:05	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl	*56*		*14 - 130*	*04/10/18 15:34*	*04/11/18 19:05*	*1*
Tetrachloro-m-xylene	*56*		*44 - 124*	*04/10/18 15:34*	*04/11/18 19:05*	*1*

Method: 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Chloride	**160**	**D**	5.0	5.0	2.0	mg/L		04/12/18 14:50	10
Sulfate	**19**	**M**	1.0	1.0	0.40	mg/L		04/11/18 12:08	1

Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Barium	**10**		10	5.0	1.7	ug/L		04/11/18 22:22	1
Cadmium	3.0	U	5.0	3.0	1.0	ug/L		04/11/18 22:22	1
Chromium	4.0	U	10	4.0	1.6	ug/L		04/11/18 22:22	1
Copper	5.0	U	20	5.0	1.8	ug/L		04/11/18 22:22	1
Iron	**25**	**J**	50	50	17	ug/L		04/11/18 22:22	1
Lead	10	U	10	10	3.9	ug/L		04/11/18 22:22	1
Manganese	**2.2**	**J**	10	3.0	1.0	ug/L		04/11/18 22:22	1
Selenium	20	U	20	20	9.9	ug/L		04/11/18 22:22	1
Silver	1.5	U	10	1.5	0.60	ug/L		04/11/18 22:22	1

Method: 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	3.0	U	3.0	3.0	1.5	ug/L		04/12/18 16:47	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Mercury	0.20	U	0.20	0.20	0.080	ug/L		04/12/18 10:05	1

General Chemistry

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Nitrate/Nitrite-N	**1.3**		0.10	0.050	0.019	mg/L		04/16/18 18:58	1
Chemical Oxygen Demand	10	U	20	10	4.1	mg/L		04/18/18 07:56	1
Cyanide, Total	**0.0032**	**J**	0.010	0.0050	0.0025	mg/L		04/12/18 10:32	1
Alkalinity	**79**		5.0	3.2	1.1	mg/L		04/10/18 20:45	1
Total Dissolved Solids (TDS)	**380**		10	10	4.7	mg/L		04/12/18 12:32	1

Client: KOMAN Government Solutions, LLC
Project/Site: Devens / DCL

TestAmerica Job ID: 680-150816-1

Client Sample ID: LFM-DUP01_SPR18
Date Collected: 04/05/18 14:25
Date Received: 04/07/18 09:42

Lab Sample ID: 680-150816-3
Matrix: Water

Method: 8081B 8082A - Organochlorine Pesticides & PCBs (GC)

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Aldrin	0.018	U	0.050	0.018	0.0072	ug/L		04/11/18 19:20	1
alpha-BHC	0.010	U	0.050	0.010	0.0034	ug/L		04/11/18 19:20	1
beta-BHC	0.018	U	0.050	0.018	0.0091	ug/L		04/11/18 19:20	1
Chlordane (technical)	0.30	U M	0.50	0.30	0.095	ug/L		04/11/18 19:20	1
4,4'-DDD	0.010	U M	0.050	0.010	0.0063	ug/L		04/11/18 19:20	1
4,4'-DDE	0.010	U	0.050	0.010	0.0051	ug/L		04/11/18 19:20	1
4,4'-DDT	0.018	U	0.050	0.018	0.0070	ug/L		04/11/18 19:20	1
delta-BHC	0.018	U	0.050	0.018	0.0075	ug/L		04/11/18 19:20	1
Dieldrin	0.010	U	0.050	0.010	0.0038	ug/L		04/11/18 19:20	1
Endosulfan I	0.010	U	0.050	0.010	0.0035	ug/L		04/11/18 19:20	1
Endosulfan II	0.010	U M	0.050	0.010	0.0042	ug/L		04/11/18 19:20	1
Endosulfan sulfate	0.010	U	0.050	0.010	0.0051	ug/L		04/11/18 19:20	1
Endrin	0.010	U	0.050	0.010	0.0053	ug/L		04/11/18 19:20	1
Endrin aldehyde	0.010	U M	0.050	0.010	0.0061	ug/L		04/11/18 19:20	1
Endrin ketone	0.010	U	0.050	0.010	0.0046	ug/L		04/11/18 19:20	1
gamma-BHC (Lindane)	0.010	U	0.050	0.010	0.0036	ug/L		04/11/18 19:20	1
Heptachlor	0.018	U	0.050	0.018	0.0071	ug/L		04/11/18 19:20	1
Heptachlor epoxide	0.010	U	0.050	0.010	0.0037	ug/L		04/11/18 19:20	1
Methoxychlor	0.018	U	0.050	0.018	0.0098	ug/L		04/11/18 19:20	1
Toxaphene	0.80	U	5.0	0.80	0.40	ug/L		04/11/18 19:20	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl	*70*		*14 - 130*	*04/10/18 15:34*	*04/11/18 19:20*	*1*
Tetrachloro-m-xylene	*56*		*44 - 124*	*04/10/18 15:34*	*04/11/18 19:20*	*1*

Method: 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Chloride	**160**	**D**	5.0	5.0	2.0	mg/L		04/12/18 15:03	10
Sulfate	**19**	**M**	1.0	1.0	0.40	mg/L		04/11/18 12:21	1

Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Barium	**11**		10	5.0	1.7	ug/L		04/11/18 22:27	1
Cadmium	3.0	U	5.0	3.0	1.0	ug/L		04/11/18 22:27	1
Chromium	4.0	U	10	4.0	1.6	ug/L		04/11/18 22:27	1
Copper	5.0	U	20	5.0	1.8	ug/L		04/11/18 22:27	1
Iron	50	U	50	50	17	ug/L		04/11/18 22:27	1
Lead	10	U	10	10	3.9	ug/L		04/11/18 22:27	1
Manganese	3.0	U	10	3.0	1.0	ug/L		04/11/18 22:27	1
Selenium	20	U	20	20	9.9	ug/L		04/11/18 22:27	1
Silver	1.5	U	10	1.5	0.60	ug/L		04/11/18 22:27	1

Method: 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	3.0	U	3.0	3.0	1.5	ug/L		04/12/18 16:51	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Mercury	0.20	U	0.20	0.20	0.080	ug/L		04/12/18 10:48	1

Client Sample ID: LFM-DUP01_SPR18

Lab Sample ID: 680-150816-3

Date Collected: 04/05/18 14:25

Matrix: Water

Date Received: 04/07/18 09:42

General Chemistry

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Nitrate/Nitrite-N	**1.3**		0.10	0.050	0.019	mg/L		04/16/18 19:00	1
Chemical Oxygen Demand	10	U	20	10	4.1	mg/L		04/18/18 07:56	1
Cyanide, Total	**0.020**		0.010	0.0050	0.0025	mg/L		04/12/18 10:33	1
Alkalinity	**86**		5.0	3.2	1.1	mg/L		04/10/18 20:52	1
Total Dissolved Solids (TDS)	**390**		10	10	4.7	mg/L		04/12/18 12:32	1

Client Sample ID: LFM-99-06A RP_SPR18

Lab Sample ID: 680-150816-4

Date Collected: 04/05/18 16:30

Matrix: Water

Date Received: 04/07/18 09:42

Method: 8081B 8082A - Organochlorine Pesticides & PCBs (GC)

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Aldrin	0.018	U	0.050	0.018	0.0073	ug/L		04/11/18 19:36	1
alpha-BHC	0.010	U	0.050	0.010	0.0034	ug/L		04/11/18 19:36	1
beta-BHC	0.018	U	0.050	0.018	0.0092	ug/L		04/11/18 19:36	1
Chlordane (technical)	0.30	U M	0.50	0.30	0.096	ug/L		04/11/18 19:36	1
4,4'-DDD	0.010	U M	0.050	0.010	0.0064	ug/L		04/11/18 19:36	1
4,4'-DDE	0.010	U	0.050	0.010	0.0051	ug/L		04/11/18 19:36	1
4,4'-DDT	0.018	U	0.050	0.018	0.0071	ug/L		04/11/18 19:36	1
delta-BHC	0.018	U	0.050	0.018	0.0076	ug/L		04/11/18 19:36	1
Dieldrin	0.010	U	0.050	0.010	0.0038	ug/L		04/11/18 19:36	1
Endosulfan I	0.010	U	0.050	0.010	0.0035	ug/L		04/11/18 19:36	1
Endosulfan II	0.010	U	0.050	0.010	0.0042	ug/L		04/11/18 19:36	1
Endosulfan sulfate	0.010	U	0.050	0.010	0.0051	ug/L		04/11/18 19:36	1
Endrin	0.010	U	0.050	0.010	0.0054	ug/L		04/11/18 19:36	1
Endrin aldehyde	0.010	U M	0.050	0.010	0.0062	ug/L		04/11/18 19:36	1
Endrin ketone	0.010	U	0.050	0.010	0.0046	ug/L		04/11/18 19:36	1
gamma-BHC (Lindane)	0.010	U	0.050	0.010	0.0036	ug/L		04/11/18 19:36	1
Heptachlor	0.018	U	0.050	0.018	0.0072	ug/L		04/11/18 19:36	1
Heptachlor epoxide	0.010	U M	0.050	0.010	0.0037	ug/L		04/11/18 19:36	1
Methoxychlor	0.018	U	0.050	0.018	0.0099	ug/L		04/11/18 19:36	1
Toxaphene	0.81	U	5.0	0.81	0.40	ug/L		04/11/18 19:36	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl	*39*		*14 - 130*	*04/10/18 15:34*	*04/11/18 19:36*	*1*
Tetrachloro-m-xylene	*59*		*44 - 124*	*04/10/18 15:34*	*04/11/18 19:36*	*1*

Method: 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Chloride	**340**	**D**	5.0	5.0	2.0	mg/L		04/12/18 15:16	10
Sulfate	**27**	**M**	1.0	1.0	0.40	mg/L		04/11/18 12:34	1

Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Barium	**4.3**	**J**	10	5.0	1.7	ug/L		04/11/18 22:32	1
Cadmium	3.0	U	5.0	3.0	1.0	ug/L		04/11/18 22:32	1
Chromium	4.0	U	10	4.0	1.6	ug/L		04/11/18 22:32	1
Copper	5.0	U	20	5.0	1.8	ug/L		04/11/18 22:32	1
Iron	50	U	50	50	17	ug/L		04/11/18 22:32	1
Lead	10	U	10	10	3.9	ug/L		04/11/18 22:32	1

Client Sample ID: LFM-99-06A RP_SPR18

Lab Sample ID: 680-150816-4

Date Collected: 04/05/18 16:30

Matrix: Water

Date Received: 04/07/18 09:42

Method: 6010C - Metals (ICP) (Continued)

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Manganese	3.0	U	10	3.0	1.0	ug/L		04/11/18 22:32	1
Selenium	20	U	20	20	9.9	ug/L		04/11/18 22:32	1
Silver	1.5	U	10	1.5	0.60	ug/L		04/11/18 22:32	1

Method: 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	3.0	U	3.0	3.0	1.5	ug/L		04/12/18 16:54	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Mercury	0.20	U	0.20	0.20	0.080	ug/L		04/12/18 10:52	1

General Chemistry

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Nitrate/Nitrite-N	**1.1**		0.10	0.050	0.019	mg/L		04/16/18 19:08	1
Chemical Oxygen Demand	**7.0**	**J**	20	10	4.1	mg/L		04/18/18 07:56	1
Cyanide, Total	0.0050	U	0.010	0.0050	0.0025	mg/L		04/12/18 10:34	1
Alkalinity	**75**		5.0	3.2	1.1	mg/L		04/10/18 20:58	1
Total Dissolved Solids (TDS)	**670**		10	10	4.7	mg/L		04/12/18 12:32	1

Client Sample ID: LFM-03-07_SPR18

Lab Sample ID: 680-150816-5

Date Collected: 04/06/18 08:05

Matrix: Water

Date Received: 04/07/18 09:42

Method: 8081B 8082A - Organochlorine Pesticides & PCBs (GC)

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Aldrin	0.019	U	0.053	0.019	0.0076	ug/L		04/12/18 19:41	1
alpha-BHC	0.011	U	0.053	0.011	0.0036	ug/L		04/12/18 19:41	1
beta-BHC	0.019	U	0.053	0.019	0.0097	ug/L		04/12/18 19:41	1
Chlordane (technical)	0.32	U M	0.53	0.32	0.10	ug/L		04/12/18 19:41	1
4,4'-DDD	0.011	U	0.053	0.011	0.0067	ug/L		04/12/18 19:41	1
4,4'-DDE	0.011	U	0.053	0.011	0.0054	ug/L		04/12/18 19:41	1
4,4'-DDT	0.019	U	0.053	0.019	0.0074	ug/L		04/12/18 19:41	1
delta-BHC	0.019	U M	0.053	0.019	0.0080	ug/L		04/12/18 19:41	1
Dieldrin	0.011	U	0.053	0.011	0.0040	ug/L		04/12/18 19:41	1
Endosulfan I	0.011	U	0.053	0.011	0.0037	ug/L		04/12/18 19:41	1
Endosulfan II	0.011	U	0.053	0.011	0.0045	ug/L		04/12/18 19:41	1
Endosulfan sulfate	0.011	U	0.053	0.011	0.0054	ug/L		04/12/18 19:41	1
Endrin	0.011	U	0.053	0.011	0.0056	ug/L		04/12/18 19:41	1
Endrin aldehyde	0.011	U M	0.053	0.011	0.0065	ug/L		04/12/18 19:41	1
Endrin ketone	0.011	U M	0.053	0.011	0.0049	ug/L		04/12/18 19:41	1
gamma-BHC (Lindane)	0.011	U	0.053	0.011	0.0038	ug/L		04/12/18 19:41	1
Heptachlor	0.019	U	0.053	0.019	0.0075	ug/L		04/12/18 19:41	1
Heptachlor epoxide	0.011	U	0.053	0.011	0.0039	ug/L		04/12/18 19:41	1
Methoxychlor	0.019	U	0.053	0.019	0.010	ug/L		04/12/18 19:41	1
Toxaphene	0.85	U	5.3	0.85	0.42	ug/L		04/12/18 19:41	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl	*79*		*14 - 130*	*04/11/18 15:10*	*04/12/18 19:41*	*1*
Tetrachloro-m-xylene	*50*		*44 - 124*	*04/11/18 15:10*	*04/12/18 19:41*	*1*

Client: KOMAN Government Solutions, LLC
Project/Site: Devens / DCL

TestAmerica Job ID: 680-150816-1

Client Sample ID: LFM-03-07_SPR18
Date Collected: 04/06/18 08:05
Date Received: 04/07/18 09:42

Lab Sample ID: 680-150816-5
Matrix: Water

Method: 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Chloride	**220**	**D**	5.0	5.0	2.0	mg/L		04/12/18 15:28	10
Sulfate	**28**	**M**	1.0	1.0	0.40	mg/L		04/11/18 12:47	1

Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Barium	**11**		10	5.0	1.7	ug/L		04/11/18 22:37	1
Cadmium	3.0	U	5.0	3.0	1.0	ug/L		04/11/18 22:37	1
Chromium	4.0	U	10	4.0	1.6	ug/L		04/11/18 22:37	1
Copper	5.0	U	20	5.0	1.8	ug/L		04/11/18 22:37	1
Iron	50	U	50	50	17	ug/L		04/11/18 22:37	1
Lead	10	U	10	10	3.9	ug/L		04/11/18 22:37	1
Manganese	3.0	U	10	3.0	1.0	ug/L		04/11/18 22:37	1
Selenium	20	U	20	20	9.9	ug/L		04/11/18 22:37	1
Silver	1.5	U	10	1.5	0.60	ug/L		04/11/18 22:37	1

Method: 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	3.0	U	3.0	3.0	1.5	ug/L		04/12/18 17:05	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Mercury	0.20	U	0.20	0.20	0.080	ug/L		04/12/18 10:55	1

General Chemistry

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Nitrate/Nitrite-N	**1.8**		0.10	0.050	0.019	mg/L		04/16/18 19:10	1
Chemical Oxygen Demand	**5.0**	**J**	20	10	4.1	mg/L		04/18/18 07:56	1
Cyanide, Total	**0.0048**	**J**	0.010	0.0050	0.0025	mg/L		04/12/18 10:37	1
Alkalinity	**76**		5.0	3.2	1.1	mg/L		04/11/18 18:10	1
Total Dissolved Solids (TDS)	**480**		10	10	4.7	mg/L		04/12/18 12:32	1

Surrogate Summary

Client: KOMAN Government Solutions, LLC
Project/Site: Devens / DCL

TestAmerica Job ID: 680-150816-1

Method: 8081B 8082A - Organochlorine Pesticides & PCBs (GC)

Matrix: Water **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)									
		DCBP1	TCX1								
Lab Sample ID	Client Sample ID	(14-130)	(44-124)								
680-150816-1	LFM-99-02B_SPR18	38	37 Q								
680-150816-1 - RE	LFM-99-02B_SPR18	61	65								
680-150816-1 MS	LFM-99-02B_SPR18	40	53								
680-150816-1 MSD	LFM-99-02B_SPR18	63	47								
680-150816-2	LFM-99-05A_SPR18	56	56								
680-150816-3	LFM-DUP01_SPR18	70	56								
680-150816-4	LFM-99-06A RP_SPR18	39	59								
680-150816-5	LFM-03-07_SPR18	79	50								
LCS 680-519377/14-A	Lab Control Sample	77	63								
LCS 680-519588/9-A	Lab Control Sample	68	65								
LCS 680-520146/17-A	Lab Control Sample	70	55								
MB 680-519377/13-A	Method Blank	74	67								
MB 680-519588/8-A	Method Blank	59	64								
MB 680-520146/16-A	Method Blank	56	57								

Surrogate Legend

DCBP = DCB Decachlorobiphenyl

TCX = Tetrachloro-m-xylene

Method: 8081B 8082A - Organochlorine Pesticides & PCBs (GC)

Lab Sample ID: MB 680-519377/13-A
Matrix: Water
Analysis Batch: 519614

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 519377

Analyte	MB Result	MB Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Aldrin	0.018	U	0.050	0.018	0.0072	ug/L		04/11/18 18:19	1
alpha-BHC	0.010	U	0.050	0.010	0.0034	ug/L		04/11/18 18:19	1
beta-BHC	0.018	U	0.050	0.018	0.0091	ug/L		04/11/18 18:19	1
Chlordane (technical)	0.30	U M	0.50	0.30	0.095	ug/L		04/11/18 18:19	1
4,4'-DDD	0.010	U	0.050	0.010	0.0063	ug/L		04/11/18 18:19	1
4,4'-DDE	0.010	U	0.050	0.010	0.0051	ug/L		04/11/18 18:19	1
4,4'-DDT	0.018	U	0.050	0.018	0.0070	ug/L		04/11/18 18:19	1
delta-BHC	0.018	U	0.050	0.018	0.0075	ug/L		04/11/18 18:19	1
Dieldrin	0.010	U	0.050	0.010	0.0038	ug/L		04/11/18 18:19	1
Endosulfan I	0.010	U	0.050	0.010	0.0035	ug/L		04/11/18 18:19	1
Endosulfan II	0.010	U M	0.050	0.010	0.0042	ug/L		04/11/18 18:19	1
Endosulfan sulfate	0.010	U	0.050	0.010	0.0051	ug/L		04/11/18 18:19	1
Endrin	0.010	U	0.050	0.010	0.0053	ug/L		04/11/18 18:19	1
Endrin aldehyde	0.010	U M	0.050	0.010	0.0061	ug/L		04/11/18 18:19	1
Endrin ketone	0.010	U M	0.050	0.010	0.0046	ug/L		04/11/18 18:19	1
gamma-BHC (Lindane)	0.010	U	0.050	0.010	0.0036	ug/L		04/11/18 18:19	1
Heptachlor	0.018	U	0.050	0.018	0.0071	ug/L		04/11/18 18:19	1
Heptachlor epoxide	0.010	U	0.050	0.010	0.0037	ug/L		04/11/18 18:19	1
Methoxychlor	0.018	U	0.050	0.018	0.0098	ug/L		04/11/18 18:19	1
Toxaphene	0.80	U	5.0	0.80	0.40	ug/L		04/11/18 18:19	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl	*74*		*14 - 130*	*04/10/18 15:34*	*04/11/18 18:19*	*1*
Tetrachloro-m-xylene	*67*		*44 - 124*	*04/10/18 15:34*	*04/11/18 18:19*	*1*

Lab Sample ID: LCS 680-519377/14-A
Matrix: Water
Analysis Batch: 519614

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 519377

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aldrin	0.100	0.0730		ug/L		73	45 - 134
alpha-BHC	0.100	0.0793		ug/L		79	54 - 138
beta-BHC	0.100	0.0776		ug/L		78	56 - 136
4,4'-DDD	0.100	0.0864		ug/L		86	56 - 143
4,4'-DDE	0.100	0.0860		ug/L		86	57 - 135
4,4'-DDT	0.100	0.0876		ug/L		88	51 - 143
delta-BHC	0.100	0.0853		ug/L		85	52 - 142
Dieldrin	0.100	0.0850		ug/L		85	60 - 136
Endosulfan I	0.100	0.0788		ug/L		79	62 - 126
Endosulfan II	0.100	0.0861		ug/L		86	52 - 135
Endosulfan sulfate	0.100	0.0881		ug/L		88	62 - 133
Endrin	0.100	0.0847		ug/L		85	60 - 138
Endrin aldehyde	0.100	0.0932		ug/L		93	51 - 132
Endrin ketone	0.100	0.0955		ug/L		95	58 - 134
gamma-BHC (Lindane)	0.100	0.0782		ug/L		78	59 - 134
Heptachlor	0.100	0.0698		ug/L		70	54 - 130
Heptachlor epoxide	0.100	0.0819		ug/L		82	61 - 133
Methoxychlor	0.100	0.0914		ug/L		91	54 - 145

Surrogate	LCS %Recovery	LCS Qualifier	Limits
DCB Decachlorobiphenyl	77		14 - 130
Tetrachloro-m-xylene	63		44 - 124

Lab Sample ID: MB 680-519588/8-A
Matrix: Water
Analysis Batch: 519800

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 519588

Analyte	MB Result	MB Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Aldrin	0.018	U	0.050	0.018	0.0072	ug/L		04/12/18 17:52	1
alpha-BHC	0.010	U	0.050	0.010	0.0034	ug/L		04/12/18 17:52	1
beta-BHC	0.018	U	0.050	0.018	0.0091	ug/L		04/12/18 17:52	1
Chlordane (technical)	0.30	U M	0.50	0.30	0.095	ug/L		04/12/18 17:52	1
4,4'-DDD	0.010	U	0.050	0.010	0.0063	ug/L		04/12/18 17:52	1
4,4'-DDE	0.010	U	0.050	0.010	0.0051	ug/L		04/12/18 17:52	1
4,4'-DDT	0.018	U	0.050	0.018	0.0070	ug/L		04/12/18 17:52	1
delta-BHC	0.018	U M	0.050	0.018	0.0075	ug/L		04/12/18 17:52	1
Dieldrin	0.010	U	0.050	0.010	0.0038	ug/L		04/12/18 17:52	1
Endosulfan I	0.010	U	0.050	0.010	0.0035	ug/L		04/12/18 17:52	1
Endosulfan II	0.010	U	0.050	0.010	0.0042	ug/L		04/12/18 17:52	1
Endosulfan sulfate	0.010	U	0.050	0.010	0.0051	ug/L		04/12/18 17:52	1
Endrin	0.010	U	0.050	0.010	0.0053	ug/L		04/12/18 17:52	1
Endrin aldehyde	0.010	U M	0.050	0.010	0.0061	ug/L		04/12/18 17:52	1
Endrin ketone	0.010	U	0.050	0.010	0.0046	ug/L		04/12/18 17:52	1
gamma-BHC (Lindane)	0.010	U	0.050	0.010	0.0036	ug/L		04/12/18 17:52	1
Heptachlor	0.018	U	0.050	0.018	0.0071	ug/L		04/12/18 17:52	1
Heptachlor epoxide	0.010	U	0.050	0.010	0.0037	ug/L		04/12/18 17:52	1
Methoxychlor	0.018	U	0.050	0.018	0.0098	ug/L		04/12/18 17:52	1
Toxaphene	0.80	U	5.0	0.80	0.40	ug/L		04/12/18 17:52	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
DCB Decachlorobiphenyl	59		14 - 130	04/11/18 15:10	04/12/18 17:52	1
Tetrachloro-m-xylene	64		44 - 124	04/11/18 15:10	04/12/18 17:52	1

Lab Sample ID: LCS 680-519588/9-A
Matrix: Water
Analysis Batch: 519800

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 519588

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aldrin	0.100	0.0689		ug/L		69	45 - 134
alpha-BHC	0.100	0.0814		ug/L		81	54 - 138
beta-BHC	0.100	0.0806		ug/L		81	56 - 136
4,4'-DDD	0.100	0.0832		ug/L		83	56 - 143
4,4'-DDE	0.100	0.0715		ug/L		72	57 - 135
4,4'-DDT	0.100	0.0847		ug/L		85	51 - 143
delta-BHC	0.100	0.0862		ug/L		86	52 - 142
Dieldrin	0.100	0.0828		ug/L		83	60 - 136
Endosulfan I	0.100	0.0808		ug/L		81	62 - 126
Endosulfan II	0.100	0.0832		ug/L		83	52 - 135
Endosulfan sulfate	0.100	0.0871		ug/L		87	62 - 133
Endrin	0.100	0.0856		ug/L		86	60 - 138
Endrin aldehyde	0.100	0.0775		ug/L		78	51 - 132
Endrin ketone	0.100	0.0928		ug/L		93	58 - 134
gamma-BHC (Lindane)	0.100	0.0803		ug/L		80	59 - 134

Method: 8081B 8082A - Organochlorine Pesticides & PCBs (GC) (Continued)

Lab Sample ID: LCS 680-519588/9-A
Matrix: Water
Analysis Batch: 519800

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 519588

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Heptachlor	0.100	0.0697		ug/L		70	54 - 130
Heptachlor epoxide	0.100	0.0804		ug/L		80	61 - 133
Methoxychlor	0.100	0.0899		ug/L		90	54 - 145

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
DCB Decachlorobiphenyl	*68*		*14 - 130*
Tetrachloro-m-xylene	*65*		*44 - 124*

Lab Sample ID: 680-150816-1 MS
Matrix: Water
Analysis Batch: 519800

Client Sample ID: LFM-99-02B_SPR18
Prep Type: Total/NA
Prep Batch: 519588

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aldrin	0.018	U	0.106	0.0632		ug/L		60	45 - 134
alpha-BHC	0.010	U	0.106	0.0740		ug/L		70	54 - 138
beta-BHC	0.018	U	0.106	0.0753		ug/L		71	56 - 136
4,4'-DDD	0.010	U	0.106	0.0797		ug/L		75	56 - 143
4,4'-DDE	0.010	U	0.106	0.0699		ug/L		66	57 - 135
4,4'-DDT	0.018	U	0.106	0.0833		ug/L		79	51 - 143
delta-BHC	0.018	U	0.106	0.0785		ug/L		74	52 - 142
Dieldrin	0.010	U	0.106	0.0781		ug/L		74	60 - 136
Endosulfan I	0.010	U	0.106	0.0734		ug/L		69	62 - 126
Endosulfan II	0.010	U	0.106	0.0782		ug/L		74	52 - 135
Endosulfan sulfate	0.010	U	0.106	0.0812		ug/L		77	62 - 133
Endrin	0.010	U	0.106	0.0838		ug/L		79	60 - 138
Endrin aldehyde	0.010	U M	0.106	0.0837		ug/L		79	51 - 132
Endrin ketone	0.010	U	0.106	0.0867		ug/L		82	58 - 134
gamma-BHC (Lindane)	0.010	U	0.106	0.0727		ug/L		69	59 - 134
Heptachlor	0.018	U	0.106	0.0636		ug/L		60	54 - 130
Heptachlor epoxide	0.010	U	0.106	0.0743		ug/L		70	61 - 133
Methoxychlor	0.018	U	0.106	0.0870		ug/L		82	54 - 145

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
DCB Decachlorobiphenyl	*40*		*14 - 130*
Tetrachloro-m-xylene	*53*		*44 - 124*

Lab Sample ID: 680-150816-1 MSD
Matrix: Water
Analysis Batch: 519800

Client Sample ID: LFM-99-02B_SPR18
Prep Type: Total/NA
Prep Batch: 519588

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aldrin	0.018	U	0.0957	0.0555		ug/L		58	45 - 134	13	30
alpha-BHC	0.010	U	0.0957	0.0598		ug/L		62	54 - 138	21	30
beta-BHC	0.018	U	0.0957	0.0707		ug/L		74	56 - 136	6	30
4,4'-DDD	0.010	U	0.0957	0.0774		ug/L		81	56 - 143	3	30
4,4'-DDE	0.010	U	0.0957	0.0709		ug/L		74	57 - 135	2	30
4,4'-DDT	0.018	U	0.0957	0.0817		ug/L		85	51 - 143	2	30
delta-BHC	0.018	U	0.0957	0.0783		ug/L		82	52 - 142	0	30

Method: 8081B 8082A - Organochlorine Pesticides & PCBs (GC) (Continued)

Lab Sample ID: 680-150816-1 MSD
Matrix: Water
Analysis Batch: 519800

Client Sample ID: LFM-99-02B_SPR18
Prep Type: Total/NA
Prep Batch: 519588

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Dieldrin	0.010	U	0.0957	0.0739		ug/L		77	60 - 136	5	30
Endosulfan I	0.010	U	0.0957	0.0671		ug/L		70	62 - 126	9	30
Endosulfan II	0.010	U	0.0957	0.0740		ug/L		77	52 - 135	5	30
Endosulfan sulfate	0.010	U	0.0957	0.0784		ug/L		82	62 - 133	4	30
Endrin	0.010	U	0.0957	0.0792		ug/L		83	60 - 138	6	30
Endrin aldehyde	0.010	U M	0.0957	0.0781		ug/L		82	51 - 132	7	30
Endrin ketone	0.010	U	0.0957	0.0835		ug/L		87	58 - 134	4	30
gamma-BHC (Lindane)	0.010	U	0.0957	0.0612		ug/L		64	59 - 134	17	30
Heptachlor	0.018	U	0.0957	0.0555		ug/L		58	54 - 130	13	30
Heptachlor epoxide	0.010	U	0.0957	0.0691		ug/L		72	61 - 133	7	30
Methoxychlor	0.018	U	0.0957	0.0819		ug/L		85	54 - 145	6	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
DCB Decachlorobiphenyl	*63*		*14 - 130*
Tetrachloro-m-xylene	*47*		*44 - 124*

Lab Sample ID: MB 680-520146/16-A
Matrix: Water
Analysis Batch: 520390

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 520146

Analyte	MB Result	MB Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Aldrin	0.018	U	0.050	0.018	0.0072	ug/L		04/17/18 21:10	1
alpha-BHC	0.010	U	0.050	0.010	0.0034	ug/L		04/17/18 21:10	1
beta-BHC	0.018	U	0.050	0.018	0.0091	ug/L		04/17/18 21:10	1
Chlordane (technical)	0.30	U M	0.50	0.30	0.095	ug/L		04/17/18 21:10	1
4,4'-DDD	0.010	U	0.050	0.010	0.0063	ug/L		04/17/18 21:10	1
4,4'-DDE	0.010	U	0.050	0.010	0.0051	ug/L		04/17/18 21:10	1
4,4'-DDT	0.018	U	0.050	0.018	0.0070	ug/L		04/17/18 21:10	1
delta-BHC	0.018	U	0.050	0.018	0.0075	ug/L		04/17/18 21:10	1
Dieldrin	0.010	U	0.050	0.010	0.0038	ug/L		04/17/18 21:10	1
Endosulfan I	0.010	U	0.050	0.010	0.0035	ug/L		04/17/18 21:10	1
Endosulfan II	0.010	U	0.050	0.010	0.0042	ug/L		04/17/18 21:10	1
Endosulfan sulfate	0.010	U	0.050	0.010	0.0051	ug/L		04/17/18 21:10	1
Endrin	0.010	U	0.050	0.010	0.0053	ug/L		04/17/18 21:10	1
Endrin aldehyde	0.010	U M	0.050	0.010	0.0061	ug/L		04/17/18 21:10	1
Endrin ketone	0.010	U M	0.050	0.010	0.0046	ug/L		04/17/18 21:10	1
gamma-BHC (Lindane)	0.010	U	0.050	0.010	0.0036	ug/L		04/17/18 21:10	1
Heptachlor	0.018	U	0.050	0.018	0.0071	ug/L		04/17/18 21:10	1
Heptachlor epoxide	0.010	U	0.050	0.010	0.0037	ug/L		04/17/18 21:10	1
Methoxychlor	0.018	U	0.050	0.018	0.0098	ug/L		04/17/18 21:10	1
Toxaphene	0.80	U	5.0	0.80	0.40	ug/L		04/17/18 21:10	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl	*56*		*14 - 130*	*04/16/18 14:26*	*04/17/18 21:10*	*1*
Tetrachloro-m-xylene	*57*		*44 - 124*	*04/16/18 14:26*	*04/17/18 21:10*	*1*

Method: 8081B 8082A - Organochlorine Pesticides & PCBs (GC) (Continued)

Lab Sample ID: LCS 680-520146/17-A
Matrix: Water
Analysis Batch: 520390

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 520146

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aldrin	0.100	0.0719		ug/L		72	45 - 134
alpha-BHC	0.100	0.0850		ug/L		85	54 - 138
beta-BHC	0.100	0.0835		ug/L		83	56 - 136
4,4'-DDD	0.100	0.0885		ug/L		89	56 - 143
4,4'-DDE	0.100	0.0886		ug/L		89	57 - 135
4,4'-DDT	0.100	0.0942		ug/L		94	51 - 143
delta-BHC	0.100	0.0896		ug/L		90	52 - 142
Dieldrin	0.100	0.0860		ug/L		86	60 - 136
Endosulfan I	0.100	0.0824		ug/L		82	62 - 126
Endosulfan II	0.100	0.0874		ug/L		87	52 - 135
Endosulfan sulfate	0.100	0.0883		ug/L		88	62 - 133
Endrin	0.100	0.0875		ug/L		87	60 - 138
Endrin aldehyde	0.100	0.0919		ug/L		92	51 - 132
Endrin ketone	0.100	0.0955		ug/L		95	58 - 134
gamma-BHC (Lindane)	0.100	0.0841		ug/L		84	59 - 134
Heptachlor	0.100	0.0663		ug/L		66	54 - 130
Heptachlor epoxide	0.100	0.0836		ug/L		84	61 - 133
Methoxychlor	0.100	0.0899		ug/L		90	54 - 145

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
DCB Decachlorobiphenyl	*70*		*14 - 130*
Tetrachloro-m-xylene	*55*		*44 - 124*

Method: 9056A - Anions, Ion Chromatography

Lab Sample ID: MB 680-519555/2
Matrix: Water
Analysis Batch: 519555

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Chloride	0.50	U M	0.50	0.50	0.20	mg/L		04/11/18 10:25	1
Sulfate	1.0	U M	1.0	1.0	0.40	mg/L		04/11/18 10:25	1

Lab Sample ID: LCS 680-519555/3
Matrix: Water
Analysis Batch: 519555

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	10.0	9.77	M	mg/L		98	87 - 111
Sulfate	10.0	10.1	M	mg/L		101	87 - 112

Lab Sample ID: LCSD 680-519555/4
Matrix: Water
Analysis Batch: 519555

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	10.0	9.78	M	mg/L		98	87 - 111	0	15
Sulfate	10.0	10.3	M	mg/L		103	87 - 112	2	15

Client: KOMAN Government Solutions, LLC
Project/Site: Devens / DCL

TestAmerica Job ID: 680-150816-1

Lab Sample ID: 680-150816-1 MS
Matrix: Water
Analysis Batch: 519555

Client Sample ID: LFM-99-02B_SPR18
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Sulfate	20	M	10.0	30.7	M	mg/L		102	87 - 112		

Lab Sample ID: 680-150816-1 MSD
Matrix: Water
Analysis Batch: 519555

Client Sample ID: LFM-99-02B_SPR18
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Sulfate	20	M	10.0	30.6	M	mg/L		101	87 - 112	0	15

Lab Sample ID: MB 680-519735/2
Matrix: Water
Analysis Batch: 519735

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Chloride	0.50	U M	0.50	0.50	0.20	mg/L		04/12/18 12:22	1
Sulfate	1.0	U M	1.0	1.0	0.40	mg/L		04/12/18 12:22	1

Lab Sample ID: LCS 680-519735/3
Matrix: Water
Analysis Batch: 519735

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	10.0	9.95		mg/L		99	87 - 111
Sulfate	10.0	9.80		mg/L		98	87 - 112

Lab Sample ID: LCSD 680-519735/4
Matrix: Water
Analysis Batch: 519735

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	10.0	9.98		mg/L		100	87 - 111	0	15
Sulfate	10.0	9.89		mg/L		99	87 - 112	1	15

Lab Sample ID: 680-150816-1 MS
Matrix: Water
Analysis Batch: 519735

Client Sample ID: LFM-99-02B_SPR18
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Chloride	350	D	100	457	D	mg/L		102	87 - 111		

Lab Sample ID: 680-150816-1 MSD
Matrix: Water
Analysis Batch: 519735

Client Sample ID: LFM-99-02B_SPR18
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	350	D	100	460	D	mg/L		105	87 - 111	1	15

Method: 6010C - Metals (ICP)

Lab Sample ID: MB 680-519496/1-A
Matrix: Water
Analysis Batch: 519787

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 519496

Analyte	MB Result	MB Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Barium	5.0	U	10	5.0	1.7	ug/L		04/11/18 21:36	1
Cadmium	3.0	U	5.0	3.0	1.0	ug/L		04/11/18 21:36	1
Chromium	4.0	U	10	4.0	1.6	ug/L		04/11/18 21:36	1
Copper	5.0	U	20	5.0	1.8	ug/L		04/11/18 21:36	1
Iron	50	U	50	50	17	ug/L		04/11/18 21:36	1
Lead	10	U	10	10	3.9	ug/L		04/11/18 21:36	1
Manganese	3.0	U	10	3.0	1.0	ug/L		04/11/18 21:36	1
Selenium	20	U	20	20	9.9	ug/L		04/11/18 21:36	1
Silver	1.5	U	10	1.5	0.60	ug/L		04/11/18 21:36	1

Lab Sample ID: LCS 680-519496/2-A
Matrix: Water
Analysis Batch: 519787

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 519496

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Barium	100	94.1		ug/L		94	88 - 113
Cadmium	50.0	48.3		ug/L		97	88 - 113
Chromium	100	101		ug/L		101	90 - 113
Copper	100	95.8		ug/L		96	86 - 114
Iron	5000	4860		ug/L		97	87 - 115
Lead	500	460		ug/L		92	86 - 113
Manganese	500	492		ug/L		98	90 - 114
Selenium	100	89.4		ug/L		89	83 - 114
Silver	50.0	47.3		ug/L		95	84 - 115

Lab Sample ID: 680-150816-1 MS
Matrix: Water
Analysis Batch: 519787

Client Sample ID: LFM-99-02B_SPR18
Prep Type: Total/NA
Prep Batch: 519496

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Barium	22	J1	100	109	J1	ug/L		87	88 - 113
Cadmium	3.0	U	50.0	47.1		ug/L		94	88 - 113
Chromium	4.0	U	100	97.8		ug/L		98	90 - 113
Copper	5.0	U	100	95.4		ug/L		95	86 - 114
Iron	50	U	5000	4740		ug/L		95	87 - 115
Lead	10	U	500	449		ug/L		90	86 - 113
Manganese	3.0	U	500	481		ug/L		96	90 - 114
Selenium	20	U J1	100	88.1		ug/L		88	83 - 114
Silver	1.5	U	50.0	47.4		ug/L		95	84 - 115

Lab Sample ID: 680-150816-1 MSD
Matrix: Water
Analysis Batch: 519787

Client Sample ID: LFM-99-02B_SPR18
Prep Type: Total/NA
Prep Batch: 519496

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Barium	22	J1	100	108	J1	ug/L		86	88 - 113	1	20
Cadmium	3.0	U	50.0	46.2		ug/L		92	88 - 113	2	20
Chromium	4.0	U	100	95.9		ug/L		96	90 - 113	2	20
Copper	5.0	U	100	93.1		ug/L		93	86 - 114	2	20

Method: 6010C - Metals (ICP) (Continued)

Lab Sample ID: 680-150816-1 MSD — **Client Sample ID: LFM-99-02B_SPR18**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 519787 — **Prep Batch: 519496**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Iron	50	U	5000	4640		ug/L		93	87 - 115	2	20
Lead	10	U	500	441		ug/L		88	86 - 113	2	20
Manganese	3.0	U	500	472		ug/L		94	90 - 114	2	20
Selenium	20	U J1	100	81.1	J1	ug/L		81	83 - 114	8	20
Silver	1.5	U	50.0	46.8		ug/L		94	84 - 115	1	20

Method: 6020A - Metals (ICP/MS)

Lab Sample ID: MB 680-519494/1-A — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 519899 — **Prep Batch: 519494**

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		04/12/18 16:23	1

Lab Sample ID: LCS 680-519494/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 519899 — **Prep Batch: 519494**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	100	91.5		ug/L		92	84 - 116

Lab Sample ID: 680-150816-1 MS — **Client Sample ID: LFM-99-02B_SPR18**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 519899 — **Prep Batch: 519494**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	3.0	U J1	100	90.2		ug/L		90	84 - 116

Lab Sample ID: 680-150816-1 MSD — **Client Sample ID: LFM-99-02B_SPR18**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 519899 — **Prep Batch: 519494**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Arsenic	3.0	U J1	100	86.2		ug/L		86	84 - 116	5	20

Method: 7470A - Mercury (CVAA)

Lab Sample ID: MB 680-519250/1-A — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 519824 — **Prep Batch: 519250**

Analyte	MB Result	MB Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Mercury	0.20	U	0.20	0.20	0.080	ug/L		04/12/18 09:49	1

Method: 7470A - Mercury (CVAA) (Continued)

Lab Sample ID: LCS 680-519250/2-A
Matrix: Water
Analysis Batch: 519824

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 519250

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	2.50	2.57		ug/L		103	80 - 124

Lab Sample ID: 680-150816-1 MS
Matrix: Water
Analysis Batch: 519824

Client Sample ID: LFM-99-02B_SPR18
Prep Type: Total/NA
Prep Batch: 519250

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	0.20	U	1.00	1.01		ug/L		101	80 - 124

Lab Sample ID: 680-150816-1 MSD
Matrix: Water
Analysis Batch: 519824

Client Sample ID: LFM-99-02B_SPR18
Prep Type: Total/NA
Prep Batch: 519250

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	0.20	U	1.00	1.01		ug/L		101	80 - 124	0	20

Method: 353.2 - Nitrogen, Nitrate-Nitrite

Lab Sample ID: MB 280-411490/22
Matrix: Water
Analysis Batch: 411490

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Nitrate/Nitrite-N	0.050	U	0.10	0.050	0.019	mg/L		04/16/18 18:24	1

Lab Sample ID: LCS 280-411490/21
Matrix: Water
Analysis Batch: 411490

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Nitrate/Nitrite-N	5.00	4.97		mg/L		99	90 - 110

Lab Sample ID: 680-150816-1 MS
Matrix: Water
Analysis Batch: 411490

Client Sample ID: LFM-99-02B_SPR18
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Nitrate/Nitrite-N	0.60		4.00	4.93		mg/L		108	90 - 110

Lab Sample ID: 680-150816-1 MSD
Matrix: Water
Analysis Batch: 411490

Client Sample ID: LFM-99-02B_SPR18
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Nitrate/Nitrite-N	0.60		4.00	4.58		mg/L		100	90 - 110	7	10

Method: 410.4 - COD

Lab Sample ID: MB 280-411708/5
Matrix: Water
Analysis Batch: 411708

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Chemical Oxygen Demand	10	U	20	10	4.1	mg/L		04/18/18 07:56	1

Lab Sample ID: LCS 280-411708/3
Matrix: Water
Analysis Batch: 411708

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chemical Oxygen Demand	100	98.9		mg/L		99	90 - 110

Lab Sample ID: LCSD 280-411708/4
Matrix: Water
Analysis Batch: 411708

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chemical Oxygen Demand	100	100		mg/L		100	90 - 110	1	11

Lab Sample ID: 680-150816-1 MS
Matrix: Water
Analysis Batch: 411708

Client Sample ID: LFM-99-02B_SPR18
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chemical Oxygen Demand	10	J1	50.0	57.0		mg/L		93	90 - 110

Lab Sample ID: 680-150816-1 MSD
Matrix: Water
Analysis Batch: 411708

Client Sample ID: LFM-99-02B_SPR18
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chemical Oxygen Demand	10	J1	50.0	54.0	J1	mg/L		87	90 - 110	5	11

Method: 9012B - Cyanide, Total and/or Amenable

Lab Sample ID: MB 680-519715/1-A
Matrix: Water
Analysis Batch: 519778

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 519715

Analyte	MB Result	MB Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Cyanide, Total	0.0050	U	0.010	0.0050	0.0025	mg/L		04/12/18 10:19	1

Lab Sample ID: LCS 680-519715/2-A
Matrix: Water
Analysis Batch: 519778

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 519715

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Cyanide, Total	0.0500	0.0529		mg/L		106	83 - 116

Method: 9012B - Cyanide, Total and/or Amenable (Continued)

Lab Sample ID: 680-150816-1 MS — **Client Sample ID: LFM-99-02B_SPR18**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 519778 — **Prep Batch: 519715**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Cyanide, Total	0.0048	J	0.0500	0.0524		mg/L		95	83 - 116

Lab Sample ID: 680-150816-1 MSD — **Client Sample ID: LFM-99-02B_SPR18**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 519778 — **Prep Batch: 519715**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Cyanide, Total	0.0048	J	0.0500	0.0541		mg/L		99	83 - 116	3	20

Method: SM 2320B - Alkalinity

Lab Sample ID: MB 280-410981/31 — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 410981

Analyte	MB Result	MB Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Alkalinity	3.2	U	5.0	3.2	1.1	mg/L		04/10/18 20:34	1

Lab Sample ID: MB 280-410981/5 — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 410981

Analyte	MB Result	MB Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Alkalinity	3.2	U	5.0	3.2	1.1	mg/L		04/10/18 17:25	1

Lab Sample ID: LCS 280-410981/30 — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 410981

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Alkalinity	200	191		mg/L		96	90 - 110

Lab Sample ID: LCS 280-410981/4 — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 410981

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Alkalinity	200	190		mg/L		95	90 - 110

Lab Sample ID: MB 280-411025/5 — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 411025

Analyte	MB Result	MB Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Alkalinity	3.2	U	5.0	3.2	1.1	mg/L		04/11/18 15:50	1

Method: SM 2320B - Alkalinity (Continued)

Lab Sample ID: LCS 280-411025/4
Matrix: Water
Analysis Batch: 411025

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Alkalinity			200	189		mg/L		95	90 - 110		

Method: SM 2540C - Solids, Total Dissolved (TDS)

Lab Sample ID: MB 280-411100/1
Matrix: Water
Analysis Batch: 411100

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Total Dissolved Solids (TDS)	10	U	10	10	4.7	mg/L		04/12/18 12:32	1

Lab Sample ID: LCS 280-411100/2
Matrix: Water
Analysis Batch: 411100

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Total Dissolved Solids (TDS)			501	481		mg/L		96	86 - 110		

Lab Sample ID: 680-150816-5 DU
Matrix: Water
Analysis Batch: 411100

Client Sample ID: LFM-03-07_SPR18
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Total Dissolved Solids (TDS)	480			506		mg/L				4	10

GC Semi VOA

Prep Batch: 519377

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-150816-2	LFM-99-05A_SPR18	Total/NA	Water	3520C	
680-150816-3	LFM-DUP01_SPR18	Total/NA	Water	3520C	
680-150816-4	LFM-99-06A RP_SPR18	Total/NA	Water	3520C	
MB 680-519377/13-A	Method Blank	Total/NA	Water	3520C	
LCS 680-519377/14-A	Lab Control Sample	Total/NA	Water	3520C	

Prep Batch: 519588

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-150816-1	LFM-99-02B_SPR18	Total/NA	Water	3520C	
680-150816-5	LFM-03-07_SPR18	Total/NA	Water	3520C	
MB 680-519588/8-A	Method Blank	Total/NA	Water	3520C	
LCS 680-519588/9-A	Lab Control Sample	Total/NA	Water	3520C	
680-150816-1 MS	LFM-99-02B_SPR18	Total/NA	Water	3520C	
680-150816-1 MSD	LFM-99-02B_SPR18	Total/NA	Water	3520C	

Analysis Batch: 519614

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-150816-2	LFM-99-05A_SPR18	Total/NA	Water	8081B 8082A	519377
680-150816-3	LFM-DUP01_SPR18	Total/NA	Water	8081B 8082A	519377
680-150816-4	LFM-99-06A RP_SPR18	Total/NA	Water	8081B 8082A	519377
MB 680-519377/13-A	Method Blank	Total/NA	Water	8081B 8082A	519377
LCS 680-519377/14-A	Lab Control Sample	Total/NA	Water	8081B 8082A	519377

Analysis Batch: 519800

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-150816-1	LFM-99-02B_SPR18	Total/NA	Water	8081B 8082A	519588
680-150816-5	LFM-03-07_SPR18	Total/NA	Water	8081B 8082A	519588
MB 680-519588/8-A	Method Blank	Total/NA	Water	8081B 8082A	519588
LCS 680-519588/9-A	Lab Control Sample	Total/NA	Water	8081B 8082A	519588
680-150816-1 MS	LFM-99-02B_SPR18	Total/NA	Water	8081B 8082A	519588
680-150816-1 MSD	LFM-99-02B_SPR18	Total/NA	Water	8081B 8082A	519588

Prep Batch: 520146

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-150816-1 - RE	LFM-99-02B_SPR18	Total/NA	Water	3520C	
MB 680-520146/16-A	Method Blank	Total/NA	Water	3520C	
LCS 680-520146/17-A	Lab Control Sample	Total/NA	Water	3520C	

Analysis Batch: 520390

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-150816-1 - RE	LFM-99-02B_SPR18	Total/NA	Water	8081B 8082A	520146
MB 680-520146/16-A	Method Blank	Total/NA	Water	8081B 8082A	520146
LCS 680-520146/17-A	Lab Control Sample	Total/NA	Water	8081B 8082A	520146

HPLC/IC

Analysis Batch: 519555

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-150816-1	LFM-99-02B_SPR18	Total/NA	Water	9056A	
680-150816-2	LFM-99-05A_SPR18	Total/NA	Water	9056A	

HPLC/IC (Continued)

Analysis Batch: 519555 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-150816-3	LFM-DUP01_SPR18	Total/NA	Water	9056A	
680-150816-4	LFM-99-06A RP_SPR18	Total/NA	Water	9056A	
680-150816-5	LFM-03-07_SPR18	Total/NA	Water	9056A	
MB 680-519555/2	Method Blank	Total/NA	Water	9056A	
LCS 680-519555/3	Lab Control Sample	Total/NA	Water	9056A	
LCSD 680-519555/4	Lab Control Sample Dup	Total/NA	Water	9056A	
680-150816-1 MS	LFM-99-02B_SPR18	Total/NA	Water	9056A	
680-150816-1 MSD	LFM-99-02B_SPR18	Total/NA	Water	9056A	

Analysis Batch: 519735

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-150816-1	LFM-99-02B_SPR18	Total/NA	Water	9056A	
680-150816-2	LFM-99-05A_SPR18	Total/NA	Water	9056A	
680-150816-3	LFM-DUP01_SPR18	Total/NA	Water	9056A	
680-150816-4	LFM-99-06A RP_SPR18	Total/NA	Water	9056A	
680-150816-5	LFM-03-07_SPR18	Total/NA	Water	9056A	
MB 680-519735/2	Method Blank	Total/NA	Water	9056A	
LCS 680-519735/3	Lab Control Sample	Total/NA	Water	9056A	
LCSD 680-519735/4	Lab Control Sample Dup	Total/NA	Water	9056A	
680-150816-1 MS	LFM-99-02B_SPR18	Total/NA	Water	9056A	
680-150816-1 MSD	LFM-99-02B_SPR18	Total/NA	Water	9056A	

Metals

Prep Batch: 519250

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-150816-1	LFM-99-02B_SPR18	Total/NA	Water	7470A	
680-150816-2	LFM-99-05A_SPR18	Total/NA	Water	7470A	
680-150816-3	LFM-DUP01_SPR18	Total/NA	Water	7470A	
680-150816-4	LFM-99-06A RP_SPR18	Total/NA	Water	7470A	
680-150816-5	LFM-03-07_SPR18	Total/NA	Water	7470A	
MB 680-519250/1-A	Method Blank	Total/NA	Water	7470A	
LCS 680-519250/2-A	Lab Control Sample	Total/NA	Water	7470A	
680-150816-1 MS	LFM-99-02B_SPR18	Total/NA	Water	7470A	
680-150816-1 MSD	LFM-99-02B_SPR18	Total/NA	Water	7470A	

Prep Batch: 519494

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-150816-1	LFM-99-02B_SPR18	Total/NA	Water	3010A	
680-150816-2	LFM-99-05A_SPR18	Total/NA	Water	3010A	
680-150816-3	LFM-DUP01_SPR18	Total/NA	Water	3010A	
680-150816-4	LFM-99-06A RP_SPR18	Total/NA	Water	3010A	
680-150816-5	LFM-03-07_SPR18	Total/NA	Water	3010A	
MB 680-519494/1-A	Method Blank	Total/NA	Water	3010A	
LCS 680-519494/2-A	Lab Control Sample	Total/NA	Water	3010A	
680-150816-1 MS	LFM-99-02B_SPR18	Total/NA	Water	3010A	
680-150816-1 MSD	LFM-99-02B_SPR18	Total/NA	Water	3010A	

Metals (Continued)

Prep Batch: 519496

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-150816-1	LFM-99-02B_SPR18	Total/NA	Water	3010A	
680-150816-2	LFM-99-05A_SPR18	Total/NA	Water	3010A	
680-150816-3	LFM-DUP01_SPR18	Total/NA	Water	3010A	
680-150816-4	LFM-99-06A RP_SPR18	Total/NA	Water	3010A	
680-150816-5	LFM-03-07_SPR18	Total/NA	Water	3010A	
MB 680-519496/1-A	Method Blank	Total/NA	Water	3010A	
LCS 680-519496/2-A	Lab Control Sample	Total/NA	Water	3010A	
680-150816-1 MS	LFM-99-02B_SPR18	Total/NA	Water	3010A	
680-150816-1 MSD	LFM-99-02B_SPR18	Total/NA	Water	3010A	

Analysis Batch: 519787

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-150816-1	LFM-99-02B_SPR18	Total/NA	Water	6010C	519496
680-150816-2	LFM-99-05A_SPR18	Total/NA	Water	6010C	519496
680-150816-3	LFM-DUP01_SPR18	Total/NA	Water	6010C	519496
680-150816-4	LFM-99-06A RP_SPR18	Total/NA	Water	6010C	519496
680-150816-5	LFM-03-07_SPR18	Total/NA	Water	6010C	519496
MB 680-519496/1-A	Method Blank	Total/NA	Water	6010C	519496
LCS 680-519496/2-A	Lab Control Sample	Total/NA	Water	6010C	519496
680-150816-1 MS	LFM-99-02B_SPR18	Total/NA	Water	6010C	519496
680-150816-1 MSD	LFM-99-02B_SPR18	Total/NA	Water	6010C	519496

Analysis Batch: 519824

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-150816-1	LFM-99-02B_SPR18	Total/NA	Water	7470A	519250
680-150816-2	LFM-99-05A_SPR18	Total/NA	Water	7470A	519250
680-150816-3	LFM-DUP01_SPR18	Total/NA	Water	7470A	519250
680-150816-4	LFM-99-06A RP_SPR18	Total/NA	Water	7470A	519250
680-150816-5	LFM-03-07_SPR18	Total/NA	Water	7470A	519250
MB 680-519250/1-A	Method Blank	Total/NA	Water	7470A	519250
LCS 680-519250/2-A	Lab Control Sample	Total/NA	Water	7470A	519250
680-150816-1 MS	LFM-99-02B_SPR18	Total/NA	Water	7470A	519250
680-150816-1 MSD	LFM-99-02B_SPR18	Total/NA	Water	7470A	519250

Analysis Batch: 519899

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-150816-1	LFM-99-02B_SPR18	Total/NA	Water	6020A	519494
680-150816-2	LFM-99-05A_SPR18	Total/NA	Water	6020A	519494
680-150816-3	LFM-DUP01_SPR18	Total/NA	Water	6020A	519494
680-150816-4	LFM-99-06A RP_SPR18	Total/NA	Water	6020A	519494
680-150816-5	LFM-03-07_SPR18	Total/NA	Water	6020A	519494
MB 680-519494/1-A	Method Blank	Total/NA	Water	6020A	519494
LCS 680-519494/2-A	Lab Control Sample	Total/NA	Water	6020A	519494
680-150816-1 MS	LFM-99-02B_SPR18	Total/NA	Water	6020A	519494
680-150816-1 MSD	LFM-99-02B_SPR18	Total/NA	Water	6020A	519494

General Chemistry

Analysis Batch: 410981

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-150816-2	LFM-99-05A_SPR18	Total/NA	Water	SM 2320B	
680-150816-3	LFM-DUP01_SPR18	Total/NA	Water	SM 2320B	
680-150816-4	LFM-99-06A RP_SPR18	Total/NA	Water	SM 2320B	
MB 280-410981/31	Method Blank	Total/NA	Water	SM 2320B	
MB 280-410981/5	Method Blank	Total/NA	Water	SM 2320B	
LCS 280-410981/30	Lab Control Sample	Total/NA	Water	SM 2320B	
LCS 280-410981/4	Lab Control Sample	Total/NA	Water	SM 2320B	

Analysis Batch: 411025

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-150816-1	LFM-99-02B_SPR18	Total/NA	Water	SM 2320B	
680-150816-5	LFM-03-07_SPR18	Total/NA	Water	SM 2320B	
MB 280-411025/5	Method Blank	Total/NA	Water	SM 2320B	
LCS 280-411025/4	Lab Control Sample	Total/NA	Water	SM 2320B	

Analysis Batch: 411100

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-150816-1	LFM-99-02B_SPR18	Total/NA	Water	SM 2540C	
680-150816-2	LFM-99-05A_SPR18	Total/NA	Water	SM 2540C	
680-150816-3	LFM-DUP01_SPR18	Total/NA	Water	SM 2540C	
680-150816-4	LFM-99-06A RP_SPR18	Total/NA	Water	SM 2540C	
680-150816-5	LFM-03-07_SPR18	Total/NA	Water	SM 2540C	
MB 280-411100/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 280-411100/2	Lab Control Sample	Total/NA	Water	SM 2540C	
680-150816-5 DU	LFM-03-07_SPR18	Total/NA	Water	SM 2540C	

Analysis Batch: 411490

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-150816-1	LFM-99-02B_SPR18	Total/NA	Water	353.2	
680-150816-2	LFM-99-05A_SPR18	Total/NA	Water	353.2	
680-150816-3	LFM-DUP01_SPR18	Total/NA	Water	353.2	
680-150816-4	LFM-99-06A RP_SPR18	Total/NA	Water	353.2	
680-150816-5	LFM-03-07_SPR18	Total/NA	Water	353.2	
MB 280-411490/22	Method Blank	Total/NA	Water	353.2	
LCS 280-411490/21	Lab Control Sample	Total/NA	Water	353.2	
680-150816-1 MS	LFM-99-02B_SPR18	Total/NA	Water	353.2	
680-150816-1 MSD	LFM-99-02B_SPR18	Total/NA	Water	353.2	

Analysis Batch: 411708

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-150816-1	LFM-99-02B_SPR18	Total/NA	Water	410.4	
680-150816-2	LFM-99-05A_SPR18	Total/NA	Water	410.4	
680-150816-3	LFM-DUP01_SPR18	Total/NA	Water	410.4	
680-150816-4	LFM-99-06A RP_SPR18	Total/NA	Water	410.4	
680-150816-5	LFM-03-07_SPR18	Total/NA	Water	410.4	
MB 280-411708/5	Method Blank	Total/NA	Water	410.4	
LCS 280-411708/3	Lab Control Sample	Total/NA	Water	410.4	
LCSD 280-411708/4	Lab Control Sample Dup	Total/NA	Water	410.4	
680-150816-1 MS	LFM-99-02B_SPR18	Total/NA	Water	410.4	
680-150816-1 MSD	LFM-99-02B_SPR18	Total/NA	Water	410.4	

General Chemistry (Continued)

Prep Batch: 519715

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-150816-1	LFM-99-02B_SPR18	Total/NA	Water	9012B	
680-150816-2	LFM-99-05A_SPR18	Total/NA	Water	9012B	
680-150816-3	LFM-DUP01_SPR18	Total/NA	Water	9012B	
680-150816-4	LFM-99-06A RP_SPR18	Total/NA	Water	9012B	
680-150816-5	LFM-03-07_SPR18	Total/NA	Water	9012B	
MB 680-519715/1-A	Method Blank	Total/NA	Water	9012B	
LCS 680-519715/2-A	Lab Control Sample	Total/NA	Water	9012B	
680-150816-1 MS	LFM-99-02B_SPR18	Total/NA	Water	9012B	
680-150816-1 MSD	LFM-99-02B_SPR18	Total/NA	Water	9012B	

Analysis Batch: 519778

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-150816-1	LFM-99-02B_SPR18	Total/NA	Water	9012B	519715
680-150816-2	LFM-99-05A_SPR18	Total/NA	Water	9012B	519715
680-150816-3	LFM-DUP01_SPR18	Total/NA	Water	9012B	519715
680-150816-4	LFM-99-06A RP_SPR18	Total/NA	Water	9012B	519715
680-150816-5	LFM-03-07_SPR18	Total/NA	Water	9012B	519715
MB 680-519715/1-A	Method Blank	Total/NA	Water	9012B	519715
LCS 680-519715/2-A	Lab Control Sample	Total/NA	Water	9012B	519715
680-150816-1 MS	LFM-99-02B_SPR18	Total/NA	Water	9012B	519715
680-150816-1 MSD	LFM-99-02B_SPR18	Total/NA	Water	9012B	519715

Client Sample ID: LFM-99-02B_SPR18

Lab Sample ID: 680-150816-1

Date Collected: 04/06/18 10:05

Matrix: Water

Date Received: 04/07/18 09:42

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3520C			1003.5 mL	10 mL	519588	04/11/18 15:10	CEW	TAL SAV
Total/NA	Analysis	8081B 8082A		1			519800	04/12/18 19:25	JCK	TAL SAV
	Instrument ID: CSGZ									
Total/NA	Prep	3520C	RE		937.3 mL	10 mL	520146	04/16/18 14:26	CEW	TAL SAV
Total/NA	Analysis	8081B 8082A	RE	1			520390	04/17/18 22:44	JCK	TAL SAV
	Instrument ID: CSGZ									
Total/NA	Analysis	9056A		1	5 mL	5 mL	519555	04/11/18 11:29	UI	TAL SAV
	Instrument ID: CICK									
Total/NA	Analysis	9056A		10	5 mL	5 mL	519735	04/12/18 14:11	CJM	TAL SAV
	Instrument ID: CICK									
Total/NA	Prep	3010A			50 mL	50 mL	519496	04/10/18 16:58	BCB	TAL SAV
Total/NA	Analysis	6010C		1			519787	04/11/18 21:56	BCB	TAL SAV
	Instrument ID: ICPF									
Total/NA	Prep	3010A			50 mL	250 mL	519494	04/10/18 16:56	BCB	TAL SAV
Total/NA	Analysis	6020A		1			519899	04/12/18 16:30	BWR	TAL SAV
	Instrument ID: ICPMSC									
Total/NA	Prep	7470A			50 mL	50 mL	519250	04/09/18 08:39	NVF	TAL SAV
Total/NA	Analysis	7470A		1			519824	04/12/18 09:55	NVF	TAL SAV
	Instrument ID: LEEMAN2									
Total/NA	Analysis	353.2		1			411490	04/16/18 19:02	SVC	TAL DEN
	Instrument ID: WC_Alp 2									
Total/NA	Analysis	410.4		1	2 mL	2 mL	411708	04/18/18 07:56	CCJ	TAL DEN
	Instrument ID: WC_Genesys20									
Total/NA	Prep	9012B			50 mL	50 mL	519715	04/12/18 05:34	DAM	TAL SAV
Total/NA	Analysis	9012B		1			519778	04/12/18 10:28	DAM	TAL SAV
	Instrument ID: LACHAT1									
Total/NA	Analysis	SM 2320B		1			411025	04/11/18 18:05	LPL	TAL DEN
	Instrument ID: WC_AT2									
Total/NA	Analysis	SM 2540C		1	100 mL	100 mL	411100	04/12/18 12:32	JAP	TAL DEN
	Instrument ID: NOEQUIP									

Client Sample ID: LFM-99-05A_SPR18

Lab Sample ID: 680-150816-2

Date Collected: 04/05/18 14:20

Matrix: Water

Date Received: 04/07/18 09:42

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3520C			1047.4 mL	10 mL	519377	04/10/18 15:34	CEW	TAL SAV
Total/NA	Analysis	8081B 8082A		1			519614	04/11/18 19:05	JCK	TAL SAV
	Instrument ID: CSGZ									
Total/NA	Analysis	9056A		1	5 mL	5 mL	519555	04/11/18 12:08	UI	TAL SAV
	Instrument ID: CICK									
Total/NA	Analysis	9056A		10	5 mL	5 mL	519735	04/12/18 14:50	CJM	TAL SAV
	Instrument ID: CICK									
Total/NA	Prep	3010A			50 mL	50 mL	519496	04/10/18 16:58	BCB	TAL SAV

Client Sample ID: LFM-99-05A_SPR18

Lab Sample ID: 680-150816-2

Date Collected: 04/05/18 14:20

Matrix: Water

Date Received: 04/07/18 09:42

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	6010C		1			519787	04/11/18 22:22	BCB	TAL SAV
	Instrument ID: ICPF									
Total/NA	Prep	3010A			50 mL	250 mL	519494	04/10/18 16:56	BCB	TAL SAV
Total/NA	Analysis	6020A		1			519899	04/12/18 16:47	BWR	TAL SAV
	Instrument ID: ICPMSC									
Total/NA	Prep	7470A			50 mL	50 mL	519250	04/09/18 08:39	NVF	TAL SAV
Total/NA	Analysis	7470A		1			519824	04/12/18 10:05	NVF	TAL SAV
	Instrument ID: LEEMAN2									
Total/NA	Analysis	353.2		1			411490	04/16/18 18:58	SVC	TAL DEN
	Instrument ID: WC_Alp 2									
Total/NA	Analysis	410.4		1	2 mL	2 mL	411708	04/18/18 07:56	CCJ	TAL DEN
	Instrument ID: WC_Genesys20									
Total/NA	Prep	9012B			50 mL	50 mL	519715	04/12/18 05:34	DAM	TAL SAV
Total/NA	Analysis	9012B		1			519778	04/12/18 10:32	DAM	TAL SAV
	Instrument ID: LACHAT1									
Total/NA	Analysis	SM 2320B		1			410981	04/10/18 20:45	LPL	TAL DEN
	Instrument ID: WC_AT2									
Total/NA	Analysis	SM 2540C		1	100 mL	100 mL	411100	04/12/18 12:32	JAP	TAL DEN
	Instrument ID: NOEQUIP									

Client Sample ID: LFM-DUP01_SPR18

Lab Sample ID: 680-150816-3

Date Collected: 04/05/18 14:25

Matrix: Water

Date Received: 04/07/18 09:42

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3520C			996.9 mL	10 mL	519377	04/10/18 15:34	CEW	TAL SAV
Total/NA	Analysis	8081B 8082A		1			519614	04/11/18 19:20	JCK	TAL SAV
	Instrument ID: CSGZ									
Total/NA	Analysis	9056A		1	5 mL	5 mL	519555	04/11/18 12:21	UI	TAL SAV
	Instrument ID: CICK									
Total/NA	Analysis	9056A		10	5 mL	5 mL	519735	04/12/18 15:03	CJM	TAL SAV
	Instrument ID: CICK									
Total/NA	Prep	3010A			50 mL	50 mL	519496	04/10/18 16:58	BCB	TAL SAV
Total/NA	Analysis	6010C		1			519787	04/11/18 22:27	BCB	TAL SAV
	Instrument ID: ICPF									
Total/NA	Prep	3010A			50 mL	250 mL	519494	04/10/18 16:56	BCB	TAL SAV
Total/NA	Analysis	6020A		1			519899	04/12/18 16:51	BWR	TAL SAV
	Instrument ID: ICPMSC									
Total/NA	Prep	7470A			50 mL	50 mL	519250	04/09/18 08:39	NVF	TAL SAV
Total/NA	Analysis	7470A		1			519824	04/12/18 10:48	NVF	TAL SAV
	Instrument ID: LEEMAN2									
Total/NA	Analysis	353.2		1			411490	04/16/18 19:00	SVC	TAL DEN
	Instrument ID: WC_Alp 2									

Client Sample ID: LFM-DUP01_SPR18

Lab Sample ID: 680-150816-3

Date Collected: 04/05/18 14:25

Matrix: Water

Date Received: 04/07/18 09:42

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	410.4		1	2 mL	2 mL	411708	04/18/18 07:56	CCJ	TAL DEN
	Instrument ID: WC_Genesys20									
Total/NA	Prep	9012B			50 mL	50 mL	519715	04/12/18 05:34	DAM	TAL SAV
Total/NA	Analysis	9012B		1			519778	04/12/18 10:33	DAM	TAL SAV
	Instrument ID: LACHAT1									
Total/NA	Analysis	SM 2320B		1			410981	04/10/18 20:52	LPL	TAL DEN
	Instrument ID: WC_AT2									
Total/NA	Analysis	SM 2540C		1	100 mL	100 mL	411100	04/12/18 12:32	JAP	TAL DEN
	Instrument ID: NOEQUIP									

Client Sample ID: LFM-99-06A RP_SPR18

Lab Sample ID: 680-150816-4

Date Collected: 04/05/18 16:30

Matrix: Water

Date Received: 04/07/18 09:42

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3520C			990.6 mL	10 mL	519377	04/10/18 15:34	CEW	TAL SAV
Total/NA	Analysis	8081B 8082A		1			519614	04/11/18 19:36	JCK	TAL SAV
	Instrument ID: CSGZ									
Total/NA	Analysis	9056A		1	5 mL	5 mL	519555	04/11/18 12:34	UI	TAL SAV
	Instrument ID: CICK									
Total/NA	Analysis	9056A		10	5 mL	5 mL	519735	04/12/18 15:16	CJM	TAL SAV
	Instrument ID: CICK									
Total/NA	Prep	3010A			50 mL	50 mL	519496	04/10/18 16:58	BCB	TAL SAV
Total/NA	Analysis	6010C		1			519787	04/11/18 22:32	BCB	TAL SAV
	Instrument ID: ICPF									
Total/NA	Prep	3010A			50 mL	250 mL	519494	04/10/18 16:56	BCB	TAL SAV
Total/NA	Analysis	6020A		1			519899	04/12/18 16:54	BWR	TAL SAV
	Instrument ID: ICPMSC									
Total/NA	Prep	7470A			50 mL	50 mL	519250	04/09/18 08:39	NVF	TAL SAV
Total/NA	Analysis	7470A		1			519824	04/12/18 10:52	NVF	TAL SAV
	Instrument ID: LEEMAN2									
Total/NA	Analysis	353.2		1			411490	04/16/18 19:08	SVC	TAL DEN
	Instrument ID: WC_Alp 2									
Total/NA	Analysis	410.4		1	2 mL	2 mL	411708	04/18/18 07:56	CCJ	TAL DEN
	Instrument ID: WC_Genesys20									
Total/NA	Prep	9012B			50 mL	50 mL	519715	04/12/18 05:34	DAM	TAL SAV
Total/NA	Analysis	9012B		1			519778	04/12/18 10:34	DAM	TAL SAV
	Instrument ID: LACHAT1									
Total/NA	Analysis	SM 2320B		1			410981	04/10/18 20:58	LPL	TAL DEN
	Instrument ID: WC_AT2									
Total/NA	Analysis	SM 2540C		1	100 mL	100 mL	411100	04/12/18 12:32	JAP	TAL DEN
	Instrument ID: NOEQUIP									

Lab Chronicle

Client: KOMAN Government Solutions, LLC
Project/Site: Devens / DCL

TestAmerica Job ID: 680-150816-1

Client Sample ID: LFM-03-07_SPR18
Date Collected: 04/06/18 08:05
Date Received: 04/07/18 09:42

Lab Sample ID: 680-150816-5
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3520C			941.8 mL	10 mL	519588	04/11/18 15:10	CEW	TAL SAV
Total/NA	Analysis	8081B 8082A		1			519800	04/12/18 19:41	JCK	TAL SAV
	Instrument ID: CSGZ									
Total/NA	Analysis	9056A		1	5 mL	5 mL	519555	04/11/18 12:47	UI	TAL SAV
	Instrument ID: CICK									
Total/NA	Analysis	9056A		10	5 mL	5 mL	519735	04/12/18 15:28	CJM	TAL SAV
	Instrument ID: CICK									
Total/NA	Prep	3010A			50 mL	50 mL	519496	04/10/18 16:58	BCB	TAL SAV
Total/NA	Analysis	6010C		1			519787	04/11/18 22:37	BCB	TAL SAV
	Instrument ID: ICPF									
Total/NA	Prep	3010A			50 mL	250 mL	519494	04/10/18 16:56	BCB	TAL SAV
Total/NA	Analysis	6020A		1			519899	04/12/18 17:05	BWR	TAL SAV
	Instrument ID: ICPMSC									
Total/NA	Prep	7470A			50 mL	50 mL	519250	04/09/18 08:39	NVF	TAL SAV
Total/NA	Analysis	7470A		1			519824	04/12/18 10:55	NVF	TAL SAV
	Instrument ID: LEEMAN2									
Total/NA	Analysis	353.2		1			411490	04/16/18 19:10	SVC	TAL DEN
	Instrument ID: WC_Alp 2									
Total/NA	Analysis	410.4		1	2 mL	2 mL	411708	04/18/18 07:56	CCJ	TAL DEN
	Instrument ID: WC_Genesys20									
Total/NA	Prep	9012B			50 mL	50 mL	519715	04/12/18 05:34	DAM	TAL SAV
Total/NA	Analysis	9012B		1			519778	04/12/18 10:37	DAM	TAL SAV
	Instrument ID: LACHAT1									
Total/NA	Analysis	SM 2320B		1			411025	04/11/18 18:10	LPL	TAL DEN
	Instrument ID: WC_AT2									
Total/NA	Analysis	SM 2540C		1	100 mL	100 mL	411100	04/12/18 12:32	JAP	TAL DEN
	Instrument ID: NOEQUIP									

Laboratory References:

= Katahdin Analytical Services Inc, PO BOX 540, 600 Technology Way, Scarborough, ME 04074

TAL DEN = TestAmerica Denver, 4955 Yarrow Street, Arvada, CO 80002, TEL (303)736-0100

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

TEST AMERICA SAVANNAH
DEVENS SPRING 2018
SL2997

KATAHDIN ANALYTICAL SERVICES
600 TECHNOLOGY WAY
SCARBOROUGH, ME 04074

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MassDEP Analytical Protocol Certification Form

Laboratory Name: Katahdin Analytical Services, LLC.	Project #:
Project Location: Devens Spring	RTN:

This Form provides certifications for the following data set: list Laboratory Sample ID Number(s):
SL2997-1, 2, 3, 4, 5, 6

Matrices: Groundwater/Surface Water Soil/Sediment Drinking Water Air Other:

CAM Protocol (check all that apply below):

8260 VOC CAM II A	7470/7471 Hg CAM III B	MassDEP VPH CAM IV A ✓	8081 Pesticides CAM V B	7196 Hex Cr CAM VI B	MassDEP APH CAM IX A
8270 SVOC CAM II B	7010 Metals CAM III C	MassDEP EPH CAM IV B ✓	8151 Herbicides CAM V C	8330 Explosives CAM VIII A	TO-15 VOC CAM IX B
6010 Metals CAM III A	6020 Metals CAM III D	8082 PCB CAM V A	9014 Total Cyanide/PAC CAM VI A	6860 Perchlorate CAM VIII B	

Affirmative Responses to Questions A through F are required for "Presumptive Certainty" status

A	Were all samples received in a condition consistent with those described on the Chain-of-Custody, properly preserved (including temperature) in the field or laboratory, and prepared/analyzed within method holding times?	(Yes) No
B	Were the analytical method(s) and all associated QC requirements specified in the selected CAM protocol(s) followed?	(Yes) No
C	Were all required corrective actions and analytical response actions specified in the selected CAM protocol(s) implemented for all identified performance standard non-conformances?	(Yes) No
D	Does the laboratory report comply with all the reporting requirements specified in CAM VII A, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data"?	(Yes) No
E	VPH, EPH, APH, and TO-15 only: a. VPH, EPH, and APH Methods only: Was each method conducted without significant modification(s)? (Refer to the individual method(s) for a list of significant modifications). b. APH and TO-15 Methods only: Was the complete analyte list reported for each method?	(Yes) No (Yes) No
F	Were all applicable CAM protocol QC and performance standard non-conformances identified and evaluated in a laboratory narrative (including all "No" responses to Questions A through E)?	(Yes) No

Responses to Questions G, H and I below are required for "Presumptive Certainty" status

G	Were the reporting limits at or below all CAM reporting limits specified in the selected CAM protocol(s)?	(Yes) No[1]

***Data User Note:** Data that achieve "Presumptive Certainty" status may not necessarily meet the data usability and representativeness requirements described in 310 CMR 40. 1056 (2)(k) and WSC-07-350.*

H	Were **all** QC performance standards specified in the CAM protocol(s) achieved?	Yes (No[1])
I	Were results reported for the complete analyte list specified in the selected CAM protocol(s)?	(Yes) No[1]

[1] *All negative responses must be addressed in an attached laboratory narrative.*

I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, accurate and complete.

Signature: Leslie Dimond **Position:** Q.A. Officer

Printed Name: Leslie Dimond **Date:** 04/20/2018

SAMPLE DATA PACKAGE

SDG NARRATIVE
KATAHDIN ANALYTICAL SERVICES
TEST AMERICA, SAVANNAH
DEVENS SPRING 2018
SL2997

Sample Receipt

The following samples were received on April 09, 2018 and were logged in under Katahdin Analytical Services work order number SL2997 for a hardcopy due date of April 21, 2018.

KATAHDIN Sample No.	TEST AMERICA SAVANNAH Sample Identification
SL2997-1	LFM-99-02B_SPR18
SL2997-2	LFM-99-05A_SPR18
SL2997-3	LFM-DUP01_SPR18
SL2997-4	LFM-99-06A RP_SPR18
SL2997-5	LFM-03-07_SPR18
SL2997-6	TRIPBLANK1_040518

The samples were logged in for the analyses specified on the chain of custody form. All problems encountered and resolved during sample receipt have been documented on the applicable chain of custody forms.

We certify that the test results provided in this report meet all the requirements of the NELAC standards unless otherwise noted in this narrative or in the Report of Analysis.

Sample analyses have been performed by the methods as noted herein.

Should you have any questions or comments concerning this Report of Analysis, please do not hesitate to contact your Katahdin Analytical Services Project Manager, **Ms. Heather Manz**. This narrative is an integral part of the Report of Analysis.

Organics Analysis

The samples of Work Order SL2997 were analyzed in accordance with the Method for the Determination of Extractable Petroleum Hydrocarbons (EPH), MADEP, May 2004, Revision 1.1, and/or Method for the Determination of Volatile Petroleum Hydrocarbons (VPH), MADEP, May 2004, Revision 1.1, and/or for the specific methods listed below or on the Report of Analysis.

Sample SL2997-1 was used as the matrix spike (MS) and matrix spike duplicate (MSD), as per client request.

MA-EPH Analysis

The method blank, WG226338-1, had a low recovery of the extraction surrogate 5-alpha-androstane that was outside of the method acceptance limits. Since all of the associated samples

had acceptable surrogate recoveries, and no target analytes or hydrocarbon ranges were detected above the MDL, no further action was taken.

The opening calibration verification standard (CV) (file CLD2033) had a low response for the C36 hydrocarbon that was outside of the method acceptance limits. Since the C19-C36 aliphatic range response was acceptable, no further action was taken.

MA-VPH Analysis

The MSD WG226278-5 had a high recovery for the spike target analyte naphthalene that was outside of the method acceptance limits. Since the associated LCS/LCSD WG226278-2 and 3 were acceptable, no further action was taken.

There were no other protocol deviations or observations noted by the organics laboratory staff.

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized the Quality Assurance Officer, or their designee, as verified by the following signature.

Leslie Dimond 04.19.18

Leslie Dimond
Quality Assurance Officer

Katahdin Analytical Services, Inc.

Manual Integration Codes For GC/MS, GC, HPLC and/or IC

M1	Peak splitting.
M2	Well defined peaks on the shoulders of the other peaks.
M3	There is additional area due to a coeluting interferant.
M4	There are negative spikes in the baseline.
M5	There are rising or falling baselines.
M6	The software has failed to detect a peak or misidentified a peak.
M7	Excessive peak tailing.
M8	Analysis such as GRO, DRO and TPH require a baseline hold.
M9	Peak was not completely integrated as in GC/MS.
M10	Primary ion was correctly integrated, but secondary or tertiary ion needed manual integration as in GC/MS.
M11	For GC analysis, when a sample is diluted by 1:10 or more, the surrogate is set to undetected and then the area under the surrogate is manually integrated.
M12	Manual integration saved in method due to TurboChrom floating point error.

Catahdin Analytical Services, LLC. Sample Receipt Condition Report

Client: Tel America (KOMAN GS)	KAS PM: HHM	Sampled By:
Project:	KIMS Entry By: JCB	Delivered By: Fed ex
KAS Work Order#: ~~SL2996~~ JCB SL2997	KIMS Review By: HHM	Received By: BF
SDG #:	Cooler: 1 of 2	Date/Time Rec.: 11:25 4-7-18

Receipt Criteria	Y	N	EX*	NA	Comments and/or Resolution
1. Custody seals present / intact?	✓				
2. Chain of Custody present in cooler?	✓				
3. Chain of Custody signed by client?	✓				wrong chain?
4. Chain of Custody matches samples?	~~✓~~ JCB		X		Only EPH/VPH samples
5. Temperature Blanks present? If not, take temperature of any sample w/ IR gun.		✓			Temp (°C): 4.6
Samples received at <6 °C w/o freezing?	✓				Note: Not required for metals (except Hg soil) analysis.
Ice packs or ice present?	✓				The lack of ice or ice packs (i.e. no attempt to begin cooling process) or insufficient ice may not meet certain regulatory requirements and may invalidate certain data.
If yes, was there sufficient ice to meet temperature requirements?	✓				
If temp. out, has the cooling process begun (i.e. ice or packs present) and sample collection times <6hrs., but samples are not yet cool?				✓	Note: No cooling process required for metals (except Hg soil) analysis.
6. Volatiles:					
Aqueous: No bubble larger than a pea?	✓				
Soil/Sediment:					
Received in airtight container?				✓	
Received in methanol?				✓	
Methanol covering soil?				✓	
D.I. Water - Received within 48 hour HT?				✓	
Air: Refer to KAS COC for canister/flow controller requirements.	√ if air included				
7. Trip Blank present in cooler?	✓				
8. Proper sample containers and volume?	✓				
9. Samples within hold time upon receipt?	✓				
10. Aqueous samples properly preserved? Metals, COD, NH3, TKN, O/G, phenol, TPO4, N+N, TOC, DRO, TPH – pH <2	✓				
Sulfide - >9				✓	
Cyanide – pH >12				✓	

* Log-In Notes to Exceptions: document any problems with samples or discrepancies or pH adjustments.

QA-048 – Revision 6 – 07/20/2015

Katahdin Analytical Services, LLC. Sample Receipt Condition Report

Client: Test America	KAS PM: HMM	Sampled By:
Project:	KIMS Entry By: JCB	Delivered By: Fedex
KAS Work Order#: 582997	KIMS Review By: HMM	Received By: BF
SDG #:	Cooler: 2 of 2	Date/Time Rec.: 11:25 4-7-18

Receipt Criteria	Y	N	EX*	NA	Comments and/or Resolution
1. Custody seals present / intact?	✓				
2. Chain of Custody present in cooler?		✓			Other cooler COC?
3. Chain of Custody signed by client?	✓				
4. Chain of Custody matches samples?			✓		only FRM/UPIT
5. Temperature Blanks present? If not, take temperature of any sample w/ IR gun.	✓				Temp (°C): 4.8
Samples received at <6 °C w/o freezing?	✓				Note: Not required for metals (except Hg soil) analysis.
Ice packs or ice present?	✓				The lack of ice or ice packs (i.e. no attempt to begin cooling process) or insufficient ice may not meet certain regulatory requirements and may invalidate certain data.
If yes, was there sufficient ice to meet temperature requirements?	✓				
If temp. out, has the cooling process begun (i.e. ice or packs present) and sample collection times <6hrs., but samples are not yet cool?				✓	Note: No cooling process required for metals (except Hg soil) analysis.
6. Volatiles:					
Aqueous: No bubble larger than a pea?				✓	
Soil/Sediment:					
Received in airtight container?				✓	
Received in methanol?				✓	
Methanol covering soil?				✓	
D.I. Water - Received within 48 hour HT?				✓	
Air: Refer to KAS COC for canister/flow controller requirements.	√ if air included				
7. Trip Blank present in cooler?				✓	
8. Proper sample containers and volume?	✓				
9. Samples within hold time upon receipt?	✓				
10. Aqueous samples properly preserved? Metals, COD, NH3, TKN, O/G, phenol, TPO4, N+N, TOC, DRO, TPH – pH <2	✓				
Sulfide - >9				✓	
Cyanide – pH >12				✓	

* Log-In Notes to Exceptions: document any problems with samples or discrepancies or pH adjustments.

From: Ragnaldsen, Amy [Amy.Ragnaldsen@testamericainc.com]
Sent: Monday, April 09, 2018 12:31 PM
To: 'Heather Manz'
Cc: Lanier, Jerry
Subject: RE: TestAmerica in Savannah Project to be received by Katahdin on Saturday 4/7/18 * Information

Hi Heather,

The extra COC does not require EPH or VPH, please discard

On your sample receipt you did log the trip blank in, can you confirm you received all 3 HCL vials for the trip blank to run the VPH?

Also,

The client wanted the trip blank ID revised to: TripBlank1_040518

Thank you!

From: Heather Manz [mailto:hmanz@katahdinlab.com]
Sent: Monday, April 09, 2018 12:26 PM
To: Ragnaldsen, Amy
Cc: Lanier, Jerry
Subject: RE: TestAmerica in Savannah Project to be received by Katahdin on Saturday 4/7/18 * Information

Hi Amy,

We received the samples on Saturday in good condition. We've logged them into work order SL2997. We also received an extra page of COC with no samples to go with it. I just wanted to check and make sure this was sent by accident, it is attached here.

Thanks
Heather

From: Ragnaldsen, Amy [mailto:Amy.Ragnaldsen@testamericainc.com]
Sent: Friday, April 06, 2018 3:13 PM
To: 'Heather Manz'
Cc: Lanier, Jerry
Subject: TestAmerica in Savannah Project to be received by Katahdin on Saturday 4/7/18 * Information
Importance: High

Samples coming from the KOMAN (KGS) / Fort Devens, MA project. (they are shipping to the Saturday address you gave me and will mark Hold for Pick Up)

Our Waltham, MA SVC Center is shipping aqueous samples to your lab for receipt tomorrow-Saturday 4/7/18

5 waters, 1 MS/MSD, and 1 trip blank for VPH analysis.

The TestAmerica Job Number for the report and invoice is 680-150816

Level II report with Excel EDD

(I have attached a copy of the COC called Devens / DCL

Please confirm that you receive them tomorrow and we will forward you the TestAmerica job number that should be referenced on the final report & invoice.

Please forward the signed, dated, and temperature recorded chains of custody.

(All other analyses on the COC are being performed by TestAmerica)

Thank You,
Amy

AMY RAGNALDSEN
Project Management Assistant

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

5102 LaRoche Avenue
Savannah, GA 31404
Tel 912.354.7858 Ext. 3225

SL2997

Chain of Custody Record

Page: 1 of: 1

PO #	18-706
	Devens - DCL Spring 2018
Company:	KOMAN GS, LLC
Address:	293 Boston Post Road, Suite 100 Marlborough, MA 01752
Phone:	508-366-7442 Fax: 508-366-7445
Sampled by [Print Name(s)]/Affilliation	
Sampler(s) Signature(s)	

Laboratory:	Test America - Savannah
Address:	510 LaRoche Ave Savannah, GA 31404
Contact:	Jerry Lanier
Regulatory Facility No.	
Project Name:	Devens Spring 20187 LTM
Sampling QAP No.:	
Approval Date:	
TAT	Routine
Other:	

Item No.	Field ID No.	Sampled Date	Sampled Time	Col. Method (see codes)	Matrix (see codes)	Number of Containers	MA VPH 3-40-ml VOA vials (HCl)	MA EPH 2-1liter amber glass(HCl)	Pesticides/SW8081 2-1liter amber glass	Total Metals* (SW6010/6020/7470) 1-250 ml poly (HNO3)	Total Cyanide/SW9012 1-250ml poly (NaOH)	Chloride/Sulfate (SW9056) 1-125ml poly	Nitrate/Nitrite-E353.2 1-500 ml amber glass (H2SO4)	Alkalinity/SM2320B 1-250-ml poly	TDS/SM2540D 1-1liter poly	COD/SW9060 1-500-ml amber glass (H2SO4)	Remarks	Lab. No.
						Preservatives (see codes)	H	H	I	N	O	I	S	I	I	S		
						Analyses Requested												
LFM-99-02B_SPR18		4/6/18	1005	P	GW	42	X	X	X	X	X	X	X	X	X	X	MS/MSD	
LFM-99-05A_SPR18		4/5/18	1420	P	GW	14	X	X	X	X	X	X	X	X	X	X		
LFM-DUP01_SPR18		4/5/18	1425	P	GW	14	X	X	X	X	X	X	X	X	X	X		
LFM-99-06A RP_SPR18		4/5/18	1630	P	GW	14	X	X	X	X	X	X	X	X	X	X		
LFM-03-07_SPR18		4/6/18	805	P	GW	14	X	X	X	X	X	X	X	X	X	X		
TripBlank1_		4/5/18	-	O	WQ	5	X											

Total Number of Containers

Shipping Details: courier pick up

Date Out: Via:

Returned: Via:

Additional Comments:

* = Total Metals include: Ba, Cd, Cr, Cu, Fe, Pb, Mn, Se, Ag (6010); As (6020); Hg (7470)

Item No.	Relinquished by/Affiliation	Date	Time		Date	Time
	[signature] KGS	4/6/18	1350	[signature]		
	[signature]	4-6-18	1801		4/9	835

email logins and results to:

lckes@komangs.com

Lab Comments

Preserve Where Applicable ☐

On ICE ☐

Temperature _____C

☐ NJ Reduced
☐ NJ Full
☐ Full CLP
☐ Disk Deliverable
☐ Other (Specify)

NJ Data Deliverable Info

☐ Commercial "A"
☐ Commercial "B"
☐ State Forms

MATRIX CODES: GW = Groundwater SW = Surface Water

PRESERVATIVE CODES: H = HCL + Ice I = Ice Only N = Nitric Acid + Ice S = Sulfuric Acid + Ice O = Other

COLLECTION METHOD CODES: C = Composite G=Grab P= Pumping O = Other

O = Other

4/23/2018

Katahdin
ANALYTICAL SERVICES

Katahdin Analytical Services

Login Chain of Custody Report (lno1)

Apr. 09, 2018
12:33 PM

Login Number: SL2997

Account: TASAV001
Test America Savannah

Project: TASAV-DEVENS

NoWeb

Quote/Incoming:

Primary Report Address:
Jerry Lanier
Test America Savannah
5102 LaRoche Avenue

Savannah,GA 31404
Jerry.Lanier@testamericainc.com

Primary Invoice Address:
Accounts Payable
Test America Savannah
5102 LaRoche Avenue

Savannah,GA 31404

Report CC Addresses:
Invoice CC Addresses:

Login Information:

ANALYSIS INSTRUCTIONS	:	FDS, DOD QSM 4.2 reporting with DOD limits. ND to PQL. "J" flag between MDL and PQL. Need LCS/LCSD. Follow MA MCP CAM. Include level 4 narrative.
CHECK NO.	:	
CLIENT PO#	:	680-150816
CLIENT PROJECT MANAGE	:	Jerry Lanier
CONTRACT	:	W912WJ-10-D-0003
COOLER TEMPERATURE	:	4.6, 4.8
DELIVERY SERVICES	:	FedEx
EDD FORMAT	:	KAS033QC-XLS
LOGIN INITIALS	:	JCB
PM	:	HHM
PROJECT NAME	:	Devens Spring 2018
QC LEVEL	:	IV
REPORT INSTRUCTIONS	:	SDS needs all forms. Include Level 4 narrative and MCP forms (from Leslie). Send level 4 PDF & level 2 PDF. Level 2= SDP & SDS. Email PDF, EDD, and invoice to Jerry. No HC.
SDG ID	:	
SDG STATUS	:	
VERBAL TAT	:	

Laboratory Sample ID	Client Sample Number	Collect Date/Time	Receive Date	PR	Verbal Date	Due Date	Mailed
SL2997-1	LFM-99-02B_SPR18	06-APR-18 10:05	09-APR-18			21-APR-18	

Matrix		Product	Hold Date (shortest)	Bottle Type	Bottle Count	Comments
Aqueous	S	MA-EPH	20-APR-18	1L N-Amber Glass		**MS/MSD**
Aqueous	S	MA-VPH	20-APR-18	40mL Vial+HCl		

SL2997-2	LFM-99-05A_SPR18	05-APR-18 14:20	09-APR-18			21-APR-18	

Matrix		Product	Hold Date (shortest)	Bottle Type	Bottle Count	Comments
Aqueous	S	MA-EPH	19-APR-18	1L N-Amber Glass		
Aqueous	S	MA-VPH	19-APR-18	40mL Vial+HCl		

SL2997-3	LFM-DUP01_SPR18	05-APR-18 14:25	09-APR-18			21-APR-18	

Matrix		Product	Hold Date (shortest)	Bottle Type	Bottle Count	Comments
Aqueous	S	MA-EPH	19-APR-18	1L N-Amber Glass		
Aqueous	S	MA-VPH	19-APR-18	40mL Vial+HCl		

SL2997-4	LFM-99-06A RP_SPR18	05-APR-18 16:30	09-APR-18			21-APR-18	

Matrix		Product	Hold Date (shortest)	Bottle Type	Bottle Count	Comments
Aqueous	S	MA-EPH	19-APR-18	1L N-Amber Glass		
Aqueous	S	MA-VPH	19-APR-18	40mL Vial+HCl		

SL2997-5	LFM-03-07_SPR18	06-APR-18 08:05	09-APR-18			21-APR-18	

Matrix		Product	Hold Date (shortest)	Bottle Type	Bottle Count	Comments
Aqueous	S	MA-EPH	20-APR-18	1L N-Amber Glass		
Aqueous	S	MA-VPH	20-APR-18	40mL Vial+HCl		

SL2997-6	TRIPBLANK1_040518	05-APR-18 00:00	09-APR-18			21-APR-18	

Matrix		Product	Hold Date (shortest)	Bottle Type	Bottle Count	Comments
Aqueous	S	MA-VPH	19-APR-18	40mL Vial+HCl		

HHM 4-9-18

Total Samples: **6** ***Total Analyses:*** **11**

SAMPLE DATA SUMMARY PACKAGE

1
2
3
4
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6
7
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11
12
13
14

KATAHDIN ANALYTICAL SERVICES - ORGANIC DATA QUALIFIERS

The sampled date indicated on the attached Report(s) of Analysis (ROA) is the date for which a grab sample was collected or the date for which a composite sample was completed. Beginning and start times for composite samples can be found on the Chain-of-Custody.

U — Indicates the compound was analyzed for but not detected above the specified level. This level may be the Limit of Quantitation (LOQ)(previously called Practical Quantitation Level (PQL)), the Limit of Detection (LOD) or Method Detection Limit (MDL) as required by the client.

Note: All results reported as "U" MDL have a 50% rate for false negatives compared to those results reported as "U" PQL/LOQ or "U" LOD, where the rate of false negatives is <1%.

* — Compound recovery or percent RPD (relative percent difference) was outside of quality control limits.

D — Indicates the result was obtained from analysis of a diluted sample. Surrogate recoveries may not be calculable.

E — Estimated value. This flag identifies compounds whose concentrations exceed the upper level of the calibration range of the instrument for that specific analysis.

J — Estimated value. The analyte was detected in the sample at a concentration less than the laboratory Limit of Quantitation (LOQ)(previously called Practical Quantitation Limit (PQL)), but above the Method Detection Limit (MDL).

or

J — Used for Pesticides, PCBs, Herbicides, Formaldehyde, Explosives and Method 504.1 analytes when there is a greater than 40% difference for detected concentrations between the two GC columns.

B — Indicates the analyte was detected in the laboratory method blank analyzed concurrently with the sample.

C — Indicates that the flagged compound did not meet DoD criteria in the corresponding daily calibration verification (CV).

L — Indicates that the flagged compound did not meet DoD criteria in the corresponding Laboratory Control Sample (LCS) and/or Laboratory Control Sample Duplicate (LCSD) prepared and/or analyzed concurrently with the sample.

M — Indicates that the flagged compound did not meet DoD criteria in the Matrix Spike and/or Matrix Spike Duplicate prepared and/or analyzed concurrently with the native sample.

N — Presumptive evidence of a compound based on a mass spectral library search.

A — Indicates that a tentatively identified compound is a suspected aldol-condensation product.

P — Used for Pesticide/Aroclor analyte when there is a greater than 25% difference for detected concentrations between the two GC columns. (for CLP methods only).

Report of Analytical Results

Client: Test America Savannah
Lab ID: SL2997-1
Client ID: LFM-99-02B_SPR18
Project: Devens Spring 2018
SDG: SL2997
Lab File ID: CLD2050.D

Sample Date: 06-APR-18
Received Date: 09-APR-18
Extract Date: 11-APR-18
Extracted By: KF
Extraction Method: SW846 3510C
Lab Prep Batch: WG226338

Analysis Date: 16-APR-18
Analyst: AAB
Analysis Method: MA DEP EPH 04-1.1
Matrix: AQ
% Solids: NA
Report Date: 18-APR-18

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
C9-C18 Aliphatics	U	99	ug/L	1	100	99.	50.	74.
C19-C36 Aliphatics	U	99	ug/L	1	100	99.	50.	74.
C11-C22 Aromatics	U	99	ug/L	1	100	99.	50.	74.
Naphthalene	U	2.0	ug/L	1	2	2.0	0.89	1.5
2-Methylnaphthalene	U	2.0	ug/L	1	2	2.0	0.79	1.5
Phenanthrene	U	2.0	ug/L	1	2	2.0	0.89	1.5
Acenaphthylene	U	2.0	ug/L	1	2	2.0	0.79	1.5
Acenaphthene	U	2.0	ug/L	1	2	2.0	1.8	1.9
Anthracene	U	2.0	ug/L	1	2	2.0	1.4	1.5
Benzo(a)anthracene	U	2.0	ug/L	1	2	2.0	1.4	1.5
Benzo(a)pyrene	U	2.0	ug/L	1	2	2.0	1.3	1.5
Benzo(b)fluoranthene	U	2.0	ug/L	1	2	2.0	0.79	1.5
Benzo(g,h,i)perylene	U	2.0	ug/L	1	2	2.0	1.3	1.5
Benzo(k)fluoranthene	U	2.0	ug/L	1	2	2.0	0.99	1.5
Chrysene	U	2.0	ug/L	1	2	2.0	0.89	1.5
Dibenzo(a,h)anthracene	U	2.0	ug/L	1	2	2.0	1.2	1.5
Fluoranthene	U	2.0	ug/L	1	2	2.0	0.79	1.5
Fluorene	U	2.0	ug/L	1	2	2.0	0.89	1.5
Indeno(1,2,3-cd)pyrene	U	2.0	ug/L	1	2	2.0	1.4	1.5
Pyrene	U	2.0	ug/L	1	2	2.0	1.1	1.5
5-Alpha Androstane		43.1	%					
o-Terphenyl		48.6	%					
2-Fluorobiphenyl		59.7	%					
2-Bromonaphthalene		61.5	%					

600 Technology Way
P.O. Box 540, Scarborough, ME 04070
Tel:(207) 874-2400 Fax:(207) 775-4029

http://www.katahdinlab.com

Report of Analytical Results

Client: Test America Savannah
Lab ID: SL2997-2
Client ID: LFM-99-05A_SPR18
Project: Devens Spring 2018
SDG: SL2997
Lab File ID: CLD2051.D

Sample Date: 05-APR-18
Received Date: 09-APR-18
Extract Date: 11-APR-18
Extracted By: KF
Extraction Method: SW846 3510C
Lab Prep Batch: WG226338

Analysis Date: 16-APR-18
Analyst: AAB
Analysis Method: MA DEP EPH 04-1.1
Matrix: AQ
% Solids: NA
Report Date: 18-APR-18

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
C9-C18 Aliphatics	U	110	ug/L	1	100	110	53.	80.
C19-C36 Aliphatics	U	110	ug/L	1	100	110	53.	80.
C11-C22 Aromatics	U	110	ug/L	1	100	110	53.	80.
Naphthalene	U	2.1	ug/L	1	2	2.1	0.96	1.6
2-Methylnaphthalene	U	2.1	ug/L	1	2	2.1	0.85	1.6
Phenanthrene	U	2.1	ug/L	1	2	2.1	0.96	1.6
Acenaphthylene	U	2.1	ug/L	1	2	2.1	0.85	1.6
Acenaphthene	U	2.1	ug/L	1	2	2.1	1.9	2.0
Anthracene	U	2.1	ug/L	1	2	2.1	1.5	1.6
Benzo(a)anthracene	U	2.1	ug/L	1	2	2.1	1.5	1.6
Benzo(a)pyrene	U	2.1	ug/L	1	2	2.1	1.4	1.6
Benzo(b)fluoranthene	U	2.1	ug/L	1	2	2.1	0.85	1.6
Benzo(g,h,i)perylene	U	2.1	ug/L	1	2	2.1	1.4	1.6
Benzo(k)fluoranthene	U	2.1	ug/L	1	2	2.1	1.1	1.6
Chrysene	U	2.1	ug/L	1	2	2.1	0.96	1.6
Dibenzo(a,h)anthracene	U	2.1	ug/L	1	2	2.1	1.3	1.6
Fluoranthene	U	2.1	ug/L	1	2	2.1	0.85	1.6
Fluorene	U	2.1	ug/L	1	2	2.1	0.96	1.6
Indeno(1,2,3-cd)pyrene	U	2.1	ug/L	1	2	2.1	1.5	1.6
Pyrene	U	2.1	ug/L	1	2	2.1	1.2	1.6
5-Alpha Androstane		42.1	%					
o-Terphenyl		51.4	%					
2-Fluorobiphenyl		64.9	%					
2-Bromonaphthalene		66.4	%					

600 Technology Way
P.O. Box 540, Scarborough, ME 04070
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Report of Analytical Results

Client: Test America Savannah
Lab ID: SL2997-3
Client ID: LFM-DUP01_SPR18
Project: Devens Spring 2018
SDG: SL2997
Lab File ID: CLD2052.D

Sample Date: 05-APR-18
Received Date: 09-APR-18
Extract Date: 11-APR-18
Extracted By: KF
Extraction Method: SW846 3510C
Lab Prep Batch: WG226338

Analysis Date: 16-APR-18
Analyst: AAB
Analysis Method: MA DEP EPH 04-1.1
Matrix: AQ
% Solids: NA
Report Date: 18-APR-18

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
C9-C18 Aliphatics	U	97	ug/L	1	100	97.	48.	73.
C19-C36 Aliphatics	U	97	ug/L	1	100	97.	48.	73.
C11-C22 Aromatics	U	97	ug/L	1	100	97.	48.	73.
Naphthalene	U	1.9	ug/L	1	2	1.9	0.87	1.4
2-Methylnaphthalene	U	1.9	ug/L	1	2	1.9	0.78	1.4
Phenanthrene	U	1.9	ug/L	1	2	1.9	0.87	1.4
Acenaphthylene	U	1.9	ug/L	1	2	1.9	0.78	1.4
Acenaphthene	U	1.9	ug/L	1	2	1.9	1.7	1.8
Anthracene	U	1.9	ug/L	1	2	1.9	1.4	1.4
Benzo(a)anthracene	U	1.9	ug/L	1	2	1.9	1.4	1.4
Benzo(a)pyrene	U	1.9	ug/L	1	2	1.9	1.3	1.4
Benzo(b)fluoranthene	U	1.9	ug/L	1	2	1.9	0.78	1.4
Benzo(g,h,i)perylene	U	1.9	ug/L	1	2	1.9	1.3	1.4
Benzo(k)fluoranthene	U	1.9	ug/L	1	2	1.9	0.97	1.4
Chrysene	U	1.9	ug/L	1	2	1.9	0.87	1.4
Dibenzo(a,h)anthracene	U	1.9	ug/L	1	2	1.9	1.2	1.4
Fluoranthene	U	1.9	ug/L	1	2	1.9	0.78	1.4
Fluorene	U	1.9	ug/L	1	2	1.9	0.87	1.4
Indeno(1,2,3-cd)pyrene	U	1.9	ug/L	1	2	1.9	1.4	1.4
Pyrene	U	1.9	ug/L	1	2	1.9	1.1	1.4
5-Alpha Androstane		47.0	%					
o-Terphenyl		49.0	%					
2-Fluorobiphenyl		63.0	%					
2-Bromonaphthalene		63.8	%					

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Katahdin
ANALYTICAL SERVICES

Report of Analytical Results

Client: Test America Savannah
Lab ID: SL2997-4
Client ID: LFM-99-06A RP_SPR18
Project: Devens Spring 2018
SDG: SL2997
Lab File ID: CLD2053.D

Sample Date: 05-APR-18
Received Date: 09-APR-18
Extract Date: 11-APR-18
Extracted By: KF
Extraction Method: SW846 3510C
Lab Prep Batch: WG226338

Analysis Date: 16-APR-18
Analyst: AAB
Analysis Method: MA DEP EPH 04-1.1
Matrix: AQ
% Solids: NA
Report Date: 18-APR-18

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
C9-C18 Aliphatics	U	96	ug/L	1	100	96.	48.	72.
C19-C36 Aliphatics	U	96	ug/L	1	100	96.	48.	72.
C11-C22 Aromatics	U	96	ug/L	1	100	96.	48.	72.
Naphthalene	U	1.9	ug/L	1	2	1.9	0.86	1.4
2-Methylnaphthalene	U	1.9	ug/L	1	2	1.9	0.77	1.4
Phenanthrene	U	1.9	ug/L	1	2	1.9	0.86	1.4
Acenaphthylene	U	1.9	ug/L	1	2	1.9	0.77	1.4
Acenaphthene	U	1.9	ug/L	1	2	1.9	1.7	1.8
Anthracene	U	1.9	ug/L	1	2	1.9	1.3	1.4
Benzo(a)anthracene	U	1.9	ug/L	1	2	1.9	1.3	1.4
Benzo(a)pyrene	U	1.9	ug/L	1	2	1.9	1.2	1.4
Benzo(b)fluoranthene	U	1.9	ug/L	1	2	1.9	0.77	1.4
Benzo(g,h,i)perylene	U	1.9	ug/L	1	2	1.9	1.2	1.4
Benzo(k)fluoranthene	U	1.9	ug/L	1	2	1.9	0.96	1.4
Chrysene	U	1.9	ug/L	1	2	1.9	0.86	1.4
Dibenzo(a,h)anthracene	U	1.9	ug/L	1	2	1.9	1.2	1.4
Fluoranthene	U	1.9	ug/L	1	2	1.9	0.77	1.4
Fluorene	U	1.9	ug/L	1	2	1.9	0.86	1.4
Indeno(1,2,3-cd)pyrene	U	1.9	ug/L	1	2	1.9	1.3	1.4
Pyrene	U	1.9	ug/L	1	2	1.9	1.0	1.4
5-Alpha Androstane		52.9	%					
o-Terphenyl		52.6	%					
2-Fluorobiphenyl		65.0	%					
2-Bromonaphthalene		66.6	%					

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Report of Analytical Results

Client: Test America Savannah
Lab ID: SL2997-5
Client ID: LFM-03-07_SPR18
Project: Devens Spring 2018
SDG: SL2997
Lab File ID: CLD2054.D

Sample Date: 06-APR-18
Received Date: 09-APR-18
Extract Date: 11-APR-18
Extracted By: KF
Extraction Method: SW846 3510C
Lab Prep Batch: WG226338

Analysis Date: 16-APR-18
Analyst: AAB
Analysis Method: MA DEP EPH 04-1.1
Matrix: AQ
% Solids: NA
Report Date: 18-APR-18

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
C9-C18 Aliphatics	U	95	ug/L	1	100	95.	48.	71.
C19-C36 Aliphatics	U	95	ug/L	1	100	95.	48.	71.
C11-C22 Aromatics	U	95	ug/L	1	100	95.	48.	71.
Naphthalene	U	1.9	ug/L	1	2	1.9	0.86	1.4
2-Methylnaphthalene	U	1.9	ug/L	1	2	1.9	0.76	1.4
Phenanthrene	U	1.9	ug/L	1	2	1.9	0.86	1.4
Acenaphthylene	U	1.9	ug/L	1	2	1.9	0.76	1.4
Acenaphthene	U	1.9	ug/L	1	2	1.9	1.7	1.8
Anthracene	U	1.9	ug/L	1	2	1.9	1.3	1.4
Benzo(a)anthracene	U	1.9	ug/L	1	2	1.9	1.3	1.4
Benzo(a)pyrene	U	1.9	ug/L	1	2	1.9	1.2	1.4
Benzo(b)fluoranthene	U	1.9	ug/L	1	2	1.9	0.76	1.4
Benzo(g,h,i)perylene	U	1.9	ug/L	1	2	1.9	1.2	1.4
Benzo(k)fluoranthene	U	1.9	ug/L	1	2	1.9	0.95	1.4
Chrysene	U	1.9	ug/L	1	2	1.9	0.86	1.4
Dibenzo(a,h)anthracene	U	1.9	ug/L	1	2	1.9	1.1	1.4
Fluoranthene	U	1.9	ug/L	1	2	1.9	0.76	1.4
Fluorene	U	1.9	ug/L	1	2	1.9	0.86	1.4
Indeno(1,2,3-cd)pyrene	U	1.9	ug/L	1	2	1.9	1.3	1.4
Pyrene	U	1.9	ug/L	1	2	1.9	1.0	1.4
5-Alpha Androstane		52.5	%					
o-Terphenyl		53.3	%					
2-Fluorobiphenyl		62.0	%					
2-Bromonaphthalene		63.5	%					

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Report of Analytical Results

Client:
Lab ID: WG226338-1
Client ID: Method Blank Sample
Project:
SDG: SL2997
Lab File ID: CLD2035.D

Sample Date:
Received Date:
Extract Date: 11-APR-18
Extracted By: KF
Extraction Method: SW846 3510C
Lab Prep Batch: WG226338

Analysis Date: 12-APR-18
Analyst: AAB
Analysis Method: MA DEP EPH 04-1.1
Matrix: AQ
% Solids: NA
Report Date: 18-APR-18

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
C9-C18 Aliphatics	U	100	ug/L	1	100	100	50.	75.
C19-C36 Aliphatics	U	100	ug/L	1	100	100	50.	75.
C11-C22 Aromatics	U	100	ug/L	1	100	100	50.	75.
Naphthalene	U	2.0	ug/L	1	2	2.0	0.90	1.5
2-Methylnaphthalene	U	2.0	ug/L	1	2	2.0	0.80	1.5
Phenanthrene	U	2.0	ug/L	1	2	2.0	0.90	1.5
Acenaphthylene	U	2.0	ug/L	1	2	2.0	0.80	1.5
Acenaphthene	U	2.0	ug/L	1	2	2.0	1.8	1.9
Anthracene	U	2.0	ug/L	1	2	2.0	1.4	1.5
Benzo(a)anthracene	U	2.0	ug/L	1	2	2.0	1.4	1.5
Benzo(a)pyrene	U	2.0	ug/L	1	2	2.0	1.3	1.5
Benzo(b)fluoranthene	U	2.0	ug/L	1	2	2.0	0.80	1.5
Benzo(g,h,i)perylene	U	2.0	ug/L	1	2	2.0	1.3	1.5
Benzo(k)fluoranthene	U	2.0	ug/L	1	2	2.0	1.0	1.5
Chrysene	U	2.0	ug/L	1	2	2.0	0.90	1.5
Dibenzo(a,h)anthracene	U	2.0	ug/L	1	2	2.0	1.2	1.5
Fluoranthene	U	2.0	ug/L	1	2	2.0	0.80	1.5
Fluorene	U	2.0	ug/L	1	2	2.0	0.90	1.5
Indeno(1,2,3-cd)pyrene	U	2.0	ug/L	1	2	2.0	1.4	1.5
Pyrene	U	2.0	ug/L	1	2	2.0	1.1	1.5
5-Alpha Androstane	*	38.3	%					
o-Terphenyl		45.0	%					
2-Fluorobiphenyl		63.0	%					
2-Bromonaphthalene		65.0	%					

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1 2 3 4 5 6 7 8 9 10 11 12 13 14

Form 2
System Monitoring Compound Recovery

Lab Name: Katahdin Analytical Services **Project:** Devens Spring 2018 **Matrix:** AQ
Lab Code: KAS **SDG:** SL2997

Client Sample ID	Lab Sample ID	Col. ID	2BN	#	2FBP	#	5AA	#	OTP	#
LFM-99-02B_SPR18	SL2997-1	B	61.5		59.7		43.1		48.6	
LFM-99-05A_SPR18	SL2997-2	B	66.4		64.9		42.1		51.4	
LFM-DUP01_SPR18	SL2997-3	B	63.8		63.0		47.0		49.0	
LFM-99-06A RP_SPR18	SL2997-4	B	66.6		65.0		52.9		52.6	
LFM-03-07_SPR18	SL2997-5	B	63.5		62.0		52.5		53.3	
Method Blank Sample	WG226338-1	B	65.0		63.0		38.3	*	45.0	
Laboratory Control S	WG226338-2	B	54.0		57.3		57.8		48.2	
Laboratory Control S	WG226338-3	B	58.7		60.1		55.2		50.8	
Matrix Spike	WG226338-4	B	59.8		58.0		51.4		51.1	
Matrix Spike Duplica	WG226338-5	B	55.9		54.4		52.1		47.5	

		QC Limits
5AA	5-ALPHA ANDROSTANE	40-140
OTP	O-TERPHENYL	40-140
2FBP	2-FLUOROBIPHENYL	40-140
2BN	2-BROMONAPHTHALENE	40-140

= Column to be used to flag recovery limits.
* = Values outside of contract required QC limits.
D= System Monitoring Compound diluted out.

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Katahdin
ANALYTICAL SERVICES

LCS/LCSD Recovery Report

LCS ID: WG226338-2
LCSD ID: WG226338-3
Project:
SDG: SL2997
Report Date: 18-APR-18
LCS File ID: CLD2036.D

Received Date:
Extract Date: 11-APR-18
Extracted By: KF
Extraction Method: SW846 3510C
Lab Prep Batch: WG226338
LCSD File ID: CLD1037.d

Analysis Date: 12-APR-18
Analyst: AAB
Analysis Method: MA DEP EPH 04-1.1
Matrix: AQ
% Solids: NA

Compound	Spike Amt	LCS Conc	LCS Rec (%)	LCSD Conc	LCSD Rec (%)	Conc Units	RPD (%)	RPD Limit	Limits
Unadjusted C11-C22 Aromatics	1530	827.	54.0	872.	57.0	ug/L	5	25	40-140
C9-C18 Aliphatics	540.	283.	52.4	257.	47.6	ug/L	10	25	40-140
C19-C36 Aliphatics	720.	445.	61.8	413.	57.4	ug/L	7	25	40-140
Naphthalene	90.0	39.0	43.3	41.6	46.2	ug/L	6	25	40-140
2-Methylnaphthalene	90.0	43.6	48.4	46.5	51.7	ug/L	6	25	40-140
Phenanthrene	90.0	47.5	52.8	50.4	56.0	ug/L	6	25	40-140
Acenaphthylene	90.0	39.7	44.1	42.4	47.1	ug/L	6	25	40-140
Acenaphthene	90.0	40.8	45.3	43.9	48.8	ug/L	7	25	40-140
Anthracene	90.0	46.2	51.3	49.0	54.4	ug/L	6	25	40-140
Benzo(a)anthracene	90.0	50.5	56.1	53.1	59.0	ug/L	5	25	40-140
Benzo(a)pyrene	90.0	52.1	57.9	54.9	61.0	ug/L	5	25	40-140
Benzo(b)fluoranthene	90.0	51.2	56.9	52.1	57.9	ug/L	2	25	40-140
Benzo(g,h,i)perylene	90.0	51.2	56.9	55.4	61.6	ug/L	8	25	40-140
Benzo(k)fluoranthene	90.0	49.5	55.0	53.9	59.9	ug/L	8	25	40-140
Chrysene	90.0	50.4	56.0	53.2	59.1	ug/L	5	25	40-140
Dibenzo(a,h)anthracene	90.0	56.1	62.3	60.0	66.7	ug/L	7	25	40-140
Fluoranthene	90.0	50.8	56.4	53.4	59.3	ug/L	5	25	40-140
Fluorene	90.0	42.5	47.2	45.8	50.9	ug/L	7	25	40-140
Indeno(1,2,3-cd)pyrene	90.0	48.7	54.1	49.7	55.2	ug/L	2	25	40-140
Pyrene	90.0	48.9	54.3	51.7	57.4	ug/L	6	25	40-140
5-Alpha Androstane			57.8		55.2				40-140
o-Terphenyl			48.2		50.8				40-140
2-Fluorobiphenyl			57.3		60.1				40-140
2-Bromonaphthalene			54.0		58.7				40-140

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ANALYTICAL SERVICES

MS/MSD Recovery Report

MS ID: WG226338-4
MSD ID: WG226338-5
Sample ID: SL2997-1
Client ID: LFM-99-02B_SPR18
Project:
SDG: SL2997
MS File ID: CLD2038.D

Received Date:
Extract Date: 11-APR-18
Extracted By: KF
Extraction Method: SW846 3510C
Lab Prep Batch: WG226338
Report Date: 18-APR-18
MSD File ID: CLD1039a.d

Analysis Date: 12-APR-18
Analyst: AAB
Analysis Method: MA DEP EPH 04-1.1
Matrix: AQ
% Solids: NA

Compound	MS Spike	MSD Spike	Conc Units	Samp Conc	MS Conc	MSD Conc	MS Rec (%)	MSD Rec (%)	RPD (%)	RPD Limit	Limits
C9-C18 Aliphatics	524.	535.	ug/L	U99	232	246	44.2	46.0	6	25	40-140
C19-C36 Aliphatics	699.	713.	ug/L	U99	394	404	56.4	56.7	2	25	40-140
Naphthalene	87.4	89.1	ug/L	U2.0	41	37.2	46.9	41.7	10	25	40-140
2-Methylnaphthalene	87.4	89.1	ug/L	U2.0	46.2	42.4	52.9	47.6	8	25	40-140
Phenanthrene	87.4	89.1	ug/L	U2.0	48.6	46.3	55.6	52.0	5	25	40-140
Acenaphthylene	87.4	89.1	ug/L	U2.0	41.7	39.1	47.7	43.9	6	25	40-140
Acenaphthene	87.4	89.1	ug/L	U2.0	42.9	40	49.1	44.9	7	25	40-140
Anthracene	87.4	89.1	ug/L	U2.0	47.6	45.2	54.5	50.7	5	25	40-140
Benzo(a)anthracene	87.4	89.1	ug/L	U2.0	52.8	48.8	60.4	54.8	8	25	40-140
Benzo(a)pyrene	87.4	89.1	ug/L	U2.0	54.2	50.3	62.0	56.4	7	25	40-140
Benzo(b)fluoranthene	87.4	89.1	ug/L	U2.0	54.1	46.8	61.9	52.5	14	25	40-140
Benzo(g,h,i)perylene	87.4	89.1	ug/L	U2.0	55	50.8	62.9	57.0	8	25	40-140
Benzo(k)fluoranthene	87.4	89.1	ug/L	U2.0	51.1	50.3	58.5	56.4	2	25	40-140
Chrysene	87.4	89.1	ug/L	U2.0	52.6	48.7	60.2	54.6	8	25	40-140
Dibenzo(a,h)anthracene	87.4	89.1	ug/L	U2.0	56.2	55.6	64.3	62.4	1	25	40-140
Fluoranthene	87.4	89.1	ug/L	U2.0	52.2	48.9	59.7	54.9	6	25	40-140
Fluorene	87.4	89.1	ug/L	U2.0	44.4	41.8	50.8	46.9	6	25	40-140
Indeno(1,2,3-cd)pyrene	87.4	89.1	ug/L	U2.0	52.4	45.8	60.0	51.4	13	25	40-140
Pyrene	87.4	89.1	ug/L	U2.0	50.9	47.7	58.2	53.5	6	25	40-140
5-Alpha Androstane							51.4	52.1			40-140
o-Terphenyl							51.1	47.5			40-140
2-Fluorobiphenyl							58.0	54.4			40-140
2-Bromonaphthalene							59.8	55.9			40-140

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Form 4
Method Blank Summary

Lab Name : Katahdin Analytical Services
Project : Devens Spring 2018
Lab File ID : CLD1035.D
Instrument ID : GC12

SDG : SL2997
Lab Sample ID : WG226338-1
Date Analyzed : 12-APR-18
Time Analyzed : 11:57
Date Extracted : 11-APR-18

This Method Blank applies to the following samples, LCS, MS and MSD:

Client Sample ID	Lab Sample ID	Lab File ID	Date Analyzed	Time Analyzed
Laboratory Control S	WG226338-2	CLD1036.I	04/12/18	12:42
Laboratory Control S	WG226338-3	CLD1037.I	04/12/18	13:27
Matrix Spike	WG226338-4	CLD1038.I	04/12/18	14:13
Matrix Spike Duplica	WG226338-5	CLD1039.I	04/12/18	14:58
LFM-99-02B_SPR18	SL2997-1	CLD1050.I	04/16/18	13:53
LFM-99-05A_SPR18	SL2997-2	CLD1051.I	04/16/18	14:38
LFM-DUP01_SPR18	SL2997-3	CLD1052.I	04/16/18	15:23
LFM-99-06A RP_SPR18	SL2997-4	CLD1053.I	04/16/18	16:08
LFM-03-07_SPR18	SL2997-5	CLD1054.I	04/16/18	16:53

1 2 3 4 5 6 7 8 9 10 11 12 13 14

Form 4
Method Blank Summary

Lab Name : Katahdin Analytical Services
Project : Devens Spring 2018
Lab File ID : CLD1035A.D
Instrument ID : GC12

SDG : SL2997
Lab Sample ID : WG226338-1
Date Analyzed : 12-APR-18
Time Analyzed : 11:57
Date Extracted : 11-APR-18

This Method Blank applies to the following samples, LCS, MS and MSD:

Client Sample ID	Lab Sample ID	Lab File ID	Date Analyzed	Time Analyzed
Laboratory Control S	WG226338-2	CLD1036A	04/12/18	12:42
Laboratory Control S	WG226338-3	CLD1037A	04/12/18	13:27
Matrix Spike	WG226338-4	CLD1038A	04/12/18	14:13
Matrix Spike Duplica	WG226338-5	CLD1039A	04/12/18	14:58
LFM-99-02B_SPR18	SL2997-1	CLD1050A	04/16/18	13:53
LFM-99-05A_SPR18	SL2997-2	CLD1051A	04/16/18	14:38
LFM-DUP01_SPR18	SL2997-3	CLD1052A	04/16/18	15:23
LFM-99-06A RP_SPR18	SL2997-4	CLD1053A	04/16/18	16:08
LFM-03-07_SPR18	SL2997-5	CLD1054A	04/16/18	16:53

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1 2 3 4 5 6 7 8 9 10 11 12 13 14

Form 4
Method Blank Summary

Lab Name : Katahdin Analytical Services
Project : Devens Spring 2018
Lab File ID : CLD2035.D
Instrument ID : GC12

SDG : SL2997
Lab Sample ID : WG226338-1
Date Analyzed : 12-APR-18
Time Analyzed : 11:57
Date Extracted : 11-APR-18

This Method Blank applies to the following samples, LCS, MS and MSD:

Client Sample ID	Lab Sample ID	Lab File ID	Date Analyzed	Time Analyzed
Laboratory Control S	WG226338-2	CLD2036.I	04/12/18	12:42
Laboratory Control S	WG226338-3	CLD2037.I	04/12/18	13:27
Matrix Spike	WG226338-4	CLD2038.I	04/12/18	14:13
Matrix Spike Duplica	WG226338-5	CLD2039.I	04/12/18	14:58
LFM-99-02B_SPR18	SL2997-1	CLD2050.I	04/16/18	13:53
LFM-99-05A_SPR18	SL2997-2	CLD2051.I	04/16/18	14:38
LFM-DUP01_SPR18	SL2997-3	CLD2052.I	04/16/18	15:23
LFM-99-06A RP_SPR18	SL2997-4	CLD2053.I	04/16/18	16:08
LFM-03-07_SPR18	SL2997-5	CLD2054.I	04/16/18	16:53

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Form 6
Initial Calibration Summary

Lab Name : Katahdin Analytical Services
Project : Devens Spring 2018
Lab File IDs : CKL1139.d CKL1140.d CKL1141.d CKL1143.d CKL1142.d

SDG: SL2997
Instrument ID: GC12
Column ID: A
Calibration Date(s): 14-DEC-17 12:34
14-DEC-17 15:35

	Level 1	Level 2	Level 3	Level 4	Level 5		Crv					Max	
	1.0000	10.0000	50.0000	100.0000	200.0000		New	b	m1	m2	%RSD	%RSD	
Unadjusted C11-C22 Aromatic	11331	10451	10205	8720	9968		AVG		10135		9.31273	25.00000	M (
Naphthalene	11716	10895	10713	9148	10437		AVG		10582		8.81266	25.00000	O
2-Methylnaphthalene	10323	9719	9592	8183	9314		AVG		9426		8.34672	25.00000	O
Acenaphthylene	11201	10340	10110	8641	9839		AVG		10026		9.24934	25.00000	O
Acenaphthene	11897	10654	10411	8895	10132		AVG		10398		10.3622(	25.00000	O
Fluorene	12227	10588	10331	8801	10028		AVG		10395		11.8546(	25.00000	O
Phenanthrene	10987	10423	10197	8704	9924		AVG		10047		8.42381	25.00000	O
Anthracene	11382	10572	10232	8719	9958		AVG		10173		9.56252	25.00000	O
Fluoranthene	11417	10502	10322	8766	10007		AVG		10203		9.40293	25.00000	O
Pyrene	11658	10731	10482	8884	10174		AVG		10386		9.68656	25.00000	O
Benzo(a)Anthracene	11219	10537	10336	8847	10102		AVG		10208		8.49745	25.00000	O
Chrysene	11683	10559	10334	8790	9991		AVG		10271		10.1557(	25.00000	O
Benzo(b)Fluoranthene	12030	11610	10527	9562	10955		AVG		10937		8.79979	25.00000	O
Benzo(k)Fluoranthene	11463	9894	10270	8235	9430		AVG		9858		11.9639(	25.00000	O
Benzo(a)Pyrene	10704	10209	10016	8590	9860		AVG		9876		7.95790	25.00000	O
Indeno(1,2,3-cd)Pyrene	10916	10902	10928	10045	11787		AVG		10916		5.64183	25.00000	O
Dibenzo(a,h)Anthracene	11093	9431	8907	7028	7878		AVG		8867		17.5038(	25.00000	O
Benzo(g,h,i)Perylene	10704	10111	9783	8411	9635		AVG		9729		8.66841	25.00000	O
2-Fluorobiphenyl	9980	9539	9346	8015	9152		AVG		9206		7.96553	25.00000	
2-Bromonaphthalene	6420	6396	6368	5445	6228		AVG		6171		6.69254	25.00000	
O-Terphenyl	12885	11449	11273	9556	10912		AVG		11215		10.6356(	25.00000	

Legend: O = Kept Original Curve
Y = Failed Minimum RF
W = Failed %RSD Value

Form 6
Initial Calibration Summary

Lab Name : Katahdin Analytical Services
Project : Devens Spring 2018
Lab File IDs : CKL2139.d CKL2140.d CKL2141.d CKL2143.d CKL2142.d

SDG: SL2997
Instrument ID: GC12
Column ID: A
Calibration Date(s): 14-DEC-17 12:34
14-DEC-17 15:35

	Level 1	Level 2	Level 3	Level 4	Level 5		Crv					Max	
	1.0000	10.0000	50.0000	100.0000	200.0000		New	b	m1	m2	%RSD	%RSD	
C9-C18 Aliphatic	9191	9112	8894	8344	8513		AVG		8811		4.20387	25.00000	M (
C19-C36 Aliphatic	9043	8888	8657	7989	8250		AVG		8566		5.13141	25.00000	S O
C-9	9531	9383	9167	8604	8767		AVG		9090		4.35456	30.00000	O
C-10	9689	9468	9227	8630	8806		AVG		9164		4.83480	25.00000	O
C-12	9541	9247	9066	8492	8682		AVG		9006		4.69986	25.00000	O
C-14	9054	8976	8749	8214	8379		AVG		8675		4.23463	25.00000	O
C-16	8842	8895	8708	8192	8354		AVG		8598		3.60315	25.00000	O
C-18	8491	8702	8446	7930	8093		AVG		8332		3.76644	25.00000	O
C-19	9251	9001	8750	8225	8400		AVG		8725		4.82433	25.00000	O
C-20	9001	8801	8629	8116	8293		AVG		8568		4.22895	25.00000	O
C-22	9289	8891	8614	8113	8278		AVG		8637		5.47232	25.00000	O
C-24	9250	8837	8604	8098	8270		AVG		8612		5.31873	25.00000	O
C-26	9033	8794	8574	8053	8211		AVG		8533		4.73785	25.00000	O
C-28	8980	8945	8670	8167	8332		AVG		8619		4.20428	25.00000	O
C-30	9064	9000	8720	8170	8364		AVG		8664		4.50548	25.00000	O
C-36	8479	8839	8697	6969	7854		AVG		8167		9.41032	25.00000	O
5-alpha androstane	9175	8925	8779	8229	8424		AVG		8706		4.37630	25.00000	

Legend: O = Kept Original Curve
Y = Failed Minimum RF
W = Failed %RSD Value

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Form 7
Calibration Verification Summary

Lab Name : Katahdin Analytical Services
Project : Devens Spring 2018 **SDG:** SL2997
Lab ID : WG226653-1 **Analytical Date:** 04/12/18 05:24
Lab File ID : CLD1033.d **Instrument ID:** GC12
Initial Calibration Date(s): 12/14/17 12:34 12/14/17 15:35 **Column ID:** A

	Compound	RRF/Amount	RF50	Min RRF	%D/ %Drift	Max %D/ %Drift	Curve Type
50	Naphthalene	10582	10308	0.010	-2.58732	25.00000	Averaged
60	2-Methylnaphthalene	9426	9407	0.010	-0.20670	25.00000	Averaged
70	Phenanthrene	10047	10311	0.010	2.62580	25.00000	Averaged
80	Acenaphthylene	10026	10157	0.010	1.30895	25.00000	Averaged
90	Acenaphthene	10398	10437	0.010	0.37635	25.00000	Averaged
100	Anthracene	10173	10056	0.010	-1.14853	25.00000	Averaged
110	Benzo(a)Anthracene	10208	10389	0.010	1.76696	25.00000	Averaged
120	Benzo(a)Pyrene	9876	10056	0.010	1.83060	25.00000	Averaged
130	Benzo(b)Fluoranthene	10937	10847	0.010	-0.82034	25.00000	Averaged
140	Benzo(g,h,i)Perylene	9729	9502	0.010	-2.32627	25.00000	Averaged
150	Benzo(k)Fluoranthene	9858	10022	0.010	1.66205	25.00000	Averaged
160	Chrysene	10271	10295	0.010	0.22777	25.00000	Averaged
170	Dibenzo(a,h)Anthracene	8867	9342	0.010	5.34977	25.00000	Averaged
180	Fluoranthene	10203	10235	0.010	0.31562	25.00000	Averaged
190	Fluorene	10395	10351	0.010	-0.42480	25.00000	Averaged
200	Indeno(1,2,3-cd)Pyrene	10916	10833	0.010	-0.75761	25.00000	Averaged
210	Pyrene	10386	10421	0.010	0.34156	25.00000	Averaged
4	2-Fluorobiphenyl	9206	9221	0.010	0.16198	25.00000	Averaged
6	2-Bromonaphthalene	6171	6342	0.010	2.76432	25.00000	Averaged
11	O-Terphenyl	11215	11183	0.010	-0.28975	25.00000	Averaged

*** = Compound out of QC criteria**

1 2 3 4 5 6 7 8 9 10 11 12 13 14

Form 7
Calibration Verification Summary

Lab Name : Katahdin Analytical Services
Project : Devens Spring 2018
Lab ID : WG226653-2
Lab File ID : CLD1046.d
Initial Calibration Date(s): 12/14/17 12:34 12/14/17 15:35

SDG: SL2997
Analytical Date: 04/16/18 09:55
Instrument ID: GC12
Column ID: A

	Compound	$\overline{RRF}$/Amount	RF50	Min RRF	%D/ %Drift	Max %D/ %Drift	Curve Type
50	Naphthalene	10582	9905	0.010	-6.40083	25.00000	Averaged
60	2-Methylnaphthalene	9426	9007	0.010	-4.44260	25.00000	Averaged
70	Phenanthrene	10047	9696	0.010	-3.48872	25.00000	Averaged
80	Acenaphthylene	10026	9480	0.010	-5.44788	25.00000	Averaged
90	Acenaphthene	10398	9742	0.010	-6.30934	25.00000	Averaged
100	Anthracene	10173	9227	0.010	-9.29361	25.00000	Averaged
110	Benzo(a)Anthracene	10208	9717	0.010	-4.81670	25.00000	Averaged
120	Benzo(a)Pyrene	9876	9609	0.010	-2.70519	25.00000	Averaged
130	Benzo(b)Fluoranthene	10937	10879	0.010	-0.52885	25.00000	Averaged
140	Benzo(g,h,i)Perylene	9729	9192	0.010	-5.51666	25.00000	Averaged
150	Benzo(k)Fluoranthene	9858	9140	0.010	-7.29193	25.00000	Averaged
160	Chrysene	10271	9808	0.010	-4.51567	25.00000	Averaged
170	Dibenzo(a,h)Anthracene	8867	8455	0.010	-4.65207	25.00000	Averaged
180	Fluoranthene	10203	9852	0.010	-3.43516	25.00000	Averaged
190	Fluorene	10395	9686	0.010	-6.81913	25.00000	Averaged
200	Indeno(1,2,3-cd)Pyrene	10916	10493	0.010	-3.87309	25.00000	Averaged
210	Pyrene	10386	10037	0.010	-3.35755	25.00000	Averaged
4	2-Fluorobiphenyl	9206	8844	0.010	-3.93302	25.00000	Averaged
6	2-Bromonaphthalene	6171	5997	0.010	-2.82598	25.00000	Averaged
11	O-Terphenyl	11215	10726	0.010	-4.35885	25.00000	Averaged

*** = Compound out of QC criteria**

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Form 7
Calibration Verification Summary

Lab Name : Katahdin Analytical Services
Project : Devens Spring 2018
Lab ID : WG226653-3
Lab File ID : CLD1062.d
Initial Calibration Date(s): 12/14/17 12:34 12/14/17 15:35

SDG: SL2997
Analytical Date: 04/16/18 22:56
Instrument ID: GC12
Column ID: A

	Compound	RRF/Amount	RF50	Min RRF	%D/ %Drift	Max %D/ %Drift	Curve Type
50	Naphthalene	10582	10078	0.010	-4.75764	25.00000	Averaged
60	2-Methylnaphthalene	9426	9196	0.010	-2.44474	25.00000	Averaged
70	Phenanthrene	10047	10092	0.010	0.45081	25.00000	Averaged
80	Acenaphthylene	10026	9849	0.010	-1.76686	25.00000	Averaged
90	Acenaphthene	10398	10148	0.010	-2.39925	25.00000	Averaged
100	Anthracene	10173	9561	0.010	-6.00947	25.00000	Averaged
110	Benzo(a)Anthracene	10208	10236	0.010	0.26897	25.00000	Averaged
120	Benzo(a)Pyrene	9876	9987	0.010	1.12583	25.00000	Averaged
130	Benzo(b)Fluoranthene	10937	11608	0.010	6.13939	25.00000	Averaged
140	Benzo(g,h,i)Perylene	9729	9505	0.010	-2.29522	25.00000	Averaged
150	Benzo(k)Fluoranthene	9858	9067	0.010	-8.02937	25.00000	Averaged
160	Chrysene	10271	10149	0.010	-1.19131	25.00000	Averaged
170	Dibenzo(a,h)Anthracene	8867	9245	0.010	4.25968	25.00000	Averaged
180	Fluoranthene	10203	10181	0.010	-0.21522	25.00000	Averaged
190	Fluorene	10395	10024	0.010	-3.56347	25.00000	Averaged
200	Indeno(1,2,3-cd)Pyrene	10916	10849	0.010	-0.61121	25.00000	Averaged
210	Pyrene	10386	10376	0.010	-0.09346	25.00000	Averaged
4	2-Fluorobiphenyl	9206	9090	0.010	-1.26421	25.00000	Averaged
6	2-Bromonaphthalene	6171	6249	0.010	1.24927	25.00000	Averaged
11	O-Terphenyl	11215	11127	0.010	-0.78596	25.00000	Averaged

*** = Compound out of QC criteria**

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Form 7
Calibration Verification Summary

Lab Name : Katahdin Analytical Services
Project : Devens Spring 2018
Lab ID : WG226653-5
Lab File ID : CLD2033.d
Initial Calibration Date(s): 12/14/17 12:34 12/14/17 15:35

SDG: SL2997
Analytical Date: 04/12/18 05:24
Instrument ID: GC12
Column ID: A

	Compound	RRF/Amount	RF50	Min RRF	%D/ %Drift	Max %D/ %Drift	Curve Type	
20	C9-C18 Aliphatic	8811	8312	0.010	-5.65758	25.00000	Averaged	
30	C19-C36 Aliphatic	8566	8132	0.010	-5.05884	25.00000	Averaged	
370	C-9	9090	8305	0.010	-8.64246	30.00000	Averaged	
380	C-10	9164	8369	0.010	-8.67892	25.00000	Averaged	
390	C-12	9006	8391	0.010	-6.82192	25.00000	Averaged	
400	C-14	8675	8315	0.010	-4.14248	25.00000	Averaged	
410	C-16	8598	8329	0.010	-3.13592	25.00000	Averaged	
420	C-18	8332	8166	0.010	-1.99924	25.00000	Averaged	
430	C-19	8725	8483	0.010	-2.77373	25.00000	Averaged	
440	C-20	8568	8397	0.010	-1.99464	25.00000	Averaged	
450	C-22	8637	8394	0.010	-2.81016	25.00000	Averaged	
460	C-24	8612	8388	0.010	-2.60156	25.00000	Averaged	
470	C-26	8533	8409	0.010	-1.45403	25.00000	Averaged	
480	C-28	8619	8456	0.010	-1.88925	25.00000	Averaged	
490	C-30	8664	8458	0.010	-2.37035	25.00000	Averaged	
500	C-36	8167	6073	0.010	-25.64668	25.00000	Averaged	<-
44	5-alpha androstane	8706	8572	0.010	-1.54997	25.00000	Averaged	

*** = Compound out of QC criteria**

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1 2 3 4 5 6 7 8 9 10 11 12 13 14

Form 7
Calibration Verification Summary

Lab Name : Katahdin Analytical Services
Project : Devens Spring 2018
Lab ID : WG226653-6
Lab File ID : CLD2046.d
Initial Calibration Date(s): 12/14/17 12:34 12/14/17 15:35

SDG: SL2997
Analytical Date: 04/16/18 09:55
Instrument ID: GC12
Column ID: A

	Compound	$\overline{RRF}$/Amount	RF50	Min RRF	%D/ %Drift	Max %D/ %Drift	Curve Type
20	C9-C18 Aliphatic	8811	8327	0.010	-5.48815	25.00000	Averaged
30	C19-C36 Aliphatic	8566	8199	0.010	-4.27502	25.00000	Averaged
370	C-9	9090	8330	0.010	-8.36525	30.00000	Averaged
380	C-10	9164	8353	0.010	-8.84915	25.00000	Averaged
390	C-12	9006	8385	0.010	-6.88988	25.00000	Averaged
400	C-14	8675	8298	0.010	-4.34330	25.00000	Averaged
410	C-16	8598	8393	0.010	-2.38459	25.00000	Averaged
420	C-18	8332	8205	0.010	-1.53215	25.00000	Averaged
430	C-19	8725	8475	0.010	-2.86312	25.00000	Averaged
440	C-20	8568	8385	0.010	-2.13516	25.00000	Averaged
450	C-22	8637	8413	0.010	-2.59435	25.00000	Averaged
460	C-24	8612	8433	0.010	-2.07738	25.00000	Averaged
470	C-26	8533	8416	0.010	-1.37106	25.00000	Averaged
480	C-28	8619	8500	0.010	-1.37270	25.00000	Averaged
490	C-30	8664	8505	0.010	-1.83409	25.00000	Averaged
500	C-36	8167	6468	0.010	-20.80864	25.00000	Averaged
44	5-alpha androstane	8706	8480	0.010	-2.59575	25.00000	Averaged

*** = Compound out of QC criteria**

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Form 7
Calibration Verification Summary

Lab Name : Katahdin Analytical Services
Project : Devens Spring 2018
Lab ID : WG226653-7
Lab File ID : CLD2062.d
Initial Calibration Date(s): 12/14/17 12:34 12/14/17 15:35

SDG: SL2997
Analytical Date: 04/16/18 22:56
Instrument ID: GC12
Column ID: A

	Compound	RRF/Amount	RF50	Min RRF	%D/ %Drift	Max %D/ %Drift	Curve Type
20	C9-C18 Aliphatic	8811	8472	0.010	-3.85132	25.00000	Averaged
30	C19-C36 Aliphatic	8566	8483	0.010	-0.95993	25.00000	Averaged
370	C-9	9090	8475	0.010	-6.76708	30.00000	Averaged
380	C-10	9164	8490	0.010	-7.35724	25.00000	Averaged
390	C-12	9006	8565	0.010	-4.89135	25.00000	Averaged
400	C-14	8675	8475	0.010	-2.29687	25.00000	Averaged
410	C-16	8598	8493	0.010	-1.22412	25.00000	Averaged
420	C-18	8332	8331	0.010	-0.01951	25.00000	Averaged
430	C-19	8725	8644	0.010	-0.93494	25.00000	Averaged
440	C-20	8568	8522	0.010	-0.53832	25.00000	Averaged
450	C-22	8637	8564	0.010	-0.84791	25.00000	Averaged
460	C-24	8612	8402	0.010	-2.43689	25.00000	Averaged
470	C-26	8533	8384	0.010	-1.74958	25.00000	Averaged
480	C-28	8619	8473	0.010	-1.68643	25.00000	Averaged
490	C-30	8664	8522	0.010	-1.63279	25.00000	Averaged
500	C-36	8167	8356	0.010	2.31536	25.00000	Averaged
44	5-alpha androstane	8706	8652	0.010	-0.62882	25.00000	Averaged

*** = Compound out of QC criteria**

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FORM 8
DRO ANALYTICAL SEQUENCE

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: TASAV-DEVENS SDG No.: SDGA02536

GC Column: RTX-5 ID: 0.53 (mm)Init. Calib. Date(s): 12/14/17 12/14/17

Instrument ID: GC12

THE ANALYTICAL SEQUENCE OF PERFORMANCE EVALUATION MIXTURES, BLANKS, SAMPLES, AND STANDARDS IS GIVEN BELOW:

MEAN SURROGATE RT FROM INITIAL CALIBRATION
S1 : 8.76 S2 : 10.12

	CLIENT SAMPLE ID	LAB SAMPLE ID	DATE ANALYZED	TIME ANALYZED	S1 RT #	S2 RT #
01		WG220074-1	12/14/17	1234	8.76	10.12
02		WG220074-2	12/14/17	1319	8.74	10.11
03		WG220074-3	12/14/17	1405	8.74	10.10
04		WG220074-5	12/14/17	1450	8.75	10.12
05		WG220074-4	12/14/17	1535	8.74	10.11
06		WG220074-6	12/14/17	1620		
07						
08						
09						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						

QC LIMITS
S1 = 2-Fluorobiphenyl (+/- 0.15 MINUTES)
S2 = 2-Bromonaphthalene (+/- 0.15 MINUTES)

Column used to flag retention time values with an asterisk.
* Values outside of QC limits.

FORM 8
DRO ANALYTICAL SEQUENCE

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: TASAV-DEVENS SDG No.: SDGA02536

GC Column: RTX-5 ID: 0.53 (mm)Init. Calib. Date(s): 12/14/17 12/14/17

Instrument ID: GC12

THE ANALYTICAL SEQUENCE OF PERFORMANCE EVALUATION MIXTURES, BLANKS, SAMPLES, AND STANDARDS IS GIVEN BELOW:

MEAN SURROGATE RT FROM INITIAL CALIBRATION
S3 : 14.92

	CLIENT SAMPLE ID	LAB SAMPLE ID	DATE ANALYZED	TIME ANALYZED	S3 RT #	RT #
01		WG220074-1	12/14/17	1234	14.91	
02		WG220074-2	12/14/17	1319	14.90	
03		WG220074-3	12/14/17	1405	14.90	
04		WG220074-5	12/14/17	1450	14.92	
05		WG220074-4	12/14/17	1535	14.91	
06		WG220074-6	12/14/17	1620		
07						
08						
09						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						

QC LIMITS
S3 = O-Terphenyl (+/- 0.15 MINUTES)

Column used to flag retention time values with an asterisk.
* Values outside of QC limits.

FORM 8
DRO ANALYTICAL SEQUENCE

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: TASAV-DEVENS SDG No.: SDGA02536

GC Column: RTX-1 ID: 0.53 (mm)Init. Calib. Date(s): 12/14/17 12/14/17

Instrument ID: GC12

THE ANALYTICAL SEQUENCE OF PERFORMANCE EVALUATION MIXTURES, BLANKS, SAMPLES, AND STANDARDS IS GIVEN BELOW:

MEAN SURROGATE RT FROM INITIAL CALIBRATION
S1 : 16.69

	CLIENT SAMPLE ID	LAB SAMPLE ID	DATE ANALYZED	TIME ANALYZED	S1 RT	#	RT	#
01		WG220074-7	12/14/17	1234	16.69			
02		WG220074-8	12/14/17	1319	16.68			
03		WG220074-9	12/14/17	1405	16.69			
04		WG220074-11	12/14/17	1450	16.71			
05		WG220074-10	12/14/17	1535	16.69			
06		WG220074-12	12/14/17	1620				
07								
08								
09								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								

QC LIMITS
S1 = 5-alpha androstane (+/- 0.33 MINUTES)

Column used to flag retention time values with an asterisk.
* Values outside of QC limits.

page 1 of 1

FORM VIII DRO

Katahdin Analytical Services A0000025

FORM 8
DRO ANALYTICAL SEQUENCE

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: TASAV-DEVENS SDG No.: SL2997

GC Column: RTX-5 ID: 0.53 (mm)Init. Calib. Date(s): 12/14/17 12/14/17

Instrument ID: GC12

THE ANALYTICAL SEQUENCE OF PERFORMANCE EVALUATION MIXTURES, BLANKS, SAMPLES, AND STANDARDS IS GIVEN BELOW:

MEAN SURROGATE RT FROM INITIAL CALIBRATION
S1 : 8.73 S2 : 10.09

	CLIENT SAMPLE ID	LAB SAMPLE ID	DATE ANALYZED	TIME ANALYZED	S1 RT	S1 #	S2 RT	S2 #
01		WG226653-1	04/12/18	0524	8.73		10.09	
02	WG226338-BLA	WG226338-1	04/12/18	1157	8.78		10.14	
03	WG226338-LCS	WG226338-2	04/12/18	1242	8.76		10.12	
04	WG226338-LCS	WG226338-3	04/12/18	1327	8.73		10.10	
05	LFM-99-02B_S	WG226338-4	04/12/18	1413	8.73		10.09	
06	LFM-99-02B_S	WG226338-5	04/12/18	1458	8.74		10.10	
07		WG226653-2	04/16/18	0955	8.76		10.12	
08	LFM-99-02B_S	SL2997-1	04/16/18	1353	8.76		10.12	
09	LFM-99-05A_S	SL2997-2	04/16/18	1438	8.75		10.11	
10	LFM-DUP01_SP	SL2997-3	04/16/18	1523	8.75		10.11	
11	LFM-99-06A R	SL2997-4	04/16/18	1608	8.73		10.09	
12	LFM-03-07_SP	SL2997-5	04/16/18	1653	8.74		10.11	
13		WG226653-3	04/16/18	2256	8.72		10.08	
14								
15								
16								
17								
18								
19								
20								

QC LIMITS
S1 = 2-Fluorobiphenyl (+/- 0.15 MINUTES)
S2 = 2-Bromonaphthalene (+/- 0.15 MINUTES)

Column used to flag retention time values with an asterisk.
* Values outside of QC limits.

page 1 of 2

FORM VIII DRO

Katahdin Analytical Services A0000026

FORM 8
DRO ANALYTICAL SEQUENCE

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: TASAV-DEVENS SDG No.: SL2997

GC Column: RTX-5 ID: 0.53 (mm)Init. Calib. Date(s): 12/14/17 12/14/17

Instrument ID: GC12

THE ANALYTICAL SEQUENCE OF PERFORMANCE EVALUATION MIXTURES, BLANKS, SAMPLES, AND STANDARDS IS GIVEN BELOW:

MEAN SURROGATE RT FROM INITIAL CALIBRATION
S3 : 14.88

	CLIENT SAMPLE ID	LAB SAMPLE ID	DATE ANALYZED	TIME ANALYZED	S3 RT #	RT #
01		WG226653-1	04/12/18	0524	14.88	
02	WG226338-BLA	WG226338-1	04/12/18	1157	14.94	
03	WG226338-LCS	WG226338-2	04/12/18	1242	14.91	
04	WG226338-LCS	WG226338-3	04/12/18	1327	14.89	
05	LFM-99-02B_S	WG226338-4	04/12/18	1413	14.88	
06	LFM-99-02B_S	WG226338-5	04/12/18	1458	14.90	
07		WG226653-2	04/16/18	0955	14.91	
08	LFM-99-02B_S	SL2997-1	04/16/18	1353	14.91	
09	LFM-99-05A_S	SL2997-2	04/16/18	1438	14.90	
10	LFM-DUP01_SP	SL2997-3	04/16/18	1523	14.90	
11	LFM-99-06A R	SL2997-4	04/16/18	1608	14.88	
12	LFM-03-07_SP	SL2997-5	04/16/18	1653	14.90	
13		WG226653-3	04/16/18	2256	14.87	
14						
15						
16						
17						
18						
19						
20						

QC LIMITS
S3 = O-Terphenyl (+/- 0.15 MINUTES)

Column used to flag retention time values with an asterisk.
* Values outside of QC limits.

Katahdin Analytical Services A000027

FORM 8
DRO ANALYTICAL SEQUENCE

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: TASAV-DEVENS SDG No.: SL2997

GC Column: RTX-1 ID: 0.53 (mm)Init. Calib. Date(s): 12/14/17 12/14/17

Instrument ID: GC12

THE ANALYTICAL SEQUENCE OF PERFORMANCE EVALUATION MIXTURES, BLANKS, SAMPLES, AND STANDARDS IS GIVEN BELOW:

MEAN SURROGATE RT FROM INITIAL CALIBRATION
S1 : 16.67

	CLIENT SAMPLE ID	LAB SAMPLE ID	DATE ANALYZED	TIME ANALYZED	S1 RT #	RT #
01		WG226653-5	04/12/18	0524	16.67	
02	WG226338-BLA	WG226338-1	04/12/18	1157	16.69	
03	WG226338-LCS	WG226338-2	04/12/18	1242	16.68	
04	WG226338-LCS	WG226338-3	04/12/18	1327	16.68	
05	LFM-99-02B_S	WG226338-4	04/12/18	1413	16.67	
06	LFM-99-02B_S	WG226338-5	04/12/18	1458	16.68	
07		WG226653-6	04/16/18	0955	16.68	
08	LFM-99-02B_S	SL2997-1	04/16/18	1353	16.68	
09	LFM-99-05A_S	SL2997-2	04/16/18	1438	16.68	
10	LFM-DUP01_SP	SL2997-3	04/16/18	1523	16.68	
11	LFM-99-06A R	SL2997-4	04/16/18	1608	16.67	
12	LFM-03-07_SP	SL2997-5	04/16/18	1653	16.68	
13		WG226653-7	04/16/18	2256	16.66	
14						
15						
16						
17						
18						
19						
20						

QC LIMITS
S1 = 5-alpha androstane (+/- 0.33 MINUTES)

Column used to flag retention time values with an asterisk.
* Values outside of QC limits.

page 1 of 1

FORM VIII DRO

Katahdin Analytical Services A0000028

Katahdin
ANALYTICAL SERVICES

Report of Analytical Results

Client: Test America Savannah
Lab ID: SL2997-1
Client ID: LFM-99-02B_SPR18
Project: Devens Spring 2018
SDG: SL2997
Lab File ID: 2LD10051.D

Sample Date: 06-APR-18
Received Date: 09-APR-18
Extract Date: 10-APR-18
Extracted By: JHR
Extraction Method: MA-VPH
Lab Prep Batch: WG226278

Analysis Date: 10-APR-18
Analyst: JHR
Analysis Method: MA DEP VPH 04-1.1
Matrix: AQ
% Solids: NA
Report Date: 16-APR-18

Compound	Qualifier	Result	Units	Dilution	PQL	ADJ PQL	ADJ MDL
C5-C8 Aliphatics	U	100	ug/L	1	100	100	50.
C9-C12 Aliphatics	U	100	ug/L	1	100	100	50.
C9-C10 Aromatics	U	100	ug/L	1	100	100	50.
Benzene	U	3.0	ug/L	1	3	3.0	0.31
Ethylbenzene	U	5.0	ug/L	1	5	5.0	0.42
Methyl tert-butylether	U	5.0	ug/L	1	5	5.0	0.31
Naphthalene	U	5.0	ug/L	1	5	5.0	1.6
Toluene	U	5.0	ug/L	1	5	5.0	0.34
m+p-Xylenes	U	10	ug/L	1	10	10.	0.92
o-Xylene	U	5.0	ug/L	1	5	5.0	0.47
2,5-Dibromotoluene (FID)		84.3	%				
2,5-Dibromotoluene (PID)		94.6	%				

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Report of Analytical Results

Client: Test America Savannah
Lab ID: SL2997-2
Client ID: LFM-99-05A_SPR18
Project: Devens Spring 2018
SDG: SL2997
Lab File ID: 2LD10052.D

Sample Date: 05-APR-18
Received Date: 09-APR-18
Extract Date: 10-APR-18
Extracted By: JHR
Extraction Method: MA-VPH
Lab Prep Batch: WG226278

Analysis Date: 10-APR-18
Analyst: JHR
Analysis Method: MA DEP VPH 04-1.1
Matrix: AQ
% Solids: NA
Report Date: 16-APR-18

Compound	Qualifier	Result	Units	Dilution	PQL	ADJ PQL	ADJ MDL
C5-C8 Aliphatics	U	100	ug/L	1	100	100	50.
C9-C12 Aliphatics	U	100	ug/L	1	100	100	50.
C9-C10 Aromatics	U	100	ug/L	1	100	100	50.
Benzene	U	3.0	ug/L	1	3	3.0	0.31
Ethylbenzene	U	5.0	ug/L	1	5	5.0	0.42
Methyl tert-butylether	U	5.0	ug/L	1	5	5.0	0.31
Naphthalene	U	5.0	ug/L	1	5	5.0	1.6
Toluene	U	5.0	ug/L	1	5	5.0	0.34
m+p-Xylenes	U	10	ug/L	1	10	10.	0.92
o-Xylene	U	5.0	ug/L	1	5	5.0	0.47
2,5-Dibromotoluene (FID)		81.1	%				
2,5-Dibromotoluene (PID)		88.3	%				

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Report of Analytical Results

Client: Test America Savannah
Lab ID: SL2997-3
Client ID: LFM-DUP01_SPR18
Project: Devens Spring 2018
SDG: SL2997
Lab File ID: 2LD10053.D

Sample Date: 05-APR-18
Received Date: 09-APR-18
Extract Date: 10-APR-18
Extracted By: JHR
Extraction Method: MA-VPH
Lab Prep Batch: WG226278

Analysis Date: 10-APR-18
Analyst: JHR
Analysis Method: MA DEP VPH 04-1.1
Matrix: AQ
% Solids: NA
Report Date: 16-APR-18

Compound	Qualifier	Result	Units	Dilution	PQL	ADJ PQL	ADJ MDL
C5-C8 Aliphatics	U	100	ug/L	1	100	100	50.
C9-C12 Aliphatics	U	100	ug/L	1	100	100	50.
C9-C10 Aromatics	U	100	ug/L	1	100	100	50.
Benzene	U	3.0	ug/L	1	3	3.0	0.31
Ethylbenzene	U	5.0	ug/L	1	5	5.0	0.42
Methyl tert-butylether	U	5.0	ug/L	1	5	5.0	0.31
Naphthalene	U	5.0	ug/L	1	5	5.0	1.6
Toluene	U	5.0	ug/L	1	5	5.0	0.34
m+p-Xylenes	U	10	ug/L	1	10	10.	0.92
o-Xylene	U	5.0	ug/L	1	5	5.0	0.47
2,5-Dibromotoluene (FID)		87.5	%				
2,5-Dibromotoluene (PID)		98.4	%				

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Report of Analytical Results

Client: Test America Savannah
Lab ID: SL2997-4
Client ID: LFM-99-06A RP_SPR18
Project: Devens Spring 2018
SDG: SL2997
Lab File ID: 2LD10054.D

Sample Date: 05-APR-18
Received Date: 09-APR-18
Extract Date: 10-APR-18
Extracted By: JHR
Extraction Method: MA-VPH
Lab Prep Batch: WG226278

Analysis Date: 10-APR-18
Analyst: JHR
Analysis Method: MA DEP VPH 04-1.1
Matrix: AQ
% Solids: NA
Report Date: 16-APR-18

Compound	Qualifier	Result	Units	Dilution	PQL	ADJ PQL	ADJ MDL
C5-C8 Aliphatics	U	100	ug/L	1	100	100	50.
C9-C12 Aliphatics	U	100	ug/L	1	100	100	50.
C9-C10 Aromatics	U	100	ug/L	1	100	100	50.
Benzene	U	3.0	ug/L	1	3	3.0	0.31
Ethylbenzene	U	5.0	ug/L	1	5	5.0	0.42
Methyl tert-butylether	U	5.0	ug/L	1	5	5.0	0.31
Naphthalene	U	5.0	ug/L	1	5	5.0	1.6
Toluene	U	5.0	ug/L	1	5	5.0	0.34
m+p-Xylenes	U	10	ug/L	1	10	10.	0.92
o-Xylene	U	5.0	ug/L	1	5	5.0	0.47
2,5-Dibromotoluene (FID)		89.0	%				
2,5-Dibromotoluene (PID)		98.7	%				

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Report of Analytical Results

Client: Test America Savannah
Lab ID: SL2997-5
Client ID: LFM-03-07_SPR18
Project: Devens Spring 2018
SDG: SL2997
Lab File ID: 2LD10055.D

Sample Date: 06-APR-18
Received Date: 09-APR-18
Extract Date: 10-APR-18
Extracted By: JHR
Extraction Method: MA-VPH
Lab Prep Batch: WG226278

Analysis Date: 10-APR-18
Analyst: JHR
Analysis Method: MA DEP VPH 04-1.1
Matrix: AQ
% Solids: NA
Report Date: 16-APR-18

Compound	Qualifier	Result	Units	Dilution	PQL	ADJ PQL	ADJ MDL
C5-C8 Aliphatics	U	100	ug/L	1	100	100	50.
C9-C12 Aliphatics	U	100	ug/L	1	100	100	50.
C9-C10 Aromatics	U	100	ug/L	1	100	100	50.
Benzene	U	3.0	ug/L	1	3	3.0	0.31
Ethylbenzene	U	5.0	ug/L	1	5	5.0	0.42
Methyl tert-butylether	U	5.0	ug/L	1	5	5.0	0.31
Naphthalene	U	5.0	ug/L	1	5	5.0	1.6
Toluene	U	5.0	ug/L	1	5	5.0	0.34
m+p-Xylenes	U	10	ug/L	1	10	10.	0.92
o-Xylene	U	5.0	ug/L	1	5	5.0	0.47
2,5-Dibromotoluene (FID)		85.0	%				
2,5-Dibromotoluene (PID)		95.3	%				

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Report of Analytical Results

Client: Test America Savannah
Lab ID: SL2997-6
Client ID: TRIPBLANK1_040518
Project: Devens Spring 2018
SDG: SL2997
Lab File ID: 2LD10050.D

Sample Date: 05-APR-18
Received Date: 09-APR-18
Extract Date: 10-APR-18
Extracted By: JHR
Extraction Method: MA-VPH
Lab Prep Batch: WG226278

Analysis Date: 10-APR-18
Analyst: JHR
Analysis Method: MA DEP VPH 04-1.1
Matrix: AQ
% Solids: NA
Report Date: 16-APR-18

Compound	Qualifier	Result	Units	Dilution	PQL	ADJ PQL	ADJ MDL
C5-C8 Aliphatics	U	100	ug/L	1	100	100	50.
C9-C12 Aliphatics	U	100	ug/L	1	100	100	50.
C9-C10 Aromatics	U	100	ug/L	1	100	100	50.
Benzene	U	3.0	ug/L	1	3	3.0	0.31
Ethylbenzene	U	5.0	ug/L	1	5	5.0	0.42
Methyl tert-butylether	U	5.0	ug/L	1	5	5.0	0.31
Naphthalene	U	5.0	ug/L	1	5	5.0	1.6
Toluene	U	5.0	ug/L	1	5	5.0	0.34
m+p-Xylenes	U	10	ug/L	1	10	10.	0.92
o-Xylene	U	5.0	ug/L	1	5	5.0	0.47
2,5-Dibromotoluene (FID)		85.0	%				
2,5-Dibromotoluene (PID)		96.2	%				

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ANALYTICAL SERVICES

Report of Analytical Results

Client:
Lab ID: WG226278-1
Client ID: Method Blank Sample
Project:
SDG: SL2997
Lab File ID: 2LD10046.D

Sample Date:
Received Date:
Extract Date: 10-APR-18
Extracted By: JHR
Extraction Method: MA-VPH
Lab Prep Batch: WG226278

Analysis Date: 10-APR-18
Analyst: JHR
Analysis Method: MA DEP VPH 04-1.1
Matrix: AQ
% Solids: NA
Report Date: 16-APR-18

Compound	Qualifier	Result	Units	Dilution	PQL	ADJ PQL	ADJ MDL
C5-C8 Aliphatics	U	100	ug/L	1	100	100	50.
C9-C12 Aliphatics	U	100	ug/L	1	100	100	50.
C9-C10 Aromatics	U	100	ug/L	1	100	100	50.
Benzene	U	3.0	ug/L	1	3	3.0	0.31
Ethylbenzene	U	5.0	ug/L	1	5	5.0	0.42
Methyl tert-butylether	U	5.0	ug/L	1	5	5.0	0.31
Naphthalene	U	5.0	ug/L	1	5	5.0	1.6
Toluene	U	5.0	ug/L	1	5	5.0	0.34
m+p-Xylenes	U	10	ug/L	1	10	10.	0.92
o-Xylene	U	5.0	ug/L	1	5	5.0	0.47
2,5-Dibromotoluene (FID)		87.0	%				
2,5-Dibromotoluene (PID)		95.9	%				

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1 2 3 4 5 6 7 8 9 10 11 12 13 14

Form 2
System Monitoring Compound Recovery

Lab Name: Katahdin Analytical Services **Project:** Devens Spring 2018 **Matrix:** AQ
Lab Code: KAS **SDG:** SL2997

Client Sample ID	Lab Sample ID	Col. ID	DBT-FID #	DBT-PID #
LFM-99-02B_SPR18	SL2997-1	B	84.3	94.6
LFM-99-05A_SPR18	SL2997-2	B	81.1	88.3
LFM-DUP01_SPR18	SL2997-3	B	87.5	98.4
LFM-99-06A RP_SPR18	SL2997-4	B	89.0	98.7
LFM-03-07_SPR18	SL2997-5	B	85.0	95.3
TRIPBLANK1_040518	SL2997-6	B	85.0	96.2
Method Blank Sample	WG226278-1	B	87.0	95.9
Laboratory Control S	WG226278-2	B	82.7	94.1
Laboratory Control S	WG226278-3	B	79.9	90.8
Matrix Spike	WG226278-4	B	100.	112.
Matrix Spike Duplica	WG226278-5	B	106.	120.

		QC Limits
DBT-FID	2,5-DIBROMOTOLUENE (FID)	70-130
DBT-PID	2,5-DIBROMOTOLUENE (PID)	70-130

= Column to be used to flag recovery limits.
* = Values outside of contract required QC limits.
D= System Monitoring Compound diluted out.

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Katahdin
ANALYTICAL SERVICES

LCS/LCSD Recovery Report

LCS ID: WG226278-2
LCSD ID: WG226278-3
Project:
SDG: SL2997
Report Date: 16-APR-18
LCS File ID: 2LD10047.D

Received Date:
Extract Date: 10-APR-18
Extracted By: JHR
Extraction Method: MA-VPH
Lab Prep Batch: WG226278
LCSD File ID: 2LD10048.D

Analysis Date: 10-APR-18
Analyst: JHR
Analysis Method: MA DEP VPH 04-1.1
Matrix: AQ
% Solids: NA

Compound	Spike Amt	LCS Conc	LCS Rec (%)	LCSD Conc	LCSD Rec (%)	Conc Units	RPD (%)	RPD Limit	Limits
C5-C8 Aliphatics	300.	296.	98.7	291.	97.0	ug/L	2	25	70-130
C9-C12 Aliphatics	200.	196.	98.0	196.	98.0	ug/L	0	25	70-130
C9-C10 Aromatics	100.	99.9	99.9	101.	101.	ug/L	1	25	70-130
Benzene	100.	89.9	89.9	90.7	90.7	ug/L	1	25	70-130
Ethylbenzene	100.	92.2	92.2	92.8	92.8	ug/L	1	25	70-130
Methyl tert-butylether	100.	91.2	91.2	92.0	92.0	ug/L	1	25	70-130
Naphthalene	100.	115.	115.	111.	111.	ug/L	4	25	70-130
Toluene	100.	90.2	90.2	90.9	90.9	ug/L	1	25	70-130
m+p-Xylenes	200.	182.	91.0	183.	91.5	ug/L	0	25	70-130
o-Xylene	100.	90.6	90.6	91.2	91.2	ug/L	1	25	70-130
2,5-Dibromotoluene (FID)			82.7		79.9				70-130
2,5-Dibromotoluene (PID)			94.1		90.8				70-130

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Katahdin
ANALYTICAL SERVICES

MS/MSD Recovery Report

MS ID: WG226278-4
MSD ID: WG226278-5
Sample ID: SL2997-1
Client ID: LFM-99-02B_SPR18
Project:
SDG: SL2997
MS File ID: 2LD10056.D

Received Date:
Extract Date: 10-APR-18
Extracted By: JHR
Extraction Method: MA-VPH
Lab Prep Batch: WG226278
Report Date: 16-APR-18
MSD File ID: 2LD10057.D

Analysis Date: 10-APR-18
Analyst: JHR
Analysis Method: MA DEP VPH 04-1.1
Matrix: AQ
% Solids: NA

Compound	MS Spike	MSD Spike	Conc Units	Samp Conc	MS Conc	MSD Conc	MS Rec (%)	MSD Rec (%)	RPD (%)	RPD Limit	Limits
C5-C8 Aliphatics	300.	300.	ug/L	U100	364	348	121.	116.	4	50	70-130
C9-C12 Aliphatics	200.	200.	ug/L	U100	232	231	116.	116.	0	50	70-130
C9-C10 Aromatics	100.	100.	ug/L	U100	115	121	115.	121.	5	50	70-130
Benzene	100.	100.	ug/L	U3.0	108	112	108.	112.	4	50	70-130
Ethylbenzene	100.	100.	ug/L	U5.0	110	113	110.	113.	3	50	70-130
Methyl tert-butylether	100.	100.	ug/L	U5.0	106	110	106.	110.	4	50	70-130
Naphthalene	100.	100.	ug/L	U5.0	117	132	117.	132.*	12	50	70-130
Toluene	100.	100.	ug/L	U5.0	108	111	108.	111.	3	50	70-130
m+p-Xylenes	200.	200.	ug/L	U10	214	219	107.	110.	2	50	70-130
o-Xylene	100.	100.	ug/L	U5.0	107	110	107.	110.	3	50	70-130
2,5-Dibromotoluene (FID)							100.	106.			70-130
2,5-Dibromotoluene (PID)							112.	120.			70-130

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1 2 3 4 5 6 7 8 9 10 11 12 13 14

Form 4
Method Blank Summary

Lab Name : Katahdin Analytical Services
Project : Devens Spring 2018
Lab File ID : 2LD10046.D
Instrument ID : GC02

SDG : SL2997
Lab Sample ID : WG226278-1
Date Analyzed : 10-APR-18
Time Analyzed : 09:59
Date Extracted : 10-APR-18

This Method Blank applies to the following samples, LCS, MS and MSD:

Client Sample ID	Lab Sample ID	Lab File ID	Date Analyzed	Time Analyzed
Laboratory Control S	WG226278-2	2LD10047.	04/10/18	10:40
Laboratory Control S	WG226278-3	2LD10048.	04/10/18	11:22
TRIPBLANK1_040518	SL2997-6	2LD10050.	04/10/18	14:24
LFM-99-02B_SPR18	SL2997-1	2LD10051.	04/10/18	15:05
LFM-99-05A_SPR18	SL2997-2	2LD10052.	04/10/18	15:47
LFM-DUP01_SPR18	SL2997-3	2LD10053.	04/10/18	16:29
LFM-99-06A RP_SPR18	SL2997-4	2LD10054.	04/10/18	17:10
LFM-03-07_SPR18	SL2997-5	2LD10055.	04/10/18	17:51
Matrix Spike	WG226278-4	2LD10056.	04/10/18	18:33
Matrix Spike Duplica	WG226278-5	2LD10057.	04/10/18	19:14

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Form 6
Initial Calibration Summary

Lab Name : Katahdin Analytical Services **SDG:** SL2997
Project : Devens Spring 2018 **Instrument ID:** GC02
Lab File IDs : 2LC10123.D 2LC10124.D 2LC10125.D 2LC10122.D 2LC10126.D 2LC10127.D **Calibration Date(s):** 30-MAR-18 10:30 30-MAR-18 13:58

	Level 1 1.0000	Level 2 5.0000	Level 3 10.0000	Level 4 50.0000	Level 5 100.0000	Level 6 300.0000	Crv New	b	m1	m2	%RSD	Max %RSD	
C9-C10 Aromatic	5404	5791	6070	6214	6277	5132	AVG		5815		7.96891	25.00000	M (
Methyl tert-butylether	2955	3578	3623	3422	3468	3075	AVG		3353		8.18889	25.00000	O
Benzene	7637	7587	7702	7447	7569	6656	AVG		7433		5.24397	25.00000	O
Toluene	6675	6914	7039	6835	6918	5977	AVG		6726		5.74027	25.00000	O
Ethylbenzene	5494	5735	5995	5943	6009	5161	AVG		5723		5.91327	25.00000	O
m+p-Xylene	6871	7076	7348	6990	6836	4805	AVG		6654		13.8910	25.00000	O
o-Xylene	5732	6026	6211	6049	6019	5124	AVG		5860		6.69736	25.00000	O
1,2,4-trimethylbenzene	5404	5791	6070	6214	6277	5132	AVG		5815		7.96891	25.00000	O
Naphthalene	4177	4429	4701	5617	6211	5195	AVG		5055		15.2178	25.00000	O
2,5-Dibromotoluene (PID)	1895	10589	24354	162214	384753	983891	LNR	-0.64017	3332		0.99621	0.99000	

Legend: O = Kept Original Curve
Y = Failed Minimum RF
W = Failed %RSD Value

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Form 6
Initial Calibration Summary

Lab Name : Katahdin Analytical Services **SDG:** SL2997
Project : Devens Spring 2018 **Instrument ID:** GC02
Lab File IDs : 2LC10123.D 2LC10124.D 2LC10125.D 2LC10122.D 2LC10126.D 2LC10127.D **Calibration Date(s):** 30-MAR-18 10:30 30-MAR-18 13:58

	Level 1 1.0000	Level 2 5.0000	Level 3 10.0000	Level 4 50.0000	Level 5 100.0000	Level 6 300.0000	Crv New	b	m1	m2	%RSD	Max %RSD	
C5-C8 Aliphatic	4542	5642	5693	5328	5436	4968	AVG		5268		8.35756	25.00000	M (
C9-C12 Aliphatic	5478	5042	5089	5025	5616	5599	AVG		5308		5.37307	25.00000	M (
n-Pentane	3762	5526	5507	4743	4868	4399	AVG		4801		14.04307	25.00000	O
2-Methylpentane	4521	5386	5448	5329	5434	4993	AVG		5185		7.06124	25.00000	O
Methyl tert-butylether	3375	4104	4260	4020	4081	3685	AVG		3921		8.36145	25.00000	O
2,2,4-Trimethylpentane	5343	6012	6123	5914	6008	5511	AVG		5819		5.41249	25.00000	O
Benzene	7380	7324	7457	7251	7469	6893	AVG		7296		2.92654	25.00000	O
Toluene	7073	7250	7401	7224	7448	6843	AVG		7207		3.09103	25.00000	O
n-Nonane	4690	5130	5193	5267	5517	5520	AVG		5219		5.87263	25.00000	O
n-Decane	4824	4183	4363	4668	5584	5552	AVG		4862		12.15881	25.00000	O
Ethylbenzene	6463	6629	6947	6972	7185	6642	AVG		6806		3.98171	25.00000	O
m+p-Xylene	6846	7118	7387	7189	7365	6776	AVG		7113		3.60845	25.00000	O
o-Xylene	6884	7102	7399	7265	7398	6783	AVG		7138		3.66983	25.00000	O
1,2,4-trimethylbenzene	6272	6438	6721	6936	7176	6587	AVG		6688		4.94155	25.00000	O
n-Butylcyclohexane	6130	5902	5815	5382	5647	5645	AVG		5754		4.45572	25.00000	O
Naphthalene	3372	3944	3825	4554	5088	4747	AVG		4255		15.18824	25.00000	O
2,5-Dibromotoluene (FID)	1025	3919	9686	62691	150487	462771	LNR	3.07781	1554		0.99914	0.99000	

Legend: O = Kept Original Curve
Y = Failed Minimum RF
W = Failed %RSD Value

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Form 7
Calibration Verification Summary

Lab Name : Katahdin Analytical Services
Project : Devens Spring 2018
Lab ID : WG226278-6
Lab File ID : 2LD10045.D
Initial Calibration Date(s): 03/30/18 10:30 03/30/18 13:58

SDG: SL2997
Analytical Date: 04/10/18 08:48
Instrument ID: GC02
Column ID: A

	Compound	RRF/Amount	RF50	CCAL RRF50	Min	%D/ %Drift	Max %D/ %Drift	Curve Type
2	Methyl tert-butylether	3353	3423	3423	0.100	2.08818	25.00000	Averaged
3	Benzene	7433	7447	7447	0.100	0.18694	25.00000	Averaged
4	Toluene	6726	6830	6830	0.100	1.53538	25.00000	Averaged
5	Ethylbenzene	5723	5905	5905	0.100	3.19061	25.00000	Averaged
6	m+p-Xylene	6654	6990	6990	0.100	5.05058	25.00000	Averaged
7	o-Xylene	5860	6035	6035	0.100	2.98573	25.00000	Averaged
8	1,2,4-trimethylbenzene	5815	6155	6155	0.100	5.85055	25.00000	Averaged
10	Naphthalene	5055	5832	5832	0.100	15.36648	25.00000	Averaged
11	2,5-Dibromotoluene (PID)	50.00000	48.16581	3253	0.100	-3.66837	25.00000	Linear

*** = Compound out of QC criteria**

Form 7
Calibration Verification Summary

Lab Name : Katahdin Analytical Services
Project : Devens Spring 2018
Lab ID : WG226278-6
Lab File ID : 2LD10045.D
Initial Calibration Date(s): 03/30/18 10:30 03/30/18 13:58

SDG: SL2997
Analytical Date: 04/10/18 08:48
Instrument ID: GC02
Column ID: B

	Compound	$\overline{RRF}$/Amount	RF50	CCAL RRF50	Min	%D/ %Drift	Max %D/ %Drift	Curve Type
5	n-Pentane	4801	4833	4833	0.100	0.66671	25.00000	Averaged
6	2-Methylpentane	5185	5398	5398	0.100	4.09925	25.00000	Averaged
7	Methyl tert-butylether	3921	4059	4059	0.100	3.53207	25.00000	Averaged
8	2,2,4-Trimethylpentane	5819	6006	6006	0.100	3.22693	25.00000	Averaged
9	Benzene	7296	7345	7345	0.100	0.67986	25.00000	Averaged
11	Toluene	7207	7314	7314	0.100	1.48869	25.00000	Averaged
12	n-Nonane	5219	5324	5324	0.100	2.00947	30.00000	Averaged
13	n-Decane	4862	4619	4619	0.100	-4.99552	25.00000	Averaged
14	Ethylbenzene	6806	7030	7030	0.100	3.29111	25.00000	Averaged
15	m+p-Xylene	7113	7283	7283	0.100	2.38995	25.00000	Averaged
16	o-Xylene	7138	7336	7336	0.100	2.76605	25.00000	Averaged
18	1,2,4-trimethylbenzene	6688	6944	6944	0.100	3.82471	25.00000	Averaged
19	n-Butylcyclohexane	5754	5466	5466	0.100	-4.99635	25.00000	Averaged
20	Naphthalene	4255	4571	4571	0.100	7.43319	25.00000	Averaged
21	2,5-Dibromotoluene (FID)	50.00000	43.18877	1246	0.100	-13.62245	25.00000	Linear

*** = Compound out of QC criteria**

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1 2 3 4 5 6 7 8 9 10 11 12 13 14

Form 7
Calibration Verification Summary

Lab Name : Katahdin Analytical Services
Project : Devens Spring 2018
Lab ID : WG226278-7
Lab File ID : 2LD10058.D
Initial Calibration Date(s): 03/30/18 10:30 03/30/18 13:58

SDG: SL2997
Analytical Date: 04/10/18 19:55
Instrument ID: GC02
Column ID: A

	Compound	$\overline{RRF}$/Amount	RF50	CCAL RRF50	Min	%D/ %Drift	Max %D/ %Drift	Curve Type
2	Methyl tert-butylether	3353	3328	3328	0.100	-0.76458	25.00000	Averaged
3	Benzene	7433	7225	7225	0.100	-2.80274	25.00000	Averaged
4	Toluene	6726	6621	6621	0.100	-1.57354	25.00000	Averaged
5	Ethylbenzene	5723	5713	5713	0.100	-0.17699	25.00000	Averaged
6	m+p-Xylene	6654	6766	6766	0.100	1.68560	25.00000	Averaged
7	o-Xylene	5860	5860	5860	0.100	-0.00738	25.00000	Averaged
8	1,2,4-trimethylbenzene	5815	5945	5945	0.100	2.24451	25.00000	Averaged
10	Naphthalene	5055	5629	5629	0.100	11.35890	25.00000	Averaged
11	2,5-Dibromotoluene (PID)	50.00000	47.01189	3176	0.100	-5.97622	25.00000	Linear

*** = Compound out of QC criteria**

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Form 7
Calibration Verification Summary

Lab Name : Katahdin Analytical Services
Project : Devens Spring 2018
Lab ID : WG226278-7
Lab File ID : 2LD10058.D
Initial Calibration Date(s): 03/30/18 10:30 03/30/18 13:58

SDG: SL2997
Analytical Date: 04/10/18 19:55
Instrument ID: GC02
Column ID: B

	Compound	RRF/Amount	RF50	CCAL RRF50	Min	%D/ %Drift	Max %D/ %Drift	Curve Type
5	n-Pentane	4801	4460	4460	0.100	-7.08832	25.00000	Averaged
6	2-Methylpentane	5185	4955	4955	0.100	-4.44772	25.00000	Averaged
7	Methyl tert-butylether	3921	3994	3994	0.100	1.85892	25.00000	Averaged
8	2,2,4-Trimethylpentane	5819	5471	5471	0.100	-5.97957	25.00000	Averaged
9	Benzene	7296	7137	7137	0.100	-2.17137	25.00000	Averaged
11	Toluene	7207	7101	7101	0.100	-1.45943	25.00000	Averaged
12	n-Nonane	5219	4700	4700	0.100	-9.94678	30.00000	Averaged
13	n-Decane	4862	4171	4171	0.100	-14.22453	25.00000	Averaged
14	Ethylbenzene	6806	6788	6788	0.100	-0.27123	25.00000	Averaged
15	m+p-Xylene	7113	7061	7061	0.100	-0.73314	25.00000	Averaged
16	o-Xylene	7138	7130	7130	0.100	-0.11697	25.00000	Averaged
18	1,2,4-trimethylbenzene	6688	6711	6711	0.100	0.34218	25.00000	Averaged
19	n-Butylcyclohexane	5754	4912	4912	0.100	-14.62491	25.00000	Averaged
20	Naphthalene	4255	4562	4562	0.100	7.22591	25.00000	Averaged
21	2,5-Dibromotoluene (FID)	50.00000	42.54968	1227	0.100	-14.90064	25.00000	Linear

*** = Compound out of QC criteria**

Form 8
GC Analytical Sequence

Lab Name : Katahdin Analytical Services
Project : Devens Spring 2018
Instrument ID : GC02

SDG : SL2997

Client Sample ID	Lab Sample ID	Date Analyzed	Time Analyzed	DBT (FID)	DBT (PID)
Initial Calibration	WG225909-4	03/30/18	10:30		31.532
Initial Calibration	WG225909-4	03/30/18	10:30	31.522	
Initial Calibration	WG225909-1	03/30/18	11:12		31.531
Initial Calibration	WG225909-1	03/30/18	11:12	31.52	
Initial Calibration	WG225909-2	03/30/18	11:53		31.528
Initial Calibration	WG225909-2	03/30/18	11:53	31.518	
Initial Calibration	WG225909-3	03/30/18	12:35		31.528
Initial Calibration	WG225909-3	03/30/18	12:35	31.518	
Initial Calibration	WG225909-5	03/30/18	13:17		31.527
Initial Calibration	WG225909-5	03/30/18	13:17	31.517	
Initial Calibration	WG225909-6	03/30/18	13:58		31.531
Initial Calibration	WG225909-6	03/30/18	13:58	31.52	
Independent Source	WG225909-7	03/30/18	14:40	31.519	31.53
Continuing Calibrati	WG226278-6	04/10/18	08:48	31.498	31.508
Method Blank Sample	WG226278-1	04/10/18	09:59	31.499	31.509
Laboratory Control S	WG226278-2	04/10/18	10:40	31.5	31.51
Laboratory Control S	WG226278-3	04/10/18	11:22	31.497	31.507
TRIPBLANK1_040518	SL2997-6	04/10/18	14:24	31.499	31.509
LFM-99-02B_SPR18	SL2997-1	04/10/18	15:05	31.5	31.511
LFM-99-05A_SPR18	SL2997-2	04/10/18	15:47	31.501	31.511
LFM-DUP01_SPR18	SL2997-3	04/10/18	16:29	31.499	31.51
LFM-99-06A RP_SPR18	SL2997-4	04/10/18	17:10	31.5	31.51
LFM-03-07_SPR18	SL2997-5	04/10/18	17:51	31.499	31.509
Matrix Spike	WG226278-4	04/10/18	18:33	31.498	31.508
Matrix Spike Duplica	WG226278-5	04/10/18	19:14	31.498	31.508
Continuing Calibrati	WG226278-7	04/10/18	19:55	31.497	31.507

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Devens - DCL Spring 2018

Chain of Custody Record

Page: 1 of: 1

KOMAN GS, LLC

Ad... ...ston Post Road, Suite 100
...borough, MA 01752
Phone: 508-366-7442 Fax: 508-366-7445

Sampled by [Print Name(s)]/Affilliation: Kevin G. Anderson

Sampler(s) Signature(s): [signature]

Laboratory: Test America - Savannah
Address: 510 LaRoche Ave, Savannah, GA 31404
Contact: Jerry Lanier
Regulatory Facility No.
Project Name: Devens Spring 20187 LTM
Sampling QAP No.:
Approval Date:
TAT
Other:

680-150816 Chain of Custody

Preservatives (see codes) / Analyses Requested

Item No.	Field ID No.	Sampled Date	Sampled Time	Col. Method (see codes)	Matrix (see codes)	Number of Containers	H: MA VPH 3-40-ml VOA vials (HCl)	H: MA EPH 2-1liter amber glass(HCl)	I: Pesticides/SW8081 2-1liter amber glass	N: **Total Metals*** (SW6010/6020/7470) 1-250 ml poly (HNO3)	O: Total Cyanide/SW9012 1-250ml poly (NaOH)	I: Chloride/Sulfate (SW9056) 1-125ml poly	S: Nitrate/Nitrite-E353.2 1-500 ml amber glass (H2SO4)	I: Alkalinity/SM2320B 1-250-ml poly	I: TDS/SM2540D 1-1liter poly	S: COD/SW9060 1-500-ml amber glass (H2SO4)	Remarks
LFM-99-02B_SPR18		4/6/18	1005	P	GW	42	X	X	X	X	X	X	X	X	X	X	MS/MSD
LFM-99-05A_SPR18		4/5/18	1420	P	GW	14	X	X	X	X	X	X	X	X	X	X	
LFM-DUP01_SPR18		4/5/18	1425	P	GW	14	X	X	X	X	X	X	X	X	X	X	
LFM-99-06A RP_SPR18		4/5/18	1630	P	GW	14	X	X	X	X	X	X	X	X	X	X	
LFM-03-07_SPR18		4/6/18	805	P	GW	14	X	X	X	X	X	X	X	X	X	X	
TripBlank1_		4/5/18	-	O	WQ	5	X										

Shipping Details: courier pick up ← Total Number of Containers

Date Out: Via:
Returned: Via:

Additional Comments:
* = Total Metals include: Ba, Cd, Cr, Cu, Fe, Pb, Mn, Se, Ag (6010); As (6020); Hg (7470)

Item No.	Relinquished by/Affiliation	Date	Time		Date	Time
	[signature] KGS	4/6/18	4-6-18 1350	[signature]		1342 BS
	[signature]	4-6-18	1800			
			4/7/18	M Tyl		942

email logins and results to:
lekes@komangs.com

Lab Comments
Preserve Where Applicable ☐
On ICE ☐
Temperature _____ C

☐ NJ Reduced
☐ NJ Full
☐ Full CLP
☐ Disk Deliverable
☐ Other (Specify)

NJ Data Deliverable Info
☐ Commercial "A"
☐ Commercial "B"
☐ State Forms

MATRIX CODES:	GW = Groundwater	SW = Surface Water			O = Other
PRESERVATIVE CODES:	H = HCL + Ice	I = Ice Only	N = Nitric Acid + Ice	S = Sulfuric Acid + Ice	O = Other
COLLECTION METHOD CODES:	C = Composite	G=Grab	P= Pumping		O = Other

0.2°C (UF) 0.3 1.2°C (UF) 1.3°C

360325-Boston

PO #	18-706	Devens - DCL Spring 2018	**Chain of Custody Record**	Page: 1 of: 1

Company: KOMAN GS, LLC

Address: 293 Boston Post Road, Suite 100
Marlborough, MA 01752

Phone: 508-366-7442 Fax: 508-366-7445

Sampled by [Print Name(s)]/Affilliation: Kong G. Anderson

Sampler(s) Signature(s): [signature]

Laboratory: Test America - Savannah
Address: 510 LaRoche Ave
Savannah, GA 31404
Contact: Jerry Lanier
Regulatory Facility No.
Project Name: Devens Spring 20187 LTM
Sampling QAP No.:
Approval Date:
TAT Routine
Other:

Preservatives (see codes) / Analyses Requested

Item No.	Field ID No.	Sampled Date	Sampled Time	Col. Method (see codes)	Matrix (see codes)	Number of Containers	MA VPH 3-40-ml VOA vials (HCl) (H)	MA EPH 2-1liter amber glass(HCl) (H)	Pesticides/SW8081 2-1liter amber glass (I)	**Total Metals*** (SW6010/6020/7470) 1-250 ml poly (HNO3) (N)	Total Cyanide/SW9012 1-250ml poly (NaOH) (O)	Chloride/Sulfate (SW9056) 1-125ml poly (I)	Nitrate/Nitrite-E353.2 1-500 ml amber glass (H2SO4) (S)	Alkalinity/SM2320B 1-250-ml poly (I)	TDS/SM2540D 1-1liter poly (I)	COD/SW9060 1-500-ml amber glass (H2SO4) (S)	Remarks	Lab. No.
LFM-99-02B_SPR18		4/6/18	1005	P	GW	42	X	X	X	X	X	X	X	X	X	X	MS/MSD	
LFM-99-05A_SPR18		4/5/18	1420	P	GW	14	X	X	X	X	X	X	X	X	X	X		
LFM-DUP01_SPR18		4/5/18	1425	P	GW	14	X	X	X	X	X	X	X	X	X	X		
LFM-99-06A RP_SPR18		4/5/18	1630	P	GW	14	X	X	X	X	X	X	X	X	X	X		
LFM-03-07_SPR18		4/6/18	805	P	GW	14	X	X	X	X	X	X	X	X	X	X		
TripBlank1_		4/5/18	-	O	WQ	5	X											

Shipping Details: courier pick up ← Total Number of Containers

Date Out: Via:
Returned: Via:
Additional Comments:
* = Total Metals include: Ba, Cd, Cr, Cu, Fe, Pb, Mn, Se, Ag (6010); As (6020); Hg (7470)

Item No.	Relinquished by/Affiliation	Date	Time		Date	Time
	[signature] KGS	4/6/18	4/1 1350	[signature]		7/2 1350
	[signature]	4-6-18	1800	Red Pop	TA-Den	4-7-18 0845

email logins and results to:
lekes@komangs.com

Lab Comments
Preserve Where Applicable ☐
On ICE ☐
6.6, 0.2 IRH8-0.1
Transfer RP 4-7-18
Temperature _____ C

680-150816 Chain of Custody

NJ Data Deliverable Info
☐ Commercial "A"
☐ Commercial "B"
☐ State Forms

MATRIX CODES:	GW = Groundwater	SW = Surface Water			O = Other
PRESERVATIVE CODES:	H = HCL + Ice	I = Ice Only	N = Nitric Acid + Ice	S = Sulfuric Acid + Ice	O = Other
COLLECTION METHOD CODES:	C = Composite	G=Grab	P= Pumping		O = Other

Login Sample Receipt Checklist

Client: KOMAN Government Solutions, LLC

Job Number: 680-150816-1

Login Number: 150816

List Source: TestAmerica Savannah

List Number: 1

Creator: Ragnaldsen, Amy E

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.	True	
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.	N/A	
Residual Chlorine Checked.	N/A	

Accreditation/Certification Summary

Client: KOMAN Government Solutions, LLC
Project/Site: Devens / DCL

TestAmerica Job ID: 680-150816-1

Laboratory: TestAmerica Savannah

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
	AFCEE		SAVLAB	
Alabama	State Program	4	41450	06-30-18
Alaska	State Program	10		06-30-18
Alaska (UST)	State Program	10	UST-104	09-22-19
Arizona	State Program	9	AZ0808	12-14-18
Arkansas DEQ	State Program	6	88-0692	02-01-19
California	State Program	9	2939	06-30-18
Colorado	State Program	8	N/A	12-31-18
Connecticut	State Program	1	PH-0161	03-31-19
Florida	NELAP	4	E87052	06-30-18
GA Dept. of Agriculture	State Program	4	N/A	06-12-18
Georgia	State Program	4	803	06-30-18
Hawaii	State Program	9	N/A	06-30-18
Illinois	NELAP	5	200022	11-30-18
Indiana	State Program	5	N/A	06-30-18
Iowa	State Program	7	353	06-30-19
Kentucky (DW)	State Program	4	90084	12-31-18
Kentucky (UST)	State Program	4	18	06-30-18
Kentucky (WW)	State Program	4	90084	12-31-18 *
L-A-B	DoD ELAP		L2463	09-22-19
L-A-B	ISO/IEC 17025		L2463.01	09-22-19
Louisiana	NELAP	6	30690	06-30-18
Louisiana (DW)	NELAP	6	LA160019	12-31-18
Maine	State Program	1	GA00006	09-24-18
Maryland	State Program	3	250	12-31-18
Massachusetts	State Program	1	M-GA006	06-30-18
Michigan	State Program	5	9925	06-30-18
Mississippi	State Program	4	N/A	06-30-18
Nebraska	State Program	7	TestAmerica-Savannah	06-30-18
New Jersey	NELAP	2	GA769	06-30-18
New Mexico	State Program	6	N/A	06-30-18
New York	NELAP	2	10842	03-31-19
North Carolina (DW)	State Program	4	13701	07-31-18
North Carolina (WW/SW)	State Program	4	269	12-31-18
Oklahoma	State Program	6	9984	08-31-18
Pennsylvania	NELAP	3	68-00474	06-30-18
Puerto Rico	State Program	2	GA00006	12-31-18
South Carolina	State Program	4	98001	06-30-18
Tennessee	State Program	4	TN02961	06-30-18
Texas	NELAP	6	T104704185-16-9	11-30-18
Texas	State Program	6	T104704185	06-30-18
US Fish & Wildlife	Federal		LE058448-0	07-31-18
USDA	Federal		P330-17-00213	06-14-20 *
Virginia	NELAP	3	460161	06-14-18
Washington	State Program	10	C805	06-10-18
West Virginia (DW)	State Program	3	9950C	12-31-18
West Virginia DEP	State Program	3	094	06-30-18
Wisconsin	State Program	5	999819810	08-31-18
Wyoming	State Program	8	8TMS-L	06-30-16 *

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Accreditation/Certification Summary

Client: KOMAN Government Solutions, LLC
Project/Site: Devens / DCL

TestAmerica Job ID: 680-150816-1

Laboratory: TestAmerica Denver

The accreditations/certifications listed below are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
A2LA	DoD ELAP		2907.01	10-31-19

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING



ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Tel: (912)354-7858

TestAmerica Job ID: 680-150977-1
Client Project/Site: Devens / AOC32/43A Spring 2018

For:
KOMAN Government Solutions, LLC
293 Boston Post Road
Suite 100
Marlborough, Massachusetts 01752

Attn: Laurie Ekes

Jerry Lanier

Authorized for release by:
4/26/2018 2:43:37 PM

Jerry Lanier, Project Manager I
(912)354-7858 e.3410
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.

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Job ID: 680-150977-1

Laboratory: TestAmerica Savannah

Narrative

CASE NARRATIVE

Client: KOMAN Government Solutions, LLC

Project: Devens / AOC32/43A Spring 2018

Report Number: 680-150977-1

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 04/12/2018; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 1.7º C and 2.1º C.

VOLATILE ORGANIC COMPOUNDS (GC/MS)
Samples 32M-01-13XBR_SPR18 (680-150977-1), 32M-01-14XOB_SPR18 (680-150977-2), 32M-01-17XBR_SPR18 (680-150977-3), 32M-01-18XBR_SPR18 (680-150977-4), 32M-DUP01_SPR18 (680-150977-5) and Trip Blank1_040918 (680-150977-6) were analyzed for Volatile Organic Compounds (GC/MS) in accordance with EPA SW-846 Method 8260B. The samples were analyzed on 04/16/2018 and 04/17/2018.

1,2,3-Trichlorobenzene and Naphthalene exceeded the RPD limit for the MSD of sample 32M-01-17XBR_SPR18MSD (680-150977-3) in batch 680-520101.

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.

Samples 32M-01-18XBR_SPR18 (680-150977-4)[10X] and 32M-DUP01_SPR18 (680-150977-5)[10X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with analytical batch 680-520250.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

METALS (ICP)
Samples 32M-01-13XBR_SPR18 (680-150977-1), 32M-01-14XOB_SPR18 (680-150977-2), 32M-01-17XBR_SPR18 (680-150977-3), 32M-01-18XBR_SPR18 (680-150977-4) and 32M-DUP01_SPR18 (680-150977-5) were analyzed for Metals (ICP) in accordance with EPA SW-846 Method 6010C. The samples were prepared on 04/14/2018 and 04/15/2018 and analyzed on 04/18/2018.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

METALS
Samples 32M-01-13XBR_SPR18 (680-150977-1), 32M-01-14XOB_SPR18 (680-150977-2), 32M-01-17XBR_SPR18 (680-150977-3), 32M-01-18XBR_SPR18 (680-150977-4) and 32M-DUP01_SPR18 (680-150977-5) were analyzed for Metals in accordance with EPA SW-846 Method 6020. The samples were prepared on 04/14/2018 and 04/15/2018 and analyzed on 04/16/2018.

Job ID: 680-150977-1 (Continued)

Laboratory: TestAmerica Savannah (Continued)

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Subcontract Work
Method MA VPH: This method was subcontracted to Katahdin Analytical Services Inc. The subcontract laboratory certification is different from that of the facility issuing the final report.

Sample Summary

Client: KOMAN Government Solutions, LLC
Project/Site: Devens / AOC32/43A Spring 2018

TestAmerica Job ID: 680-150977-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
680-150977-1	32M-01-13XBR_SPR18	Water	04/10/18 12:40	04/12/18 09:10
680-150977-2	32M-01-14XOB_SPR18	Water	04/10/18 13:40	04/12/18 09:10
680-150977-3	32M-01-17XBR_SPR18	Water	04/09/18 12:35	04/12/18 09:10
680-150977-4	32M-01-18XBR_SPR18	Water	04/09/18 14:00	04/12/18 09:10
680-150977-5	32M-DUP01_SPR18	Water	04/09/18 14:05	04/12/18 09:10
680-150977-6	Trip Blank1_040918	Water	04/09/18 00:00	04/12/18 09:10
680-150977-7	Trip Blank2_040918	Water	04/09/18 00:00	04/12/18 09:10

Method Summary

Client: KOMAN Government Solutions, LLC
Project/Site: Devens / AOC32/43A Spring 2018

TestAmerica Job ID: 680-150977-1

Method	Method Description	Protocol	Laboratory
8260B	Volatile Organic Compounds (GC/MS)	SW846	TAL SAV
6010C	Metals (ICP)	SW846	TAL SAV
6020A	Metals (ICP/MS)	SW846	TAL SAV
MA-VPH	MADEP VPH Volatile Petroleum Hydrocarbon	MA DEP	
3010A	Preparation, Total Metals	SW846	TAL SAV
5030B	Purge and Trap	SW846	TAL SAV

Protocol References:

MA DEP = Massachusetts Department Of Environmental Protection

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

= Katahdin Analytical Services Inc, PO BOX 540, 600 Technology Way, Scarborough, ME 04074

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.
M	Manual integrated compound.
J1	Estimated: The quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.
J	Estimated: The analyte was positively identified; the quantitation is an estimation
D	The reported value is from a dilution.
Q	One or more quality control criteria failed.

Metals

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.
J	Estimated: The analyte was positively identified; the quantitation is an estimation

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: KOMAN Government Solutions, LLC
Project/Site: Devens / AOC32/43A Spring 2018

TestAmerica Job ID: 680-150977-1

Client Sample ID: 32M-01-13XBR_SPR18
Date Collected: 04/10/18 12:40
Date Received: 04/12/18 09:10

Lab Sample ID: 680-150977-1
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Acetone	10	U	10	10	7.0	ug/L		04/16/18 14:20	1
Benzene	1.0	U	1.0	1.0	0.43	ug/L		04/16/18 14:20	1
Bromobenzene	1.0	U	1.0	1.0	0.50	ug/L		04/16/18 14:20	1
Bromoform	1.0	U	1.0	1.0	0.43	ug/L		04/16/18 14:20	1
Bromomethane	5.0	U	5.0	5.0	2.5	ug/L		04/16/18 14:20	1
2-Butanone (MEK)	10	U	10	10	3.4	ug/L		04/16/18 14:20	1
Carbon disulfide	2.0	U	2.0	2.0	0.43	ug/L		04/16/18 14:20	1
Carbon tetrachloride	0.50	U	1.0	0.50	0.33	ug/L		04/16/18 14:20	1
Chlorobenzene	0.50	U	1.0	0.50	0.26	ug/L		04/16/18 14:20	1
Chlorobromomethane	1.0	U	1.0	1.0	0.45	ug/L		04/16/18 14:20	1
Chlorodibromomethane	0.50	U	1.0	0.50	0.32	ug/L		04/16/18 14:20	1
Chloroethane	5.0	U	5.0	5.0	2.5	ug/L		04/16/18 14:20	1
Chloroform	1.0	U	1.0	1.0	0.50	ug/L		04/16/18 14:20	1
Chloromethane	1.0	U	1.0	1.0	0.40	ug/L		04/16/18 14:20	1
2-Chlorotoluene	0.50	U	1.0	0.50	0.27	ug/L		04/16/18 14:20	1
4-Chlorotoluene	1.0	U	1.0	1.0	0.45	ug/L		04/16/18 14:20	1
cis-1,2-Dichloroethene	1.0	U	1.0	1.0	0.41	ug/L		04/16/18 14:20	1
cis-1,3-Dichloropropene	1.0	U	1.0	1.0	0.40	ug/L		04/16/18 14:20	1
1,2-Dibromo-3-Chloropropane	2.0	U	5.0	2.0	1.1	ug/L		04/16/18 14:20	1
Dibromomethane	1.0	U	1.0	1.0	0.35	ug/L		04/16/18 14:20	1
1,2-Dichlorobenzene	1.0	U	1.0	1.0	0.37	ug/L		04/16/18 14:20	1
1,3-Dichlorobenzene	1.0	U	1.0	1.0	0.43	ug/L		04/16/18 14:20	1
1,4-Dichlorobenzene	1.0	U	1.0	1.0	0.46	ug/L		04/16/18 14:20	1
Dichlorobromomethane	1.0	U	1.0	1.0	0.44	ug/L		04/16/18 14:20	1
Dichlorodifluoromethane	1.0	U	1.0	1.0	0.60	ug/L		04/16/18 14:20	1
1,1-Dichloroethane	1.0	U	1.0	1.0	0.38	ug/L		04/16/18 14:20	1
1,2-Dichloroethane	1.0	U M	1.0	1.0	0.50	ug/L		04/16/18 14:20	1
1,1-Dichloroethene	1.0	U	1.0	1.0	0.36	ug/L		04/16/18 14:20	1
1,2-Dichloroethene, Total	1.0	U	2.0	1.0	0.74	ug/L		04/16/18 14:20	1
1,2-Dichloropropane	1.0	U	1.0	1.0	0.67	ug/L		04/16/18 14:20	1
1,3-Dichloropropane	1.0	U	1.0	1.0	0.34	ug/L		04/16/18 14:20	1
2,2-Dichloropropane	1.0	U	1.0	1.0	0.37	ug/L		04/16/18 14:20	1
1,1-Dichloropropene	1.0	U	1.0	1.0	0.34	ug/L		04/16/18 14:20	1
Ethylbenzene	0.50	U	1.0	0.50	0.33	ug/L		04/16/18 14:20	1
Ethylene Dibromide	1.0	U	1.0	1.0	0.44	ug/L		04/16/18 14:20	1
Hexachlorobutadiene	5.0	U	5.0	5.0	2.5	ug/L		04/16/18 14:20	1
2-Hexanone	5.0	U	10	5.0	2.0	ug/L		04/16/18 14:20	1
Isopropylbenzene	1.0	U	1.0	1.0	0.35	ug/L		04/16/18 14:20	1
4-Isopropyltoluene	1.0	U	1.0	1.0	0.48	ug/L		04/16/18 14:20	1
Methylene Chloride	5.0	U	5.0	5.0	2.5	ug/L		04/16/18 14:20	1
4-Methyl-2-pentanone (MIBK)	5.0	U	10	5.0	2.1	ug/L		04/16/18 14:20	1
Methyl tert-butyl ether	0.50	U	10	0.50	0.30	ug/L		04/16/18 14:20	1
m-Xylene & p-Xylene	1.0	U	1.0	1.0	0.35	ug/L		04/16/18 14:20	1
Naphthalene	5.0	U	5.0	5.0	2.5	ug/L		04/16/18 14:20	1
n-Butylbenzene	1.0	U	1.0	1.0	0.47	ug/L		04/16/18 14:20	1
N-Propylbenzene	1.0	U	1.0	1.0	0.38	ug/L		04/16/18 14:20	1
o-Xylene	0.50	U	1.0	0.50	0.23	ug/L		04/16/18 14:20	1
sec-Butylbenzene	1.0	U	1.0	1.0	0.42	ug/L		04/16/18 14:20	1
Styrene	0.50	U	1.0	0.50	0.27	ug/L		04/16/18 14:20	1

Client Sample ID: 32M-01-13XBR_SPR18

Date Collected: 04/10/18 12:40
Date Received: 04/12/18 09:10

Lab Sample ID: 680-150977-1

Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
tert-Butylbenzene	1.0	U	1.0	1.0	0.45	ug/L		04/16/18 14:20	1
1,1,1,2-Tetrachloroethane	1.0	U	1.0	1.0	0.37	ug/L		04/16/18 14:20	1
1,1,2,2-Tetrachloroethane	1.0	U	1.0	1.0	0.62	ug/L		04/16/18 14:20	1
Tetrachloroethene	1.0	U	1.0	1.0	0.74	ug/L		04/16/18 14:20	1
Toluene	1.0	U	1.0	1.0	0.48	ug/L		04/16/18 14:20	1
trans-1,2-Dichloroethene	1.0	U	1.0	1.0	0.37	ug/L		04/16/18 14:20	1
trans-1,3-Dichloropropene	1.0	U	1.0	1.0	0.42	ug/L		04/16/18 14:20	1
1,2,3-Trichlorobenzene	5.0	U	5.0	5.0	2.5	ug/L		04/16/18 14:20	1
1,2,4-Trichlorobenzene	5.0	U	5.0	5.0	2.5	ug/L		04/16/18 14:20	1
1,1,1-Trichloroethane	1.0	U	1.0	1.0	0.37	ug/L		04/16/18 14:20	1
1,1,2-Trichloroethane	0.50	U	1.0	0.50	0.33	ug/L		04/16/18 14:20	1
Trichloroethene	1.0	U	1.0	1.0	0.48	ug/L		04/16/18 14:20	1
Trichlorofluoromethane	1.0	U	1.0	1.0	0.42	ug/L		04/16/18 14:20	1
1,2,3-Trichloropropane	1.0	U	1.0	1.0	0.39	ug/L		04/16/18 14:20	1
1,2,4-Trimethylbenzene	1.0	U	1.0	1.0	0.47	ug/L		04/16/18 14:20	1
1,3,5-Trimethylbenzene	0.50	U	1.0	0.50	0.31	ug/L		04/16/18 14:20	1
Vinyl acetate	2.0	U	2.0	2.0	0.81	ug/L		04/16/18 14:20	1
Vinyl chloride	1.0	U	1.0	1.0	0.50	ug/L		04/16/18 14:20	1
Xylenes, Total	0.50	U	2.0	0.50	0.23	ug/L		04/16/18 14:20	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*98*		*85 - 114*		*04/16/18 14:20*	*1*
Dibromofluoromethane (Surr)	*97*		*80 - 119*		*04/16/18 14:20*	*1*
1,2-Dichloroethane-d4 (Surr)	*91*		*81 - 118*		*04/16/18 14:20*	*1*
Toluene-d8 (Surr)	*94*		*89 - 112*		*04/16/18 14:20*	*1*

Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Manganese	**110**		10	3.0	1.0	ug/L		04/18/18 21:46	1

Method: 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	3.0	U	3.0	3.0	1.5	ug/L		04/16/18 14:44	1

Client Sample ID: 32M-01-14XOB_SPR18

Date Collected: 04/10/18 13:40
Date Received: 04/12/18 09:10

Lab Sample ID: 680-150977-2

Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Acetone	10	U	10	10	7.0	ug/L		04/16/18 14:42	1
Benzene	1.0	U	1.0	1.0	0.43	ug/L		04/16/18 14:42	1
Bromobenzene	1.0	U	1.0	1.0	0.50	ug/L		04/16/18 14:42	1
Bromoform	1.0	U	1.0	1.0	0.43	ug/L		04/16/18 14:42	1
Bromomethane	5.0	U	5.0	5.0	2.5	ug/L		04/16/18 14:42	1
2-Butanone (MEK)	10	U	10	10	3.4	ug/L		04/16/18 14:42	1
Carbon disulfide	2.0	U	2.0	2.0	0.43	ug/L		04/16/18 14:42	1
Carbon tetrachloride	0.50	U	1.0	0.50	0.33	ug/L		04/16/18 14:42	1
Chlorobenzene	0.50	U	1.0	0.50	0.26	ug/L		04/16/18 14:42	1
Chlorobromomethane	1.0	U	1.0	1.0	0.45	ug/L		04/16/18 14:42	1

Client: KOMAN Government Solutions, LLC
Project/Site: Devens / AOC32/43A Spring 2018

TestAmerica Job ID: 680-150977-1

Client Sample ID: 32M-01-14XOB_SPR18
Date Collected: 04/10/18 13:40
Date Received: 04/12/18 09:10

Lab Sample ID: 680-150977-2
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Chlorodibromomethane	0.50	U	1.0	0.50	0.32	ug/L		04/16/18 14:42	1
Chloroethane	5.0	U	5.0	5.0	2.5	ug/L		04/16/18 14:42	1
Chloroform	1.0	U	1.0	1.0	0.50	ug/L		04/16/18 14:42	1
Chloromethane	1.0	U	1.0	1.0	0.40	ug/L		04/16/18 14:42	1
2-Chlorotoluene	0.50	U	1.0	0.50	0.27	ug/L		04/16/18 14:42	1
4-Chlorotoluene	1.0	U	1.0	1.0	0.45	ug/L		04/16/18 14:42	1
cis-1,2-Dichloroethene	1.0	U	1.0	1.0	0.41	ug/L		04/16/18 14:42	1
cis-1,3-Dichloropropene	1.0	U	1.0	1.0	0.40	ug/L		04/16/18 14:42	1
1,2-Dibromo-3-Chloropropane	2.0	U	5.0	2.0	1.1	ug/L		04/16/18 14:42	1
Dibromomethane	1.0	U	1.0	1.0	0.35	ug/L		04/16/18 14:42	1
1,2-Dichlorobenzene	1.0	U	1.0	1.0	0.37	ug/L		04/16/18 14:42	1
1,3-Dichlorobenzene	1.0	U	1.0	1.0	0.43	ug/L		04/16/18 14:42	1
1,4-Dichlorobenzene	1.0	U	1.0	1.0	0.46	ug/L		04/16/18 14:42	1
Dichlorobromomethane	1.0	U	1.0	1.0	0.44	ug/L		04/16/18 14:42	1
Dichlorodifluoromethane	1.0	U	1.0	1.0	0.60	ug/L		04/16/18 14:42	1
1,1-Dichloroethane	1.0	U	1.0	1.0	0.38	ug/L		04/16/18 14:42	1
1,2-Dichloroethane	1.0	U M	1.0	1.0	0.50	ug/L		04/16/18 14:42	1
1,1-Dichloroethene	1.0	U	1.0	1.0	0.36	ug/L		04/16/18 14:42	1
1,2-Dichloroethene, Total	1.0	U	2.0	1.0	0.74	ug/L		04/16/18 14:42	1
1,2-Dichloropropane	1.0	U	1.0	1.0	0.67	ug/L		04/16/18 14:42	1
1,3-Dichloropropane	1.0	U	1.0	1.0	0.34	ug/L		04/16/18 14:42	1
2,2-Dichloropropane	1.0	U	1.0	1.0	0.37	ug/L		04/16/18 14:42	1
1,1-Dichloropropene	1.0	U	1.0	1.0	0.34	ug/L		04/16/18 14:42	1
Ethylbenzene	0.50	U	1.0	0.50	0.33	ug/L		04/16/18 14:42	1
Ethylene Dibromide	1.0	U	1.0	1.0	0.44	ug/L		04/16/18 14:42	1
Hexachlorobutadiene	5.0	U	5.0	5.0	2.5	ug/L		04/16/18 14:42	1
2-Hexanone	5.0	U	10	5.0	2.0	ug/L		04/16/18 14:42	1
Isopropylbenzene	1.0	U	1.0	1.0	0.35	ug/L		04/16/18 14:42	1
4-Isopropyltoluene	1.0	U	1.0	1.0	0.48	ug/L		04/16/18 14:42	1
Methylene Chloride	5.0	U	5.0	5.0	2.5	ug/L		04/16/18 14:42	1
4-Methyl-2-pentanone (MIBK)	5.0	U	10	5.0	2.1	ug/L		04/16/18 14:42	1
Methyl tert-butyl ether	0.50	U	10	0.50	0.30	ug/L		04/16/18 14:42	1
m-Xylene & p-Xylene	1.0	U	1.0	1.0	0.35	ug/L		04/16/18 14:42	1
Naphthalene	5.0	U	5.0	5.0	2.5	ug/L		04/16/18 14:42	1
n-Butylbenzene	1.0	U	1.0	1.0	0.47	ug/L		04/16/18 14:42	1
N-Propylbenzene	1.0	U	1.0	1.0	0.38	ug/L		04/16/18 14:42	1
o-Xylene	0.50	U	1.0	0.50	0.23	ug/L		04/16/18 14:42	1
sec-Butylbenzene	1.0	U	1.0	1.0	0.42	ug/L		04/16/18 14:42	1
Styrene	0.50	U	1.0	0.50	0.27	ug/L		04/16/18 14:42	1
tert-Butylbenzene	1.0	U	1.0	1.0	0.45	ug/L		04/16/18 14:42	1
1,1,1,2-Tetrachloroethane	1.0	U	1.0	1.0	0.37	ug/L		04/16/18 14:42	1
1,1,2,2-Tetrachloroethane	1.0	U	1.0	1.0	0.62	ug/L		04/16/18 14:42	1
Tetrachloroethene	1.0	U	1.0	1.0	0.74	ug/L		04/16/18 14:42	1
Toluene	1.0	U	1.0	1.0	0.48	ug/L		04/16/18 14:42	1
trans-1,2-Dichloroethene	1.0	U	1.0	1.0	0.37	ug/L		04/16/18 14:42	1
trans-1,3-Dichloropropene	1.0	U	1.0	1.0	0.42	ug/L		04/16/18 14:42	1
1,2,3-Trichlorobenzene	5.0	U	5.0	5.0	2.5	ug/L		04/16/18 14:42	1
1,2,4-Trichlorobenzene	5.0	U	5.0	5.0	2.5	ug/L		04/16/18 14:42	1
1,1,1-Trichloroethane	1.0	U	1.0	1.0	0.37	ug/L		04/16/18 14:42	1

Client Sample ID: 32M-01-14XOB_SPR18

Lab Sample ID: 680-150977-2

Date Collected: 04/10/18 13:40

Matrix: Water

Date Received: 04/12/18 09:10

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
1,1,2-Trichloroethane	0.50	U	1.0	0.50	0.33	ug/L		04/16/18 14:42	1
Trichloroethene	1.0	U	1.0	1.0	0.48	ug/L		04/16/18 14:42	1
Trichlorofluoromethane	1.0	U	1.0	1.0	0.42	ug/L		04/16/18 14:42	1
1,2,3-Trichloropropane	1.0	U	1.0	1.0	0.39	ug/L		04/16/18 14:42	1
1,2,4-Trimethylbenzene	1.0	U	1.0	1.0	0.47	ug/L		04/16/18 14:42	1
1,3,5-Trimethylbenzene	0.50	U	1.0	0.50	0.31	ug/L		04/16/18 14:42	1
Vinyl acetate	2.0	U	2.0	2.0	0.81	ug/L		04/16/18 14:42	1
Vinyl chloride	1.0	U	1.0	1.0	0.50	ug/L		04/16/18 14:42	1
Xylenes, Total	0.50	U	2.0	0.50	0.23	ug/L		04/16/18 14:42	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*91*		*85 - 114*		*04/16/18 14:42*	*1*
Dibromofluoromethane (Surr)	*99*		*80 - 119*		*04/16/18 14:42*	*1*
1,2-Dichloroethane-d4 (Surr)	*94*		*81 - 118*		*04/16/18 14:42*	*1*
Toluene-d8 (Surr)	*102*		*89 - 112*		*04/16/18 14:42*	*1*

Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Manganese	**2700**		10	3.0	1.0	ug/L		04/18/18 21:31	1

Method: 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	**32**		3.0	3.0	1.5	ug/L		04/16/18 14:27	1

Client Sample ID: 32M-01-17XBR_SPR18

Lab Sample ID: 680-150977-3

Date Collected: 04/09/18 12:35

Matrix: Water

Date Received: 04/12/18 09:10

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Acetone	10	U	10	10	7.0	ug/L		04/16/18 15:04	1
Benzene	1.0	U	1.0	1.0	0.43	ug/L		04/16/18 15:04	1
Bromobenzene	1.0	U	1.0	1.0	0.50	ug/L		04/16/18 15:04	1
Bromoform	1.0	U	1.0	1.0	0.43	ug/L		04/16/18 15:04	1
Bromomethane	5.0	U	5.0	5.0	2.5	ug/L		04/16/18 15:04	1
2-Butanone (MEK)	10	U	10	10	3.4	ug/L		04/16/18 15:04	1
Carbon disulfide	2.0	U	2.0	2.0	0.43	ug/L		04/16/18 15:04	1
Carbon tetrachloride	0.50	U	1.0	0.50	0.33	ug/L		04/16/18 15:04	1
Chlorobenzene	0.50	U	1.0	0.50	0.26	ug/L		04/16/18 15:04	1
Chlorobromomethane	1.0	U	1.0	1.0	0.45	ug/L		04/16/18 15:04	1
Chlorodibromomethane	0.50	U	1.0	0.50	0.32	ug/L		04/16/18 15:04	1
Chloroethane	5.0	U	5.0	5.0	2.5	ug/L		04/16/18 15:04	1
Chloroform	1.0	U	1.0	1.0	0.50	ug/L		04/16/18 15:04	1
Chloromethane	1.0	U	1.0	1.0	0.40	ug/L		04/16/18 15:04	1
2-Chlorotoluene	0.50	U	1.0	0.50	0.27	ug/L		04/16/18 15:04	1
4-Chlorotoluene	1.0	U	1.0	1.0	0.45	ug/L		04/16/18 15:04	1
cis-1,2-Dichloroethene	1.0	U	1.0	1.0	0.41	ug/L		04/16/18 15:04	1
cis-1,3-Dichloropropene	1.0	U	1.0	1.0	0.40	ug/L		04/16/18 15:04	1
1,2-Dibromo-3-Chloropropane	2.0	U	5.0	2.0	1.1	ug/L		04/16/18 15:04	1
Dibromomethane	1.0	U	1.0	1.0	0.35	ug/L		04/16/18 15:04	1

Client Sample ID: 32M-01-17XBR_SPR18
Date Collected: 04/09/18 12:35
Date Received: 04/12/18 09:10

Lab Sample ID: 680-150977-3
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
1,2-Dichlorobenzene	1.0	U	1.0	1.0	0.37	ug/L		04/16/18 15:04	1
1,3-Dichlorobenzene	1.0	U	1.0	1.0	0.43	ug/L		04/16/18 15:04	1
1,4-Dichlorobenzene	1.0	U	1.0	1.0	0.46	ug/L		04/16/18 15:04	1
Dichlorobromomethane	1.0	U	1.0	1.0	0.44	ug/L		04/16/18 15:04	1
Dichlorodifluoromethane	1.0	U	1.0	1.0	0.60	ug/L		04/16/18 15:04	1
1,1-Dichloroethane	1.0	U	1.0	1.0	0.38	ug/L		04/16/18 15:04	1
1,2-Dichloroethane	1.0	U M	1.0	1.0	0.50	ug/L		04/16/18 15:04	1
1,1-Dichloroethene	1.0	U	1.0	1.0	0.36	ug/L		04/16/18 15:04	1
1,2-Dichloroethene, Total	1.0	U	2.0	1.0	0.74	ug/L		04/16/18 15:04	1
1,2-Dichloropropane	1.0	U	1.0	1.0	0.67	ug/L		04/16/18 15:04	1
1,3-Dichloropropane	1.0	U	1.0	1.0	0.34	ug/L		04/16/18 15:04	1
2,2-Dichloropropane	1.0	U	1.0	1.0	0.37	ug/L		04/16/18 15:04	1
1,1-Dichloropropene	1.0	U	1.0	1.0	0.34	ug/L		04/16/18 15:04	1
Ethylbenzene	0.50	U	1.0	0.50	0.33	ug/L		04/16/18 15:04	1
Ethylene Dibromide	1.0	U	1.0	1.0	0.44	ug/L		04/16/18 15:04	1
Hexachlorobutadiene	5.0	U	5.0	5.0	2.5	ug/L		04/16/18 15:04	1
2-Hexanone	5.0	U	10	5.0	2.0	ug/L		04/16/18 15:04	1
Isopropylbenzene	1.0	U	1.0	1.0	0.35	ug/L		04/16/18 15:04	1
4-Isopropyltoluene	1.0	U	1.0	1.0	0.48	ug/L		04/16/18 15:04	1
Methylene Chloride	5.0	U	5.0	5.0	2.5	ug/L		04/16/18 15:04	1
4-Methyl-2-pentanone (MIBK)	5.0	U	10	5.0	2.1	ug/L		04/16/18 15:04	1
Methyl tert-butyl ether	0.50	U	10	0.50	0.30	ug/L		04/16/18 15:04	1
m-Xylene & p-Xylene	1.0	U	1.0	1.0	0.35	ug/L		04/16/18 15:04	1
Naphthalene	5.0	U J1	5.0	5.0	2.5	ug/L		04/16/18 15:04	1
n-Butylbenzene	1.0	U	1.0	1.0	0.47	ug/L		04/16/18 15:04	1
N-Propylbenzene	1.0	U	1.0	1.0	0.38	ug/L		04/16/18 15:04	1
o-Xylene	0.50	U	1.0	0.50	0.23	ug/L		04/16/18 15:04	1
sec-Butylbenzene	1.0	U	1.0	1.0	0.42	ug/L		04/16/18 15:04	1
Styrene	0.50	U	1.0	0.50	0.27	ug/L		04/16/18 15:04	1
tert-Butylbenzene	1.0	U	1.0	1.0	0.45	ug/L		04/16/18 15:04	1
1,1,1,2-Tetrachloroethane	1.0	U	1.0	1.0	0.37	ug/L		04/16/18 15:04	1
1,1,2,2-Tetrachloroethane	1.0	U	1.0	1.0	0.62	ug/L		04/16/18 15:04	1
Tetrachloroethene	1.0	U	1.0	1.0	0.74	ug/L		04/16/18 15:04	1
Toluene	1.0	U	1.0	1.0	0.48	ug/L		04/16/18 15:04	1
trans-1,2-Dichloroethene	1.0	U	1.0	1.0	0.37	ug/L		04/16/18 15:04	1
trans-1,3-Dichloropropene	1.0	U	1.0	1.0	0.42	ug/L		04/16/18 15:04	1
1,2,3-Trichlorobenzene	5.0	U J1	5.0	5.0	2.5	ug/L		04/16/18 15:04	1
1,2,4-Trichlorobenzene	5.0	U	5.0	5.0	2.5	ug/L		04/16/18 15:04	1
1,1,1-Trichloroethane	1.0	U	1.0	1.0	0.37	ug/L		04/16/18 15:04	1
1,1,2-Trichloroethane	0.50	U	1.0	0.50	0.33	ug/L		04/16/18 15:04	1
Trichloroethene	1.0	U	1.0	1.0	0.48	ug/L		04/16/18 15:04	1
Trichlorofluoromethane	1.0	U	1.0	1.0	0.42	ug/L		04/16/18 15:04	1
1,2,3-Trichloropropane	1.0	U	1.0	1.0	0.39	ug/L		04/16/18 15:04	1
1,2,4-Trimethylbenzene	1.0	U	1.0	1.0	0.47	ug/L		04/16/18 15:04	1
1,3,5-Trimethylbenzene	0.50	U	1.0	0.50	0.31	ug/L		04/16/18 15:04	1
Vinyl acetate	2.0	U	2.0	2.0	0.81	ug/L		04/16/18 15:04	1
Vinyl chloride	1.0	U	1.0	1.0	0.50	ug/L		04/16/18 15:04	1
Xylenes, Total	0.50	U	2.0	0.50	0.23	ug/L		04/16/18 15:04	1

Client Sample ID: 32M-01-17XBR_SPR18

Lab Sample ID: 680-150977-3

Date Collected: 04/09/18 12:35

Matrix: Water

Date Received: 04/12/18 09:10

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*95*		*85 - 114*		*04/16/18 15:04*	*1*
Dibromofluoromethane (Surr)	*99*		*80 - 119*		*04/16/18 15:04*	*1*
1,2-Dichloroethane-d4 (Surr)	*94*		*81 - 118*		*04/16/18 15:04*	*1*
Toluene-d8 (Surr)	*100*		*89 - 112*		*04/16/18 15:04*	*1*

Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Manganese	**1.1**	**J**	10	3.0	1.0	ug/L		04/18/18 17:13	1

Method: 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	3.0	U	3.0	3.0	1.5	ug/L		04/16/18 12:42	1

Client Sample ID: 32M-01-18XBR_SPR18

Lab Sample ID: 680-150977-4

Date Collected: 04/09/18 14:00

Matrix: Water

Date Received: 04/12/18 09:10

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Acetone	10	U	10	10	7.0	ug/L		04/16/18 15:26	1
Benzene	**0.79**	**J**	1.0	1.0	0.43	ug/L		04/16/18 15:26	1
Bromobenzene	1.0	U	1.0	1.0	0.50	ug/L		04/16/18 15:26	1
Bromoform	1.0	U	1.0	1.0	0.43	ug/L		04/16/18 15:26	1
Bromomethane	5.0	U	5.0	5.0	2.5	ug/L		04/16/18 15:26	1
2-Butanone (MEK)	10	U	10	10	3.4	ug/L		04/16/18 15:26	1
Carbon disulfide	2.0	U	2.0	2.0	0.43	ug/L		04/16/18 15:26	1
Carbon tetrachloride	0.50	U	1.0	0.50	0.33	ug/L		04/16/18 15:26	1
Chlorobromomethane	1.0	U	1.0	1.0	0.45	ug/L		04/16/18 15:26	1
Chlorodibromomethane	0.50	U	1.0	0.50	0.32	ug/L		04/16/18 15:26	1
Chloroethane	5.0	U	5.0	5.0	2.5	ug/L		04/16/18 15:26	1
Chloroform	1.0	U	1.0	1.0	0.50	ug/L		04/16/18 15:26	1
Chloromethane	1.0	U	1.0	1.0	0.40	ug/L		04/16/18 15:26	1
2-Chlorotoluene	0.50	U	1.0	0.50	0.27	ug/L		04/16/18 15:26	1
4-Chlorotoluene	1.0	U	1.0	1.0	0.45	ug/L		04/16/18 15:26	1
cis-1,2-Dichloroethene	**1.0**		1.0	1.0	0.41	ug/L		04/16/18 15:26	1
cis-1,3-Dichloropropene	1.0	U	1.0	1.0	0.40	ug/L		04/16/18 15:26	1
1,2-Dibromo-3-Chloropropane	2.0	U	5.0	2.0	1.1	ug/L		04/16/18 15:26	1
Dibromomethane	1.0	U	1.0	1.0	0.35	ug/L		04/16/18 15:26	1
1,3-Dichlorobenzene	**150**		1.0	1.0	0.43	ug/L		04/16/18 15:26	1
1,4-Dichlorobenzene	**97**		1.0	1.0	0.46	ug/L		04/16/18 15:26	1
Dichlorobromomethane	1.0	U	1.0	1.0	0.44	ug/L		04/16/18 15:26	1
Dichlorodifluoromethane	1.0	U	1.0	1.0	0.60	ug/L		04/16/18 15:26	1
1,1-Dichloroethane	1.0	U	1.0	1.0	0.38	ug/L		04/16/18 15:26	1
1,2-Dichloroethane	1.0	U M	1.0	1.0	0.50	ug/L		04/16/18 15:26	1
1,1-Dichloroethene	1.0	U	1.0	1.0	0.36	ug/L		04/16/18 15:26	1
1,2-Dichloroethene, Total	**1.0**	**J**	2.0	1.0	0.74	ug/L		04/16/18 15:26	1
1,2-Dichloropropane	1.0	U	1.0	1.0	0.67	ug/L		04/16/18 15:26	1
1,3-Dichloropropane	1.0	U	1.0	1.0	0.34	ug/L		04/16/18 15:26	1
2,2-Dichloropropane	1.0	U	1.0	1.0	0.37	ug/L		04/16/18 15:26	1
1,1-Dichloropropene	1.0	U	1.0	1.0	0.34	ug/L		04/16/18 15:26	1
Ethylbenzene	**0.47**	**J**	1.0	0.50	0.33	ug/L		04/16/18 15:26	1

Client Sample ID: 32M-01-18XBR_SPR18
Date Collected: 04/09/18 14:00
Date Received: 04/12/18 09:10

Lab Sample ID: 680-150977-4
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Ethylene Dibromide	1.0	U	1.0	1.0	0.44	ug/L		04/16/18 15:26	1
Hexachlorobutadiene	5.0	U	5.0	5.0	2.5	ug/L		04/16/18 15:26	1
2-Hexanone	5.0	U	10	5.0	2.0	ug/L		04/16/18 15:26	1
Isopropylbenzene	**1.1**		1.0	1.0	0.35	ug/L		04/16/18 15:26	1
4-Isopropyltoluene	1.0	U M	1.0	1.0	0.48	ug/L		04/16/18 15:26	1
Methylene Chloride	5.0	U	5.0	5.0	2.5	ug/L		04/16/18 15:26	1
4-Methyl-2-pentanone (MIBK)	5.0	U	10	5.0	2.1	ug/L		04/16/18 15:26	1
Methyl tert-butyl ether	0.50	U	10	0.50	0.30	ug/L		04/16/18 15:26	1
m-Xylene & p-Xylene	1.0	U	1.0	1.0	0.35	ug/L		04/16/18 15:26	1
Naphthalene	5.0	U	5.0	5.0	2.5	ug/L		04/16/18 15:26	1
n-Butylbenzene	1.0	U	1.0	1.0	0.47	ug/L		04/16/18 15:26	1
N-Propylbenzene	**0.98**	**J**	1.0	1.0	0.38	ug/L		04/16/18 15:26	1
o-Xylene	**0.30**	**J**	1.0	0.50	0.23	ug/L		04/16/18 15:26	1
sec-Butylbenzene	**0.58**	**J**	1.0	1.0	0.42	ug/L		04/16/18 15:26	1
Styrene	0.50	U	1.0	0.50	0.27	ug/L		04/16/18 15:26	1
tert-Butylbenzene	1.0	U	1.0	1.0	0.45	ug/L		04/16/18 15:26	1
1,1,1,2-Tetrachloroethane	1.0	U	1.0	1.0	0.37	ug/L		04/16/18 15:26	1
1,1,2,2-Tetrachloroethane	1.0	U	1.0	1.0	0.62	ug/L		04/16/18 15:26	1
Tetrachloroethene	1.0	U	1.0	1.0	0.74	ug/L		04/16/18 15:26	1
Toluene	1.0	U	1.0	1.0	0.48	ug/L		04/16/18 15:26	1
trans-1,2-Dichloroethene	1.0	U	1.0	1.0	0.37	ug/L		04/16/18 15:26	1
trans-1,3-Dichloropropene	1.0	U	1.0	1.0	0.42	ug/L		04/16/18 15:26	1
1,2,3-Trichlorobenzene	5.0	U	5.0	5.0	2.5	ug/L		04/16/18 15:26	1
1,2,4-Trichlorobenzene	5.0	U	5.0	5.0	2.5	ug/L		04/16/18 15:26	1
1,1,1-Trichloroethane	1.0	U	1.0	1.0	0.37	ug/L		04/16/18 15:26	1
1,1,2-Trichloroethane	0.50	U	1.0	0.50	0.33	ug/L		04/16/18 15:26	1
Trichloroethene	**0.92**	**J**	1.0	1.0	0.48	ug/L		04/16/18 15:26	1
Trichlorofluoromethane	1.0	U	1.0	1.0	0.42	ug/L		04/16/18 15:26	1
1,2,3-Trichloropropane	1.0	U	1.0	1.0	0.39	ug/L		04/16/18 15:26	1
1,2,4-Trimethylbenzene	1.0	U M	1.0	1.0	0.47	ug/L		04/16/18 15:26	1
1,3,5-Trimethylbenzene	0.50	U M	1.0	0.50	0.31	ug/L		04/16/18 15:26	1
Vinyl acetate	2.0	U	2.0	2.0	0.81	ug/L		04/16/18 15:26	1
Vinyl chloride	1.0	U	1.0	1.0	0.50	ug/L		04/16/18 15:26	1
Xylenes, Total	**0.30**	**J**	2.0	0.50	0.23	ug/L		04/16/18 15:26	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*92*		*85 - 114*		*04/16/18 15:26*	*1*
Dibromofluoromethane (Surr)	*96*		*80 - 119*		*04/16/18 15:26*	*1*
1,2-Dichloroethane-d4 (Surr)	*91*		*81 - 118*		*04/16/18 15:26*	*1*
Toluene-d8 (Surr)	*101*		*89 - 112*		*04/16/18 15:26*	*1*

Method: 8260B - Volatile Organic Compounds (GC/MS) - DL

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Chlorobenzene	**440**	**D**	10	5.0	2.6	ug/L		04/17/18 11:46	10
1,2-Dichlorobenzene	**840**	**D**	10	10	3.7	ug/L		04/17/18 11:46	10

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*97*		*85 - 114*		*04/17/18 11:46*	*10*
Dibromofluoromethane (Surr)	*116*		*80 - 119*		*04/17/18 11:46*	*10*
1,2-Dichloroethane-d4 (Surr)	*115*		*81 - 118*		*04/17/18 11:46*	*10*

Client Sample ID: 32M-01-18XBR_SPR18

Lab Sample ID: 680-150977-4

Date Collected: 04/09/18 14:00
Matrix: Water
Date Received: 04/12/18 09:10

Method: 8260B - Volatile Organic Compounds (GC/MS) - DL (Continued)

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	*103*		*89 - 112*		*04/17/18 11:46*	*10*

Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Manganese	**8400**		10	3.0	1.0	ug/L		04/18/18 21:41	1

Method: 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	**6.5**		3.0	3.0	1.5	ug/L		04/16/18 14:34	1

Client Sample ID: 32M-DUP01_SPR18

Lab Sample ID: 680-150977-5

Date Collected: 04/09/18 14:05
Matrix: Water
Date Received: 04/12/18 09:10

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Acetone	10	U	10	10	7.0	ug/L		04/16/18 15:48	1
Benzene	**0.69**	**J**	1.0	1.0	0.43	ug/L		04/16/18 15:48	1
Bromobenzene	1.0	U	1.0	1.0	0.50	ug/L		04/16/18 15:48	1
Bromoform	1.0	U	1.0	1.0	0.43	ug/L		04/16/18 15:48	1
Bromomethane	5.0	U	5.0	5.0	2.5	ug/L		04/16/18 15:48	1
2-Butanone (MEK)	10	U	10	10	3.4	ug/L		04/16/18 15:48	1
Carbon disulfide	2.0	U	2.0	2.0	0.43	ug/L		04/16/18 15:48	1
Carbon tetrachloride	0.50	U	1.0	0.50	0.33	ug/L		04/16/18 15:48	1
Chlorobromomethane	1.0	U	1.0	1.0	0.45	ug/L		04/16/18 15:48	1
Chlorodibromomethane	0.50	U	1.0	0.50	0.32	ug/L		04/16/18 15:48	1
Chloroethane	5.0	U	5.0	5.0	2.5	ug/L		04/16/18 15:48	1
Chloroform	1.0	U	1.0	1.0	0.50	ug/L		04/16/18 15:48	1
Chloromethane	1.0	U	1.0	1.0	0.40	ug/L		04/16/18 15:48	1
2-Chlorotoluene	0.50	U	1.0	0.50	0.27	ug/L		04/16/18 15:48	1
4-Chlorotoluene	1.0	U	1.0	1.0	0.45	ug/L		04/16/18 15:48	1
cis-1,2-Dichloroethene	**0.94**	**J**	1.0	1.0	0.41	ug/L		04/16/18 15:48	1
cis-1,3-Dichloropropene	1.0	U	1.0	1.0	0.40	ug/L		04/16/18 15:48	1
1,2-Dibromo-3-Chloropropane	2.0	U	5.0	2.0	1.1	ug/L		04/16/18 15:48	1
Dibromomethane	1.0	U	1.0	1.0	0.35	ug/L		04/16/18 15:48	1
1,3-Dichlorobenzene	**140**		1.0	1.0	0.43	ug/L		04/16/18 15:48	1
1,4-Dichlorobenzene	**89**		1.0	1.0	0.46	ug/L		04/16/18 15:48	1
Dichlorobromomethane	1.0	U	1.0	1.0	0.44	ug/L		04/16/18 15:48	1
Dichlorodifluoromethane	1.0	U	1.0	1.0	0.60	ug/L		04/16/18 15:48	1
1,1-Dichloroethane	1.0	U	1.0	1.0	0.38	ug/L		04/16/18 15:48	1
1,2-Dichloroethane	1.0	U M	1.0	1.0	0.50	ug/L		04/16/18 15:48	1
1,1-Dichloroethene	1.0	U	1.0	1.0	0.36	ug/L		04/16/18 15:48	1
1,2-Dichloroethene, Total	**0.94**	**J**	2.0	1.0	0.74	ug/L		04/16/18 15:48	1
1,2-Dichloropropane	1.0	U	1.0	1.0	0.67	ug/L		04/16/18 15:48	1
1,3-Dichloropropane	1.0	U	1.0	1.0	0.34	ug/L		04/16/18 15:48	1
2,2-Dichloropropane	1.0	U	1.0	1.0	0.37	ug/L		04/16/18 15:48	1
1,1-Dichloropropene	1.0	U	1.0	1.0	0.34	ug/L		04/16/18 15:48	1
Ethylbenzene	**0.42**	**J**	1.0	0.50	0.33	ug/L		04/16/18 15:48	1
Ethylene Dibromide	1.0	U	1.0	1.0	0.44	ug/L		04/16/18 15:48	1
Hexachlorobutadiene	5.0	U	5.0	5.0	2.5	ug/L		04/16/18 15:48	1

Client Sample ID: 32M-DUP01_SPR18
Date Collected: 04/09/18 14:05
Date Received: 04/12/18 09:10

Lab Sample ID: 680-150977-5
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
2-Hexanone	5.0	U	10	5.0	2.0	ug/L		04/16/18 15:48	1
Isopropylbenzene	**1.0**		1.0	1.0	0.35	ug/L		04/16/18 15:48	1
4-Isopropyltoluene	1.0	U M	1.0	1.0	0.48	ug/L		04/16/18 15:48	1
Methylene Chloride	5.0	U	5.0	5.0	2.5	ug/L		04/16/18 15:48	1
4-Methyl-2-pentanone (MIBK)	5.0	U	10	5.0	2.1	ug/L		04/16/18 15:48	1
Methyl tert-butyl ether	0.50	U	10	0.50	0.30	ug/L		04/16/18 15:48	1
m-Xylene & p-Xylene	1.0	U	1.0	1.0	0.35	ug/L		04/16/18 15:48	1
Naphthalene	5.0	U	5.0	5.0	2.5	ug/L		04/16/18 15:48	1
n-Butylbenzene	1.0	U	1.0	1.0	0.47	ug/L		04/16/18 15:48	1
N-Propylbenzene	**0.89**	**J**	1.0	1.0	0.38	ug/L		04/16/18 15:48	1
o-Xylene	**0.27**	**J**	1.0	0.50	0.23	ug/L		04/16/18 15:48	1
sec-Butylbenzene	**0.56**	**J**	1.0	1.0	0.42	ug/L		04/16/18 15:48	1
Styrene	0.50	U	1.0	0.50	0.27	ug/L		04/16/18 15:48	1
tert-Butylbenzene	1.0	U	1.0	1.0	0.45	ug/L		04/16/18 15:48	1
1,1,1,2-Tetrachloroethane	1.0	U	1.0	1.0	0.37	ug/L		04/16/18 15:48	1
1,1,2,2-Tetrachloroethane	1.0	U	1.0	1.0	0.62	ug/L		04/16/18 15:48	1
Tetrachloroethene	1.0	U	1.0	1.0	0.74	ug/L		04/16/18 15:48	1
Toluene	1.0	U	1.0	1.0	0.48	ug/L		04/16/18 15:48	1
trans-1,2-Dichloroethene	1.0	U	1.0	1.0	0.37	ug/L		04/16/18 15:48	1
trans-1,3-Dichloropropene	1.0	U	1.0	1.0	0.42	ug/L		04/16/18 15:48	1
1,2,3-Trichlorobenzene	5.0	U	5.0	5.0	2.5	ug/L		04/16/18 15:48	1
1,2,4-Trichlorobenzene	5.0	U	5.0	5.0	2.5	ug/L		04/16/18 15:48	1
1,1,1-Trichloroethane	1.0	U	1.0	1.0	0.37	ug/L		04/16/18 15:48	1
1,1,2-Trichloroethane	0.50	U	1.0	0.50	0.33	ug/L		04/16/18 15:48	1
Trichloroethene	**0.82**	**J**	1.0	1.0	0.48	ug/L		04/16/18 15:48	1
Trichlorofluoromethane	1.0	U	1.0	1.0	0.42	ug/L		04/16/18 15:48	1
1,2,3-Trichloropropane	1.0	U	1.0	1.0	0.39	ug/L		04/16/18 15:48	1
1,2,4-Trimethylbenzene	1.0	U M	1.0	1.0	0.47	ug/L		04/16/18 15:48	1
1,3,5-Trimethylbenzene	0.50	U M	1.0	0.50	0.31	ug/L		04/16/18 15:48	1
Vinyl acetate	2.0	U	2.0	2.0	0.81	ug/L		04/16/18 15:48	1
Vinyl chloride	1.0	U	1.0	1.0	0.50	ug/L		04/16/18 15:48	1
Xylenes, Total	**0.27**	**J**	2.0	0.50	0.23	ug/L		04/16/18 15:48	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*93*		*85 - 114*		*04/16/18 15:48*	*1*
Dibromofluoromethane (Surr)	*97*		*80 - 119*		*04/16/18 15:48*	*1*
1,2-Dichloroethane-d4 (Surr)	*91*		*81 - 118*		*04/16/18 15:48*	*1*
Toluene-d8 (Surr)	*100*		*89 - 112*		*04/16/18 15:48*	*1*

Method: 8260B - Volatile Organic Compounds (GC/MS) - DL

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Chlorobenzene	**450**	**D**	10	5.0	2.6	ug/L		04/17/18 12:08	10
1,2-Dichlorobenzene	**850**	**D**	10	10	3.7	ug/L		04/17/18 12:08	10

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*97*		*85 - 114*		*04/17/18 12:08*	*10*
Dibromofluoromethane (Surr)	*116*		*80 - 119*		*04/17/18 12:08*	*10*
1,2-Dichloroethane-d4 (Surr)	*113*		*81 - 118*		*04/17/18 12:08*	*10*
Toluene-d8 (Surr)	*103*		*89 - 112*		*04/17/18 12:08*	*10*

Client Sample ID: 32M-DUP01_SPR18

Lab Sample ID: 680-150977-5

Date Collected: 04/09/18 14:05

Matrix: Water

Date Received: 04/12/18 09:10

Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Manganese	7900		10	3.0	1.0	ug/L		04/18/18 21:36	1

Method: 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	6.1		3.0	3.0	1.5	ug/L		04/16/18 14:30	1

Client Sample ID: Trip Blank1_040918

Lab Sample ID: 680-150977-6

Date Collected: 04/09/18 00:00

Matrix: Water

Date Received: 04/12/18 09:10

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Acetone	10	U	10	10	7.0	ug/L		04/17/18 10:20	1
Benzene	1.0	U	1.0	1.0	0.43	ug/L		04/17/18 10:20	1
Bromobenzene	1.0	U	1.0	1.0	0.50	ug/L		04/17/18 10:20	1
Bromoform	1.0	U	1.0	1.0	0.43	ug/L		04/17/18 10:20	1
Bromomethane	5.0	U	5.0	5.0	2.5	ug/L		04/17/18 10:20	1
2-Butanone (MEK)	10	U	10	10	3.4	ug/L		04/17/18 10:20	1
Carbon disulfide	2.0	U	2.0	2.0	0.43	ug/L		04/17/18 10:20	1
Carbon tetrachloride	0.50	U	1.0	0.50	0.33	ug/L		04/17/18 10:20	1
Chlorobenzene	0.50	U	1.0	0.50	0.26	ug/L		04/17/18 10:20	1
Chlorobromomethane	1.0	U	1.0	1.0	0.45	ug/L		04/17/18 10:20	1
Chlorodibromomethane	0.50	U	1.0	0.50	0.32	ug/L		04/17/18 10:20	1
Chloroethane	5.0	U	5.0	5.0	2.5	ug/L		04/17/18 10:20	1
Chloroform	1.0	U	1.0	1.0	0.50	ug/L		04/17/18 10:20	1
Chloromethane	1.0	U	1.0	1.0	0.40	ug/L		04/17/18 10:20	1
2-Chlorotoluene	0.50	U	1.0	0.50	0.27	ug/L		04/17/18 10:20	1
4-Chlorotoluene	1.0	U	1.0	1.0	0.45	ug/L		04/17/18 10:20	1
cis-1,2-Dichloroethene	1.0	U	1.0	1.0	0.41	ug/L		04/17/18 10:20	1
cis-1,3-Dichloropropene	1.0	U	1.0	1.0	0.40	ug/L		04/17/18 10:20	1
1,2-Dibromo-3-Chloropropane	2.0	U	5.0	2.0	1.1	ug/L		04/17/18 10:20	1
Dibromomethane	1.0	U	1.0	1.0	0.35	ug/L		04/17/18 10:20	1
1,2-Dichlorobenzene	1.0	U	1.0	1.0	0.37	ug/L		04/17/18 10:20	1
1,3-Dichlorobenzene	1.0	U	1.0	1.0	0.43	ug/L		04/17/18 10:20	1
1,4-Dichlorobenzene	1.0	U	1.0	1.0	0.46	ug/L		04/17/18 10:20	1
Dichlorobromomethane	1.0	U	1.0	1.0	0.44	ug/L		04/17/18 10:20	1
Dichlorodifluoromethane	1.0	U Q	1.0	1.0	0.60	ug/L		04/17/18 10:20	1
1,1-Dichloroethane	1.0	U	1.0	1.0	0.38	ug/L		04/17/18 10:20	1
1,2-Dichloroethane	1.0	U M	1.0	1.0	0.50	ug/L		04/17/18 10:20	1
1,1-Dichloroethene	1.0	U	1.0	1.0	0.36	ug/L		04/17/18 10:20	1
1,2-Dichloroethene, Total	1.0	U	2.0	1.0	0.74	ug/L		04/17/18 10:20	1
1,2-Dichloropropane	1.0	U	1.0	1.0	0.67	ug/L		04/17/18 10:20	1
1,3-Dichloropropane	1.0	U	1.0	1.0	0.34	ug/L		04/17/18 10:20	1
2,2-Dichloropropane	1.0	U	1.0	1.0	0.37	ug/L		04/17/18 10:20	1
1,1-Dichloropropene	1.0	U	1.0	1.0	0.34	ug/L		04/17/18 10:20	1
Ethylbenzene	0.50	U	1.0	0.50	0.33	ug/L		04/17/18 10:20	1
Ethylene Dibromide	1.0	U	1.0	1.0	0.44	ug/L		04/17/18 10:20	1
Hexachlorobutadiene	5.0	U	5.0	5.0	2.5	ug/L		04/17/18 10:20	1
2-Hexanone	5.0	U	10	5.0	2.0	ug/L		04/17/18 10:20	1
Isopropylbenzene	1.0	U	1.0	1.0	0.35	ug/L		04/17/18 10:20	1

Client: KOMAN Government Solutions, LLC
Project/Site: Devens / AOC32/43A Spring 2018

TestAmerica Job ID: 680-150977-1

Client Sample ID: Trip Blank1_040918
Date Collected: 04/09/18 00:00
Date Received: 04/12/18 09:10

Lab Sample ID: 680-150977-6
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
4-Isopropyltoluene	1.0	U	1.0	1.0	0.48	ug/L		04/17/18 10:20	1
Methylene Chloride	5.0	U	5.0	5.0	2.5	ug/L		04/17/18 10:20	1
4-Methyl-2-pentanone (MIBK)	5.0	U	10	5.0	2.1	ug/L		04/17/18 10:20	1
Methyl tert-butyl ether	0.50	U	10	0.50	0.30	ug/L		04/17/18 10:20	1
m-Xylene & p-Xylene	1.0	U	1.0	1.0	0.35	ug/L		04/17/18 10:20	1
Naphthalene	5.0	U	5.0	5.0	2.5	ug/L		04/17/18 10:20	1
n-Butylbenzene	1.0	U	1.0	1.0	0.47	ug/L		04/17/18 10:20	1
N-Propylbenzene	1.0	U	1.0	1.0	0.38	ug/L		04/17/18 10:20	1
o-Xylene	0.50	U	1.0	0.50	0.23	ug/L		04/17/18 10:20	1
sec-Butylbenzene	1.0	U	1.0	1.0	0.42	ug/L		04/17/18 10:20	1
Styrene	0.50	U	1.0	0.50	0.27	ug/L		04/17/18 10:20	1
tert-Butylbenzene	1.0	U	1.0	1.0	0.45	ug/L		04/17/18 10:20	1
1,1,1,2-Tetrachloroethane	1.0	U	1.0	1.0	0.37	ug/L		04/17/18 10:20	1
1,1,2,2-Tetrachloroethane	1.0	U	1.0	1.0	0.62	ug/L		04/17/18 10:20	1
Tetrachloroethene	1.0	U	1.0	1.0	0.74	ug/L		04/17/18 10:20	1
Toluene	1.0	U	1.0	1.0	0.48	ug/L		04/17/18 10:20	1
trans-1,2-Dichloroethene	1.0	U	1.0	1.0	0.37	ug/L		04/17/18 10:20	1
trans-1,3-Dichloropropene	1.0	U	1.0	1.0	0.42	ug/L		04/17/18 10:20	1
1,2,3-Trichlorobenzene	5.0	U	5.0	5.0	2.5	ug/L		04/17/18 10:20	1
1,2,4-Trichlorobenzene	5.0	U	5.0	5.0	2.5	ug/L		04/17/18 10:20	1
1,1,1-Trichloroethane	1.0	U	1.0	1.0	0.37	ug/L		04/17/18 10:20	1
1,1,2-Trichloroethane	0.50	U	1.0	0.50	0.33	ug/L		04/17/18 10:20	1
Trichloroethene	1.0	U	1.0	1.0	0.48	ug/L		04/17/18 10:20	1
Trichlorofluoromethane	1.0	U	1.0	1.0	0.42	ug/L		04/17/18 10:20	1
1,2,3-Trichloropropane	1.0	U	1.0	1.0	0.39	ug/L		04/17/18 10:20	1
1,2,4-Trimethylbenzene	1.0	U	1.0	1.0	0.47	ug/L		04/17/18 10:20	1
1,3,5-Trimethylbenzene	0.50	U	1.0	0.50	0.31	ug/L		04/17/18 10:20	1
Vinyl acetate	2.0	U	2.0	2.0	0.81	ug/L		04/17/18 10:20	1
Vinyl chloride	1.0	U	1.0	1.0	0.50	ug/L		04/17/18 10:20	1
Xylenes, Total	0.50	U	2.0	0.50	0.23	ug/L		04/17/18 10:20	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*99*		*85 - 114*		*04/17/18 10:20*	*1*
Dibromofluoromethane (Surr)	*106*		*80 - 119*		*04/17/18 10:20*	*1*
1,2-Dichloroethane-d4 (Surr)	*100*		*81 - 118*		*04/17/18 10:20*	*1*
Toluene-d8 (Surr)	*100*		*89 - 112*		*04/17/18 10:20*	*1*

Surrogate Summary

Client: KOMAN Government Solutions, LLC
Project/Site: Devens / AOC32/43A Spring 2018

TestAmerica Job ID: 680-150977-1

Method: 8260B - Volatile Organic Compounds (GC/MS)

Matrix: Water

Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)			
		BFB	DBFM	DCA	TOL
Lab Sample ID	Client Sample ID	(85-114)	(80-119)	(81-118)	(89-112)
680-150977-1	32M-01-13XBR_SPR18	98	97	91	94
680-150977-2	32M-01-14XOB_SPR18	91	99	94	102
680-150977-3	32M-01-17XBR_SPR18	95	99	94	100
680-150977-3 MS	32M-01-17XBR_SPR18	94	95	88	100
680-150977-3 MSD	32M-01-17XBR_SPR18	93	95	87	98
680-150977-4	32M-01-18XBR_SPR18	92	96	91	101
680-150977-4 - DL	32M-01-18XBR_SPR18	97	116	115	103
680-150977-5	32M-DUP01_SPR18	93	97	91	100
680-150977-5 - DL	32M-DUP01_SPR18	97	116	113	103
680-150977-6	Trip Blank1_040918	99	106	100	100
LCS 680-520101/4	Lab Control Sample	95	96	90	98
LCS 680-520250/3	Lab Control Sample	96	101	96	100
LCSD 680-520101/5	Lab Control Sample Dup	96	98	94	98
LCSD 680-520250/4	Lab Control Sample Dup	98	101	95	100
MB 680-520101/9	Method Blank	92	97	92	100
MB 680-520250/7	Method Blank	98	106	99	100

Surrogate Legend

BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
DCA = 1,2-Dichloroethane-d4 (Surr)
TOL = Toluene-d8 (Surr)

Method: 8260B - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 680-520101/9
Matrix: Water
Analysis Batch: 520101

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Acetone	10	U	10	10	7.0	ug/L		04/16/18 13:35	1
Benzene	1.0	U	1.0	1.0	0.43	ug/L		04/16/18 13:35	1
Bromobenzene	1.0	U	1.0	1.0	0.50	ug/L		04/16/18 13:35	1
Bromoform	1.0	U	1.0	1.0	0.43	ug/L		04/16/18 13:35	1
Bromomethane	5.0	U	5.0	5.0	2.5	ug/L		04/16/18 13:35	1
2-Butanone (MEK)	10	U	10	10	3.4	ug/L		04/16/18 13:35	1
Carbon disulfide	2.0	U	2.0	2.0	0.43	ug/L		04/16/18 13:35	1
Carbon tetrachloride	0.50	U	1.0	0.50	0.33	ug/L		04/16/18 13:35	1
Chlorobenzene	0.50	U	1.0	0.50	0.26	ug/L		04/16/18 13:35	1
Chlorobromomethane	1.0	U	1.0	1.0	0.45	ug/L		04/16/18 13:35	1
Chlorodibromomethane	0.50	U	1.0	0.50	0.32	ug/L		04/16/18 13:35	1
Chloroethane	5.0	U	5.0	5.0	2.5	ug/L		04/16/18 13:35	1
Chloroform	1.0	U	1.0	1.0	0.50	ug/L		04/16/18 13:35	1
Chloromethane	1.0	U	1.0	1.0	0.40	ug/L		04/16/18 13:35	1
2-Chlorotoluene	0.50	U	1.0	0.50	0.27	ug/L		04/16/18 13:35	1
4-Chlorotoluene	1.0	U	1.0	1.0	0.45	ug/L		04/16/18 13:35	1
cis-1,2-Dichloroethene	1.0	U	1.0	1.0	0.41	ug/L		04/16/18 13:35	1
cis-1,3-Dichloropropene	1.0	U	1.0	1.0	0.40	ug/L		04/16/18 13:35	1
1,2-Dibromo-3-Chloropropane	2.0	U	5.0	2.0	1.1	ug/L		04/16/18 13:35	1
Dibromomethane	1.0	U	1.0	1.0	0.35	ug/L		04/16/18 13:35	1
1,2-Dichlorobenzene	1.0	U	1.0	1.0	0.37	ug/L		04/16/18 13:35	1
1,3-Dichlorobenzene	1.0	U	1.0	1.0	0.43	ug/L		04/16/18 13:35	1
1,4-Dichlorobenzene	1.0	U	1.0	1.0	0.46	ug/L		04/16/18 13:35	1
Dichlorobromomethane	1.0	U	1.0	1.0	0.44	ug/L		04/16/18 13:35	1
Dichlorodifluoromethane	1.0	U	1.0	1.0	0.60	ug/L		04/16/18 13:35	1
1,1-Dichloroethane	1.0	U	1.0	1.0	0.38	ug/L		04/16/18 13:35	1
1,2-Dichloroethane	1.0	U M	1.0	1.0	0.50	ug/L		04/16/18 13:35	1
1,1-Dichloroethene	1.0	U	1.0	1.0	0.36	ug/L		04/16/18 13:35	1
1,2-Dichloroethene, Total	1.0	U	2.0	1.0	0.74	ug/L		04/16/18 13:35	1
1,2-Dichloropropane	1.0	U	1.0	1.0	0.67	ug/L		04/16/18 13:35	1
1,3-Dichloropropane	1.0	U	1.0	1.0	0.34	ug/L		04/16/18 13:35	1
2,2-Dichloropropane	1.0	U	1.0	1.0	0.37	ug/L		04/16/18 13:35	1
1,1-Dichloropropene	1.0	U	1.0	1.0	0.34	ug/L		04/16/18 13:35	1
Ethylbenzene	0.50	U	1.0	0.50	0.33	ug/L		04/16/18 13:35	1
Ethylene Dibromide	1.0	U	1.0	1.0	0.44	ug/L		04/16/18 13:35	1
Hexachlorobutadiene	5.0	U	5.0	5.0	2.5	ug/L		04/16/18 13:35	1
2-Hexanone	5.0	U	10	5.0	2.0	ug/L		04/16/18 13:35	1
Isopropylbenzene	1.0	U	1.0	1.0	0.35	ug/L		04/16/18 13:35	1
4-Isopropyltoluene	1.0	U	1.0	1.0	0.48	ug/L		04/16/18 13:35	1
Methylene Chloride	5.0	U	5.0	5.0	2.5	ug/L		04/16/18 13:35	1
4-Methyl-2-pentanone (MIBK)	5.0	U	10	5.0	2.1	ug/L		04/16/18 13:35	1
Methyl tert-butyl ether	0.50	U	10	0.50	0.30	ug/L		04/16/18 13:35	1
m-Xylene & p-Xylene	1.0	U	1.0	1.0	0.35	ug/L		04/16/18 13:35	1
Naphthalene	5.0	U	5.0	5.0	2.5	ug/L		04/16/18 13:35	1
n-Butylbenzene	1.0	U	1.0	1.0	0.47	ug/L		04/16/18 13:35	1
N-Propylbenzene	1.0	U	1.0	1.0	0.38	ug/L		04/16/18 13:35	1
o-Xylene	0.50	U	1.0	0.50	0.23	ug/L		04/16/18 13:35	1
sec-Butylbenzene	1.0	U	1.0	1.0	0.42	ug/L		04/16/18 13:35	1

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 680-520101/9
Matrix: Water
Analysis Batch: 520101

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Styrene	0.50	U	1.0	0.50	0.27	ug/L		04/16/18 13:35	1
tert-Butylbenzene	1.0	U	1.0	1.0	0.45	ug/L		04/16/18 13:35	1
1,1,1,2-Tetrachloroethane	1.0	U	1.0	1.0	0.37	ug/L		04/16/18 13:35	1
1,1,2,2-Tetrachloroethane	1.0	U	1.0	1.0	0.62	ug/L		04/16/18 13:35	1
Tetrachloroethene	1.0	U	1.0	1.0	0.74	ug/L		04/16/18 13:35	1
Toluene	1.0	U	1.0	1.0	0.48	ug/L		04/16/18 13:35	1
trans-1,2-Dichloroethene	1.0	U	1.0	1.0	0.37	ug/L		04/16/18 13:35	1
trans-1,3-Dichloropropene	1.0	U	1.0	1.0	0.42	ug/L		04/16/18 13:35	1
1,2,3-Trichlorobenzene	5.0	U	5.0	5.0	2.5	ug/L		04/16/18 13:35	1
1,2,4-Trichlorobenzene	5.0	U	5.0	5.0	2.5	ug/L		04/16/18 13:35	1
1,1,1-Trichloroethane	1.0	U	1.0	1.0	0.37	ug/L		04/16/18 13:35	1
1,1,2-Trichloroethane	0.50	U	1.0	0.50	0.33	ug/L		04/16/18 13:35	1
Trichloroethene	1.0	U	1.0	1.0	0.48	ug/L		04/16/18 13:35	1
Trichlorofluoromethane	1.0	U	1.0	1.0	0.42	ug/L		04/16/18 13:35	1
1,2,3-Trichloropropane	1.0	U	1.0	1.0	0.39	ug/L		04/16/18 13:35	1
1,2,4-Trimethylbenzene	1.0	U	1.0	1.0	0.47	ug/L		04/16/18 13:35	1
1,3,5-Trimethylbenzene	0.50	U	1.0	0.50	0.31	ug/L		04/16/18 13:35	1
Vinyl acetate	2.0	U	2.0	2.0	0.81	ug/L		04/16/18 13:35	1
Vinyl chloride	1.0	U	1.0	1.0	0.50	ug/L		04/16/18 13:35	1
Xylenes, Total	0.50	U	2.0	0.50	0.23	ug/L		04/16/18 13:35	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*92*		*85 - 114*		*04/16/18 13:35*	*1*
Dibromofluoromethane (Surr)	*97*		*80 - 119*		*04/16/18 13:35*	*1*
1,2-Dichloroethane-d4 (Surr)	*92*		*81 - 118*		*04/16/18 13:35*	*1*
Toluene-d8 (Surr)	*100*		*89 - 112*		*04/16/18 13:35*	*1*

Lab Sample ID: LCS 680-520101/4
Matrix: Water
Analysis Batch: 520101

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Acetone	250	246		ug/L		98	39 - 160
Benzene	50.0	48.4		ug/L		97	79 - 120
Bromobenzene	50.0	50.3		ug/L		101	80 - 120
Bromoform	50.0	52.7		ug/L		105	66 - 130
Bromomethane	50.0	59.5		ug/L		119	53 - 141
2-Butanone (MEK)	250	239		ug/L		96	56 - 143
Carbon disulfide	50.0	51.7		ug/L		103	64 - 133
Carbon tetrachloride	50.0	49.0		ug/L		98	72 - 136
Chlorobenzene	50.0	49.8		ug/L		100	82 - 118
Chlorobromomethane	50.0	47.1		ug/L		94	78 - 123
Chlorodibromomethane	50.0	53.4		ug/L		107	74 - 126
Chloroethane	50.0	53.0		ug/L		106	60 - 138
Chloroform	50.0	47.5		ug/L		95	79 - 124
Chloromethane	50.0	53.9	M	ug/L		108	50 - 139
2-Chlorotoluene	50.0	50.6		ug/L		101	79 - 122
4-Chlorotoluene	50.0	51.4		ug/L		103	78 - 122

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 680-520101/4
Matrix: Water
Analysis Batch: 520101

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
cis-1,2-Dichloroethene	50.0	48.7		ug/L		97	78 - 123
cis-1,3-Dichloropropene	50.0	52.6		ug/L		105	75 - 124
1,2-Dibromo-3-Chloropropane	50.0	48.5		ug/L		97	62 - 128
Dibromomethane	50.0	46.6		ug/L		93	79 - 123
1,2-Dichlorobenzene	50.0	47.4		ug/L		95	80 - 119
1,3-Dichlorobenzene	50.0	49.4		ug/L		99	80 - 119
1,4-Dichlorobenzene	50.0	49.5		ug/L		99	79 - 118
Dichlorobromomethane	50.0	49.5		ug/L		99	79 - 125
Dichlorodifluoromethane	50.0	52.0		ug/L		104	32 - 152
1,1-Dichloroethane	50.0	49.1		ug/L		98	77 - 125
1,2-Dichloroethane	50.0	46.3		ug/L		93	73 - 128
1,1-Dichloroethene	50.0	51.0		ug/L		102	71 - 131
1,2-Dichloroethene, Total	100	95.8		ug/L		96	79 - 121
1,2-Dichloropropane	50.0	49.4		ug/L		99	78 - 122
1,3-Dichloropropane	50.0	50.4		ug/L		101	80 - 119
2,2-Dichloropropane	50.0	50.9		ug/L		102	60 - 139
1,1-Dichloropropene	50.0	49.2		ug/L		98	79 - 125
Ethylbenzene	50.0	50.7		ug/L		101	79 - 121
Ethylene Dibromide	50.0	51.0		ug/L		102	75 - 127
Hexachlorobutadiene	50.0	53.5		ug/L		107	66 - 134
2-Hexanone	250	261		ug/L		104	57 - 139
Isopropylbenzene	50.0	51.3		ug/L		103	72 - 131
4-Isopropyltoluene	50.0	51.8		ug/L		104	77 - 127
Methylene Chloride	50.0	49.4		ug/L		99	74 - 124
4-Methyl-2-pentanone (MIBK)	250	263		ug/L		105	67 - 130
Methyl tert-butyl ether	50.0	47.9		ug/L		96	71 - 124
m-Xylene & p-Xylene	50.0	51.3		ug/L		103	80 - 121
Naphthalene	50.0	56.3		ug/L		113	61 - 128
n-Butylbenzene	50.0	51.4		ug/L		103	75 - 128
N-Propylbenzene	50.0	51.6		ug/L		103	76 - 126
o-Xylene	50.0	51.3		ug/L		103	78 - 122
sec-Butylbenzene	50.0	51.5		ug/L		103	77 - 126
Styrene	50.0	52.3		ug/L		105	78 - 123
tert-Butylbenzene	50.0	51.3		ug/L		103	78 - 124
1,1,1,2-Tetrachloroethane	50.0	52.2		ug/L		104	78 - 124
1,1,2,2-Tetrachloroethane	50.0	47.4		ug/L		95	71 - 121
Tetrachloroethene	50.0	52.6		ug/L		105	74 - 129
Toluene	50.0	51.9		ug/L		104	80 - 121
trans-1,2-Dichloroethene	50.0	47.1		ug/L		94	75 - 124
trans-1,3-Dichloropropene	50.0	53.8		ug/L		108	73 - 127
1,2,3-Trichlorobenzene	50.0	53.1		ug/L		106	69 - 129
1,2,4-Trichlorobenzene	50.0	49.0		ug/L		98	69 - 130
1,1,1-Trichloroethane	50.0	48.4		ug/L		97	74 - 131
1,1,2-Trichloroethane	50.0	51.5		ug/L		103	80 - 119
Trichloroethene	50.0	48.7		ug/L		97	79 - 123
Trichlorofluoromethane	50.0	52.9		ug/L		106	65 - 141
1,2,3-Trichloropropane	50.0	46.5		ug/L		93	73 - 122
1,2,4-Trimethylbenzene	50.0	51.3		ug/L		103	76 - 124

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 680-520101/4
Matrix: Water
Analysis Batch: 520101

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,3,5-Trimethylbenzene	50.0	52.3		ug/L		105	75 - 124
Vinyl acetate	100	107		ug/L		107	54 - 146
Vinyl chloride	50.0	50.0		ug/L		100	58 - 137
Xylenes, Total	100	103		ug/L		103	79 - 121

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*95*		*85 - 114*
Dibromofluoromethane (Surr)	*96*		*80 - 119*
1,2-Dichloroethane-d4 (Surr)	*90*		*81 - 118*
Toluene-d8 (Surr)	*98*		*89 - 112*

Lab Sample ID: LCSD 680-520101/5
Matrix: Water
Analysis Batch: 520101

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Acetone	250	261		ug/L		104	39 - 160	6	20
Benzene	50.0	48.7		ug/L		97	79 - 120	1	20
Bromobenzene	50.0	51.5		ug/L		103	80 - 120	2	20
Bromoform	50.0	54.7		ug/L		109	66 - 130	4	20
Bromomethane	50.0	60.5		ug/L		121	53 - 141	2	20
2-Butanone (MEK)	250	250		ug/L		100	56 - 143	4	20
Carbon disulfide	50.0	51.1		ug/L		102	64 - 133	1	20
Carbon tetrachloride	50.0	48.0		ug/L		96	72 - 136	2	20
Chlorobenzene	50.0	49.1		ug/L		98	82 - 118	1	20
Chlorobromomethane	50.0	49.1		ug/L		98	78 - 123	4	20
Chlorodibromomethane	50.0	56.7		ug/L		113	74 - 126	6	20
Chloroethane	50.0	52.4		ug/L		105	60 - 138	1	20
Chloroform	50.0	48.4		ug/L		97	79 - 124	2	20
Chloromethane	50.0	52.0		ug/L		104	50 - 139	4	20
2-Chlorotoluene	50.0	50.3		ug/L		101	79 - 122	1	20
4-Chlorotoluene	50.0	50.5		ug/L		101	78 - 122	2	20
cis-1,2-Dichloroethene	50.0	49.2		ug/L		98	78 - 123	1	20
cis-1,3-Dichloropropene	50.0	57.1		ug/L		114	75 - 124	8	20
1,2-Dibromo-3-Chloropropane	50.0	50.0		ug/L		100	62 - 128	3	20
Dibromomethane	50.0	49.9		ug/L		100	79 - 123	7	20
1,2-Dichlorobenzene	50.0	49.2		ug/L		98	80 - 119	4	20
1,3-Dichlorobenzene	50.0	50.2		ug/L		100	80 - 119	2	20
1,4-Dichlorobenzene	50.0	49.7		ug/L		99	79 - 118	0	20
Dichlorobromomethane	50.0	52.6		ug/L		105	79 - 125	6	20
Dichlorodifluoromethane	50.0	49.4		ug/L		99	32 - 152	5	20
1,1-Dichloroethane	50.0	49.5		ug/L		99	77 - 125	1	20
1,2-Dichloroethane	50.0	49.0		ug/L		98	73 - 128	6	20
1,1-Dichloroethene	50.0	51.6		ug/L		103	71 - 131	1	20
1,2-Dichloroethene, Total	100	99.7		ug/L		100	79 - 121	4	20
1,2-Dichloropropane	50.0	51.6		ug/L		103	78 - 122	4	20
1,3-Dichloropropane	50.0	53.5		ug/L		107	80 - 119	6	20
2,2-Dichloropropane	50.0	50.3		ug/L		101	60 - 139	1	20

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCSD 680-520101/5
Matrix: Water
Analysis Batch: 520101

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1-Dichloropropene			50.0	48.8		ug/L		98	79 - 125	1	20
Ethylbenzene			50.0	49.5		ug/L		99	79 - 121	2	20
Ethylene Dibromide			50.0	52.3		ug/L		105	75 - 127	3	20
Hexachlorobutadiene			50.0	51.5		ug/L		103	66 - 134	4	20
2-Hexanone			250	272		ug/L		109	57 - 139	4	20
Isopropylbenzene			50.0	50.0		ug/L		100	72 - 131	3	20
4-Isopropyltoluene			50.0	50.8		ug/L		102	77 - 127	2	20
Methylene Chloride			50.0	53.1		ug/L		106	74 - 124	7	20
4-Methyl-2-pentanone (MIBK)			250	268		ug/L		107	67 - 130	2	20
Methyl tert-butyl ether			50.0	53.0		ug/L		106	71 - 124	10	20
m-Xylene & p-Xylene			50.0	50.0		ug/L		100	80 - 121	2	20
Naphthalene			50.0	58.9		ug/L		118	61 - 128	5	20
n-Butylbenzene			50.0	50.7		ug/L		101	75 - 128	1	20
N-Propylbenzene			50.0	51.1		ug/L		102	76 - 126	1	20
o-Xylene			50.0	50.8		ug/L		102	78 - 122	1	20
sec-Butylbenzene			50.0	49.7		ug/L		99	77 - 126	4	20
Styrene			50.0	52.9		ug/L		106	78 - 123	1	20
tert-Butylbenzene			50.0	50.0		ug/L		100	78 - 124	3	20
1,1,1,2-Tetrachloroethane			50.0	52.4		ug/L		105	78 - 124	0	20
1,1,2,2-Tetrachloroethane			50.0	50.7		ug/L		101	71 - 121	7	20
Tetrachloroethene			50.0	50.7		ug/L		101	74 - 129	4	20
Toluene			50.0	53.1		ug/L		106	80 - 121	2	20
trans-1,2-Dichloroethene			50.0	50.4		ug/L		101	75 - 124	7	20
trans-1,3-Dichloropropene			50.0	57.0		ug/L		114	73 - 127	6	20
1,2,3-Trichlorobenzene			50.0	56.7		ug/L		113	69 - 129	7	20
1,2,4-Trichlorobenzene			50.0	50.4		ug/L		101	69 - 130	3	20
1,1,1-Trichloroethane			50.0	47.6		ug/L		95	74 - 131	2	20
1,1,2-Trichloroethane			50.0	53.5		ug/L		107	80 - 119	4	20
Trichloroethene			50.0	48.7		ug/L		97	79 - 123	0	20
Trichlorofluoromethane			50.0	51.8		ug/L		104	65 - 141	2	20
1,2,3-Trichloropropane			50.0	50.3		ug/L		101	73 - 122	8	20
1,2,4-Trimethylbenzene			50.0	50.1		ug/L		100	76 - 124	2	20
1,3,5-Trimethylbenzene			50.0	51.3		ug/L		103	75 - 124	2	20
Vinyl acetate			100	113		ug/L		113	54 - 146	6	20
Vinyl chloride			50.0	48.5		ug/L		97	58 - 137	3	20
Xylenes, Total			100	101		ug/L		101	79 - 121	2	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*96*		*85 - 114*
Dibromofluoromethane (Surr)	*98*		*80 - 119*
1,2-Dichloroethane-d4 (Surr)	*94*		*81 - 118*
Toluene-d8 (Surr)	*98*		*89 - 112*

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 680-150977-3 MS
Matrix: Water
Analysis Batch: 520101

Client Sample ID: 32M-01-17XBR_SPR18
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Acetone	10	U	250	252		ug/L		101	39 - 160
Benzene	1.0	U	50.0	47.8		ug/L		96	79 - 120
Bromobenzene	1.0	U	50.0	50.6		ug/L		101	80 - 120
Bromoform	1.0	U	50.0	51.8		ug/L		104	66 - 130
Bromomethane	5.0	U	50.0	48.8		ug/L		98	53 - 141
2-Butanone (MEK)	10	U	250	226		ug/L		90	56 - 143
Carbon disulfide	2.0	U	50.0	54.2		ug/L		108	64 - 133
Carbon tetrachloride	0.50	U	50.0	49.4		ug/L		99	72 - 136
Chlorobenzene	0.50	U	50.0	49.4		ug/L		99	82 - 118
Chlorobromomethane	1.0	U	50.0	47.3		ug/L		95	78 - 123
Chlorodibromomethane	0.50	U	50.0	49.7		ug/L		99	74 - 126
Chloroethane	5.0	U	50.0	54.2		ug/L		108	60 - 138
Chloroform	1.0	U	50.0	46.5		ug/L		93	79 - 124
Chloromethane	1.0	U	50.0	57.4	M	ug/L		115	50 - 139
2-Chlorotoluene	0.50	U	50.0	50.1		ug/L		100	79 - 122
4-Chlorotoluene	1.0	U	50.0	50.7		ug/L		101	78 - 122
cis-1,2-Dichloroethene	1.0	U	50.0	46.4		ug/L		93	78 - 123
cis-1,3-Dichloropropene	1.0	U	50.0	47.9		ug/L		96	75 - 124
1,2-Dibromo-3-Chloropropane	2.0	U	50.0	46.0		ug/L		92	62 - 128
Dibromomethane	1.0	U	50.0	44.9		ug/L		90	79 - 123
1,2-Dichlorobenzene	1.0	U	50.0	47.9		ug/L		96	80 - 119
1,3-Dichlorobenzene	1.0	U	50.0	49.2		ug/L		98	80 - 119
1,4-Dichlorobenzene	1.0	U	50.0	48.0		ug/L		96	79 - 118
Dichlorobromomethane	1.0	U	50.0	48.3		ug/L		97	79 - 125
Dichlorodifluoromethane	1.0	U	50.0	57.7		ug/L		115	32 - 152
1,1-Dichloroethane	1.0	U	50.0	48.4		ug/L		97	77 - 125
1,2-Dichloroethane	1.0	U M	50.0	45.1		ug/L		90	73 - 128
1,1-Dichloroethene	1.0	U	50.0	55.6		ug/L		111	71 - 131
1,2-Dichloroethene, Total	1.0	U	100	95.0		ug/L		95	79 - 121
1,2-Dichloropropane	1.0	U	50.0	49.1		ug/L		98	78 - 122
1,3-Dichloropropane	1.0	U	50.0	47.6		ug/L		95	80 - 119
2,2-Dichloropropane	1.0	U	50.0	39.5		ug/L		79	60 - 139
1,1-Dichloropropene	1.0	U	50.0	49.9		ug/L		100	79 - 125
Ethylbenzene	0.50	U	50.0	50.4		ug/L		101	79 - 121
Ethylene Dibromide	1.0	U	50.0	46.8		ug/L		94	75 - 127
Hexachlorobutadiene	5.0	U	50.0	45.1		ug/L		90	66 - 134
2-Hexanone	5.0	U	250	244		ug/L		98	57 - 139
Isopropylbenzene	1.0	U	50.0	52.4		ug/L		105	72 - 131
4-Isopropyltoluene	1.0	U	50.0	51.4		ug/L		103	77 - 127
Methylene Chloride	5.0	U	50.0	47.7		ug/L		95	74 - 124
4-Methyl-2-pentanone (MIBK)	5.0	U	250	242		ug/L		97	67 - 130
Methyl tert-butyl ether	0.50	U	50.0	46.7		ug/L		93	71 - 124
m-Xylene & p-Xylene	1.0	U	50.0	51.0		ug/L		102	80 - 121
Naphthalene	5.0	U J1	50.0	45.3		ug/L		91	61 - 128
n-Butylbenzene	1.0	U	50.0	50.2		ug/L		100	75 - 128
N-Propylbenzene	1.0	U	50.0	51.5		ug/L		103	76 - 126
o-Xylene	0.50	U	50.0	50.6		ug/L		101	78 - 122
sec-Butylbenzene	1.0	U	50.0	51.5		ug/L		103	77 - 126

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 680-150977-3 MS
Matrix: Water
Analysis Batch: 520101

Client Sample ID: 32M-01-17XBR_SPR18
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Styrene	0.50	U	50.0	51.7		ug/L		103	78 - 123
tert-Butylbenzene	1.0	U	50.0	51.9		ug/L		104	78 - 124
1,1,1,2-Tetrachloroethane	1.0	U	50.0	50.8		ug/L		102	78 - 124
1,1,2,2-Tetrachloroethane	1.0	U	50.0	47.9		ug/L		96	71 - 121
Tetrachloroethene	1.0	U	50.0	48.8		ug/L		98	74 - 129
Toluene	1.0	U	50.0	49.5		ug/L		99	80 - 121
trans-1,2-Dichloroethene	1.0	U	50.0	48.5		ug/L		97	75 - 124
trans-1,3-Dichloropropene	1.0	U	50.0	47.4		ug/L		95	73 - 127
1,2,3-Trichlorobenzene	5.0	U J1	50.0	38.4		ug/L		77	69 - 129
1,2,4-Trichlorobenzene	5.0	U	50.0	42.0		ug/L		84	69 - 130
1,1,1-Trichloroethane	1.0	U	50.0	48.7		ug/L		97	74 - 131
1,1,2-Trichloroethane	0.50	U	50.0	47.5		ug/L		95	80 - 119
Trichloroethene	1.0	U	50.0	48.4		ug/L		97	79 - 123
Trichlorofluoromethane	1.0	U	50.0	58.3		ug/L		117	65 - 141
1,2,3-Trichloropropane	1.0	U	50.0	46.4		ug/L		93	73 - 122
1,2,4-Trimethylbenzene	1.0	U	50.0	51.2		ug/L		102	76 - 124
1,3,5-Trimethylbenzene	0.50	U	50.0	51.7		ug/L		103	75 - 124
Vinyl acetate	2.0	U	100	89.4		ug/L		89	54 - 146
Vinyl chloride	1.0	U	50.0	54.3		ug/L		109	58 - 137
Xylenes, Total	0.50	U	100	102		ug/L		102	79 - 121

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*94*		*85 - 114*
Dibromofluoromethane (Surr)	*95*		*80 - 119*
1,2-Dichloroethane-d4 (Surr)	*88*		*81 - 118*
Toluene-d8 (Surr)	*100*		*89 - 112*

Lab Sample ID: 680-150977-3 MSD
Matrix: Water
Analysis Batch: 520101

Client Sample ID: 32M-01-17XBR_SPR18
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Acetone	10	U	250	250		ug/L		100	39 - 160	1	20
Benzene	1.0	U	50.0	47.5		ug/L		95	79 - 120	1	20
Bromobenzene	1.0	U	50.0	49.0		ug/L		98	80 - 120	3	20
Bromoform	1.0	U	50.0	51.2		ug/L		102	66 - 130	1	20
Bromomethane	5.0	U	50.0	56.0		ug/L		112	53 - 141	14	20
2-Butanone (MEK)	10	U	250	222		ug/L		89	56 - 143	2	20
Carbon disulfide	2.0	U	50.0	54.0		ug/L		108	64 - 133	0	20
Carbon tetrachloride	0.50	U	50.0	49.0		ug/L		98	72 - 136	1	20
Chlorobenzene	0.50	U	50.0	48.7		ug/L		97	82 - 118	1	20
Chlorobromomethane	1.0	U	50.0	46.5		ug/L		93	78 - 123	2	20
Chlorodibromomethane	0.50	U	50.0	49.2		ug/L		98	74 - 126	1	20
Chloroethane	5.0	U	50.0	55.6		ug/L		111	60 - 138	3	20
Chloroform	1.0	U	50.0	46.5		ug/L		93	79 - 124	0	20
Chloromethane	1.0	U	50.0	57.3	M	ug/L		115	50 - 139	0	20
2-Chlorotoluene	0.50	U	50.0	49.1		ug/L		98	79 - 122	2	20
4-Chlorotoluene	1.0	U	50.0	48.6		ug/L		97	78 - 122	4	20

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 680-150977-3 MSD
Matrix: Water
Analysis Batch: 520101

Client Sample ID: 32M-01-17XBR_SPR18
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
cis-1,2-Dichloroethene	1.0	U	50.0	46.7		ug/L		93	78 - 123	1	20
cis-1,3-Dichloropropene	1.0	U	50.0	47.6		ug/L		95	75 - 124	1	20
1,2-Dibromo-3-Chloropropane	2.0	U	50.0	49.8		ug/L		100	62 - 128	8	20
Dibromomethane	1.0	U	50.0	44.8		ug/L		90	79 - 123	0	20
1,2-Dichlorobenzene	1.0	U	50.0	48.2		ug/L		96	80 - 119	1	20
1,3-Dichlorobenzene	1.0	U	50.0	49.3		ug/L		99	80 - 119	0	20
1,4-Dichlorobenzene	1.0	U	50.0	48.2		ug/L		96	79 - 118	0	20
Dichlorobromomethane	1.0	U	50.0	48.2		ug/L		96	79 - 125	0	20
Dichlorodifluoromethane	1.0	U	50.0	54.1		ug/L		108	32 - 152	6	20
1,1-Dichloroethane	1.0	U	50.0	49.4		ug/L		99	77 - 125	2	20
1,2-Dichloroethane	1.0	U M	50.0	44.4		ug/L		89	73 - 128	1	20
1,1-Dichloroethene	1.0	U	50.0	55.8		ug/L		112	71 - 131	0	20
1,2-Dichloroethene, Total	1.0	U	100	97.5		ug/L		97	79 - 121	3	20
1,2-Dichloropropane	1.0	U	50.0	48.4		ug/L		97	78 - 122	2	20
1,3-Dichloropropane	1.0	U	50.0	46.5		ug/L		93	80 - 119	2	20
2,2-Dichloropropane	1.0	U	50.0	39.3		ug/L		79	60 - 139	1	20
1,1-Dichloropropene	1.0	U	50.0	49.2		ug/L		98	79 - 125	1	20
Ethylbenzene	0.50	U	50.0	49.6		ug/L		99	79 - 121	2	20
Ethylene Dibromide	1.0	U	50.0	46.4		ug/L		93	75 - 127	1	20
Hexachlorobutadiene	5.0	U	50.0	50.0		ug/L		100	66 - 134	10	20
2-Hexanone	5.0	U	250	235		ug/L		94	57 - 139	4	20
Isopropylbenzene	1.0	U	50.0	51.4		ug/L		103	72 - 131	2	20
4-Isopropyltoluene	1.0	U	50.0	51.2		ug/L		102	77 - 127	1	20
Methylene Chloride	5.0	U	50.0	52.6		ug/L		105	74 - 124	10	20
4-Methyl-2-pentanone (MIBK)	5.0	U	250	233		ug/L		93	67 - 130	4	20
Methyl tert-butyl ether	0.50	U	50.0	51.1		ug/L		102	71 - 124	9	20
m-Xylene & p-Xylene	1.0	U	50.0	50.0		ug/L		100	80 - 121	2	20
Naphthalene	5.0	U J1	50.0	57.9	J1	ug/L		116	61 - 128	24	20
n-Butylbenzene	1.0	U	50.0	49.1		ug/L		98	75 - 128	2	20
N-Propylbenzene	1.0	U	50.0	50.0		ug/L		100	76 - 126	3	20
o-Xylene	0.50	U	50.0	50.5		ug/L		101	78 - 122	0	20
sec-Butylbenzene	1.0	U	50.0	51.5		ug/L		103	77 - 126	0	20
Styrene	0.50	U	50.0	51.1		ug/L		102	78 - 123	1	20
tert-Butylbenzene	1.0	U	50.0	53.4		ug/L		107	78 - 124	3	20
1,1,1,2-Tetrachloroethane	1.0	U	50.0	50.8		ug/L		102	78 - 124	0	20
1,1,2,2-Tetrachloroethane	1.0	U	50.0	47.8		ug/L		96	71 - 121	0	20
Tetrachloroethene	1.0	U	50.0	47.9		ug/L		96	74 - 129	2	20
Toluene	1.0	U	50.0	48.8		ug/L		98	80 - 121	1	20
trans-1,2-Dichloroethene	1.0	U	50.0	50.8		ug/L		102	75 - 124	4	20
trans-1,3-Dichloropropene	1.0	U	50.0	47.3		ug/L		95	73 - 127	0	20
1,2,3-Trichlorobenzene	5.0	U J1	50.0	52.3	J1	ug/L		105	69 - 129	31	20
1,2,4-Trichlorobenzene	5.0	U	50.0	47.7		ug/L		95	69 - 130	13	20
1,1,1-Trichloroethane	1.0	U	50.0	48.1		ug/L		96	74 - 131	1	20
1,1,2-Trichloroethane	0.50	U	50.0	46.2		ug/L		92	80 - 119	3	20
Trichloroethene	1.0	U	50.0	47.8		ug/L		96	79 - 123	1	20
Trichlorofluoromethane	1.0	U	50.0	57.5		ug/L		115	65 - 141	1	20
1,2,3-Trichloropropane	1.0	U	50.0	45.1		ug/L		90	73 - 122	3	20
1,2,4-Trimethylbenzene	1.0	U	50.0	52.5		ug/L		105	76 - 124	2	20

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 680-150977-3 MSD
Matrix: Water
Analysis Batch: 520101

Client Sample ID: 32M-01-17XBR_SPR18
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,3,5-Trimethylbenzene	0.50	U	50.0	50.8		ug/L		102	75 - 124	2	20
Vinyl acetate	2.0	U	100	91.7		ug/L		92	54 - 146	3	20
Vinyl chloride	1.0	U	50.0	53.7		ug/L		107	58 - 137	1	20
Xylenes, Total	0.50	U	100	101		ug/L		101	79 - 121	1	20

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*93*		*85 - 114*
Dibromofluoromethane (Surr)	*95*		*80 - 119*
1,2-Dichloroethane-d4 (Surr)	*87*		*81 - 118*
Toluene-d8 (Surr)	*98*		*89 - 112*

Lab Sample ID: MB 680-520250/7
Matrix: Water
Analysis Batch: 520250

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Acetone	10	U	10	10	7.0	ug/L		04/17/18 09:58	1
Benzene	1.0	U	1.0	1.0	0.43	ug/L		04/17/18 09:58	1
Bromobenzene	1.0	U	1.0	1.0	0.50	ug/L		04/17/18 09:58	1
Bromoform	1.0	U	1.0	1.0	0.43	ug/L		04/17/18 09:58	1
Bromomethane	5.0	U	5.0	5.0	2.5	ug/L		04/17/18 09:58	1
2-Butanone (MEK)	10	U	10	10	3.4	ug/L		04/17/18 09:58	1
Carbon disulfide	2.0	U	2.0	2.0	0.43	ug/L		04/17/18 09:58	1
Carbon tetrachloride	0.50	U	1.0	0.50	0.33	ug/L		04/17/18 09:58	1
Chlorobenzene	0.50	U	1.0	0.50	0.26	ug/L		04/17/18 09:58	1
Chlorobromomethane	1.0	U	1.0	1.0	0.45	ug/L		04/17/18 09:58	1
Chlorodibromomethane	0.50	U	1.0	0.50	0.32	ug/L		04/17/18 09:58	1
Chloroethane	5.0	U	5.0	5.0	2.5	ug/L		04/17/18 09:58	1
Chloroform	1.0	U	1.0	1.0	0.50	ug/L		04/17/18 09:58	1
Chloromethane	1.0	U	1.0	1.0	0.40	ug/L		04/17/18 09:58	1
2-Chlorotoluene	0.50	U	1.0	0.50	0.27	ug/L		04/17/18 09:58	1
4-Chlorotoluene	1.0	U	1.0	1.0	0.45	ug/L		04/17/18 09:58	1
cis-1,2-Dichloroethene	1.0	U	1.0	1.0	0.41	ug/L		04/17/18 09:58	1
cis-1,3-Dichloropropene	1.0	U	1.0	1.0	0.40	ug/L		04/17/18 09:58	1
1,2-Dibromo-3-Chloropropane	2.0	U	5.0	2.0	1.1	ug/L		04/17/18 09:58	1
Dibromomethane	1.0	U	1.0	1.0	0.35	ug/L		04/17/18 09:58	1
1,2-Dichlorobenzene	1.0	U	1.0	1.0	0.37	ug/L		04/17/18 09:58	1
1,3-Dichlorobenzene	1.0	U	1.0	1.0	0.43	ug/L		04/17/18 09:58	1
1,4-Dichlorobenzene	1.0	U	1.0	1.0	0.46	ug/L		04/17/18 09:58	1
Dichlorobromomethane	1.0	U	1.0	1.0	0.44	ug/L		04/17/18 09:58	1
Dichlorodifluoromethane	1.0	U	1.0	1.0	0.60	ug/L		04/17/18 09:58	1
1,1-Dichloroethane	1.0	U	1.0	1.0	0.38	ug/L		04/17/18 09:58	1
1,2-Dichloroethane	1.0	U M	1.0	1.0	0.50	ug/L		04/17/18 09:58	1
1,1-Dichloroethene	1.0	U	1.0	1.0	0.36	ug/L		04/17/18 09:58	1
1,2-Dichloroethene, Total	1.0	U	2.0	1.0	0.74	ug/L		04/17/18 09:58	1
1,2-Dichloropropane	1.0	U	1.0	1.0	0.67	ug/L		04/17/18 09:58	1
1,3-Dichloropropane	1.0	U	1.0	1.0	0.34	ug/L		04/17/18 09:58	1
2,2-Dichloropropane	1.0	U	1.0	1.0	0.37	ug/L		04/17/18 09:58	1

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 680-520250/7
Matrix: Water
Analysis Batch: 520250

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
1,1-Dichloropropene	1.0	U	1.0	1.0	0.34	ug/L		04/17/18 09:58	1
Ethylbenzene	0.50	U	1.0	0.50	0.33	ug/L		04/17/18 09:58	1
Ethylene Dibromide	1.0	U	1.0	1.0	0.44	ug/L		04/17/18 09:58	1
Hexachlorobutadiene	5.0	U	5.0	5.0	2.5	ug/L		04/17/18 09:58	1
2-Hexanone	5.0	U	10	5.0	2.0	ug/L		04/17/18 09:58	1
Isopropylbenzene	1.0	U	1.0	1.0	0.35	ug/L		04/17/18 09:58	1
4-Isopropyltoluene	1.0	U	1.0	1.0	0.48	ug/L		04/17/18 09:58	1
Methylene Chloride	5.0	U	5.0	5.0	2.5	ug/L		04/17/18 09:58	1
4-Methyl-2-pentanone (MIBK)	5.0	U	10	5.0	2.1	ug/L		04/17/18 09:58	1
Methyl tert-butyl ether	0.50	U	10	0.50	0.30	ug/L		04/17/18 09:58	1
m-Xylene & p-Xylene	1.0	U	1.0	1.0	0.35	ug/L		04/17/18 09:58	1
Naphthalene	5.0	U	5.0	5.0	2.5	ug/L		04/17/18 09:58	1
n-Butylbenzene	1.0	U	1.0	1.0	0.47	ug/L		04/17/18 09:58	1
N-Propylbenzene	1.0	U	1.0	1.0	0.38	ug/L		04/17/18 09:58	1
o-Xylene	0.50	U	1.0	0.50	0.23	ug/L		04/17/18 09:58	1
sec-Butylbenzene	1.0	U	1.0	1.0	0.42	ug/L		04/17/18 09:58	1
Styrene	0.50	U	1.0	0.50	0.27	ug/L		04/17/18 09:58	1
tert-Butylbenzene	1.0	U	1.0	1.0	0.45	ug/L		04/17/18 09:58	1
1,1,1,2-Tetrachloroethane	1.0	U	1.0	1.0	0.37	ug/L		04/17/18 09:58	1
1,1,2,2-Tetrachloroethane	1.0	U	1.0	1.0	0.62	ug/L		04/17/18 09:58	1
Tetrachloroethene	1.0	U	1.0	1.0	0.74	ug/L		04/17/18 09:58	1
Toluene	1.0	U	1.0	1.0	0.48	ug/L		04/17/18 09:58	1
trans-1,2-Dichloroethene	1.0	U	1.0	1.0	0.37	ug/L		04/17/18 09:58	1
trans-1,3-Dichloropropene	1.0	U	1.0	1.0	0.42	ug/L		04/17/18 09:58	1
1,2,3-Trichlorobenzene	5.0	U	5.0	5.0	2.5	ug/L		04/17/18 09:58	1
1,2,4-Trichlorobenzene	5.0	U	5.0	5.0	2.5	ug/L		04/17/18 09:58	1
1,1,1-Trichloroethane	1.0	U	1.0	1.0	0.37	ug/L		04/17/18 09:58	1
1,1,2-Trichloroethane	0.50	U	1.0	0.50	0.33	ug/L		04/17/18 09:58	1
Trichloroethene	1.0	U M	1.0	1.0	0.48	ug/L		04/17/18 09:58	1
Trichlorofluoromethane	1.0	U	1.0	1.0	0.42	ug/L		04/17/18 09:58	1
1,2,3-Trichloropropane	1.0	U	1.0	1.0	0.39	ug/L		04/17/18 09:58	1
1,2,4-Trimethylbenzene	1.0	U	1.0	1.0	0.47	ug/L		04/17/18 09:58	1
1,3,5-Trimethylbenzene	0.50	U	1.0	0.50	0.31	ug/L		04/17/18 09:58	1
Vinyl acetate	2.0	U	2.0	2.0	0.81	ug/L		04/17/18 09:58	1
Vinyl chloride	1.0	U	1.0	1.0	0.50	ug/L		04/17/18 09:58	1
Xylenes, Total	0.50	U	2.0	0.50	0.23	ug/L		04/17/18 09:58	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*98*		*85 - 114*		*04/17/18 09:58*	*1*
Dibromofluoromethane (Surr)	*106*		*80 - 119*		*04/17/18 09:58*	*1*
1,2-Dichloroethane-d4 (Surr)	*99*		*81 - 118*		*04/17/18 09:58*	*1*
Toluene-d8 (Surr)	*100*		*89 - 112*		*04/17/18 09:58*	*1*

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 680-520250/3
Matrix: Water
Analysis Batch: 520250

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Acetone	250	247		ug/L		99	39 - 160
Benzene	50.0	49.6		ug/L		99	79 - 120
Bromobenzene	50.0	51.1		ug/L		102	80 - 120
Bromoform	50.0	52.3		ug/L		105	66 - 130
Bromomethane	50.0	46.5		ug/L		93	53 - 141
2-Butanone (MEK)	250	241		ug/L		96	56 - 143
Carbon disulfide	50.0	50.9		ug/L		102	64 - 133
Carbon tetrachloride	50.0	51.9		ug/L		104	72 - 136
Chlorobenzene	50.0	51.3		ug/L		103	82 - 118
Chlorobromomethane	50.0	50.4		ug/L		101	78 - 123
Chlorodibromomethane	50.0	53.5		ug/L		107	74 - 126
Chloroethane	50.0	45.5		ug/L		91	60 - 138
Chloroform	50.0	51.6		ug/L		103	79 - 124
Chloromethane	50.0	49.0		ug/L		98	50 - 139
2-Chlorotoluene	50.0	50.9		ug/L		102	79 - 122
4-Chlorotoluene	50.0	50.6		ug/L		101	78 - 122
cis-1,2-Dichloroethene	50.0	50.8		ug/L		102	78 - 123
cis-1,3-Dichloropropene	50.0	55.2		ug/L		110	75 - 124
1,2-Dibromo-3-Chloropropane	50.0	50.6		ug/L		101	62 - 128
Dibromomethane	50.0	52.0		ug/L		104	79 - 123
1,2-Dichlorobenzene	50.0	51.0		ug/L		102	80 - 119
1,3-Dichlorobenzene	50.0	50.2		ug/L		100	80 - 119
1,4-Dichlorobenzene	50.0	50.9		ug/L		102	79 - 118
Dichlorobromomethane	50.0	52.8		ug/L		106	79 - 125
Dichlorodifluoromethane	50.0	59.1		ug/L		118	32 - 152
1,1-Dichloroethane	50.0	50.9		ug/L		102	77 - 125
1,2-Dichloroethane	50.0	49.6		ug/L		99	73 - 128
1,1-Dichloroethene	50.0	52.2		ug/L		104	71 - 131
1,2-Dichloroethene, Total	100	104		ug/L		104	79 - 121
1,2-Dichloropropane	50.0	53.3		ug/L		107	78 - 122
1,3-Dichloropropane	50.0	50.2		ug/L		100	80 - 119
2,2-Dichloropropane	50.0	56.0	M	ug/L		112	60 - 139
1,1-Dichloropropene	50.0	50.6		ug/L		101	79 - 125
Ethylbenzene	50.0	50.8		ug/L		102	79 - 121
Ethylene Dibromide	50.0	50.8		ug/L		102	75 - 127
Hexachlorobutadiene	50.0	56.0		ug/L		112	66 - 134
2-Hexanone	250	240		ug/L		96	57 - 139
Isopropylbenzene	50.0	52.0		ug/L		104	72 - 131
4-Isopropyltoluene	50.0	52.4		ug/L		105	77 - 127
Methylene Chloride	50.0	51.6		ug/L		103	74 - 124
4-Methyl-2-pentanone (MIBK)	250	243		ug/L		97	67 - 130
Methyl tert-butyl ether	50.0	50.1		ug/L		100	71 - 124
m-Xylene & p-Xylene	50.0	51.0		ug/L		102	80 - 121
Naphthalene	50.0	48.7		ug/L		97	61 - 128
n-Butylbenzene	50.0	54.4		ug/L		109	75 - 128
N-Propylbenzene	50.0	51.8		ug/L		104	76 - 126
o-Xylene	50.0	51.4		ug/L		103	78 - 122
sec-Butylbenzene	50.0	52.9		ug/L		106	77 - 126

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 680-520250/3
Matrix: Water
Analysis Batch: 520250

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Styrene	50.0	51.0		ug/L		102	78 - 123
tert-Butylbenzene	50.0	52.5		ug/L		105	78 - 124
1,1,1,2-Tetrachloroethane	50.0	52.7		ug/L		105	78 - 124
1,1,2,2-Tetrachloroethane	50.0	49.6		ug/L		99	71 - 121
Tetrachloroethene	50.0	50.3		ug/L		101	74 - 129
Toluene	50.0	50.3		ug/L		101	80 - 121
trans-1,2-Dichloroethene	50.0	52.8		ug/L		106	75 - 124
trans-1,3-Dichloropropene	50.0	51.7		ug/L		103	73 - 127
1,2,3-Trichlorobenzene	50.0	51.7		ug/L		103	69 - 129
1,2,4-Trichlorobenzene	50.0	52.3		ug/L		105	69 - 130
1,1,1-Trichloroethane	50.0	52.0		ug/L		104	74 - 131
1,1,2-Trichloroethane	50.0	51.6		ug/L		103	80 - 119
Trichloroethene	50.0	51.2		ug/L		102	79 - 123
Trichlorofluoromethane	50.0	52.4		ug/L		105	65 - 141
1,2,3-Trichloropropane	50.0	48.6		ug/L		97	73 - 122
1,2,4-Trimethylbenzene	50.0	51.3		ug/L		103	76 - 124
1,3,5-Trimethylbenzene	50.0	51.9		ug/L		104	75 - 124
Vinyl acetate	100	104		ug/L		104	54 - 146
Vinyl chloride	50.0	47.0		ug/L		94	58 - 137
Xylenes, Total	100	102		ug/L		102	79 - 121

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*96*		*85 - 114*
Dibromofluoromethane (Surr)	*101*		*80 - 119*
1,2-Dichloroethane-d4 (Surr)	*96*		*81 - 118*
Toluene-d8 (Surr)	*100*		*89 - 112*

Lab Sample ID: LCSD 680-520250/4
Matrix: Water
Analysis Batch: 520250

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Acetone	250	246		ug/L		99	39 - 160	0	20
Benzene	50.0	49.6		ug/L		99	79 - 120	0	20
Bromobenzene	50.0	50.4		ug/L		101	80 - 120	1	20
Bromoform	50.0	51.4		ug/L		103	66 - 130	2	20
Bromomethane	50.0	46.3		ug/L		93	53 - 141	0	20
2-Butanone (MEK)	250	239		ug/L		96	56 - 143	1	20
Carbon disulfide	50.0	50.3		ug/L		101	64 - 133	1	20
Carbon tetrachloride	50.0	51.3		ug/L		103	72 - 136	1	20
Chlorobenzene	50.0	50.6		ug/L		101	82 - 118	1	20
Chlorobromomethane	50.0	49.5		ug/L		99	78 - 123	2	20
Chlorodibromomethane	50.0	52.4		ug/L		105	74 - 126	2	20
Chloroethane	50.0	45.6		ug/L		91	60 - 138	0	20
Chloroform	50.0	51.0		ug/L		102	79 - 124	1	20
Chloromethane	50.0	48.8		ug/L		98	50 - 139	0	20
2-Chlorotoluene	50.0	49.9		ug/L		100	79 - 122	2	20
4-Chlorotoluene	50.0	50.5		ug/L		101	78 - 122	0	20

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCSD 680-520250/4
Matrix: Water
Analysis Batch: 520250

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
cis-1,2-Dichloroethene	50.0	50.5		ug/L		101	78 - 123	0	20
cis-1,3-Dichloropropene	50.0	54.6		ug/L		109	75 - 124	1	20
1,2-Dibromo-3-Chloropropane	50.0	51.9		ug/L		104	62 - 128	2	20
Dibromomethane	50.0	51.5		ug/L		103	79 - 123	1	20
1,2-Dichlorobenzene	50.0	51.7		ug/L		103	80 - 119	1	20
1,3-Dichlorobenzene	50.0	51.1		ug/L		102	80 - 119	2	20
1,4-Dichlorobenzene	50.0	51.5		ug/L		103	79 - 118	1	20
Dichlorobromomethane	50.0	51.7		ug/L		103	79 - 125	2	20
Dichlorodifluoromethane	50.0	57.6		ug/L		115	32 - 152	2	20
1,1-Dichloroethane	50.0	50.5		ug/L		101	77 - 125	1	20
1,2-Dichloroethane	50.0	49.3		ug/L		99	73 - 128	1	20
1,1-Dichloroethene	50.0	49.9		ug/L		100	71 - 131	4	20
1,2-Dichloroethene, Total	100	103		ug/L		103	79 - 121	0	20
1,2-Dichloropropane	50.0	52.5		ug/L		105	78 - 122	2	20
1,3-Dichloropropane	50.0	49.1		ug/L		98	80 - 119	2	20
2,2-Dichloropropane	50.0	54.8	M	ug/L		110	60 - 139	2	20
1,1-Dichloropropene	50.0	49.6		ug/L		99	79 - 125	2	20
Ethylbenzene	50.0	50.3		ug/L		101	79 - 121	1	20
Ethylene Dibromide	50.0	50.2		ug/L		100	75 - 127	1	20
Hexachlorobutadiene	50.0	56.5		ug/L		113	66 - 134	1	20
2-Hexanone	250	239		ug/L		95	57 - 139	1	20
Isopropylbenzene	50.0	51.9		ug/L		104	72 - 131	0	20
4-Isopropyltoluene	50.0	53.0		ug/L		106	77 - 127	1	20
Methylene Chloride	50.0	51.1		ug/L		102	74 - 124	1	20
4-Methyl-2-pentanone (MIBK)	250	243		ug/L		97	67 - 130	0	20
Methyl tert-butyl ether	50.0	49.7		ug/L		99	71 - 124	1	20
m-Xylene & p-Xylene	50.0	50.9		ug/L		102	80 - 121	0	20
Naphthalene	50.0	50.2		ug/L		100	61 - 128	3	20
n-Butylbenzene	50.0	54.8		ug/L		110	75 - 128	1	20
N-Propylbenzene	50.0	50.9		ug/L		102	76 - 126	2	20
o-Xylene	50.0	51.5		ug/L		103	78 - 122	0	20
sec-Butylbenzene	50.0	52.3		ug/L		105	77 - 126	1	20
Styrene	50.0	50.8		ug/L		102	78 - 123	1	20
tert-Butylbenzene	50.0	51.9		ug/L		104	78 - 124	1	20
1,1,1,2-Tetrachloroethane	50.0	51.4		ug/L		103	78 - 124	2	20
1,1,2,2-Tetrachloroethane	50.0	48.8		ug/L		98	71 - 121	2	20
Tetrachloroethene	50.0	50.4		ug/L		101	74 - 129	0	20
Toluene	50.0	50.5		ug/L		101	80 - 121	1	20
trans-1,2-Dichloroethene	50.0	52.5		ug/L		105	75 - 124	0	20
trans-1,3-Dichloropropene	50.0	51.1		ug/L		102	73 - 127	1	20
1,2,3-Trichlorobenzene	50.0	52.3		ug/L		105	69 - 129	1	20
1,2,4-Trichlorobenzene	50.0	53.3		ug/L		107	69 - 130	2	20
1,1,1-Trichloroethane	50.0	51.4		ug/L		103	74 - 131	1	20
1,1,2-Trichloroethane	50.0	51.5		ug/L		103	80 - 119	0	20
Trichloroethene	50.0	51.1		ug/L		102	79 - 123	0	20
Trichlorofluoromethane	50.0	51.1		ug/L		102	65 - 141	2	20
1,2,3-Trichloropropane	50.0	47.7		ug/L		95	73 - 122	2	20
1,2,4-Trimethylbenzene	50.0	50.9		ug/L		102	76 - 124	1	20

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCSD 680-520250/4
Matrix: Water
Analysis Batch: 520250

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,3,5-Trimethylbenzene			50.0	51.7		ug/L		103	75 - 124	0	20
Vinyl acetate			100	104		ug/L		104	54 - 146	0	20
Vinyl chloride			50.0	46.2		ug/L		92	58 - 137	2	20
Xylenes, Total			100	102		ug/L		102	79 - 121	0	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*98*		*85 - 114*
Dibromofluoromethane (Surr)	*101*		*80 - 119*
1,2-Dichloroethane-d4 (Surr)	*95*		*81 - 118*
Toluene-d8 (Surr)	*100*		*89 - 112*

Method: 6010C - Metals (ICP)

Lab Sample ID: MB 680-520051/1-A
Matrix: Water
Analysis Batch: 520707

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 520051

Analyte	MB Result	MB Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Manganese	3.0	U	10	3.0	1.0	ug/L		04/18/18 20:44	1

Lab Sample ID: LCS 680-520051/2-A
Matrix: Water
Analysis Batch: 520707

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 520051

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Manganese			500	540		ug/L		108	90 - 114		

Lab Sample ID: MB 680-520055/1-A
Matrix: Water
Analysis Batch: 520707

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 520055

Analyte	MB Result	MB Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Manganese	3.0	U	10	3.0	1.0	ug/L		04/18/18 17:03	1

Lab Sample ID: LCS 680-520055/2-A
Matrix: Water
Analysis Batch: 520707

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 520055

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Manganese			500	535		ug/L		107	90 - 114		

Lab Sample ID: 680-150977-3 MS
Matrix: Water
Analysis Batch: 520707

Client Sample ID: 32M-01-17XBR_SPR18
Prep Type: Total/NA
Prep Batch: 520055

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Manganese	1.1	J	500	475		ug/L		95	90 - 114		

Method: 6010C - Metals (ICP) (Continued)

Lab Sample ID: 680-150977-3 MSD — **Client Sample ID: 32M-01-17XBR_SPR18**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 520707 — **Prep Batch: 520055**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Manganese	1.1	J	500	458		ug/L		91	90 - 114	4	20

Method: 6020A - Metals (ICP/MS)

Lab Sample ID: MB 680-520048/1-A — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 520297 — **Prep Batch: 520048**

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		04/16/18 14:03	1

Lab Sample ID: LCS 680-520048/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 520297 — **Prep Batch: 520048**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	100	105		ug/L		105	84 - 116

Lab Sample ID: MB 680-520054/1-A — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 520297 — **Prep Batch: 520054**

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		04/16/18 12:35	1

Lab Sample ID: LCS 680-520054/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 520297 — **Prep Batch: 520054**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	100	100		ug/L		100	84 - 116

Lab Sample ID: 680-150977-3 MS — **Client Sample ID: 32M-01-17XBR_SPR18**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 520297 — **Prep Batch: 520054**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	3.0	U	100	95.9		ug/L		96	84 - 116

Lab Sample ID: 680-150977-3 MSD — **Client Sample ID: 32M-01-17XBR_SPR18**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 520297 — **Prep Batch: 520054**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Arsenic	3.0	U	100	91.2		ug/L		91	84 - 116	5	20

GC/MS VOA

Analysis Batch: 520101

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-150977-1	32M-01-13XBR_SPR18	Total/NA	Water	8260B	
680-150977-2	32M-01-14XOB_SPR18	Total/NA	Water	8260B	
680-150977-3	32M-01-17XBR_SPR18	Total/NA	Water	8260B	
680-150977-4	32M-01-18XBR_SPR18	Total/NA	Water	8260B	
680-150977-5	32M-DUP01_SPR18	Total/NA	Water	8260B	
MB 680-520101/9	Method Blank	Total/NA	Water	8260B	
LCS 680-520101/4	Lab Control Sample	Total/NA	Water	8260B	
LCSD 680-520101/5	Lab Control Sample Dup	Total/NA	Water	8260B	
680-150977-3 MS	32M-01-17XBR_SPR18	Total/NA	Water	8260B	
680-150977-3 MSD	32M-01-17XBR_SPR18	Total/NA	Water	8260B	

Analysis Batch: 520250

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-150977-4 - DL	32M-01-18XBR_SPR18	Total/NA	Water	8260B	
680-150977-5 - DL	32M-DUP01_SPR18	Total/NA	Water	8260B	
680-150977-6	Trip Blank1_040918	Total/NA	Water	8260B	
MB 680-520250/7	Method Blank	Total/NA	Water	8260B	
LCS 680-520250/3	Lab Control Sample	Total/NA	Water	8260B	
LCSD 680-520250/4	Lab Control Sample Dup	Total/NA	Water	8260B	

Metals

Prep Batch: 520048

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-150977-1	32M-01-13XBR_SPR18	Total/NA	Water	3010A	
680-150977-2	32M-01-14XOB_SPR18	Total/NA	Water	3010A	
680-150977-4	32M-01-18XBR_SPR18	Total/NA	Water	3010A	
680-150977-5	32M-DUP01_SPR18	Total/NA	Water	3010A	
MB 680-520048/1-A	Method Blank	Total/NA	Water	3010A	
LCS 680-520048/2-A	Lab Control Sample	Total/NA	Water	3010A	

Prep Batch: 520051

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-150977-1	32M-01-13XBR_SPR18	Total/NA	Water	3010A	
680-150977-2	32M-01-14XOB_SPR18	Total/NA	Water	3010A	
680-150977-4	32M-01-18XBR_SPR18	Total/NA	Water	3010A	
680-150977-5	32M-DUP01_SPR18	Total/NA	Water	3010A	
MB 680-520051/1-A	Method Blank	Total/NA	Water	3010A	
LCS 680-520051/2-A	Lab Control Sample	Total/NA	Water	3010A	

Prep Batch: 520054

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-150977-3	32M-01-17XBR_SPR18	Total/NA	Water	3010A	
MB 680-520054/1-A	Method Blank	Total/NA	Water	3010A	
LCS 680-520054/2-A	Lab Control Sample	Total/NA	Water	3010A	
680-150977-3 MS	32M-01-17XBR_SPR18	Total/NA	Water	3010A	
680-150977-3 MSD	32M-01-17XBR_SPR18	Total/NA	Water	3010A	

Metals (Continued)

Prep Batch: 520055

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-150977-3	32M-01-17XBR_SPR18	Total/NA	Water	3010A	
MB 680-520055/1-A	Method Blank	Total/NA	Water	3010A	
LCS 680-520055/2-A	Lab Control Sample	Total/NA	Water	3010A	
680-150977-3 MS	32M-01-17XBR_SPR18	Total/NA	Water	3010A	
680-150977-3 MSD	32M-01-17XBR_SPR18	Total/NA	Water	3010A	

Analysis Batch: 520297

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-150977-1	32M-01-13XBR_SPR18	Total/NA	Water	6020A	520048
680-150977-2	32M-01-14XOB_SPR18	Total/NA	Water	6020A	520048
680-150977-3	32M-01-17XBR_SPR18	Total/NA	Water	6020A	520054
680-150977-4	32M-01-18XBR_SPR18	Total/NA	Water	6020A	520048
680-150977-5	32M-DUP01_SPR18	Total/NA	Water	6020A	520048
MB 680-520048/1-A	Method Blank	Total/NA	Water	6020A	520048
MB 680-520054/1-A	Method Blank	Total/NA	Water	6020A	520054
LCS 680-520048/2-A	Lab Control Sample	Total/NA	Water	6020A	520048
LCS 680-520054/2-A	Lab Control Sample	Total/NA	Water	6020A	520054
680-150977-3 MS	32M-01-17XBR_SPR18	Total/NA	Water	6020A	520054
680-150977-3 MSD	32M-01-17XBR_SPR18	Total/NA	Water	6020A	520054

Analysis Batch: 520707

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-150977-1	32M-01-13XBR_SPR18	Total/NA	Water	6010C	520051
680-150977-2	32M-01-14XOB_SPR18	Total/NA	Water	6010C	520051
680-150977-3	32M-01-17XBR_SPR18	Total/NA	Water	6010C	520055
680-150977-4	32M-01-18XBR_SPR18	Total/NA	Water	6010C	520051
680-150977-5	32M-DUP01_SPR18	Total/NA	Water	6010C	520051
MB 680-520051/1-A	Method Blank	Total/NA	Water	6010C	520051
MB 680-520055/1-A	Method Blank	Total/NA	Water	6010C	520055
LCS 680-520051/2-A	Lab Control Sample	Total/NA	Water	6010C	520051
LCS 680-520055/2-A	Lab Control Sample	Total/NA	Water	6010C	520055
680-150977-3 MS	32M-01-17XBR_SPR18	Total/NA	Water	6010C	520055
680-150977-3 MSD	32M-01-17XBR_SPR18	Total/NA	Water	6010C	520055

Client Sample ID: 32M-01-13XBR_SPR18

Lab Sample ID: 680-150977-1
Date Collected: 04/10/18 12:40
Matrix: Water
Date Received: 04/12/18 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	520101	04/16/18 14:20	Y1S	TAL SAV
	Instrument ID: CMSB									
Total/NA	Prep	3010A			50 mL	50 mL	520051	04/15/18 10:45	AJR	TAL SAV
Total/NA	Analysis	6010C		1			520707	04/18/18 21:46	BCB	TAL SAV
	Instrument ID: ICPF									
Total/NA	Prep	3010A			50 mL	250 mL	520048	04/15/18 10:45	AJR	TAL SAV
Total/NA	Analysis	6020A		1			520297	04/16/18 14:44	BWR	TAL SAV
	Instrument ID: ICPMSC									

Client Sample ID: 32M-01-14XOB_SPR18

Lab Sample ID: 680-150977-2
Date Collected: 04/10/18 13:40
Matrix: Water
Date Received: 04/12/18 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	520101	04/16/18 14:42	Y1S	TAL SAV
	Instrument ID: CMSB									
Total/NA	Prep	3010A			50 mL	50 mL	520051	04/15/18 10:45	AJR	TAL SAV
Total/NA	Analysis	6010C		1			520707	04/18/18 21:31	BCB	TAL SAV
	Instrument ID: ICPF									
Total/NA	Prep	3010A			50 mL	250 mL	520048	04/15/18 10:45	AJR	TAL SAV
Total/NA	Analysis	6020A		1			520297	04/16/18 14:27	BWR	TAL SAV
	Instrument ID: ICPMSC									

Client Sample ID: 32M-01-17XBR_SPR18

Lab Sample ID: 680-150977-3
Date Collected: 04/09/18 12:35
Matrix: Water
Date Received: 04/12/18 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	520101	04/16/18 15:04	Y1S	TAL SAV
	Instrument ID: CMSB									
Total/NA	Prep	3010A			50 mL	50 mL	520055	04/14/18 16:02	AJR	TAL SAV
Total/NA	Analysis	6010C		1			520707	04/18/18 17:13	BCB	TAL SAV
	Instrument ID: ICPF									
Total/NA	Prep	3010A			50 mL	250 mL	520054	04/14/18 16:02	AJR	TAL SAV
Total/NA	Analysis	6020A		1			520297	04/16/18 12:42	BWR	TAL SAV
	Instrument ID: ICPMSC									

Client Sample ID: 32M-01-18XBR_SPR18

Lab Sample ID: 680-150977-4
Date Collected: 04/09/18 14:00
Matrix: Water
Date Received: 04/12/18 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B	DL	10	5 mL	5 mL	520250	04/17/18 11:46	JLK	TAL SAV

Lab Chronicle

Client: KOMAN Government Solutions, LLC
Project/Site: Devens / AOC32/43A Spring 2018

TestAmerica Job ID: 680-150977-1

Client Sample ID: 32M-01-18XBR_SPR18

Lab Sample ID: 680-150977-4

Date Collected: 04/09/18 14:00

Matrix: Water

Date Received: 04/12/18 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B	DL	10	5 mL	5 mL	520250	04/17/18 11:46	JLK	TAL SAV
	Instrument ID: CMSA2									
Total/NA	Analysis	8260B		1	5 mL	5 mL	520101	04/16/18 15:26	Y1S	TAL SAV
	Instrument ID: CMSB									
Total/NA	Prep	3010A			50 mL	50 mL	520051	04/15/18 10:45	AJR	TAL SAV
Total/NA	Analysis	6010C		1			520707	04/18/18 21:41	BCB	TAL SAV
	Instrument ID: ICPF									
Total/NA	Prep	3010A			50 mL	250 mL	520048	04/15/18 10:45	AJR	TAL SAV
Total/NA	Analysis	6020A		1			520297	04/16/18 14:34	BWR	TAL SAV
	Instrument ID: ICPMSC									

Client Sample ID: 32M-DUP01_SPR18

Lab Sample ID: 680-150977-5

Date Collected: 04/09/18 14:05

Matrix: Water

Date Received: 04/12/18 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B	DL	10	5 mL	5 mL	520250	04/17/18 12:08	JLK	TAL SAV
	Instrument ID: CMSA2									
Total/NA	Analysis	8260B		1	5 mL	5 mL	520101	04/16/18 15:48	Y1S	TAL SAV
	Instrument ID: CMSB									
Total/NA	Prep	3010A			50 mL	50 mL	520051	04/15/18 10:45	AJR	TAL SAV
Total/NA	Analysis	6010C		1			520707	04/18/18 21:36	BCB	TAL SAV
	Instrument ID: ICPF									
Total/NA	Prep	3010A			50 mL	250 mL	520048	04/15/18 10:45	AJR	TAL SAV
Total/NA	Analysis	6020A		1			520297	04/16/18 14:30	BWR	TAL SAV
	Instrument ID: ICPMSC									

Client Sample ID: Trip Blank1_040918

Lab Sample ID: 680-150977-6

Date Collected: 04/09/18 00:00

Matrix: Water

Date Received: 04/12/18 09:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	520250	04/17/18 10:20	JLK	TAL SAV
	Instrument ID: CMSA2									

Laboratory References:

= Katahdin Analytical Services Inc, PO BOX 540, 600 Technology Way, Scarborough, ME 04074

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

TEST AMERICA SAVANNAH
DEVENS SPRING 2018
SL3114

KATAHDIN ANALYTICAL SERVICES
600 TECHNOLOGY WAY
SCARBOROUGH, ME 04074

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MassDEP Analytical Protocol Certification Form

Laboratory Name: Katahdin Analytical Services, LLC. Project #:

Project Location: Devens Spring RTN:

This Form provides certifications for the following data set: list Laboratory Sample ID Number(s):
SL3114-1, 2, 3, 4, 5 and 6

Matrices: (Groundwater/Surface Water) Soil/Sediment Drinking Water Air Other:

CAM Protocol (check all that apply below):

8260 VOC CAM II A	7470/7471 Hg CAM III B	MassDEP VPH CAM IV A ✓	8081 Pesticides CAM V B	7196 Hex Cr CAM VI B	MassDEP APH CAM IX A
8270 SVOC CAM II B	7010 Metals CAM III C	MassDEP EPH CAM IV B	8151 Herbicides CAM V C	8330 Explosives CAM VIII A	TO-15 VOC CAM IX B
6010 Metals CAM III A	6020 Metals CAM III D	8082 PCB CAM V A	9014 Total Cyanide/PAC CAM VI A	6860 Perchlorate CAM VIII B	

Affirmative Responses to Questions A through F are required for "Presumptive Certainty" status

A	Were all samples received in a condition consistent with those described on the Chain-of-Custody, properly preserved (including temperature) in the field or laboratory, and prepared/analyzed within method holding times?	(Yes) No
B	Were the analytical method(s) and all associated QC requirements specified in the selected CAM protocol(s) followed?	(Yes) No
C	Were all required corrective actions and analytical response actions specified in the selected CAM protocol(s) implemented for all identified performance standard non-conformances?	(Yes) No
D	Does the laboratory report comply with all the reporting requirements specified in CAM VII A, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data"?	(Yes) No
E	VPH, EPH, APH, and TO-15 only: a. VPH, EPH, and APH Methods only: Was each method conducted without significant modification(s)? (Refer to the individual method(s) for a list of significant modifications). b. APH and TO-15 Methods only: Was the complete analyte list reported for each method?	(Yes) No Yes No
F	Were all applicable CAM protocol QC and performance standard non-conformances identified and evaluated in a laboratory narrative (including all "No" responses to Questions A through E)?	(Yes) No

Responses to Questions G, H and I below are required for "Presumptive Certainty" status

G	Were the reporting limits at or below all CAM reporting limits specified in the selected CAM protocol(s)?	(Yes) No[1]

***Data User Note:** Data that achieve "Presumptive Certainty" status may not necessarily meet the data usability and representativeness requirements described in 310 CMR 40. 1056 (2)(k) and WSC-07-350.*

H	Were **all** QC performance standards specified in the CAM protocol(s) achieved?	(Yes) No[1]
I	Were results reported for the complete analyte list specified in the selected CAM protocol(s)?	(Yes) No[1]

[1] *All negative responses must be addressed in an attached laboratory narrative.*

I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, accurate and complete.

Signature: Leslie Dimond **Position:** Q.A. Officer

Printed Name: Leslie Dimond **Date:** 04/26/2018

SAMPLE DATA PACKAGE

SDG NARRATIVE
KATAHDIN ANALYTICAL SERVICES
TEST AMERICA, SAVANNAH
DEVENS SPRING 2018
SL3114

Sample Receipt

The following samples were received on April 12, 2018 and were logged in under Katahdin Analytical Services work order number SL3114 for a hardcopy due date of April 24, 2018.

KATAHDIN	TEST AMERICA SAVANNAH
Sample No.	Sample Identification
SL3114-1	32M-01-13XBR_SPR18
SL3114-2	32M-01-14XOB_SPR18
SL3114-3	32M-01-17XBR_SPR18
SL3114-4	32M-01-18XBR_SPR18
SL3114-5	32M-01-DUP01_SPR18
SL3114-6	TRIPBLANK2_040918

The samples were logged in for the analyses specified on the chain of custody form. All problems encountered and resolved during sample receipt have been documented on the applicable chain of custody forms.

We certify that the test results provided in this report meet all the requirements of the NELAP standards unless otherwise noted in this narrative or in the Report of Analysis.

We certify that the test results provided in this report are accredited under the laboratory's ISO/IEC 17025:2005 and DoD-ELAP accreditation issued by the ANSI-ASQ National Accreditation Board. Refer to certificate and scope of accreditation L2223.

Analytes which are reported but not listed on our ANAB scope of accreditation will be "^" flagged and the following language will be included in the case narrative for all DoD compliant work: "^" Indicates this analyte is not included on Katahdin Analytical Services DoD-ELAP Scope of Accreditation.

Sample analyses have been performed by the methods as noted herein.

Should you have any questions or comments concerning this Report of Analysis, please do not hesitate to contact your Katahdin Analytical Services Project Manager, **Ms. Heather Manz**. This narrative is an integral part of the Report of Analysis.

Organics Analysis

The samples of Work Order SL3114 were analyzed in accordance with the Method for the Determination of Volatile Petroleum Hydrocarbons (VPH), MADEP, May 2004, Revision 1.1, and/or for the specific methods listed below or on the Report of Analysis.

Sample SL3114-3 was used as the matrix spike (MS) and matrix spike duplicate (MSD), as per client request.

MA-VPH Analysis

Samples SL3114-4 and 5 were manually integrated for the surrogate 2,5-dibromotoluene on the FID. The specific reasons for the manual integrations are indicated on the raw data by the manual integration codes (M1-M11). These codes are further explained in the attachment following this narrative.

The MS WG226605-4 had low recoveries for the target analyte methyl tert-butylether, the C9-C12 aliphatic range, and the surrogate 2,5-dibromotoluene on the FID that were outside of the method acceptance limits. Since the associated LCS/LCSD WG226605-2 and 3 were acceptable, no further action was taken.

Samples SL3114-4 and 5 each had a peak detected for ethylbenzene because the peaks were within the retention time window. In the previous Work Order SK5622 the client questioned the validity of the peaks for samples SK5622-4 and 5 since historically ethylbenzene had not been reported at this site. Samples SK5622-4 and 5 were reanalyzed by GC/MS using method 8260. The peak that was reported as ethylbenzene by VPH was identified as chlorobenzene. Chlorobenzene is not a target analyte for the VPH method, but it does coelute with ethylbenzene. The two samples were reissued with ethylbenzene undetected. Based on history, the peaks that eluted in the ethylbenzene retention time window for samples SL3114-4 and 5 were undetected.

There were no other protocol deviations or observations noted by the organics laboratory staff.

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized the Quality Assurance Officer, or their designee, as verified by the following signature.

Leslie Dimond 04.26.18

Leslie Dimond
Quality Assurance Officer

Katahdin Analytical Services, Inc.

Manual Integration Codes For GC/MS, GC, HPLC and/or IC

M1	Peak splitting.
M2	Well defined peaks on the shoulders of the other peaks.
M3	There is additional area due to a coeluting interferant.
M4	There are negative spikes in the baseline.
M5	There are rising or falling baselines.
M6	The software has failed to detect a peak or misidentified a peak.
M7	Excessive peak tailing.
M8	Analysis such as GRO, DRO and TPH require a baseline hold.
M9	Peak was not completely integrated as in GC/MS.
M10	Primary ion was correctly integrated, but secondary or tertiary ion needed manual integration as in GC/MS.
M11	For GC analysis, when a sample is diluted by 1:10 or more, the surrogate is set to undetected and then the area under the surrogate is manually integrated.
M12	Manual integration saved in method due to TurboChrom floating point error.

Katahdin Analytical Services, LLC. — Sample Receipt Condition Report

Client:	Koman GS	KAS PM:	HMM	Sampled By:	Client
Project:		KIMS Entry By:	SO	Delivered By:	Fedex
KAS Work Order#:	5L3114	KIMS Review By:	HMM	Received By:	JCB
SDG #:		Cooler: 1 of 1		Date/Time Rec.:	4/12/18 900

Receipt Criteria	Y	N	EX*	NA	Comments and/or Resolution
1. Custody seals present / intact?	✓				
2. Chain of Custody present in cooler?	✓				
3. Chain of Custody signed by client?	✓				
4. Chain of Custody matches samples?					
5. Temperature Blanks present? If not, take temperature of any sample w/ IR gun.		✓			Temp (°C): 0.2
Samples received at <6 °C w/o freezing?	✓				Note: Not required for metals (except Hg soil) analysis.
Ice packs or ice present?	✓				The lack of ice or ice packs (i.e. no attempt to begin cooling process) or insufficient ice may not meet certain regulatory requirements and may invalidate certain data.
If yes, was there sufficient ice to meet temperature requirements?	✓				
If temp. out, has the cooling process begun (i.e. ice or packs present) and sample collection times <6hrs., but samples are not yet cool?				✓	Note: No cooling process required for metals (except Hg soil) analysis.
6. Volatiles:					
Aqueous: No bubble larger than a pea?	✓				
Soil/Sediment:					
Received in airtight container?				✓	
Received in methanol?				✓	
Methanol covering soil?				✓	
D.I. Water - Received within 48 hour HT?				✓	
Air: Refer to KAS COC for canister/flow controller requirements.	√ if air included				
7. Trip Blank present in cooler?	✓				
8. Proper sample containers and volume?	✓				
9. Samples within hold time upon receipt?	✓				
10. Aqueous samples properly preserved?					
Metals, COD, NH3, TKN, O/G, phenol, TPO4, N+N, TOC, DRO, TPH – pH <2				✓	
Sulfide - >9				✓	
Cyanide – pH >12				✓	

* Log-In Notes to Exceptions: document any problems with samples or discrepancies or pH adjustments.

SL3114

PO #	17-636	Devens - AOC32/43A Spring 2018

Chain of Custody Record

Page: 1 of: 1

Company: KOMAN GS, LLC

Address: 293 Boston Post Road, Suite 100

Phone: 508-366-7442 Fax: 508-366-7445

Sampled by [Print Name(s)]/Affilliation

Sampler(s) Signature(s)

Laboratory: Test America - Savannah
Address: 510 LaRoche Ave
Savannah, GA 31404
Contact: Jerry Lanier
Regulatory Facility No.
Project Name: Devens Spring 2018 LTM
Sampling QAP No.:
Approval Date:
TAT Routine
Other:

Preservatives (see codes): H H I S O I S N

Analyses Requested

Item No.	Field ID No.	Sampled Date	Sampled Time	Col. Method (see codes)	Matrix (see codes)	Number of Containers	VOCs/SW8260 3-40-ml VOA vials (HCl)	VPH/MaDEP 3-40-ml VOA vials (HCl)	Total Metals*-SW6010/6020 1-250 ml poly (HNO3)						Remarks	Lab. No.
32M-01-13XBR_SPR18		4/10/18	1240	P	GW	7	X	X	X							
32M-01-14XOB_SPR18		4/10/18	1340	P	GW	7	X	X	X							
32M-01-17XBR_SPR18		4/9/18	1235	P	GW	21	X	X	X						MS/MSD	
32M-01-18XBR_SPR18		4/9/18	1400	P	GW	7	X	X	X							
32M-DUP01_SPR18		4/9/18	1405	P	GW	7	X	X	X							
TripBlank1_		4/9/18	–	O	O	2	X									
TripBlank2_		4/9/18	–	P	GW	2		X								
				P	GW											
				courier pick up		0	← Total Number of Containers									

Shipping Details
Date Out: Via:
Returned: Via:
Additional Comments:
* = Dissolved Metals include: Mn (6010); As (6020)

Item No.	Relinquished by/Affiliation	Date	Time		Date	Time
	[signature]	4/11/18	1355	[signature]	4-11-18	1355
	[signature]	4-11-18	1500	[signature]	4-12-18	900

email logins and results to:
lekes@komangs.com

Lab Comments

Preserve Where Applicable ☐
On ICE ☐
Temperature _____ C

☐ NJ Reduced
☐ NJ Full
☐ Full CLP
☐ Disk Deliverable
☐ Other (Specify)

NJ Data Deliverable Info

☐ Commercial "A"
☐ Commercial "B"
☐ State Forms

MATRIX CODES: A = Air GW = Groundwater SE = Sediment SP = Soil SW = Surface Water O = Other
PRESERVATIVE CODES: H = HCL + Ice I = Ice Only N = Nitric Acid + Ice S = Sulfuric Acid + Ice M = Methanol O = Other
COLLECTION METHOD CC C = Composite G=Grab P= Pumping O = Other

Katahdin ANALYTICAL SERVICES

Katahdin Analytical Services

Login Chain of Custody Report (lno1)

Apr. 12, 2018
04:31 PM

Login Number: SL3114

Account: TASAV001 NoWeb
Test America Savannah

Project: TASAV-DEVENS

Quote/Incoming:

Primary Report Address:
Jerry Lanier
Test America Savannah
5102 LaRoche Avenue

Savannah,GA 31404
Jerry.Lanier@testamericainc.com

Primary Invoice Address:
Accounts Payable
Test America Savannah
5102 LaRoche Avenue

Savannah,GA 31404

Report CC Addresses:
Invoice CC Addresses:

Login Information:

ANALYSIS INSTRUCTIONS	:	FDS, DOD QSM 4.2 reporting with DOD limits. ND to PQL. "J" flag between MDL and PQL. Need LCS/LCSD. Follow MA MCP CAM. Include level 4 narrative.
CHECK NO.	:	
CLIENT PO#	:	680-150977-1
CLIENT PROJECT MANAGE	:	Jerry Lanier
CONTRACT	:	W912WJ-10-D-0003
COOLER TEMPERATURE	:	0.2
DELIVERY SERVICES	:	Fedex
EDD FORMAT	:	KAS033QC-XLS
LOGIN INITIALS	:	SO
PM	:	HHM
PROJECT NAME	:	Devens Spring 2018
QC LEVEL	:	IV
REPORT INSTRUCTIONS	:	SDS needs all forms. Include Level 4 narrative and MCP forms (from Leslie). Send level 4 PDF & level 2 PDF. Level 2= SDP & SDS. Email PDF, EDD, and invoice to Jerry. No HC.
SDG ID	:	
SDG STATUS	:	
VERBAL TAT	:	

Laboratory Sample ID	Client Sample Number	Collect Date/Time	Receive Date	PR	Verbal Date	Due Date	Mailed
SL3114-1	32M-01-13XBR_SPR18	10-APR-18 12:40	12-APR-18			24-APR-18	

Matrix		Product	Hold Date (shortest)	Bottle Type	Bottle Count	Comments
Aqueous	S	MA-VPH	24-APR-18	40mL Vial+HCl		

Laboratory Sample ID	Client Sample Number	Collect Date/Time	Receive Date	PR	Verbal Date	Due Date	Mailed
SL3114-2	32M-01-14XOB_SPR18	10-APR-18 13:40	12-APR-18			24-APR-18	

Matrix		Product	Hold Date (shortest)	Bottle Type	Bottle Count	Comments
Aqueous	S	MA-VPH	24-APR-18	40mL Vial+HCl		

Laboratory Sample ID	Client Sample Number	Collect Date/Time	Receive Date	PR	Verbal Date	Due Date	Mailed
SL3114-3	32M-01-17XBR_SPR18	09-APR-18 12:35	12-APR-18			24-APR-18	

Matrix		Product	Hold Date (shortest)	Bottle Type	Bottle Count	Comments
Aqueous	S	MA-VPH	23-APR-18	40mL Vial+HCl		**MS/MSD**

Laboratory Sample ID	Client Sample Number	Collect Date/Time	Receive Date	PR	Verbal Date	Due Date	Mailed
SL3114-4	32M-01-18XBR_SPR18	09-APR-18 14:00	12-APR-18			24-APR-18	

Matrix		Product	Hold Date (shortest)	Bottle Type	Bottle Count	Comments
Aqueous	S	MA-VPH	23-APR-18	40mL Vial+HCl		

Laboratory Sample ID	Client Sample Number	Collect Date/Time	Receive Date	PR	Verbal Date	Due Date	Mailed
SL3114-5	32M-DUP01_SPR18	09-APR-18 14:05	12-APR-18			24-APR-18	

Matrix		Product	Hold Date (shortest)	Bottle Type	Bottle Count	Comments
Aqueous	S	MA-VPH	23-APR-18	40mL Vial+HCl		

Laboratory Sample ID	Client Sample Number	Collect Date/Time	Receive Date	PR	Verbal Date	Due Date	Mailed
SL3114-6	TRIPBLANK2_040918	09-APR-18 00:00	12-APR-18			24-APR-18	

Matrix		Product	Hold Date (shortest)	Bottle Type	Bottle Count	Comments
Aqueous	S	MA-VPH	23-APR-18	40mL Vial+HCl		

Total Samples: **6** ***Total Analyses:*** **6**

HHM 4-12-18

4/26/2018

SAMPLE DATA SUMMARY PACKAGE

Page 49 of 80 Katahdin Analytical Services A00000001 4/26/2018

KATAHDIN ANALYTICAL SERVICES - ORGANIC DATA QUALIFIERS

The sampled date indicated on the attached Report(s) of Analysis (ROA) is the date for which a grab sample was collected or the date for which a composite sample was completed. Beginning and start times for composite samples can be found on the Chain-of-Custody.

U — Indicates the compound was analyzed for but not detected above the specified level. This level may be the Limit of Quantitation (LOQ)(previously called Practical Quantitation Level (PQL)), the Limit of Detection (LOD) or Method Detection Limit (MDL) as required by the client.

Note: All results reported as "U" MDL have a 50% rate for false negatives compared to those results reported as "U" PQL/LOQ or "U" LOD, where the rate of false negatives is <1%.

* — Compound recovery or percent RPD (relative percent difference) was outside of quality control limits.

D — Indicates the result was obtained from analysis of a diluted sample. Surrogate recoveries may not be calculable.

E — Estimated value. This flag identifies compounds whose concentrations exceed the upper level of the calibration range of the instrument for that specific analysis.

J — Estimated value. The analyte was detected in the sample at a concentration less than the laboratory Limit of Quantitation (LOQ)(previously called Practical Quantitation Limit (PQL)), but above the Method Detection Limit (MDL).

or

J — Used for Pesticides, PCBs, Herbicides, Formaldehyde, Explosives and Method 504.1 analytes when there is a greater than 40% difference for detected concentrations between the two GC columns.

B — Indicates the analyte was detected in the laboratory method blank analyzed concurrently with the sample.

C — Indicates that the flagged compound did not meet DoD criteria in the corresponding daily calibration verification (CV).

L — Indicates that the flagged compound did not meet DoD criteria in the corresponding Laboratory Control Sample (LCS) and/or Laboratory Control Sample Duplicate (LCSD) prepared and/or analyzed concurrently with the sample.

M — Indicates that the flagged compound did not meet DoD criteria in the Matrix Spike and/or Matrix Spike Duplicate prepared and/or analyzed concurrently with the native sample.

N — Presumptive evidence of a compound based on a mass spectral library search.

A — Indicates that a tentatively identified compound is a suspected aldol-condensation product.

P — Used for Pesticide/Aroclor analyte when there is a greater than 25% difference for detected concentrations between the two GC columns. (for CLP methods only).

Katahdin
ANALYTICAL SERVICES

Report of Analytical Results

Client: Test America Savannah
Lab ID: SL3114-1RA
Client ID: 32M-01-13XBR_SPR18
Project: Devens Spring 2018
SDG: SL3114
Lab File ID: 2LD10084.D

Sample Date: 10-APR-18
Received Date: 12-APR-18
Extract Date: 17-APR-18
Extracted By: JHR
Extraction Method: MA-VPH
Lab Prep Batch: WG226650

Analysis Date: 17-APR-18
Analyst: JHR
Analysis Method: MA DEP VPH 04-1.1
Matrix: AQ
% Solids: NA
Report Date: 23-APR-18

Compound	Qualifier	Result	Units	Dilution	PQL	ADJ PQL	ADJ MDL
C5-C8 Aliphatics	U	100	ug/L	1	100	100	50.
C9-C12 Aliphatics	U	100	ug/L	1	100	100	50.
C9-C10 Aromatics	U	100	ug/L	1	100	100	50.
Benzene	U	3.0	ug/L	1	3	3.0	0.31
Ethylbenzene	U	5.0	ug/L	1	5	5.0	0.42
Methyl tert-butylether	U	5.0	ug/L	1	5	5.0	0.31
Naphthalene	U	5.0	ug/L	1	5	5.0	1.6
Toluene	U	5.0	ug/L	1	5	5.0	0.34
m+p-Xylenes	U	10	ug/L	1	10	10.	0.92
o-Xylene	U	5.0	ug/L	1	5	5.0	0.47
2,5-Dibromotoluene (FID)		85.4	%				
2,5-Dibromotoluene (PID)		90.4	%				

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ANALYTICAL SERVICES

Report of Analytical Results

Client: Test America Savannah
Lab ID: SL3114-2
Client ID: 32M-01-14XOB_SPR18
Project: Devens Spring 2018
SDG: SL3114
Lab File ID: 2LD10072.D

Sample Date: 10-APR-18
Received Date: 12-APR-18
Extract Date: 16-APR-18
Extracted By: JHR
Extraction Method: MA-VPH
Lab Prep Batch: WG226605

Analysis Date: 16-APR-18
Analyst: JHR
Analysis Method: MA DEP VPH 04-1.1
Matrix: AQ
% Solids: NA
Report Date: 23-APR-18

Compound	Qualifier	Result	Units	Dilution	PQL	ADJ PQL	ADJ MDL
C5-C8 Aliphatics	U	100	ug/L	1	100	100	50.
C9-C12 Aliphatics	U	100	ug/L	1	100	100	50.
C9-C10 Aromatics	U	100	ug/L	1	100	100	50.
Benzene	U	3.0	ug/L	1	3	3.0	0.31
Ethylbenzene	U	5.0	ug/L	1	5	5.0	0.42
Methyl tert-butylether	U	5.0	ug/L	1	5	5.0	0.31
Naphthalene	U	5.0	ug/L	1	5	5.0	1.6
Toluene	U	5.0	ug/L	1	5	5.0	0.34
m+p-Xylenes	U	10	ug/L	1	10	10.	0.92
o-Xylene	U	5.0	ug/L	1	5	5.0	0.47
2,5-Dibromotoluene (FID)		77.8	%				
2,5-Dibromotoluene (PID)		83.2	%				

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Katahdin
ANALYTICAL SERVICES

Report of Analytical Results

Client: Test America Savannah
Lab ID: SL3114-3
Client ID: 32M-01-17XBR_SPR18
Project: Devens Spring 2018
SDG: SL3114
Lab File ID: 2LD10073.D

Sample Date: 09-APR-18
Received Date: 12-APR-18
Extract Date: 16-APR-18
Extracted By: JHR
Extraction Method: MA-VPH
Lab Prep Batch: WG226605

Analysis Date: 16-APR-18
Analyst: JHR
Analysis Method: MA DEP VPH 04-1.1
Matrix: AQ
% Solids: NA
Report Date: 23-APR-18

Compound	Qualifier	Result	Units	Dilution	PQL	ADJ PQL	ADJ MDL
C5-C8 Aliphatics	U	100	ug/L	1	100	100	50.
C9-C12 Aliphatics	U	100	ug/L	1	100	100	50.
C9-C10 Aromatics	U	100	ug/L	1	100	100	50.
Benzene	U	3.0	ug/L	1	3	3.0	0.31
Ethylbenzene	U	5.0	ug/L	1	5	5.0	0.42
Methyl tert-butylether	U	5.0	ug/L	1	5	5.0	0.31
Naphthalene	U	5.0	ug/L	1	5	5.0	1.6
Toluene	U	5.0	ug/L	1	5	5.0	0.34
m+p-Xylenes	U	10	ug/L	1	10	10.	0.92
o-Xylene	U	5.0	ug/L	1	5	5.0	0.47
2,5-Dibromotoluene (FID)		82.9	%				
2,5-Dibromotoluene (PID)		88.7	%				

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ANALYTICAL SERVICES

Report of Analytical Results

Client: Test America Savannah
Lab ID: SL3114-4
Client ID: 32M-01-18XBR_SPR18
Project: Devens Spring 2018
SDG: SL3114
Lab File ID: 2LD10074.D

Sample Date: 09-APR-18
Received Date: 12-APR-18
Extract Date: 16-APR-18
Extracted By: JHR
Extraction Method: MA-VPH
Lab Prep Batch: WG226605

Analysis Date: 16-APR-18
Analyst: JHR
Analysis Method: MA DEP VPH 04-1.1
Matrix: AQ
% Solids: NA
Report Date: 23-APR-18

Compound	Qualifier	Result	Units	Dilution	PQL	ADJ PQL	ADJ MDL
C5-C8 Aliphatics	U	100	ug/L	1	100	100	50.
C9-C12 Aliphatics	E	740	ug/L	1	100	100	50.
C9-C10 Aromatics	E	600	ug/L	1	100	100	50.
Benzene	J	0.81	ug/L	1	3	3.0	0.31
Ethylbenzene	U	5.0	ug/L	1	5	5.0	0.42
Methyl tert-butylether	U	5.0	ug/L	1	5	5.0	0.31
Naphthalene	U	5.0	ug/L	1	5	5.0	1.6
Toluene	U	5.0	ug/L	1	5	5.0	0.34
m+p-Xylenes	U	10	ug/L	1	10	10.	0.92
o-Xylene	U	5.0	ug/L	1	5	5.0	0.47
2,5-Dibromotoluene (FID)		82.4	%				
2,5-Dibromotoluene (PID)		99.8	%				

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ANALYTICAL SERVICES

Report of Analytical Results

Client: Test America Savannah
Lab ID: SL3114-4DL
Client ID: 32M-01-18XBR_SPR18
Project: Devens Spring 2018
SDG: SL3114
Lab File ID: 2LD10085.D

Sample Date: 09-APR-18
Received Date: 12-APR-18
Extract Date: 17-APR-18
Extracted By: JHR
Extraction Method: MA-VPH
Lab Prep Batch: WG226650

Analysis Date: 17-APR-18
Analyst: JHR
Analysis Method: MA DEP VPH 04-1.1
Matrix: AQ
% Solids: NA
Report Date: 23-APR-18

Compound	Qualifier	Result	Units	Dilution	PQL	ADJ PQL	ADJ MDL
C5-C8 Aliphatics	U	400	ug/L	4	100	400	200
C9-C12 Aliphatics	J	370	ug/L	4	100	400	200
C9-C10 Aromatics		760	ug/L	4	100	400	200
Benzene	J	1.6	ug/L	4	3	12.	1.2
Ethylbenzene	U	20	ug/L	4	5	20.	1.7
Methyl tert-butylether	U	20	ug/L	4	5	20.	1.2
Naphthalene	U	20	ug/L	4	5	20.	6.4
Toluene	U	20	ug/L	4	5	20.	1.4
m+p-Xylenes	J	6.2	ug/L	4	10	40.	3.7
o-Xylene	U	20	ug/L	4	5	20.	1.9
2,5-Dibromotoluene (FID)		87.7	%				
2,5-Dibromotoluene (PID)		92.8	%				

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ANALYTICAL SERVICES

Report of Analytical Results

Client: Test America Savannah
Lab ID: SL3114-5
Client ID: 32M-DUP01_SPR18
Project: Devens Spring 2018
SDG: SL3114
Lab File ID: 2LD10075.D

Sample Date: 09-APR-18
Received Date: 12-APR-18
Extract Date: 16-APR-18
Extracted By: JHR
Extraction Method: MA-VPH
Lab Prep Batch: WG226605

Analysis Date: 16-APR-18
Analyst: JHR
Analysis Method: MA DEP VPH 04-1.1
Matrix: AQ
% Solids: NA
Report Date: 23-APR-18

Compound	Qualifier	Result	Units	Dilution	PQL	ADJ PQL	ADJ MDL
C5-C8 Aliphatics	U	100	ug/L	1	100	100	50.
C9-C12 Aliphatics	E	780	ug/L	1	100	100	50.
C9-C10 Aromatics	E	610	ug/L	1	100	100	50.
Benzene	J	0.78	ug/L	1	3	3.0	0.31
Ethylbenzene	U	5.0	ug/L	1	5	5.0	0.42
Methyl tert-butylether	U	5.0	ug/L	1	5	5.0	0.31
Naphthalene	U	5.0	ug/L	1	5	5.0	1.6
Toluene	U	5.0	ug/L	1	5	5.0	0.34
m+p-Xylenes	U	10	ug/L	1	10	10.	0.92
o-Xylene	U	5.0	ug/L	1	5	5.0	0.47
2,5-Dibromotoluene (FID)		86.8	%				
2,5-Dibromotoluene (PID)		105.	%				

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Katahdin
ANALYTICAL SERVICES

Report of Analytical Results

Client: Test America Savannah
Lab ID: SL3114-5DL
Client ID: 32M-DUP01_SPR18
Project: Devens Spring 2018
SDG: SL3114
Lab File ID: 2LD10086.D

Sample Date: 09-APR-18
Received Date: 12-APR-18
Extract Date: 17-APR-18
Extracted By: JHR
Extraction Method: MA-VPH
Lab Prep Batch: WG226650

Analysis Date: 17-APR-18
Analyst: JHR
Analysis Method: MA DEP VPH 04-1.1
Matrix: AQ
% Solids: NA
Report Date: 23-APR-18

Compound	Qualifier	Result	Units	Dilution	PQL	ADJ PQL	ADJ MDL
C5-C8 Aliphatics	U	400	ug/L	4	100	400	200
C9-C12 Aliphatics		400	ug/L	4	100	400	200
C9-C10 Aromatics		790	ug/L	4	100	400	200
Benzene	U	12	ug/L	4	3	12.	1.2
Ethylbenzene	U	20	ug/L	4	5	20.	1.7
Methyl tert-butylether	U	20	ug/L	4	5	20.	1.2
Naphthalene	U	20	ug/L	4	5	20.	6.4
Toluene	U	20	ug/L	4	5	20.	1.4
m+p-Xylenes	U	40	ug/L	4	10	40.	3.7
o-Xylene	U	20	ug/L	4	5	20.	1.9
2,5-Dibromotoluene (FID)		99.4	%				
2,5-Dibromotoluene (PID)		106.	%				

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ANALYTICAL SERVICES

Report of Analytical Results

Client: Test America Savannah
Lab ID: SL3114-6
Client ID: TRIPBLANK2_040918
Project: Devens Spring 2018
SDG: SL3114
Lab File ID: 2LD10070.D

Sample Date: 09-APR-18
Received Date: 12-APR-18
Extract Date: 16-APR-18
Extracted By: JHR
Extraction Method: MA-VPH
Lab Prep Batch: WG226605

Analysis Date: 16-APR-18
Analyst: JHR
Analysis Method: MA DEP VPH 04-1.1
Matrix: AQ
% Solids: NA
Report Date: 23-APR-18

Compound	Qualifier	Result	Units	Dilution	PQL	ADJ PQL	ADJ MDL
C5-C8 Aliphatics	U	100	ug/L	1	100	100	50.
C9-C12 Aliphatics	U	100	ug/L	1	100	100	50.
C9-C10 Aromatics	U	100	ug/L	1	100	100	50.
Benzene	U	3.0	ug/L	1	3	3.0	0.31
Ethylbenzene	U	5.0	ug/L	1	5	5.0	0.42
Methyl tert-butylether	U	5.0	ug/L	1	5	5.0	0.31
Naphthalene	U	5.0	ug/L	1	5	5.0	1.6
Toluene	U	5.0	ug/L	1	5	5.0	0.34
m+p-Xylenes	U	10	ug/L	1	10	10.	0.92
o-Xylene	U	5.0	ug/L	1	5	5.0	0.47
2,5-Dibromotoluene (FID)		82.7	%				
2,5-Dibromotoluene (PID)		91.3	%				

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Report of Analytical Results

Client:
Lab ID: WG226605-1
Client ID: Method Blank Sample
Project:
SDG: SL3114
Lab File ID: 2LD10067.D

Sample Date:
Received Date:
Extract Date: 16-APR-18
Extracted By: JHR
Extraction Method: MA-VPH
Lab Prep Batch: WG226605

Analysis Date: 16-APR-18
Analyst: JHR
Analysis Method: MA DEP VPH 04-1.1
Matrix: AQ
% Solids: NA
Report Date: 23-APR-18

Compound	Qualifier	Result	Units	Dilution	PQL	ADJ PQL	ADJ MDL
C5-C8 Aliphatics	U	100	ug/L	1	100	100	50.
C9-C12 Aliphatics	U	100	ug/L	1	100	100	50.
C9-C10 Aromatics	U	100	ug/L	1	100	100	50.
Benzene	U	3.0	ug/L	1	3	3.0	0.31
Ethylbenzene	U	5.0	ug/L	1	5	5.0	0.42
Methyl tert-butylether	U	5.0	ug/L	1	5	5.0	0.31
Naphthalene	U	5.0	ug/L	1	5	5.0	1.6
Toluene	U	5.0	ug/L	1	5	5.0	0.34
m+p-Xylenes	U	10	ug/L	1	10	10.	0.92
o-Xylene	U	5.0	ug/L	1	5	5.0	0.47
2,5-Dibromotoluene (FID)		77.2	%				
2,5-Dibromotoluene (PID)		85.8	%				

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Report of Analytical Results

Client:
Lab ID: WG226650-1
Client ID: Method Blank Sample
Project:
SDG: SL3114
Lab File ID: 2LD10081.D

Sample Date:
Received Date:
Extract Date: 17-APR-18
Extracted By: JHR
Extraction Method: MA-VPH
Lab Prep Batch: WG226650

Analysis Date: 17-APR-18
Analyst: JHR
Analysis Method: MA DEP VPH 04-1.1
Matrix: AQ
% Solids: NA
Report Date: 23-APR-18

Compound	Qualifier	Result	Units	Dilution	PQL	ADJ PQL	ADJ MDL
C5-C8 Aliphatics	U	100	ug/L	1	100	100	50.
C9-C12 Aliphatics	U	100	ug/L	1	100	100	50.
C9-C10 Aromatics	U	100	ug/L	1	100	100	50.
Benzene	U	3.0	ug/L	1	3	3.0	0.31
Ethylbenzene	U	5.0	ug/L	1	5	5.0	0.42
Methyl tert-butylether	U	5.0	ug/L	1	5	5.0	0.31
Naphthalene	U	5.0	ug/L	1	5	5.0	1.6
Toluene	U	5.0	ug/L	1	5	5.0	0.34
m+p-Xylenes	U	10	ug/L	1	10	10.	0.92
o-Xylene	U	5.0	ug/L	1	5	5.0	0.47
2,5-Dibromotoluene (FID)		98.2	%				
2,5-Dibromotoluene (PID)		102.	%				

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Form 2
System Monitoring Compound Recovery

Lab Name: Katahdin Analytical Services **Project:** Devens Spring 2018 **Matrix:** AQ
Lab Code: KAS **SDG:** SL3114

Client Sample ID	Lab Sample ID	Col. ID	DBT-FID	#	DBT-PID	#
32M-01-13XBR_SPR18	SL3114-1RA	B	85.4		90.4	
32M-01-14XOB_SPR18	SL3114-2	B	77.8		83.2	
32M-01-17XBR_SPR18	SL3114-3	B	82.9		88.7	
32M-01-18XBR_SPR18	SL3114-4	B	82.4		99.8	
32M-01-18XBR_SPR18	SL3114-4DL	B	87.7		92.8	
32M-DUP01_SPR18	SL3114-5	B	86.8		105.	
32M-DUP01_SPR18	SL3114-5DL	B	99.4		106.	
TRIPBLANK2_040918	SL3114-6	B	82.7		91.3	
Method Blank Sample	WG226605-1	B	77.2		85.8	
Laboratory Control S	WG226605-2	B	85.4		96.4	
Laboratory Control S	WG226605-3	B	89.9		98.9	
Matrix Spike	WG226605-4	B	66.6	*	73.5	
Matrix Spike Duplica	WG226605-5	B	70.4		78.2	
Method Blank Sample	WG226650-1	B	98.2		102.	
Laboratory Control S	WG226650-2	B	88.2		93.4	
Laboratory Control S	WG226650-3	B	92.5		98.9	

		QC Limits
DBT-FID	2,5-DIBROMOTOLUENE (FID)	70-130
DBT-PID	2,5-DIBROMOTOLUENE (PID)	70-130

= Column to be used to flag recovery limits.
* = Values outside of contract required QC limits.
D= System Monitoring Compound diluted out.

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ANALYTICAL SERVICES

LCS/LCSD Recovery Report

LCS ID: WG226605-2
LCSD ID: WG226605-3
Project:
SDG: SL3114
Report Date: 23-APR-18
LCS File ID: 2LD10068.D

Received Date:
Extract Date: 16-APR-18
Extracted By: JHR
Extraction Method: MA-VPH
Lab Prep Batch: WG226605
LCSD File ID: 2LD10069.D

Analysis Date: 16-APR-18
Analyst: JHR
Analysis Method: MA DEP VPH 04-1.1
Matrix: AQ
% Solids: NA

Compound	Spike Amt	LCS Conc	LCS Rec (%)	LCSD Conc	LCSD Rec (%)	Conc Units	RPD (%)	RPD Limit	Limits
C5-C8 Aliphatics	300.	283.	94.3	278.	92.7	ug/L	2	25	70-130
C9-C12 Aliphatics	200.	198.	99.0	193.	96.5	ug/L	2	25	70-130
C9-C10 Aromatics	100.	101.	101.	98.4	98.4	ug/L	3	25	70-130
Benzene	100.	87.7	87.7	87.9	87.9	ug/L	0	25	70-130
Ethylbenzene	100.	90.0	90.0	90.2	90.2	ug/L	0	25	70-130
Methyl tert-butylether	100.	88.8	88.8	89.5	89.5	ug/L	1	25	70-130
Naphthalene	100.	99.6	99.6	110.	110.	ug/L	10	25	70-130
Toluene	100.	88.0	88.0	88.1	88.1	ug/L	0	25	70-130
m+p-Xylenes	200.	177.	88.5	178.	89.0	ug/L	0	25	70-130
o-Xylene	100.	88.6	88.6	88.7	88.7	ug/L	0	25	70-130
2,5-Dibromotoluene (FID)			85.4		89.9				70-130
2,5-Dibromotoluene (PID)			96.4		98.9				70-130

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LCS/LCSD Recovery Report

LCS ID: WG226650-2
LCSD ID: WG226650-3
Project:
SDG: SL3114
Report Date: 23-APR-18
LCS File ID: 2LD10082.D

Received Date:
Extract Date: 17-APR-18
Extracted By: JHR
Extraction Method: MA-VPH
Lab Prep Batch: WG226650
LCSD File ID: 2LD10083.D

Analysis Date: 17-APR-18
Analyst: JHR
Analysis Method: MA DEP VPH 04-1.1
Matrix: AQ
% Solids: NA

Compound	Spike Amt	LCS Conc	LCS Rec (%)	LCSD Conc	LCSD Rec (%)	Conc Units	RPD (%)	RPD Limit	Limits
C5-C8 Aliphatics	300.	291.	97.0	286.	95.3	ug/L	2	25	70-130
C9-C12 Aliphatics	200.	195.	97.5	191.	95.5	ug/L	2	25	70-130
C9-C10 Aromatics	100.	91.6	91.6	95.6	95.6	ug/L	4	25	70-130
Benzene	100.	83.7	83.7	83.6	83.6	ug/L	0	25	70-130
Ethylbenzene	100.	86.2	86.2	85.8	85.8	ug/L	0	25	70-130
Methyl tert-butylether	100.	84.3	84.3	84.0	84.0	ug/L	0	25	70-130
Naphthalene	100.	97.0	97.0	101.	101.	ug/L	4	25	70-130
Toluene	100.	84.0	84.0	83.9	83.9	ug/L	0	25	70-130
m+p-Xylenes	200.	170.	85.0	169.	84.5	ug/L	0	25	70-130
o-Xylene	100.	84.8	84.8	84.5	84.5	ug/L	0	25	70-130
2,5-Dibromotoluene (FID)			88.2		92.5				70-130
2,5-Dibromotoluene (PID)			93.4		98.9				70-130

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MS/MSD Recovery Report

MS ID: WG226605-4
MSD ID: WG226605-5
Sample ID: SL3114-3
Client ID: 32M-01-17XBR_SPR18
Project:
SDG: SL3114
MS File ID: 2LD10076.D

Received Date:
Extract Date: 16-APR-18
Extracted By: JHR
Extraction Method: MA-VPH
Lab Prep Batch: WG226605
Report Date: 23-APR-18
MSD File ID: 2LD10077.D

Analysis Date: 16-APR-18
Analyst: JHR
Analysis Method: MA DEP VPH 04-1.1
Matrix: AQ
% Solids: NA

Compound	MS Spike	MSD Spike	Conc Units	Samp Conc	MS Conc	MSD Conc	MS Rec (%)	MSD Rec (%)	RPD (%)	RPD Limit	Limits
C5-C8 Aliphatics	300.	300.	ug/L	U100	225	254	75.0	84.7	12	50	70-130
C9-C12 Aliphatics	200.	200.	ug/L	U100	134	149	67.0*	74.5	11	50	70-130
C9-C10 Aromatics	100.	100.	ug/L	U100	83.6	85.8	83.6	85.8	2	50	70-130
Benzene	100.	100.	ug/L	U3.0	70.3	78.2	70.3	78.2	11	50	70-130
Ethylbenzene	100.	100.	ug/L	U5.0	72	80.4	72.0	80.4	11	50	70-130
Methyl tert-butylether	100.	100.	ug/L	U5.0	66.9	75.9	66.9*	75.9	13	50	70-130
Naphthalene	100.	100.	ug/L	U5.0	78.4	89.8	78.4	89.8	14	50	70-130
Toluene	100.	100.	ug/L	U5.0	70.4	78.4	70.4	78.4	11	50	70-130
m+p-Xylenes	200.	200.	ug/L	U10	143	158	71.5	79.0	10	50	70-130
o-Xylene	100.	100.	ug/L	U5.0	70.3	78.4	70.3	78.4	11	50	70-130
2,5-Dibromotoluene (FID)							66.6*	70.4			70-130
2,5-Dibromotoluene (PID)							73.5	78.2			70-130

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Form 4
Method Blank Summary

Lab Name : Katahdin Analytical Services
Project : Devens Spring 2018
Lab File ID : 2LD10067.D
Instrument ID : GC02

SDG : SL3114
Lab Sample ID : WG226605-1
Date Analyzed : 16-APR-18
Time Analyzed : 09:41
Date Extracted : 16-APR-18

This Method Blank applies to the following samples, LCS, MS and MSD:

Client Sample ID	Lab Sample ID	Lab File ID	Date Analyzed	Time Analyzed
Laboratory Control S	WG226605-2	2LD10068.	04/16/18	10:22
Laboratory Control S	WG226605-3	2LD10069.	04/16/18	11:04
TRIPBLANK2_040918	SL3114-6	2LD10070.	04/16/18	12:21
32M-01-14XOB_SPR18	SL3114-2	2LD10072.	04/16/18	13:43
32M-01-17XBR_SPR18	SL3114-3	2LD10073.	04/16/18	14:24
32M-01-18XBR_SPR18	SL3114-4	2LD10074.	04/16/18	15:06
32M-DUP01_SPR18	SL3114-5	2LD10075.	04/16/18	15:47
Matrix Spike	WG226605-4	2LD10076.	04/16/18	16:29
Matrix Spike Duplica	WG226605-5	2LD10077.	04/16/18	17:10

1 2 3 4 5 6 7 8 9 10 11 12 13 14

Form 4
Method Blank Summary

Lab Name : Katahdin Analytical Services
Project : Devens Spring 2018
Lab File ID : 2LD10081.D
Instrument ID : GC02

SDG : SL3114
Lab Sample ID : WG226650-1
Date Analyzed : 17-APR-18
Time Analyzed : 09:57
Date Extracted : 17-APR-18

This Method Blank applies to the following samples, LCS, MS and MSD:

Client Sample ID	Lab Sample ID	Lab File ID	Date Analyzed	Time Analyzed
Laboratory Control S	WG226650-2	2LD10082.	04/17/18	10:38
Laboratory Control S	WG226650-3	2LD10083.	04/17/18	11:20
32M-01-13XBR_SPR18	SL3114-1RA	2LD10084.	04/17/18	12:43
32M-01-18XBR_SPR18	SL3114-4DL	2LD10085.	04/17/18	13:24
32M-DUP01_SPR18	SL3114-5DL	2LD10086.	04/17/18	14:06

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Form 6
Initial Calibration Summary

Lab Name : Katahdin Analytical Services **SDG:** SL3114
Project : Devens Spring 2018 **Instrument ID:** GC02
Lab File IDs : 2LC10123.D 2LC10124.D 2LC10125.D 2LC10122.D 2LC10126.D 2LC10127.D **Calibration Date(s):** 30-MAR-18 10:30 30-MAR-18 13:58

	Level 1 1.0000	Level 2 5.0000	Level 3 10.0000	Level 4 50.0000	Level 5 100.0000	Level 6 300.0000	Crv New	b	m1	m2	%RSD	Max %RSD	
C9-C10 Aromatic	5404	5791	6070	6214	6277	5132	AVG		5815		7.96891	25.00000	M (
Methyl tert-butylether	2955	3578	3623	3422	3468	3075	AVG		3353		8.18889	25.00000	O
Benzene	7637	7587	7702	7447	7569	6656	AVG		7433		5.24397	25.00000	O
Toluene	6675	6914	7039	6835	6918	5977	AVG		6726		5.74027	25.00000	O
Ethylbenzene	5494	5735	5995	5943	6009	5161	AVG		5723		5.91327	25.00000	O
m+p-Xylene	6871	7076	7348	6990	6836	4805	AVG		6654		13.8910	25.00000	O
o-Xylene	5732	6026	6211	6049	6019	5124	AVG		5860		6.69736	25.00000	O
1,2,4-trimethylbenzene	5404	5791	6070	6214	6277	5132	AVG		5815		7.96891	25.00000	O
Naphthalene	4177	4429	4701	5617	6211	5195	AVG		5055		15.2178	25.00000	O
2,5-Dibromotoluene (PID)	1895	10589	24354	162214	384753	983891	LNR	-0.64017	3332		0.99621	0.99000	

Legend: O = Kept Original Curve
Y = Failed Minimum RF
W = Failed %RSD Value

Form 6
Initial Calibration Summary

Lab Name : Katahdin Analytical Services **SDG:** SL3114
Project : Devens Spring 2018 **Instrument ID:** GC02
Lab File IDs : 2LC10123.D 2LC10124.D 2LC10125.D 2LC10122.D 2LC10126.D 2LC10127.D **Calibration Date(s):** 30-MAR-18 10:30 30-MAR-18 13:58

	Level 1 1.0000	Level 2 5.0000	Level 3 10.0000	Level 4 50.0000	Level 5 100.0000	Level 6 300.0000	Crv New	b	m1	m2	%RSD	Max %RSD	
C5-C8 Aliphatic	4542	5642	5693	5328	5436	4968	AVG		5268		8.35756	25.00000	M (
C9-C12 Aliphatic	5478	5042	5089	5025	5616	5599	AVG		5308		5.37307	25.00000	M (
n-Pentane	3762	5526	5507	4743	4868	4399	AVG		4801		14.04307	25.00000	O
2-Methylpentane	4521	5386	5448	5329	5434	4993	AVG		5185		7.06124	25.00000	O
Methyl tert-butylether	3375	4104	4260	4020	4081	3685	AVG		3921		8.36145	25.00000	O
2,2,4-Trimethylpentane	5343	6012	6123	5914	6008	5511	AVG		5819		5.41249	25.00000	O
Benzene	7380	7324	7457	7251	7469	6893	AVG		7296		2.92654	25.00000	O
Toluene	7073	7250	7401	7224	7448	6843	AVG		7207		3.09103	25.00000	O
n-Nonane	4690	5130	5193	5267	5517	5520	AVG		5219		5.87263	25.00000	O
n-Decane	4824	4183	4363	4668	5584	5552	AVG		4862		12.15881	25.00000	O
Ethylbenzene	6463	6629	6947	6972	7185	6642	AVG		6806		3.98171	25.00000	O
m+p-Xylene	6846	7118	7387	7189	7365	6776	AVG		7113		3.60845	25.00000	O
o-Xylene	6884	7102	7399	7265	7398	6783	AVG		7138		3.66983	25.00000	O
1,2,4-trimethylbenzene	6272	6438	6721	6936	7176	6587	AVG		6688		4.94155	25.00000	O
n-Butylcyclohexane	6130	5902	5815	5382	5647	5645	AVG		5754		4.45572	25.00000	O
Naphthalene	3372	3944	3825	4554	5088	4747	AVG		4255		15.18824	25.00000	O
2,5-Dibromotoluene (FID)	1025	3919	9686	62691	150487	462771	LNR	3.07781	1554		0.99914	0.99000	

Legend: O = Kept Original Curve
Y = Failed Minimum RF
W = Failed %RSD Value

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Form 7
Calibration Verification Summary

Lab Name : Katahdin Analytical Services
Project : Devens Spring 2018
Lab ID : WG226605-6
Lab File ID : 2LD10066.D
Initial Calibration Date(s): 03/30/18 10:30 03/30/18 13:58

SDG: SL3114
Analytical Date: 04/16/18 08:34
Instrument ID: GC02
Column ID: A

	Compound	$\overline{RRF}$/Amount	RF50	CCAL RRF50	Min	%D/ %Drift	Max %D/ %Drift	Curve Type
2	Methyl tert-butylether	3353	3301	3301	0.100	-1.56381	25.00000	Averaged
3	Benzene	7433	7230	7230	0.100	-2.72336	25.00000	Averaged
4	Toluene	6726	6631	6631	0.100	-1.42100	25.00000	Averaged
5	Ethylbenzene	5723	5779	5779	0.100	0.98049	25.00000	Averaged
6	m+p-Xylene	6654	6778	6778	0.100	1.86579	25.00000	Averaged
7	o-Xylene	5860	5883	5883	0.100	0.39091	25.00000	Averaged
8	1,2,4-trimethylbenzene	5815	5989	5989	0.100	2.99124	25.00000	Averaged
10	Naphthalene	5055	5424	5424	0.100	7.29513	25.00000	Averaged
11	2,5-Dibromotoluene (PID)	50.00000	47.98455	3240	0.100	-4.03091	25.00000	Linear

*** = Compound out of QC criteria**

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Form 7
Calibration Verification Summary

Lab Name : Katahdin Analytical Services
Project : Devens Spring 2018
Lab ID : WG226605-6
Lab File ID : 2LD10066.D
Initial Calibration Date(s): 03/30/18 10:30 03/30/18 13:58

SDG: SL3114
Analytical Date: 04/16/18 08:34
Instrument ID: GC02
Column ID: B

	Compound	RRF/Amount	RF50	CCAL RRF50	Min	%D/ %Drift	Max %D/ %Drift	Curve Type
5	n-Pentane	4801	4755	4755	0.100	-0.94387	25.00000	Averaged
6	2-Methylpentane	5185	5381	5381	0.100	3.77410	25.00000	Averaged
7	Methyl tert-butylether	3921	3969	3969	0.100	1.22639	25.00000	Averaged
8	2,2,4-Trimethylpentane	5819	5964	5964	0.100	2.49341	25.00000	Averaged
9	Benzene	7296	7214	7214	0.100	-1.12337	25.00000	Averaged
11	Toluene	7207	7193	7193	0.100	-0.18394	25.00000	Averaged
12	n-Nonane	5219	5378	5378	0.100	3.03374	30.00000	Averaged
13	n-Decane	4862	4717	4717	0.100	-2.97959	25.00000	Averaged
14	Ethylbenzene	6806	6948	6948	0.100	2.07722	25.00000	Averaged
15	m+p-Xylene	7113	7161	7161	0.100	0.67419	25.00000	Averaged
16	o-Xylene	7138	7228	7228	0.100	1.25926	25.00000	Averaged
18	1,2,4-trimethylbenzene	6688	6877	6877	0.100	2.81547	25.00000	Averaged
19	n-Butylcyclohexane	5754	5510	5510	0.100	-4.23368	25.00000	Averaged
20	Naphthalene	4255	4483	4483	0.100	5.36269	25.00000	Averaged
21	2,5-Dibromotoluene (FID)	50.00000	44.77524	1296	0.100	-10.44951	25.00000	Linear

*** = Compound out of QC criteria**

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Form 7
Calibration Verification Summary

Lab Name : Katahdin Analytical Services
Project : Devens Spring 2018
Lab ID : WG226605-7
Lab File ID : 2LD10078.D
Initial Calibration Date(s): 03/30/18 10:30 03/30/18 13:58

SDG: SL3114
Analytical Date: 04/16/18 17:51
Instrument ID: GC02
Column ID: A

	Compound	RRF/Amount	RF50	CCAL RRF50	Min	%D/ %Drift	Max %D/ %Drift	Curve Type
2	Methyl tert-butylether	3353	3257	3257	0.100	-2.85749	25.00000	Averaged
3	Benzene	7433	7093	7093	0.100	-4.57674	25.00000	Averaged
4	Toluene	6726	6498	6498	0.100	-3.39262	25.00000	Averaged
5	Ethylbenzene	5723	5612	5612	0.100	-1.93383	25.00000	Averaged
6	m+p-Xylene	6654	6643	6643	0.100	-0.16258	25.00000	Averaged
7	o-Xylene	5860	5748	5748	0.100	-1.91211	25.00000	Averaged
8	1,2,4-trimethylbenzene	5815	5841	5841	0.100	0.44561	25.00000	Averaged
10	Naphthalene	5055	5528	5528	0.100	9.34937	25.00000	Averaged
11	2,5-Dibromotoluene (PID)	50.00000	47.07191	3180	0.100	-5.85617	25.00000	Linear

*** = Compound out of QC criteria**

Form 7
Calibration Verification Summary

Lab Name : Katahdin Analytical Services
Project : Devens Spring 2018
Lab ID : WG226605-7
Lab File ID : 2LD10078.D
Initial Calibration Date(s): 03/30/18 10:30 03/30/18 13:58

SDG: SL3114
Analytical Date: 04/16/18 17:51
Instrument ID: GC02
Column ID: B

	Compound	$\overline{RRF}$/Amount	RF50	CCAL RRF50	Min	%D/ %Drift	Max %D/ %Drift	Curve Type
5	n-Pentane	4801	4364	4364	0.100	-9.10634	25.00000	Averaged
6	2-Methylpentane	5185	5064	5064	0.100	-2.33364	25.00000	Averaged
7	Methyl tert-butylether	3921	3994	3994	0.100	1.87218	25.00000	Averaged
8	2,2,4-Trimethylpentane	5819	5567	5567	0.100	-4.32588	25.00000	Averaged
9	Benzene	7296	7225	7225	0.100	-0.96931	25.00000	Averaged
11	Toluene	7207	7193	7193	0.100	-0.18310	25.00000	Averaged
12	n-Nonane	5219	4890	4890	0.100	-6.30151	30.00000	Averaged
13	n-Decane	4862	4404	4404	0.100	-9.42514	25.00000	Averaged
14	Ethylbenzene	6806	6880	6880	0.100	1.08283	25.00000	Averaged
15	m+p-Xylene	7113	7155	7155	0.100	0.58746	25.00000	Averaged
16	o-Xylene	7138	7225	7225	0.100	1.21471	25.00000	Averaged
18	1,2,4-trimethylbenzene	6688	6794	6794	0.100	1.57838	25.00000	Averaged
19	n-Butylcyclohexane	5754	5089	5089	0.100	-11.54157	25.00000	Averaged
20	Naphthalene	4255	4597	4597	0.100	8.04659	25.00000	Averaged
21	2,5-Dibromotoluene (FID)	50.00000	43.68499	1262	0.100	-12.63002	25.00000	Linear

*** = Compound out of QC criteria**

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Form 7
Calibration Verification Summary

Lab Name : Katahdin Analytical Services
Project : Devens Spring 2018
Lab ID : WG226650-4
Lab File ID : 2LD10080.D
Initial Calibration Date(s): 03/30/18 10:30 03/30/18 13:58

SDG: SL3114
Analytical Date: 04/17/18 08:52
Instrument ID: GC02
Column ID: A

	Compound	RRF/Amount	RF50	CCAL RRF50	Min	%D/ %Drift	Max %D/ %Drift	Curve Type
2	Methyl tert-butylether	3353	3148	3148	0.100	-6.10808	25.00000	Averaged
3	Benzene	7433	6813	6813	0.100	-8.34485	25.00000	Averaged
4	Toluene	6726	6248	6248	0.100	-7.11464	25.00000	Averaged
5	Ethylbenzene	5723	5407	5407	0.100	-5.51916	25.00000	Averaged
6	m+p-Xylene	6654	6399	6399	0.100	-3.83037	25.00000	Averaged
7	o-Xylene	5860	5519	5519	0.100	-5.82670	25.00000	Averaged
8	1,2,4-trimethylbenzene	5815	5631	5631	0.100	-3.16318	25.00000	Averaged
10	Naphthalene	5055	5408	5408	0.100	6.99325	25.00000	Averaged
11	2,5-Dibromotoluene (PID)	50.00000	44.08402	2981	0.100	-11.83196	25.00000	Linear

*** = Compound out of QC criteria**

Form 7
Calibration Verification Summary

Lab Name : Katahdin Analytical Services
Project : Devens Spring 2018
Lab ID : WG226650-4
Lab File ID : 2LD10080.D
Initial Calibration Date(s): 03/30/18 10:30 03/30/18 13:58

SDG: SL3114
Analytical Date: 04/17/18 08:52
Instrument ID: GC02
Column ID: B

	Compound	RRF/Amount	RF50	CCAL RRF50	Min	%D/ %Drift	Max %D/ %Drift	Curve Type
5	n-Pentane	4801	4562	4562	0.100	-4.96407	25.00000	Averaged
6	2-Methylpentane	5185	5289	5289	0.100	1.99211	25.00000	Averaged
7	Methyl tert-butylether	3921	3946	3946	0.100	0.63670	25.00000	Averaged
8	2,2,4-Trimethylpentane	5819	5892	5892	0.100	1.26010	25.00000	Averaged
9	Benzene	7296	7108	7108	0.100	-2.57817	25.00000	Averaged
11	Toluene	7207	7092	7092	0.100	-1.59098	25.00000	Averaged
12	n-Nonane	5219	5343	5343	0.100	2.37695	30.00000	Averaged
13	n-Decane	4862	4703	4703	0.100	-3.27863	25.00000	Averaged
14	Ethylbenzene	6806	6808	6808	0.100	0.02291	25.00000	Averaged
15	m+p-Xylene	7113	7054	7054	0.100	-0.83871	25.00000	Averaged
16	o-Xylene	7138	7047	7047	0.100	-1.27745	25.00000	Averaged
18	1,2,4-trimethylbenzene	6688	6734	6734	0.100	0.67679	25.00000	Averaged
19	n-Butylcyclohexane	5754	5551	5551	0.100	-3.51655	25.00000	Averaged
20	Naphthalene	4255	4470	4470	0.100	5.06045	25.00000	Averaged
21	2,5-Dibromotoluene (FID)	50.00000	42.07728	1212	0.100	-15.84544	25.00000	Linear

*** = Compound out of QC criteria**

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Form 7
Calibration Verification Summary

Lab Name : Katahdin Analytical Services
Project : Devens Spring 2018
Lab ID : WG226650-5
Lab File ID : 2LD10087.D
Initial Calibration Date(s): 03/30/18 10:30 03/30/18 13:58

SDG: SL3114
Analytical Date: 04/17/18 15:53
Instrument ID: GC02
Column ID: A

	Compound	RRF/Amount	RF50	CCAL RRF50	Min	%D/ %Drift	Max %D/ %Drift	Curve Type
2	Methyl tert-butylether	3353	3022	3022	0.100	-9.87995	25.00000	Averaged
3	Benzene	7433	6714	6714	0.100	-9.66601	25.00000	Averaged
4	Toluene	6726	6167	6167	0.100	-8.31735	25.00000	Averaged
5	Ethylbenzene	5723	5379	5379	0.100	-6.00284	25.00000	Averaged
6	m+p-Xylene	6654	6358	6358	0.100	-4.45390	25.00000	Averaged
7	o-Xylene	5860	5490	5490	0.100	-6.31235	25.00000	Averaged
8	1,2,4-trimethylbenzene	5815	5622	5622	0.100	-3.31142	25.00000	Averaged
10	Naphthalene	5055	5257	5257	0.100	3.99379	25.00000	Averaged
11	2,5-Dibromotoluene (PID)	50.00000	51.85477	3498	0.100	3.70953	25.00000	Linear

*** = Compound out of QC criteria**

Form 7
Calibration Verification Summary

Lab Name : Katahdin Analytical Services
Project : Devens Spring 2018
Lab ID : WG226650-5
Lab File ID : 2LD10087.D
Initial Calibration Date(s): 03/30/18 10:30 03/30/18 13:58

SDG: SL3114
Analytical Date: 04/17/18 15:53
Instrument ID: GC02
Column ID: B

	Compound	RRF/Amount	RF50	CCAL RRF50	Min	%D/ %Drift	Max %D/ %Drift	Curve Type
5	n-Pentane	4801	4463	4463	0.100	-7.04583	25.00000	Averaged
6	2-Methylpentane	5185	5163	5163	0.100	-0.43825	25.00000	Averaged
7	Methyl tert-butylether	3921	3851	3851	0.100	-1.77917	25.00000	Averaged
8	2,2,4-Trimethylpentane	5819	5800	5800	0.100	-0.32278	25.00000	Averaged
9	Benzene	7296	7024	7024	0.100	-3.72376	25.00000	Averaged
11	Toluene	7207	6984	6984	0.100	-3.09487	25.00000	Averaged
12	n-Nonane	5219	5226	5226	0.100	0.13491	30.00000	Averaged
13	n-Decane	4862	4588	4588	0.100	-5.64789	25.00000	Averaged
14	Ethylbenzene	6806	6759	6759	0.100	-0.69849	25.00000	Averaged
15	m+p-Xylene	7113	6986	6986	0.100	-1.78663	25.00000	Averaged
16	o-Xylene	7138	7032	7032	0.100	-1.49235	25.00000	Averaged
18	1,2,4-trimethylbenzene	6688	6682	6682	0.100	-0.09142	25.00000	Averaged
19	n-Butylcyclohexane	5754	5375	5375	0.100	-6.57556	25.00000	Averaged
20	Naphthalene	4255	4445	4445	0.100	4.47009	25.00000	Averaged
21	2,5-Dibromotoluene (FID)	50.00000	48.86595	1423	0.100	-2.26809	25.00000	Linear

*** = Compound out of QC criteria**

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Form 8
GC Analytical Sequence

Lab Name : Katahdin Analytical Services
Project : Devens Spring 2018
Instrument ID : GC02

SDG : SL3114

Client Sample ID	Lab Sample ID	Date Analyzed	Time Analyzed	DBT (FID)	DBT (PID)
Initial Calibration	WG225909-4	03/30/18	10:30		31.532
Initial Calibration	WG225909-4	03/30/18	10:30	31.522	
Initial Calibration	WG225909-1	03/30/18	11:12		31.531
Initial Calibration	WG225909-1	03/30/18	11:12	31.52	
Initial Calibration	WG225909-2	03/30/18	11:53		31.528
Initial Calibration	WG225909-2	03/30/18	11:53	31.518	
Initial Calibration	WG225909-3	03/30/18	12:35		31.528
Initial Calibration	WG225909-3	03/30/18	12:35	31.518	
Initial Calibration	WG225909-5	03/30/18	13:17		31.527
Initial Calibration	WG225909-5	03/30/18	13:17	31.517	
Initial Calibration	WG225909-6	03/30/18	13:58		31.531
Initial Calibration	WG225909-6	03/30/18	13:58	31.52	
Independent Source	WG225909-7	03/30/18	14:40	31.519	31.53
Continuing Calibrati	WG226605-6	04/16/18	08:34	31.49	31.501
Method Blank Sample	WG226605-1	04/16/18	09:41	31.492	31.502
Laboratory Control S	WG226605-2	04/16/18	10:22	31.495	31.505
Laboratory Control S	WG226605-3	04/16/18	11:04	31.497	31.507
TRIPBLANK2_040918	SL3114-6	04/16/18	12:21	31.493	31.504
32M-01-14XOB_SPR18	SL3114-2	04/16/18	13:43	31.501	31.511
32M-01-17XBR_SPR18	SL3114-3	04/16/18	14:24	31.495	31.505
32M-01-18XBR_SPR18	SL3114-4	04/16/18	15:06	31.501	31.512
32M-DUP01_SPR18	SL3114-5	04/16/18	15:47	31.501	31.512
Matrix Spike	WG226605-4	04/16/18	16:29	31.505	31.516
Matrix Spike Duplica	WG226605-5	04/16/18	17:10	31.506	31.516
Continuing Calibrati	WG226605-7	04/16/18	17:51	31.503	31.513
Continuing Calibrati	WG226650-4	04/17/18	08:52	31.524	31.534
Method Blank Sample	WG226650-1	04/17/18	09:57	31.527	31.537
Laboratory Control S	WG226650-2	04/17/18	10:38	31.526	31.536
Laboratory Control S	WG226650-3	04/17/18	11:20	31.525	31.535
32M-01-13XBR_SPR18	SL3114-1RA	04/17/18	12:43	31.525	31.535
32M-01-18XBR_SPR18	SL3114-4DL	04/17/18	13:24	31.524	31.534
32M-DUP01_SPR18	SL3114-5DL	04/17/18	14:06	31.526	31.536
Continuing Calibrati	WG226650-5	04/17/18	15:53	31.524	31.535

PO #	17-636	Devens - AOC32/43A Spring 2018	**Chain of Custody Record**	Page: 1 of: 1

Company	KOMAN GS, LLC		Laboratory: Test America - Savannah
Address:	293 Boston Post Road, Suite 100		Address: 510 LaRoche Ave, Savannah, GA 31404
Phone: 508-366-7442	Fax: 508-366-7445		Contact: Jerry Lanier
Sampled by [Print Name(s)]/Affilliation			Regulatory Facility No.
Sampler(s) Signature(s)			Project Name: Devens Spring 2018 LTM
			Sampling QAP No.:
			Approval Date:
			TAT Routine
			Other:

Preservatives (see codes): H, H, I, S, O, I, S, N

Analyses Requested

Item No.	Field ID No.	Sampled Date	Sampled Time	Col. Method (see codes)	Matrix (see codes)	Number of Containers	VOCs/SW8260 3-40-ml VOA vials (HCl)	VPH/MaDEP 3-40-ml VOA vials (HCl)	Total Metals*-SW6010/6020 1-250 ml poly (HNO3)	Remarks	Lab. No.
32M-01-13XBR_SPR18		4/10/18	1240	P	GW	7	X	X	X		
32M-01-14XOB_SPR18		4/10/18	1340	P	GW	7	X	X	X		
32M-01-17XBR_SPR18		4/9/18	1235	P	GW	21	X	X	X	MS/MSD	
32M-01-18XBR_SPR18		4/9/18	1400	P	GW	7	X	X	X		
32M-DUP01_SPR18		4/9/18	1405	P	GW	7	X	X	X		
TripBlank1		4/9/18	–	O	O	2	X				
TripBlank2		4/9/18	–	P	GW	2		X			
				P	GW						

680-150977 Chain of Custody

Shipping Details		courier pick up	0	← Total Number of Containers

		Item No.	Relinquished by/Affiliation	Date	Time		Date	Time
Date Out:	Via:		[signature]	4/11/18	1355	[signature]	4/11/18	[illegible]
Returned:	Via:		[signature]	4-11-18	1800			
Additional Comments:			[signature] (Received)	4/12/2018	9:10	TA Savannah		

* = Dissolved Metals include: Mn (6010); As (6020)

email logins and results to:

lekes@komangs.com

Lab Comments

Preserve Where Applicable ☐

On ICE ☐

Temperature _____ C

☐ NJ Reduced
☐ NJ Full
☐ Full CLP
☐ Disk Deliverable
☐ Other (Specify)

NJ Data Deliverable Info

☐ Commercial "A"
☐ Commercial "B"
☐ State Forms

MATRIX CODES: A = Air	GW = Groundwater	SE = Sediment	SP = Soil	SW = Surface Water		O = Other
PRESERVATIVE CODES:	H = HCL + Ice	I = Ice Only	N = Nitric Acid + Ice	S = Sulfuric Acid + Ice	M = Methanol	O = Other
COLLECTION METHOD CC	C = Composite	G=Grab	P= Pumping			O = Other

2.0°C / 2.1°C

Login Sample Receipt Checklist

Client: KOMAN Government Solutions, LLC

Job Number: 680-150977-1

Login Number: 150977
List Number: 1
Creator: Ragnaldsen, Amy E

List Source: 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.	True	
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.	N/A	
Residual Chlorine Checked.	N/A	

Accreditation/Certification Summary

Client: KOMAN Government Solutions, LLC
Project/Site: Devens / AOC32/43A Spring 2018

TestAmerica Job ID: 680-150977-1

Laboratory: TestAmerica Savannah

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
	AFCEE		SAVLAB	
Alabama	State Program	4	41450	06-30-18
Alaska	State Program	10		06-30-18
Alaska (UST)	State Program	10	UST-104	09-22-19
Arizona	State Program	9	AZ0808	12-14-18
Arkansas DEQ	State Program	6	88-0692	02-01-19
California	State Program	9	2939	06-30-18
Colorado	State Program	8	N/A	12-31-18
Connecticut	State Program	1	PH-0161	03-31-19
Florida	NELAP	4	E87052	06-30-18
GA Dept. of Agriculture	State Program	4	N/A	06-12-18
Georgia	State Program	4	803	06-30-18
Hawaii	State Program	9	N/A	06-30-18
Illinois	NELAP	5	200022	11-30-18
Indiana	State Program	5	N/A	06-30-18
Iowa	State Program	7	353	06-30-19
Kentucky (DW)	State Program	4	90084	12-31-18
Kentucky (UST)	State Program	4	18	06-30-18
Kentucky (WW)	State Program	4	90084	12-31-18 *
L-A-B	DoD ELAP		L2463	09-22-19
L-A-B	ISO/IEC 17025		L2463.01	09-22-19
Louisiana	NELAP	6	30690	06-30-18
Louisiana (DW)	NELAP	6	LA160019	12-31-18
Maine	State Program	1	GA00006	09-24-18
Maryland	State Program	3	250	12-31-18
Massachusetts	State Program	1	M-GA006	06-30-18
Michigan	State Program	5	9925	06-30-18
Mississippi	State Program	4	N/A	06-30-18
Nebraska	State Program	7	TestAmerica-Savannah	06-30-18
New Jersey	NELAP	2	GA769	06-30-18
New Mexico	State Program	6	N/A	06-30-18
New York	NELAP	2	10842	03-31-19
North Carolina (DW)	State Program	4	13701	07-31-18
North Carolina (WW/SW)	State Program	4	269	12-31-18
Oklahoma	State Program	6	9984	08-31-18
Pennsylvania	NELAP	3	68-00474	06-30-18
Puerto Rico	State Program	2	GA00006	12-31-18
South Carolina	State Program	4	98001	06-30-18
Tennessee	State Program	4	TN02961	06-30-18
Texas	NELAP	6	T104704185-16-9	11-30-18
Texas	State Program	6	T104704185	06-30-18
US Fish & Wildlife	Federal		LE058448-0	07-31-18
USDA	Federal		P330-17-00213	06-14-20 *
Virginia	NELAP	3	460161	06-14-18
Washington	State Program	10	C805	06-10-18
West Virginia (DW)	State Program	3	9950C	12-31-18
West Virginia DEP	State Program	3	094	06-30-18
Wisconsin	State Program	5	999819810	08-31-18
Wyoming	State Program	8	8TMS-L	06-30-16 *

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING



ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Tel: (912)354-7858

TestAmerica Job ID: 680-152299-1
Client Project/Site: Fort Devens / AOC 57 Spring 2018
Revision: 1

For:
KOMAN Government Solutions, LLC
293 Boston Post Road
Suite 100
Marlborough, Massachusetts 01752

Attn: Laurie Ekes

Authorized for release by:
6/4/2018 5:12:45 PM

Jerry Lanier, Project Manager I
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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.

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Job ID: 680-152299-1

Laboratory: TestAmerica Savannah

Narrative

CASE NARRATIVE

Client: KOMAN Government Solutions, LLC

Project: Fort Devens / AOC 57 Spring 2018

Report Number: 680-152299-1

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 05/10/2018; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 1.3 C.

METALS (ICP)
Samples 57M-SW1_SPR18 (680-152299-4) and 57M-SWDUP_SPR18 (680-152299-5) were analyzed for Metals (ICP) in accordance with EPA SW-846 Method 6010C. The samples were prepared on 05/15/2018 and analyzed on 05/16/2018.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

METALS (ICP)
Samples 57M-96-11X_SPR18 (680-152299-1), 57M-DUP01_SPR18 (680-152299-2) and 57M-95-03X_SPR18 (680-152299-3) were analyzed for Metals (ICP) in accordance with EPA SW-846 Method 6010C. The samples were prepared on 05/16/2018 and analyzed on 05/18/2018.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

METALS BY ICPMS
Samples 57M-SW1_SPR18 (680-152299-4) and 57M-SWDUP_SPR18 (680-152299-5) were analyzed for Metals by ICPMS in accordance with EPA SW-846 6020A. The samples were prepared on 05/15/2018 and analyzed on 05/17/2018.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

METALS
Samples 57M-96-11X_SPR18 (680-152299-1), 57M-DUP01_SPR18 (680-152299-2) and 57M-95-03X_SPR18 (680-152299-3) were analyzed for Metals in accordance with EPA SW-846 Method 6020. The samples were prepared on 05/16/2018 and analyzed on 05/17/2018.

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 / AOC 57 Spring 2018

TestAmerica Job ID: 680-152299-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
680-152299-1	57M-96-11X_SPR18	Water	05/08/18 11:25	05/10/18 08:45
680-152299-2	57M-DUP01_SPR18	Water	05/08/18 11:30	05/10/18 08:45
680-152299-3	57M-95-03X_SPR18	Water	05/08/18 12:45	05/10/18 08:45
680-152299-4	57M-SW1_SPR18	Water	05/08/18 11:40	05/10/18 08:45
680-152299-5	57M-SWDUP_SPR18	Water	05/08/18 11:45	05/10/18 08:45

Method Summary

Client: KOMAN Government Solutions, LLC
Project/Site: Fort Devens / AOC 57 Spring 2018

TestAmerica Job ID: 680-152299-1

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
3010A	Preparation, Total 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 = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

Qualifiers

Metals

Qualifier	Qualifier Description
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)

Detection Summary

Client: KOMAN Government Solutions, LLC
Project/Site: Fort Devens / AOC 57 Spring 2018

TestAmerica Job ID: 680-152299-1

Client Sample ID: 57M-96-11X_SPR18 — Lab Sample ID: 680-152299-1

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	Dil Fac	D	Method	Prep Type
Iron	37000		50	50	17	ug/L	1		6010C	Total/NA
Manganese	2700		10	3.0	1.0	ug/L	1		6010C	Total/NA
Arsenic	180		3.0	3.0	1.5	ug/L	1		6020A	Total/NA

Client Sample ID: 57M-DUP01_SPR18 — Lab Sample ID: 680-152299-2

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	Dil Fac	D	Method	Prep Type
Iron	36000		50	50	17	ug/L	1		6010C	Total/NA
Manganese	2500		10	3.0	1.0	ug/L	1		6010C	Total/NA
Arsenic	200		3.0	3.0	1.5	ug/L	1		6020A	Total/NA

Client Sample ID: 57M-95-03X_SPR18 — Lab Sample ID: 680-152299-3

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	Dil Fac	D	Method	Prep Type
Iron	8400		50	50	17	ug/L	1		6010C	Total/NA
Manganese	110		10	3.0	1.0	ug/L	1		6010C	Total/NA
Arsenic	42		3.0	3.0	1.5	ug/L	1		6020A	Total/NA

Client Sample ID: 57M-SW1_SPR18 — Lab Sample ID: 680-152299-4

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	Dil Fac	D	Method	Prep Type
Iron	4000		50	50	17	ug/L	1		6010C	Total Recoverable
Manganese	800		10	3.0	1.0	ug/L	1		6010C	Total Recoverable
Arsenic	5.2		3.0	3.0	1.5	ug/L	1		6020A	Total Recoverable

Client Sample ID: 57M-SWDUP_SPR18 — Lab Sample ID: 680-152299-5

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	Dil Fac	D	Method	Prep Type
Iron	4700		50	50	17	ug/L	1		6010C	Total Recoverable
Manganese	910		10	3.0	1.0	ug/L	1		6010C	Total Recoverable
Arsenic	4.9		3.0	3.0	1.5	ug/L	1		6020A	Total Recoverable

This Detection Summary does not include radiochemical test results.

Client Sample ID: 57M-96-11X_SPR18

Lab Sample ID: 680-152299-1
Date Collected: 05/08/18 11:25
Matrix: Water
Date Received: 05/10/18 08:45

Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	37000		50	50	17	ug/L		05/18/18 03:20	1
Manganese	2700		10	3.0	1.0	ug/L		05/18/18 03:20	1

Method: 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	180		3.0	3.0	1.5	ug/L		05/17/18 12:40	1

Client Sample ID: 57M-DUP01_SPR18

Lab Sample ID: 680-152299-2
Date Collected: 05/08/18 11:30
Matrix: Water
Date Received: 05/10/18 08:45

Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	36000		50	50	17	ug/L		05/18/18 03:25	1
Manganese	2500		10	3.0	1.0	ug/L		05/18/18 03:25	1

Method: 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	200		3.0	3.0	1.5	ug/L		05/17/18 12:43	1

Client Sample ID: 57M-95-03X_SPR18

Lab Sample ID: 680-152299-3
Date Collected: 05/08/18 12:45
Matrix: Water
Date Received: 05/10/18 08:45

Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	8400		50	50	17	ug/L		05/18/18 02:23	1
Manganese	110		10	3.0	1.0	ug/L		05/18/18 02:23	1

Method: 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	42		3.0	3.0	1.5	ug/L		05/17/18 12:24	1

Client Sample ID: 57M-SW1_SPR18

Lab Sample ID: 680-152299-4
Date Collected: 05/08/18 11:40
Matrix: Water
Date Received: 05/10/18 08:45

Method: 6010C - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	4000		50	50	17	ug/L		05/16/18 19:43	1
Manganese	800		10	3.0	1.0	ug/L		05/16/18 19:43	1

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	5.2		3.0	3.0	1.5	ug/L		05/17/18 11:55	1

Client: KOMAN Government Solutions, LLC
Project/Site: Fort Devens / AOC 57 Spring 2018

TestAmerica Job ID: 680-152299-1

Client Sample ID: 57M-SWDUP_SPR18
Date Collected: 05/08/18 11:45
Date Received: 05/10/18 08:45

Lab Sample ID: 680-152299-5
Matrix: Water

Method: 6010C - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	4700		50	50	17	ug/L		05/16/18 19:09	1
Manganese	910		10	3.0	1.0	ug/L		05/16/18 19:09	1

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	4.9		3.0	3.0	1.5	ug/L		05/17/18 10:51	1

Method: 6010C - Metals (ICP)

Lab Sample ID: MB 680-524121/1-A
Matrix: Water
Analysis Batch: 524545

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 524121

Analyte	MB Result	MB Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	50	U	50	50	17	ug/L		05/18/18 02:13	1
Manganese	3.0	U	10	3.0	1.0	ug/L		05/18/18 02:13	1

Lab Sample ID: LCS 680-524121/2-A
Matrix: Water
Analysis Batch: 524545

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 524121

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Iron	5000	5070		ug/L		101	87 - 115
Manganese	500	520		ug/L		104	90 - 114

Lab Sample ID: 680-152299-3 MS
Matrix: Water
Analysis Batch: 524545

Client Sample ID: 57M-95-03X_SPR18
Prep Type: Total/NA
Prep Batch: 524121

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Iron	8400		5000	13800		ug/L		108	87 - 115
Manganese	110		500	638		ug/L		106	90 - 114

Lab Sample ID: 680-152299-3 MSD
Matrix: Water
Analysis Batch: 524545

Client Sample ID: 57M-95-03X_SPR18
Prep Type: Total/NA
Prep Batch: 524121

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Iron	8400		5000	13400		ug/L		99	87 - 115	3	20
Manganese	110		500	614		ug/L		101	90 - 114	4	20

Lab Sample ID: MB 680-524001/1-A
Matrix: Water
Analysis Batch: 524330

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 524001

Analyte	MB Result	MB Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	50	U	50	50	17	ug/L		05/16/18 18:31	1
Manganese	3.0	U	10	3.0	1.0	ug/L		05/16/18 18:31	1

Lab Sample ID: LCS 680-524001/2-A
Matrix: Water
Analysis Batch: 524330

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 524001

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Iron	5000	4730		ug/L		95	87 - 115
Manganese	500	478		ug/L		96	90 - 114

Lab Sample ID: MB 680-524061/1-A
Matrix: Water
Analysis Batch: 524330

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 524061

Analyte	MB Result	MB Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	50	U	50	50	17	ug/L		05/16/18 19:13	1

Method: 6010C - Metals (ICP) (Continued)

Lab Sample ID: MB 680-524061/1-A
Matrix: Water
Analysis Batch: 524330

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 524061

Analyte	MB Result	MB Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Manganese	3.0	U	10	3.0	1.0	ug/L		05/16/18 19:13	1

Lab Sample ID: LCS 680-524061/2-A
Matrix: Water
Analysis Batch: 524330

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 524061

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Iron	5000	4770		ug/L		95	87 - 115
Manganese	500	490		ug/L		98	90 - 114

Method: 6020A - Metals (ICP/MS)

Lab Sample ID: MB 680-524116/1-A
Matrix: Water
Analysis Batch: 524414

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 524116

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		05/17/18 12:18	1

Lab Sample ID: LCS 680-524116/2-A
Matrix: Water
Analysis Batch: 524414

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 524116

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	100	107		ug/L		107	84 - 116

Lab Sample ID: 680-152299-3 MS
Matrix: Water
Analysis Batch: 524414

Client Sample ID: 57M-95-03X_SPR18
Prep Type: Total/NA
Prep Batch: 524116

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	42		100	147		ug/L		105	84 - 116

Lab Sample ID: 680-152299-3 MSD
Matrix: Water
Analysis Batch: 524414

Client Sample ID: 57M-95-03X_SPR18
Prep Type: Total/NA
Prep Batch: 524116

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Arsenic	42		100	149		ug/L		107	84 - 116	1	20

Lab Sample ID: MB 680-524000/1-A
Matrix: Water
Analysis Batch: 524414

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 524000

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		05/17/18 09:28	1

Method: 6020A - Metals (ICP/MS) (Continued)

Lab Sample ID: LCS 680-524000/2-A
Matrix: Water
Analysis Batch: 524414

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 524000

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	100	95.2		ug/L		95	84 - 116

Lab Sample ID: MB 680-524060/1-A
Matrix: Water
Analysis Batch: 524414

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 524060

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		05/17/18 11:14	1

Lab Sample ID: LCS 680-524060/2-A
Matrix: Water
Analysis Batch: 524414

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 524060

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	100	98.4		ug/L		98	84 - 116

Metals

Prep Batch: 524000

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-152299-5	57M-SWDUP_SPR18	Total Recoverable	Water	3005A	
MB 680-524000/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 680-524000/2-A	Lab Control Sample	Total Recoverable	Water	3005A	

Prep Batch: 524001

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-152299-5	57M-SWDUP_SPR18	Total Recoverable	Water	3005A	
MB 680-524001/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 680-524001/2-A	Lab Control Sample	Total Recoverable	Water	3005A	

Prep Batch: 524060

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-152299-4	57M-SW1_SPR18	Total Recoverable	Water	3005A	
MB 680-524060/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 680-524060/2-A	Lab Control Sample	Total Recoverable	Water	3005A	

Prep Batch: 524061

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-152299-4	57M-SW1_SPR18	Total Recoverable	Water	3005A	
MB 680-524061/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 680-524061/2-A	Lab Control Sample	Total Recoverable	Water	3005A	

Prep Batch: 524116

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-152299-1	57M-96-11X_SPR18	Total/NA	Water	3010A	
680-152299-2	57M-DUP01_SPR18	Total/NA	Water	3010A	
680-152299-3	57M-95-03X_SPR18	Total/NA	Water	3010A	
MB 680-524116/1-A	Method Blank	Total/NA	Water	3010A	
LCS 680-524116/2-A	Lab Control Sample	Total/NA	Water	3010A	
680-152299-3 MS	57M-95-03X_SPR18	Total/NA	Water	3010A	
680-152299-3 MSD	57M-95-03X_SPR18	Total/NA	Water	3010A	

Prep Batch: 524121

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-152299-1	57M-96-11X_SPR18	Total/NA	Water	3010A	
680-152299-2	57M-DUP01_SPR18	Total/NA	Water	3010A	
680-152299-3	57M-95-03X_SPR18	Total/NA	Water	3010A	
MB 680-524121/1-A	Method Blank	Total/NA	Water	3010A	
LCS 680-524121/2-A	Lab Control Sample	Total/NA	Water	3010A	
680-152299-3 MS	57M-95-03X_SPR18	Total/NA	Water	3010A	
680-152299-3 MSD	57M-95-03X_SPR18	Total/NA	Water	3010A	

Analysis Batch: 524330

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-152299-4	57M-SW1_SPR18	Total Recoverable	Water	6010C	524061
680-152299-5	57M-SWDUP_SPR18	Total Recoverable	Water	6010C	524001
MB 680-524001/1-A	Method Blank	Total Recoverable	Water	6010C	524001
MB 680-524061/1-A	Method Blank	Total Recoverable	Water	6010C	524061
LCS 680-524001/2-A	Lab Control Sample	Total Recoverable	Water	6010C	524001
LCS 680-524061/2-A	Lab Control Sample	Total Recoverable	Water	6010C	524061

Metals (Continued)

Analysis Batch: 524414

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-152299-1	57M-96-11X_SPR18	Total/NA	Water	6020A	524116
680-152299-2	57M-DUP01_SPR18	Total/NA	Water	6020A	524116
680-152299-3	57M-95-03X_SPR18	Total/NA	Water	6020A	524116
680-152299-4	57M-SW1_SPR18	Total Recoverable	Water	6020A	524060
680-152299-5	57M-SWDUP_SPR18	Total Recoverable	Water	6020A	524000
MB 680-524000/1-A	Method Blank	Total Recoverable	Water	6020A	524000
MB 680-524060/1-A	Method Blank	Total Recoverable	Water	6020A	524060
MB 680-524116/1-A	Method Blank	Total/NA	Water	6020A	524116
LCS 680-524000/2-A	Lab Control Sample	Total Recoverable	Water	6020A	524000
LCS 680-524060/2-A	Lab Control Sample	Total Recoverable	Water	6020A	524060
LCS 680-524116/2-A	Lab Control Sample	Total/NA	Water	6020A	524116
680-152299-3 MS	57M-95-03X_SPR18	Total/NA	Water	6020A	524116
680-152299-3 MSD	57M-95-03X_SPR18	Total/NA	Water	6020A	524116

Analysis Batch: 524545

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-152299-1	57M-96-11X_SPR18	Total/NA	Water	6010C	524121
680-152299-2	57M-DUP01_SPR18	Total/NA	Water	6010C	524121
680-152299-3	57M-95-03X_SPR18	Total/NA	Water	6010C	524121
MB 680-524121/1-A	Method Blank	Total/NA	Water	6010C	524121
LCS 680-524121/2-A	Lab Control Sample	Total/NA	Water	6010C	524121
680-152299-3 MS	57M-95-03X_SPR18	Total/NA	Water	6010C	524121
680-152299-3 MSD	57M-95-03X_SPR18	Total/NA	Water	6010C	524121

Lab Chronicle

Client: KOMAN Government Solutions, LLC
Project/Site: Fort Devens / AOC 57 Spring 2018

TestAmerica Job ID: 680-152299-1

Client Sample ID: 57M-96-11X_SPR18

Lab Sample ID: 680-152299-1

Date Collected: 05/08/18 11:25

Matrix: Water

Date Received: 05/10/18 08:45

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3010A			50 mL	50 mL	524121	05/16/18 09:32	AJR	TAL SAV
Total/NA	Analysis	6010C		1			524545	05/18/18 03:20	BCB	TAL SAV
	Instrument ID: ICPE									
Total/NA	Prep	3010A			50 mL	250 mL	524116	05/16/18 09:32	AJR	TAL SAV
Total/NA	Analysis	6020A		1			524414	05/17/18 12:40	BWR	TAL SAV
	Instrument ID: ICPMSD									

Client Sample ID: 57M-DUP01_SPR18

Lab Sample ID: 680-152299-2

Date Collected: 05/08/18 11:30

Matrix: Water

Date Received: 05/10/18 08:45

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3010A			50 mL	50 mL	524121	05/16/18 09:32	AJR	TAL SAV
Total/NA	Analysis	6010C		1			524545	05/18/18 03:25	BCB	TAL SAV
	Instrument ID: ICPE									
Total/NA	Prep	3010A			50 mL	250 mL	524116	05/16/18 09:32	AJR	TAL SAV
Total/NA	Analysis	6020A		1			524414	05/17/18 12:43	BWR	TAL SAV
	Instrument ID: ICPMSD									

Client Sample ID: 57M-95-03X_SPR18

Lab Sample ID: 680-152299-3

Date Collected: 05/08/18 12:45

Matrix: Water

Date Received: 05/10/18 08:45

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3010A			50 mL	50 mL	524121	05/16/18 09:32	AJR	TAL SAV
Total/NA	Analysis	6010C		1			524545	05/18/18 02:23	BCB	TAL SAV
	Instrument ID: ICPE									
Total/NA	Prep	3010A			50 mL	250 mL	524116	05/16/18 09:32	AJR	TAL SAV
Total/NA	Analysis	6020A		1			524414	05/17/18 12:24	BWR	TAL SAV
	Instrument ID: ICPMSD									

Client Sample ID: 57M-SW1_SPR18

Lab Sample ID: 680-152299-4

Date Collected: 05/08/18 11:40

Matrix: Water

Date Received: 05/10/18 08:45

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	524061	05/15/18 16:44	BCB	TAL SAV
Total Recoverable	Analysis	6010C		1			524330	05/16/18 19:43	BCB	TAL SAV
	Instrument ID: ICPE									
Total Recoverable	Prep	3005A			50 mL	250 mL	524060	05/15/18 16:42	BCB	TAL SAV
Total Recoverable	Analysis	6020A		1			524414	05/17/18 11:55	BWR	TAL SAV
	Instrument ID: ICPMSD									

Lab Chronicle

Client: KOMAN Government Solutions, LLC
Project/Site: Fort Devens / AOC 57 Spring 2018

TestAmerica Job ID: 680-152299-1

Client Sample ID: 57M-SWDUP_SPR18
Date Collected: 05/08/18 11:45
Date Received: 05/10/18 08:45

Lab Sample ID: 680-152299-5
Matrix: Water

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	524001	05/15/18 12:57	AJR	TAL SAV
Total Recoverable	Analysis	6010C		1			524330	05/16/18 19:09	BCB	TAL SAV
	Instrument ID: ICPE									
Total Recoverable	Prep	3005A			50 mL	250 mL	524000	05/15/18 12:57	AJR	TAL SAV
Total Recoverable	Analysis	6020A		1			524414	05/17/18 10:51	BWR	TAL SAV
	Instrument ID: ICPMSD									

Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

360325-Boston

PO # 18-706 | Devens - AOC57 Spring 2018

Chain of Custody Record

Page: 1 of: 1

Company:	KOMAN GS, LLC
Address:	293 Boston Post Road, Suite 100, Marlborough, MA 01752
Phone:	508-366-7442 Fax: 508-366-7445
Sampled by Print Name(s)/Affiliation	Jerry Lanier
Sampler(s) Signature(s)	

Laboratory:	Test America - Savannah
Address:	510 LaRoche Ave, Savannah, GA 31404
Contact:	Jerry Lanier
Regulatory Facility No.	
Project Name:	Devens Spring 2018 LTM
Sampling QAP No.:	
Approval Date:	
TAT	Routine
Other:	

Item No.	Field ID No.	Sampled Date	Sampled Time	Col. Method (see codes)	Matrix (see codes)	Number of Containers	Preservatives (see codes) N	H	I	S	O	I	S	Analyses Requested: Total Metals*-SW6010/6020 1-250 ml poly (HNO3)	Analyses Requested: Dissolved Metals*-SW6010/6020 1-250 ml poly (HNO3)	Remarks	Lab. No.
1	57M-96-11X_SPR18	5/8/18	1125	P	GW	1								X			
2	57M-DUP01_SPR18	5/8/18	1130	P	GW	1								X			
3	57M-95-03X_SPR18	5/8/18	1245	P	GW	3								X		MS/MSD	
4	57M-SW1_SPR18	5/8/18	1140	P	GW	1									X		
5	57M-SWDUP_SPR18	5/8/18	1145	P	GW	1									X		

680-152299 Chain of Custody

Shipping Details: courier pick up | 7 0 ← Total Number of Containers

Date Out:	Via:	Item No.	Relinquished by/Affiliation	Date	Time		Date	Time
Returned:	Via:			5/8/18	1440	Offic		
Additional Comments:				5/9/18	1400		5-9-18	1400
* = Dissolved Metals include: Fe, Mn (6010), As (6020)				5-9-18	1000			
							5/10/18	0845
						1.9 (1.3)		

email logins and results to: lekes@komangs.com

Lab Comments

Preserve Where Applicable ☐

On ICE ☐

Temperature _____ C

☐ NJ Reduced
☐ NJ Full
☐ Full CLP
☐ Disk Deliverable
☐ Other (Specify)

NJ Data Deliverable Info

☐ Commercial "A"
☐ Commercial "B"
☐ State Forms

MATRIX CODES:	GW = Groundwater			SW = Surface Water									O = Other
PRESERVATIVE CODES:	H = HCL + Ice	I = Ice Only		N = Nitric Acid + Ice									O = Other
COLLECTION METHOD CODES:	P= Pumping	G=Grab											O = Other

Login Sample Receipt Checklist

Client: KOMAN Government Solutions, LLC

Job Number: 680-152299-1

Login Number: 152299

List Source: TestAmerica Savannah

List Number: 1

Creator: Edwards, Jessica R

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: Fort Devens / AOC 57 Spring 2018

TestAmerica Job ID: 680-152299-1

Laboratory: TestAmerica Savannah

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
	AFCEE		SAVLAB	
Alabama	State Program	4	41450	06-30-18
Alaska	State Program	10		06-30-18
Alaska (UST)	State Program	10	UST-104	09-22-19
Arizona	State Program	9	AZ0808	12-14-18
Arkansas DEQ	State Program	6	88-0692	02-01-19
California	State Program	9	2939	06-30-18
Colorado	State Program	8	N/A	12-31-18
Connecticut	State Program	1	PH-0161	03-31-19
Florida	NELAP	4	E87052	06-30-18
GA Dept. of Agriculture	State Program	4	N/A	06-12-18
Georgia	State Program	4	803	06-30-18
Guam	State Program	9	15-005r	04-17-19
Hawaii	State Program	9	N/A	06-30-18
Illinois	NELAP	5	200022	11-30-18
Indiana	State Program	5	N/A	06-30-18
Iowa	State Program	7	353	06-30-19
Kentucky (DW)	State Program	4	90084	12-31-18
Kentucky (UST)	State Program	4	18	06-30-18
Kentucky (WW)	State Program	4	90084	12-31-18 *
L-A-B	DoD ELAP		L2463	09-22-19
L-A-B	ISO/IEC 17025		L2463.01	09-22-19
Louisiana	NELAP	6	30690	06-30-18
Louisiana (DW)	NELAP	6	LA160019	12-31-18
Maine	State Program	1	GA00006	09-24-18
Maryland	State Program	3	250	12-31-18
Massachusetts	State Program	1	M-GA006	06-30-18
Michigan	State Program	5	9925	06-30-18
Mississippi	State Program	4	N/A	06-30-18
Nebraska	State Program	7	TestAmerica-Savannah	06-30-18
New Jersey	NELAP	2	GA769	06-30-18
New Mexico	State Program	6	N/A	06-30-18
New York	NELAP	2	10842	03-31-19
North Carolina (DW)	State Program	4	13701	07-31-18
North Carolina (WW/SW)	State Program	4	269	12-31-18
Oklahoma	State Program	6	9984	08-31-18
Pennsylvania	NELAP	3	68-00474	06-30-18
Puerto Rico	State Program	2	GA00006	12-31-18
South Carolina	State Program	4	98001	06-30-18
Tennessee	State Program	4	TN02961	06-30-18
Texas	NELAP	6	T104704185-16-9	11-30-18
Texas	State Program	6	T104704185	06-30-18
US Fish & Wildlife	Federal		LE058448-0	07-31-18
USDA	Federal		P330-17-00213	06-14-20 *
Virginia	NELAP	3	460161	06-14-18
Washington	State Program	10	C805	06-10-18
West Virginia (DW)	State Program	3	9950C	12-31-18
West Virginia DEP	State Program	3	094	06-30-18
Wisconsin	State Program	5	999819810	08-31-18
Wyoming	State Program	8	8TMS-L	06-30-16 *

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

B.2

Fall 2018 LTM Event

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING



ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Tel: (912)354-7858

TestAmerica Job ID: 680-159120-2
Client Project/Site: Fort Devens / LTM / AOC 43G

For:
KOMAN Government Solutions, LLC
293 Boston Post Road
Suite 100
Marlborough, Massachusetts 01752

Attn: Laurie Ekes

Jerry Lanier

Authorized for release by:
10/30/2018 5:17:38 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.

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Job ID: 680-159120-2

Laboratory: TestAmerica Savannah

Narrative

CASE NARRATIVE

Client: KOMAN Government Solutions, LLC

Project: Fort Devens / LTM / AOC 43G

Report Number: 680-159120-2

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 10/11/2018; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 2.0 C.

METALS (ICP)
Samples XGM-93-02X_FAL18 (680-159120-12), XGM-97-12X_FAL18 (680-159120-13), XGM-DUP1_FAL18 (680-159120-14), AAFES-2_FAL18 (680-159120-15), XGM-94-04X_FAL18 (680-159120-16) and AAFES-7_FAL18 (680-159120-17) were analyzed for Metals (ICP) in accordance with EPA SW-846 Method 6010C. The samples were prepared on 10/13/2018 and analyzed on 10/16/2018.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

METALS
Samples XGM-93-02X_FAL18 (680-159120-12), XGM-97-12X_FAL18 (680-159120-13), XGM-DUP1_FAL18 (680-159120-14), AAFES-2_FAL18 (680-159120-15), XGM-94-04X_FAL18 (680-159120-16) and AAFES-7_FAL18 (680-159120-17) were analyzed for Metals in accordance with EPA SW-846 Method 6020. The samples were prepared on 10/13/2018 and analyzed on 10/15/2018.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

ALKALINITY
Samples XGM-93-02X_FAL18 (680-159120-12), XGM-97-12X_FAL18 (680-159120-13), XGM-DUP1_FAL18 (680-159120-14), AAFES-2_FAL18 (680-159120-15) and XGM-94-04X_FAL18 (680-159120-16) were analyzed for alkalinity in accordance with SM 2320B. The samples were analyzed on 10/12/2018.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Subcontract Work
Method MA VPH: This method was subcontracted to Katahdin Analytical Services Inc. The subcontract laboratory certification is different from that of the facility issuing the final report.

Sample Summary

Client: KOMAN Government Solutions, LLC
Project/Site: Fort Devens / LTM / AOC 43G

TestAmerica Job ID: 680-159120-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
680-159120-12	XGM-93-02X_FAL18	Water	10/10/18 11:40	10/11/18 09:20
680-159120-13	XGM-97-12X_FAL18	Water	10/10/18 12:55	10/11/18 09:20
680-159120-14	XGM-DUP1_FAL18	Water	10/10/18 13:00	10/11/18 09:20
680-159120-15	AAFES-2_FAL18	Water	10/10/18 12:30	10/11/18 09:20
680-159120-16	XGM-94-04X_FAL18	Water	10/10/18 11:15	10/11/18 09:20
680-159120-17	AAFES-7_FAL18	Water	10/10/18 10:15	10/11/18 09:20
680-159120-18	XGM-TRIPBLANK	Water	10/10/18 00:00	10/11/18 09:20

Method Summary

Client: KOMAN Government Solutions, LLC
Project/Site: Fort Devens / LTM / AOC 43G

TestAmerica Job ID: 680-159120-2

Method	Method Description	Protocol	Laboratory
6010C	Metals (ICP)	SW846	TAL SAV
6020A	Metals (ICP/MS)	SW846	TAL SAV
SM 2320B	Alkalinity	SM	TAL DEN
MA-VPH	MADEP VPH Volatile Petroleum Hydrocarbon	MA DEP	
3010A	Preparation, Total Metals	SW846	TAL SAV

Protocol References:

MA DEP = Massachusetts Department Of Environmental Protection

SM = "Standard Methods For The Examination Of Water And Wastewater"

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

= Katahdin Analytical Services Inc, PO BOX 540, 600 Technology Way, Scarborough, ME 04074

TAL DEN = TestAmerica Denver, 4955 Yarrow Street, Arvada, CO 80002, TEL (303)736-0100

TAL SAV = 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
U	Undetected at the Limit of Detection.

General Chemistry

Qualifier	Qualifier Description
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 ID: XGM-93-02X_FAL18

Lab Sample ID: 680-159120-12
Date Collected: 10/10/18 11:40
Matrix: Water
Date Received: 10/11/18 09:20

Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	20000		50	50	17	ug/L		10/16/18 12:20	1
Manganese	1900		10	3.0	1.0	ug/L		10/16/18 12:20	1

Method: 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	11		3.0	3.0	1.5	ug/L		10/15/18 22:37	1

General Chemistry

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Alkalinity	160		5.0	5.0	1.1	mg/L		10/12/18 21:39	1

Client Sample ID: XGM-97-12X_FAL18

Lab Sample ID: 680-159120-13
Date Collected: 10/10/18 12:55
Matrix: Water
Date Received: 10/11/18 09:20

Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	27000		50	50	17	ug/L		10/16/18 11:47	1
Manganese	3800		10	3.0	1.0	ug/L		10/16/18 11:47	1

Method: 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	9.8		3.0	3.0	1.5	ug/L		10/15/18 22:19	1

General Chemistry

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Alkalinity	220		5.0	5.0	1.1	mg/L		10/12/18 21:44	1

Client Sample ID: XGM-DUP1_FAL18

Lab Sample ID: 680-159120-14
Date Collected: 10/10/18 13:00
Matrix: Water
Date Received: 10/11/18 09:20

Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	28000		50	50	17	ug/L		10/16/18 11:55	1
Manganese	3900		10	3.0	1.0	ug/L		10/16/18 11:55	1

Method: 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	11		3.0	3.0	1.5	ug/L		10/15/18 22:26	1

General Chemistry

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Alkalinity	220		5.0	5.0	1.1	mg/L		10/12/18 21:50	1

Client Sample ID: AAFES-2_FAL18

Lab Sample ID: 680-159120-15
Date Collected: 10/10/18 12:30
Matrix: Water
Date Received: 10/11/18 09:20

Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	19000		50	50	17	ug/L		10/16/18 11:51	1
Manganese	3100		10	3.0	1.0	ug/L		10/16/18 11:51	1

Method: 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	20		3.0	3.0	1.5	ug/L		10/15/18 22:23	1

General Chemistry

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Alkalinity	130		5.0	5.0	1.1	mg/L		10/12/18 21:55	1

Client Sample ID: XGM-94-04X_FAL18

Lab Sample ID: 680-159120-16
Date Collected: 10/10/18 11:15
Matrix: Water
Date Received: 10/11/18 09:20

Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	140		50	50	17	ug/L		10/16/18 11:26	1
Manganese	230		10	3.0	1.0	ug/L		10/16/18 11:26	1

Method: 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	1.6	J	3.0	3.0	1.5	ug/L		10/15/18 22:02	1

General Chemistry

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Alkalinity	170		5.0	5.0	1.1	mg/L		10/12/18 22:01	1

Client Sample ID: AAFES-7_FAL18

Lab Sample ID: 680-159120-17
Date Collected: 10/10/18 10:15
Matrix: Water
Date Received: 10/11/18 09:20

Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Manganese	16		10	3.0	1.0	ug/L		10/16/18 12:24	1

Method: 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	3.0	U	3.0	3.0	1.5	ug/L		10/15/18 22:40	1

Method: 6010C - Metals (ICP)

Lab Sample ID: MB 680-543244/1-A
Matrix: Water
Analysis Batch: 543603

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 543244

Analyte	MB Result	MB Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	50	U	50	50	17	ug/L		10/16/18 11:18	1
Manganese	3.0	U	10	3.0	1.0	ug/L		10/16/18 11:18	1

Lab Sample ID: LCS 680-543244/2-A
Matrix: Water
Analysis Batch: 543603

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 543244

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Iron	5000	5090		ug/L		102	87 - 115
Manganese	500	533		ug/L		107	90 - 114

Lab Sample ID: 680-159120-16 MS
Matrix: Water
Analysis Batch: 543603

Client Sample ID: XGM-94-04X_FAL18
Prep Type: Total/NA
Prep Batch: 543244

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Iron	140		5000	5160		ug/L		100	87 - 115
Manganese	230		500	769		ug/L		108	90 - 114

Lab Sample ID: 680-159120-16 MSD
Matrix: Water
Analysis Batch: 543603

Client Sample ID: XGM-94-04X_FAL18
Prep Type: Total/NA
Prep Batch: 543244

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Iron	140		5000	4770		ug/L		93	87 - 115	8	20
Manganese	230		500	754		ug/L		105	90 - 114	2	20

Method: 6020A - Metals (ICP/MS)

Lab Sample ID: MB 680-543243/1-A
Matrix: Water
Analysis Batch: 543525

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 543243

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		10/15/18 21:55	1

Lab Sample ID: LCS 680-543243/2-A
Matrix: Water
Analysis Batch: 543525

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 543243

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	100	101		ug/L		101	84 - 116

Lab Sample ID: 680-159120-16 MS
Matrix: Water
Analysis Batch: 543525

Client Sample ID: XGM-94-04X_FAL18
Prep Type: Total/NA
Prep Batch: 543243

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	1.6	J	100	109		ug/L		107	84 - 116

Method: 6020A - Metals (ICP/MS) (Continued)

Lab Sample ID: 680-159120-16 MSD
Matrix: Water
Analysis Batch: 543525

Client Sample ID: XGM-94-04X_FAL18
Prep Type: Total/NA
Prep Batch: 543243

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Arsenic	1.6	J	100	97.9		ug/L		96	84 - 116	11	20

Method: SM 2320B - Alkalinity

Lab Sample ID: MB 280-433268/31
Matrix: Water
Analysis Batch: 433268

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Alkalinity	5.0	U	5.0	5.0	1.1	mg/L		10/12/18 20:24	1

Lab Sample ID: LCS 280-433268/30
Matrix: Water
Analysis Batch: 433268

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Alkalinity	200	197		mg/L		99	90 - 110

Metals

Prep Batch: 543243

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-159120-12	XGM-93-02X_FAL18	Total/NA	Water	3010A	
680-159120-13	XGM-97-12X_FAL18	Total/NA	Water	3010A	
680-159120-14	XGM-DUP1_FAL18	Total/NA	Water	3010A	
680-159120-15	AAFES-2_FAL18	Total/NA	Water	3010A	
680-159120-16	XGM-94-04X_FAL18	Total/NA	Water	3010A	
680-159120-17	AAFES-7_FAL18	Total/NA	Water	3010A	
MB 680-543243/1-A	Method Blank	Total/NA	Water	3010A	
LCS 680-543243/2-A	Lab Control Sample	Total/NA	Water	3010A	
680-159120-16 MS	XGM-94-04X_FAL18	Total/NA	Water	3010A	
680-159120-16 MSD	XGM-94-04X_FAL18	Total/NA	Water	3010A	

Prep Batch: 543244

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-159120-12	XGM-93-02X_FAL18	Total/NA	Water	3010A	
680-159120-13	XGM-97-12X_FAL18	Total/NA	Water	3010A	
680-159120-14	XGM-DUP1_FAL18	Total/NA	Water	3010A	
680-159120-15	AAFES-2_FAL18	Total/NA	Water	3010A	
680-159120-16	XGM-94-04X_FAL18	Total/NA	Water	3010A	
680-159120-17	AAFES-7_FAL18	Total/NA	Water	3010A	
MB 680-543244/1-A	Method Blank	Total/NA	Water	3010A	
LCS 680-543244/2-A	Lab Control Sample	Total/NA	Water	3010A	
680-159120-16 MS	XGM-94-04X_FAL18	Total/NA	Water	3010A	
680-159120-16 MSD	XGM-94-04X_FAL18	Total/NA	Water	3010A	

Analysis Batch: 543525

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-159120-12	XGM-93-02X_FAL18	Total/NA	Water	6020A	543243
680-159120-13	XGM-97-12X_FAL18	Total/NA	Water	6020A	543243
680-159120-14	XGM-DUP1_FAL18	Total/NA	Water	6020A	543243
680-159120-15	AAFES-2_FAL18	Total/NA	Water	6020A	543243
680-159120-16	XGM-94-04X_FAL18	Total/NA	Water	6020A	543243
680-159120-17	AAFES-7_FAL18	Total/NA	Water	6020A	543243
MB 680-543243/1-A	Method Blank	Total/NA	Water	6020A	543243
LCS 680-543243/2-A	Lab Control Sample	Total/NA	Water	6020A	543243
680-159120-16 MS	XGM-94-04X_FAL18	Total/NA	Water	6020A	543243
680-159120-16 MSD	XGM-94-04X_FAL18	Total/NA	Water	6020A	543243

Analysis Batch: 543603

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-159120-12	XGM-93-02X_FAL18	Total/NA	Water	6010C	543244
680-159120-13	XGM-97-12X_FAL18	Total/NA	Water	6010C	543244
680-159120-14	XGM-DUP1_FAL18	Total/NA	Water	6010C	543244
680-159120-15	AAFES-2_FAL18	Total/NA	Water	6010C	543244
680-159120-16	XGM-94-04X_FAL18	Total/NA	Water	6010C	543244
680-159120-17	AAFES-7_FAL18	Total/NA	Water	6010C	543244
MB 680-543244/1-A	Method Blank	Total/NA	Water	6010C	543244
LCS 680-543244/2-A	Lab Control Sample	Total/NA	Water	6010C	543244
680-159120-16 MS	XGM-94-04X_FAL18	Total/NA	Water	6010C	543244
680-159120-16 MSD	XGM-94-04X_FAL18	Total/NA	Water	6010C	543244

QC Association Summary

Client: KOMAN Government Solutions, LLC
Project/Site: Fort Devens / LTM / AOC 43G

TestAmerica Job ID: 680-159120-2

General Chemistry

Analysis Batch: 433268

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-159120-12	XGM-93-02X_FAL18	Total/NA	Water	SM 2320B	
680-159120-13	XGM-97-12X_FAL18	Total/NA	Water	SM 2320B	
680-159120-14	XGM-DUP1_FAL18	Total/NA	Water	SM 2320B	
680-159120-15	AAFES-2_FAL18	Total/NA	Water	SM 2320B	
680-159120-16	XGM-94-04X_FAL18	Total/NA	Water	SM 2320B	
MB 280-433268/31	Method Blank	Total/NA	Water	SM 2320B	
LCS 280-433268/30	Lab Control Sample	Total/NA	Water	SM 2320B	

Client Sample ID: XGM-93-02X_FAL18

Lab Sample ID: 680-159120-12

Date Collected: 10/10/18 11:40

Matrix: Water

Date Received: 10/11/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3010A			50 mL	50 mL	543244	10/13/18 10:15	AJR	TAL SAV
Total/NA	Analysis	6010C		1			543603	10/16/18 12:20	BCB	TAL SAV
	Instrument ID: ICPE									
Total/NA	Prep	3010A			50 mL	250 mL	543243	10/13/18 10:15	AJR	TAL SAV
Total/NA	Analysis	6020A		1			543525	10/15/18 22:37	BWR	TAL SAV
	Instrument ID: ICPMSC									
Total/NA	Analysis	SM 2320B		1			433268	10/12/18 21:39	SGB	TAL DEN
	Instrument ID: WC-AT3									

Client Sample ID: XGM-97-12X_FAL18

Lab Sample ID: 680-159120-13

Date Collected: 10/10/18 12:55

Matrix: Water

Date Received: 10/11/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3010A			50 mL	50 mL	543244	10/13/18 10:15	AJR	TAL SAV
Total/NA	Analysis	6010C		1			543603	10/16/18 11:47	BCB	TAL SAV
	Instrument ID: ICPE									
Total/NA	Prep	3010A			50 mL	250 mL	543243	10/13/18 10:15	AJR	TAL SAV
Total/NA	Analysis	6020A		1			543525	10/15/18 22:19	BWR	TAL SAV
	Instrument ID: ICPMSC									
Total/NA	Analysis	SM 2320B		1			433268	10/12/18 21:44	SGB	TAL DEN
	Instrument ID: WC-AT3									

Client Sample ID: XGM-DUP1_FAL18

Lab Sample ID: 680-159120-14

Date Collected: 10/10/18 13:00

Matrix: Water

Date Received: 10/11/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3010A			50 mL	50 mL	543244	10/13/18 10:15	AJR	TAL SAV
Total/NA	Analysis	6010C		1			543603	10/16/18 11:55	BCB	TAL SAV
	Instrument ID: ICPE									
Total/NA	Prep	3010A			50 mL	250 mL	543243	10/13/18 10:15	AJR	TAL SAV
Total/NA	Analysis	6020A		1			543525	10/15/18 22:26	BWR	TAL SAV
	Instrument ID: ICPMSC									
Total/NA	Analysis	SM 2320B		1			433268	10/12/18 21:50	SGB	TAL DEN
	Instrument ID: WC-AT3									

Client Sample ID: AAFES-2_FAL18

Lab Sample ID: 680-159120-15

Date Collected: 10/10/18 12:30

Matrix: Water

Date Received: 10/11/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3010A			50 mL	50 mL	543244	10/13/18 10:15	AJR	TAL SAV

Lab Chronicle

Client: KOMAN Government Solutions, LLC
Project/Site: Fort Devens / LTM / AOC 43G

TestAmerica Job ID: 680-159120-2

Client Sample ID: AAFES-2_FAL18

Date Collected: 10/10/18 12:30
Date Received: 10/11/18 09:20

Lab Sample ID: 680-159120-15

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	6010C		1			543603	10/16/18 11:51	BCB	TAL SAV
	Instrument ID: ICPE									
Total/NA	Prep	3010A			50 mL	250 mL	543243	10/13/18 10:15	AJR	TAL SAV
Total/NA	Analysis	6020A		1			543525	10/15/18 22:23	BWR	TAL SAV
	Instrument ID: ICPMSC									
Total/NA	Analysis	SM 2320B		1			433268	10/12/18 21:55	SGB	TAL DEN
	Instrument ID: WC-AT3									

Client Sample ID: XGM-94-04X_FAL18

Date Collected: 10/10/18 11:15
Date Received: 10/11/18 09:20

Lab Sample ID: 680-159120-16

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3010A			50 mL	50 mL	543244	10/13/18 10:15	AJR	TAL SAV
Total/NA	Analysis	6010C		1			543603	10/16/18 11:26	BCB	TAL SAV
	Instrument ID: ICPE									
Total/NA	Prep	3010A			50 mL	250 mL	543243	10/13/18 10:15	AJR	TAL SAV
Total/NA	Analysis	6020A		1			543525	10/15/18 22:02	BWR	TAL SAV
	Instrument ID: ICPMSC									
Total/NA	Analysis	SM 2320B		1			433268	10/12/18 22:01	SGB	TAL DEN
	Instrument ID: WC-AT3									

Client Sample ID: AAFES-7_FAL18

Date Collected: 10/10/18 10:15
Date Received: 10/11/18 09:20

Lab Sample ID: 680-159120-17

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3010A			50 mL	50 mL	543244	10/13/18 10:15	AJR	TAL SAV
Total/NA	Analysis	6010C		1			543603	10/16/18 12:24	BCB	TAL SAV
	Instrument ID: ICPE									
Total/NA	Prep	3010A			50 mL	250 mL	543243	10/13/18 10:15	AJR	TAL SAV
Total/NA	Analysis	6020A		1			543525	10/15/18 22:40	BWR	TAL SAV
	Instrument ID: ICPMSC									

Laboratory References:

= Katahdin Analytical Services Inc, PO BOX 540, 600 Technology Way, Scarborough, ME 04074

TAL DEN = TestAmerica Denver, 4955 Yarrow Street, Arvada, CO 80002, TEL (303)736-0100

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

MassDEP Analytical Protocol Certification Form

Laboratory Name: Katahdin Analytical Services, LLC. Project #:

Project Location: Fort Devons RTN:

This Form provides certifications for the following data set: list Laboratory Sample ID Number(s):

SL9925-1 → 6

Matrices: (Groundwater/Surface Water) Soil/Sediment Drinking Water Air Other:

CAM Protocol (check all that apply below):

8260 VOC CAM II A	7470/7471 Hg CAM III B	MassDEP VPH CAM IV A	8081 Pesticides CAM V B	7196 Hex Cr CAM VI B	MassDEP APH CAM IX A
8270 SVOC CAM II B	7010 Metals CAM III C	MassDEP EPH CAM IV B	8151 Herbicides CAM V C	8330 Explosives CAM VIII A	TO-15 VOC CAM IX B
6010 Metals CAM III A	6020 Metals CAM III D	8082 PCB CAM V A	9014 Total Cyanide/PAC CAM VI A	6860 Perchlorate CAM VIII B	

Affirmative Responses to Questions A through F are required for "Presumptive Certainty" status

A	Were all samples received in a condition consistent with those described on the Chain-of-Custody, properly preserved (including temperature) in the field or laboratory, and prepared/analyzed within method holding times?	(Yes) No
B	Were the analytical method(s) and all associated QC requirements specified in the selected CAM protocol(s) followed?	(Yes) No
C	Were all required corrective actions and analytical response actions specified in the selected CAM protocol(s) implemented for all identified performance standard non-conformances?	(Yes) No
D	Does the laboratory report comply with all the reporting requirements specified in CAM VII A, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data"?	(Yes) No
E	VPH, EPH, APH, and TO-15 only: a. VPH, EPH, and APH Methods only: Was each method conducted without significant modification(s)? (Refer to the individual method(s) for a list of significant modifications). b. APH and TO-15 Methods only: Was the complete analyte list reported for each method?	(Yes) No Yes No
F	Were all applicable CAM protocol QC and performance standard non-conformances identified and evaluated in a laboratory narrative (including all "No" responses to Questions A through E)?	(Yes) No

Responses to Questions G, H and I below are required for "Presumptive Certainty" status

G	Were the reporting limits at or below all CAM reporting limits specified in the selected CAM protocol(s)?	(Yes) No[1]

***Data User Note**: Data that achieve "Presumptive Certainty" status may not necessarily meet the data usability and representativeness requirements described in 310 CMR 40. 1056 (2)(k) and WSC-07-350.*

H	Were **all** QC performance standards specified in the CAM protocol(s) achieved?	(Yes) No[1]
I	Were results reported for the complete analyte list specified in the selected CAM protocol(s)?	(Yes) No[1]

[1] *All negative responses must be addressed in an attached laboratory narrative.*

I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, accurate and complete.

Signature: _____ **Position:** Q.A. Officer

Printed Name: Leslie Dimond **Date:** 10/29/2018

TEST AMERICA SAVANNAH
LONG TERM MONITORING
MAIN POST FALL 2018
SL9925

KATAHDIN ANALYTICAL SERVICES
600 TECHNOLOGY WAY
SCARBOROUGH, ME 04074

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SAMPLE DATA PACKAGE

NARRATIVE
KATAHDIN ANALYTICAL SERVICES
TEST AMERICA SAVANNAH
LONG TERM MONITORING, MAIN POST FALL 2018
SL9925

Sample Receipt

The following samples were received on October 11, 2018 and were logged in under Katahdin Analytical Services work order number SL9925 for a hardcopy due date of October 23, 2018.

KATAHDIN Sample No.	TEST AMERICA SAVANNAH Sample Identification
SL9925-1	XGM-93-02X_FAL18
SL9925-2	XGM-97-12X_FAL18
SL9925-3	XGM-DUP1_FAL18
SL9925-4	AAFES-2_FAL18
SL9925-5	XGM-94-04X_FAL18
SL9925-6	XGM-TRIPBLANK

The samples were logged in for the analyses specified on the chain of custody form. All problems encountered and resolved during sample receipt have been documented on the applicable chain of custody forms.

We certify that the test results provided in this report meet all the requirements of the NELAP standards unless otherwise noted in this narrative or in the Report of Analysis.

We certify that the test results provided in this report are accredited under the laboratory's ISO/IEC 17025:2005 and DoD-ELAP accreditation issued by the ANSI-ASQ National Accreditation Board. Refer to certificate and scope of accreditation L2223.

Analytes which are reported but not listed on our ANAB scope of accreditation will be "^" flagged and the following language will be included in the case narrative for all DoD compliant work: "^" Indicates this analyte is not included on Katahdin Analytical Services DoD-ELAP Scope of Accreditation.

Sample analyses have been performed by the methods as noted herein.

Should you have any questions or comments concerning this Report of Analysis, please do not hesitate to contact your Katahdin Analytical Services Project Manager, **Ms. Heather Manz**. This narrative is an integral part of the Report of Analysis.

Reissue 10/30/2018

This report is being reissued to correct the page numbering of the Sample Data Package section.

Organics Analysis

The samples of Work Order SL9925 were analyzed in accordance with the Method for the Determination of Volatile Petroleum Hydrocarbons (VPH), MADEP, May 2004, Revision 1.1, and/or for the specific methods listed below or on the Report of Analysis.

Sample SL9925-5 was used for the matrix spike (MS) and matrix spike duplicate (MSD), as per client request.

MA-VPH Analysis

Samples SL9925, 1, 2, 3, 4, and 4DL were manually integrated for one or more target analytes, the C9-C10 aromatic range and/or the surrogate 2,5-Dibromotoluene on the PID and/or FID. The specific reasons for the manual integrations are indicated on the raw data by the manual integration codes (M1-M11). These codes are further explained in the attachment following this narrative.

The MSD WG238687-5 had a high recovery for the C9-C10 Aromatics range which was outside of the method acceptance limits. Since the associated LCS/LCSD was acceptable, no further action was taken.

There were no other protocol deviations or observations noted by the organics laboratory staff.

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized the Quality Assurance Officer, or their designee, as verified by the following signature.

Edward A Morgan for 10-30-18

Leslie Dimond
Quality Assurance Officer

Katahdin Analytical Services, Inc.

Manual Integration Codes For GC/MS, GC, HPLC and/or IC

M1	Peak splitting.
M2	Well defined peaks on the shoulders of the other peaks.
M3	There is additional area due to a coeluting interferant.
M4	There are negative spikes in the baseline.
M5	There are rising or falling baselines.
M6	The software has failed to detect a peak or misidentified a peak.
M7	Excessive peak tailing.
M8	Analysis such as GRO, DRO and TPH require a baseline hold.
M9	Peak was not completely integrated as in GC/MS.
M10	Primary ion was correctly integrated, but secondary or tertiary ion needed manual integration as in GC/MS.
M11	For GC analysis, when a sample is diluted by 1:10 or more, the surrogate is set to undetected and then the area under the surrogate is manually integrated.
M12	Manual integration saved in method due to TurboChrom floating point error.

Katahdin Analytical Services, LLC. Sample Receipt Condition Report

Client: Koman	KAS PM: HHM	Sampled By: Client
Project:	KIMS Entry By: JCB	Delivered By: Fedex
KAS Work Order#: SL9925 / 9928	KIMS Review By: HHM	Received By: JCB
SDG #:	Cooler: 1 of 3	Date/Time Rec.: 10·11·18 900

Receipt Criteria	Y	N	EX*	NA	Comments and/or Resolution
1. Custody seals present / intact?		✓			
2. Chain of Custody present in cooler?	✓				
3. Chain of Custody signed by client?	✓				
4. Chain of Custody matches samples?	✓				
5. Temperature Blanks present? If not, take temperature of any sample w/ IR gun.	✓				Temp (°C): 1.5
Samples received at <6 °C w/o freezing?	✓				Note: Not required for metals (except Hg soil) analysis.
Ice packs or ice present?	✓				The lack of ice or ice packs (i.e. no attempt to begin cooling process) or insufficient ice may not meet certain regulatory requirements and may invalidate certain data.
If yes, was there sufficient ice to meet temperature requirements?	✓				
If temp. out, has the cooling process begun (i.e. ice or packs present) and sample collection times <6hrs., but samples are not yet cool?				✓	Note: No cooling process required for metals (except Hg soil) analysis.
6. Volatiles:					
Aqueous: No bubble larger than a pea?				✓	
Soil/Sediment:					
Received in airtight container?				✓	
Received in methanol?				✓	
Methanol covering soil?				✓	
D.I. Water - Received within 48 hour HT?				✓	
Air: Refer to KAS COC for canister/flow controller requirements.	√ if air included				
7. Trip Blank present in cooler?				✓	
8. Proper sample containers and volume?	✓				
9. Samples within hold time upon receipt?	✓				
10. Aqueous samples properly preserved? Metals, COD, NH3, TKN, O/G, phenol, TPO4, N+N, TOC, DRO, TPH – pH <2	✓				
Sulfide - >9				✓	
Cyanide – pH >12				✓	

* Log-In Notes to Exceptions: document any problems with samples or discrepancies or pH adjustments.

QA-048 – Revision 6 – 07/20/2015

Katahdin Analytical Services, LLC. — Sample Receipt Condition Report

Client:	Komen	KAS PM:	HHM	Sampled By:	Client
Project:		KIMS Entry By:	JCB	Delivered By:	Fedex
KAS Work Order#:	52925 / 9928	KIMS Review By:	HHM	Received By:	JCB
SDG #:		Cooler: 2 of 3		Date/Time Rec.:	10.11.18 900

Receipt Criteria	Y	N	EX*	NA	Comments and/or Resolution
1. Custody seals present / intact?		✓			
2. Chain of Custody present in cooler?	✓				
3. Chain of Custody signed by client?	✓				
4. Chain of Custody matches samples?	✓				
5. Temperature Blanks present? If not, take temperature of any sample w/ IR gun.	✓				Temp (°C): 0.6
Samples received at <6 °C w/o freezing?	✓				Note: Not required for metals (except Hg soil) analysis.
Ice packs or ice present?	✓				The lack of ice or ice packs (i.e. no attempt to begin cooling process) or insufficient ice may not meet certain regulatory requirements and may invalidate certain data.
If yes, was there sufficient ice to meet temperature requirements?	✓				
If temp. out, has the cooling process begun (i.e. ice or packs present) and sample collection times <6hrs., but samples are not yet cool?				✓	Note: No cooling process required for metals (except Hg soil) analysis.
6. Volatiles: **Aqueous:** No bubble larger than a pea?				✓	
Soil/Sediment: Received in airtight container?				✓	
Received in methanol?				✓	
Methanol covering soil?				✓	
D.I. Water - Received within 48 hour HT?				✓	
Air: Refer to KAS COC for canister/flow controller requirements.	√ if air included				
7. Trip Blank present in cooler?				✓	
8. Proper sample containers and volume?	✓				
9. Samples within hold time upon receipt?	✓				
10. Aqueous samples properly preserved? Metals, COD, NH3, TKN, O/G, phenol, TPO4, N+N, TOC, DRO, TPH – pH <2	✓				
Sulfide - >9				✓	
Cyanide – pH >12				✓	

* Log-In Notes to Exceptions: document any problems with samples or discrepancies or pH adjustments.

Katahdin Analytical Services, LLC. — Sample Receipt Condition Report

Client: Koman	KAS PM: HHM	Sampled By: Client	
Project:	KIMS Entry By: JCB	Delivered By: Fedex	
KAS Work Order#: 5L9925/9928	KIMS Review By: HHM	Received By: JCB	
SDG #:	Cooler: 3 of 3	Date/Time Rec.: 10.11.18 900	

Receipt Criteria	Y	N	EX*	NA	Comments and/or Resolution
1. Custody seals present / intact?		✓			
2. Chain of Custody present in cooler?	✓				
3. Chain of Custody signed by client?	✓				
4. Chain of Custody matches samples?	✓				
5. Temperature Blanks present? If not, take temperature of any sample w/ IR gun.	✓				Temp (°C): 1.9
Samples received at <6 °C w/o freezing?	✓				Note: Not required for metals (except Hg soil) analysis.
Ice packs or ice present?	✓				The lack of ice or ice packs (i.e. no attempt to begin cooling process) or insufficient ice may not meet certain regulatory requirements and may invalidate certain data.
If yes, was there sufficient ice to meet temperature requirements?	✓				
If temp. out, has the cooling process begun (i.e. ice or packs present) and sample collection times <6hrs., but samples are not yet cool?				✓	Note: No cooling process required for metals (except Hg soil) analysis.
6. Volatiles: **Aqueous:** No bubble larger than a pea?	✓				
Soil/Sediment:					
Received in airtight container?				✓	
Received in methanol?				✓	
Methanol covering soil?				✓	
D.I. Water - Received within 48 hour HT?				✓	
Air: Refer to KAS COC for canister/flow controller requirements.	√ if air included				
7. Trip Blank present in cooler?	✓				
8. Proper sample containers and volume?	✓				
9. Samples within hold time upon receipt?	✓				
10. Aqueous samples properly preserved? Metals, COD, NH3, TKN, O/G, phenol, TPO4, N+N, TOC, DRO, TPH – pH <2	✓				
Sulfide - >9				✓	
Cyanide – pH >12				✓	

* Log-In Notes to Exceptions: document any problems with samples or discrepancies or pH adjustments.

REISSUE

CHAIN-OF-CUSTODY RECORD

SL9925

360325-Boston

COC # 201810A43

360325-Boston

KOMAN Government Services, LLC
Laurie Ekes
293 Boston Post Road West, Suite 100, Marlborough, MA 01752
(508) 366.7442, lekes@komangs.com

Project Name: Long Term Monitoring	Laboratory: TestAmerica Laboratories, Inc., Savannah, GA	Event: KOMAN, Long Term Monitoring, Main Post Fall 2018
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:

4°C

See codes

Equipment:

Code	Matrix
WG	Ground Water
WQ	Water Quality Control Matrix

Code	Container/Preservative
3	3* 40mL glass VOA Vials, HCl, pH < 2; Cool < 6°C
45	1* 250mL, plastic, Cool < 6°C
9	1* 250mL, plastic, HNO3, pH < 2; Cool < 6°C

Event: KOMAN, Long Term Monitoring, Main Post Fall 2018

	Sample ID	Matrix	Date	Time	Samp Init.	A2320B - Alkalinity	MADEPVP - VPH with targets	SW6010C - Fe Mn	SW6010C - Mn	SW6020A - As	Location ID	Sample Type	Depth (ft bgs) Top	Depth (ft bgs) Bottom	Comments	Cooler
	Analytical Test Method					**45**	**3**	**9**	**9**	**9**						
1	~~AAFES-2_FAL18~~	~~WG~~				X	X	X		X	~~AAFES-2~~	~~N1~~	~~18.30~~	~~33.30~~		1
2	XGM-93-02X_FAL18	WG	10/10/18	1140	MM	X	X	X		X	XGM-93-02X	N1	28.00	38.00		1
3	~~XGM-94-04X_FAL18~~	~~WG~~				X	X	X		X	~~XGM-94-04X~~	~~N1~~	~~20.50~~	~~30.50~~		1
4	XGM-97-12X_FAL18	WG	10/10/18	1255	MM	X	X	X		X	XGM-97-12X	N1	24.00	34.00		1
5	~~XGM-94-04X_FAL18~~	~~WG~~				X	X	X		X	~~XGM-94-04X~~	~~SD1~~	~~20.50~~	~~30.50~~		1
6	~~XGM-94-04X_FAL18~~	~~WG~~				X	X	X		X	~~XGM-94-04X~~	~~MS1~~	20.50	30.50		1
7	XGM-DUP1_FAL18	WG	10/10/18	1300	MM	X	X	X		X	FIELDQC	FD1				1
8	~~AAFES-7_FAL18~~	~~WG~~							X	X	~~AAFES-7~~	~~N1~~	~~0.00~~	~~0.00~~		1
9	~~XGM-TRIPBLANK~~	~~WQ~~					X				~~FIELDQC~~	~~TB1~~	~~0.00~~	~~0.00~~		1
		Turnaround Time:														

Relinquished by: *(Signature)*	Date	Time
	10/10/18	1300
	10/10/18	1350
	10/10/18	1700

Received by: *(Signature)*	Date	Time
	10/10/18	1300
	10/12/18	1325

Shipping Date / Carrier / Airbill Number

Received by Laboratory: *(Signature, Date, Time)* **& condition**

10-11-18 900 Good

REISSUE

CHAIN-OF-CUSTODY RECORD

KOMAN Government Services, LLC
Laurie Ekes
293 Boston Post Road West, Suite 100, Marlborough, MA 01752
(508) 366-7442 lekes@komangs.com

360325-Boston

COC # 201810A43 360325-Boston

KGS

Project Name: Long Term Monitoring	Laboratory: TestAmerica Laboratories, Inc., Savannah, GA	Event: KOMAN, Long Term Monitoring, Main Post Fall 2018
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:

Equipment:

Code	Matrix
WG	Ground Water
WQ	Water Quality Control Matrix

Code	Container/Preservative
3	3* 40mL glass VOA Vials, HCl, pH < 2; Cool < 6°C
45	1* 250mL, plastic, Cool < 6°C
9	1* 250mL, plastic, HNO3, pH < 2; Cool < 6°C

Event: KOMAN, Long Term Monitoring, Main Post Fall 2018

					Analytical Test Method	A2320B - Alkalinity	MADEPVP - VPH with targets	SW6010C - Fe Mn	SW6010C - Mn	SW6020A - As					
						45	3	9	9	9					
	Sample ID	Matrix	Date	Time	Samp Init.						Location ID	Sample Type	Depth (ft bgs) Top	Depth (ft bgs) Bottom	Comments	Cooler
1	AAFES-2_FAL18	WG	10/10/18	1230	BrA	X	X	X		X	AAFES-2	N1	18.30	33.30		1
2	~~XGM-93-02X_FAL18~~	~~WG~~				~~X~~	~~X~~	~~X~~		~~X~~	~~XGM-93-02X~~	~~N1~~	~~28.00~~	~~38.00~~		1
3	XGM-94-04X_FAL18	WG	10/10/18	1115	BrA	X	X	X		X	XGM-94-04X	N1	20.50	30.50		1
4	~~XGM-97-12X_FAL18~~	~~WG~~				~~X~~	~~X~~	~~X~~		~~X~~	~~XGM-97-12X~~	~~N1~~	~~24.00~~	~~34.00~~		1
5	XGM-94-04X_FAL18_MS	WG	10/10/18	1115	BrA	X	X	X		X	XGM-94-04X	SD1	20.50	30.50		1
6	XGM-94-04X_FAL18_MSD	WG	10/10/18	1115	BrA	X	X	X		X	XGM-94-04X	MS1	20.50	30.50		1
7	~~XGM-DUP1_FAL18~~	~~WG~~				~~X~~	~~X~~	~~X~~		~~X~~	~~FIELDQC~~	~~FD1~~				1
8	AAFES-7_FAL18	WG	10/10/18	1015	BrA				X	X	AAFES-7	N1	0.00	0.00		1
9	XGM-TRIPBLANK	WQ	10/10/18				X				FIELDQC	TB1	0.00	0.00		1
		Turnaround Time: Routine														

Relinquished by: *(Signature)*	Date	Time
	10/10/18	1350
	10/10/18	1710

Received by: *(Signature)*	Date	Time
	10/10/18	13:50

Shipping Date / Carrier / Airbill Number

Received by Laboratory: *(Signature, Date, Time)* **& condition**

Katahdin ANALYTICAL SERVICES

Katahdin Analytical Services

Login Chain of Custody Report (lno1)

Oct. 12, 2018
06:04 PM

Login Number: SL9925

Account: TASAV001 NoWeb
Test America Savannah

Project: TASAV-DEVENS

Quote/Incoming:

Primary Report Address:
Jerry Lanier
Test America Savannah
5102 LaRoche Avenue

Savannah,GA 31404
Jerry.Lanier@testamericainc.com

Primary Invoice Address:
Accounts Payable
Test America Savannah
5102 LaRoche Avenue

Savannah,GA 31404

Report CC Addresses:
Invoice CC Addresses:

Login Information:

ANALYSIS INSTRUCTIONS	:	FDS, DOD QSM 4.2 reporting with DOD limits. ND to PQL. "J" flag between MDL and PQL. Need LCS/LCSD. Follow MA MCP CAM. Include level 4 narrative. VPH undetect ethylbenzene.
CHECK NO.	:	
CLIENT PO#	:	680-159120-2
CLIENT PROJECT MANAGE	:	Jerry Lanier
CONTRACT	:	DEVNS-LTM AOC 43G
COOLER TEMPERATURE	:	1.9, 0.6, 1.5
DELIVERY SERVICES	:	FedEx
EDD FORMAT	:	ECC-091317-TXT
LOGIN INITIALS	:	JCB
PM	:	HHM
PROJECT NAME	:	Long Term Monitoring, Main Post Fall 2018
QC LEVEL	:	IV
REPORT INSTRUCTIONS	:	SDS needs all forms. Include Level 4 narrative and MCP forms (from Leslie). Send level 4 PDF & level 2 PDF. Level 2= SDP & SDS. Email PDF, EDD, and invoice to Jerry & Amy.Reynaldsen@testamericainc.com. No HC.
SDG STATUS	:	
VERBAL TAT	:	

Laboratory Sample ID	Client Sample Number	Collect Date/Time	Receive Date	PR	Verbal Date	Due Date	Mailed
SL9925-1	XGM-93-02X_FAL18	10-OCT-18 17:40	11-OCT-18			23-OCT-18	

Matrix		Product	Hold Date (shortest)	Bottle Type	Bottle Count	Comments
Aqueous	S	MA-VPH	24-OCT-18	40mL Vial+HCl		

Laboratory Sample ID	Client Sample Number	Collect Date/Time	Receive Date	PR	Verbal Date	Due Date	Mailed
SL9925-2	XGM-97-12X_FAL18	10-OCT-18 12:55	11-OCT-18			23-OCT-18	

Matrix		Product	Hold Date (shortest)	Bottle Type	Bottle Count	Comments
Aqueous	S	MA-VPH	24-OCT-18	40mL Vial+HCl		

Laboratory Sample ID	Client Sample Number	Collect Date/Time	Receive Date	PR	Verbal Date	Due Date	Mailed
SL9925-3	XGM-DUP1_-FAL18	10-OCT-18 13:00	11-OCT-18			23-OCT-18	

Matrix		Product	Hold Date (shortest)	Bottle Type	Bottle Count	Comments
Aqueous	S	MA-VPH	24-OCT-18	40mL Vial+HCl		

Laboratory Sample ID	Client Sample Number	Collect Date/Time	Receive Date	PR	Verbal Date	Due Date	Mailed
SL9925-4	AAFES-2_FAL18	10-OCT-18 12:30	11-OCT-18			23-OCT-18	

Matrix		Product	Hold Date (shortest)	Bottle Type	Bottle Count	Comments
Aqueous	S	MA-VPH	24-OCT-18	40mL Vial+HCl		

Laboratory Sample ID	Client Sample Number	Collect Date/Time	Receive Date	PR	Verbal Date	Due Date	Mailed
SL9925-5	XGM-94-04X_FAL18	10-OCT-18 11:15	11-OCT-18			23-OCT-18	

Matrix		Product	Hold Date (shortest)	Bottle Type	Bottle Count	Comments
Aqueous	S	MA-VPH	24-OCT-18	40mL Vial+HCl		**MS/MSD**

Laboratory Sample ID	Client Sample Number	Collect Date/Time	Receive Date	PR	Verbal Date	Due Date	Mailed
SL9925-6	XGM-TRIPBLANK	10-OCT-18 00:00	11-OCT-18			23-OCT-18	

Matrix		Product	Hold Date (shortest)	Bottle Type	Bottle Count	Comments
Aqueous	S	MA-VPH	24-OCT-18	40mL Vial+HCl		

HHM 10-12-18

Laboratory Sample ID	Client Sample Number	Collect Date/Time	Receive Date	PR	Verbal Date	Due Date	Mailed
SL9925-7	XGM-94-04X_FAL18 MS CHARGE	10-OCT-18 11:15	11-OCT-18			23-OCT-18	

Matrix		Product	Hold Date (shortest)	Bottle Type	Bottle Count	Comments
Aqueous	S	MA-VPH	24-OCT-18	40mL Vial+HCl		**Not a sample, MS charge**

Katahdin ANALYTICAL SERVICES

Katahdin Analytical Services

Login Chain of Custody Report (lno1)

Oct. 12, 2018
06:04 PM

Login Number: SL9925

Quote/Incoming:

Account: TASAV001 NoWeb
Test America Savannah

Project: TASAV-DEVENS

Laboratory Sample ID	Client Sample Number	Collect Date/Time	Receive Date	PR	Verbal Date	Due Date	Mailed
SL9925-8	XGM-94-04X_FAL18 MSD CHARGE	10-OCT-18 11:15	11-OCT-18			23-OCT-18	

Matrix		*Product*	*Hold Date (shortest)*	*Bottle Type*	*Bottle Count*	*Comments*
Aqueous	S	MA-VPH	24-OCT-18	40mL Vial+HCl		**Not a sample, MSD charge**

Total Samples: *8* ***Total Analyses:*** *8*

10-12-18

SAMPLE DATA SUMMARY PACKAGE

Page 29 of 69 Katahdin Analytical Services A00000001 10/10/2018

KATAHDIN ANALYTICAL SERVICES - ORGANIC DATA QUALIFIERS

The sampled date indicated on the attached Report(s) of Analysis (ROA) is the date for which a grab sample was collected or the date for which a composite sample was completed. Beginning and start times for composite samples can be found on the Chain-of-Custody.

U Indicates the compound was analyzed for but not detected above the specified level. This level may be the Limit of Quantitation (LOQ)(previously called Practical Quantitation Level (PQL)), the Limit of Detection (LOD) or Method Detection Limit (MDL) as required by the client.

Note: All results reported as "U" MDL have a 50% rate for false negatives compared to those results reported as "U" PQL/LOQ or "U" LOD, where the rate of false negatives is <1%.

* Compound recovery or percent RPD (relative percent difference) was outside of quality control limits.

D Indicates the result was obtained from analysis of a diluted sample. Surrogate recoveries may not be calculable.

E Estimated value. This flag identifies compounds whose concentrations exceed the upper level of the calibration range of the instrument for that specific analysis.

J Estimated value. The analyte was detected in the sample at a concentration less than the laboratory Limit of Quantitation (LOQ)(previously called Practical Quantitation Limit (PQL)), but above the Method Detection Limit (MDL).

or

J Used for Pesticides, PCBs, Herbicides, Formaldehyde, Explosives and Method 504.1 analytes when there is a greater than 40% difference for detected concentrations between the two GC columns.

B Indicates the analyte was detected in the laboratory method blank analyzed concurrently with the sample.

C Indicates that the flagged compound did not meet DoD criteria in the corresponding daily calibration verification (CV).

L Indicates that the flagged compound did not meet DoD criteria in the corresponding Laboratory Control Sample (LCS) and/or Laboratory Control Sample Duplicate (LCSD) prepared and/or analyzed concurrently with the sample.

M Indicates that the flagged compound did not meet DoD criteria in the Matrix Spike and/or Matrix Spike Duplicate prepared and/or analyzed concurrently with the native sample.

N Presumptive evidence of a compound based on a mass spectral library search.

A Indicates that a tentatively identified compound is a suspected aldol-condensation product.

P Used for Pesticide/Aroclor analyte when there is a greater than 25% difference for detected concentrations between the two GC columns. (for CLP methods only).

Katahdin
ANALYTICAL SERVICES

Report of Analytical Results

Client: Test America Savannah
Lab ID: SL9925-1
Client ID: XGM-93-02X_FAL18
Project: Long Term Monitoring, Main Post Fall
SDG: SL9925
Lab File ID: 2LJ10072.D

Sample Date: 10-OCT-18
Received Date: 11-OCT-18
Extract Date: 17-OCT-18
Extracted By: JHR
Extraction Method: MA-VPH
Lab Prep Batch: WG238687

Analysis Date: 17-OCT-18
Analyst: JHR
Analysis Method: MA DEP VPH 04-1.1
Matrix: AQ
% Solids: NA
Report Date: 24-OCT-18

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
C5-C8 Aliphatics	J	84	ug/L	1	100	100	50.	75.
C9-C12 Aliphatics	U	100	ug/L	1	100	100	50.	75.
C9-C10 Aromatics	J	75	ug/L	1	100	100	50.	75.
Benzene	J	0.60	ug/L	1	3	3.0	0.31	2.0
Ethylbenzene	U	5.0	ug/L	1	5	5.0	0.42	3.8
Methyl tert-butylether	J	4.7	ug/L	1	5	5.0	0.31	3.8
Naphthalene	U	5.0	ug/L	1	5	5.0	1.6	3.8
Toluene	J	0.46	ug/L	1	5	5.0	0.34	3.8
m+p-Xylenes	U	10	ug/L	1	10	10.	0.92	7.5
o-Xylene	U	5.0	ug/L	1	5	5.0	0.47	3.8
2,5-Dibromotoluene (FID)		81.2	%					
2,5-Dibromotoluene (PID)		83.5	%					

600 Technology Way
P.O. Box 540, Scarborough, ME 04070
Tel:(207) 874-2400 Fax:(207) 775-4029

http://www.katahdinlab.com

Katahdin
ANALYTICAL SERVICES

Report of Analytical Results

Client: Test America Savannah
Lab ID: SL9925-2
Client ID: XGM-97-12X_FAL18
Project: Long Term Monitoring, Main Post Fall
SDG: SL9925
Lab File ID: 2LJ10073.D

Sample Date: 10-OCT-18
Received Date: 11-OCT-18
Extract Date: 17-OCT-18
Extracted By: JHR
Extraction Method: MA-VPH
Lab Prep Batch: WG238687

Analysis Date: 17-OCT-18
Analyst: JHR
Analysis Method: MA DEP VPH 04-1.1
Matrix: AQ
% Solids: NA
Report Date: 24-OCT-18

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
C5-C8 Aliphatics		360	ug/L	1	100	100	50.	75.
C9-C12 Aliphatics	E	580	ug/L	1	100	100	50.	75.
C9-C10 Aromatics	E	1100	ug/L	1	100	100	50.	75.
Benzene		4.0	ug/L	1	3	3.0	0.31	2.0
Ethylbenzene		230	ug/L	1	5	5.0	0.42	3.8
Methyl tert-butylether	U	5.0	ug/L	1	5	5.0	0.31	3.8
Naphthalene		88	ug/L	1	5	5.0	1.6	3.8
Toluene		5.1	ug/L	1	5	5.0	0.34	3.8
m+p-Xylenes		180	ug/L	1	10	10.	0.92	7.5
o-Xylene		93	ug/L	1	5	5.0	0.47	3.8
2,5-Dibromotoluene (FID)		81.6	%					
2,5-Dibromotoluene (PID)		85.4	%					

600 Technology Way
P.O. Box 540, Scarborough, ME 04070
Tel:(207) 874-2400 Fax:(207) 775-4029

http://www.katahdinlab.com

Katahdin
ANALYTICAL SERVICES

Report of Analytical Results

Client: Test America Savannah
Lab ID: SL9925-2DL
Client ID: XGM-97-12X_FAL18
Project: Long Term Monitoring, Main Post Fall
SDG: SL9925
Lab File ID: 2LJ10092.D

Sample Date: 10-OCT-18
Received Date: 11-OCT-18
Extract Date: 18-OCT-18
Extracted By: JHR
Extraction Method: MA-VPH
Lab Prep Batch: WG238785

Analysis Date: 18-OCT-18
Analyst: JHR
Analysis Method: MA DEP VPH 04-1.1
Matrix: AQ
% Solids: NA
Report Date: 24-OCT-18

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
C5-C8 Aliphatics	U	500	ug/L	5	100	500	250	380
C9-C12 Aliphatics	J	420	ug/L	5	100	500	250	380
C9-C10 Aromatics		1000	ug/L	5	100	500	250	380
Benzene	J	4.9	ug/L	5	3	15.	1.6	10.
Ethylbenzene		200	ug/L	5	5	25.	2.1	19.
Methyl tert-butylether	U	25	ug/L	5	5	25.	1.6	19.
Naphthalene		83	ug/L	5	5	25.	8.0	19.
Toluene	J	4.4	ug/L	5	5	25.	1.7	19.
m+p-Xylenes		170	ug/L	5	10	50.	4.6	38.
o-Xylene		85	ug/L	5	5	25.	2.4	19.
2,5-Dibromotoluene (FID)		87.8	%					
2,5-Dibromotoluene (PID)		91.6	%					

600 Technology Way
P.O. Box 540, Scarborough, ME 04070
Tel:(207) 874-2400 Fax:(207) 775-4029
http://www.katahdinlab.com

Katahdin
ANALYTICAL SERVICES

Report of Analytical Results

Client: Test America Savannah
Lab ID: SL9925-3
Client ID: XGM-DUP1_-FAL18
Project: Long Term Monitoring, Main Post Fall
SDG: SL9925
Lab File ID: 2LJ10074.D

Sample Date: 10-OCT-18
Received Date: 11-OCT-18
Extract Date: 17-OCT-18
Extracted By: JHR
Extraction Method: MA-VPH
Lab Prep Batch: WG238687

Analysis Date: 17-OCT-18
Analyst: JHR
Analysis Method: MA DEP VPH 04-1.1
Matrix: AQ
% Solids: NA
Report Date: 24-OCT-18

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
C5-C8 Aliphatics		350	ug/L	1	100	100	50.	75.
C9-C12 Aliphatics	E	530	ug/L	1	100	100	50.	75.
C9-C10 Aromatics	E	1100	ug/L	1	100	100	50.	75.
Benzene		4.0	ug/L	1	3	3.0	0.31	2.0
Ethylbenzene		220	ug/L	1	5	5.0	0.42	3.8
Methyl tert-butylether	U	5.0	ug/L	1	5	5.0	0.31	3.8
Naphthalene		88	ug/L	1	5	5.0	1.6	3.8
Toluene	J	4.9	ug/L	1	5	5.0	0.34	3.8
m+p-Xylenes		170	ug/L	1	10	10.	0.92	7.5
o-Xylene		90	ug/L	1	5	5.0	0.47	3.8
2,5-Dibromotoluene (FID)		84.8	%					
2,5-Dibromotoluene (PID)		88.8	%					

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Report of Analytical Results

Client: Test America Savannah
Lab ID: SL9925-3DL
Client ID: XGM-DUP1_-FAL18
Project: Long Term Monitoring, Main Post Fall
SDG: SL9925
Lab File ID: 2LJ10093.D

Sample Date: 10-OCT-18
Received Date: 11-OCT-18
Extract Date: 18-OCT-18
Extracted By: JHR
Extraction Method: MA-VPH
Lab Prep Batch: WG238785

Analysis Date: 18-OCT-18
Analyst: JHR
Analysis Method: MA DEP VPH 04-1.1
Matrix: AQ
% Solids: NA
Report Date: 24-OCT-18

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
C5-C8 Aliphatics	U	500	ug/L	5	100	500	250	380
C9-C12 Aliphatics	J	410	ug/L	5	100	500	250	380
C9-C10 Aromatics		1000	ug/L	5	100	500	250	380
Benzene	J	5.0	ug/L	5	3	15.	1.6	10.
Ethylbenzene		210	ug/L	5	5	25.	2.1	19.
Methyl tert-butylether	U	25	ug/L	5	5	25.	1.6	19.
Naphthalene		79	ug/L	5	5	25.	8.0	19.
Toluene	J	4.8	ug/L	5	5	25.	1.7	19.
m+p-Xylenes		170	ug/L	5	10	50.	4.6	38.
o-Xylene		87	ug/L	5	5	25.	2.4	19.
2,5-Dibromotoluene (FID)		89.1	%					
2,5-Dibromotoluene (PID)		91.9	%					

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Report of Analytical Results

Client: Test America Savannah
Lab ID: SL9925-4
Client ID: AAFES-2_FAL18
Project: Long Term Monitoring, Main Post Fall
SDG: SL9925
Lab File ID: 2LJ10075.D

Sample Date: 10-OCT-18
Received Date: 11-OCT-18
Extract Date: 17-OCT-18
Extracted By: JHR
Extraction Method: MA-VPH
Lab Prep Batch: WG238687

Analysis Date: 17-OCT-18
Analyst: JHR
Analysis Method: MA DEP VPH 04-1.1
Matrix: AQ
% Solids: NA
Report Date: 24-OCT-18

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
C5-C8 Aliphatics	E	1000	ug/L	1	100	100	50.	75.
C9-C12 Aliphatics	E	570	ug/L	1	100	100	50.	75.
C9-C10 Aromatics	E	1200	ug/L	1	100	100	50.	75.
Benzene	U	3.0	ug/L	1	3	3.0	0.31	2.0
Ethylbenzene		23	ug/L	1	5	5.0	0.42	3.8
Methyl tert-butylether	U	5.0	ug/L	1	5	5.0	0.31	3.8
Naphthalene		20	ug/L	1	5	5.0	1.6	3.8
Toluene	U	5.0	ug/L	1	5	5.0	0.34	3.8
m+p-Xylenes	J	5.4	ug/L	1	10	10.	0.92	7.5
o-Xylene	J	4.7	ug/L	1	5	5.0	0.47	3.8
2,5-Dibromotoluene (FID)		84.3	%					
2,5-Dibromotoluene (PID)		86.8	%					

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Report of Analytical Results

Client: Test America Savannah
Lab ID: SL9925-4DL
Client ID: AAFES-2_FAL18
Project: Long Term Monitoring, Main Post Fall
SDG: SL9925
Lab File ID: 2LJ10094.D

Sample Date: 10-OCT-18
Received Date: 11-OCT-18
Extract Date: 18-OCT-18
Extracted By: JHR
Extraction Method: MA-VPH
Lab Prep Batch: WG238785

Analysis Date: 18-OCT-18
Analyst: JHR
Analysis Method: MA DEP VPH 04-1.1
Matrix: AQ
% Solids: NA
Report Date: 24-OCT-18

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
C5-C8 Aliphatics	J	480	ug/L	5	100	500	250	380
C9-C12 Aliphatics	J	330	ug/L	5	100	500	250	380
C9-C10 Aromatics		990	ug/L	5	100	500	250	380
Benzene	U	15	ug/L	5	3	15.	1.6	10.
Ethylbenzene	J	18	ug/L	5	5	25.	2.1	19.
Methyl tert-butylether	U	25	ug/L	5	5	25.	1.6	19.
Naphthalene	J	17	ug/L	5	5	25.	8.0	19.
Toluene	U	25	ug/L	5	5	25.	1.7	19.
m+p-Xylenes	J	6.1	ug/L	5	10	50.	4.6	38.
o-Xylene	J	2.6	ug/L	5	5	25.	2.4	19.
2,5-Dibromotoluene (FID)		93.8	%					
2,5-Dibromotoluene (PID)		96.1	%					

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Report of Analytical Results

Client: Test America Savannah
Lab ID: SL9925-5
Client ID: XGM-94-04X_FAL18
Project: Long Term Monitoring, Main Post Fall
SDG: SL9925
Lab File ID: 2LJ10076.D

Sample Date: 10-OCT-18
Received Date: 11-OCT-18
Extract Date: 17-OCT-18
Extracted By: JHR
Extraction Method: MA-VPH
Lab Prep Batch: WG238687

Analysis Date: 17-OCT-18
Analyst: JHR
Analysis Method: MA DEP VPH 04-1.1
Matrix: AQ
% Solids: NA
Report Date: 24-OCT-18

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
C5-C8 Aliphatics	U	100	ug/L	1	100	100	50.	75.
C9-C12 Aliphatics	U	100	ug/L	1	100	100	50.	75.
C9-C10 Aromatics	UM	100	ug/L	1	100	100	50.	75.
Benzene	U	3.0	ug/L	1	3	3.0	0.31	2.0
Ethylbenzene	J	0.87	ug/L	1	5	5.0	0.42	3.8
Methyl tert-butylether	U	5.0	ug/L	1	5	5.0	0.31	3.8
Naphthalene	U	5.0	ug/L	1	5	5.0	1.6	3.8
Toluene	U	5.0	ug/L	1	5	5.0	0.34	3.8
m+p-Xylenes	U	10	ug/L	1	10	10.	0.92	7.5
o-Xylene	U	5.0	ug/L	1	5	5.0	0.47	3.8
2,5-Dibromotoluene (FID)		89.4	%					
2,5-Dibromotoluene (PID)		96.5	%					

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Report of Analytical Results

Client: Test America Savannah
Lab ID: SL9925-6
Client ID: XGM-TRIPBLANK
Project: Long Term Monitoring, Main Post Fall
SDG: SL9925
Lab File ID: 2LJ10070.D

Sample Date: 10-OCT-18
Received Date: 11-OCT-18
Extract Date: 17-OCT-18
Extracted By: JHR
Extraction Method: MA-VPH
Lab Prep Batch: WG238687

Analysis Date: 17-OCT-18
Analyst: JHR
Analysis Method: MA DEP VPH 04-1.1
Matrix: AQ
% Solids: NA
Report Date: 24-OCT-18

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
C5-C8 Aliphatics	U	100	ug/L	1	100	100	50.	75.
C9-C12 Aliphatics	U	100	ug/L	1	100	100	50.	75.
C9-C10 Aromatics	U	100	ug/L	1	100	100	50.	75.
Benzene	U	3.0	ug/L	1	3	3.0	0.31	2.0
Ethylbenzene	U	5.0	ug/L	1	5	5.0	0.42	3.8
Methyl tert-butylether	U	5.0	ug/L	1	5	5.0	0.31	3.8
Naphthalene	U	5.0	ug/L	1	5	5.0	1.6	3.8
Toluene	U	5.0	ug/L	1	5	5.0	0.34	3.8
m+p-Xylenes	U	10	ug/L	1	10	10.	0.92	7.5
o-Xylene	U	5.0	ug/L	1	5	5.0	0.47	3.8
2,5-Dibromotoluene (FID)		84.5	%					
2,5-Dibromotoluene (PID)		89.0	%					

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Report of Analytical Results

Client:
Lab ID: WG238687-1
Client ID: Method Blank Sample
Project:
SDG: SL9925
Lab File ID: 2LJ10067.D

Sample Date:
Received Date:
Extract Date: 17-OCT-18
Extracted By: JHR
Extraction Method: MA-VPH
Lab Prep Batch: WG238687

Analysis Date: 17-OCT-18
Analyst: JHR
Analysis Method: MA DEP VPH 04-1.1
Matrix: AQ
% Solids: NA
Report Date: 24-OCT-18

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
C5-C8 Aliphatics	U	100	ug/L	1	100	100	50.	75.
C9-C12 Aliphatics	U	100	ug/L	1	100	100	50.	75.
C9-C10 Aromatics	U	100	ug/L	1	100	100	50.	75.
Benzene	U	3.0	ug/L	1	3	3.0	0.31	2.0
Ethylbenzene	U	5.0	ug/L	1	5	5.0	0.42	3.8
Methyl tert-butylether	U	5.0	ug/L	1	5	5.0	0.31	3.8
Naphthalene	U	5.0	ug/L	1	5	5.0	1.6	3.8
Toluene	U	5.0	ug/L	1	5	5.0	0.34	3.8
m+p-Xylenes	U	10	ug/L	1	10	10.	0.92	7.5
o-Xylene	U	5.0	ug/L	1	5	5.0	0.47	3.8
2,5-Dibromotoluene (FID)		86.1	%					
2,5-Dibromotoluene (PID)		90.9	%					

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Report of Analytical Results

Client:
Lab ID: WG238785-1
Client ID: Method Blank Sample
Project:
SDG: SL9925
Lab File ID: 2LJ10089.D

Sample Date:
Received Date:
Extract Date: 18-OCT-18
Extracted By: JHR
Extraction Method: MA-VPH
Lab Prep Batch: WG238785

Analysis Date: 18-OCT-18
Analyst: JHR
Analysis Method: MA DEP VPH 04-1.1
Matrix: AQ
% Solids: NA
Report Date: 24-OCT-18

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
C5-C8 Aliphatics	U	100	ug/L	1	100	100	50.	75.
C9-C12 Aliphatics	U	100	ug/L	1	100	100	50.	75.
C9-C10 Aromatics	U	100	ug/L	1	100	100	50.	75.
Benzene	U	3.0	ug/L	1	3	3.0	0.31	2.0
Ethylbenzene	U	5.0	ug/L	1	5	5.0	0.42	3.8
Methyl tert-butylether	U	5.0	ug/L	1	5	5.0	0.31	3.8
Naphthalene	U	5.0	ug/L	1	5	5.0	1.6	3.8
Toluene	U	5.0	ug/L	1	5	5.0	0.34	3.8
m+p-Xylenes	U	10	ug/L	1	10	10.	0.92	7.5
o-Xylene	U	5.0	ug/L	1	5	5.0	0.47	3.8
2,5-Dibromotoluene (FID)		78.6	%					
2,5-Dibromotoluene (PID)		83.2	%					

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Form 2
System Monitoring Compound Recovery

Lab Name: Katahdin Analytical Services **Project:** Long Term Monitoring, Main Post Fall 201 **Matrix:** AQ
Lab Code: KAS **SDG:** SL9925

Client Sample ID	Lab Sample ID	Col. ID	DBT-FID	#	DBT-PID	#
XGM-93-02X_FAL18	SL9925-1	B	81.2		83.5	
XGM-97-12X_FAL18	SL9925-2	B	81.6		85.4	
XGM-97-12X_FAL18	SL9925-2DL	B	87.8		91.6	
XGM-DUP1_-FAL18	SL9925-3	B	84.8		88.8	
XGM-DUP1_-FAL18	SL9925-3DL	B	89.1		91.9	
AAFES-2_FAL18	SL9925-4	B	84.3		86.8	
AAFES-2_FAL18	SL9925-4DL	B	93.8		96.1	
XGM-94-04X_FAL18	SL9925-5	B	89.4		96.5	
XGM-TRIPBLANK	SL9925-6	B	84.5		89.0	
Method Blank Sample	WG238687-1	B	86.1		90.9	
Laboratory Control S	WG238687-2	B	97.6		99.7	
Laboratory Control S	WG238687-3	B	98.7		99.2	
Matrix Spike	WG238687-4	B	98.5		101.	
Matrix Spike Duplica	WG238687-5	B	111.		111.	
Method Blank Sample	WG238785-1	B	78.6		83.2	
Laboratory Control S	WG238785-2	B	94.9		97.8	
Laboratory Control S	WG238785-3	B	85.2		91.0	

		QC Limits
DBT-FID	2,5-DIBROMOTOLUENE (FID)	70-130
DBT-PID	2,5-DIBROMOTOLUENE (PID)	70-130

= Column to be used to flag recovery limits.
* = Values outside of contract required QC limits.
D= System Monitoring Compound diluted out.

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LCS/LCSD Recovery Report

LCS ID: WG238687-2
LCSD ID: WG238687-3
Project:
SDG: SL9925
Report Date: 19-OCT-18
LCS File ID: 2LJ10068.D

Received Date:
Extract Date: 17-OCT-18
Extracted By: JHR
Extraction Method: MA-VPH
Lab Prep Batch: WG238687
LCSD File ID: 2LJ10069.D

Analysis Date: 17-OCT-18
Analyst: JHR
Analysis Method: MA DEP VPH 04-1.1
Matrix: AQ
% Solids: NA

Compound	Spike Amt	LCS Conc	LCS Rec (%)	LCSD Conc	LCSD Rec (%)	Conc Units	RPD (%)	RPD Limit	Limits
C5-C8 Aliphatics	300.	309.	103.	299.	99.7	ug/L	3	25	70-130
C9-C12 Aliphatics	200.	216.	108.	213.	106.	ug/L	1	25	70-130
C9-C10 Aromatics	100.	106.	106.	107.	107.	ug/L	1	25	70-130
Benzene	100.	95.6	95.6	96.2	96.2	ug/L	1	25	70-130
Ethylbenzene	100.	101.	101.	101.	101.	ug/L	0	25	70-130
Methyl tert-butylether	100.	94.0	94.0	93.3	93.3	ug/L	1	25	70-130
Naphthalene	100.	104.	104.	107.	107.	ug/L	3	25	70-130
Toluene	100.	96.9	96.9	97.4	97.4	ug/L	0	25	70-130
m+p-Xylenes	200.	194.	97.0	194.	97.0	ug/L	0	25	70-130
o-Xylene	100.	97.7	97.7	97.9	97.9	ug/L	0	25	70-130
2,5-Dibromotoluene (FID)			97.6		98.7				70-130
2,5-Dibromotoluene (PID)			99.7		99.2				70-130

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LCS/LCSD Recovery Report

LCS ID: WG238785-2
LCSD ID: WG238785-3
Project:
SDG: SL9925
Report Date: 19-OCT-18
LCS File ID: 2LJ10090.D

Received Date:
Extract Date: 18-OCT-18
Extracted By: JHR
Extraction Method: MA-VPH
Lab Prep Batch: WG238785
LCSD File ID: 2LJ10091.D

Analysis Date: 18-OCT-18
Analyst: JHR
Analysis Method: MA DEP VPH 04-1.1
Matrix: AQ
% Solids: NA

Compound	Spike Amt	LCS Conc	LCS Rec (%)	LCSD Conc	LCSD Rec (%)	Conc Units	RPD (%)	RPD Limit	Limits
C5-C8 Aliphatics	300.	293.	97.7	287.	95.7	ug/L	2	25	70-130
C9-C12 Aliphatics	200.	208.	104.	208.	104.	ug/L	0	25	70-130
C9-C10 Aromatics	100.	107.	107.	106.	106.	ug/L	1	25	70-130
Benzene	100.	96.8	96.8	97.5	97.5	ug/L	1	25	70-130
Ethylbenzene	100.	102.	102.	102.	102.	ug/L	0	25	70-130
Methyl tert-butylether	100.	94.6	94.6	92.9	92.9	ug/L	2	25	70-130
Naphthalene	100.	102.	102.	99.1	99.1	ug/L	3	25	70-130
Toluene	100.	98.1	98.1	99.5	99.5	ug/L	1	25	70-130
m+p-Xylenes	200.	194.	97.0	194.	97.0	ug/L	0	25	70-130
o-Xylene	100.	98.9	98.9	99.1	99.1	ug/L	0	25	70-130
2,5-Dibromotoluene (FID)			94.9		85.2				70-130
2,5-Dibromotoluene (PID)			97.8		91.0				70-130

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MS/MSD Recovery Report

MS ID: WG238687-4
MSD ID: WG238687-5
Sample ID: SL9925-5
Client ID: XGM-94-04X_FAL18
Project:
SDG: SL9925
MS File ID: 2LJ10082.D

Received Date:
Extract Date: 17-OCT-18
Extracted By: JHR
Extraction Method: MA-VPH
Lab Prep Batch: WG238687
Report Date: 24-OCT-18
MSD File ID: 2LJ10083.D

Analysis Date: 17-OCT-18
Analyst: JHR
Analysis Method: MA DEP VPH 04-1.1
Matrix: AQ
% Solids: NA

Compound	MS Spike	MSD Spike	Conc Units	Samp Conc	MS Conc	MSD Conc	MS Rec (%)	MSD Rec (%)	RPD (%)	RPD Limit	Limits
C5-C8 Aliphatics	300.	300.	ug/L	U100	331	348	110.	116.	5	50	70-130
C9-C12 Aliphatics	200.	200.	ug/L	U100	218	242	109.	121.	10	50	70-130
C9-C10 Aromatics	100.	100.	ug/L	UM100	122	136	122.	136.*	11	50	70-130
Benzene	100.	100.	ug/L	U3.0	103	118	103.	118.	14	50	70-130
Ethylbenzene	100.	100.	ug/L	J0.87	109	123	108.	122.	12	50	70-130
Methyl tert-butylether	100.	100.	ug/L	U5.0	97.8	115	97.8	115.	16	50	70-130
Naphthalene	100.	100.	ug/L	U5.0	107	121	107.	121.	12	50	70-130
Toluene	100.	100.	ug/L	U5.0	104	118	104.	118.	13	50	70-130
m+p-Xylenes	200.	200.	ug/L	U10	204	222	102.	111.	8	50	70-130
o-Xylene	100.	100.	ug/L	U5.0	104	118	104.	118.	13	50	70-130
2,5-Dibromotoluene (FID)							98.5	111.			70-130
2,5-Dibromotoluene (PID)							101.	111.			70-130

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1 2 3 4 5 6 7 8 9 10 11 12 13 14

Form 4
Method Blank Summary

Lab Name : Katahdin Analytical Services
Project : Long Term Monitoring, Main Post Fall 201
Lab File ID : 2LJ10067.D
Instrument ID : GC02

SDG : SL9925
Lab Sample ID : WG238687-1
Date Analyzed : 17-OCT-18
Time Analyzed : 09:50
Date Extracted : 17-OCT-18

This Method Blank applies to the following samples, LCS, MS and MSD:

Client Sample ID	Lab Sample ID	Lab File ID	Date Analyzed	Time Analyzed
Laboratory Control S	WG238687-2	2LJ10068.I	10/17/18	10:31
Laboratory Control S	WG238687-3	2LJ10069.I	10/17/18	11:13
XGM-TRIPBLANK	SL9925-6	2LJ10070.I	10/17/18	12:21
XGM-93-02X_FAL18	SL9925-1	2LJ10072.I	10/17/18	13:43
XGM-97-12X_FAL18	SL9925-2	2LJ10073.I	10/17/18	14:25
XGM-DUP1_-FAL18	SL9925-3	2LJ10074.I	10/17/18	15:06
AAFES-2_FAL18	SL9925-4	2LJ10075.I	10/17/18	15:48
XGM-94-04X_FAL18	SL9925-5	2LJ10076.I	10/17/18	16:29
Matrix Spike	WG238687-4	2LJ10082.I	10/17/18	20:39
Matrix Spike Duplica	WG238687-5	2LJ10083.I	10/17/18	21:20

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Form 4
Method Blank Summary

Lab Name : Katahdin Analytical Services
Project : Long Term Monitoring, Main Post Fall 201
Lab File ID : 2LJ10089.D
Instrument ID : GC02

SDG : SL9925
Lab Sample ID : WG238785-1
Date Analyzed : 18-OCT-18
Time Analyzed : 09:56
Date Extracted : 18-OCT-18

This Method Blank applies to the following samples, LCS, MS and MSD:

Client Sample ID	Lab Sample ID	Lab File ID	Date Analyzed	Time Analyzed
Laboratory Control S	WG238785-2	2LJ10090.I	10/18/18	10:37
Laboratory Control S	WG238785-3	2LJ10091.I	10/18/18	11:19
XGM-97-12X_FAL18	SL9925-2DL	2LJ10092.I	10/18/18	12:28
XGM-DUP1_-FAL18	SL9925-3DL	2LJ10093.I	10/18/18	13:10
AAFES-2_FAL18	SL9925-4DL	2LJ10094.I	10/18/18	13:52

Form 6
Initial Calibration Summary

Lab Name : Katahdin Analytical Services **SDG:** SL9925
Project : Long Term Monitoring, Main Post Fall 201 **Instrument ID:** GC02
Lab File IDs : 2LJ10062.D 2LJ10057.D 2LJ10058.D 2LJ10063.D 2LJ10059.D 2LJ10060.D **Calibration Date(s):** 16-OCT-18 09:44 16-OCT-18 15:44

	1.0000 Level 1	5.0000 Level 2	10.0000 Level 3	50.0000 Level 4	100.0000 Level 5	300.0000 Level 6	New Crv	b	m1	m2	%RSD	Max %RSD	
C9-C10 Aromatic	3672	3938	4315	4449	4622	3733	AVG		4121		9.59009	25.00000	M (
Methyl tert-butylether	2196	2523	2659	2457	2584	2478	AVG		2483		6.38805	25.00000	O
Benzene	5013	5318	5577	5284	5515	4983	AVG		5282		4.67040	25.00000	O
Toluene	4319	4762	5022	4781	4989	4297	AVG		4695		6.76892	25.00000	O
Ethylbenzene	3532	3869	4226	4167	4352	3685	AVG		3972		8.22615	25.00000	O
m+p-Xylene	4468	4836	5206	4955	4760	3531	AVG		4626		12.71315	25.00000	O
o-Xylene	3795	4147	4450	4310	4417	3743	AVG		4144		7.46187	25.00000	O
1,2,4-trimethylbenzene	3672	3938	4315	4449	4622	3733	AVG		4121		9.59009	25.00000	O
Naphthalene	4268	3663	3970	4746	4974	3946	AVG		4261		11.89873	25.00000	O
2,5-Dibromotoluene (PID)	4277	3258	3649	4187	4214	3235	AVG		3803		12.79733	25.00000	

Legend: O = Kept Original Curve
Y = Failed Minimum RF
W = Failed %RSD Value

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Form 6
Initial Calibration Summary

Lab Name : Katahdin Analytical Services **SDG:** SL9925
Project : Long Term Monitoring, Main Post Fall 201 **Instrument ID:** GC02
Lab File IDs : 2LJ10062.D 2LJ10057.D 2LJ10058.D 2LJ10063.D 2LJ10059.D 2LJ10060.D **Calibration Date(s):** 16-OCT-18 09:44 16-OCT-18 15:44

	1.0000 Level 1	5.0000 Level 2	10.0000 Level 3	50.0000 Level 4	100.0000 Level 5	300.0000 Level 6	New Crv	b	m1	m2	%RSD	Max %RSD	
C5-C8 Aliphatic	5435	5541	5986	5309	5531	5668	AVG		5578		4.17485	25.00000	M (
C9-C12 Aliphatic	4685	4595	4781	5013	5745	6409	AVG		5205		13.85732	25.00000	M (
n-Pentane	4620	5363	6284	4564	4931	5024	AVG		5131		12.38016	25.00000	O
2-Methylpentane	5511	5422	5563	5384	5511	5706	AVG		5516		2.06496	25.00000	O
Methyl tert-butylether	3584	4076	4240	3993	4129	4089	AVG		4018		5.66211	25.00000	O
2,2,4-Trimethylpentane	6173	5837	6112	5980	6152	6275	AVG		6088		2.55860	25.00000	O
Benzene	7269	7031	7394	7107	7467	7579	AVG		7308		2.90141	25.00000	O
Toluene	6877	6808	7222	6969	7359	7454	AVG		7115		3.76206	25.00000	O
n-Nonane	4966	4480	4843	5126	5521	6215	AVG		5192		11.67947	25.00000	O
n-Decane	4375	3683	3888	4668	5772	6372	AVG		4793		22.26482	25.00000	O
Ethylbenzene	5956	6176	6724	6714	7144	7217	AVG		6655		7.60618	25.00000	O
m+p-Xylene	6506	6709	7182	6961	7339	7417	AVG		7019		5.13954	25.00000	O
o-Xylene	6680	6710	7209	7051	7449	7417	AVG		7086		4.74026	25.00000	O
1,2,4-trimethylbenzene	5754	6028	6569	6793	7223	7239	AVG		6601		9.28420	25.00000	O
n-Butylcyclohexane	4995	5507	5673	5357	5718	6446	AVG		5616		8.60006	25.00000	O
Naphthalene	4953	4214	4672	5211	5616	5665	AVG		5055		11.10560	25.00000	O
2,5-Dibromotoluene (FID)	2549	1767	1949	2176	2417	2298	AVG		2193		13.35965	25.00000	

Legend: O = Kept Original Curve
Y = Failed Minimum RF
W = Failed %RSD Value

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Form 7
Calibration Verification Summary

Lab Name : Katahdin Analytical Services
Project : Long Term Monitoring, Main Po
Lab ID : WG238687-8
Lab File ID : 2LJ10066.D
Initial Calibration Date(s): 10/16/18 09:44 10/16/18 15:44

SDG: SL9925
Analytical Date: 10/17/18 08:34
Instrument ID: GC02
Column ID: A

	Compound	$\overline{RRF}$/Amount	RF50	Min RRF	%D/ %Drift	Max %D/ %Drift	Curve Type
20	Benzene	5282	5144	0.100	-2.61582	25.00000	Averaged
30	Ethylbenzene	3972	4051	0.100	1.97681	25.00000	Averaged
40	Methyl tert-butylether	2483	2415	0.100	-2.72271	25.00000	Averaged
50	Naphthalene	4261	4459	0.100	4.63994	25.00000	Averaged
60	Toluene	4695	4654	0.100	-0.87278	25.00000	Averaged
70	m+p-Xylene	4626	4824	0.100	4.28132	25.00000	Averaged
80	o-Xylene	4144	4193	0.100	1.18176	25.00000	Averaged
90	2,5-Dibromotoluene (PID)	3803	4048	0.100	6.44501	25.00000	Averaged
180	1,2,4-trimethylbenzene	4121	4324	0.100	4.92539	25.00000	Averaged

*** = Compound out of QC criteria**

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Form 7
Calibration Verification Summary

Lab Name : Katahdin Analytical Services
Project : Long Term Monitoring, Main Po
SDG: SL9925
Lab ID : WG238687-8
Analytical Date: 10/17/18 08:34
Lab File ID : 2LJ10066.D
Instrument ID: GC02
Initial Calibration Date(s): 10/16/18 09:44 10/16/18 15:44
Column ID: B

	Compound	RRF/Amount	RF50	Min RRF	%D/ %Drift	Max %D/ %Drift	Curve Type
60	Benzene	7308	6972	0.100	-4.59272	25.00000	Averaged
70	Ethylbenzene	6655	6583	0.100	-1.07857	25.00000	Averaged
80	Methyl tert-butylether	4018	3945	0.100	-1.83190	25.00000	Averaged
90	Naphthalene	5055	4994	0.100	-1.21509	25.00000	Averaged
100	Toluene	7115	6837	0.100	-3.90229	25.00000	Averaged
110	m+p-Xylene	7019	6874	0.100	-2.06182	25.00000	Averaged
120	o-Xylene	7086	6955	0.100	-1.84919	25.00000	Averaged
200	n-Pentane	5131	4599	0.100	-10.37339	25.00000	Averaged
210	2-Methylpentane	5516	5054	0.100	-8.36856	25.00000	Averaged
220	2,2,4-Trimethylpentane	6088	5606	0.100	-7.91133	25.00000	Averaged
230	n-Nonane	5192	4804	0.100	-7.47511	30.00000	Averaged
240	n-Decane	4793	4336	0.100	-9.52822	25.00000	Averaged
250	n-Butylcyclohexane	5616	5029	0.100	-10.45741	25.00000	Averaged
260	1,2,4-trimethylbenzene	6601	6656	0.100	0.83107	25.00000	Averaged
21	2,5-Dibromotoluene (FID)	2193	2163	0.100	-1.34199	25.00000	Averaged

*** = Compound out of QC criteria**

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Form 7
Calibration Verification Summary

Lab Name : Katahdin Analytical Services
Project : Long Term Monitoring, Main Po
Lab ID : WG238687-9
Lab File ID : 2LJ10086.D
Initial Calibration Date(s): 10/16/18 09:44 10/16/18 15:44

SDG: SL9925
Analytical Date: 10/17/18 23:25
Instrument ID: GC02
Column ID: A

	Compound	$\overline{RRF}$/Amount	RF50	Min RRF	%D/ %Drift	Max %D/ %Drift	Curve Type
20	Benzene	5282	5194	0.100	-1.65479	25.00000	Averaged
30	Ethylbenzene	3972	4093	0.100	3.04227	25.00000	Averaged
40	Methyl tert-butylether	2483	2400	0.100	-3.33088	25.00000	Averaged
50	Naphthalene	4261	4542	0.100	6.59662	25.00000	Averaged
60	Toluene	4695	4712	0.100	0.36218	25.00000	Averaged
70	m+p-Xylene	4626	4882	0.100	5.53836	25.00000	Averaged
80	o-Xylene	4144	4253	0.100	2.64224	25.00000	Averaged
90	2,5-Dibromotoluene (PID)	3803	4068	0.100	6.95614	25.00000	Averaged
180	1,2,4-trimethylbenzene	4121	4331	0.100	5.09475	25.00000	Averaged

*** = Compound out of QC criteria**

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Form 7
Calibration Verification Summary

Lab Name : Katahdin Analytical Services
Project : Long Term Monitoring, Main Po
SDG: SL9925
Lab ID : WG238687-9
Analytical Date: 10/17/18 23:25
Lab File ID : 2LJ10086.D
Instrument ID: GC02
Initial Calibration Date(s): 10/16/18 09:44 10/16/18 15:44
Column ID: B

	Compound	RRF/Amount	RF50	Min RRF	%D/ %Drift	Max %D/ %Drift	Curve Type
60	Benzene	7308	7029	0.100	-3.81163	25.00000	Averaged
70	Ethylbenzene	6655	6653	0.100	-0.04090	25.00000	Averaged
80	Methyl tert-butylether	4018	3990	0.100	-0.70508	25.00000	Averaged
90	Naphthalene	5055	5017	0.100	-0.75456	25.00000	Averaged
100	Toluene	7115	6890	0.100	-3.15765	25.00000	Averaged
110	m+p-Xylene	7019	6902	0.100	-1.66147	25.00000	Averaged
120	o-Xylene	7086	7001	0.100	-1.19663	25.00000	Averaged
200	n-Pentane	5131	4473	0.100	-12.82007	25.00000	Averaged
210	2-Methylpentane	5516	4875	0.100	-11.61690	25.00000	Averaged
220	2,2,4-Trimethylpentane	6088	5357	0.100	-12.01446	25.00000	Averaged
230	n-Nonane	5192	4044	0.100	-22.09920	30.00000	Averaged
240	n-Decane	4793	3648	0.100	-23.89685	25.00000	Averaged
250	n-Butylcyclohexane	5616	4471	0.100	-20.38641	25.00000	Averaged
260	1,2,4-trimethylbenzene	6601	6657	0.100	0.84197	25.00000	Averaged
21	2,5-Dibromotoluene (FID)	2193	2113	0.100	-3.63046	25.00000	Averaged

*** = Compound out of QC criteria**

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Form 7
Calibration Verification Summary

Lab Name : Katahdin Analytical Services
Project : Long Term Monitoring, Main Po
Lab ID : WG238785-4
Lab File ID : 2LJ10088.D
Initial Calibration Date(s): 10/16/18 09:44 10/16/18 15:44

SDG: SL9925
Analytical Date: 10/18/18 08:33
Instrument ID: GC02
Column ID: A

	Compound	$\overline{RRF}$/Amount	RF50	Min RRF	%D/ %Drift	Max %D/ %Drift	Curve Type
20	Benzene	5282	5167	0.100	-2.17468	25.00000	Averaged
30	Ethylbenzene	3972	4089	0.100	2.94962	25.00000	Averaged
40	Methyl tert-butylether	2483	2368	0.100	-4.60604	25.00000	Averaged
50	Naphthalene	4261	4328	0.100	1.55403	25.00000	Averaged
60	Toluene	4695	4712	0.100	0.36686	25.00000	Averaged
70	m+p-Xylene	4626	4870	0.100	5.28046	25.00000	Averaged
80	o-Xylene	4144	4224	0.100	1.92986	25.00000	Averaged
90	2,5-Dibromotoluene (PID)	3803	4015	0.100	5.57839	25.00000	Averaged
180	1,2,4-trimethylbenzene	4121	4330	0.100	5.07243	25.00000	Averaged

*** = Compound out of QC criteria**

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10/18/18

1 2 3 4 5 6 7 8 9 10 11 12 13 14

Form 7
Calibration Verification Summary

Lab Name : Katahdin Analytical Services
Project : Long Term Monitoring, Main Po
Lab ID : WG238785-4
Lab File ID : 2LJ10088.D
Initial Calibration Date(s): 10/16/18 09:44 10/16/18 15:44

SDG: SL9925
Analytical Date: 10/18/18 08:33
Instrument ID: GC02
Column ID: B

	Compound	$\overline{RRF}$/Amount	RF50	Min RRF	%D/ %Drift	Max %D/ %Drift	Curve Type
60	Benzene	7308	6924	0.100	-5.25338	25.00000	Averaged
70	Ethylbenzene	6655	6554	0.100	-1.52394	25.00000	Averaged
80	Methyl tert-butylether	4018	3870	0.100	-3.69782	25.00000	Averaged
90	Naphthalene	5055	4867	0.100	-3.72940	25.00000	Averaged
100	Toluene	7115	6846	0.100	-3.77944	25.00000	Averaged
110	m+p-Xylene	7019	6799	0.100	-3.12751	25.00000	Averaged
120	o-Xylene	7086	6868	0.100	-3.07048	25.00000	Averaged
200	n-Pentane	5131	4408	0.100	-14.09388	25.00000	Averaged
210	2-Methylpentane	5516	5134	0.100	-6.91715	25.00000	Averaged
220	2,2,4-Trimethylpentane	6088	5692	0.100	-6.50530	25.00000	Averaged
230	n-Nonane	5192	4880	0.100	-5.99698	30.00000	Averaged
240	n-Decane	4793	4377	0.100	-8.67238	25.00000	Averaged
250	n-Butylcyclohexane	5616	5072	0.100	-9.68142	25.00000	Averaged
260	1,2,4-trimethylbenzene	6601	6561	0.100	-0.60176	25.00000	Averaged
21	2,5-Dibromotoluene (FID)	2193	2111	0.100	-3.73809	25.00000	Averaged

*** = Compound out of QC criteria**

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Form 7
Calibration Verification Summary

Lab Name : Katahdin Analytical Services
Project : Long Term Monitoring, Main Po
SDG: SL9925
Lab ID : WG238785-5
Analytical Date: 10/18/18 15:36
Lab File ID : 2LJ10095.D
Instrument ID: GC02
Initial Calibration Date(s): 10/16/18 09:44 10/16/18 15:44
Column ID: A

	Compound	RRF/Amount	RF50	Min RRF	%D/ %Drift	Max %D/ %Drift	Curve Type
20	Benzene	5282	5272	0.100	-0.18674	25.00000	Averaged
30	Ethylbenzene	3972	4153	0.100	4.55738	25.00000	Averaged
40	Methyl tert-butylether	2483	2370	0.100	-4.54965	25.00000	Averaged
50	Naphthalene	4261	4564	0.100	7.09881	25.00000	Averaged
60	Toluene	4695	4756	0.100	1.30575	25.00000	Averaged
70	m+p-Xylene	4626	4951	0.100	7.01675	25.00000	Averaged
80	o-Xylene	4144	4300	0.100	3.77598	25.00000	Averaged
90	2,5-Dibromotoluene (PID)	3803	4160	0.100	9.36984	25.00000	Averaged
180	1,2,4-trimethylbenzene	4121	4444	0.100	7.82248	25.00000	Averaged

*** = Compound out of QC criteria**

Form 7
Calibration Verification Summary

Lab Name : Katahdin Analytical Services
Project : Long Term Monitoring, Main Po
Lab ID : WG238785-5
Lab File ID : 2LJ10095.D
Initial Calibration Date(s): 10/16/18 09:44 10/16/18 15:44

SDG: SL9925
Analytical Date: 10/18/18 15:36
Instrument ID: GC02
Column ID: B

	Compound	RRF/Amount	RF50	Min RRF	%D/ %Drift	Max %D/ %Drift	Curve Type
60	Benzene	7308	6997	0.100	-4.25062	25.00000	Averaged
70	Ethylbenzene	6655	6614	0.100	-0.61278	25.00000	Averaged
80	Methyl tert-butylether	4018	3906	0.100	-2.80044	25.00000	Averaged
90	Naphthalene	5055	4939	0.100	-2.28807	25.00000	Averaged
100	Toluene	7115	6821	0.100	-4.13729	25.00000	Averaged
110	m+p-Xylene	7019	6894	0.100	-1.78271	25.00000	Averaged
120	o-Xylene	7086	6973	0.100	-1.59658	25.00000	Averaged
200	n-Pentane	5131	5027	0.100	-2.02188	25.00000	Averaged
210	2-Methylpentane	5516	5448	0.100	-1.23589	25.00000	Averaged
220	2,2,4-Trimethylpentane	6088	6040	0.100	-0.79082	25.00000	Averaged
230	n-Nonane	5192	5145	0.100	-0.90771	30.00000	Averaged
240	n-Decane	4793	4581	0.100	-4.43031	25.00000	Averaged
250	n-Butylcyclohexane	5616	5439	0.100	-3.14626	25.00000	Averaged
260	1,2,4-trimethylbenzene	6601	6683	0.100	1.23858	25.00000	Averaged
21	2,5-Dibromotoluene (FID)	2193	2172	0.100	-0.94157	25.00000	Averaged

*** = Compound out of QC criteria**

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Form 8
GC Analytical Sequence

Lab Name : Katahdin Analytical Services **SDG :** SL9925
Project : Long Term Monitoring, Main Post Fall 201
Instrument ID : GC02

Client Sample ID	Lab Sample ID	Date Analyzed	Time Analyzed	DBT (FID)	DBT (PID)
Initial Calibration	WG238688-2	10/16/18	11:07		31.508
Initial Calibration	WG238688-2	10/16/18	11:07	31.498	
Initial Calibration	WG238688-3	10/16/18	11:48		31.508
Initial Calibration	WG238688-3	10/16/18	11:48	31.498	
Initial Calibration	WG238688-5	10/16/18	12:30		31.507
Initial Calibration	WG238688-5	10/16/18	12:30	31.498	
Initial Calibration	WG238688-6	10/16/18	13:11		31.512
Initial Calibration	WG238688-6	10/16/18	13:11	31.502	
Initial Calibration	WG238688-1	10/16/18	15:02		31.509
Initial Calibration	WG238688-1	10/16/18	15:02	31.499	
Initial Calibration	WG238688-4	10/16/18	15:44		31.509
Initial Calibration	WG238688-4	10/16/18	15:44	31.499	
Independent Source	WG238688-7	10/16/18	17:04	31.499	31.507
Continuing Calibrati	WG238687-8	10/17/18	08:34	31.498	31.509
Method Blank Sample	WG238687-1	10/17/18	09:50	31.5	31.51
Laboratory Control S	WG238687-2	10/17/18	10:31	31.502	31.51
Laboratory Control S	WG238687-3	10/17/18	11:13	31.503	31.511
XGM-TRIPBLANK	SL9925-6	10/17/18	12:21	31.505	31.514
XGM-93-02X_FAL18	SL9925-1	10/17/18	13:43	31.504	31.514
XGM-97-12X_FAL18	SL9925-2	10/17/18	14:25	31.504	31.514
XGM-DUP1_-FAL18	SL9925-3	10/17/18	15:06	31.496	31.502
AAFES-2_FAL18	SL9925-4	10/17/18	15:48	31.506	31.514
XGM-94-04X_FAL18	SL9925-5	10/17/18	16:29	31.51	31.519
Matrix Spike	WG238687-4	10/17/18	20:39	31.502	31.511
Matrix Spike Duplica	WG238687-5	10/17/18	21:20	31.502	31.511
Continuing Calibrati	WG238687-9	10/17/18	23:25	31.505	31.515
Continuing Calibrati	WG238785-4	10/18/18	08:33	31.499	31.509
Method Blank Sample	WG238785-1	10/18/18	09:56	31.498	31.508
Laboratory Control S	WG238785-2	10/18/18	10:37	31.498	31.507
Laboratory Control S	WG238785-3	10/18/18	11:19	31.499	31.508
XGM-97-12X_FAL18	SL9925-2DL	10/18/18	12:28	31.501	31.51
XGM-DUP1_-FAL18	SL9925-3DL	10/18/18	13:10	31.5	31.509
AAFES-2_FAL18	SL9925-4DL	10/18/18	13:52	31.5	31.509
Continuing Calibrati	WG238785-5	10/18/18	15:36	31.497	31.508

CHAIN-OF-CUSTODY RECORD

KOMAN Government Services, LLC
Laurie Ekes
293 Boston Post Road West, Suite 100, Marlborough, MA 01752
(508) 366 7442, lekes@komangs.com

COC # 201810A43

360925 Boston

KGS

Project Name: Long Term Monitoring	Laboratory: TestAmerica Laboratories, Inc., Savannah, GA	Event: KOMAN, Long Term Monitoring, Main Post Fall 2018
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:

4°C

See codes

Equipment:

Code	Matrix
WG	Ground Water
WQ	Water Quality Control Matrix

Code	Container/Preservative
3	2* 40mL glass VOA Vials, HCl pH < 2, Cool < 6°C
45	1* 250mL plastic, Cool < 6°C
9	1* 250mL plastic, HNO3 pH < 2, Cool < 6°C

680-159120 Chain of Custody

Event: KOMAN, Long Term Monitoring, Main Post Fall 2018

	Sample ID	Matrix	Date	Time	Samp Init	A2320B - Alkalinity	MADEPVP - VPH with targets	SW6010C - Fe Mn	SW6010C - Mn	SW6020A - As	Location ID	Sample Type	Depth (ft bgs) Top	Depth (ft bgs) Bottom	Comments	Cooler
						45	3	9	9	9						
1	~~AAFES-2 FAL18~~	~~WG~~				~~X~~	~~X~~	~~X~~		~~X~~	~~AAFES-2~~	~~N1~~	~~18.30~~	~~33.30~~		1
2	XGM-93-02X FAL18	WG	10/10/18	1140	MM	X	X	X		X	XGM-93-02X	N1	28.00	38.00		1
3	~~XGM-94-04X FAL18~~	~~WG~~				~~X~~	~~X~~	~~X~~		~~X~~	~~XGM-94-04X~~	~~N1~~	~~20.50~~	~~30.50~~		1
4	XGM-97-12X FAL18	WG	10/10/18	1255	MM	X	X	X		X	XGM-97-12X	N1	24.00	34.00		1
5	~~XGM-94-04X FAL18~~	~~WG~~				~~X~~	~~X~~	~~X~~		~~X~~	~~XGM-94-04X~~	~~SD1~~	~~20.50~~	~~30.50~~		1
6	~~XGM-94-04X FAL18~~	~~WG~~				~~X~~	~~X~~	~~X~~		~~X~~	~~XGM-94-04X~~	~~MS1~~	~~20.50~~	~~30.50~~		1
7	XGM-DUP1 FAL18	WG	10/10/18	1300	MM	X	X	X		X	FIELDOC	FD1				1
8	~~AAFES-7 FAL18~~	~~WG~~							~~X~~	~~X~~	~~AAFES-7~~	~~N1~~	~~0.00~~	~~0.00~~		1
9	~~XGM-TRIPBLANK~~	~~WG~~					~~X~~				~~FIELDOC~~	~~TB1~~	~~0.00~~	~~0.00~~		1
		Turnaround Time:														

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
[signature]	10/10/18	1300	[signature]	10/10/18	1300
[signature]	10/10/18	1350	[signature]	10/10/18	1350
[signature]	10/10/18	1200	[signature] TA	10/11/18	920

Shipping Date / Carrier / Airbill Number

Received by Laboratory: (Signature, Date, Time) & condition

1.5/2.0

Page 1 of 1

CHAIN-OF-CUSTODY RECORD

KOMAN Government Services, LLC
Laurie Ekes
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(508) 366-7442 lekes@komangs.com

COC # 201810A43 352325-Boston

KGS

Project Name: Long Term Monitoring	Laboratory: TestAmerica Laboratories, Inc., Savannah, GA	Event: KOMAN, Long Term Monitoring, Main Post Fall 2018
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:

Equipment:

Code	Matrix
WG	Ground Water
WQ	Water Quality Control Matrix

Code	Container/Preservative
3	2 40mL glass VOA Vials, HCl, pH < 2, Cool < 6°C
45	1L plastic, Cool < 6°C
9	2 250mL plastic, HNO3, pH < 2, Cool < 6°C

	Event: KOMAN, Long Term Monitoring, Main Post Fall 2018					Analytical Test Method									
						A2320B - Alkalinity	MADEP VPH with targets	SW6010C - Fe,Mn	SW6010C - Mn	SW6020A - As					
						45	3	9	9	9					
	Sample ID	Matrix	Date	Time	Samp Init						Location ID	Sample Type	Depth (ft bgs) Top	Depth (ft bgs) Bottom	Comments	Cooler
1	AAFES-2_FAL18	WG	10/10/18	1230	B:A	X	X	X		X	AAFES-2	N1	18.30	33.30		1
2	XGM-93-02X_FAL18	WG				X	X	X		X	XGM-93-02X	N1	28.00	38.00		1
3	XGM-94-04X_FAL18	WG	10/10/18	1115	B:A	X	X	X		X	XGM-94-04X	N1	20.50	30.50		1
4	~~XGM-97-12X_FAL18~~	WG				X	X	X		X	XGM-97-12X	N1	24.00	34.00		1
5	XGM-94-04X_FAL18_MS	WG	10/10/18	1115	B:A	X	X	X		X	XGM-94-04X	SD1	20.50	30.50		1
6	XGM-94-04X_FAL18_MSD	WG	10/10/18	1115	B:A	X	X	X		X	XGM-94-04X	MS1	20.50	30.50		1
7	~~XGM-DUP1_FAL18~~	WG				X	X	X		X	FIELDQC	FD1				1
8	AAFES-7_FAL18	WG	10/10/18	1015	B:A				X	X	AAFES-7	N1	0.00	0.00		1
9	XGM-TRIPBLANK	WQ	10/10/18				X				FIELDQC	TB1	0.00	0.00		1
		Turnaround Time: Routine														

Relinquished by: *(Signature)*	Date	Time
Ruth Baca	10/10/18	1350
[signature]	10/10/18	1910

Received by: *(Signature)*	Date	Time
[signature]	10/10/18	1930
V. Sapp TA	10-11-18	920

Shipping Date / Carrier / Airbill Number

Received by Laboratory: *(Signature, Date, Time)* **& condition**

1-8/2-0

CHAIN-OF-CUSTODY RECORD

KOMAN Government Services, LLC
Laurie Ekes
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(508) 366.7442, lekes@komangs.com

360325-Boston

COC # 201810A43

360325-Boston

KGS

Project Name: Long Term Monitoring	Laboratory: TestAmerica Laboratories, Inc., Savannah, GA	Event: KOMAN, Long Term Monitoring, Main Post Fall 2018
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:

Equipment:

Code	Matrix
WG	Ground Water
WQ	Water Quality Control Matrix

Code	Container/Preservative
3	3* 40mL glass VOA Vials, HCl, pH < 2; Cool < 6°C
45	1* 250mL, plastic, Cool < 6°C
9	1* 250mL, plastic, HNO3, pH < 2; Cool < 6°C

Event: KOMAN, Long Term Monitoring, Main Post Fall 2018

	Sample ID	Matrix	Date	Time	Samp Init.	A2320B - Alkalinity	MADEPVP - VPH with targets	SW6010C - Fe Mn	SW6010C - Mn	SW6020A - As	Location ID	Sample Type	Depth (ft bgs) Top	Depth (ft bgs) Bottom	Cooler
	Analytical Test Method					45	3	9	9	9					
1	AAFES-2_FAL18	WG	10/10/18	1230	BrA	X	X	X		X	AAFES-2	N1	18.30	33.30	1
2	~~XGM-93-02X_FAL18~~	~~WG~~				~~X~~	~~X~~	~~X~~		~~X~~	~~XGM-93-02X~~	~~N1~~	~~28.00~~	~~38.00~~	1
3	XGM-94-04X_FAL18	WG	10/10/18	1115	BrA	X	X	X		X	XGM-94-04X	N1	20.50	30.50	1
4	~~XGM-97-12X_FAL18~~	~~WG~~				~~X~~	~~X~~	~~X~~		~~X~~	~~XGM-97-12X~~	~~N1~~	~~24.00~~	~~34.00~~	1
5	XGM-94-04X_FAL18_MS	WG	10/10/18	1115	BrA	X	X	X		X	XGM-94-04X	SD1	20.50	30.50	1
6	XGM-94-04X_FAL18_MSD	WG	10/10/18	1115	BrA	X	X	X		X	XGM-94-04X	MS1	20.50	30.50	1
7	~~XGM-DUP1_FAL18~~	~~WG~~				~~X~~	~~X~~	~~X~~		~~X~~	~~FIELDQC~~	~~FD1~~			1
8	AAFES-7_FAL18	WG	10/10/18	1015	BrA				X	X	AAFES-7	N1	0.00	0.00	1
9	XGM-TRIPBLANK	WQ	10/10/18				X				FIELDQC	TB1	0.00	0.00	1
		Turnaround Time: Routine													

680-159120 Chain of Custody

Relinquished by: *(Signature)*	Date	Time
	10/10/18	1350
	10/10/18	1700

Received by: *(Signature)*	Date	Time
	10/10/18	13:50
	10/11/18	0910

Shipping Date / Carrier / Airbill Number

Received by Laboratory: *(Signature, Date, Time)* **& condition**

360325-Boston
360325-Boston

CHAIN-OF-CUSTODY RECORD

KOMAN Government Services, LLC
Laurie Ekes
293 Boston Post Road West, Suite 100, Marlborough, MA 01752
(508) 366.7442, lekes@komangs.com

COC # 201810A43

360325-Boston

KGS

Project Name: Long Term Monitoring	Laboratory: TestAmerica Laboratories, Inc., Savannah, GA	Event: KOMAN, Long Term Monitoring, Main Post Fall 2018
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:

4°C

See codes

Equipment:

Code	Matrix
WG	Ground Water
WQ	Water Quality Control Matrix

Code	Container/Preservative
3	3* 40mL glass VOA Vials, HCl, pH < 2, Cool < 6°C
45	1* 250mL, plastic, Cool < 6°C
9	1* 250mL, plastic, HNO3, pH < 2, Cool < 6°C

						Analytical Test Method	A2320B - Alkalinity	MADEPVP - VPH with targets	SW6010C - Fe Mn	SW6010C - Mn	SW6020A - As					
	Event: KOMAN, Long Term Monitoring, Main Post Fall 2018						45	3	9	9	9					
	Sample ID	Matrix	Date	Time	Samp Init.							Location ID	Sample Type	Depth (ft bgs) Top	Depth (ft bgs) Bottom	Comments	Cooler
1	~~AAFES-2_FAL18~~	~~WG~~					X	X	X		X	~~AAFES-2~~	~~N1~~	~~18.30~~	~~33.30~~		1
2	XGM-93-02X_FAL18	WG	10/10/18	1140	MM		X	X	X		X	XGM-93-02X	N1	28.00	38.00		1
3	~~XGM-94-04X_FAL18~~	~~WG~~					~~X~~	~~X~~	~~X~~		~~X~~	~~XGM-94-04X~~	~~N1~~	~~20.50~~	~~30.50~~		1
4	XGM-97-12X_FAL18	WG	10/10/18	1255	MM		X	X	X		X	XGM-97-12X	N1	24.00	34.00		1
5	~~XGM-94-04X_FAL18~~	~~WG~~					~~X~~	~~X~~	~~X~~		~~X~~	~~XGM-94-04X~~	~~SD1~~	~~20.50~~	~~30.50~~		1
6	XGM-94-04X_FAL18	WG					~~X~~	~~X~~	~~X~~		~~X~~	~~XGM-94-04X~~	~~MS1~~	20.50	30.50		1
7	XGM-DUP1_FAL18	WG	10/10/18	1300	MM		X	X	X		X	FIELDQC	FD1				1
8	~~AAFES-7_FAL18~~	~~WG~~								~~X~~	~~X~~	~~AAFES-7~~	~~N1~~	~~0.00~~	~~0.00~~		1
9	~~XGM-TRIPBLANK~~	~~WQ~~						~~X~~				~~FIELDQC~~	~~TB1~~	~~0.00~~	~~0.00~~		1
		Turnaround Time:															

Relinquished by: *(Signature)*	Date	Time
	10/10/18	1300
	10/10/18	1350
	10/10/18	1700

Received by: *(Signature)*	Date	Time
	10/10/18	1300
	10/10/18	1350
	10/11/18	0410

Shipping Date / Carrier / Airbill Number

Received by Laboratory: *(Signature, Date, Time)* **& condition**

360325 Boston

CHAIN-OF-CUSTODY RECORD

KOMAN Government Services, LLC
Laurie Ekes
293 Boston Post Road West, Suite 100, Marlborough, MA 01752
(508) 366.7442, lekes@komangs.com

360325 Boston

COC # 201810A692

360325 Boston

KGS

Project Name: Long Term Monitoring	Laboratory: TestAmerica Laboratories, Inc., Savannah, GA	Event: KOMAN, Long Term Monitoring, Main Post Fall 2018
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:

Equipment:

Code	Matrix
WG	Ground Water

Code	Container/Preservative
2	2* 1 Liter, amber, glass, 1:1 HCl to pH =2; Cool < 6°C
9	1* 250mL, plastic, HNO3, pH < 2; Cool < 6°C

						Analytical Test Method	MADEPEP - EPH with PAHs	SW6010C/FLDFLT - Fe Mn	SW6010C/FLDFLT - Mn	SW6020A/FLDFLT - As					
	Event: KOMAN, Long Term Monitoring, Main Post Fall 2018						2	9	9	9					
	Sample ID	Matrix	Date	Time	Samp Init.						Location ID	Sample Type	Depth (ft bgs) Top	Depth (ft bgs) Bottom	Comments	Cooler
1	ZWM-99-23X_FAL18	WG	10/12/2018				X	X		X	ZWM-99-23X	N1	4.68	14.68		1
2	ZWM-99-24X_FAL18	WG	10/12/2018				X	X		X	ZWM-99-24X	N1	5.52	15.52		1
3	ZWM-01-25X_FAL18	WG	10/12/2018				X	X		X	ZWM-01-25X	N1	6.13	16.13		1
4	69WP-08-01_FAL18	WG	10/12/2018	1500	CJ			X		X	69WP-08-01	N1	10.00	13.00		1
5	69WP-13-01_FAL18	WG	10/12/2018	1330	CJ				X		69WP-13-01	N1	0.00	0.00		1
		Turnaround Time:														

Relinquished by: *(Signature)*	Date	Time
	10/9/18	1615
	10/10/18	1350
	10/11/18	0910

Received by: *(Signature)*	Date	Time
	10/9/18	1615
	10/10/18	1350
	10/11/18	0910

Shipping Date / Carrier / Airbill Number

Received by Laboratory: *(Signature, Date, Time)* **& condition**

360325-Boston 360325-Boston

CHAIN-OF-CUSTODY RECORD

KOMAN Government Services, LLC
Laurie Ekes
293 Boston Post Road West, Suite 100, Marlborough, MA 01752
(508) 366.7442, lekes@komangs.com

COC # 201810A691 360325-Boston

Project Name: Long Term Monitoring	Laboratory: TestAmerica Laboratories, Inc., Savannah, GA	Event: KOMAN, Long Term Monitoring, Main Post Fall 2018
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:

Equipment:

Code	Matrix
WG	Ground Water

Code	Container/Preservative
2	2* 1 Liter, amber, glass, 1:1 HCl to pH =2; Cool < 6°C
9	1* 250mL, plastic, HNO3, pH < 2; Cool < 6°C

Analytical Test Method

Event: KOMAN, Long Term Monitoring, Main Post Fall 2018

	Sample ID	Matrix	Date	Time	Samp Init.	MADEPEP - EPH with PAHs	SW6010C/FLDFLT - Fe Mn	SW6020A/FLDFLT - As	Location ID	Sample Type	Depth (ft bgs) Top	Depth (ft bgs) Bottom	Comments	Cooler
						2	9	9						
1	69W-94-13_FAL18	WG	10/11/2018	1410	OJ	X	X	X	69W-94-13	N1	6.49	16.49		1
2	~~69W-94-14_FAL18~~	~~WG~~	~~10/11/2018~~			~~X~~	~~X~~	~~X~~	~~69W-94-14~~	~~N1~~	~~5.49~~	~~15.49~~		~~1~~
3	ZWM-95-15X_FAL18	WG	10/11/2018	0930	OJ	X	X	X	ZWM-95-15X	N1	5.87	15.87		1
4	ZWM-95-18X_FAL18 MS	WG	10/11/2018	0830	OJ	X	X	X	ZWM-95-18X	N1	5.22	15.22		1
5	ZWM-95-18X_FAL18 MSD	WG	10/11/2018	0830	OJ	X	X	X	ZWM-95-18X	MS1	5.22	15.22		1
6	ZWM-95-18X_FAL18	WG	10/11/2018	1020	OJ	X	X	X	ZWM-95-18X	SD1	5.22	15.22		1
7	~~69W-DUP1_FAL18~~	~~WG~~	~~10/11/2018~~			~~X~~	~~X~~	~~X~~	~~FIELDQC~~	~~FD1~~				~~1~~
8	~~ZWM-99-22X_FAL18~~	~~WG~~	~~10/11/2018~~			~~X~~	~~X~~	~~X~~	~~ZWM-99-22X~~	~~N1~~	~~4.63~~	~~14.63~~		~~1~~
		Turnaround Time:												

Relinquished by: *(Signature)*	Date	Time
	10/9/18	1615
	10/10/18	1350

Received by: *(Signature)*	Date	Time
	10/9/18	1615
	10/10/18	1350
	10/11/18	0910

Shipping Date / Carrier / Airbill Number

Received by Laboratory: *(Signature, Date, Time)* **& condition**

Page 1 of 1

360325-Boston 360325-Boston 360325-Boston

CHAIN-OF-CUSTODY RECORD

KOMAN Government Services, LLC
Laurie Ekes
293 Boston Post Road West, Suite 100, Marlborough, MA 01752
(508) 366.7442, lekes@komangs.com

COC # 201810A692

Project Name: Long Term Monitoring	Laboratory: TestAmerica Laboratories, Inc., Savannah, GA	Event: KOMAN, Long Term Monitoring, Main Post Fall 2018
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:

Equipment:

Analytical Test Method

Code	Matrix
WG	Ground Water

Code	Container/Preservative
2	2* 1 Liter, amber, glass, 1:1 HCl to pH =2; Cool < 6°C
9	1* 250mL, plastic, HNO3, pH < 2; Cool < 6°C

Event: KOMAN, Long Term Monitoring, Main Post Fall 2018

	Sample ID	Matrix	Date	Time	Samp Init.	MADEPEP - EPH with PAHs	SW6010C/FLDFLT - Fe Mn	SW6010C/FLDFLT - Mn	SW6020A/FLDFLT - As	Location ID	Sample Type	Depth (ft bgs) Top	Depth (ft bgs) Bottom	Comments	Cooler
						2	9	9	9						
1	ZWM-99-23X_FAL18	WG	10/12/2018	1000	B/A	X	X		X	ZWM-99-23X	N1	4.68	14.68		1
2	ZWM-99-24X_FAL18	WG	10/12/2018	1445	B/A	X	X		X	ZWM-99-24X	N1	5.52	15.52		1
3	ZWM-01-25X_FAL18	WG	10/12/2018	1115	B/A	X	X		X	ZWM-01-25X	N1	6.13	16.13		1
4	~~69WP-08-01_FAL18~~	~~WG~~	~~10/12/2018~~				X		X	~~69WP-08-01~~	~~N1~~	~~10.00~~	~~13.00~~		1
5	~~69WP-13-01_FAL18~~	~~WG~~	~~10/12/2018~~					X		~~69WP-13-01~~	~~N1~~	0.00	0.00		1
		Turnaround Time: Routine													

Relinquished by: *(Signature)*	Date	Time
	10/10/18	1350
	10/10/18	1540

Received by: *(Signature)*	Date	Time
	10/10/18	13:50
	10/11/18	0910

Shipping Date / Carrier / Airbill Number

Received by Laboratory: *(Signature, Date, Time)* **& condition**

360325-Boston

CHAIN-OF-CUSTODY RECORD

KOMAN Government Services, LLC
Laurie Ekes
293 Boston Post Road West, Suite 100, Marlborough, MA 01752
(508) 366.7442, lekes@komangs.com

360325-Boston **COC # 201810A691** 360325-Boston

KGS

Project Name: Long Term Monitoring	Laboratory: TestAmerica Laboratories, Inc., Savannah, GA	Event: KOMAN, Long Term Monitoring, Main Post Fall 2018
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:

Equipment:

Code	Matrix
WG	Ground Water

Code	Container/Preservative
2	2* 1 Liter, amber, glass, 1:1 HCl to pH =2; Cool < 6°C
9	1* 250mL, plastic, HNO3, pH < 2; Cool < 6°C

	Analytical Test Method	MADEPEP - EPH with PAHs	SW6010C/FLDFLT - Fe Mn	SW6020A/FLDFLT - As
Event: KOMAN, Long Term Monitoring, Main Post Fall 2018		2	9	9

	Sample ID	Matrix	Date	Time	Samp Init.				Location ID	Sample Type	Depth (ft bgs) Top	Depth (ft bgs) Bottom	Comments	Cooler
1	~~69W-94-13_FAL18~~	~~WG~~	~~10/11/2018~~			~~X~~	~~X~~	~~X~~	~~69W-94-13~~	~~N1~~	~~6.49~~	~~16.49~~		1
2	69W-94-14_FAL18	WG	10/~~11~~ 09/2018	0530	BrA	X	X	X	69W-94-14	N1	5.49	15.49		1
3	~~ZWM-95-15X_FAL18~~	~~WG~~	~~10/11/2018~~			~~X~~	~~X~~	~~X~~	~~ZWM-95-15X~~	~~N1~~	5.87	15.87		1
4	~~ZWM-95-18X_FAL18~~	~~WG~~	~~10/11/2018~~			~~X~~	~~X~~	~~X~~	~~ZWM-95-18X~~	N1	5.22	15.22		1
5	~~ZWM-95-18X_FAL18~~	~~WG~~	~~10/11/2018~~			~~X~~	~~X~~	~~X~~	~~ZWM-95-18X~~	~~MS1~~	~~5.22~~	~~15.22~~		1
6	~~ZWM-95-18X_FAL18~~	~~WG~~	~~10/11/2018~~			~~X~~	~~X~~	~~X~~	~~ZWM-95-18X~~	~~SD1~~	~~5.22~~	~~15.22~~		1
7	69W-DUP1_FAL18	WG	10/~~11~~ 09/2018	1330	BrA	X	X	X	FIELDQC	FD1				1
8	ZWM-99-22X_FAL18	WG	10/~~11~~ 08/2018	1320	BrA	X	X	X	ZWM-99-22X	N1	4.63	14.63		1
		Turnaround Time: Routine												

Relinquished by: *(Signature)*	Date	Time	Received by: *(Signature)*	Date	Time
[signature]	10/10/18	1350	[signature]	10/10/18	1350
[signature]	10/10/18	1760	[signature]	10/11/18	0910

Shipping Date / Carrier / Airbill Number

Received by Laboratory: *(Signature, Date, Time)* & condition

Page 1 of 1

Login Sample Receipt Checklist

Client: KOMAN Government Solutions, LLC

Job Number: 680-159120-2

Login Number: 159120
List Number: 1
Creator: Ragnaldsen, Amy E

List Source: 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.	True	
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.	N/A	
Residual Chlorine Checked.	N/A	

Accreditation/Certification Summary

Client: KOMAN Government Solutions, LLC
Project/Site: Fort Devens / LTM / AOC 43G

TestAmerica Job ID: 680-159120-2

Laboratory: TestAmerica Savannah

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
	AFCEE		SAVLAB	
Alabama	State Program	4	41450	06-30-19
Alaska	State Program	10		06-30-19
Alaska (UST)	State Program	10	UST-104	09-22-19
ANAB	DoD ELAP		L2463	09-22-19
ANAB	ISO/IEC 17025		L2463.01	09-22-19
Arizona	State Program	9	AZ0808	12-14-18
Arkansas DEQ	State Program	6	88-0692	02-01-19
California	State Program	9	2939	06-30-19
Colorado	State Program	8	N/A	12-31-18
Connecticut	State Program	1	PH-0161	03-31-19
Florida	NELAP	4	E87052	06-30-19
GA Dept. of Agriculture	State Program	4	N/A	06-12-19
Georgia	State Program	4	N/A	06-30-19
Guam	State Program	9	15-005r	04-17-19
Hawaii	State Program	9	N/A	06-30-19
Illinois	NELAP	5	200022	11-30-18
Indiana	State Program	5	N/A	06-30-19
Iowa	State Program	7	353	06-30-19
Kentucky (DW)	State Program	4	90084	12-31-18
Kentucky (UST)	State Program	4	18	06-30-19
Kentucky (WW)	State Program	4	90084	12-31-18 *
Louisiana	NELAP	6	30690	06-30-19
Louisiana (DW)	NELAP	6	LA160019	12-31-18
Maine	State Program	1	GA00006	09-25-20
Maryland	State Program	3	250	12-31-18
Massachusetts	State Program	1	M-GA006	06-30-19
Michigan	State Program	5	9925	03-05-19
Mississippi	State Program	4	N/A	06-30-19
Nebraska	State Program	7	TestAmerica-Savannah	06-30-19
New Jersey	NELAP	2	GA769	06-30-19
New Mexico	State Program	6	N/A	06-30-19
New York	NELAP	2	10842	03-31-19
North Carolina (DW)	State Program	4	13701	07-31-19
North Carolina (WW/SW)	State Program	4	269	12-31-18
Oklahoma	State Program	6	9984	08-31-19
Pennsylvania	NELAP	3	68-00474	06-30-19
Puerto Rico	State Program	2	GA00006	12-31-18
South Carolina	State Program	4	98001	06-30-18 *
Tennessee	State Program	4	TN02961	06-30-19
Texas	NELAP	6	T104704185-16-9	11-30-18
Texas (DW)	State Program	1	T104704185	06-30-19
US Fish & Wildlife	Federal		LE058448-0	07-31-19
Virginia	NELAP	3	460161	06-14-19
Washington	State Program	10	C805	06-10-19
West Virginia (DW)	State Program	3	9950C	12-31-18
West Virginia DEP	State Program	3	094	06-30-19
Wisconsin	State Program	5	999819810	08-31-19
Wyoming	State Program	8	8TMS-L	06-30-16 *

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Accreditation/Certification Summary

Client: KOMAN Government Solutions, LLC
Project/Site: Fort Devens / LTM / AOC 43G

TestAmerica Job ID: 680-159120-2

Laboratory: TestAmerica Denver

The accreditations/certifications listed below are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
A2LA	DoD ELAP		2907.01	10-31-19

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING



ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Tel: (912)354-7858

TestAmerica Job ID: 680-159120-1
Client Project/Site: Fort Devens / LTM / AOC 69W

For:
KOMAN Government Solutions, LLC
293 Boston Post Road
Suite 100
Marlborough, Massachusetts 01752

Attn: Laurie Ekes

Jerry Lanier

Authorized for release by:
10/31/2018 9:42:00 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.

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Job ID: 680-159120-1

Laboratory: TestAmerica Savannah

Narrative

CASE NARRATIVE

Client: KOMAN Government Solutions, LLC

Project: Fort Devens / LTM / AOC 69W

Report Number: 680-159120-1

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 10/11/2018; 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 69W-94-14_FAL18 (680-159120-1), 69W-DUP1_FAL18 (680-159120-2), ZWM-99-22X_FAL18 (680-159120-3), ZWM-99-23X_FAL18 (680-159120-4), ZWM-99-24X_FAL18 (680-159120-5), ZWM-01-25X_FAL18 (680-159120-6), 69W-94-13_FAL18 (680-159120-7), ZWM-95-15X_FAL18 (680-159120-8), ZWM-95-18X_FAL18 (680-159120-9), 69WP-08-01_FAL18 (680-159120-10) and 69WP-13-01_FAL18 (680-159120-11) were analyzed for Metals (ICP) - Dissolved in accordance with EPA SW-846 Method 6010C. The samples were prepared on 10/13/2018 and analyzed on 10/17/2018.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

METALS (ICPMS) - DISSOLVED

Samples 69W-94-14_FAL18 (680-159120-1), 69W-DUP1_FAL18 (680-159120-2), ZWM-99-22X_FAL18 (680-159120-3), ZWM-99-23X_FAL18 (680-159120-4), ZWM-99-24X_FAL18 (680-159120-5), ZWM-01-25X_FAL18 (680-159120-6), 69W-94-13_FAL18 (680-159120-7), ZWM-95-15X_FAL18 (680-159120-8), ZWM-95-18X_FAL18 (680-159120-9) and 69WP-08-01_FAL18 (680-159120-10) were analyzed for Metals (ICPMS) - Dissolved in accordance with EPA SW-846 Method 6020A. The samples were prepared on 10/13/2018 and analyzed on 10/15/2018.

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 / AOC 69W

TestAmerica Job ID: 680-159120-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
680-159120-1	69W-94-14_FAL18	Water	10/09/18 08:30	10/11/18 09:20
680-159120-2	69W-DUP1_FAL18	Water	10/08/18 13:30	10/11/18 09:20
680-159120-3	ZWM-99-22X_FAL18	Water	10/08/18 13:20	10/11/18 09:20
680-159120-4	ZWM-99-23X_FAL18	Water	10/09/18 10:00	10/11/18 09:20
680-159120-5	ZWM-99-24X_FAL18	Water	10/08/18 14:45	10/11/18 09:20
680-159120-6	ZWM-01-25X_FAL18	Water	10/08/18 11:15	10/11/18 09:20
680-159120-7	69W-94-13_FAL18	Water	10/08/18 14:10	10/11/18 09:20
680-159120-8	ZWM-95-15X_FAL18	Water	10/09/18 08:20	10/11/18 09:20
680-159120-9	ZWM-95-18X_FAL18	Water	10/09/18 10:25	10/11/18 09:20
680-159120-10	69WP-08-01_FAL18	Water	10/09/18 15:00	10/11/18 09:20
680-159120-11	69WP-13-01_FAL18	Water	10/09/18 13:30	10/11/18 09:20

Method Summary

Client: KOMAN Government Solutions, LLC
Project/Site: Fort Devens / LTM / AOC 69W

TestAmerica Job ID: 680-159120-1

Method	Method Description	Protocol	Laboratory
6010C	Metals (ICP)	SW846	TAL SAV
6020A	Metals (ICP/MS)	SW846	TAL SAV
MA-EPH	MADEP EPH (Extractable Petroleum Hydroca	MA DEP	
3005A	Preparation, Total Recoverable or Dissolved Metals	SW846	TAL SAV

Protocol References:

MA DEP = Massachusetts Department Of Environmental Protection

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

= Katahdin Analytical Services Inc, PO BOX 540, 600 Technology Way, Scarborough, ME 04074

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

Qualifiers

Metals

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.
J	Estimated: The analyte was positively identified; the quantitation is an estimation

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 ID: 69W-94-14_FAL18

Lab Sample ID: 680-159120-1
Date Collected: 10/09/18 08:30
Matrix: Water
Date Received: 10/11/18 09:20

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	910		50	50	17	ug/L		10/17/18 18:28	1
Manganese	320		10	3.0	1.0	ug/L		10/17/18 18:28	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	3.8		3.0	3.0	1.5	ug/L		10/15/18 19:29	1

Client Sample ID: 69W-DUP1_FAL18

Lab Sample ID: 680-159120-2
Date Collected: 10/08/18 13:30
Matrix: Water
Date Received: 10/11/18 09:20

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	19000		50	50	17	ug/L		10/17/18 18:53	1
Manganese	1300		10	3.0	1.0	ug/L		10/17/18 18:53	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	140		3.0	3.0	1.5	ug/L		10/15/18 19:54	1

Client Sample ID: ZWM-99-22X_FAL18

Lab Sample ID: 680-159120-3
Date Collected: 10/08/18 13:20
Matrix: Water
Date Received: 10/11/18 09:20

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	19000		50	50	17	ug/L		10/17/18 18:41	1
Manganese	1500		10	3.0	1.0	ug/L		10/17/18 18:41	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	150		3.0	3.0	1.5	ug/L		10/15/18 19:36	1

Client Sample ID: ZWM-99-23X_FAL18

Lab Sample ID: 680-159120-4
Date Collected: 10/09/18 10:00
Matrix: Water
Date Received: 10/11/18 09:20

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	4700		50	50	17	ug/L		10/17/18 19:14	1
Manganese	1600		10	3.0	1.0	ug/L		10/17/18 19:14	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	39		3.0	3.0	1.5	ug/L		10/15/18 20:04	1

Client Sample ID: ZWM-99-24X_FAL18

Lab Sample ID: 680-159120-5
Date Collected: 10/08/18 14:45
Matrix: Water
Date Received: 10/11/18 09:20

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	700		50	50	17	ug/L		10/17/18 19:01	1
Manganese	68		10	3.0	1.0	ug/L		10/17/18 19:01	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		10/15/18 20:01	1

Client Sample ID: ZWM-01-25X_FAL18

Lab Sample ID: 680-159120-6
Date Collected: 10/08/18 11:15
Matrix: Water
Date Received: 10/11/18 09:20

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	130		50	50	17	ug/L		10/17/18 18:57	1
Manganese	1400		10	3.0	1.0	ug/L		10/17/18 18:57	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		10/15/18 19:57	1

Client Sample ID: 69W-94-13_FAL18

Lab Sample ID: 680-159120-7
Date Collected: 10/08/18 14:10
Matrix: Water
Date Received: 10/11/18 09:20

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	4500		50	50	17	ug/L		10/17/18 18:49	1
Manganese	1600		10	3.0	1.0	ug/L		10/17/18 18:49	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	35		3.0	3.0	1.5	ug/L		10/15/18 19:50	1

Client Sample ID: ZWM-95-15X_FAL18

Lab Sample ID: 680-159120-8
Date Collected: 10/09/18 08:20
Matrix: Water
Date Received: 10/11/18 09:20

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	1800		50	50	17	ug/L		10/17/18 17:59	1
Manganese	340		10	3.0	1.0	ug/L		10/17/18 17:59	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Arsenic	18		3.0	3.0	1.5	ug/L		10/15/18 19:11	1

Client Sample Results

Client: KOMAN Government Solutions, LLC
Project/Site: Fort Devens / LTM / AOC 69W

TestAmerica Job ID: 680-159120-1

Client Sample ID: ZWM-95-18X_FAL18

Lab Sample ID: 680-159120-9
Date Collected: 10/09/18 10:25
Matrix: Water
Date Received: 10/11/18 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		10/17/18 18:45	1
Manganese	81		10	3.0	1.0	ug/L		10/17/18 18:45	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		10/15/18 19:47	1

Client Sample ID: 69WP-08-01_FAL18

Lab Sample ID: 680-159120-10
Date Collected: 10/09/18 15:00
Matrix: Water
Date Received: 10/11/18 09:20

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	6000		50	50	17	ug/L		10/17/18 18:36	1
Manganese	35		10	3.0	1.0	ug/L		10/17/18 18:36	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		10/15/18 19:32	1

Client Sample ID: 69WP-13-01_FAL18

Lab Sample ID: 680-159120-11
Date Collected: 10/09/18 13:30
Matrix: Water
Date Received: 10/11/18 09:20

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Manganese	33		10	3.0	1.0	ug/L		10/17/18 18:32	1

Method: 6010C - Metals (ICP)

Lab Sample ID: MB 680-543286/1-A
Matrix: Water
Analysis Batch: 543830

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 543286

Analyte	MB Result	MB Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Iron	50	U	50	50	17	ug/L		10/17/18 17:51	1
Manganese	3.0	U	10	3.0	1.0	ug/L		10/17/18 17:51	1

Lab Sample ID: LCS 680-543286/2-A
Matrix: Water
Analysis Batch: 543830

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 543286

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Iron	5000	5140		ug/L		103	87 - 115
Manganese	500	529		ug/L		106	90 - 114

Lab Sample ID: 680-159120-8 MS
Matrix: Water
Analysis Batch: 543830

Client Sample ID: ZWM-95-15X_FAL18
Prep Type: Dissolved
Prep Batch: 543286

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Iron	1800		5000	6880		ug/L		102	87 - 115
Manganese	340		500	872		ug/L		106	90 - 114

Lab Sample ID: 680-159120-8 MSD
Matrix: Water
Analysis Batch: 543830

Client Sample ID: ZWM-95-15X_FAL18
Prep Type: Dissolved
Prep Batch: 543286

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Iron	1800		5000	6710		ug/L		99	87 - 115	3	20
Manganese	340		500	822		ug/L		96	90 - 114	6	20

Method: 6020A - Metals (ICP/MS)

Lab Sample ID: MB 680-543285/1-A
Matrix: Water
Analysis Batch: 543525

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 543285

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		10/15/18 19:04	1

Lab Sample ID: LCS 680-543285/2-A
Matrix: Water
Analysis Batch: 543525

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 543285

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	100	103		ug/L		103	84 - 116

Lab Sample ID: 680-159120-8 MS
Matrix: Water
Analysis Batch: 543525

Client Sample ID: ZWM-95-15X_FAL18
Prep Type: Dissolved
Prep Batch: 543285

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	18		100	122		ug/L		103	84 - 116

Method: 6020A - Metals (ICP/MS) (Continued)

Lab Sample ID: 680-159120-8 MSD
Matrix: Water
Analysis Batch: 543525

Client Sample ID: ZWM-95-15X_FAL18
Prep Type: Dissolved
Prep Batch: 543285

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Arsenic	18		100	116		ug/L		97	84 - 116	5	20

Metals

Prep Batch: 543285

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-159120-1	69W-94-14_FAL18	Dissolved	Water	3005A	
680-159120-2	69W-DUP1_FAL18	Dissolved	Water	3005A	
680-159120-3	ZWM-99-22X_FAL18	Dissolved	Water	3005A	
680-159120-4	ZWM-99-23X_FAL18	Dissolved	Water	3005A	
680-159120-5	ZWM-99-24X_FAL18	Dissolved	Water	3005A	
680-159120-6	ZWM-01-25X_FAL18	Dissolved	Water	3005A	
680-159120-7	69W-94-13_FAL18	Dissolved	Water	3005A	
680-159120-8	ZWM-95-15X_FAL18	Dissolved	Water	3005A	
680-159120-9	ZWM-95-18X_FAL18	Dissolved	Water	3005A	
680-159120-10	69WP-08-01_FAL18	Dissolved	Water	3005A	
MB 680-543285/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 680-543285/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
680-159120-8 MS	ZWM-95-15X_FAL18	Dissolved	Water	3005A	
680-159120-8 MSD	ZWM-95-15X_FAL18	Dissolved	Water	3005A	

Prep Batch: 543286

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-159120-1	69W-94-14_FAL18	Dissolved	Water	3005A	
680-159120-2	69W-DUP1_FAL18	Dissolved	Water	3005A	
680-159120-3	ZWM-99-22X_FAL18	Dissolved	Water	3005A	
680-159120-4	ZWM-99-23X_FAL18	Dissolved	Water	3005A	
680-159120-5	ZWM-99-24X_FAL18	Dissolved	Water	3005A	
680-159120-6	ZWM-01-25X_FAL18	Dissolved	Water	3005A	
680-159120-7	69W-94-13_FAL18	Dissolved	Water	3005A	
680-159120-8	ZWM-95-15X_FAL18	Dissolved	Water	3005A	
680-159120-9	ZWM-95-18X_FAL18	Dissolved	Water	3005A	
680-159120-10	69WP-08-01_FAL18	Dissolved	Water	3005A	
680-159120-11	69WP-13-01_FAL18	Dissolved	Water	3005A	
MB 680-543286/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 680-543286/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
680-159120-8 MS	ZWM-95-15X_FAL18	Dissolved	Water	3005A	
680-159120-8 MSD	ZWM-95-15X_FAL18	Dissolved	Water	3005A	

Analysis Batch: 543525

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-159120-1	69W-94-14_FAL18	Dissolved	Water	6020A	543285
680-159120-2	69W-DUP1_FAL18	Dissolved	Water	6020A	543285
680-159120-3	ZWM-99-22X_FAL18	Dissolved	Water	6020A	543285
680-159120-4	ZWM-99-23X_FAL18	Dissolved	Water	6020A	543285
680-159120-5	ZWM-99-24X_FAL18	Dissolved	Water	6020A	543285
680-159120-6	ZWM-01-25X_FAL18	Dissolved	Water	6020A	543285
680-159120-7	69W-94-13_FAL18	Dissolved	Water	6020A	543285
680-159120-8	ZWM-95-15X_FAL18	Dissolved	Water	6020A	543285
680-159120-9	ZWM-95-18X_FAL18	Dissolved	Water	6020A	543285
680-159120-10	69WP-08-01_FAL18	Dissolved	Water	6020A	543285
MB 680-543285/1-A	Method Blank	Total Recoverable	Water	6020A	543285
LCS 680-543285/2-A	Lab Control Sample	Total Recoverable	Water	6020A	543285
680-159120-8 MS	ZWM-95-15X_FAL18	Dissolved	Water	6020A	543285
680-159120-8 MSD	ZWM-95-15X_FAL18	Dissolved	Water	6020A	543285

Metals (Continued)

Analysis Batch: 543830

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-159120-1	69W-94-14_FAL18	Dissolved	Water	6010C	543286
680-159120-2	69W-DUP1_FAL18	Dissolved	Water	6010C	543286
680-159120-3	ZWM-99-22X_FAL18	Dissolved	Water	6010C	543286
680-159120-4	ZWM-99-23X_FAL18	Dissolved	Water	6010C	543286
680-159120-5	ZWM-99-24X_FAL18	Dissolved	Water	6010C	543286
680-159120-6	ZWM-01-25X_FAL18	Dissolved	Water	6010C	543286
680-159120-7	69W-94-13_FAL18	Dissolved	Water	6010C	543286
680-159120-8	ZWM-95-15X_FAL18	Dissolved	Water	6010C	543286
680-159120-9	ZWM-95-18X_FAL18	Dissolved	Water	6010C	543286
680-159120-10	69WP-08-01_FAL18	Dissolved	Water	6010C	543286
680-159120-11	69WP-13-01_FAL18	Dissolved	Water	6010C	543286
MB 680-543286/1-A	Method Blank	Total Recoverable	Water	6010C	543286
LCS 680-543286/2-A	Lab Control Sample	Total Recoverable	Water	6010C	543286
680-159120-8 MS	ZWM-95-15X_FAL18	Dissolved	Water	6010C	543286
680-159120-8 MSD	ZWM-95-15X_FAL18	Dissolved	Water	6010C	543286

Lab Chronicle

Client: KOMAN Government Solutions, LLC
Project/Site: Fort Devens / LTM / AOC 69W

TestAmerica Job ID: 680-159120-1

Client Sample ID: 69W-94-14_FAL18

Lab Sample ID: 680-159120-1
Date Collected: 10/09/18 08:30
Matrix: Water
Date Received: 10/11/18 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	543286	10/13/18 13:57	AJR	TAL SAV
Dissolved	Analysis	6010C		1			543830	10/17/18 18:28	BCB	TAL SAV
	Instrument ID: ICPE									
Dissolved	Prep	3005A			50 mL	250 mL	543285	10/13/18 13:57	AJR	TAL SAV
Dissolved	Analysis	6020A		1			543525	10/15/18 19:29	BWR	TAL SAV
	Instrument ID: ICPMSC									

Client Sample ID: 69W-DUP1_FAL18

Lab Sample ID: 680-159120-2
Date Collected: 10/08/18 13:30
Matrix: Water
Date Received: 10/11/18 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	543286	10/13/18 13:57	AJR	TAL SAV
Dissolved	Analysis	6010C		1			543830	10/17/18 18:53	BCB	TAL SAV
	Instrument ID: ICPE									
Dissolved	Prep	3005A			50 mL	250 mL	543285	10/13/18 13:57	AJR	TAL SAV
Dissolved	Analysis	6020A		1			543525	10/15/18 19:54	BWR	TAL SAV
	Instrument ID: ICPMSC									

Client Sample ID: ZWM-99-22X_FAL18

Lab Sample ID: 680-159120-3
Date Collected: 10/08/18 13:20
Matrix: Water
Date Received: 10/11/18 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	543286	10/13/18 13:57	AJR	TAL SAV
Dissolved	Analysis	6010C		1			543830	10/17/18 18:41	BCB	TAL SAV
	Instrument ID: ICPE									
Dissolved	Prep	3005A			50 mL	250 mL	543285	10/13/18 13:57	AJR	TAL SAV
Dissolved	Analysis	6020A		1			543525	10/15/18 19:36	BWR	TAL SAV
	Instrument ID: ICPMSC									

Client Sample ID: ZWM-99-23X_FAL18

Lab Sample ID: 680-159120-4
Date Collected: 10/09/18 10:00
Matrix: Water
Date Received: 10/11/18 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	543286	10/13/18 13:57	AJR	TAL SAV
Dissolved	Analysis	6010C		1			543830	10/17/18 19:14	BCB	TAL SAV
	Instrument ID: ICPE									
Dissolved	Prep	3005A			50 mL	250 mL	543285	10/13/18 13:57	AJR	TAL SAV
Dissolved	Analysis	6020A		1			543525	10/15/18 20:04	BWR	TAL SAV
	Instrument ID: ICPMSC									

Lab Chronicle

Client: KOMAN Government Solutions, LLC
Project/Site: Fort Devens / LTM / AOC 69W

TestAmerica Job ID: 680-159120-1

Client Sample ID: ZWM-99-24X_FAL18

Date Collected: 10/08/18 14:45
Date Received: 10/11/18 09:20

Lab Sample ID: 680-159120-5

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	543286	10/13/18 13:57	AJR	TAL SAV
Dissolved	Analysis	6010C		1			543830	10/17/18 19:01	BCB	TAL SAV
	Instrument ID: ICPE									
Dissolved	Prep	3005A			50 mL	250 mL	543285	10/13/18 13:57	AJR	TAL SAV
Dissolved	Analysis	6020A		1			543525	10/15/18 20:01	BWR	TAL SAV
	Instrument ID: ICPMSC									

Client Sample ID: ZWM-01-25X_FAL18

Date Collected: 10/08/18 11:15
Date Received: 10/11/18 09:20

Lab Sample ID: 680-159120-6

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	543286	10/13/18 13:57	AJR	TAL SAV
Dissolved	Analysis	6010C		1			543830	10/17/18 18:57	BCB	TAL SAV
	Instrument ID: ICPE									
Dissolved	Prep	3005A			50 mL	250 mL	543285	10/13/18 13:57	AJR	TAL SAV
Dissolved	Analysis	6020A		1			543525	10/15/18 19:57	BWR	TAL SAV
	Instrument ID: ICPMSC									

Client Sample ID: 69W-94-13_FAL18

Date Collected: 10/08/18 14:10
Date Received: 10/11/18 09:20

Lab Sample ID: 680-159120-7

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	543286	10/13/18 13:57	AJR	TAL SAV
Dissolved	Analysis	6010C		1			543830	10/17/18 18:49	BCB	TAL SAV
	Instrument ID: ICPE									
Dissolved	Prep	3005A			50 mL	250 mL	543285	10/13/18 13:57	AJR	TAL SAV
Dissolved	Analysis	6020A		1			543525	10/15/18 19:50	BWR	TAL SAV
	Instrument ID: ICPMSC									

Client Sample ID: ZWM-95-15X_FAL18

Date Collected: 10/09/18 08:20
Date Received: 10/11/18 09:20

Lab Sample ID: 680-159120-8

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	543286	10/13/18 13:57	AJR	TAL SAV
Dissolved	Analysis	6010C		1			543830	10/17/18 17:59	BCB	TAL SAV
	Instrument ID: ICPE									
Dissolved	Prep	3005A			50 mL	250 mL	543285	10/13/18 13:57	AJR	TAL SAV
Dissolved	Analysis	6020A		1			543525	10/15/18 19:11	BWR	TAL SAV
	Instrument ID: ICPMSC									

Lab Chronicle

Client: KOMAN Government Solutions, LLC
Project/Site: Fort Devens / LTM / AOC 69W

TestAmerica Job ID: 680-159120-1

Client Sample ID: ZWM-95-18X_FAL18

Date Collected: 10/09/18 10:25
Date Received: 10/11/18 09:20

Lab Sample ID: 680-159120-9

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	543286	10/13/18 13:57	AJR	TAL SAV
Dissolved	Analysis	6010C		1			543830	10/17/18 18:45	BCB	TAL SAV
	Instrument ID: ICPE									
Dissolved	Prep	3005A			50 mL	250 mL	543285	10/13/18 13:57	AJR	TAL SAV
Dissolved	Analysis	6020A		1			543525	10/15/18 19:47	BWR	TAL SAV
	Instrument ID: ICPMSC									

Client Sample ID: 69WP-08-01_FAL18

Date Collected: 10/09/18 15:00
Date Received: 10/11/18 09:20

Lab Sample ID: 680-159120-10

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	543286	10/13/18 13:57	AJR	TAL SAV
Dissolved	Analysis	6010C		1			543830	10/17/18 18:36	BCB	TAL SAV
	Instrument ID: ICPE									
Dissolved	Prep	3005A			50 mL	250 mL	543285	10/13/18 13:57	AJR	TAL SAV
Dissolved	Analysis	6020A		1			543525	10/15/18 19:32	BWR	TAL SAV
	Instrument ID: ICPMSC									

Client Sample ID: 69WP-13-01_FAL18

Date Collected: 10/09/18 13:30
Date Received: 10/11/18 09:20

Lab Sample ID: 680-159120-11

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	543286	10/13/18 13:57	AJR	TAL SAV
Dissolved	Analysis	6010C		1			543830	10/17/18 18:32	BCB	TAL SAV
	Instrument ID: ICPE									

Laboratory References:

= Katahdin Analytical Services Inc, PO BOX 540, 600 Technology Way, Scarborough, ME 04074

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

MassDEP Analytical Protocol Certification Form

Laboratory Name: Katahdin Analytical Services, LLC.	Project #:
Project Location: Fort Devons	RTN:

This Form provides certifications for the following data set: list Laboratory Sample ID Number(s):
SL9928-1, 2, 3, 4, 5, 6, 7, 8 & 9

Matrices: (Groundwater/Surface Water) Soil/Sediment Drinking Water Air Other:

CAM Protocol (check all that apply below):

8260 VOC CAM II A	7470/7471 Hg CAM III B	MassDEP VPH CAM IV A	8081 Pesticides CAM V B	7196 Hex Cr CAM VI B	MassDEP APH CAM IX A
8270 SVOC CAM II B	7010 Metals CAM III C	MassDEP EPH CAM IV B ✓	8151 Herbicides CAM V C	8330 Explosives CAM VIII A	TO-15 VOC CAM IX B
6010 Metals CAM III A	6020 Metals CAM III D	8082 PCB CAM V A	9014 Total Cyanide/PAC CAM VI A	6860 Perchlorate CAM VIII B	

Affirmative Responses to Questions A through F are required for "Presumptive Certainty" status

A	Were all samples received in a condition consistent with those described on the Chain-of-Custody, properly preserved (including temperature) in the field or laboratory, and prepared/analyzed within method holding times?	(Yes) No
B	Were the analytical method(s) and all associated QC requirements specified in the selected CAM protocol(s) followed?	(Yes) No
C	Were all required corrective actions and analytical response actions specified in the selected CAM protocol(s) implemented for all identified performance standard non-conformances?	(Yes) No
D	Does the laboratory report comply with all the reporting requirements specified in CAM VII A, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data"?	(Yes) No
E	VPH, EPH, APH, and TO-15 only: a. VPH, EPH, and APH Methods only: Was each method conducted without significant modification(s)? (Refer to the individual method(s) for a list of significant modifications). b. APH and TO-15 Methods only: Was the complete analyte list reported for each method?	(Yes) No Yes No
F	Were all applicable CAM protocol QC and performance standard non-conformances identified and evaluated in a laboratory narrative (including all "No" responses to Questions A through E)?	(Yes) No

Responses to Questions G, H and I below are required for "Presumptive Certainty" status

G	Were the reporting limits at or below all CAM reporting limits specified in the selected CAM protocol(s)?	(Yes) No[1]

***Data User Note**: Data that achieve "Presumptive Certainty" status may not necessarily meet the data usability and representativeness requirements described in 310 CMR 40. 1056 (2)(k) and WSC-07-350.*

H	Were **all** QC performance standards specified in the CAM protocol(s) achieved?	Yes (No[1])
I	Were results reported for the complete analyte list specified in the selected CAM protocol(s)?	(Yes) No[1]

[1] *All negative responses must be addressed in an attached laboratory narrative.*

I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, accurate and complete.

Signature: Leslie Dimond **Position:** Q.A. Officer

Printed Name: Leslie Dimond **Date:** 10/30/2018

TEST AMERICA SAVANNAH
LONG TERM MONITORING
MAIN POST FALL 2018
SL9928

KATAHDIN ANALYTICAL SERVICES
600 TECHNOLOGY WAY
SCARBOROUGH, ME 04074

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SAMPLE DATA PACKAGE

NARRATIVE
KATAHDIN ANALYTICAL SERVICES
TEST AMERICA SAVANNAH
LONG TERM MONITORING, MAIN POST FALL 2018
SL9928

Sample Receipt

The following samples were received on October 11, 2018 and were logged in under Katahdin Analytical Services work order number SL9928 for a hardcopy due date of October 23, 2018.

KATAHDIN	TEST AMERICA SAVANNAH
Sample No.	Sample Identification
SL9928-1	69W-94-14_FAL18
SL9928-2	69W-DUP1_FAL18
SL9928-3	ZWM-99-22X_FAL18
SL9928-4	ZWM-99-23X_FAL18
SL9928-5	ZWM-99-24X_FAL18
SL9928-6	ZWM-01-25X_FAL18
SL9928-7	69W-94-13_FAL18
SL9928-8	ZWM-95-15X_FAL18
SL9928-9	ZWM-95-18X_FAL18

The samples were logged in for the analyses specified on the chain of custody form. All problems encountered and resolved during sample receipt have been documented on the applicable chain of custody forms.

We certify that the test results provided in this report meet all the requirements of the NELAP standards unless otherwise noted in this narrative or in the Report of Analysis.

We certify that the test results provided in this report are accredited under the laboratory's ISO/IEC 17025:2005 and DoD-ELAP accreditation issued by the ANSI-ASQ National Accreditation Board. Refer to certificate and scope of accreditation L2223.

Analytes which are reported but not listed on our ANAB scope of accreditation will be "^" flagged and the following language will be included in the case narrative for all DoD compliant work: "^" Indicates this analyte is not included on Katahdin Analytical Services DoD-ELAP Scope of Accreditation.

Sample analyses have been performed by the methods as noted herein.

Should you have any questions or comments concerning this Report of Analysis, please do not hesitate to contact your Katahdin Analytical Services Project Manager, **Ms. Heather Manz**. This narrative is an integral part of the Report of Analysis.

Organics Analysis

The samples of Work Order SL9928 were analyzed in accordance with the Method for the Determination of Extractable Petroleum Hydrocarbons (EPH), MADEP, May 2004, Revision 1.1, and/or for the specific methods listed below or on the Report of Analysis.

Sample SL9928-8 was used for the matrix spike (MS) and matrix spike duplicate (MSD), as requested by the client.

MA-EPH Analysis

Samples SL9928-2RE, 3RE, 5RE, 6RE, 7RE, 8RE, and 9RE were manually integrated for the target analytes naphthalene, 2-methylnaphthalene, acenaphthene, fluorene, the C11-C22 aromatic range, the fractionation surrogates 2-fluorobiphenyl and/or 2-bromonaphthalene, and/or the extraction surrogate 5-alpha-androstane. The specific reasons for the manual integrations are indicated on the raw data by the manual integration codes (M1-M11). These codes are further explained in the attachment following this narrative.

The method blank, WG238575-1, and sample SL9928-5 had low recoveries of the extraction surrogate 5-alpha-androstane that were outside the method acceptance limits. The sample was re-extracted within hold time and reanalyzed with similar results, indicating a likely matrix effect. The results for both analyses are reported.

The aliphatic continuing calibration verification standard (CV) (file CLJ2092) had a low response for the C36 hydrocarbon that resulted in a %D that exceeded the method acceptance limit of ± 25%. Since the C19-C36 range response was acceptable, no further action was taken.

There were no other protocol deviations or observations noted by the organics laboratory staff.

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized the Quality Assurance Officer, or their designee, as verified by the following signature.

Leslie Dimond
10.30.18

Leslie Dimond
Quality Assurance Officer

Katahdin Analytical Services, Inc.

Manual Integration Codes For GC/MS, GC, HPLC and/or IC

M1	Peak splitting.
M2	Well defined peaks on the shoulders of the other peaks.
M3	There is additional area due to a coeluting interferant.
M4	There are negative spikes in the baseline.
M5	There are rising or falling baselines.
M6	The software has failed to detect a peak or misidentified a peak.
M7	Excessive peak tailing.
M8	Analysis such as GRO, DRO and TPH require a baseline hold.
M9	Peak was not completely integrated as in GC/MS.
M10	Primary ion was correctly integrated, but secondary or tertiary ion needed manual integration as in GC/MS.
M11	For GC analysis, when a sample is diluted by 1:10 or more, the surrogate is set to undetected and then the area under the surrogate is manually integrated.
M12	Manual integration saved in method due to TurboChrom floating point error.

Katahdin Analytical Services, LLC. Sample Receipt Condition Report

Client: Koman	KAS PM: HMM	Sampled By: Client
Project:	KIMS Entry By: JCB	Delivered By: Fedex
KAS Work Order#: 52925 1928	KIMS Review By: HMM	Received By: JCB
SDG #:	Cooler: 1 of 3	Date/Time Rec.: 10·11·18 900

Receipt Criteria	Y	N	EX*	NA	Comments and/or Resolution
1. Custody seals present / intact?		✓			
2. Chain of Custody present in cooler?	✓				
3. Chain of Custody signed by client?	✓				
4. Chain of Custody matches samples?	✓				
5. Temperature Blanks present? If not, take temperature of any sample w/ IR gun.	✓				Temp (°C): 1.5
Samples received at <6 °C w/o freezing?	✓				Note: Not required for metals (except Hg soil) analysis.
Ice packs or ice present?	✓				The lack of ice or ice packs (i.e. no attempt to begin cooling process) or insufficient ice may not meet certain regulatory requirements and may invalidate certain data.
If yes, was there sufficient ice to meet temperature requirements?	✓				
If temp. out, has the cooling process begun (i.e. ice or packs present) and sample collection times <6hrs., but samples are not yet cool?				✓	Note: No cooling process required for metals (except Hg soil) analysis.
6. Volatiles: **Aqueous:** No bubble larger than a pea?				✓	
Soil/Sediment: Received in airtight container?				✓	
Received in methanol?				✓	
Methanol covering soil?				✓	
D.I. Water - Received within 48 hour HT?				✓	
Air: Refer to KAS COC for canister/flow controller requirements.	√ if air included				
7. Trip Blank present in cooler?				✓	
8. Proper sample containers and volume?	✓				
9. Samples within hold time upon receipt?	✓				
10. Aqueous samples properly preserved? Metals, COD, NH3, TKN, O/G, phenol, TPO4, N+N, TOC, DRO, TPH – pH <2	✓				
Sulfide - >9				✓	
Cyanide – pH >12				✓	

* Log-In Notes to Exceptions: document any problems with samples or discrepancies or pH adjustments.

Katahdin Analytical Services, LLC. — Sample Receipt Condition Report

Client:	Komen	KAS PM:	HTM	Sampled By:	Client
Project:		KIMS Entry By:	JCB	Delivered By:	Fedex
KAS Work Order#:	529925 / 9928	KIMS Review By:	HTM	Received By:	JCB
SDG #:		Cooler: 2 of 3		Date/Time Rec.:	10.11.18 900

Receipt Criteria	Y	N	EX*	NA	Comments and/or Resolution
1. Custody seals present / intact?		✓			
2. Chain of Custody present in cooler?	✓				
3. Chain of Custody signed by client?	✓				
4. Chain of Custody matches samples?	✓				
5. Temperature Blanks present? If not, take temperature of any sample w/ IR gun.	✓				Temp (°C): 0.6
Samples received at <6 °C w/o freezing?	✓				Note: Not required for metals (except Hg soil) analysis.
Ice packs or ice present?	✓				The lack of ice or ice packs (i.e. no attempt to begin cooling process) or insufficient ice may not meet certain regulatory requirements and may invalidate certain data.
If yes, was there sufficient ice to meet temperature requirements?	✓				
If temp. out, has the cooling process begun (i.e. ice or packs present) and sample collection times <6hrs., but samples are not yet cool?				✓	Note: No cooling process required for metals (except Hg soil) analysis.
6. Volatiles:				✓	
Aqueous: No bubble larger than a pea?					
Soil/Sediment:				✓	
Received in airtight container?				✓	
Received in methanol?				✓	
Methanol covering soil?				✓	
D.I. Water - Received within 48 hour HT?				✓	
Air: Refer to KAS COC for canister/flow controller requirements.	√ if air included				
7. Trip Blank present in cooler?				✓	
8. Proper sample containers and volume?	✓				
9. Samples within hold time upon receipt?	✓				
10. Aqueous samples properly preserved? Metals, COD, NH3, TKN, O/G, phenol, TPO4, N+N, TOC, DRO, TPH – pH <2	✓				
Sulfide - >9				✓	
Cyanide – pH >12				✓	

* Log-In Notes to Exceptions: document any problems with samples or discrepancies or pH adjustments.

Katahdin Analytical Services, LLC. — Sample Receipt Condition Report

Client:	Koman	KAS PM:	HHM	Sampled By:	Client
Project:		KIMS Entry By:	JCB	Delivered By:	Fedex
KAS Work Order#:	5L9925/9928	KIMS Review By:	HHM	Received By:	JCB
SDG #:		Cooler:	3 of 3	Date/Time Rec.:	10.11.18 900

Receipt Criteria	Y	N	EX*	NA	Comments and/or Resolution
1. Custody seals present / intact?		✓			
2. Chain of Custody present in cooler?	✓				
3. Chain of Custody signed by client?	✓				
4. Chain of Custody matches samples?	✓				
5. Temperature Blanks present? If not, take temperature of any sample w/ IR gun.	✓				Temp (°C): 1.9
Samples received at <6 °C w/o freezing?	✓				Note: Not required for metals (except Hg soil) analysis.
Ice packs or ice present?	✓				The lack of ice or ice packs (i.e. no attempt to begin cooling process) or insufficient ice may not meet certain regulatory requirements and may invalidate certain data.
If yes, was there sufficient ice to meet temperature requirements?	✓				
If temp. out, has the cooling process begun (i.e. ice or packs present) and sample collection times <6hrs., but samples are not yet cool?				✓	Note: No cooling process required for metals (except Hg soil) analysis.
6. Volatiles:					
Aqueous: No bubble larger than a pea?	✓				
Soil/Sediment:					
Received in airtight container?				✓	
Received in methanol?				✓	
Methanol covering soil?				✓	
D.I. Water - Received within 48 hour HT?				✓	
Air: Refer to KAS COC for canister/flow controller requirements.	√ if air included				
7. Trip Blank present in cooler?	✓				
8. Proper sample containers and volume?	✓				
9. Samples within hold time upon receipt?	✓				
10. Aqueous samples properly preserved? Metals, COD, NH3, TKN, O/G, phenol, TPO4, N+N, TOC, DRO, TPH – pH <2	✓				
Sulfide - >9				✓	
Cyanide – pH >12				✓	

* Log-In Notes to Exceptions: document any problems with samples or discrepancies or pH adjustments.

360325-Boston 360325-Boston 360325-Boston

CHAIN-OF-CUSTODY RECORD

SL9928

KOMAN Government Services, LLC
Laurie Ekes
293 Boston Post Road West, Suite 100, Marlborough, MA 01752
(508) 366.7442, lekes@komangs.com

COC # 201810A691

KGS

Project Name: Long Term Monitoring	Laboratory: TestAmerica Laboratories, Inc., Savannah, GA	Event: KOMAN, Long Term Monitoring, Main Post Fall 2018
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:

Equipment:

Code	Matrix
WG	Ground Water

Code	Container/Preservative
2	2* 1 Liter, amber, glass, 1:1 HCl to pH =2; Cool < 6°C
9	1* 250mL, plastic, HNO3, pH < 2; Cool < 6°C

Event: KOMAN, Long Term Monitoring, Main Post Fall 2018

	Sample ID	Matrix	Date	Time	Samp Init.	MADEPEP - EPH with PAHs	SW6010C/FLDFLT - Fe Mn	SW6020A/FLDFLT - As	Location ID	Sample Type	Depth (ft bgs) Top	Depth (ft bgs) Bottom	Comments	Cooler
					Analytical Test Method	2	9	9						
1	~~69W-94-13_FAL18~~	~~WG~~	~~10/11/2018~~			~~X~~	~~X~~	~~X~~	~~69W-94-13~~	~~N1~~	~~6.49~~	~~16.49~~		1
2	69W-94-14_FAL18	WG	10/~~11~~ 09/2018	0830	BrA	X	X	X	69W-94-14	N1	5.49	15.49		1
3	~~ZWM-95-15X_FAL18~~	~~WG~~	~~10/11/2018~~			~~X~~	~~X~~	~~X~~	~~ZWM-95-15X~~	~~N1~~	5.87	15.87		1
4	~~ZWM-95-18X_FAL18~~	~~WG~~	~~10/11/2018~~			~~X~~	~~X~~	~~X~~	~~ZWM-95-18X~~	N1	5.22	15.22		1
5	~~ZWM-95-18X_FAL18~~	~~WG~~	~~10/11/2018~~			~~X~~	~~X~~	~~X~~	~~ZWM-95-18X~~	~~MS1~~	~~5.22~~	~~15.22~~		1
6	~~ZWM-95-18X_FAL18~~	~~WG~~	~~10/11/2018~~			~~X~~	~~X~~	~~X~~	~~ZWM-95-18X~~	~~SD1~~	~~5.22~~	~~15.22~~		1
7	69W-DUP1_FAL18	WG	10/~~11~~ 09/2018	1330	BrA	X	X	X	FIELDQC	FD1				1
8	ZWM-99-22X_FAL18	WG	10/~~11~~ 09/2018	1320	BrA	X	X	X	ZWM-99-22X	N1	4.63	14.63		1
		Turnaround Time: Routine												

Relinquished by: *(Signature)*	Date	Time
[signature]	10/10/18	1350
[signature]	10/10/18	1360

Received by: *(Signature)*	Date	Time
[signature]	10/10/18	1350

Shipping Date / Carrier / Airbill Number

Received by Laboratory: *(Signature, Date, Time)* & condition
[signature] 10-11-18 900 Good

Page 1 of 1

10/30/2018 0000008

360325-Boston 360325-Boston

CHAIN-OF-CUSTODY RECORD

KOMAN Government Services, LLC
Laurie Ekes
293 Boston Post Road West, Suite 100, Marlborough, MA 01752
(508) 366.7442, lekes@komangs.com

COC # 201810A692 360325-Boston

KGS

Project Name: Long Term Monitoring	Laboratory: TestAmerica Laboratories, Inc., Savannah, GA	Event: KOMAN, Long Term Monitoring, Main Post Fall 2018
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:

Equipment:

Code	Matrix
WG	Ground Water

Code	Container/Preservative
2	2* 1 Liter, amber, glass, 1:1 HCl to pH =2; Cool < 6°C
9	1* 250mL, plastic, HNO3, pH < 2; Cool < 6°C

						Analytical Test Method	MADEPEP - EPH with PAHs	SW6010C/FLDFLT - Fe Mn	SW6010C/FLDFLT - Mn	SW6020A/FLDFLT - As					
	Event: KOMAN, Long Term Monitoring, Main Post Fall 2018						2	9	9	9					
	Sample ID	Matrix	Date	Time	Samp Init.					Location ID	Sample Type	Depth (ft bgs) Top	Depth (ft bgs) Bottom	Comments	Cooler
1	ZWM-99-23X_FAL18	WG	10/12/2018	1000	BrA		X	X		X	ZWM-99-23X	N1	4.68	14.68		1
2	ZWM-99-24X_FAL18	WG	10/12/2018	1445	BrA		X	X		X	ZWM-99-24X	N1	5.52	15.52		1
3	ZWM-01-25X_FAL18	WG	10/12/2018	1115	BrA		X	X		X	ZWM-01-25X	N1	6.13	16.13		1
4	~~69WP-08-01_FAL18~~	~~WG~~	~~10/12/2018~~					X		X	~~69WP-08-01~~	~~N1~~	~~19.00~~	~~19.00~~		1
5	~~69WP-13-01_FAL18~~	~~WG~~	~~10/12/2018~~						X		~~69WP-13-01~~	N1	0.00	0.00		1
		Turnaround Time: Routine													

Relinquished by: *(Signature)*	Date	Time	Received by: *(Signature)*	Date	Time
	10/10/18	1350		10/10/18	13:50
	10/10/18	1740			

Shipping Date / Carrier / Airbill Number

Received by Laboratory: *(Signature, Date, Time)* & condition

360325-Boston

CHAIN-OF-CUSTODY RECORD

KOMAN Government Services, LLC
Laurie Ekes
293 Boston Post Road West, Suite 100, Marlborough, MA 01752
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360325-Boston

COC # 201810A691

360325-Boston

KGS

Project Name: Long Term Monitoring	Laboratory: TestAmerica Laboratories, Inc., Savannah, GA	Event: KOMAN, Long Term Monitoring, Main Post Fall 2018
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Equipment:

Code	Matrix
WG	Ground Water

Code	Container/Preservative
2	2* 1 Liter, amber, glass, 1:1 HCl to pH =2; Cool < 6°C
9	1* 250mL, plastic, HNO3, pH < 2; Cool < 6°C

Event: KOMAN, Long Term Monitoring, Main Post Fall 2018

	Sample ID	Matrix	Date	Time	Samp Init.	MADEPEP - EPH with PAHs	SW6010C/FLDFLT - Fe Mn	SW6020A/FLDFLT - As	Location ID	Sample Type	Depth (ft bgs) Top	Depth (ft bgs) Bottom	Comments	Cooler
					Analytical Test Method	2	9	9						
1	69W-94-13_FAL18	WG	10/~~11~~ 9/2018	1410	OJ	X	X	X	69W-94-13	N1	6.49	16.49		1
~~2~~	~~69W-94-14_FAL18~~	~~WG~~	~~10/11/2018~~			~~X~~	~~X~~	~~X~~	~~69W-94-14~~	~~N1~~	~~5.49~~	~~15.49~~		~~1~~
3	ZWM-95-15X_FAL18	WG	10/~~11~~ 9/2018	0830	OJ	X	X	X	ZWM-95-15X	N1	5.87	15.87		1
4	ZWM-95-18X_FAL18 MS	WG	10/~~11~~ 9/2018	0830	OJ	X	X	X	ZWM-95-18X	N1	5.22	15.22		1
5	ZWM-95-18X_FAL18 MSD	WG	10/~~11~~ 9/2018	0830	OJ	X	X	X	ZWM-95-18X	MS1	5.22	15.22		1
6	ZWM-95-18X_FAL18	WG	10/~~11~~ 9/2018	1025	OJ	X	X	X	ZWM-95-18X	SD1	5.22	15.22		1
~~7~~	~~69W-DUP1_FAL18~~	~~WG~~	~~10/11/2018~~			~~X~~	~~X~~	~~X~~	~~FIELDQC~~	~~FD1~~				~~1~~
~~8~~	~~ZWM-99-22X_FAL18~~	~~WG~~	~~10/11/2018~~			~~X~~	~~X~~	~~X~~	~~ZWM-99-22X~~	~~N1~~	~~4.63~~	~~14.63~~		~~1~~
		Turnaround Time:												

Relinquished by: *(Signature)*	Date	Time	Received by: *(Signature)*	Date	Time
[signature]	10/9/18	1615	Bett [signature]	10/9/18	1615
Bett [signature]	10/10/18	1350	[signature]	10/10/18	1350

Shipping Date / Carrier / Airbill Number

Received by Laboratory: *(Signature, Date, Time)* **& condition**

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) 366.7442, lekes@komangs.com

360325-Boston

COC # 201810A692

360325-Boston

Project Name: Long Term Monitoring	Laboratory: TestAmerica Laboratories, Inc., Savannah, GA	Event: KOMAN, Long Term Monitoring, Main Post Fall 2018
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:

Equipment:

Code	Matrix
WG	Ground Water

Code	Container/Preservative
2	2* 1 Liter, amber, glass, 1:1 HCl to pH =2; Cool < 6°C
9	1* 250mL, plastic, HNO3, pH < 2; Cool < 6°C

		Analytical Test Method	MADEPEP - EPH with PAHs	SW6010C/FLDFLT - Fe Mn	SW6010C/FLDFLT - Mn	SW6020A/FLDFLT - As						
	Event: KOMAN, Long Term Monitoring, Main Post Fall 2018		2	9	9	9						
	Sample ID	Matrix	Date	Time	Samp Init.				Location ID	Sample Type	Depth (ft bgs) Top	Depth (ft bgs) Bottom	Comments	Cooler
1	~~ZWM-99-23X_FAL18~~	~~WG~~	~~10/12/2018~~			~~X~~	~~X~~		~~X~~	~~ZWM-99-23X~~	~~N1~~	~~4.68~~	~~14.68~~		~~1~~
2	~~ZWM-99-24X_FAL18~~	~~WG~~	~~10/12/2018~~			~~X~~	~~X~~		~~X~~	~~ZWM-99-24X~~	~~N1~~	~~5.52~~	~~15.52~~		~~1~~
3	~~ZWM-01-25X_FAL18~~	~~WG~~	~~10/12/2018~~			X	X		X	ZWM-01-25X	N1	6.13	16.13		1
4	69WP-08-01_FAL18	WG	10/12/2018	1500	CJ		X		X	69WP-08-01	N1	10.00	13.00		1
5	69WP-13-01_FAL18	WG	10/12/2018	1530	CJ			X		69WP-13-01	N1	0.00	0.00		1
		Turnaround Time:													

Relinquished by: *(Signature)*	Date	Time
	10/9/18	1615
	10/10/18	1350
	10/10/18	1700

Received by: *(Signature)*	Date	Time
	10/9/18	1615
	10/11/18	1356

Shipping Date / Carrier / Airbill Number

Received by Laboratory: *(Signature, Date, Time)* & condition

Page 1 of 1

Katahdin ANALYTICAL SERVICES

Katahdin Analytical Services

Login Chain of Custody Report (lno1)

Oct. 15, 2018
05:36 PM

Login Number: SL9928

Account: TASAV001 NoWeb
Test America Savannah

Project: TASAV-DEVENS

Quote/Incoming:

Primary Report Address:
Jerry Lanier
Test America Savannah
5102 LaRoche Avenue

Savannah,GA 31404
Jerry.Lanier@testamericainc.com

Primary Invoice Address:
Accounts Payable
Test America Savannah
5102 LaRoche Avenue

Savannah,GA 31404

Report CC Addresses:
Invoice CC Addresses:

Login Information:

ANALYSIS INSTRUCTIONS	:	FDS, DOD QSM 4.2 reporting with DOD limits. ND to PQL. "J" flag between MDL and PQL. Need LCS/LCSD. Follow MA MCP CAM. Include level 4 narrative. Sample data summary needs all forms. VPH undetect ethylbenzene.
CHECK NO.	:	
CLIENT PO#	:	680-159120-1
CLIENT PROJECT MANAGE	:	Jerry Lanier
CONTRACT	:	DEVNS-LTM AOC 69W
COOLER TEMPERATURE	:	1.9, 1.5, 0.6
DELIVERY SERVICES	:	FedEx
EDD FORMAT	:	ECC-091317-TXT
LOGIN INITIALS	:	JCB
PM	:	HHM
PROJECT NAME	:	Long Term Monitoring, Main Post Fall 2018
QC LEVEL	:	IV
REPORT INSTRUCTIONS	:	SDS needs all forms. Include Level 4 narrative and MCP forms (from Leslie). Send level 4 PDF & level 2 PDF. Level 2= SDP & SDS. Email PDF, EDD, and invoice to Jerry & Amy.Ragnaldsen@testamericainc.com. No HC.
SDG STATUS	:	
VERBAL TAT	:	

Laboratory Sample ID	Client Sample Number	Collect Date/Time	Receive Date	PR	Verbal Date	Due Date	Mailed
SL9928-1	69W-94-14_FAL18	09-OCT-18 08:30	11-OCT-18			23-OCT-18	

Matrix		Product	Hold Date (shortest)	Bottle Type	Bottle Count	Comments
Aqueous	S	MA-EPH	23-OCT-18	1L N-Amber Glass		

SL9928-2	69W-DUP1_FAL18	08-OCT-18 13:30	11-OCT-18			23-OCT-18

Matrix		Product	Hold Date (shortest)	Bottle Type	Bottle Count	Comments
Aqueous	S	MA-EPH	22-OCT-18	1L N-Amber Glass		

SL9928-3	ZWM-99-22X_FAL18	08-OCT-18 13:20	11-OCT-18			23-OCT-18

Matrix		Product	Hold Date (shortest)	Bottle Type	Bottle Count	Comments
Aqueous	S	MA-EPH	22-OCT-18	1L N-Amber Glass		

SL9928-4	ZWM-99-23X_FAL18	09-OCT-18 10:00	11-OCT-18			23-OCT-18

Matrix		Product	Hold Date (shortest)	Bottle Type	Bottle Count	Comments
Aqueous	S	MA-EPH	23-OCT-18	1L N-Amber Glass		

SL9928-5	ZWM-99-24X_FAL18	09-OCT-18 14:45	11-OCT-18			23-OCT-18

Matrix		Product	Hold Date (shortest)	Bottle Type	Bottle Count	Comments
Aqueous	S	MA-EPH	23-OCT-18	1L N-Amber Glass		

SL9928-6	ZWM-01-25X_FAL18	09-OCT-18 11:15	11-OCT-18			23-OCT-18

Matrix		Product	Hold Date (shortest)	Bottle Type	Bottle Count	Comments
Aqueous	S	MA-EPH	23-OCT-18	1L N-Amber Glass		

HHM 10-15-18

SL9928-7	69W-94-13_FAL18	08-OCT-18 14:10	11-OCT-18			23-OCT-18

Matrix		Product	Hold Date (shortest)	Bottle Type	Bottle Count	Comments
Aqueous	S	MA-EPH	22-OCT-18	1L N-Amber Glass		

Katahdin ANALYTICAL SERVICES

Katahdin Analytical Services

Login Chain of Custody Report (lno1)

Oct. 15, 2018
05:36 PM

Login Number: SL9928

Quote/Incoming:

Account: TASAV001
Test America Savannah

NoWeb

Project: TASAV-DEVENS

Laboratory Sample ID	Client Sample Number	Collect Date/Time	Receive Date	PR	Verbal Date	Due Date	Mailed
SL9928-8	ZWM-95-15X_FAL18	09-OCT-18 08:20	11-OCT-18			23-OCT-18	

Matrix		Product	Hold Date (shortest)	Bottle Type	Bottle Count	Comments
Aqueous	S	MA-EPH	23-OCT-18	1L N-Amber Glass		MS/MSD

Laboratory Sample ID	Client Sample Number	Collect Date/Time	Receive Date	PR	Verbal Date	Due Date	Mailed
SL9928-9	ZWM-95-18X_FAL18	09-OCT-18 10:25	11-OCT-18			23-OCT-18	

Matrix		Product	Hold Date (shortest)	Bottle Type	Bottle Count	Comments
Aqueous	S	MA-EPH	23-OCT-18	1L N-Amber Glass		

Laboratory Sample ID	Client Sample Number	Collect Date/Time	Receive Date	PR	Verbal Date	Due Date	Mailed
SL9928-10	ZWM-95-15X_FAL18 MS CHARGE	09-OCT-18 08:20	11-OCT-18			23-OCT-18	

Matrix		Product	Hold Date (shortest)	Bottle Type	Bottle Count	Comments
Aqueous	S	MA-EPH	23-OCT-18	1L N-Amber Glass		Not a sample, MS charge

Laboratory Sample ID	Client Sample Number	Collect Date/Time	Receive Date	PR	Verbal Date	Due Date	Mailed
SL9928-11	ZWM-95-15X_FAL18 MSD CHARGE	09-OCT-18 08:20	11-OCT-18			23-OCT-18	

Matrix		Product	Hold Date (shortest)	Bottle Type	Bottle Count	Comments
Aqueous	S	MA-EPH	23-OCT-18	1L N-Amber Glass		Not a sample, MSD charge

Total Samples: ***11*** ***Total Analyses:*** ***11***

10-15-18

SAMPLE DATA SUMMARY PACKAGE

Page 33 of 76 Katahdin Analytical Services A0000001 10/A0008

KATAHDIN ANALYTICAL SERVICES - ORGANIC DATA QUALIFIERS

The sampled date indicated on the attached Report(s) of Analysis (ROA) is the date for which a grab sample was collected or the date for which a composite sample was completed. Beginning and start times for composite samples can be found on the Chain-of-Custody.

U Indicates the compound was analyzed for but not detected above the specified level. This level may be the Limit of Quantitation (LOQ)(previously called Practical Quantitation Level (PQL)), the Limit of Detection (LOD) or Method Detection Limit (MDL) as required by the client.

Note: All results reported as "U" MDL have a 50% rate for false negatives compared to those results reported as "U" PQL/LOQ or "U" LOD, where the rate of false negatives is <1%.

* Compound recovery or percent RPD (relative percent difference) was outside of quality control limits.

D Indicates the result was obtained from analysis of a diluted sample. Surrogate recoveries may not be calculable.

E Estimated value. This flag identifies compounds whose concentrations exceed the upper level of the calibration range of the instrument for that specific analysis.

J Estimated value. The analyte was detected in the sample at a concentration less than the laboratory Limit of Quantitation (LOQ)(previously called Practical Quantitation Limit (PQL)), but above the Method Detection Limit (MDL).

or

J Used for Pesticides, PCBs, Herbicides, Formaldehyde, Explosives and Method 504.1 analytes when there is a greater than 40% difference for detected concentrations between the two GC columns.

B Indicates the analyte was detected in the laboratory method blank analyzed concurrently with the sample.

C Indicates that the flagged compound did not meet DoD criteria in the corresponding daily calibration verification (CV).

L Indicates that the flagged compound did not meet DoD criteria in the corresponding Laboratory Control Sample (LCS) and/or Laboratory Control Sample Duplicate (LCSD) prepared and/or analyzed concurrently with the sample.

M Indicates that the flagged compound did not meet DoD criteria in the Matrix Spike and/or Matrix Spike Duplicate prepared and/or analyzed concurrently with the native sample.

N Presumptive evidence of a compound based on a mass spectral library search.

A Indicates that a tentatively identified compound is a suspected aldol-condensation product.

P Used for Pesticide/Aroclor analyte when there is a greater than 25% difference for detected concentrations between the two GC columns. (for CLP methods only).

Katahdin
ANALYTICAL SERVICES

Report of Analytical Results

Client: Test America Savannah
Lab ID: SL9928-1RE
Client ID: 69W-94-14_FAL18
Project: Long Term Monitoring, Main Post Fall
SDG: SL9928
Lab File ID: CLJ2076.D

Sample Date: 09-OCT-18
Received Date: 11-OCT-18
Extract Date: 16-OCT-18
Extracted By: DP/LR
Extraction Method: SW846 3510C
Lab Prep Batch: WG238624

Analysis Date: 19-OCT-18
Analyst: AAB
Analysis Method: MA DEP EPH 04-1.1
Matrix: AQ
% Solids: NA
Report Date: 25-OCT-18

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
C9-C18 Aliphatics	U	94	ug/L	1	100	94.	47.	71.
C19-C36 Aliphatics	U	94	ug/L	1	100	94.	47.	71.
C11-C22 Aromatics	U	94	ug/L	1	100	94.	47.	71.
Naphthalene	U	1.9	ug/L	1	2	1.9	0.85	1.4
2-Methylnaphthalene	U	1.9	ug/L	1	2	1.9	0.75	1.4
Phenanthrene	U	1.9	ug/L	1	2	1.9	0.85	1.4
Acenaphthylene	U	1.9	ug/L	1	2	1.9	0.75	1.4
Acenaphthene	U	1.9	ug/L	1	2	1.9	1.7	1.8
Anthracene	U	1.9	ug/L	1	2	1.9	1.3	1.4
Benzo(a)anthracene	U	1.9	ug/L	1	2	1.9	1.3	1.4
Benzo(a)pyrene	U	1.9	ug/L	1	2	1.9	1.2	1.4
Benzo(b)fluoranthene	U	1.9	ug/L	1	2	1.9	0.75	1.4
Benzo(g,h,i)perylene	U	1.9	ug/L	1	2	1.9	1.2	1.4
Benzo(k)fluoranthene	U	1.9	ug/L	1	2	1.9	0.94	1.4
Chrysene	U	1.9	ug/L	1	2	1.9	0.85	1.4
Dibenzo(a,h)anthracene	U	1.9	ug/L	1	2	1.9	1.1	1.4
Fluoranthene	U	1.9	ug/L	1	2	1.9	0.75	1.4
Fluorene	U	1.9	ug/L	1	2	1.9	0.85	1.4
Indeno(1,2,3-cd)pyrene	U	1.9	ug/L	1	2	1.9	1.3	1.4
Pyrene	U	1.9	ug/L	1	2	1.9	1.0	1.4
5-Alpha Androstane		53.2	%					
o-Terphenyl		63.4	%					
2-Fluorobiphenyl		69.8	%					
2-Bromonaphthalene		72.6	%					

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Report of Analytical Results

Client: Test America Savannah
Lab ID: SL9928-2RE
Client ID: 69W-DUP1_FAL18
Project: Long Term Monitoring, Main Post Fall
SDG: SL9928
Lab File ID: CLJ2077.D

Sample Date: 08-OCT-18
Received Date: 11-OCT-18
Extract Date: 16-OCT-18
Extracted By: DP/LR
Extraction Method: SW846 3510C
Lab Prep Batch: WG238624

Analysis Date: 19-OCT-18
Analyst: AAB
Analysis Method: MA DEP EPH 04-1.1
Matrix: AQ
% Solids: NA
Report Date: 25-OCT-18

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
C9-C18 Aliphatics	U	94	ug/L	1	100	94.	47.	71.
C19-C36 Aliphatics	U	94	ug/L	1	100	94.	47.	71.
C11-C22 Aromatics		220	ug/L	1	100	94.	47.	71.
Naphthalene		3.9	ug/L	1	2	1.9	0.85	1.4
2-Methylnaphthalene		9.6	ug/L	1	2	1.9	0.75	1.4
Phenanthrene	U	1.9	ug/L	1	2	1.9	0.85	1.4
Acenaphthylene	U	1.9	ug/L	1	2	1.9	0.75	1.4
Acenaphthene	U	1.9	ug/L	1	2	1.9	1.7	1.8
Anthracene	U	1.9	ug/L	1	2	1.9	1.3	1.4
Benzo(a)anthracene	U	1.9	ug/L	1	2	1.9	1.3	1.4
Benzo(a)pyrene	U	1.9	ug/L	1	2	1.9	1.2	1.4
Benzo(b)fluoranthene	U	1.9	ug/L	1	2	1.9	0.75	1.4
Benzo(g,h,i)perylene	U	1.9	ug/L	1	2	1.9	1.2	1.4
Benzo(k)fluoranthene	U	1.9	ug/L	1	2	1.9	0.94	1.4
Chrysene	U	1.9	ug/L	1	2	1.9	0.85	1.4
Dibenzo(a,h)anthracene	U	1.9	ug/L	1	2	1.9	1.1	1.4
Fluoranthene	U	1.9	ug/L	1	2	1.9	0.75	1.4
Fluorene	J	1.9	ug/L	1	2	1.9	0.85	1.4
Indeno(1,2,3-cd)pyrene	U	1.9	ug/L	1	2	1.9	1.3	1.4
Pyrene	U	1.9	ug/L	1	2	1.9	1.0	1.4
5-Alpha Androstane		49.2	%					
o-Terphenyl		61.6	%					
2-Fluorobiphenyl		71.4	%					
2-Bromonaphthalene		74.4	%					

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Report of Analytical Results

Client: Test America Savannah
Lab ID: SL9928-3RE
Client ID: ZWM-99-22X_FAL18
Project: Long Term Monitoring, Main Post Fall
SDG: SL9928
Lab File ID: CLJ2078.D

Sample Date: 08-OCT-18
Received Date: 11-OCT-18
Extract Date: 16-OCT-18
Extracted By: DP/LR
Extraction Method: SW846 3510C
Lab Prep Batch: WG238624

Analysis Date: 19-OCT-18
Analyst: AAB
Analysis Method: MA DEP EPH 04-1.1
Matrix: AQ
% Solids: NA
Report Date: 25-OCT-18

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
C9-C18 Aliphatics	U	94	ug/L	1	100	94.	47.	71.
C19-C36 Aliphatics	U	94	ug/L	1	100	94.	47.	71.
C11-C22 Aromatics		230	ug/L	1	100	94.	47.	71.
Naphthalene		5.6	ug/L	1	2	1.9	0.85	1.4
2-Methylnaphthalene		13	ug/L	1	2	1.9	0.75	1.4
Phenanthrene	U	1.9	ug/L	1	2	1.9	0.85	1.4
Acenaphthylene	U	1.9	ug/L	1	2	1.9	0.75	1.4
Acenaphthene	J	1.7	ug/L	1	2	1.9	1.7	1.8
Anthracene	U	1.9	ug/L	1	2	1.9	1.3	1.4
Benzo(a)anthracene	U	1.9	ug/L	1	2	1.9	1.3	1.4
Benzo(a)pyrene	U	1.9	ug/L	1	2	1.9	1.2	1.4
Benzo(b)fluoranthene	U	1.9	ug/L	1	2	1.9	0.75	1.4
Benzo(g,h,i)perylene	U	1.9	ug/L	1	2	1.9	1.2	1.4
Benzo(k)fluoranthene	U	1.9	ug/L	1	2	1.9	0.94	1.4
Chrysene	U	1.9	ug/L	1	2	1.9	0.85	1.4
Dibenzo(a,h)anthracene	U	1.9	ug/L	1	2	1.9	1.1	1.4
Fluoranthene	U	1.9	ug/L	1	2	1.9	0.75	1.4
Fluorene		2.5	ug/L	1	2	1.9	0.85	1.4
Indeno(1,2,3-cd)pyrene	U	1.9	ug/L	1	2	1.9	1.3	1.4
Pyrene	U	1.9	ug/L	1	2	1.9	1.0	1.4
5-Alpha Androstane		47.2	%					
o-Terphenyl		62.0	%					
2-Fluorobiphenyl		71.8	%					
2-Bromonaphthalene		74.9	%					

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Report of Analytical Results

Client: Test America Savannah
Lab ID: SL9928-4RE
Client ID: ZWM-99-23X_FAL18
Project: Long Term Monitoring, Main Post Fall
SDG: SL9928
Lab File ID: CLJ2079.D

Sample Date: 09-OCT-18
Received Date: 11-OCT-18
Extract Date: 16-OCT-18
Extracted By: DP/LR
Extraction Method: SW846 3510C
Lab Prep Batch: WG238624

Analysis Date: 19-OCT-18
Analyst: AAB
Analysis Method: MA DEP EPH 04-1.1
Matrix: AQ
% Solids: NA
Report Date: 25-OCT-18

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
C9-C18 Aliphatics	U	94	ug/L	1	100	94.	47.	71.
C19-C36 Aliphatics	U	94	ug/L	1	100	94.	47.	71.
C11-C22 Aromatics		130	ug/L	1	100	94.	47.	71.
Naphthalene	U	1.9	ug/L	1	2	1.9	0.85	1.4
2-Methylnaphthalene	U	1.9	ug/L	1	2	1.9	0.75	1.4
Phenanthrene	U	1.9	ug/L	1	2	1.9	0.85	1.4
Acenaphthylene	U	1.9	ug/L	1	2	1.9	0.75	1.4
Acenaphthene	U	1.9	ug/L	1	2	1.9	1.7	1.8
Anthracene	U	1.9	ug/L	1	2	1.9	1.3	1.4
Benzo(a)anthracene	U	1.9	ug/L	1	2	1.9	1.3	1.4
Benzo(a)pyrene	U	1.9	ug/L	1	2	1.9	1.2	1.4
Benzo(b)fluoranthene	U	1.9	ug/L	1	2	1.9	0.75	1.4
Benzo(g,h,i)perylene	U	1.9	ug/L	1	2	1.9	1.2	1.4
Benzo(k)fluoranthene	U	1.9	ug/L	1	2	1.9	0.94	1.4
Chrysene	U	1.9	ug/L	1	2	1.9	0.85	1.4
Dibenzo(a,h)anthracene	U	1.9	ug/L	1	2	1.9	1.1	1.4
Fluoranthene	U	1.9	ug/L	1	2	1.9	0.75	1.4
Fluorene	U	1.9	ug/L	1	2	1.9	0.85	1.4
Indeno(1,2,3-cd)pyrene	U	1.9	ug/L	1	2	1.9	1.3	1.4
Pyrene	U	1.9	ug/L	1	2	1.9	1.0	1.4
5-Alpha Androstane		53.8	%					
o-Terphenyl		67.1	%					
2-Fluorobiphenyl		76.3	%					
2-Bromonaphthalene		77.6	%					

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Report of Analytical Results

Client: Test America Savannah
Lab ID: SL9928-5
Client ID: ZWM-99-24X_FAL18
Project: Long Term Monitoring, Main Post Fall
SDG: SL9928
Lab File ID: CLJ2063.D

Sample Date: 09-OCT-18
Received Date: 11-OCT-18
Extract Date: 16-OCT-18
Extracted By: DP/LR
Extraction Method: SW846 3510C
Lab Prep Batch: WG238575

Analysis Date: 18-OCT-18
Analyst: AAB
Analysis Method: MA DEP EPH 04-1.1
Matrix: AQ
% Solids: NA
Report Date: 30-OCT-18

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
C9-C18 Aliphatics	U	94	ug/L	1	100	94.	47.	71.
C19-C36 Aliphatics	U	94	ug/L	1	100	94.	47.	71.
C11-C22 Aromatics	J	89	ug/L	1	100	94.	47.	71.
Naphthalene	U	1.9	ug/L	1	2	1.9	0.85	1.4
2-Methylnaphthalene	U	1.9	ug/L	1	2	1.9	0.75	1.4
Phenanthrene	U	1.9	ug/L	1	2	1.9	0.85	1.4
Acenaphthylene	U	1.9	ug/L	1	2	1.9	0.75	1.4
Acenaphthene	U	1.9	ug/L	1	2	1.9	1.7	1.8
Anthracene	U	1.9	ug/L	1	2	1.9	1.3	1.4
Benzo(a)anthracene	U	1.9	ug/L	1	2	1.9	1.3	1.4
Benzo(a)pyrene	U	1.9	ug/L	1	2	1.9	1.2	1.4
Benzo(b)fluoranthene	U	1.9	ug/L	1	2	1.9	0.75	1.4
Benzo(g,h,i)perylene	U	1.9	ug/L	1	2	1.9	1.2	1.4
Benzo(k)fluoranthene	U	1.9	ug/L	1	2	1.9	0.94	1.4
Chrysene	U	1.9	ug/L	1	2	1.9	0.85	1.4
Dibenzo(a,h)anthracene	U	1.9	ug/L	1	2	1.9	1.1	1.4
Fluoranthene	U	1.9	ug/L	1	2	1.9	0.75	1.4
Fluorene	U	1.9	ug/L	1	2	1.9	0.85	1.4
Indeno(1,2,3-cd)pyrene	U	1.9	ug/L	1	2	1.9	1.3	1.4
Pyrene	U	1.9	ug/L	1	2	1.9	1.0	1.4
5-Alpha Androstane	*	35.0	%					
o-Terphenyl		59.7	%					
2-Fluorobiphenyl		61.1	%					
2-Bromonaphthalene		63.1	%					

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Report of Analytical Results

Client: Test America Savannah
Lab ID: SL9928-5RE
Client ID: ZWM-99-24X_FAL18
Project: Long Term Monitoring, Main Post Fall
SDG: SL9928
Lab File ID: CLJ2080.D

Sample Date: 09-OCT-18
Received Date: 11-OCT-18
Extract Date: 16-OCT-18
Extracted By: DP/LR
Extraction Method: SW846 3510C
Lab Prep Batch: WG238624

Analysis Date: 19-OCT-18
Analyst: AAB
Analysis Method: MA DEP EPH 04-1.1
Matrix: AQ
% Solids: NA
Report Date: 25-OCT-18

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
C9-C18 Aliphatics	U	94	ug/L	1	100	94.	47.	71.
C19-C36 Aliphatics	U	94	ug/L	1	100	94.	47.	71.
C11-C22 Aromatics		100	ug/L	1	100	94.	47.	71.
Naphthalene	U	1.9	ug/L	1	2	1.9	0.85	1.4
2-Methylnaphthalene	U	1.9	ug/L	1	2	1.9	0.75	1.4
Phenanthrene	U	1.9	ug/L	1	2	1.9	0.85	1.4
Acenaphthylene	U	1.9	ug/L	1	2	1.9	0.75	1.4
Acenaphthene	U	1.9	ug/L	1	2	1.9	1.7	1.8
Anthracene	U	1.9	ug/L	1	2	1.9	1.3	1.4
Benzo(a)anthracene	U	1.9	ug/L	1	2	1.9	1.3	1.4
Benzo(a)pyrene	U	1.9	ug/L	1	2	1.9	1.2	1.4
Benzo(b)fluoranthene	U	1.9	ug/L	1	2	1.9	0.75	1.4
Benzo(g,h,i)perylene	U	1.9	ug/L	1	2	1.9	1.2	1.4
Benzo(k)fluoranthene	U	1.9	ug/L	1	2	1.9	0.94	1.4
Chrysene	U	1.9	ug/L	1	2	1.9	0.85	1.4
Dibenzo(a,h)anthracene	U	1.9	ug/L	1	2	1.9	1.1	1.4
Fluoranthene	U	1.9	ug/L	1	2	1.9	0.75	1.4
Fluorene	U	1.9	ug/L	1	2	1.9	0.85	1.4
Indeno(1,2,3-cd)pyrene	U	1.9	ug/L	1	2	1.9	1.3	1.4
Pyrene	U	1.9	ug/L	1	2	1.9	1.0	1.4
5-Alpha Androstane	*	37.9	%					
o-Terphenyl		61.6	%					
2-Fluorobiphenyl		70.7	%					
2-Bromonaphthalene		74.6	%					

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Report of Analytical Results

Client: Test America Savannah
Lab ID: SL9928-6RE
Client ID: ZWM-01-25X_FAL18
Project: Long Term Monitoring, Main Post Fall
SDG: SL9928
Lab File ID: CLJ2081.D

Sample Date: 09-OCT-18
Received Date: 11-OCT-18
Extract Date: 16-OCT-18
Extracted By: DP/LR
Extraction Method: SW846 3510C
Lab Prep Batch: WG238624

Analysis Date: 19-OCT-18
Analyst: AAB
Analysis Method: MA DEP EPH 04-1.1
Matrix: AQ
% Solids: NA
Report Date: 25-OCT-18

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
C9-C18 Aliphatics	U	94	ug/L	1	100	94.	47.	71.
C19-C36 Aliphatics	U	94	ug/L	1	100	94.	47.	71.
C11-C22 Aromatics	U	94	ug/L	1	100	94.	47.	71.
Naphthalene	U	1.9	ug/L	1	2	1.9	0.85	1.4
2-Methylnaphthalene	U	1.9	ug/L	1	2	1.9	0.75	1.4
Phenanthrene	U	1.9	ug/L	1	2	1.9	0.85	1.4
Acenaphthylene	U	1.9	ug/L	1	2	1.9	0.75	1.4
Acenaphthene	U	1.9	ug/L	1	2	1.9	1.7	1.8
Anthracene	U	1.9	ug/L	1	2	1.9	1.3	1.4
Benzo(a)anthracene	U	1.9	ug/L	1	2	1.9	1.3	1.4
Benzo(a)pyrene	U	1.9	ug/L	1	2	1.9	1.2	1.4
Benzo(b)fluoranthene	U	1.9	ug/L	1	2	1.9	0.75	1.4
Benzo(g,h,i)perylene	U	1.9	ug/L	1	2	1.9	1.2	1.4
Benzo(k)fluoranthene	U	1.9	ug/L	1	2	1.9	0.94	1.4
Chrysene	U	1.9	ug/L	1	2	1.9	0.85	1.4
Dibenzo(a,h)anthracene	U	1.9	ug/L	1	2	1.9	1.1	1.4
Fluoranthene	U	1.9	ug/L	1	2	1.9	0.75	1.4
Fluorene	U	1.9	ug/L	1	2	1.9	0.85	1.4
Indeno(1,2,3-cd)pyrene	U	1.9	ug/L	1	2	1.9	1.3	1.4
Pyrene	U	1.9	ug/L	1	2	1.9	1.0	1.4
5-Alpha Androstane		48.8	%					
o-Terphenyl		63.6	%					
2-Fluorobiphenyl		72.2	%					
2-Bromonaphthalene		74.2	%					

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Report of Analytical Results

Client: Test America Savannah
Lab ID: SL9928-7RE
Client ID: 69W-94-13_FAL18
Project: Long Term Monitoring, Main Post Fall
SDG: SL9928
Lab File ID: CLJ2082.D

Sample Date: 08-OCT-18
Received Date: 11-OCT-18
Extract Date: 16-OCT-18
Extracted By: DP/LR
Extraction Method: SW846 3510C
Lab Prep Batch: WG238624

Analysis Date: 19-OCT-18
Analyst: AAB
Analysis Method: MA DEP EPH 04-1.1
Matrix: AQ
% Solids: NA
Report Date: 25-OCT-18

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
C9-C18 Aliphatics	U	94	ug/L	1	100	94.	47.	71.
C19-C36 Aliphatics	U	94	ug/L	1	100	94.	47.	71.
C11-C22 Aromatics		98	ug/L	1	100	94.	47.	71.
Naphthalene	U	1.9	ug/L	1	2	1.9	0.85	1.4
2-Methylnaphthalene	U	1.9	ug/L	1	2	1.9	0.75	1.4
Phenanthrene	U	1.9	ug/L	1	2	1.9	0.85	1.4
Acenaphthylene	U	1.9	ug/L	1	2	1.9	0.75	1.4
Acenaphthene	U	1.9	ug/L	1	2	1.9	1.7	1.8
Anthracene	U	1.9	ug/L	1	2	1.9	1.3	1.4
Benzo(a)anthracene	U	1.9	ug/L	1	2	1.9	1.3	1.4
Benzo(a)pyrene	U	1.9	ug/L	1	2	1.9	1.2	1.4
Benzo(b)fluoranthene	U	1.9	ug/L	1	2	1.9	0.75	1.4
Benzo(g,h,i)perylene	U	1.9	ug/L	1	2	1.9	1.2	1.4
Benzo(k)fluoranthene	U	1.9	ug/L	1	2	1.9	0.94	1.4
Chrysene	U	1.9	ug/L	1	2	1.9	0.85	1.4
Dibenzo(a,h)anthracene	U	1.9	ug/L	1	2	1.9	1.1	1.4
Fluoranthene	U	1.9	ug/L	1	2	1.9	0.75	1.4
Fluorene	U	1.9	ug/L	1	2	1.9	0.85	1.4
Indeno(1,2,3-cd)pyrene	U	1.9	ug/L	1	2	1.9	1.3	1.4
Pyrene	U	1.9	ug/L	1	2	1.9	1.0	1.4
5-Alpha Androstane		61.0	%					
o-Terphenyl		68.2	%					
2-Fluorobiphenyl		71.8	%					
2-Bromonaphthalene		74.4	%					

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Report of Analytical Results

Client: Test America Savannah
Lab ID: SL9928-8RE
Client ID: ZWM-95-15X_FAL18
Project: Long Term Monitoring, Main Post Fall
SDG: SL9928
Lab File ID: CLJ2083.D

Sample Date: 09-OCT-18
Received Date: 11-OCT-18
Extract Date: 16-OCT-18
Extracted By: DP/LR
Extraction Method: SW846 3510C
Lab Prep Batch: WG238624

Analysis Date: 19-OCT-18
Analyst: AAB
Analysis Method: MA DEP EPH 04-1.1
Matrix: AQ
% Solids: NA
Report Date: 25-OCT-18

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
C9-C18 Aliphatics	U	94	ug/L	1	100	94.	47.	71.
C19-C36 Aliphatics	U	94	ug/L	1	100	94.	47.	71.
C11-C22 Aromatics	U	94	ug/L	1	100	94.	47.	71.
Naphthalene	U	1.9	ug/L	1	2	1.9	0.85	1.4
2-Methylnaphthalene	U	1.9	ug/L	1	2	1.9	0.75	1.4
Phenanthrene	U	1.9	ug/L	1	2	1.9	0.85	1.4
Acenaphthylene	U	1.9	ug/L	1	2	1.9	0.75	1.4
Acenaphthene	U	1.9	ug/L	1	2	1.9	1.7	1.8
Anthracene	U	1.9	ug/L	1	2	1.9	1.3	1.4
Benzo(a)anthracene	U	1.9	ug/L	1	2	1.9	1.3	1.4
Benzo(a)pyrene	U	1.9	ug/L	1	2	1.9	1.2	1.4
Benzo(b)fluoranthene	U	1.9	ug/L	1	2	1.9	0.75	1.4
Benzo(g,h,i)perylene	U	1.9	ug/L	1	2	1.9	1.2	1.4
Benzo(k)fluoranthene	U	1.9	ug/L	1	2	1.9	0.94	1.4
Chrysene	U	1.9	ug/L	1	2	1.9	0.85	1.4
Dibenzo(a,h)anthracene	U	1.9	ug/L	1	2	1.9	1.1	1.4
Fluoranthene	U	1.9	ug/L	1	2	1.9	0.75	1.4
Fluorene	U	1.9	ug/L	1	2	1.9	0.85	1.4
Indeno(1,2,3-cd)pyrene	U	1.9	ug/L	1	2	1.9	1.3	1.4
Pyrene	U	1.9	ug/L	1	2	1.9	1.0	1.4
5-Alpha Androstane		57.6	%					
o-Terphenyl		65.1	%					
2-Fluorobiphenyl		68.8	%					
2-Bromonaphthalene		71.3	%					

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Report of Analytical Results

Client: Test America Savannah
Lab ID: SL9928-9RE
Client ID: ZWM-95-18X_FAL18
Project: Long Term Monitoring, Main Post Fall
SDG: SL9928
Lab File ID: CLJ2084.D

Sample Date: 09-OCT-18
Received Date: 11-OCT-18
Extract Date: 16-OCT-18
Extracted By: DP/LR
Extraction Method: SW846 3510C
Lab Prep Batch: WG238624

Analysis Date: 19-OCT-18
Analyst: AAB
Analysis Method: MA DEP EPH 04-1.1
Matrix: AQ
% Solids: NA
Report Date: 25-OCT-18

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
C9-C18 Aliphatics	U	94	ug/L	1	100	94.	47.	71.
C19-C36 Aliphatics	U	94	ug/L	1	100	94.	47.	71.
C11-C22 Aromatics	U	94	ug/L	1	100	94.	47.	71.
Naphthalene	U	1.9	ug/L	1	2	1.9	0.85	1.4
2-Methylnaphthalene	U	1.9	ug/L	1	2	1.9	0.75	1.4
Phenanthrene	U	1.9	ug/L	1	2	1.9	0.85	1.4
Acenaphthylene	U	1.9	ug/L	1	2	1.9	0.75	1.4
Acenaphthene	U	1.9	ug/L	1	2	1.9	1.7	1.8
Anthracene	U	1.9	ug/L	1	2	1.9	1.3	1.4
Benzo(a)anthracene	U	1.9	ug/L	1	2	1.9	1.3	1.4
Benzo(a)pyrene	U	1.9	ug/L	1	2	1.9	1.2	1.4
Benzo(b)fluoranthene	U	1.9	ug/L	1	2	1.9	0.75	1.4
Benzo(g,h,i)perylene	U	1.9	ug/L	1	2	1.9	1.2	1.4
Benzo(k)fluoranthene	U	1.9	ug/L	1	2	1.9	0.94	1.4
Chrysene	U	1.9	ug/L	1	2	1.9	0.85	1.4
Dibenzo(a,h)anthracene	U	1.9	ug/L	1	2	1.9	1.1	1.4
Fluoranthene	U	1.9	ug/L	1	2	1.9	0.75	1.4
Fluorene	U	1.9	ug/L	1	2	1.9	0.85	1.4
Indeno(1,2,3-cd)pyrene	U	1.9	ug/L	1	2	1.9	1.3	1.4
Pyrene	U	1.9	ug/L	1	2	1.9	1.0	1.4
5-Alpha Androstane		60.6	%					
o-Terphenyl		65.4	%					
2-Fluorobiphenyl		70.9	%					
2-Bromonaphthalene		73.0	%					

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Report of Analytical Results

Client:
Lab ID: WG238575-1
Client ID: Method Blank Sample
Project:
SDG: SL9928
Lab File ID: CLJ2053.D

Sample Date:
Received Date:
Extract Date: 15-OCT-18
Extracted By: DP/LR
Extraction Method: SW846 3510C
Lab Prep Batch: WG238575

Analysis Date: 18-OCT-18
Analyst: AAB
Analysis Method: MA DEP EPH 04-1.1
Matrix: AQ
% Solids: NA
Report Date: 25-OCT-18

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
C9-C18 Aliphatics	U	100	ug/L	1	100	100	50.	75.
C19-C36 Aliphatics	U	100	ug/L	1	100	100	50.	75.
C11-C22 Aromatics	U	100	ug/L	1	100	100	50.	75.
Naphthalene	U	2.0	ug/L	1	2	2.0	0.90	1.5
2-Methylnaphthalene	U	2.0	ug/L	1	2	2.0	0.80	1.5
Phenanthrene	U	2.0	ug/L	1	2	2.0	0.90	1.5
Acenaphthylene	U	2.0	ug/L	1	2	2.0	0.80	1.5
Acenaphthene	U	2.0	ug/L	1	2	2.0	1.8	1.9
Anthracene	U	2.0	ug/L	1	2	2.0	1.4	1.5
Benzo(a)anthracene	U	2.0	ug/L	1	2	2.0	1.4	1.5
Benzo(a)pyrene	U	2.0	ug/L	1	2	2.0	1.3	1.5
Benzo(b)fluoranthene	U	2.0	ug/L	1	2	2.0	0.80	1.5
Benzo(g,h,i)perylene	U	2.0	ug/L	1	2	2.0	1.3	1.5
Benzo(k)fluoranthene	U	2.0	ug/L	1	2	2.0	1.0	1.5
Chrysene	U	2.0	ug/L	1	2	2.0	0.90	1.5
Dibenzo(a,h)anthracene	U	2.0	ug/L	1	2	2.0	1.2	1.5
Fluoranthene	U	2.0	ug/L	1	2	2.0	0.80	1.5
Fluorene	U	2.0	ug/L	1	2	2.0	0.90	1.5
Indeno(1,2,3-cd)pyrene	U	2.0	ug/L	1	2	2.0	1.4	1.5
Pyrene	U	2.0	ug/L	1	2	2.0	1.1	1.5
5-Alpha Androstane	*	36.9	%					
o-Terphenyl		50.2	%					
2-Fluorobiphenyl		64.1	%					
2-Bromonaphthalene		65.6	%					

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ANALYTICAL SERVICES

Report of Analytical Results

Client:
Lab ID: WG238624-1
Client ID: Method Blank Sample
Project:
SDG: SL9928
Lab File ID: CLJ2069.D

Sample Date:
Received Date:
Extract Date: 16-OCT-18
Extracted By: DP/LR
Extraction Method: SW846 3510C
Lab Prep Batch: WG238624

Analysis Date: 19-OCT-18
Analyst: AAB
Analysis Method: MA DEP EPH 04-1.1
Matrix: AQ
% Solids: NA
Report Date: 25-OCT-18

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
C9-C18 Aliphatics	U	100	ug/L	1	100	100	50.	75.
C19-C36 Aliphatics	U	100	ug/L	1	100	100	50.	75.
C11-C22 Aromatics	U	100	ug/L	1	100	100	50.	75.
Naphthalene	U	2.0	ug/L	1	2	2.0	0.90	1.5
2-Methylnaphthalene	U	2.0	ug/L	1	2	2.0	0.80	1.5
Phenanthrene	U	2.0	ug/L	1	2	2.0	0.90	1.5
Acenaphthylene	U	2.0	ug/L	1	2	2.0	0.80	1.5
Acenaphthene	U	2.0	ug/L	1	2	2.0	1.8	1.9
Anthracene	U	2.0	ug/L	1	2	2.0	1.4	1.5
Benzo(a)anthracene	U	2.0	ug/L	1	2	2.0	1.4	1.5
Benzo(a)pyrene	U	2.0	ug/L	1	2	2.0	1.3	1.5
Benzo(b)fluoranthene	U	2.0	ug/L	1	2	2.0	0.80	1.5
Benzo(g,h,i)perylene	U	2.0	ug/L	1	2	2.0	1.3	1.5
Benzo(k)fluoranthene	U	2.0	ug/L	1	2	2.0	1.0	1.5
Chrysene	U	2.0	ug/L	1	2	2.0	0.90	1.5
Dibenzo(a,h)anthracene	U	2.0	ug/L	1	2	2.0	1.2	1.5
Fluoranthene	U	2.0	ug/L	1	2	2.0	0.80	1.5
Fluorene	U	2.0	ug/L	1	2	2.0	0.90	1.5
Indeno(1,2,3-cd)pyrene	U	2.0	ug/L	1	2	2.0	1.4	1.5
Pyrene	U	2.0	ug/L	1	2	2.0	1.1	1.5
5-Alpha Androstane		44.9	%					
o-Terphenyl		60.9	%					
2-Fluorobiphenyl		68.8	%					
2-Bromonaphthalene		71.2	%					

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1 2 3 4 5 6 7 8 9 10 11 12 13 14

Form 2
System Monitoring Compound Recovery

Lab Name: Katahdin Analytical Services **Project:** Long Term Monitoring, Main Post Fall 201 **Matrix:** AQ
Lab Code: KAS **SDG:** SL9928

Client Sample ID	Lab Sample ID	Col. ID	2BN	#	2FBP	#	5AA	#	OTP	#
69W-94-14_FAL18	SL9928-1RE	B	72.6		69.8		53.2		63.4	
69W-DUP1_FAL18	SL9928-2RE	B	74.4		71.4		49.2		61.6	
ZWM-99-22X_FAL18	SL9928-3RE	B	74.9		71.8		47.2		62.0	
ZWM-99-23X_FAL18	SL9928-4RE	B	77.6		76.3		53.8		67.1	
ZWM-99-24X_FAL18	SL9928-5	B	63.1		61.1		35.0	*	59.7	
ZWM-99-24X_FAL18	SL9928-5RE	B	74.6		70.7		37.9	*	61.6	
ZWM-01-25X_FAL18	SL9928-6RE	B	74.2		72.2		48.8		63.6	
69W-94-13_FAL18	SL9928-7RE	B	74.4		71.8		61.0		68.2	
ZWM-95-15X_FAL18	SL9928-8RE	B	71.3		68.8		57.6		65.1	
ZWM-95-18X_FAL18	SL9928-9RE	B	73.0		70.9		60.6		65.4	
Method Blank Sample	WG238575-1	B	65.6		64.1		36.9	*	50.2	
Laboratory Control S	WG238575-2	B	62.6		59.0		46.9		63.8	
Method Blank Sample	WG238624-1	B	71.2		68.8		44.9		60.9	
Laboratory Control S	WG238624-2	B	72.3		69.2		56.3		66.1	
Laboratory Control S	WG238624-3	B	73.8		71.2		64.9		65.9	
Matrix Spike	WG238624-4	B	71.4		68.8		64.9		64.2	
Matrix Spike Duplica	WG238624-5	B	72.2		70.1		58.8		63.8	

		QC Limits
5AA	5-ALPHA ANDROSTANE	40-140
OTP	O-TERPHENYL	40-140
2FBP	2-FLUOROBIPHENYL	40-140
2BN	2-BROMONAPHTHALENE	40-140

= Column to be used to flag recovery limits.
* = Values outside of contract required QC limits.
D= System Monitoring Compound diluted out.

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ANALYTICAL SERVICES

LCS Recovery Report

Client:
Lab ID: WG238575-2
Client ID: LCS
Project:
SDG: SL9928
LCS File ID: CLJ2054.D

Sample Date:
Received Date:
Extract Date: 15-OCT-18
Extracted By: DP/LR
Extraction Method: SW846 3510C
Lab Prep Batch: WG238575

Analysis Date: 18-OCT-18
Analyst: AAB
Analysis Method: MA DEP EPH 04-1.1
Matrix: AQ
% Solids: NA
Report Date: 25-OCT-18

Compound	Recovery (%)	Conc Added	Conc Recovered	Conc Units	Limits
Unadjusted C11-C22 Aromatics	63.0	1530	964.	ug/L	40-140
C9-C18 Aliphatics	51.3	540.	277.	ug/L	40-140
C19-C36 Aliphatics	63.3	720.	456.	ug/L	40-140
Naphthalene	45.6	90.0	41.0	ug/L	40-140
2-Methylnaphthalene	52.9	90.0	47.6	ug/L	40-140
Phenanthrene	60.7	90.0	54.6	ug/L	40-140
Acenaphthylene	50.7	90.0	45.6	ug/L	40-140
Acenaphthene	52.4	90.0	47.2	ug/L	40-140
Anthracene	60.8	90.0	54.7	ug/L	40-140
Benzo(a)anthracene	65.3	90.0	58.8	ug/L	40-140
Benzo(a)pyrene	65.4	90.0	58.9	ug/L	40-140
Benzo(b)fluoranthene	67.2	90.0	60.5	ug/L	40-140
Benzo(g,h,i)perylene	70.9	90.0	63.8	ug/L	40-140
Benzo(k)fluoranthene	63.0	90.0	56.7	ug/L	40-140
Chrysene	67.9	90.0	61.1	ug/L	40-140
Dibenzo(a,h)anthracene	72.9	90.0	65.6	ug/L	40-140
Fluoranthene	65.7	90.0	59.1	ug/L	40-140
Fluorene	55.4	90.0	49.9	ug/L	40-140
Indeno(1,2,3-cd)pyrene	64.0	90.0	57.6	ug/L	40-140
Pyrene	64.6	90.0	58.1	ug/L	40-140
5-Alpha Androstane	46.9				40-140
o-Terphenyl	63.8				40-140
2-Fluorobiphenyl	59.0				40-140
2-Bromonaphthalene	62.6				40-140

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ANALYTICAL SERVICES

LCS/LCSD Recovery Report

LCS ID: WG238624-2
LCSD ID: WG238624-3
Project:
SDG: SL9928
Report Date: 25-OCT-18
LCS File ID: CLJ2070.D

Received Date:
Extract Date: 16-OCT-18
Extracted By: DP/LR
Extraction Method: SW846 3510C
Lab Prep Batch: WG238624
LCSD File ID: CLJ1071a.d

Analysis Date: 19-OCT-18
Analyst: AAB
Analysis Method: MA DEP EPH 04-1.1
Matrix: AQ
% Solids: NA

Compound	Spike Amt	LCS Conc	LCS Rec (%)	LCSD Conc	LCSD Rec (%)	Conc Units	RPD (%)	RPD Limit	Limits
Unadjusted C11-C22 Aromatics	1530	1050	68.6	1020	66.7	ug/L	3	25	40-140
C9-C18 Aliphatics	540.	345.	63.9	301.	55.7	ug/L	14	25	40-140
C19-C36 Aliphatics	720.	568.	78.9	507.	70.4	ug/L	11	25	40-140
Naphthalene	90.0	52.0	57.8	50.6	56.2	ug/L	3	25	40-140
2-Methylnaphthalene	90.0	59.4	66.0	58.3	64.8	ug/L	2	25	40-140
Phenanthrene	90.0	60.0	66.7	57.7	64.1	ug/L	4	25	40-140
Acenaphthylene	90.0	55.1	61.2	54.0	60.0	ug/L	2	25	40-140
Acenaphthene	90.0	56.9	63.2	55.5	61.7	ug/L	2	25	40-140
Anthracene	90.0	59.0	65.6	56.8	63.1	ug/L	4	25	40-140
Benzo(a)anthracene	90.0	62.3	69.2	59.8	66.4	ug/L	4	25	40-140
Benzo(a)pyrene	90.0	62.2	69.1	60.4	67.1	ug/L	3	25	40-140
Benzo(b)fluoranthene	90.0	60.0	66.7	56.3	62.6	ug/L	6	25	40-140
Benzo(g,h,i)perylene	90.0	66.6	74.0	64.6	71.8	ug/L	3	25	40-140
Benzo(k)fluoranthene	90.0	63.8	70.9	63.0	70.0	ug/L	1	25	40-140
Chrysene	90.0	63.9	71.0	61.6	68.4	ug/L	4	25	40-140
Dibenzo(a,h)anthracene	90.0	66.4	73.8	65.1	72.3	ug/L	2	25	40-140
Fluoranthene	90.0	62.5	69.4	60.2	66.9	ug/L	4	25	40-140
Fluorene	90.0	57.9	64.3	55.9	62.1	ug/L	4	25	40-140
Indeno(1,2,3-cd)pyrene	90.0	61.8	68.7	59.3	65.9	ug/L	4	25	40-140
Pyrene	90.0	61.4	68.2	59.1	65.7	ug/L	4	25	40-140
5-Alpha Androstane			56.3		64.9				40-140
o-Terphenyl			66.1		65.9				40-140
2-Fluorobiphenyl			69.2		71.2				40-140
2-Bromonaphthalene			72.3		73.8				40-140

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MS/MSD Recovery Report

MS ID: WG238624-4
MSD ID: WG238624-5
Sample ID: SL9928-8
Client ID: ZWM-95-15X_FAL18
Project:
SDG: SL9928
MS File ID: CLJ2072.D

Received Date:
Extract Date: 16-OCT-18
Extracted By: DP/LR
Extraction Method: SW846 3510C
Lab Prep Batch: WG238624
Report Date: 25-OCT-18
MSD File ID: CLJ2073.d

Analysis Date: 19-OCT-18
Analyst: AAB
Analysis Method: MA DEP EPH 04-1.1
Matrix: AQ
% Solids: NA

Compound	MS Spike	MSD Spike	Conc Units	Samp Conc	MS Conc	MSD Conc	MS Rec (%)	MSD Rec (%)	RPD (%)	RPD Limit	Limits
Unadjusted C11-C22 Aromatics	1530	1530	ug/L	U94	912	916	59.6	59.9	0	25	40-140
C9-C18 Aliphatics	540.	540.	ug/L	U94	267	239	49.4	44.2	11	25	40-140
C19-C36 Aliphatics	720.	720.	ug/L	U94	456	430	63.3	59.7	6	25	40-140
Naphthalene	90.0	90.0	ug/L	U1.9	41.9	42.6	46.6	47.3	2	25	40-140
2-Methylnaphthalene	90.0	90.0	ug/L	U1.9	48.8	49.2	54.2	54.7	1	25	40-140
Phenanthrene	90.0	90.0	ug/L	U1.9	51.6	51.7	57.3	57.4	0	25	40-140
Acenaphthylene	90.0	90.0	ug/L	U1.9	46.2	46.5	51.3	51.7	1	25	40-140
Acenaphthene	90.0	90.0	ug/L	U1.9	47	47.2	52.2	52.4	0	25	40-140
Anthracene	90.0	90.0	ug/L	U1.9	51.2	51.4	56.9	57.1	0	25	40-140
Benzo(a)anthracene	90.0	90.0	ug/L	U1.9	54.1	54.2	60.1	60.2	0	25	40-140
Benzo(a)pyrene	90.0	90.0	ug/L	U1.9	55.2	55.1	61.3	61.2	0	25	40-140
Benzo(b)fluoranthene	90.0	90.0	ug/L	U1.9	54.5	52.8	60.6	58.7	3	25	40-140
Benzo(g,h,i)perylene	90.0	90.0	ug/L	U1.9	58.6	59.1	65.1	65.7	1	25	40-140
Benzo(k)fluoranthene	90.0	90.0	ug/L	U1.9	53	54.4	58.9	60.4	3	25	40-140
Chrysene	90.0	90.0	ug/L	U1.9	54.7	56.1	60.8	62.3	2	25	40-140
Dibenzo(a,h)anthracene	90.0	90.0	ug/L	U1.9	60.4	58.1	67.1	64.6	4	25	40-140
Fluoranthene	90.0	90.0	ug/L	U1.9	54.6	54.8	60.7	60.9	0	25	40-140
Fluorene	90.0	90.0	ug/L	U1.9	48.6	48.5	54.0	53.9	0	25	40-140
Indeno(1,2,3-cd)pyrene	90.0	90.0	ug/L	U1.9	52.7	54.2	58.6	60.2	3	25	40-140
Pyrene	90.0	90.0	ug/L	U1.9	53.3	53.7	59.2	59.7	1	25	40-140
5-Alpha Androstane							64.9	58.8			40-140
o-Terphenyl							64.2	63.8			40-140
2-Fluorobiphenyl							68.8	70.1			40-140
2-Bromonaphthalene							71.4	72.2			40-140

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FORM 4
SEMIVOLATILE METHOD BLANK SUMMARY

CLIENT SAMPLE ID

WG238575-BLANK

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: TASAV-DEVENS SDG No.: SL9928

Lab File ID: CLJ1053 Lab Sample ID: WG238575-1

Instrument ID: GC12 Date Extracted: 10/15/18

Matrix: (soil/water) WATER Date Analyzed: 10/18/18

Level:(low/med) LOW Time Analyzed: 1348

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS and MSD:

	CLIENT SAMPLE ID	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	WG238575-LCS	WG238575-2	CLJ1054	10/18/18	1433
02	ZWM-99-24X_FAL18	SL9928-5	CLJ1063	10/18/18	2119
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
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COMMENTS:

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FORM IVDRO

FORM 4
SEMIVOLATILE METHOD BLANK SUMMARY

CLIENT SAMPLE ID

WG238575-BLANK

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: TASAV-DEVENS SDG No.: SL9928

Lab File ID: CLJ1053A Lab Sample ID: WG238575-1

Instrument ID: GC12 Date Extracted: 10/15/18

Matrix: (soil/water) WATER Date Analyzed: 10/18/18

Level:(low/med) LOW Time Analyzed: 1348

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS and MSD:

	CLIENT SAMPLE ID	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	WG238575-LCS	WG238575-2	CLJ1054A	10/18/18	1433
02	ZWM-99-24X_FAL18	SL9928-5	CLJ1063A	10/18/18	2119
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COMMENTS:

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FORM IVDRO

FORM 4
SEMIVOLATILE METHOD BLANK SUMMARY

CLIENT SAMPLE ID

WG238575-BLANK

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: TASAV-DEVENS SDG No.: SL9928

Lab File ID: CLJ2053 Lab Sample ID: WG238575-1

Instrument ID: GC12 Date Extracted: 10/15/18

Matrix: (soil/water) WATER Date Analyzed: 10/18/18

Level:(low/med) LOW Time Analyzed: 1348

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS and MSD:

	CLIENT SAMPLE ID	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	WG238575-LCS	WG238575-2	CLJ2054	10/18/18	1433
02	ZWM-99-24X_FAL18	SL9928-5	CLJ2063	10/18/18	2119
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COMMENTS:

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FORM IVDRO

FORM 4
SEMIVOLATILE METHOD BLANK SUMMARY

CLIENT SAMPLE ID

WG238624-BLANK

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: TASAV-DEVENS SDG No.: SL9928

Lab File ID: CLJ1069 Lab Sample ID: WG238624-1

Instrument ID: GC12 Date Extracted: 10/16/18

Matrix: (soil/water) WATER Date Analyzed: 10/19/18

Level:(low/med) LOW Time Analyzed: 0148

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS and MSD:

	CLIENT SAMPLE ID	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	WG238624-LCS	WG238624-2	CLJ1070	10/19/18	0233
02	WG238624-LCSD	WG238624-3	CLJ1071	10/19/18	0318
03	MS	WG238624-4	CLJ1072	10/19/18	0403
04	MSD	WG238624-5	CLJ1073	10/19/18	0448
05	69W-94-14_FAL18	SL9928-1RE	CLJ1076	10/19/18	0702
06	69W-DUP1_FAL18	SL9928-2RE	CLJ1077	10/19/18	0747
07	ZWM-99-22X_FAL18	SL9928-3RE	CLJ1078	10/19/18	0832
08	ZWM-99-23X_FAL18	SL9928-4RE	CLJ1079	10/19/18	0917
09	ZWM-99-24X_FAL18	SL9928-5RE	CLJ1080	10/19/18	1002
10	ZWM-01-25X_FAL18	SL9928-6RE	CLJ1081	10/19/18	1047
11	69W-94-13_FAL18	SL9928-7RE	CLJ1082	10/19/18	1132
12	ZWM-95-15X_FAL18	SL9928-8RE	CLJ1083	10/19/18	1217
13	ZWM-95-18X_FAL18	SL9928-9RE	CLJ1084	10/19/18	1302
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COMMENTS:

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FORM IVDRO

FORM 4
SEMIVOLATILE METHOD BLANK SUMMARY

CLIENT SAMPLE ID

WG238624-BLANK

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: TASAV-DEVENS SDG No.: SL9928

Lab File ID: CLJ1069A Lab Sample ID: WG238624-1

Instrument ID: GC12 Date Extracted: 10/16/18

Matrix: (soil/water) WATER Date Analyzed: 10/19/18

Level:(low/med) LOW Time Analyzed: 0148

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS and MSD:

	CLIENT SAMPLE ID	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	WG238624-LCS	WG238624-2	CLJ1070A	10/19/18	0233
02	WG238624-LCSD	WG238624-3	CLJ1071A	10/19/18	0318
03	MS	WG238624-4	CLJ1072A	10/19/18	0403
04	MSD	WG238624-5	CLJ1073A	10/19/18	0448
05	69W-94-14_FAL18	SL9928-1RE	CLJ1076A	10/19/18	0702
06	69W-DUP1_FAL18	SL9928-2RE	CLJ1077A	10/19/18	0747
07	ZWM-99-22X_FAL18	SL9928-3RE	CLJ1078A	10/19/18	0832
08	ZWM-99-23X_FAL18	SL9928-4RE	CLJ1079A	10/19/18	0917
09	ZWM-99-24X_FAL18	SL9928-5RE	CLJ1080A	10/19/18	1002
10	ZWM-01-25X_FAL18	SL9928-6RE	CLJ1081A	10/19/18	1047
11	69W-94-13_FAL18	SL9928-7RE	CLJ1082A	10/19/18	1132
12	ZWM-95-15X_FAL18	SL9928-8RE	CLJ1083A	10/19/18	1217
13	ZWM-95-18X_FAL18	SL9928-9RE	CLJ1084A	10/19/18	1302
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COMMENTS:

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FORM IVDRO

FORM 4
SEMIVOLATILE METHOD BLANK SUMMARY

CLIENT SAMPLE ID

WG238624-BLANK

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: TASAV-DEVENS SDG No.: SL9928

Lab File ID: CLJ2069 Lab Sample ID: WG238624-1

Instrument ID: GC12 Date Extracted: 10/16/18

Matrix: (soil/water) WATER Date Analyzed: 10/19/18

Level:(low/med) LOW Time Analyzed: 0148

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS and MSD:

	CLIENT SAMPLE ID	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	WG238624-LCS	WG238624-2	CLJ2070	10/19/18	0233
02	WG238624-LCSD	WG238624-3	CLJ2071	10/19/18	0318
03	MS	WG238624-4	CLJ2072	10/19/18	0403
04	MSD	WG238624-5	CLJ2073	10/19/18	0448
05	69W-94-14_FAL18	SL9928-1RE	CLJ2076	10/19/18	0702
06	69W-DUP1_FAL18	SL9928-2RE	CLJ2077	10/19/18	0747
07	ZWM-99-22X_FAL18	SL9928-3RE	CLJ2078	10/19/18	0832
08	ZWM-99-23X_FAL18	SL9928-4RE	CLJ2079	10/19/18	0917
09	ZWM-99-24X_FAL18	SL9928-5RE	CLJ2080	10/19/18	1002
10	ZWM-01-25X_FAL18	SL9928-6RE	CLJ2081	10/19/18	1047
11	69W-94-13_FAL18	SL9928-7RE	CLJ2082	10/19/18	1132
12	ZWM-95-15X_FAL18	SL9928-8RE	CLJ2083	10/19/18	1217
13	ZWM-95-18X_FAL18	SL9928-9RE	CLJ2084	10/19/18	1302
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COMMENTS:

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FORM IVDRO

Form 6
Initial Calibration Summary

Lab Name : Katahdin Analytical Services **SDG:** SL9928
Project : Long Term Monitoring, Main Post Fall 201 **Instrument ID:** GC12
Lab File IDs : CLI1112.d CLI1098.d CLI1099.d **Calibration Date(s):** 11-SEP-18 19:25
CLI1100.d CLI1115.d 12-SEP-18 12:02

	1.0000 Level 1	10.0000 Level 2	50.0000 Level 3	100.0000 Level 4	200.0000 Level 5		New Crv	b	m1	m2	%RSD	Max %RSD	
Unadjusted C11-C22 Aromatic	10172	10408	10067	9401	9562		AVG		9922		4.27800	25.00000	M I
Naphthalene	10477	10551	10098	9468	9626		AVG		10044		4.86131	25.00000	O
2-Methylnaphthalene	9300	9616	9181	8583	8747		AVG		9085		4.61648	25.00000	O
Acenaphthylene	10171	10306	9907	9253	9417		AVG		9811		4.69783	25.00000	O
Acenaphthene	10538	10528	10173	9498	9633		AVG		10074		4.85672	25.00000	O
Fluorene	10630	10448	10099	9431	9592		AVG		10040		5.19804	25.00000	O
Phenanthrene	10461	10478	10110	9425	9617		AVG		10018		4.80803	25.00000	O
Anthracene	10239	10528	10111	9408	9649		AVG		9987		4.53856	25.00000	O
Fluoranthene	10446	10570	10188	9463	9679		AVG		10069		4.78231	25.00000	O
Pyrene	10160	10740	10368	9636	9863		AVG		10154		4.24310	25.00000	O
Benzo(a)Anthracene	10582	10446	10196	9565	9743		AVG		10106		4.35563	25.00000	O
Chrysene	10329	10490	10126	9449	9610		AVG		10001		4.52699	25.00000	O
Benzo(b)Fluoranthene	11353	11388	11178	9987	10927		AVG		10967		5.26544	25.00000	O
Benzo(k)Fluoranthene	10089	10151	9590	9377	8656		AVG		9573		6.35400	25.00000	O
Benzo(a)Pyrene	10109	10375	10038	9369	9515		AVG		9882		4.28298	25.00000	O
Indeno(1,2,3-cd)Pyrene	9970	10924	10757	10670	11013		AVG		10667		3.86452	25.00000	O
Dibenzo(a,h)Anthracene	8583	9656	9361	8166	8062		AVG		8765		8.13820	25.00000	O
Benzo(g,h,i)Perylene	9488	9745	9655	9077	9203		AVG		9434		3.04278	25.00000	O
2-Fluorobiphenyl	9010	8985	8602	8051	8217		AVG		8573		5.08650	25.00000	
2-Bromonaphthalene	5480	6079	5914	5535	5621		AVG		5726		4.52066	25.00000	
O-Terphenyl	10323	10200	9877	9238	9363		AVG		9800		4.96302	25.00000	

Legend: O = Kept Original Curve
Y = Failed Minimum RF
W = Failed %RSD Value

Form 6
Initial Calibration Summary

Lab Name : Katahdin Analytical Services **SDG:** SL9928
Project : Long Term Monitoring, Main Post Fall 201 **Instrument ID:** GC12
Lab File IDs : CLI2112.d CLI2098.d CLI2099.d **Calibration Date(s):** 11-SEP-18 19:25
CLI2100.d CLI2115.d 12-SEP-18 12:02

	1.0000 Level 1	10.0000 Level 2	50.0000 Level 3	100.0000 Level 4	200.0000 Level 5		New Crv	b	m1	m2	%RSD	Max %RSD	
C9-C18 Aliphatic	9601	9391	8680	8500	8636		AVG		8962		5.55234	25.00000	M (
C19-C36 Aliphatic	9353	9694	8679	8683	8654		AVG		9013		5.34323	25.00000	S O
C-9	9481	9284	8826	8293	8620		AVG		8901		5.43857	30.00000	O
C-10	9877	9098	8710	8581	8688		AVG		8991		5.92601	25.00000	O
C-12	9810	9510	8714	8616	8711		AVG		9072		6.04395	25.00000	O
C-14	9456	9469	8611	8521	8625		AVG		8936		5.39321	25.00000	O
C-16	9551	9619	8751	8588	8672		AVG		9036		5.58727	25.00000	O
C-18	9430	9364	8471	8402	8503		AVG		8834		5.83949	25.00000	O
C-19	9136	9696	8779	8723	8797		AVG		9026		4.52155	25.00000	O
C-20	9405	9645	8674	8616	8787		AVG		9025		5.18363	25.00000	O
C-22	9200	9646	8683	8601	8715		AVG		8969		4.96686	25.00000	O
C-24	9664	9682	8591	8576	8450		AVG		8992		6.93501	25.00000	O
C-26	9539	9699	8591	8497	8494		AVG		8964		6.71340	25.00000	O
C-28	9585	9730	8685	8606	8604		AVG		9042		6.24991	25.00000	O
C-30	9639	9788	8709	8699	8632		AVG		9093		6.25907	25.00000	O
C-36	8654	9665	8722	9148	8755		AVG		8989		4.71947	25.00000	O
5-alpha androstane	9395	9602	8650	8392	8405		AVG		8889		6.41719	25.00000	

Legend: O = Kept Original Curve
Y = Failed Minimum RF
W = Failed %RSD Value

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Form 7
Calibration Verification Summary

Lab Name : Katahdin Analytical Services
Project : Long Term Monitoring, Main Po
Lab ID : WG239063-1
Lab File ID : CLJ1052.d
Initial Calibration Date(s): 09/11/18 19:25 09/12/18 12:02

SDG: SL9928
Analytical Date: 10/18/18 09:28
Instrument ID: GC12
Column ID: A

	Compound	$\overline{RRF}$/Amount	RF50	Min RRF	%D/ %Drift	Max %D/ %Drift	Curve Type
50	Naphthalene	10044	9396	0.010	-6.44546	25.00000	Averaged
60	2-Methylnaphthalene	9085	8527	0.010	-6.13988	25.00000	Averaged
70	Phenanthrene	10018	9213	0.010	-8.03493	25.00000	Averaged
80	Acenaphthylene	9811	9195	0.010	-6.27879	25.00000	Averaged
90	Acenaphthene	10074	9419	0.010	-6.50409	25.00000	Averaged
100	Anthracene	9987	9164	0.010	-8.24527	25.00000	Averaged
110	Benzo(a)Anthracene	10106	9353	0.010	-7.45969	25.00000	Averaged
120	Benzo(a)Pyrene	9882	9146	0.010	-7.44824	25.00000	Averaged
130	Benzo(b)Fluoranthene	10967	10526	0.010	-4.01343	25.00000	Averaged
140	Benzo(g,h,i)Perylene	9434	8922	0.010	-5.42293	25.00000	Averaged
150	Benzo(k)Fluoranthene	9573	8389	0.010	-12.36920	25.00000	Averaged
160	Chrysene	10001	9250	0.010	-7.51104	25.00000	Averaged
170	Dibenzo(a,h)Anthracene	8765	8422	0.010	-3.92280	25.00000	Averaged
180	Fluoranthene	10069	9247	0.010	-8.16564	25.00000	Averaged
190	Fluorene	10040	9326	0.010	-7.10729	25.00000	Averaged
200	Indeno(1,2,3-cd)Pyrene	10667	9973	0.010	-6.50043	25.00000	Averaged
210	Pyrene	10154	9420	0.010	-7.22902	25.00000	Averaged
4	2-Fluorobiphenyl	8573	7967	0.010	-7.06511	25.00000	Averaged
6	2-Bromonaphthalene	5726	5427	0.010	-5.21767	25.00000	Averaged
11	O-Terphenyl	9800	9148	0.010	-6.65541	25.00000	Averaged

*** = Compound out of QC criteria**

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Form 7
Calibration Verification Summary

Lab Name : Katahdin Analytical Services
Project : Long Term Monitoring, Main Po
Lab ID : WG239063-2
Lab File ID : CLJ1068.d
Initial Calibration Date(s): 09/11/18 19:25 09/12/18 12:02

SDG: SL9928
Analytical Date: 10/19/18 01:03
Instrument ID: GC12
Column ID: A

	Compound	$\overline{RRF}$/Amount	RF50	Min RRF	%D/ %Drift	Max %D/ %Drift	Curve Type
50	Naphthalene	10044	9338	0.010	-7.02770	25.00000	Averaged
60	2-Methylnaphthalene	9085	8455	0.010	-6.93700	25.00000	Averaged
70	Phenanthrene	10018	9263	0.010	-7.53584	25.00000	Averaged
80	Acenaphthylene	9811	9142	0.010	-6.81698	25.00000	Averaged
90	Acenaphthene	10074	9371	0.010	-6.97540	25.00000	Averaged
100	Anthracene	9987	9095	0.010	-8.93197	25.00000	Averaged
110	Benzo(a)Anthracene	10106	9350	0.010	-7.48542	25.00000	Averaged
120	Benzo(a)Pyrene	9882	9154	0.010	-7.36303	25.00000	Averaged
130	Benzo(b)Fluoranthene	10967	9653	0.010	-11.97854	25.00000	Averaged
140	Benzo(g,h,i)Perylene	9434	8958	0.010	-5.04004	25.00000	Averaged
150	Benzo(k)Fluoranthene	9573	9244	0.010	-3.43994	25.00000	Averaged
160	Chrysene	10001	9308	0.010	-6.93150	25.00000	Averaged
170	Dibenzo(a,h)Anthracene	8765	8412	0.010	-4.02798	25.00000	Averaged
180	Fluoranthene	10069	9277	0.010	-7.87047	25.00000	Averaged
190	Fluorene	10040	9272	0.010	-7.65172	25.00000	Averaged
200	Indeno(1,2,3-cd)Pyrene	10667	10025	0.010	-6.01762	25.00000	Averaged
210	Pyrene	10154	9450	0.010	-6.93001	25.00000	Averaged
4	2-Fluorobiphenyl	8573	7928	0.010	-7.52878	25.00000	Averaged
6	2-Bromonaphthalene	5726	5432	0.010	-5.13996	25.00000	Averaged
11	O-Terphenyl	9800	9170	0.010	-6.42632	25.00000	Averaged

*** = Compound out of QC criteria**

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Form 7
Calibration Verification Summary

Lab Name : Katahdin Analytical Services
Project : Long Term Monitoring, Main Po
Lab ID : WG239063-3
Lab File ID : CLJ1092.d
Initial Calibration Date(s): 09/11/18 19:25 09/12/18 12:02

SDG: SL9928
Analytical Date: 10/22/18 08:14
Instrument ID: GC12
Column ID: A

	Compound	$\overline{RRF}$/Amount	RF50	Min RRF	%D/ %Drift	Max %D/ %Drift	Curve Type
50	Naphthalene	10044	8797	0.010	-12.41030	25.00000	Averaged
60	2-Methylnaphthalene	9085	7928	0.010	-12.73656	25.00000	Averaged
70	Phenanthrene	10018	8700	0.010	-13.15454	25.00000	Averaged
80	Acenaphthylene	9811	8649	0.010	-11.84062	25.00000	Averaged
90	Acenaphthene	10074	8857	0.010	-12.08102	25.00000	Averaged
100	Anthracene	9987	8555	0.010	-14.34142	25.00000	Averaged
110	Benzo(a)Anthracene	10106	8800	0.010	-12.93105	25.00000	Averaged
120	Benzo(a)Pyrene	9882	8591	0.010	-13.06195	25.00000	Averaged
130	Benzo(b)Fluoranthene	10967	9703	0.010	-11.51969	25.00000	Averaged
140	Benzo(g,h,i)Perylene	9434	8402	0.010	-10.93433	25.00000	Averaged
150	Benzo(k)Fluoranthene	9573	8121	0.010	-15.16922	25.00000	Averaged
160	Chrysene	10001	8717	0.010	-12.83551	25.00000	Averaged
170	Dibenzo(a,h)Anthracene	8765	8003	0.010	-8.69404	25.00000	Averaged
180	Fluoranthene	10069	8765	0.010	-12.95416	25.00000	Averaged
190	Fluorene	10040	8707	0.010	-13.27812	25.00000	Averaged
200	Indeno(1,2,3-cd)Pyrene	10667	9164	0.010	-14.09258	25.00000	Averaged
210	Pyrene	10154	8896	0.010	-12.38369	25.00000	Averaged
4	2-Fluorobiphenyl	8573	7564	0.010	-11.77295	25.00000	Averaged
6	2-Bromonaphthalene	5726	5247	0.010	-8.36468	25.00000	Averaged
11	O-Terphenyl	9800	8604	0.010	-12.20698	25.00000	Averaged

*** = Compound out of QC criteria**

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Form 7
Calibration Verification Summary

Lab Name : Katahdin Analytical Services
Project : Long Term Monitoring, Main Po
SDG: SL9928
Lab ID : WG239063-4
Analytical Date: 10/18/18 09:28
Lab File ID : CLJ2052.d
Instrument ID: GC12
Initial Calibration Date(s): 09/11/18 19:25 09/12/18 12:02
Column ID: A

	Compound	RRF/Amount	RF50	Min RRF	%D/ %Drift	Max %D/ %Drift	Curve Type
20	C9-C18 Aliphatic	8962	8706	0.010	-2.85192	25.00000	Averaged
30	C19-C36 Aliphatic	9013	8524	0.010	-5.42434	25.00000	Averaged
370	C-9	8901	8779	0.010	-1.37090	30.00000	Averaged
380	C-10	8991	8722	0.010	-2.99026	25.00000	Averaged
390	C-12	9072	8784	0.010	-3.17630	25.00000	Averaged
400	C-14	8936	8680	0.010	-2.87051	25.00000	Averaged
410	C-16	9036	8761	0.010	-3.03881	25.00000	Averaged
420	C-18	8834	8511	0.010	-3.66070	25.00000	Averaged
430	C-19	9026	8837	0.010	-2.10067	25.00000	Averaged
440	C-20	9025	8770	0.010	-2.82795	25.00000	Averaged
450	C-22	8969	8747	0.010	-2.47929	25.00000	Averaged
460	C-24	8992	8713	0.010	-3.10922	25.00000	Averaged
470	C-26	8964	8690	0.010	-3.06031	25.00000	Averaged
480	C-28	9042	8726	0.010	-3.49361	25.00000	Averaged
490	C-30	9093	8721	0.010	-4.09889	25.00000	Averaged
500	C-36	8989	6987	0.010	-22.26483	25.00000	Averaged
44	5-alpha androstane	8889	8632	0.010	-2.89025	25.00000	Averaged

*** = Compound out of QC criteria**

600 Technology Way
P.O. Box 540, Scarborough, ME 04070
Tel:(207) 874-2400 Fax:(207) 775-4029

http://katahdinlab.com
sales@katahdinlab.com

1 2 3 4 5 6 7 8 9 10 11 12 13 14

Form 7
Calibration Verification Summary

Lab Name : Katahdin Analytical Services
Project : Long Term Monitoring, Main Po
Lab ID : WG239063-5
Lab File ID : CLJ2068.d
Initial Calibration Date(s): 09/11/18 19:25 09/12/18 12:02

SDG: SL9928
Analytical Date: 10/19/18 01:03
Instrument ID: GC12
Column ID: A

	Compound	$\overline{RRF}$/Amount	RF50	Min RRF	%D/ %Drift	Max %D/ %Drift	Curve Type
20	C9-C18 Aliphatic	8962	8561	0.010	-4.46917	25.00000	Averaged
30	C19-C36 Aliphatic	9013	8591	0.010	-4.67767	25.00000	Averaged
370	C-9	8901	8702	0.010	-2.22903	30.00000	Averaged
380	C-10	8991	8640	0.010	-3.90564	25.00000	Averaged
390	C-12	9072	8581	0.010	-5.41813	25.00000	Averaged
400	C-14	8936	8494	0.010	-4.94672	25.00000	Averaged
410	C-16	9036	8568	0.010	-5.18266	25.00000	Averaged
420	C-18	8834	8382	0.010	-5.11284	25.00000	Averaged
430	C-19	9026	8688	0.010	-3.74342	25.00000	Averaged
440	C-20	9025	8616	0.010	-4.53716	25.00000	Averaged
450	C-22	8969	8591	0.010	-4.21527	25.00000	Averaged
460	C-24	8992	8548	0.010	-4.94342	25.00000	Averaged
470	C-26	8964	8486	0.010	-5.32520	25.00000	Averaged
480	C-28	9042	8528	0.010	-5.68384	25.00000	Averaged
490	C-30	9093	8554	0.010	-5.93121	25.00000	Averaged
500	C-36	8989	8717	0.010	-3.02717	25.00000	Averaged
44	5-alpha androstane	8889	8561	0.010	-3.68900	25.00000	Averaged

*** = Compound out of QC criteria**

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1 2 3 4 5 6 7 8 9 10 11 12 13 14

Form 7
Calibration Verification Summary

Lab Name : Katahdin Analytical Services
Project : Long Term Monitoring, Main Po
Lab ID : WG239063-6
Lab File ID : CLJ2092.d
Initial Calibration Date(s): 09/11/18 19:25 09/12/18 12:02

SDG: SL9928
Analytical Date: 10/22/18 08:14
Instrument ID: GC12
Column ID: A

	Compound	$\overline{RRF}$/Amount	RF50	Min RRF	%D/ %Drift	Max %D/ %Drift	Curve Type	
20	C9-C18 Aliphatic	8962	8116	0.010	-9.43973	25.00000	Averaged	
30	C19-C36 Aliphatic	9013	7796	0.010	-13.49708	25.00000	Averaged	
370	C-9	8901	8083	0.010	-9.18927	30.00000	Averaged	
380	C-10	8991	8088	0.010	-10.04658	25.00000	Averaged	
390	C-12	9072	8200	0.010	-9.61630	25.00000	Averaged	
400	C-14	8936	8130	0.010	-9.02126	25.00000	Averaged	
410	C-16	9036	8172	0.010	-9.55957	25.00000	Averaged	
420	C-18	8834	8022	0.010	-9.19461	25.00000	Averaged	
430	C-19	9026	8267	0.010	-8.40754	25.00000	Averaged	
440	C-20	9025	8186	0.010	-9.29715	25.00000	Averaged	
450	C-22	8969	8172	0.010	-8.89004	25.00000	Averaged	
460	C-24	8992	8173	0.010	-9.11246	25.00000	Averaged	
470	C-26	8964	8100	0.010	-9.63653	25.00000	Averaged	
480	C-28	9042	8168	0.010	-9.66638	25.00000	Averaged	
490	C-30	9093	8061	0.010	-11.34791	25.00000	Averaged	
500	C-36	8989	5242	0.010	-41.68694	25.00000	Averaged	<-
44	5-alpha androstane	8889	8133	0.010	-8.50177	25.00000	Averaged	

*** = Compound out of QC criteria**

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FORM 8
DRO ANALYTICAL SEQUENCE

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: TASAV-DEVENS SDG No.: SDGA02536

GC Column: RTX-5 ID: 0.53 (mm)Init. Calib. Date(s): 09/11/18 09/12/18

Instrument ID: GC12

THE ANALYTICAL SEQUENCE OF PERFORMANCE EVALUATION MIXTURES, BLANKS, SAMPLES, AND STANDARDS IS GIVEN BELOW:

MEAN SURROGATE RT FROM INITIAL CALIBRATION
S1 : 9.12 S2 : 10.50

	CLIENT SAMPLE ID	LAB SAMPLE ID	DATE ANALYZED	TIME ANALYZED	S1 RT #	S2 RT #
01		WG236385-2	09/11/18	2010	9.12	10.50
02		WG236385-3	09/11/18	2055	9.12	10.49
03		WG236385-4	09/11/18	2140	9.12	10.50
04		WG236385-1	09/12/18	0946	9.14	10.51
05		WG236385-5	09/12/18	1202	9.12	10.50
06		WG236385-6	09/12/18	1333		
07						
08						
09						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						

QC LIMITS
S1 = 2-Fluorobiphenyl (+/- 0.15 MINUTES)
S2 = 2-Bromonaphthalene (+/- 0.15 MINUTES)

Column used to flag retention time values with an asterisk.
* Values outside of QC limits.

FORM 8
DRO ANALYTICAL SEQUENCE

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: TASAV-DEVENS SDG No.: SDGA02536

GC Column: RTX-5 ID: 0.53 (mm)Init. Calib. Date(s): 09/11/18 09/12/18

Instrument ID: GC12

THE ANALYTICAL SEQUENCE OF PERFORMANCE EVALUATION MIXTURES, BLANKS, SAMPLES, AND STANDARDS IS GIVEN BELOW:

MEAN SURROGATE RT FROM INITIAL CALIBRATION
S3 : 15.41

	CLIENT SAMPLE ID	LAB SAMPLE ID	DATE ANALYZED	TIME ANALYZED	S3 RT #	RT #
01		WG236385-2	09/11/18	2010	15.41	
02		WG236385-3	09/11/18	2055	15.41	
03		WG236385-4	09/11/18	2140	15.41	
04		WG236385-1	09/12/18	0946	15.43	
05		WG236385-5	09/12/18	1202	15.41	
06		WG236385-6	09/12/18	1333		
07						
08						
09						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						

QC LIMITS
S3 = O-Terphenyl (+/- 0.15 MINUTES)

Column used to flag retention time values with an asterisk.
* Values outside of QC limits.

FORM 8
DRO ANALYTICAL SEQUENCE

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: TASAV-DEVENS SDG No.: SDGA02536

GC Column: RTX-1 ID: 0.53 (mm)Init. Calib. Date(s): 09/11/18 09/12/18

Instrument ID: GC12

THE ANALYTICAL SEQUENCE OF PERFORMANCE EVALUATION MIXTURES, BLANKS, SAMPLES, AND STANDARDS IS GIVEN BELOW:

MEAN SURROGATE RT FROM INITIAL CALIBRATION
S1 : 16.64

	CLIENT SAMPLE ID	LAB SAMPLE ID	DATE ANALYZED	TIME ANALYZED	S1 RT #	RT #
01		WG236385-8	09/11/18	2010	16.64	
02		WG236385-9	09/11/18	2055	16.64	
03		WG236385-10	09/11/18	2140	16.65	
04		WG236385-7	09/12/18	0946	16.64	
05		WG236385-11	09/12/18	1202	16.64	
06		WG236385-12	09/12/18	1333		
07						
08						
09						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						

QC LIMITS
S1 = 5-alpha androstane (+/- 0.33 MINUTES)

Column used to flag retention time values with an asterisk.
* Values outside of QC limits.

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FORM VIII DRO

Katahdin Analytical Services A0000035

FORM 8
DRO ANALYTICAL SEQUENCE

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: TASAV-DEVENS SDG No.: SL9928

GC Column: RTX-5 ID: 0.53 (mm)Init. Calib. Date(s): 09/11/18 09/12/18

Instrument ID: GC12

THE ANALYTICAL SEQUENCE OF PERFORMANCE EVALUATION MIXTURES, BLANKS, SAMPLES, AND STANDARDS IS GIVEN BELOW:

MEAN SURROGATE RT FROM INITIAL CALIBRATION
S1 : 9.14 S2 : 10.50

	CLIENT SAMPLE ID	LAB SAMPLE ID	DATE ANALYZED	TIME ANALYZED	S1 RT #	S2 RT #
01		WG239063-1	10/18/18	0928	9.14	10.50
02	WG238575-BLA	WG238575-1	10/18/18	1348	9.19	10.56
03	WG238575-LCS	WG238575-2	10/18/18	1433	9.17	10.54
04	ZWM-99-24X_F	SL9928-5	10/18/18	2119	9.25	10.62
05		WG239063-2	10/19/18	0103	9.24	10.61
06	WG238624-BLA	WG238624-1	10/19/18	0148	9.24	10.61
07	WG238624-LCS	WG238624-2	10/19/18	0233	9.24	10.60
08	WG238624-LCS	WG238624-3	10/19/18	0318	9.23	10.60
09	MS	WG238624-4	10/19/18	0403	9.23	10.60
10	MSD	WG238624-5	10/19/18	0448	9.23	10.60
11	69W-94-14_FA	SL9928-1RE	10/19/18	0702	9.24	10.61
12	69W-DUP1_FAL	SL9928-2RE	10/19/18	0747	9.25	10.62
13	ZWM-99-22X_F	SL9928-3RE	10/19/18	0832	9.26	10.63
14	ZWM-99-23X_F	SL9928-4RE	10/19/18	0917	9.22	10.58
15	ZWM-99-24X_F	SL9928-5RE	10/19/18	1002	9.18	10.55
16	ZWM-01-25X_F	SL9928-6RE	10/19/18	1047	9.18	10.55
17	69W-94-13_FA	SL9928-7RE	10/19/18	1132	9.18	10.55
18	ZWM-95-15X_F	SL9928-8RE	10/19/18	1217	9.17	10.53
19	ZWM-95-18X_F	SL9928-9RE	10/19/18	1302	9.14	10.51
20		WG239063-3	10/22/18	0814	9.24	10.61

QC LIMITS
S1 = 2-Fluorobiphenyl (+/- 0.15 MINUTES)
S2 = 2-Bromonaphthalene (+/- 0.15 MINUTES)

Column used to flag retention time values with an asterisk.
* Values outside of QC limits.

page 1 of 2

FORM VIII DRO

FORM 8
DRO ANALYTICAL SEQUENCE

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: TASAV-DEVENS SDG No.: SL9928

GC Column: RTX-5 ID: 0.53 (mm)Init. Calib. Date(s): 09/11/18 09/12/18

Instrument ID: GC12

THE ANALYTICAL SEQUENCE OF PERFORMANCE EVALUATION MIXTURES, BLANKS, SAMPLES, AND STANDARDS IS GIVEN BELOW:

MEAN SURROGATE RT FROM INITIAL CALIBRATION
S3 : 15.40

	CLIENT SAMPLE ID	LAB SAMPLE ID	DATE ANALYZED	TIME ANALYZED	S3 RT #	RT #
01		WG239063-1	10/18/18	0928	15.40	
02	WG238575-BLA	WG238575-1	10/18/18	1348	15.47	
03	WG238575-LCS	WG238575-2	10/18/18	1433	15.44	
04	ZWM-99-24X_F	SL9928-5	10/18/18	2119	15.53	
05		WG239063-2	10/19/18	0103	15.51	
06	WG238624-BLA	WG238624-1	10/19/18	0148	15.52	
07	WG238624-LCS	WG238624-2	10/19/18	0233	15.51	
08	WG238624-LCS	WG238624-3	10/19/18	0318	15.51	
09	MS	WG238624-4	10/19/18	0403	15.50	
10	MSD	WG238624-5	10/19/18	0448	15.50	
11	69W-94-14_FA	SL9928-1RE	10/19/18	0702	15.52	
12	69W-DUP1_FAL	SL9928-2RE	10/19/18	0747	15.53	
13	ZWM-99-22X_F	SL9928-3RE	10/19/18	0832	15.53	
14	ZWM-99-23X_F	SL9928-4RE	10/19/18	0917	15.48	
15	ZWM-99-24X_F	SL9928-5RE	10/19/18	1002	15.46	
16	ZWM-01-25X_F	SL9928-6RE	10/19/18	1047	15.46	
17	69W-94-13_FA	SL9928-7RE	10/19/18	1132	15.45	
18	ZWM-95-15X_F	SL9928-8RE	10/19/18	1217	15.44	
19	ZWM-95-18X_F	SL9928-9RE	10/19/18	1302	15.41	
20		WG239063-3	10/22/18	0814	15.51	

QC LIMITS
S3 = O-Terphenyl (+/- 0.15 MINUTES)

Column used to flag retention time values with an asterisk.
* Values outside of QC limits.

FORM 8
DRO ANALYTICAL SEQUENCE

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: TASAV-DEVENS SDG No.: SL9928

GC Column: RTX-1 ID: 0.53 (mm)Init. Calib. Date(s): 09/11/18 09/12/18

Instrument ID: GC12

THE ANALYTICAL SEQUENCE OF PERFORMANCE EVALUATION MIXTURES, BLANKS, SAMPLES, AND STANDARDS IS GIVEN BELOW:

MEAN SURROGATE RT FROM INITIAL CALIBRATION
S1 : 16.65

	CLIENT SAMPLE ID	LAB SAMPLE ID	DATE ANALYZED	TIME ANALYZED	S1 RT	#	RT	#
01		WG239063-4	10/18/18	0928	16.61			
02	WG238575-BLA	WG238575-1	10/18/18	1348	16.64			
03	WG238575-LCS	WG238575-2	10/18/18	1433	16.63			
04	ZWM-99-24X_F	SL9928-5	10/18/18	2119	16.65			
05		WG239063-5	10/19/18	0103	16.65			
06	WG238624-BLA	WG238624-1	10/19/18	0148	16.65			
07	WG238624-LCS	WG238624-2	10/19/18	0233	16.65			
08	WG238624-LCS	WG238624-3	10/19/18	0318	16.65			
09	MS	WG238624-4	10/19/18	0403	16.64			
10	MSD	WG238624-5	10/19/18	0448	16.64			
11	69W-94-14_FA	SL9928-1RE	10/19/18	0702	16.65			
12	69W-DUP1_FAL	SL9928-2RE	10/19/18	0747	16.65			
13	ZWM-99-22X_F	SL9928-3RE	10/19/18	0832	16.65			
14	ZWM-99-23X_F	SL9928-4RE	10/19/18	0917	16.64			
15	ZWM-99-24X_F	SL9928-5RE	10/19/18	1002	16.63			
16	ZWM-01-25X_F	SL9928-6RE	10/19/18	1047	16.63			
17	69W-94-13_FA	SL9928-7RE	10/19/18	1132	16.62			
18	ZWM-95-15X_F	SL9928-8RE	10/19/18	1217	16.63			
19	ZWM-95-18X_F	SL9928-9RE	10/19/18	1302	16.63			
20		WG239063-6	10/22/18	0814	16.65			

QC LIMITS
S1 = 5-alpha androstane (+/- 0.33 MINUTES)

Column used to flag retention time values with an asterisk.
* Values outside of QC limits.

page 1 of 1

FORM VIII DRO

Katahdin Analytical Services A0000038

CHAIN-OF-CUSTODY RECORD

KOMAN Government Services, LLC
Laura Ekes
293 Boston Post Road West, Suite 160, Marlborough, MA, 01752
(508) 206 7442, lekes@komangs.com

COC # 201810A691

Project Name: Long Term Monitoring	Laboratory: TestAmerica Laboratories, Inc., Savannah, GA	Event: KOMAN, Long Term Monitoring, Main Post Fall 2018
Project Number: DEVNS-LTM	POC: Jerry Lamer 912 354 7858 jerry.lamer@testamericainc.com	
WBS Code: Purchase Order 18-706	Ship to: 5102 LaRoche Avenue, Savannah, GA 31404	

Comments:

Equipment:

Analytical Test Method: MADEP-EPH with PAHs | 8260B(GC-FID)-Fe,Mn | SW6020A(GFL DFLT)-Mn

Code	Matrix
WG	Ground Water

Code	Container/Preservative
2	2 - 1 Liter amber glass, 1 HCl to pH < 2, Cool < 6C
9	1 - 500mL plastic HDPE pH < 2, Cool < 6C

Event: KOMAN, Long Term Monitoring, Main Post Fall 2018 — 2 | 9 | 3

	Sample ID	Matrix	Date	Time	Samp Ind				Location ID	Sample Type	Depth (ft bgs) Top	Depth (ft bgs) Bottom	Comments	Cooler
1	~~GWW-54-15_FAL18~~	~~WG~~	~~10/11/2018~~			X	X	X	~~GWW-94-15~~	~~N1~~	5.49	15.49		1
2	GWW-94-14_FAL18	WG	10/[illegible]/2018	[illegible]30	N/A	X	X	X	GWW-94-14	N1	5.49	15.49		1
3	~~ZWM-95-15X_FAL18~~	~~WG~~	~~10/11/2018~~			X	X	X	ZWM-95-15X	N1	5.87	15.87		1
4	~~ZWM-95-18X_FAL18~~	~~WG~~	~~10/11/2018~~			X	X	X	~~ZWM-95-18X~~	N1	5.22	15.22		1
5	ZWM-95-18X_FAL18	WG	10/11/2018			X	X	X	ZWM-95-18X	N1	5.22	15.22		1
6	ZWM-95-18X_FAL18	WG	10/11/2018			X	X	X	~~ZWM-95-18X~~	FD1	5.22	15.22		1
7	GWW-DUP1_FAL18	WG	10/[illegible]/2018	1330	N/A	X	X	X	FIELDQC	FD1				1
8	ZWM-99-22X_FAL18	WG	10/[illegible]/2018	1330	N/A	X	X	X	ZWM-99-22X	N1	4.63	19.64		1
		Turnaround Time: Routine												

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
[signature]	10/10/18	1930	[signature]	10/11/18	1350
[signature]	10/10/18	1230			

Shipping Date / Carrier / Airbill Number:

Received by Laboratory: (Signature, Date, Time) & condition:

CHAIN-OF-CUSTODY RECORD

KOMAN Government Services, LLC
Laura Ekos
293 Boston Post Road West, Suite 100, Marlborough, MA 01752
(508) 305-7442, lekos@komangs.com

COC # 201810A692

Project Name: Long Term Monitoring	Laboratory: TestAmerica Laboratories, Inc., Savannah, GA	Event: KOMAN, Long Term Monitoring, Main Post Fall 2018
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:

Equipment:

Code	Matrix
WG	Ground Water

Code	Container/Preservative
2	8 oz clear amber glass, 1 unpreserved, 4 Cool <6°C
9	1 x 250mL, amber HDPE w/ 2 Cool <6°C

	Sample ID	Matrix	Date	Time	Sample Ind	Analytical Test Method: MADEP-EPH-04 with PAHs	SW8260C-5 DF=1 Fe,Mn	SW6010C-FLDFLT - Mn	SW6020A-1 DFLT - As	Location ID	Sample Type	Depth (ft bgs) Top	Depth (ft bgs) Bottom	Comments	Cooler
	Event: KOMAN, Long Term Monitoring, Main Post Fall 2018					2	9	9	9						
1	ZWM-99-25X_FAL18	WG	10/[illegible]/2018	[illegible]	B-A	X	X		X	ZWM-99-25X	N1	4.58	14.08		1
2	ZWM-99-24X_FAL18	WG	10/12/2018	[illegible]	B-A	X	X		X	ZWM-99-24X	N1	5.62	15.62		1
3	ZWM-01-25X_FAL18	WG	10/[illegible]/2018	[illegible]	B-A	X	X		X	ZWM-01-25X	N1	5.13	15.13		1
4	~~SWP-99-01_FAL18~~	WG	10/12/2018				X		X	~~SWP-99-01~~	N1	~~3.06~~	~~13.06~~		1
5	~~SWP-13-01_FAL18~~	WG	10/12/2018					X		~~SWP-13-01~~	N1	~~0.00~~	~~0.00~~		1
		Turnaround Time: Routine													

Relinquished by: (Signature)	Date	Time
[signature]	10/10/18	1550
[signature]	10/10/18	1710

Received by: (Signature)	Date	Time
[signature]	10/10/18	13:32
[signature] TA	10-11-18	820

Shipping Date / Carrier / Airbill Number

Received by Laboratory: (Signature, Date, Time) & condition

Page 1 of 1

1-8-20

CHAIN-OF-CUSTODY RECORD

KOMAN Government Services, LLC
Laurie Ekes
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(508) 366-7442, lekes@komangs.com

COC # 201810A691

KGS

Project Name: Long Term Monitoring	Laboratory: TestAmerica Laboratories, Inc., Savannah, GA	Event: KOMAN, Long Term Monitoring, Main Post Fall 2018
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:

Equipment:

Code	Matrix
WG	Ground Water

Code	Container/Preservative
2	[illegible]
9	[illegible]

Event: KOMAN, Long Term Monitoring, Main Post Fall 2018

	Sample ID	Matrix	Date	Time	Samp Init	Analytical Test Method: MADEPEP - EPH with PAHs	SW6010C FLDFLT - Fe Mn	SW6020A FLDFLT - As	Location ID	Sample Type	Depth (ft bgs) Top	Bottom	Comments	Cooler
						2	9	9						
1	69W-94-13_FAL18	WG	10/11/2018	1410	OJ	X	X	X	69W-94-13	N1	6.49	16.49		1
2	69W-94-14_FAL18	WG	10/11/2018			X	X	X	69W-94-14	N1	5.49	15.49		1
3	ZWM-95-16X_FAL18	WG	10/11/2018	0830	OJ	X	X	X	ZWM-95-16X	N1	5.87	15.87		1
4	ZWM-95-18X_FAL18 MS	WG	10/11/2018	0830	OJ	X	X	X	ZWM-95-18X	N1	5.22	15.22		1
5	ZWM-95-18X_FAL18 MSD	WG	10/11/2018	0830	OJ	X	X	X	ZWM-95-18X	MS1	5.22	15.22		1
6	ZWM-95-18X_FAL18	WG	10/11/2018	1045	OJ	X	X	X	ZWM-95-18X	SD1	5.22	15.22		1
7	69W-DUP1_FAL18	WG	10/11/2018			X	X	X	FIELDQC	FD1				1
8	ZWM-99-22X_FAL18	WG	10/11/2018			X	X	X	ZWM-99-22X	N1	4.63	14.63		1
		Turnaround Time:												

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
[signature]	10/9/18	1615	Bett [signature]	10/9/18	1615
Bett [signature]	10/10/18	1350	[signature]	[illegible]	[illegible]
			V.8 TA	10-11-18	920

1.8/2.0

Shipping Date / Carrier / Airbill Number

Received by Laboratory: (Signature, Date, Time) & condition

Page 1 of 1

CHAIN-OF-CUSTODY RECORD

KOMAN Government Services, LLC
Laura Ekes
293 Boston Post Road West, Suite 100, Marlborough, MA 01752
(508) 366 7442, lekes@komangs.com

COC # 201810A692

KGS

Project Name: Long Term Monitoring	Laboratory: TestAmerica Laboratories, Inc., Savannah, GA	Event: KOMAN, Long Term Monitoring, Main Post Fall 2018
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:

Equipment:

Code	Matrix
WG	Ground Water

Code	Container/Preservative
2	[illegible]
9	[illegible]

Analytical Test Method

	MADEPEP - EPH with PAHs	SW6010C/FLDFLT - Fe Mn	SW6010C/FLDFLT - Mn	SW6020A/FLDFLT - As
Event: KOMAN, Long Term Monitoring, Main Post Fall 2018	2	9	9	9

	Sample ID	Matrix	Date	Time	Samp Init					Location ID	Sample Type	Depth (ft bgs) Top	Depth (ft bgs) Bottom	Comments	Cooler
1	ZWM-99-23X_FAL18	WG	10/12/2018			X	X		X	ZWM-99-23X	N1	4.68	14.68		1
2	ZWM-99-24X_FAL18	WG	10/12/2018			X	X		X	ZWM-99-24X	N1	5.52	15.52		1
3	ZWM-01-25X_FAL18	WG	10/12/2018			X	X		X	ZWM-01-25X	N1	6.13	16.13		1
4	69WP-08-01_FAL18	WG	10/12/2018	1500	OJ		X		X	69WP-08-01	N1	10.00	13.00		1
5	69WP-13-01_FAL18	WG	10/12/2018	1450	OJ			X		69WP-13-01	N1	0.00	0.00		1
		Turnaround Time:													

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
[signature]	10/9/18	1615	[signature]	10/9/18	1615
[signature]	[illegible]	1350	[signature]	[illegible]	1356
[signature]	[illegible]	[illegible]	[signature]	10-11-18	920

1-8/20

Shipping Date / Carrier / Airbill Number

Received by Laboratory: (Signature, Date, Time) & condition

Page 1 of 1

Login Sample Receipt Checklist

Client: KOMAN Government Solutions, LLC

Job Number: 680-159120-1

Login Number: 159120
List Number: 1
Creator: Ragnaldsen, Amy E

List Source: 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.	True	
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.	N/A	
Residual Chlorine Checked.	N/A	

Accreditation/Certification Summary

Client: KOMAN Government Solutions, LLC
Project/Site: Fort Devens / LTM / AOC 69W

TestAmerica Job ID: 680-159120-1

Laboratory: TestAmerica Savannah

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
	AFCEE		SAVLAB	
Alabama	State Program	4	41450	06-30-19
Alaska	State Program	10		06-30-19
Alaska (UST)	State Program	10	UST-104	09-22-19
ANAB	DoD ELAP		L2463	09-22-19
ANAB	ISO/IEC 17025		L2463.01	09-22-19
Arizona	State Program	9	AZ0808	12-14-18
Arkansas DEQ	State Program	6	88-0692	02-01-19
California	State Program	9	2939	06-30-19
Colorado	State Program	8	N/A	12-31-18
Connecticut	State Program	1	PH-0161	03-31-19
Florida	NELAP	4	E87052	06-30-19
GA Dept. of Agriculture	State Program	4	N/A	06-12-19
Georgia	State Program	4	N/A	06-30-19
Guam	State Program	9	15-005r	04-17-19
Hawaii	State Program	9	N/A	06-30-19
Illinois	NELAP	5	200022	11-30-18
Indiana	State Program	5	N/A	06-30-19
Iowa	State Program	7	353	06-30-19
Kentucky (DW)	State Program	4	90084	12-31-18
Kentucky (UST)	State Program	4	18	06-30-19
Kentucky (WW)	State Program	4	90084	12-31-18 *
Louisiana	NELAP	6	30690	06-30-19
Louisiana (DW)	NELAP	6	LA160019	12-31-18
Maine	State Program	1	GA00006	09-25-20
Maryland	State Program	3	250	12-31-18
Massachusetts	State Program	1	M-GA006	06-30-19
Michigan	State Program	5	9925	03-05-19
Mississippi	State Program	4	N/A	06-30-19
Nebraska	State Program	7	TestAmerica-Savannah	06-30-19
New Jersey	NELAP	2	GA769	06-30-19
New Mexico	State Program	6	N/A	06-30-19
New York	NELAP	2	10842	03-31-19
North Carolina (DW)	State Program	4	13701	07-31-19
North Carolina (WW/SW)	State Program	4	269	12-31-18
Oklahoma	State Program	6	9984	08-31-19
Pennsylvania	NELAP	3	68-00474	06-30-19
Puerto Rico	State Program	2	GA00006	12-31-18
South Carolina	State Program	4	98001	06-30-18 *
Tennessee	State Program	4	TN02961	06-30-19
Texas	NELAP	6	T104704185-16-9	11-30-18
Texas (DW)	State Program	1	T104704185	06-30-19
US Fish & Wildlife	Federal		LE058448-0	07-31-19
Virginia	NELAP	3	460161	06-14-19
Washington	State Program	10	C805	06-10-19
West Virginia (DW)	State Program	3	9950C	12-31-18
West Virginia DEP	State Program	3	094	06-30-19
Wisconsin	State Program	5	999819810	08-31-19
Wyoming	State Program	8	8TMS-L	06-30-16 *

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

APPENDIX C
ANALYTICAL DATA VALIDATION REPORTS
(on CD)

C.1

Data Validation Reports
Spring 2018 LTM Event

Extractable Petroleum Hydrocarbons
MADEP Method EPH-04-1.1
USEPA Level 2B Review

Site: DCL Spring 2018 LTM	SDG #: 680-150816
Laboratory: Test America-Savannah, GA Subcontracted to Katahdin Analytical and reported in SDG SL2997	Date: 5/7/2018
KGS Reviewer: Laurie Ekes	Project: 1082-042

TAL Lab Sample ID	Katahdin Lab Sample ID	Client Sample ID	Collection Date	Analysis Method	Matrix
680-150816-1	SL2997-1	LFM-99-02B_SPR18	4/6/2018	EPH	Groundwater
680-150816-2	SL2997-2	LFM-99-05A_SPR18	4/5/2018	EPH	Groundwater
680-150816-3	SL2997-3	LFM-DUP01_SPR18	4/5/2018	EPH	Groundwater
680-150816-4	SL2997-4	LFM-99-06A RP_SPR18	4/5/2018	EPH	Groundwater
680-150816-5	SL2997-5	LFM-03-07_SPR18	4/6/2018	EPH	Groundwater

Summary – Data validation was performed on the data for four (4) groundwater samples and one (1) field duplicate sample collected and submitted for Extractable Petroleum Hydrocarbon (EPH) analyses by MADEP method EPH 04-1.1. Samples for EPH analysis were subcontracted by Test America to Katahdin Analytical Services in Scarborough, Maine and reported in SDG SL2997.

Narrative and Completeness Review – The case narrative and data package were checked for completeness. No discrepancies were noted.

Qualification: None required.

Sample Delivery and Condition – All samples arrived at the laboratory on 4/7/2018 in acceptable condition and temperature and were properly preserved. Proper custody was documented.

Qualification: None required.

Holding Times – All samples were analyzed within the 14-day holding time required for preserved aqueous samples.

Qualification: None required.

Initial and Continuing Calibration Verification (ICV and CCV) – The ICVs and CCVs reported with these samples exhibited acceptable percent differences (%D ≤25%) for all target EPH compounds.

Qualification: None required.

Surrogates – All surrogate recoveries were within the laboratory control limits.

Qualification: None required

Laboratory Control Sample – The LCS/LCSD pair prepared and analyzed with these samples met the laboratory %R and RPD control limits.

Qualification: None required.

MS/MSD – Matrix spike/matrix spike duplicate analyses were performed for all target EPHs on sample LFM-99-02B_SPR18 (Lab sample ID: SL2997-1). The %R and RPD results were within laboratory control limits for all EPH analytes.

Qualification: None required.

Method Blank – The method blank prepared and analyzed with these samples was non-detect for all target EPH compounds.

Qualification: None required.

Field Blanks – Field blank samples were not collected with this sample set.

Qualification: None required.

Field Duplicate – Sample LFM-DUP01_SPR18 (Lab sample ID: SL2997-3) was the field duplicate of sample LFM-99-05A_SPR18 (Lab sample ID: SL2997-2). Target EPH were non-detect in both samples.

Qualification: None required.

Compound Quantitation – Analyte non-detections were reported as "ND"; these results should be considered the equivalent of "PQL U." Analyte detections below the PQL were reported as J qualified results. These J qualifiers were retained unless superseded by a more severe qualifier.

Qualification: None required.

Qualification Summary Table - The EPH results are acceptable as reported and the data may be used for its intended purpose.

Lab Sample ID	Katahdin Lab Sample ID	Client Sample ID	Analysis	Lab Value (µg/L)	Lab Qualifier	Validated Value (µg/L)	Validation Qualifier
680-150816-1	SL2997-1	LFM-99-02B_SPR18	EPH	No qualification needed.			
680-150816-2	SL2997-2	LFM-99-05A_SPR18	EPH	No qualification needed.			
680-150816-3	SL2997-3	LFM-DUP01_SPR18	EPH	No qualification needed.			
680-150816-4	SL2997-4	LFM-99-06A RP_SPR18	EPH	No qualification needed.			
680-150816-5	SL2997-5	LFM-03-07_SPR18	EPH	No qualification needed.			

Wet Chemistry

Total Alkalinity (SM2320B), Chloride and Sulfate (SW9056A) Nitrate/Nitrite (E353.2), Total Cyanide (SW9012B), Total Dissolved Solids (TDS) (SM2540C) and Chemical Oxygen Demand (COD) (E410.4)

USEPA Level 2B Review

Site: Devens Consolidation Landfill (DCL) – Spring 2018	SDG #: 680-150816
Laboratory: Test America-Savannah, GA	Date: 5/3/2018
KGS Reviewer: Laurie Ekes	Project: 1082-042

Lab Sample ID	Client Sample ID	Collection Date	Analysis	Matrix
680-150816-1	LFM-99-02B_SPR18	4/6/2018	Miscellaneous Parameters	Groundwater
680-150816-2	LFM-99-05A_SPR18	4/5/2018	Miscellaneous Parameters	Groundwater
680-150816-3	LFM-DUP01_SPR18	4/5/2018	Miscellaneous Parameters	Groundwater
680-150816-4	LFM-99-06A RP_SPR18	4/5/2018	Miscellaneous Parameters	Groundwater
680-150816-5	LFM-03-07_SPR18	4/6/2018	Miscellaneous Parameters	Groundwater

Summary - Data validation was performed on the data for four (4) groundwater samples and one (1) field duplicate sample submitted for the miscellaneous wet chemistry analyses listed above. The samples submitted for alkalinity, TDS, nitrate/nitrite and COD analyses were shipped to Test America-Denver for analysis. The samples submitted for chloride, sulfate and total cyanide were analyzed at Test America-Savannah.

Narrative and Completeness Review – The case narrative and data package were checked for completeness. No discrepancies were noted.

Qualification: None required.

Sample Delivery and Condition – All samples arrived intact at the laboratory on 4/7/2018 in acceptable condition and temperature and were properly preserved. Proper custody was documented.

Qualification: None required.

Holding Times – All samples were analyzed within the respective holding times required for preserved aqueous samples.

Qualification: None required.

Method Blank – The method blanks prepared and analyzed with these samples were free from contamination for all parameters.

Qualification: None required.

Field Blanks – Field blank samples were not collected with these sample sets.

Qualification: None required.

Laboratory Control Sample – The LCS and/or LCSD %R results reported for all parameters were

within control limits.

Qualification: None required.

MS/MSD – Sample LFM-99-02B_SPR18 (Lab Sample ID: 680-150816-1) was spiked and analyzed as matrix spike/matrix spike duplicate samples for nitrate/nitrite, cyanide, COD, chloride and sulfate. The %R for COD from the MSD was below control limits; the MS %R and RPD were within control limits. The %Rs and RPD results for all other parameters were within the laboratory control limits for all spiked analytes.

Qualification: None required.

Field Duplicate – Sample LFM-DUP-1_SPR18 (Lab sample ID: 680-150816-3) was a field duplicate of sample LFM-99-05A_SPR18 (Lab sample ID: 680-150816-2). The results for COD were non-detect in both samples. Detected results for nitrate/nitrite, chloride, sulfate, alkalinity and TDS were comparable with %RPDs less than 10%. The %RPD for the cyanide results was 46%. The FD results are summarized below.

Lab Sample ID	680-150816-2	680-150816-3	
Client Sample ID	LFM-99-05A_SPR18	LFM-DUP01_SPR18	
Collection Date	4/5/2018	4/5/2018	
Analyte	Result (mg/L)	Result (mg/L)	RPD (%)
Nitrate/Nitrite-N	1.3	1.3	0
Cyanide, Total	0.0032 J	0.020	46
Chloride	160	160	0
Sulfate	19	19	0
Alkalinity	79	86	8.5
TDS	380	390	2.6

Qualification: The results for cyanide in the FD sample pair were qualified as estimated (J).

Compound Quantitation – The results for chloride were reported from dilutions due to high levels detected in the samples. Analyte non-detections were reported as "ND"; these results should be considered the equivalent of "LOD U." Analyte detections below the LOQ were reported as J-qualified results. These J qualifiers were retained unless superseded by a more severe qualifier.

Qualification: None required.

Qualification Summary Table: The results for the miscellaneous parameters reported in this are acceptable with the noted qualifications. The data may be used for its intended purpose.

Lab Sample ID	Client Sample ID	Analysis	Lab Value (mg/L)	Lab Qualifier	Validated Value (mg/L)	Validation Qualifier
680-150816-1	LFM-99-02B_SPR18	Miscellaneous Parameters	No qualifications needed.			
680-150816-2	LFM-99-05A_SPR18	Cyanide	0.0032	J	0.0032	J
680-150816-3	LFM-DUP01_SPR18	Cyanide	0.020		0.020	J
680-150816-4	LFM-99-06A RP_SPR18	Miscellaneous Parameters	No qualifications needed.			
680-150816-5	LFM-03-07_SPR18	Miscellaneous Parameters	No qualifications needed.			

Pesticides
SW846/8081B
USEPA Level 2B Review

Site: Devens Consolidation Landfill (DCL) – Spring 2018	SDG #: 680-150816
Laboratory: Test America-Savannah, GA	Date: 5/3/2018
KGS Reviewer: Laurie Ekes	Project: 1082-042

Lab Sample ID	Client Sample ID	Collection Date	Analysis	Matrix
680-150816-1	LFM-99-02B_SPR18	4/6/2018	SW8081/Pesticides	Groundwater
680-150816-2	LFM-99-05A_SPR18	4/5/2018	SW8081/Pesticides	Groundwater
680-150816-3	LFM-DUP01_SPR18	4/5/2018	SW8081/Pesticides	Groundwater
680-150816-4	LFM-99-06A RP_SPR18	4/5/2018	SW8081/Pesticides	Groundwater
680-150816-5	LFM-03-07_SPR18	4/6/2018	SW8081/Pesticides	Groundwater

Summary - Data validation was performed on the data for four (4) groundwater samples and one (1) field duplicate sample collected from DCL and submitted for Pesticide analyses by EPA method SW846/8081B. All sample results in this SDG were subjected to Level 2B data validation, which includes evaluation of preparatory batch and instrument-related QC results.

Narrative and Completeness Review – The case narrative and data package were checked for completeness. No discrepancies were noted.

Qualification: None required.

Sample Delivery and Condition – All samples arrived at the laboratory on 4/7/2018 in acceptable condition and temperature and were properly preserved. Proper custody was documented.

Qualification: None required.

Holding Times – Sample LFM-99-02B_SPR18 (Lab Sample ID: 680-150816-1) was re-extracted outside the 7-day holding time for extraction due to a low surrogate percent recovery. All other samples were prepared within the required extraction and analysis holding times for aqueous samples.

Qualification: The re-extracted/re-analyzed pesticide results for sample LFM-99-02B_SPR18 (Lab Sample ID: 680-150816-1) were reported as qualified non-detects (UJ).

Initial and Continuing Calibration Verification (ICV and CCV) – The ICVs and CCVs reported with these samples exhibited acceptable percent differences (%D $\leq$20%) for all target pesticide compounds.

Qualification: None required.

Surrogate Recoveries – The surrogate recoveries (%Rs) from the initial analysis of sample LFM-99-02B_SPR18 (Lab Sample ID: 680-150816-1) were below control limits. The sample was re-extracted outside the 7-day extraction holding time and re-analyzed with acceptable surrogate %Rs. The re-extracted/re-analyzed sample results were reported. Surrogate recoveries were within the control limits for all other samples.

Qualification: The re-extracted/re-analyzed results for sample LFM-99-02B_SPR18 (Lab Sample ID: 680-150816-1) were reported as qualified non-detects (UJ).

Laboratory Control Sample – The LCS/LCSD samples prepared and analyzed with these samples met the %R and RPD control limits for all pesticide compounds.

Qualification: None required.

MS/MSD – Sample LFM-99-02B_SPR18 (Lab Sample ID: 680-150816-1) was spiked and analyzed as matrix spike/matrix spike duplicate samples. The %R and RPDs were within the laboratory control limits for all target pesticide compounds.

Qualification: None required.

Method Blank – The method blanks prepared and analyzed for pesticides with these samples on 4/11, 4/12 and 4/17/2018 were non-detect for all pesticide compounds.

Qualification: None required.

Field Blanks – Field blank samples were not collected with this sample set.

Qualification: None required.

Field Duplicate – Sample LFM-DUP1_SPR18 (Lab Sample ID: 680-150816-3) was the field duplicate sample of LFM-99-05A_SPR18 (Lab Sample ID: 680-150816-2). Pesticide compounds were non-detect in both samples.

Qualification: None required.

Compound Quantitation – Analyte non-detections were reported as "ND"; these results should be considered the equivalent of "LOD U." Analyte detections below the LOD were reported as J qualified results. These J qualifiers were retained unless superseded by a more severe qualifier.

Qualification: None required.

Qualification Summary Table - The Pesticide results reported in this SDG are acceptable with the noted qualifications and may be used for their intended purpose.

Lab Sample ID	Client Sample ID	Analysis	Lab Value (µg/L)	Lab Qualifier	Validated Value (µg/L)	Validation Qualifier
680-150816-1	LFM-99-02B_SPR18	Pesticides	All Pesticides	UH	All Pesticides	UJ
680-150816-2	LFM-99-05A_SPR18	Pesticides	No qualifications needed.			
680-150816-3	LFM-DUP01_SPR18	Pesticides	No qualifications needed.			
680-150816-4	LFM-99-06A RP_SPR18	Pesticides	No qualifications needed.			
680-150816-5	LFM-03-07_SPR18	Pesticides	No qualifications needed.			

Total Metals
SW 846/6010C/6020A/7470A
USEPA Level 2B Review

Site: Devens Consolidation Landfill (DCL) – Spring 2018	SDG #: 680-150816
Laboratory: Test America-Savannah, GA	Date: 5/3/2018
KGS Reviewer: Laurie Ekes	Project: 1082-042

Lab Sample ID	Client Sample ID	Collection Date	Analysis	Matrix
680-150816-1	LFM-99-02B_SPR18	4/6/2018	Select Metals	Groundwater
680-150816-2	LFM-99-05A_SPR18	4/5/2018	Select Metals	Groundwater
680-150816-3	LFM-DUP01_SPR18	4/5/2018	Select Metals	Groundwater
680-150816-4	LFM-99-06A RP_SPR18	4/5/2018	Select Metals	Groundwater
680-150816-5	LFM-03-07_SPR18	4/6/2018	Select Metals	Groundwater

Summary – Data validation was performed on the data for four (4) groundwater samples and one (1) field duplicate sample collected and submitted for total metals analyses. Samples were analyzed and reported for the following select analytes: arsenic by method SW6020A, barium, cadmium, chromium, copper, iron, lead, manganese, selenium and silver by method SW6010C and mercury by method SW7470A. All sample results in this SDG were subjected to Level 2B data validation, which includes evaluation of preparatory batch and instrument-related QC results.

Narrative and Completeness Review – The case narrative and data package were checked for completeness. No discrepancies were noted.

Qualification: None required.

Sample Delivery and Condition – All samples arrived at the laboratory on 4/7/2018 in acceptable condition and temperature and were properly preserved. Proper custody was documented.

Qualification: None required.

Holding Times – All samples were prepared and analyzed within the 6-month holding time required for preserved aqueous samples.

Qualification: None required.

Initial and Continuing Calibration Verification (ICV and CCV) – The ICVs and CCVs reported with these samples on 4/11 and 4/12/2018 were analyzed at the required frequencies and exhibited acceptable percent recoveries (%R ±10%) for all target analytes.

Qualification: None required.

Initial and Continuing Calibration Blanks (ICB and CCB) – The ICBs and CCBs reported with these samples were free of contamination.

Qualification: None required.

Laboratory Control Sample – The LCS recoveries (%R) for all target analytes met the laboratory %R control limits.

Qualification: None required.

MS/MSD – Sample LFM-99-02B_SPR18 (Lab Sample ID: 680-150816-1) was spiked and analyzed as matrix spike/matrix spike duplicate samples. The %Rs for barium from the MS and MSD samples were just below the laboratory control limit; the LCS %Rs were within control limits. The %Rs for all other analytes and the RPDs for all the spiked analytes were within laboratory control limits.

Qualification: None required.

Method Blank – The method blanks prepared and analyzed with these samples were non-detect for all target analytes.

Qualification: None required.

Field Blank – Field blank samples were not collected with this sample set.

Qualification: None required.

Field Duplicate – Sample LFM-DUP01_SPR18 (Lab sample ID: 680-150816-3) was the field duplicate of sample LFM-99-05A_SPR18 (Lab sample ID: 680-150816-2). The results for cadmium, chromium, copper, lead, selenium, silver, arsenic and mercury were non-detect (ND) in both samples. Iron and manganese were detected at estimated levels in the native sample but were non-detect in the FD sample. RPDs could not be calculated for these analytes. The FD sample results are summarized in the table below.

Lab Sample ID	680-150816-2	680-150816-3	
Client Sample ID	LFM-99-05A_SPR18	LFM-DUP01_SPR18	
Collection Date	4/5/2018	4/5/2018	
Analyte	Result (µg/L)	Result (µg/L)	RPD (%)
Barium	10	11	9.5
Iron	25 J	50 U	--
Manganese	2.2 J	3.0 U	--

Qualification: None required.

Compound Quantitation – Analyte non-detections were reported as "ND"; these results should be considered the equivalent of "LOD U." Analyte detections below the LOQ were reported as J- qualified results. These J qualifiers were retained unless superseded by a more severe qualifier.

Qualification: None required.

Qualification Summary Table - The results for select total metals reported in this SDG are acceptable with the noted qualifications. The data may be used for its intended purpose.

Lab Sample ID	Client Sample ID	Analysis	Lab Value (µg/L)	Lab Qualifier	Validated Value (µg/L)	Validation Qualifier
680-150816-1	LFM-99-02B_SPR18	Select Metals	No qualifications needed.			
680-150816-2	LFM-99-05A_SPR18	Select Metals	No qualifications needed.			
680-150816-3	LFM-DUP01_SPR18	Select Metals	No qualifications needed.			
680-150816-4	LFM-99-06A RP_SPR18	Select Metals	No qualifications needed.			
680-150816-5	LFM-03-07_SPR18	Select Metals	No qualifications needed.			

Volatile Petroleum Hydrocarbons
MADEP Method VPH-04-1.1
USEPA Level 2B Review

Site: DCL Spring 2018 LTM	SDG #: 680-150816
Laboratory: Test America-Savannah, GA Subcontracted to Katahdin Analytical and reported in SDG SL2997	Date: 5/7/2018
KGS Reviewer: Laurie Ekes	Project: 1082-042

TAL Lab Sample ID	Katahdin Lab Sample ID	Client Sample ID	Collection Date	Analysis Method	Matrix
680-150816-1	SL2997-1	LFM-99-02B_SPR18	4/6/2018	VPH	Groundwater
680-150816-2	SL2997-2	LFM-99-05A_SPR18	4/5/2018	VPH	Groundwater
680-150816-3	SL2997-3	LFM-DUP01_SPR18	4/5/2018	VPH	Groundwater
680-150816-4	SL2997-4	LFM-99-06A RP_SPR18	4/5/2018	VPH	Groundwater
680-150816-5	SL2997-5	LFM-03-07_SPR18	4/6/2018	VPH	Groundwater
680-150816-6	SL2997-6	TRIPBLANK1_040518	4/5/2018	VPH	Trip Blank

Summary – Data validation was performed on the data for four (4) groundwater samples, one (1) field duplicate sample and one (1) trip blank sample submitted for Volatile Petroleum Hydrocarbon (VPH) analyses by MADEP method VPH 04-1.1. Samples for VPH analysis were subcontracted by Test America to Katahdin Analytical Services in Scarborough, Maine and reported in SDG SL2997.

Narrative and Completeness Review – The case narrative and data package were checked for completeness. No discrepancies were noted.

Qualification: None required.

Sample Delivery and Condition – All samples arrived at the laboratory on 4/7/2018 in acceptable condition and temperature and were properly preserved. Proper custody was documented.

Qualification: None required.

Holding Times – All samples were analyzed within the 14-day holding time required for preserved aqueous samples.

Qualification: None required.

Initial and Continuing Calibration Verification (ICV and CCV) – The ICVs and CCVs reported with these samples exhibited acceptable percent differences (%D ≤25%) for all target VPH compounds.

Qualification: None required.

Surrogates – All surrogate recoveries were within the laboratory control limits.

Qualification: None required

Laboratory Control Sample – The LCS/LCSD pair prepared and analyzed with these samples met the laboratory %R and RPD control limits.

Qualification: None required.

MS/MSD – Matrix spike/matrix spike duplicate analyses were performed for all target VPHs on sample LFM-99-02B_SPR18 (Lab sample ID: SL2997-1). The %R and RPD results were within laboratory control limits for all analytes. The %R for naphthalene from the MSD was above control limits; naphthalene was non-detect in all samples.

Qualification: None required.

Method Blank – The method blank prepared and analyzed with these samples was non-detect for all target VPH compounds.

Qualification: None required.

Trip Blanks – One trip blank sample TRIPBLANK1_040518 (Lab Sample ID: SL2997-6) was submitted with these samples. The TB sample was non-detect for all target VPH.

Qualification: None required.

Field Blanks – Field blank samples were not collected with this sample set.

Qualification: None required.

Field Duplicate – Sample LFM-DUP01_SPR18 (Lab sample ID: SL2997-3) was the field duplicate of sample LFM-99-05A_SPR18 (Lab sample ID: SL2997-2). Target VPH were non-detect in both samples.

Qualification: None required.

Compound Quantitation – Analyte non-detections were reported as "ND"; these results should be considered the equivalent of "PQL U." Analyte detections below the PQL were reported as J qualified results. These J qualifiers were retained unless superseded by a more severe qualifier.

Qualification: None required.

Qualification Summary Table - The VPH results are acceptable as reported and the data may be used for its intended purpose.

Lab Sample ID	Katahdin Lab Sample ID	Client Sample ID	Analysis	Lab Value (µg/L)	Lab Qualifier	Validated Value (µg/L)	Validation Qualifier
680-150816-1	SL2997-1	LFM-99-02B_SPR18	VPH	No qualification needed.			
680-150816-2	SL2997-2	LFM-99-05A_SPR18	VPH	No qualification needed.			
680-150816-3	SL2997-3	LFM-DUP01_SPR18	VPH	No qualification needed.			
680-150816-4	SL2997-4	LFM-99-06A RP_SPR18	VPH	No qualification needed.			
680-150816-5	SL2997-5	LFM-03-07_SPR18	VPH	No qualification needed.			
680-150816-6	SL2997-6	TRIPBLANK1_040518	VPH	No qualification needed.			

DCL Spring 2018 LTM Validated Data

Lab Sample ID	Client Sample ID	Collection Date	Method	Prep Type	Analyte	Result	Unit	Flag	LOQ	LOD	DL	Katahdin Lab ID
680-150816-5	LFM-03-07_SPR18	4/6/2018	353.2	Total/NA	Nitrate/Nitrite-N	1.8	mg/L		0.1	0.05	0.019	
680-150816-5	LFM-03-07_SPR18	4/6/2018	410.4	Total/NA	Chemical Oxygen Demand	5	mg/L	J	20	10	4.1	
680-150816-5	LFM-03-07_SPR18	4/6/2018	6010C	Total/NA	Barium	11	ug/L		10	5	1.7	
680-150816-5	LFM-03-07_SPR18	4/6/2018	6010C	Total/NA	Cadmium	3	ug/L	U	5	3	1	
680-150816-5	LFM-03-07_SPR18	4/6/2018	6010C	Total/NA	Chromium	4	ug/L	U	10	4	1.6	
680-150816-5	LFM-03-07_SPR18	4/6/2018	6010C	Total/NA	Copper	5	ug/L	U	20	5	1.8	
680-150816-5	LFM-03-07_SPR18	4/6/2018	6010C	Total/NA	Iron	50	ug/L	U	50	50	17	
680-150816-5	LFM-03-07_SPR18	4/6/2018	6010C	Total/NA	Lead	10	ug/L	U	10	10	3.9	
680-150816-5	LFM-03-07_SPR18	4/6/2018	6010C	Total/NA	Manganese	3	ug/L	U	10	3	1	
680-150816-5	LFM-03-07_SPR18	4/6/2018	6010C	Total/NA	Selenium	20	ug/L	U	20	20	9.9	
680-150816-5	LFM-03-07_SPR18	4/6/2018	6010C	Total/NA	Silver	1.5	ug/L	U	10	1.5	0.6	
680-150816-5	LFM-03-07_SPR18	4/6/2018	6020A	Total/NA	Arsenic	3	ug/L	U	3	3	1.5	
680-150816-5	LFM-03-07_SPR18	4/6/2018	7470A	Total/NA	Mercury	0.2	ug/L	U	0.2	0.2	0.08	
680-150816-5	LFM-03-07_SPR18	4/6/2018	8081B 8082A	Total/NA	4,4'-DDD	0.011	ug/L	U	0.053	0.011	0.0067	
680-150816-5	LFM-03-07_SPR18	4/6/2018	8081B 8082A	Total/NA	4,4'-DDE	0.011	ug/L	U	0.053	0.011	0.0054	
680-150816-5	LFM-03-07_SPR18	4/6/2018	8081B 8082A	Total/NA	4,4'-DDT	0.019	ug/L	U	0.053	0.019	0.0074	
680-150816-5	LFM-03-07_SPR18	4/6/2018	8081B 8082A	Total/NA	Aldrin	0.019	ug/L	U	0.053	0.019	0.0076	
680-150816-5	LFM-03-07_SPR18	4/6/2018	8081B 8082A	Total/NA	alpha-BHC	0.011	ug/L	U	0.053	0.011	0.0036	
680-150816-5	LFM-03-07_SPR18	4/6/2018	8081B 8082A	Total/NA	beta-BHC	0.019	ug/L	U	0.053	0.019	0.0097	
680-150816-5	LFM-03-07_SPR18	4/6/2018	8081B 8082A	Total/NA	Chlordane (technical)	0.32	ug/L	U	0.53	0.32	0.1	
680-150816-5	LFM-03-07_SPR18	4/6/2018	8081B 8082A	Total/NA	delta-BHC	0.019	ug/L	U	0.053	0.019	0.008	
680-150816-5	LFM-03-07_SPR18	4/6/2018	8081B 8082A	Total/NA	Dieldrin	0.011	ug/L	U	0.053	0.011	0.004	
680-150816-5	LFM-03-07_SPR18	4/6/2018	8081B 8082A	Total/NA	Endosulfan I	0.011	ug/L	U	0.053	0.011	0.0037	
680-150816-5	LFM-03-07_SPR18	4/6/2018	8081B 8082A	Total/NA	Endosulfan II	0.011	ug/L	U	0.053	0.011	0.0045	
680-150816-5	LFM-03-07_SPR18	4/6/2018	8081B 8082A	Total/NA	Endosulfan sulfate	0.011	ug/L	U	0.053	0.011	0.0054	
680-150816-5	LFM-03-07_SPR18	4/6/2018	8081B 8082A	Total/NA	Endrin	0.011	ug/L	U	0.053	0.011	0.0056	
680-150816-5	LFM-03-07_SPR18	4/6/2018	8081B 8082A	Total/NA	Endrin aldehyde	0.011	ug/L	U	0.053	0.011	0.0065	
680-150816-5	LFM-03-07_SPR18	4/6/2018	8081B 8082A	Total/NA	Endrin ketone	0.011	ug/L	U	0.053	0.011	0.0049	
680-150816-5	LFM-03-07_SPR18	4/6/2018	8081B 8082A	Total/NA	gamma-BHC (Lindane)	0.011	ug/L	U	0.053	0.011	0.0038	
680-150816-5	LFM-03-07_SPR18	4/6/2018	8081B 8082A	Total/NA	Heptachlor	0.019	ug/L	U	0.053	0.019	0.0075	
680-150816-5	LFM-03-07_SPR18	4/6/2018	8081B 8082A	Total/NA	Heptachlor epoxide	0.011	ug/L	U	0.053	0.011	0.0039	
680-150816-5	LFM-03-07_SPR18	4/6/2018	8081B 8082A	Total/NA	Methoxychlor	0.019	ug/L	U	0.053	0.019	0.01	
680-150816-5	LFM-03-07_SPR18	4/6/2018	8081B 8082A	Total/NA	Toxaphene	0.85	ug/L	U	5.3	0.85	0.42	
680-150816-5	LFM-03-07_SPR18	4/6/2018	9012B	Total/NA	Cyanide, Total	0.0048	mg/L	J	0.01	0.005	0.0025	
680-150816-5	LFM-03-07_SPR18	4/6/2018	9056A	Total/NA	Chloride	220	mg/L		5	5	2	
680-150816-5	LFM-03-07_SPR18	4/6/2018	9056A	Total/NA	Sulfate	28	mg/L		1	1	0.4	
680-150816-5	LFM-03-07_SPR18	4/6/2018	MADEPEPH	T	2-METHYLNAPHTHALENE	1.9	ug/L	U	1.9		0.76	SL2997-5
680-150816-5	LFM-03-07_SPR18	4/6/2018	MADEPEPH	T	ACENAPHTHENE	1.9	ug/L	U	1.9		1.7	SL2997-5
680-150816-5	LFM-03-07_SPR18	4/6/2018	MADEPEPH	T	ACENAPHTHYLENE	1.9	ug/L	U	1.9		0.76	SL2997-5
680-150816-5	LFM-03-07_SPR18	4/6/2018	MADEPEPH	T	ANTHRACENE	1.9	ug/L	U	1.9		1.3	SL2997-5
680-150816-5	LFM-03-07_SPR18	4/6/2018	MADEPEPH	T	BENZO(A)ANTHRACENE	1.9	ug/L	U	1.9		1.3	SL2997-5
680-150816-5	LFM-03-07_SPR18	4/6/2018	MADEPEPH	T	BENZO(A)PYRENE	1.9	ug/L	U	1.9		1.2	SL2997-5
680-150816-5	LFM-03-07_SPR18	4/6/2018	MADEPEPH	T	BENZO(B)FLUORANTHENE	1.9	ug/L	U	1.9		0.76	SL2997-5
680-150816-5	LFM-03-07_SPR18	4/6/2018	MADEPEPH	T	BENZO(K)FLUORANTHENE	1.9	ug/L	U	1.9		0.95	SL2997-5
680-150816-5	LFM-03-07_SPR18	4/6/2018	MADEPEPH	T	BENZO[G,H,I]PERYLENE	1.9	ug/L	U	1.9		1.2	SL2997-5

DCL Spring 2018 LTM Validated Data

Lab Sample ID	Client Sample ID	Collection Date	Method	Prep Type	Analyte	Result	Unit	Flag	LOQ	LOD	DL	Katahdin Lab ID
680-150816-5	LFM-03-07_SPR18	4/6/2018	MADEPEPH	T	C11-C22 AROMATICS	95	ug/L	U	95		48	SL2997-5
680-150816-5	LFM-03-07_SPR18	4/6/2018	MADEPEPH	T	C19-C36 ALIPHATICS	95	ug/L	U	95		48	SL2997-5
680-150816-5	LFM-03-07_SPR18	4/6/2018	MADEPEPH	T	C9-C18 ALIPHATICS	95	ug/L	U	95		48	SL2997-5
680-150816-5	LFM-03-07_SPR18	4/6/2018	MADEPEPH	T	CHRYSENE	1.9	ug/L	U	1.9		0.86	SL2997-5
680-150816-5	LFM-03-07_SPR18	4/6/2018	MADEPEPH	T	DIBENZO(A,H)ANTHRACEN	1.9	ug/L	U	1.9		1.1	SL2997-5
680-150816-5	LFM-03-07_SPR18	4/6/2018	MADEPEPH	T	FLUORANTHENE	1.9	ug/L	U	1.9		0.76	SL2997-5
680-150816-5	LFM-03-07_SPR18	4/6/2018	MADEPEPH	T	FLUORENE	1.9	ug/L	U	1.9		0.86	SL2997-5
680-150816-5	LFM-03-07_SPR18	4/6/2018	MADEPEPH	T	INDENO(1,2,3-CD)PYRENE	1.9	ug/L	U	1.9		1.3	SL2997-5
680-150816-5	LFM-03-07_SPR18	4/6/2018	MADEPEPH	T	NAPHTHALENE	1.9	ug/L	U	1.9		0.86	SL2997-5
680-150816-5	LFM-03-07_SPR18	4/6/2018	MADEPEPH	T	PHENANTHRENE	1.9	ug/L	U	1.9		0.86	SL2997-5
680-150816-5	LFM-03-07_SPR18	4/6/2018	MADEPEPH	T	PYRENE	1.9	ug/L	U	1.9		1	SL2997-5
680-150816-5	LFM-03-07_SPR18	4/6/2018	MADEPVPH	T	BENZENE	3	ug/L	U	3		0.31	SL2997-5
680-150816-5	LFM-03-07_SPR18	4/6/2018	MADEPVPH	T	C5-C8 ALIPHATICS	100	ug/L	U	100		50	SL2997-5
680-150816-5	LFM-03-07_SPR18	4/6/2018	MADEPVPH	T	C9-C10 AROMATICS	100	ug/L	U	100		50	SL2997-5
680-150816-5	LFM-03-07_SPR18	4/6/2018	MADEPVPH	T	C9-C12 ALIPHATICS	100	ug/L	U	100		50	SL2997-5
680-150816-5	LFM-03-07_SPR18	4/6/2018	MADEPVPH	T	ETHYLBENZENE	5	ug/L	U	5		0.42	SL2997-5
680-150816-5	LFM-03-07_SPR18	4/6/2018	MADEPVPH	T	M-,P-XYLENE	10	ug/L	U	10		0.92	SL2997-5
680-150816-5	LFM-03-07_SPR18	4/6/2018	MADEPVPH	T	METHYL TERT-BUTYL ETH	5	ug/L	U	5		0.31	SL2997-5
680-150816-5	LFM-03-07_SPR18	4/6/2018	MADEPVPH	T	NAPHTHALENE	5	ug/L	U	5		1.6	SL2997-5
680-150816-5	LFM-03-07_SPR18	4/6/2018	MADEPVPH	T	O-XYLENE	5	ug/L	U	5		0.47	SL2997-5
680-150816-5	LFM-03-07_SPR18	4/6/2018	MADEPVPH	T	TOLUENE	5	ug/L	U	5		0.34	SL2997-5
680-150816-5	LFM-03-07_SPR18	4/6/2018	SM 2320B	Total/NA	Alkalinity	76	mg/L		5	3.2	1.1	
680-150816-5	LFM-03-07_SPR18	4/6/2018	SM 2540C	Total/NA	Total Dissolved Solids (TDS)	480	mg/L		10	10	4.7	
680-150816-1	LFM-99-02B_SPR18	4/6/2018	353.2	Total/NA	Nitrate/Nitrite-N	0.6	mg/L		0.1	0.05	0.019	
680-150816-1	LFM-99-02B_SPR18	4/6/2018	410.4	Total/NA	Chemical Oxygen Demand	10	mg/L	J	20	10	4.1	
680-150816-1	LFM-99-02B_SPR18	4/6/2018	6010C	Total/NA	Barium	22	ug/L		10	5	1.7	
680-150816-1	LFM-99-02B_SPR18	4/6/2018	6010C	Total/NA	Cadmium	3	ug/L	U	5	3	1	
680-150816-1	LFM-99-02B_SPR18	4/6/2018	6010C	Total/NA	Chromium	4	ug/L	U	10	4	1.6	
680-150816-1	LFM-99-02B_SPR18	4/6/2018	6010C	Total/NA	Copper	5	ug/L	U	20	5	1.8	
680-150816-1	LFM-99-02B_SPR18	4/6/2018	6010C	Total/NA	Iron	50	ug/L	U	50	50	17	
680-150816-1	LFM-99-02B_SPR18	4/6/2018	6010C	Total/NA	Lead	10	ug/L	U	10	10	3.9	
680-150816-1	LFM-99-02B_SPR18	4/6/2018	6010C	Total/NA	Manganese	3	ug/L	U	10	3	1	
680-150816-1	LFM-99-02B_SPR18	4/6/2018	6010C	Total/NA	Selenium	20	ug/L	U	20	20	9.9	
680-150816-1	LFM-99-02B_SPR18	4/6/2018	6010C	Total/NA	Silver	1.5	ug/L	U	10	1.5	0.6	
680-150816-1	LFM-99-02B_SPR18	4/6/2018	6020A	Total/NA	Arsenic	3	ug/L	U	3	3	1.5	
680-150816-1	LFM-99-02B_SPR18	4/6/2018	7470A	Total/NA	Mercury	0.2	ug/L	U	0.2	0.2	0.08	
680-150816-1	LFM-99-02B_SPR18	4/6/2018	8081B 8082A	Total/NA	4,4'-DDD	0.011	ug/L	UJ	0.053	0.011	0.0067	
680-150816-1	LFM-99-02B_SPR18	4/6/2018	8081B 8082A	Total/NA	4,4'-DDE	0.011	ug/L	UJ	0.053	0.011	0.0054	
680-150816-1	LFM-99-02B_SPR18	4/6/2018	8081B 8082A	Total/NA	4,4'-DDT	0.019	ug/L	UJ	0.053	0.019	0.0075	
680-150816-1	LFM-99-02B_SPR18	4/6/2018	8081B 8082A	Total/NA	Aldrin	0.019	ug/L	UJ	0.053	0.019	0.0077	
680-150816-1	LFM-99-02B_SPR18	4/6/2018	8081B 8082A	Total/NA	alpha-BHC	0.011	ug/L	UJ	0.053	0.011	0.0036	
680-150816-1	LFM-99-02B_SPR18	4/6/2018	8081B 8082A	Total/NA	beta-BHC	0.019	ug/L	UJ	0.053	0.019	0.0097	
680-150816-1	LFM-99-02B_SPR18	4/6/2018	8081B 8082A	Total/NA	Chlordane (technical)	0.32	ug/L	UJ	0.53	0.32	0.1	
680-150816-1	LFM-99-02B_SPR18	4/6/2018	8081B 8082A	Total/NA	delta-BHC	0.019	ug/L	UJ	0.053	0.019	0.008	
680-150816-1	LFM-99-02B_SPR18	4/6/2018	8081B 8082A	Total/NA	Dieldrin	0.011	ug/L	UJ	0.053	0.011	0.0041	

DCL Spring 2018 LTM Validated Data

Lab Sample ID	Client Sample ID	Collection Date	Method	Prep Type	Analyte	Result	Unit	Flag	LOQ	LOD	DL	Katahdin Lab ID
680-150816-1	LFM-99-02B_SPR18	4/6/2018	8081B 8082A	Total/NA	Endosulfan I	0.011	ug/L	UJ	0.053	0.011	0.0037	
680-150816-1	LFM-99-02B_SPR18	4/6/2018	8081B 8082A	Total/NA	Endosulfan II	0.011	ug/L	UJ	0.053	0.011	0.0045	
680-150816-1	LFM-99-02B_SPR18	4/6/2018	8081B 8082A	Total/NA	Endosulfan sulfate	0.011	ug/L	UJ	0.053	0.011	0.0054	
680-150816-1	LFM-99-02B_SPR18	4/6/2018	8081B 8082A	Total/NA	Endrin	0.011	ug/L	UJ	0.053	0.011	0.0057	
680-150816-1	LFM-99-02B_SPR18	4/6/2018	8081B 8082A	Total/NA	Endrin aldehyde	0.011	ug/L	UJ	0.053	0.011	0.0065	
680-150816-1	LFM-99-02B_SPR18	4/6/2018	8081B 8082A	Total/NA	Endrin ketone	0.011	ug/L	UJ	0.053	0.011	0.0049	
680-150816-1	LFM-99-02B_SPR18	4/6/2018	8081B 8082A	Total/NA	gamma-BHC (Lindane)	0.011	ug/L	UJ	0.053	0.011	0.0038	
680-150816-1	LFM-99-02B_SPR18	4/6/2018	8081B 8082A	Total/NA	Heptachlor	0.019	ug/L	UJ	0.053	0.019	0.0076	
680-150816-1	LFM-99-02B_SPR18	4/6/2018	8081B 8082A	Total/NA	Heptachlor epoxide	0.011	ug/L	UJ	0.053	0.011	0.0039	
680-150816-1	LFM-99-02B_SPR18	4/6/2018	8081B 8082A	Total/NA	Methoxychlor	0.019	ug/L	UJ	0.053	0.019	0.01	
680-150816-1	LFM-99-02B_SPR18	4/6/2018	8081B 8082A	Total/NA	Toxaphene	0.85	ug/L	UJ	5.3	0.85	0.43	
680-150816-1	LFM-99-02B_SPR18	4/6/2018	9012B	Total/NA	Cyanide, Total	0.0048	mg/L	J	0.01	0.005	0.0025	
680-150816-1	LFM-99-02B_SPR18	4/6/2018	9056A	Total/NA	Chloride	350	mg/L		5	5	2	
680-150816-1	LFM-99-02B_SPR18	4/6/2018	9056A	Total/NA	Sulfate	20	mg/L		1	1	0.4	
680-150816-1	LFM-99-02B_SPR18	4/6/2018	MADEPEPH	T	2-METHYLNAPHTHALENE	2	ug/L	U	2		0.79	SL2997-1
680-150816-1	LFM-99-02B_SPR18	4/6/2018	MADEPEPH	T	ACENAPHTHENE	2	ug/L	U	2		1.8	SL2997-1
680-150816-1	LFM-99-02B_SPR18	4/6/2018	MADEPEPH	T	ACENAPHTHYLENE	2	ug/L	U	2		0.79	SL2997-1
680-150816-1	LFM-99-02B_SPR18	4/6/2018	MADEPEPH	T	ANTHRACENE	2	ug/L	U	2		1.4	SL2997-1
680-150816-1	LFM-99-02B_SPR18	4/6/2018	MADEPEPH	T	BENZO(A)ANTHRACENE	2	ug/L	U	2		1.4	SL2997-1
680-150816-1	LFM-99-02B_SPR18	4/6/2018	MADEPEPH	T	BENZO(A)PYRENE	2	ug/L	U	2		1.3	SL2997-1
680-150816-1	LFM-99-02B_SPR18	4/6/2018	MADEPEPH	T	BENZO(B)FLUORANTHENE	2	ug/L	U	2		0.79	SL2997-1
680-150816-1	LFM-99-02B_SPR18	4/6/2018	MADEPEPH	T	BENZO(K)FLUORANTHENE	2	ug/L	U	2		0.99	SL2997-1
680-150816-1	LFM-99-02B_SPR18	4/6/2018	MADEPEPH	T	BENZO[G,H,I]PERYLENE	2	ug/L	U	2		1.3	SL2997-1
680-150816-1	LFM-99-02B_SPR18	4/6/2018	MADEPEPH	T	C11-C22 AROMATICS	99	ug/L	U	99		50	SL2997-1
680-150816-1	LFM-99-02B_SPR18	4/6/2018	MADEPEPH	T	C19-C36 ALIPHATICS	99	ug/L	U	99		50	SL2997-1
680-150816-1	LFM-99-02B_SPR18	4/6/2018	MADEPEPH	T	C9-C18 ALIPHATICS	99	ug/L	U	99		50	SL2997-1
680-150816-1	LFM-99-02B_SPR18	4/6/2018	MADEPEPH	T	CHRYSENE	2	ug/L	U	2		0.89	SL2997-1
680-150816-1	LFM-99-02B_SPR18	4/6/2018	MADEPEPH	T	DIBENZO(A,H)ANTHRACEN	2	ug/L	U	2		1.2	SL2997-1
680-150816-1	LFM-99-02B_SPR18	4/6/2018	MADEPEPH	T	FLUORANTHENE	2	ug/L	U	2		0.79	SL2997-1
680-150816-1	LFM-99-02B_SPR18	4/6/2018	MADEPEPH	T	FLUORENE	2	ug/L	U	2		0.89	SL2997-1
680-150816-1	LFM-99-02B_SPR18	4/6/2018	MADEPEPH	T	INDENO(1,2,3-CD)PYRENE	2	ug/L	U	2		1.4	SL2997-1
680-150816-1	LFM-99-02B_SPR18	4/6/2018	MADEPEPH	T	NAPHTHALENE	2	ug/L	U	2		0.89	SL2997-1
680-150816-1	LFM-99-02B_SPR18	4/6/2018	MADEPEPH	T	PHENANTHRENE	2	ug/L	U	2		0.89	SL2997-1
680-150816-1	LFM-99-02B_SPR18	4/6/2018	MADEPEPH	T	PYRENE	2	ug/L	U	2		1.1	SL2997-1
680-150816-1	LFM-99-02B_SPR18	4/6/2018	MADEPVPH	T	BENZENE	3	ug/L	U	3		0.31	SL2997-1
680-150816-1	LFM-99-02B_SPR18	4/6/2018	MADEPVPH	T	C5-C8 ALIPHATICS	100	ug/L	U	100		50	SL2997-1
680-150816-1	LFM-99-02B_SPR18	4/6/2018	MADEPVPH	T	C9-C10 AROMATICS	100	ug/L	U	100		50	SL2997-1
680-150816-1	LFM-99-02B_SPR18	4/6/2018	MADEPVPH	T	C9-C12 ALIPHATICS	100	ug/L	U	100		50	SL2997-1
680-150816-1	LFM-99-02B_SPR18	4/6/2018	MADEPVPH	T	ETHYLBENZENE	5	ug/L	U	5		0.42	SL2997-1
680-150816-1	LFM-99-02B_SPR18	4/6/2018	MADEPVPH	T	M-,P-XYLENE	10	ug/L	U	10		0.92	SL2997-1
680-150816-1	LFM-99-02B_SPR18	4/6/2018	MADEPVPH	T	METHYL TERT-BUTYL ETH	5	ug/L	U	5		0.31	SL2997-1
680-150816-1	LFM-99-02B_SPR18	4/6/2018	MADEPVPH	T	NAPHTHALENE	5	ug/L	U	5		1.6	SL2997-1
680-150816-1	LFM-99-02B_SPR18	4/6/2018	MADEPVPH	T	O-XYLENE	5	ug/L	U	5		0.47	SL2997-1
680-150816-1	LFM-99-02B_SPR18	4/6/2018	MADEPVPH	T	TOLUENE	5	ug/L	U	5		0.34	SL2997-1
680-150816-1	LFM-99-02B_SPR18	4/6/2018	SM 2320B	Total/NA	Alkalinity	48	mg/L		5	3.2	1.1	

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Lab Sample ID	Client Sample ID	Collection Date	Method	Prep Type	Analyte	Result	Unit	Flag	LOQ	LOD	DL	Katahdin Lab ID
680-150816-1	LFM-99-02B_SPR18	4/6/2018	SM 2540C	Total/NA	Total Dissolved Solids (TDS)	660	mg/L		10	10	4.7	
680-150816-2	LFM-99-05A_SPR18	4/5/2018	353.2	Total/NA	Nitrate/Nitrite-N	1.3	mg/L		0.1	0.05	0.019	
680-150816-2	LFM-99-05A_SPR18	4/5/2018	410.4	Total/NA	Chemical Oxygen Demand	10	mg/L	U	20	10	4.1	
680-150816-2	LFM-99-05A_SPR18	4/5/2018	6010C	Total/NA	Barium	10	ug/L		10	5	1.7	
680-150816-2	LFM-99-05A_SPR18	4/5/2018	6010C	Total/NA	Cadmium	3	ug/L	U	5	3	1	
680-150816-2	LFM-99-05A_SPR18	4/5/2018	6010C	Total/NA	Chromium	4	ug/L	U	10	4	1.6	
680-150816-2	LFM-99-05A_SPR18	4/5/2018	6010C	Total/NA	Copper	5	ug/L	U	20	5	1.8	
680-150816-2	LFM-99-05A_SPR18	4/5/2018	6010C	Total/NA	Iron	25	ug/L	J	50	50	17	
680-150816-2	LFM-99-05A_SPR18	4/5/2018	6010C	Total/NA	Lead	10	ug/L	U	10	10	3.9	
680-150816-2	LFM-99-05A_SPR18	4/5/2018	6010C	Total/NA	Manganese	2.2	ug/L	J	10	3	1	
680-150816-2	LFM-99-05A_SPR18	4/5/2018	6010C	Total/NA	Selenium	20	ug/L	U	20	20	9.9	
680-150816-2	LFM-99-05A_SPR18	4/5/2018	6010C	Total/NA	Silver	1.5	ug/L	U	10	1.5	0.6	
680-150816-2	LFM-99-05A_SPR18	4/5/2018	6020A	Total/NA	Arsenic	3	ug/L	U	3	3	1.5	
680-150816-2	LFM-99-05A_SPR18	4/5/2018	7470A	Total/NA	Mercury	0.2	ug/L	U	0.2	0.2	0.08	
680-150816-2	LFM-99-05A_SPR18	4/5/2018	8081B 8082A	Total/NA	4,4'-DDD	0.0095	ug/L	U	0.048	0.0095	0.006	
680-150816-2	LFM-99-05A_SPR18	4/5/2018	8081B 8082A	Total/NA	4,4'-DDE	0.0095	ug/L	U	0.048	0.0095	0.0049	
680-150816-2	LFM-99-05A_SPR18	4/5/2018	8081B 8082A	Total/NA	4,4'-DDT	0.017	ug/L	U	0.048	0.017	0.0067	
680-150816-2	LFM-99-05A_SPR18	4/5/2018	8081B 8082A	Total/NA	Aldrin	0.017	ug/L	U	0.048	0.017	0.0069	
680-150816-2	LFM-99-05A_SPR18	4/5/2018	8081B 8082A	Total/NA	alpha-BHC	0.0095	ug/L	U	0.048	0.0095	0.0032	
680-150816-2	LFM-99-05A_SPR18	4/5/2018	8081B 8082A	Total/NA	beta-BHC	0.017	ug/L	U	0.048	0.017	0.0087	
680-150816-2	LFM-99-05A_SPR18	4/5/2018	8081B 8082A	Total/NA	Chlordane (technical)	0.29	ug/L	U	0.48	0.29	0.091	
680-150816-2	LFM-99-05A_SPR18	4/5/2018	8081B 8082A	Total/NA	delta-BHC	0.017	ug/L	U	0.048	0.017	0.0072	
680-150816-2	LFM-99-05A_SPR18	4/5/2018	8081B 8082A	Total/NA	Dieldrin	0.0095	ug/L	U	0.048	0.0095	0.0036	
680-150816-2	LFM-99-05A_SPR18	4/5/2018	8081B 8082A	Total/NA	Endosulfan I	0.0095	ug/L	U	0.048	0.0095	0.0033	
680-150816-2	LFM-99-05A_SPR18	4/5/2018	8081B 8082A	Total/NA	Endosulfan II	0.0095	ug/L	U	0.048	0.0095	0.004	
680-150816-2	LFM-99-05A_SPR18	4/5/2018	8081B 8082A	Total/NA	Endosulfan sulfate	0.0095	ug/L	U	0.048	0.0095	0.0049	
680-150816-2	LFM-99-05A_SPR18	4/5/2018	8081B 8082A	Total/NA	Endrin	0.0095	ug/L	U	0.048	0.0095	0.0051	
680-150816-2	LFM-99-05A_SPR18	4/5/2018	8081B 8082A	Total/NA	Endrin aldehyde	0.0095	ug/L	U	0.048	0.0095	0.0058	
680-150816-2	LFM-99-05A_SPR18	4/5/2018	8081B 8082A	Total/NA	Endrin ketone	0.0095	ug/L	U	0.048	0.0095	0.0044	
680-150816-2	LFM-99-05A_SPR18	4/5/2018	8081B 8082A	Total/NA	gamma-BHC (Lindane)	0.0095	ug/L	U	0.048	0.0095	0.0034	
680-150816-2	LFM-99-05A_SPR18	4/5/2018	8081B 8082A	Total/NA	Heptachlor	0.017	ug/L	U	0.048	0.017	0.0068	
680-150816-2	LFM-99-05A_SPR18	4/5/2018	8081B 8082A	Total/NA	Heptachlor epoxide	0.0095	ug/L	U	0.048	0.0095	0.0035	
680-150816-2	LFM-99-05A_SPR18	4/5/2018	8081B 8082A	Total/NA	Methoxychlor	0.017	ug/L	U	0.048	0.017	0.0094	
680-150816-2	LFM-99-05A_SPR18	4/5/2018	8081B 8082A	Total/NA	Toxaphene	0.76	ug/L	U	4.8	0.76	0.38	
680-150816-2	LFM-99-05A_SPR18	4/5/2018	9012B	Total/NA	Cyanide, Total	0.0032	mg/L	J	0.01	0.005	0.0025	
680-150816-2	LFM-99-05A_SPR18	4/5/2018	9056A	Total/NA	Chloride	160	mg/L		5	5	2	
680-150816-2	LFM-99-05A_SPR18	4/5/2018	9056A	Total/NA	Sulfate	19	mg/L		1	1	0.4	
680-150816-2	LFM-99-05A_SPR18	4/5/2018	MADEPEPH	T	2-METHYLNAPHTHALENE	2.1	ug/L	U	2.1		0.85	SL2997-2
680-150816-2	LFM-99-05A_SPR18	4/5/2018	MADEPEPH	T	ACENAPHTHENE	2.1	ug/L	U	2.1		1.9	SL2997-2
680-150816-2	LFM-99-05A_SPR18	4/5/2018	MADEPEPH	T	ACENAPHTHYLENE	2.1	ug/L	U	2.1		0.85	SL2997-2
680-150816-2	LFM-99-05A_SPR18	4/5/2018	MADEPEPH	T	ANTHRACENE	2.1	ug/L	U	2.1		1.5	SL2997-2
680-150816-2	LFM-99-05A_SPR18	4/5/2018	MADEPEPH	T	BENZO(A)ANTHRACENE	2.1	ug/L	U	2.1		1.5	SL2997-2
680-150816-2	LFM-99-05A_SPR18	4/5/2018	MADEPEPH	T	BENZO(A)PYRENE	2.1	ug/L	U	2.1		1.4	SL2997-2
680-150816-2	LFM-99-05A_SPR18	4/5/2018	MADEPEPH	T	BENZO(B)FLUORANTHENE	2.1	ug/L	U	2.1		0.85	SL2997-2
680-150816-2	LFM-99-05A_SPR18	4/5/2018	MADEPEPH	T	BENZO(K)FLUORANTHENE	2.1	ug/L	U	2.1		1.1	SL2997-2

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Lab Sample ID	Client Sample ID	Collection Date	Method	Prep Type	Analyte	Result	Unit	Flag	LOQ	LOD	DL	Katahdin Lab ID
680-150816-2	LFM-99-05A_SPR18	4/5/2018	MADEPEPH	T	BENZO[G,H,I]PERYLENE	2.1	ug/L	U	2.1		1.4	SL2997-2
680-150816-2	LFM-99-05A_SPR18	4/5/2018	MADEPEPH	T	C11-C22 AROMATICS	110	ug/L	U	110		53	SL2997-2
680-150816-2	LFM-99-05A_SPR18	4/5/2018	MADEPEPH	T	C19-C36 ALIPHATICS	110	ug/L	U	110		53	SL2997-2
680-150816-2	LFM-99-05A_SPR18	4/5/2018	MADEPEPH	T	C9-C18 ALIPHATICS	110	ug/L	U	110		53	SL2997-2
680-150816-2	LFM-99-05A_SPR18	4/5/2018	MADEPEPH	T	CHRYSENE	2.1	ug/L	U	2.1		0.96	SL2997-2
680-150816-2	LFM-99-05A_SPR18	4/5/2018	MADEPEPH	T	DIBENZO(A,H)ANTHRACEN	2.1	ug/L	U	2.1		1.3	SL2997-2
680-150816-2	LFM-99-05A_SPR18	4/5/2018	MADEPEPH	T	FLUORANTHENE	2.1	ug/L	U	2.1		0.85	SL2997-2
680-150816-2	LFM-99-05A_SPR18	4/5/2018	MADEPEPH	T	FLUORENE	2.1	ug/L	U	2.1		0.96	SL2997-2
680-150816-2	LFM-99-05A_SPR18	4/5/2018	MADEPEPH	T	INDENO(1,2,3-CD)PYRENE	2.1	ug/L	U	2.1		1.5	SL2997-2
680-150816-2	LFM-99-05A_SPR18	4/5/2018	MADEPEPH	T	NAPHTHALENE	2.1	ug/L	U	2.1		0.96	SL2997-2
680-150816-2	LFM-99-05A_SPR18	4/5/2018	MADEPEPH	T	PHENANTHRENE	2.1	ug/L	U	2.1		0.96	SL2997-2
680-150816-2	LFM-99-05A_SPR18	4/5/2018	MADEPEPH	T	PYRENE	2.1	ug/L	U	2.1		1.2	SL2997-2
680-150816-2	LFM-99-05A_SPR18	4/5/2018	MADEPVPH	T	BENZENE	3	ug/L	U	3		0.31	SL2997-2
680-150816-2	LFM-99-05A_SPR18	4/5/2018	MADEPVPH	T	C5-C8 ALIPHATICS	100	ug/L	U	100		50	SL2997-2
680-150816-2	LFM-99-05A_SPR18	4/5/2018	MADEPVPH	T	C9-C10 AROMATICS	100	ug/L	U	100		50	SL2997-2
680-150816-2	LFM-99-05A_SPR18	4/5/2018	MADEPVPH	T	C9-C12 ALIPHATICS	100	ug/L	U	100		50	SL2997-2
680-150816-2	LFM-99-05A_SPR18	4/5/2018	MADEPVPH	T	ETHYLBENZENE	5	ug/L	U	5		0.42	SL2997-2
680-150816-2	LFM-99-05A_SPR18	4/5/2018	MADEPVPH	T	M-,P-XYLENE	10	ug/L	U	10		0.92	SL2997-2
680-150816-2	LFM-99-05A_SPR18	4/5/2018	MADEPVPH	T	METHYL TERT-BUTYL ETH	5	ug/L	U	5		0.31	SL2997-2
680-150816-2	LFM-99-05A_SPR18	4/5/2018	MADEPVPH	T	NAPHTHALENE	5	ug/L	U	5		1.6	SL2997-2
680-150816-2	LFM-99-05A_SPR18	4/5/2018	MADEPVPH	T	O-XYLENE	5	ug/L	U	5		0.47	SL2997-2
680-150816-2	LFM-99-05A_SPR18	4/5/2018	MADEPVPH	T	TOLUENE	5	ug/L	U	5		0.34	SL2997-2
680-150816-2	LFM-99-05A_SPR18	4/5/2018	SM 2320B	Total/NA	Alkalinity	79	mg/L		5	3.2	1.1	
680-150816-2	LFM-99-05A_SPR18	4/5/2018	SM 2540C	Total/NA	Total Dissolved Solids (TDS)	380	mg/L		10	10	4.7	
680-150816-4	LFM-99-06A RP_SPR18	4/5/2018	353.2	Total/NA	Nitrate/Nitrite-N	1.1	mg/L		0.1	0.05	0.019	
680-150816-4	LFM-99-06A RP_SPR18	4/5/2018	410.4	Total/NA	Chemical Oxygen Demand	7	mg/L	J	20	10	4.1	
680-150816-4	LFM-99-06A RP_SPR18	4/5/2018	6010C	Total/NA	Barium	4.3	ug/L		10	5	1.7	
680-150816-4	LFM-99-06A RP_SPR18	4/5/2018	6010C	Total/NA	Cadmium	3	ug/L	U	5	3	1	
680-150816-4	LFM-99-06A RP_SPR18	4/5/2018	6010C	Total/NA	Chromium	4	ug/L	U	10	4	1.6	
680-150816-4	LFM-99-06A RP_SPR18	4/5/2018	6010C	Total/NA	Copper	5	ug/L	U	20	5	1.8	
680-150816-4	LFM-99-06A RP_SPR18	4/5/2018	6010C	Total/NA	Iron	50	ug/L	U	50	50	17	
680-150816-4	LFM-99-06A RP_SPR18	4/5/2018	6010C	Total/NA	Lead	10	ug/L	U	10	10	3.9	
680-150816-4	LFM-99-06A RP_SPR18	4/5/2018	6010C	Total/NA	Manganese	3	ug/L	U	10	3	1	
680-150816-4	LFM-99-06A RP_SPR18	4/5/2018	6010C	Total/NA	Selenium	20	ug/L	U	20	20	9.9	
680-150816-4	LFM-99-06A RP_SPR18	4/5/2018	6010C	Total/NA	Silver	1.5	ug/L	U	10	1.5	0.6	
680-150816-4	LFM-99-06A RP_SPR18	4/5/2018	6020A	Total/NA	Arsenic	3	ug/L	U	3	3	1.5	
680-150816-4	LFM-99-06A RP_SPR18	4/5/2018	7470A	Total/NA	Mercury	0.2	ug/L	U	0.2	0.2	0.08	
680-150816-4	LFM-99-06A RP_SPR18	4/5/2018	8081B 8082A	Total/NA	4,4'-DDD	0.01	ug/L	U	0.05	0.01	0.0064	
680-150816-4	LFM-99-06A RP_SPR18	4/5/2018	8081B 8082A	Total/NA	4,4'-DDE	0.01	ug/L	U	0.05	0.01	0.0051	
680-150816-4	LFM-99-06A RP_SPR18	4/5/2018	8081B 8082A	Total/NA	4,4'-DDT	0.018	ug/L	U	0.05	0.018	0.0071	
680-150816-4	LFM-99-06A RP_SPR18	4/5/2018	8081B 8082A	Total/NA	Aldrin	0.018	ug/L	U	0.05	0.018	0.0073	
680-150816-4	LFM-99-06A RP_SPR18	4/5/2018	8081B 8082A	Total/NA	alpha-BHC	0.01	ug/L	U	0.05	0.01	0.0034	
680-150816-4	LFM-99-06A RP_SPR18	4/5/2018	8081B 8082A	Total/NA	beta-BHC	0.018	ug/L	U	0.05	0.018	0.0092	
680-150816-4	LFM-99-06A RP_SPR18	4/5/2018	8081B 8082A	Total/NA	Chlordane (technical)	0.3	ug/L	U	0.5	0.3	0.096	
680-150816-4	LFM-99-06A RP_SPR18	4/5/2018	8081B 8082A	Total/NA	delta-BHC	0.018	ug/L	U	0.05	0.018	0.0076	

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Lab Sample ID	Client Sample ID	Collection Date	Method	Prep Type	Analyte	Result	Unit	Flag	LOQ	LOD	DL	Katahdin Lab ID
680-150816-4	LFM-99-06A RP_SPR18	4/5/2018	8081B 8082A	Total/NA	Dieldrin	0.01	ug/L	U	0.05	0.01	0.0038	
680-150816-4	LFM-99-06A RP_SPR18	4/5/2018	8081B 8082A	Total/NA	Endosulfan I	0.01	ug/L	U	0.05	0.01	0.0035	
680-150816-4	LFM-99-06A RP_SPR18	4/5/2018	8081B 8082A	Total/NA	Endosulfan II	0.01	ug/L	U	0.05	0.01	0.0042	
680-150816-4	LFM-99-06A RP_SPR18	4/5/2018	8081B 8082A	Total/NA	Endosulfan sulfate	0.01	ug/L	U	0.05	0.01	0.0051	
680-150816-4	LFM-99-06A RP_SPR18	4/5/2018	8081B 8082A	Total/NA	Endrin	0.01	ug/L	U	0.05	0.01	0.0054	
680-150816-4	LFM-99-06A RP_SPR18	4/5/2018	8081B 8082A	Total/NA	Endrin aldehyde	0.01	ug/L	U	0.05	0.01	0.0062	
680-150816-4	LFM-99-06A RP_SPR18	4/5/2018	8081B 8082A	Total/NA	Endrin ketone	0.01	ug/L	U	0.05	0.01	0.0046	
680-150816-4	LFM-99-06A RP_SPR18	4/5/2018	8081B 8082A	Total/NA	gamma-BHC (Lindane)	0.01	ug/L	U	0.05	0.01	0.0036	
680-150816-4	LFM-99-06A RP_SPR18	4/5/2018	8081B 8082A	Total/NA	Heptachlor	0.018	ug/L	U	0.05	0.018	0.0072	
680-150816-4	LFM-99-06A RP_SPR18	4/5/2018	8081B 8082A	Total/NA	Heptachlor epoxide	0.01	ug/L	U	0.05	0.01	0.0037	
680-150816-4	LFM-99-06A RP_SPR18	4/5/2018	8081B 8082A	Total/NA	Methoxychlor	0.018	ug/L	U	0.05	0.018	0.0099	
680-150816-4	LFM-99-06A RP_SPR18	4/5/2018	8081B 8082A	Total/NA	Toxaphene	0.81	ug/L	U	5	0.81	0.4	
680-150816-4	LFM-99-06A RP_SPR18	4/5/2018	9012B	Total/NA	Cyanide, Total	0.005	mg/L	U	0.01	0.005	0.0025	
680-150816-4	LFM-99-06A RP_SPR18	4/5/2018	9056A	Total/NA	Chloride	340	mg/L		5	5	2	
680-150816-4	LFM-99-06A RP_SPR18	4/5/2018	9056A	Total/NA	Sulfate	27	mg/L		1	1	0.4	
680-150816-4	LFM-99-06A RP_SPR18	4/5/2018	MADEPEPH	T	2-METHYLNAPHTHALENE	1.9	ug/L	U	1.9		0.77	SL2997-4
680-150816-4	LFM-99-06A RP_SPR18	4/5/2018	MADEPEPH	T	ACENAPHTHENE	1.9	ug/L	U	1.9		1.7	SL2997-4
680-150816-4	LFM-99-06A RP_SPR18	4/5/2018	MADEPEPH	T	ACENAPHTHYLENE	1.9	ug/L	U	1.9		0.77	SL2997-4
680-150816-4	LFM-99-06A RP_SPR18	4/5/2018	MADEPEPH	T	ANTHRACENE	1.9	ug/L	U	1.9		1.3	SL2997-4
680-150816-4	LFM-99-06A RP_SPR18	4/5/2018	MADEPEPH	T	BENZO(A)ANTHRACENE	1.9	ug/L	U	1.9		1.3	SL2997-4
680-150816-4	LFM-99-06A RP_SPR18	4/5/2018	MADEPEPH	T	BENZO(A)PYRENE	1.9	ug/L	U	1.9		1.2	SL2997-4
680-150816-4	LFM-99-06A RP_SPR18	4/5/2018	MADEPEPH	T	BENZO(B)FLUORANTHENE	1.9	ug/L	U	1.9		0.77	SL2997-4
680-150816-4	LFM-99-06A RP_SPR18	4/5/2018	MADEPEPH	T	BENZO(K)FLUORANTHENE	1.9	ug/L	U	1.9		0.96	SL2997-4
680-150816-4	LFM-99-06A RP_SPR18	4/5/2018	MADEPEPH	T	BENZO[G,H,I]PERYLENE	1.9	ug/L	U	1.9		1.2	SL2997-4
680-150816-4	LFM-99-06A RP_SPR18	4/5/2018	MADEPEPH	T	C11-C22 AROMATICS	96	ug/L	U	96		48	SL2997-4
680-150816-4	LFM-99-06A RP_SPR18	4/5/2018	MADEPEPH	T	C19-C36 ALIPHATICS	96	ug/L	U	96		48	SL2997-4
680-150816-4	LFM-99-06A RP_SPR18	4/5/2018	MADEPEPH	T	C9-C18 ALIPHATICS	96	ug/L	U	96		48	SL2997-4
680-150816-4	LFM-99-06A RP_SPR18	4/5/2018	MADEPEPH	T	CHRYSENE	1.9	ug/L	U	1.9		0.86	SL2997-4
680-150816-4	LFM-99-06A RP_SPR18	4/5/2018	MADEPEPH	T	DIBENZO(A,H)ANTHRACEN	1.9	ug/L	U	1.9		1.2	SL2997-4
680-150816-4	LFM-99-06A RP_SPR18	4/5/2018	MADEPEPH	T	FLUORANTHENE	1.9	ug/L	U	1.9		0.77	SL2997-4
680-150816-4	LFM-99-06A RP_SPR18	4/5/2018	MADEPEPH	T	FLUORENE	1.9	ug/L	U	1.9		0.86	SL2997-4
680-150816-4	LFM-99-06A RP_SPR18	4/5/2018	MADEPEPH	T	INDENO(1,2,3-CD)PYRENE	1.9	ug/L	U	1.9		1.3	SL2997-4
680-150816-4	LFM-99-06A RP_SPR18	4/5/2018	MADEPEPH	T	NAPHTHALENE	1.9	ug/L	U	1.9		0.86	SL2997-4
680-150816-4	LFM-99-06A RP_SPR18	4/5/2018	MADEPEPH	T	PHENANTHRENE	1.9	ug/L	U	1.9		0.86	SL2997-4
680-150816-4	LFM-99-06A RP_SPR18	4/5/2018	MADEPEPH	T	PYRENE	1.9	ug/L	U	1.9		1	SL2997-4
680-150816-4	LFM-99-06A RP_SPR18	4/5/2018	MADEPVPH	T	BENZENE	3	ug/L	U	3		0.31	SL2997-4
680-150816-4	LFM-99-06A RP_SPR18	4/5/2018	MADEPVPH	T	C5-C8 ALIPHATICS	100	ug/L	U	100		50	SL2997-4
680-150816-4	LFM-99-06A RP_SPR18	4/5/2018	MADEPVPH	T	C9-C10 AROMATICS	100	ug/L	U	100		50	SL2997-4
680-150816-4	LFM-99-06A RP_SPR18	4/5/2018	MADEPVPH	T	C9-C12 ALIPHATICS	100	ug/L	U	100		50	SL2997-4
680-150816-4	LFM-99-06A RP_SPR18	4/5/2018	MADEPVPH	T	ETHYLBENZENE	5	ug/L	U	5		0.42	SL2997-4
680-150816-4	LFM-99-06A RP_SPR18	4/5/2018	MADEPVPH	T	M-,P-XYLENE	10	ug/L	U	10		0.92	SL2997-4
680-150816-4	LFM-99-06A RP_SPR18	4/5/2018	MADEPVPH	T	METHYL TERT-BUTYL ETH	5	ug/L	U	5		0.31	SL2997-4
680-150816-4	LFM-99-06A RP_SPR18	4/5/2018	MADEPVPH	T	NAPHTHALENE	5	ug/L	U	5		1.6	SL2997-4
680-150816-4	LFM-99-06A RP_SPR18	4/5/2018	MADEPVPH	T	O-XYLENE	5	ug/L	U	5		0.47	SL2997-4
680-150816-4	LFM-99-06A RP_SPR18	4/5/2018	MADEPVPH	T	TOLUENE	5	ug/L	U	5		0.34	SL2997-4

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Lab Sample ID	Client Sample ID	Collection Date	Method	Prep Type	Analyte	Result	Unit	Flag	LOQ	LOD	DL	Katahdin Lab ID
680-150816-4	LFM-99-06A RP_SPR18	4/5/2018	SM 2320B	Total/NA	Alkalinity	75	mg/L		5	3.2	1.1	
680-150816-4	LFM-99-06A RP_SPR18	4/5/2018	SM 2540C	Total/NA	Total Dissolved Solids (TDS)	670	mg/L		10	10	4.7	
680-150816-3	LFM-DUP01_SPR18	4/5/2018	353.2	Total/NA	Nitrate/Nitrite-N	1.3	mg/L		0.1	0.05	0.019	
680-150816-3	LFM-DUP01_SPR18	4/5/2018	410.4	Total/NA	Chemical Oxygen Demand	10	mg/L	U	20	10	4.1	
680-150816-3	LFM-DUP01_SPR18	4/5/2018	6010C	Total/NA	Barium	11	ug/L		10	5	1.7	
680-150816-3	LFM-DUP01_SPR18	4/5/2018	6010C	Total/NA	Cadmium	3	ug/L	U	5	3	1	
680-150816-3	LFM-DUP01_SPR18	4/5/2018	6010C	Total/NA	Chromium	4	ug/L	U	10	4	1.6	
680-150816-3	LFM-DUP01_SPR18	4/5/2018	6010C	Total/NA	Copper	5	ug/L	U	20	5	1.8	
680-150816-3	LFM-DUP01_SPR18	4/5/2018	6010C	Total/NA	Iron	50	ug/L	U	50	50	17	
680-150816-3	LFM-DUP01_SPR18	4/5/2018	6010C	Total/NA	Lead	10	ug/L	U	10	10	3.9	
680-150816-3	LFM-DUP01_SPR18	4/5/2018	6010C	Total/NA	Manganese	3	ug/L	U	10	3	1	
680-150816-3	LFM-DUP01_SPR18	4/5/2018	6010C	Total/NA	Selenium	20	ug/L	U	20	20	9.9	
680-150816-3	LFM-DUP01_SPR18	4/5/2018	6010C	Total/NA	Silver	1.5	ug/L	U	10	1.5	0.6	
680-150816-3	LFM-DUP01_SPR18	4/5/2018	6020A	Total/NA	Arsenic	3	ug/L	U	3	3	1.5	
680-150816-3	LFM-DUP01_SPR18	4/5/2018	7470A	Total/NA	Mercury	0.2	ug/L	U	0.2	0.2	0.08	
680-150816-3	LFM-DUP01_SPR18	4/5/2018	8081B 8082A	Total/NA	4,4'-DDD	0.01	ug/L	U	0.05	0.01	0.0063	
680-150816-3	LFM-DUP01_SPR18	4/5/2018	8081B 8082A	Total/NA	4,4'-DDE	0.01	ug/L	U	0.05	0.01	0.0051	
680-150816-3	LFM-DUP01_SPR18	4/5/2018	8081B 8082A	Total/NA	4,4'-DDT	0.018	ug/L	U	0.05	0.018	0.007	
680-150816-3	LFM-DUP01_SPR18	4/5/2018	8081B 8082A	Total/NA	Aldrin	0.018	ug/L	U	0.05	0.018	0.0072	
680-150816-3	LFM-DUP01_SPR18	4/5/2018	8081B 8082A	Total/NA	alpha-BHC	0.01	ug/L	U	0.05	0.01	0.0034	
680-150816-3	LFM-DUP01_SPR18	4/5/2018	8081B 8082A	Total/NA	beta-BHC	0.018	ug/L	U	0.05	0.018	0.0091	
680-150816-3	LFM-DUP01_SPR18	4/5/2018	8081B 8082A	Total/NA	Chlordane (technical)	0.3	ug/L	U	0.5	0.3	0.095	
680-150816-3	LFM-DUP01_SPR18	4/5/2018	8081B 8082A	Total/NA	delta-BHC	0.018	ug/L	U	0.05	0.018	0.0075	
680-150816-3	LFM-DUP01_SPR18	4/5/2018	8081B 8082A	Total/NA	Dieldrin	0.01	ug/L	U	0.05	0.01	0.0038	
680-150816-3	LFM-DUP01_SPR18	4/5/2018	8081B 8082A	Total/NA	Endosulfan I	0.01	ug/L	U	0.05	0.01	0.0035	
680-150816-3	LFM-DUP01_SPR18	4/5/2018	8081B 8082A	Total/NA	Endosulfan II	0.01	ug/L	U	0.05	0.01	0.0042	
680-150816-3	LFM-DUP01_SPR18	4/5/2018	8081B 8082A	Total/NA	Endosulfan sulfate	0.01	ug/L	U	0.05	0.01	0.0051	
680-150816-3	LFM-DUP01_SPR18	4/5/2018	8081B 8082A	Total/NA	Endrin	0.01	ug/L	U	0.05	0.01	0.0053	
680-150816-3	LFM-DUP01_SPR18	4/5/2018	8081B 8082A	Total/NA	Endrin aldehyde	0.01	ug/L	U	0.05	0.01	0.0061	
680-150816-3	LFM-DUP01_SPR18	4/5/2018	8081B 8082A	Total/NA	Endrin ketone	0.01	ug/L	U	0.05	0.01	0.0046	
680-150816-3	LFM-DUP01_SPR18	4/5/2018	8081B 8082A	Total/NA	gamma-BHC (Lindane)	0.01	ug/L	U	0.05	0.01	0.0036	
680-150816-3	LFM-DUP01_SPR18	4/5/2018	8081B 8082A	Total/NA	Heptachlor	0.018	ug/L	U	0.05	0.018	0.0071	
680-150816-3	LFM-DUP01_SPR18	4/5/2018	8081B 8082A	Total/NA	Heptachlor epoxide	0.01	ug/L	U	0.05	0.01	0.0037	
680-150816-3	LFM-DUP01_SPR18	4/5/2018	8081B 8082A	Total/NA	Methoxychlor	0.018	ug/L	U	0.05	0.018	0.0098	
680-150816-3	LFM-DUP01_SPR18	4/5/2018	8081B 8082A	Total/NA	Toxaphene	0.8	ug/L	U	5	0.8	0.4	
680-150816-3	LFM-DUP01_SPR18	4/5/2018	9012B	Total/NA	Cyanide, Total	0.02	mg/L	J	0.01	0.005	0.0025	
680-150816-3	LFM-DUP01_SPR18	4/5/2018	9056A	Total/NA	Chloride	160	mg/L		5	5	2	
680-150816-3	LFM-DUP01_SPR18	4/5/2018	9056A	Total/NA	Sulfate	19	mg/L		1	1	0.4	
680-150816-3	LFM-DUP01_SPR18	4/5/2018	MADEPEPH	T	2-METHYLNAPHTHALENE	1.9	ug/L	U	1.9		0.78	SL2997-3
680-150816-3	LFM-DUP01_SPR18	4/5/2018	MADEPEPH	T	ACENAPHTHENE	1.9	ug/L	U	1.9		1.7	SL2997-3
680-150816-3	LFM-DUP01_SPR18	4/5/2018	MADEPEPH	T	ACENAPHTHYLENE	1.9	ug/L	U	1.9		0.78	SL2997-3
680-150816-3	LFM-DUP01_SPR18	4/5/2018	MADEPEPH	T	ANTHRACENE	1.9	ug/L	U	1.9		1.4	SL2997-3
680-150816-3	LFM-DUP01_SPR18	4/5/2018	MADEPEPH	T	BENZO(A)ANTHRACENE	1.9	ug/L	U	1.9		1.4	SL2997-3
680-150816-3	LFM-DUP01_SPR18	4/5/2018	MADEPEPH	T	BENZO(A)PYRENE	1.9	ug/L	U	1.9		1.3	SL2997-3
680-150816-3	LFM-DUP01_SPR18	4/5/2018	MADEPEPH	T	BENZO(B)FLUORANTHENE	1.9	ug/L	U	1.9		0.78	SL2997-3

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Lab Sample ID	Client Sample ID	Collection Date	Method	Prep Type	Analyte	Result	Unit	Flag	LOQ	LOD	DL	Katahdin Lab ID
680-150816-3	LFM-DUP01_SPR18	4/5/2018	MADEPEPH	T	BENZO(K)FLUORANTHENE	1.9	ug/L	U	1.9		0.97	SL2997-3
680-150816-3	LFM-DUP01_SPR18	4/5/2018	MADEPEPH	T	BENZO[G,H,I]PERYLENE	1.9	ug/L	U	1.9		1.3	SL2997-3
680-150816-3	LFM-DUP01_SPR18	4/5/2018	MADEPEPH	T	C11-C22 AROMATICS	97	ug/L	U	97		48	SL2997-3
680-150816-3	LFM-DUP01_SPR18	4/5/2018	MADEPEPH	T	C19-C36 ALIPHATICS	97	ug/L	U	97		48	SL2997-3
680-150816-3	LFM-DUP01_SPR18	4/5/2018	MADEPEPH	T	C9-C18 ALIPHATICS	97	ug/L	U	97		48	SL2997-3
680-150816-3	LFM-DUP01_SPR18	4/5/2018	MADEPEPH	T	CHRYSENE	1.9	ug/L	U	1.9		0.87	SL2997-3
680-150816-3	LFM-DUP01_SPR18	4/5/2018	MADEPEPH	T	DIBENZO(A,H)ANTHRACEN	1.9	ug/L	U	1.9		1.2	SL2997-3
680-150816-3	LFM-DUP01_SPR18	4/5/2018	MADEPEPH	T	FLUORANTHENE	1.9	ug/L	U	1.9		0.78	SL2997-3
680-150816-3	LFM-DUP01_SPR18	4/5/2018	MADEPEPH	T	FLUORENE	1.9	ug/L	U	1.9		0.87	SL2997-3
680-150816-3	LFM-DUP01_SPR18	4/5/2018	MADEPEPH	T	INDENO(1,2,3-CD)PYRENE	1.9	ug/L	U	1.9		1.4	SL2997-3
680-150816-3	LFM-DUP01_SPR18	4/5/2018	MADEPEPH	T	NAPHTHALENE	1.9	ug/L	U	1.9		0.87	SL2997-3
680-150816-3	LFM-DUP01_SPR18	4/5/2018	MADEPEPH	T	PHENANTHRENE	1.9	ug/L	U	1.9		0.87	SL2997-3
680-150816-3	LFM-DUP01_SPR18	4/5/2018	MADEPEPH	T	PYRENE	1.9	ug/L	U	1.9		1.1	SL2997-3
680-150816-3	LFM-DUP01_SPR18	4/5/2018	MADEPVPH	T	BENZENE	3	ug/L	U	3		0.31	SL2997-3
680-150816-3	LFM-DUP01_SPR18	4/5/2018	MADEPVPH	T	C5-C8 ALIPHATICS	100	ug/L	U	100		50	SL2997-3
680-150816-3	LFM-DUP01_SPR18	4/5/2018	MADEPVPH	T	C9-C10 AROMATICS	100	ug/L	U	100		50	SL2997-3
680-150816-3	LFM-DUP01_SPR18	4/5/2018	MADEPVPH	T	C9-C12 ALIPHATICS	100	ug/L	U	100		50	SL2997-3
680-150816-3	LFM-DUP01_SPR18	4/5/2018	MADEPVPH	T	ETHYLBENZENE	5	ug/L	U	5		0.42	SL2997-3
680-150816-3	LFM-DUP01_SPR18	4/5/2018	MADEPVPH	T	M-,P-XYLENE	10	ug/L	U	10		0.92	SL2997-3
680-150816-3	LFM-DUP01_SPR18	4/5/2018	MADEPVPH	T	METHYL TERT-BUTYL ETH	5	ug/L	U	5		0.31	SL2997-3
680-150816-3	LFM-DUP01_SPR18	4/5/2018	MADEPVPH	T	NAPHTHALENE	5	ug/L	U	5		1.6	SL2997-3
680-150816-3	LFM-DUP01_SPR18	4/5/2018	MADEPVPH	T	O-XYLENE	5	ug/L	U	5		0.47	SL2997-3
680-150816-3	LFM-DUP01_SPR18	4/5/2018	MADEPVPH	T	TOLUENE	5	ug/L	U	5		0.34	SL2997-3
680-150816-3	LFM-DUP01_SPR18	4/5/2018	SM 2320B	Total/NA	Alkalinity	86	mg/L		5	3.2	1.1	
680-150816-3	LFM-DUP01_SPR18	4/5/2018	SM 2540C	Total/NA	Total Dissolved Solids (TDS)	390	mg/L		10	10	4.7	
	TRIPBLANK1_040518	4/5/2018	MADEPVPH	T	BENZENE	3	ug/L	U	3		0.31	SL2997-6
	TRIPBLANK1_040518	4/5/2018	MADEPVPH	T	C5-C8 ALIPHATICS	100	ug/L	U	100		50	SL2997-6
	TRIPBLANK1_040518	4/5/2018	MADEPVPH	T	C9-C10 AROMATICS	100	ug/L	U	100		50	SL2997-6
	TRIPBLANK1_040518	4/5/2018	MADEPVPH	T	C9-C12 ALIPHATICS	100	ug/L	U	100		50	SL2997-6
	TRIPBLANK1_040518	4/5/2018	MADEPVPH	T	ETHYLBENZENE	5	ug/L	U	5		0.42	SL2997-6
	TRIPBLANK1_040518	4/5/2018	MADEPVPH	T	M-,P-XYLENE	10	ug/L	U	10		0.92	SL2997-6
	TRIPBLANK1_040518	4/5/2018	MADEPVPH	T	METHYL TERT-BUTYL ETH	5	ug/L	U	5		0.31	SL2997-6
	TRIPBLANK1_040518	4/5/2018	MADEPVPH	T	NAPHTHALENE	5	ug/L	U	5		1.6	SL2997-6
	TRIPBLANK1_040518	4/5/2018	MADEPVPH	T	O-XYLENE	5	ug/L	U	5		0.47	SL2997-6
	TRIPBLANK1_040518	4/5/2018	MADEPVPH	T	TOLUENE	5	ug/L	U	5		0.34	SL2997-6

Notes:
µg/L = microgram per liter
mg/L = milligram per liter
U = Non-detect
UJ = Estimated non-detect
J = Estimated result
LOQ = Limit of Quantitation
LOD = Limit of Detection
DL = Method Detection Limit

qualified data

Total Metals
SW 846/6010C/6020A
USEPA Level 2B Review

Site: AOC 32/43A Spring 2018 LTM	SDG #: 680-150977-1
Laboratory: Test America-Savannah, GA	Date: 4/27/2018
KGS Reviewer: Laurie Ekes	Project: 1082-042

Lab Sample ID	Client Sample ID	Collection Date	Analysis	Matrix
680-150977-1	32M-01-13XBR_SPR18	4/10/2018	Total Metals (As, Mn)	Groundwater
680-150977-2	32M-01-14XOB_SPR18	4/10/2018	Total Metals (As, Mn)	Groundwater
680-150977-3	32M-01-17XBR_SPR18	4/9/2018	Total Metals (As, Mn)	Groundwater
680-150977-4	32M-01-18XBR_SPR18	4/9/2018	Total Metals (As, Mn)	Groundwater
680-150977-5	32M-DUP01_SPR18	4/9/2018	Total Metals (As, Mn)	Groundwater

Summary – Data validation was performed on the data for four (4) groundwater samples and one (1) field duplicate sample collected from AOC 32/43A and submitted for dissolved arsenic and manganese analyses. Manganese was analyzed and reported by method SW6010C and arsenic was analyzed and reported by method SW6020A. All sample results in this SDG were subjected to Level 2B data validation, which includes evaluation of preparatory batch and instrument-related QC results.

Narrative and Completeness Review – The case narrative and data package were checked for completeness. No discrepancies were noted.

Qualification: None required.

Sample Delivery and Condition – All samples arrived at the laboratory on 4/12/2018 in acceptable condition and temperature and were properly preserved. Proper custody was documented.

Qualification: None required.

Holding Times – All samples were analyzed within the 6-month holding time required for preserved aqueous samples.

Qualification: None required.

Initial and Continuing Calibration Verification (ICV and CCV) – The ICVs and CCVs reported with these samples on 4/16 and 4/18/2018 were analyzed at the required frequencies and exhibited acceptable percent recoveries (%R ±10%) for all target analytes.

Qualification: None required.

Initial and Continuing Calibration Blanks (ICB and CCB) – The ICBs and CCBs reported with these samples were free of contamination.

Qualification: None required.

Laboratory Control Sample – The LCS recoveries (%R) for the reported target analytes met the laboratory control limits.

Qualification: None required.

MS/MSD – The laboratory selected sample 32M-01-17XBR_SPR18 (Lab Sample ID: 680-150777-3) to spike and analyze as matrix spike/matrix spike duplicate samples. The %Rs and RPDs were within control limits for both arsenic and manganese.

Qualification: None required.

Method Blank – The method blanks associated and analyzed with these samples were non-detect for all target analytes.

Qualification: None required.

Field Blanks – Field blank samples were not submitted with this sample set.

Qualification: None required.

Field Duplicate – Sample 32M-DUP01_SPR18 (Lab Sample ID: 680-150777-5) was the field duplicate sample of 32M-01-18XBR_SPR18 (Lab Sample ID: 680-150777-4). The FD sample results were comparable with %RPDs less than 10%. The FD sample results are summarized in the table below.

Lab Sample ID	680-150977-4	680-150977-5	
Client Sample ID	32M-01-18XBR_SPR18	32M-DUP01_SPR18	
Collection Date	4/9/2018	4/9/2018	
Analyte	**Result (µg/L)**	**Result (µg/L)**	**RPD (%)**
Manganese	8,400	7,900	6.1
Arsenic	6.5	6.1	6.3

Qualification: None required.

Compound Quantitation – Analyte non-detections were reported as "ND"; these results should be considered the equivalent of "PQL U." Analyte detections below the PQL were reported as J qualified results. These J qualifiers were retained unless superseded by a more severe qualifier.

Qualification: None required.

Qualification Summary Table - The total metals results reported for the groundwater samples in this SDG are acceptable as reported and the data may be used for its intended purpose.

Lab Sample ID	Client Sample ID	Analysis	Lab Value (µg/L)	Lab Qualifier	Validated Value (µg/L)	Validation Qualifier
680-150977-1	32M-01-13XBR_SPR18	Total Metals	No qualification needed.			
680-150977-2	32M-01-14XOB_SPR18	Total Metals	No qualification needed.			
680-150977-3	32M-01-17XBR_SPR18	Total Metals	No qualification needed.			
680-150977-4	32M-01-18XBR_SPR18	Total Metals	No qualification needed.			
680-150977-5	32M-DUP01_SPR18	Total Metals	No qualification needed.			

Volatile Organic Compounds
SW-846 Method 8260B
USEPA Level 2B Review

Site: AOC 32/43A Spring 2018 LTM	SDG #: 680-150977-1
Laboratory: Test America-Savannah, GA	Date: 4/27/2018
KGS Reviewer: Laurie Ekes	Project: 1082-042

Lab Sample ID	Client Sample ID	Collection Date	Analysis	Matrix
680-150977-1	32M-01-13XBR_SPR18	4/10/2018	SW8260B/VOCs	Groundwater
680-150977-2	32M-01-14XOB_SPR18	4/10/2018	SW8260B/VOCs	Groundwater
680-150977-3	32M-01-17XBR_SPR18	4/9/2018	SW8260B/VOCs	Groundwater
680-150977-4	32M-01-18XBR_SPR18	4/9/2018	SW8260B/VOCs	Groundwater
680-150977-5	32M-DUP01_SPR18	4/9/2018	SW8260B/VOCs	Groundwater
680-150977-6	Trip Blank1_040918	4/9/2018	SW8260B/VOCs	Trip Blank

Summary - Data validation was performed on the data for four (4) groundwater samples, one (1) field duplicate sample and one (1) trip blank sample collected from AOC 32/43A and submitted for Volatile Organic Compound (VOC) analysis by SW846 Method 8260B. All sample results in this SDG were subjected to Level 2B data validation, which includes evaluation of preparatory batch and instrument-related QC results.

Narrative and Completeness Review – The case narrative and data package were checked for completeness. No discrepancies were noted.

Sample Delivery and Condition – All samples arrived at the laboratory on 4/12/2018 in acceptable condition and temperature and were properly preserved. Proper custody was documented.

Qualification: None required.

Holding Times –All samples were analyzed within the 14-day holding time required for preserved aqueous samples.

Qualification: None required.

GC/MS Tuning - All BFB tunes in the initial and continuing calibrations met the percent relative abundance criteria.

Qualification: None required.

Initial Calibration - Initial calibration curves reported with these samples exhibited acceptable %RSDs (≤15%) and average RRF (>0.050) values for all target compounds.

Qualification: None required.

Initial Calibration Verification (ICV): - Initial calibration verifications reported with these samples exhibited acceptable %Ds (≤30%) for all target VOC.

Qualification: None required.

Continuing Calibration Verification (CCV): - The %Ds for the CCVs analyzed and reported with these samples on 4/16 and 4/17/2018 were within acceptance limits (%Ds ≤30%) for all target VOCs.

Qualification: None required.

Surrogates – Surrogate percent recoveries were within the control limits for all other samples.

Qualification: None required.

Internal Standard (IS) Area Performance: - Samples exhibited acceptable area counts for all internal standards.

Qualification: None required.

LCS/LCSD – Percent recoveries and RPDs for the LCS/LCDSs analyzed and reported with these samples were within laboratory control limits.

Qualification: None required.

MS/MSD – Sample 32M-01-17XBR_SPR18 (Lab Sample ID: 260-150777-3) was spiked and analyzed as MS/MSD samples. The RPDs for naphthalene and 1,2,3-trichlorobenzene were above the control limit of 20%. Naphthalene and 1,2,3-trichlorobenzene were non-detect in all samples. The %Rs and RPDs for all other VOCs were within control limits.

Qualification: None required.

Method Blank – The method blanks prepared and analyzed with these samples were free of contamination.

Qualification: None required.

Field Blanks – One Trip Blank sample, Trip Blank1_040918 (Lab Sample ID: 680-150977-6), was submitted with this sample set. Target VOCs were non-detect in the TB sample.

Qualification: None required.

Field Duplicate – Sample 32M-DUP01_SPR18 (Lab Sample ID: 680-150977-5) was the field duplicate sample of 32M-01-18XBR_SPR18 (Lab Sample ID: 680-150977-4). The FD sample results for the detected VOC were comparable with %RPDs less than 30%. The FD sample results are summarized in the table below.

Lab Sample ID	680-150977-4		680-150977-5		
Client Sample ID	32M-01-18XBR_SPR18		32M-DUP01_SPR18		
Collection Date	4/9/2018		4/9/2018		
Analyte	**Result (µg/L)**	**Flag**	**Result (µg/L)**	**Flag**	**RPD (%)**
1,2-Dichloroethene, Total	1.0	J	0.94	J	4.08
1,3-Dichlorobenzene	150		140		4.55
1,4-Dichlorobenzene	97		89		5.65
Benzene	0.79	J	0.69	J	8.81
cis-1,2-Dichloroethene	1.0		0.94	J	4.08
Ethylbenzene	0.47	J	0.42	J	7.35
Isopropylbenzene	1.1		1.0		6.25
N-Propylbenzene	0.98	J	0.89	J	6.32

Lab Sample ID	680-150977-4		680-150977-5		
Client Sample ID	32M-01-18XBR_SPR18		32M-DUP01_SPR18		
Collection Date	4/9/2018		4/9/2018		
Analyte	**Result (µg/L)**	**Flag**	**Result (µg/L)**	**Flag**	**RPD (%)**
o-Xylene	0.30	J	0.27	J	6.90
sec-Butylbenzene	0.58	J	0.56	J	2.33
Trichloroethene	0.92	J	0.82	J	7.52
Xylenes, Total	0.30	J	0.27	J	6.90
1,2-Dichlorobenzene	840		850		0.79
Chlorobenzene	440		450		1.50

Qualification: None required.

Compound Quantitation – The FD samples, 32M-01-18XBR_SPR18 and 32M-DUP01_-SPR18, were reanalyzed at a ten times (10X) dilution due to high levels of 1,2-dichlorobenzene and chlorobenzene; the remaining VOCs were reported from the initial undiluted analysis of these samples. Analyte non-detections were reported as "ND"; these results should be considered the equivalent of "LOD U." Analyte detections below the PQL were reported as J qualified results. These J qualifiers were retained unless superseded by a more severe qualifier.

Qualification: None required.

Qualification Summary Table - The VOC results reported in this SDG are acceptable as reported. and may be used for their intended purpose.

Lab Sample ID	Client Sample ID	Analysis	Lab Value (µg/L)	Lab Qualifier	Validated Value (µg/L)	Validation Qualifier
680-150977-1	32M-01-13XBR_SPR18	SW8260B/VOCs	No qualification needed.			
680-150977-2	32M-01-14XOB_SPR18	SW8260B/VOCs	No qualification needed.			
680-150977-3	32M-01-17XBR_SPR18	SW8260B/VOCs	No qualification needed.			
680-150977-4	32M-01-18XBR_SPR18	SW8260B/VOCs	No qualification needed.			
680-150977-5	32M-DUP01_SPR18	SW8260B/VOCs	No qualification needed.			
680-150977-6	Trip Blank1_040918	SW8260B/VOCs	No qualification needed.			

Volatile Petroleum Hydrocarbons
MADEP Method VPH-04-1.1
USEPA Level II Review

Site: AOC 32/43A Spring 2018 LTM	SDG #: 680-150977-1
Laboratory: Test America-Savannah, GA Subcontracted to Katahdin Analytical and reported in SDG SL3114	Date: 5/2/2018
KGS Reviewer: Laurie Ekes	Project: 1082-042

TAL Lab Sample ID	Katahdin Lab Sample ID	Client Sample ID	Collection Date	Analysis	Matrix
680-150977-1	SL3114-1	32M-01-13XBR_SPR18	4/10/2018	VPH	Groundwater
680-150977-2	SL3114-2	32M-01-14XOB_SPR18	4/10/2018	VPH	Groundwater
680-150977-3	SL3114-3	32M-01-17XBR_SPR18	4/9/2018	VPH	Groundwater
680-150977-4	SL3114-4	32M-01-18XBR_SPR18	4/9/2018	VPH	Groundwater
680-150977-5	SL3114-5	32M-DUP01_SPR18	4/9/2018	VPH	Groundwater
680-150977-6	SL3114-6	TRIPBLANK2_040918	4/9/2018	VPH	Groundwater

Summary – Samples for VPH analysis were subcontracted by Test America to Katahdin Analytical Services in Scarborough, Maine and reported in SDG SL3114. Data validation was performed on the data for four (4) groundwater samples, one (1) field duplicate sample and one (1) trip blank sample submitted for Volatile Petroleum Hydrocarbon (VPH) analyses by MADEP method VPH 04-1.1.

Narrative and Completeness Review – The case narrative and data package were checked for completeness. No discrepancies were noted.

Qualification: None required.

Sample Delivery and Condition – All samples arrived at the laboratory on 4/12/2018 in acceptable condition and temperature and were properly preserved. Proper custody was documented.

Qualification: None required

Holding Times – All samples were analyzed within the 14-day holding time required for preserved aqueous samples.

Qualification: None required

Surrogates – All surrogate recoveries were within the laboratory control limits

Qualification: None required

Laboratory Control Sample – The LCS/LCSD pair prepared and analyzed with these samples met the laboratory %R and RPD control limits.

Qualification: None required.

MS/MSD – Sample 32M-01-17XBR_SPR17 (Lab Sample ID: 680-150777-3/SL3114-3) was spiked and analyzed as matrix spike/matrix spike duplicate samples. The %Rs and RPDs for all spiked VPH compounds were within acceptance limits.

Qualification: None required.

Method Blank – Method blanks prepared and analyzed with these samples were non-detect for all target VPH compounds.

Qualification: None required.

Trip Blanks – One trip blank sample, TRIPBLANK2 040918 (Lab Sample ID: 680-150777-6/SL3114-6) was submitted with these samples. The TB sample was non-detect for all target VPH compounds.

Qualification: None required.

Field Blanks – Field blank samples were not collected with this sample set.

Qualification: None required.

Field Duplicate – Sample 32M-DUP01_SPR18 (Lab sample ID: 680-150777-5/SL3114-5) was the field duplicate of sample 32M-01-18XBR_SPR18 (Lab sample ID: 680-150777-4/SL3114-4). The RPDs for detected VPH compounds were less than 10%. The FD sample results are summarized in the table below.

Lab Sample ID	680-150977-4	680-150977-5	
Client Sample ID	32M-01-18XBR_SPR18	32M-DUP01_SPR18	
Collection Date	4/9/2018	4/9/2018	
Analyte	**Result (µg/L)**	**Result (µg/L)**	**RPD (%)**
BENZENE	0.81	0.78	3.8
C9-C10 AROMATICS	760	790	3.9
C9-C12 ALIPHATICS	370	400	7.8

Qualification: None required.

Compound Quantitation – The FD samples, 32M-01-18XBR_SPR18 and 32M-DUP01_SPR18, were re-analyzed at four times (4X) dilution due to high levels of C9-C10 aromatics and C9-C12 aliphatics; the remaining VPH target compounds were reported from the undiluted sample results. Analyte non-detections were reported as "ND"; these results should be considered the equivalent of "PQL U." Analyte detections below the PQL were reported as J qualified results. These J qualifiers were retained unless superseded by a more severe qualifier.

Qualification: None required.

Qualification Summary Table - The VPH results are acceptable as reported and the data may be used for its intended purpose.

Katahdin Lab Sample ID	Client Sample ID	Analysis	Lab Value (µg/L)	Lab Qualifier	Validated Value (µg/L)	Validation Qualifier
SL3114-1	32M-01-13XBR_SPR18	VPH	No qualification needed.			
SL3114-2	32M-01-14XOB_SPR18	VPH	No qualification needed.			
SL3114-3	32M-01-17XBR_SPR18	VPH	No qualification needed.			
SL3114-4	32M-01-18XBR_SPR18	VPH	No qualification needed.			
SL3114-5	32M-DUP01_SPR18	VPH	No qualification needed.			
SL3114-6	TRIPBLANK2_040918	VPH	No qualification needed.			

AOC 32/43A Spring 2018 LTM Validated Data

Lab Sample ID	Client Sample ID	Collection Date	Method	Prep Type	Analyte	Result	Unit	Flag	LOQ	LOD	DL	Dilution Factor
680-150977-1	32M-01-13XBR_SPR18	4/10/2018	6010C	Total/NA	Manganese	**110**	ug/L		10	3	1	1
680-150977-1	32M-01-13XBR_SPR18	4/10/2018	6020A	Total/NA	Arsenic	3.0	ug/L	U	3	3	1.5	1
680-150977-1	32M-01-13XBR_SPR18	4/10/2018	8260B	Total/NA	1,1,1,2-Tetrachloroethane	1.0	ug/L	U	1	1	0.37	1
680-150977-1	32M-01-13XBR_SPR18	4/10/2018	8260B	Total/NA	1,1,1-Trichloroethane	1.0	ug/L	U	1	1	0.37	1
680-150977-1	32M-01-13XBR_SPR18	4/10/2018	8260B	Total/NA	1,1,2,2-Tetrachloroethane	1.0	ug/L	U	1	1	0.62	1
680-150977-1	32M-01-13XBR_SPR18	4/10/2018	8260B	Total/NA	1,1,2-Trichloroethane	0.50	ug/L	U	1	0.5	0.33	1
680-150977-1	32M-01-13XBR_SPR18	4/10/2018	8260B	Total/NA	1,1-Dichloroethane	1.0	ug/L	U	1	1	0.38	1
680-150977-1	32M-01-13XBR_SPR18	4/10/2018	8260B	Total/NA	1,1-Dichloroethene	1.0	ug/L	U	1	1	0.36	1
680-150977-1	32M-01-13XBR_SPR18	4/10/2018	8260B	Total/NA	1,1-Dichloropropene	1.0	ug/L	U	1	1	0.34	1
680-150977-1	32M-01-13XBR_SPR18	4/10/2018	8260B	Total/NA	1,2,3-Trichlorobenzene	5.0	ug/L	U	5	5	2.5	1
680-150977-1	32M-01-13XBR_SPR18	4/10/2018	8260B	Total/NA	1,2,3-Trichloropropane	1.0	ug/L	U	1	1	0.39	1
680-150977-1	32M-01-13XBR_SPR18	4/10/2018	8260B	Total/NA	1,2,4-Trichlorobenzene	5.0	ug/L	U	5	5	2.5	1
680-150977-1	32M-01-13XBR_SPR18	4/10/2018	8260B	Total/NA	1,2,4-Trimethylbenzene	1.0	ug/L	U	1	1	0.47	1
680-150977-1	32M-01-13XBR_SPR18	4/10/2018	8260B	Total/NA	1,2-Dibromo-3-Chloropropane	2.0	ug/L	U	5	2	1.1	1
680-150977-1	32M-01-13XBR_SPR18	4/10/2018	8260B	Total/NA	1,2-Dichlorobenzene	1.0	ug/L	U	1	1	0.37	1
680-150977-1	32M-01-13XBR_SPR18	4/10/2018	8260B	Total/NA	1,2-Dichloroethane	1.0	ug/L	U	1	1	0.5	1
680-150977-1	32M-01-13XBR_SPR18	4/10/2018	8260B	Total/NA	1,2-Dichloroethene, Total	1.0	ug/L	U	2	1	0.74	1
680-150977-1	32M-01-13XBR_SPR18	4/10/2018	8260B	Total/NA	1,2-Dichloropropane	1.0	ug/L	U	1	1	0.67	1
680-150977-1	32M-01-13XBR_SPR18	4/10/2018	8260B	Total/NA	1,3,5-Trimethylbenzene	0.50	ug/L	U	1	0.5	0.31	1
680-150977-1	32M-01-13XBR_SPR18	4/10/2018	8260B	Total/NA	1,3-Dichlorobenzene	1.0	ug/L	U	1	1	0.43	1
680-150977-1	32M-01-13XBR_SPR18	4/10/2018	8260B	Total/NA	1,3-Dichloropropane	1.0	ug/L	U	1	1	0.34	1
680-150977-1	32M-01-13XBR_SPR18	4/10/2018	8260B	Total/NA	1,4-Dichlorobenzene	1.0	ug/L	U	1	1	0.46	1
680-150977-1	32M-01-13XBR_SPR18	4/10/2018	8260B	Total/NA	2,2-Dichloropropane	1.0	ug/L	U	1	1	0.37	1
680-150977-1	32M-01-13XBR_SPR18	4/10/2018	8260B	Total/NA	2-Butanone (MEK)	10	ug/L	U	10	10	3.4	1
680-150977-1	32M-01-13XBR_SPR18	4/10/2018	8260B	Total/NA	2-Chlorotoluene	0.50	ug/L	U	1	0.5	0.27	1
680-150977-1	32M-01-13XBR_SPR18	4/10/2018	8260B	Total/NA	2-Hexanone	5.0	ug/L	U	10	5	2	1
680-150977-1	32M-01-13XBR_SPR18	4/10/2018	8260B	Total/NA	4-Chlorotoluene	1.0	ug/L	U	1	1	0.45	1
680-150977-1	32M-01-13XBR_SPR18	4/10/2018	8260B	Total/NA	4-Isopropyltoluene	1.0	ug/L	U	1	1	0.48	1
680-150977-1	32M-01-13XBR_SPR18	4/10/2018	8260B	Total/NA	4-Methyl-2-pentanone (MIBK)	5.0	ug/L	U	10	5	2.1	1
680-150977-1	32M-01-13XBR_SPR18	4/10/2018	8260B	Total/NA	Acetone	10	ug/L	U	10	10	7	1
680-150977-1	32M-01-13XBR_SPR18	4/10/2018	8260B	Total/NA	Benzene	1.0	ug/L	U	1	1	0.43	1
680-150977-1	32M-01-13XBR_SPR18	4/10/2018	8260B	Total/NA	Bromobenzene	1.0	ug/L	U	1	1	0.5	1
680-150977-1	32M-01-13XBR_SPR18	4/10/2018	8260B	Total/NA	Bromoform	1.0	ug/L	U	1	1	0.43	1
680-150977-1	32M-01-13XBR_SPR18	4/10/2018	8260B	Total/NA	Bromomethane	5.0	ug/L	U	5	5	2.5	1
680-150977-1	32M-01-13XBR_SPR18	4/10/2018	8260B	Total/NA	Carbon disulfide	2.0	ug/L	U	2	2	0.43	1
680-150977-1	32M-01-13XBR_SPR18	4/10/2018	8260B	Total/NA	Carbon tetrachloride	0.50	ug/L	U	1	0.5	0.33	1
680-150977-1	32M-01-13XBR_SPR18	4/10/2018	8260B	Total/NA	Chlorobenzene	0.50	ug/L	U	1	0.5	0.26	1
680-150977-1	32M-01-13XBR_SPR18	4/10/2018	8260B	Total/NA	Chlorobromomethane	1.0	ug/L	U	1	1	0.45	1
680-150977-1	32M-01-13XBR_SPR18	4/10/2018	8260B	Total/NA	Chlorodibromomethane	0.50	ug/L	U	1	0.5	0.32	1

AOC 32/43A Spring 2018 LTM Validated Data

Lab Sample ID	Client Sample ID	Collection Date	Method	Prep Type	Analyte	Result	Unit	Flag	LOQ	LOD	DL	Dilution Factor
680-150977-1	32M-01-13XBR_SPR18	4/10/2018	8260B	Total/NA	Chloroethane	5.0	ug/L	U	5	5	2.5	1
680-150977-1	32M-01-13XBR_SPR18	4/10/2018	8260B	Total/NA	Chloroform	1.0	ug/L	U	1	1	0.5	1
680-150977-1	32M-01-13XBR_SPR18	4/10/2018	8260B	Total/NA	Chloromethane	1.0	ug/L	U	1	1	0.4	1
680-150977-1	32M-01-13XBR_SPR18	4/10/2018	8260B	Total/NA	cis-1,2-Dichloroethene	1.0	ug/L	U	1	1	0.41	1
680-150977-1	32M-01-13XBR_SPR18	4/10/2018	8260B	Total/NA	cis-1,3-Dichloropropene	1.0	ug/L	U	1	1	0.4	1
680-150977-1	32M-01-13XBR_SPR18	4/10/2018	8260B	Total/NA	Dibromomethane	1.0	ug/L	U	1	1	0.35	1
680-150977-1	32M-01-13XBR_SPR18	4/10/2018	8260B	Total/NA	Dichlorobromomethane	1.0	ug/L	U	1	1	0.44	1
680-150977-1	32M-01-13XBR_SPR18	4/10/2018	8260B	Total/NA	Dichlorodifluoromethane	1.0	ug/L	U	1	1	0.6	1
680-150977-1	32M-01-13XBR_SPR18	4/10/2018	8260B	Total/NA	Ethylbenzene	0.50	ug/L	U	1	0.5	0.33	1
680-150977-1	32M-01-13XBR_SPR18	4/10/2018	8260B	Total/NA	Ethylene Dibromide	1.0	ug/L	U	1	1	0.44	1
680-150977-1	32M-01-13XBR_SPR18	4/10/2018	8260B	Total/NA	Hexachlorobutadiene	5.0	ug/L	U	5	5	2.5	1
680-150977-1	32M-01-13XBR_SPR18	4/10/2018	8260B	Total/NA	Isopropylbenzene	1.0	ug/L	U	1	1	0.35	1
680-150977-1	32M-01-13XBR_SPR18	4/10/2018	8260B	Total/NA	Methyl tert-butyl ether	0.50	ug/L	U	10	0.5	0.3	1
680-150977-1	32M-01-13XBR_SPR18	4/10/2018	8260B	Total/NA	Methylene Chloride	5.0	ug/L	U	5	5	2.5	1
680-150977-1	32M-01-13XBR_SPR18	4/10/2018	8260B	Total/NA	m-Xylene & p-Xylene	1.0	ug/L	U	1	1	0.35	1
680-150977-1	32M-01-13XBR_SPR18	4/10/2018	8260B	Total/NA	Naphthalene	5.0	ug/L	U	5	5	2.5	1
680-150977-1	32M-01-13XBR_SPR18	4/10/2018	8260B	Total/NA	n-Butylbenzene	1.0	ug/L	U	1	1	0.47	1
680-150977-1	32M-01-13XBR_SPR18	4/10/2018	8260B	Total/NA	N-Propylbenzene	1.0	ug/L	U	1	1	0.38	1
680-150977-1	32M-01-13XBR_SPR18	4/10/2018	8260B	Total/NA	o-Xylene	0.50	ug/L	U	1	0.5	0.23	1
680-150977-1	32M-01-13XBR_SPR18	4/10/2018	8260B	Total/NA	sec-Butylbenzene	1.0	ug/L	U	1	1	0.42	1
680-150977-1	32M-01-13XBR_SPR18	4/10/2018	8260B	Total/NA	Styrene	0.50	ug/L	U	1	0.5	0.27	1
680-150977-1	32M-01-13XBR_SPR18	4/10/2018	8260B	Total/NA	tert-Butylbenzene	1.0	ug/L	U	1	1	0.45	1
680-150977-1	32M-01-13XBR_SPR18	4/10/2018	8260B	Total/NA	Tetrachloroethene	1.0	ug/L	U	1	1	0.74	1
680-150977-1	32M-01-13XBR_SPR18	4/10/2018	8260B	Total/NA	Toluene	1.0	ug/L	U	1	1	0.48	1
680-150977-1	32M-01-13XBR_SPR18	4/10/2018	8260B	Total/NA	trans-1,2-Dichloroethene	1.0	ug/L	U	1	1	0.37	1
680-150977-1	32M-01-13XBR_SPR18	4/10/2018	8260B	Total/NA	trans-1,3-Dichloropropene	1.0	ug/L	U	1	1	0.42	1
680-150977-1	32M-01-13XBR_SPR18	4/10/2018	8260B	Total/NA	Trichloroethene	1.0	ug/L	U	1	1	0.48	1
680-150977-1	32M-01-13XBR_SPR18	4/10/2018	8260B	Total/NA	Trichlorofluoromethane	1.0	ug/L	U	1	1	0.42	1
680-150977-1	32M-01-13XBR_SPR18	4/10/2018	8260B	Total/NA	Vinyl acetate	2.0	ug/L	U	2	2	0.81	1
680-150977-1	32M-01-13XBR_SPR18	4/10/2018	8260B	Total/NA	Vinyl chloride	1.0	ug/L	U	1	1	0.5	1
680-150977-1	32M-01-13XBR_SPR18	4/10/2018	8260B	Total/NA	Xylenes, Total	0.50	ug/L	U	2	0.5	0.23	1
SL3114-1RA	32M-01-13XBR_SPR18	4/10/2018	MA VPH	Total/NA	BENZENE	3.0	ug/L	U	3	3	0.31	1
SL3114-1RA	32M-01-13XBR_SPR18	4/10/2018	MA VPH	Total/NA	C5-C8 ALIPHATICS	100	ug/L	U	100	100	50	1
SL3114-1RA	32M-01-13XBR_SPR18	4/10/2018	MA VPH	Total/NA	C9-C10 AROMATICS	100	ug/L	U	100	100	50	1
SL3114-1RA	32M-01-13XBR_SPR18	4/10/2018	MA VPH	Total/NA	C9-C12 ALIPHATICS	100	ug/L	U	100	100	50	1
SL3114-1RA	32M-01-13XBR_SPR18	4/10/2018	MA VPH	Total/NA	ETHYLBENZENE	5.0	ug/L	U	5	5	0.42	1
SL3114-1RA	32M-01-13XBR_SPR18	4/10/2018	MA VPH	Total/NA	M-,P-XYLENE	10	ug/L	U	10	10	0.92	1
SL3114-1RA	32M-01-13XBR_SPR18	4/10/2018	MA VPH	Total/NA	METHYL TERT-BUTYL ETHER	5.0	ug/L	U	5	5	0.31	1
SL3114-1RA	32M-01-13XBR_SPR18	4/10/2018	MA VPH	Total/NA	NAPHTHALENE	5.0	ug/L	U	5	5	1.6	1

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Lab Sample ID	Client Sample ID	Collection Date	Method	Prep Type	Analyte	Result	Unit	Flag	LOQ	LOD	DL	Dilution Factor
SL3114-1RA	32M-01-13XBR_SPR18	4/10/2018	MA VPH	Total/NA	O-XYLENE	5.0	ug/L	U	5	5	0.47	1
SL3114-1RA	32M-01-13XBR_SPR18	4/10/2018	MA VPH	Total/NA	TOLUENE	5.0	ug/L	U	5	5	0.34	1
680-150977-2	32M-01-14XOB_SPR18	4/10/2018	6010C	Total/NA	Manganese	**2,700**	ug/L		10	3	1	1
680-150977-2	32M-01-14XOB_SPR18	4/10/2018	6020A	Total/NA	Arsenic	**32**	ug/L		3	3	1.5	1
680-150977-2	32M-01-14XOB_SPR18	4/10/2018	8260B	Total/NA	1,1,1,2-Tetrachloroethane	1.0	ug/L	U	1	1	0.37	1
680-150977-2	32M-01-14XOB_SPR18	4/10/2018	8260B	Total/NA	1,1,1-Trichloroethane	1.0	ug/L	U	1	1	0.37	1
680-150977-2	32M-01-14XOB_SPR18	4/10/2018	8260B	Total/NA	1,1,2,2-Tetrachloroethane	1.0	ug/L	U	1	1	0.62	1
680-150977-2	32M-01-14XOB_SPR18	4/10/2018	8260B	Total/NA	1,1,2-Trichloroethane	0.50	ug/L	U	1	0.5	0.33	1
680-150977-2	32M-01-14XOB_SPR18	4/10/2018	8260B	Total/NA	1,1-Dichloroethane	1.0	ug/L	U	1	1	0.38	1
680-150977-2	32M-01-14XOB_SPR18	4/10/2018	8260B	Total/NA	1,1-Dichloroethene	1.0	ug/L	U	1	1	0.36	1
680-150977-2	32M-01-14XOB_SPR18	4/10/2018	8260B	Total/NA	1,1-Dichloropropene	1.0	ug/L	U	1	1	0.34	1
680-150977-2	32M-01-14XOB_SPR18	4/10/2018	8260B	Total/NA	1,2,3-Trichlorobenzene	5.0	ug/L	U	5	5	2.5	1
680-150977-2	32M-01-14XOB_SPR18	4/10/2018	8260B	Total/NA	1,2,3-Trichloropropane	1.0	ug/L	U	1	1	0.39	1
680-150977-2	32M-01-14XOB_SPR18	4/10/2018	8260B	Total/NA	1,2,4-Trichlorobenzene	5.0	ug/L	U	5	5	2.5	1
680-150977-2	32M-01-14XOB_SPR18	4/10/2018	8260B	Total/NA	1,2,4-Trimethylbenzene	1.0	ug/L	U	1	1	0.47	1
680-150977-2	32M-01-14XOB_SPR18	4/10/2018	8260B	Total/NA	1,2-Dibromo-3-Chloropropane	2.0	ug/L	U	5	2	1.1	1
680-150977-2	32M-01-14XOB_SPR18	4/10/2018	8260B	Total/NA	1,2-Dichlorobenzene	1.0	ug/L	U	1	1	0.37	1
680-150977-2	32M-01-14XOB_SPR18	4/10/2018	8260B	Total/NA	1,2-Dichloroethane	1.0	ug/L	U	1	1	0.5	1
680-150977-2	32M-01-14XOB_SPR18	4/10/2018	8260B	Total/NA	1,2-Dichloroethene, Total	1.0	ug/L	U	2	1	0.74	1
680-150977-2	32M-01-14XOB_SPR18	4/10/2018	8260B	Total/NA	1,2-Dichloropropane	1.0	ug/L	U	1	1	0.67	1
680-150977-2	32M-01-14XOB_SPR18	4/10/2018	8260B	Total/NA	1,3,5-Trimethylbenzene	0.50	ug/L	U	1	0.5	0.31	1
680-150977-2	32M-01-14XOB_SPR18	4/10/2018	8260B	Total/NA	1,3-Dichlorobenzene	1.0	ug/L	U	1	1	0.43	1
680-150977-2	32M-01-14XOB_SPR18	4/10/2018	8260B	Total/NA	1,3-Dichloropropane	1.0	ug/L	U	1	1	0.34	1
680-150977-2	32M-01-14XOB_SPR18	4/10/2018	8260B	Total/NA	1,4-Dichlorobenzene	1.0	ug/L	U	1	1	0.46	1
680-150977-2	32M-01-14XOB_SPR18	4/10/2018	8260B	Total/NA	2,2-Dichloropropane	1.0	ug/L	U	1	1	0.37	1
680-150977-2	32M-01-14XOB_SPR18	4/10/2018	8260B	Total/NA	2-Butanone (MEK)	10	ug/L	U	10	10	3.4	1
680-150977-2	32M-01-14XOB_SPR18	4/10/2018	8260B	Total/NA	2-Chlorotoluene	0.50	ug/L	U	1	0.5	0.27	1
680-150977-2	32M-01-14XOB_SPR18	4/10/2018	8260B	Total/NA	2-Hexanone	5.0	ug/L	U	10	5	2	1
680-150977-2	32M-01-14XOB_SPR18	4/10/2018	8260B	Total/NA	4-Chlorotoluene	1.0	ug/L	U	1	1	0.45	1
680-150977-2	32M-01-14XOB_SPR18	4/10/2018	8260B	Total/NA	4-Isopropyltoluene	1.0	ug/L	U	1	1	0.48	1
680-150977-2	32M-01-14XOB_SPR18	4/10/2018	8260B	Total/NA	4-Methyl-2-pentanone (MIBK)	5.0	ug/L	U	10	5	2.1	1
680-150977-2	32M-01-14XOB_SPR18	4/10/2018	8260B	Total/NA	Acetone	10	ug/L	U	10	10	7	1
680-150977-2	32M-01-14XOB_SPR18	4/10/2018	8260B	Total/NA	Benzene	1.0	ug/L	U	1	1	0.43	1
680-150977-2	32M-01-14XOB_SPR18	4/10/2018	8260B	Total/NA	Bromobenzene	1.0	ug/L	U	1	1	0.5	1
680-150977-2	32M-01-14XOB_SPR18	4/10/2018	8260B	Total/NA	Bromoform	1.0	ug/L	U	1	1	0.43	1
680-150977-2	32M-01-14XOB_SPR18	4/10/2018	8260B	Total/NA	Bromomethane	5.0	ug/L	U	5	5	2.5	1
680-150977-2	32M-01-14XOB_SPR18	4/10/2018	8260B	Total/NA	Carbon disulfide	2.0	ug/L	U	2	2	0.43	1
680-150977-2	32M-01-14XOB_SPR18	4/10/2018	8260B	Total/NA	Carbon tetrachloride	0.50	ug/L	U	1	0.5	0.33	1
680-150977-2	32M-01-14XOB_SPR18	4/10/2018	8260B	Total/NA	Chlorobenzene	0.50	ug/L	U	1	0.5	0.26	1

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Lab Sample ID	Client Sample ID	Collection Date	Method	Prep Type	Analyte	Result	Unit	Flag	LOQ	LOD	DL	Dilution Factor
680-150977-2	32M-01-14XOB_SPR18	4/10/2018	8260B	Total/NA	Chlorobromomethane	1.0	ug/L	U	1	1	0.45	1
680-150977-2	32M-01-14XOB_SPR18	4/10/2018	8260B	Total/NA	Chlorodibromomethane	0.50	ug/L	U	1	0.5	0.32	1
680-150977-2	32M-01-14XOB_SPR18	4/10/2018	8260B	Total/NA	Chloroethane	5.0	ug/L	U	5	5	2.5	1
680-150977-2	32M-01-14XOB_SPR18	4/10/2018	8260B	Total/NA	Chloroform	1.0	ug/L	U	1	1	0.5	1
680-150977-2	32M-01-14XOB_SPR18	4/10/2018	8260B	Total/NA	Chloromethane	1.0	ug/L	U	1	1	0.4	1
680-150977-2	32M-01-14XOB_SPR18	4/10/2018	8260B	Total/NA	cis-1,2-Dichloroethene	1.0	ug/L	U	1	1	0.41	1
680-150977-2	32M-01-14XOB_SPR18	4/10/2018	8260B	Total/NA	cis-1,3-Dichloropropene	1.0	ug/L	U	1	1	0.4	1
680-150977-2	32M-01-14XOB_SPR18	4/10/2018	8260B	Total/NA	Dibromomethane	1.0	ug/L	U	1	1	0.35	1
680-150977-2	32M-01-14XOB_SPR18	4/10/2018	8260B	Total/NA	Dichlorobromomethane	1.0	ug/L	U	1	1	0.44	1
680-150977-2	32M-01-14XOB_SPR18	4/10/2018	8260B	Total/NA	Dichlorodifluoromethane	1.0	ug/L	U	1	1	0.6	1
680-150977-2	32M-01-14XOB_SPR18	4/10/2018	8260B	Total/NA	Ethylbenzene	0.50	ug/L	U	1	0.5	0.33	1
680-150977-2	32M-01-14XOB_SPR18	4/10/2018	8260B	Total/NA	Ethylene Dibromide	1.0	ug/L	U	1	1	0.44	1
680-150977-2	32M-01-14XOB_SPR18	4/10/2018	8260B	Total/NA	Hexachlorobutadiene	5.0	ug/L	U	5	5	2.5	1
680-150977-2	32M-01-14XOB_SPR18	4/10/2018	8260B	Total/NA	Isopropylbenzene	1.0	ug/L	U	1	1	0.35	1
680-150977-2	32M-01-14XOB_SPR18	4/10/2018	8260B	Total/NA	Methyl tert-butyl ether	0.50	ug/L	U	10	0.5	0.3	1
680-150977-2	32M-01-14XOB_SPR18	4/10/2018	8260B	Total/NA	Methylene Chloride	5.0	ug/L	U	5	5	2.5	1
680-150977-2	32M-01-14XOB_SPR18	4/10/2018	8260B	Total/NA	m-Xylene & p-Xylene	1.0	ug/L	U	1	1	0.35	1
680-150977-2	32M-01-14XOB_SPR18	4/10/2018	8260B	Total/NA	Naphthalene	5.0	ug/L	U	5	5	2.5	1
680-150977-2	32M-01-14XOB_SPR18	4/10/2018	8260B	Total/NA	n-Butylbenzene	1.0	ug/L	U	1	1	0.47	1
680-150977-2	32M-01-14XOB_SPR18	4/10/2018	8260B	Total/NA	N-Propylbenzene	1.0	ug/L	U	1	1	0.38	1
680-150977-2	32M-01-14XOB_SPR18	4/10/2018	8260B	Total/NA	o-Xylene	0.50	ug/L	U	1	0.5	0.23	1
680-150977-2	32M-01-14XOB_SPR18	4/10/2018	8260B	Total/NA	sec-Butylbenzene	1.0	ug/L	U	1	1	0.42	1
680-150977-2	32M-01-14XOB_SPR18	4/10/2018	8260B	Total/NA	Styrene	0.50	ug/L	U	1	0.5	0.27	1
680-150977-2	32M-01-14XOB_SPR18	4/10/2018	8260B	Total/NA	tert-Butylbenzene	1.0	ug/L	U	1	1	0.45	1
680-150977-2	32M-01-14XOB_SPR18	4/10/2018	8260B	Total/NA	Tetrachloroethene	1.0	ug/L	U	1	1	0.74	1
680-150977-2	32M-01-14XOB_SPR18	4/10/2018	8260B	Total/NA	Toluene	1.0	ug/L	U	1	1	0.48	1
680-150977-2	32M-01-14XOB_SPR18	4/10/2018	8260B	Total/NA	trans-1,2-Dichloroethene	1.0	ug/L	U	1	1	0.37	1
680-150977-2	32M-01-14XOB_SPR18	4/10/2018	8260B	Total/NA	trans-1,3-Dichloropropene	1.0	ug/L	U	1	1	0.42	1
680-150977-2	32M-01-14XOB_SPR18	4/10/2018	8260B	Total/NA	Trichloroethene	1.0	ug/L	U	1	1	0.48	1
680-150977-2	32M-01-14XOB_SPR18	4/10/2018	8260B	Total/NA	Trichlorofluoromethane	1.0	ug/L	U	1	1	0.42	1
680-150977-2	32M-01-14XOB_SPR18	4/10/2018	8260B	Total/NA	Vinyl acetate	2.0	ug/L	U	2	2	0.81	1
680-150977-2	32M-01-14XOB_SPR18	4/10/2018	8260B	Total/NA	Vinyl chloride	1.0	ug/L	U	1	1	0.5	1
680-150977-2	32M-01-14XOB_SPR18	4/10/2018	8260B	Total/NA	Xylenes, Total	0.50	ug/L	U	2	0.5	0.23	1
SL3114-2	32M-01-14XOB_SPR18	4/10/2018	MA VPH	Total/NA	BENZENE	3.0	ug/L	U	3	3	0.31	1
SL3114-2	32M-01-14XOB_SPR18	4/10/2018	MA VPH	Total/NA	C5-C8 ALIPHATICS	100	ug/L	U	100	100	50	1
SL3114-2	32M-01-14XOB_SPR18	4/10/2018	MA VPH	Total/NA	C9-C10 AROMATICS	100	ug/L	U	100	100	50	1
SL3114-2	32M-01-14XOB_SPR18	4/10/2018	MA VPH	Total/NA	C9-C12 ALIPHATICS	100	ug/L	U	100	100	50	1
SL3114-2	32M-01-14XOB_SPR18	4/10/2018	MA VPH	Total/NA	ETHYLBENZENE	5.0	ug/L	U	5	5	0.42	1
SL3114-2	32M-01-14XOB_SPR18	4/10/2018	MA VPH	Total/NA	M-,P-XYLENE	10	ug/L	U	10	10	0.92	1

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Lab Sample ID	Client Sample ID	Collection Date	Method	Prep Type	Analyte	Result	Unit	Flag	LOQ	LOD	DL	Dilution Factor
SL3114-2	32M-01-14XOB_SPR18	4/10/2018	MA VPH	Total/NA	METHYL TERT-BUTYL ETHER	5.0	ug/L	U	5	5	0.31	1
SL3114-2	32M-01-14XOB_SPR18	4/10/2018	MA VPH	Total/NA	NAPHTHALENE	5.0	ug/L	U	5	5	1.6	1
SL3114-2	32M-01-14XOB_SPR18	4/10/2018	MA VPH	Total/NA	O-XYLENE	5.0	ug/L	U	5	5	0.47	1
SL3114-2	32M-01-14XOB_SPR18	4/10/2018	MA VPH	Total/NA	TOLUENE	5.0	ug/L	U	5	5	0.34	1
680-150977-3	32M-01-17XBR_SPR18	4/9/2018	6010C	Total/NA	Manganese	**1.1**	ug/L	J	10	3	1	1
680-150977-3	32M-01-17XBR_SPR18	4/9/2018	6020A	Total/NA	Arsenic	3.0	ug/L	U	3	3	1.5	1
680-150977-3	32M-01-17XBR_SPR18	4/9/2018	8260B	Total/NA	1,1,1,2-Tetrachloroethane	1.0	ug/L	U	1	1	0.37	1
680-150977-3	32M-01-17XBR_SPR18	4/9/2018	8260B	Total/NA	1,1,1-Trichloroethane	1.0	ug/L	U	1	1	0.37	1
680-150977-3	32M-01-17XBR_SPR18	4/9/2018	8260B	Total/NA	1,1,2,2-Tetrachloroethane	1.0	ug/L	U	1	1	0.62	1
680-150977-3	32M-01-17XBR_SPR18	4/9/2018	8260B	Total/NA	1,1,2-Trichloroethane	0.50	ug/L	U	1	0.5	0.33	1
680-150977-3	32M-01-17XBR_SPR18	4/9/2018	8260B	Total/NA	1,1-Dichloroethane	1.0	ug/L	U	1	1	0.38	1
680-150977-3	32M-01-17XBR_SPR18	4/9/2018	8260B	Total/NA	1,1-Dichloroethene	1.0	ug/L	U	1	1	0.36	1
680-150977-3	32M-01-17XBR_SPR18	4/9/2018	8260B	Total/NA	1,1-Dichloropropene	1.0	ug/L	U	1	1	0.34	1
680-150977-3	32M-01-17XBR_SPR18	4/9/2018	8260B	Total/NA	1,2,3-Trichlorobenzene	5.0	ug/L	U	5	5	2.5	1
680-150977-3	32M-01-17XBR_SPR18	4/9/2018	8260B	Total/NA	1,2,3-Trichloropropane	1.0	ug/L	U	1	1	0.39	1
680-150977-3	32M-01-17XBR_SPR18	4/9/2018	8260B	Total/NA	1,2,4-Trichlorobenzene	5.0	ug/L	U	5	5	2.5	1
680-150977-3	32M-01-17XBR_SPR18	4/9/2018	8260B	Total/NA	1,2,4-Trimethylbenzene	1.0	ug/L	U	1	1	0.47	1
680-150977-3	32M-01-17XBR_SPR18	4/9/2018	8260B	Total/NA	1,2-Dibromo-3-Chloropropane	2.0	ug/L	U	5	2	1.1	1
680-150977-3	32M-01-17XBR_SPR18	4/9/2018	8260B	Total/NA	1,2-Dichlorobenzene	1.0	ug/L	U	1	1	0.37	1
680-150977-3	32M-01-17XBR_SPR18	4/9/2018	8260B	Total/NA	1,2-Dichloroethane	1.0	ug/L	U	1	1	0.5	1
680-150977-3	32M-01-17XBR_SPR18	4/9/2018	8260B	Total/NA	1,2-Dichloroethene, Total	1.0	ug/L	U	2	1	0.74	1
680-150977-3	32M-01-17XBR_SPR18	4/9/2018	8260B	Total/NA	1,2-Dichloropropane	1.0	ug/L	U	1	1	0.67	1
680-150977-3	32M-01-17XBR_SPR18	4/9/2018	8260B	Total/NA	1,3,5-Trimethylbenzene	0.50	ug/L	U	1	0.5	0.31	1
680-150977-3	32M-01-17XBR_SPR18	4/9/2018	8260B	Total/NA	1,3-Dichlorobenzene	1.0	ug/L	U	1	1	0.43	1
680-150977-3	32M-01-17XBR_SPR18	4/9/2018	8260B	Total/NA	1,3-Dichloropropane	1.0	ug/L	U	1	1	0.34	1
680-150977-3	32M-01-17XBR_SPR18	4/9/2018	8260B	Total/NA	1,4-Dichlorobenzene	1.0	ug/L	U	1	1	0.46	1
680-150977-3	32M-01-17XBR_SPR18	4/9/2018	8260B	Total/NA	2,2-Dichloropropane	1.0	ug/L	U	1	1	0.37	1
680-150977-3	32M-01-17XBR_SPR18	4/9/2018	8260B	Total/NA	2-Butanone (MEK)	10	ug/L	U	10	10	3.4	1
680-150977-3	32M-01-17XBR_SPR18	4/9/2018	8260B	Total/NA	2-Chlorotoluene	0.50	ug/L	U	1	0.5	0.27	1
680-150977-3	32M-01-17XBR_SPR18	4/9/2018	8260B	Total/NA	2-Hexanone	5.0	ug/L	U	10	5	2	1
680-150977-3	32M-01-17XBR_SPR18	4/9/2018	8260B	Total/NA	4-Chlorotoluene	1.0	ug/L	U	1	1	0.45	1
680-150977-3	32M-01-17XBR_SPR18	4/9/2018	8260B	Total/NA	4-Isopropyltoluene	1.0	ug/L	U	1	1	0.48	1
680-150977-3	32M-01-17XBR_SPR18	4/9/2018	8260B	Total/NA	4-Methyl-2-pentanone (MIBK)	5.0	ug/L	U	10	5	2.1	1
680-150977-3	32M-01-17XBR_SPR18	4/9/2018	8260B	Total/NA	Acetone	10	ug/L	U	10	10	7	1
680-150977-3	32M-01-17XBR_SPR18	4/9/2018	8260B	Total/NA	Benzene	1.0	ug/L	U	1	1	0.43	1
680-150977-3	32M-01-17XBR_SPR18	4/9/2018	8260B	Total/NA	Bromobenzene	1.0	ug/L	U	1	1	0.5	1
680-150977-3	32M-01-17XBR_SPR18	4/9/2018	8260B	Total/NA	Bromoform	1.0	ug/L	U	1	1	0.43	1
680-150977-3	32M-01-17XBR_SPR18	4/9/2018	8260B	Total/NA	Bromomethane	5.0	ug/L	U	5	5	2.5	1
680-150977-3	32M-01-17XBR_SPR18	4/9/2018	8260B	Total/NA	Carbon disulfide	2.0	ug/L	U	2	2	0.43	1

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Lab Sample ID	Client Sample ID	Collection Date	Method	Prep Type	Analyte	Result	Unit	Flag	LOQ	LOD	DL	Dilution Factor
680-150977-3	32M-01-17XBR_SPR18	4/9/2018	8260B	Total/NA	Carbon tetrachloride	0.50	ug/L	U	1	0.5	0.33	1
680-150977-3	32M-01-17XBR_SPR18	4/9/2018	8260B	Total/NA	Chlorobenzene	0.50	ug/L	U	1	0.5	0.26	1
680-150977-3	32M-01-17XBR_SPR18	4/9/2018	8260B	Total/NA	Chlorobromomethane	1.0	ug/L	U	1	1	0.45	1
680-150977-3	32M-01-17XBR_SPR18	4/9/2018	8260B	Total/NA	Chlorodibromomethane	0.50	ug/L	U	1	0.5	0.32	1
680-150977-3	32M-01-17XBR_SPR18	4/9/2018	8260B	Total/NA	Chloroethane	5.0	ug/L	U	5	5	2.5	1
680-150977-3	32M-01-17XBR_SPR18	4/9/2018	8260B	Total/NA	Chloroform	1.0	ug/L	U	1	1	0.5	1
680-150977-3	32M-01-17XBR_SPR18	4/9/2018	8260B	Total/NA	Chloromethane	1.0	ug/L	U	1	1	0.4	1
680-150977-3	32M-01-17XBR_SPR18	4/9/2018	8260B	Total/NA	cis-1,2-Dichloroethene	1.0	ug/L	U	1	1	0.41	1
680-150977-3	32M-01-17XBR_SPR18	4/9/2018	8260B	Total/NA	cis-1,3-Dichloropropene	1.0	ug/L	U	1	1	0.4	1
680-150977-3	32M-01-17XBR_SPR18	4/9/2018	8260B	Total/NA	Dibromomethane	1.0	ug/L	U	1	1	0.35	1
680-150977-3	32M-01-17XBR_SPR18	4/9/2018	8260B	Total/NA	Dichlorobromomethane	1.0	ug/L	U	1	1	0.44	1
680-150977-3	32M-01-17XBR_SPR18	4/9/2018	8260B	Total/NA	Dichlorodifluoromethane	1.0	ug/L	U	1	1	0.6	1
680-150977-3	32M-01-17XBR_SPR18	4/9/2018	8260B	Total/NA	Ethylbenzene	0.50	ug/L	U	1	0.5	0.33	1
680-150977-3	32M-01-17XBR_SPR18	4/9/2018	8260B	Total/NA	Ethylene Dibromide	1.0	ug/L	U	1	1	0.44	1
680-150977-3	32M-01-17XBR_SPR18	4/9/2018	8260B	Total/NA	Hexachlorobutadiene	5.0	ug/L	U	5	5	2.5	1
680-150977-3	32M-01-17XBR_SPR18	4/9/2018	8260B	Total/NA	Isopropylbenzene	1.0	ug/L	U	1	1	0.35	1
680-150977-3	32M-01-17XBR_SPR18	4/9/2018	8260B	Total/NA	Methyl tert-butyl ether	0.50	ug/L	U	10	0.5	0.3	1
680-150977-3	32M-01-17XBR_SPR18	4/9/2018	8260B	Total/NA	Methylene Chloride	5.0	ug/L	U	5	5	2.5	1
680-150977-3	32M-01-17XBR_SPR18	4/9/2018	8260B	Total/NA	m-Xylene & p-Xylene	1.0	ug/L	U	1	1	0.35	1
680-150977-3	32M-01-17XBR_SPR18	4/9/2018	8260B	Total/NA	Naphthalene	5.0	ug/L	U	5	5	2.5	1
680-150977-3	32M-01-17XBR_SPR18	4/9/2018	8260B	Total/NA	n-Butylbenzene	1.0	ug/L	U	1	1	0.47	1
680-150977-3	32M-01-17XBR_SPR18	4/9/2018	8260B	Total/NA	N-Propylbenzene	1.0	ug/L	U	1	1	0.38	1
680-150977-3	32M-01-17XBR_SPR18	4/9/2018	8260B	Total/NA	o-Xylene	0.50	ug/L	U	1	0.5	0.23	1
680-150977-3	32M-01-17XBR_SPR18	4/9/2018	8260B	Total/NA	sec-Butylbenzene	1.0	ug/L	U	1	1	0.42	1
680-150977-3	32M-01-17XBR_SPR18	4/9/2018	8260B	Total/NA	Styrene	0.50	ug/L	U	1	0.5	0.27	1
680-150977-3	32M-01-17XBR_SPR18	4/9/2018	8260B	Total/NA	tert-Butylbenzene	1.0	ug/L	U	1	1	0.45	1
680-150977-3	32M-01-17XBR_SPR18	4/9/2018	8260B	Total/NA	Tetrachloroethene	1.0	ug/L	U	1	1	0.74	1
680-150977-3	32M-01-17XBR_SPR18	4/9/2018	8260B	Total/NA	Toluene	1.0	ug/L	U	1	1	0.48	1
680-150977-3	32M-01-17XBR_SPR18	4/9/2018	8260B	Total/NA	trans-1,2-Dichloroethene	1.0	ug/L	U	1	1	0.37	1
680-150977-3	32M-01-17XBR_SPR18	4/9/2018	8260B	Total/NA	trans-1,3-Dichloropropene	1.0	ug/L	U	1	1	0.42	1
680-150977-3	32M-01-17XBR_SPR18	4/9/2018	8260B	Total/NA	Trichloroethene	1.0	ug/L	U	1	1	0.48	1
680-150977-3	32M-01-17XBR_SPR18	4/9/2018	8260B	Total/NA	Trichlorofluoromethane	1.0	ug/L	U	1	1	0.42	1
680-150977-3	32M-01-17XBR_SPR18	4/9/2018	8260B	Total/NA	Vinyl acetate	2.0	ug/L	U	2	2	0.81	1
680-150977-3	32M-01-17XBR_SPR18	4/9/2018	8260B	Total/NA	Vinyl chloride	1.0	ug/L	U	1	1	0.5	1
680-150977-3	32M-01-17XBR_SPR18	4/9/2018	8260B	Total/NA	Xylenes, Total	0.50	ug/L	U	2	0.5	0.23	1
SL3114-3	32M-01-17XBR_SPR18	4/9/2018	MA VPH	Total/NA	BENZENE	3.0	ug/L	U	3	3	0.31	1
SL3114-3	32M-01-17XBR_SPR18	4/9/2018	MA VPH	Total/NA	C5-C8 ALIPHATICS	100	ug/L	U	100	100	50	1
SL3114-3	32M-01-17XBR_SPR18	4/9/2018	MA VPH	Total/NA	C9-C10 AROMATICS	100	ug/L	U	100	100	50	1
SL3114-3	32M-01-17XBR_SPR18	4/9/2018	MA VPH	Total/NA	C9-C12 ALIPHATICS	100	ug/L	U	100	100	50	1

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Lab Sample ID	Client Sample ID	Collection Date	Method	Prep Type	Analyte	Result	Unit	Flag	LOQ	LOD	DL	Dilution Factor
SL3114-3	32M-01-17XBR_SPR18	4/9/2018	MA VPH	Total/NA	ETHYLBENZENE	5.0	ug/L	U	5	5	0.42	1
SL3114-3	32M-01-17XBR_SPR18	4/9/2018	MA VPH	Total/NA	M-,P-XYLENE	10	ug/L	U	10	10	0.92	1
SL3114-3	32M-01-17XBR_SPR18	4/9/2018	MA VPH	Total/NA	METHYL TERT-BUTYL ETHER	5.0	ug/L	U	5	5	0.31	1
SL3114-3	32M-01-17XBR_SPR18	4/9/2018	MA VPH	Total/NA	NAPHTHALENE	5.0	ug/L	U	5	5	1.6	1
SL3114-3	32M-01-17XBR_SPR18	4/9/2018	MA VPH	Total/NA	O-XYLENE	5.0	ug/L	U	5	5	0.47	1
SL3114-3	32M-01-17XBR_SPR18	4/9/2018	MA VPH	Total/NA	TOLUENE	5.0	ug/L	U	5	5	0.34	1
680-150977-4	32M-01-18XBR_SPR18	4/9/2018	6010C	Total/NA	Manganese	**8,400**	ug/L		10	3	1	1
680-150977-4	32M-01-18XBR_SPR18	4/9/2018	6020A	Total/NA	Arsenic	**6.5**	ug/L		3	3	1.5	1
680-150977-4	32M-01-18XBR_SPR18	4/9/2018	8260B	Total/NA	1,1,1,2-Tetrachloroethane	1.0	ug/L	U	1	1	0.37	1
680-150977-4	32M-01-18XBR_SPR18	4/9/2018	8260B	Total/NA	1,1,1-Trichloroethane	1.0	ug/L	U	1	1	0.37	1
680-150977-4	32M-01-18XBR_SPR18	4/9/2018	8260B	Total/NA	1,1,2,2-Tetrachloroethane	1.0	ug/L	U	1	1	0.62	1
680-150977-4	32M-01-18XBR_SPR18	4/9/2018	8260B	Total/NA	1,1,2-Trichloroethane	0.50	ug/L	U	1	0.5	0.33	1
680-150977-4	32M-01-18XBR_SPR18	4/9/2018	8260B	Total/NA	1,1-Dichloroethane	1.0	ug/L	U	1	1	0.38	1
680-150977-4	32M-01-18XBR_SPR18	4/9/2018	8260B	Total/NA	1,1-Dichloroethene	1.0	ug/L	U	1	1	0.36	1
680-150977-4	32M-01-18XBR_SPR18	4/9/2018	8260B	Total/NA	1,1-Dichloropropene	1.0	ug/L	U	1	1	0.34	1
680-150977-4	32M-01-18XBR_SPR18	4/9/2018	8260B	Total/NA	1,2,3-Trichlorobenzene	5.0	ug/L	U	5	5	2.5	1
680-150977-4	32M-01-18XBR_SPR18	4/9/2018	8260B	Total/NA	1,2,3-Trichloropropane	1.0	ug/L	U	1	1	0.39	1
680-150977-4	32M-01-18XBR_SPR18	4/9/2018	8260B	Total/NA	1,2,4-Trichlorobenzene	5.0	ug/L	U	5	5	2.5	1
680-150977-4	32M-01-18XBR_SPR18	4/9/2018	8260B	Total/NA	1,2,4-Trimethylbenzene	1.0	ug/L	U	1	1	0.47	1
680-150977-4	32M-01-18XBR_SPR18	4/9/2018	8260B	Total/NA	1,2-Dibromo-3-Chloropropane	2.0	ug/L	U	5	2	1.1	1
680-150977-4	32M-01-18XBR_SPR18	4/9/2018	8260B	Total/NA	1,2-Dichlorobenzene	**840**	ug/L		10	10	3.7	10
680-150977-4	32M-01-18XBR_SPR18	4/9/2018	8260B	Total/NA	1,2-Dichloroethane	1.0	ug/L	U	1	1	0.5	1
680-150977-4	32M-01-18XBR_SPR18	4/9/2018	8260B	Total/NA	1,2-Dichloroethene, Total	**1.0**	ug/L	J	2	1	0.74	1
680-150977-4	32M-01-18XBR_SPR18	4/9/2018	8260B	Total/NA	1,2-Dichloropropane	1.0	ug/L	U	1	1	0.67	1
680-150977-4	32M-01-18XBR_SPR18	4/9/2018	8260B	Total/NA	1,3,5-Trimethylbenzene	0.50	ug/L	U	1	0.5	0.31	1
680-150977-4	32M-01-18XBR_SPR18	4/9/2018	8260B	Total/NA	1,3-Dichlorobenzene	**150**	ug/L		1	1	0.43	1
680-150977-4	32M-01-18XBR_SPR18	4/9/2018	8260B	Total/NA	1,3-Dichloropropane	1.0	ug/L	U	1	1	0.34	1
680-150977-4	32M-01-18XBR_SPR18	4/9/2018	8260B	Total/NA	1,4-Dichlorobenzene	**97**	ug/L		1	1	0.46	1
680-150977-4	32M-01-18XBR_SPR18	4/9/2018	8260B	Total/NA	2,2-Dichloropropane	1.0	ug/L	U	1	1	0.37	1
680-150977-4	32M-01-18XBR_SPR18	4/9/2018	8260B	Total/NA	2-Butanone (MEK)	10	ug/L	U	10	10	3.4	1
680-150977-4	32M-01-18XBR_SPR18	4/9/2018	8260B	Total/NA	2-Chlorotoluene	0.50	ug/L	U	1	0.5	0.27	1
680-150977-4	32M-01-18XBR_SPR18	4/9/2018	8260B	Total/NA	2-Hexanone	5.0	ug/L	U	10	5	2	1
680-150977-4	32M-01-18XBR_SPR18	4/9/2018	8260B	Total/NA	4-Chlorotoluene	1.0	ug/L	U	1	1	0.45	1
680-150977-4	32M-01-18XBR_SPR18	4/9/2018	8260B	Total/NA	4-Isopropyltoluene	1.0	ug/L	U	1	1	0.48	1
680-150977-4	32M-01-18XBR_SPR18	4/9/2018	8260B	Total/NA	4-Methyl-2-pentanone (MIBK)	5.0	ug/L	U	10	5	2.1	1
680-150977-4	32M-01-18XBR_SPR18	4/9/2018	8260B	Total/NA	Acetone	10	ug/L	U	10	10	7	1
680-150977-4	32M-01-18XBR_SPR18	4/9/2018	8260B	Total/NA	Benzene	**0.79**	ug/L	J	1	1	0.43	1
680-150977-4	32M-01-18XBR_SPR18	4/9/2018	8260B	Total/NA	Bromobenzene	1.0	ug/L	U	1	1	0.5	1
680-150977-4	32M-01-18XBR_SPR18	4/9/2018	8260B	Total/NA	Bromoform	1.0	ug/L	U	1	1	0.43	1

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Lab Sample ID	Client Sample ID	Collection Date	Method	Prep Type	Analyte	Result	Unit	Flag	LOQ	LOD	DL	Dilution Factor
680-150977-4	32M-01-18XBR_SPR18	4/9/2018	8260B	Total/NA	Bromomethane	5.0	ug/L	U	5	5	2.5	1
680-150977-4	32M-01-18XBR_SPR18	4/9/2018	8260B	Total/NA	Carbon disulfide	2.0	ug/L	U	2	2	0.43	1
680-150977-4	32M-01-18XBR_SPR18	4/9/2018	8260B	Total/NA	Carbon tetrachloride	0.50	ug/L	U	1	0.5	0.33	1
680-150977-4	32M-01-18XBR_SPR18	4/9/2018	8260B	Total/NA	Chlorobenzene	**440**	ug/L		10	5	2.6	10
680-150977-4	32M-01-18XBR_SPR18	4/9/2018	8260B	Total/NA	Chlorobromomethane	1.0	ug/L	U	1	1	0.45	1
680-150977-4	32M-01-18XBR_SPR18	4/9/2018	8260B	Total/NA	Chlorodibromomethane	0.50	ug/L	U	1	0.5	0.32	1
680-150977-4	32M-01-18XBR_SPR18	4/9/2018	8260B	Total/NA	Chloroethane	5.0	ug/L	U	5	5	2.5	1
680-150977-4	32M-01-18XBR_SPR18	4/9/2018	8260B	Total/NA	Chloroform	1.0	ug/L	U	1	1	0.5	1
680-150977-4	32M-01-18XBR_SPR18	4/9/2018	8260B	Total/NA	Chloromethane	1.0	ug/L	U	1	1	0.4	1
680-150977-4	32M-01-18XBR_SPR18	4/9/2018	8260B	Total/NA	cis-1,2-Dichloroethene	**1.0**	ug/L		1	1	0.41	1
680-150977-4	32M-01-18XBR_SPR18	4/9/2018	8260B	Total/NA	cis-1,3-Dichloropropene	1.0	ug/L	U	1	1	0.4	1
680-150977-4	32M-01-18XBR_SPR18	4/9/2018	8260B	Total/NA	Dibromomethane	1.0	ug/L	U	1	1	0.35	1
680-150977-4	32M-01-18XBR_SPR18	4/9/2018	8260B	Total/NA	Dichlorobromomethane	1.0	ug/L	U	1	1	0.44	1
680-150977-4	32M-01-18XBR_SPR18	4/9/2018	8260B	Total/NA	Dichlorodifluoromethane	1.0	ug/L	U	1	1	0.6	1
680-150977-4	32M-01-18XBR_SPR18	4/9/2018	8260B	Total/NA	Ethylbenzene	**0.47**	ug/L	J	1	0.5	0.33	1
680-150977-4	32M-01-18XBR_SPR18	4/9/2018	8260B	Total/NA	Ethylene Dibromide	1.0	ug/L	U	1	1	0.44	1
680-150977-4	32M-01-18XBR_SPR18	4/9/2018	8260B	Total/NA	Hexachlorobutadiene	5.0	ug/L	U	5	5	2.5	1
680-150977-4	32M-01-18XBR_SPR18	4/9/2018	8260B	Total/NA	Isopropylbenzene	**1.1**	ug/L		1	1	0.35	1
680-150977-4	32M-01-18XBR_SPR18	4/9/2018	8260B	Total/NA	Methyl tert-butyl ether	0.50	ug/L	U	10	0.5	0.3	1
680-150977-4	32M-01-18XBR_SPR18	4/9/2018	8260B	Total/NA	Methylene Chloride	5.0	ug/L	U	5	5	2.5	1
680-150977-4	32M-01-18XBR_SPR18	4/9/2018	8260B	Total/NA	m-Xylene & p-Xylene	1.0	ug/L	U	1	1	0.35	1
680-150977-4	32M-01-18XBR_SPR18	4/9/2018	8260B	Total/NA	Naphthalene	5.0	ug/L	U	5	5	2.5	1
680-150977-4	32M-01-18XBR_SPR18	4/9/2018	8260B	Total/NA	n-Butylbenzene	1.0	ug/L	U	1	1	0.47	1
680-150977-4	32M-01-18XBR_SPR18	4/9/2018	8260B	Total/NA	N-Propylbenzene	**0.98**	ug/L	J	1	1	0.38	1
680-150977-4	32M-01-18XBR_SPR18	4/9/2018	8260B	Total/NA	o-Xylene	**0.30**	ug/L	J	1	0.5	0.23	1
680-150977-4	32M-01-18XBR_SPR18	4/9/2018	8260B	Total/NA	sec-Butylbenzene	**0.58**	ug/L	J	1	1	0.42	1
680-150977-4	32M-01-18XBR_SPR18	4/9/2018	8260B	Total/NA	Styrene	0.50	ug/L	U	1	0.5	0.27	1
680-150977-4	32M-01-18XBR_SPR18	4/9/2018	8260B	Total/NA	tert-Butylbenzene	1.0	ug/L	U	1	1	0.45	1
680-150977-4	32M-01-18XBR_SPR18	4/9/2018	8260B	Total/NA	Tetrachloroethene	1.0	ug/L	U	1	1	0.74	1
680-150977-4	32M-01-18XBR_SPR18	4/9/2018	8260B	Total/NA	Toluene	1.0	ug/L	U	1	1	0.48	1
680-150977-4	32M-01-18XBR_SPR18	4/9/2018	8260B	Total/NA	trans-1,2-Dichloroethene	1.0	ug/L	U	1	1	0.37	1
680-150977-4	32M-01-18XBR_SPR18	4/9/2018	8260B	Total/NA	trans-1,3-Dichloropropene	1.0	ug/L	U	1	1	0.42	1
680-150977-4	32M-01-18XBR_SPR18	4/9/2018	8260B	Total/NA	Trichloroethene	**0.92**	ug/L	J	1	1	0.48	1
680-150977-4	32M-01-18XBR_SPR18	4/9/2018	8260B	Total/NA	Trichlorofluoromethane	1.0	ug/L	U	1	1	0.42	1
680-150977-4	32M-01-18XBR_SPR18	4/9/2018	8260B	Total/NA	Vinyl acetate	2.0	ug/L	U	2	2	0.81	1
680-150977-4	32M-01-18XBR_SPR18	4/9/2018	8260B	Total/NA	Vinyl chloride	1.0	ug/L	U	1	1	0.5	1
680-150977-4	32M-01-18XBR_SPR18	4/9/2018	8260B	Total/NA	Xylenes, Total	**0.30**	ug/L	J	2	0.5	0.23	1
SL3114-4	32M-01-18XBR_SPR18	4/9/2018	MA VPH	Total/NA	BENZENE	0.81	ug/L	J	3	3	0.31	1
SL3114-4	32M-01-18XBR_SPR18	4/9/2018	MA VPH	Total/NA	C5-C8 ALIPHATICS	100	ug/L	U	100	100	50	1

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Lab Sample ID	Client Sample ID	Collection Date	Method	Prep Type	Analyte	Result	Unit	Flag	LOQ	LOD	DL	Dilution Factor
SL3114-4DL	32M-01-18XBR_SPR18	4/9/2018	MA VPH	Total/NA	C9-C10 AROMATICS	760	ug/L		400	400	200	4
SL3114-4DL	32M-01-18XBR_SPR18	4/9/2018	MA VPH	Total/NA	C9-C12 ALIPHATICS	370	ug/L	J	400	400	200	4
SL3114-4	32M-01-18XBR_SPR18	4/9/2018	MA VPH	Total/NA	ETHYLBENZENE	5.0	ug/L	U	5	5	0.42	1
SL3114-4	32M-01-18XBR_SPR18	4/9/2018	MA VPH	Total/NA	M-,P-XYLENE	10	ug/L	U	10	10	0.92	1
SL3114-4	32M-01-18XBR_SPR18	4/9/2018	MA VPH	Total/NA	METHYL TERT-BUTYL ETHER	5.0	ug/L	U	5	5	0.31	1
SL3114-4	32M-01-18XBR_SPR18	4/9/2018	MA VPH	Total/NA	NAPHTHALENE	5.0	ug/L	U	5	5	1.6	1
SL3114-4	32M-01-18XBR_SPR18	4/9/2018	MA VPH	Total/NA	O-XYLENE	5.0	ug/L	U	5	5	0.47	1
SL3114-4	32M-01-18XBR_SPR18	4/9/2018	MA VPH	Total/NA	TOLUENE	5.0	ug/L	U	5	5	0.34	1
680-150977-5	32M-DUP01_SPR18	4/9/2018	6010C	Total/NA	Manganese	**7,900**	ug/L		10	3	1	1
680-150977-5	32M-DUP01_SPR18	4/9/2018	6020A	Total/NA	Arsenic	**6.1**	ug/L		3	3	1.5	1
680-150977-5	32M-DUP01_SPR18	4/9/2018	8260B	Total/NA	1,1,1,2-Tetrachloroethane	1.0	ug/L	U	1	1	0.37	1
680-150977-5	32M-DUP01_SPR18	4/9/2018	8260B	Total/NA	1,1,1-Trichloroethane	1.0	ug/L	U	1	1	0.37	1
680-150977-5	32M-DUP01_SPR18	4/9/2018	8260B	Total/NA	1,1,2,2-Tetrachloroethane	1.0	ug/L	U	1	1	0.62	1
680-150977-5	32M-DUP01_SPR18	4/9/2018	8260B	Total/NA	1,1,2-Trichloroethane	0.50	ug/L	U	1	0.5	0.33	1
680-150977-5	32M-DUP01_SPR18	4/9/2018	8260B	Total/NA	1,1-Dichloroethane	1.0	ug/L	U	1	1	0.38	1
680-150977-5	32M-DUP01_SPR18	4/9/2018	8260B	Total/NA	1,1-Dichloroethene	1.0	ug/L	U	1	1	0.36	1
680-150977-5	32M-DUP01_SPR18	4/9/2018	8260B	Total/NA	1,1-Dichloropropene	1.0	ug/L	U	1	1	0.34	1
680-150977-5	32M-DUP01_SPR18	4/9/2018	8260B	Total/NA	1,2,3-Trichlorobenzene	5.0	ug/L	U	5	5	2.5	1
680-150977-5	32M-DUP01_SPR18	4/9/2018	8260B	Total/NA	1,2,3-Trichloropropane	1.0	ug/L	U	1	1	0.39	1
680-150977-5	32M-DUP01_SPR18	4/9/2018	8260B	Total/NA	1,2,4-Trichlorobenzene	5.0	ug/L	U	5	5	2.5	1
680-150977-5	32M-DUP01_SPR18	4/9/2018	8260B	Total/NA	1,2,4-Trimethylbenzene	1.0	ug/L	U	1	1	0.47	1
680-150977-5	32M-DUP01_SPR18	4/9/2018	8260B	Total/NA	1,2-Dibromo-3-Chloropropane	2.0	ug/L	U	5	2	1.1	1
680-150977-5	32M-DUP01_SPR18	4/9/2018	8260B	Total/NA	1,2-Dichlorobenzene	**850**	ug/L		10	10	3.7	10
680-150977-5	32M-DUP01_SPR18	4/9/2018	8260B	Total/NA	1,2-Dichloroethane	1.0	ug/L	U	1	1	0.5	1
680-150977-5	32M-DUP01_SPR18	4/9/2018	8260B	Total/NA	1,2-Dichloroethene, Total	**0.94**	ug/L	J	2	1	0.74	1
680-150977-5	32M-DUP01_SPR18	4/9/2018	8260B	Total/NA	1,2-Dichloropropane	1.0	ug/L	U	1	1	0.67	1
680-150977-5	32M-DUP01_SPR18	4/9/2018	8260B	Total/NA	1,3,5-Trimethylbenzene	0.50	ug/L	U	1	0.5	0.31	1
680-150977-5	32M-DUP01_SPR18	4/9/2018	8260B	Total/NA	1,3-Dichlorobenzene	**140**	ug/L		1	1	0.43	1
680-150977-5	32M-DUP01_SPR18	4/9/2018	8260B	Total/NA	1,3-Dichloropropane	1.0	ug/L	U	1	1	0.34	1
680-150977-5	32M-DUP01_SPR18	4/9/2018	8260B	Total/NA	1,4-Dichlorobenzene	**89**	ug/L		1	1	0.46	1
680-150977-5	32M-DUP01_SPR18	4/9/2018	8260B	Total/NA	2,2-Dichloropropane	1.0	ug/L	U	1	1	0.37	1
680-150977-5	32M-DUP01_SPR18	4/9/2018	8260B	Total/NA	2-Butanone (MEK)	10	ug/L	U	10	10	3.4	1
680-150977-5	32M-DUP01_SPR18	4/9/2018	8260B	Total/NA	2-Chlorotoluene	0.50	ug/L	U	1	0.5	0.27	1
680-150977-5	32M-DUP01_SPR18	4/9/2018	8260B	Total/NA	2-Hexanone	5.0	ug/L	U	10	5	2	1
680-150977-5	32M-DUP01_SPR18	4/9/2018	8260B	Total/NA	4-Chlorotoluene	1.0	ug/L	U	1	1	0.45	1
680-150977-5	32M-DUP01_SPR18	4/9/2018	8260B	Total/NA	4-Isopropyltoluene	1.0	ug/L	U	1	1	0.48	1
680-150977-5	32M-DUP01_SPR18	4/9/2018	8260B	Total/NA	4-Methyl-2-pentanone (MIBK)	5.0	ug/L	U	10	5	2.1	1
680-150977-5	32M-DUP01_SPR18	4/9/2018	8260B	Total/NA	Acetone	10	ug/L	U	10	10	7	1
680-150977-5	32M-DUP01_SPR18	4/9/2018	8260B	Total/NA	Benzene	**0.69**	ug/L	J	1	1	0.43	1

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Lab Sample ID	Client Sample ID	Collection Date	Method	Prep Type	Analyte	Result	Unit	Flag	LOQ	LOD	DL	Dilution Factor
680-150977-5	32M-DUP01_SPR18	4/9/2018	8260B	Total/NA	Bromobenzene	1.0	ug/L	U	1	1	0.5	1
680-150977-5	32M-DUP01_SPR18	4/9/2018	8260B	Total/NA	Bromoform	1.0	ug/L	U	1	1	0.43	1
680-150977-5	32M-DUP01_SPR18	4/9/2018	8260B	Total/NA	Bromomethane	5.0	ug/L	U	5	5	2.5	1
680-150977-5	32M-DUP01_SPR18	4/9/2018	8260B	Total/NA	Carbon disulfide	2.0	ug/L	U	2	2	0.43	1
680-150977-5	32M-DUP01_SPR18	4/9/2018	8260B	Total/NA	Carbon tetrachloride	0.50	ug/L	U	1	0.5	0.33	1
680-150977-5	32M-DUP01_SPR18	4/9/2018	8260B	Total/NA	Chlorobenzene	**450**	ug/L		10	5	2.6	10
680-150977-5	32M-DUP01_SPR18	4/9/2018	8260B	Total/NA	Chlorobromomethane	1.0	ug/L	U	1	1	0.45	1
680-150977-5	32M-DUP01_SPR18	4/9/2018	8260B	Total/NA	Chlorodibromomethane	0.50	ug/L	U	1	0.5	0.32	1
680-150977-5	32M-DUP01_SPR18	4/9/2018	8260B	Total/NA	Chloroethane	5.0	ug/L	U	5	5	2.5	1
680-150977-5	32M-DUP01_SPR18	4/9/2018	8260B	Total/NA	Chloroform	1.0	ug/L	U	1	1	0.5	1
680-150977-5	32M-DUP01_SPR18	4/9/2018	8260B	Total/NA	Chloromethane	1.0	ug/L	U	1	1	0.4	1
680-150977-5	32M-DUP01_SPR18	4/9/2018	8260B	Total/NA	cis-1,2-Dichloroethene	**0.94**	ug/L	J	1	1	0.41	1
680-150977-5	32M-DUP01_SPR18	4/9/2018	8260B	Total/NA	cis-1,3-Dichloropropene	1.0	ug/L	U	1	1	0.4	1
680-150977-5	32M-DUP01_SPR18	4/9/2018	8260B	Total/NA	Dibromomethane	1.0	ug/L	U	1	1	0.35	1
680-150977-5	32M-DUP01_SPR18	4/9/2018	8260B	Total/NA	Dichlorobromomethane	1.0	ug/L	U	1	1	0.44	1
680-150977-5	32M-DUP01_SPR18	4/9/2018	8260B	Total/NA	Dichlorodifluoromethane	1.0	ug/L	U	1	1	0.6	1
680-150977-5	32M-DUP01_SPR18	4/9/2018	8260B	Total/NA	Ethylbenzene	**0.42**	ug/L	J	1	0.5	0.33	1
680-150977-5	32M-DUP01_SPR18	4/9/2018	8260B	Total/NA	Ethylene Dibromide	1.0	ug/L	U	1	1	0.44	1
680-150977-5	32M-DUP01_SPR18	4/9/2018	8260B	Total/NA	Hexachlorobutadiene	5.0	ug/L	U	5	5	2.5	1
680-150977-5	32M-DUP01_SPR18	4/9/2018	8260B	Total/NA	Isopropylbenzene	**1.0**	ug/L		1	1	0.35	1
680-150977-5	32M-DUP01_SPR18	4/9/2018	8260B	Total/NA	Methyl tert-butyl ether	0.50	ug/L	U	10	0.5	0.3	1
680-150977-5	32M-DUP01_SPR18	4/9/2018	8260B	Total/NA	Methylene Chloride	5.0	ug/L	U	5	5	2.5	1
680-150977-5	32M-DUP01_SPR18	4/9/2018	8260B	Total/NA	m-Xylene & p-Xylene	1.0	ug/L	U	1	1	0.35	1
680-150977-5	32M-DUP01_SPR18	4/9/2018	8260B	Total/NA	Naphthalene	5.0	ug/L	U	5	5	2.5	1
680-150977-5	32M-DUP01_SPR18	4/9/2018	8260B	Total/NA	n-Butylbenzene	1.0	ug/L	U	1	1	0.47	1
680-150977-5	32M-DUP01_SPR18	4/9/2018	8260B	Total/NA	N-Propylbenzene	**0.89**	ug/L	J	1	1	0.38	1
680-150977-5	32M-DUP01_SPR18	4/9/2018	8260B	Total/NA	o-Xylene	**0.27**	ug/L	J	1	0.5	0.23	1
680-150977-5	32M-DUP01_SPR18	4/9/2018	8260B	Total/NA	sec-Butylbenzene	**0.56**	ug/L	J	1	1	0.42	1
680-150977-5	32M-DUP01_SPR18	4/9/2018	8260B	Total/NA	Styrene	0.50	ug/L	U	1	0.5	0.27	1
680-150977-5	32M-DUP01_SPR18	4/9/2018	8260B	Total/NA	tert-Butylbenzene	1.0	ug/L	U	1	1	0.45	1
680-150977-5	32M-DUP01_SPR18	4/9/2018	8260B	Total/NA	Tetrachloroethene	1.0	ug/L	U	1	1	0.74	1
680-150977-5	32M-DUP01_SPR18	4/9/2018	8260B	Total/NA	Toluene	1.0	ug/L	U	1	1	0.48	1
680-150977-5	32M-DUP01_SPR18	4/9/2018	8260B	Total/NA	trans-1,2-Dichloroethene	1.0	ug/L	U	1	1	0.37	1
680-150977-5	32M-DUP01_SPR18	4/9/2018	8260B	Total/NA	trans-1,3-Dichloropropene	1.0	ug/L	U	1	1	0.42	1
680-150977-5	32M-DUP01_SPR18	4/9/2018	8260B	Total/NA	Trichloroethene	**0.82**	ug/L	J	1	1	0.48	1
680-150977-5	32M-DUP01_SPR18	4/9/2018	8260B	Total/NA	Trichlorofluoromethane	1.0	ug/L	U	1	1	0.42	1
680-150977-5	32M-DUP01_SPR18	4/9/2018	8260B	Total/NA	Vinyl acetate	2.0	ug/L	U	2	2	0.81	1
680-150977-5	32M-DUP01_SPR18	4/9/2018	8260B	Total/NA	Vinyl chloride	1.0	ug/L	U	1	1	0.5	1
680-150977-5	32M-DUP01_SPR18	4/9/2018	8260B	Total/NA	Xylenes, Total	**0.27**	ug/L	J	2	0.5	0.23	1

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Lab Sample ID	Client Sample ID	Collection Date	Method	Prep Type	Analyte	Result	Unit	Flag	LOQ	LOD	DL	Dilution Factor
SL3114-5	32M-DUP01_SPR18	4/9/2018	MA VPH	Total/NA	BENZENE	0.78	ug/L	J	3	3	0.31	1
SL3114-5	32M-DUP01_SPR18	4/9/2018	MA VPH	Total/NA	C5-C8 ALIPHATICS	100	ug/L	U	100	100	50	1
SL3114-5DL	32M-DUP01_SPR18	4/9/2018	MA VPH	Total/NA	C9-C10 AROMATICS	790	ug/L		400	400	200	4
SL3114-5DL	32M-DUP01_SPR18	4/9/2018	MA VPH	Total/NA	C9-C12 ALIPHATICS	400	ug/L		400	400	200	4
SL3114-5	32M-DUP01_SPR18	4/9/2018	MA VPH	Total/NA	ETHYLBENZENE	5	ug/L	U	5	5	0.42	1
SL3114-5	32M-DUP01_SPR18	4/9/2018	MA VPH	Total/NA	M-,P-XYLENE	10	ug/L	U	10	10	0.92	1
SL3114-5	32M-DUP01_SPR18	4/9/2018	MA VPH	Total/NA	METHYL TERT-BUTYL ETHER	5	ug/L	U	5	5	0.31	1
SL3114-5	32M-DUP01_SPR18	4/9/2018	MA VPH	Total/NA	NAPHTHALENE	5	ug/L	U	5	5	1.6	1
SL3114-5	32M-DUP01_SPR18	4/9/2018	MA VPH	Total/NA	O-XYLENE	5	ug/L	U	5	5	0.47	1
SL3114-5	32M-DUP01_SPR18	4/9/2018	MA VPH	Total/NA	TOLUENE	5	ug/L	U	5	5	0.34	1
680-150977-6	Trip Blank1_040918	4/9/2018	8260B	Total/NA	1,1,1,2-Tetrachloroethane	1.0	ug/L	U	1	1	0.37	1
680-150977-6	Trip Blank1_040918	4/9/2018	8260B	Total/NA	1,1,1-Trichloroethane	1.0	ug/L	U	1	1	0.37	1
680-150977-6	Trip Blank1_040918	4/9/2018	8260B	Total/NA	1,1,2,2-Tetrachloroethane	1.0	ug/L	U	1	1	0.62	1
680-150977-6	Trip Blank1_040918	4/9/2018	8260B	Total/NA	1,1,2-Trichloroethane	0.50	ug/L	U	1	0.5	0.33	1
680-150977-6	Trip Blank1_040918	4/9/2018	8260B	Total/NA	1,1-Dichloroethane	1.0	ug/L	U	1	1	0.38	1
680-150977-6	Trip Blank1_040918	4/9/2018	8260B	Total/NA	1,1-Dichloroethene	1.0	ug/L	U	1	1	0.36	1
680-150977-6	Trip Blank1_040918	4/9/2018	8260B	Total/NA	1,1-Dichloropropene	1.0	ug/L	U	1	1	0.34	1
680-150977-6	Trip Blank1_040918	4/9/2018	8260B	Total/NA	1,2,3-Trichlorobenzene	5.0	ug/L	U	5	5	2.5	1
680-150977-6	Trip Blank1_040918	4/9/2018	8260B	Total/NA	1,2,3-Trichloropropane	1.0	ug/L	U	1	1	0.39	1
680-150977-6	Trip Blank1_040918	4/9/2018	8260B	Total/NA	1,2,4-Trichlorobenzene	5.0	ug/L	U	5	5	2.5	1
680-150977-6	Trip Blank1_040918	4/9/2018	8260B	Total/NA	1,2,4-Trimethylbenzene	1.0	ug/L	U	1	1	0.47	1
680-150977-6	Trip Blank1_040918	4/9/2018	8260B	Total/NA	1,2-Dibromo-3-Chloropropane	2.0	ug/L	U	5	2	1.1	1
680-150977-6	Trip Blank1_040918	4/9/2018	8260B	Total/NA	1,2-Dichlorobenzene	1.0	ug/L	U	1	1	0.37	1
680-150977-6	Trip Blank1_040918	4/9/2018	8260B	Total/NA	1,2-Dichloroethane	1.0	ug/L	U	1	1	0.5	1
680-150977-6	Trip Blank1_040918	4/9/2018	8260B	Total/NA	1,2-Dichloroethene, Total	1.0	ug/L	U	2	1	0.74	1
680-150977-6	Trip Blank1_040918	4/9/2018	8260B	Total/NA	1,2-Dichloropropane	1.0	ug/L	U	1	1	0.67	1
680-150977-6	Trip Blank1_040918	4/9/2018	8260B	Total/NA	1,3,5-Trimethylbenzene	0.50	ug/L	U	1	0.5	0.31	1
680-150977-6	Trip Blank1_040918	4/9/2018	8260B	Total/NA	1,3-Dichlorobenzene	1.0	ug/L	U	1	1	0.43	1
680-150977-6	Trip Blank1_040918	4/9/2018	8260B	Total/NA	1,3-Dichloropropane	1.0	ug/L	U	1	1	0.34	1
680-150977-6	Trip Blank1_040918	4/9/2018	8260B	Total/NA	1,4-Dichlorobenzene	1.0	ug/L	U	1	1	0.46	1
680-150977-6	Trip Blank1_040918	4/9/2018	8260B	Total/NA	2,2-Dichloropropane	1.0	ug/L	U	1	1	0.37	1
680-150977-6	Trip Blank1_040918	4/9/2018	8260B	Total/NA	2-Butanone (MEK)	10	ug/L	U	10	10	3.4	1
680-150977-6	Trip Blank1_040918	4/9/2018	8260B	Total/NA	2-Chlorotoluene	0.50	ug/L	U	1	0.5	0.27	1
680-150977-6	Trip Blank1_040918	4/9/2018	8260B	Total/NA	2-Hexanone	5.0	ug/L	U	10	5	2	1
680-150977-6	Trip Blank1_040918	4/9/2018	8260B	Total/NA	4-Chlorotoluene	1.0	ug/L	U	1	1	0.45	1
680-150977-6	Trip Blank1_040918	4/9/2018	8260B	Total/NA	4-Isopropyltoluene	1.0	ug/L	U	1	1	0.48	1
680-150977-6	Trip Blank1_040918	4/9/2018	8260B	Total/NA	4-Methyl-2-pentanone (MIBK)	5.0	ug/L	U	10	5	2.1	1
680-150977-6	Trip Blank1_040918	4/9/2018	8260B	Total/NA	Acetone	10	ug/L	U	10	10	7	1
680-150977-6	Trip Blank1_040918	4/9/2018	8260B	Total/NA	Benzene	1.0	ug/L	U	1	1	0.43	1

AOC 32/43A Spring 2018 LTM Validated Data

Lab Sample ID	Client Sample ID	Collection Date	Method	Prep Type	Analyte	Result	Unit	Flag	LOQ	LOD	DL	Dilution Factor
680-150977-6	Trip Blank1_040918	4/9/2018	8260B	Total/NA	Bromobenzene	1.0	ug/L	U	1	1	0.5	1
680-150977-6	Trip Blank1_040918	4/9/2018	8260B	Total/NA	Bromoform	1.0	ug/L	U	1	1	0.43	1
680-150977-6	Trip Blank1_040918	4/9/2018	8260B	Total/NA	Bromomethane	5.0	ug/L	U	5	5	2.5	1
680-150977-6	Trip Blank1_040918	4/9/2018	8260B	Total/NA	Carbon disulfide	2.0	ug/L	U	2	2	0.43	1
680-150977-6	Trip Blank1_040918	4/9/2018	8260B	Total/NA	Carbon tetrachloride	0.50	ug/L	U	1	0.5	0.33	1
680-150977-6	Trip Blank1_040918	4/9/2018	8260B	Total/NA	Chlorobenzene	0.50	ug/L	U	1	0.5	0.26	1
680-150977-6	Trip Blank1_040918	4/9/2018	8260B	Total/NA	Chlorobromomethane	1.0	ug/L	U	1	1	0.45	1
680-150977-6	Trip Blank1_040918	4/9/2018	8260B	Total/NA	Chlorodibromomethane	0.50	ug/L	U	1	0.5	0.32	1
680-150977-6	Trip Blank1_040918	4/9/2018	8260B	Total/NA	Chloroethane	5.0	ug/L	U	5	5	2.5	1
680-150977-6	Trip Blank1_040918	4/9/2018	8260B	Total/NA	Chloroform	1.0	ug/L	U	1	1	0.5	1
680-150977-6	Trip Blank1_040918	4/9/2018	8260B	Total/NA	Chloromethane	1.0	ug/L	U	1	1	0.4	1
680-150977-6	Trip Blank1_040918	4/9/2018	8260B	Total/NA	cis-1,2-Dichloroethene	1.0	ug/L	U	1	1	0.41	1
680-150977-6	Trip Blank1_040918	4/9/2018	8260B	Total/NA	cis-1,3-Dichloropropene	1.0	ug/L	U	1	1	0.4	1
680-150977-6	Trip Blank1_040918	4/9/2018	8260B	Total/NA	Dibromomethane	1.0	ug/L	U	1	1	0.35	1
680-150977-6	Trip Blank1_040918	4/9/2018	8260B	Total/NA	Dichlorobromomethane	1.0	ug/L	U	1	1	0.44	1
680-150977-6	Trip Blank1_040918	4/9/2018	8260B	Total/NA	Dichlorodifluoromethane	1.0	ug/L	U	1	1	0.6	1
680-150977-6	Trip Blank1_040918	4/9/2018	8260B	Total/NA	Ethylbenzene	0.50	ug/L	U	1	0.5	0.33	1
680-150977-6	Trip Blank1_040918	4/9/2018	8260B	Total/NA	Ethylene Dibromide	1.0	ug/L	U	1	1	0.44	1
680-150977-6	Trip Blank1_040918	4/9/2018	8260B	Total/NA	Hexachlorobutadiene	5.0	ug/L	U	5	5	2.5	1
680-150977-6	Trip Blank1_040918	4/9/2018	8260B	Total/NA	Isopropylbenzene	1.0	ug/L	U	1	1	0.35	1
680-150977-6	Trip Blank1_040918	4/9/2018	8260B	Total/NA	Methyl tert-butyl ether	0.50	ug/L	U	10	0.5	0.3	1
680-150977-6	Trip Blank1_040918	4/9/2018	8260B	Total/NA	Methylene Chloride	5.0	ug/L	U	5	5	2.5	1
680-150977-6	Trip Blank1_040918	4/9/2018	8260B	Total/NA	m-Xylene & p-Xylene	1.0	ug/L	U	1	1	0.35	1
680-150977-6	Trip Blank1_040918	4/9/2018	8260B	Total/NA	Naphthalene	5.0	ug/L	U	5	5	2.5	1
680-150977-6	Trip Blank1_040918	4/9/2018	8260B	Total/NA	n-Butylbenzene	1.0	ug/L	U	1	1	0.47	1
680-150977-6	Trip Blank1_040918	4/9/2018	8260B	Total/NA	N-Propylbenzene	1.0	ug/L	U	1	1	0.38	1
680-150977-6	Trip Blank1_040918	4/9/2018	8260B	Total/NA	o-Xylene	0.50	ug/L	U	1	0.5	0.23	1
680-150977-6	Trip Blank1_040918	4/9/2018	8260B	Total/NA	sec-Butylbenzene	1.0	ug/L	U	1	1	0.42	1
680-150977-6	Trip Blank1_040918	4/9/2018	8260B	Total/NA	Styrene	0.50	ug/L	U	1	0.5	0.27	1
680-150977-6	Trip Blank1_040918	4/9/2018	8260B	Total/NA	tert-Butylbenzene	1.0	ug/L	U	1	1	0.45	1
680-150977-6	Trip Blank1_040918	4/9/2018	8260B	Total/NA	Tetrachloroethene	1.0	ug/L	U	1	1	0.74	1
680-150977-6	Trip Blank1_040918	4/9/2018	8260B	Total/NA	Toluene	1.0	ug/L	U	1	1	0.48	1
680-150977-6	Trip Blank1_040918	4/9/2018	8260B	Total/NA	trans-1,2-Dichloroethene	1.0	ug/L	U	1	1	0.37	1
680-150977-6	Trip Blank1_040918	4/9/2018	8260B	Total/NA	trans-1,3-Dichloropropene	1.0	ug/L	U	1	1	0.42	1
680-150977-6	Trip Blank1_040918	4/9/2018	8260B	Total/NA	Trichloroethene	1.0	ug/L	U	1	1	0.48	1
680-150977-6	Trip Blank1_040918	4/9/2018	8260B	Total/NA	Trichlorofluoromethane	1.0	ug/L	U	1	1	0.42	1
680-150977-6	Trip Blank1_040918	4/9/2018	8260B	Total/NA	Vinyl acetate	2.0	ug/L	U	2	2	0.81	1
680-150977-6	Trip Blank1_040918	4/9/2018	8260B	Total/NA	Vinyl chloride	1.0	ug/L	U	1	1	0.5	1
680-150977-6	Trip Blank1_040918	4/9/2018	8260B	Total/NA	Xylenes, Total	0.50	ug/L	U	2	0.5	0.23	1

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Lab Sample ID	Client Sample ID	Collection Date	Method	Prep Type	Analyte	Result	Unit	Flag	LOQ	LOD	DL	Dilution Factor
SL3114-6	TRIPBLANK2_040918	4/9/2018	MA VPH	Total/NA	BENZENE	3.0	ug/L	U	3	3	0.31	1
SL3114-6	TRIPBLANK2_040918	4/9/2018	MA VPH	Total/NA	C5-C8 ALIPHATICS	100	ug/L	U	100	100	50	1
SL3114-6	TRIPBLANK2_040918	4/9/2018	MA VPH	Total/NA	C9-C10 AROMATICS	100	ug/L	U	100	100	50	1
SL3114-6	TRIPBLANK2_040918	4/9/2018	MA VPH	Total/NA	C9-C12 ALIPHATICS	100	ug/L	U	100	100	50	1
SL3114-6	TRIPBLANK2_040918	4/9/2018	MA VPH	Total/NA	ETHYLBENZENE	5.0	ug/L	U	5	5	0.42	1
SL3114-6	TRIPBLANK2_040918	4/9/2018	MA VPH	Total/NA	M-,P-XYLENE	10	ug/L	U	10	10	0.92	1
SL3114-6	TRIPBLANK2_040918	4/9/2018	MA VPH	Total/NA	METHYL TERT-BUTYL ETHER	5.0	ug/L	U	5	5	0.31	1
SL3114-6	TRIPBLANK2_040918	4/9/2018	MA VPH	Total/NA	NAPHTHALENE	5.0	ug/L	U	5	5	1.6	1
SL3114-6	TRIPBLANK2_040918	4/9/2018	MA VPH	Total/NA	O-XYLENE	5.0	ug/L	U	5	5	0.47	1
SL3114-6	TRIPBLANK2_040918	4/9/2018	MA VPH	Total/NA	TOLUENE	5.0	ug/L	U	5	5	0.34	1

Notes:

µg/L = microgram per liter

U = Non-detect

J = Estimated result

LOQ = Limit of Quantitation

LOD = Limit of Detection

DL = Method Detection Limit

Total Metals
SW 846/6010C/6020A
USEPA Level II Review

Site: AOC 57 - Spring LTM 2018	SDG #: 680-152299-1
Laboratory: Test America-Savannah, GA	Date: 6/7/2018
KGS Reviewer: Laurie Ekes	Project: 1082

Lab Sample ID	Client Sample ID	Date Sampled	Analysis	Matrix
680-140428-1	57M-96-11X-SPR18	5/8/2018	Total As, Fe and Mn	Groundwater
680-140428-2	57M-DUP01-SPR18	5/8/2018	Total As, Fe and Mn	Groundwater
680-140428-3	57M-95-03X-SPR18	5/8/2018	Total As, Fe and Mn	Groundwater
680-140428-4	57M-SW-1-SPR18	5/8/2018	Total As, Fe and Mn	Surface Water
680-140428-5	57M-SWDUP-SPR18	5/8/2018	Total As, Fe and Mn	Surface Water

Summary – Data validation was performed on the data for two (2) groundwater samples, one (1) groundwater field duplicate sample, one (1) surface water sample and one (1) surface water field duplicate sample. Samples were collected on 5/8/2018 and submitted for total arsenic, iron and manganese analyses. Iron and manganese were analyzed and reported by method SW6010B and arsenic was reported by method SW6020A.

Narrative and Completeness Review – The case narrative and data package were checked for completeness. The surface water samples were inadvertently listed as dissolved metals on the chain-of-custody. These samples were collected for total metals analysis. The laboratory was notified, and the samples were analyzed and reported for total metals. No other discrepancies were noted.

Qualification: None required.

Sample Delivery and Condition – All samples arrived at the laboratory on 5/10/2018 in acceptable condition and temperature and were properly preserved. Proper custody was documented.

Qualification: None required

Holding Times – All samples were analyzed within the 6-month holding time required by the QAPP for preserved aqueous samples.

Qualification: None required

Laboratory Control Sample – The LCS recoveries (%R) for the reported target analytes met the %R control limits established in the QAPP.

Qualification: None required.

MS/MSD – Groundwater sample 57M-95-03X_SPR18 (Lab Sample ID: 680-152299-3) was spiked and analyzed as matrix spike/matrix spike duplicate samples. The %Rs and calculated RPDs for all spiked analytes were within the laboratory control limits.

Qualification: None required.

Method Blank – The method blanks associated and analyzed with these samples were non-detect for all target analytes.

Qualification: None required.

Field Duplicate – Sample 57M-DUP01_SPR18 (Lab sample ID: 680-152299-2) was a field duplicate of groundwater sample 57M-96-11X_SPR18 (Lab sample ID: 680-152299-1). Sample 57M-SWDUP_SPR18 (Lab Sample ID: 680-152299-5) was the field duplicate of surface water sample 57M-SW1_SPR18 (Lab Sample ID: 680-152299-4). Detected results for total analytes were comparable with RPDs less than 20%. FD results are summarized in the table below.

Lab Sample ID	680-152299-1	680-152299-2	
Client Sample ID	57M-96-11X_SPR18	57M-DUP01_SPR18	
Collection Date	5/8/2018	5/8/2018	
Analyte	**Result (µg/L)**	**Result (µg/L)**	**RPD (%)**
Total Iron	37,000	36,000	2.7
Total Manganese	2,700	2,500	7.7
Total Arsenic	180	200	11
Lab Sample ID	680-152299-4	680-152299-5	
Client Sample ID	57M-SW1_SPR18	57M-SWDUP_SPR18	
Collection Date	5/8/2018	5/8/2018	
Analyte	**Result (µg/L)**	**Result (µg/L)**	**RPD (%)**
Total Iron	4,000	4,700	16
Total Manganese	800	910	13
Total Arsenic	5.2	4.9	5.9

Qualification: None required.

Compound Quantitation – Analyte non-detections were reported as "ND"; these results should be considered the equivalent of "PQL U." Analyte detections below the PQL were reported as J qualified results. These J qualifiers were retained unless superseded by a more severe qualifier.

Qualification: None required.

Qualification Summary Table - The total and dissolved metals results reported in this SDG are acceptable as reported and the data may be used for its intended purpose.

Lab Sample ID	**Client Sample ID**	**Analysis**	**Lab Value (µg/L)**	**Lab Qualifier**	**Validated Value**	**Validation Qualifier (µg/L)**
680-152299-1	57M-96-11X_SPR18	Total As, Fe, Mn	No qualifications needed.			
680-152299-2	57M-DUP01_SPR18	Total As, Fe, Mn	No qualifications needed.			
680-152299-3	57M-95-03X_SPR18	Total As, Fe, Mn	No qualifications needed.			
680-152299-4	57M-SW1_SPR18	Total As, Fe, Mn	No qualifications needed.			
680-152299-5	57M-SWDUP_SPR18	Total As, Fe, Mn	No qualifications needed.			

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Lab Sample ID	Client Sample ID	Collection Date	Analysis Method	Prep Type	Analyte	Result	Unit	Flag	LOQ	LOD	DL	Dilution Factor
680-152299-1	57M-96-11X_SPR18	5/8/2018	6010C	Total/NA	Iron	37,000	ug/L		50	50	17	1
680-152299-1	57M-96-11X_SPR18	5/8/2018	6010C	Total/NA	Manganese	2,700	ug/L		10	3	1	1
680-152299-1	57M-96-11X_SPR18	5/8/2018	6020A	Total/NA	Arsenic	180	ug/L		3	3	1.5	1
680-152299-2	57M-DUP01_SPR18	5/8/2018	6010C	Total/NA	Iron	36,000	ug/L		50	50	17	1
680-152299-2	57M-DUP01_SPR18	5/8/2018	6010C	Total/NA	Manganese	2,500	ug/L		10	3	1	1
680-152299-2	57M-DUP01_SPR18	5/8/2018	6020A	Total/NA	Arsenic	200	ug/L		3	3	1.5	1
680-152299-3	57M-95-03X_SPR18	5/8/2018	6010C	Total/NA	Iron	8,400	ug/L		50	50	17	1
680-152299-3	57M-95-03X_SPR18	5/8/2018	6010C	Total/NA	Manganese	110	ug/L		10	3	1	1
680-152299-3	57M-95-03X_SPR18	5/8/2018	6020A	Total/NA	Arsenic	42	ug/L		3	3	1.5	1
680-152299-4	57M-SW1_SPR18	5/8/2018	6010C	Total/NA	Iron	4,000	ug/L		50	50	17	1
680-152299-4	57M-SW1_SPR18	5/8/2018	6010C	Total/NA	Manganese	800	ug/L		10	3	1	1
680-152299-4	57M-SW1_SPR18	5/8/2018	6020A	Total/NA	Arsenic	5.2	ug/L		3	3	1.5	1
680-152299-5	57M-SWDUP_SPR18	5/8/2018	6010C	Total/NA	Iron	4,700	ug/L		50	50	17	1
680-152299-5	57M-SWDUP_SPR18	5/8/2018	6010C	Total/NA	Manganese	910	ug/L		10	3	1	1
680-152299-5	57M-SWDUP_SPR18	5/8/2018	6020A	Total/NA	Arsenic	4.9	ug/L		3	3	1.5	1

Notes:
µg/L = microgram per liter
LOQ = Limit of Quantitation
LOD = Limit of Detection
DL = Method Detection Limit

C.2

Data Validation Reports
Fall 2018 LTM Event

Data Validation Report for 6801591202

Facility:	Long Term Monitoring
Event:	KOMAN, Long Term Monitoring, Main Post Fall 2018
SDG:	6801591202
Guidance Document:	Quality Assurance Project Plan, Long Term Monitoring Program, Former Fort Devens, 2018
Prime Contractor:	KOMAN Government Solutions, LLC, Marlborough, MA
Project Manager:	Jim Ropp
Contract Laboratory:	TestAmerica Laboratories, Inc., Arvada, CO
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:	December 12, 2018

Field Sample ID	Lab Sample ID	Matrix	Type/Type Code	A2320B	SW6010C	SW6020A
AAFES-2_FAL18	680-159120-15	Water	Field Sample/N	X	X	X
AAFES-7_FAL18	680-159120-17	Water	Field Sample/N		X	X
XGM-93-02X_FAL18	680-159120-12	Water	Field Sample/N	X	X	X
XGM-94-04X_FAL18	680-159120-16	Water	Field Sample/N	X	X	X
XGM-97-12X_FAL18	680-159120-13	Water	Field Sample/N	X	X	X
XGM-DUP1_FAL18	680-159120-14	Water	Field Duplicate/FD	X	X	X

This report assesses the analytical data quality associated with the analyses listed on the preceding cover page. 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 Solutions, LLC, Marlborough, MA; analyses were performed by TestAmerica Laboratories, Inc., Arvada, CO and were reported under sample delivery group (SDG) 6801591202. 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
- 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
- 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 22 results (sample and field QC samples) reported are qualified based on review and 0 results (0.00%) have been rejected. 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 Fall 2018 LTM samples collected from AOC43G.

Analytical Method	Data Reviewer Comment
A2320B	No additional comments; see Checklist for detail.
SW6010C	No additional comments; see Checklist for detail.
SW6020A	No additional comments; see Checklist for detail.

Sherri A Pullar — November 20, 2018

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 — December 13, 2018

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, Total, 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 680-543603/25 (CB)/ CCB 680-543603/25	Manganese	1.560	< 1	< 10	ug/l	U/None	B2	
CCB 680-543603/37 (CB)/ CCB 680-543603/37	Manganese	1.310	< 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.

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
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: A2320B (Alkalinity by Titrimetric Method)				
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: 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
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?	•			MS/MSD spl 680-159120-16
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?	•			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?	•			MS/MSD Spl 680-159120-16
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?	•			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?		•		

Facility:	Long Term Monitoring
Event:	KOMAN, Long Term Monitoring, Main Post Fall 2018
SDG:	SL9925
Guidance Document:	Quality Assurance Project Plan, Long Term Monitoring Program, Former Fort Devens, 2018
Prime Contractor:	KOMAN Government Solutions, LLC, Marlborough, MA
Project Manager:	Jim Ropp
Contract Laboratory:	Katahdin Analytical Services, Westbrook, ME
Data Review Contractor:	KOMAN Government Solutions
Data Review Level:	2B
Primary Data Reviewer:	Sherri Pullar, Data Validation Chemist
Second Reviewer:	Laurie Ekes, Senior Scientist
Date Submitted:	December 12, 2018

Field Sample ID	Lab Sample ID	Matrix	Type/Type Code	MADEPVP
AAFES-2_FAL18	SL9925-4	Water	Field Sample/N	X
AAFES-2_FAL18	SL9925-4DL	Water	Field Sample/N	X
XGM-93-02X_FAL18	SL9925-1	Water	Field Sample/N	X
XGM-94-04X_FAL18	SL9925-5	Water	Field Sample/N	X
XGM-97-12X_FAL18	SL9925-2	Water	Field Sample/N	X
XGM-97-12X_FAL18	SL9925-2DL	Water	Field Sample/N	X
XGM-DUP1_FAL18	SL9925-3	Water	Field Duplicate/FD	X
XGM-DUP1_FAL18	SL9925-3DL	Water	Field Duplicate/FD	X
XGM-TRIPBLANK	SL9925-6	Water	Trip Blank/TB	X

This report assesses the analytical data quality associated with the analyses listed on the preceding cover page. 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 Solutions, LLC, Marlborough, MA; analyses were performed by Katahdin Analytical Services, Westbrook, ME and were reported under sample delivery group (SDG) SL9925. 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
- Blank - Negative
- Field Duplicate RPD
- LCS Recovery
- LCS RPD
- MS Recovery
- MS RPD
- Prep Hold Time
- Surrogate
- Test Hold Time
- Trip Blank

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 60 results (sample and field QC samples) reported are qualified based on review and 0 results (0.00%) have been rejected. 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 Fall 2018 LTM samples collected from AOC43G. Samples were subcontracted to Katahdin Analytical for VPH analysis and the data package is included in SDG 680-159120-2.

Analytical Method	Data Reviewer Comment
MADEPVP	Analyzed by Katahdin

Sherri A Pullar — November 20, 2018

Reviewed by Sherri Pullar, Data Validation Chemist, KOMAN Government Solutions

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 — December 13, 2018

Reviewed by Laurie Ekes, Senior Scientist, KOMAN Government Solutions

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 MADEPVP, 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-94-04X_FAL18 (SD)/ WG238687-5	Volatile Petroleum Hydrocarbons C9-C10 Aromatic	136.0	70 - 130	10 - 130	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.

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: MADEPVP (Method for the Determination of Volatile Petroleum Hydrocarbons (VPH))				
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?	•			
Were the required minimum levels of calibration standards used in the initial calibration?	•			
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?	•			
Were surrogate recoveries within project acceptance limits?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were field blanks (EBs or FBs) submitted with these samples?		•		
Were target analytes reported in the field blank(s) less than MDL?			•	
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?	•			MS/MSD Spl SL9925-5
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. 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 DoD QSM corrective actions followed if deviations were noted?	•			
Were any data rejected during the verification process?		•		

Field Duplicate Report By SDG
Long Term Monitoring
KOMAN, Long Term Monitoring, Main Post Fall 2018
Field Duplicates for SDG: 6801591202

Location	Analysis
XGM-97-12X	A2320B

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
XGM-97-12X_FAL18 / XGM-DUP1_FAL18	680-159120-13 / 680-159120-14	Alkalinity, Total (as CaCO3)	220	220	5.00	0.00	30	OK	NA

Location	Analysis
XGM-97-12X	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-97-12X_FAL18 / XGM-DUP1_FAL18	680-159120-13 / 680-159120-14	Iron (TOTAL)	27000	28000	50.0	3.64	30	OK	NA
XGM-97-12X_FAL18 / XGM-DUP1_FAL18	680-159120-13 / 680-159120-14	Manganese (TOTAL)	3800	3900	10.0	2.60	30	OK	NA

Location	Analysis
XGM-97-12X	SW6020A

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
XGM-97-12X_FAL18 / XGM-DUP1_FAL18	680-159120-13 / 680-159120-14	Arsenic (TOTAL)	9.80	11.0	3.00	11.5	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"

Field Duplicate Report By SDG
Long Term Monitoring
KOMAN, Long Term Monitoring, Main Post Fall 2018
Field Duplicates for SDG: SL9925

Location	Analysis
XGM-97-12X	MADEPVP

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
XGM-97-12X_FAL18 / XGM-DUP1_FAL18	SL9925-2 / SL9925-3	Benzene	4.00	4.00	3.00	0.00	30	NA	OK
XGM-97-12X_FAL18 / XGM-DUP1_FAL18	SL9925-2 / SL9925-3	Ethylbenzene	230	220	5.00	4.44	30	OK	NA
XGM-97-12X_FAL18 / XGM-DUP1_FAL18	SL9925-2 / SL9925-3	m,p-Xylene	180	170	10.0	5.71	30	OK	NA
XGM-97-12X_FAL18 / XGM-DUP1_FAL18	SL9925-2 / SL9925-3	Methyl tert-butyl ether (MTBE)	ND	ND	5.00	NA	30	NA	OK
XGM-97-12X_FAL18 / XGM-DUP1_FAL18	SL9925-2 / SL9925-3	Naphthalene	88.0	88.0	5.00	0.00	30	OK	NA
XGM-97-12X_FAL18 / XGM-DUP1_FAL18	SL9925-2 / SL9925-3	o-Xylene	93.0	90.0	5.00	3.28	30	OK	NA
XGM-97-12X_FAL18 / XGM-DUP1_FAL18	SL9925-2 / SL9925-3	Toluene	5.10	4.90	5.00	4.00	30	NA	OK
XGM-97-12X_FAL18 / XGM-DUP1_FAL18	SL9925-2 / SL9925-3	Volatile Petroleum Hydrocarbons C5-C8 Aliphatic, Adjusted for Target Analytes, Surrogates and Internal Standards	360	350	100	2.82	30	NA	OK
XGM-97-12X_FAL18 / XGM-DUP1_FAL18	SL9925-2DL / SL9925-3DL	Volatile Petroleum Hydrocarbons C9-C10 Aromatic	1000	1000	500	0.00	30	NA	OK
XGM-97-12X_FAL18 / XGM-DUP1_FAL18	SL9925-2DL / SL9925-3DL	Volatile Petroleum Hydrocarbons C9-C12 Aliphatic, Adjusted for Target Analytes, Surrogates and Internal Standards	420	410	500	2.41	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 6801591201

Facility:	Long Term Monitoring
Event:	KOMAN, Long Term Monitoring, Main Post Fall 2018
SDG:	6801591201
Guidance Document:	Quality Assurance Project Plan, Long Term Monitoring Program, Former Fort Devens, 2018
Prime Contractor:	KOMAN Government Solutions, LLC, Marlborough, MA
Project Manager:	Jim Ropp
Contract Laboratory:	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:	December 12, 2018

Field Sample ID	Lab Sample ID	Matrix	Type/Type Code	SW6010C - Dissolved	SW6020A - Dissolved
69W-94-13_FAL18	680-159120-7	Water	Field Sample/N	X	X
69W-94-14_FAL18	680-159120-1	Water	Field Sample/N	X	X
69W-DUP1_FAL18	680-159120-2	Water	Field Duplicate/FD	X	X
69WP-08-01_FAL18	680-159120-10	Water	Field Sample/N	X	X
69WP-13-01_FAL18	680-159120-11	Water	Field Sample/N	X	
ZWM-01-25X_FAL18	680-159120-6	Water	Field Sample/N	X	X
ZWM-95-15X_FAL18	680-159120-8	Water	Field Sample/N	X	X
ZWM-95-18X_FAL18	680-159120-9	Water	Field Sample/N	X	X
ZWM-99-22X_FAL18	680-159120-3	Water	Field Sample/N	X	X
ZWM-99-23X_FAL18	680-159120-4	Water	Field Sample/N	X	X
ZWM-99-24X_FAL18	680-159120-5	Water	Field Sample/N	X	X

This report assesses the analytical data quality associated with the analyses listed on the preceding cover page. 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 Solutions, LLC, Marlborough, MA; analyses were performed by TestAmerica Laboratories, Inc., Savannah, GA and were reported under sample delivery group (SDG) 6801591201. 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
- 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
- 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 31 results (sample and field QC samples) reported are qualified based on review and 0 results (0.00%) have been rejected. 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 Fall 2018 LTM samples from AOC 69W.

Analytical Method	Data Reviewer Comment
SW6010C	No additional comments; see Checklist for detail.
SW6020A	No additional comments; see Checklist for detail.

Sherri A Pullar

November 20, 2018

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.

December 13, 2018

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, 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 680-543830/37 (CB)/ CCB 680-543830/37	Manganese	2.160	< 1	< 10	ug/l	U/None	B2	
CCB 680-543830/61 (CB)/ CCB 680-543830/61	Manganese	3.060	< 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.

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
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
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?	•			MS/MSD Spl 680-159120-8
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?	•			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?	•			MS/MSD spl - 680-159120-8
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?	•			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?		•		

Facility:	Long Term Monitoring
Event:	KOMAN, Long Term Monitoring, Main Post Fall 2018
SDG:	SL9928
Guidance Document:	Quality Assurance Project Plan, Long Term Monitoring Program, Former Fort Devens, 2018
Prime Contractor:	KOMAN Government Solutions, LLC, Marlborough, MA
Project Manager:	Jim Ropp
Contract Laboratory:	Katahdin Analytical Services, Westbrook, ME
Data Review Contractor:	KOMAN Governmental Solutions
Data Review Level:	2B
Primary Data Reviewer:	Sherri Pullar, Data Validation Chemist
Second Reviewer:	Laurie Ekes, Senior Scientist
Date Submitted:	December 12, 2018

Field Sample ID	Lab Sample ID	Matrix	Type/Type Code	MADEPEP
69W-94-13_FAL18	SL9928-7RE	Water	Field Sample/N	X
69W-94-14_FAL18	SL9928-1RE	Water	Field Sample/N	X
69W-DUP1_FAL18	SL9928-2RE	Water	Field Duplicate/FD	X
ZWM-01-25X_FAL18	SL9928-6RE	Water	Field Sample/N	X
ZWM-95-15X_FAL18	SL9928-8RE	Water	Field Sample/N	X
ZWM-95-18X_FAL18	SL9928-9RE	Water	Field Sample/N	X
ZWM-99-22X_FAL18	SL9928-3RE	Water	Field Sample/N	X
ZWM-99-23X_FAL18	SL9928-4RE	Water	Field Sample/N	X
ZWM-99-24X_FAL18	SL9928-5	Water	Field Sample/N	X

This report assesses the analytical data quality associated with the analyses listed on the preceding cover page. 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 Solutions, LLC, Marlborough, MA; analyses were performed by Katahdin Analytical Services, Westbrook, ME and were reported under sample delivery group (SDG) SL9928. 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
- Blank - Negative
- Field Duplicate RPD
- LCS Recovery
- LCS RPD
- MS Recovery
- MS RPD
- Prep Hold Time
- Surrogate
- 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 20 results (11.11%) out of the 180 results (sample and field QC samples) reported are qualified based on review and 0 results (0.00%) have been rejected. 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 ADR reviews the EPH results for Fall 2018 LTM samples from AOC69W. Samples were subcontracted to Katahdin Analytical for EPH analysis and the data package is included in SDG 680-159120-1.

Analytical Method	Data Reviewer Comment
MADEPEP	Analyzed by Katahdin

Sherri A Pullar — November 20, 2018

Reviewed by Sherri Pullar, Data Validation Chemist, KOMAN Governmental Solutions

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 — December 13, 2018

Reviewed by Laurie Ekes, Senior Scientist, KOMAN Governmental Solutions

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 MADEPEP, 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
ZWM-99-22X_FAL18 (FD)/ SL9928-2RE	2-Methylnaphthalene	30.09	< 30	< 30	rpd	J/UJ	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.

No results associated with this QC element required qualification.

Quality Control Outliers for test method MADEPEP, Surrogate

Method performance for individual samples is demonstrated through spiking activities. All samples are spiked with surrogate compounds prior to sample preparation. The sample itself may produce effects due to such factors as interferences and high concentrations of analytes. Summary forms were evaluated and compared to electronic data deliverables. Surrogate 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
ZWM-99-24X_FAL18 (N)/ SL9928-5	5A-Androstane	35.00	40 - 140	10 - 140	percent	J/UJ	I	

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 Surrogate for MADEPEP

FieldSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
ZWM-99-24X_FAL18	N	2-Methylnaphthalene	1.90	1.40	1.40 UJ	-	ug/l	I
ZWM-99-24X_FAL18	N	Acenaphthene	1.90	1.80	1.80 UJ	-	ug/l	I
ZWM-99-24X_FAL18	N	Acenaphthylene	1.90	1.40	1.40 UJ	-	ug/l	I
ZWM-99-24X_FAL18	N	Anthracene	1.90	1.40	1.40 UJ	-	ug/l	I
ZWM-99-24X_FAL18	N	Benzo(a)anthracene	1.90	1.40	1.40 UJ	-	ug/l	I
ZWM-99-24X_FAL18	N	Benzo(a)pyrene	1.90	1.40	1.40 UJ	-	ug/l	I
ZWM-99-24X_FAL18	N	Benzo(b)fluoranthene	1.90	1.40	1.40 UJ	-	ug/l	I
ZWM-99-24X_FAL18	N	Benzo(g,h,i)perylene	1.90	1.40	1.40 UJ	-	ug/l	I
ZWM-99-24X_FAL18	N	Benzo(k)fluoranthene	1.90	1.40	1.40 UJ	-	ug/l	I
ZWM-99-24X_FAL18	N	Chrysene	1.90	1.40	1.40 UJ	-	ug/l	I
ZWM-99-24X_FAL18	N	Dibenz(a,h)anthracene	1.90	1.40	1.40 UJ	-	ug/l	I
ZWM-99-24X_FAL18	N	Fluoranthene	1.90	1.40	1.40 UJ	-	ug/l	I
ZWM-99-24X_FAL18	N	Fluorene	1.90	1.40	1.40 UJ	-	ug/l	I
ZWM-99-24X_FAL18	N	Indeno(1,2,3-c,d)pyrene	1.90	1.40	1.40 UJ	-	ug/l	I
ZWM-99-24X_FAL18	N	Naphthalene	1.90	1.40	1.40 UJ	-	ug/l	I
ZWM-99-24X_FAL18	N	Petroleum Hydrocarbons C11-C22, Aromatic Fraction, Adjusted for Target Analytes, Surrogates and Internal Standards	94.0	89.0	89.0 J	-	ug/l	I/TR
ZWM-99-24X_FAL18	N	Petroleum Hydrocarbons C19-C36, Aliphatic	94.0	71.0	71.0 UJ	-	ug/l	I
ZWM-99-24X_FAL18	N	Petroleum Hydrocarbons C9-C18 Aliphatic	94.0	71.0	71.0 UJ	-	ug/l	I
ZWM-99-24X_FAL18	N	Phenanthrene	1.90	1.40	1.40 UJ	-	ug/l	I
ZWM-99-24X_FAL18	N	Pyrene	1.90	1.40	1.40 UJ	-	ug/l	I

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: MADEPEP	Extraction Method: SW3510C							
FieldSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
ZWM-99-24X_FAL18	N	2-Methylnaphthalene	1.90	1.40	1.40 UJ	-	ug/l	I
ZWM-99-24X_FAL18	N	Acenaphthene	1.90	1.80	1.80 UJ	-	ug/l	I
ZWM-99-24X_FAL18	N	Acenaphthylene	1.90	1.40	1.40 UJ	-	ug/l	I
ZWM-99-24X_FAL18	N	Anthracene	1.90	1.40	1.40 UJ	-	ug/l	I
ZWM-99-24X_FAL18	N	Benzo(a)anthracene	1.90	1.40	1.40 UJ	-	ug/l	I
ZWM-99-24X_FAL18	N	Benzo(a)pyrene	1.90	1.40	1.40 UJ	-	ug/l	I
ZWM-99-24X_FAL18	N	Benzo(b)fluoranthene	1.90	1.40	1.40 UJ	-	ug/l	I
ZWM-99-24X_FAL18	N	Benzo(g,h,i)perylene	1.90	1.40	1.40 UJ	-	ug/l	I
ZWM-99-24X_FAL18	N	Benzo(k)fluoranthene	1.90	1.40	1.40 UJ	-	ug/l	I
ZWM-99-24X_FAL18	N	Chrysene	1.90	1.40	1.40 UJ	-	ug/l	I
ZWM-99-24X_FAL18	N	Dibenz(a,h)anthracene	1.90	1.40	1.40 UJ	-	ug/l	I
ZWM-99-24X_FAL18	N	Fluoranthene	1.90	1.40	1.40 UJ	-	ug/l	I
ZWM-99-24X_FAL18	N	Fluorene	1.90	1.40	1.40 UJ	-	ug/l	I
ZWM-99-24X_FAL18	N	Indeno(1,2,3-c,d)pyrene	1.90	1.40	1.40 UJ	-	ug/l	I
ZWM-99-24X_FAL18	N	Naphthalene	1.90	1.40	1.40 UJ	-	ug/l	I
ZWM-99-24X_FAL18	N	Petroleum Hydrocarbons C11-C22, Aromatic Fraction, Adjusted for Target Analytes, Surrogates and Internal Standards	94.0	89.0	89.0 J	-	ug/l	I/TR
ZWM-99-24X_FAL18	N	Petroleum Hydrocarbons C19-C36, Aliphatic	94.0	71.0	71.0 UJ	-	ug/l	I
ZWM-99-24X_FAL18	N	Petroleum Hydrocarbons C9-C18 Aliphatic	94.0	71.0	71.0 UJ	-	ug/l	I
ZWM-99-24X_FAL18	N	Phenanthrene	1.90	1.40	1.40 UJ	-	ug/l	I
ZWM-99-24X_FAL18	N	Pyrene	1.90	1.40	1.40 UJ	-	ug/l	I

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 MADEPEP

FieldSample ID	Type	Analyte	LOQ	Lab Result	ADR Result	Modified Result	Reason
69W-DUP1_FAL18	FD	2-Methylnaphthalene	1.90	9.60	9.60 J	9.60	
ZWM-99-22X_FAL18	N	2-Methylnaphthalene	1.90	13.0	13.0 J	13.0	

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
D3	Field Duplicate RPD
I	Surrogate recovery outside project limits.
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: MADEPEP (Method for the Determination of Extractable Petroleum Hydrocarbons (EPH))				
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?	•			
Were the required minimum levels of calibration standards used in the initial calibration?	•			
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?	•			
Were surrogate recoveries within project acceptance limits?		•		See outlier report
Was a method blank prepared and analyzed with each batch?	•			
Were field blanks (EBs or FBs) submitted with these samples?		•		
Were target analytes reported in the field blank(s) less than MDL?			•	
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?	•			MS/MSD spl SL9928-8
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
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were DoD QSM corrective actions followed if deviations were noted?	•			
Were any data rejected during the verification process?		•		

Field Duplicate Report By SDG
Long Term Monitoring
KOMAN, Long Term Monitoring, Main Post Fall 2018
Field Duplicates for SDG: 6801591201

Location	Analysis
ZWM-99-22X	SW6010C

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
ZWM-99-22X_FAL18 / 69W-DUP1_FAL18	680-159120-3 / 680-159120-2	Iron (FLDFLT)	19000	19000	50.0	0.00	30	OK	NA
ZWM-99-22X_FAL18 / 69W-DUP1_FAL18	680-159120-3 / 680-159120-2	Manganese (FLDFLT)	1500	1300	10.0	14.3	30	OK	NA

Location	Analysis
ZWM-99-22X	SW6020A

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
ZWM-99-22X_FAL18 / 69W-DUP1_FAL18	680-159120-3 / 680-159120-2	Arsenic (FLDFLT)	150	140	3.00	6.90	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"

Field Duplicate Report By SDG
Long Term Monitoring
KOMAN, Long Term Monitoring, Main Post Fall 2018
Field Duplicates for SDG: SL9928

Location	Analysis
ZWM-99-22X	MADEPEP

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
ZWM-99-22X_FAL18 / 69W-DUP1_FAL18	SL9928-3RE / SL9928-2RE	2-Methylnaphthalene	13.0	9.60	1.90	30.1	30		NA
ZWM-99-22X_FAL18 / 69W-DUP1_FAL18	SL9928-3RE / SL9928-2RE	Acenaphthene	1.70	ND	1.90	NA	30	NA	OK
ZWM-99-22X_FAL18 / 69W-DUP1_FAL18	SL9928-3RE / SL9928-2RE	Acenaphthylene	ND	ND	1.90	NA	30	NA	OK
ZWM-99-22X_FAL18 / 69W-DUP1_FAL18	SL9928-3RE / SL9928-2RE	Anthracene	ND	ND	1.90	NA	30	NA	OK
ZWM-99-22X_FAL18 / 69W-DUP1_FAL18	SL9928-3RE / SL9928-2RE	Benzo(a)anthracene	ND	ND	1.90	NA	30	NA	OK
ZWM-99-22X_FAL18 / 69W-DUP1_FAL18	SL9928-3RE / SL9928-2RE	Benzo(a)pyrene	ND	ND	1.90	NA	30	NA	OK
ZWM-99-22X_FAL18 / 69W-DUP1_FAL18	SL9928-3RE / SL9928-2RE	Benzo(b)fluoranthene	ND	ND	1.90	NA	30	NA	OK
ZWM-99-22X_FAL18 / 69W-DUP1_FAL18	SL9928-3RE / SL9928-2RE	Benzo(g,h,i)perylene	ND	ND	1.90	NA	30	NA	OK
ZWM-99-22X_FAL18 / 69W-DUP1_FAL18	SL9928-3RE / SL9928-2RE	Benzo(k)fluoranthene	ND	ND	1.90	NA	30	NA	OK
ZWM-99-22X_FAL18 / 69W-DUP1_FAL18	SL9928-3RE / SL9928-2RE	Chrysene	ND	ND	1.90	NA	30	NA	OK
ZWM-99-22X_FAL18 / 69W-DUP1_FAL18	SL9928-3RE / SL9928-2RE	Dibenz(a,h)anthracene	ND	ND	1.90	NA	30	NA	OK
ZWM-99-22X_FAL18 / 69W-DUP1_FAL18	SL9928-3RE / SL9928-2RE	Fluoranthene	ND	ND	1.90	NA	30	NA	OK
ZWM-99-22X_FAL18 / 69W-DUP1_FAL18	SL9928-3RE / SL9928-2RE	Fluorene	2.50	1.90	1.90	27.3	30	NA	OK
ZWM-99-22X_FAL18 / 69W-DUP1_FAL18	SL9928-3RE / SL9928-2RE	Indeno(1,2,3-c,d)pyrene	ND	ND	1.90	NA	30	NA	OK
ZWM-99-22X_FAL18 / 69W-DUP1_FAL18	SL9928-3RE / SL9928-2RE	Naphthalene	5.60	3.90	1.90	35.8	30	NA	OK
ZWM-99-22X_FAL18 / 69W-DUP1_FAL18	SL9928-3RE / SL9928-2RE	Petroleum Hydrocarbons C11-C22, Aromatic Fraction, Adjusted for Target Analytes, Surrogates and Internal Standards	230	220	94.0	4.44	30	NA	OK
ZWM-99-22X_FAL18 / 69W-DUP1_FAL18	SL9928-3RE / SL9928-2RE	Petroleum Hydrocarbons C19-C36, Aliphatic	ND	ND	94.0	NA	30	NA	OK
ZWM-99-22X_FAL18 / 69W-DUP1_FAL18	SL9928-3RE / SL9928-2RE	Petroleum Hydrocarbons C9-C18 Aliphatic	ND	ND	94.0	NA	30	NA	OK
ZWM-99-22X_FAL18 / 69W-DUP1_FAL18	SL9928-3RE / SL9928-2RE	Phenanthrene	ND	ND	1.90	NA	30	NA	OK
ZWM-99-22X_FAL18 / 69W-DUP1_FAL18	SL9928-3RE / SL9928-2RE	Pyrene	ND	ND	1.90	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"

Facility:	Long Term Monitoring
Event:	KOMAN, Long Term Monitoring, Main Post Fall 2018
SDG:	6801591851REV
Guidance Document:	Quality Assurance Project Plan, Long Term Monitoring Program, Former Fort Devens, 2018
Prime Contractor:	KOMAN Government Solutions, LLC, Marlborough, MA
Project Manager:	Jim Ropp
Contract Laboratory:	TestAmerica Laboratories, Inc., Arvada, CO
Data Review Contractor:	KOMAN Government Solutions, LLC
Data Review Level:	2A
Primary Data Reviewer:	Laurie Ekes, Senior Project Chemist

Field Sample ID	Lab Sample ID	Matrix	Type/Type Code	A2320B	A2540C	E353.2	E410.4	SW6010C - Dissolved	SW6020A - Dissolved	SW7470A - Dissolved	SW8081B	SW9012B	SW9056A
LFM-03-07_FAL18	680-159185-5	Water	Field Sample/N	X	X	X	X	X	X	X	X	X	X
LFM-99-02B_FAL18	680-159185-1	Water	Field Sample/N	X	X	X	X	X	X	X	X	X	X
LFM-99-05A_FAL18	680-159185-2	Water	Field Sample/N	X	X	X	X	X	X	X	X	X	X
LFM-99-06ARP_FAL18	680-159185-4	Water	Field Sample/N	X	X	X	X	X	X	X	X	X	X
LFM-DUP01_FAL18	680-159185-3	Water	Field Duplicate/FD	X	X	X	X	X	X	X	X	X	X

This report assesses the analytical data quality associated with the analyses listed on the preceding cover page. 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 Solutions, LLC, Marlborough, MA; analyses were performed by TestAmerica Laboratories, Inc., Arvada, CO and were reported under sample delivery group (SDG) 6801591851REV. 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
- 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 Replicate RPD
- LCS Recovery
- LCS RPD
- MS Recovery
- MS RPD
- Prep Hold Time
- Surrogate
- 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 39 results (20.53%) out of the 190 results (sample and field QC samples) reported are qualified based on review and 0 results (0.00%) have been rejected. 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 reports Fall 2018 LTM samples collected from DCL; 4 native samples and 1 FD sample. Samples -2/-3 were FD samples.

Analytical Method	Data Reviewer Comment
A2320B	Alkalinity was detected in associated blanks from 3.2 to 4 mg/L. Sample results were greater than 5 times blank levels; qualifications were not required.
A2540C	TDS results were acceptable as reported.
E353.2	Nitrate/nitrite results were acceptable as reported.
E410.4	COD results were acceptable as reported.
SW6010C	Ba, Cr, Cu, Fe and Mn were reported at low level in associate CCBs. The estimated results for Ba less than 5 times the blank level (1.84 ug/L) were qualified as ND. The results for all other analytes were greater than 5 times the blank levels.
SW6020A	Arsenic results were acceptable as reported.
SW7470A	Mercury results were acceptable as reported.
SW8081B	The MS % recoveries from sample-1 for several pesticide compounds were outside control limits. The ND results for the pesticide compounds wee qualified as estimated (UJ).
SW9012B	Cyanide results were acceptable as reported.
SW9056A	Chloride and sulfate results were acceptable as reported.

December 12, 2018

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.

Quality Control Outliers for test method A2320B, 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 280-433585/88 (LB)/ MB 280-433585/88	Alkalinity, Total (as CaCO3)	3.950	< 1.1	< 5	mg/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 A2320B, 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 280-433585/85 (CB)/ CCB 280-433585/85	Alkalinity, Total (as CaCO3)	3.180	< 1.1	< 5	mg/l	U/None	B2	
CCB 280-433585/97 (CB)/ CCB 280-433585/97	Alkalinity, Total (as CaCO3)	3.410	< 1.1	< 5	mg/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, 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 680-543830/128 (CB)/ CCB 680-543830/128	Barium	1.840	< 1.7	< 10	ug/l	U/None	B2	
CCB 680-543830/128 (CB)/ CCB 680-543830/128	Copper	1.950	< 1.8	< 20	ug/l	U/None	B2	
CCB 680-543830/128 (CB)/ CCB 680-543830/128	Iron	22.90	< 17	< 50	ug/l	U/None	B2	
CCB 680-543830/128 (CB)/ CCB 680-543830/128	Chromium	3.000	< 1.6	< 10	ug/l	U/None	B2	
CCB 680-543830/128 (CB)/ CCB 680-543830/128	Manganese	3.680	< 1	< 10	ug/l	U/None	B2	
CCB 680-543830/140 (CB)/ CCB 680-543830/140	Iron	17.10	< 17	< 50	ug/l	U/None	B2	
CCB 680-543830/140 (CB)/ CCB 680-543830/140	Chromium	2.720	< 1.6	< 10	ug/l	U/None	B2	
CCB 680-543830/140 (CB)/ CCB 680-543830/140	Manganese	3.130	< 1	< 10	ug/l	U/None	B2	
CCB 680-543830/150 (CB)/ CCB 680-543830/150	Copper	2.310	< 1.8	< 20	ug/l	U/None	B2	
CCB 680-543830/150 (CB)/ CCB 680-543830/150	Iron	29.70	< 17	< 50	ug/l	U/None	B2	
CCB 680-543830/150 (CB)/ CCB 680-543830/150	Chromium	3.830	< 1.6	< 10	ug/l	U/None	B2	
CCB 680-543830/150 (CB)/ CCB 680-543830/150	Manganese	4.920	< 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
LFM-99-02B_FAL18	N	Barium	10.0	6.00 J	10.0 U		ug/l	B2
LFM-99-06ARP_FAL18	N	Barium	10.0	1.80 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.

Quality Control Outliers for test method SW8081B, 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
LFM-99-02B_FAL18 (SD)/ 680-159185-1	Aldrin	24.32	45 - 134	10 - 134	percent	J/UJ	M	
LFM-99-02B_FAL18 (SD)/ 680-159185-1	Heptachlor	26.51	54 - 130	10 - 130	percent	J/UJ	M	
LFM-99-02B_FAL18 (MS)/ 680-159185-1	Aldrin	30.92	45 - 134	10 - 134	percent	J/UJ	M	
LFM-99-02B_FAL18 (MS)/ 680-159185-1	Heptachlor	33.23	54 - 130	10 - 130	percent	J/UJ	M	
LFM-99-02B_FAL18 (SD)/ 680-159185-1	p,p'-DDE	35.49	57 - 135	10 - 135	percent	J/UJ	M	
LFM-99-02B_FAL18 (SD)/ 680-159185-1	alpha-Endosulfan	35.49	62 - 126	10 - 126	percent	J/UJ	M	
LFM-99-02B_FAL18 (SD)/ 680-159185-1	alpha-BHC (alpha-Hexachlorocyclohexane)	35.91	54 - 138	10 - 138	percent	J/UJ	M	
LFM-99-02B_FAL18 (SD)/ 680-159185-1	gamma-BHC (Lindane)	36.12	59 - 134	10 - 134	percent	J/UJ	M	
LFM-99-02B_FAL18 (SD)/ 680-159185-1	Heptachlor epoxide	38.00	61 - 133	10 - 133	percent	J/UJ	M	
LFM-99-02B_FAL18 (MS)/ 680-159185-1	p,p'-DDE	38.26	57 - 135	10 - 135	percent	J/UJ	M	
LFM-99-02B_FAL18 (MS)/ 680-159185-1	alpha-Endosulfan	38.26	62 - 126	10 - 126	percent	J/UJ	M	
LFM-99-02B_FAL18 (MS)/ 680-159185-1	alpha-BHC (alpha-Hexachlorocyclohexane)	38.36	54 - 138	10 - 138	percent	J/UJ	M	
LFM-99-02B_FAL18 (MS)/ 680-159185-1	gamma-BHC (Lindane)	38.36	59 - 134	10 - 134	percent	J/UJ	M	
LFM-99-02B_FAL18 (MS)/ 680-159185-1	Heptachlor epoxide	39.41	61 - 133	10 - 133	percent	J/UJ	M	
LFM-99-02B_FAL18 (MS)/ 680-159185-1	beta-Endosulfan	41.40	52 - 135	10 - 135	percent	J/UJ	M	
LFM-99-02B_FAL18 (SD)/ 680-159185-1	beta-Endosulfan	42.07	52 - 135	10 - 135	percent	J/UJ	M	
LFM-99-02B_FAL18 (SD)/ 680-159185-1	Dieldrin	42.07	60 - 136	10 - 136	percent	J/UJ	M	
LFM-99-02B_FAL18 (SD)/ 680-159185-1	delta-BHC (delta-Hexachlorocyclohexane)	42.28	52 - 142	10 - 142	percent	J/UJ	M	
LFM-99-02B_FAL18 (MS)/ 680-159185-1	Dieldrin	42.45	60 - 136	10 - 136	percent	J/UJ	M	
LFM-99-02B_FAL18 (SD)/ 680-159185-1	Endrin	42.48	60 - 138	10 - 138	percent	J/UJ	M	
LFM-99-02B_FAL18 (SD)/ 680-159185-1	p,p'-DDD	42.90	56 - 143	10 - 143	percent	J/UJ	M	
LFM-99-02B_FAL18 (MS)/ 680-159185-1	delta-BHC (delta-Hexachlorocyclohexane)	43.08	52 - 142	10 - 142	percent	J/UJ	M	
LFM-99-02B_FAL18 (MS)/ 680-159185-1	Endrin	43.61	60 - 138	10 - 138	percent	J/UJ	M	

Quality Control Outliers for test method SW8081B, 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
LFM-99-02B_FAL18 (SD)/ 680-159185-1	beta-BHC (beta-Hexachlorocyclohexane)	43.63	56 - 136	10 - 136	percent	J/UJ	M	
LFM-99-02B_FAL18 (MS)/ 680-159185-1	p,p'-DDD	44.55	56 - 143	10 - 143	percent	J/UJ	M	
LFM-99-02B_FAL18 (MS)/ 680-159185-1	Endosulfan sulfate	45.49	62 - 133	10 - 133	percent	J/UJ	M	
LFM-99-02B_FAL18 (MS)/ 680-159185-1	beta-BHC (beta-Hexachlorocyclohexane)	45.91	56 - 136	10 - 136	percent	J/UJ	M	
LFM-99-02B_FAL18 (SD)/ 680-159185-1	Endosulfan sulfate	46.24	62 - 133	10 - 133	percent	J/UJ	M	
LFM-99-02B_FAL18 (MS)/ 680-159185-1	Endrin aldehyde	46.86	51 - 132	10 - 132	percent	J/UJ	M	
LFM-99-02B_FAL18 (SD)/ 680-159185-1	Endrin aldehyde	48.64	51 - 132	10 - 132	percent	J/UJ	M	
LFM-99-02B_FAL18 (MS)/ 680-159185-1	Endrin ketone	49.48	58 - 134	10 - 134	percent	J/UJ	M	
LFM-99-02B_FAL18 (SD)/ 680-159185-1	Endrin ketone	49.90	58 - 134	10 - 134	percent	J/UJ	M	
LFM-99-02B_FAL18 (SD)/ 680-159185-1	Methoxychlor	50.21	54 - 145	10 - 145	percent	J/UJ	M	
LFM-99-02B_FAL18 (MS)/ 680-159185-1	Methoxychlor	51.99	54 - 145	10 - 145	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 SW8081B

FieldSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
LFM-99-02B_FAL18	N	Aldrin	0.0480	0.0170 U J1	0.0170 UJ	-	ug/l	M
LFM-99-02B_FAL18	N	alpha-BHC (alpha-Hexachlorocyclohexane)	0.0480	0.00960 U J1	0.00960 UJ	-	ug/l	M
LFM-99-02B_FAL18	N	alpha-Endosulfan	0.0480	0.00960 U J1	0.00960 UJ	-	ug/l	M
LFM-99-02B_FAL18	N	beta-BHC (beta-Hexachlorocyclohexane)	0.0480	0.0170 U J1	0.0170 UJ	-	ug/l	M
LFM-99-02B_FAL18	N	beta-Endosulfan	0.0480	0.00960 U J1	0.00960 UJ	-	ug/l	M
LFM-99-02B_FAL18	N	delta-BHC (delta-Hexachlorocyclohexane)	0.0480	0.0170 U M J1	0.0170 UJ	-	ug/l	M
LFM-99-02B_FAL18	N	Dieldrin	0.0480	0.00960 U J1	0.00960 UJ	-	ug/l	M
LFM-99-02B_FAL18	N	Endosulfan sulfate	0.0480	0.00960 U J1	0.00960 UJ	-	ug/l	M

Qualified Results associated with the MS Recovery for SW8081B

FieldSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
LFM-99-02B_FAL18	N	Endrin	0.0480	0.00960 U J1	0.00960 UJ	-	ug/l	M
LFM-99-02B_FAL18	N	Endrin aldehyde	0.0480	0.00960 U J1	0.00960 UJ	-	ug/l	M
LFM-99-02B_FAL18	N	Endrin ketone	0.0480	0.00960 U J1	0.00960 UJ	-	ug/l	M
LFM-99-02B_FAL18	N	gamma-BHC (Lindane)	0.0480	0.00960 U J1	0.00960 UJ	-	ug/l	M
LFM-99-02B_FAL18	N	Heptachlor	0.0480	0.0170 U J1	0.0170 UJ	-	ug/l	M
LFM-99-02B_FAL18	N	Heptachlor epoxide	0.0480	0.00960 U J1	0.00960 UJ	-	ug/l	M
LFM-99-02B_FAL18	N	Methoxychlor	0.0480	0.0170 U J1	0.0170 UJ	-	ug/l	M
LFM-99-02B_FAL18	N	p,p'-DDD	0.0480	0.00960 U J1	0.00960 UJ	-	ug/l	M
LFM-99-02B_FAL18	N	p,p'-DDE	0.0480	0.00960 U J1	0.00960 UJ	-	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 SW8081B, Surrogate

Method performance for individual samples is demonstrated through spiking activities. All samples are spiked with surrogate compounds prior to sample preparation. The sample itself may produce effects due to such factors as interferences and high concentrations of analytes. Summary forms were evaluated and compared to electronic data deliverables. Surrogate 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
LFM-DUP01_FAL18 (FD)/ 680-159185-3	2,4,5,6-Tetrachloro-meta-xylene	40.69	44 - 124	10 - 124	percent	J/UJ	I	

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 Surrogate for SW8081B

FieldSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
LFM-DUP01_FAL18	FD	Aldrin	0.0480	0.0170 U	0.0170 UJ	-	ug/l	I
LFM-DUP01_FAL18	FD	alpha-BHC (alpha-Hexachlorocyclohexane)	0.0480	0.00960 U	0.00960 UJ	-	ug/l	I
LFM-DUP01_FAL18	FD	alpha-Endosulfan	0.0480	0.00960 U	0.00960 UJ	-	ug/l	I
LFM-DUP01_FAL18	FD	beta-BHC (beta-Hexachlorocyclohexane)	0.0480	0.0170 U	0.0170 UJ	-	ug/l	I
LFM-DUP01_FAL18	FD	beta-Endosulfan	0.0480	0.00960 U	0.00960 UJ	-	ug/l	I
LFM-DUP01_FAL18	FD	Chlordane	0.480	0.290 U M	0.290 UJ	-	ug/l	I
LFM-DUP01_FAL18	FD	delta-BHC (delta-Hexachlorocyclohexane)	0.0480	0.0170 U M	0.0170 UJ	-	ug/l	I
LFM-DUP01_FAL18	FD	Dieldrin	0.0480	0.00960 U	0.00960 UJ	-	ug/l	I
LFM-DUP01_FAL18	FD	Endosulfan sulfate	0.0480	0.00960 U	0.00960 UJ	-	ug/l	I
LFM-DUP01_FAL18	FD	Endrin	0.0480	0.00960 U	0.00960 UJ	-	ug/l	I
LFM-DUP01_FAL18	FD	Endrin aldehyde	0.0480	0.00960 U M	0.00960 UJ	-	ug/l	I
LFM-DUP01_FAL18	FD	Endrin ketone	0.0480	0.00960 U	0.00960 UJ	-	ug/l	I

Qualified Results associated with the Surrogate for SW8081B

FieldSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
LFM-DUP01_FAL18	FD	gamma-BHC (Lindane)	0.0480	0.00960 U	0.00960 UJ	-	ug/l	I
LFM-DUP01_FAL18	FD	Heptachlor	0.0480	0.0170 U	0.0170 UJ	-	ug/l	I
LFM-DUP01_FAL18	FD	Heptachlor epoxide	0.0480	0.00960 U	0.00960 UJ	-	ug/l	I
LFM-DUP01_FAL18	FD	Methoxychlor	0.0480	0.0170 U	0.0170 UJ	-	ug/l	I
LFM-DUP01_FAL18	FD	p,p'-DDD	0.0480	0.00960 U	0.00960 UJ	-	ug/l	I
LFM-DUP01_FAL18	FD	p,p'-DDE	0.0480	0.00960 U	0.00960 UJ	-	ug/l	I
LFM-DUP01_FAL18	FD	p,p'-DDT	0.0480	0.0170 U	0.0170 UJ	-	ug/l	I
LFM-DUP01_FAL18	FD	Toxaphene	4.80	0.770 U	0.770 UJ	-	ug/l	I

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
LFM-99-02B_FAL18	N	Barium	10.0	6.00 J	10.0 U		ug/l	B2
LFM-99-06ARP_FAL18	N	Barium	10.0	1.80 J	10.0 U		ug/l	B2

Test Method: SW8081B	Extraction Method: SW3520C							
FieldSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
LFM-99-02B_FAL18	N	Aldrin	0.0480	0.0170 U J1	0.0170 UJ	-	ug/l	M
LFM-99-02B_FAL18	N	alpha-BHC (alpha-Hexachlorocyclohexane)	0.0480	0.00960 U J1	0.00960 UJ	-	ug/l	M
LFM-99-02B_FAL18	N	alpha-Endosulfan	0.0480	0.00960 U J1	0.00960 UJ	-	ug/l	M
LFM-99-02B_FAL18	N	beta-BHC (beta-Hexachlorocyclohexane)	0.0480	0.0170 U J1	0.0170 UJ	-	ug/l	M
LFM-99-02B_FAL18	N	beta-Endosulfan	0.0480	0.00960 U J1	0.00960 UJ	-	ug/l	M
LFM-99-02B_FAL18	N	delta-BHC (delta-Hexachlorocyclohexane)	0.0480	0.0170 U M J1	0.0170 UJ	-	ug/l	M
LFM-99-02B_FAL18	N	Dieldrin	0.0480	0.00960 U J1	0.00960 UJ	-	ug/l	M
LFM-99-02B_FAL18	N	Endosulfan sulfate	0.0480	0.00960 U J1	0.00960 UJ	-	ug/l	M
LFM-99-02B_FAL18	N	Endrin	0.0480	0.00960 U J1	0.00960 UJ	-	ug/l	M
LFM-99-02B_FAL18	N	Endrin aldehyde	0.0480	0.00960 U J1	0.00960 UJ	-	ug/l	M
LFM-99-02B_FAL18	N	Endrin ketone	0.0480	0.00960 U J1	0.00960 UJ	-	ug/l	M
LFM-99-02B_FAL18	N	gamma-BHC (Lindane)	0.0480	0.00960 U J1	0.00960 UJ	-	ug/l	M
LFM-99-02B_FAL18	N	Heptachlor	0.0480	0.0170 U J1	0.0170 UJ	-	ug/l	M
LFM-99-02B_FAL18	N	Heptachlor epoxide	0.0480	0.00960 U J1	0.00960 UJ	-	ug/l	M
LFM-99-02B_FAL18	N	Methoxychlor	0.0480	0.0170 U J1	0.0170 UJ	-	ug/l	M
LFM-99-02B_FAL18	N	p,p'-DDD	0.0480	0.00960 U J1	0.00960 UJ	-	ug/l	M
LFM-99-02B_FAL18	N	p,p'-DDE	0.0480	0.00960 U J1	0.00960 UJ	-	ug/l	M
LFM-DUP01_FAL18	FD	Aldrin	0.0480	0.0170 U	0.0170 UJ	-	ug/l	I
LFM-DUP01_FAL18	FD	alpha-BHC (alpha-Hexachlorocyclohexane)	0.0480	0.00960 U	0.00960 UJ	-	ug/l	I
LFM-DUP01_FAL18	FD	alpha-Endosulfan	0.0480	0.00960 U	0.00960 UJ	-	ug/l	I
LFM-DUP01_FAL18	FD	beta-BHC (beta-Hexachlorocyclohexane)	0.0480	0.0170 U	0.0170 UJ	-	ug/l	I
LFM-DUP01_FAL18	FD	beta-Endosulfan	0.0480	0.00960 U	0.00960 UJ	-	ug/l	I
LFM-DUP01_FAL18	FD	Chlordane	0.480	0.290 U M	0.290 UJ	-	ug/l	I
LFM-DUP01_FAL18	FD	delta-BHC (delta-Hexachlorocyclohexane)	0.0480	0.0170 U M	0.0170 UJ	-	ug/l	I
LFM-DUP01_FAL18	FD	Dieldrin	0.0480	0.00960 U	0.00960 UJ	-	ug/l	I
LFM-DUP01_FAL18	FD	Endosulfan sulfate	0.0480	0.00960 U	0.00960 UJ	-	ug/l	I
LFM-DUP01_FAL18	FD	Endrin	0.0480	0.00960 U	0.00960 UJ	-	ug/l	I
LFM-DUP01_FAL18	FD	Endrin aldehyde	0.0480	0.00960 U M	0.00960 UJ	-	ug/l	I

Table of All Qualified Results

Test Method: SW8081B	Extraction Method: SW3520C							
FieldSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
LFM-DUP01_FAL18	FD	Endrin ketone	0.0480	0.00960 U	0.00960 UJ	-	ug/l	I
LFM-DUP01_FAL18	FD	gamma-BHC (Lindane)	0.0480	0.00960 U	0.00960 UJ	-	ug/l	I
LFM-DUP01_FAL18	FD	Heptachlor	0.0480	0.0170 U	0.0170 UJ	-	ug/l	I
LFM-DUP01_FAL18	FD	Heptachlor epoxide	0.0480	0.00960 U	0.00960 UJ	-	ug/l	I
LFM-DUP01_FAL18	FD	Methoxychlor	0.0480	0.0170 U	0.0170 UJ	-	ug/l	I
LFM-DUP01_FAL18	FD	p,p'-DDD	0.0480	0.00960 U	0.00960 UJ	-	ug/l	I
LFM-DUP01_FAL18	FD	p,p'-DDE	0.0480	0.00960 U	0.00960 UJ	-	ug/l	I
LFM-DUP01_FAL18	FD	p,p'-DDT	0.0480	0.0170 U	0.0170 UJ	-	ug/l	I
LFM-DUP01_FAL18	FD	Toxaphene	4.80	0.770 U	0.770 UJ	-	ug/l	I

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
LFM-99-05A_FAL18	N	Barium	10.0	9.80 J	9.80 U	9.80 J	TR
LFM-DUP01_FAL18	FD	Barium	10.0	10.0	10.0 U	10.0	

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
I	Surrogate recovery outside project limits.
L	Lab Blank
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.

Facility:	Long Term Monitoring
Event:	KOMAN, Long Term Monitoring, Main Post Fall 2018
SDG:	TL0044
Guidance Document:	Quality Assurance Project Plan, Long Term Monitoring Program, Former Fort Devens, 2018
Prime Contractor:	KOMAN Government Solutions, LLC, Marlborough, MA
Project Manager:	Jim Ropp
Contract Laboratory:	Katahdin Analytical Services, Westbrook, ME
Data Review Contractor:	KOMAN Government Solutions, LLC
Data Review Level:	2A
Primary Data Reviewer:	Laurie Ekes, Senior Project Chemist

Field Sample ID	Lab Sample ID	Matrix	Type/Type Code	MADEPEP	MADEPVP
LFM-03-07_FAL18	TL0044-5	Water	Field Sample/N	X	X
LFM-99-02B_FAL18	TL0044-1	Water	Field Sample/N	X	X
LFM-99-05A_FAL18	TL0044-2	Water	Field Sample/N	X	X
LFM-99-06ARP_FAL18	TL0044-4	Water	Field Sample/N	X	X
LFM-DUP01_FAL18	TL0044-3	Water	Field Duplicate/FD	X	X
LFM-TRIPBLANK2	TL0044-6	Water	Trip Blank/TB		X

This report assesses the analytical data quality associated with the analyses listed on the preceding cover page. 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 Solutions, LLC, Marlborough, MA; analyses were performed by Katahdin Analytical Services, Westbrook, ME and were reported under sample delivery group (SDG) TL0044. 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
- Blank - Negative
- Field Duplicate RPD
- LCS Recovery
- LCS RPD
- MS Recovery
- MS RPD
- Prep Hold Time
- Surrogate
- Test Hold Time
- Trip Blank

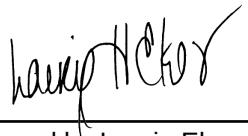
Results of the ADR process were subsequently reviewed and updated as applicable by the data review chemists identified on the signature page. Quality control elements that were not included in the electronic deliverable were reviewed manually and findings are documented within this report. Summaries of findings and associated qualified results are documented throughout this report.

A total of 0 results (0.00%) out of the 160 results (sample and field QC samples) reported are qualified based on review and 0 results (0.00%) have been rejected. 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

DCL samples for EPH/VPH were submitted to Katahdin Analytical for analysis. Sample results are reported in SDG 680-159185-1.

Analytical Method	Data Reviewer Comment
MADEPEP	EPH results were acceptable as reported and were ND in all samples
MADEPVP	VPH results were acceptable as reported and were ND in all samples



December 19, 2018

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.

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

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.

Field Duplicate Report By SDG
Long Term Monitoring
KOMAN, Long Term Monitoring, Main Post Fall 2018
Field Duplicates for SDG: 6801591851REV

Location	Analysis
LFM-99-05A	A2320B

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
LFM-99-05A_FAL18 / LFM-DUP01_FAL18	680-159185-2 / 680-159185-3	Alkalinity, Total (as CaCO3)	99.0	96.0	5.00	3.08	30	OK	NA

Location	Analysis
LFM-99-05A	A2540C

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
LFM-99-05A_FAL18 / LFM-DUP01_FAL18	680-159185-2 / 680-159185-3	Total Dissolved Solids	420	410	10.0	2.41	30	OK	NA

Location	Analysis
LFM-99-05A	E353.2

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
LFM-99-05A_FAL18 / LFM-DUP01_FAL18	680-159185-2 / 680-159185-3	Nitrate-Nitrite (as N)	0.920	0.920	0.100	0.00	30	OK	NA

Location	Analysis
LFM-99-05A	E410.4

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
LFM-99-05A_FAL18 / LFM-DUP01_FAL18	680-159185-2 / 680-159185-3	Chemical Oxygen Demand	ND	ND	20.0	NA	30	NA	OK

Location	Analysis
LFM-99-05A	SW6010C

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
LFM-99-05A_FAL18 / LFM-DUP01_FAL18	680-159185-2 / 680-159185-3	Barium (FLDFLT)	ND	ND	10.0	NA	30	NA	OK
LFM-99-05A_FAL18 / LFM-DUP01_FAL18	680-159185-2 / 680-159185-3	Cadmium (FLDFLT)	ND	ND	5.00	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"

Field Duplicate Report By SDG
Long Term Monitoring
KOMAN, Long Term Monitoring, Main Post Fall 2018
Field Duplicates for SDG: 6801591851REV

Location	Analysis
LFM-99-05A	SW6010C

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
LFM-99-05A_FAL18 / LFM-DUP01_FAL18	680-159185-2 / 680-159185-3	Chromium (FLDFLT)	ND	ND	10.0	NA	30	NA	OK
LFM-99-05A_FAL18 / LFM-DUP01_FAL18	680-159185-2 / 680-159185-3	Copper (FLDFLT)	ND	ND	20.0	NA		NA	OK
LFM-99-05A_FAL18 / LFM-DUP01_FAL18	680-159185-2 / 680-159185-3	Copper (FLDFLT)	ND	ND	20.0	NA	30	NA	OK
LFM-99-05A_FAL18 / LFM-DUP01_FAL18	680-159185-2 / 680-159185-3	Iron (FLDFLT)	ND	ND	50.0	NA	30	NA	OK
LFM-99-05A_FAL18 / LFM-DUP01_FAL18	680-159185-2 / 680-159185-3	Lead (FLDFLT)	ND	ND	10.0	NA	30	NA	OK
LFM-99-05A_FAL18 / LFM-DUP01_FAL18	680-159185-2 / 680-159185-3	Manganese (FLDFLT)	ND	ND	10.0	NA	30	NA	OK
LFM-99-05A_FAL18 / LFM-DUP01_FAL18	680-159185-2 / 680-159185-3	Selenium (FLDFLT)	ND	ND	20.0	NA	30	NA	OK
LFM-99-05A_FAL18 / LFM-DUP01_FAL18	680-159185-2 / 680-159185-3	Silver (FLDFLT)	ND	ND	10.0	NA	30	NA	OK

Location	Analysis
LFM-99-05A	SW6020A

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
LFM-99-05A_FAL18 / LFM-DUP01_FAL18	680-159185-2 / 680-159185-3	Arsenic (FLDFLT)	ND	ND	3.00	NA	30	NA	OK

Location	Analysis
LFM-99-05A	SW7470A

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
LFM-99-05A_FAL18 / LFM-DUP01_FAL18	680-159185-2 / 680-159185-3	Mercury (FLDFLT)	ND	ND	0.200	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"

Field Duplicate Report By SDG
Long Term Monitoring
KOMAN, Long Term Monitoring, Main Post Fall 2018
Field Duplicates for SDG: 6801591851REV

Location	Analysis
LFM-99-05A	SW8081B

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
LFM-99-05A_FAL18 / LFM-DUP01_FAL18	680-159185-2 / 680-159185-3	Aldrin	ND	ND	0.0480	NA	30	NA	OK
LFM-99-05A_FAL18 / LFM-DUP01_FAL18	680-159185-2 / 680-159185-3	alpha-BHC (alpha-Hexachlorocyclohexane)	ND	ND	0.0480	NA	30	NA	OK
LFM-99-05A_FAL18 / LFM-DUP01_FAL18	680-159185-2 / 680-159185-3	alpha-Endosulfan	ND	ND	0.0480	NA	30	NA	OK
LFM-99-05A_FAL18 / LFM-DUP01_FAL18	680-159185-2 / 680-159185-3	beta-BHC (beta-Hexachlorocyclohexane)	ND	ND	0.0480	NA	30	NA	OK
LFM-99-05A_FAL18 / LFM-DUP01_FAL18	680-159185-2 / 680-159185-3	beta-Endosulfan	ND	ND	0.0480	NA	30	NA	OK
LFM-99-05A_FAL18 / LFM-DUP01_FAL18	680-159185-2 / 680-159185-3	Chlordane	ND	ND	0.480	NA	30	NA	OK
LFM-99-05A_FAL18 / LFM-DUP01_FAL18	680-159185-2 / 680-159185-3	delta-BHC (delta-Hexachlorocyclohexane)	ND	ND	0.0480	NA	30	NA	OK
LFM-99-05A_FAL18 / LFM-DUP01_FAL18	680-159185-2 / 680-159185-3	Dieldrin	ND	ND	0.0480	NA	30	NA	OK
LFM-99-05A_FAL18 / LFM-DUP01_FAL18	680-159185-2 / 680-159185-3	Endosulfan sulfate	ND	ND	0.0480	NA	30	NA	OK
LFM-99-05A_FAL18 / LFM-DUP01_FAL18	680-159185-2 / 680-159185-3	Endrin	ND	ND	0.0480	NA	30	NA	OK
LFM-99-05A_FAL18 / LFM-DUP01_FAL18	680-159185-2 / 680-159185-3	Endrin aldehyde	ND	ND	0.0480	NA	30	NA	OK
LFM-99-05A_FAL18 / LFM-DUP01_FAL18	680-159185-2 / 680-159185-3	Endrin ketone	ND	ND	0.0480	NA	30	NA	OK
LFM-99-05A_FAL18 / LFM-DUP01_FAL18	680-159185-2 / 680-159185-3	gamma-BHC (Lindane)	ND	ND	0.0480	NA	30	NA	OK
LFM-99-05A_FAL18 / LFM-DUP01_FAL18	680-159185-2 / 680-159185-3	Heptachlor	ND	ND	0.0480	NA	30	NA	OK
LFM-99-05A_FAL18 / LFM-DUP01_FAL18	680-159185-2 / 680-159185-3	Heptachlor epoxide	ND	ND	0.0480	NA	30	NA	OK
LFM-99-05A_FAL18 / LFM-DUP01_FAL18	680-159185-2 / 680-159185-3	Methoxychlor	ND	ND	0.0480	NA	30	NA	OK
LFM-99-05A_FAL18 / LFM-DUP01_FAL18	680-159185-2 / 680-159185-3	p,p'-DDD	ND	ND	0.0480	NA	30	NA	OK
LFM-99-05A_FAL18 / LFM-DUP01_FAL18	680-159185-2 / 680-159185-3	p,p'-DDE	ND	ND	0.0480	NA	30	NA	OK
LFM-99-05A_FAL18 / LFM-DUP01_FAL18	680-159185-2 / 680-159185-3	p,p'-DDT	ND	ND	0.0480	NA	30	NA	OK
LFM-99-05A_FAL18 / LFM-DUP01_FAL18	680-159185-2 / 680-159185-3	Toxaphene	ND	ND	4.80	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"

Field Duplicate Report By SDG
Long Term Monitoring
KOMAN, Long Term Monitoring, Main Post Fall 2018
Field Duplicates for SDG: 6801591851REV

Location	Analysis
LFM-99-05A	SW9012B

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
LFM-99-05A_FAL18 / LFM-DUP01_FAL18	680-159185-2 / 680-159185-3	Cyanide	ND	0.00290	0.0100	NA	30	NA	OK

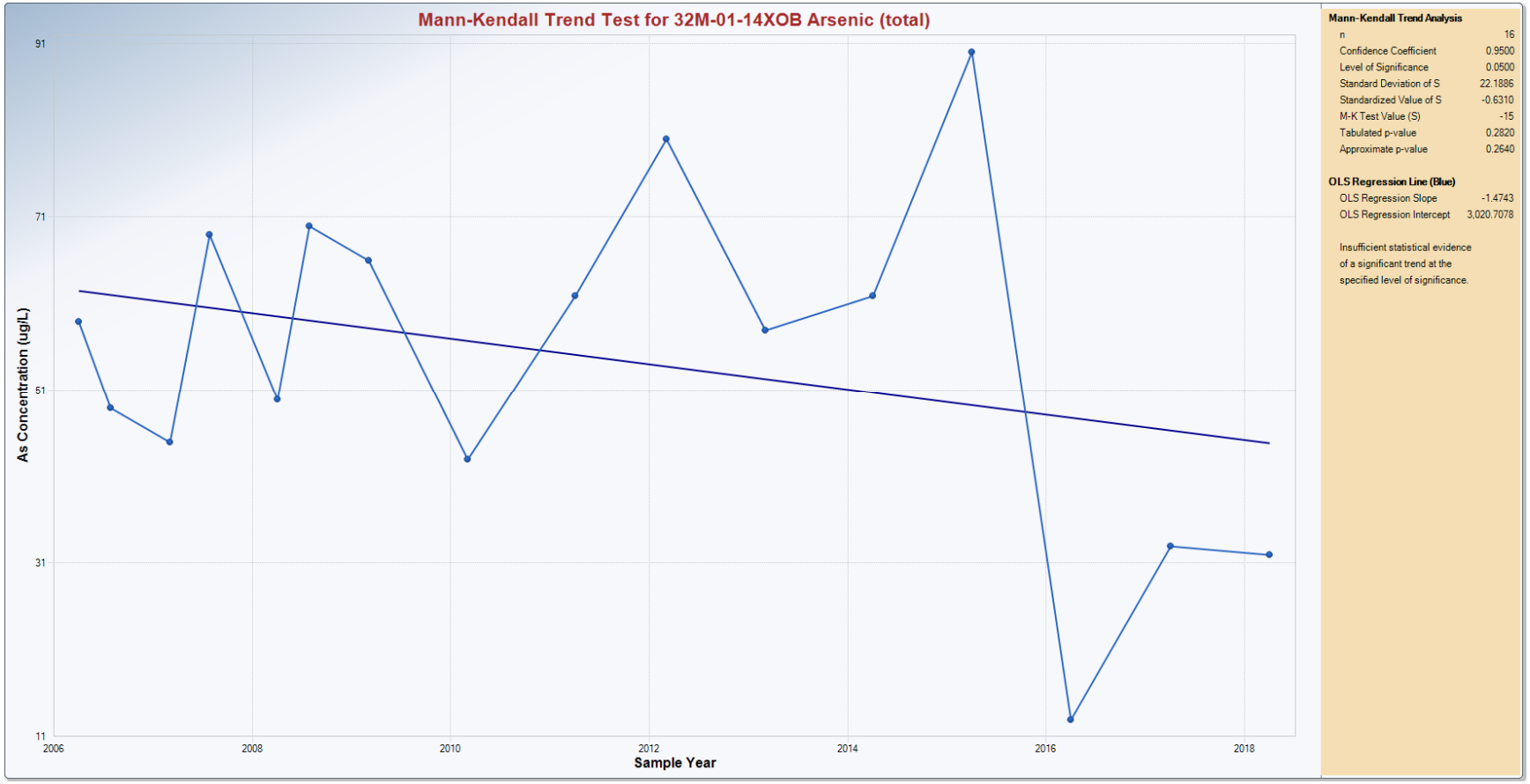
Location	Analysis
LFM-99-05A	SW9056A

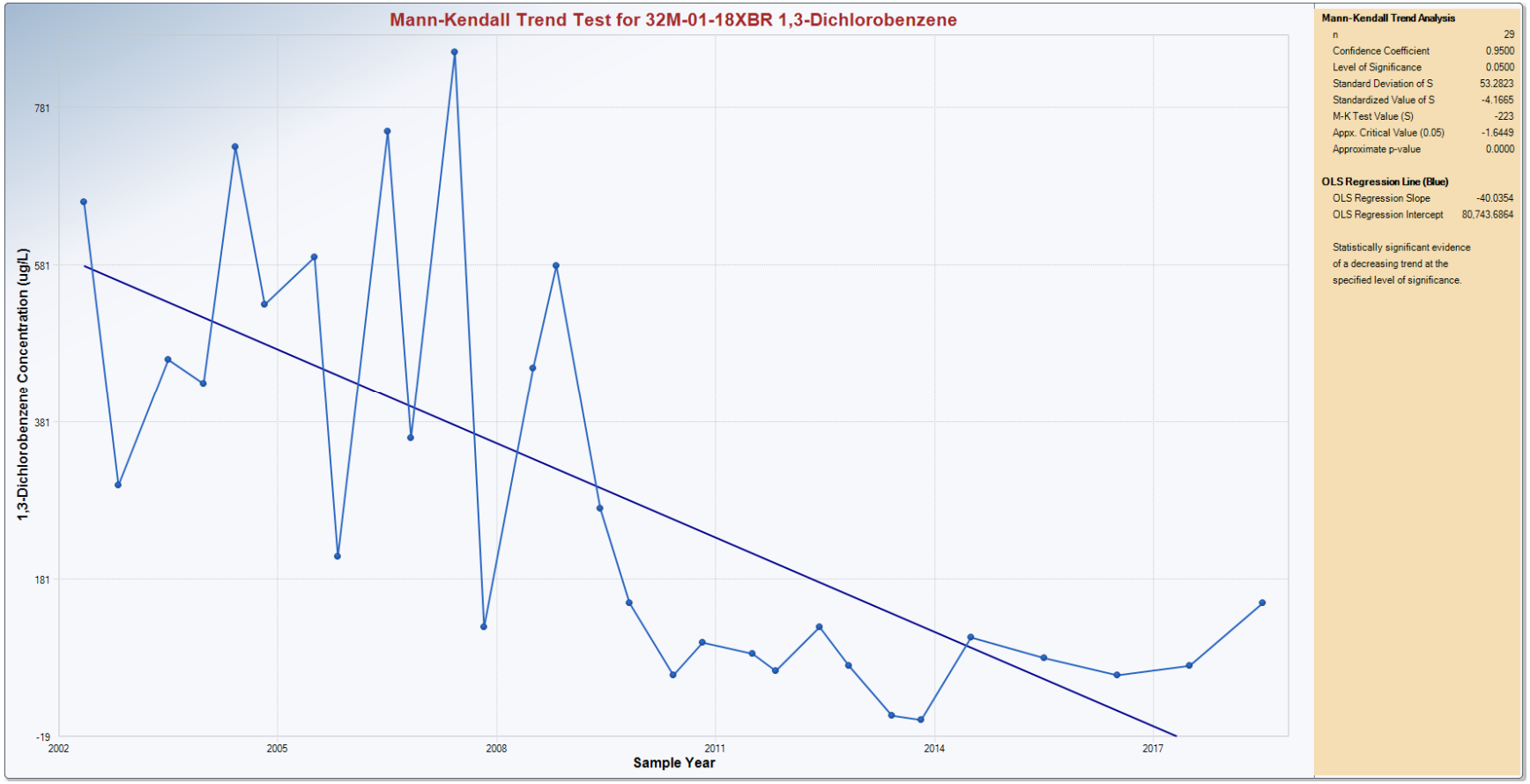
Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
LFM-99-05A_FAL18 / LFM-DUP01_FAL18	680-159185-2 / 680-159185-3	Chloride	180	180	2.50	0.00	30	OK	NA
LFM-99-05A_FAL18 / LFM-DUP01_FAL18	680-159185-2 / 680-159185-3	Sulfate	25.0	25.0	5.00	0.00	30	NA	OK

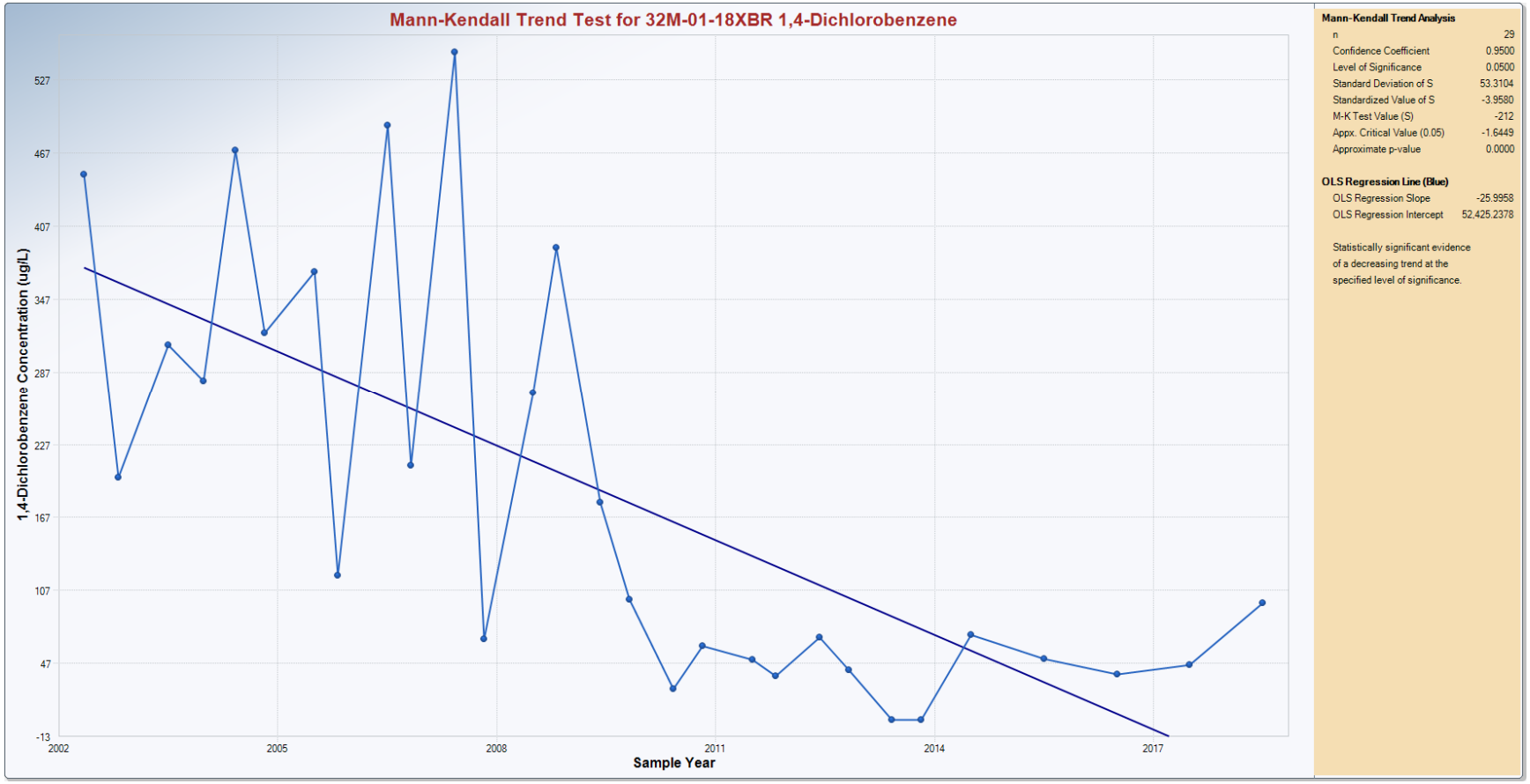
FD = Field Duplicate
RL = Reporting Limit
RPD = Relative Percent Difference

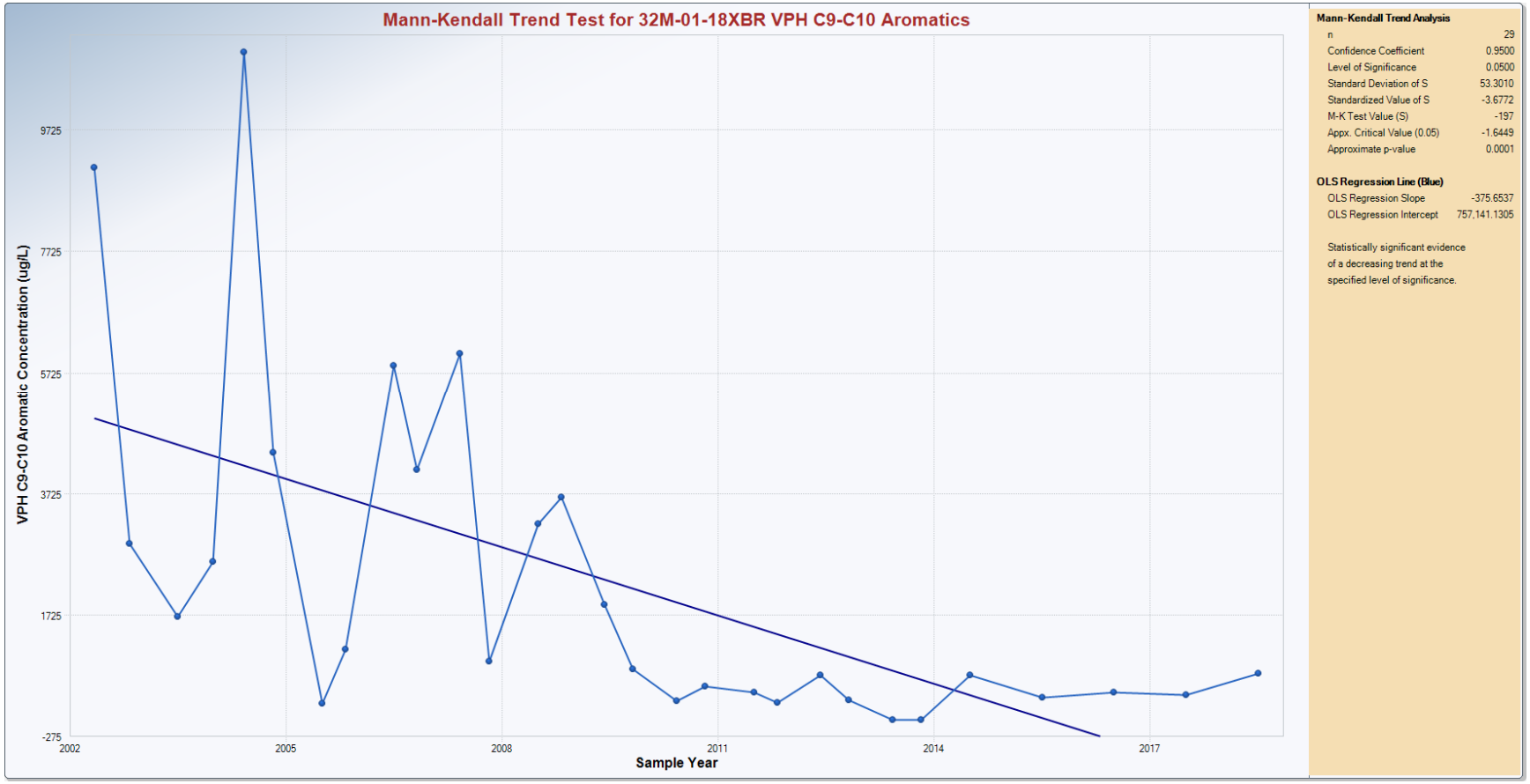
RL Check = If either the primary sample or field duplicate result is less than 5 times the RL then the criteria used to determine if the field duplicate is outside QC limits is +/- RL for Water and +/- 2 times RL for Soil"

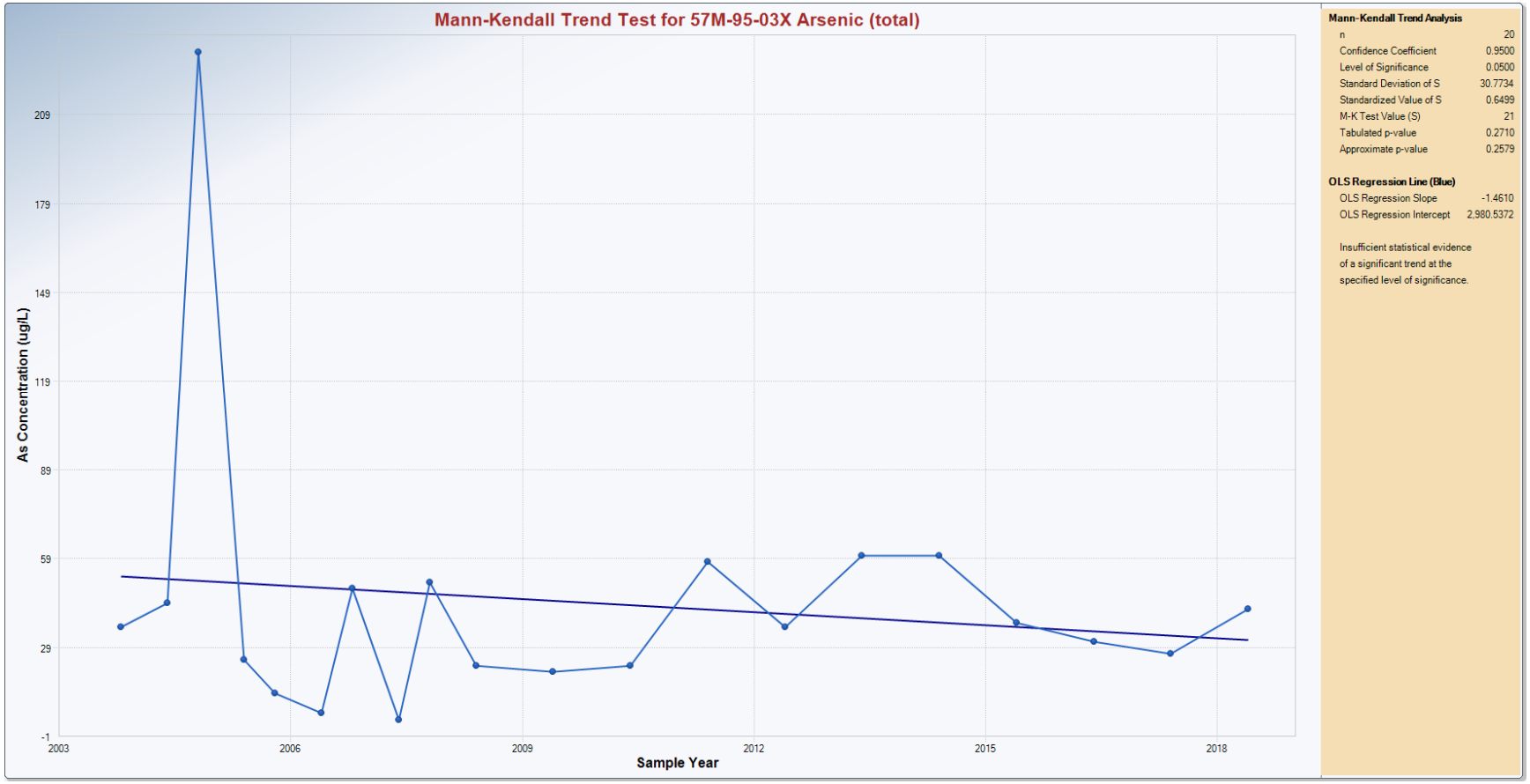
APPENDIX D
DATA TREND ANALYSES

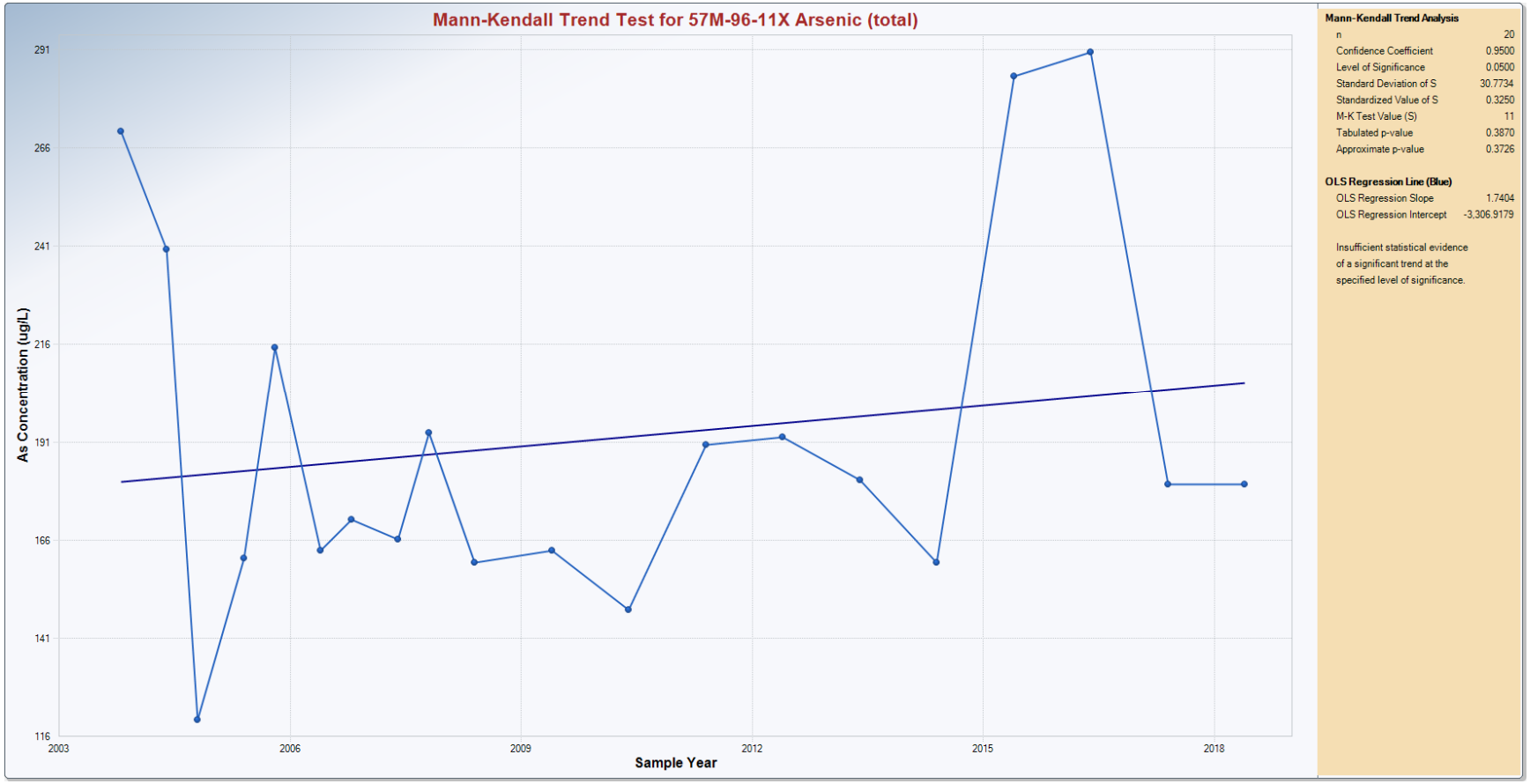

Mann-Kendall Trend Test for 32M-01-14XOB Arsenic (total)
As Concentration (ug/L)
91
71
51
31
11
2006
2008
2010
2012
2014
2016
2018
Sample Year
Mann-Kendall Trend Analysis
n 16
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 22.1886
Standardized Value of S -0.6310
M-K Test Value (S) -15
Tabulated p-value 0.2820
Approximate p-value 0.2640
OLS Regression Line (Blue)
OLS Regression Slope -1.4743
OLS Regression Intercept 3,020.7078
Insufficient statistical evidence of a significant trend at the specified level of significance.

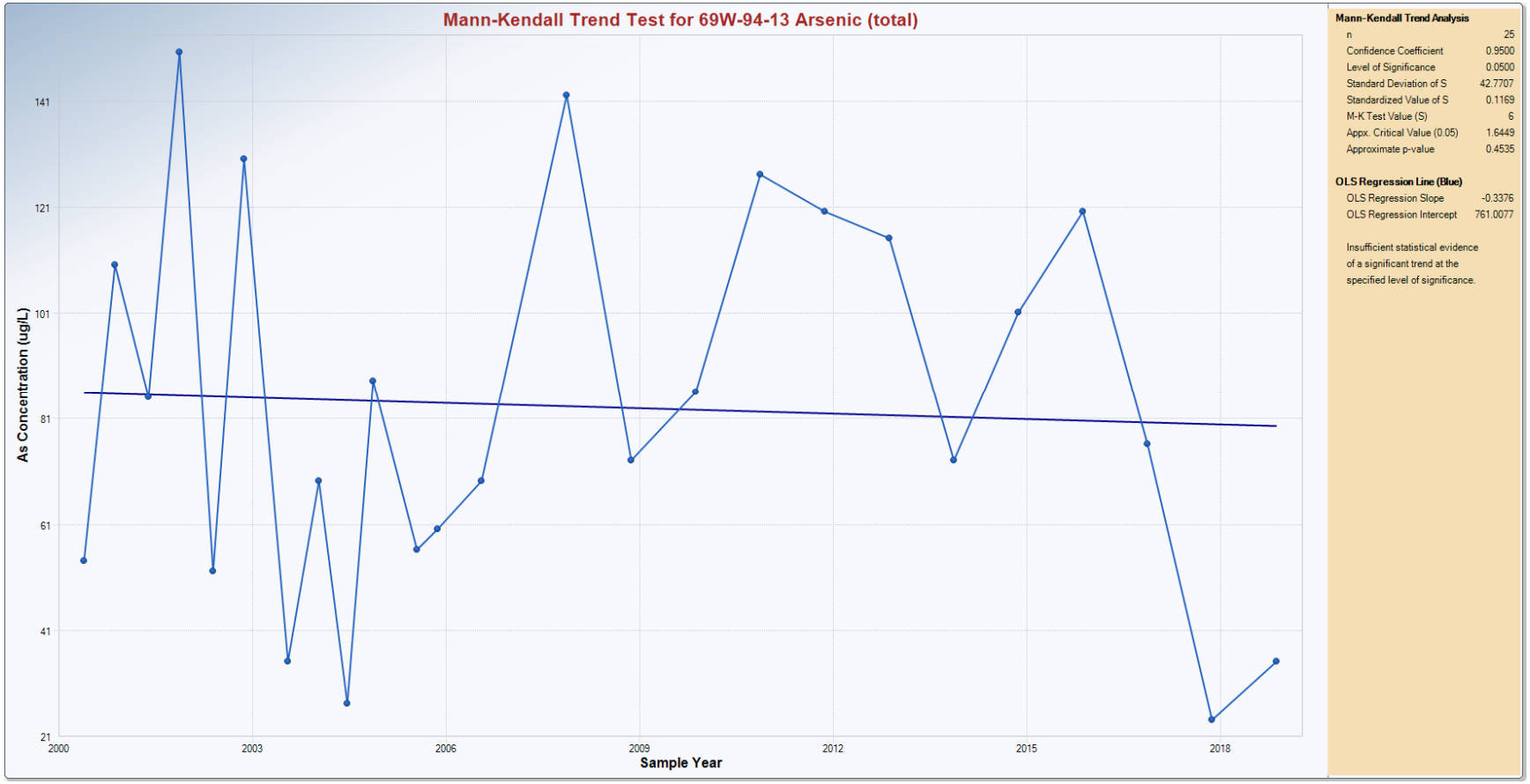

Mann-Kendall Trend Test for 32M-01-18XBR 1,3-Dichlorobenzene
1,3-Dichlorobenzene Concentration (ug/L)
781
581
381
181
-19
2002
2005
2008
2011
2014
2017
Sample Year
Mann-Kendall Trend Analysis
n 29
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 53.2823
Standardized Value of S -4.1665
M-K Test Value (S) -223
Appx. Critical Value (0.05) -1.6449
Approximate p-value 0.0000
OLS Regression Line (Blue)
OLS Regression Slope -40.0354
OLS Regression Intercept 80,743.6864
Statistically significant evidence of a decreasing trend at the specified level of significance.

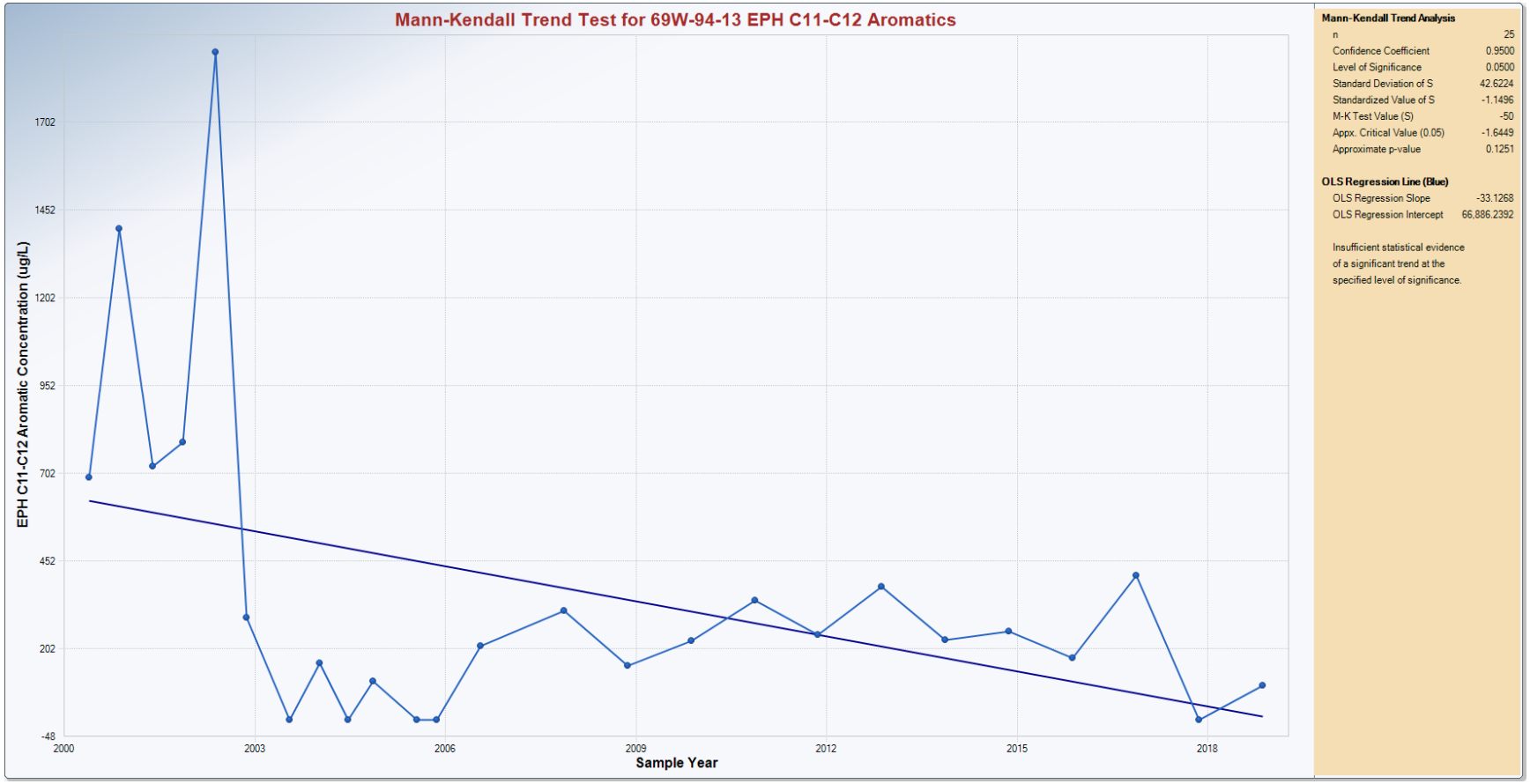

Mann-Kendall Trend Test for 32M-01-18XBR 1,4-Dichlorobenzene
1,4-Dichlorobenzene Concentration (ug/L)
527
467
407
347
287
227
167
107
47
-13
2002
2005
2008
2011
2014
2017
Sample Year
Mann-Kendall Trend Analysis
n 29
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 53.3104
Standardized Value of S -3.9580
M-K Test Value (S) -212
Appx. Critical Value (0.05) -1.6449
Approximate p-value 0.0000
OLS Regression Line (Blue)
OLS Regression Slope -25.9958
OLS Regression Intercept 52,425.2378
Statistically significant evidence of a decreasing trend at the specified level of significance.

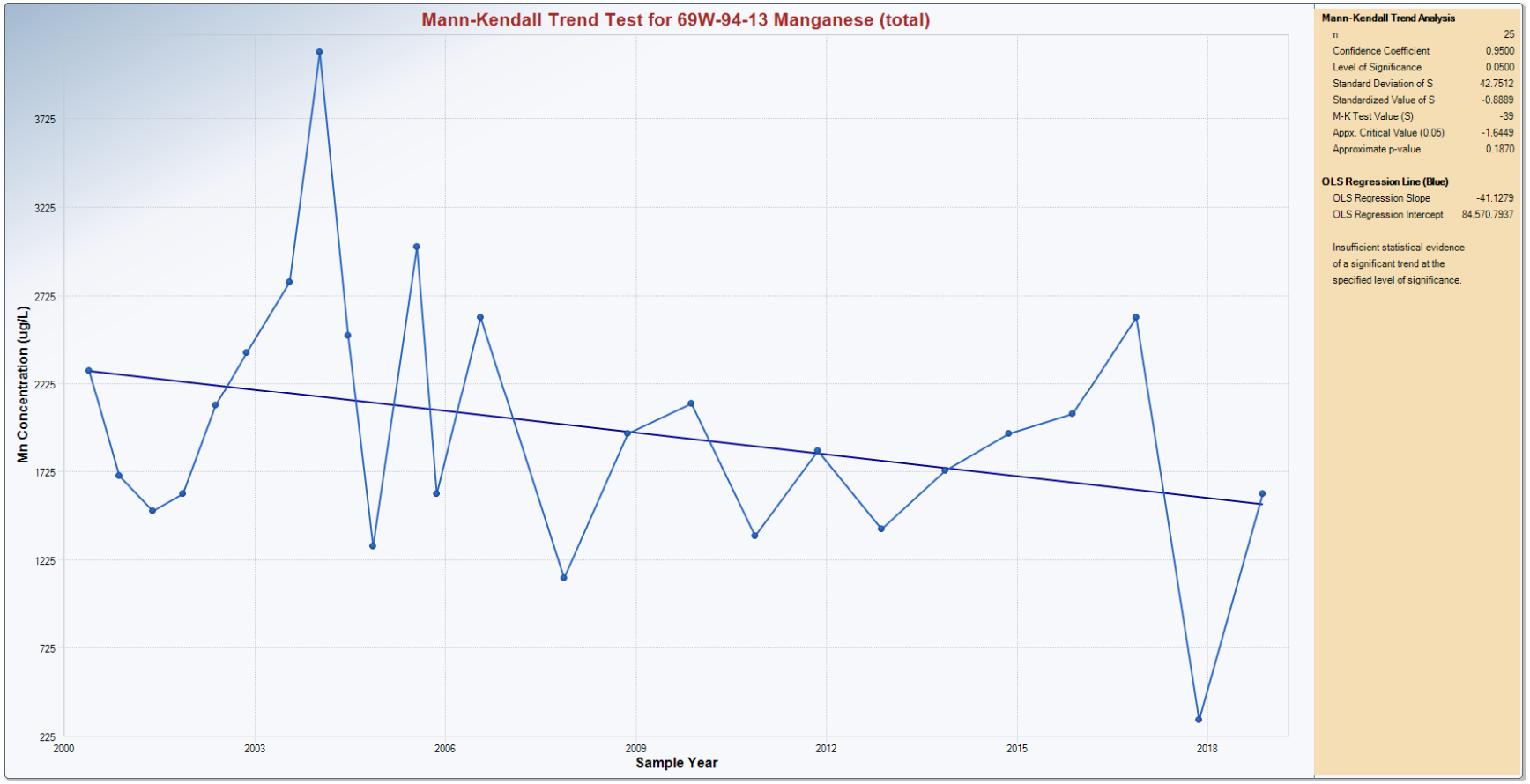

Mann-Kendall Trend Test for 32M-01-18XBR VPH C9-C10 Aromatics
VPH C9-C10 Aromatic Concentration (ug/L)
9725
7725
5725
3725
1725
-275
2002
2005
2008
2011
2014
2017
Sample Year
Mann-Kendall Trend Analysis
n 29
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 53.3010
Standardized Value of S -3.6772
M-K Test Value (S) -197
Appx. Critical Value (0.05) -1.6449
Approximate p-value 0.0001
OLS Regression Line (Blue)
OLS Regression Slope -375.6537
OLS Regression Intercept 757,141.1305
Statistically significant evidence of a decreasing trend at the specified level of significance.

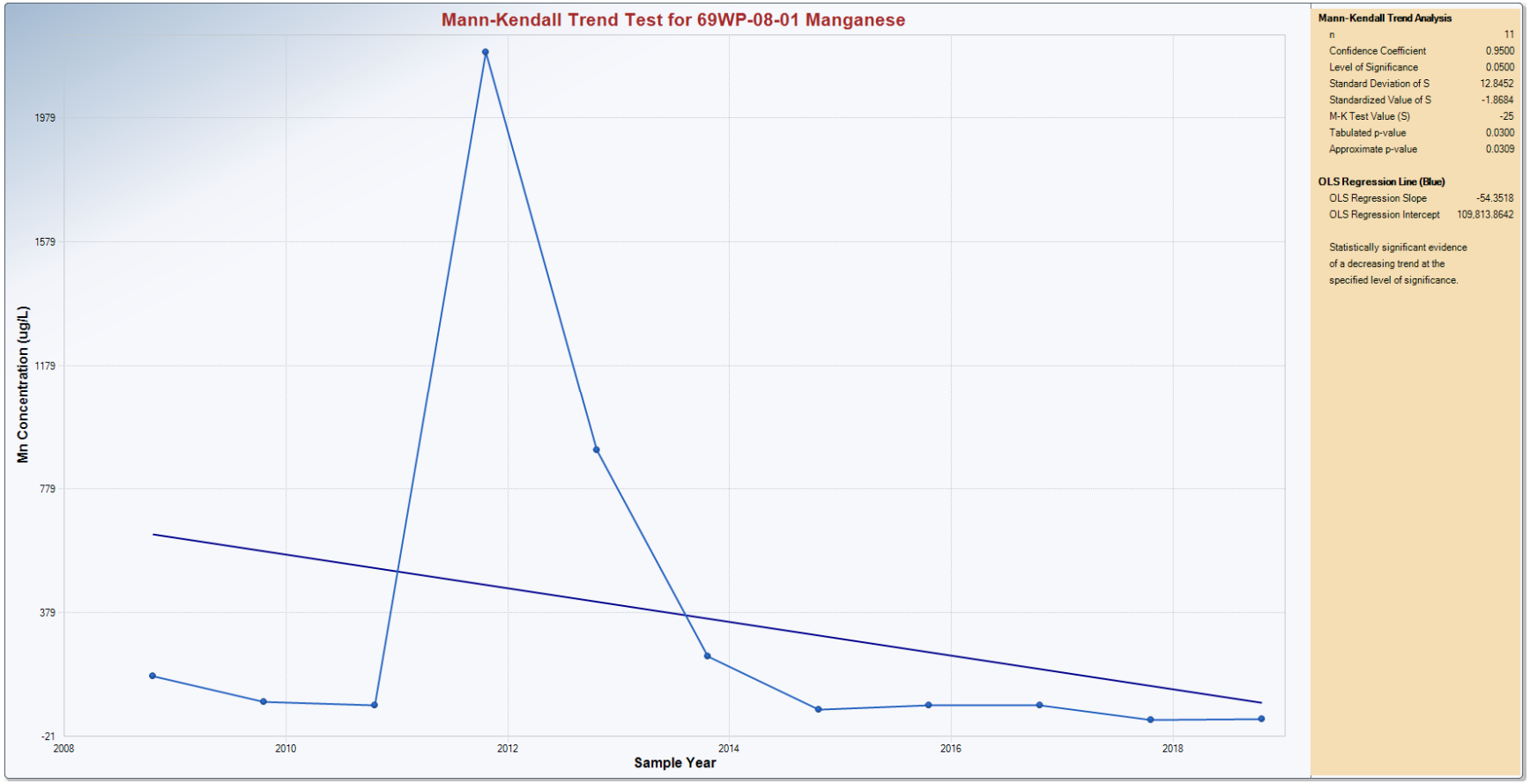

Mann-Kendall Trend Test for 57M-95-03X Arsenic (total)
As Concentration (ug/L)
209
179
149
119
89
59
29
-1
2003
2006
2009
2012
2015
2018
Sample Year
Mann-Kendall Trend Analysis
n 20
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 30.7734
Standardized Value of S 0.6499
M-K Test Value (S) 21
Tabulated p-value 0.2710
Approximate p-value 0.2579
OLS Regression Line (Blue)
OLS Regression Slope -1.4610
OLS Regression Intercept 2,980.5372
Insufficient statistical evidence of a significant trend at the specified level of significance.

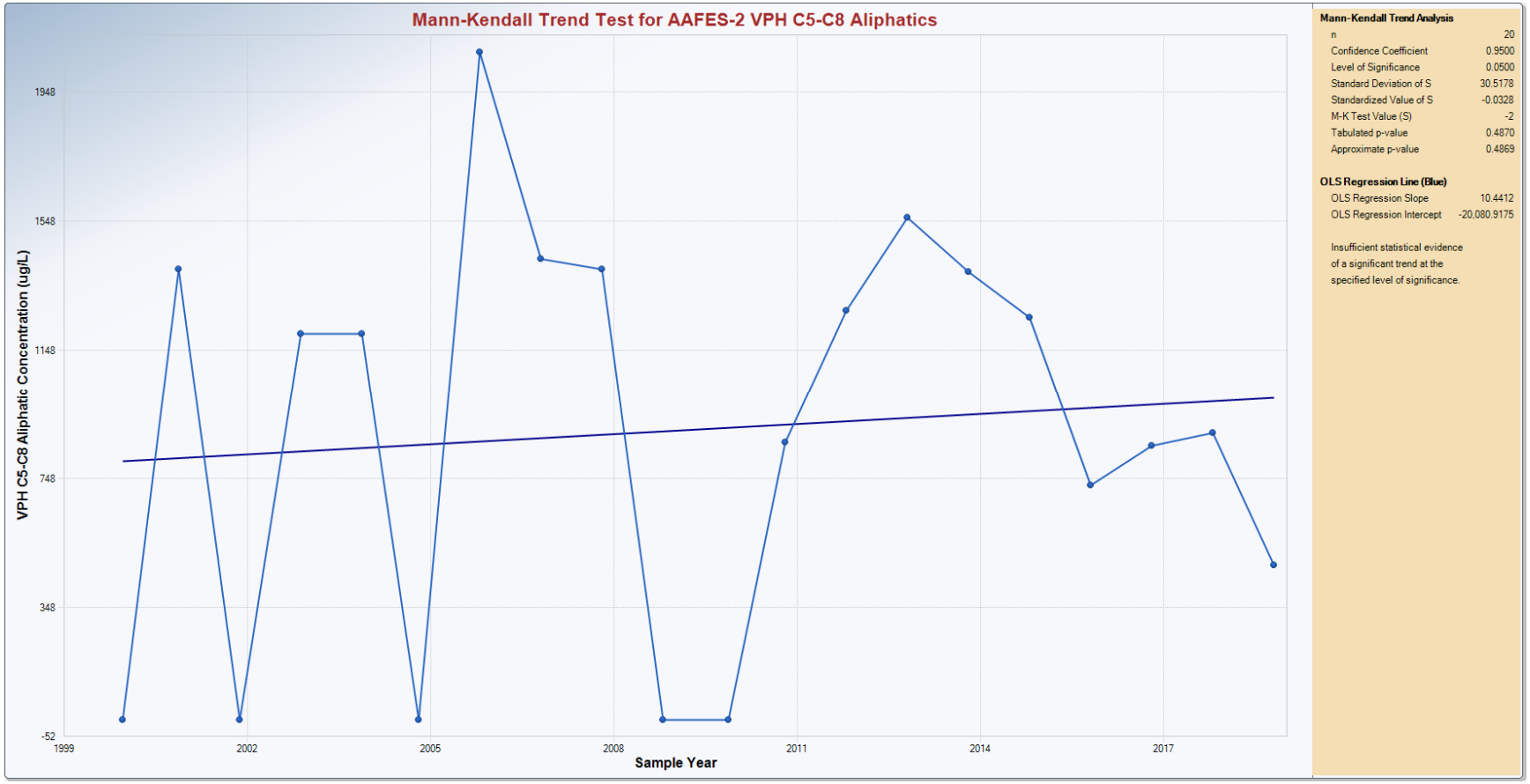

Mann-Kendall Trend Test for 57M-96-11X Arsenic (total)
As Concentration (ug/L)
291
266
241
216
191
166
141
116
2003
2006
2009
2012
2015
2018
Sample Year
Mann-Kendall Trend Analysis
n 20
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 30.7734
Standardized Value of S 0.3250
M-K Test Value (S) 11
Tabulated p-value 0.3870
Approximate p-value 0.3726
OLS Regression Line (Blue)
OLS Regression Slope 1.7404
OLS Regression Intercept -3,306.9179
Insufficient statistical evidence of a significant trend at the specified level of significance.

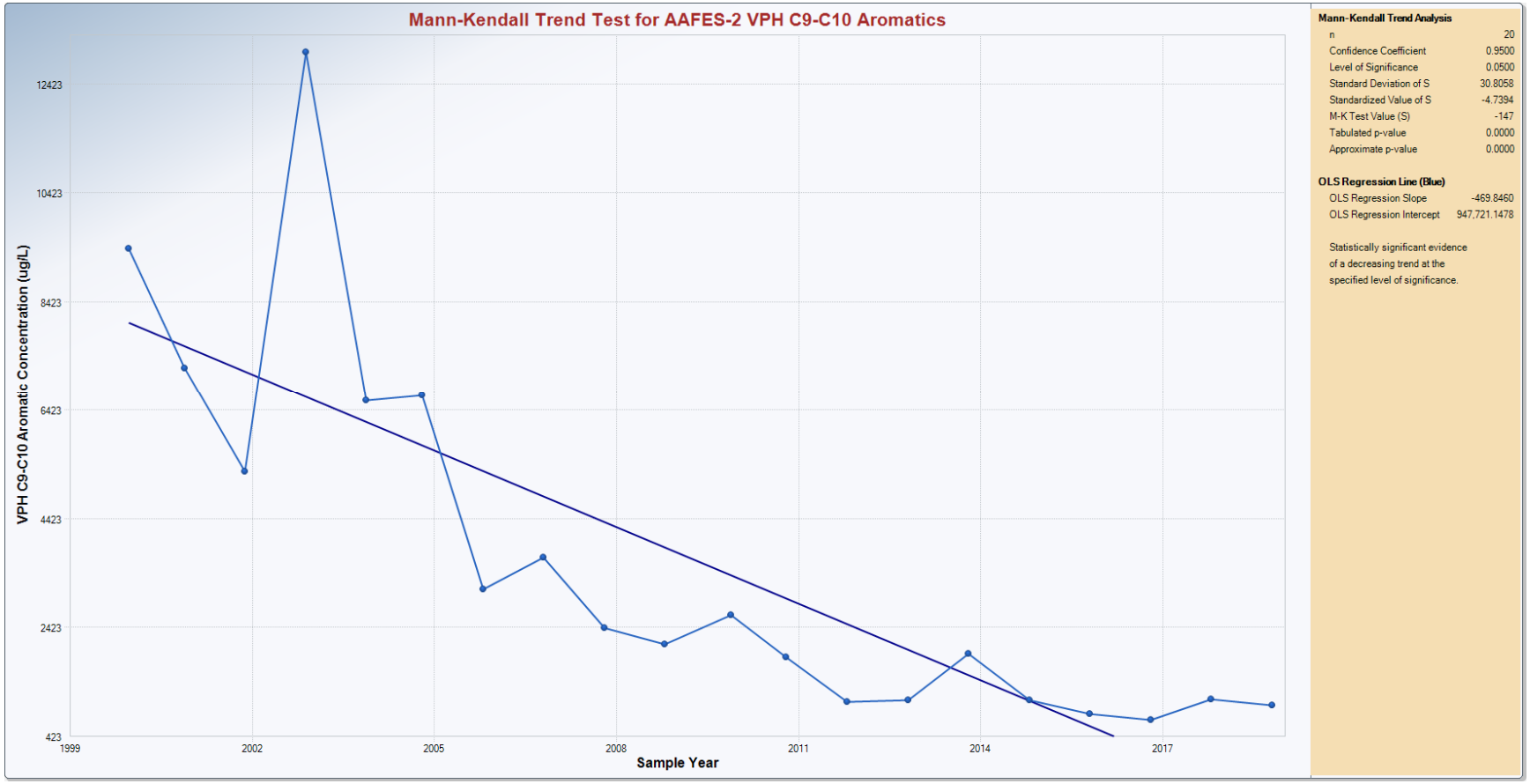

Mann-Kendall Trend Test for 69W-94-13 Arsenic (total)
As Concentration (ug/L)
141
121
101
81
61
41
21
2000
2003
2006
2009
2012
2015
2018
Sample Year
Mann-Kendall Trend Analysis
n 25
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 42.7707
Standardized Value of S 0.1169
M-K Test Value (S) 6
Appx. Critical Value (0.05) 1.6449
Approximate p-value 0.4535
OLS Regression Line (Blue)
OLS Regression Slope -0.3376
OLS Regression Intercept 761.0077
Insufficient statistical evidence of a significant trend at the specified level of significance.

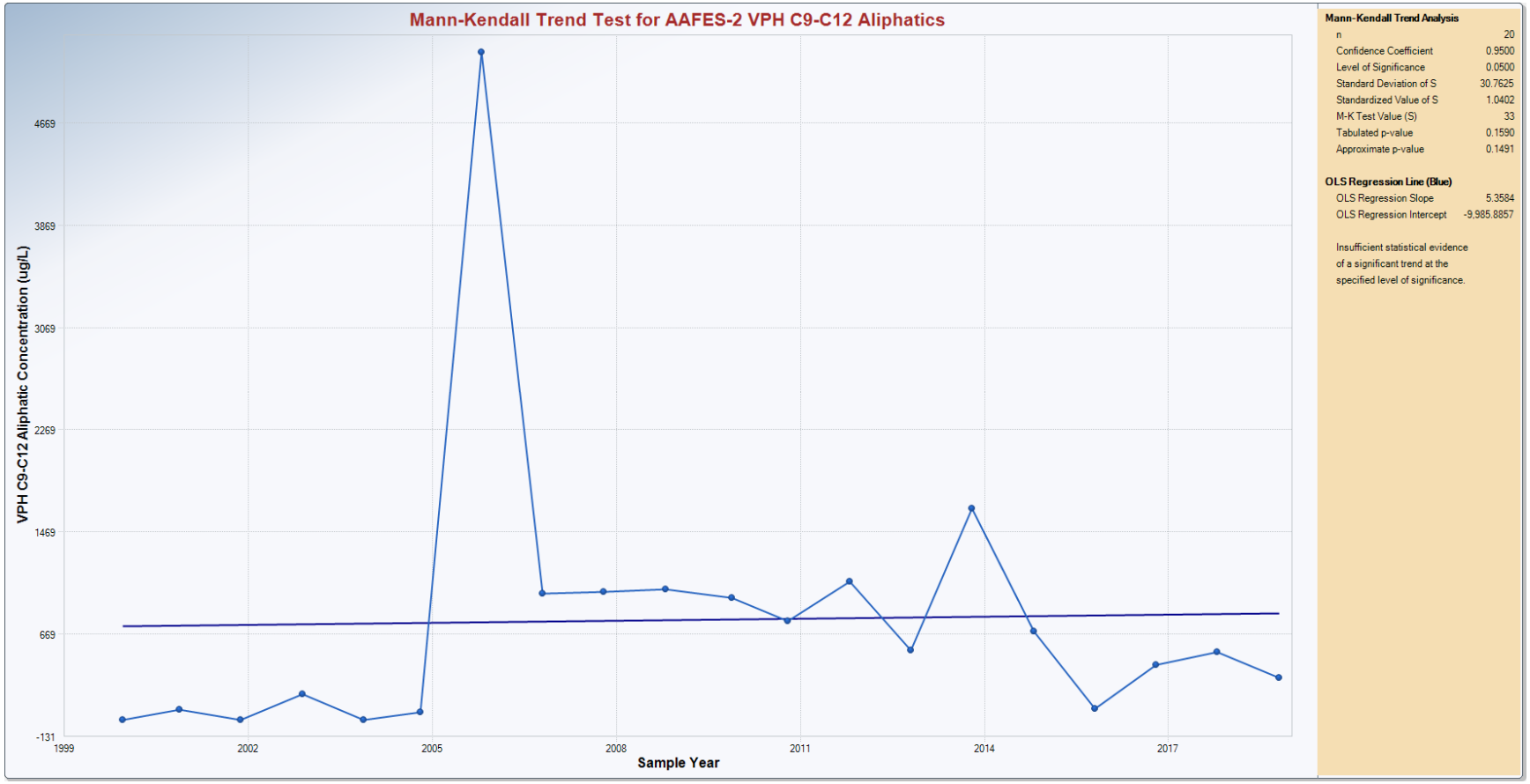

Mann-Kendall Trend Test for 69W-94-13 EPH C11-C12 Aromatics
EPH C11-C12 Aromatic Concentration (ug/L)
1702
1452
1202
952
702
452
202
-48
2000
2003
2006
2009
2012
2015
2018
Sample Year
Mann-Kendall Trend Analysis
n 25
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 42.6224
Standardized Value of S -1.1496
M-K Test Value (S) -50
Appx. Critical Value (0.05) -1.6449
Approximate p-value 0.1251
OLS Regression Line (Blue)
OLS Regression Slope -33.1268
OLS Regression Intercept 66,886.2392
Insufficient statistical evidence of a significant trend at the specified level of significance.

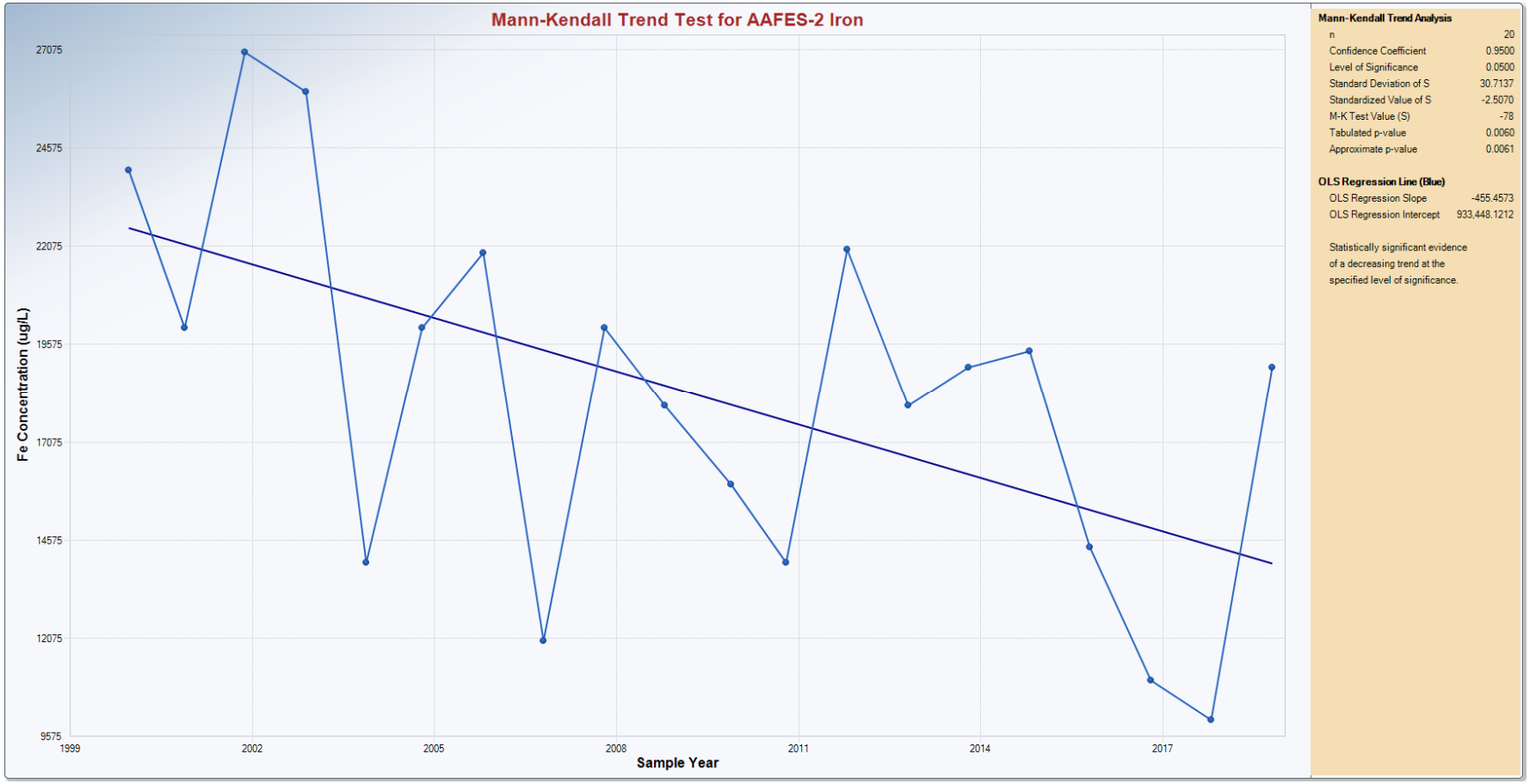

Mann-Kendall Trend Test for 69W-94-13 Manganese (total)
Mn Concentration (ug/L)
3725
3225
2725
2225
1725
1225
725
225
2000
2003
2006
2009
2012
2015
2018
Sample Year
Mann-Kendall Trend Analysis
n 25
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 42.7512
Standardized Value of S -0.8889
M-K Test Value (S) -39
Appx. Critical Value (0.05) -1.6449
Approximate p-value 0.1870
OLS Regression Line (Blue)
OLS Regression Slope -41.1279
OLS Regression Intercept 84,570.7937
Insufficient statistical evidence of a significant trend at the specified level of significance.

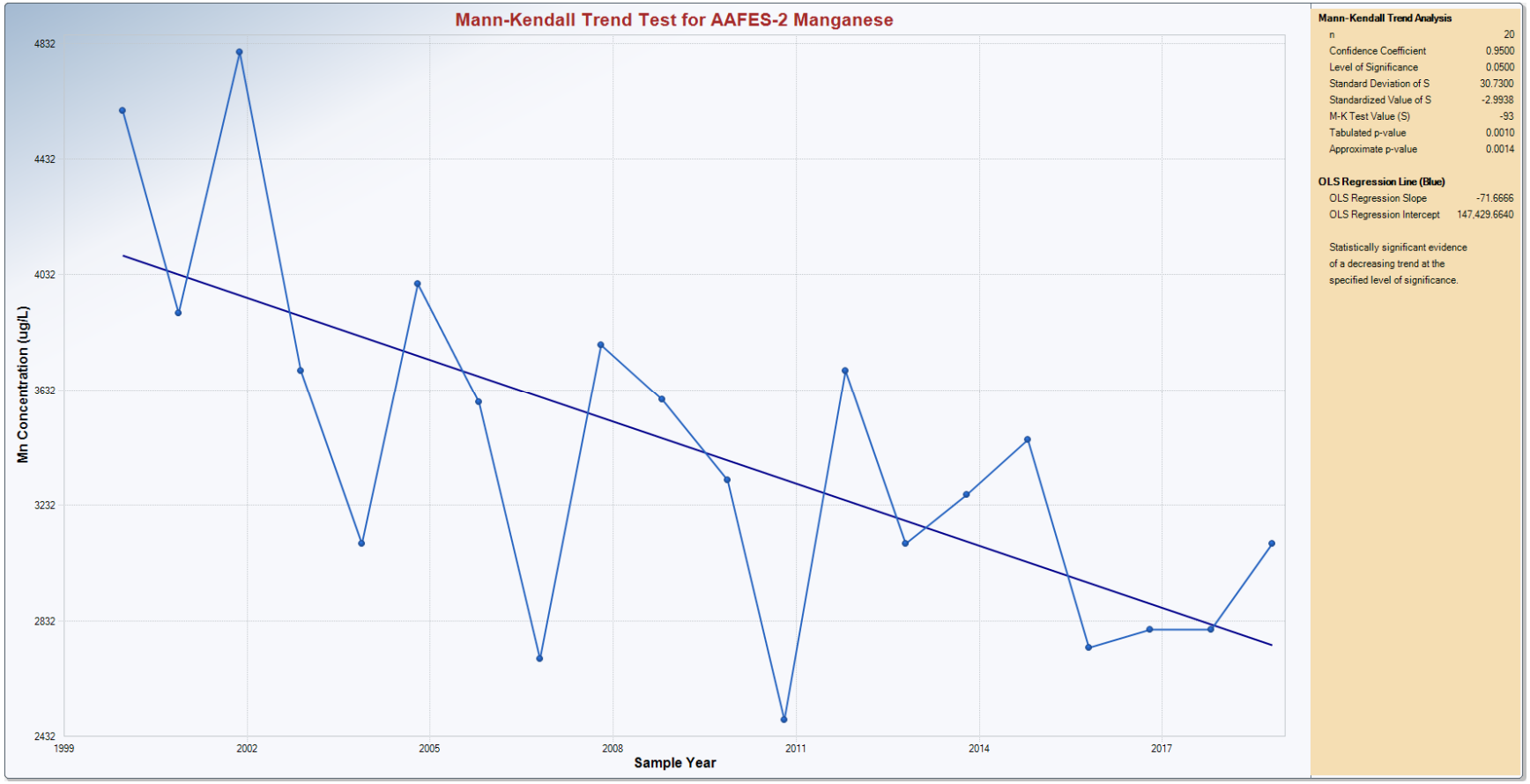

Mann-Kendall Trend Test for 69WP-08-01 Manganese
Mn Concentration (ug/L)
1979
1579
1179
779
379
-21
2008
2010
2012
2014
2016
2018
Sample Year
Mann-Kendall Trend Analysis
n 11
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 12.8452
Standardized Value of S -1.8684
M-K Test Value (S) -25
Tabulated p-value 0.0300
Approximate p-value 0.0309
OLS Regression Line (Blue)
OLS Regression Slope -54.3518
OLS Regression Intercept 109,813.8642
Statistically significant evidence of a decreasing trend at the specified level of significance.

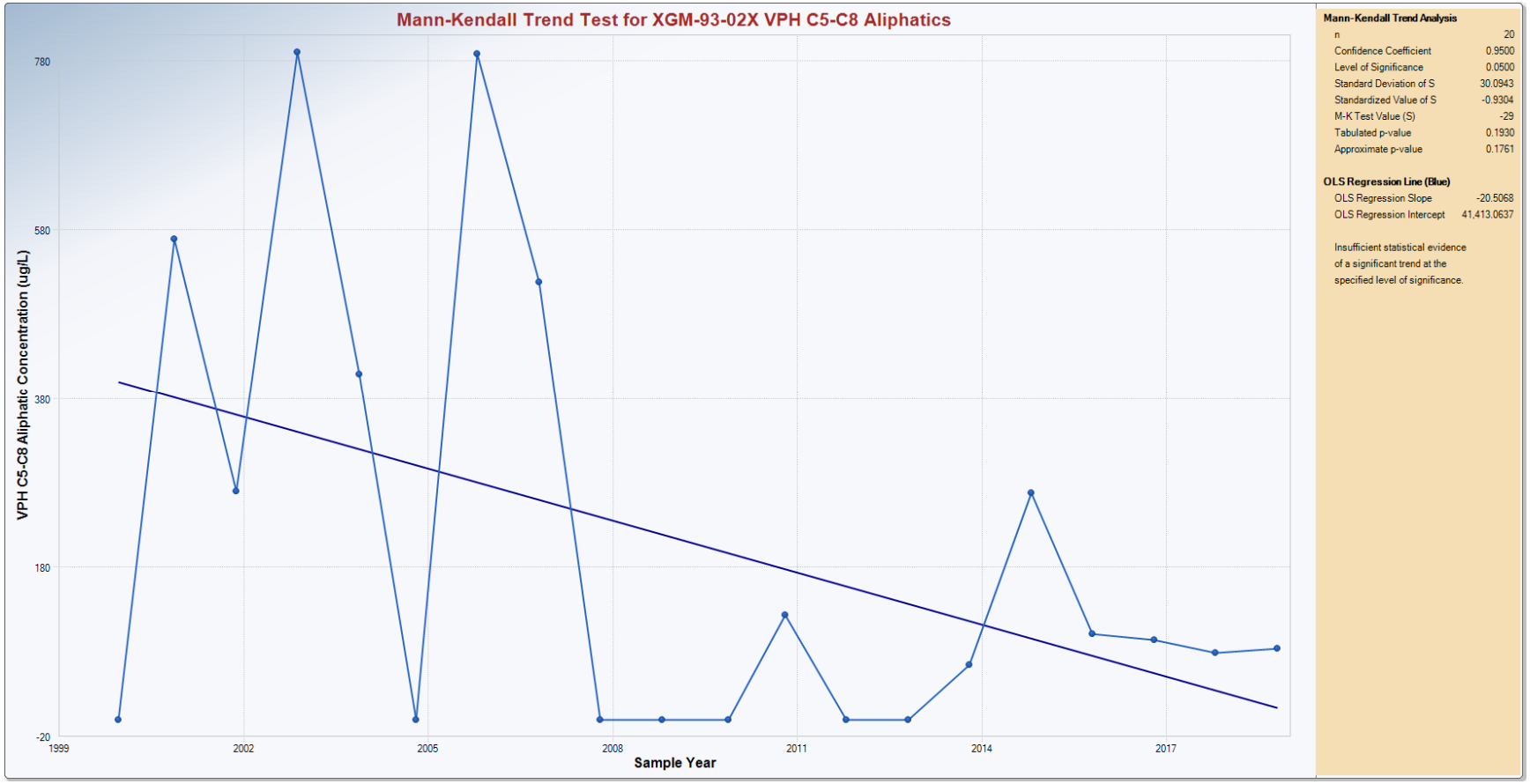

Mann-Kendall Trend Test for AAFES-2 VPH C5-C8 Aliphatics
VPH C5-C8 Aliphatic Concentration (ug/L)
1948
1548
1148
748
348
-52
1999
2002
2005
2008
2011
2014
2017
Sample Year
Mann-Kendall Trend Analysis
n 20
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 30.5178
Standardized Value of S -0.0328
M-K Test Value (S) -2
Tabulated p-value 0.4870
Approximate p-value 0.4869
OLS Regression Line (Blue)
OLS Regression Slope 10.4412
OLS Regression Intercept -20,080.9175
Insufficient statistical evidence of a significant trend at the specified level of significance.

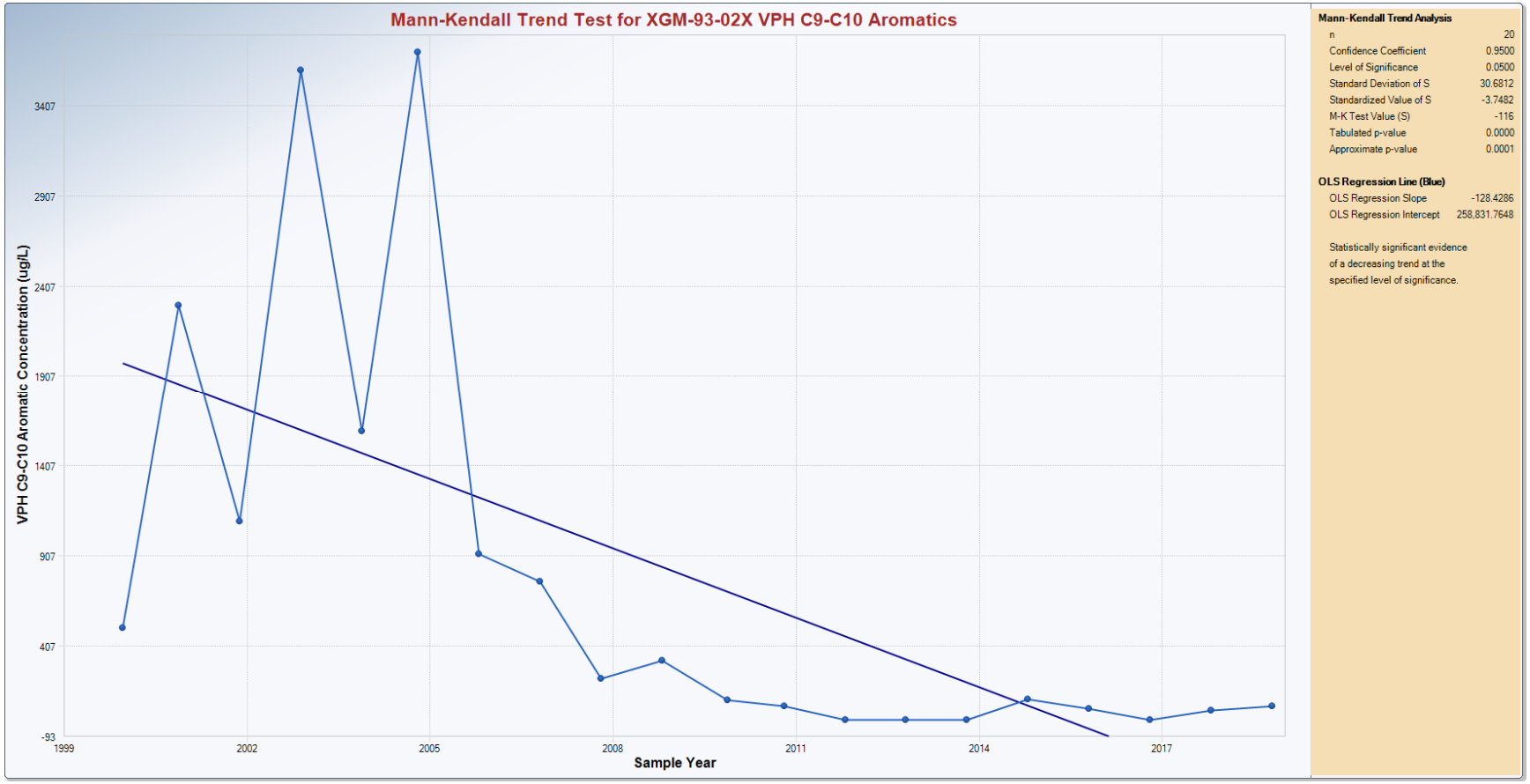

Mann-Kendall Trend Test for AAFES-2 VPH C9-C10 Aromatics
VPH C9-C10 Aromatic Concentration (ug/L)
12423
10423
8423
6423
4423
2423
423
1999
2002
2005
2008
2011
2014
2017
Sample Year
Mann-Kendall Trend Analysis
n 20
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 30.8058
Standardized Value of S -4.7394
M-K Test Value (S) -147
Tabulated p-value 0.0000
Approximate p-value 0.0000
OLS Regression Line (Blue)
OLS Regression Slope -469.8460
OLS Regression Intercept 947,721.1478
Statistically significant evidence of a decreasing trend at the specified level of significance.

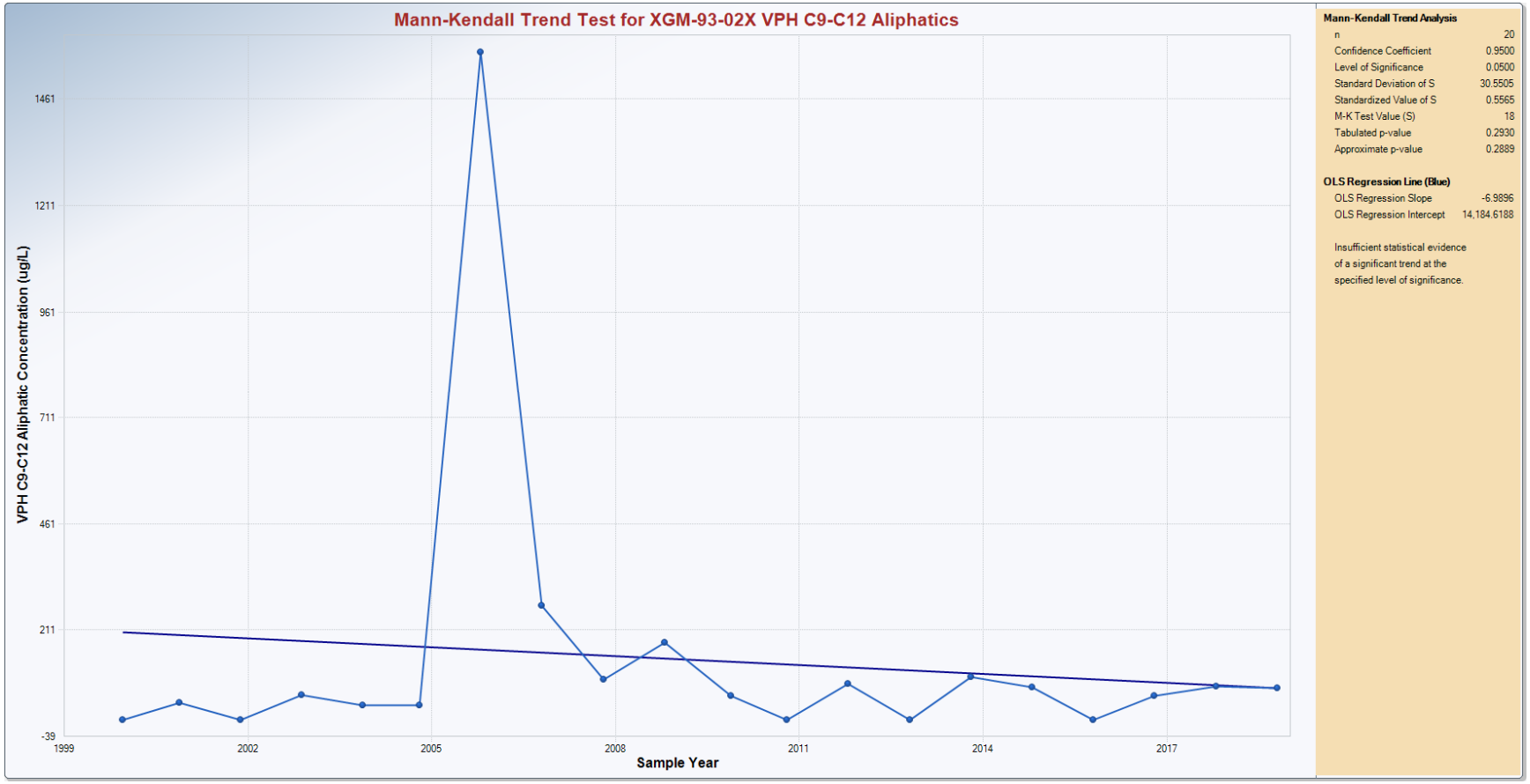

Mann-Kendall Trend Test for AAFES-2 VPH C9-C12 Aliphatics
VPH C9-C12 Aliphatic Concentration (ug/L)
4669
3869
3069
2269
1469
669
-131
1999
2002
2005
2008
2011
2014
2017
Sample Year
Mann-Kendall Trend Analysis
n 20
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 30.7625
Standardized Value of S 1.0402
M-K Test Value (S) 33
Tabulated p-value 0.1590
Approximate p-value 0.1491
OLS Regression Line (Blue)
OLS Regression Slope 5.3584
OLS Regression Intercept -9,985.8857
Insufficient statistical evidence of a significant trend at the specified level of significance.

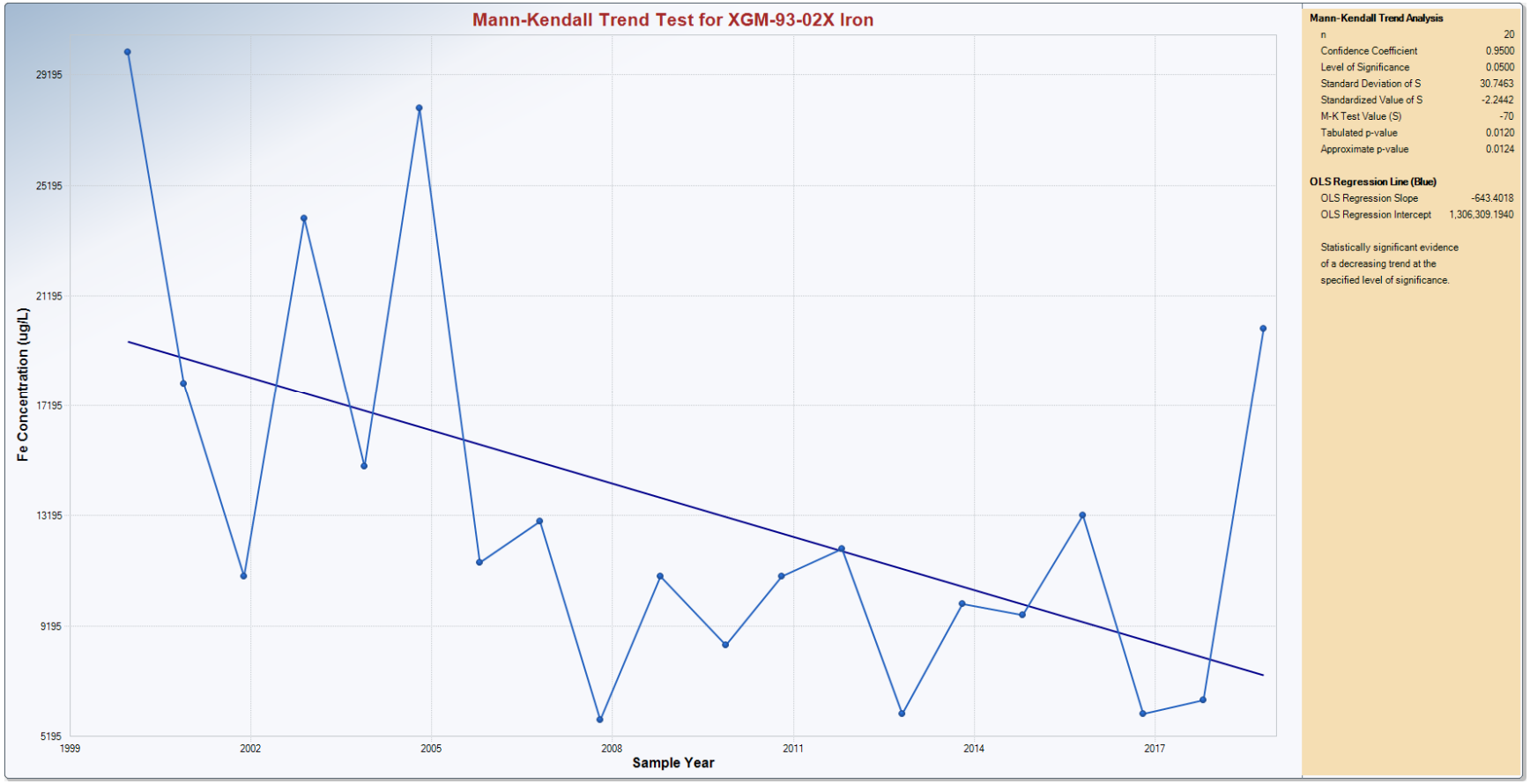

Mann-Kendall Trend Test for AAFES-2 Iron
Fe Concentration (ug/L)
27075
24575
22075
19575
17075
14575
12075
9575
1999
2002
2005
2008
2011
2014
2017
Sample Year
Mann-Kendall Trend Analysis
n 20
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 30.7137
Standardized Value of S -2.5070
M-K Test Value (S) -78
Tabulated p-value 0.0060
Approximate p-value 0.0061
OLS Regression Line (Blue)
OLS Regression Slope -455.4573
OLS Regression Intercept 933,448.1212
Statistically significant evidence of a decreasing trend at the specified level of significance.

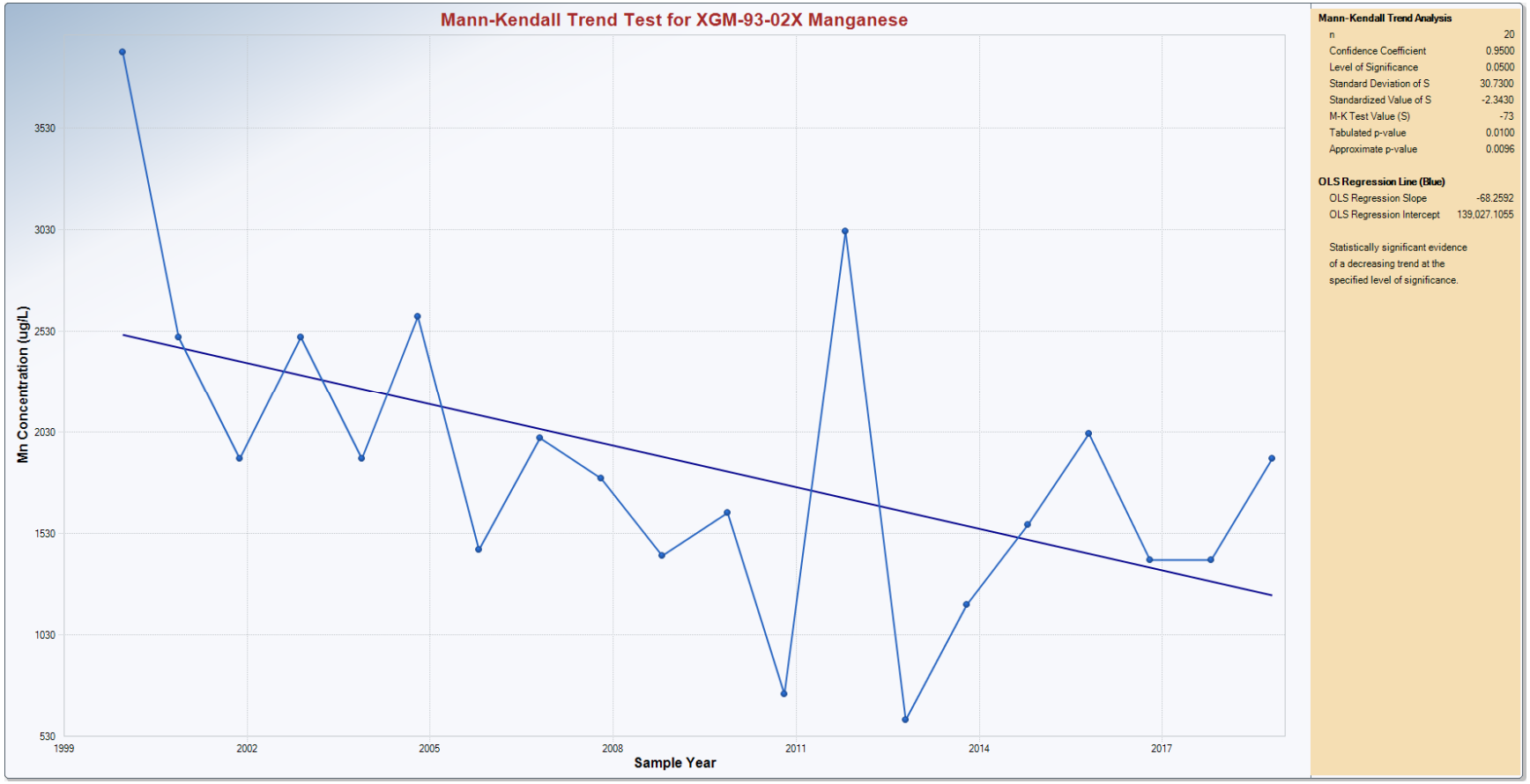

Mann-Kendall Trend Test for AAFES-2 Manganese
Mn Concentration (ug/L)
4832
4432
4032
3632
3232
2832
2432
1999
2002
2005
2008
2011
2014
2017
Sample Year
Mann-Kendall Trend Analysis
n 20
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 30.7300
Standardized Value of S -2.9938
M-K Test Value (S) -93
Tabulated p-value 0.0010
Approximate p-value 0.0014
OLS Regression Line (Blue)
OLS Regression Slope -71.6666
OLS Regression Intercept 147,429.6640
Statistically significant evidence of a decreasing trend at the specified level of significance.

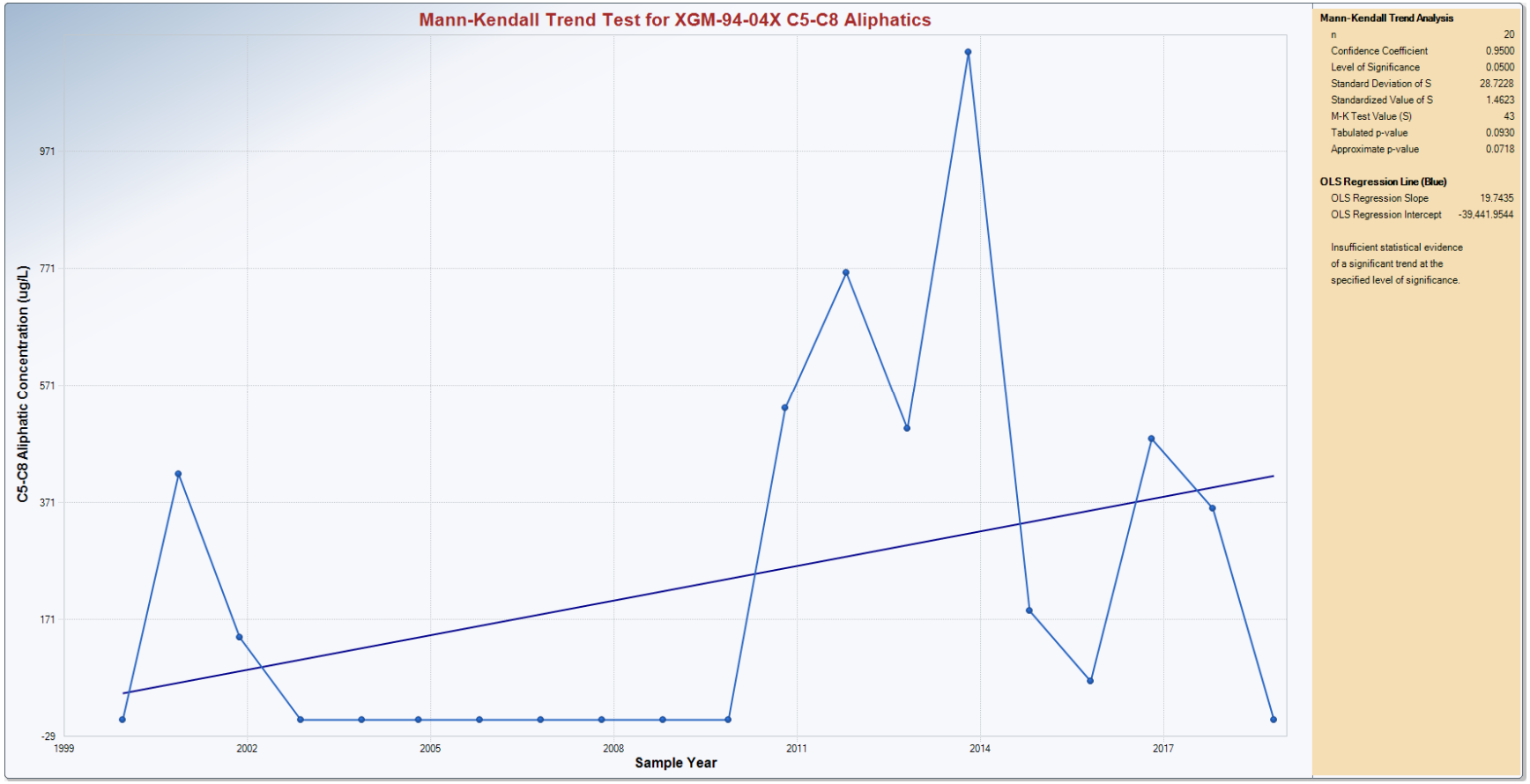

Mann-Kendall Trend Test for XGM-93-02X VPH C5-C8 Aliphatics
VPH C5-C8 Aliphatic Concentration (ug/L)
780
580
380
180
-20
1999
2002
2005
2008
2011
2014
2017
Sample Year
Mann-Kendall Trend Analysis
n 20
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 30.0943
Standardized Value of S -0.9304
M-K Test Value (S) -29
Tabulated p-value 0.1930
Approximate p-value 0.1761
OLS Regression Line (Blue)
OLS Regression Slope -20.5068
OLS Regression Intercept 41,413.0637
Insufficient statistical evidence of a significant trend at the specified level of significance.

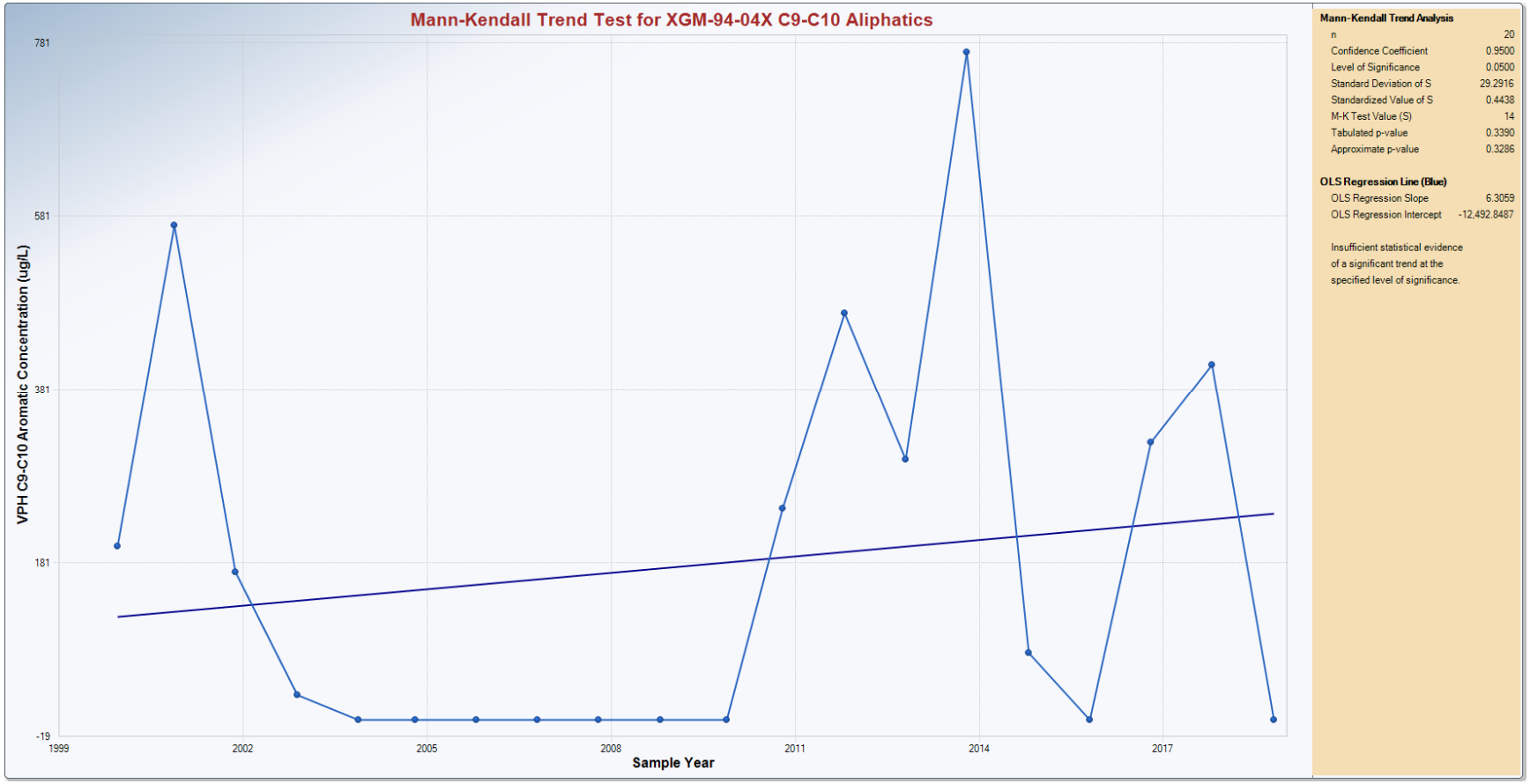

Mann-Kendall Trend Test for XGM-93-02X VPH C9-C10 Aromatics
VPH C9-C10 Aromatic Concentration (ug/L)
3407
2907
2407
1907
1407
907
407
-93
1999
2002
2005
2008
2011
2014
2017
Sample Year
Mann-Kendall Trend Analysis
n 20
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 30.6812
Standardized Value of S -3.7482
M-K Test Value (S) -116
Tabulated p-value 0.0000
Approximate p-value 0.0001
OLS Regression Line (Blue)
OLS Regression Slope -128.4286
OLS Regression Intercept 258,831.7648
Statistically significant evidence of a decreasing trend at the specified level of significance.

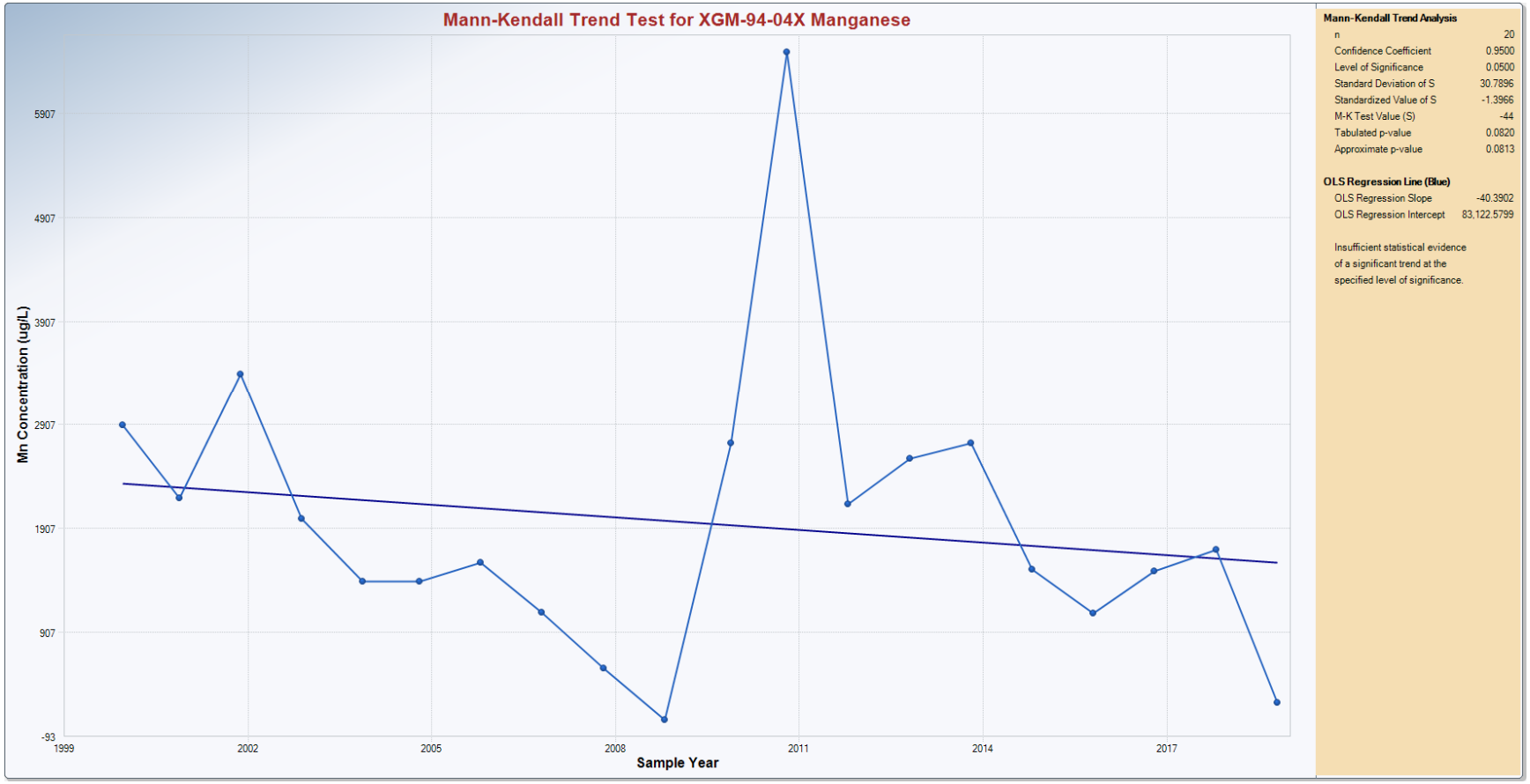

Mann-Kendall Trend Test for XGM-93-02X VPH C9-C12 Aliphatics
VPH C9-C12 Aliphatic Concentration (ug/L)
1461
1211
961
711
461
211
-39
1999
2002
2005
2008
2011
2014
2017
Sample Year
Mann-Kendall Trend Analysis
n 20
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 30.5505
Standardized Value of S 0.5565
M-K Test Value (S) 18
Tabulated p-value 0.2930
Approximate p-value 0.2889
OLS Regression Line (Blue)
OLS Regression Slope -6.9896
OLS Regression Intercept 14,184.6188
Insufficient statistical evidence
of a significant trend at the
specified level of significance.

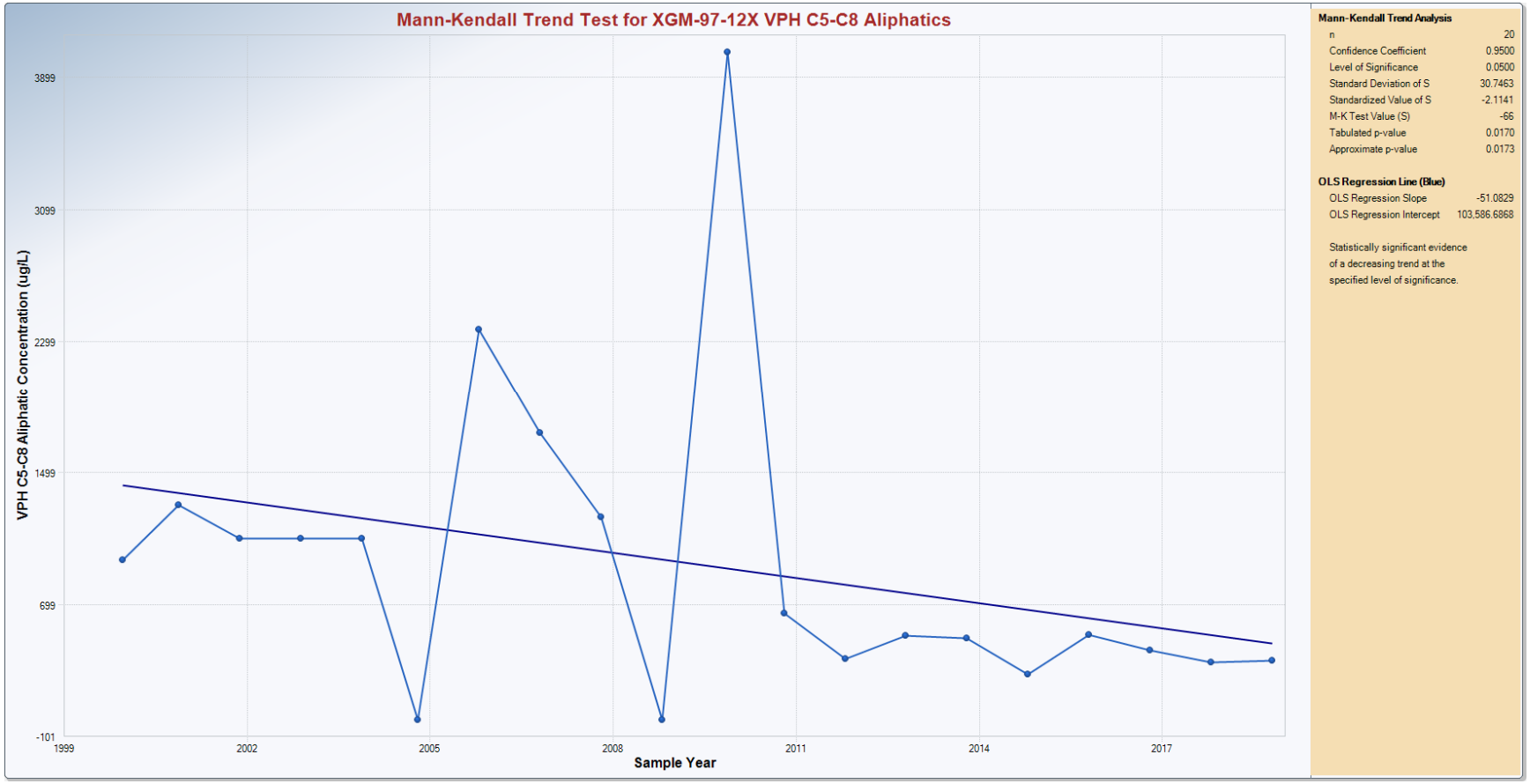

Mann-Kendall Trend Test for XGM-93-02X Iron
Fe Concentration (ug/L)
29195
25195
21195
17195
13195
9195
5195
1999
2002
2005
2008
2011
2014
2017
Sample Year
Mann-Kendall Trend Analysis
n 20
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 30.7463
Standardized Value of S -2.2442
M-K Test Value (S) -70
Tabulated p-value 0.0120
Approximate p-value 0.0124
OLS Regression Line (Blue)
OLS Regression Slope -643.4018
OLS Regression Intercept 1,306,309.1940
Statistically significant evidence of a decreasing trend at the specified level of significance.

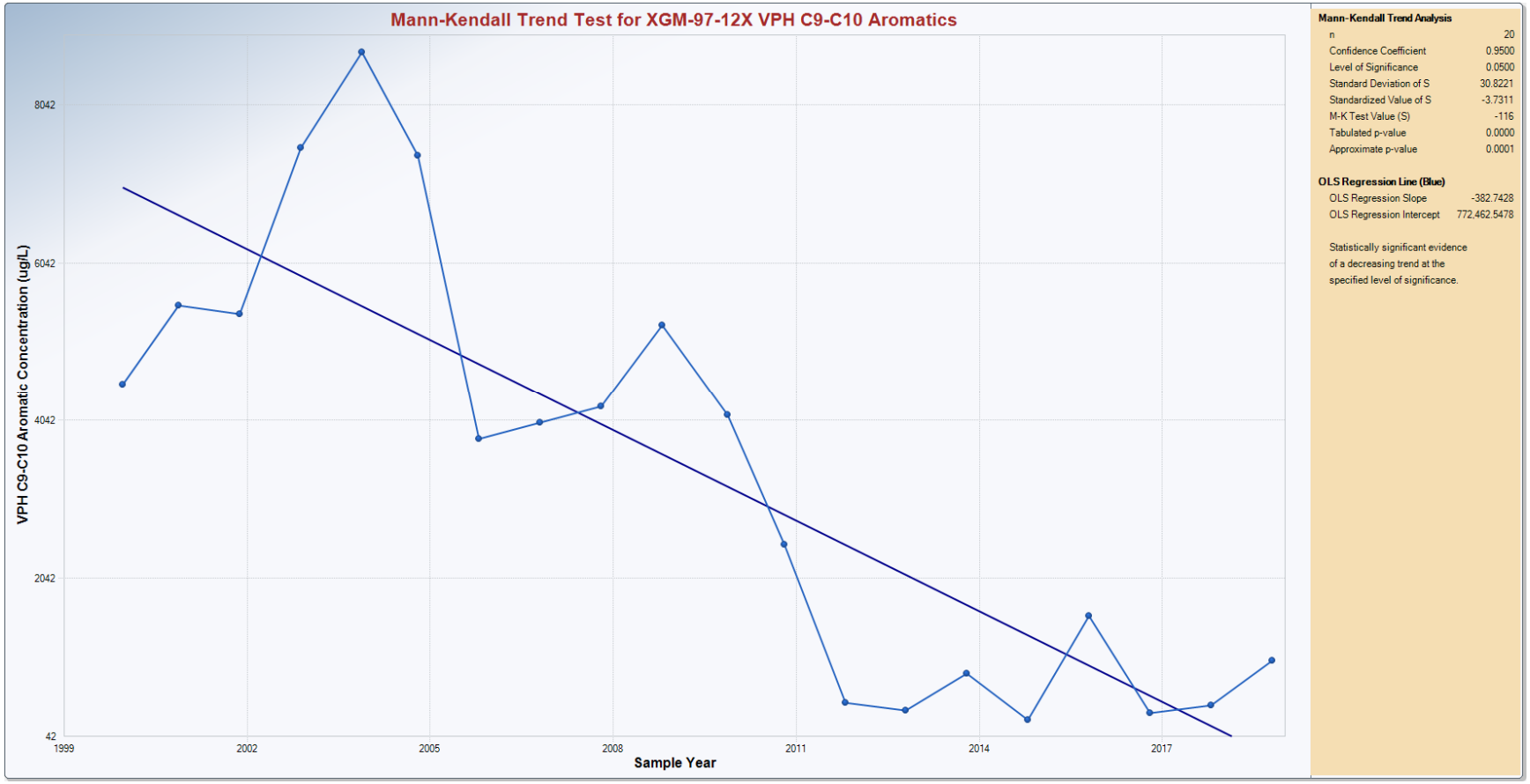

Mann-Kendall Trend Test for XGM-93-02X Manganese
Mn Concentration (ug/L)
3530
3030
2530
2030
1530
1030
530
1999
2002
2005
2008
2011
2014
2017
Sample Year
Mann-Kendall Trend Analysis
n 20
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 30.7300
Standardized Value of S -2.3430
M-K Test Value (S) -73
Tabulated p-value 0.0100
Approximate p-value 0.0096
OLS Regression Line (Blue)
OLS Regression Slope -68.2592
OLS Regression Intercept 139,027.1055
Statistically significant evidence of a decreasing trend at the specified level of significance.

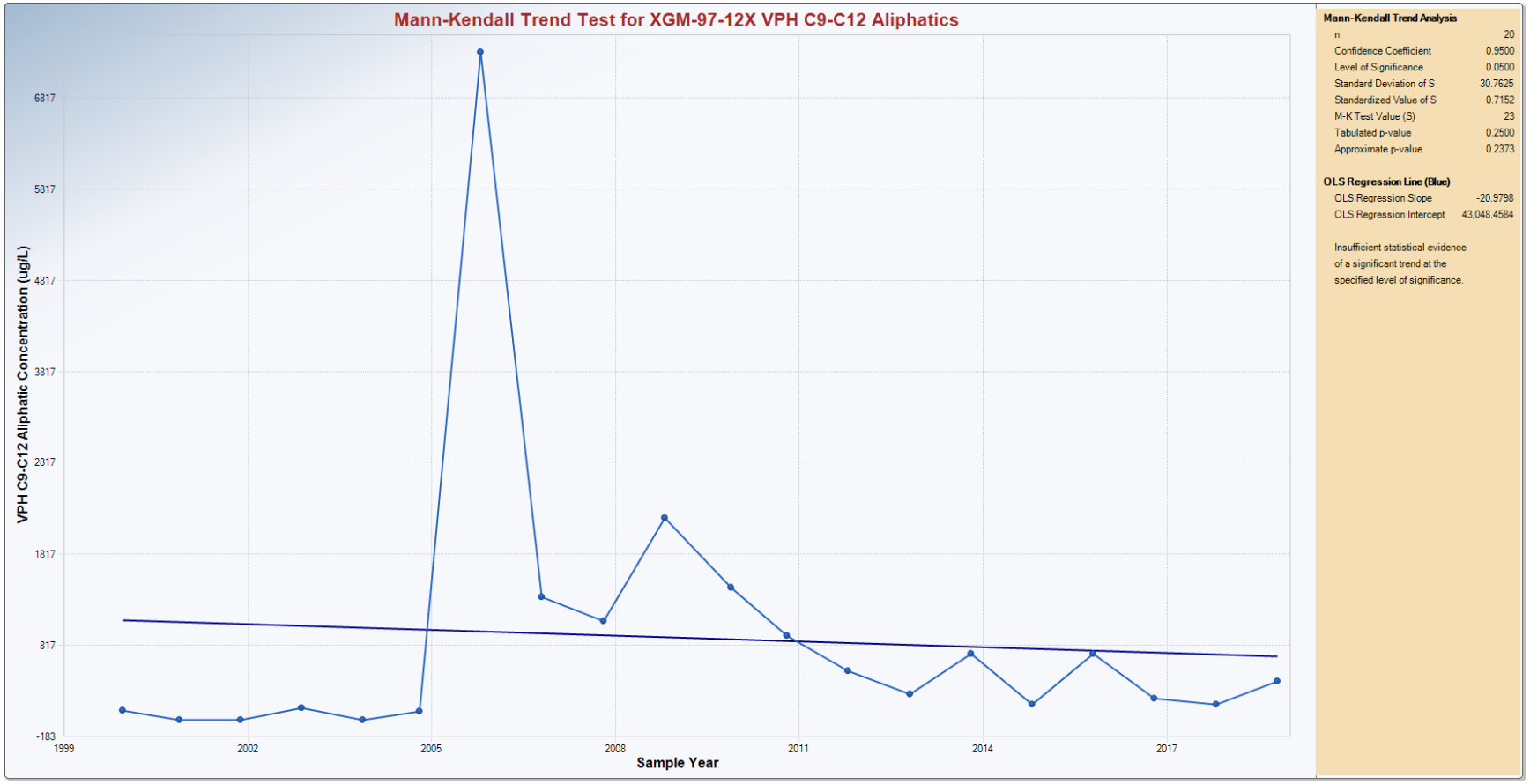

Mann-Kendall Trend Test for XGM-94-04X C5-C8 Aliphatics
C5-C8 Aliphatic Concentration (ug/L)
971
771
571
371
171
-29
1999
2002
2005
2008
2011
2014
2017
Sample Year
Mann-Kendall Trend Analysis
n 20
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 28.7228
Standardized Value of S 1.4623
M-K Test Value (S) 43
Tabulated p-value 0.0930
Approximate p-value 0.0718
OLS Regression Line (Blue)
OLS Regression Slope 19.7435
OLS Regression Intercept -39,441.9544
Insufficient statistical evidence
of a significant trend at the
specified level of significance.

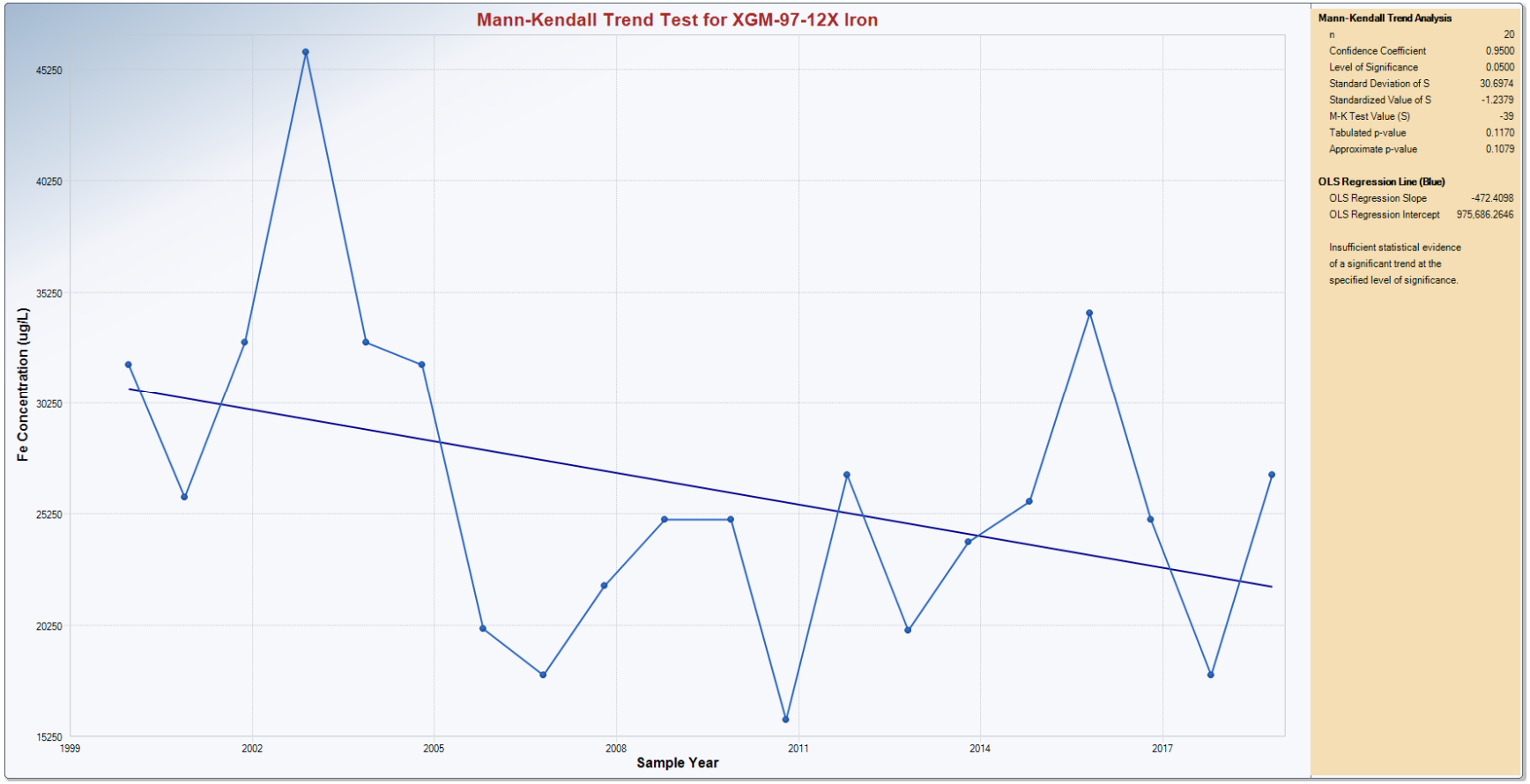

Mann-Kendall Trend Test for XGM-94-04X C9-C10 Aliphatics
VPH C9-C10 Aromatic Concentration (ug/L)
781
581
381
181
-19
1999
2002
2005
2008
2011
2014
2017
Sample Year
Mann-Kendall Trend Analysis
n 20
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 29.2916
Standardized Value of S 0.4438
M-K Test Value (S) 14
Tabulated p-value 0.3390
Approximate p-value 0.3286
OLS Regression Line (Blue)
OLS Regression Slope 6.3059
OLS Regression Intercept -12,492.8487
Insufficient statistical evidence of a significant trend at the specified level of significance.

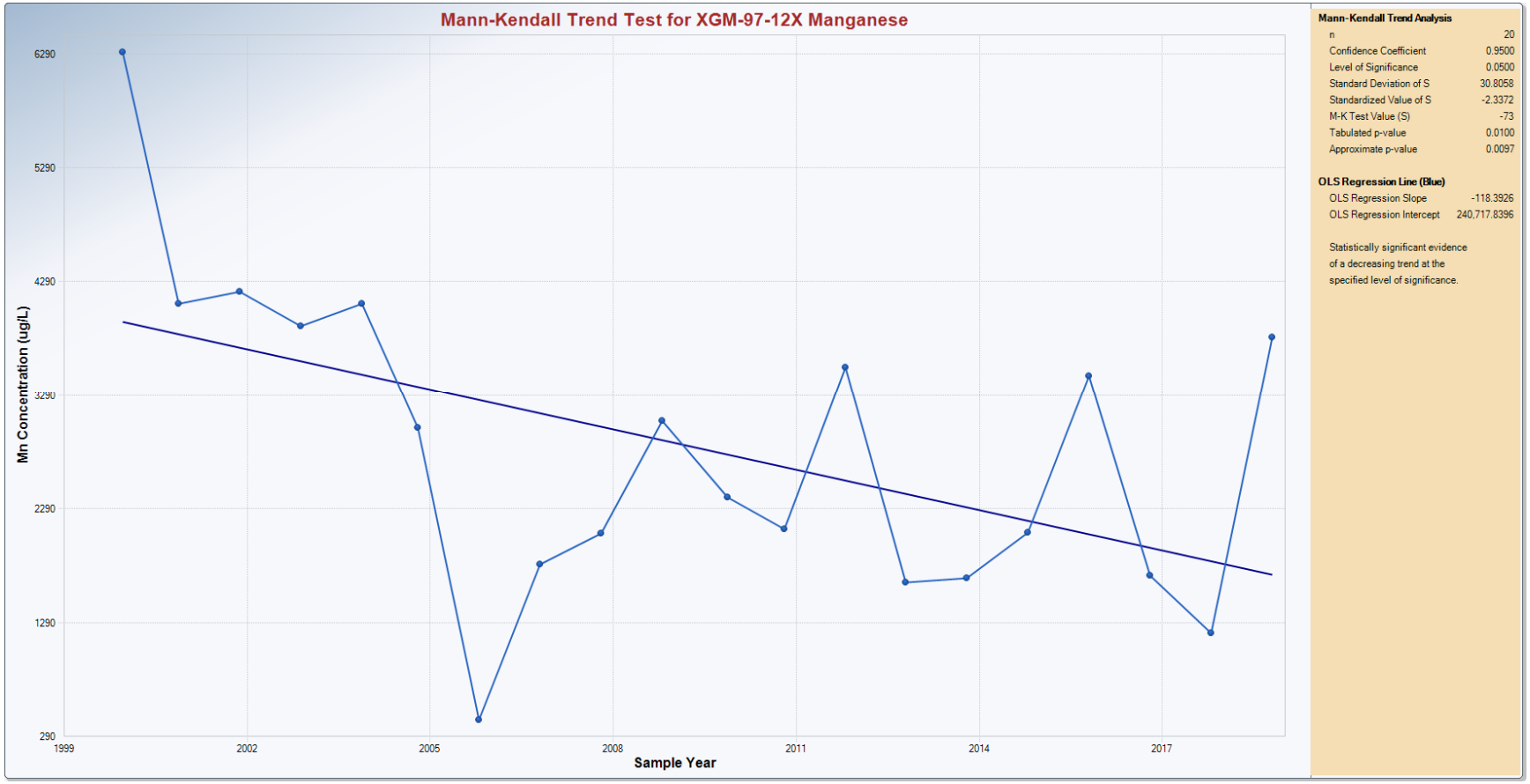

Mann-Kendall Trend Test for XGM-94-04X Manganese
Mn Concentration (ug/L)
5907
4907
3907
2907
1907
907
-93
1999
2002
2005
2008
2011
2014
2017
Sample Year
Mann-Kendall Trend Analysis
n 20
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 30.7896
Standardized Value of S -1.3966
M-K Test Value (S) -44
Tabulated p-value 0.0820
Approximate p-value 0.0813
OLS Regression Line (Blue)
OLS Regression Slope -40.3902
OLS Regression Intercept 83,122.5799
Insufficient statistical evidence of a significant trend at the specified level of significance.

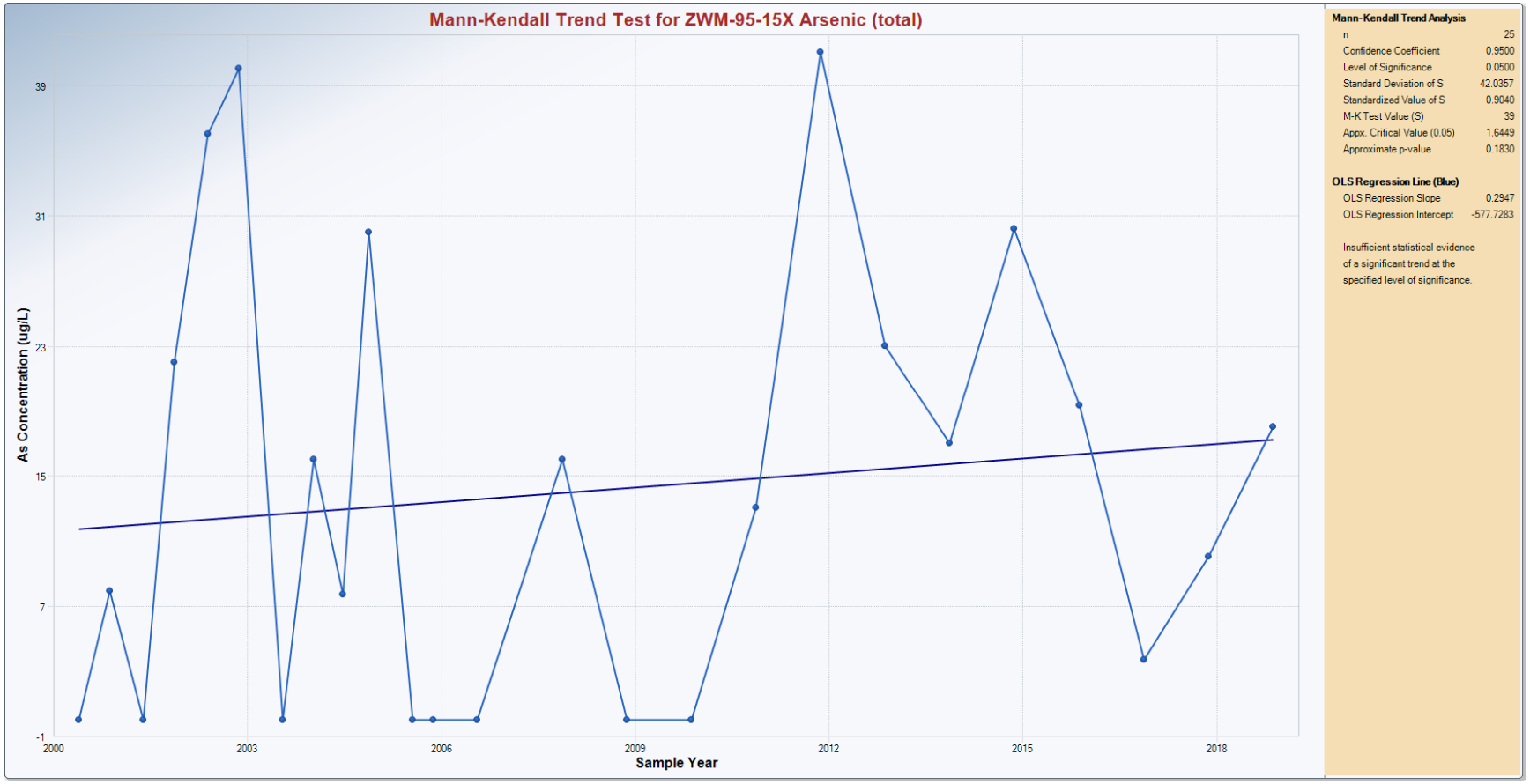

Mann-Kendall Trend Test for XGM-97-12X VPH C5-C8 Aliphatics
VPH C5-C8 Aliphatic Concentration (ug/L)
3899
3099
2299
1499
699
-101
1999
2002
2005
2008
2011
2014
2017
Sample Year
Mann-Kendall Trend Analysis
n 20
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 30.7463
Standardized Value of S -2.1141
M-K Test Value (S) -66
Tabulated p-value 0.0170
Approximate p-value 0.0173
OLS Regression Line (Blue)
OLS Regression Slope -51.0829
OLS Regression Intercept 103,586.6868
Statistically significant evidence of a decreasing trend at the specified level of significance.

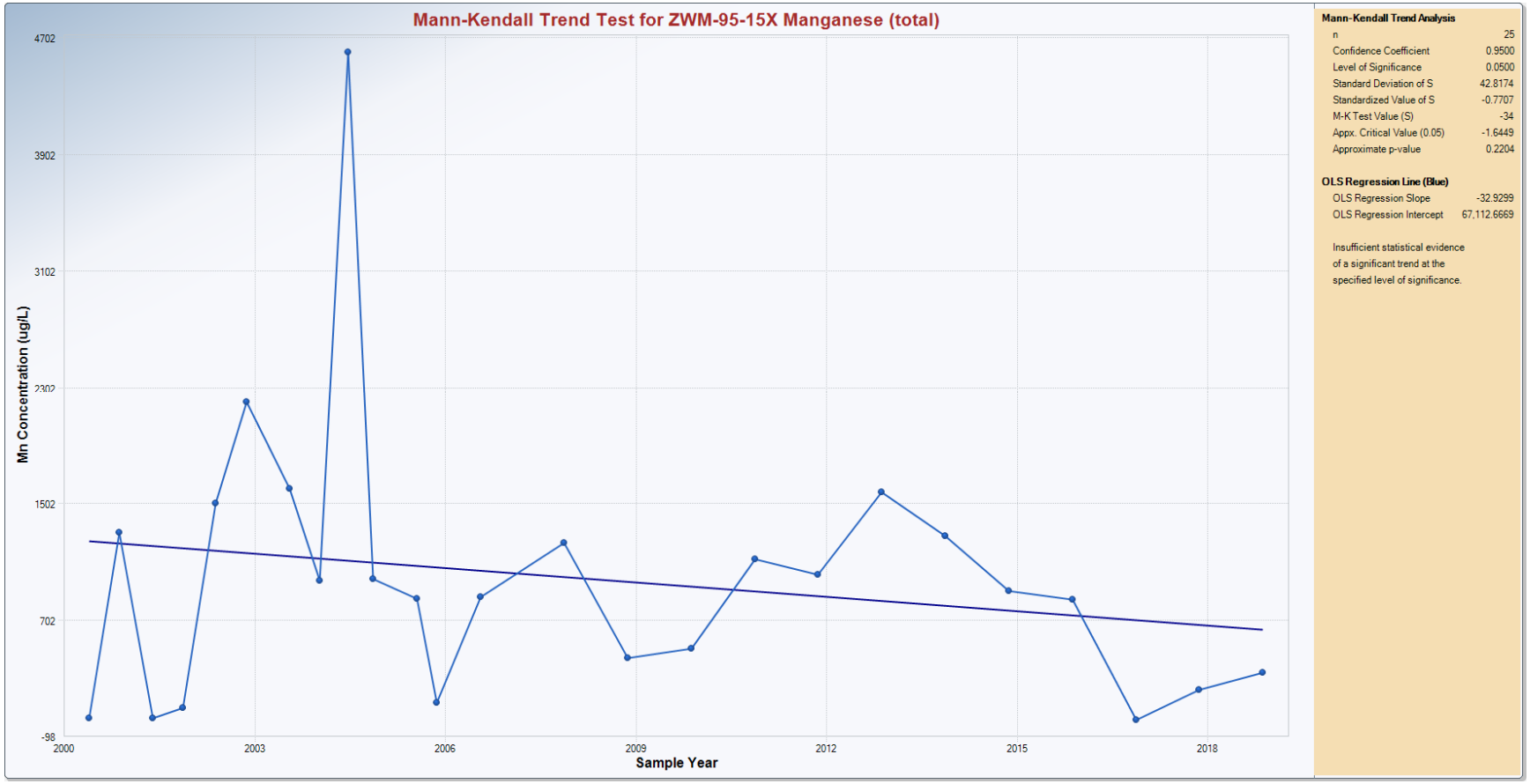

Mann-Kendall Trend Test for XGM-97-12X VPH C9-C10 Aromatics
VPH C9-C10 Aromatic Concentration (ug/L)
8042
6042
4042
2042
42
1999
2002
2005
2008
2011
2014
2017
Sample Year
Mann-Kendall Trend Analysis
n 20
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 30.8221
Standardized Value of S -3.7311
M-K Test Value (S) -116
Tabulated p-value 0.0000
Approximate p-value 0.0001
OLS Regression Line (Blue)
OLS Regression Slope -382.7428
OLS Regression Intercept 772,462.5478
Statistically significant evidence of a decreasing trend at the specified level of significance.

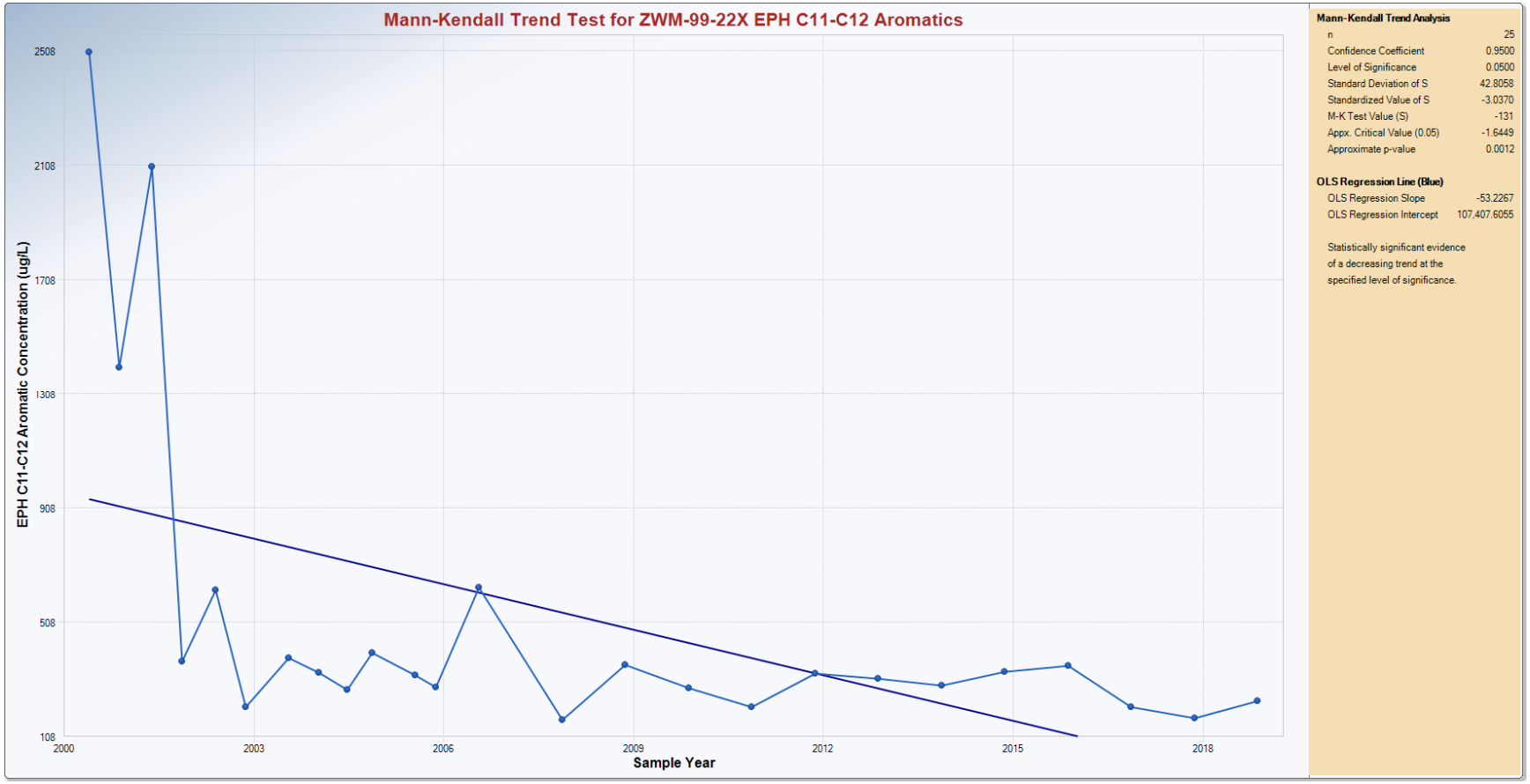

Mann-Kendall Trend Test for XGM-97-12X VPH C9-C12 Aliphatics
VPH C9-C12 Aliphatic Concentration (ug/L)
6817
5817
4817
3817
2817
1817
817
-183
1999
2002
2005
2008
2011
2014
2017
Sample Year
Mann-Kendall Trend Analysis
n 20
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 30.7625
Standardized Value of S 0.7152
M-K Test Value (S) 23
Tabulated p-value 0.2500
Approximate p-value 0.2373
OLS Regression Line (Blue)
OLS Regression Slope -20.9798
OLS Regression Intercept 43,048.4584
Insufficient statistical evidence
of a significant trend at the
specified level of significance.

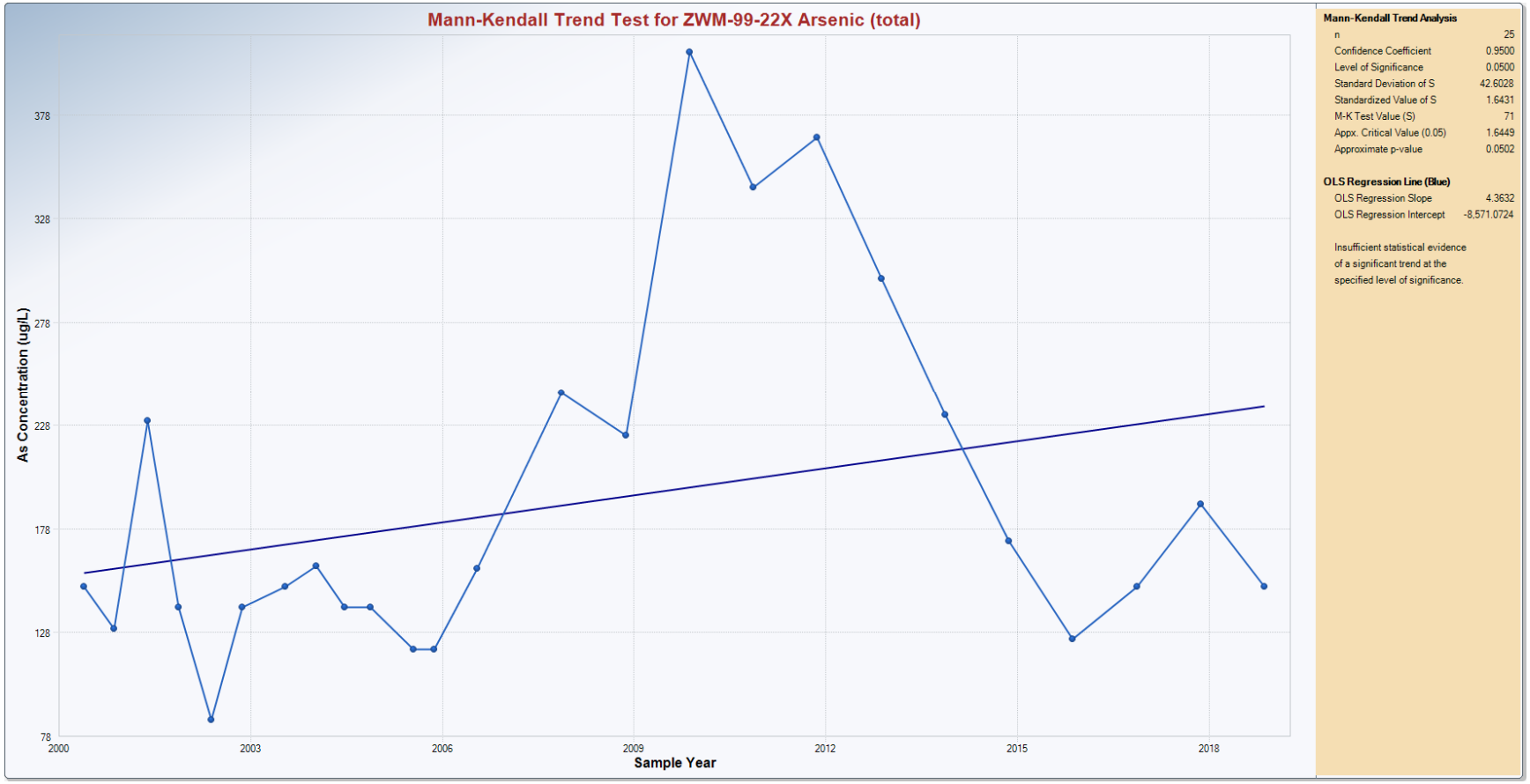

Mann-Kendall Trend Test for XGM-97-12X Iron
Fe Concentration (ug/L)
45250
40250
35250
30250
25250
20250
15250
1999
2002
2005
2008
2011
2014
2017
Sample Year
Mann-Kendall Trend Analysis
n 20
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 30.6974
Standardized Value of S -1.2379
M-K Test Value (S) -39
Tabulated p-value 0.1170
Approximate p-value 0.1079
OLS Regression Line (Blue)
OLS Regression Slope -472.4098
OLS Regression Intercept 975,686.2646
Insufficient statistical evidence of a significant trend at the specified level of significance.

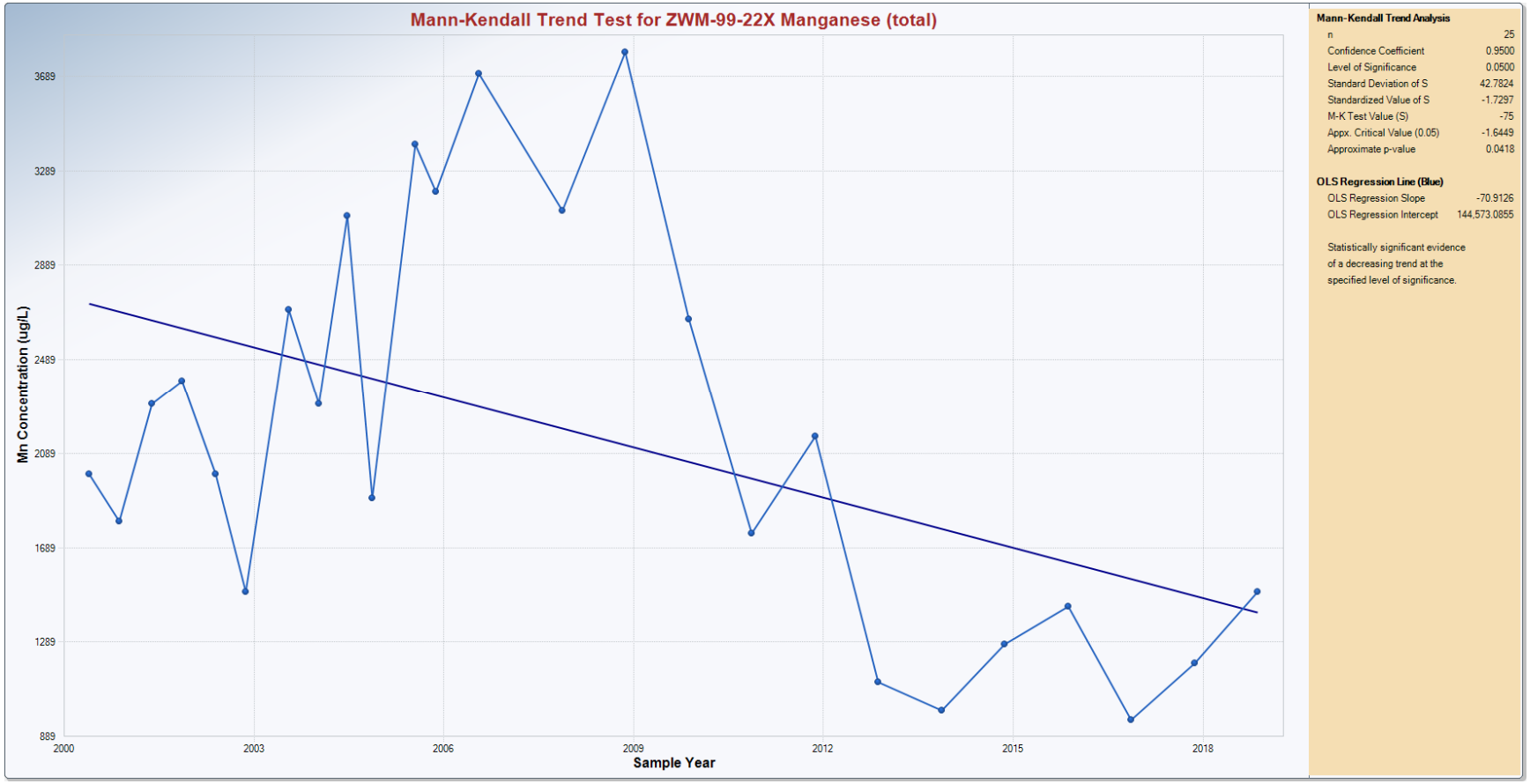

Mann-Kendall Trend Test for XGM-97-12X Manganese
Mn Concentration (ug/L)
6290
5290
4290
3290
2290
1290
290
1999
2002
2005
2008
2011
2014
2017
Sample Year
Mann-Kendall Trend Analysis
n 20
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 30.8058
Standardized Value of S -2.3372
M-K Test Value (S) -73
Tabulated p-value 0.0100
Approximate p-value 0.0097
OLS Regression Line (Blue)
OLS Regression Slope -118.3926
OLS Regression Intercept 240,717.8396
Statistically significant evidence of a decreasing trend at the specified level of significance.

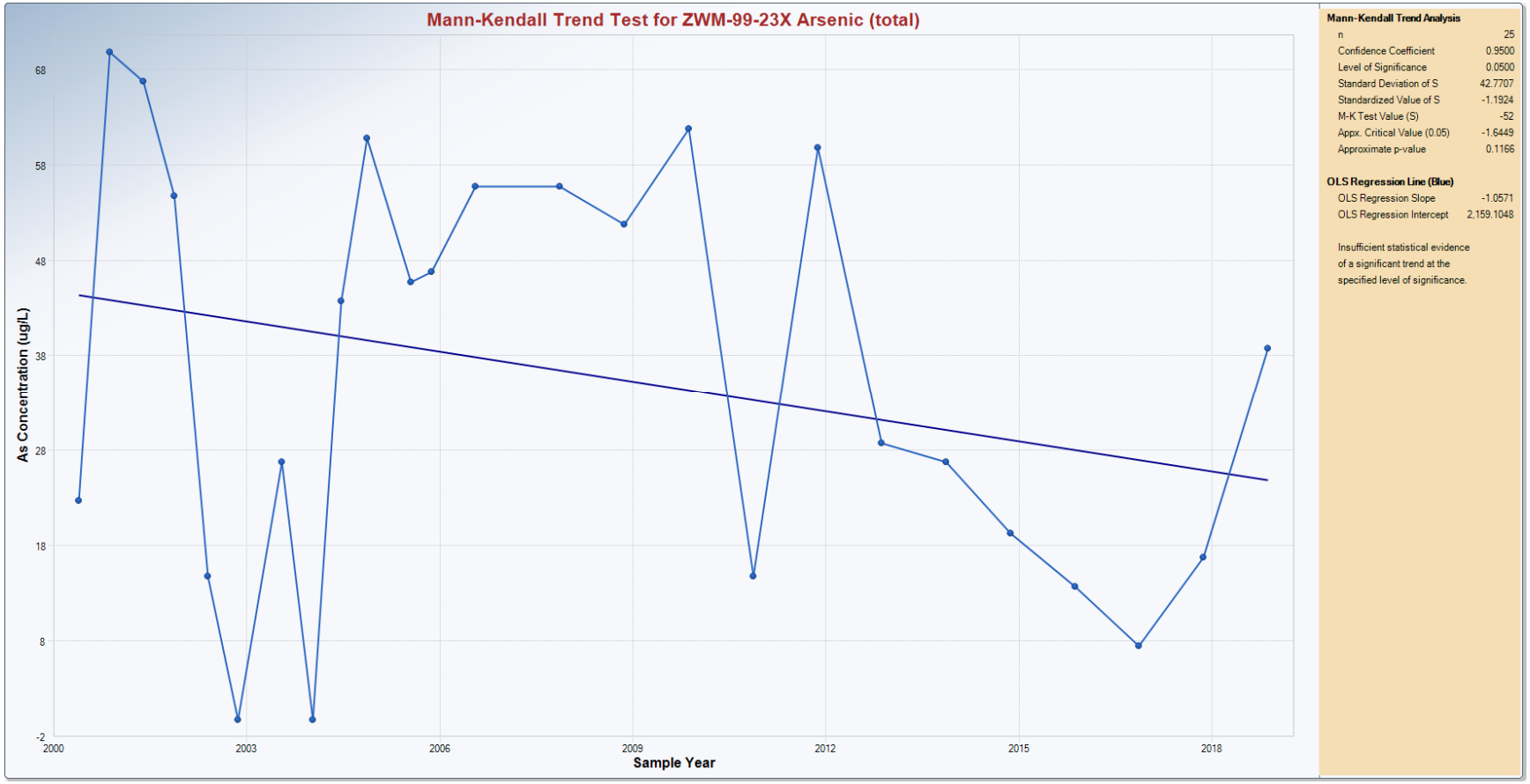

Mann-Kendall Trend Test for ZWM-95-15X Arsenic (total)
As Concentration (ug/L)
39
31
23
15
7
-1
2000
2003
2006
2009
2012
2015
2018
Sample Year
Mann-Kendall Trend Analysis
n 25
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 42.0357
Standardized Value of S 0.9040
M-K Test Value (S) 39
Appx. Critical Value (0.05) 1.6449
Approximate p-value 0.1830
OLS Regression Line (Blue)
OLS Regression Slope 0.2947
OLS Regression Intercept -577.7283
Insufficient statistical evidence of a significant trend at the specified level of significance.

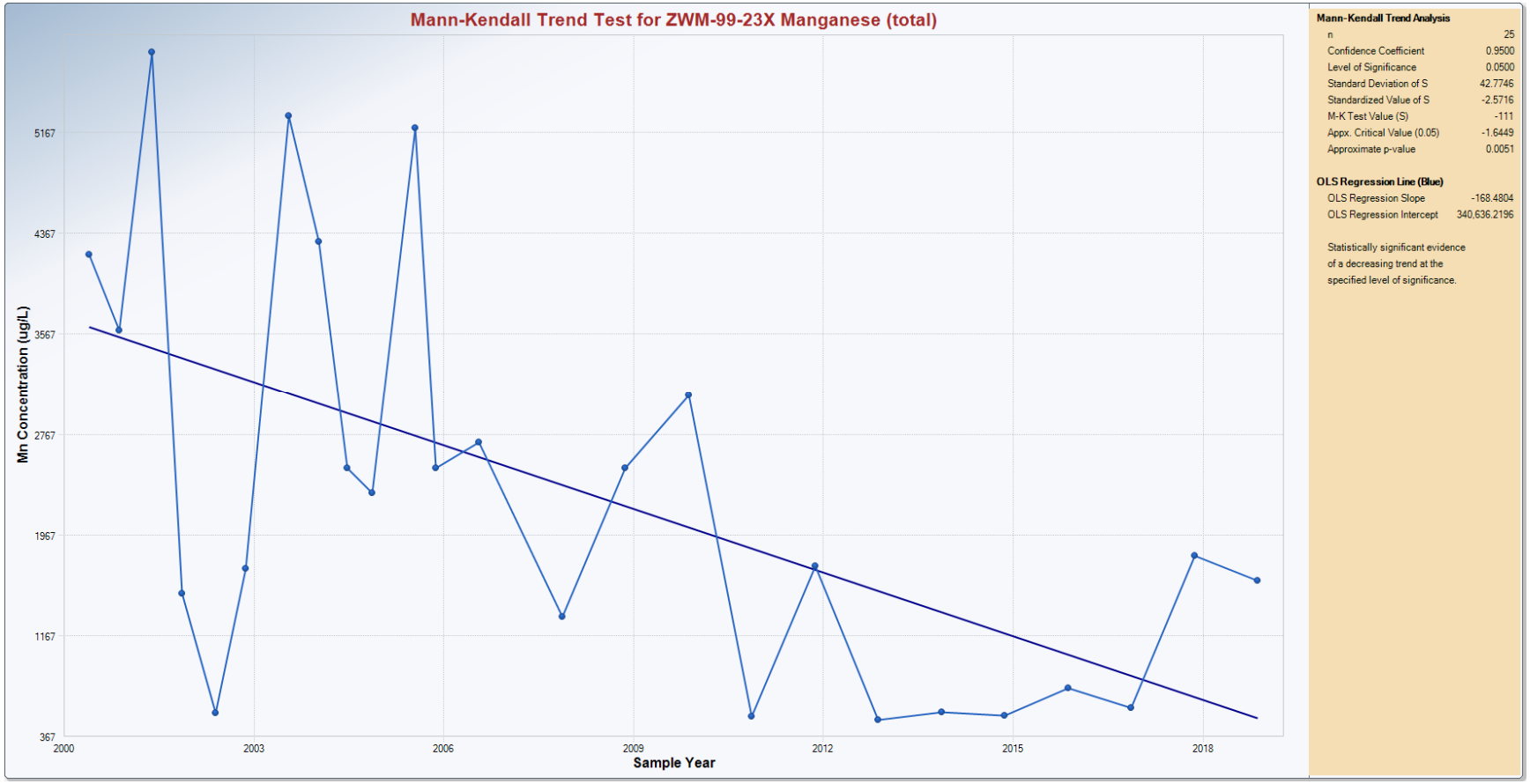

Mann-Kendall Trend Test for ZWM-95-15X Manganese (total)
Mn Concentration (ug/L)
4702
3902
3102
2302
1502
702
-98
2000
2003
2006
2009
2012
2015
2018
Sample Year
Mann-Kendall Trend Analysis
n 25
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 42.8174
Standardized Value of S -0.7707
M-K Test Value (S) -34
Appx. Critical Value (0.05) -1.6449
Approximate p-value 0.2204
OLS Regression Line (Blue)
OLS Regression Slope -32.9299
OLS Regression Intercept 67,112.6669
Insufficient statistical evidence of a significant trend at the specified level of significance.


Mann-Kendall Trend Test for ZWM-99-22X EPH C11-C12 Aromatics
EPH C11-C12 Aromatic Concentration (ug/L)
2508
2108
1708
1308
908
508
108
2000
2003
2006
2009
2012
2015
2018
Sample Year
Mann-Kendall Trend Analysis
n 25
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 42.8058
Standardized Value of S -3.0370
M-K Test Value (S) -131
Appx. Critical Value (0.05) -1.6449
Approximate p-value 0.0012
OLS Regression Line (Blue)
OLS Regression Slope -53.2267
OLS Regression Intercept 107,407.6055
Statistically significant evidence of a decreasing trend at the specified level of significance.


Mann-Kendall Trend Test for ZWM-99-22X Arsenic (total)
As Concentration (ug/L)
378
328
278
228
178
128
78
2000
2003
2006
2009
2012
2015
2018
Sample Year
Mann-Kendall Trend Analysis
n 25
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 42.6028
Standardized Value of S 1.6431
M-K Test Value (S) 71
Appx. Critical Value (0.05) 1.6449
Approximate p-value 0.0502
OLS Regression Line (Blue)
OLS Regression Slope 4.3632
OLS Regression Intercept -8,571.0724
Insufficient statistical evidence of a significant trend at the specified level of significance.


Mann-Kendall Trend Test for ZWM-99-22X Manganese (total)
Mn Concentration (ug/L)
3689
3289
2889
2489
2089
1689
1289
889
2000
2003
2006
2009
2012
2015
2018
Sample Year
Mann-Kendall Trend Analysis
n 25
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 42.7824
Standardized Value of S -1.7297
M-K Test Value (S) -75
Appx. Critical Value (0.05) -1.6449
Approximate p-value 0.0418
OLS Regression Line (Blue)
OLS Regression Slope -70.9126
OLS Regression Intercept 144,573.0855
Statistically significant evidence of a decreasing trend at the specified level of significance.


Mann-Kendall Trend Test for ZWM-99-23X Arsenic (total)
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 25
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 42.7707
Standardized Value of S -1.1924
M-K Test Value (S) -52
Appx. Critical Value (0.05) -1.6449
Approximate p-value 0.1166
OLS Regression Line (Blue)
OLS Regression Slope -1.0571
OLS Regression Intercept 2,159.1048
Insufficient statistical evidence of a significant trend at the specified level of significance.


Mann-Kendall Trend Test for ZWM-99-23X Manganese (total)
Mn Concentration (ug/L)
5167
4367
3567
2767
1967
1167
367
2000
2003
2006
2009
2012
2015
2018
Sample Year
Mann-Kendall Trend Analysis
n 25
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 42.7746
Standardized Value of S -2.5716
M-K Test Value (S) -111
Appx. Critical Value (0.05) -1.6449
Approximate p-value 0.0051
OLS Regression Line (Blue)
OLS Regression Slope -168.4804
OLS Regression Intercept 340,636.2196
Statistically significant evidence of a decreasing trend at the specified level of significance.

APPENDIX E
ANNUAL LAND-USE CONTROL PLAN CHECKLIST

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 October 2018.	
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	
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: Ron Ostrowski (MassDevelopment) and Neil Angus (Devens Enterprise Commission)			
Date/Location of Interview: 11/7/2018 Telephone conference call with Ron Ostrowski and Neil Angus			
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	
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	
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 October 2018.	
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: Ron Ostrowski (MassDevelopment) and Neil Angus (Devens Enterprise Commission)			
Date/Location of Interview: 11/7/2018 Telphone conference call with Ron Ostrowski and Neil Angus			
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	
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	
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			
Position: Business Manager, Francis W. Parker Charter Essential School			
Location of Interview: email/phone mmckenna@theparkerschool.org (978)772-3293 February 6, 2019 Ms. McKenna responded in a telephone conversation.			
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	
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	
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 October 2018.			
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		
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 31**,** 2019 - sent email with interview questions. February 6, 2019 - Email response from Robert Simeone.			
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 October 2018.			
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	
IV. Interview			
Name of Interviewer: Laurie Ekes/KGS			
Name of Interviewee: Ron Ostrowski (MassDevelopment) and Neil Angus (Devens Enterprise Commission)			
Date/Location of Interview: 11/7/2018; Telephone conference call with Ron Ostrowski and Neil Angus			
O'Reilly Auto Parts Warehouse is located within the foot print of AOC32/43A. 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. This report is also 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 31, 2019 - Sent email to Jason Pahl with interview questions. February 2, 2019 - Email response from Jason Pahl.			
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 monitoirng wells around the site that are sampled by USACE and two that are monitored by O'Reilly.
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?		NA	
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: October 17, 2018 during landfill mowing			
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	
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			
The landfill was mowed on 10/17/2018 with oversight by KGS field personnel. KGS 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		The access gate was absent.
Any signs of increased exposure potential?		X	

IV. Interview			
Name of Interviewer: Laurie Ekes			
Name of Interviewee: Ron Ostrowski (MassDevelopment) and Neil Angus (Devens Enterprise Commission)			
Date/Location of Interview: 11/7/2018 - Telephone conference call with Ron Ostrowski and Neil Angus			
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	
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	
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:**
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.	
Inspection/Date: November 8, 2018	
Inspectors: Melissa Miller, KGS	

II. Documentation and Records

November 7, 2019 - Spoke with Ron Ostrowski for response to questions below.

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 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
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:**
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.	
Inspection/Date: November 8, 2018	
Inspectors: Melissa Miller, KGS	

II. Documentation and Records

November 7, 2019 - Spoke with Ron Ostrowski for response to questions below.

Item	Yes	No	Comments
Any related notices filed with Devens Enterprise Commission?		X	No activity at AOC40.
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 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:**
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 commercial and industrial uses.	
Inspection/Date: November 8, 2018	
Inspectors: Melissa Miller, KGS	

II. Documentation and Records

November 7, 2019 - Spoke with Ron Ostrowski for response to questions below.

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	Ron O noted that soil tests were conducted in SA13 to evaluate the soils for potential construction. The findings indicated that the soil was not suitable for construction and no further work is planned.

II. 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	Two 2" monitoring wells in wetland
Is there sufficient access to the site for monitoring?	X		Access from Lake George Street
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*
X	Interview of municipal personnel as to the discovery, reporting and disposal of UXO	Name(s) and title(s) of person(s) interviewed: Ron Ostrowski/Environmental Services - MassDevelopment Phone: (978) 784-2936 Neil Angus/Environmental Planner - Devens Enterprise Commission Phone: 978) 772-8831 X3334 Chief Joseph LeBlanc/Fire Chief - MassDevelopment Phone: (978) 772-4600 Date(s) of interview: 11/7/2018 - Phone call with Ron and Neil 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*
X	Physical Inspection of Impact Area	Date conducted: October 17, 2018 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)
X	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: Ron Ostrowski/Environmental Services - MassDevelopment Phone: (978) 784-2936 Date of interview: November 7, 2018 Work conducted? **X No.** □ 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. Phase 2 of the Emerson Green project has started; construction has started and utility installation ins underway.		
check√	*task*	*notes*
X	Verify existence of website and content	Spoke to Ron Ostrowski (Mass Development) and Neil Angus (Devens Enterprise Commission). Website is **www.devensec.com/planning-docs**. The Soil Management Plan and UXO information pamphlet (utility insert) are available on the website. They stated that these documents are provided to all incoming contractors.
X	Verify the inclusion of required utility bill inserts	Spoke to Ron Ostrowski on 2/11/2019. He confirmed that informational inserts are included in first time utility bills of new residents and re-sent every year. A copy of the UXO utility bill letter and insert are included.
X	Verify posting of utility bill insert in a conspicuous location	Spoke to Ron Ostrowski and Neil Angus. As noted above, information is available on the Website (www.devensec.com).
X	Verify distribution of current soils management policy to construction	Spoke to Ron Ostrowski and Neil Angus. As noted above, information is available on the Website (www.devensec.com). policy.
X	Verify that awareness training is being conducted	(1) Did ground intrusive construction activities occur during the reporting period in the Grant HA? **Yes. The Emerson Green Development Phase 2 project has started.** (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 attend preconstruction meetings and are presented copies of relevant plans. The info is also available on the website, as noted above.** (3) Were all contractors who applied for a building permit required to attend UXO awareness training prior to commencing ground intrusive construction activities? **Yes**
X	Verify that supplemental deed notice has been included in deeds conveying portions of the Grant HA	Phase 2 of the Emerson Green project has started. To date, the developer has broken ground and begun utility installation.
X	Physical Inspection (to be conducted only if deemed necessary)	**X No.** A physical inspection of the Grant Housing Area development was not necessary. □ Yes. (if "yes", provide date of inspection, the areas that were inspected and whether any surface or near surface UXO were discovered)

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.

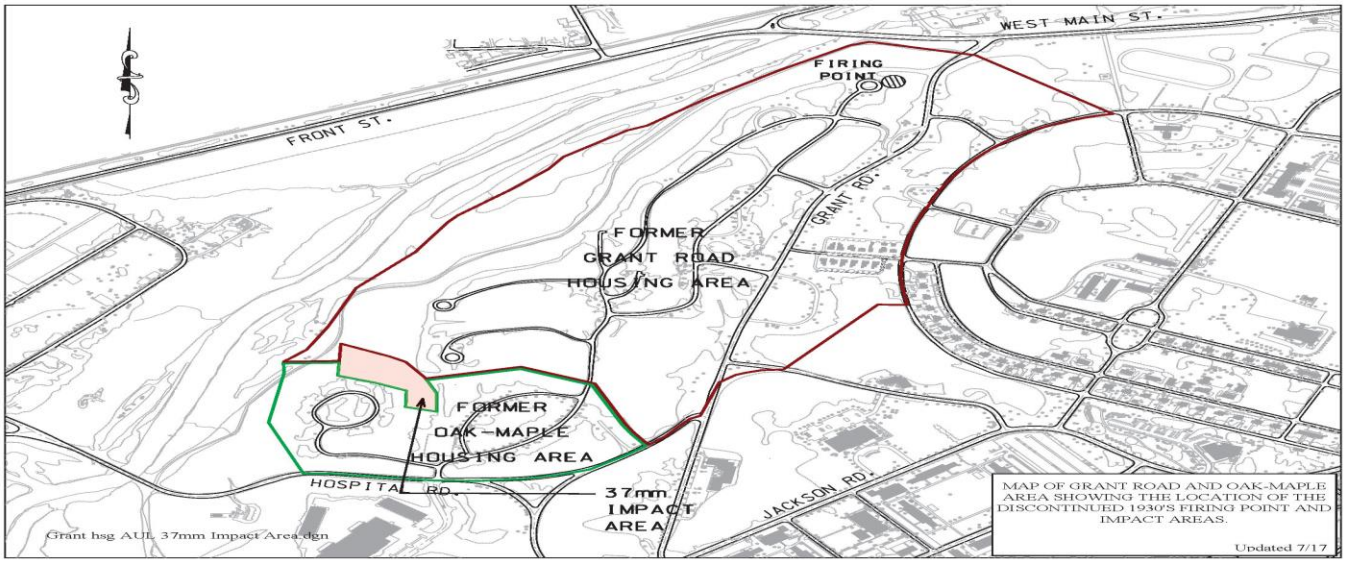


Figure 1. Map of Grant Road and Oak/Maple Housing Areas showing the location of the discontinued 1930's firing range impact area relative to now-demolished 1960's era military housing.

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.

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 Significant 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: Ron Ostrowski/Environmental Services - MassDevelopment Phone: (978) 784-2936 Neil Angus/Environmental Planner - Devens Enterprise Commission Phone: (978) 772-8831 X3334 Date(s) of interview: November 7, 2018 An Oak and Maple Land Use Control Implementation Plan (LUCIP) addendum has been prepared and was finalized in 2018. 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 - There has been no construction activity in the Oak and Maple Housing Area property in 2018.** (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**
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

REAL PROPERTY MASTER PLAN
LONG RANGE COMPONENT
FOR
DEVENS RESERVE FORCES TRAINING AREA

ADDENDUM – SEPTEMBER 2007

This addendum applies to Chapter 4.C. (Land Use Policies and Constraints) and Chapter 5.E. (Environmental Concerns) of the *Real Property Master Plan, Long Range Component for Devens Reserves Forces Training Area, June 1999.* The addendum provides supplemental information on Land-Use Controls (LUCs) established under BRAC and CERCLA programs that are applicable to the following areas:

Area A (Main Cantonment)

The CERCLA remedy for the former AAFES Gas Station located on Queenstown Street is addressed in the Record of Decision (ROD) for Area of Contamination (AOC) 43G. The remedy is based on Army retention of this area and continued restricted access to groundwater; however, any proposed actions that affect this property must consider the following ROD requirements and site environmental conditions:

- Assure that the Property is not used for residential purposes and prohibit the use of groundwater beneath the site. If the Army changes the land-use within the AOC, then additional assessment and/or possible remedial action may be needed based upon the possible resultant changed risk factors.

- If the Army transfers this property by lease or deed, an Environmental Baseline Assessment (EBS) will be conducted to ensure that the remedy remains protective by incorporating all necessary environmental protection provisions within the Finding of Suitability to Transfer (FOST) and the property transfer deed.

- Any intrusive construction work must consider that residual soil and groundwater contamination has been documented for AOC 43G and that such actions should be coordinated with the DPW, the BRAC Environmental Office and the BRAC Clean-up Team (BCT).

Area C (Range & Training Area)

The CERCLA remedy for the South Post range and training areas is addressed in the ROD for the South Post Impact Area (SPIA) and AOCs 25, 26, 27 and 41. The "no action" remedy is based on Army retention of the South Post; however, any proposed actions that affect this property must consider the following ROD requirements:

- If the Army should close or transfer or change the use of this property, an Environmental Baseline Survey (EBS) will be conducted, and the "no action" decision in the ROD will be re-examined in light of the changed use and risk factors resulting from this closure/transfer.

- The Army will not develop new drinking water sources within the SPIA monitored area.

Area F (3700 Area – Barnum Road Maintenance Yards)

The CERCLA remedy for the former Cannibalization Yard and TDA Maintenance Yard is addressed in the ROD for AOCs 44 and 52, respectively. The remedy is based on Army retention of this property; however, any proposed actions that affect this property must consider the following ROD requirements:

- Assure the Property is not used for residential purposes. If the Army transfers this property by lease or deed, an EBS will be conducted to ensure that the remedy remains protective by incorporating all necessary environmental protection provisions within the FOST and the property transfer deed.

- Maintain the existing paved areas and storm water collection systems to prevent long-term worker exposure to residual oil contaminated soils 2-5 feet BGS associated with AOC 44/52 remedy.

- Assure that Soil Management Plans and Health and Safety Plans are prepared and executed prior to subsurface excavations.

- Any intrusive construction work must consider that residual soil contamination has been documented for AOC 44/52 and that such actions should be coordinated with the DPW, the BRAC Environmental Office and the BCT.

Area G (3800 Area – RTS Maintenance)

The CERCLA remedy for the former Moore Army Airfield is addressed in the ROD for AOC 50. Active remediation and monitoring of the AOC 50 chlorinated solvent plume, which is under building 3813 is ongoing. Treatment transects and associated monitoring wells are located in the RTC vehicle storage area and on the Southwest Corner of Building 3813 former hanger, along the axis of the plume through Army retained Parcel H. Any proposed actions that affect this property must consider the following ROD requirements:

- Provide continued access to treatment transects and monitoring wells and access to install additional injection or monitoring wells, if necessary.

- Coordinate construction plans with the BCT to facilitate ongoing remediation and future access to plume areas

- No groundwater extraction or injection for any purpose

- Coordinate construction plans for modifications to storm water systems with the BCT including engineered storm water management plans and hydrologic/ mounding studies. (Continue use of existing storm water system to direct storm water away from the plume)

APPENDIX F

DEVENS CONSOLIDATION LANDFILL INSPECTION REPORT

2018 GEOTECHNICAL ENGINEERING ANNUAL INSPECTION REPORT

DEVENS CONSOLIDATION LANDFILL

FORMER FORT DEVENS ARMY INSTALLATION, DEVENS, MA

APRIL 2019

Prepared for:
U.S. Army Corp 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 November 14, 2018. 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 5). An area on the eastern slope located north of gas vent #7 (Photo 4) may have settled slightly since the original construction and should continue to be monitored (there are no apparent adverse impacts to the landfill cap or nearby gas vents at this time).

In general, the cap vegetation appeared healthy and provides good coverage of the cap. Selected areas of the upper cap were reseeded and fertilized on 10 May 2018 and appeared to be growing well overall (Photos 5 and 6). The cap and adjacent area vegetation were mowed on 17 October 2018. 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 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.

Four groundhog burrows were present in the southwest portion of the landfill cap (approximately 50 feet west of gas vent #2, 100 feet west of gas vent #2, at the base of gas vent #4, and 75 feet north of gas vent #4). 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 gate at the southern entrance to the landfill has been dislocated and deposited in the shrubs on the west side of the access from Patton Road and no longer restricts vehicle access to the landfill area. Security to this area should be reestablished by replacing the gates to restrict vehicle access. Based on the disposition of the gate and chain link fence, it appears this condition has existed for some time.

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 this 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 (Photo 7). Some sediment has accumulated in a small area of the riprap on the southeast side of the landfill (Photo 8); no action is required at this time. One small erosion hole (1' x 1' x 1') that was noted at the upper edge of the riprap located south of gas vent #1 should be backfilled to prevent further erosion.

Vegetation was removed from the riprap along the southern toe of the landfill in March 2018. No significant vegetation is present in the riprap along the eastern and western portions of the landfill. Some vegetation is present in the rip rap along the northern toe of the landfill (tall grasses, shrubs); this vegetation should be cut down to prevent potential clogging/displacement of the riprap. Gabion slope drains were in good condition with minimal vegetation present.

The detention pond northeast of the DCL was in good condition overall (Photo 9). Some vehicle tire ruts (1-2 inches deep, 15-20 feet long) were present on the slope at the southeast corner 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 anticipated to recover in 2019, but the area should continue to be monitored for potential future erosion (if 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 19 October 2018. The leachate pump was inspected monthly.

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. Repairs to the gas vents' labels and bird/insect screens that were conducted in May 2018 were found to still be in good condition during the November 2018 inspection.

A GEM 2000 gas monitor was used to monitor the gas vents for methane (CH_4), carbon dioxide (CO_2), oxygen (O_2), and %LEL. A MultiRAE+ was used to check volatile organic compound (VOC) levels, hydrogen sulfide (H_2S), carbon monoxide (CO), oxygen, and %LEL readings. Gas monitoring showed non-detect (zero) readings for VOCs, H_2S, CO, CO_2, and CH_4 in all gas vents. Oxygen levels ranged from 20.4% to 22.2%. Eight gas vents had a %LEL of zero and 1% LEL was detected in gas vents #4, #6, and #7 (these low readings correspond to the low/non-detect levels of methane during the November 2018 monitoring event).

5.0 OTHER OBSERVATIONS

- As noted in previous inspections, a small, sheet-metal storage shed (Conex box) is located next to the leachate pump station (Photo 12). The shed contains a small amount of miscellaneous equipment (e.g., wooden pallets, empty 5-gallon buckets, groundwater

bailer and tubing, empty 1-gallon gas can) and two empty, unlabeled drums. The door is braced shut, as the door latch is broken. The owner of this storage shed has not been identified. The shed does not appear to be impacting the landfill, but it is recommended that the owner be identified so the shed can be repaired/secured, or removed, as appropriate.

6.0 RECOMMENDATIONS AND CORRECTIVE ACTIONS

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

1. 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.
2. 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.
3. Continue general landfill maintenance, such as clearing large/woody vegetative growth from the cap and drainage channels. Small shrubs growing on the landfill cap should continue to be cut low during the annual mowing, and/or flush cut to the ground as feasible during the annual maintenance program. Vegetation (tall grasses, shrubs, etc.) should be cut down from the riprap along the northern toe of the landfill.
4. Backfill the four groundhog burrows located approximately 50 feet west of gas vent #2, 100 feet west of gas vent #2, at the base of gas vent #4, and 75 feet north of gas vent #4.
5. Backfill the small erosion hole (1’ x 1’ x 1’) at the upper edge of the riprap located south of gas vent #1.
6. The gate at the southern end of the landfill should be replaced to restrict vehicle access to the landfill area.
7. The door to the metal storage shed located next to the leaching pumping station should be repaired to secure this structure.
8. Since the cap was completed in 2002, post-closure inspection and monitoring has been performed for 17 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.

US Army Corps of Engineers
New England District

FIGURE



Figure 1

Fall 2017 Annual Inspection
15, 17 November 2017

○ Gas Vents

→ Photo Directions

⊕ LFM-99-05A - Monitoring Well ID

Base Map Devens As-Built Drawing C-7 from "Remedial Action Closure Report", Shaw Environmental, Inc. (September 2003).

Imagery: National Agriculture Imagery Program (NAIP) 7/28/16

Horizontal Datum - NAD 83

0 62.5 125 250

Feet

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New England District

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PHOTOGRAPH LOG

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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

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New England District



Photo 7 – Riprap drainage channel at southeastern toe of the landfill



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



Photo 9 – Stormwater detention pond (looking west)



Photo 10 – Vehicle tire ruts at southeast corner of stormwater detention pond



Photo 11 – Gas Vent #2 sampling



Photo 12 - Conex box near leachate pump

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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: Ropp (KGS), Kilbridge (USACE) Date: 14 November 2018

Item	Description of Inspection Items	Checked (X)	Comments
Landfill Cap	Inspect for Eroded Areas	X	No significantly eroded areas were observed.
	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 was observed
	Inspect Vegetated Areas	X	Last mowed in October 2018. Vegetation is well established, however tends to be sparser in the upper portion of the landfill. The upper area was reseeded and fertilized in spring 2018 and appeared 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 flush to the ground or removed as feasible as part of the annual maintenance program.
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 to the south, east, and west are generally free of excess vegetation, but vegetation growing in the northern riprap should be cut down/removed as feasible.
Gas Vent System	Gas Monitoring Vents 1 through 11	X	Landfill gas concentrations were low to non-detect.
	Inspect Vent Pipe and Bird Screen	X	The vent pipes and bird/insect screens are in good condition.

US Army Corps of Engineers
New England District

Item	Description of Inspection Items	Checked (X)	Comments
Security Fence	Inspect for Damage to or Breeches in Fencing	X	Perimeter security fence and gates are in good condition where present. The gate to the landfill access road from Patton Road was removed in the past and set in the wooded area to the side. The gate should be replaced in order to reduce vehicle access to the landfill area.
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.			

US Army Corps of Engineers®
New England District

APPENDIX B

Landfill Gas Monitoring

Landfill Gas Monitoring
Devens Consolidated Landfill
Devens, Massachusetts

Sampler: Melissa Miller, Project Scientist **Date:** 11/14/2018
Weather: Cold, 31 F, Windy (WNW, Wind Speed 30 mph)
Barometer (in-Hg): 29.70 **Time:** 0900
29.64 1023
29.64 1120

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 2000	% GEM 2000	% GEM 2000	% GEM 2000	
V-1	1010	0.0	0.0	0.0	0.0	20.9	22.0	0.0	0.0	0.0	
V-2	0917	0.0	0.0	0.0	0.0	20.9	21.9	0.0	0.0	0.0	
V-3	0957	0.0	0.0	0.0	0.0	20.8	22.1	0.0	0.0	0.0	
V-4	0943	0.0	0.0	0.0	0.0	20.9	21.4	0.0	0.0	1.0	
V-5	0932	0.0	0.0	0.0	0.0	20.9	21.2	0.0	0.0	0.0	
V-6	0953	0.0	0.0	0.0	0.0	20.7	22.2	0.0	0.0	1.0	No Tag
V-7	1039	0.0	0.0	0.0	0.0	20.7	20.9	0.0	0.0	1.0	
V-8	1023	0.0	0.0	0.0	0.0	20.8	20.8	0.0	0.0	0.0	
V-9	1053	0.0	0.0	0.0	0.0	20.4	20.8	0.0	0.0	0.0	
V-10	1118	0.0	0.0	0.0	0.0	20.6	20.9	0.0	0.0	0.0	
V-11	1105	0.0	0.0	0.0	0.0	20.7	21.0	0.0	0.0	0.0	

Notes:

NA – Not Analyzed
CALIBRATION INFORMATION:
1. Instrument: MultiRAE+ Calibrated by: Pine Environmental, All Gas Parameters OK
Calibrated With: 50 ppm CO, 10 ppm H_2S, 50% LEL (CH_4), 20.9% O2, VOC 100 ppm isobutylene (R.F. = 1.0)
Calibration Check Performed by: KGS, All Gas Parameters OK
2. Instrument: Landtec GEM 2000 Calibrated by: Pine Environmental All Gas Parameters OK
Calibrated With: 15% CH_4, 15% CO_2, 20.9% O_2
Calibration Check Performed by: KGS , All Gas Parameters OK

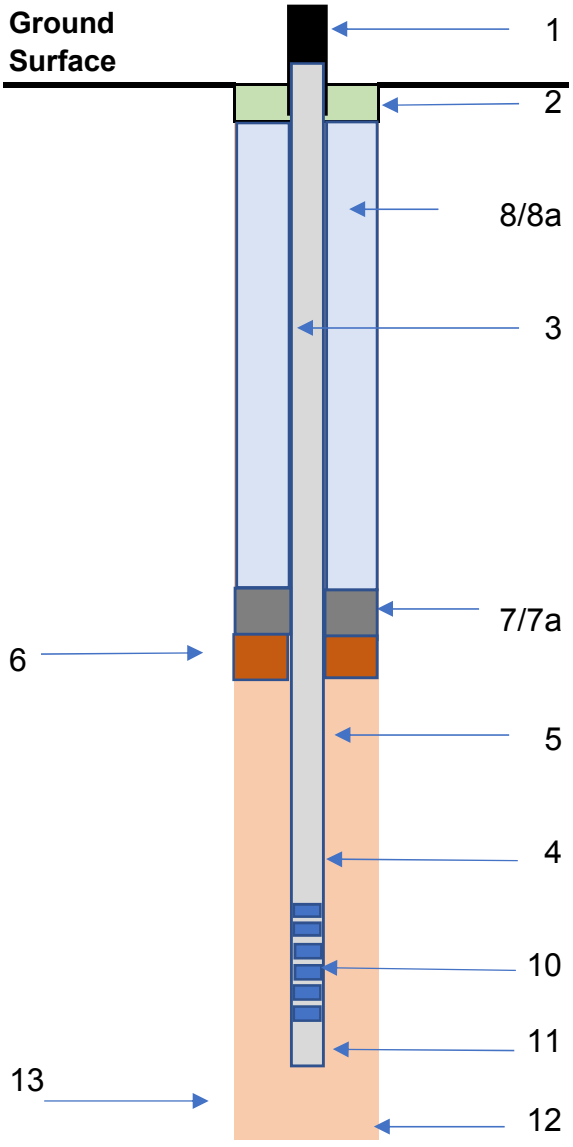
APPENDIX G

DCL GAS MONITORING WELL CONSTRUCTION LOGS

KGS	Project: Devens	Well Identification: LFGM-18-01
	Project Number: 1082-0004-003	

GAS MONITORING WELL CONSTRUCTION DIAGRAM

Client: USACE	Location: Devens Consolidated Landfill
Drilling Company: Technical Drilling Services	
Drilling Method and Equipment: Geoprobe Rig Model 7822	
Drilling Date(s): 12/07/18	Well Construction Date: 12/07/18
Potable Water Used: No	Drums of IDW: 0
KGS Field Personnel: K. Anderson	Associated Soil Boring Log: None
Ground Elevation (ft msl): ~ 334 ft (NVGD)	Top of PVC Elevation (ft msl): TBD



1. Well Protection Type: Steel Protective Standpipe
   Stickup: TBD
2. Concrete Pad Depth: 0-2 ft bgs

3. Diameter/Type of well casing: 1-in/PVC Riser w/ 1" diameter
   pvc shut off cap
4. Type/Screen Slot: PVC Screen/0.010-inch

5. Type of Screen Filter Sand: #1
   Quantity Used: na
   Top/Bottom of Pack: 3/12 ft bgs

6. Type of Filter Sand: #1
   Quanity Used: na
   Top/Bottom of Pack: 3/12 ft bgs

7. Type of Seal: Bentonite
7a. Top/Bottom of Seal: 2/3 ft bgs

8. Grout Mixture Used: none
8a. Placement Method: none
Top/Bottom of Grout: none

9. Screen length: 9 feet
10. Screen interval: 3-12 ft bgs
11. Sump Length: na - end cap

12. Bottom of Boring: 12 ft bgs
13. Diameter of borehole: 4 inches

Comments:

TBD - to be determined

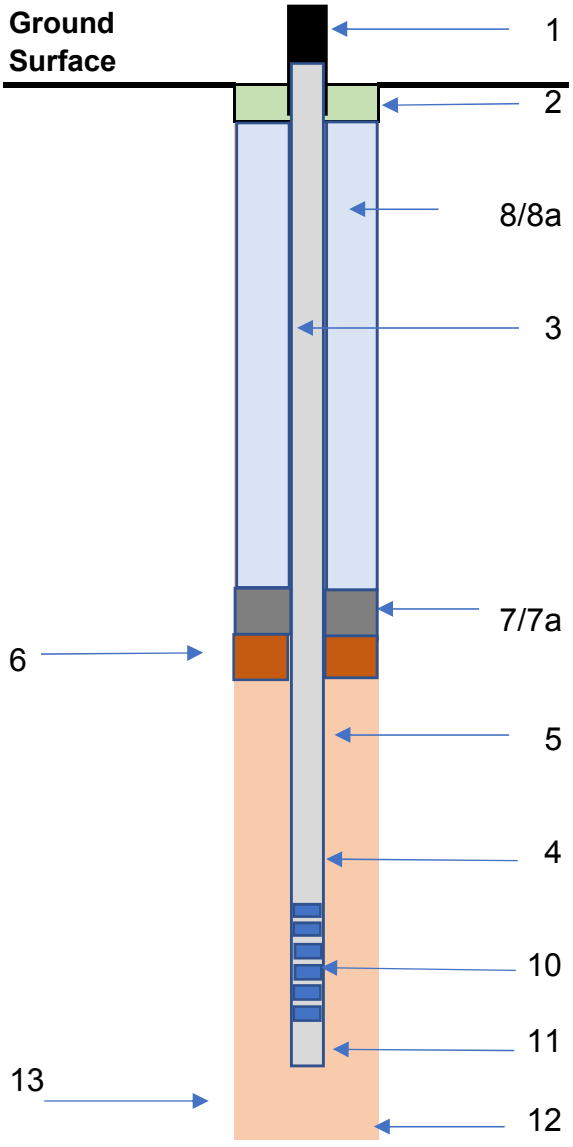
DTW measured at approximately 12 feet bgs

na - not available

KGS	Project: Devens	Well Identification: LFGM-18-02
	Project Number: 1082-0004-003	

GAS MONITORING WELL CONSTRUCTION DIAGRAM

Client: USACE	Location: Devens Consolidated Landfill
Drilling Company: Technical Drilling Services	
Drilling Method and Equipment: Geoprobe Rig Model 7822	
Drilling Date(s): 12/07/18	Well Construction Date: 12/07/18
Potable Water Used: No	Drums of IDW: 0
KGS Field Personnel: K. Anderson	Associated Soil Boring Log: None
Ground Elevation (ft msl): ~ 326 ft (NVGD)	Top of PVC Elevation (ft msl): TBD



1. Well Protection Type: Steel Protective Standpipe
   Stickup: TBD
2. Concrete Pad Depth: 0-2 ft bgs

3. Diameter/Type of well casing: 1-in/PVC Riser w/ 1" diameter
   pvc shut off cap
4. Type/Screen Slot: PVC Screen/0.010-inch

5. Type of Screen Filter Sand: #1
   Quantity Used: na
   Top/Bottom of Pack: 3/7 ft bgs

6. Type of Filter Sand: #1
   Quanity Used: na
   Top/Bottom of Pack: 3/7 ft bgs

7. Type of Seal: Bentonite
7a. Top/Bottom of Seal: 2/3 ft bgs

8. Grout Mixture Used: none
8a. Placement Method: none
Top/Bottom of Grout: none

9. Screen length: 4 feet
10. Screen interval: 3-7 ft bgs
11. Sump Length: na - end cap

12. Bottom of Boring: 7 ft bgs
13. Diameter of borehole: 4 inches

Comments:

TBD - to be determined

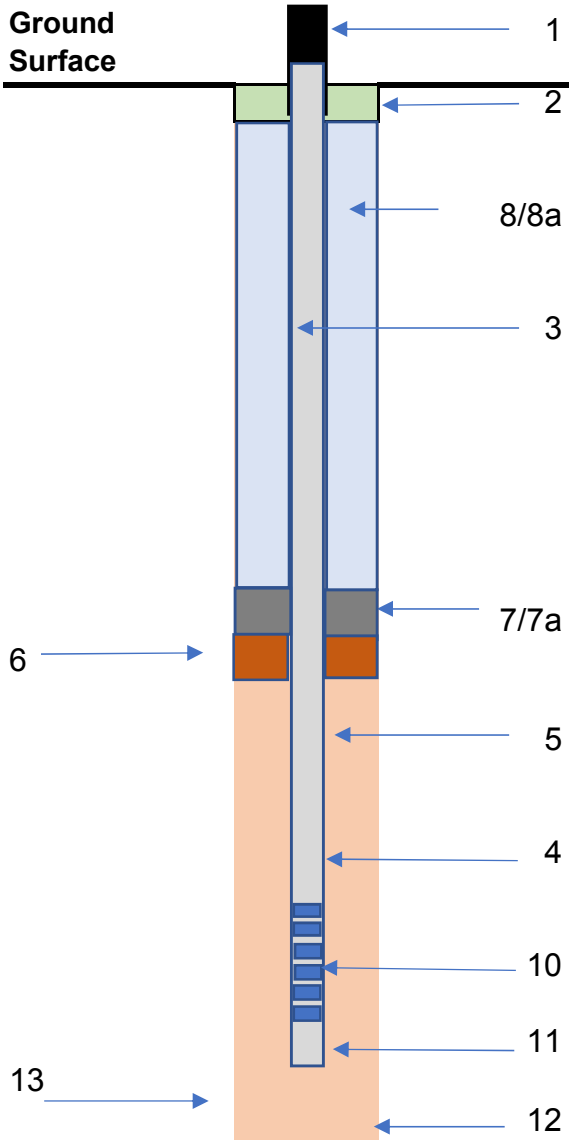
DTW measured at approximately 7 feet bgs

na - not available

KGS	Project: Devens	Well Identification: LFGM-18-03
	Project Number: 1082-0004-003	

GAS MONITORING WELL CONSTRUCTION DIAGRAM

Client: USACE	Location: Devens Consolidated Landfill
Drilling Company: Technical Drilling Services	
Drilling Method and Equipment: Geoprobe Rig Model 7822	
Drilling Date(s): 12/07/18	Well Construction Date: 12/07/18
Potable Water Used: No	Drums of IDW: 0
KGS Field Personnel: K. Anderson	Associated Soil Boring Log: None
Ground Elevation (ft msl): ~ 328 ft (NVGD)	Top of PVC Elevation (ft msl): TBD



1. Well Protection Type: Steel Protective Standpipe
   Stickup: TBD
2. Concrete Pad Depth: 0-2 ft bgs

3. Diameter/Type of well casing: 1-in/PVC Riser w/ 1" diameter
   pvc shut off cap
4. Type/Screen Slot: PVC Screen/0.010-inch

5. Type of Screen Filter Sand: #1
   Quantity Used: na
   Top/Bottom of Pack: 3/6 ft bgs

6. Type of Filter Sand: #1
   Quanity Used: na
   Top/Bottom of Pack: 3/6 ft bgs

7. Type of Seal: Bentonite
   7a.Top/Bottom of Seal: 2/3 ft bgs

8. Grout Mixture Used: none
   8a. Placement Method: none
   Top/Bottom of Grout: none

9. Screen length: 3 feet
10. Screen interval: 3-6 ft bgs
11. Sump Length: na - end cap

12. Bottom of Boring: 7 ft bgs
13. Diameter of borehole: 4 inches

Comments:

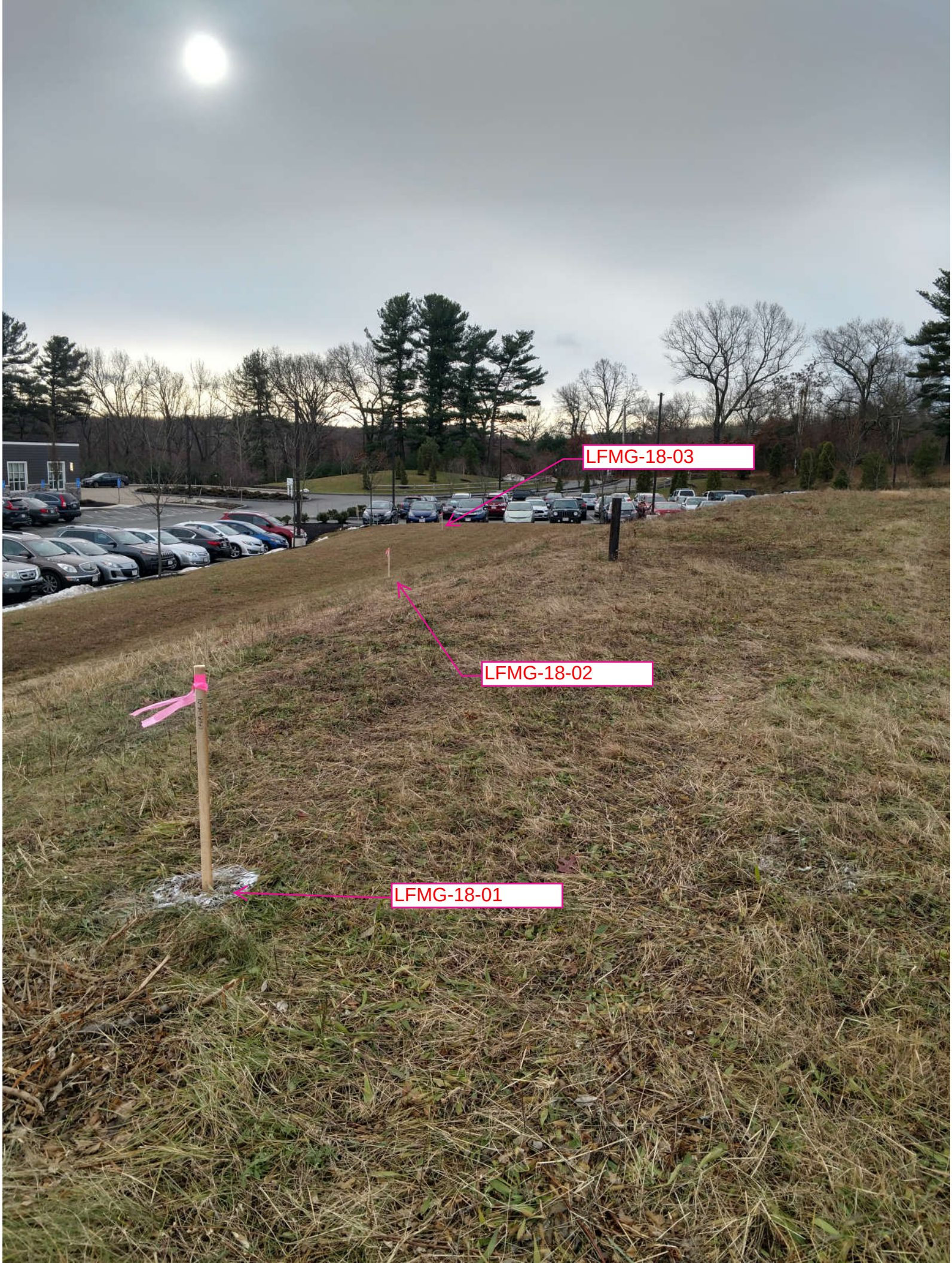
TBD - to be determined

DTW measured at approximately 6 feet bgs

na - not available


Approximate location of LFMG-18-03
View Looking West Northwest toward DCL from Teravista parking lot


LFMG-18-03
LFMG-18-02
LFMG-18-01


LFMG-18-03
LFMG-18-02
LFMG-18-01


LFMG-18-03


LFGM-18-03
(approximate location)


LEGM
18
01


DO NOT FILL
DO NOT FILL
LFGM
18
02
MONITORING WELL
EMCP

LFGM
18
03
DO NOT FILL
DO NOT FILL
MONITORING WELL
ENCO

APPENDIX H
RESPONSES TO COMMENTS

U.S. ARMY RESPONSES TO U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA) COMMENTS ON THE DRAFT 2018 ANNUAL OPERATIONS, MAINTENANCE, AND MONITORING REPORT, MAIN POST FORMER FORT DEVENS ARMY INSTALLATION, DEVENS, MASSACHUSETTS 30 October 2019

The following U.S. Army responses pertain to the U.S. Environmental Protection Agency (EPA) comments, dated 5 August 2019, on the Draft *2018 Annual Operations, Maintenance, and Monitoring Report, Main Post, Former Fort Devens Army Installation*, dated April 2019.

GENERAL COMMENTS

Comment 1 – In comments on the 2015 and 2016 Annual Reports, EPA requested that Zone II Wellhead Protection Areas be shown on certain figures to correspond with discussions in the text. EPA appreciated the addition of Zone II to Figure 1-1 in the 2017 Annual Report. In the 2018 Annual Report, Figure 1 shows the public well or wells for which each of the Zone IIs is drawn but not the Zone IIs. Please restore the Zone II areas to Figure 1-1 in the 2018 Main Post Annual Report ("the 2018 Report"). 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 AOC 32. Some conclusions and predictions in the 2018 Main Post Annual Report are not justified by site specific data. This is especially important where there is a particularly sensitive receptor such as a public well. See Page-Specific Comments (PSCs) 6, 9, 11, 13, 14, 15, 18, and 19.

Response: Zone II areas have been added to Figure 1-1.

Comment 2 – As discussed in EPA's June 12, 2019 email to Army, many of the issues outlined below were initially raised in comments on the draft 2015 LTMMP Update, 2015 Devens Five-Year Review (FYR), 2016 Main Post Annual Report, and 2017 Main Post Annual Report. Army's continued refusal to address EPA's concerns and requests for expanded monitoring programs at both AOCs 43G and 57, coupled with it unilateral decision in 2015 to eliminate LTM in AOC 57 Area 2 and significantly scale back LTM in AOC 57 Area 3, has significantly hindered the collection and availability of groundwater data needed to adequately evaluate the performance and continued protectiveness of ROD-specified remedial actions in the next (2020) Devens Five-Year Review (FYR).

Response: As discussed with EPA at the BRAC Cleanup Team (BCT) meetings held on 25 July 2019 and 17 October 2019, the Army will be collecting additional samples at AOCs 43G and 57 to address EPA comments and to confirm the conceptual site model (CSM) for these AOCs which has been well-established through over 15 years of long-term monitoring and data evaluations. The supplemental data will be used to support preparation of the 2020 Five Year Review. The Army provided a work plan which describes the supplemental sampling program and how it addresses the CSM for regulatory agency review on 28 September 2019.

Comment 3 – Concerns regarding the adequacy of existing monitoring networks remain for some of the AOCs. See PSCs 4, 6, 14, 15, and 16.

Response: See the responses to page-specific Comments 4, 6, 14, 15, and 16.

Comment 4 – Please delete "Final" prior to all references to the 2015 LTMMP Update and replace it with "Draft". Alternatively, a footnote could be inserted after each reference to 2015 LTTMP Update acknowledging that it was released and implemented without EPA concurrence and/or approval.

Response: Incidences of "Final LTMMP" in the text have been revised to "2015 LTMMP"; however, the Army disagrees that the LTMMP should be called "draft". On August 11, 2014, the Army issued responses to EPA comments on the draft LTMMP and provided a redline/strikeout version of the document for final approval. No further comments were received from EPA during the requested review period and the Army proceeded to finalize the LTMMP in February 2015. EPA's subsequent comments on the scope of the LTMMP are being addressed with supplemental sampling events for the LTM sites and will be further evaluated during the 2020 five year review process.

PAGE-SPECIFIC COMMENTS

Comment 1 – Pages ES-1, Executive Summary, first bullet – As discussed in EPA's June 12, 2019 and General Comment (GC) 2 above, the existing LTMMP program at AOC 57 is inadequate and must be expanded to address the issues outlined below, prior to Army's issuance of the draft 2020 Devens FYR Report:

- All existing AOC 57 monitoring wells are screened in shallow groundwater. As such, the potential presence of contaminant concentrations in deeper portions of the aquifer, within or downgradient of the suspected site boundary, has not be explored; additional monitoring wells, with deeper screened intervals, must be installed throughout Areas 2 and 3 to assess groundwater quality in deeper portions of the aquifer; although the deep piezometers proposed by Army are a good start, they will not allow a determination of flow direction in the deeper portion of the aquifer; a minimum of three deep piezometers are needed in each of the Areas (i.e. both 2 and 3) to accomplish this task;
- Monitoring wells in Areas 2 and 3 have had or currently have COC detections above ROD-specified cleanup goals yet there are no monitoring wells downgradient of these locations to confirm/deny the presence of contamination beyond the currently monitored area and possibly beyond the site boundaries;
- The actual, field-measured boundaries of the "reducing environment present in the aquifer (low DO and ORP), which tend to promote the mobilization of metals such as arsenic from native soils" (and prevent the off-site migration of these metals), must be defined/confirmed with site-specified field data; in addition to confirming where within the aquifer these metals "precipitate out of low-ORP groundwater emanating from the site", groundwater data should be collected to evaluate COC concentrations where they are released back into the environment; and,
- Additional monitoring wells are needed within and downgradient of Cold Spring Brook (CSB) to support Army's assertion that "all groundwater at the site [shallow and deep] discharges to the brook"; groundwater flow direction or interpretative flow lines from a groundwater flow model not specific to the site, do prove discharge to a brook; the brook could have a low-permeability bed or it could flow over peat or clay deposits, resulting in some or all groundwater flow beneath the brook; a vertical gradient determination used a nested

piezometer pair at the brook bank could help to evaluate possible underflow; because the AOC 57 site is within a Zone II for a public water supply wells, extra scrutiny is required.

Response: See the response to General Comment #2 regarding the supplemental sampling planned for AOC 57. Discussions concerning potential changes to the LTMMP will take place following assessment of the fall 2019 supplemental sampling data and the 2020 Five Year Review.

a. As discussed at the 25 July 2019 and 17 October 2019 BCT meetings, the proposed supplemental sampling to be conducted in fall 2019, including deep piezometers, will provide the initial indication if there may be reason to be concerned with site contaminant of concern (COCs) in the deeper groundwater. Following assessment of these supplemental data and the need for potential expansion of the LTM program to be included in the 2020 FYR, any resultant changes to the program will be incorporated into an updated LTMMP.

b. The proposed supplemental sampling to be conducted in fall 2019 includes existing downgradient piezometers at AOC 57 Area 3 to provide data concerning COC levels downgradient of existing LTM monitoring wells. For AOC 57 Area 2, the summary table (Table BCT-3, copy provided) of historical data provided at the 25 July 2019 BCT meeting identified sporadic detections and temporary exceedances of arsenic at wells within Area 2. The proposed supplemental sampling to be conducted in fall 2019 includes the resampling of existing shallow well 57M-03-05X to provide current data for assessment as part of the 2020 FYR. In addition, a new deep well to be installed during the PFAS RI program by well 57M-03-05X will also be sampled. The PFAS RI to be conducted in Area 1, including AOC 57, will install temporary push points adjacent to and within CSB; arsenic samples will be collected from these push point sites in addition to the PFAS samples to provide supplemental data concerning the distribution of arsenic in the area of CSB. The arsenic data provided by the fall 2019 supplemental sampling and the PFAS RI will be evaluated to determine whether expanded arsenic monitoring is warranted.

c. The proposed fall 2019 supplemental sampling will generate additional detail concerning the redox conditions within the groundwater at AOC 57.

d. Consistent with final revisions to the 2017 Annual Report, the text has been revised to state that the shallow groundwater at AOC 57 discharges to Cold Spring Brook. Data to be generated by the fall 2019 supplement sampling event will indicate if there is a need to be concerned with site COCs in downgradient areas in the shallow groundwater and in the deeper groundwater. The planned investigations in this area as part of the PFAS RI will also be investigating vertical gradients in groundwater flow. Assessment of these data will be included in the 2020 FYR and any changes agreed upon will be reflected in updates to the LTMMP.

Comment 2 – Page ES-1, last ¶ – In Army's April 26, 2019 response to EPA's Comment 1 (March 26, 2019) on the February 2019 version of the 2017 Annual Report, Army agreed to prepare and submit a revised Long-Term Monitoring and Maintenance Plan (LTMMP) to address EPA's concerns regarding the adequacy of several existing LTMMPs by June 28, 2019. As recently discussed (and confirmed in the 2018 Main Post Annual Report), Army has decided to forego preparation and

issuance of a revised 2019 LTMMP Update, despite the fact that Army continues to implement a LTM program (i.e. draft 2015 LTMMP Update) that was not approved or accepted by the EPA. Although Army presented its "proposal to address EPA's June 12, 2019 comments on further characterization and sampling required at LTM Sites AOC 57 and AOC 43G" at the June 25, 2019 BCT meeting, the one-page summary lacked the level of detail needed to adequately evaluate the proposal and determine if data of sufficient quantity and quality will be collected for consideration in the 2020 Devens FYR. EPA requests that Army submit a draft revised LTM/groundwater sampling plan for AOCs 57 and 43G to EPA and MassDEP, as quickly as possible, to allow sufficient time to review, comment and finalize the document prior to commencement of the fall 2019 sampling program.

Response: See the response to General Comment #2. A supplemental work plan was submitted on 28 September 2019 for EPA and MassDEP review. The work plan provides additional detail and more fully provide the rationale for the supplemental sampling. The supplemental data is planned be collected during fall 2019, and will provide information to be incorporated into the 2020 Five Year Review and the subsequent revision to the LTMMP. LTM sampling at AOC 57 is conducted in the spring; however, the proposed supplemental sampling will be conducted in fall 2019 to provide additional data prior to the 2020 Five Year Review. The regularly scheduled spring LTM event will still be conducted in spring 2020. For AOC 43G, LTM sampling occurs in the fall, and the supplemental sampling points will be added to the current LTM sampling point for the fall 2019 event.

Comment 3 – Page ES-2, AOC 43G, 1st bullet – The 2018 Report identifies four wells (all the wells sampled in AOC 43G) having an exceedance of at least one of the following – arsenic, iron, manganese and states that the exceedances "are likely attributable to "a reducing groundwater environment…." However, two of the four wells, XGM-93-02X and XGM-94-04X, have positive ORPs of 63.1 mV and 180 mV, respectively. Given the inconsistency between Army's alleged "reducing conditions" and actual, site-specific field data confirming "oxidizing conditions" in two of the four wells, Army should prepare a draft revised LTM/groundwater sampling plan for AOC 43G that expands the existing monitoring network to address concerns raised by EPA in the comment letters and emails referenced in General Comment (GC) 2 above.

Army has consistently refused to expand the monitoring program based on is supposition that the plume attenuates prior to migrating off-site. However, Army has not collected the site-specific data needed to confirm/deny contaminant concentrations along the plume boundaries and substantiate Army's assumptions. As stated on numerous occasions, and most recently at the June 25, 2019 Devens BCT meeting, the additional data is critical for evaluating ongoing remedy performance and effectiveness in the next, 2020 Devens FYR. Without these data, EPA may be obliged to defer he protectiveness determination for the AOC 43G remedy until sufficient data is available to adequately assess site conditions along plume boundaries and confirm that contamination is not migrating off-site. For reasons discussed above, Army should submit a draft revised LTM/groundwater sampling plan for AOC 43G to EPA and MassDEP, as soon as possible, to allow sufficient time to review, comment and finalize the document prior to commencement of the fall 2019 sampling program.

Response: The cited fall 2018 ORP measurements for wells XGM-93-02X and XGM-94-04X were only moderately oxidizing, and conditions in these wells have been observed to vary over time. Redox conditions were observed to be moderately reducing during the previous LTM event in fall 2017 (well XGM-93-02X had an ORP if -54.9 mV and a DO level of 0.26 mg/L and well XGM-94-04X had an ORP of -1.9 mV and a DO of 0.35 mg/L). As such, the tendency for metals

to mobilize into or precipitate out of groundwater varies accordingly. Over time, as carbon sources are depleted, redox will tend toward more oxidative conditions and thereby promote the reduction of dissolved phase metals concentrations in groundwater. At AOC 43G, an indicator of the remedy success will be whether concentrations overall are stable or decreasing over time, and not increasing to the point where COC concentrations are migrating offsite at levels above cleanup goals.

During the 25 July 2019 BCT, the Army presented historical data at downgradient wells that indicated that manganese concentrations, although greater than the site-specific cleanup goal of 375 ug/L, had remained stable during the LTM monitoring period through fall 2014. With the removal of the source area contaminant mass via excavation, manganese concentrations are not expected to increase and LTM sampling at these two wells was discontinued beginning for the fall 2015 LTM sampling. Downgradient monitoring well AAFES-7 has been continuously sampled through fall 2018, and manganese levels have deceased to less than the cleanup goal. The current dataset indicates that site contaminants are not migrating downgradient at levels greater than the cleanup goals. To provide additional support to this conclusion, a supplemental work plan was submitted for regulatory agency review on 28 September 2019. The work plan describes supplemental sampling that will add existing downgradient wells XGM-94-06X, XGM-94-07X and XGM-94-08X to the fall 2019 sampling event to provide a more complete, contemporaneous dataset for the downgradient area, with the objective to more fully support current Army understanding of the downgradient extent of site impacts. See also the response to General Comment #2.

Comment 4 – Page ES-3, AOC 43G, 1st bullet – Army noted an upward trend in C5-C8 Aliphatics in the 2016 and 2017 Annual Reports. In 2018, despite a non-detect result, the overall upward trend is still present for C5-C8 aliphatics. If results of the fall 2019/spring 2020 sampling program show rebounding VPH or concentrations that are not trending downward, Army must agree to expand the existing LTMMP or EPA will elevate the issue for resolution in accordance with the provisions set forth in the Devens FFA. In the interim, however, Army should be aware that without the requested data, EPA may be obliged to defer the protectiveness determination for the AOC 43G remedy until the additional data can be collected to confirm/deny Army's assumptions with site-specific field data.

Response: As noted in the Annual Report, VPH compounds are not COCs requiring remediation under the ROD but are instead being monitored to help evaluate the overall site conditions for attenuating the metal COC concentrations. Of the four wells sampled at AOC 43G, an upward trend was noted for C5-C8 aliphatics in just one well (XGM-94-04X), whereas a downward trend was noted for the other three wells sampled at the site (AAFES-2, XGM-93-02X, and XGM-97-12X). The Army will continue to monitor the trend of C_5-C_8 aliphatic concentrations in LTM wells. However, the supplemental sampling of existing downgradient monitoring wells planned for the fall 2019 sampling event will include manganese and iron only, with the objective to more fully support the current understanding of the downgradient extent of site impacts from ROD-specified COCs. The text has been clarified accordingly.

Comment 5 – Page ES-3, AOCs 32 and 43A, 1st bullet – Several VOC and VPH exceedances occurred in 32M-01-18XBR. Based on this well's location immediately west of the Zone II boundary, one or more wells within Zone II should be added to the list of wells to be monitored in Fall 2019 and in 2020. Although 32M-01-15XBR should be included, at a minimum, 32M-01-16XBR and 32Z-99-02X are also recommended.

Response: Based on the groundwater flow direction identified in 2018, wells 32M-01-15XBR and 32M-01-16XBR will be included in the fall 2019 LTM sampling program as a supplement to the currently planned LTM program. Results from the supplemental data will indicate if continued sampling in subsequent sampling events is warranted.

Comment 6 – Page ES-4, Grant, Oak, Maple Housing Areas and 37-mm Impact Area – Please include a statement regarding the status of the draft Oak and Maple Housing Areas LUCIP, NAUL and site-specific Soil Management Plan (SMP) and a tentative date(s) for issuance of the final versions of each.

Response: The following bullet has been added to page ES-4:

- *In March 2017, the Army submitted a Land Use Control Implemental Plan (LUCIP) for the Oak and Maple Housing Areas for regulatory agency approval. On 2 October 2018, EPA requested that the LUCIP be put on hold pending completion of a Massachusetts Notice of Activity and Use Limitation (NAUL) between MassDEP and MassDevelopment. Regulatory agency concurrence of the NAUL is pending.*

Comment 7 – Page 1, § 1.0 – Please delete "revised" and replace it with "draft" in the last sentence. The 2015 LTMMP Update was released without EPA concurrence and/or approval, it is misleading to refer to it as a "revised" (i.e. final) document. Alternatively, a sentence could be inserted at the end of the paragraph (or a footnote after "LTMMP Update") acknowledging that it was released and implemented without EPA concurrence and/or approval.

Response: "Revised" has been deleted. See also the response to General Comment #4.

Comment 8 – Page 1, § 1.1, 3rd ¶ – The second sentence of the paragraph refers to sampling in 2017; EPA assumes this is a typo and Army refers to sampling done in 2018. Also, please see GC 4 above.

Response: The reference to "2017" has been corrected to "2018", and "final" was deleted, as indicated in the response to General Comment #4.

Comment 9 – Page 1, § 1.1, 1st bullet – Army states that under the LTMMP, groundwater and surface water sampling is required every five years, and that 2017 sampling was inadvertent. This is unacceptable. Please see PSC 1 above.

Response: Although Table 3-1 of the 2015 LTMMP notes that sampling at AOC 57 is planned every five years, the Army has been collecting samples at this AOC annually. The text has been clarified accordingly. As noted in the responses to General Comment #2 and page-specific Comment #1, the Army is planning a supplemental sampling event at AOC 57 during fall 2019 in order to support the five-year review and future LTMMP updates.

Comment 10 – Page 2, § 1.1, 1st bullet – Army points out that the LTMMP calls for an evaluation of the feasibility of modifying the leachate collection and recovery system (LCRS). If Army prepares a technical memorandum on this matter for MassDEP, EPA requests that it also receive a copy for concurrent review. Obtaining EPA input early in the process will save time in the long run, as an

Explanation of Significant Differences (ESD) document will ultimately be required from EPA if the modifications are to go forward.

Response: The text describing modification of the LCRS to allow for on-site discharge has been deleted, as the Army does not plan to pursue such a change at this time.

Comment 11 – Page 3, § 1.3, last ¶ – This paragraph contains an apparent contradiction. The second sentence states that greater precipitation occurred in September. The fourth sentence states that dryness returned during September, increasing the area of drought. Please elaborate or correct any errors. If Devens was not part of the area returned to drought, is the NOAA information necessary?

Response: The text has been revised to note that the rainfall data for 2018 for the months of August and September were substantially greater than the long term averages for the Devens area.

Comment 12 – Page 8, § 2.0 – Refer to responses at GC 2 and PSCs 1 and 2 above.

Response: See the responses to General Comment #2 and Specific Comments #1 and #2. Data from the planned supplemental sampling event in fall 2019 will be reported in the 2019 Annual Report.

Comment 13 – Page 8, § 2.1, first ¶ – Please insert "for the Town of Ayer Grove Pond public water supply wells" after "Zone II aquifer protection area" at the end of the second sentence. Zone II is defined in footnote 1 at the bottom of the page as "the area of an aquifer which contributes water to a well under the most severe pumping and recharge conditions …". As such, groundwater contamination within a Zone II could be drawn toward a public water supply well. Because Area 3 contains groundwater with elevated metals (the public water MCL for arsenic is 10 micrograms per liter), and is located within Zone II, additional scrutiny and site-specific data are required to determine whether groundwater contamination at AOC 57 could threaten any of the Grove Pond wells. As stated above, new monitoring wells, with deeper screens, are needed in Areas 2 and 3 to assess the potential of contaminants to be transported to the Grove Pond wells.

Response: The report text in the first sentence of this comment has been revised as requested. See the response to Specific Comment #1 regarding the additional sampling proposed for AOC 57 Areas 2 and 3.

Comment 14 – Page 8, §2.1, 5th ¶ – Please clarify whether the "expanded LTM activities" included monitoring for soil and/or groundwater. Similarly, in the last sentence, please explain whether the discontinued sampling refers to soil or groundwater.

Response: The text has been revised to state the following:

"The 2004 ESD expanded LTM activities to include EPH C_{11}-C_{12} as a COC for Area 2 soils to monitor the presence of petroleum waste encountered during contaminated soil removal, and to include EPH C_{11}-C_{12} and PCBs as COCs for Area 2 groundwater in the September 2001 AOC 57 ROD. Based on evaluation of LTM data through 2014, groundwater sampling at Area 2 was discontinued in 2015 and groundwater monitoring was reduced to every five years at Area 3for dissolved-phase arsenic, iron, and manganese. No soil remediation activities

necessitating soil sampling have been conducted at AOC 57 since 2003; therefore, no soil sampling has been conducted since issuance of the 2004 ESD."

Comment 15 – <u>Page 9, § 2.2</u> – As stated above, because AOC 57 occurs within a Zone II, it is especially important that speculative interpretations and conclusions must be supported by site specific data. The last sentence of the section states that "shallow groundwater flows to the south-southeast and groundwater discharges to Cold Spring Brook." The Brook could be perched on low permeability peat or wetland muck deposits, and some or all the groundwater could continue to flow to the south-southeast, beneath the Brook. Site specific activities could be undertaken to confirm/deny the assertion that all groundwater from AOC 57 discharges to the Brook. Recommended activities include installation of a piezometer or monitoring well on the far side of the Brook and/or establishment of a nested piezometer pair on the north bank of the brook. Vertical gradients obtained from such a piezometer pair could indicate whether groundwater is likely to be discharging to the Brook. Additionally, additional monitoring wells must be installed to evaluate groundwater quality in deeper portions of the aquifer. Currently, only shallow screened monitoring wells exist at AOC 57.

Response: See the response to Specific Comment #1. Data from the planned supplemental sampling event in fall 2019 will be reported in the 2019 Annual Report. The last paragraph of Section 2.1 has been revised to indicate that a supplemental sampling event is planned for fall 2019.

Comment 16 – <u>Page 11, § 2.7.1, last ¶</u> – Please show the location of the irrigation well at 78 Barnum Road on a report figure. Depending on the location, depth, and type (overburden vs. bedrock) of the well, it may have the potential to alter groundwater flow at AOC 57. Additional information on the irrigation well should be collected (i.e. pumping volume and frequency) for inclusion in the 2019 Annual Report. For now, please include the well on a figure in the 2018 Annual Report.

Response: The location of the irrigation well at 78 Barnum Road has been added to Figure 2-1 and further described in the text. This well was installed on 16 January 2016 and is completed in the bedrock to a depth of 505 feet. It is permitted by DEP for non-potable use to support landscaping/irrigation activities. A pumping test conducted in February 2016 measured a sustained flow rate of 12.5 gallons per minute.

<u>Comment 17 – Page 11, § 2.8</u> – Please see GC 2 and PSCs 1 and 2 above.

Response: See the responses to General Comment #2 and Specific Comments #1 and #2. The following text has been added to the last paragraph of Section 2.8:

"The next monitoring event is planned for spring 2019. A supplemental sampling event is also planned for fall 2019 in order to support the upcoming 2020 five-year review by addressing potential data gaps in the understanding of groundwater flow and the extent of contamination at AOC 57. The results of the spring and fall 2019 sampling events will be presented in the 2019 Annual Report."

Comment 18 – <u>Page 12, § 2.8, first ¶, last sentence</u> – As stated above, there is not enough site-specific information to conclude that "AOC 57 does not pose … a risk to human health in the future." While impacts to the Grove Pond wells from AOC 50 might be considered unlikely, there is not enough information to rule it out. The delineation of the wells' Zone II to include AOC 57 must be taken to

mean that groundwater from AOC 57 has the potential to impact the wells unless site specific information is presented to show such impacts will not occur. EPA points out that neither AOC 57 nor Cold Spring Brook is at or near the edge of Zone II, suggesting that the Brook is not considered a hydrogeologic boundary. In addition to those previously discussed, several investigative approaches exist that might help resolve existing data gaps and collect the site-specific data needed to evaluate the AOC 57 remedy. These include:

- determining the elevations of the Grove Pond wells' intakes (screens) and the relationship of these elevations to the elevations of screens at AOC 57 where groundwater impacts are present;
- installing deeper monitoring wells at AOC 57, sampling them, and determining whether deep groundwater (at similar elevations to the Grove Pond well screens) is impacted;
- using the same new monitoring wells to determine whether deep groundwater flow direction is toward or away from the Grove Pond wells;
- using borings to determine whether a low-permeability layer is present in the subsurface that might isolate shallow, impacted groundwater at AOC 57 from deeper groundwater that might be tapped by the Grove Pond wells (assuming this is the case); and/or conducting a hydrogeologic study that indicates that the Zone II mapping is erroneous and petitioning MassDEP to re-delineate the Zone II.

Response: See the response to Specific Comments #1 and #17.

Comment 19 – <u>Page 12, § 2.8, 2nd and 3rd ¶s</u> – The second paragraph of the conclusions section for AOC 57 discusses elevated arsenic concentrations in Area 3 wells and the association of these concentrations with ORP values. This is a clear and helpful discussion, with a justified conclusion. The third paragraph, however, states that metals are expected to come out of solution when oxidizing conditions are reached, either with the passage of time or with groundwater flow into an oxidizing area. Army follows with the conclusion, based on the above prediction, that "therefore, there is no anticipated adverse impact to the public drinking water wells …" Because neither the time nor the location of the oxidizing conditions is not known, Army's conclusion is probabilistic at best. Possible options for evaluating Army's predictions are as follows: (1) Wells 57M-96-11X and 57M-95-03X should continue to be monitored and sampled over time to see if the predicted declines in metals concentrations, associated with predicted return to oxidizing conditions, actually occurs; (2) If feasible, existing piezometers 57P-98-04X and 57P-98-03X should be sampled to see if oxidizing conditions and lower metals concentrations are present at these locations; and (3) Install and sample a new monitoring well to the south of the two piezometers to see if predicted oxidizing conditions and low metals concentrations are present.

Response: As discussed during the 25 July 2019 BCT meeting, wells 57M-96-11X and 57M-95-03X are planned to be sampled and analyzed for arsenic and field parameters as part of a supplemental sampling event in fall 2019 as well as existing downgradient piezometers 57P-98-04X and 57P-98-03X. The results of this supplemental sampling will provide further information about the redox conditions in the monitored area and the results will be evaluated to determine whether additional monitoring points are warranted. The work plan for the supplemental sampling projected to was provided for EPA review on 28 September 2019. Potential updates to the LTMMP will be evaluated during the 2020 Five Year Review. See also the response to General Comment #2.

Comment 20 – <u>Page 12, § 2.8, last ¶</u> – The sixth sentence in the paragraph states, "the extent of the elevated arsenic in groundwater is defined." This is not clear, based on 2017 or 2018 data presented in the respective reports. Only two Area 3 wells were sampled, and both had elevated arsenic. It is unknown how much farther beyond these two wells the elevated arsenic might extend, based on the data presented. In order to define the extent of elevated arsenic, locations with non-detects or detections below the arsenic standard would be needed; if these data exist from previous reports the data should be presented or cited. Alternatively, additional wells are available for sampling to define the extent of elevated arsenic. EPA's June 2018 review of Army's draft 2017 Annual Report contained General Comment 2, which called for additional monitoring wells to monitor shallow groundwater on the far side of Cold Spring Brook and deep groundwater on both sides of Cold Spring Brook; these are still needed. Army's February 9, 2019 response to that comment stated that new wells are "not warranted given that site groundwater discharges to Cold Spring Brook." As discussed in PSC 1 above, groundwater flow direction alone is not sufficient to demonstrate discharge to Cold Spring Brook. Army should either present site-specific evidence that site groundwater discharges to Cold Spring Brook or present a plan to add existing wells to the monitoring list and/or install the needed new wells (which may be combined with wells installed for a PFAS investigation).

Response: The referenced sentence regarding the extent of arsenic in groundwater has been deleted pending the planned supplemental sampling to be conducted in fall 2019 to provide additional data to assess groundwater quality and flow patterns. See also the responses to Specific Comments #1 and #17.

Comment 21 – <u>Page 15, § 3.2, last ¶</u> –The third sentence in the last paragraph of the section states that groundwater discharges to Willow Brook in the southwestern portion of the site, but this is inconsistent with the potentiometric surface contours shown in Figure 3-2, which indicate a north-northwesterly groundwater flow direction throughout those portions of the site where there are data points. Figure 3-2 shows no monitoring wells at all in the southwestern part of the site; if Army is claiming a flow toward Willow Brook in this area based on other data, the data should be presented or referenced. As discussed relative to AOC 57, the fact that groundwater flow might be toward a brook does not justify the conclusion that all groundwater discharges to the Brook, as Army states in the same sentence. Additional monitoring wells or piezometers are needed to confirm or refute the claim that groundwater discharges to the Brook in the southwestern part of the site.

Response: The text has been revised to indicate that shallow groundwater in the southwestern portion of the parcel boundary flows toward Willow Brook, as indicated by the groundwater contours shown in Figure 3-2. Figures 3-3 and 3-4 indicate that levels of EPH and metals respectively, at well ZMW-99-24X are non-detect or below clean up goals. Well ZMW-99-24X is located downgradient of the former source area and within the shallow groundwater flow regime that flows toward Willow Brook. The text is intended to be descriptive of the geohydrologic environment and does not intend to describe the presence of chemical impacts at this AOC.

Comment 22 – <u>Page 16, § 3.4.1, 1st bullet</u> – Four wells with arsenic exceedances are listed here, but only two of these wells (69W-99-22X and 69W-99-23X) show reducing conditions, based on ORP and DO, using the criteria defined in Section 3.4.3. Similarly, for manganese, the same two wells had exceedances (above background) and showed reducing conditions, while the other three listed wells with manganese exceedances do not exhibit reducing conditions. These points should be discussed, either here or in Section 3.7, as also indicated in EPA's Specific Comments 1 and 11 on the 2017 Annual Report (February 2018 draft).

Response: The following text has been added to Section 3.7:

"Current literature (e.g., API Groundwater Arsenic Manual, API Publication 4761, February 2011) describing the relationships among inorganic analytes and petroleum hydrocarbon releases in groundwater clearly supports the linking of ORP, pH, and adsorptive characteristics of aquifer materials with concentrations of inorganic analytes such as arsenic and manganese. The projection that elevated metals will decrease over time, as described for AOC 69W, is a position supported by the literature as well as the data for a number of wells at this AOC, some of which have up to 18 years of monitoring. For specific areas/wells where elevated metals remain although aquifer conditions have progressed to a more aerobic 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. The presence of metal oxyhydroxides that can adsorb and bind metals such as arsenic and manganese is required to support the attenuation of metals. The specific mineral composition of the soils across the AOC varies, indicating that their adsorptive ability would be similarly variable. Therefore, the timeframes within which dissolved metals concentrations decrease will vary similarly at specific areas within individual AOC 69W. The LTM program, as designed, allows for continued monitoring to evaluate the progression of changes in the dissolved metals concentrations."

Comment 23 – <u>Page 19, § 3.7, 4th ¶ (just above table)</u> – The next-to-last sentence states, "Elevated dissolved metals … are believed to be attributable to reducing conditions ..." As mentioned in comments on the 2017 Annual Report, this warrants discussion and scrutiny in future annual reports, and is still the case. Also, the prediction in the last sentence is vague, should be specified in this report, and should be checked in future reports. What is meant by "significant distance"? Please explain the expectation that metals dissolution is not expected to extend a "significant distance" from the release point when comparison of Figures 3-3 and 3-4 indicate that in 2018, elevated concentrations of dissolved metals extend beyond elevated EPH detections. Army's conclusion may be true at many sites but may not be supported by site-specific data at AOC 69W. Site-specific, evidence-based conclusions are especially important because this site lies within a Zone II and groundwater flow in the AOC is toward the MacPherson Well.

Response: The following text has been added for clarification:

"As indicated in Figure 3-4, metals concentrations greater than the cleanup goals or monitoring criteria have not migrated to downgradient wells ZWM-95-18X, 69WP-08-01 and 69W-13-01."

Comment 24 – <u>Page 19, § 3.7, 4th ¶, (just above the table)</u> – The last sentence in the paragraph was added to the 2017 Annual Report (April 2019 version) in response to an EPA comment. However, the sentence is not currently true, because well 69W-94-13 is incorrectly presented as an example for decreasing dissolved metals. However, Section 3.4.2 states that this well shows no statistically significant trends for arsenic or manganese. More cautious, site-specific, and less-optimistic conclusions are appropriate for AOC 69W, especially because it is located within a Zone II.

Response: The text has been revised to indicate that although decreases in concentration were noted for several years prior to 2018, increases were detected in 2018. However, no statistically significant trends for arsenic and manganese were identified by the dataset.

Comment 25 – Page 22, § 4.4.2, 1st and 2nd ¶s – Increasing C9-C10 levels for XGM-94-04X were discussed in 2016, and the increases continued in 2017, but were non-detect in 2018. The same well is experiencing a statistically significant upward trend in C5-C8 aliphatics. Please continue to track this well; if a rebound in C9-C10 levels occurs, please discuss whether a risk-based standard needs to be developed. EPA appreciates that Army indicated this intention in the last sentence of the third-from-last paragraph on page 24.

Response: Comment noted. The Army will continue to monitor VPH concentrations at AOC 43G and will evaluate whether risk-based standards need to be developed if an upward concentrations trend continues.

Comment 26 – Page 26, § 5.4.2, first ¶ – The discussion of groundwater flow direction should acknowledge that the eastern edge of the AOC 32 and 43A overlaps the western edge of the Zone II for the Grove Pond wells and that the mapped groundwater flow direction in both overburden and bedrock is toward Zone II.

Response: The text in Section 5.2 has been revised as requested.

Comment 27 – Page 28, § 5.4.2, first ¶ – EPA appreciates that Army will continue to monitor DCB concentrations. Should concentrations continue to increase, it may be necessary to reconsider additional persulfate injections. Also, VPH concentration trends should continue to be watched closely.

Response: Comment noted. Continued monitoring of VPH was added to the third paragraph on this page.

Comment 28 – Page 28, § 5.4.2, last ¶ and Page 30, § 5.7, first ¶ – Army notes elevated manganese concentrations in 32M-01-18XBR, along with evidence that the well has reverted to an oxidizing environment. 2017 measurements show an ORP value of 134.4 and a DO of 5.42 mg/L, and 2018 measurements show an ORP of 129.4 and a DO of 1.36 mg/L, above the generally accepted levels of 50 and 1, respectively, for reducing conditions to be expected. This is acknowledged in the next-to-last sentence of Section 5.4.3 in the 2017 Annual Report and is described as "anomalous" in the 2018 Annual Report. If elevated metal concentrations, combined with an oxidizing environment, are observed again in 2019, it will be inappropriate to call these results "anomalous" again; further explanation or investigation will be needed.

Response: The last sentence of this sentence was revised to read as follows:

"These concentration trends will continue to be monitored in future LTM events, and any potential continued increasing trend for manganese detected in this well in 2019 will be evaluated, and discussed in the 2019 Annual Report."

Comment 29 – Page 32, § 6.3, 2nd ¶ and Figure 6-4 – EPA agrees with this paragraph but notes that both the April and October 2018 water elevations for overburden well LFM-99-6A-RP, when

projected into the cross sections shown in Figure 6-4, occur above the bedrock water levels (blue line) 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 the saturated overburden is in contact with the base of the landfill. However, Army has pointed out that overburden in some portions of the site is unsaturated, making replacement of the current bedrock trigger wells by overburden wells infeasible. EPA suggests that overburden well LFM-99-6A-RP be added as a trigger well, while also retaining the existing bedrock wells as trigger wells.

Response: Text has been revised to indicate that LFM-99-6A-RP has been added to the list of trigger wells.

Comment 30 – Page 32, § 6.4, 2nd ¶ – In the first sentence, "overburden" should be "bedrock". As described in PSC 29 above, EPA recommends adding LFM-99-6A-RP as a trigger well.

Response: Text has been corrected as indicated. Well LFM-99-6A-RP also has been added as a trigger well.

Comment 31 – Page 34, § 6.7, 2nd and 3rd bullets – The second bullet indicates that potential repairs to the shed door "are being considered for 2018." The 2017 Annual Report said that the repairs will be evaluated for 2018. It is now 2019; when will these actions take place? Please document in the final 2018 report or in next year's report that these matters have been taken care of. What is stored in the shed? Similarly, please document the repair of the gate in the 2019 Annual Report.

Response: It should be noted that the metal shed is not adversely impacting the remedial action and is being addressed as a housekeeping issue. The contents of the shed are described in Appendix F of the Annual Report. The Army removed the shed in October 2019. This will be documented in the 2019 Annual Report.

The text has been revised to indicate that the entrance gate along Patton Road was repaired in July 2019.

Comment 32 – Figure 1-1 – Please show the Zone IIs on this figure.

Response: The figure has been revised accordingly.

Comment 33 - Figure 2-1 – It would be helpful to add arrows to the Brook, showing the direction of flow.

Response: The figure has been revised accordingly.

Comment 34 – Figure 2-2 – It would be helpful to explain the containment dam, shown in the figure, in the text.

Response: Section 2.1 has been revised to indicate that the containment dam was installed prior to the soil removal action at AOC 57 Area 2 in response to a release of No. 4 fuel oil from an overfilled UST at Building 3714 in February 1977. The oil entered a nearby storm drain which

discharges to Cold Spring Brook. The containment dam and absorbent booms were set up across the brook to recover the oil release (SI Data Package, ABB-ES, January 1993).

Comment 35 – Figure 3-1 – Please add a note to this figure stating that AOC 69W is within Zone II.

Response: The notes on Figure 3-1 already state that AOC 69W is located within the MassDEP Zone II Wellhead Protection Area for the MacPherson well.

Comment 36 – Figure 3-2 – The groundwater potentiometric surface contours and flow arrows in this figure are not consistent with the text in Section 3.2, regarding flow in the southwestern part of the site. Please correct either the text or the figure. Also, the text regarding Zone II, beneath the Legend needs formatting.

Response: A second flow line has been added to Figure 3-2 in the southwestern part of the site to indicate shallow groundwater in this area flows to Willow Brook. The Zone II text below the legend also has been reformatted.

U.S. ARMY RESPONSES TO MASSACHUSTTES DEPARTMENT OF ENVIRONMENTAL PROTECTION (MASSDEP) COMMENTS ON THE DRAFT 2018 ANNUAL OPERATIONS, MAINTENANCE, AND MONITORING REPORT, MAIN POST FORMER FORT DEVENS ARMY INSTALLATION, DEVENS, MASSACHUSETTS 30 October 2019

The following U.S. Army responses pertain to the Massachusetts Department of Environmental Protection (MassDEP) comments, dated 14 June 2019, on the Draft *2018 Annual Operations, Maintenance, and Monitoring Report, Main Post, Former Fort Devens Army Installation*, dated April 2019.

Comment 1 – Section 3.4.2, Second Paragraph: The statement indicating that the sample collected from monitoring well ZWM-01-25X was not analyzed for arsenic appears to be incorrect; sample results provided in Appendix B indicate that the sample was analyzed for arsenic in accordance with the LTMMP.

> **Response:** The text has been corrected to indicate that arsenic was analyzed and was detected at a concentration of 2.0 J ug/L.

Comment 2 – Section 5.2, First Paragraph: Please confirm/correct/clarify text indicating that shallow groundwater flow in April 2017 was southeastward toward Willow Brook; Willow Brook is located west of AOC 32/43A.

> **Response:** The text has been corrected to indicate that the southeastern flow is toward Cold Spring Brook.

Comment 3 – Section 6.11.1: If not done previously, please submit the results from the soil tests conducted at SA 13.

> **Response:** It is the Army's understanding that the soil tests performed by MassDevelopment were for physical properties only (no chemical analyses) with regards to suitability for construction, and as such are not pertinent to the LTM report. The text has been clarified.

Comment 4 – Section 7.1, Next to Last Paragraph: The source document for the Oak and Maple LUCs should be cited here and listed in Section 8.0.

> **Response:** The following document, *Final Land Use Control Implementation Plan Addendum, Former Oak and Maple Housing Areas, Former Fort Devens Army Installation, Devens, MA* (USACE, March 2017), has been cited in Section 7.1 and added to Section 8.

Comment 5 – Section 8.0 should include a listing for reference USACE, 2017 (cited in Section 7.1).

> **Response:** The following document, *Final Land Use Control Implementation Plan Addendum, Former Oak and Maple Housing Areas, Former Fort Devens Army*

Installation, Devens, MA (USACE, March 2017), has been added to Section 8.0 to support the reference cited in Section 7.1.

Comment 6 – Figure 2-1 should identify the location of the recently installed irrigation well (refer to Section 2.7.1).

Response: The location of the irrigation well has been added to Figure 2-1.

Comment 7 – Figure 2-4: The 221.5-foot contour should extend to the east between the 221.0-foot and 222.0-foot contour.

Response: The 221.5-foot contour has been extended to the east.

Comment 8 – Figure 6-3: Elevations posted at wells LFM-03-07 and LFM-99-06A-RP are inconsistent with values listed in Table 1-2. Please confirm/correct as necessary.

Response: The elevations shown in Figure 6-3 and those listed in Table 1-2 have been adjusted to values referenced to the North American Vertical Datum of 1988 (NAVD88).

Comment 9 – Table 1-1: The TOR Elevation listed for well 57M-96-11X is inconsistent with the Top of Casing Elevation listed in Table 1-5. Please confirm/correct as necessary

Response: The elevations listed in Tables 1-1 and 1-5 have been adjusted to values referenced to NAVD88.

Comment 10 – Tables 1-1 and 1-2: TOR Elevations listed for DCL wells LFM-03-07 and LFM-99-06A-RP are inconsistent with the Top of Casing Elevations listed in Table 1-5. Please confirm/correct as necessary.

Response: The TOR/TOC elevations listed in Tables 1-1, 1-2, and 1-5 have been adjusted to values referenced to NAVD88.

Comment 11 – Tables 1-1 and 1-2: Many of TOR Elevations listed for the AOC 32/43A wells differ slightly (< 1 foot) from the Top of Casing Elevations listed in Table 1-5. Please confirm/correct as necessary.

Response: The TOR/TOC elevations listed in Tables 1-1, 1-2, and 1-5 have been adjusted to values referenced to NAVD88.

Comment 12 – Table 2-2 should include the field parameters measured with surface water sample 57M-SW-1, and a copy of the associated surface water sampling log should be included in Appendix A.

Response: A sampling log with field parameters for surface water sample location 57M-SW-1 was mistakenly not collected during the spring 2018 LTM event. This information will be collected during the next (spring 2019) LTM event.

Comment 13 – Table 3-1 should include results for arsenic, iron, and manganese in sample ZWM-01-25X (provided in Appendix B), and results should be posted on Figure 3-4.

> **Response:** Sample results for arsenic, iron, and manganese for sample ZWM-01-25X have been added to Table 3-1 and Figure 3-4.

Comment 14 – Table 4-1 should include results for arsenic and manganese in sample AAFES-7 (provided in Appendix B), and results should be posted on Figure 4-4.

> **Response:** The arsenic (3.0 U ug/L) and manganese (16 ug/L) results have been added to Table 4-1 and Figure 4-4.

U.S. ARMY RESPONSES TO U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA) COMMENTS ON THE DRAFT 2018 ANNUAL OPERATIONS, MAINTENANCE, AND MONITORING REPORT, MAIN POST FORMER FORT DEVENS ARMY INSTALLATION, DEVENS, MASSACHUSETTS March 2020

The following U.S. Army responses pertain to the U.S. Environmental Protection Agency (EPA) follow-on comments, dated 15 January 2020, on the Draft *2018 Annual Operations, Maintenance, and Monitoring Report, Main Post, Former Fort Devens Army Installation*, dated April 2019.

General Comment 2 – Army's RTC refers to the Army's Supplemental Sampling Plan Addendum (Addendum), submitted on 9/28/19; EPA has already commented on the Addendum. Army submitted additional proposed sample locations via email on 11/19/19 and EPA provided comments via email on 12/23/19. Specifically, EPA noted that while the additional work was a welcomed step, there were several, previously-raised concerns that would not be addressed by Army's proposed supplemental sampling program (i.e. groundwater sampling on far side of brook, confirmation of reducing zone boundary, arsenic concentrations on downgradient (far) side of reducing zone boundary (i.e. in area of high ORP), etc.). In the interest of allowing the proposed field effort to proceed, however, EPA agreed to await results from the supplemental sampling program to discuss recommended next steps.

> **Response:** Comment noted. The Army is collecting additional samples at AOC 57 that will provide supplemental information regarding the configuration of the reducing zone attributable to the initial release of hydrocarbon compounds as well as arsenic concentrations at sampling points downgradient of the current long-term monitoring (LTM) well network. Results of this supplemental sampling will be assessed and the need for and types of additional characterization activities will be evaluated. In addition, the planned piezometer transects in the wetlands downgradient of AOC 57 and into Cold Spring Brook associated with the PFAS Remedial Investigation will also be sampled for arsenic to provide additional characterization data for the distribution of arsenic and the extent of the reducing zone.

General Comment 4 – Army's RTC indicates their disagreement with EPA's comment regarding the status of the Draft LTMMP (2015) and the document's proper name. Since resolution of this matter is unlikely at this point in time, EPA will agree to disagree with Army's position and move forward.

> **Response:** Comment noted. At this time, the Army has deleted the use of the term Final in reference to the plan and is referring to the document as the "LTMMP (2015)".

Page-Specific Comment 1, 2nd bullet – If contamination is found in the new deep piezometers, a third deep piezometer will need to be installed at Area 2, Area 3, or both in order to establish deep groundwater flow direction.

> **Response:** Comment noted. As noted above in the response to General Comment 2, the supplemental characterization data generated by the proposed sampling will be assessed to determine the types of potential additional sampling that may be needed to address the concerns of EPA.

Page-Specific Comment 1, 4th bullet – In reviewing Army's RTCs EPA found a typo/word omission in its original comment. Specifically, EPA's Page-Specific Comment 1, should have said that groundwater flow from a groundwater model … do ***not*** prove discharge to a brook;". EPA regrets the error and believes that this question regarding the conceptual site model warrants continued attention in upcoming monitoring efforts and reports.

Response: Comment noted. The additional data to be generated will be assessed with respect to the current conceptual site model.

Page-Specific Comment 3 – Predictions regarding metals concentrations and redox concentrations must be confirmed with actual field data (i.e. sample data must confirm redox boundary).

Response: Comment noted. The ongoing supplemental sampling event is designed to provide the data required to address this technical point.

Other Page-Specific Comments – EPA appreciates resolution of many of the remaining page-specific comments. Concerns regarding groundwater flow (deep and shallow) in AOC 57; whether groundwater (shallow and/or deep) discharges to Cold Spring Brook; and the association between dissolved metals and redox conditions at some locations are still not fully resolved between Army and EPA, despite Army's preparation and issuance of the additional sampling proposed in Army's December 16, 2019 "Amended Supplemental Sampling to Support the 2020 Five-Year Review". Unless successfully resolved beforehand, EPA will request that these unresolved issues be included in the "Issues" section of the 2020 FYR Report with specific recommendations that will include the additional work necessary to resolve previously-identified, unresolved issues.

Response: Comment noted. The supplemental sampling is designed to provide the data required to address the noted technical points. If successful resolution of all points is not achieved by the assessment of these data, inclusion of remaining issues in the "Issues" section of the 2020 Five Year Review report may be warranted.

U.S. ARMY RESPONSES TO U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA) COMMENTS ON THE DRAFT FINAL 2018 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 27 April 2020, on the Draft Final *2018 Annual Operations, Maintenance, and Monitoring Report, Main Post, Former Fort Devens Army Installation*, dated March 2020.

GENERAL COMMENTS

Comment 1 – EPA has reviewed the above-referenced document, focusing on Appendix H, which contains Army's responses to comments by EPA and MassDEP on earlier versions of the Operations, Maintenance, and Monitoring **(**OM&M) Report. While issues remain regarding technical questions and the speed and specificity with which Army proposes to address the issues, EPA appreciates that Army is taking the opportunity to coordinate efforts to address the AOCs, especially AOC 57, as described in the OM&M Report comment responses; as is underway in the current PFAS investigation; and as described in versions of the Supplemental Sampling Work Plan (SSP) to support the 2020 Devens Five-Year Review (FYR) Report. There is considerable overlap of comments in both (OM&M Report and SSP) strings of comments, responses and follow-on comments. EPA, once again, requests that SSP tables include all monitoring points and sampling parameters promised in response to comments on all these documents, in conjunction with the PFAS investigation.

Response: The Army completed the requested work to address EPA's comments for the LTM program at AOCs 57 and 43G in 2019 and 2020. Wells were installed and sampled at the same time to support the PFAS RI. The LTM sampling results and information regarding groundwater flow in both the shallow and deep aquifer have been incorporated into the 2019 Annual Report and the Five-Year Review for EPA's review. For these reasons, the Army proposes finalizing the 2018 OM&M Report.

Comment 2 - As mentioned above, EPA's comments focus on Appendix H of the above-referenced document, which includes the following:

1. Army's October 30, 2019 responses to EPA's August 5, 2019 comments on the April 2019 Draft OM&M Report;
2. Army's October 30, 2019 responses to MassDEP's June 14, 2019 comments on the April 2019 Draft OM&M Report; and
3. Army's March 2020 responses to EPA's January 15, 2020 follow-on notes on Army's October 30, 2019 RTCs (item 1, above).

The comments below focus specifically on item 3 above and do not re-visit, in detail, remaining technical issues raised in EPA's October 30, 2019 comments (item 1) or in recent comments on the SSP. It is important that these remaining issues continue to be addressed in upcoming documents, plans, and field activities, including the 2019 and 2020 Annual OM&M Reports, upcoming 2020 FYR, upcoming revision of the LTMMP, and related PFAS investigations.

Response: The specific items listed in this comment address text associated with the 2019 Annual Report. With regard to the 2018 Annual Report, currently in Draft Final version, the Army feels that this report is a complete, stand-alone reporting of site data collected in calendar year 2018 and can be finalized as-is. As noted in the EPA comment, reports and work plans generated in years subsequent to 2018 are being prepared and revised to address items identified by EPA. In addition, follow-on discussion and responses are being developed via stakeholder conversation at BCT and RAB meetings, and in response to comments specific to those documents.

The Army will continue to work with EPA to address their comments on the status of the AOC monitoring programs as part of the 2019 AR, 2020 FYR, and planned 2020 LTMMP update. Accordingly, the Army proposes finalizing the 2018 OM&M report as-is.

PAGE-SPECIFIC COMMENTS

Comment 1 – Army's Response to GC 2 – While EPA accepts Army's response, because the points raised in the original (August 5, 2019) GC 2 and related Page-Specific Comments (PSC) 4, 6, 14, 15, and 16 are critical to ongoing discussions, EPA requests that they be tabled for later discussion/resolution.

Response: The Army agrees to table the referenced EPA comments for later discussion/ resolution and proposes to finalize the 2018 Annual Report. Please note that the winter 2020 supplemental sampling events at AOC 43G and AOC 57 (intended to address EPA items presented in GC 2 as well as in a number of page-specific comments in the 2018 Annual Report) are documented in Appendix G of the draft 2019 Annual OM&M Report, which was submitted for EPA review on 29 May 2020.

Comment 2 – Army's Response to GC 4 – Once again, EPA never approved or concurred with the "final" 2015 LTMMP. It is critically important, therefore, that EPA and Army work closely together to develop an updated LTMMP in 2020 that is acceptable and addresses the outstanding technical issues discussed in comments on the recent Main Post Annual OM&M Reports and recent SSP versions.

Response: The Army acknowledges that EPA has not concurred with the final 2015 LTMMP. The Army will work with EPA to develop an acceptable updated LTMMP in 2020.

Comment 3 – Army's Response to PSC 1, 2nd Bullet – As previously stated in the January 15, 2020 discussion of the 2nd bullet (of original PSC 1), if contamination is found in any of the new deep piezometers installed at AOC 57 Areas 2 and 3, a third piezometer will be needed at either Area 2 or Area 3 or both, to establish deep groundwater flow direction. This is critical to help

determine if flow is directly toward Cold Spring Brook (CSB), improve the Conceptual Site Model, and help determine if groundwater from AOC 57 could flow toward the Town of Ayer Grove Pond wellfield and/or private wells on the downgradient side of CSB. Army's response discusses additional sampling in a general way but does not acknowledge the need to establish flow direction if deep groundwater is impacted.

Response: Recently-completed field investigations at AOC 57 and beneath Cold Spring Brook have provided additional data on groundwater flow direction and contaminant distribution. The winter 2020 supplemental sampling is described in Appendix G of the draft 2019 Annual OM&M Report that was submitted for EPA review on 29 May 2020. Appendix G includes groundwater contour figures for both shallow and deep groundwater, discussion of vertical gradients, and an evaluation of metals results (dissolved arsenic, iron, and manganese).

Comment 4 – Army's Response to PSC 1, 4th Bullet – While EPA accepts Army's response, additional work is needed to resolve issues related to the discharge of shallow and deep groundwater to CSB, groundwater flow beneath the brook, or both, is important for the Conceptual Site Model and for assessing the threat, if any, to the Town of Ayer Grove Pond wellfield and/or downgradient private wells. EPA's original PSC 1 (4th bullet) and 18 suggest ways this could be done. Future reports and plans should describe the types of data analysis to be undertaken in addition to describing future sampling, new monitoring and piezometer locations, etc.

Response: The Army agrees that future work plans will describe both the field investigation activities and the types of data analysis to be undertaken. Please note that Appendix G of the draft 2019 Annual OM&M Report submitted to EPA on 29 May 2020 describes the results of the supplemental sampling at AOCs 57 and 43G. The appendix includes groundwater contour figures for both shallow and deep groundwater at AOC 57 and a discussion of vertical gradients. The Area 1 Preliminary Site Characterization Summary (PSCS) for PFAS that was submitted to EPA on 3 June 2020 also includes discussion of shallow and deep groundwater flow at AOC 57. The spring 2020 Cold Spring Brook vertical profiling results will be presented in an upcoming addendum to the Area 1 PSCS.

Comment 5 – Army's Response to Other PSCs – EPA acknowledges Army's response and hopes that as many of the technical issues as feasible can be resolved in upcoming reports, so that as few remaining issues as possible will have to be included as remaining "issues" in the 2020 FYR.

Response: Comment noted. The winter 2020 Supplemental Sampling at AOC 43G and AOC 57 was designed to provide the data required to address the noted technical points. The results were provided for EPA review on 29 May 2020 in Appendix G of the draft 2019 Annual OM&M Report. Please note that the spring 2020 Cold Spring Brook vertical profiling results will be presented in an upcoming addendum to the Area 1 PSCS. These submittals are expected to resolve many of the technical points currently under discussion. Any remaining issues will be identified in revisions to the 2020 FYR. As these issues do not affect finalization of the 2018 OM&M report, Army proposes that the report be finalized as-is.