Lockheed Martin Corporation 6801 Rockledge Drive MP CCT 246 Bethesda, MD 20817 Telephone (301) 548-2223



March 23, 2018

## VIA OVERNIGHT CARRIER

Saaya Jessica Okazaki WSA/Compliance Program Maryland Department of the Environment Water Management Administration 1800 Washington Boulevard, Suite 420 Baltimore, MD. 21230

Re: Transmittal of the MDE NPDES Permit Closure and Compliance Report

Lockheed Martin Corporation Middle River Complex

Cow Pen Creek and Dark Head Cove Sediment Remediation Project

State Permit No. 17-DP-3843, MD0071935,

Middle River, Maryland

Dear Ms. Okazaki:

The letter constitutes the final National Pollutant Discharge Elimination System (NPDES) report of authorized surface water discharges for the Cow Pen Creek and Dark Head Cove Sediment Remediation Project adjacent to Lockheed Martin Corporation's (Lockheed Martin) Middle River Complex (MRC) in Middle River, Maryland, (State Permit No. 17-DP-3843-MD0071935), and a request for closure of the permit.

## **Summary of the Remediation Effort and Water Discharges**

Work authorized by the Maryland Department of the Environment (MDE) and United States Army Corps of Engineers (USACE) under the Cow Pen Creek and Dark Head Cove Sediment Remediation Project started on October 26, 2016, and all work was completed on December 27, 2017. Remediation included dredging 3.2 acres of contaminated sediment in Dark Head Cove, and dredging and excavating 7.1 acres of contaminated sediment in Cow Pen Creek. In addition, a layer of activated carbon was placed over 13.7 acres of substrate in Dark Head Cove as *in situ* treatment, a sand Residual Management Layer (RML) was placed over all dredged areas, a streambed gravel mix was placed within the excavated creek bed, and backfill was placed over other excavated portions of Cow Pen Creek. Other activities authorized and completed included the repair of approximately 1,400 linear feet of existing bulkhead along Dark Head Cove.

A silt curtain, installed before work began, was used to prevent suspended materials from traveling to downstream areas; the curtain was removed on December 8, 2017, within 30 days

following completion of the *in situ* treatment on December 6, 2017. Most project work was completed over two seasons and within the in-water work period between October 15 and February 15. However, during Season 1, some dredging in Dark Head Cove and Cow Pen Creek extended beyond the end date of February 15, 2017, to March 3, 2017; this extension of work was approved by the Maryland Department of the Environment (MDE) and the United States Army Corps of Engineers (USACE) on February 16, 2017. In addition, a portion of the Cow Pen Creek sediment excavation was conducted during the subaquatic vegetation (SAV) work closure period between June 15, 2017, and October 15, 2017. Work in Cow Pen Creek during this time was authorized under an in-water work period waiver approved by the USACE and MDE as part of their respective permit approval processes.

## Season 1 Remediation Work October 15, 2016 – March 3, 2017

During Season 1, approximately 3.2 acres of contaminated sediment was dredged from Dark Head Cove. This activity began on October 26, 2016, and ended on March 3, 2017, (an extension waiver was received from MDE and the USACE on February 16, 2017, to work beyond the February 15, 2017, in-water work window). A silt curtain was installed at the mouth of Dark Head Cove before starting all in-water work, and was removed on March 9, 2017. Note that during Season 1 all contact water was successfully contained within the dewatering pad and was ultimately disposed of through the sanitary sewer under Baltimore County Wastewater Discharge Permit (WWDP) No. 1667. No contact or process water from the dewatering pad was discharged to any surface waters of the United States during Season 1.

Other activities completed during this period included installation of new sheet piling along 1,400 feet of existing bulkhead in Dark Head Cove. Temporary cofferdams were installed around the outfalls in this area to allow for proper installation and welding of the outfall pipes through the repaired bulkhead. The cofferdams have been removed, and normal water levels have been restored to this area. Temporary dewatering of the cofferdam areas during Season 1 was permitted under the USACE Nationwide Permit 38 No. 2015-61958-M02 and MDE Tidal Wetlands Permit No. 15-WL-1119 and therefore did not require an NPDES surface water discharge permit.

## Season 2 Remediation Work June 2017 – December 27, 2017

Following a June 2017 mobilization, Season 2 excavation of contaminated sediment in Cow Pen Creek started in July per the in-water work waiver approved by MDE. The excavation process within the creek channel included placement of both an upstream and downstream dam to isolate and temporarily dewater individual sections of the creek during excavation, and required a NPDES permit to effectively manage the volume of water entering an open excavation. Excavated sediment was dewatered at an onshore dewatering pad. Water within each excavation "cell," as well as water collected at the dewatering pad, was pumped to an onshore portable treatment system and then discharged downstream below the lower dam back into Cow Pen Creek. Discharges to Cow Pen Creek through the treatment system from both the dewatered cells and from water collected in the dewatering pad were authorized by MDE under NPDES Industrial Discharge Permit No. 17-DP-3843 - MD0071935.

The outfall for the surface water discharge, referred to as Outfall 001, was periodically relocated along the stream channel as the excavation work progressed downstream. The surface water

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discharge permit established discharge limits for total suspended solids (TSS), cadmium, copper, lead, and pH. The limit for TSS was established at a daily maximum of 20 milligrams per liter (mg/L), and at 15 mg/L as a monthly daily average. The limit for pH was set as a daily maximum range between 6.0 and 9.0, while the monthly average range was 6.5 to 8.5. The daily maximum for cadmium was 5.0 micrograms per liter ( $\mu$ g/L), with a monthly average of 0.45  $\mu$ g/L. The daily maximum for copper was 31.6  $\mu$ g/L, while the monthly average was 18.9  $\mu$ g/L. The daily maximum for lead was set at 246  $\mu$ g/L, with a monthly average of 6.4  $\mu$ g/L. The above limits were approved in a July 6, 2017, correspondence from MDE, and are based on site-specific hardness data collected in Cow Pen Creek.

Surface water overtopped a downstream dam during a large and unanticipated storm that occurred during Season 2 on July 28 and 29, 2017, resulting in an unintended discharge of surface water. However, per correspondence dated August 1, 2017, from Ms. Marjorie Mewbourne of MDE Wastewater Division, this discharge was beyond the control of the construction team and was remedied as quickly as possible, and therefore did not constitute a violation of the NPDES permit. Furthermore, a silt curtain had been placed near the mouth of Cow Pen Creek before starting work to minimize migration of suspended material to downstream areas in the event of a dam failure. Once *in situ* treatment started on October 21, 2017, the silt curtain was removed from Cow Pen Creek and moved to the mouth of Dark Head Cove.

Other minor deviations from normal operations and discharges occurred when piping occurred beneath the bladder dam beginning on November 10, 2017, and continuing until the dam was repaired and typical treatment system discharges were restarted on November 24, 2017. While the treatment system operated normally during this two-week period, treatment was slowed or stopped periodically to process highly turbid water behind the dam and until dam repairs could be made. Also, some water appeared to move between the up- and downstream sides of the dam during this period; however, the volume of water movement is unknown.

# Compliance with the Authorized Limits for TSS, pH, Cadmium, Copper, and Lead Under NPDES State Permit No. DP-17-3843

Outside of the period when excessive rainfall caused flooding of the excavation area, discharges to surface waters from Outfall 001 were within permitted limits for all parameters. Results from required sampling of the effluent from Outfall 001 were recorded as part of standard quarterly reports in the NetDMR electronic reporting system during system operation between July and December 2017 (Quarters 3 and 4 in 2017). Note that a "no discharge" report was submitted for Quarter 2, 2017, (since the permit was issued June 1, 2017, and operation did not start until July 2017).

## TSS Exceedance During the July/August Storm Events

As noted in the attached TSS exceedance report previously submitted to MDE (Attachment A), exceedances of TSS were noted during the period of heavy storms in late July to early-mid- August 2017. While MDE indicated that these exceedances were beyond the design capability of the treatment system and were therefore not considered a violation of the authorized permit limit for TSS, Lockheed Martin conducted additional TSS sampling beyond that required for the MDE discharge permit after the dam was breached. Additional sampling included initial sampling for TSS over a three-day period beginning on August 23, 2017, to evaluate the degree

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of TSS resulting from the dam breach, and subsequent weekly sampling for TSS for the life of the project. Note that this additional TSS sampling was beyond the requirement established by the discharge permit and was completed voluntarily by Lockheed Martin.

Results of the three consecutive sampling events, in the attached TestAmerica lab reports (Attachment B), indicate that while the TSS concentration (5.9 mg/L) on August 23, 2017, was within the permitted TSS level, subsequent TSS concentrations exceeded the permitted level on both August 24, 2017, (23 mg/L) and August 25, 2017 (41 mg/L). The system was shut down and completely rehabilitated to restore its function. This rehabilitation included a complete change-out of the carbon vessels and the sand media filtration units, as well as reducing the filtration size of the lead bag-filter from 25 to 20 microns. Once the system was restarted, weekly TSS sampling results, which resumed on September 4, 2017, indicated that TSS levels had returned to its typical levels (below the permitted discharge concentration) for the remainder of the project. Results of the weekly TSS results are provided in the table below, and in the attached TestAmerica lab reports (Attachment B).

Additional Weekly TSS Sampling Results – 9/04/17 – 12/19/17 (Project End) Cow Pen Creek and Dark Head Cove Remediation Project State Discharge Permit No. 17-DP-3843							
Date	Value	Units					
9/4/2017	ND	mg/L					
9/5/2017	1.7	mg/L					
9/6/2017	ND	mg/L					
9/18/2017	8.2	mg/L					
9/20/2017	1.9	mg/L					
9/26/2017	6.6	mg/L					
10/2/2017	11.0	mg/L					
10/12/2017	1.5	mg/L					
10/18/2017	2.4	mg/L					
10/24/2017	2.7	mg/L					
10/31/2017	ND	mg/L					
11/8/2017	2.6	mg/L					
11/14/2017	ND	mg/L					
11/28/2017	4.6	mg/L					
11/30/2017	5.0	mg/L					
12/5/2017	1.6	mg/L					
12/19/2017	1.3	mg/L					

ND – Not Detected at a reporting limit of 1 mg/L

No TSS concentration exceedances were observed at the treatment system outfall during the temporary failure of the bladder dam in November 2017, as indicated by the weekly TSS sampling events that occurred during this period.

As part of an alternate treatment-system test that evaluated options to expedite the dewatering process during the dam failure, Lockheed Martin sampled and analyzed water from behind and downstream of the bladder dam, as well as from the excavation area, that was treated using

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filtration by sand and by geotextile fabric. Results of this experiment, included in the attached TestAmerica lab reports dated November 15, 2017, indicate that water sampled post-sand and post-geotextile fabric treatment exceeded the NPDES TSS discharge criterion. Therefore, these possible treatment methods were not employed. Note that the post-sand filter and post-geotextile fabric samples were collected solely to evaluate the effectiveness of these alternative treatment methods, and the water processed during these brief tests was discharged back into the flooded excavation area.

## **Cadmium Exceedance during the July/August Storm Events**

As reported in the cadmium exceedance report previously submitted to MDE (Attachment C), the monthly average for cadmium in July 2017 was 0.88  $\mu$ g/L, while the monthly average for August 2017 was 0.53  $\mu$ g/L. Both values are above the monthly average limit (0.45  $\mu$ g/L) set by the permit. The monthly average values were based on two samples collected for each month. Cadmium in the first sample in July, collected on July 20, 2017, was not detected at a reporting limit of 0.043  $\mu$ g/L, while cadmium in the second sample, collected on July 25, 2017, was 0.99  $\mu$ g/L. Cadmium in the first sample in August, collected on August 9, 2017, was 3.1  $\mu$ g/L, while cadmium in the second sample, collected on August 28, 2017, was 0.42  $\mu$ g/L. The likely cause of the elevated cadmium results is described below. Note that all values were well below the daily maximum permit limit of 5.0  $\mu$ g/L.

#### **Potential Cause of Cadmium Exceedance**

Only one of the cadmium results listed above is significantly elevated as compared to other data points: the August 9, 2017 sample with a cadmium concentration of 3.1 µg/L. The late-July storm described above was followed by two other large storms on August 18, 2017, and August 21, 2017. Rainfall from these storms overwhelmed the watershed, the temporary dams, and the water treatment system, resulting in a large volume of highly turbid water entering the stream channel, and requiring extended maintenance on the treatment system, which was performed between July 31st and September 4th. TSS levels were also elevated during this period, and the highest cadmium concentration (3.1 µg/L), recorded on August 9, 2017, coincided with the highest recorded TSS reading of 49 mg/L. Because cadmium is typically associated with particulates/suspended solids, it is likely that the elevated cadmium concentration recorded on August 9, 2017, is related to the late-July storm, and the subsequent elevated cadmium concentrations detected during the month of August are likewise related to the August storms. Subsequent TSS and cadmium results from samples collected in September were below both the daily and average monthly maximum limits specified in the current discharge permit, indicating that the treatment system was functioning properly and maintaining concentrations within permitted limits after the system was rehabilitated in response to the storms in July and August.

The cadmium exceedances prompted Lockheed Martin to collect two additional samples per month beginning in November 2017, bringing the total number of samples per month to four. The additional data were collected to provide a more robust set of data to more accurately evaluate the actual average concentrations for cadmium throughout each month.

Results of the additional sampling conducted between November and December 2017, when remediation was complete, were factored into the overall monthly average values, and were recorded in the NetDMR electronic reporting system. These results indicate that the daily

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maximum and monthly average cadmium concentrations did not exceed the authorized levels specified in the MDE discharge permit.

### **Permit Closure**

As noted above, the remediation effort and all surface water discharges terminated on December 27, 2017. Therefore, Lockheed Martin requests closure of the above referenced permit.

Please let me know if you have any questions. My office phone number is (301) 548-2209.

Sincerely,

Thomas D. Blackman

Project Lead, Environmental Remediation

Lockheed Martin Corporation

Enclosures:

Attachment A

Attachment B

Attachment C

cc: (via email with enclosure)

James Carroll, MDE

Gary Schold, MDE

Mark Mank, MDE

Marjorie Mewbourne, MDE

Thomas Johnson, MDE

Christine Kline, Lockheed Martin

Norm Varney, Lockheed Martin

Lynnette Drake, Lockheed Martin

Scott Heinlein, LMCPI

Cannon Silver, CDM Smith

Mike Martin, Tetra Tech

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# ATTACHMENT A

Lockheed Martin Corporation 6801 Rockledge Drive MP: CCT-246 Bethes da, MD 20817 Telephone 301-548-2209



August 28, 2017

VIA PRIVATE CARRIER

Saaya Jessica Okazaki WSA/Compliance Division Maryland Dept. of the Environment 1800 Washington Blvd, Suite 420 Baltimore, MD 21230

Subject: Notification of Noncompliance with Effluent Limits

State Discharge Permit No. 17DP3843, NPDES No. MD0071935

Lockheed Martin Corporation; Middle River Complex

2323 Eastern Boulevard, Middle River, Baltimore County, Maryland

Dear Ms. Okazaki:

This notification is provided in accordance with General Condition B.2. Noncompliance with Effluent Limits of the above referenced permit. The corrective actions described in the notification are currently being implemented.

Please let me know if you have any questions. My office phone is (301) 548-2209.

Sincerely

Thomas D. Blackman

Project Lead, Environmental Remediation

cc: (via email with enclosure)

la 1.161

James Carroll, MDE

Gary Schold, MDE

Mark Mank, MDE

Marjorie Mewbourne, MDE

Thomas Johnson, MDE

### **Non-compliance Notification**

#### State Discharge Permit No. 17DP3843 NPDES No. MD0071935

### Lockheed Martin Cow Pen Creek Remediation Discharge – Outfall 001

#### Description of the Non-Complying Discharge and its impact on the aquatic environment

On August 9, 2017, a sample was collected in accordance with the above referenced NPDES permit. Laboratory analysis conducted by TestAmerica and made aware to Lockheed Martin on August 23 indicated that parameters being monitored including cadmium, copper, lead, and pH were within permitted limits; however, Total Suspended Solids (TSS) was reported at a concentration of 49 mg/L, above the permitted limit of 20 mg/L. It is unlikely that the temporary discharge of TSS slightly above the permitted level would cause adverse consequences in the aquatic environment because it was temporary, and due to recent heavy storm events, TSS in the receiving waters would also be expected to be elevated.

#### **Cause of Non-compliance**

The primary cause of the non-compliance is the elevated rainfall event that occurred during the latter part of July. On July 28<sup>th</sup> and 29<sup>th</sup> a severe thunderstorm produced over 5 inches of rainfall in the general area with preliminary indications from interpretation of National Oceanic and Atmospheric Administration (NOAA) data that this storm approached a 25-year storm event. The excessive precipitation exceeded the designed capacity (10-year flow event) of the stream diversion and water treatment system; thus, storm water entered the excavation area. Following the impact of this storm, the treatment system was not pumping at full capacity due to the inundation of turbid storm water. From that point forward, Tetra Tech performed routine maintenance on the system (such as, replacing bag filters, backwashing carbon media, backwashing sand filters, removing a 2-inch layer of sediment caked at the top of the sand media, and replacing sump pit gravel) beginning on July 30<sup>th</sup> to bring the water treatment system back into full operation, and to minimize impact from storm events. The sample collected on August 9<sup>th</sup> was collected shortly following the turbid water surge event and actions taken to clean the system. Note, prior to the July 28<sup>th</sup> and July 29<sup>th</sup> storm event the two previous lab-analyzed TSS concentrations in the water treatment effluent were below the NPDES discharge limits at not detectable (less than 1 mg/L) and 14 mg/L, respectively.

# Anticipated time of non-compliance is expected to continue, or if such condition has been corrected, the duration of the period of non-compliance

The non-compliance is expected to have started around the time of the severe storm event that occurred on July 28<sup>th</sup> and 29<sup>th</sup> and terminated sometime prior to August 23<sup>rd</sup>. Upon becoming aware of the TSS concentration exceeding the permit limit on August 23<sup>rd</sup>, Lockheed Martin immediately began conducting daily TSS sampling on expedited turnaround time to determine if the TSS levels had been reduced and were now in compliance with permitted limits. A sample was collected on August 23<sup>rd</sup> and was found to have a TSS concentration of 5.9 mg/L, below the permitted level. However, the next sample collected on August 24<sup>th</sup> recorded a level of 23 mg/L, just above the permitted level. The system was shut down and additional corrective measures as described below will be implemented prior to restarting the system.

#### Steps taken to reduce or eliminate the non-complying discharge

Based on the TSS data from the August 23<sup>rd</sup> and 24<sup>th</sup> sampling events, it appears the ongoing maintenance activities have not fully rehabilitated the water treatment from the effects of its having been inundated with turbid water created by the late July storms. The corrective actions to be completed prior to restart of the system will include complete change out of the carbon media, complete change out of the sand filtration units, and reducing the filtration size of the lead bag filter from 25 microns to 20 microns. Once these actions are completed, the system will be restarted, maintenance as discussed above will be resumed, and systems operations will be subject to the activities described below to prevent reoccurrence.

#### Steps taken to prevent reoccurrence

Steps taken to prevent reoccurrence will be as follows:

- 1. Upon system startup, collect and analyze samples for TSS in succession over a three day period on 24-hour turnaround time.
- 2. If all three TSS sample results pass the discharge criteria, an aggressive maintenance schedule will be performed, consisting of increasing backwash of sand filters both in duration and frequency, back washing carbon units, and continued timely change-out of bag filters.
- 3. Once the system is verified to be in compliance, future monitoring for TSS will include sampling and analysis, on a 24-hour turnaround time, conducted at a frequency of once per week, which is a frequency greater than the current permit requirement of bimonthly monitoring.

If any TSS data exceed the permit limit then the following actions will be taken:

- a. Shut down the system
- b. Increase the filtration, most likely by including 1 micron filters to treat the system effluent
- c. Restart the system and sample for TSS on a 24-hour turnaround time
- d. If resampling produces results that still exceed the permit limit, then either smaller filtration cartridges (0.5 micron) will be utilized or more extensive system changes will be considered

# Description of the accelerated or additional monitoring to determine the nature of the impact of the non-complying discharge

Lockheed Martin is conducting TSS monitoring through the certified lab TestAmerica. Since the TSS result was received on August 23<sup>rd</sup>, subsequent results are being provided within 24 hours of sampling. As discussed above, this process will be conducted three times in succession after system restart; and, thereafter, weekly monitoring for TSS will be conducted.

# ATTACHMENT B



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: 680-142444-1

Client Project/Site: Middle River Sediment Remediation

#### For:

Tetra Tech, Inc. 19803 North Creek Parkway Bothell, Washington 98011

Attn: Keir Craigie

Juny Jamie

Authorized for release by: 8/24/2017 4:46:41 PM

Jerry Lanier, Project Manager I (912)354-7858 e.3410 jerry.lanier@testamericainc.com

LINKS .....

Review your project results through

Total Access

**Have a Question?** 



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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## **Case Narrative**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-142444-1

Job ID: 680-142444-1

**Laboratory: TestAmerica Savannah** 

Narrative

### **CASE NARRATIVE**

Client: Tetra Tech, Inc.

**Project: Middle River Sediment Remediation** 

Report Number: 680-142444-1

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 08/24/2017; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 3.1 C.

#### **TOTAL SUSPENDED SOLIDS**

Sample DW -14-082317 (680-142444-1) was analyzed for total suspended solids in accordance with SM 2540D. The samples were analyzed on 08/24/2017.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

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# **Sample Summary**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-142444-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
680-142444-1	DW -14-082317	Water	08/23/17 15:30	08/24/17 09:10

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# **Method Summary**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-142444-1

Method	Method Description	Protocol	Laboratory
2540 D-2011	Total Suspended Solids (Dried at 103-105°C)	SM	TAL SAV

#### **Protocol References:**

SM = "Standard Methods For The Examination Of Water And Wastewater",

#### **Laboratory References:**

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

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# **Definitions/Glossary**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-142444-1

## **Qualifiers**

## **General Chemistry**

Indicates the analyte was analyzed for but not detected.

## **Glossary**

Abbreviation	These commonly used abbreviations may or may not be present in this report.
a	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)

RLReporting Limit or Requested Limit (Radiochemistry)

**RPD** Relative Percent Difference, a measure of the relative difference between two points

**TEF** Toxicity Equivalent Factor (Dioxin) Toxicity Equivalent Quotient (Dioxin) **TEQ** 

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# **Client Sample Results**

Client: Tetra Tech, Inc.

TestAmerica Job ID: 680-142444-1

Project/Site: Middle River Sediment Remediation

Client Sample ID: DW -14-082317 Lab Sample ID: 680-142444-1

Date Collected: 08/23/17 15:30 Matrix: Water

Date Received: 08/24/17 09:10

General Chemistry					_			
Analyte	Result Qual	lifier RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	5.9	1.0	1.0	mg/L			08/24/17 13:13	1

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# QC Sample Results

Client: Tetra Tech, Inc. TestAmerica Job ID: 680-142444-1

Project/Site: Middle River Sediment Remediation

Method: 2540 D-2011 - Total Suspended Solids (Dried at 103-105°C)

Lab Sample ID: MB 680-492811/1 **Client Sample ID: Method Blank Matrix: Water Prep Type: Total/NA** 

Analysis Batch: 492811

MB MB Analyte Result Qualifier RL MDL Unit D Prepared Analyzed Dil Fac Total Suspended Solids 1.0 1.0 mg/L 08/24/17 13:13 1.0 U

Lab Sample ID: LCS 680-492811/2 **Client Sample ID: Lab Control Sample Matrix: Water Prep Type: Total/NA** Analysis Batch: 492811

Spike LCS LCS %Rec. Added Result Qualifier Limits Analyte Unit %Rec Total Suspended Solids 80 - 120 20.0 20.0 mg/L 100

Lab Sample ID: LCSD 680-492811/3 **Client Sample ID: Lab Control Sample Dup Matrix: Water** Prep Type: Total/NA

Analysis Batch: 492811

Spike LCSD LCSD %Rec. **RPD** Added Result Qualifier RPD Limit Analyte D %Rec Limits Unit **Total Suspended Solids** 20.0 19.5 mg/L 98 25

8/24/2017

# **QC Association Summary**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-142444-1

# **General Chemistry**

## Analysis Batch: 492811

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-142444-1	DW -14-082317	Total/NA	Water	2540 D-2011	
MB 680-492811/1	Method Blank	Total/NA	Water	2540 D-2011	
LCS 680-492811/2	Lab Control Sample	Total/NA	Water	2540 D-2011	
LCSD 680-492811/3	Lab Control Sample Dup	Total/NA	Water	2540 D-2011	

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## **Lab Chronicle**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

Client Sample ID: DW -14-082317

TestAmerica Job ID: 680-142444-1

Lab Sample ID: 680-142444-1

Matrix: Water

Matrix: Water

Date Collected: 08/23/17 15:30
Date Received: 08/24/17 09:10

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	2540 D-2011		1	1000 mL	1000 mL	492811	08/24/17 13:13	JEC	TAL SAV
	Instrument	ID: NOEQUIP								

**Laboratory References:** 

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

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1:

Chain of Custody Record

TestAmericol
THE LEADER IN ENVIRONMENTAL TESTING 162089 TestAmerica Canton 4101 Shuffel Street, N. U. Horth Lanton, RH 44778

Client Contact	Project Manager: Kell (	rusic	Site Contact: Tokin Makent	Date: 8/2/3/17	COC NO:
Company Name: Tetra Tell Inc.	TellFax: 478-835-6	649	Lab Contact: Terry Laniel	Carrier: Felling	/ of / cocs
3 North Cree	Turnaro	und Time			Sampler.
the 11, wa 950	☐ CALENDAR DAYS ☐ M	WORKING DAYS			For Lab Use Only:
182-76	TAT if different from Below				Walk-in Client:
	2 weeks		TO /		Lab Sampling:
act Name: Mpr Set		Ly Horry	) a		
PO# Port # 680179	2 days		Z - SW / S		Job / SDG No.:
Sample Identification	Sample Sample (C=Comp. Date Time G=Grab)	# of Watrix Cont.	Filtered Sa		Sample Specific Notes:
OW-14-082317		1 24	×		
				680	
				-1424	
	a	, ,		44 Cr	
		8/23/1		hain (	
	1	1		of Cu	
	*	\		stody	
	*				
\					
Preservation Used: 1=1ce 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other	03; 5=NaOH; 6= Other				
Possible Hazard Identification: Are any samples from a listed EPA Hazardous Waste? P Comments Section if the lab is to dispose of the sample.	Please List any EPA Waste Codes f	for the sample in the		Sample Disposal ( A fee may be assessed if samples are retained longer than 1 month)	ined longer than 1 month)
Mon-Hazard   Plammable   Skin Irritant	Poison B	Unknown	Return to Client	Sposal by Lab	orMonths
Special Instructions/QC Requirements & Comments:	24 Horn TAT,	755 Re	Lesangle Kelician	Liteu	
Custody Seals Intact: Tes No	Custody Seal No.:		Cooler Temp. (°C): Obs'd	bs'd; Corr'd.	Therm ID No.:
Relinquished by M	Company. The The	St. 3/7 (60	Received by:	Company:	Date/Time:
Relinquished by	Company:	/ Date/Time:	Received by:	Company:	Date/Time:
elinguished by:	Company	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

Client: Tetra Tech, Inc.

Job Number: 680-142444-1

Login Number: 142444 List Source: TestAmerica Savannah

List Number: 1

**Creator: Tyler, Matthew M** 

oroator. Tylor, matthow in		
Question	Answer	Comment
Radioactivity wasn't checked or is = background as measured by a survey meter.</td <td>True</td> <td></td>	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

TestAmerica Savannah

# **Accreditation/Certification Summary**

Client: Tetra Tech, Inc.

TestAmerica Job ID: 680-142444-1

Project/Site: Middle River Sediment Remediation

# **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 Da
	AFCEE		SAVLAB	
Alabama	State Program	4	41450	06-30-18
Alaska	State Program	10		06-30-18
Alaska (UST)	State Program	10	UST-104	11-05-17
Arizona	State Program	9	AZ808	12-14-17
Arkansas DEQ	State Program	6	88-0692	02-01-18
California	State Program	9	2939	06-30-17 *
Colorado	State Program	8	N/A	12-31-17
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	04-16-18
Hawaii	State Program	9	N/A	06-30-18
Illinois	NELAP	5	200022	11-30-17
Indiana	State Program	5	N/A	06-30-18
lowa	State Program	7	353	06-30-19
Kentucky (DW)	State Program	4	90084	12-31-17
Kentucky (UST)	State Program	4	18	06-30-18
Kentucky (WW)	State Program	4	90084	12-31-17
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	12-31-17
Maine	State Program	1	GA00006	09-24-18
Maryland	State Program	3	250	12-31-17
Massachusetts	State Program	1	M-GA006	06-30-18
Michigan	State Program	5	9925	06-30-17 *
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	03-31-18
North Carolina (DW)	State Program	4	13701	07-31-18
North Carolina (WW/SW)	State Program	4	269	12-31-17
Oklahoma	State Program	6	9984	08-31-17 *
	NELAP		68-00474	06-31-17
Pennsylvania		3	GA00006	
Puerto Rico South Carolina	State Program	2		12-31-17
	State Program	4	98001	06-30-17 *
Tennessee	State Program	4	TN02961	06-30-18
Texas	NELAP	6	T104704185-16-9	11-30-17
US Fish & Wildlife	Federal		LE058448-0	07-31-18
USDA	Federal	•	SAV 3-04	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	12-31-17
West Virginia DEP	State Program	3	094	06-30-18
Wisconsin	State Program	5	999819810	08-31-17 *
Wyoming	State Program	8	8TMS-L	06-30-16 *

<sup>\*</sup> Accreditation/Certification renewal pending - accreditation/certification considered valid.

TestAmerica Savannah

8/24/2017

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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: 680-142509-1

Client Project/Site: Middle River Sediment Remediation

#### For:

Tetra Tech, Inc. 19803 North Creek Parkway Bothell, Washington 98011

Attn: Keir Craigie

Jerry Jamies

Authorized for release by: 8/25/2017 5:02:01 PM

Jerry Lanier, Project Manager I (912)354-7858 e.3410 jerry.lanier@testamericainc.com

..... LINKS .....

Review your project results through
Total Access

**Have a Question?** 



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.

Project/Site: Middle River Sediment Remediation

# **Table of Contents**

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## **Case Narrative**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-142509-1

Job ID: 680-142509-1

**Laboratory: TestAmerica Savannah** 

Narrative

### **CASE NARRATIVE**

Client: Tetra Tech, Inc.

**Project: Middle River Sediment Remediation** 

Report Number: 680-142509-1

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 08/25/2017; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 3.8 C.

#### **TOTAL SUSPENDED SOLIDS**

Sample DW-15-082417 (680-142509-1) was analyzed for total suspended solids in accordance with SM 2540D. The samples were analyzed on 08/25/2017.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

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# **Sample Summary**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-142509-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
680-142509-1	DW-15-082417	Water	08/24/17 15:00	08/25/17 09:05

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# **Method Summary**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-142509-1

Method	Method Description	Protocol	Laboratory
2540 D-2011	Total Suspended Solids (Dried at 103-105°C)	SM	TAL SAV

#### **Protocol References:**

SM = "Standard Methods For The Examination Of Water And Wastewater",

#### Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

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# **Definitions/Glossary**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

Not Calculated

**Quality Control** 

Practical Quantitation Limit

Relative Error Ratio (Radiochemistry)

Toxicity Equivalent Factor (Dioxin)

Toxicity Equivalent Quotient (Dioxin)

Not Detected at the reporting limit (or MDL or EDL if shown)

Relative Percent Difference, a measure of the relative difference between two points

Reporting Limit or Requested Limit (Radiochemistry)

TestAmerica Job ID: 680-142509-1

#### **Qualifiers**

## **General Chemistry**

Qualifier	Qualifier Description					
U	Indicates the analyte was analyzed for but not detected.					

## **Glossary**

NC

ND

PQL

QC

RER

RPD

TEF

**TEQ** 

RL

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)

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# **Client Sample Results**

Client: Tetra Tech, Inc.

TestAmerica Job ID: 680-142509-1

Project/Site: Middle River Sediment Remediation

Client Sample ID: DW-15-082417 Lab Sample ID: 680-142509-1

Date Collected: 08/24/17 15:00 Matrix: Water

Date Received: 08/25/17 09:05

General Chemistry								
Analyte	Result Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	23	2.0	2.0	mg/L			08/25/17 14:18	1

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## **QC Sample Results**

Client: Tetra Tech, Inc. TestAmerica Job ID: 680-142509-1

Project/Site: Middle River Sediment Remediation

Method: 2540 D-2011 - Total Suspended Solids (Dried at 103-105°C)

**Matrix: Water** 

Analysis Batch: 492970

Lab Sample ID: MB 680-492970/1

мв мв Result Qualifier RL MDL Unit Dil Fac Analyte D Prepared Analyzed 1.0 U 1.0 1.0 mg/L 08/25/17 14:18 **Total Suspended Solids** 

Lab Sample ID: LCS 680-492970/2 **Matrix: Water** 

Analysis Batch: 492970

Spike LCS LCS %Rec. Analyte Added Result Qualifier Unit %Rec Limits **Total Suspended Solids** 20.0 21.5 mg/L 108 80 - 120

Lab Sample ID: LCSD 680-492970/3

**Matrix: Water** 

Analysis Batch: 492970

Spike LCSD LCSD %Rec. RPD Added Result Qualifier Unit %Rec Limits **RPD** Limit Total Suspended Solids 20.0 21.5 108 25 mg/L

Lab Sample ID: 680-142509-1 DU

**Matrix: Water** 

Analysis Batch: 492970

DU DU RPD Sample Sample Analyte Result Qualifier Result Qualifier Unit Limit Total Suspended Solids 23 22.4 mg/L 5

Client Sample ID: Method Blank

**Client Sample ID: Lab Control Sample** 

Client Sample ID: Lab Control Sample Dup

Client Sample ID: DW-15-082417

Prep Type: Total/NA

Prep Type: Total/NA

Prep Type: Total/NA

Prep Type: Total/NA

# **QC Association Summary**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-142509-1

# **General Chemistry**

## Analysis Batch: 492970

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-142509-1	DW-15-082417	Total/NA	Water	2540 D-2011	
MB 680-492970/1	Method Blank	Total/NA	Water	2540 D-2011	
LCS 680-492970/2	Lab Control Sample	Total/NA	Water	2540 D-2011	
LCSD 680-492970/3	Lab Control Sample Dup	Total/NA	Water	2540 D-2011	
680-142509-1 DU	DW-15-082417	Total/NA	Water	2540 D-2011	

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## **Lab Chronicle**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

Client Sample ID: DW-15-082417

TestAmerica Job ID: 680-142509-1

Lab Sample ID: 680-142509-1

Matrix: Water

Date Collected: 08/24/17 15:00 Date Received: 08/25/17 09:05

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	2540 D-2011		1	500 mL	1000 mL	492970	08/25/17 14:18	JEC	TAL SAV
	Instrument	ID: NOEQUIP								

#### Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

Suite F

**TestAmerica** TestAmerica Laboratories, Inc. TAL-8210 (0713) 000432 Chain of Custody Record Other RCRA NPDES Regulatory Program: Dw Hanover, 10 21076 Phone: 410.766.2516 Fax: 7526 Connelley Drive

Sample Specific Notes: COCS 3.6 CE 3.8° Sample Disposal ( A fee may be assessed if samples are retained longer than 1 month) Bate Birme B. 1 For Lab Use Only Months Job / SDG No. Walk-in Client ab Sampling: COC No 680-142509 Chain of Custody Archive for C.1/18/18 Company Kew. Cutyie Cttratch Con Company Company O Sposal by Lab Carrier: Site Contact: Tour Mobats Date: Lunin Received in Laboratory by: Lab Contact: Texas Return to Client Filtered Sample (Y/N)
Perform MS/MSD (Y/N)
Perform MS/MSD (Y/N) 6/24/17 1959 Date/Time: R Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Special Instructions/QC Requirements & Comments: 74 Mr. 14T, 755 Sumple # of Cont. Date/Time: 2 weeks 24 HAS WORKING DAYS Matrix 7 Analysis Turnaround Time Project Manager: Keur Cougic 428-875-6694 Type (C=Comp, G=Grab) Sample TAT if different from Below 1 week 2 days 1 day Sample 8/24/17 1800 CALENDAR DAYS Preservation Used: 1= Ice, 2= HCI; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other Custody Seal No. Sample Company: Company Tel/Fax: Date Comments Section if the lab is to dispose of the sample. Project Name: MRc Sellment nemed mall any 20 C14280-51-Ma . WR. PSOL 1980 3 Worth Creek Company Name: Vetra Jeck Inc Sample Identification -194-234-5ch Client Contact Possible Hazard Identification: City/State/Zip: Profile Custody Seals Igtact: MAR wich elinquished by: Relinquished Relinquishe Address: Phone: # O d Site:

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8/25/2017

# **Login Sample Receipt Checklist**

Client: Tetra Tech, Inc. Job Number: 680-142509-1

Login Number: 142509 List Source: TestAmerica Savannah

List Number: 1

Creator: Banda, Christy S

Question	Answer	Comment
		Comment
Radioactivity wasn't checked or is = background as measured by a survey meter.</td <td>N/A</td> <td></td>	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

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# **Accreditation/Certification Summary**

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-142509-1

### 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	11-05-17
Arizona	State Program	9	AZ808	12-14-17
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California	State Program	9	2939	06-30-17 *
Colorado	State Program	8	N/A	12-31-17
Connecticut	State Program	1	PH-0161	03-31-19
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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	04-16-18
Hawaii	State Program	9	N/A	06-30-18
Illinois	NELAP	5	200022	11-30-17
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lowa	State Program	7	353	06-30-19
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Kentucky (UST)	State Program	4	18	06-30-18
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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	12-31-17
Maine	State Program	1	GA00006	09-24-18
Maryland	State Program	3	250	12-31-17
Massachusetts	State Program	1	M-GA006	06-30-18
Michigan	State Program	5	9925	06-30-17 *
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	03-31-18
North Carolina (DW)	State Program	4	13701	07-31-18
North Carolina (WW/SW)	State Program	4	269	12-31-17
Oklahoma	State Program	6	9984	08-31-17 *
Pennsylvania	NELAP	3	68-00474	06-30-18
Puerto Rico	State Program	2	GA00006	12-31-17
South Carolina	State Program	4	98001	06-30-17 *
Tennessee	State Program		TN02961	06-30-18
Texas	NELAP	6	T104704185-16-9	11-30-17
US Fish & Wildlife	Federal	-	LE058448-0	07-31-18
USDA	Federal		SAV 3-04	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	12-31-17
West Virginia (BVV)	State Program	3	094	06-30-18
Wisconsin	State Program	5	999819810	08-31-17 *
Wyoming	State Program		8TMS-L	06-30-16 *

<sup>\*</sup> Accreditation/Certification renewal pending - accreditation/certification considered valid.

TestAmerica Savannah

8/25/2017

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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: 680-142571-1

Client Project/Site: Middle River Sediment Remediation

#### For:

Tetra Tech, Inc. 19803 North Creek Parkway Bothell, Washington 98011

Attn: Keir Craigie

Juny James

Authorized for release by: 8/28/2017 5:04:22 PM

Jerry Lanier, Project Manager I (912)354-7858 e.3410 jerry.lanier@testamericainc.com

·····LINKS ·······

Review your project results through

Total Access

**Have a Question?** 



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.

# TestAmerica Job ID: 680-142571-1

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#### **Case Narrative**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-142571-1

Job ID: 680-142571-1

**Laboratory: TestAmerica Savannah** 

Narrative

#### **CASE NARRATIVE**

Client: Tetra Tech, Inc.

**Project: Middle River Sediment Remediation** 

Report Number: 680-142571-1

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 08/26/2017; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 0.5 C.

#### **TOTAL SUSPENDED SOLIDS**

Sample DW-16-082517 (680-142571-1) was analyzed for total suspended solids in accordance with SM 2540D. The samples were analyzed on 08/28/2017.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

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# **Sample Summary**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-142571-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
680-142571-1	DW-16-082517	Water	08/25/17 11:30	08/26/17 08:45

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# **Method Summary**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-142571-1

Method	Method Description	Protocol	Laboratory
2540 D-2011	Total Suspended Solids (Dried at 103-105°C)	SM	TAL SAV

#### **Protocol References:**

SM = "Standard Methods For The Examination Of Water And Wastewater",

#### Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

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# **Definitions/Glossary**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

Not Calculated

**Quality Control** 

Practical Quantitation Limit

Relative Error Ratio (Radiochemistry)

Toxicity Equivalent Factor (Dioxin)

Toxicity Equivalent Quotient (Dioxin)

Not Detected at the reporting limit (or MDL or EDL if shown)

Relative Percent Difference, a measure of the relative difference between two points

Reporting Limit or Requested Limit (Radiochemistry)

TestAmerica Job ID: 680-142571-1

#### **Qualifiers**

#### **General Chemistry**

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.

### **Glossary**

NC

ND

PQL

QC

RER

RPD

TEF

**TEQ** 

RL

Abbreviation	These commonly used abbreviations may or may not be present in this report.
n	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)

# **Client Sample Results**

Client: Tetra Tech, Inc.

TestAmerica Job ID: 680-142571-1

Project/Site: Middle River Sediment Remediation

Client Sample ID: DW-16-082517 Lab Sample ID: 680-142571-1

Date Collected: 08/25/17 11:30 Matrix: Water Date Received: 08/26/17 08:45

General Chemistry									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	41		3.2	3.2	mg/L			08/28/17 12:28	1

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# **QC Sample Results**

Client: Tetra Tech, Inc. TestAmerica Job ID: 680-142571-1

Project/Site: Middle River Sediment Remediation

Method: 2540 D-2011 - Total Suspended Solids (Dried at 103-105°C)

Lab Sample ID: MB 680-493230/1 Client Sample ID: Method Blank **Matrix: Water** Prep Type: Total/NA

Analysis Batch: 493230

	IVID	IVID							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	1.0	U	1.0	1.0	mg/L			08/28/17 12:28	1

Lab Sample ID: LCS 680-493230/2 **Client Sample ID: Lab Control Sample Matrix: Water** Prep Type: Total/NA

Analysis Batch: 493230

	Spike	LCS	LCS				%Rec.	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Total Suspended Solids	 20.0	21.0		mg/L	_	105	80 - 120	 

Lab Sample ID: LCSD 680-493230/3 **Client Sample ID: Lab Control Sample Dup Matrix: Water** Prep Type: Total/NA

Analysis Batch: 493230

	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D %	Rec	Limits	RPD	Limit
Total Suspended Solids	20.0	22.5		mg/L	_	113	80 - 120	7	25

8/28/2017

# **QC Association Summary**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-142571-1

# **General Chemistry**

### Analysis Batch: 493230

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-142571-1	DW-16-082517	Total/NA	Water	2540 D-2011	
MB 680-493230/1	Method Blank	Total/NA	Water	2540 D-2011	
LCS 680-493230/2	Lab Control Sample	Total/NA	Water	2540 D-2011	
LCSD 680-493230/3	Lab Control Sample Dup	Total/NA	Water	2540 D-2011	

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#### **Lab Chronicle**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-142571-1

Lab Sample ID: 680-142571-1

Matrix: Water

Date Collected: 08/25/17 11:30 Date Received: 08/26/17 08:45

Client Sample ID: DW-16-082517

		Batch	Batch		Dil	Initial	Final	Batch	Prepared		
	Prep Type	Туре	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
	Total/NA	Analysis	2540 D-2011		1	310 mL	1000 mL	493230	08/28/17 12:28	JEC	TAL SAV
l		Instrument	ID: NOEQUIP								

#### Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

**TestAmerica** TestAmerica Laboratories, Inc. 1140 TAL-8210 (0713) Sample Specific Notes: COCs 6 2CGTD 3 Sample Disposal ( A fee may be assessed if samples are retained longer than 1 month) For Lab Use Only Date/Time: Walk-in Client: Job / SDG No. ab Sampling: Date/Time 680-142571 Chain of Custody Archive for 000431 BALTMORE Site Contact: Color lose | Sarie: 8/25/17 Keir. Craigic etetistech. com Company Misposal by Lab TESTAMENEUM SAUMINAH, 6A & Chain of Custody Record Received in Laboratory by Return to Client ved by RCRA Filtered Sample (Y/N)
Perform MS/MSD (Y/N)
Perform Sample (Y/N) 300 24 HA TAT, TSS Sample. Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the NPDES # of Cont. Date/Time: 6/15/18 2 weeks 24 H/25 WORKING DAYS Matrix MO Analysis Turnaround Time Project Manager: Kelr Confile TellFax: 478-835-6644 Type (C=Comp, G=Grab) Sample Regulatory Program: TAT if different from Below Tetra Per Land 0 1 week 2 days 1 day CALENDAR DAYS Sample Sample Date Time 8/25/17/130 Preservation Used 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other Custody Seal No. Company Company Special Instructions/QC Requirements & Comments: Comments Section if the lab is to dispose of the sample TestAmerica Baltimore Project Name: Mpc Sellmer Newly Widelle Plus AND 3 North Cleek Tech Inc. 115-80-91-MD Sample Identification 45.482-7647 Hanover, 10 21076 Phone: 410.766.2516 Fax: Client Contact Possible Hazard Identification: 7526 Connelley Drive Company Name: Tetrus Custody Seals Intact: Address: (9853 Relinquished by: Non-Hazard City/State/Zip: Relinquished Relinquisher Phone: # O d Site: -ax: 8/28/2017 Page 11 of 13

# **Login Sample Receipt Checklist**

Client: Tetra Tech, Inc. Job Number: 680-142571-1

Login Number: 142571 List Source: TestAmerica Savannah

List Number: 1

Creator: Edwards, Jessica R

ordator. Editardo, occorda ix	
Question	Answer Comment
Radioactivity wasn't checked or is = background as measured by a survey meter.</td <td>N/A</td>	N/A
The cooler's custody seal, if present, is intact.	True
Sample custody seals, if present, are intact.	True
The cooler or samples do not appear to have been compromised or tampered with.	True
Samples were received on ice.	True
Cooler Temperature is acceptable.	True
Cooler Temperature is recorded.	True
COC is present.	True
COC is filled out in ink and legible.	True
COC is filled out with all pertinent information.	True
Is the Field Sampler's name present on COC?	N/A
There are no discrepancies between the containers received and the COC.	True
Samples are received within Holding Time (excluding tests with immediate HTs)	True
Sample containers have legible labels.	True
Containers are not broken or leaking.	True
Sample collection date/times are provided.	True
Appropriate sample containers are used.	True
Sample bottles are completely filled.	True
Sample Preservation Verified.	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").	N/A
Multiphasic samples are not present.	True
Samples do not require splitting or compositing.	True
Residual Chlorine Checked.	N/A

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# **Accreditation/Certification Summary**

Client: Tetra Tech, Inc. Project/Site: Middle River Sediment Remediation TestAmerica Job ID: 680-142571-1

### 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	11-05-17
Arizona	State Program	9	AZ808	12-14-17
Arkansas DEQ	State Program	6	88-0692	02-01-18
California	State Program	9	2939	06-30-17 *
Colorado	State Program	8	N/A	12-31-17
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	04-16-18
Hawaii	State Program	9	N/A	06-30-18
Illinois	NELAP	5	200022	11-30-17
Indiana	State Program	5	N/A	06-30-18
lowa	State Program	7	353	06-30-19
Kentucky (DW)	State Program	4	90084	12-31-17
Kentucky (UST)	State Program	4	18	06-30-18
Kentucky (WW)	State Program	4	90084	12-31-17
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	12-31-17
Maine	State Program	1	GA00006	09-24-18
Maryland	State Program	3	250	12-31-17
Massachusetts	State Program	1	M-GA006	06-30-18
Michigan	State Program		9925	06-30-17 *
Mississippi	State Program	4	N/A	06-30-17
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	03-31-18
		4	13701	07-31-18
North Carolina (DW)	State Program			
North Carolina (WW/SW)	State Program	4	269	12-31-17
Oklahoma	State Program	6	9984	08-31-17 *
Pennsylvania	NELAP	3	68-00474	06-30-18
Puerto Rico	State Program	2	GA00006	12-31-17
South Carolina	State Program	4	98001	06-30-17 *
Tennessee	State Program	4	TN02961	06-30-18
Texas	NELAP	6	T104704185-16-9	11-30-17
US Fish & Wildlife	Federal		LE058448-0	07-31-18
USDA	Federal		SAV 3-04	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	12-31-17
West Virginia DEP	State Program	3	094	06-30-18
Wisconsin	State Program	5	999819810	08-31-17 *
Wyoming	State Program	8	8TMS-L	06-30-16 *

<sup>\*</sup> Accreditation/Certification renewal pending - accreditation/certification considered valid.

TestAmerica Savannah

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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: 680-142848-1

Client Project/Site: Middle River Sediment Remediation

#### For:

Tetra Tech, Inc. 19803 North Creek Parkway Bothell, Washington 98011

Attn: Keir Craigie

Jerry Jamier

Authorized for release by: 9/7/2017 4:12:31 PM

Jerry Lanier, Project Manager I (912)354-7858 e.3410

jerry.lanier@testamericainc.com

..... Links .....

Review your project results through

Total Access

**Have a Question?** 



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.

# Project/Site: Middle River Sediment Remediation

# **Table of Contents**

Cover Page	1
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#### **Case Narrative**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-142848-1

Job ID: 680-142848-1

**Laboratory: TestAmerica Savannah** 

**Narrative** 

#### **CASE NARRATIVE**

Client: Tetra Tech, Inc.

**Project: Middle River Sediment Remediation** 

Report Number: 680-142848-1

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 09/06/2017; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 3.1 C.

#### **TOTAL SUSPENDED SOLIDS**

Samples DW-18-090417 (680-142848-1) and DW-19-090517 (680-142848-2) were analyzed for total suspended solids in accordance with SM 2540D. The samples were analyzed on 09/07/2017.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

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# **Sample Summary**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-142848-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
680-142848-1	DW-18-090417	Water	09/04/17 13:00	09/06/17 09:30
680-142848-2	DW-19-090517	Water	09/05/17 08:00	09/06/17 09:30

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# **Method Summary**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-142848-1

Method	Method Description	Protocol	Laboratory
2540 D-2011	Total Suspended Solids (Dried at 103-105°C)	SM	TAL SAV

#### **Protocol References:**

SM = "Standard Methods For The Examination Of Water And Wastewater",

#### Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

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# **Definitions/Glossary**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

Not Detected at the reporting limit (or MDL or EDL if shown)

Relative Percent Difference, a measure of the relative difference between two points

Reporting Limit or Requested Limit (Radiochemistry)

Practical Quantitation Limit

Relative Error Ratio (Radiochemistry)

Toxicity Equivalent Factor (Dioxin)

Toxicity Equivalent Quotient (Dioxin)

**Quality Control** 

TestAmerica Job ID: 680-142848-1

#### **Qualifiers**

#### **General Chemistry**

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.

#### **Glossary**

ND

PQL

QC

RER

RPD

TEF

**TEQ** 

RL

Abbreviation	These commonly used abbreviations may or may not be present in this report.
n	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

9/7/2017

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# **Client Sample Results**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-142848-1

Client Sample ID: DW-18-090417

Lab Sample ID: 680-142848-1 Date Collected: 09/04/17 13:00

Matrix: Water

Date Received: 09/06/17 09:30

**General Chemistry** Analyte Result Qualifier RLMDL Unit Prepared Dil Fac D Analyzed Total Suspended Solids 1.0 U 1.0 1.0 mg/L 09/07/17 09:09

Client Sample ID: DW-19-090517 Lab Sample ID: 680-142848-2

Date Collected: 09/05/17 08:00 Matrix: Water

Date Received: 09/06/17 09:30

**General Chemistry** Analyte RL MDL Unit Result Qualifier D Prepared Analyzed Dil Fac 1.0 09/07/17 09:09 **Total Suspended Solids** 1.0 mg/L 1.7

#### **QC Sample Results**

Client: Tetra Tech, Inc. TestAmerica Job ID: 680-142848-1

Project/Site: Middle River Sediment Remediation

Method: 2540 D-2011 - Total Suspended Solids (Dried at 103-105°C)

MR MR

Lab Sample ID: MB 680-494338/1 Client Sample ID: Method Blank **Matrix: Water** Prep Type: Total/NA

Analysis Batch: 494338

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	1.0	U	1.0	1.0	mg/L			09/07/17 09:09	1

Lab Sample ID: LCS 680-494338/2 **Client Sample ID: Lab Control Sample Matrix: Water** Prep Type: Total/NA

Analysis Batch: 494338

	Spike	LCS	LCS				%Rec.	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Total Suspended Solids	 20.0	19.0		mg/L	_	95	80 - 120	

Lab Sample ID: LCSD 680-494338/3 **Client Sample ID: Lab Control Sample Dup Matrix: Water** Prep Type: Total/NA Analysis Batch: 494338

Spike LCSD LCSD %Rec. RPD Added Result Qualifier Unit %Rec Limits **RPD** 

Limit Total Suspended Solids 20.0 20.0 mg/L 100

# **QC Association Summary**

Client: Tetra Tech, Inc.

TestAmerica

Project/Site: Middle River Sediment Remediation

# TestAmerica Job ID: 680-142848-1

# **General Chemistry**

#### Analysis Batch: 494338

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-142848-1	DW-18-090417	Total/NA	Water	2540 D-2011	
680-142848-2	DW-19-090517	Total/NA	Water	2540 D-2011	
MB 680-494338/1	Method Blank	Total/NA	Water	2540 D-2011	
LCS 680-494338/2	Lab Control Sample	Total/NA	Water	2540 D-2011	
LCSD 680-494338/3	Lab Control Sample Dup	Total/NA	Water	2540 D-2011	

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#### **Lab Chronicle**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

Client Sample ID: DW-18-090417

TestAmerica Job ID: 680-142848-1

Lab Sample ID: 680-142848-1

Matrix: Water

Date Collected: 09/04/17 13:00

Date Received: 09/06/17 09:30

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	2540 D-2011		1	1000 mL	1000 mL	494338	09/07/17 09:09	JEC	TAL SAV
	Instrument	ID: NOEQUIP								

Client Sample ID: DW-19-090517 Lab Sample ID: 680-142848-2

Date Collected: 09/05/17 08:00 Matrix: Water

Date Received: 09/06/17 09:30

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	2540 D-2011		1	1000 mL	1000 mL	494338	09/07/17 09:09	JEC	TAL SAV
	Instrume	nt ID: NOFOLIIP								

Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

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TestAmerica Canton Test AMERICA SAVANNAHA

Chain dratustody Record

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**TestAmerica** 

THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Laboratories, Inc. TAL-8210 (0713) Sample Specific Notes COCs Sample Disposal ( A fee may be assessed if samples are retained longer than 1 month) 24 HR TAT For Lab Use Only. Nalk-in Client: Job / SDG No. ab Sampling: COC No: Archive for 11/5/6 Disposal by Lab Carrier: Date: Middle Piver Sediment Project - NPDES Sangling + TSS 680-142848 Chain of Custody Roberts Lenle! Return to Client Site Contact: Joh BALTIMORE Received by: Co, Pl, Cd. 200.8 100 Filtered Sample (Y/N)
Perform MS / MSD (Y/N) Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the # of Cont. 17 9/5/17 P 48-2017 WORKING DAYS Matrix 40 An MO Analysis Turnaround Time Type (C=Comp, G=Grab) 699-589-86 Sample Regulatory Program: TAT if different from Below 0 Project Manager: Keir 2 weeks 2 days 1 week 1 day Company Company Sample 9/4/17 1300 0080 4/5/6 CALENDAR DAYS Company: Let. Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other P Confact Keir Chargie for The requirements & Contact Contact Seal No. Poison B Sample Tel/Fax: Skin Irritant North Canton, UN 44720 Phone: 330.497.9396 Fax: 330.497.0772 Special Instructions/QC Requirements & Comments: Comments Section if the lab is to dispose of the sample. Project Name: And Sedinet Remedy Company Name: Territ Tech INE Address: 19803 North Cluk Phys Sample Identification Bothell, WA 9801 01-19-090817 DW-18-090417 Client Contact MA middle por Possible Hazard Identification: Phone: 425-482-7647 6261729 Relinquished by: Relinquished by City/State/Zip: # O d Site: Page 11 of 13

Company

Received in Laboratory by:

Date/Tinje:

Selinquished by:

2.6.c(ce) 3.1°c

# **Login Sample Receipt Checklist**

Client: Tetra Tech, Inc. Job Number: 680-142848-1

Login Number: 142848 List Source: TestAmerica Savannah

List Number: 1

Creator: Tyler, Matthew M

oreator. Tyler, matthew m		
Question	Answer	Comment
Radioactivity wasn't checked or is = background as measured by a survey meter.</td <td>N/A</td> <td></td>	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	
s 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 <a href="mailto:smm">&lt;6mm</a> (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

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# **Accreditation/Certification Summary**

Client: Tetra Tech, Inc.

TestAmerica Job ID: 680-142848-1

Project/Site: Middle River Sediment Remediation

#### **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	11-05-17 *
Arizona	State Program	9	AZ808	12-14-17
Arkansas DEQ	State Program	6	88-0692	02-01-18
California	State Program	9	2939	06-30-17 *
Colorado	State Program	8	N/A	12-31-17
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	04-16-18
Hawaii	State Program	9	N/A	06-30-18
Illinois	NELAP	5	200022	11-30-17
Indiana	State Program	5	N/A	06-30-18
lowa	State Program	7	353	06-30-19
Kentucky (DW)	State Program	4	90084	12-31-17
Kentucky (UST)	State Program	4	18	06-30-18
Kentucky (WW)	State Program	4	90084	12-31-17
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	12-31-17
Maine	State Program	1	GA00006	09-24-18
Maryland	State Program	3	250	12-31-17
Massachusetts	State Program	1	M-GA006	06-30-18
Michigan	State Program	5	9925	06-30-17 *
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	03-31-18
North Carolina (DW)	State Program	4	13701	07-31-18
North Carolina (WW/SW)	State Program	4	269	12-31-17
Oklahoma	State Program	6	9984	08-31-18
Pennsylvania	NELAP	3	68-00474	06-30-18
Puerto Rico	State Program	2	GA00006	12-31-17
South Carolina	State Program	4	98001	06-30-17 *
Tennessee	State Program		TN02961	06-30-18
Texas	NELAP	6	T104704185-16-9	11-30-17
US Fish & Wildlife	Federal	-	LE058448-0	07-31-18
USDA	Federal		SAV 3-04	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	12-31-17
West Virginia (DVV)	State Program	3	094	06-30-18
Wisconsin	State Program	5	999819810	08-31-17 *
Wyoming	State Program		8TMS-L	06-30-16 *

<sup>\*</sup> Accreditation/Certification renewal pending - accreditation/certification considered valid.

TestAmerica Savannah

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9/7/2017



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: 680-142907-1

Client Project/Site: Middle River Sediment Remediation

#### For:

Tetra Tech, Inc. 19803 North Creek Parkway Bothell, Washington 98011

Attn: Keir Craigie

Jerry Jamier

Authorized for release by: 9/7/2017 4:16:07 PM

Jerry Lanier, Project Manager I (912)354-7858 e.3410

jerry.lanier@testamericainc.com

..... Links .....

Review your project results through
Total Access

**Have a Question?** 



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.

# Project/Site: Middle River Sediment Remediation

# **Table of Contents**

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#### **Case Narrative**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-142907-1

Job ID: 680-142907-1

**Laboratory: TestAmerica Savannah** 

**Narrative** 

#### **CASE NARRATIVE**

Client: Tetra Tech, Inc.

**Project: Middle River Sediment Remediation** 

Report Number: 680-142907-1

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 09/07/2017; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 0.5 C.

#### **TOTAL SUSPENDED SOLIDS**

Sample DW-20-090617 (680-142907-1) was analyzed for total suspended solids in accordance with SM 2540D. The samples were analyzed on 09/07/2017.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

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# **Sample Summary**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-142907-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
680-142907-1	DW-20-090617	Water	09/06/17 08:55	09/07/17 09:10

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# **Method Summary**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-142907-1

Method	Method Description	Protocol	Laboratory
2540 D-2011	Total Suspended Solids (Dried at 103-105°C)	SM	TAL SAV

#### **Protocol References:**

SM = "Standard Methods For The Examination Of Water And Wastewater",

#### Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

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# **Definitions/Glossary**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

Not Detected at the reporting limit (or MDL or EDL if shown)

Relative Percent Difference, a measure of the relative difference between two points

Reporting Limit or Requested Limit (Radiochemistry)

Practical Quantitation Limit

Relative Error Ratio (Radiochemistry)

Toxicity Equivalent Factor (Dioxin)

Toxicity Equivalent Quotient (Dioxin)

**Quality Control** 

TestAmerica Job ID: 680-142907-1

#### **Qualifiers**

#### **General Chemistry**

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.

#### **Glossary**

ND

PQL

QC

RER

RPD

TEF

**TEQ** 

RL

Abbreviation	These commonly used abbreviations may or may not be present in this report.
n	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

9/7/2017

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# **Client Sample Results**

Client: Tetra Tech, Inc.

TestAmerica Job ID: 680-142907-1

Project/Site: Middle River Sediment Remediation

Client Sample ID: DW-20-090617 Lab Sample ID: 680-142907-1

Date Collected: 09/06/17 08:55 Matrix: Water

Date Received: 09/07/17 09:10

General Chemistry									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	1.0	U	1.0	1.0	mg/L			09/07/17 11:11	1

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# **QC Sample Results**

Client: Tetra Tech, Inc.

TestAmerica Job ID: 680-142907-1

Project/Site: Middle River Sediment Remediation

Method: 2540 D-2011 - Total Suspended Solids (Dried at 103-105°C)

Lab Sample ID: MB 680-494353/1

Matrix: Water

Client Sample ID: Method Blank

Prep Type: Total/NA

Analysis Batch: 494353

	IVID	IVID								
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac	
Total Suspended Solids	1.0	U	1.0	1.0	mg/L			09/07/17 09:31	1	

Lab Sample ID: LCS 680-494353/2

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 494353

	Sp	ike	LCS	LCS				%Rec.	
Analyte	Add	ded	Result	Qualifier	Unit	D	%Red	Limits	
Total Suspended Solids	2	0.0	23.5		mg/L		118	80 - 120	

Lab Sample ID: LCSD 680-494353/3

Client Sample ID: Lab Control Sample Dup
Matrix: Water

Prep Type: Total/NA

Analysis Batch: 494353

-	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Total Suspended Solids	20.0	21.0		mg/L		105	80 - 120	11	25

9/7/2017

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# **QC Association Summary**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-142907-1

# **General Chemistry**

#### Analysis Batch: 494353

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-142907-1	DW-20-090617	Total/NA	Water	2540 D-2011	
MB 680-494353/1	Method Blank	Total/NA	Water	2540 D-2011	
LCS 680-494353/2	Lab Control Sample	Total/NA	Water	2540 D-2011	
LCSD 680-494353/3	Lab Control Sample Dup	Total/NA	Water	2540 D-2011	

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### **Lab Chronicle**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-142907-1

Lab Sample ID: 680-142907-1

**Matrix: Water** 

Date Collected: 09/06/17 08:55 Date Received: 09/07/17 09:10

Client Sample ID: DW-20-090617

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	2540 D-2011		1	1000 mL	1000 mL	494353	09/07/17 11:11	JEC	TAL SAV
	Instruma	nt ID: NOFOLIIP								

#### **Laboratory References:**

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

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**TestAmerica** THE LEADER IN ENVIRONMENTAL TESTING TestAmerica Laboratories, Inc.

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TestAmerica Canton & TESTAMENALA SAUANNAM 64 K Chain of Custody Record

TAL-8210 (0713) Sample Specific Notes: COCs Sample Disposal ( A fee may be assessed if samples are retained longer than 1 month) For Lab Use Only: 4.1.6 Date/Time: Walk-in Client: ab Sampling: Job / SDG No. herm ID No COC No Sampler 680-142907 Chain of Custody Archive for BALTIMORE (Pany) Company Company Opisposal by Lab Carrier: Roberts Date: Samplas Received in Laboratory by Lab Contact: Jerry Site Contact: 50% Return to Client 12 RCRA (N /X) GSW/SW WODER Middle have Sedieret, Additional Filtered Sample (Y / N) Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the NPDES # of Cont. 9-6-2017 86/17 Date/Time Date/Time Date/Timb WORKING DAYS Matrix A Analysis Turnaround Time 2 weeks 24 Mil MO Project Manager: Keyr Craffle TellFax: Y78-835-6694 2 days TAT 0 Type (C=Comp, G=Grab) Sample TAT if different from Below Regulatory Program: 0 1 week Inc Company. AMPOTICA 1 day Sample CALENDAR DAYS Time 5580 4/9/8 Company: Test Preservation Used: 1= Ice, 2= HCl; 3= H2SO4, 4=HNO3; 5=NaOH; 6= Other Custody Seal No. Poison B Sample Company Date North Canton, BM 44720 Phone: 330.497.9396 Fax: 330.497.0772 Special Instructions/QC Requirements & Comments: Project Name: MRc Selbment Premiety Comments Section if the lab is to dispose of the sample. 19040-02-MQ Company Name: Tetra Teuh Inc. Address: 1480 3 Nort, Creek F City/State/Zip: Bothe II, WA, 98011 Sample Identification Project # 6801729 7-5-482-7647 Yes Client Contact Possible Hazard Identification: Custody Seals Intact Nelinquished by: MILC Refinquished by: Relinquished by Mon-Hazard Phone: #Od Site: -ax Page 11 of 13

### **Login Sample Receipt Checklist**

Client: Tetra Tech, Inc. Job Number: 680-142907-1

Login Number: 142907 List Source: TestAmerica Savannah

List Number: 1

Creator: Banda, Christy S

Question	Answer	Comment
Radioactivity wasn't checked or is = background as measured by a survey meter.</td <td>N/A</td> <td></td>	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

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# **Accreditation/Certification Summary**

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-142907-1

### 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 Dat
	AFCEE		SAVLAB	
Alabama	State Program	4	41450	06-30-18
Alaska	State Program	10		06-30-18
Alaska (UST)	State Program	10	UST-104	11-05-17 *
Arizona	State Program	9	AZ808	12-14-17
Arkansas DEQ	State Program	6	88-0692	02-01-18
California	State Program	9	2939	06-30-17 *
Colorado	State Program	8	N/A	12-31-17
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	04-16-18
Hawaii	State Program	9	N/A	06-30-18
Illinois	NELAP	5	200022	11-30-17
Indiana	State Program	5	N/A	06-30-18
lowa	State Program	7	353	06-30-19
Kentucky (DW)	State Program	4	90084	12-31-17
Kentucky (UST)	State Program	4	18	06-30-18
Kentucky (WW)	State Program	4	90084	12-31-17
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	12-31-17
Maine	State Program		GA00006	09-24-18
Maryland	State Program	3	250	12-31-17
Massachusetts	State Program	1	M-GA006	06-30-18
	State Program		9925	06-30-17 *
Michigan Michigan	<del>-</del>	4	9925 N/A	06-30-17
Mississippi	State Program			
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	03-31-18
North Carolina (DW)	State Program	4	13701	07-31-18
North Carolina (WW/SW)	State Program	4	269	12-31-17
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Pennsylvania	NELAP	3	68-00474	06-30-18
Puerto Rico	State Program	2	GA00006	12-31-17
South Carolina	State Program	4	98001	06-30-17 *
Tennessee	State Program	4	TN02961	06-30-18
Texas	NELAP	6	T104704185-16-9	11-30-17
US Fish & Wildlife	Federal		LE058448-0	07-31-18
USDA	Federal		SAV 3-04	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	12-31-17
West Virginia DEP	State Program	3	094	06-30-18
Wisconsin	State Program	5	999819810	08-31-17 *
Wyoming	State Program	8	8TMS-L	06-30-16 *

<sup>\*</sup> Accreditation/Certification renewal pending - accreditation/certification considered valid.

TestAmerica Savannah

9/7/2017

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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: 680-143198-1

Client Project/Site: Middle River Sediment Remediation

#### For:

Tetra Tech, Inc. 19803 North Creek Parkway Bothell, Washington 98011

Attn: Keir Craigie

Jerry James

Authorized for release by: 9/20/2017 12:05:49 PM

Jerry Lanier, Project Manager I (912)354-7858 e.3410

jerry.lanier@testamericainc.com

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The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

# **Table of Contents**

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Receipt Checklists	12
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### **Case Narrative**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-143198-1

Job ID: 680-143198-1

**Laboratory: TestAmerica Savannah** 

**Narrative** 

#### **CASE NARRATIVE**

Client: Tetra Tech, Inc.

**Project: Middle River Sediment Remediation** 

Report Number: 680-143198-1

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 09/19/2017; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 3.3 C.

#### **TOTAL SUSPENDED SOLIDS**

Sample DW-22-091817 (680-143198-1) was analyzed for total suspended solids in accordance with SM 2540D. The samples were analyzed on 09/19/2017.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

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# **Sample Summary**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-143198-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
680-143198-1	DW-22-091817	Water	09/18/17 11:30	09/19/17 09:15

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# **Method Summary**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-143198-1

Method	Method Description	Protocol	Laboratory
2540 D-2011	Total Suspended Solids (Dried at 103-105°C)	SM	TAL SAV

#### **Protocol References:**

SM = "Standard Methods For The Examination Of Water And Wastewater",

#### Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

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### **Definitions/Glossary**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

Not Calculated

**Quality Control** 

Practical Quantitation Limit

Relative Error Ratio (Radiochemistry)

Toxicity Equivalent Factor (Dioxin)

Toxicity Equivalent Quotient (Dioxin)

Not Detected at the reporting limit (or MDL or EDL if shown)

Relative Percent Difference, a measure of the relative difference between two points

Reporting Limit or Requested Limit (Radiochemistry)

TestAmerica Job ID: 680-143198-1

#### **Qualifiers**

#### **General Chemistry**

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.

### **Glossary**

NC

ND

PQL

QC

RER

RPD

TEF

**TEQ** 

RL

Abbreviation	These commonly used abbreviations may or may not be present in this report.
a	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)

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# **Client Sample Results**

Client: Tetra Tech, Inc.

TestAmerica Job ID: 680-143198-1

Project/Site: Middle River Sediment Remediation

Client Sample ID: DW-22-091817 Lab Sample ID: 680-143198-1

Date Collected: 09/18/17 11:30 Matrix: Water

Date Received: 09/19/17 09:15

General Chemistry							
Analyte	Result Qualifier	RL	MDL Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	8.2	1.0	1.0 mg/L			09/19/17 12:29	1

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### **QC Sample Results**

Client: Tetra Tech, Inc.

TestAmerica Job ID: 680-143198-1

Project/Site: Middle River Sediment Remediation

Method: 2540 D-2011 - Total Suspended Solids (Dried at 103-105°C)

MD MD

Matrix: Water Prep Type: Total/NA

Analysis Batch: 495213

Lab Sample ID: MB 680-495213/1

	IND	IVID							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	1.0	U	1.0	1.0	mg/L			09/19/17 12:29	1

Lab Sample ID: LCS 680-495213/2

Matrix: Water

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analysis Batch: 495213

 Analyte
 Added Total Suspended Solids
 Result 20.0
 Qualifier 22.0
 Unit mg/L
 D 110
 80 - 120

Lab Sample ID: LCSD 680-495213/3

Client Sample ID: Lab Control Sample Dup

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 495213

Spike LCSD LCSD %Rec. RPD Added Limit Result Qualifier Unit %Rec Limits **RPD** Total Suspended Solids 20.0 22.0 mg/L 110 80 - 120 25

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Client Sample ID: Method Blank

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# **QC Association Summary**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-143198-1

### **General Chemistry**

### Analysis Batch: 495213

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-143198-1	DW-22-091817	Total/NA	Water	2540 D-2011	
MB 680-495213/1	Method Blank	Total/NA	Water	2540 D-2011	
LCS 680-495213/2	Lab Control Sample	Total/NA	Water	2540 D-2011	
LCSD 680-495213/3	Lab Control Sample Dup	Total/NA	Water	2540 D-2011	

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### **Lab Chronicle**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

Client Sample ID: DW-22-091817

TestAmerica Job ID: 680-143198-1

Lab Sample ID: 680-143198-1

**Matrix: Water** 

Date Collected: 09/18/17 11:30 Date Received: 09/19/17 09:15

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	2540 D-2011		1	1000 mL	1000 mL	495213	09/19/17 12:29	JEC	TAL SAV
	Instrument	ID: NOEQUIP								

Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

TestAmerica Laboratories, Inc. **TestAmerico** TAL-8210 (0713) (4) Home poly battle Sample Specific Notes COCs Sample Disposal ( A fee may be assessed if samples are retained longer than 1 month) t102/81/10 For Lab Use Only: 41/51/6 Walk-in Client: Job / SDG No. ab Sampling. Therm ID No Date/Time COC No: 680-143198 Chain of Custody Archive for 162092 A 1/8/16 1 Company Company Disposal by Lab Carrier: Site Contact: Ph. 12511 15 Date: Chain of Custody Record Lab Contact: Terry Lenix! T Special Instructions/QC Requirements & Comments: & Middle Mart Schinect, Additional 755 Samples Received in Laboratory Other: Received by: Return to Client Received by: RCRA Filtered Sample (Y/N)
Perform MS/MSD (Y/N)
Ocy22-227 Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the NPDES # of Cont. Date/Time: 7 Date/Time: Date/Time: WORKING DAYS Matrix 24 HA Project Manager: Key Cruisie MO An Analysis Turnaround Time TellFax: 478-835-6694 TAT 4101 Shuffel Street, N. H. & TEST AMERICA
SAVANNAH GA & Type (C=Comp, G=Grab) Sample Regulatory Program: TAT if different from Below 0 2 weeks 7 1 week 2 days 1 day Sample CALENDAR DAYS 0811 1130 Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other Custody Seal No. Company Poison B Sample Company: Company: Date North Canton, GH 44720 Phone: 330.497.9396 Fax: 330.497.0772 Comments Section if the lab is to dispose of the sample. PKWY Project Name: MIRC Sedinent Rementy Tetra Tech Inc 19803 North Creek 11816-22-MO Sample Identification TestAmerica Canton 624/089 middle Part Client Contact 136-482-764 Possible Hazard Identification: Intact Custody Seals MAC Company Name: telinquished by: elinquished by: City/State/Zip: Relinquished Address: Phone: # O d Page 11 of 13 9/<del>20/20</del>17

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### **Login Sample Receipt Checklist**

Client: Tetra Tech, Inc. Job Number: 680-143198-1

Login Number: 143198 List Source: TestAmerica Savannah

List Number: 1

Creator: Edwards, Jessica R

Creator: Edwards, Jessica R		
Question	Answer	Comment
Radioactivity wasn't checked or is = background as measured by a survey meter.</td <td>N/A</td> <td></td>	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

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# **Accreditation/Certification Summary**

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-143198-1

### 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	11-05-17 *
Arizona	State Program	9	AZ808	12-14-17
Arkansas DEQ	State Program	6	88-0692	02-01-18
California	State Program	9	2939	06-30-17 *
Colorado	State Program	8	N/A	12-31-17
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	04-16-18
Hawaii	State Program	9	N/A	06-30-18
Illinois	NELAP	5	200022	11-30-17
Indiana	State Program	5	N/A	06-30-18
lowa	State Program	7	353	06-30-19
Kentucky (DW)	State Program	4	90084	12-31-17
Kentucky (UST)	State Program		18	06-30-18
Kentucky (WW)	State Program	4	90084	12-31-17
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	12-31-17
Maine			GA00006	09-24-18
	State Program	3	250	
Maryland	State Program	ა 1	M-GA006	12-31-17
Massachusetts	State Program	<del>.</del>		06-30-18
Michigan	State Program	5	9925	06-30-17 *
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	03-31-18
North Carolina (DW)	State Program	4	13701	07-31-18
North Carolina (WW/SW)	State Program	4	269	12-31-17
Oklahoma	State Program	6	9984	08-31-18
Pennsylvania	NELAP	3	68-00474	06-30-18
Puerto Rico	State Program	2	GA00006	12-31-17
South Carolina	State Program	4	98001	06-30-17 *
Tennessee	State Program	4	TN02961	06-30-18
Texas	NELAP	6	T104704185-16-9	11-30-17
Texas	State Program	6	T104704185	06-30-18
US Fish & Wildlife	Federal		LE058448-0	07-31-18
USDA	Federal		SAV 3-04	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	12-31-17
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 *

<sup>\*</sup> Accreditation/Certification renewal pending - accreditation/certification considered valid.

TestAmerica Savannah

9/20/2017

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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: 680-143293-1

Client Project/Site: Middle River Sediment Remediation

#### For:

Tetra Tech, Inc. 19803 North Creek Parkway Bothell, Washington 98011

Attn: Keir Craigie

Jerry James

Authorized for release by: 9/22/2017 10:24:53 AM

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.

TestAmerica Job ID: 680-143293-1

Project/Site: Middle River Sediment Remediation

# **Table of Contents**

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### **Case Narrative**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-143293-1

Job ID: 680-143293-1

**Laboratory: TestAmerica Savannah** 

Narrative

#### **CASE NARRATIVE**

Client: Tetra Tech, Inc.

**Project: Middle River Sediment Remediation** 

Report Number: 680-143293-1

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 09/21/2017; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 1.9 C.

#### **TOTAL SUSPENDED SOLIDS**

Sample DW-23-092017 (680-143293-1) was analyzed for total suspended solids in accordance with SM 2540D. The samples were analyzed on 09/21/2017.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

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# **Sample Summary**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-143293-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
680-143293-1	DW-23-092017	Water	09/20/17 09:30	09/21/17 09:15

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# **Method Summary**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-143293-1

Method	Method Description	Protocol	Laboratory
2540 D-2011	Total Suspended Solids (Dried at 103-105°C)	SM	TAL SAV

**Protocol References:** 

SM = "Standard Methods For The Examination Of Water And Wastewater",

Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

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### **Definitions/Glossary**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

Not Calculated

**Quality Control** 

Practical Quantitation Limit

Relative Error Ratio (Radiochemistry)

Toxicity Equivalent Factor (Dioxin)

Toxicity Equivalent Quotient (Dioxin)

Not Detected at the reporting limit (or MDL or EDL if shown)

Relative Percent Difference, a measure of the relative difference between two points

Reporting Limit or Requested Limit (Radiochemistry)

TestAmerica Job ID: 680-143293-1

#### **Qualifiers**

### **General Chemistry**

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.

### **Glossary**

NC ND

PQL

QC

RER

RPD

TEF

**TEQ** 

RL

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)

TestAmerica Savannah

# **Client Sample Results**

Client: Tetra Tech, Inc.

TestAmerica Job ID: 680-143293-1

Project/Site: Middle River Sediment Remediation

Client Sample ID: DW-23-092017 Lab Sample ID: 680-143293-1

Date Collected: 09/20/17 09:30 Matrix: Water

Date Received: 09/21/17 09:15

General Chemistry								
Analyte	Result Qua	alifier RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	1.9	1.0	1.0	mg/L			09/21/17 13:24	1

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### **QC Sample Results**

Client: Tetra Tech, Inc.

TestAmerica Job ID: 680-143293-1

Project/Site: Middle River Sediment Remediation

Method: 2540 D-2011 - Total Suspended Solids (Dried at 103-105°C)

Lab Sample ID: MB 680-495536/1 Client Sample ID: Method Blank
Matrix: Water Prep Type: Total/NA

Analysis Batch: 495536

	MB	MB								
Analyte	Result	Qualifier	RL	MDL	Unit	D	)	Prepared	Analyzed	Dil Fac
Total Suspended Solids	1.0	U	1.0	1.0	mg/L				09/21/17 13:24	1

Lab Sample ID: LCS 680-495536/2

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 495536

		Spike	LCS	LCS				%Rec.	
Analyte		Added	Result	Qualifier	Unit	D	%Rec	Limits	
Total Suspended Solids		20.0	21.5		mg/L		108	80 - 120	

Lab Sample ID: LCSD 680-495536/3

Client Sample ID: Lab Control Sample Dup
Matrix: Water

Prep Type: Total/NA

Analysis Batch: 495536

	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Total Suspended Solids	20.0	22.5		mg/L	<del></del> _	113	80 - 120	5	25

9/22/2017

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# **QC Association Summary**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-143293-1

### **General Chemistry**

### Analysis Batch: 495536

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-143293-1	DW-23-092017	Total/NA	Water	2540 D-2011	
MB 680-495536/1	Method Blank	Total/NA	Water	2540 D-2011	
LCS 680-495536/2	Lab Control Sample	Total/NA	Water	2540 D-2011	
LCSD 680-495536/3	Lab Control Sample Dup	Total/NA	Water	2540 D-2011	

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### **Lab Chronicle**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

Client Sample ID: DW-23-092017

TestAmerica Job ID: 680-143293-1

Lab Sample ID: 680-143293-1

**Matrix: Water** 

Date Collected: 09/20/17 09:30

Date Received: 09/21/17 09:15

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	2540 D-2011		1	1000 mL	1000 mL	495536	09/21/17 13:24	JEC	TAL SAV
	Instrument	ID: NOEQUIP								

#### **Laboratory References:**

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

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9/22/2017

### **Login Sample Receipt Checklist**

Client: Tetra Tech, Inc. Job Number: 680-143293-1

Login Number: 143293 List Source: TestAmerica Savannah

List Number: 1

Creator: Banda, Christy S

oroator. Barrat, ormoty o	
Question	Answer Comment
Radioactivity wasn't checked or is = background as measured by a survey meter.</td <td>N/A</td>	N/A
The cooler's custody seal, if present, is intact.	True
Sample custody seals, if present, are intact.	True
The cooler or samples do not appear to have been compromised or tampered with.	True
Samples were received on ice.	True
Cooler Temperature is acceptable.	True
Cooler Temperature is recorded.	True
COC is present.	True
COC is filled out in ink and legible.	True
COC is filled out with all pertinent information.	True
Is the Field Sampler's name present on COC?	N/A
There are no discrepancies between the containers received and the COC.	True
Samples are received within Holding Time (excluding tests with immediate HTs)	True
Sample containers have legible labels.	True
Containers are not broken or leaking.	True
Sample collection date/times are provided.	True
Appropriate sample containers are used.	True
Sample bottles are completely filled.	True
Sample Preservation Verified.	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").	N/A
Multiphasic samples are not present.	True
Samples do not require splitting or compositing.	True
Residual Chlorine Checked.	N/A

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# **Accreditation/Certification Summary**

Client: Tetra Tech, Inc.

TestAmerica Job ID: 680-143293-1

### **Laboratory: TestAmerica Savannah**

Project/Site: Middle River Sediment Remediation

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	11-05-17 *
Arizona	State Program	9	AZ808	12-14-17
Arkansas DEQ	State Program	6	88-0692	02-01-18
California	State Program	9	2939	06-30-17 *
Colorado	State Program	8	N/A	12-31-17
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	04-16-18
Hawaii	State Program	9	N/A	06-30-18
Illinois	NELAP	5	200022	11-30-17
Indiana	State Program	5	N/A	06-30-18
lowa	State Program	7	353	06-30-19
Kentucky (DW)	State Program	4	90084	12-31-17
Kentucky (UST)	State Program	4	18	06-30-18
Kentucky (WW)	State Program	4	90084	12-31-17
L-A-B	DoD ELAP	7	L2463	09-22-19
L-A-B	ISO/IEC 17025		L2463.01	09-22-19
Louisiana	NELAP	6	30690	06-30-18
	NELAP	6	LA160019	12-31-17
Louisiana (DW)				
Maine Mariland	State Program	1	GA00006	09-24-18
Maryland	State Program	3	250	12-31-17
Massachusetts	State Program	1 <u>-</u>	M-GA006	06-30-18
Michigan	State Program	5	9925	06-30-17 *
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	03-31-18
North Carolina (DW)	State Program	4	13701	07-31-18
North Carolina (WW/SW)	State Program	4	269	12-31-17
Oklahoma	State Program	6	9984	08-31-18
Pennsylvania	NELAP	3	68-00474	06-30-18
Puerto Rico	State Program	2	GA00006	12-31-17
South Carolina	State Program	4	98001	06-30-17 *
Tennessee	State Program	4	TN02961	06-30-18
Texas	NELAP	6	T104704185-16-9	11-30-17
Texas	State Program	6	T104704185	06-30-18
US Fish & Wildlife	Federal		LE058448-0	07-31-18
USDA	Federal		SAV 3-04	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	12-31-17
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 *

<sup>\*</sup> Accreditation/Certification renewal pending - accreditation/certification considered valid.

TestAmerica Savannah

9/22/2017



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: 680-143538-1

Client Project/Site: Middle River Sediment Remediation

#### For:

Tetra Tech, Inc. 19803 North Creek Parkway Bothell, Washington 98011

Attn: Keir Craigie

Jerry James

Authorized for release by: 9/28/2017 5:05:51 PM

Jerry Lanier, Project Manager I (912)354-7858 e.3410 jerry.lanier@testamericainc.com

·····LINKS ·······

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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### **Case Narrative**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-143538-1

Job ID: 680-143538-1

**Laboratory: TestAmerica Savannah** 

**Narrative** 

#### **CASE NARRATIVE**

Client: Tetra Tech, Inc.

**Project: Middle River Sediment Remediation** 

Report Number: 680-143538-1

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 09/27/2017; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 3.2 C.

#### **TOTAL SUSPENDED SOLIDS**

Sample DW-24-092617 (680-143538-1) was analyzed for total suspended solids in accordance with SM 2540D. The samples were analyzed on 09/27/2017.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

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# **Sample Summary**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-143538-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
680-143538-1	DW-24-092617	Water	09/26/17 10:30	09/27/17 09:25

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# **Method Summary**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-143538-1

Method	Method Description	Protocol	Laboratory
2540 D-2011	Total Suspended Solids (Dried at 103-105°C)	SM	TAL SAV

#### **Protocol References:**

SM = "Standard Methods For The Examination Of Water And Wastewater",

#### Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

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### **Definitions/Glossary**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

Not Calculated

**Quality Control** 

Practical Quantitation Limit

Relative Error Ratio (Radiochemistry)

Toxicity Equivalent Factor (Dioxin)

Toxicity Equivalent Quotient (Dioxin)

Not Detected at the reporting limit (or MDL or EDL if shown)

Relative Percent Difference, a measure of the relative difference between two points

Reporting Limit or Requested Limit (Radiochemistry)

TestAmerica Job ID: 680-143538-1

#### **Qualifiers**

### **General Chemistry**

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.

### **Glossary**

NC

ND

PQL

QC

RER

RPD

TEF

**TEQ** 

RL

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	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)			

### **Client Sample Results**

Client: Tetra Tech, Inc.

TestAmerica Job ID: 680-143538-1

Project/Site: Middle River Sediment Remediation

Client Sample ID: DW-24-092617 Lab Sample ID: 680-143538-1

Date Collected: 09/26/17 10:30 Matrix: Water

Date Received: 09/27/17 09:25

General Chemistry								
Analyte	Result Qualif	fier RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	6.6	1.0	1.0	mg/L			09/27/17 18:05	1

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### **QC Sample Results**

Client: Tetra Tech, Inc.

TestAmerica Job ID: 680-143538-1

Project/Site: Middle River Sediment Remediation

Method: 2540 D-2011 - Total Suspended Solids (Dried at 103-105°C)

Lab Sample ID: MB 680-496357/1 Client Sample ID: Method Blank
Matrix: Water Prep Type: Total/NA

Analysis Batch: 496357

	IVID	IVID							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	1.0	U	1.0	1.0	mg/L			09/27/17 18:05	1

Lab Sample ID: LCS 680-496357/2

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 496357

	Spike	LCS	LCS				%Rec.	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Total Suspended Solids	20.0	18.5		mg/L		93	80 - 120	

Lab Sample ID: LCSD 680-496357/3

Client Sample ID: Lab Control Sample Dup
Matrix: Water

Prep Type: Total/NA

Analysis Batch: 496357

<b>,</b>	Spike	LCSD	LCSD				%Rec.		RPD	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit	
Total Suspended Solids	 20.0	18.5		ma/l		93	80 - 120		25	

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## **QC Association Summary**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-143538-1

### **General Chemistry**

#### Analysis Batch: 496357

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-143538-1	DW-24-092617	Total/NA	Water	2540 D-2011	
MB 680-496357/1	Method Blank	Total/NA	Water	2540 D-2011	
LCS 680-496357/2	Lab Control Sample	Total/NA	Water	2540 D-2011	
LCSD 680-496357/3	Lab Control Sample Dup	Total/NA	Water	2540 D-2011	

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#### **Lab Chronicle**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

Client Sample ID: DW-24-092617

TestAmerica Job ID: 680-143538-1

Lab Sample ID: 680-143538-1

Matrix: Water

Date Collected: 09/26/17 10:30 Date Received: 09/27/17 09:25

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	2540 D-2011		1	1000 mL	1000 mL	496357	09/27/17 18:05	JEC	TAL SAV
	Instrument	ID: NOEQUIP								

#### Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

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### **Login Sample Receipt Checklist**

Client: Tetra Tech, Inc. Job Number: 680-143538-1

Login Number: 143538 List Source: TestAmerica Savannah

List Number: 1

Creator: Banda, Christy S

Question	Answer	Comment
Radioactivity wasn't checked or is = background as measured by a survey meter.</td <td>N/A</td> <td></td>	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

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### **Accreditation/Certification Summary**

Client: Tetra Tech, Inc. Project/Site: Middle River Sediment Remediation TestAmerica Job ID: 680-143538-1

#### **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	11-05-17 *
Arizona	State Program	9	AZ808	12-14-17
Arkansas DEQ	State Program	6	88-0692	02-01-18
California	State Program	9	2939	06-30-18
Colorado	State Program	8	N/A	12-31-17
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	04-16-18
Hawaii	State Program	9	N/A	06-30-18
Illinois	NELAP	5	200022	11-30-17
Indiana	State Program	5	N/A	06-30-18
lowa	State Program	7	353	06-30-19
Kentucky (DW)	State Program	4	90084	12-31-17
Kentucky (UST)	State Program	4	18	06-30-18
Kentucky (WW)	State Program	4	90084	12-31-17
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	12-31-17
Maine	State Program	1	GA00006	09-24-18
Maryland	State Program	3	250	12-31-17
Massachusetts	State Program	1	M-GA006	06-30-18
Michigan	State Program	5	9925	06-30-17 *
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	03-31-18
North Carolina (DW)	State Program		13701	07-31-18
North Carolina (WW/SW)	State Program	4	269	12-31-17
Oklahoma	State Program	6	9984	08-31-18
Pennsylvania	NELAP	3	68-00474	06-30-18
Puerto Rico	State Program	2	GA00006	12-31-17
South Carolina	State Program	4	98001	06-30-17 *
	State Program		TN02961	06-30-17
Tennessee Texas	NELAP	6	T104704185-16-9	11-30-17
Texas	State Program	6	T104704185-10-9	06-30-18
US Fish & Wildlife	Federal		LE058448-0	07-31-18
USDA				06-14-20 *
	Federal	2	SAV 3-04	
Virginia	NELAP	3	460161	06-14-18
Washington	State Program	10	C805	06-10-18
West Virginia (DW)	State Program	3	9950C	12-31-17
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 *

<sup>\*</sup> Accreditation/Certification renewal pending - accreditation/certification considered valid.

TestAmerica Savannah

9/28/2017

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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: 680-143779-1

Client Project/Site: Middle River Sediment Remediation

#### For:

Tetra Tech, Inc. 19803 North Creek Parkway Bothell, Washington 98011

Attn: Keir Craigie



Authorized for release by: 10/4/2017 11:54:41 AM Michele Kersey, Project Manager II (912)354-7858 michele.kersey@testamericainc.com

Designee for

Jerry Lanier, Project Manager I (912)354-7858 e.3410 jerry.lanier@testamericainc.com

.....LINKS .....

Review your project results through
Total Access

**Have a Question?** 



Visit us at: www.testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

# **Table of Contents**

Cover Page	1
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#### **Case Narrative**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-143779-1

Job ID: 680-143779-1

**Laboratory: TestAmerica Savannah** 

**Narrative** 

#### **CASE NARRATIVE**

Client: Tetra Tech, Inc.

**Project: Middle River Sediment Remediation** 

Report Number: 680-143779-1

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 sample was received on 10/3/2017 9:15 AM; the sample arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 0.4° C.

#### **TOTAL SUSPENDED SOLIDS**

Sample DW-24-100217 (680-143779-1) was analyzed for total suspended solids in accordance with SM 2540D. The samples were analyzed on 10/03/2017.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

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### **Sample Summary**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-143779-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
680-143779-1	DW-24-100217	Water	10/02/17 09:45	10/03/17 09:15

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### **Method Summary**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-143779-1

Method	Method Description	Protocol	Laboratory
2540 D-2011	Total Suspended Solids (Dried at 103-105°C)	SM	TAL SAV

#### Protocol References:

SM = "Standard Methods For The Examination Of Water And Wastewater",

#### Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

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### **Definitions/Glossary**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

Not Detected at the reporting limit (or MDL or EDL if shown)

Relative Percent Difference, a measure of the relative difference between two points

Reporting Limit or Requested Limit (Radiochemistry)

**Practical Quantitation Limit** 

Relative Error Ratio (Radiochemistry)

Toxicity Equivalent Factor (Dioxin)

Toxicity Equivalent Quotient (Dioxin)

**Quality Control** 

TestAmerica Job ID: 680-143779-1

#### **Qualifiers**

#### **General Chemistry**

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.

### **Glossary**

ND PQL

QC

RER

RPD

TEF

TEQ

RL

Abbreviation	These commonly used abbreviations may or may not be present in this report.
n	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

### **Client Sample Results**

Client: Tetra Tech, Inc.

TestAmerica Job ID: 680-143779-1

Project/Site: Middle River Sediment Remediation

Client Sample ID: DW-24-100217 Lab Sample ID: 680-143779-1

Date Collected: 10/02/17 09:45 Matrix: Water

Date Received: 10/03/17 09:15

	General Chemistry									
	Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
l	Total Suspended Solids	11		2.0	2.0	mg/L			10/03/17 16:07	1

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#### **QC Sample Results**

Client: Tetra Tech, Inc. TestAmerica Job ID: 680-143779-1

Project/Site: Middle River Sediment Remediation

Method: 2540 D-2011 - Total Suspended Solids (Dried at 103-105°C)

Lab Sample ID: MB 680-497078/1 Client Sample ID: Method Blank **Matrix: Water** Prep Type: Total/NA

Analysis Batch: 497078

мв мв Result Qualifier RL MDL Unit Dil Fac Analyte D Prepared Analyzed 1.0 U 1.0 1.0 mg/L 10/03/17 16:07 **Total Suspended Solids** 

Lab Sample ID: LCS 680-497078/2 **Client Sample ID: Lab Control Sample Matrix: Water** Prep Type: Total/NA

Analysis Batch: 497078

Spike LCS LCS %Rec. Analyte Added Result Qualifier Unit %Rec Limits **Total Suspended Solids** 20.0 20.0 mg/L 100 80 - 120

Lab Sample ID: LCSD 680-497078/3 Client Sample ID: Lab Control Sample Dup **Matrix: Water** Prep Type: Total/NA

Analysis Batch: 497078

Spike LCSD LCSD %Rec. RPD Limit Added Result Qualifier Unit %Rec Limits **RPD** Total Suspended Solids 20.0 20.5 103 80 - 120 25 mg/L

Lab Sample ID: 680-143779-1 DU Client Sample ID: DW-24-100217 Prep Type: Total/NA

**Matrix: Water** 

Analysis Batch: 497078

DU DU RPD Sample Sample Analyte Result Qualifier Result Qualifier Unit Limit Total Suspended Solids 11 10.6 5 mg/L

## **QC Association Summary**

Client: Tetra Tech, Inc.

TestAmerica Job ID: 680-143779-1 Project/Site: Middle River Sediment Remediation

### **General Chemistry**

#### Analysis Batch: 497078

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-143779-1	DW-24-100217	Total/NA	Water	2540 D-2011	
MB 680-497078/	1 Method Blank	Total/NA	Water	2540 D-2011	
LCS 680-497078	/2 Lab Control Sample	Total/NA	Water	2540 D-2011	
LCSD 680-49707	78/3 Lab Control Sample Dup	Total/NA	Water	2540 D-2011	
680-143779-1 DI	J DW-24-100217	Total/NA	Water	2540 D-2011	

#### **Lab Chronicle**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-143779-1

Lab Sample ID: 680-143779-1

**Matrix: Water** 

Client Sample ID: DW-24-100217 Date Collected: 10/02/17 09:45

Date Received: 10/03/17 09:15

		Batch	Batch		Dil	Initial	Final	Batch	Prepared		
	Prep Type	Туре	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
	Total/NA	Analysis	2540 D-2011		1	500 mL	1000 mL	497078	10/03/17 16:07	JEC	TAL SAV
Instrument ID: NOEQUIP											

Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

**TestAmerica** THE LEADER IN ENVIRONMENTAL TESTING TestAmerica Laboratories, Inc. TAL-8210 (0713) # TSS 24 HR FAT X Sample Specific Notes: COCs Sample Disposal ( A fee may be assessed if samples are retained longer than 1 month) Special Instructions/QC Requirements & Comments: # Meddle Privat Sediment Project :- NPDES Sampling & 30AY TAT & 24HA TAT For TSS & mille For Lab Use Only ld-2-201 Walk-in Client: Job / SDG No. Lab Sampling: of Therm ID No Date/Time: Date/Time: COC No: 680-143779 Chain of Custody Archive for 000543 EGHMENICA BALTIMORE eMEK 80325 NO. Company Date: (v/2) Disposal by Lab Carrier: Chain of Custody Record Site Contact: John Roberty Lab Contact: Jeny Lanel Return to Client ved in Kabo Filtered Sample (Y/N)
Perform MS/MSD (Y/N)
Methol S Cus Pb Cd. (200.8)
TSS-2540.0 eceived by × Sx51 (/P/0) 191 t1) to 0 NPDES Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the # of Cont. 2 weeks 3 MAYS P Date/Time 2 days + 24 H/2 WORKING DAYS Matrix 49 Analysis Turnaround Time Regulatory Program: Dw Project Manager: Keir Craifie TellFax: 978-835-6894 Type (C=Comp, G=Grab) Sample TAT if different from Below A TESTAMERICH SALAWWAH, GAR 0 Company Feel Inc Sample Shb0 4/4/01 CALENDAR DAYS Time Preservation Used: 1= Ice, 2= HCI; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other Custody Seal No. Company: Sample Company Date Comments Section if the lab is to dispose of the sample. MAC- Selliment Memedy estAmerica Baltimore 112001-42-MO Sample Identification Company Name: Tetra Tech Inc. Address: 19807 North Creek Hanover, ND 21076 Phone: 410.766.2516 Fax: Client Contact 4211089 riddle port 425-482-7647 7526 Connelley Drive Possible Hazard Identification: City/State/Zip: Bothell, wA. Custody Seals Intact Relinquished by: Relinquished b Project Name: Relinquished Suite F Phone: # O d Page 11 of 13

Client: Tetra Tech, Inc.

Job Number: 680-143779-1

Login Number: 143779 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.</td <td>N/A</td> <td></td>	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").	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: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-143779-1

### 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	11-05-17 *
Arizona	State Program	9	AZ808	12-14-17
Arkansas DEQ	State Program	6	88-0692	02-01-18
California	State Program	9	2939	06-30-18
Colorado	State Program	8	N/A	12-31-17
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	04-16-18
Hawaii	State Program	9	N/A	06-30-18
Illinois	NELAP	5	200022	11-30-17
Indiana	State Program		N/A	06-30-18
lowa	State Program	7	353	06-30-19
Kentucky (DW)	State Program	4	90084	12-31-17
Kentucky (UST)	State Program	4	18	06-30-18
Kentucky (WW)	State Program	4	90084	12-31-17
L-A-B	DoD ELAP	4	L2463	09-22-19
L-A-B L-A-B	ISO/IEC 17025		L2463.01	09-22-19
		0		
Louisiana (DM)	NELAP	6	30690	06-30-18
Louisiana (DW)	NELAP	6	LA160019	12-31-17
Maine	State Program	1	GA00006	09-24-18
Maryland	State Program	3	250	12-31-17
Massachusetts	State Program	<u> </u>	M-GA006	06-30-18
Michigan	State Program	5	9925	06-30-17 *
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	03-31-18
North Carolina (DW)	State Program	4	13701	07-31-18
North Carolina (WW/SW)	State Program	4	269	12-31-17
Oklahoma	State Program	6	9984	08-31-18
Pennsylvania	NELAP	3	68-00474	06-30-18
Puerto Rico	State Program	2	GA00006	12-31-17
South Carolina	State Program	4	98001	06-30-17 *
Tennessee	State Program	4	TN02961	06-30-18
Texas	NELAP	6	T104704185-16-9	11-30-17
Texas	State Program	6	T104704185	06-30-18
US Fish & Wildlife	Federal		LE058448-0	07-31-18
USDA	Federal		SAV 3-04	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	12-31-17
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 *

<sup>\*</sup> Accreditation/Certification renewal pending - accreditation/certification considered valid.

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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: 680-144296-1

Client Project/Site: Middle River Sediment Remediation

#### For:

Tetra Tech, Inc. 19803 North Creek Parkway Bothell, Washington 98011

Attn: Keir Craigie

Juny Janier

Authorized for release by: 10/16/2017 5:35:59 PM

Jerry Lanier, Project Manager I (912)354-7858 e.3410 jerry.lanier@testamericainc.com

.....LINKS .....

Review your project results through

Total Access

**Have a Question?** 



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.

TestAmerica Job ID: 680-144296-1

Project/Site: Middle River Sediment Remediation

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#### **Case Narrative**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-144296-1

Job ID: 680-144296-1

**Laboratory: TestAmerica Savannah** 

Narrative

#### **CASE NARRATIVE**

Client: Tetra Tech, Inc.

**Project: Middle River Sediment Remediation** 

Report Number: 680-144296-1

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 10/13/2017; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 0.6 C.

#### **TOTAL SUSPENDED SOLIDS**

Sample DW-25-101217 (680-144296-1) was analyzed for total suspended solids in accordance with SM 2540D. The samples were analyzed on 10/15/2017.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

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### **Sample Summary**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-144296-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
680-144296-1	DW-25-101217	Water	10/12/17 07:20	10/13/17 08:55

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### **Method Summary**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-144296-1

Method	Method Description	Protocol	Laboratory
2540 D-2011	Total Suspended Solids (Dried at 103-105°C)	SM	TAL SAV

#### **Protocol References:**

SM = "Standard Methods For The Examination Of Water And Wastewater",

#### Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

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### **Definitions/Glossary**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

Practical Quantitation Limit

Relative Error Ratio (Radiochemistry)

Toxicity Equivalent Factor (Dioxin)

Toxicity Equivalent Quotient (Dioxin)

Reporting Limit or Requested Limit (Radiochemistry)

Relative Percent Difference, a measure of the relative difference between two points

**Quality Control** 

TestAmerica Job ID: 680-144296-1

#### **Qualifiers**

#### **General Chemistry**

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.

### **Glossary**

PQL

QC

RER

RPD TEF

TEQ

RL

Ciossary	
Abbreviation	These commonly used abbreviations may or may not be present in this report.
n	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)

TestAmerica Savannah

### **Detection Summary**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-144296-1

Client Sample ID: DW-25-101217 Lab Sample ID: 680-144296-1

Analyte	Result Qualifier	RL	MDL Unit	Dil Fac	Method	Prep Type
Total Suspended Solids	1.5	1.0	1.0 mg/L		2540 D-2011	Total/NA

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### **Client Sample Results**

Client: Tetra Tech, Inc.

TestAmerica Job ID: 680-144296-1

Project/Site: Middle River Sediment Remediation

Client Sample ID: DW-25-101217 Lab Sample ID: 680-144296-1

Date Collected: 10/12/17 07:20 Matrix: Water

Date Received: 10/13/17 08:55

General Chemistry								
Analyte	Result Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	1.5	1.0	1.0	mg/L			10/15/17 10:42	1

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### **QC Sample Results**

Client: Tetra Tech, Inc.

TestAmerica Job ID: 680-144296-1

Project/Site: Middle River Sediment Remediation

Method: 2540 D-2011 - Total Suspended Solids (Dried at 103-105°C)

Lab Sample ID: MB 680-498556/1	Client Sample ID: Method Blank
Matrix: Water	Prep Type: Total/NA

Analysis Batch: 498556

	MB	MB							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	1.0	U	1.0	1.0	mg/L			10/15/17 10:42	1

Lab Sample ID: LCS 680-498556/2	Client Sample ID: Lab Control Sample
Matrix: Water	Prep Type: Total/NA
Analysis Batch: 498556	

	Spik	e LCS	LCS				%Rec.	
Analyte	Adde	d Result	Qualifier	Unit	D	%Rec	Limits	
Total Suspended Solids	20.	0 20.5		mg/L		103	80 - 120	

Lab Sample ID: LCSD 680-498556/3

Client Sample ID: Lab Control Sample Dup
Matrix: Water

Prep Type: Total/NA

Analysis Batch: 498556

Timely Cit Button 100000										
	Spike	LCSD	LCSD				%Rec.		RPD	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit	
Total Suspended Solids	20.0	22.0		ma/L		110	80 - 120	7	25	

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## **QC Association Summary**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-144296-1

### **General Chemistry**

### Analysis Batch: 498556

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-144296-1	DW-25-101217	Total/NA	Water	2540 D-2011	
MB 680-498556/1	Method Blank	Total/NA	Water	2540 D-2011	
LCS 680-498556/2	Lab Control Sample	Total/NA	Water	2540 D-2011	
LCSD 680-498556/3	Lab Control Sample Dup	Total/NA	Water	2540 D-2011	

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#### **Lab Chronicle**

Client: Tetra Tech, Inc.

Date Received: 10/13/17 08:55

Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-144296-1

Lab Sample ID: 680-144296-1

**Matrix: Water** 

Client Sample ID: DW-25-101217 Date Collected: 10/12/17 07:20

Batch Batch Dil Initial Final Batch Prepared Prep Type Method or Analyzed Type Run Factor Amount **Amount** Number Analyst Lab Total/NA Analysis 2540 D-2011 1000 mL 1000 mL 498556 10/15/17 10:42 JEC TAL SAV Instrument ID: NOEQUIP

#### Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

BALTIMORE TestAmerica Laboratories, Inc. TAL-8210 (0713) **TestAmerico** MA Sample Specific Notes 558 Special Instructions/AC Requirements & Comments: A Middle River Sediment Prodect - NPDES Sanding & B 3 Day TATA 24HR MITTEN TSSA COCs ATSS 24 HC 680-1 44296 Chain of Custody Sample Disposal ( A fee may be assessed if samples are retained longer than 1 month) Test 4 Werica 10-12-201 Date/Time: Sampler: MVII For Lab Use Only: of 1 Walk-in Client Job / SDG No. ab Sampling: Therm ID No Archive for 180325 Company: Carrier: Fed EX Site Contact: John Roberts Date: 10/12/17 Disposal by Lab Suite F Chain of Custody Record Lab Contact: Jecry Lynier Received in Laboratory by: Other: Return to Client RCRA Perform MS / MSD (Y / N ) N/N/X Filtered Sample (Y/N) 19/11/11/16/5 Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the NPDES 16.12-2017/ # of Cont. 012 Date/Time: WORKING DAYS Matrix Project Manager: Keir Lragie TellFax: 978-835-6694 A9, Analysis Turnaround Time Regulatory Program: Dw Type (C=Comp. G=Grab) Sample TAT if different from Below 5 estAmerica 2 weeks 2 days 1 week Tetratich foc 1 day CALENDAR DAYS Sample Time di2/17 0720 Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other Custody Seal No. 7 Poison B Sample Company Company Date ITECK PKWY Comments Section If the lab is to dispose of the sample Project Name: MRC - Sediment Remedy Company Name: Teth Tech
Address: 19803 North Cre
City/State/Zip: Bothell VA 98011
Phone: 425-482-7647 Sample Identification DW-25-101217 Yes PO# Project# 6801729 Client Contact Hanover, ND 21076 Phone: 410.766.2516 Fax: Possible Hazard Identification: Custody Seals Intact Relinquished by: . Kelinquished by: /16/5017 elinquished by: Non-Hazard Fax Page 12 of 14

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### **Login Sample Receipt Checklist**

Client: Tetra Tech, Inc. Job Number: 680-144296-1

Login Number: 144296 List Source: TestAmerica Savannah

List Number: 1

Creator: Tyler, Matthew M

orollor. Tyror, mutation in	
Question	Answer Comment
Radioactivity wasn't checked or is = background as measured by a survey meter.</td <td>N/A</td>	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
s the Field Sampler's name present on COC?	N/A
There are no discrepancies between the containers received and the COC.	True
Samples are received within Holding Time (excluding tests with immediate HTs)	True
Sample containers have legible labels.	True
Containers are not broken or leaking.	True
Sample collection date/times are provided.	True
Appropriate sample containers are used.	True
Sample bottles are completely filled.	True
Sample Preservation Verified.	N/A
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True
Containers requiring zero headspace have no headspace or bubble is 6mm (1/4").	N/A
Multiphasic samples are not present.	True
Samples do not require splitting or compositing.	True
Residual Chlorine Checked.	N/A

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### **Accreditation/Certification Summary**

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-144296-1

# Laboratory: TestAmerica Savannah

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

AFCEE		SAVLAB	
State Program	4	41450	06-30-18
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-			12-31-17
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			06-30-18
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State Program			06-30-18
State Program			04-16-18
State Program	9		06-30-18
NELAP	5	200022	11-30-17
State Program	5	N/A	06-30-18
State Program	7	353	06-30-19
State Program	4	90084	12-31-17
State Program	4	18	06-30-18
State Program	4	90084	12-31-17
DoD ELAP		L2463	09-22-19
ISO/IEC 17025		L2463.01	09-22-19
NELAP	6	30690	06-30-18
NELAP	6	LA160019	12-31-17
State Program	1	GA00006	09-24-18
State Program	3	250	12-31-17
State Program	1	M-GA006	06-30-18
State Program	5	9925	06-30-17 *
State Program	4	N/A	06-30-18
State Program	7	TestAmerica-Savannah	06-30-18
NELAP	2	GA769	06-30-18
State Program	6	N/A	06-30-18
NELAP	2	10842	03-31-18
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State Program	8	8TMS-L	06-30-16 *
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<sup>\*</sup> Accreditation/Certification renewal pending - accreditation/certification considered valid.

TestAmerica Savannah

10/16/2017

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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: 680-144485-1

Client Project/Site: Middle River Sediment Remediation

#### For:

Tetra Tech, Inc. 19803 North Creek Parkway Bothell, Washington 98011

Attn: Keir Craigie

Juny Jamie

Authorized for release by: 10/20/2017 12:55:21 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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#### **Case Narrative**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-144485-1

Job ID: 680-144485-1

**Laboratory: TestAmerica Savannah** 

Narrative

#### **CASE NARRATIVE**

Client: Tetra Tech, Inc.

**Project: Middle River Sediment Remediation** 

Report Number: 680-144485-1

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 10/19/2017; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 1.4 C.

#### **TOTAL SUSPENDED SOLIDS**

Sample DW-26-101817 (680-144485-1) was analyzed for total suspended solids in accordance with SM 2540D. The samples were analyzed on 10/19/2017.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

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## **Sample Summary**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-144485-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
680-144485-1	DW-26-101817	Water	10/18/17 13:30	10/19/17 09:21

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## **Method Summary**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-144485-1

Method	Method Description	Protocol	Laboratory
2540 D-2011	Total Suspended Solids (Dried at 103-105°C)	SM	TAL SAV

#### **Protocol References:**

SM = "Standard Methods For The Examination Of Water And Wastewater",

#### Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

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## **Definitions/Glossary**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

Not Calculated

**Quality Control** 

Practical Quantitation Limit

Relative Error Ratio (Radiochemistry)

Toxicity Equivalent Factor (Dioxin)

Toxicity Equivalent Quotient (Dioxin)

Not Detected at the reporting limit (or MDL or EDL if shown)

Relative Percent Difference, a measure of the relative difference between two points

Reporting Limit or Requested Limit (Radiochemistry)

TestAmerica Job ID: 680-144485-1

#### **Qualifiers**

#### **General Chemistry**

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.

## **Glossary**

NC

ND

PQL

QC

RER

RPD

TEF

**TEQ** 

RL

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)

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## **Client Sample Results**

Client: Tetra Tech, Inc.

TestAmerica Job ID: 680-144485-1

Project/Site: Middle River Sediment Remediation

Client Sample ID: DW-26-101817 Lab Sample ID: 680-144485-1

Date Collected: 10/18/17 13:30 Matrix: Water

Date Received: 10/19/17 09:21

General Chemistry								
Analyte	Result Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	2.4	1.0	1.0	mg/L			10/19/17 14:44	1

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## **QC Sample Results**

Client: Tetra Tech, Inc. TestAmerica Job ID: 680-144485-1

Project/Site: Middle River Sediment Remediation

Method: 2540 D-2011 - Total Suspended Solids (Dried at 103-105°C)

Lab Sample ID: MB 680-499150/1 Client Sample ID: Method Blank **Matrix: Water** Prep Type: Total/NA

Analysis Batch: 499150

	MB	MB							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepare	ed Analyzed	Dil Fac
Total Suspended Solids	1.0	U	1.0	1.0	mg/L			10/19/17 11:35	1

Lab Sample ID: LCS 680-499150/2 **Client Sample ID: Lab Control Sample Matrix: Water** Prep Type: Total/NA

Analysis Batch: 499150

	Spike	LCS	LCS				%Rec.	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Total Suspended Solids	 20.0	16.5		mg/L	_	83	80 - 120	

Lab Sample ID: LCSD 680-499150/3 **Client Sample ID: Lab Control Sample Dup Matrix: Water** Prep Type: Total/NA

Analysis Batch: 499150

7	Spike	LCSD	LCSD			%Rec.		RPD	
Analyte	Added	Result	Qualifier U	Jnit D	%Rec	Limits	RPD	Limit	
Total Suspended Solids	20.0	16.0	n	na/L	80	80 - 120	3	25	

TestAmerica Savannah

# **QC Association Summary**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-144485-1

## **General Chemistry**

## Analysis Batch: 499150

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-144485-1	DW-26-101817	Total/NA	Water	2540 D-2011	
MB 680-499150/1	Method Blank	Total/NA	Water	2540 D-2011	
LCS 680-499150/2	Lab Control Sample	Total/NA	Water	2540 D-2011	
LCSD 680-499150/3	Lab Control Sample Dup	Total/NA	Water	2540 D-2011	

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#### **Lab Chronicle**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

Client Sample ID: DW-26-101817

Date Collected: 10/18/17 13:30

Date Received: 10/19/17 09:21

TestAmerica Job ID: 680-144485-1

Lab Sample ID: 680-144485-1

**Matrix: Water** 

Dil Batch Batch Initial Final Batch Prepared Prep Type Method or Analyzed Type Run Factor Amount **Amount** Number Analyst Lab Total/NA Analysis 2540 D-2011 1000 mL 1000 mL 499150 10/19/17 14:44 JEC TAL SAV Instrument ID: NOEQUIP

Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

180325 TestAmerica BALTIMOR HestAmerica Laboratories, Inc. TAL-8210 (0713) 4:30 # 755-24 hr mat Sample Specific Notes: 921 COCs 680-1 44485 Chain of Custody Sample Disposal ( A fee may be assessed if samples are retained longer than 1 month) Date/Time/(q))) For Lab Use Only: 10 19 17 Date/Time: Job / SDG No. Walk-in Client: ab Sampling: 5 Date/Time COC No 1,10c(1P) 1.40C Keir, caigie @ totatel.com Archive for Company SAV 10/18/17 Company. Company: Posposal by Lab Carrier: Date: Chain of Custody Record Site Contact: John Roberts Received in Labaratory by: Special Instructions/QC Requirements & Comments: # Middle Awar Sediment Poject -NPDES Sungling A Return to Client Lab Contact: 8.000 Filtered Sample ( Y / N ) NPDES Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the 0-18-2017 # of 2 days 755 24 MRS Date/Time: 1/8/101 WORKING DAYS 2 weeks 3 04 PS Matrix RD Project Manager: Kei'r Craisi'e TellFax: Y78-675-66fy Regulatory Program: Dw Analysis Turnaround Time Type (C=Comp, G=Grab) rest fureria Sample TAT if different from Below TestAmerica Baltimore 0 Company. Tel Jos CALENDAR DAYS Sample 19/8/11 1330 Time Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other Custody Seal No. Poison B Sample Comments Section if the lab is to dispose of the sample. Project Name: MPL Sediment Prengly No Company Name: Tet w Tech Inc Address: 19803 North (Teek Phuy Pathell WA, 98011 DW-26-101817 Sample Identification 175-482-7647 Client Contact Hanover, 110 21076 Phone: 410.766.2516 Fax: Possible Hazard Identification: MAC-MADL 6801729 Custody Seals Intact Relinquished by: Relinquished by Refinguished by City/State/Zip: Phone: #0 d Site: <del>10/20/20</del>17 Page 11 of 13

## **Login Sample Receipt Checklist**

Client: Tetra Tech, Inc. Job Number: 680-144485-1

Login Number: 144485 List Source: TestAmerica Savannah

List Number: 1

Creator: Tyler, Matthew M

oreator. Tyler, matthew in		
Question	Answer	Comment
Radioactivity wasn't checked or is = background as measured by a survey meter.</td <td>N/A</td> <td></td>	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

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## **Accreditation/Certification Summary**

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-144485-1

## Laboratory: TestAmerica Savannah

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program  AFCEE	EPA Region	- Identification Number SAVLAB	Expiration Date
Alabama	State Program	4	41450	06-30-18
Alaska		10	41430	06-30-18
	State Program		LICT 104	
Alaska (UST)	State Program	10	UST-104	11-05-17 *
Arizona	State Program	9	AZ808	12-14-17
Arkansas DEQ	State Program	6	88-0692	02-01-18
California	State Program	9	2939	06-30-18
Colorado	State Program	8	N/A	12-31-17
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	04-16-18
Hawaii	State Program	9	N/A	06-30-18
Illinois	NELAP	5	200022	11-30-17
Indiana	State Program	5	N/A	06-30-18
lowa	State Program	7	353	06-30-19
Kentucky (DW)	State Program	4	90084	12-31-17
Kentucky (UST)	State Program	4	18	06-30-18
Kentucky (WW)	State Program	4	90084	12-31-17
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	12-31-17
Maine	State Program	1	GA00006	09-24-18
Maryland	State Program	3	250	12-31-17
Massachusetts	State Program	1	M-GA006	06-30-18
Michigan	State Program	5	9925	06-30-17 *
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	03-31-18
North Carolina (DW)	State Program	4	13701	07-31-18
North Carolina (WW/SW)	State Program	4	269	12-31-17
Oklahoma	State Program	6	9984	08-31-18
Pennsylvania	NELAP	3	68-00474	06-30-18
Puerto Rico	State Program	2	GA00006	12-31-17
South Carolina	State Program	4	98001	06-30-17 *
Tennessee	State Program	4	TN02961	06-30-18
Texas	NELAP	6	T104704185-16-9	11-30-17
Texas	State Program	6	T104704185	06-30-18
Texas US Fish & Wildlife	<del>-</del>			07-31-18
	Federal Federal		LE058448-0	
USDA Virginia		2	SAV 3-04	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	12-31-17
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 *

<sup>\*</sup> Accreditation/Certification renewal pending - accreditation/certification considered valid.

TestAmerica Savannah

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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: 680-144693-1

Client Project/Site: Middle River Sediment Remediation

#### For:

Tetra Tech, Inc. 19803 North Creek Parkway Bothell, Washington 98011

Attn: Keir Craigie

Juny Janier

Authorized for release by: 10/26/2017 6:13:14 PM

Jerry Lanier, Project Manager I (912)354-7858 e.3410 jerry.lanier@testamericainc.com

·····LINKS ·······

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Total Access

**Have a Question?** 



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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.

Project/Site: Middle River Sediment Remediation

# **Table of Contents**

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#### **Case Narrative**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-144693-1

Job ID: 680-144693-1

**Laboratory: TestAmerica Savannah** 

**Narrative** 

#### **CASE NARRATIVE**

Client: Tetra Tech, Inc.

**Project: Middle River Sediment Remediation** 

Report Number: 680-144693-1

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 10/25/2017; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 3.1 C.

#### **TOTAL SUSPENDED SOLIDS**

Sample DW-27-102417 (680-144693-1) was analyzed for total suspended solids in accordance with SM 2540D. The samples were analyzed on 10/26/2017.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

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## **Sample Summary**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-144693-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
680-144693-1	DW-27-102417	Water	10/24/17 09:00	10/25/17 09:40

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## **Method Summary**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-144693-1

Method	Method Description	Protocol	Laboratory
2540 D-2011	Total Suspended Solids (Dried at 103-105°C)	SM	TAL SAV

#### **Protocol References:**

SM = "Standard Methods For The Examination Of Water And Wastewater",

#### Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

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## **Definitions/Glossary**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

Not Calculated

**Quality Control** 

Practical Quantitation Limit

Relative Error Ratio (Radiochemistry)

Toxicity Equivalent Factor (Dioxin)

Toxicity Equivalent Quotient (Dioxin)

Not Detected at the reporting limit (or MDL or EDL if shown)

Relative Percent Difference, a measure of the relative difference between two points

Reporting Limit or Requested Limit (Radiochemistry)

TestAmerica Job ID: 680-144693-1

#### **Qualifiers**

#### **General Chemistry**

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.

## **Glossary**

NC

ND

PQL

QC

RER RL

RPD

TEF

**TEQ** 

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)

TestAmerica Savannah

10/26/2017

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## **Client Sample Results**

Client: Tetra Tech, Inc.

TestAmerica Job ID: 680-144693-1

Project/Site: Middle River Sediment Remediation

Client Sample ID: DW-27-102417 Lab Sample ID: 680-144693-1

Date Collected: 10/24/17 09:00 Matrix: Water

Date Received: 10/25/17 09:40

General Chemistry								
Analyte	Result Qualifier	r RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	2.7	1.0	1.0	mg/L			10/26/17 11:32	1

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## **QC Sample Results**

Client: Tetra Tech, Inc.

TestAmerica Job ID: 680-144693-1

Project/Site: Middle River Sediment Remediation

Method: 2540 D-2011 - Total Suspended Solids (Dried at 103-105°C)

Lab Sample ID: MB 680-500137/1 Client Sample ID: Method Blank
Matrix: Water Prep Type: Total/NA

Analysis Batch: 500137

	MB	MB							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepare	ed Analyzed	Dil Fac
Total Suspended Solids	1.0	U	1.0	1.0	mg/L			10/26/17 11:32	1

Lab Sample ID: LCS 680-500137/2

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 500137

	Spike	LCS	LCS				%Rec.	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Total Suspended Solids	20.0	23.5		mg/L	_	118	80 - 120	

Lab Sample ID: LCSD 680-500137/3

Client Sample ID: Lab Control Sample Dup
Matrix: Water

Prep Type: Total/NA

Analysis Batch: 500137

	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Total Suspended Solids	20.0	23.5		mg/L	<u></u>	118	80 - 120	0	25

10/26/2017

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# **QC Association Summary**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-144693-1

## **General Chemistry**

## Analysis Batch: 500137

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-144693-1	DW-27-102417	Total/NA	Water	2540 D-2011	
MB 680-500137/1	Method Blank	Total/NA	Water	2540 D-2011	
LCS 680-500137/2	Lab Control Sample	Total/NA	Water	2540 D-2011	
LCSD 680-500137/3	Lab Control Sample Dup	Total/NA	Water	2540 D-2011	

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#### **Lab Chronicle**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-144693-1

Lab Sample ID: 680-144693-1

**Matrix: Water** 

Date Collected: 10/24/17 09:00 Date Received: 10/25/17 09:40

Client Sample ID: DW-27-102417

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	2540 D-2011		1	1000 mL	1000 mL	500137	10/26/17 11:32	JEC	TAL SAV
	Inetrumo	nt ID: NOEOLIID								

#### Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

10/25/17 940

Date/Time

Bry by:

Received in Labor

Date/Time:

Company

TestAmerica Baltimore A TESTAMERICA

7526 Connelley Drive Suite F

THE LEADER IN ENVIRONMENTAL TESTING TestAmerica Laboratories, Inc.

TAL-8210 (0713) -155 - pw-17-10247-Sample Specific Notes Sample Disposal ( A fee may be assessed if samples are retained longer than 1 month) For Lab Use Only 24 hr TAT & Keil, Craige @ totalech. Com Job / SDG No. Walk-in Client ab Sampling to Date/Time: 19/2/ Date/Time COC No. Archive for 10/24/17 680-144693 Chain of Custody Company Company BALTIMORE 180325 Sposal by Lab Carrier: Roserts Date: Lab Contact: Jerry Lenjel Site Contact: Juha Return to Client eived by Filtered Sample (Y/W)
Perform MS/MSD (Y/ RCRA 19652 \* Middle Priver TSS Sample doler/17 150 Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the NPDES 1/6/1/0. # of Cont. Pate/Time: WORKING DAYS Matrix AR MO Analysis Turnaround Time 978-835-6899 Unknown (C=Comp, G=Grab) Sample Type Total Tech Inc Regulatory Program: TAT if different from Below 0 2 weeks 2 days Project Manager: Ke,/ Sample Time co30 1/15/c1 Preservation Used 1= joe, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other CALENDAR DAYS Custody Seal No. Company Sample Tel/Fax: Special Instructions/QC Requirements & Comments: Comments Section if the lab is to dispose of the sample Sedences Prenedy 0W-27-102417 Sample Identification 9803 North Creek H.Vas Hanover, ND 21076 Phone: 410.766.2516 Fax: Client Contact Tetra Jech Phone: 425-482-7647 Possible Hazard Identification: MAC Custody Seals Intac Marc Relinquished by: Company Name: Relinquished by: Non-Hazard City/State/Zip: Project Name: Address: # O d Site: -ax Page 11 of 13

## **Login Sample Receipt Checklist**

Client: Tetra Tech, Inc. Job Number: 680-144693-1

Login Number: 144693 List Source: TestAmerica Savannah

List Number: 1

Creator: Anderson, Jordan K

Cleator. Anderson, Jordan K		
Question	Answer	Comment
Radioactivity wasn't checked or is = background as measured by a survey meter.</td <td>N/A</td> <td></td>	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

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## **Accreditation/Certification Summary**

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-144693-1

## 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	11-05-17 *
Arizona	State Program	9	AZ808	12-14-17
Arkansas DEQ	State Program	6	88-0692	02-01-18
California	State Program	9	2939	06-30-18
Colorado	State Program	8	N/A	12-31-17
Connecticut	State Program	1	PH-0161	03-31-19
Florida	NELAP	4	E87052	06-30-18
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Georgia	State Program	4	803	06-30-18
Guam	State Program	9	15-005r	04-16-18
Hawaii	State Program	9	N/A	06-30-18
Illinois	NELAP	5	200022	11-30-17
Indiana	State Program	5	N/A	06-30-18
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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	12-31-17
Maine	State Program	1	GA00006	09-24-18
Maryland	State Program	3	250	12-31-17
Massachusetts	State Program	1	M-GA006	06-30-18
Michigan	State Program	5	9925	06-30-17 *
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	03-31-18
North Carolina (DW)	State Program		13701	07-31-18
North Carolina (WW/SW)	State Program	4	269	12-31-17
Oklahoma	State Program	6	9984	08-31-18
Pennsylvania	NELAP	3	68-00474	06-30-18
Puerto Rico	State Program	2	GA00006	12-31-17
South Carolina	State Program	4	98001	06-30-17 *
	State Program		TN02961	06-30-17
Tennessee Texas	NELAP	6	T104704185-16-9	11-30-17
Texas	State Program	6	T104704185-10-9	06-30-18
US Fish & Wildlife	Federal		LE058448-0	07-31-18
USDA				06-14-20 *
	Federal	2	SAV 3-04	
Virginia	NELAP	3	460161	06-14-18
Washington	State Program	10	C805	06-10-18
West Virginia (DW)	State Program	3	9950C	12-31-17
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 *

<sup>\*</sup> Accreditation/Certification renewal pending - accreditation/certification considered valid.

10/26/2017

TestAmerica Savannah



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: 680-144998-1

Client Project/Site: Middle River Sediment Remediation

#### For:

Tetra Tech, Inc. 19803 North Creek Parkway Bothell, Washington 98011

Attn: Keir Craigie

Juny Janier

Authorized for release by: 11/2/2017 5:55:26 PM

Jerry Lanier, Project Manager I (912)354-7858 e.3410 jerry.lanier@testamericainc.com

·····LINKS ·······

Review your project results through

Total Access

**Have a Question?** 



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.

Project/Site: Middle River Sediment Remediation

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#### **Case Narrative**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-144998-1

Job ID: 680-144998-1

**Laboratory: TestAmerica Savannah** 

Narrative

#### **CASE NARRATIVE**

Client: Tetra Tech, Inc.

**Project: Middle River Sediment Remediation** 

Report Number: 680-144998-1

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 11/01/2017; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 0.7 C.

#### **TOTAL SUSPENDED SOLIDS**

Sample DW-28-103117 (680-144998-13) was analyzed for total suspended solids in accordance with SM 2540D. The samples were analyzed on 11/02/2017.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

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## **Sample Summary**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-144998-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
680-144998-13	DW-28-103117	Water	10/31/17 10:00	11/01/17 09:00

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## **Method Summary**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-144998-1

Method	Method Description	Protocol	Laboratory
2540 D-2011	Total Suspended Solids (Dried at 103-105°C)	SM	TAL SAV

#### **Protocol References:**

SM = "Standard Methods For The Examination Of Water And Wastewater",

#### Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

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## **Definitions/Glossary**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

Not Calculated

**Quality Control** 

Practical Quantitation Limit

Relative Error Ratio (Radiochemistry)

Toxicity Equivalent Factor (Dioxin)

Toxicity Equivalent Quotient (Dioxin)

Not Detected at the reporting limit (or MDL or EDL if shown)

Relative Percent Difference, a measure of the relative difference between two points

Reporting Limit or Requested Limit (Radiochemistry)

TestAmerica Job ID: 680-144998-1

#### **Qualifiers**

#### **General Chemistry**

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.

## **Glossary**

NC

ND

PQL

QC

RER RL

RPD

TEF

**TEQ** 

Abbreviation	These commonly used abbreviations may or may not be present in this report.
m m	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)

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## **Client Sample Results**

Client: Tetra Tech, Inc.

TestAmerica Job ID: 680-144998-1

Project/Site: Middle River Sediment Remediation

Client Sample ID: DW-28-103117 Lab Sample ID: 680-144998-13

Date Collected: 10/31/17 10:00 Matrix: Water

Date Received: 11/01/17 09:00

General Chemistry									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	1.0	U	1.0	1.0	mg/L			11/02/17 10:45	1

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## **QC Sample Results**

Client: Tetra Tech, Inc.

TestAmerica Job ID: 680-144998-1

Project/Site: Middle River Sediment Remediation

Method: 2540 D-2011 - Total Suspended Solids (Dried at 103-105°C)

Lab Sample ID: MB 680-501048/1	Client Sample ID: Method Blank
Matrix: Water	Prep Type: Total/NA

Analysis Batch: 501048

	MB	MB							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	1.0	U	1.0	1.0	mg/L	<del></del>		11/02/17 10:45	1

Lab Sample ID: LCS 680-501048/2	Client Sample ID: Lab Control Sample
Matrix: Water	Prep Type: Total/NA
Analysis Batch: 501048	

	Spike	LCS	LCS				%Rec.	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Total Suspended Solids	 20.0	21.5		mg/L		108	80 - 120	

Lab Sample ID: LCSD 680-501048/3

Client Sample ID: Lab Control Sample Dup
Matrix: Water

Prep Type: Total/NA

Analysis Batch: 501048

		Spike	LCSD	LCSD				%Rec.		RPD
Analyte		Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Total Suspended Solids	<del></del>	20.0	20.5		mg/L		103	80 - 120	5	25

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11/2/2017

# **QC Association Summary**

Client: Tetra Tech, Inc.

TestAmerica Job ID: 680-144998-1 Project/Site: Middle River Sediment Remediation

## **General Chemistry**

## Analysis Batch: 501048

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-144998-13	DW-28-103117	Total/NA	Water	2540 D-2011	
MB 680-501048/1	Method Blank	Total/NA	Water	2540 D-2011	
LCS 680-501048/2	Lab Control Sample	Total/NA	Water	2540 D-2011	
LCSD 680-501048/3	Lab Control Sample Dup	Total/NA	Water	2540 D-2011	

#### **Lab Chronicle**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-144998-1

Lab Sample ID: 680-144998-13

Matrix: Water

Date Collected: 10/31/17 10:00 Date Received: 11/01/17 09:00

Client Sample ID: DW-28-103117

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	2540 D-2011		1	1000 mL	1000 mL	501048	11/02/17 10:45	JEC	TAL SAV
	Inetruma	nt ID: NOFOLIIP								

#### **Laboratory References:**

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

altım	Chain of Custody Record	TestAmerica
Suite F WILLIAM WINE AT ESTAM	PTESTAMERICA SAVANNAM X	1003/296
Hanover, ND 21076 Phone: 410.766.2516 Fax:	Regulatory Program: Names Decod	THE LEADER IN ENVIRONM TestAmerica Labor
1.5	Colas, Site Contact: Tola Malets   Date:	A THORE COC NO.
Company Name Tol.	Care Contact of the Contact	1
4) (4)	Analysis Turnaround Time	Sampler
elZip. Patiell. WA 1801	AYS	For Lab Use Only:
16. 125-482-764	If from Below	Walk-in Client:
1100	O TO NO N	Lab Sampling:
Site: MAK - Maddy Ren	(A) =	Job / SDS / dol.
6	1 day 755 24 Hr.) E	
Sample Identification	Sample Sample # of # o	Samole Specific Notee
DW-28-103117	7	# 755-24 M. TOT
		\
F		
ag	2	
e 1	10/31/11	
10		
f 13		
December Isod: 4= Ico. 2= UCI: 2= U2CAS. X=UNIO2: E=NIOUI: E= Others		
Possible Hazard Identification:	33, 3-NaOn; 5- Other Sample Disnosal A fee may be accessed if camples are retained longer than 4 months	los are retained londer than 4 months
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.		ores are retained fortiger (nam i month)
Mon-Hazard Flammable Skin Irritant	Poison B Unknown Return to Client	Archive for Months
Special Instructions/QC Requirements & Comments:	A Middle Rover Edinat Project -NPDES samplingt	Kelr. Craisie etchuted, won
Custody Seals Intact: Tes No	Cooler Temp. ("C): Obs'd:	Corr'd: Therm ID No.
Relinquished by M	Company: Let Le 1971/1976 Received by: Company:	1
Relinquished W.		Date/Time: /
Relinquished by:	Date/Timey Received in Laboratory by:	Company PSPU Date/Time: (11/61/17 C/00)
17		7/10
	9 10 11 12 13	1 2 3 4 5 6 7

## **Login Sample Receipt Checklist**

Client: Tetra Tech, Inc. Job Number: 680-144998-1

Login Number: 144998 List Source: TestAmerica Savannah

List Number: 1

Creator: Tyler, Matthew M

Creator. Tyler, Matthew M		
Question	Answer	Comment
Radioactivity wasn't checked or is = background as measured by a survey meter.</td <td>N/A</td> <td></td>	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

# **Accreditation/Certification Summary**

Client: Tetra Tech, Inc.

TestAmerica Job ID: 680-144998-1 Project/Site: Middle River Sediment Remediation

### **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	11-05-17 *
Arizona	State Program	9	AZ808	12-14-17 *
Arkansas DEQ	State Program	6	88-0692	02-01-18
California	State Program	9	2939	06-30-18
Colorado	State Program	8	N/A	12-31-17
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	04-16-18
Hawaii	State Program	9	N/A	06-30-18
Illinois	NELAP	5	200022	11-30-17 *
Indiana	State Program	5	N/A	06-30-18
lowa	State Program	7	353	06-30-19
Kentucky (DW)	State Program	4	90084	12-31-17
Kentucky (UST)	State Program		18	06-30-18
Kentucky (WW)	State Program	4	90084	12-31-17
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	12-31-17
Maine			GA00006	09-24-18
	State Program	3	250	12-31-17
Maryland Massachusetts	State Program	1	M-GA006	06-30-18
	State Program	· · · · · · · · · · · · · · · · · · ·		06-30-17 *
Michigan Michigan	State Program	5 4	9925 N/A	
Mississippi	State Program	•		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	03-31-18
North Carolina (DW)	State Program	4	13701	07-31-18
North Carolina (WW/SW)	State Program	4	269	12-31-17
Oklahoma	State Program	6	9984	08-31-18
Pennsylvania	NELAP	3	68-00474	06-30-18
Puerto Rico	State Program	2	GA00006	12-31-17
South Carolina	State Program	4	98001	06-30-17 *
Tennessee	State Program	4	TN02961	06-30-18
Texas	NELAP	6	T104704185-16-9	11-30-17 *
Texas	State Program	6	T104704185	06-30-18
US Fish & Wildlife	Federal		LE058448-0	07-31-18
USDA	Federal		SAV 3-04	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	12-31-17
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 *

<sup>\*</sup> Accreditation/Certification renewal pending - accreditation/certification considered valid.

TestAmerica Savannah



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: 680-145357-1

Client Project/Site: Middle River Sediment Remediation

#### For:

Tetra Tech, Inc. 19803 North Creek Parkway Bothell, Washington 98011

Attn: Keir Craigie

Lathurn Smith

Authorized for release by: 11/10/2017 9:49:50 PM Kathryn Smith, Manager of Project Management (912)354-7858 kathy.smith@testamericainc.com

Designee for

Jerry Lanier, Project Manager I (912)354-7858 e.3410 jerry.lanier@testamericainc.com



Review your project results through
Total Access

**Have a Question?** 



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.

Project/Site: Middle River Sediment Remediation

# **Table of Contents**

Cover Page	1
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#### **Case Narrative**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-145357-1

Job ID: 680-145357-1

**Laboratory: TestAmerica Savannah** 

Narrative

#### **CASE NARRATIVE**

Client: Tetra Tech, Inc.

**Project: Middle River Sediment Remediation** 

Report Number: 680-145357-1

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 11/09/2017; the samples arrived in good condition, properly preserved and on ice. The temperature of the cooler at receipt was 2.7° C.

#### **TOTAL SUSPENDED SOLIDS**

Sample DW-29-110817 (680-145357-1) was analyzed for total suspended solids in accordance with SM 2540D. The samples were analyzed on 11/09/2017.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

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# **Sample Summary**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-145357-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
680-145357-1	DW-29-110817	Water	11/08/17 10:10	11/09/17 09:20

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# **Method Summary**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-145357-1

Method	Method Description	Protocol	Laboratory
2540 D-2011	Total Suspended Solids (Dried at 103-105°C)	SM	TAL SAV

#### **Protocol References:**

SM = "Standard Methods For The Examination Of Water And Wastewater",

#### Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

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# **Definitions/Glossary**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

Not Calculated

**Quality Control** 

Practical Quantitation Limit

Relative Error Ratio (Radiochemistry)

Toxicity Equivalent Factor (Dioxin)

Toxicity Equivalent Quotient (Dioxin)

Not Detected at the reporting limit (or MDL or EDL if shown)

Relative Percent Difference, a measure of the relative difference between two points

Reporting Limit or Requested Limit (Radiochemistry)

TestAmerica Job ID: 680-145357-1

#### **Qualifiers**

#### **General Chemistry**

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.

### **Glossary**

NC

ND

PQL

QC

RER

RPD

TEF

**TEQ** 

RL

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)

TestAmerica Savannah

Page 6 of 13

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# **Client Sample Results**

Client: Tetra Tech, Inc.

TestAmerica Job ID: 680-145357-1

Project/Site: Middle River Sediment Remediation

Client Sample ID: DW-29-110817 Lab Sample ID: 680-145357-1

Date Collected: 11/08/17 10:10 Matrix: Water

Date Received: 11/09/17 09:20

General Chemistry								
Analyte	Result Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	2.6	1.0	1.0	mg/L			11/09/17 13:41	1

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# **QC Sample Results**

Client: Tetra Tech, Inc.

TestAmerica Job ID: 680-145357-1

Project/Site: Middle River Sediment Remediation

Method: 2540 D-2011 - Total Suspended Solids (Dried at 103-105°C)

Lab Sample ID: MB 680-501991/1

Matrix: Water

Client Sample ID: Method Blank

Prep Type: Total/NA

Analysis Batch: 501991

	MB	MB							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	1.0	U	1.0	1.0	mg/L			11/09/17 13:41	1

Lab Sample ID: LCS 680-501991/2

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 501991

		Spike	LCS	LCS				%Rec.	
Analyte		Added	Result	Qualifier	Unit	9	∕₀Rec	Limits	
Total Suspended Solids		20.0	20.5		mg/L		103	80 - 120	

Lab Sample ID: LCSD 680-501991/3

Matrix: Water

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analysis Batch: 501991

	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Total Suspended Solids	20.0	20.5		mg/L		103	80 - 120	0	25

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# **QC Association Summary**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-145357-1

# **General Chemistry**

### Analysis Batch: 501991

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-145357-1	DW-29-110817	Total/NA	Water	2540 D-2011	
MB 680-501991/1	Method Blank	Total/NA	Water	2540 D-2011	
LCS 680-501991/2	Lab Control Sample	Total/NA	Water	2540 D-2011	
LCSD 680-501991/3	Lab Control Sample Dup	Total/NA	Water	2540 D-2011	

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#### **Lab Chronicle**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-145357-1

Client Sample ID: DW-29-110817 Lab Sample ID: 680-145357-1

Date Collected: 11/08/17 10:10 Matrix: Water

Date Received: 11/09/17 09:20

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	2540 D-2011		1	1000 mL	1000 mL	501991	11/09/17 13:41	JEC	TAL SAV
	Instrument	ID: NOEQUIP								

#### Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

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TestAmerica

	B 1651 AMENTUR SAVANIVAHA		180325 000578	5 7 8 THE LEADER IN ENVIRONMENTAL TESTING
Phone: 410.766.2516 Fax:	Regulatory Program:	DW NPDES	RCRA TRIANDRE	TAL-8210 (0713)
Client Contact	X	1/2	Site Contact: John Hobe A C Date: 16/8/1	COC No:
Company Name: 16th All Inc.	Tel/Fax: 978-835-6	15-6694 La		/ of / cocs
1803 NOTH G	Analysis Turnaround Time	id Time	8	Sampler. Moserts
terzip: Patiell WA	CALENDAR DAYS W	WORKING DAYS	co	For Lab Use Only:
Fax:	IAT if different from Below		N /	Lab Sampling:
Project Name: MRL Sellment Memudy		30AMS	298	n
AL- Middle Raver		Tec 24 HAS 10		Job / SDG No.:
A 6801 12	1 day	,		
Sample Identification	Sample Sample (Type (Ccomp.) Date Time (G-Gcmp.)	Matrix Cont.	755 <u>-</u> 125 <u>-</u> 125-74	Sample Specific Notes:
718011-62-MO	9 010/1/8/11		XXX	
	,,			1
				\
				1
	1/8/1/	1		-
		1		
1				
			680-145357 Chain of Custody	
1				1-1-1
Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other	3; 5=NaOH; 6= Other		616	
Possible Hazard Identification: Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.	ase List any EPA Waste Codes fo	or the sample in the	Sample Disposal ( A fee may be assessed if samples are retained longer than 1 month)	are retained longer than 1 month)
Ron-Hazard Flammable Skin Irritant	Poison B	Unknown	Return to Client	Archive for Months
Special Instructions/QC Requirements & Comments: 🌈	Middle hwar	Schmut Poja	Mych- NPDES Sangling & Hear, Crangle	aigle etatheted. Com
Custody Seals Intagt: Tes No	Custody Seal No.:		ler Temp. ("C): Obs'd:	Therm ID No.:
Relinquished by:	Toka Ted Inc	1/8/17 1415	Received by Company.	11/8/17 1415
Relinquished by	Company But	Date/Time:	Received by: Compány:	Date/Time:
Selinquished by 50	Company:	Date/Time:	Received in Laboratory by: Company:	Date/Time: 720

# **Login Sample Receipt Checklist**

Client: Tetra Tech, Inc. Job Number: 680-145357-1

Login Number: 145357 List Source: TestAmerica Savannah

List Number: 1

Creator: Anderson, Jordan K

Cleator. Anderson, Jordan K		
Question	Answer Comment	
Radioactivity wasn't checked or is = background as measured by a survey meter.</td <td>N/A</td> <td></td>	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

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# **Accreditation/Certification Summary**

Client: Tetra Tech, Inc. Project/Site: Middle River Sediment Remediation TestAmerica Job ID: 680-145357-1

#### **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	11-05-17 *
Arizona	State Program	9	AZ808	12-14-17 *
Arkansas DEQ	State Program	6	88-0692	02-01-18
California	State Program	9	2939	06-30-18
Colorado	State Program	8	N/A	12-31-17
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	04-16-18
Hawaii	State Program	9	N/A	06-30-18
Illinois	NELAP	5	200022	11-30-17 *
Indiana	State Program	5	N/A	06-30-18
lowa	State Program	7	353	06-30-19
Kentucky (DW)	State Program	4	90084	12-31-17
Kentucky (UST)	State Program	4	18	06-30-18
Kentucky (WW)	State Program	4	90084	12-31-17
L-A-B	DoD ELAP	7	L2463	09-22-19
L-A-B	ISO/IEC 17025		L2463.01	09-22-19
Louisiana	NELAP	6	30690	06-30-18
	NELAP	6	LA160019	12-31-17
Louisiana (DW)				
Maine Mandand	State Program	1	GA00006	09-24-18
Maryland	State Program	3	250	12-31-17
Massachusetts	State Program	1 <u>-</u>	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	03-31-18
North Carolina (DW)	State Program	4	13701	07-31-18
North Carolina (WW/SW)	State Program	4	269	12-31-17
Oklahoma	State Program	6	9984	08-31-18
Pennsylvania	NELAP	3	68-00474	06-30-18
Puerto Rico	State Program	2	GA00006	12-31-17
South Carolina	State Program	4	98001	06-30-17 *
Tennessee	State Program	4	TN02961	06-30-18
Texas	NELAP	6	T104704185-16-9	11-30-17 *
Texas	State Program	6	T104704185	06-30-18
US Fish & Wildlife	Federal		LE058448-0	07-31-18
USDA	Federal		SAV 3-04	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	12-31-17
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 *

<sup>\*</sup> Accreditation/Certification renewal pending - accreditation/certification considered valid.

TestAmerica Savannah

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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: 680-145587-1

Client Project/Site: Middle River Sediment Remediation

#### For:

Tetra Tech, Inc. 19803 North Creek Parkway Bothell, Washington 98011

Attn: Keir Craigie

Lathurn Smith

Authorized for release by: 11/16/2017 5:11:16 PM Kathryn Smith, Manager of Project Management (912)354-7858 kathy.smith@testamericainc.com

Designee for

Jerry Lanier, Project Manager I (912)354-7858 e.3410 jerry.lanier@testamericainc.com

----- LINKS -----

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**Have a Question?** 



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.

Project/Site: Middle River Sediment Remediation

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#### **Case Narrative**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-145587-1

Job ID: 680-145587-1

**Laboratory: TestAmerica Savannah** 

**Narrative** 

### **CASE NARRATIVE**

Client: Tetra Tech, Inc.

**Project: Middle River Sediment Remediation** 

Report Number: 680-145587-1

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 11/15/2017; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 3.7 C.

#### **TOTAL SUSPENDED SOLIDS**

Sample DW-30-111417 (680-145587-1) was analyzed for total suspended solids in accordance with SM 2540D. The samples were analyzed on 11/16/2017.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

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# **Sample Summary**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-145587-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
680-145587-1	DW-30-111417	Water	11/14/17 12:15	11/15/17 09:20

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# **Method Summary**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-145587-1

Method	Method Description	Protocol	Laboratory
2540 D-2011	Total Suspended Solids (Dried at 103-105°C)	SM	TAL SAV

#### Protocol References:

SM = "Standard Methods For The Examination Of Water And Wastewater",

#### Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

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# **Definitions/Glossary**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

Not Calculated

**Quality Control** 

Practical Quantitation Limit

Relative Error Ratio (Radiochemistry)

Toxicity Equivalent Factor (Dioxin)

Toxicity Equivalent Quotient (Dioxin)

Not Detected at the reporting limit (or MDL or EDL if shown)

Relative Percent Difference, a measure of the relative difference between two points

Reporting Limit or Requested Limit (Radiochemistry)

TestAmerica Job ID: 680-145587-1

#### **Qualifiers**

#### **General Chemistry**

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.

### **Glossary**

NC ND

PQL

QC

RER

RPD

TEF

**TEQ** 

RL

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)

# **Client Sample Results**

Client: Tetra Tech, Inc.

TestAmerica Job ID: 680-145587-1

Project/Site: Middle River Sediment Remediation

Client Sample ID: DW-30-111417 Lab Sample ID: 680-145587-1

Date Collected: 11/14/17 12:15 Matrix: Water

Date Received: 11/15/17 09:20

General Chemistry									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	1.0	U	1.0	1.0	mg/L			11/16/17 07:16	1

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# **QC Sample Results**

Client: Tetra Tech, Inc. TestAmerica Job ID: 680-145587-1

Project/Site: Middle River Sediment Remediation

Method: 2540 D-2011 - Total Suspended Solids (Dried at 103-105°C)

MD MD

Lab Sample ID: MB 680-502809/1 Client Sample ID: Method Blank **Matrix: Water** Prep Type: Total/NA

Analysis Batch: 502809

	1410	1410							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	1.0	U	1.0	1.0	mg/L			11/16/17 07:16	1

Lab Sample ID: LCS 680-502809/2 **Client Sample ID: Lab Control Sample Matrix: Water** Prep Type: Total/NA

Analysis Batch: 502809

		Spike	LCS	LCS				%Rec.	
Analyte		Added	Result	Qualifier	Unit	9	∕₀Rec	Limits	
Total Suspended Solids		20.0	20.5		mg/L		103	80 - 120	

Lab Sample ID: LCSD 680-502809/3 **Client Sample ID: Lab Control Sample Dup Matrix: Water** Prep Type: Total/NA

Analysis Batch: 502809

	Spik	e LCSD	LCSD			%Rec.		RPD
Analyte	Adde	d Result	Qualifier Un	it D	%Rec	Limits	RPD	Limit
Total Suspended Solids	20.	19.5	mg	ı/L	98	80 - 120	5	25

TestAmerica Savannah

11/16/2017

# **QC Association Summary**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-145587-1

# **General Chemistry**

### Analysis Batch: 502809

١	Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
	680-145587-1	DW-30-111417	Total/NA	Water	2540 D-2011	
	MB 680-502809/1	Method Blank	Total/NA	Water	2540 D-2011	
١	LCS 680-502809/2	Lab Control Sample	Total/NA	Water	2540 D-2011	
	LCSD 680-502809/3	Lab Control Sample Dup	Total/NA	Water	2540 D-2011	

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#### **Lab Chronicle**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-145587-1

Client Sample ID: DW-30-111417 Lab Sample ID: 680-145587-1

Date Collected: 11/14/17 12:15 Matrix: Water

Date Received: 11/15/17 09:20

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	2540 D-2011		1	1000 mL	1000 mL	502809	11/16/17 07:16	JEC	TAL SAV
	Instrument	ID: NOEQUIP								

#### **Laboratory References:**

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

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Chain of Custody Record SALMWAN & TestAmerica Baltimore Afferamento

7526 Connelley Drive Suite F

# O d Site:

000736

**TestAmerica** 

TestAmerica Laboratories, Inc.

TAL-8210 (0713) Sample Specific Notes: Sample Disposal ( A fee may be assessed if samples are retained longer than 1 month) For Lab Use Only Job / SDG No. Walk-in Client: ab Sampling of COC No BALITIMORE 680-145587 Chain of Custody Carrier: Date: Site Contact: John Robert 5 Lancel Other Lab Contact: Jem Filtered Sample (Y/N)
Perform MS/MSD (Y/N)
Motals Cryth, Co. 2008
755-2545
Accordances-236c XX RCRA Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the NPDES # of Cont. 2 days TSS 24 HPS 5180 E WORKING DAYS Matrix AD MO Analysis Turnaround Time Project Manager: Keir Dayle Tel/Fax: 978-835-6694 Type (C=Comp, G=Grab) Sample Regulatory Program: TAT if different from Below 2 weeks 1 week 1 day Sample 5/4/1/1/11/11 CALENDAR DAYS Preservation Used: A= Ide, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other Sample Comments Section if the lab is to dispose of the sample. PW-30-111417 Sample Identification 175-487-247 Mrc Sedment Hanover, 110 21076 Phone: 410.766.2516 Fax: Client Contact Medille any MO Possible Hazard Identification: Morte Company Name: 1etra 50861 Project Name: City/State/Zip: Address Phone:

Page 11 of 13

Company: Company d in Laboratory b 11/14/12/33

Date/Time:

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11/11 Date/Time

Company:

Special Instructions/QC Requirements & Comments: & Middle Pever Sedipent Poject -NPDES Sampling & Keir, Craigie etetrated. com

Date/Time.

Company: Tell

Company:

Custody Seal No.

Yes

Custody Seals Intact

Relinquished by:

Relinquished by:

Theimquished by:

# **Login Sample Receipt Checklist**

Client: Tetra Tech, Inc. Job Number: 680-145587-1

Login Number: 145587 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.</td <td>N/A</td> <td></td>	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").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

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# **Accreditation/Certification Summary**

Client: Tetra Tech, Inc. Project/Site: Middle River Sediment Remediation TestAmerica Job ID: 680-145587-1

### **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	11-05-17 *	
Arizona	State Program	9	AZ808	12-14-17 *	
Arkansas DEQ	State Program	6	88-0692	02-01-18	
California	State Program	9	2939	06-30-18	
Colorado	State Program	8	N/A	12-31-17	
Connecticut	State Program	1	PH-0161	03-31-19	
Florida	NELAP	4	E87052	06-30-18	
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Illinois	NELAP	5	200022	11-30-17 *	
Indiana	State Program	5	N/A	06-30-18	
lowa	State Program	7	353	06-30-19	
Kentucky (DW)	State Program	4	90084	12-31-17	
Kentucky (UST)	State Program	4	18	06-30-18	
Kentucky (WW)	State Program	4	90084	12-31-17	
L-A-B	DoD ELAP	7	L2463	09-22-19	
L-A-B	ISO/IEC 17025		L2463.01	09-22-19	
Louisiana	NELAP	6	30690	06-30-18	
	NELAP	6	LA160019	12-31-17	
Louisiana (DW)					
Maine Mandand	State Program	1	GA00006	09-24-18	
Maryland	State Program	3	250	12-31-17	
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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	03-31-18	
North Carolina (DW)	State Program	4	13701	07-31-18	
North Carolina (WW/SW)	State Program	4	269	12-31-17	
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US Fish & Wildlife	Federal		LE058448-0	07-31-18	
USDA	Federal		SAV 3-04	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	12-31-17	
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 *	

<sup>\*</sup> Accreditation/Certification renewal pending - accreditation/certification considered valid.

TestAmerica Savannah

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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: 680-145650-1

Client Project/Site: Middle River Sediment Remediation

For:

Tetra Tech, Inc. 19803 North Creek Parkway Bothell, Washington 98011

Attn: Keir Craigie

Rathryn Smith

Authorized for release by: 11/17/2017 5:33:39 PM Kathryn Smith, Manager of Project Management (912)354-7858 kathy.smith@testamericainc.com

Designee for

Jerry Lanier, Project Manager I (912)354-7858 e.3410 jerry.lanier@testamericainc.com

..... LINKS .....

Review your project results through

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**Have a Question?** 



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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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# **Sample Summary**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-145650-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
680-145650-1	ASAND-111517	Water	11/15/17 12:45	11/16/17 09:15
680-145650-2	E-ND-111517	Water	11/15/17 12:55	11/16/17 09:15
680-145650-3	E-MC-111517	Water	11/15/17 13:05	11/16/17 09:15
680-145650-4	E-AD-111517	Water	11/15/17 13:15	11/16/17 09:15
680-145650-5	US-DAM-111517	Water	11/15/17 13:25	11/16/17 09:15
680-145650-6	ICURT-111517	Water	11/15/17 13:35	11/16/17 09:15
680-145650-7	OCURT-111517	Water	11/15/17 13:45	11/16/17 09:15
680-145650-8	GEOEXC-111517	Water	11/15/17 13:55	11/16/17 09:15

11/17/2017

# **Method Summary**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-145650-1

Method	Method Description	Protocol	Laboratory
2340C-2011	Hardness, Total	SM	TAL SAV
2540 D-2011	Total Suspended Solids (Dried at 103-105°C)	SM	TAL SAV

#### **Protocol References:**

SM = "Standard Methods For The Examination Of Water And Wastewater",

#### **Laboratory References:**

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

TestAmerica Savannah

# **Definitions/Glossary**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-145650-1

### **Qualifiers**

### **General Chemistry**

U Indicates the analyte was analyzed for but not detected.

### **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)

TestAmerica Savannah

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Project/Site: Middle River Sediment Remediation

Client Sample ID: ASAND-111517

Lab Sample ID: 680-145650-1

**Matrix: Water** 

Date Collected: 11/15/17 12:45 Date Received: 11/16/17 09:15

General Chemistry									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hardness as calcium carbonate	1900		250	250	mg/L			11/17/17 08:17	1
Total Suspended Solids	22		4.0	4.0	mg/L			11/17/17 12:31	1

Client Sample ID: E-ND-111517

Date Collected: 11/15/17 12:55 Date Received: 11/16/17 09:15 **∕£ab** Sample ID: 680-145650-2 **Matrix: Water** 

General Chemistry Analyte	Result	Qualifier	RL	MDL Unit	∜ D	Prepared	Analyzed	Dil Fac
Hardness as calcium carbonate	2100		250	250 mg/L			11/17/17 08:17	1
Total Suspended Solids	16		2.0	2.0 mg/L			11/17/17 12:31	1

Client Sample ID: E-MC-111517

Date Collected: 11/15/17 13:05 Date Received: 11/16/17 09:15 Lab Sample ID: 680-145650-3 **Matrix: Water** 

General Chemistry								
Analyte	Result Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hardness as calcium carbonate	2300	250	250	mg/L			11/17/17 08:17	1
Total Suspended Solids	19	2.0	2.0	mg/L			11/17/17 12:31	1

Client Sample ID: E-AD-111517

Date Collected: 11/15/17 13:15 Date Received: 11/16/17 09:15

Lab Sample ID: 680-145650-4

**Matrix: Water** 

General Chemistry Analyte	Result Q	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hardness as calcium carbonate	1800		250	250	mg/L			11/17/17 08:17	1
Total Suspended Solids	25		4.0	4.0	mg/L			11/17/17 12:31	1

Client Sample 10 US-DAM-111517 Lab Sample ID: 680-145650-5 **Matrix: Water** 

Date Collected: 11/15/17 13:25 Date Received: 11/16/17 09:15

**General Chemistry** Analyte Result Qualifier RL MDL Unit D Prepared Analyzed Dil Fac

Hardness as calcium carbonate 250 250 mg/L 11/17/17 08:17 1900 **Total Suspended Solids** 11/17/17 12:31 4.0 4.0 mg/L 24

Lab Sample ID: 680-145650-6 Client Sample ID: ICURT-111517 Date Collected: 11/15/17 13:35 **Matrix: Water** 

Date Received: 11/16/17 09:15

General Chemistry Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hardness as calcium carbonate	1800		250	250	mg/L			11/17/17 08:17	1
Total Suspended Solids	9.5		1.3	1.3	mg/L			11/17/17 12:31	1

# **Client Sample Results**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-145650-1

**Lab Sample ID: 680-145650-8** 

Lab Sample ID: 680-145650-7

**Matrix: Water** 

**Matrix: Water** 

Client Sample ID: OCURT-111517

Date Collected: 11/15/17 13:45 Date Received: 11/16/17 09:15

General Chemistry Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hardness as calcium carbonate	1600		250	250	mg/L			11/17/17 08:17	1
Total Suspended Solids	9.7		1.0	1.0	mg/L			11/17/17 12:31	1

Client Sample ID: GEOEXC-111517

Date Collected: 11/15/17 13:55 Date Received: 11/16/17 09:15

General Chemistry Analyte	Result Qua	alifier RL	MDL Unit	Prepared	Analyzed	Dil Fac
Hardness as calcium carbonate	2100	250	250 mg/L		11/17/17 08:17	1
Total Suspended Solids	28	4.0	4.0 mg/L		11/17/17 12:31	1

Client Sample ID: Method Blank

Client Sample ID: Lab Control Sample

%Rec.

Limits

75 - 125

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

Method: 2340C-2011 - Hardness, Total

Lab Sample ID: MB 680-503006/1

**Matrix: Water** 

**Analysis Batch: 503006** 

MB MB

Analyte

Result Qualifier Hardness as calcium carbonate 10 U

RL 10

Spike

Added

1000

Spike

**MDL** Unit 10 mg/L

LCS LCS/

LCSD LCSD

DU DU

1870

Result Qualifier

982

Result Qualifier

Prepared

%Rec

98

Client Sample ID: Lab Control Sample Dup

Analyzed 11/17/17 08:17

Prep Type: Total/NA

Prep Type: Total/NA

Prep Type: Total/NA

**RPD** 

Limit

30

Dil Fac

Lab Sample ID: LCS 680-503006/2

**Matrix: Water** 

**Analysis Batch: 503006** 

Analyte Hardness as calcium carbonate

Lab Sample ID: LCSD 680-503006/3

**Matrix: Water** 

Analysis Batch: 503006

Analyte Hardness as calcium carbonate

Lab Sample ID: 680-145650-1 DU

**Matrix: Water** 

**Analysis Batch: 503006** 

Hardness as calcium carbonate

Added Result Qualifier Limits RPD Unit D %Rec 1000 980 mg/L 98

mg/L

Unit

mg/L

Unit

mg/L

Client Sample ID: ASAND-111517

%Rec.

Prep Type: Total/NA

**Client Sample ID: Method Blank** 

RPD **RPD** Limit

Method: 2540 D-2011 - Total Suspended Solids (Dried at 103-105°C)

Sample Sample

1900

Result Qualifier

Lab Sample ID: MB 680-503088/1

**Matrix: Water** 

Analysis Batch: 503088

Analyte Total Suspended Solids

MR MR Result Qualifier

1.0 U

RL 1.0

Spike

Added

20.0

Spike

Added

20.0

**MDL** Unit 1.0 mg/L

LCS LCS

LCSD LCSD

21.5

Result Qualifier

20.5

Result Qualifier

Prepared

Dil Fac Analyzed

11/17/17 12:31

Prep Type: Total/NA

Lab Sample ID: LCS 680-503088/2

**Matrix: Water** 

**Analysis Batch: 503088** 

Analyte

**Total Suspended Solids** Lab Sample ID: LCSD 680-503088/3

**Matrix: Water** 

**Analysis Batch: 503088** 

Analyte **Total Suspended Solids**  **Client Sample ID: Lab Control Sample** Prep Type: Total/NA

%Rec. Limits

Client Sample ID: Lab Control Sample Dup

80 - 120

%Rec

103

Prep Type: Total/NA

%Rec. **RPD** 

Unit D %Rec Limits **RPD** Limit mg/L 108 80 - 120

TestAmerica Savannah

# **QC Association Summary**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-145650-1

# **General Chemistry**

### Analysis Batch: 503006

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-145650-1	ASAND-111517	Total/NA	Water	2340C-2011	
680-145650-2	E-ND-111517	Total/NA	Water	2340C-2011	
680-145650-3	E-MC-111517	Total/NA	Water	2340C-2011	
680-145650-4	E-AD-111517	Total/NA	Water	2340C-2011	
680-145650-5	US-DAM-111517	Total/NA	Water	2340C-2011	
680-145650-6	ICURT-111517	Total/NA	Water	2340C-2011	
680-145650-7	OCURT-111517	Total/NA	Water	2340C-2011	
680-145650-8	GEOEXC-111517	Total/NA	Water	2340C-2011	
MB 680-503006/1	Method Blank	Total/NA	Water	2340C-2011	
LCS 680-503006/2	Lab Control Sample	Total/NA	Water	2340C-2011	
LCSD 680-503006/3	Lab Control Sample Dup	Total/NA	Water	2340C-2011	
680-145650-1 DU	ASAND-111517	Total/NA	Water	2340C-2011	

### Analysis Batch: 503088

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-145650-1	ASAND-111517	Total/NA	Water	2540 D-2011	
680-145650-2	E-ND-111517	Total/NA	Water	2540 D-2011	
680-145650-3	E-MC-111517	Total/NA	Water	2540 D-2011	
680-145650-4	E-AD-111517	Total/NA	Water	2540 D-2011	
680-145650-5	US-DAM-111517	Total/NA	Water	2540 D-2011	
680-145650-6	ICURT-111517	Total/NA	Water	2540 D-2011	
680-145650-7	OCURT-111517	Total/NA	Water	2540 D-2011	
680-145650-8	GEOEXC-111517	Total/NA	Water	2540 D-2011	
MB 680-503088/1	Method Blank	Total/NA	Water	2540 D-2011	
LCS 680-503088/2	Lab Control Sample	Total/NA	Water	2540 D-2011	
LCSD 680-503088/3	Lab Control Sample Dup	Total/NA	Water	2540 D-2011	

11/17/2017

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

Lab Sample ID: 680-145650-1

Matrix: Water

Client Sample ID: ASAND-111517

Date Collected: 11/15/17 12:45 Date Received: 11/16/17 09:15

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis Instrumen	2340C-2011 at ID: NOEQUIP		1	1 mL	25 mL	503006	11/17/17 08:17	DAM	TAL SAV
Total/NA	Analysis Instrumen	2540 D-2011 at ID: NOEQUIP		1	250 mL	1000 mL	503088	11/17/17 12:31	JEC	TAL SAV

Lab Sample ID: 680-145650-2

Lab Sample ID: 680-145650-3

Matrix: Water

Date Collected: 11/15/17 12:55 Date Received: 11/16/17 09:15

Client Sample ID: E-ND-111517

Dil Batch Batch Initial Final **Batch Prepared Prep Type** Type Method Run **Factor** Amount Amount Number or Analyzed Analyst Lab Total/NA 2340C-2011 503006 11/17/17 08:17 DAM TAL SAV Analysis 1 mL 25 mL Instrument ID: NOEQUIP Total/NA Analysis 2540 D-2011 500 mL 1000 mL 503088 11/17/17 12:31 JEC TAL SAV Instrument ID: NOEQUIP

Client Sample ID: E-MC-111517

Date Collected: 11/15/17 13:05 Date Received: 11/16/17 09:15

_		0	, V							
	Batch	Batch	<b>&gt;</b>	Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis Instrumer	2340C-2011 nt ID: NOEQUIP		1	1 mL	25 mL	503006	11/17/17 08:17	DAM	TAL SAV
Total/NA	Analysis Instrumer	2540 D-2011 nt ID: NOEQUIP		1	500 mL	1000 mL	503088	11/17/17 12:31	JEC	TAL SAV

Client Sample 10 E-AD-111517

Date Collected: 11/15/17 13:15 Date Received: 11/16/17 09:15

Batch Batch Dil Initial Final Batch Prepared **Prep Type** Type Method Run **Factor** Amount Amount Number or Analyzed **Analyst** Lab Total/NA 2340C-2011 11/17/17 08:17 DAM Analysis 1 mL 25 mL 503006 TAL SAV Instrument ID: NOEQUIP Total/NA Analysis 2540 D-2011 250 mL 11/17/17 12:31 JEC 1000 mL 503088 TAL SAV Instrument ID: NOEQUIP

Client Sample ID: US-DAM-111517

Date Collected: 11/15/17 13:25

Date Received: 11/16/17 09:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	2340C-2011		1	1 mL	25 mL	503006	11/17/17 08:17	DAM	TAL SAV
	Instrumer	it ID: NOEQUIP								

TestAmerica Savannah

Lab Sample ID: 680-145650-5

**Matrix: Water** 

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0

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Lab Sample ID: 680-145650-4

**Matrix: Water** 

Matrix: Water

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

Client Sample ID: US-DAM-111517

Lab Sample ID: 680-145650-5

Date Collected: 11/15/17 13:25

**Matrix: Water** 

Date Received: 11/16/17 09:15

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	2540 D-2011		1	250 mL	1000 mL	503088	11/17/17 12:31	JEC	TAL SAV

Instrument ID: NOEQUIP

Lab Sample ID: 680-145650-6

Lab Sample ID: 680-145650-7

Lab Sample ID: 680-145650-8

**Matrix: Water** 

**Matrix: Water** 

**Matrix: Water** 

Client Sample ID: ICURT-111517

Date Collected: 11/15/17 13:35 Date Received: 11/16/17 09:15

Prep Type Total/NA	Batch Type Analysis	Batch Method 2340C-2011	Run	Factor	Initial Amount	Final Amount 25 mL	Batch Number	Prepared or Analyzed 11/17/17 08:17	Analyst DAM	Lab TAL SAV
	,	nt ID: NOEQUIP		·	4				27	
Total/NA	Analysis Instrumer	2540 D-2011 at ID: NOEQUIP		1	750 mL	1000 mL	503088	11/17/17 12:31	JEC	TAL SAV

Client Sample ID: OCURT-111517

Date Collected: 11/15/17 13:45

Date Received: 11/16/17 09:15

			\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \						
	Batch	Batch	)// Dil	Initial	Final	Batch	Prepared		
Prep Type	Туре	Method Rur	n Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	2340C-2011	1	1 mL	25 mL	503006	11/17/17 08:17	DAM	TAL SAV
	Instrumer	t ID: NOEQUIP							
Total/NA	Analysis	2540 D-2011	1	1000 mL	1000 mL	503088	11/17/17 12:31	JEC	TAL SAV
	Instrumer	it.ID: NOEQUIP							

Client Sample ID; GEOEXC-111517

Instrument ID: NOEQUIP

Date Collected: 11/15/17/13:55

Date Receive	d: 11/16/17 0	9:15								
	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	2340C-2011		1	1 mL	25 mL	503006	11/17/17 08:17	DAM	TAL SAV
	Instrumer	nt ID: NOEQUIP								
Total/NA	Analysis	2540 D-2011		1	250 mL	1000 mL	503088	11/17/17 12:31	JEC	TAL SAV

#### **Laboratory References:**

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

TestAmerica Savannah

Canton, UN 44720 330.497.9396 Fax: 330.497.0772	MENTELLA A SAVANINARI A		stody Kecord	123954	IESTAMENICO THE LEADER IN ENVIRONMENTAL TESTING TESTAMENICA LABORATORIES, INC.
	Project Manager:	DW NPDES	Site Contact: 786. 1.4.71 Date: 11	1115/19	TAL-8210 (0713)
	-835-		John land	Fedra	of / cocs
	Analysis Turnar	ne			4
	TAT if different from Below	WORKING DAYS	3001 (1		For Lab Use Only: Walk-in Client:
	2 week	N. 1111	111		Lab Sampling:
	1 week				)G No
Sombles	1 day				
	Sample Sample (Cacomp.  Date Time GeGrab)	op. Matrix Com	Markel S Flora 680-145650 Chain of Custody	ain of Custody	Sample Specific Notes:
	8 SHELLIPS/11	A2 3 C	\$ \times		
	1 5521	-	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \		
	1305		W XV	1000	
	1318		The state of the s	C7C007	
	(325)		~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~		
	1335		XXX	LITMORE	
	1348		\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \		
	\$ 1355 A	7	XXX	4	
	C1/51/11	7			
	7			**	
VO3:	Preservation Used: 4= Ice 2= HCl: 3= H2SOA: 4=HNO3: 5=NaOH: 6= Other				
Pleas	Please List any EPA Waste Codes for the sample in the	for the sample in the	e Di	if samples are retain	ned longer than 1 month)
Skin Irritant	Doison B	Unknown	Return to Client	Archive for	Months
Special Instructions/QC Requirements & Comments:	A ADOLTERNAL SAMI	SAMPLENG FOR	ration	Pojut &	telr. U
	Custody Seal No.:		Cooler Temp. (°C): Obs'd:	Corr'd: 10	Therm ID No.:
	Company: Let 1-1	Date/Time: (4/2)	Received by:	Company:	Date(Time: )
	Company:	Date/Time:	Received by:	Company:	Date/Time:
	Company:	Date/Time:	Received in Laboratory by: Cor	Company: AL	Date/Time:

Client: Tetra Tech, Inc.

Job Number: 680-145650-1

Login Number: 145650 List Source: TestAmerica Savannah

List Number: 1

Creator: Flanagan, Naomi V

•	_	
Question	Answer	Comment
Radioactivity wasn't checked or is = background as measured by a survey meter.</td <td>N/A</td> <td></td>	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").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

TestAmerica Savannah

Client: Tetra Tech, Inc.

TestAmerica Job ID: 680-145650-1

# Laboratory: TestAmerica Savannah

Project/Site: Middle River Sediment Remediation

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	11-05-17 *
Arizona	State Program	9	AZ808	12-14-17 *
Arkansas DEQ	State Program	6	88-0692	02-01-18
California	State Program	9	2939	06-30-18
Colorado	State Program	8	N/A	12-31-17
Connecticut	State Program	1	PH-0161	03-31-19
-lorida	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	04-16-18
Hawaii	State Program	9	N/A	06-30-18
llinois	NELAP	5	200022	11-30-17 *
ndiana	State Program	5	N/A	06-30-18
owa	State Program	Z/	353	06-30-19
Kentucky (DW)	State Program	4	90084	12-31-17
Kentucky (UST)	State Program	4	18	06-30-18
Kentucky (WW)	State Program	4	90084	12-31-17
A-B	DoD ELAP		L2463	09-22-19
A-B	ISO/IEC 17025		L2463.01	09-22-19
₋ouisiana	NELAP	6	30690	06-30-18
Louisiana (DW)	NELAP	6	LA160019	12-31-17
Maine	State Program	1	GA00006	09-24-18
Maryland	State Program	3	250	12-31-17
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	03-30-18
		4	13701	03-31-16
North Carolina (DW)	State Program		269	12-31-16
North Carolina (WW/SW)	State Program	4	9984	
Oklahoma	State Program	6		08-31-18
Pennsylvania	NELAP	3	68-00474	06-30-18
Puerto Rico	State Program	2	GA00006	12-31-17
South Carolina	State Program	4	98001	06-30-17 *
Tennessee	State Program	4	TN02961	06-30-18
Texas	NELAP	6	T104704185-16-9	11-30-17 *
Texas	State Program	6	T104704185	06-30-18
JS Fish & Wildlife	Federal		LE058448-0	07-31-18
JSDA	Federal		SAV 3-04	06-14-20 *
/irginia	NELAP	3	460161	06-14-18
Vashington	State Program	10	C805	06-10-18
West Virginia (DW)	State Program	3	9950C	12-31-17
West Virginia DEP	State Program	3	094	06-30-18
Visconsin	State Program	5	999819810	08-31-18
Wyoming	State Program	8	8TMS-L	06-30-16 *

<sup>\*</sup> Accreditation/Certification renewal pending - accreditation/certification considered valid.

TestAmerica Savannah

11/17/2017

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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: 680-146039-1

Client Project/Site: Middle River Sediment Remediation

#### For:

Tetra Tech, Inc. 19803 North Creek Parkway Bothell, Washington 98011

Attn: Keir Craigie

Jerry James

Authorized for release by: 11/30/2017 5:56:23 PM

Jerry Lanier, Project Manager I (912)354-7858 e.3410 jerry.lanier@testamericainc.com

..... LINKS .....

Review your project results through

Total Access

**Have a Question?** 



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.

Project/Site: Middle River Sediment Remediation

# **Table of Contents**

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#### **Case Narrative**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-146039-1

Job ID: 680-146039-1

**Laboratory: TestAmerica Savannah** 

Narrative

#### **CASE NARRATIVE**

Client: Tetra Tech, Inc.

**Project: Middle River Sediment Remediation** 

Report Number: 680-146039-1

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 11/29/2017; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 0.7 C.

#### **TOTAL SUSPENDED SOLIDS**

Sample DW-32-012817 (680-146039-1) was analyzed for total suspended solids in accordance with SM 2540D. The samples were analyzed on 11/30/2017.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

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# **Sample Summary**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-146039-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
680-146039-1	DW-32-012817	Water	11/28/17 10:30	11/29/17 09:15

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# **Method Summary**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-146039-1

Method	Method Description	Protocol	Laboratory
2540 D-2011	Total Suspended Solids (Dried at 103-105°C)	SM	TAL SAV

#### Protocol References:

SM = "Standard Methods For The Examination Of Water And Wastewater",

#### Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

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## **Definitions/Glossary**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

Not Calculated

**Quality Control** 

Practical Quantitation Limit

Relative Error Ratio (Radiochemistry)

Toxicity Equivalent Factor (Dioxin)

Toxicity Equivalent Quotient (Dioxin)

Not Detected at the reporting limit (or MDL or EDL if shown)

Relative Percent Difference, a measure of the relative difference between two points

Reporting Limit or Requested Limit (Radiochemistry)

TestAmerica Job ID: 680-146039-1

#### **Qualifiers**

#### **General Chemistry**

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.

### **Glossary**

NC ND

PQL

QC

RER

RPD

TEF

**TEQ** 

RL

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)

11/30/2017

# **Client Sample Results**

Client: Tetra Tech, Inc.

TestAmerica Job ID: 680-146039-1

Project/Site: Middle River Sediment Remediation

Client Sample ID: DW-32-012817 Lab Sample ID: 680-146039-1

Date Collected: 11/28/17 10:30 Matrix: Water

Date Received: 11/29/17 09:15

General Chemistry							
Analyte	Result Qualifier	RL	MDL Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	4.8	1.3	1.3 mg/L			11/30/17 12:37	1

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## **QC Sample Results**

Client: Tetra Tech, Inc.

TestAmerica Job ID: 680-146039-1

Project/Site: Middle River Sediment Remediation

Method: 2540 D-2011 - Total Suspended Solids (Dried at 103-105°C)

Lab Sample ID: MB 680-504544/1 Client Sample ID: Method Blank
Matrix: Water Prep Type: Total/NA

Analysis Batch: 504544

	MB	MB							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	1.0	U	1.0	1.0	mg/L			11/30/17 12:37	1

Lab Sample ID: LCS 680-504544/2

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 504544

		Spike	LCS	LCS					%Rec.	
Analyte		Added	Result	Qualifier	Unit	!	D	%Rec	Limits	
Total Suspended Solids		20.0	18.0		mg/L			90	80 - 120	

Lab Sample ID: LCSD 680-504544/3

Client Sample ID: Lab Control Sample Dup
Matrix: Water

Prep Type: Total/NA

Analysis Batch: 504544

-	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Total Suspended Solids	20.0	17.0		mg/L		85	80 - 120	6	25

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# **QC Association Summary**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-146039-1

## **General Chemistry**

### Analysis Batch: 504544

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-146039-1	DW-32-012817	Total/NA	Water	2540 D-2011	
MB 680-504544/1	Method Blank	Total/NA	Water	2540 D-2011	
LCS 680-504544/2	Lab Control Sample	Total/NA	Water	2540 D-2011	
LCSD 680-504544/3	Lab Control Sample Dup	Total/NA	Water	2540 D-2011	

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#### **Lab Chronicle**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

Client Sample ID: DW-32-012817

TestAmerica Job ID: 680-146039-1

Lab Sample ID: 680-146039-1

**Matrix: Water** 

Date Collected: 11/28/17 10:30 Date Received: 11/29/17 09:15

Dil Batch Batch Initial Final Batch Prepared Prep Type Method or Analyzed Type Run Factor Amount **Amount** Number Analyst Lab Total/NA Analysis 2540 D-2011 750 mL 1000 mL 504544 11/30/17 12:37 JEC TAL SAV Instrument ID: NOEQUIP

#### Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

Chain of Custody Recording	ESTHMETICA Baltimore
2 0 2 0 2 1 1 1 1 1 1 1	Program:  T: Keir Cray  T: Keir Cray  Sis Turnaround  VS   WORK  2 weeks 3    1 week 3    1 week 3    1 day  Cabys TSS  1 day  G=Grab)  10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10    10

## **Login Sample Receipt Checklist**

Client: Tetra Tech, Inc. Job Number: 680-146039-1

Login Number: 146039 List Source: TestAmerica Savannah

List Number: 1

Creator: Edwards, Jessica R

ordator. Edwards, 9055100 ft	
Question	Answer Comment
Radioactivity wasn't checked or is = background as measured by a survey meter.</td <td>N/A</td>	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 <a href="https://www.edu.nc.no.nd/">6mm (1/4").</a>	N/A
Multiphasic samples are not present.	True
Samples do not require splitting or compositing.	True
Residual Chlorine Checked.	N/A

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# **Accreditation/Certification Summary**

Client: Tetra Tech, Inc. Project/Site: Middle River Sediment Remediation TestAmerica Job ID: 680-146039-1

### 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	11-05-17 *
Arizona	State Program	9	AZ808	12-14-17 *
Arkansas DEQ	State Program	6	88-0692	02-01-18
California	State Program	9	2939	06-30-18
Colorado	State Program	8	N/A	12-31-17
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	04-16-18
Hawaii	State Program	9	N/A	06-30-18
Illinois	NELAP	5	200022	11-30-17 *
Indiana	State Program		N/A	06-30-18
lowa	State Program	7	353	06-30-19
Kentucky (DW)	State Program	4	90084	12-31-17
Kentucky (UST)	State Program		18	06-30-18
Kentucky (WW)	State Program	4	90084	12-31-17
L-A-B	DoD ELAP	7	L2463	09-22-19
L-A-B	ISO/IEC 17025		L2463.01	09-22-19
Louisiana	NELAP	6	30690	06-30-18
	NELAP	6	LA160019	
Louisiana (DW)				12-31-18
Maine Mariland	State Program	1	GA00006	09-24-18
Maryland	State Program	3	250	12-31-17
Massachusetts	State Program	1 <u>-</u>	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	03-31-18
North Carolina (DW)	State Program	4	13701	07-31-18
North Carolina (WW/SW)	State Program	4	269	12-31-17
Oklahoma	State Program	6	9984	08-31-18
Pennsylvania	NELAP	3	68-00474	06-30-18
Puerto Rico	State Program	2	GA00006	12-31-17
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		SAV 3-04	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	12-31-17
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 *

<sup>\*</sup> Accreditation/Certification renewal pending - accreditation/certification considered valid.

TestAmerica Savannah

11/30/2017

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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: 680-146157-1

Client Project/Site: Middle River Sediment Remediation

#### For:

Tetra Tech, Inc. 19803 North Creek Parkway Bothell, Washington 98011

Attn: Keir Craigie

Jerry Janier

Authorized for release by: 12/7/2017 7:09:21 AM

Jerry Lanier, Project Manager I (912)354-7858 e.3410

jerry.lanier@testamericainc.com

..... LINKS .....

Review your project results through

Total Access

**Have a Question?** 



**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.

Project/Site: Middle River Sediment Remediation

# **Table of Contents**

Cover Page	1
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#### **Case Narrative**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-146157-1

Job ID: 680-146157-1

**Laboratory: TestAmerica Savannah** 

Narrative

#### **CASE NARRATIVE**

Client: Tetra Tech, Inc.

**Project: Middle River Sediment Remediation** 

Report Number: 680-146157-1

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 12/01/2017; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 3.0 C.

#### **TOTAL SUSPENDED SOLIDS**

Sample DW-33-113017 (680-146157-1) was analyzed for total suspended solids in accordance with SM 2540D. The samples were analyzed on 12/05/2017.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

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# **Sample Summary**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-146157-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
680-146157-1	DW-33-113017	Water	11/30/17 12:40	12/01/17 09:25

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# **Method Summary**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-146157-1

Method	Method Description	Protocol	Laboratory
2540 D-2011	Total Suspended Solids (Dried at 103-105°C)	SM	TAL SAV

#### **Protocol References:**

SM = "Standard Methods For The Examination Of Water And Wastewater",

#### Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

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## **Definitions/Glossary**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

Not Calculated

**Quality Control** 

Practical Quantitation Limit

Relative Error Ratio (Radiochemistry)

Toxicity Equivalent Factor (Dioxin)

Toxicity Equivalent Quotient (Dioxin)

Not Detected at the reporting limit (or MDL or EDL if shown)

Relative Percent Difference, a measure of the relative difference between two points

Reporting Limit or Requested Limit (Radiochemistry)

TestAmerica Job ID: 680-146157-1

#### **Qualifiers**

#### **General Chemistry**

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.

### **Glossary**

NC

ND

PQL

QC

RER

RPD

TEF

**TEQ** 

RL

Abbreviation	These commonly used abbreviations may or may not be present in this report.							
a	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)							

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# **Client Sample Results**

Client: Tetra Tech, Inc.

TestAmerica Job ID: 680-146157-1

Project/Site: Middle River Sediment Remediation

Client Sample ID: DW-33-113017 Lab Sample ID: 680-146157-1

Date Collected: 11/30/17 12:40 Matrix: Water

Date Received: 12/01/17 09:25

General Chemistry							
Analyte	Result Qualifier	RL	MDL Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	5.0	2.0	2.0 mg/L			12/05/17 17:34	1

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## **QC Sample Results**

Client: Tetra Tech, Inc.

TestAmerica Job ID: 680-146157-1

Project/Site: Middle River Sediment Remediation

Method: 2540 D-2011 - Total Suspended Solids (Dried at 103-105°C)

Lab Sample ID: MB 680-505155/1 Client Sample ID: Method Blank
Matrix: Water Prep Type: Total/NA

Analysis Batch: 505155

	MB	MB							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	1.0	U	1.0	1.0	mg/L			12/05/17 16:32	1

Lab Sample ID: LCS 680-505155/2

Matrix: Water

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analysis Batch: 505155

		Spike	LCS	LCS					%Rec.	
Analyte		Added	Result	Qualifier	Unit	!	D	%Rec	Limits	
Total Suspended Solids	 	20.0	19.0		mg/L		_	95	80 - 120	

Lab Sample ID: LCSD 680-505155/3

Client Sample ID: Lab Control Sample Dup
Matrix: Water

Prep Type: Total/NA

Analysis Batch: 505155

	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Total Suspended Solids	20.0	18.5		mg/L		93	80 - 120	3	25

12/7/2017

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# **QC Association Summary**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-146157-1

## **General Chemistry**

### Analysis Batch: 505155

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-146157-1	DW-33-113017	Total/NA	Water	2540 D-2011	
MB 680-505155/1	Method Blank	Total/NA	Water	2540 D-2011	
LCS 680-505155/2	Lab Control Sample	Total/NA	Water	2540 D-2011	
LCSD 680-505155/3	Lab Control Sample Dup	Total/NA	Water	2540 D-2011	

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#### **Lab Chronicle**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-146157-1

Client Sample ID: DW-33-113017 Lab Sample ID: 680-146157-1

Date Collected: 11/30/17 12:40 Matrix: Water

Date Received: 12/01/17 09:25

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	2540 D-2011		1	500 mL	1000 mL	505155	12/05/17 17:34	JER	TAL SAV
	Instrument	ID: NOEQUIP								

#### Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

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9h:5 THE LEADER IN ENVIRONMENTAL TESTING **TestAmerica** TestAmerica Laboratories, Inc. TAL-8210 (0713) 935 Sample Specific Notes: COCs roberts A WIN TAT Sample Disposal ( A fee may be assessed if samples are retained longer than 1 month) For Lab Use Only: Date/Time: CH Walk-in Client: Job / SDG No. ab Sampling: Date/Time: herm ID No COC No 2,8°C (rF) 3.0°C Archive for 123957 80325 K 680-146157 Chain of Custody Company: Company: John Nakotts Date: 11 Carrier: Chain of Custody Record LAR Sandlag Received in Laboratory Other: Return to Client Received by: Received by: Site Contact: Lab Contact: RCRA (N /Y) OSM/SM mohog X CISTORE PT. PIR Filtered Sample (Y / N ) Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the NPDES # of Cont. Sediment -Date/Time: Date/Time: WORKING DAYS Craisic Matrix TellFax: 978-835-6694 AR Regulatory Program: Dw Analysis Turnaround Time Type (C=Comp, G=Grab) Sample SAVANNAH A Vest1 TAT if different from Below Special Instructions/QC Requirements & Comments: # Muddle Ruvel Tetra Fel De Sample 143/17/240 Project Manager: CALENDAR DAYS Preservation Used: (1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other Custody Seal No. 4101 Shuffel Street, N. W. JESTAMENICA Sample Company: Company North Canton, UN 44720 Phone: 330.497.9396 Fax: 330.497.0772 Mar Bellmen number Comments Section if the lab is to dispose of the sample TestAmerica Canton letra tal In Celk Sample Identification DW-33-11301 Yes Client Contact 6201729 NAM City/State/Zip: Bothell Custody Seals Intact Company Name: Relinquished by: Relinquished by; Relinquished by: Project Name: Address: Phone: # O d Site Fax:

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12/7/2017

## **Login Sample Receipt Checklist**

Client: Tetra Tech, Inc. Job Number: 680-146157-1

Login Number: 146157 List Source: TestAmerica Savannah

List Number: 1

Creator: Anderson, Jordan K

ordator. Andorson, vordan te	
Question	Answer Comment
Radioactivity wasn't checked or is = background as measured by a survey meter.</td <td>N/A</td>	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
s the Field Sampler's name present on COC?	N/A
There are no discrepancies between the containers received and the COC.	True
Samples are received within Holding Time (excluding tests with immediate HTs)	True
Sample containers have legible labels.	True
Containers are not broken or leaking.	True
Sample collection date/times are provided.	True
Appropriate sample containers are used.	True
Sample bottles are completely filled.	True
Sample Preservation Verified.	N/A
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True
Containers requiring zero headspace have no headspace or bubble is <a href="https://www.edu.nc.no.nd/">6mm (1/4").</a>	N/A
Multiphasic samples are not present.	True
Samples do not require splitting or compositing.	True
Residual Chlorine Checked.	N/A

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# **Accreditation/Certification Summary**

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-146157-1

r roject cite. Middle raver ecalment remedie

### Laboratory: TestAmerica Savannah

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program  AFCEE	EPA Region	- Identification Number SAVLAB	Expiration Date
Alabama	State Program	4	41450	06-30-18
	<del>-</del>		41450	
Alaska	State Program	10	LIOT 404	06-30-18
Alaska (UST)	State Program	10	UST-104	11-05-17 *
Arizona	State Program	9	AZ808	12-14-17 *
Arkansas DEQ	State Program	6	88-0692	02-01-18
California	State Program	9	2939	06-30-18
Colorado	State Program	8	N/A	12-31-17
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	04-16-18
Hawaii	State Program	9	N/A	06-30-18
Illinois	NELAP	5	200022	11-30-17 *
Indiana	State Program	5	N/A	06-30-18
lowa	State Program	7	353	06-30-19
Kentucky (DW)	State Program	4	90084	12-31-17
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	12-31-17
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	03-31-18
North Carolina (DW)	State Program		13701	07-31-18
North Carolina (WW/SW)	State Program	4	269	12-31-17
Oklahoma	State Program	6	9984	08-31-18
Pennsylvania	NELAP	3	68-00474	06-30-18
Puerto Rico	State Program	2	GA00006	12-31-17
South Carolina	State Program	4	98001	06-30-18
Tennessee	State Program	4	TN02961	06-30-18
Termessee Texas	NELAP	6	T104704185-16-9	11-30-18
	State Program	6		
Texas		σ	T104704185	06-30-18
US Fish & Wildlife	Federal		LE058448-0	07-31-18
USDA	Federal	•	SAV 3-04	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	12-31-17
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 *

<sup>\*</sup> Accreditation/Certification renewal pending - accreditation/certification considered valid.

TestAmerica Savannah

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12/7/2017



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: 680-147079-1

Client Project/Site: Middle River Sediment Remediation

#### For:

Tetra Tech, Inc. 19803 North Creek Parkway Bothell, Washington 98011

Attn: Keir Craigie

Ja Jampa

Authorized for release by: 12/21/2017 3:23:04 PM Jon Lawhon, Project Manager I (912)354-7858 jon.lawhon@testamericainc.com

Designee for

Jerry Lanier, Project Manager I (912)354-7858 e.3410 jerry.lanier@testamericainc.com

.....LINKS .....

Review your project results through

Total Access

**Have a Question?** 



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.

Project/Site: Middle River Sediment Remediation

# **Table of Contents**

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#### **Case Narrative**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-147079-1

Job ID: 680-147079-1

**Laboratory: TestAmerica Savannah** 

**Narrative** 

CASE NARRATIVE
Client: Tetra Tech, Inc.
Project: Middle River Sediment Remediation

Report Number: 680-147079-1

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 sample was received on  $12/20/2017\ 10:20\ AM$ ; the sample arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was  $2.6^{\circ}\ C$ 

#### **TOTAL SUSPENDED SOLIDS**

Sample DW-36-121917 (680-147079-1) was analyzed for total suspended solids in accordance with SM 2540D. The sample was analyzed on 12/21/2017.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

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# **Sample Summary**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-147079-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
680-147079-1	DW-36-121917	Water	12/19/17 10:30	12/20/17 10:20

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# **Method Summary**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-147079-1

Method	Method Description	Protocol	Laboratory
2540 D-2011	Total Suspended Solids (Dried at 103-105°C)	SM	TAL SAV

**Protocol References:** 

SM = "Standard Methods For The Examination Of Water And Wastewater",

Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

# **Definitions/Glossary**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

Not Calculated

**Quality Control** 

Practical Quantitation Limit

Relative Error Ratio (Radiochemistry)

Toxicity Equivalent Factor (Dioxin)

Toxicity Equivalent Quotient (Dioxin)

Not Detected at the reporting limit (or MDL or EDL if shown)

Relative Percent Difference, a measure of the relative difference between two points

Reporting Limit or Requested Limit (Radiochemistry)

TestAmerica Job ID: 680-147079-1

### **Qualifiers**

# **General Chemistry**

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.

# **Glossary**

NC

ND

PQL

QC

RER

RPD

TEF

**TEQ** 

RL

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)

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# **Client Sample Results**

Client: Tetra Tech, Inc.

TestAmerica Job ID: 680-147079-1

Project/Site: Middle River Sediment Remediation

Client Sample ID: DW-36-121917 Lab Sample ID: 680-147079-1

Date Collected: 12/19/17 10:30 Matrix: Water

Date Received: 12/20/17 10:20

General Chemistry									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	1.3		1.0	1.0	mg/L			12/21/17 09:09	1

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# **QC Sample Results**

Client: Tetra Tech, Inc. TestAmerica Job ID: 680-147079-1

Project/Site: Middle River Sediment Remediation

Method: 2540 D-2011 - Total Suspended Solids (Dried at 103-105°C)

**Matrix: Water** 

Analysis Batch: 507333

mary 313 Daton. 007 000		
	MB	MB
nalyte	Result	Oua

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	1.0	U	1.0	1.0	mg/L			12/21/17 09:09	1

Lab Sample ID: LCS 680-507333/2

**Matrix: Water** 

Lab Sample ID: MB 680-507333/1

Analysis Batch: 507333

	Spike	LCS	LCS			%Rec.	
Analyte	Added	Result	Qualifier Ur	nit D	%Rec	Limits	
Total Suspended Solids	20.0	22.5	m	g/L	113	80 - 120	

Lab Sample ID: LCSD 680-507333/3

**Matrix: Water** 

Analysis Batch: 507333

	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Total Suspended Solids	20.0	23.0		mg/L		115	80 - 120	2	25

Client Sample ID: Method Blank

**Client Sample ID: Lab Control Sample** 

**Client Sample ID: Lab Control Sample Dup** 

Prep Type: Total/NA

Prep Type: Total/NA

Prep Type: Total/NA

# **QC Association Summary**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-147079-1

# **General Chemistry**

# Analysis Batch: 507333

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-147079-1	DW-36-121917	Total/NA	Water	2540 D-2011	
MB 680-507333/1	Method Blank	Total/NA	Water	2540 D-2011	
LCS 680-507333/2	Lab Control Sample	Total/NA	Water	2540 D-2011	
LCSD 680-507333/3	Lab Control Sample Dup	Total/NA	Water	2540 D-2011	

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# **Lab Chronicle**

Client: Tetra Tech, Inc.

Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-147079-1

Client Sample ID: DW-36-121917 Lab Sample ID: 680-147079-1

Date Collected: 12/19/17 10:30 Matrix: Water

Date Received: 12/20/17 10:20

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	2540 D-2011		1	990 mL	1000 mL	507333	12/21/17 09:09	KLD	TAL SAV
	Instrument	ID: NOEQUIP								

#### Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

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# **TestAmerica**

# Chain of Custody Record

Savannah 5102 LaRoche Avenue

Client Contact	Project Manager: Keir Craigie	Site Contact: John Roberts	Date: 12/19/2017	COC No:
Tetra Tech	Tel/Fax: 425,482,7647 (cell)	Lab Contact: Jerry Lanier	Carrier: Fedex	1 of 1 COCs
19803 North Creek Pkwy	Analysis Turnaround Time			Job No.
Bothell, WA 98011	Calendar ( C ) or Work Days (W)			
425-482-7647	TAT if different from Below: 3 Days	8	180325	77 000
Project Name: MRC Sediment Remediation Season 2	2 weeks	8°00Z (		SDG NO.
Site: Middle River NPDES	2 days	()	DAT THE LOS	
Project # 6801724	l day	(2340)	WIND WAR	Sampler: Roberts
Sample Identification	Sample Sample Sample Date Time Type Matrix	O # O PE Pillered S TSS (2540 Hardness O Perals (C		Sample Specific Notes:
0W-36-121917	12/13/17 1030 G AQ	x x		**24 hour TAT for TSS
				\
		4//5		
	1/hl			
	m			
		680-147079 Chain of Custody	of Custody	
Preservation Used 1= Job, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other	aOH; 6= Other	1 4 4		
Possible Hazard Idenissication  Non-Hazard   Flammable Skm Irritant	Poison B	Sample Disposal ( A fee may	Sample Disposal ( A fee may be assessed if samples are retained longer than 1 month)  Return To Client ( Disposal By Lab Archive For Monti	etained longer than 1 month) Archive For Months
Special Instructions/QC Requirements & Comments: Middle River Sediment - treatment		system sampling, Keir.craigie@tetratech.com		
Relinquished by:	Company tell for 18/19/19	e: (L. 4 Received by	Company:	Date Fine. 1 (1:50)
Relinquished by:	Company: Daté/Time	e. Received by:	Company:	Date Time. 10 Date 10 Date 10 Date 12 Zol A 10 Zo
Relinquished by:	Company: Date Time	Received by:	Company	DateTime

# **Login Sample Receipt Checklist**

Client: Tetra Tech, Inc.

Job Number: 680-147079-1

Login Number: 147079 List Source: TestAmerica Savannah

List Number: 1

Creator: Chamberlain, Kim A

oreator. Onamberiam, Nim A		
Question	Answer	Comment
Radioactivity wasn't checked or is = background as measured by a survey meter.</td <td>N/A</td> <td></td>	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	
s the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is 6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

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# **Accreditation/Certification Summary**

Client: Tetra Tech, Inc. Project/Site: Middle River Sediment Remediation TestAmerica Job ID: 680-147079-1

# 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	11-05-17 *
Arizona	State Program	9	AZ808	12-14-18
Arkansas DEQ	State Program	6	88-0692	02-01-18
California	State Program	9	2939	06-30-18
Colorado	State Program	8	N/A	12-31-17
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	04-16-18
Hawaii	State Program	9	N/A	06-30-18
Illinois	NELAP	5	200022	11-30-18
Indiana	State Program		N/A	06-30-18
lowa	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	4	L2463	09-22-19
L-A-B	ISO/IEC 17025		L2463.01	09-22-19
		c		06-30-18
Louisiana	NELAP	6	30690	
Louisiana (DW)	NELAP	6	LA160019	12-31-18
Maine	State Program	1	GA00006	09-24-18
Maryland	State Program	3	250	12-31-17
Massachusetts	State Program	<u> </u>	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	03-31-18
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	12-31-17
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		SAV 3-04	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	12-31-17
	State i Togram	•		
- ' '	State Program	3	094	06-30-18
West Virginia DEP Wisconsin	State Program State Program	3 5	094 999819810	06-30-18 08-31-18

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12/21/2017

TestAmerica Savannah

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<sup>\*</sup> Accreditation/Certification renewal pending - accreditation/certification considered valid.

# ATTACHMENT C

# Martin, Michael

From:

Myers, Paul

Sent:

Friday, October 27, 2017 5:22 PM

To: Cc: marjorie.mewbourn@maryland.gov
Thomas Johnson -MDE-; tom.d.blackman@lmco.com; Martin, Michael; Ashley, Ernest

Subject:

Lockheed NPDES No. MD0071935 Monthly Average Cadmium Exceedance

Attachments:

Lockheed NPDES MD0071935 Monthly Average Cadmium Exceedance Report.docx

## Marjorie/Thomas,

Attached is a report on the exceedance of the monthly average limit for cadmium at the Cow Pen Creek Sediment Remediation project in Middle River, Maryland. As we discussed earlier this week, the elevated cadmium concentration that was recorded on August 9th and that caused the monthly average to be exceeded coincided with the severe storm events in late July and early August and associated elevated level of TSS. Cadmium (as well as TSS) concentrations have been well below permitted levels since the storm event and subsequent corrective actions taken on the treatment system.

The attached report is being provided to accompany and supplement the DMR being submitted to the NetDMR system for 3rd quarter 2017. If you have any questions please don't hesitate to call me. Thanks again,

Paul

**Paul Myers** 

Senior Environmental Scientist

paul.myers@tetratech.com | www.tetratech.com

Tetra Tech | Complex World, Clear Solutions™

288 Dexter Road | Garland, Maine 04939

Direct: 207-299-0594

#### Report on the Monthly Average Exceedance for Cadmium

#### State Permit No. 17-DP-3843 NPDES Permit No. MD0071935

#### Lockheed Martin Corporation - Cow Pen Creek Sediment Remediation Surface Water Discharge

The following is a report on the recent monthly average exceedance for cadmium during third quarter 2017 monitoring of the Cow Pen Creek Sediment Remediation NPDES wastewater discharge permit cited above. This includes details of the exceedance of the monthly average, a discussion of the likely cause of the exceedance, and proposed actions to address the situation.

#### **Maximum Daily Limit**

The maximum daily limit for cadmium is  $5.0 \,\mu g/L$ . The maximum daily limit was not exceeded at any time during the third quarter (July through September). The following table presents the results for cadmium during July, August, and September 2017.

Concentrations of TSS and Cadmium by Date – 3 <sup>rd</sup> Quarter (July, August, September) 2017						
Constituent	7/20	7/25	8/9	8/28	9/5	9/20
Cadmium (µg/L)	0.043	0.99	3.1	0.42	0.15	0.43
TSS (mg/L)	1.0	14	49	1.1	1.7	1.9

Note: Bolded values represent elevated concentrations

#### **Monthly Average Exceedance for Cadmium**

The monthly average limit for cadmium as currently set for the existing NPDES permit is 0.45 micrograms per liter ( $\mu$ g/L). This monthly average limit was exceeded during July and August 2017. The monthly average limit was not exceeded during the month of September.

The monthly average for July was 0.88  $\mu$ g/L, while the monthly average for August was 0.53  $\mu$ g/L. Note that these are flow-weighted averages and are based on the daily flow for each sample date. These monthly average values are both above the monthly average limit of 0.45  $\mu$ g/L set by the current permit. The monthly average values are based on two samples collected for each month. In July the first sample taken on July 20 indicated cadmium concentration at 0.43  $\mu$ g/L (the reporting limit for a non-detect result), while the second sample taken on July 25 was 0.99  $\mu$ g/L. In August the first sample taken on August 9 was 3.1  $\mu$ g/L, while the second sample taken on August 28 was 0.42  $\mu$ g/L.

#### **Potential Cause of Exceedance**

The above results clearly show that only one sample was found to be significantly elevated over other data point. The August  $9^{th}$  sample was found to have a cadmium concentration of  $3.1 \,\mu\text{g/L}$ . This result is related to a series of storm events in late July and August that overwhelmed the watershed, temporary dam, and treatment system. The storm events during this period resulted in a large volume of highly turbid water entering the stream channel and the need to perform extended maintenance on the treatment system between July  $31^{st}$  and September 4th. TSS levels were also elevated during this period and the cadmium concentration of  $3.1 \,\mu\text{g/L}$  recorded on August  $9^{th}$  coincided with the highest

recorded TSS reading of 49 mg/L (see table above). A report on the TSS exceedance during this period was submitted to MDE and corrective action was taken to address the higher levels of TSS. Corrective actions taken have been successful at reducing TSS concentrations to permitted levels. Because cadmium is typically associated with particulates/suspended solids it is likely that the elevated cadmium concentration recorded on August 9<sup>th</sup> is likewise related to the storm event and subsequent treatment system issues experienced during the month of August.

Subsequent results from samples taken in September for both TSS and cadmium have been below both the daily and average monthly maximum limits specified in the current discharge permit. This indicates that the treatment system has been functioning properly and maintaining concentrations within permitted limits under normal conditions following rehabilitation of the system after the storm events. .

#### **Recommended Actions**

Based on the analysis of both sample data and the timeline of storm events, it is likely that the elevated cadmium concentration of 3.1  $\mu$ g/L that led to an exceedance of the monthly average limit was due to the severe storm event at the site in late July and August. Lockheed Martin proposes two recommended actions, the first of which has already been completed:

- Perform rehabilitation of the treatment system after major storm events by changing out the carbon and sand filtration media; also adding a solids settling weir (completed by early September 2017); and
- 2) Conduct two additional sampling events beginning in November. This will result in a total of four samples taken each month for the remainder of the permitted discharge period. The additional data should provide a more robust set of data for more accurately evaluating the actual average concentrations for cadmium throughout each month. It is expected that the additional data will demonstrate that during normal operation the discharge criteria as specified in the permit are being met.