Chemical Analysis Report

NW-DIST-2023-06-21-01

Florida DEP Laboratory
2600 Blair Stone Road
Tallahassee, FL 32399-2400
DOH Accreditation E31780

Event Description: **Rest Area Run**
Request ID: **RQ-2023-06-19-26**
Customer: **NW-DIST**
Project ID: **SMP**

Send Reports to:
FL Dept. of Environmental Protection
160 W Government Street
Suite 208
Pensacola, FL 32502-5794
Attn: Myranda Butler

For additional information please contact
Colin Wright, Ph.D.
Chris Bowen, B.S.
Kerry Tate, Ph.D.
Dr. rer. nat. Bettina Steinbock
Thekkekalathil Chandrasekhar, Ph.D, QA Officer
Phone (850) 245-8085

Certified by: Thekkekalathil Chandrasekhar, Environmental Consultant Date Certified: 10-JUL-2023 09:59

Case Narrative

Unless otherwise noted, all samples included in this report were received in accordance with protocols referenced in Chapter 62-160, Florida Administrative Code (F.A.C.). Results published in this report pertain only to the samples as submitted to, and received by the laboratory. All times in this report are adjusted to the applicable Eastern Time Zone (EST or EDT).

Results for the following analytical groups are included in this report: Metals and Nutrients.

Scientific notation may be used in reporting very large or small values. Values reported using scientific notation will take the form of the following example: 1.3E+03, which is equivalent to 1.3×10^3 or 1300.

Unless otherwise noted, analytical values for soil and sediment samples are reported on a dry weight basis, and analytical values for waste and tissue samples are reported on a wet weight basis.

Results for TNI accredited tests met requirements established by The NELAC Institute. A double asterisk (**) is used to indicate an analyte/matrix/method for which the laboratory is not TNI accredited by the Florida Department of Health Environmental Laboratory Certification Program or where accreditation for that field of testing is not applicable.

Any significant anomalies or deviations from established protocols are documented in Non-Conformance Reports, which, where appropriate, are included within this analytical report. Additional comments related to specific analytical tests may be included as remarks following the analytical results for each sample. Such comments and remarks are for informational purposes only and are not intended to convey judgement about the usability of the reported data.

A quality control report on the performance of the test method for the submitted samples is included. Uncertainty associated with the analytical results contained in this report can be estimated from the reported quality assurance results and from published quality control acceptance limits for each analytical test. Matrix quality control results (matrix spike recoveries and matrix sample precision) pertain only to the matrix sample tested and do not necessarily reflect test method performance for other samples.

Typical matrix quality control (QC) measurements may include matrix spike recovery, matrix spike duplicate recovery, matrix spike precision and matrix sample precision. Not all matrix QC results may be available or reportable; where they are not an explanation is provided. Typical reasons for unavailable QC results include, but are not limited to, a) insufficient matrix sample to perform some or all QC measurements; b) analyte concentration in the sample replicated was too low for a meaningful measurement of precision and c) analyte concentration in the matrix sample spiked was too high (relative to the amount of analyte spiked) for a meaningful measurement of recovery. Where matrix QC results are unavailable, other method performance metrics (e.g., LCS recovery, LCS precision, surrogate recovery) may be used to assess performance of the method. Comments explaining any missing QC measurements are not intended to convey any adverse conclusions about the quality of the reported data.

Precision is reported as relative percent difference unless otherwise noted.

Quality Control codes as defined below may be used in this report to indicate results that are associated with one or more quality control elements which did not fall within established test method criteria. Such results may be qualified as estimates using a J qualifier as required by 62-160 F.A.C. Explanations are included in the report for any results that were reported as estimates for other reasons.

QC Codes used in this report may include:

- LCS – Recovery for the batch Laboratory Control Sample (LCS) was outside existing control limits;
- MS – Recovery for the batch matrix spike (MS) was outside existing control limits;
- CCV – Recovery for a continuing calibration verification (CCV) standard was outside existing control limits;
- SUR – Recovery of a surrogate (SUR) for associated analytes was outside existing control limits;
- RPD – The precision, measured as relative percent difference (RPD), of batch replicate measurements was outside existing control limits;
- RSD – The precision, measured as relative standard deviation (RSD), of batch replicate measurements was outside existing control limits;
- SMP – Sample - used precision derived from replicate analyses of a sample;

The following data qualifiers are used, where applicable, in this report as specified in 62-160 F.A.C.

- A - Value reported is the mean of two or more determinations.
- B - Results based on colony counts outside the acceptable range.
- I - The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
- J - Estimated value and/or the analysis did not meet established quality control criteria.
- K - Actual value is known to be less than value given.
- L - Actual value is known to be greater than value given.
- N - Presumptive evidence of presence of material.
- O - Sampled, but analysis lost or not performed.
- Q - Sample held beyond normal holding time.
- T - Value reported is less than the criterion of detection.
- U - Material was analyzed for but not detected. The reported value is the method detection limit for the sample analyzed.
- V - Analyte was detected in both sample and method blank.
- X - Too few individuals to calculate SCI value.
- Y - The laboratory analysis was from an unpreserved or improperly preserved sample. The data may not be accurate.
- Z - Colonies were too numerous to count (TNTC).

Quality control information from overflow laboratories may not be included in this report. Please refer to the associated report from the overflow laboratory for additional information.

Sample Location: Rest Area run below Beaver Pond Creek **Collection Date/Time: 06/20/2023 10:26**

Field ID: G5NW0068 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2418864	DEP SOP: NU-094-1	Color (true)	75		PCU	P431606	
	EPA 180.1 Rev. 2.0	Turbidity	60		NTU	P431593	
	EPA 300.0 Rev. 2.1	Chloride	6.7	A	mg Cl/L	P431914	
		Sulfate	5.4	A	mg SO4/L	P431833	
	SM 2320 B-2011	Total Alkalinity	12		mg CaCO3/L	P431954	
	SM 2540 C-2015	TDS	73		mg/L	P432043	
	SM 2540 D-2015	TSS	14		mg/L	P432045	
	SM 4500-F- C-2011	Fluoride	0.034	I	mg F/L	P431774	
2418865	EPA 350.1 Rev. 2.0	Ammonia-N	0.21		mg N/L	P431839	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.74		mg N/L	P431677	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.20		mg N/L	P431996	
	EPA 365.1 Rev. 2.0	Total-P	0.036		mg P/L	P431778	
	SM 5310 B-2011	Organic Carbon	11		mg C/L	P431708	

Ref. Method and Comment:
SM 2540 D-2015: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
SM 4500-F- C-2011: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

Sample Location: Beaver Pond Creek **Collection Date/Time: 06/20/2023 10:46**

Field ID: 33010066 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2418862	DEP SOP: NU-094-1	Color (true)	81		PCU	P431606	
	EPA 180.1 Rev. 2.0	Turbidity	40		NTU	P431593	
	EPA 300.0 Rev. 2.1	Chloride	11		mg Cl/L	P431829	
		Sulfate	5.6		mg SO4/L	P431832	
	SM 2320 B-2011	Total Alkalinity	38		mg CaCO3/L	P431954	
	SM 2540 C-2015	TDS	120		mg/L	P432043	
	SM 2540 D-2015	TSS	10		mg/L	P432045	
	SM 4500-F- C-2011	Fluoride	0.057	I	mg F/L	P431774	
2418863	EPA 350.1 Rev. 2.0	Ammonia-N	0.12		mg N/L	P431839	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.97		mg N/L	P431677	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.19		mg N/L	P431996	
	EPA 365.1 Rev. 2.0	Total-P	0.065		mg P/L	P431732	
	SM 5310 B-2011	Organic Carbon	16		mg C/L	P431708	
2418883	EPA 200.7 Rev. 4.4	Calcium	14.2		mg/L	P431717	
		Iron	2.48E+03		ug/L	P431717	
		Magnesium	2.57		mg/L	P431717	
		Potassium	4.3		mg/L	P431717	
		Sodium	10.1		mg/L	P431717	
		Strontium	40.3		ug/L	P431717	
		Tin	3.0	U	ug/L	P431717	
		Titanium	85.5		ug/L	P431717	
		Vanadium	4.9	I	ug/L	P431717	
		Zinc	6.9	I	ug/L	P431717	
	EPA 200.8 Rev. 5.4	Aluminum	920		ug/L	P431717	
		Antimony	0.14	I	ug/L	P431717	
		Arsenic	1.36		ug/L	P431717	
		Barium	20.2		ug/L	P431717	
		Beryllium	0.039	I	ug/L	P431717	
		Boron	72.9		ug/L	P431717	
		Cadmium	0.020	U	ug/L	P431717	
		Chromium	1.5	I	ug/L	P431717	
		Cobalt	0.330		ug/L	P431717	
		Copper	1.56		ug/L	P431717	
		Lead	0.67		ug/L	P431717	
		Manganese	48.5		ug/L	P431717	
		Molybdenum	0.37	I	ug/L	P431717	
		Nickel	1.0	I	ug/L	P431717	
		Selenium	0.23	I	ug/L	P431717	
		Silver	0.010	U	ug/L	P431717	
		Thallium	0.10	U	ug/L	P431717	
	SM 2340 B-2011	Hardness	46.0		mg/L	P431717	

Field ID: 33010066 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes

Ref. Method and Comment:
EPA 300.0 Rev. 2.1: Sulfate: Batch matrix spike recoveries for one of two spiked samples are unavailable because of high analyte concentration in the QC sample.
SM 2540 D-2015: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
SM 4500-F- C-2011: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

Quality Assurance Report
Method Blank Results

Reference Method: DEP SOP: NU-094-1
Batch ID: P431606

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P431593

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P431717

Component	Result	Code	Units
Calcium	0.075	U	mg/L
Iron	30	U	ug/L
Magnesium	0.040	U	mg/L
Potassium	0.30	U	mg/L
Sodium	0.50	U	mg/L
Strontium	2.0	U	ug/L
Tin	3.0	U	ug/L
Titanium	0.75	U	ug/L
Vanadium	2.0	U	ug/L
Zinc	5.0	U	ug/L

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P431717

Component	Result	Code	Units
Aluminum	5.0	U	ug/L
Antimony	0.050	U	ug/L
Arsenic	0.050	U	ug/L
Barium	0.20	U	ug/L
Beryllium	0.010	U	ug/L
Boron	2.0	U	ug/L
Cadmium	0.020	U	ug/L
Chromium	0.40	U	ug/L
Cobalt	0.020	U	ug/L
Copper	0.40	U	ug/L
Lead	0.20	U	ug/L
Manganese	0.10	U	ug/L
Molybdenum	0.15	U	ug/L
Nickel	0.50	U	ug/L
Selenium	0.20	U	ug/L
Silver	0.010	U	ug/L
Thallium	0.10	U	ug/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P431829

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Quality Assurance Report
Method Blank Results

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P431832

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P431833

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P431914

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P431839

Component	Result	Code	Units
Ammonia-N	0.002	U	mg N/L

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P431677

Component	Result	Code	Units
Kjeldahl Nitrogen	0.080	U	mg N/L

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P431996

Component	Result	Code	Units
NO2NO3-N	0.004	U	mg N/L

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P431732

Component	Result	Code	Units
Total-P	0.002	U	mg P/L

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P431778

Component	Result	Code	Units
Total-P	0.002	U	mg P/L

Reference Method: SM 2320 B-2011
Batch ID: P431954

Component	Result	Code	Units
Total Alkalinity	0.65	U	mg CaCO3/L

Quality Assurance Report
Method Blank Results

Reference Method: SM 2540 C-2015
Batch ID: P432043

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-2015
Batch ID: P432045

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500-F- C-2011
Batch ID: P431774

Component	Result	Code	Units
Fluoride	0.025	U	mg F/L

Reference Method: SM 5310 B-2011
Batch ID: P431708

Component	Result	Code	Units
Organic Carbon	0.50	U	mg C/L

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: DEP SOP: NU-094-1
Batch ID: P431606

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	98.0		P	90 - 110

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P431593

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Turbidity	100		P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P431717

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	103		P	85 - 115
Iron	106		P	85 - 115
Magnesium	105		P	85 - 115
Potassium	103		P	85 - 115
Sodium	106		P	85 - 115
Strontium	103		P	85 - 115
Tin	103		P	85 - 115
Titanium	102		P	85 - 115
Vanadium	102		P	85 - 115
Zinc	104		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P431717

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	105		P	85 - 115
Antimony	103		P	85 - 115
Arsenic	102		P	85 - 115
Barium	105		P	85 - 115
Beryllium	99.2		P	85 - 115
Boron	105		P	85 - 115
Cadmium	105		P	85 - 115
Chromium	99.4		P	85 - 115
Cobalt	100		P	85 - 115
Copper	99.7		P	85 - 115
Lead	96.4		P	85 - 115
Manganese	98.5		P	85 - 115
Molybdenum	101		P	85 - 115
Nickel	101		P	85 - 115
Selenium	103		P	85 - 115
Silver	105		P	85 - 115
Thallium	102		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P431829

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Chloride	103		P	90 - 110

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P431832

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Sulfate	102		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P431833

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Sulfate	103		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P431914

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Chloride	99.5		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P431839

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	98.2		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P431677

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	96.0		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P431996

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	104		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P431732

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total-P	101		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P431778

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total-P	98.2		P	90 - 110

Reference Method: SM 2320 B-2011
Batch ID: P431954

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	95.8		P	92 - 105

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: SM 2540 C-2015
Batch ID: P432043

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
TDS	102		P	90 - 110

Reference Method: SM 2540 D-2015
Batch ID: P432045

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
TSS	98.4		P	85 - 106

Reference Method: SM 4500-F- C-2011
Batch ID: P431774

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	105		P	94 - 106

Reference Method: SM 5310 B-2011
Batch ID: P431708

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	95.0		P	85 - 115

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P431717

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2418480	Calcium	104		P	80 - 120
2418480	Iron	109	107	P/P	80 - 120
2418480	Magnesium	108	106	P/P	80 - 120
2418480	Potassium	104	102	P/P	80 - 120
2418480	Sodium	108	106	P/P	80 - 120
2418480	Strontium	106	103	P/P	80 - 120
2418480	Tin	109	106	P/P	80 - 120
2418480	Titanium	105	105	P/P	80 - 120
2418480	Vanadium	107	105	P/P	80 - 120
2418480	Zinc	107	105	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P431717

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2418480	Aluminum	104	103	P/P	80 - 120
2418480	Antimony	104	103	P/P	80 - 120
2418480	Arsenic	102	101	P/P	80 - 120
2418480	Barium	105	104	P/P	80 - 120
2418480	Beryllium	99.9	101	P/P	80 - 120
2418480	Boron	107	103	P/P	80 - 120
2418480	Cadmium	106	103	P/P	80 - 120
2418480	Chromium	101	101	P/P	80 - 120
2418480	Cobalt	99.9	98.3	P/P	80 - 120
2418480	Copper	99.5	99.5	P/P	80 - 120
2418480	Lead	98.4	97.3	P/P	80 - 120
2418480	Manganese	101	99.4	P/P	80 - 120
2418480	Molybdenum	102	102	P/P	80 - 120
2418480	Nickel	99.3	98.7	P/P	80 - 120
2418480	Selenium	104	102	P/P	80 - 120
2418480	Silver	105	105	P/P	80 - 120
2418480	Thallium	106	105	P/P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P431829

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2418455	Chloride	106		P	90 - 110
2418708	Chloride	105		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P431832

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2418455	Sulfate	101		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P431833

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2418864	Sulfate	101		P	90 - 110
2419270	Sulfate	105		P	90 - 110

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P431914

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2418864	Chloride	104		P	90 - 110
2419270	Chloride	106		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P431839

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2418711	Ammonia-N	97.0	97.4	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P431677

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2418854	Kjeldahl Nitrogen	102	106	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P431996

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2418863	NO2NO3-N	100	99.5	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P431732

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2418942	Total-P	102	104	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P431778

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2419105	Total-P	99.7	99.0	P/P	90 - 110

Reference Method: SM 5310 B-2011
Batch ID: P431708

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2418854	Organic Carbon	93.1	95.0	P/P	85 - 115

Quality Assurance Report
Precision

Reference Method: DEP SOP: NU-094-1
Batch ID: P431606

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2418709	Color (true)	2.41	Sample	P	0 - 20

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P431593

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2418474	Turbidity	19.7	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P431717

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2418480	Calcium	1.23	Spike	P	0 - 20
2418480	Iron	1.94	Spike	P	0 - 20
2418480	Magnesium	1.62	Spike	P	0 - 20
2418480	Potassium	1.20	Spike	P	0 - 20
2418480	Sodium	1.15	Spike	P	0 - 20
2418480	Strontium	2.04	Spike	P	0 - 20
2418480	Tin	2.31	Spike	P	0 - 20
2418480	Titanium	0.00544	Spike	P	0 - 20
2418480	Vanadium	1.12	Spike	P	0 - 20
2418480	Zinc	1.32	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P431717

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2418480	Aluminum	0.847	Spike	P	0 - 20
2418480	Antimony	0.929	Spike	P	0 - 20
2418480	Arsenic	1.62	Spike	P	0 - 20
2418480	Barium	1.08	Spike	P	0 - 20
2418480	Beryllium	1.52	Spike	P	0 - 20
2418480	Boron	3.13	Spike	P	0 - 20
2418480	Cadmium	3.16	Spike	P	0 - 20
2418480	Chromium	0.0591	Spike	P	0 - 20
2418480	Cobalt	1.63	Spike	P	0 - 20
2418480	Copper	0.0569	Spike	P	0 - 20
2418480	Lead	1.12	Spike	P	0 - 20
2418480	Manganese	1.35	Spike	P	0 - 20
2418480	Molybdenum	0.305	Spike	P	0 - 20
2418480	Nickel	0.629	Spike	P	0 - 20
2418480	Selenium	2.36	Spike	P	0 - 20
2418480	Silver	0.528	Spike	P	0 - 20
2418480	Thallium	1.21	Spike	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P431829

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2418455	Chloride	5.09	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P431832

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2418455	Sulfate	5.19	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P431833

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2418864	Sulfate	1.22	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P431914

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2418864	Chloride	0.348	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P431839

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2418711	Ammonia-N	0.306	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P431677

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2418854	Kjeldahl Nitrogen	2.66	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P431996

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2418863	NO2NO3-N	0.258	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P431732

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2418942	Total-P	2.02	Spike	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P431778

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2419105	Total-P	0.687	Spike	P	0 - 20

Reference Method: SM 2320 B-2011
Batch ID: P431954

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2419268	Total Alkalinity	0.244	Sample	P	0 - 3.9

Reference Method: SM 2540 C-2015
Batch ID: P432043

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2418552	TDS	3.92	Sample	P	0 - 10

Reference Method: SM 4500-F- C-2011
Batch ID: P431774

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2418853	Fluoride	1.45	Spike	P	0 - 1.9

Reference Method: SM 5310 B-2011
Batch ID: P431708

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2418854	Organic Carbon	0.966	Spike	P	0 - 20

* Sample, spike and/or laboratory control sample precision (LCS) is reported.

Quality Assurance Report
Calibration Verification

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A119947
Included Lab Sample IDs: 2418862, 2418864

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	101	101	P/P	95 - 105

Reference Method: DEP SOP: NU-094-1
Run ID: A119950
Included Lab Sample IDs: 2418862, 2418864

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	99.3	98.9	P/P	90 - 110

Reference Method: SM 5310 B-2011
Run ID: A119991
Included Lab Sample IDs: 2418863, 2418865

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	96.5	96.8	P/P	90 - 110
Organic Carbon	96.6	96.2	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A120023
Included Lab Sample IDs: 2418863, 2418865

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	94.9	91.1	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A120029
Included Lab Sample IDs: 2418863

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	99.8	97.5	P/P	90 - 110

Reference Method: SM 4500-F- C-2011
Run ID: A120036
Included Lab Sample IDs: 2418862, 2418864

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	106	106	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A120039
Included Lab Sample IDs: 2418883

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	103	105	P/P	90 - 110
Antimony	101	101	P/P	90 - 110
Arsenic	100	101	P/P	90 - 110
Barium	101	103	P/P	90 - 110
Beryllium	102	101	P/P	90 - 110
Boron	96.5	103	P/P	90 - 110
Cadmium	99.9	102	P/P	90 - 110
Chromium	99.6	102	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A120039
Included Lab Sample IDs: 2418883

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Cobalt	99.7	99.8	P/P	90 - 110
Copper	98.6	99.3	P/P	90 - 110
Lead	93.4	95.8	P/P	90 - 110
Manganese	98.7	101	P/P	90 - 110
Molybdenum	98.9	101	P/P	90 - 110
Nickel	100	100	P/P	90 - 110
Selenium	100	102	P/P	90 - 110
Silver	102	104	P/P	90 - 110
Thallium	101	104	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A120045
Included Lab Sample IDs: 2418863, 2418865

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	98.6	98.1	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A120051
Included Lab Sample IDs: 2418862, 2418864

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	101	101	P/P	90 - 110
Chloride	102	103	P/P	90 - 110
Sulfate	103	104	P/P	90 - 110
Sulfate	104	102	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A120063
Included Lab Sample IDs: 2418883

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	104	106	P/P	90 - 110
Iron	105	107	P/P	90 - 110
Magnesium	104	106	P/P	90 - 110
Potassium	103	104	P/P	90 - 110
Sodium	105	106	P/P	90 - 110
Strontium	106	105	P/P	90 - 110
Tin	105	105	P/P	90 - 110
Titanium	102	102	P/P	90 - 110
Vanadium	103	103	P/P	90 - 110
Zinc	106	105	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A120078
Included Lab Sample IDs: 2418865

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	99.0	99.5	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A120095
Included Lab Sample IDs: 2418863, 2418865

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	102	102	P/P	90 - 110

Reference Method: SM 2320 B-2011
Run ID: A120110
Included Lab Sample IDs: 2418862, 2418864

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	95.6	94.0	P/P	90 - 110

* Pass/Fail determinations are made for each bracketing calibration verification check.
Control limits for initial calibration checks may be different from those for continuing checks, depending on method requirements.
Where they are different, both control limits are provided.

Quality Assurance Report
Summary

Ref. Method	Analyte	LCS % Recovery	MS % Recovery		Precision		
					LCS	SMP	MS
DEP SOP: NU-094-1	Color (true)	98.0				2.41	
EPA 180.1 Rev. 2.0	Turbidity	100				19.7	
EPA 200.7 Rev. 4.4	Calcium	103	104				1.23
	Iron	106	109	107			1.94
	Magnesium	105	108	106			1.62
	Potassium	103	104	102			1.20
	Sodium	106	108	106			1.15
	Strontium	103	106	103			2.04
	Tin	103	109	106			2.31
	Titanium	102	105	105			0.0054
	Vanadium	102	107	105			1.12
	Zinc	104	107	105			1.32
EPA 200.8 Rev. 5.4	Aluminum	105	104	103			0.847
	Antimony	103	104	103			0.929
	Arsenic	102	102	101			1.62
	Barium	105	105	104			1.08
	Beryllium	99.2	99.9	101			1.52
	Boron	105	107	103			3.13
	Cadmium	105	106	103			3.16
	Chromium	99.4	101	101			0.0591
	Cobalt	100	99.9	98.3			1.63
	Copper	99.7	99.5	99.5			0.0569
	Lead	96.4	98.4	97.3			1.12
	Manganese	98.5	101	99.4			1.35
	Molybdenum	101	102	102			0.305
	Nickel	101	99.3	98.7			0.629
	Selenium	103	104	102			2.36
	Silver	105	105	105			0.528
	Thallium	102	106	105			1.21
EPA 300.0 Rev. 2.1	Chloride	103	106	105		5.09	
	Chloride	99.5	104	106		0.348	
	Sulfate	102	101			5.19	
	Sulfate	103	101	105		1.22	
EPA 350.1 Rev. 2.0	Ammonia-N	98.2	97.0	97.4			0.306
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	96.0	102	106			2.66
EPA 353.2 Rev. 2.0	NO2NO3-N	104	100	99.5			0.258
EPA 365.1 Rev. 2.0	Total-P	101	102	104			2.02
	Total-P	98.2	99.7	99.0			0.687
SM 2320 B-2011	Total Alkalinity	95.8				0.244	
SM 2540 C-2015	TDS	102				3.92	
SM 2540 D-2015	TSS	98.4					
SM 4500-F- C-2011	Fluoride	105					1.45
SM 5310 B-2011	Organic Carbon	95.0	93.1	95.0			0.966

Reference Method Descriptions

Method	Description	Associated Samples
DEP SOP: NU-094-1	True Color measured at 450 nm (not valid for NPDES monitoring)	2418862, 2418864
EPA 180.1 Rev. 2.0	Turbidity in aqueous matrices	2418862, 2418864
EPA 200.7 Rev. 4.4	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2418883
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2418883

Reference Method Descriptions

Method	Description	Associated Samples
EPA 300.0 Rev. 2.1	Chloride in aqueous matrices	2418862, 2418864
EPA 300.0 Rev. 2.1	Sulfate in aqueous matrices	2418862, 2418864
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2418863, 2418865
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2418863, 2418865
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2418863, 2418865
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2418863, 2418865
SM 2320 B-2011	Alkalinity in aqueous matrices as mg CaCO3/L	2418862, 2418864
SM 2340 B-2011	Hardness by calculation, in aqueous matrices, reported as mg/L CaCO3	2418883
SM 2540 C-2015	Total Dissolved Solids in aqueous matrices	2418862, 2418864
SM 2540 D-2015	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2418862, 2418864
SM 4500-F- C-2011	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2418862, 2418864
SM 5310 B-2011	Nonpurgeable Organic Carbon in aqueous matrices	2418863, 2418865

Preparation and Analysis Log

Ref. Method	Received Date	Prep Date/Time	Prepared By	Analysis Date/Time	Analyzed By	Associated Samples
DEP SOP: NU-094-1	06/21/2023			06/21/2023 15:34	Anna M. Plaviak	2418862, 2418864
EPA 180.1 Rev. 2.0	06/21/2023			06/21/2023 13:22	Alexis Price	2418862
	06/21/2023			06/21/2023 13:31	Alexis Price	2418864
EPA 200.7 Rev. 4.4	06/21/2023	06/23/2023 12:35	George D Taylor	06/27/2023 15:05	Samatha Luckman	2418883
EPA 200.8 Rev. 5.4	06/21/2023	06/23/2023 12:35	George D Taylor	06/26/2023 15:09	Emily M Philpot	2418883
EPA 300.0 Rev. 2.1	06/21/2023			06/27/2023 01:00	James L Waggerby	2418862
	06/21/2023			06/27/2023 02:30	James L Waggerby	2418864
	06/21/2023			06/28/2023 10:35	James L Waggerby	2418864
EPA 350.1 Rev. 2.0	06/21/2023			06/27/2023 13:54	Khloe J Berg	2418863
	06/21/2023			06/27/2023 13:55	Khloe J Berg	2418865
EPA 351.2 Rev. 2.0	06/21/2023	06/23/2023 14:22	Samantha L Bates	06/26/2023 09:50	Samantha L Bates	2418863
	06/21/2023	06/23/2023 14:22	Samantha L Bates	06/26/2023 09:51	Samantha L Bates	2418865
EPA 353.2 Rev. 2.0	06/21/2023			06/29/2023 10:27	Beverly Y. Sanders	2418863
	06/21/2023			06/29/2023 10:33	Beverly Y. Sanders	2418865
EPA 365.1 Rev. 2.0	06/21/2023	06/23/2023 15:29	Adam P Silver	06/26/2023 12:24	Simonne.V. Calhoun	2418863
	06/21/2023	06/27/2023 13:15	Simonne.V. Calhoun	06/28/2023 14:56	Simonne.V. Calhoun	2418865
SM 2320 B-2011	06/21/2023			06/28/2023 20:03	Dale L. Simmons	2418862
	06/21/2023			06/28/2023 20:16	Dale L. Simmons	2418864
SM 2340 B-2011	06/21/2023			06/27/2023 15:05	Samatha Luckman	2418883
SM 2540 C-2015	06/21/2023			06/23/2023 15:19	Yijie Li	2418862, 2418864
SM 2540 D-2015	06/21/2023			06/23/2023 15:19	Yijie Li	2418862, 2418864
SM 4500-F- C-2011	06/21/2023			06/24/2023 07:47	Dale L. Simmons	2418862
	06/21/2023			06/24/2023 07:59	Dale L. Simmons	2418864
SM 5310 B-2011	06/21/2023			06/22/2023 16:14	Khloe J Berg	2418865
	06/21/2023			06/22/2023 21:58	Khloe J Berg	2418863