

Chemical Analysis Report

CEN-DIST-2022-08-02-01

Florida Department of Environmental Protection
Central Laboratory
2600 Blair Stone Road
Tallahassee, FL 32399-2400
DOH Accreditation E31780

Event Description: **Roberts Branch x2, Howell Creek x2**
Request ID: **RQ-2022-08-01-33**
Customer: **CEN-DIST**
Project ID: **SMP**

Send Reports to:

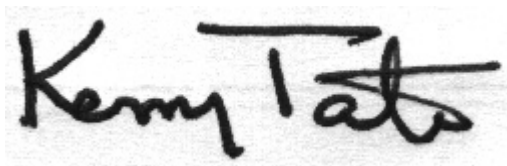
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Attn: Matthew Bearden

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Certified by: Kerry Tate, Ph.D., Environmental Administrator

Date Certified: 22-AUG-2022 09:00

A handwritten signature in black ink that reads "Kerry Tate". The signature is written in a cursive, flowing style with a horizontal line above the first name.

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: Roberts Branch @ Curryville Rd

Collection Date/Time: 08/01/2022 11:04

Field ID: G3CE0011

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2345147	DEP SOP: NU-094-1	Color (true)	520		PCU	P417532	
	EPA 180.1 Rev. 2.0	Turbidity	4.8		NTU	P417524	
	EPA 300.0 Rev. 2.1	Chloride	12		mg Cl/L	P417882	
		Sulfate	0.77		mg SO4/L	P417887	
	SM 2320 B-2011	Total Alkalinity	0.65	U	mg CaCO3/L	P417841	
	SM 2540 C-2011	TDS	106		mg/L	P417986	
	SM 2540 D-2011	TSS	4	I	mg/L	P418065	
2345148	SM 4500-F- C-2011	Fluoride	0.035	U	mg F/L	P417846	
	EPA 350.1 Rev. 2.0	Ammonia-N	0.027		mg N/L	P417771	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.6		mg N/L	P417573	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.009	I	mg N/L	P417648	
	EPA 365.1 Rev. 2.0	Total-P	0.058		mg P/L	P417738	
2345154	SM 5310 B-2011	Organic Carbon	46		mg C/L	P417762	
	EPA 200.7 Rev. 4.4	Calcium	3.46		mg/L	P417540	
		Iron	630		ug/L	P417540	
		Magnesium	1.07		mg/L	P417540	
		Potassium	0.80	I	mg/L	P417540	
		Sodium	6.9		mg/L	P417540	
		Strontium	20.0		ug/L	P417540	
		Tin	3.0	U	ug/L	P417540	
		Titanium	4.7		ug/L	P417540	
		Vanadium	2.0	U	ug/L	P417540	
		Zinc	7.4	I	ug/L	P417540	
	EPA 200.8 Rev. 5.4	Aluminum	667		ug/L	P417540	
		Antimony	0.056	I	ug/L	P417540	
		Arsenic	0.64		ug/L	P417540	
		Barium	9.31		ug/L	P417540	
		Beryllium	0.034	I	ug/L	P417540	
		Boron	20.2		ug/L	P417540	
		Cadmium	0.020	U	ug/L	P417540	
		Chromium	0.62	I	ug/L	P417540	
		Cobalt	0.140		ug/L	P417540	
		Copper	0.52	I	ug/L	P417540	
		Lead	0.54		ug/L	P417540	
		Manganese	5.85		ug/L	P417540	
		Molybdenum	0.15	U	ug/L	P417540	
		Nickel	0.55	I	ug/L	P417540	
		Selenium	0.20	U	ug/L	P417540	
		Silver	0.010	U	ug/L	P417540	
		Thallium	0.10	U	ug/L	P417540	
	SM 2340 B-2011	Hardness	13.1		mg/L	P417540	

Ref. Method and Comment:

SM 2540 D-2011: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.

EPA 200.8 Rev. 5.4: The lead result was confirmed in the undigested sample on 08/04/2022.

Sample Location: Roberts Branch @ Fort Christmas Rd N

Collection Date/Time: 08/01/2022 11:38

Field ID: G3CE0065

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2345155	EPA 200.7 Rev. 4.4	Calcium	1.39		mg/L	P417540	
		Iron	930		ug/L	P417540	
		Magnesium	0.78		mg/L	P417540	
		Potassium	0.30	U	mg/L	P417540	
		Sodium	5.4		mg/L	P417540	
		Strontium	12.5		ug/L	P417540	
		Tin	3.0	U	ug/L	P417540	
		Titanium	3.3		ug/L	P417540	
		Vanadium	2.0	U	ug/L	P417540	
		Zinc	8.3	I	ug/L	P417540	
	EPA 200.8 Rev. 5.4	Aluminum	485		ug/L	P417540	
		Antimony	0.051	I	ug/L	P417540	
		Arsenic	0.41		ug/L	P417540	
		Barium	6.19		ug/L	P417540	
		Beryllium	0.033	I	ug/L	P417540	
		Boron	17.9		ug/L	P417540	
		Cadmium	0.020	U	ug/L	P417540	
		Chromium	0.48	I	ug/L	P417540	
		Cobalt	0.128		ug/L	P417540	
		Copper	0.40	U	ug/L	P417540	
		Lead	0.71		ug/L	P417540	
		Manganese	3.71		ug/L	P417540	
		Molybdenum	0.15	U	ug/L	P417540	
		Nickel	0.61	I	ug/L	P417540	
		Selenium	0.20	U	ug/L	P417540	
		Silver	0.010	U	ug/L	P417540	
		Thallium	0.10	U	ug/L	P417540	
	SM 2340 B-2011	Hardness	6.7		mg/L	P417540	

Ref. Method and Comment:
 EPA 200.8 Rev. 5.4: The lead result was confirmed in the undigested sample on 08/04/2022.

Quality Assurance Report

Method Blank Results

Reference Method: DEP SOP: NU-094-1
Batch ID: P417532

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P417524

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P417540

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: P417540

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: P417882

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: P417887

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P417771

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P417573

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P417648

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P417738

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

Reference Method: SM 2320 B-2011
Batch ID: P417841

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

Reference Method: SM 2540 C-2011
Batch ID: P417986

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-2011
Batch ID: P418065

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500-F- C-2011
Batch ID: P417846

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Quality Assurance Report

Method Blank Results

Reference Method: SM 5310 B-2011
Batch ID: P417762

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: P417532

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	99.0		P	90 - 110

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P417524

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Turbidity	97.0		P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P417540

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

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P417540

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	96.4		P	85 - 115
Antimony	101		P	85 - 115
Arsenic	98.5		P	85 - 115
Barium	103		P	85 - 115
Beryllium	90.0		P	85 - 115
Boron	93.5		P	85 - 115
Cadmium	96.8		P	85 - 115
Chromium	99.0		P	85 - 115
Cobalt	96.7		P	85 - 115
Copper	98.0		P	85 - 115
Lead	91.8		P	85 - 115
Manganese	98.4		P	85 - 115
Molybdenum	95.4		P	85 - 115
Nickel	98.6		P	85 - 115
Selenium	100		P	85 - 115
Silver	95.7		P	85 - 115
Thallium	96.2		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P417882

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

Quality Assurance Report

Laboratory Control Sample Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P417887

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Sulfate	98.7		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P417771

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P417573

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P417648

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	101		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P417738

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total-P	105		P	90 - 110

Reference Method: SM 2320 B-2011
Batch ID: P417841

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	100		P	94 - 106

Reference Method: SM 4500-F- C-2011
Batch ID: P417846

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	102		P	96 - 104

Reference Method: SM 5310 B-2011
Batch ID: P417762

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	96.5		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P417540

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2345168	Calcium	105		P	80 - 120
2345168	Iron	104	99.5	P/P	80 - 120
2345168	Magnesium	104	98.2	P/P	80 - 120
2345168	Potassium	108	99.6	P/P	80 - 120
2345168	Sodium	111	101	P/P	80 - 120
2345168	Strontium	107	101	P/P	80 - 120
2345168	Tin	105	101	P/P	80 - 120
2345168	Titanium	107	101	P/P	80 - 120
2345168	Vanadium	105	98.9	P/P	80 - 120
2345168	Zinc	105	99.7	P/P	80 - 120
2345248	Calcium	107		P	80 - 120
2345248	Iron	104		P	80 - 120
2345248	Magnesium	105		P	80 - 120
2345248	Potassium	106		P	80 - 120
2345248	Sodium	105		P	80 - 120
2345248	Strontium	109		P	80 - 120
2345248	Tin	106		P	80 - 120
2345248	Titanium	108		P	80 - 120
2345248	Vanadium	108		P	80 - 120
2345248	Zinc	107		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P417540

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2345168	Aluminum	93.1	97.7	P/P	80 - 120
2345168	Antimony	101	104	P/P	80 - 120
2345168	Arsenic	96.6	101	P/P	80 - 120
2345168	Barium	101	105	P/P	80 - 120
2345168	Beryllium	92.8	93.6	P/P	80 - 120
2345168	Boron	93.8	98.8	P/P	80 - 120
2345168	Cadmium	96.5	98.6	P/P	80 - 120
2345168	Chromium	98.2	98.5	P/P	80 - 120
2345168	Cobalt	94.2	97.6	P/P	80 - 120
2345168	Copper	95.2	98.2	P/P	80 - 120
2345168	Lead	92.1	95.3	P/P	80 - 120
2345168	Manganese	96.4	100	P/P	80 - 120
2345168	Molybdenum	94.7	98.0	P/P	80 - 120
2345168	Nickel	94.6	98.4	P/P	80 - 120
2345168	Selenium	94.3	98.2	P/P	80 - 120
2345168	Silver	94.4	95.6	P/P	80 - 120
2345168	Thallium	96.9	100	P/P	80 - 120
2345248	Aluminum	97.1		P	80 - 120
2345248	Antimony	101		P	80 - 120
2345248	Arsenic	98.6		P	80 - 120
2345248	Barium	102		P	80 - 120
2345248	Beryllium	88.7		P	80 - 120
2345248	Boron	101		P	80 - 120
2345248	Cadmium	98.6		P	80 - 120
2345248	Chromium	97.8		P	80 - 120
2345248	Cobalt	91.7		P	80 - 120
2345248	Copper	98.2		P	80 - 120

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P417540

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2345248	Lead	94.2		P	80 - 120
2345248	Manganese	96.7		P	80 - 120
2345248	Molybdenum	97.8		P	80 - 120
2345248	Nickel	96.5		P	80 - 120
2345248	Selenium	93.0		P	80 - 120
2345248	Silver	95.1		P	80 - 120
2345248	Thallium	98.8		P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P417882

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2344988	Chloride	96.5		P	90 - 110
2345203	Chloride	100		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P417887

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2344988	Sulfate	94.0		P	90 - 110
2345203	Sulfate	94.0		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P417771

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2345111	Ammonia-N	97.0	100	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P417573

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2344748	Kjeldahl Nitrogen	101	108	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P417648

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2345111	NO2NO3-N	101	100	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P417738

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2345164	Total-P	103	104	P/P	90 - 110

Reference Method: SM 4500-F- C-2011
Batch ID: P417846

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2345203	Fluoride	99.8	100	P/P	94 - 104

Quality Assurance Report

Matrix Spike Accuracy

Reference Method: SM 5310 B-2011
Batch ID: P417762

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2345344	Organic Carbon	94.7	96.7	P/P	85 - 115

Quality Assurance Report Precision

Reference Method: DEP SOP: NU-094-1
Batch ID: P417532

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2345047	Color (true)	1.73	Sample	P	0 - 20

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P417524

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2344749	Turbidity	0.0	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P417540

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2345168	Calcium	5.38	Spike	P	0 - 20
2345168	Iron	4.23	Spike	P	0 - 20
2345168	Magnesium	4.35	Spike	P	0 - 20
2345168	Potassium	6.14	Spike	P	0 - 20
2345168	Sodium	4.99	Spike	P	0 - 20
2345168	Strontium	5.89	Spike	P	0 - 20
2345168	Tin	4.00	Spike	P	0 - 20
2345168	Titanium	5.78	Spike	P	0 - 20
2345168	Vanadium	6.31	Spike	P	0 - 20
2345168	Zinc	5.32	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P417540

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2345168	Aluminum	4.78	Spike	P	0 - 20
2345168	Antimony	3.49	Spike	P	0 - 20
2345168	Arsenic	4.50	Spike	P	0 - 20
2345168	Barium	3.51	Spike	P	0 - 20
2345168	Beryllium	0.886	Spike	P	0 - 20
2345168	Boron	4.34	Spike	P	0 - 20
2345168	Cadmium	2.11	Spike	P	0 - 20
2345168	Chromium	0.370	Spike	P	0 - 20
2345168	Cobalt	3.59	Spike	P	0 - 20
2345168	Copper	2.80	Spike	P	0 - 20
2345168	Lead	3.37	Spike	P	0 - 20
2345168	Manganese	3.59	Spike	P	0 - 20
2345168	Molybdenum	3.24	Spike	P	0 - 20
2345168	Nickel	3.94	Spike	P	0 - 20
2345168	Selenium	4.13	Spike	P	0 - 20
2345168	Silver	1.36	Spike	P	0 - 20
2345168	Thallium	3.48	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P417882

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2344988	Chloride	2.44	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P417887

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2344988	Sulfate	3.34	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P417771

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2345111	Ammonia-N	2.81	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P417573

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2344748	Kjeldahl Nitrogen	5.11	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P417648

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2345111	NO2NO3-N	0.496	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P417738

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2345164	Total-P	1.44	Spike	P	0 - 20

Reference Method: SM 2320 B-2011
Batch ID: P417841

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2345203	Total Alkalinity	1.40	Sample	P	0 - 3.8

Reference Method: SM 2540 C-2011
Batch ID: P417986

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2345201	TDS	3.06	Sample	P	0 - 10

Quality Assurance Report Precision

Reference Method: SM 4500-F- C-2011
Batch ID: P417846

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2345203	Fluoride	0.516	Spike	P	0 - 1.6

Reference Method: SM 5310 B-2011
Batch ID: P417762

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2345344	Organic Carbon	1.17	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: A113859

Included Lab Sample IDs: 2345147

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	100	100	P/P	95 - 105

Reference Method: DEP SOP: NU-094-1

Run ID: A113861

Included Lab Sample IDs: 2345147

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	102	103	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A113887

Included Lab Sample IDs: 2345154, 2345155

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	97.2	96.1	P/P	90 - 110
Antimony	98.8	100	P/P	90 - 110
Arsenic	98.2	99.2	P/P	90 - 110
Barium	98.7	98.6	P/P	90 - 110
Beryllium	93.0	90.4	P/P	90 - 110
Boron	95.0	96.0	P/P	90 - 110
Cadmium	98.9	101	P/P	90 - 110
Copper	97.5	98.2	P/P	90 - 110
Lead	90.3	91.5	P/P	90 - 110
Molybdenum	95.2	95.8	P/P	90 - 110
Nickel	96.8	96.6	P/P	90 - 110
Selenium	96.8	95.7	P/P	90 - 110
Silver	96.1	97.7	P/P	90 - 110
Thallium	95.1	96.2	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A113903

Included Lab Sample IDs: 2345154, 2345155

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	104	104	P/P	90 - 110
Calcium	104	104	P/P	90 - 110
Iron	100	99.4	P/P	90 - 110
Iron	99.4	99.8	P/P	90 - 110
Magnesium	101	99.9	P/P	90 - 110
Magnesium	99.9	100	P/P	90 - 110
Potassium	104	105	P/P	90 - 110
Potassium	105	105	P/P	90 - 110
Sodium	102	102	P/P	90 - 110
Sodium	102	102	P/P	90 - 110
Strontium	102	102	P/P	90 - 110
Strontium	99.2	102	P/P	90 - 110
Tin	100	101	P/P	90 - 110
Tin	98.4	100	P/P	90 - 110
Titanium	102	99.7	P/P	90 - 110
Titanium	98.9	102	P/P	90 - 110
Vanadium	101	101	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A113903

Included Lab Sample IDs: 2345154, 2345155

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Vanadium	98.7	101	P/P	90 - 110
Zinc	101	101	P/P	90 - 110
Zinc	99.2	101	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A113906

Included Lab Sample IDs: 2345148

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	101	101	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A113920

Included Lab Sample IDs: 2345154, 2345155

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chromium	101	101	P/P	90 - 110
Cobalt	94.8	93.7	P/P	90 - 110
Manganese	102	103	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A113954

Included Lab Sample IDs: 2345148

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	101	99.9	P/P	90 - 110

Reference Method: SM 5310 B-2011

Run ID: A113961

Included Lab Sample IDs: 2345148

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	96.8	97.6	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A113967

Included Lab Sample IDs: 2345148

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	100	98.2	P/P	90 - 110

Reference Method: SM 2320 B-2011

Run ID: A113988

Included Lab Sample IDs: 2345147

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	99.7	100	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: SM 4500-F- C-2011

Run ID: A113988

Included Lab Sample IDs: 2345147

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	102	103	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A113990

Included Lab Sample IDs: 2345148

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	90.6	92.4	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1

Run ID: A114002

Included Lab Sample IDs: 2345147

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	99.6	101	P/P	90 - 110
Sulfate	98.3	100	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 SMP	MS
			LCS				
DEP SOP: NU-094-1	Color (true)	99.0				1.73	
EPA 180.1 Rev. 2.0	Turbidity	97.0				0.0	
EPA 200.7 Rev. 4.4	Calcium	105	105	107			5.38
	Iron	104	104	99.5	104		4.23
	Magnesium	103	104	98.2	105		4.35
	Potassium	102	108	99.6	106		6.14
	Sodium	106	111	101	105		4.99
	Strontium	106	107	101	109		5.89
	Tin	104	105	101	106		4.00
	Titanium	104	107	101	108		5.78
	Vanadium	103	105	98.9	108		6.31
	Zinc	104	105	99.7	107		5.32
EPA 200.8 Rev. 5.4	Aluminum	96.4	93.1	97.7	97.1		4.78
	Antimony	101	101	104	101		3.49
	Arsenic	98.5	96.6	101	98.6		4.50
	Barium	103	101	105	102		3.51
	Beryllium	90.0	92.8	93.6	88.7		0.886
	Boron	93.5	93.8	98.8	101		4.34
	Cadmium	96.8	96.5	98.6	98.6		2.11
	Chromium	99.0	98.2	98.5	97.8		0.370
	Cobalt	96.7	91.7	94.2	97.6		3.59
	Copper	98.0	95.2	98.2	98.2		2.80
	Lead	91.8	92.1	95.3	94.2		3.37
	Manganese	98.4	96.4	100	96.7		3.59
	Molybdenum	95.4	94.7	98.0	97.8		3.24
	Nickel	98.6	94.6	98.4	96.5		3.94
	Selenium	100	94.3	98.2	93.0		4.13
	Silver	95.7	94.4	95.6	95.1		1.36
	Thallium	96.2	96.9	100	98.8		3.48
EPA 300.0 Rev. 2.1	Chloride	101	96.5	100		2.44	
	Sulfate	98.7	94.0	94.0		3.34	
EPA 350.1 Rev. 2.0	Ammonia-N	97.4	97.0	100			2.81
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	103	101	108			5.11
EPA 353.2 Rev. 2.0	NO2NO3-N	101	101	100			0.496
EPA 365.1 Rev. 2.0	Total-P	105	103	104			1.44
SM 2320 B-2011	Total Alkalinity	100				1.40	
SM 2540 C-2011	TDS					3.06	
SM 4500-F- C-2011	Fluoride	102	99.8	100			0.516
SM 5310 B-2011	Organic Carbon	96.5	94.7	96.7			1.17

Reference Method Descriptions

Method	Description	Associated Samples
DEP SOP: NU-094-1	True Color measured at 450 nm (not valid for NPDES monitoring)	2345147
EPA 180.1 Rev. 2.0	Turbidity in aqueous matrices	2345147
EPA 200.7 Rev. 4.4	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2345154, 2345155
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2345154, 2345155
EPA 300.0 Rev. 2.1	Chloride in aqueous matrices	2345147
EPA 300.0 Rev. 2.1	Sulfate in aqueous matrices	2345147
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2345148
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2345148

Reference Method Descriptions

Method	Description	<u>Associated Samples</u>
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2345148
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2345148
SM 2320 B-2011	Alkalinity in aqueous matrices as mg CaCO ₃ /L	2345147
SM 2340 B-2011	Hardness by calculation, in aqueous matrices, reported as mg/L CaCO ₃	2345154, 2345155
SM 2540 C-2011	Total Dissolved Solids in aqueous matrices	2345147
SM 2540 D-2011	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2345147
SM 4500-F- C-2011	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2345147
SM 5310 B-2011	Nonpurgeable Organic Carbon in aqueous matrices	2345148

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	08/02/2022			08/02/2022 16:12	Anna M. Plaviak	2345147
EPA 180.1 Rev. 2.0	08/02/2022			08/02/2022 15:20	Khloe J Berg	2345147
EPA 200.7 Rev. 4.4	08/02/2022	08/03/2022 09:28	Mackenzie Hunt	08/03/2022 23:28	McKinley C Carter	2345154
	08/02/2022	08/03/2022 09:28	Mackenzie Hunt	08/04/2022 00:03	McKinley C Carter	2345155
EPA 200.8 Rev. 5.4	08/02/2022	08/03/2022 09:28	Mackenzie Hunt	08/03/2022 23:50	Alexander Thompson	2345154
	08/02/2022	08/03/2022 09:28	Mackenzie Hunt	08/03/2022 23:59	Alexander Thompson	2345155
	08/02/2022	08/03/2022 09:28	Mackenzie Hunt	08/04/2022 14:38	Emily M Philpot	2345154
	08/02/2022	08/03/2022 09:28	Mackenzie Hunt	08/04/2022 14:45	Emily M Philpot	2345155
EPA 300.0 Rev. 2.1	08/02/2022			08/09/2022 01:56	Anna M. Plaviak	2345147
EPA 350.1 Rev. 2.0	08/02/2022			08/08/2022 14:46	Ping Hua	2345148
EPA 351.2 Rev. 2.0	08/02/2022	08/04/2022 12:05	Samantha L Bates	08/09/2022 14:41	Samantha L Bates	2345148
EPA 353.2 Rev. 2.0	08/02/2022			08/04/2022 12:22	Beverly Y. Sanders	2345148
EPA 365.1 Rev. 2.0	08/02/2022	08/05/2022 18:15	Adam P Silver	08/08/2022 09:53	James L Waggeberby	2345148
SM 2320 B-2011	08/02/2022			08/05/2022 13:53	Adam P Silver	2345147
SM 2340 B-2011	08/02/2022			08/03/2022 23:28	McKinley C Carter	2345154
	08/02/2022			08/04/2022 00:03	McKinley C Carter	2345155
SM 2540 C-2011	08/02/2022			08/05/2022 16:02	Yijie Li	2345147
SM 2540 D-2011	08/02/2022			08/05/2022 16:02	Yijie Li	2345147
SM 4500-F- C-2011	08/02/2022			08/05/2022 13:53	Adam P Silver	2345147
SM 5310 B-2011	08/02/2022			08/05/2022 17:28	Khloe J Berg	2345148