

Chemical Analysis Report

WAS-SECT-2019-10-03-02

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

Event Description: **Group 2**
Request ID: **RQ-2019-09-16-21**
Customer: **WAS-SECT**
Project ID: **SMP**

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Date Certified: 22-OCT-2019 13:30



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: Big Branch Downstream of Road 5

Collection Date/Time: 10/02/2019 12:46

Field ID: G2WA0010

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2124475	EPA 180.1 Rev. 2.0	Turbidity	4.6		NTU	P371846	
	EPA 300.0 Rev. 2.1	Chloride	4.0		mg Cl/L	P372380	
		Sulfate	0.35	I	mg SO4/L	P372384	
	SM 2120 B	Color (true)	120		PCU	P371851	
	SM 2320 B-97	Total Alkalinity	5.0		mg CaCO3/L	P371996	
	SM 2540 C-97	TDS	31		mg/L	P372427	
	SM 2540 D-97	TSS	4	I	mg/L	P372224	
	SM 4500 F-C-97	Fluoride	0.035	U	mg F/L	P371998	
2124476	EPA 350.1 Rev. 2.0	Ammonia-N	0.26		mg N/L	P372138	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.66		mg N/L	P371926	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.008	I	mg N/L	P372035	
	EPA 365.1 Rev. 2.0	Total-P	0.013		mg P/L	P371918	
	SM 5310 B-00	Organic Carbon	6.9		mg C/L	P371948	
2124477	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P371904	

Ref. Method and Comment:

SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.

EPA 351.2 Rev. 2.0: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

Sample Location: Wilson Mill Creek Upstream of SR 274

Collection Date/Time: 10/02/2019 13:56

Field ID: G2WA0020

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2124469	EPA 180.1 Rev. 2.0	Turbidity	2.0		NTU	P371846	
	EPA 300.0 Rev. 2.1	Chloride	8.0		mg Cl/L	P372380	
		Sulfate	0.82		mg SO4/L	P372384	
		Color (true)	21		PCU	P371851	
	SM 2320 B-97	Total Alkalinity	17		mg CaCO3/L	P371996	
	SM 2540 C-97	TDS	55		mg/L	P372427	
	SM 2540 D-97	TSS	2	U	mg/L	P372224	
	SM 4500 F-C-97	Fluoride	0.041	I	mg F/L	P371998	
2124471	EPA 350.1 Rev. 2.0	Ammonia-N	0.013		mg N/L	P372138	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.26		mg N/L	P371926	
	EPA 353.2 Rev. 2.0	NO2NO3-N	1.8		mg N/L	P372034	
	EPA 365.1 Rev. 2.0	Total-P	0.010		mg P/L	P371918	
	SM 5310 B-00	Organic Carbon	2.1		mg C/L	P371948	
2124473	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P371904	
2124485	EPA 200.7 Rev. 4.4	Barium	65.8		ug/L	P371975	
		Calcium	6.80		mg/L	P371975	
		Iron	230		ug/L	P371975	
		Magnesium	3.38		mg/L	P371975	
		Potassium	2.1		mg/L	P371975	
		Sodium	1.8	I	mg/L	P371975	
		Zinc	5.0	U	ug/L	P371975	
	EPA 200.8 Rev. 5.4	Aluminum	46		ug/L	P371975	
		Antimony	0.050	U	ug/L	P371975	
		Arsenic	0.29		ug/L	P371975	
		Boron**	15.5		ug/L	P371975	
		Cadmium	0.020	U	ug/L	P371975	
		Chromium	0.40	U	ug/L	P371975	
		Copper	1.44		ug/L	P371975	
		Lead	0.20	U	ug/L	P371975	
		Nickel	0.50	U	ug/L	P371975	
		Selenium	0.20	U	ug/L	P371975	
		Silver	0.010	U	ug/L	P371975	
		Thallium	0.10	U	ug/L	P371975	

Ref. Method and Comment:

SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.

EPA 351.2 Rev. 2.0: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

Sample Location: Willacoochee Creek at 161

Collection Date/Time: 10/02/2019 16:14

Field ID: G1WA0087

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2124470	EPA 180.1 Rev. 2.0	Turbidity	14		NTU	P371846	
	EPA 300.0 Rev. 2.1	Chloride	6.6		mg Cl/L	P372380	
		Sulfate	0.27	I	mg SO4/L	P372384	
		Color (true)	64		PCU	P371851	
	SM 2320 B-97	Total Alkalinity	16		mg CaCO3/L	P371996	
	SM 2540 C-97	TDS	49		mg/L	P372427	
	SM 2540 D-97	TSS	6	I	mg/L	P372224	
	SM 4500 F-C-97	Fluoride	0.064	I	mg F/L	P371998	
2124472	EPA 350.1 Rev. 2.0	Ammonia-N	0.010		mg N/L	P372138	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.31		mg N/L	P371926	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.90		mg N/L	P372035	
	EPA 365.1 Rev. 2.0	Total-P	0.069		mg P/L	P371918	
	SM 5310 B-00	Organic Carbon	3.3		mg C/L	P371948	
2124474	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.026		mg P/L	P371904	
2124486	EPA 200.7 Rev. 4.4	Barium	22.6		ug/L	P371975	
		Calcium	4.63		mg/L	P371975	
		Iron	1.10E+03		ug/L	P371975	
		Magnesium	2.88		mg/L	P371975	
		Potassium	0.72	I	mg/L	P371975	
		Sodium	3.3		mg/L	P371975	
		Zinc	5.0	U	ug/L	P371975	
	EPA 200.8 Rev. 5.4	Aluminum	525		ug/L	P371975	
		Antimony	0.050	U	ug/L	P371975	
		Arsenic	0.71		ug/L	P371975	
		Boron**	10.6		ug/L	P371975	
		Cadmium	0.020	U	ug/L	P371975	
		Chromium	0.60	I	ug/L	P371975	
		Copper	0.61	I	ug/L	P371975	
		Lead	0.43		ug/L	P371975	
		Nickel	0.50	U	ug/L	P371975	
		Selenium	0.20	U	ug/L	P371975	
		Silver	0.010	U	ug/L	P371975	
		Thallium	0.10	U	ug/L	P371975	

Ref. Method and Comment:

SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.

EPA 351.2 Rev. 2.0: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

Quality Assurance Report

Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0

Batch ID: P371846

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P371975

Component	Result	Code	Units
Barium	1.0	U	ug/L
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
Zinc	5.0	U	ug/L

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P371975

Component	Result	Code	Units
Aluminum	5.0	U	ug/L
Antimony	0.050	U	ug/L
Arsenic	0.050	U	ug/L
Boron	2.0	U	ug/L
Cadmium	0.020	U	ug/L
Chromium	0.40	U	ug/L
Copper	0.40	U	ug/L
Lead	0.20	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: P372380

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P372384

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0

Batch ID: P372138

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

Quality Assurance Report Method Blank Results

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P371926

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P372034

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P372035

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P371918

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P371904

Component	Result	Code	Units
O-Phosphate-P	0.004	U	mg P/L

Reference Method: SM 2120 B
Batch ID: P371851

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-97
Batch ID: P371996

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

Reference Method: SM 2540 C-97
Batch ID: P372427

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P372224

Component	Result	Code	Units
TSS	2	U	mg/L

Quality Assurance Report

Method Blank Results

Reference Method: SM 4500 F-C-97

Batch ID: P371998

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00

Batch ID: P371948

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

Quality Assurance Report

Laboratory Control Sample Accuracy

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P371975

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Barium	95.6		P	80 - 120
Calcium	105		P	80 - 120
Iron	104		P	80 - 120
Magnesium	105		P	80 - 120
Potassium	101		P	80 - 120
Sodium	101		P	80 - 120
Zinc	94.3		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P371975

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	96.4		P	85 - 115
Antimony	97.3		P	85 - 115
Arsenic	102		P	85 - 115
Boron	93.6		P	85 - 115
Cadmium	101		P	85 - 115
Chromium	93.4		P	85 - 115
Copper	94.2		P	85 - 115
Lead	102		P	85 - 115
Nickel	101		P	85 - 115
Selenium	100		P	85 - 115
Silver	102		P	85 - 115
Thallium	97.0		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P372380

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

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P372384

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Sulfate	99.3		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Batch ID: P372138

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	97.7		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Batch ID: P371926

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	97.3		P	90 - 110

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P372034

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P372035

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P371918

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P371904

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	99.4		P	90 - 110

Reference Method: SM 2120 B
Batch ID: P371851

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	100		P	85 - 115

Reference Method: SM 2320 B-97
Batch ID: P371996

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	103		P	98 - 106

Reference Method: SM 4500 F-C-97
Batch ID: P371998

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	96.2		P	92 - 103

Reference Method: SM 5310 B-00
Batch ID: P371948

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	101		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P371975

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2124406	Barium	94.8		P	80 - 120
2124406	Calcium	98.7		P	80 - 120
2124406	Iron	103		P	80 - 120
2124406	Magnesium	98.2		P	80 - 120
2124406	Potassium	106		P	80 - 120
2124406	Sodium	102		P	80 - 120
2124406	Zinc	93.2		P	80 - 120
2124775	Barium	98.6	98.5	P/P	80 - 120
2124775	Calcium	106	109	P/P	80 - 120
2124775	Iron	103	107	P/P	80 - 120
2124775	Magnesium	106	109	P/P	80 - 120
2124775	Potassium	106	109	P/P	80 - 120
2124775	Sodium	102	103	P/P	80 - 120
2124775	Zinc	96.9	97.1	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P371975

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2124406	Aluminum	95.7		P	80 - 120
2124406	Antimony	100		P	80 - 120
2124406	Arsenic	105		P	80 - 120
2124406	Boron	92.5		P	80 - 120
2124406	Cadmium	102		P	80 - 120
2124406	Chromium	90.5		P	80 - 120
2124406	Copper	91.4		P	80 - 120
2124406	Lead	98.3		P	80 - 120
2124406	Nickel	99.5		P	80 - 120
2124406	Selenium	103		P	80 - 120
2124406	Silver	101		P	80 - 120
2124406	Thallium	100		P	80 - 120
2124775	Aluminum	93.9	96.5	P/P	80 - 120
2124775	Antimony	96.6	99.1	P/P	80 - 120
2124775	Arsenic	102	104	P/P	80 - 120
2124775	Boron	91.6	95.3	P/P	80 - 120
2124775	Cadmium	97.2	102	P/P	80 - 120
2124775	Chromium	90.5	93.3	P/P	80 - 120
2124775	Copper	93.1	95.4	P/P	80 - 120
2124775	Lead	98.9	104	P/P	80 - 120
2124775	Nickel	98.0	101	P/P	80 - 120
2124775	Selenium	97.8	101	P/P	80 - 120
2124775	Silver	101	103	P/P	80 - 120
2124775	Thallium	95.2	101	P/P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P372380

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2124318	Chloride	98.3		P	90 - 110
2124416	Chloride	98.9		P	90 - 110

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P372384

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2124318	Sulfate	98.0		P	90 - 110
2124416	Sulfate	99.4		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P372138

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2124419	Ammonia-N	99.1	97.4	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P372034

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2124459	NO2NO3-N	99.0	100	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P372035

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2124476	NO2NO3-N	99.0	99.5	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P371918

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2124471	Total-P	96.0	98.5	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P371904

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2124460	O-Phosphate-P	95.3	97.1	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Batch ID: P371998

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2124542	Fluoride	94.7	94.7	P/P	89 - 106

Reference Method: SM 5310 B-00
Batch ID: P371948

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2124459	Organic Carbon	97.4	98.5	P/P	85 - 115

Quality Assurance Report Precision

Reference Method: EPA 180.1 Rev. 2.0
 Batch ID: P371846

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2124378	Turbidity	3.80	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
 Batch ID: P371975

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2124775	Barium	0.117	Spike	P	0 - 20
2124775	Calcium	2.77	Spike	P	0 - 20
2124775	Iron	2.94	Spike	P	0 - 20
2124775	Magnesium	2.42	Spike	P	0 - 20
2124775	Potassium	2.73	Spike	P	0 - 20
2124775	Sodium	0.301	Spike	P	0 - 20
2124775	Zinc	0.130	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
 Batch ID: P371975

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2124775	Aluminum	2.60	Spike	P	0 - 20
2124775	Antimony	2.55	Spike	P	0 - 20
2124775	Arsenic	1.94	Spike	P	0 - 20
2124775	Boron	3.69	Spike	P	0 - 20
2124775	Cadmium	4.39	Spike	P	0 - 20
2124775	Chromium	3.08	Spike	P	0 - 20
2124775	Copper	2.50	Spike	P	0 - 20
2124775	Lead	4.54	Spike	P	0 - 20
2124775	Nickel	2.87	Spike	P	0 - 20
2124775	Selenium	3.07	Spike	P	0 - 20
2124775	Silver	1.75	Spike	P	0 - 20
2124775	Thallium	6.07	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
 Batch ID: P372380

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2124318	Chloride	0.294	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
 Batch ID: P372384

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2124318	Sulfate	0.702	Sample	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P372138

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2124419	Ammonia-N	1.54	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P371926

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2124450	Kjeldahl Nitrogen	3.84	Sample	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P372034

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2124459	NO2NO3-N	0.646	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P372035

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2124476	NO2NO3-N	0.484	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P371918

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2124471	Total-P	2.53	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P371904

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2124460	O-Phosphate-P	1.78	Spike	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P371851

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2124458	Color (true)	1.58	Sample	P	0 - 20

Reference Method: SM 2320 B-97
Batch ID: P371996

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2124542	Total Alkalinity	0.583	Sample	P	0 - 2.8

Quality Assurance Report Precision

Reference Method: SM 2540 C-97
Batch ID: P372427

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2124491	TDS	1.11	Sample	P	0 - 10

Reference Method: SM 4500 F-C-97
Batch ID: P371998

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2124542	Fluoride	0.0	Spike	P	0 - 2.5

Reference Method: SM 5310 B-00
Batch ID: P371948

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2124459	Organic Carbon	0.944	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: A94709

Included Lab Sample IDs: 2124469, 2124470, 2124475

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	98.5	99.5	P/P	95 - 105

Reference Method: SM 2120 B

Run ID: A94710

Included Lab Sample IDs: 2124469, 2124470, 2124475

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	100	102	P/P	90 - 115

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A94721

Included Lab Sample IDs: 2124473, 2124474, 2124477

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.6	99.0	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A94727

Included Lab Sample IDs: 2124471, 2124472, 2124476

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	101	102	P/P	90 - 110
NO2NO3-N	102	102	P/P	90 - 110

Reference Method: SM 5310 B-00

Run ID: A94743

Included Lab Sample IDs: 2124471, 2124472, 2124476

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	101	98.6	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A94753

Included Lab Sample IDs: 2124472

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	102	99.8	P/P	90 - 110

Reference Method: SM 2320 B-97

Run ID: A94757

Included Lab Sample IDs: 2124469, 2124470, 2124475

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

Reference Method: SM 4500 F-C-97

Run ID: A94757

Included Lab Sample IDs: 2124469, 2124470, 2124475

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	98.6	100	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A94758

Included Lab Sample IDs: 2124471, 2124472, 2124476

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	102	107	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A94759

Included Lab Sample IDs: 2124471, 2124476

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	100	99.5	P/P	90 - 110
Total-P	99.8	100	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A94806

Included Lab Sample IDs: 2124485, 2124486

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Barium	98.0	101	P/P	90 - 110
Calcium	97.6	98.2	P/P	90 - 110
Iron	99.1	98.2	P/P	90 - 110
Magnesium	97.9	97.7	P/P	90 - 110
Potassium	98.4	97.2	P/P	90 - 110
Sodium	96.3	95.5	P/P	90 - 110
Zinc	97.5	102	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A94808

Included Lab Sample IDs: 2124471, 2124472, 2124476

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	100	101	P/P	90 - 110
Ammonia-N	99.8	99.1	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A94842

Included Lab Sample IDs: 2124485, 2124486

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	108	109	P/P	90 - 110
Antimony	97.5	99.0	P/P	90 - 110
Arsenic	105	107	P/P	90 - 110
Boron	107	107	P/P	90 - 110
Cadmium	102	103	P/P	90 - 110
Chromium	95.5	99.0	P/P	90 - 110
Lead	100	101	P/P	90 - 110
Nickel	103	105	P/P	90 - 110
Selenium	103	105	P/P	90 - 110
Silver	99.9	101	P/P	90 - 110
Thallium	93.8	91.4	P/P	90 - 110

Quality Assurance Report

Calibration Verification

Reference Method: EPA 300.0 Rev. 2.1

Run ID: A94920

Included Lab Sample IDs: 2124469, 2124470, 2124475

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	100	100	P/P	90 - 110
Chloride	100	101	P/P	90 - 110
Sulfate	101	101	P/P	90 - 110
Sulfate	101	101	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A94933

Included Lab Sample IDs: 2124485, 2124486

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Copper	98.1	98.2	P/P	90 - 110
Copper	98.2	98.0	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 SMP	MS
			LCS				
EPA 180.1 Rev. 2.0	Turbidity					3.80	
EPA 200.7 Rev. 4.4	Barium	95.6	94.8	98.6	98.5		0.117
	Calcium	105	98.7	106	109		2.77
	Iron	104	103	103	107		2.94
	Magnesium	105	98.2	106	109		2.42
	Potassium	101	106	106	109		2.73
	Sodium	101	102	102	103		0.301
	Zinc	94.3	93.2	96.9	97.1		0.130
EPA 200.8 Rev. 5.4	Aluminum	96.4	95.7	93.9	96.5		2.60
	Antimony	97.3	100	96.6	99.1		2.55
	Arsenic	102	105	102	104		1.94
	Boron	93.6	92.5	91.6	95.3		3.69
	Cadmium	101	102	97.2	102		4.39
	Chromium	93.4	90.5	90.5	93.3		3.08
	Copper	94.2	91.4	93.1	95.4		2.50
	Lead	102	98.3	98.9	104		4.54
	Nickel	101	99.5	98.0	101		2.87
	Selenium	100	103	97.8	101		3.07
	Silver	102	101	101	103		1.75
	Thallium	97.0	100	95.2	101		6.07
EPA 300.0 Rev. 2.1	Chloride	98.7	98.3	98.9		0.294	
	Sulfate	99.3	98.0	99.4		0.702	
EPA 350.1 Rev. 2.0	Ammonia-N	97.7	99.1	97.4			1.54
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	97.3				3.84	
EPA 353.2 Rev. 2.0	NO2NO3-N	100	99.0	100			0.646
	NO2NO3-N	99.5	99.0	99.5			0.484
EPA 365.1 Rev. 2.0	Total-P	97.5	96.0	98.5			2.53
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	99.4	95.3	97.1			1.78
SM 2120 B	Color (true)	100				1.58	
SM 2320 B-97	Total Alkalinity	103				0.583	
SM 2540 C-97	TDS					1.11	
SM 4500 F-C-97	Fluoride	96.2	94.7	94.7			0.0
SM 5310 B-00	Organic Carbon	101	97.4	98.5			0.944

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	2124469, 2124470, 2124475
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2124485, 2124486
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2124485, 2124486
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	2124469, 2124470, 2124475
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	2124469, 2124470, 2124475
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	2124471, 2124472, 2124476
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	2124471, 2124472, 2124476
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	2124471, 2124472, 2124476
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	2124471, 2124472, 2124476

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2124473, 2124474, 2124477
SM 2120 B / E31780	True Color measured at 450 nm	2124469, 2124470, 2124475
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO ₃ /L	2124469, 2124470, 2124475
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	2124469, 2124470, 2124475
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2124469, 2124470, 2124475
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2124469, 2124470, 2124475
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	2124471, 2124472, 2124476

Preparation and Analysis Log

Ref. Method	Received Date	Prep Date/Time	Prepared By	Analysis Date/Time	Analyzed By	Associated Samples
EPA 180.1 Rev. 2.0	10/03/2019			10/03/2019 16:10	Rosalyn Ballman	2124469, 2124470, 2124475
EPA 200.7 Rev. 4.4	10/03/2019	10/07/2019 12:00	Elliott D. Healy	10/08/2019 12:24	Alexander Thompson	2124485
	10/03/2019	10/07/2019 12:00	Elliott D. Healy	10/08/2019 12:32	Alexander Thompson	2124486
EPA 200.8 Rev. 5.4	10/03/2019	10/07/2019 12:00	Elliott D. Healy	10/09/2019 21:08	Robert K Palmer	2124485
	10/03/2019	10/07/2019 12:00	Elliott D. Healy	10/09/2019 21:17	Robert K Palmer	2124486
	10/03/2019	10/07/2019 12:00	Elliott D. Healy	10/14/2019 20:43	Robert K Palmer	2124485
	10/03/2019	10/07/2019 12:00	Elliott D. Healy	10/14/2019 21:03	Robert K Palmer	2124486
EPA 300.0 Rev. 2.1	10/03/2019			10/11/2019 21:22	Julia Storbeck	2124469
	10/03/2019			10/11/2019 21:58	Julia Storbeck	2124470
	10/03/2019			10/11/2019 22:10	Julia Storbeck	2124475
EPA 350.1 Rev. 2.0	10/03/2019			10/08/2019 12:49	Ping Hua	2124471
	10/03/2019			10/08/2019 12:51	Ping Hua	2124472
	10/03/2019			10/08/2019 14:31	Ping Hua	2124476
EPA 351.2 Rev. 2.0	10/03/2019	10/04/2019 14:15	Jhamieka S. Greenwood	10/07/2019 11:40	Virginia P. Brown	2124471
	10/03/2019	10/04/2019 14:15	Jhamieka S. Greenwood	10/07/2019 11:41	Virginia P. Brown	2124472
	10/03/2019	10/04/2019 14:15	Jhamieka S. Greenwood	10/07/2019 11:43	Virginia P. Brown	2124476
EPA 353.2 Rev. 2.0	10/03/2019			10/04/2019 10:59	Beverly Y. Sanders	2124476
	10/03/2019			10/04/2019 12:48	Beverly Y. Sanders	2124471
	10/03/2019			10/04/2019 12:51	Beverly Y. Sanders	2124472
EPA 365.1 Rev. 2.0	10/03/2019	10/04/2019 14:00	Vijayalakshmi Reddy	10/07/2019 10:51	Lipi Saha	2124472
	10/03/2019	10/04/2019 14:00	Vijayalakshmi Reddy	10/07/2019 13:10	Lipi Saha	2124471
	10/03/2019	10/04/2019 14:00	Vijayalakshmi Reddy	10/07/2019 13:17	Lipi Saha	2124476
EPA 365.1 Rev. 2.0 dissolved	10/03/2019			10/03/2019 15:50	Samantha Davila	2124473
	10/03/2019			10/03/2019 15:51	Samantha Davila	2124474, 2124477
SM 2120 B	10/03/2019			10/03/2019 16:38	Madeline Funaro	2124469
	10/03/2019			10/03/2019 16:39	Madeline Funaro	2124470
	10/03/2019			10/03/2019 16:40	Madeline Funaro	2124475
SM 2320 B-97	10/03/2019			10/05/2019 07:01	Dale L. Simmons	2124469
	10/03/2019			10/05/2019 07:12	Dale L. Simmons	2124470
	10/03/2019			10/05/2019 07:27	Dale L. Simmons	2124475
SM 2540 C-97	10/03/2019			10/04/2019 20:17	Rosalyn Ballman	2124469, 2124470, 2124475
SM 2540 D-97	10/03/2019			10/04/2019 20:17	Rosalyn Ballman	2124469, 2124470, 2124475
SM 4500 F-C-97	10/03/2019			10/05/2019 07:01	Dale L. Simmons	2124469
	10/03/2019			10/05/2019 07:12	Dale L. Simmons	2124470
	10/03/2019			10/05/2019 07:27	Dale L. Simmons	2124475
SM 5310 B-00	10/03/2019			10/05/2019 00:02	Madeline Funaro	2124471
	10/03/2019			10/05/2019 00:18	Madeline Funaro	2124472
	10/03/2019			10/05/2019 00:30	Madeline Funaro	2124476