

Chemical Analysis Report

TLH-ROC-2019-02-27-01

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

Event Description: **Run 2**
Request ID: **RQ-2018-12-31-29**
Customer: **TLH-ROC**
Project ID: **SMP**

Send Reports to:
FL Dept. of Environmental Protection
2600 Blair Stone Rd
Tallahassee, FL 32399
Attn: Michael Eckles

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

Certified by: Colin Wright, Program Administrator

Date Certified: 19-MAR-2019 11:22

A handwritten signature in black ink, appearing to read "Colin Wright", is shown on a light-colored background.

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: MIDDLE WARRIOR CREEK

Collection Date/Time: 02/27/2019 11:35

Field ID: G1TLHR0007

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2065748	EPA 180.1 Rev. 2.0	Turbidity	1.6		NTU	P359637	
	EPA 300.0 Rev. 2.1	Chloride	5.7		mg Cl/L	P360202	
		Sulfate	0.20	U	mg SO4/L	P360207	
	SM 2120 B	Color (true)	300		PCU	P359668	
	SM 2320 B-97	Total Alkalinity	66		mg CaCO3/L	P360160	
	SM 2540 C-97	TDS	123		mg/L	P360083	
	SM 2540 D-97	TSS	3	I	mg/L	P359987	
	SM 4500 F-C-97	Fluoride	0.077	I	mg F/L	P360163	
	EPA 350.1 Rev. 2.0	Ammonia-N	0.017		mg N/L	P359942	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.81		mg N/L	P359797	
2065750	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P359824	
	EPA 365.1 Rev. 2.0	Total-P	0.073		mg P/L	P360130	
	SM 5310 B-00	Organic Carbon	27		mg C/L	P359952	
	EPA 365.1 Rev. 2.0	O-Phosphate-P	0.044		mg P/L	P359647	
	dissolved						

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: Steinhatchee River 40m N of Yearling Rd.

Collection Date/Time: 02/27/2019 12:15

Field ID: G1TLHR0065

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2065749	EPA 180.1 Rev. 2.0	Turbidity	3.2		NTU	P359638	
	EPA 300.0 Rev. 2.1	Chloride	6.6		mg Cl/L	P360202	
		Sulfate	1.8		mg SO4/L	P360207	
	SM 2120 B	Color (true)	310		PCU	P359668	
	SM 2320 B-97	Total Alkalinity	83		mg CaCO3/L	P360160	
	SM 2540 C-97	TDS	148	A	mg/L	P360083	
	SM 2540 D-97	TSS	6	IA	mg/L	P359987	
	SM 4500 F-C-97	Fluoride	0.094	I	mg F/L	P360163	
2065751	EPA 350.1 Rev. 2.0	Ammonia-N	0.033		mg N/L	P359943	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.90		mg N/L	P359797	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.020		mg N/L	P359824	
	EPA 365.1 Rev. 2.0	Total-P	0.13		mg P/L	P360130	
	SM 5310 B-00	Organic Carbon	26		mg C/L	P359952	
2065753	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.084		mg P/L	P359647	

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: Steinhatchee River @ S Canal Rd

Collection Date/Time: 02/27/2019 12:40

Field ID: G1TLHR0064

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2065754	EPA 180.1 Rev. 2.0	Turbidity	7.7	A	NTU	P359638	
	EPA 300.0 Rev. 2.1	Chloride	6.3		mg Cl/L	P360202	
		Sulfate	2.0		mg SO4/L	P360207	
		Color (true)	410		PCU	P359668	
	SM 2320 B-97	Total Alkalinity	69		mg CaCO3/L	P360160	
	SM 2540 C-97	TDS	146		mg/L	P360083	
	SM 2540 D-97	TSS	19		mg/L	P359987	
	SM 4500 F-C-97	Fluoride	0.071	I	mg F/L	P360163	
2065755	EPA 350.1 Rev. 2.0	Ammonia-N	0.034		mg N/L	P359944	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.3		mg N/L	P359797	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.030		mg N/L	P359824	
	EPA 365.1 Rev. 2.0	Total-P	0.13		mg P/L	P360130	
	SM 5310 B-00	Organic Carbon	34		mg C/L	P359952	
2065756	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.064		mg P/L	P359647	
2065763	EPA 200.7 Rev. 4.4	Barium	8.2		ug/L	P359822	
		Calcium	30.2		mg/L	P359822	
		Iron	1.14E+03		ug/L	P359822	
		Magnesium	3.59		mg/L	P359822	
	EPA 200.8 Rev. 5.4	Potassium	0.30	U	mg/L	P359822	
		Sodium	3.5		mg/L	P359822	
		Zinc	5.0	U	ug/L	P359822	
		Aluminum	492		ug/L	P359822	
		Antimony	0.050	U	ug/L	P359822	
		Arsenic	0.33		ug/L	P359822	
		Boron**	12.2		ug/L	P359822	
		Cadmium	0.020	U	ug/L	P359822	
		Chromium	1.1	I	ug/L	P359822	
		Copper	0.40	U	ug/L	P359822	
		Lead	0.49		ug/L	P359822	
		Nickel	0.50	U	ug/L	P359822	
		Selenium	0.20	U	ug/L	P359822	
		Silver	0.010	U	ug/L	P359822	
		Thallium	0.10	U	ug/L	P359822	

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.

EPA 200.7 Rev. 4.4: Batch matrix spike recoveries for potassium are unavailable for one of two spiked samples 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: P359637

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P359638

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P359822

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: P359822

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: P360202

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P360207

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Quality Assurance Report Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P359942

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P359943

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P359944

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P359797

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P359824

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P360130

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P359647

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

Reference Method: SM 2120 B
Batch ID: P359668

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-97
Batch ID: P360160

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

Quality Assurance Report

Method Blank Results

Reference Method: SM 2540 C-97
Batch ID: P360083

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P359987

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P360163

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P359952

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: P359822

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Barium	105		P	85 - 115
Calcium	100		P	85 - 115
Iron	102		P	85 - 115
Magnesium	97.6		P	85 - 115
Potassium	97.2		P	85 - 115
Sodium	101		P	85 - 115
Zinc	103		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P359822

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	102		P	85 - 115
Antimony	98.6		P	85 - 115
Arsenic	106		P	85 - 115
Boron	104		P	85 - 115
Cadmium	103		P	85 - 115
Chromium	102		P	85 - 115
Copper	102		P	85 - 115
Lead	103		P	85 - 115
Nickel	102		P	85 - 115
Selenium	101		P	85 - 115
Silver	100		P	85 - 115
Thallium	100		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P360202

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P360207

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P359942

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	93.1		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P359943

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

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P359944

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	97.8		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P359797

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P359824

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P360130

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P359647

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	98.5		P	90 - 110

Reference Method: SM 2120 B
Batch ID: P359668

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	102		P	85 - 115

Reference Method: SM 2320 B-97
Batch ID: P360160

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	102		P	98 - 107

Reference Method: SM 4500 F-C-97
Batch ID: P360163

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	94.8		P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P359952

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	94.1		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P359822

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2065870	Barium	103	105	P/P	80 - 120
2065870	Calcium	101		P	80 - 120
2065870	Iron	103	99.8	P/P	80 - 120
2065870	Magnesium	100		P	80 - 120
2065870	Potassium	97.6	94.4	P/P	80 - 120
2065870	Sodium	103	102	P/P	80 - 120
2065870	Zinc	102	103	P/P	80 - 120
2066738	Barium	103		P	80 - 120
2066738	Calcium	103		P	80 - 120
2066738	Iron	102		P	80 - 120
2066738	Magnesium	101		P	80 - 120
2066738	Sodium	99.7		P	80 - 120
2066738	Zinc	104		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P359822

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2065870	Aluminum	100	100	P/P	80 - 120
2065870	Antimony	99.5	100	P/P	80 - 120
2065870	Arsenic	106	106	P/P	80 - 120
2065870	Boron	106	104	P/P	80 - 120
2065870	Cadmium	101	102	P/P	80 - 120
2065870	Chromium	102	102	P/P	80 - 120
2065870	Copper	103	102	P/P	80 - 120
2065870	Lead	101	101	P/P	80 - 120
2065870	Nickel	100	99.7	P/P	80 - 120
2065870	Selenium	100	100	P/P	80 - 120
2065870	Silver	99.1	99.4	P/P	80 - 120
2065870	Thallium	101	102	P/P	80 - 120
2066738	Aluminum	99.6		P	75 - 125
2066738	Antimony	100		P	75 - 125
2066738	Arsenic	109		P	75 - 125
2066738	Cadmium	102		P	75 - 125
2066738	Chromium	102		P	75 - 125
2066738	Copper	102		P	75 - 125
2066738	Lead	102		P	75 - 125
2066738	Nickel	101		P	75 - 125
2066738	Selenium	100		P	75 - 125
2066738	Silver	98.7		P	75 - 125
2066738	Thallium	101		P	75 - 125

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P360202

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2065633	Chloride	102		P	90 - 110
2065714	Chloride	99.8		P	90 - 110

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P360207

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2065633	Sulfate	102		P	90 - 110
2065714	Sulfate	99.4		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P359942

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2065636	Ammonia-N	92.1	98.1	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P359943

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2065751	Ammonia-N	105	105	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P359944

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2065856	Ammonia-N	97.8	94.5	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P359824

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2065750	NO2NO3-N	98.5	97.5	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P360130

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2065786	Total-P	104	99.2	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P359647

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2065769	O-Phosphate-P	95.0	96.7	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Batch ID: P360163

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2065779	Fluoride	101	101	P/P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P359952

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2065710	Organic Carbon	93.4	96.2	P/P	85 - 115

Quality Assurance Report Precision

Reference Method: EPA 180.1 Rev. 2.0
 Batch ID: P359637

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2065714	Turbidity	9.66	Sample	P	0 - 20

Reference Method: EPA 180.1 Rev. 2.0
 Batch ID: P359638

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2065754	Turbidity	15.2	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
 Batch ID: P359822

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2065870	Barium	1.16	Spike	P	0 - 20
2065870	Calcium	0.260	Spike	P	0 - 20
2065870	Iron	3.35	Spike	P	0 - 20
2065870	Magnesium	4.38	Spike	P	0 - 20
2065870	Potassium	2.95	Spike	P	0 - 20
2065870	Sodium	0.466	Spike	P	0 - 20
2065870	Zinc	0.402	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
 Batch ID: P359822

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2065870	Aluminum	0.109	Spike	P	0 - 20
2065870	Antimony	0.995	Spike	P	0 - 20
2065870	Arsenic	0.197	Spike	P	0 - 20
2065870	Boron	1.80	Spike	P	0 - 20
2065870	Cadmium	0.883	Spike	P	0 - 20
2065870	Chromium	0.127	Spike	P	0 - 20
2065870	Copper	0.851	Spike	P	0 - 20
2065870	Lead	0.250	Spike	P	0 - 20
2065870	Nickel	0.427	Spike	P	0 - 20
2065870	Selenium	0.0785	Spike	P	0 - 20
2065870	Silver	0.307	Spike	P	0 - 20
2065870	Thallium	0.901	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
 Batch ID: P360202

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2065714	Chloride	0.568	Sample	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 300.0 Rev. 2.1
 Batch ID: P360207

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2065714	Sulfate	0.906	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
 Batch ID: P359942

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2065636	Ammonia-N	5.62	Spike	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
 Batch ID: P359943

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2065751	Ammonia-N	0.0595	Spike	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
 Batch ID: P359944

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2065856	Ammonia-N	2.10	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
 Batch ID: P359797

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2065710	Kjeldahl Nitrogen	1.58	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
 Batch ID: P359824

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2065750	NO2NO3-N	1.02	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
 Batch ID: P360130

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2065786	Total-P	4.88	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
 Batch ID: P359647

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2065769	O-Phosphate-P	1.27	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: SM 2120 B
 Batch ID: P359668

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2065662	Color (true)	2.14	Sample	P	0 - 20

Reference Method: SM 2320 B-97
 Batch ID: P360160

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2065779	Total Alkalinity	0.576	Sample	P	0 - 1.6

Reference Method: SM 2540 C-97
 Batch ID: P360083

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2065749	TDS	4.71	Sample	P	0 - 10

Reference Method: SM 4500 F-C-97
 Batch ID: P360163

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2065779	Fluoride	0.0	Spike	P	0 - 3.5

Reference Method: SM 5310 B-00
 Batch ID: P359952

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2065710	Organic Carbon	1.59	Spike	P	0 - 20

* Sample, spike and/or laboratory control sample precision (LCS) is reported.
 Replicate spike precision may be reported when sample results are below quantifiable levels.

Quality Assurance Report Calibration Verification

Reference Method: EPA 180.1 Rev. 2.0

Run ID: A89702

Included Lab Sample IDs: 2065748, 2065749, 2065754

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A89704

Included Lab Sample IDs: 2065752, 2065753, 2065756

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	97.1	96.7	P/P	90 - 110

Reference Method: SM 2120 B

Run ID: A89716

Included Lab Sample IDs: 2065748, 2065749, 2065754

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	99.7	99.2	P/P	90 - 115

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A89771

Included Lab Sample IDs: 2065750, 2065751, 2065755

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

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A89772

Included Lab Sample IDs: 2065750, 2065751, 2065755

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	102	100	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A89814

Included Lab Sample IDs: 2065750, 2065751, 2065755

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	101	99.9	P/P	90 - 110
Ammonia-N	104	99.7	P/P	90 - 110
Ammonia-N	105	104	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A89816

Included Lab Sample IDs: 2065763

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Barium	102	103	P/P	90 - 110
Calcium	102	101	P/P	90 - 110
Iron	102	101	P/P	90 - 110
Magnesium	102	101	P/P	90 - 110
Potassium	98.0	97.9	P/P	90 - 110
Sodium	99.9	99.9	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A89816

Included Lab Sample IDs: 2065763

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

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A89818

Included Lab Sample IDs: 2065763

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	100	99.7	P/P	90 - 110
Antimony	94.5	94.7	P/P	90 - 110
Arsenic	101	99.4	P/P	90 - 110
Boron	101	103	P/P	90 - 110
Cadmium	96.1	96.3	P/P	90 - 110
Chromium	98.5	97.5	P/P	90 - 110
Copper	102	99.8	P/P	90 - 110
Lead	102	100	P/P	90 - 110
Nickel	100	98.2	P/P	90 - 110
Selenium	97.2	97.0	P/P	90 - 110
Silver	95.0	94.8	P/P	90 - 110
Thallium	97.3	96.0	P/P	90 - 110

Reference Method: SM 5310 B-00

Run ID: A89824

Included Lab Sample IDs: 2065750, 2065751, 2065755

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	91.8	90.4	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1

Run ID: A89885

Included Lab Sample IDs: 2065748, 2065749, 2065754

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

Reference Method: SM 2320 B-97

Run ID: A89907

Included Lab Sample IDs: 2065748, 2065749, 2065754

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	102	100	P/P	90 - 110

Reference Method: SM 4500 F-C-97

Run ID: A89907

Included Lab Sample IDs: 2065748, 2065749, 2065754

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

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A89989

Included Lab Sample IDs: 2065750, 2065751, 2065755

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	102	102	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					9.66	
	Turbidity					15.2	
EPA 200.7 Rev. 4.4	Barium	105	103	105	103		1.16
	Calcium	100	101	103			0.260
	Iron	102	103	99.8	102		3.35
	Magnesium	97.6	100	101			4.38
	Potassium	97.2	97.6	94.4			2.95
	Sodium	101	103	102	99.7		0.466
	Zinc	103	102	103	104		0.402
EPA 200.8 Rev. 5.4	Aluminum	102	100	100	99.6		0.109
	Antimony	98.6	99.5	100	100		0.995
	Arsenic	106	106	106	109		0.197
	Boron	104	106	104			1.80
	Cadmium	103	101	102	102		0.883
	Chromium	102	102	102	102		0.127
	Copper	102	103	102	102		0.851
	Lead	103	101	101	102		0.250
	Nickel	102	100	99.7	101		0.427
	Selenium	101	100	100	100		0.0785
	Silver	100	99.1	99.4	98.7		0.307
	Thallium	100	101	102	101		0.901
EPA 300.0 Rev. 2.1	Chloride	103	99.8	102		0.568	
	Sulfate	103	99.4	102		0.906	
EPA 350.1 Rev. 2.0	Ammonia-N	93.1	92.1	98.1			5.62
	Ammonia-N	103	105	105			0.0595
	Ammonia-N	97.8	97.8	94.5			2.10
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	102					1.58
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	99.0	98.5	97.5			1.02
EPA 365.1 Rev. 2.0	Total-P	99.0	104	99.2			4.88
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	98.5	95.0	96.7			1.27
SM 2120 B	Color (true)	102				2.14	
SM 2320 B-97	Total Alkalinity	102				0.576	
SM 2540 C-97	TDS					4.71	
SM 4500 F-C-97	Fluoride	94.8	101	101			0.0
SM 5310 B-00	Organic Carbon	94.1	93.4	96.2			1.59

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	2065748, 2065749, 2065754
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2065763
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2065763
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	2065748, 2065749, 2065754
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	2065748, 2065749, 2065754
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	2065750, 2065751, 2065755
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	2065750, 2065751, 2065755
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	2065750, 2065751, 2065755

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	2065750, 2065751, 2065755
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2065752, 2065753, 2065756
SM 2120 B / E31780	True Color measured at 450 nm	2065748, 2065749, 2065754
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO ₃ /L	2065748, 2065749, 2065754
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	2065748, 2065749, 2065754
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2065748, 2065749, 2065754
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2065748, 2065749, 2065754
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	2065750, 2065751, 2065755

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	02/27/2019			02/27/2019 17:05	Adrian Shelby	2065748, 2065749, 2065754
EPA 200.7 Rev. 4.4	02/27/2019	03/04/2019 14:10	Elliott D. Healy	03/05/2019 13:32	Betina Topolski	2065763
EPA 200.8 Rev. 5.4	02/27/2019	03/04/2019 14:10	Elliott D. Healy	03/05/2019 17:21	Allison Taylor	2065763
EPA 300.0 Rev. 2.1	02/27/2019			03/09/2019 03:43	Lipi Saha	2065748
	02/27/2019			03/09/2019 03:58	Lipi Saha	2065749
	02/27/2019			03/09/2019 04:12	Lipi Saha	2065754
EPA 350.1 Rev. 2.0	02/27/2019			03/05/2019 12:57	Ping Hua	2065750
	02/27/2019			03/05/2019 13:09	Ping Hua	2065751
	02/27/2019			03/05/2019 14:10	Ping Hua	2065755
EPA 351.2 Rev. 2.0	02/27/2019	03/01/2019 14:15	Adrian Shelby	03/04/2019 13:41	Joseph Suarez	2065750
	02/27/2019	03/01/2019 14:15	Adrian Shelby	03/04/2019 13:42	Joseph Suarez	2065751
	02/27/2019	03/01/2019 14:15	Adrian Shelby	03/04/2019 13:44	Joseph Suarez	2065755
EPA 353.2 Rev. 2.0	02/27/2019			03/04/2019 10:15	Beverly Y. Sanders	2065750
	02/27/2019			03/04/2019 10:21	Beverly Y. Sanders	2065751
	02/27/2019			03/04/2019 10:22	Beverly Y. Sanders	2065755
EPA 365.1 Rev. 2.0	02/27/2019	03/08/2019 12:35	Sima Feizi	03/13/2019 15:20	Rosalyn Ballman	2065750
	02/27/2019	03/08/2019 12:35	Sima Feizi	03/13/2019 15:22	Rosalyn Ballman	2065751
	02/27/2019	03/08/2019 12:35	Sima Feizi	03/13/2019 15:23	Rosalyn Ballman	2065755
EPA 365.1 Rev. 2.0 dissolved	02/27/2019			02/27/2019 18:09	Jhamieka S. Greenwood	2065752
	02/27/2019			02/27/2019 18:10	Jhamieka S. Greenwood	2065753
	02/27/2019			02/27/2019 18:11	Jhamieka S. Greenwood	2065756
SM 2120 B	02/27/2019			02/27/2019 17:46	Chelsea Hernandez	2065748
	02/27/2019			02/27/2019 17:47	Chelsea Hernandez	2065749, 2065754
SM 2320 B-97	02/27/2019			03/07/2019 23:58	Dale L. Simmons	2065748
	02/27/2019			03/08/2019 00:10	Dale L. Simmons	2065749
	02/27/2019			03/08/2019 00:23	Dale L. Simmons	2065754
SM 2540 C-97	02/27/2019			03/01/2019 15:19	Yijie Li	2065748, 2065749, 2065754
SM 2540 D-97	02/27/2019			03/01/2019 15:19	Yijie Li	2065748, 2065749, 2065754
SM 4500 F-C-97	02/27/2019			03/07/2019 23:58	Dale L. Simmons	2065748
	02/27/2019			03/08/2019 00:10	Dale L. Simmons	2065749
	02/27/2019			03/08/2019 00:23	Dale L. Simmons	2065754
SM 5310 B-00	02/27/2019			03/05/2019 06:58	Chelsea Hernandez	2065750
	02/27/2019			03/05/2019 07:12	Chelsea Hernandez	2065751
	02/27/2019			03/05/2019 07:31	Chelsea Hernandez	2065755