

Chemical Analysis Report

SW-DIST-2019-03-12-01

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

Event Description: **Flint**
Request ID: **RQ-2019-03-11-11**
Customer: **SW-DIST**
Project ID: **SMP**

Send Reports to:
FL Dept. of Environmental Protection
FL Dept. of Environmental Protection
13051 N. Telecom Parkway
Temple Terrace, FL 33637-0926
Attn: Ben Paswater

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: Kerry Tate, Ph.D., Environmental Administrator

Date Certified: 29-MAR-2019 10:23

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: FLINT CREEK @ KNIGHTS GRIFFIN RD

Collection Date/Time: 03/11/2019 10:30

Field ID: G2SW0066

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2068772	EPA 180.1 Rev. 2.0	Turbidity	9.6	A	NTU	P360284	
	EPA 300.0 Rev. 2.1	Chloride	23		mg Cl/L	P360718	
	SM 2120 B	Color (true)	97		PCU	P360324	
	SM 2320 B-97	Total Alkalinity	50		mg CaCO3/L	P360800	
	SM 2540 C-97	TDS	128		mg/L	P360682	
	SM 2540 D-97	TSS	16	I	mg/L	P360656	
	SM 4500 F-C-97	Fluoride	0.26		mg F/L	P360803	
2068773	EPA 350.1 Rev. 2.0	Ammonia-N	0.15		mg N/L	P360425	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.9		mg N/L	P360466	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.10		mg N/L	P360360	
	EPA 365.1 Rev. 2.0	Total-P	0.41		mg P/L	P360526	
	SM 5310 B-00	Organic Carbon	17		mg C/L	P360635	
2068774	EPA 300.0 Rev. 2.1 dissolved	Sulfate	9.0		mg SO4/L	P360720	
	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.22		mg P/L	P360298	

Ref. Method and Comment:

SM 2540 D-97: The PQL was elevated due to sample matrix interference.

EPA 300.0 Rev. 2.1 dissolved: Sulfate: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.

Sample Location: FLINT CREEK @ US 301

Collection Date/Time: 03/11/2019 10:05

Field ID: G2SW0004

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2068769	EPA 180.1 Rev. 2.0	Turbidity	7.4		NTU	P360283	
	EPA 300.0 Rev. 2.1	Chloride	22		mg Cl/L	P360718	
	SM 2120 B	Color (true)	100		PCU	P360324	
	SM 2320 B-97	Total Alkalinity	48		mg CaCO3/L	P360800	
	SM 2540 C-97	TDS	137	A	mg/L	P360682	
	SM 2540 D-97	TSS	14	A	mg/L	P360656	
	SM 4500 F-C-97	Fluoride	0.27		mg F/L	P360803	
2068770	EPA 350.1 Rev. 2.0	Ammonia-N	0.23		mg N/L	P360425	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.7		mg N/L	P360466	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.13		mg N/L	P360360	
	EPA 365.1 Rev. 2.0	Total-P	0.40		mg P/L	P360526	
	SM 5310 B-00	Organic Carbon	18		mg C/L	P360635	
2068771	EPA 300.0 Rev. 2.1 dissolved	Sulfate	8.9		mg SO4/L	P360720	
	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.24		mg P/L	P360296	
2068789	EPA 200.7 Rev. 4.4	Barium	4.6		ug/L	P360395	
		Calcium	20.8		mg/L	P360395	
		Iron	300		ug/L	P360395	
		Magnesium	3.52		mg/L	P360395	
		Potassium	3.2		mg/L	P360395	
		Sodium	12.6		mg/L	P360395	
		Zinc	5.0	U	ug/L	P360395	
	EPA 200.8 Rev. 5.4	Aluminum	162		ug/L	P360395	
		Antimony	0.12	I	ug/L	P360395	
		Arsenic	1.41		ug/L	P360395	
		Boron**	35.5		ug/L	P360395	
		Cadmium	0.020	U	ug/L	P360395	
		Chromium	0.81	I	ug/L	P360395	
		Copper	1.12		ug/L	P360395	
		Lead	0.29	I	ug/L	P360395	
		Nickel	0.65	I	ug/L	P360395	
		Selenium	0.20	U	ug/L	P360395	
		Silver	0.010	U	ug/L	P360395	
		Thallium	0.10	U	ug/L	P360395	

Ref. Method and Comment:

EPA 300.0 Rev. 2.1 dissolved: Sulfate: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.

Quality Assurance Report Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P360283

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P360284

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P360395

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: P360395

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: P360718

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1 dissolved
Batch ID: P360720

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: P360425

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P360466

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P360360

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P360526

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P360296

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P360298

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

Reference Method: SM 2120 B
Batch ID: P360324

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-97
Batch ID: P360800

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

Reference Method: SM 2540 C-97
Batch ID: P360682

Component	Result	Code	Units
TDS	15	U	mg/L

Quality Assurance Report

Method Blank Results

Reference Method: SM 2540 D-97
Batch ID: P360656

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P360803

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P360635

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: P360395

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Barium	104		P	85 - 115
Calcium	98.8		P	85 - 115
Iron	105		P	85 - 115
Magnesium	107		P	85 - 115
Potassium	99.8		P	85 - 115
Sodium	103		P	85 - 115
Zinc	102		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P360395

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	104		P	85 - 115
Antimony	102		P	85 - 115
Arsenic	107		P	85 - 115
Boron	102		P	85 - 115
Cadmium	104		P	85 - 115
Chromium	105		P	85 - 115
Copper	103		P	85 - 115
Lead	103		P	85 - 115
Nickel	103		P	85 - 115
Selenium	105		P	85 - 115
Silver	100		P	85 - 115
Thallium	98.3		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P360718

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

Reference Method: EPA 300.0 Rev. 2.1 dissolved
Batch ID: P360720

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P360425

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P360466

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

Quality Assurance Report

Laboratory Control Sample Accuracy

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P360360

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P360526

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P360296

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	97.6		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P360298

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	98.3		P	90 - 110

Reference Method: SM 2120 B
Batch ID: P360324

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

Reference Method: SM 2320 B-97
Batch ID: P360800

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	101		P	98 - 107

Reference Method: SM 4500 F-C-97
Batch ID: P360803

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	96.0		P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P360635

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	97.6		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P360395

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2068882	Barium	104		P	80 - 120
2068882	Calcium	101		P	80 - 120
2068882	Iron	107		P	80 - 120
2068882	Magnesium	102		P	80 - 120
2068882	Potassium	99.5		P	80 - 120
2068882	Sodium	98.5		P	80 - 120
2068882	Zinc	104		P	80 - 120
2069070	Barium	103	101	P/P	80 - 120
2069070	Calcium	102		P	80 - 120
2069070	Iron	104	104	P/P	80 - 120
2069070	Magnesium	107	106	P/P	80 - 120
2069070	Potassium	98.3	96.9	P/P	80 - 120
2069070	Sodium	102	98.7	P/P	80 - 120
2069070	Zinc	105	102	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P360395

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2068882	Aluminum	101		P	80 - 120
2068882	Antimony	105		P	80 - 120
2068882	Arsenic	109		P	80 - 120
2068882	Boron	102		P	80 - 120
2068882	Cadmium	107		P	80 - 120
2068882	Chromium	102		P	80 - 120
2068882	Copper	100		P	80 - 120
2068882	Lead	103		P	80 - 120
2068882	Nickel	101		P	80 - 120
2068882	Selenium	105		P	80 - 120
2068882	Silver	100		P	80 - 120
2068882	Thallium	101		P	80 - 120
2069070	Aluminum	101	101	P/P	80 - 120
2069070	Antimony	103	103	P/P	80 - 120
2069070	Arsenic	108	107	P/P	80 - 120
2069070	Boron	106	101	P/P	80 - 120
2069070	Cadmium	105	105	P/P	80 - 120
2069070	Chromium	103	103	P/P	80 - 120
2069070	Copper	101	100	P/P	80 - 120
2069070	Lead	101	101	P/P	80 - 120
2069070	Nickel	101	101	P/P	80 - 120
2069070	Selenium	104	103	P/P	80 - 120
2069070	Silver	100	100	P/P	80 - 120
2069070	Thallium	97.6	99.6	P/P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P360718

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2068543	Chloride	100		P	90 - 110
2068727	Chloride	101		P	90 - 110

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 300.0 Rev. 2.1 dissolved
Batch ID: P360720

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2068543	Sulfate	102		P	90 - 110
2068727	Sulfate	102		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P360425

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2068731	Ammonia-N	99.3	99.1	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P360466

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2068842	Kjeldahl Nitrogen	93.2	91.2	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P360360

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2068770	NO2NO3-N	100	101	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P360526

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2068732	Total-P	99.8	107	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P360296

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2068736	O-Phosphate-P	98.7	99.6	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P360298

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2068863	O-Phosphate-P	94.2	96.1	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Batch ID: P360803

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2068696	Fluoride	96.1	96.1	P/P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P360635

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2068733	Organic Carbon	97.8	99.1	P/P	85 - 115

Quality Assurance Report Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P360283

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2068723	Turbidity	5.75	Sample	P	0 - 20

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P360284

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2068772	Turbidity	1.46	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P360395

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2069070	Barium	1.98	Spike	P	0 - 20
2069070	Calcium	0.247	Spike	P	0 - 20
2069070	Iron	0.156	Spike	P	0 - 20
2069070	Magnesium	0.780	Spike	P	0 - 20
2069070	Potassium	1.26	Spike	P	0 - 20
2069070	Sodium	1.98	Spike	P	0 - 20
2069070	Zinc	2.62	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P360395

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2069070	Aluminum	0.260	Spike	P	0 - 20
2069070	Antimony	0.174	Spike	P	0 - 20
2069070	Arsenic	0.365	Spike	P	0 - 20
2069070	Boron	4.92	Spike	P	0 - 20
2069070	Cadmium	0.0979	Spike	P	0 - 20
2069070	Chromium	0.535	Spike	P	0 - 20
2069070	Copper	0.356	Spike	P	0 - 20
2069070	Lead	0.134	Spike	P	0 - 20
2069070	Nickel	0.166	Spike	P	0 - 20
2069070	Selenium	0.437	Spike	P	0 - 20
2069070	Silver	0.401	Spike	P	0 - 20
2069070	Thallium	2.06	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P360718

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2068543	Chloride	2.32	Sample	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P360425

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2068731	Ammonia-N	0.209	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P360466

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2068842	Kjeldahl Nitrogen	1.81	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P360360

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2068770	NO2NO3-N	0.299	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P360526

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2068732	Total-P	6.45	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P360296

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2068736	O-Phosphate-P	0.908	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P360298

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2068863	O-Phosphate-P	1.57	Spike	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P360324

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2068727	Color (true)	0.503	Sample	P	0 - 20

Reference Method: SM 2320 B-97
Batch ID: P360800

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2068696	Total Alkalinity	0.611	Sample	P	0 - 1.6

Quality Assurance Report Precision

Reference Method: SM 2540 C-97
Batch ID: P360682

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2068769	TDS	4.38	Sample	P	0 - 10

Reference Method: SM 2540 D-97
Batch ID: P360656

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2068769	TSS	5.88	Sample	P	0 - 10

Reference Method: SM 4500 F-C-97
Batch ID: P360803

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2068696	Fluoride	0.0	Spike	P	0 - 3.5

Reference Method: SM 5310 B-00
Batch ID: P360635

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2068733	Organic Carbon	1.21	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: A89962

Included Lab Sample IDs: 2068769, 2068772

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	99.5	100	P/P	95 - 105
Turbidity	99.5	99.5	P/P	95 - 105

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A89964

Included Lab Sample IDs: 2068771, 2068774

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	98.7	98.3	P/P	90 - 110

Reference Method: SM 2120 B

Run ID: A89978

Included Lab Sample IDs: 2068769, 2068772

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	103	102	P/P	90 - 115

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A89981

Included Lab Sample IDs: 2068770, 2068773

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

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A90011

Included Lab Sample IDs: 2068770, 2068773

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	100	98.8	P/P	90 - 110
Ammonia-N	101	100	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A90019

Included Lab Sample IDs: 2068789

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Barium	99.5	101	P/P	90 - 110
Calcium	98.7	102	P/P	90 - 110
Iron	101	104	P/P	90 - 110
Magnesium	99.9	103	P/P	90 - 110
Potassium	98.4	99.8	P/P	90 - 110
Sodium	99.3	101	P/P	90 - 110
Zinc	99.1	102	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A90036

Included Lab Sample IDs: 2068770, 2068773

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	107	108	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A90063

Included Lab Sample IDs: 2068770, 2068773

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

Reference Method: EPA 300.0 Rev. 2.1

Run ID: A90071

Included Lab Sample IDs: 2068769, 2068772

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

Reference Method: EPA 300.0 Rev. 2.1 dissolved

Run ID: A90071

Included Lab Sample IDs: 2068771, 2068774

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

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A90074

Included Lab Sample IDs: 2068789

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	98.8	100	P/P	90 - 110
Antimony	96.1	97.2	P/P	90 - 110
Arsenic	99.4	100	P/P	90 - 110
Boron	97.6	97.1	P/P	90 - 110
Cadmium	97.3	97.5	P/P	90 - 110
Chromium	99.4	98.8	P/P	90 - 110
Copper	98.8	99.7	P/P	90 - 110
Lead	98.5	99.5	P/P	90 - 110
Nickel	98.4	98.7	P/P	90 - 110
Selenium	98.9	98.9	P/P	90 - 110
Silver	94.3	95.0	P/P	90 - 110
Thallium	90.9	92.4	P/P	90 - 110

Reference Method: SM 5310 B-00

Run ID: A90082

Included Lab Sample IDs: 2068770, 2068773

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

Reference Method: SM 2320 B-97

Run ID: A90132

Included Lab Sample IDs: 2068769, 2068772

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	102	99.3	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: SM 4500 F-C-97

Run ID: A90132

Included Lab Sample IDs: 2068769, 2068772

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	98.1	99.5	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					5.75	
	Turbidity					1.46	
EPA 200.7 Rev. 4.4	Barium	104	104	103	101		1.98
	Calcium	98.8	101	102			0.247
	Iron	105	107	104	104		0.156
	Magnesium	107	102	107	106		0.780
	Potassium	99.8	99.5	98.3	96.9		1.26
	Sodium	103	98.5	102	98.7		1.98
	Zinc	102	104	105	102		2.62
EPA 200.8 Rev. 5.4	Aluminum	104	101	101	101		0.260
	Antimony	102	105	103	103		0.174
	Arsenic	107	109	108	107		0.365
	Boron	102	102	106	101		4.92
	Cadmium	104	107	105	105		0.0979
	Chromium	105	102	103	103		0.535
	Copper	103	100	101	100		0.356
	Lead	103	103	101	101		0.134
	Nickel	103	101	101	101		0.166
	Selenium	105	105	104	103		0.437
	Silver	100	100	100	100		0.401
	Thallium	98.3	101	97.6	99.6		2.06
EPA 300.0 Rev. 2.1	Chloride	100	100	101		2.32	
EPA 300.0 Rev. 2.1 dissolved	Sulfate	102	102	102			
EPA 350.1 Rev. 2.0	Ammonia-N	98.7	99.3	99.1			0.209
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	104	93.2	91.2			1.81
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	102	100	101			0.299
EPA 365.1 Rev. 2.0	Total-P	97.8	99.8	107			6.45
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	97.6	98.7	99.6			0.908
	O-Phosphate-P	98.3	94.2	96.1			1.57
SM 2120 B	Color (true)	102				0.503	
SM 2320 B-97	Total Alkalinity	101				0.611	
SM 2540 C-97	TDS					4.38	
SM 2540 D-97	TSS					5.88	
SM 4500 F-C-97	Fluoride	96.0	96.1	96.1			0.0
SM 5310 B-00	Organic Carbon	97.6	97.8	99.1			1.21

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	2068769, 2068772
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2068789
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2068789
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	2068769, 2068772
EPA 300.0 Rev. 2.1 dissolved / E31780	Sulfate, dissolved, in filtered, aqueous matrices	2068771, 2068774
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	2068770, 2068773
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	2068770, 2068773
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	2068770, 2068773

Reference Method Descriptions

Method / DoH Cert #	Description	<u>Associated Samples</u>
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	2068770, 2068773
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2068771, 2068774
SM 2120 B / E31780	True Color measured at 450 nm	2068769, 2068772
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO ₃ /L	2068769, 2068772
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	2068769, 2068772
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2068769, 2068772
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2068769, 2068772
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	2068770, 2068773

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	03/12/2019			03/12/2019 16:50	Adrian Shelby	2068769, 2068772
EPA 200.7 Rev. 4.4	03/12/2019	03/13/2019 17:35	Elliott D. Healy	03/14/2019 14:55	Betina Topolski	2068789
EPA 200.8 Rev. 5.4	03/12/2019	03/13/2019 17:35	Elliott D. Healy	03/16/2019 09:28	Allison Taylor	2068789
EPA 300.0 Rev. 2.1	03/12/2019			03/20/2019 00:55	Lipi Saha	2068769
	03/12/2019			03/20/2019 01:07	Lipi Saha	2068772
EPA 300.0 Rev. 2.1 dissolved	03/12/2019			03/20/2019 02:32	Lipi Saha	2068771
	03/12/2019			03/20/2019 02:44	Lipi Saha	2068774
EPA 350.1 Rev. 2.0	03/12/2019			03/13/2019 12:46	Ping Hua	2068773
	03/12/2019			03/13/2019 13:08	Ping Hua	2068770
EPA 351.2 Rev. 2.0	03/12/2019	03/14/2019 12:00	Adrian Shelby	03/15/2019 12:04	Joseph Suarez	2068770
	03/12/2019	03/14/2019 12:00	Adrian Shelby	03/15/2019 12:05	Joseph Suarez	2068773
EPA 353.2 Rev. 2.0	03/12/2019			03/13/2019 11:29	Beverly Y. Sanders	2068770
	03/12/2019			03/13/2019 11:35	Beverly Y. Sanders	2068773
EPA 365.1 Rev. 2.0	03/12/2019	03/15/2019 14:20	Sima Feizi	03/18/2019 09:50	Beverly Y. Sanders	2068770
	03/12/2019	03/15/2019 14:20	Sima Feizi	03/18/2019 09:51	Beverly Y. Sanders	2068773
EPA 365.1 Rev. 2.0 dissolved	03/12/2019			03/12/2019 15:56	Jhamieka S. Greenwood	2068771
	03/12/2019			03/12/2019 15:57	Jhamieka S. Greenwood	2068774
SM 2120 B	03/12/2019			03/12/2019 15:56	Mariam Hanna	2068769
	03/12/2019			03/12/2019 15:57	Mariam Hanna	2068772
SM 2320 B-97	03/12/2019			03/20/2019 00:06	Dale L. Simmons	2068769
	03/12/2019			03/20/2019 00:19	Dale L. Simmons	2068772
SM 2540 C-97	03/12/2019			03/13/2019 14:03	Yijie Li	2068769, 2068772
SM 2540 D-97	03/12/2019			03/13/2019 14:03	Yijie Li	2068769, 2068772
SM 4500 F-C-97	03/12/2019			03/20/2019 00:06	Dale L. Simmons	2068769
	03/12/2019			03/20/2019 00:19	Dale L. Simmons	2068772
SM 5310 B-00	03/12/2019			03/18/2019 10:43	Julia Storbeck	2068770
	03/12/2019			03/18/2019 10:56	Julia Storbeck	2068773