

Chemical Analysis Report

SW-DIST-2019-05-31-02

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

Event Description: **Flint**
Request ID: **RQ-2019-05-13-09**
Customer: **SW-DIST**
Project ID: **SMP**

Send Reports to:
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13051 N. Telecom Parkway
Temple Terrace, FL 33637-0926
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Certified by: Colin Wright, Program Administrator

Date Certified: 24-JUN-2019 11:51

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: Flint Creek @ US 301

Collection Date/Time: 05/30/2019 10:00

Field ID: G2SW0004

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2090395	EPA 180.1 Rev. 2.0	Turbidity	14		NTU	P364835	
	EPA 300.0 Rev. 2.1	Chloride	32		mg Cl/L	P365163	
	SM 2120 B	Color (true)	54		PCU	P364848	
	SM 2320 B-97	Total Alkalinity	70		mg CaCO3/L	P365401	RPD
	SM 2540 C-97	TDS	165		mg/L	P365177	
	SM 2540 D-97	TSS	23		mg/L	P364982	
	SM 4500 F-C-97	Fluoride	0.29		mg F/L	P365404	
2090396	EPA 350.1 Rev. 2.0	Ammonia-N	0.73		mg N/L	P365209	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	3.3		mg N/L	P365089	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.31		mg N/L	P364893	
	EPA 365.1 Rev. 2.0	Total-P	0.59		mg P/L	P365187	
	SM 5310 B-00	Organic Carbon	14		mg C/L	P364950	
2090397	EPA 300.0 Rev. 2.1 dissolved	Sulfate	7.1		mg SO4/L	P365032	
	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.31		mg P/L	P364854	
2090403	EPA 200.7 Rev. 4.4	Barium	7.4		ug/L	P365001	
		Calcium	29.7		mg/L	P365001	
		Iron	360		ug/L	P365445	
		Magnesium	4.29		mg/L	P365001	
		Potassium	3.7		mg/L	P365001	
		Sodium	19.0		mg/L	P365001	
		Zinc	5.0	U	ug/L	P365001	
	EPA 200.8 Rev. 5.4	Aluminum	225		ug/L	P365001	
		Antimony	0.11	I	ug/L	P365001	
		Arsenic	1.35		ug/L	P365001	
		Boron**	39.4		ug/L	P365001	
		Cadmium	0.020	U	ug/L	P365001	
		Chromium	0.73	I	ug/L	P365001	
		Copper	1.14		ug/L	P365001	
		Lead	0.43		ug/L	P365445	
		Nickel	0.58	I	ug/L	P365001	
		Selenium	0.20	U	ug/L	P365001	
		Silver	0.010	U	ug/L	P365001	
		Thallium	0.10	U	ug/L	P365001	

Sample Location: Flint Creek @ Knights Griffin Rd

Collection Date/Time: 05/30/2019 10:20

Field ID: G2SW0066

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2090398	EPA 180.1 Rev. 2.0	Turbidity	11	A	NTU	P364836	
	EPA 300.0 Rev. 2.1	Chloride	32		mg Cl/L	P365163	
	SM 2120 B	Color (true)	56		PCU	P364848	
	SM 2320 B-97	Total Alkalinity	74		mg CaCO3/L	P365401	RPD
	SM 2540 C-97	TDS	170	A	mg/L	P365177	
	SM 2540 D-97	TSS	18	A	mg/L	P364982	
	SM 4500 F-C-97	Fluoride	0.30		mg F/L	P365404	
2090399	EPA 350.1 Rev. 2.0	Ammonia-N	1.3		mg N/L	P365212	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	3.2		mg N/L	P365273	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.081		mg N/L	P364893	
	EPA 365.1 Rev. 2.0	Total-P	0.61		mg P/L	P365187	
	SM 5310 B-00	Organic Carbon	14		mg C/L	P364950	
2090400	EPA 300.0 Rev. 2.1 dissolved	Sulfate	6.9		mg SO4/L	P365032	
	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.37		mg P/L	P364854	

Quality Assurance Report Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P364835

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P364836

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P365001

Component	Result	Code	Units
Barium	1.0	U	ug/L
Calcium	0.075	U	mg/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 200.7 Rev. 4.4
Batch ID: P365445

Component	Result	Code	Units
Iron	30	U	ug/L

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P365001

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
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 200.8 Rev. 5.4
Batch ID: P365445

Component	Result	Code	Units
Lead	0.20	U	ug/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P365163

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Quality Assurance Report Method Blank Results

Reference Method: EPA 300.0 Rev. 2.1 dissolved
Batch ID: P365032

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P365209

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P365212

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P365089

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P365273

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P364893

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P365187

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P364854

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

Reference Method: SM 2120 B
Batch ID: P364848

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Quality Assurance Report

Method Blank Results

Reference Method: SM 2320 B-97
Batch ID: P365401

Component	Result	Code	Units
Total Alkalinity	0.65	U	mg CaCO ₃ /L

Reference Method: SM 2540 C-97
Batch ID: P365177

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P364982

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P365404

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P364950

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: P365001

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Barium	101		P	85 - 115
Calcium	100		P	85 - 115
Magnesium	101		P	85 - 115
Potassium	101		P	85 - 115
Sodium	101		P	85 - 115
Zinc	98.8		P	85 - 115

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P365445

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Iron	103		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P365001

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	93.4		P	85 - 115
Antimony	97.6		P	85 - 115
Arsenic	101		P	85 - 115
Boron	97.3		P	85 - 115
Cadmium	97.4		P	85 - 115
Chromium	103		P	85 - 115
Copper	99.7		P	85 - 115
Nickel	101		P	85 - 115
Selenium	107		P	85 - 115
Silver	97.6		P	85 - 115
Thallium	95.6		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P365445

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P365163

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

Reference Method: EPA 300.0 Rev. 2.1 dissolved
Batch ID: P365032

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Sulfate	98.9		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P365209

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

Quality Assurance Report

Laboratory Control Sample Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P365212

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P365089

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P365273

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P364893

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	97.0		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P365187

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P364854

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

Reference Method: SM 2120 B
Batch ID: P364848

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

Reference Method: SM 2320 B-97
Batch ID: P365401

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	104		P	98 - 106

Reference Method: SM 4500 F-C-97
Batch ID: P365404

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	97.4		P	92 - 103

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: SM 5310 B-00
Batch ID: P364950

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	104		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P365001

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2089895	Barium	103		P	80 - 120
2089895	Calcium	102		P	80 - 120
2089895	Magnesium	102		P	80 - 120
2089895	Potassium	102		P	80 - 120
2089895	Sodium	103		P	80 - 120
2089895	Zinc	102		P	80 - 120
2090436	Barium	102	103	P/P	80 - 120
2090436	Calcium	97.8		P	80 - 120
2090436	Magnesium	101		P	80 - 120
2090436	Potassium	102	102	P/P	80 - 120
2090436	Sodium	98.3		P	80 - 120
2090436	Zinc	101	101	P/P	80 - 120

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P365445

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2089909	Iron	104		P	80 - 120
2092811	Iron	104	103	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P365001

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2089895	Aluminum	93.1		P	80 - 120
2089895	Antimony	98.1		P	80 - 120
2089895	Arsenic	102		P	80 - 120
2089895	Boron	95.1		P	80 - 120
2089895	Cadmium	99.8		P	80 - 120
2089895	Chromium	102		P	80 - 120
2089895	Copper	94.8		P	80 - 120
2089895	Nickel	98.6		P	80 - 120
2089895	Selenium	105		P	80 - 120
2089895	Silver	96.1		P	80 - 120
2089895	Thallium	98.1		P	80 - 120
2090436	Aluminum	93.1	92.6	P/P	80 - 120
2090436	Antimony	98.6	98.7	P/P	80 - 120
2090436	Arsenic	97.2	98.3	P/P	80 - 120
2090436	Boron	98.6	99.7	P/P	80 - 120
2090436	Cadmium	100	99.9	P/P	80 - 120
2090436	Chromium	99.7	100	P/P	80 - 120
2090436	Copper	94.8	95.4	P/P	80 - 120
2090436	Nickel	96.8	96.6	P/P	80 - 120
2090436	Selenium	103	103	P/P	80 - 120
2090436	Silver	97.1	96.8	P/P	80 - 120
2090436	Thallium	97.9	98.8	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P365445

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2089909	Lead	105		P	80 - 120

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P365445

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2092811	Lead	102	103	P/P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P365163

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2090181	Chloride	96.6		P	90 - 110
2090334	Chloride	99.2		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1 dissolved
Batch ID: P365032

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2089775	Sulfate	98.6		P	90 - 110
2090028	Sulfate	97.6		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P365209

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2090190	Ammonia-N	101	102	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P365212

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2090433	Ammonia-N	98.3	99.7	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P365089

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2090339	Kjeldahl Nitrogen	106	105	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P365273

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2090490	Kjeldahl Nitrogen	102	101	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P364893

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2090320	NO2NO3-N	99.5	100	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P365187

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2090339	Total-P	95.8	101	P/P	90 - 110

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P364854

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2090345	O-Phosphate-P	92.4	92.2	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Batch ID: P365404

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2090335	Fluoride	96.1	96.6	P/P	89 - 106

Reference Method: SM 5310 B-00
Batch ID: P364950

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2090338	Organic Carbon	102	102	P/P	85 - 115

Quality Assurance Report Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P364835

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2090360	Turbidity	2.43	Sample	P	0 - 20

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P364836

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2090398	Turbidity	1.89	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P365001

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2090436	Barium	0.692	Spike	P	0 - 20
2090436	Calcium	0.573	Spike	P	0 - 20
2090436	Magnesium	0.607	Spike	P	0 - 20
2090436	Potassium	0.0623	Spike	P	0 - 20
2090436	Sodium	0.368	Spike	P	0 - 20
2090436	Zinc	0.226	Spike	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P365445

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2092811	Iron	0.405	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P365001

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2090436	Aluminum	0.508	Spike	P	0 - 20
2090436	Antimony	0.101	Spike	P	0 - 20
2090436	Arsenic	1.03	Spike	P	0 - 20
2090436	Boron	0.917	Spike	P	0 - 20
2090436	Cadmium	0.100	Spike	P	0 - 20
2090436	Chromium	0.554	Spike	P	0 - 20
2090436	Copper	0.605	Spike	P	0 - 20
2090436	Nickel	0.211	Spike	P	0 - 20
2090436	Selenium	0.300	Spike	P	0 - 20
2090436	Silver	0.313	Spike	P	0 - 20
2090436	Thallium	0.862	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P365445

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2092811	Lead	0.620	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P365163

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2090181	Chloride	0.869	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1 dissolved
Batch ID: P365032

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2090028	Sulfate	1.19	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P365209

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2090190	Ammonia-N	1.10	Spike	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P365212

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2090433	Ammonia-N	1.18	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P365089

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2090339	Kjeldahl Nitrogen	0.407	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P365273

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2090490	Kjeldahl Nitrogen	1.01	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P364893

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2090320	NO2NO3-N	1.00	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P365187

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2090339	Total-P	5.53	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P364854

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2090345	O-Phosphate-P	0.217	Spike	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P364848

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2090334	Color (true)	4.32	Sample	P	0 - 20

Reference Method: SM 2320 B-97
Batch ID: P365401

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2090335	Total Alkalinity	4.94	Sample	F	0 - 2.8

Reference Method: SM 2540 C-97
Batch ID: P365177

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2090398	TDS	0.587	Sample	P	0 - 10

Reference Method: SM 2540 D-97
Batch ID: P364982

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2090398	TSS	0.0	Sample	P	0 - 10

Reference Method: SM 4500 F-C-97
Batch ID: P365404

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2090335	Fluoride	0.482	Spike	P	0 - 2.5

Reference Method: SM 5310 B-00
Batch ID: P364950

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2090338	Organic Carbon	0.0311	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: A91791

Included Lab Sample IDs: 2090395, 2090398

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

Reference Method: SM 2120 B

Run ID: A91795

Included Lab Sample IDs: 2090395, 2090398

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	105	101	P/P	90 - 115

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A91796

Included Lab Sample IDs: 2090397, 2090400

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	96.2	96.3	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A91809

Included Lab Sample IDs: 2090396, 2090399

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	97.5	97.0	P/P	90 - 110

Reference Method: SM 5310 B-00

Run ID: A91835

Included Lab Sample IDs: 2090396, 2090399

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

Reference Method: EPA 300.0 Rev. 2.1

Run ID: A91854

Included Lab Sample IDs: 2090395, 2090398

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

Reference Method: EPA 300.0 Rev. 2.1 dissolved

Run ID: A91854

Included Lab Sample IDs: 2090397, 2090400

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

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A91914

Included Lab Sample IDs: 2090396, 2090399

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

Quality Assurance Report Calibration Verification

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A91916

Included Lab Sample IDs: 2090403

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Barium	103	104	P/P	90 - 110
Calcium	104	103	P/P	90 - 110
Magnesium	104	104	P/P	90 - 110
Potassium	104	101	P/P	90 - 110
Sodium	103	101	P/P	90 - 110
Zinc	103	105	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A91923

Included Lab Sample IDs: 2090396

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	97.2	93.6	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A91924

Included Lab Sample IDs: 2090403

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	95.6	94.4	P/P	90 - 110
Antimony	97.2	97.1	P/P	90 - 110
Arsenic	97.5	98.1	P/P	90 - 110
Boron	98.7	102	P/P	90 - 110
Cadmium	100	99.7	P/P	90 - 110
Chromium	105	105	P/P	90 - 110
Copper	99.0	98.7	P/P	90 - 110
Nickel	99.6	100	P/P	90 - 110
Silver	97.6	97.5	P/P	90 - 110
Thallium	96.0	92.1	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A91938

Included Lab Sample IDs: 2090396, 2090399

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

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A92003

Included Lab Sample IDs: 2090399

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	96.7	103	P/P	90 - 110

Reference Method: SM 2320 B-97

Run ID: A92009

Included Lab Sample IDs: 2090395, 2090398

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	102	105	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: SM 4500 F-C-97

Run ID: A92009

Included Lab Sample IDs: 2090395, 2090398

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	99.1	99.0	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A92024

Included Lab Sample IDs: 2090403

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

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A92095

Included Lab Sample IDs: 2090403

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

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A92264

Included Lab Sample IDs: 2090403

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Lead	101	101	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			LCS	Precision	MS
							SMP	
EPA 180.1 Rev. 2.0	Turbidity						2.43	
	Turbidity						1.89	
EPA 200.7 Rev. 4.4	Barium	101	103	102	103			0.692
	Calcium	100	102	97.8				0.573
	Iron	103	104	104	103			0.405
	Magnesium	101	102	101				0.607
	Potassium	101	102	102	102			0.0623
	Sodium	101	103	98.3				0.368
	Zinc	98.8	102	101	101			0.226
EPA 200.8 Rev. 5.4	Aluminum	93.4	93.1	93.1	92.6			0.508
	Antimony	97.6	98.1	98.6	98.7			0.101
	Arsenic	101	102	97.2	98.3			1.03
	Boron	97.3	95.1	98.6	99.7			0.917
	Cadmium	97.4	99.8	100	99.9			0.100
	Chromium	103	102	99.7	100			0.554
	Copper	99.7	94.8	94.8	95.4			0.605
	Lead	101	105	102	103			0.620
	Nickel	101	98.6	96.8	96.6			0.211
	Selenium	107	105	103	103			0.300
	Silver	97.6	96.1	97.1	96.8			0.313
	Thallium	95.6	98.1	97.9	98.8			0.862
EPA 300.0 Rev. 2.1	Chloride	98.2	96.6	99.2			0.869	
EPA 300.0 Rev. 2.1 dissolved	Sulfate	98.9	97.6	98.6			1.19	
EPA 350.1 Rev. 2.0	Ammonia-N	101	101	102				1.10
	Ammonia-N	100	98.3	99.7				1.18
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	100	106	105				0.407
	Kjeldahl Nitrogen	103	102	101				1.01
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	97.0	99.5	100				1.00
EPA 365.1 Rev. 2.0	Total-P	100	95.8	101				5.53
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	98.2	92.4	92.2				0.217
SM 2120 B	Color (true)	102					4.32	
SM 2320 B-97	Total Alkalinity	104					4.94	
SM 2540 C-97	TDS						0.587	
SM 2540 D-97	TSS						0.0	
SM 4500 F-C-97	Fluoride	97.4	96.1	96.6				0.482
SM 5310 B-00	Organic Carbon	104	102	102				0.0311

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	2090395, 2090398
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2090403
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2090403
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	2090395, 2090398
EPA 300.0 Rev. 2.1 dissolved / E31780	Sulfate, dissolved, in filtered, aqueous matrices	2090397, 2090400
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	2090396, 2090399
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	2090396, 2090399

Reference Method Descriptions

Method / DoH Cert #	Description	<u>Associated Samples</u>
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	2090396, 2090399
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	2090396, 2090399
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2090397, 2090400
SM 2120 B / E31780	True Color measured at 450 nm	2090395, 2090398
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO ₃ /L	2090395, 2090398
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	2090395, 2090398
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2090395, 2090398
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2090395, 2090398
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	2090396, 2090399

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	05/31/2019			05/31/2019 16:22	Julia Storbeck	2090395, 2090398
EPA 200.7 Rev. 4.4	05/31/2019	06/04/2019 17:15	Elliott D. Healy	06/06/2019 14:23	Betina Topolski	2090403
	05/31/2019	06/11/2019 16:10	Elliott D. Healy	06/12/2019 22:36	Betina Topolski	2090403
EPA 200.8 Rev. 5.4	05/31/2019	06/04/2019 17:15	Elliott D. Healy	06/07/2019 04:59	Robert K Palmer	2090403
	05/31/2019	06/04/2019 17:15	Elliott D. Healy	06/11/2019 18:08	Robert K Palmer	2090403
	05/31/2019	06/11/2019 16:10	Elliott D. Healy	06/20/2019 16:39	Robert K Palmer	2090403
EPA 300.0 Rev. 2.1	05/31/2019			06/05/2019 18:42	Lipi Saha	2090395
	05/31/2019			06/05/2019 18:54	Lipi Saha	2090398
EPA 300.0 Rev. 2.1 dissolved	05/31/2019			06/04/2019 22:12	Lipi Saha	2090397
	05/31/2019			06/04/2019 22:24	Lipi Saha	2090400
EPA 350.1 Rev. 2.0	05/31/2019			06/05/2019 14:57	Ping Hua	2090396
	05/31/2019			06/05/2019 15:50	Ping Hua	2090399
EPA 351.2 Rev. 2.0	05/31/2019	06/05/2019 16:30	Adrian Shelby	06/06/2019 14:26	Joseph Suarez	2090396
	05/31/2019	06/07/2019 11:30	Adrian Shelby	06/10/2019 14:54	Virginia P. Brown	2090399
EPA 353.2 Rev. 2.0	05/31/2019			06/03/2019 11:07	Beverly Y. Sanders	2090396
	05/31/2019			06/03/2019 11:09	Beverly Y. Sanders	2090399
EPA 365.1 Rev. 2.0	05/31/2019	06/06/2019 12:35	Sima Feizi	06/07/2019 09:22	Lipi Saha	2090396
	05/31/2019	06/06/2019 12:35	Sima Feizi	06/07/2019 09:23	Lipi Saha	2090399
EPA 365.1 Rev. 2.0 dissolved	05/31/2019			05/31/2019 16:27	Jhamieka S. Greenwood	2090397
	05/31/2019			05/31/2019 16:28	Jhamieka S. Greenwood	2090400
SM 2120 B	05/31/2019			05/31/2019 17:04	Madeline Funaro	2090395
	05/31/2019			05/31/2019 17:05	Madeline Funaro	2090398
SM 2320 B-97	05/31/2019			06/11/2019 08:35	Dale L. Simmons	2090395
	05/31/2019			06/11/2019 08:47	Dale L. Simmons	2090398
SM 2540 C-97	05/31/2019			06/03/2019 15:26	Mariam Hanna	2090395, 2090398
SM 2540 D-97	05/31/2019			06/03/2019 15:47	Mariam Hanna	2090395, 2090398
SM 4500 F-C-97	05/31/2019			06/11/2019 08:35	Dale L. Simmons	2090395
	05/31/2019			06/11/2019 08:47	Dale L. Simmons	2090398
SM 5310 B-00	05/31/2019			06/04/2019 02:10	Madeline Funaro	2090396
	05/31/2019			06/04/2019 02:22	Madeline Funaro	2090399