

Chemical Analysis Report

SW-DIST-2019-10-08-02

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

Event Description: **Flint**
Request ID: **RQ-2019-10-07-11**
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: Kerry Tate, Ph.D., Environmental Administrator

Date Certified: 01-NOV-2019 13:15

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: 10/07/2019 12:55

Field ID: G2SW0066

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2126085	EPA 180.1 Rev. 2.0	Turbidity	5.5	A	NTU	P372169	
	EPA 300.0 Rev. 2.1	Chloride	22		mg Cl/L	P372585	
	SM 2120 B	Color (true)	100		PCU	P372126	
	SM 2320 B-97	Total Alkalinity	56		mg CaCO3/L	P372632	
	SM 2540 C-97	TDS	137	A	mg/L	P372493	
	SM 2540 D-97	TSS	7	IA	mg/L	P372483	
	SM 4500 F-C-97	Fluoride	0.25		mg F/L	P372634	
2126086	EPA 350.1 Rev. 2.0	Ammonia-N	0.23		mg N/L	P372450	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.3		mg N/L	P372235	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.20		mg N/L	P372272	
	EPA 365.1 Rev. 2.0	Total-P	0.44		mg P/L	P372340	
	SM 5310 B-00	Organic Carbon	16		mg C/L	P372520	
2126087	EPA 300.0 Rev. 2.1 dissolved	Sulfate	7.5		mg SO4/L	P372763	
	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.30		mg P/L	P372120	

Ref. Method and Comment:

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

Sample Location: Flint Creek @ US 301

Collection Date/Time: 10/07/2019 13:15

Field ID: G2SW0004

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2126082	EPA 180.1 Rev. 2.0	Turbidity	5.5		NTU	P372169	
	EPA 300.0 Rev. 2.1	Chloride	22		mg Cl/L	P372585	
	SM 2120 B	Color (true)	100		PCU	P372125	
	SM 2320 B-97	Total Alkalinity	55		mg CaCO3/L	P372632	
	SM 2540 C-97	TDS	136		mg/L	P372492	
	SM 2540 D-97	TSS	6	I	mg/L	P372482	
	SM 4500 F-C-97	Fluoride	0.25		mg F/L	P372634	
2126083	EPA 350.1 Rev. 2.0	Ammonia-N	0.21		mg N/L	P372305	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.3		mg N/L	P372235	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.25		mg N/L	P372272	
	EPA 365.1 Rev. 2.0	Total-P	0.44		mg P/L	P372340	
	SM 5310 B-00	Organic Carbon	16		mg C/L	P372520	
2126084	EPA 300.0 Rev. 2.1 dissolved	Sulfate	7.4		mg SO4/L	P372763	
	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.31		mg P/L	P372120	
2126102	EPA 200.7 Rev. 4.4	Barium	5.7		ug/L	P372214	
		Calcium	22.9		mg/L	P372214	
		Iron	340		ug/L	P372214	
		Magnesium	3.32		mg/L	P372214	
		Potassium	3.7		mg/L	P372214	
		Sodium	13.1		mg/L	P372214	
		Zinc	5.0	U	ug/L	P372214	
	EPA 200.8 Rev. 5.4	Aluminum	122		ug/L	P372214	
		Antimony	0.12	I	ug/L	P372214	
		Arsenic	1.74		ug/L	P372214	
		Boron**	34.1		ug/L	P372214	
		Cadmium	0.020	U	ug/L	P372214	
		Chromium	0.65	I	ug/L	P372214	
		Copper	0.88		ug/L	P372214	
		Lead	0.21	I	ug/L	P372214	
		Nickel	0.50	U	ug/L	P372214	
		Selenium	0.20	U	ug/L	P372214	
		Silver	0.010	U	ug/L	P372214	
		Thallium	0.10	U	ug/L	P372214	
							MS

Ref. Method and Comment:

SM 2540 D-97: 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: P372169

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P372214

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: P372214

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: P372585

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1 dissolved
Batch ID: P372763

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P372305

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

Quality Assurance Report Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P372450

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P372235

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P372272

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P372340

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P372120

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

Reference Method: SM 2120 B
Batch ID: P372125

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2120 B
Batch ID: P372126

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-97
Batch ID: P372632

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

Reference Method: SM 2540 C-97
Batch ID: P372492

Component	Result	Code	Units
TDS	15	U	mg/L

Quality Assurance Report

Method Blank Results

Reference Method: SM 2540 C-97
Batch ID: P372493

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P372482

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P372483

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P372634

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P372520

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: P372214

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Barium	99.5		P	85 - 115
Calcium	103		P	85 - 115
Iron	100		P	85 - 115
Magnesium	107		P	85 - 115
Potassium	99.3		P	85 - 115
Sodium	101		P	85 - 115
Zinc	95.9		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P372214

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	98.8		P	85 - 115
Antimony	98.7		P	85 - 115
Arsenic	96.0		P	85 - 115
Boron	98.0		P	85 - 115
Cadmium	92.0		P	85 - 115
Chromium	102		P	85 - 115
Copper	101		P	85 - 115
Lead	98.9		P	85 - 115
Nickel	96.1		P	85 - 115
Selenium	89.7		P	85 - 115
Silver	96.7		P	85 - 115
Thallium	103		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P372585

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

Reference Method: EPA 300.0 Rev. 2.1 dissolved
Batch ID: P372763

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P372305

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P372450

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	98.6		P	90 - 110

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P372235

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	99.2		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P372272

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: P372340

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total-P	99.6		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P372120

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

Reference Method: SM 2120 B
Batch ID: P372125

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	99.2		P	85 - 115

Reference Method: SM 2120 B
Batch ID: P372126

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	99.8		P	85 - 115

Reference Method: SM 2320 B-97
Batch ID: P372632

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

Reference Method: SM 4500 F-C-97
Batch ID: P372634

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	94.5		P	92 - 103

Reference Method: SM 5310 B-00
Batch ID: P372520

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	95.2		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P372214

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2125620	Barium	99.1	99.2	P/P	80 - 120
2125620	Calcium	102	100	P/P	80 - 120
2125620	Iron	101	101	P/P	80 - 120
2125620	Magnesium	106	105	P/P	80 - 120
2125620	Potassium	104	103	P/P	80 - 120
2125620	Sodium	97.1	95.5	P/P	80 - 120
2125620	Zinc	96.4	96.4	P/P	80 - 120
2125652	Barium	96.2		P	80 - 120
2125652	Calcium	95.8		P	80 - 120
2125652	Iron	99.8		P	80 - 120
2125652	Magnesium	99.8		P	80 - 120
2125652	Potassium	97.2		P	80 - 120
2125652	Sodium	97.5		P	80 - 120
2125652	Zinc	94.0		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P372214

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2125620	Aluminum	100	100	P/P	80 - 120
2125620	Antimony	102	100	P/P	80 - 120
2125620	Arsenic	99.4	98.8	P/P	80 - 120
2125620	Boron	103	102	P/P	80 - 120
2125620	Cadmium	96.6	94.7	P/P	80 - 120
2125620	Chromium	93.8	94.4	P/P	80 - 120
2125620	Copper	95.7	95.8	P/P	80 - 120
2125620	Lead	100	99.1	P/P	80 - 120
2125620	Nickel	95.8	95.1	P/P	80 - 120
2125620	Selenium	97.1	95.2	P/P	80 - 120
2125620	Silver	99.0	98.3	P/P	80 - 120
2125620	Thallium	103	103	P/P	80 - 120
2125652	Aluminum	99.7		P	80 - 120
2125652	Antimony	105		P	80 - 120
2125652	Arsenic	102		P	80 - 120
2125652	Boron	100		P	80 - 120
2125652	Cadmium	97.0		P	80 - 120
2125652	Chromium	94.6		P	80 - 120
2125652	Copper	69.6		F	80 - 120
2125652	Lead	101		P	80 - 120
2125652	Nickel	88.8		P	80 - 120
2125652	Selenium	96.2		P	80 - 120
2125652	Silver	97.6		P	80 - 120
2125652	Thallium	105		P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P372585

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2125927	Chloride	101		P	90 - 110
2126300	Chloride	103		P	90 - 110

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 300.0 Rev. 2.1 dissolved
Batch ID: P372763

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2126536	Sulfate	98.3	100	P/P	90 - 110
2126644	Sulfate	98.4		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P372305

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2125921	Ammonia-N	100	99.7	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P372450

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2126136	Ammonia-N	97.2	96.8	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P372235

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2126137	Kjeldahl Nitrogen	96.4	102	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P372272

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2126066	NO2NO3-N	104	102	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P372340

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2126066	Total-P	98.3	100	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P372120

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2125926	O-Phosphate-P	100	101	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Batch ID: P372634

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2125300	Fluoride	94.4	93.9	P/P	89 - 106

Reference Method: SM 5310 B-00
Batch ID: P372520

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2126066	Organic Carbon	96.0	95.2	P/P	85 - 115

Quality Assurance Report Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P372169

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2126085	Turbidity	3.11	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P372214

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2125620	Barium	0.0817	Spike	P	0 - 20
2125620	Calcium	0.862	Spike	P	0 - 20
2125620	Iron	0.126	Spike	P	0 - 20
2125620	Magnesium	0.505	Spike	P	0 - 20
2125620	Potassium	0.607	Spike	P	0 - 20
2125620	Sodium	1.19	Spike	P	0 - 20
2125620	Zinc	0.0442	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P372214

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2125620	Aluminum	0.125	Spike	P	0 - 20
2125620	Antimony	1.08	Spike	P	0 - 20
2125620	Arsenic	0.660	Spike	P	0 - 20
2125620	Boron	0.893	Spike	P	0 - 20
2125620	Cadmium	1.93	Spike	P	0 - 20
2125620	Chromium	0.645	Spike	P	0 - 20
2125620	Copper	0.118	Spike	P	0 - 20
2125620	Lead	1.15	Spike	P	0 - 20
2125620	Nickel	0.721	Spike	P	0 - 20
2125620	Selenium	2.02	Spike	P	0 - 20
2125620	Silver	0.761	Spike	P	0 - 20
2125620	Thallium	0.139	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P372585

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2125927	Chloride	1.37	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1 dissolved
Batch ID: P372763

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2126536	Sulfate	1.74	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P372305

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2125921	Ammonia-N	0.579	Spike	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P372450

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2126136	Ammonia-N	0.426	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P372235

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2126137	Kjeldahl Nitrogen	4.98	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P372272

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2126066	NO2NO3-N	1.46	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P372340

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2126066	Total-P	1.56	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P372120

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2125926	O-Phosphate-P	1.09	Spike	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P372125

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2125672	Color (true)	5.78	Sample	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P372126

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2125928	Color (true)	2.02	Sample	P	0 - 20

Quality Assurance Report Precision

Reference Method: SM 2320 B-97
Batch ID: P372632

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2125300	Total Alkalinity	0.0264	Sample	P	0 - 2.8

Reference Method: SM 2540 C-97
Batch ID: P372492

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2125664	TDS	2.46	Sample	P	0 - 10

Reference Method: SM 2540 C-97
Batch ID: P372493

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2126085	TDS	2.92	Sample	P	0 - 10

Reference Method: SM 4500 F-C-97
Batch ID: P372634

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2125300	Fluoride	0.474	Spike	P	0 - 2.5

Reference Method: SM 5310 B-00
Batch ID: P372520

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2126066	Organic Carbon	0.619	Spike	P	0 - 20

* Sample, spike and/or laboratory control sample precision (LCS) is reported.

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A94801

Included Lab Sample IDs: 2126084, 2126087

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	98.5	97.0	P/P	90 - 110

Reference Method: SM 2120 B

Run ID: A94804

Included Lab Sample IDs: 2126082, 2126085

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	100	101	P/P	90 - 115
Color (true)	101	101	P/P	90 - 115

Reference Method: EPA 180.1 Rev. 2.0

Run ID: A94821

Included Lab Sample IDs: 2126082, 2126085

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

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A94854

Included Lab Sample IDs: 2126083, 2126086

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

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A94867

Included Lab Sample IDs: 2126102

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Barium	99.5	100	P/P	90 - 110
Calcium	98.7	96.6	P/P	90 - 110
Iron	100	100	P/P	90 - 110
Magnesium	99.0	98.7	P/P	90 - 110
Potassium	99.1	99.6	P/P	90 - 110
Sodium	101	102	P/P	90 - 110
Zinc	97.5	98.7	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A94868

Included Lab Sample IDs: 2126083

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

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A94903

Included Lab Sample IDs: 2126083, 2126086

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	99.1	98.0	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A94934

Included Lab Sample IDs: 2126083, 2126086

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	105	103	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A94935

Included Lab Sample IDs: 2126086

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

Reference Method: SM 5310 B-00

Run ID: A94976

Included Lab Sample IDs: 2126083, 2126086

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	102	95.6	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1

Run ID: A95003

Included Lab Sample IDs: 2126082, 2126085

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

Reference Method: EPA 300.0 Rev. 2.1 dissolved

Run ID: A95003

Included Lab Sample IDs: 2126084, 2126087

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

Reference Method: SM 2320 B-97

Run ID: A95018

Included Lab Sample IDs: 2126082, 2126085

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	105	101	P/P	90 - 110

Reference Method: SM 4500 F-C-97

Run ID: A95018

Included Lab Sample IDs: 2126082, 2126085

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	98.1	98.5	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A95182

Included Lab Sample IDs: 2126102

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	100	100	P/P	90 - 110
Antimony	98.9	100	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A95182

Included Lab Sample IDs: 2126102

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	100	101	P/P	90 - 110
Boron	102	102	P/P	90 - 110
Cadmium	99.6	101	P/P	90 - 110
Lead	99.1	99.5	P/P	90 - 110
Nickel	98.0	98.1	P/P	90 - 110
Selenium	100	101	P/P	90 - 110
Silver	97.8	98.2	P/P	90 - 110
Thallium	96.2	96.5	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A95228

Included Lab Sample IDs: 2126102

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chromium	93.4	93.0	P/P	90 - 110
Copper	92.9	93.7	P/P	90 - 110

* Pass/Fail determinations are made for each bracketing calibration verification check.

Control limits for initial calibration checks may be different from those for continuing checks, depending on method requirements.

Where they are different, both control limits are provided.

Quality Assurance Report Summary

Ref. Method	Analyte	LCS % Recovery	MS % Recovery			Precision SMP	MS
			LCS				
EPA 180.1 Rev. 2.0	Turbidity					3.11	
EPA 200.7 Rev. 4.4	Barium	99.5	99.1	99.2	96.2		0.0817
	Calcium	103	102	100	95.8		0.862
	Iron	100	101	101	99.8		0.126
	Magnesium	107	106	105	99.8		0.505
	Potassium	99.3	104	103	97.2		0.607
	Sodium	101	97.1	95.5	97.5		1.19
	Zinc	95.9	96.4	96.4	94.0		0.0442
EPA 200.8 Rev. 5.4	Aluminum	98.8	100	100	99.7		0.125
	Antimony	98.7	102	100	105		1.08
	Arsenic	96.0	99.4	98.8	102		0.660
	Boron	98.0	103	102	100		0.893
	Cadmium	92.0	96.6	94.7	97.0		1.93
	Chromium	102	93.8	94.4	94.6		0.645
	Copper	101	95.7	95.8	69.6		0.118
	Lead	98.9	100	99.1	101		1.15
	Nickel	96.1	95.8	95.1	88.8		0.721
	Selenium	89.7	97.1	95.2	96.2		2.02
	Silver	96.7	99.0	98.3	97.6		0.761
	Thallium	103	103	103	105		0.139
EPA 300.0 Rev. 2.1	Chloride	102	101	103		1.37	
EPA 300.0 Rev. 2.1 dissolved	Sulfate	101	98.3	100	98.4		1.74
EPA 350.1 Rev. 2.0	Ammonia-N	100	100	99.7			0.579
	Ammonia-N	98.6	97.2	96.8			0.426
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	99.2	96.4	102			4.98
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	102	104	102			1.46
EPA 365.1 Rev. 2.0	Total-P	99.6	98.3	100			1.56
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	104	100	101			1.09
SM 2120 B	Color (true)	99.2				5.78	
	Color (true)	99.8				2.02	
SM 2320 B-97	Total Alkalinity	104				0.0264	
SM 2540 C-97	TDS					2.46	
	TDS					2.92	
SM 4500 F-C-97	Fluoride	94.5	94.4	93.9			0.474
SM 5310 B-00	Organic Carbon	95.2	96.0	95.2			0.619

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	2126082, 2126085
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2126102
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2126102
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	2126082, 2126085
EPA 300.0 Rev. 2.1 dissolved / E31780	Sulfate, dissolved, in filtered, aqueous matrices	2126084, 2126087
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	2126083, 2126086
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	2126083, 2126086
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	2126083, 2126086

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	2126083, 2126086
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2126084, 2126087
SM 2120 B / E31780	True Color measured at 450 nm	2126082, 2126085
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO ₃ /L	2126082, 2126085
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	2126082, 2126085
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2126082, 2126085
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2126082, 2126085
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	2126083, 2126086

Preparation and Analysis Log

Ref. Method	Received Date	Prep Date/Time	Prepared By	Analysis Date/Time	Analyzed By	Associated Samples
EPA 180.1 Rev. 2.0	10/08/2019			10/08/2019 17:21	Rosalyn Ballman	2126082, 2126085
EPA 200.7 Rev. 4.4	10/08/2019	10/09/2019 16:55	Elliott D. Healy	10/10/2019 18:39	Betina Topolski	2126102
EPA 200.8 Rev. 5.4	10/08/2019	10/09/2019 16:55	Elliott D. Healy	10/22/2019 19:38	Robert K Palmer	2126102
	10/08/2019	10/09/2019 16:55	Elliott D. Healy	10/24/2019 17:37	Robert K Palmer	2126102
EPA 300.0 Rev. 2.1	10/08/2019			10/15/2019 09:58	Jhamieka S. Greenwood	2126082
	10/08/2019			10/15/2019 10:10	Jhamieka S. Greenwood	2126085
EPA 300.0 Rev. 2.1 dissolved	10/08/2019			10/17/2019 01:03	Jhamieka S. Greenwood	2126084
	10/08/2019			10/17/2019 01:15	Jhamieka S. Greenwood	2126087
EPA 350.1 Rev. 2.0	10/08/2019			10/10/2019 15:22	Ping Hua	2126083
	10/08/2019			10/11/2019 15:09	Ping Hua	2126086
EPA 351.2 Rev. 2.0	10/08/2019	10/10/2019 11:40	Sima Feizi	10/11/2019 13:31	Jhamieka S. Greenwood	2126083
	10/08/2019	10/10/2019 11:40	Sima Feizi	10/11/2019 13:32	Jhamieka S. Greenwood	2126086
EPA 353.2 Rev. 2.0	10/08/2019			10/10/2019 11:21	Beverly Y. Sanders	2126083
	10/08/2019			10/10/2019 11:22	Beverly Y. Sanders	2126086
EPA 365.1 Rev. 2.0	10/08/2019	10/10/2019 14:40	Lipi Saha	10/14/2019 12:26	Rosalyn Ballman	2126083
	10/08/2019	10/10/2019 14:40	Lipi Saha	10/14/2019 12:27	Rosalyn Ballman	2126086
EPA 365.1 Rev. 2.0 dissolved	10/08/2019			10/08/2019 16:05	Julia Storbeck	2126084
	10/08/2019			10/08/2019 16:06	Julia Storbeck	2126087
SM 2120 B	10/08/2019			10/08/2019 16:35	Madeline Funaro	2126082
	10/08/2019			10/08/2019 16:40	Madeline Funaro	2126085
SM 2320 B-97	10/08/2019			10/12/2019 10:40	Dale L. Simmons	2126082
	10/08/2019			10/12/2019 10:52	Dale L. Simmons	2126085
SM 2540 C-97	10/08/2019			10/09/2019 13:46	Yijie Li	2126082, 2126085
SM 2540 D-97	10/08/2019			10/09/2019 13:46	Yijie Li	2126082, 2126085
SM 4500 F-C-97	10/08/2019			10/12/2019 10:40	Dale L. Simmons	2126082
	10/08/2019			10/12/2019 10:52	Dale L. Simmons	2126085
SM 5310 B-00	10/08/2019			10/12/2019 02:55	Madeline Funaro	2126083
	10/08/2019			10/12/2019 03:11	Madeline Funaro	2126086