Chemical Analysis Report

WAS-SECT-2018-10-03-01

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

Event Description: **Group 2 LVI**
Request ID: **RQ-2018-10-01-20**
Customer: **WAS-SECT**
Project ID: **SMP**

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Certified by: Colin Wright, Program Administrator

Date Certified: 31-OCT-2018 10:20

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 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: Little River 100 Meters upstream of US 90 **Collection Date/Time: 10/03/2018 11:30**

Field ID: G1WA0073 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2030830	EPA 180.1 Rev. 2.0	Turbidity	17	A	NTU	P352808	
	EPA 300.0 Rev. 2.1	Chloride	7.3		mg Cl/L	P353433	
		Sulfate	1.3		mg SO4/L	P353438	
	SM 2120 B	Color (true)	52	A	PCU	P352755	
	SM 2320 B-97	Total Alkalinity	21		mg CaCO3/L	P353024	RPD
	SM 2540 C-97	TDS	70		mg/L	P353109	
	SM 2540 D-97	TSS	12		mg/L	P353126	
	SM 4500 F-C-97	Fluoride	0.095	I	mg F/L	P353027	
2030832	EPA 350.1 Rev. 2.0	Ammonia-N	0.017		mg N/L	P353410	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.55		mg N/L	P352935	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.71		mg N/L	P352957	
	EPA 365.1 Rev. 2.0	Total-P	0.11		mg P/L	P352849	
	SM 5310 B-00	Organic Carbon	7.4		mg C/L	P352969	
2030834	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.045		mg P/L	P352711	
2030840	EPA 200.7 Rev. 4.4	Calcium	6.24		mg/L	P352944	
		Chromium	1.0	U	ug/L	P352944	
		Iron	1.58E+03		ug/L	P352944	
		Magnesium	2.62		mg/L	P352944	
		Nickel	2.0	U	ug/L	P352944	
		Potassium	1.6		mg/L	P352944	
		Sodium	5.2		mg/L	P352944	
		Zinc	5.0	U	ug/L	P352944	
	EPA 200.8 Rev. 5.4	Arsenic	0.95		ug/L	P352944	
		Cadmium	0.020	U	ug/L	P352944	
		Copper	1.06		ug/L	P353601	
		Lead	0.50		ug/L	P352944	
		Silver	0.010	U	ug/L	P352944	

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: Lake Monkey Business Middle **Collection Date/Time: 10/03/2018 10:00**

Field ID: G1WA0036 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2030831	EPA 180.1 Rev. 2.0	Turbidity	4.0		NTU	P352808	
	EPA 300.0 Rev. 2.1	Chloride	5.7		mg Cl/L	P353433	
		Sulfate	0.51	I	mg SO4/L	P353438	
	SM 2120 B	Color (true)	9.5		PCU	P352755	
	SM 2320 B-97	Total Alkalinity	26		mg CaCO3/L	P353024	RPD
	SM 2540 C-97	TDS	41		mg/L	P353109	
	SM 2540 D-97	TSS	5	I	mg/L	P353126	
	SM 4500 F-C-97	Fluoride	0.058	I	mg F/L	P353027	
2030833	EPA 350.1 Rev. 2.0	Ammonia-N	0.004	I	mg N/L	P353410	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.61		mg N/L	P352935	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P352957	
	EPA 365.1 Rev. 2.0	Total-P	0.034		mg P/L	P352849	
	SM 5310 B-00	Organic Carbon	4.1		mg C/L	P352969	
2030835	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P352711	
2030841	EPA 200.7 Rev. 4.4	Calcium	7.37		mg/L	P352944	
		Chromium	1.0	U	ug/L	P352944	
		Iron	360		ug/L	P352944	
		Magnesium	2.32		mg/L	P352944	
		Nickel	2.0	U	ug/L	P352944	
		Potassium	1.4		mg/L	P352944	
		Sodium	3.0		mg/L	P352944	
		Zinc	5.0	U	ug/L	P352944	
	EPA 200.8 Rev. 5.4	Arsenic	0.51		ug/L	P352944	
		Cadmium	0.020	U	ug/L	P352944	
		Copper	0.23	I	ug/L	P353601	
		Lead	0.050	U	ug/L	P352944	
		Silver	0.010	U	ug/L	P352944	

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: P352808

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P352944

Component	Result	Code	Units
Calcium	0.075	U	mg/L
Chromium	1.0	U	ug/L
Iron	30	U	ug/L
Magnesium	0.040	U	mg/L
Nickel	2.0	U	ug/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: P352944

Component	Result	Code	Units
Arsenic	0.050	U	ug/L
Cadmium	0.020	U	ug/L
Lead	0.050	U	ug/L
Silver	0.010	U	ug/L

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P353601

Component	Result	Code	Units
Copper	0.20	U	ug/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P353433

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P353438

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P353410

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P352935

Component	Result	Code	Units

Quality Assurance Report
Method Blank Results

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P352935

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P352957

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P352849

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P352711

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

Reference Method: SM 2120 B
Batch ID: P352755

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-97
Batch ID: P353024

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

Reference Method: SM 2540 C-97
Batch ID: P353109

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P353126

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P353027

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Quality Assurance Report
Method Blank Results

Reference Method: SM 5310 B-00
Batch ID: P352969

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: P352944

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	104		P	85 - 115
Chromium	101		P	85 - 115
Iron	101		P	85 - 115
Magnesium	104		P	85 - 115
Nickel	96.0		P	85 - 115
Potassium	95.3		P	85 - 115
Sodium	96.0		P	85 - 115
Zinc	97.2		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P352944

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Arsenic	100		P	85 - 115
Cadmium	103		P	85 - 115
Lead	92.2		P	85 - 115
Silver	97.2		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P353601

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Copper	96.0		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P353433

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P353438

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P353410

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P352935

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P352957

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P352957

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P352849

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P352711

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

Reference Method: SM 2120 B
Batch ID: P352755

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

Reference Method: SM 2320 B-97
Batch ID: P353024

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	104		P	98 - 107

Reference Method: SM 4500 F-C-97
Batch ID: P353027

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	98.5		P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P352969

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	93.7		P	85 - 115

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P352944

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2030652	Calcium	106		P	80 - 120
2030652	Chromium	100		P	80 - 120
2030652	Iron	104		P	80 - 120
2030652	Magnesium	107		P	80 - 120
2030652	Nickel	96.0		P	80 - 120
2030652	Potassium	101		P	80 - 120
2030652	Sodium	92.2		P	80 - 120
2030652	Zinc	98.5		P	80 - 120
2031012	Calcium	106	104	P/P	80 - 120
2031012	Chromium	99.4	99.3	P/P	80 - 120
2031012	Iron	103	102	P/P	80 - 120
2031012	Magnesium	105	104	P/P	80 - 120
2031012	Nickel	94.7	94.3	P/P	80 - 120
2031012	Potassium	97.9	97.0	P/P	80 - 120
2031012	Sodium	94.0		P	80 - 120
2031012	Zinc	99.3	98.8	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P352944

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2030652	Arsenic	101		P	80 - 120
2030652	Cadmium	103		P	80 - 120
2030652	Lead	92.0		P	80 - 120
2030652	Silver	95.8		P	80 - 120
2031012	Arsenic	101	99.6	P/P	80 - 120
2031012	Cadmium	103	105	P/P	80 - 120
2031012	Lead	91.8	90.7	P/P	80 - 120
2031012	Silver	96.4	94.8	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P353601

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2034803	Copper	96.6	97.6	P/P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P353433

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2030819	Chloride	94.0		P	90 - 110
2031059	Chloride	95.4		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P353438

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2030819	Sulfate	95.5		P	90 - 110
2031059	Sulfate	96.2		P	90 - 110

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P353410

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2030833	Ammonia-N	97.6	99.2	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P352935

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2030803	Kjeldahl Nitrogen	98.6	106	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P352957

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2030803	NO2NO3-N	99.8	101	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P352849

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2030833	Total-P	106	103	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P352711

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2030806	O-Phosphate-P	99.6	101	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Batch ID: P353027

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2031038	Fluoride	97.4	98.0	P/P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P352969

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2030791	Organic Carbon	96.4	97.3	P/P	85 - 115

Quality Assurance Report
Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P352808

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2030830	Turbidity	4.76	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P352944

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2031012	Calcium	1.62	Spike	P	0 - 20
2031012	Chromium	0.145	Spike	P	0 - 20
2031012	Iron	0.933	Spike	P	0 - 20
2031012	Magnesium	1.38	Spike	P	0 - 20
2031012	Nickel	0.420	Spike	P	0 - 20
2031012	Potassium	0.919	Spike	P	0 - 20
2031012	Sodium	0.452	Spike	P	0 - 20
2031012	Zinc	0.578	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P352944

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2031012	Arsenic	1.17	Spike	P	0 - 20
2031012	Cadmium	1.55	Spike	P	0 - 20
2031012	Lead	1.13	Spike	P	0 - 20
2031012	Silver	1.71	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P353601

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2034803	Copper	0.975	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P353433

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2030819	Chloride	0.206	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P353438

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2030819	Sulfate	0.244	Sample	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P353410

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2030833	Ammonia-N	1.47	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P352935

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2030803	Kjeldahl Nitrogen	5.95	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P352957

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2030803	NO2NO3-N	0.909	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P352849

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2030833	Total-P	2.20	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P352711

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2030806	O-Phosphate-P	1.10	Spike	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P352755

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2030830	Color (true)	0.0386	Sample	P	0 - 20

Reference Method: SM 2320 B-97
Batch ID: P353024

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2031038	Total Alkalinity	2.00	Sample	F	0 - 1.6

Reference Method: SM 2540 C-97
Batch ID: P353109

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2030761	TDS	5.21	Sample	P	0 - 10

Quality Assurance Report
Precision

Reference Method: SM 4500 F-C-97
Batch ID: P353027

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2031038	Fluoride	0.473	Spike	P	0 - 3.5

Reference Method: SM 5310 B-00
Batch ID: P352969

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2030791	Organic Carbon	0.929	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 365.1 Rev. 2.0 dissolved
Run ID: A86891
Included Lab Sample IDs: 2030834, 2030835

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.6	100	P/P	90 - 110

Reference Method: SM 2120 B
Run ID: A86905
Included Lab Sample IDs: 2030831

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

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A86923
Included Lab Sample IDs: 2030830, 2030831

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	102	102	P/P	95 - 105

Reference Method: SM 2120 B
Run ID: A86939
Included Lab Sample IDs: 2030830

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	101	104	P/P	90 - 115

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A86973
Included Lab Sample IDs: 2030833

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	99.8	101	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A86975
Included Lab Sample IDs: 2030832

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	104	106	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A86985
Included Lab Sample IDs: 2030832, 2030833

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

Reference Method: SM 5310 B-00
Run ID: A86987
Included Lab Sample IDs: 2030832, 2030833

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	96.5	96.6	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: SM 2320 B-97
Run ID: A87013
Included Lab Sample IDs: 2030830, 2030831

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: A87013
Included Lab Sample IDs: 2030830, 2030831

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

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A87045
Included Lab Sample IDs: 2030832, 2030833

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	94.4	92.8	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A87105
Included Lab Sample IDs: 2030830, 2030831

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	94.8	95.7	P/P	90 - 110
Sulfate	93.7	95.1	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A87161
Included Lab Sample IDs: 2030840, 2030841

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	99.5	99.5	P/P	90 - 110
Cadmium	103	103	P/P	90 - 110
Lead	97.6	98.7	P/P	90 - 110
Silver	94.5	95.0	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A87185
Included Lab Sample IDs: 2030832, 2030833

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	102	99.5	P/P	90 - 110
Ammonia-N	99.5	99.0	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A87223
Included Lab Sample IDs: 2030840, 2030841

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	103	103	P/P	90 - 110
Calcium	103	103	P/P	90 - 110
Chromium	100	101	P/P	90 - 110
Chromium	101	99.9	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A87223
Included Lab Sample IDs: 2030840, 2030841

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Iron	103	104	P/P	90 - 110
Iron	104	104	P/P	90 - 110
Magnesium	101	102	P/P	90 - 110
Magnesium	102	102	P/P	90 - 110
Nickel	101	99.5	P/P	90 - 110
Nickel	99.8	101	P/P	90 - 110
Potassium	98.6	99.1	P/P	90 - 110
Potassium	99.1	98.6	P/P	90 - 110
Sodium	97.1	97.1	P/P	90 - 110
Sodium	97.3	97.1	P/P	90 - 110
Zinc	100	101	P/P	90 - 110
Zinc	101	99.8	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A87372
Included Lab Sample IDs: 2030840, 2030841

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Copper	95.7	96.4	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		
						LCS	SMP	MS
EPA 180.1 Rev. 2.0	Turbidity						4.76	
EPA 200.7 Rev. 4.4	Calcium	104	106	106	104			1.62
	Chromium	101	100	99.4	99.3			0.145
	Iron	101	104	103	102			0.933
	Magnesium	104	107	105	104			1.38
	Nickel	96.0	96.0	94.7	94.3			0.420
	Potassium	95.3	101	97.9	97.0			0.919
	Sodium	96.0	92.2	94.0				0.452
	Zinc	97.2	98.5	99.3	98.8			0.578
EPA 200.8 Rev. 5.4	Arsenic	100	101	101	99.6			1.17
	Cadmium	103	103	103	105			1.55
	Copper	96.0	96.6	97.6				0.975
	Lead	92.2	92.0	91.8	90.7			1.13
	Silver	97.2	95.8	96.4	94.8			1.71
EPA 300.0 Rev. 2.1	Chloride	99.0	94.0	95.4			0.206	
	Sulfate	98.5	95.5	96.2			0.244	
EPA 350.1 Rev. 2.0	Ammonia-N	99.3	97.6	99.2				1.47
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	106	98.6	106				5.95
EPA 353.2 Rev. 2.0	NO2NO3-N	100	99.8	101				0.909
EPA 365.1 Rev. 2.0	Total-P	104	106	103				2.20
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	102	99.6	101				1.10
SM 2120 B	Color (true)	102					0.0386	
SM 2320 B-97	Total Alkalinity	104					2.00	
SM 2540 C-97	TDS						5.21	
SM 4500 F-C-97	Fluoride	98.5	97.4	98.0				0.473
SM 5310 B-00	Organic Carbon	93.7	96.4	97.3				0.929

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	2030830, 2030831
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2030840, 2030841
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2030840, 2030841
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	2030830, 2030831
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	2030830, 2030831
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	2030832, 2030833
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	2030832, 2030833
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	2030832, 2030833
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	2030832, 2030833
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2030834, 2030835
SM 2120 B / E31780	True Color measured at 450 nm	2030830, 2030831
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO3/L	2030830, 2030831
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	2030830, 2030831
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2030830, 2030831
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2030830, 2030831

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	2030832, 2030833

Preparation and Analysis Log

Ref. Method	Received Date	Prep Date/Time	Prepared By	Analysis Date/Time	Analyzed By	Associated Samples
EPA 180.1 Rev. 2.0	10/03/2018			10/03/2018 16:51	Megan Treadwell	2030830, 2030831
EPA 200.7 Rev. 4.4	10/03/2018	10/08/2018 14:00	Elliott D. Healy	10/23/2018 11:43	Betina Topolski	2030840
	10/03/2018	10/08/2018 14:00	Elliott D. Healy	10/23/2018 12:36	Betina Topolski	2030841
EPA 200.8 Rev. 5.4	10/03/2018	10/08/2018 14:00	Elliott D. Healy	10/18/2018 19:06	Robert K Palmer	2030840
	10/03/2018	10/08/2018 14:00	Elliott D. Healy	10/18/2018 19:15	Robert K Palmer	2030841
	10/03/2018	10/24/2018 15:15	Elliott D. Healy	10/29/2018 19:09	Robert K Palmer	2030840
	10/03/2018	10/24/2018 15:15	Elliott D. Healy	10/29/2018 19:18	Robert K Palmer	2030841
EPA 300.0 Rev. 2.1	10/03/2018			10/19/2018 14:23	Lipi Saha	2030830
	10/03/2018			10/19/2018 14:35	Lipi Saha	2030831
EPA 350.1 Rev. 2.0	10/03/2018			10/18/2018 14:25	Ping Hua	2030833
	10/03/2018			10/18/2018 14:35	Ping Hua	2030832
EPA 351.2 Rev. 2.0	10/03/2018	10/08/2018 11:45	Adrian Shelby	10/16/2018 10:25	Joseph Suarez	2030832
	10/03/2018	10/08/2018 11:45	Adrian Shelby	10/16/2018 10:27	Joseph Suarez	2030833
EPA 353.2 Rev. 2.0	10/03/2018			10/08/2018 12:58	Lauren Bottorf	2030832
	10/03/2018			10/08/2018 12:59	Lauren Bottorf	2030833
EPA 365.1 Rev. 2.0	10/03/2018	10/05/2018 13:35	Sima Feizi	10/08/2018 09:33	Beverly Y. Sanders	2030832
	10/03/2018	10/05/2018 13:35	Sima Feizi	10/08/2018 11:09	Beverly Y. Sanders	2030833
EPA 365.1 Rev. 2.0 dissolved	10/03/2018			10/03/2018 17:44	Julia Storbeck	2030834, 2030835
SM 2120 B	10/03/2018			10/03/2018 16:02	Chelsea Hernandez	2030831
	10/03/2018			10/03/2018 17:56	Chelsea Hernandez	2030830
SM 2320 B-97	10/03/2018			10/09/2018 13:54	Dale L. Simmons	2030830
	10/03/2018			10/09/2018 14:04	Dale L. Simmons	2030831
SM 2540 C-97	10/03/2018			10/05/2018 16:36	Yijie Li	2030830, 2030831
SM 2540 D-97	10/03/2018			10/05/2018 16:36	Yijie Li	2030830, 2030831
SM 4500 F-C-97	10/03/2018			10/09/2018 13:54	Dale L. Simmons	2030830
	10/03/2018			10/09/2018 14:04	Dale L. Simmons	2030831
SM 5310 B-00	10/03/2018			10/06/2018 08:42	Megan Treadwell	2030832
	10/03/2018			10/06/2018 08:54	Megan Treadwell	2030833