

Chemical Analysis Report

SE-DIST-2019-03-20-01

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

Event Description: **SMP-PSL**
Request ID: **RQ-2019-03-04-72**
Customer: **SE-DIST**
Project ID: **SMP**

Send Reports to:
FL Dept. of Environmental Protection
FL Dept. of Environmental Protection
2199 South Rock Road
Fort Pierce, FL 34945
Attn: Matthew Sewell

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

Certified by: Liang Lin, Environmental Administrator

Date Certified: 09-APR-2019 11:05

A handwritten signature in black ink, appearing to read "Liang Lin", 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: WARNER CREEK @ JENSEN BEACH
ELEMENTARY**

Collection Date/Time: 03/19/2019 13:45

Field ID: G2SE0051

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2071282	EPA 180.1 Rev. 2.0	Turbidity	23	A	NTU	P360790	
	EPA 300.0 Rev. 2.1	Chloride	52	A	mg Cl/L	P361126	
		Sulfate	11	A	mg SO4/L	P361128	
	SM 2120 B	Color (true)	81		PCU	P360826	
	SM 2320 B-97	Total Alkalinity	73		mg CaCO3/L	P361243	
	SM 2540 C-97	TDS	209		mg/L	P361340	
	SM 2540 D-97	TSS	19		mg/L	P361351	
	SM 4500 F-C-97	Fluoride	0.035	U	mg F/L	P361247	
2071283	EPA 350.1 Rev. 2.0	Ammonia-N	0.13		mg N/L	P361179	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.3		mg N/L	P360913	MS
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.033		mg N/L	P360963	
	EPA 365.1 Rev. 2.0	Total-P	0.080		mg P/L	P361119	
	SM 5310 B-00	Organic Carbon	24		mg C/L	P361060	
2071284	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P360796	
2071292	EPA 200.7 Rev. 4.4	Barium	8.3		ug/L	P360846	
		Calcium	32.2		mg/L	P360846	
		Iron	320		ug/L	P360846	
		Magnesium	2.16		mg/L	P360846	
		Potassium	2.4		mg/L	P360846	
		Sodium	30.8		mg/L	P360846	
		Zinc	17	I	ug/L	P360846	
	EPA 200.8 Rev. 5.4	Aluminum	677		ug/L	P360846	
		Antimony	0.11	I	ug/L	P360846	
		Arsenic	0.56		ug/L	P360846	
		Boron**	43.3		ug/L	P360846	
		Cadmium	0.020	U	ug/L	P360846	
		Chromium	1.7		ug/L	P360846	
		Copper	1.29		ug/L	P360846	
		Lead	0.85		ug/L	P360846	
		Nickel	0.50	U	ug/L	P360846	
		Selenium	0.20	U	ug/L	P360846	
		Silver	0.010	U	ug/L	P360846	
		Thallium	0.10	U	ug/L	P360846	

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: C-24 CANAL @ PSL

Collection Date/Time: 03/19/2019 14:30

Field ID: G2SE0011

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2071285	EPA 180.1 Rev. 2.0	Turbidity	3.7		NTU	P360790	
	EPA 300.0 Rev. 2.1	Chloride	360		mg Cl/L	P361126	
		Sulfate	82		mg SO4/L	P361128	
	SM 2120 B	Color (true)	45		PCU	P360823	
	SM 2320 B-97	Total Alkalinity	163		mg CaCO3/L	P361243	
	SM 2540 C-97	TDS	888		mg/L	P361340	
	SM 2540 D-97	TSS	6	I	mg/L	P361351	
	SM 4500 F-C-97	Fluoride	0.33		mg F/L	P361247	
2071286	EPA 350.1 Rev. 2.0	Ammonia-N	0.008		mg N/L	P361179	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.82		mg N/L	P360913	MS
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.007	I	mg N/L	P360963	
	EPA 365.1 Rev. 2.0	Total-P	0.077		mg P/L	P361119	
	SM 5310 B-00	Organic Carbon	13		mg C/L	P361060	
2071287	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.022		mg P/L	P360796	
2071293	EPA 200.7 Rev. 4.4	Barium	35.9		ug/L	P360846	
		Calcium	89.2		mg/L	P360846	
		Iron	190		ug/L	P360846	
		Magnesium	29.2		mg/L	P360846	
		Potassium	7.2		mg/L	P360846	
		Sodium	164		mg/L	P360846	
		Zinc	5.0	U	ug/L	P360846	
	EPA 200.8 Rev. 5.4	Aluminum	76		ug/L	P360846	
		Antimony	0.12	I	ug/L	P360846	
		Arsenic	1.21		ug/L	P360846	
		Boron**	74.1		ug/L	P360846	
		Cadmium	0.020	U	ug/L	P360846	
		Chromium	0.40	U	ug/L	P360846	
		Copper	1.77		ug/L	P360846	
		Lead	0.20	U	ug/L	P360846	
		Nickel	0.50	U	ug/L	P360846	
		Selenium	0.22	I	ug/L	P360846	
		Silver	0.010	U	ug/L	P360846	
		Thallium	0.10	U	ug/L	P360846	

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: P360790

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P360846

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: P360846

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: P361126

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P361128

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P361179

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

Quality Assurance Report Method Blank Results

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P360913

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P360963

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P361119

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P360796

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

Reference Method: SM 2120 B
Batch ID: P360823

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2120 B
Batch ID: P360826

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-97
Batch ID: P361243

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

Reference Method: SM 2540 C-97
Batch ID: P361340

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P361351

Component	Result	Code	Units
TSS	2	U	mg/L

Quality Assurance Report

Method Blank Results

Reference Method: SM 4500 F-C-97
Batch ID: P361247

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P361060

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: P360846

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Barium	101		P	85 - 115
Calcium	97.3		P	85 - 115
Iron	100		P	85 - 115
Magnesium	105		P	85 - 115
Potassium	98.9		P	85 - 115
Sodium	97.8		P	85 - 115
Zinc	101		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P360846

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	95.1		P	85 - 115
Antimony	94.8		P	85 - 115
Arsenic	100		P	85 - 115
Boron	93.0		P	85 - 115
Cadmium	95.3		P	85 - 115
Chromium	90.6		P	85 - 115
Copper	96.7		P	85 - 115
Lead	92.5		P	85 - 115
Nickel	96.6		P	85 - 115
Selenium	102		P	85 - 115
Silver	101		P	85 - 115
Thallium	97.5		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P361126

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P361128

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P361179

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P360913

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

Quality Assurance Report

Laboratory Control Sample Accuracy

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P360963

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P361119

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total-P	96.8		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P360796

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	99.4		P	90 - 110

Reference Method: SM 2120 B
Batch ID: P360823

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

Reference Method: SM 2120 B
Batch ID: P360826

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	104		P	85 - 115

Reference Method: SM 2320 B-97
Batch ID: P361243

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	105		P	98 - 107

Reference Method: SM 4500 F-C-97
Batch ID: P361247

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

Reference Method: SM 5310 B-00
Batch ID: P361060

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	95.8		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P360846

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2071118	Barium	97.5		P	80 - 120
2071118	Calcium	98.3		P	80 - 120
2071118	Iron	97.7		P	80 - 120
2071118	Magnesium	96.6		P	80 - 120
2071118	Potassium	97.9		P	80 - 120
2071118	Sodium	96.9		P	80 - 120
2071118	Zinc	98.1		P	80 - 120
2071273	Barium	100	96.4	P/P	80 - 120
2071273	Calcium	97.3		P	80 - 120
2071273	Iron	100	98.2	P/P	80 - 120
2071273	Magnesium	102	97.8	P/P	80 - 120
2071273	Potassium	99.4	97.6	P/P	80 - 120
2071273	Sodium	95.7		P	80 - 120
2071273	Zinc	104	99.8	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P360846

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2071118	Aluminum	95.2		P	80 - 120
2071118	Antimony	97.7		P	80 - 120
2071118	Arsenic	99.1		P	80 - 120
2071118	Boron	96.7		P	80 - 120
2071118	Cadmium	98.9		P	80 - 120
2071118	Chromium	90.8		P	80 - 120
2071118	Copper	91.5		P	80 - 120
2071118	Lead	95.4		P	80 - 120
2071118	Nickel	92.0		P	80 - 120
2071118	Selenium	97.9		P	80 - 120
2071118	Silver	100		P	80 - 120
2071118	Thallium	102		P	80 - 120
2071273	Aluminum	95.5	93.3	P/P	80 - 120
2071273	Antimony	97.7	94.4	P/P	80 - 120
2071273	Arsenic	99.3	95.9	P/P	80 - 120
2071273	Boron	97.1	94.9	P/P	80 - 120
2071273	Cadmium	99.0	95.9	P/P	80 - 120
2071273	Chromium	92.3	90.0	P/P	80 - 120
2071273	Copper	94.8	91.7	P/P	80 - 120
2071273	Lead	97.0	94.3	P/P	80 - 120
2071273	Nickel	96.3	94.7	P/P	80 - 120
2071273	Selenium	99.4	92.8	P/P	80 - 120
2071273	Silver	101	103	P/P	80 - 120
2071273	Thallium	102	100	P/P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P361126

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2071282	Chloride	98.0		P	90 - 110
2071499	Chloride	99.1		P	90 - 110

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P361128

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2071282	Sulfate	101		P	90 - 110
2071499	Sulfate	99.2		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P361179

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2071252	Ammonia-N	109	108	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P360913

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2071252	Kjeldahl Nitrogen	89.1	87.2	F/F	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P360963

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2071253	NO2NO3-N	96.8	97.3	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P361119

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2071261	Total-P	102	94.8	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P360796

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2071256	O-Phosphate-P	96.2	97.5	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Batch ID: P361247

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2071227	Fluoride	97.3	97.3	P/P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P361060

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2071261	Organic Carbon	99.6	99.8	P/P	85 - 115

Quality Assurance Report Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P360790

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2071282	Turbidity	0.881	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P360846

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2071273	Barium	3.89	Spike	P	0 - 20
2071273	Calcium	2.55	Spike	P	0 - 20
2071273	Iron	1.63	Spike	P	0 - 20
2071273	Magnesium	2.39	Spike	P	0 - 20
2071273	Potassium	1.45	Spike	P	0 - 20
2071273	Sodium	1.50	Spike	P	0 - 20
2071273	Zinc	4.45	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P360846

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2071273	Aluminum	2.15	Spike	P	0 - 20
2071273	Antimony	3.45	Spike	P	0 - 20
2071273	Arsenic	3.41	Spike	P	0 - 20
2071273	Boron	1.73	Spike	P	0 - 20
2071273	Cadmium	3.18	Spike	P	0 - 20
2071273	Chromium	2.58	Spike	P	0 - 20
2071273	Copper	2.47	Spike	P	0 - 20
2071273	Lead	2.78	Spike	P	0 - 20
2071273	Nickel	1.70	Spike	P	0 - 20
2071273	Selenium	6.86	Spike	P	0 - 20
2071273	Silver	2.23	Spike	P	0 - 20
2071273	Thallium	1.76	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P361126

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2071282	Chloride	0.425	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P361128

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2071282	Sulfate	0.294	Sample	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P361179

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2071252	Ammonia-N	0.143	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P360913

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2071252	Kjeldahl Nitrogen	1.14	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P360963

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2071253	NO2NO3-N	0.396	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P361119

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2071261	Total-P	6.30	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P360796

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2071256	O-Phosphate-P	1.19	Spike	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P360823

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2071243	Color (true)	0.104	Sample	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P360826

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2071516	Color (true)	1.31	Sample	P	0 - 20

Reference Method: SM 2320 B-97
Batch ID: P361243

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2071227	Total Alkalinity	0.471	Sample	P	0 - 1.6

Quality Assurance Report Precision

Reference Method: SM 2540 C-97
Batch ID: P361340

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2071260	TDS	1.78	Sample	P	0 - 10

Reference Method: SM 4500 F-C-97
Batch ID: P361247

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2071227	Fluoride	0.0	Spike	P	0 - 3.5

Reference Method: SM 5310 B-00
Batch ID: P361060

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2071261	Organic Carbon	0.0623	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: A90130

Included Lab Sample IDs: 2071282, 2071285

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A90131

Included Lab Sample IDs: 2071284, 2071287

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.3	99.0	P/P	90 - 110

Reference Method: SM 2120 B

Run ID: A90152

Included Lab Sample IDs: 2071282, 2071285

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	103	103	P/P	90 - 115
Color (true)	104	104	P/P	90 - 115

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A90208

Included Lab Sample IDs: 2071292, 2071293

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Barium	99.3	98.9	P/P	90 - 110
Calcium	99.3	98.0	P/P	90 - 110
Iron	98.2	98.6	P/P	90 - 110
Magnesium	98.6	99.1	P/P	90 - 110
Potassium	95.9	96.1	P/P	90 - 110
Sodium	98.0	98.0	P/P	90 - 110
Zinc	100	99.4	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A90215

Included Lab Sample IDs: 2071283, 2071286

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

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A90235

Included Lab Sample IDs: 2071283, 2071286

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	95.7	94.9	P/P	90 - 110

Reference Method: SM 5310 B-00

Run ID: A90238

Included Lab Sample IDs: 2071283, 2071286

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	93.5	94.4	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A90254

Included Lab Sample IDs: 2071292, 2071293

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	98.3	98.3	P/P	90 - 110
Antimony	96.7	97.7	P/P	90 - 110
Arsenic	96.7	97.6	P/P	90 - 110
Boron	99.3	101	P/P	90 - 110
Cadmium	97.6	98.0	P/P	90 - 110
Chromium	98.3	97.8	P/P	90 - 110
Copper	96.2	97.2	P/P	90 - 110
Lead	97.5	98.1	P/P	90 - 110
Nickel	96.4	96.8	P/P	90 - 110
Selenium	97.8	97.1	P/P	90 - 110
Silver	102	102	P/P	90 - 110
Thallium	95.7	94.2	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1

Run ID: A90259

Included Lab Sample IDs: 2071282, 2071285

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	99.4	102	P/P	90 - 110
Sulfate	101	103	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A90288

Included Lab Sample IDs: 2071283, 2071286

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

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A90290

Included Lab Sample IDs: 2071283, 2071286

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

Reference Method: SM 2320 B-97

Run ID: A90311

Included Lab Sample IDs: 2071282, 2071285

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	102	105	P/P	90 - 110
Total Alkalinity	104	102	P/P	90 - 110

Reference Method: SM 4500 F-C-97

Run ID: A90311

Included Lab Sample IDs: 2071282, 2071285

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

Quality Assurance Report

Calibration Verification

* 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					0.881	
EPA 200.7 Rev. 4.4	Barium	101	97.5	100	96.4		3.89
	Calcium	97.3	98.3	97.3			2.55
	Iron	100	97.7	100	98.2		1.63
	Magnesium	105	96.6	102	97.8		2.39
	Potassium	98.9	97.9	99.4	97.6		1.45
	Sodium	97.8	96.9	95.7			1.50
	Zinc	101	98.1	104	99.8		4.45
EPA 200.8 Rev. 5.4	Aluminum	95.1	95.2	95.5	93.3		2.15
	Antimony	94.8	97.7	97.7	94.4		3.45
	Arsenic	100	99.1	99.3	95.9		3.41
	Boron	93.0	96.7	97.1	94.9		1.73
	Cadmium	95.3	98.9	99.0	95.9		3.18
	Chromium	90.6	90.8	92.3	90.0		2.58
	Copper	96.7	91.5	94.8	91.7		2.47
	Lead	92.5	95.4	97.0	94.3		2.78
	Nickel	96.6	92.0	96.3	94.7		1.70
	Selenium	102	97.9	99.4	92.8		6.86
	Silver	101	100	101	103		2.23
	Thallium	97.5	102	102	100		1.76
EPA 300.0 Rev. 2.1	Chloride	101	98.0	99.1		0.425	
	Sulfate	102	101	99.2		0.294	
EPA 350.1 Rev. 2.0	Ammonia-N	102	109	108			0.143
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	98.2	89.1	87.2			1.14
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	98.5	96.8	97.3			0.396
EPA 365.1 Rev. 2.0	Total-P	96.8	102	94.8			6.30
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	99.4	96.2	97.5			1.19
SM 2120 B	Color (true)	102				0.104	
	Color (true)	104				1.31	
SM 2320 B-97	Total Alkalinity	105				0.471	
SM 2540 C-97	TDS					1.78	
SM 4500 F-C-97	Fluoride	101	97.3	97.3			0.0
SM 5310 B-00	Organic Carbon	95.8	99.6	99.8			0.0623

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	2071282, 2071285
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2071292, 2071293
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2071292, 2071293
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	2071282, 2071285
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	2071282, 2071285
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	2071283, 2071286
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	2071283, 2071286
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	2071283, 2071286
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	2071283, 2071286

Reference Method Descriptions

Method / DoH Cert #	Description	<u>Associated Samples</u>
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2071284, 2071287
SM 2120 B / E31780	True Color measured at 450 nm	2071282, 2071285
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO ₃ /L	2071282, 2071285
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	2071282, 2071285
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2071282, 2071285
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2071282, 2071285
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	2071283, 2071286

Preparation and Analysis Log

Ref. Method	Received Date	Prep Date/Time	Prepared By	Analysis Date/Time	Analyzed By	Associated Samples
EPA 180.1 Rev. 2.0	03/20/2019			03/20/2019 16:08	Adrian Shelby	2071282, 2071285
EPA 200.7 Rev. 4.4	03/20/2019	03/21/2019 15:15	Elliott D. Healy	03/22/2019 18:05	Betina Topolski	2071292
	03/20/2019	03/21/2019 15:15	Elliott D. Healy	03/22/2019 18:10	Betina Topolski	2071293
EPA 200.8 Rev. 5.4	03/20/2019	03/21/2019 15:15	Elliott D. Healy	03/26/2019 21:57	Robert K Palmer	2071292
	03/20/2019	03/21/2019 15:15	Elliott D. Healy	03/26/2019 22:06	Robert K Palmer	2071293
EPA 300.0 Rev. 2.1	03/20/2019			03/26/2019 17:01	Lipi Saha	2071282
	03/20/2019			03/26/2019 18:13	Lipi Saha	2071285
EPA 350.1 Rev. 2.0	03/20/2019			03/27/2019 11:55	Ping Hua	2071283
	03/20/2019			03/27/2019 12:16	Ping Hua	2071286
EPA 351.2 Rev. 2.0	03/20/2019	03/22/2019 12:00	Adrian Shelby	03/26/2019 13:04	Joseph Suarez	2071283
	03/20/2019	03/22/2019 12:00	Adrian Shelby	03/26/2019 13:06	Joseph Suarez	2071286
EPA 353.2 Rev. 2.0	03/20/2019			03/22/2019 11:17	Beverly Y. Sanders	2071283
	03/20/2019			03/22/2019 11:18	Beverly Y. Sanders	2071286
EPA 365.1 Rev. 2.0	03/20/2019	03/27/2019 12:00	Adrian Shelby	03/28/2019 10:57	Rosalyn Ballman	2071283
	03/20/2019	03/27/2019 12:00	Adrian Shelby	03/28/2019 10:58	Rosalyn Ballman	2071286
EPA 365.1 Rev. 2.0 dissolved	03/20/2019			03/20/2019 16:23	Julia Storbeck	2071284
	03/20/2019			03/20/2019 16:24	Julia Storbeck	2071287
SM 2120 B	03/20/2019			03/20/2019 16:03	Mariam Hanna	2071285
	03/20/2019			03/20/2019 16:31	Mariam Hanna	2071282
SM 2320 B-97	03/20/2019			03/28/2019 15:47	Dale L. Simmons	2071282
	03/20/2019			03/28/2019 18:16	Dale L. Simmons	2071285
SM 2540 C-97	03/20/2019			03/22/2019 14:59	Yijie Li	2071282, 2071285
SM 2540 D-97	03/20/2019			03/22/2019 14:59	Yijie Li	2071282, 2071285
SM 4500 F-C-97	03/20/2019			03/28/2019 15:47	Dale L. Simmons	2071282
	03/20/2019			03/28/2019 18:16	Dale L. Simmons	2071285
SM 5310 B-00	03/20/2019			03/26/2019 03:26	Julia Storbeck	2071283
	03/20/2019			03/26/2019 03:40	Julia Storbeck	2071286