

Chemical Analysis Report

SO-DIST-2019-03-13-02

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

Event Description: **2019 Continuous Monitoring**

Request ID: **RQ-2019-03-11-63**

Customer: **SO-DIST**

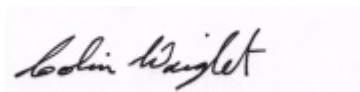
Project ID: **SMP**

Send Reports to:
FL Dept. of Environmental Protection
FLDEP South District Office
2295 Victoria Ave. Suite 364
Fort Myers, FL 33901-3381
Attn: John Barrington

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: Colin Wright, Program Administrator

Date Certified: 26-MAR-2019 11:47

A handwritten signature in black ink, appearing to read "Colin Wright", is shown on a light-colored rectangular 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: ClevelandCemeteryDitch

Collection Date/Time: 03/12/2019 09:10

Field ID: G3SD0076

Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2069396	EPA 180.1 Rev. 2.0	Turbidity	1.0		NTU	P360387	
	SM 2320 B-97	Total Alkalinity	199		mg CaCO3/L	P360896	
	SM 2540 D-97	TSS	2	I	mg/L	P360833	
	SM 4500 F-C-97	Fluoride	0.32		mg F/L	P360903	
2069397	EPA 350.1 Rev. 2.0	Ammonia-N	0.045		mg N/L	P360577	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.96		mg N/L	P360542	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.037		mg N/L	P360663	
	EPA 365.1 Rev. 2.0	Total-P	0.35		mg P/L	P360606	
	SM 5310 B-00	Organic Carbon	19		mg C/L	P360838	
2069398	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.28		mg P/L	P360381	
2069414	EPA 200.7 Rev. 4.4	Iron	190		ug/L	P360652	
		Manganese	18.8		ug/L	P360652	
		Zinc	5.0	U	ug/L	P360652	
	EPA 200.8 Rev. 5.4	Aluminum	35		ug/L	P360652	
		Antimony	0.12	I	ug/L	P360652	
		Arsenic	1.88		ug/L	P360652	
		Cadmium	0.020	U	ug/L	P360652	
		Chromium	0.49	I	ug/L	P360652	
		Copper	0.45	I	ug/L	P360652	
		Lead	0.60	U	ug/L	P360652	
		Nickel	0.50	U	ug/L	P360652	
		Selenium	0.22	I	ug/L	P360652	
		Thallium	0.30	U	ug/L	P360652	

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: Coral Creek (East)

Collection Date/Time: 03/12/2019 10:55

Field ID: G2SD0039

Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2069399	EPA 180.1 Rev. 2.0	Turbidity	2.0		NTU	P360387	
	SM 2320 B-97	Total Alkalinity	139		mg CaCO3/L	P360897	
	SM 2540 D-97	TSS	9	I	mg/L	P360835	
	SM 4500 F-C-97	Fluoride	0.69		mg F/L	P360904	
2069400	EPA 350.1 Rev. 2.0	Ammonia-N	0.008		mg N/L	P360577	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.71		mg N/L	P360542	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P360849	
	EPA 365.1 Rev. 2.0	Total-P	0.039		mg P/L	P360606	
	SM 5310 B-00	Organic Carbon	10		mg C/L	P360840	
2069401	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.011		mg P/L	P360381	
2069415	EPA 200.7 Rev. 4.4	Iron	90	U	ug/L	P360388	
		Manganese	4.5	I	ug/L	P360388	
		Zinc	15	U	ug/L	P360388	
	EPA 200.8 Rev. 5.4	Aluminum	59	I	ug/L	P360388	
		Antimony	0.20	U	ug/L	P360388	
		Arsenic	2.94		ug/L	P360388	
		Cadmium	0.080	U	ug/L	P360388	
		Chromium	4.0	U	ug/L	P360388	
		Copper	1.6	U	ug/L	P360388	
		Lead	0.80	U	ug/L	P360388	
		Nickel	2.0	U	ug/L	P360388	
		Selenium	0.80	U	ug/L	P360388	
		Silver	0.040	U	ug/L	P360388	
		Thallium	1.0	U	ug/L	P360388	

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: P360387

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P360388

Component	Result	Code	Units
Iron	30	U	ug/L
Manganese	1.0	U	ug/L
Zinc	5.0	U	ug/L

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P360652

Component	Result	Code	Units
Iron	30	U	ug/L
Manganese	1.0	U	ug/L
Zinc	5.0	U	ug/L

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P360388

Component	Result	Code	Units
Aluminum	5.0	U	ug/L
Antimony	0.050	U	ug/L
Arsenic	0.050	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 200.8 Rev. 5.4
Batch ID: P360652

Component	Result	Code	Units
Aluminum	5.0	U	ug/L
Antimony	0.050	U	ug/L
Arsenic	0.050	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
Thallium	0.10	U	ug/L

Quality Assurance Report Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P360577

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P360542

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P360663

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P360849

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P360606

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P360381

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

Reference Method: SM 2320 B-97
Batch ID: P360896

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

Reference Method: SM 2320 B-97
Batch ID: P360897

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

Reference Method: SM 2540 D-97
Batch ID: P360833

Component	Result	Code	Units
TSS	2	U	mg/L

Quality Assurance Report

Method Blank Results

Reference Method: SM 2540 D-97
Batch ID: P360835

Component	Result	Code	Units
TSS	3	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P360903

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 4500 F-C-97
Batch ID: P360904

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P360838

Component	Result	Code	Units
Organic Carbon	0.50	U	mg C/L

Reference Method: SM 5310 B-00
Batch ID: P360840

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: P360388

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Iron	109		P	85 - 115
Manganese	101		P	85 - 115
Zinc	100		P	85 - 115

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P360652

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Iron	108		P	85 - 115
Manganese	102		P	85 - 115
Zinc	102		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P360388

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	97.4		P	85 - 115
Antimony	95.6		P	85 - 115
Arsenic	100		P	85 - 115
Cadmium	98.7		P	85 - 115
Chromium	97.8		P	85 - 115
Copper	97.2		P	85 - 115
Lead	97.6		P	85 - 115
Nickel	97.5		P	85 - 115
Selenium	96.5		P	85 - 115
Silver	96.2		P	85 - 115
Thallium	96.4		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P360652

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	96.8		P	85 - 115
Antimony	98.6		P	85 - 115
Arsenic	102		P	85 - 115
Cadmium	99.8		P	85 - 115
Chromium	91.9		P	85 - 115
Copper	98.1		P	85 - 115
Lead	98.3		P	85 - 115
Nickel	98.1		P	85 - 115
Selenium	99.0		P	85 - 115
Thallium	100		P	85 - 115

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P360577

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	99.8		P	90 - 110

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 351.2 Rev. 2.0
 Batch ID: P360542

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

Reference Method: EPA 353.2 Rev. 2.0
 Batch ID: P360663

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

Reference Method: EPA 353.2 Rev. 2.0
 Batch ID: P360849

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: P360606

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: P360381

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	99.5		P	90 - 110

Reference Method: SM 2320 B-97
 Batch ID: P360896

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

Reference Method: SM 2320 B-97
 Batch ID: P360897

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	102		P	98 - 107

Reference Method: SM 4500 F-C-97
 Batch ID: P360903

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	98.1		P	91 - 105

Reference Method: SM 4500 F-C-97
 Batch ID: P360904

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	99.0		P	91 - 105

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: SM 5310 B-00
Batch ID: P360838

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	99.2		P	85 - 115

Reference Method: SM 5310 B-00
Batch ID: P360840

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	98.0		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P360388

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2068917	Iron	107	105	P/P	80 - 120
2068917	Manganese	95.1	97.0	P/P	80 - 120
2068917	Zinc	98.4	98.8	P/P	80 - 120

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P360652

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2069273	Iron	107		P	80 - 120
2069273	Manganese	99.6		P	80 - 120
2069273	Zinc	101		P	80 - 120
2069327	Iron	109	108	P/P	80 - 120
2069327	Manganese	101	100	P/P	80 - 120
2069327	Zinc	100	99.5	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P360388

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2068917	Aluminum	96.9	95.6	P/P	70 - 130
2068917	Antimony	101	99.8	P/P	70 - 130
2068917	Arsenic	110	109	P/P	70 - 130
2068917	Cadmium	98.7	98.5	P/P	70 - 130
2068917	Chromium	88.1	92.5	P/P	70 - 130
2068917	Copper	93.1	92.9	P/P	70 - 130
2068917	Lead	101	101	P/P	70 - 130
2068917	Nickel	94.0	93.2	P/P	70 - 130
2068917	Selenium	82.8	79.7	P/P	70 - 130
2068917	Silver	91.6	90.9	P/P	70 - 130
2068917	Thallium	95.1	94.1	P/P	70 - 130

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P360652

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2069273	Aluminum	100		P	80 - 120
2069273	Antimony	99.3		P	80 - 120
2069273	Arsenic	101		P	80 - 120
2069273	Cadmium	97.8		P	80 - 120
2069273	Chromium	87.2		P	80 - 120
2069273	Copper	95.2		P	80 - 120
2069273	Lead	98.6		P	80 - 120
2069273	Nickel	96.5		P	80 - 120
2069273	Selenium	99.5		P	80 - 120
2069273	Thallium	101		P	80 - 120
2069327	Aluminum	98.7	98.6	P/P	80 - 120
2069327	Antimony	99.2	98.1	P/P	80 - 120
2069327	Arsenic	99.5	99.5	P/P	80 - 120
2069327	Cadmium	99.0	100	P/P	80 - 120
2069327	Chromium	91.4	92.0	P/P	80 - 120
2069327	Copper	94.4	94.7	P/P	80 - 120
2069327	Lead	98.5	97.8	P/P	80 - 120

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P360652

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2069327	Nickel	96.0	95.0	P/P	80 - 120
2069327	Selenium	95.2	97.9	P/P	80 - 120
2069327	Thallium	101	101	P/P	80 - 120

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P360577

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2069208	Ammonia-N	101	102	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P360542

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2069235	Kjeldahl Nitrogen	104	107	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P360663

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2069237	NO2NO3-N	96.2	98.2	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P360849

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2069151	NO2NO3-N	93.2	95.2	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P360606

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2069238	Total-P	104	104	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P360381

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2069401	O-Phosphate-P	95.4	94.3	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Batch ID: P360903

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2069122	Fluoride	99.0	98.3	P/P	91 - 105

Reference Method: SM 4500 F-C-97
Batch ID: P360904

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2069509	Fluoride	96.7	96.7	P/P	91 - 105

Quality Assurance Report Matrix Spike Accuracy

Reference Method: SM 5310 B-00
Batch ID: P360838

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2069352	Organic Carbon	94.7	97.4	P/P	85 - 115

Reference Method: SM 5310 B-00
Batch ID: P360840

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2068810	Organic Carbon	96.8	97.0	P/P	85 - 115

Quality Assurance Report Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P360387

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2069344	Turbidity	10.5	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P360388

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2068917	Iron	1.82	Spike	P	0 - 20
2068917	Manganese	1.97	Spike	P	0 - 20
2068917	Zinc	0.428	Spike	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P360652

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2069327	Iron	1.27	Spike	P	0 - 20
2069327	Manganese	0.381	Spike	P	0 - 20
2069327	Zinc	0.566	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P360388

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2068917	Aluminum	1.36	Spike	P	0 - 20
2068917	Antimony	0.991	Spike	P	0 - 20
2068917	Arsenic	0.317	Spike	P	0 - 20
2068917	Cadmium	0.146	Spike	P	0 - 20
2068917	Chromium	4.86	Spike	P	0 - 20
2068917	Copper	0.227	Spike	P	0 - 20
2068917	Lead	0.122	Spike	P	0 - 20
2068917	Nickel	0.835	Spike	P	0 - 20
2068917	Selenium	3.80	Spike	P	0 - 20
2068917	Silver	0.770	Spike	P	0 - 20
2068917	Thallium	1.00	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P360652

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2069327	Aluminum	0.0910	Spike	P	0 - 20
2069327	Antimony	1.16	Spike	P	0 - 20
2069327	Arsenic	0.0323	Spike	P	0 - 20
2069327	Cadmium	1.09	Spike	P	0 - 20
2069327	Chromium	0.659	Spike	P	0 - 20
2069327	Copper	0.345	Spike	P	0 - 20
2069327	Lead	0.720	Spike	P	0 - 20
2069327	Nickel	1.01	Spike	P	0 - 20
2069327	Selenium	2.76	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P360652

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2069327	Thallium	0.171	Spike	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P360577

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2069208	Ammonia-N	0.997	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P360542

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2069235	Kjeldahl Nitrogen	2.31	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P360663

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2069237	NO2NO3-N	1.99	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P360849

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2069151	NO2NO3-N	2.00	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P360606

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2069238	Total-P	0.144	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P360381

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2069401	O-Phosphate-P	1.04	Spike	P	0 - 20

Reference Method: SM 2320 B-97
Batch ID: P360896

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2069122	Total Alkalinity	0.494	Sample	P	0 - 1.6

Quality Assurance Report Precision

Reference Method: SM 2320 B-97
 Batch ID: P360897

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2069509	Total Alkalinity	0.102	Sample	P	0 - 1.6

Reference Method: SM 4500 F-C-97
 Batch ID: P360903

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2069122	Fluoride	0.470	Spike	P	0 - 3.5

Reference Method: SM 4500 F-C-97
 Batch ID: P360904

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2069509	Fluoride	0.0	Spike	P	0 - 3.5

Reference Method: SM 5310 B-00
 Batch ID: P360838

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2069352	Organic Carbon	1.83	Spike	P	0 - 20

Reference Method: SM 5310 B-00
 Batch ID: P360840

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2068810	Organic Carbon	0.139	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: A89987

Included Lab Sample IDs: 2069398, 2069401

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	97.7	98.9	P/P	90 - 110
O-Phosphate-P	98.9	97.8	P/P	90 - 110

Reference Method: EPA 180.1 Rev. 2.0

Run ID: A89988

Included Lab Sample IDs: 2069396, 2069399

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

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A90026

Included Lab Sample IDs: 2069415

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	97.6	97.3	P/P	90 - 110
Antimony	94.3	94.3	P/P	90 - 110
Arsenic	98.0	98.3	P/P	90 - 110
Cadmium	95.1	95.7	P/P	90 - 110
Copper	97.5	98.3	P/P	90 - 110
Lead	97.8	97.7	P/P	90 - 110
Nickel	96.1	97.3	P/P	90 - 110
Selenium	95.7	96.5	P/P	90 - 110
Silver	93.0	93.4	P/P	90 - 110
Thallium	92.1	90.7	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A90027

Included Lab Sample IDs: 2069415

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Iron	102	101	P/P	90 - 110
Manganese	103	102	P/P	90 - 110
Zinc	100	99.4	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A90052

Included Lab Sample IDs: 2069415

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chromium	95.9	96.0	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A90054

Included Lab Sample IDs: 2069397, 2069400

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	103	101	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A90092

Included Lab Sample IDs: 2069397

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	99.8	99.4	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A90094

Included Lab Sample IDs: 2069397, 2069400

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	101	96.4	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A90095

Included Lab Sample IDs: 2069397

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

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A90103

Included Lab Sample IDs: 2069414

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	103	105	P/P	90 - 110
Antimony	99.8	100	P/P	90 - 110
Arsenic	101	102	P/P	90 - 110
Cadmium	102	101	P/P	90 - 110
Chromium	102	102	P/P	90 - 110
Copper	102	103	P/P	90 - 110
Nickel	102	102	P/P	90 - 110
Selenium	99.4	98.9	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A90113

Included Lab Sample IDs: 2069414

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Iron	102	102	P/P	90 - 110
Manganese	102	102	P/P	90 - 110
Zinc	102	101	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A90137

Included Lab Sample IDs: 2069414

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Lead	99.6	101	P/P	90 - 110
Thallium	93.0	94.5	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: SM 5310 B-00

Run ID: A90156

Included Lab Sample IDs: 2069397, 2069400

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	94.6	95.8	P/P	90 - 110
Organic Carbon	95.9	95.2	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A90160

Included Lab Sample IDs: 2069400

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	98.5	99.0	P/P	90 - 110

Reference Method: SM 2320 B-97

Run ID: A90183

Included Lab Sample IDs: 2069396, 2069399

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	101	103	P/P	90 - 110
Total Alkalinity	103	102	P/P	90 - 110

Reference Method: SM 4500 F-C-97

Run ID: A90183

Included Lab Sample IDs: 2069396, 2069399

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

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A90185

Included Lab Sample IDs: 2069400

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	102	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 SMP	MS
EPA 180.1 Rev. 2.0	Turbidity						10.5	
EPA 200.7 Rev. 4.4	Iron	109	107	105				1.82
	Iron	108	107	109	108			1.27
	Manganese	101	95.1	97.0				1.97
	Manganese	102	99.6	101	100			0.381
	Zinc	100	98.4	98.8				0.428
	Zinc	102	101	100	99.5			0.566
EPA 200.8 Rev. 5.4	Aluminum	97.4	96.9	95.6				1.36
	Aluminum	96.8	100	98.7	98.6			0.0910
	Antimony	95.6	101	99.8				0.991
	Antimony	98.6	99.3	99.2	98.1			1.16
	Arsenic	100	110	109				0.317
	Arsenic	102	101	99.5	99.5			0.0323
	Cadmium	98.7	98.7	98.5				0.146
	Cadmium	99.8	97.8	99.0	100			1.09
	Chromium	97.8	88.1	92.5				4.86
	Chromium	91.9	87.2	91.4	92.0			0.659
	Copper	97.2	93.1	92.9				0.227
	Copper	98.1	95.2	94.4	94.7			0.345
	Lead	97.6	101	101				0.122
	Lead	98.3	98.6	98.5	97.8			0.720
	Nickel	97.5	94.0	93.2				0.835
	Nickel	98.1	96.5	96.0	95.0			1.01
	Selenium	96.5	82.8	79.7				3.80
	Selenium	99.0	99.5	95.2	97.9			2.76
	Silver	96.2	91.6	90.9				0.770
	Thallium	96.4	95.1	94.1				1.00
	Thallium	100	101	101	101			0.171
EPA 350.1 Rev. 2.0	Ammonia-N	99.8	101	102				0.997
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	99.1	104	107				2.31
EPA 353.2 Rev. 2.0	NO2NO3-N	100	96.2	98.2				1.99
	NO2NO3-N	98.5	93.2	95.2				2.00
EPA 365.1 Rev. 2.0	Total-P	100	104	104				0.144
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	99.5	95.4	94.3				1.04
SM 2320 B-97	Total Alkalinity	101					0.494	
	Total Alkalinity	102					0.102	
SM 4500 F-C-97	Fluoride	98.1	99.0	98.3				0.470
	Fluoride	99.0	96.7	96.7				0.0
SM 5310 B-00	Organic Carbon	99.2	94.7	97.4				1.83
	Organic Carbon	98.0	96.8	97.0				0.139

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	2069396, 2069399
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2069414, 2069415
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2069414, 2069415
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	2069397, 2069400
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	2069397, 2069400

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	2069397, 2069400
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	2069397, 2069400
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2069398, 2069401
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO ₃ /L	2069396, 2069399
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2069396, 2069399
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2069396, 2069399
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	2069397, 2069400

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	03/13/2019			03/13/2019 16:52	Adrian Shelby	2069396, 2069399
EPA 200.7 Rev. 4.4	03/13/2019	03/13/2019 17:30	Elliott D. Healy	03/14/2019 18:00	Vijayalakshmi Reddy	2069415
	03/13/2019	03/18/2019 13:30	Elliott D. Healy	03/19/2019 15:50	Vijayalakshmi Reddy	2069414
EPA 200.8 Rev. 5.4	03/13/2019	03/13/2019 17:30	Elliott D. Healy	03/14/2019 22:38	Allison Taylor	2069415
	03/13/2019	03/13/2019 17:30	Elliott D. Healy	03/15/2019 03:05	Allison Taylor	2069415
	03/13/2019	03/13/2019 17:30	Elliott D. Healy	03/15/2019 22:53	Allison Taylor	2069415
	03/13/2019	03/18/2019 13:30	Elliott D. Healy	03/19/2019 19:02	Robert K Palmer	2069414
	03/13/2019	03/18/2019 13:30	Elliott D. Healy	03/21/2019 00:07	Robert K Palmer	2069414
EPA 350.1 Rev. 2.0	03/13/2019			03/14/2019 12:33	Ping Hua	2069397
	03/13/2019			03/14/2019 12:35	Ping Hua	2069400
EPA 351.2 Rev. 2.0	03/13/2019	03/15/2019 16:30	Adrian Shelby	03/19/2019 14:07	Joseph Suarez	2069397
	03/13/2019	03/15/2019 16:30	Adrian Shelby	03/19/2019 14:08	Joseph Suarez	2069400
EPA 353.2 Rev. 2.0	03/13/2019			03/18/2019 13:00	Lauren Lees	2069397
	03/13/2019			03/21/2019 12:24	Lauren Lees	2069400
EPA 365.1 Rev. 2.0	03/13/2019	03/18/2019 14:30	Sima Feizi	03/19/2019 10:52	Beverly Y. Sanders	2069397
	03/13/2019	03/18/2019 14:30	Sima Feizi	03/21/2019 14:31	Beverly Y. Sanders	2069400
EPA 365.1 Rev. 2.0 dissolved	03/13/2019			03/13/2019 15:55	Julia Storbeck	2069401
	03/13/2019			03/13/2019 16:01	Julia Storbeck	2069398
SM 2320 B-97	03/13/2019			03/21/2019 15:24	Dale L. Simmons	2069396
	03/13/2019			03/21/2019 17:47	Dale L. Simmons	2069399
SM 2540 D-97	03/13/2019			03/18/2019 14:58	Yijie Li	2069396, 2069399
SM 4500 F-C-97	03/13/2019			03/21/2019 15:24	Dale L. Simmons	2069396
	03/13/2019			03/21/2019 17:47	Dale L. Simmons	2069399
SM 5310 B-00	03/13/2019			03/20/2019 05:34	Julia Storbeck	2069397
	03/13/2019			03/21/2019 07:41	Julia Storbeck	2069400