Chemical Analysis Report

NE-DIST-2019-03-14-01

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

Event Description: **Nassau West**
Request ID: **RQ-2019-03-11-17**
Customer: **NE-DIST**
Project ID: **SMP**

Send Reports to:
FL Dept. of Environmental Protection
8800 Baymeadows Way West
Suite 100
Jacksonville, FL 32256
Attn: Jeremy Parrish

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: Thekkekalathil Chandrasekhar, Chemist Administrator

Date Certified: 03-APR-2019 11:40

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: ST MARYS S PRONG @ CR 23C **Collection Date/Time: 03/13/2019 10:05**

Field ID: 19010023 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2069714	EPA 180.1 Rev. 2.0	Turbidity	3.8		NTU	P360453	
	EPA 300.0 Rev. 2.1	Chloride	9.0	A	mg Cl/L	P361005	
		Sulfate	0.52	IA	mg SO4/L	P361011	
	SM 2120 B	Color (true)	300		PCU	P360446	
	SM 2320 B-97	Total Alkalinity	3.1		mg CaCO3/L	P360897	
	SM 2540 C-97	TDS	77		mg/L	P360770	
	SM 2540 D-97	TSS	4	I	mg/L	P360631	
	SM 4500 F-C-97	Fluoride	0.040	I	mg F/L	P360904	
2069716	EPA 350.1 Rev. 2.0	Ammonia-N	0.026		mg N/L	P360670	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.89		mg N/L	P360711	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.077		mg N/L	P360697	
	EPA 365.1 Rev. 2.0	Total-P	0.054		mg P/L	P360603	
	SM 5310 B-00	Organic Carbon	26		mg C/L	P360839	
2069718	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.035		mg P/L	P360478	
2069724	EPA 200.7 Rev. 4.4	Barium	17.5		ug/L	P360615	
		Calcium	3.70		mg/L	P360615	
		Iron	740		ug/L	P360615	
		Magnesium	1.32		mg/L	P360615	
		Potassium	0.68	I	mg/L	P360615	
		Sodium	5.7		mg/L	P360615	
		Zinc	5.8	I	ug/L	P360615	
	EPA 200.8 Rev. 5.4	Aluminum	523		ug/L	P360615	
		Antimony	0.050	U	ug/L	P360615	
		Arsenic	0.35		ug/L	P360615	
		Boron**	16.1		ug/L	P360615	
		Cadmium	0.020	U	ug/L	P360615	
		Chromium	0.77	I	ug/L	P360615	
		Copper	0.41	I	ug/L	P360615	
		Lead	0.63		ug/L	P360615	
		Nickel	0.58	I	ug/L	P360615	
		Selenium	0.20	U	ug/L	P360615	
		Silver	0.010	U	ug/L	P360615	
		Thallium	0.10	U	ug/L	P360615	

Ref. Method and Comment:
EPA 300.0 Rev. 2.1: Sulfate: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
EPA 351.2 Rev. 2.0: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.
EPA 200.8 Rev. 5.4: The lead result was confirmed in the undigested sample on 03/22/2019.

Sample Location: DAUGHTERY BR @ CREWS RD **Collection Date/Time: 03/13/2019 10:40**

Field ID: 19010136 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2069715	EPA 180.1 Rev. 2.0	Turbidity	4.5		NTU	P360453	
	EPA 300.0 Rev. 2.1	Chloride	11		mg Cl/L	P361005	
		Sulfate	0.71		mg SO4/L	P361011	
	SM 2120 B	Color (true)	300		PCU	P360446	
	SM 2320 B-97	Total Alkalinity	5.7		mg CaCO3/L	P360897	
	SM 2540 C-97	TDS	93		mg/L	P360771	
	SM 2540 D-97	TSS	2	I	mg/L	P360632	
	SM 4500 F-C-97	Fluoride	0.058	I	mg F/L	P360904	
2069717	EPA 350.1 Rev. 2.0	Ammonia-N	0.030		mg N/L	P360670	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.90		mg N/L	P360711	
	EPA 353.2 Rev. 2.0	NO2NO3-N	1.7		mg N/L	P360697	
	EPA 365.1 Rev. 2.0	Total-P	0.038		mg P/L	P360604	
	SM 5310 B-00	Organic Carbon	25		mg C/L	P360839	
2069719	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.021		mg P/L	P360478	
2069725	EPA 200.7 Rev. 4.4	Barium	45.6		ug/L	P360615	
		Calcium	5.52		mg/L	P360615	
		Iron	1.00E+03		ug/L	P360615	
		Magnesium	2.90		mg/L	P360615	
		Potassium	0.51	I	mg/L	P360615	
		Sodium	7.7		mg/L	P360615	
		Zinc	7.0	I	ug/L	P360615	
	EPA 200.8 Rev. 5.4	Aluminum	516		ug/L	P360615	
		Antimony	0.050	U	ug/L	P360615	
		Arsenic	0.40		ug/L	P360615	
		Boron**	14.8		ug/L	P360615	
		Cadmium	0.044	I	ug/L	P360615	
		Chromium	0.81	I	ug/L	P360615	
		Copper	0.40	U	ug/L	P360615	
		Lead	0.72		ug/L	P360615	
		Nickel	1.1	I	ug/L	P360615	
		Selenium	0.23	I	ug/L	P360615	
		Silver	0.010	U	ug/L	P360615	
		Thallium	0.10	U	ug/L	P360615	

Ref. Method and Comment:
EPA 300.0 Rev. 2.1: Sulfate: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
EPA 351.2 Rev. 2.0: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.
EPA 200.8 Rev. 5.4: The lead result was confirmed in the undigested sample on 03/22/2019.

Quality Assurance Report
Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P360453

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P360615

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: P360615

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: P361005

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P361011

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P360670

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: P360711

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P360697

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P360603

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P360604

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P360478

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

Reference Method: SM 2120 B
Batch ID: P360446

Component	Result	Code	Units
Color (true)	2.5	U	PCU

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 C-97
Batch ID: P360770

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 C-97
Batch ID: P360771

Component	Result	Code	Units
TDS	15	U	mg/L

Quality Assurance Report
Method Blank Results

Reference Method: SM 2540 D-97
Batch ID: P360631

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P360632

Component	Result	Code	Units
TSS	2	U	mg/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: P360839

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: P360615

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Barium	100		P	85 - 115
Calcium	103		P	85 - 115
Iron	107		P	85 - 115
Magnesium	104		P	85 - 115
Potassium	106		P	85 - 115
Sodium	109		P	85 - 115
Zinc	99.7		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P360615

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	97.6		P	85 - 115
Antimony	98.1		P	85 - 115
Arsenic	102		P	85 - 115
Boron	94.2		P	85 - 115
Cadmium	97.3		P	85 - 115
Chromium	92.2		P	85 - 115
Copper	99.1		P	85 - 115
Lead	98.5		P	85 - 115
Nickel	100		P	85 - 115
Selenium	101		P	85 - 115
Silver	106		P	85 - 115
Thallium	100		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P361005

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Chloride	99.7		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P361011

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Sulfate	99.9		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P360670

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P360711

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

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P360697

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P360603

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P360604

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P360478

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	97.4		P	90 - 110

Reference Method: SM 2120 B
Batch ID: P360446

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

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: P360904

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

Reference Method: SM 5310 B-00
Batch ID: P360839

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	97.7		P	85 - 115

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P360615

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2069535	Barium	99.1	101	P/P	80 - 120
2069535	Calcium	101		P	80 - 120
2069535	Iron	109	108	P/P	80 - 120
2069535	Magnesium	102		P	80 - 120
2069535	Potassium	108	107	P/P	80 - 120
2069535	Sodium	110	110	P/P	80 - 120
2069535	Zinc	97.5	99.9	P/P	80 - 120
2069923	Barium	104		P	80 - 120
2069923	Calcium	102		P	80 - 120
2069923	Iron	106		P	80 - 120
2069923	Magnesium	103		P	80 - 120
2069923	Potassium	106		P	80 - 120
2069923	Sodium	104		P	80 - 120
2069923	Zinc	103		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P360615

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2069535	Aluminum	97.1	96.6	P/P	80 - 120
2069535	Antimony	98.5	101	P/P	80 - 120
2069535	Arsenic	101	101	P/P	80 - 120
2069535	Boron	97.7	101	P/P	80 - 120
2069535	Cadmium	99.2	102	P/P	80 - 120
2069535	Chromium	93.6	94.2	P/P	80 - 120
2069535	Copper	95.2	98.5	P/P	80 - 120
2069535	Lead	97.5	98.5	P/P	80 - 120
2069535	Nickel	96.1	97.2	P/P	80 - 120
2069535	Selenium	99.0	99.2	P/P	80 - 120
2069535	Silver	106	108	P/P	80 - 120
2069535	Thallium	99.8	102	P/P	80 - 120
2069923	Aluminum	96.4		P	80 - 120
2069923	Antimony	98.8		P	80 - 120
2069923	Arsenic	101		P	80 - 120
2069923	Boron	99.6		P	80 - 120
2069923	Cadmium	101		P	80 - 120
2069923	Chromium	92.9		P	80 - 120
2069923	Copper	96.8		P	80 - 120
2069923	Lead	98.0		P	80 - 120
2069923	Nickel	97.4		P	80 - 120
2069923	Selenium	97.1		P	80 - 120
2069923	Silver	106		P	80 - 120
2069923	Thallium	100		P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P361005

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2069714	Chloride	94.9		P	90 - 110
2069732	Chloride	101		P	90 - 110

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P361011

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2069714	Sulfate	97.4		P	90 - 110
2069732	Sulfate	100		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P360670

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2069734	Ammonia-N	102	102	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P360697

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2069684	NO2NO3-N	95.7	98.7	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P360603

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2069666	Total-P	100	99.8	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P360604

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2069789	Total-P	101	101	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P360478

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2069742	O-Phosphate-P	95.7	97.2	P/P	90 - 110

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

Reference Method: SM 5310 B-00
Batch ID: P360839

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2069806	Organic Carbon	96.2	96.3	P/P	85 - 115

Quality Assurance Report
Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P360453

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2069680	Turbidity	8.88	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P360615

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2069535	Barium	2.25	Spike	P	0 - 20
2069535	Calcium	0.481	Spike	P	0 - 20
2069535	Iron	1.07	Spike	P	0 - 20
2069535	Magnesium	1.22	Spike	P	0 - 20
2069535	Potassium	0.530	Spike	P	0 - 20
2069535	Sodium	0.0226	Spike	P	0 - 20
2069535	Zinc	2.34	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P360615

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2069535	Aluminum	0.468	Spike	P	0 - 20
2069535	Antimony	2.66	Spike	P	0 - 20
2069535	Arsenic	0.466	Spike	P	0 - 20
2069535	Boron	2.72	Spike	P	0 - 20
2069535	Cadmium	2.42	Spike	P	0 - 20
2069535	Chromium	0.656	Spike	P	0 - 20
2069535	Copper	3.42	Spike	P	0 - 20
2069535	Lead	1.07	Spike	P	0 - 20
2069535	Nickel	1.20	Spike	P	0 - 20
2069535	Selenium	0.132	Spike	P	0 - 20
2069535	Silver	1.69	Spike	P	0 - 20
2069535	Thallium	2.52	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P361005

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2069714	Chloride	0.663	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P360670

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2069734	Ammonia-N	0.0535	Spike	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P360711

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2069704	Kjeldahl Nitrogen	2.63	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P360697

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2069684	NO2NO3-N	2.05	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P360603

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2069666	Total-P	0.146	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P360604

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2069789	Total-P	0.255	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P360478

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2069742	O-Phosphate-P	1.49	Spike	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P360446

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2069729	Color (true)	0.744	Sample	P	0 - 20

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 2540 C-97
Batch ID: P360770

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2069681	TDS	0.643	Sample	P	0 - 10

Quality Assurance Report
Precision

Reference Method: SM 2540 C-97
Batch ID: P360771

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2069788	TDS	1.06	Sample	P	0 - 10

Reference Method: SM 2540 D-97
Batch ID: P360632

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2069788	TSS	7.41	Sample	P	0 - 10

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: P360839

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2069806	Organic Carbon	0.0998	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: SM 2120 B
Run ID: A90016
Included Lab Sample IDs: 2069714, 2069715

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

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A90017
Included Lab Sample IDs: 2069714, 2069715

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A90024
Included Lab Sample IDs: 2069718, 2069719

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	98.7	98.8	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A90071
Included Lab Sample IDs: 2069714, 2069715

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	100	96.3	P/P	90 - 110
Chloride	96.3	99.2	P/P	90 - 110
Sulfate	101	96.6	P/P	90 - 110
Sulfate	96.6	99.9	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A90092
Included Lab Sample IDs: 2069716

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	98.8	99.9	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A90097
Included Lab Sample IDs: 2069716, 2069717

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

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A90099
Included Lab Sample IDs: 2069716, 2069717

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	100	100	P/P	90 - 110
NO2NO3-N	100	95.5	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A90113
Included Lab Sample IDs: 2069724, 2069725

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Barium	101	103	P/P	90 - 110
Calcium	101	103	P/P	90 - 110
Iron	103	104	P/P	90 - 110
Magnesium	103	104	P/P	90 - 110
Potassium	101	102	P/P	90 - 110
Sodium	105	105	P/P	90 - 110
Zinc	100	102	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A90127
Included Lab Sample IDs: 2069716, 2069717

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	97.4	96.5	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A90137
Included Lab Sample IDs: 2069724, 2069725

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	99.5	99.6	P/P	90 - 110
Antimony	98.5	97.8	P/P	90 - 110
Boron	98.5	99.3	P/P	90 - 110
Cadmium	99.0	99.5	P/P	90 - 110
Chromium	98.8	99.6	P/P	90 - 110
Copper	98.0	100	P/P	90 - 110
Lead	100	100	P/P	90 - 110
Selenium	99.7	98.2	P/P	90 - 110
Silver	105	107	P/P	90 - 110
Thallium	94.4	95.5	P/P	90 - 110

Reference Method: SM 5310 B-00
Run ID: A90156
Included Lab Sample IDs: 2069716, 2069717

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	95.7	96.0	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A90167
Included Lab Sample IDs: 2069724, 2069725

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	95.3	93.8	P/P	90 - 110
Nickel	92.8	90.7	P/P	90 - 110

Reference Method: SM 2320 B-97
Run ID: A90183
Included Lab Sample IDs: 2069714, 2069715

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

Quality Assurance Report
Calibration Verification

Reference Method: SM 2320 B-97
Run ID: A90183
Included Lab Sample IDs: 2069714, 2069715

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

Reference Method: SM 4500 F-C-97
Run ID: A90183
Included Lab Sample IDs: 2069714, 2069715

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

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A90185
Included Lab Sample IDs: 2069717

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	102	102	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						8.88	
EPA 200.7 Rev. 4.4	Barium	100	99.1	101	104			2.25
	Calcium	103	101	102				0.481
	Iron	107	109	108	106			1.07
	Magnesium	104	102	103				1.22
	Potassium	106	108	107	106			0.530
	Sodium	109	110	110	104			0.0226
	Zinc	99.7	97.5	99.9	103			2.34
EPA 200.8 Rev. 5.4	Aluminum	97.6	97.1	96.6	96.4			0.468
	Antimony	98.1	98.5	101	98.8			2.66
	Arsenic	102	101	101	101			0.466
	Boron	94.2	97.7	101	99.6			2.72
	Cadmium	97.3	99.2	102	101			2.42
	Chromium	92.2	93.6	94.2	92.9			0.656
	Copper	99.1	95.2	98.5	96.8			3.42
	Lead	98.5	97.5	98.5	98.0			1.07
	Nickel	100	96.1	97.2	97.4			1.20
	Selenium	101	99.0	99.2	97.1			0.132
	Silver	106	106	108	106			1.69
	Thallium	100	99.8	102	100			2.52
EPA 300.0 Rev. 2.1	Chloride	99.7	94.9	101			0.663	
	Sulfate	99.9	97.4	100				
EPA 350.1 Rev. 2.0	Ammonia-N	99.4	102	102				0.0535
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	107						2.63
EPA 353.2 Rev. 2.0	NO2NO3-N	97.5	95.7	98.7				2.05
EPA 365.1 Rev. 2.0	Total-P	102	100	99.8				0.146
	Total-P	103	101	101				0.255
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	97.4	95.7	97.2				1.49
SM 2120 B	Color (true)	102					0.744	
SM 2320 B-97	Total Alkalinity	102					0.102	
SM 2540 C-97	TDS						0.643	
	TDS						1.06	
SM 2540 D-97	TSS						7.41	
SM 4500 F-C-97	Fluoride	99.0	96.7	96.7				0.0
SM 5310 B-00	Organic Carbon	97.7	96.2	96.3				0.0998

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	2069714, 2069715
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2069724, 2069725
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2069724, 2069725
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	2069714, 2069715
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	2069714, 2069715
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	2069716, 2069717
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	2069716, 2069717
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	2069716, 2069717

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	2069716, 2069717
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2069718, 2069719
SM 2120 B / E31780	True Color measured at 450 nm	2069714, 2069715
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO3/L	2069714, 2069715
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	2069714, 2069715
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2069714, 2069715
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2069714, 2069715
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	2069716, 2069717

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	03/14/2019			03/14/2019 17:11	Adrian Shelby	2069714, 2069715
EPA 200.7 Rev. 4.4	03/14/2019	03/18/2019 17:00	Elliott D. Healy	03/19/2019 17:43	Vijayalakshmi Reddy	2069724
	03/14/2019	03/18/2019 17:00	Elliott D. Healy	03/19/2019 17:48	Vijayalakshmi Reddy	2069725
EPA 200.8 Rev. 5.4	03/14/2019	03/18/2019 17:00	Elliott D. Healy	03/20/2019 20:22	Robert K Palmer	2069724
	03/14/2019	03/18/2019 17:00	Elliott D. Healy	03/20/2019 20:31	Robert K Palmer	2069725
	03/14/2019	03/18/2019 17:00	Elliott D. Healy	03/21/2019 13:05	Robert K Palmer	2069724
	03/14/2019	03/18/2019 17:00	Elliott D. Healy	03/21/2019 13:12	Robert K Palmer	2069725
EPA 300.0 Rev. 2.1	03/14/2019			03/21/2019 15:16	Lipi Saha	2069714
	03/14/2019			03/21/2019 17:17	Lipi Saha	2069715
EPA 350.1 Rev. 2.0	03/14/2019			03/19/2019 10:18	Ping Hua	2069716
	03/14/2019			03/19/2019 10:19	Ping Hua	2069717
EPA 351.2 Rev. 2.0	03/14/2019	03/19/2019 12:25	Adrian Shelby	03/20/2019 09:51	Joseph Suarez	2069716
	03/14/2019	03/19/2019 12:25	Adrian Shelby	03/20/2019 09:52	Joseph Suarez	2069717
EPA 353.2 Rev. 2.0	03/14/2019			03/19/2019 13:44	Lauren Lees	2069716
	03/14/2019			03/19/2019 15:05	Lauren Lees	2069717
EPA 365.1 Rev. 2.0	03/14/2019	03/18/2019 14:30	Sima Feizi	03/19/2019 10:06	Beverly Y. Sanders	2069716
	03/14/2019	03/18/2019 14:30	Sima Feizi	03/21/2019 13:59	Beverly Y. Sanders	2069717
EPA 365.1 Rev. 2.0 dissolved	03/14/2019			03/14/2019 16:31	Jhamieka S. Greenwood	2069718
	03/14/2019			03/14/2019 16:32	Jhamieka S. Greenwood	2069719
SM 2120 B	03/14/2019			03/14/2019 16:50	Mariam Hanna	2069714
	03/14/2019			03/14/2019 16:51	Mariam Hanna	2069715
SM 2320 B-97	03/14/2019			03/21/2019 18:54	Dale L. Simmons	2069714
	03/14/2019			03/21/2019 19:05	Dale L. Simmons	2069715
SM 2540 C-97	03/14/2019			03/15/2019 17:15	Mariam Hanna	2069714, 2069715
SM 2540 D-97	03/14/2019			03/15/2019 17:15	Mariam Hanna	2069714, 2069715
SM 4500 F-C-97	03/14/2019			03/21/2019 18:54	Dale L. Simmons	2069714
	03/14/2019			03/21/2019 19:05	Dale L. Simmons	2069715
SM 5310 B-00	03/14/2019			03/20/2019 11:29	Julia Storbeck	2069716
	03/14/2019			03/20/2019 11:43	Julia Storbeck	2069717