Chemical Analysis Report

CEN-DIST-2020-07-07-01

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

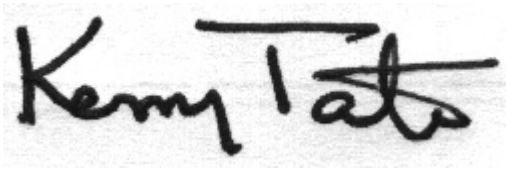
Event Description: **Panther**
Request ID: **RQ-2020-07-06-69**
Customer: **CEN-DIST**
Project ID: **SMP**

Send Reports to:
FL Dept. of Environmental Protection
FL Dept. of Environmental Protection
3319 Maguire Blvd., Suite 232
Orlando, FL 32803-3767
Attn: Kalina Warren

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: Kerry Tate, Ph.D., Environmental Administrator

Date Certified: 27-JUL-2020 10:49



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: Panther Lake @ Center of Central Lobe **Collection Date/Time: 07/06/2020 11:40**

Field ID: G4CE0156 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2181010	EPA 180.1 Rev. 2.0	Turbidity	0.70		NTU	P384164	
	EPA 300.0 Rev. 2.1	Chloride	30		mg Cl/L	P384525	
		Sulfate	24		mg SO4/L	P384529	
	SM 2120 B-2011	Color (true)	16		PCU	P384174	
	SM 2320 B-2011	Total Alkalinity	24		mg CaCO3/L	P384687	
	SM 2540 C-2011	TDS	121		mg/L	P384731	
	SM 2540 D-2011	TSS	2	U	mg/L	P384723	
	SM 4500 F-C-2011	Fluoride	0.059	I	mg F/L	P384690	
2181013	EPA 350.1 Rev. 2.0	Ammonia-N	0.005	I	mg N/L	P384431	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.61		mg N/L	P384317	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P384292	
	EPA 365.1 Rev. 2.0	Total-P	0.009		mg P/L	P384309	
	SM 5310 B-2011	Organic Carbon	7.9		mg C/L	P384345	
2181016	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P384238	
2181026	EPA 200.7 Rev. 4.4	Barium	8.2		ug/L	P384298	
		Calcium	10.9		mg/L	P384298	
		Iron	30	U	ug/L	P384298	
		Magnesium	5.33		mg/L	P384298	
		Potassium	7.4		mg/L	P384298	
		Sodium	17.7		mg/L	P384298	
		Zinc	5.0	U	ug/L	P384298	
	EPA 200.8 Rev. 5.4	Aluminum	27		ug/L	P384298	
		Antimony	0.11	I	ug/L	P384298	
		Arsenic	0.86		ug/L	P384298	
		Boron**	57.8		ug/L	P384298	
		Cadmium	0.020	U	ug/L	P384298	
		Chromium	0.40	U	ug/L	P384298	
		Copper	0.60	I	ug/L	P384298	
		Lead	0.20	U	ug/L	P384298	
		Nickel	0.50	U	ug/L	P384298	
		Selenium	0.20	U	ug/L	P384298	
		Silver	0.010	U	ug/L	P384298	
		Thallium	0.10	U	ug/L	P384298	
	SM 2340B	Hardness	49.2		mg/L	P384298	

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-2011: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
EPA 200.7 Rev. 4.4: Batch matrix spike recoveries for calcium are unavailable for one of two spiked samples because of high analyte concentration in the QC sample.

Sample Location: Panther Lake @ center of West Lobe **Collection Date/Time: 07/06/2020 12:03**

Field ID: G4CE0164 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2181011	EPA 180.1 Rev. 2.0	Turbidity	1.0		NTU	P384164	
	EPA 300.0 Rev. 2.1	Chloride	30		mg Cl/L	P384525	
		Sulfate	24		mg SO4/L	P384529	
	SM 2120 B-2011	Color (true)	22		PCU	P384174	
	SM 2320 B-2011	Total Alkalinity	26		mg CaCO3/L	P384687	
	SM 2540 C-2011	TDS	114		mg/L	P384731	
	SM 2540 D-2011	TSS	2	U	mg/L	P384723	
	SM 4500 F-C-2011	Fluoride	0.055	I	mg F/L	P384690	
2181014	EPA 350.1 Rev. 2.0	Ammonia-N	0.004	I	mg N/L	P384431	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.66		mg N/L	P384317	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P384292	
	EPA 365.1 Rev. 2.0	Total-P	0.012		mg P/L	P384309	
	SM 5310 B-2011	Organic Carbon	8.4		mg C/L	P384345	
2181017	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P384238	
2181027	EPA 200.7 Rev. 4.4	Barium	7.9		ug/L	P384298	
		Calcium	11.5		mg/L	P384298	
		Iron	30	U	ug/L	P384298	
		Magnesium	5.26		mg/L	P384298	
		Potassium	7.5		mg/L	P384298	
		Sodium	18.0		mg/L	P384298	
		Zinc	5.0	U	ug/L	P384298	
	EPA 200.8 Rev. 5.4	Aluminum	12	I	ug/L	P384298	
		Antimony	0.085	I	ug/L	P384298	
		Arsenic	0.96		ug/L	P384298	
		Boron**	56.8		ug/L	P384298	
		Cadmium	0.020	U	ug/L	P384298	
		Chromium	0.40	U	ug/L	P384298	
		Copper	0.40	U	ug/L	P384298	
		Lead	0.20	U	ug/L	P384298	
		Nickel	0.50	U	ug/L	P384298	
		Selenium	0.20	U	ug/L	P384298	
		Silver	0.010	U	ug/L	P384298	
		Thallium	0.10	U	ug/L	P384298	
	SM 2340B	Hardness	50.5		mg/L	P384298	

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-2011: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
EPA 200.7 Rev. 4.4: Batch matrix spike recoveries for calcium are unavailable for one of two spiked samples because of high analyte concentration in the QC sample.

Sample Location: Panther Lake @ Center of East Lobe **Collection Date/Time: 07/06/2020 12:45**

Field ID: G4CE0165 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2181012	EPA 180.1 Rev. 2.0	Turbidity	1.4		NTU	P384165	
	EPA 300.0 Rev. 2.1	Chloride	31		mg Cl/L	P384525	
		Sulfate	23		mg SO4/L	P384529	
	SM 2120 B-2011	Color (true)	42	A	PCU	P384174	
	SM 2320 B-2011	Total Alkalinity	25		mg CaCO3/L	P384687	
	SM 2540 C-2011	TDS	120		mg/L	P384731	
	SM 2540 D-2011	TSS	2	U	mg/L	P384723	
	SM 4500 F-C-2011	Fluoride	0.060	I	mg F/L	P384690	
2181015	EPA 350.1 Rev. 2.0	Ammonia-N	0.005	I	mg N/L	P384431	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.67		mg N/L	P384317	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P384292	
	EPA 365.1 Rev. 2.0	Total-P	0.020		mg P/L	P384309	
	SM 5310 B-2011	Organic Carbon	9.3		mg C/L	P384345	
2181018	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P384238	
2181028	EPA 200.7 Rev. 4.4	Barium	8.4		ug/L	P384298	
		Calcium	10.7		mg/L	P384298	
		Iron	35	I	ug/L	P384298	
		Magnesium	5.24		mg/L	P384298	
		Potassium	7.4		mg/L	P384298	
		Sodium	18.8		mg/L	P384298	
		Zinc	5.0	U	ug/L	P384298	
	EPA 200.8 Rev. 5.4	Aluminum	16	I	ug/L	P384298	
		Antimony	0.077	I	ug/L	P384298	
		Arsenic	0.67		ug/L	P384298	
		Boron**	58.7		ug/L	P384298	
		Cadmium	0.020	U	ug/L	P384298	
		Chromium	0.40	U	ug/L	P384298	
		Copper	0.40	U	ug/L	P384298	
		Lead	0.20	U	ug/L	P384298	
		Nickel	0.50	U	ug/L	P384298	
		Selenium	0.20	U	ug/L	P384298	
		Silver	0.010	U	ug/L	P384298	
		Thallium	0.10	U	ug/L	P384298	
	SM 2340B	Hardness	48.4		mg/L	P384298	

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-2011: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
EPA 200.7 Rev. 4.4: Batch matrix spike recoveries for calcium are unavailable for one of two spiked samples because of high analyte concentration in the QC sample.

Quality Assurance Report
Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P384164

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P384165

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P384298

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: P384298

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: P384525

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P384529

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Quality Assurance Report
Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P384431

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P384317

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P384292

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P384309

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P384238

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

Reference Method: SM 2120 B-2011
Batch ID: P384174

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-2011
Batch ID: P384687

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

Reference Method: SM 2540 C-2011
Batch ID: P384731

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-2011
Batch ID: P384723

Component	Result	Code	Units
TSS	2	U	mg/L

Quality Assurance Report
Method Blank Results

Reference Method: SM 4500 F-C-2011
Batch ID: P384690

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-2011
Batch ID: P384345

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: P384298

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Barium	106		P	85 - 115
Calcium	102		P	85 - 115
Iron	106		P	85 - 115
Magnesium	99.3		P	85 - 115
Potassium	99.1		P	85 - 115
Sodium	98.9		P	85 - 115
Zinc	108		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P384298

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	96.7		P	85 - 115
Antimony	96.1		P	85 - 115
Arsenic	104		P	85 - 115
Boron	98.1		P	85 - 115
Cadmium	99.6		P	85 - 115
Chromium	98.0		P	85 - 115
Copper	102		P	85 - 115
Lead	99.5		P	85 - 115
Nickel	101		P	85 - 115
Selenium	101		P	85 - 115
Silver	100		P	85 - 115
Thallium	102		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P384525

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P384529

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P384431

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	96.5		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P384317

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: P384292

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P384309

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P384238

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	96.6		P	90 - 110

Reference Method: SM 2120 B-2011
Batch ID: P384174

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

Reference Method: SM 2320 B-2011
Batch ID: P384687

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	99.1		P	93 - 104

Reference Method: SM 4500 F-C-2011
Batch ID: P384690

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	99.5		P	90 - 106

Reference Method: SM 5310 B-2011
Batch ID: P384345

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	99.0		P	85 - 115

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P384298

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2180829	Barium	105		P	80 - 120
2180829	Iron	105		P	80 - 120
2180829	Magnesium	105		P	80 - 120
2180829	Potassium	98.2		P	80 - 120
2180829	Sodium	101		P	80 - 120
2180829	Zinc	111		P	80 - 120
2181027	Barium	103	103	P/P	80 - 120
2181027	Calcium	104		P	80 - 120
2181027	Iron	107	107	P/P	80 - 120
2181027	Magnesium	103		P	80 - 120
2181027	Potassium	100		P	80 - 120
2181027	Sodium	101		P	80 - 120
2181027	Zinc	107	107	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P384298

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2180829	Aluminum	94.9		P	80 - 120
2180829	Antimony	96.3		P	80 - 120
2180829	Arsenic	105		P	80 - 120
2180829	Boron	102		P	80 - 120
2180829	Cadmium	100		P	80 - 120
2180829	Chromium	99.6		P	80 - 120
2180829	Copper	97.6		P	80 - 120
2180829	Lead	100		P	80 - 120
2180829	Nickel	98.1		P	80 - 120
2180829	Selenium	93.9		P	80 - 120
2180829	Silver	99.2		P	80 - 120
2180829	Thallium	108		P	80 - 120
2181027	Aluminum	95.5	97.2	P/P	80 - 120
2181027	Antimony	96.6	97.6	P/P	80 - 120
2181027	Arsenic	104	106	P/P	80 - 120
2181027	Boron	98.8	99.8	P/P	80 - 120
2181027	Cadmium	99.5	99.6	P/P	80 - 120
2181027	Chromium	99.6	99.4	P/P	80 - 120
2181027	Copper	103	104	P/P	80 - 120
2181027	Lead	99.9	101	P/P	80 - 120
2181027	Nickel	100	100	P/P	80 - 120
2181027	Selenium	96.9	99.3	P/P	80 - 120
2181027	Silver	99.1	97.3	P/P	80 - 120
2181027	Thallium	107	106	P/P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P384525

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2180993	Chloride	101		P	90 - 110
2181062	Chloride	101		P	90 - 110

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P384529

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2180993	Sulfate	100		P	90 - 110
2181062	Sulfate	98.4		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P384431

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2181035	Ammonia-N	98.5	101	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P384317

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2181013	Kjeldahl Nitrogen	105	98.1	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P384292

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2181013	NO2NO3-N	100	100	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P384309

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2180996	Total-P	101	103	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P384238

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2181001	O-Phosphate-P	91.3	92.6	P/P	90 - 110

Reference Method: SM 4500 F-C-2011
Batch ID: P384690

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2181392	Fluoride	104	103	P/P	94 - 107

Reference Method: SM 5310 B-2011
Batch ID: P384345

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2181013	Organic Carbon	93.8	94.9	P/P	85 - 115

Quality Assurance Report
Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P384164

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2180977	Turbidity	3.11	Sample	P	0 - 20

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P384165

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2181062	Turbidity	3.28	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P384298

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2181027	Barium	0.0210	Spike	P	0 - 20
2181027	Calcium	0.278	Spike	P	0 - 20
2181027	Iron	0.0699	Spike	P	0 - 20
2181027	Magnesium	0.280	Spike	P	0 - 20
2181027	Potassium	0.598	Spike	P	0 - 20
2181027	Sodium	0.893	Spike	P	0 - 20
2181027	Zinc	0.436	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P384298

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2181027	Aluminum	1.79	Spike	P	0 - 20
2181027	Antimony	0.945	Spike	P	0 - 20
2181027	Arsenic	1.28	Spike	P	0 - 20
2181027	Boron	0.632	Spike	P	0 - 20
2181027	Cadmium	0.0778	Spike	P	0 - 20
2181027	Chromium	0.206	Spike	P	0 - 20
2181027	Copper	0.463	Spike	P	0 - 20
2181027	Lead	0.618	Spike	P	0 - 20
2181027	Nickel	0.0464	Spike	P	0 - 20
2181027	Selenium	2.43	Spike	P	0 - 20
2181027	Silver	1.75	Spike	P	0 - 20
2181027	Thallium	0.976	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P384525

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2181062	Chloride	0.128	Sample	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P384431

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2181035	Ammonia-N	1.83	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P384317

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2181013	Kjeldahl Nitrogen	4.67	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P384292

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2181013	NO2NO3-N	0.0	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P384309

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2180996	Total-P	1.66	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P384238

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2181001	O-Phosphate-P	1.31	Spike	P	0 - 20

Reference Method: SM 2120 B-2011
Batch ID: P384174

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2181012	Color (true)	1.16	Sample	P	0 - 20

Reference Method: SM 2320 B-2011
Batch ID: P384687

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2181392	Total Alkalinity	0.0828	Sample	P	0 - 8.1

Reference Method: SM 2540 C-2011
Batch ID: P384731

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2180804	TDS	3.98	Sample	P	0 - 10

Quality Assurance Report
Precision

Reference Method: SM 4500 F-C-2011
Batch ID: P384690

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2181392	Fluoride	0.457	Spike	P	0 - 2.8

Reference Method: SM 5310 B-2011
Batch ID: P384345

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2181013	Organic Carbon	0.784	Spike	P	0 - 20

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

Quality Assurance Report
Calibration Verification

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A99720
Included Lab Sample IDs: 2181010, 2181011, 2181012

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	101	102	P/P	95 - 105
Turbidity	102	101	P/P	95 - 105

Reference Method: SM 2120 B-2011
Run ID: A99724
Included Lab Sample IDs: 2181010, 2181011, 2181012

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	100	102	P/P	90 - 115

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A99744
Included Lab Sample IDs: 2181016, 2181017, 2181018

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	96.4	95.3	P/P	90 - 110
O-Phosphate-P	96.6	96.4	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A99767
Included Lab Sample IDs: 2181013, 2181014, 2181015

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	100	101	P/P	90 - 110

Reference Method: SM 5310 B-2011
Run ID: A99787
Included Lab Sample IDs: 2181013, 2181014, 2181015

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	93.3	93.2	P/P	90 - 110
Organic Carbon	97.2	93.3	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A99808
Included Lab Sample IDs: 2181013, 2181014, 2181015

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

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A99813
Included Lab Sample IDs: 2181026, 2181027, 2181028

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Barium	101	100	P/P	90 - 110
Barium	101	101	P/P	90 - 110
Calcium	103	105	P/P	90 - 110
Calcium	105	104	P/P	90 - 110
Iron	104	106	P/P	90 - 110
Iron	106	106	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A99813
Included Lab Sample IDs: 2181026, 2181027, 2181028

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Magnesium	103	105	P/P	90 - 110
Magnesium	105	104	P/P	90 - 110
Potassium	100	99.3	P/P	90 - 110
Potassium	99.3	99.6	P/P	90 - 110
Sodium	102	102	P/P	90 - 110
Sodium	102	102	P/P	90 - 110
Zinc	102	101	P/P	90 - 110
Zinc	102	102	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A99820
Included Lab Sample IDs: 2181013, 2181014, 2181015

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	104	103	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A99833
Included Lab Sample IDs: 2181013, 2181014, 2181015

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	106	99.3	P/P	90 - 110
Kjeldahl Nitrogen	99.3	106	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A99836
Included Lab Sample IDs: 2181010, 2181011, 2181012

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

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A99900
Included Lab Sample IDs: 2181026, 2181027, 2181028

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	96.7	97.5	P/P	90 - 110
Aluminum	97.5	98.6	P/P	90 - 110
Antimony	94.8	94.0	P/P	90 - 110
Antimony	95.2	94.8	P/P	90 - 110
Arsenic	103	103	P/P	90 - 110
Arsenic	103	101	P/P	90 - 110
Boron	94.9	99.7	P/P	90 - 110
Boron	99.7	104	P/P	90 - 110
Cadmium	97.9	98.2	P/P	90 - 110
Cadmium	98.2	97.7	P/P	90 - 110
Chromium	94.7	94.9	P/P	90 - 110
Chromium	94.9	93.1	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A99900
Included Lab Sample IDs: 2181026, 2181027, 2181028

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Copper	98.7	96.2	P/P	90 - 110
Copper	99.6	98.7	P/P	90 - 110
Lead	98.2	99.3	P/P	90 - 110
Lead	99.3	98.4	P/P	90 - 110
Nickel	101	99.3	P/P	90 - 110
Nickel	99.3	96.6	P/P	90 - 110
Selenium	99.5	96.8	P/P	90 - 110
Selenium	99.5	99.5	P/P	90 - 110
Silver	96.5	96.2	P/P	90 - 110
Silver	96.5	96.5	P/P	90 - 110
Thallium	96.6	98.3	P/P	90 - 110
Thallium	98.3	97.2	P/P	90 - 110

Reference Method: SM 2320 B-2011
Run ID: A99904
Included Lab Sample IDs: 2181010, 2181011, 2181012

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	100	96.4	P/P	90 - 110

Reference Method: SM 4500 F-C-2011
Run ID: A99904
Included Lab Sample IDs: 2181010, 2181011, 2181012

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	102	103	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						3.11	
	Turbidity						3.28	
EPA 200.7 Rev. 4.4	Barium	106	105	103	103			0.0210
	Calcium	102	104					0.278
	Iron	106	105	107	107			0.0699
	Magnesium	99.3	105	103				0.280
	Potassium	99.1	98.2	100				0.598
	Sodium	98.9	101	101				0.893
	Zinc	108	111	107	107			0.436
EPA 200.8 Rev. 5.4	Aluminum	96.7	95.5	97.2	94.9			1.79
	Antimony	96.1	96.6	97.6	96.3			0.945
	Arsenic	104	104	106	105			1.28
	Boron	98.1	98.8	99.8	102			0.632
	Cadmium	99.6	99.5	99.6	100			0.0778
	Chromium	98.0	99.6	99.4	99.6			0.206
	Copper	102	103	104	97.6			0.463
	Lead	99.5	99.9	101	100			0.618
	Nickel	101	100	100	98.1			0.0464
	Selenium	101	96.9	99.3	93.9			2.43
	Silver	100	99.1	97.3	99.2			1.75
	Thallium	102	107	106	108			0.976
EPA 300.0 Rev. 2.1	Chloride	101	101	101			0.128	
	Sulfate	99.8	98.4	100				
EPA 350.1 Rev. 2.0	Ammonia-N	96.5	98.5	101				1.83
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	107	105	98.1				4.67
EPA 353.2 Rev. 2.0	NO2NO3-N	100	100	100				0.0
EPA 365.1 Rev. 2.0	Total-P	106	101	103				1.66
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	96.6	91.3	92.6				1.31
SM 2120 B-2011	Color (true)	104					1.16	
SM 2320 B-2011	Total Alkalinity	99.1					0.0828	
SM 2540 C-2011	TDS						3.98	
SM 4500 F-C-2011	Fluoride	99.5	104	103				0.457
SM 5310 B-2011	Organic Carbon	99.0	93.8	94.9				0.784

Reference Method Descriptions

Method	Description	Associated Samples
EPA 180.1 Rev. 2.0	Turbidity in aqueous matrices	2181010, 2181011, 2181012
EPA 200.7 Rev. 4.4	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2181026, 2181027, 2181028
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2181026, 2181027, 2181028
EPA 300.0 Rev. 2.1	Chloride in aqueous matrices	2181010, 2181011, 2181012
EPA 300.0 Rev. 2.1	Sulfate in aqueous matrices	2181010, 2181011, 2181012
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2181013, 2181014, 2181015
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2181013, 2181014, 2181015
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2181013, 2181014, 2181015
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2181013, 2181014, 2181015
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2181016, 2181017, 2181018
SM 2120 B-2011	True Color measured at 450 nm (not valid for NPDES monitoring)	2181010, 2181011, 2181012
SM 2320 B-2011	Alkalinity in aqueous matrices as mg CaCO3/L	2181010, 2181011, 2181012
SM 2340B	Hardness by calculation, in aqueous matrices, reported as mg/L CaCO3	2181026, 2181027, 2181028

Reference Method Descriptions

Method	Description	Associated Samples
SM 2540 C-2011	Total Dissolved Solids in aqueous matrices	2181010, 2181011, 2181012
SM 2540 D-2011	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2181010, 2181011, 2181012
SM 4500 F-C-2011	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2181010, 2181011, 2181012
SM 5310 B-2011	Nonpurgeable Organic Carbon in aqueous matrices	2181013, 2181014, 2181015

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	07/07/2020			07/07/2020 16:04	Yen Ta	2181010, 2181011, 2181012
EPA 200.7 Rev. 4.4	07/07/2020	07/09/2020 13:55	Elliott D. Healy	07/10/2020 16:39	Betina Topolski	2181026
	07/07/2020	07/09/2020 13:55	Elliott D. Healy	07/10/2020 16:47	Betina Topolski	2181028
	07/07/2020	07/09/2020 13:55	Elliott D. Healy	07/10/2020 17:31	Betina Topolski	2181027
EPA 200.8 Rev. 5.4	07/07/2020	07/09/2020 13:55	Elliott D. Healy	07/15/2020 21:41	Alexander Thompson	2181027
	07/07/2020	07/09/2020 13:55	Elliott D. Healy	07/15/2020 23:13	Alexander Thompson	2181026
	07/07/2020	07/09/2020 13:55	Elliott D. Healy	07/15/2020 23:20	Alexander Thompson	2181028
EPA 300.0 Rev. 2.1	07/07/2020			07/10/2020 03:39	Julia Storbeck	2181010
	07/07/2020			07/10/2020 03:51	Julia Storbeck	2181011
	07/07/2020			07/10/2020 04:27	Julia Storbeck	2181012
EPA 350.1 Rev. 2.0	07/07/2020			07/11/2020 12:26	Ping Hua	2181013
	07/07/2020			07/11/2020 12:27	Ping Hua	2181014
	07/07/2020			07/11/2020 12:29	Ping Hua	2181015
EPA 351.2 Rev. 2.0	07/07/2020	07/09/2020 17:00	Jhamieka S. Greenwood	07/13/2020 13:32	Jhamieka S. Greenwood	2181013
	07/07/2020	07/09/2020 17:00	Jhamieka S. Greenwood	07/13/2020 13:44	Jhamieka S. Greenwood	2181014
	07/07/2020	07/09/2020 17:00	Jhamieka S. Greenwood	07/13/2020 13:45	Jhamieka S. Greenwood	2181015
EPA 353.2 Rev. 2.0	07/07/2020			07/09/2020 10:11	Beverly Y. Sanders	2181013
	07/07/2020			07/09/2020 10:16	Beverly Y. Sanders	2181014
	07/07/2020			07/09/2020 10:18	Beverly Y. Sanders	2181015
EPA 365.1 Rev. 2.0	07/07/2020	07/09/2020 13:55	Yen Ta	07/13/2020 09:25	Lipi Saha	2181013, 2181014
	07/07/2020	07/09/2020 13:55	Yen Ta	07/13/2020 09:26	Lipi Saha	2181015
EPA 365.1 Rev. 2.0 dissolved	07/07/2020			07/07/2020 17:02	Carlos Miranda	2181016
	07/07/2020			07/07/2020 17:03	Carlos Miranda	2181017
	07/07/2020			07/07/2020 17:08	Carlos Miranda	2181018
SM 2120 B-2011	07/07/2020			07/07/2020 18:47	Benjamin T. Nordmann	2181012
	07/07/2020			07/07/2020 18:52	Benjamin T. Nordmann	2181010, 2181011
SM 2320 B-2011	07/07/2020			07/15/2020 22:52	Lauren Lees	2181010
	07/07/2020			07/15/2020 23:04	Lauren Lees	2181011
	07/07/2020			07/15/2020 23:16	Lauren Lees	2181012
SM 2340B	07/07/2020			07/10/2020 16:39	Betina Topolski	2181026
	07/07/2020			07/10/2020 16:47	Betina Topolski	2181028
	07/07/2020			07/10/2020 17:31	Betina Topolski	2181027
SM 2540 C-2011	07/07/2020			07/09/2020 14:12	Yijie Li	2181010, 2181011, 2181012
SM 2540 D-2011	07/07/2020			07/09/2020 14:12	Yijie Li	2181010, 2181011, 2181012
SM 4500 F-C-2011	07/07/2020			07/15/2020 22:52	Lauren Lees	2181010
	07/07/2020			07/15/2020 23:04	Lauren Lees	2181011
	07/07/2020			07/15/2020 23:16	Lauren Lees	2181012
SM 5310 B-2011	07/07/2020			07/09/2020 14:35	David Boose	2181013
	07/07/2020			07/09/2020 15:32	David Boose	2181014
	07/07/2020			07/09/2020 18:14	David Boose	2181015