Chemical Analysis Report

CEN-DIST-2018-08-17-02

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

Event Description: **Myrtle X2 / Ellen / Concord**
Request ID: **RQ-2018-08-13-85**
Customer: **CEN-DIST**
Project ID: **SMP**

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Certified by: Thekkekalathil Chandrasekhar, Chemist Administrator Date Certified: 05-SEP-2018 15:47

Case Narrative

Unless otherwise noted, all samples included in this report were received in accordance with protocols referenced in Chapter 62-160, Florida Administrative Code (F.A.C.). Results published in this report pertain only to the samples as submitted to, and received by the laboratory. All times in this report are adjusted to the applicable Eastern Time Zone (EST or EDT).

Results for the following analytical groups are included in this report: Metals and Nutrients.

Scientific notation may be used in reporting very large or small values. Values reported using scientific notation will take the form of the following example: 1.3E+03, which is equivalent to 1.3×10^3 or 1300.

Unless otherwise noted, analytical values for soil and sediment samples are reported on a dry weight basis, and analytical values for waste and tissue samples are reported on a wet weight basis.

Results for TNI accredited tests met requirements established by The NELAC Institute. A double asterisk (**) is used to indicate an analyte/matrix/method for which the laboratory is not TNI accredited or where accreditation for that field of testing is not applicable.

Any significant anomalies or deviations from established protocols are documented in Non-Conformance Reports, which, where appropriate, are included within this analytical report. Additional comments related to specific analytical tests may be included as remarks following the analytical results for each sample. Such comments and remarks are for informational purposes only and are not intended to convey judgement about the usability of the reported data.

A quality control report on the performance of the test method for the submitted samples is included. Uncertainty associated with the analytical results contained in this report can be estimated from the reported quality assurance results and from published quality control acceptance limits for each analytical test. Matrix quality control results (matrix spike recoveries and matrix sample precision) pertain only to the matrix sample tested and do not necessarily reflect test method performance for other samples.

Typical matrix quality control (QC) measurements may include matrix spike recovery, matrix spike duplicate recovery, matrix spike precision and matrix sample precision. Not all matrix QC results may be available or reportable; where they are not an explanation is provided. Typical reasons for unavailable QC results include, but are not limited to, a) insufficient matrix sample to perform some or all QC measurements; b) analyte concentration in the sample replicated was too low for a meaningful measurement of precision and c) analyte concentration in the matrix sample spiked was too high (relative to the amount of analyte spiked) for a meaningful measurement of recovery. Where matrix QC results are unavailable, other method performance metrics (e.g., LCS recovery, LCS precision, surrogate recovery) may be used to assess performance of the method. Comments explaining any missing QC measurements are not intended to convey any adverse conclusions about the quality of the reported data.

Precision is reported as relative percent difference unless otherwise noted.

Quality Control codes as defined below may be used in this report to indicate results that are associated with one or more quality control elements which did not fall within established test method criteria. Such results may be qualified as estimates using a J qualifier as required by 62-160 F.A.C. Explanations are included in the report for any results that were reported as estimates for other reasons.

QC Codes used in this report may include:

LCS – Recovery for the batch Laboratory Control Sample (LCS) was outside existing control limits;
MS – Recovery for the batch matrix spike (MS) was outside existing control limits;
CCV – Recovery for a continuing calibration verification (CCV) standard was outside existing control limits;
SUR – Recovery of a surrogate (SUR) for associated analytes was outside existing control limits;
RPD – The precision, measured as relative percent difference (RPD), of batch replicate measurements was outside existing control limits;
RSD – The precision, measured as relative standard deviation (RSD), of batch replicate measurements was outside existing control limits;
SMP – Sample - used precision derived from replicate analyses of a sample;

The following data qualifiers are used, where applicable, in this report as specified in 62-160 F.A.C.

A - Value reported is the mean of two or more determinations.
B - Results based on colony counts outside the acceptable range.
I - The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
J - Estimated value and/or the analysis did not meet established quality control criteria.
K - Actual value is known to be less than value given.
L - Actual value is known to be greater than value given.
N - Presumptive evidence of presence of material.
O - Sampled, but analysis lost or not performed.
Q - Sample held beyond normal holding time.
T - Value reported is less than the criterion of detection.
U - Material was analyzed for but not detected. The reported value is the method detection limit for the sample analyzed.
V - Analyte was detected in both sample and method blank.
X - Too few individuals to calculate SCI value.
Y - The laboratory analysis was from an unpreserved or improperly preserved sample. The data may not be accurate.
Z - Colonies were too numerous to count (TNTC).

Quality control information from overflow laboratories may not be included in this report. Please refer to the associated report from the overflow laboratory for additional information.

Sample Location: LAKE MYRTLE @ 140M W OF CENTER OF SOUTH LOBE **Collection Date/Time: 08/16/2018 10:04**

Field ID: G2CE0190 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2017895	EPA 180.1 Rev. 2.0	Turbidity	4.2		NTU	P350381	
	EPA 300.0 Rev. 2.1	Chloride	28		mg Cl/L	P350644	
		Sulfate	3.2		mg SO4/L	P350646	
	SM 2120 B	Color (true)	41		PCU	P350378	
	SM 2320 B-97	Total Alkalinity	52		mg CaCO3/L	P350556	
	SM 2540 C-97	TDS	133		mg/L	P350816	
	SM 2540 D-97	TSS	10		mg/L	P350807	
	SM 4500 F-C-97	Fluoride	0.12		mg F/L	P350559	
2017897	EPA 350.1 Rev. 2.0	Ammonia-N	0.009		mg N/L	P350629	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.5		mg N/L	P350460	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P350527	
	EPA 365.1 Rev. 2.0	Total-P	0.067		mg P/L	P350581	
	SM 5310 B-00	Organic Carbon	11		mg C/L	P350548	
2017899	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.005	I	mg P/L	P350368	
2017915	EPA 200.7 Rev. 4.4	Calcium	15.8		mg/L	P350432	
		Iron	110	I	ug/L	P350432	
		Magnesium	3.37		mg/L	P350432	
		Potassium	3.7		mg/L	P350432	
		Sodium	20.4		mg/L	P350432	
		Zinc	5.0	U	ug/L	P350432	
	EPA 200.8 Rev. 5.4	Arsenic	0.97		ug/L	P350432	
		Cadmium	0.020	U	ug/L	P350432	
		Chromium	0.40	U	ug/L	P350432	
		Copper	0.30	I	ug/L	P350432	
		Lead	0.23		ug/L	P350432	
		Nickel	0.24	I	ug/L	P350432	
		Silver	0.010	U	ug/L	P350432	

Ref. Method and Comment:
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.

Sample Location: MYRTLE LAKE @ 135M NE OF CENTER OF SOUTH LOBE **Collection Date/Time: 08/16/2018 10:13**

Field ID: G2CE0191 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2017896	EPA 180.1 Rev. 2.0	Turbidity	5.0		NTU	P350381	
	EPA 300.0 Rev. 2.1	Chloride	29		mg Cl/L	P350644	
		Sulfate	3.3		mg SO4/L	P350646	
	SM 2120 B	Color (true)	42		PCU	P350378	
	SM 2320 B-97	Total Alkalinity	53		mg CaCO3/L	P350557	
	SM 2540 C-97	TDS	119		mg/L	P350816	
	SM 2540 D-97	TSS	9	I	mg/L	P350807	
	SM 4500 F-C-97	Fluoride	0.12		mg F/L	P350562	
2017898	EPA 350.1 Rev. 2.0	Ammonia-N	0.006		mg N/L	P350629	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.4		mg N/L	P350460	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P350527	
	EPA 365.1 Rev. 2.0	Total-P	0.067		mg P/L	P350581	
	SM 5310 B-00	Organic Carbon	11		mg C/L	P350548	
2017900	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	I	mg P/L	P350368	
2017916	EPA 200.7 Rev. 4.4	Calcium	15.8		mg/L	P350432	
		Iron	110	I	ug/L	P350432	
		Magnesium	3.40		mg/L	P350432	
		Potassium	3.8		mg/L	P350432	
		Sodium	20.7		mg/L	P350432	
		Zinc	5.0	U	ug/L	P350432	
	EPA 200.8 Rev. 5.4	Arsenic	0.96		ug/L	P350432	
		Cadmium	0.020	U	ug/L	P350432	
		Chromium	0.42	I	ug/L	P350432	
		Copper	0.30	I	ug/L	P350432	
		Lead	0.26		ug/L	P350912	
		Nickel	0.24	I	ug/L	P350432	
		Silver	0.010	U	ug/L	P350432	

Ref. Method and Comment:
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: Batch matrix spike recoveries for lead are unavailable for one of two spiked samples because of high analyte concentration in the QC sample.

Sample Location: LAKE CONCORD AT CENTER **Collection Date/Time: 08/16/2018 10:55**

Field ID: G2CE0059 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2017901	EPA 180.1 Rev. 2.0	Turbidity	4.1		NTU	P350381	
	EPA 300.0 Rev. 2.1	Chloride	12		mg Cl/L	P350644	
		Sulfate	6.6		mg SO4/L	P350646	
	SM 2120 B	Color (true)	15	A	PCU	P350378	
	SM 2320 B-97	Total Alkalinity	69		mg CaCO3/L	P350557	
	SM 2540 C-97	TDS	112	A	mg/L	P350816	
	SM 2540 D-97	TSS	6	IA	mg/L	P350807	
	SM 4500 F-C-97	Fluoride	0.059	I	mg F/L	P350562	
2017903	EPA 350.1 Rev. 2.0	Ammonia-N	0.003	I	mg N/L	P350687	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.75		mg N/L	P350460	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P350528	
	EPA 365.1 Rev. 2.0	Total-P	0.036		mg P/L	P350581	
	SM 5310 B-00	Organic Carbon	5.1		mg C/L	P350549	
2017905	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P350368	

Ref. Method and Comment:
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.

Sample Location: LAKE ELLEN @ CENTER **Collection Date/Time: 08/16/2018 11:21**

Field ID: G2CE0060 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2017902	EPA 180.1 Rev. 2.0	Turbidity	1.2		NTU	P350381	
	EPA 300.0 Rev. 2.1	Chloride	13		mg Cl/L	P350644	
		Sulfate	12		mg SO4/L	P350646	
	SM 2120 B	Color (true)	30		PCU	P350378	
	SM 2320 B-97	Total Alkalinity	7.1		mg CaCO3/L	P350557	
	SM 2540 C-97	TDS	53		mg/L	P350816	
	SM 2540 D-97	TSS	3	I	mg/L	P350807	
	SM 4500 F-C-97	Fluoride	0.054	I	mg F/L	P350562	
2017904	EPA 350.1 Rev. 2.0	Ammonia-N	0.002	U	mg N/L	P350687	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.47		mg N/L	P350460	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P350528	
	EPA 365.1 Rev. 2.0	Total-P	0.013		mg P/L	P350581	
	SM 5310 B-00	Organic Carbon	6.0		mg C/L	P350549	
2017906	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P350368	

Ref. Method and Comment:
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.

Quality Assurance Report
Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P350381

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P350432

Component	Result	Code	Units
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: P350432

Component	Result	Code	Units
Arsenic	0.050	U	ug/L
Cadmium	0.020	U	ug/L
Chromium	0.40	U	ug/L
Copper	0.20	U	ug/L
Lead	0.050	U	ug/L
Nickel	0.20	U	ug/L
Silver	0.010	U	ug/L

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P350912

Component	Result	Code	Units
Lead	0.050	U	ug/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P350644

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P350646

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P350629

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

Quality Assurance Report
Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P350687

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P350460

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P350527

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P350528

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P350581

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P350368

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

Reference Method: SM 2120 B
Batch ID: P350378

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-97
Batch ID: P350556

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

Reference Method: SM 2320 B-97
Batch ID: P350557

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

Quality Assurance Report
Method Blank Results

Reference Method: SM 2540 C-97
Batch ID: P350816

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P350807

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P350559

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 4500 F-C-97
Batch ID: P350562

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P350548

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

Reference Method: SM 5310 B-00
Batch ID: P350549

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: P350432

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	102		P	85 - 115
Iron	103		P	85 - 115
Magnesium	106		P	85 - 115
Potassium	100		P	85 - 115
Sodium	98.0		P	85 - 115
Zinc	102		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P350432

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Arsenic	102		P	85 - 115
Cadmium	105		P	85 - 115
Chromium	102		P	85 - 115
Copper	99.0		P	85 - 115
Lead	102		P	85 - 115
Nickel	101		P	85 - 115
Silver	101		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P350912

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Lead	101		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P350644

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: P350646

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P350629

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P350687

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	98.4		P	90 - 110

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P350460

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P350527

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P350528

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P350581

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P350368

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

Reference Method: SM 2120 B
Batch ID: P350378

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	98.4		P	85 - 115

Reference Method: SM 2320 B-97
Batch ID: P350556

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

Reference Method: SM 2320 B-97
Batch ID: P350557

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

Reference Method: SM 4500 F-C-97
Batch ID: P350559

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	96.3		P	91 - 105

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: SM 4500 F-C-97
Batch ID: P350562

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	95.3		P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P350548

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	98.1		P	85 - 115

Reference Method: SM 5310 B-00
Batch ID: P350549

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

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P350432

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2017739	Calcium	105		P	80 - 120
2017739	Iron	104		P	80 - 120
2017739	Magnesium	101		P	80 - 120
2017739	Potassium	99.4		P	80 - 120
2017739	Sodium	99.1		P	80 - 120
2017739	Zinc	105		P	80 - 120
2017915	Calcium	104		P	80 - 120
2017915	Iron	103	104	P/P	80 - 120
2017915	Magnesium	104	107	P/P	80 - 120
2017915	Potassium	101	103	P/P	80 - 120
2017915	Sodium	97.3		P	80 - 120
2017915	Zinc	111	108	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P350432

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2017739	Arsenic	106		P	80 - 120
2017739	Cadmium	109		P	80 - 120
2017739	Chromium	103		P	80 - 120
2017739	Copper	101		P	80 - 120
2017739	Lead	105		P	80 - 120
2017739	Nickel	102		P	80 - 120
2017739	Silver	102		P	80 - 120
2017915	Arsenic	98.5	107	P/P	80 - 120
2017915	Cadmium	101	108	P/P	80 - 120
2017915	Chromium	96.5	103	P/P	80 - 120
2017915	Copper	93.2	101	P/P	80 - 120
2017915	Lead	98.1	106	P/P	80 - 120
2017915	Nickel	94.2	103	P/P	80 - 120
2017915	Silver	97.6	102	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P350912

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2020287	Lead	101	99.1	P/P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P350644

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2017839	Chloride	98.8		P	90 - 110
2017971	Chloride	96.1		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P350646

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2017839	Sulfate	101		P	90 - 110
2017971	Sulfate	97.3		P	90 - 110

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P350629

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2017776	Ammonia-N	98.5	101	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P350687

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2017903	Ammonia-N	95.9	94.3	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P350527

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2017776	NO2NO3-N	100	100	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P350528

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2017903	NO2NO3-N	102	104	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P350581

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2017903	Total-P	99.0	99.3	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P350368

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2017905	O-Phosphate-P	98.1	98.3	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Batch ID: P350559

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2018328	Fluoride	96.2	96.7	P/P	91 - 105

Reference Method: SM 4500 F-C-97
Batch ID: P350562

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2017977	Fluoride	95.6	96.1	P/P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P350548

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2017596	Organic Carbon	108		P	85 - 115

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: SM 5310 B-00
Batch ID: P350549

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2017903	Organic Carbon	97.6	97.9	P/P	85 - 115

Quality Assurance Report
Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P350381

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2017971	Turbidity	2.54	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P350432

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2017915	Calcium	0.0335	Spike	P	0 - 20
2017915	Iron	1.09	Spike	P	0 - 20
2017915	Magnesium	1.44	Spike	P	0 - 20
2017915	Potassium	1.26	Spike	P	0 - 20
2017915	Sodium	0.994	Spike	P	0 - 20
2017915	Zinc	2.21	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P350432

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2017915	Arsenic	7.68	Spike	P	0 - 20
2017915	Cadmium	6.38	Spike	P	0 - 20
2017915	Chromium	6.87	Spike	P	0 - 20
2017915	Copper	7.64	Spike	P	0 - 20
2017915	Lead	7.46	Spike	P	0 - 20
2017915	Nickel	8.72	Spike	P	0 - 20
2017915	Silver	4.46	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P350912

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2020287	Lead	1.79	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P350644

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2017839	Chloride	0.272	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P350646

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2017839	Sulfate	0.0437	Sample	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P350629

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2017776	Ammonia-N	2.14	Spike	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P350687

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2017903	Ammonia-N	1.60	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P350460

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2017897	Kjeldahl Nitrogen	5.50	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P350527

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2017776	NO2NO3-N	0.0	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P350528

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2017903	NO2NO3-N	1.46	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P350581

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2017903	Total-P	0.210	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P350368

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2017905	O-Phosphate-P	0.204	Spike	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P350378

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2017901	Color (true)	4.88	Sample	P	0 - 20

Quality Assurance Report
Precision

Reference Method: SM 2320 B-97
Batch ID: P350556

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2018328	Total Alkalinity	0.733	Sample	P	0 - 1.6

Reference Method: SM 2320 B-97
Batch ID: P350557

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2017977	Total Alkalinity	0.688	Sample	P	0 - 1.6

Reference Method: SM 2540 C-97
Batch ID: P350816

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2017901	TDS	1.79	Sample	P	0 - 10

Reference Method: SM 4500 F-C-97
Batch ID: P350559

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2018328	Fluoride	0.467	Spike	P	0 - 3.5

Reference Method: SM 4500 F-C-97
Batch ID: P350562

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2017977	Fluoride	0.484	Spike	P	0 - 3.5

Reference Method: SM 5310 B-00
Batch ID: P350548

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2017596	Organic Carbon	0.448	Spike	P	0 - 20

Reference Method: SM 5310 B-00
Batch ID: P350549

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2017903	Organic Carbon	0.203	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: A85971
Included Lab Sample IDs: 2017899, 2017900, 2017905, 2017906

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

Reference Method: SM 2120 B
Run ID: A85974
Included Lab Sample IDs: 2017895, 2017896, 2017901, 2017902

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	97.7	97.4	P/P	90 - 115

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A85975
Included Lab Sample IDs: 2017895, 2017896, 2017901, 2017902

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	100	104	P/P	95 - 105

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A86029
Included Lab Sample IDs: 2017897, 2017898, 2017903, 2017904

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	97.2	95.4	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A86032
Included Lab Sample IDs: 2017897, 2017898, 2017903, 2017904

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	100	100	P/P	90 - 110
NO2NO3-N	100	102	P/P	90 - 110

Reference Method: SM 5310 B-00
Run ID: A86036
Included Lab Sample IDs: 2017897, 2017898, 2017903, 2017904

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	96.4	96.8	P/P	90 - 110
Organic Carbon	97.8	96.4	P/P	90 - 110

Reference Method: SM 2320 B-97
Run ID: A86040
Included Lab Sample IDs: 2017895, 2017896, 2017901, 2017902

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	101	104	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: SM 4500 F-C-97
Run ID: A86040
Included Lab Sample IDs: 2017895, 2017896, 2017901, 2017902

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	98.1	98.0	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A86042
Included Lab Sample IDs: 2017915, 2017916

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	102	104	P/P	90 - 110
Iron	99.0	101	P/P	90 - 110
Magnesium	99.2	101	P/P	90 - 110
Potassium	98.0	99.2	P/P	90 - 110
Sodium	98.1	98.8	P/P	90 - 110
Zinc	103	106	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A86049
Included Lab Sample IDs: 2017895, 2017896, 2017901, 2017902

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

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A86067
Included Lab Sample IDs: 2017897, 2017898

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

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A86076
Included Lab Sample IDs: 2017897, 2017898

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

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A86078
Included Lab Sample IDs: 2017903, 2017904

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

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A86096
Included Lab Sample IDs: 2017903, 2017904

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	97.6	99.4	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A86106
Included Lab Sample IDs: 2017915, 2017916

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	99.1	99.8	P/P	90 - 110
Cadmium	99.8	99.0	P/P	90 - 110
Chromium	99.0	100	P/P	90 - 110
Copper	97.4	98.3	P/P	90 - 110
Lead	104	104	P/P	90 - 110
Nickel	97.5	98.5	P/P	90 - 110
Silver	98.3	97.7	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A86217
Included Lab Sample IDs: 2017916

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Lead	105	108	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						2.54	
EPA 200.7 Rev. 4.4	Calcium	102	105	104				0.0335
	Iron	103	104	103	104			1.09
	Magnesium	106	101	104	107			1.44
	Potassium	100	99.4	101	103			1.26
	Sodium	98.0	99.1	97.3				0.994
	Zinc	102	105	111	108			2.21
EPA 200.8 Rev. 5.4	Arsenic	102	106	98.5	107			7.68
	Cadmium	105	109	101	108			6.38
	Chromium	102	103	96.5	103			6.87
	Copper	99.0	101	93.2	101			7.64
	Lead	102	105	98.1	106			7.46
	Lead	101	101	99.1				1.79
	Nickel	101	102	94.2	103			8.72
	Silver	101	102	97.6	102			4.46
EPA 300.0 Rev. 2.1	Chloride	99.7	98.8	96.1			0.272	
	Sulfate	99.7	101	97.3			0.0437	
EPA 350.1 Rev. 2.0	Ammonia-N	99.1	98.5	101				2.14
	Ammonia-N	98.4	95.9	94.3				1.60
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	106						5.50
EPA 353.2 Rev. 2.0	NO2NO3-N	101	100	100				0.0
	NO2NO3-N	101	102	104				1.46
EPA 365.1 Rev. 2.0	Total-P	96.8	99.0	99.3				0.210
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	98.5	98.1	98.3				0.204
SM 2120 B	Color (true)	98.4					4.88	
SM 2320 B-97	Total Alkalinity	104					0.733	
	Total Alkalinity	104					0.688	
SM 2540 C-97	TDS						1.79	
SM 4500 F-C-97	Fluoride	96.3	96.2	96.7				0.467
	Fluoride	95.3	95.6	96.1				0.484
SM 5310 B-00	Organic Carbon	98.1	108					0.448
	Organic Carbon	97.0	97.6	97.9				0.203

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	2017895, 2017896, 2017901, 2017902
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2017915, 2017916
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2017915, 2017916
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	2017895, 2017896, 2017901, 2017902
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	2017895, 2017896, 2017901, 2017902
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	2017897, 2017898, 2017903, 2017904
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	2017897, 2017898, 2017903, 2017904
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	2017897, 2017898, 2017903, 2017904
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	2017897, 2017898, 2017903, 2017904

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2017899, 2017900, 2017905, 2017906
SM 2120 B / E31780	True Color measured at 450 nm	2017895, 2017896, 2017901, 2017902
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO3/L	2017895, 2017896, 2017901, 2017902
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	2017895, 2017896, 2017901, 2017902
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2017895, 2017896, 2017901, 2017902
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2017895, 2017896, 2017901, 2017902
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	2017897, 2017898, 2017903, 2017904

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	08/17/2018			08/17/2018 15:47	Julia Storbeck	2017895, 2017896, 2017901, 2017902
EPA 200.7 Rev. 4.4	08/17/2018	08/20/2018 13:00	Elliott D. Healy	08/21/2018 15:50	Betina Topolski	2017915
	08/17/2018	08/20/2018 13:00	Elliott D. Healy	08/21/2018 16:16	Betina Topolski	2017916
EPA 200.8 Rev. 5.4	08/17/2018	08/20/2018 13:00	Elliott D. Healy	08/23/2018 22:32	Allison Taylor	2017915
	08/17/2018	08/20/2018 13:00	Elliott D. Healy	08/23/2018 23:01	Allison Taylor	2017916
	08/17/2018	08/29/2018 15:15	Elliott D. Healy	08/30/2018 21:24	Robert K Palmer	2017916
EPA 300.0 Rev. 2.1	08/17/2018			08/22/2018 23:32	Lipi Saha	2017895
	08/17/2018			08/22/2018 23:44	Lipi Saha	2017896
	08/17/2018			08/22/2018 23:56	Lipi Saha	2017901
	08/17/2018			08/23/2018 00:08	Lipi Saha	2017902
EPA 350.1 Rev. 2.0	08/17/2018			08/22/2018 13:32	Ping Hua	2017897
	08/17/2018			08/22/2018 13:34	Ping Hua	2017898
	08/17/2018			08/23/2018 11:29	Ping Hua	2017903
	08/17/2018			08/23/2018 11:34	Ping Hua	2017904
EPA 351.2 Rev. 2.0	08/17/2018	08/20/2018 11:00	Adrian Shelby	08/21/2018 12:43	Joseph Suarez	2017897
	08/17/2018	08/20/2018 11:00	Adrian Shelby	08/21/2018 12:48	Joseph Suarez	2017898
	08/17/2018	08/20/2018 11:00	Adrian Shelby	08/21/2018 12:50	Joseph Suarez	2017903
	08/17/2018	08/20/2018 11:00	Adrian Shelby	08/21/2018 12:51	Joseph Suarez	2017904
EPA 353.2 Rev. 2.0	08/17/2018			08/21/2018 13:35	Lauren Bottorf	2017897
	08/17/2018			08/21/2018 13:36	Lauren Bottorf	2017898
	08/17/2018			08/21/2018 13:43	Lauren Bottorf	2017903
	08/17/2018			08/21/2018 13:52	Lauren Bottorf	2017904
EPA 365.1 Rev. 2.0	08/17/2018	08/22/2018 13:40	Sima Feizi	08/23/2018 10:03	Beverly Y. Sanders	2017897
	08/17/2018	08/22/2018 13:40	Sima Feizi	08/23/2018 10:04	Beverly Y. Sanders	2017898
	08/17/2018	08/22/2018 13:40	Sima Feizi	08/23/2018 11:48	Beverly Y. Sanders	2017903
	08/17/2018	08/22/2018 13:40	Sima Feizi	08/23/2018 11:49	Beverly Y. Sanders	2017904
EPA 365.1 Rev. 2.0 dissolved	08/17/2018			08/17/2018 13:10	Lipi Saha	2017905
	08/17/2018			08/17/2018 13:22	Lipi Saha	2017899
	08/17/2018			08/17/2018 13:23	Lipi Saha	2017900
	08/17/2018			08/17/2018 13:24	Lipi Saha	2017906
SM 2120 B	08/17/2018			08/17/2018 15:59	Julia Storbeck	2017901
	08/17/2018			08/17/2018 16:04	Julia Storbeck	2017895, 2017896
	08/17/2018			08/17/2018 16:05	Julia Storbeck	2017902
SM 2320 B-97	08/17/2018			08/21/2018 21:42	Dale L. Simmons	2017895
	08/17/2018			08/21/2018 22:46	Dale L. Simmons	2017896
	08/17/2018			08/21/2018 22:56	Dale L. Simmons	2017901
	08/17/2018			08/21/2018 23:07	Dale L. Simmons	2017902
SM 2540 C-97	08/17/2018			08/22/2018 15:33	Yijie Li	2017895, 2017896, 2017901, 2017902
SM 2540 D-97	08/17/2018			08/22/2018 15:33	Yijie Li	2017895, 2017896, 2017901, 2017902
SM 4500 F-C-97	08/17/2018			08/21/2018 21:42	Dale L. Simmons	2017895

Preparation and Analysis Log

Ref. Method	Received Date	Prep Date/Time	Prepared By	Analysis Date/Time	Analyzed By	Associated Samples
SM 4500 F-C-97	08/17/2018			08/21/2018 22:46	Dale L. Simmons	2017896
	08/17/2018			08/21/2018 22:56	Dale L. Simmons	2017901
	08/17/2018			08/21/2018 23:07	Dale L. Simmons	2017902
SM 5310 B-00	08/17/2018			08/21/2018 02:03	Megan Treadwell	2017897
	08/17/2018			08/21/2018 02:17	Megan Treadwell	2017898
	08/17/2018			08/21/2018 03:11	Megan Treadwell	2017903
	08/17/2018			08/21/2018 04:37	Megan Treadwell	2017904