Chemical Analysis Report

WQAP-2016-12-14-04

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

Event Description: **Merritt's Mill Pond**
Request ID: **RQ-2016-12-12-54**
Customer: **WQAP**
Project ID: **BMAP**

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Certified by: Thekkekalathil Chandrasekhar, Chemist Administrator Date Certified: 09-JAN-2017 14:14

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: Merritt's Mill Pond 500 meters upstream of dam Collection Date/Time: 12/14/2016 10:20

Field ID: G2WA0009-12142016 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1857880	EPA 180.1 Rev. 2.0	Turbidity	0.95		NTU	P316810	
	EPA 300.0 Rev. 2.1	Chloride	4.8	A	mg Cl/L	P317356	
	SM 2120 B	Color (true)	6.1		PCU	P316875	
	SM 2320 B-97	Total Alkalinity	114		mg CaCO3/L	P317138	
	SM 2540 C-97	TDS	154		mg/L	P317408	
	SM 2540 D-97	TSS	2	I	mg/L	P317286	
	SM 4500 F-C-97	Fluoride	0.040	I	mg F/L	P317330	
1857883	EPA 350.1 Rev. 2.0	Ammonia-N	0.061		mg N/L	P317601	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.16	I	mg N/L	P317004	
	EPA 353.2 Rev. 2.0	NO2NO3-N	2.3		mg N/L	P317150	
	EPA 365.1 Rev. 2.0	Total-P	0.022		mg P/L	P317171	
	SM 5310 B-00	Organic Carbon	1.6		mg C/L	P316966	
1857886	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.012		mg P/L	P316871	
1857892	EPA 200.7 Rev. 4.4	Calcium	47.8		mg/L	P317014	
		Iron	45	I	ug/L	P317014	
		Magnesium	2.62		mg/L	P317014	
		Potassium	0.43	I	mg/L	P317014	
		Sodium	2.1		mg/L	P317014	
		Zinc	5.0	U	ug/L	P317014	
	EPA 200.8 Rev. 5.4	Arsenic	0.30		ug/L	P317014	
		Cadmium	0.020	U	ug/L	P317014	
		Chromium	0.80		ug/L	P317014	
		Copper	0.10	U	ug/L	P317014	
		Lead	0.050	U	ug/L	P317014	
		Nickel	0.050	U	ug/L	P317014	
		Silver	0.0050	U	ug/L	P317014	

Ref. Method and Comment:
EPA 180.1 Rev. 2.0: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.

Sample Location: Merritt's Mill Pond mid under power lines Collection Date/Time: 12/14/2016 10:35

Field ID: G2WA0008-12142016 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1857881	EPA 180.1 Rev. 2.0	Turbidity	0.85		NTU	P316810	
	EPA 300.0 Rev. 2.1	Chloride	4.7		mg Cl/L	P317356	
	SM 2120 B	Color (true)	2.5	U	PCU	P316875	
	SM 2320 B-97	Total Alkalinity	123	A	mg CaCO3/L	P317138	
	SM 2540 C-97	TDS	145		mg/L	P317408	
	SM 2540 D-97	TSS	2	I	mg/L	P317286	
	SM 4500 F-C-97	Fluoride	0.043	I	mg F/L	P317330	
1857884	EPA 350.1 Rev. 2.0	Ammonia-N	0.060		mg N/L	P317601	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.12	I	mg N/L	P317004	
	EPA 353.2 Rev. 2.0	NO2NO3-N	2.6		mg N/L	P317150	
	EPA 365.1 Rev. 2.0	Total-P	0.022		mg P/L	P317171	

Field ID: G2WA0008-12142016 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1857884	SM 5310 B-00	Organic Carbon	0.82	I	mg C/L	P316966	
1857887	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.016		mg P/L	P316871	
1857893	EPA 200.7 Rev. 4.4	Calcium	51.5		mg/L	P317014	
		Iron	30	U	ug/L	P317014	
		Magnesium	2.64		mg/L	P317014	
		Potassium	0.43	I	mg/L	P317014	
		Sodium	2.0		mg/L	P317014	
		Zinc	5.0	U	ug/L	P317014	
	EPA 200.8 Rev. 5.4	Arsenic	0.28		ug/L	P317014	
		Cadmium	0.020	U	ug/L	P317014	
		Chromium	0.88		ug/L	P317014	
		Copper	0.10	U	ug/L	P317014	
		Lead	0.050	U	ug/L	P317014	
		Nickel	0.050	U	ug/L	P317014	
		Silver	0.0050	U	ug/L	P317014	

Ref. Method and Comment:
EPA 180.1 Rev. 2.0: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.

Sample Location: Merritt's Mill Pond 600 meters downstream of Jackson Blue Spring **Collection Date/Time: 12/14/2016 09:50**

Field ID: G2WA0007-12142016 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1857882	EPA 180.1 Rev. 2.0	Turbidity	0.25		NTU	P316810	
	EPA 300.0 Rev. 2.1	Chloride	4.8		mg Cl/L	P317356	
	SM 2120 B	Color (true)	2.5	U	PCU	P316875	
	SM 2320 B-97	Total Alkalinity	119	A	mg CaCO3/L	P317132	
	SM 2540 C-97	TDS	163		mg/L	P317408	
	SM 2540 D-97	TSS	3	I	mg/L	P317286	
	SM 4500 F-C-97	Fluoride	0.040	I	mg F/L	P317331	
1857885	EPA 350.1 Rev. 2.0	Ammonia-N	0.005		mg N/L	P317601	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.080	U	mg N/L	P317004	
	EPA 353.2 Rev. 2.0	NO2NO3-N	3.3		mg N/L	P317150	
	EPA 365.1 Rev. 2.0	Total-P	0.020		mg P/L	P317171	
	SM 5310 B-00	Organic Carbon	0.50	U	mg C/L	P316966	
1857888	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.019		mg P/L	P316871	
1857894	EPA 200.7 Rev. 4.4	Calcium	52.6		mg/L	P317014	
		Iron	30	U	ug/L	P317014	
		Magnesium	2.35		mg/L	P317014	
		Potassium	0.42	I	mg/L	P317014	
		Sodium	1.9	I	mg/L	P317014	
		Zinc	5.0	U	ug/L	P317014	
	EPA 200.8 Rev. 5.4	Arsenic	0.26		ug/L	P317014	
		Cadmium	0.020	U	ug/L	P317014	
		Chromium	1.12		ug/L	P317014	

Field ID: G2WA0007-12142016 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1857894	EPA 200.8 Rev. 5.4	Copper	0.10	U	ug/L	P317014	
		Lead	0.050	U	ug/L	P317014	
		Nickel	0.050	U	ug/L	P317014	
		Silver	0.0050	U	ug/L	P317014	

Ref. Method and Comment:
EPA 180.1 Rev. 2.0: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.

Quality Assurance Report
Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P316810

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P317014

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: P317014

Component	Result	Code	Units
Arsenic	0.050	U	ug/L
Cadmium	0.020	U	ug/L
Chromium	0.050	U	ug/L
Copper	0.10	U	ug/L
Lead	0.050	U	ug/L
Nickel	0.050	U	ug/L
Silver	0.0050	U	ug/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P317356

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P317601

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P317004

Component	Result	Code	Units

Quality Assurance Report
Method Blank Results

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P317004

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P317150

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P317171

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P316871

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

Reference Method: SM 2120 B
Batch ID: P316875

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-97
Batch ID: P317132

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

Reference Method: SM 2320 B-97
Batch ID: P317138

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

Reference Method: SM 2540 C-97
Batch ID: P317408

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P317286

Component	Result	Code	Units
TSS	2	U	mg/L

Quality Assurance Report
Method Blank Results

Reference Method: SM 4500 F-C-97
Batch ID: P317330

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 4500 F-C-97
Batch ID: P317331

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P316966

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: P317014

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	105		P	85 - 115
Iron	107		P	85 - 115
Magnesium	108		P	85 - 115
Potassium	104		P	85 - 115
Sodium	107		P	85 - 115
Zinc	99.1		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P317014

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Arsenic	98.7		P	85 - 115
Cadmium	102		P	85 - 115
Chromium	101		P	85 - 115
Copper	95.8		P	85 - 115
Lead	99.5		P	85 - 115
Nickel	97.7		P	85 - 115
Silver	100		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P317356

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P317601

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

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P317004

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P317150

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	94.5		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P317171

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total-P	94.6		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P316871

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

Reference Method: SM 2320 B-97
Batch ID: P317132

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	99.8		P	95 - 108

Reference Method: SM 2320 B-97
Batch ID: P317138

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	99.6		P	95 - 108

Reference Method: SM 4500 F-C-97
Batch ID: P317330

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	98.5		P	92 - 103

Reference Method: SM 4500 F-C-97
Batch ID: P317331

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	98.5		P	92 - 103

Reference Method: SM 5310 B-00
Batch ID: P316966

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	99.5		P	85 - 115

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P317014

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1857859	Calcium	105		P	80 - 120
1857859	Iron	108		P	80 - 120
1857859	Magnesium	104		P	80 - 120
1857859	Potassium	101		P	80 - 120
1857859	Sodium	104		P	80 - 120
1857859	Zinc	97.2		P	80 - 120
1857893	Calcium	101		P	80 - 120
1857893	Iron	107	109	P/P	80 - 120
1857893	Magnesium	107	110	P/P	80 - 120
1857893	Potassium	104	106	P/P	80 - 120
1857893	Sodium	104	106	P/P	80 - 120
1857893	Zinc	96.9	97.1	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P317014

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1857859	Arsenic	98.6		P	80 - 120
1857859	Cadmium	99.3		P	80 - 120
1857859	Chromium	98.8		P	80 - 120
1857859	Copper	92.2		P	80 - 120
1857859	Lead	99.5		P	80 - 120
1857859	Nickel	93.4		P	80 - 120
1857859	Silver	98.9		P	80 - 120
1857893	Arsenic	97.6	98.8	P/P	80 - 120
1857893	Cadmium	101	102	P/P	80 - 120
1857893	Chromium	101	102	P/P	80 - 120
1857893	Copper	91.2	92.4	P/P	80 - 120
1857893	Lead	100	99.9	P/P	80 - 120
1857893	Nickel	93.1	94.6	P/P	80 - 120
1857893	Silver	99.8	101	P/P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P317356

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1857880	Chloride	100		P	90 - 110
1858180	Chloride	96.0		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P317601

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1857883	Ammonia-N	97.1	97.8	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P317004

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1857883	Kjeldahl Nitrogen	102	103	P/P	90 - 110

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P317150

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1857854	NO2NO3-N	93.5	95.5	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P317171

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1857835	Total-P	94.8	97.7	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P316871

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1857886	O-Phosphate-P	97.6	98.9	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Batch ID: P317330

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1857881	Fluoride	96.7	96.7	P/P	91 - 105

Reference Method: SM 4500 F-C-97
Batch ID: P317331

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1857882	Fluoride	96.3	95.7	P/P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P316966

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1857532	Organic Carbon	98.5	98.6	P/P	85 - 115

Quality Assurance Report
Precision

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P317014

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1857893	Calcium	0.416	Spike	P	0 - 20
1857893	Iron	1.75	Spike	P	0 - 20
1857893	Magnesium	1.66	Spike	P	0 - 20
1857893	Potassium	2.30	Spike	P	0 - 20
1857893	Sodium	1.55	Spike	P	0 - 20
1857893	Zinc	0.228	Spike	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P317014

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1857893	Arsenic	1.22	Spike	P	0 - 20
1857893	Cadmium	1.06	Spike	P	0 - 20
1857893	Chromium	1.42	Spike	P	0 - 20
1857893	Copper	1.33	Spike	P	0 - 20
1857893	Lead	0.182	Spike	P	0 - 20
1857893	Nickel	1.59	Spike	P	0 - 20
1857893	Silver	1.44	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P317356

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1857880	Chloride	0.151	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P317601

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1857883	Ammonia-N	0.327	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P317004

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1857883	Kjeldahl Nitrogen	0.389	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P317150

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1857854	NO2NO3-N	2.12	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P317171

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1857835	Total-P	3.07	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P316871

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1857886	O-Phosphate-P	1.18	Spike	P	0 - 20

Quality Assurance Report
Precision

Reference Method: SM 2120 B
Batch ID: P316875

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1858040	Color (true)	0.632	Sample	P	0 - 20

Reference Method: SM 2320 B-97
Batch ID: P317132

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1857882	Total Alkalinity	1.27	Sample	P	0 - 4.8

Reference Method: SM 2320 B-97
Batch ID: P317138

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1857881	Total Alkalinity	0.776	Sample	P	0 - 4.8

Reference Method: SM 2540 C-97
Batch ID: P317408

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1857802	TDS	7.48	Sample	P	0 - 10

Reference Method: SM 2540 D-97
Batch ID: P317286

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1857802	TSS	5.41	Sample	P	0 - 10

Reference Method: SM 4500 F-C-97
Batch ID: P317330

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1857881	Fluoride	0.0	Spike	P	0 - 3.0

Reference Method: SM 4500 F-C-97
Batch ID: P317331

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1857882	Fluoride	0.539	Spike	P	0 - 3.0

Reference Method: SM 5310 B-00
Batch ID: P316966

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1857532	Organic Carbon	0.107	Spike	P	0 - 20

Quality Assurance Report
Precision

* Sample, spike and/or laboratory control sample precision (LCS) is reported.
Replicate spike precision may be reported when sample results are below quantifiable levels.

Quality Assurance Report
Calibration Verification

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A73379
Included Lab Sample IDs: 1857880, 1857881, 1857882

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	97.5	97.5	P/P	95 - 105

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A73406
Included Lab Sample IDs: 1857886, 1857887, 1857888

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	97.0	96.8	P/P	90 - 110
O-Phosphate-P	98.3	97.0	P/P	90 - 110
O-Phosphate-P	98.5	97.8	P/P	90 - 110

Reference Method: SM 2120 B
Run ID: A73407
Included Lab Sample IDs: 1857880, 1857881, 1857882

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	101	99.8	P/P	85 - 115

Reference Method: SM 5310 B-00
Run ID: A73440
Included Lab Sample IDs: 1857883, 1857884, 1857885

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	99.4	100	P/P	90 - 110

Reference Method: SM 2320 B-97
Run ID: A73503
Included Lab Sample IDs: 1857880, 1857881, 1857882

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	101	98.0	P/P	90 - 110
Total Alkalinity	102	101	P/P	90 - 110
Total Alkalinity	98.3	100	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A73504
Included Lab Sample IDs: 1857883, 1857884, 1857885

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	102	102	P/P	90 - 110
Kjeldahl Nitrogen	107	102	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A73513
Included Lab Sample IDs: 1857892, 1857893, 1857894

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	97.0	96.3	P/P	90 - 110
Cadmium	99.6	99.6	P/P	90 - 110
Chromium	101	102	P/P	90 - 110
Copper	94.2	93.2	P/P	90 - 110
Lead	97.3	97.0	P/P	90 - 110
Nickel	95.8	94.3	P/P	90 - 110
Silver	102	102	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A73514
Included Lab Sample IDs: 1857883, 1857884, 1857885

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	90.5	90.5	P/P	90 - 110
NO2NO3-N	92.0	90.5	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A73532
Included Lab Sample IDs: 1857892, 1857893, 1857894

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	103	103	P/P	90 - 110
Calcium	103	102	P/P	90 - 110
Iron	102	103	P/P	90 - 110
Iron	103	102	P/P	90 - 110
Magnesium	102	103	P/P	90 - 110
Magnesium	103	102	P/P	90 - 110
Potassium	102	102	P/P	90 - 110
Potassium	103	102	P/P	90 - 110
Sodium	102	103	P/P	90 - 110
Sodium	102	102	P/P	90 - 110
Zinc	102	101	P/P	90 - 110
Zinc	99.5	102	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Run ID: A73565
Included Lab Sample IDs: 1857880, 1857881, 1857882

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	100	100	P/P	90 - 110
Fluoride	100	100	P/P	90 - 110
Fluoride	99.0	100	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A73573
Included Lab Sample IDs: 1857883, 1857884, 1857885

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	97.2	97.0	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A73576
Included Lab Sample IDs: 1857880, 1857881, 1857882

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

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A73671
Included Lab Sample IDs: 1857883, 1857884, 1857885

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	100	100	P/P	90 - 110
Ammonia-N	100	100	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 200.7 Rev. 4.4	Calcium	105	105	101				0.416
	Iron	107	108	107	109			1.75
	Magnesium	108	104	107	110			1.66
	Potassium	104	101	104	106			2.30
	Sodium	107	104	104	106			1.55
	Zinc	99.1	97.2	96.9	97.1			0.228
EPA 200.8 Rev. 5.4	Arsenic	98.7	98.6	97.6	98.8			1.22
	Cadmium	102	99.3	101	102			1.06
	Chromium	101	98.8	101	102			1.42
	Copper	95.8	92.2	91.2	92.4			1.33
	Lead	99.5	99.5	100	99.9			0.182
	Nickel	97.7	93.4	93.1	94.6			1.59
	Silver	100	98.9	99.8	101			1.44
EPA 300.0 Rev. 2.1	Chloride	100	100	96.0			0.151	
EPA 350.1 Rev. 2.0	Ammonia-N	101	97.1	97.8				0.327
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	107	102	103				0.389
EPA 353.2 Rev. 2.0	NO2NO3-N	94.5	93.5	95.5				2.12
EPA 365.1 Rev. 2.0	Total-P	94.6	94.8	97.7				3.07
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	97.7	97.6	98.9				1.18
SM 2120 B	Color (true)						0.632	
SM 2320 B-97	Total Alkalinity	99.8					1.27	
	Total Alkalinity	99.6					0.776	
SM 2540 C-97	TDS						7.48	
SM 2540 D-97	TSS						5.41	
SM 4500 F-C-97	Fluoride	98.5	96.7	96.7				0.0
	Fluoride	98.5	96.3	95.7				0.539
SM 5310 B-00	Organic Carbon	99.5	98.5	98.6				0.107

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	1857880, 1857881, 1857882
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	1857892, 1857893, 1857894
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	1857892, 1857893, 1857894
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	1857880, 1857881, 1857882
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	1857883, 1857884, 1857885
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	1857883, 1857884, 1857885
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	1857883, 1857884, 1857885
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	1857883, 1857884, 1857885
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	1857886, 1857887, 1857888
SM 2120 B / E31780	True Color measured at 450 nm	1857880, 1857881, 1857882
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO3/L	1857880, 1857881, 1857882
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	1857880, 1857881, 1857882
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices	1857880, 1857881, 1857882
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	1857880, 1857881, 1857882
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	1857883, 1857884, 1857885

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	12/14/2016			12/14/2016 16:19	Julie Michelle Frank	1857880, 1857881, 1857882
EPA 200.7 Rev. 4.4	12/14/2016	12/19/2016	Elliott D. Healy	12/21/2016	Joshua Ayres	1857892, 1857893, 1857894
EPA 200.8 Rev. 5.4	12/14/2016	12/19/2016	Elliott D. Healy	12/21/2016	Charles J. Peterson	1857892, 1857893, 1857894
EPA 300.0 Rev. 2.1	12/14/2016			12/22/2016	Ping Hua	1857880, 1857881, 1857882
EPA 350.1 Rev. 2.0	12/14/2016			12/29/2016	Sofia Elnemr	1857883, 1857884, 1857885
EPA 351.2 Rev. 2.0	12/14/2016	12/19/2016	Adrian Shelby	12/21/2016	Joseph Suarez	1857883, 1857884, 1857885
EPA 353.2 Rev. 2.0	12/14/2016			12/21/2016	Beverly Y. Sanders	1857883, 1857884, 1857885
EPA 365.1 Rev. 2.0	12/14/2016	12/21/2016	Vijayalakshmi Reddy	12/23/2016	Lipi Saha	1857883, 1857884, 1857885
EPA 365.1 Rev. 2.0 dissolved	12/14/2016			12/15/2016 14:21	Julia Storbeck	1857886
	12/14/2016			12/15/2016 14:48	Julia Storbeck	1857888
	12/14/2016			12/15/2016 15:01	Julia Storbeck	1857887
SM 2120 B	12/14/2016			12/15/2016 15:49	Jared I. Manley	1857880
	12/14/2016			12/15/2016 15:50	Jared I. Manley	1857881
	12/14/2016			12/15/2016 15:51	Jared I. Manley	1857882
SM 2320 B-97	12/14/2016			12/17/2016	Dale L. Simmons	1857880, 1857881, 1857882
SM 2540 C-97	12/14/2016			12/15/2016	Yijie Li	1857880, 1857881, 1857882
SM 2540 D-97	12/14/2016			12/15/2016	Yijie Li	1857880, 1857881, 1857882
SM 4500 F-C-97	12/14/2016			12/23/2016	Dale L. Simmons	1857880, 1857881, 1857882
SM 5310 B-00	12/14/2016			12/17/2016	Julie Michelle Frank	1857883, 1857884, 1857885