Chemical Analysis Report

WQAP-2016-04-27-05

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

Event Description: **Moriah Creek, Wakulla River Below Highway 98 Bridge**
Request ID: **RQ-2016-04-25-64**
Customer: **WQAP**
Project ID: **SMP**

Send Reports to:
FL Dept. of Environmental Protection
2600 Blair Stone Rd
MS #3560
Tallahassee, FL 32399-2400
Attn: Katrina Sanders

For additional information please contact
Timothy W. Fitzpatrick
Liang-Tsair Lin, Ph.D.
Colin Wright, Ph.D.
Thekkekalathil Chandrasekhar, PhD, QA Officer
Phone (850) 245-8085

Certified by: Thekkekalathil Chandrasekhar, Chemist Administrator Date Certified: 24-MAY-2016 16:12

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 group are included in this report: 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: WAKULLA RIVER BELOW US 98 **Collection Date/Time: 04/27/2016 09:30**

Field ID: G1WA0028 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1793543	EPA 180.1 Rev. 2.0	Turbidity	1.4		NTU	P303201	
	EPA 300.0 Rev. 2.1	Chloride	13		mg Cl/L	P303646	
	SM 2120 B	Color (true)	21		PCU	P303185	
	SM 2320 B-97	Total Alkalinity	140		mg CaCO3/L	P303814	
	SM 2540 C-97	TDS	194	A	mg/L	P303763	
	SM 2540 D-97	TSS	5	I	mg/L	P303754	
	SM 4500 F-C-97	Fluoride	0.12		mg F/L	P303818	
1793547	EPA 350.1 Rev. 2.0	Ammonia-N	0.009		mg N/L	P303792	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.20		mg N/L	P304040	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.31		mg N/L	P303833	
	EPA 365.1 Rev. 2.0	Total-P	0.033		mg P/L	P304233	
	SM 5310 B-00	Organic Carbon	2.2		mg C/L	P304636	
1793551	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.023		mg P/L	P303105	

Ref. Method and Comment:
SM 2540 D-97: The precision data is unavailable due to the low analyte concentration in the QC sample.

Sample Location: WAKULLA RIVER BELOW US 98 **Collection Date/Time: 04/27/2016 09:30**

Field ID: G1WA0028D Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1793555	EPA 180.1 Rev. 2.0	Turbidity	1.4		NTU	P303201	
	EPA 300.0 Rev. 2.1	Chloride	13		mg Cl/L	P303646	
	SM 2120 B	Color (true)	22		PCU	P303185	
	SM 2320 B-97	Total Alkalinity	139		mg CaCO3/L	P303814	
	SM 2540 C-97	TDS	177		mg/L	P303763	
	SM 2540 D-97	TSS	3	I	mg/L	P303754	
	SM 4500 F-C-97	Fluoride	0.12		mg F/L	P303818	
1793556	EPA 350.1 Rev. 2.0	Ammonia-N	0.010		mg N/L	P303795	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.17	I	mg N/L	P304041	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.31		mg N/L	P303834	
	EPA 365.1 Rev. 2.0	Total-P	0.032		mg P/L	P303917	
	SM 5310 B-00	Organic Carbon	2.2		mg C/L	P304637	
1793557	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.023		mg P/L	P303105	

Ref. Method and Comment:
SM 2540 D-97: The precision data is unavailable due to the low analyte concentration in the QC sample.

Sample Location: WAKULLA RIVER BELOW US 98 **Collection Date/Time: 04/27/2016 09:45**

Field ID: G1WA0028B Matrix: W-FIELD-BK

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1793558	EPA 180.1 Rev. 2.0	Turbidity	0.10	U	NTU	P303201	
	EPA 300.0 Rev. 2.1	Chloride	0.20	U	mg Cl/L	P303647	
	SM 2120 B	Color (true)	2.5	U	PCU	P303185	
	SM 2320 B-97	Total Alkalinity	0.65	U	mg CaCO3/L	P303814	
	SM 2540 C-97	TDS	15	U	mg/L	P303758	

Field ID: G1WA0028B Matrix: W-FIELD-BK

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1793558	SM 2540 D-97	TSS	2	U	mg/L	P303749	
	SM 4500 F-C-97	Fluoride	0.035	U	mg F/L	P303818	
1793559	EPA 350.1 Rev. 2.0	Ammonia-N	0.002	U	mg N/L	P303795	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.080	U	mg N/L	P304041	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P303834	
	EPA 365.1 Rev. 2.0	Total-P	0.002	I	mg P/L	P303917	
	SM 5310 B-00	Organic Carbon	0.50	U	mg C/L	P304637	
1793560	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P303105	

Ref. Method and Comment:
SM 2540 D-97: The precision data is unavailable due to the low analyte concentration in the QC sample.
EPA 365.1 Rev. 2.0: Total-P: The result was confirmed on 05/16/2016.

Sample Location: MORIAH CREEK AT ST MARKS RIVER **Collection Date/Time: 04/27/2016 11:00**

Field ID: G1WA0037 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1793544	EPA 180.1 Rev. 2.0	Turbidity	1.0		NTU	P303201	
	EPA 300.0 Rev. 2.1	Chloride	5.7		mg Cl/L	P303646	
	SM 2120 B	Color (true)	73	A	PCU	P303185	
	SM 2320 B-97	Total Alkalinity	169		mg CaCO3/L	P303814	
	SM 2540 C-97	TDS	219		mg/L	P303763	
	SM 2540 D-97	TSS	2	I	mg/L	P303754	
	SM 4500 F-C-97	Fluoride	0.11		mg F/L	P303818	
1793548	EPA 350.1 Rev. 2.0	Ammonia-N	0.009		mg N/L	P303795	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.54		mg N/L	P304040	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.009	I	mg N/L	P303833	
	EPA 365.1 Rev. 2.0	Total-P	0.022		mg P/L	P304233	
	SM 5310 B-00	Organic Carbon	12		mg C/L	P304636	
1793552	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.009	I	mg P/L	P303105	

Ref. Method and Comment:
SM 2540 D-97: The precision data is unavailable due to the low analyte concentration in the QC sample.

Sample Location: MORIAH CREEK AT US 98 **Collection Date/Time: 04/27/2016 13:00**

Field ID: G1WA0027 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1793545	EPA 180.1 Rev. 2.0	Turbidity	1.0		NTU	P303201	
	EPA 300.0 Rev. 2.1	Chloride	4.3		mg Cl/L	P303646	
	SM 2120 B	Color (true)	67		PCU	P303185	
	SM 2320 B-97	Total Alkalinity	193		mg CaCO3/L	P303814	
	SM 2540 C-97	TDS	244		mg/L	P303763	
	SM 2540 D-97	TSS	2	U	mg/L	P303754	
	SM 4500 F-C-97	Fluoride	0.10		mg F/L	P303818	
1793549	EPA 350.1 Rev. 2.0	Ammonia-N	0.014		mg N/L	P303795	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.60		mg N/L	P304040	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P303833	

Field ID: G1WA0027 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1793549	EPA 365.1 Rev. 2.0	Total-P	0.012		mg P/L	P304233	
	SM 5310 B-00	Organic Carbon	13		mg C/L	P304636	
1793553	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P303105	

Ref. Method and Comment:
SM 2540 D-97: The precision data is unavailable due to the low analyte concentration in the QC sample.

Sample Location: MORIAH CREEK100 METERS UPSTREAM OF NEWPORT RD. **Collection Date/Time: 04/27/2016 13:05**

Field ID: G1WA0057 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1793546	EPA 180.1 Rev. 2.0	Turbidity	0.80		NTU	P303201	
	EPA 300.0 Rev. 2.1	Chloride	4.6		mg Cl/L	P303646	
	SM 2120 B	Color (true)	64		PCU	P303185	
	SM 2320 B-97	Total Alkalinity	195		mg CaCO3/L	P303814	
	SM 2540 C-97	TDS	239		mg/L	P303763	
	SM 2540 D-97	TSS	2	I	mg/L	P303754	
	SM 4500 F-C-97	Fluoride	0.11		mg F/L	P303818	
1793550	EPA 350.1 Rev. 2.0	Ammonia-N	0.012		mg N/L	P303795	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.61		mg N/L	P304041	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	I	mg N/L	P303833	
	EPA 365.1 Rev. 2.0	Total-P	0.011		mg P/L	P304233	
	SM 5310 B-00	Organic Carbon	13		mg C/L	P304636	
1793554	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P303105	

Ref. Method and Comment:
SM 2540 D-97: The precision data is unavailable due to the low analyte concentration in the QC sample.

Quality Assurance Report
Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P303201

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P303646

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P303647

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Quality Assurance Report
Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P303792

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P303795

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P304040

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P304041

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P303833

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P303834

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P303917

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P304233

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P303105

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

Quality Assurance Report
Method Blank Results

Reference Method: SM 2120 B
Batch ID: P303185

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-97
Batch ID: P303814

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

Reference Method: SM 2540 C-97
Batch ID: P303758

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 C-97
Batch ID: P303763

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P303749

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P303754

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P303818

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P304636

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

Reference Method: SM 5310 B-00
Batch ID: P304637

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

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P303646

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Chloride	98.3		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P303647

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P303792

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P303795

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P304040

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P304041

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P303833

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P303834

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: P303917

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

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P304233

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P303105

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	104		P	90 - 110

Reference Method: SM 2320 B-97
Batch ID: P303814

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	101		P	95 - 105

Reference Method: SM 4500 F-C-97
Batch ID: P303818

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	96.0		P	92 - 103

Reference Method: SM 5310 B-00
Batch ID: P304636

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

Reference Method: SM 5310 B-00
Batch ID: P304637

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

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P303646

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1793399	Chloride	99.5		P	90 - 110
1793555	Chloride	98.5		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P303647

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1793603	Chloride	101		P	90 - 110
1793617	Chloride	98.5		P	90 - 110

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P303792

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1793444	Ammonia-N	101	102	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P303795

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1793548	Ammonia-N	101	101	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P304040

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1793407	Kjeldahl Nitrogen	98.6	98.8	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P304041

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1793550	Kjeldahl Nitrogen	96.5	95.5	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P303833

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1793442	NO2NO3-N	98.7	101	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P303834

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1793556	NO2NO3-N	99.5		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P303917

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1793556	Total-P	101	97.4	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P304233

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1793547	Total-P	97.4	101	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P303105

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1793446	O-Phosphate-P	102	103	P/P	90 - 110

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: SM 4500 F-C-97
Batch ID: P303818

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1793863	Fluoride	95.9	96.6	P/P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P304636

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1793332	Organic Carbon	97.5	98.0	P/P	85 - 115

Reference Method: SM 5310 B-00
Batch ID: P304637

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1793556	Organic Carbon	95.9	97.6	P/P	85 - 115

Quality Assurance Report
Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P303201

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1793532	Turbidity	0.687	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P303646

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1793399	Chloride	0.237	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P303647

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1793617	Chloride	0.115	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P303792

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1793444	Ammonia-N	1.34	Spike	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P303795

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1793548	Ammonia-N	0.209	Spike	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P304040

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1793407	Kjeldahl Nitrogen	0.162	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P304041

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1793550	Kjeldahl Nitrogen	0.653	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P303833

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1793442	NO2NO3-N	1.86	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P303834

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1793556	NO2NO3-N	0.587	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P303917

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1793556	Total-P	3.20	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P304233

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1793547	Total-P	3.71	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P303105

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1793446	O-Phosphate-P	1.27	Spike	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P303185

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1793544	Color (true)	1.39	Sample	P	0 - 20

Quality Assurance Report
Precision

Reference Method: SM 2320 B-97
Batch ID: P303814

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1793863	Total Alkalinity	0.505	Sample	P	0 - 4.8

Reference Method: SM 2540 C-97
Batch ID: P303758

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1792960	TDS	3.85	Sample	P	0 - 10

Reference Method: SM 2540 C-97
Batch ID: P303763

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1793543	TDS	4.63	Sample	P	0 - 10

Reference Method: SM 4500 F-C-97
Batch ID: P303818

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1793863	Fluoride	0.524	Spike	P	0 - 3.0

Reference Method: SM 5310 B-00
Batch ID: P304636

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1793332	Organic Carbon	0.272	Spike	P	0 - 20

Reference Method: SM 5310 B-00
Batch ID: P304637

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1793556	Organic Carbon	1.58	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: A69135
Included Lab Sample IDs: 1793551, 1793552, 1793553, 1793554, 1793557, 1793560

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.0	99.5	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: SM 2120 B
Run ID: A69157
Included Lab Sample IDs: 1793543, 1793544, 1793545, 1793546, 1793555, 1793558

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	99.1	99.7	P/P	90 - 115

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A69165
Included Lab Sample IDs: 1793543, 1793544, 1793545, 1793546, 1793555, 1793558

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	98.5	101	P/P	95 - 105

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A69217
Included Lab Sample IDs: 1793543, 1793544, 1793545, 1793546, 1793555, 1793558

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	101	102	P/P	90 - 110
Chloride	102	101	P/P	90 - 110
Chloride	99.1	100	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A69333
Included Lab Sample IDs: 1793547, 1793548, 1793549, 1793550, 1793556, 1793559

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

Reference Method: SM 2320 B-97
Run ID: A69345
Included Lab Sample IDs: 1793543, 1793544, 1793545, 1793546, 1793555, 1793558

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	97.7	99.9	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Run ID: A69345
Included Lab Sample IDs: 1793543, 1793544, 1793545, 1793546, 1793555, 1793558

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	99.0	97.0	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A69353
Included Lab Sample IDs: 1793547, 1793548, 1793549, 1793550, 1793556, 1793559

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	99.5	100	P/P	90 - 110
NO2NO3-N	99.5	99.5	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A69422
Included Lab Sample IDs: 1793556, 1793559

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

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A69462
Included Lab Sample IDs: 1793547, 1793548, 1793549, 1793550, 1793556, 1793559

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	97.7	97.0	P/P	90 - 110
Kjeldahl Nitrogen	98.6	97.2	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A69506
Included Lab Sample IDs: 1793547, 1793548, 1793549, 1793550

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

Reference Method: SM 5310 B-00
Run ID: A69584
Included Lab Sample IDs: 1793547, 1793548, 1793549, 1793550, 1793556, 1793559

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	97.7	98.2	P/P	90 - 110
Organic Carbon	98.4	97.7	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					0.687	
EPA 300.0 Rev. 2.1	Chloride	98.3	99.5	98.5		0.237	
	Chloride	100	98.5	101		0.115	
EPA 350.1 Rev. 2.0	Ammonia-N	99.9	101	102			1.34
	Ammonia-N	100	101	101			0.209
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	103	98.6	98.8			0.162
	Kjeldahl Nitrogen	102	96.5	95.5			0.653
EPA 353.2 Rev. 2.0	NO2NO3-N	98.5	98.7	101			1.86
	NO2NO3-N	101	99.5				0.587
EPA 365.1 Rev. 2.0	Total-P	101	101	97.4			3.20
	Total-P	104	97.4	101			3.71
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	104	102	103			1.27
SM 2120 B	Color (true)					1.39	
SM 2320 B-97	Total Alkalinity	101				0.505	
SM 2540 C-97	TDS					3.85	
	TDS					4.63	

Quality Assurance Report
Summary

Ref. Method	Analyte	LCS % Recovery	MS % Recovery		Precision		
					LCS	SMP	MS
SM 4500 F-C-97	Fluoride	96.0	95.9	96.6			0.524
SM 5310 B-00	Organic Carbon	98.6	97.5	98.0			0.272
	Organic Carbon	97.6	95.9	97.6			1.58

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	1793543, 1793544, 1793545, 1793546, 1793555, 1793558
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	1793543, 1793544, 1793545, 1793546, 1793555, 1793558
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	1793547, 1793548, 1793549, 1793550, 1793556, 1793559
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	1793547, 1793548, 1793549, 1793550, 1793556, 1793559
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	1793547, 1793548, 1793549, 1793550, 1793556, 1793559
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	1793547, 1793548, 1793549, 1793550, 1793556, 1793559
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	1793551, 1793552, 1793553, 1793554, 1793557, 1793560
SM 2120 B / E31780	True Color measured at 450 nm	1793543, 1793544, 1793545, 1793546, 1793555, 1793558
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO3/L	1793543, 1793544, 1793545, 1793546, 1793555, 1793558
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	1793543, 1793544, 1793545, 1793546, 1793555, 1793558
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices	1793543, 1793544, 1793545, 1793546, 1793555, 1793558
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	1793543, 1793544, 1793545, 1793546, 1793555, 1793558
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	1793547, 1793548, 1793549, 1793550, 1793556, 1793559

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	04/27/2016			04/28/2016 15:12	Sima Feizi	1793543, 1793544, 1793545, 1793546, 1793555, 1793558
EPA 300.0 Rev. 2.1	04/27/2016			05/04/2016	Elisa J Lutz	1793543, 1793544, 1793545, 1793555
	04/27/2016			05/05/2016	Elisa J Lutz	1793546, 1793558
EPA 350.1 Rev. 2.0	04/27/2016			05/06/2016	Diana M. Turner	1793547, 1793548, 1793549, 1793550, 1793556, 1793559
EPA 351.2 Rev. 2.0	04/27/2016	05/11/2016	Sofia Elnemr	05/12/2016	Christopher Armour	1793547, 1793548, 1793549, 1793550, 1793556, 1793559
EPA 353.2 Rev. 2.0	04/27/2016			05/09/2016	Peter D. Kaus	1793547, 1793548, 1793549, 1793550, 1793556, 1793559
EPA 365.1 Rev. 2.0	04/27/2016	05/10/2016	Vijayalakshmi Reddy	05/11/2016	Lipi Saha	1793556, 1793559
	04/27/2016	05/13/2016	Lipi Saha	05/16/2016	Lipi Saha	1793547, 1793548, 1793549, 1793550
EPA 365.1 Rev. 2.0 dissolved	04/27/2016			04/27/2016 16:15	Julia Storbeck	1793551
	04/27/2016			04/27/2016 16:16	Julia Storbeck	1793557
	04/27/2016			04/27/2016 16:17	Julia Storbeck	1793560
	04/27/2016			04/27/2016 16:18	Julia Storbeck	1793552
	04/27/2016			04/27/2016 16:19	Julia Storbeck	1793553, 1793554
SM 2120 B	04/27/2016			04/28/2016 13:36	Rochelle Y Jackson	1793543
	04/27/2016			04/28/2016 13:38	Rochelle Y Jackson	1793544, 1793545
	04/27/2016			04/28/2016 13:39	Rochelle Y Jackson	1793546
	04/27/2016			04/28/2016 13:40	Rochelle Y Jackson	1793555
	04/27/2016			04/28/2016 13:41	Rochelle Y Jackson	1793558
SM 2320 B-97	04/27/2016			05/06/2016	Dale L. Simmons	1793543, 1793544, 1793545, 1793546, 1793555, 1793558
SM 2540 C-97	04/27/2016			04/29/2016	Yijie Li	1793543, 1793544, 1793545, 1793546, 1793555, 1793558
SM 2540 D-97	04/27/2016			04/29/2016	Yijie Li	1793543, 1793544, 1793545, 1793546, 1793555, 1793558
SM 4500 F-C-97	04/27/2016			05/06/2016	Dale L. Simmons	1793543, 1793544, 1793545, 1793546, 1793555, 1793558
SM 5310 B-00	04/27/2016			05/19/2016	Diana M. Turner	1793547, 1793548, 1793549, 1793550, 1793556, 1793559