

Chemical Analysis Report

WQAP-2016-04-06-02

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

Event Description: **Caney Creek, Ward Creek and Lake Lafayette Drain**
Request ID: **RQ-2016-04-04-61**
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: 04-MAY-2016 11:23



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 LAFAYETTE DRAIN 250 METERS
DOWNSTREAM OF WEEMS RD.**

Collection Date/Time: 04/06/2016 10:15

Field ID: G1WA0007

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1787203	EPA 180.1 Rev. 2.0	Turbidity	5.1		NTU	P301756	
	EPA 300.0 Rev. 2.1	Chloride	3.5		mg Cl/L	P302028	
	SM 2120 B	Color (true)	11		PCU	P301782	
	SM 2320 B-97	Total Alkalinity	28		mg CaCO3/L	P301981	
	SM 2540 C-97	TDS	67		mg/L	P302482	
	SM 2540 D-97	TSS	4	I	mg/L	P302397	
	SM 4500 F-C-97	Fluoride	0.059	I	mg F/L	P301991	
1787204	EPA 350.1 Rev. 2.0	Ammonia-N	0.009		mg N/L	P302171	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.29		mg N/L	P302391	MS
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.080		mg N/L	P302014	
	EPA 365.1 Rev. 2.0	Total-P	0.050		mg P/L	P302223	
	SM 5310 B-00	Organic Carbon	2.6		mg C/L	P302247	
1787205	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.005	I	mg P/L	P301724	

Ref. Method and Comment:

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

EPA 350.1 Rev. 2.0: Matrix spike recovery data is unavailable due to high analyte concentration in the QC sample.

Sample Location: CANEY CREEK UPSTREAM OF US 90

Collection Date/Time: 04/06/2016 12:35

Field ID: G1WA0014

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1787200	EPA 180.1 Rev. 2.0	Turbidity	16		NTU	P301756	
	EPA 300.0 Rev. 2.1	Chloride	4.6		mg Cl/L	P302028	
	SM 2120 B	Color (true)	74	Q	PCU	P302162	
	SM 2320 B-97	Total Alkalinity	15		mg CaCO3/L	P301981	
	SM 2540 C-97	TDS	55		mg/L	P302482	
	SM 2540 D-97	TSS	12		mg/L	P302397	
	SM 4500 F-C-97	Fluoride	0.080	I	mg F/L	P301991	
1787201	EPA 350.1 Rev. 2.0	Ammonia-N	0.061		mg N/L	P302171	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.63		mg N/L	P302391	MS
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.19		mg N/L	P302014	
	EPA 365.1 Rev. 2.0	Total-P	0.29		mg P/L	P302223	
	SM 5310 B-00	Organic Carbon	7.0		mg C/L	P302247	
1787202	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.19		mg P/L	P301724	
1787221	EPA 200.7 Rev. 4.4	Calcium	5.61		mg/L	P301827	
		Iron	900		ug/L	P301827	
		Magnesium	1.66		mg/L	P301827	
		Potassium	1.9		mg/L	P301827	
		Sodium	2.9		mg/L	P301827	
	EPA 200.8 Rev. 5.4	Zinc	5.0	U	ug/L	P301827	
		Arsenic	0.54		ug/L	P301827	
		Cadmium	0.020	U	ug/L	P301827	
		Chromium	1.61		ug/L	P301827	

Field ID: G1WA0014

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1787221	EPA 200.8 Rev. 5.4	Copper	0.47		ug/L	P301827	
		Lead	0.71		ug/L	P301827	
		Nickel	0.53		ug/L	P301827	
		Silver	0.0050	U	ug/L	P301827	

Ref. Method and Comment:

SM 2120 B: Sample reanalyzed out of holding time due to analytical difficulties.

SM 2540 D-97: The precision data is unavailable due to the low analyte concentration in the QC sample. Poor replication with field duplicate confirmed on 04/20/2016.

EPA 350.1 Rev. 2.0: Matrix spike recovery data is unavailable due to high analyte concentration in the QC sample.

EPA 200.8 Rev. 5.4: The lead result was confirmed on 04/29/2016.

Sample Location: CANEY CREEK UPSTREAM OF US 90

Collection Date/Time: 04/06/2016 12:35

Field ID: G1WA0014D

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1787206	EPA 180.1 Rev. 2.0	Turbidity	16		NTU	P301756	
	EPA 300.0 Rev. 2.1	Chloride	4.6		mg Cl/L	P302028	
	SM 2120 B	Color (true)	74		PCU	P301781	
	SM 2320 B-97	Total Alkalinity	15		mg CaCO3/L	P301982	
	SM 2540 C-97	TDS	63		mg/L	P302482	
	SM 2540 D-97	TSS	2	I	mg/L	P302397	
	SM 4500 F-C-97	Fluoride	0.080	I	mg F/L	P301992	
1787207	EPA 350.1 Rev. 2.0	Ammonia-N	0.060		mg N/L	P302171	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.66		mg N/L	P302391	MS
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.19		mg N/L	P302014	
	EPA 365.1 Rev. 2.0	Total-P	0.28		mg P/L	P302223	
	SM 5310 B-00	Organic Carbon	7.1		mg C/L	P302247	
1787208	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.19		mg P/L	P301724	
1787222	EPA 200.7 Rev. 4.4	Calcium	5.75		mg/L	P301827	
		Iron	900		ug/L	P301827	
		Magnesium	1.70		mg/L	P301827	
		Potassium	2.0		mg/L	P301827	
		Sodium	3.0		mg/L	P301827	
		Zinc	5.0	U	ug/L	P301827	
	EPA 200.8 Rev. 5.4	Arsenic	0.53		ug/L	P301827	
		Cadmium	0.020	U	ug/L	P301827	
		Chromium	1.59		ug/L	P301827	
		Copper	0.62		ug/L	P301827	
		Lead	0.69		ug/L	P301827	
		Nickel	0.51		ug/L	P301827	
		Silver	0.0050	U	ug/L	P301827	

Ref. Method and Comment:

SM 2540 D-97: The precision data is unavailable due to the low analyte concentration in the QC sample. Poor replication with field duplicate confirmed on 04/20/2016.

EPA 350.1 Rev. 2.0: Matrix spike recovery data is unavailable due to high analyte concentration in the QC sample.

EPA 200.8 Rev. 5.4: The lead result was confirmed on 04/29/2016.

Sample Location: FIELD BLANK

Collection Date/Time: 04/06/2016 12:20

Field ID: G1WA0014B

Matrix: W-FIELD-BK

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1787209	EPA 180.1 Rev. 2.0	Turbidity	0.10	U	NTU	P301756	
	EPA 300.0 Rev. 2.1	Chloride	0.20	U	mg Cl/L	P302028	
	SM 2120 B	Color (true)	2.5	U	PCU	P301782	
	SM 2320 B-97	Total Alkalinity	0.65	U	mg CaCO3/L	P301982	
	SM 2540 C-97	TDS	15	U	mg/L	P302479	
	SM 2540 D-97	TSS	2	U	mg/L	P302394	
	SM 4500 F-C-97	Fluoride	0.035	U	mg F/L	P301992	
1787210	EPA 350.1 Rev. 2.0	Ammonia-N	0.002	U	mg N/L	P302171	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.080	U	mg N/L	P302468	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P302014	
	EPA 365.1 Rev. 2.0	Total-P	0.003	I	mg P/L	P302224	
	SM 5310 B-00	Organic Carbon	0.52	I	mg C/L	P302247	
1787211	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P301724	
1787223	EPA 200.7 Rev. 4.4	Calcium	0.075	U	mg/L	P301827	
		Iron	30	U	ug/L	P301827	
		Magnesium	0.040	U	mg/L	P301827	
		Potassium	0.30	U	mg/L	P301827	
		Sodium	0.50	U	mg/L	P301827	
		Zinc	5.0	U	ug/L	P301827	
	EPA 200.8 Rev. 5.4	Arsenic	0.050	U	ug/L	P301827	
		Cadmium	0.020	U	ug/L	P301827	
		Chromium	0.050	U	ug/L	P301827	
		Copper	0.10	U	ug/L	P301827	
		Lead	0.050	U	ug/L	P301827	
		Nickel	0.050	U	ug/L	P301827	
		Silver	0.0050	U	ug/L	P301827	

Ref. Method and Comment:

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

EPA 350.1 Rev. 2.0: Matrix spike recovery data is unavailable due to high analyte concentration in the QC sample.

EPA 365.1 Rev. 2.0: Total-P: The result was confirmed on 04/20/2016.

SM 5310 B-00: The result was confirmed on 04/14/2016.

Quality Assurance Report Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0

Batch ID: P301756

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P301827

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

Quality Assurance Report Method Blank Results

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P301827

Component	Result	Code	Units
Sodium	0.50	U	mg/L
Zinc	5.0	U	ug/L

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P301827

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: P302028

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P302171

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P302391

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P302468

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P302014

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P302223

Component	Result	Code	Units
Total-P	0.003	I	mg P/L

Quality Assurance Report Method Blank Results

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P302224

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P301724

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

Reference Method: SM 2120 B
Batch ID: P301781

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2120 B
Batch ID: P301782

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2120 B
Batch ID: P302162

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-97
Batch ID: P301981

Component	Result	Code	Units
Total Alkalinity	0.65	U	mg CaCO ₃ /L

Reference Method: SM 2320 B-97
Batch ID: P301982

Component	Result	Code	Units
Total Alkalinity	0.65	U	mg CaCO ₃ /L

Reference Method: SM 2540 C-97
Batch ID: P302479

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 C-97
Batch ID: P302482

Component	Result	Code	Units
TDS	15	U	mg/L

Quality Assurance Report Method Blank Results

Reference Method: SM 2540 D-97
Batch ID: P302394

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P302397

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P301991

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 4500 F-C-97
Batch ID: P301992

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P302247

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: P301827

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	104		P	85 - 115
Iron	108		P	85 - 115
Magnesium	108		P	85 - 115
Potassium	104		P	85 - 115
Sodium	105		P	85 - 115
Zinc	102		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P301827

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Arsenic	96.3		P	85 - 115
Cadmium	94.8		P	85 - 115
Chromium	94.4		P	85 - 115
Copper	93.6		P	85 - 115
Lead	89.0		P	85 - 115
Nickel	95.2		P	85 - 115
Silver	93.4		P	85 - 115

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P302028

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Chloride	98.7		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P302171

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P302391

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	95.9		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P302468

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	96.7		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P302014

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	98.0		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P302223

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P302224

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total-P	99.2		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P301724

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

Reference Method: SM 2320 B-97
Batch ID: P301981

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	104		P	95 - 105

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: SM 2320 B-97
Batch ID: P301982

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	104		P	95 - 105

Reference Method: SM 4500 F-C-97
Batch ID: P301991

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	100		P	92 - 103

Reference Method: SM 4500 F-C-97
Batch ID: P301992

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	98.2		P	92 - 103

Reference Method: SM 5310 B-00
Batch ID: P302247

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	96.6		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P301827

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1786177	Calcium	105		P	80 - 120
1786177	Iron	108		P	80 - 120
1786177	Magnesium	104		P	80 - 120
1786177	Potassium	102		P	80 - 120
1786177	Sodium	106		P	80 - 120
1786177	Zinc	99.1		P	80 - 120
1786577	Calcium	104		P	80 - 120
1786577	Iron	107	107	P/P	80 - 120
1786577	Magnesium	107	105	P/P	80 - 120
1786577	Potassium	104	101	P/P	80 - 120
1786577	Sodium	103		P	80 - 120
1786577	Zinc	102	103	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P301827

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1786177	Arsenic	97.8		P	80 - 120
1786177	Cadmium	97.5		P	80 - 120
1786177	Chromium	95.4		P	80 - 120
1786177	Copper	91.8		P	80 - 120
1786177	Lead	91.3		P	80 - 120
1786177	Nickel	93.6		P	80 - 120
1786177	Silver	95.3		P	80 - 120

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P301827

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1786577	Arsenic	100	102	P/P	80 - 120
1786577	Cadmium	97.7	101	P/P	80 - 120
1786577	Chromium	97.2	98.5	P/P	80 - 120
1786577	Copper	92.5	94.4	P/P	80 - 120
1786577	Lead	93.3	94.1	P/P	80 - 120
1786577	Nickel	95.8	97.3	P/P	80 - 120
1786577	Silver	95.7	96.9	P/P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P302028

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1787480	Chloride	98.2		P	90 - 110
1787486	Chloride	96.9		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P302391

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1787104	Kjeldahl Nitrogen	112	107	F/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P302468

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1787278	Kjeldahl Nitrogen	102	96.6	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P302014

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1787207	NO2NO3-N	97.0	95.0	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P302223

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1787065	Total-P	97.9	99.7	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P302224

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1787278	Total-P	96.7	97.5	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P301724

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1787205	O-Phosphate-P	98.9	101	P/P	90 - 110

Quality Assurance Report Matrix Spike Accuracy

Reference Method: SM 4500 F-C-97
Batch ID: P301991

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1787001	Fluoride	98.7	98.7	P/P	91 - 105

Reference Method: SM 4500 F-C-97
Batch ID: P301992

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1787456	Fluoride	98.0	98.6	P/P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P302247

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1787106	Organic Carbon	100	97.8	P/P	85 - 115

Quality Assurance Report Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P301756

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1787146	Turbidity	5.64	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P301827

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1786577	Calcium	0.690	Spike	P	0 - 20
1786577	Iron	0.0269	Spike	P	0 - 20
1786577	Magnesium	0.736	Spike	P	0 - 20
1786577	Potassium	1.47	Spike	P	0 - 20
1786577	Sodium	1.06	Spike	P	0 - 20
1786577	Zinc	0.706	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P301827

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1786577	Arsenic	1.38	Spike	P	0 - 20
1786577	Cadmium	3.09	Spike	P	0 - 20
1786577	Chromium	1.34	Spike	P	0 - 20
1786577	Copper	1.91	Spike	P	0 - 20
1786577	Lead	0.818	Spike	P	0 - 20
1786577	Nickel	1.56	Spike	P	0 - 20
1786577	Silver	1.32	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P302028

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1787480	Chloride	0.694	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P302171

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1787201	Ammonia-N	0.315	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P302391

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1787104	Kjeldahl Nitrogen	2.78	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P302468

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1787278	Kjeldahl Nitrogen	3.90	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P302014

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1787207	NO2NO3-N	1.05	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P302223

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1787065	Total-P	1.73	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P302224

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1787278	Total-P	0.723	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P301724

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1787205	O-Phosphate-P	1.63	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: SM 2120 B
Batch ID: P301781

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1787200	Color (true)	0.481	Sample	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P301782

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1787373	Color (true)	1.01	Sample	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P302162

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1789092	Color (true)	0.444	Sample	P	0 - 20

Reference Method: SM 2320 B-97
Batch ID: P301981

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1787001	Total Alkalinity	0.523	Sample	P	0 - 4.8

Reference Method: SM 2320 B-97
Batch ID: P301982

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1787456	Total Alkalinity	0.0361	Sample	P	0 - 4.8

Reference Method: SM 2540 C-97
Batch ID: P302479

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1786778	TDS	4.90	Sample	P	0 - 10

Reference Method: SM 2540 C-97
Batch ID: P302482

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1787146	TDS	6.19	Sample	P	0 - 10

Reference Method: SM 4500 F-C-97
Batch ID: P301991

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1787001	Fluoride	0.0	Spike	P	0 - 3.0

Quality Assurance Report Precision

Reference Method: SM 4500 F-C-97
Batch ID: P301992

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1787456	Fluoride	0.495	Spike	P	0 - 3.0

Reference Method: SM 5310 B-00
Batch ID: P302247

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1787106	Organic Carbon	1.48	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: A68694
Included Lab Sample IDs: 1787202, 1787205, 1787208, 1787211

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	98.2	99.2	P/P	90 - 110
O-Phosphate-P	99.5	98.2	P/P	90 - 110

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A68705
Included Lab Sample IDs: 1787200, 1787203, 1787206, 1787209

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

Reference Method: SM 2120 B
Run ID: A68717
Included Lab Sample IDs: 1787203, 1787206, 1787209

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	98.3	99.7	P/P	85 - 115
Color (true)	99.7	103	P/P	85 - 115

Reference Method: SM 2320 B-97
Run ID: A68783
Included Lab Sample IDs: 1787200, 1787203, 1787206, 1787209

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	100	104	P/P	90 - 110
Total Alkalinity	104	100	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: SM 4500 F-C-97

Run ID: A68783

Included Lab Sample IDs: 1787200, 1787203, 1787206, 1787209

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

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A68799

Included Lab Sample IDs: 1787201, 1787204, 1787207, 1787210

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	96.0	95.5	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A68802

Included Lab Sample IDs: 1787221, 1787222, 1787223

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	102	102	P/P	95 - 105
Calcium	103	101	P/P	90 - 110
Iron	103	103	P/P	90 - 110
Iron	104	104	P/P	95 - 105
Magnesium	101	101	P/P	90 - 110
Magnesium	102	102	P/P	95 - 105
Potassium	101	100	P/P	90 - 110
Potassium	101	102	P/P	95 - 105
Sodium	101	101	P/P	95 - 105
Sodium	103	101	P/P	90 - 110
Zinc	102	101	P/P	90 - 110
Zinc	102	99.9	P/P	95 - 105

Reference Method: EPA 300.0 Rev. 2.1

Run ID: A68804

Included Lab Sample IDs: 1787200, 1787203, 1787206, 1787209

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

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A68810

Included Lab Sample IDs: 1787221, 1787222, 1787223

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	99.1	98.5	P/P	90 - 110
Arsenic	99.9	99.1	P/P	90 - 110
Cadmium	96.8	96.6	P/P	90 - 110
Cadmium	97.7	97.8	P/P	90 - 110
Chromium	96.9	98.6	P/P	90 - 110
Chromium	98.8	99.0	P/P	90 - 110
Copper	98.2	98.1	P/P	90 - 110
Copper	99.3	99.2	P/P	90 - 110
Lead	95.4	94.9	P/P	90 - 110
Silver	94.7	94.5	P/P	90 - 110
Silver	95.0	95.2	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: SM 2120 B
Run ID: A68852
Included Lab Sample IDs: 1787200

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	99.5	97.5	P/P	90 - 115

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A68853
Included Lab Sample IDs: 1787201, 1787204, 1787207, 1787210

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	101	102	P/P	90 - 110
Ammonia-N	102	103	P/P	90 - 110
Ammonia-N	104	104	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A68876
Included Lab Sample IDs: 1787221, 1787222

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Lead	94.8	94.2	P/P	90 - 110
Nickel	97.8	95.6	P/P	90 - 110

Reference Method: SM 5310 B-00
Run ID: A68878
Included Lab Sample IDs: 1787201, 1787204, 1787207, 1787210

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	96.6	95.7	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A68893
Included Lab Sample IDs: 1787201, 1787207

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	101	102	P/P	90 - 110
Total-P	103	101	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A68903
Included Lab Sample IDs: 1787223

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Nickel	101	98.7	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A68904
Included Lab Sample IDs: 1787210

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	97.8	97.8	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A68958

Included Lab Sample IDs: 1787204

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	98.8	99.0	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A68966

Included Lab Sample IDs: 1787201, 1787204, 1787207

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	104	97.4	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A68995

Included Lab Sample IDs: 1787210

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	96.6	97.4	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			LCS	Precision SMP	MS
EPA 180.1 Rev. 2.0	Turbidity						5.64	
EPA 200.7 Rev. 4.4	Calcium	104	105	104				0.690
	Iron	108	108	107	107			0.0269
	Magnesium	108	104	107	105			0.736
	Potassium	104	102	104	101			1.47
	Sodium	105	106	103				1.06
	Zinc	102	99.1	102	103			0.706
EPA 200.8 Rev. 5.4	Arsenic	96.3	97.8	100	102			1.38
	Cadmium	94.8	97.5	97.7	101			3.09
	Chromium	94.4	95.4	97.2	98.5			1.34
	Copper	93.6	91.8	92.5	94.4			1.91
	Lead	89.0	91.3	93.3	94.1			0.818
	Nickel	95.2	93.6	95.8	97.3			1.56
	Silver	93.4	95.3	95.7	96.9			1.32
EPA 300.0 Rev. 2.1	Chloride	98.7	98.2	96.9			0.694	
EPA 350.1 Rev. 2.0	Ammonia-N	101						0.315
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	95.9	112	107				2.78
	Kjeldahl Nitrogen	96.7	102	96.6				3.90
EPA 353.2 Rev. 2.0	NO2NO3-N	98.0	97.0	95.0				1.05
EPA 365.1 Rev. 2.0	Total-P	101	97.9	99.7				1.73
	Total-P	99.2	96.7	97.5				0.723
EPA 365.1 Rev. 2.0 dissolved SM 2120 B	O-Phosphate-P	102	98.9	101				1.63
	Color (true)						0.481	
	Color (true)						1.01	
	Color (true)						0.444	

Quality Assurance Report Summary

Ref. Method	Analyte	LCS % Recovery	MS % Recovery		LCS	Precision SMP	MS
SM 2320 B-97	Total Alkalinity	104				0.523	
	Total Alkalinity	104				0.0361	
SM 2540 C-97	TDS					4.90	
	TDS					6.19	
SM 4500 F-C-97	Fluoride	100	98.7	98.7			0.0
	Fluoride	98.2	98.0	98.6			0.495
SM 5310 B-00	Organic Carbon	96.6	100	97.8			1.48

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	1787200, 1787203, 1787206, 1787209
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	1787221, 1787222, 1787223
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	1787221, 1787222, 1787223
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	1787200, 1787203, 1787206, 1787209
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	1787201, 1787204, 1787207, 1787210
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	1787201, 1787204, 1787207, 1787210
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	1787201, 1787204, 1787207, 1787210
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	1787201, 1787204, 1787207, 1787210
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	1787202, 1787205, 1787208, 1787211
SM 2120 B / E31780	True Color measured at 450 nm	1787200, 1787203, 1787206, 1787209
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO3/L	1787200, 1787203, 1787206, 1787209
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	1787200, 1787203, 1787206, 1787209
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices	1787200, 1787203, 1787206, 1787209
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	1787200, 1787203, 1787206, 1787209
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	1787201, 1787204, 1787207, 1787210

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	04/06/2016			04/06/2016 16:24	Sima Feizi	1787200, 1787203, 1787206, 1787209
EPA 200.7 Rev. 4.4	04/06/2016	04/07/2016	Elliott D. Healy	04/11/2016	Joshua Ayres	1787221, 1787222, 1787223
EPA 200.8 Rev. 5.4	04/06/2016	04/07/2016	Elliott D. Healy	04/11/2016	Charles J. Peterson	1787221, 1787222, 1787223
	04/06/2016	04/07/2016	Elliott D. Healy	04/14/2016	Charles J. Peterson	1787221, 1787222, 1787223
EPA 300.0 Rev. 2.1	04/06/2016			04/12/2016	Ping Hua	1787200, 1787203, 1787206, 1787209
EPA 350.1 Rev. 2.0	04/06/2016			04/13/2016	Diana M. Turner	1787201, 1787204, 1787207, 1787210
EPA 351.2 Rev. 2.0	04/06/2016	04/18/2016	Sofia Elnemr	04/19/2016	Rochelle Y Jackson	1787201, 1787204, 1787207
	04/06/2016	04/19/2016	Sofia Elnemr	04/20/2016	Christopher Armour	1787210
EPA 353.2 Rev. 2.0	04/06/2016			04/11/2016	Diana M. Turner	1787201, 1787204, 1787207, 1787210
EPA 365.1 Rev. 2.0	04/06/2016	04/14/2016	Christopher Armour	04/14/2016	Lipi Saha	1787201, 1787207
	04/06/2016	04/14/2016	Christopher Armour	04/15/2016	Lipi Saha	1787204, 1787210
EPA 365.1 Rev. 2.0 dissolved	04/06/2016			04/06/2016 16:30	Julia Storbeck	1787205
	04/06/2016			04/06/2016 16:45	Julia Storbeck	1787211
	04/06/2016			04/06/2016 16:47	Julia Storbeck	1787202, 1787208
SM 2120 B	04/06/2016			04/07/2016 11:11	Blanca Fach	1787206
	04/06/2016			04/07/2016 11:18	Blanca Fach	1787203, 1787209
	04/06/2016			04/13/2016 14:20	Rochelle Y Jackson	1787200
SM 2320 B-97	04/06/2016			04/09/2016	Dale L. Simmons	1787200, 1787203, 1787206, 1787209
SM 2540 C-97	04/06/2016			04/11/2016	Yijie Li	1787200, 1787203, 1787206, 1787209
SM 2540 D-97	04/06/2016			04/11/2016	Yijie Li	1787200, 1787203, 1787206, 1787209
SM 4500 F-C-97	04/06/2016			04/09/2016	Dale L. Simmons	1787200, 1787203, 1787206, 1787209
SM 5310 B-00	04/06/2016			04/13/2016	Sofia Elnemr	1787201, 1787204, 1787207, 1787210