

Chemical Analysis Report

SE-DIST-2017-05-23-01

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

Event Description: **SMP-G5 Everglades Run**
Request ID: **RQ-2017-05-01-32**
Customer: **SE-DIST**
Project ID: **SMP**

Send Reports to:
FL Dept. of Environmental Protection
FL Dept. of Environmental Protection
2199 South Rock Road
Fort Pierce, FL 34945
Attn: Matthew Sewell

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Certified by: Thekkekalathil Chandrasekhar, Chemist Administrator Date Certified: 16-JUN-2017 15:10



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: WCA 3 L-67 @ L-151

Collection Date/Time: 05/22/2017 12:45

Field ID: G5SE0041

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1900701	EPA 180.1 Rev. 2.0	Turbidity	1.9		NTU	P325721	
	EPA 300.0 Rev. 2.1	Chloride	120		mg Cl/L	P326763	
		Sulfate	30		mg SO4/L	P326766	
	SM 2120 B	Color (true)	98		PCU	P325711	
	SM 2320 B-97	Total Alkalinity	251		mg CaCO3/L	P325879	
	SM 2540 C-97	TDS	584		mg/L	P325989	
	SM 2540 D-97	TSS	2	I	mg/L	P326002	
	SM 4500 F-C-97	Fluoride	0.55		mg F/L	P325881	RPD
1900703	EPA 350.1 Rev. 2.0	Ammonia-N	0.073		mg N/L	P325859	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.8		mg N/L	P325729	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.074		mg N/L	P325755	
	EPA 365.1 Rev. 2.0	Total-P	0.020		mg P/L	P325749	
	SM 5310 B-00	Organic Carbon	28		mg C/L	P326022	
1900705	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P325743	

Ref. Method and Comment:

SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.

EPA 365.1 Rev. 2.0: Total-P: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

Sample Location: WCA 2B @ L-141

Collection Date/Time: 05/22/2017 13:20

Field ID: G5SE0040

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1900702	EPA 180.1 Rev. 2.0	Turbidity	1.3		NTU	P325721	
	EPA 300.0 Rev. 2.1	Chloride	120		mg Cl/L	P326772	
		Sulfate	45		mg SO4/L	P326774	
	SM 2120 B	Color (true)	99		PCU	P325711	
	SM 2320 B-97	Total Alkalinity	215		mg CaCO3/L	P325879	
	SM 2540 C-97	TDS	554	A	mg/L	P325989	
	SM 2540 D-97	TSS	3	IA	mg/L	P326002	
	SM 4500 F-C-97	Fluoride	0.62		mg F/L	P325881	RPD
1900704	EPA 350.1 Rev. 2.0	Ammonia-N	0.018		mg N/L	P325859	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.9		mg N/L	P325729	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.012		mg N/L	P325755	
	EPA 365.1 Rev. 2.0	Total-P	0.022		mg P/L	P325749	
	SM 5310 B-00	Organic Carbon	29		mg C/L	P326022	
1900706	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P325743	

Ref. Method and Comment:

SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.

EPA 365.1 Rev. 2.0: Total-P: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

Sample Location: WCA 1 SOUTH NEAR S-39

Collection Date/Time: 05/22/2017 14:20

Field ID: WCA 1 SOUTH NEAR S-39

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1900707	EPA 180.1 Rev. 2.0	Turbidity	0.70		NTU	P325721	

Field ID: WCA 1 SOUTH NEAR S-39

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1900707	EPA 300.0 Rev. 2.1	Chloride	120		mg Cl/L	P326772	
		Sulfate	35		mg SO4/L	P326774	
	SM 2120 B	Color (true)	67	A	PCU	P325711	
	SM 2320 B-97	Total Alkalinity	121		mg CaCO3/L	P325879	
	SM 2540 C-97	TDS	405		mg/L	P325989	
	SM 2540 D-97	TSS	2	I	mg/L	P326002	
	SM 4500 F-C-97	Fluoride	0.29		mg F/L	P325881	RPD
1900708	EPA 350.1 Rev. 2.0	Ammonia-N	0.015		mg N/L	P325859	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.5		mg N/L	P325729	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P325755	
	EPA 365.1 Rev. 2.0	Total-P	0.013		mg P/L	P325749	
	SM 5310 B-00	Organic Carbon	23		mg C/L	P326022	
1900709	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P325743	
1900722	EPA 200.7 Rev. 4.4	Calcium	39.8		mg/L	P325839	
		Iron	30	U	ug/L	P325839	
		Magnesium	17.0		mg/L	P325839	
		Potassium	6.4		mg/L	P325839	
		Sodium	80.8		mg/L	P325839	
		Zinc	5.0	U	ug/L	P325839	
	EPA 200.8 Rev. 5.4	Arsenic	1.03		ug/L	P326400	
		Cadmium	0.020	U	ug/L	P326400	
		Chromium	0.40	U	ug/L	P326400	
		Copper	0.20	U	ug/L	P326400	
		Lead	0.050	U	ug/L	P326400	
		Nickel	0.20	U	ug/L	P326400	
		Silver	0.010	U	ug/L	P326400	

Ref. Method and Comment:

SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.

EPA 365.1 Rev. 2.0: Total-P: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

EPA 200.7 Rev. 4.4: Batch matrix spike recoveries for potassium are unavailable for one of two spiked samples because of high analyte concentration in the QC sample.

Quality Assurance Report

Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0

Batch ID: P325721

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P325839

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: P325839

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: P326400

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P326763

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P326766

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P326772

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P326774

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P325859

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P325729

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

Quality Assurance Report Method Blank Results

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P325755

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P325749

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P325743

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

Reference Method: SM 2120 B
Batch ID: P325711

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-97
Batch ID: P325879

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

Reference Method: SM 2540 C-97
Batch ID: P325989

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P326002

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P325881

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P326022

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: P325839

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	104		P	85 - 115
Iron	107		P	85 - 115
Magnesium	113		P	85 - 115
Potassium	102		P	85 - 115
Sodium	103		P	85 - 115
Zinc	98.7		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P326400

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Arsenic	93.3		P	85 - 115
Cadmium	97.7		P	85 - 115
Chromium	94.8		P	85 - 115
Copper	88.3		P	85 - 115
Lead	92.8		P	85 - 115
Nickel	91.7		P	85 - 115
Silver	92.9		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P326763

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P326766

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Sulfate	95.8		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P326772

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P326774

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P325859

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

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P325729

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	97.1		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P325755

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	105		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P325749

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P325743

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

Reference Method: SM 2320 B-97
Batch ID: P325879

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	103		P	95 - 108

Reference Method: SM 4500 F-C-97
Batch ID: P325881

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	95.8		P	92 - 103

Reference Method: SM 5310 B-00
Batch ID: P326022

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	97.4		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P325839

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1901001	Calcium	107		P	80 - 120
1901001	Iron	107		P	80 - 120
1901001	Magnesium	108		P	80 - 120
1901001	Sodium	104		P	80 - 120
1901001	Zinc	101		P	80 - 120
1901456	Calcium	98.6		P	80 - 120

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P325839

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1901456	Iron	109	102	P/P	80 - 120
1901456	Magnesium	112	102	P/P	80 - 120
1901456	Potassium	101	95.6	P/P	80 - 120
1901456	Sodium	105		P	80 - 120
1901456	Zinc	103	101	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P326400

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1900666	Arsenic	100	99.0	P/P	80 - 120
1900666	Cadmium	98.3	98.9	P/P	80 - 120
1900666	Chromium	90.3	89.5	P/P	80 - 120
1900666	Copper	87.6	86.3	P/P	80 - 120
1900666	Lead	99.1	98.2	P/P	80 - 120
1900666	Nickel	90.1	89.4	P/P	80 - 120
1900666	Silver	94.7	95.8	P/P	80 - 120
1901316	Arsenic	94.6		P	80 - 120
1901316	Cadmium	99.0		P	80 - 120
1901316	Chromium	92.1		P	80 - 120
1901316	Copper	85.4		P	80 - 120
1901316	Lead	95.2		P	80 - 120
1901316	Nickel	88.7		P	80 - 120
1901316	Silver	97.1		P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P326763

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1901477	Chloride	108		P	90 - 110
1901589	Chloride	99.2		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P326766

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1901477	Sulfate	101		P	90 - 110
1901589	Sulfate	93.4		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P326772

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1900916	Chloride	103		P	90 - 110
1900917	Chloride	101		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P326774

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1900916	Sulfate	101		P	90 - 110
1900917	Sulfate	99.1		P	90 - 110

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P325859

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1900703	Ammonia-N	99.0	100	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P325729

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1900714	Kjeldahl Nitrogen	99.0	97.4	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P325755

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1900656	NO2NO3-N	106	105	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P325743

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1900705	O-Phosphate-P	101	102	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Batch ID: P325881

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1900626	Fluoride	93.6	99.3	P/P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P326022

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1900630	Organic Carbon	96.8	97.1	P/P	85 - 115

Quality Assurance Report Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P325721

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1900671	Turbidity	0.906	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P325839

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1901456	Calcium	3.19	Spike	P	0 - 20
1901456	Iron	5.89	Spike	P	0 - 20
1901456	Magnesium	6.00	Spike	P	0 - 20
1901456	Potassium	3.76	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P325839

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1901456	Sodium	3.54	Spike	P	0 - 20
1901456	Zinc	1.28	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P326400

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1900666	Arsenic	1.01	Spike	P	0 - 20
1900666	Cadmium	0.552	Spike	P	0 - 20
1900666	Chromium	0.886	Spike	P	0 - 20
1900666	Copper	1.41	Spike	P	0 - 20
1900666	Lead	0.921	Spike	P	0 - 20
1900666	Nickel	0.712	Spike	P	0 - 20
1900666	Silver	1.17	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P326763

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1901477	Chloride	0.330	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P326766

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1901477	Sulfate	0.151	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P326772

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1900916	Chloride	0.798	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P326774

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1900916	Sulfate	0.523	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P325859

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1900703	Ammonia-N	0.575	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P325729

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1900714	Kjeldahl Nitrogen	0.952	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P325755

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1900656	NO2NO3-N	0.475	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P325749

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1900656	Total-P	2.02	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P325743

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1900705	O-Phosphate-P	1.28	Spike	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P325711

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1900707	Color (true)	0.731	Sample	P	0 - 20

Reference Method: SM 2320 B-97
Batch ID: P325879

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1900626	Total Alkalinity	0.199	Sample	P	0 - 4.8

Reference Method: SM 2540 C-97
Batch ID: P325989

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1900702	TDS	2.35	Sample	P	0 - 10

Reference Method: SM 4500 F-C-97
Batch ID: P325881

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1900626	Fluoride	4.43	Spike	F	0 - 3.0

Quality Assurance Report Precision

Reference Method: SM 5310 B-00
Batch ID: P326022

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1900630	Organic Carbon	0.159	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: SM 2120 B
Run ID: A76628
Included Lab Sample IDs: 1900701, 1900702, 1900707

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	99.3	99.0	P/P	85 - 115

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A76632
Included Lab Sample IDs: 1900701, 1900702, 1900707

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	101	99.5	P/P	95 - 105

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A76634
Included Lab Sample IDs: 1900705, 1900706, 1900709

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	101	105	P/P	90 - 110
O-Phosphate-P	98.0	102	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A76646
Included Lab Sample IDs: 1900703, 1900704, 1900708

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	103	102	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A76677
Included Lab Sample IDs: 1900703, 1900704, 1900708

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	92.8	94.2	P/P	90 - 110
Total-P	94.2	94.5	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A76683
Included Lab Sample IDs: 1900703, 1900704, 1900708

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
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Quality Assurance Report Calibration Verification

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A76683

Included Lab Sample IDs: 1900703, 1900704, 1900708

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

Reference Method: SM 2320 B-97

Run ID: A76685

Included Lab Sample IDs: 1900701, 1900702, 1900707

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

Reference Method: SM 4500 F-C-97

Run ID: A76685

Included Lab Sample IDs: 1900701, 1900702, 1900707

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	95.5	97.1	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A76704

Included Lab Sample IDs: 1900703, 1900704, 1900708

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	98.9	95.8	P/P	90 - 110

Reference Method: SM 5310 B-00

Run ID: A76775

Included Lab Sample IDs: 1900703, 1900704, 1900708

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	94.4	90.8	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A76818

Included Lab Sample IDs: 1900722

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

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A76969

Included Lab Sample IDs: 1900722

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	94.1	93.3	P/P	90 - 110
Cadmium	97.4	97.5	P/P	90 - 110
Chromium	97.0	97.1	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A76969

Included Lab Sample IDs: 1900722

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Copper	91.4	91.5	P/P	90 - 110
Lead	93.8	94.6	P/P	90 - 110
Nickel	91.5	91.8	P/P	90 - 110
Silver	97.5	97.6	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1

Run ID: A77072

Included Lab Sample IDs: 1900701

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	95.0	93.9	P/P	90 - 110
Sulfate	94.2	99.8	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1

Run ID: A77076

Included Lab Sample IDs: 1900702, 1900707

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	97.5	98.9	P/P	90 - 110
Sulfate	103	99.7	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			LCS	Precision	
									SMP	MS
EPA 180.1 Rev. 2.0	Turbidity								0.906	
EPA 200.7 Rev. 4.4	Calcium	104			107	98.6				3.19
	Iron	107			107	109	102			5.89
	Magnesium	113			108	112	102			6.00
	Potassium	102			101	95.6				3.76
	Sodium	103			104	105				3.54
	Zinc	98.7			101	103	101			1.28
EPA 200.8 Rev. 5.4	Arsenic	93.3			100	99.0	94.6			1.01
	Cadmium	97.7			98.3	98.9	99.0			0.552
	Chromium	94.8			90.3	89.5	92.1			0.886
	Copper	88.3			87.6	86.3	85.4			1.41
	Lead	92.8			99.1	98.2	95.2			0.921
	Nickel	91.7			90.1	89.4	88.7			0.712
	Silver	92.9			94.7	95.8	97.1			1.17
EPA 300.0 Rev. 2.1	Chloride	101			108	99.2			0.330	
	Chloride	101			103	101			0.798	
	Sulfate	95.8			93.4	101			0.151	
	Sulfate	98.4			101	99.1			0.523	
EPA 350.1 Rev. 2.0	Ammonia-N	99.2			99.0	100				0.575
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	97.1			99.0	97.4				0.952

Quality Assurance Report Summary

Ref. Method	Analyte	LCS % Recovery	MS % Recovery		Precision	
					LCS	MS
EPA 353.2 Rev. 2.0	NO2NO3-N	105	106	105		0.475
EPA 365.1 Rev. 2.0	Total-P	106				2.02
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	107	101	102		1.28
SM 2120 B	Color (true)				0.731	
SM 2320 B-97	Total Alkalinity	103			0.199	
SM 2540 C-97	TDS				2.35	
SM 4500 F-C-97	Fluoride	95.8	93.6	99.3		4.43
SM 5310 B-00	Organic Carbon	97.4	96.8	97.1		0.159

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	1900701, 1900702, 1900707
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	1900722
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	1900722
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	1900701, 1900702, 1900707
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	1900701, 1900702, 1900707
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	1900703, 1900704, 1900708
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	1900703, 1900704, 1900708
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	1900703, 1900704, 1900708
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	1900703, 1900704, 1900708
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	1900705, 1900706, 1900709
SM 2120 B / E31780	True Color measured at 450 nm	1900701, 1900702, 1900707
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO3/L	1900701, 1900702, 1900707
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	1900701, 1900702, 1900707
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices	1900701, 1900702, 1900707
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	1900701, 1900702, 1900707
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	1900703, 1900704, 1900708

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	05/23/2017			05/23/2017 15:59	Sima Feizi	1900701, 1900702, 1900707
EPA 200.7 Rev. 4.4	05/23/2017	05/25/2017	Elliott D. Healy	06/01/2017	Betina Topolski	1900722
EPA 200.8 Rev. 5.4	05/23/2017	06/07/2017	Elliott D. Healy	06/08/2017	Robert K Palmer	1900722
EPA 300.0 Rev. 2.1	05/23/2017			06/12/2017	Julia Storbeck	1900701, 1900702, 1900707
EPA 350.1 Rev. 2.0	05/23/2017			05/25/2017	Julia Storbeck	1900703, 1900704, 1900708
EPA 351.2 Rev. 2.0	05/23/2017	05/24/2017	Adrian Shelby	05/26/2017	Joseph Suarez	1900703, 1900704, 1900708
EPA 353.2 Rev. 2.0	05/23/2017			05/24/2017	Beverly Y. Sanders	1900703, 1900704, 1900708
EPA 365.1 Rev. 2.0	05/23/2017	05/24/2017	Vijayalakshmi Reddy	05/25/2017	Lipi Saha	1900703, 1900704, 1900708
EPA 365.1 Rev. 2.0 dissolved	05/23/2017			05/23/2017 14:33	Anthony C. Onicha	1900705
	05/23/2017			05/23/2017 15:06	Anthony C. Onicha	1900706
	05/23/2017			05/23/2017 15:07	Anthony C. Onicha	1900709
SM 2120 B	05/23/2017			05/23/2017 14:54	Tanya Welborn	1900701
	05/23/2017			05/23/2017 14:55	Tanya Welborn	1900702
	05/23/2017			05/23/2017 14:56	Tanya Welborn	1900707
SM 2320 B-97	05/23/2017			05/26/2017	Dale L. Simmons	1900701, 1900702, 1900707
SM 2540 C-97	05/23/2017			05/24/2017	Yijie Li	1900701, 1900702, 1900707
SM 2540 D-97	05/23/2017			05/24/2017	Yijie Li	1900701, 1900702, 1900707
SM 4500 F-C-97	05/23/2017			05/26/2017	Dale L. Simmons	1900701, 1900702, 1900707
SM 5310 B-00	05/23/2017			05/30/2017	Julie Michelle Frank	1900703, 1900704, 1900708