

Chemical Analysis Report

SE-DIST-2016-02-11-01

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

Event Description: **SMP with Feb TREND**
Request ID: **RQ-2016-02-01-58**
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: Jordan Skaggs

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Certified by: Timothy Fitzpatrick, Program Administrator

Date Certified: 03-MAR-2016 10:02

A handwritten signature in black ink, appearing to read 'Timothy W. Fitzpatrick', with a stylized flourish at the end.

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: Florida City Canal (FC-15 Miami-Dade) 3306

Collection Date/Time: 02/10/2016 09:45

Field ID: G5SEFC15_02102016

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1770500	EPA 180.1 Rev. 2.0	Turbidity	1.0		NTU	P298474	
	EPA 300.0 Rev. 2.1	Chloride	37		mg Cl/L	P298712	
	SM 2120 B	Color (true)	3.7	I	PCU	P298470	
	SM 2320 B-97	Total Alkalinity	202		mg CaCO3/L	P298809	
	SM 2540 C-97	TDS	295		mg/L	P299074	
	SM 2540 D-97	TSS	2	U	mg/L	P298898	
	SM 4500 F-C-97	Fluoride	0.12		mg F/L	P298799	
1770501	EPA 350.1 Rev. 2.0	Ammonia-N	0.020		mg N/L	P299117	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.37		mg N/L	P298763	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.65		mg N/L	P298840	
	EPA 365.1 Rev. 2.0	Total-P	0.006		mg P/L	P298643	
	SM 5310 B-00	Organic Carbon	2.7		mg C/L	P298681	
1770502	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P298457	
1770509	EPA 200.7 Rev. 4.4	Calcium	82.9		mg/L	P298582	
		Iron	30	U	ug/L	P298582	
		Magnesium	5.05		mg/L	P298582	
		Potassium	6.5		mg/L	P298582	
		Sodium	23.5		mg/L	P298582	
		Zinc	5.0	U	ug/L	P298582	
	EPA 200.8 Rev. 5.4	Arsenic	0.70		ug/L	P298582	
		Cadmium	0.020	U	ug/L	P298582	
		Chromium	0.050	U	ug/L	P298582	
		Copper	0.56		ug/L	P298582	
		Lead	0.062	I	ug/L	P298582	
		Nickel	0.78		ug/L	P298582	
		Silver	0.0067	I	ug/L	P298582	

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 200.7 Rev. 4.4: The calcium matrix spike recovery data for one of two spiked samples is unavailable due to high analyte concentration in the QC sample.

Sample Location: L-5 @ G-206 3263A

Collection Date/Time: 02/10/2016 13:37

Field ID: g5se0002_02102016

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1770494	EPA 180.1 Rev. 2.0	Turbidity	0.75		NTU	P298474	
	EPA 300.0 Rev. 2.1	Chloride	49		mg Cl/L	P298614	
		Sulfate	32		mg SO4/L	P298616	
	SM 2120 B	Color (true)	120		PCU	P298470	
	SM 2320 B-97	Total Alkalinity	150		mg CaCO3/L	P298809	
	SM 2540 C-97	TDS	333		mg/L	P299074	
	SM 2540 D-97	TSS	2	U	mg/L	P298898	
	SM 4500 F-C-97	Fluoride	0.27		mg F/L	P298799	
	EPA 350.1 Rev. 2.0	Ammonia-N	0.059		mg N/L	P299117	

Field ID: g5se0002_02102016

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1770496	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.6		mg N/L	P298763	
	EPA 353.2 Rev. 2.0	NO2NO3-N	1.3		mg N/L	P298840	
	EPA 365.1 Rev. 2.0	Total-P	0.011		mg P/L	P298643	
	SM 5310 B-00	Organic Carbon	22		mg C/L	P298681	
1770498	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P298457	

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: L-5 @ G-205 3260B

Collection Date/Time: 02/10/2016 14:03

Field ID: G5SE0032_02102016

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1770495	EPA 180.1 Rev. 2.0	Turbidity	1.0		NTU	P298474	
	EPA 300.0 Rev. 2.1	Chloride	65		mg Cl/L	P298712	
		Sulfate	46		mg SO4/L	P298714	
	SM 2120 B	Color (true)	120		PCU	P298470	
	SM 2320 B-97	Total Alkalinity	208		mg CaCO3/L	P298809	
	SM 2540 C-97	TDS	462		mg/L	P299074	
	SM 2540 D-97	TSS	2	U	mg/L	P298898	
	SM 4500 F-C-97	Fluoride	0.38		mg F/L	P298799	
1770497	EPA 350.1 Rev. 2.0	Ammonia-N	0.11		mg N/L	P299117	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.7		mg N/L	P298763	
	EPA 353.2 Rev. 2.0	NO2NO3-N	2.0		mg N/L	P298840	
	EPA 365.1 Rev. 2.0	Total-P	0.009		mg P/L	P298643	
	SM 5310 B-00	Organic Carbon	24		mg C/L	P298681	
1770499	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P298457	

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.

Quality Assurance Report Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0

Batch ID: P298474

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P298582

Component	Result	Code	Units
Calcium	0.075	U	mg/L
Iron	30	U	ug/L
Magnesium	0.040	U	mg/L
Potassium	0.30	U	mg/L
Sodium	0.50	U	mg/L
Zinc	5.0	U	ug/L

Quality Assurance Report Method Blank Results

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P298582

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: P298614

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P298616

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P298712

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P298714

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P299117

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P298763

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P298840

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

Quality Assurance Report Method Blank Results

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P298643

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P298457

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

Reference Method: SM 2120 B
Batch ID: P298470

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-97
Batch ID: P298809

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

Reference Method: SM 2540 C-97
Batch ID: P299074

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P298898

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P298799

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P298681

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: P298582

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
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Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P298582

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	109		P	85 - 115
Iron	105		P	85 - 115
Magnesium	107		P	85 - 115
Potassium	106		P	85 - 115
Sodium	105		P	85 - 115
Zinc	98.5		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P298582

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Arsenic	95.9		P	85 - 115
Cadmium	97.0		P	85 - 115
Chromium	101		P	85 - 115
Copper	92.4		P	85 - 115
Lead	92.0		P	85 - 115
Nickel	94.6		P	85 - 115
Silver	95.8		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P298614

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P298616

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P298712

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P298714

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Sulfate	97.3		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P299117

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

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P298763

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P298840

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P298643

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P298457

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

Reference Method: SM 2320 B-97
Batch ID: P298809

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

Reference Method: SM 4500 F-C-97
Batch ID: P298799

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	97.5		P	94 - 108

Reference Method: SM 5310 B-00
Batch ID: P298681

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	93.7		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P298582

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1770451	Calcium	105		P	80 - 120
1770451	Iron	107	108	P/P	80 - 120
1770451	Magnesium	103		P	80 - 120
1770451	Potassium	105	106	P/P	80 - 120
1770451	Sodium	105		P	80 - 120
1770451	Zinc	97.3	96.6	P/P	80 - 120

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P298582

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1770509	Iron	104		P	80 - 120
1770509	Magnesium	107		P	80 - 120
1770509	Potassium	109		P	80 - 120
1770509	Sodium	104		P	80 - 120
1770509	Zinc	100		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P298582

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1770451	Arsenic	97.6	98.8	P/P	80 - 120
1770451	Cadmium	98.7	100	P/P	80 - 120
1770451	Chromium	100	100	P/P	80 - 120
1770451	Copper	90.4	90.9	P/P	80 - 120
1770451	Lead	92.1	92.5	P/P	80 - 120
1770451	Nickel	93.5	93.4	P/P	80 - 120
1770451	Silver	96.9	97.1	P/P	80 - 120
1770509	Arsenic	99.3		P	80 - 120
1770509	Cadmium	102		P	80 - 120
1770509	Chromium	101		P	80 - 120
1770509	Copper	90.3		P	80 - 120
1770509	Lead	93.9		P	80 - 120
1770509	Nickel	94.0		P	80 - 120
1770509	Silver	97.5		P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P298614

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1770428	Chloride	99.3		P	90 - 110
1770445	Chloride	101		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P298616

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1770428	Sulfate	97.5		P	90 - 110
1770445	Sulfate	95.4		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P298712

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1770565	Chloride	103		P	90 - 110
1770567	Chloride	102		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P298714

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1770565	Sulfate	96.4		P	90 - 110
1770567	Sulfate	95.6		P	90 - 110

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P298763

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1770466	Kjeldahl Nitrogen	101	105	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P298840

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1770518	NO2NO3-N	108	108	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P298643

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1770467	Total-P	98.2	102	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P298457

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1770502	O-Phosphate-P	99.6	101	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Batch ID: P298799

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1770515	Fluoride	98.2	99.5	P/P	94 - 107

Reference Method: SM 5310 B-00
Batch ID: P298681

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1770465	Organic Carbon	94.5	95.0	P/P	85 - 115

Quality Assurance Report Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P298474

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1770464	Turbidity	0.816	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P298582

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1770451	Calcium	1.59	Spike	P	0 - 20
1770451	Iron	0.351	Spike	P	0 - 20
1770451	Magnesium	1.02	Spike	P	0 - 20
1770451	Potassium	0.672	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P298582

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1770451	Sodium	0.464	Spike	P	0 - 20
1770451	Zinc	0.805	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P298582

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1770451	Arsenic	1.20	Spike	P	0 - 20
1770451	Cadmium	1.62	Spike	P	0 - 20
1770451	Chromium	0.187	Spike	P	0 - 20
1770451	Copper	0.453	Spike	P	0 - 20
1770451	Lead	0.441	Spike	P	0 - 20
1770451	Nickel	0.161	Spike	P	0 - 20
1770451	Silver	0.266	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P298614

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1770428	Chloride	1.05	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P298616

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1770428	Sulfate	2.93	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P298712

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1770565	Chloride	0.110	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P298714

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1770565	Sulfate	0.254	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P299117

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1770468	Ammonia-N	0.0441	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P298763

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1770466	Kjeldahl Nitrogen	2.52	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P298840

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1770518	NO2NO3-N	0.462	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P298643

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1770467	Total-P	3.98	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P298457

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1770502	O-Phosphate-P	1.30	Spike	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P298470

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1770515	Color (true)	1.84	Sample	P	0 - 20

Reference Method: SM 2320 B-97
Batch ID: P298809

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1770515	Total Alkalinity	0.440	Sample	P	0 - 4.8

Reference Method: SM 2540 C-97
Batch ID: P299074

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1770461	TDS	0.0	Sample	P	0 - 10

Reference Method: SM 4500 F-C-97
Batch ID: P298799

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1770515	Fluoride	0.986	Spike	P	0 - 3.7

Quality Assurance Report Precision

Reference Method: SM 5310 B-00
Batch ID: P298681

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1770465	Organic Carbon	0.361	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 300.0 Rev. 2.1
Run ID: A67519
Included Lab Sample IDs: 1770494

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	97.6	99.1	P/P	90 - 110
Sulfate	94.3	96.9	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A67573
Included Lab Sample IDs: 1770498, 1770499, 1770502

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	98.6	99.4	P/P	90 - 110
O-Phosphate-P	99.3	99.3	P/P	90 - 110

Reference Method: SM 2120 B
Run ID: A67575
Included Lab Sample IDs: 1770494, 1770495, 1770500

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	99.7	98.6	P/P	90 - 115

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A67576
Included Lab Sample IDs: 1770494, 1770495, 1770500

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	100	99.5	P/P	95 - 105

Reference Method: SM 5310 B-00
Run ID: A67629
Included Lab Sample IDs: 1770496, 1770497, 1770501

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	93.4	94.2	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A67638
Included Lab Sample IDs: 1770495, 1770500

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

Reference Method: EPA 300.0 Rev. 2.1

Run ID: A67638

Included Lab Sample IDs: 1770495, 1770500

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	100	99.5	P/P	90 - 110
Chloride	99.5	100	P/P	90 - 110
Sulfate	99.7	97.9	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A67645

Included Lab Sample IDs: 1770496, 1770497, 1770501

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	97.5	98.2	P/P	90 - 110

Reference Method: SM 4500 F-C-97

Run ID: A67660

Included Lab Sample IDs: 1770494, 1770495, 1770500

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	99.0	99.5	P/P	90 - 110
Fluoride	99.5	98.5	P/P	90 - 110

Reference Method: SM 2320 B-97

Run ID: A67665

Included Lab Sample IDs: 1770494, 1770495, 1770500

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

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A67672

Included Lab Sample IDs: 1770496, 1770497, 1770501

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	104	104	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A67679

Included Lab Sample IDs: 1770496, 1770497, 1770501

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

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A67685

Included Lab Sample IDs: 1770509

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	102	102	P/P	90 - 110
Iron	99.7	99.0	P/P	90 - 110
Magnesium	101	101	P/P	90 - 110
Potassium	101	101	P/P	90 - 110
Sodium	99.6	101	P/P	90 - 110
Zinc	101	102	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A67725

Included Lab Sample IDs: 1770509

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	100	98.6	P/P	90 - 110
Cadmium	102	101	P/P	90 - 110
Chromium	104	104	P/P	90 - 110
Copper	99.2	97.2	P/P	90 - 110
Lead	97.6	96.5	P/P	90 - 110
Nickel	98.8	97.7	P/P	90 - 110
Silver	98.1	96.7	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A67770

Included Lab Sample IDs: 1770496, 1770497, 1770501

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	96.9	97.5	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						0.816	
EPA 200.7 Rev. 4.4	Calcium	109	105					1.59
	Iron	105	107	108	104			0.351
	Magnesium	107	103	107				1.02
	Potassium	106	105	106	109			0.672
	Sodium	105	105	104				0.464
	Zinc	98.5	97.3	96.6	100			0.805
EPA 200.8 Rev. 5.4	Arsenic	95.9	97.6	98.8	99.3			1.20
	Cadmium	97.0	98.7	100	102			1.62
	Chromium	101	100	100	101			0.187
	Copper	92.4	90.4	90.9	90.3			0.453
	Lead	92.0	92.1	92.5	93.9			0.441
	Nickel	94.6	93.5	93.4	94.0			0.161
	Silver	95.8	96.9	97.1	97.5			0.266
EPA 300.0 Rev. 2.1	Chloride	101	99.3	101			1.05	
	Chloride	103	103	102			0.110	
	Sulfate	98.7	97.5	95.4			2.93	
	Sulfate	97.3	96.4	95.6			0.254	
EPA 350.1 Rev. 2.0	Ammonia-N	94.6						0.0441
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	100	101	105				2.52
EPA 353.2 Rev. 2.0	NO2NO3-N	104	108	108				0.462
EPA 365.1 Rev. 2.0	Total-P	102	98.2	102				3.98
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	101	99.6	101				1.30
SM 2120 B	Color (true)						1.84	
SM 2320 B-97	Total Alkalinity	104					0.440	
SM 2540 C-97	TDS						0.0	

Quality Assurance Report Summary

Ref. Method	Analyte	LCS % Recovery	MS % Recovery		Precision	
					LCS	MS
SM 4500 F-C-97	Fluoride	97.5	98.2	99.5		0.986
SM 5310 B-00	Organic Carbon	93.7	94.5	95.0		0.361

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	1770494, 1770495, 1770500
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	1770509
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	1770509
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	1770494, 1770495, 1770500
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	1770494, 1770495
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	1770496, 1770497, 1770501
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	1770496, 1770497, 1770501
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	1770496, 1770497, 1770501
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	1770496, 1770497, 1770501
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	1770498, 1770499, 1770502
SM 2120 B / E31780	True Color measured at 450 nm	1770494, 1770495, 1770500
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO3/L	1770494, 1770495, 1770500
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	1770494, 1770495, 1770500
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices	1770494, 1770495, 1770500
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	1770494, 1770495, 1770500
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	1770496, 1770497, 1770501

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	02/11/2016			02/11/2016 13:28	Sima Feizi	1770494, 1770495, 1770500
EPA 200.7 Rev. 4.4	02/11/2016	02/15/2016	Elliott D. Healy	02/18/2016	Joshua Ayres	1770509
EPA 200.8 Rev. 5.4	02/11/2016	02/15/2016	Elliott D. Healy	02/19/2016	Charles J. Peterson	1770509
EPA 300.0 Rev. 2.1	02/11/2016			02/13/2016	Ping Hua	1770494
	02/11/2016			02/16/2016	Ping Hua	1770495
EPA 350.1 Rev. 2.0	02/11/2016			02/23/2016	Diana M. Turner	1770496, 1770497, 1770501
EPA 351.2 Rev. 2.0	02/11/2016	02/17/2016	Sofia Elnemr	02/18/2016	Bryan A. Werth	1770496, 1770497, 1770501
EPA 353.2 Rev. 2.0	02/11/2016			02/18/2016	Peter D. Kaus	1770496, 1770497, 1770501
EPA 365.1 Rev. 2.0	02/11/2016	02/16/2016	Christopher Armour	02/17/2016	Lipi Saha	1770496, 1770497, 1770501
EPA 365.1 Rev. 2.0 dissolved	02/11/2016			02/11/2016 12:37	Julia Storbeck	1770502
	02/11/2016			02/11/2016 13:16	Julia Storbeck	1770498
	02/11/2016			02/11/2016 13:17	Julia Storbeck	1770499
SM 2120 B	02/11/2016			02/11/2016 14:20	Rochelle Y Jackson	1770494
	02/11/2016			02/11/2016 14:21	Rochelle Y Jackson	1770495, 1770500
SM 2320 B-97	02/11/2016			02/16/2016	Dale L. Simmons	1770494, 1770495, 1770500
SM 2540 C-97	02/11/2016			02/15/2016	Sima Feizi	1770494, 1770495, 1770500
SM 2540 D-97	02/11/2016			02/15/2016	Sima Feizi	1770494, 1770495, 1770500
SM 4500 F-C-97	02/11/2016			02/15/2016	Dale L. Simmons	1770494, 1770495, 1770500
SM 5310 B-00	02/11/2016			02/16/2016	Sofia Elnemr	1770496, 1770497, 1770501