

Chemical Analysis Report

SO-DIST-2016-04-20-01

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

Event Description: **SMP: Myrtle & Myrtle**

Request ID: **RQ-2016-04-18-10**

Customer: **SO-DIST**

Project ID: **SMP**

Send Reports to:
FL Dept. of Environmental Protection
FLDEP South District Office
2295 Victoria Ave. Suite 364
Fort Myers, FL 33901
Attn: Ben Paswater

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Date Certified: 13-MAY-2016 16:15



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: MYRTLE SLOUGH @ SR31

Collection Date/Time: 04/19/2016 11:20

Field ID: G3SD04192016-2

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1790763	EPA 180.1 Rev. 2.0	Turbidity	2.2	A	NTU	P302625	
	EPA 300.0 Rev. 2.1	Chloride	140		mg Cl/L	P303123	
		Sulfate	66		mg SO4/L	P303125	
	SM 2120 B	Color (true)	50		PCU	P302594	
	SM 2320 B-97	Total Alkalinity	207		mg CaCO3/L	P302875	
	SM 2540 C-97	TDS	583		mg/L	P303354	
	SM 2540 D-97	TSS	2	I	mg/L	P303214	
	SM 4500 F-C-97	Fluoride	0.22		mg F/L	P302878	
1790766	EPA 350.1 Rev. 2.0	Ammonia-N	0.015		mg N/L	P303370	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.86		mg N/L	P303458	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.023		mg N/L	P303159	
	EPA 365.1 Rev. 2.0	Total-P	0.048		mg P/L	P303170	
	SM 5310 B-00	Organic Carbon	13		mg C/L	P303344	
1790769	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.028		mg P/L	P302617	
1790777	EPA 200.7 Rev. 4.4	Calcium	118		mg/L	P302729	
		Iron	170		ug/L	P302729	
		Magnesium	12.7		mg/L	P302729	
		Potassium	7.9		mg/L	P302729	
		Sodium	69.8		mg/L	P302729	
	EPA 200.8 Rev. 5.4	Zinc	5.0	U	ug/L	P302729	
		Arsenic	0.60		ug/L	P302729	
		Cadmium	0.020	U	ug/L	P302729	
		Chromium	0.33		ug/L	P302729	
		Copper	0.72		ug/L	P302729	
		Lead	0.12	I	ug/L	P302729	
		Nickel	1.25		ug/L	P302729	
		Silver	0.0050	U	ug/L	P302729	

Ref. Method and Comment:

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

EPA 351.2 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: Matrix spike recovery data is unavailable due to high analyte concentration in the QC sample.

Sample Location: MYRTLE 1995 UPSTREAM OF PRAIRIE

Collection Date/Time: 04/19/2016 11:55

Field ID: G3SD04192016-1

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1790764	EPA 180.1 Rev. 2.0	Turbidity	1.4		NTU	P302625	
	EPA 300.0 Rev. 2.1	Chloride	140		mg Cl/L	P303123	
		Sulfate	110		mg SO4/L	P303125	
	SM 2120 B	Color (true)	65		PCU	P302595	
	SM 2320 B-97	Total Alkalinity	243		mg CaCO3/L	P302875	
	SM 2540 C-97	TDS	676		mg/L	P303354	
	SM 2540 D-97	TSS	2	I	mg/L	P303214	
	SM 4500 F-C-97	Fluoride	0.31		mg F/L	P302878	
1790767	EPA 350.1 Rev. 2.0	Ammonia-N	0.062		mg N/L	P303370	

Field ID: G3SD04192016-1

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1790767	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.1		mg N/L	P303458	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.038		mg N/L	P303159	
	EPA 365.1 Rev. 2.0	Total-P	0.15		mg P/L	P303170	
	SM 5310 B-00	Organic Carbon	16		mg C/L	P303344	
1790770	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.11		mg P/L	P302617	
1790778	EPA 200.7 Rev. 4.4	Calcium	143		mg/L	P302729	
		Iron	130		ug/L	P302729	
		Magnesium	18.4		mg/L	P302729	
		Potassium	9.4		mg/L	P302729	
		Sodium	70.5		mg/L	P302729	
	EPA 200.8 Rev. 5.4	Zinc	5.0	U	ug/L	P302729	
		Arsenic	1.91		ug/L	P302729	
		Cadmium	0.020	U	ug/L	P302729	
		Chromium	0.24		ug/L	P302729	
		Copper	0.50		ug/L	P302729	
		Lead	0.063	I	ug/L	P302729	
		Nickel	1.04		ug/L	P302729	
		Silver	0.0050	U	ug/L	P302729	

Ref. Method and Comment:

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

EPA 351.2 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: Matrix spike recovery data is unavailable due to high analyte concentration in the QC sample.

Sample Location: BLANK

Collection Date/Time: 04/19/2016 09:40

Field ID: BLANK

Matrix: W-FIELD-BK

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1790765	EPA 180.1 Rev. 2.0	Turbidity	0.10	U	NTU	P302625	
	EPA 300.0 Rev. 2.1	Chloride	0.20	U	mg Cl/L	P303123	
		Sulfate	0.20	U	mg SO4/L	P303125	
	SM 2120 B	Color (true)	2.5	U	PCU	P302595	
	SM 2320 B-97	Total Alkalinity	0.65	U	mg CaCO3/L	P302875	
	SM 2540 C-97	TDS	15	U	mg/L	P303352	
	SM 2540 D-97	TSS	2	U	mg/L	P303212	
	SM 4500 F-C-97	Fluoride	0.035	U	mg F/L	P302878	
1790768	EPA 350.1 Rev. 2.0	Ammonia-N	0.002	U	mg N/L	P303370	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.080	U	mg N/L	P303458	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P303159	
	EPA 365.1 Rev. 2.0	Total-P	0.002	U	mg P/L	P303412	
	SM 5310 B-00	Organic Carbon	0.50	U	mg C/L	P303344	
1790771	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P302617	
1790779	EPA 200.7 Rev. 4.4	Calcium	0.075	U	mg/L	P302729	
		Iron	30	U	ug/L	P302729	
		Magnesium	0.040	U	mg/L	P302729	
		Potassium	0.30	U	mg/L	P302729	
		Sodium	0.50	U	mg/L	P302729	

Field ID: BLANK

Matrix: W-FIELD-BK

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1790779	EPA 200.7 Rev. 4.4	Zinc	5.0	U	ug/L	P302729	
	EPA 200.8 Rev. 5.4	Arsenic	0.050	U	ug/L	P302729	
		Cadmium	0.020	U	ug/L	P302729	
		Chromium	0.050	U	ug/L	P302729	
		Copper	0.10	U	ug/L	P302729	
		Lead	0.050	U	ug/L	P302729	
		Nickel	0.050	U	ug/L	P302729	
		Silver	0.0050	U	ug/L	P302729	

Ref. Method and Comment:
 SM 2540 D-97: The precision data is unavailable due to the low analyte concentration in the QC sample.
 EPA 351.2 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: 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: P302625

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
 Batch ID: P302729

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

Reference Method: EPA 200.8 Rev. 5.4
 Batch ID: P302729

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: P303123

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Quality Assurance Report Method Blank Results

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P303125

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P303370

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P303458

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P303159

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P303170

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P303412

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P302617

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

Reference Method: SM 2120 B
Batch ID: P302594

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2120 B
Batch ID: P302595

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Quality Assurance Report Method Blank Results

Reference Method: SM 2320 B-97
Batch ID: P302875

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

Reference Method: SM 2540 C-97
Batch ID: P303352

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 C-97
Batch ID: P303354

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P303212

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P303214

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P302878

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P303344

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: P302729

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	111		P	85 - 115
Iron	107		P	85 - 115
Magnesium	108		P	85 - 115
Potassium	103		P	85 - 115
Sodium	108		P	85 - 115
Zinc	97.2		P	85 - 115

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P302729

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Arsenic	96.3		P	85 - 115
Cadmium	95.8		P	85 - 115
Chromium	93.9		P	85 - 115
Copper	94.8		P	85 - 115
Lead	96.4		P	85 - 115
Nickel	97.5		P	85 - 115
Silver	93.4		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P303123

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Chloride	96.2		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P303125

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Sulfate	95.7		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P303370

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	98.8		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P303458

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P303159

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P303170

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total-P	98.1		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P303412

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

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P302617

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

Reference Method: SM 2320 B-97
Batch ID: P302875

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	98.8		P	95 - 105

Reference Method: SM 4500 F-C-97
Batch ID: P302878

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	94.9		P	92 - 103

Reference Method: SM 5310 B-00
Batch ID: P303344

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	99.4		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P302729

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1791057	Calcium	108	110	P/P	80 - 120
1791057	Iron	107	106	P/P	80 - 120
1791057	Magnesium	108	108	P/P	80 - 120
1791057	Potassium	100	102	P/P	80 - 120
1791057	Sodium	102	105	P/P	80 - 120
1791057	Zinc	102	102	P/P	80 - 120
1791093	Calcium	101		P	80 - 120
1791093	Iron	106		P	80 - 120
1791093	Magnesium	103		P	80 - 120
1791093	Potassium	97.9		P	80 - 120
1791093	Sodium	101		P	80 - 120
1791093	Zinc	99.7		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P302729

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1791057	Arsenic	94.2	94.9	P/P	80 - 120
1791057	Cadmium	98.2	98.2	P/P	80 - 120
1791057	Chromium	95.3	94.6	P/P	80 - 120
1791057	Copper	91.4	91.9	P/P	80 - 120
1791057	Lead	97.8	98.2	P/P	80 - 120
1791057	Nickel	93.4	92.9	P/P	80 - 120
1791057	Silver	93.4	94.4	P/P	80 - 120

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P302729

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1791093	Arsenic	95.9		P	80 - 120
1791093	Cadmium	99.3		P	80 - 120
1791093	Chromium	95.0		P	80 - 120
1791093	Copper	92.3		P	80 - 120
1791093	Lead	98.7		P	80 - 120
1791093	Nickel	93.3		P	80 - 120
1791093	Silver	93.3		P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P303123

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1790694	Chloride	93.4		P	90 - 110
1790709	Chloride	95.6		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P303125

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1790694	Sulfate	93.7		P	90 - 110
1790709	Sulfate	92.8		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P303370

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1790766	Ammonia-N	98.9	98.6	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P303159

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1790743	NO2NO3-N	98.7	97.2	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P302617

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1790744	O-Phosphate-P	99.8	101	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Batch ID: P302878

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1790709	Fluoride	94.6	96.1	P/P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P303344

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1790741	Organic Carbon	96.2	94.8	P/P	85 - 115

Quality Assurance Report Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P302625

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1790763	Turbidity	5.87	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P302729

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1791057	Calcium	0.924	Spike	P	0 - 20
1791057	Iron	0.546	Spike	P	0 - 20
1791057	Magnesium	0.398	Spike	P	0 - 20
1791057	Potassium	1.26	Spike	P	0 - 20
1791057	Sodium	1.59	Spike	P	0 - 20
1791057	Zinc	0.393	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P302729

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1791057	Arsenic	0.758	Spike	P	0 - 20
1791057	Cadmium	0.0115	Spike	P	0 - 20
1791057	Chromium	0.687	Spike	P	0 - 20
1791057	Copper	0.609	Spike	P	0 - 20
1791057	Lead	0.349	Spike	P	0 - 20
1791057	Nickel	0.528	Spike	P	0 - 20
1791057	Silver	1.08	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P303123

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1790694	Chloride	0.161	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P303125

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1790694	Sulfate	0.597	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P303370

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1790766	Ammonia-N	0.209	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P303458

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1790743	Kjeldahl Nitrogen	1.81	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P303159

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1790743	NO2NO3-N	1.39	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P303170

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1790713	Total-P	2.53	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P303412

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1790037	Total-P	2.80	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P302617

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1790744	O-Phosphate-P	0.677	Spike	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P302594

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1790709	Color (true)	4.81	Sample	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P302595

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1790798	Color (true)	0.659	Sample	P	0 - 20

Reference Method: SM 2320 B-97
Batch ID: P302875

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1790709	Total Alkalinity	0.0277	Sample	P	0 - 4.8

Quality Assurance Report Precision

Reference Method: SM 2540 C-97
Batch ID: P303352

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1790663	TDS	6.20	Sample	P	0 - 10

Reference Method: SM 2540 C-97
Batch ID: P303354

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1790740	TDS	3.86	Sample	P	0 - 10

Reference Method: SM 4500 F-C-97
Batch ID: P302878

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1790709	Fluoride	0.979	Spike	P	0 - 3.0

Reference Method: SM 5310 B-00
Batch ID: P303344

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1790741	Organic Carbon	0.791	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: A68985
Included Lab Sample IDs: 1790763, 1790764, 1790765

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	100	101	P/P	90 - 115
Color (true)	99.6	100	P/P	90 - 115

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A68990
Included Lab Sample IDs: 1790769, 1790770, 1790771

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	100	99.2	P/P	90 - 110

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A68992
Included Lab Sample IDs: 1790763, 1790764, 1790765

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

Quality Assurance Report Calibration Verification

Reference Method: SM 2320 B-97

Run ID: A69069

Included Lab Sample IDs: 1790763, 1790764, 1790765

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	96.3	99.7	P/P	90 - 110
Total Alkalinity	99.7	96.2	P/P	90 - 110

Reference Method: SM 4500 F-C-97

Run ID: A69069

Included Lab Sample IDs: 1790763, 1790764, 1790765

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	96.7	98.0	P/P	90 - 110
Fluoride	98.0	97.6	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A69081

Included Lab Sample IDs: 1790777, 1790778, 1790779

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	101	98.8	P/P	90 - 110
Calcium	98.8	103	P/P	90 - 110
Iron	100	101	P/P	90 - 110
Iron	101	100	P/P	90 - 110
Magnesium	101	101	P/P	90 - 110
Magnesium	101	102	P/P	90 - 110
Potassium	100	99.5	P/P	90 - 110
Potassium	99.5	99.7	P/P	90 - 110
Sodium	102	99.8	P/P	90 - 110
Sodium	99.8	101	P/P	90 - 110
Zinc	101	100	P/P	90 - 110
Zinc	100	101	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A69123

Included Lab Sample IDs: 1790777, 1790778, 1790779

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	97.4	96.6	P/P	90 - 110
Arsenic	99.8	97.4	P/P	90 - 110
Cadmium	97.2	97.3	P/P	90 - 110
Cadmium	97.3	98.1	P/P	90 - 110
Chromium	94.4	94.8	P/P	90 - 110
Chromium	97.3	94.4	P/P	90 - 110
Copper	101	96.9	P/P	90 - 110
Copper	96.9	94.1	P/P	90 - 110
Lead	96.0	95.7	P/P	90 - 110
Lead	97.6	96.0	P/P	90 - 110
Nickel	101	97.2	P/P	90 - 110
Nickel	97.2	94.3	P/P	90 - 110
Silver	96.0	96.1	P/P	90 - 110
Silver	97.7	96.0	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 300.0 Rev. 2.1

Run ID: A69144

Included Lab Sample IDs: 1790763, 1790764, 1790765

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	101	101	P/P	90 - 110
Sulfate	97.9	100	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A69154

Included Lab Sample IDs: 1790766, 1790767, 1790768

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

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A69158

Included Lab Sample IDs: 1790767

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

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A69171

Included Lab Sample IDs: 1790766

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

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A69207

Included Lab Sample IDs: 1790766, 1790767, 1790768

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	98.3	100	P/P	90 - 110
Ammonia-N	99.4	98.3	P/P	90 - 110

Reference Method: SM 5310 B-00

Run ID: A69209

Included Lab Sample IDs: 1790766, 1790767, 1790768

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	96.0	96.8	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A69293

Included Lab Sample IDs: 1790768

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	99.2	100	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A69327

Included Lab Sample IDs: 1790766, 1790767

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

Reference Method: EPA 351.2 Rev. 2.0
 Run ID: A69327
 Included Lab Sample IDs: 1790766, 1790767

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	96.1	101	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
 Run ID: A69328
 Included Lab Sample IDs: 1790768

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	96.5	92.7	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						5.87	
EPA 200.7 Rev. 4.4	Calcium	111	108	110	101			0.924
	Iron	107	107	106	106			0.546
	Magnesium	108	108	108	103			0.398
	Potassium	103	100	102	97.9			1.26
	Sodium	108	102	105	101			1.59
	Zinc	97.2	102	102	99.7			0.393
EPA 200.8 Rev. 5.4	Arsenic	96.3	94.2	94.9	95.9			0.758
	Cadmium	95.8	98.2	98.2	99.3			0.0115
	Chromium	93.9	95.3	94.6	95.0			0.687
	Copper	94.8	91.4	91.9	92.3			0.609
	Lead	96.4	97.8	98.2	98.7			0.349
	Nickel	97.5	93.4	92.9	93.3			0.528
	Silver	93.4	93.4	94.4	93.3			1.08
EPA 300.0 Rev. 2.1	Chloride	96.2	93.4	95.6			0.161	
	Sulfate	95.7	93.7	92.8			0.597	
EPA 350.1 Rev. 2.0	Ammonia-N	98.8	98.9	98.6				0.209
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	102						1.81
EPA 353.2 Rev. 2.0	NO2NO3-N	102	98.7	97.2				1.39
EPA 365.1 Rev. 2.0	Total-P	98.1						2.53
	Total-P	99.0						2.80
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	103	99.8	101				0.677
SM 2120 B	Color (true)						4.81	
	Color (true)						0.659	
SM 2320 B-97	Total Alkalinity	98.8					0.0277	
SM 2540 C-97	TDS						6.20	
	TDS						3.86	
SM 4500 F-C-97	Fluoride	94.9	94.6	96.1				0.979
SM 5310 B-00	Organic Carbon	99.4	96.2	94.8				0.791

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	1790763, 1790764, 1790765
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	1790777, 1790778, 1790779
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	1790777, 1790778, 1790779
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	1790763, 1790764, 1790765
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	1790763, 1790764, 1790765
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	1790766, 1790767, 1790768
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	1790766, 1790767, 1790768
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	1790766, 1790767, 1790768
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	1790766, 1790767, 1790768
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	1790769, 1790770, 1790771
SM 2120 B / E31780	True Color measured at 450 nm	1790763, 1790764, 1790765
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO ₃ /L	1790763, 1790764, 1790765
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	1790763, 1790764, 1790765
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices	1790763, 1790764, 1790765
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	1790763, 1790764, 1790765
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	1790766, 1790767, 1790768

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	04/20/2016			04/20/2016 14:20	Sima Feizi	1790763, 1790764, 1790765
EPA 200.7 Rev. 4.4	04/20/2016	04/21/2016	Elliott D. Healy	04/25/2016	Joshua Ayres	1790777, 1790778, 1790779
EPA 200.8 Rev. 5.4	04/20/2016	04/21/2016	Elliott D. Healy	04/26/2016	Charles J. Peterson	1790777, 1790778, 1790779
EPA 300.0 Rev. 2.1	04/20/2016			04/28/2016	Elisa J Lutz	1790763, 1790764, 1790765
EPA 350.1 Rev. 2.0	04/20/2016			05/02/2016	Diana M. Turner	1790766, 1790767, 1790768
EPA 351.2 Rev. 2.0	04/20/2016	05/04/2016	Sofia Elnemr	05/06/2016	Christopher Armour	1790766, 1790767, 1790768
EPA 353.2 Rev. 2.0	04/20/2016			04/28/2016	Diana M. Turner	1790766, 1790767, 1790768
EPA 365.1 Rev. 2.0	04/20/2016	04/28/2016	Lipi Saha	04/28/2016	Lipi Saha	1790767
	04/20/2016	04/28/2016	Lipi Saha	04/29/2016	Lipi Saha	1790766
	04/20/2016	05/03/2016	Vijayalakshmi Reddy	05/04/2016	Lipi Saha	1790768
EPA 365.1 Rev. 2.0 dissolved	04/20/2016			04/20/2016 14:36	Ping Hua	1790769
	04/20/2016			04/20/2016 14:37	Ping Hua	1790770
	04/20/2016			04/20/2016 14:38	Ping Hua	1790771
SM 2120 B	04/20/2016			04/20/2016 13:09	Rochelle Y Jackson	1790763
	04/20/2016			04/20/2016 13:44	Rochelle Y Jackson	1790764
	04/20/2016			04/20/2016 13:45	Rochelle Y Jackson	1790765
SM 2320 B-97	04/20/2016			04/22/2016	Dale L. Simmons	1790763, 1790764, 1790765
SM 2540 C-97	04/20/2016			04/22/2016	Yijie Li	1790763, 1790764, 1790765
SM 2540 D-97	04/20/2016			04/22/2016	Yijie Li	1790763, 1790764, 1790765
SM 4500 F-C-97	04/20/2016			04/22/2016	Dale L. Simmons	1790763, 1790764, 1790765
SM 5310 B-00	04/20/2016			04/30/2016	Sofia Elnemr	1790766, 1790767, 1790768