

Chemical Analysis Report

SO-DIST-2016-08-09-03

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

Event Description: **SMP: Myrtle and Myrtle?**

Request ID: **RQ-2016-08-08-11**

Customer: **SO-DIST**

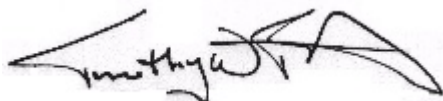
Project ID: **SMP**

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

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Certified by: Timothy Fitzpatrick, Program Administrator

Date Certified: 31-AUG-2016 11:18

A handwritten signature in black ink, appearing to read "Timothy 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: Myrtle Slough @ SR31

Collection Date/Time: 08/08/2016 11:05

Field ID: G3SD080816-5

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1822577	EPA 180.1 Rev. 2.0	Turbidity	3.0		NTU	P309442	
	EPA 300.0 Rev. 2.1	Chloride	95		mg Cl/L	P309870	
		Sulfate	49		mg SO4/L	P309873	
	SM 2120 B	Color (true)	100		PCU	P309416	
	SM 2320 B-97	Total Alkalinity	130		mg CaCO3/L	P309562	
	SM 2540 C-97	TDS	425		mg/L	P309826	
	SM 2540 D-97	TSS	4	I	mg/L	P309767	
	SM 4500 F-C-97	Fluoride	0.19		mg F/L	P309564	
1822580	EPA 350.1 Rev. 2.0	Ammonia-N	0.060		mg N/L	P309539	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.2		mg N/L	P309741	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.28		mg N/L	P309611	
	EPA 365.1 Rev. 2.0	Total-P	0.11		mg P/L	P309722	
	SM 5310 B-00	Organic Carbon	15		mg C/L	P310047	
1822583	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.081		mg P/L	P309427	
1822629	EPA 200.7 Rev. 4.4	Calcium	73.2		mg/L	P309594	
		Iron	310		ug/L	P309594	
		Magnesium	9.56		mg/L	P309594	
		Potassium	10.8		mg/L	P309594	
		Sodium	43.1		mg/L	P309594	
		Zinc	5.0	U	ug/L	P309594	
	EPA 200.8 Rev. 5.4	Arsenic	0.65		ug/L	P309594	
		Cadmium	0.020	U	ug/L	P309594	
		Chromium	0.64		ug/L	P309594	
		Copper	1.39		ug/L	P309594	
		Lead	0.096	I	ug/L	P309594	
		Nickel	1.06		ug/L	P309594	
		Silver	0.0050	U	ug/L	P309594	

Ref. Method and Comment:

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

Sample Location: Field Blank

Collection Date/Time: 08/08/2016 11:10

Field ID: G3SD080816-FB

Matrix: W-FIELD-BK

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1822578	EPA 180.1 Rev. 2.0	Turbidity	0.10	U	NTU	P309442	
	EPA 300.0 Rev. 2.1	Chloride	0.20	U	mg Cl/L	P309870	
		Sulfate	0.20	U	mg SO4/L	P309873	
	SM 2120 B	Color (true)	2.5	U	PCU	P309416	
	SM 2320 B-97	Total Alkalinity	0.65	U	mg CaCO3/L	P309562	
	SM 2540 C-97	TDS	15	U	mg/L	P309823	
	SM 2540 D-97	TSS	2	U	mg/L	P309764	
	SM 4500 F-C-97	Fluoride	0.035	U	mg F/L	P309564	
1822581	EPA 350.1 Rev. 2.0	Ammonia-N	0.002	U	mg N/L	P309539	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.080	U	mg N/L	P309741	

Field ID: G3SD080816-FB

Matrix: W-FIELD-BK

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1822581	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P309611	
	EPA 365.1 Rev. 2.0	Total-P	0.002	U	mg P/L	P309722	
	SM 5310 B-00	Organic Carbon	0.50	U	mg C/L	P310047	
1822584	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P309428	
1822630	EPA 200.7 Rev. 4.4	Calcium	0.075	U	mg/L	P309594	
		Iron	30	U	ug/L	P309594	
		Magnesium	0.040	U	mg/L	P309594	
		Potassium	0.30	U	mg/L	P309594	
		Sodium	0.50	U	mg/L	P309594	
		Zinc	5.0	U	ug/L	P309594	
	EPA 200.8 Rev. 5.4	Arsenic	0.050	U	ug/L	P309594	
		Cadmium	0.020	U	ug/L	P309594	
		Chromium	0.079	I	ug/L	P309594	
		Copper	0.19	I	ug/L	P309889	
		Lead	0.050	U	ug/L	P309889	
		Nickel	0.050	U	ug/L	P309594	
		Silver	0.0050	U	ug/L	P309594	

Ref. Method and Comment:

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

EPA 200.8 Rev. 5.4: The presence of chromium was confirmed in the undigested sample on 08/12/2016. The copper result was confirmed on 08/12/2016.

Sample Location: Myrtle 1995 @ Pine Island St.

Collection Date/Time: 08/08/2016 10:40

Field ID: G3SD080816-21

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1822579	EPA 180.1 Rev. 2.0	Turbidity	2.2		NTU	P309442	
	EPA 300.0 Rev. 2.1	Chloride	21		mg Cl/L	P309870	
		Sulfate	5.1		mg SO4/L	P309873	
		Color (true)	210		PCU	P309416	
	SM 2320 B-97	Total Alkalinity	44	A	mg CaCO3/L	P309562	
	SM 2540 C-97	TDS	128		mg/L	P309826	
	SM 2540 D-97	TSS	6	I	mg/L	P309767	
	SM 4500 F-C-97	Fluoride	0.14		mg F/L	P309564	
1822582	EPA 350.1 Rev. 2.0	Ammonia-N	0.017		mg N/L	P309539	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.4		mg N/L	P309784	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P310020	
	EPA 365.1 Rev. 2.0	Total-P	0.031		mg P/L	P309722	
	SM 5310 B-00	Organic Carbon	24		mg C/L	P310047	
1822585	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.005	I	mg P/L	P309428	
1822631	EPA 200.7 Rev. 4.4	Calcium	16.7		mg/L	P309594	
		Iron	540		ug/L	P309594	
		Magnesium	6.55		mg/L	P309594	
		Potassium	2.1		mg/L	P309594	
		Sodium	10.8		mg/L	P309594	
		Zinc	5.0	U	ug/L	P309594	

Field ID: G3SD080816-21

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1822631	EPA 200.8 Rev. 5.4	Arsenic	0.67		ug/L	P309594	
		Cadmium	0.020	U	ug/L	P309594	
		Chromium	0.34		ug/L	P309594	
		Copper	0.39	I	ug/L	P309594	
		Lead	0.17	I	ug/L	P309594	
		Nickel	0.18	I	ug/L	P309594	
		Silver	0.0050	U	ug/L	P309594	

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

Quality Assurance Report

Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0
 Batch ID: P309442

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
 Batch ID: P309594

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: P309594

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 200.8 Rev. 5.4
 Batch ID: P309889

Component	Result	Code	Units
Copper	0.10	U	ug/L
Lead	0.050	U	ug/L

Reference Method: EPA 300.0 Rev. 2.1
 Batch ID: P309870

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: P309873

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P309539

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P309741

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P309784

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P309611

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P310020

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P309722

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P309427

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P309428

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

Quality Assurance Report Method Blank Results

Reference Method: SM 2120 B
Batch ID: P309416

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-97
Batch ID: P309562

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

Reference Method: SM 2540 C-97
Batch ID: P309823

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 C-97
Batch ID: P309826

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P309764

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P309767

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P309564

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P310047

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: P309594

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: P309594

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	105		P	85 - 115
Iron	107		P	85 - 115
Magnesium	106		P	85 - 115
Potassium	102		P	85 - 115
Sodium	107		P	85 - 115
Zinc	101		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P309594

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Arsenic	96.4		P	85 - 115
Cadmium	97.8		P	85 - 115
Chromium	96.7		P	85 - 115
Copper	96.5		P	85 - 115
Lead	97.9		P	85 - 115
Nickel	96.6		P	85 - 115
Silver	97.1		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P309889

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Copper	92.2		P	85 - 115
Lead	95.0		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P309870

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Chloride	99.6		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P309873

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Sulfate	94.3		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Batch ID: P309539

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

Reference Method: EPA 351.2 Rev. 2.0

Batch ID: P309741

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	109		P	90 - 110

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P309784

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P309611

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P310020

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P309722

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: P309427

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P309428

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

Reference Method: SM 2320 B-97
Batch ID: P309562

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

Reference Method: SM 4500 F-C-97
Batch ID: P309564

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	97.7		P	92 - 103

Reference Method: SM 5310 B-00
Batch ID: P310047

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	96.0		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P309594

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1823138	Calcium	104		P	80 - 120
1823138	Iron	107	111	P/P	80 - 120
1823138	Magnesium	107		P	80 - 120
1823138	Potassium	103	104	P/P	80 - 120
1823138	Sodium	103	104	P/P	80 - 120
1823138	Zinc	102	102	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P309594

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1823138	Arsenic	97.9	98.7	P/P	80 - 120
1823138	Cadmium	100	99.3	P/P	80 - 120
1823138	Chromium	98.5	99.7	P/P	80 - 120
1823138	Copper	95.5	95.4	P/P	80 - 120
1823138	Lead	99.3	100	P/P	80 - 120
1823138	Nickel	95.6	95.9	P/P	80 - 120
1823138	Silver	99.7	100	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P309889

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1823617	Copper	94.4	91.3	P/P	80 - 120
1823617	Lead	99.7	96.4	P/P	80 - 120
1823965	Copper	93.9		P	80 - 120
1823965	Lead	99.2		P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P309870

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1822641	Chloride	99.0		P	90 - 110
1822780	Chloride	98.3		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P309873

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1822641	Sulfate	95.9		P	90 - 110
1822780	Sulfate	93.5		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P309539

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1822642	Ammonia-N	103	104	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P309741

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P309741

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1822533	Kjeldahl Nitrogen	106	104	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P309784

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1822608	Kjeldahl Nitrogen	92.8	96.3	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P309611

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1822552	NO2NO3-N	94.3	97.3	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P310020

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1823209	NO2NO3-N	96.0	97.0	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P309722

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1822580	Total-P	103	102	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P309427

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1822542	O-Phosphate-P	99.7	100	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P309428

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1822585	O-Phosphate-P	96.2	97.2	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Batch ID: P309564

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1822579	Fluoride	98.4	99.7	P/P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P310047

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1822503	Organic Carbon	102		P	85 - 115

Quality Assurance Report Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P309442

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1822529	Turbidity	4.41	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P309594

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1823138	Calcium	0.0250	Spike	P	0 - 20
1823138	Iron	2.54	Spike	P	0 - 20
1823138	Magnesium	1.37	Spike	P	0 - 20
1823138	Potassium	0.799	Spike	P	0 - 20
1823138	Sodium	0.538	Spike	P	0 - 20
1823138	Zinc	0.0398	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P309594

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1823138	Arsenic	0.752	Spike	P	0 - 20
1823138	Cadmium	0.717	Spike	P	0 - 20
1823138	Chromium	1.15	Spike	P	0 - 20
1823138	Copper	0.0527	Spike	P	0 - 20
1823138	Lead	1.23	Spike	P	0 - 20
1823138	Nickel	0.280	Spike	P	0 - 20
1823138	Silver	0.439	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P309889

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1823617	Copper	3.28	Spike	P	0 - 20
1823617	Lead	3.41	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P309870

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1822780	Chloride	0.00100	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P309873

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1822780	Sulfate	0.389	Sample	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P309539

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1822642	Ammonia-N	0.706	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P309741

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1822533	Kjeldahl Nitrogen	1.12	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P309784

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1822608	Kjeldahl Nitrogen	2.86	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P309611

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1822552	NO2NO3-N	3.05	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P310020

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1823209	NO2NO3-N	0.608	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P309722

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1822580	Total-P	0.784	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P309427

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1822542	O-Phosphate-P	0.600	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P309428

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1822585	O-Phosphate-P	0.981	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: SM 2120 B
Batch ID: P309416

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1822549	Color (true)	0.889	Sample	P	0 - 20

Reference Method: SM 2320 B-97
Batch ID: P309562

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1822579	Total Alkalinity	0.0425	Sample	P	0 - 4.8

Reference Method: SM 2540 C-97
Batch ID: P309823

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1822270	TDS	3.38	Sample	P	0 - 10

Reference Method: SM 2540 C-97
Batch ID: P309826

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1822550	TDS	3.70	Sample	P	0 - 10

Reference Method: SM 4500 F-C-97
Batch ID: P309564

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1822579	Fluoride	0.979	Spike	P	0 - 3.0

Reference Method: SM 5310 B-00
Batch ID: P310047

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1822503	Organic Carbon	0.0967	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: A71020
Included Lab Sample IDs: 1822577, 1822578, 1822579

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	96.5	96.0	P/P	90 - 115
Color (true)	97.7	97.6	P/P	90 - 115

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A71024

Included Lab Sample IDs: 1822583, 1822584, 1822585

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

Reference Method: EPA 180.1 Rev. 2.0

Run ID: A71025

Included Lab Sample IDs: 1822577, 1822578, 1822579

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

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A71065

Included Lab Sample IDs: 1822580, 1822581, 1822582

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	99.5	99.8	P/P	90 - 110
Ammonia-N	99.5	99.5	P/P	90 - 110

Reference Method: SM 2320 B-97

Run ID: A71072

Included Lab Sample IDs: 1822577, 1822578, 1822579

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

Reference Method: SM 4500 F-C-97

Run ID: A71072

Included Lab Sample IDs: 1822577, 1822578, 1822579

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

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A71077

Included Lab Sample IDs: 1822580, 1822581

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

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A71119

Included Lab Sample IDs: 1822629, 1822630, 1822631

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	100	96.6	P/P	90 - 110
Cadmium	99.2	97.4	P/P	90 - 110
Chromium	100	97.5	P/P	90 - 110
Copper	100	96.5	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A71119

Included Lab Sample IDs: 1822629, 1822630, 1822631

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Lead	99.5	97.1	P/P	90 - 110
Nickel	99.9	96.3	P/P	90 - 110
Silver	100	97.2	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A71131

Included Lab Sample IDs: 1822629, 1822630, 1822631

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	100	102	P/P	95 - 105
Calcium	102	102	P/P	90 - 110
Iron	101	101	P/P	95 - 105
Iron	101	102	P/P	90 - 110
Magnesium	103	103	P/P	95 - 105
Magnesium	103	103	P/P	90 - 110
Potassium	101	101	P/P	95 - 105
Potassium	101	101	P/P	90 - 110
Sodium	97.8	98.3	P/P	95 - 105
Sodium	98.3	98.5	P/P	90 - 110
Zinc	101	102	P/P	95 - 105
Zinc	102	100	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A71171

Included Lab Sample IDs: 1822580

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

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A71172

Included Lab Sample IDs: 1822580

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	98.9	93.7	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1

Run ID: A71177

Included Lab Sample IDs: 1822577, 1822578, 1822579

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	101	101	P/P	90 - 110
Sulfate	95.8	96.3	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A71187

Included Lab Sample IDs: 1822581, 1822582

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	102	98.5	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A71192

Included Lab Sample IDs: 1822581

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	105	95.3	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A71196

Included Lab Sample IDs: 1822582

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	97.0	104	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A71229

Included Lab Sample IDs: 1822582

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

Reference Method: SM 5310 B-00

Run ID: A71236

Included Lab Sample IDs: 1822580, 1822581, 1822582

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	96.8	96.1	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A71245

Included Lab Sample IDs: 1822630

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Copper	98.9	95.8	P/P	90 - 110
Lead	95.8	95.9	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				4.41	
EPA 200.7 Rev. 4.4	Calcium	105	104			0.0250
	Iron	107	107	111		2.54
	Magnesium	106	107			1.37
	Potassium	102	103	104		0.799
	Sodium	107	103	104		0.538
	Zinc	101	102	102		0.0398
EPA 200.8 Rev. 5.4	Arsenic	96.4	97.9	98.7		0.752
	Cadmium	97.8	100	99.3		0.717
	Chromium	96.7	98.5	99.7		1.15

Quality Assurance Report Summary

Ref. Method	Analyte	LCS % Recovery	MS % Recovery			Precision	MS
			LCS	SMP	MS		
EPA 200.8 Rev. 5.4	Copper	96.5	95.5	95.4			0.0527
	Copper	92.2	94.4	91.3	93.9		3.28
	Lead	97.9	99.3	100			1.23
	Lead	95.0	99.7	96.4	99.2		3.41
	Nickel	96.6	95.6	95.9			0.280
	Silver	97.1	99.7	100			0.439
EPA 300.0 Rev. 2.1	Chloride	99.6	98.3	99.0		0.0010	
	Sulfate	94.3	93.5	95.9		0.389	
EPA 350.1 Rev. 2.0	Ammonia-N	95.9	103	104			0.706
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	109	106	104			1.12
	Kjeldahl Nitrogen	107	92.8	96.3			2.86
EPA 353.2 Rev. 2.0	NO2NO3-N	102	94.3	97.3			3.05
	NO2NO3-N	101	96.0	97.0			0.608
EPA 365.1 Rev. 2.0	Total-P	106	103	102			0.784
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	100	99.7	100			0.600
	O-Phosphate-P	99.2	96.2	97.2			0.981
SM 2120 B	Color (true)					0.889	
SM 2320 B-97	Total Alkalinity	103				0.0425	
SM 2540 C-97	TDS					3.38	
	TDS					3.70	
SM 4500 F-C-97	Fluoride	97.7	98.4	99.7			0.979
SM 5310 B-00	Organic Carbon	96.0	102				0.0967

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	1822577, 1822578, 1822579
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	1822629, 1822630, 1822631
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	1822629, 1822630, 1822631
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	1822577, 1822578, 1822579
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	1822577, 1822578, 1822579
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	1822580, 1822581, 1822582
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	1822580, 1822581, 1822582
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	1822580, 1822581, 1822582
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	1822580, 1822581, 1822582
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	1822583, 1822584, 1822585
SM 2120 B / E31780	True Color measured at 450 nm	1822577, 1822578, 1822579
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO3/L	1822577, 1822578, 1822579
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	1822577, 1822578, 1822579
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices	1822577, 1822578, 1822579
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	1822577, 1822578, 1822579
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	1822580, 1822581, 1822582

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	08/09/2016			08/09/2016 14:10	Sima Feizi	1822577, 1822578, 1822579
EPA 200.7 Rev. 4.4	08/09/2016	08/11/2016	Elliott D. Healy	08/15/2016	Joshua Ayres	1822629, 1822630, 1822631
EPA 200.8 Rev. 5.4	08/09/2016	08/11/2016	Elliott D. Healy	08/12/2016	Charles J. Peterson	1822629, 1822630, 1822631
	08/09/2016	08/17/2016	Elliott D. Healy	08/18/2016	Charles J. Peterson	1822630
EPA 300.0 Rev. 2.1	08/09/2016			08/17/2016	Ping Hua	1822577, 1822578, 1822579
EPA 350.1 Rev. 2.0	08/09/2016			08/09/2016	Joseph Suarez	1822580, 1822581, 1822582
EPA 351.2 Rev. 2.0	08/09/2016	08/15/2016	Sofia Elnemr	08/16/2016	Virginia P. Brown	1822580
	08/09/2016	08/15/2016	Sofia Elnemr	08/17/2016	Christopher Armour	1822581
	08/09/2016	08/16/2016	Sofia Elnemr	08/18/2016	Christopher Armour	1822582
EPA 353.2 Rev. 2.0	08/09/2016			08/11/2016	Beverly Y. Sanders	1822580, 1822581
	08/09/2016			08/19/2016	Beverly Y. Sanders	1822582
EPA 365.1 Rev. 2.0	08/09/2016	08/15/2016	Vijayalakshmi Reddy	08/16/2016	Lipi Saha	1822580
	08/09/2016	08/15/2016	Vijayalakshmi Reddy	08/17/2016	Lipi Saha	1822581, 1822582
EPA 365.1 Rev. 2.0 dissolved	08/09/2016			08/09/2016 14:20	Julia Storbeck	1822585
	08/09/2016			08/09/2016 14:32	Julia Storbeck	1822584
	08/09/2016			08/09/2016 14:52	Julia Storbeck	1822583
SM 2120 B	08/09/2016			08/09/2016 13:26	Rochelle Y Jackson	1822577
	08/09/2016			08/09/2016 13:27	Rochelle Y Jackson	1822578
	08/09/2016			08/09/2016 14:10	Rochelle Y Jackson	1822579
SM 2320 B-97	08/09/2016			08/10/2016	Dale L. Simmons	1822579
	08/09/2016			08/11/2016	Dale L. Simmons	1822577, 1822578
SM 2540 C-97	08/09/2016			08/10/2016	Yijie Li	1822577, 1822578, 1822579
SM 2540 D-97	08/09/2016			08/10/2016	Yijie Li	1822577, 1822578, 1822579
SM 4500 F-C-97	08/09/2016			08/10/2016	Dale L. Simmons	1822579
	08/09/2016			08/11/2016	Dale L. Simmons	1822577, 1822578
SM 5310 B-00	08/09/2016			08/19/2016	Sofia Elnemr	1822580, 1822581, 1822582