

Chemical Analysis Report

CEN-DIST-2018-12-28-01

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

Event Description: **Puzzle + D&B / Asher**
Request ID: **RQ-2018-12-17-12**
Customer: **CEN-DIST**
Project ID: **SMP**

Send Reports to:
FL Dept. of Environmental Protection
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3319 Maguire Blvd., Suite 232
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Certified by: Liang Lin, Environmental Administrator

Date Certified: 14-JAN-2019 14:43

A handwritten signature in black ink, appearing to read "Liang Lin", on a light-colored background.

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: SJR @ Hatbill Park Boat Ramp

Collection Date/Time: 12/27/2018 11:36

Field ID: G3CE0010

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2051063	EPA 180.1 Rev. 2.0	Turbidity	10		NTU	P356729	
	EPA 300.0 Rev. 2.1	Chloride	930		mg Cl/L	P356869	
		Sulfate	390		mg SO4/L	P356873	
		Color (true)	79		PCU	P356702	
	SM 2320 B-97	Total Alkalinity	47		mg CaCO3/L	P356933	
	SM 2540 C-97	TDS	2.12E+03		mg/L	P356783	
	SM 2540 D-97	TSS	11		mg/L	P356764	
	SM 4500 F-C-97	Fluoride	0.096	I	mg F/L	P356938	
2051064	EPA 350.1 Rev. 2.0	Ammonia-N	0.083		mg N/L	P356903	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.4		mg N/L	P356757	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.16		mg N/L	P356737	
	EPA 365.1 Rev. 2.0	Total-P	0.062		mg P/L	P356770	
	SM 5310 B-00	Organic Carbon	18		mg C/L	P356742	
2051065	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.006	I	mg P/L	P356698	
2051075	EPA 200.7 Rev. 4.4	Calcium	131		mg/L	P356780	
		Iron	720		ug/L	P356780	
		Magnesium	71.8		mg/L	P356780	
		Potassium	14.2		mg/L	P356780	
		Sodium	486		mg/L	P356780	
		Zinc	5.0	U	ug/L	P356780	
	EPA 200.8 Rev. 5.4	Arsenic	0.67		ug/L	P356780	
		Cadmium	0.020	U	ug/L	P356780	
		Chromium	0.40	U	ug/L	P356780	
		Copper	0.55	I	ug/L	P356780	
		Lead	0.60		ug/L	P356780	
		Nickel	0.70	I	ug/L	P356780	
		Silver	0.010	U	ug/L	P356780	

Ref. Method and Comment:

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

EPA 365.1 Rev. 2.0: Total-P: The result was confirmed on 01/09/2019.

EPA 200.7 Rev. 4.4: The iron result was confirmed in the undigested sample on 01/04/2019.

Sample Location: SJR @ Hatbill Park Boat Ramp (2964B1)

Collection Date/Time: 12/27/2018 11:39

Field ID: G3CE0010 DUP

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2051066	EPA 180.1 Rev. 2.0	Turbidity	10		NTU	P356729	
	EPA 300.0 Rev. 2.1	Chloride	920		mg Cl/L	P356869	
		Sulfate	390		mg SO4/L	P356873	
		Color (true)	78		PCU	P356702	
	SM 2320 B-97	Total Alkalinity	47		mg CaCO3/L	P356933	
	SM 2540 C-97	TDS	2.06E+03		mg/L	P356783	
	SM 2540 D-97	TSS	10		mg/L	P356764	
	SM 4500 F-C-97	Fluoride	0.095	I	mg F/L	P356938	
2051067	EPA 350.1 Rev. 2.0	Ammonia-N	0.085		mg N/L	P356752	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.4		mg N/L	P356757	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.16		mg N/L	P356737	
	EPA 365.1 Rev. 2.0	Total-P	0.072		mg P/L	P356770	
	SM 5310 B-00	Organic Carbon	18		mg C/L	P356742	
2051068	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.006	I	mg P/L	P356698	
2051076	EPA 200.7 Rev. 4.4	Calcium	128		mg/L	P356780	
		Iron	1.0E+03		ug/L	P356955	
		Magnesium	70.7		mg/L	P356780	
		Potassium	14.2		mg/L	P356780	
		Sodium	479		mg/L	P356780	
		Zinc	5.2	I	ug/L	P356780	
	EPA 200.8 Rev. 5.4	Arsenic	0.71		ug/L	P356780	
		Cadmium	0.020	U	ug/L	P356780	
		Chromium	0.46	I	ug/L	P356780	
		Copper	0.63	I	ug/L	P356780	
		Lead	0.73		ug/L	P356780	
		Nickel	0.76	I	ug/L	P356780	
		Silver	0.010	U	ug/L	P356780	

Ref. Method and Comment:

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

EPA 365.1 Rev. 2.0: Total-P: The result was confirmed on 01/09/2019.

EPA 200.7 Rev. 4.4: The iron result was confirmed on 01/04/2019.

Sample Location: Blank_12202018

Collection Date/Time: 12/27/2018 11:45

Field ID: Field Blank

Matrix: W-FIELD-BK

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2051069	EPA 180.1 Rev. 2.0	Turbidity	0.10	U	NTU	P356729	
	EPA 300.0 Rev. 2.1	Chloride	0.20	U	mg Cl/L	P356869	
		Sulfate	0.20	U	mg SO4/L	P356873	
		Color (true)	2.5	U	PCU	P356702	
	SM 2320 B-97	Total Alkalinity	0.65	U	mg CaCO3/L	P356933	
	SM 2540 C-97	TDS	15	U	mg/L	P356782	
	SM 2540 D-97	TSS	2	U	mg/L	P356763	
	SM 4500 F-C-97	Fluoride	0.035	U	mg F/L	P356938	
2051070	EPA 350.1 Rev. 2.0	Ammonia-N	0.002	U	mg N/L	P356752	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.080	U	mg N/L	P356757	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P356737	
	EPA 365.1 Rev. 2.0	Total-P	0.002	U	mg P/L	P356770	
	SM 5310 B-00	Organic Carbon	0.50	U	mg C/L	P356742	
2051071	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P356698	
2051077	EPA 200.7 Rev. 4.4	Calcium	0.075	U	mg/L	P356780	
		Iron	30	U	ug/L	P356780	
		Magnesium	0.040	U	mg/L	P356780	
		Potassium	0.30	U	mg/L	P356780	
		Sodium	0.50	U	mg/L	P356780	
		Zinc	5.0	U	ug/L	P356780	
	EPA 200.8 Rev. 5.4	Arsenic	0.050	U	ug/L	P356780	
		Cadmium	0.020	U	ug/L	P356780	
		Chromium	0.40	U	ug/L	P356780	
		Copper	0.20	U	ug/L	P356780	
		Lead	0.050	U	ug/L	P356780	
		Nickel	0.20	U	ug/L	P356780	
		Silver	0.010	U	ug/L	P356780	

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: P356729

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P356780

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 200.7 Rev. 4.4
Batch ID: P356955

Component	Result	Code	Units
Iron	30	U	ug/L

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P356780

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P356869

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P356873

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P356752

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

Quality Assurance Report Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P356903

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P356757

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P356737

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P356770

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P356698

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

Reference Method: SM 2120 B
Batch ID: P356702

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-97
Batch ID: P356933

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

Reference Method: SM 2540 C-97
Batch ID: P356782

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 C-97
Batch ID: P356783

Component	Result	Code	Units
TDS	15	U	mg/L

Quality Assurance Report

Method Blank Results

Reference Method: SM 2540 D-97
Batch ID: P356763

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P356764

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P356938

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P356742

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: P356780

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	101		P	85 - 115
Iron	105		P	85 - 115
Magnesium	106		P	85 - 115
Potassium	98.9		P	85 - 115
Sodium	97.8		P	85 - 115
Zinc	98.6		P	85 - 115

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P356955

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Iron	100		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P356780

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Arsenic	109		P	85 - 115
Cadmium	105		P	85 - 115
Chromium	105		P	85 - 115
Copper	106		P	85 - 115
Lead	104		P	85 - 115
Nickel	109		P	85 - 115
Silver	98.8		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P356869

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P356873

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Sulfate	97.2		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P356752

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P356903

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

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P356757

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	97.2		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P356737

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P356770

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P356698

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	96.9		P	90 - 110

Reference Method: SM 2120 B
Batch ID: P356702

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	101		P	85 - 115

Reference Method: SM 2320 B-97
Batch ID: P356933

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	101		P	98 - 107

Reference Method: SM 4500 F-C-97
Batch ID: P356938

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	95.1		P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P356742

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	97.5		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P356780

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2051003	Calcium	95.9		P	80 - 120
2051003	Iron	107	106	P/P	80 - 120
2051003	Magnesium	110	108	P/P	80 - 120
2051003	Potassium	104	102	P/P	80 - 120
2051003	Sodium	104	102	P/P	80 - 120
2051003	Zinc	99.4	98.7	P/P	80 - 120

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P356955

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2051851	Iron	104	103	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P356780

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2051003	Arsenic	107	109	P/P	80 - 120
2051003	Cadmium	107	108	P/P	80 - 120
2051003	Chromium	101	104	P/P	80 - 120
2051003	Copper	102	103	P/P	80 - 120
2051003	Lead	104	105	P/P	80 - 120
2051003	Nickel	104	105	P/P	80 - 120
2051003	Silver	106	103	P/P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P356869

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2050990	Chloride	96.4		P	90 - 110
2051275	Chloride	97.5		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P356873

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2050990	Sulfate	96.6		P	90 - 110
2051275	Sulfate	98.3		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P356752

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2051158	Ammonia-N	99.3	102	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P356903

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2051445	Ammonia-N	96.9	97.5	P/P	90 - 110

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P356757

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2050993	Kjeldahl Nitrogen	107	104	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P356737

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2051106	NO2NO3-N	100		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P356770

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2050995	Total-P	103	102	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P356698

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2051159	O-Phosphate-P	92.7	94.5	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Batch ID: P356938

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2051828	Fluoride	93.4	95.7	P/P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P356742

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2051064	Organic Carbon	98.2	97.0	P/P	85 - 115

Quality Assurance Report Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P356729

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2051016	Turbidity	1.83	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P356780

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2051003	Calcium	2.12	Spike	P	0 - 20
2051003	Iron	0.601	Spike	P	0 - 20
2051003	Magnesium	0.847	Spike	P	0 - 20
2051003	Potassium	2.30	Spike	P	0 - 20
2051003	Sodium	1.04	Spike	P	0 - 20
2051003	Zinc	0.744	Spike	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P356955

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2051851	Iron	1.10	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P356780

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2051003	Arsenic	1.10	Spike	P	0 - 20
2051003	Cadmium	0.699	Spike	P	0 - 20
2051003	Chromium	2.60	Spike	P	0 - 20
2051003	Copper	1.65	Spike	P	0 - 20
2051003	Lead	0.593	Spike	P	0 - 20
2051003	Nickel	1.04	Spike	P	0 - 20
2051003	Silver	2.64	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P356869

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2050990	Chloride	0.973	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P356873

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2050990	Sulfate	0.668	Sample	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P356752

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2051158	Ammonia-N	2.82	Spike	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P356903

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2051445	Ammonia-N	0.552	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P356757

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2050993	Kjeldahl Nitrogen	2.88	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P356737

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2051106	NO2NO3-N	0.346	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P356770

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2050995	Total-P	1.31	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P356698

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2051159	O-Phosphate-P	1.46	Spike	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P356702

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2051105	Color (true)	0.751	Sample	P	0 - 20

Reference Method: SM 2320 B-97
Batch ID: P356933

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2051828	Total Alkalinity	0.0128	Sample	P	0 - 1.6

Quality Assurance Report Precision

Reference Method: SM 2540 C-97
Batch ID: P356782

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2050917	TDS	3.59	Sample	P	0 - 10

Reference Method: SM 2540 C-97
Batch ID: P356783

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2051017	TDS	0.0	Sample	P	0 - 10

Reference Method: SM 4500 F-C-97
Batch ID: P356938

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2051828	Fluoride	1.96	Spike	P	0 - 3.5

Reference Method: SM 5310 B-00
Batch ID: P356742

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2051064	Organic Carbon	0.670	Spike	P	0 - 20

* Sample, spike and/or laboratory control sample precision (LCS) is reported.
Replicate spike precision may be reported when sample results are below quantifiable levels.

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A88556

Included Lab Sample IDs: 2051065, 2051068, 2051071

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	97.7	97.1	P/P	90 - 110

Reference Method: SM 2120 B

Run ID: A88558

Included Lab Sample IDs: 2051063, 2051066, 2051069

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	98.6	99.9	P/P	90 - 115

Reference Method: EPA 180.1 Rev. 2.0

Run ID: A88582

Included Lab Sample IDs: 2051063, 2051066, 2051069

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

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A88590

Included Lab Sample IDs: 2051064, 2051067, 2051070

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

Reference Method: SM 5310 B-00

Run ID: A88596

Included Lab Sample IDs: 2051064, 2051067, 2051070

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	98.4	97.4	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A88604

Included Lab Sample IDs: 2051067, 2051070

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	101	98.8	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1

Run ID: A88626

Included Lab Sample IDs: 2051063, 2051066, 2051069

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

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A88643

Included Lab Sample IDs: 2051064, 2051067, 2051070

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	95.8	94.0	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A88647

Included Lab Sample IDs: 2051064, 2051067

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	99.9	100	P/P	90 - 110
Total-P	100	99.0	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A88662

Included Lab Sample IDs: 2051070

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

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A88663

Included Lab Sample IDs: 2051075, 2051076, 2051077

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	99.5	99.7	P/P	95 - 105
Calcium	99.7	98.3	P/P	90 - 110
Iron	101	99.1	P/P	90 - 110
Iron	101	101	P/P	95 - 105
Magnesium	101	100	P/P	95 - 105
Magnesium	100	98.7	P/P	90 - 110
Potassium	97.4	96.4	P/P	90 - 110
Potassium	97.6	97.4	P/P	95 - 105
Sodium	96.3	96.6	P/P	95 - 105
Sodium	96.6	95.4	P/P	90 - 110
Zinc	99.8	98.1	P/P	90 - 110
Zinc	99.9	99.8	P/P	95 - 105

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A88679

Included Lab Sample IDs: 2051075, 2051076, 2051077

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	106	106	P/P	90 - 110
Arsenic	106	106	P/P	90 - 110
Cadmium	102	104	P/P	90 - 110
Cadmium	104	105	P/P	90 - 110
Chromium	104	104	P/P	90 - 110
Chromium	104	106	P/P	90 - 110
Copper	106	106	P/P	90 - 110
Copper	106	107	P/P	90 - 110
Lead	104	105	P/P	90 - 110
Lead	105	105	P/P	90 - 110
Nickel	105	107	P/P	90 - 110
Nickel	106	105	P/P	90 - 110
Silver	101	103	P/P	90 - 110
Silver	100	101	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A88681

Included Lab Sample IDs: 2051064

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	98.0	98.2	P/P	90 - 110

Reference Method: SM 2320 B-97

Run ID: A88689

Included Lab Sample IDs: 2051063, 2051066, 2051069

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

Reference Method: SM 4500 F-C-97

Run ID: A88689

Included Lab Sample IDs: 2051063, 2051066, 2051069

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	96.7	95.3	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A88713

Included Lab Sample IDs: 2051076

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Iron	101	102	P/P	95 - 105

* 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	MS
						SMP	
EPA 180.1 Rev. 2.0	Turbidity					1.83	
EPA 200.7 Rev. 4.4	Calcium	101	95.9				2.12
	Iron	105	107	106			0.601
	Iron	100	104	103			1.10
	Magnesium	106	110	108			0.847
	Potassium	98.9	104	102			2.30
	Sodium	97.8	104	102			1.04
	Zinc	98.6	99.4	98.7			0.744
EPA 200.8 Rev. 5.4	Arsenic	109	107	109			1.10
	Cadmium	105	107	108			0.699
	Chromium	105	101	104			2.60
	Copper	106	102	103			1.65
	Lead	104	104	105			0.593
	Nickel	109	104	105			1.04
	Silver	98.8	106	103			2.64
EPA 300.0 Rev. 2.1	Chloride	98.2	96.4	97.5		0.973	
	Sulfate	97.2	96.6	98.3		0.668	
EPA 350.1 Rev. 2.0	Ammonia-N	98.9	99.3	102			2.82
	Ammonia-N	95.5	96.9	97.5			0.552
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	97.2	107	104			2.88
EPA 353.2 Rev. 2.0	NO2NO3-N	100	100				0.346
EPA 365.1 Rev. 2.0	Total-P	105	103	102			1.31
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	96.9	92.7	94.5			1.46
SM 2120 B	Color (true)	101				0.751	
SM 2320 B-97	Total Alkalinity	101				0.0128	
SM 2540 C-97	TDS					3.59	
	TDS					0.0	
SM 4500 F-C-97	Fluoride	95.1	93.4	95.7			1.96
SM 5310 B-00	Organic Carbon	97.5	98.2	97.0			0.670

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	2051063, 2051066, 2051069
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2051075, 2051076, 2051077
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2051075, 2051076, 2051077
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	2051063, 2051066, 2051069
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	2051063, 2051066, 2051069
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	2051064, 2051067, 2051070
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	2051064, 2051067, 2051070
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	2051064, 2051067, 2051070
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	2051064, 2051067, 2051070
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2051065, 2051068, 2051071
SM 2120 B / E31780	True Color measured at 450 nm	2051063, 2051066, 2051069
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO3/L	2051063, 2051066, 2051069

Reference Method Descriptions

Method / DoH Cert #	Description	<u>Associated Samples</u>
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	2051063, 2051066, 2051069
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2051063, 2051066, 2051069
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2051063, 2051066, 2051069
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	2051064, 2051067, 2051070

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	12/28/2018			12/28/2018 15:41	Blanca Fach	2051063, 2051066, 2051069
EPA 200.7 Rev. 4.4	12/28/2018	01/03/2019 15:55	Elliott D. Healy	01/04/2019 10:57	Betina Topolski	2051077
	12/28/2018	01/03/2019 15:55	Elliott D. Healy	01/04/2019 12:18	Betina Topolski	2051075
	12/28/2018	01/03/2019 15:55	Elliott D. Healy	01/04/2019 12:25	Betina Topolski	2051075
	12/28/2018	01/03/2019 15:55	Elliott D. Healy	01/04/2019 12:33	Betina Topolski	2051076
	12/28/2018	01/03/2019 15:55	Elliott D. Healy	01/04/2019 12:40	Betina Topolski	2051076
	12/28/2018	01/08/2019 15:45	Elliott D. Healy	01/09/2019 09:42	Betina Topolski	2051076
EPA 200.8 Rev. 5.4	12/28/2018	01/03/2019 15:55	Elliott D. Healy	01/07/2019 15:40	Allison Taylor	2051077
	12/28/2018	01/03/2019 15:55	Elliott D. Healy	01/07/2019 18:03	Allison Taylor	2051075
	12/28/2018	01/03/2019 15:55	Elliott D. Healy	01/07/2019 18:12	Allison Taylor	2051076
EPA 300.0 Rev. 2.1	12/28/2018			01/04/2019 23:20	Lipi Saha	2051063
	12/28/2018			01/04/2019 23:32	Lipi Saha	2051066
	12/28/2018			01/04/2019 23:44	Lipi Saha	2051069
EPA 350.1 Rev. 2.0	12/28/2018			01/02/2019 13:09	Ping Hua	2051067
	12/28/2018			01/02/2019 13:12	Ping Hua	2051070
	12/28/2018			01/04/2019 13:42	Ping Hua	2051064
EPA 351.2 Rev. 2.0	12/28/2018	01/03/2019 11:20	Adrian Shelby	01/04/2019 12:02	Joseph Suarez	2051064
	12/28/2018	01/03/2019 11:20	Adrian Shelby	01/04/2019 12:04	Joseph Suarez	2051067
	12/28/2018	01/03/2019 11:20	Adrian Shelby	01/04/2019 12:05	Joseph Suarez	2051070
EPA 353.2 Rev. 2.0	12/28/2018			01/02/2019 15:28	Lauren Bottorf	2051070
	12/28/2018			01/02/2019 15:29	Lauren Bottorf	2051064
	12/28/2018			01/02/2019 15:30	Lauren Bottorf	2051067
EPA 365.1 Rev. 2.0	12/28/2018	01/03/2019 13:10	Sima Feizi	01/04/2019 10:17	Beverly Y. Sanders	2051064
	12/28/2018	01/03/2019 13:10	Sima Feizi	01/04/2019 10:20	Beverly Y. Sanders	2051067
	12/28/2018	01/03/2019 13:10	Sima Feizi	01/04/2019 16:02	Beverly Y. Sanders	2051070
EPA 365.1 Rev. 2.0 dissolved	12/28/2018			12/28/2018 14:29	Jhamieka S. Greenwood	2051071
	12/28/2018			12/28/2018 14:31	Jhamieka S. Greenwood	2051065
	12/28/2018			12/28/2018 14:32	Jhamieka S. Greenwood	2051068
SM 2120 B	12/28/2018			12/28/2018 15:25	Chelsea Hernandez	2051063
	12/28/2018			12/28/2018 15:26	Chelsea Hernandez	2051066
	12/28/2018			12/28/2018 15:27	Chelsea Hernandez	2051069
SM 2320 B-97	12/28/2018			01/08/2019 08:39	Dale L. Simmons	2051069
	12/28/2018			01/08/2019 09:57	Dale L. Simmons	2051063
	12/28/2018			01/08/2019 10:07	Dale L. Simmons	2051066
SM 2540 C-97	12/28/2018			12/28/2018 17:03	Yijie Li	2051063, 2051066, 2051069
SM 2540 D-97	12/28/2018			12/28/2018 17:03	Yijie Li	2051063, 2051066, 2051069
SM 4500 F-C-97	12/28/2018			01/08/2019 08:39	Dale L. Simmons	2051069
	12/28/2018			01/08/2019 09:57	Dale L. Simmons	2051063
	12/28/2018			01/08/2019 10:07	Dale L. Simmons	2051066
SM 5310 B-00	12/28/2018			01/02/2019 09:38	Megan Treadwell	2051064

Preparation and Analysis Log

Ref. Method	Received Date	Prep Date/Time	Prepared By	Analysis Date/Time	Analyzed By	Associated Samples
SM 5310 B-00	12/28/2018			01/02/2019 10:27	Megan Treadwell	2051067
	12/28/2018			01/02/2019 10:42	Megan Treadwell	2051070