

Chemical Analysis Report

NW-DIST-2020-02-05-01

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

Event Description: **Highway 4 Run**
Request ID: **RQ-2020-02-03-64**
Customer: **NW-DIST**
Project ID: **SMP**

Send Reports to:
FL Dept. of Environmental Protection
160 Government Center
Suite 208
Pensacola, FL 32502-5794
Attn: Cheryl Bunch

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Certified by: Colin Wright, Program Administrator

Date Certified: 25-FEB-2020 11:25

A handwritten signature in black ink, appearing to read "Colin Wright", is displayed on a light-colored rectangular 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 by the Florida Department of Health Environmental Laboratory Certification Program 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: Bear Creek @ Forest Rd. 0.7 Miles West of Bear Lake **Collection Date/Time: 02/04/2020 11:00**

Field ID: G4NW0380

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2154662	EPA 180.1 Rev. 2.0	Turbidity	1.4		NTU	P378398	
	EPA 300.0 Rev. 2.1	Chloride	2.8		mg Cl/L	P379224	
		Sulfate	0.86		mg SO4/L	P379226	
	SM 2120 B-2011	Color (true)	30		PCU	P378445	
	SM 2320 B-2011	Total Alkalinity	6.5		mg CaCO3/L	P378557	
	SM 2540 C-2011	TDS	21	I	mg/L	P378877	
	SM 2540 D-2011	TSS	2	U	mg/L	P378660	
	SM 4500 F-C-2011	Fluoride	0.035	U	mg F/L	P378561	
2154663	EPA 350.1 Rev. 2.0	Ammonia-N	0.009		mg N/L	P378885	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.25		mg N/L	P379034	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.038		mg N/L	P378949	
	EPA 365.1 Rev. 2.0	Total-P	0.01		mg P/L	P378631	
	SM 5310 B-2011	Organic Carbon	3.6		mg C/L	P378534	
2154664	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P378356	
2154678	EPA 200.7 Rev. 4.4	Barium	8.4		ug/L	P378477	
		Calcium	2.04		mg/L	P378477	
		Iron	480		ug/L	P378477	
		Magnesium	0.88		mg/L	P378477	
		Potassium	0.30	U	mg/L	P378477	
		Sodium	1.7	I	mg/L	P378477	
		Zinc	5.0	U	ug/L	P378477	
	EPA 200.8 Rev. 5.4	Aluminum	34		ug/L	P378477	
		Antimony	0.050	U	ug/L	P378477	
		Arsenic	0.24		ug/L	P378477	
		Boron**	7.8	I	ug/L	P378477	
		Cadmium	0.020	U	ug/L	P378477	
		Chromium	0.40	U	ug/L	P378477	
		Copper	0.40	U	ug/L	P378477	
		Lead	0.20	U	ug/L	P378477	
		Nickel	1.1	I	ug/L	P378477	
		Selenium	0.20	U	ug/L	P378477	
		Silver	0.010	U	ug/L	P378477	
		Thallium	0.10	U	ug/L	P378477	

Ref. Method and Comment:

SM 2540 D-2011: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.

Sample Location: Bucket Branch end of Bucket Creek Rd

Collection Date/Time: 02/04/2020 09:55

Field ID: G4NW0059

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2154665	EPA 180.1 Rev. 2.0	Turbidity	0.90		NTU	P378398	
	EPA 300.0 Rev. 2.1	Chloride	4.8		mg Cl/L	P379224	
		Sulfate	1.3		mg SO4/L	P379226	
	SM 2120 B-2011	Color (true)	30		PCU	P378445	
	SM 2320 B-2011	Total Alkalinity	3.0		mg CaCO3/L	P378557	
	SM 2540 C-2011	TDS	32		mg/L	P378877	
	SM 2540 D-2011	TSS	2	U	mg/L	P378660	
	SM 4500 F-C-2011	Fluoride	0.035	U	mg F/L	P378561	
2154667	EPA 350.1 Rev. 2.0	Ammonia-N	0.006		mg N/L	P378885	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.10	I	mg N/L	P378672	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.23		mg N/L	P378949	
	EPA 365.1 Rev. 2.0	Total-P	0.012		mg P/L	P378631	
	SM 5310 B-2011	Organic Carbon	3.0		mg C/L	P378534	
2154669	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P378355	

Ref. Method and Comment:

SM 2540 D-2011: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.

Sample Location: Big Coldwater Creek (east fork) upstream of Springhill Rd

Collection Date/Time: 02/04/2020 12:00

Field ID: G4NW0434

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2154666	EPA 180.1 Rev. 2.0	Turbidity	2.4		NTU	P378398	
	EPA 300.0 Rev. 2.1	Chloride	3.1		mg Cl/L	P379224	
		Sulfate	1.4		mg SO4/L	P379226	
	SM 2120 B-2011	Color (true)	16		PCU	P378445	
	SM 2320 B-2011	Total Alkalinity	0.65	U	mg CaCO3/L	P378557	
	SM 2540 C-2011	TDS	15	U	mg/L	P378877	
	SM 2540 D-2011	TSS	4	I	mg/L	P378660	
	SM 4500 F-C-2011	Fluoride	0.035	U	mg F/L	P378561	
2154668	EPA 350.1 Rev. 2.0	Ammonia-N	0.004	I	mg N/L	P378886	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.080	U	mg N/L	P378672	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.24		mg N/L	P378950	
	EPA 365.1 Rev. 2.0	Total-P	0.004	I	mg P/L	P378631	
	SM 5310 B-2011	Organic Carbon	2.3		mg C/L	P378534	
2154670	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P378355	

Ref. Method and Comment:

SM 2540 D-2011: 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: P378398

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P378477

Component	Result	Code	Units
Barium	1.0	U	ug/L
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: P378477

Component	Result	Code	Units
Aluminum	5.0	U	ug/L
Antimony	0.050	U	ug/L
Arsenic	0.050	U	ug/L
Boron	2.0	U	ug/L
Cadmium	0.020	U	ug/L
Chromium	0.40	U	ug/L
Copper	0.40	U	ug/L
Lead	0.20	U	ug/L
Nickel	0.50	U	ug/L
Selenium	0.20	U	ug/L
Silver	0.010	U	ug/L
Thallium	0.10	U	ug/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P379224

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P379226

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P378885

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: P378886

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P378672

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P379034

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P378949

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P378950

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P378631

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P378355

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P378356

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

Reference Method: SM 2120 B-2011
Batch ID: P378445

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Quality Assurance Report

Method Blank Results

Reference Method: SM 2320 B-2011
Batch ID: P378557

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

Reference Method: SM 2540 C-2011
Batch ID: P378877

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-2011
Batch ID: P378660

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-2011
Batch ID: P378561

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-2011
Batch ID: P378534

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: P378477

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Barium	94.8		P	85 - 115
Calcium	99.5		P	85 - 115
Iron	103		P	85 - 115
Magnesium	102		P	85 - 115
Potassium	98.7		P	85 - 115
Sodium	99.4		P	85 - 115
Zinc	92.4		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P378477

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	104		P	85 - 115
Antimony	104		P	85 - 115
Arsenic	103		P	85 - 115
Boron	98.1		P	80 - 120
Cadmium	103		P	85 - 115
Chromium	101		P	85 - 115
Copper	102		P	85 - 115
Lead	99.4		P	85 - 115
Nickel	106		P	80 - 120
Selenium	101		P	85 - 115
Silver	104		P	85 - 115
Thallium	97.9		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P379224

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: P379226

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Sulfate	98.0		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P378885

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P378886

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

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P378672

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P379034

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P378949

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P378950

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: P378631

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P378355

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P378356

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

Reference Method: SM 2120 B-2011
Batch ID: P378445

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	98.8		P	85 - 115

Reference Method: SM 2320 B-2011
Batch ID: P378557

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	102		P	98 - 106

Quality Assurance Report

Laboratory Control Sample Accuracy

Reference Method: SM 4500 F-C-2011
Batch ID: P378561

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	102		P	92 - 103

Reference Method: SM 5310 B-2011
Batch ID: P378534

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	97.8		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P378477

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2154958	Barium	95.2	93.2	P/P	80 - 120
2154958	Calcium	99.2		P	80 - 120
2154958	Iron	102	99.1	P/P	80 - 120
2154958	Magnesium	99.8	96.3	P/P	80 - 120
2154958	Potassium	98.4	96.3	P/P	80 - 120
2154958	Sodium	101	98.2	P/P	80 - 120
2154958	Zinc	92.5	89.9	P/P	80 - 120
2155034	Barium	94.1		P	80 - 120
2155034	Calcium	96.5		P	80 - 120
2155034	Iron	101		P	80 - 120
2155034	Magnesium	95.1		P	80 - 120
2155034	Potassium	97.2		P	80 - 120
2155034	Sodium	95.7		P	80 - 120
2155034	Zinc	90.0		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P378477

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2154958	Aluminum	101	99.7	P/P	80 - 120
2154958	Antimony	104	103	P/P	80 - 120
2154958	Arsenic	102	101	P/P	80 - 120
2154958	Boron	98.6	97.0	P/P	80 - 120
2154958	Cadmium	104	102	P/P	80 - 120
2154958	Chromium	100	103	P/P	80 - 120
2154958	Copper	99.8	98.8	P/P	80 - 120
2154958	Lead	98.9	96.9	P/P	80 - 120
2154958	Nickel	103	99.7	P/P	80 - 120
2154958	Selenium	97.6	95.7	P/P	80 - 120
2154958	Silver	103	104	P/P	80 - 120
2154958	Thallium	97.4	96.4	P/P	80 - 120
2155034	Aluminum	101		P	80 - 120
2155034	Antimony	107		P	80 - 120
2155034	Arsenic	103		P	80 - 120
2155034	Boron	99.2		P	80 - 120
2155034	Cadmium	104		P	80 - 120
2155034	Chromium	102		P	80 - 120
2155034	Copper	103		P	80 - 120
2155034	Lead	99.3		P	80 - 120
2155034	Nickel	99.9		P	80 - 120
2155034	Selenium	99.2		P	80 - 120
2155034	Silver	103		P	80 - 120
2155034	Thallium	98.0		P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P379224

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2154535	Chloride	99.1		P	90 - 110
2154686	Chloride	101		P	90 - 110

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P379226

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2154535	Sulfate	98.6		P	90 - 110
2154686	Sulfate	99.1		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P378885

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2154544	Ammonia-N	99.6	98.8	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P378886

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2154668	Ammonia-N	96.1	98.8	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P378672

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2154667	Kjeldahl Nitrogen	102	106	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P379034

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2156672	Kjeldahl Nitrogen	94.5	97.8	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P378949

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2154538	NO2NO3-N	99.0	99.5	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P378950

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2154668	NO2NO3-N	98.2		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P378631

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2154571	Total-P	108	106	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P378355

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2154806	O-Phosphate-P	97.4	100	P/P	90 - 110

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P378356

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2154664	O-Phosphate-P	99.0	99.5	P/P	90 - 110

Reference Method: SM 4500 F-C-2011
Batch ID: P378561

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2155025	Fluoride	104	105	P/P	89 - 106

Reference Method: SM 5310 B-2011
Batch ID: P378534

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2154539	Organic Carbon	102		P	85 - 115

Quality Assurance Report Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P378398

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2154534	Turbidity	0.948	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P378477

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2154958	Barium	2.10	Spike	P	0 - 20
2154958	Calcium	2.01	Spike	P	0 - 20
2154958	Iron	2.42	Spike	P	0 - 20
2154958	Magnesium	1.97	Spike	P	0 - 20
2154958	Potassium	1.99	Spike	P	0 - 20
2154958	Sodium	1.68	Spike	P	0 - 20
2154958	Zinc	2.48	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P378477

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2154958	Aluminum	1.38	Spike	P	0 - 20
2154958	Antimony	0.874	Spike	P	0 - 20
2154958	Arsenic	1.27	Spike	P	0 - 20
2154958	Boron	1.48	Spike	P	0 - 20
2154958	Cadmium	2.50	Spike	P	0 - 20
2154958	Chromium	2.14	Spike	P	0 - 20
2154958	Copper	0.941	Spike	P	0 - 20
2154958	Lead	2.06	Spike	P	0 - 20
2154958	Nickel	3.02	Spike	P	0 - 20
2154958	Selenium	1.91	Spike	P	0 - 20
2154958	Silver	0.447	Spike	P	0 - 20
2154958	Thallium	1.04	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P379224

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2154535	Chloride	0.844	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P379226

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2154535	Sulfate	1.33	Sample	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P378885

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2154544	Ammonia-N	0.735	Spike	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P378886

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2154668	Ammonia-N	2.58	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P378672

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2154667	Kjeldahl Nitrogen	3.05	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P379034

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2156672	Kjeldahl Nitrogen	1.92	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P378949

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2154538	NO2NO3-N	0.504	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P378950

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2154668	NO2NO3-N	0.0	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P378631

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2154571	Total-P	1.65	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P378355

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2154806	O-Phosphate-P	2.25	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 365.1 Rev. 2.0 dissolved
 Batch ID: P378356

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2154664	O-Phosphate-P	0.504	Spike	P	0 - 20

Reference Method: SM 2120 B-2011
 Batch ID: P378445

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2154543	Color (true)	0.150	Sample	P	0 - 20

Reference Method: SM 2320 B-2011
 Batch ID: P378557

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2155025	Total Alkalinity	0.119	Sample	P	0 - 2.8

Reference Method: SM 2540 C-2011
 Batch ID: P378877

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2154534	TDS	1.07	Sample	P	0 - 10

Reference Method: SM 4500 F-C-2011
 Batch ID: P378561

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2155025	Fluoride	0.464	Spike	P	0 - 2.5

Reference Method: SM 5310 B-2011
 Batch ID: P378534

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2154539	Organic Carbon	0.430	Spike	P	0 - 20

* Sample, spike and/or laboratory control sample precision (LCS) is reported.

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A97339

Included Lab Sample IDs: 2154664, 2154669, 2154670

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	96.9	96.0	P/P	90 - 110
O-Phosphate-P	97.1	96.9	P/P	90 - 110

Reference Method: EPA 180.1 Rev. 2.0

Run ID: A97350

Included Lab Sample IDs: 2154662, 2154665, 2154666

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	101	100	P/P	95 - 105

Reference Method: SM 2120 B-2011

Run ID: A97363

Included Lab Sample IDs: 2154662, 2154665, 2154666

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	99.6	99.5	P/P	90 - 115

Reference Method: SM 5310 B-2011

Run ID: A97399

Included Lab Sample IDs: 2154663, 2154667, 2154668

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

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A97400

Included Lab Sample IDs: 2154678

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Barium	96.3	95.2	P/P	90 - 110
Calcium	99.9	97.3	P/P	90 - 110
Iron	102	99.6	P/P	90 - 110
Magnesium	99.2	96.9	P/P	90 - 110
Potassium	98.6	96.3	P/P	90 - 110
Sodium	99.5	96.9	P/P	90 - 110
Zinc	94.7	92.9	P/P	90 - 110

Reference Method: SM 2320 B-2011

Run ID: A97407

Included Lab Sample IDs: 2154662, 2154665, 2154666

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

Reference Method: SM 4500 F-C-2011

Run ID: A97407

Included Lab Sample IDs: 2154662, 2154665, 2154666

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	105	106	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A97476

Included Lab Sample IDs: 2154663, 2154667, 2154668

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	100	101	P/P	90 - 110
NO2NO3-N	101	101	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A97486

Included Lab Sample IDs: 2154667, 2154668

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	103	96.9	P/P	90 - 110
Kjeldahl Nitrogen	98.9	103	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A97525

Included Lab Sample IDs: 2154663, 2154667, 2154668

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

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A97615

Included Lab Sample IDs: 2154663

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	97.9	98.4	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A97637

Included Lab Sample IDs: 2154678

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	101	100	P/P	90 - 110
Antimony	99.7	101	P/P	90 - 110
Arsenic	99.9	98.8	P/P	90 - 110
Cadmium	97.0	97.3	P/P	90 - 110
Chromium	93.9	93.2	P/P	90 - 110
Copper	97.2	96.4	P/P	90 - 110
Lead	96.2	94.9	P/P	90 - 110
Selenium	99.1	97.6	P/P	90 - 110
Silver	99.1	99.9	P/P	90 - 110
Thallium	97.6	95.6	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1

Run ID: A97638

Included Lab Sample IDs: 2154662, 2154665, 2154666

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	98.2	98.2	P/P	90 - 110
Sulfate	98.9	98.9	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A97643

Included Lab Sample IDs: 2154663, 2154667, 2154668

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	103	104	P/P	90 - 110
Total-P	104	104	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A97713

Included Lab Sample IDs: 2154678

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Boron	105	103	P/P	90 - 110
Nickel	101	101	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			Precision SMP	MS
			LCS				
EPA 180.1 Rev. 2.0	Turbidity					0.948	
EPA 200.7 Rev. 4.4	Barium	94.8		95.2	93.2	94.1	2.10
	Calcium	99.5		99.2	96.5		2.01
	Iron	103		102	99.1	101	2.42
	Magnesium	102		99.8	96.3	95.1	1.97
	Potassium	98.7		98.4	96.3	97.2	1.99
	Sodium	99.4		101	98.2	95.7	1.68
	Zinc	92.4		92.5	89.9	90.0	2.48
EPA 200.8 Rev. 5.4	Aluminum	104		101	99.7	101	1.38
	Antimony	104		104	103	107	0.874
	Arsenic	103		103	102	101	1.27
	Boron	98.1		98.6	97.0	99.2	1.48
	Cadmium	103		104	102	104	2.50
	Chromium	101		100	103	102	2.14
	Copper	102		99.8	98.8	103	0.941
	Lead	99.4		98.9	96.9	99.3	2.06
	Nickel	106		103	99.7	99.9	3.02
	Selenium	101		99.2	97.6	95.7	1.91
	Silver	104		103	104	103	0.447
	Thallium	97.9		97.4	96.4	98.0	1.04
EPA 300.0 Rev. 2.1	Chloride	98.2		99.1	101		0.844
	Sulfate	98.0		98.6	99.1		1.33
EPA 350.1 Rev. 2.0	Ammonia-N	98.4		99.6	98.8		0.735
	Ammonia-N	101		96.1	98.8		2.58
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	103		102	106		3.05
	Kjeldahl Nitrogen	101		94.5	97.8		1.92
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	100		99.0	99.5		0.504
	NO ₂ NO ₃ -N	100		98.2			0.0
EPA 365.1 Rev. 2.0	Total-P	103		108	106		1.65
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	102		97.4	100		2.25
	O-Phosphate-P	99.3		99.0	99.5		0.504
SM 2120 B-2011	Color (true)	98.8				0.150	
SM 2320 B-2011	Total Alkalinity	102				0.119	
SM 2540 C-2011	TDS					1.07	
SM 4500 F-C-2011	Fluoride	102		104	105		0.464
SM 5310 B-2011	Organic Carbon	97.8		102			0.430

Reference Method Descriptions

Method	Description	Associated Samples
EPA 180.1 Rev. 2.0	Turbidity in aqueous matrices	2154662, 2154665, 2154666
EPA 200.7 Rev. 4.4	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2154678
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2154678
EPA 300.0 Rev. 2.1	Chloride in aqueous matrices	2154662, 2154665, 2154666
EPA 300.0 Rev. 2.1	Sulfate in aqueous matrices	2154662, 2154665, 2154666
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2154663, 2154667, 2154668
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2154663, 2154667, 2154668
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2154663, 2154667, 2154668
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2154663, 2154667, 2154668
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2154664, 2154669, 2154670

Reference Method Descriptions

Method	Description	<u>Associated Samples</u>
SM 2120 B-2011	True Color measured at 450 nm (not valid for NPDES monitoring)	2154662, 2154665, 2154666
SM 2320 B-2011	Alkalinity in aqueous matrices as mg CaCO ₃ /L	2154662, 2154665, 2154666
SM 2540 C-2011	Total Dissolved Solids in aqueous matrices	2154662, 2154665, 2154666
SM 2540 D-2011	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2154662, 2154665, 2154666
SM 4500 F-C-2011	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2154662, 2154665, 2154666
SM 5310 B-2011	Nonpurgeable Organic Carbon in aqueous matrices	2154663, 2154667, 2154668

Preparation and Analysis Log

Ref. Method	Received Date	Prep Date/Time	Prepared By	Analysis Date/Time	Analyzed By	Associated Samples
EPA 180.1 Rev. 2.0	02/05/2020			02/05/2020 16:54	Yen Ta	2154662, 2154665, 2154666
EPA 200.7 Rev. 4.4	02/05/2020	02/06/2020 17:45	Elliott D. Healy	02/07/2020 14:05	Betina Topolski	2154678
EPA 200.8 Rev. 5.4	02/05/2020	02/06/2020 17:45	Elliott D. Healy	02/18/2020 19:14	Justin Cutchin	2154678
	02/05/2020	02/06/2020 17:45	Elliott D. Healy	02/20/2020 16:00	Justin Cutchin	2154678
EPA 300.0 Rev. 2.1	02/05/2020			02/19/2020 16:24	Lipi Saha	2154662
	02/05/2020			02/19/2020 16:36	Lipi Saha	2154665
	02/05/2020			02/19/2020 16:48	Lipi Saha	2154666
EPA 350.1 Rev. 2.0	02/05/2020			02/13/2020 10:22	Ping Hua	2154663
	02/05/2020			02/13/2020 10:24	Ping Hua	2154667
	02/05/2020			02/13/2020 10:36	Ping Hua	2154668
EPA 351.2 Rev. 2.0	02/05/2020	02/11/2020 11:45	Jhamieka S. Greenwood	02/12/2020 12:55	Jhamieka S. Greenwood	2154667
	02/05/2020	02/11/2020 11:45	Jhamieka S. Greenwood	02/12/2020 13:04	Jhamieka S. Greenwood	2154668
	02/05/2020	02/17/2020 14:52	Sima Feizi	02/18/2020 11:20	Jhamieka S. Greenwood	2154663
EPA 353.2 Rev. 2.0	02/05/2020			02/12/2020 11:37	Beverly Y. Sanders	2154663
	02/05/2020			02/12/2020 11:38	Beverly Y. Sanders	2154667
	02/05/2020			02/12/2020 11:45	Beverly Y. Sanders	2154668
EPA 365.1 Rev. 2.0	02/05/2020	02/10/2020 17:16	Yen Ta	02/18/2020 15:43	Benjamin T. Nordmann	2154663
	02/05/2020	02/10/2020 17:16	Yen Ta	02/18/2020 15:44	Benjamin T. Nordmann	2154667
	02/05/2020	02/10/2020 17:16	Yen Ta	02/18/2020 15:52	Benjamin T. Nordmann	2154668
EPA 365.1 Rev. 2.0 dissolved	02/05/2020			02/05/2020 18:16	Carlos Miranda	2154664
	02/05/2020			02/05/2020 18:30	Carlos Miranda	2154669
	02/05/2020			02/05/2020 18:31	Carlos Miranda	2154670
SM 2120 B-2011	02/05/2020			02/05/2020 17:32	Madeline Funaro	2154662
	02/05/2020			02/05/2020 17:33	Madeline Funaro	2154665
	02/05/2020			02/05/2020 17:34	Madeline Funaro	2154666
SM 2320 B-2011	02/05/2020			02/08/2020 09:17	Dale L. Simmons	2154662
	02/05/2020			02/08/2020 09:31	Dale L. Simmons	2154665
	02/05/2020			02/08/2020 09:43	Dale L. Simmons	2154666
SM 2540 C-2011	02/05/2020			02/07/2020 17:00	Blanca Fach	2154662, 2154665, 2154666
SM 2540 D-2011	02/05/2020			02/07/2020 17:00	Blanca Fach	2154662, 2154665, 2154666
SM 4500 F-C-2011	02/05/2020			02/08/2020 09:17	Dale L. Simmons	2154662
	02/05/2020			02/08/2020 09:31	Dale L. Simmons	2154665
	02/05/2020			02/08/2020 09:43	Dale L. Simmons	2154666
SM 5310 B-2011	02/05/2020			02/07/2020 22:09	Madeline Funaro	2154663
	02/05/2020			02/07/2020 22:21	Madeline Funaro	2154667
	02/05/2020			02/07/2020 22:59	Madeline Funaro	2154668