

Chemical Analysis Report

NW-DIST-2021-06-10-02

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

Event Description: **Laurel Hill East Run**

Request ID: **RQ-2021-05-24-37**

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: Liang Lin, Environmental Administrator

Date Certified: 02-JUL-2021 15:16

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 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: Pond Creek Upstream of Bob Sikes Hwy

Collection Date/Time: 06/09/2021 10:10

Field ID: G4NW0522

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2254283	EPA 200.7 Rev. 4.4	Barium	21.8		ug/L	P399514	
		Calcium	5.66		mg/L	P399514	
		Iron	2.03E+03		ug/L	P399514	
		Magnesium	1.71		mg/L	P399514	
		Manganese	67.5		ug/L	P399514	
		Potassium	1.1	I	mg/L	P399514	
		Sodium	2.8		mg/L	P399514	
	EPA 200.8 Rev. 5.4	Zinc	5.0	U	ug/L	P399514	
		Aluminum	157		ug/L	P399514	
		Antimony	0.054	I	ug/L	P399514	
		Arsenic	1.39		ug/L	P399514	
		Beryllium	0.010	U	ug/L	P399514	
		Boron**	15.2		ug/L	P399514	
		Cadmium	0.020	U	ug/L	P399514	
		Chromium	0.40	U	ug/L	P399514	
		Copper	0.69	I	ug/L	P399514	
		Lead	0.42		ug/L	P399514	
		Nickel	0.50	U	ug/L	P399514	
		Selenium	0.20	U	ug/L	P399514	
		Silver	0.010	U	ug/L	P399514	
		Thallium	0.10	U	ug/L	P399514	
	SM 2340B	Hardness	21.2		mg/L	P399514	

Sample Location: Horsehead Creek Upstream of Millside Rd.

Collection Date/Time: 06/09/2021 10:45

Field ID: G4NW0515

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2254269	EPA 180.1 Rev. 2.0	Turbidity	6.4		NTU	P399529	
	EPA 300.0 Rev. 2.1	Chloride	4.4		mg Cl/L	P399825	
		Sulfate	0.80		mg SO4/L	P399827	
		Color (true)	73		PCU	P399532	
	SM 2320 B-2011	Total Alkalinity	7.7	J	mg CaCO3/L	P400074	LCS
	SM 2540 C-2011	TDS	30		mg/L	P400001	
	SM 2540 D-2011	TSS	8	I	mg/L	P399855	
2254270	SM 4500 F-C-2011	Fluoride	0.035	U	mg F/L	P399739	
	EPA 350.1 Rev. 2.0	Ammonia-N	0.019		mg N/L	P400174	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.39		mg N/L	P400009	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.32		mg N/L	P399691	
	EPA 365.1 Rev. 2.0	Total-P	0.042		mg P/L	P400123	
2254271	SM 5310 B-2011	Organic Carbon	5.8		mg C/L	P400167	
	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.015		mg P/L	P399512	
2254281	EPA 200.7 Rev. 4.4	Barium	25.2		ug/L	P399514	
		Calcium	3.59		mg/L	P399514	
		Iron	1.01E+03		ug/L	P399514	
		Magnesium	1.17		mg/L	P399514	
		Manganese	43.8		ug/L	P399514	
		Potassium	0.83	I	mg/L	P399514	
		Sodium	2.0		mg/L	P399514	
	EPA 200.8 Rev. 5.4	Zinc	5.0	U	ug/L	P399514	
		Aluminum	152		ug/L	P399514	
		Antimony	0.050	U	ug/L	P399514	
		Arsenic	0.64		ug/L	P399514	
		Beryllium	0.016	I	ug/L	P399514	
		Boron**	9.4		ug/L	P399514	
		Cadmium	0.020	U	ug/L	P399514	
		Chromium	0.40	U	ug/L	P399514	
		Copper	0.40	U	ug/L	P399514	
		Lead	0.29	I	ug/L	P399514	
		Nickel	0.50	U	ug/L	P399514	
		Selenium	0.20	U	ug/L	P399514	
		Silver	0.010	U	ug/L	P399514	
		Thallium	0.10	U	ug/L	P399514	
	SM 2340B	Hardness	13.8		mg/L	P399514	

Ref. Method and Comment:

SM 2320 B-2011: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample. Refer to the Lab Analysis Report for an explanation of QC Codes.

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

Sample Location: Poverty Creek Upstream of Poverty Creek Rd. Collection Date/Time: 06/09/2021 11:10

Field ID: G4NW0427

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2254272	EPA 180.1 Rev. 2.0	Turbidity	4.5	A	NTU	P399530	
	EPA 300.0 Rev. 2.1	Chloride	2.8		mg Cl/L	P399825	
		Sulfate	2.1		mg SO4/L	P399827	
		Color (true)	26		PCU	P399533	
	SM 2320 B-2011	Total Alkalinity	0.65	UJ	mg CaCO3/L	P400074	LCS
	SM 2540 C-2011	TDS	18	I	mg/L	P400001	
	SM 2540 D-2011	TSS	7	I	mg/L	P399855	
2254273	SM 4500 F-C-2011	Fluoride	0.035	U	mg F/L	P399739	
	EPA 350.1 Rev. 2.0	Ammonia-N	0.006		mg N/L	P400174	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.17	I	mg N/L	P400009	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.15		mg N/L	P399691	
	EPA 365.1 Rev. 2.0	Total-P	0.005	I	mg P/L	P400123	
2254274	SM 5310 B-2011	Organic Carbon	2.5		mg C/L	P400167	
	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P399512	
2254282	EPA 200.7 Rev. 4.4	Barium	13.4		ug/L	P399514	
		Calcium	0.72		mg/L	P399514	
		Iron	580		ug/L	P399514	
		Magnesium	0.50		mg/L	P399514	
		Manganese	14.3		ug/L	P399514	
		Potassium	0.40	I	mg/L	P399514	
		Sodium	1.7	I	mg/L	P399514	
	EPA 200.8 Rev. 5.4	Zinc	6.1	I	ug/L	P399514	
		Aluminum	170		ug/L	P399514	
		Antimony	0.050	U	ug/L	P399514	
		Arsenic	0.34		ug/L	P399514	
		Beryllium	0.129		ug/L	P399514	
		Boron**	8.2		ug/L	P399514	
		Cadmium	0.030	I	ug/L	P399514	
		Chromium	0.40	U	ug/L	P399514	
		Copper	0.68	I	ug/L	P399514	
		Lead	0.29	I	ug/L	P399514	
		Nickel	1.0	I	ug/L	P399514	
		Selenium	0.20	U	ug/L	P399514	
		Silver	0.010	U	ug/L	P399514	
		Thallium	0.10	U	ug/L	P399514	
		Hardness	3.8		mg/L	P399514	

Ref. Method and Comment:

SM 2320 B-2011: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample. Refer to the Lab Analysis Report for an explanation of QC Codes.

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

Sample Location: Trammel Creek East of Hwy 4

Collection Date/Time: 06/09/2021 11:45

Field ID: G4NW0052

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2254284	EPA 200.7 Rev. 4.4	Barium	16.5		ug/L	P399514	
		Calcium	6.07		mg/L	P399514	
		Iron	550		ug/L	P399514	
		Magnesium	1.25		mg/L	P399514	
		Manganese	11.7		ug/L	P399514	
		Potassium	1.3		mg/L	P399514	
		Sodium	4.3		mg/L	P399514	
	EPA 200.8 Rev. 5.4	Zinc	5.0	U	ug/L	P399514	
		Aluminum	89		ug/L	P399514	
		Antimony	0.050	U	ug/L	P399514	
		Arsenic	0.32		ug/L	P399514	
		Beryllium	0.010	U	ug/L	P399514	
		Boron**	72.4		ug/L	P399514	
		Cadmium	0.020	U	ug/L	P399514	
		Chromium	0.40	U	ug/L	P399514	
		Copper	0.40	U	ug/L	P399514	
		Lead	0.30	I	ug/L	P399514	
		Nickel	0.50	U	ug/L	P399514	
		Selenium	0.20	U	ug/L	P399514	
		Silver	0.010	U	ug/L	P399514	
		Thallium	0.10	U	ug/L	P399514	
	SM 2340B	Hardness	20.3		mg/L	P399514	

Quality Assurance Report Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P399529

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P399530

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P399514

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
Manganese	1.0	U	ug/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: P399514

Component	Result	Code	Units
Aluminum	5.0	U	ug/L
Antimony	0.050	U	ug/L
Arsenic	0.050	U	ug/L
Beryllium	0.010	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: P399825

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P399827

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Quality Assurance Report Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P400174

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P400009

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P399691

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P400123

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P399512

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

Reference Method: SM 2120 B-2011
Batch ID: P399532

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2120 B-2011
Batch ID: P399533

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-2011
Batch ID: P400074

Component	Result	Code	Units
Total Alkalinity	0.73	I	mg CaCO3/L

Reference Method: SM 2540 C-2011
Batch ID: P400001

Component	Result	Code	Units
TDS	15	U	mg/L

Quality Assurance Report

Method Blank Results

Reference Method: SM 2540 D-2011
Batch ID: P399855

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-2011
Batch ID: P399739

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-2011
Batch ID: P400167

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: P399514

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Barium	99.5		P	85 - 115
Calcium	106		P	85 - 115
Iron	109		P	85 - 115
Magnesium	110		P	85 - 115
Manganese	101		P	85 - 115
Potassium	104		P	85 - 115
Sodium	112		P	85 - 115
Zinc	91.8		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P399514

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	103		P	85 - 115
Antimony	102		P	85 - 115
Arsenic	104		P	85 - 115
Beryllium	95.7		P	85 - 115
Boron	104		P	85 - 115
Cadmium	104		P	85 - 115
Chromium	100		P	85 - 115
Copper	103		P	85 - 115
Lead	113		P	85 - 115
Nickel	102		P	85 - 115
Selenium	105		P	85 - 115
Silver	102		P	85 - 115
Thallium	103		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P399825

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

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P399827

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Sulfate	99.4		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Batch ID: P400174

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	96.0		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Batch ID: P400009

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

Quality Assurance Report

Laboratory Control Sample Accuracy

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P399691

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: P400123

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P399512

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

Reference Method: SM 2120 B-2011
Batch ID: P399532

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	99.8		P	85 - 115

Reference Method: SM 2120 B-2011
Batch ID: P399533

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

Reference Method: SM 2320 B-2011
Batch ID: P400074

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	106		F	94 - 106

Reference Method: SM 4500 F-C-2011
Batch ID: P399739

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	102		P	93 - 104

Reference Method: SM 5310 B-2011
Batch ID: P400167

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	97.3		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P399514

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2253352	Barium	103	101	P/P	80 - 120
2253352	Calcium	107	104	P/P	80 - 120
2253352	Iron	111	109	P/P	80 - 120
2253352	Magnesium	112	110	P/P	80 - 120
2253352	Manganese	104	102	P/P	80 - 120
2253352	Potassium	102	98.9	P/P	80 - 120
2253352	Sodium	106	103	P/P	80 - 120
2253352	Zinc	94.9	93.6	P/P	80 - 120
2254166	Barium	102		P	80 - 120
2254166	Calcium	107		P	80 - 120
2254166	Iron	109		P	80 - 120
2254166	Magnesium	110		P	80 - 120
2254166	Manganese	104		P	80 - 120
2254166	Potassium	108		P	80 - 120
2254166	Sodium	106		P	80 - 120
2254166	Zinc	95.4		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P399514

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2253352	Aluminum	106	105	P/P	80 - 120
2253352	Antimony	103	102	P/P	80 - 120
2253352	Arsenic	105	106	P/P	80 - 120
2253352	Beryllium	98.8	97.9	P/P	80 - 120
2253352	Boron	110	108	P/P	80 - 120
2253352	Cadmium	108	109	P/P	80 - 120
2253352	Chromium	105	106	P/P	80 - 120
2253352	Copper	104	106	P/P	80 - 120
2253352	Lead	112	113	P/P	80 - 120
2253352	Nickel	104	105	P/P	80 - 120
2253352	Selenium	105	105	P/P	80 - 120
2253352	Silver	102	102	P/P	80 - 120
2253352	Thallium	103	104	P/P	80 - 120
2254166	Aluminum	103		P	80 - 120
2254166	Antimony	101		P	80 - 120
2254166	Arsenic	103		P	80 - 120
2254166	Beryllium	97.3		P	80 - 120
2254166	Boron	109		P	80 - 120
2254166	Cadmium	107		P	80 - 120
2254166	Chromium	102		P	80 - 120
2254166	Copper	102		P	80 - 120
2254166	Lead	112		P	80 - 120
2254166	Nickel	101		P	80 - 120
2254166	Selenium	102		P	80 - 120
2254166	Silver	99.5		P	80 - 120
2254166	Thallium	103		P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P399825

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P399825

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2254247	Chloride	100		P	90 - 110
2254404	Chloride	92.7		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P399827

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2254247	Sulfate	100		P	90 - 110
2254404	Sulfate	95.4		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P400174

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2253917	Ammonia-N	97.6	97.6	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P400009

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2253849	Kjeldahl Nitrogen	96.2	101	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P399691

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2254156	NO2NO3-N	99.0	99.5	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P400123

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2254157	Total-P	106	104	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P399512

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2254249	O-Phosphate-P	100	101	P/P	90 - 110

Reference Method: SM 4500 F-C-2011
Batch ID: P399739

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2254134	Fluoride	102	102	P/P	92 - 107

Reference Method: SM 5310 B-2011
Batch ID: P400167

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2254351	Organic Carbon	96.2	104	P/P	85 - 115

Quality Assurance Report Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P399529

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2254134	Turbidity	0.301	Sample	P	0 - 20

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P399530

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2254272	Turbidity	5.11	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P399514

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2253352	Barium	2.35	Spike	P	0 - 20
2253352	Calcium	1.20	Spike	P	0 - 20
2253352	Iron	1.80	Spike	P	0 - 20
2253352	Magnesium	1.79	Spike	P	0 - 20
2253352	Manganese	2.19	Spike	P	0 - 20
2253352	Potassium	2.70	Spike	P	0 - 20
2253352	Sodium	2.18	Spike	P	0 - 20
2253352	Zinc	1.39	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P399514

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2253352	Aluminum	1.12	Spike	P	0 - 20
2253352	Antimony	0.703	Spike	P	0 - 20
2253352	Arsenic	0.271	Spike	P	0 - 20
2253352	Beryllium	0.863	Spike	P	0 - 20
2253352	Boron	1.44	Spike	P	0 - 20
2253352	Cadmium	0.365	Spike	P	0 - 20
2253352	Chromium	0.412	Spike	P	0 - 20
2253352	Copper	1.25	Spike	P	0 - 20
2253352	Lead	0.456	Spike	P	0 - 20
2253352	Nickel	1.11	Spike	P	0 - 20
2253352	Selenium	0.328	Spike	P	0 - 20
2253352	Silver	0.522	Spike	P	0 - 20
2253352	Thallium	1.24	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P399825

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2254247	Chloride	1.15	Sample	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P399827

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2254247	Sulfate	1.08	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P400174

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2253917	Ammonia-N	0.0	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P400009

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2253849	Kjeldahl Nitrogen	3.09	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P399691

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2254156	NO2NO3-N	0.504	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P400123

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2254157	Total-P	1.13	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P399512

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2254249	O-Phosphate-P	0.797	Spike	P	0 - 20

Reference Method: SM 2120 B-2011
Batch ID: P399532

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2254154	Color (true)	0.574	Sample	P	0 - 20

Reference Method: SM 2120 B-2011
Batch ID: P399533

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2254404	Color (true)	0.400	Sample	P	0 - 20

Quality Assurance Report Precision

Reference Method: SM 2540 C-2011
Batch ID: P400001

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2254327	TDS	7.44	Sample	P	0 - 10

Reference Method: SM 4500 F-C-2011
Batch ID: P399739

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2254134	Fluoride	0.479	Spike	P	0 - 2.1

Reference Method: SM 5310 B-2011
Batch ID: P400167

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2254351	Organic Carbon	3.88	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: A105989

Included Lab Sample IDs: 2254271, 2254274

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.8	100	P/P	90 - 110

Reference Method: EPA 180.1 Rev. 2.0

Run ID: A105999

Included Lab Sample IDs: 2254269, 2254272

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	98.5	99.5	P/P	95 - 105
Turbidity	99.5	99.0	P/P	95 - 105

Reference Method: SM 2120 B-2011

Run ID: A106000

Included Lab Sample IDs: 2254269, 2254272

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	101	102	P/P	90 - 115
Color (true)	99.8	101	P/P	90 - 115

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A106050

Included Lab Sample IDs: 2254281, 2254282, 2254283, 2254284

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Barium	105	107	P/P	90 - 110
Calcium	99.7	101	P/P	90 - 110
Iron	104	104	P/P	90 - 110
Magnesium	104	105	P/P	90 - 110
Manganese	107	108	P/P	90 - 110
Potassium	101	101	P/P	90 - 110
Sodium	100	101	P/P	90 - 110
Zinc	92.6	95.1	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A106065

Included Lab Sample IDs: 2254270, 2254273

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	100	100	P/P	90 - 110
NO2NO3-N	102	100	P/P	90 - 110

Reference Method: SM 4500 F-C-2011

Run ID: A106087

Included Lab Sample IDs: 2254269, 2254272

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	103	105	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 300.0 Rev. 2.1

Run ID: A106105

Included Lab Sample IDs: 2254269, 2254272

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	100	101	P/P	90 - 110
Sulfate	99.5	100	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A106126

Included Lab Sample IDs: 2254282

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Zinc	98.8	97.4	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A106130

Included Lab Sample IDs: 2254281, 2254282, 2254283, 2254284

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	103	102	P/P	90 - 110
Arsenic	102	103	P/P	90 - 110
Beryllium	99.9	103	P/P	90 - 110
Boron	105	101	P/P	90 - 110
Cadmium	103	103	P/P	90 - 110
Chromium	100	102	P/P	90 - 110
Copper	97.2	99.3	P/P	90 - 110
Nickel	98.2	100	P/P	90 - 110
Selenium	104	103	P/P	90 - 110

Reference Method: SM 2320 B-2011

Run ID: A106227

Included Lab Sample IDs: 2254269, 2254272

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

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A106241

Included Lab Sample IDs: 2254281, 2254282, 2254283, 2254284

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Antimony	100	101	P/P	90 - 110
Lead	109	108	P/P	90 - 110
Silver	98.9	99.1	P/P	90 - 110
Thallium	95.1	94.8	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A106257

Included Lab Sample IDs: 2254270, 2254273

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

Quality Assurance Report Calibration Verification

Reference Method: SM 5310 B-2011

Run ID: A106258

Included Lab Sample IDs: 2254270, 2254273

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

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A106261

Included Lab Sample IDs: 2254270, 2254273

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

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A106277

Included Lab Sample IDs: 2254270, 2254273

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	94.8	96.1	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					0.301	
	Turbidity					5.11	
EPA 200.7 Rev. 4.4	Barium	99.5	103	101	102		2.35
	Calcium	106	107	104	107		1.20
	Iron	109	111	109	109		1.80
	Magnesium	110	112	110	110		1.79
	Manganese	101	104	102	104		2.19
	Potassium	104	102	98.9	108		2.70
	Sodium	112	106	103	106		2.18
	Zinc	91.8	94.9	93.6	95.4		1.39
EPA 200.8 Rev. 5.4	Aluminum	103	106	105	103		1.12
	Antimony	102	103	102	101		0.703
	Arsenic	104	105	106	103		0.271
	Beryllium	95.7	98.8	97.9	97.3		0.863
	Boron	104	110	108	109		1.44
	Cadmium	104	108	109	107		0.365
	Chromium	100	105	106	102		0.412
	Copper	103	104	106	102		1.25
	Lead	113	112	113	112		0.456
	Nickel	102	104	105	101		1.11
	Selenium	105	105	105	102		0.328
	Silver	102	102	102	99.5		0.522
	Thallium	103	103	104	103		1.24
EPA 300.0 Rev. 2.1	Chloride	100	100	92.7		1.15	
	Sulfate	99.4	100	95.4		1.08	
EPA 350.1 Rev. 2.0	Ammonia-N	96.0	97.6	97.6			0.0
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	97.8	96.2	101			3.09
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	100	99.0	99.5			0.504
EPA 365.1 Rev. 2.0	Total-P	102	106	104			1.13
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	104	100	101			0.797
SM 2120 B-2011	Color (true)	99.8				0.574	
	Color (true)	101				0.400	
SM 2320 B-2011	Total Alkalinity	106					
SM 2540 C-2011	TDS					7.44	
SM 4500 F-C-2011	Fluoride	102	102	102			0.479
SM 5310 B-2011	Organic Carbon	97.3	96.2	104			3.88

Reference Method Descriptions

Method	Description	Associated Samples
EPA 180.1 Rev. 2.0	Turbidity in aqueous matrices	2254269, 2254272
EPA 200.7 Rev. 4.4	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2254281, 2254282, 2254283, 2254284
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2254281, 2254282, 2254283, 2254284
EPA 300.0 Rev. 2.1	Chloride in aqueous matrices	2254269, 2254272
EPA 300.0 Rev. 2.1	Sulfate in aqueous matrices	2254269, 2254272
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2254270, 2254273
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2254270, 2254273
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2254270, 2254273
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2254270, 2254273
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2254271, 2254274

Reference Method Descriptions

Method	Description	<u>Associated Samples</u>
SM 2120 B-2011	True Color measured at 450 nm (not valid for NPDES monitoring)	2254269, 2254272
SM 2320 B-2011	Alkalinity in aqueous matrices as mg CaCO ₃ /L	2254269, 2254272
SM 2340B	Hardness by calculation, in aqueous matrices, reported as mg/L CaCO ₃	2254281, 2254282, 2254283, 2254284
SM 2540 C-2011	Total Dissolved Solids in aqueous matrices	2254269, 2254272
SM 2540 D-2011	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2254269, 2254272
SM 4500 F-C-2011	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2254269, 2254272
SM 5310 B-2011	Nonpurgeable Organic Carbon in aqueous matrices	2254270, 2254273

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	06/10/2021			06/10/2021 14:54	Sarah A Nixon	2254269, 2254272
EPA 200.7 Rev. 4.4	06/10/2021	06/10/2021 15:00	Elliott D. Healy	06/14/2021 23:25	Josef B Mick	2254281
	06/10/2021	06/10/2021 15:00	Elliott D. Healy	06/14/2021 23:31	Josef B Mick	2254282
	06/10/2021	06/10/2021 15:00	Elliott D. Healy	06/14/2021 23:37	Josef B Mick	2254283
	06/10/2021	06/10/2021 15:00	Elliott D. Healy	06/14/2021 23:45	Josef B Mick	2254284
	06/10/2021	06/10/2021 15:00	Elliott D. Healy	06/16/2021 18:02	Josef B Mick	2254282
EPA 200.8 Rev. 5.4	06/10/2021	06/10/2021 15:00	Elliott D. Healy	06/16/2021 21:42	McKinley C Carter	2254281
	06/10/2021	06/10/2021 15:00	Elliott D. Healy	06/16/2021 21:50	McKinley C Carter	2254282
	06/10/2021	06/10/2021 15:00	Elliott D. Healy	06/16/2021 21:59	McKinley C Carter	2254283
	06/10/2021	06/10/2021 15:00	Elliott D. Healy	06/16/2021 22:07	McKinley C Carter	2254284
	06/10/2021	06/10/2021 15:00	Elliott D. Healy	06/23/2021 22:43	Alexander Thompson	2254281
	06/10/2021	06/10/2021 15:00	Elliott D. Healy	06/23/2021 22:49	Alexander Thompson	2254282
	06/10/2021	06/10/2021 15:00	Elliott D. Healy	06/23/2021 22:56	Alexander Thompson	2254283
	06/10/2021	06/10/2021 15:00	Elliott D. Healy	06/23/2021 23:02	Alexander Thompson	2254284
EPA 300.0 Rev. 2.1	06/10/2021			06/16/2021 23:45	Lipi Saha	2254269
	06/10/2021			06/16/2021 23:57	Lipi Saha	2254272
EPA 350.1 Rev. 2.0	06/10/2021			06/24/2021 12:28	Roberta Tatti	2254270
	06/10/2021			06/24/2021 12:30	Roberta Tatti	2254273
EPA 351.2 Rev. 2.0	06/10/2021	06/21/2021 14:57	Benjamin T. Nordmann	06/24/2021 15:41	Letuzia M De Oliveira	2254270
	06/10/2021	06/21/2021 14:57	Benjamin T. Nordmann	06/24/2021 15:43	Letuzia M De Oliveira	2254273
EPA 353.2 Rev. 2.0	06/10/2021			06/15/2021 09:49	Beverly Y. Sanders	2254273
	06/10/2021			06/15/2021 11:04	Beverly Y. Sanders	2254270
EPA 365.1 Rev. 2.0	06/10/2021	06/23/2021 13:50	Shengyu Ding	06/24/2021 13:37	Shengyu Ding	2254270
	06/10/2021	06/23/2021 13:50	Shengyu Ding	06/24/2021 13:38	Shengyu Ding	2254273
EPA 365.1 Rev. 2.0 dissolved	06/10/2021			06/10/2021 13:46	Ping Hua	2254271
	06/10/2021			06/10/2021 13:47	Ping Hua	2254274
SM 2120 B-2011	06/10/2021			06/10/2021 16:23	Madeline Gruver	2254269
	06/10/2021			06/10/2021 16:27	Madeline Gruver	2254272
SM 2320 B-2011	06/10/2021			06/22/2021 19:29	Patrick M. Roche	2254269
	06/10/2021			06/22/2021 19:34	Patrick M. Roche	2254272
SM 2340B	06/10/2021			06/14/2021 23:25	Josef B Mick	2254281
	06/10/2021			06/14/2021 23:31	Josef B Mick	2254282
	06/10/2021			06/14/2021 23:37	Josef B Mick	2254283
	06/10/2021			06/14/2021 23:45	Josef B Mick	2254284
SM 2540 C-2011	06/10/2021			06/15/2021 14:12	Yijie Li	2254269, 2254272
SM 2540 D-2011	06/10/2021			06/15/2021 14:12	Yijie Li	2254269, 2254272
SM 4500 F-C-2011	06/10/2021			06/15/2021 18:44	Dale L. Simmons	2254269
	06/10/2021			06/15/2021 18:49	Dale L. Simmons	2254272
SM 5310 B-2011	06/10/2021			06/22/2021 23:02	Madeline Gruver	2254270
	06/10/2021			06/22/2021 23:17	Madeline Gruver	2254273