

Chemical Analysis Report

NW-DIST-2021-06-29-01

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

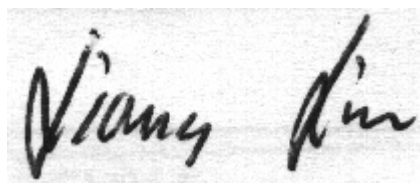
Event Description: **Pensacola Milton West Run**
Request ID: **RQ-2021-06-21-28**
Customer: **NW-DIST**
Project ID: **SMP**

Send Reports to:
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Certified by: Liang Lin, Environmental Administrator

Date Certified: 21-JUL-2021 11:56

A handwritten signature in black ink, appearing to read "Liang Lin", is shown 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: Rest Area Run below Beaver Pond Creek

Collection Date/Time: 06/28/2021 09:20

Field ID: G5NW0068

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2257539	EPA 180.1 Rev. 2.0	Turbidity	8.1		NTU	P400354	
	EPA 300.0 Rev. 2.1	Chloride	6.8		mg Cl/L	P400626	
		Sulfate	1.6		mg SO4/L	P400627	
		Color (true)	100		PCU	P400351	
	SM 2320 B-2011	Total Alkalinity	8.7		mg CaCO3/L	P400706	
	SM 2540 C-2011	TDS	61		mg/L	P400762	
	SM 2540 D-2011	TSS	3	I	mg/L	P400670	
	SM 4500 F-C-2011	Fluoride	0.035	U	mg F/L	P400709	
2257540	EPA 350.1 Rev. 2.0	Ammonia-N	0.043		mg N/L	P400691	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.38		mg N/L	P400521	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.22		mg N/L	P400368	
	EPA 365.1 Rev. 2.0	Total-P	0.012		mg P/L	P400501	
	SM 5310 B-2011	Organic Carbon	7.9		mg C/L	P400567	
2257541	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P400347	
2257559	EPA 200.7 Rev. 4.4	Barium	18.5		ug/L	P400316	
		Calcium	3.46		mg/L	P400316	
		Iron	930		ug/L	P400316	
		Magnesium	1.20		mg/L	P400316	
		Manganese	13.9		ug/L	P400316	
		Potassium	1.2		mg/L	P400316	
		Sodium	4.4		mg/L	P400316	
		Zinc	5.4	I	ug/L	P400316	
	EPA 200.8 Rev. 5.4	Aluminum	403		ug/L	P400316	
		Antimony	0.050	U	ug/L	P400316	
		Arsenic	0.58		ug/L	P400316	
		Beryllium	0.019	I	ug/L	P400316	
		Boron**	24.0		ug/L	P400316	
		Cadmium	0.020	U	ug/L	P400316	
		Chromium	0.55	I	ug/L	P400316	
		Copper	0.66	I	ug/L	P400316	
		Lead	0.39	I	ug/L	P400316	
		Nickel	0.51	I	ug/L	P400316	
		Selenium	0.20	U	ug/L	P400316	
		Silver	0.010	U	ug/L	P400316	
		Thallium	0.10	U	ug/L	P400316	
		Hardness	13.6		mg/L	P400316	

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: Dridglers Creek above Parkview Street

Collection Date/Time: 06/28/2021 11:30

Field ID: G4NW0168

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2257561	EPA 200.7 Rev. 4.4	Barium	17.8		ug/L	P400316	
		Calcium	4.05		mg/L	P400316	
		Iron	780		ug/L	P400316	
		Magnesium	1.21		mg/L	P400316	
		Manganese	36.2		ug/L	P400316	
		Potassium	0.74	I	mg/L	P400316	
		Sodium	4.2		mg/L	P400316	
	EPA 200.8 Rev. 5.4	Zinc	5.9	I	ug/L	P400316	
		Aluminum	223		ug/L	P400316	
		Antimony	0.054	I	ug/L	P400316	
		Arsenic	0.76		ug/L	P400316	
		Beryllium	0.013	I	ug/L	P400316	
		Boron**	21.3		ug/L	P400316	
		Cadmium	0.020	U	ug/L	P400316	
		Chromium	0.43	I	ug/L	P400316	
		Copper	1.23		ug/L	P400316	
		Lead	0.33	I	ug/L	P400316	
		Nickel	0.50	U	ug/L	P400316	
		Selenium	0.20	U	ug/L	P400316	
		Silver	0.010	U	ug/L	P400316	
		Thallium	0.10	U	ug/L	P400316	
	SM 2340B	Hardness	15.1		mg/L	P400316	

Sample Location: Pace Mill Creek upstream of Hwy 90

Collection Date/Time: 06/28/2021 11:40

Field ID: G4NW0481

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2257542	EPA 180.1 Rev. 2.0	Turbidity	2.9		NTU	P400354	
	EPA 300.0 Rev. 2.1	Chloride	6.2		mg Cl/L	P400626	
		Sulfate	1.3		mg SO4/L	P400627	
	SM 2120 B-2011	Color (true)	56	A	PCU	P400351	
	SM 2320 B-2011	Total Alkalinity	10		mg CaCO3/L	P400707	
	SM 2540 C-2011	TDS	47		mg/L	P400762	
	SM 2540 D-2011	TSS	3	I	mg/L	P400670	
2257543	SM 4500 F-C-2011	Fluoride	0.035	U	mg F/L	P400710	
	EPA 350.1 Rev. 2.0	Ammonia-N	0.070		mg N/L	P400691	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.34		mg N/L	P400521	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.36		mg N/L	P400368	
	EPA 365.1 Rev. 2.0	Total-P	0.011		mg P/L	P400501	
2257544	SM 5310 B-2011	Organic Carbon	4.6		mg C/L	P400567	
	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P400347	
2257560	EPA 200.7 Rev. 4.4	Barium	23.8		ug/L	P400316	
		Calcium	3.82		mg/L	P400316	
		Iron	1.47E+03		ug/L	P400316	
		Magnesium	1.34		mg/L	P400316	
		Manganese	40.3		ug/L	P400316	
		Potassium	0.77	I	mg/L	P400316	
		Sodium	4.2		mg/L	P400316	
	EPA 200.8 Rev. 5.4	Zinc	5.0	U	ug/L	P400316	
		Aluminum	138		ug/L	P400316	
		Antimony	0.056	I	ug/L	P400316	
		Arsenic	0.71		ug/L	P400316	
		Beryllium	0.016	I	ug/L	P400316	
		Boron**	19.6		ug/L	P400316	
		Cadmium	0.020	U	ug/L	P400316	
		Chromium	0.40	U	ug/L	P400316	
		Copper	0.49	I	ug/L	P400316	
		Lead	0.32	I	ug/L	P400316	
		Nickel	0.50	U	ug/L	P400316	
		Selenium	0.20	U	ug/L	P400316	
		Silver	0.010	U	ug/L	P400316	
		Thallium	0.10	U	ug/L	P400316	
		Hardness	15.0		mg/L	P400316	

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: P400354

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P400316

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: P400316

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: P400626

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P400627

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P400691

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

Quality Assurance Report

Method Blank Results

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P400521

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P400368

Component	Result	Code	Units
NO ₂ NO ₃ -N	0.004	U	mg N/L

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P400501

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P400347

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

Reference Method: SM 2120 B-2011
Batch ID: P400351

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-2011
Batch ID: P400706

Component	Result	Code	Units
Total Alkalinity	0.69	I	mg CaCO ₃ /L

Reference Method: SM 2320 B-2011
Batch ID: P400707

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

Reference Method: SM 2540 C-2011
Batch ID: P400762

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-2011
Batch ID: P400670

Component	Result	Code	Units
TSS	2	U	mg/L

Quality Assurance Report

Method Blank Results

Reference Method: SM 4500 F-C-2011
Batch ID: P400709

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 4500 F-C-2011
Batch ID: P400710

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-2011
Batch ID: P400567

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: P400316

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Barium	99.9		P	85 - 115
Calcium	101		P	85 - 115
Iron	106		P	85 - 115
Magnesium	108		P	85 - 115
Manganese	98.5		P	85 - 115
Potassium	104		P	85 - 115
Sodium	100		P	85 - 115
Zinc	97.0		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P400316

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	110		P	85 - 115
Antimony	110		P	85 - 115
Arsenic	106		P	85 - 115
Beryllium	105		P	85 - 115
Boron	111		P	85 - 115
Cadmium	104		P	85 - 115
Chromium	102		P	85 - 115
Copper	109		P	85 - 115
Lead	105		P	85 - 115
Nickel	108		P	85 - 115
Selenium	107		P	85 - 115
Silver	102		P	85 - 115
Thallium	109		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P400626

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P400627

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P400691

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P400521

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

Quality Assurance Report

Laboratory Control Sample Accuracy

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P400368

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P400501

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: P400347

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

Reference Method: SM 2120 B-2011
Batch ID: P400351

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	99.3		P	85 - 115

Reference Method: SM 2320 B-2011
Batch ID: P400706

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	102		P	94 - 106

Reference Method: SM 2320 B-2011
Batch ID: P400707

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	103		P	94 - 106

Reference Method: SM 4500 F-C-2011
Batch ID: P400709

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	99.9		P	93 - 104

Reference Method: SM 4500 F-C-2011
Batch ID: P400710

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	99.9		P	93 - 104

Reference Method: SM 5310 B-2011
Batch ID: P400567

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	95.3		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P400316

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2257559	Barium	101		P	80 - 120
2257559	Calcium	117		P	80 - 120
2257559	Iron	108		P	80 - 120
2257559	Magnesium	113		P	80 - 120
2257559	Manganese	98.6		P	80 - 120
2257559	Potassium	104		P	80 - 120
2257559	Sodium	102		P	80 - 120
2257559	Zinc	98.7		P	80 - 120
2257627	Barium	101	102	P/P	80 - 120
2257627	Calcium	102		P	80 - 120
2257627	Iron	106	108	P/P	80 - 120
2257627	Magnesium	107	110	P/P	80 - 120
2257627	Manganese	99.2	101	P/P	80 - 120
2257627	Potassium	103	106	P/P	80 - 120
2257627	Sodium	102		P	80 - 120
2257627	Zinc	100	101	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P400316

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2257559	Aluminum	106		P	80 - 120
2257559	Antimony	107		P	80 - 120
2257559	Arsenic	102		P	80 - 120
2257559	Beryllium	103		P	80 - 120
2257559	Boron	113		P	80 - 120
2257559	Cadmium	102		P	80 - 120
2257559	Chromium	99.5		P	80 - 120
2257559	Copper	101		P	80 - 120
2257559	Lead	102		P	80 - 120
2257559	Nickel	102		P	80 - 120
2257559	Selenium	102		P	80 - 120
2257559	Silver	99.6		P	80 - 120
2257559	Thallium	107		P	80 - 120
2257627	Aluminum	108	110	P/P	80 - 120
2257627	Antimony	109	111	P/P	80 - 120
2257627	Arsenic	103	105	P/P	80 - 120
2257627	Beryllium	102	106	P/P	80 - 120
2257627	Boron	111	112	P/P	80 - 120
2257627	Cadmium	101	106	P/P	80 - 120
2257627	Chromium	101	102	P/P	80 - 120
2257627	Copper	103	106	P/P	80 - 120
2257627	Lead	102	104	P/P	80 - 120
2257627	Nickel	104	106	P/P	80 - 120
2257627	Selenium	103	104	P/P	80 - 120
2257627	Silver	101	101	P/P	80 - 120
2257627	Thallium	108	109	P/P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P400626

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: P400626

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2257434	Chloride	101		P	90 - 110
2257572	Chloride	100		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P400627

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2257434	Sulfate	101		P	90 - 110
2257572	Sulfate	98.9		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P400691

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2257540	Ammonia-N	98.6	100	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P400521

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2257442	Kjeldahl Nitrogen	104	90.8	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P400368

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2257512	NO2NO3-N	102	102	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P400501

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2257570	Total-P	103	102	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P400347

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2257425	O-Phosphate-P	97.9	99.7	P/P	90 - 110

Reference Method: SM 4500 F-C-2011
Batch ID: P400709

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2257423	Fluoride	97.7	98.3	P/P	92 - 107

Reference Method: SM 4500 F-C-2011
Batch ID: P400710

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2257941	Fluoride	95.0	97.3	P/P	92 - 107

Quality Assurance Report

Matrix Spike Accuracy

Reference Method: SM 5310 B-2011
Batch ID: P400567

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2257543	Organic Carbon	95.9	96.2	P/P	85 - 115

Quality Assurance Report Precision

Reference Method: EPA 180.1 Rev. 2.0

Batch ID: P400354

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2257511	Turbidity	6.76	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P400316

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2257627	Barium	1.65	Spike	P	0 - 20
2257627	Calcium	1.28	Spike	P	0 - 20
2257627	Iron	1.31	Spike	P	0 - 20
2257627	Magnesium	1.34	Spike	P	0 - 20
2257627	Manganese	1.64	Spike	P	0 - 20
2257627	Potassium	1.59	Spike	P	0 - 20
2257627	Sodium	1.64	Spike	P	0 - 20
2257627	Zinc	1.02	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P400316

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2257627	Aluminum	2.11	Spike	P	0 - 20
2257627	Antimony	1.45	Spike	P	0 - 20
2257627	Arsenic	1.92	Spike	P	0 - 20
2257627	Beryllium	3.93	Spike	P	0 - 20
2257627	Boron	0.922	Spike	P	0 - 20
2257627	Cadmium	4.27	Spike	P	0 - 20
2257627	Chromium	0.833	Spike	P	0 - 20
2257627	Copper	2.73	Spike	P	0 - 20
2257627	Lead	1.90	Spike	P	0 - 20
2257627	Nickel	2.64	Spike	P	0 - 20
2257627	Selenium	0.910	Spike	P	0 - 20
2257627	Silver	0.120	Spike	P	0 - 20
2257627	Thallium	0.271	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P400626

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2257572	Chloride	0.510	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P400627

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2257572	Sulfate	0.616	Sample	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0

Batch ID: P400691

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2257540	Ammonia-N	0.859	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0

Batch ID: P400521

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2257442	Kjeldahl Nitrogen	7.73	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0

Batch ID: P400368

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2257512	NO2NO3-N	0.980	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0

Batch ID: P400501

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2257570	Total-P	1.21	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Batch ID: P400347

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2257425	O-Phosphate-P	1.24	Spike	P	0 - 20

Reference Method: SM 2120 B-2011

Batch ID: P400351

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2257542	Color (true)	0.107	Sample	P	0 - 20

Reference Method: SM 2320 B-2011

Batch ID: P400706

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2257423	Total Alkalinity	0.0357	Sample	P	0 - 5.2

Reference Method: SM 2320 B-2011

Batch ID: P400707

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2257941	Total Alkalinity	0.884	Sample	P	0 - 5.2

Quality Assurance Report Precision

Reference Method: SM 2540 C-2011
Batch ID: P400762

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2257511	TDS	5.44	Sample	P	0 - 10

Reference Method: SM 4500 F-C-2011
Batch ID: P400709

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2257423	Fluoride	0.457	Spike	P	0 - 2.1

Reference Method: SM 4500 F-C-2011
Batch ID: P400710

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2257941	Fluoride	0.457	Spike	P	0 - 2.1

Reference Method: SM 5310 B-2011
Batch ID: P400567

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2257543	Organic Carbon	0.252	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: A106351

Included Lab Sample IDs: 2257541, 2257544

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.6	99.4	P/P	90 - 110

Reference Method: SM 2120 B-2011

Run ID: A106352

Included Lab Sample IDs: 2257539, 2257542

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

Reference Method: EPA 180.1 Rev. 2.0

Run ID: A106353

Included Lab Sample IDs: 2257539, 2257542

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

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A106362

Included Lab Sample IDs: 2257540, 2257543

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

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A106408

Included Lab Sample IDs: 2257559, 2257560, 2257561

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	105	104	P/P	90 - 110
Antimony	105	106	P/P	90 - 110
Arsenic	99.7	99.8	P/P	90 - 110
Beryllium	94.9	95.8	P/P	90 - 110
Boron	104	104	P/P	90 - 110
Cadmium	99.8	100	P/P	90 - 110
Chromium	97.4	97.9	P/P	90 - 110
Copper	101	99.5	P/P	90 - 110
Lead	97.2	98.1	P/P	90 - 110
Nickel	101	99.7	P/P	90 - 110
Selenium	99.4	100	P/P	90 - 110
Silver	97.2	97.4	P/P	90 - 110
Thallium	97.8	98.6	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A106418

Included Lab Sample IDs: 2257559, 2257560, 2257561

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	98.8	100	P/P	90 - 110
Iron	99.4	101	P/P	90 - 110
Magnesium	98.8	100	P/P	90 - 110
Potassium	101	102	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A106418

Included Lab Sample IDs: 2257559, 2257560, 2257561

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Sodium	99.0	101	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A106441

Included Lab Sample IDs: 2257559, 2257560, 2257561

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Barium	101	102	P/P	90 - 110
Manganese	104	102	P/P	90 - 110
Zinc	100	103	P/P	90 - 110

Reference Method: SM 5310 B-2011

Run ID: A106454

Included Lab Sample IDs: 2257540, 2257543

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	96.6	96.4	P/P	90 - 110
Organic Carbon	97.3	97.4	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A106459

Included Lab Sample IDs: 2257540, 2257543

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

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A106466

Included Lab Sample IDs: 2257540, 2257543

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	96.9	98.0	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1

Run ID: A106481

Included Lab Sample IDs: 2257539, 2257542

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	100	100	P/P	90 - 110
Sulfate	99.5	99.8	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A106506

Included Lab Sample IDs: 2257540, 2257543

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	98.5	98.4	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: SM 2320 B-2011

Run ID: A106513

Included Lab Sample IDs: 2257539, 2257542

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

Reference Method: SM 4500 F-C-2011

Run ID: A106513

Included Lab Sample IDs: 2257539, 2257542

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	102	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					6.76	
EPA 200.7 Rev. 4.4	Barium	99.9	101	101	102		1.65
	Calcium	101	117	102			1.28
	Iron	106	108	106	108		1.31
	Magnesium	108	113	107	110		1.34
	Manganese	98.5	98.6	99.2	101		1.64
	Potassium	104	104	103	106		1.59
	Sodium	100	102	102			1.64
	Zinc	97.0	98.7	100	101		1.02
EPA 200.8 Rev. 5.4	Aluminum	110	108	110	106		2.11
	Antimony	110	109	111	107		1.45
	Arsenic	106	103	105	102		1.92
	Beryllium	105	102	106	103		3.93
	Boron	111	111	112	113		0.922
	Cadmium	104	101	106	102		4.27
	Chromium	102	101	102	99.5		0.833
	Copper	109	103	106	101		2.73
	Lead	105	102	104	102		1.90
	Nickel	108	104	106	102		2.64
	Selenium	107	103	104	102		0.910
	Silver	102	101	101	99.6		0.120
	Thallium	109	108	109	107		0.271
EPA 300.0 Rev. 2.1	Chloride	101	100	101		0.510	
	Sulfate	101	98.9	101		0.616	
EPA 350.1 Rev. 2.0	Ammonia-N	99.8	98.6	100			0.859
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	101	104	90.8			7.73
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	102	102	102			0.980
EPA 365.1 Rev. 2.0	Total-P	103	103	102			1.21
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	99.7	97.9	99.7			1.24
SM 2120 B-2011	Color (true)	99.3				0.107	
SM 2320 B-2011	Total Alkalinity	102				0.0357	
	Total Alkalinity	103				0.884	
SM 2540 C-2011	TDS					5.44	
SM 4500 F-C-2011	Fluoride	99.9	97.7	98.3			0.457
	Fluoride	99.9	95.0	97.3			0.457
SM 5310 B-2011	Organic Carbon	95.3	95.9	96.2			0.252

Reference Method Descriptions

Method	Description	Associated Samples
EPA 180.1 Rev. 2.0	Turbidity in aqueous matrices	2257539, 2257542
EPA 200.7 Rev. 4.4	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2257559, 2257560, 2257561
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2257559, 2257560, 2257561
EPA 300.0 Rev. 2.1	Chloride in aqueous matrices	2257539, 2257542
EPA 300.0 Rev. 2.1	Sulfate in aqueous matrices	2257539, 2257542
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2257540, 2257543
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2257540, 2257543
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2257540, 2257543
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2257540, 2257543
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2257541, 2257544

Reference Method Descriptions

Method	Description	<u>Associated Samples</u>
SM 2120 B-2011	True Color measured at 450 nm (not valid for NPDES monitoring)	2257539, 2257542
SM 2320 B-2011	Alkalinity in aqueous matrices as mg CaCO ₃ /L	2257539, 2257542
SM 2340B	Hardness by calculation, in aqueous matrices, reported as mg/L CaCO ₃	2257559, 2257560, 2257561
SM 2540 C-2011	Total Dissolved Solids in aqueous matrices	2257539, 2257542
SM 2540 D-2011	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2257539, 2257542
SM 4500 F-C-2011	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2257539, 2257542
SM 5310 B-2011	Nonpurgeable Organic Carbon in aqueous matrices	2257540, 2257543

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	06/29/2021			06/29/2021 15:42	Sarah A Nixon	2257539, 2257542
EPA 200.7 Rev. 4.4	06/29/2021	06/29/2021 13:30	Elliott D. Healy	07/01/2021 18:03	Josef B Mick	2257559
	06/29/2021	06/29/2021 13:30	Elliott D. Healy	07/01/2021 18:24	Josef B Mick	2257560
	06/29/2021	06/29/2021 13:30	Elliott D. Healy	07/01/2021 18:32	Josef B Mick	2257561
	06/29/2021	06/29/2021 13:30	Elliott D. Healy	07/02/2021 14:43	Betina Topolski	2257559
	06/29/2021	06/29/2021 13:30	Elliott D. Healy	07/02/2021 14:47	Betina Topolski	2257560
	06/29/2021	06/29/2021 13:30	Elliott D. Healy	07/02/2021 14:52	Betina Topolski	2257561
EPA 200.8 Rev. 5.4	06/29/2021	06/29/2021 13:30	Elliott D. Healy	07/01/2021 16:27	Alexander Thompson	2257560
	06/29/2021	06/29/2021 13:30	Elliott D. Healy	07/01/2021 16:36	Alexander Thompson	2257561
	06/29/2021	06/29/2021 13:30	Elliott D. Healy	07/01/2021 16:55	Alexander Thompson	2257559
EPA 300.0 Rev. 2.1	06/29/2021			07/07/2021 09:12	Lipi Saha	2257539
	06/29/2021			07/07/2021 09:24	Lipi Saha	2257542
EPA 350.1 Rev. 2.0	06/29/2021			07/08/2021 11:52	Roberta Tatti	2257540
	06/29/2021			07/08/2021 11:56	Roberta Tatti	2257543
EPA 351.2 Rev. 2.0	06/29/2021	07/02/2021 12:58	Benjamin T. Nordmann	07/06/2021 14:51	Letuzia M De Oliveira	2257540
	06/29/2021	07/02/2021 12:58	Benjamin T. Nordmann	07/06/2021 14:53	Letuzia M De Oliveira	2257543
EPA 353.2 Rev. 2.0	06/29/2021			06/30/2021 09:39	Beverly Y. Sanders	2257540
	06/29/2021			06/30/2021 09:40	Beverly Y. Sanders	2257543
EPA 365.1 Rev. 2.0	06/29/2021	07/02/2021 14:09	Madeline Gruver	07/06/2021 13:05	Shengyu Ding	2257540
	06/29/2021	07/02/2021 14:09	Madeline Gruver	07/06/2021 13:06	Shengyu Ding	2257543
EPA 365.1 Rev. 2.0 dissolved	06/29/2021			06/29/2021 15:04	Ping Hua	2257541
	06/29/2021			06/29/2021 15:05	Ping Hua	2257544
SM 2120 B-2011	06/29/2021			06/29/2021 16:26	Sarah A Nixon	2257542
	06/29/2021			06/29/2021 16:28	Sarah A Nixon	2257539
SM 2320 B-2011	06/29/2021			07/08/2021 20:39	Dale L. Simmons	2257539
	06/29/2021			07/08/2021 22:00	Dale L. Simmons	2257542
SM 2340B	06/29/2021			07/01/2021 18:03	Josef B Mick	2257559
	06/29/2021			07/01/2021 18:24	Josef B Mick	2257560
	06/29/2021			07/01/2021 18:32	Josef B Mick	2257561
SM 2540 C-2011	06/29/2021			07/01/2021 15:22	Yijie Li	2257539, 2257542
SM 2540 D-2011	06/29/2021			07/01/2021 15:22	Yijie Li	2257539, 2257542
SM 4500 F-C-2011	06/29/2021			07/08/2021 20:39	Dale L. Simmons	2257539
	06/29/2021			07/08/2021 22:00	Dale L. Simmons	2257542
SM 5310 B-2011	06/29/2021			07/02/2021 19:15	Madeline Gruver	2257543
	06/29/2021			07/03/2021 00:04	Madeline Gruver	2257540