Chemical Analysis Report

NW-DIST-2021-08-27-02

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

Event Description: **Pensacola Run**
Request ID: **RQ-2021-08-16-20**
Customer: **NW-DIST**
Project ID: **SMP**

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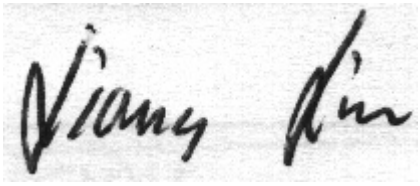
Certified by: Liang Lin, Environmental Administrator

Date Certified: 22-SEP-2021 15:35



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: Ten Mile Creek above Powerlines **Collection Date/Time: 08/26/2021 10:20**

Field ID: G5NW0045 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2272455	EPA 200.7 Rev. 4.4	Barium	15.9		ug/L	P403121	
		Calcium	8.09		mg/L	P403121	
		Iron	1.54E+03		ug/L	P403121	
		Magnesium	1.41		mg/L	P403121	
		Manganese	23.8		ug/L	P403121	
		Potassium	1.3		mg/L	P403121	
		Sodium	4.2		mg/L	P403121	
		Zinc	5.0	U	ug/L	P403121	
	EPA 200.8 Rev. 5.4	Aluminum	255		ug/L	P403121	
		Antimony	0.050	U	ug/L	P403121	
		Arsenic	1.04		ug/L	P403121	
		Beryllium	0.030	I	ug/L	P403121	
		Boron**	19.1		ug/L	P403121	
		Cadmium	0.020	U	ug/L	P403121	
		Chromium	0.46	I	ug/L	P403121	
		Copper	0.77	I	ug/L	P403121	
		Lead	0.45		ug/L	P403121	
		Nickel	0.55	I	ug/L	P403121	
		Selenium	0.20	U	ug/L	P403121	
		Silver	0.010	U	ug/L	P403121	
		Thallium	0.10	U	ug/L	P403121	
	SM 2340B	Hardness	26.0		mg/L	P403121	

Sample Location: Rest Area Run below Beaver Pond Creek **Collection Date/Time: 08/26/2021 11:55**

Field ID: G5NW0068 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2272446	EPA 180.1 Rev. 2.0	Turbidity	4.5		NTU	P403098	
	EPA 300.0 Rev. 2.1	Chloride	7.2		mg Cl/L	P403407	
		Sulfate	1.7		mg SO4/L	P403409	
	SM 2120 B-2011	Color (true)	82		PCU	P403099	
	SM 2320 B-2011	Total Alkalinity	12		mg CaCO3/L	P403167	
	SM 2540 C-2011	TDS	46		mg/L	P403403	
	SM 2540 D-2011	TSS	3	I	mg/L	P403396	
	SM 4500 F-C-2011	Fluoride	0.035	U	mg F/L	P403169	
2272447	EPA 350.1 Rev. 2.0	Ammonia-N	0.017		mg N/L	P403210	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.37		mg N/L	P403356	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.22		mg N/L	P403190	
	EPA 365.1 Rev. 2.0	Total-P	0.015		mg P/L	P403170	
	SM 5310 B-2011	Organic Carbon	8.4		mg C/L	P403345	
2272448	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P403091	
2272454	EPA 200.7 Rev. 4.4	Barium	18.6		ug/L	P403121	
		Calcium	4.49		mg/L	P403121	
		Iron	870		ug/L	P403121	
		Magnesium	1.41		mg/L	P403121	
		Manganese	17.6		ug/L	P403121	
		Potassium	1.5		mg/L	P403121	
		Sodium	4.9		mg/L	P403121	
		Zinc	5.0	U	ug/L	P403121	
	EPA 200.8 Rev. 5.4	Aluminum	219		ug/L	P403121	
		Antimony	0.050	U	ug/L	P403121	
		Arsenic	0.56		ug/L	P403121	
		Beryllium	0.018	I	ug/L	P403121	
		Boron**	26.6		ug/L	P403121	
		Cadmium	0.020	U	ug/L	P403121	
		Chromium	0.43	I	ug/L	P403121	
		Copper	0.40	U	ug/L	P403121	
		Lead	0.29	I	ug/L	P403121	
		Nickel	0.50	U	ug/L	P403121	
		Selenium	0.20	U	ug/L	P403121	
		Silver	0.010	U	ug/L	P403121	
		Thallium	0.10	U	ug/L	P403121	
	SM 2340B	Hardness	17.0		mg/L	P403121	

Ref. Method and Comment:
SM 2540 D-2011: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
EPA 351.2 Rev. 2.0: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

Sample Location: Muscogee Creek 300m downstream of Beulah Road **Collection Date/Time: 08/26/2021 11:05**

Field ID: G5NW0162 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2272456	EPA 200.7 Rev. 4.4	Barium	14.6		ug/L	P403121	
		Calcium	1.36		mg/L	P403121	
		Iron	890		ug/L	P403121	
		Magnesium	0.56		mg/L	P403121	
		Manganese	16.5		ug/L	P403121	
		Potassium	0.49	I	mg/L	P403121	
		Sodium	3.8		mg/L	P403121	
		Zinc	5.0	U	ug/L	P403121	
	EPA 200.8 Rev. 5.4	Aluminum	377		ug/L	P403121	
		Antimony	0.050	U	ug/L	P403121	
		Arsenic	0.44		ug/L	P403121	
		Beryllium	0.069		ug/L	P403121	
		Boron**	15.4		ug/L	P403121	
		Cadmium	0.020	U	ug/L	P403121	
		Chromium	0.58	I	ug/L	P403121	
		Copper	0.40	U	ug/L	P403121	
		Lead	0.34	I	ug/L	P403121	
		Nickel	0.79	I	ug/L	P403121	
		Selenium	0.20	U	ug/L	P403121	
		Silver	0.010	U	ug/L	P403121	
		Thallium	0.10	U	ug/L	P403121	
	SM 2340B	Hardness	5.7		mg/L	P403121	

Sample Location: Ten Mile Creek upstream of Pine Forest Road **Collection Date/Time: 08/26/2021 10:00**

Field ID: G5NW0051 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2272457	EPA 200.7 Rev. 4.4	Barium	13.8		ug/L	P403121	
		Calcium	7.78		mg/L	P403121	
		Iron	1.71E+03		ug/L	P403121	
		Magnesium	1.40		mg/L	P403121	
		Manganese	32.2		ug/L	P403121	
		Potassium	1.3		mg/L	P403121	
		Sodium	4.1		mg/L	P403121	
		Zinc	5.0	U	ug/L	P403121	
	EPA 200.8 Rev. 5.4	Aluminum	186		ug/L	P403121	
		Antimony	0.050	U	ug/L	P403121	
		Arsenic	1.14		ug/L	P403121	
		Beryllium	0.014	I	ug/L	P403121	
		Boron**	18.9		ug/L	P403121	
		Cadmium	0.020	U	ug/L	P403121	
		Chromium	0.40	U	ug/L	P403121	
		Copper	0.58	I	ug/L	P403121	
		Lead	0.40		ug/L	P403121	
		Nickel	0.50	U	ug/L	P403121	
		Selenium	0.20	U	ug/L	P403121	
		Silver	0.010	U	ug/L	P403121	
		Thallium	0.10	U	ug/L	P403121	
	SM 2340B	Hardness	25.2		mg/L	P403121	

Quality Assurance Report
Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P403098

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P403121

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: P403121

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: P403407

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P403409

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P403210

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: P403356

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P403190

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P403170

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P403091

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

Reference Method: SM 2120 B-2011
Batch ID: P403099

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-2011
Batch ID: P403167

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

Reference Method: SM 2540 C-2011
Batch ID: P403403

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-2011
Batch ID: P403396

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-2011
Batch ID: P403169

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Quality Assurance Report
Method Blank Results

Reference Method: SM 5310 B-2011
Batch ID: P403345

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: P403121

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Barium	93.1		P	85 - 115
Calcium	100		P	85 - 115
Iron	96.0		P	85 - 115
Magnesium	97.5		P	85 - 115
Manganese	92.9		P	85 - 115
Potassium	93.9		P	85 - 115
Sodium	95.3		P	85 - 115
Zinc	92.2		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P403121

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	101		P	85 - 115
Antimony	105		P	85 - 115
Arsenic	103		P	85 - 115
Beryllium	102		P	85 - 115
Boron	96.5		P	85 - 115
Cadmium	98.2		P	85 - 115
Chromium	102		P	85 - 115
Copper	103		P	85 - 115
Lead	104		P	85 - 115
Nickel	104		P	85 - 115
Selenium	102		P	85 - 115
Silver	108		P	85 - 115
Thallium	104		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P403407

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P403409

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Sulfate	98.3		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P403210

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P403356

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

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P403190

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	98.5		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P403170

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P403091

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

Reference Method: SM 2120 B-2011
Batch ID: P403099

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	100		P	85 - 115

Reference Method: SM 2320 B-2011
Batch ID: P403167

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

Reference Method: SM 4500 F-C-2011
Batch ID: P403169

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	99.0		P	93 - 104

Reference Method: SM 5310 B-2011
Batch ID: P403345

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	99.2		P	85 - 115

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P403121

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2272208	Barium	99.1	103	P/P	80 - 120
2272208	Calcium	103		P	80 - 120
2272208	Iron	106	108	P/P	80 - 120
2272208	Magnesium	107	110	P/P	80 - 120
2272208	Manganese	98.9	103	P/P	80 - 120
2272208	Potassium	102	105	P/P	80 - 120
2272208	Sodium	103	109	P/P	80 - 120
2272208	Zinc	99.6	103	P/P	80 - 120
2272344	Barium	88.2		P	80 - 120
2272344	Calcium	97.6		P	80 - 120
2272344	Iron	91.5		P	80 - 120
2272344	Magnesium	99.2		P	80 - 120
2272344	Manganese	88.1		P	80 - 120
2272344	Potassium	81.8		P	80 - 120
2272344	Sodium	98.8		P	80 - 120
2272344	Zinc	90.3		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P403121

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2272208	Aluminum	98.6	103	P/P	80 - 120
2272208	Antimony	105	105	P/P	80 - 120
2272208	Arsenic	100	101	P/P	80 - 120
2272208	Beryllium	99.9	98.0	P/P	80 - 120
2272208	Boron	98.0	104	P/P	80 - 120
2272208	Cadmium	100	101	P/P	80 - 120
2272208	Chromium	103	102	P/P	80 - 120
2272208	Copper	101	98.8	P/P	80 - 120
2272208	Lead	106	106	P/P	80 - 120
2272208	Nickel	102	101	P/P	80 - 120
2272208	Selenium	98.6	99.9	P/P	80 - 120
2272208	Silver	107	107	P/P	80 - 120
2272208	Thallium	107	107	P/P	80 - 120
2272344	Aluminum	100		P	80 - 120
2272344	Antimony	106		P	80 - 120
2272344	Arsenic	101		P	80 - 120
2272344	Beryllium	96.0		P	80 - 120
2272344	Boron	98.8		P	80 - 120
2272344	Cadmium	99.4		P	80 - 120
2272344	Chromium	103		P	80 - 120
2272344	Copper	97.7		P	80 - 120
2272344	Lead	105		P	80 - 120
2272344	Nickel	101		P	80 - 120
2272344	Selenium	99.4		P	80 - 120
2272344	Silver	105		P	80 - 120
2272344	Thallium	107		P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P403407

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P403407

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2272421	Chloride	97.5		P	90 - 110
2272891	Chloride	97.3		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P403409

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2272421	Sulfate	98.0		P	90 - 110
2272891	Sulfate	98.4		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P403210

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2272419	Ammonia-N	95.0	94.8	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P403190

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2272447	NO2NO3-N	95.0		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P403170

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2272387	Total-P	107	107	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P403091

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2272448	O-Phosphate-P	99.8	99.9	P/P	90 - 110

Reference Method: SM 4500 F-C-2011
Batch ID: P403169

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2272393	Fluoride	98.4	98.4	P/P	92 - 107

Reference Method: SM 5310 B-2011
Batch ID: P403345

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2272233	Organic Carbon	96.2	98.8	P/P	85 - 115

Quality Assurance Report
Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P403098

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2272376	Turbidity	0.242	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P403121

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2272208	Barium	3.78	Spike	P	0 - 20
2272208	Calcium	3.07	Spike	P	0 - 20
2272208	Iron	2.31	Spike	P	0 - 20
2272208	Magnesium	2.62	Spike	P	0 - 20
2272208	Manganese	3.68	Spike	P	0 - 20
2272208	Potassium	2.75	Spike	P	0 - 20
2272208	Sodium	3.37	Spike	P	0 - 20
2272208	Zinc	2.94	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P403121

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2272208	Aluminum	3.49	Spike	P	0 - 20
2272208	Antimony	0.549	Spike	P	0 - 20
2272208	Arsenic	0.783	Spike	P	0 - 20
2272208	Beryllium	1.76	Spike	P	0 - 20
2272208	Boron	3.61	Spike	P	0 - 20
2272208	Cadmium	0.464	Spike	P	0 - 20
2272208	Chromium	0.638	Spike	P	0 - 20
2272208	Copper	1.95	Spike	P	0 - 20
2272208	Lead	0.270	Spike	P	0 - 20
2272208	Nickel	1.16	Spike	P	0 - 20
2272208	Selenium	1.32	Spike	P	0 - 20
2272208	Silver	0.431	Spike	P	0 - 20
2272208	Thallium	0.664	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P403407

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2272421	Chloride	0.345	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P403409

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2272421	Sulfate	0.156	Sample	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P403210

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2272419	Ammonia-N	0.181	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P403356

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2272687	Kjeldahl Nitrogen	1.64	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P403190

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2272447	NO2NO3-N	0.244	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P403170

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2272387	Total-P	0.134	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P403091

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2272448	O-Phosphate-P	0.100	Spike	P	0 - 20

Reference Method: SM 2120 B-2011
Batch ID: P403099

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2272313	Color (true)	0.296	Sample	P	0 - 20

Reference Method: SM 2320 B-2011
Batch ID: P403167

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2272393	Total Alkalinity	0.0994	Sample	P	0 - 5.2

Reference Method: SM 2540 C-2011
Batch ID: P403403

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2272470	TDS	6.35	Sample	P	0 - 10

Quality Assurance Report
Precision

Reference Method: SM 4500 F-C-2011
Batch ID: P403169

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2272393	Fluoride	0.0	Spike	P	0 - 2.1

Reference Method: SM 5310 B-2011
Batch ID: P403345

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2272233	Organic Carbon	1.58	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: A107515
Included Lab Sample IDs: 2272448

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

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A107517
Included Lab Sample IDs: 2272446

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

Reference Method: SM 2120 B-2011
Run ID: A107518
Included Lab Sample IDs: 2272446

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	100	100	P/P	90 - 115

Reference Method: SM 2320 B-2011
Run ID: A107559
Included Lab Sample IDs: 2272446

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

Reference Method: SM 4500 F-C-2011
Run ID: A107559
Included Lab Sample IDs: 2272446

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

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A107563
Included Lab Sample IDs: 2272447

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

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A107569
Included Lab Sample IDs: 2272447

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

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A107599
Included Lab Sample IDs: 2272447

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

Quality Assurance Report
Calibration Verification

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A107604
Included Lab Sample IDs: 2272454, 2272455, 2272456, 2272457

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Barium	93.1	94.0	P/P	90 - 110
Calcium	96.1	93.5	P/P	90 - 110
Iron	95.7	93.3	P/P	90 - 110
Magnesium	96.1	93.3	P/P	90 - 110
Manganese	97.2	98.4	P/P	90 - 110
Potassium	97.0	94.9	P/P	90 - 110
Sodium	97.0	95.9	P/P	90 - 110
Zinc	95.0	95.0	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A107605
Included Lab Sample IDs: 2272454, 2272455, 2272456, 2272457

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	101	99.7	P/P	90 - 110
Antimony	105	102	P/P	90 - 110
Arsenic	99.8	98.8	P/P	90 - 110
Beryllium	94.5	94.6	P/P	90 - 110
Boron	99.4	97.8	P/P	90 - 110
Cadmium	98.8	98.2	P/P	90 - 110
Chromium	102	98.6	P/P	90 - 110
Copper	98.2	96.4	P/P	90 - 110
Lead	100	99.2	P/P	90 - 110
Nickel	99.2	97.4	P/P	90 - 110
Selenium	99.4	97.3	P/P	90 - 110
Silver	102	101	P/P	90 - 110
Thallium	103	100	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A107634
Included Lab Sample IDs: 2272446

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	99.3	100	P/P	90 - 110
Sulfate	99.0	100	P/P	90 - 110

Reference Method: SM 5310 B-2011
Run ID: A107635
Included Lab Sample IDs: 2272447

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

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A107660
Included Lab Sample IDs: 2272447

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	96.9	99.6	P/P	90 - 110

Quality Assurance Report
Calibration Verification

* 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		
						LCS	SMP	MS
EPA 180.1 Rev. 2.0	Turbidity						0.242	
EPA 200.7 Rev. 4.4	Barium	93.1	99.1	103	88.2			3.78
	Calcium	100	103	97.6				3.07
	Iron	96.0	106	108	91.5			2.31
	Magnesium	97.5	107	110	99.2			2.62
	Manganese	92.9	98.9	103	88.1			3.68
	Potassium	93.9	102	105	81.8			2.75
	Sodium	95.3	103	109	98.8			3.37
	Zinc	92.2	99.6	103	90.3			2.94
EPA 200.8 Rev. 5.4	Aluminum	101	98.6	103	100			3.49
	Antimony	105	105	105	106			0.549
	Arsenic	103	100	101	101			0.783
	Beryllium	102	99.9	98.0	96.0			1.76
	Boron	96.5	98.0	104	98.8			3.61
	Cadmium	98.2	100	101	99.4			0.464
	Chromium	102	103	102	103			0.638
	Copper	103	101	98.8	97.7			1.95
	Lead	104	106	106	105			0.270
	Nickel	104	102	101	101			1.16
	Selenium	102	98.6	99.9	99.4			1.32
	Silver	108	107	107	105			0.431
	Thallium	104	107	107	107			0.664
EPA 300.0 Rev. 2.1	Chloride	99.3	97.5	97.3			0.345	
	Sulfate	98.3	98.0	98.4			0.156	
EPA 350.1 Rev. 2.0	Ammonia-N	99.6	95.0	94.8				0.181
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	99.7						1.64
EPA 353.2 Rev. 2.0	NO2NO3-N	98.5	95.0					0.244
EPA 365.1 Rev. 2.0	Total-P	107	107	107				0.134
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	101	99.8	99.9				0.100
SM 2120 B-2011	Color (true)	100					0.296	
SM 2320 B-2011	Total Alkalinity	103					0.0994	
SM 2540 C-2011	TDS						6.35	
SM 4500 F-C-2011	Fluoride	99.0	98.4	98.4				0.0
SM 5310 B-2011	Organic Carbon	99.2	96.2	98.8				1.58

Reference Method Descriptions

Method	Description	Associated Samples
EPA 180.1 Rev. 2.0	Turbidity in aqueous matrices	2272446
EPA 200.7 Rev. 4.4	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2272454, 2272455, 2272456, 2272457
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2272454, 2272455, 2272456, 2272457
EPA 300.0 Rev. 2.1	Chloride in aqueous matrices	2272446
EPA 300.0 Rev. 2.1	Sulfate in aqueous matrices	2272446
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2272447
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2272447
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2272447
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2272447
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2272448
SM 2120 B-2011	True Color measured at 450 nm (not valid for NPDES monitoring)	2272446
SM 2320 B-2011	Alkalinity in aqueous matrices as mg CaCO3/L	2272446

Reference Method Descriptions

Method	Description	Associated Samples
SM 2340B	Hardness by calculation, in aqueous matrices, reported as mg/L CaCO3	2272454, 2272455, 2272456, 2272457
SM 2540 C-2011	Total Dissolved Solids in aqueous matrices	2272446
SM 2540 D-2011	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2272446
SM 4500 F-C-2011	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2272446
SM 5310 B-2011	Nonpurgeable Organic Carbon in aqueous matrices	2272447

Preparation and Analysis Log

Ref. Method	Received Date	Prep Date/Time	Prepared By	Analysis Date/Time	Analyzed By	Associated Samples
EPA 180.1 Rev. 2.0	08/27/2021			08/27/2021 15:00	Sarah A Nixon	2272446
EPA 200.7 Rev. 4.4	08/27/2021	08/30/2021 13:10	Elliott D. Healy	09/02/2021 05:19	Josef B Mick	2272454
	08/27/2021	08/30/2021 13:10	Elliott D. Healy	09/02/2021 05:27	Josef B Mick	2272455
	08/27/2021	08/30/2021 13:10	Elliott D. Healy	09/02/2021 05:35	Josef B Mick	2272456
	08/27/2021	08/30/2021 13:10	Elliott D. Healy	09/02/2021 05:41	Josef B Mick	2272457
EPA 200.8 Rev. 5.4	08/27/2021	08/30/2021 13:10	Elliott D. Healy	09/01/2021 18:00	Alexander Thompson	2272454
	08/27/2021	08/30/2021 13:10	Elliott D. Healy	09/01/2021 18:09	Alexander Thompson	2272455
	08/27/2021	08/30/2021 13:10	Elliott D. Healy	09/01/2021 18:18	Alexander Thompson	2272456
	08/27/2021	08/30/2021 13:10	Elliott D. Healy	09/01/2021 18:27	Alexander Thompson	2272457
EPA 300.0 Rev. 2.1	08/27/2021			09/03/2021 15:47	Roberta Tatti	2272446
EPA 350.1 Rev. 2.0	08/27/2021			08/31/2021 12:30	Ping Hua	2272447
EPA 351.2 Rev. 2.0	08/27/2021	09/03/2021 13:24	Benjamin T. Nordmann	09/07/2021 11:21	Alexandra J Mattheus	2272447
EPA 353.2 Rev. 2.0	08/27/2021			08/31/2021 09:47	Beverly Y. Sanders	2272447
EPA 365.1 Rev. 2.0	08/27/2021	08/31/2021 14:38	Simonne.V. Calhoun	09/01/2021 14:03	Shengyu Ding	2272447
EPA 365.1 Rev. 2.0 dissolved	08/27/2021			08/27/2021 15:02	James L Waggerby	2272448
SM 2120 B-2011	08/27/2021			08/27/2021 15:51	Sarah A Nixon	2272446
SM 2320 B-2011	08/27/2021			08/30/2021 19:09	Dale L. Simmons	2272446
SM 2340B	08/27/2021			09/02/2021 05:19	Josef B Mick	2272454
	08/27/2021			09/02/2021 05:27	Josef B Mick	2272455
	08/27/2021			09/02/2021 05:35	Josef B Mick	2272456
	08/27/2021			09/02/2021 05:41	Josef B Mick	2272457
SM 2540 C-2011	08/27/2021			08/30/2021 15:46	Yijie Li	2272446
SM 2540 D-2011	08/27/2021			08/30/2021 14:36	Yijie Li	2272446
SM 4500 F-C-2011	08/27/2021			08/30/2021 19:09	Dale L. Simmons	2272446
SM 5310 B-2011	08/27/2021			09/02/2021 08:38	Touraj Touran	2272447