Chemical Analysis Report

TLH-ROC-2021-03-31-03

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

Event Description: **Run 13**
Request ID: **RQ-2021-03-15-34**
Customer: **TLH-ROC**
Project ID: **SMP**

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Certified by: Thekkekalathil Chandrasekhar, Environmental Consultant Date Certified: 21-APR-2021 09:25

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: Little Creek @ Treatment Plant Rd **Collection Date/Time: 03/31/2021 12:05**

Field ID: G3TLHR0002 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2235314	EPA 180.1 Rev. 2.0	Turbidity	12		NTU	P395820	
	EPA 300.0 Rev. 2.1	Chloride	5.3		mg Cl/L	P395979	
		Sulfate	1.1		mg SO4/L	P395981	
	SM 2120 B-2011	Color (true)	43		PCU	P395828	
	SM 2320 B-2011	Total Alkalinity	94		mg CaCO3/L	P396042	
	SM 2540 C-2011	TDS	126		mg/L	P396197	
	SM 2540 D-2011	TSS	7	I	mg/L	P396189	
	SM 4500 F-C-2011	Fluoride	0.037	I	mg F/L	P396044	
2235316	EPA 350.1 Rev. 2.0	Ammonia-N	0.041		mg N/L	P395916	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.39		mg N/L	P396164	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.49		mg N/L	P395865	
	EPA 365.1 Rev. 2.0	Total-P	0.056		mg P/L	P395890	
	SM 5310 B-2011	Organic Carbon	4.3		mg C/L	P396052	
2235318	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.021		mg P/L	P395807	

Ref. Method and Comment:
SM 2540 D-2011: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
SM 4500 F-C-2011: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

Sample Location: Camp Branch @ US90 **Collection Date/Time: 03/31/2021 12:45**

Field ID: G3TLHR0005 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2235315	EPA 180.1 Rev. 2.0	Turbidity	7.2		NTU	P395820	
	EPA 300.0 Rev. 2.1	Chloride	6.1		mg Cl/L	P395979	
		Sulfate	0.88		mg SO4/L	P395981	
	SM 2120 B-2011	Color (true)	90		PCU	P395828	
	SM 2320 B-2011	Total Alkalinity	41		mg CaCO3/L	P396042	
	SM 2540 C-2011	TDS	63		mg/L	P396197	
	SM 2540 D-2011	TSS	3	I	mg/L	P396189	
	SM 4500 F-C-2011	Fluoride	0.041	I	mg F/L	P396044	
2235317	EPA 350.1 Rev. 2.0	Ammonia-N	0.033		mg N/L	P395916	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.49		mg N/L	P396164	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.093		mg N/L	P395865	
	EPA 365.1 Rev. 2.0	Total-P	0.12		mg P/L	P395890	
	SM 5310 B-2011	Organic Carbon	8.0		mg C/L	P396052	
2235319	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.077		mg P/L	P395807	

Ref. Method and Comment:
SM 2540 D-2011: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
SM 4500 F-C-2011: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

Sample Location: Flat Creek @ Gainer Rd **Collection Date/Time: 03/31/2021 13:30**

Field ID: G3TLHR0008 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2235320	EPA 180.1 Rev. 2.0	Turbidity	13		NTU	P395820	
	EPA 300.0 Rev. 2.1	Chloride	4.7		mg Cl/L	P395979	
		Sulfate	0.59		mg SO4/L	P395981	
	SM 2120 B-2011	Color (true)	110		PCU	P395828	
	SM 2320 B-2011	Total Alkalinity	8.4		mg CaCO3/L	P396042	
	SM 2540 C-2011	TDS	47		mg/L	P396198	
	SM 2540 D-2011	TSS	5	I	mg/L	P396190	
	SM 4500 F-C-2011	Fluoride	0.038	I	mg F/L	P396044	
2235321	EPA 350.1 Rev. 2.0	Ammonia-N	0.032		mg N/L	P395916	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.55		mg N/L	P396164	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.060		mg N/L	P395865	
	EPA 365.1 Rev. 2.0	Total-P	0.052		mg P/L	P395890	
	SM 5310 B-2011	Organic Carbon	7.0		mg C/L	P396052	
2235322	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.017		mg P/L	P395807	
2235335	EPA 200.7 Rev. 4.4	Barium	18.3		ug/L	P395972	
		Calcium	3.15		mg/L	P395972	
		Iron	1.96E+03		ug/L	P395972	
		Magnesium	1.39		mg/L	P395972	
		Manganese	51.8		ug/L	P395972	
		Potassium	1.3		mg/L	P395972	
		Sodium	2.1		mg/L	P395972	
		Zinc	6.4	I	ug/L	P395972	
	EPA 200.8 Rev. 5.4	Aluminum	614		ug/L	P395972	
		Antimony	0.050	U	ug/L	P395972	
		Arsenic	0.71		ug/L	P395972	
		Beryllium	0.027	I	ug/L	P395972	
		Boron**	9.7		ug/L	P395972	
		Cadmium	0.020	U	ug/L	P395972	
		Chromium	0.61	I	ug/L	P395972	
		Copper	0.54	I	ug/L	P395972	
		Lead	0.66		ug/L	P395972	
		Nickel	0.50	U	ug/L	P395972	
		Selenium	0.20	U	ug/L	P395972	
		Silver	0.010	U	ug/L	P395972	
		Thallium	0.10	U	ug/L	P395972	
	SM 2340B	Hardness	13.6		mg/L	P395972	

Ref. Method and Comment:
SM 2540 D-2011: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
SM 4500 F-C-2011: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.
EPA 200.8 Rev. 5.4: The lead result was confirmed on 04/19/2021.

Quality Assurance Report
Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P395820

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P395972

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: P395972

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: P395979

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P395981

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P395916

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: P396164

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P395865

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P395890

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P395807

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

Reference Method: SM 2120 B-2011
Batch ID: P395828

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-2011
Batch ID: P396042

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

Reference Method: SM 2540 C-2011
Batch ID: P396197

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 C-2011
Batch ID: P396198

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-2011
Batch ID: P396189

Component	Result	Code	Units
TSS	2	U	mg/L

Quality Assurance Report
Method Blank Results

Reference Method: SM 2540 D-2011
Batch ID: P396190

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-2011
Batch ID: P396044

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-2011
Batch ID: P396052

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: P395972

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Barium	99.2		P	85 - 115
Calcium	104		P	85 - 115
Iron	104		P	85 - 115
Magnesium	103		P	85 - 115
Manganese	101		P	85 - 115
Potassium	102		P	85 - 115
Sodium	102		P	85 - 115
Zinc	105		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P395972

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	94.8		P	85 - 115
Antimony	99.1		P	85 - 115
Arsenic	96.8		P	85 - 115
Beryllium	93.5		P	85 - 115
Boron	98.7		P	85 - 115
Cadmium	97.0		P	85 - 115
Chromium	94.8		P	85 - 115
Copper	93.8		P	85 - 115
Lead	96.0		P	85 - 115
Nickel	94.2		P	85 - 115
Selenium	94.0		P	85 - 115
Silver	97.3		P	85 - 115
Thallium	102		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P395979

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P395981

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P395916

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	96.8		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P396164

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

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P395865

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	104		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P395890

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P395807

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

Reference Method: SM 2120 B-2011
Batch ID: P395828

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	99.9		P	85 - 115

Reference Method: SM 2320 B-2011
Batch ID: P396042

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	100		P	93 - 104

Reference Method: SM 4500 F-C-2011
Batch ID: P396044

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	99.0		P	90 - 106

Reference Method: SM 5310 B-2011
Batch ID: P396052

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	93.5		P	85 - 115

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P395972

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2235304	Barium	103	101	P/P	80 - 120
2235304	Calcium	108	106	P/P	80 - 120
2235304	Iron	110	108	P/P	80 - 120
2235304	Magnesium	108	106	P/P	80 - 120
2235304	Manganese	106	104	P/P	80 - 120
2235304	Potassium	106	104	P/P	80 - 120
2235304	Sodium	111	108	P/P	80 - 120
2235304	Zinc	108	106	P/P	80 - 120
2235335	Barium	98.7		P	80 - 120
2235335	Calcium	102		P	80 - 120
2235335	Iron	106		P	80 - 120
2235335	Magnesium	105		P	80 - 120
2235335	Manganese	99.5		P	80 - 120
2235335	Potassium	104		P	80 - 120
2235335	Sodium	103		P	80 - 120
2235335	Zinc	104		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P395972

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2235304	Aluminum	93.9	92.5	P/P	80 - 120
2235304	Antimony	101	99.3	P/P	80 - 120
2235304	Arsenic	96.4	96.2	P/P	80 - 120
2235304	Beryllium	89.7	93.0	P/P	80 - 120
2235304	Boron	95.9	97.5	P/P	80 - 120
2235304	Cadmium	96.9	95.7	P/P	80 - 120
2235304	Chromium	96.7	94.8	P/P	80 - 120
2235304	Copper	95.8	94.3	P/P	80 - 120
2235304	Lead	96.4	94.2	P/P	80 - 120
2235304	Nickel	93.5	91.3	P/P	80 - 120
2235304	Selenium	94.8	92.4	P/P	80 - 120
2235304	Silver	96.1	94.9	P/P	80 - 120
2235304	Thallium	102	101	P/P	80 - 120
2235335	Aluminum	85.7		P	80 - 120
2235335	Antimony	96.4		P	80 - 120
2235335	Arsenic	92.4		P	80 - 120
2235335	Beryllium	88.3		P	80 - 120
2235335	Boron	96.1		P	80 - 120
2235335	Cadmium	96.8		P	80 - 120
2235335	Chromium	92.3		P	80 - 120
2235335	Copper	88.9		P	80 - 120
2235335	Lead	93.3		P	80 - 120
2235335	Nickel	88.2		P	80 - 120
2235335	Selenium	90.0		P	80 - 120
2235335	Silver	92.5		P	80 - 120
2235335	Thallium	99.5		P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P395979

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: P395979

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2235289	Chloride	99.3		P	90 - 110
2235365	Chloride	97.6		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P395981

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2235289	Sulfate	99.6		P	90 - 110
2235365	Sulfate	101		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P395916

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2235296	Ammonia-N	95.8	95.2	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P396164

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2235311	Kjeldahl Nitrogen	104	109	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P395865

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2235291	NO2NO3-N	104	104	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P395890

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2235296	Total-P	102	105	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P395807

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2235312	O-Phosphate-P	99.1	97.7	P/P	90 - 110

Reference Method: SM 5310 B-2011
Batch ID: P396052

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2235317	Organic Carbon	95.2	95.9	P/P	85 - 115

Quality Assurance Report
Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P395820

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2235310	Turbidity	1.82	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P395972

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2235304	Barium	1.95	Spike	P	0 - 20
2235304	Calcium	1.01	Spike	P	0 - 20
2235304	Iron	2.19	Spike	P	0 - 20
2235304	Magnesium	2.24	Spike	P	0 - 20
2235304	Manganese	1.92	Spike	P	0 - 20
2235304	Potassium	1.32	Spike	P	0 - 20
2235304	Sodium	2.04	Spike	P	0 - 20
2235304	Zinc	2.49	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P395972

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2235304	Aluminum	1.50	Spike	P	0 - 20
2235304	Antimony	1.27	Spike	P	0 - 20
2235304	Arsenic	0.221	Spike	P	0 - 20
2235304	Beryllium	3.64	Spike	P	0 - 20
2235304	Boron	1.50	Spike	P	0 - 20
2235304	Cadmium	1.25	Spike	P	0 - 20
2235304	Chromium	1.97	Spike	P	0 - 20
2235304	Copper	1.61	Spike	P	0 - 20
2235304	Lead	2.31	Spike	P	0 - 20
2235304	Nickel	2.33	Spike	P	0 - 20
2235304	Selenium	2.50	Spike	P	0 - 20
2235304	Silver	1.28	Spike	P	0 - 20
2235304	Thallium	1.08	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P395979

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2235289	Chloride	0.220	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P395981

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2235289	Sulfate	0.482	Sample	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P395916

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2235296	Ammonia-N	0.541	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P396164

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2235311	Kjeldahl Nitrogen	3.18	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P395865

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2235291	NO2NO3-N	0.319	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P395890

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2235296	Total-P	3.19	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P395807

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2235312	O-Phosphate-P	1.20	Spike	P	0 - 20

Reference Method: SM 2120 B-2011
Batch ID: P395828

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2235290	Color (true)	1.59	Sample	P	0 - 20

Reference Method: SM 2320 B-2011
Batch ID: P396042

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2235759	Total Alkalinity	0.609	Sample	P	0 - 8.1

Reference Method: SM 2540 C-2011
Batch ID: P396197

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2235212	TDS	3.36	Sample	P	0 - 10

Quality Assurance Report
Precision

Reference Method: SM 2540 C-2011
Batch ID: P396198

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2234997	TDS	1.49	Sample	P	0 - 10

Reference Method: SM 4500 F-C-2011
Batch ID: P396044

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2235759	Fluoride	0.502	Spike	P	0 - 2.8

Reference Method: SM 5310 B-2011
Batch ID: P396052

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2235317	Organic Carbon	0.479	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: A104426
Included Lab Sample IDs: 2235318, 2235319, 2235322

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.2	98.9	P/P	90 - 110

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A104429
Included Lab Sample IDs: 2235314, 2235315, 2235320

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	99.5	101	P/P	95 - 105

Reference Method: SM 2120 B-2011
Run ID: A104430
Included Lab Sample IDs: 2235314, 2235315, 2235320

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	100	101	P/P	90 - 115

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A104447
Included Lab Sample IDs: 2235316, 2235317, 2235321

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	104	104	P/P	90 - 110
NO2NO3-N	104	105	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A104465
Included Lab Sample IDs: 2235316, 2235317, 2235321

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	97.9	97.6	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A104493
Included Lab Sample IDs: 2235316

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

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A104494
Included Lab Sample IDs: 2235317, 2235321

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	105	104	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A104495
Included Lab Sample IDs: 2235314, 2235315, 2235320

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

Quality Assurance Report
Calibration Verification

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A104495
Included Lab Sample IDs: 2235314, 2235315, 2235320

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

Reference Method: SM 2320 B-2011
Run ID: A104518
Included Lab Sample IDs: 2235314, 2235315, 2235320

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

Reference Method: SM 4500 F-C-2011
Run ID: A104518
Included Lab Sample IDs: 2235314, 2235315, 2235320

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

Reference Method: SM 5310 B-2011
Run ID: A104530
Included Lab Sample IDs: 2235316, 2235317, 2235321

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	96.4	97.1	P/P	90 - 110
Organic Carbon	97.1	97.6	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A104649
Included Lab Sample IDs: 2235316, 2235317, 2235321

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

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A104678
Included Lab Sample IDs: 2235335

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	97.2	97.3	P/P	90 - 110
Antimony	100	99.0	P/P	90 - 110
Arsenic	97.1	94.5	P/P	90 - 110
Beryllium	96.7	94.4	P/P	90 - 110
Boron	97.0	96.5	P/P	90 - 110
Cadmium	96.6	96.0	P/P	90 - 110
Chromium	96.8	94.9	P/P	90 - 110
Copper	94.4	90.5	P/P	90 - 110
Lead	97.1	95.5	P/P	90 - 110
Nickel	94.9	90.2	P/P	90 - 110
Selenium	98.3	94.3	P/P	90 - 110
Silver	96.0	94.6	P/P	90 - 110
Thallium	100	99.0	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A104712
Included Lab Sample IDs: 2235335

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Barium	101	100	P/P	90 - 110
Calcium	101	103	P/P	90 - 110
Iron	103	105	P/P	90 - 110
Magnesium	100	103	P/P	90 - 110
Manganese	103	102	P/P	90 - 110
Potassium	104	106	P/P	90 - 110
Sodium	102	104	P/P	90 - 110
Zinc	106	103	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		
						LCS	SMP	MS
EPA 180.1 Rev. 2.0	Turbidity						1.82	
EPA 200.7 Rev. 4.4	Barium	99.2	103	101	98.7			1.95
	Calcium	104	108	106	102			1.01
	Iron	104	110	108	106			2.19
	Magnesium	103	108	106	105			2.24
	Manganese	101	106	104	99.5			1.92
	Potassium	102	106	104	104			1.32
	Sodium	102	111	108	103			2.04
	Zinc	105	108	106	104			2.49
EPA 200.8 Rev. 5.4	Aluminum	94.8	93.9	92.5	85.7			1.50
	Antimony	99.1	101	99.3	96.4			1.27
	Arsenic	96.8	96.4	96.2	92.4			0.221
	Beryllium	93.5	89.7	93.0	88.3			3.64
	Boron	98.7	95.9	97.5	96.1			1.50
	Cadmium	97.0	96.9	95.7	96.8			1.25
	Chromium	94.8	96.7	94.8	92.3			1.97
	Copper	93.8	95.8	94.3	88.9			1.61
	Lead	96.0	96.4	94.2	93.3			2.31
	Nickel	94.2	93.5	91.3	88.2			2.33
	Selenium	94.0	94.8	92.4	90.0			2.50
	Silver	97.3	96.1	94.9	92.5			1.28
	Thallium	102	102	101	99.5			1.08
EPA 300.0 Rev. 2.1	Chloride	100	99.3	97.6			0.220	
	Sulfate	100	99.6	101			0.482	
EPA 350.1 Rev. 2.0	Ammonia-N	96.8	95.8	95.2				0.541
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	107	104	109				3.18
EPA 353.2 Rev. 2.0	NO2NO3-N	104	104	104				0.319
EPA 365.1 Rev. 2.0	Total-P	105	102	105				3.19
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	99.8	99.1	97.7				1.20
SM 2120 B-2011	Color (true)	99.9					1.59	
SM 2320 B-2011	Total Alkalinity	100					0.609	
SM 2540 C-2011	TDS						3.36	
	TDS						1.49	
SM 4500 F-C-2011	Fluoride	99.0						0.502
SM 5310 B-2011	Organic Carbon	93.5	95.2	95.9				0.479

Reference Method Descriptions

Method	Description	Associated Samples
EPA 180.1 Rev. 2.0	Turbidity in aqueous matrices	2235314, 2235315, 2235320
EPA 200.7 Rev. 4.4	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2235335
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2235335
EPA 300.0 Rev. 2.1	Chloride in aqueous matrices	2235314, 2235315, 2235320
EPA 300.0 Rev. 2.1	Sulfate in aqueous matrices	2235314, 2235315, 2235320
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2235316, 2235317, 2235321
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2235316, 2235317, 2235321
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2235316, 2235317, 2235321
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2235316, 2235317, 2235321
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2235318, 2235319, 2235322
SM 2120 B-2011	True Color measured at 450 nm (not valid for NPDES monitoring)	2235314, 2235315, 2235320

Reference Method Descriptions

Method	Description	Associated Samples
SM 2320 B-2011	Alkalinity in aqueous matrices as mg CaCO3/L	2235314, 2235315, 2235320
SM 2340B	Hardness by calculation, in aqueous matrices, reported as mg/L CaCO3	2235335
SM 2540 C-2011	Total Dissolved Solids in aqueous matrices	2235314, 2235315, 2235320
SM 2540 D-2011	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2235314, 2235315, 2235320
SM 4500 F-C-2011	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2235314, 2235315, 2235320
SM 5310 B-2011	Nonpurgeable Organic Carbon in aqueous matrices	2235316, 2235317, 2235321

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	03/31/2021			04/01/2021 15:12	Yen Ta	2235314, 2235315, 2235320
EPA 200.7 Rev. 4.4	03/31/2021	04/05/2021 15:55	Elliott D. Healy	04/13/2021 14:56	Betina Topolski	2235335
EPA 200.8 Rev. 5.4	03/31/2021	04/05/2021 15:55	Elliott D. Healy	04/12/2021 15:19	Alexander Thompson	2235335
EPA 300.0 Rev. 2.1	03/31/2021			04/05/2021 22:20	Lipi Saha	2235314
	03/31/2021			04/05/2021 22:32	Lipi Saha	2235315
	03/31/2021			04/05/2021 22:45	Lipi Saha	2235320
EPA 350.1 Rev. 2.0	03/31/2021			04/03/2021 14:38	Ping Hua	2235316
	03/31/2021			04/03/2021 14:39	Ping Hua	2235317
	03/31/2021			04/03/2021 14:40	Ping Hua	2235321
EPA 351.2 Rev. 2.0	03/31/2021	04/08/2021 13:19	Benjamin T. Nordmann	04/09/2021 15:22	Virginia P. Brown	2235316
	03/31/2021	04/08/2021 13:19	Benjamin T. Nordmann	04/09/2021 15:24	Virginia P. Brown	2235317
	03/31/2021	04/08/2021 13:19	Benjamin T. Nordmann	04/09/2021 15:25	Virginia P. Brown	2235321
EPA 353.2 Rev. 2.0	03/31/2021			04/02/2021 10:20	Beverly Y. Sanders	2235317
	03/31/2021			04/02/2021 10:21	Beverly Y. Sanders	2235321
	03/31/2021			04/02/2021 10:52	Beverly Y. Sanders	2235316
EPA 365.1 Rev. 2.0	03/31/2021	04/02/2021 13:22	Yen Ta	04/05/2021 14:48	Shengyu Ding	2235317
	03/31/2021	04/02/2021 13:22	Yen Ta	04/05/2021 14:49	Shengyu Ding	2235321
	03/31/2021	04/02/2021 13:22	Yen Ta	04/05/2021 15:11	Shengyu Ding	2235316
EPA 365.1 Rev. 2.0 dissolved	03/31/2021			04/01/2021 13:35	Lipi Saha	2235318
	03/31/2021			04/01/2021 13:36	Lipi Saha	2235319
	03/31/2021			04/01/2021 13:37	Lipi Saha	2235322
SM 2120 B-2011	03/31/2021			04/01/2021 16:07	Benjamin T. Nordmann	2235314
	03/31/2021			04/01/2021 16:08	Benjamin T. Nordmann	2235315
	03/31/2021			04/01/2021 16:09	Benjamin T. Nordmann	2235320
SM 2320 B-2011	03/31/2021			04/06/2021 05:27	Dale L. Simmons	2235314
	03/31/2021			04/06/2021 05:40	Dale L. Simmons	2235315
	03/31/2021			04/06/2021 05:51	Dale L. Simmons	2235320
SM 2340B	03/31/2021			04/13/2021 14:56	Betina Topolski	2235335
SM 2540 C-2011	03/31/2021			04/02/2021 15:25	Yijie Li	2235314, 2235315, 2235320
SM 2540 D-2011	03/31/2021			04/02/2021 15:25	Yijie Li	2235314, 2235315, 2235320
SM 4500 F-C-2011	03/31/2021			04/06/2021 05:27	Dale L. Simmons	2235314
	03/31/2021			04/06/2021 05:40	Dale L. Simmons	2235315
	03/31/2021			04/06/2021 05:51	Dale L. Simmons	2235320
SM 5310 B-2011	03/31/2021			04/05/2021 21:03	Madeline Gruver	2235317
	03/31/2021			04/05/2021 21:44	Madeline Gruver	2235321
	03/31/2021			04/05/2021 23:13	Madeline Gruver	2235316