Chemical Analysis Report

CEN-DIST-2021-10-20-01

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

Event Description: **Cow Creek/B-19 Canal**
Request ID: **RQ-2021-07-12-09**
Customer: **CEN-DIST**
Project ID: **SMP**

Send Reports to:
FL Dept. of Environmental Protection
3319 Maguire Blvd., Suite 232
Orlando, FL 32803-3767
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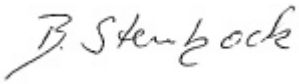
Certified by: Dr. rer. nat. Bettina Steinbock, Environmental Administrator Date Certified: 12-NOV-2021 16:49



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: Cow Creek at OsteenMaytown Road (2952) **Collection Date/Time: 10/19/2021 14:22**

Field ID: G2CE0086 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2284904	EPA 180.1 Rev. 2.0	Turbidity	0.75		NTU	P405344	
	EPA 300.0 Rev. 2.1	Chloride	14	A	mg Cl/L	P405509	
		Sulfate	0.20	UA	mg SO4/L	P405511	
	SM 2120 B-2011	Color (true)	650		PCU	P405347	
	SM 2320 B-2011	Total Alkalinity	0.65	U	mg CaCO3/L	P405521	
	SM 2540 C-2011	TDS	169		mg/L	P405956	
	SM 2540 D-2011	TSS	2	I	mg/L	P405878	
	SM 4500 F-C-2011	Fluoride	0.035	U	mg F/L	P405524	
2284905	EPA 350.1 Rev. 2.0	Ammonia-N	0.019		mg N/L	P405801	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.6		mg N/L	P405570	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.005	I	mg N/L	P405654	
	EPA 365.1 Rev. 2.0	Total-P	0.020		mg P/L	P405467	
	SM 5310 B-2011	Organic Carbon	57		mg C/L	P405621	
2284906	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.007	I	mg P/L	P405334	
2284909	EPA 200.7 Rev. 4.4	Barium	9.1		ug/L	P405355	
		Calcium	5.21		mg/L	P405355	
		Iron	1.16E+03		ug/L	P405355	
		Magnesium	1.47		mg/L	P405355	
		Manganese	10.6		ug/L	P405355	
		Potassium	0.30	U	mg/L	P405355	
		Sodium	8.6		mg/L	P405355	
		Zinc	5.0	U	ug/L	P405355	
	EPA 200.8 Rev. 5.4	Aluminum	384		ug/L	P405355	
		Antimony	0.060	I	ug/L	P405355	
		Arsenic	0.40		ug/L	P405355	
		Beryllium	0.019	I	ug/L	P405355	
		Boron**	29.1		ug/L	P405355	
		Cadmium	0.020	U	ug/L	P405355	
		Chromium	0.44	I	ug/L	P405355	
		Copper	0.40	U	ug/L	P405355	
		Lead	0.40	I	ug/L	P405355	
		Nickel	0.51	I	ug/L	P405355	
		Selenium	0.20	U	ug/L	P405355	
		Silver	0.010	U	ug/L	P405355	
		Thallium	0.10	U	ug/L	P405355	
	SM 2340B	Hardness	19.1		mg/L	P405355	

Ref. Method and Comment:
EPA 300.0 Rev. 2.1: Sulfate: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
SM 2540 D-2011: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
EPA 365.1 Rev. 2.0: Total-P: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

Quality Assurance Report
Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P405344

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P405355

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: P405355

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: P405509

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P405511

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P405801

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: P405570

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P405654

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P405467

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P405334

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

Reference Method: SM 2120 B-2011
Batch ID: P405347

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-2011
Batch ID: P405521

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

Reference Method: SM 2540 C-2011
Batch ID: P405956

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-2011
Batch ID: P405878

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-2011
Batch ID: P405524

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: P405621

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: P405355

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Barium	99.5		P	85 - 115
Calcium	108		P	85 - 115
Iron	108		P	85 - 115
Magnesium	110		P	85 - 115
Manganese	103		P	85 - 115
Potassium	103		P	85 - 115
Sodium	106		P	85 - 115
Zinc	102		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P405355

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	97.2		P	85 - 115
Antimony	100		P	85 - 115
Arsenic	94.3		P	85 - 115
Beryllium	95.5		P	85 - 115
Boron	97.5		P	85 - 115
Cadmium	95.3		P	85 - 115
Chromium	93.1		P	85 - 115
Copper	92.9		P	85 - 115
Lead	97.3		P	85 - 115
Nickel	94.1		P	85 - 115
Selenium	97.3		P	85 - 115
Silver	93.7		P	85 - 115
Thallium	96.6		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P405509

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Chloride	99.2		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P405511

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P405801

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P405570

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	97.6		P	90 - 110

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P405654

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P405467

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: P405334

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

Reference Method: SM 2120 B-2011
Batch ID: P405347

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	98.4		P	85 - 115

Reference Method: SM 2320 B-2011
Batch ID: P405521

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	100		P	94 - 106

Reference Method: SM 4500 F-C-2011
Batch ID: P405524

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	99.2		P	93 - 104

Reference Method: SM 5310 B-2011
Batch ID: P405621

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	98.5		P	85 - 115

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P405355

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2283902	Barium	101	98.9	P/P	80 - 120
2283902	Calcium	109	107	P/P	80 - 120
2283902	Iron	109	106	P/P	80 - 120
2283902	Magnesium	112	108	P/P	80 - 120
2283902	Manganese	104	103	P/P	80 - 120
2283902	Potassium	111	109	P/P	80 - 120
2283902	Sodium	105	103	P/P	80 - 120
2283902	Zinc	104	103	P/P	80 - 120
2283931	Barium	101		P	80 - 120
2283931	Calcium	97.6		P	80 - 120
2283931	Iron	105		P	80 - 120
2283931	Magnesium	104		P	80 - 120
2283931	Manganese	106		P	80 - 120
2283931	Potassium	102		P	80 - 120
2283931	Sodium	106		P	80 - 120
2283931	Zinc	106		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P405355

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2283902	Aluminum	100	101	P/P	80 - 120
2283902	Antimony	104	105	P/P	80 - 120
2283902	Arsenic	96.7	97.4	P/P	80 - 120
2283902	Beryllium	98.8	95.1	P/P	80 - 120
2283902	Boron	101	102	P/P	80 - 120
2283902	Cadmium	100	101	P/P	80 - 120
2283902	Chromium	96.9	97.1	P/P	80 - 120
2283902	Copper	98.2	98.5	P/P	80 - 120
2283902	Lead	101	102	P/P	80 - 120
2283902	Nickel	96.7	96.3	P/P	80 - 120
2283902	Selenium	101	98.1	P/P	80 - 120
2283902	Silver	96.5	96.5	P/P	80 - 120
2283902	Thallium	101	102	P/P	80 - 120
2283931	Aluminum	98.9		P	80 - 120
2283931	Antimony	107		P	80 - 120
2283931	Arsenic	98.4		P	80 - 120
2283931	Beryllium	97.1		P	80 - 120
2283931	Boron	102		P	80 - 120
2283931	Cadmium	103		P	80 - 120
2283931	Chromium	101		P	80 - 120
2283931	Copper	94.0		P	80 - 120
2283931	Lead	101		P	80 - 120
2283931	Nickel	96.4		P	80 - 120
2283931	Selenium	98.0		P	80 - 120
2283931	Silver	97.4		P	80 - 120
2283931	Thallium	103		P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P405509

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: P405509

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2284904	Chloride	102		P	90 - 110
2285052	Chloride	99.6		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P405511

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2284904	Sulfate	101		P	90 - 110
2285052	Sulfate	101		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P405801

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2284997	Ammonia-N	98.0	99.2	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P405570

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2284824	Kjeldahl Nitrogen	90.1	95.4	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P405654

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2284915	NO2NO3-N	100	99.5	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P405334

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2285024	O-Phosphate-P	97.7	98.2	P/P	90 - 110

Reference Method: SM 4500 F-C-2011
Batch ID: P405524

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2285141	Fluoride	99.1	98.5	P/P	92 - 107

Reference Method: SM 5310 B-2011
Batch ID: P405621

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2284490	Organic Carbon	96.2	95.9	P/P	85 - 115

Quality Assurance Report
Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P405344

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2284820	Turbidity	6.86	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P405355

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2283902	Barium	1.82	Spike	P	0 - 20
2283902	Calcium	1.24	Spike	P	0 - 20
2283902	Iron	2.83	Spike	P	0 - 20
2283902	Magnesium	3.10	Spike	P	0 - 20
2283902	Manganese	1.20	Spike	P	0 - 20
2283902	Potassium	1.76	Spike	P	0 - 20
2283902	Sodium	1.34	Spike	P	0 - 20
2283902	Zinc	1.19	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P405355

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2283902	Aluminum	1.17	Spike	P	0 - 20
2283902	Antimony	0.462	Spike	P	0 - 20
2283902	Arsenic	0.772	Spike	P	0 - 20
2283902	Beryllium	3.78	Spike	P	0 - 20
2283902	Boron	1.40	Spike	P	0 - 20
2283902	Cadmium	1.06	Spike	P	0 - 20
2283902	Chromium	0.261	Spike	P	0 - 20
2283902	Copper	0.332	Spike	P	0 - 20
2283902	Lead	0.384	Spike	P	0 - 20
2283902	Nickel	0.389	Spike	P	0 - 20
2283902	Selenium	3.11	Spike	P	0 - 20
2283902	Silver	0.0328	Spike	P	0 - 20
2283902	Thallium	1.19	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P405509

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2284904	Chloride	0.327	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P405801

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2284997	Ammonia-N	0.993	Spike	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P405570

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2284824	Kjeldahl Nitrogen	4.50	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P405654

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2284915	NO2NO3-N	0.501	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P405467

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2285001	Total-P	0.247	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P405334

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2285024	O-Phosphate-P	0.510	Spike	P	0 - 20

Reference Method: SM 2120 B-2011
Batch ID: P405347

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2284760	Color (true)	0.711	Sample	P	0 - 20

Reference Method: SM 2320 B-2011
Batch ID: P405521

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2285141	Total Alkalinity	1.88	Sample	P	0 - 5.2

Reference Method: SM 2540 C-2011
Batch ID: P405956

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2285082	TDS	3.95	Sample	P	0 - 10

Reference Method: SM 4500 F-C-2011
Batch ID: P405524

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2285141	Fluoride	0.495	Spike	P	0 - 2.1

Quality Assurance Report
Precision

Reference Method: SM 5310 B-2011
Batch ID: P405621

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2284490	Organic Carbon	0.149	Spike	P	0 - 20

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

Quality Assurance Report
Calibration Verification

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A108426
Included Lab Sample IDs: 2284904

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	99.5	100	P/P	90 - 110
Sulfate	99.9	101	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A108441
Included Lab Sample IDs: 2284906

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.0	98.5	P/P	90 - 110

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A108442
Included Lab Sample IDs: 2284904

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	98.0	99.0	P/P	95 - 105

Reference Method: SM 2120 B-2011
Run ID: A108443
Included Lab Sample IDs: 2284904

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

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A108504
Included Lab Sample IDs: 2284909

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	99.8	102	P/P	90 - 110
Antimony	103	105	P/P	90 - 110
Arsenic	95.1	96.5	P/P	90 - 110
Beryllium	93.0	94.8	P/P	90 - 110
Boron	103	102	P/P	90 - 110
Cadmium	99.5	99.7	P/P	90 - 110
Chromium	95.3	95.9	P/P	90 - 110
Copper	92.4	94.4	P/P	90 - 110
Nickel	92.6	94.9	P/P	90 - 110
Selenium	98.5	101	P/P	90 - 110
Silver	95.4	95.7	P/P	90 - 110
Thallium	96.9	96.9	P/P	90 - 110

Reference Method: SM 2320 B-2011
Run ID: A108510
Included Lab Sample IDs: 2284904

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

Quality Assurance Report
Calibration Verification

Reference Method: SM 4500 F-C-2011
Run ID: A108510
Included Lab Sample IDs: 2284904

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

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A108517
Included Lab Sample IDs: 2284909

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Lead	94.1	93.9	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A108538
Included Lab Sample IDs: 2284905

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	99.2	99.8	P/P	90 - 110

Reference Method: SM 5310 B-2011
Run ID: A108545
Included Lab Sample IDs: 2284905

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	96.2	96.5	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A108558
Included Lab Sample IDs: 2284905

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

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A108571
Included Lab Sample IDs: 2284909

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Barium	101	100	P/P	90 - 110
Calcium	104	105	P/P	90 - 110
Iron	103	104	P/P	90 - 110
Magnesium	106	107	P/P	90 - 110
Manganese	104	104	P/P	90 - 110
Potassium	98.0	99.1	P/P	90 - 110
Sodium	103	104	P/P	90 - 110
Zinc	103	102	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A108580
Included Lab Sample IDs: 2284905

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	95.3	98.4	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A108646
Included Lab Sample IDs: 2284905

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	100	99.1	P/P	90 - 110

* Pass/Fail determinations are made for each bracketing calibration verification check.
Control limits for initial calibration checks may be different from those for continuing checks, depending on method requirements.
Where they are different, both control limits are provided.

Quality Assurance Report
Summary

Ref. Method	Analyte	LCS % Recovery	MS % Recovery			Precision		
						LCS	SMP	MS
EPA 180.1 Rev. 2.0	Turbidity						6.86	
EPA 200.7 Rev. 4.4	Barium	99.5	98.9	101	101			1.82
	Calcium	108	109	107	97.6			1.24
	Iron	108	109	106	105			2.83
	Magnesium	110	112	108	104			3.10
	Manganese	103	104	103	106			1.20
	Potassium	103	111	109	102			1.76
	Sodium	106	105	103	106			1.34
	Zinc	102	104	103	106			1.19
EPA 200.8 Rev. 5.4	Aluminum	97.2	100	101	98.9			1.17
	Antimony	100	104	105	107			0.462
	Arsenic	94.3	96.7	97.4	98.4			0.772
	Beryllium	95.5	98.8	95.1	97.1			3.78
	Boron	97.5	101	102	102			1.40
	Cadmium	95.3	100	101	103			1.06
	Chromium	93.1	96.9	97.1	101			0.261
	Copper	92.9	98.2	98.5	94.0			0.332
	Lead	97.3	101	102	101			0.384
	Nickel	94.1	96.7	96.3	96.4			0.389
	Selenium	97.3	101	98.1	98.0			3.11
	Silver	93.7	96.5	96.5	97.4			0.0328
	Thallium	96.6	101	102	103			1.19
EPA 300.0 Rev. 2.1	Chloride	99.2	102	99.6			0.327	
	Sulfate	99.8	101	101				
EPA 350.1 Rev. 2.0	Ammonia-N	98.4	98.0	99.2				0.993
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	97.6	90.1	95.4				4.50
EPA 353.2 Rev. 2.0	NO2NO3-N	101	100	99.5				0.501
EPA 365.1 Rev. 2.0	Total-P	103						0.247
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	99.5	97.7	98.2				0.510
SM 2120 B-2011	Color (true)	98.4					0.711	
SM 2320 B-2011	Total Alkalinity	100					1.88	
SM 2540 C-2011	TDS						3.95	
SM 4500 F-C-2011	Fluoride	99.2	99.1	98.5				0.495
SM 5310 B-2011	Organic Carbon	98.5	96.2	95.9				0.149

Reference Method Descriptions

Method	Description	Associated Samples
EPA 180.1 Rev. 2.0	Turbidity in aqueous matrices	2284904
EPA 200.7 Rev. 4.4	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2284909
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2284909
EPA 300.0 Rev. 2.1	Chloride in aqueous matrices	2284904
EPA 300.0 Rev. 2.1	Sulfate in aqueous matrices	2284904
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2284905
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2284905
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2284905
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2284905
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2284906
SM 2120 B-2011	True Color measured at 450 nm (not valid for NPDES monitoring)	2284904
SM 2320 B-2011	Alkalinity in aqueous matrices as mg CaCO3/L	2284904

Reference Method Descriptions

Method	Description	Associated Samples
SM 2340B	Hardness by calculation, in aqueous matrices, reported as mg/L CaCO3	2284909
SM 2540 C-2011	Total Dissolved Solids in aqueous matrices	2284904
SM 2540 D-2011	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2284904
SM 4500 F-C-2011	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2284904
SM 5310 B-2011	Nonpurgeable Organic Carbon in aqueous matrices	2284905

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	10/20/2021			10/20/2021 17:04	Khloe J Berg	2284904
EPA 200.7 Rev. 4.4	10/20/2021	10/21/2021 10:00	Emily M Philpot	10/27/2021 19:25	Josef B Mick	2284909
EPA 200.8 Rev. 5.4	10/20/2021	10/21/2021 10:00	Emily M Philpot	10/22/2021 17:54	Alexander Thompson	2284909
	10/20/2021	10/21/2021 10:00	Emily M Philpot	10/25/2021 14:18	Alexander Thompson	2284909
EPA 300.0 Rev. 2.1	10/20/2021			10/22/2021 12:30	Roberta Tatti	2284904
EPA 350.1 Rev. 2.0	10/20/2021			10/28/2021 12:57	Ping Hua	2284905
EPA 351.2 Rev. 2.0	10/20/2021	10/26/2021 09:10	Benjamin T. Nordmann	10/27/2021 14:09	Alexandra J Mattheus	2284905
EPA 353.2 Rev. 2.0	10/20/2021			10/27/2021 09:39	Beverly Y. Sanders	2284905
EPA 365.1 Rev. 2.0	10/20/2021	10/22/2021 12:26	Simonne.V. Calhoun	10/26/2021 13:24	Lipi Saha	2284905
EPA 365.1 Rev. 2.0 dissolved	10/20/2021			10/20/2021 14:18	James L Waggerby	2284906
SM 2120 B-2011	10/20/2021			10/20/2021 15:58	Sarah A Nixon	2284904
SM 2320 B-2011	10/20/2021			10/22/2021 23:10	Dale L. Simmons	2284904
SM 2340B	10/20/2021			10/27/2021 19:25	Josef B Mick	2284909
SM 2540 C-2011	10/20/2021			10/22/2021 15:35	Yijie Li	2284904
SM 2540 D-2011	10/20/2021			10/22/2021 15:35	Yijie Li	2284904
SM 4500 F-C-2011	10/20/2021			10/22/2021 23:10	Dale L. Simmons	2284904
SM 5310 B-2011	10/20/2021			10/26/2021 07:21	Khloe J Berg	2284905