

Chemical Analysis Report

WQAP-2016-05-11-01

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

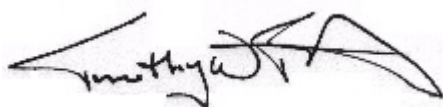
Event Description: **Ochlockonee River, Harbinwood Estates Drain and Chicken Branch**
Request ID: **RQ-2016-05-09-75**
Customer: **WQAP**
Project ID: **SMP**

Send Reports to:
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2600 Blair Stone Rd
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Tallahassee, FL 32399-2400
Attn: Katrina Sanders

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Certified by: Timothy Fitzpatrick, Program Administrator

Date Certified: 03-JUN-2016 17:04

A handwritten signature in black ink, appearing to read "Timothy W. Fitzpatrick", with a stylized flourish at the end.

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 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: Harbinwood Estates Drain

Collection Date/Time: 05/11/2016 11:35

Field ID: G1WA0034

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1797969	EPA 180.1 Rev. 2.0	Turbidity	2.6		NTU	P304133	
	EPA 300.0 Rev. 2.1	Chloride	8.3		mg Cl/L	P304780	
	SM 2120 B	Color (true)	32		PCU	P304258	
	SM 2320 B-97	Total Alkalinity	36		mg CaCO3/L	P304666	
	SM 2540 C-97	TDS	55		mg/L	P304857	
	SM 2540 D-97	TSS	4	I	mg/L	P304757	
	SM 4500 F-C-97	Fluoride	0.13		mg F/L	P304669	
1797973	EPA 350.1 Rev. 2.0	Ammonia-N	0.030		mg N/L	P304548	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.34		mg N/L	P304819	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.012		mg N/L	P304650	
	EPA 365.1 Rev. 2.0	Total-P	0.11		mg P/L	P304974	
	SM 5310 B-00	Organic Carbon	4.9		mg C/L	P304980	
1797977	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.066		mg P/L	P304102	
1797985	EPA 200.7 Rev. 4.4	Calcium	10.8		mg/L	P304458	
		Iron	580		ug/L	P304458	
		Magnesium	3.37		mg/L	P304458	
		Potassium	0.63	I	mg/L	P304458	
		Sodium	5.0		mg/L	P304458	
		Zinc	5.0	U	ug/L	P304458	
	EPA 200.8 Rev. 5.4	Arsenic	1.01		ug/L	P304458	
		Cadmium	0.020	U	ug/L	P304458	
		Chromium	0.22		ug/L	P304458	
		Copper	0.42		ug/L	P304458	
		Lead	0.15	I	ug/L	P304458	
		Nickel	0.15	I	ug/L	P304458	
		Silver	0.0050	U	ug/L	P304458	

Ref. Method and Comment:

SM 2540 D-97: The precision data is unavailable due to the low analyte concentration in the QC sample.

Sample Location: Ochlockonee River 350m Upstream of SR 12

Collection Date/Time: 05/11/2016 13:05

Field ID: G1WA0042

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1797970	EPA 180.1 Rev. 2.0	Turbidity	12		NTU	P304133	
	EPA 300.0 Rev. 2.1	Chloride	12		mg Cl/L	P304780	
	SM 2120 B	Color (true)	110		PCU	P304255	
	SM 2320 B-97	Total Alkalinity	28		mg CaCO3/L	P304666	
	SM 2540 C-97	TDS	86		mg/L	P304857	
	SM 2540 D-97	TSS	12		mg/L	P304757	
	SM 4500 F-C-97	Fluoride	0.13		mg F/L	P304669	
1797974	EPA 350.1 Rev. 2.0	Ammonia-N	0.047		mg N/L	P304548	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.55		mg N/L	P304819	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.45		mg N/L	P304650	
	EPA 365.1 Rev. 2.0	Total-P	0.14		mg P/L	P304974	

Field ID: G1WA0042

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1797974	SM 5310 B-00	Organic Carbon	8.1		mg C/L	P304980	
1797978	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.080		mg P/L	P304102	
1797986	EPA 200.7 Rev. 4.4	Calcium	8.58		mg/L	P304458	
		Iron	2.27E+03		ug/L	P304458	
		Magnesium	4.05		mg/L	P304458	
		Potassium	2.5		mg/L	P304458	
		Sodium	7.9		mg/L	P304458	
		Zinc	5.0	U	ug/L	P304458	
	EPA 200.8 Rev. 5.4	Arsenic	1.15		ug/L	P304458	
		Cadmium	0.020	U	ug/L	P304458	
		Chromium	0.89		ug/L	P304458	
		Copper	0.60		ug/L	P304458	
		Lead	0.63		ug/L	P304458	
		Nickel	0.49		ug/L	P304458	
		Silver	0.0050	U	ug/L	P304458	

Ref. Method and Comment:

SM 2540 D-97: The precision data is unavailable due to the low analyte concentration in the QC sample.

Sample Location: Ochlockonee River 350m Upstream of SR 12 **Collection Date/Time: 05/11/2016 13:05**

Field ID: G1WA0042D

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1797971	EPA 180.1 Rev. 2.0	Turbidity	12		NTU	P304133	
	EPA 300.0 Rev. 2.1	Chloride	12		mg Cl/L	P304780	
	SM 2120 B	Color (true)	110		PCU	P304255	
	SM 2320 B-97	Total Alkalinity	28		mg CaCO3/L	P304666	
	SM 2540 C-97	TDS	91		mg/L	P304858	
	SM 2540 D-97	TSS	12		mg/L	P304758	
	SM 4500 F-C-97	Fluoride	0.13		mg F/L	P304669	
1797975	EPA 350.1 Rev. 2.0	Ammonia-N	0.048		mg N/L	P304548	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.55		mg N/L	P304819	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.44		mg N/L	P304652	
	EPA 365.1 Rev. 2.0	Total-P	0.14		mg P/L	P304974	
	SM 5310 B-00	Organic Carbon	8.2		mg C/L	P304980	
1797979	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.080		mg P/L	P304102	
1797987	EPA 200.7 Rev. 4.4	Calcium	8.63		mg/L	P304458	
		Iron	2.26E+03		ug/L	P304458	
		Magnesium	4.09		mg/L	P304458	
		Potassium	2.6		mg/L	P304458	
		Sodium	8.0		mg/L	P304458	
		Zinc	5.0	U	ug/L	P304458	
	EPA 200.8 Rev. 5.4	Arsenic	1.11		ug/L	P304458	
		Cadmium	0.020	U	ug/L	P304458	
		Chromium	0.85		ug/L	P304458	
		Copper	0.57		ug/L	P304458	

Field ID: G1WA0042D

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1797987	EPA 200.8 Rev. 5.4	Lead	0.62		ug/L	P304458	
		Nickel	0.44		ug/L	P304458	
		Silver	0.0050	U	ug/L	P304458	

Ref. Method and Comment:

SM 2540 D-97: The precision data is unavailable due to the low analyte concentration in the QC sample.

Sample Location: Ochlockonee River Upstream of SR 12

Collection Date/Time: 05/11/2016 13:30

Field ID: G1WA0038

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1797972	EPA 180.1 Rev. 2.0	Turbidity	11		NTU	P304133	
	EPA 300.0 Rev. 2.1	Chloride	12		mg Cl/L	P304780	
	SM 2120 B	Color (true)	110		PCU	P304255	
	SM 2320 B-97	Total Alkalinity	28		mg CaCO3/L	P304666	
	SM 2540 C-97	TDS	89		mg/L	P304858	
	SM 2540 D-97	TSS	8	I	mg/L	P304758	
	SM 4500 F-C-97	Fluoride	0.13		mg F/L	P304669	
1797976	EPA 350.1 Rev. 2.0	Ammonia-N	0.046		mg N/L	P304548	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.57		mg N/L	P304866	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.44		mg N/L	P304652	
	EPA 365.1 Rev. 2.0	Total-P	0.13		mg P/L	P304974	
	SM 5310 B-00	Organic Carbon	8.1		mg C/L	P304980	
1797980	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.080		mg P/L	P304102	
1797988	EPA 200.7 Rev. 4.4	Calcium	8.59		mg/L	P304458	
		Iron	2.22E+03		ug/L	P304458	
		Magnesium	4.13		mg/L	P304458	
		Potassium	2.5		mg/L	P304458	
		Sodium	8.0		mg/L	P304458	
		Zinc	5.0	U	ug/L	P304458	
	EPA 200.8 Rev. 5.4	Arsenic	1.11		ug/L	P304458	
		Cadmium	0.020	U	ug/L	P304458	
		Chromium	0.80		ug/L	P304458	
		Copper	0.59		ug/L	P304458	
		Lead	0.61		ug/L	P304458	
		Nickel	0.47		ug/L	P304458	
		Silver	0.0050	U	ug/L	P304458	

Ref. Method and Comment:

SM 2540 D-97: The precision data is unavailable due to the low analyte concentration in the QC sample.

Quality Assurance Report

Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0

Batch ID: P304133

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Quality Assurance Report Method Blank Results

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P304458

Component	Result	Code	Units
Calcium	0.075	U	mg/L
Iron	30	U	ug/L
Magnesium	0.040	U	mg/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: P304458

Component	Result	Code	Units
Arsenic	0.050	U	ug/L
Cadmium	0.020	U	ug/L
Chromium	0.050	U	ug/L
Copper	0.10	U	ug/L
Lead	0.050	U	ug/L
Nickel	0.050	U	ug/L
Silver	0.0050	U	ug/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P304780

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P304548

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P304819

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P304866

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P304650

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

Quality Assurance Report Method Blank Results

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P304652

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P304974

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P304102

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

Reference Method: SM 2120 B
Batch ID: P304255

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2120 B
Batch ID: P304258

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-97
Batch ID: P304666

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

Reference Method: SM 2540 C-97
Batch ID: P304857

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 C-97
Batch ID: P304858

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P304757

Component	Result	Code	Units
TSS	2	U	mg/L

Quality Assurance Report Method Blank Results

Reference Method: SM 2540 D-97
Batch ID: P304758

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P304669

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P304980

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: P304458

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	109		P	85 - 115
Iron	106		P	85 - 115
Magnesium	102		P	85 - 115
Potassium	107		P	85 - 115
Sodium	109		P	85 - 115
Zinc	99.9		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P304458

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Arsenic	95.8		P	85 - 115
Cadmium	95.6		P	85 - 115
Chromium	96.9		P	85 - 115
Copper	95.6		P	85 - 115
Lead	95.9		P	85 - 115
Nickel	97.8		P	85 - 115
Silver	91.9		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P304780

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Chloride	98.7		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P304548

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

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P304819

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	98.2		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P304866

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	106		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P304650

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P304652

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: P304974

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P304102

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

Reference Method: SM 2320 B-97
Batch ID: P304666

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	102		P	95 - 105

Reference Method: SM 4500 F-C-97
Batch ID: P304669

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	98.4		P	92 - 103

Reference Method: SM 5310 B-00
Batch ID: P304980

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	101		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P304458

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1797985	Calcium	111		P	80 - 120
1797985	Iron	106		P	80 - 120
1797985	Magnesium	106		P	80 - 120
1797985	Potassium	104		P	80 - 120
1797985	Sodium	104		P	80 - 120
1797985	Zinc	98.9		P	80 - 120
1798052	Calcium	113		P	80 - 120
1798052	Iron	107	107	P/P	80 - 120
1798052	Magnesium	103		P	80 - 120
1798052	Potassium	107	107	P/P	80 - 120
1798052	Sodium	109	109	P/P	80 - 120
1798052	Zinc	99.2	101	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P304458

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1797985	Arsenic	98.2		P	80 - 120
1797985	Cadmium	97.8		P	80 - 120
1797985	Chromium	98.3		P	80 - 120
1797985	Copper	96.9		P	80 - 120
1797985	Lead	97.4		P	80 - 120
1797985	Nickel	98.6		P	80 - 120
1797985	Silver	91.8		P	80 - 120
1798052	Arsenic	98.3	97.2	P/P	80 - 120
1798052	Cadmium	97.3	97.9	P/P	80 - 120
1798052	Chromium	97.9	96.9	P/P	80 - 120
1798052	Copper	96.3	93.7	P/P	80 - 120
1798052	Lead	93.9	94.1	P/P	80 - 120
1798052	Nickel	97.0	96.1	P/P	80 - 120
1798052	Silver	92.8	92.0	P/P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P304780

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1797995	Chloride	100		P	90 - 110
1798016	Chloride	100		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P304548

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1797975	Ammonia-N	99.8	95.4	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P304819

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1797889	Kjeldahl Nitrogen	96.4	97.3	P/P	90 - 110

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P304866

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1797997	Kjeldahl Nitrogen	98.6	97.6	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P304650

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1799127	NO2NO3-N	98.4	100	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P304652

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1798017	NO2NO3-N	104	105	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P304974

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1797973	Total-P	93.4	97.9	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P304102

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1797915	O-Phosphate-P	102	104	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Batch ID: P304669

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1798058	Fluoride	97.4	97.4	P/P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P304980

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1797585	Organic Carbon	95.4	97.0	P/P	85 - 115

Quality Assurance Report Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P304133

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1797579	Turbidity	1.65	Sample	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P304458

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1798052	Calcium	1.10	Spike	P	0 - 20
1798052	Iron	0.369	Spike	P	0 - 20
1798052	Magnesium	0.149	Spike	P	0 - 20
1798052	Potassium	0.280	Spike	P	0 - 20
1798052	Sodium	0.431	Spike	P	0 - 20
1798052	Zinc	1.93	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P304458

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1798052	Arsenic	1.10	Spike	P	0 - 20
1798052	Cadmium	0.547	Spike	P	0 - 20
1798052	Chromium	0.991	Spike	P	0 - 20
1798052	Copper	2.73	Spike	P	0 - 20
1798052	Lead	0.221	Spike	P	0 - 20
1798052	Nickel	0.989	Spike	P	0 - 20
1798052	Silver	0.869	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P304780

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1797995	Chloride	0.0797	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P304548

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1797975	Ammonia-N	2.31	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P304819

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1797889	Kjeldahl Nitrogen	0.694	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P304866

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1797997	Kjeldahl Nitrogen	0.749	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P304650

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1799127	NO2NO3-N	1.95	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P304652

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1798017	NO2NO3-N	0.477	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P304974

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1797973	Total-P	3.67	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P304102

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1797915	O-Phosphate-P	1.65	Spike	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P304255

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1798073	Color (true)	1.68	Sample	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P304258

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1798432	Color (true)	0.376	Sample	P	0 - 20

Reference Method: SM 2320 B-97
Batch ID: P304666

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1798058	Total Alkalinity	0.887	Sample	P	0 - 4.8

Reference Method: SM 2540 C-97
Batch ID: P304857

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1797994	TDS	5.41	Sample	P	0 - 10

Quality Assurance Report Precision

Reference Method: SM 2540 C-97
Batch ID: P304858

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1798058	TDS	1.53	Sample	P	0 - 10

Reference Method: SM 4500 F-C-97
Batch ID: P304669

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1798058	Fluoride	0.0	Spike	P	0 - 3.0

Reference Method: SM 5310 B-00
Batch ID: P304980

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1797585	Organic Carbon	1.39	Spike	P	0 - 20

* Sample, spike and/or laboratory control sample precision (LCS) is reported.
Replicate spike precision may be reported when sample results are below quantifiable levels.

Quality Assurance Report Calibration Verification

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A39620
Included Lab Sample IDs: 1797969, 1797970, 1797971, 1797972

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A69430
Included Lab Sample IDs: 1797977, 1797978, 1797979, 1797980

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

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A69439
Included Lab Sample IDs: 1797969, 1797970, 1797971, 1797972

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

Reference Method: SM 2120 B
Run ID: A69465
Included Lab Sample IDs: 1797969, 1797970, 1797971, 1797972

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	102	99.4	P/P	90 - 115

Quality Assurance Report Calibration Verification

Reference Method: SM 2120 B

Run ID: A69465

Included Lab Sample IDs: 1797969, 1797970, 1797971, 1797972

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	99.2	99.7	P/P	90 - 115

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A69554

Included Lab Sample IDs: 1797973, 1797974, 1797975, 1797976

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	98.5	99.0	P/P	90 - 110
Ammonia-N	99.2	98.5	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A69570

Included Lab Sample IDs: 1797985, 1797986, 1797987, 1797988

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	99.4	99.3	P/P	90 - 110
Arsenic	99.6	99.4	P/P	90 - 110
Cadmium	96.9	97.1	P/P	90 - 110
Cadmium	97.1	97.7	P/P	90 - 110
Chromium	97.8	98.6	P/P	90 - 110
Chromium	98.6	99.6	P/P	90 - 110
Copper	100	99.0	P/P	90 - 110
Copper	99.0	97.7	P/P	90 - 110
Lead	94.7	95.4	P/P	90 - 110
Lead	95.3	94.7	P/P	90 - 110
Nickel	101	100	P/P	90 - 110
Nickel	100	98.6	P/P	90 - 110
Silver	94.7	95.0	P/P	90 - 110
Silver	95.0	94.5	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A69587

Included Lab Sample IDs: 1797973, 1797974, 1797975, 1797976

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

Reference Method: SM 2320 B-97

Run ID: A69588

Included Lab Sample IDs: 1797969, 1797970, 1797971, 1797972

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	102	97.5	P/P	90 - 110

Reference Method: SM 4500 F-C-97

Run ID: A69588

Included Lab Sample IDs: 1797969, 1797970, 1797971, 1797972

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
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Quality Assurance Report Calibration Verification

Reference Method: SM 4500 F-C-97

Run ID: A69588

Included Lab Sample IDs: 1797969, 1797970, 1797971, 1797972

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	99.0	98.1	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A69589

Included Lab Sample IDs: 1797985, 1797986, 1797987, 1797988

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	101	102	P/P	90 - 110
Calcium	99.9	101	P/P	90 - 110
Iron	101	101	P/P	90 - 110
Iron	99.8	101	P/P	90 - 110
Magnesium	100	101	P/P	90 - 110
Magnesium	101	101	P/P	90 - 110
Potassium	102	103	P/P	90 - 110
Potassium	103	102	P/P	90 - 110
Sodium	102	102	P/P	90 - 110
Sodium	103	102	P/P	90 - 110
Zinc	98.3	99.3	P/P	90 - 110
Zinc	99.3	97.6	P/P	90 - 110

Reference Method: SM 5310 B-00

Run ID: A69683

Included Lab Sample IDs: 1797973, 1797974, 1797975, 1797976

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

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A69702

Included Lab Sample IDs: 1797973, 1797974, 1797975

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	91.3	90.3	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A69705

Included Lab Sample IDs: 1797976

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	102	107	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A69724

Included Lab Sample IDs: 1797973, 1797974, 1797975, 1797976

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	101	103	P/P	90 - 110
Total-P	103	101	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 SMP	MS
			LCS	MS	MS		
EPA 180.1 Rev. 2.0	Turbidity					1.65	
EPA 200.7 Rev. 4.4	Calcium	109	111	113			1.10
	Iron	106	106	107	107		0.369
	Magnesium	102	106	103			0.149
	Potassium	107	104	107	107		0.280
	Sodium	109	104	109	109		0.431
	Zinc	99.9	98.9	99.2	101		1.93
EPA 200.8 Rev. 5.4	Arsenic	95.8	98.2	98.3	97.2		1.10
	Cadmium	95.6	97.8	97.3	97.9		0.547
	Chromium	96.9	98.3	97.9	96.9		0.991
	Copper	95.6	96.9	96.3	93.7		2.73
	Lead	95.9	97.4	93.9	94.1		0.221
	Nickel	97.8	98.6	97.0	96.1		0.989
	Silver	91.9	91.8	92.8	92.0		0.869
EPA 300.0 Rev. 2.1	Chloride	98.7	100	100		0.0797	
EPA 350.1 Rev. 2.0	Ammonia-N	97.8	99.8	95.4			2.31
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	98.2	96.4	97.3			0.694
	Kjeldahl Nitrogen	106	98.6	97.6			0.749
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	101	98.4	100			1.95
	NO ₂ NO ₃ -N	102	104	105			0.477
EPA 365.1 Rev. 2.0	Total-P	100	93.4	97.9			3.67
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	102	102	104			1.65
SM 2120 B	Color (true)					1.68	
	Color (true)					0.376	
SM 2320 B-97	Total Alkalinity	102				0.887	
SM 2540 C-97	TDS					5.41	
	TDS					1.53	
SM 4500 F-C-97	Fluoride	98.4	97.4	97.4			0.0
SM 5310 B-00	Organic Carbon	101	95.4	97.0			1.39

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	1797969, 1797970, 1797971, 1797972
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	1797985, 1797986, 1797987, 1797988
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	1797985, 1797986, 1797987, 1797988
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	1797969, 1797970, 1797971, 1797972
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	1797973, 1797974, 1797975, 1797976
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	1797973, 1797974, 1797975, 1797976
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	1797973, 1797974, 1797975, 1797976

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	1797973, 1797974, 1797975, 1797976
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	1797977, 1797978, 1797979, 1797980
SM 2120 B / E31780	True Color measured at 450 nm	1797969, 1797970, 1797971, 1797972
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO3/L	1797969, 1797970, 1797971, 1797972
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	1797969, 1797970, 1797971, 1797972
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices	1797969, 1797970, 1797971, 1797972
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	1797969, 1797970, 1797971, 1797972
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	1797973, 1797974, 1797975, 1797976

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	05/11/2016			05/11/2016 15:59	Sima Feizi	1797969, 1797970, 1797971, 1797972
EPA 200.7 Rev. 4.4	05/11/2016	05/17/2016	Elliott D. Healy	05/19/2016	Joshua Ayres	1797985, 1797986, 1797987, 1797988
EPA 200.8 Rev. 5.4	05/11/2016	05/17/2016	Elliott D. Healy	05/18/2016	Charles J. Peterson	1797985, 1797986, 1797987, 1797988
EPA 300.0 Rev. 2.1	05/11/2016			05/20/2016	Elisa J Lutz	1797969, 1797970, 1797971, 1797972
EPA 350.1 Rev. 2.0	05/11/2016			05/18/2016	Diana M. Turner	1797973, 1797974, 1797975, 1797976
EPA 351.2 Rev. 2.0	05/11/2016	05/23/2016	Sofia Elnemr	05/25/2016	Christopher Armour	1797973, 1797974, 1797975
	05/11/2016	05/24/2016	Sofia Elnemr	05/25/2016	Christopher Armour	1797976
EPA 353.2 Rev. 2.0	05/11/2016			05/19/2016	Peter D. Kaus	1797973, 1797974, 1797975, 1797976
EPA 365.1 Rev. 2.0	05/11/2016	05/25/2016	Vijayalakshmi Reddy	05/26/2016	Rochelle Y Jackson	1797973, 1797974, 1797975, 1797976
EPA 365.1 Rev. 2.0 dissolved	05/11/2016			05/11/2016 16:45	Julia Storbeck	1797978
	05/11/2016			05/11/2016 16:46	Julia Storbeck	1797979
	05/11/2016			05/11/2016 17:01	Julia Storbeck	1797977
	05/11/2016			05/11/2016 17:02	Julia Storbeck	1797980
SM 2120 B	05/11/2016			05/12/2016 15:39	Chrisoulla Rakowski	1797970
	05/11/2016			05/12/2016 15:40	Chrisoulla Rakowski	1797971
	05/11/2016			05/12/2016 15:41	Chrisoulla Rakowski	1797972
	05/11/2016			05/12/2016 16:17	Chrisoulla Rakowski	1797969
SM 2320 B-97	05/11/2016			05/19/2016	Dale L. Simmons	1797969, 1797970, 1797971, 1797972
SM 2540 C-97	05/11/2016			05/13/2016	Yijie Li	1797969, 1797970, 1797971, 1797972
SM 2540 D-97	05/11/2016			05/13/2016	Yijie Li	1797969, 1797970, 1797971, 1797972
SM 4500 F-C-97	05/11/2016			05/19/2016	Dale L. Simmons	1797969, 1797970, 1797971, 1797972
SM 5310 B-00	05/11/2016			05/25/2016	Diana M. Turner	1797973, 1797974, 1797975, 1797976