

Chemical Analysis Report

CEN-DIST-2018-01-26-01

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

Event Description: **Little Lk Harris X5 / Howey Height**

Request ID: **RQ-2018-01-08-27**

Customer: **CEN-DIST**

Project ID: **SMP**

Send Reports to:

FL Dept. of Environmental Protection
FL Dept. of Environmental Protection
3319 Maguire Blvd., Suite 232
Orlando, FL 32803-3767
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For additional information please contact

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Certified by: Thekkekalathil Chandrasekhar, Chemist Administrator

Date Certified: 15-FEB-2018 15:13



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: LITTLE LAKE HARRIS @ CENTER

Collection Date/Time: 01/25/2018 10:24

Field ID: G1CE0068

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1962472	EPA 180.1 Rev. 2.0	Turbidity	1.8		NTU	P338891	
	EPA 300.0 Rev. 2.1	Chloride	21		mg Cl/L	P339113	
		Sulfate	6.8		mg SO4/L	P339111	
	SM 2120 B	Color (true)	41		PCU	P338887	
	SM 2320 B-97	Total Alkalinity	86		mg CaCO3/L	P339302	
	SM 2540 C-97	TDS	155		mg/L	P339396	
	SM 2540 D-97	TSS	3	I	mg/L	P339383	
	SM 4500 F-C-97	Fluoride	0.13		mg F/L	P339305	
1962476	EPA 350.1 Rev. 2.0	Ammonia-N	0.11		mg N/L	P339187	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.1		mg N/L	P338907	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.021		mg N/L	P339034	
	EPA 365.1 Rev. 2.0	Total-P	0.018		mg P/L	P339028	
	SM 5310 B-00	Organic Carbon	15		mg C/L	P339237	
1962480	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P338885	
1962493	EPA 200.7 Rev. 4.4	Calcium	31.0		mg/L	P339027	
		Iron	31	I	ug/L	P339027	
		Magnesium	6.85		mg/L	P339027	
		Potassium	3.2		mg/L	P339027	
		Sodium	11.0		mg/L	P339027	
	EPA 200.8 Rev. 5.4	Zinc	5.0	U	ug/L	P339027	
		Arsenic	1.26		ug/L	P339027	
		Cadmium	0.020	U	ug/L	P339027	
		Chromium	0.40	U	ug/L	P339027	
		Copper	0.22	I	ug/L	P339027	
		Lead	0.11	I	ug/L	P339027	
		Nickel	0.20	U	ug/L	P339027	
		Silver	0.010	U	ug/L	P339027	

Ref. Method and Comment:

SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.

Sample Location: LITTLE LAKE HARRIS @ 2500M S OF CENTER

Collection Date/Time: 01/25/2018 10:52

Field ID: G1CE0098

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1962473	EPA 180.1 Rev. 2.0	Turbidity	1.8		NTU	P338891	
	EPA 300.0 Rev. 2.1	Chloride	20		mg Cl/L	P339113	
		Sulfate	6.8		mg SO4/L	P339111	
	SM 2120 B	Color (true)	42		PCU	P338887	
	SM 2320 B-97	Total Alkalinity	86		mg CaCO3/L	P339302	
	SM 2540 C-97	TDS	159		mg/L	P339396	
	SM 2540 D-97	TSS	4	I	mg/L	P339383	
	SM 4500 F-C-97	Fluoride	0.12		mg F/L	P339305	
1962477	EPA 350.1 Rev. 2.0	Ammonia-N	0.12		mg N/L	P339187	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.1		mg N/L	P338907	

Field ID: G1CE0098

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1962477	EPA 353.2 Rev. 2.0	NO2NO3-N	0.025		mg N/L	P339034	
	EPA 365.1 Rev. 2.0	Total-P	0.018		mg P/L	P339028	
	SM 5310 B-00	Organic Carbon	15		mg C/L	P339237	
1962481	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P338885	
1962494	EPA 200.7 Rev. 4.4	Calcium	31.2		mg/L	P339027	
		Iron	31	I	ug/L	P339027	
		Magnesium	6.93		mg/L	P339027	
		Potassium	3.1		mg/L	P339027	
		Sodium	10.9		mg/L	P339027	
		Zinc	5.0	U	ug/L	P339027	
	EPA 200.8 Rev. 5.4	Arsenic	1.25		ug/L	P339027	
		Cadmium	0.020	U	ug/L	P339027	
		Chromium	0.40	U	ug/L	P339027	
		Copper	0.22	I	ug/L	P339027	
		Lead	0.12	I	ug/L	P339027	
		Nickel	0.20	U	ug/L	P339027	
		Silver	0.010	U	ug/L	P339027	

Ref. Method and Comment:

SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.

Sample Location: LITTLE LAKE HARRIS @ 1000M SW OF CENTER

Collection Date/Time: 01/25/2018 11:03

Field ID: G1CE0096

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1962474	EPA 180.1 Rev. 2.0	Turbidity	1.8		NTU	P338891	
	EPA 300.0 Rev. 2.1	Chloride	21		mg Cl/L	P339113	
		Sulfate	6.8		mg SO4/L	P339111	
		Color (true)	40		PCU	P338887	
	SM 2320 B-97	Total Alkalinity	86	A	mg CaCO3/L	P339303	
	SM 2540 C-97	TDS	150		mg/L	P339396	
	SM 2540 D-97	TSS	4	I	mg/L	P339383	
	SM 4500 F-C-97	Fluoride	0.13		mg F/L	P339307	
	EPA 350.1 Rev. 2.0	Ammonia-N	0.12		mg N/L	P339187	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.1		mg N/L	P338907	
1962482	EPA 353.2 Rev. 2.0	NO2NO3-N	0.022		mg N/L	P339034	
	EPA 365.1 Rev. 2.0	Total-P	0.019		mg P/L	P339028	
	SM 5310 B-00	Organic Carbon	15		mg C/L	P339238	
	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P338885	
	EPA 200.7 Rev. 4.4	Calcium	30.9		mg/L	P339027	
		Iron	33	I	ug/L	P339027	
		Magnesium	6.86		mg/L	P339027	
		Potassium	3.2		mg/L	P339027	
		Sodium	11.0		mg/L	P339027	
		Zinc	5.0	U	ug/L	P339027	

Field ID: G1CE0096

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1962495	EPA 200.8 Rev. 5.4	Arsenic	1.23		ug/L	P339027	
		Cadmium	0.020	U	ug/L	P339027	
		Chromium	0.40	U	ug/L	P339027	
		Copper	0.24	I	ug/L	P339027	
		Lead	0.12	I	ug/L	P339027	
		Nickel	0.20	U	ug/L	P339027	
		Silver	0.010	U	ug/L	P339027	

Ref. Method and Comment:

SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.

Sample Location: LITTLE LAKE HARRIS @ 1000M SE OF CENTER

Collection Date/Time: 01/25/2018 11:12

Field ID: G1CE0097

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1962475	EPA 180.1 Rev. 2.0	Turbidity	2.6		NTU	P338891	
	EPA 300.0 Rev. 2.1	Chloride	21		mg Cl/L	P339113	
		Sulfate	6.7		mg SO4/L	P339111	
	SM 2120 B	Color (true)	41	A	PCU	P338888	
	SM 2320 B-97	Total Alkalinity	86		mg CaCO3/L	P339303	
	SM 2540 C-97	TDS	157		mg/L	P339396	
	SM 2540 D-97	TSS	4	I	mg/L	P339383	
	SM 4500 F-C-97	Fluoride	0.13		mg F/L	P339307	
1962479	EPA 350.1 Rev. 2.0	Ammonia-N	0.12		mg N/L	P339187	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.1		mg N/L	P338907	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.023		mg N/L	P339034	
	EPA 365.1 Rev. 2.0	Total-P	0.016		mg P/L	P339028	
	SM 5310 B-00	Organic Carbon	15		mg C/L	P339238	
1962483	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P338885	
1962496	EPA 200.7 Rev. 4.4	Calcium	30.7		mg/L	P339027	
		Iron	30	U	ug/L	P339027	
		Magnesium	6.83		mg/L	P339027	
		Potassium	3.1		mg/L	P339027	
		Sodium	10.8		mg/L	P339027	
		Zinc	5.0	U	ug/L	P339027	
	EPA 200.8 Rev. 5.4	Arsenic	1.23		ug/L	P339027	
		Cadmium	0.020	U	ug/L	P339027	
		Chromium	0.40	U	ug/L	P339027	
		Copper	0.24	I	ug/L	P339027	
		Lead	0.10	I	ug/L	P339027	
		Nickel	0.20	U	ug/L	P339027	
		Silver	0.010	U	ug/L	P339027	

Ref. Method and Comment:

SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.

Sample Location: DOUBLE RUN @ 800M DS OF DOUBLE RUN RD.

Collection Date/Time: 01/25/2018 10:41

Field ID: G1CE0032

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1962484	EPA 180.1 Rev. 2.0	Turbidity	0.95		NTU	P338891	
	EPA 300.0 Rev. 2.1	Chloride	12		mg Cl/L	P339113	
		Sulfate	7.6		mg SO4/L	P339111	
	SM 2120 B	Color (true)	110		PCU	P338888	
	SM 2320 B-97	Total Alkalinity	66		mg CaCO3/L	P339303	
	SM 2540 C-97	TDS	126		mg/L	P339396	
	SM 2540 D-97	TSS	2	I	mg/L	P339383	
	SM 4500 F-C-97	Fluoride	0.078	I	mg F/L	P339307	
1962485	EPA 350.1 Rev. 2.0	Ammonia-N	0.024		mg N/L	P339187	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.61		mg N/L	P338907	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.18		mg N/L	P339034	
	EPA 365.1 Rev. 2.0	Total-P	0.018		mg P/L	P339028	
	SM 5310 B-00	Organic Carbon	14		mg C/L	P339238	
1962486	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.006	I	mg P/L	P338885	
1962497	EPA 200.7 Rev. 4.4	Calcium	21.3		mg/L	P339027	
		Iron	93	I	ug/L	P339027	
		Magnesium	7.93		mg/L	P339027	
		Potassium	1.8		mg/L	P339027	
		Sodium	5.6		mg/L	P339027	
		Zinc	5.0	U	ug/L	P339027	
	EPA 200.8 Rev. 5.4	Arsenic	0.44		ug/L	P339027	
		Cadmium	0.020	U	ug/L	P339027	
		Chromium	0.42	I	ug/L	P339027	
		Copper	0.20	U	ug/L	P339027	
		Lead	0.050	U	ug/L	P339027	
		Nickel	0.20	U	ug/L	P339027	
		Silver	0.010	U	ug/L	P339027	

Ref. Method and Comment:

SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.

Quality Assurance Report

Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0

Batch ID: P338891

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P339027

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

Quality Assurance Report Method Blank Results

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P339027

Component	Result	Code	Units
Arsenic	0.050	U	ug/L
Cadmium	0.020	U	ug/L
Chromium	0.40	U	ug/L
Copper	0.20	U	ug/L
Lead	0.050	U	ug/L
Nickel	0.20	U	ug/L
Silver	0.010	U	ug/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P339111

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P339113

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P339187

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P338907

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P339034

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P339028

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P338885

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

Quality Assurance Report

Method Blank Results

Reference Method: SM 2120 B
Batch ID: P338887

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2120 B
Batch ID: P338888

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-97
Batch ID: P339302

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

Reference Method: SM 2320 B-97
Batch ID: P339303

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

Reference Method: SM 2540 C-97
Batch ID: P339396

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P339383

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P339305

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 4500 F-C-97
Batch ID: P339307

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P339237

Component	Result	Code	Units
Organic Carbon	0.50	U	mg C/L

Quality Assurance Report Method Blank Results

Reference Method: SM 5310 B-00
Batch ID: P339238

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: P339027

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	101		P	85 - 115
Iron	102		P	85 - 115
Magnesium	101		P	85 - 115
Potassium	100		P	85 - 115
Sodium	98.2		P	85 - 115
Zinc	99.0		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P339027

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Arsenic	103		P	85 - 115
Cadmium	98.6		P	85 - 115
Chromium	99.3		P	85 - 115
Copper	97.4		P	85 - 115
Lead	103		P	85 - 115
Nickel	100		P	85 - 115
Silver	97.1		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P339111

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P339113

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P339187

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P338907

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

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P339034

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	103		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P339028

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P338885

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	96.5		P	90 - 110

Reference Method: SM 2320 B-97
Batch ID: P339302

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	97.4		P	95 - 108

Reference Method: SM 2320 B-97
Batch ID: P339303

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	100		P	95 - 108

Reference Method: SM 4500 F-C-97
Batch ID: P339305

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	94.3		P	92 - 103

Reference Method: SM 4500 F-C-97
Batch ID: P339307

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	97.5		P	92 - 103

Reference Method: SM 5310 B-00
Batch ID: P339237

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	95.6		P	85 - 115

Reference Method: SM 5310 B-00
Batch ID: P339238

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	94.8		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
 Batch ID: P339027

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1962497	Calcium	99.5		P	80 - 120
1962497	Iron	107	105	P/P	80 - 120
1962497	Magnesium	99.8		P	80 - 120
1962497	Potassium	102	100	P/P	80 - 120
1962497	Sodium	99.1		P	80 - 120
1962497	Zinc	102	101	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
 Batch ID: P339027

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1962497	Arsenic	104	105	P/P	80 - 120
1962497	Cadmium	102	102	P/P	80 - 120
1962497	Chromium	98.4	100	P/P	80 - 120
1962497	Copper	97.7	99.4	P/P	80 - 120
1962497	Lead	106	106	P/P	80 - 120
1962497	Nickel	100	101	P/P	80 - 120
1962497	Silver	98.2	97.9	P/P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
 Batch ID: P339111

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1962383	Sulfate	93.3		P	90 - 110
1962427	Sulfate	94.7		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
 Batch ID: P339113

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1962383	Chloride	95.2		P	90 - 110
1962427	Chloride	95.1		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
 Batch ID: P339187

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1962434	Ammonia-N	99.6	99.6	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
 Batch ID: P338907

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1962434	Kjeldahl Nitrogen	108	108	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
 Batch ID: P339034

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1962433	NO2NO3-N	101	101	P/P	90 - 110

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P339028

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1962476	Total-P	102	102	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P338885

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1962437	O-Phosphate-P	95.5	96.4	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Batch ID: P339305

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1962381	Fluoride	95.6	97.1	P/P	91 - 105

Reference Method: SM 4500 F-C-97
Batch ID: P339307

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1962474	Fluoride	96.9	96.9	P/P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P339237

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1962386	Organic Carbon	98.6	99.0	P/P	85 - 115

Reference Method: SM 5310 B-00
Batch ID: P339238

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1962478	Organic Carbon	100	96.0	P/P	85 - 115

Quality Assurance Report Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P338891

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1962443	Turbidity	2.82	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P339027

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1962497	Calcium	0.497	Spike	P	0 - 20
1962497	Iron	1.48	Spike	P	0 - 20
1962497	Magnesium	1.00	Spike	P	0 - 20
1962497	Potassium	1.47	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P339027

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1962497	Sodium	0.547	Spike	P	0 - 20
1962497	Zinc	1.32	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P339027

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1962497	Arsenic	1.06	Spike	P	0 - 20
1962497	Cadmium	0.358	Spike	P	0 - 20
1962497	Chromium	1.63	Spike	P	0 - 20
1962497	Copper	1.71	Spike	P	0 - 20
1962497	Lead	0.370	Spike	P	0 - 20
1962497	Nickel	1.23	Spike	P	0 - 20
1962497	Silver	0.249	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P339111

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1962427	Sulfate	1.04	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P339113

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1962427	Chloride	0.967	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P339187

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1962434	Ammonia-N	0.00345	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P338907

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1962434	Kjeldahl Nitrogen	0.381	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P339034

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1962433	NO2NO3-N	0.0	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P339028

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1962476	Total-P	0.683	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P338885

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1962437	O-Phosphate-P	0.938	Spike	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P338887

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1962427	Color (true)	0.404	Sample	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P338888

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1962475	Color (true)	0.0821	Sample	P	0 - 20

Reference Method: SM 2320 B-97
Batch ID: P339302

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1962381	Total Alkalinity	0.209	Sample	P	0 - 4.8

Reference Method: SM 2320 B-97
Batch ID: P339303

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1962474	Total Alkalinity	0.147	Sample	P	0 - 4.8

Reference Method: SM 2540 C-97
Batch ID: P339396

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1962444	TDS	8.16	Sample	P	0 - 10

Reference Method: SM 4500 F-C-97
Batch ID: P339305

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1962381	Fluoride	0.993	Spike	P	0 - 3.0

Quality Assurance Report Precision

Reference Method: SM 4500 F-C-97
Batch ID: P339307

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1962474	Fluoride	0.0	Spike	P	0 - 3.0

Reference Method: SM 5310 B-00
Batch ID: P339237

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1962386	Organic Carbon	0.304	Spike	P	0 - 20

Reference Method: SM 5310 B-00
Batch ID: P339238

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1962478	Organic Carbon	2.30	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 365.1 Rev. 2.0 dissolved
Run ID: A81678
Included Lab Sample IDs: 1962480, 1962481, 1962482, 1962483, 1962486

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.1	99.5	P/P	90 - 110
O-Phosphate-P	99.5	98.2	P/P	90 - 110

Reference Method: SM 2120 B
Run ID: A81679
Included Lab Sample IDs: 1962472, 1962473, 1962474, 1962475, 1962484

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	104	105	P/P	85 - 115
Color (true)	105	104	P/P	85 - 115

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A81680
Included Lab Sample IDs: 1962472, 1962473, 1962474, 1962475, 1962484

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

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A81735
Included Lab Sample IDs: 1962476, 1962477, 1962478, 1962479, 1962485

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

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A81735

Included Lab Sample IDs: 1962476, 1962477, 1962478, 1962479, 1962485

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	98.8	98.5	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A81760

Included Lab Sample IDs: 1962476, 1962477, 1962478, 1962479, 1962485

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	104	103	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A81771

Included Lab Sample IDs: 1962493, 1962494, 1962495, 1962496, 1962497

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	97.0	97.3	P/P	90 - 110
Calcium	97.1	97.0	P/P	90 - 110
Iron	98.1	98.8	P/P	90 - 110
Iron	98.8	98.8	P/P	90 - 110
Magnesium	98.0	98.3	P/P	90 - 110
Magnesium	98.3	98.5	P/P	90 - 110
Potassium	95.4	95.5	P/P	90 - 110
Potassium	96.1	95.4	P/P	90 - 110
Sodium	96.2	96.9	P/P	90 - 110
Sodium	96.9	96.5	P/P	90 - 110
Zinc	101	100	P/P	90 - 110
Zinc	99.1	101	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1

Run ID: A81775

Included Lab Sample IDs: 1962472, 1962473, 1962474, 1962475, 1962484

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	101	100	P/P	90 - 110
Chloride	101	101	P/P	90 - 110
Sulfate	101	99.7	P/P	90 - 110
Sulfate	99.8	101	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A81788

Included Lab Sample IDs: 1962476, 1962477, 1962478, 1962479, 1962485

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

Reference Method: SM 5310 B-00

Run ID: A81820

Included Lab Sample IDs: 1962476, 1962477, 1962478, 1962479, 1962485

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	98.2	98.8	P/P	90 - 110
Organic Carbon	98.8	99.2	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A81837

Included Lab Sample IDs: 1962476, 1962477, 1962478, 1962479, 1962485

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	102	103	P/P	90 - 110
Ammonia-N	103	101	P/P	90 - 110

Reference Method: SM 2320 B-97

Run ID: A81839

Included Lab Sample IDs: 1962472, 1962473, 1962474, 1962475, 1962484

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	96.3	97.9	P/P	90 - 110

Reference Method: SM 4500 F-C-97

Run ID: A81839

Included Lab Sample IDs: 1962472, 1962473, 1962474, 1962475, 1962484

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

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A81845

Included Lab Sample IDs: 1962493, 1962494, 1962495, 1962496, 1962497

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	102	102	P/P	90 - 110
Arsenic	102	102	P/P	90 - 110
Cadmium	98.9	99.4	P/P	90 - 110
Cadmium	99.4	100	P/P	90 - 110
Chromium	98.6	100	P/P	90 - 110
Chromium	98.9	98.6	P/P	90 - 110
Copper	100	98.9	P/P	90 - 110
Copper	98.9	99.4	P/P	90 - 110
Lead	103	105	P/P	90 - 110
Lead	104	103	P/P	90 - 110
Nickel	100	99.3	P/P	90 - 110
Nickel	99.3	99.3	P/P	90 - 110
Silver	98.0	98.3	P/P	90 - 110
Silver	98.3	99.4	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	LCS	Precision SMP	MS
EPA 180.1 Rev. 2.0	Turbidity				2.82	
EPA 200.7 Rev. 4.4	Calcium	101	99.5			0.497
	Iron	102	107	105		1.48
	Magnesium	101	99.8			1.00

Quality Assurance Report Summary

Ref. Method	Analyte	LCS % Recovery	MS % Recovery		Precision	
					LCS	MS
EPA 200.7 Rev. 4.4	Potassium	100	102	100		1.47
	Sodium	98.2	99.1			0.547
	Zinc	99.0	102	101		1.32
EPA 200.8 Rev. 5.4	Arsenic	103	104	105		1.06
	Cadmium	98.6	102	102		0.358
	Chromium	99.3	98.4	100		1.63
	Copper	97.4	97.7	99.4		1.71
	Lead	103	106	106		0.370
	Nickel	100	100	101		1.23
	Silver	97.1	98.2	97.9		0.249
EPA 300.0 Rev. 2.1	Chloride	99.8	95.1	95.2	0.967	
	Sulfate	98.5	94.7	93.3	1.04	
EPA 350.1 Rev. 2.0	Ammonia-N	102	99.6	99.6		0.0034
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	100	108	108		0.381
EPA 353.2 Rev. 2.0	NO2NO3-N	103	101	101		0.0
EPA 365.1 Rev. 2.0	Total-P	102	102	102		0.683
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	96.5	95.5	96.4		0.938
SM 2120 B	Color (true)				0.404	
	Color (true)				0.0821	
SM 2320 B-97	Total Alkalinity	97.4			0.209	
	Total Alkalinity	100			0.147	
SM 2540 C-97	TDS				8.16	
SM 4500 F-C-97	Fluoride	94.3	95.6	97.1		0.993
	Fluoride	97.5	96.9	96.9		0.0
SM 5310 B-00	Organic Carbon	95.6	98.6	99.0		0.304
	Organic Carbon	94.8	100	96.0		2.30

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	1962472, 1962473, 1962474, 1962475, 1962484
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	1962493, 1962494, 1962495, 1962496, 1962497
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	1962493, 1962494, 1962495, 1962496, 1962497
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	1962472, 1962473, 1962474, 1962475, 1962484
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	1962472, 1962473, 1962474, 1962475, 1962484
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	1962476, 1962477, 1962478, 1962479, 1962485
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	1962476, 1962477, 1962478, 1962479, 1962485
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	1962476, 1962477, 1962478, 1962479, 1962485
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	1962476, 1962477, 1962478, 1962479, 1962485
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	1962480, 1962481, 1962482, 1962483, 1962486
SM 2120 B / E31780	True Color measured at 450 nm	1962472, 1962473, 1962474, 1962475, 1962484
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO3/L	1962472, 1962473, 1962474, 1962475, 1962484
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	1962472, 1962473, 1962474, 1962475, 1962484

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices	1962472, 1962473, 1962474, 1962475, 1962484
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	1962472, 1962473, 1962474, 1962475, 1962484
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	1962476, 1962477, 1962478, 1962479, 1962485

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	01/26/2018			01/26/2018 15:09	Tanya Welborn	1962472, 1962473, 1962474, 1962475, 1962484
EPA 200.7 Rev. 4.4	01/26/2018	01/30/2018	Elliott D. Healy	01/31/2018	Betina Topolski	1962493, 1962494, 1962495, 1962496, 1962497
EPA 200.8 Rev. 5.4	01/26/2018	01/30/2018	Elliott D. Healy	02/02/2018	Nadine Brooks	1962493, 1962494, 1962495, 1962496, 1962497
EPA 300.0 Rev. 2.1	01/26/2018			01/31/2018	Julia Storbeck	1962472, 1962473, 1962474, 1962475, 1962484
EPA 350.1 Rev. 2.0	01/26/2018			02/01/2018	Ping Hua	1962476, 1962477, 1962478, 1962479, 1962485
EPA 351.2 Rev. 2.0	01/26/2018	01/29/2018	Adrian Shelby	01/30/2018	Joseph Suarez	1962476, 1962477, 1962478, 1962479, 1962485
EPA 353.2 Rev. 2.0	01/26/2018			01/30/2018	Lauren Bottorf	1962476, 1962477, 1962478, 1962479, 1962485
EPA 365.1 Rev. 2.0	01/26/2018	01/30/2018	Sima Feizi	01/31/2018	Lipi Saha	1962476, 1962477, 1962478, 1962479, 1962485
EPA 365.1 Rev. 2.0 dissolved	01/26/2018			01/26/2018 15:40	Megan Treadwell	1962480
	01/26/2018			01/26/2018 15:41	Megan Treadwell	1962481
	01/26/2018			01/26/2018 15:46	Megan Treadwell	1962482
	01/26/2018			01/26/2018 15:47	Megan Treadwell	1962483
	01/26/2018			01/26/2018 15:48	Megan Treadwell	1962486
SM 2120 B	01/26/2018			01/26/2018 16:19	Tanya Welborn	1962472, 1962473
	01/26/2018			01/26/2018 16:20	Tanya Welborn	1962474
	01/26/2018			01/26/2018 16:24	Tanya Welborn	1962475
	01/26/2018			01/26/2018 16:25	Tanya Welborn	1962484
SM 2320 B-97	01/26/2018			02/03/2018	Dale L. Simmons	1962472, 1962473, 1962474, 1962475, 1962484
SM 2540 C-97	01/26/2018			01/31/2018	Yijie Li	1962472, 1962473, 1962474, 1962475, 1962484
SM 2540 D-97	01/26/2018			01/31/2018	Yijie Li	1962472, 1962473, 1962474, 1962475, 1962484
SM 4500 F-C-97	01/26/2018			02/03/2018	Dale L. Simmons	1962472, 1962473, 1962474, 1962475, 1962484
SM 5310 B-00	01/26/2018			02/01/2018	Megan Treadwell	1962476, 1962477, 1962478
	01/26/2018			02/02/2018	Megan Treadwell	1962479, 1962485