



December 12, 2017

Vista Work Order No. 1701702

Mr. Patrick Williford
Great Lakes Water Authority
10100 E. Jefferson Avenue
Detroit, MI 48214

Dear Mr. Williford,

Enclosed are the results for the sample set received at Vista Analytical Laboratory on November 15, 2017. This sample set was analyzed on a standard turn-around time, under your Project Name 'GLWA - PFAS'.

Vista Analytical Laboratory is committed to serving you effectively. If you require additional information, please contact me at 916-673-1520 or by email at mmaier@vista-analytical.com.

Thank you for choosing Vista as part of your analytical support team.

Sincerely,

Karen J. Volpendesta
for

Martha Maier
Laboratory Director



Vista Analytical Laboratory certifies that the report herein meets all the requirements set forth by NELAP for those applicable test methods. Results relate only to the samples as received by the laboratory. This report should not be reproduced except in full without the written approval of Vista.

Vista Work Order No. 1701702**Case Narrative****Sample Condition on Receipt:**

Four drinking water and two surface water samples were received in good condition and within the method temperature requirements. The samples were received and stored securely in accordance with Vista standard operating procedures and EPA methodology.

Analytical Notes:**Modified EPA Method 537**

The samples were extracted and analyzed for a selected list of PFAS using Modified EPA Method 537. The results for PFHxS, PFOA and PFOS include both linear and branched isomers. Results for all other analytes include the linear isomers only.

Holding Times

The samples were extracted and analyzed within the method hold times.

Quality Control

The Initial Calibration and Continuing Calibration Verifications met the acceptance criteria.

A Method Blank and Ongoing Precision and Recovery (OPR) sample were extracted and analyzed with the preparation batch. No analytes were detected in the Method Blank above the Reporting Limit. The recovery of PFDA was 144% in the OPR; this analyte was not detected in the samples. The recoveries of all other analytes were within the method acceptance criteria.

The recoveries of all internal standards in the QC and field samples were within the acceptance criteria.

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Sample Inventory Report

Vista Sample ID	Client Sample ID	Sampled	Received	Components/Containers
1701702-01	WWP-TAP	13-Nov-17 13:43	15-Nov-17 09:30	HDPE Bottle, 250 mL
1701702-02	BI-RAW	13-Nov-17 08:25	15-Nov-17 09:30	HDPE Bottle, 250 mL
1701702-03	SPW-TAP	13-Nov-17 09:20	15-Nov-17 09:30	HDPE Bottle, 250 mL
1701702-04	SW-TAP	13-Nov-17 14:57	15-Nov-17 09:30	HDPE Bottle, 250 mL
1701702-05	SW-RAW	13-Nov-17 15:03	15-Nov-17 09:30	HDPE Bottle, 250 mL
1701702-06	NE-TAP	13-Nov-17 08:23	15-Nov-17 09:30	HDPE Bottle, 250 mL

ANALYTICAL RESULTS

Sample ID: Method Blank					Modified EPA Method 537					
Client Data Name: Great Lakes Water Authority Project: GLWA - PFAS Matrix: Aqueous				Laboratory Data Lab Sample: B7K0135-BLK1 Column: BEH C18						
Analyte	Conc. (ng/L)			RL	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	ND			2.00		B7K0135	21-Nov-17	0.250 L	08-Dec-17 02:49	1
PFHxA	ND			2.00		B7K0135	21-Nov-17	0.250 L	08-Dec-17 02:49	1
PFHpA	ND			2.00		B7K0135	21-Nov-17	0.250 L	08-Dec-17 02:49	1
PFHxS	ND			2.00		B7K0135	21-Nov-17	0.250 L	08-Dec-17 02:49	1
PFOA	ND			2.00		B7K0135	21-Nov-17	0.250 L	08-Dec-17 02:49	1
PFOS	ND			2.00		B7K0135	21-Nov-17	0.250 L	08-Dec-17 02:49	1
PFNA	ND			2.00		B7K0135	21-Nov-17	0.250 L	08-Dec-17 02:49	1
PFDA	ND			2.00		B7K0135	21-Nov-17	0.250 L	08-Dec-17 02:49	1
MeFOSAA	ND			2.00		B7K0135	21-Nov-17	0.250 L	08-Dec-17 02:49	1
PFUnA	ND			2.00		B7K0135	21-Nov-17	0.250 L	08-Dec-17 02:49	1
EtFOSAA	ND			2.00		B7K0135	21-Nov-17	0.250 L	08-Dec-17 02:49	1
PFDaA	ND			2.00		B7K0135	21-Nov-17	0.250 L	08-Dec-17 02:49	1
PFTDA	ND			2.00		B7K0135	21-Nov-17	0.250 L	08-Dec-17 02:49	1
PFTeDA	ND			2.00		B7K0135	21-Nov-17	0.250 L	08-Dec-17 02:49	1
Labeled Standards	Type	% Recovery		Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	95.6		60 - 150		B7K0135	21-Nov-17	0.250 L	08-Dec-17 02:49	1
13C2-PFHxA	IS	92.0		70 - 130		B7K0135	21-Nov-17	0.250 L	08-Dec-17 02:49	1
13C4-PFHpA	IS	80.8		60 - 150		B7K0135	21-Nov-17	0.250 L	08-Dec-17 02:49	1
18O2-PFHxS	IS	90.6		60 - 130		B7K0135	21-Nov-17	0.250 L	08-Dec-17 02:49	1
13C2-PFOA	IS	91.6		60 - 130		B7K0135	21-Nov-17	0.250 L	08-Dec-17 02:49	1
13C8-PFOS	IS	93.6		60 - 130		B7K0135	21-Nov-17	0.250 L	08-Dec-17 02:49	1
13C5-PFNA	IS	81.9		50 - 130		B7K0135	21-Nov-17	0.250 L	08-Dec-17 02:49	1
13C2-PFDA	IS	78.1		60 - 130		B7K0135	21-Nov-17	0.250 L	08-Dec-17 02:49	1
d3-MeFOSAA	IS	84.5		50 - 150		B7K0135	21-Nov-17	0.250 L	08-Dec-17 02:49	1
13C2-PFUnA	IS	81.6		60 - 130		B7K0135	21-Nov-17	0.250 L	08-Dec-17 02:49	1
d5-EtFOSAA	IS	66.7		50 - 150		B7K0135	21-Nov-17	0.250 L	08-Dec-17 02:49	1
13C2-PFDaA	IS	80.8		30 - 130		B7K0135	21-Nov-17	0.250 L	08-Dec-17 02:49	1
13C2-PFTeDA	IS	100		20 - 150		B7K0135	21-Nov-17	0.250 L	08-Dec-17 02:49	1

RL - Reporting limit

LCL-UCL- Lower control limit - upper control limit
Results reported to RL.

When reported, PFHxS, PFOA and PFOS include both linear and branched isomers.
Only the linear isomer is reported for all other analytes.

Sample ID: OPR					Modified EPA Method 537					
Client Data Name: Great Lakes Water Authority Project: GLWA - PFAS					Laboratory Data Lab Sample: B7K0135-BS1 Column: BEH C18					
Analyte	Amt Found (ng/L)	Spike Amt	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	44.5	40.0	111	70-130		B7K0135	21-Nov-17	0.250 L	08-Dec-17 02:27	1
PFHxA	39.7	40.0	99.1	70-130		B7K0135	21-Nov-17	0.250 L	08-Dec-17 02:27	1
PFHpA	43.8	40.0	109	70-130		B7K0135	21-Nov-17	0.250 L	08-Dec-17 02:27	1
PFHxS	43.1	40.0	108	70-130		B7K0135	21-Nov-17	0.250 L	08-Dec-17 02:27	1
PFOA	38.0	40.0	95.1	70-130		B7K0135	21-Nov-17	0.250 L	08-Dec-17 02:27	1
PFOS	50.9	40.0	127	70-130		B7K0135	21-Nov-17	0.250 L	08-Dec-17 02:27	1
PFNA	44.3	40.0	111	70-130		B7K0135	21-Nov-17	0.250 L	08-Dec-17 02:27	1
PFDA	57.6	40.0	144	70-130	H	B7K0135	21-Nov-17	0.250 L	08-Dec-17 02:27	1
MeFOSAA	39.1	40.0	97.8	70-130		B7K0135	21-Nov-17	0.250 L	08-Dec-17 02:27	1
PFUnA	39.1	40.0	97.6	70-130		B7K0135	21-Nov-17	0.250 L	08-Dec-17 02:27	1
EtFOSAA	44.5	40.0	111	70-130		B7K0135	21-Nov-17	0.250 L	08-Dec-17 02:27	1
PFDaA	36.2	40.0	90.4	70-130		B7K0135	21-Nov-17	0.250 L	08-Dec-17 02:27	1
PFTTrDA	41.6	40.0	104	60-130		B7K0135	21-Nov-17	0.250 L	08-Dec-17 02:27	1
PFTeDA	49.5	40.0	124	70-130		B7K0135	21-Nov-17	0.250 L	08-Dec-17 02:27	1
Labeled Standards	Type		% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS		89.3	60- 150		B7K0135	21-Nov-17	0.250 L	08-Dec-17 02:27	1
13C2-PFHxA	IS		85.5	70- 130		B7K0135	21-Nov-17	0.250 L	08-Dec-17 02:27	1
13C4-PFHpA	IS		85.7	60- 150		B7K0135	21-Nov-17	0.250 L	08-Dec-17 02:27	1
18O2-PFHxS	IS		88.5	60- 130		B7K0135	21-Nov-17	0.250 L	08-Dec-17 02:27	1
13C2-PFOA	IS		105	60- 130		B7K0135	21-Nov-17	0.250 L	08-Dec-17 02:27	1
13C8-PFOS	IS		85.4	60- 130		B7K0135	21-Nov-17	0.250 L	08-Dec-17 02:27	1
13C5-PFNA	IS		79.9	50- 130		B7K0135	21-Nov-17	0.250 L	08-Dec-17 02:27	1
13C2-PFDA	IS		61.4	60- 130		B7K0135	21-Nov-17	0.250 L	08-Dec-17 02:27	1
d3-MeFOSAA	IS		73.8	50- 150		B7K0135	21-Nov-17	0.250 L	08-Dec-17 02:27	1
13C2-PFUnA	IS		79.5	60- 130		B7K0135	21-Nov-17	0.250 L	08-Dec-17 02:27	1
d5-EtFOSAA	IS		74.1	50- 150		B7K0135	21-Nov-17	0.250 L	08-Dec-17 02:27	1
13C2-PFDaA	IS		79.1	30- 130		B7K0135	21-Nov-17	0.250 L	08-Dec-17 02:27	1
13C2-PFTeDA	IS		77.5	20- 150		B7K0135	21-Nov-17	0.250 L	08-Dec-17 02:27	1

Sample ID: WWP-TAP						Modified EPA Method 537				
Client Data Name: Great Lakes Water Authority Project: GLWA - PFAS Location: Water Works Park WTP TAP						Laboratory Data Lab Sample: 1701702-01 Date Received: 15-Nov-17 09:30 Column: BEH C18				
Analyte	Conc. (ng/L)	RL	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution		
PFBS	ND	2.31		B7K0135	21-Nov-17	0.216 L	03-Dec-17 22:46	1		
PFHxA	ND	2.31		B7K0135	21-Nov-17	0.216 L	03-Dec-17 22:46	1		
PFHpA	ND	2.31		B7K0135	21-Nov-17	0.216 L	03-Dec-17 22:46	1		
PFHxS	ND	2.31		B7K0135	21-Nov-17	0.216 L	03-Dec-17 22:46	1		
PFOA	ND	2.31		B7K0135	21-Nov-17	0.216 L	03-Dec-17 22:46	1		
PFOS	ND	2.31		B7K0135	21-Nov-17	0.216 L	03-Dec-17 22:46	1		
PFNA	ND	2.31		B7K0135	21-Nov-17	0.216 L	03-Dec-17 22:46	1		
PFDA	ND	2.31		B7K0135	21-Nov-17	0.216 L	08-Dec-17 03:00	1		
MeFOSAA	ND	2.31		B7K0135	21-Nov-17	0.216 L	03-Dec-17 22:46	1		
PFUnA	ND	2.31		B7K0135	21-Nov-17	0.216 L	03-Dec-17 22:46	1		
EtFOSAA	ND	2.31		B7K0135	21-Nov-17	0.216 L	03-Dec-17 22:46	1		
PFDaA	ND	2.31		B7K0135	21-Nov-17	0.216 L	03-Dec-17 22:46	1		
PFTDA	ND	2.31		B7K0135	21-Nov-17	0.216 L	03-Dec-17 22:46	1		
PFTeDA	ND	2.31		B7K0135	21-Nov-17	0.216 L	08-Dec-17 03:00	1		
Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
13C3-PFBS	IS	98.6	60 - 150		B7K0135	21-Nov-17	0.216 L	03-Dec-17 22:46	1	
13C2-PFHxA	IS	94.1	70 - 130		B7K0135	21-Nov-17	0.216 L	03-Dec-17 22:46	1	
13C4-PFHpA	IS	90.2	60 - 150		B7K0135	21-Nov-17	0.216 L	03-Dec-17 22:46	1	
18O2-PFHxS	IS	104	60 - 130		B7K0135	21-Nov-17	0.216 L	03-Dec-17 22:46	1	
13C2-PFOA	IS	101	60 - 130		B7K0135	21-Nov-17	0.216 L	03-Dec-17 22:46	1	
13C8-PFOS	IS	112	60 - 130		B7K0135	21-Nov-17	0.216 L	03-Dec-17 22:46	1	
13C5-PFNA	IS	88.4	50 - 130		B7K0135	21-Nov-17	0.216 L	03-Dec-17 22:46	1	
13C2-PFDA	IS	121	60 - 130		B7K0135	21-Nov-17	0.216 L	08-Dec-17 03:00	1	
d3-MeFOSAA	IS	72.4	50 - 150		B7K0135	21-Nov-17	0.216 L	03-Dec-17 22:46	1	
13C2-PFUnA	IS	70.2	60 - 130		B7K0135	21-Nov-17	0.216 L	03-Dec-17 22:46	1	
d5-EtFOSAA	IS	77.2	50 - 150		B7K0135	21-Nov-17	0.216 L	03-Dec-17 22:46	1	
13C2-PFDaA	IS	88.2	30 - 130		B7K0135	21-Nov-17	0.216 L	03-Dec-17 22:46	1	
13C2-PFTeDA	IS	81.4	20 - 150		B7K0135	21-Nov-17	0.216 L	08-Dec-17 03:00	1	

RL - Reporting limit

LCL-UCL- Lower control limit - upper control limit
Results reported to RL.

When reported, PFHxS, PFOA and PFOS include both linear and branched isomers.
Only the linear isomer is reported for all other analytes.

Sample ID: BI-RAW					Modified EPA Method 537				
Client Data Name: Great Lakes Water Authority Project: GLWA - PFAS Location: Belle Isle Intake RAW					Laboratory Data Lab Sample: 1701702-02 Date Received: 15-Nov-17 09:30 Column: BEH C18				
Matrix: Surface Water Date Collected: 13-Nov-17 08:25									
Analyte	Conc. (ng/L)	RL	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
PFBS	ND	2.13		B7K0135	21-Nov-17	0.235 L	03-Dec-17 22:57	1	
PFHxA	ND	2.13		B7K0135	21-Nov-17	0.235 L	03-Dec-17 22:57	1	
PFHpA	ND	2.13		B7K0135	21-Nov-17	0.235 L	03-Dec-17 22:57	1	
PFHxS	ND	2.13		B7K0135	21-Nov-17	0.235 L	03-Dec-17 22:57	1	
PFOA	ND	2.13		B7K0135	21-Nov-17	0.235 L	03-Dec-17 22:57	1	
PFOS	ND	2.13		B7K0135	21-Nov-17	0.235 L	03-Dec-17 22:57	1	
PFNA	ND	2.13		B7K0135	21-Nov-17	0.235 L	03-Dec-17 22:57	1	
PFDA	ND	2.13		B7K0135	21-Nov-17	0.235 L	08-Dec-17 03:11	1	
MeFOSAA	ND	2.13		B7K0135	21-Nov-17	0.235 L	03-Dec-17 22:57	1	
PFUnA	ND	2.13		B7K0135	21-Nov-17	0.235 L	03-Dec-17 22:57	1	
EtFOSAA	ND	2.13		B7K0135	21-Nov-17	0.235 L	03-Dec-17 22:57	1	
PFDaA	ND	2.13		B7K0135	21-Nov-17	0.235 L	03-Dec-17 22:57	1	
PFTTrDA	ND	2.13		B7K0135	21-Nov-17	0.235 L	03-Dec-17 22:57	1	
PFTeDA	ND	2.13		B7K0135	21-Nov-17	0.235 L	08-Dec-17 03:11	1	
Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	99.5	60 - 150		B7K0135	21-Nov-17	0.235 L	03-Dec-17 22:57	1
13C2-PFHxA	IS	83.3	70 - 130		B7K0135	21-Nov-17	0.235 L	03-Dec-17 22:57	1
13C4-PFHpA	IS	92.7	60 - 150		B7K0135	21-Nov-17	0.235 L	03-Dec-17 22:57	1
18O2-PFHxS	IS	102	60 - 130		B7K0135	21-Nov-17	0.235 L	03-Dec-17 22:57	1
13C2-PFOA	IS	92.5	60 - 130		B7K0135	21-Nov-17	0.235 L	03-Dec-17 22:57	1
13C8-PFOS	IS	85.8	60 - 130		B7K0135	21-Nov-17	0.235 L	03-Dec-17 22:57	1
13C5-PFNA	IS	96.7	50 - 130		B7K0135	21-Nov-17	0.235 L	03-Dec-17 22:57	1
13C2-PFDA	IS	121	60 - 130		B7K0135	21-Nov-17	0.235 L	08-Dec-17 03:11	1
d3-MeFOSAA	IS	77.2	50 - 150		B7K0135	21-Nov-17	0.235 L	03-Dec-17 22:57	1
13C2-PFUnA	IS	92.2	60 - 130		B7K0135	21-Nov-17	0.235 L	03-Dec-17 22:57	1
d5-EtFOSAA	IS	98.0	50 - 150		B7K0135	21-Nov-17	0.235 L	03-Dec-17 22:57	1
13C2-PFDaA	IS	80.9	30 - 130		B7K0135	21-Nov-17	0.235 L	03-Dec-17 22:57	1
13C2-PFTeDA	IS	58.0	20 - 150		B7K0135	21-Nov-17	0.235 L	08-Dec-17 03:11	1

RL - Reporting limit

LCL-UCL- Lower control limit - upper control limit
Results reported to RL.

When reported, PFHxS, PFOA and PFOS include both linear and branched isomers.
Only the linear isomer is reported for all other analytes.

Sample ID: SPW-TAP						Modified EPA Method 537				
Client Data Name: Great Lakes Water Authority Project: GLWA - PFAS Location: Springwells WTP TAP						Laboratory Data Lab Sample: 1701702-03 Date Received: 15-Nov-17 09:30 Column: BEH C18				
Analyte	Conc. (ng/L)	RL	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution		
PFBS	ND	2.03		B7K0135	21-Nov-17	0.246 L	03-Dec-17 23:08	1		
PFHxA	ND	2.03		B7K0135	21-Nov-17	0.246 L	03-Dec-17 23:08	1		
PFHpA	ND	2.03		B7K0135	21-Nov-17	0.246 L	03-Dec-17 23:08	1		
PFHxS	ND	2.03		B7K0135	21-Nov-17	0.246 L	03-Dec-17 23:08	1		
PFOA	ND	2.03		B7K0135	21-Nov-17	0.246 L	03-Dec-17 23:08	1		
PFOS	ND	2.03		B7K0135	21-Nov-17	0.246 L	03-Dec-17 23:08	1		
PFNA	ND	2.03		B7K0135	21-Nov-17	0.246 L	03-Dec-17 23:08	1		
PFDA	ND	2.03		B7K0135	21-Nov-17	0.246 L	08-Dec-17 03:23	1		
MeFOSAA	ND	2.03		B7K0135	21-Nov-17	0.246 L	03-Dec-17 23:08	1		
PFUnA	ND	2.03		B7K0135	21-Nov-17	0.246 L	03-Dec-17 23:08	1		
EtFOSAA	ND	2.03		B7K0135	21-Nov-17	0.246 L	03-Dec-17 23:08	1		
PFDaA	ND	2.03		B7K0135	21-Nov-17	0.246 L	03-Dec-17 23:08	1		
PFTDA	ND	2.03		B7K0135	21-Nov-17	0.246 L	03-Dec-17 23:08	1		
PFTeDA	ND	2.03		B7K0135	21-Nov-17	0.246 L	08-Dec-17 03:23	1		
Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
13C3-PFBS	IS	103	60 - 150		B7K0135	21-Nov-17	0.246 L	03-Dec-17 23:08	1	
13C2-PFHxA	IS	105	70 - 130		B7K0135	21-Nov-17	0.246 L	03-Dec-17 23:08	1	
13C4-PFHpA	IS	99.0	60 - 150		B7K0135	21-Nov-17	0.246 L	03-Dec-17 23:08	1	
18O2-PFHxS	IS	106	60 - 130		B7K0135	21-Nov-17	0.246 L	03-Dec-17 23:08	1	
13C2-PFOA	IS	92.1	60 - 130		B7K0135	21-Nov-17	0.246 L	03-Dec-17 23:08	1	
13C8-PFOS	IS	92.8	60 - 130		B7K0135	21-Nov-17	0.246 L	03-Dec-17 23:08	1	
13C5-PFNA	IS	86.4	50 - 130		B7K0135	21-Nov-17	0.246 L	03-Dec-17 23:08	1	
13C2-PFDA	IS	80.1	60 - 130		B7K0135	21-Nov-17	0.246 L	08-Dec-17 03:23	1	
d3-MeFOSAA	IS	63.0	50 - 150		B7K0135	21-Nov-17	0.246 L	03-Dec-17 23:08	1	
13C2-PFUnA	IS	73.3	60 - 130		B7K0135	21-Nov-17	0.246 L	03-Dec-17 23:08	1	
d5-EtFOSAA	IS	63.5	50 - 150		B7K0135	21-Nov-17	0.246 L	03-Dec-17 23:08	1	
13C2-PFDaA	IS	63.7	30 - 130		B7K0135	21-Nov-17	0.246 L	03-Dec-17 23:08	1	
13C2-PFTeDA	IS	65.4	20 - 150		B7K0135	21-Nov-17	0.246 L	08-Dec-17 03:23	1	

RL - Reporting limit

LCL-UCL- Lower control limit - upper control limit
Results reported to RL.

When reported, PFHxS, PFOA and PFOS include both linear and branched isomers.
Only the linear isomer is reported for all other analytes.

Sample ID: SW-TAP						Modified EPA Method 537				
Client Data Name: Great Lakes Water Authority Project: GLWA - PFAS Location: Southwest WTP TAP						Laboratory Data Lab Sample: 1701702-04 Date Received: 15-Nov-17 09:30 Column: BEH C18				
Analyte	Conc. (ng/L)	RL	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution		
PFBS	ND	2.19		B7K0135	21-Nov-17	0.228 L	03-Dec-17 23:19	1		
PFHxA	ND	2.19		B7K0135	21-Nov-17	0.228 L	03-Dec-17 23:19	1		
PFHpA	ND	2.19		B7K0135	21-Nov-17	0.228 L	03-Dec-17 23:19	1		
PFHxS	ND	2.19		B7K0135	21-Nov-17	0.228 L	03-Dec-17 23:19	1		
PFOA	ND	2.19		B7K0135	21-Nov-17	0.228 L	03-Dec-17 23:19	1		
PFOS	ND	2.19		B7K0135	21-Nov-17	0.228 L	03-Dec-17 23:19	1		
PFNA	ND	2.19		B7K0135	21-Nov-17	0.228 L	03-Dec-17 23:19	1		
PFDA	ND	2.19		B7K0135	21-Nov-17	0.228 L	08-Dec-17 03:34	1		
MeFOSAA	ND	2.19		B7K0135	21-Nov-17	0.228 L	03-Dec-17 23:19	1		
PFUnA	ND	2.19		B7K0135	21-Nov-17	0.228 L	03-Dec-17 23:19	1		
EtFOSAA	ND	2.19		B7K0135	21-Nov-17	0.228 L	03-Dec-17 23:19	1		
PFDaA	ND	2.19		B7K0135	21-Nov-17	0.228 L	03-Dec-17 23:19	1		
PFTDA	ND	2.19		B7K0135	21-Nov-17	0.228 L	03-Dec-17 23:19	1		
PFTeDA	ND	2.19		B7K0135	21-Nov-17	0.228 L	08-Dec-17 03:34	1		
Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
13C3-PFBS	IS	101	60 - 150		B7K0135	21-Nov-17	0.228 L	03-Dec-17 23:19	1	
13C2-PFHxA	IS	101	70 - 130		B7K0135	21-Nov-17	0.228 L	03-Dec-17 23:19	1	
13C4-PFHpA	IS	109	60 - 150		B7K0135	21-Nov-17	0.228 L	03-Dec-17 23:19	1	
18O2-PFHxS	IS	120	60 - 130		B7K0135	21-Nov-17	0.228 L	03-Dec-17 23:19	1	
13C2-PFOA	IS	120	60 - 130		B7K0135	21-Nov-17	0.228 L	03-Dec-17 23:19	1	
13C8-PFOS	IS	96.5	60 - 130		B7K0135	21-Nov-17	0.228 L	03-Dec-17 23:19	1	
13C5-PFNA	IS	88.5	50 - 130		B7K0135	21-Nov-17	0.228 L	03-Dec-17 23:19	1	
13C2-PFDA	IS	86.8	60 - 130		B7K0135	21-Nov-17	0.228 L	08-Dec-17 03:34	1	
d3-MeFOSAA	IS	80.6	50 - 150		B7K0135	21-Nov-17	0.228 L	03-Dec-17 23:19	1	
13C2-PFUnA	IS	92.3	60 - 130		B7K0135	21-Nov-17	0.228 L	03-Dec-17 23:19	1	
d5-EtFOSAA	IS	79.1	50 - 150		B7K0135	21-Nov-17	0.228 L	03-Dec-17 23:19	1	
13C2-PFDaA	IS	88.2	30 - 130		B7K0135	21-Nov-17	0.228 L	03-Dec-17 23:19	1	
13C2-PFTeDA	IS	60.1	20 - 150		B7K0135	21-Nov-17	0.228 L	08-Dec-17 03:34	1	

RL - Reporting limit

 LCL-UCL- Lower control limit - upper control limit
 Results reported to RL.

 When reported, PFHxS, PFOA and PFOS include both linear and branched isomers.
 Only the linear isomer is reported for all other analytes.

Sample ID: SW-RAW					Modified EPA Method 537				
Client Data Name: Great Lakes Water Authority Project: GLWA - PFAS Location: Southwest WTP RAW					Laboratory Data Lab Sample: 1701702-05 Date Received: 15-Nov-17 09:30 Column: BEH C18				
Analyte	Conc. (ng/L)	RL	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
PFBS	ND	2.26		B7K0135	21-Nov-17	0.222 L	03-Dec-17 23:30	1	
PFHxA	ND	2.26		B7K0135	21-Nov-17	0.222 L	03-Dec-17 23:30	1	
PFHpA	ND	2.26		B7K0135	21-Nov-17	0.222 L	03-Dec-17 23:30	1	
PFHxS	ND	2.26		B7K0135	21-Nov-17	0.222 L	03-Dec-17 23:30	1	
PFOA	ND	2.26		B7K0135	21-Nov-17	0.222 L	03-Dec-17 23:30	1	
PFOS	ND	2.26		B7K0135	21-Nov-17	0.222 L	03-Dec-17 23:30	1	
PFNA	ND	2.26		B7K0135	21-Nov-17	0.222 L	03-Dec-17 23:30	1	
PFDA	ND	2.26		B7K0135	21-Nov-17	0.222 L	08-Dec-17 03:45	1	
MeFOSAA	ND	2.26		B7K0135	21-Nov-17	0.222 L	03-Dec-17 23:30	1	
PFUnA	ND	2.26		B7K0135	21-Nov-17	0.222 L	03-Dec-17 23:30	1	
EtFOSAA	ND	2.26		B7K0135	21-Nov-17	0.222 L	03-Dec-17 23:30	1	
PFDaA	ND	2.26		B7K0135	21-Nov-17	0.222 L	03-Dec-17 23:30	1	
PFTTrDA	ND	2.26		B7K0135	21-Nov-17	0.222 L	03-Dec-17 23:30	1	
PFTeDA	ND	2.26		B7K0135	21-Nov-17	0.222 L	08-Dec-17 03:45	1	
Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	96.1	60 - 150		B7K0135	21-Nov-17	0.222 L	03-Dec-17 23:30	1
13C2-PFHxA	IS	94.7	70 - 130		B7K0135	21-Nov-17	0.222 L	03-Dec-17 23:30	1
13C4-PFHpA	IS	89.1	60 - 150		B7K0135	21-Nov-17	0.222 L	03-Dec-17 23:30	1
18O2-PFHxS	IS	78.2	60 - 130		B7K0135	21-Nov-17	0.222 L	03-Dec-17 23:30	1
13C2-PFOA	IS	93.1	60 - 130		B7K0135	21-Nov-17	0.222 L	03-Dec-17 23:30	1
13C8-PFOS	IS	98.2	60 - 130		B7K0135	21-Nov-17	0.222 L	03-Dec-17 23:30	1
13C5-PFNA	IS	97.7	50 - 130		B7K0135	21-Nov-17	0.222 L	03-Dec-17 23:30	1
13C2-PFDA	IS	108	60 - 130		B7K0135	21-Nov-17	0.222 L	08-Dec-17 03:45	1
d3-MeFOSAA	IS	74.7	50 - 150		B7K0135	21-Nov-17	0.222 L	03-Dec-17 23:30	1
13C2-PFUnA	IS	80.7	60 - 130		B7K0135	21-Nov-17	0.222 L	03-Dec-17 23:30	1
d5-EtFOSAA	IS	77.1	50 - 150		B7K0135	21-Nov-17	0.222 L	03-Dec-17 23:30	1
13C2-PFDaA	IS	89.8	30 - 130		B7K0135	21-Nov-17	0.222 L	03-Dec-17 23:30	1
13C2-PFTeDA	IS	89.9	20 - 150		B7K0135	21-Nov-17	0.222 L	08-Dec-17 03:45	1

RL - Reporting limit

LCL-UCL- Lower control limit - upper control limit
Results reported to RL.

When reported, PFHxS, PFOA and PFOS include both linear and branched isomers.
Only the linear isomer is reported for all other analytes.

Sample ID: NE-TAP						Modified EPA Method 537				
Client Data Name: Great Lakes Water Authority Project: GLWA - PFAS Location: Northeast WTP TAP						Laboratory Data Lab Sample: 1701702-06 Date Received: 15-Nov-17 09:30 Column: BEH C18				
Analyte	Conc. (ng/L)	RL	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution		
PFBS	ND	2.43		B7K0135	21-Nov-17	0.205 L	03-Dec-17 23:42	1		
PFHxA	ND	2.43		B7K0135	21-Nov-17	0.205 L	03-Dec-17 23:42	1		
PFHpA	ND	2.43		B7K0135	21-Nov-17	0.205 L	03-Dec-17 23:42	1		
PFHxS	ND	2.43		B7K0135	21-Nov-17	0.205 L	03-Dec-17 23:42	1		
PFOA	ND	2.43		B7K0135	21-Nov-17	0.205 L	03-Dec-17 23:42	1		
PFOS	ND	2.43		B7K0135	21-Nov-17	0.205 L	03-Dec-17 23:42	1		
PFNA	ND	2.43		B7K0135	21-Nov-17	0.205 L	03-Dec-17 23:42	1		
PFDA	ND	2.43		B7K0135	21-Nov-17	0.205 L	08-Dec-17 03:56	1		
MeFOSAA	ND	2.43		B7K0135	21-Nov-17	0.205 L	03-Dec-17 23:42	1		
PFUnA	ND	2.43		B7K0135	21-Nov-17	0.205 L	03-Dec-17 23:42	1		
EtFOSAA	ND	2.43		B7K0135	21-Nov-17	0.205 L	03-Dec-17 23:42	1		
PFDaA	ND	2.43		B7K0135	21-Nov-17	0.205 L	03-Dec-17 23:42	1		
PFTDA	ND	2.43		B7K0135	21-Nov-17	0.205 L	03-Dec-17 23:42	1		
PFTeDA	ND	2.43		B7K0135	21-Nov-17	0.205 L	08-Dec-17 03:56	1		
Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
13C3-PFBS	IS	93.6	60 - 150		B7K0135	21-Nov-17	0.205 L	03-Dec-17 23:42	1	
13C2-PFHxA	IS	89.9	70 - 130		B7K0135	21-Nov-17	0.205 L	03-Dec-17 23:42	1	
13C4-PFHpA	IS	90.0	60 - 150		B7K0135	21-Nov-17	0.205 L	03-Dec-17 23:42	1	
18O2-PFHxS	IS	91.4	60 - 130		B7K0135	21-Nov-17	0.205 L	03-Dec-17 23:42	1	
13C2-PFOA	IS	99.4	60 - 130		B7K0135	21-Nov-17	0.205 L	03-Dec-17 23:42	1	
13C8-PFOS	IS	89.9	60 - 130		B7K0135	21-Nov-17	0.205 L	03-Dec-17 23:42	1	
13C5-PFNA	IS	78.8	50 - 130		B7K0135	21-Nov-17	0.205 L	03-Dec-17 23:42	1	
13C2-PFDA	IS	86.4	60 - 130		B7K0135	21-Nov-17	0.205 L	08-Dec-17 03:56	1	
d3-MeFOSAA	IS	84.6	50 - 150		B7K0135	21-Nov-17	0.205 L	03-Dec-17 23:42	1	
13C2-PFUnA	IS	86.7	60 - 130		B7K0135	21-Nov-17	0.205 L	03-Dec-17 23:42	1	
d5-EtFOSAA	IS	79.8	50 - 150		B7K0135	21-Nov-17	0.205 L	03-Dec-17 23:42	1	
13C2-PFDaA	IS	85.4	30 - 130		B7K0135	21-Nov-17	0.205 L	03-Dec-17 23:42	1	
13C2-PFTeDA	IS	77.0	20 - 150		B7K0135	21-Nov-17	0.205 L	08-Dec-17 03:56	1	

RL - Reporting limit

LCL-UCL- Lower control limit - upper control limit
Results reported to RL.

When reported, PFHxS, PFOA and PFOS include both linear and branched isomers.
Only the linear isomer is reported for all other analytes.

DATA QUALIFIERS & ABBREVIATIONS

B	This compound was also detected in the method blank.
D	Dilution
E	The associated compound concentration exceeded the calibration range of the instrument.
H	Recovery and/or RPD was outside laboratory acceptance limits.
I	Chemical Interference
J	The amount detected is below the Reporting Limit/LOQ.
M	Estimated Maximum Possible Concentration. (CA Region 2 projects only)
*	See Cover Letter
Conc.	Concentration
NA	Not applicable
ND	Not Detected
TEQ	Toxic Equivalency
U	Not Detected (specific projects only)

Unless otherwise noted, solid sample results are reported in dry weight. Tissue samples are reported in wet weight.

CERTIFICATIONS

Accrediting Authority	Certificate Number
Arkansas Department of Environmental Quality	17-015-0
California Department of Health – ELAP	2892
DoD ELAP - A2LA Accredited - ISO/IEC 17025:2005	3091.01
Florida Department of Health	E87777-18
Hawaii Department of Health	N/A
Louisiana Department of Environmental Quality	01977
Maine Department of Health	2016026
Minnesota Department of Health	1175673
New Hampshire Environmental Accreditation Program	207716
New Jersey Department of Environmental Protection	CA003
New York Department of Health	11411
Oregon Laboratory Accreditation Program	4042-008
Pennsylvania Department of Environmental Protection	013
Texas Commission on Environmental Quality	T104704189-17-8
Virginia Department of General Services	8621
Washington Department of Ecology	C584
Wisconsin Department of Natural Resources	998036160

Current certificates and lists of licensed parameters are located in the Quality Assurance office and are available upon request.

NELAP Accredited Test Methods

MATRIX: Air	
Description of Test	Method
Determination of Polychlorinated p-Dioxins & Polychlorinated Dibenzofurans	EPA 23

MATRIX: Biological Tissue	
Description of Test	Method
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Drinking Water	
Description of Test	Method
2,3,7,8-Tetrachlorodibenzo- p-dioxin (2,3,7,8-TCDD) GC/HRMS	EPA 1613
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537

MATRIX: Non-Potable Water	
Description of Test	Method
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Dioxin by GC/HRMS	EPA 613
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Solids	
Description of Test	Method
Tetra-Octa Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope	EPA 1613B

Dilution GC/HRMS	
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A



CHAIN OF CUSTODY

For Laboratory Use Only

Work Order # 1701702 Temp. 1.0 °C

Storage ID WR-2 Storage Secured Yes ☒ No ☐

Project ID: GLWA - PFAS

PO# 0007276

Sampler: Nathan Taylor
(name)

TAT	Standard	☒	21 days
(check one)	Rush (surcharge may apply)	☐	
		☐	14 days
		☐	7 days
			Specify:

Invoice to: Name	Company	Address	City	State	Ph#	Fax#
ACCOUNTSPAYABLE@GLWATER.ORG [or mail: Great Lakes Water Authority, ATTN: Accounts Payable, PO Box 441370, Detroit, MI 48244], V: 313.297.6483, F: 313.297.6812						

Relinquished by (printed name and signature)

Date 11-13-17 Time 1400

Received by (printed name and signature)

Date 11-13-17 Time 1400

Relinquished by (printed name and signature)

Date	Time
11-14-17	07:30

Received by (printed name and signature)

Date 11/15/17 Time 0935

SHIP TO: Vista Analytical Laboratory
1104 Windfield Way
El Dorado Hills, CA 95762
(916) 673-1520 * Fax (916) 673-0106

Method of Shipment:

ATTN:

Tracking No.:

Add Analysis(es) Requested

Container(s)

Mod. EPA
Method 537

EPA Method
821-D (DW only)

[illegible]

Special Instructions/Comments: _____

SEND
DOCUMENTATION
AND RESULTS TO:

Name: MARY LYNN SEMEGEN

Company: GREAT LAKES WATER AUTHORITY (GLWA)

Address: 10100 EAST JEFFERSON AVENUE

City: DETROIT State: MI Zip: 48214

Phone: (313) 926-8102 Fax: (313) 842-6418

Email: mary.semegen@glwater.org, patrick.williford@glwater.org

Container Types: P= HDPE, PJ= HDPE Jar
Q = Other:

Bottle Preservation Type: T = Thiosulfate,
TZ = Trizma: TZ

Matrix Types: AQ = Aqueous, DW = Drinking Water, EF = Effluent, PP = Pulp/Paper, SO = Sediment,
SL = Sludge, SO = Soil, WW = Wastewater, B = Blood/Serum, O = Other: **SW = SURFACE WATER**



CHAIN OF CUSTODY

For Laboratory Use Only
Work Order #: 1701702 Temp: 1.0 °C
Storage ID: WR-2 Storage Secured: Yes ☒ No ☐

Project ID: GLWA - PFAS PO#: 0007276 Sampler: OGUNNIRE A1
(name)

TAT Standard: ☒ 21 days
(check one) Rush (surcharge may apply)
☐ 14 days ☐ 7 days Specify: _____

Invoice to: Name _____ Company _____ Address _____ City _____ State _____ Pn# _____ Fax# _____
ACCOUNTSPAYABLE@GLWATER.ORG [or mail: Great Lakes Water Authority, ATTN: Accounts Payable, PO Box 441370, Detroit, MI 48244], V: 313.297.6483, F: 313.297.6812

Relinquished by (printed name and signature) _____ Date _____ Time _____ Received by (printed name and signature) _____ Date _____ Time _____
② Will. Ford 11/14/17 07:30 Sydney Roughton 11/15/17 0939
Relinquished by (printed name and signature) _____ Date _____ Time _____ Received by (printed name and signature) _____ Date _____ Time _____
① OGUNNIRE ADETAYO 11/13/17 4:17PM A. R 11/13/17 4:17Am

SHIP TO: Vista Analytical Laboratory
1104 Windfield Way
El Dorado Hills, CA 95762
(916) 673-1520 * Fax (916) 673-0106

Method of Shipment: _____

Add Analysis(es) Requested

Container(s)

ATTN: _____

Tracking No.: _____

Sample ID	Date	Time	Location/Sample Description	Quantity	Type	Matrix	PFAS/PFOS	UCM3 PFAS List 6	537 List 14	Full List of 26	Other: Please List	PFAS/PFOS	UCM3 PFAS List 6	PFAS List 14	Comments
SPW-TAP	<u>11/13/17</u>	<u>9:20A</u>	Springwells WTP TAP	<u>2</u>	<u>P</u>	<u>DW</u>				<u>X</u>					
SW-TAP	<u>11/13/17</u>	<u>2:51P</u>	Southwest WTP TAP	<u>2</u>	<u>P</u>	<u>DW</u>				<u>X</u>					
SW-RAW	<u>11/13/17</u>	<u>3:03P</u>	Southwest WTP RAW	<u>2</u>	<u>P</u>	<u>SW</u>				<u>X</u>					
NE-TAP	<u>11/13/17</u>	<u>8:23A</u>	Northeast WTP TAP	<u>2</u>	<u>P</u>	<u>DW</u>				<u>X</u>					

Special Instructions/Comments: _____

SEND
DOCUMENTATION
AND RESULTS TO:

Name: MARY LYNN SEMEGEN
Company: GREAT LAKES WATER AUTHORITY (GLWA)
Address: 10100 EAST JEFFERSON AVENUE
City: DETROIT State: MI Zip: 48214
Phone: (313) 926-8102 Fax: (313) 842-6418
Email: mary.semegen@glwater.org, patrick.williford@glwater.org

Container Types: P = HDPE, PJ = HDPE Jar
O = Other: _____

Bottle Preservation Type: T = Thiosulfate,
TZ = Trizma: TZ

Matrix Types: AQ = Aqueous, DW = Drinking Water, EF = Effluent, PP = Pulp/Paper, SD = Sediment,
SL = Sludge, SO = Soil, WW = Wastewater, B = Blood/Serum, O = Other: SW = SURFACE WATER

Sample Log-in Checklist

Vista Work Order #: 1701702 TAT Std

Samples Arrival:	Date/Time <u>11/15/17 0930</u>	Initials: <u>SR</u>	Location: <u>WR-2</u> Shelf/Rack: <u>N/A</u>
Logged In:	Date/Time <u>11/16/17 1338</u>	Initials: <u>WWS</u>	Location: <u>WR-2</u> Shelf/Rack: <u>F-5</u>
Delivered By:	<u>FedEx</u> UPS On Trac GSO DHL Hand Delivered Other		
Preservation:	<u>Ice</u> Blue Ice Dry Ice None		
Temp °C: <u>0.9</u> (uncorrected)	Time: <u>0940 0935</u> <u>SR 11/15/17</u>	Thermometer ID: IR-1	
Temp °C: <u>1.0</u> (corrected)	Probe used: Yes ☐ No ☒		

		YES	NO	NA
Adequate Sample Volume Received?		✓		
Holding Time Acceptable?		✓		
Shipping Container(s) Intact?		✓		
Shipping Custody Seals Intact?				✓
Shipping Documentation Present?		✓		
Airbill	Trk # <u>7907 3989 8604</u>	✓		
Sample Container Intact?		✓		
Sample Custody Seals Intact?				✓
Chain of Custody / Sample Documentation Present?		✓		
COC Anomaly/Sample Acceptance Form completed?			✓	✓
If Chlorinated or Drinking Water Samples, Acceptable Preservation?		✓		✗
Preservation Documented:	Na ₂ S ₂ O ₃ <u>Trizma</u> None	<u>Yes</u>	No	NA
Shipping Container	Vista <u>Client</u> Retain <u>Return</u> Dispose			

Comments: