13-Sep-2021

Brian VanderMeulen
City of Lowell
301 East Main Street
Lowell, MI 49331

Re: **IPP FOG/BIO PFAS** Work Order: **21090239**

Dear Brian,

ALS Environmental received 2 samples on 02-Sep-2021 10:00 AM for the analyses presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental - Holland and for only the analyses requested.

Sample results are compliant with industry accepted practices and Quality Control results achieved laboratory specifications. Any exceptions are noted in the Case Narrative, or noted with qualifiers in the report or QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained from ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

The total number of pages in this report is 23.

If you have any questions regarding this report, please feel free to contact me:

ADDRESS: 3352 128th Avenue, Holland, MI, USA
PHONE: +1 (616) 399-6070 FAX: +1 (616) 399-6185

Sincerely,

Jodi Blouw

Electronically approved by: Chad Whelton

Jodi Blouw

Report of Laboratory Analysis

Certificate No: MI: 0022

ALS Group, USA

Date: 13-Sep-21

Client: City of Lowell
Project: IPP FOG/BIO PFAS
Work Order: **21090239**

Work Order Sample Summary

Lab Samp ID	Client Sample ID	Matrix	Tag Number	Collection Date	Date Received	Hold
21090239-01	IPP FOG	Wastewater		9/1/2021 08:00	9/2/2021 10:00	☐
21090239-02	Biosolids PFAS	Solid		9/1/2021 08:30	9/2/2021 10:00	☐

ALS Group, USA

Date: 13-Sep-21

Client: City of Lowell
Project: IPP FOG/BIO PFAS
Work Order: 21090239

Case Narrative

Samples for the above noted Work Order were received on 09/02/2021. The attached "Sample Receipt Checklist" documents the status of custody seals, container integrity, preservation, and temperature compliance.

Samples were analyzed according to the analytical methodology previously transmitted in the "Work Order Acknowledgement". Methodologies are also documented in the "Analytical Result" section for each sample. Quality control results are listed in the "QC Report" section. Sample association for the reported quality control is located at the end of each batch summary. If applicable, results are appropriately qualified in the Analytical Result and QC Report sections. The "Qualifiers" section documents the various qualifiers, units, and acronyms utilized in reporting. A copy of the laboratory's scope of accreditation is available upon request.

With the following exceptions, all sample analyses achieved analytical criteria.

Extractable Organics:

Batch 183025, Method D7968-17a, Sample Biosolids PFAS (21090239-02A): The Continuing Calibration Verification did not meet acceptance criteria with high bias, however, the sample results were non-detect for the following analytes: 13C3-HFPO-DA, target non-detect.

Batch 183025, Method D7968-17a, Sample Biosolids PFAS (21090239-02A): One or more surrogate recoveries were below the lower control limits. The sample results may be biased low. 13C2-PFDoA, 13C2-PFTeA, 13C2-PFUnA, 13C4-PFOS.

Wet Chemistry:

Batch 183252, Method E1664A, Sample IPP FOG (21090239-01A): A reduced volume of sample was used for analysis due to sample matrix.

ALS Group, USA

Date: 13-Sep-21

Client: City of Lowell
Project: IPP FOG/BIO PFAS
WorkOrder: **21090239**

QUALIFIERS, ACRONYMS, UNITS

Qualifier	Description
*	Value exceeds Regulatory Limit
**	Estimated Value
a	Analyte is non-accredited
B	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
Hr	BOD/CBOD - Sample was reset outside Hold Time, value should be considered estimated.
J	Analyte is present at an estimated concentration between the MDL and Report Limit
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL
X	Analyte was detected in the Method Blank between the MDL and Reporting Limit, sample results may exhibit background or reagent contamination at the observed level.

Acronym	Description
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
LOD	Limit of Detection (see MDL)
LOQ	Limit of Quantitation (see PQL)
MBLK	Method Blank
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PQL	Practical Quantitation Limit
RPD	Relative Percent Difference
TDL	Target Detection Limit
TNTC	Too Numerous To Count
A	APHA Standard Methods
D	ASTM
E	EPA
SW	SW-846 Update III

Units Reported	Description
% of sample	Percent of Sample
mg/L	Milligrams per Liter

ALS Group, USA

Date: *13-Sep-21*

Client: City of Lowell
Project: IPP FOG/BIO PFAS
Sample ID: IPP FOG
Collection Date: 9/1/2021 08:00 AM

Work Order: 21090239
Lab ID: 21090239-01
Matrix: WASTEWATER

Analyses	Result	Qual	MDL	Report Limit	Units	Dilution Factor	Date Analyzed
OIL AND GREASE		Method: **E1664A**		Prep: E1664A / 9/7/21			Analyst: **AWH**
Oil and Grease	**39**		**4.7**	**17**	**mg/L**	1	9/7/2021 08:30

Note: See Qualifiers page for a list of qualifiers and their definitions.

ALS Group, USA

Date: *13-Sep-21*

Client: City of Lowell
Project: IPP FOG/BIO PFAS
Sample ID: Biosolids PFAS
Collection Date: 9/1/2021 08:30 AM

Work Order: 21090239
Lab ID: 21090239-02
Matrix: SOLID

Analyses	Result	Qual	MDL	Report Limit	Units	Dilution Factor	Date Analyzed
PFAS BY LC-MS-MS		Method: **D7968-17A**			Prep: D7968-17a / 9/9/21		Analyst: **SK**
Perfluorobutanoic Acid (PFBA)	U		1,300	3,800	ng/Kg-dry	1	9/10/2021 23:28
Perfluoropentanoic Acid (PFPeA)	**1,500**	J	**520**	**3,800**	**ng/Kg-dry**	1	9/10/2021 23:28
Perfluorohexanoic Acid (PFHxA)	**3,000**	J	**470**	**3,800**	**ng/Kg-dry**	1	9/10/2021 23:28
Perfluoroheptanoic Acid (PFHpA)	U		520	3,800	ng/Kg-dry	1	9/10/2021 23:28
Perfluorooctanoic Acid (PFOA)	**1,100**		**350**	**770**	**ng/Kg-dry**	1	9/10/2021 23:28
Perfluorononanoic Acid (PFNA)	U		380	770	ng/Kg-dry	1	9/10/2021 23:28
Perfluorodecanoic Acid (PFDA)	**2,300**	J	**600**	**3,800**	**ng/Kg-dry**	1	9/10/2021 23:28
Perfluoroundecanoic Acid (PFUnA)	U		660	3,800	ng/Kg-dry	1	9/10/2021 23:28
Perfluorododecanoic Acid (PFDoA)	U		810	3,800	ng/Kg-dry	1	9/10/2021 23:28
Perfluorotridecanoic Acid (PFTriA)	U		870	3,800	ng/Kg-dry	1	9/10/2021 23:28
Perfluorotetradecanoic Acid (PFTeA)	U		1,200	3,800	ng/Kg-dry	1	9/10/2021 23:28
Perfluorobutanesulfonic Acid (PFBS)	U		520	770	ng/Kg-dry	1	9/10/2021 23:28
Perfluoropentanesulfonic Acid (PFPeS)	U		420	770	ng/Kg-dry	1	9/10/2021 23:28
Perfluorohexanesulfonic Acid (PFHxS)	U		730	3,800	ng/Kg-dry	1	9/10/2021 23:28
Perfluoroheptanesulfonic Acid (PFHpS)	U		670	3,800	ng/Kg-dry	1	9/10/2021 23:28
Perfluorooctanesulfonic Acid (PFOS)	**14,000**		**320**	**770**	**ng/Kg-dry**	1	9/10/2021 23:28
Perfluorononanesulfonic Acid (PFNS)	U		670	3,800	ng/Kg-dry	1	9/10/2021 23:28
Perfluorodecanesulfonic Acid (PFDS)	U		400	770	ng/Kg-dry	1	9/10/2021 23:28
Fluorotelomer Sulphonic Acid 4:2 (FtS 4:2)	U		870	3,800	ng/Kg-dry	1	9/10/2021 23:28
Fluorotelomer Sulphonic Acid 6:2 (FtS 6:2)	U		1,500	3,800	ng/Kg-dry	1	9/10/2021 23:28
Fluorotelomer Sulphonic Acid 8:2 (FtS 8:2)	U		1,800	3,800	ng/Kg-dry	1	9/10/2021 23:28
Perfluorooctanesulfonamide (PFOSA)	**1,600**		**260**	**770**	**ng/Kg-dry**	1	9/10/2021 23:28
N-Ethylperfluorooctanesulfonamidoacetic Acid	**3,300**	J	**1,500**	**3,800**	**ng/Kg-dry**	1	9/10/2021 23:28
N-Methylperfluorooctanesulfonamidoacetic Acid	**10,000**		**940**	**3,800**	**ng/Kg-dry**	1	9/10/2021 23:28
11Cl-Pf3OUdS	U		310	770	ng/Kg-dry	1	9/10/2021 23:28
4,8-Dioxa-3H-perfluorononanoic Acid (DONA)	U		190	770	ng/Kg-dry	1	9/10/2021 23:28
9Cl-PF3ONS	U		150	770	ng/Kg-dry	1	9/10/2021 23:28
Hexafluoropropylene oxide dimer acid (HFPO-DA)	U		3,100	3,800	ng/Kg-dry	1	9/10/2021 23:28
Surr: 13C4-PFBA	*73.7*			*50-130*	*%REC*	1	9/10/2021 23:28
Surr: 13C5-PFPeA	*79.4*			*50-130*	*%REC*	1	9/10/2021 23:28
Surr: 13C2-PFHxA	*76.0*			*50-130*	*%REC*	1	9/10/2021 23:28

Note: See Qualifiers page for a list of qualifiers and their definitions.

ALS Group, USA

Date: *13-Sep-21*

Client: City of Lowell
Project: IPP FOG/BIO PFAS
Sample ID: Biosolids PFAS
Collection Date: 9/1/2021 08:30 AM

Work Order: 21090239
Lab ID: 21090239-02
Matrix: SOLID

Analyses	Result	Qual	MDL	Report Limit	Units	Dilution Factor	Date Analyzed
Surr: 13C4-PFHpA	*85.8*			*50-130*	*%REC*	1	9/10/2021 23:28
Surr: 13C4-PFOA	*76.0*			*70-130*	*%REC*	1	9/10/2021 23:28
Surr: 13C5-PFNA	*80.1*			*70-130*	*%REC*	1	9/10/2021 23:28
Surr: 13C2-PFDA	*71.7*			*70-130*	*%REC*	1	9/10/2021 23:28
Surr: 13C2-PFUnA	*57.3*	S		*70-130*	*%REC*	1	9/10/2021 23:28
Surr: 13C2-PFDoA	*30.3*	S		*70-130*	*%REC*	1	9/10/2021 23:28
Surr: 13C2-PFTeA	*2.11*	S		*50-130*	*%REC*	1	9/10/2021 23:28
Surr: 13C3-PFBS	*69.0*			*50-130*	*%REC*	1	9/10/2021 23:28
Surr: 18O2-PFHxS	*71.0*			*70-130*	*%REC*	1	9/10/2021 23:28
Surr: 13C4-PFOS	*61.5*	S		*70-130*	*%REC*	1	9/10/2021 23:28
Surr: 13C2-FtS 4:2	*62.9*			*50-130*	*%REC*	1	9/10/2021 23:28
Surr: 13C2-FtS 6:2	*73.4*			*50-130*	*%REC*	1	9/10/2021 23:28
Surr: 13C2-FtS 8:2	*76.6*			*50-130*	*%REC*	1	9/10/2021 23:28
Surr: 13C8-FOSA	*54.1*			*50-130*	*%REC*	1	9/10/2021 23:28
Surr: d3-N-MeFOSAA	*56.8*			*50-130*	*%REC*	1	9/10/2021 23:28
Surr: d5-N-EtFOSAA	*50.5*			*50-130*	*%REC*	1	9/10/2021 23:28
Surr: 13C3-HFPO-DA	*93.6*			*50-130*	*%REC*	1	9/10/2021 23:28
MOISTURE		Method: **SW3550C**					Analyst: **ALG**
Moisture	**97**		**0.10**	**0.10**	**% of sample**	1	9/7/2021 13:29

Note: See Qualifiers page for a list of qualifiers and their definitions.

Batch ID: **183025** Instrument ID **LCMS1** Method: **D7968-17a**

MBLK1 Sample ID: **MBLK1-183025-183025** Units: **ng/Kg** Analysis Date: **9/10/2021 09:12 PM**

Client ID: Run ID: **LCMS1_210910D** SeqNo: **7741224** Prep Date: **9/9/2021** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Perfluorobutanoic Acid (PFBA)	U	120	0	0	0		0			
Perfluoropentanoic Acid (PFPeA)	U	120	0	0	0		0			
Perfluorohexanoic Acid (PFHxA)	U	120	0	0	0		0			
Perfluoroheptanoic Acid (PFHpA)	U	120	0	0	0		0			
Perfluorooctanoic Acid (PFOA)	U	25	0	0	0		0			
Perfluorononanoic Acid (PFNA)	U	25	0	0	0		0			
Perfluorodecanoic Acid (PFDA)	U	120	0	0	0		0			
Perfluoroundecanoic Acid (PFUnA)	U	120	0	0	0		0			
Perfluorododecanoic Acid (PFDoA)	U	120	0	0	0		0			
Perfluorotridecanoic Acid (PFTriA)	U	120	0	0	0		0			
Perfluorotetradecanoic Acid (PFTeA)	U	120	0	0	0		0			
Perfluorobutanesulfonic Acid (PFBS)	U	25	0	0	0		0			
Perfluoropentanesulfonic Acid (PFPeS	U	25	0	0	0		0			
Perfluorohexanesulfonic Acid (PFHxS)	U	120	0	0	0		0			
Perfluoroheptanesulfonic Acid (PFHpS	U	120	0	0	0		0			
Perfluorooctanesulfonic Acid (PFOS)	U	25	0	0	0		0			
Perfluorononanesulfonic Acid (PFNS)	U	120	0	0	0		0			
Perfluorodecanesulfonic Acid (PFDS)	U	25	0	0	0		0			
Fluorotelomer Sulphonic Acid 4:2 (FtS	U	120	0	0	0		0			
Fluorotelomer Sulphonic Acid 6:2 (FtS	U	120	0	0	0		0			
Fluorotelomer Sulphonic Acid 8:2 (FtS	U	120	0	0	0		0			
Perfluorooctanesulfonamide (PFOSA)	U	25	0	0	0		0			
N-Ethylperfluorooctanesulfonamidoace	U	120	0	0	0		0			
N-Methylperfluorooctanesulfonamidoa	U	120	0	0	0		0			
11Cl-Pf3OUdS	U	25	0	0	0		0			
4,8-Dioxa-3H-perfluorononanoic Acid (	U	25	0	0	0		0			
9Cl-PF3ONS	U	25	0	0	0		0			
Hexafluoropropylene oxide dimer acid	U	120	0	0	0		0			
Surr: 13C4-PFBA	*314.9*	0	*400*	0	*78.7*	*50-130*	0			
Surr: 13C5-PFPeA	*343.2*	0	*400*	0	*85.8*	*50-130*	0			
Surr: 13C2-PFHxA	*377.7*	0	*400*	0	*94.4*	*50-130*	0			
Surr: 13C4-PFHpA	*366.7*	0	*400*	0	*91.7*	*50-130*	0			
Surr: 13C4-PFOA	*354.9*	0	*400*	0	*88.7*	*70-130*	0			
Surr: 13C5-PFNA	*352.9*	0	*400*	0	*88.2*	*70-130*	0			
Surr: 13C2-PFDA	*347.6*	0	*400*	0	*86.9*	*70-130*	0			
Surr: 13C2-PFUnA	*344*	0	*400*	0	*86*	*70-130*	0			
Surr: 13C2-PFDoA	*360.8*	0	*400*	0	*90.2*	*70-130*	0			
Surr: 13C2-PFTeA	*238.5*	0	*400*	0	*59.6*	*50-130*	0			
Surr: 13C3-PFBS	*326*	0	*400*	0	*81.5*	*50-130*	0			
Surr: 18O2-PFHxS	*345.9*	0	*378*	0	*91.5*	*70-130*	0			
Surr: 13C4-PFOS	*322.6*	0	*383*	0	*84.2*	*70-130*	0			

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

QC BATCH REPORT

Batch ID: **183025** Instrument ID **LCMS1** Method: **D7968-17a**

Surr: 13C2-FtS 4:2	*220.7*	0	*373*	0	*59.2*	*50-130*	0
Surr: 13C2-FtS 6:2	*273.2*	0	*380*	0	*71.9*	*50-130*	0
Surr: 13C2-FtS 8:2	*301.3*	0	*383*	0	*78.7*	*50-130*	0
Surr: 13C8-FOSA	*344.3*	0	*400*	0	*86.1*	*50-130*	0
Surr: d3-N-MeFOSAA	*329.7*	0	*400*	0	*82.4*	*50-130*	0
Surr: d5-N-EtFOSAA	*340.1*	0	*400*	0	*85*	*50-130*	0
Surr: 13C3-HFPO-DA	*445*	0	*400*	0	*111*	*50-130*	0

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: City of Lowell
Work Order: 21090239
Project: IPP FOG/BIO PFAS

QC BATCH REPORT

Batch ID: **183025** Instrument ID **LCMS1** Method: **D7968-17a**

MBLK2	Sample ID: **MBLK2-183025-183025**				Units: **ng/Kg**			Analysis Date: **9/10/2021 09:54 PM**			
Client ID:		Run ID: **LCMS1_210910D**			SeqNo: **7741233**			Prep Date: **9/9/2021**		DF: **1**	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Perfluorobutanoic Acid (PFBA)	U	120	0	0	0		0			
Perfluoropentanoic Acid (PFPeA)	U	120	0	0	0		0			
Perfluorohexanoic Acid (PFHxA)	U	120	0	0	0		0			
Perfluoroheptanoic Acid (PFHpA)	U	120	0	0	0		0			
Perfluorooctanoic Acid (PFOA)	U	25	0	0	0		0			
Perfluorononanoic Acid (PFNA)	U	25	0	0	0		0			
Perfluorodecanoic Acid (PFDA)	U	120	0	0	0		0			
Perfluoroundecanoic Acid (PFUnA)	U	120	0	0	0		0			
Perfluorododecanoic Acid (PFDoA)	U	120	0	0	0		0			
Perfluorotridecanoic Acid (PFTriA)	U	120	0	0	0		0			
Perfluorotetradecanoic Acid (PFTeA)	U	120	0	0	0		0			
Perfluorobutanesulfonic Acid (PFBS)	U	25	0	0	0		0			
Perfluoropentanesulfonic Acid (PFPeS	U	25	0	0	0		0			
Perfluorohexanesulfonic Acid (PFHxS)	U	120	0	0	0		0			
Perfluoroheptanesulfonic Acid (PFHpS	U	120	0	0	0		0			
Perfluorooctanesulfonic Acid (PFOS)	U	25	0	0	0		0			
Perfluorononanesulfonic Acid (PFNS)	U	120	0	0	0		0			
Perfluorodecanesulfonic Acid (PFDS)	U	25	0	0	0		0			
Fluorotelomer Sulphonic Acid 4:2 (FtS	U	120	0	0	0		0			
Fluorotelomer Sulphonic Acid 6:2 (FtS	U	120	0	0	0		0			
Fluorotelomer Sulphonic Acid 8:2 (FtS	U	120	0	0	0		0			
Perfluorooctanesulfonamide (PFOSA)	U	25	0	0	0		0			
N-Ethylperfluorooctanesulfonamidoace	U	120	0	0	0		0			
N-Methylperfluorooctanesulfonamidoa	U	120	0	0	0		0			
11Cl-Pf3OUdS	U	25	0	0	0		0			
4,8-Dioxa-3H-perfluorononanoic Acid (	U	25	0	0	0		0			
9Cl-PF3ONS	U	25	0	0	0		0			
Hexafluoropropylene oxide dimer acid	U	120	0	0	0		0			
Surr: 13C4-PFBA	*327.9*	0	*400*	0	*82*	*50-130*	0			
Surr: 13C5-PFPeA	*363.8*	0	*400*	0	*90.9*	*50-130*	0			
Surr: 13C2-PFHxA	*387.2*	0	*400*	0	*96.8*	*50-130*	0			
Surr: 13C4-PFHpA	*377.8*	0	*400*	0	*94.5*	*50-130*	0			
Surr: 13C4-PFOA	*353.9*	0	*400*	0	*88.5*	*70-130*	0			
Surr: 13C5-PFNA	*357.3*	0	*400*	0	*89.3*	*70-130*	0			
Surr: 13C2-PFDA	*347.3*	0	*400*	0	*86.8*	*70-130*	0			
Surr: 13C2-PFUnA	*342*	0	*400*	0	*85.5*	*70-130*	0			
Surr: 13C2-PFDoA	*351.4*	0	*400*	0	*87.9*	*70-130*	0			
Surr: 13C2-PFTeA	*222.2*	0	*400*	0	*55.6*	*50-130*	0			
Surr: 13C3-PFBS	*327.4*	0	*400*	0	*81.8*	*50-130*	0			
Surr: 18O2-PFHxS	*364.4*	0	*378*	0	*96.4*	*70-130*	0			
Surr: 13C4-PFOS	*339.4*	0	*383*	0	*88.6*	*70-130*	0			
Surr: 13C2-FtS 4:2	*239.2*	0	*373*	0	*64.1*	*50-130*	0			

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

QC BATCH REPORT

Batch ID: **183025** Instrument ID **LCMS1** Method: **D7968-17a**

Surr: 13C2-FtS 6:2	*282.2*	0	*380*	0	*74.3*	*50-130*	0
Surr: 13C2-FtS 8:2	*307.2*	0	*383*	0	*80.2*	*50-130*	0
Surr: 13C8-FOSA	*368.2*	0	*400*	0	*92.1*	*50-130*	0
Surr: d3-N-MeFOSAA	*348.8*	0	*400*	0	*87.2*	*50-130*	0
Surr: d5-N-EtFOSAA	*371.2*	0	*400*	0	*92.8*	*50-130*	0
Surr: 13C3-HFPO-DA	*488.4*	0	*400*	0	*122*	*50-130*	0

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: City of Lowell
Work Order: 21090239
Project: IPP FOG/BIO PFAS

QC BATCH REPORT

Batch ID: **183025** Instrument ID **LCMS1** Method: **D7968-17a**

MS Sample ID: **21090042-04A MS** Units: **ng/Kg** Analysis Date: **9/10/2021 10:04 PM**

Client ID: Run ID: **LCMS1_210910D** SeqNo: **7741234** Prep Date: **9/9/2021** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Perfluorobutanoic Acid (PFBA)	373.7	120	495	26.77	70.1	50-130	0			
Perfluoropentanoic Acid (PFPeA)	397.1	120	495	5.943	79	70-130	0			
Perfluorohexanoic Acid (PFHxA)	405.8	120	495	0	82	50-130	0			
Perfluoroheptanoic Acid (PFHpA)	394.3	120	495	0	79.6	50-130	0			
Perfluorooctanoic Acid (PFOA)	423.4	25	495	58.68	73.7	70-130	0			
Perfluorononanoic Acid (PFNA)	411.4	25	495	0	83.1	70-130	0			
Perfluorodecanoic Acid (PFDA)	394	120	495	2.884	79	70-130	0			
Perfluoroundecanoic Acid (PFUnA)	445.4	120	495	0	90	70-130	0			
Perfluorododecanoic Acid (PFDoA)	428.3	120	495	0	86.5	70-130	0			
Perfluorotridecanoic Acid (PFTriA)	371.9	120	495	0	75.1	70-130	0			
Perfluorotetradecanoic Acid (PFTeA)	200.9	120	495	0	40.6	70-130	0			S
Perfluorobutanesulfonic Acid (PFBS)	392.3	25	437.6	0	89.7	70-130	0			
Perfluoropentanesulfonic Acid (PFPeS	398.3	25	464.4	0	85.8	70-130	0			
Perfluorohexanesulfonic Acid (PFHxS)	399.4	120	450.5	31.25	81.7	70-130	0			
Perfluoroheptanesulfonic Acid (PFHpS	335.5	120	471.3	0	71.2	70-130	0			
Perfluorooctanesulfonic Acid (PFOS)	550.8	25	459.4	171.7	82.5	70-130	0			
Perfluorononanesulfonic Acid (PFNS)	367.8	120	475.2	0	77.4	70-130	0			
Perfluorodecanesulfonic Acid (PFDS)	366.9	25	477.2	0	76.9	70-130	0			
Fluorotelomer Sulphonic Acid 4:2 (FtS	322.7	120	462.4	0	69.8	70-130	0			S
Fluorotelomer Sulphonic Acid 6:2 (FtS	442.8	120	469.3	0	94.3	70-130	0			
Fluorotelomer Sulphonic Acid 8:2 (FtS	497.6	120	474.3	0	105	70-130	0			
Perfluorooctanesulfonamide (PFOSA)	357.1	25	495	0	72.1	70-130	0			
N-Ethylperfluorooctanesulfonamidoace	356.1	120	495	0	71.9	70-130	0			
N-Methylperfluorooctanesulfonamidoa	391.1	120	495	0	79	70-130	0			
11Cl-Pf3OUdS	329.9	25	466.3	0	70.7	70-130	0			
4,8-Dioxa-3H-perfluorononanoic Acid (	357	25	466.3	0	76.6	70-130	0			
9Cl-PF3ONS	393.3	25	461.4	0	85.2	70-130	0			
Hexafluoropropylene oxide dimer acid	488.2	120	495	0	98.6	50-130	0			
Surr: 13C4-PFBA	*334.5*	0	*396*	0	*84.5*	*50-130*	0			
Surr: 13C5-PFPeA	*369.2*	0	*396*	0	*93.2*	*50-130*	0			
Surr: 13C2-PFHxA	*371.7*	0	*396*	0	*93.9*	*50-130*	0			
Surr: 13C4-PFHpA	*387.5*	0	*396*	0	*97.8*	*50-130*	0			
Surr: 13C4-PFOA	*365.7*	0	*396*	0	*92.3*	*70-130*	0			
Surr: 13C5-PFNA	*390.4*	0	*396*	0	*98.6*	*70-130*	0			
Surr: 13C2-PFDA	*384*	0	*396*	0	*97*	*70-130*	0			
Surr: 13C2-PFUnA	*386.3*	0	*396*	0	*97.5*	*70-130*	0			
Surr: 13C2-PFDoA	*360.1*	0	*396*	0	*90.9*	*70-130*	0			
Surr: 13C2-PFTeA	*139*	0	*396*	0	*35.1*	*50-130*	0			*S*
Surr: 13C3-PFBS	*336.3*	0	*396*	0	*84.9*	*50-130*	0			
Surr: 18O2-PFHxS	*342.2*	0	*374.3*	0	*91.4*	*70-130*	0			
Surr: 13C4-PFOS	*368.6*	0	*379.2*	0	*97.2*	*70-130*	0			
Surr: 13C2-FtS 4:2	*242.3*	0	*369.3*	0	*65.6*	*50-130*	0			

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

QC BATCH REPORT

Batch ID: **183025** Instrument ID **LCMS1** Method: **D7968-17a**

Surr: 13C2-FtS 6:2	*314.9*	0	*376.2*	0	*83.7*	*50-130*	0
Surr: 13C2-FtS 8:2	*413.6*	0	*379.2*	0	*109*	*50-130*	0
Surr: 13C8-FOSA	*322.3*	0	*396*	0	*81.4*	*50-130*	0
Surr: d3-N-MeFOSAA	*324.9*	0	*396*	0	*82*	*50-130*	0
Surr: d5-N-EtFOSAA	*389.3*	0	*396*	0	*98.3*	*50-130*	0
Surr: 13C3-HFPO-DA	*467.3*	0	*396*	0	*118*	*50-130*	0

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: City of Lowell
Work Order: 21090239
Project: IPP FOG/BIO PFAS

QC BATCH REPORT

Batch ID: **183025** Instrument ID **LCMS1** Method: **D7968-17a**

MSD Sample ID: **21090042-04A MSD** Units: **ng/Kg** Analysis Date: **9/10/2021 10:15 PM**
Client ID: Run ID: **LCMS1_210910D** SeqNo: **7741235** Prep Date: **9/9/2021** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Perfluorobutanoic Acid (PFBA)	386.7	120	497.5	26.77	72.3	50-130	373.7	3.4	30	
Perfluoropentanoic Acid (PFPeA)	418.2	120	497.5	5.943	82.9	70-130	397.1	5.18	30	
Perfluorohexanoic Acid (PFHxA)	395.7	120	497.5	0	79.5	50-130	405.8	2.52	30	
Perfluoroheptanoic Acid (PFHpA)	396.5	120	497.5	0	79.7	50-130	394.3	0.561	30	
Perfluorooctanoic Acid (PFOA)	452	25	497.5	58.68	79.1	70-130	423.4	6.55	30	
Perfluorononanoic Acid (PFNA)	418.6	25	497.5	0	84.1	70-130	411.4	1.74	30	
Perfluorodecanoic Acid (PFDA)	387.7	120	497.5	2.884	77.4	70-130	394	1.6	30	
Perfluoroundecanoic Acid (PFUnA)	425.1	120	497.5	0	85.4	70-130	445.4	4.66	30	
Perfluorododecanoic Acid (PFDoA)	369.4	120	497.5	0	74.2	70-130	428.3	14.8	30	
Perfluorotridecanoic Acid (PFTriA)	326.2	120	497.5	0	65.6	70-130	371.9	13.1	30	S
Perfluorotetradecanoic Acid (PFTeA)	162.5	120	497.5	0	32.7	70-130	200.9	21.1	30	S
Perfluorobutanesulfonic Acid (PFBS)	359.8	25	439.8	0	81.8	70-130	392.3	8.65	30	
Perfluoropentanesulfonic Acid (PFPeS	373.2	25	466.7	0	80	70-130	398.3	6.5	30	
Perfluorohexanesulfonic Acid (PFHxS)	415.6	120	452.7	31.25	84.9	70-130	399.4	3.98	30	
Perfluoroheptanesulfonic Acid (PFHpS	356.6	120	473.6	0	75.3	70-130	335.5	6.1	30	
Perfluorooctanesulfonic Acid (PFOS)	509.2	25	461.7	171.7	73.1	70-130	550.8	7.85	30	
Perfluorononanesulfonic Acid (PFNS)	346.4	120	477.6	0	72.5	70-130	367.8	6	30	
Perfluorodecanesulfonic Acid (PFDS)	359.5	25	479.6	0	75	70-130	366.9	2.03	30	
Fluorotelomer Sulphonic Acid 4:2 (FtS	333.6	120	464.7	0	71.8	70-130	322.7	3.31	30	
Fluorotelomer Sulphonic Acid 6:2 (FtS	461.2	120	471.6	0	97.8	70-130	442.8	4.08	30	
Fluorotelomer Sulphonic Acid 8:2 (FtS	453.2	120	476.6	0	95.1	70-130	497.6	9.34	30	
Perfluorooctanesulfonamide (PFOSA)	370.2	25	497.5	0	74.4	70-130	357.1	3.62	30	
N-Ethylperfluorooctanesulfonamidoace	413.1	120	497.5	0	83	70-130	356.1	14.8	30	
N-Methylperfluorooctanesulfonamidoa	444.7	120	497.5	0	89.4	70-130	391.1	12.8	30	
11Cl-Pf3OUdS	338.4	25	468.7	0	72.2	70-130	329.9	2.57	30	
4,8-Dioxa-3H-perfluorononanoic Acid (	369	25	468.7	0	78.7	70-130	357	3.29	30	
9Cl-PF3ONS	368	25	463.7	0	79.4	70-130	393.3	6.63	30	
Hexafluoropropylene oxide dimer acid	486.8	120	497.5	0	97.8	50-130	488.2	0.293	30	
Surr: 13C4-PFBA	*327.9*	0	*398*	0	*82.4*	*50-130*	334.5	*1.99*	*30*	
Surr: 13C5-PFPeA	*351.3*	0	*398*	0	*88.3*	*50-130*	369.2	*4.98*	*30*	
Surr: 13C2-PFHxA	*380.8*	0	*398*	0	*95.7*	*50-130*	371.7	*2.42*	*30*	
Surr: 13C4-PFHpA	*373.6*	0	*398*	0	*93.9*	*50-130*	387.5	*3.65*	*30*	
Surr: 13C4-PFOA	*364.4*	0	*398*	0	*91.6*	*70-130*	365.7	*0.369*	*30*	
Surr: 13C5-PFNA	*378.2*	0	*398*	0	*95*	*70-130*	390.4	*3.16*	*30*	
Surr: 13C2-PFDA	*357.5*	0	*398*	0	*89.8*	*70-130*	384	*7.14*	*30*	
Surr: 13C2-PFUnA	*338*	0	*398*	0	*84.9*	*70-130*	386.3	*13.3*	*30*	
Surr: 13C2-PFDoA	*319.8*	0	*398*	0	*80.3*	*70-130*	360.1	*11.9*	*30*	
Surr: 13C2-PFTeA	*111*	0	*398*	0	*27.9*	*50-130*	139	*22.3*	*30*	*S*
Surr: 13C3-PFBS	*328.9*	0	*398*	0	*82.6*	*50-130*	336.3	*2.22*	*30*	
Surr: 18O2-PFHxS	*342.8*	0	*376.1*	0	*91.1*	*70-130*	342.2	*0.164*	*30*	
Surr: 13C4-PFOS	*340.5*	0	*381.1*	0	*89.4*	*70-130*	368.6	*7.91*	*30*	
Surr: 13C2-FtS 4:2	*228.4*	0	*371.1*	0	*61.5*	*50-130*	242.3	*5.91*	*30*	

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Batch ID: **183025** Instrument ID **LCMS1** Method: **D7968-17a**

Surr: 13C2-FtS 6:2	*316.7*	0	*378.1*	0	*83.8*	*50-130*	314.9	*0.558*	*30*
Surr: 13C2-FtS 8:2	*349.4*	0	*381.1*	0	*91.7*	*50-130*	413.6	*16.8*	*30*
Surr: 13C8-FOSA	*337.1*	0	*398*	0	*84.7*	*50-130*	322.3	*4.47*	*30*
Surr: d3-N-MeFOSAA	*361.4*	0	*398*	0	*90.8*	*50-130*	324.9	*10.6*	*30*
Surr: d5-N-EtFOSAA	*348.8*	0	*398*	0	*87.6*	*50-130*	389.3	*11*	*30*
Surr: 13C3-HFPO-DA	*503*	0	*398*	0	*126*	*50-130*	467.3	*7.35*	*30*

LCS1 Sample ID: **LCS1-183025-183025** Units: **ng/Kg** Analysis Date: **9/10/2021 09:23 PM**

Client ID: Run ID: **LCMS1_210910D** SeqNo: **7741225** Prep Date: **9/9/2021** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Perfluorooctanoic Acid (PFOA)	19.47	25	25	0	77.9	35-150	0			J
Perfluorononanoic Acid (PFNA)	13.84	25	25	0	55.4	35-150	0			J
Perfluorobutanesulfonic Acid (PFBS)	17.07	25	22	0	77.6	35-150	0			J
Perfluoropentanesulfonic Acid (PFPeS	25.39	25	23.5	0	108	35-150	0			
Perfluorooctanesulfonic Acid (PFOS)	27.11	25	23	0	118	35-150	0			
Perfluorodecanesulfonic Acid (PFDS)	23.92	25	24	0	99.7	35-150	0			J
Perfluorooctanesulfonamide (PFOSA)	17.25	25	25	0	69	35-150	0			J
11Cl-Pf3OUdS	22.49	25	23.5	0	95.7	35-150	0			J
4,8-Dioxa-3H-perfluorononanoic Acid (	17.71	25	23.5	0	75.4	35-150	0			J
9Cl-PF3ONS	22.26	25	23	0	96.8	35-150	0			J
Surr: 13C4-PFBA	*324.4*	0	*400*	0	*81.1*	*50-130*	0			
Surr: 13C5-PFPeA	*351.9*	0	*400*	0	*88*	*50-130*	0			
Surr: 13C2-PFHxA	*386*	0	*400*	0	*96.5*	*50-130*	0			
Surr: 13C4-PFHpA	*371.2*	0	*400*	0	*92.8*	*50-130*	0			
Surr: 13C4-PFOA	*349.4*	0	*400*	0	*87.3*	*70-130*	0			
Surr: 13C5-PFNA	*360.1*	0	*400*	0	*90*	*70-130*	0			
Surr: 13C2-PFDA	*341.5*	0	*400*	0	*85.4*	*70-130*	0			
Surr: 13C2-PFUnA	*336*	0	*400*	0	*84*	*70-130*	0			
Surr: 13C2-PFDoA	*347.3*	0	*400*	0	*86.8*	*70-130*	0			
Surr: 13C3-PFBS	*335.9*	0	*400*	0	*84*	*50-130*	0			
Surr: 18O2-PFHxS	*333.4*	0	*378*	0	*88.2*	*70-130*	0			
Surr: 13C4-PFOS	*336.6*	0	*383*	0	*87.9*	*70-130*	0			
Surr: 13C2-FtS 4:2	*222.9*	0	*373*	0	*59.8*	*50-130*	0			
Surr: 13C2-FtS 6:2	*242.6*	0	*380*	0	*63.9*	*50-130*	0			
Surr: 13C2-FtS 8:2	*286.7*	0	*383*	0	*74.9*	*50-130*	0			
Surr: 13C8-FOSA	*351.4*	0	*400*	0	*87.8*	*50-130*	0			
Surr: d3-N-MeFOSAA	*281.3*	0	*400*	0	*70.3*	*50-130*	0			
Surr: d5-N-EtFOSAA	*381.5*	0	*400*	0	*95.4*	*50-130*	0			
Surr: 13C3-HFPO-DA	*453.3*	0	*400*	0	*113*	*50-130*	0			

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: City of Lowell
Work Order: 21090239
Project: IPP FOG/BIO PFAS

QC BATCH REPORT

Batch ID: **183025** Instrument ID **LCMS1** Method: **D7968-17a**

LCS2	Sample ID: **LCS2-183025-183025**				Units: **ng/Kg**			Analysis Date: **9/10/2021 09:43 PM**			
Client ID:		Run ID: **LCMS1_210910D**			SeqNo: **7741232**			Prep Date: **9/9/2021**		DF: **1**	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Perfluorobutanoic Acid (PFBA)	394.2	120	500	0	78.8	50-130	0			
Perfluoropentanoic Acid (PFPeA)	412.9	120	500	0	82.6	70-130	0			
Perfluorohexanoic Acid (PFHxA)	443.7	120	500	0	88.7	50-130	0			
Perfluoroheptanoic Acid (PFHpA)	412.8	120	500	0	82.6	50-130	0			
Perfluorooctanoic Acid (PFOA)	421.6	25	500	0	84.3	70-130	0			
Perfluorononanoic Acid (PFNA)	419.5	25	500	0	83.9	70-130	0			
Perfluorodecanoic Acid (PFDA)	402.9	120	500	0	80.6	70-130	0			
Perfluoroundecanoic Acid (PFUnA)	468.4	120	500	0	93.7	70-130	0			
Perfluorododecanoic Acid (PFDoA)	456.8	120	500	0	91.4	70-130	0			
Perfluorotridecanoic Acid (PFTriA)	526.6	120	500	0	105	70-130	0			
Perfluorotetradecanoic Acid (PFTeA)	380.3	120	500	0	76.1	70-130	0			
Perfluorobutanesulfonic Acid (PFBS)	388.7	25	442	0	88	70-130	0			
Perfluoropentanesulfonic Acid (PFPeS	413.8	25	469	0	88.2	70-130	0			
Perfluorohexanesulfonic Acid (PFHxS)	403.9	120	455	0	88.8	70-130	0			
Perfluoroheptanesulfonic Acid (PFHpS	366.2	120	476	0	76.9	70-130	0			
Perfluorooctanesulfonic Acid (PFOS)	367.2	25	464	0	79.1	70-130	0			
Perfluorononanesulfonic Acid (PFNS)	419.9	120	480	0	87.5	70-130	0			
Perfluorodecanesulfonic Acid (PFDS)	378.8	25	482	0	78.6	70-130	0			
Fluorotelomer Sulphonic Acid 4:2 (FtS	338.6	120	467	0	72.5	70-130	0			
Fluorotelomer Sulphonic Acid 6:2 (FtS	395.7	120	474	0	83.5	70-130	0			
Fluorotelomer Sulphonic Acid 8:2 (FtS	446.5	120	479	0	93.2	70-130	0			
Perfluorooctanesulfonamide (PFOSA)	416.5	25	500	0	83.3	70-130	0			
N-Ethylperfluorooctanesulfonamidoace	378.1	120	500	0	75.6	70-130	0			
N-Methylperfluorooctanesulfonamidoa	444.1	120	500	0	88.8	70-130	0			
11Cl-Pf3OUdS	405.2	25	471	0	86	70-130	0			
4,8-Dioxa-3H-perfluorononanoic Acid (	395.6	25	471	0	84	70-130	0			
9Cl-PF3ONS	428.4	25	466	0	91.9	70-130	0			
Hexafluoropropylene oxide dimer acid	527.7	120	500	0	106	50-130	0			
Surr: 13C4-PFBA	*314.5*	0	*400*	0	*78.6*	*50-130*	0			
Surr: 13C5-PFPeA	*349.2*	0	*400*	0	*87.3*	*50-130*	0			
Surr: 13C2-PFHxA	*357.1*	0	*400*	0	*89.3*	*50-130*	0			
Surr: 13C4-PFHpA	*350.9*	0	*400*	0	*87.7*	*50-130*	0			
Surr: 13C4-PFOA	*344.6*	0	*400*	0	*86.1*	*70-130*	0			
Surr: 13C5-PFNA	*350.8*	0	*400*	0	*87.7*	*70-130*	0			
Surr: 13C2-PFDA	*343.5*	0	*400*	0	*85.9*	*70-130*	0			
Surr: 13C2-PFUnA	*342.5*	0	*400*	0	*85.6*	*70-130*	0			
Surr: 13C2-PFDoA	*352.2*	0	*400*	0	*88*	*70-130*	0			
Surr: 13C2-PFTeA	*235.4*	0	*400*	0	*58.8*	*50-130*	0			
Surr: 13C3-PFBS	*306.9*	0	*400*	0	*76.7*	*50-130*	0			
Surr: 18O2-PFHxS	*335.1*	0	*378*	0	*88.7*	*70-130*	0			
Surr: 13C4-PFOS	*331*	0	*383*	0	*86.4*	*70-130*	0			
Surr: 13C2-FtS 4:2	*238.2*	0	*373*	0	*63.9*	*50-130*	0			

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

QC BATCH REPORT

Batch ID: **183025** Instrument ID **LCMS1** Method: **D7968-17a**

Surr: 13C2-FtS 6:2	*268.3*	0	*380*	0	*70.6*	*50-130*	0
Surr: 13C2-FtS 8:2	*305.6*	0	*383*	0	*79.8*	*50-130*	0
Surr: 13C8-FOSA	*351.1*	0	*400*	0	*87.8*	*50-130*	0
Surr: d3-N-MeFOSAA	*383.4*	0	*400*	0	*95.8*	*50-130*	0
Surr: d5-N-EtFOSAA	*319.7*	0	*400*	0	*79.9*	*50-130*	0
Surr: 13C3-HFPO-DA	*471.3*	0	*400*	0	*118*	*50-130*	0

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: City of Lowell
Work Order: 21090239
Project: IPP FOG/BIO PFAS

QC BATCH REPORT

Batch ID: **183025** Instrument ID **LCMS1** Method: **D7968-17a**

LCS3	Sample ID: **LCS3-183025-183025**				Units: **ng/Kg**			Analysis Date: **9/10/2021 09:33 PM**			
Client ID:		Run ID: **LCMS1_210910D**			SeqNo: **7741231**			Prep Date: **9/9/2021**		DF: **1**	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Perfluorobutanoic Acid (PFBA)	97.78	120	125	0	78.2	35-150	0			J
Perfluoropentanoic Acid (PFPeA)	95.79	120	125	0	76.6	35-150	0			J
Perfluorohexanoic Acid (PFHxA)	100.7	120	125	0	80.6	35-150	0			J
Perfluoroheptanoic Acid (PFHpA)	87.87	120	125	0	70.3	35-150	0			J
Perfluorooctanoic Acid (PFOA)	109.5	25	125	0	87.6	35-150	0			
Perfluorononanoic Acid (PFNA)	98.99	25	125	0	79.2	35-150	0			
Perfluorodecanoic Acid (PFDA)	95.81	120	125	0	76.6	35-150	0			J
Perfluoroundecanoic Acid (PFUnA)	105.2	120	125	0	84.2	35-150	0			J
Perfluorododecanoic Acid (PFDoA)	110.4	120	125	0	88.3	35-150	0			J
Perfluorotridecanoic Acid (PFTriA)	127.1	120	125	0	102	35-150	0			
Perfluorotetradecanoic Acid (PFTeA)	101.1	120	125	0	80.9	35-150	0			J
Perfluorobutanesulfonic Acid (PFBS)	101.4	25	110	0	92.2	35-150	0			
Perfluoropentanesulfonic Acid (PFPeS	93.29	25	118	0	79.1	35-150	0			
Perfluorohexanesulfonic Acid (PFHxS)	83.02	120	115	0	72.2	35-150	0			J
Perfluoroheptanesulfonic Acid (PFHpS	92.71	120	120	0	77.3	35-150	0			J
Perfluorooctanesulfonic Acid (PFOS)	102.9	25	115	0	89.5	35-150	0			
Perfluorononanesulfonic Acid (PFNS)	112.8	120	120	0	94	35-150	0			J
Perfluorodecanesulfonic Acid (PFDS)	108.2	25	120	0	90.2	35-150	0			
Fluorotelomer Sulphonic Acid 4:2 (FtS	91.3	120	118	0	77.4	35-150	0			J
Fluorotelomer Sulphonic Acid 6:2 (FtS	119.3	120	118	0	101	35-150	0			J
Fluorotelomer Sulphonic Acid 8:2 (FtS	90.46	120	120	0	75.4	35-150	0			J
Perfluorooctanesulfonamide (PFOSA)	99.67	25	125	0	79.7	35-150	0			
N-Ethylperfluorooctanesulfonamidoace	106.1	120	125	0	84.9	35-150	0			J
N-Methylperfluorooctanesulfonamidoa	128.5	120	125	0	103	35-150	0			
11Cl-Pf3OUdS	93.53	25	118	0	79.3	35-150	0			
4,8-Dioxa-3H-perfluorononanoic Acid (	100.5	25	118	0	85.2	35-150	0			
9Cl-PF3ONS	95.95	25	118	0	81.3	35-150	0			
Hexafluoropropylene oxide dimer acid	138.2	120	125	0	111	35-150	0			
Surr: 13C4-PFBA	*330.4*	0	*400*	0	*82.6*	*50-130*	0			
Surr: 13C5-PFPeA	*363*	0	*400*	0	*90.7*	*50-130*	0			
Surr: 13C2-PFHxA	*390.7*	0	*400*	0	*97.7*	*50-130*	0			
Surr: 13C4-PFHpA	*382.8*	0	*400*	0	*95.7*	*50-130*	0			
Surr: 13C4-PFOA	*371.4*	0	*400*	0	*92.9*	*70-130*	0			
Surr: 13C5-PFNA	*378*	0	*400*	0	*94.5*	*70-130*	0			
Surr: 13C2-PFDA	*372.1*	0	*400*	0	*93*	*70-130*	0			
Surr: 13C2-PFUnA	*363.1*	0	*400*	0	*90.8*	*70-130*	0			
Surr: 13C2-PFDoA	*364.8*	0	*400*	0	*91.2*	*70-130*	0			
Surr: 13C2-PFTeA	*228*	0	*400*	0	*57*	*50-130*	0			
Surr: 13C3-PFBS	*334.3*	0	*400*	0	*83.6*	*50-130*	0			
Surr: 18O2-PFHxS	*355*	0	*378*	0	*93.9*	*70-130*	0			
Surr: 13C4-PFOS	*330.1*	0	*383*	0	*86.2*	*70-130*	0			
Surr: 13C2-FtS 4:2	*229.3*	0	*373*	0	*61.5*	*50-130*	0			

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: City of Lowell
Work Order: 21090239
Project: IPP FOG/BIO PFAS

QC BATCH REPORT

Batch ID: **183025**	Instrument ID **LCMS1**		Method: **D7968-17a**				
Surr: 13C2-FtS 6:2	*289.3*	0	*380*	0	*76.1*	*50-130*	0
Surr: 13C2-FtS 8:2	*302.1*	0	*383*	0	*78.9*	*50-130*	0
Surr: 13C8-FOSA	*381*	0	*400*	0	*95.3*	*50-130*	0
Surr: d3-N-MeFOSAA	*367.3*	0	*400*	0	*91.8*	*50-130*	0
Surr: d5-N-EtFOSAA	*387.9*	0	*400*	0	*97*	*50-130*	0
Surr: 13C3-HFPO-DA	*474.5*	0	*400*	0	*119*	*50-130*	0

The following samples were analyzed in this batch: 21090239-02A

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: City of Lowell
Work Order: 21090239
Project: IPP FOG/BIO PFAS

QC BATCH REPORT

Batch ID: **183252** Instrument ID **O&G** Method: **E1664A**

MBLK Sample ID: **MBLK-183252-183252** Units: **mg/L** Analysis Date: **9/7/2021 08:30 AM**
Client ID: Run ID: **O&G_210907A** SeqNo: **7724892** Prep Date: **9/7/2021** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Oil and Grease	U	5.0								

LCS Sample ID: **LCS-183252-183252** Units: **mg/L** Analysis Date: **9/7/2021 08:30 AM**
Client ID: Run ID: **O&G_210907A** SeqNo: **7724891** Prep Date: **9/7/2021** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Oil and Grease	32.9	5.0	40	0	82.2	78-114	0			

MS Sample ID: **21090094-01C MS** Units: **mg/L** Analysis Date: **9/7/2021 08:30 AM**
Client ID: Run ID: **O&G_210907A** SeqNo: **7724878** Prep Date: **9/7/2021** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Oil and Grease	42.47	5.9	47.06	0	90.3	78-114	0			

DUP Sample ID: **21090094-02C DUP** Units: **mg/L** Analysis Date: **9/7/2021 08:30 AM**
Client ID: Run ID: **O&G_210907A** SeqNo: **7724880** Prep Date: **9/7/2021** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Oil and Grease	U	5.0	0	0	0	0-0	0.2	0	18	

The following samples were analyzed in this batch: 21090239-01A

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: City of Lowell
Work Order: 21090239
Project: IPP FOG/BIO PFAS

QC BATCH REPORT

Batch ID: **R326169** Instrument ID **MOIST** Method: **SW3550C**

MBLK Sample ID: **WBLKS-R326169** Units: **% of sample** Analysis Date: **9/7/2021 01:29 PM**
Client ID: Run ID: **MOIST_210907B** SeqNo: **7727496** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Moisture	U	0.10								

LCS Sample ID: **LCS-R326169** Units: **% of sample** Analysis Date: **9/7/2021 01:29 PM**
Client ID: Run ID: **MOIST_210907B** SeqNo: **7727495** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Moisture	99.98	0.10	100	0	100	98-102	0			

DUP Sample ID: **21090135-03B DUP** Units: **% of sample** Analysis Date: **9/7/2021 01:29 PM**
Client ID: Run ID: **MOIST_210907B** SeqNo: **7727482** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Moisture	19.14	0.10	0	0	0	0-0	16.82	12.9	10	R

DUP Sample ID: **21090250-01B DUP** Units: **% of sample** Analysis Date: **9/7/2021 01:29 PM**
Client ID: Run ID: **MOIST_210907B** SeqNo: **7727489** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Moisture	15.33	0.10	0	0	0	0-0	14.85	3.18	10	

The following samples were analyzed in this batch: 21090239-02A

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Cincinnati, OH +1 513 733 5336
Everett, WA +1 425 356 2600
Fort Collins, CO +1 970 490 1511
Holland, MI +1 616 399 6070
Houston, TX +1 281 530 5656
Middletown, PA +1 717 944 5541
Spring City, PA +1 610 948 4903
Salt Lake City, UT +1 801 266 7700
South Charleston, WV +1 304 356 3168
York, PA +1 717 505 5280

Chain of Custody Form

Page ____ of ____

COC ID 51296

ALS Project Manager: JM

ALS Work Order #: 21090239

Customer Information		Project Information		Parameter/Method Request for Analysis	
Purchase Order		Project Name	IPP FOG / Bio PFAS	A	Fats, Oils & Grease
Work Order		Project Number		B	PFAS (28 compounds) Method 537
Company Name	City of Lowell - Suez	Bill To Company	City of Lowell - Suez	C	
Send Report To	Brian Vander Meulen	Invoice Attn	Brian Vander Meulen	D	
Address	300 Bowes St	Address	PO Box 194	E	
				F	
City/State/Zip	Lowell, MI 49331	City/State/Zip	Lowell, MI 49331	G	
Phone	616-897-8135	Phone	616-897-8135	H	
Fax		Fax		I	
e-Mail Address	brian.vandermeulen@suez.com	e-Mail Address	same	J	

No.	Sample Description	Date	Time	Matrix	Pres.	# Bottles	A	B	C	D	E	F	G	H	I	J	Hold
1	IPP FOG	9/1/21	8:00a	WW	3	2	X										
2	Biosolids PFAS	9/1/21	8:30a	Biosolids	—	2		X									
3																	
4																	
5																	
6																	
7																	
8																	
9																	
10																	

Sampler(s) Please Print & Sign: Brian Vander Meulen

Shipment Method: UPS

Turnaround Time in Business Days (BD): ☐ 10 BD ☐ 5 BD ☐ 3 BD ☐ 2 BD ☐ 1 BD ☐ Other ____

Results Due Date:

Relinquished by: Date: 9/1/21 Time: 9:00 am Received by: UPS

Relinquished by: UPS Date: 9/2/21 Time: 1000 Received by (Laboratory):

Logged by (Laboratory): Date: 9/2/21 Time: 1450 Checked by (Laboratory):

Notes:

Cooler ID	Cooler Temp
0.8C	IR3

QC Package: (Check One Box Below)
☐ Level II Std QC ☐ TRRP Checklist
☐ Level III Std QC/Raw Data ☐ TRRP Level IV
☐ Level IV SW846/CLP
☐ Other ____

Preservative Key: 1-HCl 2-HNO_3 3-H_2SO_4 4-NaOH 5-$Na_2S_2O_3$ 6-$NaHSO_4$ 7-Other 8-4°C 9-5035

Note: 1. Any changes must be made in writing once samples and COC Form have been submitted to ALS Environmental.
2. Unless otherwise agreed in a formal contract, services provided by ALS Environmental are expressly limited to the terms and conditions stated on the reverse.
3. The Chain of Custody is a legal document. All information must be completed accurately.

ALS Group, USA

Sample Receipt Checklist

Client Name: **LOWELL - CITY OF** Date/Time Received: **02-Sep-21 10:00**

Work Order: **21090239** Received by: **LYS**

Checklist completed by Lydia Sweet 02-Sep-21 Reviewed by: Jodi Blouw 02-Sep-21

eSignature / Date / eSignature / Date

Matrices: Water, solid

Carrier name: UPS

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on shipping container/cooler?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time?	Yes ☑	No ☐	
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐	
Sample(s) received on ice?	Yes ☑	No ☐	
Temperature(s)/Thermometer(s):	0.8/1.8C	IR3	
Cooler(s)/Kit(s):			
Date/Time sample(s) sent to storage:	9/2/2021 3:02:30 PM		
Water - VOA vials have zero headspace?	Yes ☐	No ☐	No VOA vials submitted ☑
Water - pH acceptable upon receipt?	Yes ☐	No ☐	N/A ☑
pH adjusted?	Yes ☐	No ☐	N/A ☑
pH adjusted by:	-		

Login Notes:

Client Contacted: Date Contacted: Person Contacted:

Contacted By: Regarding:

Comments:

CorrectiveAction: