October 28, 2018

Vista Work Order No. 1802664

Ms. Maya Murshak
Merit Laboratories, Inc.
2680 East Lansing Drive
East Lansing, MI 48823

Dear Ms. Murshak,

Enclosed are the results for the sample set received at Vista Analytical Laboratory on August 23, 2018 under your Project Name 'MDEQ State Municipal Sampling'.

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,

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. 1802664
Case Narrative

Sample Condition on Receipt:

One drinking water sample was received in good condition and within the method temperature requirements. The sample was received and stored securely in accordance with Vista standard operating procedures and EPA methodology.

Analytical Notes:

EPA Method 537, Rev. 1.1

The sample was extracted and analyzed for a selected list of 14 PFAS using EPA Method 537, Rev. 1.1. The results have been reported following the conventions specified by the Michigan Department of Environmental Quality.

Holding Times

The sample was extracted and analyzed within the method hold times.

Quality Control

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

Two Laboratory Fortified Blanks (LFB/LFBD) and a Laboratory Reagent Blank (LRB) were extracted and analyzed with the preparation batch. No analytes were detected in the Laboratory Reagent Blank. The LFB/LFBD recoveries were within the method acceptance criteria.

The surrogate recoveries outside of the acceptance criteria are listed in the table below.

QC Anomalies

LabNumber	SampleName	Analysis	Analyte	Flag	%Rec
1802664-01	GWNT1808211015GSC	EPA Method 537	13C2-PFHxA	H	132

H = Recovery was outside laboratory acceptance criteria.

TABLE OF CONTENTS

Sample Inventory Report

Vista Sample ID	Client Sample ID	Sampled	Received	Components/Containers
1802664-01	GWNT1808211015GSC	21-Aug-18 10:15	23-Aug-18 09:36	HDPE Bottle, 250 mL HDPE Bottle, 250 mL

Vista Project: 1802664

Client Project: MDEQ State Municipal Sampling

ANALYTICAL RESULTS

Sample ID: LRB

EPA Method 537

Client Data

Name: Merit Laboratories, Inc.
Project: MDEQ State Municipal Sampling
Matrix: Aqueous

Laboratory Data

Lab Sample: B8H0210-BLK1
Column: BEH C18

Analyte	CAS Number	Conc. (ng/L)	RL	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	375-73-5	ND	2		B8H0210	29-Aug-18	0.25 L	16-Sep-18 15:10	1
PFHxA	307-24-4	ND	2		B8H0210	29-Aug-18	0.25 L	16-Sep-18 15:10	1
PFHpA	375-85-9	ND	2		B8H0210	29-Aug-18	0.25 L	16-Sep-18 15:10	1
PFHxS	355-46-4	ND	2		B8H0210	29-Aug-18	0.25 L	16-Sep-18 15:10	1
PFOA	335-67-1	ND	2		B8H0210	29-Aug-18	0.25 L	16-Sep-18 15:10	1
PFNA	375-95-1	ND	2		B8H0210	29-Aug-18	0.25 L	16-Sep-18 15:10	1
PFOS	1763-23-1	ND	2		B8H0210	29-Aug-18	0.25 L	16-Sep-18 15:10	1
PFDA	335-76-2	ND	2		B8H0210	29-Aug-18	0.25 L	16-Sep-18 15:10	1
MeFOSAA	2355-31-9	ND	4		B8H0210	29-Aug-18	0.25 L	16-Sep-18 15:10	1
EtFOSAA	2991-50-6	ND	4		B8H0210	29-Aug-18	0.25 L	16-Sep-18 15:10	1
PFUnA	2058-94-8	ND	4		B8H0210	29-Aug-18	0.25 L	16-Sep-18 15:10	1
PFDoA	307-55-1	ND	4		B8H0210	29-Aug-18	0.25 L	16-Sep-18 15:10	1
PFTrDA	72629-94-8	ND	4		B8H0210	29-Aug-18	0.25 L	16-Sep-18 15:10	1
PFTeDA	376-06-7	ND	4		B8H0210	29-Aug-18	0.25 L	16-Sep-18 15:10	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-PFHxA	SURR	105	70 - 130		B8H0210	29-Aug-18	0.25 L	16-Sep-18 15:10	1
13C2-PFDA	SURR	107	70 - 130		B8H0210	29-Aug-18	0.25 L	16-Sep-18 15:10	1
d5-EtFOSAA	SURR	100	70 - 130		B8H0210	29-Aug-18	0.25 L	16-Sep-18 15:10	1

RL - Reporting limit

Results reported to RL.
Reporting convention specified by MI DEQ.

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

Sample ID: LFBD **EPA Method 537**

Name:	Merit Laboratories, Inc.	Lab Sample:	B8H0210-BS1/B8H0210-BSD1
Project:	MDEQ State Municipal Sampling	QC Batch:	B8H0210
Matrix:	Aqueous	Samp Size:	0.25/0.25 L
		Date Extracted:	29-Aug-18
		Column:	BEH C18

Analyte	CAS Number	LFB (ng/L)	LFB Spike Amt	LFB % Rec	LFB Quals	LFBD (ng/L)	LFBD Spike Amt	LFBD % Rec	RPD	LFBD Quals	%Rec Limits	RPD Limits	LFB Analyzed	LFB Dil	LFBD Analyzed	LFBD Dil
PFBS	375-73-5	80	71	113		87	71	123	9		70-130	30	17-Sep-18 14:08	1	16-Sep-18 15:36	1
PFHxA	307-24-4	76	80	95		87	80	109	13		70-130	30	17-Sep-18 14:08	1	16-Sep-18 15:36	1
PFHpA	375-85-9	76	80	95		79	80	99	4		70-130	30	17-Sep-18 14:08	1	16-Sep-18 15:36	1
PFHxS	355-46-4	90	73	124		92	73	126	1		70-130	30	17-Sep-18 14:08	1	16-Sep-18 15:36	1
PFOA	335-67-1	87	80	109		90	80	113	4		70-130	30	17-Sep-18 14:08	1	16-Sep-18 15:36	1
PFNA	375-95-1	98	80	122		93	80	116	5		70-130	30	17-Sep-18 14:08	1	16-Sep-18 15:36	1
PFOS	1763-23-1	87	74	117		94	74	127	8		70-130	30	17-Sep-18 14:08	1	16-Sep-18 15:36	1
PFDA	335-76-2	86	80	107		85	80	106	1		70-130	30	17-Sep-18 14:08	1	16-Sep-18 15:36	1
MeFOSAA	2355-31-9	80	80	101		94	80	117	15		70-130	30	17-Sep-18 14:08	1	16-Sep-18 15:36	1
EtFOSAA	2991-50-6	69	80	86		75	80	93	8		70-130	30	17-Sep-18 14:08	1	16-Sep-18 15:36	1
PFUnA	2058-94-8	82	80	103		82	80	102	0		70-130	30	17-Sep-18 14:08	1	16-Sep-18 15:36	1
PFDoA	307-55-1	76	80	95		88	80	110	14		70-130	30	17-Sep-18 14:08	1	16-Sep-18 15:36	1
PFTrDA	72629-94-8	76	80	95		84	80	105	10		70-130	30	17-Sep-18 14:08	1	16-Sep-18 15:36	1
PFTeDA	376-06-7	66	80	83		76	80	95	13		70-130	30	17-Sep-18 14:08	1	16-Sep-18 15:36	1

Labeled Standards	Type	LFB % Rec	LFB Quals	LFBD % Rec	LFBD Quals	Limits	LFB Analyzed	LFB Dil	LFBD Analyzed	LFBD Dil
13C2-PFHxA	SURR	108		104		70-130	17-Sep-18 14:08	1	16-Sep-18 15:36	1
13C2-PFDA	SURR	104		100		70-130	17-Sep-18 14:08	1	16-Sep-18 15:36	1
d5-EtFOSAA	SURR	92		96		70-130	17-Sep-18 14:08	1	16-Sep-18 15:36	1

Data Reported per Michigan DEQ instructions.

Sample ID: GWNT1808211015GSC

EPA Method 537

Client Data

Name: Merit Laboratories, Inc.
Project: MDEQ State Municipal Sampling
Location: FORDRIVER02350CH001
Matrix: Drinking Water
Date Collected: 21-Aug-18 10:15

Laboratory Data

Lab Sample: 1802664-01
Date Received: 23-Aug-18 09:36
Column: BEH C18

Analyte	CAS Number	Conc. (ng/L)	RL	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	375-73-5	ND	2		B8H0210	29-Aug-18	0.24 L	18-Sep-18 16:54	1
PFHxA	307-24-4	ND	2		B8H0210	29-Aug-18	0.24 L	18-Sep-18 16:54	1
PFHpA	375-85-9	ND	2		B8H0210	29-Aug-18	0.24 L	18-Sep-18 16:54	1
PFHxS	355-46-4	ND	2		B8H0210	29-Aug-18	0.24 L	18-Sep-18 16:54	1
PFOA	335-67-1	ND	2		B8H0210	29-Aug-18	0.24 L	18-Sep-18 16:54	1
PFNA	375-95-1	ND	2		B8H0210	29-Aug-18	0.24 L	18-Sep-18 16:54	1
PFOS	1763-23-1	ND	2		B8H0210	29-Aug-18	0.24 L	18-Sep-18 16:54	1
PFDA	335-76-2	ND	2		B8H0210	29-Aug-18	0.24 L	18-Sep-18 16:54	1
MeFOSAA	2355-31-9	ND	4		B8H0210	29-Aug-18	0.24 L	18-Sep-18 16:54	1
EtFOSAA	2991-50-6	ND	4		B8H0210	29-Aug-18	0.24 L	18-Sep-18 16:54	1
PFUnA	2058-94-8	ND	4		B8H0210	29-Aug-18	0.24 L	18-Sep-18 16:54	1
PFDoA	307-55-1	ND	4		B8H0210	29-Aug-18	0.24 L	18-Sep-18 16:54	1
PFTrDA	72629-94-8	ND	4		B8H0210	29-Aug-18	0.24 L	18-Sep-18 16:54	1
PFTeDA	376-06-7	ND	4		B8H0210	29-Aug-18	0.24 L	18-Sep-18 16:54	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-PFHxA	SURR	132	70 - 130	H	B8H0210	29-Aug-18	0.24 L	18-Sep-18 16:54	1
13C2-PFDA	SURR	127	70 - 130		B8H0210	29-Aug-18	0.24 L	18-Sep-18 16:54	1
d5-EtFOSAA	SURR	107	70 - 130		B8H0210	29-Aug-18	0.24 L	18-Sep-18 16:54	1

RL - Reporting limit

Results reported to RL.
Reporting convention specified by MI DEQ..

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA 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**
Conc.	**Concentration**
D	**Dilution**
DL	**Detection limit**
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**
LOD	**Limits of Detection**
LOQ	**Limits of Quantitation**
M	**Estimated Maximum Possible Concentration (CA Region 2 projects only)**
NA	**Not applicable**
ND	**Not Detected**
Q	**Ion ratio outside of 70-130% of Standard Ratio. (DOD PFAS projects only)**
TEQ	**Toxic Equivalency**
U	**Not Detected (specific projects only)**
*****	**See Cover Letter**

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

CERTIFICATIONS

Accrediting Authority	Certificate Number
Alaska Department of Environmental Conservation	17-013
Arkansas Department of Environmental Quality	18-008-0
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	2018017
Minnesota Department of Health	1322288
New Hampshire Environmental Accreditation Program	207717
New Jersey Department of Environmental Protection	CA003
New York Department of Health	11411
Oregon Laboratory Accreditation Program	4042-009
Pennsylvania Department of Environmental Protection	014
Texas Commission on Environmental Quality	T104704189-18-8
Virginia Department of General Services	9077
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 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
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

Vista Analytical Laboratory

CHAIN OF CUSTODY

For Laboratory Use Only
Work Order #: 1802664 Temp: 1.7 °C
Storage ID: WR-2 Storage Secured: Yes ☑ No ☐

Project ID: MDEQ STATE MUNICIPAL SAMPLING PO#: 60570309 Sampler: GARTH COUSINEAU (name)

TAT (check one): Standard: [x] 21 days; Rush (surcharge may apply) [ ] 14 days [ ] 7 days Specify:

Invoice to: Name	Company	Address	City	State	Ph#	Fax#
MIKE JURY	MDEQ	401 KETCHUM ST, SUITE B	BAY CITY	MI	989-894-6255	989-891-9237

Relinquished by (printed name and signature)	Date	Time	Received by (printed name and signature)	Date	Time
Garth Cousineau	8/22/18	1300	Kim Ecric	8/23/18	1035
Relinquished by (printed name and signature)	Date	Time	Received by (printed name and signature)	Date	Time

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

ATTN: Jennifer Miller

Method of Shipment:

Tracking No.:

Add Analysis(es) Requested

Sample ID	Date	Time	Location/Sample Description	Container(s) Quantity	Type	Matrix	PFAS Isotope Dilution: List of 21	List of 21 w/isomers	List of 24	List of 24 w/isomers	List of 28	Other: Please List Below	USEPA Method 537: PFOA/ PFOS	UCMR3 PFAS List 6	PFAS List 14	Comments
GWNT1808211015GSC	8/21/18	1015	FORDRIVER02350CH001	2	P	DW									X	

Special Instructions/Comments: Send Results and Acknowledgements to the list provided by e-mail to Vista.

SEND DOCUMENTATION AND RESULTS TO:
Name: MIKE JURY
Company: MDEQ
Address: 401 KETCHUM ST, SUITE B
City: BAY CITY State: MI Zip: 48708
Phone: 989-894-6255 Fax: 989-891-9237
Email: dorin.bogdan@aecom.com

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

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

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:

Vista Analytical Laboratory

Sample Log in Checklist

2 of 2

WO#: 1802664
SDG#: —
TAT: Std

Section 1: Container Receipt

Delivered By: ☑ FedEx ☐ UPS ☐ On Trac ☐ GSO ☐ DHL ☐ Hand Delivered ☐ Other

Number of Containers	Arrival Date	Arrival time	Received By/Date	LR-SCL Initiated By
2	08/23/18	0936	KE 08/23/18	KE

Section 2: Sample Receipt Condition and Initial Storage

Container Condition	Chain of Custody	Preservation Type	Temperature	Storage Location	Initials/ Date
☑ Shipping container intact ☐ Custody Seals present ☐ Custody seals intact	☑ COC present ☑ Relinquished by section complete 9 COC's	☑ Ice ☐ Blue Ice ☐ Dry Ice ☐ Other	Thermometer ID: **IR-4** ☐ Probe used 1035 Temp (uncorrected): 1.8 °C Temp (corrected): 1.7 °C ☐ Anomaly form required	☑ WR2 ☐ WF2 ☐ NA	KE 8/23/18

Airbill/Trk # 7730 2634 1757 (2 of 2)

Shipping container ☐ Vista ☑ Client ☐ Retain ☑ Return ☐ Dispose — By Initials/Date: KE 8/24/18

Section 3: Sample Log In

	YES Initials/Date	NO Initials/Date
COC identifies sample ID, date and time of collection, collector's name	KE 8/23/18	☐ Anomaly form required
COC identifies sample matrix and test method	KE 8/23/18	☐ Anomaly form required
All samples present and accounted for on COC	KE 8/24/18	☐ Anomaly form required
Sample IDs are legible on COC and Bottles	KE 8/24/18	☐ Anomaly form required
Samples conform to the description on the COC	KE 8/24/18	☐ Anomaly form required
Samples are within hold, intact and suitable for testing	KE 8/24/18	☐ Anomaly form required
Preservation documented as required: ☐ $Na_2S_2O_3$ ☑ Trizma ☐ NA	KE 8/24/18	
Samples stored ☑ WR2 Shelf: A3 E4 ☐ WF2 Shelf: _____ ☐ R1	By Initials/Date: KE 08/24/18 KT	

Section 4: Comments

	Initials/Date
☐ Sample Inventory Form Attached NA	—

ID.: LR – SLC *Rev No.: 1* *Rev Date: 21 August 2018* *Page: 1 of 1*