TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Canton
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Tel: (330)497-9396

TestAmerica Job ID: 240-104487-2
Client Project/Site: Ford LTP Livonia MI - E203631

For:
ARCADIS U.S., Inc.
28550 Cabot Drive
Suite 500
Novi, Michigan 48377

Attn: Kristoffer Hinskey

Authorized for release by:
1/16/2019 5:08:04 PM

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Results relate only to the items tested and the sample(s) as received by the laboratory.

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Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
X	Surrogate is outside control limits
U	Indicates the analyte was analyzed for but not detected.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Job ID: 240-104487-2

Laboratory: TestAmerica Canton

Narrative

CASE NARRATIVE

Client: ARCADIS U.S., Inc.

Project: Ford LTP Livonia MI - E203631

Report Number: 240-104487-2

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica Canton attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header.

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

RECEIPT

The samples were received on 11/16/2018 8:40 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 2 coolers at receipt time were 1.3º C and 1.9º C.

VOLATILE ORGANIC COMPOUNDS (GCMS)

Samples HPT-197_15-19_111318 (240-104487-1), HPT-197_10-14_111318 (240-104487-2), HPT-197_5-9_111318 (240-104487-3), HPT-198_16-20_111318 (240-104487-4), HPT-198_11-15_111318 (240-104487-5) and HPT-198_6-10_111318 (240-104487-6) were analyzed for volatile organic compounds (GCMS) in accordance with EPA SW-846 Method 8260B. The samples were analyzed on 11/23/2018 and 11/24/2018.

1,2-Dichloroethane-d4 (Surr) failed the surrogate recovery criteria high for HPT-197_15-19_111318 (240-104487-1), HPT-197_10-14_111318 (240-104487-2), HPT-198_6-10_111318 (240-104487-6), MB 240-356773/6, MB 240-356855/6, LCS 240-356855/4, 240-104447-D-4 MS, HPT-197_5-9_111318MS (240-104487-3MS), 240-104447-E-4 MSD and HPT-197_5-9_111318MSD (240-104487-3MSD). Refer to the QC report for details.

1,2-Dichloroethane-d4 (Surr) and Dibromofluoromethane (Surr) failed the surrogate recovery criteria high for HPT-197_5-9_111318 (240-104487-3), HPT-198_16-20_111318 (240-104487-4) and HPT-198_11-15_111318 (240-104487-5).

Surrogate recovery for the following samples was outside the upper control limit. This sample did not contain any target analytes; therefore, re-extraction and/or re-analysis was not performed: HPT-197_15-19_111318 (240-104487-1), HPT-197_10-14_111318

Job ID: 240-104487-2 (Continued)

Laboratory: TestAmerica Canton (Continued)

(240-104487-2), HPT-197_5-9_111318 (240-104487-3), HPT-198_16-20_111318 (240-104487-4), (MB 240-356773/6), HPT-198_11-15_111318 (240-104487-5), HPT-198_6-10_111318 (240-104487-6), (LCS 240-356855/4) and (MB 240-356855/6).

The pH of the samples was greater than 2. The samples were analyzed within the normal 14 day holding time; however, experimental evidence suggests that some aromatic compounds in wastewater samples, notably, Benzene, Toluene, and Ethylbenzene are susceptible to biological degradation if samples are not preserved to a pH of 2: HPT-197_15-19_111318 (240-104487-1) and HPT-198_16-20_111318 (240-104487-4).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

VOLATILE ORGANIC COMPOUNDS (GCMS SIM)

Samples HPT-197_15-19_111318 (240-104487-1), HPT-197_10-14_111318 (240-104487-2), HPT-197_5-9_111318 (240-104487-3), HPT-198_16-20_111318 (240-104487-4), HPT-198_11-15_111318 (240-104487-5) and HPT-198_6-10_111318 (240-104487-6) were analyzed for volatile organic compounds (GCMS SIM) in accordance with EPA SW-846 Method 8260B SIM. The samples were analyzed on 11/21/2018.

The pH is greater than 2 for the following samples: HPT-197_15-19_111318 (240-104487-1), HPT-198_16-20_111318 (240-104487-4) and HPT-198_11-15_111318 (240-104487-5).

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Method Summary

Client: ARCADIS U.S., Inc.
Project/Site: Ford LTP Livonia MI - E203631

TestAmerica Job ID: 240-104487-2

Method	Method Description	Protocol	Laboratory
8260B	Volatile Organic Compounds (GC/MS)	SW846	TAL CAN
8260B SIM	Volatile Organic Compounds (GC/MS)	SW846	TAL CAN
5030B	Purge and Trap	SW846	TAL CAN

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL CAN = TestAmerica Canton, 4101 Shuffel Street NW, North Canton, OH 44720, TEL (330)497-9396

Sample Summary

Client: ARCADIS U.S., Inc.
Project/Site: Ford LTP Livonia MI - E203631

TestAmerica Job ID: 240-104487-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
240-104487-1	HPT-197_15-19_111318	Water	11/13/18 13:40	11/16/18 08:40
240-104487-2	HPT-197_10-14_111318	Water	11/13/18 14:05	11/16/18 08:40
240-104487-3	HPT-197_5-9_111318	Water	11/13/18 14:15	11/16/18 08:40
240-104487-4	HPT-198_16-20_111318	Water	11/13/18 15:40	11/16/18 08:40
240-104487-5	HPT-198_11-15_111318	Water	11/13/18 16:00	11/16/18 08:40
240-104487-6	HPT-198_6-10_111318	Water	11/13/18 16:15	11/16/18 08:40

Detection Summary

Client: ARCADIS U.S., Inc.
Project/Site: Ford LTP Livonia MI - E203631

TestAmerica Job ID: 240-104487-2

Client Sample ID: HPT-197_15-19_111318 — Lab Sample ID: 240-104487-1

No Detections.

Client Sample ID: HPT-197_10-14_111318 — Lab Sample ID: 240-104487-2

No Detections.

Client Sample ID: HPT-197_5-9_111318 — Lab Sample ID: 240-104487-3

No Detections.

Client Sample ID: HPT-198_16-20_111318 — Lab Sample ID: 240-104487-4

No Detections.

Client Sample ID: HPT-198_11-15_111318 — Lab Sample ID: 240-104487-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	0.38	J	1.0	0.16	ug/L	1		8260B	Total/NA

Client Sample ID: HPT-198_6-10_111318 — Lab Sample ID: 240-104487-6

No Detections.

This Detection Summary does not include radiochemical test results.

Client: ARCADIS U.S., Inc.
Project/Site: Ford LTP Livonia MI - E203631

TestAmerica Job ID: 240-104487-2

Client Sample ID: HPT-197_15-19_111318
Date Collected: 11/13/18 13:40
Date Received: 11/16/18 08:40

Lab Sample ID: 240-104487-1
Matrix: Water

Method: 8260B SIM - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	2.0	U	2.0	0.86	ug/L			11/21/18 16:03	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*103*		*63 - 125*		*11/21/18 16:03*	*1*

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	1.0	U	1.0	0.19	ug/L			11/23/18 21:01	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			11/23/18 21:01	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			11/23/18 21:01	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			11/23/18 21:01	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			11/23/18 21:01	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			11/23/18 21:01	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*148*	*X*	*70 - 121*		*11/23/18 21:01*	*1*
4-Bromofluorobenzene (Surr)	*88*		*59 - 120*		*11/23/18 21:01*	*1*
Toluene-d8 (Surr)	*92*		*70 - 123*		*11/23/18 21:01*	*1*
Dibromofluoromethane (Surr)	*128*		*75 - 128*		*11/23/18 21:01*	*1*

Client: ARCADIS U.S., Inc.
Project/Site: Ford LTP Livonia MI - E203631

TestAmerica Job ID: 240-104487-2

Client Sample ID: HPT-197_10-14_111318
Date Collected: 11/13/18 14:05
Date Received: 11/16/18 08:40

Lab Sample ID: 240-104487-2
Matrix: Water

Method: 8260B SIM - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	2.0	U	2.0	0.86	ug/L			11/21/18 16:29	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*104*		*63 - 125*		*11/21/18 16:29*	*1*

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	1.0	U	1.0	0.19	ug/L			11/23/18 21:25	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			11/23/18 21:25	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			11/23/18 21:25	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			11/23/18 21:25	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			11/23/18 21:25	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			11/23/18 21:25	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*145*	*X*	*70 - 121*		*11/23/18 21:25*	*1*
4-Bromofluorobenzene (Surr)	*87*		*59 - 120*		*11/23/18 21:25*	*1*
Toluene-d8 (Surr)	*89*		*70 - 123*		*11/23/18 21:25*	*1*
Dibromofluoromethane (Surr)	*127*		*75 - 128*		*11/23/18 21:25*	*1*

Client: ARCADIS U.S., Inc.
Project/Site: Ford LTP Livonia MI - E203631

TestAmerica Job ID: 240-104487-2

Client Sample ID: HPT-197_5-9_111318
Date Collected: 11/13/18 14:15
Date Received: 11/16/18 08:40

Lab Sample ID: 240-104487-3
Matrix: Water

Method: 8260B SIM - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	2.0	U	2.0	0.86	ug/L			11/21/18 16:54	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*103*		*63 - 125*		*11/21/18 16:54*	*1*

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	1.0	U	1.0	0.19	ug/L			11/23/18 22:13	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			11/23/18 22:13	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			11/23/18 22:13	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			11/23/18 22:13	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			11/23/18 22:13	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			11/23/18 22:13	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*151*	*X*	*70 - 121*		*11/23/18 22:13*	*1*
4-Bromofluorobenzene (Surr)	*88*		*59 - 120*		*11/23/18 22:13*	*1*
Toluene-d8 (Surr)	*87*		*70 - 123*		*11/23/18 22:13*	*1*
Dibromofluoromethane (Surr)	*132*	*X*	*75 - 128*		*11/23/18 22:13*	*1*

Client: ARCADIS U.S., Inc.
Project/Site: Ford LTP Livonia MI - E203631

TestAmerica Job ID: 240-104487-2

Client Sample ID: HPT-198_16-20_111318
Date Collected: 11/13/18 15:40
Date Received: 11/16/18 08:40

Lab Sample ID: 240-104487-4
Matrix: Water

Method: 8260B SIM - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	2.0	U	2.0	0.86	ug/L			11/21/18 18:11	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*104*		*63 - 125*		*11/21/18 18:11*	*1*

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	1.0	U	1.0	0.19	ug/L			11/23/18 21:49	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			11/23/18 21:49	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			11/23/18 21:49	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			11/23/18 21:49	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			11/23/18 21:49	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			11/23/18 21:49	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*151*	*X*	*70 - 121*		*11/23/18 21:49*	*1*
4-Bromofluorobenzene (Surr)	*88*		*59 - 120*		*11/23/18 21:49*	*1*
Toluene-d8 (Surr)	*92*		*70 - 123*		*11/23/18 21:49*	*1*
Dibromofluoromethane (Surr)	*130*	*X*	*75 - 128*		*11/23/18 21:49*	*1*

Client: ARCADIS U.S., Inc.
Project/Site: Ford LTP Livonia MI - E203631

TestAmerica Job ID: 240-104487-2

Client Sample ID: HPT-198_11-15_111318
Date Collected: 11/13/18 16:00
Date Received: 11/16/18 08:40

Lab Sample ID: 240-104487-5
Matrix: Water

Method: 8260B SIM - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	2.0	U	2.0	0.86	ug/L			11/21/18 18:37	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*106*		*63 - 125*		*11/21/18 18:37*	*1*

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	1.0	U	1.0	0.19	ug/L			11/24/18 18:55	1
cis-1,2-Dichloroethene	**0.38**	**J**	1.0	0.16	ug/L			11/24/18 18:55	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			11/24/18 18:55	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			11/24/18 18:55	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			11/24/18 18:55	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			11/24/18 18:55	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*147*	*X*	*70 - 121*		*11/24/18 18:55*	*1*
4-Bromofluorobenzene (Surr)	*88*		*59 - 120*		*11/24/18 18:55*	*1*
Toluene-d8 (Surr)	*91*		*70 - 123*		*11/24/18 18:55*	*1*
Dibromofluoromethane (Surr)	*130*	*X*	*75 - 128*		*11/24/18 18:55*	*1*

Client Sample ID: HPT-198_6-10_111318
Date Collected: 11/13/18 16:15
Date Received: 11/16/18 08:40

Lab Sample ID: 240-104487-6
Matrix: Water

Method: 8260B SIM - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	2.0	U	2.0	0.86	ug/L			11/21/18 19:03	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*104*		*63 - 125*		*11/21/18 19:03*	*1*

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	1.0	U	1.0	0.19	ug/L			11/24/18 19:18	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			11/24/18 19:18	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			11/24/18 19:18	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			11/24/18 19:18	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			11/24/18 19:18	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			11/24/18 19:18	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*152*	*X*	*70 - 121*		*11/24/18 19:18*	*1*
4-Bromofluorobenzene (Surr)	*87*		*59 - 120*		*11/24/18 19:18*	*1*
Toluene-d8 (Surr)	*90*		*70 - 123*		*11/24/18 19:18*	*1*
Dibromofluoromethane (Surr)	*128*		*75 - 128*		*11/24/18 19:18*	*1*

Surrogate Summary

Client: ARCADIS U.S., Inc.
Project/Site: Ford LTP Livonia MI - E203631

TestAmerica Job ID: 240-104487-2

Method: 8260B - Volatile Organic Compounds (GC/MS)

Matrix: Water **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	BFB	TOL	DBFM
Lab Sample ID	Client Sample ID	(70-121)	(59-120)	(70-123)	(75-128)
240-104447-D-4 MS	Matrix Spike	129 X	111	97	108
240-104447-E-4 MSD	Matrix Spike Duplicate	125 X	110	96	110
240-104487-1	HPT-197_15-19_111318	148 X	88	92	128
240-104487-2	HPT-197_10-14_111318	145 X	87	89	127
240-104487-3	HPT-197_5-9_111318	151 X	88	87	132 X
240-104487-3 MS	HPT-197_5-9_111318	129 X	110	97	111
240-104487-3 MSD	HPT-197_5-9_111318	127 X	108	96	111
240-104487-4	HPT-198_16-20_111318	151 X	88	92	130 X
240-104487-5	HPT-198_11-15_111318	147 X	88	91	130 X
240-104487-6	HPT-198_6-10_111318	152 X	87	90	128
LCS 240-356773/4	Lab Control Sample	119	107	96	106
LCS 240-356855/4	Lab Control Sample	125 X	110	97	109
MB 240-356773/6	Method Blank	134 X	91	91	117
MB 240-356855/6	Method Blank	140 X	91	94	121

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
TOL = Toluene-d8 (Surr)
DBFM = Dibromofluoromethane (Surr)

Method: 8260B SIM - Volatile Organic Compounds (GC/MS)

Matrix: Water **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)
		DCA
Lab Sample ID	Client Sample ID	(63-125)
240-104487-1	HPT-197_15-19_111318	103
240-104487-2	HPT-197_10-14_111318	104
240-104487-3	HPT-197_5-9_111318	103
240-104487-3 MS	HPT-197_5-9_111318	107
240-104487-3 MSD	HPT-197_5-9_111318	105
240-104487-4	HPT-198_16-20_111318	104
240-104487-5	HPT-198_11-15_111318	106
240-104487-6	HPT-198_6-10_111318	104
LCS 240-356577/4	Lab Control Sample	103
MB 240-356577/5	Method Blank	103

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)

Method: 8260B - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 240-356773/6
Matrix: Water
Analysis Batch: 356773

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	1.0	U	1.0	0.19	ug/L			11/23/18 14:16	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			11/23/18 14:16	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			11/23/18 14:16	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			11/23/18 14:16	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			11/23/18 14:16	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			11/23/18 14:16	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*134*	*X*	*70 - 121*		*11/23/18 14:16*	*1*
4-Bromofluorobenzene (Surr)	*91*		*59 - 120*		*11/23/18 14:16*	*1*
Toluene-d8 (Surr)	*91*		*70 - 123*		*11/23/18 14:16*	*1*
Dibromofluoromethane (Surr)	*117*		*75 - 128*		*11/23/18 14:16*	*1*

Lab Sample ID: LCS 240-356773/4
Matrix: Water
Analysis Batch: 356773

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1-Dichloroethene	10.0	10.2		ug/L		102	65 - 139
cis-1,2-Dichloroethene	10.0	9.85		ug/L		98	76 - 128
Tetrachloroethene	10.0	10.6		ug/L		106	74 - 130
trans-1,2-Dichloroethene	10.0	9.92		ug/L		99	78 - 133
Trichloroethene	10.0	10.2		ug/L		102	76 - 125
Vinyl chloride	10.0	8.08		ug/L		81	58 - 143

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*119*		*70 - 121*
4-Bromofluorobenzene (Surr)	*107*		*59 - 120*
Toluene-d8 (Surr)	*96*		*70 - 123*
Dibromofluoromethane (Surr)	*106*		*75 - 128*

Lab Sample ID: 240-104487-3 MS
Matrix: Water
Analysis Batch: 356773

Client Sample ID: HPT-197_5-9_111318
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1-Dichloroethene	1.0	U	10.0	9.98		ug/L		100	53 - 140
cis-1,2-Dichloroethene	1.0	U	10.0	9.50		ug/L		95	64 - 130
Tetrachloroethene	1.0	U	10.0	9.83		ug/L		98	51 - 136
trans-1,2-Dichloroethene	1.0	U	10.0	9.88		ug/L		99	68 - 133
Trichloroethene	1.0	U	10.0	9.80		ug/L		98	55 - 131
Vinyl chloride	1.0	U	10.0	7.71		ug/L		77	43 - 154

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*129*	*X*	*70 - 121*
4-Bromofluorobenzene (Surr)	*110*		*59 - 120*
Toluene-d8 (Surr)	*97*		*70 - 123*

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 240-104487-3 MS
Matrix: Water
Analysis Batch: 356773

Client Sample ID: HPT-197_5-9_111318
Prep Type: Total/NA

Surrogate	MS %Recovery	MS Qualifier	Limits
Dibromofluoromethane (Surr)	*111*		*75 - 128*

Lab Sample ID: 240-104487-3 MSD
Matrix: Water
Analysis Batch: 356773

Client Sample ID: HPT-197_5-9_111318
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1-Dichloroethene	1.0	U	10.0	10.6		ug/L		106	53 - 140	6	35
cis-1,2-Dichloroethene	1.0	U	10.0	10.3		ug/L		103	64 - 130	8	21
Tetrachloroethene	1.0	U	10.0	9.88		ug/L		99	51 - 136	0	23
trans-1,2-Dichloroethene	1.0	U	10.0	9.98		ug/L		100	68 - 133	1	24
Trichloroethene	1.0	U	10.0	9.76		ug/L		98	55 - 131	0	23
Vinyl chloride	1.0	U	10.0	8.34		ug/L		83	43 - 154	8	29

Surrogate	MSD %Recovery	MSD Qualifier	Limits
1,2-Dichloroethane-d4 (Surr)	*127*	*X*	*70 - 121*
4-Bromofluorobenzene (Surr)	*108*		*59 - 120*
Toluene-d8 (Surr)	*96*		*70 - 123*
Dibromofluoromethane (Surr)	*111*		*75 - 128*

Lab Sample ID: MB 240-356855/6
Matrix: Water
Analysis Batch: 356855

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	1.0	U	1.0	0.19	ug/L			11/24/18 14:56	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			11/24/18 14:56	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			11/24/18 14:56	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			11/24/18 14:56	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			11/24/18 14:56	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			11/24/18 14:56	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	*140*	*X*	*70 - 121*		*11/24/18 14:56*	*1*
4-Bromofluorobenzene (Surr)	*91*		*59 - 120*		*11/24/18 14:56*	*1*
Toluene-d8 (Surr)	*94*		*70 - 123*		*11/24/18 14:56*	*1*
Dibromofluoromethane (Surr)	*121*		*75 - 128*		*11/24/18 14:56*	*1*

Lab Sample ID: LCS 240-356855/4
Matrix: Water
Analysis Batch: 356855

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1-Dichloroethene	10.0	10.9		ug/L		109	65 - 139
cis-1,2-Dichloroethene	10.0	10.1		ug/L		101	76 - 128
Tetrachloroethene	10.0	10.7		ug/L		107	74 - 130
trans-1,2-Dichloroethene	10.0	10.5		ug/L		105	78 - 133

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 240-356855/4
Matrix: Water
Analysis Batch: 356855

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Trichloroethene			10.0	10.3		ug/L		103	76 - 125		
Vinyl chloride			10.0	8.51		ug/L		85	58 - 143		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*125*	*X*	*70 - 121*
4-Bromofluorobenzene (Surr)	*110*		*59 - 120*
Toluene-d8 (Surr)	*97*		*70 - 123*
Dibromofluoromethane (Surr)	*109*		*75 - 128*

Lab Sample ID: 240-104447-D-4 MS
Matrix: Water
Analysis Batch: 356855

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
1,1-Dichloroethene	1.0	U	10.0	10.9		ug/L		109	53 - 140		
cis-1,2-Dichloroethene	1.0	U	10.0	9.93		ug/L		99	64 - 130		
Tetrachloroethene	1.0	U	10.0	10.8		ug/L		108	51 - 136		
trans-1,2-Dichloroethene	1.0	U	10.0	10.4		ug/L		104	68 - 133		
Trichloroethene	1.0	U	10.0	10.1		ug/L		101	55 - 131		
Vinyl chloride	1.0	U	10.0	8.20		ug/L		82	43 - 154		

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*129*	*X*	*70 - 121*
4-Bromofluorobenzene (Surr)	*111*		*59 - 120*
Toluene-d8 (Surr)	*97*		*70 - 123*
Dibromofluoromethane (Surr)	*108*		*75 - 128*

Lab Sample ID: 240-104447-E-4 MSD
Matrix: Water
Analysis Batch: 356855

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1-Dichloroethene	1.0	U	10.0	10.7		ug/L		107	53 - 140	2	35
cis-1,2-Dichloroethene	1.0	U	10.0	9.84		ug/L		98	64 - 130	1	21
Tetrachloroethene	1.0	U	10.0	10.2		ug/L		102	51 - 136	5	23
trans-1,2-Dichloroethene	1.0	U	10.0	10.0		ug/L		100	68 - 133	3	24
Trichloroethene	1.0	U	10.0	9.92		ug/L		99	55 - 131	2	23
Vinyl chloride	1.0	U	10.0	8.18		ug/L		82	43 - 154	0	29

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*125*	*X*	*70 - 121*
4-Bromofluorobenzene (Surr)	*110*		*59 - 120*
Toluene-d8 (Surr)	*96*		*70 - 123*
Dibromofluoromethane (Surr)	*110*		*75 - 128*

Method: 8260B SIM - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 240-356577/5
Matrix: Water
Analysis Batch: 356577

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	2.0	U	2.0	0.86	ug/L			11/21/18 13:29	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*103*		*63 - 125*		*11/21/18 13:29*	*1*

Lab Sample ID: LCS 240-356577/4
Matrix: Water
Analysis Batch: 356577

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
1,4-Dioxane			10.0	10.6		ug/L		106	59 - 131		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*103*		*63 - 125*

Lab Sample ID: 240-104487-3 MS
Matrix: Water
Analysis Batch: 356577

Client Sample ID: HPT-197_5-9_111318
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
1,4-Dioxane	2.0	U	10.0	11.9		ug/L		119	52 - 129		

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*107*		*63 - 125*

Lab Sample ID: 240-104487-3 MSD
Matrix: Water
Analysis Batch: 356577

Client Sample ID: HPT-197_5-9_111318
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,4-Dioxane	2.0	U	10.0	10.6		ug/L		106	52 - 129	11	13

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*105*		*63 - 125*

QC Association Summary

Client: ARCADIS U.S., Inc.
Project/Site: Ford LTP Livonia MI - E203631

TestAmerica Job ID: 240-104487-2

GC/MS VOA

Analysis Batch: 356577

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-104487-1	HPT-197_15-19_111318	Total/NA	Water	8260B SIM	
240-104487-2	HPT-197_10-14_111318	Total/NA	Water	8260B SIM	
240-104487-3	HPT-197_5-9_111318	Total/NA	Water	8260B SIM	
240-104487-4	HPT-198_16-20_111318	Total/NA	Water	8260B SIM	
240-104487-5	HPT-198_11-15_111318	Total/NA	Water	8260B SIM	
240-104487-6	HPT-198_6-10_111318	Total/NA	Water	8260B SIM	
MB 240-356577/5	Method Blank	Total/NA	Water	8260B SIM	
LCS 240-356577/4	Lab Control Sample	Total/NA	Water	8260B SIM	
240-104487-3 MS	HPT-197_5-9_111318	Total/NA	Water	8260B SIM	
240-104487-3 MSD	HPT-197_5-9_111318	Total/NA	Water	8260B SIM	

Analysis Batch: 356773

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-104487-1	HPT-197_15-19_111318	Total/NA	Water	8260B	
240-104487-2	HPT-197_10-14_111318	Total/NA	Water	8260B	
240-104487-3	HPT-197_5-9_111318	Total/NA	Water	8260B	
240-104487-4	HPT-198_16-20_111318	Total/NA	Water	8260B	
MB 240-356773/6	Method Blank	Total/NA	Water	8260B	
LCS 240-356773/4	Lab Control Sample	Total/NA	Water	8260B	
240-104487-3 MS	HPT-197_5-9_111318	Total/NA	Water	8260B	
240-104487-3 MSD	HPT-197_5-9_111318	Total/NA	Water	8260B	

Analysis Batch: 356855

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-104487-5	HPT-198_11-15_111318	Total/NA	Water	8260B	
240-104487-6	HPT-198_6-10_111318	Total/NA	Water	8260B	
MB 240-356855/6	Method Blank	Total/NA	Water	8260B	
LCS 240-356855/4	Lab Control Sample	Total/NA	Water	8260B	
240-104447-D-4 MS	Matrix Spike	Total/NA	Water	8260B	
240-104447-E-4 MSD	Matrix Spike Duplicate	Total/NA	Water	8260B	

Lab Chronicle

Client: ARCADIS U.S., Inc.
Project/Site: Ford LTP Livonia MI - E203631

TestAmerica Job ID: 240-104487-2

Client Sample ID: HPT-197_15-19_111318
Lab Sample ID: 240-104487-1
Date Collected: 11/13/18 13:40
Matrix: Water
Date Received: 11/16/18 08:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	356773	11/23/18 21:01	LRW	TAL CAN
Total/NA	Analysis	8260B SIM		1	356577	11/21/18 16:03	SAM	TAL CAN

Client Sample ID: HPT-197_10-14_111318
Lab Sample ID: 240-104487-2
Date Collected: 11/13/18 14:05
Matrix: Water
Date Received: 11/16/18 08:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	356773	11/23/18 21:25	LRW	TAL CAN
Total/NA	Analysis	8260B SIM		1	356577	11/21/18 16:29	SAM	TAL CAN

Client Sample ID: HPT-197_5-9_111318
Lab Sample ID: 240-104487-3
Date Collected: 11/13/18 14:15
Matrix: Water
Date Received: 11/16/18 08:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	356773	11/23/18 22:13	LRW	TAL CAN
Total/NA	Analysis	8260B SIM		1	356577	11/21/18 16:54	SAM	TAL CAN

Client Sample ID: HPT-198_16-20_111318
Lab Sample ID: 240-104487-4
Date Collected: 11/13/18 15:40
Matrix: Water
Date Received: 11/16/18 08:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	356773	11/23/18 21:49	LRW	TAL CAN
Total/NA	Analysis	8260B SIM		1	356577	11/21/18 18:11	SAM	TAL CAN

Client Sample ID: HPT-198_11-15_111318
Lab Sample ID: 240-104487-5
Date Collected: 11/13/18 16:00
Matrix: Water
Date Received: 11/16/18 08:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	356855	11/24/18 18:55	LRW	TAL CAN
Total/NA	Analysis	8260B SIM		1	356577	11/21/18 18:37	SAM	TAL CAN

Client Sample ID: HPT-198_6-10_111318
Lab Sample ID: 240-104487-6
Date Collected: 11/13/18 16:15
Matrix: Water
Date Received: 11/16/18 08:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	356855	11/24/18 19:18	LRW	TAL CAN

Lab Chronicle

Client: ARCADIS U.S., Inc.
Project/Site: Ford LTP Livonia MI - E203631

TestAmerica Job ID: 240-104487-2

Client Sample ID: HPT-198_6-10_111318
Date Collected: 11/13/18 16:15
Date Received: 11/16/18 08:40

Lab Sample ID: 240-104487-6
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B SIM		1	356577	11/21/18 19:03	SAM	TAL CAN

Laboratory References:

TAL CAN = TestAmerica Canton, 4101 Shuffel Street NW, North Canton, OH 44720, TEL (330)497-9396

Accreditation/Certification Summary

Client: ARCADIS U.S., Inc.
Project/Site: Ford LTP Livonia MI - E203631

TestAmerica Job ID: 240-104487-2

Laboratory: TestAmerica Canton

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
California	State Program	9	2927	02-23-19 *
Connecticut	State Program	1	PH-0590	12-31-19
Florida	NELAP	4	E87225	06-30-19
Illinois	NELAP	5	200004	07-31-19
Kansas	NELAP	7	E-10336	04-30-19
Kentucky (UST)	State Program	4	58	02-23-19 *
Kentucky (WW)	State Program	4	98016	12-31-19
Minnesota	NELAP	5	039-999-348	12-31-19 *
Minnesota (Petrofund)	State Program	1	3506	07-31-19
Nevada	State Program	9	OH00048	07-31-19
New Jersey	NELAP	2	OH001	06-30-19
New York	NELAP	2	10975	03-31-19 *
Ohio VAP	State Program	5	CL0024	09-06-19
Oregon	NELAP	10	4062	02-23-19 *
Pennsylvania	NELAP	3	68-00340	08-31-19 *
Texas	NELAP	6	T104704517-18-10	08-31-19
USDA	Federal		P330-16-00404	12-28-19
Virginia	NELAP	3	460175	09-14-19
Washington	State Program	10	C971	01-12-20 *
West Virginia DEP	State Program	3	210	12-31-19

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

TestAmerica Michigan
10448 Citation Drive
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Brighton, MI 48116
Phone: 810.229.2763 Fax: 412.963.2470

MICHIGAN 190

Chain of Custody Record

1.0/C1.9 0.4/C1.3

221759

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
TestAmerica Laboratories, Inc.
TAL-8210 (0713)

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

Client Contact	Project Manager: KRIS HINSKEY	Site Contact:	Date:	COC No: 1
Company Name: ARCADIS	Tel/Fax: 269-579-5462	Lab Contact:	Carrier:	1 of 2 COCs
Address: 28550 CABOT DR. #500	Analysis Turnaround Time			Sampler:
City/State/Zip: NOVI, MI 48377	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
Phone: 248-994-2240	TAT if different from Below STANDARD			Walk-in Client:
Fax: 248-994-2241	☐ 2 weeks			Lab Sampling:
Project Name: FORD LTP	☐ 1 week			
Site: OFF-SITE	☐ 2 days			Job / SDG No.:
PO# MI001454.0002.00023	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	SEE BELOW PRESERVATION		Specific Notes:
HPT-197_15-19_111318	11-13-18	1340	G	GW	6	N	N	X	2	
HPT-197_10-14_111318	11-13-18	1405	G	GW	6	N	N	X	2	
HPT-197_5-9_111318	11-13-18	1415	G	GW	18	N	Y	X	2	
HPT-198_16-20_111318	11-13-18	1540	G	GW	6	N	N	X	2	
HPT-198_11-15_111318	11-13-18	1600	G	GW	6	N	N	X	2	
HPT-198_6-10_111318	11-13-18	1615	G	GW	6	N	N	X	2	
~~HPT-199_14-18_111318~~	~~11-13-18~~	110								KB 111418
HPT-199_14-18_111418	11-14-18	1105	G	GW	6	N	N	X	2	
HPT-199_9-13_111418	11-14-18	1120	G	GW	6	N	N	X	2	
HPT-199_4-6_111418	11-14-18	1130	G	GW	6	N	N	X	2	
HPT-200_15-19_111418	11-14-18	1330	G	GW	6	N	N	X	2	
TRIP BLANK	-	-	-	W	1	N	N	X	2	

240-104487 Chain of Custody

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☐ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments: ANALYZE SAMPLES FOR: 1,1-DCE; cis-1,2-DCE; trans-1,2-DCE; PCE; TCE; AND VINYL CHLORIDE VIA USEPA METHOD 8260B AND 1,4-DIOXANE VIA USEPA METHOD 8260B-SIM. SUBMIT ALL RESULTS THROUGH CADENA AT JIM.TOMALIA@CADENA.COM #E203631

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C): Obs'd: _____ Corr'd: _____ Therm ID No.: _____

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
KALAN BRIGGS	ARCADIS	11-15-18 1015		TA	11-15-18 1015
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
	TA	11/15/18 1240		TA	11/16/18 840
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

1/16/2019

TestAmerica Michigan
10448 Citation Drive
Suite 200
Brighton, MI 48116
Phone: 810.229.2763 Fax: 412.963.2470

MICHIGAN 190

Chain of Custody Record

221762

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
TestAmerica Laboratories, Inc.

TAL-8210 (0713)

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

Client Contact	Project Manager: KRIS HINSKEY	Site Contact:	Date:	COC No: 2
Company Name: ARCADIS	Tel/Fax: 269-579-5402	Lab Contact:	Carrier:	2 of 2 COCs
Address: 28550 CABOT DR #500	Analysis Turnaround Time			Sampler:
City/State/Zip: NOVI, MI 48377	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
Phone: 248-994-2240	TAT if different from Below STANDARD			Walk-in Client:
Fax: 248-994-2241	☐ 2 weeks			Lab Sampling:
Project Name: FORD LTP	☐ 1 week			
Site: OFF-SITE	☐ 2 days			Job / SDG No.:
PO# MI001454.0002.0002B	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	SEE BELOW	PRESERVATION															Sample Specific Notes:
HPT-200_9-13_111418	11-14-18	1350	G	GW	6	N	N	X	2															
HPT-200_4-8_111418	11-14-18	1405	G	GW	6	N	N	X	2															
HPT-201_15-19_111418	11-14-18	1555	G	GW	6	N	N	X	2															
HPT-201_9-13_111418	11-14-18	1610	G	GW	6	N	N	X	2															
HPT-201_4-8_111418	11-14-18	1625	G	GW	6	N	N	X	2															

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☐ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments: ANALYZE SAMPLES FOR: 1,1-DCE; cis-1,2-DCE; trans-1,2-DCE; PCE; TCE; AND VINYL CHLORIDE VIA USEPA METHOD 8260B AND 1,4-DIOXANE VIA USEPA METHOD 8260B-SIM. SUBMIT ALL RESULTS THROUGH CADENA AT SIM.TOMALIA@CADENA.COM #E203631

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C): Obs'd:_____ Corr'd:_____ | Therm ID No.:_____

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
KALAN BRIGGS	ARCADIS	11-15-18 1015	Jeni Heal	TAL	11/15/18 1015
Relinquished by: Jeni Heal	Company: TAL	Date/Time: 11/15/18 1240	Received by:	Company: TA	Date/Time: 11/16/18 840
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

1/16/2019

TestAmerica Canton Sample Receipt Form/Narrative **Login # :** 104487

Canton Facility

Client Accutis Site Name _____ Cooler unpacked by:

Cooler Received on 11/16/18 Opened on 11/16/18

FedEx: 1st (Grd) Exp UPS FAS Clipper Client Drop Off TestAmerica Courier Other _____

Receipt After-hours: Drop-off Date/Time _____ Storage Location _____

TestAmerica Cooler # NA Foam Box Client Cooler Box Other _____

Packing material used: (Bubble Wrap) (Foam) (Plastic Bag) None Other _____

COOLANT: (Wet Ice) Blue Ice Dry Ice Water None

1. Cooler temperature upon receipt ☒ See Multiple Cooler Form
   IR GUN# IR-8 (CF +0.9 °C) Observed Cooler Temp._____°C Corrected Cooler Temp._____°C
   IR GUN #36 (CF +0.6°C) Observed Cooler Temp._____°C Corrected Cooler Temp._____°C
2. Were tamper/custody seals on the outside of the cooler(s)? If Yes Quantity 1 (Yes) No
   -Were the seals on the outside of the cooler(s) signed & dated? (Yes) No NA
   -Were tamper/custody seals on the bottle(s) or bottle kits (LLHg/MeHg)? Yes (No)
   -Were tamper/custody seals intact and uncompromised? (Yes) No NA
3. Shippers' packing slip attached to the cooler(s)? (Yes) No
4. Did custody papers accompany the sample(s)? (Yes) No
5. Were the custody papers relinquished & signed in the appropriate place? (Yes) No
6. Was/were the person(s) who collected the samples clearly identified on the COC? Yes (No)
7. Did all bottles arrive in good condition (Unbroken)? (Yes) No
8. Could all bottle labels be reconciled with the COC? (Yes) No
9. Were correct bottle(s) used for the test(s) indicated? (Yes) No
10. Sufficient quantity received to perform indicated analyses? (Yes) No
11. Are these work share samples? Yes (No)
    If yes, Questions 12-16 have been checked at the originating laboratory.
12. Were all preserved sample(s) at the correct pH upon receipt? Yes No (NA) pH Strip Lot# **HC850248**
13. Were VOAs on the COC? (Yes) No
14. Were air bubbles >6 mm in any VOA vials? ● ⬅ Larger than this. Yes (No) NA
15. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot # N/A (Yes) No
16. Was a LL Hg or Me Hg trip blank present? _____ Yes (No)

Tests that are not checked for pH by Receiving:
VOAs
Oil and Grease
TOC

Contacted PM _____ Date _____ by _____ via Verbal Voice Mail Other

Concerning _____

17. CHAIN OF CUSTODY & SAMPLE DISCREPANCIES Samples processed by: MS

Received 2 empty vials for sample HPT-197-5-9

18. SAMPLE CONDITION

Sample(s) _____ were received after the recommended holding time had expired.
Sample(s) _____ were received in a broken container.
Sample(s) _____ were received with bubble >6 mm in diameter. (Notify PM)

19. SAMPLE PRESERVATION

Sample(s) _____ were further preserved in the laboratory.
Time preserved: _____ Preservative(s) added/Lot number(s): _____

WI-NC-099

TestAmerica Multiple Cooler Receipt Form/Narrative **Login # :** 104487
Canton Facility

Cooler #	IR Gun #	Observed Temp °C	Corrected Temp °C	Coolant
TA 1	8 1	1.0	1.9	ICE
		0.4	1.3	1

January 17, 2019

Kris Hinskey
Arcadis Inc
10559 Citation Ave
Suite 100
Brighton, MI 48116

CADENA project ID: E203631
Project: Ford Livonia Transmission Project - OFF-SITE - Soil Gas and Groundwater
Project number: MI001454.0002/3/4.00002/2B/3B
Client project scope reference: Sample COC only was used to define project analytical requirements.
Laboratory: TestAmerica - North Canton
Laboratory submittal: 104487-2
Sample date: 2018-11-13
Report received by CADENA: 2019-01-16
Initial Data Verification completed by CADENA: 2019-01-17

The following minor QC exceptions or missing information were noted:

SPV - GCMS VOC samples -001, -004 preservation non-compliance as noted in the laboratory submittal should render all associated results as estimated and qualified with J flags if detected and UJ flags if non-detect.

SPV - SIM 1,4-DIOXANE samples -001, -004, -005 preservation non-compliance as noted in the laboratory submittal should render all associated results as estimated and qualified with J flags if detected and UJ flags if non-detect.

SUR - GCMS VOC sample -005 surrogate recoveries were outliers biased high for 2 out of 4 surrogates. These client sample results should be considered to be estimated and qualified with J flags if detected. Non-detect results do not require qualification.

GCMS VOC samples -001, -002, -003, -004, -006, method blanks, LCS, -003MS/MSD, and non-client MS/MSD SURROGATE recoveries were outliers biased high for at least 1 surrogate. Associated client sample results were non-detect so qualification was not required based on these high bias QC outliers.

Data verification for the report specified above was completed using the Ford Motor Company Environmental Laboratory Technical Specification, the CADENA Standard Operating Procedure for the Verification of Environmental Analytical Data and the associated analytical methods as references for evaluating the batch QC, sample data and report content. The EPA National Functional Guidelines for validating organic and inorganic data were used as guidance when addressing out of control QC results and the associated data qualifiers.

6 Water sample(s) were analyzed for GCMS VOC parameter(s).

Sample/MS/MSD Surrogate Recovery, Blank/LCS Surrogate Recovery, LCS/LCD Recovery, MS/MSD Recovery, MS/MSD RPD, Blank Contamination and Hold Time Exception were reviewed as part of our verification.

The definitions of the qualifiers used for this data package are defined in the analytical report. CADENA valid qualifiers are defined in the table below. To view and download a PDF copy of the laboratory analytical report access the CADENA CLMS at http://clms.cadenaco.com/index.cfm.

Please contact me if you have any questions.

Sincerely,

Jim Tomalia

Project Scientist

CADENA Inc, 1099 Highland Drive, Suite E, Ann Arbor, MI 48108 517-819-0356

CADENA Valid Qualifiers

Valid Qualifiers	Description
<	Less than the reported concentration.
>	Greater than the reported concentration.
B	The analyte / compound was detected in the associated blank. For Organic methods the sample concentration was greater than the RDL and less than 5x (or 10x for common lab contaminates) the blank concentration and is considered non-detect at the reported concentration. For Inorganic methods the sample concentration was greater than the RDL and less than 10x the blank concentration and is considered non-detect at the reported concentration.
E	The analyte / Compound reported exceeds the calibration range and is considered estimated.
EMPC	Estimated Minimum Potential Contamination - Dioxin/Furan analyses only.
J	Indicates an estimated value. This flag is used either when estimating a concentration for a tentatively identified compound or when the data indicates the presence of an analyte / compound but the result is less than the sample Quantitation limit, but greater than zero. The flag is also used in data validation to indicate a reported value should be considered estimated due to associated quality assurance deficiencies.
J-	The result is an estimated quantity, but the result may be biased low.
JB	NON-DETECT AT THE CONCENTRATION REPORTED AND ESTIMATED
JH	The sample result is considered estimated and is potentially biased high.
JL	The sample result is considered estimated and is potentially biased low.
JUB	NON-DETECT AT THE REPORTING LIMIT AND ESTIMATED
NJ	Tentatively identified compound with approximated concentration.
R	Indicates the value is considered to be unusable. (Note: The analyte / compound may or may not be present.)
TNTC	Too Numerous to Count - Asbestos and Microbiological Results.
U	Indicates that the analyte / compound was analyzed for, but not detected.
UB	The analyte / compound was detected in the associated blank. For Organic methods the sample concentration was less than the RDL and less than 5x (or 10x for common lab contaminates) the blank concentration and is considered non-detect at the RDL. For Inorganic methods the sample concentration was less than the RDL and less than 10x the blank concentration and is considered non-detect at the RDL.
UJ	The analyte / compound was not detected above the reported sample Quantitation limit. However, the Quantitation limit is considered to be approximate due to associated quality assurance results and may or may not represent the actual limit of Quantitation to accurately and precisely report the analyte in the sample.

SAMPLING AND ANALYSIS SUMMARY

CADENA Project ID: E203631
Laboratory: TestAmerica-North Canton
Laboratory Submittal: 104487-2

Lab Sample ID	Sample ID	Collection Date (mm/yy/dd)	Collection Time (hh:mm:ss)	Volatile Organics by GCMS	8260B with Single Ion Monitoring	Comment
2401044871	HPT-197_15-19_111318	11/13/2018	1:40:00	X	X	
2401044872	HPT-197_10-14_111318	11/13/2018	2:05:00	X	X	
2401044873	HPT-197_5-9_111318	11/13/2018	2:15:00	X	X	
2401044874	HPT-198_16-20_111318	11/13/2018	3:40:00	X	X	
2401044875	HPT-198_11-15_111318	11/13/2018	4:00:00	X	X	
2401044876	HPT-198_6-10_111318	11/13/2018	4:15:00	X	X	

Qualified Results Summary

CADENA Project ID: E203631
Laboratory: TestAmerica - North Canton
Laboratory Submittal: 104487-2

		Sample Name:	HPT-197_15-19_111318				HPT-198_16-20_111318				HPT-198_11-15_111318			
		Lab Sample ID:	2401044871				2401044874				2401044875			
		Sample Date:	11/13/2018				11/13/2018				11/13/2018			
Analyte	Cas No.	Result	Report Limit	Units	Valid Qualifier	Result	Report Limit	Units	Valid Qualifier	Result	Report Limit	Units	Valid Qualifier
GC/MS VOC													
OSW-8260B													
1,1-Dichloroethene	75-35-4	ND	1.0	ug/l	UJ	ND	1.0	ug/l	UJ				
cis-1,2-Dichloroethene	156-59-2	ND	1.0	ug/l	UJ	ND	1.0	ug/l	UJ	0.38	1.0	ug/l	J
Tetrachloroethene	127-18-4	ND	1.0	ug/l	UJ	ND	1.0	ug/l	UJ				
trans-1,2-Dichloroethene	156-60-5	ND	1.0	ug/l	UJ	ND	1.0	ug/l	UJ				
Trichloroethene	79-01-6	ND	1.0	ug/l	UJ	ND	1.0	ug/l	UJ				
Vinyl chloride	75-01-4	ND	1.0	ug/l	UJ	ND	1.0	ug/l	UJ				
OSW-8260BBSim													
1,4-Dioxane	123-91-1	ND	2.0	ug/l	UJ	ND	2.0	ug/l	UJ	ND	2.0	ug/l	UJ

Analytical Results Summary

Reportable Results Only

CADENA Project ID: E203631
Laboratory: TestAmerica - North Canton
Laboratory Submittal: 104487-2

		Sample Name:	HPT-197_15-19_111318				HPT-197_10-14_111318				HPT-197_5-9_111318				HPT-198_16-20_111318				HPT-198_11-15_111318				HPT-198_6-10_111318			
		Lab Sample ID:	2401044871				2401044872				2401044873				2401044874				2401044875				2401044876			
		Sample Date:	11/13/2018				11/13/2018				11/13/2018				11/13/2018				11/13/2018				11/13/2018			
Analyte	Cas No.		Result	Report Limit	Units	Valid Qualifier	Result	Report Limit	Units	Valid Qualifier	Result	Report Limit	Units	Valid Qualifier	Result	Report Limit	Units	Valid Qualifier	Result	Report Limit	Units	Valid Qualifier	Result	Report Limit	Units	Valid Qualifier
GC/MS VOC																										
OSW-8260B																										
1,1-Dichloroethene	75-35-4		ND	1.0	ug/l	UJ	ND	1.0	ug/l	---	ND	1.0	ug/l	---	ND	1.0	ug/l	UJ	ND	1.0	ug/l	---	ND	1.0	ug/l	---
cis-1,2-Dichloroethene	156-59-2		ND	1.0	ug/l	UJ	ND	1.0	ug/l	---	ND	1.0	ug/l	---	ND	1.0	ug/l	UJ	0.38	1.0	ug/l	J	ND	1.0	ug/l	---
Tetrachloroethene	127-18-4		ND	1.0	ug/l	UJ	ND	1.0	ug/l	---	ND	1.0	ug/l	---	ND	1.0	ug/l	UJ	ND	1.0	ug/l	---	ND	1.0	ug/l	---
trans-1,2-Dichloroethene	156-60-5		ND	1.0	ug/l	UJ	ND	1.0	ug/l	---	ND	1.0	ug/l	---	ND	1.0	ug/l	UJ	ND	1.0	ug/l	---	ND	1.0	ug/l	---
Trichloroethene	79-01-6		ND	1.0	ug/l	UJ	ND	1.0	ug/l	---	ND	1.0	ug/l	---	ND	1.0	ug/l	UJ	ND	1.0	ug/l	---	ND	1.0	ug/l	---
Vinyl chloride	75-01-4		ND	1.0	ug/l	UJ	ND	1.0	ug/l	---	ND	1.0	ug/l	---	ND	1.0	ug/l	UJ	ND	1.0	ug/l	---	ND	1.0	ug/l	---
OSW-8260BSim																										
1,4-Dioxane	123-91-1		ND	2.0	ug/l	UJ	ND	2.0	ug/l	---	ND	2.0	ug/l	---	ND	2.0	ug/l	UJ	ND	2.0	ug/l	UJ	ND	2.0	ug/l	---