

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Canton
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Tel: (330)497-9396

TestAmerica Job ID: 240-99733-1

Client Project/Site: Ford LTP Livonia MI - E203631

For:

ARCADIS U.S., Inc.
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Attn: Kristoffer Hinskey



Authorized for release by:
8/24/2018 9:47:23 AM

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

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Definitions/Glossary

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

TestAmerica Job ID: 240-99733-1

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
F1	MS and/or MSD Recovery is outside acceptance limits.
F2	MS/MSD RPD exceeds control limits
U	Indicates the analyte was analyzed for but not detected.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	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)

Case Narrative

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

TestAmerica Job ID: 240-99733-1

Job ID: 240-99733-1

Laboratory: TestAmerica Canton

Narrative

CASE NARRATIVE

Client: ARCADIS U.S., Inc.

Project: Ford LTP Livonia MI - E203631

Report Number: 240-99733-1

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 8/10/2018 8:45 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 2 coolers at receipt time were 1.4° C and 1.8° C.

VOLATILE ORGANIC COMPOUNDS (GCMS)

Samples MW-85-080818 (240-99733-1), MW-83-080818 (240-99733-2), MW-82D-080818 (240-99733-3) and MW-82S-080818 (240-99733-4) were analyzed for volatile organic compounds (GCMS) in accordance with EPA SW-846 Method 8260B. The samples were analyzed on 08/18/2018 and 08/21/2018.

1,1-Dichloroethene and Trichloroethene failed the recovery criteria low for the MS of sample 240-99672-11 in batch 240-341822.

1,1-Dichloroethene exceeded the RPD limit for the MSD of sample 240-99672-11 in batch 240-341822. Refer to the QC report for details.

No MS/MSD in batch 3415007 due to an instrument fault: MW-83-080818 (240-99733-2) and MW-82D-080818 (240-99733-3).

The pH of the sample was greater than 2. The sample was 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 sample is not preserved to a pH of 2: MW-82D-080818 (240-99733-3).

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

Case Narrative

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

TestAmerica Job ID: 240-99733-1

Job ID: 240-99733-1 (Continued)

Laboratory: TestAmerica Canton (Continued)

VOLATILE ORGANIC COMPOUNDS (GCMS SIM)

Samples MW-85-080818 (240-99733-1), MW-83-080818 (240-99733-2), MW-82D-080818 (240-99733-3) and MW-82S-080818 (240-99733-4) were analyzed for volatile organic compounds (GCMS SIM) in accordance with EPA SW-846 Method 8260B SIM. The samples were analyzed on 08/15/2018.

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: 240-99733-1

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

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Sample Summary

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

TestAmerica Job ID: 240-99733-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
240-99733-1	MW-85-080818	Water	08/08/18 12:35	08/10/18 08:45
240-99733-2	MW-83-080818	Water	08/08/18 13:55	08/10/18 08:45
240-99733-3	MW-82D-080818	Water	08/08/18 16:55	08/10/18 08:45
240-99733-4	MW-82S-080818	Water	08/08/18 18:05	08/10/18 08:45

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Detection Summary

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

TestAmerica Job ID: 240-99733-1

Client Sample ID: MW-85-080818

Lab Sample ID: 240-99733-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Vinyl chloride	7.2		1.0	0.20	ug/L	1		8260B	Total/NA

Client Sample ID: MW-83-080818

Lab Sample ID: 240-99733-2

No Detections.

Client Sample ID: MW-82D-080818

Lab Sample ID: 240-99733-3

No Detections.

Client Sample ID: MW-82S-080818

Lab Sample ID: 240-99733-4

No Detections.

This Detection Summary does not include radiochemical test results.

TestAmerica Canton



Client Sample Results

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

TestAmerica Job ID: 240-99733-1

Client Sample ID: MW-85-080818

Lab Sample ID: 240-99733-1

Date Collected: 08/08/18 12:35

Matrix: Water

Date Received: 08/10/18 08:45

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			08/15/18 14:49	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	110		63 - 125					08/15/18 14:49	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			08/21/18 17:20	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			08/21/18 17:20	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			08/21/18 17:20	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			08/21/18 17:20	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			08/21/18 17:20	1
Vinyl chloride	7.2		1.0	0.20	ug/L			08/21/18 17:20	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	127		61 - 138					08/21/18 17:20	1
4-Bromofluorobenzene (Surr)	110		69 - 120					08/21/18 17:20	1
Toluene-d8 (Surr)	111		73 - 120					08/21/18 17:20	1
Dibromofluoromethane (Surr)	114		69 - 124					08/21/18 17:20	1

Client Sample Results

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

TestAmerica Job ID: 240-99733-1

Client Sample ID: MW-83-080818

Lab Sample ID: 240-99733-2

Date Collected: 08/08/18 13:55

Matrix: Water

Date Received: 08/10/18 08:45

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			08/15/18 15:14	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	113		63 - 125					08/15/18 15:14	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			08/18/18 14:39	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			08/18/18 14:39	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			08/18/18 14:39	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			08/18/18 14:39	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			08/18/18 14:39	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			08/18/18 14:39	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	99		61 - 138					08/18/18 14:39	1
4-Bromofluorobenzene (Surr)	71		69 - 120					08/18/18 14:39	1
Toluene-d8 (Surr)	88		73 - 120					08/18/18 14:39	1
Dibromofluoromethane (Surr)	94		69 - 124					08/18/18 14:39	1

Client Sample Results

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

TestAmerica Job ID: 240-99733-1

Client Sample ID: MW-82D-080818

Lab Sample ID: 240-99733-3

Date Collected: 08/08/18 16:55

Matrix: Water

Date Received: 08/10/18 08:45

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			08/15/18 14:24	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	113		63 - 125					08/15/18 14:24	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			08/18/18 15:01	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			08/18/18 15:01	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			08/18/18 15:01	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			08/18/18 15:01	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			08/18/18 15:01	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			08/18/18 15:01	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	93		61 - 138					08/18/18 15:01	1
4-Bromofluorobenzene (Surr)	72		69 - 120					08/18/18 15:01	1
Toluene-d8 (Surr)	89		73 - 120					08/18/18 15:01	1
Dibromofluoromethane (Surr)	90		69 - 124					08/18/18 15:01	1

Client Sample Results

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

TestAmerica Job ID: 240-99733-1

Client Sample ID: MW-82S-080818

Lab Sample ID: 240-99733-4

Date Collected: 08/08/18 18:05

Matrix: Water

Date Received: 08/10/18 08:45

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			08/15/18 15:39	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	114		63 - 125					08/15/18 15:39	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			08/21/18 17:43	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			08/21/18 17:43	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			08/21/18 17:43	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			08/21/18 17:43	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			08/21/18 17:43	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			08/21/18 17:43	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	128		61 - 138					08/21/18 17:43	1
4-Bromofluorobenzene (Surr)	111		69 - 120					08/21/18 17:43	1
Toluene-d8 (Surr)	110		73 - 120					08/21/18 17:43	1
Dibromofluoromethane (Surr)	113		69 - 124					08/21/18 17:43	1

Surrogate Summary

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

TestAmerica Job ID: 240-99733-1

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

Matrix: Water

Prep Type: Total/NA

Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	Percent Surrogate Recovery (Acceptance Limits)			
		DCA (61-138)	BFB (69-120)	TOL (73-120)	DBFM (69-124)
240-99672-B-11 MS	Matrix Spike	118	110	108	109
240-99672-B-11 MSD	Matrix Spike Duplicate	122	112	112	112
240-99733-1	MW-85-080818	127	110	111	114
240-99733-2	MW-83-080818	99	71	88	94
240-99733-3	MW-82D-080818	93	72	89	90
240-99733-4	MW-82S-080818	128	111	110	113
LCS 240-341507/4	Lab Control Sample	82	89	95	86
LCS 240-341822/5	Lab Control Sample	119	112	111	108
MB 240-341507/6	Method Blank	92	70	86	80
MB 240-341822/8	Method Blank	123	111	109	108

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)

Lab Sample ID	Client Sample ID	DCA
		(63-125)
240-99733-1	MW-85-080818	110
240-99733-2	MW-83-080818	113
240-99733-3	MW-82D-080818	113
240-99733-4	MW-82S-080818	114
240-99736-A-4 MS	Matrix Spike	119
240-99736-A-4 MSD	Matrix Spike Duplicate	111
LCS 240-341043/4	Lab Control Sample	117
MB 240-341043/5	Method Blank	113

Surrogate Legend

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

QC Sample Results

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

TestAmerica Job ID: 240-99733-1

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

Lab Sample ID: MB 240-341507/6
Matrix: Water
Analysis Batch: 341507

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			08/18/18 13:56	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			08/18/18 13:56	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			08/18/18 13:56	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			08/18/18 13:56	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			08/18/18 13:56	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			08/18/18 13:56	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	92		61 - 138		08/18/18 13:56	1
4-Bromofluorobenzene (Surr)	70		69 - 120		08/18/18 13:56	1
Toluene-d8 (Surr)	86		73 - 120		08/18/18 13:56	1
Dibromofluoromethane (Surr)	80		69 - 124		08/18/18 13:56	1

Lab Sample ID: LCS 240-341507/4
Matrix: Water
Analysis Batch: 341507

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	12.5		ug/L		125	65 - 127
cis-1,2-Dichloroethene	10.0	10.1		ug/L		101	77 - 120
Tetrachloroethene	10.0	10.1		ug/L		101	80 - 122
trans-1,2-Dichloroethene	10.0	10.7		ug/L		107	74 - 124
Trichloroethene	10.0	9.53		ug/L		95	76 - 124
Vinyl chloride	10.0	10.3		ug/L		103	65 - 124

Surrogate	LCS %Recovery	LCS Qualifier	Limits
1,2-Dichloroethane-d4 (Surr)	82		61 - 138
4-Bromofluorobenzene (Surr)	89		69 - 120
Toluene-d8 (Surr)	95		73 - 120
Dibromofluoromethane (Surr)	86		69 - 124

Lab Sample ID: MB 240-341822/8
Matrix: Water
Analysis Batch: 341822

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			08/21/18 12:41	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			08/21/18 12:41	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			08/21/18 12:41	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			08/21/18 12:41	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			08/21/18 12:41	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			08/21/18 12:41	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	123		61 - 138		08/21/18 12:41	1
4-Bromofluorobenzene (Surr)	111		69 - 120		08/21/18 12:41	1
Toluene-d8 (Surr)	109		73 - 120		08/21/18 12:41	1

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QC Sample Results

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

TestAmerica Job ID: 240-99733-1

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

Lab Sample ID: MB 240-341822/8
Matrix: Water
Analysis Batch: 341822

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

Surrogate	MB MB		Limits	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier				
Dibromofluoromethane (Surr)	108		69 - 124		08/21/18 12:41	1

Lab Sample ID: LCS 240-341822/5
Matrix: Water
Analysis Batch: 341822

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
cis-1,2-Dichloroethene	20.0	19.2		ug/L		96	77 - 120
Tetrachloroethene	20.0	18.0		ug/L		90	80 - 122
trans-1,2-Dichloroethene	20.0	21.1		ug/L		105	74 - 124
Trichloroethene	20.0	17.3		ug/L		86	76 - 124
Vinyl chloride	20.0	20.4		ug/L		102	65 - 124

Surrogate	LCS LCS		Limits
	%Recovery	Qualifier	
1,2-Dichloroethane-d4 (Surr)	119		61 - 138
4-Bromofluorobenzene (Surr)	112		69 - 120
Toluene-d8 (Surr)	111		73 - 120
Dibromofluoromethane (Surr)	108		69 - 124

Lab Sample ID: 240-99672-B-11 MS
Matrix: Water
Analysis Batch: 341822

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
cis-1,2-Dichloroethene	180		200	377		ug/L		97	69 - 127
Tetrachloroethene	140		200	290		ug/L		73	69 - 126
trans-1,2-Dichloroethene	10	U	200	219		ug/L		109	66 - 131
Trichloroethene	430	F1	200	568	F1	ug/L		67	68 - 129
Vinyl chloride	5.8	J	200	172		ug/L		83	55 - 123

Surrogate	MS MS		Limits
	%Recovery	Qualifier	
1,2-Dichloroethane-d4 (Surr)	118		61 - 138
4-Bromofluorobenzene (Surr)	110		69 - 120
Toluene-d8 (Surr)	108		73 - 120
Dibromofluoromethane (Surr)	109		69 - 124

Lab Sample ID: 240-99672-B-11 MSD
Matrix: Water
Analysis Batch: 341822

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	Limit
cis-1,2-Dichloroethene	180		200	403		ug/L		110	69 - 127	7	11
Tetrachloroethene	140		200	321		ug/L		88	69 - 126	10	18
trans-1,2-Dichloroethene	10	U	200	229		ug/L		115	66 - 131	5	11

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QC Sample Results

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

TestAmerica Job ID: 240-99733-1

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

Lab Sample ID: 240-99672-B-11 MSD

Matrix: Water

Analysis Batch: 341822

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
Trichloroethene	430	F1	200	602		ug/L		84	68 - 129	6	12
Vinyl chloride	5.8	J	200	171		ug/L		83	55 - 123	1	12
Surrogate		MSD %Recovery	MSD Qualifier	Limits							
1,2-Dichloroethane-d4 (Surr)		122		61 - 138							
4-Bromofluorobenzene (Surr)		112		69 - 120							
Toluene-d8 (Surr)		112		73 - 120							
Dibromofluoromethane (Surr)		112		69 - 124							

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

Lab Sample ID: MB 240-341043/5

Matrix: Water

Analysis Batch: 341043

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			08/15/18 13:34	1
Surrogate		MB %Recovery	MB Qualifier	Limits					
1,2-Dichloroethane-d4 (Surr)		113		63 - 125					

Lab Sample ID: LCS 240-341043/4

Matrix: Water

Analysis Batch: 341043

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	9.89		ug/L		99	59 - 131
Surrogate		LCS %Recovery	LCS Qualifier	Limits			
1,2-Dichloroethane-d4 (Surr)		117		63 - 125			

Lab Sample ID: 240-99736-A-4 MS

Matrix: Water

Analysis Batch: 341043

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
1,4-Dioxane	2.0	U	10.0	10.2		ug/L		102	52 - 129
Surrogate		MS %Recovery	MS Qualifier	Limits					
1,2-Dichloroethane-d4 (Surr)		119		63 - 125					

Lab Sample ID: 240-99736-A-4 MSD

Matrix: Water

Analysis Batch: 341043

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
1,4-Dioxane	2.0	U	10.0	9.80		ug/L		98	52 - 129	4	13

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QC Sample Results

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

TestAmerica Job ID: 240-99733-1

<i>Surrogate</i>	<i>MSD</i>	<i>MSD</i>	<i>Limits</i>
	<i>%Recovery</i>	<i>Qualifier</i>	
1,2-Dichloroethane-d4 (Surr)	111		63 - 125

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QC Association Summary

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

TestAmerica Job ID: 240-99733-1

GC/MS VOA

Analysis Batch: 341043

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-99733-1	MW-85-080818	Total/NA	Water	8260B SIM	
240-99733-2	MW-83-080818	Total/NA	Water	8260B SIM	
240-99733-3	MW-82D-080818	Total/NA	Water	8260B SIM	
240-99733-4	MW-82S-080818	Total/NA	Water	8260B SIM	
MB 240-341043/5	Method Blank	Total/NA	Water	8260B SIM	
LCS 240-341043/4	Lab Control Sample	Total/NA	Water	8260B SIM	
240-99736-A-4 MS	Matrix Spike	Total/NA	Water	8260B SIM	
240-99736-A-4 MSD	Matrix Spike Duplicate	Total/NA	Water	8260B SIM	

Analysis Batch: 341507

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-99733-2	MW-83-080818	Total/NA	Water	8260B	
240-99733-3	MW-82D-080818	Total/NA	Water	8260B	
MB 240-341507/6	Method Blank	Total/NA	Water	8260B	
LCS 240-341507/4	Lab Control Sample	Total/NA	Water	8260B	

Analysis Batch: 341822

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-99733-1	MW-85-080818	Total/NA	Water	8260B	
240-99733-4	MW-82S-080818	Total/NA	Water	8260B	
MB 240-341822/8	Method Blank	Total/NA	Water	8260B	
LCS 240-341822/5	Lab Control Sample	Total/NA	Water	8260B	
240-99672-B-11 MS	Matrix Spike	Total/NA	Water	8260B	
240-99672-B-11 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: 240-99733-1

Client Sample ID: MW-85-080818

Date Collected: 08/08/18 12:35

Date Received: 08/10/18 08:45

Lab Sample ID: 240-99733-1

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	341822	08/21/18 17:20	HMB	TAL CAN
Total/NA	Analysis	8260B SIM		1	341043	08/15/18 14:49	SAM	TAL CAN

Client Sample ID: MW-83-080818

Date Collected: 08/08/18 13:55

Date Received: 08/10/18 08:45

Lab Sample ID: 240-99733-2

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	341507	08/18/18 14:39	LEE	TAL CAN
Total/NA	Analysis	8260B SIM		1	341043	08/15/18 15:14	SAM	TAL CAN

Client Sample ID: MW-82D-080818

Date Collected: 08/08/18 16:55

Date Received: 08/10/18 08:45

Lab Sample ID: 240-99733-3

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	341507	08/18/18 15:01	LEE	TAL CAN
Total/NA	Analysis	8260B SIM		1	341043	08/15/18 14:24	SAM	TAL CAN

Client Sample ID: MW-82S-080818

Date Collected: 08/08/18 18:05

Date Received: 08/10/18 08:45

Lab Sample ID: 240-99733-4

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	341822	08/21/18 17:43	HMB	TAL CAN
Total/NA	Analysis	8260B SIM		1	341043	08/15/18 15:39	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: 240-99733-1

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	07-31-18 *
Kansas	NELAP	7	E-10336	01-31-19
Kentucky (UST)	State Program	4	58	02-23-19
Kentucky (WW)	State Program	4	98016	12-31-18
Minnesota	NELAP	5	039-999-348	12-31-18
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	T104704517-17-9	08-31-18 *
USDA	Federal		P330-16-00404	12-28-19
Virginia	NELAP	3	460175	09-14-18 *
Washington	State Program	10	C971	01-12-19
West Virginia DEP	State Program	3	210	12-31-18

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

TestAmerica Michigan
 10448 Citation Drive
 Suite 200
 Brighton, MI 48116
 Phone: 810.229.2753 Fax: 412.963.2470

MICHIGAN
 190

Chain of Custody Record
 221070

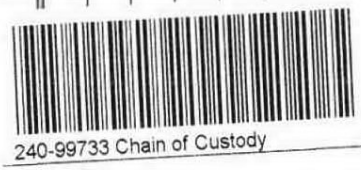
TestAmerica
 THE LEADER IN ENVIRONMENTAL TESTING
 TestAmerica Laboratories, Inc.
 TAL-8210 (07/13)

Client Contact
 Company Name: **ARCADIS**
 Address: **28550 CAROL DRIVE, SUITE 500**
 City/State/Zip: **NOVI MI 48377**
 Phone: **248-994-2240**
 Fax:
 Project Name: **FORD LTP**
 Site: **LIVONIA**
 P.O.# **MI001454.0004.00002**

Regulatory Program: DW NPDES RCRA Other:
 Project Manager: **KRIS HINSHLEY**
 Tel/Fax: **248-994-2240**
 Analysis Turnaround Time
 CALENDAR DAYS WORKING DAYS
 TAT: If different from Below **10 days**
 2 weeks
 1 week
 2 days
 1 day

Site Contact: **LAB CONTACT:**
 Lab Contact:
 Date: **08-09-2008**
 Carrier: **248**
 COC No. of COCs

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS/MSD (Y/N)	1,1-DCE 82608	Trans-1,2-DCE 82608	PCE 82608	TCE 82608	VINYL CHLORIDE 82608	1,4-Dioxane 82608 SIM	Sample Specific Notes:
MW-85-080818	8/8/18	1235	G	GW	6	N	N	✓	✓	✓	✓	✓	✓	
MW-83-080818	8/8/18	1355	G	GW	6	N	N	✓	✓	✓	✓	✓	✓	
MW-820-080818	8/8/18	1655	G	GW	6	N	N	✓	✓	✓	✓	✓	✓	
MW-825-080818	8/8/18	1805	G	GW	6	N	N	✓	✓	✓	✓	✓	✓	



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
 Special Instructions/QC Requirements & Comments:
SUBMIT ALL RESULTS THROUGH CADENA AT JIM.TOMALIA@CAPENA.COM - CADENA #E 20
 Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
 Return to Client Disposal by Lab Archive for _____ Months
 Custody Seal No.: _____
 Relinquished by: **CATUN O'NEILL / Caitlin O'Neil**
 Relinquished by: **Anna Ter Beck / Anna Ter Beck**
 Relinquished by: **John / John**
 Received by: **Erin J. Burt**
 Received by: **John**
 Received by: **John**
 Company: **ARCADIS**
 Company: **ARCADIS**
 Company: **TAL**
 Date/Time: **8/9/18 12:15**
 Date/Time: **8/9/18 12:45**
 Date/Time: **8/16/18 14:29**
 Date/Time: **8/9/18 12:15**
 Date/Time: **8/9/18 13:24**
 Date/Time: **8/16/18 8:45**
 Therm ID No.: _____



TestAmerica Canton Sample Receipt Form/Narrative Login #: 99733

Canton Facility

Client Amadis Site Name _____ Cooler unpacked by: Gil Brown
Cooler Received on 8/10/18 Opened on 8/10/18
FedEx: 1st Grd Exp UPS FAS Clipper Client Drop Off TestAmerica Courier Other _____


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

TestAmerica Cooler # _____ 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 °C) Observed Cooler Temp. _____ °C Corrected Cooler Temp. _____ °C
IR GUN #36 (CF -0.3 °C) Observed Cooler Temp. _____ °C Corrected Cooler Temp. _____ °C

2. Were tamper/custody seals on the outside of the cooler(s)? If Yes Quantity _____ 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# HC849161
13. Were VOAs on the COC? Yes No
14. Were air bubbles >6 mm in any VOA vials? Yes  Larger than this. Yes No NA
15. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot # _____ Yes No
16. Was a LL Hg or Me Hg trip blank present? Yes No

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

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

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

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): _____

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TestAmerica Multiple Cooler Receipt Form/Narrative Canton Facility			Login #: _____	
Cooler #	IR Gun #	Observed Temp °C	Corrected Temp °C	Coolant
Client	8	1.8	1.8	Ice
Client	8	1.4	1.4	Ice