

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Canton
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Tel: (330)497-9396

TestAmerica Job ID: 240-103230-1

Client Project/Site: Ford LTP Livonia MI - E203631

For:

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



Authorized for release by:
11/2/2018 11:51:31 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: 240-103230-1

Qualifiers

GC/MS VOA

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

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: 240-103230-1

Job ID: 240-103230-1

Laboratory: TestAmerica Canton

Narrative

CASE NARRATIVE

Client: ARCADIS U.S., Inc.

Project: Ford LTP Livonia MI - E203631

Report Number: 240-103230-1

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 10/24/2018 8:45 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 2.9° C.

VOLATILE ORGANIC COMPOUNDS (GCMS)

Samples MW-85_102218 (240-103230-1), MW-83_102218 (240-103230-2), MW-80S_102218 (240-103230-3) and MW-78_102218 (240-103230-4) were analyzed for volatile organic compounds (GCMS) in accordance with EPA SW-846 Method 8260B. The samples were analyzed on 10/30/2018.

Toluene-d8 (Surr) failed the surrogate recovery criteria low for 240-103233-E-6 MS and 240-103233-H-6 MSD. Refer to the QC report for details.

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 MW-85_102218 (240-103230-1), MW-83_102218 (240-103230-2), MW-80S_102218 (240-103230-3) and MW-78_102218 (240-103230-4) were analyzed for volatile organic compounds (GCMS SIM) in accordance with EPA SW-846 Method 8260B SIM. The samples were analyzed on 10/29/2018 and 10/30/2018.

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: 240-103230-1

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



Sample Summary

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

TestAmerica Job ID: 240-103230-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
240-103230-1	MW-85_102218	Water	10/22/18 11:01	10/24/18 08:45
240-103230-2	MW-83_102218	Water	10/22/18 12:30	10/24/18 08:45
240-103230-3	MW-80S_102218	Water	10/22/18 14:28	10/24/18 08:45
240-103230-4	MW-78_102218	Water	10/22/18 15:43	10/24/18 08:45

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Detection Summary

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

TestAmerica Job ID: 240-103230-1

Client Sample ID: MW-85_102218

Lab Sample ID: 240-103230-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,4-Dioxane	1.0	J	2.0	0.86	ug/L	1		8260B SIM	Total/NA
Vinyl chloride	5.5		1.0	0.20	ug/L	1		8260B	Total/NA

Client Sample ID: MW-83_102218

Lab Sample ID: 240-103230-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,4-Dioxane	0.92	J	2.0	0.86	ug/L	1		8260B SIM	Total/NA

Client Sample ID: MW-80S_102218

Lab Sample ID: 240-103230-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,4-Dioxane	1.2	J	2.0	0.86	ug/L	1		8260B SIM	Total/NA
Vinyl chloride	4.1		1.0	0.20	ug/L	1		8260B	Total/NA

Client Sample ID: MW-78_102218

Lab Sample ID: 240-103230-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,4-Dioxane	0.90	J	2.0	0.86	ug/L	1		8260B SIM	Total/NA
cis-1,2-Dichloroethene	0.26	J	1.0	0.16	ug/L	1		8260B	Total/NA

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: 240-103230-1

Client Sample ID: MW-85_102218

Lab Sample ID: 240-103230-1

Date Collected: 10/22/18 11:01

Matrix: Water

Date Received: 10/24/18 08:45

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	1.0	J	2.0	0.86	ug/L			10/29/18 19:45	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	107		63 - 125					10/29/18 19:45	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			10/30/18 19:20	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			10/30/18 19:20	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			10/30/18 19:20	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			10/30/18 19:20	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			10/30/18 19:20	1
Vinyl chloride	5.5		1.0	0.20	ug/L			10/30/18 19:20	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	115		70 - 121					10/30/18 19:20	1
4-Bromofluorobenzene (Surr)	81		59 - 120					10/30/18 19:20	1
Toluene-d8 (Surr)	82		70 - 123					10/30/18 19:20	1
Dibromofluoromethane (Surr)	128		75 - 128					10/30/18 19:20	1

Client Sample Results

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

TestAmerica Job ID: 240-103230-1

Client Sample ID: MW-83_102218

Lab Sample ID: 240-103230-2

Date Collected: 10/22/18 12:30

Matrix: Water

Date Received: 10/24/18 08:45

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	0.92	J	2.0	0.86	ug/L			10/29/18 20:11	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	108		63 - 125					10/29/18 20:11	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			10/30/18 12:42	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			10/30/18 12:42	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			10/30/18 12:42	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			10/30/18 12:42	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			10/30/18 12:42	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			10/30/18 12:42	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	110		70 - 121					10/30/18 12:42	1
4-Bromofluorobenzene (Surr)	72		59 - 120					10/30/18 12:42	1
Toluene-d8 (Surr)	70		70 - 123					10/30/18 12:42	1
Dibromofluoromethane (Surr)	119		75 - 128					10/30/18 12:42	1

Client Sample Results

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

TestAmerica Job ID: 240-103230-1

Client Sample ID: MW-80S_102218

Lab Sample ID: 240-103230-3

Date Collected: 10/22/18 14:28

Matrix: Water

Date Received: 10/24/18 08:45

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	1.2	J	2.0	0.86	ug/L			10/30/18 14:14	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	107		63 - 125					10/30/18 14:14	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			10/30/18 13:04	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			10/30/18 13:04	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			10/30/18 13:04	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			10/30/18 13:04	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			10/30/18 13:04	1
Vinyl chloride	4.1		1.0	0.20	ug/L			10/30/18 13:04	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	108		70 - 121					10/30/18 13:04	1
4-Bromofluorobenzene (Surr)	72		59 - 120					10/30/18 13:04	1
Toluene-d8 (Surr)	71		70 - 123					10/30/18 13:04	1
Dibromofluoromethane (Surr)	121		75 - 128					10/30/18 13:04	1

Client Sample Results

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

TestAmerica Job ID: 240-103230-1

Client Sample ID: MW-78_102218

Lab Sample ID: 240-103230-4

Date Collected: 10/22/18 15:43

Matrix: Water

Date Received: 10/24/18 08:45

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	0.90	J	2.0	0.86	ug/L			10/29/18 21:02	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	110		63 - 125					10/29/18 21:02	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			10/30/18 13:26	1
cis-1,2-Dichloroethene	0.26	J	1.0	0.16	ug/L			10/30/18 13:26	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			10/30/18 13:26	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			10/30/18 13:26	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			10/30/18 13:26	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			10/30/18 13:26	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	109		70 - 121					10/30/18 13:26	1
4-Bromofluorobenzene (Surr)	74		59 - 120					10/30/18 13:26	1
Toluene-d8 (Surr)	71		70 - 123					10/30/18 13:26	1
Dibromofluoromethane (Surr)	120		75 - 128					10/30/18 13:26	1

Surrogate Summary

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

TestAmerica Job ID: 240-103230-1

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 (70-121)	BFB (59-120)	TOL (70-123)	DBFM (75-128)
240-103230-1	MW-85_102218	115	81	82	128
240-103230-2	MW-83_102218	110	72	70	119
240-103230-3	MW-80S_102218	108	72	71	121
240-103230-4	MW-78_102218	109	74	71	120
240-103233-E-6 MS	Matrix Spike	96	69	64 X	98
240-103233-H-6 MSD	Matrix Spike Duplicate	100	70	66 X	106
LCS 240-352668/4	Lab Control Sample	102	88	84	111
MB 240-352668/6	Method Blank	114	84	80	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)

Lab Sample ID	Client Sample ID	DCA
		(63-125)
240-102973-F-1 MS	Matrix Spike	110
240-102973-F-1 MSD	Matrix Spike Duplicate	108
240-103230-1	MW-85_102218	107
240-103230-2	MW-83_102218	108
240-103230-3	MW-80S_102218	107
240-103230-4	MW-78_102218	110
240-103231-C-2 MS	Matrix Spike	110
240-103231-C-2 MSD	Matrix Spike Duplicate	107
LCS 240-352463/4	Lab Control Sample	104
LCS 240-352690/4	Lab Control Sample	105
MB 240-352463/5	Method Blank	105
MB 240-352690/5	Method Blank	107

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: 240-103230-1

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

Lab Sample ID: MB 240-352668/6

Matrix: Water

Analysis Batch: 352668

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			10/30/18 10:28	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			10/30/18 10:28	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			10/30/18 10:28	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			10/30/18 10:28	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			10/30/18 10:28	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			10/30/18 10:28	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	114		70 - 121		10/30/18 10:28	1
4-Bromofluorobenzene (Surr)	84		59 - 120		10/30/18 10:28	1
Toluene-d8 (Surr)	80		70 - 123		10/30/18 10:28	1
Dibromofluoromethane (Surr)	121		75 - 128		10/30/18 10:28	1

Lab Sample ID: LCS 240-352668/4

Matrix: Water

Analysis Batch: 352668

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	11.0		ug/L		110	76 - 128
Tetrachloroethene	10.0	12.3		ug/L		123	74 - 130
trans-1,2-Dichloroethene	10.0	11.3		ug/L		113	78 - 133
Trichloroethene	10.0	12.2		ug/L		122	76 - 125
Vinyl chloride	10.0	8.21		ug/L		82	58 - 143

Surrogate	LCS %Recovery	LCS Qualifier	Limits
1,2-Dichloroethane-d4 (Surr)	102		70 - 121
4-Bromofluorobenzene (Surr)	88		59 - 120
Toluene-d8 (Surr)	84		70 - 123
Dibromofluoromethane (Surr)	111		75 - 128

Lab Sample ID: 240-103233-E-6 MS

Matrix: Water

Analysis Batch: 352668

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	7.22		ug/L		72	53 - 140
cis-1,2-Dichloroethene	1.0	U	10.0	8.14		ug/L		81	64 - 130
Tetrachloroethene	1.0	U	10.0	7.42		ug/L		74	51 - 136
trans-1,2-Dichloroethene	1.0	U	10.0	8.12		ug/L		81	68 - 133
Trichloroethene	1.0	U	10.0	7.85		ug/L		78	55 - 131
Vinyl chloride	1.0	U	10.0	6.32		ug/L		63	43 - 154

Surrogate	MS %Recovery	MS Qualifier	Limits
1,2-Dichloroethane-d4 (Surr)	96		70 - 121
4-Bromofluorobenzene (Surr)	69		59 - 120
Toluene-d8 (Surr)	64	X	70 - 123

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QC Sample Results

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

TestAmerica Job ID: 240-103230-1

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

Lab Sample ID: 240-103233-E-6 MS
Matrix: Water
Analysis Batch: 352668

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

Surrogate	MS %Recovery	MS Qualifier	Limits
Dibromofluoromethane (Surr)	98		75 - 128

Lab Sample ID: 240-103233-H-6 MSD
Matrix: Water
Analysis Batch: 352668

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	7.67		ug/L		77	53 - 140	6	35
cis-1,2-Dichloroethene	1.0	U	10.0	8.71		ug/L		87	64 - 130	7	21
Tetrachloroethene	1.0	U	10.0	8.49		ug/L		85	51 - 136	13	23
trans-1,2-Dichloroethene	1.0	U	10.0	8.92		ug/L		89	68 - 133	9	24
Trichloroethene	1.0	U	10.0	8.79		ug/L		88	55 - 131	11	23
Vinyl chloride	1.0	U	10.0	6.46		ug/L		65	43 - 154	2	29

Surrogate	MSD %Recovery	MSD Qualifier	Limits
1,2-Dichloroethane-d4 (Surr)	100		70 - 121
4-Bromofluorobenzene (Surr)	70		59 - 120
Toluene-d8 (Surr)	66	X	70 - 123
Dibromofluoromethane (Surr)	106		75 - 128

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

Lab Sample ID: MB 240-352463/5
Matrix: Water
Analysis Batch: 352463

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			10/29/18 12:04	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	105		63 - 125		10/29/18 12:04	1

Lab Sample ID: LCS 240-352463/4
Matrix: Water
Analysis Batch: 352463

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	11.1		ug/L		111	59 - 131

Surrogate	LCS %Recovery	LCS Qualifier	Limits
1,2-Dichloroethane-d4 (Surr)	104		63 - 125

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QC Sample Results

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

TestAmerica Job ID: 240-103230-1

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

Lab Sample ID: 240-103231-C-2 MS

Matrix: Water
Analysis Batch: 352463

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	0.86	J	10.0	10.1		ug/L		93	52 - 129
Surrogate	%Recovery	MS Qualifier	Limits						
1,2-Dichloroethane-d4 (Surr)	110		63 - 125						

Lab Sample ID: 240-103231-C-2 MSD

Matrix: Water
Analysis Batch: 352463

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	0.86	J	10.0	10.3		ug/L		94	52 - 129	1	13
Surrogate	%Recovery	MSD Qualifier	Limits								
1,2-Dichloroethane-d4 (Surr)	107		63 - 125								

Lab Sample ID: MB 240-352690/5

Matrix: Water
Analysis Batch: 352690

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			10/30/18 12:57	1
Surrogate	%Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac			
1,2-Dichloroethane-d4 (Surr)	107		63 - 125		10/30/18 12:57	1			

Lab Sample ID: LCS 240-352690/4

Matrix: Water
Analysis Batch: 352690

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	10.9		ug/L		109	59 - 131
Surrogate	%Recovery	LCS Qualifier	Limits				
1,2-Dichloroethane-d4 (Surr)	105		63 - 125				

Lab Sample ID: 240-102973-F-1 MS

Matrix: Water
Analysis Batch: 352690

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	9.59		ug/L		96	52 - 129
Surrogate	%Recovery	MS Qualifier	Limits						
1,2-Dichloroethane-d4 (Surr)	110		63 - 125						

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QC Sample Results

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

TestAmerica Job ID: 240-103230-1

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

Lab Sample ID: 240-102973-F-1 MSD
 Matrix: Water
 Analysis Batch: 352690

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	9.89		ug/L		99	52 - 129	3	13
Surrogate	%Recovery	MSD Qualifier	MSD Limits								
1,2-Dichloroethane-d4 (Surr)	108		63 - 125								

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14

QC Association Summary

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

TestAmerica Job ID: 240-103230-1

GC/MS VOA

Analysis Batch: 352463

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-103230-1	MW-85_102218	Total/NA	Water	8260B SIM	
240-103230-2	MW-83_102218	Total/NA	Water	8260B SIM	
240-103230-4	MW-78_102218	Total/NA	Water	8260B SIM	
MB 240-352463/5	Method Blank	Total/NA	Water	8260B SIM	
LCS 240-352463/4	Lab Control Sample	Total/NA	Water	8260B SIM	
240-103231-C-2 MS	Matrix Spike	Total/NA	Water	8260B SIM	
240-103231-C-2 MSD	Matrix Spike Duplicate	Total/NA	Water	8260B SIM	

Analysis Batch: 352668

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-103230-1	MW-85_102218	Total/NA	Water	8260B	
240-103230-2	MW-83_102218	Total/NA	Water	8260B	
240-103230-3	MW-80S_102218	Total/NA	Water	8260B	
240-103230-4	MW-78_102218	Total/NA	Water	8260B	
MB 240-352668/6	Method Blank	Total/NA	Water	8260B	
LCS 240-352668/4	Lab Control Sample	Total/NA	Water	8260B	
240-103233-E-6 MS	Matrix Spike	Total/NA	Water	8260B	
240-103233-H-6 MSD	Matrix Spike Duplicate	Total/NA	Water	8260B	

Analysis Batch: 352690

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-103230-3	MW-80S_102218	Total/NA	Water	8260B SIM	
MB 240-352690/5	Method Blank	Total/NA	Water	8260B SIM	
LCS 240-352690/4	Lab Control Sample	Total/NA	Water	8260B SIM	
240-102973-F-1 MS	Matrix Spike	Total/NA	Water	8260B SIM	
240-102973-F-1 MSD	Matrix Spike Duplicate	Total/NA	Water	8260B SIM	

Lab Chronicle

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

TestAmerica Job ID: 240-103230-1

Client Sample ID: MW-85_102218

Date Collected: 10/22/18 11:01

Date Received: 10/24/18 08:45

Lab Sample ID: 240-103230-1

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	352668	10/30/18 19:20	LEE	TAL CAN
Total/NA	Analysis	8260B SIM		1	352463	10/29/18 19:45	SAM	TAL CAN

Client Sample ID: MW-83_102218

Date Collected: 10/22/18 12:30

Date Received: 10/24/18 08:45

Lab Sample ID: 240-103230-2

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	352668	10/30/18 12:42	LEE	TAL CAN
Total/NA	Analysis	8260B SIM		1	352463	10/29/18 20:11	SAM	TAL CAN

Client Sample ID: MW-80S_102218

Date Collected: 10/22/18 14:28

Date Received: 10/24/18 08:45

Lab Sample ID: 240-103230-3

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	352668	10/30/18 13:04	LEE	TAL CAN
Total/NA	Analysis	8260B SIM		1	352690	10/30/18 14:14	SAM	TAL CAN

Client Sample ID: MW-78_102218

Date Collected: 10/22/18 15:43

Date Received: 10/24/18 08:45

Lab Sample ID: 240-103230-4

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	352668	10/30/18 13:26	LEE	TAL CAN
Total/NA	Analysis	8260B SIM		1	352463	10/29/18 21:02	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: 240-103230-1

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	07-31-19
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	08-31-19
USDA	Federal		P330-16-00404	12-28-19
Virginia	NELAP	3	460175	09-14-19
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 Canton

Chain of Custody Record

TestAmerica Laboratory location: Brighton — 10448 Citation Drive, Suite 200 / Brighton, MI 48116 / 810-229-2763

Client Contact Company Name: Arcadis Address: 26550 Cabot Drive, Suite 500 City/State/Zip: Novi, MI, 48377 Phone: 248-994-2240 Project Name: Ford LTP Project Number: MI001454.0004.00002 PO # MI001454.0004.00002		Regulatory program: <input type="checkbox"/> DW <input type="checkbox"/> NPDES <input type="checkbox"/> RCRA <input type="checkbox"/> Other	
Client Project Manager: Kris Hinskey Telephone: 248-994-2240 Email: kristoffer.hinskey@arcadis.com		Lab Contact: Mike DelMonte Telephone: 330-497-9396	
Method of Shipment/Carrier: Shipping/Tracking No:		Analysis Turnaround Time TAT if different from below: <input type="checkbox"/> 3 weeks <input checked="" type="checkbox"/> 2 weeks <input type="checkbox"/> 1 week <input type="checkbox"/> 2 days <input type="checkbox"/> 1 day	
Sample Identification		Containers & Preservatives	
Sample Date	Sample Time	Matrix	Other:
MW-85 - 102218	1101	Aqueous	NaOH
MW-83 - 102218	1230	Sediment	HCl
MW-80 S - 102218	1428	Solid	HNO3
MW-78 - 102218	1543	Other:	H2SO4
			Other:
			Unpres
			Other:
			Filtered Sample (Y/N)
			Composite (C/Grab/G)
			1,1-DCE 82608
			cis-1,2-DCE 82608
			Trans-1,2-DCE 82608
			PCE 82608
			TCE 82608
			Vinyl Chloride 82608
			1,4-Dioxane 82608 SIM
			Sample Specific Notes / Special Instructions:



Possible Hazard Identification <input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown		Sample Disposal (A fee may be assessed if samples are retained longer than 1 month) <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months	
Relinquished by: RACHEL STERN	Company: ARCADIS	Date/Time: 10/23/18 0730	Received by: NOVI COLD STORAGE
Relinquished by: NINA FREDGE RALWSON	Company: ARCADIS	Date/Time: 10/23/18 1300	Received by: [Signature]
Relinquished by: [Signature]	Company: TAC	Date/Time: 10/23/18 13:00	Received in Laboratory by: [Signature]

Submit all results through Cadena at jim.tomalia@cadena.com. Cadena #E203631

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Client ARLADIS Site Name Cooler unpacked by: ROP
 Cooler Received on 10-24-18 Opened on 10-24-18

FedEx: 1st Exp UPS FAS Clipper Client Drop Off TestAmerica Courier Other

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

TestAmerica Cooler # TA 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. 2.0 °C Corrected Cooler Temp. 2.9 °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 NA
 -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 No NA ● ← Larger than this.
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

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: AM

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):