

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Canton
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North Canton, OH 44720
Tel: (330)497-9396

TestAmerica Job ID: 240-104365-2

Client Project/Site: Ford LTP Livonia MI - E203631
Revision: 1

For:

ARCADIS U.S., Inc.
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Novi, Michigan 48377

Attn: Kristoffer Hinskey



Authorized for release by:
1/16/2019 4:54:08 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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Definitions/Glossary

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

TestAmerica Job ID: 240-104365-2

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.
U	Indicates the analyte was analyzed for but not detected.
X	Surrogate is outside control limits
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.
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: 240-104365-2

Job ID: 240-104365-2

Laboratory: TestAmerica Canton

Narrative

CASE NARRATIVE

Client: ARCADIS U.S., Inc.

Project: Ford LTP Livonia MI - E203631

Report Number: 240-104365-2

Revision

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.

Revised 1/16/2019 - Report was revised to report samples separately.

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 11/14/2018 9:05 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 3.3° C.

VOLATILE ORGANIC COMPOUNDS (GCMS)

Samples HPT-194_6-10_111218 (240-104365-1) and DUP-01_111218 (240-104365-7) were analyzed for volatile organic compounds (GCMS) in accordance with EPA SW-846 Method 8260B. The samples were analyzed on 11/20/2018 and 11/21/2018.

1,2-Dichloroethane-d4 (Surr) failed the surrogate recovery criteria high for HPT-194_6-10_111218 (240-104365-1), DUP-01_111218 (240-104365-7), MB 240-356342/6 and MB 240-356573/6. Refer to the QC report for details.

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-194_6-10_111218 (240-104365-1) and (MB 240-356342/6).

There was an MS/MSD analyzed in 356342 but could not be reported because the associated sample needed reanalyzed in a different

Case Narrative

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

TestAmerica Job ID: 240-104365-2

Job ID: 240-104365-2 (Continued)

Laboratory: TestAmerica Canton (Continued)

batch: HPT-194_6-10_111218 (240-104365-1).

Surrogate recovery for the following sample(s) was outside the upper control limit: This sample did not contain any target analytes; therefore, re-extraction and/or re-analysis was not performed: DUP-01_111218 (240-104365-7) and (MB 240-356573/6).

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-194_6-10_111218 (240-104365-1) and DUP-01_111218 (240-104365-7) were analyzed for volatile organic compounds (GCMS SIM) in accordance with EPA SW-846 Method 8260B SIM. The samples were analyzed on 11/16/2018 and 11/21/2018.

1,4-Dioxane failed the recovery criteria low for the MS of sample 240-104167-6 in batch 240-355798. 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.

Method Summary

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

TestAmerica Job ID: 240-104365-2

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: 240-104365-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
240-104365-1	HPT-194_6-10_111218	Water	11/12/18 13:25	11/14/18 09:05
240-104365-7	DUP-01_111218	Water	11/12/18 00:00	11/14/18 09:05

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- 2
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Detection Summary

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

TestAmerica Job ID: 240-104365-2

Client Sample ID: HPT-194_6-10_111218

Lab Sample ID: 240-104365-1

No Detections.

Client Sample ID: DUP-01_111218

Lab Sample ID: 240-104365-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,4-Dioxane	0.89	J	2.0	0.86	ug/L	1		8260B SIM	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: 240-104365-2

Client Sample ID: HPT-194_6-10_111218

Lab Sample ID: 240-104365-1

Date Collected: 11/12/18 13:25

Matrix: Water

Date Received: 11/14/18 09:05

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			11/16/18 22:25	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	106		63 - 125					11/16/18 22:25	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			11/20/18 21:31	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			11/20/18 21:31	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			11/20/18 21:31	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			11/20/18 21:31	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			11/20/18 21:31	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			11/20/18 21:31	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	140	X	70 - 121					11/20/18 21:31	1
4-Bromofluorobenzene (Surr)	84		59 - 120					11/20/18 21:31	1
Toluene-d8 (Surr)	90		70 - 123					11/20/18 21:31	1
Dibromofluoromethane (Surr)	125		75 - 128					11/20/18 21:31	1

Client Sample Results

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

TestAmerica Job ID: 240-104365-2

Client Sample ID: DUP-01_111218

Lab Sample ID: 240-104365-7

Date Collected: 11/12/18 00:00

Matrix: Water

Date Received: 11/14/18 09:05

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	0.89	J	2.0	0.86	ug/L			11/21/18 15:37	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	103		63 - 125					11/21/18 15:37	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			11/21/18 22:04	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			11/21/18 22:04	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			11/21/18 22:04	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			11/21/18 22:04	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			11/21/18 22:04	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			11/21/18 22:04	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	141	X	70 - 121					11/21/18 22:04	1
4-Bromofluorobenzene (Surr)	84		59 - 120					11/21/18 22:04	1
Toluene-d8 (Surr)	90		70 - 123					11/21/18 22:04	1
Dibromofluoromethane (Surr)	123		75 - 128					11/21/18 22:04	1

Surrogate Summary

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

TestAmerica Job ID: 240-104365-2

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)
240-104365-1	HPT-194_6-10_111218	140 X	84	90	125
240-104365-7	DUP-01_111218	141 X	84	90	123
240-104365-7 MS	DUP-01_111218	119	110	100	106
240-104365-7 MSD	DUP-01_111218	121	109	99	109
LCS 240-356342/4	Lab Control Sample	110	110	99	101
LCS 240-356573/4	Lab Control Sample	117	110	99	107
MB 240-356342/6	Method Blank	126 X	86	90	112
MB 240-356573/6	Method Blank	129 X	86	91	118

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)
240-104167-D-6 MS	Matrix Spike	103
240-104167-D-6 MSD	Matrix Spike Duplicate	104
240-104365-1	HPT-194_6-10_111218	106
240-104365-7	DUP-01_111218	103
240-104487-A-3 MS	Matrix Spike	107
240-104487-A-3 MSD	Matrix Spike Duplicate	105
LCS 240-355798/4	Lab Control Sample	101
LCS 240-356577/4	Lab Control Sample	103
MB 240-355798/5	Method Blank	105
MB 240-356577/5	Method Blank	103

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: 240-104365-2

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

Lab Sample ID: MB 240-356342/6

Matrix: Water

Analysis Batch: 356342

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			11/20/18 15:26	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			11/20/18 15:26	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			11/20/18 15:26	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			11/20/18 15:26	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			11/20/18 15:26	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			11/20/18 15:26	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	126	X	70 - 121		11/20/18 15:26	1
4-Bromofluorobenzene (Surr)	86		59 - 120		11/20/18 15:26	1
Toluene-d8 (Surr)	90		70 - 123		11/20/18 15:26	1
Dibromofluoromethane (Surr)	112		75 - 128		11/20/18 15:26	1

Lab Sample ID: LCS 240-356342/4

Matrix: Water

Analysis Batch: 356342

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	10.0		ug/L		100	65 - 139
cis-1,2-Dichloroethene	10.0	9.26		ug/L		93	76 - 128
Tetrachloroethene	10.0	10.4		ug/L		104	74 - 130
trans-1,2-Dichloroethene	10.0	9.33		ug/L		93	78 - 133
Trichloroethene	10.0	9.59		ug/L		96	76 - 125
Vinyl chloride	10.0	8.21		ug/L		82	58 - 143

Surrogate	LCS %Recovery	LCS Qualifier	Limits
1,2-Dichloroethane-d4 (Surr)	110		70 - 121
4-Bromofluorobenzene (Surr)	110		59 - 120
Toluene-d8 (Surr)	99		70 - 123
Dibromofluoromethane (Surr)	101		75 - 128

Lab Sample ID: MB 240-356573/6

Matrix: Water

Analysis Batch: 356573

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			11/21/18 14:07	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			11/21/18 14:07	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			11/21/18 14:07	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			11/21/18 14:07	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			11/21/18 14:07	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			11/21/18 14:07	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	129	X	70 - 121		11/21/18 14:07	1
4-Bromofluorobenzene (Surr)	86		59 - 120		11/21/18 14:07	1
Toluene-d8 (Surr)	91		70 - 123		11/21/18 14:07	1

TestAmerica Canton

QC Sample Results

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

TestAmerica Job ID: 240-104365-2

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

Lab Sample ID: MB 240-356573/6
Matrix: Water
Analysis Batch: 356573

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

Surrogate	MB	MB	Limits	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier				
Dibromofluoromethane (Surr)	118		75 - 128		11/21/18 14:07	1

Lab Sample ID: LCS 240-356573/4
Matrix: Water
Analysis Batch: 356573

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	10.4		ug/L		104	65 - 139
cis-1,2-Dichloroethene	10.0	9.68		ug/L		97	76 - 128
Tetrachloroethene	10.0	10.6		ug/L		106	74 - 130
trans-1,2-Dichloroethene	10.0	9.96		ug/L		100	78 - 133
Trichloroethene	10.0	10.1		ug/L		101	76 - 125
Vinyl chloride	10.0	8.06		ug/L		81	58 - 143

Surrogate	LCS	LCS	Limits
	%Recovery	Qualifier	
1,2-Dichloroethane-d4 (Surr)	117		70 - 121
4-Bromofluorobenzene (Surr)	110		59 - 120
Toluene-d8 (Surr)	99		70 - 123
Dibromofluoromethane (Surr)	107		75 - 128

Lab Sample ID: 240-104365-7 MS
Matrix: Water
Analysis Batch: 356573

Client Sample ID: DUP-01_111218
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	9.59		ug/L		96	53 - 140
cis-1,2-Dichloroethene	1.0	U	10.0	9.46		ug/L		95	64 - 130
Tetrachloroethene	1.0	U	10.0	9.97		ug/L		100	51 - 136
trans-1,2-Dichloroethene	1.0	U	10.0	9.60		ug/L		96	68 - 133
Trichloroethene	1.0	U	10.0	9.31		ug/L		93	55 - 131
Vinyl chloride	1.0	U	10.0	7.20		ug/L		72	43 - 154

Surrogate	MS	MS	Limits
	%Recovery	Qualifier	
1,2-Dichloroethane-d4 (Surr)	119		70 - 121
4-Bromofluorobenzene (Surr)	110		59 - 120
Toluene-d8 (Surr)	100		70 - 123
Dibromofluoromethane (Surr)	106		75 - 128

Lab Sample ID: 240-104365-7 MSD
Matrix: Water
Analysis Batch: 356573

Client Sample ID: DUP-01_111218
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	10.2		ug/L		102	53 - 140	7	35
cis-1,2-Dichloroethene	1.0	U	10.0	9.84		ug/L		98	64 - 130	4	21
Tetrachloroethene	1.0	U	10.0	9.63		ug/L		96	51 - 136	3	23
trans-1,2-Dichloroethene	1.0	U	10.0	9.86		ug/L		99	68 - 133	3	24

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QC Sample Results

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

TestAmerica Job ID: 240-104365-2

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

Lab Sample ID: 240-104365-7 MSD

Matrix: Water

Analysis Batch: 356573

Client Sample ID: DUP-01_111218

Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Trichloroethene	1.0	U	10.0	9.39		ug/L		94	55 - 131	1	23
Vinyl chloride	1.0	U	10.0	8.20		ug/L		82	43 - 154	13	29
Surrogate	MSD %Recovery	MSD Qualifier	Limits								
1,2-Dichloroethane-d4 (Surr)	121		70 - 121								
4-Bromofluorobenzene (Surr)	109		59 - 120								
Toluene-d8 (Surr)	99		70 - 123								
Dibromofluoromethane (Surr)	109		75 - 128								

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

Lab Sample ID: MB 240-355798/5

Matrix: Water

Analysis Batch: 355798

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			11/16/18 12:31	1	
Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac				
1,2-Dichloroethane-d4 (Surr)	105		63 - 125		11/16/18 12:31	1				

Lab Sample ID: LCS 240-355798/4

Matrix: Water

Analysis Batch: 355798

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	10.4		ug/L		104	59 - 131			
Surrogate	LCS %Recovery	LCS Qualifier	Limits							
1,2-Dichloroethane-d4 (Surr)	101		63 - 125							

Lab Sample ID: 240-104167-D-6 MS

Matrix: Water

Analysis Batch: 355798

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	120		10.0	122	4	ug/L		43	52 - 129		
Surrogate	MS %Recovery	MS Qualifier	Limits								
1,2-Dichloroethane-d4 (Surr)	103		63 - 125								

Lab Sample ID: 240-104167-D-6 MSD

Matrix: Water

Analysis Batch: 355798

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	120		10.0	123	4	ug/L		61	52 - 129	1	13

TestAmerica Canton

QC Sample Results

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

TestAmerica Job ID: 240-104365-2

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

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-A-3 MS
Matrix: Water
Analysis Batch: 356577

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	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-A-3 MSD
Matrix: Water
Analysis Batch: 356577

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	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: 240-104365-2

GC/MS VOA

Analysis Batch: 355798

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-104365-1	HPT-194_6-10_111218	Total/NA	Water	8260B SIM	
MB 240-355798/5	Method Blank	Total/NA	Water	8260B SIM	
LCS 240-355798/4	Lab Control Sample	Total/NA	Water	8260B SIM	
240-104167-D-6 MS	Matrix Spike	Total/NA	Water	8260B SIM	
240-104167-D-6 MSD	Matrix Spike Duplicate	Total/NA	Water	8260B SIM	

Analysis Batch: 356342

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-104365-1	HPT-194_6-10_111218	Total/NA	Water	8260B	
MB 240-356342/6	Method Blank	Total/NA	Water	8260B	
LCS 240-356342/4	Lab Control Sample	Total/NA	Water	8260B	

Analysis Batch: 356573

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-104365-7	DUP-01_111218	Total/NA	Water	8260B	
MB 240-356573/6	Method Blank	Total/NA	Water	8260B	
LCS 240-356573/4	Lab Control Sample	Total/NA	Water	8260B	
240-104365-7 MS	DUP-01_111218	Total/NA	Water	8260B	
240-104365-7 MSD	DUP-01_111218	Total/NA	Water	8260B	

Analysis Batch: 356577

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-104365-7	DUP-01_111218	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-A-3 MS	Matrix Spike	Total/NA	Water	8260B SIM	
240-104487-A-3 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: 240-104365-2

Client Sample ID: HPT-194_6-10_111218

Date Collected: 11/12/18 13:25

Date Received: 11/14/18 09:05

Lab Sample ID: 240-104365-1

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	356342	11/20/18 21:31	LRW	TAL CAN
Total/NA	Analysis	8260B SIM		1	355798	11/16/18 22:25	SAM	TAL CAN

Client Sample ID: DUP-01_111218

Date Collected: 11/12/18 00:00

Date Received: 11/14/18 09:05

Lab Sample ID: 240-104365-7

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	356573	11/21/18 22:04	LRW	TAL CAN
Total/NA	Analysis	8260B SIM		1	356577	11/21/18 15:37	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: 240-104365-2

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.

Regulatory Program: DW NPDES RCRA Other:

Client Contact
Company Name: **ARCADIS**
Address: **28550 CANTON DR #500**
City/State/Zip: **NOVI, MI 48377**
Phone: **248-994-2240**
Fax: **248-994-2241**
Project Name: **FORO LTP**
Site: **OFF-SITE**
PO # **MI001454.0002.0002B**

Project Manager: **KELLY HAWKES**
Tel/Fax: **269-579-5402**
Analysis Turnaround Time
 CALENDAR DAYS WORKING DAYS
TAT if different from Below **STANDARD**
 2 weeks
 1 week
 2 days
 1 day

Site Contact: **Lab Contact:**
Date: **11-13-18**
Carrier: **1** of **1** 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)	Sample Specific Notes:
HPT-194_6-10_111218	11-12-18	1325	G	GW	6	N	N	
HPT-195_11-15_111218	11-12-18	1510	G	GW	6	N	N	
HPT-195_6-10_111218	11-12-18	1525	G	GW	6	N	N	
HPT-196_10-14_111218	11-12-18	1700	G	GW	6	N	N	
HPT-196_5-9_111218	11-12-18	1715	G	GW	6	N	N	
TRIP BLANK	-	-	-	W	1	N	N	
DUP-01-111218	11-12-18	-	G	GW	6	N	N	

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

Possible Hazard Identification: 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: **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-DIBROMOETHANE VIA USEPA METHOD 8260B-SIM. SUBMIT ALL RESULTS THROUGH CADENA AT JIM.TOMALIA@CADENA.COM # 6263631**

Custody Seal No.: Yes No

Relinquished by: **KARAN BRIGGS** Date/Time: **11-13-18 1235** Company: **ARCADIS**

Relinquished by: **John Hawk** Date/Time: **11/13/18 1505** Company: **TA**

Relinquished by: **John Hawk** Date/Time: **11-13-18 1235** Company: **TA**

Relinquished by: **John Hawk** Date/Time: **11-14-18 905** Company: **TA**

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
 Return to Client Disposal by Lab Archive for _____ Months



TestAmerica Canton Sample Receipt Form/Narrative
Canton Facility

Login # : 104365

Client Arcadis Site Name _____ Cooler unpacked by: MS
 Cooler Received on TAC Opened on 11-14-18
 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 +0.9 °C) Observed Cooler Temp. 2.4 °C Corrected Cooler Temp. 3.3 °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 _____ 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. 57/60 Yes No NA
15. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot # 02089011 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

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): _____



January 18, 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: 104365-2
Sample date: 2018-11-12
Report received by CADENA: 2019-01-16
Initial Data Verification completed by CADENA: 2019-01-18

The following minor QC exceptions or missing information were noted:

GCMS SIM 1,4-DIOXANE QC batch MS/MSD recovery outliers were not determined using a client sample so qualification was not required based on these sample-specific QC outliers.

GCMS VOC sample -001, -007 and its method blanks SURROGATE recoveries were outliers biased high for 1 surrogate. Associated client sample results were non-detect so qualification was not required based on these high bias QC outliers.

GCMS VOC MS/MSD QC batch was not available as noted in the laboratory submittal case narrative were not used to qualify client sample results as part of this level 2 data package verification review.

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.

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

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

Analytical results reported between RDL and MDL are flagged 'J' and considered estimated values.

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 contaminants) 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 contaminants) 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: 104365-2

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
2401043651	HPT-194_6-10_111218	11/12/2018	1:25:00	X	X	
2401043657	DUP-01_111218	11/12/2018	12:00:00	X	X	

Analytical Results Summary

Reportable Results Only

CADENA Project ID: E203631

Laboratory: TestAmerica - North Canton

Laboratory Submittal: 104365-2

Sample Name: HPT-194_6-10_111218 DUP-01_111218
Lab Sample ID: 2401043651 2401043657
Sample Date: 11/12/2018 11/12/2018

Analyte	Cas No.	Report		Units	Valid Qualifier	Report		Units	Valid Qualifier	
		Result	Limit			Result	Limit			
GC/MS VOC										
<u>OSW-8260B</u>										
1,1-Dichloroethene	75-35-4	ND	1.0	ug/l	---	ND	1.0	ug/l	---	
cis-1,2-Dichloroethene	156-59-2	ND	1.0	ug/l	---	ND	1.0	ug/l	---	
Tetrachloroethene	127-18-4	ND	1.0	ug/l	---	ND	1.0	ug/l	---	
trans-1,2-Dichloroethene	156-60-5	ND	1.0	ug/l	---	ND	1.0	ug/l	---	
Trichloroethene	79-01-6	ND	1.0	ug/l	---	ND	1.0	ug/l	---	
Vinyl chloride	75-01-4	ND	1.0	ug/l	---	ND	1.0	ug/l	---	
<u>OSW-8260BBSim</u>										
1,4-Dioxane	123-91-1	ND	2.0	ug/l	---	0.89	2.0	ug/l	J	