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ANALYTICAL REPORT

Eurofins TestAmerica, Canton
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Laboratory Job ID: 240-113311-1
Client Project/Site: Ford LTP Livonia MI - E203631

For:
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Attn: Kristoffer Hinskey

Authorized for release by:
6/11/2019 9:13:36 AM

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

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. Job ID: 240-113311-1
Project/Site: Ford LTP Livonia MI - E203631

Qualifiers

GC/MS VOA

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

Job ID: 240-113311-1

Laboratory: Eurofins TestAmerica, Canton

Narrative

CASE NARRATIVE

Client: ARCADIS U.S., Inc.

Project: Ford LTP Livonia MI - E203631

Report Number: 240-113311-1

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.

Eurofins TestAmerica, Canton attests to the validity of the laboratory data generated by Eurofins TestAmerica facilities reported herein. All analyses performed by Eurofins TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. Eurofins 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 Eurofins TestAmerica and its client.

RECEIPT

The samples were received on 5/25/2019 10:00 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 2 coolers at receipt time were 3.0º C and 4.0º C.

VOLATILE ORGANIC COMPOUNDS (GCMS)

Samples MW-87_052119 (240-113311-1), MW-86_052119 (240-113311-2), MW-84_052119 (240-113311-3) and TRIP BLANK (240-113311-4) were analyzed for volatile organic compounds (GCMS) in accordance with EPA SW-846 Method 8260B. The samples were analyzed on 06/03/2019 and 06/04/2019.

The continuing calibration verification (CCV) associated with batch 384267 recovered above the upper control limit for Vinyl Chloride. The samples associated with this CCV were non-detects for the affected analyte; therefore, the data have been reported. The following samples are impacted: MW-87_052119 (240-113311-1), MW-86_052119 (240-113311-2), MW-84_052119 (240-113311-3) and (240-113326-A-1).

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-87_052119 (240-113311-1), MW-86_052119 (240-113311-2) and MW-84_052119 (240-113311-3) were analyzed for volatile organic compounds (GCMS SIM) in accordance with EPA SW-846 Method 8260B SIM. The samples were analyzed on 05/30/2019.

Job ID: 240-113311-1 (Continued)

Laboratory: Eurofins TestAmerica, Canton (Continued)

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.
Job ID: 240-113311-1
Project/Site: Ford LTP Livonia MI - E203631

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 = Eurofins 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

Job ID: 240-113311-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
240-113311-1	MW-87_052119	Water	05/21/19 16:12	05/25/19 10:00	
240-113311-2	MW-86_052119	Water	05/21/19 15:10	05/25/19 10:00	
240-113311-3	MW-84_052119	Water	05/21/19 14:07	05/25/19 10:00	
240-113311-4	TRIP BLANK	Water	05/21/19 00:00	05/25/19 10:00	

Detection Summary

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

Job ID: 240-113311-1

Client Sample ID: MW-87_052119 — Lab Sample ID: 240-113311-1

No Detections.

Client Sample ID: MW-86_052119 — Lab Sample ID: 240-113311-2

No Detections.

Client Sample ID: MW-84_052119 — Lab Sample ID: 240-113311-3

No Detections.

Client Sample ID: TRIP BLANK — Lab Sample ID: 240-113311-4

No Detections.

This Detection Summary does not include radiochemical test results.

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

Job ID: 240-113311-1

Client Sample ID: MW-87_052119
Date Collected: 05/21/19 16:12
Date Received: 05/25/19 10:00

Lab Sample ID: 240-113311-1
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	2.0	U	2.0	0.86	ug/L			05/30/19 18:26	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*106*		*63 - 125*		*05/30/19 18:26*	*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			06/03/19 22:56	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			06/03/19 22:56	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			06/03/19 22:56	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			06/03/19 22:56	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			06/03/19 22:56	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			06/03/19 22:56	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*97*		*70 - 121*		*06/03/19 22:56*	*1*
4-Bromofluorobenzene (Surr)	*94*		*59 - 120*		*06/03/19 22:56*	*1*
Toluene-d8 (Surr)	*104*		*70 - 123*		*06/03/19 22:56*	*1*
Dibromofluoromethane (Surr)	*106*		*75 - 128*		*06/03/19 22:56*	*1*

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

Job ID: 240-113311-1

Client Sample ID: MW-86_052119
Date Collected: 05/21/19 15:10
Date Received: 05/25/19 10:00

Lab Sample ID: 240-113311-2
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	2.0	U	2.0	0.86	ug/L			05/30/19 18:51	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*106*		*63 - 125*		*05/30/19 18:51*	*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			06/03/19 23:18	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			06/03/19 23:18	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			06/03/19 23:18	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			06/03/19 23:18	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			06/03/19 23:18	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			06/03/19 23:18	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*97*		*70 - 121*		*06/03/19 23:18*	*1*
4-Bromofluorobenzene (Surr)	*94*		*59 - 120*		*06/03/19 23:18*	*1*
Toluene-d8 (Surr)	*104*		*70 - 123*		*06/03/19 23:18*	*1*
Dibromofluoromethane (Surr)	*107*		*75 - 128*		*06/03/19 23:18*	*1*

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

Job ID: 240-113311-1

Client Sample ID: MW-84_052119

Date Collected: 05/21/19 14:07
Date Received: 05/25/19 10:00

Lab Sample ID: 240-113311-3

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	2.0	U	2.0	0.86	ug/L			05/30/19 19:16	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*106*		*63 - 125*		*05/30/19 19:16*	*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			06/03/19 23:40	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			06/03/19 23:40	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			06/03/19 23:40	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			06/03/19 23:40	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			06/03/19 23:40	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			06/03/19 23:40	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*95*		*70 - 121*		*06/03/19 23:40*	*1*
4-Bromofluorobenzene (Surr)	*92*		*59 - 120*		*06/03/19 23:40*	*1*
Toluene-d8 (Surr)	*103*		*70 - 123*		*06/03/19 23:40*	*1*
Dibromofluoromethane (Surr)	*105*		*75 - 128*		*06/03/19 23:40*	*1*

Client: ARCADIS U.S., Inc.
Job ID: 240-113311-1
Project/Site: Ford LTP Livonia MI - E203631

Client Sample ID: TRIP BLANK
Lab Sample ID: 240-113311-4
Date Collected: 05/21/19 00:00
Matrix: Water
Date Received: 05/25/19 10:00

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			06/04/19 12:24	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			06/04/19 12:24	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			06/04/19 12:24	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			06/04/19 12:24	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			06/04/19 12:24	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			06/04/19 12:24	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*88*		*70 - 121*		*06/04/19 12:24*	*1*
4-Bromofluorobenzene (Surr)	*87*		*59 - 120*		*06/04/19 12:24*	*1*
Toluene-d8 (Surr)	*80*		*70 - 123*		*06/04/19 12:24*	*1*
Dibromofluoromethane (Surr)	*98*		*75 - 128*		*06/04/19 12:24*	*1*

Surrogate Summary

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

Job ID: 240-113311-1

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

Matrix: Water

Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)			
Lab Sample ID	Client Sample ID	DCA (70-121)	BFB (59-120)	TOL (70-123)	DBFM (75-128)
240-113149-B-13 MS	Matrix Spike	87	81	82	91
240-113149-B-13 MSD	Matrix Spike Duplicate	78	75	89	93
240-113311-1	MW-87_052119	97	94	104	106
240-113311-2	MW-86_052119	97	94	104	107
240-113311-3	MW-84_052119	95	92	103	105
240-113311-4	TRIP BLANK	88	87	80	98
240-113326-E-1 MSD	Matrix Spike Duplicate	88	94	95	89
240-113326-F-1 MS	Matrix Spike	84	96	96	89
LCS 240-384267/4	Lab Control Sample	91	107	106	101
LCS 240-384386/6	Lab Control Sample	81	83	84	88
MB 240-384267/6	Method Blank	95	91	100	105
MB 240-384386/9	Method Blank	91	95	93	97

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)
240-113259-C-5 MS	Matrix Spike	112
240-113259-C-5 MSD	Matrix Spike Duplicate	109
240-113311-1	MW-87_052119	106
240-113311-2	MW-86_052119	106
240-113311-3	MW-84_052119	106
LCS 240-383677/4	Lab Control Sample	104
MB 240-383677/5	Method Blank	107

Surrogate Legend

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

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

Lab Sample ID: MB 240-384267/6
Matrix: Water
Analysis Batch: 384267

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			06/03/19 22:11	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			06/03/19 22:11	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			06/03/19 22:11	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			06/03/19 22:11	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			06/03/19 22:11	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			06/03/19 22:11	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*95*		*70 - 121*		*06/03/19 22:11*	*1*
4-Bromofluorobenzene (Surr)	*91*		*59 - 120*		*06/03/19 22:11*	*1*
Toluene-d8 (Surr)	*100*		*70 - 123*		*06/03/19 22:11*	*1*
Dibromofluoromethane (Surr)	*105*		*75 - 128*		*06/03/19 22:11*	*1*

Lab Sample ID: LCS 240-384267/4
Matrix: Water
Analysis Batch: 384267

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	11.7		ug/L		117	65 - 139
cis-1,2-Dichloroethene	10.0	11.3		ug/L		113	76 - 128
Tetrachloroethene	10.0	9.27		ug/L		93	74 - 130
trans-1,2-Dichloroethene	10.0	11.2		ug/L		112	78 - 133
Trichloroethene	10.0	9.49		ug/L		95	76 - 125
Vinyl chloride	10.0	12.7		ug/L		127	58 - 143

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*91*		*70 - 121*
4-Bromofluorobenzene (Surr)	*107*		*59 - 120*
Toluene-d8 (Surr)	*106*		*70 - 123*
Dibromofluoromethane (Surr)	*101*		*75 - 128*

Lab Sample ID: 240-113326-E-1 MSD
Matrix: Water
Analysis Batch: 384267

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	9.78		ug/L		98	53 - 140	11	35
cis-1,2-Dichloroethene	1.0	U	10.0	9.81		ug/L		98	64 - 130	11	21
Tetrachloroethene	1.0	U	10.0	7.38		ug/L		74	51 - 136	1	23
trans-1,2-Dichloroethene	1.0	U	10.0	9.41		ug/L		94	68 - 133	10	24
Trichloroethene	1.0	U	10.0	7.74		ug/L		77	55 - 131	4	23
Vinyl chloride	1.0	U	10.0	10.7		ug/L		107	43 - 154	1	29

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*88*		*70 - 121*
4-Bromofluorobenzene (Surr)	*94*		*59 - 120*
Toluene-d8 (Surr)	*95*		*70 - 123*

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

Lab Sample ID: 240-113326-E-1 MSD
Matrix: Water
Analysis Batch: 384267

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

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
Dibromofluoromethane (Surr)	*89*		*75 - 128*

Lab Sample ID: 240-113326-F-1 MS
Matrix: Water
Analysis Batch: 384267

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	8.75		ug/L		88	53 - 140
cis-1,2-Dichloroethene	1.0	U	10.0	8.82		ug/L		88	64 - 130
Tetrachloroethene	1.0	U	10.0	7.31		ug/L		73	51 - 136
trans-1,2-Dichloroethene	1.0	U	10.0	8.53		ug/L		85	68 - 133
Trichloroethene	1.0	U	10.0	7.40		ug/L		74	55 - 131
Vinyl chloride	1.0	U	10.0	10.5		ug/L		105	43 - 154

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*84*		*70 - 121*
4-Bromofluorobenzene (Surr)	*96*		*59 - 120*
Toluene-d8 (Surr)	*96*		*70 - 123*
Dibromofluoromethane (Surr)	*89*		*75 - 128*

Lab Sample ID: MB 240-384386/9
Matrix: Water
Analysis Batch: 384386

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			06/04/19 12:02	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			06/04/19 12:02	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			06/04/19 12:02	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			06/04/19 12:02	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			06/04/19 12:02	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			06/04/19 12:02	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*91*		*70 - 121*		*06/04/19 12:02*	*1*
4-Bromofluorobenzene (Surr)	*95*		*59 - 120*		*06/04/19 12:02*	*1*
Toluene-d8 (Surr)	*93*		*70 - 123*		*06/04/19 12:02*	*1*
Dibromofluoromethane (Surr)	*97*		*75 - 128*		*06/04/19 12:02*	*1*

Lab Sample ID: LCS 240-384386/6
Matrix: Water
Analysis Batch: 384386

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	20.0	20.6		ug/L		103	65 - 139
cis-1,2-Dichloroethene	20.0	18.9		ug/L		95	76 - 128
Tetrachloroethene	20.0	18.1		ug/L		90	74 - 130
trans-1,2-Dichloroethene	20.0	19.5		ug/L		98	78 - 133
Trichloroethene	20.0	18.6		ug/L		93	76 - 125

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

Lab Sample ID: LCS 240-384386/6
Matrix: Water
Analysis Batch: 384386

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

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Vinyl chloride			20.0	19.2		ug/L		96	58 - 143		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*81*		*70 - 121*
4-Bromofluorobenzene (Surr)	*83*		*59 - 120*
Toluene-d8 (Surr)	*84*		*70 - 123*
Dibromofluoromethane (Surr)	*88*		*75 - 128*

Lab Sample ID: 240-113149-B-13 MS
Matrix: Water
Analysis Batch: 384386

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	72	J	1670	1430		ug/L		81	53 - 140		
cis-1,2-Dichloroethene	25	J	1670	1600		ug/L		94	64 - 130		
Tetrachloroethene	83	U F2	1670	1350		ug/L		81	51 - 136		
trans-1,2-Dichloroethene	83	U F2	1670	1390		ug/L		83	68 - 133		
Trichloroethene	2600		1670	4000		ug/L		85	55 - 131		
Vinyl chloride	83	U	1670	1660		ug/L		100	43 - 154		

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*87*		*70 - 121*
4-Bromofluorobenzene (Surr)	*81*		*59 - 120*
Toluene-d8 (Surr)	*82*		*70 - 123*
Dibromofluoromethane (Surr)	*91*		*75 - 128*

Lab Sample ID: 240-113149-B-13 MSD
Matrix: Water
Analysis Batch: 384386

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	72	J	1670	1980		ug/L		114	53 - 140	32	35
cis-1,2-Dichloroethene	25	J	1670	1870		ug/L		111	64 - 130	16	21
Tetrachloroethene	83	U F2	1670	1710	F2	ug/L		103	51 - 136	24	23
trans-1,2-Dichloroethene	83	U F2	1670	1900	F2	ug/L		114	68 - 133	31	24
Trichloroethene	2600		1670	3590		ug/L		61	55 - 131	11	23
Vinyl chloride	83	U	1670	1900		ug/L		114	43 - 154	13	29

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*78*		*70 - 121*
4-Bromofluorobenzene (Surr)	*75*		*59 - 120*
Toluene-d8 (Surr)	*89*		*70 - 123*
Dibromofluoromethane (Surr)	*93*		*75 - 128*

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

Lab Sample ID: MB 240-383677/5
Matrix: Water
Analysis Batch: 383677

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			05/30/19 11:19	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*107*		*63 - 125*		*05/30/19 11:19*	*1*

Lab Sample ID: LCS 240-383677/4
Matrix: Water
Analysis Batch: 383677

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	11.9		ug/L		119	59 - 131		

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

Lab Sample ID: 240-113259-C-5 MS
Matrix: Water
Analysis Batch: 383677

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	10.9		ug/L		109	52 - 129		

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*112*		*63 - 125*

Lab Sample ID: 240-113259-C-5 MSD
Matrix: Water
Analysis Batch: 383677

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	10.4		ug/L		104	52 - 129	5	13

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*109*		*63 - 125*

Client: ARCADIS U.S., Inc.
Job ID: 240-113311-1
Project/Site: Ford LTP Livonia MI - E203631

GC/MS VOA

Analysis Batch: 383677

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-113311-1	MW-87_052119	Total/NA	Water	8260B SIM	
240-113311-2	MW-86_052119	Total/NA	Water	8260B SIM	
240-113311-3	MW-84_052119	Total/NA	Water	8260B SIM	
MB 240-383677/5	Method Blank	Total/NA	Water	8260B SIM	
LCS 240-383677/4	Lab Control Sample	Total/NA	Water	8260B SIM	
240-113259-C-5 MS	Matrix Spike	Total/NA	Water	8260B SIM	
240-113259-C-5 MSD	Matrix Spike Duplicate	Total/NA	Water	8260B SIM	

Analysis Batch: 384267

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-113311-1	MW-87_052119	Total/NA	Water	8260B	
240-113311-2	MW-86_052119	Total/NA	Water	8260B	
240-113311-3	MW-84_052119	Total/NA	Water	8260B	
MB 240-384267/6	Method Blank	Total/NA	Water	8260B	
LCS 240-384267/4	Lab Control Sample	Total/NA	Water	8260B	
240-113326-E-1 MSD	Matrix Spike Duplicate	Total/NA	Water	8260B	
240-113326-F-1 MS	Matrix Spike	Total/NA	Water	8260B	

Analysis Batch: 384386

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-113311-4	TRIP BLANK	Total/NA	Water	8260B	
MB 240-384386/9	Method Blank	Total/NA	Water	8260B	
LCS 240-384386/6	Lab Control Sample	Total/NA	Water	8260B	
240-113149-B-13 MS	Matrix Spike	Total/NA	Water	8260B	
240-113149-B-13 MSD	Matrix Spike Duplicate	Total/NA	Water	8260B	

Lab Chronicle

Client: ARCADIS U.S., Inc.
Job ID: 240-113311-1
Project/Site: Ford LTP Livonia MI - E203631

Client Sample ID: MW-87_052119
Lab Sample ID: 240-113311-1
Date Collected: 05/21/19 16:12
Matrix: Water
Date Received: 05/25/19 10:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	384267	06/03/19 22:56	LEE	TAL CAN
Total/NA	Analysis	8260B SIM		1	383677	05/30/19 18:26	SAM	TAL CAN

Client Sample ID: MW-86_052119
Lab Sample ID: 240-113311-2
Date Collected: 05/21/19 15:10
Matrix: Water
Date Received: 05/25/19 10:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	384267	06/03/19 23:18	LEE	TAL CAN
Total/NA	Analysis	8260B SIM		1	383677	05/30/19 18:51	SAM	TAL CAN

Client Sample ID: MW-84_052119
Lab Sample ID: 240-113311-3
Date Collected: 05/21/19 14:07
Matrix: Water
Date Received: 05/25/19 10:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	384267	06/03/19 23:40	LEE	TAL CAN
Total/NA	Analysis	8260B SIM		1	383677	05/30/19 19:16	SAM	TAL CAN

Client Sample ID: TRIP BLANK
Lab Sample ID: 240-113311-4
Date Collected: 05/21/19 00:00
Matrix: Water
Date Received: 05/25/19 10:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	384386	06/04/19 12:24	HMB	TAL CAN

Laboratory References:

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

Accreditation/Certification Summary

Client: ARCADIS U.S., Inc.
Job ID: 240-113311-1
Project/Site: Ford LTP Livonia MI - E203631

Laboratory: Eurofins 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	02-23-20
Connecticut	State Program	1	PH-0590	12-31-19
Florida	NELAP	4	E87225	06-30-19 *
Illinois	NELAP	5	200004	07-31-19 *
Iowa	State Program	7	421	06-01-21
Kansas	NELAP	7	E-10336	04-30-20
Kentucky (UST)	State Program	4	58	02-23-20
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	03-31-20
Ohio VAP	State Program	5	CL0024	09-06-19 *
Oregon	NELAP	10	4062	02-23-20
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.

Eurofins TestAmerica, Canton
4101 Shuffel Street NW
North Canton, OH 44720
Phone (330) 497-9396 Fax (330) 497-0772

MICHIGAN 190

Chain of Custody Record

eurofins | Environment Testing TestAmerica

Client Information	Sampler: S. Turner	Lab PM: DelMonico, Michael	Carrier Tracking No(s):	COC No: 240-60548-25803.4
Client Contact: Caitlin ONeill	Phone:	E-Mail: michael.delmonico@testamericainc.com		Page: 1 of 1 ~~Page 4 of 18~~
Company: ARCADIS U.S. Inc				Job #:
Address: 28550 Cabot Drive Suite 500	Due Date Requested:			
City: Novi	TAT Requested (days): 10			
State, Zip: MI, 48377				
Phone:	PO #: ~~MI001318.0002.00002~~ MI001454.0004.00002			
Email: Caitlin.ONeill@arcadis.com	WO #: Cadena #: E203631			
Project Name: Ford LTP Livonia MI - E203631	Project #: 24015353			
Site: Ford LTP	SSOW#:			

Analysis Requested

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Z - other (specify)
Other:

240-113311 Chain of Custody

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=wasteoil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8260B, 8260B_SIM	8260B - VOCs (Short List)	Total Number of containers	Special Instructions/Note:
			Preservation Code:				A	A		
mw-87_052119	5/21/19	1612	G	Water	N	N	3	3	6	
mw-86_052119	5/21/19	1510	G	Water	N	N	3	3	6	
mw-84_052119	5/21/19	1407	G	Water	N	N	3	3	6	
Trip blank	—	—	—	Water	—	—	X	X	1	Trip blank
				Water						
				Water						
				Water						
				Water						
				Water						
				Water						
				Water						

Possible Hazard Identification
☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1	S. Turner	5/21/19 / 1830	Arcadis	Nori cold Storage	5/21/19 / 1830	Arcadis
2	Julie McGaffey	5/24/19 / 8:45	Arcadis		5-24-19 0841	ETA
3		5-24-19 1135	ETA		5-25-19 1000	ETA

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks:

Ver: 01/16/2019

TestAmerica Canton Sample Receipt Form/Narrative **Login # : 113311**
Canton Facility

Client Arcadis Site Name _____ Cooler unpacked by: Ryan Crihfield

Cooler Received on 5-25-19 Opened on 5-25-19 1000

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

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

TestAmerica Cooler # T4 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 **-0.2** °C) Observed Cooler Temp._____°C Corrected Cooler Temp._____°C
   IR GUN #36 (CF **+0.7**°C) Observed Cooler Temp._____°C Corrected Cooler Temp._____°C
2. Were tamper/custody seals on the outside of the cooler(s)? If Yes Quantity 2 total (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# **HC984738**
13. Were VOAs on the COC? (Yes) No
14. Were air bubbles >6 mm in any VOA vials? ● ⬅ Larger than this. Yes No NA
15. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot #_____ (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: Ryan

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): _____

VOA Sample Preservation - Date/Time VOAs Frozen: _____

Login # : 113311

TestAmerica Canton Sample Receipt Multiple Cooler Form				
Cooler Description (Circle)	IR Gun # (Circle)	Observed Temp °C	Corrected Temp °C	Coolant (Circle)
TA Client Box Other	**IR-8** #36	4.2	4.0	**Wet Ice** Blue Ice Dry Ice Water None
TA Client Box Other	**IR-8** #36	3.2	3.0	**Wet Ice** Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
TA Client Box Other	IR-8 #36			Wet Ice Blue Ice Dry Ice Water None
			☐ See Temperature Excursion Form	

WI-NC-099 Cooler Receipt Form Page 2 – Multiple Coolers