

# 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: 240-105940-1

Client Project/Site: Ford LTP Livonia MI - E203631

For:

ARCADIS U.S., Inc.

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Novi, Michigan 48377

Attn: Kristoffer Hinskey



Authorized for release by:

12/28/2018 4:06:49 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: 240-105940-1

## Qualifiers

### GC/MS VOA

Qualifier	Qualifier Description
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: 240-105940-1

**Job ID: 240-105940-1**

**Laboratory: TestAmerica Canton**

## Narrative

**Job Narrative  
240-105940-1**

### Comments

No additional comments.

### Receipt

The samples were received on 12/18/2018 8:45 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 0.9° C.

### GC/MS VOA

Method(s) 8260B: The pH of the sample(s) was greater than 2. The sample was analyzed within the normal 14 day holding time; however, experimental evidence suggests that some aromatic compounds in wastewater samples, notably, Benzene, Toluene, and Ethylbenzene are susceptible to biological degradation if sample is not preserved to a pH of 2.

HPT-209\_14-18\_121418 (240-105940-1)

Method(s) 8260B: 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.

HPT-209\_14-18\_121418 (240-105940-1), HPT-209\_9-13\_121418 (240-105940-2), (LCS 240-361677/4) and (MB 240-361677/6)

Method(s) 8260B SIM: The pH is greater than 2 for the following samples HPT-209\_14-18\_121418 (240-105940-1).

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

### VOA Prep

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

# Method Summary

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

TestAmerica Job ID: 240-105940-1

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: 240-105940-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
240-105940-1	HPT-209_14-18_121418	Water	12/14/18 16:25	12/18/18 08:45
240-105940-2	HPT-209_9-13_121418	Water	12/14/18 16:50	12/18/18 08:45
240-105940-3	HPT-209_4-8_121418	Water	12/14/18 17:10	12/18/18 08:45

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- 12
- 13
- 14

# Detection Summary

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

TestAmerica Job ID: 240-105940-1

## Client Sample ID: HPT-209\_14-18\_121418

## Lab Sample ID: 240-105940-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,4-Dioxane	4.7		2.0	0.86	ug/L	1		8260B SIM	Total/NA

## Client Sample ID: HPT-209\_9-13\_121418

## Lab Sample ID: 240-105940-2

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
cis-1,2-Dichloroethene	1.1		1.0	0.16	ug/L	1		8260B	Total/NA

## Client Sample ID: HPT-209\_4-8\_121418

## Lab Sample ID: 240-105940-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	1.9		1.0	0.16	ug/L	1		8260B	Total/NA
Trichloroethene	0.18	J	1.0	0.10	ug/L	1		8260B	Total/NA

This Detection Summary does not include radiochemical test results.

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# Client Sample Results

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

TestAmerica Job ID: 240-105940-1

**Client Sample ID: HPT-209\_14-18\_121418**

**Lab Sample ID: 240-105940-1**

**Date Collected: 12/14/18 16:25**

**Matrix: Water**

**Date Received: 12/18/18 08:45**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	4.7		2.0	0.86	ug/L			12/21/18 22:53	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	97		63 - 125					12/21/18 22:53	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			12/26/18 19:48	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			12/26/18 19:48	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			12/26/18 19:48	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			12/26/18 19:48	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			12/26/18 19:48	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			12/26/18 19:48	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	129	X	70 - 121					12/26/18 19:48	1
4-Bromofluorobenzene (Surr)	106		59 - 120					12/26/18 19:48	1
Toluene-d8 (Surr)	99		70 - 123					12/26/18 19:48	1
Dibromofluoromethane (Surr)	95		75 - 128					12/26/18 19:48	1



# Client Sample Results

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

TestAmerica Job ID: 240-105940-1

**Client Sample ID: HPT-209\_9-13\_121418**

**Lab Sample ID: 240-105940-2**

**Date Collected: 12/14/18 16:50**

**Matrix: Water**

**Date Received: 12/18/18 08:45**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>1,4-Dioxane</b>	<b>1.2</b>	<b>J</b>	2.0	0.86	ug/L			12/21/18 23:18	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	97		63 - 125					12/21/18 23:18	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			12/26/18 20:12	1
<b>cis-1,2-Dichloroethene</b>	<b>1.1</b>		1.0	0.16	ug/L			12/27/18 16:37	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			12/26/18 20:12	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			12/26/18 20:12	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			12/26/18 20:12	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			12/26/18 20:12	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	129	X	70 - 121					12/26/18 20:12	1
1,2-Dichloroethane-d4 (Surr)	88		70 - 121					12/27/18 16:37	1
4-Bromofluorobenzene (Surr)	101		59 - 120					12/26/18 20:12	1
4-Bromofluorobenzene (Surr)	98		59 - 120					12/27/18 16:37	1
Toluene-d8 (Surr)	102		70 - 123					12/26/18 20:12	1
Toluene-d8 (Surr)	98		70 - 123					12/27/18 16:37	1
Dibromofluoromethane (Surr)	95		75 - 128					12/26/18 20:12	1
Dibromofluoromethane (Surr)	96		75 - 128					12/27/18 16:37	1

# Client Sample Results

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

TestAmerica Job ID: 240-105940-1

**Client Sample ID: HPT-209\_4-8\_121418**

**Lab Sample ID: 240-105940-3**

**Date Collected: 12/14/18 17:10**

**Matrix: Water**

**Date Received: 12/18/18 08:45**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	2.0	U	2.0	0.86	ug/L			12/21/18 23:44	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	100		63 - 125					12/21/18 23:44	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			12/27/18 17:02	1
<b>cis-1,2-Dichloroethene</b>	<b>1.9</b>		1.0	0.16	ug/L			12/27/18 17:02	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			12/27/18 17:02	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			12/27/18 17:02	1
<b>Trichloroethene</b>	<b>0.18</b>	<b>J</b>	1.0	0.10	ug/L			12/27/18 17:02	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			12/27/18 17:02	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	90		70 - 121					12/27/18 17:02	1
4-Bromofluorobenzene (Surr)	99		59 - 120					12/27/18 17:02	1
Toluene-d8 (Surr)	95		70 - 123					12/27/18 17:02	1
Dibromofluoromethane (Surr)	98		75 - 128					12/27/18 17:02	1

# Surrogate Summary

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

TestAmerica Job ID: 240-105940-1

## 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)
240-105940-1	HPT-209_14-18_121418	129 X	106	99	95
240-105940-2	HPT-209_9-13_121418	129 X	101	102	95
240-105940-2	HPT-209_9-13_121418	88	98	98	96
240-105940-3	HPT-209_4-8_121418	90	99	95	98
240-105990-C-2 MS	Matrix Spike	94	95	95	98
240-105990-C-2 MSD	Matrix Spike Duplicate	93	100	98	102
240-105990-E-5 MS	Matrix Spike	123 X	108	104	93
240-105990-F-5 MSD	Matrix Spike Duplicate	122 X	109	104	94
LCS 240-361677/4	Lab Control Sample	125 X	108	106	94
LCS 240-361928/4	Lab Control Sample	94	97	98	99
MB 240-361677/6	Method Blank	133 X	95	102	99
MB 240-361928/6	Method Blank	94	97	102	98

#### 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)
240-105940-1	HPT-209_14-18_121418	97
240-105940-2	HPT-209_9-13_121418	97
240-105940-3	HPT-209_4-8_121418	100
500-156268-A-11 MS	Matrix Spike	94
500-156268-A-11 MSD	Matrix Spike Duplicate	96
LCS 240-361240/4	Lab Control Sample	92
MB 240-361240/5	Method Blank	96

#### 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: 240-105940-1

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

**Lab Sample ID: MB 240-361677/6**

**Matrix: Water**

**Analysis Batch: 361677**

**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			12/26/18 13:07	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			12/26/18 13:07	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			12/26/18 13:07	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			12/26/18 13:07	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			12/26/18 13:07	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			12/26/18 13:07	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	133	X	70 - 121		12/26/18 13:07	1
4-Bromofluorobenzene (Surr)	95		59 - 120		12/26/18 13:07	1
Toluene-d8 (Surr)	102		70 - 123		12/26/18 13:07	1
Dibromofluoromethane (Surr)	99		75 - 128		12/26/18 13:07	1

**Lab Sample ID: LCS 240-361677/4**

**Matrix: Water**

**Analysis Batch: 361677**

**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	9.96		ug/L		100	76 - 128
Tetrachloroethene	10.0	8.99		ug/L		90	74 - 130
trans-1,2-Dichloroethene	10.0	10.3		ug/L		103	78 - 133
Trichloroethene	10.0	9.01		ug/L		90	76 - 125
Vinyl chloride	10.0	12.7		ug/L		127	58 - 143

Surrogate	LCS %Recovery	LCS Qualifier	Limits
1,2-Dichloroethane-d4 (Surr)	125	X	70 - 121
4-Bromofluorobenzene (Surr)	108		59 - 120
Toluene-d8 (Surr)	106		70 - 123
Dibromofluoromethane (Surr)	94		75 - 128

**Lab Sample ID: 240-105990-E-5 MS**

**Matrix: Water**

**Analysis Batch: 361677**

**Client Sample ID: Matrix Spike**

**Prep Type: Total/NA**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1-Dichloroethene	1.0	U	10.0	10.3		ug/L		103	53 - 140
cis-1,2-Dichloroethene	1.0	U	10.0	10.3		ug/L		103	64 - 130
Tetrachloroethene	1.0	U	10.0	9.01		ug/L		90	51 - 136
trans-1,2-Dichloroethene	1.0	U	10.0	10.3		ug/L		103	68 - 133
Trichloroethene	1.0	U	10.0	9.15		ug/L		91	55 - 131
Vinyl chloride	1.0	U	10.0	12.7		ug/L		127	43 - 154

Surrogate	MS %Recovery	MS Qualifier	Limits
1,2-Dichloroethane-d4 (Surr)	123	X	70 - 121
4-Bromofluorobenzene (Surr)	108		59 - 120
Toluene-d8 (Surr)	104		70 - 123

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# QC Sample Results

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

TestAmerica Job ID: 240-105940-1

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

**Lab Sample ID: 240-105990-E-5 MS**

**Matrix: Water**

**Analysis Batch: 361677**

**Client Sample ID: Matrix Spike**

**Prep Type: Total/NA**

Surrogate	MS %Recovery	MS Qualifier	Limits
Dibromofluoromethane (Surr)	93		75 - 128

**Lab Sample ID: 240-105990-F-5 MSD**

**Matrix: Water**

**Analysis Batch: 361677**

**Client Sample ID: Matrix Spike Duplicate**

**Prep Type: Total/NA**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1-Dichloroethene	1.0	U	10.0	10.1		ug/L		101	53 - 140	2	35
cis-1,2-Dichloroethene	1.0	U	10.0	10.1		ug/L		101	64 - 130	2	21
Tetrachloroethene	1.0	U	10.0	8.75		ug/L		87	51 - 136	3	23
trans-1,2-Dichloroethene	1.0	U	10.0	10.0		ug/L		100	68 - 133	2	24
Trichloroethene	1.0	U	10.0	8.76		ug/L		88	55 - 131	4	23
Vinyl chloride	1.0	U	10.0	12.9		ug/L		129	43 - 154	2	29

Surrogate	MSD %Recovery	MSD Qualifier	Limits
1,2-Dichloroethane-d4 (Surr)	122	X	70 - 121
4-Bromofluorobenzene (Surr)	109		59 - 120
Toluene-d8 (Surr)	104		70 - 123
Dibromofluoromethane (Surr)	94		75 - 128

**Lab Sample ID: MB 240-361928/6**

**Matrix: Water**

**Analysis Batch: 361928**

**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			12/27/18 12:45	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			12/27/18 12:45	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			12/27/18 12:45	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			12/27/18 12:45	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			12/27/18 12:45	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			12/27/18 12:45	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	94		70 - 121		12/27/18 12:45	1
4-Bromofluorobenzene (Surr)	97		59 - 120		12/27/18 12:45	1
Toluene-d8 (Surr)	102		70 - 123		12/27/18 12:45	1
Dibromofluoromethane (Surr)	98		75 - 128		12/27/18 12:45	1

**Lab Sample ID: LCS 240-361928/4**

**Matrix: Water**

**Analysis Batch: 361928**

**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	9.99		ug/L		100	65 - 139
cis-1,2-Dichloroethene	10.0	10.9		ug/L		109	76 - 128
Tetrachloroethene	10.0	8.96		ug/L		90	74 - 130
trans-1,2-Dichloroethene	10.0	10.9		ug/L		109	78 - 133

TestAmerica Canton

# QC Sample Results

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

TestAmerica Job ID: 240-105940-1

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

**Lab Sample ID: LCS 240-361928/4**  
**Matrix: Water**  
**Analysis Batch: 361928**

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Trichloroethene	10.0	9.51		ug/L		95	76 - 125
Vinyl chloride	10.0	11.8		ug/L		118	58 - 143
<b>LCS LCS</b>							
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				
1,2-Dichloroethane-d4 (Surr)	94		70 - 121				
4-Bromofluorobenzene (Surr)	97		59 - 120				
Toluene-d8 (Surr)	98		70 - 123				
Dibromofluoromethane (Surr)	99		75 - 128				

**Lab Sample ID: 240-105990-C-2 MS**  
**Matrix: Water**  
**Analysis Batch: 361928**

**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	5.0	U	50.0	54.6		ug/L		109	53 - 140
cis-1,2-Dichloroethene	60		50.0	114		ug/L		108	64 - 130
Tetrachloroethene	5.0	U	50.0	44.8		ug/L		90	51 - 136
trans-1,2-Dichloroethene	4.6	J	50.0	62.6		ug/L		116	68 - 133
Trichloroethene	5.0	U	50.0	45.9		ug/L		92	55 - 131
Vinyl chloride	10		50.0	73.6		ug/L		127	43 - 154
<b>MS MS</b>									
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>						
1,2-Dichloroethane-d4 (Surr)	94		70 - 121						
4-Bromofluorobenzene (Surr)	95		59 - 120						
Toluene-d8 (Surr)	95		70 - 123						
Dibromofluoromethane (Surr)	98		75 - 128						

**Lab Sample ID: 240-105990-C-2 MSD**  
**Matrix: Water**  
**Analysis Batch: 361928**

**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	5.0	U	50.0	53.6		ug/L		107	53 - 140	2	35
cis-1,2-Dichloroethene	60		50.0	113		ug/L		107	64 - 130	0	21
Tetrachloroethene	5.0	U	50.0	43.9		ug/L		88	51 - 136	2	23
trans-1,2-Dichloroethene	4.6	J	50.0	62.8		ug/L		116	68 - 133	0	24
Trichloroethene	5.0	U	50.0	45.8		ug/L		92	55 - 131	0	23
Vinyl chloride	10		50.0	71.9		ug/L		124	43 - 154	2	29
<b>MSD MSD</b>											
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>								
1,2-Dichloroethane-d4 (Surr)	93		70 - 121								
4-Bromofluorobenzene (Surr)	100		59 - 120								
Toluene-d8 (Surr)	98		70 - 123								
Dibromofluoromethane (Surr)	102		75 - 128								

TestAmerica Canton

# QC Sample Results

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

TestAmerica Job ID: 240-105940-1

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

**Lab Sample ID: MB 240-361240/5**

**Matrix: Water**

**Analysis Batch: 361240**

**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			12/21/18 13:27	1
Surrogate	MB %Recovery	MB Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	96		63 - 125					12/21/18 13:27	1

**Lab Sample ID: LCS 240-361240/4**

**Matrix: Water**

**Analysis Batch: 361240**

**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	11.8		ug/L		118	59 - 131
Surrogate	LCS %Recovery	LCS Qualifier	Limits				
1,2-Dichloroethane-d4 (Surr)	92		63 - 125				

**Lab Sample ID: 500-156268-A-11 MS**

**Matrix: Water**

**Analysis Batch: 361240**

**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	3500		1000	4520		ug/L		107	52 - 129
Surrogate	MS %Recovery	MS Qualifier	Limits						
1,2-Dichloroethane-d4 (Surr)	94		63 - 125						

**Lab Sample ID: 500-156268-A-11 MSD**

**Matrix: Water**

**Analysis Batch: 361240**

**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	3500		1000	4390		ug/L		94	52 - 129	3	13
Surrogate	MSD %Recovery	MSD Qualifier	Limits								
1,2-Dichloroethane-d4 (Surr)	96		63 - 125								

TestAmerica Canton

# QC Association Summary

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

TestAmerica Job ID: 240-105940-1

## GC/MS VOA

### Analysis Batch: 361240

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-105940-1	HPT-209_14-18_121418	Total/NA	Water	8260B SIM	
240-105940-2	HPT-209_9-13_121418	Total/NA	Water	8260B SIM	
240-105940-3	HPT-209_4-8_121418	Total/NA	Water	8260B SIM	
MB 240-361240/5	Method Blank	Total/NA	Water	8260B SIM	
LCS 240-361240/4	Lab Control Sample	Total/NA	Water	8260B SIM	
500-156268-A-11 MS	Matrix Spike	Total/NA	Water	8260B SIM	
500-156268-A-11 MSD	Matrix Spike Duplicate	Total/NA	Water	8260B SIM	

### Analysis Batch: 361677

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-105940-1	HPT-209_14-18_121418	Total/NA	Water	8260B	
240-105940-2	HPT-209_9-13_121418	Total/NA	Water	8260B	
MB 240-361677/6	Method Blank	Total/NA	Water	8260B	
LCS 240-361677/4	Lab Control Sample	Total/NA	Water	8260B	
240-105990-E-5 MS	Matrix Spike	Total/NA	Water	8260B	
240-105990-F-5 MSD	Matrix Spike Duplicate	Total/NA	Water	8260B	

### Analysis Batch: 361928

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-105940-2	HPT-209_9-13_121418	Total/NA	Water	8260B	
240-105940-3	HPT-209_4-8_121418	Total/NA	Water	8260B	
MB 240-361928/6	Method Blank	Total/NA	Water	8260B	
LCS 240-361928/4	Lab Control Sample	Total/NA	Water	8260B	
240-105990-C-2 MS	Matrix Spike	Total/NA	Water	8260B	
240-105990-C-2 MSD	Matrix Spike Duplicate	Total/NA	Water	8260B	



# Lab Chronicle

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

TestAmerica Job ID: 240-105940-1

**Client Sample ID: HPT-209\_14-18\_121418**

**Lab Sample ID: 240-105940-1**

**Date Collected: 12/14/18 16:25**

**Matrix: Water**

**Date Received: 12/18/18 08:45**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	361677	12/26/18 19:48	LRW	TAL CAN
Total/NA	Analysis	8260B SIM		1	361240	12/21/18 22:53	SAM	TAL CAN

**Client Sample ID: HPT-209\_9-13\_121418**

**Lab Sample ID: 240-105940-2**

**Date Collected: 12/14/18 16:50**

**Matrix: Water**

**Date Received: 12/18/18 08:45**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	361928	12/27/18 16:37	LRW	TAL CAN
Total/NA	Analysis	8260B		1	361677	12/26/18 20:12	LRW	TAL CAN
Total/NA	Analysis	8260B SIM		1	361240	12/21/18 23:18	SAM	TAL CAN

**Client Sample ID: HPT-209\_4-8\_121418**

**Lab Sample ID: 240-105940-3**

**Date Collected: 12/14/18 17:10**

**Matrix: Water**

**Date Received: 12/18/18 08:45**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	361928	12/27/18 17:02	LRW	TAL CAN
Total/NA	Analysis	8260B SIM		1	361240	12/21/18 23:44	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: 240-105940-1

## 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	12-31-19 *
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	01-12-19 *
West Virginia DEP	State Program	3	210	12-31-18 *

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

Regulatory Program:  DW  NPDES  RCRA  Other:

Company Name: <b>Accadis</b> Address: <b>29550 Cabot Dr #600</b> City/State/Zip: <b>Novi, MI, 48377</b> Phone: Fax: Project Name: <b>FORD LTP</b> Site: <b>LIVONIA, MI</b> P O #		Client Contact Project Manager: <b>Kris Anderson</b> Tell/Fax: <b>249-832-7478</b> Analysis Turnaround Time <input type="checkbox"/> CALENDAR DAYS <input type="checkbox"/> WORKING DAYS TAT if different from Below <input type="checkbox"/> 2 weeks <input type="checkbox"/> 1 week <input type="checkbox"/> 2 days <input type="checkbox"/> 1 day		Site Contact: Lab Contact: Date: <b>12/14/18</b> Carrier: COC No.: <b>1</b> of <b>1</b> COCs Sampler: For Lab Use Only: Walk-in Client: Lab Sampling: Job / SDG No.: Sample Specific Notes:	
Sample Identification HPT-209-14-18-121418 HPT-209-9-13-121418 HPT-209-4-8-121418		Filtered Sample (Y/N) Perform MS/MSD (Y/N) Method 8260 Method 8260 STM		Sample Type (C=Comp, G=Grab) Matrix # of Cont. 12/14/18 1625 Gw 12/14/18 1650 Gw 12/14/18 1710 Gw	
Preservation Used: <input checked="" type="checkbox"/> Ice, <input type="checkbox"/> 2=HCl; <input type="checkbox"/> 3=H2SO4; <input type="checkbox"/> 4=HNO3; <input type="checkbox"/> 5=NaOH; <input type="checkbox"/> 6=Other Possible Hazard Identification: Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample. <input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown					
Special Instructions/QC Requirements & Comments: <b>1,1-Dichloroethylene, cis-1,2-Dichloroethylene, trans-1,2-Dichloroethylene, 1,4-Dioxane, TetraChloroethylene, Trichloroethylene, Vinyl Chloride.</b>					
Relinquished by: Christina Wever Christina Wever		Received by: Novi Cab Storage Accadis TAL		Date/Time: 12/14/18/1637 12/17/18/1433 12/17/18/1911	
Relinquished by: [Signature]		Relinquished by: [Signature]		Date/Time: 12/17/18/845	



TestAmerica Canton Sample Receipt Form/Narrative

Login # : 105940


Canton Facility

Client Acadus Site Name \_\_\_\_\_ Cooler unpacked by: [Signature]  
Cooler Received on 12/18/18 Opened on 12/18/18  
FedEx: 1<sup>st</sup> Grd Exp UPS FAS Clipper Client Drop Off TestAmerica Courier Other

Receipt After-hours: Drop-off Date/Time

Storage Location

TestAmerica Cooler # 1A 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

- 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°C) Observed Cooler Temp. 0.9 °C Corrected Cooler Temp. 0.9 °C
- Were tamper/custody seals on the outside of the cooler(s)? If Yes Quantity 1 Yes No  
-Were the seals on the outside of the cooler(s) signed & dated? Yes No NA  
-Were tamper/custody seals on the bottle(s) or bottle kits (LLHg/MeHg)? Yes No  
-Were tamper/custody seals intact and uncompromised? Yes No NA
- Shippers' packing slip attached to the cooler(s)? Yes No
- Did custody papers accompany the sample(s)? Yes No
- Were the custody papers relinquished & signed in the appropriate place? Yes No
- Was/were the person(s) who collected the samples clearly identified on the COC? Yes No
- Did all bottles arrive in good condition (Unbroken)? Yes No
- Could all bottle labels be reconciled with the COC? Yes No
- Were correct bottle(s) used for the test(s) indicated? Yes No
- Sufficient quantity received to perform indicated analyses? Yes No
- Are these work share samples? Yes No
- If yes, Questions 12-16 have been checked at the originating laboratory.
- Were all preserved sample(s) at the correct pH upon receipt? Yes No NA pH Strip Lot# HC854592
- Were VOAs on the COC? Yes No
- Were air bubbles >6 mm in any VOA vials? Yes No NA  Larger than this.
- Was a VOA trip blank present in the cooler(s)? Trip Blank Lot # \_\_\_\_\_ Yes No
- 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:

PC

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): \_\_\_\_\_



December 29, 2018

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: 105940-1  
Sample date: 2018-12-14  
Report received by CADENA: 2018-12-28  
Initial Data Verification completed by CADENA: 2018-12-29

The following minor QC exceptions or missing information were noted:

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

GCMS VOC samples -001, non-client MS/MSD, Method Blank, and LCS surrogate recovery outliers did not result in qualification of client sample data.

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.

3 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 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:** 105940-1

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
2401059401	HPT-209_14-18_121418	12/14/2018	4:25:00	X	X	
2401059402	HPT-209_9-13_121418	12/14/2018	4:50:00	X	X	
2401059403	HPT-209_4-8_121418	12/14/2018	5:10:00	X	X	

## Qualified Results Summary

**CADENA Project ID:** E203631

**Laboratory:** TestAmerica - North Canton

**Laboratory Submittal:** 105940-1

**Sample Name:** HPT-209\_14-18\_121418

**Lab Sample ID:** 2401059401

**Sample Date:** 12/14/2018

Analyte	Cas No.	Result	Report		Valid
			Limit	Units	

### GC/MS VOC

OSW-8260BBSim

1,4-Dioxane	123-91-1	4.7	2.0	ug/l	J
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# Analytical Results Summary

## Reportable Results Only

CADENA Project ID: E203631

Laboratory: TestAmerica - North Canton

Laboratory Submittal: 105940-1

<b>Sample Name:</b>	HPT-209_14-18_121418	HPT-209_9-13_121418	HPT-209_4-8_121418
<b>Lab Sample ID:</b>	2401059401	2401059402	2401059403
<b>Sample Date:</b>	12/14/2018	12/14/2018	12/14/2018

Analyte	Cas No.	HPT-209_14-18_121418				HPT-209_9-13_121418				HPT-209_4-8_121418			
		Report Result	Limit	Units	Valid Qualifier	Report Result	Limit	Units	Valid Qualifier	Report Result	Limit	Units	Valid Qualifier

### GC/MS VOC

#### OSW-8260B

1,1-Dichloroethene	75-35-4	ND	1.0	ug/l	---	ND	1.0	ug/l	---	ND	1.0	ug/l	---
cis-1,2-Dichloroethene	156-59-2	ND	1.0	ug/l	---	1.1	1.0	ug/l	---	1.9	1.0	ug/l	---
Tetrachloroethene	127-18-4	ND	1.0	ug/l	---	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	---	ND	1.0	ug/l	---
Trichloroethene	79-01-6	ND	1.0	ug/l	---	ND	1.0	ug/l	---	0.18	1.0	ug/l	J
Vinyl chloride	75-01-4	ND	1.0	ug/l	---	ND	1.0	ug/l	---	ND	1.0	ug/l	---

#### OSW-8260BBSim

1,4-Dioxane	123-91-1	4.7	2.0	ug/l	J	1.2	2.0	ug/l	J	ND	2.0	ug/l	---
-------------	----------	-----	-----	------	---	-----	-----	------	---	----	-----	------	-----