

OUTFALL ID: Flagstaff		
Monitoring Season	Summer 2019	Winter 2019/2020
Sampling Date	11/20/19	-
Event Data		
Duration (Hours)	NA	-
Duration between the storm events (Days)	NA	-
Volume (Gallons)	NA	-
Number of aliquots	NA	-
Total Rain (in)	NA	-
Previous event end	NA	-
Event start	NA	-
Event end	NA	-

OUTFALL ID: Flagstaff2		
Monitoring Season	Summer 2019	Winter 2019/2020
Sampling Date	-	3/18/20
Event Data		
Duration (Hours)	-	3
Duration between the storm events (Days)	-	17
Volume (Gallons)	-	7835
Number of aliquots	-	14
Total Rain (in)	-	0.39
Previous event end	-	3/1/19
Event start	-	3/18/19
Event end	-	3/18/19

OUTFALL ID: Sedona		
Monitoring Season	Summer 2019	Winter 2019/2020
Sampling Date	8/2/19	2/22/20
Event Data		
Duration (Hours)	3.0	4.0
Duration between the storm events (Days)	2.6	11.0
Volume (Gallons)	119,971	225,652
Number of aliquots	30	30
Total Rain (in)	0.31	0.78
Previous event end	7/31/2019	2/11/2020
Event start	8/2/2019	2/22/2020
Event end	8/2/2019	2/22/2020

OUTFALL ID: Phoenix		
Monitoring Season	Summer 2019	Winter 2019/2020
Sampling Date	8/29/19	11/20/19
Event Data		
Duration (Hours)	3.3	14.0
Duration between the storm events (Days)	25.0	18.0
Volume (Gallons)	68,447	465,344
Number of aliquots	5	30
Total Rain (in)	0.88	2.05
Previous event end	8/3/2019	11/1/2019
Event start	8/28/2019	11/19/2019
Event end	8/28/2019	11/20/2019

OUTFALL ID: Tucson		
Monitoring Season	Summer 2019	Winter 2019/2020
Sampling Date	8/10/19	2/11/20
Event Data		
Duration (Hours)	4.0	3.5
Duration between the storm events (Days)	4.7	20.0
Volume (Gallons)	12,750	18,500
Number of aliquots	9	12
Total Rain (in)	0.29	0.48
Previous event end	8/5/2019	1/18/2020
Event start	8/10/2019	2/10/2020
Event end	8/10/2019	2/10/2020

OUTFALL ID: Nogales			
Monitoring Season	Summer 2019	Winter 2019/2020	Winter 2019/2020
Sampling Date	7/18/19	2/10/20	6/2/20
Event Data			
Duration (Hours)	3.7	4.0	3.2
Duration between the storm events (Days)	12.0	21.0	85.0
Volume (Gallons)	115,311	13,250	22,124
Number of aliquots	30	10	30
Total Rain (in)	1.35	0.39	0.49
Previous event end	7/5/2019	1/18/2020	2/10/2020
Event start	7/17/2019	2/10/2020	6/2/2020
Event end	7/17/2019	2/10/2020	6/2/2020



Analytical Report 643926

for

NV5

Project Manager: Mike Hulst

Flagstaff

12.04.2019

Collected By: Client

**2525 West Huntington Drive, Suite 102
Tempe, AZ 85282
Ph: (480) 355-0900**

Phoenix (EPA Lab Code: AZ00901): Arizona (AZ0757)
Xenco-Houston (EPA Lab code: TX00122): Arizona (AZ0765)
Xenco-Dallas (EPA Lab code: TX01468): Arizona (AZ0809)



12.04.2019

Project Manager: **Mike Hulst**

NV5

1 West Deer Valley Building 2 #305

Phoenix, AZ 85027

Reference: TWA Report No(s): **643926**

Flagstaff

Project Address:

Mike Hulst:

We are reporting to you the results of the analyses performed on the samples received under the project name referenced above and identified with the TWA Report Number(s) 643926. All results being reported under this Report Number apply to the samples analyzed and properly identified with a Laboratory ID number. Subcontracted analyses are identified in this report with either the ADHS certification number of the subcontract lab in the analyst ID field, or the complete subcontracted report attached to this report.

Unless otherwise noted in a Case Narrative, all data reported in this Analytical Report are in compliance with ADHS standards. The uncertainty of measurement associated with the results of analysis reported is available upon request. Should insufficient sample be provided to the laboratory to meet the method and ADHS Matrix Duplicate and Matrix Spike requirements, then the data will be analyzed, evaluated and reported using all other available quality control measures.

The validity and integrity of this report will remain intact as long as it is accompanied by this letter and reproduced in full, unless written approval is granted by TransWest Analytical. This report will be filed for at least 5 years in our archives after which time it will be destroyed without further notice, unless otherwise arranged with you. The samples received, and described as recorded in Report No. 643926 will be filed for 45 days, and after that time they will be properly disposed without further notice, unless otherwise arranged with you. We reserve the right to return to you any unused samples, extracts or solutions related to them if we consider so necessary (e.g., samples identified as hazardous waste, sample sizes exceeding analytical standard practices, controlled substances under regulated protocols, etc).

We thank you for selecting TransWest Analytical to serve your analytical needs. If you have any questions concerning this report, please feel free to contact us at any time.

Respectfully,

A handwritten signature in black ink, appearing to read 'Ruriko Konuma', is written over a horizontal line.

Ruriko Konuma

Project Manager

A Small Business and Minority Company

Houston - Dallas - Midland - Tampa - Phoenix - Lubbock - San Antonio - El Paso - Atlanta - New Mexico



CASE NARRATIVE

Client Name: NV5

Project Name: Flagstaff

Project ID:
Work Order Number(s): 643926

Report Date: 12.04.2019
Date Received: 11.20.2019

Sample receipt non conformances and comments:

Sample receipt non conformances and comments per sample:

None

Flagging Criteria

Arizona Flags

All method blanks, laboratory spikes, and/or matrix spikes met quality control objectives for the parameters associated with this Work Order except as detailed below or on the Data Qualifier page of this report. Data Qualifiers used in this report are in accordance with ADHS Data Qualifiers, Revision 4.0 9/05/2012.

Data qualifiers (flags) contained within this analytical report have been issued to explain a quality control deficiency, and do not affect the quality (validity) of the data unless noted otherwise in the case narrative.

- D1** Sample required dilution due to matrix.
- D2** Sample required dilution due to high concentration of target analyte.
- M2** Matrix spike recovery was low; the associated blank spike recovery was acceptable.



Sample Cross Reference 643926

NV5, Phoenix, AZ

Flagstaff

Sample Id	Matrix	Date Collected	Sample Depth	Lab Sample Id
FLAG_191120	W	11.20.2019 12:15		643926-001
FLAG_191120	W	11.20.2019 12:15		643926-002



Certificate of Analytical Results 643926

NV5, Phoenix, AZ Flagstaff

Sample Id: **FLAG_191120**

Matrix: Storm Water

Date Received: 11.20.2019 15:55

Lab Sample Id: 643926-001

Date Collected: 11.20.2019 12:15

Analytical Method: Recoverable Metals, Total, by EPA 200.7

Prep Method: E200.7P

Tech: MLI

% Solids:

Analyst: DEP

Date Prep: 12.03.2019 03:06

Seq Number: 3109263

SUB: AZ0765

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Calcium	7440-70-2	11.5	0.200	mg/L	12.03.2019 13:28		1
Sodium	7440-23-5	3.52	0.500	mg/L	12.03.2019 13:28		1

Analytical Method: Recoverable Metals, Total, by EPA 200.8

Prep Method: E200.8P

Tech: ADS

% Solids:

Analyst: DEP

Date Prep: 12.03.2019 12:40

Seq Number: 3109285

SUB: AZ0765

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Arsenic	7440-38-2	<0.00400	0.00400	mg/L	12.04.2019 08:28		1
Barium	7440-39-3	0.0375	0.00400	mg/L	12.04.2019 08:28		1
Cadmium	7440-43-9	<0.00200	0.00200	mg/L	12.04.2019 08:28		1
Chromium	7440-47-3	0.00784	0.00400	mg/L	12.04.2019 08:28		1
Copper	7440-50-8	0.0167	0.00400	mg/L	12.04.2019 08:28		1
Lead	7439-92-1	0.00269	0.00200	mg/L	12.04.2019 08:28		1
Nickel	7440-02-0	0.00371	0.00200	mg/L	12.04.2019 08:28		1
Selenium	7782-49-2	<0.00200	0.00200	mg/L	12.04.2019 08:28		1
Silver	7440-22-4	<0.00200	0.00200	mg/L	12.04.2019 08:28		1

Analytical Method: Mercury by EPA 245.1

Prep Method: E245.1P

Tech: ADS

% Solids:

Analyst: DES

Date Prep: 11.25.2019 08:15

Seq Number: 3108643

SUB: AZ0765

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Mercury	7439-97-6	<0.000200	0.000200	mg/L	11.25.2019 15:27		1



Certificate of Analytical Results 643926

NV5, Phoenix, AZ Flagstaff

Sample Id: **FLAG_191120**

Matrix: Storm Water

Date Received: 11.20.2019 15:55

Lab Sample Id: 643926-001

Date Collected: 11.20.2019 12:15

Analytical Method: Biochemical Oxygen Demand by SM 5210B

Prep Method: SM5210P

Tech: MON

% Solids:

Analyst: MON

Date Prep: 11.21.2019 11:30

Seq Number: 3108848

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Biochemical Oxygen Demand, BOD5		57.4	2.00	mg/L	11.26.2019 11:20		1

Analytical Method: Total Dissolved Solids by SM 2540C

Tech: MON

% Solids:

Analyst: TNL

Seq Number: 3108676

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Total Dissolved Solids	1642222	65.0	10.0	mg/L	11.21.2019 16:00		1

Analytical Method: Total Suspended Solids by SM 2540D

Tech: TNL

% Solids:

Analyst: MON

Seq Number: 3108447

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Total Suspended Solids	TSS	37.1	10.0	mg/L	11.21.2019 12:30		1

Analytical Method: Turbidity by EPA 180.1

Tech: MON

% Solids:

Analyst: TNL

Seq Number: 3108256

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Turbidity	TURBIDITY	57.5	0.500	NTU	11.21.2019 09:35	D2	5



Certificate of Analytical Results 643926

NV5, Phoenix, AZ Flagstaff

Sample Id: **FLAG_191120**

Lab Sample Id: 643926-001

Matrix: Storm Water

Date Collected: 11.20.2019 12:15

Date Received: 11.20.2019 15:55

Analytical Method: Anions by EPA 300.0

Tech: JYM

Analyst: JYM

Seq Number: 3108592

Date Prep: 11.22.2019 10:30

Prep Method: E300P

% Solids:

SUB: AZ0765

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	4.21	0.500	mg/L	11.22.2019 10:42		1
Sulfate	14808-79-8	2.27	0.500	mg/L	11.22.2019 10:42		1

Analytical Method: Nitrite by SM 4500-NO2B

Tech: MON

Analyst: TNL

Seq Number: 3108372

% Solids:

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Nitrite as N	14797-65-0	<0.0200	0.0200	mg/L	11.22.2019 07:11		1

Analytical Method: Chemical Oxygen Demand by HACH 8000

Tech: TAH

Analyst: TAH

Seq Number: 3108841

% Solids:

SUB: AZ0765

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
COD - Chemical Oxygen Demand		85.0	20.0	mg/L	11.27.2019 09:32		1

Analytical Method: Fecal Coliform Bacteria by SM 9222D

Tech: TNL

Analyst: TNL

Seq Number: 3108363

Date Prep: 11.20.2019 17:19

Prep Method: SM9222P

% Solids:

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Fecal Coliform	FECCOLIFOR	>200	2	cfu/100m	11.21.2019 18:20	D1	2



Certificate of Analytical Results 643926

NV5, Phoenix, AZ

Flagstaff

Sample Id: **FLAG_191120**

Matrix: Storm Water

Date Received: 11.20.2019 15:55

Lab Sample Id: 643926-002

Date Collected: 11.20.2019 12:15

Analytical Method: PAHs by SW846 8270D SIM

Prep Method: SW3511

Tech: AHI

% Solids:

Analyst: VIC

Date Prep: 11.26.2019 17:21

Seq Number: 3108913

SUB: AZ0765

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
1-Methylnaphthalene	90-12-0	<0.000190	0.000190	mg/L	11.27.2019 22:02		1.05
2-Methylnaphthalene	91-57-6	<0.000190	0.000190	mg/L	11.27.2019 22:02		1.05
Acenaphthene	83-32-9	<0.000190	0.000190	mg/L	11.27.2019 22:02		1.05
Acenaphthylene	208-96-8	<0.000190	0.000190	mg/L	11.27.2019 22:02		1.05
Anthracene	120-12-7	<0.000190	0.000190	mg/L	11.27.2019 22:02		1.05
Benzo(a)anthracene	56-55-3	<0.000190	0.000190	mg/L	11.27.2019 22:02		1.05
Benzo(a)pyrene	50-32-8	<0.000190	0.000190	mg/L	11.27.2019 22:02		1.05
Benzo(b)fluoranthene	205-99-2	<0.000190	0.000190	mg/L	11.27.2019 22:02		1.05
Benzo(g,h,i)perylene	191-24-2	<0.000190	0.000190	mg/L	11.27.2019 22:02		1.05
Benzo(k)fluoranthene	207-08-9	<0.000190	0.000190	mg/L	11.27.2019 22:02		1.05
Chrysene	218-01-9	<0.000190	0.000190	mg/L	11.27.2019 22:02		1.05
Dibenz(a,h)anthracene	53-70-3	<0.000190	0.000190	mg/L	11.27.2019 22:02		1.05
Fluoranthene	206-44-0	<0.000190	0.000190	mg/L	11.27.2019 22:02		1.05
Fluorene	86-73-7	<0.000190	0.000190	mg/L	11.27.2019 22:02		1.05
Indeno(1,2,3-c,d)Pyrene	193-39-5	<0.000190	0.000190	mg/L	11.27.2019 22:02		1.05
Naphthalene	91-20-3	<0.000381	0.000381	mg/L	11.27.2019 22:02		1.05
Phenanthrene	85-01-8	<0.000190	0.000190	mg/L	11.27.2019 22:02		1.05
Pyrene	129-00-0	<0.000190	0.000190	mg/L	11.27.2019 22:02		1.05

% Recovery

Surrogate		Units	Limits	Analysis Date	Flag
2-Fluorobiphenyl	95	%	54-146	11.27.2019 22:02	
Nitrobenzene-d5	97	%	46-151	11.27.2019 22:02	
Terphenyl-D14	68	%	51-139	11.27.2019 22:02	

Analytical Method: Quantitray Coliform Test by SM 9223 B

Tech: MON

% Solids:

Analyst: TNL

Date Prep: 11.20.2019 17:30

Seq Number: 3108381

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Total Coliform	IOTCOLIFOR	>2419.6	20.0	MPN/100	11.21.2019 18:40	D2	20
E. coli	ECOLIF	12300	20.0	MPN/100	11.21.2019 18:40	D2	20

NV5
Flagstaff

Analytical Method: PAHs by SW846 8270D SIM

Seq Number: 3108913

MB Sample Id: 7691281-1-BLK

Matrix: Water

LCS Sample Id: 7691281-1-BKS

Prep Method: SW3511

Date Prep: 11.26.2019

LCSD Sample Id: 7691281-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
1-Methylnaphthalene	<0.000182	0.0182	0.0168	92	0.0170	93	70-126	1	30	mg/L	11.27.2019 10:34	
2-Methylnaphthalene	<0.000182	0.0182	0.0167	92	0.0169	93	74-121	1	30	mg/L	11.27.2019 10:34	
Acenaphthene	<0.000182	0.0182	0.0171	94	0.0175	96	75-127	2	30	mg/L	11.27.2019 10:34	
Acenaphthylene	<0.000182	0.0182	0.0172	95	0.0175	96	78-133	2	30	mg/L	11.27.2019 10:34	
Anthracene	<0.000182	0.0182	0.0173	95	0.0176	97	73-145	2	30	mg/L	11.27.2019 10:34	
Benzo(a)anthracene	<0.000182	0.0182	0.0159	87	0.0161	88	77-131	1	30	mg/L	11.27.2019 10:34	
Benzo(a)pyrene	<0.000182	0.0182	0.0163	90	0.0163	90	56-163	0	30	mg/L	11.27.2019 10:34	
Benzo(b)fluoranthene	<0.000182	0.0182	0.0170	93	0.0171	94	74-138	1	30	mg/L	11.27.2019 10:34	
Benzo(g,h,i)perylene	<0.000182	0.0182	0.0165	91	0.0163	90	77-127	1	30	mg/L	11.27.2019 10:34	
Benzo(k)fluoranthene	<0.000182	0.0182	0.0170	93	0.0169	93	67-142	1	30	mg/L	11.27.2019 10:34	
Chrysene	<0.000182	0.0182	0.0162	89	0.0163	90	66-126	1	30	mg/L	11.27.2019 10:34	
Dibenz(a,h)anthracene	<0.000182	0.0182	0.0166	91	0.0164	90	71-142	1	30	mg/L	11.27.2019 10:34	
Fluoranthene	<0.000182	0.0182	0.0170	93	0.0174	96	78-138	2	30	mg/L	11.27.2019 10:34	
Fluorene	<0.000182	0.0182	0.0179	98	0.0182	100	79-128	2	30	mg/L	11.27.2019 10:34	
Indeno(1,2,3-c,d)Pyrene	<0.000182	0.0182	0.0164	90	0.0162	89	76-140	1	30	mg/L	11.27.2019 10:34	
Naphthalene	<0.000364	0.0182	0.0165	91	0.0167	92	72-122	1	30	mg/L	11.27.2019 10:34	
Phenanthrene	<0.000182	0.0182	0.0173	95	0.0176	97	76-129	2	30	mg/L	11.27.2019 10:34	
Pyrene	<0.000182	0.0182	0.0166	91	0.0173	95	74-138	4	30	mg/L	11.27.2019 10:34	
Surrogate	MB %Rec	MB Flag	LCS %Rec	LCS Flag	LCSD %Rec	LCSD Flag	Limits			Units	Analysis Date	
2-Fluorobiphenyl	96		100		102		54-146			%	11.27.2019 10:34	
Nitrobenzene-d5	100		104		106		46-151			%	11.27.2019 10:34	
Terphenyl-D14	99		99		100		51-139			%	11.27.2019 10:34	

MS/MSD Percent Recovery
Relative Percent Difference
LCS/LCSD Recovery
Log Difference $[D] = 100 * (C - A) / B$
 $RPD = 200 * |(C - E) / (C + E)|$
 $[D] = 100 * (C) / [B]$
Log Diff. = Log(Sample Duplicate) - Log(Original Sample)LCS = Laboratory Control Sample
A = Parent Result
C = MS/LCS Result
E = MSD/LCSD ResultMS = Matrix Spike
B = Spike Added
D = MSD/LCSD % Rec



QC Summary 643926

NV5
Flagstaff

Analytical Method: PAHs by SW846 8270D SIM

Seq Number: 3108913

Parent Sample Id: 643773-001

Matrix: Ground Water

MS Sample Id: 643773-001 S

Prep Method: SW3511

Date Prep: 11.26.2019

MSD Sample Id: 643773-001 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
1-Methylnaphthalene	<0.000200	0.0200	0.0168	84	0.0160	83	70-126	5	30	mg/L	11.27.2019 12:17	
2-Methylnaphthalene	<0.000200	0.0200	0.0165	83	0.0157	81	74-121	5	30	mg/L	11.27.2019 12:17	
Acenaphthene	<0.000200	0.0200	0.0172	86	0.0162	84	75-127	6	30	mg/L	11.27.2019 12:17	
Acenaphthylene	<0.000200	0.0200	0.0174	87	0.0164	85	78-133	6	30	mg/L	11.27.2019 12:17	
Anthracene	<0.000200	0.0200	0.0176	88	0.0166	86	73-145	6	30	mg/L	11.27.2019 12:17	
Benzo(a)anthracene	<0.000200	0.0200	0.0163	82	0.0149	77	77-131	9	30	mg/L	11.27.2019 12:17	
Benzo(a)pyrene	<0.000200	0.0200	0.0165	83	0.0150	78	56-163	10	30	mg/L	11.27.2019 12:17	
Benzo(b)fluoranthene	<0.000200	0.0200	0.0171	86	0.0146	76	74-138	16	30	mg/L	11.27.2019 12:17	
Benzo(g,h,i)perylene	<0.000200	0.0200	0.0165	83	0.0150	78	77-127	10	30	mg/L	11.27.2019 12:17	
Benzo(k)fluoranthene	<0.000200	0.0200	0.0170	85	0.0168	87	67-142	1	30	mg/L	11.27.2019 12:17	
Chrysene	<0.000200	0.0200	0.0166	83	0.0151	78	66-126	9	30	mg/L	11.27.2019 12:17	
Dibenz(a,h)anthracene	<0.000200	0.0200	0.0171	86	0.0153	79	71-142	11	30	mg/L	11.27.2019 12:17	
Fluoranthene	<0.000200	0.0200	0.0175	88	0.0163	84	78-138	7	30	mg/L	11.27.2019 12:17	
Fluorene	<0.000200	0.0200	0.0178	89	0.0168	87	79-128	6	30	mg/L	11.27.2019 12:17	
Indeno(1,2,3-c,d)Pyrene	<0.000200	0.0200	0.0167	84	0.0151	78	76-140	10	30	mg/L	11.27.2019 12:17	
Naphthalene	<0.000400	0.0200	0.0164	82	0.0157	81	72-122	4	30	mg/L	11.27.2019 12:17	
Phenanthrene	<0.000200	0.0200	0.0176	88	0.0167	87	76-129	5	30	mg/L	11.27.2019 12:17	
Pyrene	<0.000200	0.0200	0.0170	85	0.0161	83	74-138	5	30	mg/L	11.27.2019 12:17	

Surrogate	MS %Rec	MS Flag	MSD %Rec	MSD Flag	Limits	Units	Analysis Date
2-Fluorobiphenyl	94		93		54-146	%	11.27.2019 12:17
Nitrobenzene-d5	98		98		46-151	%	11.27.2019 12:17
Terphenyl-D14	92		90		51-139	%	11.27.2019 12:17

Analytical Method: Recoverable Metals, Total, by EPA 200.7

Seq Number: 3109263

MB Sample Id: 7691494-1-BLK

Matrix: Water

LCS Sample Id: 7691494-1-BKS

Prep Method: E200.7P

Date Prep: 12.03.2019

LCSD Sample Id: 7691494-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Calcium	<0.200	25.0	23.8	95	23.8	95	85-115	0	20	mg/L	12.03.2019 11:14	
Sodium	<0.500	25.0	23.8	95	23.7	95	85-115	0	20	mg/L	12.03.2019 11:14	

Analytical Method: Recoverable Metals, Total, by EPA 200.7

Seq Number: 3109263

Parent Sample Id: 644092-001

Matrix: Drinking Water

MS Sample Id: 644092-001 S

Prep Method: E200.7P

Date Prep: 12.03.2019

MSD Sample Id: 644092-001 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Calcium	3.89	25.0	29.0	100	28.8	100	70-130	1	20	mg/L	12.03.2019 11:27	
Sodium	28.9	25.0	53.7	99	53.4	98	70-130	1	20	mg/L	12.03.2019 11:27	

MS/MSD Percent Recovery
Relative Percent Difference
LCS/LCSD Recovery
Log Difference

$[D] = 100 * (C - A) / B$
 $RPD = 200 * |(C - E) / (C + E)|$
 $[D] = 100 * (C) / [B]$
Log Diff. = Log(Sample Duplicate) - Log(Original Sample)

LCS = Laboratory Control Sample
A = Parent Result
C = MS/LCS Result
E = MSD/LCSD Result

MS = Matrix Spike
B = Spike Added
D = MSD/LCSD % Rec



QC Summary 643926

NV5 Flagstaff

Analytical Method: Recoverable Metals, Total, by EPA 200.7

Seq Number: 3109263

Matrix: Drinking Water

Parent Sample Id: 644069-001

MS Sample Id: 644069-001 S

Prep Method: E200.7P

Date Prep: 12.03.2019

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	Limits	Units	Analysis Date	Flag
Calcium	202	25.0	219	68	70-130	mg/L	12.03.2019 12:59	M2
Sodium	444	25.0	452	32	70-130	mg/L	12.03.2019 12:59	M2

Analytical Method: Recoverable Metals, Total, by EPA 200.8

Seq Number: 3109285

Matrix: Water

MB Sample Id: 7691547-1-BLK

LCS Sample Id: 7691547-1-BKS

Prep Method: E200.8P

Date Prep: 12.03.2019

LCSD Sample Id: 7691547-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Arsenic	<0.00400	0.100	0.0991	99	0.0949	95	85-115	4	20	mg/L	12.04.2019 06:07	
Barium	<0.00400	0.100	0.0939	94	0.0947	95	85-115	1	20	mg/L	12.04.2019 06:07	
Cadmium	<0.00200	0.100	0.0989	99	0.0957	96	85-115	3	20	mg/L	12.04.2019 06:07	
Chromium	<0.00400	0.100	0.0992	99	0.0964	96	85-115	3	20	mg/L	12.04.2019 06:07	
Copper	<0.00400	0.100	0.0979	98	0.0945	95	85-115	4	20	mg/L	12.04.2019 06:07	
Lead	<0.00200	0.100	0.0946	95	0.0953	95	85-115	1	20	mg/L	12.04.2019 06:07	
Nickel	<0.00200	0.100	0.0988	99	0.0957	96	85-115	3	20	mg/L	12.04.2019 06:07	
Selenium	<0.00200	0.100	0.100	100	0.0945	95	85-115	6	20	mg/L	12.04.2019 06:07	
Silver	<0.00200	0.0500	0.0497	99	0.0483	97	85-115	3	20	mg/L	12.04.2019 06:07	

Analytical Method: Recoverable Metals, Total, by EPA 200.8

Seq Number: 3109285

Matrix: Ground Water

Parent Sample Id: 644160-001

MS Sample Id: 644160-001 S

Prep Method: E200.8P

Date Prep: 12.03.2019

MSD Sample Id: 644160-001 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Arsenic	<0.00400	0.100	0.102	102	0.103	103	70-130	1	20	mg/L	12.04.2019 06:16	
Barium	0.0256	0.100	0.122	96	0.122	96	70-130	0	20	mg/L	12.04.2019 06:16	
Cadmium	<0.00200	0.100	0.0992	99	0.0993	99	70-130	0	20	mg/L	12.04.2019 06:16	
Chromium	<0.00400	0.100	0.100	100	0.0996	100	70-130	0	20	mg/L	12.04.2019 06:16	
Copper	<0.00400	0.100	0.0981	98	0.0987	99	70-130	1	20	mg/L	12.04.2019 06:16	
Lead	<0.00200	0.100	0.0969	97	0.0968	97	70-130	0	20	mg/L	12.04.2019 06:16	
Nickel	<0.00200	0.100	0.0989	99	0.0999	100	70-130	1	20	mg/L	12.04.2019 06:16	
Selenium	0.00218	0.100	0.103	101	0.104	102	70-130	1	20	mg/L	12.04.2019 06:16	
Silver	<0.00200	0.0500	0.0491	98	0.0494	99	70-130	1	20	mg/L	12.04.2019 06:16	

MS/MSD Percent Recovery
Relative Percent Difference
LCS/LCSD Recovery
Log Difference

$[D] = 100 * (C - A) / B$
 $RPD = 200 * |(C - E) / (C + E)|$
 $[D] = 100 * (C) / [B]$
Log Diff. = Log(Sample Duplicate) - Log(Original Sample)

LCS = Laboratory Control Sample
A = Parent Result
C = MS/LCS Result
E = MSD/LCSD Result

MS = Matrix Spike
B = Spike Added
D = MSD/LCSD % Rec



QC Summary 643926

NV5 Flagstaff

Analytical Method: Recoverable Metals, Total, by EPA 200.8

Seq Number: 3109285

Matrix: Ground Water

Parent Sample Id: 644170-001

MS Sample Id: 644170-001 S

Prep Method: E200.8P

Date Prep: 12.03.2019

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	Limits	Units	Analysis Date	Flag
Arsenic	<0.00400	0.100	0.0929	93	70-130	mg/L	12.04.2019 07:26	
Barium	0.0304	0.100	0.125	95	70-130	mg/L	12.04.2019 07:26	
Cadmium	<0.00200	0.100	0.0927	93	70-130	mg/L	12.04.2019 07:26	
Chromium	<0.00400	0.100	0.0933	93	70-130	mg/L	12.04.2019 07:26	
Copper	<0.00400	0.100	0.0919	92	70-130	mg/L	12.04.2019 07:26	
Lead	<0.00200	0.100	0.0958	96	70-130	mg/L	12.04.2019 07:26	
Nickel	<0.00200	0.100	0.0918	92	70-130	mg/L	12.04.2019 07:26	
Selenium	<0.00200	0.100	0.0920	92	70-130	mg/L	12.04.2019 07:26	
Silver	<0.00200	0.0500	0.0463	93	70-130	mg/L	12.04.2019 07:26	

Analytical Method: Mercury by EPA 245.1

Seq Number: 3108643

Matrix: Water

MB Sample Id: 7691078-1-BLK

LCS Sample Id: 7691078-1-BKS

Prep Method: E245.1P

Date Prep: 11.25.2019

LCSD Sample Id: 7691078-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Mercury	<0.000200	0.00200	0.00217	109	0.00214	107	85-115	1	20	mg/L	11.25.2019 14:55	

Analytical Method: Mercury by EPA 245.1

Seq Number: 3108643

Matrix: Waste Water

Parent Sample Id: 644294-001

MS Sample Id: 644294-001 S

Prep Method: E245.1P

Date Prep: 11.25.2019

MSD Sample Id: 644294-001 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Mercury	<0.0000263	0.00200	0.00176	88	0.00175	88	70-130	1	20	mg/L	11.25.2019 15:03	

Analytical Method: Biochemical Oxygen Demand by SM 5210B

Seq Number: 3108848

Matrix: Water

DO Depletion Sample 7691295-1-BLK

LCS Sample Id: 7691295-1-BKS

Prep Method: SM5210P

Date Prep: 11.21.2019

Parameter	DO Depletion	Spike Amount	LCS Result	LCS %Rec	Limits	Units	Analysis Date	Flag
Biochemical Oxygen Demand, 5 day	<2.00	198	179	90	85-115	mg/L	11.26.2019 11:20	

Analytical Method: Biochemical Oxygen Demand by SM 5210B

Seq Number: 3108848

Matrix: Waste Water

Parent Sample Id: 643885-001

MD Sample Id: 643885-001 D

Prep Method: SM5210P

Date Prep: 11.21.2019

Parameter	Parent Result	MD Result	%RPD	RPD Limit	Units	Analysis Date	Flag
Biochemical Oxygen Demand, 5 day	3470	3630	5	25	mg/L	11.26.2019 11:20	

MS/MSD Percent Recovery
Relative Percent Difference
LCS/LCSD Recovery
Log Difference

$[D] = 100 * (C - A) / B$
 $RPD = 200 * | (C - E) / (C + E) |$
 $[D] = 100 * (C) / [B]$
Log Diff. = Log(Sample Duplicate) - Log(Original Sample)

LCS = Laboratory Control Sample
A = Parent Result
C = MS/LCS Result
E = MSD/LCSD Result

MS = Matrix Spike
B = Spike Added
D = MSD/LCSD % Rec



QC Summary 643926

NV5
Flagstaff

Analytical Method: Total Dissolved Solids by SM 2540C

Seq Number: 3108676 Matrix: Water
MB Sample Id: 3108676-1-BLK LCS Sample Id: 3108676-1-BKS LCSD Sample Id: 3108676-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Total Dissolved Solids	<10.0	1000	993	99	1040	104	80-120	5	10	mg/L	11.21.2019 16:00	

Analytical Method: Total Dissolved Solids by SM 2540C

Seq Number: 3108676 Matrix: Storm Water
Parent Sample Id: 643926-001 MD Sample Id: 643926-001 D

Parameter	Parent Result	MD Result	%RPD	RPD Limit	Units	Analysis Date	Flag
Total Dissolved Solids	65.0	61.0	6	10	mg/L	11.21.2019 16:00	

Analytical Method: Total Suspended Solids by SM 2540D

Seq Number: 3108447 Matrix: Water
MB Sample Id: 3108447-1-BLK LCS Sample Id: 3108447-1-BKS LCSD Sample Id: 3108447-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Total Suspended Solids	<10.0	1000	989	99	981	98	80-120	1	10	mg/L	11.21.2019 12:30	

Analytical Method: Total Suspended Solids by SM 2540D

Seq Number: 3108447 Matrix: Waste Water
Parent Sample Id: 643886-001 MD Sample Id: 643886-001 D

Parameter	Parent Result	MD Result	%RPD	RPD Limit	Units	Analysis Date	Flag
Total Suspended Solids	3700	3540	4	10	mg/L	11.21.2019 12:30	

Analytical Method: Turbidity by EPA 180.1

Seq Number: 3108256 Matrix: Water
MB Sample Id: 3108256-1-BLK LCS Sample Id: 3108256-1-BKS LCSD Sample Id: 3108256-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Turbidity	<0.100	19.8	19.9	101	19.5	98	80-120	2	20	NTU	11.21.2019 09:35	

Analytical Method: Turbidity by EPA 180.1

Seq Number: 3108256 Matrix: Storm Water
Parent Sample Id: 643882-001 MD Sample Id: 643882-001 D

Parameter	Parent Result	MD Result	%RPD	RPD Limit	Units	Analysis Date	Flag
Turbidity	20.2	20.4	1	20	NTU	11.21.2019 09:35	

MS/MSD Percent Recovery
Relative Percent Difference
LCS/LCSD Recovery
Log Difference

$[D] = 100 * (C - A) / B$
 $RPD = 200 * |(C - E) / (C + E)|$
 $[D] = 100 * (C) / [B]$
Log Diff. = Log(Sample Duplicate) - Log(Original Sample)

LCS = Laboratory Control Sample
A = Parent Result
C = MS/LCS Result
E = MSD/LCSD Result

MS = Matrix Spike
B = Spike Added
D = MSD/LCSD % Rec



QC Summary 643926

NV5 Flagstaff

Analytical Method: Anions by EPA 300.0

Seq Number: 3108592

MB Sample Id: 7690922-1-BLK

Matrix: Water

LCS Sample Id: 7690922-1-BKS

Prep Method: E300P

Date Prep: 11.22.2019

LCSD Sample Id: 7690922-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	<0.500	10.0	10.2	102	10.2	102	90-110	0	20	mg/L	11.22.2019 09:05	
Sulfate	<0.500	10.0	10.4	104	10.4	104	90-110	0	20	mg/L	11.22.2019 09:05	

Analytical Method: Anions by EPA 300.0

Seq Number: 3108592

Parent Sample Id: 644116-001

Matrix: Water

MS Sample Id: 644116-001 S

Prep Method: E300P

Date Prep: 11.22.2019

MSD Sample Id: 644116-001 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	224	10.0	228	40	229	50	90-110	0	20	mg/L	11.22.2019 09:58	M2
Sulfate	31.4	10.0	40.3	89	40.3	89	90-110	0	20	mg/L	11.22.2019 09:58	M2

Analytical Method: Anions by EPA 300.0

Seq Number: 3108592

Parent Sample Id: 644116-003

Matrix: Water

MS Sample Id: 644116-003 S

Prep Method: E300P

Date Prep: 11.22.2019

MSD Sample Id: 644116-003 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	236	10.0	241	50	242	60	90-110	0	20	mg/L	11.22.2019 14:30	M2
Sulfate	32.7	10.0	41.3	86	41.4	87	90-110	0	20	mg/L	11.22.2019 14:30	M2

Analytical Method: Nitrite by SM 4500-NO2B

Seq Number: 3108372

MB Sample Id: 3108372-1-BLK

Matrix: Water

LCS Sample Id: 3108372-1-BKS

LCSD Sample Id: 3108372-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Nitrite as N	<0.0100	0.100	0.101	101	0.0990	99	85-115	2	20	mg/L	11.22.2019 07:11	

Analytical Method: Nitrite by SM 4500-NO2B

Seq Number: 3108372

Parent Sample Id: 644039-001

Matrix: Water

MS Sample Id: 644039-001 S

MSD Sample Id: 644039-001 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Nitrite as N	0.0228	0.100	0.128	105	0.125	102	79-117	2	20	mg/L	11.22.2019 07:11	

Analytical Method: Chemical Oxygen Demand by HACH 8000

Seq Number: 3108841

MB Sample Id: 3108841-1-BLK

Matrix: Water

LCS Sample Id: 3108841-1-BKS

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	Limits	Units	Analysis Date	Flag
COD - Chemical Oxygen Demand	<20.0	100	99.0	99	90-110	mg/L	11.27.2019 09:32	

MS/MSD Percent Recovery
Relative Percent Difference
LCS/LCSD Recovery
Log Difference

$[D] = 100 * (C-A) / B$
 $RPD = 200 * |(C-E) / (C+E)|$
 $[D] = 100 * (C) / [B]$
Log Diff. = Log(Sample Duplicate) - Log(Original Sample)

LCS = Laboratory Control Sample
A = Parent Result
C = MS/LCS Result
E = MSD/LCSD Result

MS = Matrix Spike
B = Spike Added
D = MSD/LCSD % Rec

NV5
Flagstaff**Analytical Method: Chemical Oxygen Demand by HACH 8000**

Seq Number: 3108841

Matrix: Storm Water

Parent Sample Id: 643882-001

MS Sample Id: 643882-001 S

MSD Sample Id: 643882-001 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
COD - Chemical Oxygen Demand	19.0	100	110	91	110	91	90-110	0	20	mg/L	11.27.2019 09:32	

Analytical Method: Chemical Oxygen Demand by HACH 8000

Seq Number: 3108841

Matrix: Water

Parent Sample Id: 644131-001

MS Sample Id: 644131-001 S

MSD Sample Id: 644131-001 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
COD - Chemical Oxygen Demand	8.00	100	100	92	101	93	90-110	1	20	mg/L	11.27.2019 09:32	

Analytical Method: Fecal Coliform Bacteria by SM 9222D

Seq Number: 3108363

Matrix: Water

MB Sample Id: 7690955-1-BLK

Prep Method: SM9222P

Date Prep: 11.20.2019

Parameter	MB Result	Units	Analysis Date	Flag
Fecal Coliform	<1	cfu/100ml	11.21.2019 13:40	

MS/MSD Percent Recovery
Relative Percent Difference
LCS/LCSD Recovery
Log Difference

$[D] = 100 * (C - A) / B$
 $RPD = 200 * |(C - E) / (C + E)|$
 $[D] = 100 * (C) / [B]$
Log Diff. = Log(Sample Duplicate) - Log(Original Sample)

LCS = Laboratory Control Sample
A = Parent Result
C = MS/LCS Result
E = MSD/LCSD Result

MS = Matrix Spike
B = Spike Added
D = MSD/LCSD % Rec

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other

643926

Inter-Office Shipment

IOS Number : 52898

Date/Time: 11.21.2019 Created by: Emily Petrunia
 Lab# From: **Phoenix** Delivery Priority:
 Lab# To: **Houston** Air Bill No.: 7777053585110

Please send report to: Ruriko Konuma
 Address: 2525 West Huntington Drive, Suite 102
 E-Mail: ruriko.konuma@xenco.com

Sample Id	Matrix	Client Sample Id	Sample Collection	Method	Method Name	Lab Due	HT Due	PM	Analytes	Sign
643926-001	W	FLAG_191120	11.20.2019 12:15	E200.8	Recoverable Metals, Total, by EPA 200.8	11.29.2019	05.18.2020	RKO	AG AS BA CD CR CU N	
643926-001	W	FLAG_191120	11.20.2019 12:15	E245.1	Mercury by EPA 245.1	11.29.2019	12.18.2019	RKO	HG	
643926-001	W	FLAG_191120	11.20.2019 12:15	H8000	Chemical Oxygen Demand by HACH 80	11.29.2019	12.18.2019	RKO	COD	
643926-001	W	FLAG_191120	11.20.2019 12:15	E200.7	Recoverable Metals, Total, by EPA 200.7	11.29.2019	05.18.2020	RKO	CA NA	
643926-001	W	FLAG_191120	11.20.2019 12:15	E300	Anions by EPA 300.0	11.29.2019	11.22.2019 12:15	RKO	CL SO4	
643926-002	W	FLAG_191120	11.20.2019 12:15	SW8270D_SIM_PAH	PAHs by SW846 8270D SIM	11.29.2019	11.27.2019 12:15	RKO	ACNP ACNPY ANTH Bz	

Inter Office Shipment or Sample Comments:

Relinquished By:



Emily Petrunia

Date Relinquished: 11.21.2019

Received By:



Ashly Kowalski

Date Received: 11.22.2019

Cooler Temperature: 3.0



XENCO Laboratories

Inter Office Report- Sample Receipt Checklist

Sent To: Houston

IOS #: 52898

Acceptable Temperature Range: 0 - 6 degC

Air and Metal samples Acceptable Range: Ambient

Temperature Measuring device used : HOU-068

Sent By: Emily Petrunia

Date Sent: 11.21.2019 05.34 PM

Received By: Ashly Kowalski

Date Received: 11.22.2019 09.30 AM

Sample Receipt Checklist

Comments

#1 *Temperature of cooler(s)?	3
#2 *Shipping container in good condition?	Yes
#3 *Samples received with appropriate temperature?	Yes
#4 *Custody Seals intact on shipping container/ cooler?	N/A
#5 *Custody Seals Signed and dated for Containers/coolers	N/A
#6 *IOS present?	Yes
#7 Any missing/extra samples?	No
#8 IOS agrees with sample label(s)/matrix?	Yes
#9 Sample matrix/ properties agree with IOS?	Yes
#10 Samples in proper container/ bottle?	Yes
#11 Samples properly preserved?	Yes
#12 Sample container(s) intact?	Yes
#13 Sufficient sample amount for indicated test(s)?	Yes
#14 All samples received within hold time?	Yes

*** Must be completed for after-hours delivery of samples prior to placing in the refrigerator**

NonConformance:

Corrective Action Taken:

Nonconformance Documentation

Contact: _____ Contacted by : _____ Date: _____

Checklist reviewed by:

Ashly Kowalski

Date: 11.22.2019

XENCO Laboratories
Prelogin/Nonconformance Report- Sample Log-In

Client: NV5

Date/ Time Received: 11.20.2019 03:55.00 PM

Work Order #: 643926

Acceptable Temperature Range: 0 - 6 degC

Air and Metal samples Acceptable Range: Ambient

Temperature Measuring device used : IR#1

Sample Receipt Checklist	Comments
#1 *Temperature of cooler(s)?	2.8
#2 *Shipping container in good condition?	Yes
#3 *Samples received on ice?	Yes
#4 *Custody Seals intact on shipping container/ cooler?	N/A
#5 Custody Seals intact on sample bottles?	N/A
#6 *Custody Seals Signed and dated?	N/A
#7 *Chain of Custody present?	Yes
#8 Any missing/extra samples?	No
#9 Chain of Custody signed when relinquished/ received?	Yes
#10 Chain of Custody agrees with sample labels/matrix?	Yes
#11 Container label(s) legible and intact?	Yes
#12 Samples in proper container/ bottle?	Yes
#13 Samples properly preserved?	Yes
#14 Sample container(s) intact?	Yes
#15 Sufficient sample amount for indicated test(s)?	Yes
#16 All samples received within hold time?	Yes
#17 Subcontract of sample(s)?	Yes Xenco Stafford
#18 Water VOC samples have zero headspace?	N/A

*** Must be completed for after-hours delivery of samples prior to placing in the refrigerator**

Analyst: EP

PH Device/Lot#: 207519

Checklist completed by:	 Emily Petrunia	Date: 11.20.2019
Checklist reviewed by:	 Ruriko Konuma	Date: 11.22.2019

Analytical Report 632997

**for
NV5**

Project Manager: Mike Hulst

ADOT Stormwater

15-AUG-19

Collected By: Client



2525 West Huntington Drive, Suite 102

Tempe, AZ 85282

Ph: (480) 355-0900

Phoenix (EPA Lab Code: AZ00901): Arizona (AZ0757)

Xenco-Houston (EPA Lab code: TX00122): Arizona (AZ0765)

Xenco-Dallas (EPA Lab code: TX01468): Arizona (AZ0809)



15-AUG-19

Project Manager: **Mike Hulst**

NV5

1 West Deer Valley Building 2 #305

Phoenix, AZ 85027

Reference: TWA Report No(s): **632997**

ADOT Stormwater

Project Address: Sedona

Mike Hulst:

We are reporting to you the results of the analyses performed on the samples received under the project name referenced above and identified with the TWA Report Number(s) 632997. All results being reported under this Report Number apply to the samples analyzed and properly identified with a Laboratory ID number. Subcontracted analyses are identified in this report with either the ADHS certification number of the subcontract lab in the analyst ID field, or the complete subcontracted report attached to this report.

Unless otherwise noted in a Case Narrative, all data reported in this Analytical Report are in compliance with ADHS standards. The uncertainty of measurement associated with the results of analysis reported is available upon request. Should insufficient sample be provided to the laboratory to meet the method and ADHS Matrix Duplicate and Matrix Spike requirements, then the data will be analyzed, evaluated and reported using all other available quality control measures.

The validity and integrity of this report will remain intact as long as it is accompanied by this letter and reproduced in full, unless written approval is granted by TransWest Analytical. This report will be filed for at least 5 years in our archives after which time it will be destroyed without further notice, unless otherwise arranged with you. The samples received, and described as recorded in Report No. 632997 will be filed for 45 days, and after that time they will be properly disposed without further notice, unless otherwise arranged with you. We reserve the right to return to you any unused samples, extracts or solutions related to them if we consider so necessary (e.g., samples identified as hazardous waste, sample sizes exceeding analytical standard practices, controlled substances under regulated protocols, etc).

We thank you for selecting TransWest Analytical to serve your analytical needs. If you have any questions concerning this report, please feel free to contact us at any time.

Respectfully,

A handwritten signature in black ink, appearing to read 'Ruriko Konuma', is written over a horizontal line.

Ruriko Konuma

Project Manager

Recipient of the Prestigious Small Business Administration Award of Excellence in 1994.

Certified and approved by numerous States and Agencies.

A Small Business and Minority Status Company that delivers SERVICE and QUALITY

Houston - Dallas - Midland - San Antonio - Phoenix - Oklahoma - Latin America



CASE NARRATIVE

Client Name: NV5

Project Name: ADOT Stormwater

Project ID:

Work Order Number(s): 632997

Report Date: 15-AUG-19

Date Received: 08/05/2019

Sample receipt non conformances and comments:

Per client request email on 08/05/2019 (Rebecca Davey) BOD Method to be analyze out of HT.

Sample receipt non conformances and comments per sample:

None

Arizona Flags

All method blanks, laboratory spikes, and/or matrix spikes met quality control objectives for the parameters associated with this Work Order except as detailed below or on the Data Qualifier page of this report. Data Qualifiers used in this report are in accordance with ADHS Data Qualifiers, Revision 4.0 9/05/2012. Data qualifiers (flags) contained within this analytical report have been issued to explain a quality control deficiency, and do not affect the quality (validity) of the data unless noted otherwise in the case narrative.

- H1 Sample analysis performed past holding time.
- M1 Matrix spike recovery was high; the associated blank spike recovery was acceptable.
- M2 Matrix spike recovery was low; the associated blank spike recovery was acceptable.



Sample Cross Reference 632997

NV5, Phoenix, AZ

ADOT Stormwater

Sample Id	Matrix	Date Collected	Sample Depth	Lab Sample Id
Sedona	W	08-03-19 13:39		632997-001



Certificate of Analytical Results 632997

NV5, Phoenix, AZ

ADOT Stormwater

Sample Id: **Sedona**
Lab Sample Id: 632997-001

Matrix: Storm Water
Date Collected: 08.03.19 13.39

Date Received: 08.05.19 11.35

Analytical Method: Recoverable Metals, Total, by EPA 200.7

Tech: AHI

Analyst: DEP

Seq Number: 3097794

Date Prep: 08.07.19 03.00

Prep Method: E200.7P

% Solids:

SUB: AZ0765

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Calcium	7440-70-2	44.7	0.200	mg/L	08.07.19 13.47		1
Sodium	7440-23-5	4.86	0.500	mg/L	08.07.19 13.47		1

Analytical Method: Recoverable Metals, Total, by EPA 200.8

Tech: AHI

Analyst: DEP

Seq Number: 3097868

Date Prep: 08.07.19 03.00

Prep Method: E200.8P

% Solids:

SUB: AZ0765

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Arsenic	7440-38-2	<0.00400	0.00400	mg/L	08.07.19 23.16		1
Barium	7440-39-3	0.292	0.00400	mg/L	08.07.19 23.16		1
Cadmium	7440-43-9	<0.00200	0.00200	mg/L	08.07.19 23.16		1
Chromium	7440-47-3	0.0147	0.00400	mg/L	08.07.19 23.16		1
Copper	7440-50-8	0.0771	0.00400	mg/L	08.07.19 23.16		1
Lead	7439-92-1	0.0117	0.00200	mg/L	08.07.19 23.16		1
Nickel	7440-02-0	0.0351	0.00200	mg/L	08.07.19 23.16		1
Selenium	7782-49-2	<0.00200	0.00200	mg/L	08.07.19 23.16		1
Silver	7440-22-4	<0.00200	0.00200	mg/L	08.07.19 23.16		1
Zinc	7440-66-6	0.717	0.0300	mg/L	08.07.19 23.16		1

Analytical Method: Mercury by EPA 245.1

Tech: MLI

Analyst: ANJ

Seq Number: 3098410

Date Prep: 08.13.19 08.20

Prep Method: E245.1P

% Solids:

SUB: AZ0765

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Mercury	7439-97-6	<0.000200	0.000200	mg/L	08.13.19 11.50		1



Certificate of Analytical Results 632997

NV5, Phoenix, AZ

ADOT Stormwater

Sample Id: **Sedona**
Lab Sample Id: 632997-001

Matrix: Storm Water
Date Collected: 08.03.19 13.39

Date Received: 08.05.19 11.35

Analytical Method: Biochemical Oxygen Demand by SM 5210B

Prep Method: SM5210P

Tech: MON

% Solids:

Analyst: MON

Date Prep: 08.06.19 12.00

Seq Number: 3098252

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Biochemical Oxygen Demand,		48.3	2.00	mg/L	08.11.19 13.45	H1	1

Analytical Method: Total Dissolved Solids by SM 2540C

Tech: TNL

% Solids:

Analyst: MON

Seq Number: 3097767

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Total Dissolved Solids	1642222	68.0	10.0	mg/L	08.05.19 15.30		1

Analytical Method: Total Suspended Solids by SM 2540D

Tech: TNL

% Solids:

Analyst: MON

Seq Number: 3097758

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Total Suspended Solids	TSS	779	10.0	mg/L	08.06.19 12.30		1

Analytical Method: Turbidity by EPA 180.1

Tech: TNL

% Solids:

Analyst: TNL

Seq Number: 3097747

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Turbidity	TURBIDITY	6.80	0.100	NTU	08.05.19 12.37		1



Certificate of Analytical Results 632997

NV5, Phoenix, AZ

ADOT Stormwater

Sample Id: **Sedona**
Lab Sample Id: 632997-001

Matrix: Storm Water
Date Collected: 08.03.19 13.39

Date Received: 08.05.19 11.35

Analytical Method: Anions by EPA 300.0

Tech: JYM

Analyst: JYM

Seq Number: 3097791

Date Prep: 08.07.19 10.50

Prep Method: E300P

% Solids:

SUB: AZ0765

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	3.37	0.500	mg/L	08.07.19 23.43		1
Sulfate	14808-79-8	3.18	0.500	mg/L	08.07.19 23.43		1

Analytical Method: Nitrite by SM 4500-NO2B

Tech: TNL

Analyst: MON

Seq Number: 3098042

% Solids:

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Nitrite as N	14797-65-0	0.0284	0.0200	mg/L	08.05.19 12.35		1

Analytical Method: Nitrogen, Nitrate-Nitrite by EPA 353.2

Tech: KCS

Analyst: KCS

Seq Number: 3098267

Date Prep: 08.12.19 11.00

Prep Method: E353.2P

% Solids:

SUB: AZ0765

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Nitrogen, Nitrate-Nitrite	7727-37-9	0.573	0.100	mg/L	08.12.19 19.44		1

Analytical Method: Chemical Oxygen Demand by HACH 8000

Tech: TAH

Analyst: YAV

Seq Number: 3098369

% Solids:

SUB: AZ0765

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
COD - Chemical Oxygen Demand		68.0	20.0	mg/L	08.13.19 15.35		1



NV5

ADOT Stormwater

Analytical Method: Recoverable Metals, Total, by EPA 200.7

Seq Number: 3097794

Matrix: Water

Prep Method: E200.7P

Date Prep: 08.07.19

MB Sample Id: 7683686-1-BLK

LCS Sample Id: 7683686-1-BKS

LCSD Sample Id: 7683686-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Calcium	<0.0293	25.0	24.6	98	24.7	99	85-115	0	20	mg/L	08.07.19 12:48	
Sodium	<0.0667	25.0	24.1	96	24.2	97	85-115	0	20	mg/L	08.07.19 12:48	

Analytical Method: Recoverable Metals, Total, by EPA 200.7

Seq Number: 3097794

Matrix: Drinking Water

Prep Method: E200.7P

Date Prep: 08.07.19

Parent Sample Id: 633016-001

MS Sample Id: 633016-001 S

MSD Sample Id: 633016-001 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Calcium	18.3	25.0	41.8	94	41.5	93	70-130	1	20	mg/L	08.07.19 13:01	
Sodium	13.2	25.0	36.4	93	36.2	92	70-130	1	20	mg/L	08.07.19 13:01	

Analytical Method: Recoverable Metals, Total, by EPA 200.8

Seq Number: 3097868

Matrix: Water

Prep Method: E200.8P

Date Prep: 08.07.19

MB Sample Id: 7683687-1-BLK

LCS Sample Id: 7683687-1-BKS

LCSD Sample Id: 7683687-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Arsenic	<0.000396	0.100	0.0982	98	0.0978	98	85-115	0	20	mg/L	08.07.19 22:01	
Barium	<0.000472	0.100	0.0986	99	0.0983	98	85-115	0	20	mg/L	08.07.19 22:01	
Cadmium	<0.00200	0.100	0.0978	98	0.0981	98	85-115	0	20	mg/L	08.07.19 22:01	
Chromium	<0.000283	0.100	0.100	100	0.101	101	85-115	1	20	mg/L	08.07.19 22:01	
Copper	<0.000747	0.100	0.0983	98	0.0990	99	85-115	1	20	mg/L	08.07.19 22:01	
Lead	<0.000152	0.100	0.100	100	0.0999	100	85-115	0	20	mg/L	08.07.19 22:01	
Nickel	<0.000139	0.100	0.0972	97	0.0981	98	85-115	1	20	mg/L	08.07.19 22:01	
Selenium	<0.000368	0.100	0.0983	98	0.0980	98	85-115	0	20	mg/L	08.07.19 22:01	
Silver	<0.00200	0.0500	0.0485	97	0.0487	97	85-115	0	20	mg/L	08.07.19 22:01	
Zinc	<0.000388	0.100	0.0956	96	0.0968	97	85-115	1	20	mg/L	08.07.19 22:01	

MS/MSD Percent Recovery
Relative Percent Difference
LCS/LCSD Recovery
Log Difference

$[D] = 100 * (C - A) / B$
 $RPD = 200 * |(C - E) / (C + E)|$
 $[D] = 100 * (C) / [B]$
 $\text{Log Diff.} = \text{Log}(\text{Sample Duplicate}) - \text{Log}(\text{Original Sample})$

LCS = Laboratory Control Sample
A = Parent Result
C = MS/LCS Result
E = MSD/LCSD Result

MS = Matrix Spike
B = Spike Added
D = MSD/LCSD % Rec



QC Summary 632997

NV5

ADOT Stormwater

Analytical Method: Recoverable Metals, Total, by EPA 200.8

Seq Number: 3097868

Matrix: Drinking Water

Prep Method: E200.8P

Date Prep: 08.07.19

Parent Sample Id: 632977-002

MS Sample Id: 632977-002 S

MSD Sample Id: 632977-002 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Arsenic	<0.000396	0.100	0.0987	99	0.0988	99	70-130	0	20	mg/L	08.07.19 22:13	
Barium	0.0174	0.100	0.119	102	0.118	101	70-130	1	20	mg/L	08.07.19 22:13	
Cadmium	<0.000115	0.100	0.0975	98	0.0970	97	70-130	1	20	mg/L	08.07.19 22:13	
Chromium	0.00162	0.100	0.102	100	0.101	99	70-130	1	20	mg/L	08.07.19 22:13	
Copper	0.00217	0.100	0.102	100	0.100	98	70-130	2	20	mg/L	08.07.19 22:13	
Lead	0.000286	0.100	0.101	101	0.101	101	70-130	0	20	mg/L	08.07.19 22:13	
Nickel	0.000147	0.100	0.0969	97	0.0967	97	70-130	0	20	mg/L	08.07.19 22:13	
Selenium	<0.000368	0.100	0.0393	39	0.0404	40	70-130	3	20	mg/L	08.07.19 22:13	M2
Silver	<0.000159	0.0500	0.0480	96	0.0476	95	70-130	1	20	mg/L	08.07.19 22:13	
Zinc	0.144	0.100	0.230	86	0.228	84	70-130	1	20	mg/L	08.07.19 22:13	

Analytical Method: Recoverable Metals, Total, by EPA 200.8

Seq Number: 3097868

Matrix: Drinking Water

Prep Method: E200.8P

Date Prep: 08.07.19

Parent Sample Id: 632994-009

MS Sample Id: 632994-009 S

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	Limits	Units	Analysis Date	Flag
Arsenic	0.000600	0.100	0.0978	97	70-130	mg/L	08.07.19 23:05	
Barium	0.0219	0.100	0.120	98	70-130	mg/L	08.07.19 23:05	
Cadmium	<0.000115	0.100	0.0953	95	70-130	mg/L	08.07.19 23:05	
Chromium	<0.000283	0.100	0.0975	98	70-130	mg/L	08.07.19 23:05	
Copper	0.0215	0.100	0.118	97	70-130	mg/L	08.07.19 23:05	
Lead	0.000719	0.100	0.0997	99	70-130	mg/L	08.07.19 23:05	
Nickel	0.000843	0.100	0.0958	95	70-130	mg/L	08.07.19 23:05	
Selenium	<0.000368	0.100	0.0950	95	70-130	mg/L	08.07.19 23:05	
Silver	<0.000159	0.0500	0.0462	92	70-130	mg/L	08.07.19 23:05	
Zinc	0.0151	0.100	0.108	93	70-130	mg/L	08.07.19 23:05	

Analytical Method: Mercury by EPA 245.1

Seq Number: 3098410

Matrix: Water

Prep Method: E245.1P

Date Prep: 08.13.19

MB Sample Id: 7684081-1-BLK

LCS Sample Id: 7684081-1-BKS

LCSD Sample Id: 7684081-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Mercury	<0.0000263	0.00200	0.00194	97	0.00191	96	85-115	2	20	mg/L	08.13.19 11:21	

Analytical Method: Mercury by EPA 245.1

Seq Number: 3098410

Matrix: Water

Prep Method: E245.1P

Date Prep: 08.13.19

Parent Sample Id: 633280-001

MS Sample Id: 633280-001 S

MSD Sample Id: 633280-001 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Mercury	<0.0000263	0.00200	0.00193	97	0.00194	97	70-130	1	20	mg/L	08.13.19 11:27	

MS/MSD Percent Recovery
Relative Percent Difference
LCS/LCSD Recovery
Log Difference

$[D] = 100 * (C - A) / B$
 $RPD = 200 * |(C - E) / (C + E)|$
 $[D] = 100 * (C) / [B]$
 $\text{Log Diff.} = \text{Log}(\text{Sample Duplicate}) - \text{Log}(\text{Original Sample})$

LCS = Laboratory Control Sample
A = Parent Result
C = MS/LCS Result
E = MSD/LCSD Result

MS = Matrix Spike
B = Spike Added
D = MSD/LCSD % Rec



NV5

ADOT Stormwater

Analytical Method: Biochemical Oxygen Demand by SM 5210B

Seq Number: 3098252

Matrix: Water

Prep Method: SM5210P

Date Prep: 08.06.19

DO Depletion Sample 7684049-1-BLK

LCS Sample Id: 7684049-1-BKS

Parameter	DO Depletion	Spike Amount	LCS Result	LCS %Rec	Limits	Units	Analysis Date	Flag
Biochemical Oxygen Demand, 5 day	<2.00	198	179	90	85-115	mg/L	08.11.19 13:45	

Analytical Method: Biochemical Oxygen Demand by SM 5210B

Seq Number: 3098252

Matrix: Waste Water

Prep Method: SM5210P

Date Prep: 08.06.19

Parent Sample Id: 633012-001

MD Sample Id: 633012-001 D

Parameter	Parent Result	MD Result	%RPD	RPD Limit	Units	Analysis Date	Flag
Biochemical Oxygen Demand, 5 day	3680	3760	2	25	mg/L	08.11.19 13:45	

Analytical Method: Total Dissolved Solids by SM 2540C

Seq Number: 3097767

Matrix: Water

MB Sample Id: 3097767-1-BLK

LCS Sample Id: 3097767-1-BKS

LCSD Sample Id: 3097767-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Total Dissolved Solids	<10.0	1000	1080	108	1060	106	80-120	2	10	mg/L	08.05.19 15:30	

Analytical Method: Total Dissolved Solids by SM 2540C

Seq Number: 3097767

Matrix: Water

Parent Sample Id: 632772-001

MD Sample Id: 632772-001 D

Parameter	Parent Result	MD Result	%RPD	RPD Limit	Units	Analysis Date	Flag
Total Dissolved Solids	233	231	1	10	mg/L	08.05.19 15:30	

Analytical Method: Total Suspended Solids by SM 2540D

Seq Number: 3097758

Matrix: Water

MB Sample Id: 3097758-1-BLK

LCS Sample Id: 3097758-1-BKS

LCSD Sample Id: 3097758-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Total Suspended Solids	<10.0	1000	1100	110	1120	112	80-120	2	10	mg/L	08.06.19 12:30	

MS/MSD Percent Recovery
Relative Percent Difference
LCS/LCSD Recovery
Log Difference

$[D] = 100 * (C - A) / B$
 $RPD = 200 * |(C - E) / (C + E)|$
 $[D] = 100 * (C) / [B]$
Log Diff. = Log(Sample Duplicate) - Log(Original Sample)

LCS = Laboratory Control Sample
A = Parent Result
C = MS/LCS Result
E = MSD/LCSD Result

MS = Matrix Spike
B = Spike Added
D = MSD/LCSD % Rec



NV5

ADOT Stormwater

Analytical Method: Total Suspended Solids by SM 2540D

Seq Number: 3097758 Matrix: Waste Water
Parent Sample Id: 632793-001 MD Sample Id: 632793-001 D

Parameter	Parent Result	MD Result	%RPD	RPD Limit	Units	Analysis Date	Flag
Total Suspended Solids	188	172	9	10	mg/L	08.06.19 12:30	

Analytical Method: Turbidity by EPA 180.1

Seq Number: 3097747 Matrix: Water
MB Sample Id: 3097747-1-BLK LCS Sample Id: 3097747-1-BKS LCSD Sample Id: 3097747-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Turbidity	<0.100	19.7	19.5	99	19.5	99	80-120	0	20	NTU	08.05.19 12:37	

Analytical Method: Turbidity by EPA 180.1

Seq Number: 3097747 Matrix: Storm Water
Parent Sample Id: 632997-001 MD Sample Id: 632997-001 D

Parameter	Parent Result	MD Result	%RPD	RPD Limit	Units	Analysis Date	Flag
Turbidity	6.80	6.75	1	20	NTU	08.05.19 12:37	

Analytical Method: Anions by EPA 300.0

Seq Number: 3097791 Matrix: Water Prep Method: E300P
MB Sample Id: 7683692-1-BLK LCS Sample Id: 7683692-1-BKS Date Prep: 08.07.19
LCSD Sample Id: 7683692-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	<0.0738	10.0	10.2	102	10.2	102	90-110	0	20	mg/L	08.07.19 08:58	
Sulfate	<0.500	10.0	10.1	101	10.3	103	90-110	2	20	mg/L	08.07.19 08:58	

Analytical Method: Anions by EPA 300.0

Seq Number: 3097791 Matrix: Drinking Water Prep Method: E300P
Parent Sample Id: 633151-001 MS Sample Id: 633151-001 S Date Prep: 08.07.19
MSD Sample Id: 633151-001 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	7.91	10.0	17.1	92	17.1	92	90-110	0	20	mg/L	08.07.19 21:30	
Sulfate	22.3	10.0	29.1	68	29.4	71	90-110	1	20	mg/L	08.07.19 21:30	M2

MS/MSD Percent Recovery
Relative Percent Difference
LCS/LCSD Recovery
Log Difference

$[D] = 100 * (C-A) / B$
 $RPD = 200 * |(C-E) / (C+E)|$
 $[D] = 100 * (C) / [B]$
 $\text{Log Diff.} = \text{Log}(\text{Sample Duplicate}) - \text{Log}(\text{Original Sample})$

LCS = Laboratory Control Sample
A = Parent Result
C = MS/LCS Result
E = MSD/LCSD Result

MS = Matrix Spike
B = Spike Added
D = MSD/LCSD % Rec



QC Summary 632997

NV5

ADOT Stormwater

Analytical Method: Anions by EPA 300.0

Seq Number: 3097791

Parent Sample Id: 633151-002

Matrix: Drinking Water

MS Sample Id: 633151-002 S

Prep Method: E300P

Date Prep: 08.07.19

MSD Sample Id: 633151-002 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	123	10.0	135	120	133	100	90-110	1	20	mg/L	08.07.19 22:06	M1
Sulfate	14.4	10.0	22.7	83	22.7	83	90-110	0	20	mg/L	08.07.19 22:06	M2

Analytical Method: Nitrite by SM 4500-NO2B

Seq Number: 3098042

MB Sample Id: 3098042-1-BLK

Matrix: Water

LCS Sample Id: 3098042-1-BKS

LCSD Sample Id: 3098042-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Nitrite as N	<0.0100	0.100	0.0937	94	0.102	102	85-115	8	20	mg/L	08.05.19 12:35	

Analytical Method: Nitrite by SM 4500-NO2B

Seq Number: 3098042

Parent Sample Id: 632997-001

Matrix: Storm Water

MS Sample Id: 632997-001 S

MSD Sample Id: 632997-001 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Nitrite as N	0.0284	0.100	0.114	86	0.115	87	79-117	1	20	mg/L	08.05.19 12:35	

Analytical Method: Nitrogen, Nitrate-Nitrite by EPA 353.2

Seq Number: 3098267

MB Sample Id: 7684006-1-BLK

Matrix: Water

LCS Sample Id: 7684006-1-BKS

Prep Method: E353.2P

Date Prep: 08.12.19

LCSD Sample Id: 7684006-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Nitrogen, Nitrate-Nitrite	<0.0283	1.00	0.928	93	1.08	108	90-110	15	20	mg/L	08.12.19 17:45	

Analytical Method: Nitrogen, Nitrate-Nitrite by EPA 353.2

Seq Number: 3098267

Parent Sample Id: 633106-001

Matrix: Waste Water

MS Sample Id: 633106-001 S

Prep Method: E353.2P

Date Prep: 08.12.19

MSD Sample Id: 633106-001 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Nitrogen, Nitrate-Nitrite	0.0679	1.00	1.04	97	1.23	116	90-110	17	20	mg/L	08.12.19 17:48	M1

MS/MSD Percent Recovery
Relative Percent Difference
LCS/LCSD Recovery
Log Difference

$[D] = 100 * (C - A) / B$
 $RPD = 200 * |(C - E) / (C + E)|$
 $[D] = 100 * (C) / [B]$
Log Diff. = Log(Sample Duplicate) - Log(Original Sample)

LCS = Laboratory Control Sample
A = Parent Result
C = MS/LCS Result
E = MSD/LCSD Result

MS = Matrix Spike
B = Spike Added
D = MSD/LCSD % Rec



NV5

ADOT Stormwater

Analytical Method: Nitrogen, Nitrate-Nitrite by EPA 353.2

Seq Number: 3098267

Matrix: Ground Water

Prep Method: E353.2P

Parent Sample Id: 633277-001

MS Sample Id: 633277-001 S

Date Prep: 08.12.19

MSD Sample Id: 633277-001 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Nitrogen, Nitrate-Nitrite	0.0858	1.00	1.30	121	1.31	122	90-110	1	20	mg/L	08.12.19 18:28	M1

Analytical Method: Chemical Oxygen Demand by HACH 8000

Seq Number: 3098369

Matrix: Water

MB Sample Id: 3098369-1-BLK

LCS Sample Id: 3098369-1-BKS

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	Limits	Units	Analysis Date	Flag
COD - Chemical Oxygen Demand	<20.0	100	97.0	97	90-110	mg/L	08.13.19 15:35	

Analytical Method: Chemical Oxygen Demand by HACH 8000

Seq Number: 3098369

Matrix: Water

Parent Sample Id: 633428-001

MS Sample Id: 633428-001 S

MSD Sample Id: 633428-001 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
COD - Chemical Oxygen Demand	11.0	100	106	95	101	90	90-110	5	20	mg/L	08.13.19 15:35	

Analytical Method: Chemical Oxygen Demand by HACH 8000

Seq Number: 3098369

Matrix: Waste Water

Parent Sample Id: 633532-001

MS Sample Id: 633532-001 S

MSD Sample Id: 633532-001 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
COD - Chemical Oxygen Demand	14.0	100	108	94	110	96	90-110	2	20	mg/L	08.13.19 15:35	

MS/MSD Percent Recovery
Relative Percent Difference
LCS/LCSD Recovery
Log Difference

$[D] = 100 * (C - A) / B$
 $RPD = 200 * |(C - E) / (C + E)|$
 $[D] = 100 * (C) / [B]$
Log Diff. = Log(Sample Duplicate) - Log(Original Sample)

LCS = Laboratory Control Sample
A = Parent Result
C = MS/LCS Result
E = MSD/LCSD Result

MS = Matrix Spike
B = Spike Added
D = MSD/LCSD % Rec

Chain of Custody Record

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:[illegible]

Inter-Office Shipment

IOS Number : 45594

Date/Time: 08.05.2019 18:14 Created by: Emily Petrunia
 Lab# From: **Phoenix** Delivery Priority:
 Lab# To: **Houston** Air Bill No.: 788933457839

Please send report to: Ruriko Konuma
 Address: 2525 West Huntington Drive, Suite 102
 E-Mail: ruriko.konuma@xenco.com

Sample Id	Matrix	Client Sample Id	Sample Collection	Method	Method Name	Lab Due	HT Due	PM	Analytes	Sign
632997-001	W	Sedona	08.03.2019 13:39	E245.1	Mercury by EPA 245.1	08.13.2019	08.31.2019	RKO	HG	
632997-001	W	Sedona	08.03.2019 13:39	E200.8	Recoverable Metals, Total, by EPA 200.8	08.13.2019	01.30.2020	RKO	AG AS BA CD CR CU N	
632997-001	W	Sedona	08.03.2019 13:39	E200.7	Recoverable Metals, Total, by EPA 200.7	08.13.2019	01.30.2020	RKO	CA NA	
632997-001	W	Sedona	08.03.2019 13:39	E300	Anions by EPA 300.0	08.13.2019	08.31.2019	RKO	CL SO4	
632997-001	W	Sedona	08.03.2019 13:39	E353.2	Nitrogen, Nitrate-Nitrite by EPA 353.2	08.13.2019	08.31.2019	RKO		
632997-001	W	Sedona	08.03.2019 13:39	H8000	Chemical Oxygen Demand by HACH 800	08.13.2019	08.31.2019	RKO	COD	

Inter Office Shipment or Sample Comments:

Relinquished By:



Emily Petrunia

Date Relinquished: 08.06.2019

Received By:



Ashly Kowalski

Date Received: 08.06.2019 09:15

Cooler Temperature: 2.9



XENCO Laboratories

Inter Office Report- Sample Receipt Checklist

Sent To: Houston

IOS #: 45594

Acceptable Temperature Range: 0 - 6 degC

Air and Metal samples Acceptable Range: Ambient

Temperature Measuring device used : HOU-068

Sent By: Emily Petrunia

Date Sent: 08.05.2019 06.14 PM

Received By: Ashly Kowalski

Date Received: 08.06.2019 09.15 AM

Sample Receipt Checklist

Comments

#1 *Temperature of cooler(s)?	2.9	
#2 *Shipping container in good condition?	Yes	
#3 *Samples received with appropriate temperature?	Yes	
#4 *Custody Seals intact on shipping container/ cooler?	N/A	
#5 *Custody Seals Signed and dated for Containers/coolers	N/A	
#6 *IOS present?	Yes	
#7 Any missing/extra samples?	Yes	Missing unpreserved sample for Anions. Phoenix will send tonight.
#8 IOS agrees with sample label(s)/matrix?	Yes	
#9 Sample matrix/ properties agree with IOS?	Yes	
#10 Samples in proper container/ bottle?	Yes	
#11 Samples properly preserved?	Yes	
#12 Sample container(s) intact?	Yes	
#13 Sufficient sample amount for indicated test(s)?	Yes	
#14 All samples received within hold time?	Yes	

* Must be completed for after-hours delivery of samples prior to placing in the refrigerator

NonConformance:

Corrective Action Taken:

Nonconformance Documentation

Contact: _____ Contacted by : _____ Date: _____

Checklist reviewed by:

Ashly Kowalski

Date: 08.06.2019



XENCO Laboratories

Prelogin/Nonconformance Report- Sample Log-In



Client: NV5

Date/ Time Received: 08/05/2019 11:35:00 AM

Work Order #: 632997

Acceptable Temperature Range: 0 - 6 degC

Air and Metal samples Acceptable Range: Ambient

Temperature Measuring device used : IR#1

Sample Receipt Checklist	Comments
#1 *Temperature of cooler(s)?	4.4
#2 *Shipping container in good condition?	Yes
#3 *Samples received on ice?	Yes
#4 *Custody Seals intact on shipping container/ cooler?	N/A
#5 Custody Seals intact on sample bottles?	N/A
#6 *Custody Seals Signed and dated?	N/A
#7 *Chain of Custody present?	Yes
#8 Any missing/extra samples?	No
#9 Chain of Custody signed when relinquished/ received?	Yes
#10 Chain of Custody agrees with sample labels/matrix?	Yes
#11 Container label(s) legible and intact?	Yes
#12 Samples in proper container/ bottle?	Yes
#13 Samples properly preserved?	Yes
#14 Sample container(s) intact?	Yes
#15 Sufficient sample amount for indicated test(s)?	Yes
#16 All samples received within hold time?	Yes
	Sample for BOD Analysis received within HT. However water prep. for this analysis takes more than 2 hours which means sample won't be set up before HT expires.
	Xenco Stafford
#17 Subcontract of sample(s)?	Yes
#18 Water VOC samples have zero headspace?	N/A

*** Must be completed for after-hours delivery of samples prior to placing in the refrigerator**

Analyst: EP

PH Device/Lot#: LRS-4801

Checklist completed by:

Emily Petrunia

Date: 08/05/2019

Checklist reviewed by:

Ruriko Konuma

Date: 08/05/2019

March 04, 2020

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

Engineering & Env. Consultants, INC. -AZ

Sample Delivery Group: L1192497
Samples Received: 02/25/2020
Project Number:
Description: ADOT Stormwater

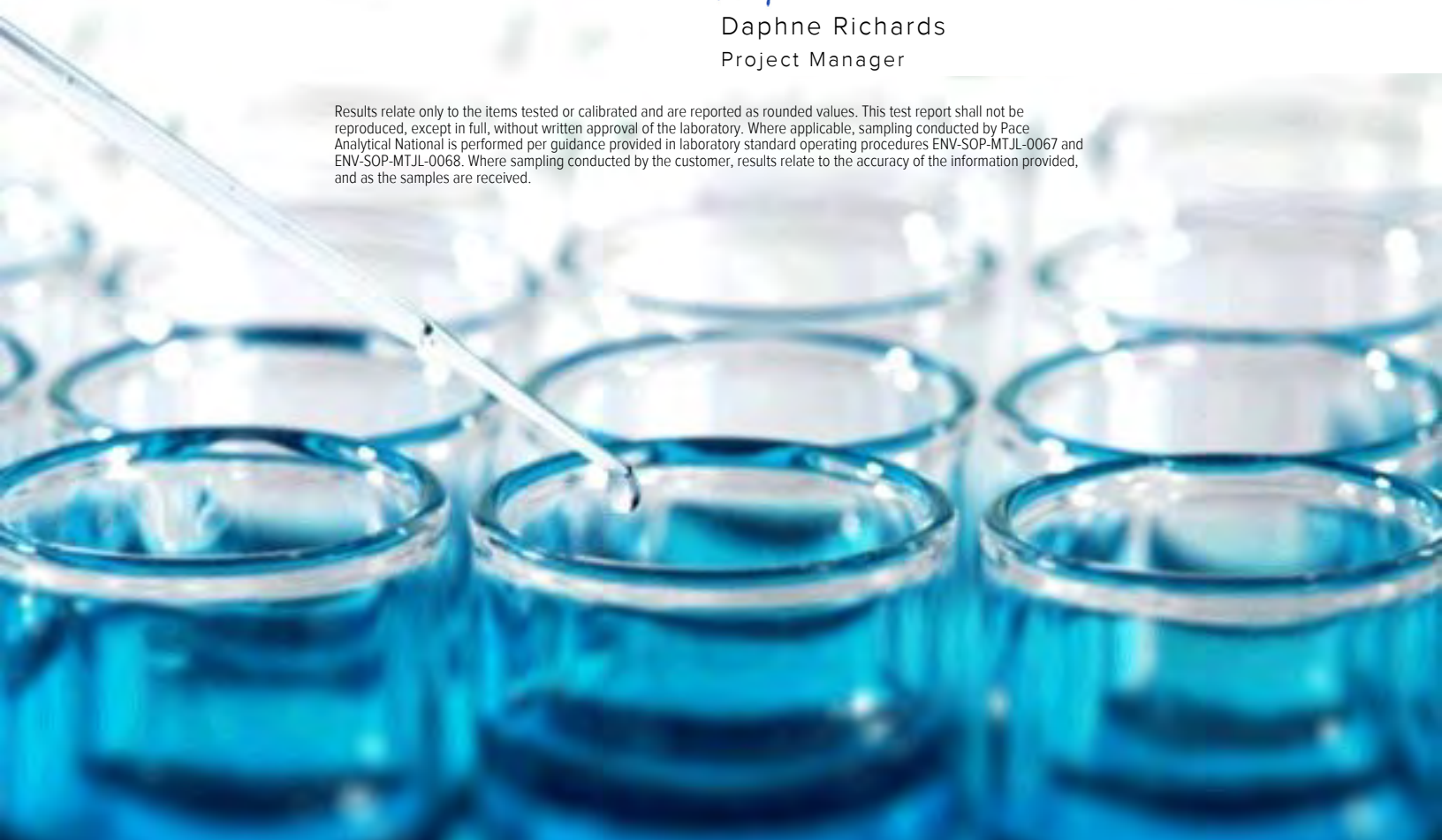
Report To: John Burton, Oliver Sullivan
7740 N. 16th Street, Ste 135
Phoenix, AZ 85020

Entire Report Reviewed By:



Daphne Richards
Project Manager

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by Pace Analytical National is performed per guidance provided in laboratory standard operating procedures ENV-SOP-MTJL-0067 and ENV-SOP-MTJL-0068. Where sampling conducted by the customer, results relate to the accuracy of the information provided, and as the samples are received.





Cp: Cover Page	1
Tc: Table of Contents	2
Ss: Sample Summary	3
Cn: Case Narrative	4
Sr: Sample Results	5
SEDONA MS4200222 L1192497-01	5
SEDONA MS4200222 L1192497-02	7
Qc: Quality Control Summary	8
Gravimetric Analysis by Method 2540 C-2011	8
Gravimetric Analysis by Method 2540 D-2011	9
Wet Chemistry by Method 130.1	10
Wet Chemistry by Method 2130 B-2011	11
Wet Chemistry by Method 300.0	12
Wet Chemistry by Method 350.1	14
Wet Chemistry by Method 410.4	15
Wet Chemistry by Method 4500CI G-2011	16
Wet Chemistry by Method 5210 B-2011	17
Mercury by Method 245.1	18
Metals (ICP) by Method 200.7	19
Metals (ICPMS) by Method 200.8	20
Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM	22
Gl: Glossary of Terms	24
Al: Accreditations & Locations	25
Sc: Sample Chain of Custody	26



SAMPLE SUMMARY

ONE LAB. NATIONWIDE.



SEDONA MS4200222 L1192497-01 WW

Collected by
Matt Simpson

Collected date/time
02/22/20 12:00

Received date/time
02/25/20 08:35

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Gravimetric Analysis by Method 2540 C-2011	WG1433586	1	02/26/20 12:28	02/26/20 13:30	MMF	Mt. Juliet, TN
Gravimetric Analysis by Method 2540 D-2011	WG1433904	1	02/25/20 21:40	02/26/20 00:15	MMF	Mt. Juliet, TN
Wet Chemistry by Method 130.1	WG1433283	1	02/26/20 06:07	02/28/20 12:36	SDL	Mt. Juliet, TN
Wet Chemistry by Method 2130 B-2011	WG1433751	1	02/25/20 15:30	02/25/20 15:30	MSP	Mt. Juliet, TN
Wet Chemistry by Method 300.0	WG1433446	1	02/25/20 14:13	02/25/20 14:13	ST	Mt. Juliet, TN
Wet Chemistry by Method 350.1	WG1434278	1	02/26/20 14:02	02/26/20 14:02	AJC	Mt. Juliet, TN
Wet Chemistry by Method 410.4	WG1434085	1	02/26/20 20:00	02/27/20 04:02	AKA	Mt. Juliet, TN
Wet Chemistry by Method 4500CI G-2011	WG1435284	1	03/02/20 13:37	03/02/20 13:37	JIC	Mt. Juliet, TN
Wet Chemistry by Method 5210 B-2011	WG1433479	1	02/25/20 13:55	03/01/20 09:35	RLC	Mt. Juliet, TN
Mercury by Method 245.1	WG1433208	1	02/25/20 12:41	02/25/20 20:01	TCT	Mt. Juliet, TN
Metals (ICP) by Method 200.7	WG1432456	1	02/25/20 16:57	02/26/20 09:55	TRB	Mt. Juliet, TN
Metals (ICPMS) by Method 200.8	WG1434096	1	02/26/20 14:54	02/27/20 00:15	TM	Mt. Juliet, TN

1 Cp
2 Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc

SEDONA MS4200222 L1192497-02 GW

Collected by
Matt Simpson

Collected date/time
02/22/20 12:01

Received date/time
02/25/20 08:35

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Microbiology by Method 9223B-2004	WG1433671	1	02/25/20 13:38	02/25/20 13:38	JTS	Mt. Juliet, TN
Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM	WG1435092	1	02/27/20 16:27	02/28/20 02:14	JF	Mt. Juliet, TN

ACCOUNT:

Engineering & Env. Consultants, INC. -AZ

PROJECT:

SDG:

L1192497

DATE/TIME:

03/04/20 11:36

PAGE:

3 of 26



All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Daphne Richards
Project Manager

Sample Delivery Group (SDG) Narrative

Sample was prepared and/or analyzed past holding time as defined in the method. Concentrations should be considered minimum values.

Lab Sample ID[L1192497-01](#)[L1192497-02](#)**Project Sample ID**[SEDONA MS4200222](#)[SEDONA MS4200222](#)**Method**

2130 B-2011, 300.0, 5210 B-2011, 4500CI G-2011

9223B-2004

¹ Cp² Tc³ Ss⁴ Cn⁵ Sr⁶ Qc⁷ Gl⁸ Al⁹ Sc



Gravimetric Analysis by Method 2540 C-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Dissolved Solids	105		10.0	1	02/26/2020 13:30	WG1433586

1 Cp

2 Tc

Gravimetric Analysis by Method 2540 D-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Suspended Solids	117		25.0	1	02/26/2020 00:15	WG1433904

3 Ss

4 Cn

Wet Chemistry by Method 130.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Hardness (colorimetric) as CaCO3	47.9	B1	30.0	1	02/28/2020 12:36	WG1433283

5 Sr

6 Qc

Wet Chemistry by Method 2130 B-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Turbidity	96.1		0.300	1	02/25/2020 15:30	WG1433751

7 Gl

8 Al

Wet Chemistry by Method 300.0

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Chloride	5.11		1.00	1	02/25/2020 14:13	WG1433446
Nitrate as (N)	0.515		0.100	1	02/25/2020 14:13	WG1433446
Nitrite as (N)	ND		0.100	1	02/25/2020 14:13	WG1433446
Sulfate	ND		5.00	1	02/25/2020 14:13	WG1433446

9 Sc

Wet Chemistry by Method 350.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Ammonia Nitrogen	0.999		0.100	1	02/26/2020 14:02	WG1434278

Wet Chemistry by Method 410.4

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
COD	162		10.0	1	02/27/2020 04:02	WG1434085

Wet Chemistry by Method 4500Cl G-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Chlorine, residual	ND		0.100	1	03/02/2020 13:37	WG1435284

Wet Chemistry by Method 5210 B-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
BOD	18.2		3.33	1	03/01/2020 09:35	WG1433479

Mercury by Method 245.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Mercury	ND		0.000200	1	02/25/2020 20:01	WG1433208



Metals (ICP) by Method 200.7

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Calcium	16.7		1.00	1	02/26/2020 09:55	WG1432456
Sodium	6.32		1.00	1	02/26/2020 09:55	WG1432456

Metals (ICPMS) by Method 200.8

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Arsenic	0.00238		0.00100	1	02/27/2020 00:15	WG1434096
Barium	0.0761		0.00500	1	02/27/2020 00:15	WG1434096
Cadmium	ND		0.00100	1	02/27/2020 00:15	WG1434096
Chromium	0.00705		0.00100	1	02/27/2020 00:15	WG1434096
Copper	0.0700		0.00100	1	02/27/2020 00:15	WG1434096
Lead	0.00302		0.00100	1	02/27/2020 00:15	WG1434096
Nickel	0.0116		0.00100	1	02/27/2020 00:15	WG1434096
Selenium	ND		0.00200	1	02/27/2020 00:15	WG1434096
Silver	ND		0.00100	1	02/27/2020 00:15	WG1434096
Zinc	0.252		0.0100	1	02/27/2020 00:15	WG1434096

¹ Cp² Tc³ Ss⁴ Cn⁵ Sr⁶ Qc⁷ Gl⁸ Al⁹ Sc



Microbiology by Method 9223B-2004

Analyte	Result MPN/100ml	Qualifier	Dilution	Analysis date / time	Batch
E.Coli	75.4		1	02/25/2020 13:38	WG1433671
Coliform, Total	>2419.6		1	02/25/2020 13:38	WG1433671

Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Anthracene	ND		0.0000500	1	02/28/2020 02:14	WG1435092
Acenaphthene	ND		0.0000500	1	02/28/2020 02:14	WG1435092
Acenaphthylene	ND		0.0000500	1	02/28/2020 02:14	WG1435092
Benzo(a)anthracene	ND		0.0000500	1	02/28/2020 02:14	WG1435092
Benzo(a)pyrene	ND		0.0000500	1	02/28/2020 02:14	WG1435092
Benzo(b)fluoranthene	0.000131		0.0000500	1	02/28/2020 02:14	WG1435092
Benzo(g,h,i)perylene	0.0000665		0.0000500	1	02/28/2020 02:14	WG1435092
Benzo(k)fluoranthene	ND		0.0000500	1	02/28/2020 02:14	WG1435092
Chrysene	0.0000908		0.0000500	1	02/28/2020 02:14	WG1435092
Dibenz(a,h)anthracene	ND		0.0000500	1	02/28/2020 02:14	WG1435092
Fluoranthene	0.000192		0.0000500	1	02/28/2020 02:14	WG1435092
Fluorene	ND		0.0000500	1	02/28/2020 02:14	WG1435092
Indeno(1,2,3-cd)pyrene	ND		0.0000500	1	02/28/2020 02:14	WG1435092
Naphthalene	ND		0.000250	1	02/28/2020 02:14	WG1435092
Phenanthrene	0.0000748		0.0000500	1	02/28/2020 02:14	WG1435092
Pyrene	0.000111		0.0000500	1	02/28/2020 02:14	WG1435092
1-Methylnaphthalene	ND		0.000250	1	02/28/2020 02:14	WG1435092
2-Methylnaphthalene	ND		0.000250	1	02/28/2020 02:14	WG1435092
2-Chloronaphthalene	ND		0.000250	1	02/28/2020 02:14	WG1435092
(S) Nitrobenzene-d5	92.0		31.0-160		02/28/2020 02:14	WG1435092
(S) 2-Fluorobiphenyl	75.5		48.0-148		02/28/2020 02:14	WG1435092
(S) p-Terphenyl-d14	92.0		37.0-146		02/28/2020 02:14	WG1435092

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

Method Blank (MB)

(MB) R3503577-1 02/26/20 13:30

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/l		mg/l	mg/l
Dissolved Solids	U		2.82	10.0

1

Cp

2

Tc

3

Ss

4

Cn

5

Sr

6

Qc

7

Gl

8

Al

9

Sc

L1192120-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1192120-01 02/26/20 13:30 • (DUP) R3503577-3 02/26/20 13:30

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
Dissolved Solids	253	254	1	0.394		5

Laboratory Control Sample (LCS)

(LCS) R3503577-2 02/26/20 13:30

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	mg/l	mg/l	%	%	
Dissolved Solids	8800	8630	98.1	85.0-115	

Method Blank (MB)

(MB) R3503959-1 02/26/20 00:15

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/l		mg/l	mg/l
Suspended Solids	U		0.350	2.50

1

Cp

2

Tc

3

Ss

4

Cn

5

Sr

6

Qc

7

Gl

8

Al

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Sc

L1192038-04 Original Sample (OS) • Duplicate (DUP)

(OS) L1192038-04 02/26/20 00:15 • (DUP) R3503959-3 02/26/20 00:15

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
Suspended Solids	26.8	28.4	1	5.80	R8	5

L1192420-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1192420-02 02/26/20 00:15 • (DUP) R3503959-4 02/26/20 00:15

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
Suspended Solids	109	115	1	5.35	R8	5

Laboratory Control Sample (LCS)

(LCS) R3503959-2 02/26/20 00:15

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	mg/l	mg/l	%	%	
Suspended Solids	773	800	103	85.0-115	



Method Blank (MB)

(MB) R3503915-1 02/28/20 12:14

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Hardness (colorimetric) as CaCO3	8.40	E4	1.43	30.0

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

L1192440-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1192440-01 02/28/20 12:54 • (DUP) R3503915-5 02/28/20 12:34

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Hardness (colorimetric) as CaCO3	90.4	91.1	1	0.771		20

L1192504-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1192504-01 02/28/20 12:36 • (DUP) R3503915-6 02/28/20 12:37

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Hardness (colorimetric) as CaCO3	183	187	1	2.16		20

Laboratory Control Sample (LCS)

(LCS) R3503915-2 02/28/20 12:15

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Hardness (colorimetric) as CaCO3	100	95.3	95.3	85.0-115	

L1192430-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1192430-01 02/28/20 12:18 • (MS) R3503915-3 02/28/20 12:19 • (MSD) R3503915-4 02/28/20 12:20

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Hardness (colorimetric) as CaCO3	100	228	258	256	30.0	28.0	1	80.0-120	E1 M2	E1 M2	0.778	20

Method Blank (MB)

(MB) R3502876-1 02/25/20 15:30

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	NTU		NTU	NTU
Turbidity	0.127	E4	0.0310	0.300

1

Cp

2

Tc

3

Ss

4

Cn

5

Sr

6

Qc

7

Gl

8

Al

9

Sc

L1192525-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1192525-01 02/25/20 15:30 • (DUP) R3502876-3 02/25/20 15:30

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	NTU	NTU		%		%
Turbidity	0.300	ND	1	1.68	E4	20

Laboratory Control Sample (LCS)

(LCS) R3502876-2 02/25/20 15:30

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	NTU	NTU	%	%	
Turbidity	40.0	36.4	91.0	90.0-110	

Method Blank (MB)

(MB) R3502968-1 02/25/20 09:29

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/l		mg/l	mg/l
Chloride	U		0.0519	1.00
Nitrate	U		0.0227	0.100
Nitrite	U		0.0277	0.100
Sulfate	U		0.0774	5.00

L1192497-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1192497-01 02/25/20 14:13 • (DUP) R3502968-3 02/25/20 14:27

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
Chloride	5.11	4.99	1	2.36		20
Nitrate	0.515	0.503	1	2.24		20
Nitrite	ND	0.000	1	0.000		20
Sulfate	ND	2.58	1	0.000		20

L1192530-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1192530-01 02/25/20 18:19 • (DUP) R3502968-4 02/25/20 18:34

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
Chloride	9.92	9.82	1	1.02		20
Nitrate	1.15	1.11	1	3.32		20
Nitrite	ND	0.000	1	0.000		20
Sulfate	9.22	9.19	1	0.349		20

Laboratory Control Sample (LCS)

(LCS) R3502968-2 02/25/20 09:44

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	mg/l	mg/l	%	%	
Chloride	40.0	39.2	97.9	90.0-110	
Nitrate	8.00	7.94	99.2	90.0-110	
Nitrite	8.00	7.80	97.5	90.0-110	
Sulfate	40.0	39.7	99.2	90.0-110	

1
Cp

2
Tc

3
Ss

4
Cn

5
Sr

6
Qc

7
Gl

8
Al

9
Sc



L1192567-01 Original Sample (OS) • Matrix Spike (MS)

(OS) L1192567-01 02/25/20 19:51 • (MS) R3502968-5 02/25/20 20:07

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MS Rec. %	Dilution	Rec. Limits %	MS Qualifier
Chloride	50.0	10.7	61.2	101	1	80.0-120	
Nitrate	5.00	0.585	5.62	101	1	80.0-120	
Nitrite	5.00	0.112	5.28	103	1	80.0-120	
Sulfate	50.0	59.9	107	93.4	1	80.0-120	E1

L1192576-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1192576-01 02/25/20 21:08 • (MS) R3502968-6 02/25/20 21:24 • (MSD) R3502968-7 02/25/20 21:39

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Chloride	50.0	73.4	121	121	94.4	94.8	1	80.0-120	E1	E1	0.164	20
Nitrate	5.00	10.1	14.3	14.6	85.6	91.1	1	80.0-120	E1	E1	1.88	20
Nitrite	5.00	U	5.11	5.12	102	102	1	80.0-120			0.201	20
Sulfate	50.0	108	152	152	88.7	88.7	1	80.0-120	E1	E1	0.00702	20

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc



Method Blank (MB)

(MB) R3503301-1 02/26/20 13:53

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/l		mg/l	mg/l
Ammonia Nitrogen	U		0.0317	0.100

L1191706-05 Original Sample (OS) • Duplicate (DUP)

(OS) L1191706-05 02/26/20 13:58 • (DUP) R3503301-3 02/26/20 14:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
Ammonia Nitrogen	U	0.000	1	0.000		10

L1192717-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1192717-01 02/26/20 14:23 • (DUP) R3503301-6 02/26/20 14:25

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
Ammonia Nitrogen	4.80	4.76	1	0.837		10

Laboratory Control Sample (LCS)

(LCS) R3503301-2 02/26/20 13:55

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	mg/l	mg/l	%	%	
Ammonia Nitrogen	7.50	7.81	104	90.0-110	

L1192498-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1192498-01 02/26/20 14:03 • (MS) R3503301-4 02/26/20 14:05 • (MSD) R3503301-5 02/26/20 14:07

	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Ammonia Nitrogen	5.00	0.891	6.02	6.18	103	106	1	90.0-110			2.59	10

L1192717-02 Original Sample (OS) • Matrix Spike (MS)

(OS) L1192717-02 02/26/20 14:27 • (MS) R3503301-7 02/26/20 14:28

	Spike Amount	Original Result	MS Result	MS Rec.	Dilution	Rec. Limits	MS Qualifier
Analyte	mg/l	mg/l	mg/l	%		%	
Ammonia Nitrogen	5.00	ND	5.00	99.9	1	90.0-110	

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc



Method Blank (MB)

(MB) R3503367-1 02/27/20 03:59

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/l		mg/l	mg/l
COD	U		3.00	10.0

L1192432-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1192432-03 02/27/20 04:01 • (DUP) R3503367-3 02/27/20 04:01

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
COD	15.4	13.5	1	13.6		20

L1192670-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1192670-01 02/27/20 04:06 • (DUP) R3503367-6 02/27/20 04:06

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
COD	151	151	1	0.291		20

Laboratory Control Sample (LCS)

(LCS) R3503367-2 02/27/20 04:00

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	mg/l	mg/l	%	%	
COD	222	226	102	90.0-110	

L1192529-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1192529-01 02/27/20 04:04 • (MS) R3503367-4 02/27/20 04:04 • (MSD) R3503367-5 02/27/20 04:04

	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
COD	400	181	581	579	100	99.7	1	80.0-120			0.377	20

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R3504543-1 03/02/20 13:37

	MB Result	<u>MB Qualifier</u>	MB MDL	MB RDL
Analyte	mg/l		mg/l	mg/l
Chlorine,residual	U		0.0260	0.100

1

Cp

2

Tc

3

Ss

4

Cn

5

Sr

6

Qc

7

Gl

8

Al

9

Sc

L1193540-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1193540-01 03/02/20 13:46 • (DUP) R3504543-3 03/02/20 13:46

	Original Result	DUP Result	Dilution	DUP RPD	<u>DUP Qualifier</u>	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
Chlorine,residual	U	0.000	1	0.000		20

Laboratory Control Sample (LCS)

(LCS) R3504543-2 03/02/20 13:37

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	<u>LCS Qualifier</u>
Analyte	mg/l	mg/l	%	%	
Chlorine,residual	1.00	0.988	98.8	85.0-115	

Method Blank (MB)

(MB) R3504271-1 03/01/20 11:44

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/l		mg/l	mg/l
BOD	U		0.2	0.200

1

Cp

2

Tc

3

Ss

4

Cn

5

Sr

6

Qc

7

Gl

8

Al

9

Sc

L1192429-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1192429-01 03/01/20 09:20 • (DUP) R3504271-4 03/01/20 09:21

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
BOD	ND	0.000	1	0		30

L1192596-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1192596-01 03/01/20 11:31 • (DUP) R3504271-5 03/01/20 11:33

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
BOD	ND	0.000	1	0		30

Laboratory Control Sample (LCS)

(LCS) R3504271-2 03/01/20 09:16

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	mg/l	mg/l	%	%	
BOD	198	169	85.2	84.6-115	

Laboratory Control Sample (LCS)

(LCS) R3504271-3 03/01/20 11:39

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	mg/l	mg/l	%	%	
BOD	198	185	93.3	84.6-115	



Method Blank (MB)

(MB) R3502957-1 02/25/20 19:35

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/l		mg/l	mg/l
Mercury	U		0.0000490	0.000200

Laboratory Control Sample (LCS)

(LCS) R3502957-2 02/25/20 19:37

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	mg/l	mg/l	%	%	
Mercury	0.00300	0.00281	93.8	85.0-115	

L1192055-07 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1192055-07 02/25/20 19:39 • (MS) R3502957-3 02/25/20 19:41 • (MSD) R3502957-4 02/25/20 19:43

	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Mercury	0.00300	ND	0.00249	0.00223	83.0	74.4	1	70.0-130			11.0	20

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R3503169-1 02/26/20 08:48

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/l		mg/l	mg/l
Calcium	U		0.100	1.00
Sodium	0.120	E4	0.0939	1.00

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Laboratory Control Sample (LCS)

(LCS) R3503169-2 02/26/20 08:51

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	mg/l	mg/l	%	%	
Calcium	10.0	9.35	93.5	85.0-115	
Sodium	10.0	9.51	95.1	85.0-115	

L1192411-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1192411-01 02/26/20 08:53 • (MS) R3503169-4 02/26/20 08:59 • (MSD) R3503169-5 02/26/20 09:01

	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Calcium	10.0	42.7	52.5	51.3	97.7	85.5	1	70.0-130			2.36	20
Sodium	10.0	2.78	12.5	12.2	97.6	94.4	1	70.0-130			2.60	20

L1192577-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1192577-01 02/26/20 09:04 • (MS) R3503169-6 02/26/20 09:07 • (MSD) R3503169-7 02/26/20 09:10

	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Calcium	10.0	7.12	15.9	16.5	88.0	93.4	1	70.0-130			3.31	20
Sodium	10.0	10700	10600	10800	0.000	1540	1	70.0-130	E1 M3	E1 M3	2.49	20

Method Blank (MB)

(MB) R3503355-1 02/26/20 22:46

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Arsenic	U		0.000170	0.00100
Barium	0.00103	E4	0.000550	0.00500
Cadmium	U		0.000220	0.00100
Chromium	0.000503	E4	0.000320	0.00100
Copper	U		0.000270	0.00100
Lead	U		0.000260	0.00100
Nickel	U		0.000320	0.00100
Selenium	U		0.000320	0.00200
Silver	U		0.000180	0.00100
Zinc	U		0.00191	0.0100

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

Laboratory Control Sample (LCS)

(LCS) R3503355-2 02/26/20 22:49

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Arsenic	0.0500	0.0490	97.9	85.0-115	
Barium	0.0500	0.0484	96.9	85.0-115	
Cadmium	0.0500	0.0497	99.4	85.0-115	
Chromium	0.0500	0.0486	97.3	85.0-115	
Copper	0.0500	0.0485	97.0	85.0-115	
Lead	0.0500	0.0481	96.2	85.0-115	
Nickel	0.0500	0.0497	99.4	85.0-115	
Selenium	0.0500	0.0501	100	85.0-115	
Silver	0.0500	0.0465	93.1	85.0-115	
Zinc	0.0500	0.0510	102	85.0-115	

L1193008-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1193008-01 02/26/20 23:05 • (MS) R3503355-6 02/26/20 23:09 • (MSD) R3503355-7 02/26/20 23:12

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Arsenic	0.0500	0.000823	0.0513	0.0521	101	102	1	70.0-130			1.42	20
Barium	0.0500	0.0104	0.0604	0.0610	100	101	1	70.0-130			1.03	20
Cadmium	0.0500	U	0.0515	0.0519	103	104	1	70.0-130			0.852	20
Chromium	0.0500	0.000751	0.0495	0.0501	97.4	98.8	1	70.0-130			1.34	20
Copper	0.0500	0.000515	0.0464	0.0486	91.8	96.1	1	70.0-130			4.61	20
Lead	0.0500	U	0.0503	0.0523	101	105	1	70.0-130			3.91	20
Nickel	0.0500	0.00338	0.0517	0.0527	96.7	98.6	1	70.0-130			1.84	20



L1192497-01

L1193008-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1193008-01 02/26/20 23:05 • (MS) R3503355-6 02/26/20 23:09 • (MSD) R3503355-7 02/26/20 23:12

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Selenium	0.0500	U	0.0524	0.0535	105	107	1	70.0-130			2.23	20
Silver	0.0500	U	0.0471	0.0478	94.1	95.5	1	70.0-130			1.50	20
Zinc	0.0500	0.00685	0.0545	0.0570	95.3	100	1	70.0-130			4.58	20

L1192537-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1192537-01 02/26/20 22:52 • (MS) R3503355-4 02/26/20 22:59 • (MSD) R3503355-5 02/26/20 23:02

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Arsenic	0.0500	ND	0.0527	0.0534	104	106	1	70.0-130			1.36	20
Barium	0.0500	0.0206	0.0761	0.0740	111	107	1	70.0-130			2.90	20
Cadmium	0.0500	ND	0.0520	0.0542	104	108	1	70.0-130			4.16	20
Chromium	0.0500	ND	0.0522	0.0521	103	102	1	70.0-130			0.264	20
Copper	0.0500	0.0200	0.0695	0.0695	99.0	99.2	1	70.0-130			0.119	20
Lead	0.0500	ND	0.0510	0.0533	102	107	1	70.0-130			4.48	20
Nickel	0.0500	0.00244	0.0541	0.0544	103	104	1	70.0-130			0.617	20
Selenium	0.0500	ND	0.0531	0.0544	106	108	1	70.0-130			2.28	20
Silver	0.0500	ND	0.0513	0.0503	103	101	1	70.0-130			2.01	20
Zinc	0.0500	0.0241	0.0740	0.0750	99.9	102	1	70.0-130			1.28	20

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc



Method Blank (MB)

(MB) R3503892-3 02/28/20 00:47

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Anthracene	U		0.0000140	0.0000500
Acenaphthene	U		0.0000100	0.0000500
Acenaphthylene	U		0.0000120	0.0000500
Benzo(a)anthracene	U		0.00000410	0.0000500
Benzo(a)pyrene	U		0.0000116	0.0000500
Benzo(b)fluoranthene	U		0.00000212	0.0000500
Benzo(g,h,i)perylene	U		0.00000227	0.0000500
Benzo(k)fluoranthene	U		0.0000136	0.0000500
Chrysene	U		0.0000108	0.0000500
Dibenz(a,h)anthracene	U		0.00000396	0.0000500
Fluoranthene	U		0.0000157	0.0000500
Fluorene	U		0.00000850	0.0000500
Indeno(1,2,3-cd)pyrene	U		0.0000148	0.0000500
Naphthalene	U		0.0000198	0.000250
Phenanthrene	U		0.00000820	0.0000500
Pyrene	U		0.0000117	0.0000500
1-Methylnaphthalene	U		0.00000821	0.000250
2-Methylnaphthalene	U		0.00000902	0.000250
2-Chloronaphthalene	U		0.00000647	0.000250
(S) Nitrobenzene-d5	84.0			31.0-160
(S) 2-Fluorobiphenyl	73.0			48.0-148
(S) p-Terphenyl-d14	86.5			37.0-146

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3503892-1 02/28/20 00:03 • (LCSD) R3503892-2 02/28/20 00:25

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Anthracene	0.00200	0.00148	0.00143	74.0	71.5	67.0-150			3.44	20
Acenaphthene	0.00200	0.00141	0.00141	70.5	70.5	65.0-138			0.000	20
Acenaphthylene	0.00200	0.00154	0.00151	77.0	75.5	66.0-140			1.97	20
Benzo(a)anthracene	0.00200	0.00160	0.00147	80.0	73.5	61.0-140			8.47	20
Benzo(a)pyrene	0.00200	0.00139	0.00127	69.5	63.5	60.0-143			9.02	20
Benzo(b)fluoranthene	0.00200	0.00143	0.00127	71.5	63.5	58.0-141			11.9	20
Benzo(g,h,i)perylene	0.00200	0.00148	0.00128	74.0	64.0	52.0-153			14.5	20
Benzo(k)fluoranthene	0.00200	0.00134	0.00123	67.0	61.5	58.0-148			8.56	20
Chrysene	0.00200	0.00157	0.00148	78.5	74.0	64.0-144			5.90	20
Dibenz(a,h)anthracene	0.00200	0.00143	0.00123	71.5	61.5	52.0-155			15.0	20
Fluoranthene	0.00200	0.00174	0.00167	87.0	83.5	69.0-153			4.11	20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3503892-1 02/28/20 00:03 • (LCSD) R3503892-2 02/28/20 00:25

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	<u>LCS Qualifier</u>	<u>LCSD Qualifier</u>	RPD %	RPD Limits %
Fluorene	0.00200	0.00142	0.00139	71.0	69.5	64.0-136			2.14	20
Indeno(1,2,3-cd)pyrene	0.00200	0.00147	0.00128	73.5	64.0	54.0-153			13.8	20
Naphthalene	0.00200	0.00142	0.00145	71.0	72.5	61.0-137			2.09	20
Phenanthrene	0.00200	0.00149	0.00144	74.5	72.0	62.0-137			3.41	20
Pyrene	0.00200	0.00154	0.00147	77.0	73.5	60.0-142			4.65	20
1-Methylnaphthalene	0.00200	0.00151	0.00153	75.5	76.5	66.0-142			1.32	20
2-Methylnaphthalene	0.00200	0.00141	0.00145	70.5	72.5	62.0-136			2.80	20
2-Chloronaphthalene	0.00200	0.00135	0.00137	67.5	68.5	64.0-140			1.47	20
(S) Nitrobenzene-d5				90.0	82.5	31.0-160				
(S) 2-Fluorobiphenyl				73.5	75.0	48.0-148				
(S) p-Terphenyl-d14				91.0	81.0	37.0-146				

1

Cp

2

Tc

3

Ss

4

Cn

5

Sr

6

Qc

7

Gl

8

Al

9

Sc



Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier Description

B1	Target analyte detected in method blank at or above the method reporting limit.
E1	Concentration estimated. Analyte exceeded calibration range. Reanalysis not possible due to insufficient sample.
E4	Concentration estimated. Analyte was detected below laboratory minimum reporting level (MRL) but above MDL.
M2	Matrix spike recovery was low, the method control sample recovery was acceptable.
M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The associated blank spike recovery was acceptable.
R8	Sample RPD exceeded the method acceptance limit.

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



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* Not all certifications held by the laboratory are applicable to the results reported in the attached report.

* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace National.

State Accreditations

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN-03-2002-34
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey–NELAP	TN002
California	2932	New Mexico ¹	n/a
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina ¹	DW21704
Georgia	NELAP	North Carolina ³	41
Georgia ¹	923	North Dakota	R-140
Idaho	TN00003	Ohio–VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LA000356
Kentucky ^{1 6}	90010	South Carolina	84004
Kentucky ²	16	South Dakota	n/a
Louisiana	AI30792	Tennessee ^{1 4}	2006
Louisiana ¹	LA180010	Texas	T104704245-18-15
Maine	TN0002	Texas ⁵	LAB0152
Maryland	324	Utah	TN00003
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	460132
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA

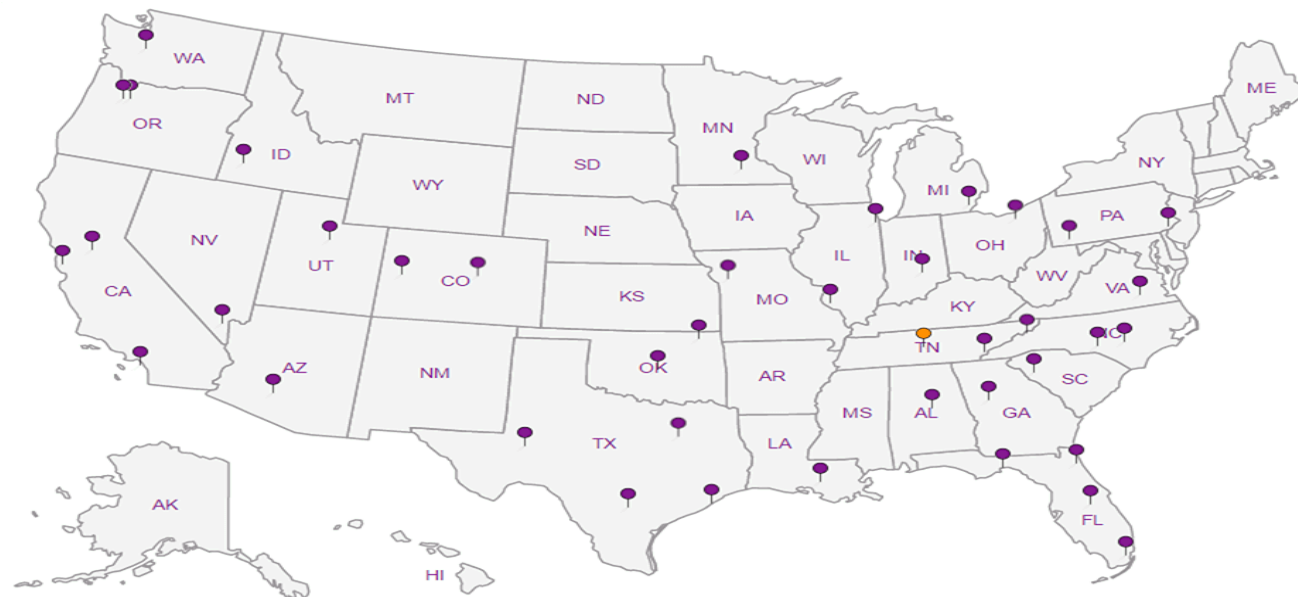
Third Party Federal Accreditations

A2LA – ISO 17025	1461.01	AIHA-LAP, LLC EMLAP	100789
A2LA – ISO 17025 ⁵	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA–Crypto	TN00003		

¹ Drinking Water ² Underground Storage Tanks ³ Aquatic Toxicity ⁴ Chemical/Microbiological ⁵ Mold ⁶ Wastewater n/a Accreditation not applicable

Our Locations

Pace National has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. Pace National performs all testing at our central laboratory.



Date: 2/25/20 Time: 68.0

Analytical Report 635505

**for
NV5**

Project Manager: Mike Hulst

ADOT Stormwater

11-SEP-19

Collected By: Client



2525 West Huntington Drive, Suite 102

Tempe, AZ 85282

Ph: (480) 355-0900

Phoenix (EPA Lab Code: AZ00901): Arizona (AZ0757)

Xenco-Houston (EPA Lab code: TX00122): Arizona (AZ0765)

Xenco-Dallas (EPA Lab code: TX01468): Arizona (AZ0809)



11-SEP-19

Project Manager: **Mike Hulst**

NV5

1 West Deer Valley Building 2 #305

Phoenix, AZ 85027

Reference: TWA Report No(s): **635505**

ADOT Stormwater

Project Address: Phoenix

Mike Hulst:

We are reporting to you the results of the analyses performed on the samples received under the project name referenced above and identified with the TWA Report Number(s) 635505. All results being reported under this Report Number apply to the samples analyzed and properly identified with a Laboratory ID number. Subcontracted analyses are identified in this report with either the ADHS certification number of the subcontract lab in the analyst ID field, or the complete subcontracted report attached to this report.

Unless otherwise noted in a Case Narrative, all data reported in this Analytical Report are in compliance with ADHS standards. The uncertainty of measurement associated with the results of analysis reported is available upon request. Should insufficient sample be provided to the laboratory to meet the method and ADHS Matrix Duplicate and Matrix Spike requirements, then the data will be analyzed, evaluated and reported using all other available quality control measures.

The validity and integrity of this report will remain intact as long as it is accompanied by this letter and reproduced in full, unless written approval is granted by TransWest Analytical. This report will be filed for at least 5 years in our archives after which time it will be destroyed without further notice, unless otherwise arranged with you. The samples received, and described as recorded in Report No. 635505 will be filed for 45 days, and after that time they will be properly disposed without further notice, unless otherwise arranged with you. We reserve the right to return to you any unused samples, extracts or solutions related to them if we consider so necessary (e.g., samples identified as hazardous waste, sample sizes exceeding analytical standard practices, controlled substances under regulated protocols, etc).

We thank you for selecting TransWest Analytical to serve your analytical needs. If you have any questions concerning this report, please feel free to contact us at any time.

Respectfully,

A handwritten signature in black ink, appearing to read 'Ruriko Konuma', is written over a horizontal line.

Ruriko Konuma

Project Manager

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CASE NARRATIVE

Client Name: NV5

Project Name: ADOT Stormwater

Project ID:

Work Order Number(s): 635505

Report Date: 11-SEP-19

Date Received: 08/29/2019

Sample receipt non conformances and comments:

None

Sample receipt non conformances and comments per sample:

None

Analytical non conformances and comments:

Batch: LBA-3100600 PAHs by SW846 8270D SIM

LCS and LCSD recoveries exceed control limits. No target analytes were detected in the sample at or above the respective limits of detection. There is not impact in final results.

LCS and LCSD recoveries exceed control limits. No target analytes were detected in the sample at or above the respective limits of detection. There is not impact in final results.

MS recoveries fall outside of the control limits. LCS/LCSD recovered within limits. Matrix interference confirmed, no further action required

Arizona Flags

All method blanks, laboratory spikes, and/or matrix spikes met quality control objectives for the parameters associated with this Work Order except as detailed below or on the Data Qualifier page of this report. Data Qualifiers used in this report are in accordance with ADHS Data Qualifiers, Revision 4.0 9/05/2012. Data qualifiers (flags) contained within this analytical report have been issued to explain a quality control deficiency, and do not affect the quality (validity) of the data unless noted otherwise in the case narrative.

- D2 Sample required dilution due to high concentration of target analyte.
- H1 Sample analysis performed past holding time.
- L1 The associated blank spike recovery was above laboratory acceptance limits.
- M2 Matrix spike recovery was low; the associated blank spike recovery was acceptable.
- S10 Surrogate recovery was above laboratory and method acceptance limits. See case narrative.
- S6 Surrogate recovery was below laboratory and method acceptance limits. Re-extraction and/or reanalysis confirms low recovery caused by matrix effect.



Sample Cross Reference 635505

NV5, Phoenix, AZ

ADOT Stormwater

Sample Id	Matrix	Date Collected	Sample Depth	Lab Sample Id
ADOT-PHX	W	08-29-19 08:45		635505-001



Certificate of Analytical Results 635505

NV5, Phoenix, AZ

ADOT Stormwater

Sample Id: **ADOT-PHX**

Matrix: Storm Water

Date Received: 08.29.19 10.21

Lab Sample Id: 635505-001

Date Collected: 08.29.19 08.45

Analytical Method: PAHs by SW846 8270D SIM

Prep Method: SW3511

Tech: DRU

% Solids:

Analyst: DNE

Date Prep: 09.03.19 17.59

Seq Number: 3100600

SUB: AZ0765

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
1-Methylnaphthalene	90-12-0	<0.000195	0.000195	mg/L	09.04.19 12.53		1.07
2-Methylnaphthalene	91-57-6	<0.000195	0.000195	mg/L	09.04.19 12.53		1.07
Acenaphthene	83-32-9	<0.000195	0.000195	mg/L	09.04.19 12.53		1.07
Acenaphthylene	208-96-8	<0.000195	0.000195	mg/L	09.04.19 12.53		1.07
Anthracene	120-12-7	<0.000195	0.000195	mg/L	09.04.19 12.53		1.07
Benzo(a)anthracene	56-55-3	<0.000195	0.000195	mg/L	09.04.19 12.53		1.07
Benzo(a)pyrene	50-32-8	<0.000195	0.000195	mg/L	09.04.19 12.53		1.07
Benzo(b)fluoranthene	205-99-2	<0.000195	0.000195	mg/L	09.04.19 12.53		1.07
Benzo(g,h,i)perylene	191-24-2	<0.000195	0.000195	mg/L	09.04.19 12.53		1.07
Benzo(k)fluoranthene	207-08-9	<0.000195	0.000195	mg/L	09.04.19 12.53		1.07
Chrysene	218-01-9	<0.000195	0.000195	mg/L	09.04.19 12.53		1.07
Dibenz(a,h)anthracene	53-70-3	<0.000195	0.000195	mg/L	09.04.19 12.53		1.07
Fluoranthene	206-44-0	<0.000195	0.000195	mg/L	09.04.19 12.53		1.07
Fluorene	86-73-7	<0.000195	0.000195	mg/L	09.04.19 12.53		1.07
Indeno(1,2,3-c,d)Pyrene	193-39-5	<0.000195	0.000195	mg/L	09.04.19 12.53		1.07
Naphthalene	91-20-3	<0.000391	0.000391	mg/L	09.04.19 12.53		1.07
Phenanthrene	85-01-8	<0.000195	0.000195	mg/L	09.04.19 12.53		1.07
Pyrene	129-00-0	<0.000195	0.000195	mg/L	09.04.19 12.53		1.07

Surrogate	% Recovery	Units	Limits	Analysis Date	Flag
2-Fluorobiphenyl	99	%	54-146	09.04.19 12.53	
Nitrobenzene-d5	138	%	46-151	09.04.19 12.53	
Terphenyl-D14	29	%	51-139	09.04.19 12.53	S6

Analytical Method: Quantitray Coliform Test by SM 9223 B

Tech: TNL

% Solids:

Analyst: MON

Date Prep: 08.29.19 11.30

Seq Number: 3100900

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
E. coli	ECOLIF	73.4	2.00	MPN/100	08.30.19 12.40	H1D2	2



QC Summary 635505

NV5

ADOT Stormwater

Analytical Method: PAHs by SW846 8270D SIM

Seq Number: 3100600

MB Sample Id: 7685511-1-BLK

Matrix: Water

LCS Sample Id: 7685511-1-BKS

Prep Method: SW3511

Date Prep: 09.03.19

LCSD Sample Id: 7685511-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
1-Methylnaphthalene	<0.000182	0.0182	0.0256	141	0.0276	152	70-126	8	30	mg/L	09.04.19 12:20	L1
2-Methylnaphthalene	<0.000182	0.0182	0.0261	143	0.0281	154	74-121	7	30	mg/L	09.04.19 12:20	L1
Acenaphthene	<0.000182	0.0182	0.0248	136	0.0264	145	75-127	6	30	mg/L	09.04.19 12:20	L1
Acenaphthylene	<0.000182	0.0182	0.0250	137	0.0267	147	78-133	7	30	mg/L	09.04.19 12:20	L1
Anthracene	<0.000182	0.0182	0.0252	138	0.0271	149	73-145	7	30	mg/L	09.04.19 12:20	L1
Benzo(a)anthracene	<0.000182	0.0182	0.0241	132	0.0259	142	77-131	7	30	mg/L	09.04.19 12:20	L1
Benzo(a)pyrene	<0.000182	0.0182	0.0255	140	0.0272	149	56-163	6	30	mg/L	09.04.19 12:20	L1
Benzo(b)fluoranthene	<0.000182	0.0182	0.0264	145	0.0277	152	74-138	5	30	mg/L	09.04.19 12:20	L1
Benzo(g,h,i)perylene	<0.000182	0.0182	0.0242	133	0.0255	140	77-127	5	30	mg/L	09.04.19 12:20	L1
Benzo(k)fluoranthene	<0.000182	0.0182	0.0257	141	0.0278	153	67-142	8	30	mg/L	09.04.19 12:20	L1
Chrysene	<0.000182	0.0182	0.0246	135	0.0264	145	66-126	7	30	mg/L	09.04.19 12:20	L1
Dibenz(a,h)anthracene	<0.000182	0.0182	0.0251	138	0.0264	145	71-142	5	30	mg/L	09.04.19 12:20	L1
Fluoranthene	<0.000182	0.0182	0.0250	137	0.0269	148	78-138	7	30	mg/L	09.04.19 12:20	L1
Fluorene	<0.000182	0.0182	0.0250	137	0.0267	147	79-128	7	30	mg/L	09.04.19 12:20	L1
Indeno(1,2,3-c,d)Pyrene	<0.000182	0.0182	0.0247	136	0.0260	143	76-140	5	30	mg/L	09.04.19 12:20	L1
Naphthalene	<0.000364	0.0182	0.0251	138	0.0269	148	72-122	7	30	mg/L	09.04.19 12:20	L1
Phenanthrene	<0.000182	0.0182	0.0244	134	0.0262	144	76-129	7	30	mg/L	09.04.19 12:20	L1
Pyrene	<0.000182	0.0182	0.0250	137	0.0267	147	74-138	7	30	mg/L	09.04.19 12:20	L1

Surrogate	MB %Rec	MB Flag	LCS %Rec	LCS Flag	LCSD %Rec	LCSD Flag	Limits	Units	Analysis Date
2-Fluorobiphenyl	136		131		141		54-146	%	09.04.19 12:20
Nitrobenzene-d5	138		138		150		46-151	%	09.04.19 12:20
Terphenyl-D14	141	S10	134		145	S10	51-139	%	09.04.19 12:20

MS/MSD Percent Recovery
Relative Percent Difference
LCS/LCSD Recovery
Log Difference

$[D] = 100 * (C - A) / B$
 $RPD = 200 * |(C - E) / (C + E)|$
 $[D] = 100 * (C) / [B]$
Log Diff. = Log(Sample Duplicate) - Log(Original Sample)

LCS = Laboratory Control Sample
A = Parent Result
C = MS/LCS Result
E = MSD/LCSD Result

MS = Matrix Spike
B = Spike Added
D = MSD/LCSD % Rec



QC Summary 635505

NV5 ADOT Stormwater

Analytical Method: PAHs by SW846 8270D SIM

Seq Number: 3100600

Matrix: Storm Water

Prep Method: SW3511

Date Prep: 09.03.19

Parent Sample Id: 635505-001

MS Sample Id: 635505-001 S

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	Limits	Units	Analysis Date	Flag
1-Methylnaphthalene	<0.000186	0.0186	0.0131	70	70-126	mg/L	09.04.19 13:10	
2-Methylnaphthalene	<0.000186	0.0186	0.0134	72	74-121	mg/L	09.04.19 13:10	M2
Acenaphthene	<0.000186	0.0186	0.0118	63	75-127	mg/L	09.04.19 13:10	M2
Acenaphthylene	<0.000186	0.0186	0.0128	69	78-133	mg/L	09.04.19 13:10	M2
Anthracene	<0.000186	0.0186	0.0101	54	73-145	mg/L	09.04.19 13:10	M2
Benzo(a)anthracene	<0.000186	0.0186	0.00428	23	77-131	mg/L	09.04.19 13:10	M2
Benzo(a)pyrene	<0.000186	0.0186	0.00305	16	56-163	mg/L	09.04.19 13:10	M2
Benzo(b)fluoranthene	<0.000186	0.0186	0.00345	19	74-138	mg/L	09.04.19 13:10	M2
Benzo(g,h,i)perylene	<0.000186	0.0186	0.00255	14	77-127	mg/L	09.04.19 13:10	M2
Benzo(k)fluoranthene	<0.000186	0.0186	0.00293	16	67-142	mg/L	09.04.19 13:10	M2
Chrysene	<0.000186	0.0186	0.00331	18	66-126	mg/L	09.04.19 13:10	M2
Dibenz(a,h)anthracene	<0.000186	0.0186	0.00235	13	71-142	mg/L	09.04.19 13:10	M2
Fluoranthene	<0.000186	0.0186	0.00818	44	78-138	mg/L	09.04.19 13:10	M2
Fluorene	<0.000186	0.0186	0.0114	61	79-128	mg/L	09.04.19 13:10	M2
Indeno(1,2,3-c,d)Pyrene	<0.000186	0.0186	0.00244	13	76-140	mg/L	09.04.19 13:10	M2
Naphthalene	<0.000371	0.0186	0.0148	80	72-122	mg/L	09.04.19 13:10	
Phenanthrene	<0.000186	0.0186	0.0102	55	76-129	mg/L	09.04.19 13:10	M2
Pyrene	<0.000186	0.0186	0.00796	43	74-138	mg/L	09.04.19 13:10	M2

Surrogate	MS %Rec	MS Flag	Limits	Units	Analysis Date
2-Fluorobiphenyl	62		54-146	%	09.04.19 13:10
Nitrobenzene-d5	117		46-151	%	09.04.19 13:10
Terphenyl-D14	20		51-139	%	09.04.19 13:10

Analytical Method: Quantitray Coliform Test by SM 9223 B

Seq Number: 3100900

Matrix: Storm Water

Parent Sample Id: 635476-001

MD Sample Id: 635476-001 D

Parameter	Parent Result	MD Result	%RPD	RPD Limit	Units	Analysis Date	Flag
E. coli	9800	8660	12	0	MPN/100m	08.30.19 09:10	

MS/MSD Percent Recovery
Relative Percent Difference
LCS/LCSD Recovery
Log Difference

$[D] = 100 * (C - A) / B$
 $RPD = 200 * |(C - E) / (C + E)|$
 $[D] = 100 * (C) / [B]$
Log Diff. = Log(Sample Duplicate) - Log(Original Sample)

LCS = Laboratory Control Sample
A = Parent Result
C = MS/LCS Result
E = MSD/LCSD Result

MS = Matrix Spike
B = Spike Added
D = MSD/LCSD % Rec

1035505

☐ DW ☐ NPDES ☐ RCRA ☐ OtherPage 9 of 12
Final 1.000

Inter-Office Shipment

IOS Number : **47206**

Date/Time: 08.29.2019

Created by: Emily Petrunia

Please send report to: Ruriko Konuma

Lab# From: **Phoenix**

Delivery Priority:

Address: 2525 West Huntington Drive, Suite 102

Lab# To: **Houston**

Air Bill No.: 776118528520

E-Mail: ruriko.konuma@xenco.com

Sample Id	Matrix	Client Sample Id	Sample Collection	Method	Method Name	Lab Due	HT Due	PM	Analytes	Sign
635505-001	W	ADOT-PHX	08.29.2019 08:45	SIM_PAH_D	PAHs by 8270D SIM	09.09.201	09.05.2019 08:45	RKO	ACNP ACNPY ANTH Bz	

Inter Office Shipment or Sample Comments:

Relinquished By:



Emily Petrunia

Date Relinquished: 08.29.2019

Received By:



Ashly Kowalski

Date Received: 08.30.2019

Cooler Temperature: 5.5



XENCO Laboratories

Inter Office Report- Sample Receipt Checklist

Sent To: Houston

IOS #: 47206

Acceptable Temperature Range: 0 - 6 degC

Air and Metal samples Acceptable Range: Ambient

Temperature Measuring device used : HOU-068

Sent By: Emily Petrunia

Date Sent: 08.29.2019 05.52 PM

Received By: Ashly Kowalski

Date Received: 08.30.2019 09.00 AM

Sample Receipt Checklist

Comments

#1 *Temperature of cooler(s)?	5.5
#2 *Shipping container in good condition?	Yes
#3 *Samples received with appropriate temperature?	Yes
#4 *Custody Seals intact on shipping container/ cooler?	N/A
#5 *Custody Seals Signed and dated for Containers/coolers	N/A
#6 *IOS present?	Yes
#7 Any missing/extra samples?	No
#8 IOS agrees with sample label(s)/matrix?	Yes
#9 Sample matrix/ properties agree with IOS?	Yes
#10 Samples in proper container/ bottle?	Yes
#11 Samples properly preserved?	Yes
#12 Sample container(s) intact?	Yes
#13 Sufficient sample amount for indicated test(s)?	Yes
#14 All samples received within hold time?	Yes

* Must be completed for after-hours delivery of samples prior to placing in the refrigerator

NonConformance:

Corrective Action Taken:

Nonconformance Documentation

Contact: _____ Contacted by : _____ Date: _____

Checklist reviewed by:

Ashly Kowalski

Date: 08.30.2019



XENCO Laboratories
Prelogin/Nonconformance Report- Sample Log-In



Client: NV5

Date/ Time Received: 08/29/2019 10:21:00 AM

Work Order #: 635505

Acceptable Temperature Range: 0 - 6 degC

Air and Metal samples Acceptable Range: Ambient

Temperature Measuring device used : IR#1

Sample Receipt Checklist	Comments
#1 *Temperature of cooler(s)?	1.1
#2 *Shipping container in good condition?	Yes
#3 *Samples received on ice?	Yes
#4 *Custody Seals intact on shipping container/ cooler?	N/A
#5 Custody Seals intact on sample bottles?	N/A
#6 *Custody Seals Signed and dated?	N/A
#7 *Chain of Custody present?	Yes
#8 Any missing/extra samples?	No
#9 Chain of Custody signed when relinquished/ received?	Yes
#10 Chain of Custody agrees with sample labels/matrix?	Yes
#11 Container label(s) legible and intact?	Yes
#12 Samples in proper container/ bottle?	Yes
#13 Samples properly preserved?	Yes
#14 Sample container(s) intact?	Yes
#15 Sufficient sample amount for indicated test(s)?	Yes
#16 All samples received within hold time?	Yes
#17 Subcontract of sample(s)?	Yes Xenco Stafford
#18 Water VOC samples have zero headspace?	N/A

*** Must be completed for after-hours delivery of samples prior to placing in the refrigerator**

Analyst: EP

PH Device/Lot#: LRS-4801

Checklist completed by:

Emily Petrunia

Date: 08/29/2019

Checklist reviewed by:

Ruriko Konuma

Date: 08/29/2019



Analytical Report 643882

for

NV5

Project Manager: Mike Hulst

ADOT Stormwater

12.05.2019

Collected By: Client

**2525 West Huntington Drive, Suite 102
Tempe, AZ 85282
Ph: (480) 355-0900**

Phoenix (EPA Lab Code: AZ00901): Arizona (AZ0757)
Xenco-Houston (EPA Lab code: TX00122): Arizona (AZ0765)
Xenco-Dallas (EPA Lab code: TX01468): Arizona (AZ0809)



12.05.2019

Project Manager: **Mike Hulst**

NV5

1 West Deer Valley Building 2 #305

Phoenix, AZ 85027

Reference: TWA Report No(s): **643882**

ADOT Stormwater

Project Address: Phoenix

Mike Hulst:

We are reporting to you the results of the analyses performed on the samples received under the project name referenced above and identified with the TWA Report Number(s) 643882. All results being reported under this Report Number apply to the samples analyzed and properly identified with a Laboratory ID number. Subcontracted analyses are identified in this report with either the ADHS certification number of the subcontract lab in the analyst ID field, or the complete subcontracted report attached to this report.

Unless otherwise noted in a Case Narrative, all data reported in this Analytical Report are in compliance with ADHS standards. The uncertainty of measurement associated with the results of analysis reported is available upon request. Should insufficient sample be provided to the laboratory to meet the method and ADHS Matrix Duplicate and Matrix Spike requirements, then the data will be analyzed, evaluated and reported using all other available quality control measures.

The validity and integrity of this report will remain intact as long as it is accompanied by this letter and reproduced in full, unless written approval is granted by TransWest Analytical. This report will be filed for at least 5 years in our archives after which time it will be destroyed without further notice, unless otherwise arranged with you. The samples received, and described as recorded in Report No. 643882 will be filed for 45 days, and after that time they will be properly disposed without further notice, unless otherwise arranged with you. We reserve the right to return to you any unused samples, extracts or solutions related to them if we consider so necessary (e.g., samples identified as hazardous waste, sample sizes exceeding analytical standard practices, controlled substances under regulated protocols, etc).

We thank you for selecting TransWest Analytical to serve your analytical needs. If you have any questions concerning this report, please feel free to contact us at any time.

Respectfully,

A handwritten signature in black ink, appearing to read 'Ruriko Konuma', is written over a horizontal line.

Ruriko Konuma

Project Manager

A Small Business and Minority Company

Houston - Dallas - Midland - Tampa - Phoenix - Lubbock - San Antonio - El Paso - Atlanta - New Mexico



CASE NARRATIVE

Client Name: NV5

Project Name: ADOT Stormwater

Project ID:
Work Order Number(s): 643882

Report Date: 12.05.2019
Date Received: 11.20.2019

Sample receipt non conformances and comments:

Sample receipt non conformances and comments per sample:

None

Flagging Criteria

Arizona Flags

All method blanks, laboratory spikes, and/or matrix spikes met quality control objectives for the parameters associated with this Work Order except as detailed below or on the Data Qualifier page of this report. Data Qualifiers used in this report are in accordance with ADHS Data Qualifiers, Revision 4.0 9/05/2012.

Data qualifiers (flags) contained within this analytical report have been issued to explain a quality control deficiency, and do not affect the quality (validity) of the data unless noted otherwise in the case narrative.

- D2** Sample required dilution due to high concentration of target analyte.
- M1** Matrix spike recovery was high; the associated blank spike recovery was acceptable.
- M2** Matrix spike recovery was low; the associated blank spike recovery was acceptable.



Sample Cross Reference 643882

NV5, Phoenix, AZ

ADOT Stormwater

Sample Id	Matrix	Date Collected	Sample Depth	Lab Sample Id
PHX	W	11.20.2019 10:34		643882-001
PHX	W	11.20.2019 10:34		643882-002



Certificate of Analytical Results 643882

NV5, Phoenix, AZ

ADOT Stormwater

Sample Id: **PHX**
Lab Sample Id: 643882-001

Matrix: Storm Water
Date Collected: 11.20.2019 10:34

Date Received: 11.20.2019 12:00

Analytical Method: Recoverable Metals per ICP by EPA 200.7

Tech: MLI

Analyst: DEP

Seq Number: 3109263

Date Prep: 12.03.2019 03:06

Prep Method: E200.7P

% Solids:

SUB: AZ0765

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Calcium	7440-70-2	7.03	0.200	mg/L	12.03.2019 12:50		1
Sodium	7440-23-5	2.58	0.500	mg/L	12.03.2019 12:50		1

Analytical Method: Recoverable Metals by EPA 200.8

Tech: MLI

Analyst: DEP

Seq Number: 3108608

Date Prep: 11.22.2019 11:02

Prep Method: E200.8P

% Solids:

SUB: AZ0765

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Arsenic	7440-38-2	<0.00400	0.00400	mg/L	11.23.2019 04:41		1
Barium	7440-39-3	0.0331	0.00400	mg/L	11.23.2019 04:41		1
Cadmium	7440-43-9	<0.00200	0.00200	mg/L	11.23.2019 04:41		1
Chromium	7440-47-3	<0.00400	0.00400	mg/L	11.23.2019 04:41		1
Copper	7440-50-8	0.0232	0.00400	mg/L	11.23.2019 04:41		1
Lead	7439-92-1	0.00237	0.00200	mg/L	11.23.2019 04:41		1
Nickel	7440-02-0	0.00323	0.00200	mg/L	11.23.2019 04:41		1
Selenium	7782-49-2	<0.00200	0.00200	mg/L	11.23.2019 04:41		1
Silver	7440-22-4	<0.00200	0.00200	mg/L	11.23.2019 04:41		1
Zinc	7440-66-6	0.0941	0.0300	mg/L	11.23.2019 04:41		1

Analytical Method: Mercury by EPA 245.1

Tech: ADS

Analyst: DES

Seq Number: 3108643

Date Prep: 11.25.2019 08:15

Prep Method: E245.1P

% Solids:

SUB: AZ0765

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Mercury	7439-97-6	<0.000200	0.000200	mg/L	11.25.2019 15:25		1



Certificate of Analytical Results 643882

NV5, Phoenix, AZ

ADOT Stormwater

Sample Id: **PHX**
Lab Sample Id: 643882-001

Matrix: Storm Water
Date Collected: 11.20.2019 10:34

Date Received: 11.20.2019 12:00

Analytical Method: Biochemical Oxygen Demand by SM 5210B

Prep Method: SM5210P

Tech: MON

% Solids:

Analyst: MON

Date Prep: 11.21.2019 11:30

Seq Number: 3108848

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Biochemical Oxygen Demand, BOD5		13.1	2.00	mg/L	11.26.2019 11:20		1

Analytical Method: Total Dissolved Solids by SM 2540C

Tech: MON

% Solids:

Analyst: TNL

Seq Number: 3108676

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Total Dissolved Solids	1642222	75.0	10.0	mg/L	11.21.2019 16:00		1

Analytical Method: Total Suspended Solids by SM 2540D

Tech: TNL

% Solids:

Analyst: MON

Seq Number: 3108447

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Total Suspended Solids	TSS	45.5	10.0	mg/L	11.21.2019 12:30		1

Analytical Method: Turbidity by EPA 180.1

Tech: MON

% Solids:

Analyst: TNL

Seq Number: 3108256

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Turbidity	TURBIDITY	20.2	0.100	NTU	11.21.2019 09:35		1



Certificate of Analytical Results 643882

NV5, Phoenix, AZ

ADOT Stormwater

Sample Id: **PHX**
Lab Sample Id: 643882-001

Matrix: Storm Water
Date Collected: 11.20.2019 10:34

Date Received: 11.20.2019 12:00

Analytical Method: Anions by EPA 300.0

Tech: JYM

Analyst: JYM

Seq Number: 3108236

Prep Method: E300P

% Solids:

Date Prep: 11.21.2019 14:35

SUB: AZ0765

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	2.57	0.500	mg/L	11.21.2019 17:22		1
Sulfate	14808-79-8	2.93	0.500	mg/L	11.21.2019 17:22		1

Analytical Method: Nitrite by SM 4500-NO2B

Tech: MON

Analyst: TNL

Seq Number: 3108372

% Solids:

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Nitrite as N	14797-65-0	<0.0200	0.0200	mg/L	11.22.2019 07:11		1

Analytical Method: Nitrogen, Nitrate-Nitrite by EPA 353.2

Tech: YAV

Analyst: YAV

Seq Number: 3109489

Date Prep: 12.05.2019 10:00

Prep Method: E353.2P

% Solids:

SUB: AZ0765

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Nitrogen, Nitrate-Nitrite	7727-37-9	0.454	0.100	mg/L	12.05.2019 12:25		1

Analytical Method: Chemical Oxygen Demand by HACH 8000

Tech: TAH

Analyst: TAH

Seq Number: 3108841

% Solids:

SUB: AZ0765

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
COD - Chemical Oxygen Demand		<20.0	20.0	mg/L	11.27.2019 09:32		1



Certificate of Analytical Results 643882

NV5, Phoenix, AZ

ADOT Stormwater

Sample Id: **PHX**
Lab Sample Id: 643882-001

Matrix: Storm Water
Date Collected: 11.20.2019 10:34

Date Received: 11.20.2019 12:00

Analytical Method: Fecal Coliform Bacteria by SM 9222D

Prep Method: SM9222P

Tech: TNL

% Solids:

Analyst: TNL

Date Prep: 11.20.2019 14:17

Seq Number: 3108363

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Fecal Coliform	FECCOLIFOR	>200	1	cfu/100m	11.21.2019 13:40		1



Certificate of Analytical Results 643882

NV5, Phoenix, AZ

ADOT Stormwater

Sample Id: **PHX**
Lab Sample Id: 643882-002

Matrix: Storm Water
Date Collected: 11.20.2019 10:34

Date Received: 11.20.2019 12:00

Analytical Method: PAHs by SW846 8270D SIM

Prep Method: SW3511

Tech: AHI

% Solids:

Analyst: VIC

Date Prep: 11.26.2019 17:18

Seq Number: 3108913

SUB: AZ0765

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
1-Methylnaphthalene	90-12-0	<0.000196	0.000196	mg/L	11.27.2019 21:44		1.08
2-Methylnaphthalene	91-57-6	<0.000196	0.000196	mg/L	11.27.2019 21:44		1.08
Acenaphthene	83-32-9	<0.000196	0.000196	mg/L	11.27.2019 21:44		1.08
Acenaphthylene	208-96-8	<0.000196	0.000196	mg/L	11.27.2019 21:44		1.08
Anthracene	120-12-7	<0.000196	0.000196	mg/L	11.27.2019 21:44		1.08
Benzo(a)anthracene	56-55-3	<0.000196	0.000196	mg/L	11.27.2019 21:44		1.08
Benzo(a)pyrene	50-32-8	<0.000196	0.000196	mg/L	11.27.2019 21:44		1.08
Benzo(b)fluoranthene	205-99-2	<0.000196	0.000196	mg/L	11.27.2019 21:44		1.08
Benzo(g,h,i)perylene	191-24-2	<0.000196	0.000196	mg/L	11.27.2019 21:44		1.08
Benzo(k)fluoranthene	207-08-9	<0.000196	0.000196	mg/L	11.27.2019 21:44		1.08
Chrysene	218-01-9	<0.000196	0.000196	mg/L	11.27.2019 21:44		1.08
Dibenz(a,h)anthracene	53-70-3	<0.000196	0.000196	mg/L	11.27.2019 21:44		1.08
Fluoranthene	206-44-0	<0.000196	0.000196	mg/L	11.27.2019 21:44		1.08
Fluorene	86-73-7	<0.000196	0.000196	mg/L	11.27.2019 21:44		1.08
Indeno(1,2,3-c,d)Pyrene	193-39-5	<0.000196	0.000196	mg/L	11.27.2019 21:44		1.08
Naphthalene	91-20-3	<0.000391	0.000391	mg/L	11.27.2019 21:44		1.08
Phenanthrene	85-01-8	<0.000196	0.000196	mg/L	11.27.2019 21:44		1.08
Pyrene	129-00-0	<0.000196	0.000196	mg/L	11.27.2019 21:44		1.08

% Recovery

Surrogate		Units	Limits	Analysis Date	Flag
2-Fluorobiphenyl	99	%	54-146	11.27.2019 21:44	
Nitrobenzene-d5	98	%	46-151	11.27.2019 21:44	
Terphenyl-D14	76	%	51-139	11.27.2019 21:44	

Analytical Method: Quantitray Coliform Test by SM 9223 B

Tech: MON

% Solids:

Analyst: TNL

Date Prep: 11.20.2019 12:39

Seq Number: 3108381

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Total Coliform	IOTCOLIFOR	>2419.6	5.00	MPN/100	11.21.2019 13:00	D2	5
E. coli	ECOLIF	388	5.00	MPN/100	11.21.2019 13:00	D2	5



NV5

ADOT Stormwater

Analytical Method: PAHs by SW846 8270D SIM

Seq Number: 3108913

MB Sample Id: 7691281-1-BLK

Matrix: Water

LCS Sample Id: 7691281-1-BKS

Prep Method: SW3511

Date Prep: 11.26.2019

LCSD Sample Id: 7691281-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
1-Methylnaphthalene	<0.000182	0.0182	0.0168	92	0.0170	93	70-126	1	30	mg/L	11.27.2019 10:34	
2-Methylnaphthalene	<0.000182	0.0182	0.0167	92	0.0169	93	74-121	1	30	mg/L	11.27.2019 10:34	
Acenaphthene	<0.000182	0.0182	0.0171	94	0.0175	96	75-127	2	30	mg/L	11.27.2019 10:34	
Acenaphthylene	<0.000182	0.0182	0.0172	95	0.0175	96	78-133	2	30	mg/L	11.27.2019 10:34	
Anthracene	<0.000182	0.0182	0.0173	95	0.0176	97	73-145	2	30	mg/L	11.27.2019 10:34	
Benzo(a)anthracene	<0.000182	0.0182	0.0159	87	0.0161	88	77-131	1	30	mg/L	11.27.2019 10:34	
Benzo(a)pyrene	<0.000182	0.0182	0.0163	90	0.0163	90	56-163	0	30	mg/L	11.27.2019 10:34	
Benzo(b)fluoranthene	<0.000182	0.0182	0.0170	93	0.0171	94	74-138	1	30	mg/L	11.27.2019 10:34	
Benzo(g,h,i)perylene	<0.000182	0.0182	0.0165	91	0.0163	90	77-127	1	30	mg/L	11.27.2019 10:34	
Benzo(k)fluoranthene	<0.000182	0.0182	0.0170	93	0.0169	93	67-142	1	30	mg/L	11.27.2019 10:34	
Chrysene	<0.000182	0.0182	0.0162	89	0.0163	90	66-126	1	30	mg/L	11.27.2019 10:34	
Dibenz(a,h)anthracene	<0.000182	0.0182	0.0166	91	0.0164	90	71-142	1	30	mg/L	11.27.2019 10:34	
Fluoranthene	<0.000182	0.0182	0.0170	93	0.0174	96	78-138	2	30	mg/L	11.27.2019 10:34	
Fluorene	<0.000182	0.0182	0.0179	98	0.0182	100	79-128	2	30	mg/L	11.27.2019 10:34	
Indeno(1,2,3-c,d)Pyrene	<0.000182	0.0182	0.0164	90	0.0162	89	76-140	1	30	mg/L	11.27.2019 10:34	
Naphthalene	<0.000364	0.0182	0.0165	91	0.0167	92	72-122	1	30	mg/L	11.27.2019 10:34	
Phenanthrene	<0.000182	0.0182	0.0173	95	0.0176	97	76-129	2	30	mg/L	11.27.2019 10:34	
Pyrene	<0.000182	0.0182	0.0166	91	0.0173	95	74-138	4	30	mg/L	11.27.2019 10:34	
Surrogate	MB %Rec	MB Flag	LCS %Rec	LCS Flag	LCSD %Rec	LCSD Flag	Limits			Units	Analysis Date	
2-Fluorobiphenyl	96		100		102		54-146			%	11.27.2019 10:34	
Nitrobenzene-d5	100		104		106		46-151			%	11.27.2019 10:34	
Terphenyl-D14	99		99		100		51-139			%	11.27.2019 10:34	

MS/MSD Percent Recovery
Relative Percent Difference
LCS/LCSD Recovery
Log Difference

$[D] = 100 * (C-A) / B$
 $RPD = 200 * |(C-E) / (C+E)|$
 $[D] = 100 * (C) / [B]$
Log Diff. = Log(Sample Duplicate) - Log(Original Sample)

LCS = Laboratory Control Sample
A = Parent Result
C = MS/LCS Result
E = MSD/LCSD Result

MS = Matrix Spike
B = Spike Added
D = MSD/LCSD % Rec



NV5

ADOT Stormwater

Analytical Method: PAHs by SW846 8270D SIM

Seq Number: 3108913

Parent Sample Id: 643773-001

Matrix: Ground Water

MS Sample Id: 643773-001 S

Prep Method: SW3511

Date Prep: 11.26.2019

MSD Sample Id: 643773-001 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
1-Methylnaphthalene	<0.000200	0.0200	0.0168	84	0.0160	83	70-126	5	30	mg/L	11.27.2019 12:17	
2-Methylnaphthalene	<0.000200	0.0200	0.0165	83	0.0157	81	74-121	5	30	mg/L	11.27.2019 12:17	
Acenaphthene	<0.000200	0.0200	0.0172	86	0.0162	84	75-127	6	30	mg/L	11.27.2019 12:17	
Acenaphthylene	<0.000200	0.0200	0.0174	87	0.0164	85	78-133	6	30	mg/L	11.27.2019 12:17	
Anthracene	<0.000200	0.0200	0.0176	88	0.0166	86	73-145	6	30	mg/L	11.27.2019 12:17	
Benzo(a)anthracene	<0.000200	0.0200	0.0163	82	0.0149	77	77-131	9	30	mg/L	11.27.2019 12:17	
Benzo(a)pyrene	<0.000200	0.0200	0.0165	83	0.0150	78	56-163	10	30	mg/L	11.27.2019 12:17	
Benzo(b)fluoranthene	<0.000200	0.0200	0.0171	86	0.0146	76	74-138	16	30	mg/L	11.27.2019 12:17	
Benzo(g,h,i)perylene	<0.000200	0.0200	0.0165	83	0.0150	78	77-127	10	30	mg/L	11.27.2019 12:17	
Benzo(k)fluoranthene	<0.000200	0.0200	0.0170	85	0.0168	87	67-142	1	30	mg/L	11.27.2019 12:17	
Chrysene	<0.000200	0.0200	0.0166	83	0.0151	78	66-126	9	30	mg/L	11.27.2019 12:17	
Dibenz(a,h)anthracene	<0.000200	0.0200	0.0171	86	0.0153	79	71-142	11	30	mg/L	11.27.2019 12:17	
Fluoranthene	<0.000200	0.0200	0.0175	88	0.0163	84	78-138	7	30	mg/L	11.27.2019 12:17	
Fluorene	<0.000200	0.0200	0.0178	89	0.0168	87	79-128	6	30	mg/L	11.27.2019 12:17	
Indeno(1,2,3-c,d)Pyrene	<0.000200	0.0200	0.0167	84	0.0151	78	76-140	10	30	mg/L	11.27.2019 12:17	
Naphthalene	<0.000400	0.0200	0.0164	82	0.0157	81	72-122	4	30	mg/L	11.27.2019 12:17	
Phenanthrene	<0.000200	0.0200	0.0176	88	0.0167	87	76-129	5	30	mg/L	11.27.2019 12:17	
Pyrene	<0.000200	0.0200	0.0170	85	0.0161	83	74-138	5	30	mg/L	11.27.2019 12:17	

Surrogate	MS %Rec	MS Flag	MSD %Rec	MSD Flag	Limits	Units	Analysis Date
2-Fluorobiphenyl	94		93		54-146	%	11.27.2019 12:17
Nitrobenzene-d5	98		98		46-151	%	11.27.2019 12:17
Terphenyl-D14	92		90		51-139	%	11.27.2019 12:17

Analytical Method: Recoverable Metals per ICP by EPA 200.7

Seq Number: 3109263

MB Sample Id: 7691494-1-BLK

Matrix: Water

LCS Sample Id: 7691494-1-BKS

Prep Method: E200.7P

Date Prep: 12.03.2019

LCSD Sample Id: 7691494-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Calcium	<0.200	25.0	23.8	95	23.8	95	85-115	0	20	mg/L	12.03.2019 11:14	
Sodium	<0.500	25.0	23.8	95	23.7	95	85-115	0	20	mg/L	12.03.2019 11:14	

Analytical Method: Recoverable Metals per ICP by EPA 200.7

Seq Number: 3109263

Parent Sample Id: 644092-001

Matrix: Drinking Water

MS Sample Id: 644092-001 S

Prep Method: E200.7P

Date Prep: 12.03.2019

MSD Sample Id: 644092-001 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Calcium	3.89	25.0	29.0	100	28.8	100	70-130	1	20	mg/L	12.03.2019 11:27	
Sodium	28.9	25.0	53.7	99	53.4	98	70-130	1	20	mg/L	12.03.2019 11:27	

MS/MSD Percent Recovery
Relative Percent Difference
LCS/LCSD Recovery
Log Difference

$[D] = 100 * (C - A) / B$
 $RPD = 200 * |(C - E) / (C + E)|$
 $[D] = 100 * (C) / [B]$
Log Diff. = Log(Sample Duplicate) - Log(Original Sample)

LCS = Laboratory Control Sample
A = Parent Result
C = MS/LCS Result
E = MSD/LCSD Result

MS = Matrix Spike
B = Spike Added
D = MSD/LCSD % Rec



QC Summary 643882

NV5

ADOT Stormwater

Analytical Method: Recoverable Metals per ICP by EPA 200.7

Seq Number: 3109263

Matrix: Drinking Water

Prep Method: E200.7P

Date Prep: 12.03.2019

Parent Sample Id: 644069-001

MS Sample Id: 644069-001 S

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	Limits	Units	Analysis Date	Flag
Calcium	202	25.0	219	68	70-130	mg/L	12.03.2019 12:59	M2
Sodium	444	25.0	452	32	70-130	mg/L	12.03.2019 12:59	M2

Analytical Method: Recoverable Metals by EPA 200.8

Seq Number: 3108608

Matrix: Water

Prep Method: E200.8P

Date Prep: 11.22.2019

MB Sample Id: 7690979-1-BLK

LCS Sample Id: 7690979-1-BKS

LCSD Sample Id: 7690979-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Arsenic	<0.00400	0.100	0.0963	96	0.0932	93	85-115	3	20	mg/L	11.23.2019 02:56	
Barium	<0.00400	0.100	0.0938	94	0.0947	95	85-115	1	20	mg/L	11.23.2019 02:56	
Cadmium	<0.00200	0.100	0.0969	97	0.0942	94	85-115	3	20	mg/L	11.23.2019 02:56	
Chromium	<0.00400	0.100	0.0982	98	0.0936	94	85-115	5	20	mg/L	11.23.2019 02:56	
Copper	<0.00400	0.100	0.0975	98	0.0934	93	85-115	4	20	mg/L	11.23.2019 02:56	
Lead	<0.00200	0.100	0.0978	98	0.0977	98	85-115	0	20	mg/L	11.23.2019 02:56	
Nickel	<0.00200	0.100	0.0971	97	0.0937	94	85-115	4	20	mg/L	11.23.2019 02:56	
Selenium	<0.00200	0.100	0.0967	97	0.0941	94	85-115	3	20	mg/L	11.23.2019 02:56	
Silver	<0.00200	0.0500	0.0513	103	0.0492	98	85-115	4	20	mg/L	11.23.2019 02:56	
Zinc	<0.0300	0.100	0.0984	98	0.0944	94	85-115	4	20	mg/L	11.23.2019 02:56	

Analytical Method: Recoverable Metals by EPA 200.8

Seq Number: 3108608

Matrix: Drinking Water

Prep Method: E200.8P

Date Prep: 11.22.2019

Parent Sample Id: 643750-001

MS Sample Id: 643750-001 S

MSD Sample Id: 643750-001 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Arsenic	<0.00400	1.00	1.02	102	1.04	104	70-130	2	20	mg/L	11.23.2019 03:05	
Barium	0.160	0.100	0.281	121	0.282	122	70-130	0	20	mg/L	11.23.2019 03:05	
Cadmium	<0.00200	1.00	0.979	98	1.00	100	70-130	2	20	mg/L	11.23.2019 03:05	
Chromium	<0.00400	1.00	1.01	101	1.02	102	70-130	1	20	mg/L	11.23.2019 03:05	
Copper	0.0595	1.00	1.03	97	1.04	98	70-130	1	20	mg/L	11.23.2019 03:05	
Lead	<0.00100	0.100	0.102	102	0.102	102	70-130	0	20	mg/L	11.23.2019 03:05	
Nickel	0.00329	1.00	0.995	99	1.01	101	70-130	1	20	mg/L	11.23.2019 03:05	
Selenium	<0.00200	1.00	1.00	100	1.03	103	70-130	3	20	mg/L	11.23.2019 03:05	
Silver	<0.00200	0.500	0.493	99	0.497	99	70-130	1	20	mg/L	11.23.2019 03:05	
Zinc	<0.0300	1.00	1.03	103	1.04	104	70-130	1	20	mg/L	11.23.2019 03:05	

MS/MSD Percent Recovery
Relative Percent Difference
LCS/LCSD Recovery
Log Difference

$[D] = 100 * (C - A) / B$
 $RPD = 200 * |(C - E) / (C + E)|$
 $[D] = 100 * (C) / [B]$
Log Diff. = Log(Sample Duplicate) - Log(Original Sample)

LCS = Laboratory Control Sample
A = Parent Result
C = MS/LCS Result
E = MSD/LCSD Result

MS = Matrix Spike
B = Spike Added
D = MSD/LCSD % Rec



QC Summary 643882

NV5

ADOT Stormwater

Analytical Method: Recoverable Metals by EPA 200.8

Seq Number: 3108608

Matrix: Water

Prep Method: E200.8P

Date Prep: 11.22.2019

Parent Sample Id: 643272-001

MS Sample Id: 643272-001 S

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	Limits	Units	Analysis Date	Flag
Arsenic	0.00737	1.00	1.07	106	70-130	mg/L	11.23.2019 04:36	
Barium	0.0228	0.100	0.121	98	70-130	mg/L	11.27.2019 01:59	
Cadmium	<0.00200	1.00	1.01	101	70-130	mg/L	11.23.2019 04:36	
Chromium	<0.00400	1.00	1.05	105	70-130	mg/L	11.23.2019 04:36	
Copper	0.00522	1.00	0.998	99	70-130	mg/L	11.23.2019 04:36	
Lead	<0.00200	0.100	0.0982	98	70-130	mg/L	11.27.2019 01:59	
Nickel	0.00502	1.00	1.01	100	70-130	mg/L	11.23.2019 04:36	
Selenium	0.00258	1.00	1.05	105	70-130	mg/L	11.23.2019 04:36	
Silver	<0.00200	0.500	0.507	101	70-130	mg/L	11.23.2019 04:36	
Zinc	0.0383	1.00	1.04	100	70-130	mg/L	11.23.2019 04:36	

Analytical Method: Mercury by EPA 245.1

Seq Number: 3108643

Matrix: Water

Prep Method: E245.1P

Date Prep: 11.25.2019

MB Sample Id: 7691078-1-BLK

LCS Sample Id: 7691078-1-BKS

LCSD Sample Id: 7691078-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Mercury	<0.000200	0.00200	0.00217	109	0.00214	107	85-115	1	20	mg/L	11.25.2019 14:55	

Analytical Method: Mercury by EPA 245.1

Seq Number: 3108643

Matrix: Waste Water

Prep Method: E245.1P

Date Prep: 11.25.2019

Parent Sample Id: 644294-001

MS Sample Id: 644294-001 S

MSD Sample Id: 644294-001 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Mercury	<0.0000263	0.00200	0.00176	88	0.00175	88	70-130	1	20	mg/L	11.25.2019 15:03	

Analytical Method: Biochemical Oxygen Demand by SM 5210B

Seq Number: 3108848

Matrix: Water

Prep Method: SM5210P

Date Prep: 11.21.2019

DO Depletion Sample 7691295-1-BLK

LCS Sample Id: 7691295-1-BKS

Parameter	DO Depletion	Spike Amount	LCS Result	LCS %Rec	Limits	Units	Analysis Date	Flag
Biochemical Oxygen Demand, 5 day	<2.00	198	179	90	85-115	mg/L	11.26.2019 11:20	

Analytical Method: Biochemical Oxygen Demand by SM 5210B

Seq Number: 3108848

Matrix: Waste Water

Prep Method: SM5210P

Date Prep: 11.21.2019

Parent Sample Id: 643885-001

MD Sample Id: 643885-001 D

Parameter	Parent Result	MD Result	%RPD	RPD Limit	Units	Analysis Date	Flag
Biochemical Oxygen Demand, 5 day	3470	3630	5	25	mg/L	11.26.2019 11:20	

MS/MSD Percent Recovery
Relative Percent Difference
LCS/LCSD Recovery
Log Difference

$[D] = 100 * (C - A) / B$
 $RPD = 200 * |(C - E) / (C + E)|$
 $[D] = 100 * (C) / [B]$
Log Diff. = Log(Sample Duplicate) - Log(Original Sample)

LCS = Laboratory Control Sample
A = Parent Result
C = MS/LCS Result
E = MSD/LCSD Result

MS = Matrix Spike
B = Spike Added
D = MSD/LCSD % Rec



NV5

ADOT Stormwater

Analytical Method: Total Dissolved Solids by SM 2540C

Seq Number: 3108676

Matrix: Water

MB Sample Id: 3108676-1-BLK

LCS Sample Id: 3108676-1-BKS

LCSD Sample Id: 3108676-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Total Dissolved Solids	<10.0	1000	993	99	1040	104	80-120	5	10	mg/L	11.21.2019 16:00	

Analytical Method: Total Dissolved Solids by SM 2540C

Seq Number: 3108676

Matrix: Storm Water

Parent Sample Id: 643926-001

MD Sample Id: 643926-001 D

Parameter	Parent Result	MD Result	%RPD	RPD Limit	Units	Analysis Date	Flag
Total Dissolved Solids	65.0	61.0	6	10	mg/L	11.21.2019 16:00	

Analytical Method: Total Suspended Solids by SM 2540D

Seq Number: 3108447

Matrix: Water

MB Sample Id: 3108447-1-BLK

LCS Sample Id: 3108447-1-BKS

LCSD Sample Id: 3108447-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Total Suspended Solids	<10.0	1000	989	99	981	98	80-120	1	10	mg/L	11.21.2019 12:30	

Analytical Method: Total Suspended Solids by SM 2540D

Seq Number: 3108447

Matrix: Waste Water

Parent Sample Id: 643886-001

MD Sample Id: 643886-001 D

Parameter	Parent Result	MD Result	%RPD	RPD Limit	Units	Analysis Date	Flag
Total Suspended Solids	3700	3540	4	10	mg/L	11.21.2019 12:30	

Analytical Method: Turbidity by EPA 180.1

Seq Number: 3108256

Matrix: Water

MB Sample Id: 3108256-1-BLK

LCS Sample Id: 3108256-1-BKS

LCSD Sample Id: 3108256-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Turbidity	<0.100	19.8	19.9	101	19.5	98	80-120	2	20	NTU	11.21.2019 09:35	

Analytical Method: Turbidity by EPA 180.1

Seq Number: 3108256

Matrix: Storm Water

Parent Sample Id: 643882-001

MD Sample Id: 643882-001 D

Parameter	Parent Result	MD Result	%RPD	RPD Limit	Units	Analysis Date	Flag
Turbidity	20.2	20.4	1	20	NTU	11.21.2019 09:35	

MS/MSD Percent Recovery
Relative Percent Difference
LCS/LCSD Recovery
Log Difference

$[D] = 100 * (C - A) / B$
 $RPD = 200 * |(C - E) / (C + E)|$
 $[D] = 100 * (C) / [B]$
Log Diff. = Log(Sample Duplicate) - Log(Original Sample)

LCS = Laboratory Control Sample
A = Parent Result
C = MS/LCS Result
E = MSD/LCSD Result

MS = Matrix Spike
B = Spike Added
D = MSD/LCSD % Rec



QC Summary 643882

NV5

ADOT Stormwater

Analytical Method: Anions by EPA 300.0

Seq Number: 3108236

MB Sample Id: 7690818-1-BLK

Matrix: Water

LCS Sample Id: 7690818-1-BKS

Prep Method: E300P

Date Prep: 11.21.2019

LCSD Sample Id: 7690818-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	<0.500	10.0	10.2	102	10.2	102	90-110	0	20	mg/L	11.21.2019 08:32	
Sulfate	<0.500	10.0	9.99	100	9.97	100	90-110	0	20	mg/L	11.21.2019 08:32	

Analytical Method: Anions by EPA 300.0

Seq Number: 3108236

Parent Sample Id: 643898-001

Matrix: Water

MS Sample Id: 643898-001 S

Prep Method: E300P

Date Prep: 11.21.2019

MSD Sample Id: 643898-001 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	74.5	10.0	82.6	81	82.6	81	90-110	0	20	mg/L	11.21.2019 09:53	M2
Sulfate	718	200	956	119	955	119	90-110	0	20	mg/L	11.21.2019 10:37	M1

Analytical Method: Anions by EPA 300.0

Seq Number: 3108236

Parent Sample Id: 643891-001

Matrix: Ground Water

MS Sample Id: 643891-001 S

Prep Method: E300P

Date Prep: 11.21.2019

MSD Sample Id: 643891-001 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	19.6	10.0	28.6	90	28.7	91	90-110	0	20	mg/L	11.21.2019 11:04	
Sulfate	25.3	10.0	34.7	94	34.8	95	90-110	0	20	mg/L	11.21.2019 11:04	

Analytical Method: Nitrite by SM 4500-NO2B

Seq Number: 3108372

MB Sample Id: 3108372-1-BLK

Matrix: Water

LCS Sample Id: 3108372-1-BKS

LCSD Sample Id: 3108372-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Nitrite as N	<0.0100	0.100	0.101	101	0.0990	99	85-115	2	20	mg/L	11.22.2019 07:11	

Analytical Method: Nitrite by SM 4500-NO2B

Seq Number: 3108372

Parent Sample Id: 644039-001

Matrix: Water

MS Sample Id: 644039-001 S

MSD Sample Id: 644039-001 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Nitrite as N	0.0228	0.100	0.128	105	0.125	102	79-117	2	20	mg/L	11.22.2019 07:11	

Analytical Method: Nitrogen, Nitrate-Nitrite by EPA 353.2

Seq Number: 3109489

MB Sample Id: 7691672-1-BLK

Matrix: Water

LCS Sample Id: 7691672-1-BKS

Prep Method: E353.2P

Date Prep: 12.05.2019

LCSD Sample Id: 7691672-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Nitrogen, Nitrate-Nitrite	<0.0283	1.00	1.00	100	0.992	99	90-110	1	20	mg/L	12.05.2019 12:05	

MS/MSD Percent Recovery
Relative Percent Difference
LCS/LCSD Recovery
Log Difference

$[D] = 100 * (C-A) / B$
 $RPD = 200 * |(C-E) / (C+E)|$
 $[D] = 100 * (C) / [B]$
Log Diff. = Log(Sample Duplicate) - Log(Original Sample)

LCS = Laboratory Control Sample
A = Parent Result
C = MS/LCS Result
E = MSD/LCSD Result

MS = Matrix Spike
B = Spike Added
D = MSD/LCSD % Rec



QC Summary 643882

NV5

ADOT Stormwater

Analytical Method: Nitrogen, Nitrate-Nitrite by EPA 353.2

Seq Number: 3109489

Matrix: Water

Prep Method: E353.2P

Date Prep: 12.05.2019

Parent Sample Id: 643745-001

MS Sample Id: 643745-001 S

MSD Sample Id: 643745-001 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Nitrogen, Nitrate-Nitrite	0.340	1.00	1.31	97	1.30	96	90-110	1	20	mg/L	12.05.2019 12:10	

Analytical Method: Nitrogen, Nitrate-Nitrite by EPA 353.2

Seq Number: 3109489

Matrix: Water

Prep Method: E353.2P

Date Prep: 12.05.2019

Parent Sample Id: 643745-002

MS Sample Id: 643745-002 S

MSD Sample Id: 643745-002 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Nitrogen, Nitrate-Nitrite	0.304	1.00	1.26	96	1.28	98	90-110	2	20	mg/L	12.05.2019 12:33	

Analytical Method: Chemical Oxygen Demand by HACH 8000

Seq Number: 3108841

Matrix: Water

MB Sample Id: 3108841-1-BLK

LCS Sample Id: 3108841-1-BKS

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	Limits	Units	Analysis Date	Flag
COD - Chemical Oxygen Demand	<20.0	100	99.0	99	90-110	mg/L	11.27.2019 09:32	

Analytical Method: Chemical Oxygen Demand by HACH 8000

Seq Number: 3108841

Matrix: Storm Water

Parent Sample Id: 643882-001

MS Sample Id: 643882-001 S

MSD Sample Id: 643882-001 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
COD - Chemical Oxygen Demand	19.0	100	110	91	110	91	90-110	0	20	mg/L	11.27.2019 09:32	

Analytical Method: Chemical Oxygen Demand by HACH 8000

Seq Number: 3108841

Matrix: Water

Parent Sample Id: 644131-001

MS Sample Id: 644131-001 S

MSD Sample Id: 644131-001 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
COD - Chemical Oxygen Demand	8.00	100	100	92	101	93	90-110	1	20	mg/L	11.27.2019 09:32	

Analytical Method: Fecal Coliform Bacteria by SM 9222D

Seq Number: 3108363

Matrix: Water

Prep Method: SM9222P

Date Prep: 11.20.2019

MB Sample Id: 7690955-1-BLK

Parameter	MB Result	Units	Analysis Date	Flag
Fecal Coliform	<1	cfu/100ml	11.21.2019 13:40	

MS/MSD Percent Recovery
Relative Percent Difference
LCS/LCSD Recovery
Log Difference

$[D] = 100 * (C - A) / B$
 $RPD = 200 * |(C - E) / (C + E)|$
 $[D] = 100 * (C) / [B]$
Log Diff. = Log(Sample Duplicate) - Log(Original Sample)

LCS = Laboratory Control Sample
A = Parent Result
C = MS/LCS Result
E = MSD/LCSD Result

MS = Matrix Spike
B = Spike Added
D = MSD/LCSD % Rec

043882

043882

Page 18 of 21
Final 1.000

Inter-Office Shipment

IOS Number : 52776

Date/Time: 11.20.2019 Created by: Emily Petrunia
 Lab# From: **Phoenix** Delivery Priority:
 Lab# To: **Houston** Air Bill No.: 777041761593

Please send report to: Ruriko Konuma
 Address: 2525 West Huntington Drive, Suite 102
 E-Mail: ruriko.konuma@xenco.com

Sample Id	Matrix	Client Sample Id	Sample Collection	Method	Method Name	Lab Due	HT Due	PM	Analytes	Sign
643882-001	W	PHX	11.20.2019 10:34	E200.8_AZ	Recoverable Metals by EPA 200.8	11.29.2019	05.18.2020	RKO	AG AS BA CD CR CU N	
643882-001	W	PHX	11.20.2019 10:34	E245.1	Mercury by EPA 245.1	11.29.2019	12.18.2019	RKO	HG	
643882-001	W	PHX	11.20.2019 10:34	H8000	Chemical Oxygen Demand by HACH 80	11.29.2019	12.18.2019	RKO	COD	
643882-001	W	PHX	11.20.2019 10:34	E353.2	Nitrogen, Nitrate-Nitrite by EPA 353.2	11.29.2019	12.18.2019	RKO		
643882-001	W	PHX	11.20.2019 10:34	E300	Anions by EPA 300.0	11.29.2019	12.18.2019	RKO	CL SO4	
643882-001	W	PHX	11.20.2019 10:34	E200.7_AZ	Recoverable Metals per ICP by EPA 200	11.29.2019	05.18.2020	RKO	CA NA	
643882-002	W	PHX	11.20.2019 10:34	SW8270D_SIM_PAH	PAHs by SW846 8270D SIM	11.29.2019	11.27.2019	RKO	ACNP ACNPY ANTH Bz	

Inter Office Shipment or Sample Comments:

Relinquished By: 
 Emily Petrunia
 Date Relinquished: 11.20.2019

Received By: 
 Ashly Kowalski
 Date Received: 11.21.2019
 Cooler Temperature: 2.2



XENCO Laboratories

Inter Office Report- Sample Receipt Checklist

Sent To: Houston

IOS #: 52776

Acceptable Temperature Range: 0 - 6 degC

Air and Metal samples Acceptable Range: Ambient

Temperature Measuring device used : HOU-068

Sent By: Emily Petrunia

Date Sent: 11.20.2019 06.13 PM

Received By: Ashly Kowalski

Date Received: 11.21.2019 09.30 AM

Sample Receipt Checklist

Comments

#1 *Temperature of cooler(s)?	2.2
#2 *Shipping container in good condition?	Yes
#3 *Samples received with appropriate temperature?	Yes
#4 *Custody Seals intact on shipping container/ cooler?	N/A
#5 *Custody Seals Signed and dated for Containers/coolers	N/A
#6 *IOS present?	Yes
#7 Any missing/extra samples?	No
#8 IOS agrees with sample label(s)/matrix?	Yes
#9 Sample matrix/ properties agree with IOS?	Yes
#10 Samples in proper container/ bottle?	Yes
#11 Samples properly preserved?	Yes
#12 Sample container(s) intact?	Yes
#13 Sufficient sample amount for indicated test(s)?	Yes
#14 All samples received within hold time?	Yes

*** Must be completed for after-hours delivery of samples prior to placing in the refrigerator**

NonConformance:

Corrective Action Taken:

Nonconformance Documentation

Contact: _____ Contacted by : _____ Date: _____

Checklist reviewed by:

Ashly Kowalski

Date: 11.21.2019

XENCO Laboratories
Prelogin/Nonconformance Report- Sample Log-In

Client: NV5

Date/ Time Received: 11.20.2019 12.00.00 PM

Work Order #: 643882

Acceptable Temperature Range: 0 - 6 degC

Air and Metal samples Acceptable Range: Ambient

Temperature Measuring device used : IR#1

Sample Receipt Checklist	Comments
#1 *Temperature of cooler(s)?	3.3
#2 *Shipping container in good condition?	Yes
#3 *Samples received on ice?	Yes
#4 *Custody Seals intact on shipping container/ cooler?	N/A
#5 Custody Seals intact on sample bottles?	N/A
#6 *Custody Seals Signed and dated?	N/A
#7 *Chain of Custody present?	Yes
#8 Any missing/extra samples?	No
#9 Chain of Custody signed when relinquished/ received?	Yes
#10 Chain of Custody agrees with sample labels/matrix?	Yes
#11 Container label(s) legible and intact?	Yes
#12 Samples in proper container/ bottle?	Yes
#13 Samples properly preserved?	Yes
#14 Sample container(s) intact?	Yes
#15 Sufficient sample amount for indicated test(s)?	Yes
#16 All samples received within hold time?	Yes
#17 Subcontract of sample(s)?	Yes Xenco Stafford
#18 Water VOC samples have zero headspace?	N/A

*** Must be completed for after-hours delivery of samples prior to placing in the refrigerator**

Analyst: EP

PH Device/Lot#: 207519

Checklist completed by:		Date: 11.20.2019
	Emily Petrunia	
Checklist reviewed by:		Date: 11.22.2019
	Ruriko Konuma	



September 27, 2019

Mike Hulst
NV5
7620 North Hartman Lane, Suite 162
Tucson, AZ 85743

TEL (520) 638-7270
FAX (623) 738-3690

Work Order No.: 19I0584
Order Name: Storm Water

RE: Storm Water

Dear Mike Hulst,

Turner Laboratories, Inc. received 1 sample(s) on 09/24/2019 for the analyses presented in the following report.

All results are intended to be considered in their entirety, and Turner Laboratories, Inc. is not responsible for use of less than the complete report. Results apply only to the samples analyzed. Samples will be disposed of 30 days after issue of our report unless special arrangements are made.

The pages that follow may contain sensitive, privileged or confidential information intended solely for the addressee named above. If you receive this message and are not the agent or employee of the addressee, this communication has been sent in error. Please do not disseminate or copy any of the attached and notify the sender immediately by telephone. Please also return the attached sheet(s) to the sender by mail.

Please call if you have any questions.

Respectfully submitted,

Turner Laboratories, Inc.
ADHS License AZ0066

Kevin Brim
Project Manager

Client: NV5
Project: Storm Water
Work Order: 19I0584
Date Received: 09/24/2019

Order: Storm Water

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Matrix	Collection Date/Time
19I0584-01	TUCMS4190924	Storm Water	09/24/2019 0845

Client: NV5
Project: Storm Water
Work Order: 19I0584
Date Received: 09/24/2019

Case Narrative

Microbiological sample was received above recommended temperature.

E3 Concentration estimated. Analyte exceeded calibration range. Reanalysis not performed due to holding time requirements.

All soil, sludge, and solid matrix determinations are reported on a wet weight basis unless otherwise noted.

ND Not Detected at or above the PQL

PQL Practical Quantitation Limit

DF Dilution Factor

Client: NV5
Project: Storm Water
Work Order: 19I0584
Lab Sample ID: 19I0584-01

Client Sample ID: TUCMS4190924
Collection Date/Time: 09/24/2019 0845
Matrix: Storm Water
Order Name: Storm Water

Analyses	Result	PQL	Qual	Units	DF	Prep Date	Analysis Date	Analyst
Total Coliform & E. Coli, MPN-SM 9223B								
E.Coli	1400	1.0		MPN/100mL	1	09/24/2019 1543	09/25/2019 1653	CR
Fecal coliforms	2400	1.0	E3	MPN/100mL	1	09/24/2019 1547	09/25/2019 1152	CR
Total Coliform	2400	1.0	E3	MPN/100mL	1	09/24/2019 1543	09/25/2019 1653	CR



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(520) 882-5880
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CHAIN OF CUSTODY/LABORATORY ANALYSIS REQUEST FORM

TURNER WORK ORDER # 19I0584 DATE 9/24 PAGE 1 OF 1

[illegible]



February 28, 2020

John Burton
Engineering and Environmental Consultants, Inc.
7740 N. 16th Street Suite 135
Phoenix, AZ 85020

TEL (602) 248-7702
FAX 602-248-7851

Work Order No.: 20B0321
Order Name: A DOT Storm Water

RE: A DOT Storm Water

Dear John Burton,

Turner Laboratories, Inc. received 1 sample(s) on 02/11/2020 for the analyses presented in the following report.

All results are intended to be considered in their entirety, and Turner Laboratories, Inc. is not responsible for use of less than the complete report. Results apply only to the samples analyzed. Samples will be disposed of 30 days after issue of our report unless special arrangements are made.

The pages that follow may contain sensitive, privileged or confidential information intended solely for the addressee named above. If you receive this message and are not the agent or employee of the addressee, this communication has been sent in error. Please do not disseminate or copy any of the attached and notify the sender immediately by telephone. Please also return the attached sheet(s) to the sender by mail.

Please call if you have any questions.

Respectfully submitted,

Turner Laboratories, Inc.
ADHS License AZ0066

Elizabeth Kasik
Laboratory Director

Client: Engineering and Environmental Consultants, Inc**Project:** A DOT Storm Water**Work Order:** 20B0321**Date Received:** 02/11/2020**Order:** A DOT Storm Water**Work Order Sample Summary**

Lab Sample ID	Client Sample ID	Matrix	Collection Date/Time
20B0321-01	Tucson MS4 200210	Non-Potable Water	02/10/2020 1950

Client: Engineering and Environmental Consultants, Inc.
Project: A DOT Storm Water
Work Order: 20B0321
Date Received: 02/11/2020

Case Narrative

The 8310 analysis was performed by Pace Analytical National in Mount Juliet, TN.

- E3 Concentration estimated. Analyte exceeded calibration range. Reanalysis not performed due to holding time requirements.
- H3 Sample was received and/or analysis requested past holding time.
- K1 The sample dilutions set-up for the BOD/CBOD analysis did not meet the oxygen depletion criteria of at least 2 mg/L. Reported result is an estimated value.
- K10 Seed control samples do not deplete at least 2.0 mg/L, with a retention of at least 1.0 mg/L DO criteria in all samples.
- K6 Glucose/glutamic acid BOD/CBOD was below the method acceptance criteria.
- K9 Test replicates show more than 30% difference between high and low values.
- M2 Matrix spike recovery was low; the associated LCS/LCSD was acceptable.
- M3 The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The associated LCS/LCSD recovery was acceptable.
- M6 Matrix spike recovery was high. Data reported per ADEQ policy 0154.000. Matrix interference was confirmed.
- R1 RPD/RSD exceeded the method acceptance limit. See case narrative.
- R13 MS/MSD RPD exceeded method acceptance limit. Matrix spike recovery was outside acceptance criteria. Batch precision and accuracy were demonstrated.

All soil, sludge, and solid matrix determinations are reported on a wet weight basis unless otherwise noted.

- ND Not Detected at or above the PQL
- PQL Practical Quantitation Limit
- DF Dilution Factor

Client: Engineering and Environmental Consultants
Project: A DOT Storm Water
Work Order: 20B0321
Lab Sample ID: 20B0321-01

Client Sample ID: Tucson MS4 200210
Collection Date/Time: 02/10/2020 1950
Matrix: Non-Potable Water
Order Name: A DOT Storm Water

Analyses	Result	PQL	Qual	Units	DF	Prep Date	Analysis Date	Analyst
Turbidity-E180.1								
Turbidity	70	0.50		NTU	5	02/11/2020 1530	02/12/2020 1545	EJ
ICP Total Metals-E200.7 (4.4)								
Calcium	15	4.0		mg/L	1	02/12/2020 1130	02/14/2020 1223	MH
Sodium	ND	5.0		mg/L	1	02/12/2020 1130	02/14/2020 1223	MH
ICP/MS Total Metals-E200.8 (5.4)								
Arsenic	0.0012	0.00050		mg/L	1	02/14/2020 1025	02/17/2020 1221	MH
Barium	0.070	0.00050		mg/L	1	02/14/2020 1025	02/17/2020 1221	MH
Cadmium	ND	0.00025		mg/L	1	02/14/2020 1025	02/17/2020 1221	MH
Chromium	0.0053	0.0025		mg/L	5	02/14/2020 1025	02/18/2020 1232	MH
Copper	0.052	0.00050		mg/L	1	02/14/2020 1025	02/17/2020 1221	MH
Lead	0.0080	0.00050		mg/L	1	02/14/2020 1025	02/17/2020 1221	MH
Nickel	0.0055	0.00050		mg/L	1	02/14/2020 1025	02/17/2020 1221	MH
Selenium	ND	0.0025		mg/L	1	02/14/2020 1025	02/17/2020 1221	MH
Silver	ND	0.00050		mg/L	1	02/14/2020 1025	02/17/2020 1221	MH
Zinc	0.13	0.040		mg/L	1	02/14/2020 1025	02/17/2020 1221	MH
CVAA Total Mercury-E245.1								
Mercury	ND	0.0010		mg/L	1	02/12/2020 1527	02/12/2020 1749	AR
Anions by Ion Chromatography-E300.0 (2.1)								
Chloride	4.3	1.0		mg/L	1	02/11/2020 1115	02/11/2020 1217	EJ
Nitrogen, Nitrate (As N)	1.0	0.50		mg/L	1	02/11/2020 1115	02/11/2020 1217	EJ
Nitrogen, Nitrite (As N)	ND	0.10		mg/L	1	02/11/2020 1115	02/11/2020 1217	EJ
Sulfate	5.9	5.0		mg/L	1	02/11/2020 1115	02/11/2020 1217	EJ
Chemical Oxygen Demand-Hach 8000								
Chemical Oxygen Demand	57	20		mg/L	1	02/21/2020 0830	02/21/2020 1530	EJ
Total Coliform & E. Coli, MPN-SM 9223B								
E.Coli	130	1.0	H3	MPN/100mL	1	02/11/2020 1550	02/12/2020 1640	CR
Fecal coliforms	2400	1.0	E3, H3	MPN/100mL	1	02/11/2020 1415	02/12/2020 1046	CR
Total Coliform	2400	1.0	E3, H3	MPN/100mL	1	02/11/2020 1550	02/12/2020 1640	CR
Total Dissolved Solids (Residue, Filterable)-SM2540 C								

Client: Engineering and Environmental Consultants **Client Sample ID:** Tucson MS4 200210
Project: A DOT Storm Water **Collection Date/Time:** 02/10/2020 1950
Work Order: 20B0321 **Matrix:** Non-Potable Water
Lab Sample ID: 20B0321-01 **Order Name:** A DOT Storm Water

Analyses	Result	PQL	Qual	Units	DF	Prep Date	Analysis Date	Analyst
Total Dissolved Solids (Residue, Filterable)	100	20		mg/L	1	02/12/2020 1730	02/14/2020 1530	CWB
Total Suspended Solids (Residue, Non-Filterable)-SM2540 D								
Total Suspended Solids	45	10		mg/L	1	02/13/2020 0858	02/14/2020 1525	ECK
Ammonia as N-SM4500-NH3 B,C								
Nitrogen, Ammonia (As N)	ND	0.50		mg/L	1	02/21/2020 0900	02/21/2020 1330	EJ
BOD, 5 day-SM5210 B								
Biochemical Oxygen Demand	8.5	2.0	K1, K9	mg/L	1	02/12/2020 0820	02/17/2020 1745	CR

Client: Engineering and Environmental Consultants, Inc.
Project: A DOT Storm Water
Work Order: 20B0321
Date Received: 02/11/2020

QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 2002135 - E245.1										
Blank (2002135-BLK1)				Prepared & Analyzed: 02/12/2020						
Mercury	ND	0.0010	mg/L							
LCS (2002135-BS1)				Prepared & Analyzed: 02/12/2020						
Mercury	0.0051	0.0010	mg/L	0.005000		101	85-115			
LCS Dup (2002135-BSD1)				Prepared & Analyzed: 02/12/2020						
Mercury	0.0051	0.0010	mg/L	0.005000		102	85-115	0.6	20	
Matrix Spike (2002135-MS1)				Source: 20B0150-01		Prepared & Analyzed: 02/12/2020				
Mercury	0.0048	0.0010	mg/L	0.005000	ND	96	70-130			
Matrix Spike (2002135-MS2)				Source: 20B0222-01		Prepared & Analyzed: 02/12/2020				
Mercury	0.0047	0.0010	mg/L	0.005000	ND	94	70-130			
Matrix Spike Dup (2002135-MSD1)				Source: 20B0150-01		Prepared & Analyzed: 02/12/2020				
Mercury	0.0048	0.0010	mg/L	0.005000	ND	96	70-130	0.3	20	
Matrix Spike Dup (2002135-MSD2)				Source: 20B0222-01		Prepared & Analyzed: 02/12/2020				
Mercury	0.0044	0.0010	mg/L	0.005000	ND	88	70-130	6	20	
Batch 2002139 - E200.7 (4.4)										
Blank (2002139-BLK1)				Prepared: 02/12/2020 Analyzed: 02/13/2020						
Calcium	ND	4.0	mg/L							
Sodium	ND	5.0	mg/L							
LCS (2002139-BS1)				Prepared: 02/12/2020 Analyzed: 02/13/2020						
Calcium	10	4.0	mg/L	10.00		103	85-115			
Sodium	9.4	5.0	mg/L	10.00		94	85-115			
LCS Dup (2002139-BSD1)				Prepared: 02/12/2020 Analyzed: 02/13/2020						
Calcium	11	4.0	mg/L	10.00		107	85-115	4	20	
Sodium	9.7	5.0	mg/L	10.00		97	85-115	3	20	
Matrix Spike (2002139-MS1)				Source: 20B0069-05		Prepared: 02/12/2020 Analyzed: 02/13/2020				
Calcium	37	4.0	mg/L	10.00	28	87	70-130			
Sodium	61	5.0	mg/L	10.00	58	34	70-130			M3
Matrix Spike (2002139-MS2)				Source: 20B0255-01		Prepared: 02/12/2020 Analyzed: 02/13/2020				
Calcium	91	4.0	mg/L	10.00	84	66	70-130			M3
Batch 2002173 - E200.8 (5.4)										

Client: Engineering and Environmental Consultants, Inc.
Project: A DOT Storm Water
Work Order: 20B0321
Date Received: 02/11/2020

QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 2002173 - E200.8 (5.4)										
Blank (2002173-BLK1)				Prepared: 02/14/2020 Analyzed: 02/17/2020						
Arsenic	ND	0.00050	mg/L							
Barium	ND	0.00050	mg/L							
Cadmium	ND	0.00025	mg/L							
Chromium	ND	0.00050	mg/L							
Copper	ND	0.00050	mg/L							
Lead	ND	0.00050	mg/L							
Nickel	ND	0.00050	mg/L							
Selenium	ND	0.0015	mg/L							
Silver	ND	0.00050	mg/L							
Zinc	ND	0.040	mg/L							
LCS (2002173-BS1)				Prepared: 02/14/2020 Analyzed: 02/17/2020						
Arsenic	0.052	0.00050	mg/L	0.05000		103	85-115			
Barium	0.051	0.00050	mg/L	0.05000		101	85-115			
Cadmium	0.052	0.00025	mg/L	0.05000		103	85-115			
Chromium	0.053	0.00050	mg/L	0.05000		105	85-115			
Copper	0.053	0.00050	mg/L	0.05000		105	85-115			
Lead	0.051	0.00050	mg/L	0.05000		101	85-115			
Nickel	0.053	0.00050	mg/L	0.05000		106	85-115			
Selenium	0.050	0.0015	mg/L	0.05000		100	85-115			
Silver	0.052	0.00050	mg/L	0.05000		104	85-115			
Zinc	0.10	0.040	mg/L	0.1000		102	85-115			
LCS Dup (2002173-BSD1)				Prepared: 02/14/2020 Analyzed: 02/17/2020						
Arsenic	0.051	0.00050	mg/L	0.05000		102	85-115	1	20	
Barium	0.048	0.00050	mg/L	0.05000		97	85-115	5	20	
Cadmium	0.051	0.00025	mg/L	0.05000		102	85-115	1	20	
Chromium	0.052	0.00050	mg/L	0.05000		104	85-115	2	20	
Copper	0.050	0.00050	mg/L	0.05000		100	85-115	5	20	
Lead	0.051	0.00050	mg/L	0.05000		101	85-115	0.2	20	
Nickel	0.053	0.00050	mg/L	0.05000		106	85-115	0.4	20	
Selenium	0.049	0.0015	mg/L	0.05000		98	85-115	2	20	
Silver	0.051	0.00050	mg/L	0.05000		102	85-115	3	20	
Zinc	0.10	0.040	mg/L	0.1000		103	85-115	0.3	20	
Matrix Spike (2002173-MS1)				Source: 20B0270-01		Prepared: 02/14/2020 Analyzed: 02/17/2020				
Arsenic	0.053	0.00050	mg/L	0.05000	0.00086	103	70-130			
Barium	0.089	0.00050	mg/L	0.05000	0.041	96	70-130			
Cadmium	0.049	0.00025	mg/L	0.05000	ND	98	70-130			
Copper	0.054	0.00050	mg/L	0.05000	0.0090	90	70-130			
Lead	0.049	0.00050	mg/L	0.05000	0.00012	98	70-130			
Nickel	0.094	0.00050	mg/L	0.05000	0.042	105	70-130			
Selenium	0.051	0.0015	mg/L	0.05000	0.0011	100	70-130			
Silver	0.045	0.00050	mg/L	0.05000	0.00012	90	70-130			
Zinc	0.10	0.040	mg/L	0.1000	ND	103	70-130			

Client: Engineering and Environmental Consultants, Inc.
Project: A DOT Storm Water
Work Order: 20B0321
Date Received: 02/11/2020

QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 2002173 - E200.8 (5.4)										
Matrix Spike (2002173-MS2)		Source: 20B0426-01			Prepared: 02/14/2020 Analyzed: 02/17/2020					
Arsenic	0.058	0.00050	mg/L	0.05000	0.0067	102	70-130			
Barium	0.15	0.00050	mg/L	0.05000	0.11	96	70-130			
Cadmium	0.049	0.00025	mg/L	0.05000	ND	98	70-130			
Chromium	0.056	0.0025	mg/L	0.05000	0.0044	104	70-130			
Copper	0.11	0.00050	mg/L	0.05000	0.066	89	70-130			
Lead	0.051	0.00050	mg/L	0.05000	0.0013	99	70-130			
Nickel	0.082	0.00050	mg/L	0.05000	0.010	143	70-130			M6
Selenium	0.052	0.0015	mg/L	0.05000	0.0028	98	70-130			
Silver	0.047	0.00050	mg/L	0.05000	0.00020	94	70-130			
Zinc	0.13	0.040	mg/L	0.1000	0.027	108	70-130			

Client: Engineering and Environmental Consultants, Inc.
Project: A DOT Storm Water
Work Order: 20B0321
Date Received: 02/11/2020

QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 2002124 - E180.1										
Duplicate (2002124-DUP1)		Source: 20B0256-01		Prepared: 02/11/2020 Analyzed: 02/12/2020						
Turbidity	1.5	0.10	NTU		1.4			7	10	
Batch 2002129 - SM2540 C										
Duplicate (2002129-DUP1)		Source: 20B0270-01		Prepared: 02/12/2020 Analyzed: 02/14/2020						
Total Dissolved Solids (Residue, Filterable)	870	20	mg/L		880			2	5	
Duplicate (2002129-DUP2)		Source: 20B0229-01		Prepared: 02/12/2020 Analyzed: 02/17/2020						
Total Dissolved Solids (Residue, Filterable)	120	20	mg/L		140			14	5	
Batch 2002145 - SM2540 D										
Duplicate (2002145-DUP1)		Source: 20B0068-01		Prepared: 02/13/2020 Analyzed: 02/14/2020						
Total Suspended Solids	15	10	mg/L		15			0	5	
Duplicate (2002145-DUP2)		Source: 20B0343-08		Prepared: 02/13/2020 Analyzed: 02/14/2020						
Total Suspended Solids	7.0	10	mg/L		5.0			33	5	R1
Batch 2002161 - SM5210 B										
Blank (2002161-BLK1)				Prepared: 02/12/2020 Analyzed: 02/17/2020						
Biochemical Oxygen Demand	ND	2.0	mg/L							K10
LCS (2002161-BS1)				Prepared: 02/12/2020 Analyzed: 02/17/2020						
Biochemical Oxygen Demand	150		mg/L	198.0		73	85-115			K6
Duplicate (2002161-DUP1)		Source: 20B0311-02		Prepared: 02/12/2020 Analyzed: 02/17/2020						
Biochemical Oxygen Demand	9.4	2.0	mg/L		8.0			16	20	K9
Batch 2002252 - SM4500-NH3 B,C										
Blank (2002252-BLK1)				Prepared & Analyzed: 02/21/2020						
Nitrogen, Ammonia (As N)	ND	0.50	mg/L							
LCS (2002252-BS1)				Prepared & Analyzed: 02/21/2020						
Nitrogen, Ammonia (As N)	5.0	0.50	mg/L	5.000		101	90-110			
LCS Dup (2002252-BS1)				Prepared & Analyzed: 02/21/2020						
Nitrogen, Ammonia (As N)	5.1	0.50	mg/L	5.000		101	90-110	0.4	10	
Matrix Spike (2002252-MS1)		Source: 20B0001-03		Prepared & Analyzed: 02/21/2020						
Nitrogen, Ammonia (As N)	5.4	0.50	mg/L	5.000	0.27	103	75-120			
Matrix Spike (2002252-MS2)		Source: 20B0320-01		Prepared & Analyzed: 02/21/2020						
Nitrogen, Ammonia (As N)	4.9	0.50	mg/L	5.000	0.090	96	75-120			
Matrix Spike Dup (2002252-MSD1)		Source: 20B0001-03		Prepared & Analyzed: 02/21/2020						
Nitrogen, Ammonia (As N)	5.3	0.50	mg/L	5.000	0.27	100	75-120	3	20	
Matrix Spike Dup (2002252-MSD2)		Source: 20B0320-01		Prepared & Analyzed: 02/21/2020						
Nitrogen, Ammonia (As N)	5.0	0.50	mg/L	5.000	0.090	97	75-120	1	20	
Batch 2002262 - Hach 8000										

Client: Engineering and Environmental Consultants, Inc.
Project: A DOT Storm Water
Work Order: 20B0321
Date Received: 02/11/2020

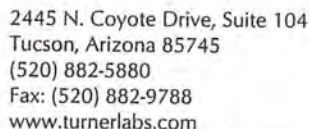
QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC Limits	RPD	RPD Limit	Qual
Batch 2002262 - Hach 8000									
Blank (2002262-BLK1)				Prepared & Analyzed: 02/21/2020					
Chemical Oxygen Demand	ND	20	mg/L						
LCS (2002262-BS1)				Prepared & Analyzed: 02/21/2020					
Chemical Oxygen Demand	480	20	mg/L	500.0		97	70-130		
LCS Dup (2002262-BSD1)				Prepared & Analyzed: 02/21/2020					
Chemical Oxygen Demand	490	20	mg/L	500.0		99	70-130	2	20
Matrix Spike (2002262-MS1)				Source: 20B0291-01		Prepared & Analyzed: 02/21/2020			
Chemical Oxygen Demand	540	20	mg/L	500.0	65	95	70-130		
Matrix Spike Dup (2002262-MSD1)				Source: 20B0291-01		Prepared & Analyzed: 02/21/2020			
Chemical Oxygen Demand	530	20	mg/L	500.0	65	94	70-130	1	20

Client: Engineering and Environmental Consultants, Inc.
Project: A DOT Storm Water
Work Order: 20B0321
Date Received: 02/11/2020

QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 2002106 - E300.0 (2.1)										
Blank (2002106-BLK1)				Prepared & Analyzed: 02/11/2020						
Chloride	ND	1.0	mg/L							
Nitrogen, Nitrate (As N)	ND	0.50	mg/L							
Nitrogen, Nitrite (As N)	ND	0.10	mg/L							
Sulfate	ND	5.0	mg/L							
LCS (2002106-BS1)				Prepared & Analyzed: 02/11/2020						
Chloride	12	1.0	mg/L	12.50		96	90-110			
Nitrogen, Nitrate (As N)	4.9	0.50	mg/L	5.000		97	90-110			
Nitrogen, Nitrite (As N)	2.5	0.10	mg/L	2.500		99	90-110			
Sulfate	12	5.0	mg/L	12.50		98	90-110			
LCS Dup (2002106-BSD1)				Prepared & Analyzed: 02/11/2020						
Chloride	12	1.0	mg/L	12.50		96	90-110	0.05	10	
Nitrogen, Nitrate (As N)	4.9	0.50	mg/L	5.000		97	90-110	0.004	10	
Nitrogen, Nitrite (As N)	2.5	0.10	mg/L	2.500		98	90-110	0.4	10	
Sulfate	12	5.0	mg/L	12.50		98	90-110	0.03	10	
Matrix Spike (2002106-MS1)				Source: 20B0319-01		Prepared & Analyzed: 02/11/2020				
Chloride	18	1.0	mg/L	12.50	5.5	101	80-120			
Nitrogen, Nitrate (As N)	5.8	0.50	mg/L	5.000	0.79	99	80-120			
Nitrogen, Nitrite (As N)	2.6	0.10	mg/L	2.500	0.056	102	80-120			
Sulfate	18	5.0	mg/L	12.50	6.1	94	80-120			
Matrix Spike (2002106-MS2)				Source: 20B0343-06		Prepared & Analyzed: 02/11/2020				
Nitrogen, Nitrate (As N)	5.4	0.50	mg/L	5.000	0.98	88	80-120			
Sulfate	30	5.0	mg/L	12.50	22	64	80-120			M2
Matrix Spike (2002106-MS3)				Source: 20B0343-03		Prepared: 02/11/2020 Analyzed: 02/12/2020				
Chloride	10	1.0	mg/L	12.50	ND	80	80-120			M2
Nitrogen, Nitrate (As N)	4.0	0.50	mg/L	5.000	ND	81	80-120			
Nitrogen, Nitrite (As N)	2.1	0.10	mg/L	2.500	ND	82	80-120			
Sulfate	10	5.0	mg/L	12.50	ND	84	80-120			
Matrix Spike Dup (2002106-MSD1)				Source: 20B0319-01		Prepared & Analyzed: 02/11/2020				
Chloride	22	1.0	mg/L	12.50	5.5	133	80-120	20	10	R13
Nitrogen, Nitrate (As N)	7.4	0.50	mg/L	5.000	0.79	131	80-120	24	10	R13
Nitrogen, Nitrite (As N)	3.4	0.10	mg/L	2.500	0.056	132	80-120	26	10	R13
Sulfate	22	5.0	mg/L	12.50	6.1	125	80-120	20	10	R13
Matrix Spike Dup (2002106-MSD2)				Source: 20B0343-06		Prepared & Analyzed: 02/11/2020				
Nitrogen, Nitrate (As N)	5.3	0.50	mg/L	5.000	0.98	86	80-120	2	10	
Sulfate	30	5.0	mg/L	12.50	22	62	80-120	0.6	10	M2
Matrix Spike Dup (2002106-MSD3)				Source: 20B0343-03		Prepared: 02/11/2020 Analyzed: 02/12/2020				
Chloride	11	1.0	mg/L	12.50	ND	85	80-120	7	10	
Nitrogen, Nitrate (As N)	4.3	0.50	mg/L	5.000	ND	85	80-120	6	10	
Nitrogen, Nitrite (As N)	2.2	0.10	mg/L	2.500	ND	87	80-120	6	10	
Sulfate	11	5.0	mg/L	12.50	ND	89	80-120	6	10	



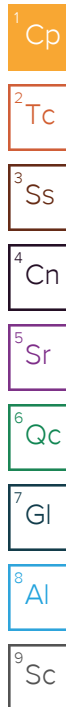
TURNER WORK ORDER # 20B0321 DATE 7/11/20 PAGE 1 OF 1

Page 12 of 23



ANALYTICAL REPORT

February 20, 2020



Turner Laboratories Inc

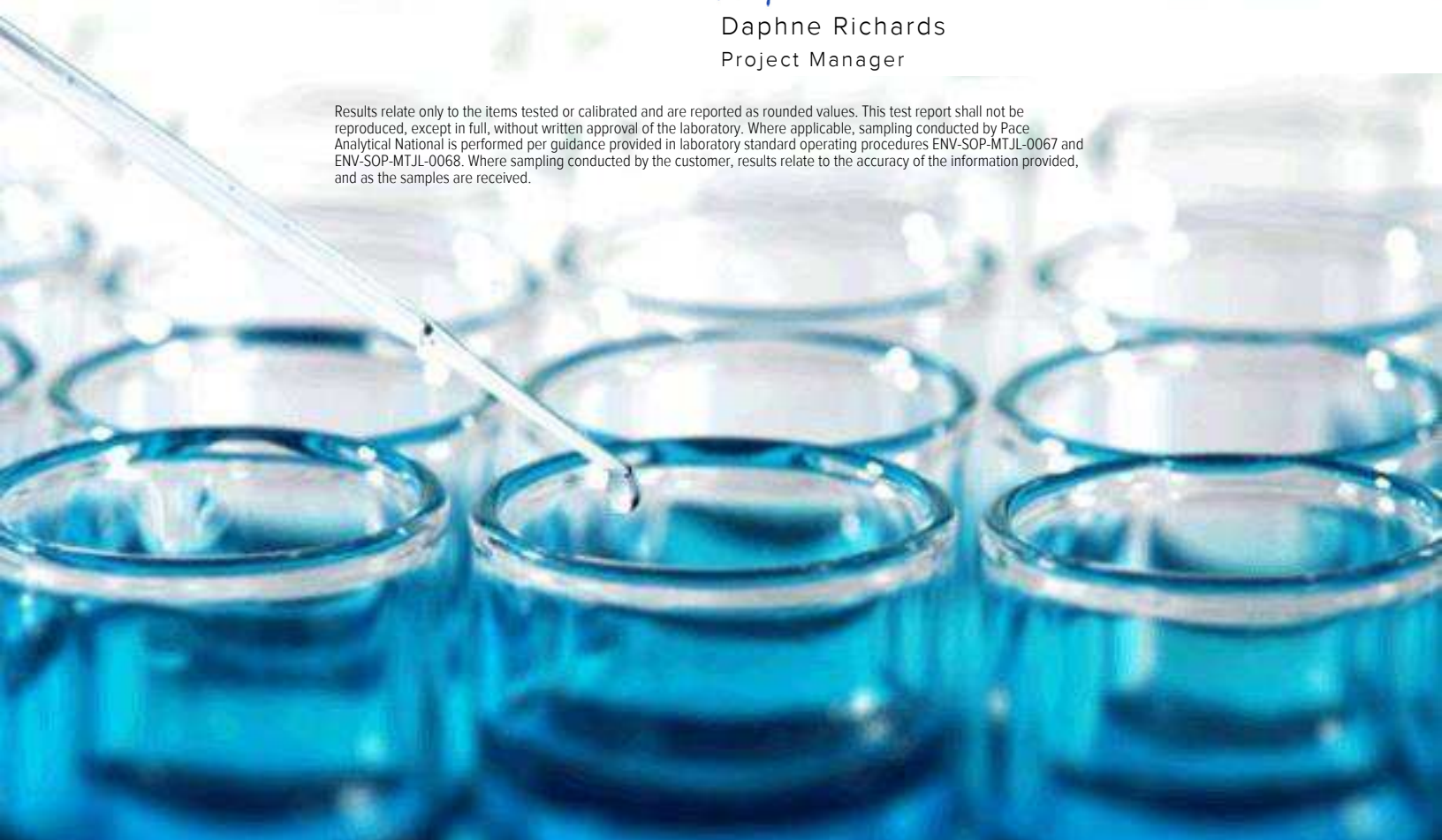
Sample Delivery Group: L1189262
Samples Received: 02/13/2020
Project Number: 20B0321
Description:

Report To: Elizabeth Kasik
2445 North Coyote Drive
Suite 104
Tucson, AZ 85745

Entire Report Reviewed By:

Daphne Richards
Project Manager

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by Pace Analytical National is performed per guidance provided in laboratory standard operating procedures ENV-SOP-MTJL-0067 and ENV-SOP-MTJL-0068. Where sampling conducted by the customer, results relate to the accuracy of the information provided, and as the samples are received.





Cp: Cover Page	1	¹ Cp
Tc: Table of Contents	2	
Ss: Sample Summary	3	² Tc
Cn: Case Narrative	4	
Sr: Sample Results	5	³ Ss
20B0321-01 L1189262-01	5	
Qc: Quality Control Summary	6	⁴ Cn
Semi-Volatile Organic Compounds (HPLC) by Method 8310	6	⁵ Sr
Gl: Glossary of Terms	8	
Al: Accreditations & Locations	9	⁶ Qc
Sc: Sample Chain of Custody	10	⁷ Gl
		⁸ Al
		⁹ Sc



20B0321-01 L1189262-01 GW

Collected by
Collected date/time
Received date/time

02/10/20 19:50
02/13/20 16:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Semi-Volatile Organic Compounds (HPLC) by Method 8310	WG1428899	1.01	02/16/20 16:32	02/18/20 12:02	GKM	Mt. Juliet, TN

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc



All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Daphne Richards
Project Manager

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc



Semi-Volatile Organic Compounds (HPLC) by Method 8310

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch	
Anthracene	ND		0.000101	1.01	02/18/2020 12:02	WG1428899	¹ Cp
Acenaphthene	ND		0.000101	1.01	02/18/2020 12:02	WG1428899	² Tc
Acenaphthylene	ND		0.000101	1.01	02/18/2020 12:02	WG1428899	³ Ss
Benzo(a)anthracene	ND		0.000101	1.01	02/18/2020 12:02	WG1428899	⁴ Cn
Benzo(a)pyrene	ND		0.000101	1.01	02/18/2020 12:02	WG1428899	⁵ Sr
Benzo(b)fluoranthene	ND		0.000101	1.01	02/18/2020 12:02	WG1428899	⁶ Qc
Benzo(g,h,i)perylene	ND		0.000101	1.01	02/18/2020 12:02	WG1428899	⁷ Gl
Benzo(k)fluoranthene	ND		0.000101	1.01	02/18/2020 12:02	WG1428899	⁸ Al
Chrysene	ND		0.000101	1.01	02/18/2020 12:02	WG1428899	⁹ Sc
Dibenz(a,h)anthracene	ND		0.000101	1.01	02/18/2020 12:02	WG1428899	
Fluoranthene	ND		0.000101	1.01	02/18/2020 12:02	WG1428899	
Fluorene	ND		0.000101	1.01	02/18/2020 12:02	WG1428899	
Indeno(1,2,3-cd)pyrene	ND		0.000101	1.01	02/18/2020 12:02	WG1428899	
1-Methylnaphthalene	ND		0.00101	1.01	02/18/2020 12:02	WG1428899	
2-Methylnaphthalene	ND		0.00101	1.01	02/18/2020 12:02	WG1428899	
Naphthalene	ND		0.00101	1.01	02/18/2020 12:02	WG1428899	
Phenanthrene	ND		0.000101	1.01	02/18/2020 12:02	WG1428899	
Pyrene	ND		0.000101	1.01	02/18/2020 12:02	WG1428899	
(S) p-Terphenyl-d14	85.1		44.0-121		02/18/2020 12:02	WG1428899	

Method Blank (MB)

(MB) R3501142-1 02/18/20 10:41

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Anthracene	U		0.0000301	0.000100
Acenaphthene	U		0.0000282	0.000100
Acenaphthylene	U		0.0000361	0.000100
Benzo(a)anthracene	U		0.00000240	0.000100
Benzo(a)pyrene	U		0.00000263	0.000100
Benzo(b)fluoranthene	U		0.00000212	0.000100
Benzo(g,h,i)perylene	U		0.00000227	0.000100
Benzo(k)fluoranthene	U		0.00000262	0.000100
Chrysene	U		0.00000343	0.000100
Dibenz(a,h)anthracene	U		0.00000161	0.000100
Fluoranthene	U		0.00000305	0.000100
Fluorene	U		0.00000327	0.000100
Indeno(1,2,3-cd)pyrene	U		0.00000323	0.000100
1-Methylnaphthalene	U		0.00000944	0.00100
2-Methylnaphthalene	U		0.00000408	0.00100
Naphthalene	U		0.00000499	0.00100
Phenanthrene	U		0.00000383	0.000100
Pyrene	U		0.00000351	0.000100
(S) p-Terphenyl-d14	83.5			44.0-121

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3501142-2 02/18/20 11:08 • (LCSD) R3501142-3 02/18/20 11:35

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Anthracene	0.00400	0.00333	0.00330	83.2	82.5	64.0-115			0.905	20
Acenaphthene	0.00400	0.00314	0.00309	78.5	77.3	60.0-115			1.61	20
Acenaphthylene	0.00400	0.00316	0.00311	79.0	77.7	59.0-115			1.59	20
Benzo(a)anthracene	0.00400	0.00356	0.00349	89.0	87.3	68.0-115			1.99	20
Benzo(a)pyrene	0.00400	0.00345	0.00337	86.2	84.3	63.0-115			2.35	20
Benzo(b)fluoranthene	0.00400	0.00368	0.00360	92.0	90.0	64.0-115			2.20	20
Benzo(g,h,i)perylene	0.00400	0.00345	0.00339	86.2	84.7	37.0-115			1.75	20
Benzo(k)fluoranthene	0.00400	0.00360	0.00352	90.0	88.0	61.0-115			2.25	20
Chrysene	0.00400	0.00366	0.00358	91.5	89.5	66.0-115			2.21	20
Dibenz(a,h)anthracene	0.00400	0.00351	0.00350	87.7	87.5	28.0-115			0.285	20
Fluoranthene	0.00400	0.00354	0.00350	88.5	87.5	67.0-115			1.14	20
Fluorene	0.00400	0.00308	0.00304	77.0	76.0	56.0-115			1.31	20
Indeno(1,2,3-cd)pyrene	0.00400	0.00337	0.00330	84.3	82.5	55.0-115			2.10	20
1-Methylnaphthalene	0.00400	0.00265	0.00260	66.2	65.0	44.0-115			1.90	20



Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3501142-2 02/18/20 11:08 • (LCSD) R3501142-3 02/18/20 11:35

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	<u>LCS Qualifier</u>	<u>LCSD Qualifier</u>	RPD %	RPD Limits %
2-Methylnaphthalene	0.00400	0.00284	0.00279	71.0	69.8	45.0-115			1.78	20
Naphthalene	0.00400	0.00273	0.00267	68.3	66.8	48.0-115			2.22	20
Phenanthrene	0.00400	0.00342	0.00337	85.5	84.3	65.0-115			1.47	20
Pyrene	0.00400	0.00374	0.00369	93.5	92.2	73.0-115			1.35	20
(S) p-Terphenyl-d14				85.5	85.0	44.0-121				

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc



Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier Description

The remainder of this page intentionally left blank, there are no qualifiers applied to this SDG.

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



Pace National is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our one location design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be YOUR LAB OF CHOICE.

* Not all certifications held by the laboratory are applicable to the results reported in the attached report.

* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace National.

State Accreditations

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN-03-2002-34
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey–NELAP	TN002
California	2932	New Mexico ¹	n/a
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina ¹	DW21704
Georgia	NELAP	North Carolina ³	41
Georgia ¹	923	North Dakota	R-140
Idaho	TN00003	Ohio–VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LA000356
Kentucky ^{1 6}	90010	South Carolina	84004
Kentucky ²	16	South Dakota	n/a
Louisiana	AI30792	Tennessee ^{1 4}	2006
Louisiana ¹	LA180010	Texas	T104704245-18-15
Maine	TN0002	Texas ⁵	LAB0152
Maryland	324	Utah	TN00003
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	460132
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA

Third Party Federal Accreditations

A2LA – ISO 17025	1461.01	AIHA-LAP, LLC EMLAP	100789
A2LA – ISO 17025 ⁵	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA–Crypto	TN00003		

¹ Drinking Water ² Underground Storage Tanks ³ Aquatic Toxicity ⁴ Chemical/Microbiological ⁵ Mold ⁶ Wastewater n/a Accreditation not applicable

Our Locations

Pace National has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. Pace National performs all testing at our central laboratory.



SUBCONTRACT ORDER

Turner Laboratories, Inc.

20B0321

4189262

SENDING LABORATORY:

Turner Laboratories, Inc.
2445 N. Coyote Drive, Ste #104
Tucson, AZ 85745
Phone: 520.882.5880
Fax: 520.882.9788
Project Manager: Elizabeth Kasik

RECEIVING LABORATORY:

Pace Analytical Services - Tennessee
12065 Lebabon Rd.
Mt. Juliet, TN 37122
Phone : (615) 758-5858
Fax: -
Please CC Kevin Brim Kbrim@turnerlabs.com

Analysis	Expires	Laboratory ID	Comments
Sample ID: 20B0321-01 Non-Potable Wa: Sampled: 02/10/2020 19:50			ro
PAHs by SW 8310	02/17/2020 19:50		
Containers Supplied:			

E185

RAD SCREEN: <0.5 mR/hr

Released By

Date

Received By

Date

Released By

Date

Received By

Date

Pace Analytical National Center for Testing & Innovation
Cooler Receipt Form

Client: <u>TURKABTAZ</u>	L1189262		
Cooler Received/Opened On: <u>2/13/20</u>	Temperature: <u>0.3°C</u>		
Received By: <u>LUCAS GREEN</u>			
Signature: <u>[Signature]</u>			
Receipt Check List	NP	Yes	No
COC Seal Present / Intact?	/		
COC Signed / Accurate?		/	
Bottles arrive intact?		/	
Correct bottles used?		/	
Sufficient volume sent?		/	
If Applicable			
VOA Zero headspace?			
Preservation Correct / Checked?			



July 31, 2019

Michelle Oakley
NV5
7620 North Hartman Lane, Suite 162
Tucson, AZ 85743

TEL (520) 638-7270
FAX (623) 738-3690

Work Order No.: 19G0551
Order Name: ADOT Stormwater

RE: Storm Water

Dear Michelle Oakley,

Turner Laboratories, Inc. received 1 sample(s) on 07/18/2019 for the analyses presented in the following report.

All results are intended to be considered in their entirety, and Turner Laboratories, Inc. is not responsible for use of less than the complete report. Results apply only to the samples analyzed. Samples will be disposed of 30 days after issue of our report unless special arrangements are made.

The pages that follow may contain sensitive, privileged or confidential information intended solely for the addressee named above. If you receive this message and are not the agent or employee of the addressee, this communication has been sent in error. Please do not disseminate or copy any of the attached and notify the sender immediately by telephone. Please also return the attached sheet(s) to the sender by mail.

Please call if you have any questions.

Respectfully submitted,

Turner Laboratories, Inc.
ADHS License AZ0066

Kevin Brim
Project Manager

Client: NV5
Project: Storm Water
Work Order: 19G0551
Date Received: 07/18/2019

Order: ADOT Stormwater

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Matrix	Collection Date/Time
19G0551-01	NOGMS4190718	Storm Water	07/18/2019 1200

Client: NV5
Project: Storm Water
Work Order: 19G0551
Date Received: 07/18/2019

Case Narrative

- C4 Confirmatory analysis was past holding time
- K6 Glucose/glutamic acid BOD/CBOD was below the method acceptance criteria.
- M1 Matrix spike recovery was high; the associated LCS/LCSD was acceptable.
- M2 Matrix spike recovery was low; the associated LCS/LCSD was acceptable.
- Q9 Insufficient sample received to meet method QC requirements.
- R12 RPD/RSD exceeded the method acceptance limit. Result less than 5 times the PQL.

All soil, sludge, and solid matrix determinations are reported on a wet weight basis unless otherwise noted.

- ND Not Detected at or above the PQL
- PQL Practical Quantitation Limit
- DF Dilution Factor

Client: NV5
 Project: Storm Water
 Work Order: 19G0551
 Lab Sample ID: 19G0551-01

Client Sample ID: NOGMS4190718
 Collection Date/Time: 07/18/2019 1200
 Matrix: Storm Water
 Order Name: ADOT Stormwater

Analyses	Result	PQL	Qual	Units	DF	Prep Date	Analysis Date	Analyst
Hardness-Calculation								
Hardness, Calcium/Magnesium (As CaCO3)	110			mg/L	1	07/29/2019 1210	07/30/2019 1523	MH
ICP/MS Dissolved Metals-E 200.8 (5.4)								
Copper	0.015	0.00050		mg/L	1	07/29/2019 1335	07/30/2019 1042	MH
Turbidity-E180.1								
Turbidity	180	0.20		NTU	2	07/19/2019 1600	07/19/2019 1615	LXM
ICP Total Metals-E200.7 (4.4)								
Calcium	26	4.0		mg/L	1	07/29/2019 1210	07/30/2019 1523	MH
Magnesium	11	3.0		mg/L	1	07/29/2019 1210	07/30/2019 1523	MH
Sodium	ND	5.0		mg/L	1	07/29/2019 1210	07/30/2019 1523	MH
ICP/MS Total Metals-E200.8 (5.4)								
Arsenic	0.0068	0.0025		mg/L	5	07/24/2019 1015	07/26/2019 1000	MH
Barium	0.19	0.0025		mg/L	5	07/24/2019 1015	07/25/2019 1836	MH
Cadmium	ND	0.00025		mg/L	1	07/24/2019 1015	07/25/2019 1501	MH
Chromium	0.0071	0.0025		mg/L	5	07/24/2019 1015	07/25/2019 1836	MH
Copper	0.038	0.00050		mg/L	1	07/24/2019 1015	07/25/2019 1501	MH
Lead	0.057	0.00050		mg/L	1	07/24/2019 1015	07/25/2019 1501	MH
Nickel	0.020	0.0025		mg/L	5	07/24/2019 1015	07/25/2019 1836	MH
Selenium	ND	0.0025		mg/L	1	07/24/2019 1015	07/25/2019 1501	MH
Silver	ND	0.00050		mg/L	1	07/24/2019 1015	07/25/2019 1501	MH
Zinc	0.15	0.040		mg/L	1	07/24/2019 1015	07/25/2019 1501	MH
CVAA Total Mercury-E245.1								
Mercury	ND	0.0010		mg/L	1	07/23/2019 1035	07/23/2019 1622	MH
Anions by Ion Chromatography-E300.0 (2.1)								
Chloride	2.3	1.0		mg/L	1	07/22/2019 1130	07/22/2019 1717	EJ
Nitrogen, Nitrate (As N)	0.81	0.50	C4	mg/L	1	07/22/2019 1130	07/22/2019 1717	EJ
Nitrogen, Nitrite (As N)	ND	0.10	C4	mg/L	1	07/22/2019 1130	07/22/2019 1717	EJ
Sulfate	ND	5.0		mg/L	1	07/19/2019 1200	07/19/2019 1307	EJ
Chemical Oxygen Demand-Hach 8000								
Chemical Oxygen Demand	160	20		mg/L	1	07/19/2019 0900	07/19/2019 1525	EJ
Total Dissolved Solids (Residue, Filterable)-SM2540 C								

Client: NV5
Project: Storm Water
Work Order: 19G0551
Lab Sample ID: 19G0551-01

Client Sample ID: NOGMS4190718
Collection Date/Time: 07/18/2019 1200
Matrix: Storm Water
Order Name: ADOT Stormwater

Analyses	Result	PQL	Qual	Units	DF	Prep Date	Analysis Date	Analyst
Total Dissolved Solids (Residue, Filterable)	96	20		mg/L	1	07/23/2019 0834	07/25/2019 1600	CR
Total Suspended Solids (Residue, Non-Filterable)-SM2540 D								
Total Suspended Solids	1300	10		mg/L	1	07/24/2019 0859	07/25/2019 1300	CR
Ammonia as N-SM4500-NH3 B,C								
Nitrogen, Ammonia (As N)	ND	0.50		mg/L	1	07/23/2019 0900	07/23/2019 1345	EJ
BOD, 5 day-SM5210 B								
Biochemical Oxygen Demand	17	2.0		mg/L	1	07/19/2019 0810	07/24/2019 1850	CR

Client: NV5
Project: Storm Water
Work Order: 19G0551
Date Received: 07/18/2019

QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 1907279 - E245.1										
Blank (1907279-BLK1)				Prepared & Analyzed: 07/23/2019						
Mercury	ND	0.0010	mg/L							
LCS (1907279-BS1)				Prepared & Analyzed: 07/23/2019						
Mercury	0.0055	0.0010	mg/L	0.005000		110	85-115			
LCS Dup (1907279-BSD1)				Prepared & Analyzed: 07/23/2019						
Mercury	0.0055	0.0010	mg/L	0.005000		110	85-115	0.1	20	
Matrix Spike (1907279-MS1)				Source: 19G0495-01		Prepared & Analyzed: 07/23/2019				
Mercury	0.0056	0.0010	mg/L	0.005000	0.00018	109	70-130			
Matrix Spike (1907279-MS2)				Source: 19G0519-01		Prepared & Analyzed: 07/23/2019				
Mercury	0.0055	0.0010	mg/L	0.005000	0.00014	108	70-130			
Matrix Spike Dup (1907279-MSD1)				Source: 19G0495-01		Prepared & Analyzed: 07/23/2019				
Mercury	0.0055	0.0010	mg/L	0.005000	0.00018	107	70-130	2	20	
Matrix Spike Dup (1907279-MSD2)				Source: 19G0519-01		Prepared & Analyzed: 07/23/2019				
Mercury	0.0055	0.0010	mg/L	0.005000	0.00014	108	70-130	0.1	20	
Batch 1907301 - E200.8 (5.4)										
Blank (1907301-BLK1)				Prepared: 07/24/2019 Analyzed: 07/25/2019						
Arsenic	ND	0.00050	mg/L							
Barium	ND	0.00050	mg/L							
Cadmium	ND	0.00025	mg/L							
Chromium	ND	0.00050	mg/L							
Copper	ND	0.00050	mg/L							
Lead	ND	0.00050	mg/L							
Nickel	ND	0.00050	mg/L							
Selenium	ND	0.0015	mg/L							
Silver	ND	0.00050	mg/L							
Zinc	ND	0.040	mg/L							
LCS (1907301-BS1)				Prepared: 07/24/2019 Analyzed: 07/25/2019						
Arsenic	0.049	0.00050	mg/L	0.05000		98	85-115			
Barium	0.049	0.00050	mg/L	0.05000		98	85-115			
Cadmium	0.050	0.00025	mg/L	0.05000		100	85-115			
Chromium	0.049	0.00050	mg/L	0.05000		98	85-115			
Copper	0.048	0.00050	mg/L	0.05000		96	85-115			
Lead	0.051	0.00050	mg/L	0.05000		103	85-115			
Nickel	0.053	0.00050	mg/L	0.05000		106	85-115			
Selenium	0.047	0.0015	mg/L	0.05000		95	85-115			
Silver	0.049	0.00050	mg/L	0.05000		97	85-115			
Zinc	0.090	0.040	mg/L	0.1000		90	85-115			

Client: NV5
 Project: Storm Water
 Work Order: 19G0551
 Date Received: 07/18/2019

QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 1907301 - E200.8 (5.4)										
LCS Dup (1907301-BSD1)				Prepared: 07/24/2019 Analyzed: 07/25/2019						
Arsenic	0.048	0.00050	mg/L	0.05000		97	85-115	1	20	
Barium	0.051	0.00050	mg/L	0.05000		101	85-115	3	20	
Cadmium	0.050	0.00025	mg/L	0.05000		100	85-115	0.6	20	
Chromium	0.050	0.00050	mg/L	0.05000		100	85-115	2	20	
Copper	0.049	0.00050	mg/L	0.05000		98	85-115	2	20	
Lead	0.051	0.00050	mg/L	0.05000		103	85-115	0.04	20	
Nickel	0.051	0.00050	mg/L	0.05000		102	85-115	4	20	
Selenium	0.047	0.0015	mg/L	0.05000		95	85-115	0.2	20	
Silver	0.050	0.00050	mg/L	0.05000		100	85-115	2	20	
Zinc	0.093	0.040	mg/L	0.1000		93	85-115	2	20	
Matrix Spike (1907301-MS1)				Source: 19G0441-01		Prepared: 07/24/2019 Analyzed: 07/25/2019				
Arsenic	0.046	0.0050	mg/L	0.05000	ND	93	70-130			
Barium	0.048	0.0025	mg/L	0.05000	0.0028	91	70-130			
Cadmium	0.048	0.0025	mg/L	0.05000	0.00055	94	70-130			
Chromium	0.049	0.0050	mg/L	0.05000	0.00029	97	70-130			
Copper	0.14	0.0025	mg/L	0.05000	0.093	98	70-130			
Lead	0.057	0.0025	mg/L	0.05000	0.0045	104	70-130			
Nickel	0.19	0.0050	mg/L	0.05000	0.15	87	70-130			
Selenium	0.063	0.015	mg/L	0.05000	0.0036	118	70-130			
Silver	0.040	0.0050	mg/L	0.05000	ND	80	70-130			
Zinc	0.27	0.40	mg/L	0.1000	0.19	84	70-130			
Batch 1907353 - E 200.8 (5.4)										
Blank (1907353-BLK1)				Prepared & Analyzed: 07/30/2019						
Copper	ND	0.00050	mg/L							
LCS (1907353-BS1)				Prepared & Analyzed: 07/30/2019						
Copper	0.048	0.00050	mg/L	0.05000		95	85-115			
LCS Dup (1907353-BSD1)				Prepared & Analyzed: 07/30/2019						
Copper	0.047	0.00050	mg/L	0.05000		93	85-115	2	20	
Matrix Spike (1907353-MS1)				Source: 19G0550-01		Prepared & Analyzed: 07/30/2019				
Copper	0.059	0.00050	mg/L	0.05000	0.014	90	70-130			
Batch 1907362 - E200.7 (4.4)										
Blank (1907362-BLK1)				Prepared: 07/29/2019 Analyzed: 07/30/2019						
Calcium	ND	4.0	mg/L							
Magnesium	ND	3.0	mg/L							
Sodium	ND	5.0	mg/L							
LCS (1907362-BS1)				Prepared: 07/29/2019 Analyzed: 07/30/2019						
Calcium	9.9	4.0	mg/L	10.00		99	85-115			
Magnesium	9.9	3.0	mg/L	10.00		99	85-115			
Sodium	9.8	5.0	mg/L	10.00		98	85-115			

Client: NV5
Project: Storm Water
Work Order: 19G0551
Date Received: 07/18/2019

QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC Limits	RPD	RPD Limit	Qual
Batch 1907362 - E200.7 (4.4)									
LCS Dup (1907362-BSD1)				Prepared: 07/29/2019 Analyzed: 07/30/2019					
Calcium	9.7	4.0	mg/L	10.00		97	85-115	2	20
Magnesium	9.7	3.0	mg/L	10.00		97	85-115	1	20
Sodium	9.9	5.0	mg/L	10.00		99	85-115	2	20
Matrix Spike (1907362-MS1)				Source: 19G0677-01		Prepared: 07/29/2019 Analyzed: 07/30/2019			
Calcium	58	4.0	mg/L	10.00	49	87	70-130		
Magnesium	20	3.0	mg/L	10.00	10	95	70-130		
Sodium	47	5.0	mg/L	10.00	39	82	70-130		
Matrix Spike (1907362-MS2)				Source: 19G0677-02		Prepared: 07/29/2019 Analyzed: 07/30/2019			
Calcium	60	4.0	mg/L	10.00	52	81	70-130		
Magnesium	20	3.0	mg/L	10.00	11	93	70-130		
Sodium	48	5.0	mg/L	10.00	40	81	70-130		

Client: NV5
Project: Storm Water
Work Order: 19G0551
Date Received: 07/18/2019

QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 1907249 - E180.1										
Duplicate (1907249-DUP1)		Source: 19G0551-01		Prepared & Analyzed: 07/19/2019						
Turbidity	180	0.20	NTU		180			0	10	
Batch 1907255 - Hach 8000										
Blank (1907255-BLK1)		Prepared & Analyzed: 07/19/2019								
Chemical Oxygen Demand	ND	20	mg/L							
LCS (1907255-BS1)		Prepared & Analyzed: 07/19/2019								
Chemical Oxygen Demand	490	20	mg/L	500.0		97	70-130			
LCS Dup (1907255-BSD1)		Prepared & Analyzed: 07/19/2019								
Chemical Oxygen Demand	500	20	mg/L	500.0		100	70-130	3	20	
Matrix Spike (1907255-MS1)		Prepared & Analyzed: 07/19/2019								
Chemical Oxygen Demand	560	20	mg/L	500.0	22	107	70-130			
Matrix Spike Dup (1907255-MSD1)		Prepared & Analyzed: 07/19/2019								
Chemical Oxygen Demand	590	20	mg/L	500.0	22	113	70-130	5	20	
Batch 1907256 - SM5210 B										
Blank (1907256-BLK1)		Prepared: 07/19/2019 Analyzed: 07/24/2019								
Biochemical Oxygen Demand	ND	2.0	mg/L							
LCS (1907256-BS1)		Prepared: 07/19/2019 Analyzed: 07/24/2019								
Biochemical Oxygen Demand	140		mg/L	198.0		73	85-115			K6
Duplicate (1907256-DUP1)		Prepared: 07/19/2019 Analyzed: 07/24/2019								
Biochemical Oxygen Demand	16	2.0	mg/L		17			8	20	
Batch 1907277 - SM2540 C										
Duplicate (1907277-DUP1)		Prepared: 07/23/2019 Analyzed: 07/26/2019								
Total Dissolved Solids (Residue, Filterable)	860	20	mg/L		860			1	5	
Duplicate (1907277-DUP2)		Prepared: 07/23/2019 Analyzed: 07/26/2019								
Total Dissolved Solids (Residue, Filterable)	200	20	mg/L		200			1	5	
Batch 1907280 - SM4500-NH3 B,C										
Blank (1907280-BLK1)		Prepared & Analyzed: 07/23/2019								
Nitrogen, Ammonia (As N)	ND	0.50	mg/L							
LCS (1907280-BS1)		Prepared & Analyzed: 07/23/2019								
Nitrogen, Ammonia (As N)	4.7	0.50	mg/L	5.000		93	90-110			
LCS Dup (1907280-BSD1)		Prepared & Analyzed: 07/23/2019								
Nitrogen, Ammonia (As N)	5.0	0.50	mg/L	5.000		101	90-110	8	10	
Matrix Spike (1907280-MS1)		Prepared & Analyzed: 07/23/2019								
Nitrogen, Ammonia (As N)	9.2	0.50	mg/L	5.000	3.2	120	75-120			

Client: NV5
Project: Storm Water
Work Order: 19G0551
Date Received: 07/18/2019

QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC Limits	RPD	RPD Limit	Qual
Batch 1907280 - SM4500-NH3 B,C									
Matrix Spike (1907280-MS2)		Source: 19G0588-04		Prepared & Analyzed: 07/23/2019					
Nitrogen, Ammonia (As N)	5.2	0.50	mg/L	5.000	0.27	99	75-120		
Matrix Spike (1907280-MS3)		Source: 19G0588-06		Prepared & Analyzed: 07/23/2019					
Nitrogen, Ammonia (As N)	4.6	0.50	mg/L	5.000	1.2	69	75-120		M2
Matrix Spike Dup (1907280-MSD1)		Source: 19G0315-01		Prepared & Analyzed: 07/23/2019					
Nitrogen, Ammonia (As N)	9.3	0.50	mg/L	5.000	3.2	121	75-120	0.5	20 M1
Matrix Spike Dup (1907280-MSD2)		Source: 19G0588-04		Prepared & Analyzed: 07/23/2019					
Nitrogen, Ammonia (As N)	5.6	0.50	mg/L	5.000	0.27	107	75-120	7	20
Matrix Spike Dup (1907280-MSD3)		Source: 19G0588-06		Prepared & Analyzed: 07/23/2019					
Nitrogen, Ammonia (As N)	4.7	0.50	mg/L	5.000	1.2	70	75-120	2	20 M2
Batch 1907292 - SM2540 D									
Duplicate (1907292-DUP1)		Source: 19G0613-01		Prepared: 07/24/2019 Analyzed: 07/25/2019					
Total Suspended Solids	47	10	mg/L		47			0	5
Duplicate (1907292-DUP2)		Source: 19G0636-02		Prepared: 07/24/2019 Analyzed: 07/25/2019					
Total Suspended Solids	1.0	10	mg/L		ND			200	5 Q9, R12

Client: NV5
Project: Storm Water
Work Order: 19G0551
Date Received: 07/18/2019

QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 1907239 - E300.0 (2.1)										
Blank (1907239-BLK1)				Prepared & Analyzed: 07/19/2019						
Sulfate	ND	5.0	mg/L							
LCS (1907239-BS1)				Prepared & Analyzed: 07/19/2019						
Sulfate	11	5.0	mg/L	12.50		90	90-110			
LCS Dup (1907239-BSD1)				Prepared & Analyzed: 07/19/2019						
Sulfate	11	5.0	mg/L	12.50		91	90-110	1	10	
Matrix Spike (1907239-MS1)				Source: 19G0551-01		Prepared & Analyzed: 07/19/2019				
Sulfate	14	5.0	mg/L	12.50	3.4	84	80-120			
Matrix Spike (1907239-MS3)				Source: 19G0516-20		Prepared: 07/19/2019 Analyzed: 07/20/2019				
Sulfate	2700	500	mg/L	1250	1900	65	80-120			M2
Matrix Spike (1907239-MS4)				Source: 19G0516-21		Prepared: 07/19/2019 Analyzed: 07/20/2019				
Sulfate	2800	500	mg/L	1250	1900	75	80-120			M2
Matrix Spike (1907239-MS5)				Source: 19G0516-37RE1		Prepared & Analyzed: 07/26/2019				
Chloride	15		mg/L	12.50	3.3	92	80-120			
Sulfate	24		mg/L	12.50		196	80-120			
Matrix Spike Dup (1907239-MSD1)				Source: 19G0551-01		Prepared & Analyzed: 07/19/2019				
Sulfate	14	5.0	mg/L	12.50	3.4	82	80-120	2	10	
Matrix Spike Dup (1907239-MSD3)				Source: 19G0516-20		Prepared: 07/19/2019 Analyzed: 07/20/2019				
Sulfate	2800	500	mg/L	1250	1900	69	80-120	2	10	M2
Matrix Spike Dup (1907239-MSD4)				Source: 19G0516-21		Prepared: 07/19/2019 Analyzed: 07/20/2019				
Sulfate	2800	500	mg/L	1250	1900	74	80-120	0.6	10	M2
Matrix Spike Dup (1907239-MSD5)				Source: 19G0516-37RE1		Prepared & Analyzed: 07/26/2019				
Chloride	15		mg/L	12.50	3.3	95	80-120	2	10	
Sulfate	27		mg/L	12.50		216	80-120	10	10	
Batch 1907263 - E300.0 (2.1)										
Blank (1907263-BLK1)				Prepared & Analyzed: 07/22/2019						
Chloride	ND	1.0	mg/L							
Nitrogen, Nitrate (As N)	ND	0.50	mg/L							
Nitrogen, Nitrite (As N)	ND	0.10	mg/L							
LCS (1907263-BS1)				Prepared & Analyzed: 07/22/2019						
Chloride	12	1.0	mg/L	12.50		96	90-110			
Nitrogen, Nitrate (As N)	4.9	0.50	mg/L	5.000		98	90-110			
Nitrogen, Nitrite (As N)	2.5	0.10	mg/L	2.500		99	90-110			
LCS Dup (1907263-BSD1)				Prepared & Analyzed: 07/22/2019						
Chloride	12	1.0	mg/L	12.50		95	90-110	2	10	
Nitrogen, Nitrate (As N)	4.8	0.50	mg/L	5.000		96	90-110	2	10	
Nitrogen, Nitrite (As N)	2.5	0.10	mg/L	2.500		99	90-110	0.08	10	

Client: NV5
Project: Storm Water
Work Order: 19G0551
Date Received: 07/18/2019

QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC Limits	RPD	RPD Limit	Qual
Batch 1907263 - E300.0 (2.1)									
Matrix Spike (1907263-MS1)		Source: 19G0588-04		Prepared: 07/22/2019 Analyzed: 07/23/2019					
Chloride	12	1.0	mg/L	12.50	0.52	92	80-120		
Nitrogen, Nitrate (As N)	4.8	0.50	mg/L	5.000	0.14	94	80-120		
Nitrogen, Nitrite (As N)	2.5	0.10	mg/L	2.500	ND	100	80-120		
Matrix Spike (1907263-MS2)		Source: 19G0560-01		Prepared: 07/22/2019 Analyzed: 07/23/2019					
Chloride	170	10	mg/L	125.0	50	97	80-120		
Matrix Spike (1907263-MS3)		Source: 19G0588-06		Prepared: 07/22/2019 Analyzed: 07/25/2019					
Chloride	15	1.0	mg/L	12.50	3.8	93	80-120		
Nitrogen, Nitrate (As N)	5.0	0.50	mg/L	5.000	0.41	92	80-120		
Matrix Spike Dup (1907263-MSD1)		Source: 19G0588-04		Prepared: 07/22/2019 Analyzed: 07/23/2019					
Chloride	12	1.0	mg/L	12.50	0.52	92	80-120	0.4	10
Nitrogen, Nitrate (As N)	4.9	0.50	mg/L	5.000	0.14	94	80-120	0.5	10
Nitrogen, Nitrite (As N)	2.5	0.10	mg/L	2.500	ND	100	80-120	0.4	10
Matrix Spike Dup (1907263-MSD2)		Source: 19G0560-01		Prepared: 07/22/2019 Analyzed: 07/23/2019					
Chloride	170	10	mg/L	125.0	50	98	80-120	0.4	10
Matrix Spike Dup (1907263-MSD3)		Source: 19G0588-06		Prepared: 07/22/2019 Analyzed: 07/25/2019					
Chloride	16	1.0	mg/L	12.50	3.8	96	80-120	2	10
Nitrogen, Nitrate (As N)	5.2	0.50	mg/L	5.000	0.41	95	80-120	3	10

Chain of Custody Record

1900551

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

Client Contact		Project Manager: Mike Huist		Site Contact:		Date:		Carrier:		COC No:	
NV5, Inc		Tel/Fax:		Lab Contact:		Sampler:		COC No:		COC No:	
1 W. Deer Valley Road, Bldg. 2, Suite 305		Analysis Turnaround Time		Filtered Sample (Y/N)		Sample Specific Notes:		Job / SDG No.:		Lab Sampling:	
Phoenix, AZ 85027		☐ CALENDAR DAYS		Perform MS / MSD (Y/N)		Hardness		Walk-In Client:		For Lab Use Only:	
623.374.6637		☑ WORKING DAYS		BOD, 5-Day		Cu, Dissolved ICP-MS		TAT if different from Below		Sample:	
623.738.3690		☐ 1 day		COD		Ammonia		☑ 2 days		Job / SDG No.:	
FAX		☐ 1 week		Chloride, Nitrate, Nitrite, Sulfate		Turbidity		☐ 2 weeks		Lab Sampling:	
Project Name: ADOT Stormwater		☑ TAT		Ca, Na by ICP		PAHs		☐ 1 month		Walk-In Client:	
Site: Nogales MS4		☐ 2 weeks		As, Ba, Cd, Cr, Cu, Pb, Ni, Se, Ag, Zn by ICP-MS		E. Coll		☐ 3 months		For Lab Use Only:	
444219-0250000.16		☐ 1 year		Mercury		Coliforms, Fecal (ColiCount - Quanti Tray)		☐ 6 months		Sample:	
		☐ 2 years		TDS		TSS		☐ 1 year		Job / SDG No.:	
		☐ 3 years		Turbidity		PAHs		☐ 2 years		Lab Sampling:	
		☐ 4 years		COD		E. Coll		☐ 3 years		Walk-In Client:	
		☐ 5 years		BOD, 5-Day		Ammonia		☐ 4 years		For Lab Use Only:	
		☐ 6 years		Chloride, Nitrate, Nitrite, Sulfate		Cu, Dissolved ICP-MS		☐ 5 years		Sample:	
		☐ 7 years		Ca, Na by ICP		Hardness		☐ 6 years		Job / SDG No.:	
		☐ 8 years		As, Ba, Cd, Cr, Cu, Pb, Ni, Se, Ag, Zn by ICP-MS				☐ 7 years		Lab Sampling:	
		☐ 9 years		Mercury				☐ 8 years		Walk-In Client:	
		☐ 10 years		TDS				☐ 9 years		For Lab Use Only:	
		☐ 11 years		TSS				☐ 10 years		Sample:	
		☐ 12 years		Turbidity				☐ 11 years		Job / SDG No.:	
		☐ 13 years		PAHs				☐ 12 years		Lab Sampling:	
		☐ 14 years		E. Coll				☐ 13 years		Walk-In Client:	
		☐ 15 years		Coliforms, Fecal (ColiCount - Quanti Tray)				☐ 14 years		For Lab Use Only:	
		☐ 16 years		Ammonia				☐ 15 years		Sample:	
		☐ 17 years		Cu, Dissolved ICP-MS				☐ 16 years		Job / SDG No.:	
		☐ 18 years		Hardness				☐ 17 years		Lab Sampling:	
		☐ 19 years						☐ 18 years		Walk-In Client:	
		☐ 20 years						☐ 19 years		For Lab Use Only:	
		☐ 21 years						☐ 20 years		Sample:	
		☐ 22 years						☐ 21 years		Job / SDG No.:	
		☐ 23 years						☐ 22 years		Lab Sampling:	
		☐ 24 years						☐ 23 years		Walk-In Client:	
		☐ 25 years						☐ 24 years		For Lab Use Only:	
		☐ 26 years						☐ 25 years		Sample:	
		☐ 27 years						☐ 26 years		Job / SDG No.:	
		☐ 28 years						☐ 27 years		Lab Sampling:	
		☐ 29 years						☐ 28 years		Walk-In Client:	
		☐ 30 years						☐ 29 years		For Lab Use Only:	
		☐ 31 years						☐ 30 years		Sample:	
		☐ 32 years						☐ 31 years		Job / SDG No.:	
		☐ 33 years						☐ 32 years		Lab Sampling:	
		☐ 34 years						☐ 33 years		Walk-In Client:	
		☐ 35 years						☐ 34 years		For Lab Use Only:	
		☐ 36 years						☐ 35 years		Sample:	
		☐ 37 years						☐ 36 years		Job / SDG No.:	
		☐ 38 years						☐ 37 years		Lab Sampling:	
		☐ 39 years						☐ 38 years		Walk-In Client:	
		☐ 40 years						☐ 39 years		For Lab Use Only:	
		☐ 41 years						☐ 40 years		Sample:	
		☐ 42 years						☐ 41 years		Job / SDG No.:	
		☐ 43 years						☐ 42 years		Lab Sampling:	
		☐ 44 years						☐ 43 years		Walk-In Client:	
		☐ 45 years						☐ 44 years		For Lab Use Only:	
		☐ 46 years						☐ 45 years		Sample:	
		☐ 47 years						☐ 46 years		Job / SDG No.:	
		☐ 48 years						☐ 47 years		Lab Sampling:	
		☐ 49 years						☐ 48 years		Walk-In Client:	
		☐ 50 years						☐ 49 years		For Lab Use Only:	
		☐ 51 years						☐ 50 years		Sample:	
		☐ 52 years						☐ 51 years		Job / SDG No.:	
		☐ 53 years						☐ 52 years		Lab Sampling:	
		☐ 54 years						☐ 53 years		Walk-In Client:	
		☐ 55 years						☐ 54 years		For Lab Use Only:	
		☐ 56 years						☐ 55 years		Sample:	
		☐ 57 years						☐ 56 years		Job / SDG No.:	
		☐ 58 years						☐ 57 years		Lab Sampling:	
		☐ 59 years						☐ 58 years		Walk-In Client:	
		☐ 60 years						☐ 59 years		For Lab Use Only:	
		☐ 61 years						☐ 60 years		Sample:	
		☐ 62 years						☐ 61 years		Job / SDG No.:	
		☐ 63 years						☐ 62 years		Lab Sampling:	
		☐ 64 years						☐ 63 years		Walk-In Client:	
		☐ 65 years						☐ 64 years		For Lab Use Only:	
		☐ 66 years						☐ 65 years		Sample:	
		☐ 67 years						☐ 66 years		Job / SDG No.:	
		☐ 68 years						☐ 67 years		Lab Sampling:	
		☐ 69 years						☐ 68 years		Walk-In Client:	
		☐ 70 years						☐ 69 years		For Lab Use Only:	
		☐ 71 years						☐ 70 years		Sample:	
		☐ 72 years						☐ 71 years		Job / SDG No.:	
		☐ 73 years						☐ 72 years		Lab Sampling:	
		☐ 74 years						☐ 73 years		Walk-In Client:	
		☐ 75 years						☐ 74 years		For Lab Use Only:	
		☐ 76 years						☐ 75 years		Sample:	
		☐ 77 years						☐ 76 years		Job / SDG No.:	
		☐ 78 years						☐ 77 years		Lab Sampling:	
		☐ 79 years						☐ 78 years		Walk-In Client:	
		☐ 80 years						☐ 79 years		For Lab Use Only:	
		☐ 81 years						☐ 80 years		Sample:	
		☐ 82 years						☐ 81 years		Job / SDG No.:	
		☐ 83 years						☐ 82 years		Lab Sampling:	
		☐ 84 years						☐ 83 years		Walk-In Client:	
		☐ 85 years						☐ 84 years		For Lab Use Only:	
		☐ 86 years						☐ 85 years		Sample:	
		☐ 87 years						☐ 86 years		Job / SDG No.:	
		☐ 88 years						☐ 87 years		Lab Sampling:	
		☐ 89 years						☐ 88 years		Walk-In Client:	
		☐ 90 years						☐ 89 years		For Lab Use Only:	
		☐ 91 years						☐ 90 years		Sample:	
		☐ 92 years						☐ 91 years		Job / SDG No.:	
		☐ 93 years						☐ 92 years		Lab Sampling:	
		☐ 94 years						☐ 93 years		Walk-In Client:	
		☐ 95 years						☐ 94 years		For Lab Use Only:	
		☐ 96 years						☐ 95 years		Sample:	
		☐ 97 years						☐ 96 years		Job / SDG No.:	
		☐ 98 years						☐ 97 years		Lab Sampling:	
		☐ 99 years						☐ 98 years		Walk-In Client:	
		☐ 100 years						☐ 99 years		For Lab Use Only:	
		☐ 101 years						☐ 100 years		Sample:	
		☐ 102 years						☐ 101 years		Job / SDG No.:	
		☐ 103 years						☐ 102 years		Lab Sampling:	
		☐ 104 years						☐ 103 years		Walk-In Client:	
		☐ 105 years						☐ 104 years		For Lab Use Only:	
		☐ 106 years						☐ 105 years		Sample:	
		☐ 107 years						☐ 106 years		Job / SDG No.:	
		☐ 108 years						☐ 107 years		Lab Sampling:	
		☐ 109 years						☐ 108 years		Walk-In Client:	
		☐ 110 years						☐ 109 years		For Lab Use Only:	
		☐ 111 years						☐ 110 years		Sample:	
		☐ 112 years						☐ 111 years		Job / SDG No.:	
		☐ 113 years						☐ 112 years		Lab Sampling:	
		☐ 114 years						☐ 113 years		Walk-In Client:	
		☐ 115 years						☐ 114 years		For Lab Use Only:	
		☐ 116 years						☐ 115 years		Sample:	
		☐ 117 years						☐ 116 years		Job / SDG No.:	
		☐ 118 years						☐ 117 years		Lab Sampling:	
		☐ 119 years						☐ 118 years		Walk-In Client:	
		☐ 120 years						☐ 119 years		For Lab Use Only:	
		☐ 121 years						☐ 120 years		Sample:	
		☐ 122 years						☐ 121 years		Job / SDG No.:	
		☐ 123 years						☐ 122 years		Lab Sampling:	
		☐ 124 years						☐ 123 years		Walk-In Client:	
		☐ 125 years						☐ 124 years		For Lab Use Only:	
		☐ 126 years						☐ 125 years		Sample:	
		☐ 127 years						☐ 126 years		Job / SDG No.:	
		☐ 128 years						☐ 127 years		Lab Sampling:	
		☐ 129 years						☐ 128 years		Walk-In Client:	
		☐ 130 years						☐ 129 years		For Lab Use Only:	
		☐ 131 years						☐ 130 years		Sample:	
		☐ 132 years						☐ 131 years		Job / SDG No.:	
		☐ 133 years						☐ 132 years		Lab Sampling:	
		☐ 134 years						☐ 133 years		Walk-In Client:	
		☐ 135 years						☐ 134 years		For Lab Use Only:	
		☐ 136 years						☐ 135 years		Sample:	
		☐ 137 years						☐ 136 years		Job / SDG No.:	
		☐ 138 years						☐ 137 years		Lab Sampling:	
		☐ 139 years						☐ 138 years		Walk-In Client:	
		☐ 140 years						☐ 139 years		For Lab Use Only:	
		☐ 141 years						☐ 140 years		Sample:	
		☐ 142 years						☐ 141 years		Job / SDG No.:	
		☐ 143 years						☐ 142 years		Lab Sampling:	
		☐ 144 years						☐ 143 years		Walk-In Client:	
		☐ 145 years						☐ 144 years		For Lab Use Only:	
		☐ 146 years						☐ 145 years		Sample:	
		☐ 147 years						☐ 146 years		Job / SDG No.:	
		☐ 148 years						☐ 147 years		Lab Sampling:	
		☐ 149 years						☐ 148 years		Walk-In Client:	
		☐ 150 years						☐ 149 years		For Lab Use Only:	
		☐ 151 years						☐ 150 years		Sample:	
		☐ 152 years						☐ 151 years		Job / SDG No.:	
		☐ 153 years						☐ 152 years		Lab Sampling:	
		☐ 154 years						☐ 153 years		Walk-In Client:	
		☐ 155 years						☐ 154 years		For Lab Use Only:	
		☐ 156 years						☐ 155 years		Sample:	
		☐ 157 years						☐ 156 years		Job / SDG No.:	
		☐ 158 years						☐ 157 years		Lab Sampling:	
		☐ 159 years						☐ 158 years		Walk-In Client:	
		☐ 160 years						☐ 159 years		For Lab Use Only:	
		☐ 161 years						☐ 160 years		Sample:	
		☐ 162 years						☐ 161 years		Job / SDG No.:	
		☐ 163 years						☐ 162 years		Lab Sampling:	
		☐ 164 years						☐ 163 years		Walk-In Client:	
		☐ 165 years						☐ 164 years		For Lab Use Only:	
		☐ 166 years						☐ 165 years		Sample:	
		☐ 167 years						☐ 166 years		Job / SDG No.:	
		☐ 168 years						☐ 167 years		Lab Sampling:	
		☐ 169 years						☐ 168 years		Walk-In Client:	
		☐ 170 years						☐ 169 years		For Lab Use Only:	
		☐ 171 years						☐ 170 years		Sample:	
		☐ 172 years						☐ 171 years		Job / SDG No.:	
		☐ 173 years						☐ 172 years		Lab Sampling:	
		☐ 174 years						☐ 173 years		Walk-In Client:	



February 27, 2020

John Burton
Engineering and Environmental Consultants, Inc.
7740 N. 16th Street Suite 135
Phoenix, AZ 85020

TEL (602) 248-7702
FAX 602-248-7851

Work Order No.: 20B0320
Order Name: A DOT Storm Water

RE: A DOT Storm Water

Dear John Burton,

Turner Laboratories, Inc. received 1 sample(s) on 02/11/2020 for the analyses presented in the following report.

All results are intended to be considered in their entirety, and Turner Laboratories, Inc. is not responsible for use of less than the complete report. Results apply only to the samples analyzed. Samples will be disposed of 30 days after issue of our report unless special arrangements are made.

The pages that follow may contain sensitive, privileged or confidential information intended solely for the addressee named above. If you receive this message and are not the agent or employee of the addressee, this communication has been sent in error. Please do not disseminate or copy any of the attached and notify the sender immediately by telephone. Please also return the attached sheet(s) to the sender by mail.

Please call if you have any questions.

Respectfully submitted,

Turner Laboratories, Inc.
ADHS License AZ0066

Kevin Brim
Project Manager

Client: Engineering and Environmental Consultants, Inc**Project:** A DOT Storm Water**Work Order:** 20B0320**Date Received:** 02/11/2020**Order:** A DOT Storm Water**Work Order Sample Summary**

Lab Sample ID	Client Sample ID	Matrix	Collection Date/Time
20B0320-01	Nogales Ms4 200210	Storm Water	02/10/2020 2215

Client: Engineering and Environmental Consultants, Inc.
Project: A DOT Storm Water
Work Order: 20B0320
Date Received: 02/11/2020

Case Narrative

The 8310 analysis was performed by Pace Analytical National in Mount Juliet, TN.

- E3 Concentration estimated. Analyte exceeded calibration range. Reanalysis not performed due to holding time requirements.
- H3 Sample was received and/or analysis requested past holding time.
- K1 The sample dilutions set-up for the BOD/CBOD analysis did not meet the oxygen depletion criteria of at least 2 mg/L. Reported result is an estimated value.
- K10 Seed control samples do not deplete at least 2.0 mg/L, with a retention of at least 1.0 mg/L DO criteria in all samples.
- K6 Glucose/glutamic acid BOD/CBOD was below the method acceptance criteria.
- K9 Test replicates show more than 30% difference between high and low values.
- M2 Matrix spike recovery was low; the associated LCS/LCSD was acceptable.
- M3 The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The associated LCS/LCSD recovery was acceptable.
- M6 Matrix spike recovery was high. Data reported per ADEQ policy 0154.000. Matrix interference was confirmed.
- Q9 Insufficient sample received to meet method QC requirements.
- R1 RPD/RSD exceeded the method acceptance limit. See case narrative.
- R13 MS/MSD RPD exceeded method acceptance limit. Matrix spike recovery was outside acceptance criteria. Batch precision and accuracy were demonstrated.

All soil, sludge, and solid matrix determinations are reported on a wet weight basis unless otherwise noted.

- ND Not Detected at or above the PQL
- PQL Practical Quantitation Limit
- DF Dilution Factor

Client: Engineering and Environmental Consultants
Project: A DOT Storm Water
Work Order: 20B0320
Lab Sample ID: 20B0320-01

Client Sample ID: Nogales Ms4 200210
Collection Date/Time: 02/10/2020 2215
Matrix: Storm Water
Order Name: A DOT Storm Water

Analyses	Result	PQL	Qual	Units	DF	Prep Date	Analysis Date	Analyst
Turbidity-E180.1								
Turbidity	50	0.50		NTU	5	02/11/2020 1530	02/12/2020 1545	EJ
ICP Total Metals-E200.7 (4.4)								
Calcium	11	4.0		mg/L	1	02/12/2020 1130	02/14/2020 1219	MH
Sodium	ND	5.0		mg/L	1	02/12/2020 1130	02/14/2020 1219	MH
ICP/MS Total Metals-E200.8 (5.4)								
Arsenic	0.0011	0.00050		mg/L	1	02/14/2020 1025	02/17/2020 1215	MH
Barium	0.039	0.00050		mg/L	1	02/14/2020 1025	02/17/2020 1215	MH
Cadmium	ND	0.00025		mg/L	1	02/14/2020 1025	02/17/2020 1215	MH
Chromium	0.0021	0.0010		mg/L	2	02/14/2020 1025	02/18/2020 1207	MH
Copper	0.020	0.00050		mg/L	1	02/14/2020 1025	02/17/2020 1215	MH
Lead	0.0039	0.00050		mg/L	1	02/14/2020 1025	02/17/2020 1215	MH
Nickel	0.0034	0.00050		mg/L	1	02/14/2020 1025	02/17/2020 1215	MH
Selenium	ND	0.0025		mg/L	1	02/14/2020 1025	02/17/2020 1215	MH
Silver	ND	0.00050		mg/L	1	02/14/2020 1025	02/17/2020 1215	MH
Zinc	0.069	0.040		mg/L	1	02/14/2020 1025	02/17/2020 1215	MH
CVAA Total Mercury-E245.1								
Mercury	ND	0.0010		mg/L	1	02/12/2020 1527	02/12/2020 1747	AR
Anions by Ion Chromatography-E300.0 (2.1)								
Chloride	1.6	1.0		mg/L	1	02/11/2020 1115	02/11/2020 1158	EJ
Nitrogen, Nitrate (As N)	0.72	0.50		mg/L	1	02/11/2020 1115	02/11/2020 1158	EJ
Nitrogen, Nitrite (As N)	ND	0.10		mg/L	1	02/11/2020 1115	02/11/2020 1158	EJ
Sulfate	ND	5.0		mg/L	1	02/11/2020 1115	02/11/2020 1158	EJ
Chemical Oxygen Demand-Hach 8000								
Chemical Oxygen Demand	36	20		mg/L	1	02/21/2020 0830	02/21/2020 1530	EJ
Total Coliform & E. Coli, MPN-SM 9223B								
E.Coli	2400	1.0	H3	MPN/100mL	1	02/11/2020 1550	02/12/2020 1640	CR
Fecal coliforms	2400	1.0	E3, H3	MPN/100mL	1	02/11/2020 1415	02/12/2020 1046	CR
Total Coliform	2400	1.0	E3, H3	MPN/100mL	1	02/11/2020 1550	02/12/2020 1640	CR
Total Dissolved Solids (Residue, Filterable)-SM2540 C								

Client: Engineering and Environmental Consultants
Project: A DOT Storm Water
Work Order: 20B0320
Lab Sample ID: 20B0320-01

Client Sample ID: Nogales Ms4 200210
Collection Date/Time: 02/10/2020 2215
Matrix: Storm Water
Order Name: A DOT Storm Water

Analyses	Result	PQL	Qual	Units	DF	Prep Date	Analysis Date	Analyst
Total Dissolved Solids (Residue, Filterable)	71	20		mg/L	1	02/12/2020 1730	02/12/2020 1230	CWB
Total Suspended Solids (Residue, Non-Filterable)-SM2540 D								
Total Suspended Solids	24	10	Q9	mg/L	1	02/13/2020 0858	02/14/2020 1525	ECK
Ammonia as N-SM4500-NH3 B,C								
Nitrogen, Ammonia (As N)	ND	0.50		mg/L	1	02/21/2020 0900	02/21/2020 1330	EJ
BOD, 5 day-SM5210 B								
Biochemical Oxygen Demand	9.5	2.0	K1, K9	mg/L	1	02/12/2020 0820	02/17/2020 1745	CR

Client: Engineering and Environmental Consultants, Inc.
Project: A DOT Storm Water
Work Order: 20B0320
Date Received: 02/11/2020

QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 2002135 - E245.1										
Blank (2002135-BLK1)				Prepared & Analyzed: 02/12/2020						
Mercury	ND	0.0010	mg/L							
LCS (2002135-BS1)				Prepared & Analyzed: 02/12/2020						
Mercury	0.0051	0.0010	mg/L	0.005000		101	85-115			
LCS Dup (2002135-BSD1)				Prepared & Analyzed: 02/12/2020						
Mercury	0.0051	0.0010	mg/L	0.005000		102	85-115	0.6	20	
Matrix Spike (2002135-MS1)				Source: 20B0150-01		Prepared & Analyzed: 02/12/2020				
Mercury	0.0048	0.0010	mg/L	0.005000	ND	96	70-130			
Matrix Spike (2002135-MS2)				Source: 20B0222-01		Prepared & Analyzed: 02/12/2020				
Mercury	0.0047	0.0010	mg/L	0.005000	ND	94	70-130			
Matrix Spike Dup (2002135-MSD1)				Source: 20B0150-01		Prepared & Analyzed: 02/12/2020				
Mercury	0.0048	0.0010	mg/L	0.005000	ND	96	70-130	0.3	20	
Matrix Spike Dup (2002135-MSD2)				Source: 20B0222-01		Prepared & Analyzed: 02/12/2020				
Mercury	0.0044	0.0010	mg/L	0.005000	ND	88	70-130	6	20	
Batch 2002139 - E200.7 (4.4)										
Blank (2002139-BLK1)				Prepared: 02/12/2020 Analyzed: 02/13/2020						
Calcium	ND	4.0	mg/L							
Sodium	ND	5.0	mg/L							
LCS (2002139-BS1)				Prepared: 02/12/2020 Analyzed: 02/13/2020						
Calcium	10	4.0	mg/L	10.00		103	85-115			
Sodium	9.4	5.0	mg/L	10.00		94	85-115			
LCS Dup (2002139-BSD1)				Prepared: 02/12/2020 Analyzed: 02/13/2020						
Calcium	11	4.0	mg/L	10.00		107	85-115	4	20	
Sodium	9.7	5.0	mg/L	10.00		97	85-115	3	20	
Matrix Spike (2002139-MS1)				Source: 20B0069-05		Prepared: 02/12/2020 Analyzed: 02/13/2020				
Calcium	37	4.0	mg/L	10.00	28	87	70-130			
Sodium	61	5.0	mg/L	10.00	58	34	70-130			M3
Matrix Spike (2002139-MS2)				Source: 20B0255-01		Prepared: 02/12/2020 Analyzed: 02/13/2020				
Calcium	91	4.0	mg/L	10.00	84	66	70-130			M3
Batch 2002173 - E200.8 (5.4)										

Client: Engineering and Environmental Consultants, Inc.
Project: A DOT Storm Water
Work Order: 20B0320
Date Received: 02/11/2020

QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 2002173 - E200.8 (5.4)										
Blank (2002173-BLK1)				Prepared: 02/14/2020 Analyzed: 02/17/2020						
Arsenic	ND	0.00050	mg/L							
Barium	ND	0.00050	mg/L							
Cadmium	ND	0.00025	mg/L							
Chromium	ND	0.00050	mg/L							
Copper	ND	0.00050	mg/L							
Lead	ND	0.00050	mg/L							
Nickel	ND	0.00050	mg/L							
Selenium	ND	0.0015	mg/L							
Silver	ND	0.00050	mg/L							
Zinc	ND	0.040	mg/L							
LCS (2002173-BS1)				Prepared: 02/14/2020 Analyzed: 02/17/2020						
Arsenic	0.052	0.00050	mg/L	0.05000		103	85-115			
Barium	0.051	0.00050	mg/L	0.05000		101	85-115			
Cadmium	0.052	0.00025	mg/L	0.05000		103	85-115			
Chromium	0.053	0.00050	mg/L	0.05000		105	85-115			
Copper	0.053	0.00050	mg/L	0.05000		105	85-115			
Lead	0.051	0.00050	mg/L	0.05000		101	85-115			
Nickel	0.053	0.00050	mg/L	0.05000		106	85-115			
Selenium	0.050	0.0015	mg/L	0.05000		100	85-115			
Silver	0.052	0.00050	mg/L	0.05000		104	85-115			
Zinc	0.10	0.040	mg/L	0.1000		102	85-115			
LCS Dup (2002173-BSD1)				Prepared: 02/14/2020 Analyzed: 02/17/2020						
Arsenic	0.051	0.00050	mg/L	0.05000		102	85-115	1	20	
Barium	0.048	0.00050	mg/L	0.05000		97	85-115	5	20	
Cadmium	0.051	0.00025	mg/L	0.05000		102	85-115	1	20	
Chromium	0.052	0.00050	mg/L	0.05000		104	85-115	2	20	
Copper	0.050	0.00050	mg/L	0.05000		100	85-115	5	20	
Lead	0.051	0.00050	mg/L	0.05000		101	85-115	0.2	20	
Nickel	0.053	0.00050	mg/L	0.05000		106	85-115	0.4	20	
Selenium	0.049	0.0015	mg/L	0.05000		98	85-115	2	20	
Silver	0.051	0.00050	mg/L	0.05000		102	85-115	3	20	
Zinc	0.10	0.040	mg/L	0.1000		103	85-115	0.3	20	
Matrix Spike (2002173-MS1)				Source: 20B0270-01		Prepared: 02/14/2020 Analyzed: 02/17/2020				
Arsenic	0.053	0.00050	mg/L	0.05000	0.00086	103	70-130			
Barium	0.089	0.00050	mg/L	0.05000	0.041	96	70-130			
Cadmium	0.049	0.00025	mg/L	0.05000	ND	98	70-130			
Copper	0.054	0.00050	mg/L	0.05000	0.0090	90	70-130			
Lead	0.049	0.00050	mg/L	0.05000	0.00012	98	70-130			
Nickel	0.094	0.00050	mg/L	0.05000	0.042	105	70-130			
Selenium	0.051	0.0015	mg/L	0.05000	0.0011	100	70-130			
Silver	0.045	0.00050	mg/L	0.05000	0.00012	90	70-130			
Zinc	0.10	0.040	mg/L	0.1000	ND	103	70-130			

Client: Engineering and Environmental Consultants, Inc.
Project: A DOT Storm Water
Work Order: 20B0320
Date Received: 02/11/2020

QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 2002173 - E200.8 (5.4)										
Matrix Spike (2002173-MS2)		Source: 20B0426-01			Prepared: 02/14/2020 Analyzed: 02/17/2020					
Arsenic	0.058	0.00050	mg/L	0.05000	0.0067	102	70-130			
Barium	0.15	0.00050	mg/L	0.05000	0.11	96	70-130			
Cadmium	0.049	0.00025	mg/L	0.05000	ND	98	70-130			
Chromium	0.056	0.0025	mg/L	0.05000	0.0044	104	70-130			
Copper	0.11	0.00050	mg/L	0.05000	0.066	89	70-130			
Lead	0.051	0.00050	mg/L	0.05000	0.0013	99	70-130			
Nickel	0.082	0.00050	mg/L	0.05000	0.010	143	70-130			M6
Selenium	0.052	0.0015	mg/L	0.05000	0.0028	98	70-130			
Silver	0.047	0.00050	mg/L	0.05000	0.00020	94	70-130			
Zinc	0.13	0.040	mg/L	0.1000	0.027	108	70-130			

Client: Engineering and Environmental Consultants, Inc.
Project: A DOT Storm Water
Work Order: 20B0320
Date Received: 02/11/2020

QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 2002124 - E180.1										
Duplicate (2002124-DUP1)		Source: 20B0256-01		Prepared: 02/11/2020 Analyzed: 02/12/2020						
Turbidity	1.5	0.10	NTU		1.4			7	10	
Batch 2002129 - SM2540 C										
Duplicate (2002129-DUP1)		Source: 20B0270-01		Prepared: 02/12/2020 Analyzed: 02/14/2020						
Total Dissolved Solids (Residue, Filterable)	870	20	mg/L		880			2	5	
Duplicate (2002129-DUP2)		Source: 20B0229-01		Prepared: 02/12/2020 Analyzed: 02/17/2020						
Total Dissolved Solids (Residue, Filterable)	120	20	mg/L		140			14	5	
Batch 2002145 - SM2540 D										
Duplicate (2002145-DUP1)		Source: 20B0068-01		Prepared: 02/13/2020 Analyzed: 02/14/2020						
Total Suspended Solids	15	10	mg/L		15			0	5	
Duplicate (2002145-DUP2)		Source: 20B0343-08		Prepared: 02/13/2020 Analyzed: 02/14/2020						
Total Suspended Solids	7.0	10	mg/L		5.0			33	5	R1
Batch 2002161 - SM5210 B										
Blank (2002161-BLK1)				Prepared: 02/12/2020 Analyzed: 02/17/2020						
Biochemical Oxygen Demand	ND	2.0	mg/L							K10
LCS (2002161-BS1)				Prepared: 02/12/2020 Analyzed: 02/17/2020						
Biochemical Oxygen Demand	150		mg/L	198.0		73	85-115			K6
Duplicate (2002161-DUP1)		Source: 20B0311-02		Prepared: 02/12/2020 Analyzed: 02/17/2020						
Biochemical Oxygen Demand	9.4	2.0	mg/L		8.0			16	20	K9
Batch 2002252 - SM4500-NH3 B,C										
Blank (2002252-BLK1)				Prepared & Analyzed: 02/21/2020						
Nitrogen, Ammonia (As N)	ND	0.50	mg/L							
LCS (2002252-BS1)				Prepared & Analyzed: 02/21/2020						
Nitrogen, Ammonia (As N)	5.0	0.50	mg/L	5.000		101	90-110			
LCS Dup (2002252-BS1)				Prepared & Analyzed: 02/21/2020						
Nitrogen, Ammonia (As N)	5.1	0.50	mg/L	5.000		101	90-110	0.4	10	
Matrix Spike (2002252-MS1)		Source: 20B0001-03		Prepared & Analyzed: 02/21/2020						
Nitrogen, Ammonia (As N)	5.4	0.50	mg/L	5.000	0.27	103	75-120			
Matrix Spike (2002252-MS2)		Source: 20B0320-01		Prepared & Analyzed: 02/21/2020						
Nitrogen, Ammonia (As N)	4.9	0.50	mg/L	5.000	0.090	96	75-120			
Matrix Spike Dup (2002252-MSD1)		Source: 20B0001-03		Prepared & Analyzed: 02/21/2020						
Nitrogen, Ammonia (As N)	5.3	0.50	mg/L	5.000	0.27	100	75-120	3	20	
Matrix Spike Dup (2002252-MSD2)		Source: 20B0320-01		Prepared & Analyzed: 02/21/2020						
Nitrogen, Ammonia (As N)	5.0	0.50	mg/L	5.000	0.090	97	75-120	1	20	
Batch 2002262 - Hach 8000										

Client: Engineering and Environmental Consultants, Inc.
Project: A DOT Storm Water
Work Order: 20B0320
Date Received: 02/11/2020

QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC Limits	RPD	RPD Limit	Qual
Batch 2002262 - Hach 8000									
Blank (2002262-BLK1)				Prepared & Analyzed: 02/21/2020					
Chemical Oxygen Demand	ND	20	mg/L						
LCS (2002262-BS1)				Prepared & Analyzed: 02/21/2020					
Chemical Oxygen Demand	480	20	mg/L	500.0		97	70-130		
LCS Dup (2002262-BSD1)				Prepared & Analyzed: 02/21/2020					
Chemical Oxygen Demand	490	20	mg/L	500.0		99	70-130	2	20
Matrix Spike (2002262-MS1)				Source: 20B0291-01		Prepared & Analyzed: 02/21/2020			
Chemical Oxygen Demand	540	20	mg/L	500.0	65	95	70-130		
Matrix Spike Dup (2002262-MSD1)				Source: 20B0291-01		Prepared & Analyzed: 02/21/2020			
Chemical Oxygen Demand	530	20	mg/L	500.0	65	94	70-130	1	20

Client: Engineering and Environmental Consultants, Inc.
Project: A DOT Storm Water
Work Order: 20B0320
Date Received: 02/11/2020

QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 2002106 - E300.0 (2.1)										
Blank (2002106-BLK1)				Prepared & Analyzed: 02/11/2020						
Chloride	ND	1.0	mg/L							
Nitrogen, Nitrate (As N)	ND	0.50	mg/L							
Nitrogen, Nitrite (As N)	ND	0.10	mg/L							
Sulfate	ND	5.0	mg/L							
LCS (2002106-BS1)				Prepared & Analyzed: 02/11/2020						
Chloride	12	1.0	mg/L	12.50		96	90-110			
Nitrogen, Nitrate (As N)	4.9	0.50	mg/L	5.000		97	90-110			
Nitrogen, Nitrite (As N)	2.5	0.10	mg/L	2.500		99	90-110			
Sulfate	12	5.0	mg/L	12.50		98	90-110			
LCS Dup (2002106-BSD1)				Prepared & Analyzed: 02/11/2020						
Chloride	12	1.0	mg/L	12.50		96	90-110	0.05	10	
Nitrogen, Nitrate (As N)	4.9	0.50	mg/L	5.000		97	90-110	0.004	10	
Nitrogen, Nitrite (As N)	2.5	0.10	mg/L	2.500		98	90-110	0.4	10	
Sulfate	12	5.0	mg/L	12.50		98	90-110	0.03	10	
Matrix Spike (2002106-MS1)				Source: 20B0319-01		Prepared & Analyzed: 02/11/2020				
Chloride	18	1.0	mg/L	12.50	5.5	101	80-120			
Nitrogen, Nitrate (As N)	5.8	0.50	mg/L	5.000	0.79	99	80-120			
Nitrogen, Nitrite (As N)	2.6	0.10	mg/L	2.500	0.056	102	80-120			
Sulfate	18	5.0	mg/L	12.50	6.1	94	80-120			
Matrix Spike (2002106-MS2)				Source: 20B0343-06		Prepared & Analyzed: 02/11/2020				
Nitrogen, Nitrate (As N)	5.4	0.50	mg/L	5.000	0.98	88	80-120			
Sulfate	30	5.0	mg/L	12.50	22	64	80-120			M2
Matrix Spike (2002106-MS3)				Source: 20B0343-03		Prepared: 02/11/2020 Analyzed: 02/12/2020				
Chloride	10	1.0	mg/L	12.50	ND	80	80-120			M2
Nitrogen, Nitrate (As N)	4.0	0.50	mg/L	5.000	ND	81	80-120			
Nitrogen, Nitrite (As N)	2.1	0.10	mg/L	2.500	ND	82	80-120			
Sulfate	10	5.0	mg/L	12.50	ND	84	80-120			
Matrix Spike Dup (2002106-MSD1)				Source: 20B0319-01		Prepared & Analyzed: 02/11/2020				
Chloride	22	1.0	mg/L	12.50	5.5	133	80-120	20	10	R13
Nitrogen, Nitrate (As N)	7.4	0.50	mg/L	5.000	0.79	131	80-120	24	10	R13
Nitrogen, Nitrite (As N)	3.4	0.10	mg/L	2.500	0.056	132	80-120	26	10	R13
Sulfate	22	5.0	mg/L	12.50	6.1	125	80-120	20	10	R13
Matrix Spike Dup (2002106-MSD2)				Source: 20B0343-06		Prepared & Analyzed: 02/11/2020				
Nitrogen, Nitrate (As N)	5.3	0.50	mg/L	5.000	0.98	86	80-120	2	10	
Sulfate	30	5.0	mg/L	12.50	22	62	80-120	0.6	10	M2
Matrix Spike Dup (2002106-MSD3)				Source: 20B0343-03		Prepared: 02/11/2020 Analyzed: 02/12/2020				
Chloride	11	1.0	mg/L	12.50	ND	85	80-120	7	10	
Nitrogen, Nitrate (As N)	4.3	0.50	mg/L	5.000	ND	85	80-120	6	10	
Nitrogen, Nitrite (As N)	2.2	0.10	mg/L	2.500	ND	87	80-120	6	10	
Sulfate	11	5.0	mg/L	12.50	ND	89	80-120	6	10	



ANALYTICAL REPORT

February 20, 2020

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

Turner Laboratories Inc

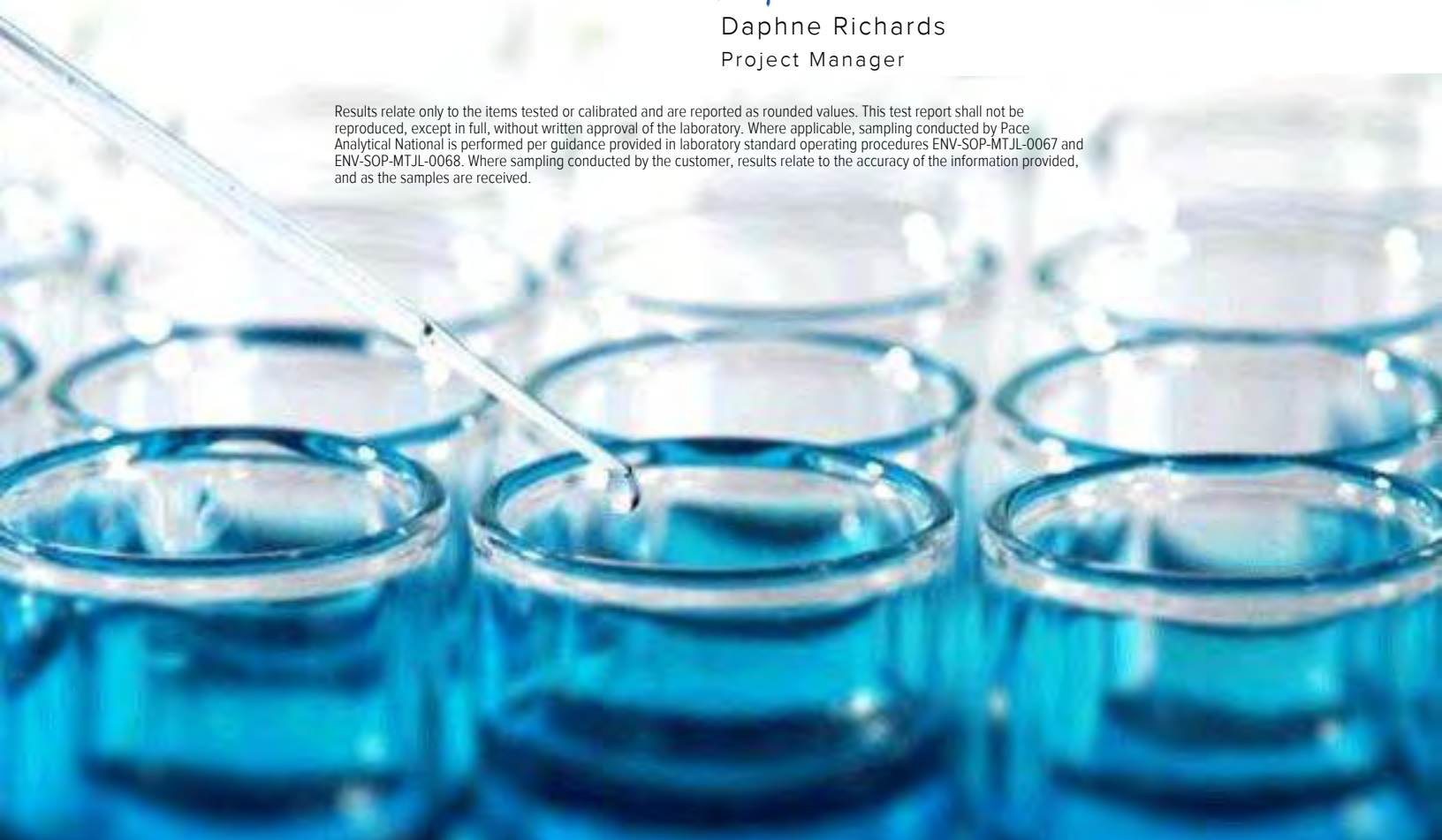
Sample Delivery Group: L1189739
Samples Received: 02/13/2020
Project Number: 20B0320
Description:

Report To: Elizabeth Kasik
2445 North Coyote Drive
Suite 104
Tucson, AZ 85745

Entire Report Reviewed By:

Daphne Richards
Project Manager

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by Pace Analytical National is performed per guidance provided in laboratory standard operating procedures ENV-SOP-MTJL-0067 and ENV-SOP-MTJL-0068. Where sampling conducted by the customer, results relate to the accuracy of the information provided, and as the samples are received.





Cp: Cover Page	1	¹ Cp
Tc: Table of Contents	2	
Ss: Sample Summary	3	² Tc
Cn: Case Narrative	4	
Sr: Sample Results	5	³ Ss
20B0320-01 L1189739-01	5	
Qc: Quality Control Summary	6	⁴ Cn
Semi-Volatile Organic Compounds (HPLC) by Method 8310	6	⁵ Sr
Gl: Glossary of Terms	8	
Al: Accreditations & Locations	9	⁶ Qc
Sc: Sample Chain of Custody	10	⁷ Gl
		⁸ Al
		⁹ Sc



20B0320-01 L1189739-01 GW

Collected by

Collected date/time

Received date/time

02/10/20 22:15

02/13/20 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Semi-Volatile Organic Compounds (HPLC) by Method 8310	WG1428899	1	02/16/20 16:32	02/18/20 12:29	GKM	Mt. Juliet, TN

¹Cp

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⁹Sc



All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Daphne Richards
Project Manager

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc



Semi-Volatile Organic Compounds (HPLC) by Method 8310

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch	
Anthracene	ND		0.000100	1	02/18/2020 12:29	WG1428899	¹ Cp
Acenaphthene	ND		0.000100	1	02/18/2020 12:29	WG1428899	² Tc
Acenaphthylene	ND		0.000100	1	02/18/2020 12:29	WG1428899	³ Ss
Benzo(a)anthracene	ND		0.000100	1	02/18/2020 12:29	WG1428899	⁴ Cn
Benzo(a)pyrene	ND		0.000100	1	02/18/2020 12:29	WG1428899	⁵ Sr
Benzo(b)fluoranthene	ND		0.000100	1	02/18/2020 12:29	WG1428899	⁶ Qc
Benzo(g,h,i)perylene	ND		0.000100	1	02/18/2020 12:29	WG1428899	⁷ Gl
Benzo(k)fluoranthene	ND		0.000100	1	02/18/2020 12:29	WG1428899	⁸ Al
Chrysene	ND		0.000100	1	02/18/2020 12:29	WG1428899	⁹ Sc
Dibenz(a,h)anthracene	ND		0.000100	1	02/18/2020 12:29	WG1428899	
Fluoranthene	ND		0.000100	1	02/18/2020 12:29	WG1428899	
Fluorene	ND		0.000100	1	02/18/2020 12:29	WG1428899	
Indeno(1,2,3-cd)pyrene	ND		0.000100	1	02/18/2020 12:29	WG1428899	
1-Methylnaphthalene	ND		0.00100	1	02/18/2020 12:29	WG1428899	
2-Methylnaphthalene	ND		0.00100	1	02/18/2020 12:29	WG1428899	
Naphthalene	ND		0.00100	1	02/18/2020 12:29	WG1428899	
Phenanthrene	ND		0.000100	1	02/18/2020 12:29	WG1428899	
Pyrene	ND		0.000100	1	02/18/2020 12:29	WG1428899	
(S) p-Terphenyl-d14	85.0		44.0-121		02/18/2020 12:29	WG1428899	



Method Blank (MB)

(MB) R3501142-1 02/18/20 10:41

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Anthracene	U		0.00000301	0.000100
Acenaphthene	U		0.0000282	0.000100
Acenaphthylene	U		0.0000361	0.000100
Benzo(a)anthracene	U		0.00000240	0.000100
Benzo(a)pyrene	U		0.00000263	0.000100
Benzo(b)fluoranthene	U		0.00000212	0.000100
Benzo(g,h,i)perylene	U		0.00000227	0.000100
Benzo(k)fluoranthene	U		0.00000262	0.000100
Chrysene	U		0.00000343	0.000100
Dibenz(a,h)anthracene	U		0.00000161	0.000100
Fluoranthene	U		0.00000305	0.000100
Fluorene	U		0.00000327	0.000100
Indeno(1,2,3-cd)pyrene	U		0.00000323	0.000100
1-Methylnaphthalene	U		0.00000944	0.00100
2-Methylnaphthalene	U		0.00000408	0.00100
Naphthalene	U		0.00000499	0.00100
Phenanthrene	U		0.00000383	0.000100
Pyrene	U		0.00000351	0.000100
(S) p-Terphenyl-d14	83.5			44.0-121

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3501142-2 02/18/20 11:08 • (LCSD) R3501142-3 02/18/20 11:35

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Anthracene	0.00400	0.00333	0.00330	83.2	82.5	64.0-115			0.905	20
Acenaphthene	0.00400	0.00314	0.00309	78.5	77.3	60.0-115			1.61	20
Acenaphthylene	0.00400	0.00316	0.00311	79.0	77.7	59.0-115			1.59	20
Benzo(a)anthracene	0.00400	0.00356	0.00349	89.0	87.3	68.0-115			1.99	20
Benzo(a)pyrene	0.00400	0.00345	0.00337	86.2	84.3	63.0-115			2.35	20
Benzo(b)fluoranthene	0.00400	0.00368	0.00360	92.0	90.0	64.0-115			2.20	20
Benzo(g,h,i)perylene	0.00400	0.00345	0.00339	86.2	84.7	37.0-115			1.75	20
Benzo(k)fluoranthene	0.00400	0.00360	0.00352	90.0	88.0	61.0-115			2.25	20
Chrysene	0.00400	0.00366	0.00358	91.5	89.5	66.0-115			2.21	20
Dibenz(a,h)anthracene	0.00400	0.00351	0.00350	87.7	87.5	28.0-115			0.285	20
Fluoranthene	0.00400	0.00354	0.00350	88.5	87.5	67.0-115			1.14	20
Fluorene	0.00400	0.00308	0.00304	77.0	76.0	56.0-115			1.31	20
Indeno(1,2,3-cd)pyrene	0.00400	0.00337	0.00330	84.3	82.5	55.0-115			2.10	20
1-Methylnaphthalene	0.00400	0.00265	0.00260	66.2	65.0	44.0-115			1.90	20



Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3501142-2 02/18/20 11:08 • (LCSD) R3501142-3 02/18/20 11:35

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	<u>LCS Qualifier</u>	<u>LCSD Qualifier</u>	RPD %	RPD Limits %
2-Methylnaphthalene	0.00400	0.00284	0.00279	71.0	69.8	45.0-115			1.78	20
Naphthalene	0.00400	0.00273	0.00267	68.3	66.8	48.0-115			2.22	20
Phenanthrene	0.00400	0.00342	0.00337	85.5	84.3	65.0-115			1.47	20
Pyrene	0.00400	0.00374	0.00369	93.5	92.2	73.0-115			1.35	20
(S) p-Terphenyl-d14				85.5	85.0	44.0-121				

¹Cp

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Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier Description

The remainder of this page intentionally left blank, there are no qualifiers applied to this SDG.

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

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Pace National is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our one location design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be YOUR LAB OF CHOICE.

* Not all certifications held by the laboratory are applicable to the results reported in the attached report.

* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace National.

State Accreditations

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN-03-2002-34
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey–NELAP	TN002
California	2932	New Mexico ¹	n/a
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina ¹	DW21704
Georgia	NELAP	North Carolina ³	41
Georgia ¹	923	North Dakota	R-140
Idaho	TN00003	Ohio–VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LA000356
Kentucky ^{1 6}	90010	South Carolina	84004
Kentucky ²	16	South Dakota	n/a
Louisiana	AI30792	Tennessee ^{1 4}	2006
Louisiana ¹	LA180010	Texas	T104704245-18-15
Maine	TN0002	Texas ⁵	LAB0152
Maryland	324	Utah	TN00003
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	460132
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA

Third Party Federal Accreditations

A2LA – ISO 17025	1461.01	AIHA-LAP, LLC EMLAP	100789
A2LA – ISO 17025 ⁵	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA–Crypto	TN00003		

¹ Drinking Water ² Underground Storage Tanks ³ Aquatic Toxicity ⁴ Chemical/Microbiological ⁵ Mold ⁶ Wastewater n/a Accreditation not applicable

Our Locations

Pace National has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. Pace National performs all testing at our central laboratory.



SUBCONTRACT ORDER

Turner Laboratories, Inc.

20B0320

1189789

SENDING LABORATORY:

Turner Laboratories, Inc.
2445 N. Coyote Drive, Ste #104
Tucson, AZ 85745
Phone: 520.882.5880
Fax: 520.882.9788
Project Manager: Elizabeth Kasik

RECEIVING LABORATORY:

Pace Analytical Services - Tennessee
12065 Leabon Rd.
Mt. Juliet, TN 37122
Phone : (615) 758-5858
Fax: -
Please CC Kevin Brim Kbrim@turnerlabs.com

Analysis

Expires Laboratory ID Comments

Sample ID: 20B0320-01 Non-Potable Wa Sampled: 02/10/2020 22:15

PAHs by SW 8310

02/17/2020 22:15

Containers Supplied:

01

Released By	Date	Received By	Date
			2-13-20
Released By	Date	Received By	Date
			0845



June 18, 2020

John Burton
Engineering and Environmental Consultants, Inc.
7740 N. 16th Street Suite 135
Phoenix, AZ 85020

TEL (602) 248-7702
FAX 602-248-7851

Work Order No.: 20F0144
Order Name: A DOT Storm Water

RE: A DOT Storm Water

Dear John Burton,

Turner Laboratories, Inc. received 1 sample(s) on 06/02/2020 for the analyses presented in the following report.

All results are intended to be considered in their entirety, and Turner Laboratories, Inc. is not responsible for use of less than the complete report. Results apply only to the samples analyzed. Samples will be disposed of 30 days after issue of our report unless special arrangements are made.

The pages that follow may contain sensitive, privileged or confidential information intended solely for the addressee named above. If you receive this message and are not the agent or employee of the addressee, this communication has been sent in error. Please do not disseminate or copy any of the attached and notify the sender immediately by telephone. Please also return the attached sheet(s) to the sender by mail.

Please call if you have any questions.

Respectfully submitted,

Turner Laboratories, Inc.
ADHS License AZ0066

Elizabeth Kasik
Laboratory Director

Client: Engineering and Environmental Consultants, Inc**Project:** A DOT Storm Water**Work Order:** 20F0144**Date Received:** 06/02/2020**Order:** A DOT Storm Water**Work Order Sample Summary**

Lab Sample ID	Client Sample ID	Matrix	Collection Date/Time
20F0144-01	Nogales MS4 200602	Storm Water	06/02/2020 1620

Client: Engineering and Environmental Consultants, Inc.
Project: A DOT Storm Water
Work Order: 20F0144
Date Received: 06/02/2020

Case Narrative

The 8310 analysis was performed by Pace Analytical National in Mount Juliet, TN.

- H2 Initial analysis was performed within holding time. Reanalysis for the required dilution was past holding time.
- K9 Test replicates show more than 30% difference between high and low values.
- M3 The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The associated LCS/LCSD recovery was acceptable.
- Q9 Insufficient sample received to meet method QC requirements.
- R12 RPD/RSD exceeded the method acceptance limit. Result less than 5 times the PQL.

All soil, sludge, and solid matrix determinations are reported on a wet weight basis unless otherwise noted.

- ND Not Detected at or above the PQL
- PQL Practical Quantitation Limit
- DF Dilution Factor

Client: Engineering and Environmental Consultants
Project: A DOT Storm Water
Work Order: 20F0144
Lab Sample ID: 20F0144-01

Client Sample ID: Nogales MS4 200602
Collection Date/Time: 06/02/2020 1620
Matrix: Storm Water
Order Name: A DOT Storm Water

Analyses	Result	PQL	Qual	Units	DF	Prep Date	Analysis Date	Analyst
Turbidity-E180.1								
Turbidity	180	5.0		NTU	50	06/03/2020 1250	06/03/2020 1303	CW
ICP Total Metals-E200.7 (4.4)								
Calcium	15	4.0		mg/L	1	06/04/2020 0900	06/05/2020 1410	MH
Sodium	6.8	5.0		mg/L	1	06/04/2020 0900	06/05/2020 1411	MH
ICP/MS Total Metals-E200.8 (5.4)								
Arsenic	0.0032	0.00050		mg/L	1	06/05/2020 0845	06/08/2020 1159	CR
Barium	0.090	0.00050		mg/L	1	06/05/2020 0845	06/08/2020 1159	CR
Cadmium	ND	0.00025		mg/L	1	06/05/2020 0845	06/08/2020 1159	CR
Chromium	0.0059	0.00050		mg/L	1	06/05/2020 0845	06/08/2020 1159	CR
Copper	0.031	0.00050		mg/L	1	06/05/2020 0845	06/08/2020 1159	CR
Lead	0.023	0.00050		mg/L	1	06/05/2020 0845	06/08/2020 1159	CR
Nickel	0.0080	0.00050		mg/L	1	06/05/2020 0845	06/09/2020 1245	CR
Selenium	ND	0.0025		mg/L	1	06/05/2020 0845	06/08/2020 1159	CR
Silver	ND	0.00050		mg/L	1	06/05/2020 0845	06/08/2020 1159	CR
Zinc	0.13	0.040		mg/L	1	06/05/2020 0845	06/08/2020 1159	CR
CVAA Total Mercury-E245.1								
Mercury	ND	0.0010		mg/L	1	06/04/2020 0925	06/04/2020 1426	MH
Anions by Ion Chromatography-E300.0 (2.1)								
Chloride	7.0	1.0		mg/L	1	06/03/2020 1430	06/03/2020 1646	EJ
Nitrogen, Nitrate (As N)	1.2	0.50		mg/L	1	06/03/2020 1430	06/03/2020 1646	EJ
Nitrogen, Nitrite (As N)	0.64	0.10	H2	mg/L	1	06/03/2020 1430	06/17/2020 1941	JG
Sulfate	8.8	5.0		mg/L	1	06/03/2020 1430	06/03/2020 1646	EJ
Chemical Oxygen Demand-Hach 8000								
Chemical Oxygen Demand	150	20		mg/L	1	06/05/2020 0810	06/05/2020 1538	JG
Total Coliform & E. Coli, MPN-SM 9223B								
E.Coli	2000	1.0		MPN/100mL	1	06/02/2020 1820	06/03/2020 1840	CWB
Fecal coliforms	2400	1.0		MPN/100mL	1	06/02/2020 1823	06/03/2020 1315	CWB
Total Coliform	2400	1.0		MPN/100mL	1	06/02/2020 1820	06/03/2020 1840	CWB
Total Dissolved Solids (Residue, Filterable)-SM2540 C								
Total Dissolved Solids (Residue, Filterable)	140	20		mg/L	1	06/04/2020 1700	06/09/2020 0840	CWB

Client: Engineering and Environmental Consultants
Project: A DOT Storm Water
Work Order: 20F0144
Lab Sample ID: 20F0144-01

Client Sample ID: Nogales MS4 200602
Collection Date/Time: 06/02/2020 1620
Matrix: Storm Water
Order Name: A DOT Storm Water

Analyses	Result	PQL	Qual	Units	DF	Prep Date	Analysis Date	Analyst
Total Suspended Solids (Residue, Non-Filterable)-SM2540 D								
Total Suspended Solids	260	10		mg/L	1	06/05/2020 1145	06/05/2020 1620	CWB
Ammonia as N-SM4500-NH3 B,C								
Nitrogen, Ammonia (As N)	ND	0.50		mg/L	1	06/03/2020 0830	06/03/2020 1320	JG
BOD, 5 day-SM5210 B								
Biochemical Oxygen Demand	22	2.0	K9	mg/L	1	06/03/2020 0840	06/09/2020 1528	CWB

Client: Engineering and Environmental Consultants, Inc.
Project: A DOT Storm Water
Work Order: 20F0144
Date Received: 06/02/2020

QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 2006055 - E245.1										
Blank (2006055-BLK1)				Prepared & Analyzed: 06/04/2020						
Mercury	ND	0.0010	mg/L							
LCS (2006055-BS1)				Prepared & Analyzed: 06/04/2020						
Mercury	0.0053	0.0010	mg/L	0.005000		106	85-115			
LCS Dup (2006055-BSD1)				Prepared & Analyzed: 06/04/2020						
Mercury	0.0053	0.0010	mg/L	0.005000		105	85-115	0.1	20	
Matrix Spike (2006055-MS1)				Source: 20E0554-01		Prepared & Analyzed: 06/04/2020				
Mercury	0.0052	0.0010	mg/L	0.005000	0.000079	103	70-130			
Matrix Spike (2006055-MS2)				Source: 20F0142-01		Prepared & Analyzed: 06/04/2020				
Mercury	0.0052	0.0010	mg/L	0.005000	ND	104	70-130			
Matrix Spike Dup (2006055-MSD1)				Source: 20E0554-01		Prepared & Analyzed: 06/04/2020				
Mercury	0.0053	0.0010	mg/L	0.005000	0.000079	104	70-130	1	20	
Matrix Spike Dup (2006055-MSD2)				Source: 20F0142-01		Prepared & Analyzed: 06/04/2020				
Mercury	0.0056	0.0010	mg/L	0.005000	ND	111	70-130	7	20	
Batch 2006062 - E200.7 (4.4)										
Blank (2006062-BLK1)				Prepared: 06/04/2020 Analyzed: 06/05/2020						
Calcium	ND	4.0	mg/L							
Sodium	ND	5.0	mg/L							
LCS (2006062-BS1)				Prepared: 06/04/2020 Analyzed: 06/05/2020						
Calcium	10	4.0	mg/L	10.00		101	85-115			
Sodium	10	5.0	mg/L	10.00		100	85-115			
LCS Dup (2006062-BSD1)				Prepared: 06/04/2020 Analyzed: 06/05/2020						
Calcium	10	4.0	mg/L	10.00		102	85-115	1	20	
Sodium	10	5.0	mg/L	10.00		101	85-115	0.8	20	
Matrix Spike (2006062-MS1)				Source: 20F0005-03		Prepared: 06/04/2020 Analyzed: 06/05/2020				
Calcium	170	4.0	mg/L	10.00	160	76	70-130			
Sodium	160	25	mg/L	10.00	160	15	70-130			M3
Matrix Spike (2006062-MS2)				Source: 20F0011-02		Prepared: 06/04/2020 Analyzed: 06/05/2020				
Calcium	250	40	mg/L	10.00	240	118	70-130			
Sodium	210	50	mg/L	10.00	190	137	70-130			M3
Batch 2006076 - E200.8 (5.4)										

Client: Engineering and Environmental Consultants, Inc.
Project: A DOT Storm Water
Work Order: 20F0144
Date Received: 06/02/2020

QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 2006076 - E200.8 (5.4)										
Blank (2006076-BLK1)				Prepared: 06/05/2020 Analyzed: 06/08/2020						
Arsenic	ND	0.00050	mg/L							
Barium	ND	0.00050	mg/L							
Cadmium	ND	0.00025	mg/L							
Chromium	ND	0.00050	mg/L							
Copper	ND	0.00050	mg/L							
Lead	ND	0.00050	mg/L							
Nickel	ND	0.00050	mg/L							
Selenium	ND	0.0025	mg/L							
Silver	ND	0.00050	mg/L							
Zinc	ND	0.040	mg/L							
LCS (2006076-BS1)				Prepared: 06/05/2020 Analyzed: 06/08/2020						
Arsenic	0.052	0.00050	mg/L	0.05000		104	85-115			
Barium	0.050	0.00050	mg/L	0.05000		101	85-115			
Cadmium	0.050	0.00025	mg/L	0.05000		100	85-115			
Chromium	0.051	0.00050	mg/L	0.05000		102	85-115			
Copper	0.051	0.00050	mg/L	0.05000		101	85-115			
Lead	0.051	0.00050	mg/L	0.05000		101	85-115			
Nickel	0.054	0.00050	mg/L	0.05000		108	85-115			
Selenium	0.052	0.0025	mg/L	0.05000		104	85-115			
Silver	0.049	0.00050	mg/L	0.05000		99	85-115			
Zinc	0.11	0.040	mg/L	0.1000		107	85-115			
LCS Dup (2006076-BSD1)				Prepared: 06/05/2020 Analyzed: 06/08/2020						
Arsenic	0.051	0.00050	mg/L	0.05000		102	85-115	2	20	
Barium	0.050	0.00050	mg/L	0.05000		99	85-115	1	20	
Cadmium	0.049	0.00025	mg/L	0.05000		98	85-115	1	20	
Chromium	0.052	0.00050	mg/L	0.05000		104	85-115	2	20	
Copper	0.050	0.00050	mg/L	0.05000		101	85-115	0.4	20	
Lead	0.050	0.00050	mg/L	0.05000		100	85-115	1	20	
Nickel	0.054	0.00050	mg/L	0.05000		108	85-115	0.5	20	
Selenium	0.052	0.0025	mg/L	0.05000		105	85-115	0.6	20	
Silver	0.051	0.00050	mg/L	0.05000		101	85-115	2	20	
Zinc	0.11	0.040	mg/L	0.1000		106	85-115	1	20	
Matrix Spike (2006076-MS1)				Source: 20F0086-01		Prepared: 06/05/2020 Analyzed: 06/08/2020				
Arsenic	0.052	0.00050	mg/L	0.05000	0.00033	104	70-130			
Barium	0.33	0.00050	mg/L	0.05000	0.28	92	70-130			
Cadmium	0.050	0.00025	mg/L	0.05000	0.00053	101	70-130			
Chromium	0.050	0.00050	mg/L	0.05000	0.0010	98	70-130			
Copper	0.049	0.00050	mg/L	0.05000	0.0017	95	70-130			
Lead	0.052	0.00050	mg/L	0.05000	0.00047	102	70-130			
Nickel	0.046	0.00050	mg/L	0.05000	0.0042	84	70-130			
Selenium	0.053	0.0025	mg/L	0.05000	ND	106	70-130			
Silver	0.046	0.00050	mg/L	0.05000	0.000037	92	70-130			
Zinc	0.12	0.040	mg/L	0.1000	0.015	108	70-130			

Client: Engineering and Environmental Consultants, Inc.
Project: A DOT Storm Water
Work Order: 20F0144
Date Received: 06/02/2020

QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 2006032 - SM2540 C										
Duplicate (2006032-DUP1)		Source: 20F0163-01		Prepared: 06/04/2020 Analyzed: 06/09/2020						
Total Dissolved Solids (Residue, Filterable)	3700	20	mg/L		3700			0.08	5	
Duplicate (2006032-DUP2)		Source: 20F0115-01		Prepared: 06/04/2020 Analyzed: 06/09/2020						
Total Dissolved Solids (Residue, Filterable)	28000	20	mg/L		27000			1	5	
Duplicate (2006032-DUP3)		Source: 20F0011-01		Prepared: 06/04/2020 Analyzed: 06/09/2020						
Total Dissolved Solids (Residue, Filterable)	1500	20	mg/L		1500			0.6	5	
Batch 2006049 - SM4500-NH3 B,C										
Blank (2006049-BLK1)		Prepared & Analyzed: 06/03/2020								
Nitrogen, Ammonia (As N)	ND	0.50	mg/L							
LCS (2006049-BS1)		Prepared & Analyzed: 06/03/2020								
Nitrogen, Ammonia (As N)	4.9	0.50	mg/L	5.000		99	90-110			
LCS Dup (2006049-BSD1)		Prepared & Analyzed: 06/03/2020								
Nitrogen, Ammonia (As N)	4.9	0.50	mg/L	5.000		97	90-110	1	10	
Matrix Spike (2006049-MS1)		Source: 20E0524-01		Prepared & Analyzed: 06/03/2020						
Nitrogen, Ammonia (As N)	4.7	0.50	mg/L	5.000	ND	95	75-120			
Matrix Spike (2006049-MS2)		Source: 20F0003-01		Prepared & Analyzed: 06/03/2020						
Nitrogen, Ammonia (As N)	4.8	0.50	mg/L	5.000	ND	95	75-120			
Matrix Spike Dup (2006049-MSD1)		Source: 20E0524-01		Prepared & Analyzed: 06/03/2020						
Nitrogen, Ammonia (As N)	4.7	0.50	mg/L	5.000	ND	95	75-120	0	20	
Matrix Spike Dup (2006049-MSD2)		Source: 20F0003-01		Prepared & Analyzed: 06/03/2020						
Nitrogen, Ammonia (As N)	4.7	0.50	mg/L	5.000	ND	94	75-120	1	20	
Batch 2006054 - E180.1										
Duplicate (2006054-DUP1)		Source: 20F0144-01		Prepared & Analyzed: 06/03/2020						
Turbidity	180	5.0	NTU		180			0	10	
Batch 2006056 - SM2540 D										
Duplicate (2006056-DUP1)		Source: 20F0011-01		Prepared & Analyzed: 06/05/2020						
Total Suspended Solids	2.0	10	mg/L		1.0			67	5	Q9, R12
Duplicate (2006056-DUP2)		Source: 20F0002-02		Prepared & Analyzed: 06/05/2020						
Total Suspended Solids	1.0	10	mg/L		3.0			100	5	Q9, R12
Batch 2006086 - SM5210 B										
Blank (2006086-BLK1)		Prepared: 06/04/2020 Analyzed: 06/09/2020								
Biochemical Oxygen Demand	ND	2.0	mg/L							
LCS (2006086-BS1)		Prepared: 06/04/2020 Analyzed: 06/09/2020								
Biochemical Oxygen Demand	190		mg/L	198.0		94	85-115			

Client: Engineering and Environmental Consultants, Inc.
Project: A DOT Storm Water
Work Order: 20F0144
Date Received: 06/02/2020

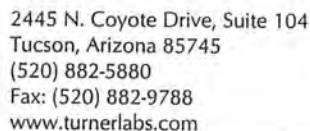
QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 2006086 - SM5210 B										
Duplicate (2006086-DUP1)		Source: 20F0125-02		Prepared: 06/04/2020 Analyzed: 06/09/2020						
Biochemical Oxygen Demand	2.2	2.0	mg/L		2.4			8	20	
Batch 2006088 - Hach 8000										
Blank (2006088-BLK1)		Prepared & Analyzed: 06/05/2020								
Chemical Oxygen Demand	ND	20	mg/L							
LCS (2006088-BS1)		Prepared & Analyzed: 06/05/2020								
Chemical Oxygen Demand	510	20	mg/L	500.0		103	70-130			
LCS Dup (2006088-BSD1)		Prepared & Analyzed: 06/05/2020								
Chemical Oxygen Demand	520	20	mg/L	500.0		104	70-130	1	20	
Matrix Spike (2006088-MS1)		Source: 20F0011-01		Prepared & Analyzed: 06/05/2020						
Chemical Oxygen Demand	500	20	mg/L	500.0	21	96	70-130			
Matrix Spike Dup (2006088-MSD1)		Source: 20F0011-01		Prepared & Analyzed: 06/05/2020						
Chemical Oxygen Demand	520	20	mg/L	500.0	21	100	70-130	4	20	

Client: Engineering and Environmental Consultants, Inc.
Project: A DOT Storm Water
Work Order: 20F0144
Date Received: 06/02/2020

QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 2006052 - E300.0 (2.1)										
Blank (2006052-BLK1)				Prepared & Analyzed: 06/03/2020						
Chloride	ND	1.0	mg/L							
Nitrogen, Nitrate (As N)	ND	0.50	mg/L							
Nitrogen, Nitrite (As N)	ND	0.10	mg/L							
Sulfate	ND	5.0	mg/L							
LCS (2006052-BS1)				Prepared & Analyzed: 06/03/2020						
Chloride	12	1.0	mg/L	12.50		95	90-110			
Nitrogen, Nitrate (As N)	4.8	0.50	mg/L	5.000		96	90-110			
Nitrogen, Nitrite (As N)	2.5	0.10	mg/L	2.500		98	90-110			
Sulfate	12	5.0	mg/L	12.50		99	90-110			
LCS Dup (2006052-BSD1)				Prepared & Analyzed: 06/03/2020						
Chloride	12	1.0	mg/L	12.50		95	90-110	0.04	10	
Nitrogen, Nitrate (As N)	4.8	0.50	mg/L	5.000		96	90-110	0.4	10	
Nitrogen, Nitrite (As N)	2.5	0.10	mg/L	2.500		99	90-110	0.4	10	
Sulfate	12	5.0	mg/L	12.50		99	90-110	0.5	10	
Matrix Spike (2006052-MS1)		Source: 20F0144-01		Prepared: 06/03/2020 Analyzed: 06/06/2020						
Chloride	20	1.0	mg/L	12.50	7.0	102	80-120			
Nitrogen, Nitrate (As N)	6.1	0.50	mg/L	5.000	1.2	97	80-120			
Nitrogen, Nitrite (As N)	2.5	0.10	mg/L	2.500	0.093	97	80-120			
Sulfate	20	5.0	mg/L	12.50	8.8	90	80-120			
Matrix Spike (2006052-MS2)		Source: 20E0416-01		Prepared: 06/03/2020 Analyzed: 06/06/2020						
Sulfate	32	5.0	mg/L	12.50	21	82	80-120			
Matrix Spike Dup (2006052-MSD1)		Source: 20F0144-01		Prepared: 06/03/2020 Analyzed: 06/06/2020						
Chloride	20	1.0	mg/L	12.50	7.0	103	80-120	0.3	10	
Nitrogen, Nitrate (As N)	6.1	0.50	mg/L	5.000	1.2	97	80-120	0.1	10	
Nitrogen, Nitrite (As N)	2.5	0.10	mg/L	2.500	0.093	98	80-120	0.9	10	
Sulfate	20	5.0	mg/L	12.50	8.8	91	80-120	1	10	
Matrix Spike Dup (2006052-MSD2)		Source: 20E0416-01		Prepared: 06/03/2020 Analyzed: 06/06/2020						
Sulfate	32	5.0	mg/L	12.50	21	83	80-120	0.3	10	



TURNER WORK ORDER # 20F0144 DATE 06/02/20 PAGE 1 OF 1

Page 11 of 22



ANALYTICAL REPORT

June 12, 2020

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

Turner Laboratories Inc

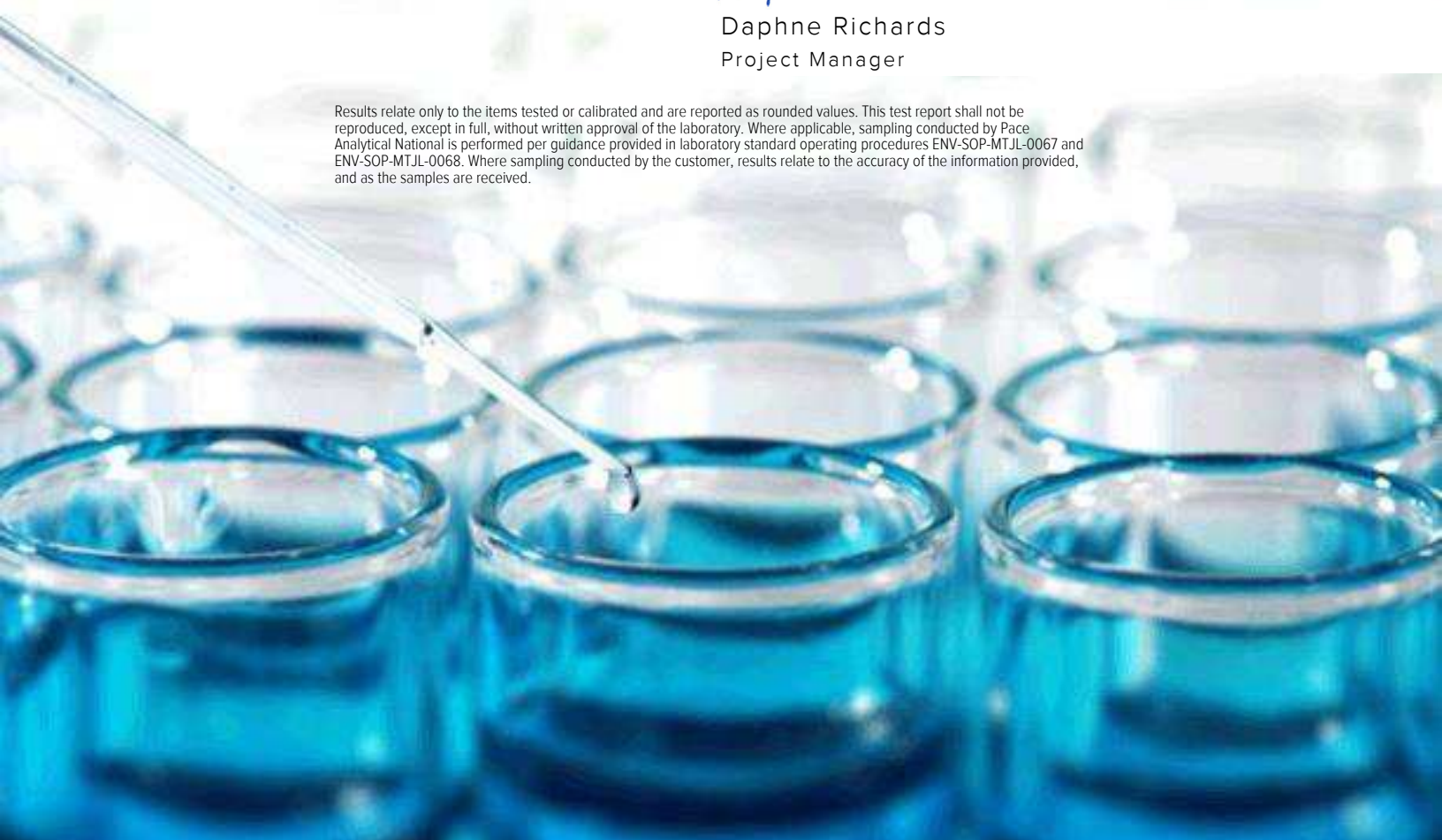
Sample Delivery Group: L1226083
Samples Received: 06/05/2020
Project Number: 20F0144
Description:

Report To: Elizabeth Kasik
2445 North Coyote Drive
Suite 104
Tucson, AZ 85745

Entire Report Reviewed By:

Daphne Richards
Project Manager

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by Pace Analytical National is performed per guidance provided in laboratory standard operating procedures ENV-SOP-MTJL-0067 and ENV-SOP-MTJL-0068. Where sampling conducted by the customer, results relate to the accuracy of the information provided, and as the samples are received.





Cp: Cover Page	1	¹ Cp
Tc: Table of Contents	2	
Ss: Sample Summary	3	² Tc
Cn: Case Narrative	4	
Sr: Sample Results	5	³ Ss
20F0144-01 L1226083-01	5	
Qc: Quality Control Summary	6	⁴ Cn
Semi-Volatile Organic Compounds (HPLC) by Method 8310	6	⁵ Sr
Gl: Glossary of Terms	8	
Al: Accreditations & Locations	9	⁶ Qc
Sc: Sample Chain of Custody	10	⁷ Gl
		⁸ Al
		⁹ Sc



20F0144-01 L1226083-01 GW

Collected by
Collected date/time
Received date/time

06/02/20 16:20 06/05/20 10:05

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Semi-Volatile Organic Compounds (HPLC) by Method 8310	WG1489397	1	06/09/20 17:07	06/10/20 17:51	GKM	Mt. Juliet, TN

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc



All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Daphne Richards
Project Manager

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc



Semi-Volatile Organic Compounds (HPLC) by Method 8310

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch	
Anthracene	ND		0.000100	1	06/10/2020 17:51	WG1489397	¹ Cp
Acenaphthene	ND	<u>R7</u>	0.000100	1	06/10/2020 17:51	WG1489397	² Tc
Acenaphthylene	ND	<u>R7</u>	0.000100	1	06/10/2020 17:51	WG1489397	³ Ss
Benzo(a)anthracene	ND		0.000100	1	06/10/2020 17:51	WG1489397	
Benzo(a)pyrene	ND		0.000100	1	06/10/2020 17:51	WG1489397	⁴ Cn
Benzo(b)fluoranthene	ND		0.000100	1	06/10/2020 17:51	WG1489397	
Benzo(g,h,i)perylene	ND		0.000100	1	06/10/2020 17:51	WG1489397	⁵ Sr
Benzo(k)fluoranthene	ND		0.000100	1	06/10/2020 17:51	WG1489397	
Chrysene	ND		0.000100	1	06/10/2020 17:51	WG1489397	⁶ Qc
Dibenz(a,h)anthracene	ND		0.000100	1	06/10/2020 17:51	WG1489397	
Fluoranthene	ND		0.000100	1	06/10/2020 17:51	WG1489397	⁷ Gl
Fluorene	ND	<u>R7</u>	0.000100	1	06/10/2020 17:51	WG1489397	
Indeno(1,2,3-cd)pyrene	ND		0.000100	1	06/10/2020 17:51	WG1489397	⁸ Al
1-Methylnaphthalene	ND	<u>R7</u>	0.00100	1	06/10/2020 17:51	WG1489397	
2-Methylnaphthalene	ND	<u>R7</u>	0.00100	1	06/10/2020 17:51	WG1489397	
Naphthalene	ND	<u>R7</u>	0.00100	1	06/10/2020 17:51	WG1489397	⁹ Sc
Phenanthrene	ND	<u>R7</u>	0.000100	1	06/10/2020 17:51	WG1489397	
Pyrene	ND		0.000100	1	06/10/2020 17:51	WG1489397	
(S) p-Terphenyl-d14	67.5		44.0-121		06/10/2020 17:51	WG1489397	

Method Blank (MB)

(MB) R3537509-1 06/10/20 16:07

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Anthracene	U		0.0000301	0.000100
Acenaphthene	U		0.0000282	0.000100
Acenaphthylene	U		0.0000361	0.000100
Benzo(a)anthracene	U		0.00000240	0.000100
Benzo(a)pyrene	U		0.00000263	0.000100
Benzo(b)fluoranthene	U		0.00000212	0.000100
Benzo(g,h,i)perylene	U		0.00000227	0.000100
Benzo(k)fluoranthene	U		0.00000262	0.000100
Chrysene	U		0.00000343	0.000100
Dibenz(a,h)anthracene	U		0.00000161	0.000100
Fluoranthene	U		0.00000305	0.000100
Fluorene	U		0.00000327	0.000100
Indeno(1,2,3-cd)pyrene	U		0.00000323	0.000100
1-Methylnaphthalene	U		0.00000944	0.00100
2-Methylnaphthalene	U		0.00000408	0.00100
Naphthalene	U		0.00000499	0.00100
Phenanthrene	U		0.00000383	0.000100
Pyrene	U		0.00000351	0.000100
(S) p-Terphenyl-d14	78.0			44.0-121

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3537509-2 06/10/20 16:33 • (LCSD) R3537509-3 06/10/20 16:59

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Anthracene	0.00400	0.00377	0.00320	94.3	80.0	64.0-115			16.4	20
Acenaphthene	0.00400	0.00334	0.00263	83.5	65.8	60.0-115		R7	23.8	20
Acenaphthylene	0.00400	0.00353	0.00279	88.3	69.8	59.0-115		R7	23.4	20
Benzo(a)anthracene	0.00400	0.00360	0.00314	90.0	78.5	68.0-115			13.6	20
Benzo(a)pyrene	0.00400	0.00357	0.00316	89.2	79.0	63.0-115			12.2	20
Benzo(b)fluoranthene	0.00400	0.00360	0.00319	90.0	79.8	64.0-115			12.1	20
Benzo(g,h,i)perylene	0.00400	0.00339	0.00313	84.7	78.3	37.0-115			7.98	20
Benzo(k)fluoranthene	0.00400	0.00364	0.00322	91.0	80.5	61.0-115			12.2	20
Chrysene	0.00400	0.00376	0.00331	94.0	82.8	66.0-115			12.7	20
Dibenz(a,h)anthracene	0.00400	0.00319	0.00291	79.8	72.8	28.0-115			9.18	20
Fluoranthene	0.00400	0.00350	0.00304	87.5	76.0	67.0-115			14.1	20
Fluorene	0.00400	0.00345	0.00275	86.2	68.8	56.0-115		R7	22.6	20
Indeno(1,2,3-cd)pyrene	0.00400	0.00344	0.00328	86.0	82.0	55.0-115			4.76	20
1-Methylnaphthalene	0.00400	0.00286	0.00223	71.5	55.7	44.0-115		R7	24.8	20



Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3537509-2 06/10/20 16:33 • (LCSD) R3537509-3 06/10/20 16:59

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	<u>LCS Qualifier</u>	<u>LCSD Qualifier</u>	RPD %	RPD Limits %
2-Methylnaphthalene	0.00400	0.00311	0.00241	77.7	60.2	45.0-115		R7	25.4	20
Naphthalene	0.00400	0.00312	0.00243	78.0	60.8	48.0-115		R7	24.9	20
Phenanthrene	0.00400	0.00351	0.00286	87.7	71.5	65.0-115		R7	20.4	20
Pyrene	0.00400	0.00365	0.00319	91.3	79.8	73.0-115			13.5	20
(S) p-Terphenyl-d14				80.0	70.0	44.0-121				

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier Description

R7	LFB/LFBD RPD exceeded the laboratory acceptance limit. Recovery met acceptance criteria.
----	--

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



Pace National is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our one location design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be YOUR LAB OF CHOICE.

* Not all certifications held by the laboratory are applicable to the results reported in the attached report.

* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace National.

State Accreditations

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN-03-2002-34
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey–NELAP	TN002
California	2932	New Mexico ¹	n/a
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina ¹	DW21704
Georgia	NELAP	North Carolina ³	41
Georgia ¹	923	North Dakota	R-140
Idaho	TN00003	Ohio–VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LA000356
Kentucky ^{1 6}	90010	South Carolina	84004
Kentucky ²	16	South Dakota	n/a
Louisiana	AI30792	Tennessee ^{1 4}	2006
Louisiana ¹	LA180010	Texas	T104704245-18-15
Maine	TN0002	Texas ⁵	LAB0152
Maryland	324	Utah	TN00003
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	460132
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA

Third Party Federal Accreditations

A2LA – ISO 17025	1461.01	AIHA-LAP, LLC EMLAP	100789
A2LA – ISO 17025 ⁵	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA–Crypto	TN00003		

¹ Drinking Water ² Underground Storage Tanks ³ Aquatic Toxicity ⁴ Chemical/Microbiological ⁵ Mold ⁶ Wastewater n/a Accreditation not applicable

Our Locations

Pace National has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. Pace National performs all testing at our central laboratory.



SUBCONTRACT ORDER

Turner Laboratories, Inc.

20F0144

SENDING LABORATORY:

Turner Laboratories, Inc.
2445 N. Coyote Drive, Ste #104
Tucson, AZ 85745
Phone: 520.882.5880
Fax: 520.882.9788
Project Manager: Elizabeth Kasik

RECEIVING LABORATORY:

Pace Analytical Services - Tennessee
12065 Lebabon Rd.
Mt. Juliet, TN 37122
Phone : (615) 758-5858
Fax: -
Please CC Kevin Brim Kbrim@turnerlabs.com

F083

Analysis	Expires	Laboratory ID	Comments
----------	---------	---------------	----------

Sample ID: 20F0144-01 Non-Potable Wa Sampled: 06/02/2020 16:20

L1226083-01

PAHs by SW 8310

06/09/2020 16:20

Containers Supplied:

*2-1-1 any
Ab*

Page 21 of 22

Released By

Date

Received By

Date

Released By

Date

Received By

Date

Pace Analytical National Center for Testing & Innovation
Cooler Receipt Form

Client:	TURLABTAZ	L1226083
Cooler Received/Opened On:	06/05/20	Temperature: .1
Received By:	Brandan Stockton	
Signature:		

Receipt Check List	NP	Yes	No
COC Seal Present / Intact?	/		
COC Signed / Accurate?		/	
Bottles arrive intact?		/	
Correct bottles used?		/	
Sufficient volume sent?		/	
If Applicable			
VOA Zero headspace?			
Preservation Correct / Checked?			



June 15, 2020

John Burton
Engineering and Environmental Consultants, Inc.
7740 N. 16th Street Suite 135
Phoenix, AZ 85020

TEL (602) 248-7702
FAX 602-248-7851

Work Order No.: 20F0145
Order Name: A DOT Storm Water

RE: A DOT Storm Water

Dear John Burton,

Turner Laboratories, Inc. received 1 sample(s) on 06/02/2020 for the analyses presented in the following report.

All results are intended to be considered in their entirety, and Turner Laboratories, Inc. is not responsible for use of less than the complete report. Results apply only to the samples analyzed. Samples will be disposed of 30 days after issue of our report unless special arrangements are made.

The pages that follow may contain sensitive, privileged or confidential information intended solely for the addressee named above. If you receive this message and are not the agent or employee of the addressee, this communication has been sent in error. Please do not disseminate or copy any of the attached and notify the sender immediately by telephone. Please also return the attached sheet(s) to the sender by mail.

Please call if you have any questions.

Respectfully submitted,

Turner Laboratories, Inc.
ADHS License AZ0066

Elizabeth Kasik
Laboratory Director

Client: Engineering and Environmental Consultants, Inc**Project:** A DOT Storm Water**Work Order:** 20F0145**Date Received:** 06/02/2020**Order:** A DOT Storm Water**Work Order Sample Summary**

Lab Sample ID	Client Sample ID	Matrix	Collection Date/Time
20F0145-01	Nog Yard 200602	Non-Potable Water	06/02/2020 1645

Client: Engineering and Environmental Consultants, Inc.
Project: A DOT Storm Water
Work Order: 20F0145
Date Received: 06/02/2020

Case Narrative

The 8310 analysis was performed by Pace Analytical National in Mount Juliet, TN.

Q9 Insufficient sample received to meet method QC requirements.

R12 RPD/RSD exceeded the method acceptance limit. Result less than 5 times the PQL.

All soil, sludge, and solid matrix determinations are reported on a wet weight basis unless otherwise noted.

ND Not Detected at or above the PQL

PQL Practical Quantitation Limit

DF Dilution Factor

Client: Engineering and Environmental Consultants
Project: A DOT Storm Water
Work Order: 20F0145
Lab Sample ID: 20F0145-01

Client Sample ID: Nog Yard 200602
Collection Date/Time: 06/02/2020 1645
Matrix: Non-Potable Water
Order Name: A DOT Storm Water

Analyses	Result	PQL	Qual	Units	DF	Prep Date	Analysis Date	Analyst
Hardness-Calculation								
Hardness, Calcium/Magnesium (As CaCO ₃)	110			mg/L	1	06/04/2020 0900	06/05/2020 1457	MH
ICP/MS Dissolved Metals-E 200.8 (5.4)								
Copper	0.12	0.0025		mg/L	5	06/04/2020 0815	06/05/2020 1149	MH
ICP Total Metals-E200.7 (4.4)								
Calcium	32	4.0		mg/L	1	06/04/2020 0900	06/05/2020 1456	MH
Magnesium	6.5	3.0		mg/L	1	06/04/2020 0900	06/05/2020 1457	MH
Total Coliform & E. Coli, MPN-SM 9223B								
E.Coli	47	1.0		MPN/100mL	1	06/02/2020 1834	06/03/2020 1840	CWB
Fecal coliforms	2400	1.0		MPN/100mL	1	06/02/2020 1836	06/03/2020 1315	CWB
Total Coliform	2400	1.0		MPN/100mL	1	06/02/2020 1834	06/03/2020 1840	CWB
Total Dissolved Solids (Residue, Filterable)-SM2540 C								
Total Dissolved Solids (Residue, Filterable)	130	20		mg/L	1	06/04/2020 1700	06/05/2020 1630	CWB
Total Suspended Solids (Residue, Non-Filterable)-SM2540 D								
Total Suspended Solids	220	10		mg/L	1	06/05/2020 1145	06/05/2020 1620	CWB
Ammonia as N-SM4500-NH₃ B,C								
Nitrogen, Ammonia (As N)	0.56	0.50		mg/L	1	06/03/2020 0830	06/03/2020 1320	JG

Client: Engineering and Environmental Consultants, Inc.
Project: A DOT Storm Water
Work Order: 20F0145
Date Received: 06/02/2020

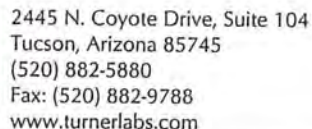
QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 2006050 - E 200.8 (5.4)										
Blank (2006050-BLK1)				Prepared & Analyzed: 06/05/2020						
Copper	ND	0.00050	mg/L							
LCS (2006050-BS1)				Prepared & Analyzed: 06/05/2020						
Copper	0.051	0.00050	mg/L	0.05000		103	85-115			
LCS Dup (2006050-BSD1)				Prepared & Analyzed: 06/05/2020						
Copper	0.051	0.00050	mg/L	0.05000		102	85-115	1	20	
Matrix Spike (2006050-MS1)				Source: 20F0174-01		Prepared & Analyzed: 06/05/2020				
Copper	0.043	0.0050	mg/L	0.05000	ND	86	70-130			
Batch 2006062 - E200.7 (4.4)										
Blank (2006062-BLK1)				Prepared: 06/04/2020 Analyzed: 06/05/2020						
Calcium	ND	4.0	mg/L							
Magnesium	ND	3.0	mg/L							
LCS (2006062-BS1)				Prepared: 06/04/2020 Analyzed: 06/05/2020						
Calcium	10	4.0	mg/L	10.00		101	85-115			
Magnesium	10	3.0	mg/L	10.00		103	85-115			
LCS Dup (2006062-BSD1)				Prepared: 06/04/2020 Analyzed: 06/05/2020						
Calcium	10	4.0	mg/L	10.00		102	85-115	1	20	
Magnesium	10	3.0	mg/L	10.00		104	85-115	2	20	
Matrix Spike (2006062-MS1)				Source: 20F0005-03		Prepared: 06/04/2020 Analyzed: 06/05/2020				
Calcium	170	4.0	mg/L	10.00	160	76	70-130			
Magnesium	31	3.0	mg/L	10.00	20	112	70-130			
Matrix Spike (2006062-MS2)				Source: 20F0011-02		Prepared: 06/04/2020 Analyzed: 06/05/2020				
Calcium	250	40	mg/L	10.00	240	118	70-130			
Magnesium	62	3.0	mg/L	10.00	52	95	70-130			

Client: Engineering and Environmental Consultants, Inc.
Project: A DOT Storm Water
Work Order: 20F0145
Date Received: 06/02/2020

QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 2006032 - SM2540 C										
Duplicate (2006032-DUP1)		Source: 20F0163-01		Prepared: 06/04/2020 Analyzed: 06/09/2020						
Total Dissolved Solids (Residue, Filterable)	3700	20	mg/L		3700			0.08	5	
Duplicate (2006032-DUP2)		Source: 20F0115-01		Prepared: 06/04/2020 Analyzed: 06/09/2020						
Total Dissolved Solids (Residue, Filterable)	28000	20	mg/L		27000			1	5	
Duplicate (2006032-DUP3)		Source: 20F0011-01		Prepared: 06/04/2020 Analyzed: 06/09/2020						
Total Dissolved Solids (Residue, Filterable)	1500	20	mg/L		1500			0.6	5	
Batch 2006049 - SM4500-NH3 B,C										
Blank (2006049-BLK1)		Prepared & Analyzed: 06/03/2020								
Nitrogen, Ammonia (As N)	ND	0.50	mg/L							
LCS (2006049-BS1)		Prepared & Analyzed: 06/03/2020								
Nitrogen, Ammonia (As N)	4.9	0.50	mg/L	5.000		99	90-110			
LCS Dup (2006049-BSD1)		Prepared & Analyzed: 06/03/2020								
Nitrogen, Ammonia (As N)	4.9	0.50	mg/L	5.000		97	90-110	1	10	
Matrix Spike (2006049-MS1)		Source: 20E0524-01		Prepared & Analyzed: 06/03/2020						
Nitrogen, Ammonia (As N)	4.7	0.50	mg/L	5.000	ND	95	75-120			
Matrix Spike (2006049-MS2)		Source: 20F0003-01		Prepared & Analyzed: 06/03/2020						
Nitrogen, Ammonia (As N)	4.8	0.50	mg/L	5.000	ND	95	75-120			
Matrix Spike Dup (2006049-MSD1)		Source: 20E0524-01		Prepared & Analyzed: 06/03/2020						
Nitrogen, Ammonia (As N)	4.7	0.50	mg/L	5.000	ND	95	75-120	0	20	
Matrix Spike Dup (2006049-MSD2)		Source: 20F0003-01		Prepared & Analyzed: 06/03/2020						
Nitrogen, Ammonia (As N)	4.7	0.50	mg/L	5.000	ND	94	75-120	1	20	
Batch 2006056 - SM2540 D										
Duplicate (2006056-DUP1)		Source: 20F0011-01		Prepared & Analyzed: 06/05/2020						
Total Suspended Solids	2.0	10	mg/L		1.0			67	5	Q9, R12
Duplicate (2006056-DUP2)		Source: 20F0002-02		Prepared & Analyzed: 06/05/2020						
Total Suspended Solids	1.0	10	mg/L		3.0			100	5	Q9, R12



TURNER WORK ORDER # 20F0145 DATE 06/02/20 PAGE 1 OF 1

Page 7 of 18



ANALYTICAL REPORT

June 12, 2020

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

Turner Laboratories Inc

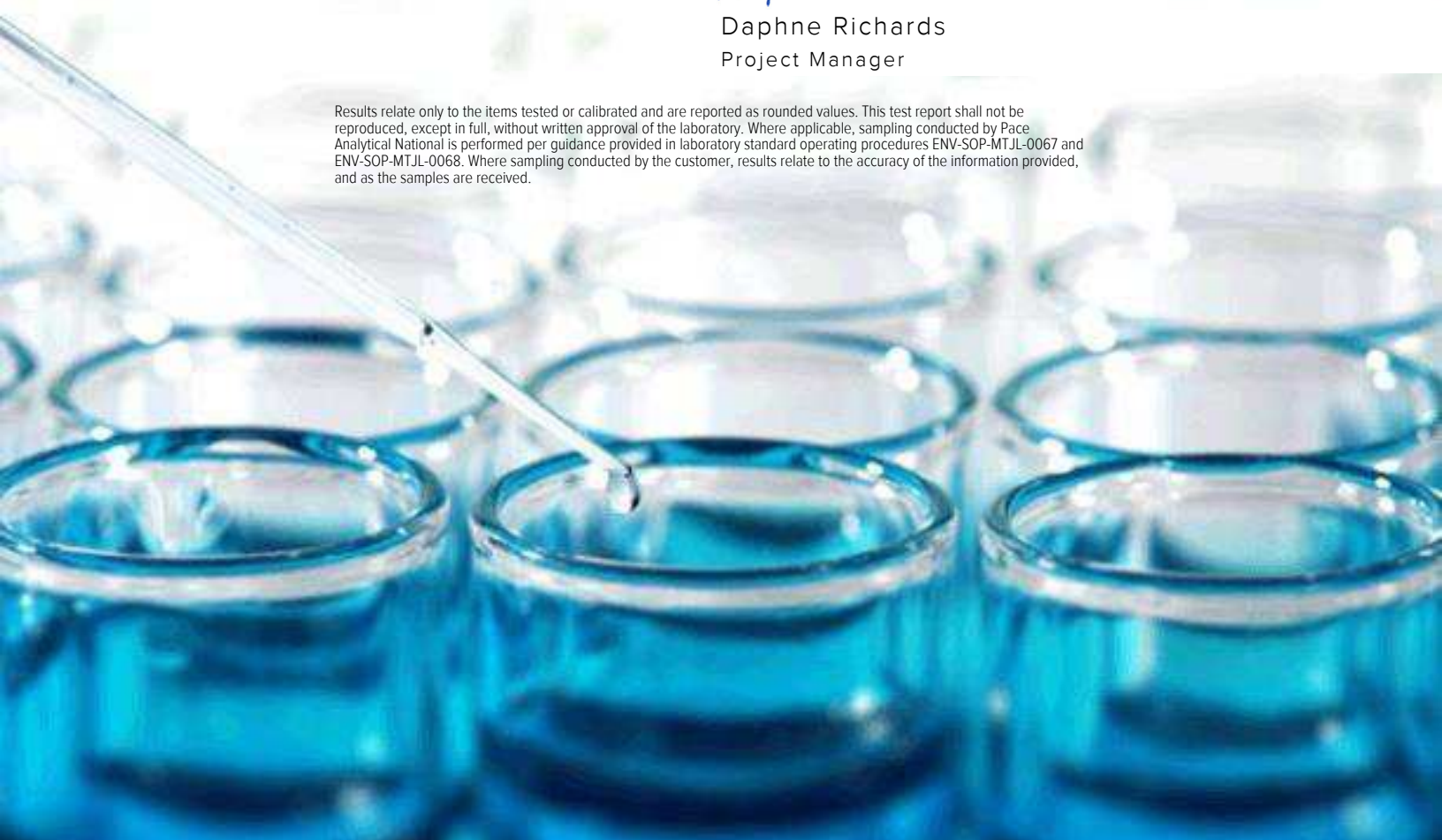
Sample Delivery Group: L1226082
Samples Received: 06/05/2020
Project Number: 20F0145
Description:

Report To: Elizabeth Kasik
2445 North Coyote Drive
Suite 104
Tucson, AZ 85745

Entire Report Reviewed By:

Daphne Richards
Project Manager

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by Pace Analytical National is performed per guidance provided in laboratory standard operating procedures ENV-SOP-MTJL-0067 and ENV-SOP-MTJL-0068. Where sampling conducted by the customer, results relate to the accuracy of the information provided, and as the samples are received.





Cp: Cover Page	1	¹ Cp
Tc: Table of Contents	2	
Ss: Sample Summary	3	² Tc
Cn: Case Narrative	4	
Sr: Sample Results	5	³ Ss
20F0145-01 L1226082-01	5	
Qc: Quality Control Summary	6	⁴ Cn
Semi-Volatile Organic Compounds (HPLC) by Method 8310	6	⁵ Sr
Gl: Glossary of Terms	8	
Al: Accreditations & Locations	9	⁶ Qc
Sc: Sample Chain of Custody	10	⁷ Gl
		⁸ Al
		⁹ Sc



20F0145-01 L1226082-01 GW

Collected by
Collected date/time
Received date/time

06/02/20 16:45
06/05/20 10:05

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Semi-Volatile Organic Compounds (HPLC) by Method 8310	WG1489397	1	06/09/20 17:07	06/10/20 17:25	GKM	Mt. Juliet, TN

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc



All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Daphne Richards
Project Manager

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc



Semi-Volatile Organic Compounds (HPLC) by Method 8310

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch	
Anthracene	ND		0.000100	1	06/10/2020 17:25	WG1489397	¹ Cp
Acenaphthene	ND	R7	0.000100	1	06/10/2020 17:25	WG1489397	² Tc
Acenaphthylene	ND	R7	0.000100	1	06/10/2020 17:25	WG1489397	³ Ss
Benzo(a)anthracene	ND		0.000100	1	06/10/2020 17:25	WG1489397	⁴ Cn
Benzo(a)pyrene	ND		0.000100	1	06/10/2020 17:25	WG1489397	⁵ Sr
Benzo(b)fluoranthene	ND		0.000100	1	06/10/2020 17:25	WG1489397	⁶ Qc
Benzo(g,h,i)perylene	ND		0.000100	1	06/10/2020 17:25	WG1489397	⁷ Gl
Benzo(k)fluoranthene	ND		0.000100	1	06/10/2020 17:25	WG1489397	⁸ Al
Chrysene	ND		0.000100	1	06/10/2020 17:25	WG1489397	⁹ Sc
Dibenz(a,h)anthracene	ND		0.000100	1	06/10/2020 17:25	WG1489397	
Fluoranthene	ND		0.000100	1	06/10/2020 17:25	WG1489397	
Fluorene	ND	R7	0.000100	1	06/10/2020 17:25	WG1489397	
Indeno(1,2,3-cd)pyrene	ND		0.000100	1	06/10/2020 17:25	WG1489397	
1-Methylnaphthalene	ND	R7	0.00100	1	06/10/2020 17:25	WG1489397	
2-Methylnaphthalene	ND	R7	0.00100	1	06/10/2020 17:25	WG1489397	
Naphthalene	ND	R7	0.00100	1	06/10/2020 17:25	WG1489397	
Phenanthrene	ND	R7	0.000100	1	06/10/2020 17:25	WG1489397	
Pyrene	ND		0.000100	1	06/10/2020 17:25	WG1489397	
(S) p-Terphenyl-d14	67.5		44.0-121		06/10/2020 17:25	WG1489397	

Method Blank (MB)

(MB) R3537509-1 06/10/20 16:07

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Anthracene	U		0.0000301	0.000100
Acenaphthene	U		0.0000282	0.000100
Acenaphthylene	U		0.0000361	0.000100
Benzo(a)anthracene	U		0.00000240	0.000100
Benzo(a)pyrene	U		0.00000263	0.000100
Benzo(b)fluoranthene	U		0.00000212	0.000100
Benzo(g,h,i)perylene	U		0.00000227	0.000100
Benzo(k)fluoranthene	U		0.00000262	0.000100
Chrysene	U		0.00000343	0.000100
Dibenz(a,h)anthracene	U		0.00000161	0.000100
Fluoranthene	U		0.00000305	0.000100
Fluorene	U		0.00000327	0.000100
Indeno(1,2,3-cd)pyrene	U		0.00000323	0.000100
1-Methylnaphthalene	U		0.00000944	0.00100
2-Methylnaphthalene	U		0.00000408	0.00100
Naphthalene	U		0.00000499	0.00100
Phenanthrene	U		0.00000383	0.000100
Pyrene	U		0.00000351	0.000100
(S) p-Terphenyl-d14	78.0			44.0-121

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3537509-2 06/10/20 16:33 • (LCSD) R3537509-3 06/10/20 16:59

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Anthracene	0.00400	0.00377	0.00320	94.3	80.0	64.0-115			16.4	20
Acenaphthene	0.00400	0.00334	0.00263	83.5	65.8	60.0-115		R7	23.8	20
Acenaphthylene	0.00400	0.00353	0.00279	88.3	69.8	59.0-115		R7	23.4	20
Benzo(a)anthracene	0.00400	0.00360	0.00314	90.0	78.5	68.0-115			13.6	20
Benzo(a)pyrene	0.00400	0.00357	0.00316	89.2	79.0	63.0-115			12.2	20
Benzo(b)fluoranthene	0.00400	0.00360	0.00319	90.0	79.8	64.0-115			12.1	20
Benzo(g,h,i)perylene	0.00400	0.00339	0.00313	84.7	78.3	37.0-115			7.98	20
Benzo(k)fluoranthene	0.00400	0.00364	0.00322	91.0	80.5	61.0-115			12.2	20
Chrysene	0.00400	0.00376	0.00331	94.0	82.8	66.0-115			12.7	20
Dibenz(a,h)anthracene	0.00400	0.00319	0.00291	79.8	72.8	28.0-115			9.18	20
Fluoranthene	0.00400	0.00350	0.00304	87.5	76.0	67.0-115			14.1	20
Fluorene	0.00400	0.00345	0.00275	86.2	68.8	56.0-115		R7	22.6	20
Indeno(1,2,3-cd)pyrene	0.00400	0.00344	0.00328	86.0	82.0	55.0-115			4.76	20
1-Methylnaphthalene	0.00400	0.00286	0.00223	71.5	55.7	44.0-115		R7	24.8	20



Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3537509-2 06/10/20 16:33 • (LCSD) R3537509-3 06/10/20 16:59

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	<u>LCS Qualifier</u>	<u>LCSD Qualifier</u>	RPD %	RPD Limits %
2-Methylnaphthalene	0.00400	0.00311	0.00241	77.7	60.2	45.0-115		R7	25.4	20
Naphthalene	0.00400	0.00312	0.00243	78.0	60.8	48.0-115		R7	24.9	20
Phenanthrene	0.00400	0.00351	0.00286	87.7	71.5	65.0-115		R7	20.4	20
Pyrene	0.00400	0.00365	0.00319	91.3	79.8	73.0-115			13.5	20
(S) p-Terphenyl-d14				80.0	70.0	44.0-121				

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

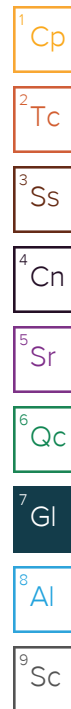
Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier Description

R7	LFB/LFBD RPD exceeded the laboratory acceptance limit. Recovery met acceptance criteria.
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Pace National is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our one location design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be YOUR LAB OF CHOICE.

* Not all certifications held by the laboratory are applicable to the results reported in the attached report.

* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace National.

State Accreditations

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN-03-2002-34
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey–NELAP	TN002
California	2932	New Mexico ¹	n/a
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina ¹	DW21704
Georgia	NELAP	North Carolina ³	41
Georgia ¹	923	North Dakota	R-140
Idaho	TN00003	Ohio–VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LA000356
Kentucky ^{1 6}	90010	South Carolina	84004
Kentucky ²	16	South Dakota	n/a
Louisiana	AI30792	Tennessee ^{1 4}	2006
Louisiana ¹	LA180010	Texas	T104704245-18-15
Maine	TN0002	Texas ⁵	LAB0152
Maryland	324	Utah	TN00003
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	460132
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA

Third Party Federal Accreditations

A2LA – ISO 17025	1461.01	AIHA-LAP, LLC EMLAP	100789
A2LA – ISO 17025 ⁵	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA–Crypto	TN00003		

¹ Drinking Water ² Underground Storage Tanks ³ Aquatic Toxicity ⁴ Chemical/Microbiological ⁵ Mold ⁶ Wastewater n/a Accreditation not applicable

Our Locations

Pace National has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. Pace National performs all testing at our central laboratory.



SUBCONTRACT ORDER

Turner Laboratories, Inc.

20F0145

SENDING LABORATORY:

Turner Laboratories, Inc.
2445 N. Coyote Drive, Ste #104
Tucson, AZ 85745
Phone: 520.882.5880
Fax: 520.882.9788
Project Manager: Elizabeth Kasik

RECEIVING LABORATORY:

Pace Analytical Services - Tennessee
12065 Lebabon Rd.
Mt. Juliet, TN 37122
Phone : (615) 758-5858
Fax: -
Please CC Kevin Brim Kbrim@turnerlabs.com

F082

Analysis	Expires	Laboratory ID	Comments
Sample ID: 20F0145-01 Non-Potable Wa	Sampled: 06/02/2020 16:45	L1226082-a	
PAHs by SW 8310	06/09/2020 16:45		
Containers Supplied:			

2-1-1 w/ AB

Released By	Date	Received By	Date
<i>[Signature]</i>	06/04/20 1600	<i>[Signature]</i>	06/05/20 1005
Released By	Date	Received By	Date

Pace Analytical National Center for Testing & Innovation
Cooler Receipt Form

Client:	TURLABTAC	L1226082
Cooler Received/Opened On:	06 / 05 / 20	Temperature: . /
Received By:	Brandan Stockton	
Signature:		
Receipt Check List	NP	Yes
COC Seal Present / Intact?	/	
COC Signed / Accurate?		/
Bottles arrive intact?		/
Correct bottles used?		/
Sufficient volume sent?		/
If Applicable		
VOA Zero headspace?		
Preservation Correct / Checked?		



July 31, 2019

Michelle Oakley
NV5
7620 North Hartman Lane, Suite 162
Tucson, AZ 85743

TEL (520) 638-7270
FAX (623) 738-3690

Work Order No.: 19G0550
Order Name: ADOT Stormwater

RE: Storm Water

Dear Michelle Oakley,

Turner Laboratories, Inc. received 1 sample(s) on 07/18/2019 for the analyses presented in the following report.

All results are intended to be considered in their entirety, and Turner Laboratories, Inc. is not responsible for use of less than the complete report. Results apply only to the samples analyzed. Samples will be disposed of 30 days after issue of our report unless special arrangements are made.

The pages that follow may contain sensitive, privileged or confidential information intended solely for the addressee named above. If you receive this message and are not the agent or employee of the addressee, this communication has been sent in error. Please do not disseminate or copy any of the attached and notify the sender immediately by telephone. Please also return the attached sheet(s) to the sender by mail.

Please call if you have any questions.

Respectfully submitted,

Turner Laboratories, Inc.
ADHS License AZ0066

Kevin Brim
Project Manager

Client: NV5
Project: Storm Water
Work Order: 19G0550
Date Received: 07/18/2019

Order: ADOT Stormwater

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Matrix	Collection Date/Time
19G0550-01	NOGYARD190718	Storm Water	07/18/2019 1445

Client: NV5
Project: Storm Water
Work Order: 19G0550
Date Received: 07/18/2019

Case Narrative

M1 Matrix spike recovery was high; the associated LCS/LCSD was acceptable.

M2 Matrix spike recovery was low; the associated LCS/LCSD was acceptable.

Q9 Insufficient sample received to meet method QC requirements.

R12 RPD/RSD exceeded the method acceptance limit. Result less than 5 times the PQL.

All soil, sludge, and solid matrix determinations are reported on a wet weight basis unless otherwise noted.

ND Not Detected at or above the PQL

PQL Practical Quantitation Limit

DF Dilution Factor

Client: NV5
Project: Storm Water
Work Order: 19G0550
Lab Sample ID: 19G0550-01

Client Sample ID: NOGYARD190718
Collection Date/Time: 07/18/2019 1445
Matrix: Storm Water
Order Name: ADOT Stormwater

Analyses	Result	PQL	Qual	Units	DF	Prep Date	Analysis Date	Analyst
Hardness-Calculation								
Hardness, Calcium/Magnesium (As CaCO ₃)	100			mg/L	1	07/29/2019 1210	07/30/2019 1518	MH
ICP/MS Dissolved Metals-E 200.8 (5.4)								
Copper	0.014	0.00050		mg/L	1	07/29/2019 1335	07/30/2019 1017	MH
ICP Total Metals-E200.7 (4.4)								
Calcium	33	4.0		mg/L	1	07/29/2019 1210	07/30/2019 1518	MH
Magnesium	5.7	3.0		mg/L	1	07/29/2019 1210	07/30/2019 1518	MH
Total Dissolved Solids (Residue, Filterable)-SM2540 C								
Total Dissolved Solids (Residue, Filterable)	190	20		mg/L	1	07/24/2019 0857	07/29/2019 1645	CR
Total Suspended Solids (Residue, Non-Filterable)-SM2540 D								
Total Suspended Solids	460	10		mg/L	1	07/24/2019 0859	07/25/2019 1300	CR
Ammonia as N-SM4500-NH₃ B,C								
Nitrogen, Ammonia (As N)	1.4	0.50		mg/L	1	07/23/2019 0900	07/23/2019 1345	EJ

Client: NV5
Project: Storm Water
Work Order: 19G0550
Date Received: 07/18/2019

QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 1907353 - E 200.8 (5.4)										
Blank (1907353-BLK1)				Prepared & Analyzed: 07/30/2019						
Copper	ND	0.00050	mg/L							
LCS (1907353-BS1)				Prepared & Analyzed: 07/30/2019						
Copper	0.048	0.00050	mg/L	0.05000		95	85-115			
LCS Dup (1907353-BSD1)				Prepared & Analyzed: 07/30/2019						
Copper	0.047	0.00050	mg/L	0.05000		93	85-115	2	20	
Matrix Spike (1907353-MS1)				Source: 19G0550-01		Prepared & Analyzed: 07/30/2019				
Copper	0.059	0.00050	mg/L	0.05000	0.014	90	70-130			
Batch 1907362 - E200.7 (4.4)										
Blank (1907362-BLK1)				Prepared: 07/29/2019 Analyzed: 07/30/2019						
Calcium	ND	4.0	mg/L							
Magnesium	ND	3.0	mg/L							
LCS (1907362-BS1)				Prepared: 07/29/2019 Analyzed: 07/30/2019						
Calcium	9.9	4.0	mg/L	10.00		99	85-115			
Magnesium	9.9	3.0	mg/L	10.00		99	85-115			
LCS Dup (1907362-BSD1)				Prepared: 07/29/2019 Analyzed: 07/30/2019						
Calcium	9.7	4.0	mg/L	10.00		97	85-115	2	20	
Magnesium	9.7	3.0	mg/L	10.00		97	85-115	1	20	
Matrix Spike (1907362-MS1)				Source: 19G0677-01		Prepared: 07/29/2019 Analyzed: 07/30/2019				
Calcium	58	4.0	mg/L	10.00	49	87	70-130			
Magnesium	20	3.0	mg/L	10.00	10	95	70-130			
Matrix Spike (1907362-MS2)				Source: 19G0677-02		Prepared: 07/29/2019 Analyzed: 07/30/2019				
Calcium	60	4.0	mg/L	10.00	52	81	70-130			
Magnesium	20	3.0	mg/L	10.00	11	93	70-130			

Client: NV5
Project: Storm Water
Work Order: 19G0550
Date Received: 07/18/2019

QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 1907280 - SM4500-NH3 B,C										
Blank (1907280-BLK1)				Prepared & Analyzed: 07/23/2019						
Nitrogen, Ammonia (As N)	ND	0.50	mg/L							
LCS (1907280-BS1)				Prepared & Analyzed: 07/23/2019						
Nitrogen, Ammonia (As N)	4.7	0.50	mg/L	5.000		93	90-110			
LCS Dup (1907280-BSD1)				Prepared & Analyzed: 07/23/2019						
Nitrogen, Ammonia (As N)	5.0	0.50	mg/L	5.000		101	90-110	8	10	
Matrix Spike (1907280-MS1)				Source: 19G0315-01		Prepared & Analyzed: 07/23/2019				
Nitrogen, Ammonia (As N)	9.2	0.50	mg/L	5.000	3.2	120	75-120			
Matrix Spike (1907280-MS2)				Source: 19G0588-04		Prepared & Analyzed: 07/23/2019				
Nitrogen, Ammonia (As N)	5.2	0.50	mg/L	5.000	0.27	99	75-120			
Matrix Spike (1907280-MS3)				Source: 19G0588-06		Prepared & Analyzed: 07/23/2019				
Nitrogen, Ammonia (As N)	4.6	0.50	mg/L	5.000	1.2	69	75-120			M2
Matrix Spike Dup (1907280-MSD1)				Source: 19G0315-01		Prepared & Analyzed: 07/23/2019				
Nitrogen, Ammonia (As N)	9.3	0.50	mg/L	5.000	3.2	121	75-120	0.5	20	M1
Matrix Spike Dup (1907280-MSD2)				Source: 19G0588-04		Prepared & Analyzed: 07/23/2019				
Nitrogen, Ammonia (As N)	5.6	0.50	mg/L	5.000	0.27	107	75-120	7	20	
Matrix Spike Dup (1907280-MSD3)				Source: 19G0588-06		Prepared & Analyzed: 07/23/2019				
Nitrogen, Ammonia (As N)	4.7	0.50	mg/L	5.000	1.2	70	75-120	2	20	M2
Batch 1907291 - SM2540 C										
Duplicate (1907291-DUP1)				Source: 19G0579-01		Prepared: 07/24/2019 Analyzed: 07/29/2019				
Total Dissolved Solids (Residue, Filterable)	320	20	mg/L		320			2	5	
Duplicate (1907291-DUP2)				Source: 19G0570-04		Prepared: 07/24/2019 Analyzed: 07/26/2019				
Total Dissolved Solids (Residue, Filterable)	880	20	mg/L		860			2	5	
Batch 1907292 - SM2540 D										
Duplicate (1907292-DUP1)				Source: 19G0613-01		Prepared: 07/24/2019 Analyzed: 07/25/2019				
Total Suspended Solids	47	10	mg/L		47			0	5	
Duplicate (1907292-DUP2)				Source: 19G0636-02		Prepared: 07/24/2019 Analyzed: 07/25/2019				
Total Suspended Solids	1.0	10	mg/L		ND			200	5	Q9, R12

1950550

[illegible]



December 18, 2019

Mike Hulst
NV5
7620 North Hartman Lane, Suite 162
Tucson, AZ 85743

TEL (520) 638-7270
FAX (623) 738-3690

Work Order No.: 19K0594
Order Name: Storm Water

RE: Storm Water

Dear Mike Hulst,

Turner Laboratories, Inc. received 1 sample(s) on 11/21/2019 for the analyses presented in the following report.

All results are intended to be considered in their entirety, and Turner Laboratories, Inc. is not responsible for use of less than the complete report. Results apply only to the samples analyzed. Samples will be disposed of 30 days after issue of our report unless special arrangements are made.

The pages that follow may contain sensitive, privileged or confidential information intended solely for the addressee named above. If you receive this message and are not the agent or employee of the addressee, this communication has been sent in error. Please do not disseminate or copy any of the attached and notify the sender immediately by telephone. Please also return the attached sheet(s) to the sender by mail.

Please call if you have any questions.

Respectfully submitted,

Turner Laboratories, Inc.
ADHS License AZ0066

Elizabeth Kasik
Laboratory Director

Client: NV5
Project: Storm Water
Work Order: 19K0594
Date Received: 11/21/2019

Order: Storm Water

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Matrix	Collection Date/Time
19K0594-01	NOGYARD191122	Storm Water	11/21/2019 1100

Client: NV5
Project: Storm Water
Work Order: 19K0594
Date Received: 11/21/2019

Case Narrative

The PAH analysis was performed by Pace Analytical National. in Mount Juliet, TN.

Q9 Insufficient sample received to meet method QC requirements.

R12 RPD/RSD exceeded the method acceptance limit. Result less than 5 times the PQL.

All soil, sludge, and solid matrix determinations are reported on a wet weight basis unless otherwise noted.

ND Not Detected at or above the PQL

PQL Practical Quantitation Limit

DF Dilution Factor

Client: NV5
Project: Storm Water
Work Order: 19K0594
Lab Sample ID: 19K0594-01

Client Sample ID: NOGYARD191122
Collection Date/Time: 11/21/2019 1100
Matrix: Storm Water
Order Name: Storm Water

Analyses	Result	PQL	Qual	Units	DF	Prep Date	Analysis Date	Analyst
Hardness-Calculation								
Hardness, Calcium/Magnesium (As CaCO ₃)	120			mg/L	1	11/25/2019 0945	12/16/2019 1322	MH
ICP/MS Dissolved Metals-E 200.8 (5.4)								
Copper	0.020	0.0025		mg/L	5	11/26/2019 1315	12/03/2019 1726	MH
ICP Total Metals-E200.7 (4.4)								
Calcium	36	4.0		mg/L	1	11/25/2019 0945	12/16/2019 1322	MH
Magnesium	6.8	3.0		mg/L	1	11/25/2019 0945	12/16/2019 1322	MH
Total Dissolved Solids (Residue, Filterable)-SM2540 C								
Total Dissolved Solids (Residue, Filterable)	250	20		mg/L	1	11/26/2019 1023	12/02/2019 1045	EJ
Total Suspended Solids (Residue, Non-Filterable)-SM2540 D								
Total Suspended Solids	210	10		mg/L	1	11/25/2019 0835	11/26/2019 0730	EJ
Ammonia as N-SM4500-NH₃ B,C								
Nitrogen, Ammonia (As N)	ND	0.50		mg/L	1	12/04/2019 1000	12/04/2019 1310	EJ

Client: NV5
Project: Storm Water
Work Order: 19K0594
Date Received: 11/21/2019

QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 1911307 - E200.7 (4.4)										
Blank (1911307-BLK1)				Prepared: 11/25/2019 Analyzed: 12/16/2019						
Calcium	ND	4.0	mg/L							
Magnesium	ND	3.0	mg/L							
LCS (1911307-BS1)				Prepared: 11/25/2019 Analyzed: 12/16/2019						
Calcium	10	4.0	mg/L	10.00		102	85-115			
Magnesium	10	3.0	mg/L	10.00		103	85-115			
LCS Dup (1911307-BSD1)				Prepared: 11/25/2019 Analyzed: 12/16/2019						
Calcium	10	4.0	mg/L	10.00		103	85-115	1	20	
Magnesium	10	3.0	mg/L	10.00		104	85-115	1	20	
Matrix Spike (1911307-MS1)				Source: 19K0432-01		Prepared: 11/25/2019 Analyzed: 12/16/2019				
Calcium	85	4.0	mg/L	10.00	76	97	70-130			
Magnesium	20	3.0	mg/L	10.00	9.9	98	70-130			
Batch 1911314 - E 200.8 (5.4)										
Blank (1911314-BLK1)				Prepared & Analyzed: 12/03/2019						
Copper	ND	0.00050	mg/L							
LCS (1911314-BS1)				Prepared & Analyzed: 12/03/2019						
Copper	0.051	0.00050	mg/L	0.05000		102	85-115			
LCS Dup (1911314-BSD1)				Prepared & Analyzed: 12/03/2019						
Copper	0.051	0.00050	mg/L	0.05000		102	85-115	0.6	20	
Matrix Spike (1911314-MS1)				Source: 19K0644-01		Prepared & Analyzed: 12/03/2019				
Copper	0.047	0.00050	mg/L	0.05000	0.0027	88	70-130			
Matrix Spike (1911314-MS2)				Source: 19K0673-02		Prepared & Analyzed: 12/03/2019				
Copper	0.049	0.00050	mg/L	0.05000	0.0030	92	70-130			

Client: NV5
Project: Storm Water
Work Order: 19K0594
Date Received: 11/21/2019

QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 1911288 - SM2540 D										
Duplicate (1911288-DUP1)		Source: 19K0430-01		Prepared: 11/25/2019 Analyzed: 11/26/2019						
Total Suspended Solids	1.0	10	mg/L		1.0			0	5	Q9
Duplicate (1911288-DUP2)		Source: 19K0514-02		Prepared: 11/25/2019 Analyzed: 11/26/2019						
Total Suspended Solids	4.0	10	mg/L		3.0			29	5	Q9, R12
Duplicate (1911288-DUP3)		Source: 19K0002-02		Prepared: 11/25/2019 Analyzed: 11/26/2019						
Total Suspended Solids	2.0	10	mg/L		1.0			67	5	Q9, R12
Batch 1911310 - SM2540 C										
Duplicate (1911310-DUP1)		Source: 19K0556-01		Prepared: 11/26/2019 Analyzed: 12/02/2019						
Total Dissolved Solids (Residue, Filterable)	320	20	mg/L		310			3	5	
Duplicate (1911310-DUP2)		Source: 19K0590-01		Prepared: 11/26/2019 Analyzed: 12/04/2019						
Total Dissolved Solids (Residue, Filterable)	280	20	mg/L		280			1	5	
Duplicate (1911310-DUP3)		Source: 19J0602-01RE1		Prepared: 11/26/2019 Analyzed: 12/04/2019						
Total Dissolved Solids (Residue, Filterable)	1600	20	mg/L		1600			0.2	5	
Batch 1912031 - SM4500-NH3 B,C										
Blank (1912031-BLK1)		Prepared & Analyzed: 12/04/2019								
Nitrogen, Ammonia (As N)	ND	0.50	mg/L							
LCS (1912031-BS1)		Prepared & Analyzed: 12/04/2019								
Nitrogen, Ammonia (As N)	4.7	0.50	mg/L	5.000		95	90-110			
LCS Dup (1912031-BSD1)		Prepared & Analyzed: 12/04/2019								
Nitrogen, Ammonia (As N)	4.8	0.50	mg/L	5.000		95	90-110	0.5	10	
Matrix Spike (1912031-MS1)		Source: 19K0567-01		Prepared & Analyzed: 12/04/2019						
Nitrogen, Ammonia (As N)	41	2.5	mg/L	25.00	13	111	75-120			
Matrix Spike (1912031-MS2)		Source: 19L0001-01		Prepared & Analyzed: 12/04/2019						
Nitrogen, Ammonia (As N)	30	2.5	mg/L	25.00	5.3	100	75-120			
Matrix Spike Dup (1912031-MSD1)		Source: 19K0567-01		Prepared & Analyzed: 12/04/2019						
Nitrogen, Ammonia (As N)	42	2.5	mg/L	25.00	13	118	75-120	4	20	
Matrix Spike Dup (1912031-MSD2)		Source: 19L0001-01		Prepared & Analyzed: 12/04/2019						
Nitrogen, Ammonia (As N)	32	2.5	mg/L	25.00	5.3	107	75-120	5	20	

19k0594

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ANALYTICAL REPORT

November 29, 2019



Turner Laboratories Inc

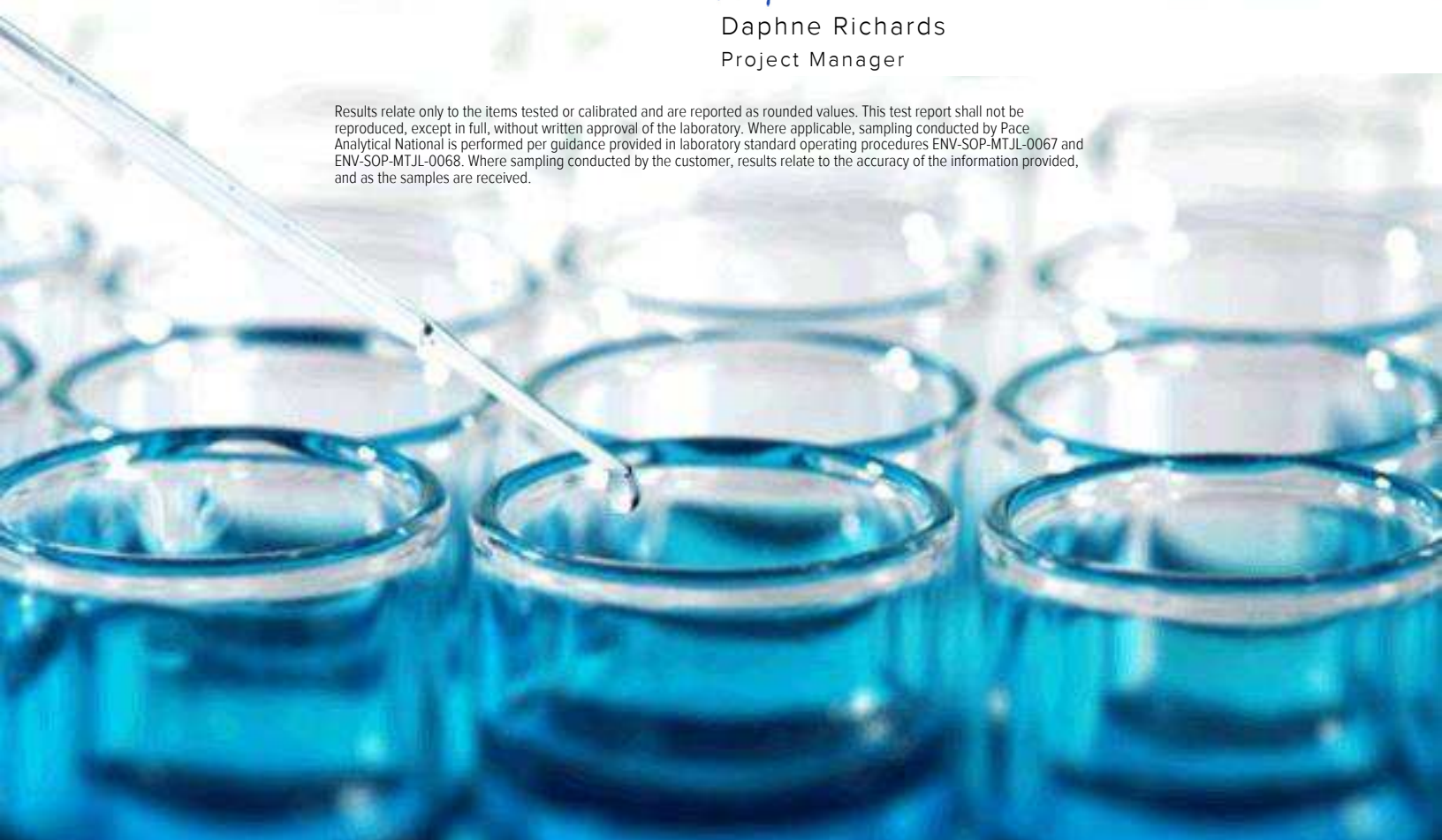
Sample Delivery Group: L1165140
Samples Received: 11/26/2019
Project Number: 19K0594
Description:

Report To: Elizabeth Kasik
2445 North Coyote Drive
Suite 104
Tucson, AZ 85745

Entire Report Reviewed By:

Daphne Richards
Project Manager

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by Pace Analytical National is performed per guidance provided in laboratory standard operating procedures ENV-SOP-MTJL-0067 and ENV-SOP-MTJL-0068. Where sampling conducted by the customer, results relate to the accuracy of the information provided, and as the samples are received.





Cp: Cover Page	1	¹ Cp
Tc: Table of Contents	2	
Ss: Sample Summary	3	² Tc
Cn: Case Narrative	4	
Sr: Sample Results	5	³ Ss
19K0594-01 L1165140-01	5	
Qc: Quality Control Summary	6	⁴ Cn
Semi Volatile Organic Compounds (GC/MS) by Method 8270 C-SIM	6	⁵ Sr
Is: Internal Standard Summary	9	
Semi Volatile Organic Compounds (GC/MS) by Method 8270 C-SIM	9	⁶ Qc
Gl: Glossary of Terms	10	⁷ Is
Al: Accreditations & Locations	11	
Sc: Sample Chain of Custody	12	⁸ Gl
		⁹ Al
		¹⁰ Sc



19K0594-01 L1165140-01 GW

Collected by

Collected date/time

Received date/time

11/21/19 11:00

11/26/19 09:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Semi Volatile Organic Compounds (GC/MS) by Method 8270 C-SIM	WG1387735	1	11/27/19 02:43	11/27/19 10:45	AAT	Mt. Juliet, TN

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Is

⁸Gl

⁹Al

¹⁰Sc



All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Daphne Richards
Project Manager

¹ Cp² Tc³ Ss⁴ Cn⁵ Sr⁶ Qc⁷ Is⁸ Gl⁹ Al¹⁰ Sc



Semi Volatile Organic Compounds (GC/MS) by Method 8270 C-SIM

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Anthracene	ND		0.0000500	1	11/27/2019 10:45	WG1387735
Acenaphthene	ND		0.0000500	1	11/27/2019 10:45	WG1387735
Acenaphthylene	ND		0.0000500	1	11/27/2019 10:45	WG1387735
Benzo(a)anthracene	ND		0.0000500	1	11/27/2019 10:45	WG1387735
Benzo(a)pyrene	ND		0.0000500	1	11/27/2019 10:45	WG1387735
Benzo(b)fluoranthene	ND		0.0000500	1	11/27/2019 10:45	WG1387735
Benzo(g,h,i)perylene	ND		0.0000500	1	11/27/2019 10:45	WG1387735
Benzo(k)fluoranthene	ND		0.0000500	1	11/27/2019 10:45	WG1387735
Chrysene	ND		0.0000500	1	11/27/2019 10:45	WG1387735
Dibenz(a,h)anthracene	ND		0.0000500	1	11/27/2019 10:45	WG1387735
Fluoranthene	ND		0.0000500	1	11/27/2019 10:45	WG1387735
Fluorene	ND		0.0000500	1	11/27/2019 10:45	WG1387735
Indeno(1,2,3-cd)pyrene	ND		0.0000500	1	11/27/2019 10:45	WG1387735
Naphthalene	ND		0.000250	1	11/27/2019 10:45	WG1387735
Phenanthrene	ND		0.0000500	1	11/27/2019 10:45	WG1387735
Pyrene	ND		0.0000500	1	11/27/2019 10:45	WG1387735
1-Methylnaphthalene	ND		0.000250	1	11/27/2019 10:45	WG1387735
2-Methylnaphthalene	ND		0.000250	1	11/27/2019 10:45	WG1387735
2-Chloronaphthalene	ND		0.000250	1	11/27/2019 10:45	WG1387735
(S) Nitrobenzene-d5	74.0		11.0-135		11/27/2019 10:45	WG1387735
(S) 2-Fluorobiphenyl	82.0		32.0-120		11/27/2019 10:45	WG1387735
(S) p-Terphenyl-d14	103		23.0-122		11/27/2019 10:45	WG1387735
(S) 2-Methylnaphthalene-D10	81.0		50.0-150		11/27/2019 10:45	WG1387735
(S) Fluoranthene-D10	81.0		50.0-150		11/27/2019 10:45	WG1387735

1	Cp
2	Tc
3	Ss
4	Cn
5	Sr
6	Qc
7	Is
8	Gl
9	Al
10	Sc

Method Blank (MB)

(MB) R3476955-2 11/27/19 09:13

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Anthracene	U		0.0000800	0.0000500
Acenaphthene	U		0.0000100	0.0000500
Acenaphthylene	U		0.00000700	0.0000500
Benzo(a)anthracene	U		0.00000830	0.0000500
Benzo(a)pyrene	U		0.0000158	0.0000500
Benzo(b)fluoranthene	U		0.00000212	0.0000500
Benzo(g,h,i)perylene	U		0.00000227	0.0000500
Benzo(k)fluoranthene	U		0.0000255	0.0000500
Chrysene	U		0.0000144	0.0000500
Dibenz(a,h)anthracene	U		0.00000454	0.0000500
Fluoranthene	U		0.0000165	0.0000500
Fluorene	U		0.00000898	0.0000500
Indeno(1,2,3-cd)pyrene	U		0.00000739	0.0000500
Naphthalene	0.0000302	E4	0.0000120	0.000250
Phenanthrene	U		0.0000184	0.0000500
Pyrene	U		0.0000155	0.0000500
1-Methylnaphthalene	U		0.0000189	0.000250
2-Methylnaphthalene	U		0.0000155	0.000250
2-Chloronaphthalene	U		0.0000165	0.000250
(S) Nitrobenzene-d5	69.5			11.0-135
(S) 2-Methylnaphthalene-d10	82.0			50.0-150
(S) 2-Fluorobiphenyl	84.0			32.0-120
(S) Fluoranthene-d10	85.5			50.0-150
(S) p-Terphenyl-d14	98.0			23.0-122

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Is

8Gl

9Al

10Sc

Laboratory Control Sample (LCS)

(LCS) R3476955-1 11/27/19 08:49

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Anthracene	0.00200	0.00160	80.0	43.0-127	
Acenaphthene	0.00200	0.00170	85.0	42.0-120	
Acenaphthylene	0.00200	0.00173	86.5	43.0-120	
Benzo(a)anthracene	0.00200	0.00177	88.5	46.0-120	
Benzo(a)pyrene	0.00200	0.00170	85.0	44.0-122	
Benzo(b)fluoranthene	0.00200	0.00184	92.0	43.0-122	
Benzo(g,h,i)perylene	0.00200	0.00180	90.0	25.0-137	
Benzo(k)fluoranthene	0.00200	0.00168	84.0	39.0-128	
Chrysene	0.00200	0.00175	87.5	42.0-129	

Laboratory Control Sample (LCS)

(LCS) R3476955-1 11/27/19 08:49

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	<u>LCS Qualifier</u>
Dibenz(a,h)anthracene	0.00200	0.00186	93.0	25.0-139	
Fluoranthene	0.00200	0.00168	84.0	48.0-131	
Fluorene	0.00200	0.00181	90.5	42.0-120	
Indeno(1,2,3-cd)pyrene	0.00200	0.00190	95.0	37.0-133	
Naphthalene	0.00200	0.00168	84.0	30.0-120	
Phenanthrene	0.00200	0.00178	89.0	42.0-120	
Pyrene	0.00200	0.00173	86.5	38.0-124	
1-Methylnaphthalene	0.00200	0.00168	84.0	43.0-120	
2-Methylnaphthalene	0.00200	0.00155	77.5	40.0-120	
2-Chloronaphthalene	0.00200	0.00166	83.0	39.0-120	
(S) Nitrobenzene-d5			75.0	11.0-135	
(S) 2-Methylnaphthalene-d10			87.0	50.0-150	
(S) 2-Fluorobiphenyl			88.0	32.0-120	
(S) Fluoranthene-d10			86.5	50.0-150	
(S) p-Terphenyl-d14			102	23.0-122	

1

Cp

2

Tc

3

Ss

4

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Sr

6

Qc

7

Is

8

Gl

9

Al

10

Sc

L1165140-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1165140-01 11/27/19 10:45 • (MS) R3476955-3 11/27/19 11:07 • (MSD) R3476955-4 11/27/19 11:31

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	<u>MS Qualifier</u>	<u>MSD Qualifier</u>	RPD %	RPD Limits %
Anthracene	0.00200	ND	0.00155	0.00147	77.5	73.5	1	28.0-120			5.30	25
Acenaphthene	0.00200	ND	0.00163	0.00156	81.5	78.0	1	16.0-120			4.39	25
Acenaphthylene	0.00200	ND	0.00177	0.00169	88.5	84.5	1	16.0-121			4.62	26
Benzo(a)anthracene	0.00200	ND	0.00179	0.00171	89.5	85.5	1	19.0-125			4.57	26
Benzo(a)pyrene	0.00200	ND	0.00160	0.00153	80.0	76.5	1	10.0-126			4.47	32
Benzo(b)fluoranthene	0.00200	ND	0.00156	0.00162	78.0	81.0	1	10.0-125			3.77	36
Benzo(g,h,i)perylene	0.00200	ND	0.00154	0.00147	77.0	73.5	1	10.0-128			4.65	37
Benzo(k)fluoranthene	0.00200	ND	0.00163	0.00143	81.5	71.5	1	10.0-124			13.1	32
Chrysene	0.00200	ND	0.00164	0.00156	82.0	78.0	1	18.0-127			5.00	26
Dibenz(a,h)anthracene	0.00200	ND	0.00162	0.00155	81.0	77.5	1	10.0-132			4.42	43
Fluoranthene	0.00200	ND	0.00154	0.00147	77.0	73.5	1	37.0-122			4.65	23
Fluorene	0.00200	ND	0.00184	0.00176	92.0	88.0	1	20.0-120			4.44	26
Indeno(1,2,3-cd)pyrene	0.00200	ND	0.00164	0.00156	82.0	78.0	1	10.0-130			5.00	38
Naphthalene	0.00200	ND	0.00163	0.00158	81.5	79.0	1	14.0-120			3.12	20
Phenanthrene	0.00200	ND	0.00175	0.00167	87.5	83.5	1	26.0-120			4.68	24
Pyrene	0.00200	ND	0.00178	0.00170	89.0	85.0	1	29.0-120			4.60	24
1-Methylnaphthalene	0.00200	ND	0.00162	0.00156	81.0	78.0	1	10.0-145			3.77	24
2-Methylnaphthalene	0.00200	ND	0.00149	0.00143	74.5	71.5	1	10.0-143			4.11	24

Semi Volatile Organic Compounds (GC/MS) by Method 8270 C-SIM

L1165140-01

L1165140-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1165140-01 11/27/19 10:45 • (MS) R3476955-3 11/27/19 11:07 • (MSD) R3476955-4 11/27/19 11:31

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
2-Chloronaphthalene	0.00200	ND	0.00159	0.00151	79.5	75.5	1	16.0-120			5.16	25
(S) Nitrobenzene-d5					74.0	73.0		11.0-135				
(S) 2-Methylnaphthalene-d10					82.0	79.0		50.0-150				
(S) 2-Fluorobiphenyl					82.0	79.0		32.0-120				
(S) Fluoranthene-d10					80.0	77.5		50.0-150				
(S) p-Terphenyl-d14					103	99.0		23.0-122				

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Is

8Gl

9Al

10Sc

Instrument: BNAMS16 • File ID: 1127_03

11/27/19 07:53						
Sample ID	File ID	NAPHTHALENE-D8	ACENAPHTHENE-D10	PHENANTHRENE-D10	CHRYSENE-D12	PERYLENE-D12
		Response	Response	Response	Response	Response
Standard	1127_03	203205	97014	169108	146246	137251
Upper Limit		406410	194028	338216	292492	274502
Lower Limit		101603	48507	84554	73123	68626
LCS R3476955-1 WG1387735 1x	1127_05	194875	92526	158123	138257	126868
BLANK R3476955-2 WG1387735 1x	1127_06	193031	91468	151606	132298	121673
L1165140-01 WG1387735 1x	1127_10	182421	88805	170382	138045	126186
MS R3476955-3 WG1387735 1x	1127_11	179330	88052	169618	134342	124932
MSD R3476955-4 WG1387735 1x	1127_12	185295	91902	175804	139129	128752

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Is

⁸Gl

⁹Al

¹⁰Sc



Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier Description

E4	Concentration estimated. Analyte was detected below laboratory minimum reporting level (MRL) but above MDL.
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1	Cp
2	Tc
3	Ss
4	Cn
5	Sr
6	Qc
7	Is
8	Gl
9	Al
10	Sc



Pace National is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our one location design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be YOUR LAB OF CHOICE.

* Not all certifications held by the laboratory are applicable to the results reported in the attached report.

* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace National.

State Accreditations

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN-03-2002-34
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey–NELAP	TN002
California	2932	New Mexico ¹	n/a
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina ¹	DW21704
Georgia	NELAP	North Carolina ³	41
Georgia ¹	923	North Dakota	R-140
Idaho	TN00003	Ohio–VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LA000356
Kentucky ^{1 6}	90010	South Carolina	84004
Kentucky ²	16	South Dakota	n/a
Louisiana	AI30792	Tennessee ^{1 4}	2006
Louisiana ¹	LA180010	Texas	T104704245-18-15
Maine	TN0002	Texas ⁵	LAB0152
Maryland	324	Utah	TN00003
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	460132
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA

Third Party Federal Accreditations

A2LA – ISO 17025	1461.01	AIHA-LAP, LLC EMLAP	100789
A2LA – ISO 17025 ⁵	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA–Crypto	TN00003		

¹ Drinking Water ² Underground Storage Tanks ³ Aquatic Toxicity ⁴ Chemical/Microbiological ⁵ Mold ⁶ Wastewater n/a Accreditation not applicable

Our Locations

Pace National has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. Pace National performs all testing at our central laboratory.



SUBCONTRACT ORDER

Turner Laboratories, Inc.

19K0594

SENDING LABORATORY:

Turner Laboratories, Inc.
2445 N. Coyote Drive, Ste #104
Tucson, AZ 85745
Phone: 520.882.5880
Fax: 520.882.9788
Project Manager: Elizabeth Kasik

RECEIVING LABORATORY:

Pace Analytical Services - Tennessee
12065 Lebabon Rd.
Mt. Juliet, TN 37122
Phone : (615) 758-5858
Fax: -
Please CC Kevin Brim Kbrim@turnerlabs.com

L1165140

B052

Analysis	Expires	Laboratory ID	Comments
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Sample ID: 19K0594-01 Non-Potable Wa	Sampled: 11/21/2019 11:00		
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PAHs by SW 8310	11/28/2019 11:00		-01
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Containers Supplied:

1.1 + 3 = 1.4^{AN}_{up}

RAD SCREEN <0.5 mfm

Containers Received 2

CB

Released By

11/25

Date

UPS

Received By

11/25 1606

Date

Released By

11/26/19

Date

Received By

11/26/19

Date

0930

**Pace Analytical National Center for Testing & Innovation
Cooler Receipt Form**

Client:		L1165140	
Cooler Received/Opened On: 11/26/19		Temperature: 1.4	
Received By: Willie Taylor		0930	
Signature: <i>Willie Taylor</i>			
Receipt Check List	NP	Yes	No
COC Seal Present / Intact?	✓		
COC Signed / Accurate?		✓	
Bottles arrive intact?		✓	
Correct bottles used?		✓	
Sufficient volume sent?		✓	
If Applicable			
VOA Zero headspace?			
Preservation Correct / Checked?			

Analytical Report 632675

**for
NV5**

Project Manager: Michelle Oakley

ADOT Roosevelt

444219-0250000.16

07-AUG-19

Collected By: Client



2525 West Huntington Drive, Suite 102

Tempe, AZ 85282

Ph: (480) 355-0900

Phoenix (EPA Lab Code: AZ00901): Arizona (AZ0757)

Xenco-Houston (EPA Lab code: TX00122): Arizona (AZ0765)

Xenco-Dallas (EPA Lab code: TX01468): Arizona (AZ0809)



07-AUG-19

Project Manager: **Michelle Oakley**

NV5

1 West Deer Valley Building 2 #305

Phoenix, AZ 85027

Reference: TWA Report No(s): **632675**

ADOT Roosevelt

Project Address:

Michelle Oakley:

We are reporting to you the results of the analyses performed on the samples received under the project name referenced above and identified with the TWA Report Number(s) 632675. All results being reported under this Report Number apply to the samples analyzed and properly identified with a Laboratory ID number. Subcontracted analyses are identified in this report with either the ADHS certification number of the subcontract lab in the analyst ID field, or the complete subcontracted report attached to this report.

Unless otherwise noted in a Case Narrative, all data reported in this Analytical Report are in compliance with ADHS standards. The uncertainty of measurement associated with the results of analysis reported is available upon request. Should insufficient sample be provided to the laboratory to meet the method and ADHS Matrix Duplicate and Matrix Spike requirements, then the data will be analyzed, evaluated and reported using all other available quality control measures.

The validity and integrity of this report will remain intact as long as it is accompanied by this letter and reproduced in full, unless written approval is granted by TransWest Analytical. This report will be filed for at least 5 years in our archives after which time it will be destroyed without further notice, unless otherwise arranged with you. The samples received, and described as recorded in Report No. 632675 will be filed for 45 days, and after that time they will be properly disposed without further notice, unless otherwise arranged with you. We reserve the right to return to you any unused samples, extracts or solutions related to them if we consider so necessary (e.g., samples identified as hazardous waste, sample sizes exceeding analytical standard practices, controlled substances under regulated protocols, etc).

We thank you for selecting TransWest Analytical to serve your analytical needs. If you have any questions concerning this report, please feel free to contact us at any time.

Respectfully,

A handwritten signature in black ink, appearing to read 'Ruriko Konuma', is written over a horizontal line.

Ruriko Konuma

Project Manager

Recipient of the Prestigious Small Business Administration Award of Excellence in 1994.

Certified and approved by numerous States and Agencies.

A Small Business and Minority Status Company that delivers SERVICE and QUALITY

Houston - Dallas - Midland - San Antonio - Phoenix - Oklahoma - Latin America



CASE NARRATIVE

Client Name: NV5

Project Name: ADOT Roosevelt

Project ID: 444219-0250000.16
Work Order Number(s): 632675

Report Date: 07-AUG-19
Date Received: 07/31/2019

Sample receipt non conformances and comments:

Per client request email (Rebecca.Davey@nv5.com) on 08/02/19 remove copper and lead and add total mercury.

Sample receipt non conformances and comments per sample:

None

Analytical non conformances and comments:

Batch: LBA-3097691 PAHs by SW846 8270D SIM

Surrogate Terphenyl-D14 recovered below QC limits. Matrix interferences is suspected; data confirmed by re-analysis.

Samples affected are: 632675-001.

Arizona Flags

All method blanks, laboratory spikes, and/or matrix spikes met quality control objectives for the parameters associated with this Work Order except as detailed below or on the Data Qualifier page of this report. Data Qualifiers used in this report are in accordance with ADHS Data Qualifiers, Revision 4.0 9/05/2012. Data qualifiers (flags) contained within this analytical report have been issued to explain a quality control deficiency, and do not affect the quality (validity) of the data unless noted otherwise in the case narrative.

- D2 Sample required dilution due to high concentration of target analyte.
- M1 Matrix spike recovery was high; the associated blank spike recovery was acceptable.
- S6 Surrogate recovery was below laboratory and method acceptance limits. Re-extraction and/or reanalysis confirms low recovery caused by matrix effect.



Sample Cross Reference 632675

NV5, Phoenix, AZ

ADOT Roosevelt

Sample Id	Matrix	Date Collected	Sample Depth	Lab Sample Id
Roosevelt	W	07-31-19 12:49		632675-001



Certificate of Analytical Results 632675

NV5, Phoenix, AZ

ADOT Roosevelt

Sample Id: **Roosevelt**
Lab Sample Id: 632675-001

Matrix: Water
Date Collected: 07.31.19 12.49

Date Received: 07.31.19 14.55

Analytical Method: PAHs by SW846 8270D SIM

Prep Method: SW3511

Tech: DRU

% Solids:

Analyst: VIC

Date Prep: 08.06.19 19.38

Seq Number: 3097691

SUB: AZ0765

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
1-Methylnaphthalene	90-12-0	<0.000187	0.000187	mg/L	08.06.19 22.05		1.03
2-Methylnaphthalene	91-57-6	<0.000187	0.000187	mg/L	08.06.19 22.05		1.03
Acenaphthene	83-32-9	<0.000187	0.000187	mg/L	08.06.19 22.05		1.03
Acenaphthylene	208-96-8	<0.000187	0.000187	mg/L	08.06.19 22.05		1.03
Anthracene	120-12-7	<0.000187	0.000187	mg/L	08.06.19 22.05		1.03
Benzo(a)anthracene	56-55-3	<0.000187	0.000187	mg/L	08.06.19 22.05		1.03
Benzo(a)pyrene	50-32-8	<0.000187	0.000187	mg/L	08.06.19 22.05		1.03
Benzo(b)fluoranthene	205-99-2	<0.000187	0.000187	mg/L	08.06.19 22.05		1.03
Benzo(g,h,i)perylene	191-24-2	<0.000187	0.000187	mg/L	08.06.19 22.05		1.03
Benzo(k)fluoranthene	207-08-9	<0.000187	0.000187	mg/L	08.06.19 22.05		1.03
Chrysene	218-01-9	<0.000187	0.000187	mg/L	08.06.19 22.05		1.03
Dibenz(a,h)anthracene	53-70-3	<0.000187	0.000187	mg/L	08.06.19 22.05		1.03
Fluoranthene	206-44-0	<0.000187	0.000187	mg/L	08.06.19 22.05		1.03
Fluorene	86-73-7	<0.000187	0.000187	mg/L	08.06.19 22.05		1.03
Indeno(1,2,3-c,d)Pyrene	193-39-5	<0.000187	0.000187	mg/L	08.06.19 22.05		1.03
Naphthalene	91-20-3	<0.000374	0.000374	mg/L	08.06.19 22.05		1.03
Phenanthrene	85-01-8	<0.000187	0.000187	mg/L	08.06.19 22.05		1.03
Pyrene	129-00-0	<0.000187	0.000187	mg/L	08.06.19 22.05		1.03

Surrogate	% Recovery	Units	Limits	Analysis Date	Flag
2-Fluorobiphenyl	96	%	55-128	08.06.19 22.05	
Nitrobenzene-d5	131	%	45-143	08.06.19 22.05	
Terphenyl-D14	42	%	56-133	08.06.19 22.05	S6



Certificate of Analytical Results 632675

NV5, Phoenix, AZ

ADOT Roosevelt

Sample Id: **Roosevelt**
Lab Sample Id: 632675-001

Matrix: Water
Date Collected: 07.31.19 12.49

Date Received: 07.31.19 14.55

Analytical Method: Recoverable Metals, Total, by EPA 200.7

Prep Method: E200.7P

Tech: AHI

% Solids:

Analyst: DEP

Date Prep: 08.02.19 03.00

Seq Number: 3097626

SUB: AZ0765

Dilution Analysis:

Seq#: 3097626 Date Analyzed: 08/06/19 03:25 Date Prep: 08/02/19 03:00

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Calcium	7440-70-2	58.5	0.400	mg/L	08.06.19 03.17	D2	2
Magnesium	7439-95-4	10.8	0.800	mg/L	08.06.19 03.17	D2	2
Potassium	7440-09-7	11.4	1.00	mg/L	08.06.19 03.17	D2	2
Sodium	7440-23-5	30.8	1.00	mg/L	08.06.19 03.17	D2	2
Hardness as CaCO ₃	471-34-1	190	4.29	mg/L	08.06.19 03.17		2

Analytical Method: Mercury by EPA 245.1

Prep Method: E245.1P

Tech: MLI

% Solids:

Analyst: ANJ

Date Prep: 08.04.19 10.10

Seq Number: 3097410

SUB: AZ0765

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Mercury	7439-97-6	<0.000200	0.000200	mg/L	08.04.19 14.37		1

Analytical Method: Total Dissolved Solids by SM 2540C

Tech: TNL

% Solids:

Analyst: TNL

Seq Number: 3097361

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Total Dissolved Solids	1642222	402	10.0	mg/L	08.01.19 15.40		1



Certificate of Analytical Results 632675

NV5, Phoenix, AZ

ADOT Roosevelt

Sample Id: **Roosevelt**

Matrix: Water

Date Received: 07.31.19 14.55

Lab Sample Id: 632675-001

Date Collected: 07.31.19 12.49

Analytical Method: Total Suspended Solids by SM 2540D

Tech: TNL

% Solids:

Analyst: MON

Seq Number: 3097758

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Total Suspended Solids	TSS	2630	10.0	mg/L	08.06.19 12.30		1



QC Summary 632675

NV5

ADOT Roosevelt

Analytical Method: PAHs by SW846 8270D SIM

Seq Number: 3097691

MB Sample Id: 7683657-1-BLK

Matrix: Water

LCS Sample Id: 7683657-1-BKS

Prep Method: SW3511

Date Prep: 08.06.19

LCSD Sample Id: 7683657-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
1-Methylnaphthalene	<0.000182	0.0182	0.0177	97	0.0164	90	63-114	8	30	mg/L	08.06.19 20:41	
2-Methylnaphthalene	<0.000182	0.0182	0.0172	95	0.0161	88	61-114	7	30	mg/L	08.06.19 20:41	
Acenaphthene	<0.000182	0.0182	0.0181	99	0.0168	92	62-114	7	30	mg/L	08.06.19 20:41	
Acenaphthylene	<0.000182	0.0182	0.0190	104	0.0178	98	63-119	7	30	mg/L	08.06.19 20:41	
Anthracene	<0.000182	0.0182	0.0200	110	0.0184	101	64-119	8	30	mg/L	08.06.19 20:41	
Benzo(a)anthracene	<0.000182	0.0182	0.0191	105	0.0176	97	34-130	8	30	mg/L	08.06.19 20:41	
Benzo(a)pyrene	<0.000182	0.0182	0.0214	118	0.0196	108	32-127	9	30	mg/L	08.06.19 20:41	
Benzo(b)fluoranthene	<0.000182	0.0182	0.0202	111	0.0180	99	36-119	12	30	mg/L	08.06.19 20:41	
Benzo(g,h,i)perylene	<0.000182	0.0182	0.0193	106	0.0176	97	36-120	9	30	mg/L	08.06.19 20:41	
Benzo(k)fluoranthene	<0.000182	0.0182	0.0180	99	0.0172	95	32-123	5	30	mg/L	08.06.19 20:41	
Chrysene	<0.000182	0.0182	0.0176	97	0.0160	88	35-116	10	30	mg/L	08.06.19 20:41	
Dibenz(a,h)anthracene	<0.000182	0.0182	0.0204	112	0.0186	102	36-132	9	30	mg/L	08.06.19 20:41	
Fluoranthene	<0.000182	0.0182	0.0196	108	0.0179	98	61-121	9	30	mg/L	08.06.19 20:41	
Fluorene	<0.000182	0.0182	0.0184	101	0.0171	94	68-119	7	30	mg/L	08.06.19 20:41	
Indeno(1,2,3-c,d)Pyrene	<0.000182	0.0182	0.0206	113	0.0188	103	34-126	9	30	mg/L	08.06.19 20:41	
Naphthalene	<0.000364	0.0182	0.0173	95	0.0162	89	56-110	7	30	mg/L	08.06.19 20:41	
Phenanthrene	<0.000182	0.0182	0.0183	101	0.0169	93	68-109	8	30	mg/L	08.06.19 20:41	
Pyrene	<0.000182	0.0182	0.0195	107	0.0179	98	40-117	9	30	mg/L	08.06.19 20:41	

Surrogate	MB %Rec	MB Flag	LCS %Rec	LCS Flag	LCSD %Rec	LCSD Flag	Limits	Units	Analysis Date
2-Fluorobiphenyl	104		107		100		55-128	%	08.06.19 20:41
Nitrobenzene-d5	120		128		119		45-143	%	08.06.19 20:41
Terphenyl-D14	109		113		105		56-133	%	08.06.19 20:41

Analytical Method: Recoverable Metals, Total, by EPA 200.7

Seq Number: 3097626

MB Sample Id: 7683367-1-BLK

Matrix: Water

LCS Sample Id: 7683367-1-BKS

Prep Method: E200.7P

Date Prep: 08.02.19

LCSD Sample Id: 7683367-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Calcium	<0.0293	25.0	24.9	100	24.9	100	85-115	0	20	mg/L	08.06.19 00:38	
Magnesium	<0.0500	25.0	25.4	102	25.4	102	85-115	0	20	mg/L	08.06.19 00:38	
Potassium	<0.107	10.0	10.0	100	10.1	101	85-115	1	20	mg/L	08.06.19 00:38	
Sodium	<0.0667	25.0	24.9	100	24.8	99	85-115	0	20	mg/L	08.06.19 00:38	

MS/MSD Percent Recovery
Relative Percent Difference
LCS/LCSD Recovery
Log Difference

$[D] = 100 * (C - A) / B$
 $RPD = 200 * |(C - E) / (C + E)|$
 $[D] = 100 * (C) / [B]$
Log Diff. = Log(Sample Duplicate) - Log(Original Sample)

LCS = Laboratory Control Sample
A = Parent Result
C = MS/LCS Result
E = MSD/LCSD Result

MS = Matrix Spike
B = Spike Added
D = MSD/LCSD % Rec



QC Summary 632675

NV5

ADOT Roosevelt

Analytical Method: Recoverable Metals, Total, by EPA 200.7

Seq Number: 3097626

Matrix: Drinking Water

Prep Method: E200.7P

Parent Sample Id: 632448-001

MS Sample Id: 632448-001 S

Date Prep: 08.02.19

MSD Sample Id: 632448-001 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Calcium	68.4	25.0	91.3	92	92.0	94	70-130	1	20	mg/L	08.06.19 00:50	
Magnesium	78.9	25.0	103	96	104	100	70-130	1	20	mg/L	08.06.19 00:50	
Potassium	15.2	10.0	25.0	98	25.3	101	70-130	1	20	mg/L	08.06.19 00:50	
Sodium	125	25.0	147	88	148	92	70-130	1	20	mg/L	08.06.19 00:50	

Analytical Method: Recoverable Metals, Total, by EPA 200.7

Seq Number: 3097626

Matrix: Liquid

Prep Method: E200.7P

Parent Sample Id: 632649-003

MS Sample Id: 632649-003 S

Date Prep: 08.02.19

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	Limits	Units	Analysis Date	Flag
Calcium	430	25.0	458	112	70-130	mg/L	08.06.19 02:14	
Magnesium	19.8	25.0	45.5	103	70-130	mg/L	08.06.19 02:14	
Potassium	23.6	10.0	35.1	115	70-130	mg/L	08.06.19 02:14	
Sodium	1210	25.0	1250	160	70-130	mg/L	08.06.19 02:14	M1

Analytical Method: Mercury by EPA 245.1

Seq Number: 3097410

Matrix: Water

Prep Method: E245.1P

MB Sample Id: 7683438-1-BLK

LCS Sample Id: 7683438-1-BKS

Date Prep: 08.04.19

LCSD Sample Id: 7683438-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Mercury	<0.0000263	0.00200	0.00191	96	0.00190	95	85-115	1	20	mg/L	08.04.19 14:05	

Analytical Method: Mercury by EPA 245.1

Seq Number: 3097410

Matrix: Water

Prep Method: E245.1P

Parent Sample Id: 632735-004

MS Sample Id: 632735-004 S

Date Prep: 08.04.19

MSD Sample Id: 632735-004 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Mercury	0.0000860	0.00200	0.00192	92	0.00195	93	70-130	2	20	mg/L	08.04.19 14:11	

Analytical Method: Total Dissolved Solids by SM 2540C

Seq Number: 3097361

Matrix: Water

MB Sample Id: 3097361-1-BLK

LCS Sample Id: 3097361-1-BKS

LCSD Sample Id: 3097361-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Total Dissolved Solids	<10.0	1000	1030	103	1010	101	80-120	2	10	mg/L	08.01.19 15:40	

MS/MSD Percent Recovery
Relative Percent Difference
LCS/LCSD Recovery
Log Difference

$[D] = 100 * (C - A) / B$
 $RPD = 200 * |(C - E) / (C + E)|$
 $[D] = 100 * (C) / [B]$
 $\text{Log Diff.} = \text{Log}(\text{Sample Duplicate}) - \text{Log}(\text{Original Sample})$

LCS = Laboratory Control Sample
A = Parent Result
C = MS/LCS Result
E = MSD/LCSD Result

MS = Matrix Spike
B = Spike Added
D = MSD/LCSD % Rec



QC Summary 632675

NV5

ADOT Roosevelt

Analytical Method: Total Dissolved Solids by SM 2540C

Seq Number: 3097361

Matrix: Ground Water

Parent Sample Id: 632586-003

MD Sample Id: 632586-003 D

Parameter	Parent Result	MD Result	%RPD	RPD Limit	Units	Analysis Date	Flag
Total Dissolved Solids	426	422	1	10	mg/L	08.01.19 15:40	

Analytical Method: Total Suspended Solids by SM 2540D

Seq Number: 3097758

Matrix: Water

MB Sample Id: 3097758-1-BLK

LCS Sample Id: 3097758-1-BKS

LCSD Sample Id: 3097758-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Total Suspended Solids	<10.0	1000	1100	110	1120	112	80-120	2	10	mg/L	08.06.19 12:30	

Analytical Method: Total Suspended Solids by SM 2540D

Seq Number: 3097758

Matrix: Waste Water

Parent Sample Id: 632793-001

MD Sample Id: 632793-001 D

Parameter	Parent Result	MD Result	%RPD	RPD Limit	Units	Analysis Date	Flag
Total Suspended Solids	188	172	9	10	mg/L	08.06.19 12:30	

MS/MSD Percent Recovery
Relative Percent Difference
LCS/LCSD Recovery
Log Difference

$[D] = 100 * (C - A) / B$
 $RPD = 200 * |(C - E) / (C + E)|$
 $[D] = 100 * (C) / [B]$
 $\text{Log Diff.} = \text{Log}(\text{Sample Duplicate}) - \text{Log}(\text{Original Sample})$

LCS = Laboratory Control Sample
A = Parent Result
C = MS/LCS Result
E = MSD/LCSD Result

MS = Matrix Spike
B = Spike Added
D = MSD/LCSD % Rec

Inter-Office Shipment

IOS Number : 45376

Date/Time: 07.31.2019 18:55 Created by: Emily Petrunia
 Lab# From: **Phoenix** Delivery Priority:
 Lab# To: **Houston** Air Bill No.: 775887988541

Please send report to: Ruriko Konuma
 Address: 2525 West Huntington Drive, Suite 102
 E-Mail: ruriko.konuma@xenco.com

Sample Id	Matrix	Client Sample Id	Sample Collection	Method	Method Name	Lab Due	HT Due	PM	Analytes	Sign
632675-001	W	Roosevelt	07.31.2019 12:49	E200.7	Recoverable Metals, Total, by EPA 200.7	08.08.2019	01.27.2020	RKO	CA HARD K MG NA	
632675-001	W	Roosevelt	07.31.2019 12:49	E200.8	Recoverable Metals, Total, by EPA 200.8	08.08.2019	01.27.2020	RKO	PB	
632675-001	W	Roosevelt	07.31.2019 12:49	E200.8DIS	Metals, Recoverable Dissolved, by EPA 2	08.08.2019	01.27.2020	RKO	CU	
632675-001	W	Roosevelt	07.31.2019 12:49	SIM_PAH_D	PAHs by 8270D SIM	08.08.2019	08.07.2019	RKO	ACNP ACNPY ANTH Bz	

Inter Office Shipment or Sample Comments:

Relinquished By: 

 Emily Petrunia
 Date Relinquished: 07.31.2019

Received By: 

 Ashly Kowalski
 Date Received: 08.01.2019 09:50

 Cooler Temperature: 3.3



XENCO Laboratories

Inter Office Report- Sample Receipt Checklist

Sent To: Houston

IOS #: 45376

Acceptable Temperature Range: 0 - 6 degC

Air and Metal samples Acceptable Range: Ambient

Temperature Measuring device used : HOU-068

Sent By: Emily Petrunia

Date Sent: 07.31.2019 06.55 PM

Received By: Ashly Kowalski

Date Received: 08.01.2019 09.50 AM

Sample Receipt Checklist

Comments

#1 *Temperature of cooler(s)?	3.3
#2 *Shipping container in good condition?	Yes
#3 *Samples received with appropriate temperature?	Yes
#4 *Custody Seals intact on shipping container/ cooler?	N/A
#5 *Custody Seals Signed and dated for Containers/coolers	N/A
#6 *IOS present?	Yes
#7 Any missing/extra samples?	No
#8 IOS agrees with sample label(s)/matrix?	Yes
#9 Sample matrix/ properties agree with IOS?	Yes
#10 Samples in proper container/ bottle?	Yes
#11 Samples properly preserved?	Yes
#12 Sample container(s) intact?	Yes
#13 Sufficient sample amount for indicated test(s)?	Yes
#14 All samples received within hold time?	Yes

* Must be completed for after-hours delivery of samples prior to placing in the refrigerator

NonConformance:

Corrective Action Taken:

Nonconformance Documentation

Contact: _____ Contacted by : _____ Date: _____

Checklist reviewed by:

Ashly Kowalski

Date: 08.01.2019



XENCO Laboratories

Prelogin/Nonconformance Report- Sample Log-In

Client: NV5

Date/ Time Received: 07/31/2019 02:55:00 PM

Work Order #: 632675

Acceptable Temperature Range: 0 - 6 degC

Air and Metal samples Acceptable Range: Ambient

Temperature Measuring device used : IR#1

Sample Receipt Checklist	Comments
#1 *Temperature of cooler(s)?	.3
#2 *Shipping container in good condition?	Yes
#3 *Samples received on ice?	Yes
#4 *Custody Seals intact on shipping container/ cooler?	N/A
#5 Custody Seals intact on sample bottles?	N/A
#6*Custody Seals Signed and dated?	N/A
#7 *Chain of Custody present?	Yes
#8 Any missing/extra samples?	No
#9 Chain of Custody signed when relinquished/ received?	Yes
#10 Chain of Custody agrees with sample labels/matrix?	Yes
#11 Container label(s) legible and intact?	Yes
#12 Samples in proper container/ bottle?	Yes
#13 Samples properly preserved?	Yes
#14 Sample container(s) intact?	Yes
#15 Sufficient sample amount for indicated test(s)?	Yes
#16 All samples received within hold time?	Yes
#17 Subcontract of sample(s)?	Yes Xenco Stafford
#18 Water VOC samples have zero headspace?	N/A

*** Must be completed for after-hours delivery of samples prior to placing in the refrigerator**

Analyst: EP

PH Device/Lot#: LRS-4801

Checklist completed by:

Emily Petrunia

Date: 07/31/2019

Checklist reviewed by:

Ruriko Konuma

Date: 08/02/2019



Analytical Report 644077

for

NV5

Project Manager: Mike Hulst

ADOT Stormwater

11.30.2019

Collected By: Client

**2525 West Huntington Drive, Suite 102
Tempe, AZ 85282
Ph: (480) 355-0900**

Phoenix (EPA Lab Code: AZ00901): Arizona (AZ0757)
Xenco-Houston (EPA Lab code: TX00122): Arizona (AZ0765)
Xenco-Dallas (EPA Lab code: TX01468): Arizona (AZ0809)



11.30.2019

Project Manager: **Mike Hulst**

NV5

1 West Deer Valley Building 2 #305

Phoenix, AZ 85027

Reference: TWA Report No(s): **644077**

ADOT Stormwater

Project Address: Roosevelt Yard

Mike Hulst:

We are reporting to you the results of the analyses performed on the samples received under the project name referenced above and identified with the TWA Report Number(s) 644077. All results being reported under this Report Number apply to the samples analyzed and properly identified with a Laboratory ID number. Subcontracted analyses are identified in this report with either the ADHS certification number of the subcontract lab in the analyst ID field, or the complete subcontracted report attached to this report.

Unless otherwise noted in a Case Narrative, all data reported in this Analytical Report are in compliance with ADHS standards. The uncertainty of measurement associated with the results of analysis reported is available upon request. Should insufficient sample be provided to the laboratory to meet the method and ADHS Matrix Duplicate and Matrix Spike requirements, then the data will be analyzed, evaluated and reported using all other available quality control measures.

The validity and integrity of this report will remain intact as long as it is accompanied by this letter and reproduced in full, unless written approval is granted by TransWest Analytical. This report will be filed for at least 5 years in our archives after which time it will be destroyed without further notice, unless otherwise arranged with you. The samples received, and described as recorded in Report No. 644077 will be filed for 45 days, and after that time they will be properly disposed without further notice, unless otherwise arranged with you. We reserve the right to return to you any unused samples, extracts or solutions related to them if we consider so necessary (e.g., samples identified as hazardous waste, sample sizes exceeding analytical standard practices, controlled substances under regulated protocols, etc).

We thank you for selecting TransWest Analytical to serve your analytical needs. If you have any questions concerning this report, please feel free to contact us at any time.

Respectfully,

A handwritten signature in black ink, appearing to read 'Ruriko Konuma', is written over a horizontal line.

Ruriko Konuma

Project Manager

A Small Business and Minority Company

Houston - Dallas - Midland - Tampa - Phoenix - Lubbock - San Antonio - El Paso - Atlanta - New Mexico



CASE NARRATIVE

Client Name: NV5

Project Name: ADOT Stormwater

Project ID:
Work Order Number(s): 644077

Report Date: 11.30.2019
Date Received: 11.21.2019

Sample receipt non conformances and comments:

Sample receipt non conformances and comments per sample:

None

Flagging Criteria

Arizona Flags

All method blanks, laboratory spikes, and/or matrix spikes met quality control objectives for the parameters associated with this Work Order except as detailed below or on the Data Qualifier page of this report. Data Qualifiers used in this report are in accordance with ADHS Data Qualifiers, Revision 4.0 9/05/2012.

Data qualifiers (flags) contained within this analytical report have been issued to explain a quality control deficiency, and do not affect the quality (validity) of the data unless noted otherwise in the case narrative.



Sample Cross Reference 644077

NV5, Phoenix, AZ

ADOT Stormwater

Sample Id	Matrix	Date Collected	Sample Depth	Lab Sample Id
ROSVLT_YYMMDD	W	11.21.2019 10:00		644077-001



Certificate of Analytical Results 644077

NV5, Phoenix, AZ

ADOT Stormwater

Sample Id: ROSVLT_YYMMDD

Matrix: Storm Water

Date Received: 11.21.2019 14:00

Lab Sample Id: 644077-001

Date Collected: 11.21.2019 10:00

Analytical Method: PAHs by SW846 8270D SIM

Prep Method: SW3511

Tech: AHI

% Solids:

Analyst: VIC

Date Prep: 11.26.2019 17:30

Seq Number: 3108913

SUB: AZ0765

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
1-Methylnaphthalene	90-12-0	<0.000200	0.000200	mg/L	11.27.2019 22:54		1.1
2-Methylnaphthalene	91-57-6	<0.000200	0.000200	mg/L	11.27.2019 22:54		1.1
Acenaphthene	83-32-9	<0.000200	0.000200	mg/L	11.27.2019 22:54		1.1
Acenaphthylene	208-96-8	<0.000200	0.000200	mg/L	11.27.2019 22:54		1.1
Anthracene	120-12-7	<0.000200	0.000200	mg/L	11.27.2019 22:54		1.1
Benzo(a)anthracene	56-55-3	<0.000200	0.000200	mg/L	11.27.2019 22:54		1.1
Benzo(a)pyrene	50-32-8	<0.000200	0.000200	mg/L	11.27.2019 22:54		1.1
Benzo(b)fluoranthene	205-99-2	<0.000200	0.000200	mg/L	11.27.2019 22:54		1.1
Benzo(g,h,i)perylene	191-24-2	<0.000200	0.000200	mg/L	11.27.2019 22:54		1.1
Benzo(k)fluoranthene	207-08-9	<0.000200	0.000200	mg/L	11.27.2019 22:54		1.1
Chrysene	218-01-9	<0.000200	0.000200	mg/L	11.27.2019 22:54		1.1
Dibenz(a,h)anthracene	53-70-3	<0.000200	0.000200	mg/L	11.27.2019 22:54		1.1
Fluoranthene	206-44-0	<0.000200	0.000200	mg/L	11.27.2019 22:54		1.1
Fluorene	86-73-7	<0.000200	0.000200	mg/L	11.27.2019 22:54		1.1
Indeno(1,2,3-c,d)Pyrene	193-39-5	<0.000200	0.000200	mg/L	11.27.2019 22:54		1.1
Naphthalene	91-20-3	<0.000399	0.000399	mg/L	11.27.2019 22:54		1.1
Phenanthrene	85-01-8	<0.000200	0.000200	mg/L	11.27.2019 22:54		1.1
Pyrene	129-00-0	<0.000200	0.000200	mg/L	11.27.2019 22:54		1.1

% Recovery

Surrogate		Units	Limits	Analysis Date	Flag
2-Fluorobiphenyl	99	%	54-146	11.27.2019 22:54	
Nitrobenzene-d5	101	%	46-151	11.27.2019 22:54	
Terphenyl-D14	80	%	51-139	11.27.2019 22:54	

Analytical Method: Mercury by EPA 245.1

Prep Method: E245.1P

Tech: ADS

% Solids:

Analyst: ANJ

Date Prep: 11.27.2019 07:00

Seq Number: 3108931

SUB: AZ0765

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Mercury	7439-97-6	<0.000200	0.000200	mg/L	11.27.2019 12:28		1



Certificate of Analytical Results 644077

NV5, Phoenix, AZ

ADOT Stormwater

Sample Id: **ROSVLT_YYMMDD**

Matrix: Storm Water

Date Received: 11.21.2019 14:00

Lab Sample Id: 644077-001

Date Collected: 11.21.2019 10:00

Analytical Method: Total Dissolved Solids by SM 2540C

Tech: MON

% Solids:

Analyst: TNL

Seq Number: 3108676

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Total Dissolved Solids	1642222	70.0	10.0	mg/L	11.21.2019 16:00		1

Analytical Method: Total Suspended Solids by SM 2540D

Tech: TNL

% Solids:

Analyst: MON

Seq Number: 3108729

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Total Suspended Solids	TSS	64.3	10.0	mg/L	11.25.2019 07:40		1



NV5
ADOT Stormwater

Analytical Method: PAHs by SW846 8270D SIM

Seq Number: 3108913

MB Sample Id: 7691281-1-BLK

Matrix: Water

LCS Sample Id: 7691281-1-BKS

Prep Method: SW3511

Date Prep: 11.26.2019

LCSD Sample Id: 7691281-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
1-Methylnaphthalene	<0.000182	0.0182	0.0168	92	0.0170	93	70-126	1	30	mg/L	11.27.2019 10:34	
2-Methylnaphthalene	<0.000182	0.0182	0.0167	92	0.0169	93	74-121	1	30	mg/L	11.27.2019 10:34	
Acenaphthene	<0.000182	0.0182	0.0171	94	0.0175	96	75-127	2	30	mg/L	11.27.2019 10:34	
Acenaphthylene	<0.000182	0.0182	0.0172	95	0.0175	96	78-133	2	30	mg/L	11.27.2019 10:34	
Anthracene	<0.000182	0.0182	0.0173	95	0.0176	97	73-145	2	30	mg/L	11.27.2019 10:34	
Benzo(a)anthracene	<0.000182	0.0182	0.0159	87	0.0161	88	77-131	1	30	mg/L	11.27.2019 10:34	
Benzo(a)pyrene	<0.000182	0.0182	0.0163	90	0.0163	90	56-163	0	30	mg/L	11.27.2019 10:34	
Benzo(b)fluoranthene	<0.000182	0.0182	0.0170	93	0.0171	94	74-138	1	30	mg/L	11.27.2019 10:34	
Benzo(g,h,i)perylene	<0.000182	0.0182	0.0165	91	0.0163	90	77-127	1	30	mg/L	11.27.2019 10:34	
Benzo(k)fluoranthene	<0.000182	0.0182	0.0170	93	0.0169	93	67-142	1	30	mg/L	11.27.2019 10:34	
Chrysene	<0.000182	0.0182	0.0162	89	0.0163	90	66-126	1	30	mg/L	11.27.2019 10:34	
Dibenz(a,h)anthracene	<0.000182	0.0182	0.0166	91	0.0164	90	71-142	1	30	mg/L	11.27.2019 10:34	
Fluoranthene	<0.000182	0.0182	0.0170	93	0.0174	96	78-138	2	30	mg/L	11.27.2019 10:34	
Fluorene	<0.000182	0.0182	0.0179	98	0.0182	100	79-128	2	30	mg/L	11.27.2019 10:34	
Indeno(1,2,3-c,d)Pyrene	<0.000182	0.0182	0.0164	90	0.0162	89	76-140	1	30	mg/L	11.27.2019 10:34	
Naphthalene	<0.000364	0.0182	0.0165	91	0.0167	92	72-122	1	30	mg/L	11.27.2019 10:34	
Phenanthrene	<0.000182	0.0182	0.0173	95	0.0176	97	76-129	2	30	mg/L	11.27.2019 10:34	
Pyrene	<0.000182	0.0182	0.0166	91	0.0173	95	74-138	4	30	mg/L	11.27.2019 10:34	
Surrogate	MB %Rec	MB Flag	LCS %Rec	LCS Flag	LCSD %Rec	LCSD Flag	Limits			Units	Analysis Date	
2-Fluorobiphenyl	96		100		102		54-146			%	11.27.2019 10:34	
Nitrobenzene-d5	100		104		106		46-151			%	11.27.2019 10:34	
Terphenyl-D14	99		99		100		51-139			%	11.27.2019 10:34	

MS/MSD Percent Recovery
Relative Percent Difference
LCS/LCSD Recovery
Log Difference

$[D] = 100 * (C-A) / B$
 $RPD = 200 * |(C-E) / (C+E)|$
 $[D] = 100 * (C) / [B]$
 Log Diff. = Log(Sample Duplicate) - Log(Original Sample)

LCS = Laboratory Control Sample
 A = Parent Result
 C = MS/LCS Result
 E = MSD/LCSD Result

MS = Matrix Spike
 B = Spike Added
 D = MSD/LCSD % Rec



NV5

ADOT Stormwater

Analytical Method: PAHs by SW846 8270D SIM

Seq Number: 3108913

Parent Sample Id: 643773-001

Matrix: Ground Water

MS Sample Id: 643773-001 S

Prep Method: SW3511

Date Prep: 11.26.2019

MSD Sample Id: 643773-001 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
1-Methylnaphthalene	<0.000200	0.0200	0.0168	84	0.0160	83	70-126	5	30	mg/L	11.27.2019 12:17	
2-Methylnaphthalene	<0.000200	0.0200	0.0165	83	0.0157	81	74-121	5	30	mg/L	11.27.2019 12:17	
Acenaphthene	<0.000200	0.0200	0.0172	86	0.0162	84	75-127	6	30	mg/L	11.27.2019 12:17	
Acenaphthylene	<0.000200	0.0200	0.0174	87	0.0164	85	78-133	6	30	mg/L	11.27.2019 12:17	
Anthracene	<0.000200	0.0200	0.0176	88	0.0166	86	73-145	6	30	mg/L	11.27.2019 12:17	
Benzo(a)anthracene	<0.000200	0.0200	0.0163	82	0.0149	77	77-131	9	30	mg/L	11.27.2019 12:17	
Benzo(a)pyrene	<0.000200	0.0200	0.0165	83	0.0150	78	56-163	10	30	mg/L	11.27.2019 12:17	
Benzo(b)fluoranthene	<0.000200	0.0200	0.0171	86	0.0146	76	74-138	16	30	mg/L	11.27.2019 12:17	
Benzo(g,h,i)perylene	<0.000200	0.0200	0.0165	83	0.0150	78	77-127	10	30	mg/L	11.27.2019 12:17	
Benzo(k)fluoranthene	<0.000200	0.0200	0.0170	85	0.0168	87	67-142	1	30	mg/L	11.27.2019 12:17	
Chrysene	<0.000200	0.0200	0.0166	83	0.0151	78	66-126	9	30	mg/L	11.27.2019 12:17	
Dibenz(a,h)anthracene	<0.000200	0.0200	0.0171	86	0.0153	79	71-142	11	30	mg/L	11.27.2019 12:17	
Fluoranthene	<0.000200	0.0200	0.0175	88	0.0163	84	78-138	7	30	mg/L	11.27.2019 12:17	
Fluorene	<0.000200	0.0200	0.0178	89	0.0168	87	79-128	6	30	mg/L	11.27.2019 12:17	
Indeno(1,2,3-c,d)Pyrene	<0.000200	0.0200	0.0167	84	0.0151	78	76-140	10	30	mg/L	11.27.2019 12:17	
Naphthalene	<0.000400	0.0200	0.0164	82	0.0157	81	72-122	4	30	mg/L	11.27.2019 12:17	
Phenanthrene	<0.000200	0.0200	0.0176	88	0.0167	87	76-129	5	30	mg/L	11.27.2019 12:17	
Pyrene	<0.000200	0.0200	0.0170	85	0.0161	83	74-138	5	30	mg/L	11.27.2019 12:17	

Surrogate	MS %Rec	MS Flag	MSD %Rec	MSD Flag	Limits	Units	Analysis Date
2-Fluorobiphenyl	94		93		54-146	%	11.27.2019 12:17
Nitrobenzene-d5	98		98		46-151	%	11.27.2019 12:17
Terphenyl-D14	92		90		51-139	%	11.27.2019 12:17

Analytical Method: Mercury by EPA 245.1

Seq Number: 3108931

MB Sample Id: 7691282-1-BLK

Matrix: Water

LCS Sample Id: 7691282-1-BKS

Prep Method: E245.1P

Date Prep: 11.27.2019

LCSD Sample Id: 7691282-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Mercury	<0.000200	0.00200	0.00190	95	0.00186	93	85-115	2	20	mg/L	11.27.2019 11:53	

Analytical Method: Mercury by EPA 245.1

Seq Number: 3108931

Parent Sample Id: 644035-001

Matrix: Water

MS Sample Id: 644035-001 S

Prep Method: E245.1P

Date Prep: 11.27.2019

MSD Sample Id: 644035-001 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Mercury	<0.000263	0.00200	0.00193	97	0.00197	99	70-130	2	20	mg/L	11.27.2019 12:36	

MS/MSD Percent Recovery
Relative Percent Difference
LCS/LCSD Recovery
Log Difference

$[D] = 100 * (C - A) / B$
 $RPD = 200 * |(C - E) / (C + E)|$
 $[D] = 100 * (C) / [B]$
Log Diff. = Log(Sample Duplicate) - Log(Original Sample)

LCS = Laboratory Control Sample
A = Parent Result
C = MS/LCS Result
E = MSD/LCSD Result

MS = Matrix Spike
B = Spike Added
D = MSD/LCSD % Rec



NV5

ADOT Stormwater

Analytical Method: Mercury by EPA 245.1

Seq Number: 3108931

Matrix: Drinking Water

Prep Method: E245.1P

Parent Sample Id: 644268-001

MS Sample Id: 644268-001 S

Date Prep: 11.27.2019

MSD Sample Id: 644268-001 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Mercury	<0.0000263	0.00200	0.00193	97	0.00190	95	70-130	2	20	mg/L	11.27.2019 11:58	

Analytical Method: Total Dissolved Solids by SM 2540C

Seq Number: 3108676

Matrix: Water

MB Sample Id: 3108676-1-BLK

LCS Sample Id: 3108676-1-BKS

LCSD Sample Id: 3108676-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Total Dissolved Solids	<10.0	1000	993	99	1040	104	80-120	5	10	mg/L	11.21.2019 16:00	

Analytical Method: Total Dissolved Solids by SM 2540C

Seq Number: 3108676

Matrix: Storm Water

Parent Sample Id: 643926-001

MD Sample Id: 643926-001 D

Parameter	Parent Result	MD Result	%RPD	RPD Limit	Units	Analysis Date	Flag
Total Dissolved Solids	65.0	61.0	6	10	mg/L	11.21.2019 16:00	

Analytical Method: Total Suspended Solids by SM 2540D

Seq Number: 3108729

Matrix: Water

MB Sample Id: 3108729-1-BLK

LCS Sample Id: 3108729-1-BKS

LCSD Sample Id: 3108729-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Total Suspended Solids	<10.0	1000	992	99	1010	101	80-120	2	10	mg/L	11.25.2019 07:40	

Analytical Method: Total Suspended Solids by SM 2540D

Seq Number: 3108729

Matrix: Waste Water

Parent Sample Id: 644023-003

MD Sample Id: 644023-003 D

Parameter	Parent Result	MD Result	%RPD	RPD Limit	Units	Analysis Date	Flag
Total Suspended Solids	1700	1660	2	10	mg/L	11.25.2019 07:40	

Analytical Method: Total Suspended Solids by SM 2540D

Seq Number: 3108729

Matrix: Storm Water

Parent Sample Id: 644227-003

MD Sample Id: 644227-003 D

Parameter	Parent Result	MD Result	%RPD	RPD Limit	Units	Analysis Date	Flag
Total Suspended Solids	52.2	56.7	8	10	mg/L	11.25.2019 07:40	

MS/MSD Percent Recovery
Relative Percent Difference
LCS/LCSD Recovery
Log Difference

$[D] = 100 * (C - A) / B$
 $RPD = 200 * |(C - E) / (C + E)|$
 $[D] = 100 * (C) / [B]$
Log Diff. = Log(Sample Duplicate) - Log(Original Sample)

LCS = Laboratory Control Sample
A = Parent Result
C = MS/LCS Result
E = MSD/LCSD Result

MS = Matrix Spike
B = Spike Added
D = MSD/LCSD % Rec

Chain of Custody Record

644077

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

Client Contact

NV5, Inc
1 W. Deer Valley Road, Bldg. 2, Suite 305
Phoenix, AZ 85027
623.374.6637 Phone
623.738.3690 FAX
Project Name: ADOT Stormwater
Site: Roosevelt Yard
P O # 444117-0250000.11

Project Manager: Mark Murphy

Tel/Fax: 520.302.9297

Site Contact:

Date:

COC No:

Lab Contact:

Carrier:

_____ of _____ COCs

Analysis Turnaround Time

☐ CALENDAR DAYS ☒ WORKING DAYS

TAT if different from Below _____

- ☒ 2 weeks
☐ 1 week
☐ 2 days
☐ 1 day

Sample Identification

Sample Date

Sample Time

Sample Type
(C=Comp, G=Grab)

Matrix

of Cont.

Filtered Sample (Y/N)

Perform MS / MSD (Y/N)

TDS

TSS

PAHs

Mercury

Sample Specific Notes:

ROSVLT_YYMMDD

11/21/19 10:00

C

W

4

x

x

x

x

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

Possible Hazard Identification:

Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant

☐ Poison B

☐ Unknown

☐ Return to Client

☐ Disposal by Lab

☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments:

Custody Seals Intact:

☐ Yes ☐ No

Custody Seal No.:

Cooler Temp. (°C): Obs'd: 0.1 Corr'd:

Therm ID No.:

Relinquished by:

Company:

Date/Time:

Received by:

Company:

Date/Time:

Relinquished by:

Company:

Date/Time:

Received by:

Company:

Date/Time:

Relinquished by:

Company:

Date/Time:

Received in Laboratory by:

Company:

Date/Time:

Inter-Office Shipment

IOS Number : **52916**

Date/Time: 11.21.2019

Created by: Emily Petrunia

Please send report to: Ruriko Konuma

Lab# From: **Phoenix**

Delivery Priority:

Address: 2525 West Huntington Drive, Suite 102

Lab# To: **Houston**

Air Bill No.: 7777053585110

E-Mail: ruriko.konuma@xenco.com

Sample Id	Matrix	Client Sample Id	Sample Collection	Method	Method Name	Lab Due	HT Due	PM	Analytes	Sign
644077-001	W	ROSVLT_YYMMDD	11.21.2019 10:00	SW8270D_SIM_PAH	PAHs by SW846 8270D SIM	12.03.2019	11.28.2019 10:00	RKO	ACNP ACNPY ANTH Bz	
644077-001	W	ROSVLT_YYMMDD	11.21.2019 10:00	E245.1	Mercury by EPA 245.1	12.03.2019	12.19.2019	RKO	HG	

Inter Office Shipment or Sample Comments:

Relinquished By:



Emily Petrunia

Date Relinquished: 11.21.2019

Received By:



Ashly Kowalski

Date Received: 11.22.2019

Cooler Temperature: 3.0



XENCO Laboratories

Inter Office Report- Sample Receipt Checklist

Sent To: Houston

IOS #: 52916

Acceptable Temperature Range: 0 - 6 degC

Air and Metal samples Acceptable Range: Ambient

Temperature Measuring device used : HOU-068

Sent By: Emily Petrunia

Date Sent: 11.21.2019 05.57 PM

Received By: Ashly Kowalski

Date Received: 11.22.2019 09.30 AM

Sample Receipt Checklist

Comments

#1 *Temperature of cooler(s)?	3
#2 *Shipping container in good condition?	Yes
#3 *Samples received with appropriate temperature?	Yes
#4 *Custody Seals intact on shipping container/ cooler?	N/A
#5 *Custody Seals Signed and dated for Containers/coolers	N/A
#6 *IOS present?	Yes
#7 Any missing/extra samples?	No
#8 IOS agrees with sample label(s)/matrix?	Yes
#9 Sample matrix/ properties agree with IOS?	Yes
#10 Samples in proper container/ bottle?	Yes
#11 Samples properly preserved?	Yes
#12 Sample container(s) intact?	Yes
#13 Sufficient sample amount for indicated test(s)?	Yes
#14 All samples received within hold time?	Yes

*** Must be completed for after-hours delivery of samples prior to placing in the refrigerator**

NonConformance:

Corrective Action Taken:

Nonconformance Documentation

Contact: _____ Contacted by : _____ Date: _____

Checklist reviewed by:

Ashly Kowalski

Date: 11.22.2019

XENCO Laboratories
Prelogin/Nonconformance Report- Sample Log-In

Client: NV5

Date/ Time Received: 11.21.2019 02.00.00 PM

Work Order #: 644077

Acceptable Temperature Range: 0 - 6 degC

Air and Metal samples Acceptable Range: Ambient

Temperature Measuring device used : IR#1

Sample Receipt Checklist	Comments
#1 *Temperature of cooler(s)?	.2
#2 *Shipping container in good condition?	Yes
#3 *Samples received on ice?	Yes
#4 *Custody Seals intact on shipping container/ cooler?	N/A
#5 Custody Seals intact on sample bottles?	N/A
#6 *Custody Seals Signed and dated?	N/A
#7 *Chain of Custody present?	Yes
#8 Any missing/extra samples?	No
#9 Chain of Custody signed when relinquished/ received?	Yes
#10 Chain of Custody agrees with sample labels/matrix?	Yes
#11 Container label(s) legible and intact?	Yes
#12 Samples in proper container/ bottle?	Yes
#13 Samples properly preserved?	Yes
#14 Sample container(s) intact?	Yes
#15 Sufficient sample amount for indicated test(s)?	No Less than 1 liter provided for TSS
#16 All samples received within hold time?	Yes
#17 Subcontract of sample(s)?	Yes Xenco Stafford
#18 Water VOC samples have zero headspace?	N/A

*** Must be completed for after-hours delivery of samples prior to placing in the refrigerator**

Analyst: EP

PH Device/Lot#: 207519

Checklist completed by:	 Emily Petrunia	Date: 11.21.2019
Checklist reviewed by:	 Ruriko Konuma	Date: 11.22.2019

Analytical Report 637846

**for
NV5**

**Project Manager: Mike Hulst
Superior Fuel**

02-OCT-19

Collected By: Client



**2525 West Huntington Drive, Suite 102
Tempe, AZ 85282
Ph: (480) 355-0900**

Phoenix (EPA Lab Code: AZ00901): Arizona (AZ0757)
Xenco-Houston (EPA Lab code: TX00122): Arizona (AZ0765)
Xenco-Dallas (EPA Lab code: TX01468): Arizona (AZ0809)



02-OCT-19

Project Manager: **Mike Hulst**

NV5

1 West Deer Valley Building 2 #305

Phoenix, AZ 85027

Reference: TWA Report No(s): **637846**

Superior Fuel

Project Address:

Mike Hulst:

We are reporting to you the results of the analyses performed on the samples received under the project name referenced above and identified with the TWA Report Number(s) 637846. All results being reported under this Report Number apply to the samples analyzed and properly identified with a Laboratory ID number. Subcontracted analyses are identified in this report with either the ADHS certification number of the subcontract lab in the analyst ID field, or the complete subcontracted report attached to this report.

Unless otherwise noted in a Case Narrative, all data reported in this Analytical Report are in compliance with ADHS standards. The uncertainty of measurement associated with the results of analysis reported is available upon request. Should insufficient sample be provided to the laboratory to meet the method and ADHS Matrix Duplicate and Matrix Spike requirements, then the data will be analyzed, evaluated and reported using all other available quality control measures.

The validity and integrity of this report will remain intact as long as it is accompanied by this letter and reproduced in full, unless written approval is granted by TransWest Analytical. This report will be filed for at least 5 years in our archives after which time it will be destroyed without further notice, unless otherwise arranged with you. The samples received, and described as recorded in Report No. 637846 will be filed for 45 days, and after that time they will be properly disposed without further notice, unless otherwise arranged with you. We reserve the right to return to you any unused samples, extracts or solutions related to them if we consider so necessary (e.g., samples identified as hazardous waste, sample sizes exceeding analytical standard practices, controlled substances under regulated protocols, etc).

We thank you for selecting TransWest Analytical to serve your analytical needs. If you have any questions concerning this report, please feel free to contact us at any time.

Respectfully,

A handwritten signature in black ink, appearing to read 'Ruriko Konuma', is written over a horizontal line.

Ruriko Konuma

Project Manager

Recipient of the Prestigious Small Business Administration Award of Excellence in 1994.

Certified and approved by numerous States and Agencies.

A Small Business and Minority Status Company that delivers SERVICE and QUALITY

Houston - Dallas - Midland - San Antonio - Phoenix - Oklahoma - Latin America



CASE NARRATIVE

Client Name: NV5

Project Name: Superior Fuel

Project ID:

Work Order Number(s): 637846

Report Date: 02-OCT-19

Date Received: 09/24/2019

Sample receipt non conformances and comments:

None

Sample receipt non conformances and comments per sample:

None

Analytical non conformances and comments:

Batch: LBA-3102707 PAHs by SW846 8270D SIM

Surrogate Terphenyl-D14 recovered below QC limits. Matrix interferences is suspected; data confirmed by re-analysis.

Samples affected are: 637846-001 SD.

2-Methylnaphthalene recovered above QC limits in the Blank Spike Duplicate. Analyte was not detected in any of the associated samples and therefore the data was accepted.

1-Methylnaphthalene, Naphthalene recovered above QC limits in the Blank Spike Duplicate. Analytes were not detected in any of the associated samples and therefore the data was accepted. Samples in the analytical batch are: 637846-001.

Lab Sample ID 637846-001 was randomly selected for Matrix Spike/Matrix Spike Duplicate (MS/MSD). Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(g,h,i)perylene, Benzo(k)fluoranthene, Chrysene, Dibenz(a,h)anthracene, Indeno(1,2,3-c,d)Pyrene recovered below QC limits in the Matrix Spike and Matrix Spike Duplicate. Outlier/s are due to possible matrix interference. Samples in the analytical batch are: 637846-001.

The Laboratory Control Sample for Dibenz(a,h)anthracene, Benzo(b)fluoranthene, Chrysene, Benzo(a)anthracene, Benzo(g,h,i)perylene, Benzo(a)pyrene, Benzo(k)fluoranthene, Indeno(1,2,3-c,d)Pyrene is within laboratory Control Limits, therefore the data was accepted.

Arizona Flags

All method blanks, laboratory spikes, and/or matrix spikes met quality control objectives for the parameters associated with this Work Order except as detailed below or on the Data Qualifier page of this report. Data Qualifiers used in this report are in accordance with ADHS Data Qualifiers, Revision 4.0 9/05/2012. Data qualifiers (flags) contained within this analytical report have been issued to explain a quality control deficiency, and do not affect the quality (validity) of the data unless noted otherwise in the case narrative.

- L1 The associated blank spike recovery was above laboratory acceptance limits.
- M2 Matrix spike recovery was low; the associated blank spike recovery was acceptable.
- S6 Surrogate recovery was below laboratory and method acceptance limits. Re-extraction and/or reanalysis confirms low recovery caused by matrix effect.



Sample Cross Reference 637846

NV5, Phoenix, AZ

Superior Fuel

Sample Id	Matrix	Date Collected	Sample Depth	Lab Sample Id
Superior Fuel	W	09-24-19 11:10		637846-001



Certificate of Analytical Results 637846

NV5, Phoenix, AZ

Superior Fuel

Sample Id: **Superior Fuel**

Matrix: Storm Water

Date Received: 09.24.19 12.30

Lab Sample Id: 637846-001

Date Collected: 09.24.19 11.10

Analytical Method: PAHs by SW846 8270D SIM

Prep Method: SW3511

Tech: AHI

% Solids:

Analyst: EKL

Date Prep: 09.27.19 14.09

Seq Number: 3102707

SUB: AZ0765

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
1-Methylnaphthalene	90-12-0	<0.000198	0.000198	mg/L	09.27.19 16.57	L1	1.09
2-Methylnaphthalene	91-57-6	<0.000198	0.000198	mg/L	09.27.19 16.57	L1	1.09
Acenaphthene	83-32-9	<0.000198	0.000198	mg/L	09.27.19 16.57		1.09
Acenaphthylene	208-96-8	<0.000198	0.000198	mg/L	09.27.19 16.57		1.09
Anthracene	120-12-7	<0.000198	0.000198	mg/L	09.27.19 16.57		1.09
Benzo(a)anthracene	56-55-3	<0.000198	0.000198	mg/L	09.27.19 16.57	M2	1.09
Benzo(a)pyrene	50-32-8	<0.000198	0.000198	mg/L	09.27.19 16.57	M2	1.09
Benzo(b)fluoranthene	205-99-2	<0.000198	0.000198	mg/L	09.27.19 16.57	M2	1.09
Benzo(g,h,i)perylene	191-24-2	<0.000198	0.000198	mg/L	09.27.19 16.57	M2	1.09
Benzo(k)fluoranthene	207-08-9	<0.000198	0.000198	mg/L	09.27.19 16.57	M2	1.09
Chrysene	218-01-9	<0.000198	0.000198	mg/L	09.27.19 16.57	M2	1.09
Dibenz(a,h)anthracene	53-70-3	<0.000198	0.000198	mg/L	09.27.19 16.57	M2	1.09
Fluoranthene	206-44-0	<0.000198	0.000198	mg/L	09.27.19 16.57		1.09
Fluorene	86-73-7	<0.000198	0.000198	mg/L	09.27.19 16.57		1.09
Indeno(1,2,3-c,d)Pyrene	193-39-5	<0.000198	0.000198	mg/L	09.27.19 16.57	M2	1.09
Naphthalene	91-20-3	<0.000396	0.000396	mg/L	09.27.19 16.57	L1	1.09
Phenanthrene	85-01-8	<0.000198	0.000198	mg/L	09.27.19 16.57		1.09
Pyrene	129-00-0	<0.000198	0.000198	mg/L	09.27.19 16.57		1.09

Surrogate	% Recovery	Units	Limits	Analysis Date	Flag
2-Fluorobiphenyl	118	%	54-146	09.27.19 16.57	
Nitrobenzene-d5	124	%	46-151	09.27.19 16.57	
Terphenyl-D14	73	%	51-139	09.27.19 16.57	



Certificate of Analytical Results 637846

NV5, Phoenix, AZ

Superior Fuel

Sample Id: **Superior Fuel**

Matrix: Storm Water

Date Received: 09.24.19 12.30

Lab Sample Id: 637846-001

Date Collected: 09.24.19 11.10

Analytical Method: Recoverable Metals, Total, by EPA 200.7

Prep Method: E200.7P

Tech: AHI

% Solids:

Analyst: DEP

Date Prep: 09.27.19 03.00

Seq Number: 3102807

SUB: AZ0765

Dilution Analysis:

Seq#: 3102807 Date Analyzed: 09/27/19 21:52 Date Prep: 09/27/19 03:00

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Calcium	7440-70-2	37.3	0.200	mg/L	09.27.19 21.40		1
Lead	7439-92-1	<0.0100	0.0100	mg/L	09.27.19 21.40		1
Magnesium	7439-95-4	13.8	0.400	mg/L	09.27.19 21.40		1
Potassium	7440-09-7	4.85	0.500	mg/L	09.27.19 21.40		1
Selenium	7782-49-2	<0.0300	0.0300	mg/L	09.27.19 21.40		1
Sodium	7440-23-5	22.8	0.500	mg/L	09.27.19 21.40		1
Hardness as CaCO3	471-34-1	150	2.14	mg/L	09.27.19 21.40		1

Analytical Method: Recoverable Metals, Dissolved, by EPA 200.7

Prep Method: E200.7P

Tech: AHI

% Solids:

Analyst: DEP

Date Prep: 09.27.19 08.50

Seq Number: 3102805

SUB: AZ0765

Dilution Analysis:

Seq#: 3102807 Date Analyzed: 09/27/19 21:52 Date Prep: 09/27/19 03:00

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Copper, Dissolved	7440-50-8	0.0697	0.0200	mg/L	09.27.19 23.45		1

Analytical Method: Total Dissolved Solids by SM 2540C

Tech: TNL

% Solids:

Analyst: TNL

Seq Number: 3103072

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Total Dissolved Solids	1642222	337	10.0	mg/L	09.27.19 15.30		1



Certificate of Analytical Results 637846

NV5, Phoenix, AZ

Superior Fuel

Sample Id: **Superior Fuel**

Matrix: Storm Water

Date Received: 09.24.19 12.30

Lab Sample Id: 637846-001

Date Collected: 09.24.19 11.10

Analytical Method: Total Suspended Solids by SM 2540D

Tech: TNL

% Solids:

Analyst: MON

Seq Number: 3102845

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Total Suspended Solids	TSS	537	10.0	mg/L	09.26.19 10.20		1



NV5
Superior Fuel

Analytical Method: PAHs by SW846 8270D SIM

Seq Number: 3102707

MB Sample Id: 7687018-1-BLK

Matrix: Water

LCS Sample Id: 7687018-1-BKS

Prep Method: SW3511

Date Prep: 09.27.19

LCSD Sample Id: 7687018-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
1-Methylnaphthalene	<0.000182	0.0182	0.0230	126	0.0239	131	70-126	4	30	mg/L	09.27.19 13:35	L1
2-Methylnaphthalene	<0.000182	0.0182	0.0226	124	0.0235	129	74-121	4	30	mg/L	09.27.19 13:35	L1
Acenaphthene	<0.000182	0.0182	0.0219	120	0.0230	126	75-127	5	30	mg/L	09.27.19 13:35	
Acenaphthylene	<0.000182	0.0182	0.0223	123	0.0233	128	78-133	4	30	mg/L	09.27.19 13:35	
Anthracene	<0.000182	0.0182	0.0231	127	0.0243	134	73-145	5	30	mg/L	09.27.19 13:35	
Benzo(a)anthracene	<0.000182	0.0182	0.0221	121	0.0229	126	77-131	4	30	mg/L	09.27.19 13:35	
Benzo(a)pyrene	<0.000182	0.0182	0.0202	111	0.0209	115	56-163	3	30	mg/L	09.27.19 13:35	
Benzo(b)fluoranthene	<0.000182	0.0182	0.0215	118	0.0221	121	74-138	3	30	mg/L	09.27.19 13:35	
Benzo(g,h,i)perylene	<0.000182	0.0182	0.0160	88	0.0165	91	77-127	3	30	mg/L	09.27.19 13:35	
Benzo(k)fluoranthene	<0.000182	0.0182	0.0230	126	0.0240	132	67-142	4	30	mg/L	09.27.19 13:35	
Chrysene	<0.000182	0.0182	0.0215	118	0.0222	122	66-126	3	30	mg/L	09.27.19 13:35	
Dibenz(a,h)anthracene	<0.000182	0.0182	0.0175	96	0.0179	98	71-142	2	30	mg/L	09.27.19 13:35	
Fluoranthene	<0.000182	0.0182	0.0225	124	0.0235	129	78-138	4	30	mg/L	09.27.19 13:35	
Fluorene	<0.000182	0.0182	0.0221	121	0.0231	127	79-128	4	30	mg/L	09.27.19 13:35	
Indeno(1,2,3-c,d)Pyrene	<0.000182	0.0182	0.0170	93	0.0174	96	76-140	2	30	mg/L	09.27.19 13:35	
Naphthalene	<0.000364	0.0182	0.0222	122	0.0229	126	72-122	3	30	mg/L	09.27.19 13:35	L1
Phenanthrene	<0.000182	0.0182	0.0218	120	0.0228	125	76-129	4	30	mg/L	09.27.19 13:35	
Pyrene	<0.000182	0.0182	0.0227	125	0.0238	131	74-138	5	30	mg/L	09.27.19 13:35	

Surrogate	MB %Rec	MB Flag	LCS %Rec	LCS Flag	LCSD %Rec	LCSD Flag	Limits	Units	Analysis Date
2-Fluorobiphenyl	145		135		135		54-146	%	09.27.19 13:35
Nitrobenzene-d5	140		135		137		46-151	%	09.27.19 13:35
Terphenyl-D14	139		136		136		51-139	%	09.27.19 13:35

MS/MSD Percent Recovery
Relative Percent Difference
LCS/LCSD Recovery
Log Difference

$[D] = 100 * (C - A) / B$
 $RPD = 200 * |(C - E) / (C + E)|$
 $[D] = 100 * (C) / [B]$
 Log Diff. = Log(Sample Duplicate) - Log(Original Sample)

LCS = Laboratory Control Sample
 A = Parent Result
 C = MS/LCS Result
 E = MSD/LCSD Result

MS = Matrix Spike
 B = Spike Added
 D = MSD/LCSD % Rec



QC Summary 637846

NV5 Superior Fuel

Analytical Method: PAHs by SW846 8270D SIM

Seq Number: 3102707

Parent Sample Id: 637846-001

Matrix: Storm Water

MS Sample Id: 637846-001 S

Prep Method: SW3511

Date Prep: 09.27.19

MSD Sample Id: 637846-001 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
1-Methylnaphthalene	<0.000198	0.0198	0.0217	110	0.0234	121	70-126	8	30	mg/L	09.27.19 17:14	
2-Methylnaphthalene	<0.000198	0.0198	0.0214	108	0.0231	120	74-121	8	30	mg/L	09.27.19 17:14	
Acenaphthene	<0.000198	0.0198	0.0201	102	0.0217	112	75-127	8	30	mg/L	09.27.19 17:14	
Acenaphthylene	<0.000198	0.0198	0.0207	105	0.0223	116	78-133	7	30	mg/L	09.27.19 17:14	
Anthracene	<0.000198	0.0198	0.0199	101	0.0209	108	73-145	5	30	mg/L	09.27.19 17:14	
Benzo(a)anthracene	<0.000198	0.0198	0.0112	57	0.0105	54	77-131	6	30	mg/L	09.27.19 17:14	M2
Benzo(a)pyrene	<0.000198	0.0198	0.00899	45	0.00803	42	56-163	11	30	mg/L	09.27.19 17:14	M2
Benzo(b)fluoranthene	<0.000198	0.0198	0.0108	55	0.00948	49	74-138	13	30	mg/L	09.27.19 17:14	M2
Benzo(g,h,i)perylene	<0.000198	0.0198	0.00720	36	0.00647	34	77-127	11	30	mg/L	09.27.19 17:14	M2
Benzo(k)fluoranthene	<0.000198	0.0198	0.00932	47	0.00848	44	67-142	9	30	mg/L	09.27.19 17:14	M2
Chrysene	<0.000198	0.0198	0.00928	47	0.00900	47	66-126	3	30	mg/L	09.27.19 17:14	M2
Dibenz(a,h)anthracene	<0.000198	0.0198	0.00685	35	0.00574	30	71-142	18	30	mg/L	09.27.19 17:14	M2
Fluoranthene	<0.000198	0.0198	0.0171	86	0.0176	91	78-138	3	30	mg/L	09.27.19 17:14	
Fluorene	<0.000198	0.0198	0.0202	102	0.0213	110	79-128	5	30	mg/L	09.27.19 17:14	
Indeno(1,2,3-c,d)Pyrene	<0.000198	0.0198	0.00721	36	0.00626	32	76-140	14	30	mg/L	09.27.19 17:14	M2
Naphthalene	<0.000395	0.0198	0.0210	106	0.0229	119	72-122	9	30	mg/L	09.27.19 17:14	
Phenanthrene	<0.000198	0.0198	0.0190	96	0.0200	104	76-129	5	30	mg/L	09.27.19 17:14	
Pyrene	<0.000198	0.0198	0.0176	89	0.0181	94	74-138	3	30	mg/L	09.27.19 17:14	

Surrogate	MS %Rec	MS Flag	MSD %Rec	MSD Flag	Limits	Units	Analysis Date
2-Fluorobiphenyl	108		121		54-146	%	09.27.19 17:14
Nitrobenzene-d5	116		130		46-151	%	09.27.19 17:14
Terphenyl-D14	56		49	S6	51-139	%	09.27.19 17:14

Analytical Method: Recoverable Metals, Total, by EPA 200.7

Seq Number: 3102807

MB Sample Id: 7687021-1-BLK

Matrix: Water

LCS Sample Id: 7687021-1-BKS

Prep Method: E200.7P

Date Prep: 09.27.19

LCSD Sample Id: 7687021-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Calcium	<0.0293	25.0	24.2	97	24.0	96	85-115	1	20	mg/L	09.27.19 20:29	
Lead	<0.00237	1.00	1.00	100	0.999	100	85-115	0	20	mg/L	09.27.19 20:29	
Magnesium	<0.0500	25.0	24.1	96	24.0	96	85-115	0	20	mg/L	09.27.19 20:29	
Potassium	<0.107	10.0	9.91	99	9.85	99	85-115	1	20	mg/L	09.27.19 20:29	
Selenium	<0.00439	1.00	1.01	101	0.982	98	85-115	3	20	mg/L	09.27.19 20:29	
Sodium	<0.0667	25.0	24.2	97	24.0	96	85-115	1	20	mg/L	09.27.19 20:29	

MS/MSD Percent Recovery
Relative Percent Difference
LCS/LCSD Recovery
Log Difference

$[D] = 100 * (C - A) / B$
 $RPD = 200 * |(C - E) / (C + E)|$
 $[D] = 100 * (C) / [B]$
 $\text{Log Diff.} = \text{Log}(\text{Sample Duplicate}) - \text{Log}(\text{Original Sample})$

LCS = Laboratory Control Sample
A = Parent Result
C = MS/LCS Result
E = MSD/LCSD Result

MS = Matrix Spike
B = Spike Added
D = MSD/LCSD % Rec

NV5
Superior Fuel**Analytical Method: Recoverable Metals, Total, by EPA 200.7**

Seq Number: 3102807

Matrix: Water

Prep Method: E200.7P

Parent Sample Id: 637932-001

MS Sample Id: 637932-001 S

Date Prep: 09.27.19

MSD Sample Id: 637932-001 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Calcium	0.0433	25.0	24.5	98	24.6	98	70-130	0	20	mg/L	09.27.19 20:50	
Lead	<0.00237	1.00	1.02	102	1.01	101	70-130	1	20	mg/L	09.27.19 20:50	
Magnesium	<0.0500	25.0	24.4	98	24.6	98	70-130	1	20	mg/L	09.27.19 20:50	
Potassium	<0.107	10.0	9.99	100	10.1	101	70-130	1	20	mg/L	09.27.19 20:50	
Selenium	<0.00439	1.00	1.02	102	1.01	101	70-130	1	20	mg/L	09.27.19 20:50	
Sodium	<0.0667	25.0	24.4	98	24.6	98	70-130	1	20	mg/L	09.27.19 20:50	

Analytical Method: Recoverable Metals, Total, by EPA 200.7

Seq Number: 3102807

Matrix: Water

Prep Method: E200.7P

Parent Sample Id: 638022-001

MS Sample Id: 638022-001 S

Date Prep: 09.27.19

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	Limits	Units	Analysis Date	Flag
Calcium	28.1	25.0	52.6	98	70-130	mg/L	09.27.19 22:01	
Lead	<0.00237	1.00	1.04	104	70-130	mg/L	09.27.19 22:01	
Magnesium	5.44	25.0	30.4	100	70-130	mg/L	09.27.19 22:01	
Potassium	5.37	10.0	15.6	102	70-130	mg/L	09.27.19 22:01	
Selenium	<0.00439	1.00	1.09	109	70-130	mg/L	09.27.19 22:01	
Sodium	68.2	25.0	90.9	91	70-130	mg/L	09.27.19 22:01	

Analytical Method: Recoverable Metals, Dissolved, by EPA 200.7

Seq Number: 3102805

Matrix: Water

Prep Method: E200.7P

MB Sample Id: 7687024-1-BLK

LCS Sample Id: 7687024-1-BKS

Date Prep: 09.27.19

LCSD Sample Id: 7687024-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Copper, Dissolved	<0.00544	1.00	0.956	96	0.953	95	85-115	0	20	mg/L	09.27.19 23:20	

Analytical Method: Recoverable Metals, Dissolved, by EPA 200.7

Seq Number: 3102805

Matrix: Storm Water

Prep Method: E200.7P

Parent Sample Id: 637846-001

MS Sample Id: 637846-001 S

Date Prep: 09.27.19

MSD Sample Id: 637846-001 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Copper, Dissolved	0.0697	1.00	1.08	101	1.08	101	70-130	0	20	mg/L	09.27.19 23:50	

MS/MSD Percent Recovery
Relative Percent Difference
LCS/LCSD Recovery
Log Difference

$[D] = 100 * (C - A) / B$
 $RPD = 200 * |(C - E) / (C + E)|$
 $[D] = 100 * (C) / [B]$
Log Diff. = Log(Sample Duplicate) - Log(Original Sample)

LCS = Laboratory Control Sample
A = Parent Result
C = MS/LCS Result
E = MSD/LCSD Result

MS = Matrix Spike
B = Spike Added
D = MSD/LCSD % Rec

NV5
Superior Fuel**Analytical Method: Total Dissolved Solids by SM 2540C**

Seq Number: 3103072

Matrix: Water

MB Sample Id: 3103072-1-BLK

LCS Sample Id: 3103072-1-BKS

LCSD Sample Id: 3103072-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Total Dissolved Solids	<10.0	1000	983	98	960	96	80-120	2	10	mg/L	09.27.19 15:30	

Analytical Method: Total Dissolved Solids by SM 2540C

Seq Number: 3103072

Matrix: Ground Water

Parent Sample Id: 638232-001

MD Sample Id: 638232-001 D

Parameter	Parent Result	MD Result	%RPD	RPD Limit	Units	Analysis Date	Flag
Total Dissolved Solids	830	848	2	10	mg/L	09.27.19 15:30	

Analytical Method: Total Suspended Solids by SM 2540D

Seq Number: 3102845

Matrix: Water

MB Sample Id: 3102845-1-BLK

LCS Sample Id: 3102845-1-BKS

LCSD Sample Id: 3102845-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Total Suspended Solids	<10.0	1000	914	91	928	93	80-120	2	10	mg/L	09.26.19 10:20	

MS/MSD Percent Recovery
Relative Percent Difference
LCS/LCSD Recovery
Log Difference

$[D] = 100 * (C - A) / B$
 $RPD = 200 * |(C - E) / (C + E)|$
 $[D] = 100 * (C) / [B]$
 $\text{Log Diff.} = \text{Log}(\text{Sample Duplicate}) - \text{Log}(\text{Original Sample})$

LCS = Laboratory Control Sample
A = Parent Result
C = MS/LCS Result
E = MSD/LCSD Result

MS = Matrix Spike
B = Spike Added
D = MSD/LCSD % Rec

Inter-Office Shipment

IOS Number : **48688**

Date/Time: 09.24.2019

Created by: Emily Petrunia

Please send report to: Ruriko Konuma

Lab# From: **Phoenix**

Delivery Priority:

Address: 2525 West Huntington Drive, Suite 102

Lab# To: **Houston**

Air Bill No.: 776327994382

E-Mail: ruriko.konuma@xenco.com

Sample Id	Matrix	Client Sample Id	Sample Collection	Method	Method Name	Lab Due	HT Due	PM	Analytes	Sign
637846-001	W	Superior Fuel	09.24.2019 11:10	E200.7	Recoverable Metals, Total, by EPA 200.7	10.02.2019	03.22.2020	RKO	CA HARD K MG NA PB	
637846-001	W	Superior Fuel	09.24.2019 11:10	E200.7_DIS	Recoverable Metals, Dissolved, by EPA	10.02.2019	03.22.2020	RKO	CU	

Inter Office Shipment or Sample Comments:

Relinquished By:



Emily Petrunia

Date Relinquished: 09.24.2019

Received By:



Monica Shakhshir

Date Received: 09.25.2019

Cooler Temperature: 2.7



XENCO Laboratories

Inter Office Report- Sample Receipt Checklist

Sent To: Houston

IOS #: 48688

Acceptable Temperature Range: 0 - 6 degC

Air and Metal samples Acceptable Range: Ambient

Temperature Measuring device used : HOU-068

Sent By: Emily Petrunia

Date Sent: 09.24.2019 05.58 PM

Received By: Monica Shakhshir

Date Received: 09.25.2019 09.15 AM

Sample Receipt Checklist

Comments

#1 *Temperature of cooler(s)?	2.7
#2 *Shipping container in good condition?	Yes
#3 *Samples received with appropriate temperature?	Yes
#4 *Custody Seals intact on shipping container/ cooler?	Yes
#5 *Custody Seals Signed and dated for Containers/coolers	Yes
#6 *IOS present?	Yes
#7 Any missing/extra samples?	No
#8 IOS agrees with sample label(s)/matrix?	Yes
#9 Sample matrix/ properties agree with IOS?	Yes
#10 Samples in proper container/ bottle?	Yes
#11 Samples properly preserved?	Yes
#12 Sample container(s) intact?	Yes
#13 Sufficient sample amount for indicated test(s)?	Yes
#14 All samples received within hold time?	Yes

* Must be completed for after-hours delivery of samples prior to placing in the refrigerator

NonConformance:

Corrective Action Taken:

Nonconformance Documentation

Contact: _____ Contacted by : _____ Date: _____

Checklist reviewed by:

Monica Shakhshir

Date: 09.25.2019



XENCO Laboratories
Prelogin/Nonconformance Report- Sample Log-In



Client: NV5

Date/ Time Received: 09/24/2019 12:30:00 PM

Work Order #: 637846

Acceptable Temperature Range: 0 - 6 degC

Air and Metal samples Acceptable Range: Ambient

Temperature Measuring device used : IR#1

Sample Receipt Checklist	Comments
#1 *Temperature of cooler(s)?	6
#2 *Shipping container in good condition?	Yes
#3 *Samples received on ice?	Yes
#4 *Custody Seals intact on shipping container/ cooler?	N/A
#5 Custody Seals intact on sample bottles?	N/A
#6 *Custody Seals Signed and dated?	N/A
#7 *Chain of Custody present?	Yes
#8 Any missing/extra samples?	No
#9 Chain of Custody signed when relinquished/ received?	Yes
#10 Chain of Custody agrees with sample labels/matrix?	Yes
#11 Container label(s) legible and intact?	Yes
#12 Samples in proper container/ bottle?	Yes
#13 Samples properly preserved?	Yes
#14 Sample container(s) intact?	Yes
#15 Sufficient sample amount for indicated test(s)?	Yes
#16 All samples received within hold time?	Yes
#17 Subcontract of sample(s)?	Yes Xenco Stafford
#18 Water VOC samples have zero headspace?	N/A

*** Must be completed for after-hours delivery of samples prior to placing in the refrigerator**

Analyst: EP

PH Device/Lot#: LRS-4801

Checklist completed by:

Emily Petrunia

Date: 09/24/2019

Checklist reviewed by:

Ruriko Konuma

Date: 09/25/2019



Analytical Report 644081

for

NV5

Project Manager: Mike Hulst

ADOT Stormwater

12.05.2019

Collected By: Client

**2525 West Huntington Drive, Suite 102
Tempe, AZ 85282
Ph: (480) 355-0900**

Phoenix (EPA Lab Code: AZ00901): Arizona (AZ0757)
Xenco-Houston (EPA Lab code: TX00122): Arizona (AZ0765)
Xenco-Dallas (EPA Lab code: TX01468): Arizona (AZ0809)



12.05.2019

Project Manager: **Mike Hulst**

NV5

1 West Deer Valley Building 2 #305

Phoenix, AZ 85027

Reference: TWA Report No(s): **644081**

ADOT Stormwater

Project Address: Superior Storage and Fuel Yard

Mike Hulst:

We are reporting to you the results of the analyses performed on the samples received under the project name referenced above and identified with the TWA Report Number(s) 644081. All results being reported under this Report Number apply to the samples analyzed and properly identified with a Laboratory ID number. Subcontracted analyses are identified in this report with either the ADHS certification number of the subcontract lab in the analyst ID field, or the complete subcontracted report attached to this report.

Unless otherwise noted in a Case Narrative, all data reported in this Analytical Report are in compliance with ADHS standards. The uncertainty of measurement associated with the results of analysis reported is available upon request. Should insufficient sample be provided to the laboratory to meet the method and ADHS Matrix Duplicate and Matrix Spike requirements, then the data will be analyzed, evaluated and reported using all other available quality control measures.

The validity and integrity of this report will remain intact as long as it is accompanied by this letter and reproduced in full, unless written approval is granted by TransWest Analytical. This report will be filed for at least 5 years in our archives after which time it will be destroyed without further notice, unless otherwise arranged with you. The samples received, and described as recorded in Report No. 644081 will be filed for 45 days, and after that time they will be properly disposed without further notice, unless otherwise arranged with you. We reserve the right to return to you any unused samples, extracts or solutions related to them if we consider so necessary (e.g., samples identified as hazardous waste, sample sizes exceeding analytical standard practices, controlled substances under regulated protocols, etc).

We thank you for selecting TransWest Analytical to serve your analytical needs. If you have any questions concerning this report, please feel free to contact us at any time.

Respectfully,

A handwritten signature in black ink, appearing to read 'Ruriko Konuma', is written over a horizontal line.

Ruriko Konuma

Project Manager

A Small Business and Minority Company

Houston - Dallas - Midland - Tampa - Phoenix - Lubbock - San Antonio - El Paso - Atlanta - New Mexico



CASE NARRATIVE

Client Name: NV5

Project Name: ADOT Stormwater

Project ID:

Work Order Number(s): 644081

Report Date: 12.05.2019

Date Received: 11.21.2019

Sample receipt non conformances and comments:

Client added Chloride analysis via email on 11/22/19 @ 16:30 (Rebecca Davey) RKO

Sample receipt non conformances and comments per sample:

None

Flagging Criteria

Arizona Flags

All method blanks, laboratory spikes, and/or matrix spikes met quality control objectives for the parameters associated with this Work Order except as detailed below or on the Data Qualifier page of this report. Data Qualifiers used in this report are in accordance with ADHS Data Qualifiers, Revision 4.0 9/05/2012.

Data qualifiers (flags) contained within this analytical report have been issued to explain a quality control deficiency, and do not affect the quality (validity) of the data unless noted otherwise in the case narrative.

D2 Sample required dilution due to high concentration of target analyte.



Sample Cross Reference 644081

NV5, Phoenix, AZ

ADOT Stormwater

Sample Id	Matrix	Date Collected	Sample Depth	Lab Sample Id
SUPFUEL_YYMMDD	W	11.21.2019 11:21		644081-001



Certificate of Analytical Results 644081

NV5, Phoenix, AZ

ADOT Stormwater

Sample Id: **SUPFUEL_YYMMDD**

Matrix: Storm Water

Date Received: 11.21.2019 14:00

Lab Sample Id: 644081-001

Date Collected: 11.21.2019 11:21

Analytical Method: Recoverable Metals, Total, by EPA 200.7

Prep Method: E200.7P

Tech: MLI

% Solids:

Analyst: DEP

Date Prep: 12.03.2019 03:06

Seq Number: 3109318

SUB: AZ0765

Dilution Analysis:

Seq#: 3109318 Date Analyzed: 12/03/19 20:22 Date Prep: 12/03/19 03:06

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Calcium	7440-70-2	75.3	10.0	mg/L	12.03.2019 20:22	D2	50
Lead	7439-92-1	0.0889	0.0100	mg/L	12.03.2019 19:28		1
Magnesium	7439-95-4	40.4	0.400	mg/L	12.03.2019 19:28		1
Potassium	7440-09-7	16.2	0.500	mg/L	12.03.2019 19:28		1
Selenium	7782-49-2	<0.0300	0.0300	mg/L	12.03.2019 19:28		1
Sodium	7440-23-5	84.5	0.500	mg/L	12.03.2019 19:28		1
Hardness as CaCO3	471-34-1	354	26.6	mg/L	12.03.2019 19:28		1

Analytical Method: Recoverable Metals, Dissolved, by EPA 200.7

Prep Method: E200.7P

Tech: ADS

% Solids:

Analyst: DEP

Date Prep: 12.04.2019 10:30

Seq Number: 3109455

SUB: AZ0765

Dilution Analysis:

Seq#: 3109318 Date Analyzed: 12/03/19 20:22 Date Prep: 12/03/19 03:06

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Copper	7440-50-8	0.0744	0.0200	mg/L	12.04.2019 18:39		1

Analytical Method: Total Dissolved Solids by SM 2540C

Tech: MON

% Solids:

Analyst: TNL

Seq Number: 3108676

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Total Dissolved Solids	1642222	670	10.0	mg/L	11.21.2019 16:00		1



Certificate of Analytical Results 644081

NV5, Phoenix, AZ

ADOT Stormwater

Sample Id: **SUPFUEL_YYMMDD**

Matrix: Storm Water

Date Received: 11.21.2019 14:00

Lab Sample Id: 644081-001

Date Collected: 11.21.2019 11:21

Analytical Method: Total Suspended Solids by SM 2540D

Tech: TNL

% Solids:

Analyst: MON

Seq Number: 3108729

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Total Suspended Solids	TSS	629	10.0	mg/L	11.25.2019 07:40		1

Analytical Method: Anions by EPA 300.0

Prep Method: E300P

Tech: JYM

% Solids:

Analyst: JYM

Date Prep: 11.26.2019 15:40

Seq Number: 3108740

SUB: AZ0765

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	211	0.500	mg/L	11.26.2019 16:13		1



NV5

ADOT Stormwater

Analytical Method: Recoverable Metals, Total, by EPA 200.7

Seq Number: 3109318

Matrix: Water

Prep Method: E200.7P

Date Prep: 12.03.2019

MB Sample Id: 7691495-1-BLK

LCS Sample Id: 7691495-1-BKS

LCSD Sample Id: 7691495-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Calcium	<0.200	25.0	24.2	97	24.3	97	85-115	0	20	mg/L	12.03.2019 17:52	
Lead	<0.0100	1.00	1.00	100	1.00	100	85-115	0	20	mg/L	12.03.2019 17:52	
Magnesium	<0.400	25.0	24.1	96	24.1	96	85-115	0	20	mg/L	12.03.2019 17:52	
Potassium	<0.500	10.0	9.94	99	9.94	99	85-115	0	20	mg/L	12.03.2019 17:52	
Selenium	<0.0300	1.00	0.980	98	0.946	95	85-115	4	20	mg/L	12.03.2019 17:52	
Sodium	<0.500	25.0	24.2	97	24.2	97	85-115	0	20	mg/L	12.03.2019 17:52	

Analytical Method: Recoverable Metals, Total, by EPA 200.7

Seq Number: 3109318

Matrix: Water

Prep Method: E200.7P

Date Prep: 12.03.2019

MB Sample Id: 7691495-1-BLK

Parameter	MB Result	Units	Analysis Date	Flag
Hardness as CaCO3	0	mg/L	12.03.2019 17:48	

Analytical Method: Recoverable Metals, Total, by EPA 200.7

Seq Number: 3109318

Matrix: Surface Water

Prep Method: E200.7P

Date Prep: 12.03.2019

Parent Sample Id: 644290-001

MS Sample Id: 644290-001 S

MSD Sample Id: 644290-001 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Calcium	13.4	25.0	40.0	106	39.8	106	70-130	1	20	mg/L	12.03.2019 18:04	
Lead	<0.0100	1.00	1.11	111	1.11	111	70-130	0	20	mg/L	12.03.2019 18:04	
Magnesium	1.92	25.0	28.9	108	28.6	107	70-130	1	20	mg/L	12.03.2019 18:04	
Potassium	5.33	10.0	16.6	113	16.5	112	70-130	1	20	mg/L	12.03.2019 18:04	
Selenium	<0.0300	1.00	1.12	112	1.12	112	70-130	0	20	mg/L	12.03.2019 18:04	
Sodium	16.7	25.0	43.3	106	43.0	105	70-130	1	20	mg/L	12.03.2019 18:04	

Analytical Method: Recoverable Metals, Total, by EPA 200.7

Seq Number: 3109318

Matrix: Water

Prep Method: E200.7P

Date Prep: 12.03.2019

Parent Sample Id: 644110-001

MS Sample Id: 644110-001 S

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	Limits	Units	Analysis Date	Flag
Calcium	<0.200	25.0	25.7	103	70-130	mg/L	12.03.2019 19:20	
Lead	<0.0100	1.00	1.07	107	70-130	mg/L	12.03.2019 19:20	
Magnesium	<0.400	25.0	25.6	102	70-130	mg/L	12.03.2019 19:20	
Potassium	<0.500	10.0	10.6	106	70-130	mg/L	12.03.2019 19:20	
Selenium	<0.0300	1.00	1.08	108	70-130	mg/L	12.03.2019 19:20	
Sodium	<0.500	25.0	25.6	102	70-130	mg/L	12.03.2019 19:20	

MS/MSD Percent Recovery
Relative Percent Difference
LCS/LCSD Recovery
Log Difference

$[D] = 100 * (C - A) / B$
 $RPD = 200 * |(C - E) / (C + E)|$
 $[D] = 100 * (C) / [B]$
Log Diff. = Log(Sample Duplicate) - Log(Original Sample)

LCS = Laboratory Control Sample
A = Parent Result
C = MS/LCS Result
E = MSD/LCSD Result

MS = Matrix Spike
B = Spike Added
D = MSD/LCSD % Rec



NV5

ADOT Stormwater

Analytical Method: Recoverable Metals, Dissolved, by EPA 200.7

Seq Number: 3109455

Matrix: Water

MB Sample Id: 7691637-1-BLK

LCS Sample Id: 7691637-1-BKS

Prep Method: E200.7P

Date Prep: 12.04.2019

LCSD Sample Id: 7691637-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Copper	<0.0200	1.00	0.986	99	0.975	98	85-115	1	20	mg/L	12.04.2019 18:01	

Analytical Method: Recoverable Metals, Dissolved, by EPA 200.7

Seq Number: 3109455

Matrix: Water

Parent Sample Id: 644470-001

MS Sample Id: 644470-001 S

Prep Method: E200.7P

Date Prep: 12.04.2019

MSD Sample Id: 644470-001 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Copper	<0.0200	1.00	1.01	101	1.00	100	70-130	1	20	mg/L	12.04.2019 18:13	

Analytical Method: Recoverable Metals, Dissolved, by EPA 200.7

Seq Number: 3109455

Matrix: Storm Water

Parent Sample Id: 644297-001

MS Sample Id: 644297-001 S

Prep Method: E200.7P

Date Prep: 12.04.2019

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	Limits	Units	Analysis Date	Flag
Copper	0.0339	1.00	1.03	100	70-130	mg/L	12.04.2019 19:29	

Analytical Method: Total Dissolved Solids by SM 2540C

Seq Number: 3108676

Matrix: Water

MB Sample Id: 3108676-1-BLK

LCS Sample Id: 3108676-1-BKS

LCSD Sample Id: 3108676-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Total Dissolved Solids	<10.0	1000	993	99	1040	104	80-120	5	10	mg/L	11.21.2019 16:00	

Analytical Method: Total Dissolved Solids by SM 2540C

Seq Number: 3108676

Matrix: Storm Water

Parent Sample Id: 643926-001

MD Sample Id: 643926-001 D

Parameter	Parent Result	MD Result	%RPD	RPD Limit	Units	Analysis Date	Flag
Total Dissolved Solids	65.0	61.0	6	10	mg/L	11.21.2019 16:00	

Analytical Method: Total Suspended Solids by SM 2540D

Seq Number: 3108729

Matrix: Water

MB Sample Id: 3108729-1-BLK

LCS Sample Id: 3108729-1-BKS

LCSD Sample Id: 3108729-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Total Suspended Solids	<10.0	1000	992	99	1010	101	80-120	2	10	mg/L	11.25.2019 07:40	

MS/MSD Percent Recovery
Relative Percent Difference
LCS/LCSD Recovery
Log Difference

$[D] = 100 * (C - A) / B$
 $RPD = 200 * |(C - E) / (C + E)|$
 $[D] = 100 * (C) / [B]$
Log Diff. = Log(Sample Duplicate) - Log(Original Sample)

LCS = Laboratory Control Sample
A = Parent Result
C = MS/LCS Result
E = MSD/LCSD Result

MS = Matrix Spike
B = Spike Added
D = MSD/LCSD % Rec



QC Summary 644081

NV5

ADOT Stormwater

Analytical Method: Total Suspended Solids by SM 2540D

Seq Number: 3108729 Matrix: Waste Water
Parent Sample Id: 644023-003 MD Sample Id: 644023-003 D

Parameter	Parent Result	MD Result	%RPD	RPD Limit	Units	Analysis Date	Flag
Total Suspended Solids	1700	1660	2	10	mg/L	11.25.2019 07:40	

Analytical Method: Total Suspended Solids by SM 2540D

Seq Number: 3108729 Matrix: Storm Water
Parent Sample Id: 644227-003 MD Sample Id: 644227-003 D

Parameter	Parent Result	MD Result	%RPD	RPD Limit	Units	Analysis Date	Flag
Total Suspended Solids	52.2	56.7	8	10	mg/L	11.25.2019 07:40	

Analytical Method: Anions by EPA 300.0

Seq Number: 3108740 Matrix: Water Prep Method: E300P
MB Sample Id: 7691191-1-BLK LCS Sample Id: 7691191-1-BKS Date Prep: 11.26.2019
LCSD Sample Id: 7691191-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	<0.500	10.0	10.1	101	10.2	102	90-110	1	20	mg/L	11.26.2019 09:24	

Analytical Method: Anions by EPA 300.0

Seq Number: 3108740 Matrix: Water Prep Method: E300P
Parent Sample Id: 644344-001 MS Sample Id: 644344-001 S Date Prep: 11.26.2019
MSD Sample Id: 644344-001 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	69.8	200	266	98	267	99	90-110	0	20	mg/L	11.26.2019 10:17	

Analytical Method: Anions by EPA 300.0

Seq Number: 3108740 Matrix: Waste Water Prep Method: E300P
Parent Sample Id: 644395-002 MS Sample Id: 644395-002 S Date Prep: 11.26.2019
MSD Sample Id: 644395-002 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	46.5	10.0	55.9	94	55.8	93	90-110	0	20	mg/L	11.26.2019 11:09	

MS/MSD Percent Recovery
Relative Percent Difference
LCS/LCSD Recovery
Log Difference

$[D] = 100 * (C - A) / B$
 $RPD = 200 * |(C - E) / (C + E)|$
 $[D] = 100 * (C) / [B]$
Log Diff. = Log(Sample Duplicate) - Log(Original Sample)

LCS = Laboratory Control Sample
A = Parent Result
C = MS/LCS Result
E = MSD/LCSD Result

MS = Matrix Spike
B = Spike Added
D = MSD/LCSD % Rec

Chain of Custody Record

644081

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

Client Contact

NV5, Inc
1 W. Deer Valley Road, Bldg. 2, Suite 305
Phoenix, AZ 85027
623.374.6637 Phone
623.738.3690 FAX
Project Name: ADOT Stormwater
Site: Superior Storage and Fuel Yard
444219-0250000.16

Project Manager: Mike Hulst

Tel/Fax:

Analysis Turnaround Time

☐ CALENDAR DAYS ☒ WORKING DAYS

TAT if different from Below _____

- ☒ 2 weeks
☐ 1 week
☐ 2 days
☐ 1 day

Site Contact:

Lab Contact:

Date:

Carrier:

COC No:

_____ of _____ COCs

Sampler:

For Lab Use Only:

Walk-in Client:

Lab Sampling:

Job / SDG No.:

Sample Identification

Sample Date

Sample Time

Sample Type
(C=Comp, G=Grab)

Matrix

of Cont.

Filtered Sample (Y/N)

Perform MS / MSD (Y/N)

TDS

TSS

PAHs

Pb, Se by ICP-MS

Cu, Dissolved by ICP-MS

Hardness

SUPFUEL YYMMDD

11-21

1121

C

W

5

x

x

x

x

x

x

Sample Specific Notes:

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

Possible Hazard Identification:

Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

☐ Return to Client ☐ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments:

Custody Seals Intact: ☐ Yes ☐ No

Custody Seal No.:

Cooler Temp. (°C): Obs'd: 0.2 Corr'd:

Therm ID No.:

Relinquished by:

Company:

Date/Time:

Received by:

Company:

Date/Time:

Relinquished by:

Company:

Date/Time:

Received by:

Company:

Date/Time:

Relinquished by:

Company:

Date/Time:

Received in Laboratory by:

Company:

Date/Time:

Inter-Office Shipment

IOS Number : 52917

Date/Time: 11.21.2019 Created by: Emily Petrunia
 Lab# From: **Phoenix** Delivery Priority:
 Lab# To: **Houston** Air Bill No.: 7777053585110

Please send report to: Ruriko Konuma
 Address: 2525 West Huntington Drive, Suite 102
 E-Mail: ruriko.konuma@xenco.com

Sample Id	Matrix	Client Sample Id	Sample Collection	Method	Method Name	Lab Due	HT Due	PM	Analytes	Sign
644081-001	W	SUPFUEL_YYMMDD	11.21.2019 11:21	E300	Anions by EPA 300.0	12.03.2019	12.19.2019	RKO	CL	
644081-001	W	SUPFUEL_YYMMDD	11.21.2019 11:21	E200.7	Recoverable Metals, Total, by EPA 200.7	12.03.2019	05.19.2020	RKO	CA HARD K MG NA PB	
644081-001	W	SUPFUEL_YYMMDD	11.21.2019 11:21	E200.7_DIS	Recoverable Metals, Dissolved, by EPA	12.03.2019	05.19.2020	RKO	CU	

Inter Office Shipment or Sample Comments:

Relinquished By: 

 Emily Petrunia

Date Relinquished: 11.25.2019

Received By: 

 Ashly Kowalski

Date Received: 11.22.2019

Cooler Temperature: 3.0



XENCO Laboratories

Inter Office Report- Sample Receipt Checklist

Sent To: Houston

IOS #: 52917

Acceptable Temperature Range: 0 - 6 degC

Air and Metal samples Acceptable Range: Ambient

Temperature Measuring device used : HOU-068

Sent By: Emily Petrunia

Date Sent: 11.21.2019 05.59 PM

Received By: Ashly Kowalski

Date Received: 11.22.2019 09.30 AM

Sample Receipt Checklist

Comments

#1 *Temperature of cooler(s)?	3
#2 *Shipping container in good condition?	Yes
#3 *Samples received with appropriate temperature?	Yes
#4 *Custody Seals intact on shipping container/ cooler?	N/A
#5 *Custody Seals Signed and dated for Containers/coolers	N/A
#6 *IOS present?	Yes
#7 Any missing/extra samples?	No
#8 IOS agrees with sample label(s)/matrix?	Yes
#9 Sample matrix/ properties agree with IOS?	Yes
#10 Samples in proper container/ bottle?	Yes
#11 Samples properly preserved?	Yes
#12 Sample container(s) intact?	Yes
#13 Sufficient sample amount for indicated test(s)?	Yes
#14 All samples received within hold time?	Yes

*** Must be completed for after-hours delivery of samples prior to placing in the refrigerator**

NonConformance:

Corrective Action Taken:

Nonconformance Documentation

Contact: _____ Contacted by : _____ Date: _____

Checklist reviewed by:

Ashly Kowalski

Date: 11.22.2019

XENCO Laboratories
Prelogin/Nonconformance Report- Sample Log-In

Client: NV5

Date/ Time Received: 11.21.2019 02.00.00 PM

Work Order #: 644081

Acceptable Temperature Range: 0 - 6 degC

Air and Metal samples Acceptable Range: Ambient

Temperature Measuring device used : IR#1

Sample Receipt Checklist	Comments
#1 *Temperature of cooler(s)?	.2
#2 *Shipping container in good condition?	Yes
#3 *Samples received on ice?	Yes
#4 *Custody Seals intact on shipping container/ cooler?	N/A
#5 Custody Seals intact on sample bottles?	N/A
#6 *Custody Seals Signed and dated?	N/A
#7 *Chain of Custody present?	Yes
#8 Any missing/extra samples?	No
#9 Chain of Custody signed when relinquished/ received?	Yes
#10 Chain of Custody agrees with sample labels/matrix?	Yes
#11 Container label(s) legible and intact?	Yes
#12 Samples in proper container/ bottle?	Yes
#13 Samples properly preserved?	Yes
#14 Sample container(s) intact?	Yes
#15 Sufficient sample amount for indicated test(s)?	Yes
#16 All samples received within hold time?	Yes
#17 Subcontract of sample(s)?	Yes Xenco Stafford
#18 Water VOC samples have zero headspace?	N/A

*** Must be completed for after-hours delivery of samples prior to placing in the refrigerator**

Analyst: EP

PH Device/Lot#: 207519

Checklist completed by:



Emily Petrunia

Date: 11.21.2019

Checklist reviewed by:



Ruriko Konuma

Date: 11.22.2019

Analytical Report 636576

**for
NV5**

**Project Manager: Mike Hulst
ADOT Stormwater: Superior Maintenance Yard**

23-SEP-19

Collected By: Client



**2525 West Huntington Drive, Suite 102
Tempe, AZ 85282
Ph: (480) 355-0900**

Phoenix (EPA Lab Code: AZ00901): Arizona (AZ0757)
Xenco-Houston (EPA Lab code: TX00122): Arizona (AZ0765)
Xenco-Dallas (EPA Lab code: TX01468): Arizona (AZ0809)



23-SEP-19

Project Manager: **Mike Hulst**

NV5

1 West Deer Valley Building 2 #305

Phoenix, AZ 85027

Reference: TWA Report No(s): **636576**

ADOT Stormwater: Superior Maintenance Yard

Project Address:

Mike Hulst:

We are reporting to you the results of the analyses performed on the samples received under the project name referenced above and identified with the TWA Report Number(s) 636576. All results being reported under this Report Number apply to the samples analyzed and properly identified with a Laboratory ID number. Subcontracted analyses are identified in this report with either the ADHS certification number of the subcontract lab in the analyst ID field, or the complete subcontracted report attached to this report.

Unless otherwise noted in a Case Narrative, all data reported in this Analytical Report are in compliance with ADHS standards. The uncertainty of measurement associated with the results of analysis reported is available upon request. Should insufficient sample be provided to the laboratory to meet the method and ADHS Matrix Duplicate and Matrix Spike requirements, then the data will be analyzed, evaluated and reported using all other available quality control measures.

The validity and integrity of this report will remain intact as long as it is accompanied by this letter and reproduced in full, unless written approval is granted by TransWest Analytical. This report will be filed for at least 5 years in our archives after which time it will be destroyed without further notice, unless otherwise arranged with you. The samples received, and described as recorded in Report No. 636576 will be filed for 45 days, and after that time they will be properly disposed without further notice, unless otherwise arranged with you. We reserve the right to return to you any unused samples, extracts or solutions related to them if we consider so necessary (e.g., samples identified as hazardous waste, sample sizes exceeding analytical standard practices, controlled substances under regulated protocols, etc).

We thank you for selecting TransWest Analytical to serve your analytical needs. If you have any questions concerning this report, please feel free to contact us at any time.

Respectfully,

A handwritten signature in black ink, appearing to read 'Ruriko Konuma', is written over a horizontal line.

Ruriko Konuma

Project Manager

Recipient of the Prestigious Small Business Administration Award of Excellence in 1994.

Certified and approved by numerous States and Agencies.

A Small Business and Minority Status Company that delivers SERVICE and QUALITY

Houston - Dallas - Midland - San Antonio - Phoenix - Oklahoma - Latin America



CASE NARRATIVE

Client Name: NV5

Project Name: ADOT Stormwater: Superior Maintenance Yard

Project ID:
Work Order Number(s): 636576

Report Date: 23-SEP-19
Date Received: 09/11/2019

Sample receipt non conformances and comments:

None

Sample receipt non conformances and comments per sample:

None

Analytical non conformances and comments:

Batch: LBA-3101752 PAHs by SW846 8270D SIM

Benzo(g,h,i)perylene recovered below QC limits in the Blank Spike Duplicate. Samples in the analytical batch are: 636576-001.

Surrogate 2-Fluorobiphenyl recovered above QC limits Data confirmed by re-analysis. Samples affected are: 7686359-1-BLK.

Surrogate Nitrobenzene-d5 recovered above QC limits Data confirmed by re-analysis. Samples affected are: 7686359-1-BLK, 636576-001.

Lab Sample ID 636576-001 was randomly selected for Matrix Spike/Matrix Spike Duplicate (MS/MSD). Dibenz(a,h)anthracene, Indeno(1,2,3-c,d)Pyrene recovered below QC limits in the Matrix Spike. 1-Methylnaphthalene, 2-Methylnaphthalene, Naphthalene recovered above QC limits in the Matrix Spike and Matrix Spike Duplicate. Acenaphthene, Acenaphthylene, Fluorene recovered above QC limits in the Matrix Spike Duplicate. Outlier/s are due to possible matrix interference. Samples in the analytical batch are: 636576-001.

The Laboratory Control Sample for Dibenz(a,h)anthracene, Acenaphthylene, Naphthalene, 1-Methylnaphthalene, Acenaphthene, 2-Methylnaphthalene, Fluorene, Indeno(1,2,3-c,d)Pyrene is within laboratory Control Limits, therefore the data was accepted.

Arizona Flags

All method blanks, laboratory spikes, and/or matrix spikes met quality control objectives for the parameters associated with this Work Order except as detailed below or on the Data Qualifier page of this report. Data Qualifiers used in this report are in accordance with ADHS Data Qualifiers, Revision 4.0 9/05/2012. Data qualifiers (flags) contained within this analytical report have been issued to explain a quality control deficiency, and do not affect the quality (validity) of the data unless noted otherwise in the case narrative.

- L2 The associated blank spike recovery was below laboratory acceptance limits.
- M1 Matrix spike recovery was high; the associated blank spike recovery was acceptable.
- M2 Matrix spike recovery was low; the associated blank spike recovery was acceptable.
- S10 Surrogate recovery was above laboratory and method acceptance limits. See case narrative.



Sample Cross Reference 636576

NV5, Phoenix, AZ

ADOT Stormwater: Superior Maintenance Yard

Sample Id	Matrix	Date Collected	Sample Depth	Lab Sample Id
SUPYARD 091119	W	09-11-19 10:25		636576-001



Certificate of Analytical Results 636576

NV5, Phoenix, AZ

ADOT Stormwater: Superior Maintenance Yard

Sample Id: **SUPYARD 091119**

Matrix: Water

Date Received: 09.11.19 11.50

Lab Sample Id: 636576-001

Date Collected: 09.11.19 10.25

Analytical Method: PAHs by SW846 8270D SIM

Prep Method: SW3511

Tech: AHI

% Solids:

Analyst: EKL

Date Prep: 09.17.19 14.11

Seq Number: 3101752

SUB: AZ0765

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
1-Methylnaphthalene	90-12-0	<0.000201	0.000201	mg/L	09.19.19 11.26	M1	1.11
2-Methylnaphthalene	91-57-6	<0.000201	0.000201	mg/L	09.19.19 11.26	M1	1.11
Acenaphthene	83-32-9	<0.000201	0.000201	mg/L	09.19.19 11.26	M1	1.11
Acenaphthylene	208-96-8	<0.000201	0.000201	mg/L	09.19.19 11.26	M1	1.11
Anthracene	120-12-7	<0.000201	0.000201	mg/L	09.19.19 11.26		1.11
Benzo(a)anthracene	56-55-3	<0.000201	0.000201	mg/L	09.19.19 11.26		1.11
Benzo(a)pyrene	50-32-8	<0.000201	0.000201	mg/L	09.19.19 11.26		1.11
Benzo(b)fluoranthene	205-99-2	<0.000201	0.000201	mg/L	09.19.19 11.26		1.11
Benzo(g,h,i)perylene	191-24-2	0.000246	0.000201	mg/L	09.19.19 11.26	L2	1.11
Benzo(k)fluoranthene	207-08-9	<0.000201	0.000201	mg/L	09.19.19 11.26		1.11
Chrysene	218-01-9	0.000225	0.000201	mg/L	09.19.19 11.26		1.11
Dibenz(a,h)anthracene	53-70-3	<0.000201	0.000201	mg/L	09.19.19 11.26	M2	1.11
Fluoranthene	206-44-0	<0.000201	0.000201	mg/L	09.19.19 11.26		1.11
Fluorene	86-73-7	<0.000201	0.000201	mg/L	09.19.19 11.26	M1	1.11
Indeno(1,2,3-c,d)Pyrene	193-39-5	<0.000201	0.000201	mg/L	09.19.19 11.26	M2	1.11
Naphthalene	91-20-3	<0.000402	0.000402	mg/L	09.19.19 11.26	M1	1.11
Phenanthrene	85-01-8	<0.000201	0.000201	mg/L	09.19.19 11.26		1.11
Pyrene	129-00-0	<0.000201	0.000201	mg/L	09.19.19 11.26		1.11

Surrogate	% Recovery	Units	Limits	Analysis Date	Flag
2-Fluorobiphenyl	143	%	54-146	09.19.19 11.26	
Nitrobenzene-d5	152	%	46-151	09.19.19 11.26	S10
Terphenyl-D14	108	%	51-139	09.19.19 11.26	



Certificate of Analytical Results 636576

NV5, Phoenix, AZ

ADOT Stormwater: Superior Maintenance Yard

Sample Id: **SUPYARD 091119**

Matrix: Water

Date Received: 09.11.19 11.50

Lab Sample Id: 636576-001

Date Collected: 09.11.19 10.25

Analytical Method: Recoverable Metals, Total, by EPA 200.7

Prep Method: E200.7P

Tech: MLI

% Solids:

Analyst: DEP

Date Prep: 09.17.19 09.30

Seq Number: 3101686

SUB: AZ0765

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Calcium	7440-70-2	14.0	0.200	mg/L	09.17.19 14.19		1
Magnesium	7439-95-4	1.57	0.400	mg/L	09.17.19 14.19		1
Potassium	7440-09-7	1.61	0.500	mg/L	09.17.19 14.19		1
Sodium	7440-23-5	5.67	0.500	mg/L	09.17.19 14.19		1
Lead	7439-92-1	<0.0100	0.0100	mg/L	09.17.19 14.19		1
Hardness as CaCO ₃	471-34-1	41.4	2.14	mg/L	09.17.19 14.19		1
Selenium	7782-49-2	<0.0300	0.0300	mg/L	09.17.19 14.19		1

Analytical Method: Recoverable Metals, Dissolved, by EPA 200.7

Prep Method: E200.7P

Tech: MLI

% Solids:

Analyst: DEP

Date Prep: 09.19.19 08.00

Seq Number: 3102090

SUB: AZ0765

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Copper	7440-50-8	<0.0200	0.0200	mg/L	09.20.19 15.41		1

Analytical Method: Total Dissolved Solids by SM 2540C

Tech: TNL

% Solids:

Analyst: MON

Seq Number: 3101613

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Total Dissolved Solids	1642222	95.0	10.0	mg/L	09.13.19 15.00		1



Certificate of Analytical Results 636576

NV5, Phoenix, AZ

ADOT Stormwater: Superior Maintenance Yard

Sample Id: **SUPYARD 091119**

Matrix: Water

Date Received: 09.11.19 11.50

Lab Sample Id: 636576-001

Date Collected: 09.11.19 10.25

Analytical Method: Total Suspended Solids by SM 2540D

Tech: MON

% Solids:

Analyst: TNL

Seq Number: 3101514

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Total Suspended Solids	TSS	135	10.0	mg/L	09.11.19 13.00		1

Analytical Method: Anions by EPA 300.0

Prep Method: E300P

Tech: JYM

% Solids:

Analyst: JYM

Date Prep: 09.19.19 09.45

Seq Number: 3101983

SUB: AZ0765

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	8.32	0.500	mg/L	09.19.19 11.03		1



NV5

ADOT Stormwater: Superior Maintenance Yard

Analytical Method: PAHs by SW846 8270D SIM

Seq Number: 3101752

MB Sample Id: 7686359-1-BLK

Matrix: Water

LCS Sample Id: 7686359-1-BKS

Prep Method: SW3511

Date Prep: 09.17.19

LCSD Sample Id: 7686359-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
1-Methylnaphthalene	<0.000182	0.0182	0.0218	120	0.0214	118	70-126	2	30	mg/L	09.19.19 10:52	
2-Methylnaphthalene	<0.000182	0.0182	0.0218	120	0.0213	117	74-121	2	30	mg/L	09.19.19 10:52	
Acenaphthene	<0.000182	0.0182	0.0209	115	0.0206	113	75-127	1	30	mg/L	09.19.19 10:52	
Acenaphthylene	<0.000182	0.0182	0.0209	115	0.0205	113	78-133	2	30	mg/L	09.19.19 10:52	
Anthracene	<0.000182	0.0182	0.0214	118	0.0211	116	73-145	1	30	mg/L	09.19.19 10:52	
Benzo(a)anthracene	<0.000182	0.0182	0.0172	95	0.0165	91	77-131	4	30	mg/L	09.19.19 10:52	
Benzo(a)pyrene	<0.000182	0.0182	0.0169	93	0.0158	87	56-163	7	30	mg/L	09.19.19 10:52	
Benzo(b)fluoranthene	<0.000182	0.0182	0.0167	92	0.0159	87	74-138	5	30	mg/L	09.19.19 10:52	
Benzo(g,h,i)perylene	<0.000182	0.0182	0.0151	83	0.0136	75	77-127	10	30	mg/L	09.19.19 10:52	L2
Benzo(k)fluoranthene	<0.000182	0.0182	0.0180	99	0.0167	92	67-142	7	30	mg/L	09.19.19 10:52	
Chrysene	<0.000182	0.0182	0.0172	95	0.0165	91	66-126	4	30	mg/L	09.19.19 10:52	
Dibenz(a,h)anthracene	<0.000182	0.0182	0.0160	88	0.0145	80	71-142	10	30	mg/L	09.19.19 10:52	
Fluoranthene	<0.000182	0.0182	0.0204	112	0.0201	110	78-138	1	30	mg/L	09.19.19 10:52	
Fluorene	<0.000182	0.0182	0.0208	114	0.0206	113	79-128	1	30	mg/L	09.19.19 10:52	
Indeno(1,2,3-c,d)Pyrene	<0.000182	0.0182	0.0156	86	0.0141	77	76-140	10	30	mg/L	09.19.19 10:52	
Naphthalene	<0.000364	0.0182	0.0211	116	0.0208	114	72-122	1	30	mg/L	09.19.19 10:52	
Phenanthrene	<0.000182	0.0182	0.0210	115	0.0207	114	76-129	1	30	mg/L	09.19.19 10:52	
Pyrene	<0.000182	0.0182	0.0217	119	0.0212	116	74-138	2	30	mg/L	09.19.19 10:52	
Surrogate	MB %Rec	MB Flag	LCS %Rec	LCS Flag	LCSD %Rec	LCSD Flag	Limits		Units	Analysis Date		
2-Fluorobiphenyl	153	S10	112		109		54-146		%	09.19.19 10:52		
Nitrobenzene-d5	154	S10	118		115		46-151		%	09.19.19 10:52		
Terphenyl-D14	138		94		88		51-139		%	09.19.19 10:52		

MS/MSD Percent Recovery
Relative Percent Difference
LCS/LCSD Recovery
Log Difference

$[D] = 100 * (C - A) / B$
 $RPD = 200 * |(C - E) / (C + E)|$
 $[D] = 100 * (C) / [B]$
 Log Diff. = Log(Sample Duplicate) - Log(Original Sample)

LCS = Laboratory Control Sample
 A = Parent Result
 C = MS/LCS Result
 E = MSD/LCSD Result

MS = Matrix Spike
 B = Spike Added
 D = MSD/LCSD % Rec



QC Summary 636576

NV5

ADOT Stormwater: Superior Maintenance Yard

Analytical Method: PAHs by SW846 8270D SIM

Seq Number: 3101752

Parent Sample Id: 636576-001

Matrix: Water

MS Sample Id: 636576-001 S

Prep Method: SW3511

Date Prep: 09.17.19

MSD Sample Id: 636576-001 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
1-Methylnaphthalene	<0.000193	0.0193	0.0255	132	0.0273	142	70-126	7	30	mg/L	09.19.19 11:42	M1
2-Methylnaphthalene	<0.000193	0.0193	0.0254	132	0.0272	142	74-121	7	30	mg/L	09.19.19 11:42	M1
Acenaphthene	<0.000193	0.0193	0.0240	124	0.0260	135	75-127	8	30	mg/L	09.19.19 11:42	M1
Acenaphthylene	<0.000193	0.0193	0.0241	125	0.0262	136	78-133	8	30	mg/L	09.19.19 11:42	M1
Anthracene	<0.000193	0.0193	0.0233	121	0.0253	132	73-145	8	30	mg/L	09.19.19 11:42	
Benzo(a)anthracene	<0.000193	0.0193	0.0190	98	0.0202	105	77-131	6	30	mg/L	09.19.19 11:42	
Benzo(a)pyrene	<0.000193	0.0193	0.0173	90	0.0186	97	56-163	7	30	mg/L	09.19.19 11:42	
Benzo(b)fluoranthene	<0.000151	0.0193	0.0176	91	0.0193	101	74-138	9	30	mg/L	09.19.19 11:42	
Benzo(g,h,i)perylene	0.000246	0.0193	0.0151	77	0.0159	82	77-127	5	30	mg/L	09.19.19 11:42	
Benzo(k)fluoranthene	<0.000193	0.0193	0.0173	90	0.0184	96	67-142	6	30	mg/L	09.19.19 11:42	
Chrysene	0.000225	0.0193	0.0183	94	0.0198	102	66-126	8	30	mg/L	09.19.19 11:42	
Dibenz(a,h)anthracene	<0.000193	0.0193	0.0136	70	0.0147	77	71-142	8	30	mg/L	09.19.19 11:42	M2
Fluoranthene	<0.000193	0.0193	0.0222	115	0.0242	126	78-138	9	30	mg/L	09.19.19 11:42	
Fluorene	<0.000193	0.0193	0.0238	123	0.0258	134	79-128	8	30	mg/L	09.19.19 11:42	M1
Indeno(1,2,3-c,d)Pyrene	<0.000193	0.0193	0.0145	75	0.0154	80	76-140	6	30	mg/L	09.19.19 11:42	M2
Naphthalene	<0.000387	0.0193	0.0249	129	0.0267	139	72-122	7	30	mg/L	09.19.19 11:42	M1
Phenanthrene	<0.000193	0.0193	0.0230	119	0.0248	129	76-129	8	30	mg/L	09.19.19 11:42	
Pyrene	0.000140	0.0193	0.0233	120	0.0243	126	74-138	4	30	mg/L	09.19.19 11:42	

Surrogate	MS %Rec	MS Flag	MSD %Rec	MSD Flag	Limits	Units	Analysis Date
2-Fluorobiphenyl	119		131		54-146	%	09.19.19 11:42
Nitrobenzene-d5	133		142		46-151	%	09.19.19 11:42
Terphenyl-D14	92		97		51-139	%	09.19.19 11:42

Analytical Method: Recoverable Metals, Total, by EPA 200.7

Seq Number: 3101686

MB Sample Id: 7686323-1-BLK

Matrix: Water

LCS Sample Id: 7686323-1-BKS

Prep Method: E200.7P

Date Prep: 09.17.19

LCSD Sample Id: 7686323-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Calcium	<0.0293	25.0	25.1	100	25.3	101	85-115	1	20	mg/L	09.17.19 13:37	
Magnesium	<0.0500	25.0	24.9	100	25.0	100	85-115	0	20	mg/L	09.17.19 13:37	
Potassium	<0.107	10.0	10.1	101	10.2	102	85-115	1	20	mg/L	09.17.19 13:37	
Sodium	<0.0667	25.0	24.7	99	24.8	99	85-115	0	20	mg/L	09.17.19 13:37	
Lead	<0.00237	1.00	1.00	100	1.01	101	85-115	1	20	mg/L	09.17.19 13:37	
Selenium	<0.00439	1.00	0.982	98	0.964	96	85-115	2	20	mg/L	09.17.19 13:37	

MS/MSD Percent Recovery
Relative Percent Difference
LCS/LCSD Recovery
Log Difference

$[D] = 100 * (C - A) / B$
 $RPD = 200 * |(C - E) / (C + E)|$
 $[D] = 100 * (C) / [B]$
Log Diff. = Log(Sample Duplicate) - Log(Original Sample)

LCS = Laboratory Control Sample
A = Parent Result
C = MS/LCS Result
E = MSD/LCSD Result

MS = Matrix Spike
B = Spike Added
D = MSD/LCSD % Rec



NV5

ADOT Stormwater: Superior Maintenance Yard

Analytical Method: Recoverable Metals, Total, by EPA 200.7

Seq Number: 3101686

Matrix: Drinking Water

Prep Method: E200.7P

Date Prep: 09.17.19

Parent Sample Id: 636607-001

MS Sample Id: 636607-001 S

MSD Sample Id: 636607-001 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Calcium	243	25.0	268	100	266	92	70-130	1	20	mg/L	09.17.19 13:58	
Magnesium	146	25.0	172	104	170	96	70-130	1	20	mg/L	09.17.19 13:58	
Potassium	13.8	10.0	24.4	106	24.3	105	70-130	0	20	mg/L	09.17.19 13:58	
Sodium	277	25.0	302	100	301	96	70-130	0	20	mg/L	09.17.19 13:58	
Lead	<0.00237	1.00	1.00	100	0.998	100	70-130	0	20	mg/L	09.17.19 13:58	
Selenium	<0.00439	1.00	1.05	105	1.06	106	70-130	1	20	mg/L	09.17.19 13:58	

Analytical Method: Recoverable Metals, Total, by EPA 200.7

Seq Number: 3101686

Matrix: Water

Prep Method: E200.7P

Date Prep: 09.17.19

Parent Sample Id: 636615-001

MS Sample Id: 636615-001 S

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	Limits	Units	Analysis Date	Flag
Calcium	47.0	25.0	73.9	108	70-130	mg/L	09.17.19 21:07	
Magnesium	10.2	25.0	35.7	102	70-130	mg/L	09.17.19 21:07	
Potassium	7.69	10.0	18.3	106	70-130	mg/L	09.17.19 21:07	
Sodium	763	25.0	818	220	70-130	mg/L	09.17.19 21:07	M1
Lead	<0.00237	1.00	1.04	104	70-130	mg/L	09.17.19 21:07	
Selenium	0.00483	1.00	1.09	109	70-130	mg/L	09.17.19 21:07	

Analytical Method: Recoverable Metals, Dissolved, by EPA 200.7

Seq Number: 3102090

Matrix: Water

Prep Method: E200.7P

Date Prep: 09.19.19

MB Sample Id: 7686525-1-BLK

LCS Sample Id: 7686525-1-BKS

LCSD Sample Id: 7686525-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Copper	<0.00544	1.00	0.993	99	0.986	99	85-115	1	20	mg/L	09.20.19 15:33	

Analytical Method: Recoverable Metals, Dissolved, by EPA 200.7

Seq Number: 3102090

Matrix: Water

Prep Method: E200.7P

Date Prep: 09.19.19

Parent Sample Id: 636576-001

MS Sample Id: 636576-001 S

MSD Sample Id: 636576-001 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Copper	0.0153	1.00	1.03	101	1.03	101	70-130	0	20	mg/L	09.20.19 15:45	

MS/MSD Percent Recovery
Relative Percent Difference
LCS/LCSD Recovery
Log Difference

$[D] = 100 * (C - A) / B$
 $RPD = 200 * |(C - E) / (C + E)|$
 $[D] = 100 * (C) / [B]$
 Log Diff. = Log(Sample Duplicate) - Log(Original Sample)

LCS = Laboratory Control Sample
 A = Parent Result
 C = MS/LCS Result
 E = MSD/LCSD Result

MS = Matrix Spike
 B = Spike Added
 D = MSD/LCSD % Rec



NV5

ADOT Stormwater: Superior Maintenance Yard

Analytical Method: Total Dissolved Solids by SM 2540C

Seq Number: 3101613

Matrix: Water

MB Sample Id: 3101613-1-BLK

LCS Sample Id: 3101613-1-BKS

LCSD Sample Id: 3101613-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Total Dissolved Solids	<10.0	1000	978	98	1010	101	80-120	3	10	mg/L	09.13.19 15:00	

Analytical Method: Total Dissolved Solids by SM 2540C

Seq Number: 3101613

Matrix: Water

Parent Sample Id: 636616-002

MD Sample Id: 636616-002 D

Parameter	Parent Result	MD Result	%RPD	RPD Limit	Units	Analysis Date	Flag
Total Dissolved Solids	5280	5500	4	10	mg/L	09.13.19 15:00	

Analytical Method: Total Suspended Solids by SM 2540D

Seq Number: 3101514

Matrix: Water

MB Sample Id: 3101514-1-BLK

LCS Sample Id: 3101514-1-BKS

LCSD Sample Id: 3101514-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Total Suspended Solids	<10.0	1000	984	98	940	94	80-120	5	10	mg/L	09.11.19 13:00	

Analytical Method: Total Suspended Solids by SM 2540D

Seq Number: 3101514

Matrix: Storm Water

Parent Sample Id: 636338-003

MD Sample Id: 636338-003 D

Parameter	Parent Result	MD Result	%RPD	RPD Limit	Units	Analysis Date	Flag
Total Suspended Solids	<10.0	<10.0	0	10	mg/L	09.11.19 13:00	

Analytical Method: Anions by EPA 300.0

Seq Number: 3101983

Matrix: Water

MB Sample Id: 7686471-1-BLK

LCS Sample Id: 7686471-1-BKS

Prep Method: E300P

Date Prep: 09.19.19

LCSD Sample Id: 7686471-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	<0.500	10.0	10.3	103	10.3	103	90-110	0	20	mg/L	09.19.19 09:22	

MS/MSD Percent Recovery
Relative Percent Difference
LCS/LCSD Recovery
Log Difference

$[D] = 100 * (C - A) / B$
 $RPD = 200 * |(C - E) / (C + E)|$
 $[D] = 100 * (C) / [B]$
 $\text{Log Diff.} = \text{Log}(\text{Sample Duplicate}) - \text{Log}(\text{Original Sample})$

LCS = Laboratory Control Sample
A = Parent Result
C = MS/LCS Result
E = MSD/LCSD Result

MS = Matrix Spike
B = Spike Added
D = MSD/LCSD % Rec



QC Summary 636576

NV5

ADOT Stormwater: Superior Maintenance Yard

Analytical Method: Anions by EPA 300.0

Seq Number: 3101983

Parent Sample Id: 637296-001

Matrix: Water

MS Sample Id: 637296-001 S

Prep Method: E300P

Date Prep: 09.19.19

MSD Sample Id: 637296-001 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	64.5	200	265	100	265	100	90-110	0	20	mg/L	09.19.19 10:26	

Analytical Method: Anions by EPA 300.0

Seq Number: 3101983

Parent Sample Id: 637224-001

Matrix: Water

MS Sample Id: 637224-001 S

Prep Method: E300P

Date Prep: 09.19.19

MSD Sample Id: 637224-001 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	270	10.0	274	40	275	50	90-110	0	20	mg/L	09.19.19 12:07	M2

MS/MSD Percent Recovery
Relative Percent Difference
LCS/LCSD Recovery
Log Difference

$[D] = 100 * (C - A) / B$
 $RPD = 200 * |(C - E) / (C + E)|$
 $[D] = 100 * (C) / [B]$
Log Diff. = Log(Sample Duplicate) - Log(Original Sample)

LCS = Laboratory Control Sample
A = Parent Result
C = MS/LCS Result
E = MSD/LCSD Result

MS = Matrix Spike
B = Spike Added
D = MSD/LCSD % Rec

[illegible]

Inter-Office Shipment

IOS Number : 47936

Date/Time: 09.12.2019 Created by: Emily Petrunia
 Lab# From: **Phoenix** Delivery Priority:
 Lab# To: **Houston** Air Bill No.: 776230859635

Please send report to: Ruriko Konuma
 Address: 2525 West Huntington Drive, Suite 102
 E-Mail: ruriko.konuma@xenco.com

Sample Id	Matrix	Client Sample Id	Sample Collection	Method	Method Name	Lab Due	HT Due	PM	Analytes	Sign
636576-001	W	SUPYARD 091119	09.11.2019 10:25	SIM_PAH_D	PAHs by 8270D SIM	09.19.2019	09.18.2019 10:25	RKO	ACNP ACNPY ANTH Bz	
636576-001	W	SUPYARD 091119	09.11.2019 10:25	E200.7	Recoverable Metals, Total, by EPA 200.7	09.19.2019	03.09.2020	RKO	PB SE	
636576-001	W	SUPYARD 091119	09.11.2019 10:25	E200.7_DIS	Recoverable Metals, Dissolved, by EPA	09.19.2019	03.09.2020	RKO	CA CU HARD HARD_C	

Inter Office Shipment or Sample Comments:

Relinquished By: 

 Emily Petrunia

Date Relinquished: 09.12.2019

Received By: 

 Travis Simmons

Date Received: 09.13.2019

Cooler Temperature: 2.1

Inter-Office Shipment

IOS Number : **48358**

Date/Time: 09.18.2019

Created by: Emily Petrunia

Please send report to: Ruriko Konuma

Lab# From: **Phoenix**

Delivery Priority:

Address: 2525 West Huntington Drive, Suite 102

Lab# To: **Houston**

Air Bill No.: 776279048637

E-Mail: ruriko.konuma@xenco.com

Sample Id	Matrix	Client Sample Id	Sample Collection	Method	Method Name	Lab Due	HT Due	PM	Analytes	Sign
636576-001	W	SUPYARD 091119	09.11.2019 10:25	E300	Anions by EPA 300.0	09.19.2019	10.09.2019	RKO	CL	

Inter Office Shipment or Sample Comments:

Relinquished By:



Emily Petrunia

Date Relinquished: 09.18.2019

Received By:



Monica Shakhshir

Date Received: 09.19.2019

Cooler Temperature: 5.3



XENCO Laboratories

Inter Office Report- Sample Receipt Checklist

Sent To: Houston

IOS #: 47936

Acceptable Temperature Range: 0 - 6 degC

Air and Metal samples Acceptable Range: Ambient

Temperature Measuring device used : HOU-068

Sent By: Emily Petrunia

Date Sent: 09.12.2019 06.20 PM

Received By: Travis Simmons

Date Received: 09.13.2019 09.30 AM

Sample Receipt Checklist

Comments

#1 *Temperature of cooler(s)?	2.1
#2 *Shipping container in good condition?	Yes
#3 *Samples received with appropriate temperature?	Yes
#4 *Custody Seals intact on shipping container/ cooler?	N/A
#5 *Custody Seals Signed and dated for Containers/coolers	N/A
#6 *IOS present?	Yes
#7 Any missing/extra samples?	No
#8 IOS agrees with sample label(s)/matrix?	Yes
#9 Sample matrix/ properties agree with IOS?	Yes
#10 Samples in proper container/ bottle?	Yes
#11 Samples properly preserved?	Yes
#12 Sample container(s) intact?	Yes
#13 Sufficient sample amount for indicated test(s)?	Yes
#14 All samples received within hold time?	Yes

*** Must be completed for after-hours delivery of samples prior to placing in the refrigerator**

NonConformance:

Corrective Action Taken:

Nonconformance Documentation

Contact: _____ Contacted by : _____ Date: _____

Checklist reviewed by:

Travis Simmons

Date: 09.13.2019



XENCO Laboratories

Inter Office Report- Sample Receipt Checklist

Sent To: Houston

IOS #: 48358

Acceptable Temperature Range: 0 - 6 degC

Air and Metal samples Acceptable Range: Ambient

Temperature Measuring device used : HOU-068

Sent By: Emily Petrunia

Date Sent: 09.18.2019 06.02 PM

Received By: Monica Shakhshir

Date Received: 09.19.2019 09.45 AM

Sample Receipt Checklist

Comments

#1 *Temperature of cooler(s)?	5.3
#2 *Shipping container in good condition?	Yes
#3 *Samples received with appropriate temperature?	Yes
#4 *Custody Seals intact on shipping container/ cooler?	Yes
#5 *Custody Seals Signed and dated for Containers/coolers	Yes
#6 *IOS present?	Yes
#7 Any missing/extra samples?	No
#8 IOS agrees with sample label(s)/matrix?	Yes
#9 Sample matrix/ properties agree with IOS?	Yes
#10 Samples in proper container/ bottle?	Yes
#11 Samples properly preserved?	Yes
#12 Sample container(s) intact?	Yes
#13 Sufficient sample amount for indicated test(s)?	Yes
#14 All samples received within hold time?	Yes

* Must be completed for after-hours delivery of samples prior to placing in the refrigerator

NonConformance:

Corrective Action Taken:

Nonconformance Documentation

Contact: _____ Contacted by : _____ Date: _____

Checklist reviewed by:

Monica Shakhshir

Date: 09.19.2019



XENCO Laboratories

Prelogin/Nonconformance Report- Sample Log-In

Client: NV5

Date/ Time Received: 09/11/2019 11:50:00 AM

Work Order #: 636576

Acceptable Temperature Range: 0 - 6 degC

Air and Metal samples Acceptable Range: Ambient

Temperature Measuring device used : IR#1

Sample Receipt Checklist	Comments
#1 *Temperature of cooler(s)?	4.5
#2 *Shipping container in good condition?	Yes
#3 *Samples received on ice?	Yes
#4 *Custody Seals intact on shipping container/ cooler?	N/A
#5 Custody Seals intact on sample bottles?	N/A
#6*Custody Seals Signed and dated?	N/A
#7 *Chain of Custody present?	Yes
#8 Any missing/extra samples?	No
#9 Chain of Custody signed when relinquished/ received?	Yes
#10 Chain of Custody agrees with sample labels/matrix?	Yes
#11 Container label(s) legible and intact?	Yes
#12 Samples in proper container/ bottle?	Yes
#13 Samples properly preserved?	Yes
#14 Sample container(s) intact?	Yes
#15 Sufficient sample amount for indicated test(s)?	Yes
#16 All samples received within hold time?	Yes
#17 Subcontract of sample(s)?	Yes Xenco Stafford
#18 Water VOC samples have zero headspace?	N/A

*** Must be completed for after-hours delivery of samples prior to placing in the refrigerator**

Analyst: EP

PH Device/Lot#: LRS-4801

Checklist completed by:

Emily Petrunia

Date: 09/11/2019

Checklist reviewed by:

Ruriko Konuma

Date: 09/12/2019



Analytical Report 644075

for

NV5

Project Manager: Mike Hulst

ADOT Stormwater

12.05.2019

Collected By: Client

**2525 West Huntington Drive, Suite 102
Tempe, AZ 85282
Ph: (480) 355-0900**

Phoenix (EPA Lab Code: AZ00901): Arizona (AZ0757)
Xenco-Houston (EPA Lab code: TX00122): Arizona (AZ0765)
Xenco-Dallas (EPA Lab code: TX01468): Arizona (AZ0809)



12.05.2019

Project Manager: **Mike Hulst**

NV5

1 West Deer Valley Building 2 #305

Phoenix, AZ 85027

Reference: TWA Report No(s): **644075**

ADOT Stormwater

Project Address: Superior Maintenance Yard

Mike Hulst:

We are reporting to you the results of the analyses performed on the samples received under the project name referenced above and identified with the TWA Report Number(s) 644075. All results being reported under this Report Number apply to the samples analyzed and properly identified with a Laboratory ID number. Subcontracted analyses are identified in this report with either the ADHS certification number of the subcontract lab in the analyst ID field, or the complete subcontracted report attached to this report.

Unless otherwise noted in a Case Narrative, all data reported in this Analytical Report are in compliance with ADHS standards. The uncertainty of measurement associated with the results of analysis reported is available upon request. Should insufficient sample be provided to the laboratory to meet the method and ADHS Matrix Duplicate and Matrix Spike requirements, then the data will be analyzed, evaluated and reported using all other available quality control measures.

The validity and integrity of this report will remain intact as long as it is accompanied by this letter and reproduced in full, unless written approval is granted by TransWest Analytical. This report will be filed for at least 5 years in our archives after which time it will be destroyed without further notice, unless otherwise arranged with you. The samples received, and described as recorded in Report No. 644075 will be filed for 45 days, and after that time they will be properly disposed without further notice, unless otherwise arranged with you. We reserve the right to return to you any unused samples, extracts or solutions related to them if we consider so necessary (e.g., samples identified as hazardous waste, sample sizes exceeding analytical standard practices, controlled substances under regulated protocols, etc).

We thank you for selecting TransWest Analytical to serve your analytical needs. If you have any questions concerning this report, please feel free to contact us at any time.

Respectfully,

A handwritten signature in black ink, appearing to read 'Ruriko Konuma', is written over a horizontal line.

Ruriko Konuma

Project Manager

A Small Business and Minority Company

Houston - Dallas - Midland - Tampa - Phoenix - Lubbock - San Antonio - El Paso - Atlanta - New Mexico



CASE NARRATIVE

Client Name: NV5

Project Name: ADOT Stormwater

Project ID:

Work Order Number(s): 644075

Report Date: 12.05.2019

Date Received: 11.21.2019

Sample receipt non conformances and comments:

Client added Chloride analysis via email on 11/22/19 @ 16:30 (Rebecca Davey) RKO

Sample receipt non conformances and comments per sample:

None

Flagging Criteria

Arizona Flags

All method blanks, laboratory spikes, and/or matrix spikes met quality control objectives for the parameters associated with this Work Order except as detailed below or on the Data Qualifier page of this report. Data Qualifiers used in this report are in accordance with ADHS Data Qualifiers, Revision 4.0 9/05/2012.

Data qualifiers (flags) contained within this analytical report have been issued to explain a quality control deficiency, and do not affect the quality (validity) of the data unless noted otherwise in the case narrative.

D2 Sample required dilution due to high concentration of target analyte.



Sample Cross Reference 644075

NV5, Phoenix, AZ

ADOT Stormwater

Sample Id	Matrix	Date Collected	Sample Depth	Lab Sample Id
SUPYARD	W	11.21.2019 11:02		644075-001



Certificate of Analytical Results 644075

NV5, Phoenix, AZ

ADOT Stormwater

Sample Id: **SUPYARD**

Matrix: Storm Water

Date Received: 11.21.2019 14:00

Lab Sample Id: 644075-001

Date Collected: 11.21.2019 11:02

Analytical Method: PAHs by SW846 8270D SIM

Prep Method: SW3511

Tech: AHI

% Solids:

Analyst: VIC

Date Prep: 11.26.2019 17:27

Seq Number: 3108913

SUB: AZ0765

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
1-Methylnaphthalene	90-12-0	<0.000193	0.000193	mg/L	11.27.2019 22:36		1.06
2-Methylnaphthalene	91-57-6	<0.000193	0.000193	mg/L	11.27.2019 22:36		1.06
Acenaphthene	83-32-9	<0.000193	0.000193	mg/L	11.27.2019 22:36		1.06
Acenaphthylene	208-96-8	<0.000193	0.000193	mg/L	11.27.2019 22:36		1.06
Anthracene	120-12-7	<0.000193	0.000193	mg/L	11.27.2019 22:36		1.06
Benzo(a)anthracene	56-55-3	<0.000193	0.000193	mg/L	11.27.2019 22:36		1.06
Benzo(a)pyrene	50-32-8	<0.000193	0.000193	mg/L	11.27.2019 22:36		1.06
Benzo(b)fluoranthene	205-99-2	<0.000193	0.000193	mg/L	11.27.2019 22:36		1.06
Benzo(g,h,i)perylene	191-24-2	<0.000193	0.000193	mg/L	11.27.2019 22:36		1.06
Benzo(k)fluoranthene	207-08-9	<0.000193	0.000193	mg/L	11.27.2019 22:36		1.06
Chrysene	218-01-9	<0.000193	0.000193	mg/L	11.27.2019 22:36		1.06
Dibenz(a,h)anthracene	53-70-3	<0.000193	0.000193	mg/L	11.27.2019 22:36		1.06
Fluoranthene	206-44-0	<0.000193	0.000193	mg/L	11.27.2019 22:36		1.06
Fluorene	86-73-7	<0.000193	0.000193	mg/L	11.27.2019 22:36		1.06
Indeno(1,2,3-c,d)Pyrene	193-39-5	<0.000193	0.000193	mg/L	11.27.2019 22:36		1.06
Naphthalene	91-20-3	<0.000386	0.000386	mg/L	11.27.2019 22:36		1.06
Phenanthrene	85-01-8	<0.000193	0.000193	mg/L	11.27.2019 22:36		1.06
Pyrene	129-00-0	<0.000193	0.000193	mg/L	11.27.2019 22:36		1.06

Surrogate	% Recovery	Units	Limits	Analysis Date	Flag
2-Fluorobiphenyl	92	%	54-146	11.27.2019 22:36	
Nitrobenzene-d5	97	%	46-151	11.27.2019 22:36	
Terphenyl-D14	63	%	51-139	11.27.2019 22:36	



Certificate of Analytical Results 644075

NV5, Phoenix, AZ

ADOT Stormwater

Sample Id: **SUPYARD**

Matrix: Storm Water

Date Received: 11.21.2019 14:00

Lab Sample Id: 644075-001

Date Collected: 11.21.2019 11:02

Analytical Method: Recoverable Metals, Total, by EPA 200.7

Prep Method: E200.7P

Tech: MLI

% Solids:

Analyst: DEP

Date Prep: 12.03.2019 03:06

Seq Number: 3109318

SUB: AZ0765

Dilution Analysis:

Seq#: 3109318 Date Analyzed: 12/03/19 20:18 Date Prep: 12/03/19 03:06

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Calcium	7440-70-2	79.9	10.0	mg/L	12.03.2019 20:18	D2	50
Hardness, Total as CaCO3	471-34-1	248	26.6	mg/L	12.03.2019 19:24		1
Lead	7439-92-1	0.0989	0.0100	mg/L	12.03.2019 19:24		1
Magnesium	7439-95-4	11.9	0.400	mg/L	12.03.2019 19:24		1
Potassium	7440-09-7	5.75	0.500	mg/L	12.03.2019 19:24		1
Selenium	7782-49-2	<0.0300	0.0300	mg/L	12.03.2019 19:24		1
Sodium	7440-23-5	17.0	0.500	mg/L	12.03.2019 19:24		1

Analytical Method: Recoverable Metals, Dissolved, by EPA 200.7

Prep Method: E200.7P

Tech: ADS

% Solids:

Analyst: DEP

Date Prep: 12.04.2019 10:30

Seq Number: 3109455

SUB: AZ0765

Dilution Analysis:

Seq#: 3109318 Date Analyzed: 12/03/19 20:18 Date Prep: 12/03/19 03:06

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Copper	7440-50-8	0.0618	0.0200	mg/L	12.04.2019 20:06		1

Analytical Method: Total Dissolved Solids by SM 2540C

Tech: MON

% Solids:

Analyst: TNL

Seq Number: 3108676

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Total Dissolved Solids	1642222	319	10.0	mg/L	11.21.2019 16:00		1



Certificate of Analytical Results 644075

NV5, Phoenix, AZ

ADOT Stormwater

Sample Id: **SUPYARD**

Matrix: Storm Water

Date Received: 11.21.2019 14:00

Lab Sample Id: 644075-001

Date Collected: 11.21.2019 11:02

Analytical Method: Total Suspended Solids by SM 2540D

Tech: TNL

% Solids:

Analyst: MON

Seq Number: 3108729

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Total Suspended Solids	TSS	72.4	10.0	mg/L	11.25.2019 07:40		1

Analytical Method: Anions by EPA 300.0

Prep Method: E300P

Tech: JYM

% Solids:

Analyst: JYM

Date Prep: 11.26.2019 15:40

Seq Number: 3108740

SUB: AZ0765

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	26.3	0.500	mg/L	11.26.2019 16:05		1



NV5

ADOT Stormwater

Analytical Method: PAHs by SW846 8270D SIM

Seq Number: 3108913

MB Sample Id: 7691281-1-BLK

Matrix: Water

LCS Sample Id: 7691281-1-BKS

Prep Method: SW3511

Date Prep: 11.26.2019

LCSD Sample Id: 7691281-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
1-Methylnaphthalene	<0.000182	0.0182	0.0168	92	0.0170	93	70-126	1	30	mg/L	11.27.2019 10:34	
2-Methylnaphthalene	<0.000182	0.0182	0.0167	92	0.0169	93	74-121	1	30	mg/L	11.27.2019 10:34	
Acenaphthene	<0.000182	0.0182	0.0171	94	0.0175	96	75-127	2	30	mg/L	11.27.2019 10:34	
Acenaphthylene	<0.000182	0.0182	0.0172	95	0.0175	96	78-133	2	30	mg/L	11.27.2019 10:34	
Anthracene	<0.000182	0.0182	0.0173	95	0.0176	97	73-145	2	30	mg/L	11.27.2019 10:34	
Benzo(a)anthracene	<0.000182	0.0182	0.0159	87	0.0161	88	77-131	1	30	mg/L	11.27.2019 10:34	
Benzo(a)pyrene	<0.000182	0.0182	0.0163	90	0.0163	90	56-163	0	30	mg/L	11.27.2019 10:34	
Benzo(b)fluoranthene	<0.000182	0.0182	0.0170	93	0.0171	94	74-138	1	30	mg/L	11.27.2019 10:34	
Benzo(g,h,i)perylene	<0.000182	0.0182	0.0165	91	0.0163	90	77-127	1	30	mg/L	11.27.2019 10:34	
Benzo(k)fluoranthene	<0.000182	0.0182	0.0170	93	0.0169	93	67-142	1	30	mg/L	11.27.2019 10:34	
Chrysene	<0.000182	0.0182	0.0162	89	0.0163	90	66-126	1	30	mg/L	11.27.2019 10:34	
Dibenz(a,h)anthracene	<0.000182	0.0182	0.0166	91	0.0164	90	71-142	1	30	mg/L	11.27.2019 10:34	
Fluoranthene	<0.000182	0.0182	0.0170	93	0.0174	96	78-138	2	30	mg/L	11.27.2019 10:34	
Fluorene	<0.000182	0.0182	0.0179	98	0.0182	100	79-128	2	30	mg/L	11.27.2019 10:34	
Indeno(1,2,3-c,d)Pyrene	<0.000182	0.0182	0.0164	90	0.0162	89	76-140	1	30	mg/L	11.27.2019 10:34	
Naphthalene	<0.000364	0.0182	0.0165	91	0.0167	92	72-122	1	30	mg/L	11.27.2019 10:34	
Phenanthrene	<0.000182	0.0182	0.0173	95	0.0176	97	76-129	2	30	mg/L	11.27.2019 10:34	
Pyrene	<0.000182	0.0182	0.0166	91	0.0173	95	74-138	4	30	mg/L	11.27.2019 10:34	
Surrogate	MB %Rec	MB Flag	LCS %Rec	LCS Flag	LCSD %Rec	LCSD Flag	Limits			Units	Analysis Date	
2-Fluorobiphenyl	96		100		102		54-146			%	11.27.2019 10:34	
Nitrobenzene-d5	100		104		106		46-151			%	11.27.2019 10:34	
Terphenyl-D14	99		99		100		51-139			%	11.27.2019 10:34	

MS/MSD Percent Recovery
Relative Percent Difference
LCS/LCSD Recovery
Log Difference

$[D] = 100 * (C-A) / B$
 $RPD = 200 * |(C-E) / (C+E)|$
 $[D] = 100 * (C) / [B]$
Log Diff. = Log(Sample Duplicate) - Log(Original Sample)

LCS = Laboratory Control Sample
A = Parent Result
C = MS/LCS Result
E = MSD/LCSD Result

MS = Matrix Spike
B = Spike Added
D = MSD/LCSD % Rec



QC Summary 644075

NV5

ADOT Stormwater

Analytical Method: PAHs by SW846 8270D SIM

Seq Number: 3108913

Parent Sample Id: 643773-001

Matrix: Ground Water

MS Sample Id: 643773-001 S

Prep Method: SW3511

Date Prep: 11.26.2019

MSD Sample Id: 643773-001 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
1-Methylnaphthalene	<0.000200	0.0200	0.0168	84	0.0160	83	70-126	5	30	mg/L	11.27.2019 12:17	
2-Methylnaphthalene	<0.000200	0.0200	0.0165	83	0.0157	81	74-121	5	30	mg/L	11.27.2019 12:17	
Acenaphthene	<0.000200	0.0200	0.0172	86	0.0162	84	75-127	6	30	mg/L	11.27.2019 12:17	
Acenaphthylene	<0.000200	0.0200	0.0174	87	0.0164	85	78-133	6	30	mg/L	11.27.2019 12:17	
Anthracene	<0.000200	0.0200	0.0176	88	0.0166	86	73-145	6	30	mg/L	11.27.2019 12:17	
Benzo(a)anthracene	<0.000200	0.0200	0.0163	82	0.0149	77	77-131	9	30	mg/L	11.27.2019 12:17	
Benzo(a)pyrene	<0.000200	0.0200	0.0165	83	0.0150	78	56-163	10	30	mg/L	11.27.2019 12:17	
Benzo(b)fluoranthene	<0.000200	0.0200	0.0171	86	0.0146	76	74-138	16	30	mg/L	11.27.2019 12:17	
Benzo(g,h,i)perylene	<0.000200	0.0200	0.0165	83	0.0150	78	77-127	10	30	mg/L	11.27.2019 12:17	
Benzo(k)fluoranthene	<0.000200	0.0200	0.0170	85	0.0168	87	67-142	1	30	mg/L	11.27.2019 12:17	
Chrysene	<0.000200	0.0200	0.0166	83	0.0151	78	66-126	9	30	mg/L	11.27.2019 12:17	
Dibenz(a,h)anthracene	<0.000200	0.0200	0.0171	86	0.0153	79	71-142	11	30	mg/L	11.27.2019 12:17	
Fluoranthene	<0.000200	0.0200	0.0175	88	0.0163	84	78-138	7	30	mg/L	11.27.2019 12:17	
Fluorene	<0.000200	0.0200	0.0178	89	0.0168	87	79-128	6	30	mg/L	11.27.2019 12:17	
Indeno(1,2,3-c,d)Pyrene	<0.000200	0.0200	0.0167	84	0.0151	78	76-140	10	30	mg/L	11.27.2019 12:17	
Naphthalene	<0.000400	0.0200	0.0164	82	0.0157	81	72-122	4	30	mg/L	11.27.2019 12:17	
Phenanthrene	<0.000200	0.0200	0.0176	88	0.0167	87	76-129	5	30	mg/L	11.27.2019 12:17	
Pyrene	<0.000200	0.0200	0.0170	85	0.0161	83	74-138	5	30	mg/L	11.27.2019 12:17	

Surrogate	MS %Rec	MS Flag	MSD %Rec	MSD Flag	Limits	Units	Analysis Date
2-Fluorobiphenyl	94		93		54-146	%	11.27.2019 12:17
Nitrobenzene-d5	98		98		46-151	%	11.27.2019 12:17
Terphenyl-D14	92		90		51-139	%	11.27.2019 12:17

Analytical Method: Recoverable Metals, Total, by EPA 200.7

Seq Number: 3109318

MB Sample Id: 7691495-1-BLK

Matrix: Water

LCS Sample Id: 7691495-1-BKS

Prep Method: E200.7P

Date Prep: 12.03.2019

LCSD Sample Id: 7691495-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Calcium	<0.200	25.0	24.2	97	24.3	97	85-115	0	20	mg/L	12.03.2019 17:52	
Lead	<0.0100	1.00	1.00	100	1.00	100	85-115	0	20	mg/L	12.03.2019 17:52	
Magnesium	<0.400	25.0	24.1	96	24.1	96	85-115	0	20	mg/L	12.03.2019 17:52	
Potassium	<0.500	10.0	9.94	99	9.94	99	85-115	0	20	mg/L	12.03.2019 17:52	
Selenium	<0.0300	1.00	0.980	98	0.946	95	85-115	4	20	mg/L	12.03.2019 17:52	
Sodium	<0.500	25.0	24.2	97	24.2	97	85-115	0	20	mg/L	12.03.2019 17:52	

Analytical Method: Recoverable Metals, Total, by EPA 200.7

Seq Number: 3109318

Matrix: Water
MB Sample Id: 7691495-1-BLK

Prep Method: E200.7P

Date Prep: 12.03.2019

Parameter	MB Result	Units	Analysis Date	Flag
Hardness, Total as CaCO3	0	mg/L	12.03.2019 17:48	

MS/MSD Percent Recovery
Relative Percent Difference
LCS/LCSD Recovery
Log Difference

$[D] = 100 * (C - A) / B$
 $RPD = 200 * |(C - E) / (C + E)|$
 $[D] = 100 * (C) / [B]$
Log Diff. = Log(Sample Duplicate) - Log(Original Sample)

LCS = Laboratory Control Sample
A = Parent Result
C = MS/LCS Result
E = MSD/LCSD Result

MS = Matrix Spike
B = Spike Added
D = MSD/LCSD % Rec



NV5

ADOT Stormwater

Analytical Method: Recoverable Metals, Total, by EPA 200.7

Seq Number: 3109318

Matrix: Surface Water

Parent Sample Id: 644290-001

MS Sample Id: 644290-001 S

Prep Method: E200.7P

Date Prep: 12.03.2019

MSD Sample Id: 644290-001 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Calcium	13.4	25.0	40.0	106	39.8	106	70-130	1	20	mg/L	12.03.2019 18:04	
Lead	<0.0100	1.00	1.11	111	1.11	111	70-130	0	20	mg/L	12.03.2019 18:04	
Magnesium	1.92	25.0	28.9	108	28.6	107	70-130	1	20	mg/L	12.03.2019 18:04	
Potassium	5.33	10.0	16.6	113	16.5	112	70-130	1	20	mg/L	12.03.2019 18:04	
Selenium	<0.0300	1.00	1.12	112	1.12	112	70-130	0	20	mg/L	12.03.2019 18:04	
Sodium	16.7	25.0	43.3	106	43.0	105	70-130	1	20	mg/L	12.03.2019 18:04	

Analytical Method: Recoverable Metals, Total, by EPA 200.7

Seq Number: 3109318

Matrix: Water

Parent Sample Id: 644110-001

MS Sample Id: 644110-001 S

Prep Method: E200.7P

Date Prep: 12.03.2019

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	Limits	Units	Analysis Date	Flag
Calcium	<0.200	25.0	25.7	103	70-130	mg/L	12.03.2019 19:20	
Lead	<0.0100	1.00	1.07	107	70-130	mg/L	12.03.2019 19:20	
Magnesium	<0.400	25.0	25.6	102	70-130	mg/L	12.03.2019 19:20	
Potassium	<0.500	10.0	10.6	106	70-130	mg/L	12.03.2019 19:20	
Selenium	<0.0300	1.00	1.08	108	70-130	mg/L	12.03.2019 19:20	
Sodium	<0.500	25.0	25.6	102	70-130	mg/L	12.03.2019 19:20	

Analytical Method: Recoverable Metals, Dissolved, by EPA 200.7

Seq Number: 3109455

Matrix: Water

MB Sample Id: 7691637-1-BLK

LCS Sample Id: 7691637-1-BKS

Prep Method: E200.7P

Date Prep: 12.04.2019

LCSD Sample Id: 7691637-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Copper	<0.0200	1.00	0.986	99	0.975	98	85-115	1	20	mg/L	12.04.2019 18:01	

Analytical Method: Recoverable Metals, Dissolved, by EPA 200.7

Seq Number: 3109455

Matrix: Water

Parent Sample Id: 644470-001

MS Sample Id: 644470-001 S

Prep Method: E200.7P

Date Prep: 12.04.2019

MSD Sample Id: 644470-001 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Copper	<0.0200	1.00	1.01	101	1.00	100	70-130	1	20	mg/L	12.04.2019 18:13	

Analytical Method: Recoverable Metals, Dissolved, by EPA 200.7

Seq Number: 3109455

Matrix: Storm Water

Parent Sample Id: 644297-001

MS Sample Id: 644297-001 S

Prep Method: E200.7P

Date Prep: 12.04.2019

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	Limits	Units	Analysis Date	Flag
Copper	0.0339	1.00	1.03	100	70-130	mg/L	12.04.2019 19:29	

MS/MSD Percent Recovery
Relative Percent Difference
LCS/LCSD Recovery
Log Difference

$[D] = 100 * (C - A) / B$
 $RPD = 200 * |(C - E) / (C + E)|$
 $[D] = 100 * (C) / [B]$
Log Diff. = Log(Sample Duplicate) - Log(Original Sample)

LCS = Laboratory Control Sample
A = Parent Result
C = MS/LCS Result
E = MSD/LCSD Result

MS = Matrix Spike
B = Spike Added
D = MSD/LCSD % Rec



NV5

ADOT Stormwater

Analytical Method: Total Dissolved Solids by SM 2540C

Seq Number: 3108676

Matrix: Water

MB Sample Id: 3108676-1-BLK

LCS Sample Id: 3108676-1-BKS

LCSD Sample Id: 3108676-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Total Dissolved Solids	<10.0	1000	993	99	1040	104	80-120	5	10	mg/L	11.21.2019 16:00	

Analytical Method: Total Dissolved Solids by SM 2540C

Seq Number: 3108676

Matrix: Storm Water

Parent Sample Id: 643926-001

MD Sample Id: 643926-001 D

Parameter	Parent Result	MD Result	%RPD	RPD Limit	Units	Analysis Date	Flag
Total Dissolved Solids	65.0	61.0	6	10	mg/L	11.21.2019 16:00	

Analytical Method: Total Suspended Solids by SM 2540D

Seq Number: 3108729

Matrix: Water

MB Sample Id: 3108729-1-BLK

LCS Sample Id: 3108729-1-BKS

LCSD Sample Id: 3108729-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Total Suspended Solids	<10.0	1000	992	99	1010	101	80-120	2	10	mg/L	11.25.2019 07:40	

Analytical Method: Total Suspended Solids by SM 2540D

Seq Number: 3108729

Matrix: Waste Water

Parent Sample Id: 644023-003

MD Sample Id: 644023-003 D

Parameter	Parent Result	MD Result	%RPD	RPD Limit	Units	Analysis Date	Flag
Total Suspended Solids	1700	1660	2	10	mg/L	11.25.2019 07:40	

Analytical Method: Total Suspended Solids by SM 2540D

Seq Number: 3108729

Matrix: Storm Water

Parent Sample Id: 644227-003

MD Sample Id: 644227-003 D

Parameter	Parent Result	MD Result	%RPD	RPD Limit	Units	Analysis Date	Flag
Total Suspended Solids	52.2	56.7	8	10	mg/L	11.25.2019 07:40	

Analytical Method: Anions by EPA 300.0

Seq Number: 3108740

Matrix: Water

MB Sample Id: 7691191-1-BLK

LCS Sample Id: 7691191-1-BKS

Prep Method: E300P

Date Prep: 11.26.2019

LCSD Sample Id: 7691191-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	<0.500	10.0	10.1	101	10.2	102	90-110	1	20	mg/L	11.26.2019 09:24	

MS/MSD Percent Recovery
Relative Percent Difference
LCS/LCSD Recovery
Log Difference

$[D] = 100 * (C - A) / B$
 $RPD = 200 * |(C - E) / (C + E)|$
 $[D] = 100 * (C) / [B]$
Log Diff. = Log(Sample Duplicate) - Log(Original Sample)

LCS = Laboratory Control Sample
A = Parent Result
C = MS/LCS Result
E = MSD/LCSD Result

MS = Matrix Spike
B = Spike Added
D = MSD/LCSD % Rec



QC Summary 644075

NV5

ADOT Stormwater

Analytical Method: Anions by EPA 300.0

Seq Number: 3108740

Parent Sample Id: 644344-001

Matrix: Water

MS Sample Id: 644344-001 S

Prep Method: E300P

Date Prep: 11.26.2019

MSD Sample Id: 644344-001 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	69.8	200	266	98	267	99	90-110	0	20	mg/L	11.26.2019 10:17	

Analytical Method: Anions by EPA 300.0

Seq Number: 3108740

Parent Sample Id: 644395-002

Matrix: Waste Water

MS Sample Id: 644395-002 S

Prep Method: E300P

Date Prep: 11.26.2019

MSD Sample Id: 644395-002 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	46.5	10.0	55.9	94	55.8	93	90-110	0	20	mg/L	11.26.2019 11:09	

MS/MSD Percent Recovery
Relative Percent Difference
LCS/LCSD Recovery
Log Difference

$[D] = 100 * (C - A) / B$
 $RPD = 200 * |(C - E) / (C + E)|$
 $[D] = 100 * (C) / [B]$
Log Diff. = Log(Sample Duplicate) - Log(Original Sample)

LCS = Laboratory Control Sample
A = Parent Result
C = MS/LCS Result
E = MSD/LCSD Result

MS = Matrix Spike
B = Spike Added
D = MSD/LCSD % Rec

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

644075

Client Contact

NV5, Inc
1 W. Deer Valley Road, Bldg. 2, Suite 305
Phoenix, AZ 85027
623.374.6637 Phone
623.738.3690 FAX
Project Name: ADOT Stormwater
Site: Superior Maintenance Yard
P O # 444219-0250000.16

Project Manager: Mike Hulst

Tel/Fax:

Analysis Turnaround Time

☐ CALENDAR DAYS ☒ WORKING DAYS

TAT if different from Below _____

- ☒ 2 weeks
☐ 1 week
☐ 2 days
☐ 1 day

Site Contact:

Date:

COC No:

Lab Contact:

Carrier:

_____ of _____ COCs

Sampler:

For Lab Use Only:

Walk-in Client: _____

Lab Sampling: _____

Job / SDG No.: _____

Sample Identification

Sample Date

Sample Time

Sample Type
(C=Comp, G=Grab)

Matrix

of Cont.

Filtered Sample (Y / N)

Perform MS / MSD (Y / N)

TDS

TSS

PAHs

Pb, Se by ICP-MS

Cu, Dissolved by ICP-MS

Hardness

SUPYARD

11-21

1102

C

W

4

x

x

x

x

x

x

x

Sample Specific Notes:

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

Possible Hazard Identification:

Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

☐ Return to Client ☐ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments:

Custody Seals Intact: ☐ Yes ☐ No

Custody Seal No.:

Cooler Temp. (°C): Obs'd: 0.2 **Corr'd:** _____ **Therm ID No.:** _____

Relinquished by: _____

Company: NV5

Date/Time: 11-21-19 14:00

Received by: _____

Company: xenco

Date/Time: 11/21/19 14:00

Relinquished by: _____

Company:

Date/Time:

Received by:

Company:

Date/Time:

Relinquished by: _____

Company:

Date/Time:

Received in Laboratory by:

Company:

Date/Time:

Inter-Office Shipment

IOS Number : 52915

Date/Time: 11.21.2019 Created by: Emily Petrunia
 Lab# From: **Phoenix** Delivery Priority:
 Lab# To: **Houston** Air Bill No.: 7777053585110

Please send report to: Ruriko Konuma
 Address: 2525 West Huntington Drive, Suite 102
 E-Mail: ruriko.konuma@xenco.com

Sample Id	Matrix	Client Sample Id	Sample Collection	Method	Method Name	Lab Due	HT Due	PM	Analytes	Sign
644075-001	W	SUPYARD	11.21.2019 11:02	E300	Anions by EPA 300.0	12.03.2019	12.19.2019	RKO	CL	
644075-001	W	SUPYARD	11.21.2019 11:02	E200.7	Recoverable Metals, Total, by EPA 200.7	12.03.2019	05.19.2020	RKO	CA HARD K MG NA PB	
644075-001	W	SUPYARD	11.21.2019 11:02	E200.7_DIS	Recoverable Metals, Dissolved, by EPA	12.03.2019	05.19.2020	RKO	CU	
644075-001	W	SUPYARD	11.21.2019 11:02	SW8270D_SIM_PAH	PAHs by SW846 8270D SIM	12.03.2019	11.28.2019 11:02	RKO	ACNP ACNPY ANTH Bz	

Inter Office Shipment or Sample Comments:

Relinquished By: 

 Emily Petrunia
 Date Relinquished: 11.25.2019

Received By: 

 Ashly Kowalski
 Date Received: 11.22.2019

 Cooler Temperature: 3.0



XENCO Laboratories

Inter Office Report- Sample Receipt Checklist

Sent To: Houston

IOS #: 52915

Acceptable Temperature Range: 0 - 6 degC

Air and Metal samples Acceptable Range: Ambient

Temperature Measuring device used : HOU-068

Sent By: Emily Petrunia

Date Sent: 11.21.2019 05.57 PM

Received By: Ashly Kowalski

Date Received: 11.22.2019 09.30 AM

Sample Receipt Checklist

Comments

#1 *Temperature of cooler(s)?	3
#2 *Shipping container in good condition?	Yes
#3 *Samples received with appropriate temperature?	Yes
#4 *Custody Seals intact on shipping container/ cooler?	N/A
#5 *Custody Seals Signed and dated for Containers/coolers	N/A
#6 *IOS present?	Yes
#7 Any missing/extra samples?	No
#8 IOS agrees with sample label(s)/matrix?	Yes
#9 Sample matrix/ properties agree with IOS?	Yes
#10 Samples in proper container/ bottle?	Yes
#11 Samples properly preserved?	Yes
#12 Sample container(s) intact?	Yes
#13 Sufficient sample amount for indicated test(s)?	Yes
#14 All samples received within hold time?	Yes

* Must be completed for after-hours delivery of samples prior to placing in the refrigerator

NonConformance:

Corrective Action Taken:

Nonconformance Documentation

Contact: _____ Contacted by : _____ Date: _____

Checklist reviewed by:

Ashly Kowalski

Date: 11.22.2019

XENCO Laboratories
Prelogin/Nonconformance Report- Sample Log-In

Client: NV5

Date/ Time Received: 11.21.2019 02.00.00 PM

Work Order #: 644075

Acceptable Temperature Range: 0 - 6 degC

Air and Metal samples Acceptable Range: Ambient

Temperature Measuring device used : IR#1

Sample Receipt Checklist	Comments
#1 *Temperature of cooler(s)?	.2
#2 *Shipping container in good condition?	Yes
#3 *Samples received on ice?	Yes
#4 *Custody Seals intact on shipping container/ cooler?	N/A
#5 Custody Seals intact on sample bottles?	N/A
#6 *Custody Seals Signed and dated?	N/A
#7 *Chain of Custody present?	Yes
#8 Any missing/extra samples?	No
#9 Chain of Custody signed when relinquished/ received?	Yes
#10 Chain of Custody agrees with sample labels/matrix?	Yes
#11 Container label(s) legible and intact?	Yes
#12 Samples in proper container/ bottle?	Yes
#13 Samples properly preserved?	Yes
#14 Sample container(s) intact?	Yes
#15 Sufficient sample amount for indicated test(s)?	Yes
#16 All samples received within hold time?	Yes
#17 Subcontract of sample(s)?	Yes Xenco Stafford
#18 Water VOC samples have zero headspace?	N/A

*** Must be completed for after-hours delivery of samples prior to placing in the refrigerator**

Analyst: EP

PH Device/Lot#: 207519

Checklist completed by: 
Emily Petrunia

Date: 11.21.2019

Checklist reviewed by: 
Ruriko Konuma

Date: 11.22.2019