June 12, 2017

Mr. Michael David, P.G.
Tennessee Department of Environment and Conservation
Division of Solid Waste Management
Jackson Environmental Field Office
1625 Hollywood Drive
Jackson, Tennessee 38305

Dear Mr. David:

Subject: First Quarter Assessment Monitoring Summary Report 2017
Environmental Waste Solutions Landfill, Permit# IDL 03-0212
CEC Project 171-873

Civil & Environmental Consultants, Inc. (CEC) has prepared this summary report for the First Quarter Assessment Monitoring Event of 2017 at the Environmental Waste Solutions, LLC (EWS) Class II Landfill. The assessment monitoring event was performed on March 8, 2017 in general accordance with the site's Groundwater Quality Assessment Plan (GWQAP) approved by TDEC-DSWM on April 4, 2016. EWS entered the Assessment Monitoring Program as a result of chloride concentrations reported above the 250 mg/L EPA secondary drinking water standard at monitoring well MW-3 during the November 2015 Semi-Annual Monitoring Event.

In accordance with the approved GWQAP, the 1st Quarter Assessment Monitoring Event consists of collecting a sample from MW-3 for chloride and additional leachate indicator parameter analysis. However, to maintain background information, a sample was also collected from upgradient monitoring well MW-1 during this event. Field parameters (temperature, pH, conductivity, dissolved oxygen, oxidation-reduction potential (ORP), and turbidity) were recorded at MW-1 and MW-3 during purging and sampling activities. Additionally, groundwater elevation data was collected from MW-1, MW-2, MW-3, MW-4, MW-5, TMW-1, TMW-2, and TMW-3 for potentiometric interpretation. Collected samples from MW-1 and MW-3 were analyzed for chloride, bromide, chemical oxygen demand (COD), alkalinity, nitrate, sulfate, ammonia, and a short list of ions (calcium, iron, magnesium, manganese, sodium, and potassium). ESC Lab Sciences, Inc. (ESC) completed the analysis and initially reported the results on April 4, 2017, and in a revised report that included bromide analysis on May 8, 2017. As indicated in the analytical report, the samples were received by ESC past the hold time expirations for alkalinity and nitrate analysis, therefore the reported concentrations of alkalinity and nitrate may not be representative of actual groundwater conditions.

The alkalinity concentrations reported during this event at MW-1 (57 mg/L) and MW-3 (<20 mg/L) were similar in comparison to previous monitoring events. The nitrate concentration reported during this event at MW-1 (0.195 mg/L) was slightly elevated when compared to the

previous 8 groundwater monitoring events (<0.1 mg/L). However, nitrate concentrations have previously been detected in upgradient MW-1 in February 2011 (5.8 mg/L) and March 2013 (0.18 mg/L). The nitrate concentration reported during this event at MW-3 (8.38 mg/L) was elevated compared to the previous monitoring events in 2016 (1.58 mg/L to 4.87 mg/L). However, the nitrate concentrations reported at MW-3 since July 2010 have ranged from <0.1 mg/L (September 2011) to 7.86 mg/L (December 2015). Given the alkalinity and nitrate samples were analyzed past the hold time during this event, these data will not be included in the dataset for future statistical analysis calculations.

The results of the First Quarter Assessment Monitoring Event of 2017 for MW-3 are summarized as follows:

- A statistically significant increase (SSI) was identified for the reported chloride concentration at MW-3 during this event. Chloride concentrations at MW-3 exhibited an increasing trend per the Mann-Kendall non-parametric trend procedure. The reported concentration of chloride at MW-3 (164 mg/L) did not exceed the 250 mg/L Secondary Drinking Water Standard, and was less than the concentrations reported during the Second Semi-Annual Monitoring Event in November 2015 (458 mg/L), the supplemental re-sampling event (360 mg/L) in December 2015, and the third quarter monitoring event in August 2016 (218 mg/L). However, the current reported concentration is higher than what was observed during the February 2016 (96.1 mg/L), May 2016 (80.7 mg/L), and November 2016 (120 mg/L) sampling events. The chloride concentrations at MW-3 will continue to be closely monitored during future quarterly assessment monitoring events.
- Time series graphs prepared for MW-3 indicate a general increasing trend starting in 2014 for chloride, calcium, magnesium, potassium, sodium, and sulfate.
- None of the parameters analyzed at MW-3 during the event exceeded the established Maximum Contaminant Levels (MCLs) or Non-Enforceable National Secondary Drinking Water Standards (2DWS) with the exception of iron and manganese concentrations reported in upgradient MW-1 and downgradient MW-3. The iron concentrations reported at MW-1 (14.4 mg/L) was above the 2DWS (0.3 mg/L). Manganese concentrations reported at MW-1 (1.09 mg/L) and MW-3 (0.551 mg/L) were above the 2DWS (0.05 mg/L).

The field parameter values collected for MW-1 and MW-3 are presented in Table 1 – Groundwater Field Data, Appendix A. A summary of inorganic results are presented in Table 2 – Summary of Analytical Results, Appendix A. Time series graphs for the detected constituents and various indicator parameters analyzed for MW-1 and MW-3 are provided in Appendix B. Statistical analysis of the chloride detections at MW-3 during this event are also provided in Appendix B. The laboratory analytical data report and associated field information logs are included as Appendix C. Although statistical analysis was performed on chloride detections at MW-3, statistical analysis was not performed on other parameters detected during March 2017 because it is not required for the current monitoring period. Statistical analysis will be performed on detected parameters during the second quarter 2017 monitoring period.

The Second Quarter 2017 Assessment Monitoring Event is tentatively scheduled for June 2017. All site monitoring wells currently in the groundwater monitoring program will be sampled during the event.

Should you have any questions or concerns, please do not hesitate to contact us at (615) 577-9328.

Sincerely,

CIVIL & ENVIRONMENTAL CONSULTANTS, INC.

Philip Campbell
Assistant Project Manager

Kevin Wolfe
Vice President

Attachments: A - Maps & Summary Tables
B - Time Series & Statistical Analysis Plots
C - Laboratory Analytical Report & Field Information Logs

cc: Craig Almanza, TDEC
Lisa Hughey, TDEC
Ashley Holt, TDEC

Civil & Environmental Consultants, Inc.

1st Quarter Groundwater Assessment Monitoring Report 2017
Environmental Waste Solutions Landfill
200 Omar Circle
Camden, Tennessee
Benton County, TN
Permit No. IDL 03-0212

For Submittal to:
Tennessee Department of Environment and Conservation

Prepared by:
Civil & Environmental Consultants, Inc.
325 Seaboard Lane
Suite 170
Franklin, TN 37067

Certification

I certify that I am a qualified groundwater professional who has received a baccalaureate or post-graduate degree in the natural sciences, and am licensed as a Professional Geologist in the State of Tennessee. I have sufficient training and experience in groundwater hydrology that enables me to make sound professional judgments regarding groundwater monitoring, contaminant fate and transport, and corrective-action.

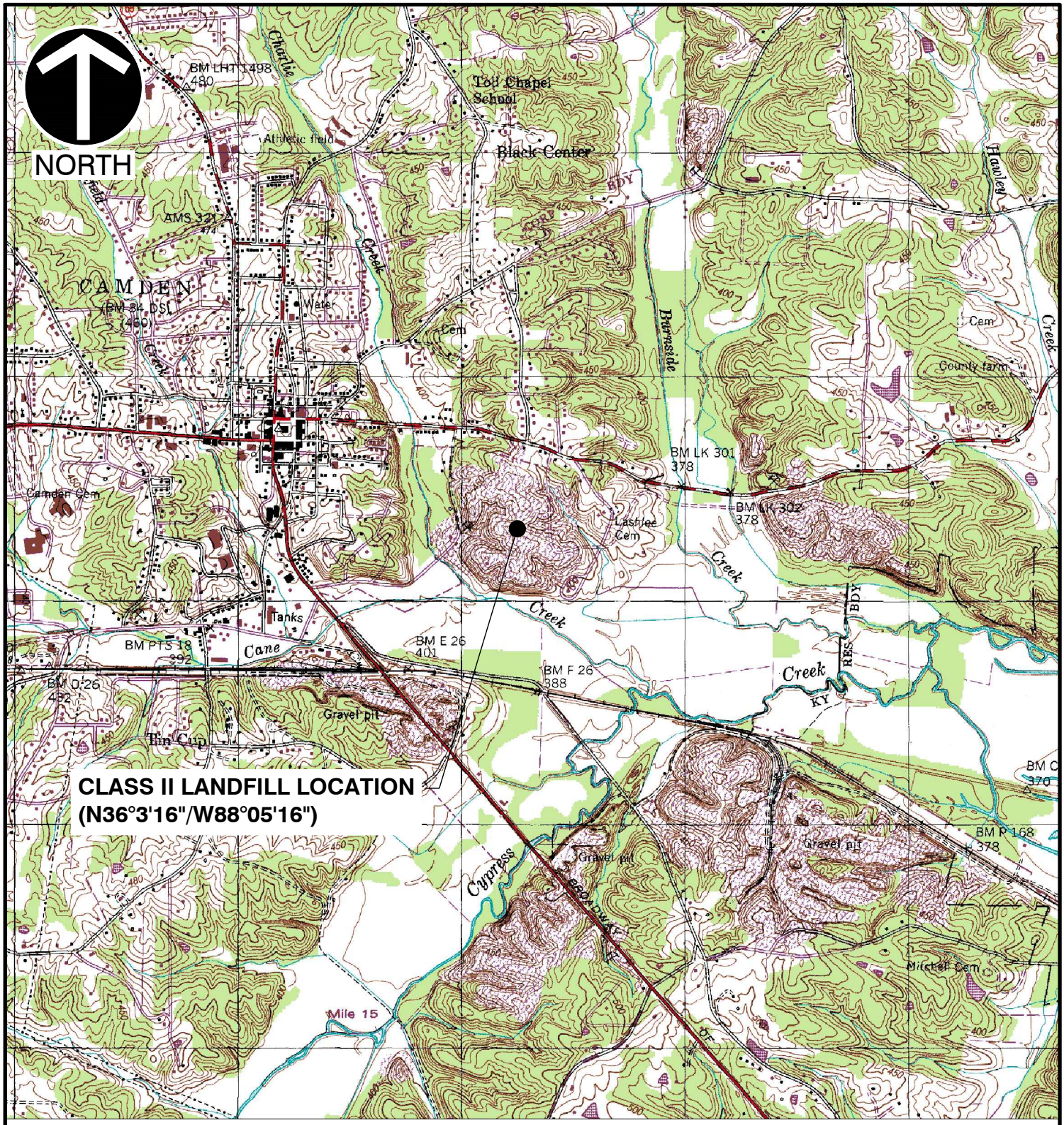
I further certify that this report was prepared by me or by a subordinate working under my direction.

Philip Campbell, P.G.

6-12-17
Date

APPENDIX A

MAPS & SUMMARY TABLES



REFERENCE

1. U.S.G.S. 7.5' TOPOGRAPHIC MAP, CAMDEN QUADRANGLE, TENN. DATED: 1950, PHOTOREVISED: 1984.

SCALE IN FEET

0 2000' 4000'

* HAND SIGNATURE ON FILE

Civil & Environmental Consultants, Inc.

325 Seaboard Lane, Suite 170 - Franklin, TN 37067

615-333-7797 · 800-763-2326

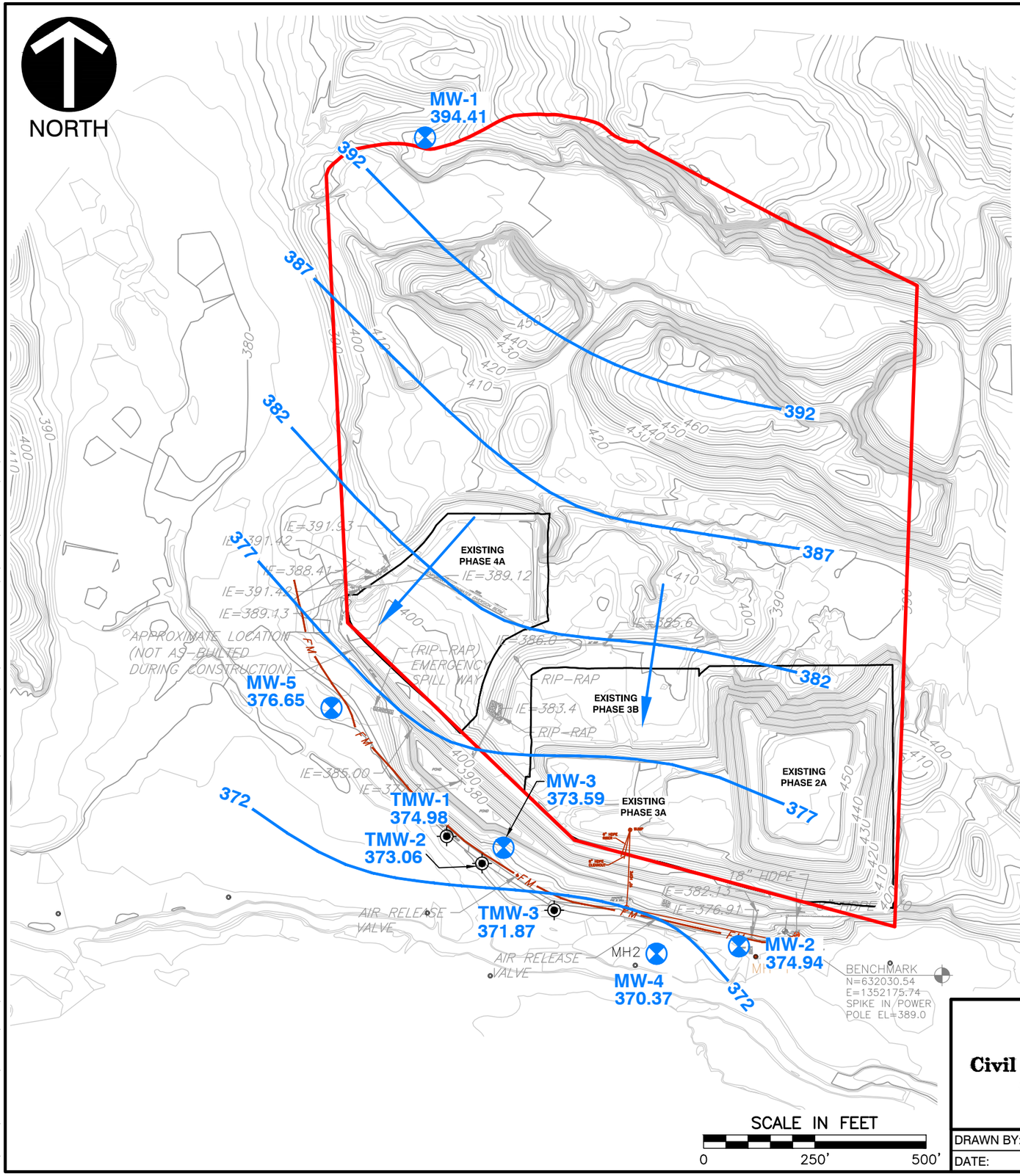
www.cecinc.com

ENVIRONMENTAL WASTE SOLUTIONS
CLASS II CAMDEN LANDFILL
CAMDEN, TENNESSEE

SITE LOCATION MAP

DRAWN BY:	KLU	CHECKED BY:	PC	APPROVED BY:	MJJ	FIGURE NO.:	1
DATE:	MARCH 2017	DWG SCALE:	1"=2000'	PROJECT NO:	142-059		

P:\2014\142-059\-CADD\Dwg\142-059 SITE LOCATION MAP.dwg{LAYOUT1} LS:(12/1/2015 - pcampbell) - LP: 3/28/2017 2:31 PM



LEGEND

MW1 394.41	GROUND WATER MONITORING WELL GROUND WATER ELEVATION (FMSL)
TMW-1 374.98	TEMPORARY GROUND WATER MONITORING WELL GROUND WATER ELEVATION (FMSL)
390	POTENTIOMETRIC SURFACE CONTOUR (FMSL)
	GROUND WATER FLOW DIRECTION
MH1	MANHOLE
	APPROXIMATE FILL LIMITS
FM	LEACHATE FORCE MAIN

NOTE:

Hydraulic gradient calculation between MW-1 and MW-4

$$i = \frac{394.41' - 370.37'}{1{,}906'} = 0.0126 \text{ ft/ft}$$

GROUNDWATER CONDITIONS

THE WATER LEVELS PRESENTED HEREIN ARE APPLICABLE TO THE LOCATION AND TIME OF MEASUREMENT. WATER LEVELS MAY FLUCTUATE THROUGH TIME.

POTENTIOMETRIC CONTOURS GENERATED FROM THESE DATA ARE CONSTRUCTED BY INTERPOLATION BETWEEN POINTS OF KNOWN STATIC WATER LEVEL ELEVATIONS AND USING KNOWLEDGE OF SPECIFIC SITE CONDITIONS. ACTUAL STATIC WATER LEVELS AT LOCATIONS BETWEEN THE MONITORING POINTS MAY DIFFER FROM THOSE DEPICTED.

* HAND SIGNATURE ON FILE

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www.cecinc.com

ENVIRONMENTAL WASTE SOLUTIONS
CAMDEN CLASS II LANDFILL
CAMDEN, TENNESSEE

MARCH 2017
POTENTIOMETRIC SURFACE MAP

DRAWN BY:	PC	CHECKED BY:	MJ	APPROVED BY:	KBW*	FIGURE NO.:	2
DATE:	MAY 2017	DWG SCALE:	1"=250'	PROJECT NO:	142-059		

Table 1

Environmental Waste Solutions Camden Class II Landfill IDL 03-0212

Field Parameters and Potentiometric Data - March 8, 2017

Monitoring Well/ Piezometric Well	Date	Sample Time	Top of Casing Elevation (Feet MSL)	Bottom of Well Elevation (Feet)	Well Diameter (Feet)	Well Volume Gallons	Depth to Water (Feet)	Potentiometric Surface (Feet MSL)	Temperature (˚C)	Conductivity (micromhos/cm)	pH (SU)	Dissolved Oxygen (mg/l)	Oxidation Reduction Potential (Millivolts)	Turbidity (NTU)
MW-1	3/8/2017	10:45	416.47	385.97	0.17	1.4	22.06	394.41	16.1	133.5	5.88	0.22	67.7	4.18
MW-2*	3/8/2017	NS	380.35	367.70	0.17	1.2	5.41	374.94	NS	NS	NS	NS	NS	NS
MW-3	3/8/2017	11:45	392.90	369.66	0.17	0.7	19.31	373.59	15.7	782.0	5.36	1.44	111.9	30.3
MW-4	3/8/2017	NS	381.47	357.25	0.17	2.2	11.10	370.37	NS	NS	NS	NS	NS	NS
MW-5	3/8/2017	NS	385.25	351.40	0.17	4.3	8.60	376.65	NS	NS	NS	NS	NS	NS
TMW-1**	3/8/2017	NS	381.19	348.99	0.085	1.1	6.21	374.98	NS	NS	NS	NS	NS	NS
TMW-2**	3/8/2017	NS	384.27	356.77	0.085	0.7	11.21	373.06	NS	NS	NS	NS	NS	NS
TMW-3**	3/8/2017	NS	381.37	353.37	0.085	0.8	9.50	371.87	NS	NS	NS	NS	NS	NS

Note 1: Top of Casing Elevations from survey by Civil & Environmental Consultants, Inc. on May 12, 2016.
Note 2: 1st Quarter sampling for MW-1 and MW-3 only.
* - MW-2 has been removed from monitoring network. Only water level and field parameters collected at MW-2.
**- TMW locations are temporary monitoring wells installed as part of the groundwater quality assessment plan, only water levels were used for potentiometric interpretation.
NS= Not Sampled
NA= Not Applicable.

Table 2
Environmental Waste Solutions Camden Class II Landfill IDL 03-0212
Inorganic Analytical Data -March 2017

		MW-1		MW-3	
		3/8/2017		3/8/2017	
Parameter	MCL (mg/l)	Value (mg/l)	Qual	Value (mg/l)	Qual
Alkalinity	-	**57**	T8	<20	T8
Ammonia Nitrogen	-	<0.1		<0.1	
COD	-	<10		**24.4**	
Bromide	-	<1.0		<5.0	
Chloride	250 [2]	**1.89**		**164**	
Nitrate	10	0.2	T8	**8.38**	T8
Sulfate	250 [2]	**8.17**		**105.0**	
Calcium	-	**4.69**		**49.3**	
Iron	0.3 [2]	**14.4**		**0.152**	
Magnesium	-	**3.25**		**22.1**	
Manganese	0.05 [2]	**1.09**		**0.551**	
Potassium	-	**1.31**		**30.3**	
Sodium	-	**12.2**		**58.6**	

Notes:

MCL: Maximum Contaminant Level Enforceable National Primary Drinking Water Standards

2: Non-Enforceable National Secondary Drinking Water Standard

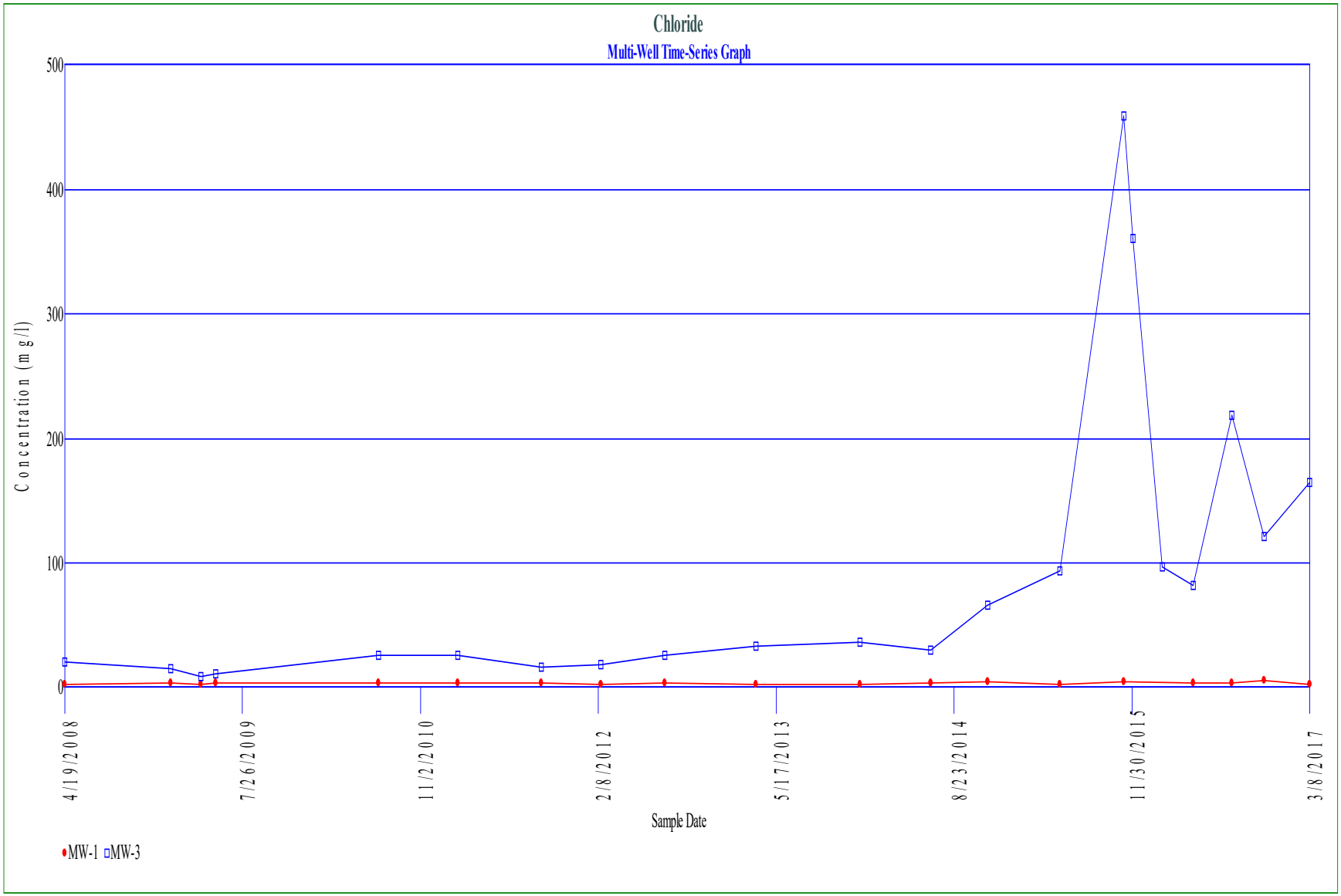
Bold text indicates laboratory analytical detections above the practical quantitation level

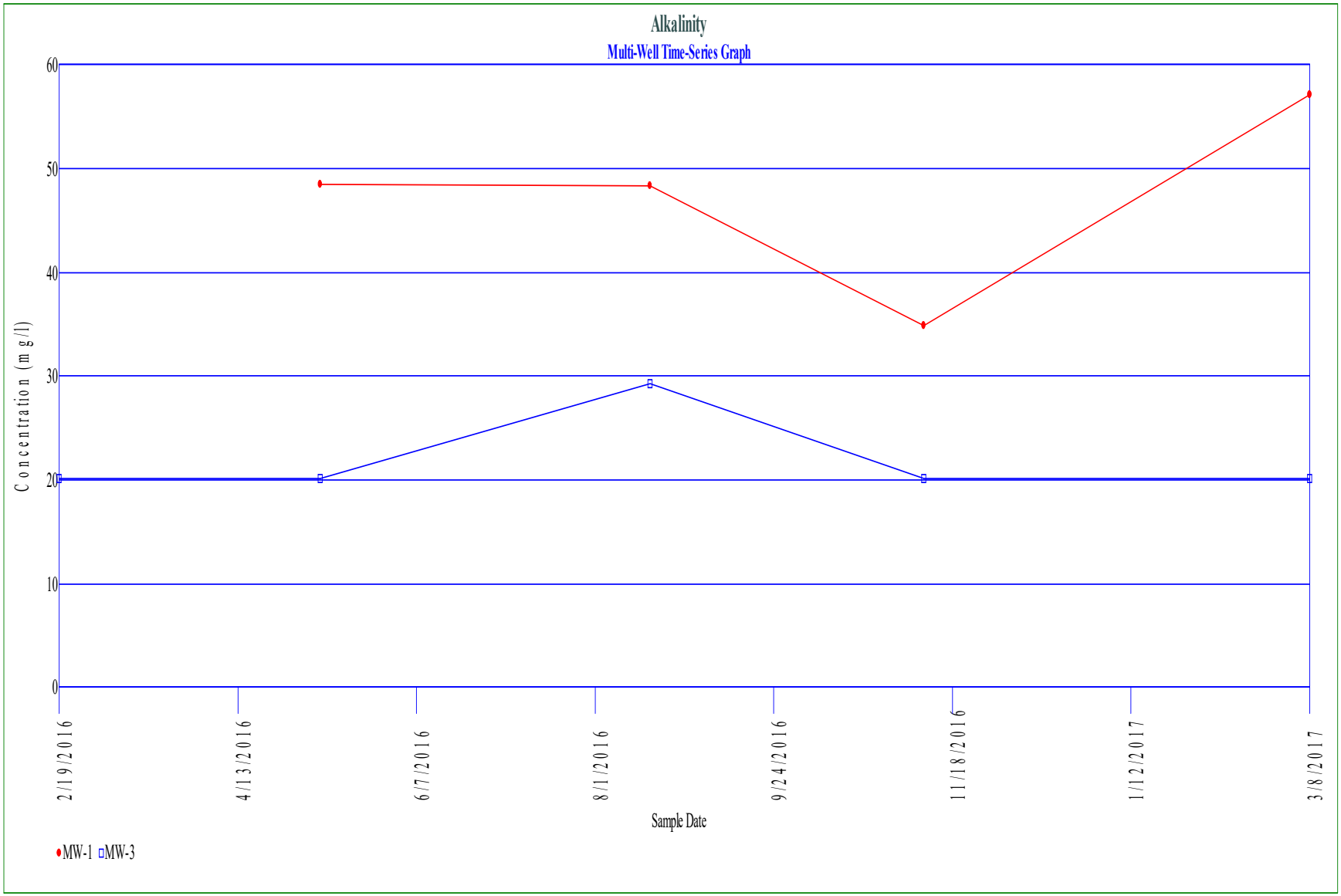
Greyed text indicates detection above respective MCL

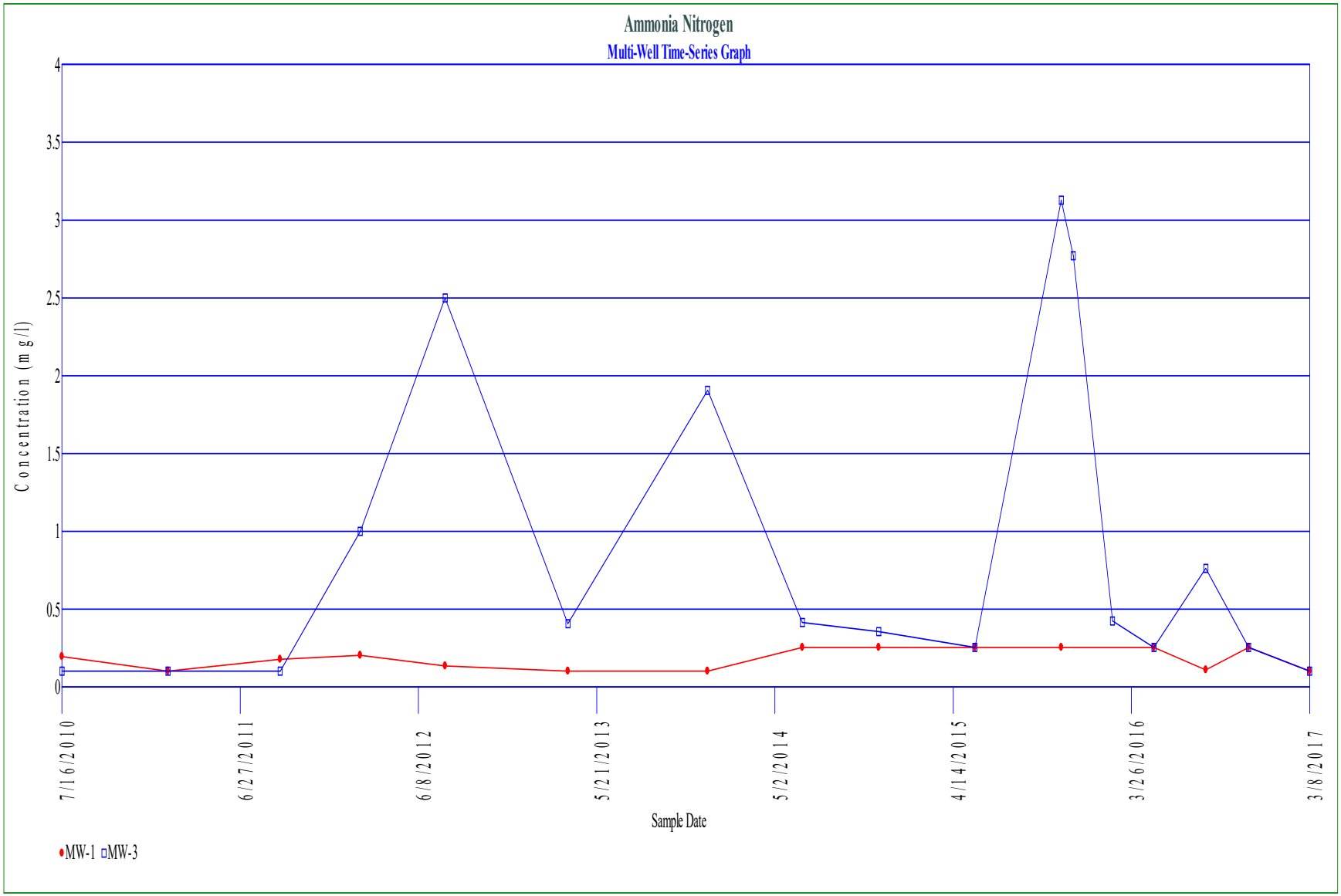
T8: (ESC)- Sample(s) received past/too close to holding time expiration.

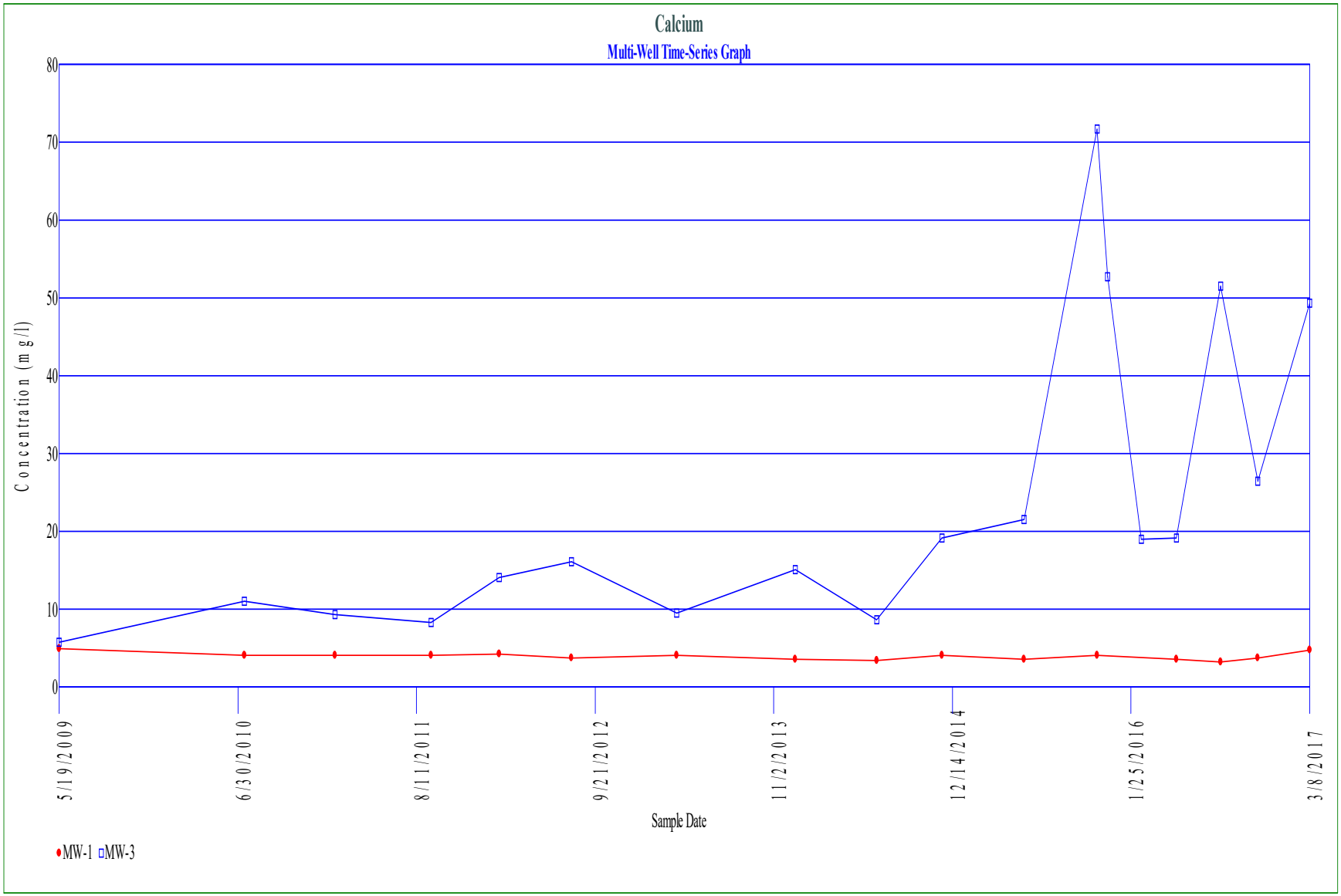
APPENDIX B

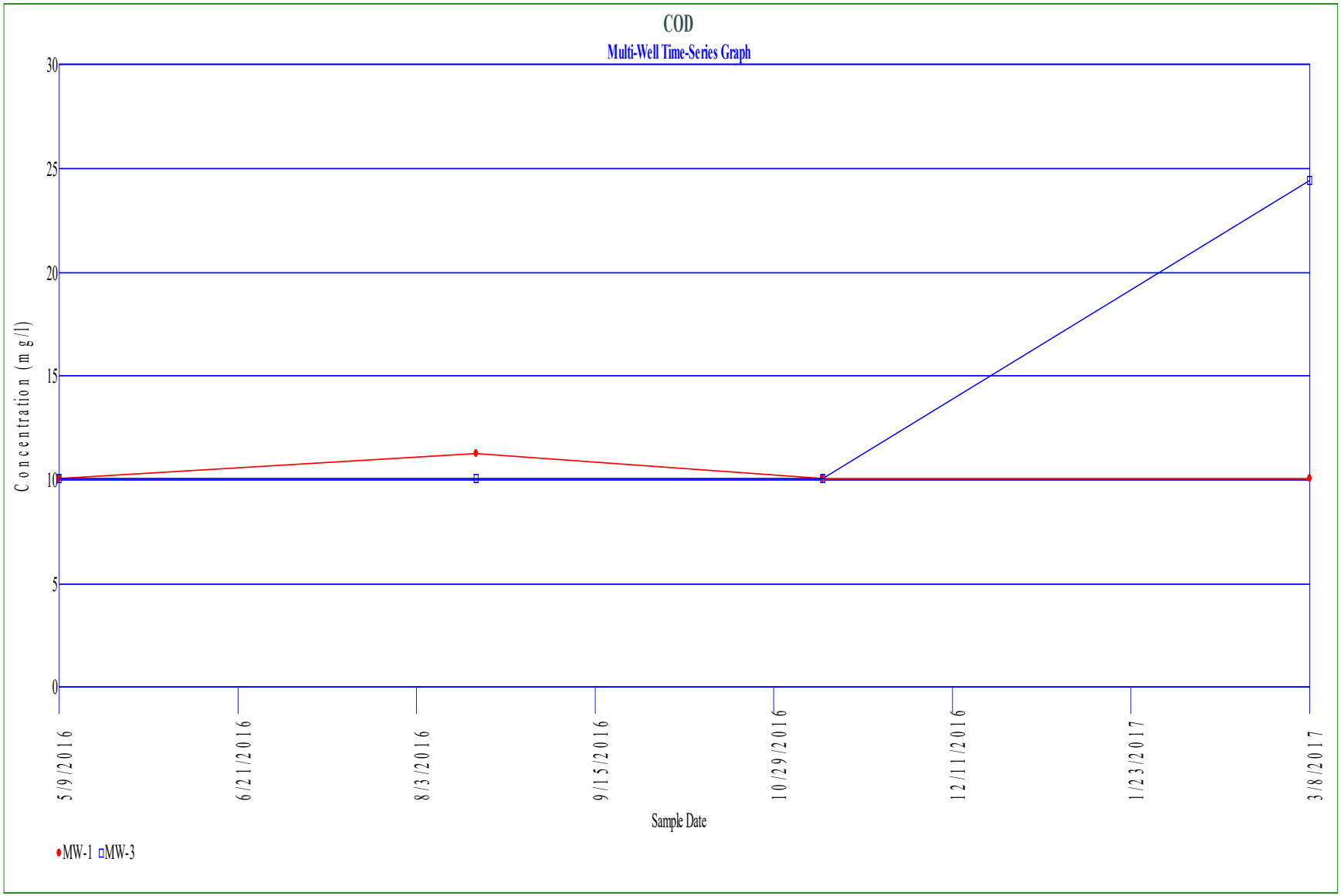
TIME SERIES & STATISTICAL ANALYSIS PLOTS

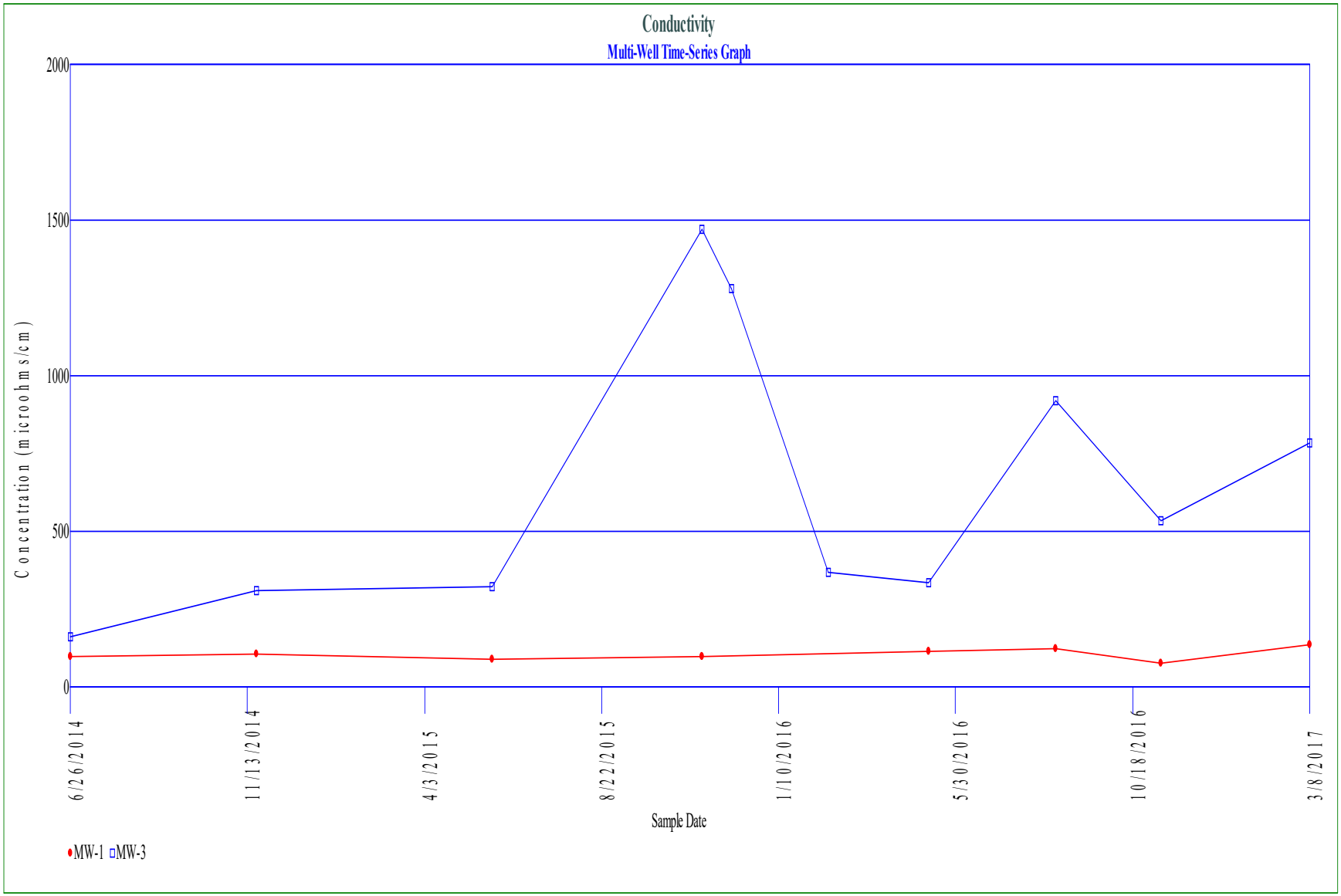

Chloride
Multi-Well Time-Series Graph
500
400
300
200
100
0
Concentration (mg/l)
4/19/2008
7/26/2009
11/2/2010
2/8/2012
5/17/2013
8/23/2014
11/30/2015
3/8/2017
Sample Date
MW-1
MW-3


Alkalinity
Multi-Well Time-Series Graph
60
50
40
30
20
10
0
Concentration (mg/l)
2/19/2016
4/13/2016
6/7/2016
8/1/2016
9/24/2016
11/18/2016
1/12/2017
3/8/2017
Sample Date
MW-1
MW-3

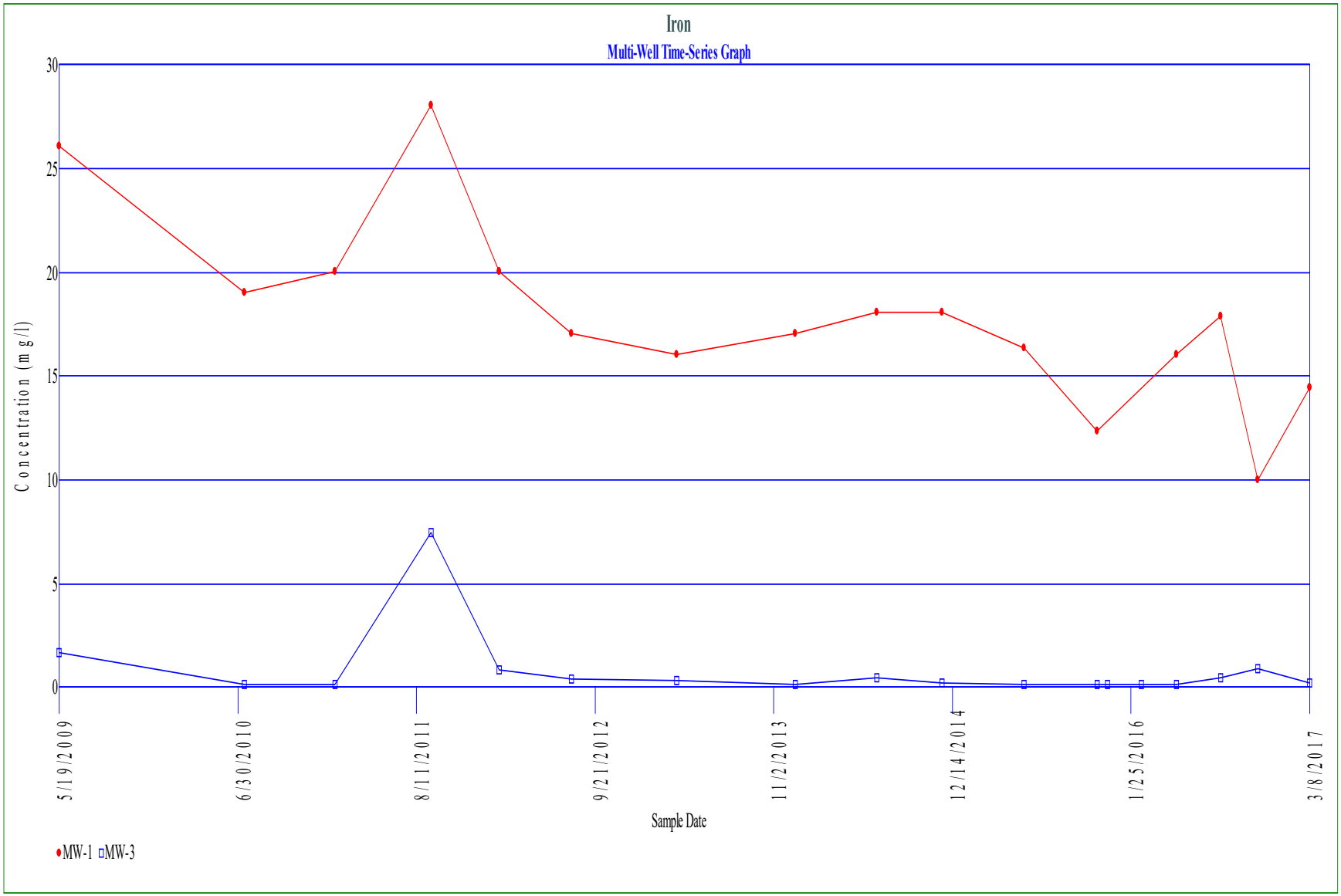

Ammonia Nitrogen
Multi-Well Time-Series Graph
Concentration (mg/l)
4
3.5
3
2.5
2
1.5
1
0.5
0
7/16/2010
6/27/2011
6/8/2012
5/21/2013
5/2/2014
4/14/2015
3/26/2016
3/8/2017
Sample Date
MW-1
MW-3

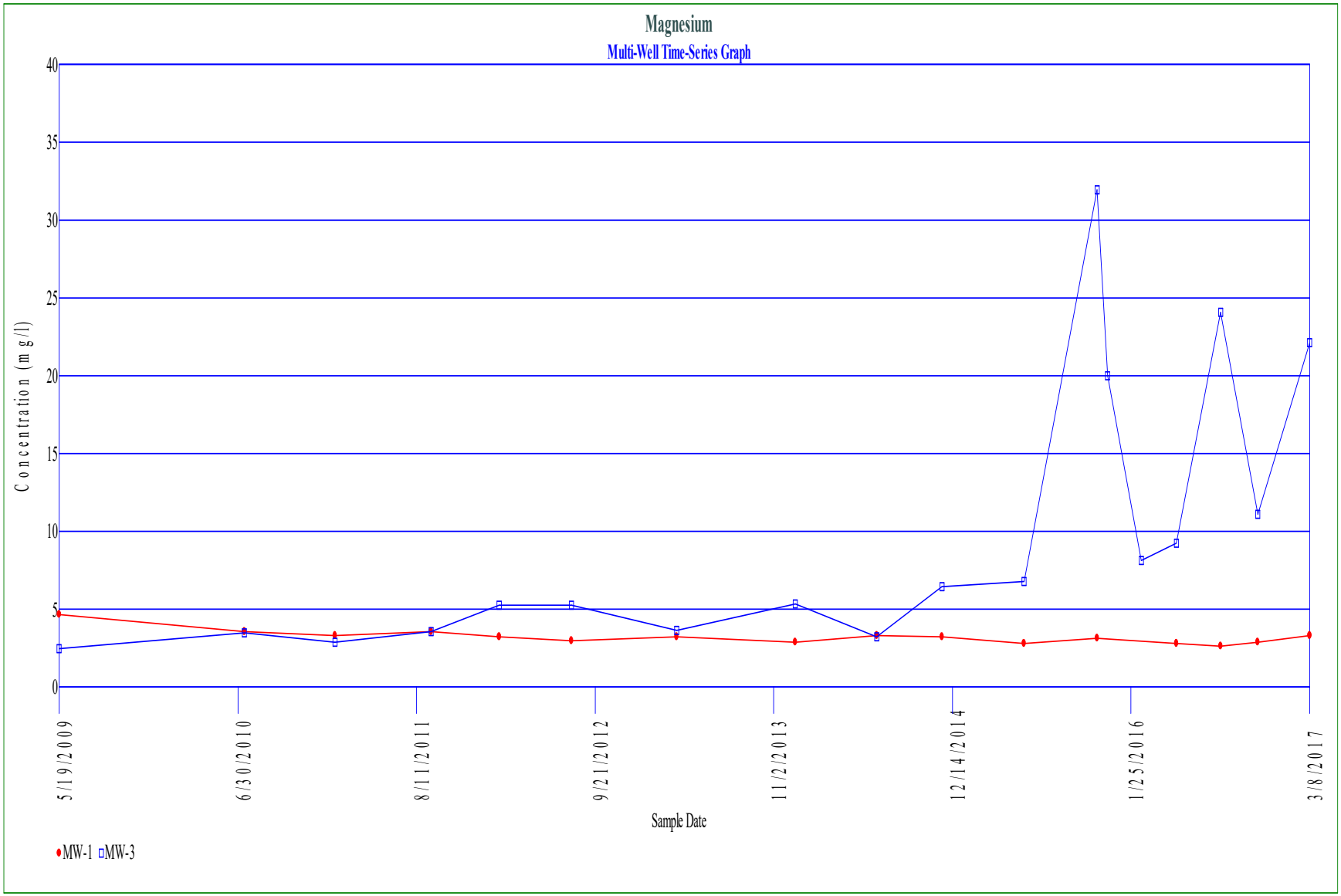

Calcium
Multi-Well Time-Series Graph
Concentration (mg/l)
80
70
60
50
40
30
20
10
0
5/19/2009
6/30/2010
8/11/2011
9/21/2012
11/2/2013
12/14/2014
1/25/2016
3/8/2017
Sample Date
MW-1
MW-3

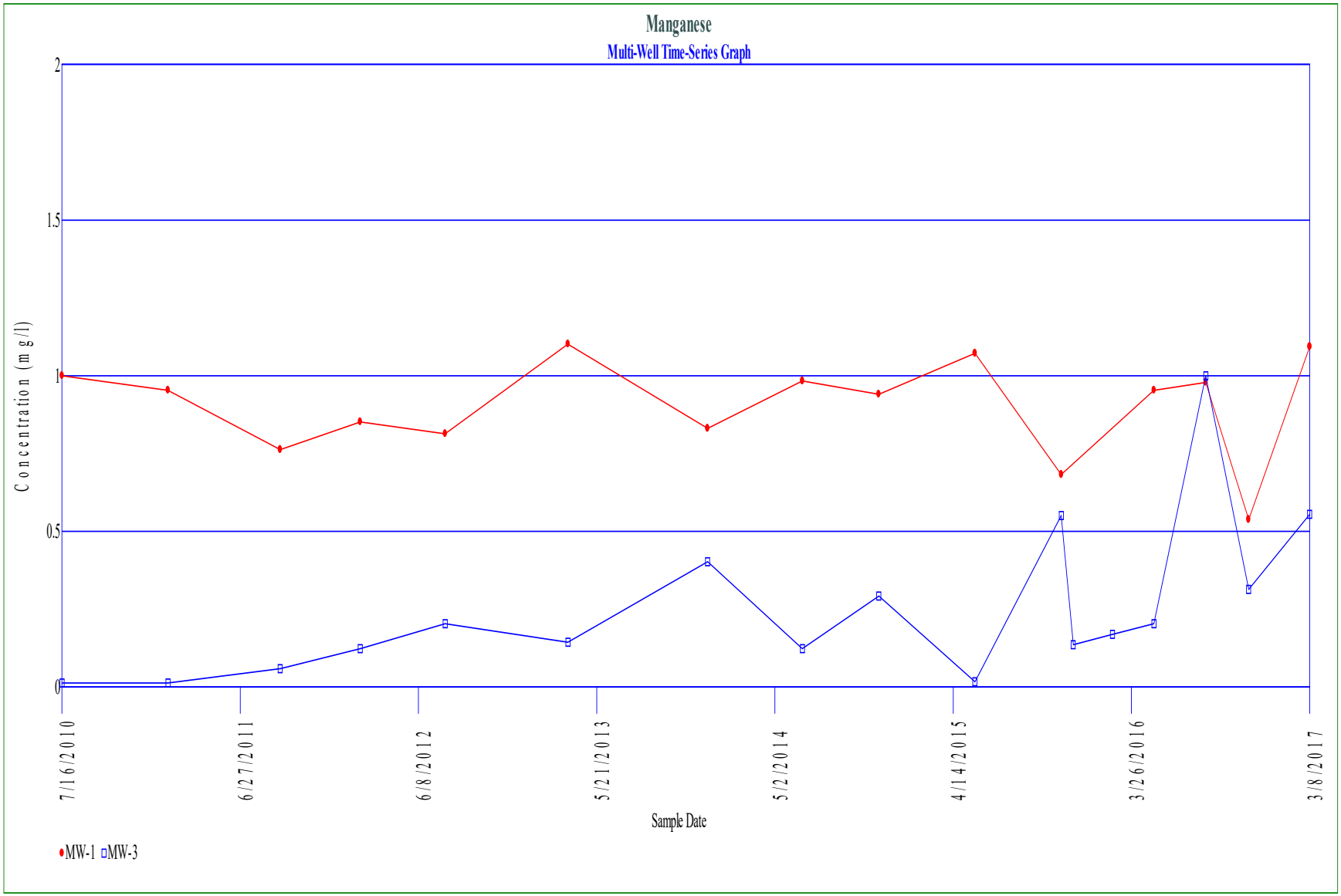

COD
Multi-Well Time-Series Graph
30
25
20
15
10
5
0
Concentration (mg/l)
5/9/2016
6/21/2016
8/3/2016
9/15/2016
10/29/2016
12/11/2016
1/23/2017
3/8/2017
Sample Date
MW-1
MW-3

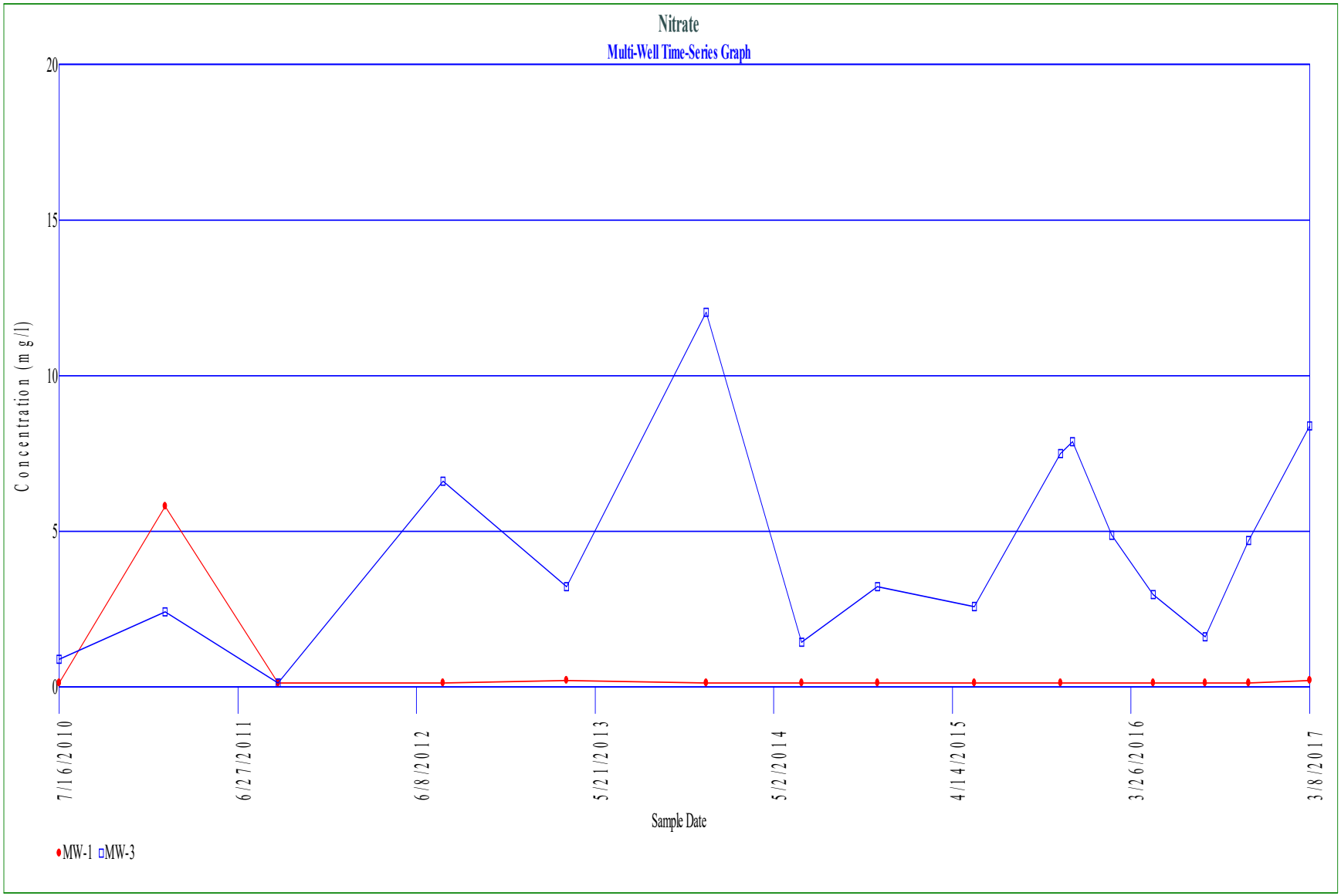

Conductivity
Multi-Well Time-Series Graph
2000
1500
1000
500
0
Concentration (microohms/cm)
6/26/2014
11/13/2014
4/3/2015
8/22/2015
1/10/2016
5/30/2016
10/18/2016
3/8/2017
Sample Date
MW-1
MW-3


Dissolved Oxygen
Multi-Well Time-Series Graph
Concentration (mg/l)
0
1
2
3
4
5
6
7
8
9
6/26/2014
11/13/2014
4/3/2015
8/22/2015
1/10/2016
5/30/2016
10/18/2016
3/8/2017
Sample Date
MW-1
MW-3

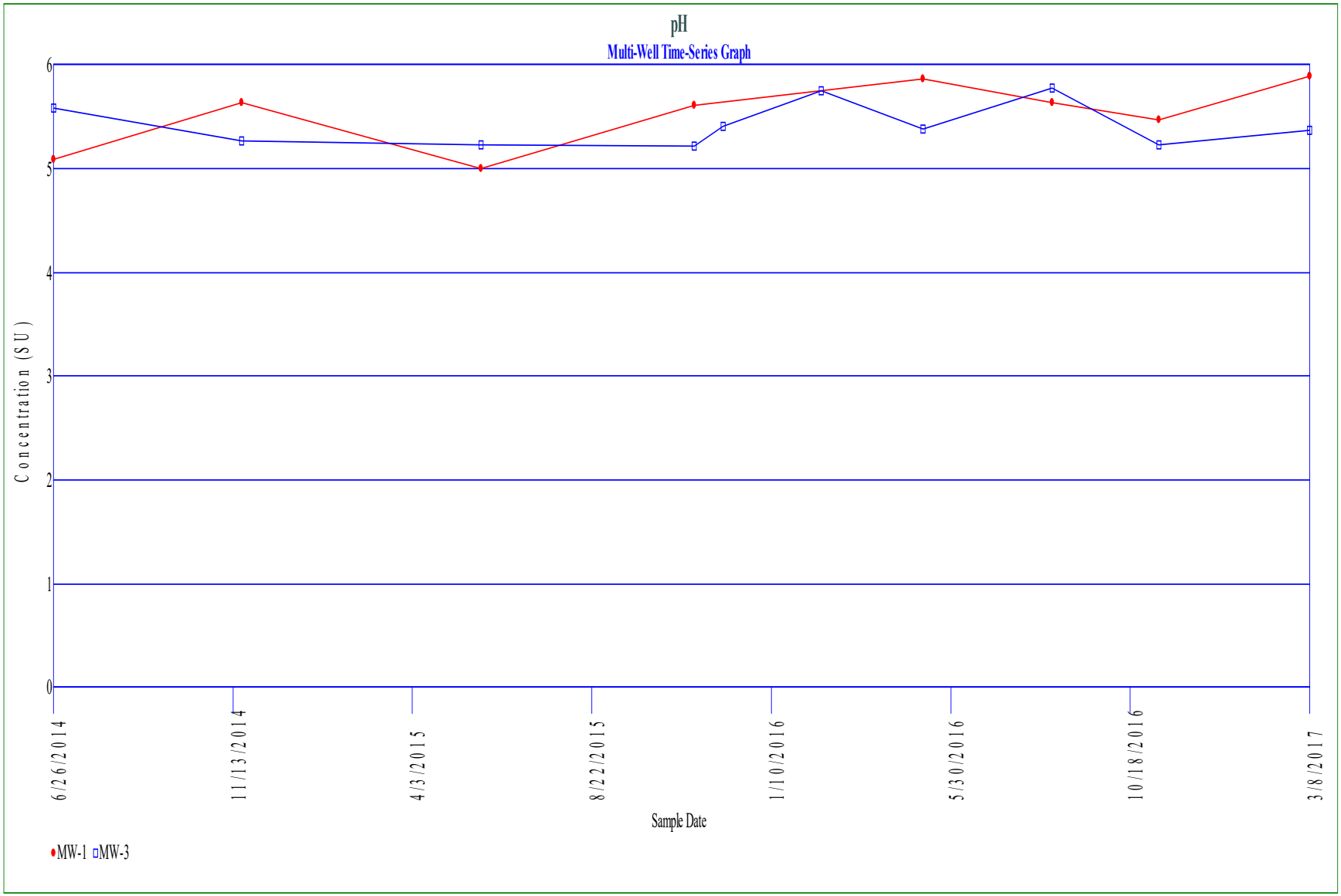

Iron
Multi-Well Time-Series Graph
30
25
20
15
10
5
0
Concentration (mg/l)
5/19/2009
6/30/2010
8/11/2011
9/21/2012
11/2/2013
12/14/2014
1/25/2016
3/8/2017
Sample Date
MW-1
MW-3

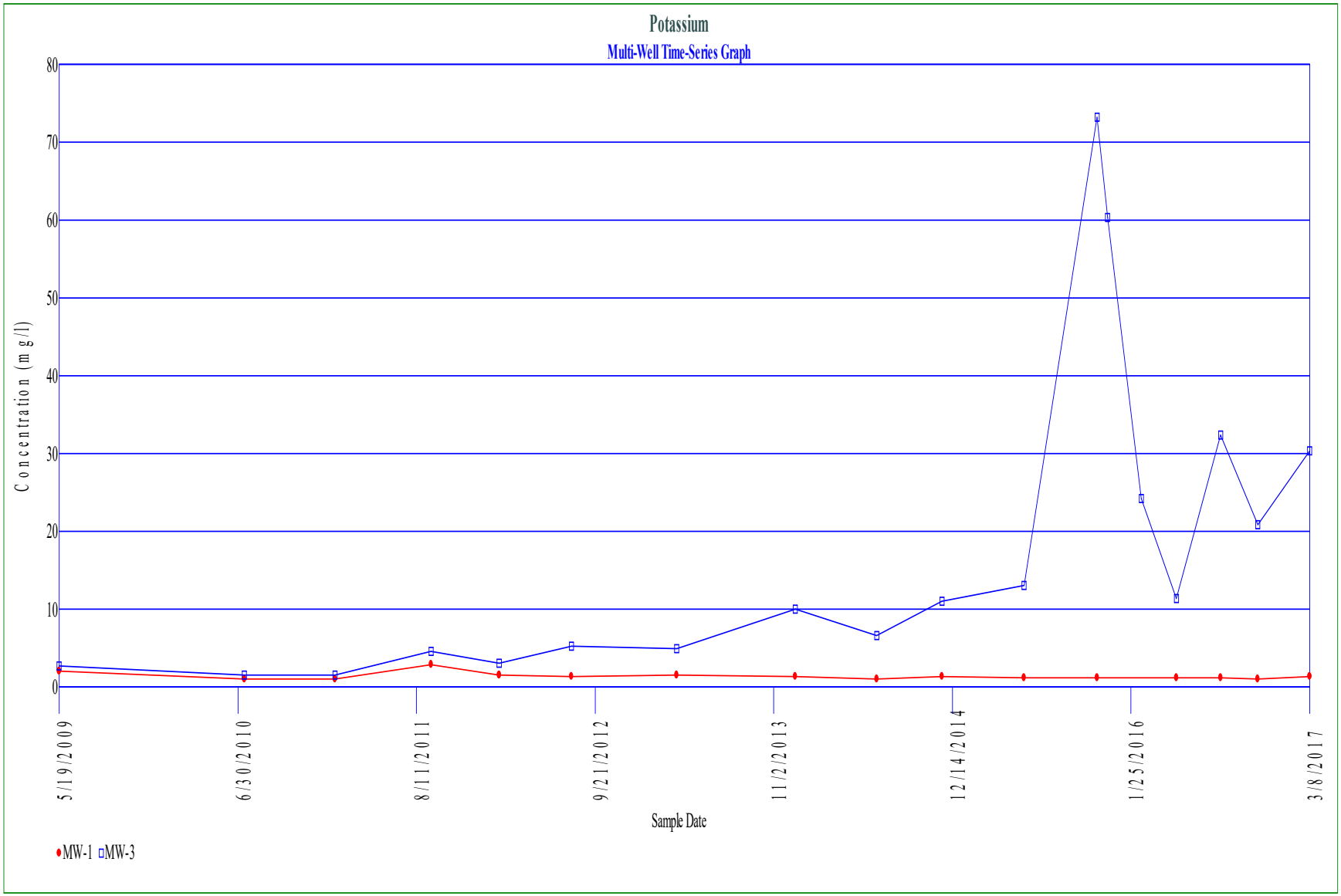

Magnesium
Multi-Well Time-Series Graph
Concentration (mg/l)
40
35
30
25
20
15
10
5
0
5/19/2009
6/30/2010
8/11/2011
9/21/2012
11/2/2013
12/14/2014
1/25/2016
3/8/2017
Sample Date
MW-1
MW-3

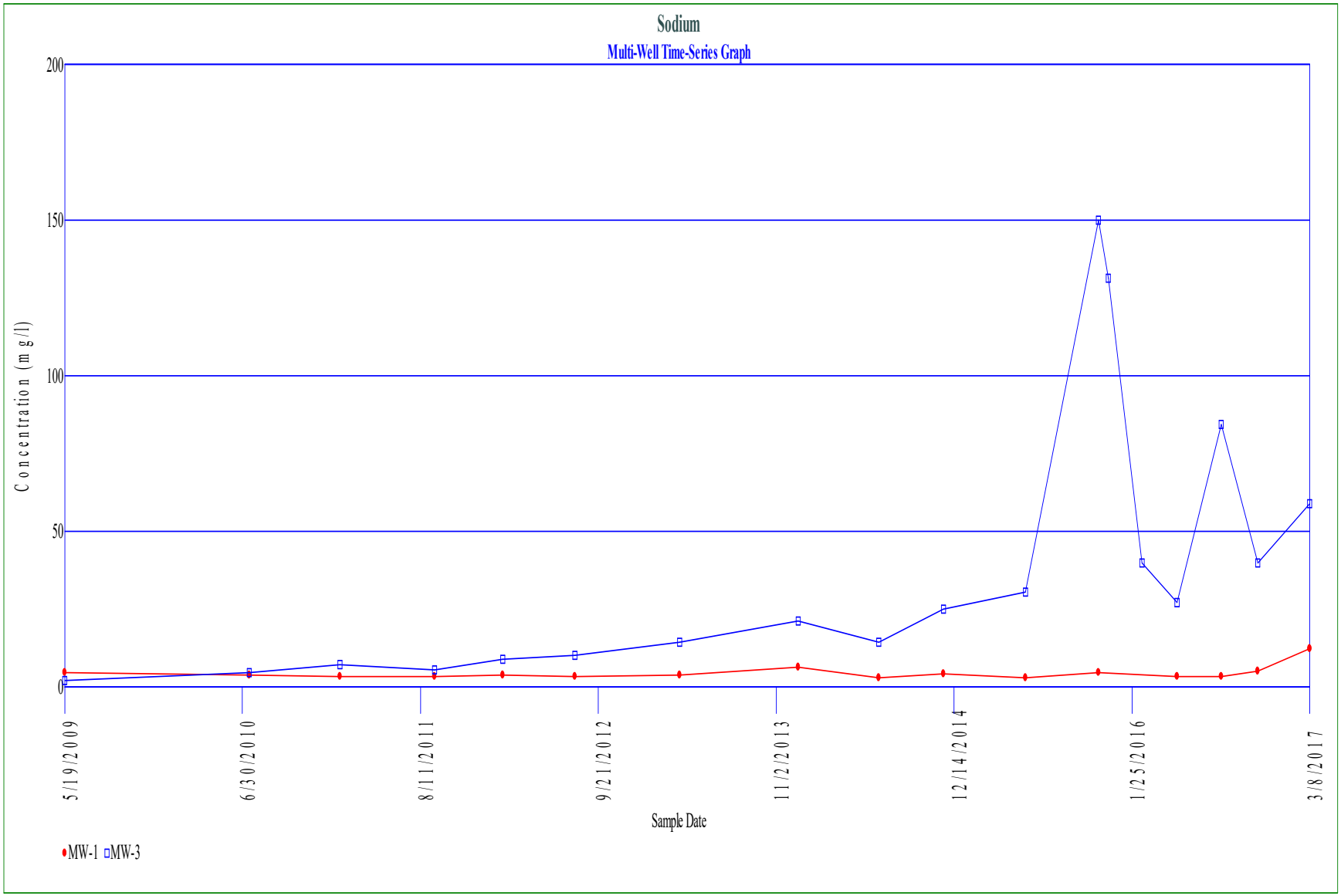

Manganese
Multi-Well Time-Series Graph
2
1.5
1
0.5
0
Concentration (mg/l)
7/16/2010
6/27/2011
6/8/2012
5/21/2013
5/2/2014
4/14/2015
3/26/2016
3/8/2017
Sample Date
MW-1
MW-3


Nitrate
Multi-Well Time-Series Graph
20
15
10
5
0
Concentration (mg/l)
7/16/2010
6/27/2011
6/8/2012
5/21/2013
5/2/2014
4/14/2015
3/26/2016
3/8/2017
Sample Date
MW-1
MW-3

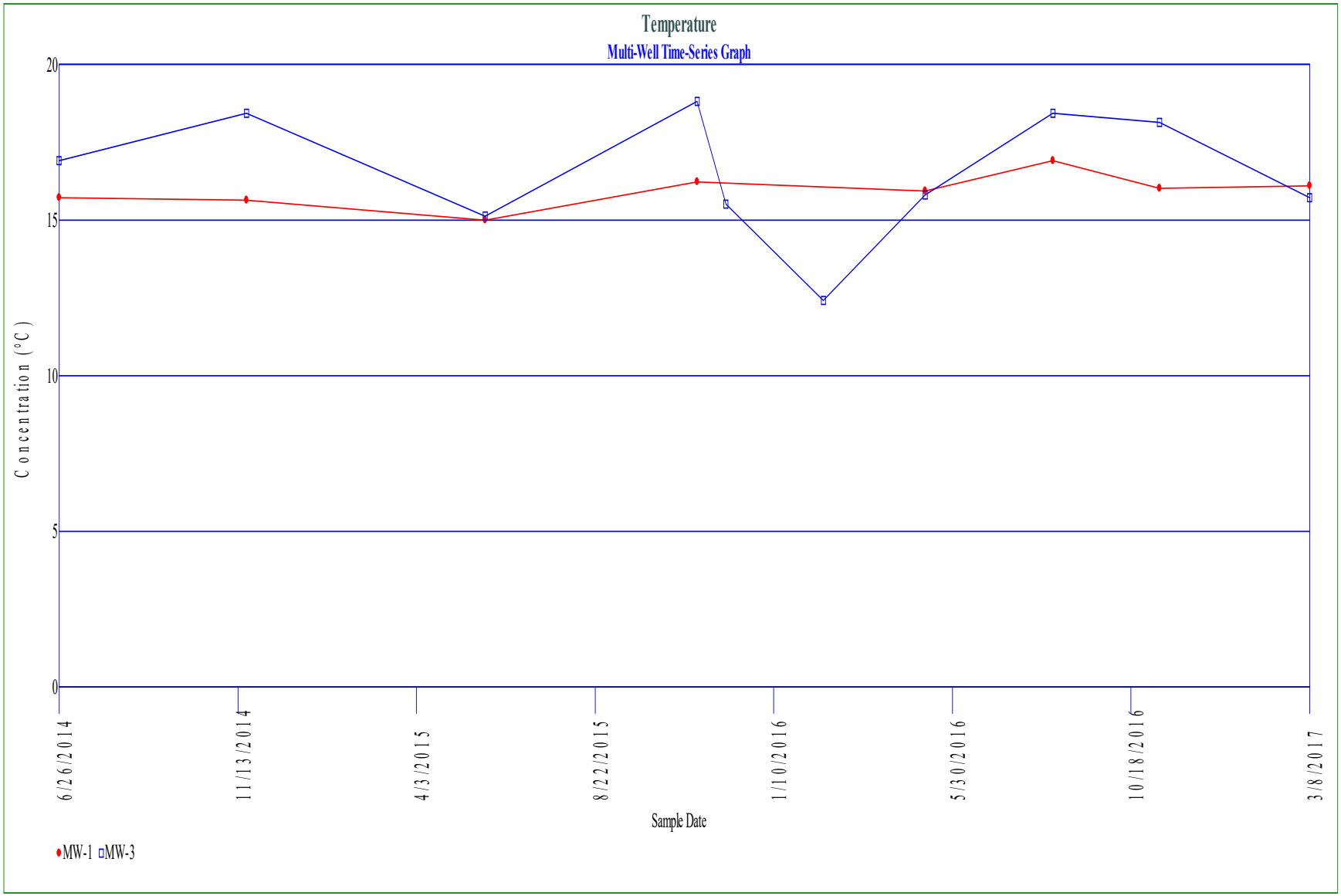

ORP
Multi-Well Time-Series Graph
300
250
200
150
100
50
0
Concentration (mV)
6/26/2014
11/13/2014
4/3/2015
8/22/2015
1/10/2016
5/30/2016
10/18/2016
3/8/2017
Sample Date
MW-1
MW-3


pH
Multi-Well Time-Series Graph
6
5
4
3
2
1
0
Concentration (SU)
6/26/2014
11/13/2014
4/3/2015
8/22/2015
1/10/2016
5/30/2016
10/18/2016
3/8/2017
Sample Date
MW-1 MW-3


Potassium
Multi-Well Time-Series Graph
Concentration (mg/l)
80
70
60
50
40
30
20
10
0
5/19/2009
6/30/2010
8/11/2011
9/21/2012
11/2/2013
12/14/2014
1/25/2016
3/8/2017
Sample Date
MW-1
MW-3


Sodium
Multi-Well Time-Series Graph
200
150
100
50
0
Concentration (mg/l)
5/19/2009
6/30/2010
8/11/2011
9/21/2012
11/2/2013
12/14/2014
1/25/2016
3/8/2017
Sample Date
MW-1
MW-3


Sulfate
Multi-Well Time-Series Graph
200
150
100
50
0
Concentration (mg/l)
5/19/2009
6/30/2010
8/11/2011
9/21/2012
11/2/2013
12/14/2014
1/25/2016
3/8/2017
Sample Date
MW-1
MW-3


Temperature
Multi-Well Time-Series Graph
20
15
10
5
0
Concentration (°C)
6/26/2014
11/13/2014
4/3/2015
8/22/2015
1/10/2016
5/30/2016
10/18/2016
3/8/2017
Sample Date
MW-1
MW-3


Turbidity
Multi-Well Time-Series Graph
70
60
50
40
30
20
10
0
Concentration (NTU)
6/26/2014
11/13/2014
4/3/2015
8/22/2015
1/10/2016
5/30/2016
10/18/2016
3/8/2017
Sample Date
MW-1
MW-3

Shapiro-Francia Test of Normality

Parameter: Chloride

All Locations

Normality Test of Parameter Concentrations

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Total Number of Measurements = 52

i	x(i)	m(i)	sum(m^2)	sum(mx)
1	1.5	-2.09693	4.39712	-3.1454
2	1.8	-1.78661	7.5891	-6.3613
3	1.89	-1.58927	10.1149	-9.36502
4	1.9	-1.43953	12.1871	-12.1001
5	2	-1.31652	13.9204	-14.7332
6	2.01	-1.21073	15.3862	-17.1667
7	2.1	-1.11699	16.6339	-19.5124
8	2.12	-1.03643	17.7081	-21.7096
9	2.2	-0.958125	18.6261	-23.8175
10	2.4	-0.885291	19.4098	-25.9422
11	2.6	-0.816874	20.0771	-28.0661
12	2.8	-0.752084	20.6427	-30.1719
13	2.8	-0.690309	21.1192	-32.1048
14	2.9	-0.631062	21.5175	-33.9349
15	2.9	-0.573953	21.8469	-35.5993
16	3.1	-0.521527	22.1189	-37.2161
17	3.9	-0.467699	22.3376	-39.0401
18	3.97	-0.415193	22.51	-40.6884
19	4.59	-0.363809	22.6424	-42.3583
20	6.4	-0.31337	22.7406	-44.3639
21	6.61	-0.263715	22.8101	-46.107
22	6.7	-0.214702	22.8562	-47.5455
23	7.34	-0.168741	22.8847	-48.7841
24	7.91	-0.12061	22.8992	-49.7381
25	8.2	-0.0727562	22.9045	-50.3347
26	10	-0.0250691	22.9052	-50.5854
27	14	0.0250691	22.9058	-50.2344
28	15	0.0727562	22.9111	-49.1431
29	17.5	0.12061	22.9256	-47.0324
30	18	0.168741	22.9541	-43.9951
31	20	0.214702	23.0002	-39.701
32	25	0.263715	23.0698	-33.1082
33	25	0.31337	23.168	-25.2739
34	25	0.363809	23.3003	-16.1787

35	26.6	0.415193	23.4727	-5.13453
36	28.6	0.467699	23.6914	8.24165
37	29	0.521527	23.9634	23.3659
38	29.4	0.573953	24.2929	40.2401
39	31	0.631062	24.6911	59.8031
40	32	0.690309	25.1676	81.8929
41	35	0.752084	25.7332	108.216
42	65	0.816874	26.4005	161.313
43	80.7	0.885291	27.1843	232.756
44	92.8	0.958125	28.1023	321.67
45	96.1	1.03643	29.1765	421.271
46	120	1.11699	30.4241	555.309
47	150	1.21073	31.89	736.919
48	164	1.31652	33.6232	952.828
49	218	1.43953	35.6955	1266.65
50	270	1.58927	38.2212	1695.75
51	360	1.78661	41.4132	2338.93
52	458	2.09693	45.8103	3299.32

Data Set Standard Deviation = 92.6309
Numerator = 1.08855e+007
Denominator = 2.00468e+007
W Statistic = 0.543005 = 1.08855e+007 / 2.00468e+007

5% Critical value of 0.957 exceeds 0.543005
Evidence of non-normality at 95% level of significance

1% Critical value of 0.938 exceeds 0.543005
Evidence of non-normality at 99% level of significance

Shapiro-Francia Test of Normality

Parameter: Chloride

All Locations

Normality Test of Parameter Concentrations

Natural Logarithm Transformation

Non-Detects Replaced with 1/2 DL

Total Number of Measurements = 52

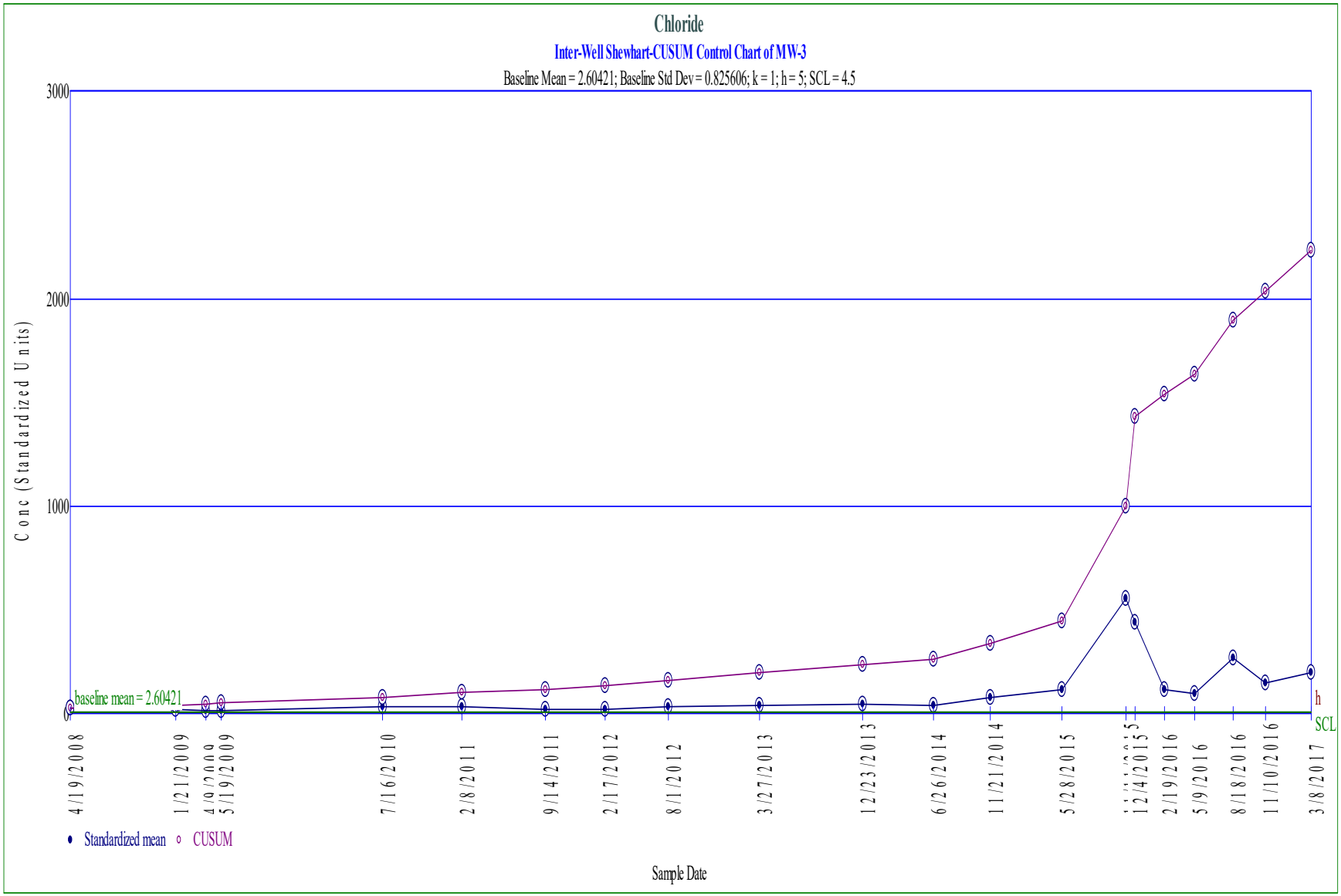
i	x(i)	m(i)	sum(m^2)	sum(mx)
1	0.405465	-2.09693	4.39712	-0.850232
2	0.587787	-1.78661	7.5891	-1.90038
3	0.636577	-1.58927	10.1149	-2.91207
4	0.641854	-1.43953	12.1871	-3.83604
5	0.693147	-1.31652	13.9204	-4.74858
6	0.698135	-1.21073	15.3862	-5.59383
7	0.741937	-1.11699	16.6339	-6.42257
8	0.751416	-1.03643	17.7081	-7.20136
9	0.788457	-0.958125	18.6261	-7.9568
10	0.875469	-0.885291	19.4098	-8.73184
11	0.955511	-0.816874	20.0771	-9.51238
12	1.02962	-0.752084	20.6427	-10.2867
13	1.02962	-0.690309	21.1192	-10.9975
14	1.06471	-0.631062	21.5175	-11.6694
15	1.06471	-0.573953	21.8469	-12.2805
16	1.1314	-0.521527	22.1189	-12.8705
17	1.36098	-0.467699	22.3376	-13.5071
18	1.37877	-0.415193	22.51	-14.0795
19	1.52388	-0.363809	22.6424	-14.6339
20	1.8563	-0.31337	22.7406	-15.2156
21	1.88858	-0.263715	22.8101	-15.7137
22	1.90211	-0.214702	22.8562	-16.1221
23	1.99334	-0.168741	22.8847	-16.4584
24	2.06813	-0.12061	22.8992	-16.7079
25	2.10413	-0.0727562	22.9045	-16.861
26	2.30259	-0.0250691	22.9052	-16.9187
27	2.63906	0.0250691	22.9058	-16.8525
28	2.70805	0.0727562	22.9111	-16.6555
29	2.8622	0.12061	22.9256	-16.3103
30	2.89037	0.168741	22.9541	-15.8226
31	2.99573	0.214702	23.0002	-15.1794
32	3.21888	0.263715	23.0698	-14.3305
33	3.21888	0.31337	23.168	-13.3218
34	3.21888	0.363809	23.3003	-12.1507

35	3.28091	0.415193	23.4727	-10.7885
36	3.35341	0.467699	23.6914	-9.22015
37	3.3673	0.521527	23.9634	-7.46401
38	3.38099	0.573953	24.2929	-5.52348
39	3.43399	0.631062	24.6911	-3.35642
40	3.46574	0.690309	25.1676	-0.963993
41	3.55535	0.752084	25.7332	1.70993
42	4.17439	0.816874	26.4005	5.11988
43	4.39074	0.885291	27.1843	9.00696
44	4.53045	0.958125	28.1023	13.3477
45	4.56539	1.03643	29.1765	18.0794
46	4.78749	1.11699	30.4241	23.427
47	5.01064	1.21073	31.89	29.4935
48	5.09987	1.31652	33.6232	36.2076
49	5.3845	1.43953	35.6955	43.9587
50	5.59842	1.58927	38.2212	52.8561
51	5.8861	1.78661	41.4132	63.3723
52	6.12687	2.09693	45.8103	76.2199

Data Set Standard Deviation = 1.62282
Numerator = 5809.48
Denominator = 6152.85
W Statistic = 0.944193 = 5809.48 / 6152.85

5% Critical value of 0.957 exceeds 0.944193
Evidence of non-normality at 95% level of significance

1% Critical value of 0.938 is less than 0.944193
Data is normally distributed at 99% level of significance


Chloride
Inter-Well Shewhart-CUSUM Control Chart of MW-3
Baseline Mean = 2.60421; Baseline Std Dev = 0.825606; k = 1; h = 5; SCL = 4.5
Conc (Standardized Units)
3000
2000
1000
0
baseline mean = 2.60421
h
SCL
4/19/2008
1/21/2009
4/9/2009
5/19/2009
7/16/2010
2/8/2011
9/14/2011
2/17/2012
8/1/2012
3/27/2013
12/23/2013
6/26/2014
11/21/2014
5/28/2015
12/4/2015
2/19/2016
5/9/2016
8/18/2016
11/10/2016
3/8/2017
Standardized mean
CUSUM
Sample Date

Wilcoxon Non-Parametric Analysis (Inter-Well)

Parameter: Chloride

Location: MW-3

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Total non detects is 0

Non detect rank is 0

Wilcoxon Ranks

Location	Date	Conc.	Rank
MW-1	4/19/2008	2	5
	1/21/2009	2.9	14
	4/9/2009	1.9	4
	5/19/2009	2.8	12
	7/16/2010	2.8	13
	2/8/2011	2.6	11
	9/14/2011	3.1	16
	2/17/2012	2.1	7
	7/31/2012	2.2	9
	3/27/2013	1.8	2
	12/23/2013	1.5	1
	6/26/2014	2.9	15
	11/21/2014	3.9	17
	5/28/2015	2.01	6
	11/11/2015	3.97	18
	5/9/2016	2.12	8
	8/18/2016	2.4	10
	11/10/2016	4.59	19
	3/8/2017	1.89	3
MW-3	4/19/2008	20	25
	1/21/2009	14	22
	4/9/2009	8.2	20
	5/19/2009	10	21
	7/16/2010	25	26
	2/8/2011	25	27
	9/14/2011	15	23
	2/17/2012	18	24
	8/1/2012	25	28
	3/27/2013	32	30
	12/23/2013	35	31

6/26/2014	29	29
11/21/2014	65	32
5/28/2015	92.8	34
11/11/2015	458	40
12/4/2015	360	39
2/19/2016	96.1	35
5/9/2016	80.7	33
8/18/2016	218	38
11/10/2016	120	36
3/8/2017	164	37

The Wilcoxon Statistic is 399
The Expected value is is 199.5
The Standard Deviation is 36.9222
The Z Score is 5.38971
The Standard Deviation adjusted for ties is 36.9222
The Z Score adjusted for ties is 5.38971
5.38971 > 2.326 indicating statistical significance at 1% level
5.38971 > 2.326 indicating statistical significance at 1% level when adjusted for ties

Mann-Kendall Trend Analysis

Parameter: Chloride
Location: MW-3
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

95% Confidence Level

Xj	Xk	Xj - Xk	Positives	Negatives
14	20	-6	0	1
8.2	20	-11.8	0	2
10	20	-10	0	3
25	20	5	1	3
25	20	5	2	3
15	20	-5	2	4
18	20	-2	2	5
25	20	5	3	5
32	20	12	4	5
35	20	15	5	5
29	20	9	6	5
65	20	45	7	5
92.8	20	72.8	8	5
458	20	438	9	5
360	20	340	10	5
96.1	20	76.1	11	5
80.7	20	60.7	12	5
218	20	198	13	5
120	20	100	14	5
164	20	144	15	5
8.2	14	-5.8	15	6
10	14	-4	15	7
25	14	11	16	7
25	14	11	17	7
15	14	1	18	7
18	14	4	19	7
25	14	11	20	7
32	14	18	21	7
35	14	21	22	7
29	14	15	23	7
65	14	51	24	7
92.8	14	78.8	25	7

458	14	444	26	7
360	14	346	27	7
96.1	14	82.1	28	7
80.7	14	66.7	29	7
218	14	204	30	7
120	14	106	31	7
164	14	150	32	7
10	8.2	1.8	33	7
25	8.2	16.8	34	7
25	8.2	16.8	35	7
15	8.2	6.8	36	7
18	8.2	9.8	37	7
25	8.2	16.8	38	7
32	8.2	23.8	39	7
35	8.2	26.8	40	7
29	8.2	20.8	41	7
65	8.2	56.8	42	7
92.8	8.2	84.6	43	7
458	8.2	449.8	44	7
360	8.2	351.8	45	7
96.1	8.2	87.9	46	7
80.7	8.2	72.5	47	7
218	8.2	209.8	48	7
120	8.2	111.8	49	7
164	8.2	155.8	50	7
25	10	15	51	7
25	10	15	52	7
15	10	5	53	7
18	10	8	54	7
25	10	15	55	7
32	10	22	56	7
35	10	25	57	7
29	10	19	58	7
65	10	55	59	7
92.8	10	82.8	60	7
458	10	448	61	7
360	10	350	62	7
96.1	10	86.1	63	7
80.7	10	70.7	64	7
218	10	208	65	7
120	10	110	66	7

164	10	154	67	7
25	25	0	67	7
15	25	-10	67	8
18	25	-7	67	9
25	25	0	67	9
32	25	7	68	9
35	25	10	69	9
29	25	4	70	9
65	25	40	71	9
92.8	25	67.8	72	9
458	25	433	73	9
360	25	335	74	9
96.1	25	71.1	75	9
80.7	25	55.7	76	9
218	25	193	77	9
120	25	95	78	9
164	25	139	79	9
15	25	-10	79	10
18	25	-7	79	11
25	25	0	79	11
32	25	7	80	11
35	25	10	81	11
29	25	4	82	11
65	25	40	83	11
92.8	25	67.8	84	11
458	25	433	85	11
360	25	335	86	11
96.1	25	71.1	87	11
80.7	25	55.7	88	11
218	25	193	89	11
120	25	95	90	11
164	25	139	91	11
18	15	3	92	11
25	15	10	93	11
32	15	17	94	11
35	15	20	95	11
29	15	14	96	11
65	15	50	97	11
92.8	15	77.8	98	11
458	15	443	99	11

360	15	345	100	11
96.1	15	81.1	101	11
80.7	15	65.7	102	11
218	15	203	103	11
120	15	105	104	11
164	15	149	105	11
25	18	7	106	11
32	18	14	107	11
35	18	17	108	11
29	18	11	109	11
65	18	47	110	11
92.8	18	74.8	111	11
458	18	440	112	11
360	18	342	113	11
96.1	18	78.1	114	11
80.7	18	62.7	115	11
218	18	200	116	11
120	18	102	117	11
164	18	146	118	11
32	25	7	119	11
35	25	10	120	11
29	25	4	121	11
65	25	40	122	11
92.8	25	67.8	123	11
458	25	433	124	11
360	25	335	125	11
96.1	25	71.1	126	11
80.7	25	55.7	127	11
218	25	193	128	11
120	25	95	129	11
164	25	139	130	11
35	32	3	131	11
29	32	-3	131	12
65	32	33	132	12
92.8	32	60.8	133	12
458	32	426	134	12
360	32	328	135	12
96.1	32	64.1	136	12
80.7	32	48.7	137	12
218	32	186	138	12

120	32	88	139	12
164	32	132	140	12
29	35	-6	140	13
65	35	30	141	13
92.8	35	57.8	142	13
458	35	423	143	13
360	35	325	144	13
96.1	35	61.1	145	13
80.7	35	45.7	146	13
218	35	183	147	13
120	35	85	148	13
164	35	129	149	13
65	29	36	150	13
92.8	29	63.8	151	13
458	29	429	152	13
360	29	331	153	13
96.1	29	67.1	154	13
80.7	29	51.7	155	13
218	29	189	156	13
120	29	91	157	13
164	29	135	158	13
92.8	65	27.8	159	13
458	65	393	160	13
360	65	295	161	13
96.1	65	31.1	162	13
80.7	65	15.7	163	13
218	65	153	164	13
120	65	55	165	13
164	65	99	166	13
458	92.8	365.2	167	13
360	92.8	267.2	168	13
96.1	92.8	3.3	169	13
80.7	92.8	-12.1	169	14
218	92.8	125.2	170	14
120	92.8	27.2	171	14
164	92.8	71.2	172	14
360	458	-98	172	15
96.1	458	-361.9	172	16

80.7	458	-377.3	172	17
218	458	-240	172	18
120	458	-338	172	19
164	458	-294	172	20
96.1	360	-263.9	172	21
80.7	360	-279.3	172	22
218	360	-142	172	23
120	360	-240	172	24
164	360	-196	172	25
80.7	96.1	-15.4	172	26
218	96.1	121.9	173	26
120	96.1	23.9	174	26
164	96.1	67.9	175	26
218	80.7	137.3	176	26
120	80.7	39.3	177	26
164	80.7	83.3	178	26
120	218	-98	178	27
164	218	-54	178	28
164	120	44	179	28

S Statistic = 179 - 28 = 151

Tied Group	Value	Members
1	25	3

Time Period	Observations
4/19/2008	1
1/21/2009	1
4/9/2009	1
5/19/2009	1
7/16/2010	1
2/8/2011	1
9/14/2011	1
2/17/2012	1
8/1/2012	1
3/27/2013	1
12/23/2013	1

6/26/2014	1
11/21/2014	1
5/28/2015	1
11/11/2015	1
12/4/2015	1
2/19/2016	1
5/9/2016	1
8/18/2016	1
11/10/2016	1
3/8/2017	1

There are 0 time periods with multiple data

A = 66
B = 0
C = 6
D = 0
E = 6
F = 0
a = 19740
b = 71820
c = 840
Group Variance = 1093
Z-Score = 4.53713
Comparison Level at 95% confidence level = 1.65463 (upward trend)
4.53713 > 1.65463 indicating an upward trend

Shapiro-Wilks Test of Normality

Parameter: COD

All Locations

Normality Test of Parameter Concentrations

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

K = 6 for 13 measurements

i	x(i)	x(n-i+1)	x(n-1+1)-x(i)	a(n-i+1)	b(i)
1	10	24.4	14.4	0.5359	7.71696
2	10	11.2	1.2	0.3325	0.399
3	10	10	0	0.2412	0
4	10	10	0	0.1707	0
5	10	10	0	0.1099	0
6	10	10	0	0.0539	0
7	10	10	0		
8	10	10	0		
9	10	10	0		
10	10	10	0		
11	10	10	0		
12	11.2	10	-1.2		
13	24.4	10	-14.4		

Sum of b values = 8.11596

Sample Standard Deviation = 3.97995

W Statistic = 0.346532

5% Critical value of 0.866 exceeds 0.346532

Evidence of non-normality at 95% level of significance

1% Critical value of 0.814 exceeds 0.346532

Evidence of non-normality at 99% level of significance

Shapiro-Wilks Test of Normality

Parameter: COD

All Locations

Normality Test of Parameter Concentrations

Natural Logarithm Transformation

Non-Detects Replaced with 1/2 DL

K = 6 for 13 measurements

i	x(i)	x(n-i+1)	x(n-1+1)-x(i)	a(n-i+1)	b(i)
1	1.60944	3.19458	1.58515	0.5359	0.849479
2	1.60944	2.41591	0.806476	0.3325	0.268153
3	1.60944	1.60944	0	0.2412	0
4	1.60944	1.60944	0	0.1707	0
5	1.60944	1.60944	0	0.1099	0
6	1.60944	1.60944	0	0.0539	0
7	1.60944	1.60944	0		
8	1.60944	1.60944	0		
9	1.60944	1.60944	0		
10	1.60944	1.60944	0		
11	1.60944	1.60944	0		
12	2.41591	1.60944	-0.806476		
13	3.19458	1.60944	-1.58515		

Sum of b values = 1.11763

Sample Standard Deviation = 0.476366

W Statistic = 0.458706

5% Critical value of 0.866 exceeds 0.458706

Evidence of non-normality at 95% level of significance

1% Critical value of 0.814 exceeds 0.458706

Evidence of non-normality at 99% level of significance

Non-Parametric Prediction Interval

Inter-Well Comparison
Parameter: COD
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 84.6154%
Number of comparisons = 3
Future Samples (k) = 3
Recent Dates = 1
Background Measurements (n) = 4
Maximum Background Value = 11.2
Confidence Level = 57.1%
False Positive Rate = 42.9%

Location	Date	Count	Mean	Significant
MW-3	**3/8/2017**	**1**	**24.4**	**TRUE**
MW-4	11/10/2016	1	10	FALSE
MW-5	11/10/2016	1	10	FALSE

Wilcoxon Non-Parametric Analysis (Inter-Well)

Parameter: COD

Location: MW-3

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Total non detects is 6
Non detect rank is 3.5

Wilcoxon Ranks

Location	Date	Conc.	Rank
MW-1	5/9/2016	ND<10	3.5
	8/18/2016	11.2	7
	11/10/2016	ND<10	3.5
	3/8/2017	ND<10	3.5
MW-3	5/9/2016	ND<10	3.5
	8/18/2016	ND<10	3.5
	11/10/2016	ND<10	3.5
	3/8/2017	24.4	8

The Wilcoxon Statistic is 8.5
The Expected value is is 8
The Standard Deviation is 3.4641
The Z Score is 0
The Standard Deviation adjusted for ties is 2.64575
The Z Score adjusted for ties is 0
0 < 2.326 indicating no statistical significance at 1% level
0 < 2.326 indicating no statistical significance at 1% level when adjusted for ties

Mann-Kendall Trend Analysis

Parameter: COD
Location: MW-3
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

95% Confidence Level

Xj	Xk	Xj - Xk	Positives	Negatives
ND<10	ND<10	0	0	0
ND<10	ND<10	0	0	0
24.4	ND<10	14.4	1	0
ND<10	ND<10	0	1	0
24.4	ND<10	14.4	2	0
24.4	ND<10	14.4	3	0

S Statistic = 3 - 0 = 3
Comparing at 95% confidence level (upward trend)
Probability of obtaining S >= 3 is 0.271
S < 0 or 0.271 >= 0.05 indicating no evidence of an upward trend

APPENDIX C

LABORATORY ANALYTICAL REPORT & FIELD INFORMATION LOGS

ANALYTICAL REPORT

May 08, 2017

Civil & Environmental Consultants - TN

Sample Delivery Group:	L898750
Samples Received:	03/09/2017
Project Number:	142-059
Description:	EWS Landfill

Report To: Philip Campbell
325 Seaboard Lane, Suite 170
Franklin, TN 37067

Entire Report Reviewed By:

Jimmy Hunt
Technical Service Representative

TABLE OF CONTENTS

MW-1 L898750-01 GW

Collected by: Philip Campbell
Collected date/time: 03/08/17 12:15
Received date/time: 03/09/17 14:35

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 2320 B-2011	WG965169	1	03/29/17 12:03	03/29/17 12:03	AMC
Wet Chemistry by Method 350.1	WG965346	1	03/30/17 14:13	03/30/17 14:13	DR
Wet Chemistry by Method 410.4	WG965088	1	03/29/17 11:51	03/29/17 15:08	MAJ
Wet Chemistry by Method 9056A	WG965193	1	03/29/17 14:30	03/29/17 14:30	KCF
Metals (ICPMS) by Method 6020	WG965287	1	04/03/17 09:56	04/04/17 14:19	JPD

MW-3 L898750-02 GW

Collected by: Philip Campbell
Collected date/time: 03/08/17 14:20
Received date/time: 03/09/17 14:35

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 2320 B-2011	WG965169	1	03/29/17 12:09	03/29/17 12:09	AMC
Wet Chemistry by Method 350.1	WG965346	1	03/30/17 14:17	03/30/17 14:17	DR
Wet Chemistry by Method 410.4	WG965088	1	03/29/17 11:51	03/29/17 15:08	MAJ
Wet Chemistry by Method 9056A	WG965154	5	03/29/17 13:36	03/29/17 13:36	KCF
Metals (ICPMS) by Method 6020	WG965287	1	04/03/17 09:56	04/04/17 14:23	JPD

FIELD BLANK L898750-03 GW

Collected by: Philip Campbell
Collected date/time: 03/08/17 14:30
Received date/time: 03/09/17 14:35

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 2320 B-2011	WG965169	1	03/29/17 12:15	03/29/17 12:15	AMC
Wet Chemistry by Method 350.1	WG965346	1	03/30/17 14:18	03/30/17 14:18	DR
Wet Chemistry by Method 410.4	WG965088	1	03/29/17 11:51	03/29/17 15:08	MAJ
Wet Chemistry by Method 9056A	WG965154	1	03/29/17 13:51	03/29/17 13:51	KCF
Metals (ICPMS) by Method 6020	WG965287	1	04/03/17 09:56	04/04/17 14:26	JPD

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times. 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.

Jimmy Hunt
Technical Service Representative

Wet Chemistry by Method 2320 B-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Alkalinity	57.0	T8	20.0	1	03/29/2017 12:03	WG965169

Wet Chemistry by Method 350.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Ammonia Nitrogen	ND		0.100	1	03/30/2017 14:13	WG965346

Wet Chemistry by Method 410.4

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
COD	ND		10.0	1	03/29/2017 15:08	WG965088

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Bromide	ND		1.00	1	03/29/2017 14:30	WG965193
Chloride	1.89		1.00	1	03/29/2017 14:30	WG965193
Nitrate	0.195	T8	0.100	1	03/29/2017 14:30	WG965193
Sulfate	8.17		5.00	1	03/29/2017 14:30	WG965193

Metals (ICPMS) by Method 6020

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Calcium	4.69		1.00	1	04/04/2017 14:19	WG965287
Iron	14.4		0.100	1	04/04/2017 14:19	WG965287
Magnesium	3.25		1.00	1	04/04/2017 14:19	WG965287
Manganese	1.09		0.00500	1	04/04/2017 14:19	WG965287
Potassium	1.31		1.00	1	04/04/2017 14:19	WG965287
Sodium	12.2		1.00	1	04/04/2017 14:19	WG965287

Wet Chemistry by Method 2320 B-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Alkalinity	ND	T8	20.0	1	03/29/2017 12:09	WG965169

Wet Chemistry by Method 350.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Ammonia Nitrogen	ND		0.100	1	03/30/2017 14:17	WG965346

Wet Chemistry by Method 410.4

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
COD	24.4		10.0	1	03/29/2017 15:08	WG965088

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Bromide	ND		5.00	5	03/29/2017 13:36	WG965154
Chloride	164		5.00	5	03/29/2017 13:36	WG965154
Nitrate	8.38	T8	0.500	5	03/29/2017 13:36	WG965154
Sulfate	105		25.0	5	03/29/2017 13:36	WG965154

Metals (ICPMS) by Method 6020

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Calcium	49.3		1.00	1	04/04/2017 14:23	WG965287
Iron	0.152		0.100	1	04/04/2017 14:23	WG965287
Magnesium	22.1		1.00	1	04/04/2017 14:23	WG965287
Manganese	0.551		0.00500	1	04/04/2017 14:23	WG965287
Potassium	30.3		1.00	1	04/04/2017 14:23	WG965287
Sodium	58.6		1.00	1	04/04/2017 14:23	WG965287

Wet Chemistry by Method 2320 B-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Alkalinity	ND	T8	20.0	1	03/29/2017 12:15	WG965169

Wet Chemistry by Method 350.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Ammonia Nitrogen	ND		0.100	1	03/30/2017 14:18	WG965346

Wet Chemistry by Method 410.4

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
COD	ND		10.0	1	03/29/2017 15:08	WG965088

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Bromide	ND		1.00	1	03/29/2017 13:51	WG965154
Chloride	ND		1.00	1	03/29/2017 13:51	WG965154
Nitrate	ND	T8	0.100	1	03/29/2017 13:51	WG965154
Sulfate	ND		5.00	1	03/29/2017 13:51	WG965154

Metals (ICPMS) by Method 6020

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Calcium	ND		1.00	1	04/04/2017 14:26	WG965287
Iron	ND		0.100	1	04/04/2017 14:26	WG965287
Magnesium	ND		1.00	1	04/04/2017 14:26	WG965287
Manganese	ND		0.00500	1	04/04/2017 14:26	WG965287
Potassium	ND		1.00	1	04/04/2017 14:26	WG965287
Sodium	ND		1.00	1	04/04/2017 14:26	WG965287

Method Blank (MB)

(MB) R3206759-1 03/29/17 11:39

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Alkalinity	U		2.71	20.0

L898774-01 Original Sample (OS) • Duplicate (DUP)

(OS) L898774-01 03/29/17 11:46 • (DUP) R3206759-3 03/29/17 11:55

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Alkalinity	92.3	93.9	1	2.00		20

L898793-06 Original Sample (OS) • Duplicate (DUP)

(OS) L898793-06 03/29/17 13:44 • (DUP) R3206759-5 03/29/17 13:52

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Alkalinity	412	411	1	0.000		20

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

(LCS) R3206759-4 03/29/17 12:43 • (LCSD) R3206759-7 03/29/17 13:58

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	%	%	%			%	%
Alkalinity	100	96.2	96.4	96.0	96.0	85.0-115			0.000	20

Method Blank (MB)

(MB) R3207071-1 03/30/17 13:53

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

L898750-01 Original Sample (OS) • Duplicate (DUP)

(OS) L898750-01 03/30/17 14:13 • (DUP) R3207071-4 03/30/17 14:15

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Ammonia Nitrogen	ND	0.000	1	0		20

L898793-03 Original Sample (OS) • Duplicate (DUP)

(OS) L898793-03 03/30/17 14:31 • (DUP) R3207071-6 03/30/17 14:32

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Ammonia Nitrogen	U	0.000	1	0		20

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

(LCS) R3207071-2 03/30/17 13:54 • (LCSD) R3207071-3 03/30/17 13:56

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	%	%	%			%	%
Ammonia Nitrogen	7.50	6.94	7.03	93	94	90-110			1	20

L898750-03 Original Sample (OS) • Matrix Spike (MS)

(OS) L898750-03 03/30/17 14:18 • (MS) R3207071-5 03/30/17 14:20

Analyte	Spike Amount	Original Result	MS Result	MS Rec.	Dilution	Rec. Limits	MS Qualifier
	mg/l	mg/l	mg/l	%		%	
Ammonia Nitrogen	5.00	ND	5.23	105	1	90-110	

L898793-06 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L898793-06 03/30/17 14:37 • (MS) R3207071-7 03/30/17 14:39 • (MSD) R3207071-8 03/30/17 14:45

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Ammonia Nitrogen	5.00	U	5.11	5.15	102	103	1	90-110			1	20

Method Blank (MB)

(MB) R3206749-1 03/29/17 15:04

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
COD	U		3	10.0

L898731-01 Original Sample (OS) • Duplicate (DUP)

(OS) L898731-01 03/29/17 15:06 • (DUP) R3206749-6 03/29/17 15:06

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
COD	127	127	1	0		20

L898847-01 Original Sample (OS) • Duplicate (DUP)

(OS) L898847-01 03/29/17 15:10 • (DUP) R3206749-7 03/29/17 15:11

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
COD	273	271	1	1		20

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

(LCS) R3206749-2 03/29/17 15:04 • (LCSD) R3206749-3 03/29/17 15:04

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 %
COD	242	235	236	97	98	90-110			0	20

L898728-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L898728-01 03/29/17 15:05 • (MS) R3206749-4 03/29/17 15:06 • (MSD) R3206749-5 03/29/17 15:06

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 %
COD	400	U	384	379	96	95	1	80-120			1	20

Method Blank (MB)

(MB) R3206685-1 03/29/17 05:59

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Bromide	U		0.079	1.00
Chloride	U		0.0519	1.00
Nitrate	U		0.0227	0.100
Sulfate	U		0.0774	5.00

L898709-01 Original Sample (OS) • Duplicate (DUP)

(OS) L898709-01 03/29/17 13:05 • (DUP) R3206685-5 03/29/17 13:20

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Chloride	42.9	42.9	1	0		15
Nitrate	1.35	1.36	1	1		15
Sulfate	59.4	59.4	1	0		15

L898775-01 Original Sample (OS) • Duplicate (DUP)

(OS) L898775-01 03/29/17 15:08 • (DUP) R3206685-6 03/29/17 15:24

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Chloride	42.7	42.6	1	0		15
Nitrate	ND	0.000	1	0		15
Sulfate	72.5	72.4	1	0		15

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

(LCS) R3206685-2 03/29/17 06:14 • (LCSD) R3206685-3 03/29/17 06:30

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 %
Bromide	40.0	39.9	40.0	100	100	80-120			0	15
Chloride	40.0	39.9	39.5	100	99	80-120			1	15
Nitrate	8.00	8.11	8.07	101	101	80-120			1	15
Sulfate	40.0	40.4	40.1	101	100	80-120			1	15

L898774-03 Original Sample (OS) • Matrix Spike (MS)

(OS) L898774-03 03/29/17 11:02 • (MS) R3206685-4 03/29/17 11:17

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MS Rec. %	Dilution	Rec. Limits %	MS Qualifier
Chloride	50.0	5.64	56.4	102	1	80-120	
Nitrate	5.00	0.912	5.95	101	1	80-120	
Sulfate	50.0	7.94	58.0	100	1	80-120	

L898775-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L898775-02 03/29/17 15:39 • (MS) R3206685-7 03/29/17 15:55 • (MSD) R3206685-8 03/29/17 16:10

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	11.7	62.0	62.0	101	101	1	80-120			0	15
Nitrate	5.00	ND	5.07	5.01	101	100	1	80-120			1	15
Sulfate	50.0	40.4	88.8	88.7	97	97	1	80-120			0	15

Method Blank (MB)

(MB) R3206908-1 03/29/17 06:48

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Bromide	U		0.079	1.00
Chloride	U		0.0519	1.00
Nitrate	U		0.0227	0.100
Sulfate	U		0.0774	5.00

L898839-01 Original Sample (OS) • Duplicate (DUP)

(OS) L898839-01 03/29/17 18:52 • (DUP) R3206908-5 03/29/17 19:08

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Bromide	1.62	1.63	1	1		15
Nitrate	U	0.000	1	0		15
Sulfate	6.17	5.75	1	7		15

L898871-03 Original Sample (OS) • Duplicate (DUP)

(OS) L898871-03 03/29/17 21:11 • (DUP) R3206908-8 03/29/17 21:26

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Bromide	ND	0.000	1	0		15
Chloride	20.9	20.8	1	0		15
Nitrate	ND	0.000	1	0		15

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

(LCS) R3206908-2 03/29/17 07:03 • (LCSD) R3206908-3 03/29/17 07:19

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 %
Bromide	40.0	39.0	39.1	97	98	80-120			0	15
Chloride	40.0	39.3	39.3	98	98	80-120			0	15
Nitrate	8.00	8.22	8.26	103	103	80-120			0	15
Sulfate	40.0	39.0	38.9	98	97	80-120			0	15

L898807-01 Original Sample (OS) • Matrix Spike (MS)

(OS) L898807-01 03/29/17 14:46 • (MS) R3206908-4 03/29/17 15:01

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MS Rec. %	Dilution	Rec. Limits %	MS Qualifier
Bromide	50.0	ND	46.4	93	1	80-120	
Chloride	50.0	46.7	97.9	102	1	80-120	
Nitrate	5.00	1.59	7.26	114	1	80-120	
Sulfate	50.0	5.81	56.4	101	1	80-120	

L898871-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L898871-02 03/29/17 20:25 • (MS) R3206908-6 03/29/17 20:40 • (MSD) R3206908-7 03/29/17 20:55

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 %
Bromide	50.0	ND	49.6	49.1	99	98	1	80-120			1	15
Chloride	50.0	30.6	81.2	81.7	101	102	1	80-120			1	15
Nitrate	5.00	0.365	5.46	5.39	102	100	1	80-120			1	15

Method Blank (MB)

(MB) R3208138-1 04/04/17 12:43

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Calcium	U		0.046	1.00
Iron	U		0.015	0.100
Magnesium	U		0.1	1.00
Manganese	U		0.00025	0.00500
Potassium	U		0.037	1.00
Sodium	U		0.11	1.00

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

(LCS) R3208138-2 04/04/17 12:47 • (LCSD) R3208138-3 04/04/17 12:50

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 %
Calcium	5.00	5.12	5.16	102	103	80-120			1	20
Iron	5.00	5.28	5.17	106	103	80-120			2	20
Magnesium	5.00	5.36	5.37	107	107	80-120			0	20
Manganese	0.0500	0.0513	0.0506	103	101	80-120			2	20
Potassium	5.00	5.18	5.18	104	104	80-120			0	20
Sodium	5.00	5.45	5.54	109	111	80-120			2	20

L898812-08 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L898812-08 04/04/17 12:54 • (MS) R3208138-5 04/04/17 13:01 • (MSD) R3208138-6 04/04/17 13:04

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 %
Calcium	5.00	159	161	162	40	54	1	75-125	V	V	0	20
Potassium	5.00	18.7	23.3	23.3	92	92	1	75-125			0	20
Iron	5.00	19.7	24.7	24.7	100	99	1	75-125			0	20
Magnesium	5.00	49.9	53.6	54.1	73	83	1	75-125	V		1	20
Manganese	0.0500	2.27	2.33	2.33	127	119	1	75-125	V		0	20
Sodium	5.00	58.8	61.9	62.4	61	71	1	75-125	V	V	1	20

Abbreviations and Definitions

SDG	Sample Delivery Group.
MDL	Method Detection Limit.
RDL	Reported Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
U	Not detected at the Reporting Limit (or MDL where applicable).
RPD	Relative Percent Difference.
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.
Rec.	Recovery.

Qualifier	Description
T8	Sample(s) received past/too close to holding time expiration.
V	The sample concentration is too high to evaluate accurate spike recoveries.

ESC Lab Sciences 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.

State Accreditations

Alabama	40660	Nevada	TN-03-2002-34
Alaska	UST-080	New Hampshire	2975
Arizona	AZ0612	New Jersey–NELAP	TN002
Arkansas	88-0469	New Mexico	TN00003
California	01157CA	New York	11742
Colorado	TN00003	North Carolina	Env375
Conneticut	PH-0197	North Carolina [1]	DW21704
Florida	E87487	North Carolina [2]	41
Georgia	NELAP	North Dakota	R-140
Georgia [1]	923	Ohio–VAP	CL0069
Idaho	TN00003	Oklahoma	9915
Illinois	200008	Oregon	TN200002
Indiana	C-TN-01	Pennsylvania	68-02979
Iowa	364	Rhode Island	221
Kansas	E-10277	South Carolina	84004
Kentucky [1]	90010	South Dakota	n/a
Kentucky [2]	16	Tennessee [1 4]	2006
Louisiana	AI30792	Texas	T 104704245-07-TX
Maine	TN0002	Texas [5]	LAB0152
Maryland	324	Utah	6157585858
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	109
Minnesota	047-999-395	Washington	C1915
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA
Nebraska	NE-OS-15-05		

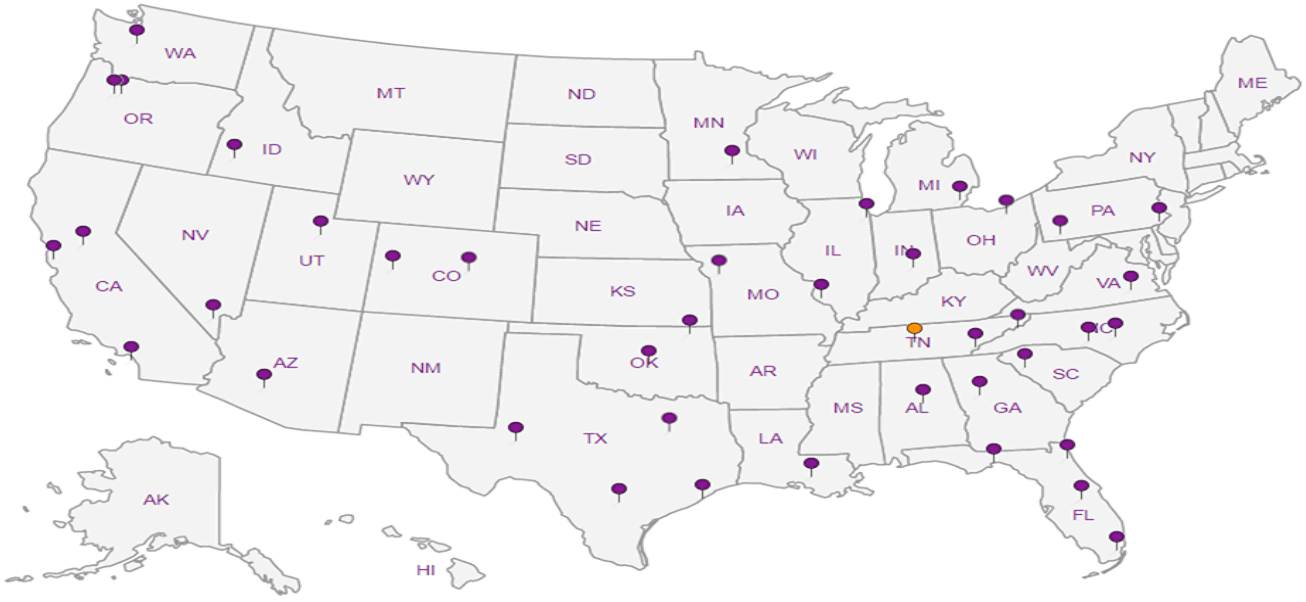
Third Party & Federal Accreditations

A2LA – ISO 17025	1461.01	AIHA-LAP,LLC	100789
A2LA – ISO 17025 [5]	1461.02	DOD	1461.01
Canada	1461.01	USDA	S-67674
EPA–Crypto	TN00003		

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

Our Locations

ESC Lab Sciences 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. **ESC Lab Sciences performs all testing at our central laboratory.**



Civil & Environmental Consultants - TN

325 Seaboard Lane, Suite 170

Billing Information:
Dr. Kevin Wolfe
325 Seaboard Lane, Suite 170
Franklin, TN 37067

Pres Chk

Report to: Philip Campbell

Email To: mjohnson@cecinc.com, pcampbell@cecinc.com

Project Description: EWS Landfill

City/State Collected:

Phone: 615-333-7797
Fax: 615-333-7751

Client Project # 142-059

Lab Project # CEC-142-059

Collected by (print): Philip Campbell

Site/Facility ID #

P.O. #

Collected by (signature): Philip Campbell

Immediately Packed on Ice N ___ Y V

Rush? (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day

Quote #

Date Results Needed

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	ALK 125mlHDPE-NoPres	COD 250mlHDPE-H2SO4	Ca,Fe,K,Mg,Mn,Na 250mlHDPE-HNO3	Cl, NO3, SO4 125mlHDPE-NoPres	NH3 125mlHDPE-H2SO4					Remarks	Sample # (lab only)
							2	2		2							
MW-1	Grab	GW		3-8-17	12:15	5	X	X	X	X	X						-01
MW-3	Grab	GW		3-8-17	14:20	5	X	X	X	X	X						02
FIELD BLANK	Grab	GW		3-8-17	14:30	5	X	X	X	X	X						03

Analysis / Container / Preservative

Chain of Custody Page ___ of ___

ESC LABORATORY SCIENCES
YOUR LAB OF CHOICE
12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

L# LB98750

D029

Acctnum: CEC
Template: T114573
Prelogin: P589489
TSR: 350 - Jimmy Hunt
PB: JE 3-24-17
Shipped Via: Courier

* Matrix:
SS - Soil AIR - Air F - Filter
GW - Groundwater B - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other_____

Remarks: RDL report HOLD ALL SAMPLES until 4-30-17 until further Notice. -pc

pH _____ Temp _____
Flow _____ Other _____

Samples returned via:
__ UPS __ FedEx __ Courier X

Tracking #

Sample Receipt Checklist
COC Seal Present/Intact: NP Y N
COC Signed/Accurate: Y N
Bottles arrive intact: Y N
Correct bottles used: Y N
Sufficient volume sent: Y N
If Applicable
VOA Zero Headspace: Y N
Preservation Correct/Checked: Y N

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)
Philip Campbell	3-9-17	14:00	Johnny Tasker
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)
Johnny Tasker	3/9/17	14:35	
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)
			JA

Trip Blank Received: Yes / No (No) HCL / MeoH TBR

Temp: 2.7 °C Bottles Received: 15

Date: 3-9-17 Time: 14:35

If preservation required by Login: Date/Time

03-032

Condition: NCF / (OK)

L898750

Jimmy Hunt

From: Campbell, Philip <pcampbell@cecinc.com>
Sent: Monday, March 27, 2017 5:07 PM
To: Jimmy Hunt
Subject: RE: EWS March sample analytical

Jimmy,

Please go ahead and analyze Alkalinity and Nitrate even if they are out of hold. I will document this accordingly in my report and assume this would be indicated in the lab report. I don't believe it would cost too much extra to go ahead and run those. Thank you.

Philip

Philip J. Campbell / Assistant Project Manager
Civil & Environmental Consultants, Inc.
325 Seaboard Lane · Suite 170 · Franklin, TN 37067
Toll-Free: (800) 763-2326 · Direct: (615) 577-9354 · Fax: (615) 333-7751
Mobile: (865) 742-2526 · http://www.cecinc.com
Senior Leadership · Integrated Services · Personal Business Relationships

From: Jimmy Hunt [mailto:JHunt@esclabsciences.com]
Sent: Monday, March 27, 2017 1:05 PM
To: Campbell, Philip <pcampbell@cecinc.com>
Subject: RE: EWS March sample analytical

Philip,
All analyses are in hold except for Alkalinity (14 day hold time) and Nitrate (48 hour hold time). Do you want us to run Alkalinity and Nitrate in addition to the other analyses?

Thanks,

Jimmy Hunt
Technical Service Representative
Phone: 615-773-9668
Toll Free: 1-800-767-5859 ext:9668
Email: jhunt@esclabsciences.com

From: Campbell, Philip [mailto:pcampbell@cecinc.com]
Sent: Friday, March 24, 2017 4:13 PM

To: Jimmy Hunt
Subject: EWS March sample analytical

Jimmy,

Can we go ahead and start the lab analysis for the samples collected at the EWS site early this month that I asked to put on hold? Please let me know which constituents are out of hold time and how far out of hold, I think Ammonia is way past and alkalinity is a few days.

Philip J. Campbell / Assistant Project Manager
Civil & Environmental Consultants, Inc.
325 Seaboard Lane · Suite 170 · Franklin, TN 37067
Toll-Free: (800) 763-2326 · Direct: (615) 577-9354 · Fax: (615) 333-7751
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EQUIPMENT CALIBRATION LOG

EQUIPMENT CALIBRATION FORM

NAME OF REPRESENTATIVE	P. Campbell
LOCATION	CEC
DATE AND TIME	3-7-17 / 17:35
Equipment and Model # (ex. YSI Pro Plus 556)	YSI #1 - Pro plus w/ quatro cable
Equipment Serial #	YSI-1

pH Calibration							
pH buffer Calibration Standard	Buffer solution exp. date	Pre-Cal Reading (S.U.)	ph mV Value	Accepted Range mV	Within Range? (Yes or No)	Post-Cal Reading (S.U.)	Calibrated? (yes/no)
4	10/2018	4.03	168	160 to 180	yes	4.00	yes
7	5/2018	7.05	-10	+/-50	yes	7.00	"
10	5/2018	10.04	173	-160 to -180	yes	10.00	"

Temperature Calibration Check	
Cert. Thermometer Value (deg C)	Meter Value (deg C)
—	—

DO Calibration				
Actual Barometric Pressure	Barometric Pressure (mm Hg)	D.O. Value (% Saturated)	Unit reading (%)	% DO accepted?
—	—	100	96.8	yes

Specific Conductivity Calibration				ORP Calibration			
Conductivity Calibration Standard buffer solution	Buffer solution exp. date	Pre Cal Reading (umhos)	Post Cal Reading (umhos)	ORP Calibration (mV)	Buffer solution exp. date	Pre Cal Reading (mV)	Post Cal Reading (mV)
1000	9/2017	998	998	—	—	—	-

Hach Model 2100P Turbidimeter Calibration					
Calibration verification Test performed and passed?	NTU Standard	Within Range? (Yes/No)	Measured Value	Stored?	Final Verification test passed? (Yes/No)
Yes	20				
No	100				
Note: if verification passed, calibration not required	800				

GROUNDWATER MONITORING FIELD INFORMATION LOG

Civil & Environmental Consultants, Inc. 325 Seaboard Lane, Ste. 170 Franklin, Tennessee 37067 - 800-763-2326 - www.cecinc.com

SITE AND MONITORING WELL DATA

FACILITY NAME	EWS	**MONITORING WELL I.D.**	MW-1
LOCATION	Camden, TN	**TEMPERATURE & WEATHER**	clear, Low 60s
DATE & TIME	3-8-17 / 11:50	**EVENT FREQUENCY**	Quarterly
PURGE METHOD	Peristaltic Pump	**FIELD REPRESENTATIVE**	Philip Campbell
TOTAL WELL DEPTH (feet)	30.50 ~~27.00~~	**SAMPLING EQUIPMENT**	Bailer
DEPTH TO WATER (feet)	22.06 ~~22.06~~	**IS SAMPLE EQUIPMENT DEDICATED?**	No
CASING DIAMETER (inches)	2	**DUPLICATE COLLECTED?**	No
WATER COLUMN (feet)	8.44 ~~4.44~~	**FIELD BLANK COLLECTED?**	No
PURGE VOLUME (gallons)	≈4.5	**EQUIPMENT BLANK COLLECTED?**	No

PURGE INFORMATION

Gallons Purged	Time (00:00)	Minutes Purged	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
~~1~~ 0	11:54	0	16.6	5.34	43.8	2.85	47.1	172
1.5	11:58	4	16.1	5.52	60.3	1.19	49.4	~~158~~ 34.6
3.0	12:02	8	16.1	5.70	82.4	0.53	55.5	19.1
4.5	12:08	14	16.1	5.88	134.2	0.23	66.8	9.18

SAMPLE DATA

Gallons Purged	Time Collected (00:00)	Minutes Purged	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
4.5	12:15	14	16.1	5.88	133.5	0.22	67.7	4.18 - metals

Sample Charateristics (Odor, Color)	clear, No odor	**Preservatives Used**	HNO_3, H_2SO_4, None
Number of Containers	4	**Sampler Signature**	Php

WELL DATA

Number of Baffles	4	**Well Cap Dedicated/In Place?**	~~yes~~ No pump
Well Clear of Weeds/Accessible?	yes / yes	**Fittings/Well Head Condition**	good
Pad/Casing Quality	good / good	**Lock Condition**	good

GROUNDWATER MONITORING FIELD INFORMATION LOG

Civil & Environmental Consultants, Inc. 325 Seaboard Lane, Ste. 170 Franklin, Tennessee 37067 - 800-763-2326 - www.cecinc.com

SITE AND MONITORING WELL DATA

FACILITY NAME	EWS	**MONITORING WELL I.D.**	MW-2
LOCATION	Camden, TN	**TEMPERATURE & WEATHER**	clear, 60's
DATE & TIME	3-8-17 / 11:05	**EVENT FREQUENCY**	Quarterly
PURGE METHOD	NA, parameters only	**FIELD REPRESENTATIVE**	Philip Campbell
TOTAL WELL DEPTH (feet)	10.0'	**SAMPLING EQUIPMENT**	~~YSI 600 pro plus~~
DEPTH TO WATER (feet)	5.41	**IS SAMPLE EQUIPMENT DEDICATED?**	No
CASING DIAMETER (inches)	2	**DUPLICATE COLLECTED?**	—
WATER COLUMN (feet)	4.59	**FIELD BLANK COLLECTED?**	—
PURGE VOLUME (gallons)	—	**EQUIPMENT BLANK COLLECTED?**	—

SAMPLE DATA

Gallons Purged	Time Collected (00:00)	Minutes Purged	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU

~~Sample Charateristics (Odor, Color)~~		**Preservatives Used**	
Number of Containers		~~Sampler Signature~~	

WELL DATA

Number of Baffles	3	**Well Cap Dedicated/In Place?**	No pump
Well Clear of Weeds/Accessible?	yes/yes	**Fittings/Well Head Condition**	good
Pad/Casing Quality	OK/OK	**Lock Condition**	good

GROUNDWATER MONITORING FIELD INFORMATION LOG

Civil & Environmental Consultants, Inc. 325 Seaboard Lane, Ste. 170 Franklin, Tennessee 37067 - 800-763-2326 - www.cecinc.com

SITE AND MONITORING WELL DATA

FACILITY NAME	EWS	**MONITORING WELL I.D.**	~~MW-1~~ MW-3
LOCATION	Camden, TN	**TEMPERATURE & WEATHER**	clear, 60s
DATE & TIME	3-8-17 / 12:20	**EVENT FREQUENCY**	Quarterly
PURGE METHOD	Peristaltic Pump	**FIELD REPRESENTATIVE**	Philip Campbell
TOTAL WELL DEPTH (feet)	~~30.5~~ 27.00	**SAMPLING EQUIPMENT**	Bailer
DEPTH TO WATER (feet)	19.31	**IS SAMPLE EQUIPMENT DEDICATED?**	No
CASING DIAMETER (inches)	2	**DUPLICATE COLLECTED?**	NO
WATER COLUMN (feet)	7.69	**FIELD BLANK COLLECTED?**	yes - 1430
PURGE VOLUME (gallons)	3.56	**EQUIPMENT BLANK COLLECTED?**	No

PURGE INFORMATION

Gallons Purged	Time (00:00)	Minutes Purged	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
0	12:37	-	15.9	5.43	786	0.35	130.1	26.7
1.25	12:40	3	15.9	5.41	784	0.27	128.0	39.0
~~2.50~~	12:42	— stop, going dry						
~~3.75~~	12:50-resume purging							
2.50	12:53	8	17.1	5.31	805	1.66	119.9	302
3.50	13:01	16	17.0	5.31	805	1.69	117.8	

SAMPLE DATA

Gallons Purged	Time Collected (00:00)	Minutes Purged	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
3.50	~~1430~~ 1420		15.7	5.36	782	1.44	111.9	30.3

Sample Charateristics (Odor, Color)	clear to milky, No odor	**Preservatives Used**	HNO_3, H_2SO_4, None
Number of Containers	4	**Sampler Signature**	Phil Campbell

WELL DATA

Number of Baffles	4	**Well Cap Dedicated/In Place?**	No pump
Well Clear of Weeds/Accessible?	yes/yes	**Fittings/Well Head Condition**	good
Pad/Casing Quality	good/good.	**Lock Condition**	good

Water Levels (TOTW) (FT)

TMW-2	11.21	MW-2	5.41	MW-5	8.60
TMW-1	6.21	MW-4	11.10		
TMW-3	~~4.62~~ 9.50				

GROUNDWATER MONITORING FIELD INFORMATION LOG

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SITE AND MONITORING WELL DATA

FACILITY NAME	EWS	**MONITORING WELL I.D.**	MW-4
LOCATION	Camden, TN	**TEMPERATURE & WEATHER**	clear, 60's
DATE & TIME	3-8-17/11:05	**EVENT FREQUENCY**	Quarterly
PURGE METHOD	~~Peristaltic Pump~~	**FIELD REPRESENTATIVE**	Philip Campbell
TOTAL WELL DEPTH (feet)	23.10	**SAMPLING EQUIPMENT**	~~Bailer~~
DEPTH TO WATER (feet)	11.10	**IS SAMPLE EQUIPMENT DEDICATED?**	No
CASING DIAMETER (inches)	2	**DUPLICATE COLLECTED?**	—
WATER COLUMN (feet)	12.00	**FIELD BLANK COLLECTED?**	—
PURGE VOLUME (gallons)	—	**EQUIPMENT BLANK COLLECTED?**	—

PURGE INFORMATION

Gallons Purged	Time (00:00)	Minutes Purged	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU

SAMPLE DATA

Gallons Purged	Time Collected (00:00)	Minutes Purged	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU

Sample Charateristics (Odor, Color)	—	**Preservatives Used**	—
Number of Containers	—	**Sampler Signature**	—

WELL DATA

Number of Baffles	0	**Well Cap Dedicated/In Place?**	No pump
Well Clear of Weeds/Accessible?	yes	**Fittings/Well Head Condition**	good
Pad/Casing Quality	good / good	**Lock Condition**	good

GROUNDWATER MONITORING FIELD INFORMATION LOG

Civil & Environmental Consultants, Inc. 325 Seaboard Lane, Ste. 170 Franklin, Tennessee 37067 - 800-763-2326 - www.cecinc.com

SITE AND MONITORING WELL DATA

FACILITY NAME	EWS	**MONITORING WELL I.D.**	MW-5
LOCATION	Camden, TN	**TEMPERATURE & WEATHER**	Clear, 60's
DATE & TIME	3-8-17 1055	**EVENT FREQUENCY**	Quarterly
PURGE METHOD	~~Peristaltic Pump~~	**FIELD REPRESENTATIVE**	Philip Campbell
TOTAL WELL DEPTH (feet)	33.85	**SAMPLING EQUIPMENT**	~~Bailer~~
DEPTH TO WATER (feet)	8.60	**IS SAMPLE EQUIPMENT DEDICATED?**	No
CASING DIAMETER (inches)	2	**DUPLICATE COLLECTED?**	—
WATER COLUMN (feet)	25.25	**FIELD BLANK COLLECTED?**	—
PURGE VOLUME (gallons)	—	**EQUIPMENT BLANK COLLECTED?**	—

PURGE INFORMATION

Gallons Purged	Time (00:00)	Minutes Purged	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU

SAMPLE DATA

Gallons Purged	Time Collected (00:00)	Minutes Purged	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU

Sample Charateristics (Odor, Color)		**Preservatives Used**	
Number of Containers		**Sampler Signature**	

WELL DATA

Number of Baffles	4	**Well Cap Dedicated/In Place?**	No pump
Well Clear of Weeds/Accessible?	yes / yes	**Fittings/Well Head Condition**	good
Pad/Casing Quality	good	**Lock Condition**	good

GROUNDWATER MONITORING FIELD INFORMATION LOG

Civil & Environmental Consultants, Inc. 325 Seaboard Lane, Ste. 170 Franklin, Tennessee 37067 · 800-763-2326 · www.cecinc.com

SITE AND MONITORING WELL DATA

FACILITY NAME	EWS	**MONITORING WELL I.D.**	TMW-1
LOCATION	Camden, TN	**TEMPERATURE & WEATHER**	clear, 60's
DATE & TIME	8-8-17/11:10	**EVENT FREQUENCY**	Quarterly
PURGE METHOD	~~Peristaltic~~ Pump	**FIELD REPRESENTATIVE**	Philip Campbell
TOTAL WELL DEPTH (feet)	32.5	**SAMPLING EQUIPMENT**	~~Bailer~~
DEPTH TO WATER (feet)	~~11.21~~ 6.21	**IS SAMPLE EQUIPMENT DEDICATED?**	No
CASING DIAMETER (inches)	1	**DUPLICATE COLLECTED?**	—
WATER COLUMN (feet)	~~21.29~~ 26.29	**FIELD BLANK COLLECTED?**	—
PURGE VOLUME (gallons)	—	**EQUIPMENT BLANK COLLECTED?**	—

PURGE INFORMATION

Gallons Purged	Time (00:00)	Minutes Purged	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU

SAMPLE DATA

Gallons Purged	Time Collected (00:00)	Minutes Purged	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU

Sample Charateristics (Odor, Color)		**Preservatives Used**	
Number of Containers		**Sampler Signature**	

WELL DATA

Number of Baffles	0	**Well Cap Dedicated/In Place?**	No pump
Well Clear of Weeds/Accessible?	yes	**Fittings/Well Head Condition**	good
Pad/Casing Quality	No pad / No casing	**Lock Condition**	~~Lock~~ PVC cap

GROUNDWATER MONITORING FIELD INFORMATION LOG

Civil & Environmental Consultants, Inc. 325 Seaboard Lane, Ste. 170 Franklin, Tennessee 37067 - 800-763-2326 - www.cecinc.com

SITE AND MONITORING WELL DATA

FACILITY NAME	EWS	**MONITORING WELL I.D.**	TMW-2
LOCATION	Camden, TN	**TEMPERATURE & WEATHER**	Clear, 60's
DATE & TIME	3-8-17 1115	**EVENT FREQUENCY**	Quarterly
PURGE METHOD	~~Peristaltic~~ Pump	**FIELD REPRESENTATIVE**	Philip Campbell
TOTAL WELL DEPTH (feet)	27.50	**SAMPLING EQUIPMENT**	~~Bailer~~
DEPTH TO WATER (feet)	~~18.21~~ 11.21	**IS SAMPLE EQUIPMENT DEDICATED?**	No
CASING DIAMETER (inches)	~~1.25~~ 1"	**DUPLICATE COLLECTED?**	—
WATER COLUMN (feet)	16.29	**FIELD BLANK COLLECTED?**	—
PURGE VOLUME (gallons)	—	**EQUIPMENT BLANK COLLECTED?**	—

PURGE INFORMATION

Gallons Purged	Time (00:00)	Minutes Purged	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU

SAMPLE DATA

Gallons Purged	Time Collected (00:00)	Minutes Purged	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU

Sample Charateristics (Odor, Color)		**Preservatives Used**	
Number of Containers		**Sampler Signature**	

WELL DATA

Number of Baffles	0	**Well Cap Dedicated/In Place?**	No pump
Well Clear of Weeds/Accessible?	yes	**Fittings/Well Head Condition**	good
Pad/Casing Quality	No pad	**Lock Condition**	good

GROUNDWATER MONITORING FIELD INFORMATION LOG

Civil & Environmental Consultants, Inc. 325 Seaboard Lane, Ste. 170 Franklin, Tennessee 37067 - 800-763-2326 - www.cecinc.com

SITE AND MONITORING WELL DATA

FACILITY NAME	EWS	**MONITORING WELL I.D.**	TMW-3
LOCATION	Camden, TN	**TEMPERATURE & WEATHER**	clear, 60's
DATE & TIME	3-8-17 1120	**EVENT FREQUENCY**	Quarterly
PURGE METHOD	~~Peristaltic Pump~~	**FIELD REPRESENTATIVE**	Philip Campbell
TOTAL WELL DEPTH (feet)	28.00	**SAMPLING EQUIPMENT**	~~Bailer~~
DEPTH TO WATER (feet)	9.50	**IS SAMPLE EQUIPMENT DEDICATED?**	No
CASING DIAMETER (inches)	1"	**DUPLICATE COLLECTED?**	-
WATER COLUMN (feet)	18.50	**FIELD BLANK COLLECTED?**	-
PURGE VOLUME (gallons)	-	**EQUIPMENT BLANK COLLECTED?**	-

PURGE INFORMATION

Gallons Purged	Time (00:00)	Minutes Purged	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU

SAMPLE DATA

Gallons Purged	Time Collected (00:00)	Minutes Purged	°C	pH	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU

Sample Charateristics (Odor, Color)		**Preservatives Used**	
Number of Containers		**Sampler Signature**	

WELL DATA

Number of Baffles	0	**Well Cap Dedicated/In Place?**	No pump
Well Clear of Weeds/Accessible?	yes	**Fittings/Well Head Condition**	good
Pad/Casing Quality	No pad	**Lock Condition**	good

Civil & Environmental Consultants - TN

325 Seaboard Lane, Suite 170

Billing Information:
Dr. Kevin Wolfe
325 Seaboard Lane, Suite 170
Franklin, TN 37067

Report to: **Philip Campbell**

Email To: **mjohnson@cecinc.com, pcampbell@cecinc.com**

Project Description: **EWS Landfill**

City/State Collected:

Phone: **615-333-7797**
Fax: **615-333-7751**

Client Project # **142-059**

Lab Project # **CEC-142-059**

Collected by (print):

Site/Facility ID #

P.O. #

Collected by (signature):

Immediately Packed on Ice N ____ Y ____

Rush? (Lab MUST Be Notified)
____ Same Day ____ Five Day
____ Next Day ____ 5 Day (Rad Only)
____ Two Day ____ 10 Day (Rad Only)
____ Three Day

Quote #

Date Results Needed

Pres Chk

Analysis / Container / Preservative

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	ALK 125mlHDPE-NoPres	COD 250mlHDPE-H2SO4	Ca,Fe,K,Mg,Mn,Na 250mlHDPE-HNO3	Cl, NO3, SO4 125mlHDPE-NoPres	NH3 125mlHDPE-H2SO4						
MW-1	Grab	GW		3-31-17	12:15	5	X	X	X	X	X						
MW-3	Grab	GW		3-31-17	14:20	5	X	X	X	X	X						
FIELD BLANK	Grab	GW		3-31-17	14:30	5	X	X	X	X	X						

Chain of Custody Page ___ of ___

ESC LAB SCIENCES
YOUR LAB OF CHOICE
12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

L #

Table #

Acctnum: **CEC**
Template: **T114573**
PreLogIn: **P589489**
TSR: **350 - Jimmy Hunt**
PB:

Shipped Via: **Courier**

Remarks | Sample # (lab only)

* Matrix:
SS - Soil **AIR** - Air **F** - Filter
GW - Groundwater **B** - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other_____

Remarks:RDL report HOLD ALL SAMPLES 4-21-17 per PC

pH _____ Temp _____
Flow _____ Other _____

Samples returned via:
__ UPS __ FedEx __ Courier

Tracking #

Sample Receipt Checklist
COC Seal Present/Intact: __NP __Y __N
COC Signed/Accurate: __Y __N
Bottles arrive intact: __Y __N
Correct bottles used: __Y __N
Sufficient volume sent: __Y __N
If Applicable
VOA Zero Headspace: __Y __N
Preservation Correct/Checked: __Y __N

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Trip Blank Received: Yes / No HCL / MeoH TBR	If preservation required by Login: Date/Time
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Temp: °C Bottles Received:	
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)	Date: Time:	Hold: Condition: NCF / OK