Hillsborough County Florida

PUBLIC UTILITIES
PO Box 1110
Tampa, FL 33601-1110

January 18, 2018

Mr. Steve Tafuni
Florida Department of Environmental Protection
Waste Permitting Section
13051 Telecom Parkway
Temple Terrace, FL 33637

SUBJECT: Southeast County Class I Landfill
WACS Facility ID No. 41193
Supplemental Groundwater Sampling Report – November 2017
Consent Agreement, OGC File No. 17-0058

Dear Mr. Tafuni:

The Hillsborough County Public Utilities Department (County) has prepared this supplemental groundwater data report in accordance with part 9(g) of the referenced Consent Agreement and Rule 62-701.510(8)(a), F.A.C. This water quality sampling event was conducted at the Southeast County Landfill (SCLF) on November 8-9, 2017 to address surficial aquifer impacts on the east side of the Phase II waste filled area.

The County collected representative groundwater samples from monitoring wells TH-20B, TH-38B, TH-66A, TH-67, TH-79, TH-80, TH-81, and TH-82, and analyzed for total dissolved solids (TDS), chloride, sodium, and ammonia. Groundwater samples were analyzed by our contract laboratory, Advanced Environmental Laboratories, Inc. (AEL) and the following paragraphs provide a brief discussion of the parameter-specific water quality observations.

Water Quality Observations

pH

Each of the eight (8) surficial aquifer monitoring wells continue to exhibit pH values below the Secondary Drinking Water Standard (SDWS) acceptable criteria of 6.5 to 8.5 pH units and has historically been observed below this criteria. Background water quality recorded within the surficial aquifer prior to construction and operation of the landfill established the pH and has been consistent over the period of record.

Conductivity

Conductivity observed within the surficial aquifer at the network of monitoring locations ranged from 83 to 1,183 umhos/cm with the highest value at monitoring well TH-79. Over the last nine (9) months the County has observed water quality improvements as conductivity values significantly decreased from 4,980 umhos/cm in February 2017 to 1,183 umhos/cm, respectively.

Monitoring well TH-67 also continues to decrease in conductivity over the period of record. Over the last four (4) water quality monitoring events, conductivity levels at this location has dropped from 3,830 uhmos/cm to its current value of 497.4 uhmos/cm, respectively. The County believes this trend shall continue over time as implementation of the corrective actions and natural attenuation continue to create a positive effect on water quality.

Chloride

Chloride ranged from 3.9 to 180 mg/l with the highest value exhibited in TH-79 and represents the most impacted location across the monitoring well network. Historically, chloride has been observed above the SDWS of 250 mg/l in wells TH-67, TH-79, and TH-81; however, over the last two monitoring events, chloride levels have dropped well below the SDWS as the corrective actions continue to take effect.

Total Dissolved Solids (TDS)

TDS has been consistently above the SDWS of 500 mg/l within a number of groundwater monitoring wells east of the Phase II waste filled area. During this water quality monitoring event, TH-79 exhibited a value of 590 mg/l, slightly exceeding the SDWS of 500 mg/l. This value continues to exhibit a downward trend since TDS was 2,700 mg/l in February 2017.

Groundwater monitoring well TH-67 also exhibits a downward trend over the period of record for TDS. Between February 2016 and May 2017, TDS values ranged from 1,400 to 2,000 mg/l.

However, over the last two quarterly monitoring events, the TDS values were well below the SDWS indicating the implementation of the corrective actions continues to create a positive effect on water quality. The remaining groundwater monitoring network, except for TH-79 did not indicate any drinking water exceedance during this monitoring event.

Sodium

Sodium values ranged from 4.5 to 120 mg/l during this water quality monitoring event well below the Primary Drinking Water Standard (PDWS) of 160 mg/l and continues to indicate a downward trend across the affected area. Over the period of record, monitoring wells TH-67, TH-79, and TH-81 have exhibited adverse sodium levels above the PDWS. The water quality in TH-67 continues to indicate improvements over the last two monitoring events with sodium levels decreasing from 380 mg/l to 38 mg/l. Monitoring wells TH-79 and TH-81 have also showed significant improvement between the May 2017 and November 2017 monitoring events as sodium decreased from 730 mg/l to 120 mg/l and 280 mg/l to 8.2 mg/l, respectively. The County believes the implementation of corrective actions within the landfill and natural attenuation of water quality continues to support this position.

Groundwater Elevations and Flow Direction

Groundwater elevations were recorded prior to sampling the eight (8) surficial aquifer groundwater monitoring wells on November 8, 2017. A surficial aquifer groundwater contour diagram was prepared to evaluate the general direction of flow at and around the affected area. The direction of flow in the surficial aquifer continues toward the Mine Cut to the southeast-east-northeast directions and is consistent with the historical evaluations in this general area. The surface water elevation in Mine Cut 1 is the primary influence on the direction of flow in this area, and is clearly demonstrated by the elevation data recorded.

Conclusions

Water quality observed in surficial aquifer monitoring wells along the east side of Phase II exhibited minimal impacts from leachate originating from the landfill. Monitoring well TH-79 indicated TDS slightly exceeding the SDWS; however, continues to be an improvement over the period of record since February 2017. All other parameters from the remaining monitoring wells including compliance wells identified as TH-80, TH-81, and TH-82 were within their respective cleanup standards and continue to exhibit significant improvements in water quality as the area of impact has been significantly reduced.

In accordance with the agreement during the October 12, 2017 meeting between the County and the Department, it was agreed by the two parties to install one (1) additional surficial aquifer groundwater monitoring well south of TH-67. Surficial aquifer monitoring well TH-83 was installed on December 28, 2017 and the initial water quality parameters collected on January 4, 2018 as outlined in part 9(g) of the Consent Agreement. The laboratory analytical results shall be provided as part of the February 2018 submittal.

Ongoing evaluation and implementation of the remedial actions shall continue along the Phase II area of the landfill. The improved water quality generated from the combination of these remedial processes and natural attenuation of the surficial aquifer are supported by the representative groundwater data. While seasonal groundwater fluctuation may result in the rebound of some constituents of concern, the County believes that the overall downward trend will continue based on corrective actions implemented to date. The next quarterly water quality monitoring event from the nine (9) wells is scheduled for February 2018.

Enclosed for your review please find a detailed site location map, a November 2017 water quality data summary table, the groundwater elevation data summary table, a November 2017 surficial aquifer groundwater elevation and contour diagram, historical data tables for the eight monitoring wells included in the supplemental assessment sampling events, and the complete laboratory analytical data report from AEL.

Should you have any questions, require any additional information, or would like to discuss the information provided within this submittal, please feel free to contact us at (813) 663-3222 or (813) 612-7757.

Respectfully submitted,

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Senior Hydrologist
Environmental Services
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1/18/2018

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Public Utilities Department

DSA/mdt
TSD\...\solid waste\enviro\Southeast\SELF Supplemental Site Assessment Project\Reports\SCLF Supplemental Eval Report November 17.pdf

Enclosures
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SOUTHEAST COUNTY LANDFILL

GROUNDWATER MONITORING WELL LOCATION MAP

2016 AERIAL PHOTO

Legend

Existing Monitoring Wells

Hillsborough County Florida

Southeast County Landfill
Supplemental Site Assessment Data
November 8-9, 2017

General Parameters Detected	Surficial Aquifer Wells								MCL Standard
	TH-20B	TH-38B	TH-66A	TH-67	TH-79	TH-80	TH-81	TH-82	
well type	Background	Background	Detection	Detection	Detection	Detection	Detection	Background	
conductivity (umhos/cm) (field)	192.9	49.6	342.1	497.4	1183	714	216.8	83	NS
dissolved oxygen (mg/l) (field)	2	1.27	1.93	2.06	4.39	3.24	1.73	1.28	NS
ORP (mV)	-26.7	28.1	-158.7	-9.5	-27.7	-100.7	76	-17.5	NS
temperature (°C) (field)	25.90	26.10	25.90	25.40	24.90	25.70	26.50	27.40	NS
turbidity (NTU) (field)	4.3	11.2	1.89	5.05	2.81	17.3	13	27.4	NS
pH (SU) (field)	**5.95**	**5.16**	**6.09**	**6.43**	**6.28**	**5.95**	**5.95**	**5.30**	(6.5 - 8.5)**
ammonia nitrogen (mg/l as N)	1.3	0.23	0.88	1.5	4.5	0.36	0.025 u	1.4	NS
chloride (mg/l)	18	3.9 i	24	79	180 j4	110	15	8.4	250**
total dissolved solids (mg/l)	130	30	160	280	**590**	370	100	68	500**
Metals Detected (mg/l)									MCL Standard
sodium	10	2.8	15	38	120	63	8.2	4.5	160*

Notes: Reference Groundwater Guidance Concentrations, FDEP 2012

NS=No Standard

MCL=Maximum Contaminant Level (Groundwater Standards)

*= Primary Drinking Water Standards as per Cahpter 62-550.310, F.A.C.

**=Secondary Drinking Water Standards as per Chapter 62-550.320, F.A.C.

***=Groundwater Cleanup Target Levels as per Chapter 62-777, FAC

5.95 Exceeds Standard

NTU=Nephelometric Turbidity Units

i = reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.

u = parameter was analyzed but not detected.

j4 = estimated value

ug/l=micrograms per liter

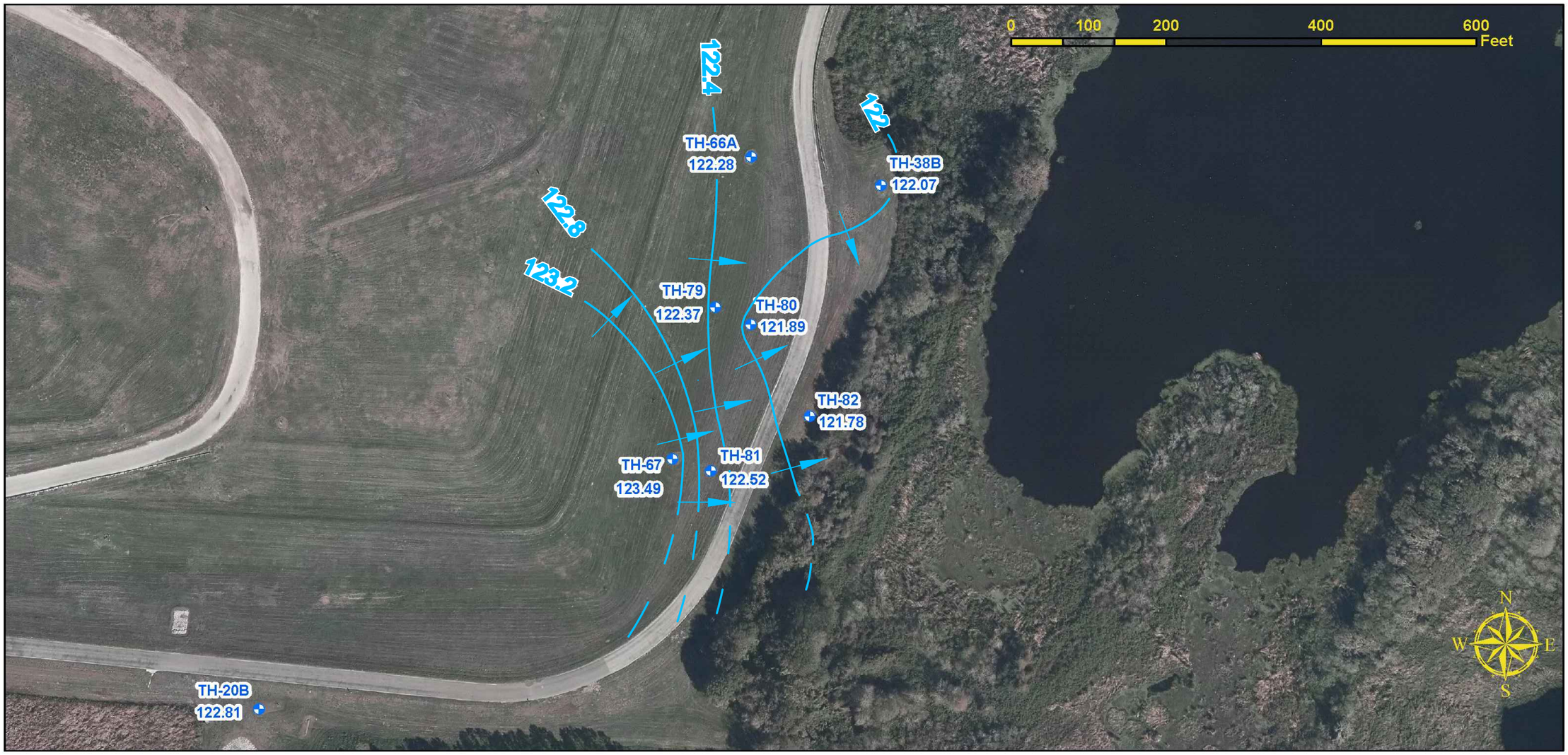
mg/l=milligrams per liter

mV = millivolts

Southeast County Landfill
Surficial Aquifer Groundwater Elevations
November 8, 2017

Measuring Point I.D.	T.O.C. Elevations (NGVD)	W.L. B.T.O.C.	W.L. (NGVD)
TH-20B	132.57	9.76	122.81
TH-38B	131.81	9.74	122.07
TH-66A	130.66	8.38	122.28
TH-67	129.51	6.02	123.49
TH-79	129.60	7.23	122.37
TH-80	129.52	7.63	121.89
TH-81	130.26	7.74	122.52
TH-82	131.24	9.46	121.78

NGVD	**= National Geodetic Vertical Datum**
T.O.C.	**= Top of Casing**
B.T.O.C.	**= Below Top of Casing**
W.L.	**= Water Level**



SOUTHEAST COUNTY LANDFILL
SURFICIAL AQUIFER GROUNDWATER CONTOUR MAP
NOVEMBER 8, 2017

2016 AERIAL PHOTO

Legend

- Existing Monitoring Wells
- Direction Of Flow

Hillsborough County Florida
EST. 1834
SM

Southeast County Landfill
Historical Supplemental Assessment Groundwater Data
TH-20B

Field Parameters	May-16	Nov-16	Feb-17	Jun-17	Aug-17	Nov-17	MCL Standard
conductivity (umhos/cm) (field)	473	332	427	275	294	192.9	NS
dissolved oxygen (mg/l) (field)	0.23	0.27	0.18	0.19	0.1	2	NS
ORP (mV)	-9.6	-31.2	-41.7	36.9	-34	-26.7	NS
temperature (°C) (field)	23.47	25.47	23.77	23.92	25.51	25.90	NS
turbidity (NTU) (field)	2.39	4.14	3.77	1.37	2.82	4.3	NS
pH (field)	**5.67**	**5.43**	**5.82**	**5.52**	**5.72**	**5.95**	**(6.5 - 8.5)****
General Parameters							**MCL Standard**
total dissolved solids (mg/l)	310	200	230	130	150	130	**500****
chloride (mg/l)	92	63	83	38	34	18	**250****
ammonia nitrogen (mg/l as N)	2.2	1.5	1.2	1.2	1.7	1.3	NS
Metals Detected (mg/l)							**MCL Standard**
sodium	35	15	31	24	14	10	**160***

Note: Reference FDEP Groundwater Guidance Concentrations
NS = No Standard
MCL = Maximum Contaminant Level
* = Primary Drinking Water Standard
** = Secondary Drinking Water Standard
5.67 = Exceeds Standard
mV = millivolts
NTU = Nephelometric Turbidity Units
mg/l = milligrams per liter
NGVD = National Geodedic Vertical Datum

Southeast County Landfill
Historical Supplemental Assessment Groundwater Data
TH-38B

Field Parameters	May-16	Nov-16	Feb-17	May-17	Aug-17	Nov-17	MCL Standard
conductivity (umhos/cm) (field)	70	61	103	ND	46	49.6	NS
dissolved oxygen (mg/l) (field)	1.5	0.76	2.02	ND	0.96	1.27	NS
ORP (mV)	175.5	-22.9	6.2	ND	158	28.1	NS
temperature (°C) (field)	24.78	25.37	23.93	ND	26.66	26.10	NS
turbidity (NTU) (field)	8.75	16	16.5	ND	46.6	11.2	NS
pH (field)	**4.95**	**4.73**	**5.45**	ND	**4.69**	**5.16**	(6.5 - 8.5)**
General Parameters							**MCL Standard**
total dissolved solids (mg/l)	65	45	57	ND	73	30	500**
chloride (mg/l)	4.2 i	4.2 i	8.2	ND	3.4 i	3.9 i	250**
ammonia nitrogen (mg/l as N)	0.79	0.66	1.4	ND	0.14	0.23	NS
Metals Detected (mg/l)							**MCL Standard**
sodium	2.8	3	3.6	ND	2.7	2.8	160*

Note: Reference FDEP Groundwater Guidance Concentrations
NS = No Standard
MCL = Maximum Contaminant Level
ND = No Data, well was dry
* = Primary Drinking Water Standard
** = Secondary Drinking Water Standard
mV = millivolts
NTU = Nephelometric Turbidity Units
mg/l = milligrams per liter
NGVD = National Geodedic Vertical Datum

Southeast County Landfill
Historical Supplemental Assessment Groundwater Data
TH-66A

Field Parameters	Feb-16	Feb-16	May-16	Nov-16	Feb-17	May-17	Aug-17	Nov-17	MCL Standard
conductivity (umhos/cm) (field)	295	313	334	512	580	513	376	342.1	NS
dissolved oxygen (mg/l) (field)	0.38	0.5	0.65	0.33	0.64	1.13	0.09	1.93	NS
ORP (mV)	ND	ND	69.7	-3	-69.2	30.3	-102.9	-158.7	NS
temperature (°C) (field)	27.01	21.5	24.55	25.44	23.68	27.67	26.63	25.90	NS
turbidity (NTU) (field)	3.17	1.35	0.86	0.49	1.06	2.17	1.81	1.89	NS
pH (field)	**6.00**	**6.12**	**6.03**	**5.82**	**6.18**	**6.09**	**5.88**	**6.09**	(6.5 - 8.5)**
General Parameters									**MCL Standard**
total dissolved solids (mg/l)	180	180	180	320	300	230	250	160	500**
chloride (mg/l)	4.9 i	15	15	92	78	52	16	24	250**
ammonia nitrogen (mg/l as N)	0.22	0.12	0.34	0.44	0.5	0.57	0.02 u	0.88	NS
Metals Detected (mg/l)									**MCL Standard**
sodium	5.7	8.7	9.5	21	21	20	15	15	160*

Note: Reference FDEP Groundwater Guidance Concentrations
NS = No Standard
MCL = Maximum Contaminant Level
* = Primary Drinking Water Standard
** = Secondary Drinking Water Standard
6.00 = Exceeds Standard
mV = millivolts
NTU = Nephelometric Turbidity Units
mg/l = milligrams per liter
NGVD = National Geodedic Vertical Datum

Southeast County Landfill
Historical Supplemental Assessment Groundwater Data
TH-67

Field Parameters	Aug-15	Feb-16	May-16	Nov-16	Feb-17	May-17	Aug-17	Nov-17	MCL Standard
conductivity (umhos/cm) (field)	429	1780	3973	2166	3830	3630	215	497.4	NS
dissolved oxygen (mg/l) (field)	0.55	1.05	0.42	3.04	2.13	0.26	0.31	2.06	NS
ORP (mV)	ND	ND	-7.9	-100	-41.7	-12.1	43.2	-9.5	NS
temperature (°C) (field)	28.32	20.81	24.63	25.23	24.52	25.25	26.79	25.40	NS
turbidity (NTU) (field)	1.13	10.11	7.64	5.29	8.72	7.64	16.5	5.05	NS
pH (field)	**6.41**	**5.98**	**6.18**	**6.21**	**6.44**	**6.32**	**6.29**	**6.43**	**(6.5 - 8.5)****
General Parameters									**MCL Standard**
total dissolved solids (mg/l)	220	**1600**	**2200**	**1400**	**2000**	**2000**	150	280	**500****
chloride (mg/l)	29	**620**	**910**	**600**	**990**	**790**	13	79	**250****
ammonia nitrogen (mg/l as N)	0.12	1.5	36	11	14	14	0.02 u	1.5	NS
Metals Detected (mg/l)									**MCL Standard**
sodium	8.7	120	**360**	49	**330**	**380**	8.4	38	**160***

Note: Reference FDEP Groundwater Guidance Concentrations
NS = No Standard
MCL = Maximum Contaminant Level
* = Primary Drinking Water Standard
** = Secondary Drinking Water Standard
6.18 = Exceeds Standard
mV = millivolts
NTU = Nephelometric Turbidity Units
mg/l = milligrams per liter
NGVD = National Geodedic Vertical Datum

Southeast County Landfill
Historical Supplemental Assessment Groundwater Data
TH-79

General Parameters	Nov-16	Feb-17	May-17	Aug-17	Nov-17	MCL Standard
conductivity (umhos/cm) (field)	2740	4980	5212	2221	1183	NS
dissolved oxygen (mg/l) (field)	0.25	1.73	1.23	1.67	4.39	NS
ORP (mV)	1.4	-20.3	-40.6	-30.8	-27.7	NS
temperature (°C) (field)	24.03	21.77	25.49	28.04	24.90	NS
turbidity (NTU) (field)	27.6	60.2	12	2.66	2.81	NS
pH (field)	**6.09**	**6.40**	**6.29**	**6.19**	**6.28**	**(6.5 - 8.5)****
Field Parameters						**MCL Standard**
total dissolved solids (mg/l)	**1500**	**2700**	**2600**	**1200**	**590**	**500****
chloride (mg/l)	500	**1200**	**1000**	**430**	180 j4	**250****
ammonia nitrogen (mg/l as N)	30	35	32	8.8	4.5	NS
Metals Detected (mg/l)						**MCL Standard**
sodium	140	**650**	**730**	**280**	120	**160***

Note: Reference FDEP Groundwater Guidance Concentrations

NS = No Standard

MCL = Maximum Contaminant Level

* = Primary Drinking Water Standard

** = Secondary Drinking Water Standard

6.09 = Exceeds Standard

mV = millivolts

NTU = Nephelometric Turbidity Units

mg/l = milligrams per liter

NGVD = National Geodedic Vertical Datum

Southeast County Landfill
Historical Groundwater Assessment Groundwater Data
TH-80

Field Parameters	Mar-17	May-17	Aug-17	Nov-17	MCL Standard
conductivity (umhos/cm) (field)	889	1090	1055	714	NS
dissolved oxygen (mg/l) (field)	0.38	0.16	0.05	3.24	NS
ORP (mV)	-10.7	34.2	-120.4	-100.7	NS
temperature (°C) (field)	24.49	25.26	25.17	25.70	NS
turbidity (NTU) (field)	16	10.6	37	17.3	NS
pH (field)	**5.67**	**5.63**	**5.69**	**5.95**	**(6.5 - 8.5)****
General Parameters					**MCL Standard**
total dissolved solids (mg/l)	500	**630**	**680**	370	**500****
chloride (mg/l)	130 j4	170	210	110	**250****
ammonia nitrogen (mg/l as N)	1.5	0.74	0.64	0.36	NS
Metals Detected (mg/l)					**MCL Standard**
sodium	37	55	92	63	**160***

Note: Reference FDEP Groundwater Guidance Concentrations
NS = No Standard
MCL = Maximum Contaminant Level
* = Primary Drinking Water Standard
** = Secondary Drinking Water Standard
5.67 = Exceeds Standard
mV = millivolts
NTU = Nephelometric Turbidity Units
mg/l = milligrams per liter
NGVD = National Geodedic Vertical Datum

Southeast County Landfill
Historical Supplemental Assessment Groundwater Data
TH-81

Field Parameters	Mar-17	May-17	Aug-17	Nov-17	MCL Standard
conductivity (umhos/cm) (field)	2723	2476	493	216.8	NS
dissolved oxygen (mg/l) (field)	0.53	0.72	1.77	1.73	NS
ORP (mV)	24.9	17.7	68.5	76	NS
temperature (°C) (field)	23.7	25.81	28.68	26.50	NS
turbidity (NTU) (field)	16.1	27.5	22.7	13	NS
pH (field)	**6.00**	**6.05**	**6.12**	**5.95**	(6.5 - 8.5)**
General Parameters					**MCL Standard**
total dissolved solids (mg/l)	**2000**	**1500**	230	100	500**
chloride (mg/l)	**810**	**670**	62	15	250**
ammonia nitrogen (mg/l as N)	4.1	2.3	0.52	0.025 u	NS
Metals Detected (mg/l)					**MCL Standard**
sodium	**250**	**280**	37	8.2	160*

Note: Reference FDEP Groundwater Guidance Concentrations
NS = No Standard
MCL = Maximum Contaminant Level
* = Primary Drinking Water Standard
** = Secondary Drinking Water Standard
6.00 = Exceeds Standard
mV = millivolts
NTU = Nephelometric Turbidity Units
mg/l = milligrams per liter
NGVD = National Geodedic Vertical Datum

Southeast County Landfill
Historical Supplemental Assessment Groundwater Data
TH-82

Field Parameters	Mar-17	Jun-17	Aug-17	Nov-17	MCL Standard
conductivity (umhos/cm) (field)	239	210	82	83	NS
dissolved oxygen (mg/l) (field)	0.23	0.70	4.11	1.28	NS
ORP (mV)	-147.1	41.9	177.2	-17.5	NS
temperature (°C) (field)	26.16	25.5	27.84	27.40	NS
turbidity (NTU) (field)	ND	33.4	34.3	27.4	NS
pH (field)	**5.69**	**5.48**	**4.73**	**5.30**	(6.5 - 8.5)**
General Parameters					**MCL Standard**
total dissolved solids (mg/l)	130	94	65	68	500**
chloride (mg/l)	25	22	4.3 i	8.4	250**
ammonia nitrogen (mg/l as N)	4.9	4.7	0.02 u	1.4	NS
Metals Detected (mg/l)					**MCL Standard**
sodium	11	9	2.8	4.5	160*

Note: Reference FDEP Groundwater Guidance Concentrations
NS = No Standard
MCL = Maximum Contaminant Level
* = Primary Drinking Water Standard
** = Secondary Drinking Water Standard
5.69 = Exceeds Standard
mV = millivolts
NTU = Nephelometric Turbidity Units
mg/l = milligrams per liter
NGVD = National Geodedic Vertical Datum