

## PART L

### WATER QUALITY MONITORING REQUIREMENTS

#### L.1 WATER QUALITY MONITORING PLAN

HDR Engineering, Inc. prepared this Water Quality Monitoring Plan (WQMP) for the Hillsborough Southeast County Landfill to supplement Part H [Hydrogeological Investigation Requirements (62-701.410(1), F A C.)] of the June 2013 FDEP permit renewal application. This WQMP is intended to replace the monitoring plan included in the current Operating Permit #35435-022-S0/01.

The WQMP proposes a monitoring network that includes an array of groundwater monitoring wells and surface water sampling points to detect potential impacts from the landfill. The WQMP will specify the methods of collecting and analyzing groundwater, surface water, and leachate samples and for reporting the results to the FDEP and describing actions to be taken if an impact occurs.

The monitoring network is summarized by the following lists: the locations of these wells are included in Figure L.1.

#### **Groundwater Monitoring**

Wells associated with the semi-annual monitoring of Phase I-VI

Well #	WACs ID	Aquifer	Designation
TH-19	821	Floridan	Background
TH-22A	19861	Surficial	Background
TH-28A	19862	Surficial	Detection
TH-40	822	Floridan	Compliance
TH-57	1570	Surficial	Detection
TH-58	1571	Surficial	Detection
TH-65	20530	Surficial	Detection
TH-66	20531	Surficial	Detection
TH-66A	22961	Surficial	Detection
TH-67	20532	Surficial	Detection
TH-72	27753	Floridan	Detection
TH-78	29337	Floridan	Compliance

Wells associated with semi-annual monitoring Sections 7, 8, and 9

Well #	WACs ID	Aquifer	Designation
TH-36A	20329	Surficial	Background
TH-61	20493	Surficial	Detection
TH-61A	22595	Surficial	Detection
TH-64	20494	Surficial	Detection
TH-68	22039	Surficial	Detection
TH-69A	22958	Surficial	Detection
TH-70A	22959	Surficial	Detection
TH-71A	22960	Surficial	Detection

Inactive wells reserved for future use

Well #	Aquifer	Designation
TH-20A	Surficial	Water level only
TH-20B	Surficial	Water level only
TH-22	Surficial	Water level only
TH-24	Surficial	Water level only
TH-30	Surficial	Water level only
TH-32	Surficial	Water level only
TH-35	Surficial	Water level only
TH-35A	Floridan	
TH-38B	Surficial	Water level only
TH-41	Floridan	Water level only
TH-42	Floridan	Water level only
TH-73	Surficial	Water level only
TH-76	Floridan	Water level only
TH-77	Floridan	Water level only

Piezometers

Well #	Aquifer	Designation
P-11D	Surficial	Water level only

**Surface Water Monitoring**

Surface water semi-annual monitoring locations

Sample Point/WACS	Location	Survey Mark and Elevation (NGVD)
1-A	Mine Cut#1	6.00 = 124.73 ft
3A/836	LFC at SW boundary	6.00 = 125.00 ft
3B2B/837	LFC WNW of TH-30	3.00 = 97.63 ft
3C2/838	LFC at NW boundary	3.00 = 91.99 ft

LFC – Long Flat Creek

A map of site features, including the groundwater monitoring well locations, surface water sampling points, and gas monitoring probe locations is included as Figure L.1.

The following provides the required description of the proposed ground water and surface water monitoring system. The current permit (35435-022-SO/01), in Appendix 3: Water Quality Monitoring Plan V.E.6, requires Monitoring Plan Evaluations to be prepared and submitted on December 15, 2015, and June 15, 2018. These evaluations will be prepared and submitted prior to the due dates.

#### **L.1.a Sign and Seal**

The WQMP is based on the information obtained in the hydrogeological investigation and the 2010 and 2013 water quality monitoring plan evaluations. It has been prepared under the supervision of and signed and sealed by John S. Catches, PG 2203, in accordance with Chapter 62-701.510(2)(a), FAC.

#### **L.1.b Sampling and Analysis**

Sampling and analyses will be performed in accordance with Chapter 62-160 (Quality Assurance), Chapter 62-701.510(2)(b) FAC, and the DEP Standard Operating Procedures 001/01. TestAmerica Laboratories in Tampa is the current analytical laboratory contracted by Hillsborough County. TestAmerica is certified by the Department of Health, Environmental Certification Program.

#### **L.1.c Groundwater Monitoring Requirements**

The WQMP was prepared based on the requirements of Chapter 62-701.510(3), FAC.

- (1) Detection wells located downgradient from and within 50 feet of disposal units; The detection monitoring network consists of 3 background wells, 15 detection wells, and 15 water level monitoring locations (piezometers and inactive wells). These wells appear in the summary list above and are shown on the map in Figure L.1.
- (2) Downgradient compliance wells; if the Department determines based on Detection well monitoring results that evaluation monitoring is required. Compliance wells will be installed at the limits of the Zone of Discharge within 90 days after receiving notification from the Department that they are required, in accordance with Chapter 62-701.510(6). Currently, only TH-40 and TH-78 are designated as compliance wells.
- (3) Background wells screened in all aquifers below the landfill that may be affected by the landfill; Two aquifer zones are recognized at the SCLF – the Floridan aquifer and the surficial aquifer. Background well TH-19 is the upgradient Floridan aquifer background monitoring well, and TH-22A and TH-36A are the upgradient surficial background monitoring wells. The background well locations are shown in Figure L-1.

- (4) Location information for each monitoring well; The locations of existing and proposed monitoring wells are shown in Figure L-1. Survey information is included in Table L-1.
- (5) Well spacing no greater than 500 feet apart for downgradient wells and no greater than 1500 feet apart for upgradient wells, unless site specific conditions justify alternative well spacings; No changes are proposed for the well spacing downgradient of Phases I-VI. Because of the convergent groundwater flow pattern on the downgradient western boundary of Phases I-VI, relatively few wells are required to comply with the 500-foot well spacing requirement in Chapter 62-701.510(3)(d)3 FAC. Monitoring wells downgradient of Section 9 are spaced approximately 450 feet apart.
- (6) Properly selected well screen locations; Well screens for the detection wells in unconfined surficial aquifers are designed to monitor the conditions at the water table. Screened intervals are expected to remain adequate through observation of water levels during the lifetime of the detection well. At locations where water level variance has resulted in submerged screens, an alternant monitoring well, designated with an A has been installed to ensure that a representative water table sample can be collected.
- (7) Monitoring wells constructed to provide representative ground water samples; Surficial aquifer monitoring wells installed at the SCLF are intended to monitor the water table. At locations where water level variance has resulted in submerged screens, an alternant monitoring well, designated with an A has been installed to ensure that a representative water table sample can be collected. Note that only one well at each location is sampled during each event.
- (8) Procedures for properly abandoning monitoring wells; Unused wells or piezometers will be abandoned properly when approved for abandonment and as specified in Chapter 40D-3.531 FAC. Abandonment of the following piezometers and wells is proposed as part of this WQMP:

Well #	Aquifer	Designation
P-4S	Surficial	Water level only
P-4D	Surficial	Water level only
P-5D	Surficial	Water level only
P-6D	Surficial	Water level only
P-7D	Surficial	Water level only
P-8D	Surficial	Water level only
P-12S	Surficial	Water level only
P-13S	Surficial	Water level only
P-14S	Surficial	Water level only
P-15S	Surficial	Water level only
P-16S	Surficial	Water level only
P-16I	Surficial	Water level only
P-16D	Surficial	Water level only

P-17S	Surficial	Water level only
P-17I	Surficial	Water level only
P-17D	Surficial	Water level only
P-18S	Surficial	Water level only
P-19*	Surficial	Water level only
P-20*	Surficial	Water level only
P-21*	Surficial	Water level only
P-22*	Surficial	Water level only
P-23*	Surficial	Water level only
TH-19A	Floridan	Water level only
TH-34A	Surficial	Water level only
TH-74	Surficial	Assessment
TH-75	Surficial	Assessment

\* Piezometers P-19 through P-23 were not included in 2013 WQMP. These piezometers used for future cell design data.

- (9) Detailed description of detection sensors, if proposed; Detection sensors have not been proposed at this time.

**L.1.d Surface Water Monitoring Requirements (62-701.510(4), FAC**

- (1) Location of and justification for all proposed surface water monitoring points; Two surface water bodies are currently being monitored as part of the SCLF monitoring plan: the Mining Cut #1 and Long Flat Creek (a minor tributary located along the west side of the property). Sampling point 1-A is located in Mining Cut #1. Sampling points in Long Flat Creek (from upstream) are designated as 3A, 3B2B, and 3C. Mining Cut #1 was selected to monitor the upgradient side of the SCLF. The Long Flat Creek locations monitor downgradient of the landfill, beginning upstream at 3A where the creek is gaining from groundwater to 3B2B as the stream transitions from a gaining stream to 3C at the point where the stream leaves the site.
- (2) Each surface water monitoring point location has been marked, and the position has been determined and recorded by a registered Florida land surveyor.

**L.1.e Initial and Routine Sampling Frequency and Requirements (62-701.510(5), FAC**

- (1) Initial background ground water and surface water sampling and analysis requirements;  
All new monitoring wells required by permit will be sampled for parameters listed in Rule 62-701.510(7)(a) and (c) before waste disposal begins, if applicable (Table L.1.e.(1)).

(2) Routine Monitoring Well Sampling and Analysis Requirements:

The detection well samples have been collected and analyzed semi-annually for the parameters listed in 62-701.510(7)(a) (Table L.1.e(2)) in accordance with Operating Permit #35435-022-S0/01. There are no changes being proposed to the sampling parameter list.

(3) Routine Surface Water Sampling and Analysis Requirements:

Surface water monitoring points will be sampled semi-annually for the parameters listed in Table L.1.e(3).

Table L.1.e(1) Initial Sampling Parameters

<b>Field Parameters</b>	<b>Laboratory Parameters</b>
Static water levels	Total ammonia – N
Specific Conductivity	Chlorides
Temperature	Iron
pH	Nitrate
Dissolved Oxygen	Sodium
Turbidity	Total dissolved solids (TDS)
Colors and Sheens	Those parameters listed in 40 CFR Part 258 Appendix II*

\* Mercury not listed because it is included in Appendix II.

\* Appendix I is not listed because it is a subset of Appendix II

Table L.1.e.(2) Routine Sampling Parameters

<b>Field Parameters</b>	<b>Laboratory Parameters</b>
Static water levels before purge	Total ammonia – N
Specific Conductance	Chlorides
pH	Iron
Dissolved oxygen	Mercury
Turbidity	Nitrate
Temperature	Sodium
Colors and sheens by observation	Total dissolved solids (TDS)
	Those parameters listed in 40 CFR Part 258 Appendix I

Table L.1.e.(3) Surface Water Sampling Parameters

Field Parameters	Laboratory Parameters
Specific Conductivity	Unionized ammonia as N
pH	Total hardness as CaCO <sub>3</sub>
Dissolved oxygen	Biochemical Oxygen Demand (BOD <sub>5</sub> )
Turbidity	Iron
Temperature	Mercury
Colors and sheens by observation	Nitrate
	Total Dissolved Solids (TDS)
	Total Organic Carbon (TOC)
	Fecal Coliform
	Total Phosphorus as P
	Chlorophyll A
	Total nitrogen
	Chemical Oxygen Demand (COD)
	Total Suspended Solids (TSS)
	Those parameters listed in 40 CFR Part 258 Appendix I

**L.1.f Evaluation Monitoring, Prevention Measures, and Corrective Action**

If monitoring parameters are detected in detections wells at concentrations that are significantly above background water quality or that are at concentrations above the Department's water quality standards or criteria specified in 62-520, FAC, the well will be re-sampled within 30 days after the initial analytical data are received to confirm the data. If the data are confirmed or the well is not re-sampled, the Department will be notified in writing within 14 days of the finding. It is understood that the County will initiate Evaluation Monitoring upon receipt of this notification.

Evaluation monitoring:

- (1) Routine monitoring of all monitoring wells will continue according to the permit requirements.
- (2) Within 90 days of initiating evaluation monitoring and annually thereafter, the background wells and all affected detection wells will be sampled for the parameters listed in 62-701.510(8)(c). Any new parameter detected and confirmed in the downgradient wells will be added to the routine groundwater monitoring parameter list.

- (3) Within 90 days of initiating evaluation monitoring, compliance monitoring wells will be installed at the compliance line of the zone of discharge and downgradient of the affected detection wells. The compliance wells will be installed in accordance with 62-701.510(3)(d) and samples from these wells and the affected detection wells will be sampled and analyzed quarterly for the parameters listed in 62-701.510(7)(c).
- (4) Within 180 days of initiating evaluation monitoring, a contamination evaluation plan will be submitted to the Department. The contamination plan will be designed to delineate the extent and cause of contamination and to predict the probability that Department water quality standards are not violated outside of the zone of discharge and to evaluate methods to prevent any violations. Upon agreement with the Department that the plan is so designed, a contamination evaluation report will be submitted to the Department. All reasonable efforts will be taken to prevent further degradation of water quality from the landfill activities.

#### **L.1.g Water Quality Monitoring Report Requirements**

##### (1) Semi-annual report requirements

- a. Water quality monitoring reports will be submitted to FDEP semiannually. The report shall include at least the following:
  - The facility name and ID number, sample collection dates, and analysis dates,
  - All analytical results, including peaks even below maximum contaminant levels,
  - Identification numbers of all surface water and groundwater monitoring points,
  - Applicable water quality standards,
  - Quality assurance, quality control notations,
  - Method detection limits,
  - STORET code numbers for all parameters,
  - Water levels recorded prior to evacuating wells or sample collection (continuous round) with elevations referenced to the top of casing and land surface at each well to within 0.01 foot (NGVD 1929),
  - Updated groundwater table contour map signed and sealed by a P.G. or P.E. Contour intervals will be no greater than 2 foot.
  - A summary of water quality standards or criteria that are exceeded.

- (2) Documentation that the water quality data shall be provided to the Department in an electronic format consistent with requirements for importing into the Department databases, unless an alternate form of submittal is specified in the permit; all data is currently and will continue to be submitted to the Department in ADaPT format. No changes are anticipated unless otherwise directed by the Department.



- (3) Two and one-half year report requirements, or every five years if in long-term care, signed, dated, and sealed by a P.G. or P.E.
- a. A technical report signed, sealed, and dated by a P.G. or P.E. will be submitted to the Department every two and one-half years and updated at the time of permit renewal. The report shall summarize and interpret the water quality and leachate monitoring results and water level measurements collected during the two and one-half year period. The report shall include at least the following:
- Tabular display of data showing all detected parameters
  - Graphical display of any leachate key indicator parameters
  - Trend analysis of any monitoring parameter consistently detected
  - Comparisons between shallow, medium, and deep zone wells
  - Comparisons between background water quality and the water quality in detection and compliance wells
  - Correlations between related parameters such as total dissolved solids and specific conductance
  - Discussions of erratic and/or poorly correlated data
  - Interpretation of groundwater contour maps including an evaluation of groundwater flow rates
  - An evaluation of the adequacy of the water quality monitoring frequency and sampling locations based on site conditions

**PROFESSIONAL GEOLOGIST CERTIFICATION**

I hereby certify that the document titled: “Part L - Water Quality Monitoring Requirements” for the Hillsborough County Southeast County Landfill was prepared under my review.

HDR Engineering, Inc.  
FL. Certificate of Authorization 004213

---

John S. Catches, PG  
Florida PG No. 2203

---

Date