

**CITRUS COUNTY CENTRAL LANDFILL  
CLASS I LANDFILL  
SUPPLEMENTAL OPERATION PLAN**

**Prepared for:**

Citrus County Board of County Commissioners  
3600 W. Sovereign Path, Suite 267  
Lecanto, Florida 34461

**Prepared by:**

Jones Edmunds  
730 NE Waldo Road  
Gainesville, Florida 32641

Certificate of Engineering Authorization #1841

Jones Edmunds Project No.: 03860-069-01

April 2018

## **INTRODUCTION**

### **PURPOSE**

This document serves as a Supplemental Operation Plan for the Citrus County Central Landfill. This plan supersedes specific sections of the approved Operations Plan prepared by SCS Engineers dated April 18, 2016. This Supplemental Operation Plan addresses the modifications proposed in the April 2018 permit application for the Landfill Gas Migration Control System and the Gas Collection and Control System Expansion prepared by Jones Edmunds.

Section K.9 of the April 2016 Operation Plan was revised to reflect the 2018 proposed modifications. For ease of review and use by the County, Jones Edmunds has revised SCS' Section K.9, Landfill Gas Monitoring, by using tracked changes.

## **K.9 LANDFILL GAS MONITORING (RULE 62-701.500(9), F.A.C.)**

This LFG monitoring program for the Central Landfill has been prepared in accordance with Rule 62-701.530, F.A.C. As described below, the plan includes monitoring for subsurface LFG migration at the facility property boundary adjacent to the active landfill (Phases 1/1A, 2 and 3) and the closed 60-acre landfill, and in on-site structures. The LFG monitoring program is designed to confirm compliance with the requirements of Rule 62-701.530(1)(a)1, F.A.C., which requires the following:

- The methane concentration in on- or off-site structures may not exceed 25 percent of the lower explosive limit (LEL). The LEL for methane is five percent by volume in air. Therefore, the maximum allowable concentration in on- or off-site structures is 1.25-percent methane by volume.
- The methane concentration at or beyond the landfill property boundary may not exceed the LEL (i.e., 5 percent methane by volume).

As explained below, the monitoring plan was prepared based on site-specific conditions.

### **K.9.a BACKGROUND INFORMATION**

In November and December of 2005, ~~eighteen~~19 permanent monitoring probes were installed along the new property boundary of the site. A new property boundary agreement has been established with the Florida Division of Forestry and FDEP. The landfill gas monitoring network was modified in 2017 from the approved gas management system design included in the Final Consent Agreement #05-1078. Due to the newly observed parameter exceedances, Jones Edmunds submitted a Landfill Gas Assessment and Groundwater Delineation Plan to FDEP on March 22, 2017, documenting a plan to expand the landfill gas and groundwater monitoring systems north of the closed Class I Landfills. The modifications were completed and are documented in the Landfill Gas Assessment and Groundwater Delineation Report, prepared by Jones Edmunds dated November 28, 2017. The new monitoring network includes the existing gas monitoring probes (GP-1 through GP-19) and 11 new landfill gas monitoring probes (GP-20 through GP-30). The probes were constructed as required in the consent order with long sections of slotted pipe and have been retrofitted for monitoring at varying depths in each probe as described in Part N of the permit modification application. The landfill gas monitoring probes are monitored quarterly. The 19 monitoring probes are now the only LFG compliance points at the site. The remaining 62 permanent LFG probes and 13 interim probes have been abandoned in place. Figure 9-1 is a site map showing the LFG monitoring probe locations and Figure 9-2 shows a detail of the gas probes.

## K.9.b LANDFILL AREAS

The landfill areas on site include the closed 60-acre landfill, a part of which is approximately seven acres that has a bottom liner as well as a geosynthetic cap liner; and the active Phase 1/1A, Phase 2, and Phase 3 landfill cells. The balance of the closed 60-acre landfill is unlined but has been capped with a geosynthetic membrane and protective soil cover. The depth of waste in the closed 60-acre landfill is approximately 40 feet below ground surface. The active Class I Landfill (Phase 1/1A, and Phase 2, and 3) landfill areas have has a geomembrane bottom liner system, and the bottom depth of refuse is approximately 80 feet below ground surface. Groundwater is present approximately 110 feet below ground surface, and the soil at the site is primarily silty and clayey sand.

The GCCS at the active Class I Landfill is designed to provide a means of relieving internal gas pressures within the landfill and prevent fugitive emissions of LFG to the atmosphere through the cover soils and the subsurface migration of LFG to the surrounding areas. The GCCS ~~for Phases 1/1A and 2~~ includes the following features:

- LFG extraction wells (EW-1 through EW-11) installed in 2009 are composed of 6-inch PVC pipe, installed in a 30-inch borehole and backfilled with FDOT No. 4 stone. The borehole ~~was~~will be sealed with a hydrated bentonite plug and backfilled to grade with clean soil backfill.
- New LFG extraction wells (EW-12 through EW-18) will consist of 8-inch PVC pipe installed in a 36-inch borehole and backfilled with gravel. The borehole will be sealed with a hydrated bentonite plug and backfilled to grade with clean soil backfill.
- New horizontal gas collector trenches in Phases 2 and 3 with remote wellhead connections (HC-1 through HC-4) will consist of 6-inch lateral piping. The horizontal trenches will drain to the north into Phase 3. Horizontal gas collectors will be installed by constructing a horizontal collector pipe surrounded by porous non-carbonate, non-calcareous media and wrapped in a geotextile filter fabric. Porous media may include tire chips, crushed concrete, or gravel as allowed by permit
- Tie-ins ~~will be~~are made to the existing LCRS risers and ~~these will be~~are connected to the header/lateral system, routing LFG to the blower/flare station.
- A below grade header/lateral network ~~will be~~is installed. All piping will be HDPE SDR 17.
- A 2" HDPE SDR 9 air supply line ~~will be~~is installed at the blower/flare and compressor location to CS-1 on the east side of the Class I cells.
- A condensate sump (CS-2) with a pneumatic pump ~~will be~~is installed at the blower/flare station. An O&M manual for the pneumatic pump ~~will be~~was submitted to the FDEP with the report of construction completion.

- The ~~S~~self-draining condensate traps (CT-1 and CT-2) will be abandoned and replaced with one condensate trap (CS-3) with a dedicated pneumatic pump on the west side of Phase 2-located at engineered low points in the header system for the collection of condensate. The ~~trap~~sumps will allow for the drainage of condensate from the header and lateral system ~~back into the landfill~~to the leachate storage tanks.
- Collected LFG ~~will be~~is routed to the blower/flare station for combustion via the 750 scfm candlestick flare.

If it is necessary to perform video inspection or cleanout the LCRS via these risers, this can be accomplished by closing the 2-inch wellhead gate valve, disconnecting the flexible hose, and removing the quick release caps or flanged lids and associated piping. For details of the ~~Phase 3~~ GCCS please see the ~~Phase 3~~ Construction documents.

The gas migration control system installed at the Closed Class I Landfills will be inspected periodically. All components and fittings including wellheads, condensate sump, and blower skid will be visually inspected for damage and/or proper function. The blower station will be operated and maintained according to the manufacturer's specifications. If any problems are identified at the blower station or condensate sump, repairs shall be completed as soon as possible. All maintenance and repair activities will be recorded and filed on site.

Pneumatic pumps will be periodically visually inspected to ensure proper operation by checking the pump counters and recording cycle counts for each pump in operation. The sumps and condensate knockout pot will be visually inspected to determine if the pumps are maintaining liquid levels at low level.

#### **K.9.c MONITORING OF ON-SITE STRUCTURES**

In order to ensure the safety of workers inside and around permanent structures on site, ambient air will be monitored on a quarterly basis in on-site structures in accordance with the requirements of Rule 62-701.530(2)(a), F.A.C. As stated above, and in Rule 62-701.530(1)(a), F.A.C., the methane concentration in on- or off-site structures may not exceed 25 percent of the LEL, or 1.25 percent methane by volume. The following gas monitoring will be performed in structures at the facility.

- Explosive gas alarms located in the scale house building and leachate treatment plant electrical room will provide continuous monitoring for unacceptable concentrations of explosive gas. These monitors are designed to sound an alarm when methane concentrations exceed 25 percent of the LEL. The signal remains on as long as gas is present, and a red alarm light stays on after an alarm condition in order to alert personnel that methane was detected during their absence. Log sheets will be kept at each location to record when the alarm has been triggered, and each alarm will be calibrated or replaced on a regular basis according to the schedule recommended by the manufacturer.

- On a quarterly basis the following structures will be monitored:
  - Administration building
  - Scale house
  - Leachate treatment plant
  - Gun ranges
  - Modular Building
  - Shop
  - Hazardous Waste Drop-Off Center

Monitoring will consist of using handheld instruments to monitor for combustible gases at all slab penetrations, floor drains, cracks in the slabs, along baseboards, in electrical boxes and outlets, and in enclosed spaces such as closets and ground-level cabinets.

## **K.9.d GAS MONITORING PROCEDURES**

### **K.9.d.1 Monitoring Procedures for Probes**

Each probe will be monitored on a quarterly basis for static pressure and methane concentration, or combustible gases using an instrument calibrated to methane. Methane will be measured and recorded in terms of a percent by volume in air or as a percentage of the LEL. The monitoring equipment will be calibrated each day prior to the monitoring.

The general procedure for monitoring at each probe will be as follows:

1. Record meteorological conditions including ambient temperature and barometric pressure.
2. Calibrate the methane monitoring equipment.
3. Purge any calibration gas or gas from previous probes from the methane monitoring instrument.
4. Zero the pressure gauge.
5. Prior to monitoring, note any damage to the probe, and repair if necessary. Failure to repair damage to the above ground casing, cap, or monitoring probe can affect the validity of the monitoring results.
6. Attach the sampling hose to the pressure meter and the labcock valve on the monitoring probe.
7. Record the time of monitoring for the probe.
8. Open the labcock valve.
9. Measure and record the pressure in the probe.
10. Close the labcock valve.
11. Connect the methane monitoring instrument to the sampling hose.
12. Open the labcock valve.

13. Turn on the meter and observe the gas concentration readings, noting any spikes in concentration.
14. After the gas concentration readings stabilize, record the steady-state reading, making note of any spike that occurred prior to reaching a steady-state reading. Note that per Rule 62-701.530(2)(b), F.A.C., purging of the probe is not allowed.
15. Remove the instrument and hose, and close the labcock valve.
16. Repeat steps 3 through 15 for each probe.

Any problems encountered during monitoring, observations, or other pertinent information that could impact the interpretation of the data shall be recorded.

#### **K.9.d.2 Monitoring Procedures for On-Site Structures**

The following on-site structures will be monitored for methane or combustible gas on a quarterly basis using handheld field instruments in accordance with Rule 62-701.530(2)(a), F.A.C.:

- Administration building
- Scale house
- Leachate treatment plant
- Gun ranges
- Modular Building
- Shop
- Hazardous Waste Drop-Off Center

Methane will be monitored and recorded in terms of the percent by volume in air or as a percentage of the LEL, and the monitoring equipment will be calibrated each day prior to the monitoring.

The general locations for monitoring at each structure will be as described below.

##### **Administration Building--**

A handheld meter will be used to monitor for methane at each of the following locations:

- Along the baseboards in each of the rooms, closets, and hallways
- In all ground-level cabinets
- At the floor drains in the bathrooms
- At all electrical outlets in each room and hallway
- At electrical panels inside and outside the building
- At outdoor electrical outlets

##### **Scale House, Modular Building, and Shop--**

A handheld meter will be used to monitor for methane in the scale house, modular building, and shop at each of the following locations:

- Along the baseboards
- At any cracks in the concrete slab or flooring
- In all ground-level cabinets
- At all electrical outlets inside and outside of the building
- At electrical panels inside and outside the building

**Leachate Treatment Plant and Hazardous Waste Drop-off Center--**

Methane concentration will be checked at the following locations at the leachate treatment plant until it is removed:

- At any cracks in the concrete slab or flooring
- In any ground-level cabinets
- At all electrical outlets inside and outside of the building
- At electrical panels inside and outside the building

**Gun Ranges--**

There are two gun ranges on site that are operated by the Withlacoochee Technical Institute on the closed 60-acre landfill. At both gun ranges, the following locations will be monitored for methane.

- At cracks in the concrete slabs
- At all electrical outlets and switches
- At all slab penetrations, such as support posts for the roofs of the firing platforms

## **K.9.e REPORTING**

Results of the monitoring will be reported to FDEP quarterly. A copy of the monitoring form is included as Appendix GA to this plan.

If the results of the monitoring show that combustible gas concentrations exceed the limits specified in Rule 62.701.530(1)(a), F.A.C., Citrus County will take the following actions:

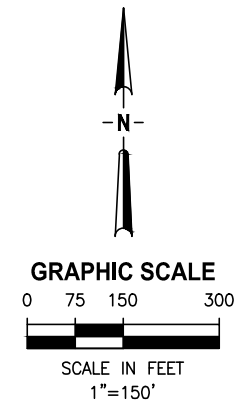
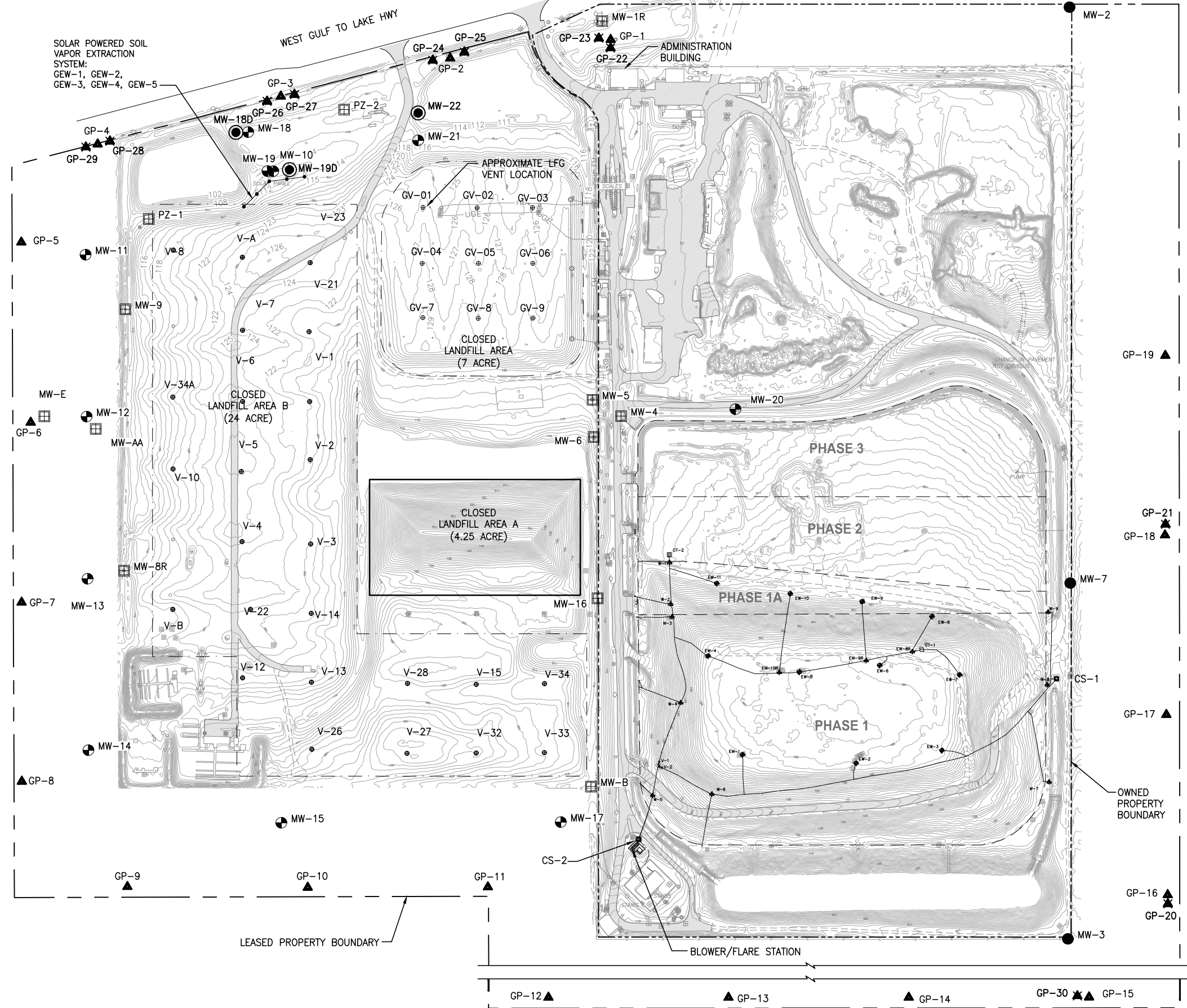
- Immediately take all necessary steps to ensure protection of human health and notify FDEP of the exceedances.
- Within seven days of the detections, submit to FDEP for approval a gas remediation plan. The gas remediation plan must describe the nature and extent of the problem and the proposed remedy. The remedy must be completed within 60 days of detection unless otherwise approved by FDEP.



#### **K.9.f ROUTINE ODOR CONTROL**

The site is inspected on a daily basis for odors at the point of compliance. Potential sources for odors include; incoming waste, workplace activities, landfill gas, condensate systems, and leachate collection and handling systems. In the event that an odor is detected and a source identified, appropriate steps will be taken to mitigate the incident. The installation of the GCCS should eliminate odors generated by the decomposition of waste.

Deodorants and odor neutralizers will be maintained on site and utilized if soil cover does not mitigate the odor issues at the working face. Daily cover provides an effective seal against the odors. If odors persist daily cover will be increased and cover procedures will be reviewed and altered if necessary.



**LEGEND**

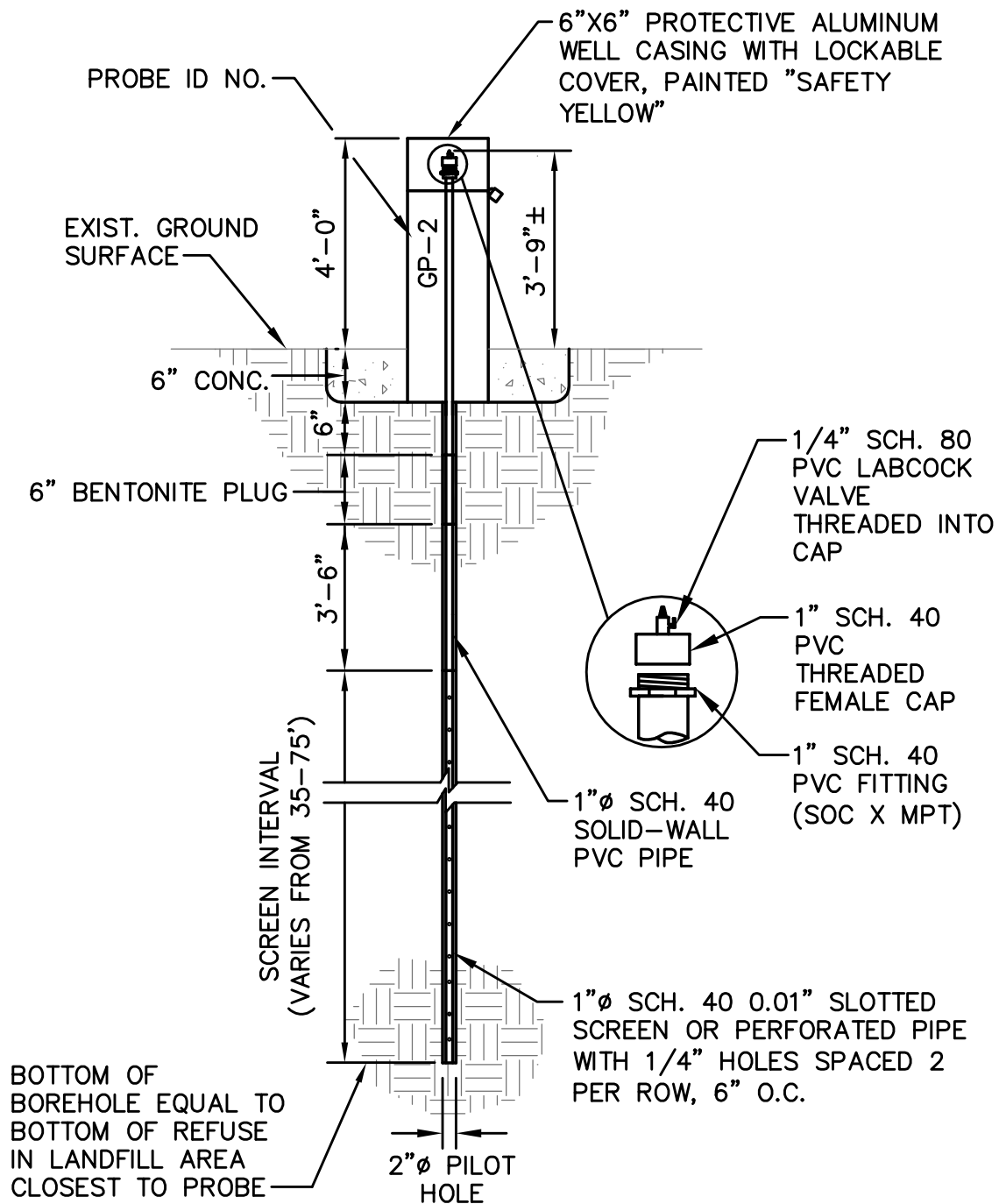
- ⊕ EW-1 LFG EXTRACTION WELL
- ⊕ EW-10 DOWNSLOPE LFG EXTRACTION WELL
- ⊕ EW-8R REMOTE LFG EXTRACTION WELLHEAD
- HEADER/LATERAL
- ⊕ CS-2 CONDENSATE SUMP
- MW-7 BACKGROUND WELLS
- ⊕ MW-13 COMPLIANCE MONITORING WELL
- ⊕ V-33 PASSIVE GAS VENT
- ⊕ GV-06 PASSIVE GAS VENT (INSTALLED 2009)
- ⊕ PZ-1 PIEZOMETERS
- ⊕ MW-9 PIEZOMETERS
- ▲ GP-1 GAS PROBE
- ▲ W-7 LEACHATE CLEANOUT RISER WELLHEAD
- × GP-21 NEW LFG PROBE (2017)
- MW-22 NEW GW MONITORING WELL (2017)

- NOTES:**
1. TOPOGRAPHIC CONTOURS PREPARED BY PICKETT SURVEYING, DATED 09/28/17.
  2. EXISTING LFG VENTS MAY NOT BE LABELED AS SHOWN.

**FIGURE 9.1**  
**MONITORING NETWORK**  
**CITRUS COUNTY CENTRAL LANDFILL**  
**CITRUS COUNTY, FLORIDA**

LAST SAVED: 3/26/2018 2:57 PM BY: PUPSTILL PATH: N:\03860 CITRUS COUNTY\059 GCS\FIGURES\03860059FIG-MON-NET.DWG PLOTTED: 4/5/2018 11:48 AM BY: RUHANI BHUIA

G:\PROJECT\Citrus\09208040.03\Operations\PermitRenewal\Figures\084003\EG-Mon-Probe-Detail.DWG Dec 01, 2009 - 2:59pm Layout Name: Monitoring Probe Plan Bx: 2378sda



SCS ENGINEERS

Figure 9-2. LFG Monitoring Probe Detail, Citrus County Central Landfill

## APPENDIX A

# **LANDFILL GAS MONITORING** **CITRUS COUNTY CENTRAL LANDFILL**

## **General Data**

Date:		Sampler:	
Time:		Sky Conditions:	
Air Temperature (deg C):		Measuring Device:	

## **Sampling Data**

Station I.D.	Date Sampled	Time Sampled	Depth of Intake (Feet)	O2 % Volume	CO2 % Volume	Methane		Station Type
						Peak Recorded Concentration as % LEL	Peak Recorded Concentration as % Volume	
GP-1			20					Gas Well
GP-1			40					Gas Well
GP-2			20					Gas Well
GP-2			40					Gas Well
GP-3			20					Gas Well
GP-3			40					Gas Well
GP-4			20					Gas Well
GP-4			40					Gas Well
GP-5			20					Gas Well
GP-5			40					Gas Well
GP-6			20					Gas Well
GP-6			40					Gas Well
GP-7			20					Gas Well
GP-7			40					Gas Well
GP-8			20					Gas Well
GP-8			40					Gas Well
GP-9			20					Gas Well
GP-9			40					Gas Well
GP-10			20					Gas Well
GP-10			40					Gas Well
GP-11			20					Gas Well
GP-11			40					Gas Well
GP-12			25					Gas Well
GP-12			50					Gas Well
GP-12			75					Gas Well
GP-13			25					Gas Well
GP-13			50					Gas Well
GP-13			75					Gas Well
GP-14			25					Gas Well
GP-14			50					Gas Well

# LANDFILL GAS MONITORING CITRUS COUNTY CENTRAL LANDFILL

## General Data

Date:		Sampler:	
Time:		Sky Conditions:	
Air Temperature (deg C):		Measuring Device:	

## Sampling Data

Station I.D.	Date Sampled	Time Sampled	Depth of Intake (Feet)	O2 % Volume	CO2 % Volume	Methane		Station Type
						Peak Recorded Concentration as % LEL	Peak Recorded Concentration as % Volume	
GP-14			75					Gas Well
GP-15			25					Gas Well
GP-15			50					Gas Well
GP-15			75					Gas Well
GP-16			25					Gas Well
GP-16			50					Gas Well
GP-16			75					Gas Well
GP-17			25					Gas Well
GP-17			50					Gas Well
GP-17			75					Gas Well
GP-18			25					Gas Well
GP-18			50					Gas Well
GP-18			75					Gas Well
GP-19			25					Gas Well
GP-19			50					Gas Well
GP-19			75					Gas Well
GP-20			105					Gas Well
GP-21			115					Gas Well
GP-22			70					Gas Well
GP-23			100					Gas Well
GP-24			70					Gas Well
GP-25			100					Gas Well
GP-26			70					Gas Well
GP-27			100					Gas Well
GP-28			70					Gas Well
GP-29			100					Gas Well
GP-30			105					Gas Well
Admin Building			-					Structure
Mod Bldg			-					Structure
Shop			-					Structure

**LANDFILL GAS MONITORING  
CITRUS COUNTY CENTRAL LANDFILL**

**General Data**

Date:		Sampler:	
Time:		Sky Conditions:	
Air Temperature (deg C):		Measuring Device:	

**Sampling Data**

						Methane		Station Type
Station I.D.	Date Sampled	Time Sampled	Depth of Intake (Feet)	O2 % Volume	CO2 % Volume	Peak Recorded Concentration as % LEL	Peak Recorded Concentration as % Volume	
Scale House			-					Structure
Treatment Facility			-					Structure
Firing Range			-					7 Structures
Haz Waste Drop off Center			-					4 Structures

**LANDFILL GAS MONITORING  
CITRUS COUNTY CENTRAL LANDFILL**

**General Data**

<b>Date:</b>	<b>Sampler:</b>
<b>Time:</b>	<b>Sky Conditions:</b>
<b>Air Temperature (deg C):</b>	<b>Measuring Device:</b>

**Sampling Data**

Station I.D.	Time Sampled	O2 % Volume	CO2 % Volume	Methane		Station Type
				Peak Recorded Concentration as % LEL	Peak Recorded Concentration as % Volume	
MW-1R						GW Well
MW-2						GW Well
MW-3						GW Well
MW-5						GW Well
MW-6						GW Well
MW-7						GW Well
MW-8R						GW Well
MW-9						GW Well
MW-10						GW Well
MW-11						GW Well
MW-12						GW Well
MW-13						GW Well
MW-14						GW Well
MW-15						GW Well
MW-16						GW Well
MW-17						GW Well
MW-18						GW Well
MW-19						GW Well
MW-20						GW Well
MW-21						GW Well
MW-AA						GW Well
MW-B						GW Well
MW-E						GW Well
PZ-1						GW Well
PZ-2						GW Well