



DRAINAGE STONE

Tipping Area  
for Unsuitable

COLLIERY SHALE

# Runfold Central Area Environmental Monitoring Plan

Report: 2445/R/09/04

February 2020

Prepared for: SUEZ Recycling and Recovery UK Ltd

PEA GRAVEL

GEOTEXTILE

RECYCLED CLAY

# Runfold Central Area

## Environmental Monitoring Plan

Report Reference: 2445/R/09/04

February 2020

**Carried Out For:**



Recycling and recovery UK

Runfold Landfill Site

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## DOCUMENT INFORMATION AND CONTROL SHEET

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## RUNFOLD CENTRAL AREA ENVIRONMENTAL MONITORING PLAN

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## RUNFOLD CENTRAL AREA

### ENVIRONMENTAL MONITORING PLAN

#### 1 INTRODUCTION

##### 1.1 Background

1.1.1 The purpose of this report is to provide an Environmental Monitoring Plan to support an application to restore the centre of the wider Runfold Quarry complex operated by SUEZ Recycling and Recovery UK Ltd. The site will be referred to in this report as Runfold Central Area.

1.1.2 This report is provided as part of the recovery permit application but it is also intended to be used to discharge planning condition 6i of planning permission reference WA/2018/0016 which requires:

*A monitoring plan that includes (but not limited to) detailed proposals for monitoring and sampling of leachate and groundwater levels, leachate and groundwater quality, and gas concentrations and flows during the earthworks and infilling, compliance limits (trigger and control levels) and contingency action, verification plans and periodic report plan.*

1.1.3 The purpose of the waste recovery activity is to restore Runfold Central Area to agricultural pasture mandated by planning permission referenced WA/2018/0016 with specific reference to the restoration contours detailed on attached SUEZ drawing referenced Rsp-CONT-0518-02: *Central Area Proposed Low Level Restoration Contours*. There is insufficient material available on site to support the scheme and it is proposed to import suitable waste materials to complete the works.

1.1.4 This report provides a summary of the potential emissions identified in other risk assessments submitted to discharge planning conditions and also support the deposit of waste for recovery permit application. Each type of emission and the proposed monitoring regime is considered in a separate section of this report.

1.1.5 It should be noted that monitoring boreholes and other locations have been included in this report which are under the regulatory control of other permits with existing compliance limits. Where this is the case it has been proposed to retain the compliance limits (where applicable) for these locations as these have been subject to prior risk assessment which it is assumed took into account the wider site setting. As the site sits within the boundary of an existing landfill permit and will be subject to a new environmental permit for a deposit for recovery operation, it would not be appropriate for separate compliance limits to be set.

## **2 LANDFILL GAS**

### **2.1 Monitoring Point Locations**

2.1.1 The Soil Gas Risk Assessment (Report referenced 2445/R/012/01) concluded that the risk associated with landfill gas emissions from the existing site, during the recovery activity works and on their completion is likely to be low due to the following:

- age of the existing waste deposits
- their inherent low gas generation potential as inert waste (TOC <3%)
- low quantities of gas currently being produced as demonstrated by in-waste gas monitoring
- inert nature of the wastes to be used in the restoration activity
- negligible impact of loading existing waste deposits in terms of gas displacement; and,
- low sensitivity receptors surrounding the majority of the site (landfills with some human occupation) or lack of pathway to the more distant receptors.

2.1.2 A programme of landfill gas monitoring will be undertaken in, adjacent to and beneath the existing waste deposits. The locations of internal and external landfill gas monitoring points are shown on the accompanying Site Investigation Plan drawing ref. 2445/5/007. In-waste gas monitoring points will also be retro-drilled into the waste used for the restoration activity on completion. The depth of this material will determine the practicability of installing an effective gas monitoring borehole. The restoration material will need to be at least 4 m deep to account for an effective surface seal above the response zone. This will limit the location of any restoration fill monitoring points to the central portion of the current void and potentially in the conveyor cutting.

### **2.2 Monitoring Regime**

2.2.1 All of the gas monitoring boreholes installed in January 2019 are in or directly beneath the waste and will likely show the influence of landfill gas. The existing waste deposits will be sampled using the 5 boreholes installed in January 2019 around the north, west and southern perimeter of the site. The in-waste gas monitoring regime is detailed in Table 1.

2.2.2 Three existing points external to the waste deposits have been added to the restoration gas monitoring regime. Two of the January 2019 boreholes were installed with deeper installations to sample the underlying groundwater. Subject to the level of saturation of the natural ground, ground gas can potentially be measured in the deeper boreholes. The external gas monitoring regime is detailed in Table 2.

**Table 1. In-Waste Gas Monitoring Regime**

Monitoring Point	Monitoring Frequency (on installation)		Parameter
	Pre-Operational / Operational	Post-Operational	
BH18/01 (Shallow), BH18/02, BH18/03 (Shallow), BH18/04 and BH18/05  Retro-installed wells installed into restoration infill (no. and location tbc on completion)	Monthly	Monthly (for 24 months then quarterly)	Methane, Carbon Dioxide, Oxygen and Gas Balance (% v/v), Carbon Monoxide, Hydrogen Sulphide (ppm), Gas Flow (l/hr), Relative pressure (mBar), Atmospheric Pressure (mBar) Water level and base level (mbgl as mAOD)

**Table 2. External Gas Monitoring Regime**

Monitoring Point	Monitoring Frequency		Parameter
	Pre-Operational / Operational	Post-Operational	
BH701, BH705, IVC107, BH18/01 (Sub waste) and BH18/03 (Sub waste)	Monthly	Monthly (for 24 months then quarterly)	Methane, Carbon Dioxide, Oxygen and Gas Balance (% v/v), Carbon Monoxide, Hydrogen Sulphide (ppm), Gas Flow (l/hr), Relative pressure (mBar), Atmospheric Pressure (mBar) Water level and base level (mbgl as mAOD)

### 2.3 Landfill Gas Assessment Criteria

- 2.3.1 Environmental permit referenced EPR/SP3131GC/V003 contains a methane compliance limit of 1 %v/v for perimeter boreholes BH701 and BH705 (in addition to other locations). A review of gas monitoring data for the period January 2018 to June 2019 indicates this compliance limit has not been exceeded. It is proposed to retain the compliance limit for BH701 and BH705 for the purposes of this report. Carbon dioxide action levels of 8.9 %v/v and 2.7 %v/v are maintained through the Site Management System.
- 2.3.2 A limited period of gas monitoring was carried out at IVC107 which is the only remaining borehole from the 2010 site investigation. No methane was detected and carbon dioxide was recorded up to 8.1 %v/v. Given the boreholes proximity to the existing waste deposits it is reasonable to assume the ground gas in the vicinity will be influenced by the landfills. As with BH18/01 and BH18/03, this borehole is located well within the confines of the Central Area and close to unlined waste deposits. It would be impractical to set methane and carbon dioxide compliance limits at these points as they do not represent conditions at the perimeter of the site or adjacent to sensitive receptors. It is therefore proposed to carry out ongoing trend analysis of gas concentrations and flow at these locations to detect significant changes to the ground gas regime.
- 2.3.3 In-waste gas monitoring data indicates low quantities of landfill gas are being produced by the existing waste deposits. The restoration fill material will consist of inert waste and it also is unlikely to produce significant quantities of landfill gas. It is not proposed to set compliance limits for the existing in-waste monitoring boreholes but monitor gas quality and flow trends as the restoration activity progresses. On completion of the infill programme, the Operator will install monitoring boreholes into the restoration fill material. This will be

sampled in accordance with Table 1 above. It is expected that the quantities of gas produced by this material will be sufficiently low to meet the permit surrender criteria for permanent deposits of waste. The programme of monitoring instigated (24 monthly samples at each point) will serve to collect the required data to support this aspect of the permit surrender process. The assessment criteria will be as detailed in Environment Agency Guidance<sup>1</sup>.

## 2.4 Contingency Action Plan

2.4.1 Exceedance of the existing permit compliance limits will initiate a response from the Operator in accordance with Section 4 of the Runfold Area A & C Landfill Site Monitoring Management Plan (December 2016) which is replicated in Table 3. This plan has been deemed fit for purpose for the management of significantly larger non-hazardous waste landfill sites and is considered appropriate to apply to the lower risk Central Area restoration scheme.

**Table 3. Perimeter Gas Contingency Action Plan**

Contingency Action	Response Time	Responsibility
<b>Internally Record</b> (exceedance of methane action level and/or carbon dioxide action level)  <b>Inform the Agency</b> (exceedance of methane compliance limit or in the event of a moderate risk being calculated only)	24 hours	Environment Assistant to inform Site Manager or SHEQ Advisor to record
Confirm calibration and QA procedures for equipment used	48 hours	Environment Assistant
Repeat monitoring in breached point and those adjacent to it	1 week	Environment Assistant
Initiate measures to control migration in accordance with Gas Management Plan	2 weeks	Site Manager
Review the risk and agree further actions with the Agency	1 month	Site Manager/SHEQ Advisor/Manager

<sup>1</sup> Landfill (EPR 5.02) and other permanent deposits of waste: how to surrender your environmental permit



### 3 GROUNDWATER

#### 3.1 Monitoring Point Locations

3.1.1 The groundwater monitoring regime is discussed in detail in the accompanying Groundwater Risk Assessment referenced 2445/R/010/03). An assessment has been made that takes into consideration the potential impact of the existing historical inert waste deposits and the proposed restoration fill material in isolation; and, the potential impact of placing the restoration fill on existing waste deposits. The groundwater risk assessment concluded that the impact of the proposed restoration activity would not adversely impact on groundwater and on the whole, would be likely to lessen the impact on groundwater from the existing site. The proposed groundwater monitoring locations are shown on the accompanying Site Investigation Plan (drawing ref: 2445/5/007)

#### 3.2 Monitoring Regime

3.2.1 The sampling regime for groundwater is detailed in Table 4. Table 4 also includes the monitoring requirements for water quality sampling in the Pond (A2) to the northwest of site and leachate sampling within the existing waste deposits. It is expected that there will be insufficient liquid present in the in-waste monitoring points to take a sample or measure a liquid level but they are included in the event that the opportunity arises.

**Table 4. Groundwater and Surface Water Monitoring Regime**

Monitoring Point	Monitoring Frequency	Parameter
<b>Upgradient Groundwater</b> BH701, IVC107, BH18/01 (Deep)	Quarterly	Temperature & Water Level, Ammoniacal-nitrogen, Chloride, Dissolved Oxygen, Electrical Conductivity and pH.
<b>Downgradient Groundwater</b> BH705, BH18/03 (Deep)	Annually	As above plus Alkalinity, Arsenic, Biological Oxygen Demand, Chemical Oxygen Demand, Calcium, Cadmium, Chromium, Copper, Iron, Lead, Magnesium, Manganese, Mercury, Nickel, Nitrate, Potassium, Sodium, Sulphate, Total Dissolved Solids, Total Organic Carbon, Total Oxidised Nitrogen, Total Phenols, Zinc, TPH, PAH and monitoring point base (where relevant).
<b>Surface Water</b> Pond A2		
<b>In-Waste</b> BH18/01 (shallow), BH18/02, BH18/03 (shallow), BH18/04, BH18/05		

#### 3.3 Groundwater Quality Compliance Limits

3.3.1 It is not proposed to set compliance limits in the permit for the deposit for recovery activity. There are compliance limits set for BH705 and the Infiltration Pond A2 in the permit for Runfold Area A & C (referenced EPR/SP3131GC). These have been subject to previous detailed risk assessment and it is not proposed to amend the compliance limits. It is not proposed to set compliance limits for BH18/03 as the deep installation is sub-waste. A summary of the compliance limits as specified in Permit Ref: EPR/SP3131GC is repeated for reference in Table 5.

**Table 5. Existing Groundwater and Infiltration Pond Compliance Limits**

Monitoring Point	Parameter	Compliance Limit
<b>Downgradient Groundwater</b> BH705	Ammoniacal Nitrogen	1.08 mg/l
	Cadmium	0.001 mg/l
	Chloride	84 mg/l
	Nickel	0.0154 mg/l
	Phenol	0.02 mg/l
	Zinc	0.5 mg/l
<b>Surface Water Infiltration Pond</b> Pond A2	Ammoniacal Nitrogen	1 mg/l
	Chloride	250 mg/l
	pH	<6.5 or >9.5
	Visible oil	None

3.3.2 It is proposed to benchmark groundwater quality down gradient of the Site as an assessment level for the key indicator substances sampled on a quarterly basis as identified in Table 4. Groundwater trends will be monitored over the period of the recovery activity, particularly the key milestones such as:

- infilling of the base of the main void;
- the conveyor cutting;
- the open flanks; and,
- commencement of the main surface water flow into the pond.

3.3.3 The benchmark data will be based on the information provided in Table 2 (BH18/01 and BH18/03) and Table 3 (BH701 and BH705) of the Groundwater Risk Assessment. A watching brief will be maintained to sample at IVC701 should groundwater levels rise sufficiently to take a sample, however there is insufficient data to support trend analysis.

### 3.4 Groundwater Action Plan

3.4.1 Exceedance of the existing groundwater compliance limits for other permits will initiate a response from the Operator in accordance with Section 4 of the Runfold Area A & C Landfill Site Monitoring Management Plan (December 2016) which is replicated in Table 6. The contingency action plan for surface water contamination (relating to Infiltration Pond A2) is replicated in 7 for information.

**Table 6. Groundwater Contingency Action Plan**

Contingency Action	Response Time	Responsibility
In the case of an obvious pollution incident establish the source instigate preventive/corrective actions	Immediate	Site Manager
Notify the EA and site manager	24 hours	Senior Environment Assistant SHEQ Advisor
Verify that leachate levels are compliant and the leachate contingency action plan is adhered to.	24 hours	Site Manager/ SHEQ Advisor/Manager
Verify results with the lab	7 days	Senior Environment

Contingency Action	Response Time	Responsibility
		Assistant
Obtain a further sample and re-analyse	1 month	Senior Environment Assistant

**Table 7. Surface Water Contingency Action Plan**

Contingency Action	Response Time	Responsibility
In the case of an obvious pollution incident establish the source instigate preventive/corrective actions	Immediate	Environment Assistant Site Manager SHEQ Advisor / Manager
Notify the EA and site manager	24 hours	Senior Environment Assistant SHEQ Advisor
Cease all discharge of suspected contaminated surface waters	24 hours	Site Manager
Verify results with the lab	7 days	Senior Environment Assistant
Obtain a further sample and re-analyse	1 month	Senior Environment Assistant
Propose remedial strategy	2 months	Site Manager/ SHEQ Advisor/Manager

## **DRAWINGS**

**2445/5/007 Site Investigation Plan**



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- Key**
- 2019 Monitoring Borehole locations
  - IVC - Original Borehole Locations
  - Retained Monitoring Locations
  - 2019 Trial Pit Locations

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Site  
**Runfold Landfill Site**

Title  
**Site Investigation Plan**

Scale	NTS @ A3	
Drawing No.	2445/5/007	
Rev	Date	Description
A	02/19	Stockpile Sample Locations Added
B	04/19	As Built Survey
File	24455004 Proposed SI Plan	
Date	04/19	Engineer PR
Drawn	OS	Checked PR