EEL.7700.RO2.001

Cyngor Sir Ynys Môn / Isle of Anglesey County Council

Penhesgyn Closed Landfill Site

REVISED LEACHATE MANAGEMENT PLAN

June 2020

Prepared for

Cyngor Sir Ynys Môn / Isle of Anglesey County Council

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Document Review

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CONTENTS

1.0 INTRODUCTION

1.1 Report Context

1.1.1 Cyngor Sir Ynys Môn / Isle of Anglesey County Council (IoACC) are responsible for the aftercare management of Penhesgyn Closed Landfill Site (the Site).

1.1.2 This document has been prepared on behalf of IoACC by Egniol Environmental Ltd and is an update and replacement to the current Leachate Management Plan[1] for the Site which has been referred to. This review provides an update of the leachate management infrastructure, and leachate management procedures which are based on the current level of risks to the local water environment. This revised Plan is informed by the revised Hydrogeological Risk Assessment 2020.

1.1.3 The objectives of the updated Leachate Management Plan is to ensure ongoing compliance with the Environmental Permit in relation to:

- Control leachate generation in Area 3 of the Site;
- Prevent contamination of groundwater and surface water by leachate migration;
- Reduce elevated leachate levels within the landfill Area 3 and to maintain them below the control levels to comply with the Permit.

1.2 Site Location & Layout

1.2.1 Penhesgyn Closed Landfill Site is located approximately 2 miles north of the town of Menai Bridge, Ynys Môn, adjacent to the Penhesgyn Household Waste Recycling Centre. The site is accessed off the B5420, via local roads.

1.2.2 The site comprises three distinct areas; Area1 includes the site infrastructure and has not been subject to waste disposal, Area 2 is an older dilute-and-disperse phase of the site which operated between the 1960s and 1998, Area 3 was the final phase of the site and was engineered on the principal of containment.

1.2.3 Area 3 consists of four engineered cells, Cells 1-3 and the Valley Cell, which bridges the gap between Cells 2 and 3. In addition, an Emergency Tipping Area (ETA) was also lined and used for waste disposal. All these areas have been capped and restored.

1.2.4 Only the cells in Area 3 have engineered leachate collection and extraction systems and it is on this basis that this report will only review this Area of the site.

[1] Appendix D of the Section A Site Closure Report (Entec 2008 Reference 00264rr2482): Leachate Management Plan

2.0 EXISTING ENGINEERING SETTING

2.1 The existing engineering details of the landfill Area 3 outlined below have been extracted from the original Leachate Management Plan.

2.2 The cell layout is shown on Drawing 7700.D01.001.

2.3 The engineered basal and sidewall lining system to Area 3 comprise a geosynthetic clay liner (GCL) overlain by a 2mm high density polyethylene (HDPE) geomembrane.

2.4 The cap to Area 3 comprises a 1mm linear low density polyethylene (LLDPE) geomembrane overlain by a geosynthetic drainage layer (GDL) and a 800mm thickness of soils.

3.0 LEACHATE MANAGEMENT SYSTEM

3.1 General

3.1.1 A leachate collection and extraction system is installed in landfill Area 3 and there is no leachate management provisions in the older Area 2. This Management Plan therefore relates to Area 3 only.

3.1.2 Each cell in Area 3 has a leachate collection and extraction system installed above the basal liner comprising; a drainage layer, collection pipework, pumping facilities and holding tanks.

3.2 Drainage Layer

3.2.1 The leachate drainage layer consists of a 300mm deep layer of 20/40mm low calcareous rounded gravel.

3.3 Collection Pipework

3.3.1 The collection pipework in each cell comprises perforated HDPE pipes of 100mm and 200mm diameter. The base to each cell was constructed to a gradient (between 1:50 and 1:100) falling to a leachate collection/abstraction riser. The layout of the collection system is shown on Drawing 7700.D01.001.

3.3.2 Leachate is extracted from each cell via the abstraction risers (vertical or side slope) which comprise 500mm diameter HDPE pipes with the bottom 2m slotted. The risers are located in the following cells in Area 3: Cell 1, Cell 2, Cell 3A, Cell 3B, the Valley Cell and the ETA.

3.4 Pumping System

3.4.1 The pumping facilities comprise dedicated hydraulic pumps in each riser. The pumps are operated manually by IoACC staff when leachate heads exceed 1.0m above the lowest point of the cells. The leachate is pumped through connecting pipework (including metered chambers) into the storage tanks via a manifold system. During the aftercare phase the abstraction risers and pumps are inspected by the Site Operator at the time of the monitoring. Any damage should be repaired within 48 hours.

3.5 Leachate Storage Tanks

3.5.1 Leachate is pumped to two leachate storage tanks each with an individual storage capacity of 54,000 litres. The tanks are located within a secondary containment bund as shown on Drawing 7700.D01.001.

3.5.2 The pumped leachate is tankered off site when the stored leachate is close to capacity of the leachate storage tanks. The leachate will be tankered to a suitable licenced treatment facility; currently to Llandullas Landfill Leachate Treatment Plan, before being discharged to sewer.

3.5.3 Both storage tanks are singled skinned. They are interconnected and fitted with isolating valves at each end. The inlet to the storage tanks is by a raised pipework with two Bauer connecting fittings. The outlet pipes are connected via a T joint and in turn one primary

pipe to allow the transport/delivery tankers to connect onto it. A manually operated isolation valve is also fitted into the connecting pipe for isolation of each line.

3.5.4 High-level floats are fitted allowing a 10% clear level safety factor after activation in each of the tanks as a backup unit which works on a closed loop system activating remote alarm notifications via mobile text message and email to the Site Manager.

3.5.5 Upon the high-level float alarm notification being generated within Tank 1, leachate can manually, via isolation valves, be discharged into Tank 2. This process can be monitored, controlled and/or stopped manually. Upon the high-level float alarm being generated within Tank 2, this provides the Site Operator a set period of time to manually switch off the leachate pumps and stop the leachate extraction process.

4.0 LEACHATE MANAGEMENT PROCEDURES

4.1 General

4.1.1 The Leachate management system is operated manually by suitably trained IoACC site operatives.

4.2 Procedure for Collection of Leachate from Leachate Storage Tanks

4.2.1 All licensed carriers will be required to follow IoACC's procedure PEN-SOP 035 Leachate Removal by Tanker from Bund and PEN-SOP 036 Leachate Removal by Tanker from Tanks. All licensed carriers will be required to comply with the Site Safety Rules at all times.

4.3 Leachate Infrastructure Inspection & Maintenance

4.3.1 The Site Operator will carry out regular inspection and maintenance of leachate infrastructure including leachate wells, pumps, collection pipeworks, storage tanks and the bund. In addition, the Site Manager will undertake visual checks on all plant and equipment at least once a week and, if deemed necessary, bring forward any planned maintenance or undertake remedial works.

4.3.2 Exterior / interior inspections (and maintenance if required) of the two leachate storage tanks will be undertaken yearly and focus on the following:

- All safety and information related decals for legibility;
- Overflow pipework and pipe terminations to assure that they perform their design function;
- Vents;
- Exterior coating for possible damage;
- Ladders, locks, platforms and safety climbing devices for corrosion and/or damage.

4.3.3 For each of the above points found to be in faulty condition, the Site Manager will action the necessary repairs.

4.3.4 Interior inspection is to be undertaken at a minimum five-year interval or more frequently if required. The inspections should include, but not be limited to the following:

- Internal sheet and coating thickness and integrity, particularly in areas where external damage may have occurred;
- Tank coating in general at all fastener locations and at sheet edges;
- Condition of sealant/welds used in all joints, in the area of the sumps and other tank penetrations;
- Riser pipes and level gauges.

4.3.5 For each of the above points found to be in faulty condition, the Site Manager will action the necessary repairs.

4.3.6 An inspection of the Secondary Containment Bund will be undertaken on a monthly basis. The inspections should include, but not be limited to the following :

- All leachate pipework, valves and pipe terminations to assure that they perform their design function;
- All exterior finishes for possible damage;
- All sumps for possible blockage or damage;
- All wall and floor protuberances for possible leaks or damage;
- Ladders, locks, platforms and safety climbing devices for corrosion and/or damage.

4.3.7 Records of all visual and scheduled inspections, and details and certificates (where appropriate) of any maintenance work undertaken, must be kept in the site office. A Maintenance Log is to be kept and updated by the site manager describing frequency, type of activity and actions undertaken.

5.0 LEACHATE MANAGEMENT RESPONSIBILITIES AND COMPETENCE

5.1 Leachate Management Responsibilities

Operation of the leachate management system is carried out by the Isle of Anglesey County Council (the site operator) with support from suitable environmental specialists, as required. The scope of leachate management and monitoring works is outlined below.

What	Who	When
NORMAL OPERATING CONDITIONS		
Leachate collection	IoACC	4-weeky or more frequently if required
Operation of leachate wells and leachate storage tanks	IoACC	As required
Leachate /groundwater monitoring and reporting to NRW	Appointed monitoring contractor	Annually or more frequently if control levels exceeded Reporting as per Schedule 4 of the Environmental Permit
Leachate tankering offsite	Appointed waste carrier	When required (close to storage capacity of on-site leachate tanks)
ENGINEERING WORKS ON LANDFILL		
Leachate system maintenance	IoACC & specialist subcontractor	When required
ABNORMAL OPERATING CONDITIONS		
Breach of leachate control levels	IoACC and appointed monitoring contractor	As per Contingency Action Plan
Failure of leachate extraction system	IoACC and appointed engineering contractor (if required)	As per Contingency Action Plan
Failure of the secondary containment	IoACC and appointed engineering contractor (if required)	As per Contingency Action Plan
Leachate spillage during extraction and/or transfer	IoACC	Immediately

5.2 Competence

The Site Manager is a technically competent manager who holds a Certificate of Technical Competence (CoTC) issued by the Waste Management Industry Training and Advisory Board (WAMITAB) for managing Landfill Hazardous Waste (Level 4) – 4LH, along with a continuing competence certificate. The Site Manager will remain qualified to supervise the landfill operation by undertaking re-testing every two years.

6.0 LEACHATE MONITORING PLAN

6.1 General

6.1.1 Leachate monitoring schedule and control and trigger levels are detailed in the revised Hydrogeological Risk Assessment (HRA) (Egniol, 2020). The revised HRA also contains a Contingency Action Plan if the assessment levels are exceeded.

7.0 CONTINGENCY ACTION PLAN

7.1 General

7.1.1 This Contingency Action Plan covers the following events:

a) Breach of leachate control levels;

b) Failure of leachate extraction system;

c) Failure of the secondary containment; and

d) Leachate spillage during extraction and/or transfer.

7.1.2 Where possible any identified minor faults or damage shall be repaired within 48 hours by IOACC site personnel, however for works relating to the pumps, telemetry or electrical works then a Specialist Contractor will be required to affect any repairs.

7.1.3 In the event of a pump failure or telemetry / electrical fault, a specialist contractor will be contacted the same day and requested to attend site to investigate within 48 hours and remedy the fault within a minimum of five working days.

7.1.4 NRW will be informed of any major failures on Incident Number 0300 065 3000 with the following details:

- Site details, Permit Number;
- Nature of the incident, leachate levels and/or event; and
- Action undertaken.

7.1.5 The Site Manager will submit a Schedule 5 notification detailing the incident to the NRW at the earliest opportunity. The Site Manager will liaise with NRW accordance with the requirements of Schedule 5 of the Permit and Schedule 5 Part B notification to close the incident issue off.

7.2 Breach of Leachate Control Level

7.2.1 In the event of the leachate control levels specified in Section 4 of revised HRA, being exceed the following actions will be undertake:

Action	**Response time**
1. The monitoring technician shall inform the Site Manager	Immediately
2. Inform NRW	In accordance with the requirements of Schedule 5 of the Permit
3. Increase monitoring frequency at the affected monitoring points to monthly	For 3 months
4. Review exiting monitoring data	1 month
5. Investigate the reason for exceedance /review performance of leachate collection system/pumps/ ambient conditions/other relating factors	3 months
6. If a fault is identified on the leachate extraction system, refer to Leachate Action Plan (Section 7.3 of LMP).	3 months

Action	Response time
Where breaches of the leachate control levels are on-going due to elevated levels, a remedial leachate action plan will be agreed with NRW.	
7. Re-evaluate risks and assessment criteria in consultation with NRW.	12 months

7.3 Failure of the Leachate Extraction System

7.3.1 The leachate extraction system shall be inspected on a daily basis to check that it is operating correctly and, that there is no damage or leaks on the pipework.

7.3.2 Where possible any identified minor faults or damage shall be repaired within 48 hours by site personnel. For the works related to pump failures, telemetry / electrical faults a specialist contractor will be appointed to carry out repair and maintenance services. The specialist contractor will be contacted the same day to attend site to investigate and remedy the fault within 5 working days.

7.4 Failure of Secondary Containment

7.4.1 In the event of a mechanical failure of the leachate storage tanks, the associated pipework or isolation valves, the Site Manager will shut down system immediately. The failure will be investigated and repaired in a timely manner.

7.4.2 In the event of an electrical failure of the high-level alarms in one or both leachate storage tanks, the Site Manager will shut down the system immediately. The High-Level alarm has a back-up battery. The alarm manufacturer/service provider will be contacted for remote assistance.

7.4.3 In the event of a major failure of the leachate storage tanks, the Site Manager will shut down the system immediately. The bund is designed to store 110% capacity of the storage tanks. If a breach occurs the following steps are to be taken:

- Remove spillage within the bund to a non-damaged tank or by tankering off site;
- Undertake repairs to damaged tank/tanks immediately.

7.5 Leachate spillage during extraction and/or transfer to tanker

7.5.1 Following a spillage incident, IoACC will follow their procedure PEN-SOP 015 Dealing with a Spillage. If a spillage incident occurs the tanker driver must inform the Site Manager immediately.

8.0 SITE COMPLETION PLAN

8.1 General

8.1.1 This section outlines the current regulatory approach towards landfill site completion in terms of the permit surrender. The overarching goal of landfill site completion is to reach the conditions of waste stabilisation, low gas generation potential and a certain leachate quality which won't require active management measures to control the potential risks to local receptors. Landfill Sector (EPR 5.02)[2] guidance states that the environmental regulator will not accept an application for the permit surrender while active control measures are required at the Site.

8.1.2 At Penhesgyn landfill, leachate is actively managed in Area 3 only, while the older Area 2 is non-LFD compliant and does not have an active leachate management system. Therefore, the approach towards completion criteria for leachate in both Areas will be based on the findings of future revisions of the HRA and the regulatory approach at that time. The main considerations for leachate completion compliance are described below.

8.2 Completion Criteria

Area 2

8.2.1 This part of the site was designed without a low permeability lining system, therefore the waste mass and the leachate are present in hydraulic continuity with the surrounding groundwater. Leachate is not collected from Area 2, albeit there are five leachate wells in the Area which are used to assess leachate quality for compliance purposes. Consequently, there are control limits which were initially set up in the Site Closure Report (Section A, Appendix E Hydrogeological Risk Assessment, Entec 2008). The revised HRA (Egniol, 2020) revised and reduced these limits, as it was demonstrated that leachate quality is weak and impact on receiving groundwater has reduced significantly.

8.2.2 Under the current trends in the leachate quality and with the ongoing water monitoring it is anticipated that in the longer term the concentrations of the regulated pollutants will be comparable with the EQSs for groundwater. This approach accords with the Permitting Guidance EPR 5.02 which advises that on non-LFD compliant sites leachate completion criteria should be based on groundwater quality.

Area 3

8.2.3 This landfill area has been designed as a fully engineered area and has active leachate management system to protect groundwater and surface waters. For such landfill sites, EPR 5.02 advises that the site operator should develop site specific completion criteria for their leachate.

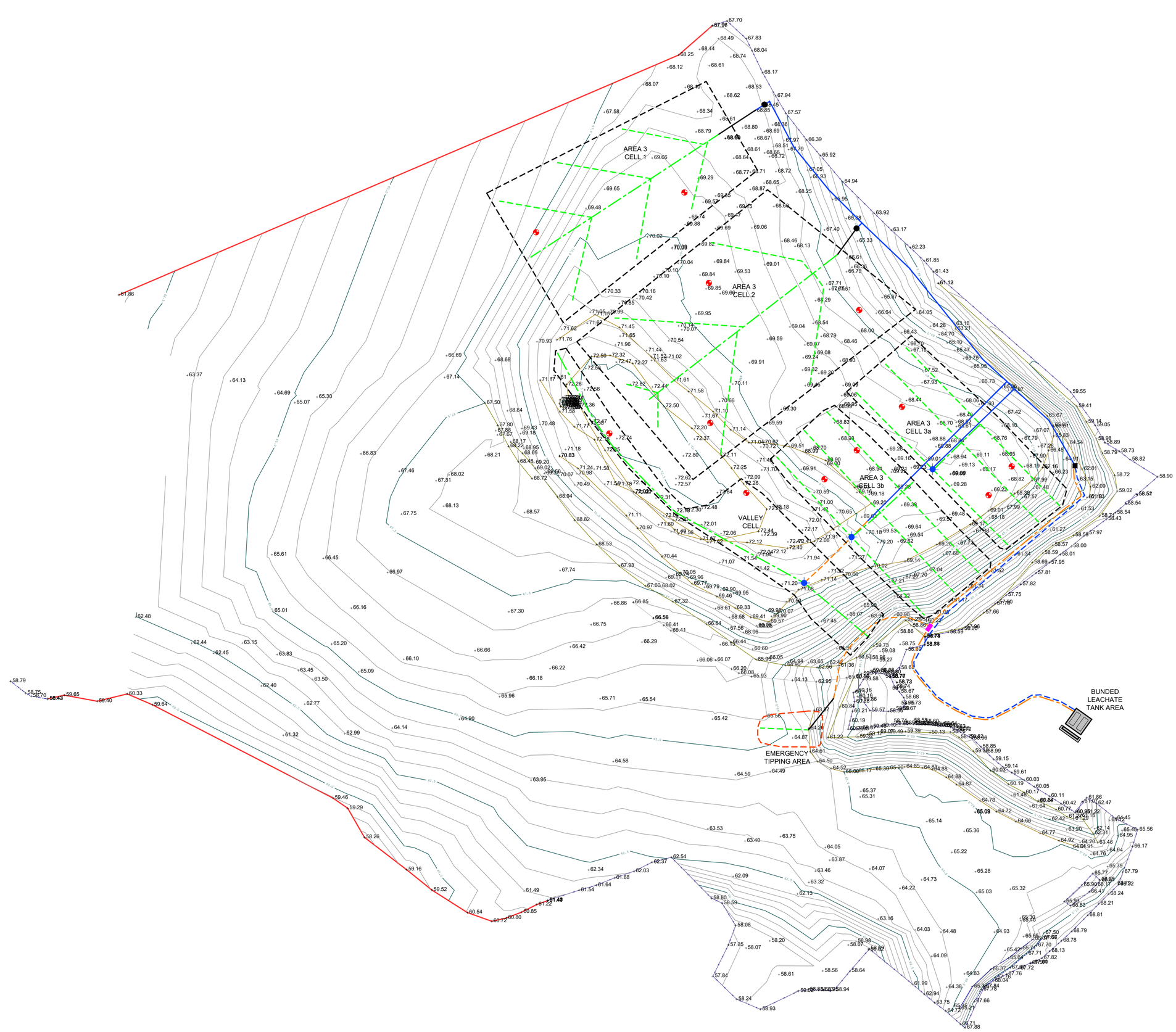
[2] The Landfill Sector (EPR 5.02) and other permanent deposits of waste. Additional Guidance. How to surrender your environmental permit. Environment Agency V2. 13/12/2012

8.2.4 Leachate control limits for Area 3 were initially set up in the Site Closure Report (HRA, Entec 2008). The revised HRA (Egniol, 2020) revised and reduced these limits, as it was demonstrated that leachate quality is slowly improving.

8.2.5 Overall, the approach for demonstrating low environmental risks from leachate at the Site and working towards the surrender of the permit involves the following steps:

- Continue monitoring leachate quality in line with the requirements of the Site Permit and the Site Closure Report – Area 2 and Area 3;
- Regularly review leachate data for the aftercare stage and update environmental risks by reviewing the site HRA – Area 2 and Area 3;
- Based on the results of the HRA review, to develop completion criteria for each regulated pollutant in leachate. The leachate completion criteria should be at the concentrations that will not result in an unacceptable impact on groundwater or surface water.
- Monitor leachate levels in Area 3 until they have returned to a level consistent with the local water table. Also, to carry out Water Balance calculations to demonstrate an ongoing need to control water levels by extraction, or to stop extraction of leachate from the waste.
- To continue monitoring leachate and groundwater quality once the active management of leachate has been stopped until such time that the site stabilisation has been reached as demonstrated (by revised HRA and other risk assessments).
- To liaise with the environmental regulator regarding adopting site specific completion criteria for leachate.

DRAWINGS



Notes

1. Survey information provided by Egniol Environmental Limited.
2. All levels in metres Above Ordnance Datum Newlyn.
3. Do not scale from this drawing.
4. Any anomalies on this drawing should be brought to the attention of Egniol Environmental Ltd.
5. Key.

- 90mmØ MDPE leachate pipework.
- 110mmØ MDPE leachate pipework.
- 90mmØ MDPE leachate pipework
- Temporary leachate pipework.
- 100mmØ leachate collection pipework.
- 200mmØ leachate collection pipework.
- Upslope riser.
- Outline of cell base.
- Leachate monitoring point.
- Existing leachate manhole.
- Riser chamber.
- Existing connection chamber.
- Existing flow meter.

Rev	Modification	By	Chk	App	Date

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Penhesgyn Landfill Site

Leachate Management System

Drawn by	Checked by	Approved by
GOJR	AC	AC
Date	Date	Date
12.06.2020	12.06.2020	12.06.2020
Status		Scale @ A1
Final		1:1000
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