



## BALLEALLY LANDFILL, BALLEALLY, LUSK, CO. DUBLIN

### ANNUAL ENVIRONMENTAL REPORT 2018

IED LICENCE REF. NO. W0009-03

APRIL 2019



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### INDUSTRIAL EMISSIONS LICENCE (IED) LICENCE REF. NO. W0009-03

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**Abstract:** This report represents the monitoring results for Balleally landfill, Balleally, Lusk, Co. Dublin. This report covers the annual reporting period of 2018 in accordance with Industrial Emissions Licence Reg. No. W0009-03.

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## 1 INTRODUCTION

### 1.1 Reporting Period

The reporting period for the AER is 1<sup>st</sup> January to 31<sup>st</sup> December 2018.

### 1.2 IED Licence

In 2000 Fingal County Council was granted a Waste Licence (Reg. W0009-01) to continue operating Balleally Landfill. In July 2001 Fingal County Council applied for a review of this licence. Waste Licence W0009-02 was issued on the 8<sup>th</sup> January 2003. On the 21<sup>st</sup> December 2009 the Environmental Protection Agency (EPA) issued Fingal County Council a third revision of the Waste Licence for Balleally Landfill: IED Licence W0009-03. The licence was subsequently brought into conformity with the provisions and requirements of the Council Directive 2010/75/EU on the 20<sup>th</sup> December 2013, becoming an Industrial Emissions (IE) Licence.

This licence permits the operation of a non-hazardous landfill. In accordance with the requirements of Condition 11.6 of the IED Licence, an Annual Environmental Report (AER) for the facility must be submitted to the EPA.

### 1.3 Facility Location

Fingal County Council has responsibility for the management and operation of the facility. The facility is located at:

Balleally Landfill  
Balleally Lane  
Lusk

National Grid reference E322500 N252200.

Drawing Monitoring Locations (Figure 1) in Appendix 1 is a map of the facility and the monitoring locations.

### 1.4 Licensed Industrial Emissions Activities at the Facility

Balleally Landfill is situated in Lusk, Co. Dublin. It has been in operation since 1971. Activities at the facility include landfill, special handling, a construction and demolition (C&D) recycling facility (which ceased in August 2005 due to capping commitments) and a civic amenity site (which ceased in December 2008 due to capping/operational commitments). Balleally Landfill closed to waste acceptance on 11<sup>th</sup> May 2012.

On January 8<sup>th</sup> 2003 Fingal County Council was licensed to carry out the following activities at Balleally Landfill, Lusk, Co. Dublin subject to twelve conditions.

The licensed activities under the IE amendment are:

- 11.5 Landfills, within the meaning of Section 5 (amended by Regulations 11(1) of the Waste Management (Certification of Historic Unlicensed Waste Disposal and Recovery Activity) Regulations 2008 (S.I. No. 524 of 2008)) of the Act of 1996, receiving more than 10 tonnes of waste per day or with a total capacity exceeding 25,000 tonnes, other than landfills of inert waste.
- 11.1 The recovery or disposal of waste in a facility, within the meaning of the Act of 1996, which facility is connected or associated with another activity specified in this Schedule in respect of which a licence or revised licence under Part IV is in force or in respect of which a licence under the said Part is or will be required.

Landfill gas is collected and converted to electricity.

E39 is the appropriate NACE code to describe activities undertaken in Balleally during 2018 – “Remediation activities and other waste management activities.”

### 1.5 Local Environmental Conditions

The landfill site covers approximately 50 ha in total. The east face of the landfill is bordered by the Dublin-Belfast railway line and the southern boundary is the Rogerstown Estuary. See Figure 1, Drawing DE07-164-03-001, Appendix 1.

The former landfill facility was approx. 40ha. The extension to this facility to the north west of the site consists of 6 engineered / lined cells (approx. 10 Ha).

### 1.6 Environmental Monitoring

Environmental monitoring is carried out in accordance with licence conditions and is reported quarterly to the Agency. The quarterly reports include results, interpretation and a certificate of analysis. The original results certificates are not included again in this report. This report only presents summary data.

### 1.7 EPA Updated Reporting Requirements

Fingal County Council has prepared the annual environmental report in line with the new EPA 2013 draft reporting requirements “AER Draft Guidance Document: Annual Environmental Report: Standardised Reporting Guidance for all IPPC (Excluding Intensive Agriculture) and IED Licences”. To this end a text document is being employed whereby the 2018 AER follows the same format as the summary template structure, where possible, and includes only information as required in the AER template. In all instances except for Bund testing, individual tabs from the AER Workbook are filled out and included as appendices to the text document. The 2018 PRTR has been submitted via the Environmental Performance Reporting application form on the EDEN Portal.

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## 2 AIR EMISSIONS MONITORING

### 2.1 Stack Emissions

As per Schedule D.7.1 of IED Licence W0009-03, the licensee is required to carry out annual or periodic environmental monitoring of the Gas Combustion Plant/Enclosed Flare. Exova Catalyst Ireland carried out the stack emissions monitoring on behalf of Fingal County Council. All results for engine BY04 in 2018 were compliant with Emission Licence Values set out in the IED licence W0009-03. The air emissions tab of the AER template is complete and included in Appendix 3.

### 2.2 Dust Monitoring

Dust monitoring was carried out at 4 locations in accordance with Schedule D of the licence. The locations of these monitoring points are shown on Balleally Monitoring Locations Map, Appendix 1.

Bergerhoff style gauges were used to determine total dust deposition levels at the site. Four gauges were set up so that the dust jars were at a height of at least 1.5 m above the ground and the jars were set in place during the monthly monitoring events. The samples were submitted to ALS Global for analysis of total dust contents.

#### 2.2.1 Dust & PM<sub>10</sub> Monitoring Results

The annual results for total dust deposition are presented in Table 2.1. PM10 monitoring results are shown in Table 2.2.

**Table 2-1: Total Dust Deposition Results (mg/m<sup>2</sup>/day)**

Monitoring Locations	April-May 2018	Sep-Oct 2018	Nov-Dec 2018
D1	18.3	41.7	<b>397</b>
D2	20.6	12.5	58.4
D3	12.8	38.5	21.6
D4	23.9	14.1	39.4

**Table 2-2: Total Dust PM<sub>10</sub> Results (ug/m<sup>3</sup>)**

Monitoring Locations	24-hour sampling start date	Average Concentration Value µg/m <sup>3</sup> Q3 2018
PM1	20/09/2018	1.4
PM2	24/09/2018	4.2
PM3	25/09/2018	4.2

### 2.2.2 Interpretation of Results

A full laboratory analysis of daily dust deposition was completed. The results indicate that during the monitoring period all results were under the licence limit of 350 mg/m<sup>3</sup>/day except for location D1 during December-November 2018. This exceedance was attributed to the presence of sticks, leaves, insects or other organic matter from the surrounding farmers' fields and not originating from the landfill.

The PM10 limit (50 µg/m<sup>3</sup>) as set out in the IED Licence was not exceeded at any location during the monitoring period.

## 2.3 Surface Emissions

Fingal County Council commissioned Odour Monitoring Ireland to perform a landfill gas surface emissions survey of Balleally landfill facility to ascertain any likely sources of landfill gas surface emissions from the closed landfill.

The survey was carried out on the 27<sup>th</sup> July 2018.

There were zero surface emissions zones greater than or equal to 500 ppm around identified features. There were zero surface emissions zones greater than or equal to 100 ppm instantaneous reading on open surfaces within the landfill footprint.

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### 3 LANDFILL GAS MONITORING

The licence requires monthly monitoring of perimeter gas boreholes/vents/wells. The location of the 13 no. monitoring positions is shown on Balleally monitoring Locations Map, Appendix 1.

In addition to the perimeter landfill gas perimeter monitoring wells, two leachate monitoring wells (chosen at random) from each of the southern and eastern boundaries LMW1-LMW18 were also monitored. LMW1 – LMW18 boreholes are located on the landfill side of the vertical barrier wall.

It should be noted that boreholes LMW1-18 are leachate sampling wells in the waste body and not specifically designed for monitoring landfill gas.

In accordance with Table D.2.1 of the IED Licence, gas wells were monitored for Methane (CH<sub>4</sub>), Carbon Dioxide (CO<sub>2</sub>), Oxygen (O<sub>2</sub>) and atmospheric pressure.

#### 3.1 Monitoring Results

The gas (LFG) monitoring results were included in the 2018 quarterly reports submitted to the Agency.

#### 3.2 Interpretation of Results

Carbon dioxide was detected on a number of occasions in perimeter monitoring wells at levels above the trigger levels of 1.5%v/v for carbon dioxide. These were reported as incidents to the EPA. Elevated concentrations of carbon dioxide can occur naturally at shallow depths of up to 2 m due to microbial activity associated with the roots of many types of vegetation.

Methane was not detected above the trigger level of 1% v/v at any wells during 2018.

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## 4 SURFACE WATER & LEACHATE MONITORING

The bulk of the AER information on surface water is contained in the Water/Wastewater tab of the AER Summary Template in Appendix 3. This section is in support of that information and to provide some supplementary information on:

- Leachate monitoring results
- Sewer Gas monitoring results

As of April 2014, Fingal County Council commenced the discharge of leachate to sewer on Rogerstown Lane. Relevant information is included on water/wastewater tab of the AER summary sheet (Appendix 3).

### 4.1 Surface Water

Schedule D of the IED Licence specifies the monitoring to be carried out for licence compliance. The licence lists 7 no. surface water monitoring locations. Monitoring is currently carried out at S7, S3, SW20a at SWV1 as listed in the licence and at SWFD. The surface water monitoring locations are predominately upstream of the landfill footprint. The results of surface water monitoring are included in the Water\_Wastewater tab of the AER summary template (Appendix 3).

There are 2 no. surface water monitoring locations, in addition to those listed in the licence, that are monitored by Fingal County Council as part of an ongoing investigation into surface water quality. These locations are located on site and are part of the surface water management system. Surface water outfalls from the southern boundary of the site are also monitored on a quarterly basis.

Fingal County Council submitted 4 quarterly reports in 2018 which included the results of monthly, quarterly and annual sampling, visual and odour inspections and interpretation of the results.

### 4.2 Surface Water Monitoring

The sample locations can be seen in Drawing Balleally Monitoring Locations Map, Appendix 1. There are 5 no. surface water monitoring locations. There was extensive works to upgrade the surface water management system in Balleally during 2018. The descriptions below describe the locations as they were at the beginning of the year. As the year and works progressed there were changes.

#### *SWFD*

Discharges to an open drain immediately west of the entrance to the wastewater treatment plant.

#### *SWV1*

The surface water discharge at the Western Point Surface Water Outfall – The samples are collected in the open channel immediately upstream of the discharge pipe/cut-off flap.

#### *S3*

This sampling point is located on a stream to the north-east edge of the landfill site prior to its discharge to the estuary.

#### *S7*

This sampling point is located upstream of the site on the stream to the north of the landfill site.

#### *SW20a*

This sampling point is located at a drainage ditch to the east of Rogerstown Lane, close to the north-eastern tip of the landfill. This was bunged shut preventing discharge to the estuary prior to works.

#### 4.2.1 Surface Water Improvements

A review of surface water contamination at the site is ongoing since August 2011. Fingal County Council committed to continuing additional monitoring at P2, SWV1, SWMH7 and at surface water outfalls OF1-OF4 and submitted two reports to the Agency entitled "W00-09-03-SWV1-010.pdf, SWV1 Trigger Level Proposal and Loading Report" and "Report OF1-OF4-009.pdf, Trigger Level and Nutrient Loading from OF1 to OF4 off Southern Boundary" respectively. The former proposal was rejected by the Agency pending further investigations and the latter was accepted.

The completed capping programme and final restoration of the landfill has improved surface water quality at SWV1. The new shallow vertical barrier surrounding the facility has been completed at the entrance as part of the closure plan. The programme of works relating to remedial measures to address contamination of surface water in this area is being managed through Compliance Investigation CI 000992 and is ongoing.

Remedial works were first undertaken during Q2, 2009 and again in Q1, 2012 to protect the surface water drain/ditch near SW20A. A 50 m length of the drain/ditch was excavated and cleaned prior to lining with low-permeability clay and a HDPE liner pinned and stabilised to the underlying clay bank. These two layers of impermeable material serve to minimise inputs into the drainage ditch. The ditch adjacent to SW20a was re-graded with stone fill, which allows the movement of water through the gravel. A manhole access point was built to facilitate visual assessment and the required periodic environmental sampling. Consequently, there is no flow into the estuary from SW20a as the outfall point is bunged.

The shallow vertical barrier at the site entrance was constructed in 2016.

During 2018, FCC completed modifications to the existing approach road and modified internal services such as surface water drainage and a leachate rising main. The full extent of the modifications carried out is listed below:

- Realignment of the existing approach road (Balleally Lane) near the eastern entrance to remediate issues with surface water flooding.
- An open channel surface water drainage system was constructed to provide drainage outfall from the realigned road.
- A new carparking pavement and surface water drainage system was constructed by the eastern entrance to the landfill.
- Installation of embankment filter drains surrounding the new hard-standing area.
- New leachate rising main constructed from existing cells to gravity leachate pipe.
- Leachate gravity main pipework replaced with HDPE pipe.
- Relocation of the Administration Office to the west side of the site over to the treatment plant compound.
- Installation of new pavement (surface layer) on existing laneway between Rogerstown Lane and a point 15m beyond the eastern side of the Dublin-Belfast Railway Line.
- Installation of new pavement (surface and regulating layer) on existing site road running from east to west along the north of the site (parallel to Balleally Lane).
- Remediation of existing filter drain at toe of cell embankment along existing site road and construction of outfalls to surface water drains on the opposite side of the road.

#### 4.2.2 Conclusions

Surface water results during 2018 indicate that water quality is impacted by both the landfill (which is both a dilute and disperse landfill (40 ha) and an engineered landfill (10 ha)) and the nearby estuary, in terms of salinity sources from the estuary. However, surface water results improved significantly during the year after the completion of the vertical barrier.

Fingal County Council has and continues to undertake additional measures in relation to monitoring and on-site works to mitigate the impact in consultation with the EPA.

### 4.3 Leachate Monitoring

Prior to April 2014, leachate was tankered off-site to a wastewater treatment plant. As of April 2014, leachate was discharged to sewer. In 2018, leachate was discharged to sewer through pumping to sewer and subsequently transferred to Portrane Waste Water Treatment Plant. Monitoring of discharge to sewer is as per Technical Amendment B, Schedule C. Relevant information is therefore included on water/wastewater tab of the AER summary sheet.

#### 4.3.1 Leachate Treatment Plant

Operation of the leachate treatment plant was suspended during Q2, 2009. During 2009, FCC applied for a full licence review for the site. The licence review was seeking to remove Chemical Oxygen Demand (COD) as a leachate treatment plant parameter and to raise the ELV levels for some of the other leachate treatment plant parameters. This application was withdrawn and a technical amendment was sought to facilitate discharge to sewer. Technical Amendment B to Industrial Emissions Licence (12/03/2014) provides for the discharge of leachate to a sewer on Rogerstown Lane and this commenced early in April 2014.

#### 4.3.2 Bund / Pipeline Testing

Condition 3.11 of W0009-03 governs Tank and Drum Storage Areas and the need for testing of same. All tanks are rendered impervious to the materials stored therein as per condition 3.11.1.

Condition 3.11.2 stipulates that all tank and drum storage areas are to be banded either locally or remotely, to a volume not less than the greater of the following:

- (a) 110% of the capacity of the largest tank or drum within the banded area; or
- (b) 25% of the total volume of substance which could be stored within the banded area.

There are two areas on site (Landfill Gas Utilisation Plant & Leachate Treatment Plant) that are remotely banded in the sense that as per Condition 3.11.3 the drainage from these banded areas can be diverted for collection and safe disposal – back through the leachate treatment plant and through the leachate storage and treatment tanks. The Leachate storage and treatment tanks are inspected by Irish Industrial Tanks Limited (IITL). As per condition 3.11.5 The Leachate and Storage Tanks are inspected at least once every three years.

Storage tanks T1a, T1b, SBR1, SBR2, T4 and T5 were inspected during 2017. A number of structural defects of concern were detected during this inspection by IITL. FCC has appointed Irish Industrial Tanks to complete the urgent repairs and this work will begin in May 2019.

Remaining works to be completed, as identified in the inspection reports, will be undertaken pending the appointment of a suitable contractor.

The inspection reports are available for inspection at the site offices.

#### 4.3.3 Water Balance and Leachate Transfers

A water balance for the reporting period has been prepared and is included as Table 4.1. The water balance calculation is derived from EPA Landfill Manuals "Landfill Site Design" (EPA, 2000; p59) and indicates that there was 15,374 m<sup>3</sup> of leachate was produced at the landfill. The infiltration rate used was 5% for fully capped areas.

The total of leachate removed from site was 23,706 m<sup>3</sup>. The volume of leachate tankered off-site was greater than that estimated as generated in the water balance, but some contaminated water pumped to plant may account for this.



#### 4.3.4 Leachate levels

A trigger level of 5.5 meters above ordnance datum (m AOD) for wells between LMW1 to LMW18 and LMW30 to LMW34 has been established to indicate an elevated head of liquid in the landfill. Leachate was recorded above the trigger level at several locations, highlighted in Figure 4.1.

Leachate levels in LMW5, LMW31, LMW32 and LMW33 were above the trigger level frequently throughout the year. Leachate levels in LMW8 were above the trigger level in Q2 and Q3 until the level dropped in Q4.

The wells (LMW31, LMW5, LMW8, LMW32, LMW33) which exceed the trigger are located beside one another on the southern boundary of the site.

There were no exceedances of the trigger level in leachate monitoring wells LMW10, LMW11, LMW13, LMW14, LMW34, LMW16, LMW18, LMW30 and L24.

The design level of the vertical barrier is 6 meters and this level was exceeded at LMW5 on the southern boundary which is set back from the vertical barrier by approximately 20m. LMW31, LMW32 and LMW33, which are adjacent to the vertical barrier recorded leachate levels below 6m during the year. No leachate breakouts were evident along the southern boundary. Ammoniacal nitrogen levels at monitored surface water outfalls (OF1-OF4) directly south of the vertical barrier were below trigger levels when monitored, with the exception of OF1 in September 2018, reported through incident INCI013524. Further sampling in 2019 found levels had returned to normal and this incident was subsequently closed.

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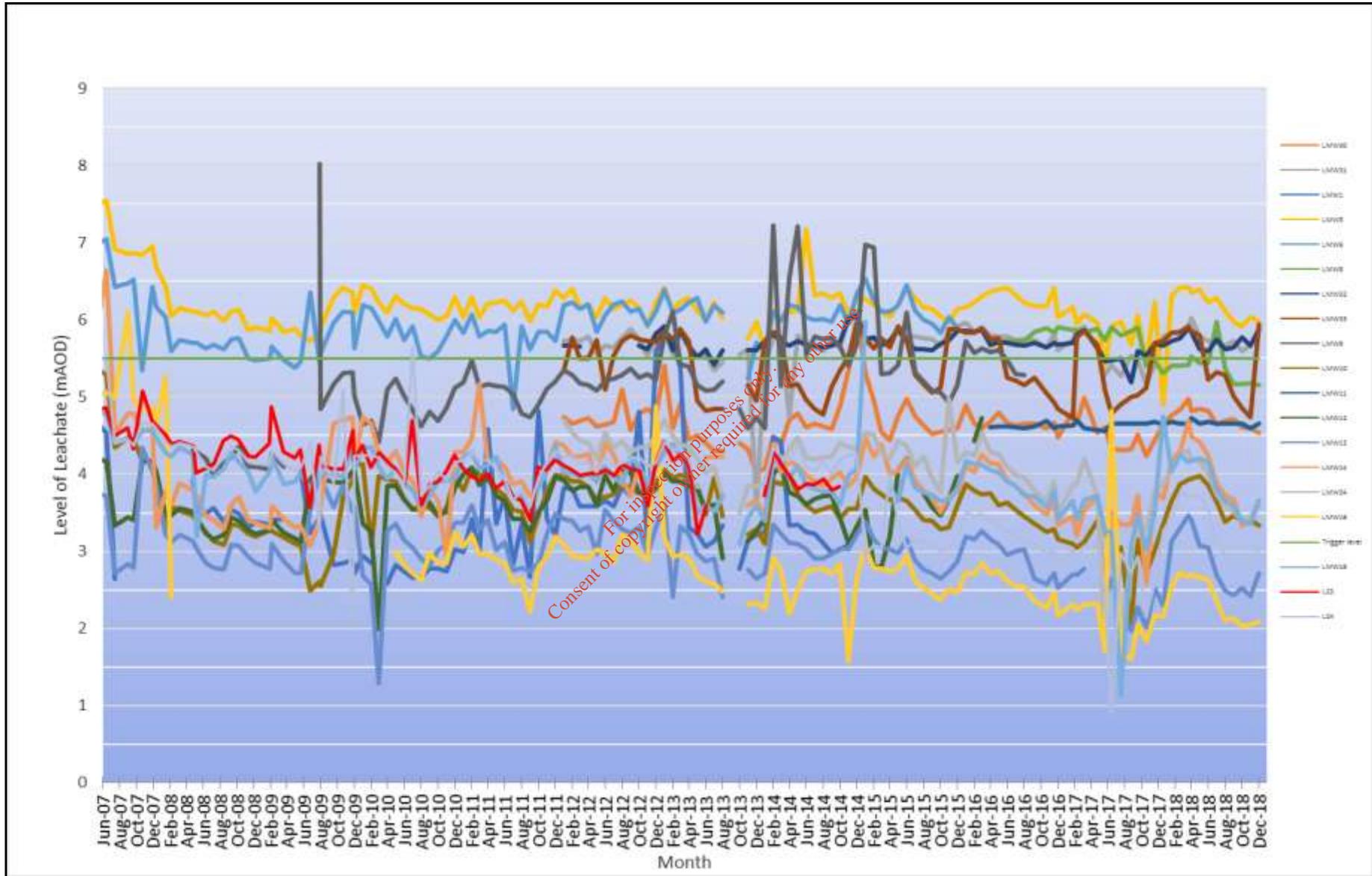


Figure 4-1: Monthly Level of Leachate Recorded in the landfill 2007-2018

#### 4.3.5 Leachate Quality

This section presents a summary of the chemical analysis. The results for leachate monitoring were included in the quarter 3 (Q3) report to the Agency. The pumping chamber receives leachate from a number of different locations on-site. As it collects leachate from a number of different areas over the site it is representative of general leachate quality over a greater time period than the individual grab samples from each of the leachate wells. The pumping chamber collects leachate from:

- Pipe 1A – New cells
- Pipe 1B – Old northern boundary
- Pipe 1C – Southern boundary

It is noted that the results for the southern boundary are slightly more concentrated, than the results along the eastern boundary. While variations are noted, the leachate quality is typical of leachate sampled from large landfills, as outlined in the Landfill Operational Practices Guidance Manual, EPA 1997 and EPA Manual on Landfill Site Design (2000).

### 4.4 Sewer Gas Monitoring

Sewer gas monitoring commenced in 2014 when Fingal County Council was granted permission to pump leachate to sewer, as per Technical Amendment B of the Industrial Emissions Licence, approved by the Agency on 12/03/2014.

The monitoring location is at a manhole on Rogerstown Lane.

The annualised results for monthly monitoring of the wastewater discharge are included in the Water Wastewater tab in the AER Summary Sheet (Appendix 3).

The sewer gas was compliant on all monitoring occasions, below the Methane daily mean concentration limit of 0.5 %v/v.

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## 5 GROUNDWATER MONITORING

The summary results of groundwater monitoring are included in the GW-Soil tab of the AER Summary Template in Appendix 3. This section of the Annual Environmental Report is in support of that information. Balleally Landfill, unlike other landfills did not receive a Technical Amendment to its licence relating to the provisions of Article 12 of the European Communities Environmental Objectives (Groundwater) Regulation 2010. The landfill is on an estuary. The downgradient groundwater monitoring borehole is in an estuarine setting.

### 5.1 Monitoring Locations

Groundwater monitoring was carried out at the locations shown on Drawing Balleally Monitoring Locations Map, Appendix 1. As part of a previous extension to the landfill a number of the boreholes stipulated in W0009-03 are no longer accessible. During July 2004, a revised monitoring schedule was agreed with the Environmental Protection Agency (EPA) on which the present monitoring is based. Details of the groundwater locations now monitored are presented in Table 5.1.

Monitoring location MB18 is located up-gradient, approximately 535 m north of the landfill on private agricultural land. Access to the monitoring location was not granted during the monitoring period.

**Table 5-1: Groundwater Monitoring Locations**

Station	Classification	Easting	Northing
MB18	Eastern Up gradient	323 245	252 783
RC3	Western Up gradient	321 906	252 729
MB35	South western Down gradient	322 029	251 906
CD1	Control Drain N/W of Cell 1	322 008	252 356

#### Location Description

##### *Borehole MB35*

This borehole is situated approximately 190 m south of the landfill on the edge of the Inner Rogerstown Estuary, downgradient of the landfill.

##### *Location CD1*

The control drain sampling location CD1 is situated approximately 30 m south of Balleally Lane west of the landfill extension. This drain collects groundwater from underneath the newly constructed lined cells.

##### *MB18*

This is an upgradient private well of Rogerstown House which lies to the north east of the landfill site along the estuary. No access permitted.

##### *RC3*

This upgradient borehole is situated approximately 535 m north of the landfill on private agricultural land.

#### 5.1.1 Monitoring Parameters

Groundwater levels were monitored and a visual assessment was performed monthly at all groundwater wells.

Groundwater monitoring location CD1 is sampled monthly and analysed for quarterly groundwater parameters, listed in Table D.5.1 of the IED Licence. MB35 and RC3 are sampled quarterly and analysed for quarterly groundwater parameters, listed in Table D.5.1 of the IED Licence. Additional sampling of RC3, CD1 and MB35 was carried out from March - November 2018 as part of investigative sampling of mineral oils in groundwater samples.

The results of monthly and quarterly groundwater monitoring undertaken for CD1, MB35 and RC3 were included in each of the quarterly reports to the Agency. Annualised and maximum results are presented in the GW-Soil tab of the AER summary templates. (Appendix 3).

## 5.2 Interpretation of Results

The groundwater results were historically compared to the relevant Interim Guideline Value (IGV) set out in the EPA report '*Towards Setting Guideline Values for the Protection of Groundwater in Ireland*' but following instruction from the EPA during the 2016 site audit, comparison with the GTVs from the European Communities, Environmental Objectives, Groundwater Regulations 2010 is now carried out. It should be noted that the groundwater beneath the landfill is likely to be estuarine in nature and would not generally be potable water.

Groundwater upgradient of the landfill at RC3 shows a rising trend over a 5-year period for pH, Conductivity and Ammoniacal Nitrogen. Downgradient, as mentioned above, the well is located within the estuary and the third well is located on-site. There is no demonstrable decrease in water quality at CD1 which is located on site. Levels of pH, ammoniacal N and TOC demonstrate an upward trend in MB35 (estuarine location).

## 5.3 Conclusion

Groundwater results indicate that groundwater quality upgradient of the landfill is impacted by local activities. Water quality on and downgradient of the landfill, maybe impacted by both the landfill (which is both dilute and disperse landfill and an engineered designed landfill) and the nearby estuary (saline intrusion from the estuary).

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## 6 FINANCIAL PROVISIONS

Condition 12.2 of the licence requires the establishment of a fund to implement the Restoration and Aftercare Plan. Fingal County Council has provided in its accounts a reserve for the restoration of the site which amounted to €7,676,704 on 31/12/2018.

See ELRA tab from AER summary templates.doc in Appendix 3.

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## 7 ENVIRONMENTAL MANAGEMENT PROGRAMME

### 7.1 Environmental Objectives and Targets for 2018

See EMP tab from AER summary templates.doc in Appendix 3.

### 7.2 Summary of written procedures

There were no new written procedures during the reporting period.

### 7.3 Communications Programme for Public Information

The Communications Programme for Fingal County Council contains information on Balleally Landfill. The information can roughly be divided into two areas. Background information prior to granting of the waste licence, and information concerning the waste licence and IED Licence (W009-02 & 03). There is also a register of correspondence to and from the Agency, along with the various correspondences relevant to the Licence. This information was updated on a continuous basis. During Q1 2013, a change came about in that correspondence with The Agency was almost exclusively sent through a new online web based system called EDEN. Most correspondence between the Agency and the Licensee must now be accessed through this system.

Environmental Information can be viewed at the following locations:

- At the Council's Headquarters between 9.30 a.m. and 12.45 p.m. and 2.00 p.m. and 4.00 p.m. Monday to Friday (excluding public holidays), unless otherwise arranged by prior appointment.
- At Balleally Landfill by prior appointment with the Landfill Manager.
- Since March 2013, Licence Reports have been submitted through, stored on and available through the Environmental Protection Agency's Website; [www.epa.ie](http://www.epa.ie).

#### Site Visits

- Site visits to Balleally Landfill can be arranged by writing to the Landfill Manager requesting the date and time of the proposed visit and indicating the number of visitors and the purpose of such a visit and whether any presentation is required. The use of cameras and video equipment during the visit must be agreed in advance with Fingal County Council.
- Such requests will be accommodated where possible.

### 7.4 Management Structure

The facility is owned and operated by Fingal County Council. The Environmental Services Department of Fingal County Council manage the landfill facility. A description of the current management structure is provided in Appendix 2.

## 7.5 Staff Training

Staff from Fingal County Council completed training in 2018 in various aspects of environmental management to improve their skills in operation and management of Balleally Landfill. Details are in Table 7.1 below.

**Table 7-1: Staff Training 2018**

Position	Training Completed
David Devine Landfill Manager	MSc Civil Engineering

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## 8 NOISE MONITORING

An Annual Noise Survey was undertaken in July 2018 to assess the existing noise emissions from the site and to establish the existing noise environment at potentially sensitive receptors near the site in accordance with Schedule D of IED Licence W0009-03. Noise monitoring was carried out during daytime hours. The location of noise monitoring points can be seen in Figure Balleally Monitoring Locations map, Appendix 1.

Noise measurements were taken for 30 minutes at each location. A Noise Monitoring Report has previously been submitted to the EPA along with commentary on noise sources. The results are included in the noise tab of the AER summary template in Appendix 3.

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## 9 RESOURCE USAGE

See Resource-Energy tab from AER summary templates.xls in Appendix 3.

Resources consumed at Balleally Landfill include diesel fuel, electricity, hydraulic oil and lubricating oil. Table 9.1 presents a summary of the quantities of each used on site for the period of this report. Electricity consumed on site was used for the purpose of heating, lighting, the operation of office equipment and the leachate treatment plant. The largest consumer of electricity was the leachate treatment plant until it was mothballed during 2009. There was a sustained and significant drop in energy usage since 2008 peak, with an increase through 2013 - 2015 associated with new pumping arrangements from the Leachate Treatment Plant. Electricity consumption in Balleally was lower in 2018 (28,488 kWh) than 2017 (55,829 kWh).

Diesel and petrol consumption (450 litres) has dropped off on site because several items of plant were off-hired for longer periods than in previous years. Additionally, the area of operation for the excavator and Dozer has reduced.

Water Consumption in Balleally was lower in 2018 (1,689 m<sup>3</sup>) than 2017 (1,689 m<sup>3</sup>).

Bioverda Power Systems (BPS) operate the landfill gas utilisation plant at Balleally Landfill.

**Table 9-1: Summary of resources used on site 2018**

Resource	FCC
Electricity	22,488 kWh
Diesel	450 litres
Petrol*	0
Lube Oil	9,450 litres
Water*	1,689 m <sup>3</sup>

\* Estimates based on average weekly usage

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**Table 9-2: Electricity consumption on site for the period January 2000 to December 2018**

Year	Site	Site	Leachate Treatment Plant	KWhr Total
2018	Ceased	15,954	6,534	22,488
2017	Ceased	47,050	8,779	55,829
2016	Ceased	38,240	24,067	62,317
2015	Ceased	54,100	41,590	95,690
2014	Ceased	50,170	29,086	79,256
2013	Ceased	67,450	7,457	74,906
2012	Ceased	58,075	7,423	65,498*
2011	Ceased	59,100*	5,109*	64,209*
2010	Ceased	71,575*	6,460*	78,035*
2009	Ceased	82,950*	101,367*	184,317*

Year	Site	Site	Leachate Treatment Plant	KWHR Total
2008	1,832*	91,350*	202,739*	295,921*
2007	1,726*	84,900*	202,669*	289,295*
2006	2,109*	97,600*	73,420*	173,129*
2005	1,033*	115,050*	N/R	15,050*
2004	NR	66,250*	N/R	66,250*
2003	NR	NR	N/R	89,155
2002	NR	NR	N/R	76,529
2001	NR	NR	N/R	55,453
2000	NR	NR	N/R	49,016

- \* Data derived from Website for three accounts registered to Balleally.
- N/R: Accounts not set up at these times.
- Data sourced from AER 2006.

## Note:

1. There was a significant increase in electricity consumption in the period 2006 – 2008, from previous years as can be observed from the table. This was attributable to the operation of site leachate treatment plant. The decrease in 2009 was attributable to the mothballing of the leachate treatment plant.
2. The electricity consumption increased each year from 2000 (exception 2004) to 2008 and decreased through to 2011. 2011 decrease may in part be due to milder winter (less heating), direr conditions (less pumping) and the move from an automated to manual wheel wash. Electricity consumption was stable during 2012. There was an increase during 2013 to 2015, associated with pumping from the Leachate Treatment plant. Pumping of leachate from Leachate Treatment Plant continued in 2017.

See Waste tab from AER summary templates.xls in Appendix 3.

**Table 9-3: Equipment and Plant list at Balleally Landfill and quantities 2018**

Type of Item	Item	Quantity
Transport	Isuzu 4X4* Jeep	2
	VW Van Caddy	1
	Mitsubishi Canter Van	1
	CAT Minidigger	1
Plant	John Deere 4X4 Tractor*	1
	Same Tractor*	1
Heavy Plant		1
	Cat excavator 330* / Dozer Package	1
	30 Ton Vibrating Roller*	1
	8 Tonne MiniDigger	1
	Kubota Tractor	1
	6 Tonne MiniDigger	1
	Diesel H/P power washer and Bowser*	1
Auxiliary Plant	CONSAW*	1
	6-inch pump*	1
	6.5 KVA diesel generator*	1
	Skimmers	3
Survey	Sokkiswa level and tripod*	1
	Sokkiswa theodolite & Tripod*	1
	NIKON auto level*	1
	Garmin GPS*	1
	GAS DATA LMSXi	1
	GMI FI 2000*	1
	30 Metre steel Tape*	1
	30m dip meter*	1
	Various P.C.s and printers*	1

## 9.1 Landfill gas utilisation

See Table 7 in the Waste tab from AER summary templates.xls in Appendix 3.

Landfill gas is actively extracted by means of a series of wells and a collection pipe network in the waste body. The gas is pumped through two main lines to the site utilisation plant. The utilisation plant comprises four generators (BY01-BY04), grouped into two operating units AER1 and AER3. BY01-BY04 ran for a total of 194 hours, 0 hours, 0 hours and 7,141 hours respectively, the flare ran for 192 hours. At present 45.0% methane gas concentration is achieved, 5,103,786 m<sup>3</sup> of landfill gas was treated in the flares and engines on site. This is an average of 583 m<sup>3</sup>/hr.

The power station/utilisation plant operators, Bioverda Power Systems Limited, regulate the inflow of gas to the station in an effort to achieve the 50% Methane target. The total power output from the station for the period is shown in Table 9.4 and Table 9.5.

**Table 9-4: Electricity output (MWhrs) from the landfill gas utilisation plant at Balleally Landfill 2003 - 2018**

YEAR	ELECTRICITY OUTPUT (MWhrs)
2003	30,194
2004	21,636
2005	21,234*
2006	20,529*
2007	23,762
2008	27,117
2009	25,429
2010	21,909
2011	20,534
2012	20,928
2013	16,693
2014	13,679
2015	10,811
2016	10,478
2017	9,073
2018	7,303

**Table 9-5: Electricity output (MWhrs) from the landfill gas utilisation plant at Balleally Landfill 2018**

Month	Combined BY01-BY04 (MWhrs)
January	590.1
February	670.5
March	527.5
April	660.9
May	630.5
June	652.8
July	614.3
August	629.6
September	628.2
October	558.9
November	549.7
December	589.1
<b>Total</b>	<b>7,303</b>

## 10 ENVIRONMENTAL INCIDENTS & COMPLAINTS

Please See Complaints and Incidents tab from AER summary templates.doc in Appendix 3.

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## 11 WASTE SUMMARY

Please refer to the Waste tab of the AER summary sheet (Appendix 3).

The landfill closed to waste acceptance in 2012.

23,706 m<sup>3</sup> of leachate was transferred off-site in 2018.

### 11.1 Remaining Landfill Capacity

The landfill is closed to waste acceptance.

### 11.2 Imported Topsoil for 2018

As part of capping upgrades at Balleally Landfill in accordance with the license requirement for 300mm of topsoil, topsoil was imported over several months in 2018 as part of final capping improvement works at the site.

The total quantities of imported topsoil during 2018 is summarised in Table 11.1.

**Table 11-1: Topsoil Deliveries for 2018 at Balleally Landfill**

Month	No. of Loads	Average Tonnes	Total Tonnage
January	0	18.5	0
February	0	18.5	0
March	0	18.5	0
April	449	18.5	8307
May	1330	18.5	24605
June	1663	18.5	30211
July	339	18.5	6272
August	0	18.5	0
September	0	18.5	0
October	1193	18.5	22071
November	0	18.5	0
December	0	18.5	0
<b>Total</b>			<b>91,464</b>

## 12 METEOROLOGICAL MONITORING

Condition 8 and Schedule D.6.1 of Waste Licence W0009-03 require daily monitoring of precipitation volume, temperature (max. /min.), wind force and direction, and atmospheric pressure, Evaporation and Atmospheric humidity.

June, July and August were warmest with the highest mean monthly temperatures. Monthly Rainfall was highest during January, March and November when highest volumes of rainfall were recorded. The site was predominantly affected by south westerly winds, highest average monthly wind speeds were in January, March and April. Evaporation and potential evapo-transpiration were highest in May, June and July.

Meteorological data is obtained from Met Éireann for Dublin Airport's Met Station. Please see Table 12.1 below for monthly averages of this data. Other meteorological parameters and daily data are available to view in Fingal County Hall and on site.

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Table 12-1: Mean Monthly Data for meteorological parameters: Dublin Airport (Source Met Éireann)

Year	Month	Mean Temperature (°C)	Max Air Temp °C	Min Air Temp °C	Total Rainfall (mm)	Mean MSL Pressure (hpa)	Mean Wind Speed (Knots)	Mean Evaporation mm	PE Mean Daily mm	Mean Atmospheric Humidity %
2018	Jan	5.3	13.1	-3.2	93.1	996.4	14.8	22.8	17.1	84.5
2018	Feb	3.4	12.0	-4.9	36.9	1005.9	11.9	29.3	20.3	85.1
2018	March	4.3	11.9	-5.1	100.0	990.9	12.2	44.6	28.7	83.6
2018	April	8.1	18.8	-2.1	68.9	998.4	10.8	76.3	49.8	75.3
2018	May	11.4	22.2	0.4	19.1	1007.9	8.8	120.6	82.4	78.2
2018	June	14.5	26.5	3.8	4.8	1009.3	8.7	146.6	103.3	77.3
2018	July	16.1	26.7	5.2	40.0	1006.1	6.9	126.6	93.2	78.4
2018	Aug	15.3	25.1	3.9	48.0	1004.9	8.1	97.8	71.3	81.4
2018	Sept	12.2	23	0.4	43.8	1008.6	9.0	71.8	51.5	82.6
2018	Oct	9.3	19.2	-1.5	42.6	1007.2	9.2	41.6	30.7	86.7
2018	Nov	8.2	15.3	1.1	131.2	996.6	10.1	25.7	20.6	87.2
2018	Dec	7.7	13.4	0.8	81.0	1001.5	9.5	19.0	15.1	88.3

## 13 SITE DEVELOPMENT WORKS

### 13.1 Work carried out in the reporting period 2018

**Table 13-1: Work carried out during 2018**

Objective/Target	Description	Timescale
<b>Objective 1</b>	<b>To minimise environmental impact on the immediate environment</b>	
Target 1	To continue to monitor Ammonical Nitrogen levels at OF1-OF4 in line with agreed trigger levels.	Ongoing.
Target 2	Continue to monitor SW quality in landfill in catchment of SWV1. To determine if improvements since 2016 are sustained.	Ongoing.
Target 3	Replacement / Rehabilitation of surface water and foul lines, manholes and pumps in area between Gas Utilisation Plant and Site Offices.	Will be complete in 2019.
Target 4	To determine final mitigation measures to deal with surface water contamination at SW20a and propose Specified Engineering Works if required.	Completed
Target 5	Surface Water line rehabilitation	Will be complete in 2019.
Target 6	Leachate Treatment Plant remedial works.	Started in 2019, to be complete in 2020
Target 7	Install topographical Monitoring points	Started in 2019, to be complete in 2020
Target 8	Southern Boundary Leachate Pumps and Drainage Improvement works	Started in 2019, to be complete in 2020
Target 9	Leachate Treatment Plant Calcification Removal & and Leachate Treatment Design and Construction	Started in 2019, to be complete in 2020
<b>Objective 2</b>	<b>Restoration of the facility.</b>	
Target 1	Completion of a vertical barrier at the northern boundary.	Completed.
Target 2	Install footpaths and Service Road	Completed.
Target 3	Address flooding issue at entrance.	Will be complete in 2019.
Target 4	Revise Restoration and Aftercare Plan	Submitted 2016 ongoing
Target 5	Grass seeding of capped areas	Completed.
Target 6	Maintenance Shed Design and Construction	Started in 2019, to be complete in 2020

Works for next reporting period (2019)

**Table 13-2: Works to be carried out during 2019**

Objective/Target	Description	Timescale
<b>Objective 1</b>	<b>To minimise environmental impact on the immediate environment</b>	
Target 1	To continue to monitor Ammoniacal Nitrogen levels at OF1-OF4 in line with agreed trigger levels.	Ongoing.
Target 2	Continue to monitor SW quality in landfill in catchment of catchment of SWV1. To determine if improvements since 2016 are sustained.	Ongoing.
Target 3	To determine final mitigation measures to deal with surface water contamination at SW20a and propose Specified Engineering Works if required.	Will be complete in 2019.
Target 4	Leachate Treatment Plant remedial works.	Started in 2019, to be complete in 2020
Target 5	Install topographical Monitoring points	Will be complete in 2019.
Target 6	Leachate Treatment Plant Calcification Removal & and Leachate Treatment Design and Construction	Started in 2019, to be complete in 2020

### 13.2 Progress on Site Restoration

The Restoration and Aftercare Plan for the landfill was submitted in July 2003 as per condition 4.1. This plan set out a framework to successfully restore Balleally Landfill to a condition suitable for use as an amenity for the general public. The plan has been prepared in accordance with the EPA Landfill manual 'Landfill Restoration and Aftercare' (1999), the Council Directive (1999/31/EC) on the Landfill of Waste and Waste Licence W0009-02 & -03. Restoration was undertaken at Balleally Landfill using a phased approach due to the size of the site and seasonal constraints. On completion of restoration in each phase, the aftercare plan to establish and maintain the after use of the site shall be implemented.

Capping of the site was as per Condition 4.3. The geotextile alternative was investigated and agreed in early 2004 with the EPA. This decreased the number of vehicle movements required for importing soil for the final cap.

Figure 2, Appendix 1, indicates the agreed phases for the capping and restoration of Balleally Landfill. The phasing provided for the restoration of the original landfill initially, and then the landfill extension area.

The total area for capping was 46.5 Hectares approx.

Between 2004 and December 2017, approx. 46.5 Hectares were capped. During 2017, the last remaining area to be capped around the Landfill Gas Plant was completed. A map showing the current extent of capping is included in Appendix 1.

During 2018, FCC completed modifications to the existing approach road and modified internal services such as surface water drainage and a leachate rising main. The full extent of the modifications carried out is listed below:

- Realignment of the existing approach road (Balleally Lane) near the eastern entrance to remediate issues with surface water flooding.
- An open channel surface water drainage system was constructed to provide drainage outfall from the realigned road.

- A new carparking pavement and surface water drainage system was constructed by the eastern entrance to the landfill.
- Installation of embankment filter drains surrounding the new hard-standing area.
- New leachate rising main constructed from existing cells to gravity leachate pipe.
- Leachate gravity main pipework replaced with HDPE pipe.
- Relocation of the Administration Office to the west side of the site over to the treatment plant compound.
- Installation of new pavement (surface layer) on existing laneway between Rogerstown Lane and a point 15m beyond the eastern side of the Dublin-Belfast Railway Line.
- Installation of new pavement (surface and regulating layer) on existing site road running from east to west along the north of the site (parallel to Balleally Lane).
- Remediation of existing filter drain at toe of cell embankment along existing site road and construction of outfalls to surface water drains on the opposite side of the road.

### 13.3 Annual Topographical Survey

Condition 8.5.1 of WL W0009-03 requires an annual Topographical Survey to be undertaken in Balleally Landfill. The last full topographic survey was completed Q1 2017 and is available to view on site or in Fingal County Hall.

### 13.4 Slope Stability

As required under Licence Condition 8.8.1. a slope stability survey was undertaken in Balleally Landfill in November 2018.

The conclusions and recommendations in the survey report are noted and will be implemented.

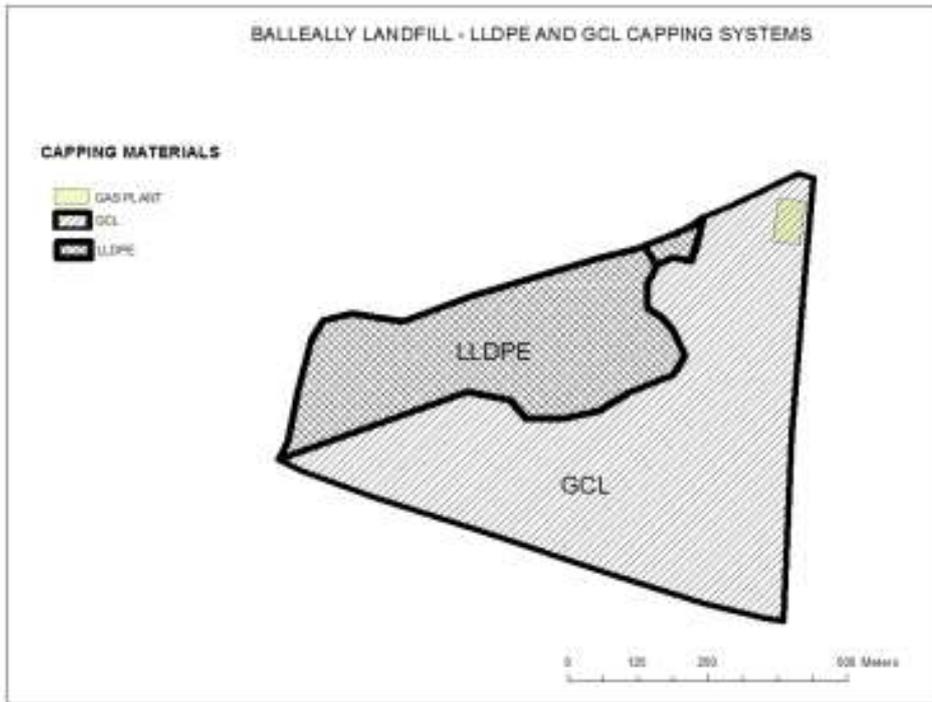
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# APPENDIX 1

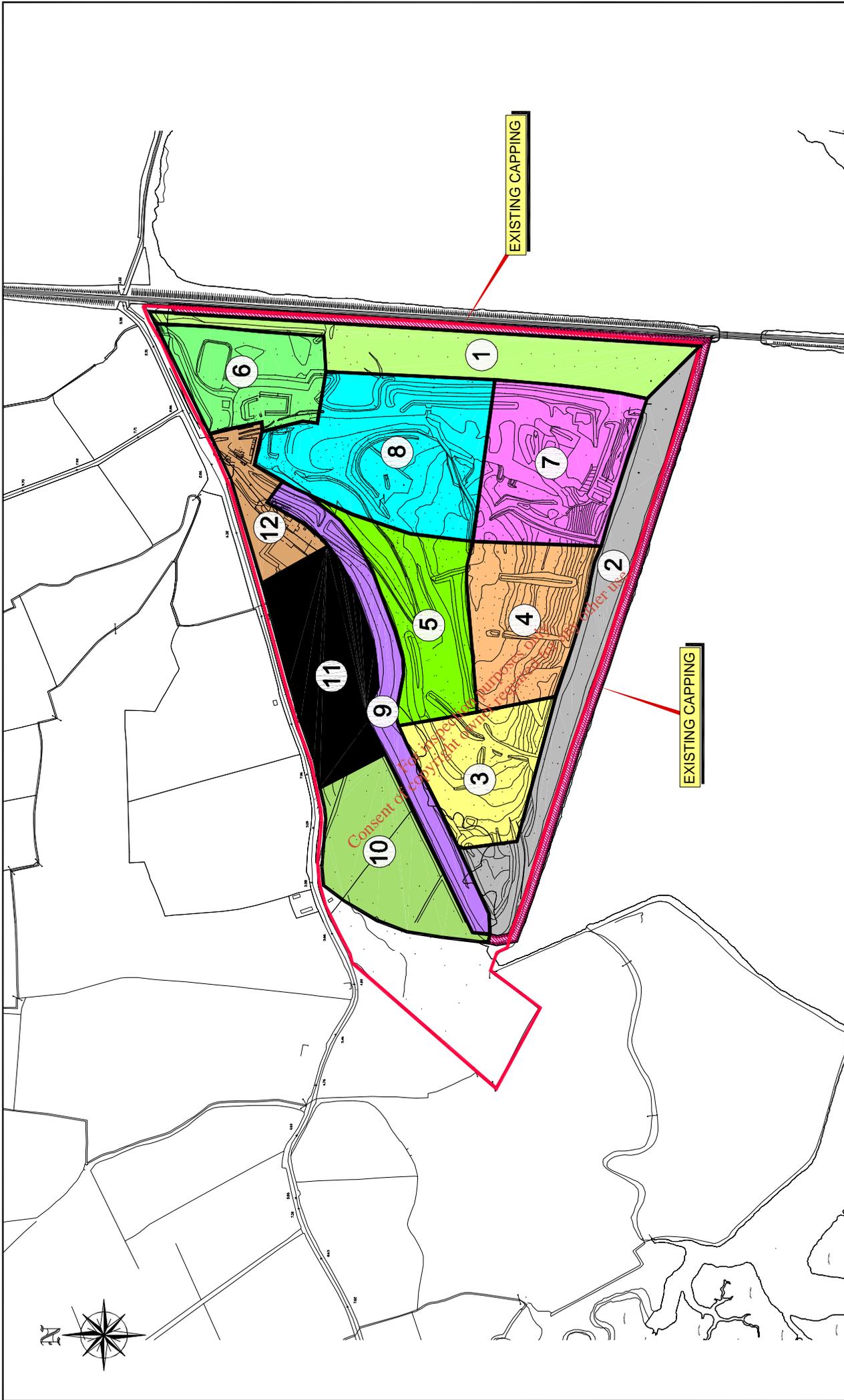
## DRAWINGS

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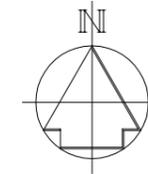


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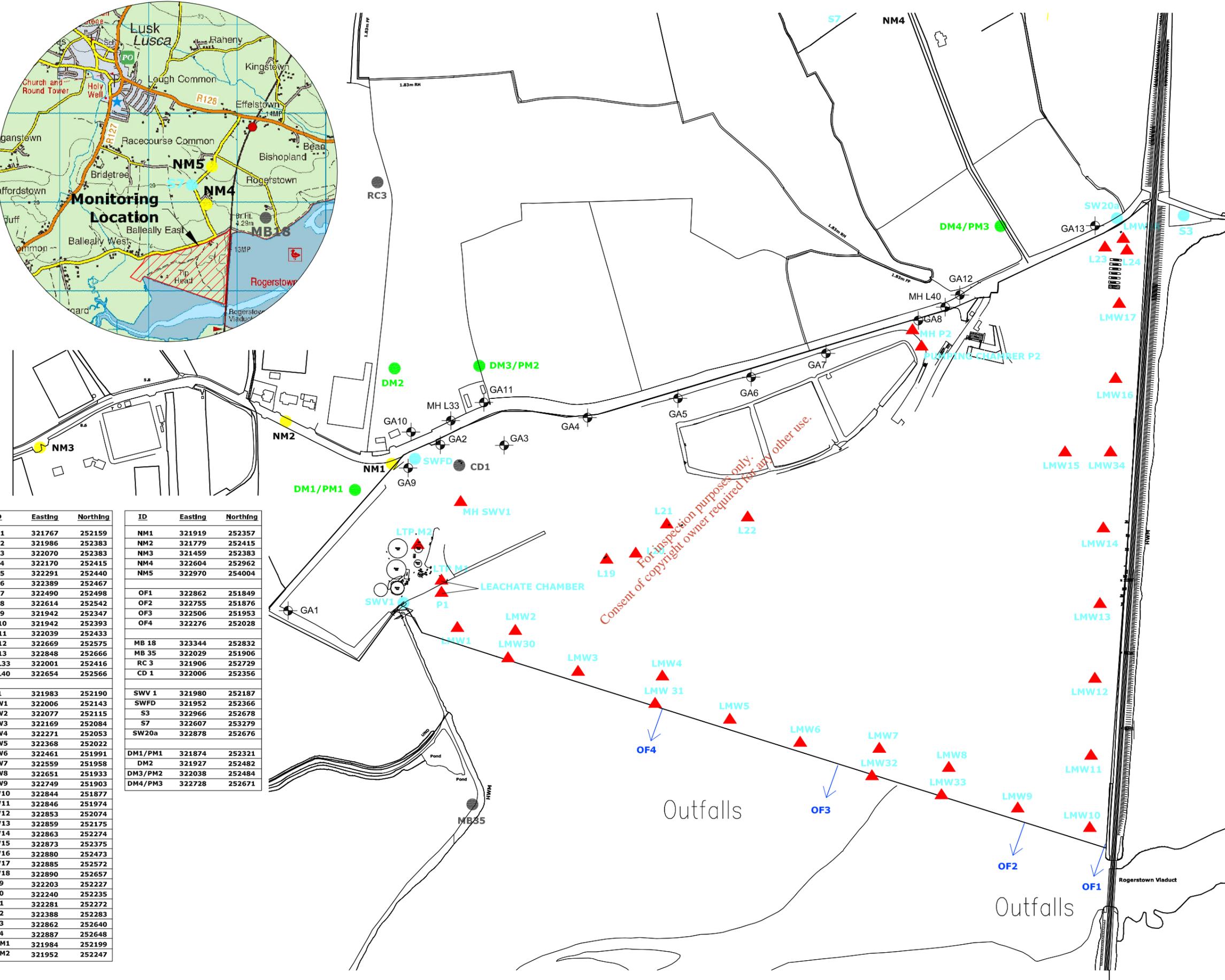


 <p><b>Comhairle Chontae Fhine Gall</b> FINGAL COUNTY COUNCIL Mr. P. J. Howell, Director of Service Phone: (01) 890 5000</p>		<p>Carnegie House, Library Road, Dun Laoghaire, Co. Dublin. Phone 01 - 2020870 Fax 01 - 2020707</p>		<p><b>MEOS</b> <b>COWI</b></p>		<table border="1"> <tr> <th>No.</th> <th>Date</th> <th>By</th> <th>Amendments</th> </tr> <tr> <td>A04</td> <td>May/03</td> <td>HF</td> <td>RE-ISSUED FOR APPROVAL</td> </tr> <tr> <td>A03</td> <td>Apr/03</td> <td>RH</td> <td>RE-ISSUED FOR APPROVAL</td> </tr> <tr> <td>A02</td> <td>Nov/02</td> <td>GDB</td> <td>RE-ISSUED FOR APPROVAL</td> </tr> <tr> <td>A01</td> <td>Oct/02</td> <td>SBG</td> <td>ISSUED FOR APPROVAL</td> </tr> </table>		No.	Date	By	Amendments	A04	May/03	HF	RE-ISSUED FOR APPROVAL	A03	Apr/03	RH	RE-ISSUED FOR APPROVAL	A02	Nov/02	GDB	RE-ISSUED FOR APPROVAL	A01	Oct/02	SBG	ISSUED FOR APPROVAL	<p>Job: <b>BALLEALLY LANDFILL RESTORATION AND AFTERCARE PLAN</b></p> <p>Title: <b>RESTORATION PHASING</b></p>		<p>Drawn: HF Checked: HD Approved: CB Scale: 1:7500 Date: Oct/02</p>		<p>File Ref.: 149507002FG0300</p> <p>Drawing No. <b>FIG 3.0</b></p> <p>Rev. <b>A04</b></p>	
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A04	May/03	HF	RE-ISSUED FOR APPROVAL																														
A03	Apr/03	RH	RE-ISSUED FOR APPROVAL																														
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- KEY**
- NSL1 Noise Monitoring Location
  - AD1 Dust Monitoring Location
  - OF1 Outfall Location
  - 3d Groundwater Monitoring Location
  - SW1 Surface Water Monitoring
  - MG1 Gas Well Monitoring Locations
  - ▲ LM1 Leachate Monitoring Locations



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ID	Easting	Northing
GA1	321767	252159
GA2	321986	252383
GA3	322070	252383
GA4	322170	252415
GA5	322291	252440
GA6	322389	252467
GA7	322490	252498
GA8	322614	252542
GA9	321942	252347
GA10	321942	252393
GA11	322039	252433
GA12	322669	252575
GA13	322848	252666
MH L33	322001	252416
MH L40	322654	252566
P1	321983	252190
LMW1	322006	252143
LMW2	322077	252115
LMW3	322169	252084
LMW4	322271	252053
LMW5	322368	252022
LMW6	322461	251991
LMW7	322559	251958
LMW8	322651	251933
LMW9	322749	251903
LMW10	322844	251877
LMW11	322846	251974
LMW12	322853	252074
LMW13	322859	252175
LMW14	322863	252274
LMW15	322873	252375
LMW16	322880	252473
LMW17	322885	252572
LMW18	322890	252657
L19	322203	252227
L20	322240	252235
L21	322281	252272
L22	322388	252283
L23	322862	252640
L24	322887	252648
LTP M1	321984	252199
LTP M2	321952	252247

ID	Easting	Northing
NM1	321919	252357
NM2	321779	252415
NM3	321459	252383
NM4	322604	252962
NM5	322970	254004
OF1	322862	251849
OF2	322755	251876
OF3	322506	251953
OF4	322276	252028
MB 18	323344	252832
MB 35	322029	251906
RC 3	321906	252729
CD 1	322006	252356
SWV 1	321980	252187
SWFD	321952	252366
S3	322966	252678
S7	322607	253279
SW20a	322878	252676
DM1/PM1	321874	252321
DM2	321927	252482
DM3/PM2	322038	252484
DM4/PM3	322728	252671

Rev.	Drawn	Checked	App'd	Date	Description	
B	MM/c	TM	DD	DD	10.01.08	ISSUE FOR INFORMATION
A	MM/c	TM	DD	DD	05.07.07	ISSUE FOR INFORMATION

Name of Client  
 Fingal County Council  
 (Dublin City Council)

Name of Job  
 ENVIRONMENTAL MONITORING  
 BALLEALLY

Title of Drawing  
 ENVIRONMENTAL MONITORING  
 LOCATIONS

Scales Used  
 1:2500 A1 / 1:5000 A3

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# APPENDIX 2

## MANAGEMENT STRUCTURE

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## Balleally Landfill Management Structure – 2017

TITLE	NAME	BASE	DUTIES AND RESPONSIBILITIES	QUALIFICATIONS	EXPERIENCE
Director of Services	Mr. Gilbert Power	Blanchardstown Office, Grove Road Dublin 15	Responsible for Environmental and Water Services Department		39 years LA Experience
A/Senior Engineer	Mr. James Walls	HQ	Responsibility for Environment Section	B.Eng in Civil Engineering 1984, MIEI Post Grad. Diploma in Env. Protection 2016	15 years Water Service experience. 4 years in Waste Management and Water Pollution Control
A/Senior Executive Scientist	Mr. Brian Reynolds	HQ	Responsibility for Waste Infrastructure	MSc in Operations Management 2004 MSc in Applied Environmental Science 1997 C Eng. MIEI	18 years experience in Water and Waste Management and Water Pollution Control Experience in Local Authority
Landfill Manager, Executive Engineer	Mr. David Devine	Balleally Landfill & HQ	Landfill Management of Waste Licence Compliance. Specified Engineering Works	BSc Civil Engineering, MIEI, Chartered Engineer, F.Á.S. Waste Management Training Course. F.Á.S. Management Safety in Construction Training Course.	19 years Civil Engineering and Project Management experience. 13 Years Local Authority experience
Executive Scientist	Mr. Mortimer Loftus	HQ & Balleally Landfill	Supervision of Scientific Monitoring, Reporting and liaison with the Environmental Protection Agency on issues relating to Environmental monitoring	PhD Ecology, BSc Environmental Science, Dip Environmental Impact Assessment Management, F.A.S. Waste Management Training Course, F.A.S. Managing Safety in Construction Training Course.	13 years Local Authority experience
	Mr. Richard Donnelly	Balleally Landfill	Deputy in the absence of the Landfill Manager, Waste Acceptance Manager, Safety inspections and day to day supervision of staff.	Completed course in Health & Safety (SAFE PASS), Manual Handling, Specified Signing Lighting and Guarding Training, CONSAW Training. Also, Elected Health & Safety Rep.	Over 20 years Local Authority Service. Assistant Foreman in Dunsink Landfill and appointed to Balleally Landfill in 2010.

# APPENDIX 3

## AER SUMMARY TEMPLATES

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**Facility Information Summary**

AER Reporting Year	2018
Licence Register Number	W0009-03
Name of site	Balleally Landfill
Site Location	Balleally, Lusk, County Dublin.
NACE Code	E39
Class/Classes of Activity	11.1, 11.5
National Grid Reference (6E, 6 N)	E322500 N252200

A description of the activities/processes at the site for the reporting year. This should include information such as production increases or decreases on site, any infrastructural changes, environmental performance which was measured during the reporting year **and an overview of compliance with your licence** listing all exceedances of licence limits (where applicable) and what they relate to e.g. air, water, noise.

Balleally landfill is closed to waste acceptance since 2012. The main activity on site in 2018 was realignment of the existing approach road (Balleally Lane), construction of an open channel surface water drainage system and new carparking pavement, installation of embankment filter drains surrounding the new hard-standing area, new leachate rising main constructed and leachate gravity main pipework replaced with HDPE pipe, the management of leachate and landfill gas and licence compliance monitoring and management activities. Leachate was discharged to sewer on Rogerstown Lane during 2018. There were 6 incidents notified during 2018, three relating to exceedances of trigger levels in landfill gas perimeter wells, and three relating to elevated levels of parameters in surface water. There were no complaints in 2018 and no exceedance of noise, dust or PM10 licence limits.

**Declaration:**

All the data and information presented in this report has been checked and certified as being accurate. The quality of the information is assured to meet licence requirements.

	05.04.2019
Signature Group/Facility manager <small>(or nominated, suitably qualified and experienced deputy)</small>	Date

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<b>AIR-summary template</b>	Lic No:	W0009-03	Year	2018
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Answer all questions and complete all tables where relevant

Additional information

- 1 Does your site have licensed air emissions? If yes please complete table A1 and A2 below for the current reporting year and answer further questions. If **you do not have** licenced emissions and **do not complete a solvent management plan** (table A4 and A5) you **do not** need to complete the tables

Yes	
-----	--

### Periodic/Non-Continuous Monitoring

- 2 Are there any results in breach of licence requirements? If yes please provide brief details in the comment section of TableA1 below
- 3 Was all monitoring carried out in accordance with EPA guidance note AG2 and using the basic air monitoring checklist? [Basic air monitoring checklist](#) [AGN2](#)

Yes	
Yes	

**Table A1: Licensed Mass Emissions/Ambient data-periodic monitoring (non-continuous)**

Emission reference no:	Parameter/ Substance	Frequency of Monitoring	ELV in licence or any revision thereof	Licence Compliance criteria	Measured value	Unit of measurement	Compliant with licence limit	Method of analysis	Annual mass load (kg)	Comments - reason for change in % mass load from previous year if applicable
Flare 1	Carbon monoxide (CO)	Annual	50		0.24	mg/Nm3	Yes	EN 15058:2004	0.05	Flare ran 192 hrs in 2018 vs 96 hrs in 2017 so higher mass emissions
Flare 1	Nitrogen oxides (NOx/NO2)	Annual	150		54.23	mg/Nm3	Yes	EN 14792	1140	Flare ran 192 hrs in 2018 vs 96 hrs in 2017 so higher mass emissions
Flare 1	Hydrogen Chloride	Annual	50	at mass flows > 0.30 kg/hr	3.6	mg/Nm3	Yes	EN1911	0.65	Flare ran 192 hrs in 2018 vs 96 hrs in 2017 so higher mass emissions
Flare 1	Hydrogen Fluoride	Annual	5	at mass flows > 0.05 kg/hr	1.48	mg/Nm3	Yes	ISO 15713	0.27	Flare ran 192 hrs in 2018 vs 96 hrs in 2017 so higher mass emissions
Flare 1	Total VOCs as Carbon	Annual	10		2.26	mg/Nm3	Yes	EN 12619:2013	0.48	Flare ran 192 hrs in 2018 vs 96 hrs in 2017 so higher mass emissions
BY04	volumetric flow	Annual	4500		3360	SELECT	Yes	OTH		
BY04	Carbon monoxide (CO)	Annual	1400	at mass flows > 0.05 kg/hr	1167.68	mg/Nm3	Yes	EN 15058:2004	28737.52	Engine ran 7141 hrs @ 3,360 m3/hr flow rate in 2018 vs 8044 hrs @ 3,186 m3/hr in 2017 so lower emissions.
BY04	Nitrogen oxides (NOx/NO2)	Annual	500		270.47	mg/Nm3	No	EN 14792	6671.21	Engine ran 7141 hrs @ 3,360 m3/hr flow rate in 2018 vs 8044 hrs @ 3,186 m3/hr in 2017 so lower emissions.
BY04	TA Luft organic substances class 1	Annual	20	at mass flows > 0.1 kg/hr	<24.4	mg/Nm3	Yes	CAT/TS 13649	601.142	Engine ran 7141 hrs @ 3,360 m3/hr flow rate in 2018 vs 8044 hrs @ 3,186 m3/hr in 2017 so lower emissions.
BY04	TA Luft organic substances class 2	Annual	100	at mass flows > 2 kg/hr	<17.32	mg/Nm3	Yes	CAT/TS 13649	425.198	Engine ran 7141 hrs @ 3,360 m3/hr flow rate in 2018 vs 8044 hrs @ 3,186 m3/hr in 2017 so lower emissions.
BY04	TA Luft organic substances class 3	Annual	150	at mass flows >3 kg/hr	<47.23	mg/Nm3	Yes	CAT/TS 13649	1165.629	Engine ran 7141 hrs @ 3,360 m3/hr flow rate in 2018 vs 8044 hrs @ 3,186 m3/hr in 2017 so lower emissions.
BY04	Hydrogen Chloride	Annual	50	at mass flows > 0.30 kg/hr	0.49	mg/Nm3	Yes	EN1911	14.662	Engine ran 7141 hrs @ 3,360 m3/hr flow rate in 2018 vs 8044 hrs @ 3,186 m3/hr in 2017 so lower emissions.
BY04	Hydrogen Fluoride	Annual	5	at mass flows > 0.05 kg/hr	1.4	mg/Nm3	Yes	ISO 15713	36.655	Engine ran 7141 hrs @ 3,360 m3/hr flow rate in 2018 vs 8044 hrs @ 3,186 m3/hr in 2017 so lower emissions.

Note 1: Volumetric flow shall be included as a reportable parameter

<b>AIR-summary template</b>	Lic No:	W0009-03	Year	2018
<b>Continuous Monitoring</b>				

4 Does your site carry out continuous air emissions monitoring?  
 If yes please review your continuous monitoring data and report the required fields below in Table A2 and compare it to its relevant Emission Limit Value (ELV)

5 Did continuous monitoring equipment experience downtime? If yes please record downtime in table A2 below

6 Do you have a proactive service agreement for each piece of continuous monitoring equipment?

7 Did your site experience any abatement system bypasses? If yes please detail them in table A3 below

**Table A2: Summary of average emissions -continuous monitoring**

Emission reference no:	Parameter/ Substance	ELV in licence or any revision thereof	Averaging Period	Compliance Criteria	Units of measurement	Annual Emission	Annual maximum	Monitoring Equipment downtime (hours)	Number of ELV exceedences in current reporting year	Comments
	SELECT			SELECT	SELECT					
	SELECT				SELECT					
	SELECT				SELECT					
	SELECT				SELECT					
	SELECT				SELECT					

note 1: Volumetric flow shall be included as a reportable parameter.

**Table A3: Abatement system bypass reporting table** [Bypass protocol](#)

Date*	Duration** (hours)	Location	Reason for bypass	Impact magnitude	Corrective action

\* this should include all dates that an abatement system bypass occurred

\*\* an accurate record of time bypass beginning and end should be logged on site and maintained for future Agency inspections please refer to bypass protocol link

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<b>AIR-summary template</b>		Lic No: W0009-03	Year	2018				
<b>Solvent use and management on site</b>								
8 Do you have a total Emission Limit Value of direct and fugitive emissions on site? if yes please fill out tables A4 and A5			No					
<b>Table A4: Solvent Management Plan Summary</b> Total VOC Emission limit value		<a href="#">Solvent regulations</a> Please refer to linked solvent regulations to complete table 5 and 6						
Reporting year	Total solvent input on site (kg)	Total VOC emissions to Air from entire site (direct and fugitive)	Total VOC emissions as %of solvent input	Total Emission Limit Value (ELV) in licence or any revision thereof	Compliance			
					SELECT			
					SELECT			
<b>Table A5: Solvent Mass Balance summary</b>								
	(I) Inputs (kg)		(O) Outputs (kg)					
Solvent	(I) Inputs (kg)	Organic solvent emission in waste	Solvents lost in water (kg)	Collected waste solvent (kg)	Fugitive Organic Solvent (kg)	Solvent released in other ways e.g.	Solvents destroyed onsite through	Total emission of Solvent to air (kg)
								Total

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Additional information

Does your site have licensed emissions direct to surface water or direct to sewer? If yes please complete table W2 and W3 below for the current reporting year and answer further questions. If you do not have licensed emissions you only need to complete table W1 and or W2 for storm water analysis and visual inspections

Yes

The site has both licensed emission to surface water at SWV1 and licensed emission to sewer, monitored at T4. The emission to surface water is stormwater, there is no process effluent. There are also 4 surface water outfalls to the estuary at OF1, OF2, OF3 and OF4. Leachate was discharged to sewer in 2018, 20,796 m<sup>3</sup>.

Was it a requirement of your licence to carry out visual inspections on any surface water discharges or watercourses on or near your site? If yes please complete table W2 below summarising only any evidence of contamination noted during visual inspections

Yes

Table W1 Storm water monitoring

Location reference	Location relative to site activities	PRTR Parameter	Licensed Parameter	Monitoring date	ELV or trigger level in licence or any revision thereof*	Licensee Compliance criteria	Measured value	Unit of measurement	Compliant with licence	Comments
SWV1	downstream	SELECT	pH	2018		N/A	7.73	pH units	SELECT	
SWV1	downstream		Temperature	2018		N/A	12.08	degrees C		
SWV1	downstream		Ammonia (as N)	2018		N/A	1.94	mg/L		Contaminated surface water and potentially groundwater have been impacting SWV1. Mitigation works in 2018 have caused a significant and sustained improvement in parameters measured (Ammoniacal Nitrogen) at SWV1 in 2018.
SWV1	downstream		Chloride	2018		N/A	93.3	mg/L		
SWV1	downstream		BOD	2018		N/A	<1	mg/L		As above
SWV1	downstream		COD	2018		N/A	11.73	mg/L		As above
SWV1	downstream		Suspended Solids	2018		N/A	7.8	mg/L		
SWV1	downstream		Dissolved Oxygen	2018		N/A	7.52	mg/L		This is an estuarine location and DO levels can be variable due to tidal influence at this location point.
SWV1	downstream		Conductivity	2018		N/A	1.16	ms/cm		
SWFD	on-site		pH (Field)	2018		N/A	7.43	pH units		
SWFD	on-site		Temperature	2018		N/A	10.22	degrees C		
SWFD	on-site		Ammoniacal Nitrogen	2018		N/A	0.2896	mg/L		Two events in May and July 2018 with levels in exceedance of the ELV, which elevated the associated licence.
SWFD	on-site		Chloride	2018		N/A	38.62	mg/L		
SWFD	on-site		BOD	2018		N/A	2.52	mg/L		Two events in July and October 2018 with levels in exceedance of the ELV, which elevated the associated licence.
SWFD	on-site		COD	2018		N/A	16.66	mg/L		
SWFD	on-site		Total Suspended Solids	2018		N/A	6.28	mg/L		
SWFD	on-site		Dissolved Oxygen	2018		N/A	6.32	mg/L		
SWFD	on-site		Electrical Conductivity (FC)	2018		N/A	0.834	ms/cm		
S3	downstream		pH (Field)	2018		N/A	8.21	pH units		
S3	downstream		Temperature	2018		N/A	10.76	degrees C		
S3	downstream		Ammoniacal Nitrogen	2018		N/A	0.178	mg/L		
S3	downstream		Chloride	2018		N/A	182.4	mg/L		
S3	downstream		BOD	2018		N/A	1.24	mg/L		
S3	downstream		COD	2018		N/A	23.08	mg/L		
S3	downstream		Suspended Solids	2018		N/A	6.36	mg/L		
S3	downstream		Dissolved Oxygen	2018		N/A	10.71	mg/L		
S3	downstream		Electrical Conductivity (FC)	2018		N/A	1.14	ms/cm		
SW20a	downstream		pH (Field)	2018		N/A	7.72	pH units		
SW20a	downstream		Temperature	2018		N/A	11.3	degrees C		
SW20a	downstream		Ammoniacal Nitrogen	2018		N/A	8.02	mg/L		Three events in January, June and July 2018 with levels in exceedance of surface water cap.
SW20a	downstream		Chloride	2018		N/A	53.8	mg/L		
SW20a	downstream		BOD	2018		N/A	1.66	mg/L		
SW20a	downstream		COD	2018		N/A	42.36	mg/L		
SW20a	downstream		Suspended Solids	2018		N/A	18.45	mg/L		
SW20a	downstream		Dissolved Oxygen	2018		N/A	4.83	mg/L		
SW20a	downstream		Electrical Conductivity (FC)	2018		N/A	0.893	ms/cm		
S7	upstream		pH (Field)	2018		N/A	7.84	pH units		
S7	upstream		Temperature	2018		N/A	10.77	degrees C		
S7	upstream		Ammoniacal Nitrogen	2018		N/A	0.08	mg/L		
S7	upstream		Chloride	2018		N/A	51.07	mg/L		
S7	upstream		BOD	2018		N/A	1.43	mg/L		
S7	upstream		COD	2018		N/A	15.7	mg/L		
S7	upstream		Total Suspended Solids	2018		N/A	6.8	mg/L		
S7	upstream		Dissolved Oxygen	2018		N/A	8.53	mg/L		
S7	upstream		Electrical Conductivity (FC)	2018		N/A	0.719	ms/cm		
OF1	downstream		Temperature	2018		N/A	8.86	degrees C		
OF2	downstream		Temperature	2018		N/A	9.08	degrees C		
OF3	downstream		Temperature	2018		N/A	9.4	degrees C		
OF4	downstream		Temperature	2018		N/A	8.86	degrees C		
OF1	downstream		pH	2018		N/A	7.73	pH units		
OF2	downstream		pH	2018		N/A	7.86	pH units		
OF3	downstream		pH	2018		N/A	7.19	pH units		
OF4	downstream		pH	2018		N/A	7.31	pH units		
OF1	downstream		Dissolved Oxygen	2018		N/A	11.76	mg/L		
OF2	downstream		Dissolved Oxygen	2018		N/A	10.89	mg/L		
OF3	downstream		Dissolved Oxygen	2018		N/A	10.5	mg/L		
OF4	downstream		Dissolved Oxygen	2018		N/A	11.01	mg/L		
OF1	downstream		Conductivity	2018		N/A	1.71	ms/cm		
OF2	downstream		Conductivity	2018		N/A	1.82	ms/cm		
OF3	downstream		Conductivity	2018		N/A	2.17	ms/cm		
OF4	downstream		Conductivity	2018		N/A	2.48	ms/cm		
OF1	downstream		Ammoniacal Nitrogen	2018		N/A	3.05	mg/L		
OF2	downstream		Ammoniacal Nitrogen	2018		N/A	0.22	mg/L		
OF3	downstream		Ammoniacal Nitrogen	2018		N/A	0.46	mg/L		
OF4	downstream		Ammoniacal Nitrogen	2018		N/A	0.82	mg/L		

\*trigger values may be agreed by the Agency outside of licence conditions

Table W2 Visual Inspections-Please only enter details where contamination was observed.

Location Reference	Date of inspection	Description of contamination	Source of contamination	Corrective action	Comments
			SELECT		
			SELECT		

Licensed Emissions to water and /or wastewater(sewer)-periodic monitoring (non-continuous)

3 Was there any result in breach of licence requirements? If yes please provide brief details in the comment section of Table W3 below

Yes

Additional information

Was all monitoring carried out in accordance with EPA guidance and checklists for Quality of Aqueous Monitoring Data Reported to the EPA? If no please detail what areas require improvement in additional information box

External / Internal Lab Assessment of results checklist

Yes

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Table W3: Licensed Emissions to water and /or wastewater (sewer)-periodic monitoring (non-continuous)

Emission reference no:	Emission released to	Parameter/ Substance/Note 1	Type of sample	Frequency of monitoring	Averaging period	ELV or trigger value in licence or any revision thereof <sup>1,2</sup>	License Compliance criteria	Measured value	Unit of measurement	Compliant with licence	Method of analysis	Procedural reference source	Procedural reference standard number	Annual mass load (kg)	Comments
T4	Wastewater/Sewer	pH	discrete	Monthly	Monthly	6-10	Monthly Mean Concentration:	7.88	pH units	yes	pH Meter (Electrode)	Manufacturer method			
T4	Wastewater/Sewer	Temperature	discrete	Monthly	Monthly	42	Monthly Mean Concentration:	11.78	degrees C	yes	pH Meter (Electrode)	Manufacturer method			
T4	Wastewater/Sewer	Conductivity	discrete	Monthly	Monthly		Monthly Mean Concentration:	5579	µS/cm @25°C	yes	Conductivity Meter (Electrode)	Manufacturer method			
T4	Wastewater/Sewer	BOD	discrete	Monthly	Monthly	150	Monthly Mean Concentration:	10.4	mg/L	yes	Filtered by Oxygen Meter on liquids	UK SCA "Blue Book" series		213.901	
T4	Wastewater/Sewer	COD	discrete	Monthly	Monthly	1100	Monthly Mean Concentration:	309.87	mg/L	yes	Dr Lange Kit	ISO		6371.603	
T4	Wastewater/Sewer	Ammonia (as N)	discrete	Monthly	Monthly	800	Monthly Mean Concentration:	296.55	mg/L	yes	Kone Analyser	B.S. (British Standard)		6097.755	
T4	Wastewater/Sewer	Suspended Solids	discrete	Monthly	Monthly	800	Monthly Mean Concentration:	14.6	mg/L	yes	TSS in waters	B.S. (British Standard)		300.205	
T4	Wastewater/Sewer	Ortho-phosphate (as PO4)	discrete	Monthly	Monthly	10	Monthly Mean Concentration:	1.62	mg/L	yes	Kone spectrophotometric Analyzers	US EPA		23.246	
T4	Wastewater/Sewer	Sulphate	discrete	Monthly	Monthly	1000	Monthly Mean Concentration:	235.93	mg/L	yes	Kone spectrophotometric Analyzers	US EPA		4851.136	
T4	Wastewater/Sewer	Chromium (diss.filt)	discrete	Monthly	Monthly	300	Monthly Mean Concentration:	11.95	µg/L	yes	ICP / ICPMS (Inductively Coupled Plasma - Mass Spectrometry)	APHA / AWWA "Standard Methods"		0.245633	
T4	Wastewater/Sewer	Copper (diss. Fil.)	discrete	Monthly	Monthly	500	Monthly Mean Concentration:	1.71	µg/L	yes	ICP / ICPMS (Inductively Coupled Plasma - Mass Spectrometry)	APHA / AWWA "Standard Methods"		0.035065	
T4	Wastewater/Sewer	Nickel (diss. Fil.)	discrete	Monthly	Monthly	500	Monthly Mean Concentration:	25.54	µg/L	yes	ICP / ICPMS (Inductively Coupled Plasma - Mass Spectrometry)	APHA / AWWA "Standard Methods"		0.525134	
T4	Wastewater/Sewer	Zinc (diss. Fil.)	discrete	Monthly	Monthly	1500	Monthly Mean Concentration:	19.18	µg/L	yes	ICP / ICPMS (Inductively Coupled Plasma - Mass Spectrometry)	APHA / AWWA "Standard Methods"		0.394482	
T4	Wastewater/Sewer	mineral oil >C10 C40 (µg)	discrete	Monthly	Monthly	12000	Monthly Mean Concentration:	<10	µg/L	yes	EPH in waters	Other (please specify)	Petroleum hydrocarbons in environmental	0.2056	
T4	Wastewater/Sewer	TPH/Oils & Greases	discrete	Monthly	Monthly	100	Monthly Mean Concentration:	2.07	mg/L	yes	IR spectroscopy	Other (please specify)	HMSO London	42.529	
T4	Wastewater/Sewer	Chloride	discrete	Monthly	Monthly	6000	Monthly Mean Concentration:	475.91	mg/L	yes	Kone Spectrophotometric Analyzers	US EPA		9785.643	
T4	Wastewater/Sewer	MTBE	discrete	Monthly	Monthly			1.69	µg/L		GCMS (Gas Chromatography Mass Spectroscopy)	US EPA		0.034904	
T4	Wastewater/Sewer	Benzene	discrete	Monthly	Monthly			1.82	µg/L		GCMS (Gas Chromatography Mass Spectroscopy)	US EPA		0.037422	
T4	Wastewater/Sewer	Toluene	discrete	Monthly	Monthly			<1	µg/L		GCMS (Gas Chromatography Mass Spectroscopy)	US EPA		0.02056	
T4	Wastewater/Sewer	Ethylbenzene	discrete	Monthly	Monthly			1.14	µg/L		GCMS (Gas Chromatography Mass Spectroscopy)	US EPA		0.02344	
T4	Wastewater/Sewer	m,p-Xylene	discrete	Monthly	Monthly			1.09	µg/L		GCMS (Gas Chromatography Mass Spectroscopy)	US EPA		0.02454	
T4	Wastewater/Sewer	o-Xylene	discrete	Monthly	Monthly			1.19	µg/L		GCMS (Gas Chromatography Mass Spectroscopy)	US EPA		0.024448	
T4	Wastewater/Sewer	Sum of Detected Xylenes	discrete	Monthly	Monthly			2.78	µg/L		GCMS (Gas Chromatography Mass Spectroscopy)	US EPA		0.057511	
T4	Wastewater/Sewer	Sum of BTEX	discrete	Monthly	Monthly	5000	Monthly Mean Concentration:	5.49			Gas meter	Manufacturer method		0	
T4	Wastewater/Sewer	Methane in headspace	discrete	Monthly	Monthly	0.5	Monthly Mean Concentration:	0	m3/day						
T4	Wastewater/Sewer	volumetric flow	discrete	Monthly	Monthly	150	max in any one day	56.33							average flow based on total volume in 2017

Note 1: Volumetric flow shall be included as a reportable parameter  
 Note 2: Where Emission Limit Values (ELV) do not apply to your licence please compare results against EQCs for Surface water or relevant receptor quality standards

Continuous monitoring

5 Does your site carry out continuous emissions to water/sewer monitoring?  
 If yes please summarise your continuous monitoring data below in Table W4 and compare it to its relevant Emission Limit Value (ELV)

6 Did continuous monitoring equipment experience downtime? If yes please record downtime in table W4 below

7 Do you have a proactive service contract for each piece of continuous monitoring equipment on site?

8 Did abatement system bypass occur during the reporting year? If yes please complete table W5 below

Table W4: Summary of average emissions -continuous monitoring

Emission reference no:	Emission released to	Parameter/ Substance	ELV or trigger value in licence or any revision thereof	Averaging Period	Compliance Criteria	Units of measurement	Annual Emission for current reporting year (kg)	% change +/- from previous reporting year	Monitoring Equipment downtime (hours)	Number of ELV exceedances in reporting year	Comments
	SELECT	SELECT	SELECT	SELECT	SELECT	SELECT					
	SELECT	SELECT	SELECT	SELECT	SELECT	SELECT					

note 1: Volumetric flow shall be included as a reportable parameter.

Table W5: Abatement system bypass reporting table

Date	Duration (hours)	Location	Reason for bypass	Corrective action*	Was a report submitted to the EPA?	When was this report submitted?
					SELECT	
					SELECT	

\*Measures taken or proposed to reduce or limit bypass frequency

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<b>Groundwater/Soil monitoring template</b>	Lic No: W0009-03	Year: 2018
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		Comments	
1	Are you required to carry out groundwater monitoring as part of your licence requirements?	yes	
2	Are you required to carry out soil monitoring as part of your licence requirements?	no	
3	Do you extract groundwater for use on site? If yes please specify use in comment section	no	
4	Do monitoring results show that groundwater generic assessment criteria such as GTVs or IGVs are exceeded or is there an upward trend in results for a substance? If yes, please complete the Groundwater Monitoring Guideline Template Report (link in cell G8) and submit separately through ALDER as a licensee return AND answer questions 5-12 below.	yes	
5	Is the contamination related to operations at the facility (either current and/or historic)	yes	influenced by leachate from the unlined portion
6	Have actions been taken to address contamination issues? If yes please summarise remediation strategies proposed/undertaken for the site	yes	See text of AER
7	Please specify the proposed time frame for the remediation strategy	SELECT	See text of AER
8	Is there a licence condition to carry out/update ELRA for the site?	SELECT	See text of AER
9	Has any type of risk assessment been carried out for the site?	N/A	See text of AER
10	Has a Conceptual Site Model been developed for the site?	N/A	See text of AER
11	Have potential receptors been identified on and off site?	N/A	See text of AER
12	Is there evidence that contamination is migrating offsite?	N/A	See text of AER

Please provide an interpretation of groundwater monitoring data in the interpretation box below or if you require additional space please include a groundwater/contaminated land monitoring results interpretation as an additional section in this AER

This landfill has unlined cells built to dilute and disperse septicification. There is evidence of an upward trend in ammonical nitrogen in MB35 a downgradient well in the estuary. Conductivity and chloride levels in these wells are impacted by saline water as well as potentially by leachate. There is an upward trend in EC and ammonical N levels at the upgradient monitoring point. The onsite well CD1 has not shown upward trends in parameters assessed for the 5 year period with the exception of chloride. Quarterly groundwater monitoring reports with interpretation are submitted to the Agency through EDEN providing all of the monitoring results for groundwater sampling on a monthly, quarterly and annual basis. A separate groundwater monitoring template has not been completed.

**Table 1: Upgradient Groundwater monitoring results**

Date of sampling	Sample location reference	Parameter/ Substance	Methodology	Monitoring frequency	Maximum Concentration++	Average Concentration+ unit	GTV's*	SELECT**	Upward trend in pollutant concentration over last 5 years of monitoring data
2018	RC3	pH (pH units) (Field)	Probe	Quarterly	7.97	7.66675 pH units	>6.5 & <9.5		Yes
2018	RC3	Temperature (°C) (Field)	Probe	Quarterly	17.6	12.925 °C		25	No
2018	RC3	Dissolved Oxygen mg/l (Field)	Probe	Quarterly	11.18	10.5075 mg/l		No Abnormal Change	No
2018	RC3	Ammoniacal Nitrogen as NH3	Kone Spectrophotometric Analyser	Quarterly	0.161	0.21666667 mg/l	0.136		Yes
2018	RC3	Chloride	Kone Spectrophotometric Analyser	Quarterly	38.9	28.275 mg/l	187.5		No
2018	RC3	Conductivity	Determination of EC using a Conductivity meter	Quarterly	0.663	0.63325 mS/cm	1.875		No
2018	RC3	Organic Carbon, Total	Colorimetry	Quarterly	142	74.89 mg/l		No Abnormal Change	No

+ where average indicates arithmetic mean

++ maximum concentration indicates the maximum measured concentration from all monitoring results produced during the reporting year

Table 2: Downgradient Groundwater monitoring results

Date of sampling	Sample location reference	Parameter/ Substance	Methodology	Monitoring frequency	Maximum Concentration	Average Concentration	unit	GTV's*	SELECT**	Upward trend in yearly average pollutant concentration over last 5 years of monitoring data
2018	MB 35	pH (field)	Probe	Quarterly	7.394	7.38	pH units	>6.5 & <9.5		yes
2018	MB 35	Temperature	Probe	Quarterly	13.8	11.75	°C		25	no
2018	MB 35	Ammoniacal Nitrogen	Kone Spectrophotometric Analyser	Quarterly	5.48	5.25	mg/l	0.136	No Abnormal Change	yes
2018	MB 35	Dissolved Oxygen	Probe	Quarterly	10.66	6.60	mg/l			yes
2018	MB 35	Conductivity (Laboratory)	Determination of EC using a Conductivity meter	Quarterly	37	35.73	mS/cm	1.875		no
2018	MB 35	Chloride	Kone Spectrophotometric Analyser	Quarterly	14800	14550	mg/l	187.5		yes
2018	MB35	TOC	Colorimetry	Quarterly	4.53	4.06	mg/l		NAC	no
2018	CD1	pH (field)	Probe	Monthly	7.75	7.37	pH units	>6.5 & <9.5		yes
2018	CD1	Temperature	Probe	Monthly	16.1	13.08	°C		25	no
2018	CD1	Ammoniacal Nitrogen	Kone Spectrophotometric Analyser	Monthly	4.32	0.70	mg/l	0.136	No Abnormal Change	no
2018	CD1	Dissolved Oxygen	Probe	Monthly	7.61	4.27	mg/l		No Abnormal Change	yes
2018	CD1	Conductivity (Laboratory)	Determination of EC using a Conductivity meter	Monthly	1.31	1.12	mS/cm	1.875		no
2018	CD1	Chloride	Kone Spectrophotometric Analyser	Monthly	76.5	62.99	mg/l	187.5		yes
2018	CD1	TOC	Colorimetry	Monthly	5.89	3.56	mg/l		No Abnormal Change	no

\* please note exceedance of generic assessment criteria (GAC) such as a Groundwater Threshold Value (GTV) or an Interim Guideline Value (IGV) or an upward trend in results for a substance indicates that further interpretation of monitoring results is required. In addition to completing the above table, please complete the Groundwater Monitoring Guideline Template Report at the link provided and submit separately through ALDER as a licensee return or as otherwise instructed by the EPA. [Groundwater monitoring template](#)

More information on the use of soil and groundwater standards/ generic assessment criteria (GAC) and risk assessment tools is available in the EPA published guidance (see the link in G31). [Guidance on the Management of Contaminated Land and Groundwater at EPA Licensed Sites \(EPA 2013\).](#)

\*\*Depending on location of the site and proximity to other sensitive receptors alternative Receptor based Water Quality standards should be used in addition to the GTV e.g. if the site is close to surface water compare to Surface Water Environmental Quality Standards (SWEQS), if the site is close to a drinking water supply compare results to the Drinking Water Standards (DWS). [Groundwater regulations](#), [Drinking water \(private supply\) standards](#), [Surface water EQS](#), [Drinking water \(public supply\) standards](#), [Interim Guideline Values \(IGV\)](#)

Table 3: Soil results

Date of sampling	Sample location reference	Parameter/ Substance	Methodology	Monitoring frequency	Maximum Concentration	Average Concentration	unit
							SELECT
							SELECT

Where additional detail is required please enter it here in 200 words or less

<b>Environmental Liabilities template</b>	Lic No:	W0009-03	Year	2018
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[Click here to access EPA guidance on Environmental Liabilities and Financial provision](#)

		Commentary	
1	ELRA initial agreement status	Required but not submitted	See Sec 53A Response for Year Ending 31/12/2012
2	ELRA review status	Review required and not completed;	See Sec 53A Response for Year Ending 31/12/2012
3	Amount of Financial Provision cover required as determined by the latest ELRA	Specify	See Sec 53A Response for Year Ending 31/12/2012
4	Financial Provision for ELRA status	SELECT	See Sec 53A Response for Year Ending 31/12/2012
5	Financial Provision for ELRA - amount of cover	Specify	Fingal County Council has provided in its accounts a reserve for the restoration which amounted to €8,845,819 on 31/12/2018
6	Financial Provision for ELRA - type	Other please specify	Fingal County Council has provided in its accounts a reserve for the restoration which amounted to €8,845,819 on 31/12/2018
7	Financial provision for ELRA expiry date	Enter expiry date	Fingal County Council has provided in its accounts a reserve for the restoration which amounted to €8,845,819 on 31/12/2018
8	Closure plan initial agreement status	Required but not submitted	
9	Closure plan review status	Review required and not completed	
10	Financial Provision for Closure status	Required but not submitted	
11	Financial Provision for Closure - amount of cover	Specify	Fingal County Council has provided in its accounts a reserve for the restoration which amounted to €8,845,819 on 31/12/2018
12	Financial Provision for Closure - type	Other please specify	Fingal County Council has provided in its accounts a reserve for the restoration which amounted to €8,845,819 on 31/12/2018
13	Financial provision for Closure expiry date	Enter expiry date	Reserve Set Annually

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Environmental Management Programme/Continuous Improvement Programme template		Lic No:	W0009-03	Year	2018
Highlighted cells contain dropdown menu click to view		Additional Information			
1	Do you maintain an Environmental Management System (EMS) for the site. If yes, please detail in additional information	Yes	Schedule of Environmental Objectives & Targets		
2	Does the EMS reference the most significant environmental aspects and associated impacts on-site	Yes	Key Objective 2016-2018 relate to installation of the Vertical Barrier Wall, Capping and replacement of surface water / leachate lines to mitigate surface water contamination.		
3	Does the EMS maintain an Environmental Management Programme (EMP) as required in accordance with the licence requirements	Yes	Please refer to Section 13 of the word document AER for a list of objectives and targets for 2018 and 2019.		
4	Do you maintain an environmental documentation/communication system to inform the public on environmental performance of the facility, as required by the licence	Yes	Self Monitoring Reports hardcopies available for inspection.		

#### Environmental Management Programme (EMP) report

Objective Category	Target	Status (% completed)	How target was progressed	Responsibility	Intermediate outcomes
Reduction of emissions to Water	Install footpaths and Service Road	100	Completed	Section Head	Reduced emissions
Reduction of emissions to Water	Address flooding issue at entrance.	100	Completed	Section Head	Reduced emissions
Reduction of emissions to Water	Final mitigation measures to deal with surface water contamination at SW20a	100	Capping completed at Landfill Gas Utilisation Plant	Section Head	Reduced emissions
Reduction of emissions to Water	Southern Boundary Leachate Pumps and Drainage Improvement works	100	Final finishing ongoing	Section Head	Reduced emissions
Reduction of emissions to Wastewater	Replace / Rehabilitate Foul Water Pipes / Manholes	90	Procurement Process completed / works begin 2018	Section Head	Reduced emissions
Reduction of emissions to Wastewater	Leachate Treatment Plant remedial works.	80	Procurement process ongoing / works begin 2018 - 2019	Section Head	Reduced emissions
Reduction of emissions to Wastewater	Leachate Treatment Plant Calcification Removal & and Leachate Treatment Design and Construction	50	Procurement process ongoing / works begin 2018 - 2019	Section Head	Reduced emissions
Additional improvements	Flood Alleviation	100	Completed	Section Head	Reduced emissions
SELECT		SELECT		SELECT	SELECT

**Noise monitoring summary report** Lic No: W0009-03 Year 2018

- 1 Was noise monitoring a licence requirement for the AER period?  
If yes please fill in table N1 noise summary below
- 2 Was noise monitoring carried out using the EPA Guidance note, including completion of the "Checklist for noise measurement report" included in the guidance note as table 6?
- 3 Does your site have a noise reduction plan
- 4 When was the noise reduction plan last updated?
- 5 Have there been changes relevant to site noise emissions (e.g. plant or operational changes) since the last noise survey?

[Noise Guidance note NG4](#)

**Table N1: Noise monitoring summary**

Date of monitoring	Time period	Noise location (on site)	Noise sensitive location -NSL (if applicable)	LA <sub>eq</sub>	LA <sub>90</sub>	LA <sub>10</sub>	LA <sub>max</sub>	Tonal or Impulsive noise* (Y/N)	If tonal /impulsive noise was identified was 5dB penalty applied?	Comments (ex. main noise sources on site, & extraneous noise ex. road traffic)	Is site compliant with noise limits (day/evening/night)?
18/05/2018	11:52	NM1		62	39	59	86	No	No	The measured Laeq noise level was 62 dB during this period and on site activity was audible. At this monitoring location on site noise sources included activity at the landfill where dumper trucks and excavators	No
18/05/2018	14:27	NM2		52	38	54	71	No			Yes
18/05/2018	15:36	NM3		57	38	52	84	No		The measured Laeq noise level was 57 dB during this period and on site activity was audible. At this monitoring locations on site noise sources included activity at the landfill where dumper trucks and excavators	No
18/05/2018	12:50	NM4		46	35	46	75	No			Yes
18/05/2018	12:15	NM5		47	34	50	67	No			Yes

\*Please ensure that a tonal analysis has been carried out as per guidance note NG4. These records must be maintained onsite for future inspection

If noise limits exceeded as a result of noise attributed to site activities, please choose the corrective action from the following options?

** please explain the reason for not taking action/resolution of noise issues?
Any additional comments? (less than 200 words)

## Resource Usage/Energy efficiency summary

Lic No:

W0009-03

Year

2018

- 1 When did the site carry out the most recent energy efficiency audit? Please list the recommendations in table 3 below
- 2 Is the site a member of any accredited programmes for reducing energy usage/water conservation such as the SEAI programme linked to the right? If yes please list them in additional information
- 3 Where Fuel Oil is used in boilers on site is the sulphur content compliant with licence conditions? Please state percentage in additional information

## Additional information

Enter date of audit	2006
No	
SELECT	

Energy Use	Previous year	Current year	Production +/- % compared to previous reporting year**	Energy Consumption +/- % vs overall site production*
Total Energy Used (MWHrs)	56	22		30.10
Total Energy Generated (MWHrs)	9	7		-30
Total Renewable Energy Generated (MWHrs)	9	7		-30
Electricity Consumption (MWHrs)	56	22		30.1
Fossil Fuels Consumption:				
Heavy Fuel Oil (m3)	86.8	0.45		-95
Light Fuel Oil (m3)				
Natural gas (m3)				
Coal/Solid fuel (metric tonnes)				
Peat (metric tonnes)				
Renewable Biomass				
Renewable energy generated on site				

\* where consumption of energy can be compared to overall site production please enter this information as percentage increase or decrease compared to the previous reporting year.

\*\* where site production information is available please enter percentage increase or decrease compared to previous year

Water use	Water Emissions		Water Consumption	
	Water extracted Previous year m3/yr.	Water extracted Current year m3/yr.	Production +/- % compared to previous reporting year**	Energy Consumption +/- % vs overall site production*
Groundwater				
Surface water				
Public supply	1689	1689	0	
Recycled water				
Total				

\* where consumption of water can be compared to overall site production please enter this information as percentage increase or decrease compared to the previous reporting year.

\*\* where site production information is available please enter percentage increase or decrease compared to previous year

	Total	Landfill	Incineration	Recycled	Other
Hazardous (Tonnes)					
Non-Hazardous (Tonnes)					

Date of audit	Recommendations	Description of Measures proposed	Origin of measures	Predicted energy savings %	Implementation date	Responsibility	Completion date	Status and comments
2006	Set Up Sleep Mode on		energy audit	560 kWhrs of	2008	Fingal County Council	2010	
	Monitoring Vehicle Use		energy audit	175,090 Kwhrs of 3,500,000	2006	Fingal County Council	2010	
	Driver Training		energy audit	203,595Kwhrs of 3,500,000 KWHRs	2006	Fingal County Council	ONGOING	

Table R5: Power Generation: Where power is generated onsite (e.g. power generation facilities/food and drink industry) please complete the following information

	BY01	BY02	BY03	BY04	Station Total
Technology	Gas Combustion	Gas Combustion	Gas Combustion	Gas Combustion	
Primary Fuel	Landfill Gas	Landfill Gas	Landfill Gas	Landfill Gas	
Thermal Efficiency					
Unit Date of Commission	Aug-98	Aug-98	Aug-98	Dec-14	
Total Starts for year					
Total Running Time	194	0	0	7141	
Total Electricity Generated (GWH)					
House Load (GWH)					
KWH per Litre of Process Water					
KWH per Litre of Total Water used on Site					

Complaints	Additional information
Have you received any environmental complaints in the current reporting year? If yes please complete summary details of complaints received on site in table 1 below	No

Table 1 Complaints summary							
Date	Category	Other type (please specify)	Brief description of complaint (Free txt <20 words)	Corrective action< 20 words	Resolution status	Resolution date	Further information
	SELECT				SELECT		
	SELECT				SELECT		
	SELECT				SELECT		
	SELECT				SELECT		
	SELECT				SELECT		
Total complaints open at start of reporting year		0					
Total new complaints received during reporting year		0					
Total complaints closed during reporting year		0					
Balance of complaints end of reporting year		0					

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Incidents Additional information

Have any incidents occurred on site in the current reporting year? Please list all incidents for current reporting year in Table 2 below

No  Yes

\*For information on how to report and what constitutes an incident [What is an incident](#)

Table 2 Incidents summary														
Date of occurrence	Incident nature	Location of occurrence	Incident category* please refer to guidance	Receptor	Cause of incident	Other cause (please specify)	Activity in progress at time of incident	Communication	Occurrence	Corrective action <20 words	Preventative action <20 words	Resolution status	Resolution date	Likelihood of reoccurrence
09/01/2018	Trigger level reached	Monitoring of groundwater at CD1.	1. Minor	Water	Between 11/12/2017 were reviewed 8/1/2018. They reveal Ammoniacal nitrogen levels at CD1, above normal range.	Historical	Other (routine monitoring)	Local Authorities	Recurring	Further monitoring, Visual inspection of CD1 sump, Leachate line scour valves also inspected	Ongoing monitoring	Complete	06/03/2018	Low
16/01/2018	Trigger level reached	Gas wells GA3, GA4, GA5, GA7, GA8, GA12 and GA13	1. Minor	Air	During monthly monitoring on 15-01-2018, the Carbon dioxide trigger level of 1.5% v/v was exceeded	low atmospheric conditions, low abstraction rates on the field and microbial action in upper soil horizons.	Other (routine monitoring)	EPA	Recurring	Ongoing monitoring	Ongoing monitoring	Complete	28/02/2018	High
16/01/2018	Trigger level reached	Monthly leachate level monitoring at a number of locations - LMW31 (5.84m AOD), LMW5(6.31m AOD), LMW32 (5.72m AOD) and LMW33 (5.83m AOD).	1. Minor	Water	Monthly leachate level monitoring along Southern and Eastern boundaries of Balleally Landfill recorded levels which exceeded the 5.5m AOD Trigger Level	design and management	Other (routine monitoring)	EPA	Recurring	Ongoing monitoring	Ongoing monitoring	Complete	28/02/2018	High
17/01/2018	Breach of ELV	Emission Limit Value exceeded for CO at Engine 4	1. Minor	Air	The Emission Limit Value (ELV) for CO 1400mg/m3 was exceeded at 1525mg/m3 and the ELV for NOx (as NO2) 500mg/m3 was exceeded at 1853mg/m3.	Engine 4 was scheduled for an overhaul at the time of the testing	Other (routine monitoring)	EPA	New	Ongoing monitoring	Ongoing monitoring	Complete	20/01/2018	Low
05/02/2018	Trigger level reached	Licensed discharge point - minor surface water contamination at SWV1	1. Minor	Water	Historical contamination issues	Historical contamination issues	Other (routine monitoring)	EPA	New	Ongoing monitoring	Compliance Investigation and SEW, historical surface water contamination is being addressed.	Ongoing		High
28/03/2018	Trigger level reached	Elevated levels of Ammoniacal nitrogen were recorded from CD1.	1. Minor	Water	Ammoniacal nitrogen levels above typical levels for CD1 at 4.32mg/l.	CD1 close to surface water pipe and foul water lines at toe of northern slopes. It is also close to construction site toilets.	Other (routine monitoring)	EPA	New	Ongoing monitoring	ongoing monitoring	Complete	03/05/2018	Low
	SELECT	SELECT	SELECT	SELECT	SELECT		SELECT	SELECT	SELECT			SELECT		SELECT
Total number of incidents current year	6													
Total number of incidents previous year	10													
% reduction/increase	40% reduction													

<b>WASTE SUMMARY</b>	Lic No:	W0009-03	Year	2018
<b>SECTION A-PRTR ON SITE WASTE TREATMENT AND WASTE TRANSFERS TAB- TO BE COMPLETED BY ALL IPPC AND WASTE FACILITIES</b>		<a href="#">PRTR facility logon</a>	dropdown list click to see options	

**SECTION B- WASTE ACCEPTED ONTO SITE-TO BE COMPLETED BY ALL IPPC AND WASTE FACILITIES**

Were any wastes accepted onto your site for recovery or disposal or treatment prior to recovery or disposal within the boundaries of your facility ?; (waste generated within your boundaries is **1 to be captured through PRTR reporting**)  
 If yes please enter details in table 1 below

Additional Information	
No	

2 Did your site have any rejected consignments of waste in the current reporting year? If yes please give a brief explanation in the additional information

No	
----	--

3 Was waste accepted onto your site that was generated outside the Republic of Ireland? If yes please state the quantity in tonnes in additional information

No	
----	--

**Table 1 Details of waste accepted onto your site for recovery, disposal or treatment (do not include wastes generated at your site, as these will have been reported in your PRTR workbook)**

Licensed annual tonnage limit for your site (total tonnes/annum)	EWC code <a href="#">European Waste Catalogue EWC codes</a>	Source of waste accepted	Description of waste accepted <b>Please enter an accurate and detailed description - which applies to relevant EWC code</b> <a href="#">European Waste Catalogue EWC codes</a>	Quantity of waste accepted in current reporting year (tonnes)	Quantity of waste accepted in previous reporting year (tonnes)	Reduction/ Increase over previous year +/- %	Reason for reduction/ increase from previous reporting year	Packaging Content (%) - only applies if the waste has a packaging component	Disposal/Recovery or treatment operation carried out at your site and the description of this operation	Quantity of waste remaining on site at the end of reporting year (tonnes)	Comments -

**SECTION C-TO BE COMPLETED BY ALL WASTE FACILITIES (waste transfer stations, Composters, Material recovery facilities etc) EXCEPT LANDFILL SITES**

4 Is all waste processing infrastructure as required by your licence and approved by the Agency in place? If no please list waste processing infrastructure required on site

SELECT	
--------	--

5 Is all waste storage infrastructure as required by your licence and approved by the Agency in place? If no please list waste storage infrastructure required on site

SELECT	
--------	--

6 Does your facility have relevant nuisance controls in place?

SELECT	
--------	--

7 Do you have an odour management system in place for your facility? If no why?

SELECT	
--------	--

8 Do you maintain a sludge register on site?

SELECT	
--------	--

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<b>WASTE SUMMARY</b>	Lic No:	W0009-03	Year	2018
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**SECTION D-TO BE COMPLETED BY LANDFILL SITES ONLY**
**Table 2 Waste type and tonnage-landfill only**

Waste types permitted for disposal	Authorised/licenced annual intake for disposal (tpa)	Actual intake for disposal in reporting year (tpa)	Remaining licensed capacity at end of reporting year (m3)	Comments
Household	152,500	0	N/A	Landfill Closed May 2012 for this waste
Commercial	200,000	0		Landfill Closed May 2012 for this waste
Sewage Sludge	30,000	0	N/A	Landfill Closed May 2012 for this waste
Construction and Demolition	63,000	0		Material Used in Recovery and capping only

**Table 3 General information-Landfill only**

Area ID	Date landfilling commenced	Date landfilling ceased	Currently landfilling	Private or Public Operated	Inert or non-hazardous	Predicted date to cease landfilling	Licence permits asbestos	Is there a separate cell for asbestos?	Accepted asbestos in reporting year	Total disposal area occupied by waste	Lined disposal area occupied by waste	Unlined area	Comments on liner type
										ha	ha	ha	
N/A	Apr-04	May-12	No	Public	Non Hazardous	May-22	No	No	No	46.25	10.11	36.14	Original Landfill Cells 1-6 and Piggybacking

**Table 4 Environmental monitoring-landfill only**
[Landfill Manual-Monitoring Standards](#)

Was meteorological monitoring in compliance with Landfill Directive (LD) standard in reporting year +	Was leachate monitored in compliance with LD standard in reporting year	Was Landfill Gas monitored in compliance with LD standard in reporting year	Was SW monitored in compliance with LD standard in reporting year	Have GW trigger levels been established	Were emission limit values agreed with the Agency (ELVs)	Was topography of the site surveyed in reporting year	Has the statement under S53(A)(5) of WMA been submitted in reporting year	Comments
Met Data from Dublin Airport	Yes	Yes	Yes	No	Yes	Yes	No	Landfill Gas Surface Water and Groundwater Results presented within text of AER

+ please refer to Landfill Manual linked above for relevant Landfill Directive monitoring standards

**Table 5 Capping-Landfill only**

Area uncapped*	Area with temporary cap	Area with final cap to LD Standard m2 ha, a	Area capped other	Area with waste that should be permanently capped to date under licence	What materials are used in the cap	Comments
SELECT UNIT	SELECT UNIT					
0	0	46.75	0	46.75	HDPE / GCL	

\*please note this includes daily cover area

**Table 6 Leachate-Landfill only**

9 Is leachate from your site treated in a Waste Water Treatment Plant?

Yes
No

10 Is leachate released to surface water? If yes please complete leachate mass load information below

Volume of leachate in reporting year(m3)	Leachate (BOD) mass load (kg/annum)	Leachate (COD) mass load (kg/annum)	Leachate (NH4) mass load (kg/annum)	Leachate (Chloride) mass load kg/annum	Leachate treatment on-site	Specify type of leachate treatment	Comments
23,706	246.66	5556.09	6004.73	11281.90	Yes	Balancing	Leachate transferred off-site in 2018.

Please ensure that all information reported in the landfill gas section is consistent with the Landfill Gas Survey submitted in conjunction with PRTR returns

**Table 7 Landfill Gas-Landfill only**

Gas Captured&Treated by LFG System m3	Power generated (MW / KWh)	Used on-site or to national grid	Was surface emissions monitoring performed during the reporting year?	Comments
5,103,786	7,303 MWhr	national grid	Yes	