EEL.7268.R03.001

RED INDUSTRIES LIMITED

WALLEYS LANDFILL SITE

LANDFILL GAS RISK ASSESSMENT

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Prepared for

Red Industries Limited

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Document Review

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1.0 INTRODUCTION

This document provides a revision of the current Landfill Gas Risk Assessment for the purpose of obtaining a Permit Variation to increase the annual waste inputs to the landfill. Red Industries Ltd is the owner and operator of Walleys Landfill Site, a non-hazardous landfill. The Permit Variation application is to increase the annual waste inputs at the site from 250,000 tonnes to 400,000 tonnes. This proposal will not require a need to increase the overall landfill void capacity or the site footprint. There will be also no changes in the waste types which are already permitted for disposal at the Site.

Previous Landfill Gas Risk Assessments for this Site were carried out in 2010 and 2013, at the time the site was operated by Tarmac. Since these earlier studies the landfill continued to receive non-hazardous waste streams in line with the site permit, although the nature of these waste inputs and tonnages changed over time.

In response to implementation of the Waste Regulations, the current site operator is dealing with increasing inputs of industrial and commercial waste materials which cannot be recycled or otherwise recovered. As a result, the Site receives increasingly non-hazardous waste with low biodegradable material content and inert waste.

This review of the Landfill Gas Risk Assessment used the GasSim v2.05.008 software package, which is the current version of this modelling tool.

2.0 SITE

2.1 Overview of waste activities

This operational landfill site is situated near Newcastle-under-Lyme in Staffordshire, at National Grid Reference SJ831 460. Access to the landfill site is gained via Cemetery Road which forms the western boundary to the landfill.

The site was originally developed as a quarry extracting clay. Engineering work for landfill operations commenced in 2006 and waste was first accepted in Cell 1 in January 2007. Since then waste disposal operations have continued progressively in Cells 1, 2 and 3. Cell 1 was temporary capped in 2010. At the same time Cell 4 was constructed and became an operational cell in 2011.

2.2 Landfill Construction Details

The engineered lining systems in the basal sections of Cells 1, 2, 3 and 4 comprise 3 metres of engineered clay with the hydraulic conductivity of $1x10^{-10}$ m/s to $8.9x10^{-11}$ m/s (based on CQA reports for Cells 1, 2, 3 and 4).

Each cell has a leachate collection and extraction system comprising a 300mm gravel drainage blanket together with collection pipework, a leachate collection facility, a remote leachate monitoring point and a concrete target pad to facilitate the installation (if required) of retro installed leachate infrastructure.

The sidewall construction of each cell comprises a metre-thick clay liner placed to provide engineered containment having a maximum permeability of $1x10^{-9}$ m/s, overlain by a 250mm thick soils protection layer, to help reduce erosion due to weather.

The proposed capping strategy for the site is to temporary cap approximately half of the site (a majority of Cells 3 and 4) during 2019. Infilling of Cell 1 will continue until reaching the 'top of waste' levels. At this stage Cell 1 will be permanently capped and infilling will take place in Cells 3 & 4, after removal of the temporary cap. Once these cells have reached 'top of waste' levels they will be permanently capped, and Cell 2 will be infilled to 'top of waste' levels and permanently capped. The temporary cap will comprise of 1mm LLDPE geomembrane. The permanent cap will be a minimum of a metre of engineered clay with a maximum permeability of $1x10^{-9}$ m/s, compacted to specification or an equivalent geosynthetic capping system, overlain by a metre depth of restoration soils.

The landfilling base level is around 85mAOD and the final site restoration height will be 145mAOD.

2.3 Gas Plant

Landfill gas utilisation was initiated in 2009 when a temporary Hofstetter 500m^3/h gas flare was installed. This flare was replaced with a 1000m^3/h permanent flare, in 2010.

The first 1067kWe Jenbacher (JGS320 GS-L.L) gas engine was commissioned in early 2011. It was followed by the second 1MW gas engine in 2014 and the third 1MW gas

engine was installed in 2017. The gas plant currently operates by continually running two primary engines 1A1 and A2 and utilising engine S3 as a standby engine when one of the primary engines is off duty/serviced. The two flares (A3 and Temporary Flare) are switched on if the gas engines are off line. So far in 2019 the large flare (A3) has run for less than 2% of the time while the small (Temporary Flare) has run for approximately 3% of the time.

The gas utilisation plant on site is a Directly Associated Activity to the waste disposal operations; it is regulated by the current landfill permit (DP3734DC). Operational management of landfill gas infrastructure and the gas plant, is subcontracted to CLP Envirogas Ltd.

2.4 Environmental Settings

The environmental settings of the site are well understood and documented in the earlier permitting applications. For consistency with the previous risk assessment reports, the environmental settings are summarised and updated, below.

Local receptors

The site is located 1km to the west of the centre of Newcastle-under-Lyme in Staffordshire. The surrounding area is a mixture of landuses which are typical of an urban fringe. These comprise residential areas, industrial and commercial units, a cemetery and a garden centre and green fields/grazing paddock. These are summarised in Table 1 below and shown on Drawing EEL.7268.D03.001.

Table 1 Walleys Landfill Site – Local Receptors

	Receptors	Minimum Distance, m	Direction
1	Silverdale residential dwellings 2	300	North
2	Knutton residential dwellings along the B5044	110	North
3	Garner's Garden Centre	20	North
4	Knutton St Mary's Primary School	260	North, NE
5	Warehouse/Depot	300	NE
6	Newcastle under Lyme residential areas	230	South, SE
7	Proposed residential development area	50	South, SE
8	Thistleberry Parkway	190	SE
9	Silverdale Holidays Park	30	South
10	Rosemary Wood Cottage	300	South
11	Recreational grounds	250	SW
12	Silverdale residential dwellings 1	260	West
13	Allotments	60	West, SW
14	Cemetery	60	West
15	Silverdale Business Park	60	West

	Receptors	Minimum Distance, m	Direction
16	Silverdale housing estate	60	East
17	Keele Road & Orme Road Housing Estate	270	East
18	Industrial area	220	NW
19	Silverdale residential area	400	North
20	Ironbridge Drive residential area	450	NE

Geology

The geological and hydrogeological settings are summarised in Table 2 below.

Table 2 Summary of the Geological Setting

Age	Formation	Local Thickness	Description
Quaternary	Glacial till	5-30m	Variable but mainly sandy clay
Carboniferous	Etruria Formation	Circa 70m	Soft mudstones with interbedded siltstone clay and occasional sandstone lenses/ band. Sandstone is not laterally persistent
Carboniferous	Upper Coal Measures	>80m	Cyclic mudstone siltstones, sandstones, seat earths and coal

Hydrogeology and Hydrology

The strata surrounding the site are a non-aquifer with negligible permeability. The groundwater level data in the perimeter boreholes shows that there is no unsaturated zone beneath the base of the site, however the groundwater lenses relate to discrete sandstone bands and mudstones rather than one aquifer unit across the site. The groundwater levels in the deep boreholes vary between 67 mAOD to 113 mAOD, whereas the groundwater levels in the shallow boreholes range between 78 mAOD to 127 mAOD.

The groundwater is actively pumped out from a sump below the site and following its pre-treatment (aeration and sedimentation), is discharged to Silverdale Brook, as stipulated by the Site Permit.

3.0 LFG CONCEPTUAL MODEL

3.1 LFG Risk Assessment Approach

GasSim is a software designed to meet the requirements of Environment Agency's Guidance Management of Landfill Gas LFTGN03. It considers the following factors:

- The source parameters: annual waste input, breakdown of the waste stream, waste moisture content and geometry of the site;
- Infiltration levels based on the amount of rainfall and surface water which enter the fill;
- Engineering properties of the site and materials used for lining and capping of the fill;
- The surrounding geology, its physical properties of ground porosity and moisture content;
- Gas dispersion pathways by air and via site surface and subsurface;
- Receptors to landfill gas – the nature and distance to the receptors within a 500m radius from the landfill.

GasSim requires a substantial amount of data inputs and recognises that certain information may not be always available. It therefore allows for a range of representative values to be entered. It also provides a number of default values for inputs such as the composition of municipal, industrial, commercial etc. waste streams; it uses typical values from waste industry reference data sources. There is therefore an option to use default values where site specific data is lacking.

The model is probabilistic and presents the outputs as a range of possible outcome values (5-95%iles); these represent different levels of confidence associated with the various results of the modelling exercise. The 95%ile is used to express the 'worst case' scenario, and therefore used exclusively for risk assessment purposes. At the same time, when the assessment is used to advise decision making such as introducing a gas plant or when assessing the likely gas generation rates, then predicted 50%ile is used.

3.2 Input Data and Assumptions

The model start year is 2007 as waste was first accepted on site in January of that year. The site is predicted to accept waste until 2026. The modelling was run for a total of 150 years allowing for the gas extraction system utilisation to be modelled until the end of its predicted lifespan.

The GasSim model for assessing gas generation potential at Walleys LFS was set up using a combination of data provided by the site operator and the relevant information sourced from the earlier GasSim studies (LFG Risk Assessment (2018), ref. 1 and LFG Risk Assessment (2013) ref. 2).

Red Industries provided guidance to Egniol on the anticipated annual input tonnages and waste inputs from late 2016 to date and those projected for the remaining operational

years. Where no site-specific data was not available for certain modelling parameters, GasSim default values were used. The following schedule outlines the key data inputs.

Table 3 GasSim Input Data Schedule and Description

GasSim Input	Description
Waste Input (tonne/year)	Annual waste inputs for 2007-2018 and future tonnage projections as advised by Red Industries. Also refer to Tables 4a-4c below.
Waste Types and percentage in the overall waste stream, %	• Waste returns for 2007-2018 in reference to LFG RA reports 2010 and 2013 and TL's Information Memorandum 2014; • Red Industries reported waste inputs for 2017 and 2018. • Projected waste types as advised by Red Industries.
Waste Composition, %	Based on GasSim default values (England 2000-2010, 2011-2013, 2014-2020, 2020+) with added compositions for 'Waste sorted at MRF' and 'Recycling Schemes' wastes in reference to earlier risk assessments and advice from Red Industries for 2017+ waste inputs.
Waste in place capped	Temporary cap: • Cell 1 2010-2019 • Cell 2 none • Cell 3 2019-2022 • Cell 4 2019-2022 Permanent cap: • Cell 1 from 2022 • Cell 2 from 2027 • Cell 3 from 2024 • Cell 4 from 2025
LFG composition, CH_4 and CO_2	CH_4 (49-60%), CO_2 (37-41%), based on LFG monitoring data.
LFG composition, trace gases	Based on LFG monitoring data.
Waste Moisture Content	Assumed as 'Wet' during infilling phases and as 'Average-Wet' during capping phases.
Waste Density	0.98-1.26t/m^3, calculated from the waste input and void consumption data for 2007-2018.
Rainfall	925mm (annual 2018)
Leachate Head	2-30m
Landfill Geometry	134,779m^2 total capping area
Liner and Final Cap Characteristics	Single Clay Liner (1-1.2m) and Single Liner (1mm LLDPE) used for temporary and permanent capping.
Biological CH_4 oxidation	GasSim default values
Infiltration rate	
Cellulose decay rate	
Hydraulic conductivity of the waste, m/s	

Waste Inputs

The earlier waste data indicates that the site accepts a variety of wastes, with the largest proportion of waste inputs being: 'Waste sorted at MRF', 'Domestic' waste and 'Inert' waste. These were followed by 'Industrial' waste and smaller fractions of 'Composted Organic' material and 'Sewage Sludge' from onsite effluent treatment.

The waste returns data for 2014-2018 showed a shift away from bulk quantities of biodegradable waste toward accepting more inert commercial wastes and wastes sorted at MRF. At the same time, the annual tonnage of waste deposited at the site has reduced to around 180,000 tonnes in 2016.

Since 2017 the current site operator is dealing with increasing demand from industrial and commercial waste producers to dispose of the waste materials which cannot be recycled or otherwise recovered, as required by the current Waste Regulations. As a result, the site receives increasingly non-hazardous waste with low biodegradable content and inert waste. The annual waste tonnages increased to 228,000 tonnes in 2017 and 250,000 tonnes in 2018.

As for the future operational years, guidance on the anticipated profile of the waste streams to be landfilled at Walleys LFS going forwards was provided to Egniol by Red Industries. The waste inputs into the GasSim model are summarised further in Tables 4a, 4b and 4c below.

Table 4a Operational Schedule and Total Waste Inputs in GasSim model

	Year	Waste input, (t/year)	Waste input total, (t)	Cell 1	Cell 2	Cell 3	Cell 4
Start of filling	2007	146,000	146,000	Ops	Ops	0	0
	2008	132,000	278,000	Ops	Ops	0	0
	2009	193,000	471,000	Ops	Ops	Ops	0
	2010	191,000	662,000	Ops/TC (Oct)	Ops	Ops	0
	2011	194,000	856,000	TC	Ops	Ops	Ops
	2012	147,000	1,003,000	TC	Ops	Ops	Ops
	2013	187,000	1,190,000	TC	Ops	Ops	Ops
	2014	155,000	1,345,000	TC	Ops	Ops	Ops
	2015	160,000	1,505,000	TC	Ops	Ops	Ops
	2016	162,500	1,667,500	TC	Ops	Ops	Ops
	2017	228,000	1,895,500	TC	Ops	Ops	Ops
	2018	250,000	2,145,500	TC	Ops	Ops	Ops
	2019	400,000	2,545,500	TC/Ops (Nov)	Ops	Ops/TC (Nov)	Ops/TC (Nov)
	2020	400,000	2,945,500	Ops	Ops	TC	TC
	2021	400,000	3,345,500	Ops/PC (Nov)	Ops	Ops	Ops
	2022	400,000	3,745,500	PC	Ops	Ops/PC (Nov)	Ops
End of Filling	2023	400,000	4,145,500	PC	Ops	PC	Ops

	Year	Waste input, (t/year)	Waste input total, (t)	Cell 1	Cell 2	Cell 3	Cell 4
LFS Capping	2024	0	0	PC	PC (Jan)	PC	PC (Jan)

Table 4b Gassim used assumptions regarding waste inputs in landfill cells

	Waste input, (t/year)	Cell 1	Cell 2	Cell 3	Cell 4
2007	146,000	73,000	73,000	0	0
2008	132,000	66,000	66,000	0	0
2009	193,000	64,333	64,333	64,333	0
2010	191,000	63,667	63,667	63,667	0
2011	194,000	TC	64,667	64,667	64,667
2012	147,000	TC	49,000	49,000	49,000
2013	187,000	TC	62,333	62,333	62,333
2014	155,000	TC	51,667	51,667	51,667
2015	160,000	TC	53,333	53,333	53,333
2016	162,500	TC	54,167	54,167	54,167
2017	228,000	TC	76,000	76,000	76,000
2018	250,000	TC	83,333	83,333	83,333
2019	400,000	100,000	100,000	100,000	100,000
2020	400,000	200,000	200,000	TC	TC
2021	400,000	100,000	100,000	100,000	100,000
2022	400,000	PC	133,333	133,333	133,333
2023	400,000	PC	200,000	PC	200,000
2024	-	PC	PC	PC	PC

Ops Operational Cell
TC Temporary Cap
Cell 1 (2010-2019) 300mm engineered clay
Cell 2-4 (2019-2021) 1mm LLDPE
PC Permanent Cap
Cell 1-4 (2022-2027) 1mm LLDPE

Table 4c Waste Composition Inputs in GasSim model

Year	Waste sorted at MRF, %	Domestic, %	Industrial, %	Commercial, %	Composted Organic, %	Inert, %	Incinerator Ash, %	Recycling Schemes, %	Sewage Sludge %
2007	55	15	10	0	0.5	18	0	0	1.5
2008	55	15	10	0	0.5	18	0	0	1.5
2009	50.8	17.6	12.6	1.8	1.5	13.1	0.1	0.5	2
2010	TRI(50-55-57)	TRI(11-14-17)	TRI(8-10-12)	UNI(0-2)	UNI(1-2)	TRI(13-16-19)	0.1	UNI(0.5-0.9)	UNI(1.5-2)
2011	TRI(50-55-57)	TRI(11-14-17)	TRI(8-10-12)	UNI(0-2)	UNI(1-2)	TRI(13-16-19)	0.1	UNI(0.5-0.9)	UNI(1.5-2)
2012	TRI(50-55-57)	TRI(11-14-17)	TRI(8-10-12)	UNI(0-2)	UNI(1-2)	TRI(13-16-19)	0.1	UNI(0.5-0.9)	UNI(1.5-2)
2013	UNI(32-51)	UNI(10-17.5)	UNI(5-12.5)	UNI(0-1)	UNI(0-2)	TRI(15-29-35)	UNI(0-1)	UNI(0.5-5.5)	UNI(1.5-3)
2014	TRI(40-41-45)	TRI(5-10-15)	UNI(5-12.5)	TRI(5-16.2-20)	UNI(0-2)	TRI(35-36.8-40)	0.3	UNI(0-1)	TRI(3-3.7-5)
2015	TRI(40-41-45)	TRI(5-7-10)	UNI(5-12.5)	TRI(5-16.2-20)	UNI(0-2)	TRI(35-36.8-40)	0.3	UNI(0-1)	TRI(3-3.7-5)
2016	TRI(50-55-57)	TRI(1-5-7)	TRI(8-10-12)	TRI(5-16.2-20)	UNI(1-2)	TRI(13-16-19)	0.1	UNI(0.5-0.9)	UNI(1.5-2)
2017	TRI(80-83.6-85)	TRI(0.5-2-3)	TRI(7-9.6-10)	TRI(5-16.2-20)	UNI(1-2)	TRI(5-6.8-19)	0.1	UNI(0.5-0.9)	UNI(0-1)
2018	TRI(80-83.6-85)	TRI(0.5-2-3)	TRI(7-9.6-10)	TRI(5-16.2-20)	UNI(1-2)	TRI(5-6.8-19)	0.1	UNI(0.5-0.9)	UNI(0-1)
2019	TRI(80-83.6-85)	TRI(0.5-2-3)	TRI(7-9.6-10)	TRI(5-16.2-20)	UNI(1-2)	TRI(5-6.8-19)	0.1	UNI(0.5-0.9)	UNI(0-1)
2020	TRI(80-83.6-85)	TRI(0.5-2-3)	TRI(7-9.6-10)	TRI(5-16.2-20)	UNI(1-2)	TRI(5-6.8-19)	0.1	UNI(0.5-0.9)	UNI(0-1)
2021	TRI(80-83.6-85)	TRI(0.5-2-3)	TRI(7-9.6-10)	TRI(5-16.2-20)	UNI(1-2)	TRI(5-6.8-19)	0.1	UNI(0.5-0.9)	UNI(0-1)
2022	TRI(80-83.6-85)	TRI(0.5-2-3)	TRI(7-9.6-10)	TRI(5-16.2-20)	UNI(1-2)	TRI(5-6.8-19)	0.1	UNI(0.5-0.9)	UNI(0-1)
2023	TRI(80-83.6-85)	TRI(0.5-2-3)	TRI(7-9.6-10)	TRI(5-16.2-20)	UNI(1-2)	TRI(5-6.8-19)	0.1	UNI(0.5-0.9)	UNI(0-1)

Gas Plant

The gas plant was set up in the model in order of priority of gas extraction and utilisation in the gas engines. The plant specifications and down time settings used are as described in Section 2.3.

4.0 ASSESSMENT RESULTS

4.1 Gas Generation Potential

The modelled long-term predictions of landfill gas generation at Walleys Landfill Site is shown on Figure 1 below.

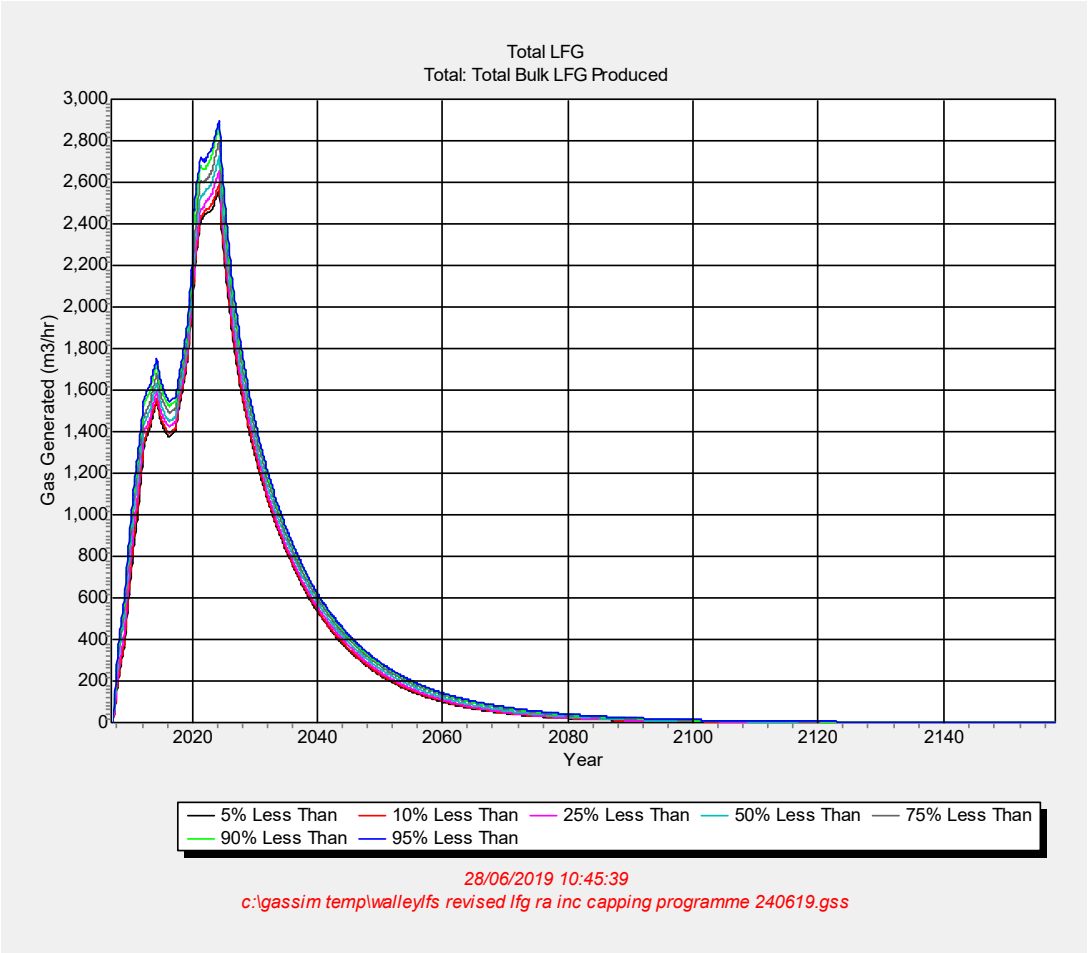


Figure 1 GasSim calculated gas generation rate at Walleys LFS

According to the model the peak landfill gas generation in 2024 would reach 2,700-2,900m^3/h (50-95th %ile). After that point and by approximately 2070 the gas levels will reduce to approximately 50m^3/h at which stage active gas extraction will not be sustainable.

The model print-out is enclosed in Appendix 2.

4.2 Model validation

The modelled gas generation rates were assessed against the actual landfill gas extraction rates as an indication of the collection efficiency as well as potential gas losses through cap emissions and off-site migration. The typical average collection

efficiency of modern landfills in the UK should be 80-85%. The comparative results are summarised in Table 5 below.

Table 5 Walleys Landfill Site GasSim model validation

Year	LFS average annual extraction rate, m^3/h	GasSim predicted LFG generation rate (50-95%ile), m^3/h
2017	**1302**	1460-1560
2018	**1439**	1600-1680
2019 (6 months	**1731**	1780-1870

These figures indicate that a) the predicted gas generation rates accord well with the extraction rates for the last three years, and b) gas collection efficiencies in the last three years were above 85% throughout.

4.3 Lateral Emissions

GasSim simulates lateral migration of landfill gas through the cell liner (engineered clay liner) using a 1-dimensional flow model. It assumes that gas flow through geological material is governed by both advection and dispersion, while flow through a geomembrane is governed by diffusion only.

The results of modelling of lateral migration of methane through the landfill liner showed that at the site boundary (20m distance), there is no gas migration off site. This modelling result is supported by the wealth of monitoring data from perimeter monitoring boreholes at this site. The monitoring data is reported to the EA on a regular basis as part of permit compliance requirements.

4.4 Surface Emissions

GasSim 2 estimates the quantity of fugitive emissions of bulk and trace gases from the landfill surface (active landfill, temporary capped and fully capped). The calculated surface emissions of landfill gas are shown on Figure 2 below.

These show that at the start of 2019 circa $750m^3/h$ (50%ile) and up to $920m^3/h$ (95%ile) of landfill gas were lost as fugitive emissions. Once the temporary capping system has been installed across a large area of the site during 2019 surface emissions are predicted to reduce to about $600m^3/h$ (50%ile) and up to $750m^3/h$.

With the current adopted approach of temporary and/or permanently capping approximately half of the site until 2024 and coupled with active gas extraction for utilisation, the surface emissions will be controlled and limited to the uncapped areas. Taking into account the future waste inputs the predicted potential surface emissions would be about $1000\text{-}1200m^3/h$ in 2023. In practical terms, these will be lower due to the highly efficient gas management system on the site, which currently achieves at least 90% extraction of generated landfill gas. Once the site is fully capped (from 2024) there are predicted to be negligible surface emissions of landfill gas.

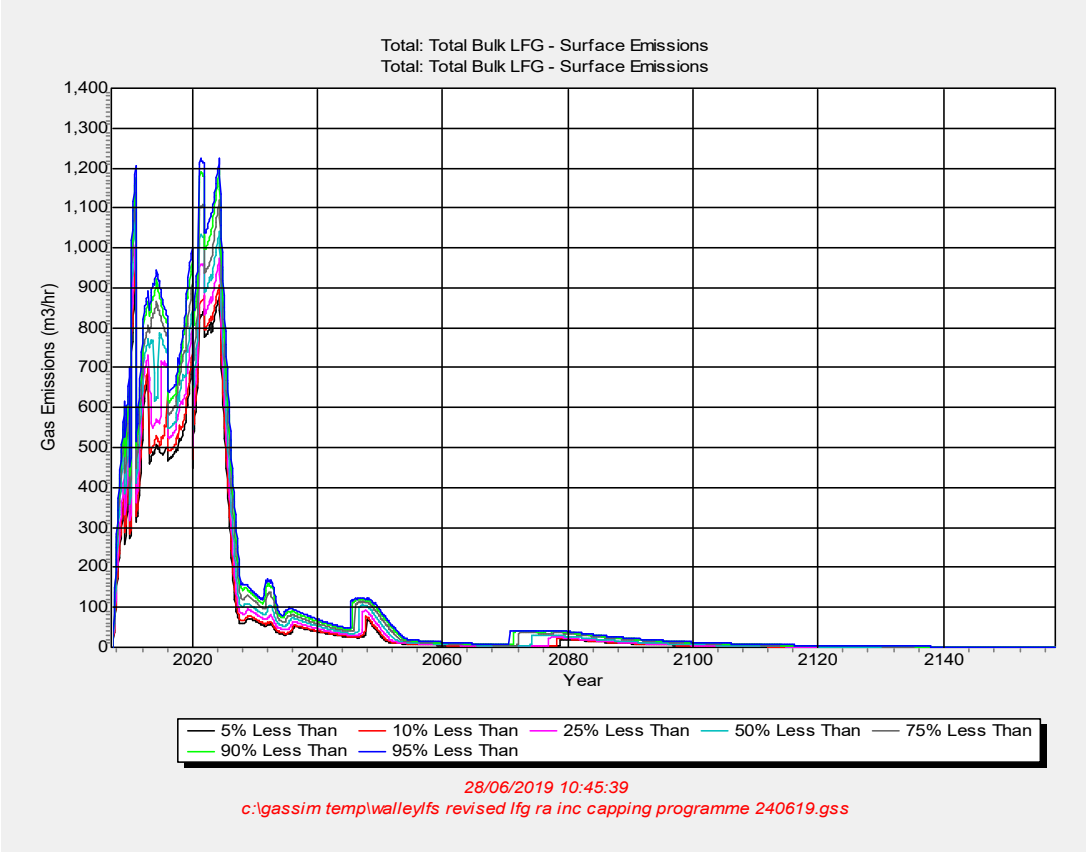


Figure 2 GasSim calculated gas surface emissions at Walleys LFS

4.5 Tier 1 Screening

GasSim 2 Tier 1 screening allows a basic screening (i.e. Tier 1 screening) of emissions to air at the site boundary and the shortest distance to receptors from the gas plant and the operational area. The Tier 1 screening methodology uses the calculated Process Contribution (PC), a product of gas emission rate and gas source location and compares it with relevant Emission Standards (ES). Emissions to air are considered insignificant if a) maximum PC (long-term) ≤1% long-term ES and b) maximum PC (long-term) ≤10% long-term ES.

Tier 1 screening was carried out for stack gas emissions to air. The emissions screening was run for 2019. Actual emission data was used for the latest set of stack gas emissions NO_2, CO, and VOCs (Sept. 2018). For other priority trace gases, GasSim default values were used.

Background concentrations of NO_2, NO_x and PM_{10}, were sourced out from the UK Air Information Resource https://uk-air.defra.gov.uk/data/laqm-background-maps year=2017. This represents the most conservative estimate as in subsequent years, background pollutant concentrations are predicted to fall. The background concentrations were extrapolated for the nearest coordinate 383500, 345500 as follows: NO_2 14.62 µg/m^3, NO_x 17.095 µg/m^3, PM_{10} 11.05 µg/m^3.

The long-term air quality standards for tier 1 emissions screening were taken from relevant national air quality objectives values (https://uk-air.defra.gov.uk/assets/documents/Air_Quality_Objectives_Update.pdf), as summarised in Table 6 below.

Table 6 Long-Term Air Quality Standards used in Tier 1 emissions screening

Combustion Emissions	Long-Term Air Quality Standard (μg/m3)
Nitrogen Dioxide	40
PM10	40
Carbon Monoxide	-
Sulphur Dioxide	-

The Tier 1 screening of atmospheric emissions screened out the majority of gases. Emissions of nitrogen oxides (NOx) from the engines was identified as potentially significant in the Tier 1 screening in both scenarios (short-term and long-term) and short-term emissions of carbon disulphide from the landfill surface A print-out of the Tier 1 emissions screening is included in Appendix 3.

4.6 Tier 2 Atmospheric Dispersion

The Tier 2 atmospheric dispersion modelling for the emissions to air from the gas plant was not carried out as part of this revised landfill gas risk assessment but will be carried out after the next round of stack gas emissions testing. The testing is scheduled for September 2019.

Tier 2 detailed modelling of this gas was previously carried out for the gas plant. The results showed that in an operational year of the plant NO_x levels in combustion gases are likely to have several exceedances of short-term air quality standards if measured along the adjacent section of the site boundary. The environmental risks associated with these exceedances are low and deemed acceptable.

5.0 CONCLUSIONS

This revised landfill gas risk assessment was prepared in support of an application to increase the annual waste tonnage input at Walleys landfill site, while retaining the originally consented restoration levels of the site and the list of permitted wastes.

The landfill Permit currently limits the annual tonnage of waste disposal at the site to 250,000 tonnes. The site operator proposed to increase annual waste inputs to 400,000 tonnes. In response to implementation of the Waste Regulations, the site operator is dealing with increasing inputs of industrial and commercial waste materials which cannot be recycled or otherwise recovered. As a result, the site receives increasingly non-hazardous waste with high non-biodegradable content as well as inert waste.

The LFG conceptual model was reviewed and amended on the basis of the current (and projected) waste tonnages and waste composition. LFG conceptual model was set up using GasSim modelling tool v2.05.008. GasSim calculates bulk landfill gas generation rates (m^3/h) during the lifetime of a landfill. The model also assesses the assess environmental risks associated the gas lateral emissions and emissions to air from the gas plant.

According to the model, the peak landfill gas generation is expected in 2024 after filling operations at the site have ended and the site has been capped. The gas generation would reach the peak rates of about 2,700-2,900m^3/h. After that, the gas production would decrease over time and by approximately 2070 there would be not enough landfill gas to sustain either a gas engine or a flare.

Risk assessment of potential lateral emissions of methane through the cell liner showed that at the site boundary, there is no indication of such gas migration. These results are supported by the wealth of monitoring data from perimeter monitoring boreholes at this site.

Landfill gas is utilised in the gas plant which is operated within the permit stipulated conditions. Environmental risks of combustion emissions to air from the gas plant were assessed as part of Tier 1 screening. With the knowledge of background concentrations of NO_2, NO_x and PM_{10}, these gases were screened for potential air quality impact; engine emission of NO_x was screened in for further modelling. Emissions screening results for carbon disulphide are based on GasSim default concentrations. The presence and concentration of this trace gas in raw landfill gas will be verified during trace gas monitoring in 2019 before re-running Tier 1 and Tier 2 emissions screening tools.

6.0 REFERENCES

1. Walleys Landfill Site Landfill Gas Risk Assessment (Egniol report 7268, December 2018)

2. Walleys Landfill Site Lafarge Tarmac Ltd Air Quality Assessment Increase in Landfill Gas Plant Output (report 1695.3.LAT.ÅKS.JDM. A3, November 2013)

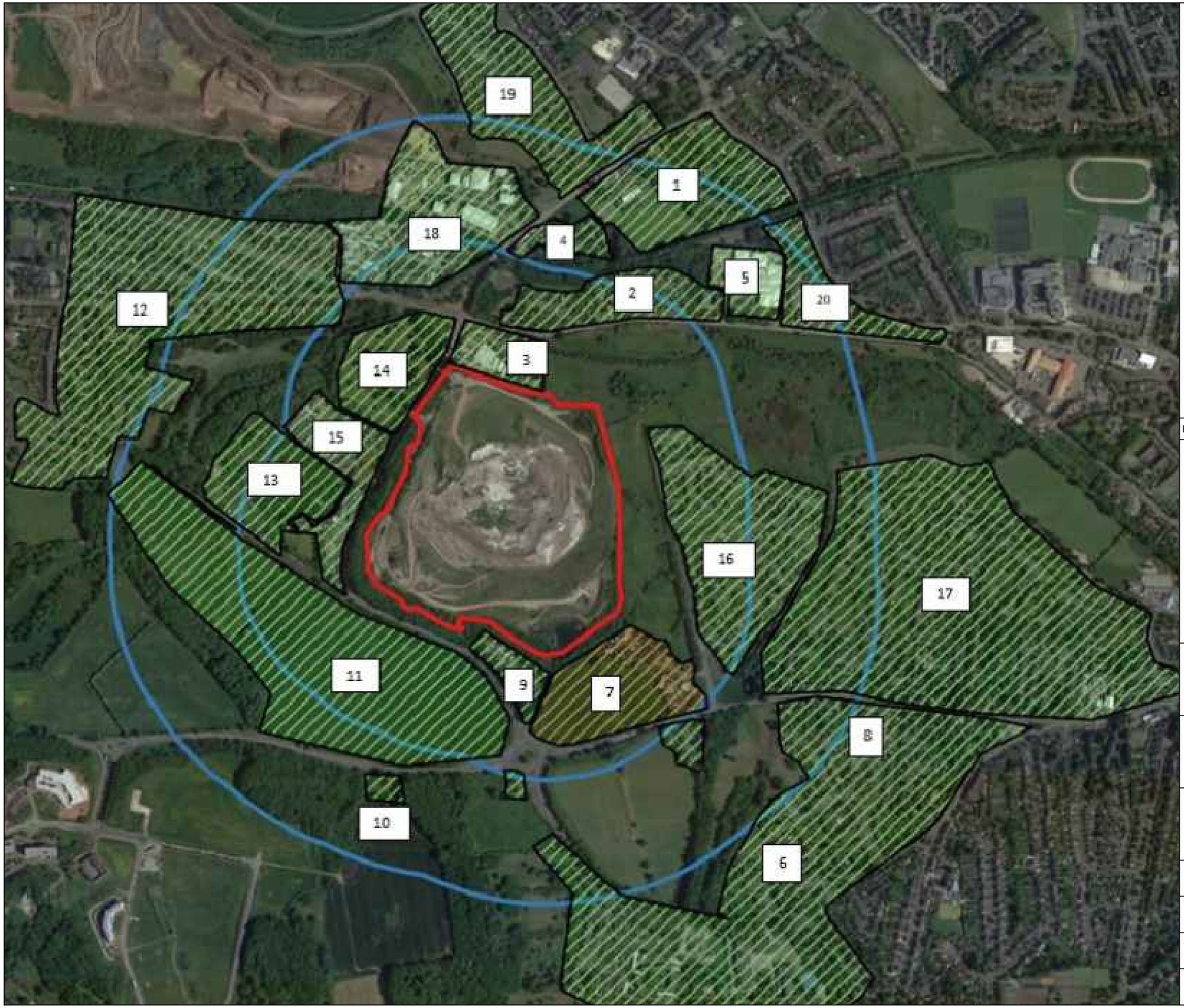
APPENDICES

Appendix 1 Walleys LFS Local Receptors. Drawing EEL.7268.D03.001

Appendix 2 GasSim model print out

Appendix 3 Tier 1 emissions screening - GasSim model print-out

Appendix 1 Walleys LFS Local Receptors. Drawing EEL.7268.D03.001



Notes

1. OS data provided by Ordnance Survey.
2. Do not scale from this drawing.
3. Any anomalies on this drawing should be brought to the attention of Egniol Environmental Ltd.
4. Key.

Site Boundary.

250m and 500m from site boundary.

Consented residential development site.

Receptor area.

Rev	Modifications	By	Chk	App	Date

Egniol Environmental Limited
Unit 7 Llys Onnen, Ffordd y Llyn
Parc Menai, Bangor
LL57 4DF
Telephone: 01248 355996
Email: info@egniol.com

Red Industries Ltd.

Walleys Quarry Landfill Site

Local Receptors

Drawn by	Checked by	Approved by
GOJR	AC	AC
Date 11.12.2018	Date 11.12.2018	Date 11.12.2018
Status: Final		Scale @ A3: Not To Scale
Drawing Number: EEL.7268.D03.001		Revision: -

CAD File Ref:M:\CAD Projects\7268 Walleys Quarry Permit Variation\Drawings\Current Working Drawings\EEL.7268.D03.001.dwg

Appendix 2 GasSim model print out

ProjectDetails

Project Name	Walley Landfill Site
Client	Red Industries Ltd
Model	c:\gassim temp\walleylfs revised lfg ra inc capping programme 240619_1.gss
Model Date	02/07/2019 14:14:58
Comments	To revise LFG Risk Assessment for permit variation application to increase the annual waste inputs to 400K tonnes
Start Year	2007
Operation Period	17
Simulation Period	150
Iterations	201

Confined Migration Pathway

Waste Composition

Year	Composition
2007	England 2000-2010 waste streams Lafarge1b
Newspapers	
Water (%)	SINGLE(30.0)
Cellulose (%)	SINGLE(48.5)
Hemi-Cellulose (%)	SINGLE(9.0)
Decomposition (%)	SINGLE(35.0)
Magazines	
Water (%)	SINGLE(30.0)
Cellulose (%)	SINGLE(42.3)
Hemi-Cellulose (%)	SINGLE(9.4)
Decomposition (%)	SINGLE(46.0)
Other paper	
Domestic	SINGLE(19.8)
Civic Amenity	SINGLE(3.3)
Commercial	SINGLE(28.8)
Industrial	SINGLE(8.8)
Residues from MRF	SINGLE(30.0)
Recycling Schemes	SINGLE(25.0)
Water (%)	SINGLE(30.0)
Cellulose (%)	SINGLE(87.4)
Hemi-Cellulose (%)	SINGLE(8.4)
Decomposition (%)	SINGLE(98.0)
Liquid cartons	
Water (%)	SINGLE(30.0)
Cellulose (%)	SINGLE(57.3)
Hemi-Cellulose (%)	SINGLE(9.9)
Decomposition (%)	SINGLE(64.0)
Card packaging	
Water (%)	SINGLE(30.0)
Cellulose (%)	SINGLE(57.3)
Hemi-Cellulose (%)	SINGLE(9.9)
Decomposition (%)	SINGLE(64.0)
Other card	
Domestic	SINGLE(3.0)
Civic Amenity	SINGLE(11.2)
Commercial	SINGLE(3.3)
Industrial	SINGLE(5.0)
Water (%)	SINGLE(30.0)
Cellulose (%)	SINGLE(57.3)
Hemi-Cellulose (%)	SINGLE(11.0)
Decomposition (%)	SINGLE(75.0)
Wood	
Water (%)	SINGLE(0.0)
Cellulose (%)	SINGLE(0.0)
Hemi-Cellulose (%)	SINGLE(0.0)
Decomposition (%)	SINGLE(0.0)
Textiles	
Domestic	SINGLE(3.3)
Civic Amenity	SINGLE(2.3)
Commercial	SINGLE(1.1)
Industrial	SINGLE(0.3)
Water (%)	SINGLE(25.0)
Cellulose (%)	SINGLE(20.0)
Hemi-Cellulose (%)	SINGLE(20.0)
Decomposition (%)	SINGLE(50.0)
Disposable nappies	
Domestic	SINGLE(3.3)
Civic Amenity	SINGLE(2.9)
Water (%)	SINGLE(20.0)
Cellulose (%)	SINGLE(25.0)
Hemi-Cellulose (%)	SINGLE(25.0)
Decomposition (%)	SINGLE(50.0)
Other misc. combustibles	
Domestic	SINGLE(0.3)
Civic Amenity	SINGLE(4.2)
Commercial	SINGLE(10.4)
Industrial	SINGLE(17.7)
Residues from MRF	UNIFORM(15.0, 20.0)
Recycling Schemes	SINGLE(25.0)
Water (%)	SINGLE(20.0)

Cellulose (%)	SINGLE(25.0)
Hemi-Cellulose (%)	SINGLE(25.0)
Decomposition (%)	SINGLE(50.0)
Garden waste	
Domestic	SINGLE(16.0)
Civic Amenity	SINGLE(32.1)
Commercial	SINGLE(9.8)
Industrial	SINGLE(4.7)
Water (%)	SINGLE(65.0)
Cellulose (%)	SINGLE(25.7)
Hemi-Cellulose (%)	SINGLE(13.0)
Decomposition (%)	SINGLE(62.0)
Other putrescible	
Domestic	SINGLE(25.6)
Civic Amenity	SINGLE(14.8)
Commercial	SINGLE(10.4)
Industrial	SINGLE(6.8)
Residues from MRF	SINGLE(20.0)
Recycling Schemes	SINGLE(25.0)
Water (%)	SINGLE(65.0)
Cellulose (%)	SINGLE(55.4)
Hemi-Cellulose (%)	SINGLE(7.2)
Decomposition (%)	SINGLE(76.0)
10mm fines	
Domestic	SINGLE(4.1)
Civic Amenity	SINGLE(1.2)
Commercial	SINGLE(1.9)
Industrial	SINGLE(0.5)
Residues from MRF	SINGLE(10.0)
Water (%)	SINGLE(40.0)
Cellulose (%)	SINGLE(25.0)
Hemi-Cellulose (%)	SINGLE(25.0)
Decomposition (%)	SINGLE(50.0)
Sewage sludge	
Sewage Sludge	SINGLE(100.0)
Water (%)	SINGLE(70.0)
Cellulose (%)	SINGLE(14.0)
Hemi-Cellulose (%)	SINGLE(14.0)
Decomposition (%)	SINGLE(75.0)
Composted organic material	
Composted Organic Material	SINGLE(100.0)
Water (%)	SINGLE(30.0)
Cellulose (%)	UNIFORM(7.47, 9.59)
Hemi-Cellulose (%)	UNIFORM(7.47, 9.59)
Decomposition (%)	SINGLE(57.0)
Incinerator ash	
Commercial	SINGLE(0.2)
Industrial	SINGLE(25.5)
Incinerator Ash	SINGLE(100.0)
Water (%)	SINGLE(30.0)
Cellulose (%)	TRIANGULAR(0.5, 0.7, 1.5)
Hemi-Cellulose (%)	TRIANGULAR(0.5, 0.7, 1.5)
Decomposition (%)	SINGLE(57.0)
Non degradable	
Domestic	SINGLE(24.6)
Civic Amenity	SINGLE(28.0)
Commercial	SINGLE(34.1)
Industrial	SINGLE(30.7)
Inert	SINGLE(100.0)
Residues from MRF	UNIFORM(20.0, 40.0)
Recycling Schemes	SINGLE(25.0)
Water (%)	SINGLE(0.0)
Cellulose (%)	SINGLE(0.0)
Hemi-Cellulose (%)	SINGLE(0.0)
Decomposition (%)	SINGLE(0.0)
Calcium Sulphate (%)	
Iron (%)	
2008	England 2000-2010 waste streams Lafarge1b
2009	England 2000-2010 waste streams Lafarge1b
2010	England 2000-2010 waste streams Lafarge1b
2011	England 2011-2013 waste streams Lafarge1b
Newspapers	
Water (%)	SINGLE(30.0)
Cellulose (%)	SINGLE(48.5)
Hemi-Cellulose (%)	SINGLE(9.0)
Decomposition (%)	SINGLE(35.0)
Magazines	
Water (%)	SINGLE(30.0)
Cellulose (%)	SINGLE(42.3)
Hemi-Cellulose (%)	SINGLE(9.4)
Decomposition (%)	SINGLE(46.0)
Other paper	
Domestic	SINGLE(19.8)
Civic Amenity	SINGLE(3.3)
Commercial	SINGLE(28.8)
Industrial	SINGLE(8.8)

Residues from MRF	SINGLE(30.0)
Recycling Schemes	SINGLE(25.0)
Water (%)	SINGLE(30.0)
Cellulose (%)	SINGLE(87.4)
Hemi-Cellulose (%)	SINGLE(8.4)
Decomposition (%)	SINGLE(98.0)
Liquid cartons	
Water (%)	SINGLE(30.0)
Cellulose (%)	SINGLE(57.3)
Hemi-Cellulose (%)	SINGLE(9.9)
Decomposition (%)	SINGLE(64.0)
Card packaging	
Water (%)	SINGLE(30.0)
Cellulose (%)	SINGLE(57.3)
Hemi-Cellulose (%)	SINGLE(9.9)
Decomposition (%)	SINGLE(64.0)
Other card	
Domestic	SINGLE(3.0)
Civic Amenity	SINGLE(11.2)
Commercial	SINGLE(3.3)
Industrial	SINGLE(5.0)
Water (%)	SINGLE(30.0)
Cellulose (%)	SINGLE(57.3)
Hemi-Cellulose (%)	SINGLE(11.0)
Decomposition (%)	SINGLE(75.0)
Wood	
Water (%)	SINGLE(0.0)
Cellulose (%)	SINGLE(0.0)
Hemi-Cellulose (%)	SINGLE(0.0)
Decomposition (%)	SINGLE(0.0)
Textiles	
Domestic	SINGLE(3.3)
Civic Amenity	SINGLE(2.3)
Commercial	SINGLE(1.1)
Industrial	SINGLE(0.3)
Water (%)	SINGLE(25.0)
Cellulose (%)	SINGLE(20.0)
Hemi-Cellulose (%)	SINGLE(20.0)
Decomposition (%)	SINGLE(50.0)
Disposable nappies	
Domestic	SINGLE(3.3)
Civic Amenity	SINGLE(2.9)
Water (%)	SINGLE(20.0)
Cellulose (%)	SINGLE(25.0)
Hemi-Cellulose (%)	SINGLE(25.0)
Decomposition (%)	SINGLE(50.0)
Other misc. combustibles	
Domestic	SINGLE(0.3)
Civic Amenity	SINGLE(4.2)
Commercial	SINGLE(10.4)
Industrial	SINGLE(17.7)
Residues from MRF	UNIFORM(15.0, 20.0)
Recycling Schemes	SINGLE(25.0)
Water (%)	SINGLE(20.0)
Cellulose (%)	SINGLE(25.0)
Hemi-Cellulose (%)	SINGLE(25.0)
Decomposition (%)	SINGLE(50.0)
Garden waste	
Domestic	SINGLE(16.0)
Civic Amenity	SINGLE(32.1)
Commercial	SINGLE(9.8)
Industrial	SINGLE(4.7)
Water (%)	SINGLE(65.0)
Cellulose (%)	SINGLE(25.7)
Hemi-Cellulose (%)	SINGLE(13.0)
Decomposition (%)	SINGLE(62.0)
Other putrescible	
Domestic	SINGLE(25.6)
Civic Amenity	SINGLE(14.8)
Commercial	SINGLE(10.4)
Industrial	SINGLE(6.8)
Residues from MRF	SINGLE(20.0)
Recycling Schemes	SINGLE(25.0)
Water (%)	SINGLE(65.0)
Cellulose (%)	SINGLE(55.4)
Hemi-Cellulose (%)	SINGLE(7.2)
Decomposition (%)	SINGLE(76.0)
10mm fines	
Domestic	SINGLE(4.1)
Civic Amenity	SINGLE(1.2)
Commercial	SINGLE(1.9)
Industrial	SINGLE(0.5)
Residues from MRF	SINGLE(10.0)
Water (%)	SINGLE(40.0)
Cellulose (%)	SINGLE(25.0)
Hemi-Cellulose (%)	SINGLE(25.0)

Decomposition (%)	SINGLE(50.0)
Sewage sludge	
Sewage Sludge	SINGLE(100.0)
Water (%)	SINGLE(70.0)
Cellulose (%)	SINGLE(14.0)
Hemi-Cellulose (%)	SINGLE(14.0)
Decomposition (%)	SINGLE(75.0)
Composted organic material	
Composted Organic Material	SINGLE(100.0)
Water (%)	SINGLE(30.0)
Cellulose (%)	UNIFORM(7.47, 9.59)
Hemi-Cellulose (%)	UNIFORM(7.47, 9.59)
Decomposition (%)	SINGLE(57.0)
Incinerator ash	
Commercial	SINGLE(0.2)
Industrial	SINGLE(25.5)
Incinerator Ash	SINGLE(100.0)
Water (%)	SINGLE(30.0)
Cellulose (%)	TRIANGULAR(0.5, 0.7, 1.5)
Hemi-Cellulose (%)	TRIANGULAR(0.5, 0.7, 1.5)
Decomposition (%)	SINGLE(57.0)
Non degradable	
Domestic	SINGLE(24.6)
Civic Amenity	SINGLE(28.0)
Commercial	SINGLE(34.1)
Industrial	SINGLE(30.7)
Inert	SINGLE(100.0)
Residues from MRF	UNIFORM(20.0, 40.0)
Recycling Schemes	SINGLE(25.0)
Water (%)	SINGLE(0.0)
Cellulose (%)	SINGLE(0.0)
Hemi-Cellulose (%)	SINGLE(0.0)
Decomposition (%)	SINGLE(0.0)
Calcium Sulphate (%)	
Iron (%)	
2012	England 2011-2013 waste streams Lafarge1b
2013	England 2011-2013 waste streams Lafarge1b
2014	walley waste streams 2014-2020
Newspapers	
Domestic	SINGLE(1.5)
Civic Amenity	SINGLE(11.2)
Commercial	SINGLE(3.3)
Industrial	SINGLE(5.0)
Residues from MRF	SINGLE(1.5)
Recycling Schemes	SINGLE(10.0)
Water (%)	SINGLE(30.0)
Cellulose (%)	SINGLE(48.5)
Hemi-Cellulose (%)	SINGLE(9.0)
Decomposition (%)	SINGLE(35.0)
Magazines	
Industrial	SINGLE(8.8)
Water (%)	SINGLE(30.0)
Cellulose (%)	SINGLE(42.3)
Hemi-Cellulose (%)	SINGLE(9.4)
Decomposition (%)	SINGLE(46.0)
Other paper	
Domestic	SINGLE(9.9)
Civic Amenity	SINGLE(3.3)
Commercial	SINGLE(38.8)
Residues from MRF	SINGLE(9.9)
Water (%)	SINGLE(30.0)
Cellulose (%)	SINGLE(87.4)
Hemi-Cellulose (%)	SINGLE(8.4)
Decomposition (%)	SINGLE(98.0)
Liquid cartons	
Water (%)	SINGLE(30.0)
Cellulose (%)	SINGLE(57.3)
Hemi-Cellulose (%)	SINGLE(9.9)
Decomposition (%)	SINGLE(64.0)
Card packaging	
Water (%)	SINGLE(30.0)
Cellulose (%)	SINGLE(57.3)
Hemi-Cellulose (%)	SINGLE(9.9)
Decomposition (%)	SINGLE(64.0)
Other card	
Water (%)	SINGLE(30.0)
Cellulose (%)	SINGLE(57.3)
Hemi-Cellulose (%)	SINGLE(9.9)
Decomposition (%)	SINGLE(64.0)
Wood	
Water (%)	SINGLE(0.0)
Cellulose (%)	SINGLE(0.0)
Hemi-Cellulose (%)	SINGLE(0.0)
Decomposition (%)	SINGLE(0.0)
Textiles	
Domestic	SINGLE(1.7)

Civic Amenity	SINGLE(2.3)
Commercial	SINGLE(1.1)
Industrial	SINGLE(0.3)
Residues from MRF	SINGLE(1.7)
Water (%)	SINGLE(25.0)
Cellulose (%)	SINGLE(20.0)
Hemi-Cellulose (%)	SINGLE(20.0)
Decomposition (%)	SINGLE(50.0)
Disposable nappies	
Domestic	SINGLE(1.7)
Civic Amenity	SINGLE(2.9)
Residues from MRF	SINGLE(1.7)
Water (%)	SINGLE(20.0)
Cellulose (%)	SINGLE(25.0)
Hemi-Cellulose (%)	SINGLE(25.0)
Decomposition (%)	SINGLE(50.0)
Other misc. combustibles	
Domestic	UNIFORM(5.0, 20.0)
Civic Amenity	SINGLE(4.2)
Commercial	SINGLE(10.4)
Industrial	SINGLE(17.7)
Residues from MRF	SINGLE(18.1)
Water (%)	SINGLE(20.0)
Cellulose (%)	SINGLE(25.0)
Hemi-Cellulose (%)	SINGLE(25.0)
Decomposition (%)	SINGLE(50.0)
Garden waste	
Domestic	UNIFORM(1.0, 5.0)
Civic Amenity	SINGLE(32.1)
Commercial	SINGLE(9.8)
Industrial	SINGLE(4.7)
Residues from MRF	SINGLE(8.0)
Recycling Schemes	SINGLE(25.0)
Water (%)	SINGLE(65.0)
Cellulose (%)	SINGLE(25.7)
Hemi-Cellulose (%)	SINGLE(13.0)
Decomposition (%)	SINGLE(62.0)
Other putrescible	
Domestic	SINGLE(12.8)
Civic Amenity	SINGLE(14.8)
Commercial	SINGLE(10.4)
Industrial	SINGLE(6.8)
Residues from MRF	UNIFORM(6.0, 8.0)
Recycling Schemes	SINGLE(25.0)
Water (%)	SINGLE(65.0)
Cellulose (%)	SINGLE(55.4)
Hemi-Cellulose (%)	SINGLE(7.2)
Decomposition (%)	SINGLE(76.0)
10mm fines	
Domestic	UNIFORM(2.0, 3.0)
Civic Amenity	SINGLE(1.2)
Commercial	SINGLE(1.9)
Industrial	SINGLE(0.5)
Residues from MRF	SINGLE(2.1)
Water (%)	SINGLE(40.0)
Cellulose (%)	SINGLE(25.0)
Hemi-Cellulose (%)	SINGLE(25.0)
Decomposition (%)	SINGLE(50.0)
Sewage sludge	
Sewage Sludge	SINGLE(100.0)
Water (%)	SINGLE(70.0)
Cellulose (%)	SINGLE(14.0)
Hemi-Cellulose (%)	SINGLE(14.0)
Decomposition (%)	SINGLE(75.0)
Composted organic material	
Composted Organic Material	SINGLE(100.0)
Water (%)	SINGLE(30.0)
Cellulose (%)	UNIFORM(7.47, 9.59)
Hemi-Cellulose (%)	UNIFORM(7.47, 9.59)
Decomposition (%)	SINGLE(57.0)
Incinerator ash	
Domestic	UNIFORM(0.0, 1.0)
Commercial	SINGLE(0.2)
Industrial	SINGLE(25.5)
Incinerator Ash	SINGLE(100.0)
Water (%)	SINGLE(30.0)
Cellulose (%)	TRIANGULAR(0.5, 0.7, 1.5)
Hemi-Cellulose (%)	TRIANGULAR(0.5, 0.7, 1.5)
Decomposition (%)	SINGLE(57.0)
Non degradable	
Domestic	UNIFORM(40.0, 70.0)
Civic Amenity	SINGLE(28.0)
Commercial	SINGLE(24.1)
Industrial	SINGLE(30.7)
Inert	SINGLE(100.0)
Residues from MRF	UNIFORM(40.0, 60.0)

Recycling Schemes	SINGLE(35.0)
Water (%)	SINGLE(0.0)
Cellulose (%)	SINGLE(0.0)
Hemi-Cellulose (%)	SINGLE(0.0)
Decomposition (%)	SINGLE(0.0)
Calcium Sulphate (%)	
Iron (%)	
2015	walley waste streams 2014-2020
2016	walley waste streams 2014-2020
2017	walley waste streams 2014-2020
2018	walley waste streams 2014-2020
2019	walley waste streams 2014-2020
2020	walley waste streams 2014-2020
2021	walley waste streams 2020+
Newspapers	
Domestic	SINGLE(1.1)
Civic Amenity	SINGLE(11.2)
Commercial	SINGLE(3.3)
Industrial	SINGLE(5.0)
Residues from MRF	UNIFORM(1.0, 2.0)
Recycling Schemes	SINGLE(10.0)
Water (%)	SINGLE(30.0)
Cellulose (%)	SINGLE(48.5)
Hemi-Cellulose (%)	SINGLE(9.0)
Decomposition (%)	SINGLE(35.0)
Magazines	
Civic Amenity	SINGLE(3.3)
Water (%)	SINGLE(30.0)
Cellulose (%)	SINGLE(42.3)
Hemi-Cellulose (%)	SINGLE(9.4)
Decomposition (%)	SINGLE(46.0)
Other paper	
Domestic	SINGLE(6.9)
Commercial	SINGLE(38.8)
Industrial	SINGLE(8.8)
Residues from MRF	UNIFORM(6.0, 10.0)
Water (%)	SINGLE(30.0)
Cellulose (%)	SINGLE(87.4)
Hemi-Cellulose (%)	SINGLE(8.4)
Decomposition (%)	SINGLE(98.0)
Liquid cartons	
Water (%)	SINGLE(30.0)
Cellulose (%)	SINGLE(57.3)
Hemi-Cellulose (%)	SINGLE(9.9)
Decomposition (%)	SINGLE(64.0)
Card packaging	
Water (%)	SINGLE(30.0)
Cellulose (%)	SINGLE(57.3)
Hemi-Cellulose (%)	SINGLE(9.9)
Decomposition (%)	SINGLE(64.0)
Other card	
Water (%)	SINGLE(30.0)
Cellulose (%)	SINGLE(57.3)
Hemi-Cellulose (%)	SINGLE(9.9)
Decomposition (%)	SINGLE(64.0)
Wood	
Water (%)	SINGLE(0.0)
Cellulose (%)	SINGLE(0.0)
Hemi-Cellulose (%)	SINGLE(0.0)
Decomposition (%)	SINGLE(0.0)
Textiles	
Domestic	UNIFORM(1.0, 5.0)
Civic Amenity	SINGLE(2.3)
Commercial	SINGLE(1.1)
Industrial	SINGLE(0.3)
Residues from MRF	UNIFORM(1.0, 2.0)
Water (%)	SINGLE(25.0)
Cellulose (%)	SINGLE(20.0)
Hemi-Cellulose (%)	SINGLE(20.0)
Decomposition (%)	SINGLE(50.0)
Disposable nappies	
Domestic	SINGLE(1.2)
Civic Amenity	SINGLE(2.9)
Residues from MRF	UNIFORM(1.0, 2.0)
Water (%)	SINGLE(20.0)
Cellulose (%)	SINGLE(25.0)
Hemi-Cellulose (%)	SINGLE(25.0)
Decomposition (%)	SINGLE(50.0)
Other misc. combustibles	
Domestic	SINGLE(0.1)
Civic Amenity	SINGLE(4.2)
Commercial	SINGLE(10.4)
Industrial	SINGLE(17.7)
Residues from MRF	UNIFORM(10.0, 20.0)
Water (%)	SINGLE(20.0)
Cellulose (%)	SINGLE(25.0)

Hemi-Cellulose (%)		SINGLE(25.0)
Decomposition (%)		SINGLE(50.0)
Garden waste		
Domestic		UNIFORM(1.0, 5.0)
Civic Amenity		SINGLE(32.1)
Commercial		SINGLE(9.8)
Industrial		SINGLE(4.7)
Residues from MRF		UNIFORM(5.0, 6.0)
Recycling Schemes		SINGLE(25.0)
Water (%)		SINGLE(65.0)
Cellulose (%)		SINGLE(25.7)
Hemi-Cellulose (%)		SINGLE(13.0)
Decomposition (%)		SINGLE(62.0)
Other putrescible		
Domestic		SINGLE(10.0)
Civic Amenity		SINGLE(14.8)
Commercial		SINGLE(10.4)
Industrial		SINGLE(6.8)
Residues from MRF		UNIFORM(4.0, 5.0)
Recycling Schemes		SINGLE(25.0)
Water (%)		SINGLE(65.0)
Cellulose (%)		SINGLE(55.4)
Hemi-Cellulose (%)		SINGLE(7.2)
Decomposition (%)		SINGLE(76.0)
10mm fines		
Domestic		UNIFORM(1.0, 2.0)
Civic Amenity		SINGLE(1.9)
Commercial		SINGLE(0.5)
Industrial		SINGLE(0.5)
Water (%)		SINGLE(40.0)
Cellulose (%)		SINGLE(25.0)
Hemi-Cellulose (%)		SINGLE(25.0)
Decomposition (%)		SINGLE(50.0)
Sewage sludge		
Sewage Sludge		SINGLE(100.0)
Water (%)		SINGLE(70.0)
Cellulose (%)		SINGLE(14.0)
Hemi-Cellulose (%)		SINGLE(14.0)
Decomposition (%)		SINGLE(75.0)
Composted organic material		
Composted Organic Material		SINGLE(100.0)
Water (%)		SINGLE(30.0)
Cellulose (%)		UNIFORM(7.47, 9.59)
Hemi-Cellulose (%)		UNIFORM(7.47, 9.59)
Decomposition (%)		SINGLE(57.0)
Incinerator ash		
Commercial		SINGLE(0.2)
Industrial		SINGLE(25.5)
Incinerator Ash		SINGLE(100.0)
Water (%)		SINGLE(30.0)
Cellulose (%)		TRIANGULAR(0.5, 0.7, 1.5)
Hemi-Cellulose (%)		TRIANGULAR(0.5, 0.7, 1.5)
Decomposition (%)		SINGLE(57.0)
Non degradable		
Domestic		UNIFORM(65.0, 75.0)
Civic Amenity		SINGLE(28.0)
Commercial		UNIFORM(20.0, 35.0)
Industrial		SINGLE(30.7)
Inert		SINGLE(100.0)
Residues from MRF		UNIFORM(40.0, 60.0)
Recycling Schemes		SINGLE(35.0)
Water (%)		SINGLE(0.0)
Cellulose (%)		SINGLE(0.0)
Hemi-Cellulose (%)		SINGLE(0.0)
Decomposition (%)		SINGLE(0.0)
Calcium Sulphate (%)		
Iron (%)		
2022		walley waste streams 2020+
2023		walley waste streams 2020+
Justification:	[Changed]	Red Industries info

Trace Gases

No Combustion Products Selected

Cell 2

Infiltration		NORMAL(620.0, 100.0)
Justification:	[Changed]	Not Justified

Waste Input

Year	AmountDepositied (t)
2007	SINGLE(7.30E+04)
2008	SINGLE(6.60E+04)
2009	SINGLE(6.43E+04)
2010	SINGLE(6.37E+04)
2011	SINGLE(6.47E+04)
2012	SINGLE(4.90E+04)
2013	SINGLE(6.23E+04)

2014		SINGLE(5.17E+04)
2015		SINGLE(5.33E+04)
2016		SINGLE(5.42E+04)
2017		SINGLE(7.60E+04)
2018		SINGLE(8.33E+04)
2019		SINGLE(1.00E+05)
2020		SINGLE(2.00E+05)
2021		SINGLE(1.00E+05)
2022		SINGLE(1.33E+05)
2023		SINGLE(2.00E+05)
Justification:	[Changed]	Red Industries info and based on site permit

Waste Breakdown

2007

Domestic	SINGLE(15.0)
Industrial	SINGLE(10.0)
Inert	SINGLE(18.0)
Sewage Sludge	SINGLE(1.5)
Composted Organic Material	SINGLE(0.5)
Residues from MRF	SINGLE(55.0)

2008

Domestic	SINGLE(15.0)
Industrial	SINGLE(10.0)
Inert	SINGLE(18.0)
Sewage Sludge	SINGLE(1.5)
Composted Organic Material	SINGLE(0.5)
Residues from MRF	SINGLE(55.0)

2009

Domestic	SINGLE(17.6)
Commercial	SINGLE(1.8)
Industrial	SINGLE(12.6)
Inert	SINGLE(13.1)
Sewage Sludge	SINGLE(2.0)
Composted Organic Material	SINGLE(1.5)
Incinerator Ash	SINGLE(0.1)
Residues from MRF	SINGLE(50.8)
Recycling Schemes	SINGLE(0.5)

2010

Domestic	TRIANGULAR(11.0, 14.0, 17.0)
Commercial	UNIFORM(0.0, 2.0)
Industrial	TRIANGULAR(8.0, 10.0, 12.0)
Inert	TRIANGULAR(13.0, 16.0, 19.0)
Sewage Sludge	UNIFORM(1.5, 2.0)
Composted Organic Material	UNIFORM(1.0, 2.0)
Incinerator Ash	SINGLE(0.1)
Residues from MRF	TRIANGULAR(50.0, 55.0, 57.0)
Recycling Schemes	UNIFORM(0.5, 0.9)

2011

Domestic	TRIANGULAR(11.0, 14.0, 17.0)
Commercial	UNIFORM(0.0, 2.0)
Industrial	TRIANGULAR(8.0, 10.0, 12.0)
Inert	TRIANGULAR(13.0, 16.0, 19.0)
Sewage Sludge	UNIFORM(1.5, 2.0)
Composted Organic Material	UNIFORM(1.0, 2.0)
Incinerator Ash	SINGLE(0.1)
Residues from MRF	TRIANGULAR(50.0, 55.0, 57.0)
Recycling Schemes	UNIFORM(0.5, 0.9)

2012

Domestic	TRIANGULAR(11.0, 14.0, 17.0)
Commercial	UNIFORM(0.0, 2.0)
Industrial	TRIANGULAR(8.0, 10.0, 12.0)
Inert	TRIANGULAR(13.0, 16.0, 19.0)
Sewage Sludge	UNIFORM(1.5, 2.0)
Composted Organic Material	UNIFORM(1.0, 2.0)
Incinerator Ash	SINGLE(0.1)
Residues from MRF	TRIANGULAR(50.0, 55.0, 57.0)
Recycling Schemes	UNIFORM(0.5, 0.9)

2013

Domestic	UNIFORM(10.0, 17.5)
Commercial	UNIFORM(0.0, 1.0)
Industrial	UNIFORM(5.0, 12.5)
Inert	TRIANGULAR(15.0, 29.0, 35.0)
Sewage Sludge	UNIFORM(1.5, 3.0)
Composted Organic Material	UNIFORM(0.0, 2.0)
Incinerator Ash	SINGLE(0.1)
Residues from MRF	UNIFORM(32.0, 51.0)
Recycling Schemes	UNIFORM(0.5, 5.5)

2014

Domestic	TRIANGULAR(5.0, 10.0, 15.0)
Commercial	TRIANGULAR(5.0, 16.2, 20.0)
Industrial	UNIFORM(5.0, 12.5)
Inert	TRIANGULAR(35.0, 36.8, 40.0)
Sewage Sludge	TRIANGULAR(3.0, 3.7, 5.0)
Composted Organic Material	UNIFORM(0.0, 2.0)
Incinerator Ash	SINGLE(0.3)
Residues from MRF	TRIANGULAR(40.0, 41.0, 45.0)
Recycling Schemes	UNIFORM(0.0, 1.0)

2015

Domestic	TRIANGULAR(5.0, 7.0, 10.0)
Commercial	TRIANGULAR(5.0, 16.2, 20.0)
Industrial	UNIFORM(5.0, 12.5)
Inert	TRIANGULAR(35.0, 36.8, 40.0)
Sewage Sludge	TRIANGULAR(3.0, 3.7, 5.0)
Composted Organic Material	UNIFORM(0.0, 2.0)
Incinerator Ash	SINGLE(0.3)
Residues from MRF	TRIANGULAR(40.0, 41.0, 45.0)
Recycling Schemes	UNIFORM(0.0, 1.0)

2016

Domestic	TRIANGULAR(1.0, 5.0, 7.0)
Commercial	TRIANGULAR(5.0, 16.2, 20.0)
Industrial	TRIANGULAR(8.0, 10.0, 12.0)
Inert	TRIANGULAR(13.0, 16.0, 19.0)
Sewage Sludge	UNIFORM(1.5, 2.0)
Composted Organic Material	UNIFORM(1.0, 2.0)
Incinerator Ash	SINGLE(0.1)
Residues from MRF	TRIANGULAR(50.0, 55.0, 57.0)
Recycling Schemes	UNIFORM(0.5, 0.9)

2017

Domestic	TRIANGULAR(0.5, 2.0, 3.0)
Commercial	TRIANGULAR(5.0, 16.2, 20.0)
Industrial	TRIANGULAR(7.0, 9.6, 10.0)
Inert	TRIANGULAR(5.0, 6.8, 10.0)
Sewage Sludge	UNIFORM(0.0, 1.0)
Composted Organic Material	UNIFORM(1.0, 2.0)
Incinerator Ash	SINGLE(0.1)
Residues from MRF	TRIANGULAR(80.0, 83.6, 85.0)
Recycling Schemes	UNIFORM(0.5, 0.9)

2018

Domestic	TRIANGULAR(0.5, 1.0, 3.0)
Commercial	TRIANGULAR(5.0, 16.2, 20.0)
Industrial	TRIANGULAR(7.0, 9.6, 10.0)
Inert	TRIANGULAR(5.0, 6.8, 10.0)
Sewage Sludge	UNIFORM(0.0, 1.0)
Composted Organic Material	UNIFORM(1.0, 2.0)
Incinerator Ash	SINGLE(0.1)
Residues from MRF	TRIANGULAR(80.0, 83.6, 85.0)
Recycling Schemes	UNIFORM(0.5, 0.9)

2019

Domestic	TRIANGULAR(0.5, 1.0, 3.0)
Commercial	TRIANGULAR(5.0, 16.2, 20.0)
Industrial	TRIANGULAR(7.0, 9.6, 10.0)
Inert	TRIANGULAR(5.0, 6.8, 10.0)
Sewage Sludge	UNIFORM(0.0, 1.0)
Composted Organic Material	UNIFORM(1.0, 2.0)
Incinerator Ash	SINGLE(0.1)
Residues from MRF	TRIANGULAR(80.0, 83.6, 85.0)
Recycling Schemes	UNIFORM(0.5, 0.9)

2020

Domestic	TRIANGULAR(0.5, 1.0, 3.0)
Commercial	UNIFORM(0.0, 2.0)
Industrial	TRIANGULAR(7.0, 9.6, 10.0)
Inert	TRIANGULAR(5.0, 6.8, 10.0)
Sewage Sludge	UNIFORM(0.0, 1.0)
Composted Organic Material	UNIFORM(1.0, 2.0)
Incinerator Ash	SINGLE(0.1)
Residues from MRF	TRIANGULAR(80.0, 83.6, 85.0)
Recycling Schemes	UNIFORM(0.5, 0.9)

2021

Domestic	TRIANGULAR(0.5, 1.0, 3.0)
Commercial	UNIFORM(0.0, 2.0)
Industrial	TRIANGULAR(7.0, 9.6, 10.0)
Inert	TRIANGULAR(5.0, 6.8, 10.0)
Sewage Sludge	UNIFORM(0.0, 1.0)
Composted Organic Material	UNIFORM(1.0, 2.0)
Incinerator Ash	SINGLE(0.1)
Residues from MRF	TRIANGULAR(80.0, 83.6, 85.0)
Recycling Schemes	UNIFORM(0.5, 0.9)

2022

Domestic	TRIANGULAR(0.5, 1.0, 3.0)
Commercial	UNIFORM(0.0, 2.0)
Industrial	TRIANGULAR(7.0, 9.6, 10.0)
Inert	TRIANGULAR(5.0, 6.8, 10.0)
Sewage Sludge	UNIFORM(0.0, 1.0)
Composted Organic Material	UNIFORM(1.0, 2.0)
Incinerator Ash	SINGLE(0.1)
Residues from MRF	TRIANGULAR(80.0, 83.6, 85.0)
Recycling Schemes	UNIFORM(0.5, 0.9)

2023

Domestic	TRIANGULAR(0.5, 1.0, 3.0)
Commercial	UNIFORM(0.0, 2.0)
Industrial	TRIANGULAR(7.0, 9.6, 10.0)
Inert	TRIANGULAR(5.0, 6.8, 10.0)
Sewage Sludge	UNIFORM(0.0, 1.0)

Composted Organic Material		UNIFORM(1.0, 2.0)
Incinerator Ash		SINGLE(0.1)
Residues from MRF		TRIANGULAR(80.0, 83.6, 85.0)
Recycling Schemes		UNIFORM(0.5, 0.9)
Justification:	[Default]	Red Industries info

Trace Gases

Source Gases		Concentration [mg/m3]
Acetalehyde (ethanal)		LOGUNIFORM(0.075, 2.546)
Benzene		LOGTRIANGULAR(3.1, 15.0, 73.0)
Butadiene (modelled as 1,3-Butadiene)		LOGUNIFORM(1.00E-30, 2.00E-02)
Butene isomers		LOGTRIANGULAR(1.00E-03, 2.00E-01, 1.80E+00)
Carbon disulphide		LOGUNIFORM(0.9, 170.0)
Carbon monoxide		LOGTRIANGULAR(0.11, 1.1, 5000.0)
Carbon tetrachloride (tetrachloromethane)		LOGUNIFORM(1.00E-30, 2.00E-02)
Chlorobenzene		LOGUNIFORM(0.002, 3000.0)
Chlorofluorocarbons (CFCs) (Total)		LOGTRIANGULAR(0.06, 102.3, 1230.0)
Chloroform (trichloromethane)		LOGTRIANGULAR(1.00E-03, 2.00E-01, 7.00E+01)
Dichloromethane (methylene chloride)		LOGTRIANGULAR(1.00E-03, 2.00E-02, 1.52E+03)
Dimethyl disulphide		LOGTRIANGULAR(0.03, 0.17, 12.0)
Ethyl toluene (all isomers)		LOGTRIANGULAR(1.00E-03, 1.00E-02, 8.30E+00)
Ethylene		UNIFORM(0.2, 5.8)
Ethylene dichloride		LOGTRIANGULAR(0.006, 0.01, 1820.0)
Formaldehyde (methanal)		LOGTRIANGULAR(0.026, 0.068, 0.188)
Halons		SINGLE(0.0)
Hexachlorocyclohexane (all isomers)		SINGLE(0.0)
Hydrochlorofluorocarbons (HCFCs) (Total		LOGTRIANGULAR(0.02, 128.8, 916.2)
Hydrofluorocarbons (HFCs) (Total)		SINGLE(0.0)
Methyl chloride (chloromethane)		LOGTRIANGULAR(0.006, 0.2, 10.0)
Methyl chloroform (1,1,1-Trichloroethane)		LOGTRIANGULAR(1.00E-03, 1.80E+02, 1.60E+03)
PAH (reported as Naphthalene)		LOGTRIANGULAR(1.00E-03, 2.00E-01, 1.70E+01)
para-Dichlorobenzene (modelled as 1,4-Dichlorobenzene)		LOGTRIANGULAR(0.006, 0.05, 2.7)
Pentane		LOGTRIANGULAR(0.02, 0.3, 105.0)
Pentene (all isomers)		LOGTRIANGULAR(0.24, 3.5, 12.0)
Perfluorocarbons (PFCs) (Total)		SINGLE(0.0)
Phenol		SINGLE(0.0)
PM10s		SINGLE(0.0)
Tetrachloroethane (modelled as 1,1,2,2-Tetrachloroethane)		LOGUNIFORM(1.00E-03, 5.00E+01)
Tetrachloroethylene (Tetrachloroethene)		LOGTRIANGULAR(1.00E-03, 1.00E-02, 7.70E+03)
Toluene		LOGTRIANGULAR(0.01, 0.1, 1250.0)
Trichlorobenzene (all isomers)		LOGTRIANGULAR(0.01, 0.01, 0.13)
Trichloroethylene (trichloroethene)		LOGTRIANGULAR(0.25, 1.65, 88.0)
Trimethylbenzene (all isomers)		LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.87E+02)
Vinyl chloride (chloroethene, chloroethylene)		LOGTRIANGULAR(1.1, 31.0, 730.0)
Xylene (all isomers)		LOGTRIANGULAR(1.00E-03, 1.00E-03, 6.18E+04)
Justification:	[Default]	Default Value
VOC Halflife		NORMAL(4.11, 1.56)
Justification:	[Default]	Default Value

Waste Moisture Content

Degradation rate - Filling Phase		User Defined 2
Justification:	[Changed]	based on wet
Degradation rate - after change		Wet
Justification:	[Changed]	based on average to wet
Waste Density		UNIFORM(0.8, 1.2)
Justification:	[Default]	Default Value
Leachate Head		SINGLE(1.0)
Justification:	[Default]	Default Value
Hydraulic Conductivity		LOGUNIFORM(1.00E-09, 1.00E-05)
Justification:	[Default]	Default Value

Engineered Controls

Cap		Single Liner
Cap Thickness		SINGLE(1.00E-03)
Cap Hydraulic Conductivity		SINGLE(1.00E-09)
Justifications		
Cap	[Changed]	design specification
Cap Thickness	[Changed]	design specification
Cap Hydraulic Conductivity	[Changed]	minimum requirement
liner		Single Clay
Liner Thickness		SINGLE(3.0)
Liner Hydraulic Conductivity		LOGUNIFORM(8.90E-11, 1.00E-09)
Justifications		
Liner	[Changed]	CQA Plan
Liner Thickness	[Changed]	CQA Plan
Liner Hydraulic Conductivit	[Changed]	minimum requirement
Justification:	[Default]	Default Value
Methane Oxidation %		SINGLE(10.0)
Justification:	[Default]	Default Value
Land Raise Depth		#UNDEFINED?

Geosphere

Ground Surface (mAOD)		0
Water Table (mAOD)		0
Geosphere Moisture Content		UNIFORM(10.0, 30.0)
Geosphere Porosity		UNIFORM(15.0, 35.0)

Cell 1 defined

Infiltration		NORMAL(620.0, 100.0)
Justification:	[Changed]	Not Justified

Waste Input

Year	AmountDepositied (t)
2007	SINGLE(7.30E+04)
2008	SINGLE(6.60E+04)
2009	SINGLE(6.43E+04)
2010	SINGLE(6.37E+04)
2011	SINGLE(0.0)
2012	SINGLE(0.0)
2013	SINGLE(0.0)
2014	SINGLE(0.0)
2015	SINGLE(0.0)
2016	SINGLE(0.0)
2017	SINGLE(0.0)
2018	SINGLE(0.0)
2019	SINGLE(1.00E+05)
2020	SINGLE(2.00E+05)
2021	SINGLE(1.00E+05)
2022	SINGLE(0.0)
2023	SINGLE(0.0)
Justification: [Changed]	Not Justified

Waste Breakdown

2007	
Domestic	SINGLE(15.0)
Industrial	SINGLE(10.0)
Inert	SINGLE(18.0)
Sewage Sludge	SINGLE(1.5)
Composted Organic Material	SINGLE(0.5)
Residues from MRF	SINGLE(55.0)
2008	
Domestic	SINGLE(15.0)
Industrial	SINGLE(10.0)
Inert	SINGLE(18.0)
Sewage Sludge	SINGLE(1.5)
Composted Organic Material	SINGLE(0.5)
Residues from MRF	SINGLE(55.0)
2009	
Domestic	SINGLE(17.6)
Commercial	SINGLE(1.8)
Industrial	SINGLE(12.6)
Inert	SINGLE(13.1)
Sewage Sludge	SINGLE(2.0)
Composted Organic Material	SINGLE(1.5)
Incinerator Ash	SINGLE(0.1)
Residues from MRF	SINGLE(50.8)
Recycling Schemes	SINGLE(0.5)
2010	
Domestic	TRIANGULAR(11.0, 14.0, 17.0)
Commercial	UNIFORM(0.0, 2.0)
Industrial	TRIANGULAR(8.0, 10.0, 12.0)
Inert	TRIANGULAR(13.0, 16.0, 19.0)
Sewage Sludge	UNIFORM(1.5, 2.0)
Composted Organic Material	UNIFORM(1.0, 2.0)
Incinerator Ash	SINGLE(0.1)
Residues from MRF	TRIANGULAR(50.0, 55.0, 57.0)
Recycling Schemes	UNIFORM(0.5, 0.9)
2011	
Domestic	TRIANGULAR(11.0, 14.0, 17.0)
Commercial	UNIFORM(0.0, 2.0)
Industrial	TRIANGULAR(8.0, 10.0, 12.0)
Inert	TRIANGULAR(13.0, 16.0, 19.0)
Sewage Sludge	UNIFORM(1.5, 2.0)
Composted Organic Material	UNIFORM(1.0, 2.0)
Incinerator Ash	SINGLE(0.1)
Residues from MRF	TRIANGULAR(50.0, 55.0, 57.0)
Recycling Schemes	UNIFORM(0.5, 0.9)
2012	
Domestic	TRIANGULAR(11.0, 14.0, 17.0)
Commercial	UNIFORM(0.0, 2.0)
Industrial	TRIANGULAR(8.0, 10.0, 12.0)
Inert	TRIANGULAR(13.0, 16.0, 19.0)
Sewage Sludge	UNIFORM(1.5, 2.0)
Composted Organic Material	UNIFORM(1.0, 2.0)
Incinerator Ash	SINGLE(0.1)
Residues from MRF	TRIANGULAR(50.0, 55.0, 57.0)
Recycling Schemes	UNIFORM(0.5, 0.9)
2013	
Domestic	UNIFORM(10.0, 17.5)
Commercial	UNIFORM(0.0, 1.0)
Industrial	UNIFORM(5.0, 12.5)
Inert	TRIANGULAR(15.0, 29.0, 35.0)
Sewage Sludge	UNIFORM(1.5, 3.0)
Composted Organic Material	UNIFORM(0.0, 2.0)

Incinerator Ash	SINGLE(0.1)
Residues from MRF	UNIFORM(32.0, 51.0)
Recycling Schemes	UNIFORM(0.5, 5.5)
2014	
Domestic	TRIANGULAR(5.0, 10.0, 15.0)
Commercial	TRIANGULAR(5.0, 16.2, 20.0)
Industrial	UNIFORM(5.0, 12.5)
Inert	TRIANGULAR(35.0, 36.8, 40.0)
Sewage Sludge	TRIANGULAR(3.0, 3.7, 5.0)
Composted Organic Material	UNIFORM(0.0, 2.0)
Incinerator Ash	SINGLE(0.3)
Residues from MRF	TRIANGULAR(40.0, 41.0, 45.0)
Recycling Schemes	UNIFORM(0.0, 1.0)
2015	
Domestic	TRIANGULAR(5.0, 7.0, 10.0)
Commercial	TRIANGULAR(5.0, 16.2, 20.0)
Industrial	UNIFORM(5.0, 12.5)
Inert	TRIANGULAR(35.0, 36.8, 40.0)
Sewage Sludge	TRIANGULAR(3.0, 3.7, 5.0)
Composted Organic Material	UNIFORM(0.0, 2.0)
Incinerator Ash	SINGLE(0.3)
Residues from MRF	TRIANGULAR(40.0, 41.0, 45.0)
Recycling Schemes	UNIFORM(0.0, 1.0)
2016	
Domestic	TRIANGULAR(1.0, 5.0, 7.0)
Commercial	TRIANGULAR(5.0, 16.2, 20.0)
Industrial	TRIANGULAR(8.0, 10.0, 12.0)
Inert	TRIANGULAR(13.0, 16.0, 19.0)
Sewage Sludge	UNIFORM(1.5, 2.0)
Composted Organic Material	UNIFORM(1.0, 2.0)
Incinerator Ash	SINGLE(0.1)
Residues from MRF	TRIANGULAR(50.0, 55.0, 57.0)
Recycling Schemes	UNIFORM(0.5, 0.9)
2017	
Domestic	TRIANGULAR(0.5, 2.0, 3.0)
Commercial	TRIANGULAR(5.0, 16.2, 20.0)
Industrial	TRIANGULAR(7.0, 9.6, 10.0)
Inert	TRIANGULAR(5.0, 6.8, 10.0)
Sewage Sludge	UNIFORM(0.0, 1.0)
Composted Organic Material	UNIFORM(1.0, 2.0)
Incinerator Ash	SINGLE(0.1)
Residues from MRF	TRIANGULAR(80.0, 83.6, 85.0)
Recycling Schemes	UNIFORM(0.5, 0.9)
2018	
Domestic	TRIANGULAR(0.5, 1.0, 3.0)
Commercial	TRIANGULAR(5.0, 16.2, 20.0)
Industrial	TRIANGULAR(7.0, 9.6, 10.0)
Inert	TRIANGULAR(5.0, 6.8, 10.0)
Sewage Sludge	UNIFORM(0.0, 1.0)
Composted Organic Material	UNIFORM(1.0, 2.0)
Incinerator Ash	SINGLE(0.1)
Residues from MRF	TRIANGULAR(80.0, 83.6, 85.0)
Recycling Schemes	UNIFORM(0.5, 0.9)
2019	
Domestic	TRIANGULAR(0.5, 1.0, 3.0)
Commercial	TRIANGULAR(5.0, 16.2, 20.0)
Industrial	TRIANGULAR(7.0, 9.6, 10.0)
Inert	TRIANGULAR(5.0, 6.8, 10.0)
Sewage Sludge	UNIFORM(0.0, 1.0)
Composted Organic Material	UNIFORM(1.0, 2.0)
Incinerator Ash	SINGLE(0.1)
Residues from MRF	TRIANGULAR(80.0, 83.6, 85.0)
Recycling Schemes	UNIFORM(0.5, 0.9)
2020	
Domestic	TRIANGULAR(0.5, 1.0, 3.0)
Commercial	UNIFORM(0.0, 2.0)
Industrial	TRIANGULAR(7.0, 9.6, 10.0)
Inert	TRIANGULAR(5.0, 6.8, 10.0)
Sewage Sludge	UNIFORM(0.0, 1.0)
Composted Organic Material	UNIFORM(1.0, 2.0)
Incinerator Ash	SINGLE(0.1)
Residues from MRF	TRIANGULAR(80.0, 83.6, 85.0)
Recycling Schemes	UNIFORM(0.5, 0.9)
2021	
Domestic	TRIANGULAR(0.5, 1.0, 3.0)
Commercial	UNIFORM(0.0, 2.0)
Industrial	TRIANGULAR(7.0, 9.6, 10.0)
Inert	TRIANGULAR(5.0, 6.8, 10.0)
Sewage Sludge	UNIFORM(0.0, 1.0)
Composted Organic Material	UNIFORM(1.0, 2.0)
Incinerator Ash	SINGLE(0.1)
Residues from MRF	TRIANGULAR(80.0, 83.6, 85.0)
Recycling Schemes	UNIFORM(0.5, 0.9)
2022	
Domestic	TRIANGULAR(0.5, 1.0, 3.0)
Commercial	UNIFORM(0.0, 2.0)

Industrial		TRIANGULAR(7.0, 9.6, 10.0)
Inert		TRIANGULAR(5.0, 6.8, 10.0)
Sewage Sludge		UNIFORM(0.0, 1.0)
Composted Organic Material		UNIFORM(1.0, 2.0)
Incinerator Ash		SINGLE(0.1)
Residues from MRF		TRIANGULAR(80.0, 83.6, 85.0)
Recycling Schemes		UNIFORM(0.5, 0.9)
2023		
Domestic		TRIANGULAR(0.5, 1.0, 3.0)
Commercial		UNIFORM(0.0, 2.0)
Industrial		TRIANGULAR(7.0, 9.6, 10.0)
Inert		TRIANGULAR(5.0, 6.8, 10.0)
Sewage Sludge		UNIFORM(0.0, 1.0)
Composted Organic Material		UNIFORM(1.0, 2.0)
Incinerator Ash		SINGLE(0.1)
Residues from MRF		TRIANGULAR(80.0, 83.6, 85.0)
Recycling Schemes		UNIFORM(0.5, 0.9)
Justification:	[Default]	Default Value

Trace Gases

Source Gases	Concentration [mg/m3]
Acetalehyde (ethanal)	LOGUNIFORM(0.075, 2.546)
Benzene	LOGTRIANGULAR(3.1, 15.0, 73.0)
Butadiene (modelled as 1,3-Butadiene)	LOGUNIFORM(1.00E-30, 2.00E-02)
Butene isomers	LOGTRIANGULAR(1.00E-03, 2.00E-01, 1.80E+00)
Carbon disulphide	LOGUNIFORM(0.9, 170.0)
Carbon monoxide	LOGTRIANGULAR(0.11, 1.1, 5000.0)
Carbon tetrachloride (tetrachloromethane)	LOGUNIFORM(1.00E-30, 2.00E-02)
Chlorobenzene	LOGUNIFORM(0.002, 3000.0)
Chlorofluorocarbons (CFCs) (Total)	LOGTRIANGULAR(0.06, 102.3, 1230.0)
Chloroform (trichloromethane)	LOGTRIANGULAR(1.00E-03, 2.00E-01, 7.00E+01)
Dichloromethane (methylene chloride)	LOGTRIANGULAR(1.00E-03, 2.00E-02, 1.52E+03)
Dimethyl disulphide	LOGTRIANGULAR(0.03, 0.17, 12.0)
Ethyl toluene (all isomers)	LOGTRIANGULAR(1.00E-03, 1.00E-02, 8.30E+00)
Ethylene	UNIFORM(0.2, 5.8)
Ethylene dichloride	LOGTRIANGULAR(0.006, 0.01, 1820.0)
Formaldehyde (methanal)	LOGTRIANGULAR(0.026, 0.068, 0.188)
Halons	SINGLE(0.0)
Hexachlorocyclohexane (all isomers)	SINGLE(0.0)
Hydrochlorofluorocarbons (HCFCs) (Total	LOGTRIANGULAR(0.02, 128.8, 916.2)
Hydrofluorocarbons (HFCs) (Total)	SINGLE(0.0)
Methyl chloride (chloromethane)	LOGTRIANGULAR(0.006, 0.2, 10.0)
Methyl chloroform (1,1,1-Trichloroethane)	LOGTRIANGULAR(1.00E-03, 1.80E+02, 1.60E+03)
PAH (reported as Naphthalene)	LOGTRIANGULAR(1.00E-03, 2.00E-01, 1.70E+01)
para-Dichlorobenzene (modelled as 1,4-Dichlorobenzene)	LOGTRIANGULAR(0.006, 0.05, 2.7)
Pentane	LOGTRIANGULAR(0.02, 0.3, 105.0)
Pentene (all isomers)	LOGTRIANGULAR(0.24, 3.5, 12.0)
Perfluorocarbons (PFCs) (Total)	SINGLE(0.0)
Phenol	SINGLE(0.0)
PM10s	SINGLE(0.0)
Tetrachloroethane (modelled as 1,1,2,2-Tetrachloroethane)	LOGUNIFORM(1.00E-03, 5.00E+01)
Tetrachloroethylene (Tetrachloroethene)	LOGTRIANGULAR(1.00E-03, 1.00E-02, 7.70E+03)
Toluene	LOGTRIANGULAR(0.01, 0.1, 1250.0)
Trichlorobenzene (all isomers)	LOGTRIANGULAR(0.01, 0.01, 0.13)
Trichloroethylene (trichloroethene)	LOGTRIANGULAR(0.25, 1.65, 88.0)
Trimethylbenzene (all isomers)	LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.87E+02)
Vinyl chloride (chloroethene, chloroethylene)	LOGTRIANGULAR(1.1, 31.0, 730.0)
Xylene (all isomers)	LOGTRIANGULAR(1.00E-03, 1.00E-03, 6.18E+04)
Justification: [Default]	Default Value
VOC Halflife	NORMAL(4.11, 1.56)
Justification: [Default]	Default Value

Waste Moisture Content

Degradation rate - Filling Phase		User Defined 2
Justification:	[Changed]	based on wet
Degradation rate - after change		Wet
Justification:	[Changed]	based on avergae to wet
Waste Density		UNIFORM(0.8, 1.2)
Justification:	[Default]	Default Value
Leachate Head		SINGLE(1.0)
Justification:	[Default]	Default Value
Hydraulic Conductivity		LOGUNIFORM(1.00E-09, 1.00E-05)
Justification:	[Default]	Default Value

Engineered Controls

Cap		Single Liner
Cap Thickness		SINGLE(1.00E-03)
Cap Hydraulic Conductivity		SINGLE(1.00E-09)
Justifications		
Cap	[Changed]	minimum requirement
Cap Thickness	[Changed]	design specification
Cap Hydraulic Conductivity	[Changed]	minimum requirement
liner		Single Clay
Liner Thickness		SINGLE(3.0)
Liner Hydraulic Conductivity		LOGUNIFORM(8.90E-11, 1.00E-09)
Justifications		

Liner	[Changed]	CQA Plan
Liner Thickness	[Changed]	CQA Plan
Liner Hydraulic Conductivit	[Changed]	minimum requirement
Justification:	[Default]	Default Value
Methane Oxidation %		SINGLE(10.0)
Justification:	[Default]	Default Value
Land Raise Depth		#UNDEFINED?

Geosphere

Ground Surface (mAOD)		0
Water Table (mAOD)		0
Geosphere Moisture Content		UNIFORM(10.0, 30.0)
Geosphere Porosity		UNIFORM(15.0, 35.0)

Cell 3

Infiltration		NORMAL(620.0, 100.0)
Justification:	[Changed]	Not Justified

Waste Input

Year		AmountDepositied (t)
2007		SINGLE(0.0)
2008		SINGLE(0.0)
2009		SINGLE(6.43E+04)
2010		SINGLE(6.37E+04)
2011		SINGLE(6.47E+04)
2012		SINGLE(4.90E+04)
2013		SINGLE(6.23E+04)
2014		SINGLE(5.17E+04)
2015		SINGLE(5.33E+04)
2016		SINGLE(5.42E+04)
2017		SINGLE(7.60E+04)
2018		SINGLE(8.33E+04)
2019		SINGLE(1.00E+05)
2020		SINGLE(0.0)
2021		SINGLE(1.00E+05)
2022		SINGLE(1.33E+05)
2023		SINGLE(0.0)
Justification:	[Changed]	Not Justified

Waste Breakdown

2007

Domestic	SINGLE(15.0)
Industrial	SINGLE(10.0)
Inert	SINGLE(18.0)
Sewage Sludge	SINGLE(1.5)
Composted Organic Material	SINGLE(0.5)
Residues from MRF	SINGLE(55.0)

2008

Domestic	SINGLE(15.0)
Industrial	SINGLE(10.0)
Inert	SINGLE(18.0)
Sewage Sludge	SINGLE(1.5)
Composted Organic Material	SINGLE(0.5)
Residues from MRF	SINGLE(55.0)

2009

Domestic	SINGLE(17.6)
Commercial	SINGLE(1.8)
Industrial	SINGLE(12.6)
Inert	SINGLE(13.1)
Sewage Sludge	SINGLE(2.0)
Composted Organic Material	SINGLE(1.5)
Incinerator Ash	SINGLE(0.1)
Residues from MRF	SINGLE(50.8)
Recycling Schemes	SINGLE(0.5)

2010

Domestic	TRIANGULAR(11.0, 14.0, 17.0)
Commercial	UNIFORM(0.0, 2.0)
Industrial	TRIANGULAR(8.0, 10.0, 12.0)
Inert	TRIANGULAR(13.0, 16.0, 19.0)
Sewage Sludge	UNIFORM(1.5, 2.0)
Composted Organic Material	UNIFORM(1.0, 2.0)
Incinerator Ash	SINGLE(0.1)
Residues from MRF	TRIANGULAR(50.0, 55.0, 57.0)
Recycling Schemes	UNIFORM(0.5, 0.9)

2011

Domestic	TRIANGULAR(11.0, 14.0, 17.0)
Commercial	UNIFORM(0.0, 2.0)
Industrial	TRIANGULAR(8.0, 10.0, 12.0)
Inert	TRIANGULAR(13.0, 16.0, 19.0)
Sewage Sludge	UNIFORM(1.5, 2.0)
Composted Organic Material	UNIFORM(1.0, 2.0)
Incinerator Ash	SINGLE(0.1)
Residues from MRF	TRIANGULAR(50.0, 55.0, 57.0)
Recycling Schemes	UNIFORM(0.5, 0.9)

2012

Domestic	TRIANGULAR(11.0, 14.0, 17.0)
Commercial	UNIFORM(0.0, 2.0)
Industrial	TRIANGULAR(8.0, 10.0, 12.0)

Inert	TRIANGULAR(13.0, 16.0, 19.0)
Sewage Sludge	UNIFORM(1.5, 2.0)
Composted Organic Material	UNIFORM(1.0, 2.0)
Incinerator Ash	SINGLE(0.1)
Residues from MRF	TRIANGULAR(50.0, 55.0, 57.0)
Recycling Schemes	UNIFORM(0.5, 0.9)
2013	
Domestic	UNIFORM(10.0, 17.5)
Commercial	UNIFORM(0.0, 1.0)
Industrial	UNIFORM(5.0, 12.5)
Inert	TRIANGULAR(15.0, 29.0, 35.0)
Sewage Sludge	UNIFORM(1.5, 3.0)
Composted Organic Material	UNIFORM(0.0, 2.0)
Incinerator Ash	SINGLE(0.1)
Residues from MRF	UNIFORM(32.0, 51.0)
Recycling Schemes	UNIFORM(0.5, 5.5)
2014	
Domestic	TRIANGULAR(5.0, 10.0, 15.0)
Commercial	TRIANGULAR(5.0, 16.2, 20.0)
Industrial	UNIFORM(5.0, 12.5)
Inert	TRIANGULAR(35.0, 36.8, 40.0)
Sewage Sludge	TRIANGULAR(3.0, 3.7, 5.0)
Composted Organic Material	UNIFORM(0.0, 2.0)
Incinerator Ash	SINGLE(0.3)
Residues from MRF	TRIANGULAR(40.0, 41.0, 45.0)
Recycling Schemes	UNIFORM(0.0, 1.0)
2015	
Domestic	TRIANGULAR(5.0, 7.0, 10.0)
Commercial	TRIANGULAR(5.0, 16.2, 20.0)
Industrial	UNIFORM(5.0, 12.5)
Inert	TRIANGULAR(35.0, 36.8, 40.0)
Sewage Sludge	TRIANGULAR(3.0, 3.7, 5.0)
Composted Organic Material	UNIFORM(0.0, 2.0)
Incinerator Ash	SINGLE(0.3)
Residues from MRF	TRIANGULAR(40.0, 41.0, 45.0)
Recycling Schemes	UNIFORM(0.0, 1.0)
2016	
Domestic	TRIANGULAR(1.0, 5.0, 7.0)
Commercial	TRIANGULAR(5.0, 16.2, 20.0)
Industrial	TRIANGULAR(8.0, 10.0, 12.0)
Inert	TRIANGULAR(13.0, 16.0, 19.0)
Sewage Sludge	UNIFORM(1.5, 2.0)
Composted Organic Material	UNIFORM(1.0, 2.0)
Incinerator Ash	SINGLE(0.1)
Residues from MRF	TRIANGULAR(50.0, 55.0, 57.0)
Recycling Schemes	UNIFORM(0.5, 0.9)
2017	
Domestic	TRIANGULAR(0.5, 2.0, 3.0)
Commercial	TRIANGULAR(5.0, 16.2, 20.0)
Industrial	TRIANGULAR(7.0, 9.6, 10.0)
Inert	TRIANGULAR(5.0, 6.8, 10.0)
Sewage Sludge	UNIFORM(0.0, 1.0)
Composted Organic Material	UNIFORM(1.0, 2.0)
Incinerator Ash	SINGLE(0.1)
Residues from MRF	TRIANGULAR(80.0, 83.6, 85.0)
Recycling Schemes	UNIFORM(0.5, 0.9)
2018	
Domestic	TRIANGULAR(0.5, 1.0, 3.0)
Commercial	TRIANGULAR(5.0, 16.2, 20.0)
Industrial	TRIANGULAR(7.0, 9.6, 10.0)
Inert	TRIANGULAR(5.0, 6.8, 10.0)
Sewage Sludge	UNIFORM(0.0, 1.0)
Composted Organic Material	UNIFORM(1.0, 2.0)
Incinerator Ash	SINGLE(0.1)
Residues from MRF	TRIANGULAR(80.0, 83.6, 85.0)
Recycling Schemes	UNIFORM(0.5, 0.9)
2019	
Domestic	TRIANGULAR(0.5, 1.0, 3.0)
Commercial	TRIANGULAR(5.0, 16.2, 20.0)
Industrial	TRIANGULAR(7.0, 9.6, 10.0)
Inert	TRIANGULAR(5.0, 6.8, 10.0)
Sewage Sludge	UNIFORM(0.0, 1.0)
Composted Organic Material	UNIFORM(1.0, 2.0)
Incinerator Ash	SINGLE(0.1)
Residues from MRF	TRIANGULAR(80.0, 83.6, 85.0)
Recycling Schemes	UNIFORM(0.5, 0.9)
2020	
Domestic	TRIANGULAR(0.5, 1.0, 3.0)
Commercial	UNIFORM(0.0, 2.0)
Industrial	TRIANGULAR(7.0, 9.6, 10.0)
Inert	TRIANGULAR(5.0, 6.8, 10.0)
Sewage Sludge	UNIFORM(0.0, 1.0)
Composted Organic Material	UNIFORM(1.0, 2.0)
Incinerator Ash	SINGLE(0.1)
Residues from MRF	TRIANGULAR(80.0, 83.6, 85.0)
Recycling Schemes	UNIFORM(0.5, 0.9)

2021		
Domestic		TRIANGULAR(0.5, 1.0, 3.0)
Commercial		UNIFORM(0.0, 2.0)
Industrial		TRIANGULAR(7.0, 9.6, 10.0)
Inert		TRIANGULAR(5.0, 6.8, 10.0)
Sewage Sludge		UNIFORM(0.0, 1.0)
Composted Organic Material		UNIFORM(1.0, 2.0)
Incinerator Ash		SINGLE(0.1)
Residues from MRF		TRIANGULAR(80.0, 83.6, 85.0)
Recycling Schemes		UNIFORM(0.5, 0.9)
2022		
Domestic		TRIANGULAR(0.5, 1.0, 3.0)
Commercial		UNIFORM(0.0, 2.0)
Industrial		TRIANGULAR(7.0, 9.6, 10.0)
Inert		TRIANGULAR(5.0, 6.8, 10.0)
Sewage Sludge		UNIFORM(0.0, 1.0)
Composted Organic Material		UNIFORM(1.0, 2.0)
Incinerator Ash		SINGLE(0.1)
Residues from MRF		TRIANGULAR(80.0, 83.6, 85.0)
Recycling Schemes		UNIFORM(0.5, 0.9)
2023		
Domestic		TRIANGULAR(0.5, 1.0, 3.0)
Commercial		UNIFORM(0.0, 2.0)
Industrial		TRIANGULAR(7.0, 9.6, 10.0)
Inert		TRIANGULAR(5.0, 6.8, 10.0)
Sewage Sludge		UNIFORM(0.0, 1.0)
Composted Organic Material		UNIFORM(1.0, 2.0)
Incinerator Ash		SINGLE(0.1)
Residues from MRF		TRIANGULAR(80.0, 83.6, 85.0)
Recycling Schemes		UNIFORM(0.5, 0.9)
Justification:	[Default]	Default Value

Trace Gases

Source Gases	Concentration [mg/m3]
Acetalehyde (ethanal)	LOGUNIFORM(0.075, 2.546)
Benzene	LOGTRIANGULAR(3.1, 15.0, 73.0)
Butadiene (modelled as 1,3-Butadiene)	LOGUNIFORM(1.00E-30, 2.00E-02)
Butene isomers	LOGTRIANGULAR(1.00E-03, 2.00E-01, 1.80E+00)
Carbon disulphide	LOGUNIFORM(0.9, 170.0)
Carbon monoxide	LOGTRIANGULAR(0.11, 1.1, 5000.0)
Carbon tetrachloride (tetrachloromethane)	LOGUNIFORM(1.00E-30, 2.00E-02)
Chlorobenzene	LOGUNIFORM(0.002, 3000.0)
Chlorofluorocarbons (CFCs) (Total)	LOGTRIANGULAR(0.06, 102.3, 1230.0)
Chloroform (trichloromethane)	LOGTRIANGULAR(1.00E-03, 2.00E-01, 7.00E+01)
Dichloromethane (methylene chloride)	LOGTRIANGULAR(1.00E-03, 2.00E-02, 1.52E+03)
Dimethyl disulphide	LOGTRIANGULAR(0.03, 0.17, 12.0)
Ethyl toluene (all isomers)	LOGTRIANGULAR(1.00E-03, 1.00E-02, 8.30E+00)
Ethylene	UNIFORM(0.2, 5.8)
Ethylene dichloride	LOGTRIANGULAR(0.006, 0.01, 1820.0)
Formaldehyde (methanal)	LOGTRIANGULAR(0.026, 0.068, 0.188)
Halons	SINGLE(0.0)
Hexachlorocyclohexane (all isomers)	SINGLE(0.0)
Hydrochlorofluorocarbons (HCFCs) (Total	LOGTRIANGULAR(0.02, 128.8, 916.2)
Hydrofluorocarbons (HFCs) (Total)	SINGLE(0.0)
Methyl chloride (chloromethane)	LOGTRIANGULAR(0.006, 0.2, 10.0)
Methyl chloroform (1,1,1-Trichloroethane)	LOGTRIANGULAR(1.00E-03, 1.80E+02, 1.60E+03)
PAH (reported as Naphthalene)	LOGTRIANGULAR(1.00E-03, 2.00E-01, 1.70E+01)
para-Dichlorobenzene (modelled as 1,4-Dichlorobenzene)	LOGTRIANGULAR(0.006, 0.05, 2.7)
Pentane	LOGTRIANGULAR(0.02, 0.3, 105.0)
Pentene (all isomers)	LOGTRIANGULAR(0.24, 3.5, 12.0)
Perfluorocarbons (PFCs) (Total)	SINGLE(0.0)
Phenol	SINGLE(0.0)
PM10s	SINGLE(0.0)
Tetrachloroethane (modelled as 1,1,2,2-Tetrachloroethane)	LOGUNIFORM(1.00E-03, 5.00E+01)
Tetrachloroethylene (Tetrachloroethene)	LOGTRIANGULAR(1.00E-03, 1.00E-02, 7.70E+03)
Toluene	LOGTRIANGULAR(0.01, 0.1, 1250.0)
Trichlorobenzene (all isomers)	LOGTRIANGULAR(0.01, 0.01, 0.13)
Trichloroethylene (trichloroethene)	LOGTRIANGULAR(0.25, 1.65, 88.0)
Trimethylbenzene (all isomers)	LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.87E+02)
Vinyl chloride (chloroethene, chloroethylene)	LOGTRIANGULAR(1.1, 31.0, 730.0)
Xylene (all isomers)	LOGTRIANGULAR(1.00E-03, 1.00E-03, 6.18E+04)
Justification: [Default]	Default Value
VOC Halflife	NORMAL(4.11, 1.56)
Justification: [Default]	Default Value

Waste Moisture Content

Degradation rate - Filling Phase		Wet
Justification:	[Changed]	based on wet
Degradation rate - after change		User Defined 2
Justification:	[Changed]	based on average to wet
Waste Density		UNIFORM(0.8, 1.2)
Justification:	[Default]	Default Value
Leachate Head		SINGLE(1.0)
Justification:	[Default]	Default Value
Hydraulic Conductivity		LOGUNIFORM(1.00E-09, 1.00E-05)

Justification:	[Default]	Default Value

Engineered Controls

Cap		Single Liner
Cap Thickness		SINGLE(1.00E-03)
Cap Hydraulic Conductivity		SINGLE(1.00E-09)
Justifications		
Cap	[Changed]	design specification
Cap Thickness	[Changed]	design specification
Cap Hydraulic Conductivity	[Changed]	minimum requirement
liner		Single Clay
Liner Thickness		SINGLE(3.0)
Liner Hydraulic Conductivity		LOGUNIFORM(8.90E-11, 1.00E-09)
Justifications		
Liner	[Changed]	CQA Plan
Liner Thickness	[Changed]	CQA PLan
Liner Hydraulic Conductivit	[Changed]	minimum requirement
Justification:	[Default]	Default Value
Methane Oxidation %		SINGLE(10.0)
Justification:	[Default]	Default Value
Land Raise Depth		#UNDEFINED?

Geosphere

Ground Surface (mAOD)		0
Water Table (mAOD)		0
Geosphere Moisture Content		UNIFORM(10.0, 30.0)
Geosphere Porosity		UNIFORM(15.0, 35.0)

Cell 4

Infiltration		NORMAL(620.0, 100.0)
Justification:	[Changed]	Not Justified

Waste Input

Year	AmountDepositied (t)
2007	SINGLE(0.0)
2008	SINGLE(0.0)
2009	SINGLE(0.0)
2010	SINGLE(0.0)
2011	SINGLE(6.47E+04)
2012	SINGLE(4.90E+04)
2013	SINGLE(6.23E+04)
2014	SINGLE(5.17E+04)
2015	SINGLE(5.33E+04)
2016	SINGLE(5.42E+04)
2017	SINGLE(7.60E+04)
2018	SINGLE(8.33E+04)
2019	SINGLE(1.00E+05)
2020	SINGLE(0.0)
2021	SINGLE(1.00E+05)
2022	SINGLE(1.33E+05)
2023	SINGLE(2.00E+05)

Justification:	[Changed]	Not Justified

Waste Breakdown

2007

Domestic	SINGLE(15.0)
Industrial	SINGLE(10.0)
Inert	SINGLE(18.0)
Sewage Sludge	SINGLE(1.5)
Composted Organic Material	SINGLE(0.5)
Residues from MRF	SINGLE(55.0)

2008

Domestic	SINGLE(15.0)
Industrial	SINGLE(10.0)
Inert	SINGLE(18.0)
Sewage Sludge	SINGLE(1.5)
Composted Organic Material	SINGLE(0.5)
Residues from MRF	SINGLE(55.0)

2009

Domestic	SINGLE(17.6)
Commercial	SINGLE(1.8)
Industrial	SINGLE(12.6)
Inert	SINGLE(13.1)
Sewage Sludge	SINGLE(2.0)
Composted Organic Material	SINGLE(1.5)
Incinerator Ash	SINGLE(0.1)
Residues from MRF	SINGLE(50.8)
Recycling Schemes	SINGLE(0.5)

2010

Domestic	TRIANGULAR(11.0, 14.0, 17.0)
Commercial	UNIFORM(0.0, 2.0)
Industrial	TRIANGULAR(8.0, 10.0, 12.0)
Inert	TRIANGULAR(13.0, 16.0, 19.0)
Sewage Sludge	UNIFORM(1.5, 2.0)
Composted Organic Material	UNIFORM(1.0, 2.0)
Incinerator Ash	SINGLE(0.1)
Residues from MRF	TRIANGULAR(50.0, 55.0, 57.0)
Recycling Schemes	UNIFORM(0.5, 0.9)

2011

Domestic	TRIANGULAR(11.0, 14.0, 17.0)
Commercial	UNIFORM(0.0, 2.0)
Industrial	TRIANGULAR(8.0, 10.0, 12.0)
Inert	TRIANGULAR(13.0, 16.0, 19.0)
Sewage Sludge	UNIFORM(1.5, 2.0)
Composted Organic Material	UNIFORM(1.0, 2.0)
Incinerator Ash	SINGLE(0.1)
Residues from MRF	TRIANGULAR(50.0, 55.0, 57.0)
Recycling Schemes	UNIFORM(0.5, 0.9)
2012	
Domestic	TRIANGULAR(11.0, 14.0, 17.0)
Commercial	UNIFORM(0.0, 2.0)
Industrial	TRIANGULAR(8.0, 10.0, 12.0)
Inert	TRIANGULAR(13.0, 16.0, 19.0)
Sewage Sludge	UNIFORM(1.5, 2.0)
Composted Organic Material	UNIFORM(1.0, 2.0)
Incinerator Ash	SINGLE(0.1)
Residues from MRF	TRIANGULAR(50.0, 55.0, 57.0)
Recycling Schemes	UNIFORM(0.5, 0.9)
2013	
Domestic	UNIFORM(10.0, 17.5)
Commercial	UNIFORM(0.0, 1.0)
Industrial	UNIFORM(5.0, 12.5)
Inert	TRIANGULAR(15.0, 29.0, 35.0)
Sewage Sludge	UNIFORM(1.5, 3.0)
Composted Organic Material	UNIFORM(0.0, 2.0)
Incinerator Ash	SINGLE(0.1)
Residues from MRF	UNIFORM(32.0, 51.0)
Recycling Schemes	UNIFORM(0.5, 5.5)
2014	
Domestic	TRIANGULAR(5.0, 10.0, 15.0)
Commercial	TRIANGULAR(5.0, 16.2, 20.0)
Industrial	UNIFORM(5.0, 12.5)
Inert	TRIANGULAR(35.0, 36.8, 40.0)
Sewage Sludge	TRIANGULAR(3.0, 3.7, 5.0)
Composted Organic Material	UNIFORM(0.0, 2.0)
Incinerator Ash	SINGLE(0.3)
Residues from MRF	TRIANGULAR(40.0, 41.0, 45.0)
Recycling Schemes	UNIFORM(0.0, 1.0)
2015	
Domestic	TRIANGULAR(5.0, 7.0, 10.0)
Commercial	TRIANGULAR(5.0, 16.2, 20.0)
Industrial	UNIFORM(5.0, 12.5)
Inert	TRIANGULAR(35.0, 36.8, 40.0)
Sewage Sludge	TRIANGULAR(3.0, 3.7, 5.0)
Composted Organic Material	UNIFORM(0.0, 2.0)
Incinerator Ash	SINGLE(0.3)
Residues from MRF	TRIANGULAR(40.0, 41.0, 45.0)
Recycling Schemes	UNIFORM(0.0, 1.0)
2016	
Domestic	TRIANGULAR(1.0, 5.0, 7.0)
Commercial	TRIANGULAR(5.0, 16.2, 20.0)
Industrial	TRIANGULAR(8.0, 10.0, 12.0)
Inert	TRIANGULAR(13.0, 16.0, 19.0)
Sewage Sludge	UNIFORM(1.5, 2.0)
Composted Organic Material	UNIFORM(1.0, 2.0)
Incinerator Ash	SINGLE(0.1)
Residues from MRF	TRIANGULAR(50.0, 55.0, 57.0)
Recycling Schemes	UNIFORM(0.5, 0.9)
2017	
Domestic	TRIANGULAR(0.5, 2.0, 3.0)
Commercial	TRIANGULAR(5.0, 16.2, 20.0)
Industrial	TRIANGULAR(7.0, 9.6, 10.0)
Inert	TRIANGULAR(5.0, 6.8, 10.0)
Sewage Sludge	UNIFORM(0.0, 1.0)
Composted Organic Material	UNIFORM(1.0, 2.0)
Incinerator Ash	SINGLE(0.1)
Residues from MRF	TRIANGULAR(80.0, 83.6, 85.0)
Recycling Schemes	UNIFORM(0.5, 0.9)
2018	
Domestic	TRIANGULAR(0.5, 1.0, 3.0)
Commercial	TRIANGULAR(5.0, 16.2, 20.0)
Industrial	TRIANGULAR(7.0, 9.6, 10.0)
Inert	TRIANGULAR(5.0, 6.8, 10.0)
Sewage Sludge	UNIFORM(0.0, 1.0)
Composted Organic Material	UNIFORM(1.0, 2.0)
Incinerator Ash	SINGLE(0.1)
Residues from MRF	TRIANGULAR(80.0, 83.6, 85.0)
Recycling Schemes	UNIFORM(0.5, 0.9)
2019	
Domestic	TRIANGULAR(0.5, 1.0, 3.0)
Commercial	TRIANGULAR(5.0, 16.2, 20.0)
Industrial	TRIANGULAR(7.0, 9.6, 10.0)
Inert	TRIANGULAR(5.0, 6.8, 10.0)
Sewage Sludge	UNIFORM(0.0, 1.0)
Composted Organic Material	UNIFORM(1.0, 2.0)

Incinerator Ash	SINGLE(0.1)
Residues from MRF	TRIANGULAR(80.0, 83.6, 85.0)
Recycling Schemes	UNIFORM(0.5, 0.9)
2020	
Domestic	TRIANGULAR(0.5, 1.0, 3.0)
Commercial	UNIFORM(0.0, 2.0)
Industrial	TRIANGULAR(7.0, 9.6, 10.0)
Inert	TRIANGULAR(5.0, 6.8, 10.0)
Sewage Sludge	UNIFORM(0.0, 1.0)
Composted Organic Material	UNIFORM(1.0, 2.0)
Incinerator Ash	SINGLE(0.1)
Residues from MRF	TRIANGULAR(80.0, 83.6, 85.0)
Recycling Schemes	UNIFORM(0.5, 0.9)
2021	
Domestic	TRIANGULAR(0.5, 1.0, 3.0)
Commercial	UNIFORM(0.0, 2.0)
Industrial	TRIANGULAR(7.0, 9.6, 10.0)
Inert	TRIANGULAR(5.0, 6.8, 10.0)
Sewage Sludge	UNIFORM(0.0, 1.0)
Composted Organic Material	UNIFORM(1.0, 2.0)
Incinerator Ash	SINGLE(0.1)
Residues from MRF	TRIANGULAR(80.0, 83.6, 85.0)
Recycling Schemes	UNIFORM(0.5, 0.9)
2022	
Domestic	TRIANGULAR(0.5, 1.0, 3.0)
Commercial	UNIFORM(0.0, 2.0)
Industrial	TRIANGULAR(7.0, 9.6, 10.0)
Inert	TRIANGULAR(5.0, 6.8, 10.0)
Sewage Sludge	UNIFORM(0.0, 1.0)
Composted Organic Material	UNIFORM(1.0, 2.0)
Incinerator Ash	SINGLE(0.1)
Residues from MRF	TRIANGULAR(80.0, 83.6, 85.0)
Recycling Schemes	UNIFORM(0.5, 0.9)
2023	
Domestic	TRIANGULAR(0.5, 1.0, 3.0)
Commercial	UNIFORM(0.0, 2.0)
Industrial	TRIANGULAR(7.0, 9.6, 10.0)
Inert	TRIANGULAR(5.0, 6.8, 10.0)
Sewage Sludge	UNIFORM(0.0, 1.0)
Composted Organic Material	UNIFORM(1.0, 2.0)
Incinerator Ash	SINGLE(0.1)
Residues from MRF	TRIANGULAR(80.0, 83.6, 85.0)
Recycling Schemes	UNIFORM(0.5, 0.9)
Justification: [Default]	Default Value

Trace Gases

Source Gases	Concentration [mg/m3]
Acetalehyde (ethanal)	LOGUNIFORM(0.075, 2.546)
Benzene	LOGTRIANGULAR(3.1, 15.0, 73.0)
Butadiene (modelled as 1,3-Butadiene)	LOGUNIFORM(1.00E-30, 2.00E-02)
Butene isomers	LOGTRIANGULAR(1.00E-03, 2.00E-01, 1.80E+00)
Carbon disulphide	LOGUNIFORM(0.9, 170.0)
Carbon monoxide	LOGTRIANGULAR(0.11, 1.1, 5000.0)
Carbon tetrachloride (tetrachloromethane)	LOGUNIFORM(1.00E-30, 2.00E-02)
Chlorobenzene	LOGUNIFORM(0.002, 3000.0)
Chlorofluorocarbons (CFCs) (Total)	LOGTRIANGULAR(0.06, 102.3, 1230.0)
Chloroform (trichloromethane)	LOGTRIANGULAR(1.00E-03, 2.00E-01, 7.00E+01)
Dichloromethane (methylene chloride)	LOGTRIANGULAR(1.00E-03, 2.00E-02, 1.52E+03)
Dimethyl disulphide	LOGTRIANGULAR(0.03, 0.17, 12.0)
Ethyl toluene (all isomers)	LOGTRIANGULAR(1.00E-03, 1.00E-02, 8.30E+00)
Ethylene	UNIFORM(0.2, 5.8)
Ethylene dichloride	LOGTRIANGULAR(0.006, 0.01, 1820.0)
Formaldehyde (methanal)	LOGTRIANGULAR(0.026, 0.068, 0.188)
Halons	SINGLE(0.0)
Hexachlorocyclohexane (all isomers)	SINGLE(0.0)
Hydrochlorofluorocarbons (HCFCs) (Total	LOGTRIANGULAR(0.02, 128.8, 916.2)
Hydrofluorocarbons (HFCs) (Total)	SINGLE(0.0)
Methyl chloride (chloromethane)	LOGTRIANGULAR(0.006, 0.2, 10.0)
Methyl chloroform (1,1,1-Trichloroethane)	LOGTRIANGULAR(1.00E-03, 1.80E+02, 1.60E+03)
PAH (reported as Naphthalene)	LOGTRIANGULAR(1.00E-03, 2.00E-01, 1.70E+01)
para-Dichlorobenzene (modelled as 1,4-Dichlorobenzene)	LOGTRIANGULAR(0.006, 0.05, 2.7)
Pentane	LOGTRIANGULAR(0.02, 0.3, 105.0)
Pentene (all isomers)	LOGTRIANGULAR(0.24, 3.5, 12.0)
Perfluorocarbons (PFCs) (Total)	SINGLE(0.0)
Phenol	SINGLE(0.0)
PM10s	SINGLE(0.0)
Tetrachloroethane (modelled as 1,1,2,2-Tetrachloroethane)	LOGUNIFORM(1.00E-03, 5.00E+01)
Tetrachloroethylene (Tetrachloroethene)	LOGTRIANGULAR(1.00E-03, 1.00E-02, 7.70E+03)
Toluene	LOGTRIANGULAR(0.01, 0.1, 1250.0)
Trichlorobenzene (all isomers)	LOGTRIANGULAR(0.01, 0.01, 0.13)
Trichloroethylene (trichloroethene)	LOGTRIANGULAR(0.25, 1.65, 88.0)
Trimethylbenzene (all isomers)	LOGTRIANGULAR(1.00E-03, 1.00E-02, 1.87E+02)
Vinyl chloride (chloroethene, chloroethylene)	LOGTRIANGULAR(1.1, 31.0, 730.0)
Xylene (all isomers)	LOGTRIANGULAR(1.00E-03, 1.00E-03, 6.18E+04)

Justification:	[Default]	Default Value
VOC Halflife		NORMAL(4.11, 1.56)
Justification:	[Default]	Default Value

Waste Moisture Content

Degradation rate - Filling Phase		Wet
Justification:	[Changed]	based on wet
Degradation rate - after change		User Defined 2
Justification:	[Changed]	based on average to wet
Waste Density		UNIFORM(0.8, 1.2)
Justification:	[Default]	Default Value
Leachate Head		SINGLE(1.0)
Justification:	[Default]	Default Value
Hydraulic Conductivity		LOGUNIFORM(1.00E-09, 1.00E-05)
Justification:	[Default]	Default Value

Engineered Controls

Cap		Single Liner
Cap Thickness		SINGLE(1.00E-03)
Cap Hydraulic Conductivity		SINGLE(1.00E-09)
Justifications		
Cap	[Changed]	design specification
Cap Thickness	[Changed]	design specification
Cap Hydraulic Conductivity	[Changed]	minimum requirement
liner		Single Clay
Liner Thickness		SINGLE(3.0)
Liner Hydraulic Conductivity		LOGUNIFORM(8.90E-11, 1.00E-09)
Justifications		
Liner	[Changed]	CQA Plan
Liner Thickness	[Changed]	CQA PLan
Liner Hydraulic Conductivit	[Changed]	minimum requirement
Justification:	[Default]	Default Value
Methane Oxidation %		SINGLE(10.0)
Justification:	[Default]	Default Value
Land Raise Depth		#UNDEFINED?

Geosphere

Ground Surface (mAOD)	0
Water Table (mAOD)	0
Geosphere Moisture Content	UNIFORM(10.0, 30.0)
Geosphere Porosity	UNIFORM(15.0, 35.0)

Site Characteristics

Proportion to CO2 [%]		UNIFORM(31.0, 41.0)
Justification:	[Changed]	CLP info
Proportion to CH4 [%]		UNIFORM(49.0, 60.0)
Justification:	[Changed]	CLP info

Cellulose Decay Rates

		Slow	Moderate	Fast
Dry		SINGLE(0.013)	SINGLE(0.046)	SINGLE(0.076)
Average		SINGLE(0.046)	SINGLE(0.076)	SINGLE(0.116)
Wet		SINGLE(0.076)	SINGLE(0.116)	SINGLE(0.694)
Saturated		SINGLE(0.013)	SINGLE(0.046)	SINGLE(0.076)
User Defined 1		SINGLE(0.046)	UNIFORM(0.046, 0.076)	UNIFORM(0.076, 0.116)
User Defined 2		UNIFORM(0.046, 0.076)	UNIFORM(0.076, 0.116)	UNIFORM(0.116, 0.694)
Justification:	[Default]	Default Value		

Gas Plant

Engine A1 (J320)		Spark Egnition Engine	
January 2011 to December 2100		300 to 745	Downtime [%]: UNIFORM(3.0, 5.0)
Justification:	[Changed]	CLP Info	
Destruction Efficiency CH4	[Default]	Default Value	
Destruction Efficiency H2	[Default]	Default Value	
Properties	[Changed]	CLP Info	
Engine A2 (J320)		Spark Egnition Engine	
January 2013 to December 2100		300 to 745	Downtime [%]: UNIFORM(3.0, 5.0)
Justification:	[Changed]	CLP Info	
Destruction Efficiency CH4	[Default]	Default Value	
Destruction Efficiency H2	[Default]	Default Value	
Properties	[Changed]	CLP Info	
Engine A4 (J320)		Spark Egnition Engine	
November 2017 to December 2100		300 to 745	Downtime [%]: UNIFORM(93.0, 95.0)
Justification:	[Changed]	CLP Info	
Destruction Efficiency CH4	[Default]	Default Value	
Destruction Efficiency H2	[Default]	Default Value	
Properties	[Changed]	CLP Info	
Flare A3		Flare	
April 2010 to December 2100		320 to 2000	Downtime [%]: UNIFORM(98.0, 100.0)
Justification:	[Changed]	CLP Info	
Destruction Efficiency CH4	[Default]	Default Value	
Destruction Efficiency H2	[Default]	Default Value	
Properties	[Changed]	CLP Info	
Temporary Flare		Flare	
January 2016 to December 2100		40 to 200	Downtime [%]: UNIFORM(0.0, 3.0)
Justification:	[Changed]	CLP Info	
Destruction Efficiency CH4	[Default]	Default Value	
Destruction Efficiency H2	[Default]	Default Value	

Properties	[Changed]	CLP Info	
Initial Flare		Flare	
April 2009 to March 2010		100 to 500	Downtime [%]: UNIFORM(1.0, 3.0)
Justification:	[Changed]	CLP Info	
Destruction Efficiency CH4	[Default]	Default Value	
Destruction Efficiency H2	[Default]	Default Value	
Properties	[Changed]	CLP Info	
Engine/Flare Order	[Changed]	CLP info	

Trace Gas Plant

Acetalehyde (ethanal)		
Spark Egnition Engine :	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Benzene		
Spark Egnition Engine :	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Benzo(a)pyrene		
Spark Egnition Engine :	combustion products	LOGUNIFORM(1.10E-12, 9.60E-10)
Dual Fuel Engine:	combustion products	LOGUNIFORM(1.10E-12, 9.60E-10)
Other Engine:	combustion products	SINGLE(0.0)
Flare:	combustion products	LOGUNIFORM(1.00E-06, 6.00E-04)
Butadiene (modelled as 1,3-Butadiene)		
Spark Egnition Engine :	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Butene isomers		
Spark Egnition Engine :	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Carbon disulphide		
Spark Egnition Engine :	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Carbon monoxide		
Spark Egnition Engine :	combustion products	NORMAL(1.13E+03, 2.16E+02)
Dual Fuel Engine:	combustion products	NORMAL(971.0, 194.0)
Other Engine:	combustion products	NORMAL(1.18E+03, 2.36E+02)
Flare:	combustion products	NORMAL(3.52, 0.7)
Carbon tetrachloride (tetrachloromethane)		
Spark Egnition Engine :	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Chlorobenzene		
Spark Egnition Engine :	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Chlorofluorocarbons (CFCs) (Total)		
Spark Egnition Engine :	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Chloroform (trichloromethane)		
Spark Egnition Engine :	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Dichloromethane (methylene chloride)		
Spark Egnition Engine :	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Dimethyl disulphide		
Spark Egnition Engine :	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Dioxins and furans (modelled as 2,3,7,8-TCDD)		
Spark Egnition Engine :	combustion products	LOGUNIFORM(7.00E-10, 2.30E-06)
Dual Fuel Engine:	combustion products	LOGUNIFORM(7.00E-10, 2.30E-06)
Other Engine:	combustion products	SINGLE(0.36)
Flare:	combustion products	NORMAL(0.71, 0.14)
Ethyl toluene (all isomers)		
Spark Egnition Engine :	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Ethylene		
Spark Egnition Engine :	non-combustion products	SINGLE(99.0)

Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Ethylene dichloride		
Spark Egnition Engine :	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Formaldehyde (methanal)		
Spark Egnition Engine :	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Halons		
Spark Egnition Engine :	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Hexachlorocyclohexane (all isomers)		
Spark Egnition Engine :	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Hydrochlorofluorocarbons (HCFCs) (Total)		
Spark Egnition Engine :	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Hydrofluorocarbons (HFCs) (Total)		
Spark Egnition Engine :	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Hydrogen chloride, or (Total chloride (reported as HCl))		
Spark Egnition Engine :	combustion products	LOGTRIANGULAR(5.00E-04, 1.00E+01, 5.84E+02)
Dual Fuel Engine:	combustion products	SINGLE(0.0)
Other Engine:	combustion products	SINGLE(0.0)
Flare:	combustion products	SINGLE(0.0)
Hydrogen fluoride, or (Total fluoride (reported as HF))		
Spark Egnition Engine :	combustion products	LOGTRIANGULAR(2.00E-04, 7.00E+00, 4.50E+01)
Dual Fuel Engine:	combustion products	SINGLE(0.0)
Other Engine:	combustion products	SINGLE(0.0)
Flare:	combustion products	SINGLE(0.0)
Methyl chloride (chloromethane)		
Spark Egnition Engine :	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Methyl chloroform (1,1,1-Trichloroethane)		
Spark Egnition Engine :	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Nitrogen dioxide (NO2)		
Spark Egnition Engine :	combustion products	NORMAL(670.0, 201.0)
Dual Fuel Engine:	combustion products	NORMAL(647.0, 194.0)
Other Engine:	combustion products	NORMAL(541.0, 162.0)
Flare:	combustion products	NORMAL(78.8, 23.6)
Nitrogen monoxide (NO)		
Spark Egnition Engine :	combustion products	SINGLE(0.0)
Dual Fuel Engine:	combustion products	SINGLE(0.0)
Other Engine:	combustion products	SINGLE(0.0)
Flare:	combustion products	SINGLE(0.0)
Nitrogen oxides (NOx)		
Spark Egnition Engine :	combustion products	NORMAL(670.0, 201.0)
Dual Fuel Engine:	combustion products	NORMAL(647.0, 194.0)
Other Engine:	combustion products	NORMAL(541.0, 162.0)
Flare:	combustion products	NORMAL(78.8, 23.6)
PAH (reported as Naphthalene)		
Spark Egnition Engine :	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
para-Dichlorobenzene (modelled as 1,4-Dichlorobenzene)		
Spark Egnition Engine :	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Pentane		
Spark Egnition Engine :	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Pentene (all isomers)		
Spark Egnition Engine :	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)

Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Perfluorocarbons (PFCs) (Total)		
Spark Egnition Engine :	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Phenol		
Spark Egnition Engine :	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
PM10s		
Spark Egnition Engine :	combustion products	TRIANGULAR(1.2, 4.6, 12.5)
Dual Fuel Engine:	combustion products	SINGLE(0.0)
Other Engine:	combustion products	SINGLE(0.0)
Flare:	combustion products	UNIFORM(1.0, 10.0)
Sulphur dioxide		
Spark Egnition Engine :	combustion products	SINGLE(0.0)
Dual Fuel Engine:	combustion products	SINGLE(0.0)
Other Engine:	combustion products	SINGLE(0.0)
Flare:	combustion products	SINGLE(0.0)
Tetrachloroethane (modelled as 1,1,2,2-Tetrachloroethane)		
Spark Egnition Engine :	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Tetrachloroethylene (Tetrachloroethene)		
Spark Egnition Engine :	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Toluene		
Spark Egnition Engine :	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Total non-methane volatile organic compounds (NMVOCs)		
Spark Egnition Engine :	combustion products	SINGLE(0.0)
Dual Fuel Engine:	combustion products	SINGLE(0.0)
Other Engine:	combustion products	SINGLE(0.0)
Flare:	combustion products	SINGLE(0.0)
Total volatile organic compounds (VOCs)		
Spark Egnition Engine :	combustion products	NORMAL(618.0, 217.0)
Dual Fuel Engine:	combustion products	NORMAL(439.0, 175.0)
Other Engine:	combustion products	NORMAL(959.0, 383.0)
Flare:	combustion products	NORMAL(3.68, 1.47)
Trichlorobenzene (all isomers)		
Spark Egnition Engine :	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Trichloroethylene (trichloroethene)		
Spark Egnition Engine :	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Trimethylbenzene (all isomers)		
Spark Egnition Engine :	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Vinyl chloride (chloroethene, chloroethylene)		
Spark Egnition Engine :	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Xylene (all isomers)		
Spark Egnition Engine :	non-combustion products	SINGLE(99.0)
Dual Fuel Engine:	non-combustion products	SINGLE(99.0)
Other Engine:	non-combustion products	SINGLE(99.0)
Flare:	non-combustion products	SINGLE(99.0)
Justification: [Changed]	Not Justified	

Global Impact

Bulk Gases

Global Warming Potential		
Carbon Dioxide [t]:		1
Methane [t carbon dioxoide]:		21
Hydrogen [t carbon dioxide]:		0
Justification:	[Default]	Default Value
Ozone Depletion Potential		
Carbon Dioxide [t trichlorofluoromethane]:		0
Methane [t trichlorofluoromethane]:		0
Hydrogen [t trichlorofluoromethane]:		0
Justification:	[Default]	Default Value

Trace Gases

Gas	Global Warming Potential	Ozone Depletion Potential
Acetalehyde (ethanal)	1.3	0
Benzene	0	0
Benzo(a)pyrene	0	0
Butadiene (modelled as 1,3-Butadiene)	0	0
Butene isomers	0	0
Carbon disulphide	0	0
Carbon monoxide	0	0
Carbon tetrachloride (tetrachloromethane)	1400	0.73
Chlorobenzene	0	0
Chlorofluorocarbons (CFCs) (Total)	0	0
Chloroform (trichloromethane)	30	0
Dichloromethane (methylene chloride)	9	0
Dimethyl disulphide	0	0
Dioxins and furans (modelled as 2,3,7,8-TCDD)	0	0
Ethyl toluene (all isomers)	0	0
Ethylene	3.7	0
Ethylene dichloride	0	0
Formaldehyde (methanal)	0	0
Halons	0	0
Hexachlorocyclohexane (all isomers)	0	0
Hydrochlorofluorocarbons (HCFCs) (Total	0	0
Hydrofluorocarbons (HFCs) (Total)	0	0
Hydrogen chloride, or (Total chloride (reported as HCl))	0	0
Hydrogen fluoride, or (Total fluoride (reported as HF))	0	0
Methyl chloride (chloromethane)	146	0
Methyl chloroform (1,1,1-Trichloroethane)	0	0
Nitrogen dioxide (NO2)	0	0
Nitrogen monoxide (NO)	0	0
Nitrogen oxides (NOx)	0	0
PAH (reported as Naphthalene)	0	0
para-Dichlorobenzene (modelled as 1,4-Dichlorobenzene)	0	0
Pentane	0	0
Pentene (all isomers)	0	0
Perfluorocarbons (PFCs) (Total)	0	0
Phenol	0	0
PM10s	0	0
Sulphur dioxide	0	0
Tetrachloroethane (modelled as 1,1,2,2-Tetrachloroethane)	0	0
Tetrachloroethylene (Tetrachloroethene)	0	0
Toluene	2.7	0
Total non-methane volatile organic compounds (NMVOCs)	0	0
Total volatile organic compounds (VOCs)	0	0
Trichlorobenzene (all isomers)	0	0
Trichloroethylene (trichloroethene)	0	0
Trimethylbenzene (all isomers)	0	0
Vinyl chloride (chloroethene, chloroethylene)	0	0
Xylene (all isomers)	0	0

Lateral Migration

Bulk Gases

Air Diffusion Coefficients		
CO2 Dispersivity		SINGLE(0.1613)
CH4 Dispersivity		SINGLE(0.2192)
H2 Dispersivity		#UNDEFINED?
Justification:	[Default]	Default values

Geosphere

Cell	Cell 2
Geosphere Moisture Content	UNIFORM(10.0, 30.0)
Geosphere Porosity	UNIFORM(15.0, 35.0)
Cell	Cell 1 defined
Geosphere Moisture Content	UNIFORM(10.0, 30.0)
Geosphere Porosity	UNIFORM(15.0, 35.0)
Cell	Cell 3
Geosphere Moisture Content	UNIFORM(10.0, 30.0)
Geosphere Porosity	UNIFORM(15.0, 35.0)
Cell	Cell 4
Geosphere Moisture Content	UNIFORM(10.0, 30.0)
Geosphere Porosity	UNIFORM(15.0, 35.0)
Justification: [Changed]	LFG RA 2010

Trace Gases

Gas	Air Diffusion Coefficient
Acetalehyde (ethanal)	SINGLE(0.1235)
Benzene	SINGLE(0.088)
Benzo(a)pyrene	SINGLE(0.043)
Butadiene (modelled as 1,3-Butadiene)	SINGLE(0.102)
Butene isomers	SINGLE(0.0977)
Carbon disulphide	SINGLE(0.108)

Carbon monoxide		SINGLE(0.2013)
Carbon tetrachloride (tetrachloromethane)		SINGLE(0.078)
Chlorobenzene		SINGLE(0.073)
Chlorofluorocarbons (CFCs) (Total)		SINGLE(0.0826)
Chloroform (trichloromethane)		SINGLE(0.104)
Dichloromethane (methylene chloride)		SINGLE(0.099)
Dimethyl disulphide		SINGLE(0.0898)
Dioxins and furans (modelled as 2,3,7,8-TCDD)		SINGLE(0.104)
Ethyl toluene (all isomers)		SINGLE(0.0796)
Ethylene		SINGLE(0.0796)
Ethylene dichloride		SINGLE(0.104)
Formaldehyde (methanal)		SINGLE(0.1591)
Halons		SINGLE(0.0754)
Hexachlorocyclohexane (all isomers)		#UNDEFINED?
Hydrochlorofluorocarbons (HCFCs) (Total		SINGLE(0.0967)
Hydrofluorocarbons (HFCs) (Total)		#UNDEFINED?
Hydrogen chloride, or (Total chloride (reported as HCl))		SINGLE(0.1763)
Hydrogen fluoride, or (Total fluoride (reported as HF))		SINGLE(0.2081)
Methyl chloride (chloromethane)		SINGLE(0.1724)
Methyl chloroform (1,1,1-Trichloroethane)		SINGLE(0.078)
Nitrogen dioxide (NO2)		SINGLE(0.2276)
Nitrogen monoxide (NO)		SINGLE(0.2276)
Nitrogen oxides (NOx)		SINGLE(0.2276)
PAH (reported as Naphthalene)		SINGLE(0.059)
para-Dichlorobenzene (modelled as 1,4-Dichlorobenzene)		SINGLE(0.069)
Pentane		SINGLE(0.1999)
Pentene (all isomers)		SINGLE(0.1999)
Perfluorocarbons (PFCs) (Total)		SINGLE(0.071)
Phenol		#UNDEFINED?
PM10s		#UNDEFINED?
Sulphur dioxide		SINGLE(0.1289)
Tetrachloroethane (modelled as 1,1,2,2-Tetrachloroethane)		SINGLE(0.071)
Tetrachloroethylene (Tetrachloroethene)		SINGLE(0.072)
Toluene		SINGLE(0.087)
Total non-methane volatile organic compounds (NMVOCs)		#UNDEFINED?
Total volatile organic compounds (VOCs)		#UNDEFINED?
Trichlorobenzene (all isomers)		SINGLE(0.03)
Trichloroethylene (trichloroethene)		SINGLE(0.079)
Trimethylbenzene (all isomers)		SINGLE(0.0619)
Vinyl chloride (chloroethene, chloroethylene)		SINGLE(0.1126)
Xylene (all isomers)		SINGLE(0.0684)
Justification:	[Default]	Default Value

Appendix 3 Tier 1 emissions screening - GasSim model print-out

Year of Interest: 2019
Distance from Flare to Nearest Boundary: 68
Distance from Flare to Nearest Receptor: 90
Distance from Gas Engine to Nearest Boundary: 68
Distance from Gas Engine to Nearest Receptor: 90
Distance from Operational Area to Nearest Boundary: 80
Distance from Operational Area to Nearest Receptor: 120

		Short Term EQS or EAL µg/m3	Long Term EQS or EAL µg/m3	Background Concentration µg/m3
Acetalehyde (ethanal) - surface	2019	9200	370	0
Benzene - surface	2019	0	5	0
Benzo(a)pyrene - engine	2019	0	0.00025	0
Benzo(a)pyrene - flare	2019	0	0.00025	0
Butadiene (modelled as 1,3-Butadiene) - surface	2019	0	2.25	0
Carbon disulphide - surface	2019	100	64	0
Carbon monoxide - engine	2019	10000	0	0
Carbon monoxide - flare	2019	10000	0	0
Carbon monoxide - surface	2019	10000	0	0
Carbon tetrachloride (tetrachloromethane) - surface	2019	3900	130	0
Chloroform (trichloromethane) - surface	2019	2970	99	0
Dichloromethane (methylene chloride) - surface	2019	3000	700	0
Ethylene dichloride - surface	2019	700	42	0
Formaldehyde (methanal) - surface	2019	100	5	0
Hydrogen chloride, or (Total chloride (reported as HCl)) - engine	2019	750	0	0
Hydrogen chloride, or (Total chloride (reported as HCl)) - flare	2019	750	0	0
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine	2019	160	16	0
Hydrogen fluoride, or (Total fluoride (reported as HF)) - flare	2019	160	16	0
Methyl chloride (chloromethane) - surface	2019	21000	1050	0
Methyl chloroform (1,1,1-Trichloroethane) - surface	2019	222000	11100	0
Nitrogen oxides (NOx) - engine	2019	200	40	17.1
Nitrogen oxides (NOx) - flare	2019	200	40	17.1
PAH (reported as Naphthalene) - surface	2019	8000	530	0
para-Dichlorobenzene (modelled as 1,4-Dichlorobenzene) - surface	2019	30600	1530	0
Phenol - surface	2019	3900	200	0
PM10s - engine	2019	50	40	11.2

		Short Term EQS or EAL µg/m3	Long Term EQS or EAL µg/m3	Background Concentration µg/m3
PM10s 24 hour - engine	2019	50		11.2
PM10s - flare	2019	50	40	11.2
PM10s 24 hour - flare	2019	50		11.2
Sulphur dioxide - engine	2019	350	0	0
Sulphur dioxide 15 min - engine	2019	266		0
Sulphur dioxide 24 hour - engine	2019	125		0
Sulphur dioxide - flare	2019	350	0	0
Sulphur dioxide 15 min - flare	2019	266		0
Sulphur dioxide 24 hour - flare	2019	125		0
Tetrachloroethylene (Tetrachloroethene) - surface	2019	8000	3450	0
Toluene - surface	2019	8000	1910	0
Trichlorobenzene (all isomers) - surface	2019	2280	76	0
Trichloroethylene (trichloroethene) - surface	2019	1000	1100	0
Trimethylbenzene (all isomers) - surface	2019	37500	1250	0
Vinyl chloride (chloroethene, chloroethylene) - surface	2019	1851	159	0
Xylene (all isomers) - surface	2019	66200	4410	0

	Short Term				Long term			
	Predicted Boundary Concentration µg/m3	Predicted Nearest Receptor Concentration µg/m3	Is the emission rate Insignificant?	Is detailed modelling required?	Predicted Boundary Concentration µg/m3	Predicted Nearest Receptor Concentration µg/m3	Is the emission rate Insignificant?	Is detailed modelling required?
Acetalehyde (ethanal) - surface - 2019	1.24748(80m)	1.02733(120m)	Yes	No	0.0209136(80m)	0.0121079(120m)	Yes	No
Benzene - surface - 2019	27.0264(80m)	22.257(120m)	No EAL	No EAL	0.453089(80m)	0.262315(120m)	No	No
Benzo(a)pyrene - engine - 2019	1.73572e-010(68m)	1.64622e-010(90m)	No EAL	No EAL	1.31494e-011(68m)	1.31494e-011(90m)	Yes	No
Benzo(a)pyrene - flare - 2019	5.32637e-006(68m)	3.93767e-006(90m)	No EAL	No EAL	2.1041e-007(68m)	2.1041e-007(90m)	Yes	No
Butadiene (modelled as 1,3-Butadiene) - surface - 2019	0.00226806(80m)	0.00186782(120m)	No EAL	No EAL	3.80234e-005(80m)	2.20136e-005(120m)	Yes	No
Carbon disulphide - surface - 2019	72.2235(80m)	59.4782(120m)	No	Yes	1.21081(80m)	0.700993(120m)	No	No
Carbon monoxide - engine - 2019	405.604(68m)	384.689(90m)	Yes	No	30.7276(68m)	30.7276(90m)	No EAL	No EAL
Carbon monoxide - flare - 2019	0.0917417(68m)	0.0678226(90m)	Yes	No	0.00362411(68m)	0.00362411(90m)	No EAL	No EAL
Carbon monoxide - surface - 2019	511.741(80m)	421.434(120m)	Yes	No	8.57918(80m)	4.96689(120m)	No EAL	No EAL
Carbon tetrachloride (tetrachloromethane) - surface - 2019	0.00156235(80m)	0.00128664(120m)	Yes	No	2.61924e-005(80m)	1.5164e-005(120m)	Yes	No
Chloroform (trichloromethane) - surface - 2019	6.90414(80m)	5.68576(120m)	Yes	No	0.115746(80m)	0.0670108(120m)	Yes	No
Dichloromethane (methylene chloride) - surface - 2019	107.342(80m)	88.3989(120m)	Yes	No	1.79955(80m)	1.04184(120m)	Yes	No
Ethylene dichloride - surface - 2019	117.279(80m)	96.5827(120m)	No	No	1.96615(80m)	1.1383(120m)	No	No
Formaldehyde (methanal) - surface - 2019	0.0985283(80m)	0.0811409(120m)	Yes	No	0.0016518(80m)	0.000956304(120m)	Yes	No
Hydrogen chloride, or (Total chloride (reported as HCl)) - engine - 2019	36.4113(68m)	34.5338(90m)	Yes	No	2.75843(68m)	2.75843(90m)	No EAL	No EAL
Hydrogen chloride, or (Total chloride (reported as HCl)) - flare - 2019	0(68m)	0(90m)	Yes	No	0(68m)	0(90m)	No EAL	No EAL
Hydrogen fluoride, or (Total fluoride (reported as HF)) - engine - 2019	5.71529(68m)	5.42058(90m)	Yes	No	0.432977(68m)	0.432977(90m)	No	No
Hydrogen fluoride, or (Total fluoride (reported as HF)) - flare - 2019	0(68m)	0(90m)	Yes	No	0(68m)	0(90m)	Yes	No
Methyl chloride (chloromethane) - surface - 2019	1.57572(80m)	1.29765(120m)	Yes	No	0.0264165(80m)	0.0152938(120m)	Yes	No
Methyl chloroform (1,1,1-Trichloroethane) - surface - 2019	286.476(80m)	235.922(120m)	Yes	No	4.80269(80m)	2.78051(120m)	Yes	No
Nitrogen oxides (NOx) - engine - 2019	135.457(68m)	128.472(90m)	No	Yes	20.5238(68m)	20.5238(90m)	No	Yes
Nitrogen oxides (NOx) - flare - 2019	1.15796(68m)	0.856052(90m)	Yes	No	0.0914865(68m)	0.0914865(90m)	Yes	No
PAH (reported as Naphthalene) - surface - 2019	2.29679(80m)	1.89148(120m)	Yes	No	0.038505(80m)	0.0222924(120m)	Yes	No
para-Dichlorobenzene (modelled as 1,4-Dichlorobenzene) - surface - 2019	0.438341(80m)	0.360987(120m)	Yes	No	0.00734866(80m)	0.00425449(120m)	Yes	No
Phenol - surface - 2019	0(80m)	0(120m)	Yes	No	0(80m)	0(120m)	Yes	No
PM10s - engine - 2019	3.04965(68m)	2.89239(90m)	Yes	No	0.231034(68m)	0.231034(90m)	Yes	No
PM10s 24 hour - engine - 2019	1.79929(68m)	1.70651(90m)	Yes	No				
PM10s - flare - 2019	0.229559(68m)	0.169708(90m)	Yes	No	0.00906837(68m)	0.00906837(90m)	Yes	No
PM10s 24 hour - flare - 2019	0.13544(68m)	0.100128(90m)	Yes	No				
Sulphur dioxide - engine - 2019	0(68m)	0(90m)	Yes	No	0(68m)	0(90m)	No EAL	No EAL
Sulphur dioxide 15 min - engine - 2019	0(68m)	0(90m)	Yes	No				
Sulphur dioxide 24 hour - engine - 2019	0(68m)	0(90m)	Yes	No				

	Short Term				Long term			
	Predicted Boundary Concentration µg/m3	Predicted Nearest Receptor Concentration µg/m3	Is the emission rate Insignificant?	Is detailed modelling required?	Predicted Boundary Concentration µg/m3	Predicted Nearest Receptor Concentration µg/m3	Is the emission rate Insignificant?	Is detailed modelling required?
Sulphur dioxide - flare - 2019	0(68m)	0(90m)	Yes	No	0(68m)	0(90m)	No EAL	No EAL
Sulphur dioxide 15 min - flare - 2019	0(68m)	0(90m)	Yes	No				
Sulphur dioxide 24 hour - flare - 2019	0(68m)	0(90m)	Yes	No				
Tetrachloroethylene (Tetrachloroethene) - surface - 2019	197.118(80m)	162.332(120m)	Yes	No	3.30462(80m)	1.9132(120m)	Yes	No
Toluene - surface - 2019	88.2318(80m)	72.6615(120m)	Yes	No	1.47918(80m)	0.856367(120m)	Yes	No
Trichlorobenzene (all isomers) - surface - 2019	0.0484779(80m)	0.039923(120m)	Yes	No	0.000812718(80m)	0.000470521(120m)	Yes	No
Trichloroethylene (trichloroethene) - surface - 2019	17.2413(80m)	14.1987(120m)	Yes	No	0.289045(80m)	0.167342(120m)	Yes	No
Trimethylbenzene (all isomers) - surface - 2019	14.4248(80m)	11.8792(120m)	Yes	No	0.241827(80m)	0.140005(120m)	Yes	No
Vinyl chloride (chloroethene, chloroethylene) - surface - 2019	152.057(80m)	125.224(120m)	Yes	No	2.5492(80m)	1.47585(120m)	Yes (at receptor)	No
Xylene (all isomers) - surface - 2019	2616.01(80m)	2154.36(120m)	Yes	No	43.8567(80m)	25.3907(120m)	Yes	No

Not Modelled:

1,1,1,2-Tetrafluorochloroethane
1,1,1-Trichlorotrifluoroethane
1,1,2-Trichloroethane
1,1-Dichloroethane
1,1-Dichloroethene
1,1-Dichlorotetrafluoroethane
1,2-Dichloropropane
1,2-Dichlorotetrafluoroethane
1-butanethiol
1-Chloro-1,1-difluoroethane
2-butoxy ethanol
2-Chloro-1,1,1-trifluoroethane
2-Propanol
Bromodichloromethane
Butene isomers
Butyric acid
Carbonyl sulphide
Chlorobenzene
Chlorodifluoromethane
Chloroethane
Chlorofluorocarbons (CFCs) (Total)
Chlorofluoromethane
Chlorotrifluoromethane
Dichlorodifluoromethane
Dichlorofluoromethane
Diethyl disulphide
Dimethyl disulphide
Dimethyl sulphide
Dioxins and furans (modelled as 2,3,7,8-TCDD)
Ethane
Ethanethiol (ethyl mercaptan)
Ethanol
Ethyl butyrate
Ethyl toluene (all isomers)
Ethylene
Ethylene dibromide
Fluorotrichloromethane
Freon 113
Furan
Halons
Hexachlorocyclohexane (all isomers)
Hydrochlorofluorocarbons (HCFCs) (Total)

Not Modelled:

Hydrofluorocarbons (HFCs) (Total)
Limonene
Methanethiol (methyl mercaptan)
Methyl isobutyl ketone
Nitrogen dioxide (NO2)
Nitrogen monoxide (NO)
Odour Units (Predicted)
Pentane
Pentene (all isomers)
Perfluorocarbons (PFCs) (Total)
Propane
Propanethiol
Sulphide, total simulations with H2S
Sulphide, total simulations without H2S
t-1,2-Dichloroethene
Tetrachloroethane (modelled as 1,1,2,2-Tetrachloroethane)
Total non-methane volatile organic compounds (NMVOCs)
Total volatile organic compounds (VOCs)
Trichlorofluoromethane
Trichlorotrifluoroethane