FCC Recycling (UK) Ltd
Drumgray Energy Recovery Centre
PPC Application
PPC/A/1187576

CONTENTS

1 NON TECHNICAL SUMMARY OF DETERMINATION

FCC Recycling (UK) Ltd (FCC) are proposing to build an Energy from Waste (EfW) Plant known as the Drumgray Energy Recovery Centre (DERC). The DERC will be located on the wider Greengairs Waste Management Complex which includes the Greengairs Landfill Site, in North Lanarkshire. The Facility will process non-hazardous waste and / or Refuse Derived Fuel (RDF) from which the majority of recyclable material has been removed prior to delivery, this is known as 'residual' waste. It should be noted that the original application also included a Mechanical Pre-Treatment plant (MPT). This was subsequently removed from the application, but references are still present in the application documents.

Planning Permission for the facility was granted by North Lanarkshire Council on 24 August 2020 (Ref. 19/01284/FUL). The facility is due to be operational by 2025.

FCC applied for a Permit as a Part A Activity under Chapter 5 Section 5.1 (b) of Schedule I of the Pollution Prevention and Control (PPC) (Scotland) Regulations 2012 (The PPC Regulations) for a waste incineration activity. To determine this application, the impact of the emissions from the proposed EfW Plant on the environment has been considered in detail. The PPC Regulations require that a Part A activity utilises Best Available Techniques (BAT) to prevent, or where that is not practicable, reduce emissions from the installation and the impact on the environment.

The Site is located on land at the southwestern edge of the wider Greengairs Waste Management Complex which includes the Greengairs Landfill Site. The Site is located 2.3km northeast of Airdrie in North Lanarkshire. The National Grid Reference of the site is NS 78550 68674. The villages of Wattston and Greengairs lie approximately 1.4km and 1.7km north from the proposed DERC respectively. The wider Greengairs Waste Management Complex covers an area of land approximately 283 ha in size and is owned entirely by FCC. The area for the proposed DERC comprises approximately 4.65 ha of this land. The DERC will be accessible via a private access road running east-west between Meikle Drumgray Road and the B803, to the south of Wattston.

The DERC will comprise: waste reception; waste storage; a single waste incineration line; water, fuel oil and air supply systems; waste furnaces; boilers; steam turbine/generator set; facilities for the treatment of flue gases; on-site facilities for treatment or storage of residues and wastewater; a flue contained within a 90m high stack; an air-cooled condenser unit; and devices and systems for controlling combustion operations and recording and monitoring conditions.

The nominal design capacity of the DERC will be approximately 37.5 tonnes per hour of non-hazardous wastes, with a net calorific value (NCV) of 9.5 MJ/kg. The DERC will have a nominal design capacity of approximately 300,000 tonnes per annum (tpa), assuming an availability of approximately 8,000 hours. However, allowing for variations in the NCV of the waste and the maximum hourly tonnage, the maximum capacity of the ERC will be approximately 333,600tpa.

The turbine has been designed to generate up to 30 MWe of electricity with a site parasitic load of approximately 3 MWe. The DERC will therefore export up to 27 MWe to the National Grid. The export of heat is also being actively explored in line with SEPA's Thermal Treatment of Waste Guidance.

The DERC will give rise to surface water run-off from roads, vehicle movement areas, building roofs and hardstanding areas. Surface water will be discharged into dedicated surface water drainage systems. An interceptor will remove oils and sediments from surface runoff from roads and areas of hardstanding. The uncontaminated surface water will pass through a Sustainable Urban Drainage System (SUDS) and have an eventual discharge into the Cameron Burn. There will be no discharge of process effluents or foul water to sewer from the DERC, these will be reused within the process or, should excess process effluent be generated, tankered and transferred off-site for appropriate treatment.

Glossary of terms	
APC	Air Pollution Control
APCr	Air Pollution Control residue
BAT	Best Available Techniques
BAT-AEL	BAT Associated Emission Level. These are Emission levels associated with the BAT for emissions to air.
BAT-AEEL	BAT Associated Energy Efficiency Level. These are Energy Efficiency levels associated with the BAT.
BAT-AEPL	BAT Associated Environmental Performance Level
BATC	BAT Conclusions
BREF	BAT Reference Document
BSI	British Standards Institute
CHP	Combined Heat and Power
CO	Coordinating Officer or Carbon Monoxide
COPCs	Chemicals Of Potential Concern
Cd + Tl	The sum of cadmium, thallium and their compounds, expressed as Cd + Tl
CEMS	Continuous Emissions Monitoring Systems
DERC	Drumgray Energy Recovery Centre
DMA	Dispersion Modelling Assessment
ELV	Emission Limit Value
EMS	Environmental Management System
ERF	Energy Recovery Facility
FDBR	Fachverband Anlagenbau (from the previous name of the organisation: Fachverband Dampfkessel-, Behälter- und Rohrleitungsbau) (See BAT 2).
FGT	Flue Gas Treatment
GLC	Ground Level Concentration
HCL	Hydrogen Chloride
HF	Hydrogen Fluoride
Hg	The sum of mercury and its compounds, expressed as Hg.
HHRA	Human Health Risk Assessment
IBA	Incinerator Bottom Ash
IED	Industrial Emissions Directive Ref. Directive 2010/75/EU
I-TEQ	International toxic equivalent according to the North Atlantic Treaty Organization (NATO) schemes.
LOI	Loss on Ignition
LT	Long-Term
NH_3	Ammonia
NO_x	Oxides of Nitrogen — the sum of nitrogen monoxide (NO) and nitrogen dioxide (NO_2), expressed as NO_2.
N_2O	Nitrous Oxide
OTNOC	Other Than Normal Operating Conditions
PAC	Powdered Activated Carbon
PM_{10}	Particulate matter which is less than 10 microns in diameter
$PM_{2.5}$	Particulate matter which is less than 2.5 microns in diameter
PAH	Polycyclic Aromatic Hydrocarbons
PC	Process Contribution
PEC	Predicted Environmental Concentration
PCB	Polychlorinated biphenyls
Dioxin-like PCB	PCBs showing a similar toxicity to the 2,3,7,8-substituted PCDD/PCDF according to WHO.
PBDD/F	Polybrominated dibenzo-p-dioxins and-furans
PCDD/D	Polychlorinated dibenzo-p-dioxins and-furans

Sb+As+Pb+Cr+Co+Cu+Mn+Ni+V	The sum of antimony, arsenic, lead, chromium, cobalt, copper, manganese, nickel, vanadium and their compounds, expressed as Sb+As+Pb+Cr+C0+Cu+Mn+Ni+V.
PPC	Pollution Prevention and Control
RDF	Refuse Derived Fuel
SO_2	Sulphur dioxide
SWMA	Specified Waste Management Activity
ST	Short-Term
TOC	Total Organic Carbon
TPA	Tonnes Per Annum
TPH	Tonnes Per Hour
TTWG	SEPA Thermal Treatment of Waste Guidelines
VOC	Volatile Organic Compounds
WHO	World Health Organisation
WHO-TEQ	Toxic Equivalent according to the World Health Organization (WHO) schemes

2 EXTERNAL CONSULTATION AND SEPA'S RESPONSE

***Is Public Consultation Required* -** Yes

Advertisements Check:	***Date***	***Compliance with advertising requirements***
Edinburgh Gazette	29 November 2019	Yes
Airdrie and Coatbridge Advertiser	November 2019	Yes

No. of responses received: 1

Summary of responses and how they were taken into account during the determination:
Objection on grounds of pollution to soils affecting livestock. A full Human Health Risk Assessment, which includes the route of eating livestock has been completed and assessed, with no issues identified.

Summary of responses withheld from the public register on request and how they were taken into account during the determination: None

***Is PPC Statutory Consultation* Required –** Yes

Food Standards Agency: Yes – standard response stating:

"*In our role as statutory consultee under these Regulations, Food Standards Scotland's assessment of the application is limited to potential risks to the safety of the human food chain that could result from the environmental impact of emissions from the installation to the surrounding area.*

Based on the application and provided that the applicant complies with the relevant SEPA Guidance and all other relevant PPC Guidance Notes and Regulations, Food Standards Scotland considers it unlikely that there will be any unacceptable effects on the human food chain from the emissions from this installation."

Actions taken: SEPA have concluded from the review of the PPC Permit application that the proposed facility will meet the requirements of SEPA Guidance and all other relevant PPC Guidance Notes and Regulation as described in this document. No further action required.

Health Board: Yes – no response due to COVID-19. SEPA's Human Health Specialist reviewed the relevant aspects of the Report.
Local Auth: Yes – no issues
Scottish Water: N/A
Health and Safety Executive: N/A
Scottish Natural Heritage (now NatureScot) (PPC Regs consultation): *"In our view, this proposal is therefore likely to have a significant effect on the qualifying interests of Black Loch Moss SAC, West Fannyside Moss SAC and Blawhorn Moss SAC. Consequently, SEPA, as competent authority for the PPC application, is required to carry out an appropriate assessment in view of the conservation objectives for the qualifying interests of these sites. To help you do this we advise that, in our view, based on the information provided in the Drumgray Energy Recovery Centre Habitats Regulations Appraisal (HRA) Report, the proposal will not adversely affect the integrity of the sites. We consider that the level of impact predicted, both for the development alone and in-combination, is unlikely to be detectable given current background levels.* *In our view, the objectives of designation and the overall integrity of the SSSIs where an exceedance of the screening thresholds has been identified will not be compromised by the proposed development.* *Given the relatively higher level of impact on Longriggend Moss, we encourage the applicant to explore opportunities to undertake, or contribute to, habitat management within the SSSI in order to increase its long-term resilience to the effects of atmospheric emissions."*
Discretionary Consultation - Community Councils
Enhanced SEPA public consultation - Dedicated webpage set up. See HERE
'*Off-site' Consultation* – N/A
***Transboundary Consultation* – N/A**
Public Participation Consultation - Yes
STATEMENT ON THE PUBLIC PARTICIPATION PROCESS **The Pollution Prevention and Control (Public participation)(Scotland) Regulations 2005 requires that SEPA's draft determination of this application be placed on SEPA's website and public register and be subject to 28 days' public consultation. The dates between which this consultation took place, the number of representations received and SEPA's response to these are outlined below.**

Date SEPA notified applicant of draft determination	24 May 2021
Date draft determination placed on SEPA's Website	01 June 2021
Details of any other 'appropriate means' used to advertise the draft.	Applicant made local consultees aware.
Date public consultation on draft permit opened	01 June 2021

Date public consultation on draft permit consultation closed	
Number of representations received to the consultation	
Date final determination placed on the SEPA's Website	
Summary of responses and how they were taken into account during the determination:	

3 ADMINISTRATIVE DETERMINATIONS

Determination of the Schedule 1 activity

As per application documents, with the exception of the MPT which was removed from the project during determination.

Determination of the stationary technical unit to be permitted:

As per application documents, with the exception of the MPT which was removed from the project during determination.

Determination of directly associated activities:

As per application documents, with the removal of the MPT which was removed from the project during determination.

Determination of 'site boundary'

As per application documents, with the removal of the MPT which was removed from the project during determination.

4 INTRODUCTION AND BACKGROUND

4.1 Historical Background to the activity and application

The Greengairs Waste Management Complex site is a former clay pit and opencast coal mine, comprising excavated areas that have subsequently been landfilled since the late 1980's. Other areas of excavation are now waterbodies, access tracks and hardstanding areas, with parts of the ground revegetated with pockets of undisturbed vegetation typically comprising rough grassland and scrub.

4.2 Description of activity

See Non-Technical summary.

4.3 Guidance/directions issued to SEPA by the Scottish Ministers under Reg.60 or 61.

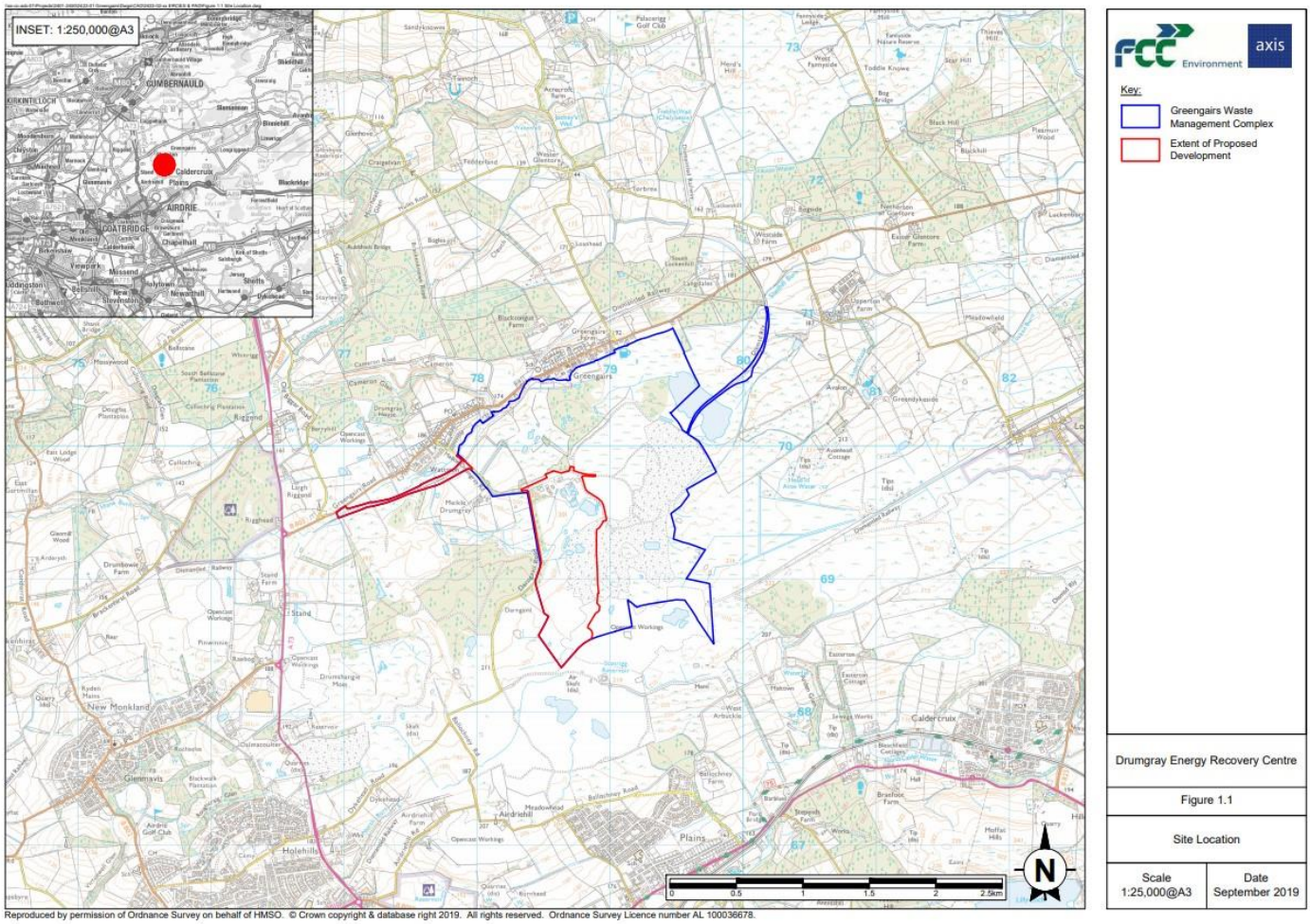
None.

4.4 Identification of important and sensitive receptors

4.4.1 Site Location

The Site is located on land at the southwestern edge of the wider Greengairs Waste Management Complex which includes the Greengairs Landfill Site. The Site location is approximately 2.3km northeast of Airdrie in North Lanarkshire. The National Grid Reference of the site is approximately NS 78550 68674. The villages of Wattston and Greengairs lie approximately 1.4km and 1.7km north from the proposed DERC respectively. The wider Greengairs Waste Management Complex covers an area of land approximately 283 ha and is owned entirely by FCC. The area for the proposed ERC comprises approximately 4.65ha of land. Figure 1 below shows the location of the Site.

Figure 1 – Site Location



The site is in a primarily agricultural area used for pasture with occasional farmsteads and residential properties and isolated areas of plantation woodland.

Key receptors are as follows:

1. Human health receptors
2. Water Environment receptors
3. Special Protection Areas (SPAs), Special Areas of Conservation (SACs) Ancient Woodland, Sites of Importance for Nature Conservation (SINCs) and Sites of Special Scientific Interest (SSSIs).

The site is not situated either in, or close to, an Air Quality Management Area with the nearest one located in Chapelhall approximately 6 km to the south of the Proposed Development.

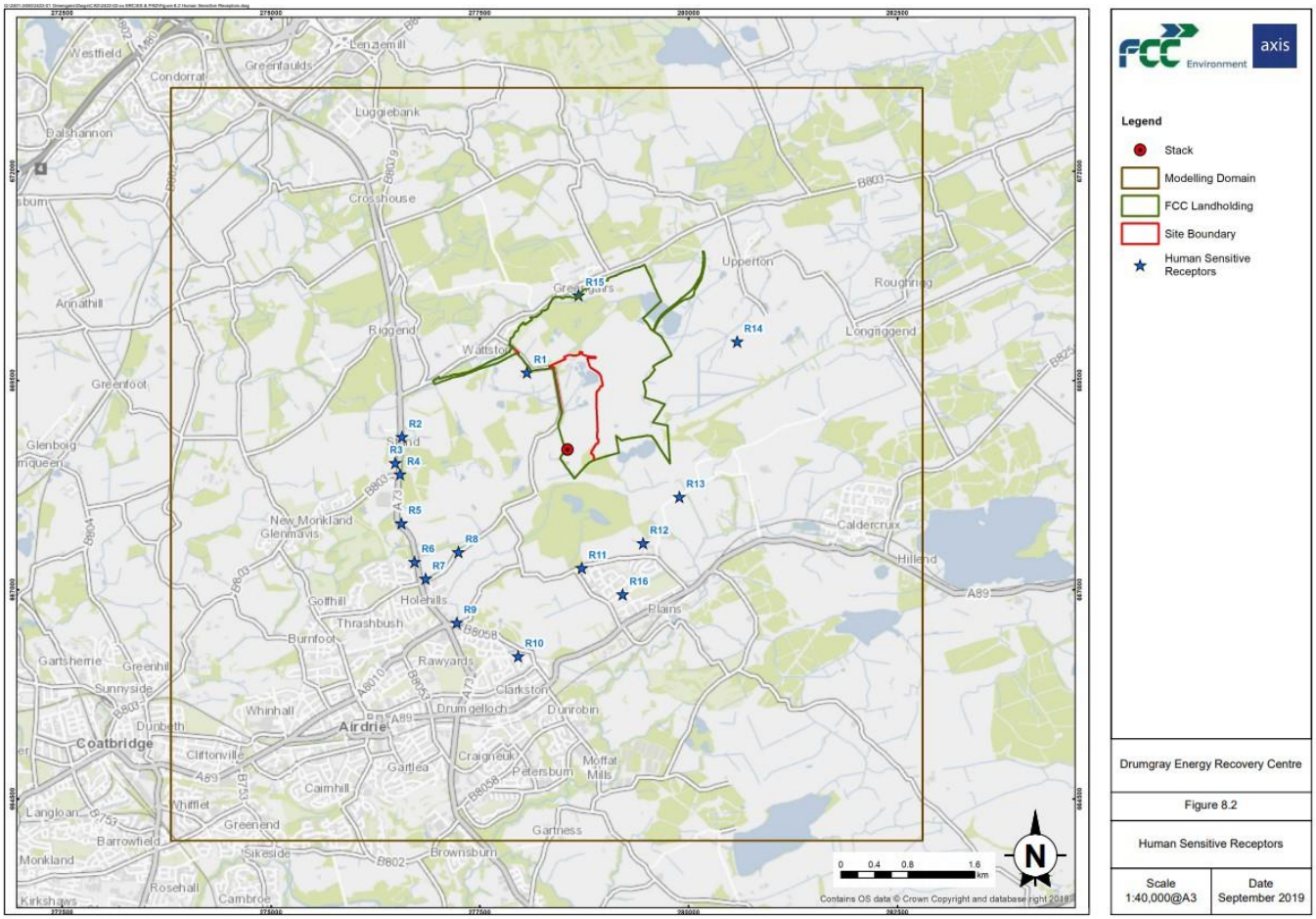
4.4.2 Human Health Receptors

A total of 16 sensitive human health receptors were assessed in the Dispersion Modelling Assessment (DMA) which assessed air quality impacts including odour and human health 'the human health risk assessment (HHRA)', [Refs. 3, 4 and 5], these are detailed in Table 1 and shown in Figure 2 below.

Table 1 – Human Health Receptors

ID	Name	Location		Distance from the ERC stack (m)
		x	y	
R1	Meikle Drumgray Farm	278069	669599	1,043
R2	Stirling Road 1	276570	668829	1,986
R3	House off Stirling Road	276491	668516	2,065
R4	Stirling Road 2	276549	668381	2,022
R5	House off Stirling Road 2	276566	667795	2,170
R6	Stirling Road 3	276724	667335	2,264
R7	Dykehead Road 1	276853	667131	2,294
R8	Dykehead Road 2	277247	667452	1,786
R9	Airdriehill Street	277227	666608	2,453
R10	Braidenhill Road	277960	666206	2,538
R11	Ballochney Road 1	278723	667260	1,425
R12	Ballochney Road 2	279459	667556	1,441
R13	Arbuckle Road	279894	668111	1,457
R14	Upperton	280585	669969	2,412
R15	Laurel Grove	278687	670523	1,854
R16	Plains Primary School	279214	666945	1,852

Figure 2 – Human Health Receptors



4.4.3 Water Environment Receptors

- The Cameron Burn flows along the Western Site boundary of the Greengairs site. This watercourse currently has poor Ecological status.
- Groundwater is at considerable depth beneath a protective layer of boulder clay.
- There are small lochs and flooded areas on and in the vicinity of the wider Greengairs site but none on the development plot.

4.4.4 Ecological Receptors

A total of 28 sites were identified within a 15km radius. These are shown in Figure 3 and detailed in Table 2 below:

Table 2 – Sensitive Ecological Receptors

ID	Site	Designation	Closest point to Site		Distance from stack at closest point (km)	Lichens or bryophytes present
			X	Y		
European and UK Designated Sites						
E1	Black Loch Moss	SAC/SSSI	284706	668775	6.2	YES
E2	West Fannyside Moss	SAC/SSSI	279752	672930	4.4	YES
E3	Blawhorn Moss	SAC/SSSI	288020	668034	9.4	YES
E4	Slamannan Plateau	SPA/SSSI	279848	672047	3.6	NO
E5	Longriggend Moss	SSSI	280472	669585	2.1	YES
E6	North Bellstane Plantation	SSSI	275778	671229	3.8	YES
E7	Woodend Loch	SSSI	271102	666842	7.7	YES
E8	Bishop Loch	SSSI	269554	667412	9.1	YES
E9	Lady Bell's Moss	SSSI	281080	665555	4.0	YES
E10	Dullatur Marsh	SSSI	275755	677643	9.4	YES
E11	Darnrig Moss	SSSI	285164	675141	9.3	YES
E12	Hassockrigg and North Shotts Mosses	SSSI	286979	662559	10.4	YES
E13	Howierig Muir	SSSI	285139	678341	11.7	YES
E14	Hamilton Low Parks	SSSI	271342	658412	12.6	YES
E15	Denny Muir	SSSI	276195	681981	13.5	YES
E16	Bothwell Castle Grounds	SSSI	269057	660299	12.7	YES
E17	Carron Glen	SSSI	279639	683023	14.4	YES
E18	North Shotts Moss	SAC	286916	661384	11.1	YES
Locally Designated Sites						
E19	Ancient Woodland 1	Ancient Woodland	277229	668532	1.3	YES
E20	Ancient Woodland 2	Ancient Woodland	276538	667956	2.1	YES

ID	Site	Designation	Closest point to Site		Distance from stack at closest point (km)	Lichens or bryophytes present
			X	Y		
E21	Greengairs Peatland (3)	SINC	278820	670192	1.5	YES
E22	Cameron Glen/Burn(3)	SINC	278112	670367	1.7	YES
E23	Drumshangie Moss North (3)	SINC	277193	668792	1.4	YES
E24	Drumshangie Moss: (3) Dykehead North	SINC	277629	668323	0.9	YES
E25	Drumshangie Moss: (3) Dykehead South	SINC	277549	667684	1.4	YES
E26	Airdriehill Reservoir (3)	SINC	277689	666862	2.0	YES
E27	Arden Glen (3)	SINC	280315	668401	1.8	YES
E28	Avon Water Head (3)	SINC	279887	669626	1.6	YES

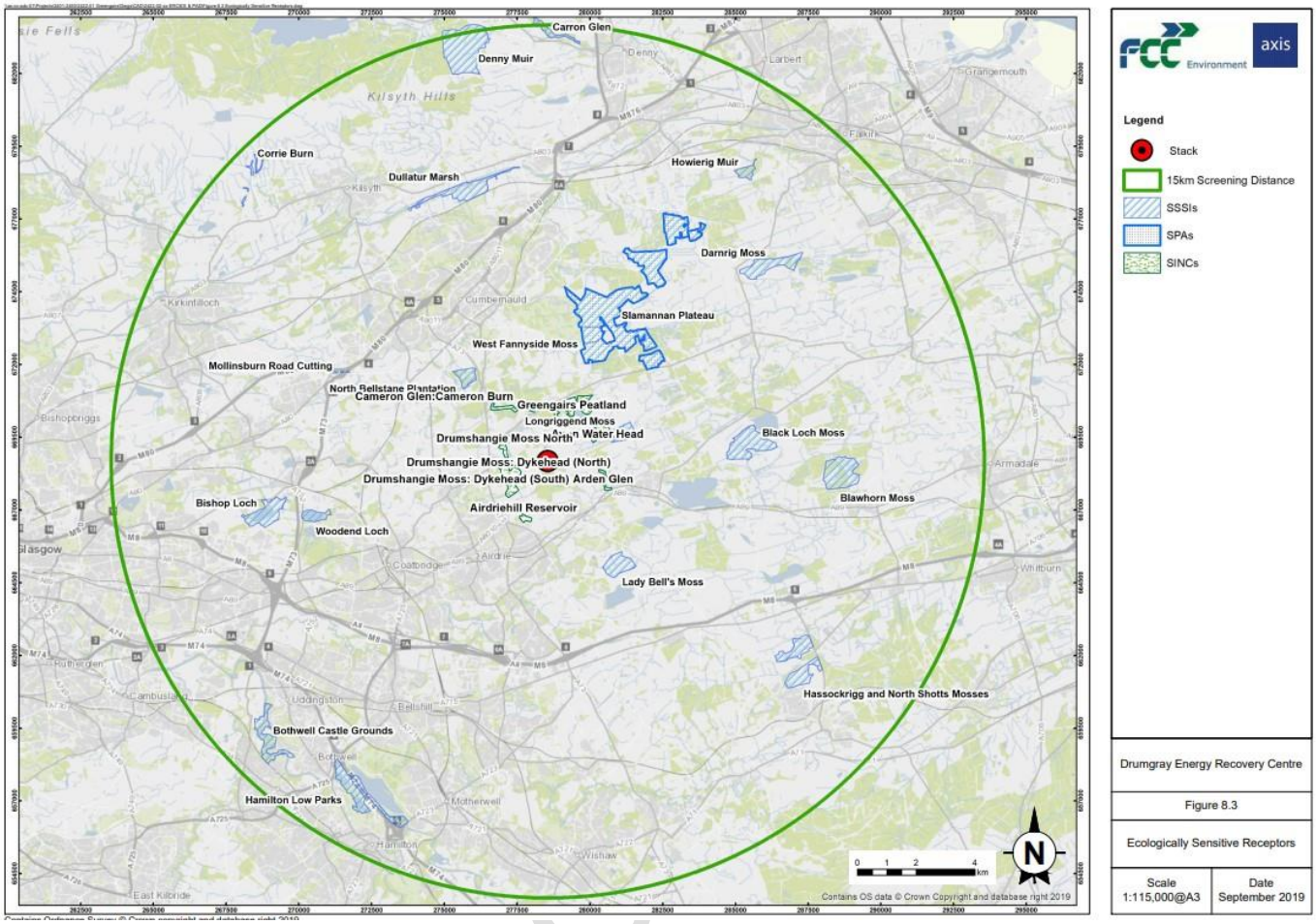
Notes:

(1) It is not known from the citations whether lichens or bryophytes are present at the locally designated sites. As a conservative measure it has been assumed that lichens and bryophytes are present and the lower Critical Levels have been applied.

(2) Biological Notification Site

(3) Site of Importance for Nature Conservation

Figure 3 – Sensitive Ecological Receptors



5 KEY ENVIRONMENTAL ISSUES

5.1 Summary of significant environmental impacts

The key potentially significant impacts of the proposed facility are emissions to air and water, odour, management of ash, accidents, noise and monitoring. These are discussed further in Sections 5.2, 5.3, 5.7, 5.13 & 5.14, 5.16, 5.17 and 5.18 respectively below, together with details of the BAT techniques for their management.

5.2 Implications of the Variation on - Point Sources to Air

One of the key issues associated with the proposed facility is the extent and impact of emissions to air. In addition to carbon dioxide and water vapour from combustion of waste and standby fuel, the principal emissions from the incineration line will be oxides of nitrogen (NO_x), sulphur dioxide (SO_2), carbon monoxide, hydrogen chloride and hydrogen fluoride gases, particulate matter (PM), heavy metals, and gaseous and vaporous organic substances known as volatile organic compounds (VOCs) which may include dioxins and furans, dioxin-like polychlorinated biphenyls (dioxin-like PCBs) and polycyclic aromatic hydrocarbons (PAHs).

These substances when emitted from waste incineration plants are subject to Emission Limit Values (ELVs) proscribed by legislation. The details of this are set out in Section 9 below.

The predicted impact of point source emissions to air from the proposed development are considered in the following documents in support of the Permit Application:

- Appendix D of the Drumgray Energy Recovery Ltd PPC Application [Ref. 1]. This contains the following assessments: Baseline Assessment, Greenhouse Gas Assessment, Dispersion Modelling Assessment (DMA), Abnormal Emissions Assessment, Human Health Risk Assessment (HHRA) and Air Quality Assessment Figures. The Dispersion Modelling Assessment includes assessment of the impact on human health and ecological receptors and a stack height assessment.
- Section 3 of the response to the 2nd Schedule 4 Further Information Notice response [Ref. 2].

5.2.1 Dispersion Modelling Assessment (DMA)

The Applicant has carried out an air dispersion modelling assessment of the pollutants identified above, to predict ground level concentrations at the point of maximum impact and at various human sensitive receptors. The modelling was undertaken using ADMS 5.2, a 'new generation' dispersion model, and a sensitivity check was carried out using another air dispersion model, AERMOD. These models are recommended for use by UK Regulators for assessing the impacts of emissions to air from new facilities. The models predict ground level concentrations for each pollutant. These values are then compared to air quality, standards and objectives (air quality assessment levels (AQALs)) taking background data into account where available to assess impact.

Cumulative impacts were also considered — these assessed the combined impact of the proposed DERC with emissions of common pollutants from other facilities in the area which currently have planning permission but have not been built. The base model included the projected emissions from four landfill gas engines and one flare on the Greengairs site (at levels predicted for 2024 when the site would become operational). The projects included in the Cumulative assessment comprise:

Table 3 – Cumulative projects

Scheme	Including in analysis	Justification
Drumshangie Energy from Waste (EfW) Facility	Yes	The Drumshangie EfW Facility will release similar pollutants and is located approximately 0.8 km from the ERC. As such there is the potential for cumulative impacts.
Greengairs Wind Farm	Yes	This is located approximately 1.0 km to the north-east of the ERC and has the potential to affect the dispersion of emissions from the ERC.
Greengairs East Wind Farm	Yes	This is located approximately 1.4 km to the east of the ERC and has the potential to affect the dispersion of emissions from the ERC.
Albert Bartlett potato processing factory	No	These do not include any significant point source emission point to atmosphere. Therefore, there is no risk of cumulative air quality impacts.
Stirling Road mixed use development	No	
Mid Forest Community Growth Area Masterplan	No	

The Dispersion Modelling Assessment (DMA) took account of the following:

a) Air Quality Standards, Objectives and Guidelines

European air quality legislation is consolidated under EC Directive 2008/50/EC of 21 May 2008 on Ambient Air Quality and Cleaner Air for Europe. Dir 2008/50/EC consolidates earlier Daughter Directives which set Ambient Air Directive (AAD) Limit Values for the following specific pollutants: NO_2 and NO_x, $S0_2$, lead and particulate matter (1st 'Daughter directive); benzene and CO (2nd Daughter Directive) and long-term target values, and alert and threshold concentrations for ozone (3rd Daughter Directive). The fourth Daughter Directive 2004/107/EC was not consolidated in Dir 2008/50/EC - this sets health-based target values for PAHs, cadmium, arsenic, nickel and mercury for which there is a requirement to reduce exposure to as low as reasonably achievable.

In the UK, ambient concentrations of pollution are controlled by a number of air quality standards and objectives for the protection of human health which are described in The Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2007 (the AQS). In Scotland these air quality objectives are implemented via the Air Quality (Scotland) Regulations 2010, as amended.

For pollutants not directly covered by this Regulation, guidance is available in Appendix D of PPC Horizontal Guidance Note IPPC H1: Environmental Assessment and Appraisal of BAT issued in 2003 [Ref. 3]. This provides both long-term (LT) and short-term (ST) Environmental Assessment Levels (EALs) for the protection of human health and the environment. EALs specified in the Environment Agency's environmental management guidance 'Air Emissions Risk assessment for your Environmental Permit' (Air Emissions Guidance) are also considered. When the AQS does not contain relevant objectives the LT and ST EALs from these documents are therefore used to assess potential impacts. Standards and objectives for the protection of sensitive ecosystems and habitats are also contained within IPPC H1, the Air Emissions Guidance and the Air Pollution Information System (APIS).

The various AQALs referred to above are summarised in Tables 2-4 in the DMA.

b) Background pollutant levels in ambient air

Background ambient data was collated for each pollutant to assess current levels in the vicinity of the proposed DERC. Local data from ambient monitoring stations was used where possible, this was supplemented with UK data from other monitoring stations and calculated data from emission maps where this was not available. This is identified in the Baseline Assessment Document for each pollutant, and the data used for further assessment is summarised in Table 9 of the DMA [Appendix D, Ref. 1].

As discussed in Section 4.4.2 above, the nearest Air Quality Management Area is located in Chapelhall approximately 6 km to the south of the Proposed Development. Due to the distance from the proposed DERC this was not considered further in the DMA.

c) Location of Sensitive Receptors

The general approach of the DMA was to evaluate the highest predicted process contribution (PC) to ground level concentration (GLC), known as the point of maximum impact within the area of a 9.0 Km x 9.0 Km grid with the main stack at the centre and a spacing of 90.0m. The predicted impact at the 16 human and 28 ecological sensitive receptors identified in Tables 1 and 2 in Section 4.4 were also evaluated.

d) Model input data

The DMA assumed the worst-case operational scenario i.e. that the pollutants are continually discharged over the whole year at the relevant ELVs based on upper end of BAT-AEL range for daily ELVs or average ELVs over the monitoring period or half-hourly ELVs based on IED ELVs. In reality, emissions will be below ELVs and the incineration line will be off for periods of maintenance (anticipated operation is 8,000 hours per annum). The selected stack height of 90m (See Section h for details of stack height assessment) was used. The input data was provided in Section 4 of the DMA.

As discussed above, operation of the DERC was assessed both in isolation and in conjunction with other potential projects which have planning approval (see Table 3 above).

VOCs were modelled at the ELV assuming that 100% of the emission was either benzene or 1,3 butadiene. Pollutants were also modelled for PAHs as represented by benzo(a)pyrene which were modelled at typical/ maximum emission concentrations for operating UK incineration plants because there is no ELV specified either in IED Annex VI or in the Waste Incineration BAT Conclusions.

Modelling was not carried out for nitrous oxide (N_20) for which there is no ELV specified either in IED Annex VI or in the Waste Incineration BATCs. It should be noted that N_20 emissions are not normally significant for moving grate incineration where ammonia-based Selective Non-Catalytic Reduction (SNCR) is used for control of NO_X emissions. N_20 emissions will, however, be evaluated by periodic monitoring over the life of the permit and is included in the Global Warming Impact Assessment in Section 5.2.4 below. An Abnormal emissions impact assessment was also undertaken based on short-term emissions during abnormal operation which are above the ELVs associated with normal operation — this is discussed in Section g) below.

All concentrations were converted to release rates, typically in grams per second (g/s), for input into the model by multiplying the concentrations by the stack flow rate. The calculations to determine the g/s input data were checked by a SEPA Air Modelling Specialist and found to be satisfactory. Additional information on expected emissions during commissioning was requested and provided in the Second Further Information Notice Response [Ref 2].

Other key inputs to the model and DMA were as follows (see Section 4 of the DMA for full details):

1. Effects of prevailing meteorological conditions including wind speed and direction, temperature, humidity and cloud cover. Meteorological (Met) Data for the years 2014 to 2018 was taken from the Met station at Glasgow Airport approximately 30 Km south west of the DERC. Five years of data is assessed to take into account the inter-annual fluctuations in weather conditions.

2. Building effects which can affect the dispersion of the plume due to turbulence and building downwash effects which can increase ground level concentrations local to the building.

3. Local topography for assessment of impacts within the gridded area.

4. Chemistry — Oxides of nitrogen released from the facility will be comprised of nitric oxide (NO) and nitrogen dioxide ($N0_2$) and a proportion of the NO will oxidise to $N0_2$ in the atmosphere. A standard assumption in modelling reports is that 70% of the NO_X in predicted annual mean GLCs will have converted to NO_2 and 35% will have converted to NO_2 for short-term (hourly) concentrations. This assumption, which is considered to be conservative, is required because the AQAL is for NO_2 rather than for NOx.

e) Sensitivity Analysis

A Sensitivity Analysis was carried out to assess the impact of different aspects of the model and is discussed in Section 5 of the report. This included assessment of the following:

i) Stack height assessment to confirm why 90 metres was selected as the chosen stack height. This is discussed in Section h) below.

ii) Choice of model. The sensitivity analysis of ADMS versus AERMOD with and without terrain effects was assessed and confirmed that for both scenarios, ADMS 5.2 consistently produces more conservative (i.e. higher) results for both long-term and short-term impacts than AERMOD. The conclusion that ADMS is the most suitable model for assessing complex terrain was supported by the SEPA Air Modelling Specialists.

iii) Building parameters — Modelling was carried out to assess the difference between 'no buildings' and buildings. Including buildings was found to predict more conservative GLCs due to building 'downwash' effects which influence the dispersion of pollutants. Buildings were therefore included in the modelling as this is considered to provide a realistic and conservative approach.

iv) Surface Roughness Length — The sensitivity of the results to surface roughness length has been considered by running the model with a range of lengths for the dispersion site. Increasing the surface roughness value leads to slightly increased concentrations on an annual mean and short-term basis. The 0.2m surface roughness value was selected for the dispersion site as this was deemed the most appropriate for the relatively open surroundings of the local area.

v) Local wind turbines — The Greengairs Wind Farm and Greengairs East Wind Farm (which have been identified as cumulative schemes to consider in this assessment) are located in close proximity to the DERC. The turbulent wakes from wind turbines have the potential to interact with the plume from the DERC and affect the dispersion of pollutants. The ADMS 5.2 dispersion model can take into account the effect of a wind turbine on the dispersion of emissions. A sensitivity analysis has been undertaken to determine if these wind farms have a potentially significant effect on the dispersion of emissions and therefore need to be considered quantitively within the cumulative assessment. Modelling the presence of the wind turbines results in greater peak annual mean and short-term concentrations and show a greater pattern of distribution when including wind turbines. In addition, including wind turbines predicts a secondary point of maximum impact to the south-west of the DERC. Therefore, the wind turbines were included in the cumulative assessment.

vi) Operation at different design points - Dispersion modelling has been undertaken based on the emission parameters based on the design point for the DERC. The DERC will be operated as a commercial plant, so it is beneficial to operate at full capacity. If loading does fall below the design point the volumetric flow rate and the exit velocity of the exhaust gases would reduce. The effect on this would be to decrease the quantity of pollutants emitted but also to reduce the buoyancy of the plume due to momentum. The reduction in buoyancy, which would lead to reduced dispersion, would be more than offset by the decrease in the amount of pollutants being emitted, so that the impact of the plant when running below the design point would be reduced.

f) Results and conclusions of the Dispersion Modelling Assessment (DMA) for normal operations

(1) Significance thresholds

The predicted ground level concentrations, known as the process contribution (PC) from modelling are compared to the long-term (LT) and short-term (ST) AQALs according to the methodology in IPPC H1 to assess impact [Ref. 3]. Where necessary ambient air concentration data is added to the PC to calculate the predicted environmental concentration (PEC) at the point of maximum impact and the PC and PEC at areas of public exposure known as sensitive receptors. The IPPC H1 methodology for impact assessment of predicted ground level concentrations from emissions to air is summarised as follows:

For long-term (LT) impacts

If the PC is <1% of the AQAL it can be screened out as insignificant.

If PC is >/= 1% of the long-term AQAL, the PC plus the ambient data, the LT PEC is compared to the AQAL; If the PEC is <70% there is little risk of the AQAL being exceeded.

For short-term (ST) impacts

If the PC is <10% of the short-term AQAL it can be screened out as insignificant.

If PC is >/= 10% of the AQAL, the PC plus the 2 x the ambient data, ST PEC is compared to the AQAL; If the ST PC is <20% of the headroom between the AQAL and twice the background concentration, there is little risk of the AQAL being exceeded.

The long-term 1% PC threshold is based on the judgement that: it is unlikely that an emission at this level will make a significant contribution to air quality; and the threshold provides a substantial safety margin to protect health and the environment. The short-term 10% PC threshold is based on the judgement that spatial and temporal conditions mean that short-term contributions are transient and are limited in comparison with long-term process contributions; and the threshold provides a substantial safety margin to protect health and the environment [Ref. Section 6 DMA, Appendix D, Ref. 1].

(2) Human health impact assessment of emissions to air (DERC in isolation)

a) Pollutants other than Group 3 heavy metals (DERC in isolation)

Table 36 in Annex A of the DMA presents the maximum predicted impact of process emissions for the five modelled years (2014–2018) at the point of maximum impact of emissions from the DERC operating in isolation. It should be noted that this assessment is considered conservative as it assumes:

- that the DERC continually operates at the ELVs for the entire year;
- operation at the short term ELVs during the worst-case conditions for dispersion of emissions;
- the entire PM emissions are assumed to consist of either PM_{10} or $PM_{2.5}$;
- that the entire VOC emissions are assumed to consist of either benzene or 1,3-butadiene; and
- that cadmium and thallium are each released at the combined emission limit for cadmium and thallium.

As shown at the point of maximum impact:

- the predicted short-term impact of process emissions is less than 10% of the AQAL for all pollutants;

- the predicted long-term impact of process emissions is less than 0.5% of the AQAL for all pollutants with the exception of:

    - Nitrogen dioxide;
    - VOCs; and
    - Cadmium.

Further analysis of these pollutants has been carried out at sensitive receptors, taking account of baseline concentrations.

5.2.1.1 Annual mean Nitrogen dioxide

Table 27 and Figure 8.10 of the DMA show the maximum predicted annual mean nitrogen dioxide concentrations over the five modelled years (2014–2018) at the point of maximum impact and at each identified receptor location.

The peak annual mean nitrogen dioxide impact from the DERC is predicted to be greater than 1% of the AQAL and therefore cannot be screened out as 'insignificant'. Further analysis has been undertaken to calculate the PEC and determine if there is a risk of exceeding the AQAL in accordance with the H1 screening approach. The Greengairs Waste Management Complex includes a number of currently operational gas engines and a gas flare which emit oxides of nitrogen and carbon monoxide. The contribution these make to local conditions may not be captured in the mapped background data. Therefore, the contribution these sources make has been included in the baseline. The contribution from the gas engines and gas flare at the point of maximum impact of process emissions from the DERC is 0.97µg/m^3 (or 2.42% of the AQAL). The baseline nitrogen dioxide concentration at this point would therefore be 17.95µg/m^3 (i.e.16.98µg/m^3(mapped background contribution) + 0.97µg/m^3 (gas engine and gas flare contribution). At the point of maximum impact, the contribution from the DERC is 0.43µg/m^3 or 1.08% of the AQAL and therefore cannot be screened out as 'insignificant'. However, as shown in Figure 8.10 [Annual Mean Nitrogen Dioxide – ERC Only, Appendix D, Ref 1], the point of maximum impact is uninhabited, located on the Greengairs landfill site, and the annual mean AQAL does not apply. For completeness, the PEC at the point of maximum impact has been considered. As shown in Table 27, the maximum PEC anywhere in the modelling domain is predicted to be 50.2% of the AQAL. This is well below 70% of the AQAL and therefore there is little risk of the additional contribution from the DERC causing an exceedance of the AQAL and the impact is 'not significant'. As the process contribution from the DERC at the point of maximum impact cannot be screened out as 'insignificant', further analysis has been undertaken on the impact at the identified receptor locations. As shown in Table 27 of the DMA, the PC is less than 1% of the AQAL at all of the receptor locations considered and Figure 8.10 [Annual Mean Nitrogen Dioxide – ERC Only, Appendix D, Ref 1] confirms that within the area where impacts cannot be screened out as 'insignificant' there are no areas of relevant exposure in line with the annual mean AQAL. Therefore, the impact at all areas of relevant exposure can be screened out as 'insignificant'.

5.2.1.2 Annual mean VOCs (as benzene)

Table 28 and Figure 8.11 in the DMA show the maximum predicted annual mean VOC concentrations (as benzene) over the five modelled years (2014–2018) at the point of maximum impact and at each identified receptor location, in addition to the contribution from background sources. This assessment conservatively assumes that all the VOCs released from the DERC consist of only benzene.

The peak annual mean benzene impact from the DERC is predicted to be greater than 1% of the AQAL and therefore cannot be screened out as 'insignificant'. However, when the baseline concentration is applied the PEC is less than 70% of the AQAL and as such it can be concluded that the impact of emissions is 'not significant'. Further analysis has been undertaken on the impact at the identified receptor locations. As shown in Table 28 of the DMA, the process contribution is less than 1% of the AQAL at all of the receptor locations considered, and therefore the impact at these receptors can be screened out as 'insignificant'. Figure 8.11 [Annual Mean VOC (Benzene) –ERC Only, Appendix D, Ref 1] confirms that within the area where impacts cannot be screened out as 'insignificant' there are no areas of relevant exposure in line with the annual mean AQAL.

5.2.1.3 Annual mean VOCs (as 1,3-butadiene)

Table 29 and Figure 8.12 of the DMA show the maximum predicted annual mean VOC concentrations (as 1,3-butadiene) over the five modelled years (2014 –2018) at the point of maximum impact and at each identified receptor location, in addition to the contribution from background sources. This assessment conservatively assumes that all the VOCs released from the DERC consist of only 1,3-butadiene.

The peak annual mean 1,3-butadiene impact from the DERC is predicted to be greater than 1% of the AQAL and therefore cannot be screened out as insignificant. However, when the baseline concentration is applied the PEC is less than 70% of the AQAL and as such it can be concluded that the impact of emissions is 'not significant'. Further analysis has been undertaken on the impact at the identified receptor locations. As shown, the change in impact at all sensitive receptor locations except R14 (Upperton) is less than 1% of the AQAL and can be screened out as 'insignificant'. At R14 the impact of the DERC is 1.06%. However, when the baseline concentration is applied the PEC is below 70% of the AQAL, and therefore the impact can be considered 'not significant'.

5.2.1.4 Annual mean Cadmium

This assessment initially used a screening assumption that cadmium is released from the DERC at the combined emission limit for cadmium and thallium. However, monitoring from waste incineration facilities has indicated that concentrations of cadmium are typically approximately 35% of the ELV. Therefore, the assessment has considered the impact of cadmium under the following three scenarios:

- screening –assumes cadmium is released at 100% of the combined ELV;
- worst-case –assumes cadmium is released at 50% of the combined ELV; and
- typical –assumes cadmium is released at 35% of the combined ELV.

Table 30 and Figure 8.13 of the DMA show the maximum predicted annual mean cadmium concentrations over the five modelled years (2014–2018) at the point of maximum impact and at each identified receptor location.

Under the 'screening scenario', the peak annual mean cadmium impact from the DERC cannot be screened out as 'insignificant'. However, the PEC is less than 70% of the AQAL and as such it can be concluded that the impact of emissions is 'not significant'. This is conservative as monitoring data from facilities processing a similar fuel has indicated concentrations of cadmium are usually about 35% of the limit. As shown, in the 'typical scenario', the peak annual mean cadmium impact from the DERC is predicted to be less than 1% of the AQAL and can be screened out as 'insignificant', and it follows that the impact at all sensitive receptors is less and can also be screened out as 'insignificant'. Figure 8.13 [Annual Mean Cadmium (Typical) –ERC Only, Appendix D, Ref 1] shows the spatial distribution of emissions assuming cadmium is emitted at 35% of the combined cadmium and thallium emission limit.

b) Group 3 heavy metals (DERC in isolation)

The Environment Agency document 'Guidance to Applicants on Impact Assessment for Group 3 Metals Stack Releases – V.4 June 2016' ("Metals Guidance")[Ref 4] outlines the following two-stage assessment methodology for detailed modelling of Group 3 metals.

Stage 1 - It is assumed that each metal is released at 100% of the combined group 3 metals ELV (i.e. 0.3mg/Nm^3).

Stage 2 - If the impact cannot be 'screened out' under the first-stage assessment, it should be assumed that each metal is released at the maximum concentration monitored at an existing facility. The Metals Guidance states that where the process contribution for any metal exceeds 1% of the long-term or 10% of the AQAL, there is potential for significant pollution. Where the process contribution exceeds these criteria, the PEC should be compared to the AQAL. The impact can be screened out as 'not significant' where the PEC is less than 100% of the AQAL. This approach is accepted by SEPA. Table 31 and Table 32 in the DMA present the maximum modelled process contribution and PEC assuming that each metal is released at the combined group 3 metals ELV (i.e. 0.3mg/m^3), as required in step one of the Metals Guidance. Further analysis has also been undertaken assuming the release from the DERC is no greater than the maximum monitored at an existing waste facility, as required in step two of the Metals Guidance.

Long Term Results
If it is assumed that the entire emissions of metals consist of only one metal, the annual process contributions of arsenic, chromium (VI), manganese and nickel are predicted to be greater than 1% of the long-term AQAL at the point of maximum impact. However, only the PEC for chromium (VI) is predicted to be greater than 100% of the AQAL under this worst-case screening assumption. If it is assumed that the DERC will perform no worse than a currently permitted facility, the predicted process contribution is below 1% of the AQAL for all pollutants, with the exception of arsenic and nickel. However, the PECs for arsenic and nickel are well below 100% of the AQAL, and so the impacts can be screened out. Therefore, using the Environment Agency Metals Guidance criteria, it can be concluded that there is no risk that emissions from the DERC will cause exceedance of the long-term AQAL for any metal and there is no potential for significant pollution.

Short Term Results
As shown, even if it is assumed that each metal is released from the DERC at the total metal ELV, the maximum 1-hour process contribution at the point of maximum impact is predicted to be less than 10% of the short-term AQAL, and so the impacts can be screened out. Therefore, using the Environment Agency Metals Guidance criteria, it can be concluded that:

- there is no risk of exceeding the short-term AQAL for any metal;
- there is no potential for significant pollution;
- the impact can be 'screened out' under the first-stage assessment; and
- there is no requirement for further assessment using the second-stage methodology.

(3) Human health impact assessment of emissions to air (Cumulative impact)

a) Pollutants other than Group 3 heavy metals (Cumulative)

Table 37 in Annex B of the DMA presents the maximum predicted impact of process emissions for the five modelled years (2014–2018) at the point of maximum impact of emissions from the DERC operating in combination with the proposed Drumshangie EfW and two wind farms. It should be noted that this assessment is considered conservative as it assumes:

- that the DERC and Drumshangie both continually operate at the ELVs for the entire year;
- the DERC and Drumshangie EfW Facility operate concurrently at the short-term ELVs during the worst-case conditions for dispersion of emissions;
- the entire PM emissions are assumed to consist of either PM_{10} or $PM_{2.5}$;
- that the entire VOC emissions are assumed to consist of either benzene or 1,3-butadiene; and
- that cadmium and thallium are released at the combined emission limit for cadmium and thallium.

At the point of maximum impact:

- the predicted long-term impact of process emissions is less than 0.5% of the AQAL for all pollutants with the exception of:
    - Nitrogen dioxide;
    - VOCs;
    - Particulate Matter as $PM_{2.5}$;
    - PAHs; and
    - Cadmium.
- the predicted short-term impact of process emissions is less than 10% of the AQAL for all pollutants, with the exception of:
    - 1-hour nitrogen dioxide; and
    - 15-minute sulphur dioxide.

Further analysis has been undertaken of the cumulative impact of each of these pollutants.

5.2.1.5 Annual mean Nitrogen dioxide

The peak cumulative annual mean nitrogen dioxide impact is predicted to be greater than 1% of the AQAL and therefore cannot be screened out as 'insignificant'. Further analysis has been undertaken to calculate the cumulative PEC and determine if there is a risk of exceeding the AQAL in accordance with the permitting screening approach. The contribution from the gas engines and gas flare on the Greengairs Waste Management Complex at the point of maximum cumulative impact is 0.97µg/m^3 (or 2.4% of the AQAL). The baseline nitrogen dioxide concentration at this point would therefore be 17.95µg/m3 (i.e. 16.98µg/m^3 (mapped background contribution) + 0.97 µg/m^3 (gas engines and gas flare contribution)). The maximum impact of combined process emissions from the DERC and the Drumshangie EfW Facility is calculated to be 1.24µg/m^3 or 3.11% of the AQAL and cannot be screened out as 'insignificant'. As shown in Figure 8.19 [Annual Mean Nitrogen Dioxide – Cumulative, Appendix D, Ref 1], the point of maximum cumulative impact is uninhabited and the annual mean AQAL does not apply. For completeness, the PEC at the point of maximum cumulative impact has been considered. The cumulative PEC at this point is predicted to be 18.60µg/m^3 or 46.5% of the AQAL. This is well below 70% of the AQAL and therefore there is little risk of the additional contribution from the cumulative schemes causing an exceedance of the AQAL

and the impact is 'not significant'. As the cumulative process contribution at the point of maximum impact cannot be screened out as 'insignificant', further analysis has been undertaken to determine the process contribution from each source at all of the receptor locations considered. The detailed results tables can be found in Table 38 of Annex B in the DMA. As shown, the cumulative process contribution is less than 1% of the AQAL at all but three of the sensitive receptor locations considered and therefore the impact can be screened out as 'insignificant'. At three sensitive receptor locations (R4, R5 and R14) the cumulative impact is greater than 1% of the AQAL. However, when the baseline concentration is applied the PEC is below 70% of the AQAL, and therefore the cumulative impact can be considered 'not significant'.

5.2.1.6 – 99.79th %ile of hourly mean nitrogen dioxide (short-term)
Table 37 of Annex B of the DMA shows the short-term cumulative process contribution cannot be screened out as 'insignificant' at the point of maximum cumulative impact. Considering baseline concentrations, the headroom is 164.09µg/m³ (200 -(2 * 17.95). The cumulative process contribution is 20.72µg/m³, which is 12.62% of the headroom. Based on the predicted short-term cumulative process contribution, it can be concluded that there is little risk of the PEC exceeding the AQAL. In addition, the cumulative process contribution is less than 10% of the AQAL at all of the sensitive receptor locations considered, and therefore the cumulative impact can be screened out as 'insignificant'.

5.2.1.7 Annual mean VOCs (as benzene)
As shown in Table 37 of Annex B in the DMA, the peak cumulative annual mean benzene impact is predicted to be greater than 1% of the AQAL and therefore cannot be screened out as 'insignificant'. However, when the baseline concentration is applied the PEC is less than 70% of the AQAL and as such it can be concluded that the impact of emissions is 'not significant'.

As shown in Table 39 of Annex B in the DMA, the process contribution is less than 1% of the AQAL at all but three receptor locations considered (R4, R5 and R14) and therefore the impact at these receptors can be screened out as 'insignificant'. At R4, R5 and R14 the cumulative impact is greater than 1%. However, when the baseline concentration is applied the PEC is below 70% of the AQAL, and therefore the cumulative impact can be considered 'not significant'.

5.2.1.8 Annual mean VOCs (as 1,3-butadiene)
The peak cumulative annual mean 1,3-butadiene impact is predicted to be greater than 1% of the AQAL and therefore cannot be screened out as 'insignificant'. However, when the baseline concentration is applied the PEC is less than 70% of the AQAL and as such it can be concluded that the impact of emissions is 'not significant'. Further analysis has been undertaken to calculate the cumulative PEC and determine if there is a risk of exceeding the AQAL in accordance with the permitting screening approach. As shown in Table 40 of Annex B in the DMA, the PC is less than 1% of the AQAL at seven receptor locations considered, and therefore the impact at these receptors can be screened out as 'insignificant'. At nine sensitive receptor locations the cumulative impact is greater than 1%. However, when the baseline concentration is applied the PEC is well below 70% of the AQAL and therefore the cumulative impact can be screened out as 'not significant'.

5.2.1.9 Annual mean Particulate Matter as $PM_{2.5}$
As shown in Table 37of Annex B, the peak cumulative annual mean $PM_{2.5}$ impact is predicted to be less than1% of the AQAL and therefore can be screened out as 'insignificant' for permitting purposes. It is mentioned in the Report for planning only.

5.2.1.10 Annual mean PAHs (as benzo[a]pyrene)
As shown in Table 37of Annex B of the DMA, the peak cumulative annual mean PAH impact is predicted to be less than 1% of the AQAL and therefore can be screened out as 'insignificant' for permitting purposes. It is mentioned in the Report for planning only.

5.2.1.11 Annual mean Cadmium
In the 'screening scenario', the peak cumulative annual mean cadmium impact cannot be screened out as 'insignificant'. However, the PEC is less than 70% of the AQAL and as such it can be concluded that the impact of emissions is 'not significant'. This is conservative as it assumes cadmium is released from both the DERC and Drumshangie EfW Facility at 100% of the combined ELV.

Further analysis has been undertaken to calculate the cumulative PEC and determine if there is a risk of exceeding the AQAL in accordance with the H1 screening approach. The results are detailed in Table 43 of Annex B in the DMA and indicate that in the 'typical scenario', the maximum annual mean cumulative process contribution at an area of relevant exposure (i.e. at an identified receptor location) is predicted to be 1.01% of the AQAL and the PEC is 6.21% of the AQAL (at R5). Therefore, the PEC is less than 70% of the AQAL and as such it can be concluded that the impact of emissions is 'not significant'.

5.2.1.12 - 99.9th %ile of 15 min. means sulphur dioxide (short-term)
As shown in Table 37 of Annex B in the DMA, the peak cumulative short-term process contribution cannot be screened out as 'insignificant'. Considering baseline concentrations, the headroom is 256.18µg/m³ (266-(4.91 * 2). The cumulative process contribution is 33.16µg/m³, which is 12.94% of the headroom. Based on the predicted short-term cumulative process contribution, it can be concluded that there is little risk of the PEC exceeding the AQAL. In addition, the cumulative process contribution is less than 10% of the AQAL at all of the sensitive receptor locations considered, and therefore the cumulative impact can be screened out as 'insignificant'.

g) Results and conclusions of the Dispersion Modelling Assessment (DMA) for abnormal operations

An assessment of the impact on air quality associated with abnormal operating conditions from the incineration line assessed potential abnormal emissions based on a review of monitoring data from operational facilities of a similar type in the UK [Appendix D of PPC Application, Ref. 1]. The types of abnormal operation considered, all of which were noted to be of low frequency of occurrence, included the loss of reagents for treating flue gas leading to unabated emissions, or failure of the bag filter failure leading to unabated emissions to air and inadequate isolation, and operation at the backstop ELV of 150 mg/m^3 for particulate. Start up and shutdown emissions were also considered, i.e. for start-up until 850^{0}C is reached, and for shutdown after full burnout of waste is completed and the burners have been switched off until the plant cools — the flue gas treatment system would be operational during both of these periods. As a modern design, however, it should be noted that the facility would be designed to operate at a high level of compliance.

The predicted impact on air quality associated with the identified plausible abnormal emissions has been calculated by pro-rating the impact associated with normal operations by the ratio between the normal and plausible abnormal emission values. This is considered to be a conservative assessment as it assumes that the plausible abnormal emissions coincide with the worst-case meteorological conditions for dispersion. In addition, when considering the impact of the DERC the impact of the Greengairs East and Greengairs West Wind Farms has been included in the dispersion modelling. Even with these factors, there are no predicted exceedances of any of the short term or long-term AQALs associated with abnormal operations. The maximum predicted short-term process contribution (as % of the applied AQAL) is 33% for Hydrogen Chloride; and the maximum predicted long-term process contribution (as % of the applied AQAL) is less than 13% for Nickel. When consideration of the baseline concentration is carried out for those pollutants where the process contribution during abnormal operations cannot be screened out as 'insignificant' the PEC is not predicted to exceed the AQAL. This conservatively assumes that the baseline includes a contribution from the Drumshangie EfW, the Greengairs landfill gas engines and flare (for nitrogen dioxide) and the effect of the Greengairs East and Greengairs West Wind Farms. In addition, the assessment has shown that there will not be any exceedances of the TDI for dioxins (see 5.2.3 below for full details).

It is concluded that periods of abnormal operation, as permissible under the IED (Article 46), are not predicted to give rise to an unacceptable impact on air quality or the environment.

h) Commissioning

During the Commissioning period of the plant emissions can temporarily be elevated as control systems are fine tuned. Additional modelling was requested in Further Information Notice 2 and the schedule from a similar facility was provided in the response [Ref 2]. The expected emissions were then modelled for this 6 – 7 month period. The results showed that the weighted annual mean impact of emissions during commissioning is less than 1% of the AQAL and can be screened out as 'insignificant' for all pollutants considered, except VOCs as benzene and as 1,3-butadiene. This is based on the conservative assumption that 100% of VOC emissions are as benzene or 1,3-butadiene (as detailed in the AQA). However, the impact of emissions on these pollutants also exceeds 1% of the AQAL during normal operation. As the PEC for benzene and 1,3-butadeine remains well below 70% of the AQAL, the impact is 'not significant'. The maximum predicted short-term impact during commissioning is less than 10% of the AQAL and screens out as 'insignificant' for all pollutants considered.

In summary, no significant air quality impacts are predicted during the commissioning phase. A detailed commissioning plan is required by Condition 2.8.4 in the Permit. This requires additional detail on the Commissioning emissions six months prior to Commissioning activities.

i) Stack height assessment

The stack height analysis calculated the maximum predicted ground level concentrations for the worst year of weather data for dispersion. This was carried out in ADMS 5.2 using similar inputs to those discussed in d) above i.e. building and terrain effects included and assessment carried out against 5 years of met data for Glasgow Airport (2014 – 2018). Long-term and short-term impacts for stack heights of between 70m to 100m were calculated. The data is presented graphically as a percentage of the AQAL versus stack height in a series of curves for different pollutants/ averaging periods. As discussed above, IPPC HI [Ref. 3] states that to screen out 'insignificant' process contributions:

- the long-term PC must be less than 1% of the long-term environmental standard; and
- the short-term PC must be less than 10% of the short-term environmental standard.

These criteria have been applied to the stack height analysis.

The objective of the stack height analysis is to identify the point where the rate of reduction with increased stack height slows down. This can be identified in the Graphs 1-4 in the DMA as a step change in the slope.

The analysis shows that, for annual mean nitrogen dioxide concentrations, there is a clear change in the slope at a stack height of 80m. However, if the stack height is increased to 90m the peak short-term impact can be described as 'insignificant' for permitting and 'negligible' for planning. Therefore, 90m was selected as the most appropriate stack height for the DERC. SEPA Air Modelling Specialists have reviewed this assessment and accept the conclusion.

j) Plume Visibility

There is the potential for the plume to be visible under certain circumstances. This is caused by water vapour in the exhaust gases condensing as the exhaust gases cool, so that the plume appears visible. However, the water vapour in the gases mix with the ambient air as the plume disperses, so that the plume ceases to be visible once the water vapour content is low enough. If the exhaust gases are hot and dry, or if the weather conditions promote rapid dispersion and slow cooling, it is more likely that the water vapour would disperse before it condenses, so that the plume is not visible at all.

ADMS 5.2 includes a plume visibility module, which models the dispersion and cooling of water vapour and predicts whether the plume would be visible, based on the liquid water content of the plume and local

weather data. This module has been used to quantify the number of visible plumes likely to occur during the operation of the DERC. Figure 8.26 from the planning application [Ref. 5] illustrates the worst-case visibility of the plume.

SEPA guidance note H1 – July 2003 provides a methodology to quantify the potential impact from visible plumes. In accordance with the guidance, conditions that result in medium or lower impacts can be considered acceptable.

The modelling indicates that a visible plume would be apparent for between 9.8% and 15.6% of daylight hours (the extent of variation is based upon the variability of weather conditions during the 5-year period included in the model). The average visible plume length is predicted to be short, with plume length being less than 50m for between approximately 91.6% and 96.4% of daylight hours (including those periods when no plumes are visible). The visible plume would be of a length that exceeds 100m for between approximately 1.7% and 3.9% of daylight hours.

The visible plume would extend outside the main application site boundary for a maximum of 6.5% of the daylight hours in the worst effected year. Using the IPPC H1 significance criteria, as a visible plume extends beyond the site boundary for between 5% and 25% of the year, the visual impact of the plume is 'medium'. Conditions that result in medium or lower impacts can be considered acceptable, and it is therefore considered that the effect of visible plumes from the DERC is 'not significant'. SEPA accepts this assessment.

The following standard Permit condition has been inserted to apply to the main stack, Emission point A1 in Schedule 6 of the Permit:

"*Emissions to air from the stack A1 other than water vapour or steam shall be colourless and free from persistent mist, fumes and droplets*".

This condition is considered to be consistent with BAT for emissions to air associated with plume visibility.

5.2.2 Ecology
See Section 6 below and Annex 1.

5.2.3 HHRA
The results of the atmospheric dispersion modelling study were used to undertake a human health risk assessment ("HHRA"). The advice from health specialists such as the Health Protection Agency (now Public Health England) and Health Protection Scotland is that the damage to health from waste incineration plants is likely to be very small and probably not detectable.

It is a requirement for a PPC application for any waste incineration plant that an assessment of the specific risks to human health are considered in a Human Health Risk Assessment (HHRA). This has been provided in Appendix D of the PPC Application [Ref. 1] as updated by the response to the Further Information Notice 2 [Ref. 2] and the revised Human Health Risk Assessment submitted on 18 December 2020 [Ref. 6].

The specific emissions from a waste incineration plant are described in Section 5.2.1 above. For most of these substances: NO_2, SO_2, particulate matter, CO, ammonia, HCI, HF and volatile organic compounds, the most significant effects on human health will be by inhalation. These impacts have been modelled to identify the predicted ground level concentrations and compared to the relevant standards set in the UK Air Quality Standards and in additional guidance issued by SEPA and the Environment Agency as discussed in Section 5.2.1. These standards have been set at a level designed to present minimum or zero risk to human health [Ref. Section 1 of The HHRA in Appendix D of the PPC Application].

Some pollutants accumulate in the environment which means that inhalation is only one of the potential exposure routes. Therefore, an assessment also needs to be made of the overall human exposure to these substances by the local population and the risk that this exposure causes on a long-term basis.

The substances which have been considered within this assessment are those which are authorised and for which a Tolerable Daily Intake or Index Dose has been set based on the inhalation and or ingestion of the substance. Although Emission Limit Values (ELVs) for PAHs are not currently set for installations, monitoring is required by legislation in the UK. Therefore, benzo(a)pyrene has been included in the assessment to represent PAH emissions. The following have been considered chemicals of potential concern (COPCs) for the purpose of this assessment:

- PCDD/Fs (individual congeners) and dioxin-like PCBs;
- Benzene;
- Benzo(a)pyrene;
- Mercury (Hg);
- Mercuric chloride;
- Cadmium (Cd);
- Arsenic (As);
- Chromium (Cr), trivalent and hexavalent; and
- Nickel (Ni).

This risk assessment investigates the potential for long term health effect of these COPCs through other routes than just inhalation.

- Benzo-a-pyrene to represent PAH emissions
- PCDD/Fs (individual congeners (compounds in the same group)) and dioxin-like PCBs
- Benzene

The following heavy metals:

- Group 1: cadmium
- Group 2: mercury (assessment of mercury and mercuric chloride)
- The following Group 3 heavy metals: arsenic, chromium and nickel

The following Group 3 heavy metals antimony, cobalt, copper, lead, manganese and vanadium do not require assessment because they pose little or no additional risk to inhalation.

Further assessment of the COPCs listed above has been undertaken using the United States Environmental Protection Agency's (USEPA) Human Health Risk Assessment Protocol for Hazardous Waste Combustion Facilities (2005) using the Industrial Risk Assessment Program - Human Health ("IRAP-h View-Version 5.0") software. This is a development of the approach taken by former UK regulator Her Majesties Inspectorate of Pollution (HMIP) in 1996: Risk Assessment of Dioxin Releases from Municipal Waste Incineration Processes. The following pathways are excluded from the assessment because the risk is considered insignificant: groundwater, surface water and absorption through the skin.

IRAP calculates the total exposure through different exposure pathways to calculate doses from inhalation and ingestion for each receptor due to emissions from the DERC. These results are then used to calculate a cancer risk using the US EPA's approach. The results are assessed using the UK Environment Agencies document "Human Health Toxicological Assessment of Contaminants in Soil" Ref. SC050021. This involved 2 types of assessment:

1. **Substances with a threshold level for toxicity.**

For these substances a Tolerable Daily Intake (TDI) is defined. This is an estimate of the amount of contaminant which can be ingested over a lifetime without appreciable health risk and is expressed on a body weight (bw) basis (e.g., Units are ug/kg bw/day). The Guidelines also specify Mean Daily Intake (MDI) values for ingestion and / or inhalation for each COPC.

The MDI is the typical daily intake from background sources across the UK including dietary intake. To calculate overall impact, the HHRA adds the calculated dose due to emissions from the DERC to the MDI for comparison to the TDI. This is relevant for cadmium, chromium (ingestion), methyl mercury, mercuric chloride, nickel, dioxins and dioxin-like PCBs. Table 3 of the revised HHRA [Ref. 6] shows that for cadmium, chromium, and nickel (screening assessment stage), that the MDI for a child receptor, i.e., the predicted contribution from existing background which exists whether or not the DERC is constructed, already exceeds the TDI for cadmium, chromium and nickel — this is unrelated to emissions from the DERC and is discussed further below.

2. **Substances without a threshold level for toxicity.**

For these substances an Index Dose (ID) is defined. This is the level of exposure associated with negligible risk to human health. To calculate impact, the calculated dose due to emissions from the DERC is compared directly to the ID without taking account of background levels. This is relevant for arsenic, benzene, benzo(a)pyrene and chromium (inhalation).

Using the above approach, if the total exposure is less than the TDI or the ID, it can be concluded that the impact of the facility is negligible and the impact is insignificant.

As discussed above, for chromium, cadmium and nickel, the MDI values for a child receptor, i.e. the UK background, already exceeds the TDI for inhalation. This is discussed in Section 4 of the revised HHRA and is summarised briefly below [Ref. 6]:

- Chromium — the MDI for chromium is based on chromium III, the trivalent form of chromium, which the World Health Organisation (WHO) conclude is "an essential nutrient and is relatively non-toxic for man and other mammalian species". The TDI is derived from the US EPA's Reference Dose of 3ug/kg bw/day for chromium VI, the hexavalent form of chromium, a carcinogen. This is the only safety limit for ingestion of chromium and DEFRA recommend it is applied to the whole chromium content as a starting point for screening. Assessing the total dietary intake of chromium [the MDI value] against this TDI is therefore highly conservative because it is not a like for like comparison.

- Cadmium — this is associated with chronic accumulation in the kidney. The Environment Agency in their toxicology report "Contaminants in Soil: Collation of Toxicological Data and Intake values for Humans. Cadmium" confirm that whilst chronic exposure to levels above the TDI may be associated with kidney disease in a proportion of those exposed, small exceedances for shorter periods are of less consequence and assessing lifetime exposure is therefore appropriate. When lifetime exposure is assessed, i.e. period as a child and an adult, the lifetime MDI is below the TDI.

- Nickel — The MDI and TDI (oral) for nickel have been revised following the publication by the European Food Safety Authority of new expert opinion relating to the reproductive and developmental effects in experimental animals. The MDI exceeds the TDI for children for both inhalation and ingestion. However, the value used is considered overly conservative because it relates to a significantly higher ambient nickel concentration than is found in practice (13.0 ng/m^3) assuming inhalation of 0.259 ug/day for an adult for the new MDI (assuming an inhalation rate of 20m^3/day). A review of the monitoring data of nickel across the UK between 2015 and 2019 has shown that concentrations at urban background locations (excluding the EfW sites at Sheffield

Tinsley and Swansea Coedgwilym, which are close to significant sources of nickel) are 0.98 ng/m^3 on average, with a maximum of 2.7 ng/m^3. At urban industrial sites the concentration is slightly higher with average concentrations (again excluding those located close to significant sources of nickel) is 1.70 ng/m^3 on average, with a maximum of 2.70 ng/m^3. A value of 0.05 ug/day or 12.9% of the inhalation TDI for an adult and 33.3% of the TDI for a child has been used in the remainder of the study, this is based on data considered more suitable for industrial sources which are not close to significant sources of nickel, such as the location of Drumgray.

The assessment considers the possible effects on human health at 16 locations which are likely to be exposed to the greatest impact from the Facility and at the point of maximum impact of annual mean emissions which is located on open land to the west of Darngavil Rd. This land is uninhabited and does not appear to be cultivated or used for grazing. The sensitive receptors are identified in Table 1 and Figure 2 in Section 4.4.2 above shows the location of these receptors relative to Drumgray. The receptors have been categorised as 'residential' or 'agricultural' — the pathways considered for these are identified in Table 5 in Section 6 of the revised HHRA [Ref. 6]. IRAP model assumptions and inputs are discussed in Section 7 of the report.

The results are assessed in Section 8 of the revised HHRA report [Ref. 6] and the response to the Further Information Notice 2 [Ref. 2]. Start-up and shutdown operations and upset process conditions are discussed in section 7.6 of the HHRA. It was not considered that these infrequent and temporary events would be likely to affect the long-term impact of the facility.

The conclusions of the revised HHRA for Drumgray only are shown below [Section 9 of the revised HHRA, Ref. 6]. Additional comments from review by SEPA are added in numbered footnotes.

The HHRA has been undertaken based on the following conservative assumptions:

- the Facility will operate continually at the draft BAT-AELs, i.e. at the maximum concentrations which it is expected that the Facility will be permitted to operate at;
- exposure to emissions is based on lifetime exposure assuming continual operation of the Facility, when in reality the Facility will have an operational lifetime of approximately 30 years; and
- the hypothetical maximum impacted receptor (an agricultural receptor at the point of maximum impact) only ingests food and drink sourced from the area with the maximum contribution from the Facility. [See Footnote 1]

The results of the HHRA show that, of all the pollutants considered with a TDI, nickel is the pollutant that results in the highest level of existing exposure (MDI). The combined impact of nickel from existing background sources and contributions from the Facility at the point of maximum impact is 177.3% of the ingestion TDI for an agricultural child receptor. However, the process contribution from the facility for nickel is small, being only 0.23% of the TDI for an agricultural child receptor at the point of maximum impact and lower at identified receptor locations. This is based on the worst case assumption that emissions of nickel are 73.3% of the Group 3 metals BAT-AEL (the maximum monitored by the Environment Agency [See Footnote 2]), along with the other conservative assumptions listed above. The analysis by the Environment Agency states that the maximum monitored nickel concentration is an outlier. If it is assumed that emissions of nickel are 18% of the draft Group 3 metals BAT-AEL, then the impact is only 0.46% of the TDI for ingestion at the point of maximum impact for an agricultural child. On this basis it is considered that the process contribution is negligible, and the Facility will not Increase the health risks from nickel for children significantly. [See Footnote 3].

Similarly, the ingestion of cadmium and chromium from existing background sources and contributions from the Facility also exceeds the ingestion TDI for children. However, the process contribution from the Facility for cadmium and chromium VI is again exceptionally small, being only 0.12% and 0.86 % of the TDI respectively for an agricultural child receptor at the point of maximum impact and lower at identified receptor locations. [See Footnote 4].

The TDI is set at a level "that can be ingested daily over a lifetime without appreciable health risk". The ingestion of nickel, cadmium and chromium by children as a result of background sources [the MDI value] already exceeds the TDI. On the basis that the process contribution of these substances is exceptionally small, it is considered that the Facility will not increase the health risks from these pollutants significantly. Moreover, if we assess the exposure over a lifetime (i.e. a period as a child and adult) the overall impact is well below the TDI, so there would not be an appreciable health risk. Total chromium is assessed against the TDI for chromium VI. Assessing the total diet intake of chromium against this TDI is highly conservative. Therefore, it is concluded that as the process contribution is so small and the TDI is set at a highly conservative level there would not be an appreciable health risk based on the emission of chromium.

The total accumulation of dioxins in an infant, considering the breast milk pathway and based on an adult agricultural receptor at the point of maximum impact feeding an infant, is 0.267 pg WHO-TEQ / kg-bw I day which is 13.36% of the TDI. As there are no other ingestion pathways for infants and the process contribution is less than the TDI, it is considered that the Facility will not increase the health risks from the accumulation of dioxins in infants significantly.
[See Footnote 5].

For all other pollutants, the combined impact from the Facility plus the existing MDI is below the TDI, so there would not be an appreciable health risk based on the emission of these pollutants.

For pollutants which do not have a TDI for inhalation and/or ingestion, a comparison has been made against the ID, which is a threshold below which there are considered to be negligible risks to human health. The greatest contribution from the Facility is from inhalation of chromium VI, which is only 24.67% of the ID for a child receptor at the point of maximum impact. The greatest impact from ingestion is from benzo(a)pyrene, which is only 0.84% Of the Index Dose for an agricultural child at the point of maximum impact [See Footnote 6]. Therefore, emissions from the Facility of chromium VI, benzo(a)pyrene and all other pollutants are considered to have a negligible impact and not significant effect on human health.
In conclusion, the operation of the Facility will not result in appreciable health risks.

Footnotes - SEPA comments
1. This highly conservative assumption is unlikely to be the case in practice. This is particularly relevant when considering predicted exceedances of the TDI discussed below where these are due to a predicted MDI.

2. See Reference 4 in Section 12 of this document. This refers to the Environment Agency Guidance Note Releases from waste incinerators, Guidance on assessing group 3 metal stack emissions from incinerators, Version 4, 28 June 2016. As discussed in Section 5.2.1 f) above, the EA Metals Guidance is based on a summary of 34 measured values for each metal recorded at 18 municipal waste incinerators and waste wood co-incinerators between 2007 and 2015. This is considered to provide a suitable range of emission values to use in the impact assessment of new Energy from Waste plants.

3. This is based on assessment of data when two outliers, i.e. results which are very different from the other results in the data set, are removed (These outliers are discussed in Guidance on assessing group 3 metal stack emissions from incinerators and are reproduced in Table 10 of the revised HHRA [Ref. 6]). Once the outliers have been removed, the Process contribution from the DERC for an agricultural child receptor is <1 % of the TDI at the point of maximum impact, and the health impact of the DERC is therefore not significant. It is the MDI which exceeds the TDI which as discussed above is based on UK background data and is not related to emissions from the DERC.

4. As discussed above, the TDIs for cadmium and chromium are exceeded at the point of maximum impact due to the respective background MDIs and are not due to ingestion or inhalation impacts associated with the DERC. Based on the site of maximum impact, as presented any TDI or Index value dietary route exceedances (dioxins when using updated TWI, cadmium, chromium nickel) are driven by other sources

in the diet than the facility or the nearby proposed Drumshangie EfW plant. We note the higher contributions from the facility (and Drumshangie EfW plant) for nickel (inhalation route) but that the overall exposure is still below the TDI. The site of maximum impact is currently uninhabited and not farmed.

5. Dioxins and furans. Consideration of reducing the TDI for dioxins and dioxin-like PCBs from 2 pg WHO-TEQ/Kg BW/day to a Tolerable Weekly Intake (TWI) of 2 pg/ WHO-TEQ/ Kg bw/ week, effectively a 7 fold decrease which is equivalent to 0.286 pg WHO-TEQ /KG BW/day is currently ongoing by UK Regulators. Therefore the applicant was asked to update their original assessment with these figures in the FIN 2 Response [Ref. 2]. Both sets of numbers have been provided and assessed by SEPA.

Overall SEPA agrees with the approach taken in the human health risk assessment. we note the emission values used, including the worst case values for dioxins (0.04 ng i-TEQ/Nm3) and dioxin-like PCBs (maximum of measured values from EA data), in the exposure assessment for inhalation and ingestion. In the case of dioxins, modelling against the updated TWI demonstrates that the majority of exposure is from other sources, and that compared with these worst case releases from the facility will be low, with a percentage point contribution relative to the TWI of around 4.2% and 5.9% for the agricultural scenario at the identified site of greatest impact (Meikle Drumgray farm).

6. The HHRA and air dispersion modelling assessment assume that 100% of the VOCs emitted from the DERC are made up of benzene which has greater toxicity than other VOCs, and that this is emitted at the level of the Emission Limit Value for VOCs. This is a highly conservative assumption recent monitoring data for VOC indicate emissions from a modern Energy from Waste Plant are typically below 5% of the daily ELV.

As was the case for the dispersion modelling study, the HHRA assumed the worst case operational scenario with all pollutants emitted at ELVs with additional comparison made to impacts at 'typical' emission rates for group 3 metals. SEPA is satisfied that the conclusions drawn in the HHRA are supported by the assessment and that no unacceptable risk to human health is presented by the proposed activities.

The following Permit requirements will enable the assumptions in the HHRA to be checked against real data:

Condition 2.8.20 and Schedule 9 of the Permit require environmental monitoring to confirm baseline data prior to commissioning of dioxins and furans and dioxin-like PCBs in soil, fine particulate matter (PM_{10} and $PM_{2.5}$) in ambient air, and the following metals and their compounds in both soil and in ambient air: cadmium, arsenic, nickel and chromium. The first report is required to be provided 3 months prior to the start of commissioning of the DERC.

Regular extractive sampling from the stack will also check the actual emissions from the site.

5.2.4 Global Warming Potential (GWP)

A greenhouse gas assessment was provided in Appendix D of the Permit Application [Ref.1] to assess the impact of direct and indirect emissions of greenhouse gases as carbon dioxide equivalent. The GWP has been calculated for the nominal design capacity of the DERC of 37.5 Te/Hour of waste with a net calorific value (NCV) of 9.5 MJ/Kg and is compared to that from a conventional power plant (Combined Cycle Gas Turbine) burning natural gas. The assumptions used for the DERC are described in Section 2.1 of the Assessment; the assumptions used for the CCGT are described in Section 3. The assessment is calculated on the basis that there is no export of heat from the DERC.

The assessment predicts that the operation of the power generating processes at the DERC will lead to the release of approximately:

- 123,800 tonnes per year of carbon dioxide equivalent from the incineration of non-biogenic waste;
- 5,700 tonnes per year of carbon dioxide equivalent from nitrous oxide from the incineration process;
- 200 tonnes per year of carbon dioxide equivalent from imported electricity for the incineration facility; and
- 3,100 tonnes per year of carbon dioxide equivalent from the combustion of gas-oil for start-up and shutdown.

Therefore, in total it is predicted that approximately 132,800 tonnes per year of carbon dioxide equivalent would be released from the Installation with the majority arising from the incineration of non-biogenic waste. However, this would be off-set by 72,600 tonnes carbon dioxide equivalent from energy recovery as electricity, so the net emission would be 60,200 tonnes per year of carbon dioxide equivalent from the generation of power from the thermal treatment of RDF — this is in comparison to generating the equivalent power in a conventional CCGT power plant.

The calculation above doesn't include avoided emissions which would have occurred from the disposal of the waste in a landfill, or from other alternative methods of waste treatment, or from future heat export, and is therefore considered to be a conservative assessment of greenhouse gas emissions associated with the operation of a thermal treatment facility. Opportunities for the export of heat from the DERC are discussed in the Heat and Power Plan — See Section 5.15 for further details.

5.2.5 Abatement
See Section 5.21 Consideration of BAT below for detailed discussion of the proposed abatement techniques.

5.2.6 Summary
In summary, SEPA considers that the design and abatement techniques proposed are consistent with BAT for Energy from Waste and that they should ensure compliance with the ELVs based on the BAT-AELs and ELVs in Annex VI of IED. The impact of emissions has been assessed and together with the conditions proposed, the DERC should not give rise to 'significant pollution', and the risk of an air quality exceedance is low.

5.3 Point Source Emissions to Surface Water

Point source emissions to water are covered in Sections 2.4.2, 3.4.3 to 3.4.5 of the application, in the Response to the third Further Information Notice and during meetings with a SEPA Water Specialist documented in an email Dated 02 September 2020 [Ref 7]. Figure 4 in Section 5.12 below also illustrates the design concept.

Surface water from areas of hardstanding and roads will be discharged via a hydrocarbon separator into one of two dedicated surface water attenuation lagoons. The use of a hydrocarbon separator (or interceptor) is in accordance with the requirements of SEPA guidance for SUDS systems (Ref: WAT-RM-08 [Ref. 8]). The design of the surface water lagoons has considered the requirements for Sustainable Urban Drainage Systems (SUDS) – the lagoons will be appropriately sized for flood risk (1 in 100 year) with an additional 40% climate change allowance. The SUDS will be designed in accordance with CIRIA C753. This is in accordance with the requirements of SEPA guidance for SUDS systems. In addition, the lagoons will also provide an additional biodiversity benefit.

The surface water lagoon in the northern half of the DERC (anticipated to have a capacity of approximately 600 m^3) will discharge into the surface water lagoon in the southern half of the DERC (anticipated to have a capacity of approximately 1,850 m^3). Due to the northern lagoon being designed to maintain at least 0.5m depth of water, the southern lagoon would operate as a 'dry' basin and would normally not retain

water other than during rainfall events. The southern surface water lagoon will then discharge via a pipe to the Cameron Burn. The DERC surface water discharge point from the site is shown as W1 in the emissions points drawing in Appendix A of the application. Detailed design of the SUDS system will be provided to SEPA in a report required by prior commissioning condition 2.8.21, 12 months prior to the commencement of commissioning. A testing programme is also required during the first year of Operation as detailed in Schedule 7 of the Permit to ensure that the discharge is uncontaminated. The discharge must also comply with SEPA's General Binding Rules 10 and 11 as detailed in Section 9 below.

During normal operation, there will be no discharges of process effluents – these will be reused, for example in the ash quench. In the event that there are excess effluents generated, such as those generated during boiler blowdown, these will be collected in an on-site tank and transferred offsite for treatment in a suitably licensed facility, assumed to be the leachate treatment facility which currently serves the Greengairs Landfill Site. However, this will be confirmed during detailed design of the DERC. There will be no discharge of process effluents to sewer, as there is currently no feasible sewage connection on or near to the site.

Process water drains within the DERC will drain to a wastewater chamber or pit. Both the process water and surface water drainage systems will be fitted with penstock valves that will inhibit the discharge of contaminated effluent off-site should a fire or significant spill occur. The penstock valves will be interlocked with the fire alarm, so that it is activated in the event of an emergency. Periodic preventative maintenance will be undertaken on the penstock valve in accordance with the manufacturer's recommendations and instructions, to ensure that it will operate when required.

Domestic effluent from welfare facilities will be treated at a package treatment plant located to the east of the DERC and discharged ultimately to the Cameron Burn. This discharge will be subject to a separate licence or registration under the Water Environment (Controlled Activities) (Scotland) Regulations 2011 and is outwith the scope of the PPC Permit. SEPA Water specialists have advised that any proposal to discharge treated sewage effluent to the Cameron Burn at the site boundary would require that the effluent meets a 0.5 mg/l ammonia standard or better and is discharged after passing through an extensive partial soakaway structure to balance the flows and protect the receiving waters.

Rainwater harvesting will be examined during detailed design of the DERC.

The occasional off-loading of process effluent from the decantation tank to tanker for off-site disposal is identified as Emission Point W2 in Table 7.1 in Schedule 7 of the draft Permit. Any tankered effluent arisings from the decantation tank will be treated as 'residues' for the purposes of Chapter IV of IED and will need to be described by an appropriate European Waste Catalogue (EWC) Code from the document 'Guidance for the Assessment and Classification of Waste, Technical Guidance WM3, UK Environment Agencies, 1st edition VI. I, as amended on the accompanying consignment note. This will require an assessment of hazard properties known as a 'WM3 Assessment' to be carried out to determine the appropriate EWC code. This has been required in the permit by prior commissioning requirement 2.8.26 b).

The techniques described above are believed to be consistent with BAT for Point Source Emissions to the Water Environment.

5.4 Point Source Emissions to Groundwater

There are no planned direct emissions to ground or groundwater from the installation activities. All waste handling activities will be carried out over impervious surfaces such as the waste reception hall floor, the waste bunker and the bottom ash hall which will all have a concrete floor with water stops to prevent the passage of water/ pollutants through the joints between concrete slabs. Liquid materials presenting a pollution hazard will be held in vessels with secondary containment to prevent loss to drains or to

ground/groundwater. These techniques are considered to be BAT for prevention of fugitive emissions to groundwater.

The base of the concrete waste bunker will be below ground level and has the potential to generate leachate. The application explains that the bunker will be designed in accordance with BS EN 1992-3: Design of concrete structures — liquid retaining and containment structures and is therefore designed to prevent either the release of liquid into ground / groundwater, or migration of groundwater into the bunker. The bunker will be subject to a routine inspection programme to confirm integrity is maintained. The bunker is also used for firewater containment for any fire inside the building — further details of the integrity will be obtained via Prior Commissioning Condition 2.8.23. Firewater containment measures are discussed further in Section 5.16 Accidents and their consequences.

The decantation tank is also planned to be below ground but limited detail was provided in the Application. Details of the construction specification, secondary containment and measures for leak detection are covered by a Prior Commissioning Condition 2.8.25.

Standard permit conditions for the protection of soil and groundwater have been incorporated into the permit under Condition 7.6. Condition 7.6.1 in particular prohibits the emission of pollutants to groundwater (or soil) from the Permitted Installation. In addition to the Prior Operating Conditions discussed above, these are considered sufficient to control this aspect. Refer to Section 5.6 for further details of techniques to prevent fugitive emissions to water.

5.5 Fugitive Emissions to Air

Fugitive emissions to air are discussed in application in Section 3.4.2 of the Supporting information to the PPC Application [Ref.1]. Fugitive emissions to air will be minimised using the following techniques:

- Waste reception and handling will be undertaken in enclosed waste reception areas which prevent the release of litter and dust. The waste will then be tipped into and stored within an enclosed waste bunker.
- All waste will be delivered to the DERC in enclosed and contained waste delivery vehicles, which will contain any fugitive emissions from the delivery of waste.
- Primary combustion air for the DERC will be drawn from the waste bunker area to maintain negative pressure in the waste bunker area and fed into the combustion chamber beneath the grate. See Section 5.7 for full details of odour control.
- Additional bunker management procedures, including fast acting roller shutter doors and the inclusion of a daily clean down of the waste reception areas, will minimise the release of litter and dusts.
- Enclosure of the majority of the process including flue gas treatment equipment inside buildings.
- Silos will be fitted with bag filter protection where appropriate, to prevent the uncontrolled release of dust during refilling. Maintenance procedures will be developed for routine inspection and testing of the bag filters.
- The lime and activated carbon silos will be filled by bulk tanker, offloaded pneumatically with displaced air vented through a reverse pulse jet filter. The delivery driver will be responsible for connecting the filling pipe to the silo/tanker, with the site operatives responsible for checking that the loading chute is closed following unloading. The silos will be fitted with high-level alarms and equipped with a vent fitted at the top with a fabric filter. Filter residues will be returned to the silo(s), with cleaning of the filter done automatically with compressed air after the filling operation. Filters will be inspected regularly for leaks.

- The APCr silos will be unloaded by a chute system. The height of discharge will be limited where possible. Dusty air from the unloading of silos will be extracted and vented to atmosphere via bag filters fitted to prevent the release of dusts from silo unloading operations. All APCr unloading operations will be supervised by site operatives and undertaken on areas of hardstanding, with any run-off contained in the process water drainage systems. The site operatives will assist the delivery vehicle driver in positioning the tanker in a suitable location beneath the unloading chute. The delivery driver will be responsible for connecting the unloading chute to the tanker. Following completion of unloading, the site operatives will be responsible for checking that the loading chute is closed following unloading.

- Hot bottom ash from the combustion process is quenched using water prior to storage. The transfer of IBA from the combustion process to its dedicated storage area will be undertaken in an enclosed building. The quenching and cooling of the IBA enables its safe removal and minimises the generation of dust and odour. The ash will be maintained wet from quenching to prevent the fugitive release of any dust emissions offsite. If possible, moisture content of the IBA will be optimised to minimise dust release. The IBA will be stored in a dedicated ash hall prior to transfer off-site for recovery or disposal.

The above techniques are considered to be BAT for prevention of fugitive emissions to air.

5.6 Fugitive Emissions to Water

Techniques to limit pollution to soil and groundwater due to fugitive emissions of water are described in section 3.4.5 of the Application and Section 3.4 of the Initial Site Report. Fugitive emissions to water will be minimised using the following techniques:

- The majority of process equipment / structures are located inside fully enclosed buildings so contact with surface water, groundwater and soils is prevented;

- Internal areas of hardstanding and underground structures e.g. the waste bunker and the decantation tank will be designed in line with appropriate standards as discussed in Section 5.4 above, to prevent emission of pollutants into groundwater or soil. Drainage from the internal areas of hardstanding will be to the wastewater pit;

- External areas of site will be constructed of impermeable hardstanding. Surface water from the lower risk areas will drain to the SUDS system via an interceptor as discussed in Section 5.3;

- The gas-oil storage tank and the ammonia storage tank will be located in separate concrete bunds with a storage capacity for spills and leaks of either 110% containment of the largest tank or 25% of the total tankage (whichever is greater). Surface water run-off or spills from the delivery areas for gas-oil and ammonia (one for each material) and any accumulation in the storage bunds will be segregated from the general surface water run-off from the yard areas.

- These storage tanks will be fitted with canopies to prevent the containment capacity of the bunds available for the storage of any spills from being reduced due to accumulation of rainwater. In this way, contaminated surface water from delivery and the storage bunds themselves is segregated from arisings of uncontaminated surface water referred to in 1. above. This is a general BAT requirement but also specifically required by BAT 32 of the Waste Incineration BAT Conclusions.

- Pipework from the storage tanks to the site buildings will be located above ground level;

- Sub-surface systems will be designed to be impermeable and resistant to the liquids collected in them. Preventative maintenance procedures will be used such as pressure and leak tests, material thickness checks and CCTV surveys;

- Hardstanding, sumps, bunds and drainage systems will be subject to regular inspection and maintenance;

- IBA storage is inside a fully enclosed building located on concrete hardstanding with water stops. The IBA Building has a dedicated drainage system and any run-off/leachate from the IBA will be collected for reuse in ash cooling; and,

- APCr is stored inside an external but fully enclosed silo and loading into tankers will be carried out in an enclosed area which drains to the decantation tank.

- Housekeeping, delivery and spill response procedures will also ensure that any spills are cleaned up promptly.

The techniques described above will provide compliance with standard permit conditions for storage of waste, in Particular Conditions 4.4.3 and 4.4.4 and Condition 7.5 for Surface Water Control, Drainage and Surfacing. Additionally, prior commissioning conditions 2.8.21 to 2.8.25 have been included in the permit to provide additional detail to SEPA prior to commissioning.

In Schedule 4, Condition 4.4.8 prohibits the storage of waste for incineration outside the Waste Reception Area. In particular this should prevent the external storage of baled waste which in addition to being a potential source of odour, a vermin and fire risk, can also result in fugitive emissions to water.

The above techniques and permit conditions will ensure the proposed facility meets BAT for prevention of fugitive emissions to water and are consistent with BAT techniques described in the UK Technical Guidance s5.01 'Incineration of Waste and Fuel Manufactured from or Including Waste' [Ref. 9]. Firewater containment measures are discussed further in Section 5.16 Accidents and their consequences.

5.7 Odour

Emissions of Odour are discussed in;

- Section 3.4.7 of the Supporting information to the PPC Application [Ref. 1];
- Odour Management and Mitigation Strategy – Ref: S2679-0330-0004RSF, Dated 05 October 2020 [Ref. 10]; and,
- Appendix D 'Air Quality Assessment' of the PPC Application [Ref. 1].

The storage and handling of incoming waste is considered to have potential to give rise to odour. The DERC will include controls to minimise odour during normal and abnormal operation. The design has allowed space for the installation of an odour abatement system in the future should one be deemed necessary. A qualitative assessment of odour was undertaken in the Air Quality chapter of the Environmental Impact Report and submitted with the planning application [Ref.5] Some of the qualitative results have been summarised in the 'Odour Management and Mitigation Strategy – Ref: S2679-0330-0004RSF, Dated 05 October 2020' [Ref 10]. The controls to minimise odorous emissions from the DERC are as follows;

- All incoming waste will be delivered to the DERC by enclosed road vehicles which are suitable for bulk transfer of waste. The waste reception area will be a fully enclosed building.

- The waste reception area (which includes the Tipping Hall, Waste Bunker and the volume above the waste bunker) within the DERC will be maintained under slight negative pressure to

reduce any emissions of odour, dust or litter, with fast acting shutter doors to the entrance/exit of the tipping hall to be kept closed when no waste deliveries are occurring.

- In the DERC, combustion air will be drawn from above the waste pit, so that odours and airborne dust are drawn from the waste reception area/waste bunker into the incineration line (thus preventing their escape to atmosphere). This ensures that a slight negative pressure is maintained, hence reducing the chance of odours escaping the building.

- the DERC will utilise a volume of air equal to at least 3 air changes per hour as combustion air.

- Odour will also be controlled by keeping the doors between the waste tipping area and the waste bunker closed when there are no waste deliveries occurring.

- Waste feed hoppers will be designed to ensure that emissions of dust and odour are minimised. By ensuring that the hopper dimensions exceed those of the grab, the potential for stray items of waste accumulating on the floor and for dust and waste to be blown from the hoppers, will be minimised.

- Bunker management procedures (mixing and periodic emptying and cleaning) will be developed and implemented to avoid the development of anaerobic conditions in the waste bunker, which could generate odorous emissions.

- In the event of a plant shutdown, which might result in waste being held in the waste bunker for a period of time, the doors to the waste bunker will be kept shut. If necessary fresh waste will be used to cap older waste to minimise odours.

- The quantities of fuel within the waste bunker will be run down prior to periods of planned maintenance, until there is minimal waste retained within the waste bunker.

- In addition, during short periods of unplanned maintenance, the doors to the DERC building will be closed to prevent the escape of odour. Should an extended period of unplanned shutdown occur, there will be facilities in place for waste to be back-loaded from the waste bunker if required for transport off-site to suitable waste treatment facilities.

- During periods of shutdown, odour will be monitored at the installation boundary through olfactory checks by site personnel.

- During normal operation emissions from the process will be released from the main stack. The Industrial Emissions Directive (IED) requires that any combustion gases passing through a waste incineration plant must experience a temperature of 850°C or more for at least two seconds. Due to the high temperature experienced by the gases, most odorous chemicals would be destroyed. Any surviving odorous chemicals may become trapped on the bag filters. The flue gases from the waste treatment/energy recovery process will pass through a flue gas treatment (FGT) system, which includes bag filters to reduce the particulate content of the flue gas.

- Ammonia solution is injected into the furnace as part of the NO_x abatement system, which converts into ammonia during the process, and there may be some occasional “ammonia slip” during operation. However, this will be released as part of the emissions from the main flue. The maximum predicted concentration of ammonia at ground level are at least an order of magnitude below the detection threshold.

- It has been confirmed that as there will be no organic or putrescible solid material present within the IBA or APCr that no odour will be emitted.

- Prior to the commencement of operations, an Odour Management Plan (OMP), which covers the operational and management procedures associated with the operation of the DERC, will be developed and provided to SEPA for approval.

During periods of shutdown, i.e., in the event that the incinerator is offline, the potentially odorous air will vent to atmosphere via a dedicated odour extraction stack which is located on the boiler hall, with the release point being 3m above the height of the boiler hall (58m). This extraction will constitute 3 air changes per hour as per the SEPA Odour Guidance 2010.

Detailed dispersion modelling has been undertaken to quantify the impact associated with the release of potentially odorous air from the odour extraction systems for the DERC. This has been carried out using ADMS 5.2. For the purpose of this analysis, it has been assumed that the odour extraction system from the DERC is continually operating. However, as explained in section 3, the odour extraction system will only operate when the incinerator is offline. Assuming the odour extraction system continually operates will ensure that the model captures the operation of the odour extraction system during the worst-case atmospheric conditions for dispersion. The results of the modelling have been compared to the odour exposure criteria set out in the SEPA's Odour Guidance. This guidance recommends some indicative odour exposure criteria for ground level concentrations of mixtures of odorant, below which there would be "no reasonable cause for annoyance". For "highly offensive odours", including those from activities involving putrescible waste, the criterion is 1.5 OUE/m^3 as the 98th percentile of hourly averages. This has been used as the evaluation criterion for the odour assessment. It is noted that the guidance also states that a local adjustment factor for hypersensitive populations this criterion should be reduced to 1 OUE/m^3. The local area is not deemed to be hypersensitive to odour and as such the criterion of 1.5 OUE/m^3 is considered appropriate for the assessment of odour impacts from the DERC. For modelling purposes, it has conservatively been assumed that the odour release concentration from the waste within the bunker is 2,800OUE/m^3, this concentration is 15% greater than calculated.

Table 4 below sets out the results at the point of maximum impact, and at each identified sensitive receptor. The results are the maximum predicted impact using the 5 years of weather data used for the original dispersion modelling exercise for the DERC in isolation.

Table 4: Odour Analysis –Sensitive Receptor Locations

ID	Receptor name	Maximum 98%ile of 1-hour odour concentration (OU/M^3)
Point of maximum impact		1.72
Maximum impact outside the FCC landholding boundary		1.49
R1	Meikle Drumgray Road	0.14
R2	Stirling Road 1	0.12
R3	House off Stirling Road	0.16
R4	Stirling Road 2	0.18
R5	House off Stirling Road	0.19
R6	Stirling Road 3	0.17
R7	Dykehead Road 1	0.15
R8	Dykehead Road 2	0.22
R9	Airdriehill Street	0.08
R10	Braidenhill Road	0.02
R11	Ballochney Road 1	0.03
R12	Ballochney Road 2	0.12
R13	Arbuckle Road	0.20
R14	Upperton	0.21
R15	Laurel Grov	0.10
R16	Plains Primary School	0.03

The following related prior commissioning conditions have been set in the Permit:

- Condition 2.8.18 requires the Operator to submit a report on the final design of the proposed system for the control of odour emissions during periods of planned and unplanned shutdowns of the incineration line in order to achieve ground level odour below 1.5 OUE/m^3 as the 98th percentile of hourly averages outside the boundary of the Permitted Installation. This is required at least 12 months prior to the Commissioning of the Permitted Installation to enable sufficient time for review, further discussion etc ahead of Commissioning.

- Condition 2.8.36 requires that prior to the commencement of commissioning, the design features necessary to ensure compliance with any condition of this Permit shall be checked to ensure they have been completed and installed as per design and signed off by a relevant qualified engineer. This includes in sub-paragraph b) the following requirement:

  b) that techniques for the control of odour emissions have been installed as described in the PPC Application, and as described in the report provided under Condition 2.8.18 to provide compliance with Condition 3.2.1 and the Odour ELVs prescribed in Table 6.2 and Table 6.2b in Schedule 6 of the Permit;

Other Conditions have been specified in Schedule 3 under the Odour Conditions and are based on conditions previously used in other Permits to control odour:

- The standard odour Condition 3.2.1, which requires that "*All emissions to air from the Permitted Installation shall be free from offensive odour, as perceived by an Authorised Person, outside the Site Boundary*";

- Standard conditions requiring the development of an Odour Management Plan 3 months prior to the first acceptance of waste at the Permitted Installation (Conditions 3.2.2 to 3.2.5):

Additional conditions require the following:

- All doors and openings to remain closed to the tipping hall are areas where odour is likely to be generated to remain closed at all times other than when required for access (Condition 3.2.6);
- Requirement for the odour extraction system to be operational during any period of planned or unplanned shutdown of the incineration line until such time as all RDF has been removed from site, and for the Operator to notify SEPA when this is the case (Conditions 3.2.7 and 3.2.8);
- A requirement for smoke testing to be carried out to check the integrity of the building and to test the effectiveness of the air extraction system particularly when the incineration plant is off-line in maintaining negative pressure. The methodology for doing this is required to be agreed by SEPA in advance and the first test is to be completed at least one month prior to the first acceptance of waste on site (Conditions 3.2.9 to 3.2.11).
- A documented system of operational checks, periodic inspection and planned maintenance on the odour extraction system to ensure that performance is maintained (Condition 3.2.12 and 3.2.13);
- A programme of odour monitoring to be carried out within 3 months of First operation to confirm odour concentrations both at the site boundary and sensitive receptors at locations to be agreed in writing with SEPA (Conditions 3.2.14 to 3.2.15 in Schedule 3; and Table 6.2 and Table 6.2b in Schedule 6 refer);
- Additional to the Permit template, Permit condition 4.4.6 requires a regular cleaning regime which will be laid out in a Hygiene Plan - this should have benefits for minimising odour generation as well as reducing fire risk, vermin etc.
- No storage of baled waste which is a potential source of odour is proposed and there should be no external storage of RDF whether baled, or not. This has been reinforced by the Permit condition 4.4.8 *'For the avoidance of doubt no waste awaiting incineration shall be stored outside the Waste Reception Area*.'

The techniques and conditions described above will ensure the proposed facility meets BAT for prevention of odours.

5.8 Management

Details of the arrangements for management of the proposed facility are discussed in the PPC Application in Section 3.10 [Ref. 1].

As defined in Part 1 of the Pollution Prevention and Control Regulations (2012), the operator is 'the person who has control over the operation of the installation or plant'. FCC will retain control and ownership of the DERC.

FCC will be required to develop an environmental management system (EMS) in accordance with the BS EN IS014001:2015 EMS Standard and with the operating and maintenance instructions of the Engineering Procurement Construction (EPC) contractor responsible for the design of the facility. FCC confirm in their PPC Application that they consider having EMS certification to BS EN ISO 14001 as important in demonstrating to stakeholders that the site will be operated in strict compliance with regulatory requirements and with a commitment to continual improvement. A key requirement of the EMS will be to operate in a transparent and proactive way to maintain the confidence of regulators and neighbours. It is noted that FCC have already attended meetings with the local community in relation to the proposed facility.

The EMS will cover the design, operation of the plant and the processing of waste. Documented procedures detailing how each activity will be controlled will be contained in an environmental procedures manual. A copy of an EMS from a similar FCC Facility was provided with the application to show the structure of the EMS.

The EMS for the facility will clearly define the plant's management structure and will include an environmental policy and an operational guidance manual containing process plant operating procedures for both standard and emergency conditions. An accident management plan will also be developed prior to commencement of commissioning.

In accordance with BAT 18 of the Final Draft Waste Incineration BREF, a risk-based management plan for 'Other Than Normal Operating Conditions' (OTNOC) will be developed as part of the EMS. This will include the following elements:

- Identification of potential OTNOC, root causes and potential consequences. Regular review and update of the list of identified OTNOC following periodic assessment.
- Appropriate design of critical equipment.
- Set-up and implementation of a preventative maintenance plan for critical equipment.
- Monitoring and recording of emissions during OTNOC and associated circumstances.
- Periodic assessment of emissions occurring during OTNOC and implementation of corrective actions if necessary.

The facility will be staffed so that there are enough staff at various grades to manage, operate and maintain the plant on a continuous basis, seven days a week throughout the year. Key roles with environmental management responsibilities will include:

- the General Manager — with overall responsibility for management of the site and compliance with the PPC Permit; waste management and scheduling. The general manager will have extensive experience relevant to these responsibilities.

- the Operations Manager — with day-to-day responsibility for plant operation, to ensure this is in accordance with the requirements of the permit and that any environmental impacts of operations are minimised; they will have responsibility for designing and implementing operating procedures which incorporate environmental aspects.

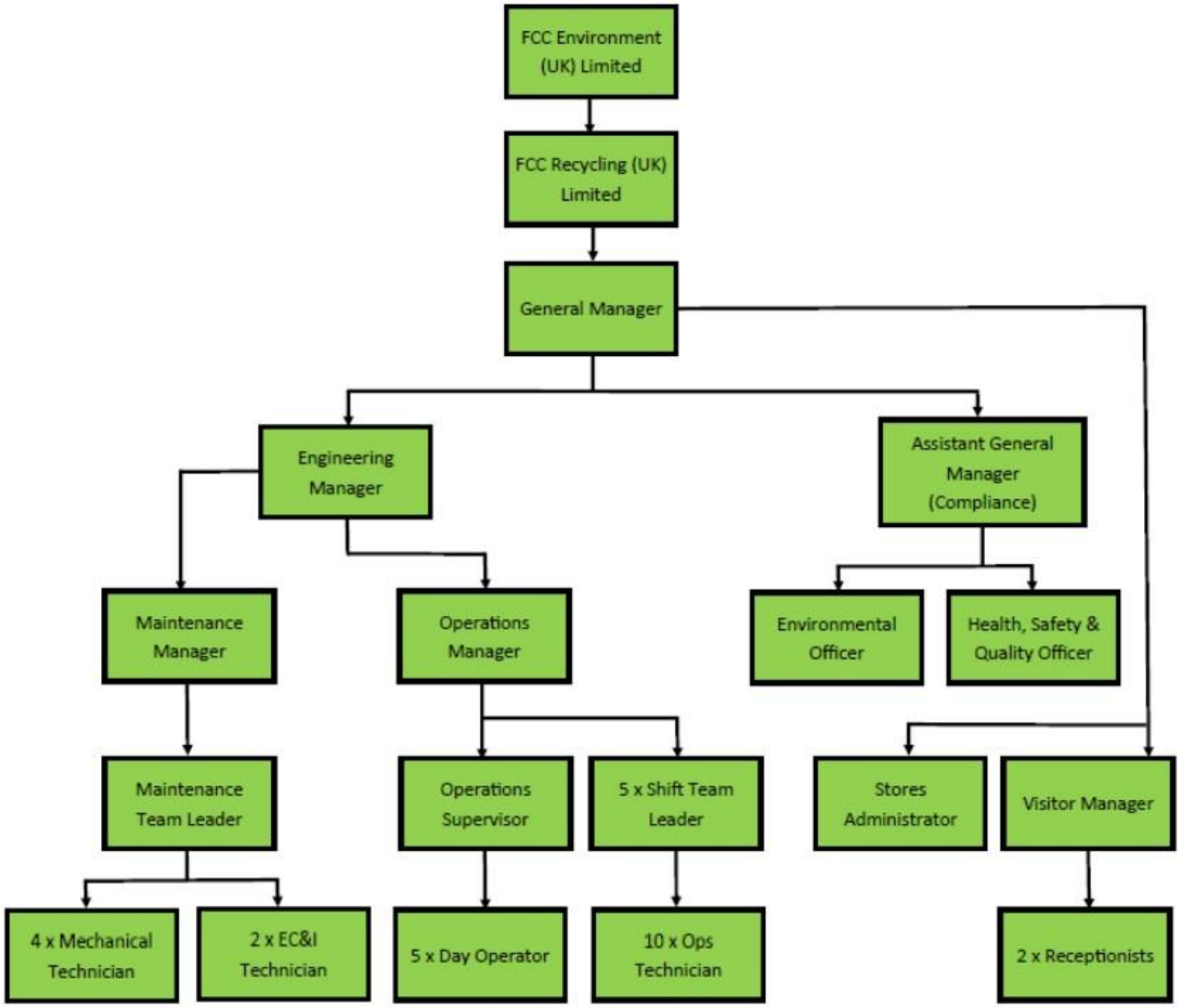
- The Maintenance Manager will be responsible for the management of maintenance activities, for maintenance planning and for ensuring that the plant continues to operate in accordance with its design.

- The Environment Manager will be responsible for the development and management of the EMS, for the monitoring of authorised releases and for interaction with SEPA.

- The Health and Safety manager would be responsible for the management of health and safety systems on-site.

The full staffing structure is shown in Figure 4 below:

Figure 4 – Staffing structure



FCC will implement a Competency Management System. Minimum competencies will be defined for each role and these will be applied during recruitment to ensure the key roles and responsibilities are satisfied by the recruited staff based on their experience, qualifications, knowledge and skills. Training will be undertaken during commissioning. Staff training needs will be identified as part of the appraisal system. Training will comprise a combination of on the job training, mentoring and attendance on internal and external training courses. Training records will be maintained onsite. The operation of the DERC will comply with the relevant industry standards or codes of practice for training (e.g., WAMITAB or similar), where they exist.

Competency levels and transfer of knowledge from the EPC contractor to the Operations team during commissioning will be followed up during inspection and at commissioning meetings by SEPA.

Under the PPC Regulations the waste incineration plant is a Specified Waste Management Activity (SWMA) and the Operator is therefore also required to meet the Fit and Proper Persons (FAPP) test. The FAPP test requires the Operator to demonstrate technical competency, adequate financial provision is in place, that they have no relevant convictions and that there is valid Planning Permission for the proposed activity. This is described in Section 10 of the Administrative decision document, DD-01 and SEPA is satisfied that these requirements have been met.

SEPA is satisfied that the techniques proposed for the operation and maintenance are consistent with BAT for the management of the proposed facility.

5.9 Raw Materials

This is discussed in the PPC Application in Section 3.1 of the Supporting Information and the Site Condition Report in Appendix B [Ref. 1]. The key raw material is the Refuse Derived Fuel (RDF) used to fuel the incineration process, this is 'residual' waste having had recyclates removed either by segregation at source from the point of generation or at a Materials Recovery Facility prior to transport to the site. The RDF will be delivered to site in enclosed or covered trucks and will be stored inside the Waste Reception area in the waste bunker (See Section 5.13 Waste Handling below). The full list of Waste Codes applied for, with comments is detailed in Table 5 below. Other key raw materials and tonnages are summarised in Table 6 below.

Table 5 – Waste Codes

Wastes permitted to be incinerated		
EWC index number (six figure code)	**Description including physical form**	**Limitations and Exclusions**
02	**WASTES FROM AGRICULTURE, HORTICULTURE, AQUACULTURE, FORESTRY, HUNTING AND FISHING, FOOD PREPARATION AND PROCESSING**	
02 01	**Wastes from agriculture, horticulture, aquaculture, forestry, hunting and fishing**	
02 01 04	Waste plastics (except packaging)	Only where material is not capable of being directly recycled.
02 01 07	Wastes from forestry	None
02 01 09	Agrochemical waste other than those mentioned in 02 01 08	None
02 02	**Wastes from the preparation and processing of meat, fish and other foods of animal origin**	
02 02 02	Animal-tissue waste	None
02 02 03	Materials unsuitable for consumption or processing	None
02 02 04	Sludges from on-site effluent treatment	None
02 06	**Wastes from the baking and confectionery industry**	
02 06 01	Materials unsuitable for consumption or processing	None
03	**WASTES FROM WOOD PROCESSING AND THE PRODUCTION OF PANELS AND FURNITURE, PULP, PAPER AND CARDBOARD**	
03 01	**Waste from wood processing and the production of panels and furniture**	
03 01 01	Waste bark and cork	None
03 01 05	Sawdust, shavings, cuttings, wood, particle board and veneer other than those mentioned in 03 01 04	None
03 03	**Wastes from pulp, paper and cardboard production and processing**	
03 03 01	Waste bark and wood	None
03 03 07	Mechanically separated rejects from pulping of waste paper and cardboard	None
03 03 08	Waste from sorting of paper and cardboard destined for recycling	None
04	**Wastes from the leather and fur industry**	
04 02	**Wastes from the textile industry**	

Wastes permitted to be incinerated		
EWC index number (six figure code)	**Description including physical form**	**Limitations and Exclusions**
04 02 09	Waste from composite materials (impregnated textile, elastomer, plastomer)	None
04 02 10	Organic matter from natural products (eg grease and wax)	None
04 02 21	Waste from unprocessed textile fibres	None
04 02 22	Waste from processed textile fibres	None
09 01	**Wastes from the photographic industry**	
09 01 07	Photographic film and paper containing silver or silver compounds	None
09 01 08	Photographic film and paper free of silver or silver compounds	None
15	**Waste packaging, absorbants, wiping cloths, filter materials and protective clothing not otherwise specified**	
15 01	**Packaging (including separately collected municipal packaging waste)**	
15 01 01	Paper and cardboard packaging	Only where material is not capable of being directly recycled
15 01 02	Plastic packaging	Only where material is not capable of being directly recycled
15 01 03	Wooden packaging	Only where material is not capable of being directly recycled
15 01 05	Composite packaging	Only where material is not capable of being directly recycled
15 01 06	Mixed packaging	Only where material is not capable of being directly recycled
15 01 09	Textile packaging	None
15 02	**Absorbents, filter materials, wiping cloths and protective clothing**	
15 02 03	Absorbants, filter materials, wiping cloths, protective clothing other than those mentioned in 15 02 02	None
17	**Construction and demolition wastes (including excavated soil from contaminated sites)**	
17 02	**Wood, glass and plastic**	
17 02 01	Wood	Only where material is not capable of being directly recycled
17 02 03	Plastic	Only where material is not capable of being directly recycled
17 06	**Insulation materials and asbestos-containing construction materials**	
17 06 04	Insulation materials other than those mentioned in 17 06 01 and 17 06 03	None

Wastes permitted to be incinerated		
EWC index number (six figure code)	**Description including physical form**	**Limitations and Exclusions**
17 09	Other construction and demolition wastes	
17 09 04	Mixed construction wastes other than those mentioned in 17 09 01, 17 09 02 and 17 09 03.	None
18	**WASTES FROM HUMAN OR ANIMAL HEALTH CARE AND/OR RELATED RESEARCH (except kitchen and restaurant wastes not arising from immediate health care)**	
18 01	**Wastes from natal care, diagnosis, treatment or prevention of disease in humans**	
18 01 04	Wastes whose collection and disposal is not subject to special requirements in order to prevent infection	None
18 01 07	Chemicals other than those mentioned in 18 01 06	None
18 01 09	Medicines other than those mentioned in 18 01 08	None
18 02	**Wastes from research, diagnosis, treatment or prevention of disease involving animals**	
18 02 03	Wastes whose collection and disposal is not subject to special requirements in order to prevent infection	None
18 02 06	Chemicals other than those mentioned in 18 02 05	None
18 02 08	Medicines other than those mentioned in 18 02 07	None
19	**Wastes from waste management facilities, off-site waste water treatment plants and the preparation of water intended for human consumption and water for industrial use**	
19 05	Wastes from aerobic treatment of solid wastes	
19 05 01	Non-composted fraction of animal and vegetable waste	None
19 05 02	Non-composted fraction of municipal and similar waste	None
19 05 03	Off specification compost	None
19 06	**Wastes from anaerobic treatment of waste**	
19 06 04	Digestate from anaerobic treatment of municipal waste	Only when the waste is not PAS100 or PAS110 Compliant.
19 06 06	Digestate from anaerobic treatment of animal and vegetable waste	Only when the waste is not PAS100 or PAS110 Compliant.
19 08	**Wastes from waste water treatment plants not otherwise specified**	

Wastes permitted to be incinerated		
EWC index number (six figure code)	**Description including physical form**	**Limitations and Exclusions**
19 08	Screenings	None
19 08	Sludges from treatment of urban waste water	None
19 12	**Wastes from the mechanical treatment of waste (for example sorting, crushing, compacting, pelletising) not otherwise specified**	
19 12 01	Paper and cardboard	Only where material is not capable of being directly recycled
19 12 04	Plastic and rubber	None
19 12 07	Wood other than that mentioned in 19 12 06	None
19 12 08	Textiles	None
19 12 10	Combustible waste (refuse derived fuel)	None
19 12 12	Other wastes (including mixtures of materials) from mechanical treatment of wastes other than those mentioned in 19 12 11.	None
20	**MUNICIPAL WASTES (HOUSEHOLD WASTE AND SIMILAR COMMERCIAL, INDUSTRIAL AND INSTITUTIONAL WASTES) INCLUDING SEPARATELY COLLECTED FRACTIONS**	
20 01	**Separately collected fractions (except 15 01)**	
20 01 01	Paper and cardboard	Only where material is not capable of being directly recycled
20 01 08	Biodegradable kitchen and canteen waste	Only to be processed where the waste is disallowed from being processed in a PAS 100 or PAS110 compliant facility.
20 01 10	Clothes	Only where material is not capable of being directly recycled
20 01 11	Textiles	Only where material is not capable of being directly recycled
20 01 38	Wood other than that mentioned in 20 01 37	Only where material is not capable of being directly recycled
20 01 39	Plastics	Only where material is not capable of being directly recycled
20 02	**Garden and park wastes (including cemetery waste)**	
20 02 01	Bio-degradable waste	Only to be processed where the waste is disallowed from being processed in a PAS 100 or PAS110 compliant facility.
20 03	**Other municipal wastes**	
20 03 01	Mixed municipal waste	Subject to pre-sorting requirements

Wastes permitted to be incinerated		
EWC index number (six figure code)	Description including physical form	Limitations and Exclusions
20 03 02	Waste from markets	None
20 03 03	Street cleaning residues	None
20 03 06	Wastes from sewage cleaning	None
20 03 07	Bulky wastes	None

Table 6 – Key Raw Materials

Material	CAS Number	Maximum storage capacity	Annual throughput [tonnes per annum]	Description including any hazard code
Low sulphur fuel oil	68334-30-5	100 m^3	104	Low sulphur fuel oil
Ammonium Hydroxide Solution	1336-21-6	40 m^3	945	25% ammonium hydroxide solution
Hydrated Lime	1305-62-0	400 m^3 (2 x 200m^3 silos)	4,170	Calcium Hydroxide
Activated carbon	7440-44-0	80m^3	100	Powdered
Boiler treatment chemicals (hydrochloric acid, caustic soda)	N/A	N/A	<50	Oxygen scavenger, pH control, biocide, water treatment regeneration chemicals

Various other materials, which will be used in small quantities (<5 tonnes per annum), will be required for the operation and maintenance of the DERC, including:

- hydraulic oils and silicone-based oils;
- isolation media within electrical switchgear;
- refrigerant gases for the air conditioning plant;
- glycol/antifreeze for cooling;
- oxyacetylene, TIG, MIG welding gases;
- CO_2 / firefighting foam agents; and
- ignition, test and calibration gases.

Materials will be stored in accordance with current guidance. Where appropriate, liquid chemicals will be stored in controlled areas, with suitably designed secondary containment facilities (such as bunds) having a volume of 110% of the stored capacity.

5.10 Raw Materials Selection

This is discussed in the permit application in Section 3.1.3 and Appendix E BAT Assessment [Ref. 1].

Reagent selection for NO_x and Acid Gas abatement is discussed in Section 5.21 below.

As stated in Article 50 (3) of the Industrial Emissions Directive:

"*The auxiliary burner shall not be fed with fuels which can cause higher emissions than those resulting from the burning of gas oil as defined in Article 2(2) of Council Directive 1999/32/EC of 26 April 1999 relating to a reduction in the sulphur content of certain liquid fuels (1) OJ L 121, 11.5.1999, p. 13., liquefied gas or natural gas*."

Therefore, the only available fuels that can be used for auxiliary firing are:

1. liquefied gas (LPG);
2. fuel oil; or
3. natural gas.

Auxiliary burner firing on a well-managed waste combustion plant is only required intermittently, i.e., during start-up, shutdown and when the temperature in the combustion chamber falls to the minimum 850°C.

LPG is a flammable mixture of hydrocarbon gases. It is a readily available product and can be used for auxiliary firing. As LPG turns gaseous under ambient temperature and pressure, it is required to be stored in purpose-built pressure vessels. If there was a fire within the DERC, there would be a significant explosion risk from the combustion of flammable gases stored under pressure. LPG has a lower NCV than fuel oil. Therefore, if the DERC was to utilise LPG as an auxiliary fuel, the DERC would consume a larger amount of LPG (on a mass basis) for auxiliary firing. This would result in a higher number of vehicle movements for the delivery of LPG compared to fuel oil. In addition, in accordance with the Liquid Petroleum Gas Association COP 1 Part 4, the required capacity of an LPG tank to supply auxiliary fuel to the DERC would require an exclusion zone of 7.5m. The current layout and design of the site does not include for a 7.5m exclusion zone within the perimeter of the auxiliary fuel tank.

Natural gas can be used for auxiliary firing and is safer to handle than LPG. As stated previously, auxiliary firing will only be required intermittently. When firing this requires large volumes of gas, which would need to be supplied from a high-pressure gas main within reasonable distance of the DERC. A high-pressure gas main with sufficient available capacity is not currently available near to or adjacent to the DERC. Therefore, the supply of natural gas is not currently determined as being 'available' for the purposes of auxiliary firing for the DERC.

A low sulphur fuel oil tank can be easily installed at the DERC. Whilst it is acknowledged that fuel oil is classed as flammable, it does not pose the same type of safety risks as those associated with the storage of LPG. The combustion of fuel oil will lead to emissions of sulphur dioxide, but these emissions will be minimised as far as reasonably practicable through the use of low sulphur fuel oil. Taking the above into consideration, low sulphur fuel oil is considered to represent BAT for auxiliary firing.

5.11 Waste Minimisation Requirements

Waste minimisation is covered in Section 3.2.4 of the Application. These include:

- Improving feed-stock homogeneity to improve process stability and therefore reduced reagent use in flue gas treatment and reduced residue production associated with this. This can be achieved though waste acceptance procedures and mixing of fuel from different sources in the bunker prior to incineration;

- Optimising furnace conditions to reduce residue quantities. This can be achieved by optimising waste feed rates and air flows to achieve burn out requirements for Total Organic Carbon of Loss on Ignition of less than 3% and 5% as dry weight respectively in IBA (bottom ash). The optimal location for the injection of secondary air will be determined by the Computational Fluid Dynamics modelling of the combustion chamber required by prior commissioning condition 2.8.7 b) and the minimum oxygen level required to ensure adequate combustion will be determined by prior commissioning condition 2.8.7 c);

- Trimming (i.e. minimising) dosing of hydrated lime into the flue gas treatment system by matching to acid gas levels in the flue gas using a fast response monitoring system — this also minimises the generation of APCr;

- Matching activated carbon injection to flue gas flow to maintain a steady rate of adsorption gaseous metals and dioxins.

- Optimising the ammonia dose rate with the emissions of NO_x to reduce consumption of ammonia and ammonia slip. The optimal location for SNCR dosing points will be determined by the Computational Fluid Dynamics modelling of the combustion chamber required by prior commissioning condition 2.8.7 d); and,

- Reuse of effluent from the boiler water treatment plant and boiler blow down for ash cooling, thereby reducing effluent arisings.

The standard permit conditions for Resource Utilisation (Condition 2.6.1 to 2.6.4) have been inserted into the Draft permit. These will require the Operator to carry out a systematic assessment every 4 years to review and where appropriate, implement, opportunities for improving the efficiency of use of raw materials, water and energy; and waste minimisation. Progress towards this will be reviewed periodically by SEPA during inspections.

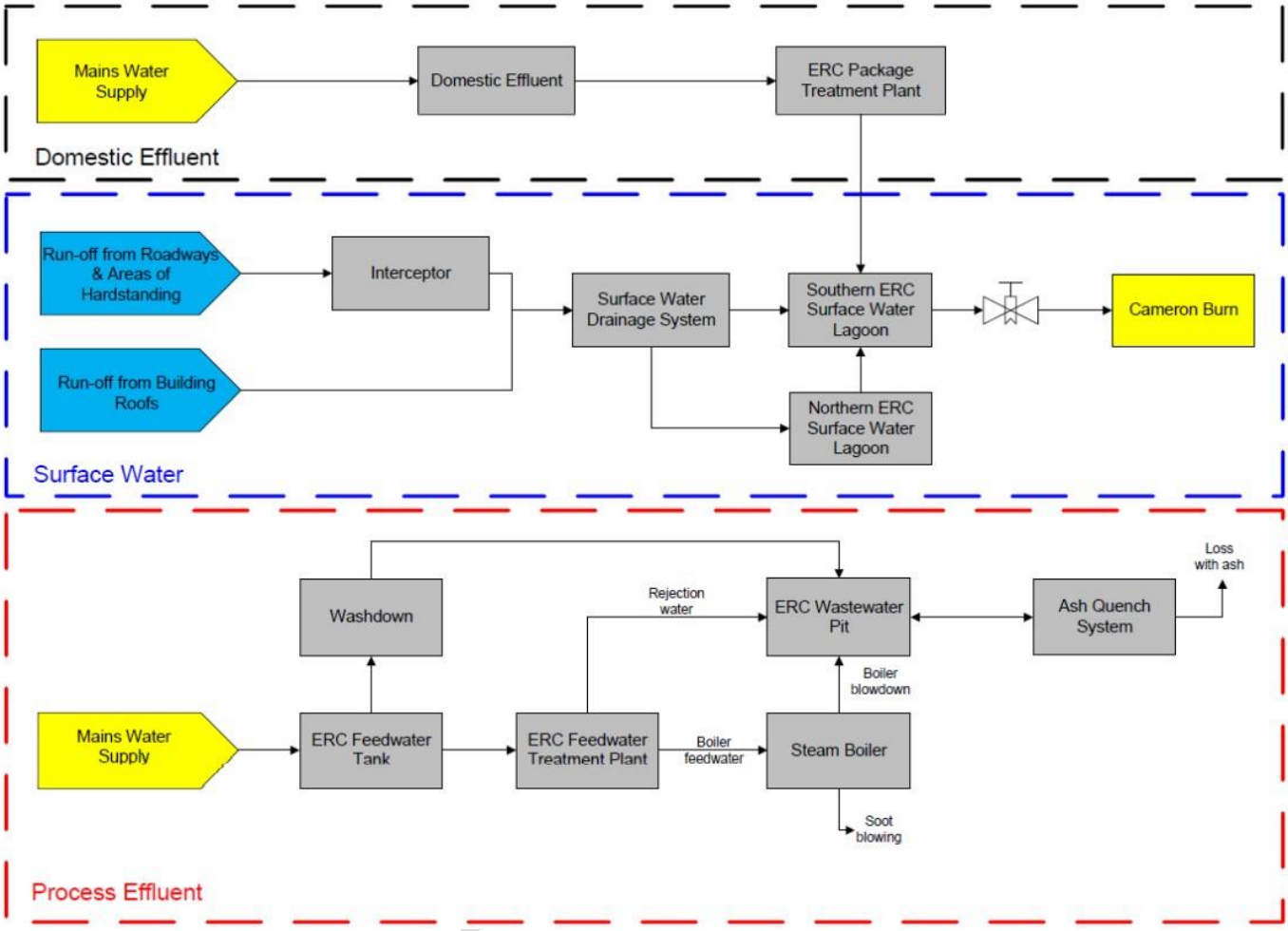
Conditions 8.1.1 and 8.1.2 requires a Residue Management Plan to be produced and reviewed every 2 years to assess how the residue from the plant is prevented or reduced to a minimum, in amount and harmfulness and where residues are produced how they are, in order of priority, prepared for re-use, recycled, recovered or, where that is technically and economically impossible, disposed of while avoiding or reducing any impact on the environment.

The techniques described above together with the Permit conditions in the draft Permit are considered to satisfy the BAT requirements for waste minimisation for the proposed facility.

5.12 Water Use

This is discussed in the application in Section 3.3 of the PPC Application [Ref. 1]. Figure 5 below shows how water will flow through the site.

Figure 5 – Water Flow



Process and potable water will be supplied by the mains water system. Boiler feedwater water will be used to compensate for boiler blow down losses. The site will have a water treatment plant. It is anticipated that DERC will consume approximately 40,000 m^3 per annum of mains water. The water treatment plant is designed to continuously supply high-quality treated water for use in the boiler.

Wastewater will be collected in a wastewater chamber. Effluent collected in the wastewater chamber will be re-used in the process, likely in the ash quench system. Under normal operating conditions, wastewater will be generated from the following processes:

1. effluent from the water treatment plant;
2. process effluent collected in site drainage systems (e.g. boiler blowdown);
3. condensate from the condensate tank;
4. effluent generated through washing and maintenance procedures; and
5. water run-off collected from the bottom ash quench.

The wastewater chamber or pit will provide acid dosing for pH adjustment and settlement of process effluents so that it can be re-used within the ash quench. Should excess process effluents be generated, these will be collected in an on-site tank and transferred off-site for treatment in a suitably licensed facility.

The design and techniques described in the application to minimise water use, including use of a dry abatement system, air-cooled condenser and recycling of effluent are consistent with BAT for water use. Additionally, rainwater harvesting will be examined during detailed design of the DERC. The standard

permit conditions for Resource Utilisation (Condition 2.6.1 to 2.6.4) will require the operator to carry out a systematic assessment every 4 years to review and where appropriate, implement, opportunities for further reductions in water consumption.

5.13 Waste Handling

5.13.1 Waste Inputs

Waste handling is covered in Section 3.2.3 of the Application. Details of acceptable wastes can be seen in Section 5.9 above. Refuse derived Fuel (RDF) will be prepared off-site. Contracts will be held with a limited number of waste treatment facilities and waste providers that will supply waste to the DERC. Contracts will be in place with these suppliers to provide the incoming waste in accordance with a fuel specification.

In respect of wastes provided under EWC code 20 03 01 – Mixed Municipal Waste (the expected main fuel supply):

1. Where, the waste is from a commercial source, non-ferrous metals and hard plastics will have been recovered at source. Therefore, the waste will not require any further treatment in accordance with the Thermal Treatment of Waste Guidelines.

2. Where the waste is from a household source, then it is deemed that it has not undergone pre-treatment. As such any supplier that provides household waste under a 20 03 code will be required to provide evidence to the Operator, in the form of a copy of the letter signed by the Head of Regulatory Services for that region, that the Pre-Treatment Practicability Test (PTP Test) has been undertaken and that further treatment is not required. In addition, the Operator will require that any supplier wishing to supply household waste that does not require pre-treatment works with the Local Authority to provide periodic evidence to ensure that capture rates of non-ferrous metals and hard plastics remain consistent with the performance submitted as part of the PTP Test, this will most likely be in the form of recycling rates and/or compositional analysis where possible.

Where either of the above cannot be demonstrated, the incoming waste will be required to be processed in a suitable facility before delivery.

Documented procedures for pre-acceptance and acceptance of all wastes will be developed prior to the commencement of operation, in accordance with the documented management systems for the DERC. The pre-acceptance and acceptance checks on wastes being delivered to the DERC will include audits of waste producers and/or fuel suppliers to review their operations to confirm that the waste which they are transferring to the DERC is in accordance with the relevant waste descriptions, specifications and EWC codes.

Pre-acceptance checks will be carried out, where possible, to identify the presence of gas canisters in the waste. Should these be identified in the bunker, they will be removed accordingly as they can explode on the grate causing CO spikes. Procedures will be implemented on site for the review of incoming wastes and their associated Waste Transfer Notes (WTN) at the weighbridges and for checking incoming wastes against the agreed specifications on a regular basis. This will include depositing waste loads onto the waste reception area floor for periodic visual inspection. Crane drivers and other operatives will be trained in order to undertake these tasks. Waste will also be inspected by the crane operator and tipping hall operator as it is tipped into the bunker and mixed.

When receiving waste the following will be adhered to:

- A high standard of housekeeping will be maintained in all areas and suitable equipment will be provided and maintained to clean up spilled materials;

- Vehicles will be loaded and unloaded in designated areas provided with impermeable hard standing. These areas will have appropriate falls to the process water drainage system;
- The integrity of hardstanding surfaces will be periodically verified as far as technically possible;
- Fire-fighting measures will be designed in consultation with the Local Fire Officers, with particular attention paid to the waste reception and storage areas;
- Delivery and reception of waste will be controlled by a management system that will identify all risks associated with the reception of waste and shall comply with all legislative requirements, including statutory documentation;
- Incoming waste will be delivered in enclosed vehicles and unloaded in the enclosed waste reception areas;
- Design of equipment, buildings and handling procedures will ensure there is insignificant dispersal of litter;
- Inspection procedures will be employed to ensure that any wastes which would prevent the DERC from operating in compliance with its PPC Permit are segregated and placed in a designated storage area pending transfer off-site; and,
- Further inspection will take place by the plant operatives during vehicle tipping and waste unloading.

In accordance with BAT 11 of the Final Draft Waste Incineration BREF, the following waste monitoring will be undertaken at the DERC.

- It is not anticipated that the incoming waste will be radioactive, therefore radioactivity detection will not be undertaken at the DERC;
- Waste deliveries will be weighed at the weighbridges upon arrival, with vehicles weighed again upon exit from the MPT and ERC;
- Where possible, periodic visual inspection of the waste will be undertaken as it is tipped into the bunker, with the crane operator able to identify and remove any unsuitable non-combustible items;
- Periodic samples of the waste will be taken to analyse for key properties such as caloric value;
- Should sewerage sludges be accepted at the DERC, periodic sampling and analysis will be undertaken where appropriate to determine key properties such as calorific value;
- Waste deliveries will be weighed and visually inspected as far as technically possible when waste is tipped into the waste bunker; and,
- There will be no hazardous waste accepted at the DERC.

Standard Permit conditions in Schedule 4 of the Permit cover requirements relating to waste reception, inspection and storage. Condition 4.1 covers permitted types of waste. A detailed list of wastes acceptable at the site is included in Section 5.9 above and in Table 4.1 in the Permit.

Schedule 4 of the Permit will specify conditions for permitted waste types including prohibited wastes i.e. such as hard/ dense plastics and non-ferrous metals; permitted quantities of waste; requirements for waste acceptance and waste storage.

The Application acknowledges that waste acceptance procedures for household waste will require a pre-acceptance step to ensure that recyclates have been segregated from the incoming waste stream prior to their arrival on site (this should already have been done for commercial waste streams). Where it is not planned for any local authority waste to have gone through a materials recovery facility to separate out recyclates from residual waste between the point of collection and the DERC, this will require a derogation letter from SEPA. This is issued on a case-by-case basis where SEPA has accepted that source segregation techniques at the point of collection are to a sufficient standard that recycling targets can be met without requiring any further sorting of residual waste prior to incineration. Prior Commissioning Condition 2.8.27 requires submission of the waste acceptance procedures and associated inspection schedule to SEPA at least 3 months prior to commissioning.

For periods of unplanned prolonged shutdown of the plant a back-loading facility will be included in the bunker design. This will comprise a feed chute to be loaded by overhead crane into an articulated lorry. This can also be used for removal from the bunker of any non-combustible or oversized items identified in the bunker.

Measures to control litter and vermin are covered by standard conditions under Condition 3.4 in Schedule 3.5 of the Permit.

The techniques described together with the standard conditions in Schedule 4 of the Permit are consistent with BAT for Waste inputs to the facility.

5.13.2 Waste Outputs

Waste outputs are covered in Sections 2.3.7, 3.4.2.3, 3.4.7.4, and Section 3.9 of the Application. Solid and liquid wastes generated by waste incineration are known as 'residues'. Storage and handling of excess process effluent is discussed in Section 5.3 above.

The key solid residues generated by the facility will be non-hazardous incinerator bottom ash (IBA), a mix of bottom ash and boiler dust; and hazardous air pollution control residues (APCr). The storage and handling arrangements for IBA and APCr are described in Sections 5.5 and 5.6 above, a key requirement is that these two residue streams are stored, and treated/ recycled or disposed of, separately. The procedures for characterising and managing these waste streams will be covered by the Residue Management Plan required by Condition 8.1, see also section 5.14 below.

Condition 2.8.29 requires the Operator to submit to SEPA details of the equipment and plant selected 6 months prior to commencement of commissioning. This shall include a drawing and technical description of the bottom ash transport, cooling and storage system and associated collection for transport off-site.

The techniques described together with the standard conditions in Schedule 8 of the Permit are consistent with BAT for residues generated by the facility.

5.14 Waste Recovery or Disposal

This is covered in Section 3.9 of the Application. IBA and APCr are segregated waste streams as required by Permit Condition 8.1.8. As discussed in Section 5.6, IBA is stored in a dedicated building for IBA storage from where it is transferred to truck for transport off-site and APCr is transferred to a silo for storage prior to transfer to a tanker for transport off-site. Table 7 below shows the quantities of residues that the site will store and produce each year.

Table 7 – Site residue summary

Source/ Material	Properties of Residue	Storage location/ volume stored	Future annual quantity of residue produced based on nominal design capacity (estimate)	Disposal Route and Transport Method	Frequency
IBA	Grate ash. This ash is relatively inert, classified as non-hazardous.	Ash hall, approximately 1,200 tonnes storage capacity.	65,000 tonnes	Transferred to a suitable IBA processing facility.	Daily
Fly Ash / APCr	Ash from the boiler and flue gas treatment, may contain some unreacted lime.	2 silos, approximately 200m^3 each storage capacity (or 280 tonnes)	12,000 tonnes	Transferred to a suitably licensed hazardous disposal facility.	Daily

Incinerator bottom ash is a mixture of boiler ash and bottom ash from the grate. The intention is to recycle IBA from the facility as secondary aggregate. The residues will be tested to confirm their hazard status under Technical Guidance WM3 Guidance on the Assessment and Classification of Waste jointly issued by the Environment Agency, Northern Ireland Environment Agency, Natural Resources Wales and SEPA [Ref. 10]. IBA usually attracts a non-hazardous waste classification. Prior commissioning condition 2.8.28 requires the Operator to submit proposal for an accelerated testing programme of IBA 3 months prior to commencement of commissioning to confirm hazard status and, if it is likely the material is to go to landfill where no outlet for recovery is identified, waste acceptance criteria testing. The condition requires FCC make reference to both the methodologies in WM3 and the Environmental Services association document "A Sampling and Testing Protocol to Assess the Status of Incinerator Bottom Ash", Ref. WRc Report Reference UC 9390.05, published by the Environmental Services Association, January 2018, as amended, this is known as the ESA Protocol [Ref. 11] and is widely used throughout the UK for establishing the hazard status of IBA. If the ash subsequently fails to meet the requirements for non-hazardous waste during routine testing it may also need to be diverted to landfill.

A small IBA processing pad is already located on the adjacent Greengairs landfill and planning permission has been granted for this to be extended. FCC plan to send the IBA there for treatment.

APCr is classified as an absolute hazardous waste in WM3 primarily due to the high content of lime and other calcium salts. There are limited options for recycling of APCr in the UK. It may be possible to use the APCr to neutralise acidic wastes at a third-party treatment site, failing that it may require disposal to hazardous waste landfill. This is currently likely to be transported for treatment and disposal in England until such time as suitable facilities are available in Scotland. The residue management plan required by Condition 8.1.1 of the Permit will require this to be kept under review.

5.15 Energy

Basic Energy Efficiency Requirements are described in Section 3.8 of the permit application and are consistent with BAT techniques and requirements described in Section 2.7 of the Sector Guidance s5.01 [Ref. 9]. This includes use of high efficiency motors, variable speed drives and high standards of cladding/ insulation etc.

NOTE - The generic guidance for the BAT states that the energy efficiency requirements under the PPC Regulations will be satisfied provided the Operator meets the following conditions: "the Operator meets the basic energy requirements in Section 2.7.1 and Section 2.7.2 below when they the site is a participant to a Climate Change Agreement (CCA) or a Direct Participant Agreement (DPA) within the Emissions Trading Scheme." This is not applicable here as the ERF is not a participant in a CCA or be a DPA within the Emissions Trading Scheme.

5.15.1 Heat and Power plan

Section 3.8 and Appendix F of the PPC Application [Ref. 1] discuss the Heat and Power Plan (HAPP) for the facility. (Note: the application and HAPP both contain reference to the MPT which has now been removed so the figures below have been revised to take that into consideration).

SEPA's Thermal Treatment of Waste Guidelines (TTWG) [Ref. 12] were first issued in 2009 and updated in 2014. TTWG specify that it is a requirement that all new thermal treatment plants must ensure the recovery of energy from waste takes place with a high level of energy efficiency as required by Regulation 9F of the PPC Regulations 2012, as amended. Specific energy efficiency recovery targets are identified in Annex 1 of TTWG for initial start-up and for 7 years after the cessation of commissioning. The Quality Assurance for Combined Heat and Power (CHPQA) standard published by DEFRA has been adopted in defining how energy recovery efficiencies are calculated.

TTWG also requires that waste treatment proposals do not impede other waste management options e.g. recycling or waste prevention opportunities further up the waste management hierarchy and work in conjunction with best practices to maximise the benefit from treatment of waste. Therefore only 'residual waste' i.e. waste which has been subject to all reasonably practicable measures to recover materials for recycling should go forward for thermal treatment (See Section 5.13 of this document).

Best practice for thermal treatment of residual waste is deriving maximum benefit from it in the form of heat and electrical energy recovery during incineration. The proposed DERC will be a Combined Heat and Power (CHP) plant. The HAPP has been produced based on the nominal design capacity for processing 300,000 tonnes of residual waste per annum based on waste with a NVC of 9.5 MJ/Kg and 8,000 hours operation per annum.

The DERC will be designed to generate approximately 30 MWe of electricity in full condensing mode, with a parasitic site load of 4.5 MWe (Note; this is the electricity requirement to operate the facility and the proposed MPT plant. With the MPT proposal removed this parasitic load should drop to 3.5 MWe) and with the remaining 26.5 MWe exported to the local grid. The Applicant is currently looking for a 30 MWe grid connection capacity offer potentially at the Cumbernauld South Sub-Station from Scottish Power Energy Networks although discussions regarding the Point of Connection (POC) are ongoing. The point of connection to the substation would accommodate the maximum electrical output from the DERC.

The HAPP states that it should be technically possible to export up to approximately 24 MWth from the DERC. However, a higher heat export capacity would have an adverse impact on power export and power efficiency. Therefore, the heat network would need to be designed to take into account the estimated local demand and economic returns resulting from power generation. Three methods of obtaining heat were considered in the HAPP;

1. Heat recovery from the air-cooled condenser;
2. Heat extraction from the steam turbine; and,
3. Heat extraction from the flue gas.

The method chosen was to supply heat for the network under consideration is by extracting steam from the steam turbine. This method for the supply of heat is considered to be preferable for the following reasons:

1. The heat requirement of the identified consumers (as described in section 5) is suited to the temperatures attainable from the turbine with minimal power loss due to exporting energy to the heat circuit.
2. The use of a flue gas condenser would generate a visible plume which would be present for significant periods of the year. This is not desirable as it would significantly add to the visual impact of the DERC and as such has not been included.

3. The use of steam from the steam turbine offers the most flexibility for allowing heat to supply potentially variable future demands.
4. There is some scope for increasing the heat export capacity when extracting steam from the steam turbine, as well as ramping up the heat supply as the network is developed.
5. Extraction of steam from the steam turbine, heat transfer to a hot water circuit and delivery of heat to consumers can be facilitated by well proven and highly efficient technology.

For potential existing heat consumers the HAPP states that Ener-Vate (specialist district heating consultant) has investigated whether there could be any existing buildings and/or developments within a 10 km radius that could potentially connect to the network via a retrofit – replacing current energy provisions that have a higher carbon intensity. The investigation has consisted of both a desktop and field study to produce potential heat off-take data. The study does not assess the viability of retrofitting dwellings within the 10 km locale. This is due to a number of factors, most importantly the cost of retrofit and difficulty in securing successful negotiations with numerous homeowners in order to make a connection viable. The desktop study used all collected field data along with a GIS mapping software to assume a square metre build out for each potential heat user within the 10 km locale and thus assume the potential heat consumption by applying benchmark figures (kWh/m^2) from the Chartered Institution of Building Services Engineers (CIBSE) Guide F (Energy Efficiency in Buildings) 4 to each heat user. Identified existing heat users have been categorised into 12 'zones' for ease of data evaluation.

Appendix A of the HAPP contains a list of all identified heat users included in the study along with their 'Zone ID' and potential heat consumption per annum in kilowatt hours (kWh). Figure 3 of the HAPP shows location of potential existing heat consumers. A list of potential existing consumers, including estimated heat demands, is provided in Table 3 of the HAPP and replicated below;

Table 3 simplifies the total kWh per annum assumed per zone.

Table 3: Potential Existing Heat Consumers

Zone	Location	Annual Heat Demand (MWh/year)	Annual Heat Demand (GJ/year)	Average Heat Demand (MW)	Peak Heat Demand (MW)
1	Greengairs and Wattston	200	721	0.02	0.06
2	Caldercruix	805	2,899	0.09	0.25
3	Plains	1620.8	1,382	0.19	0.50
4	Glenmavis	2,380	8,567	0.27	0.73
5	Airdrie North	2,846	10,246	0.32	0.88
6	Airdrie Central	4,367	15,723	0.50	1.35
7	Airdrie South	7,631	27,472	0.87	2.35
8	Coatbridge	7,094	25,539	0.81	2.19
9	Chapelhall	28,598	102,953	3.26	8.82
10	Strathclyde Business Park	16,181	58,252	1.85	4.99
11	Cumbernauld West	3,829	13,784	0.44	1.18
12	Cumbernauld East	3,622	13,039	0.41	1.12
	Total	**79,175**	**285,030**	**9.04**	**24.42**

Source: Ener-Vate Heat survey

The total estimated heat consumption for existing properties within a 10 km radius of the ERC, is 79,175 MWh per annum (79.1GWh).

For potential new connections Ener-Vate has conducted a study using data for all new developments currently in the planning application stage within a 10 km radius of the ERC which includes three developments on the former Drumshangie Open Cast Site owned by Albert Bartlett Foods, lying directly adjacent to the proposed Facility:

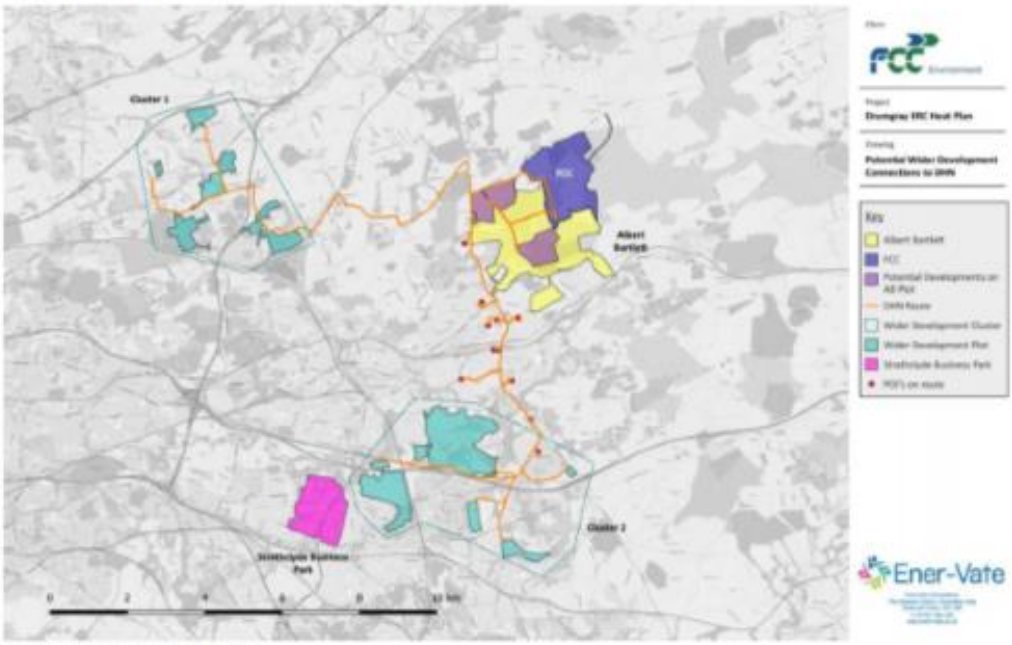
1. Residential-Led Mixed Use Development: 523 dwellings, 5,768 m^2 retail.
2. Potato Processing Factory: The factory itself (including small office space)
3. Data Centre: Office building and potential new-build developments in the 'wider area', still within the 10 km radius of the DERC.

Ener-Vate has also identified the 'potential wider developments' consists of 11 developments which are split conveniently in to two 'clusters' which lie to the south and east of the DERC.

Finally potential wider development connections to District Heat Network (DHN) have been considered along with potential design and profile of the DHN.

Figure 10 of the HAPP shows all potential heat connections along with indicative DHN routes, followed by Table 7 of the HAPP outlining heat consumption and DHN length per zone. These have been replicated below:

Figure 10: All Potential Connections to DHN



Source: Ener-Vate Heat survey

Table 7: Heat Consumption and Network Length per Zone

Building Names	Annual Heat Demand (MWh/year)	Annual Heat Demand (GJ/year)	Average Heat Demand (MW)	Peak Heat Demand (MW)	Length of Network (m)
Albert Bartlett	3,207	11,546	0.37	0.99	3,000
Cluster 1	12,676	45,634	1.45	3.91	18,745
Cluster 2	29,647	106,729	3.38	9.14	20,335
Existing heat user on route	32,676	117,632	3.73	10.08	5,677
Total	**78,206**	**281,540**	**8.93**	**24.1**	**47,757**

Source: Ener-Vate Heat Study report

The HAPP states that there are a significant number of new build multi-use developments either within the planning system or within land allocations. The availability of a low carbon competitive source of heat would be attractive to developers.

The TTWG states that the Heat and Power Plan must show how, within a period of seven years from cessation of commissioning, further energy can be recovered over and above the initial operational energy recovery. Specifically, the Heat and Power Plan should provide details of how the applicant proposes to achieve the relevant the QI value or Indicative Efficiency specified in Annex 1 of the TTWG's and should give an indication of anticipated progress for each year up to the end of the heat plan period. TTWG states that the QI value is to be estimated and calculated in accordance with the relevant Combined Heat and Power Quality Assurance (CHPQA) method for the relevant type of thermal treatment facility and fuel type. The calculation must demonstrate that as a minimum the QI or efficiency values meet the energy recovery targets provided in Annex 1 of the TTWG. Annex 1 of the TTWG requires facilities processing over 70,000 tpa of fuel to meet or exceed the following criteria:

- QI value ≥ 93; or
- indicative overall efficiency ≥ 35%, in order to demonstrate best practice for thermal treatment of waste facilities.

Fichtner have calculated the QI and efficiency values for the DERC in accordance with the TTWG for various load cases and the results are presented in in Table 10 of the HAPP, reproduced below:

Table 10: QI and efficiency calculations

Load case	Gross power efficiency (%)	Heat efficiency (%)	Overall efficiency (%)	CHPQA QI
1. No heat export	25.0%	0.0%	25.0%	55.2
2. Heat load required for indicative overall efficiency of 35%,	22.2%	12.8%	35.0%	64.5
3. Average network heat load	21.1%	18.0%	39.1%	68.3
4. Heat load required for QI value of 93	13.8%	52.2%	65.9%	93.0

The results indicate that the DERC would exceed indicative overall efficiency threshold of 35% for the average heat load export case (load case 3), based on heat consumers identified in Section 5.4 of the HAPP.

For reference, a heat export of 6.1 MWth is required to achieve overall efficiency of 35%. Based on information provided in the development plans, it is estimated that the heat demand capacity identified in the area surrounding the DERC would exceed this threshold and that it is technically possible for the DERC to export at least this amount of heat, subject to the subsequent design process

Standard Permit Conditions require annual updates of the HAPP which include a review of progress towards meeting the 7-year Energy Efficiency Recovery Target in TTWG.

The following prior commissioning conditions have also been specified in the permit in relation to the HAPP:

Permit condition 2.8.5 requires an updated version of the HAPP to be submitted to SEPA 6 months prior to commencement of commissioning. This includes an update on proposed outlets for heat and power and details of the timetable for installation of the associated infrastructure.

Permit condition 2.8.6 requires the Operator to confirm that infrastructure for exporting electricity and/ or heat or steam to the National Grid and/ or to local users has been completed and that on First Operation of the Permitted Installation said electricity shall be exported in order to meet the start-up threshold requirements as specified in the TTWG.

15.5.2 Waste Incineration BATCs — Energy efficiency requirements

BAT 2 is to determine the gross electrical efficiency, the gross energy efficiency, or the boiler efficiency of the incineration plant as a whole or of all the relevant parts of the incineration plant. For new plants the gross electrical efficiency should be determined by carrying out a performance test at full load. This has therefore been included as a requirement of the commissioning tests in Condition 2.9.2 h) of the Permit.

Prior commissioning condition 2.8.10 is inserted in the Permit to require the methodology for carrying out the performance test required by Condition 2.9.2 h) to be provided in advance of commissioning.

For grate-fired incineration processes such as planned for the DERC, BAT 2 suggests in the absence of an EN standard, that German standard FDBR Guideline RL7 'Acceptance Testing of waste Incineration Plants with Grate Firing Systems' 2013 is used. Condition 2.8.10 therefore makes reference to this standard.

BAT 20 states that in order to maximise energy efficiency, BAT is to use an appropriate combination of 9 listed techniques. BAT-Associated Energy Efficiency Levels (BAT-AEELs) for the incineration of municipal solid waste are also specified in BAT 20 Table 2 [Ref. 13]. For the gross electrical efficiency, the upper end of the BAT-AEEL can be achieved when using BAT 20f (operating at high temperature and pressure steam conditions), i.e. above 40 bar g and 400°C. The conditions at DERC will be 70 bar g and 430°C therefore the upper end of the 25-35% range applies. Gross electrical efficiency for the plant (assuming no heat export) is calculated to be 30.3% which is towards the upper end of the BAT-AEEL target range of 25-35% for BAT 20. This will be confirmed by the test required by Condition 2.9.2 h).

Refer to discussion in Annex 3 under BAT 2 and BAT 20 for further discussion.

15.5.3 Energy Efficiency Directive

Article 14 of the Energy Efficiency Directive (EED) requires that applicants carry out a Cost Benefit Assessment (CBA) as part of the application for a permit to determine whether waste heat can be utilised within a radius of 15km from the installation. SEPA consider that this requirement has been met through the HAPP submission and that the accompanying SEPA duty to ensure that the proposed use of the heat will be realised is met through the inclusion of the HAPP Standard Conditions which include requirements that the heat will be utilised within 7 years of plant commissioning and for annual updates on progress towards meeting the target over the 7-year period. However, Fichtner have also provided a CBA based on draft guidance provided by the Environment Agency in the absence of any specific SEPA guidance, this is provided in Appendix D of the HAPP. The results of the CBA indicate that both the nominal project internal rate of return and net present value (before financing and tax) over 33 years is negative. Unattractive returns are a result of large network pipe lengths resulting in high capital expenditure. Therefore, it is considered that the proposed local heat network does not yield an economically viable scheme in its current configuration. The economic feasibility of the scheme should be reassessed in the future when there is more certainty with regards the heat loads and in light of any developments to subsidies, or if alternative heat consumers which can be connected at a lower cost, can be identified. Heat consumers in closer proximity to the DERC and/or willing to accept lower temperature hot water (while still ensuring a large temperature differential can be achieved), would improve the economic case for a heat network. Model inputs and key outputs can be seen in Appendix D of the application.

The techniques described in the Application and the standard and non-standard Permit conditions are consistent with BAT for Energy.

5.16 Accidents and their Consequences

Accidents are covered in Section 2.6.1 and 3.4.5.2 of the PPC Application [Ref. 1].

Emergency procedures and incident procedures will be developed as part of the documented management system required for the site. The effectiveness of the emergency response procedures will be revised and updated as required following any major spills; these procedures will also be subject to management review under the requirements of the EMS.

Spillage control of bulk raw material is covered in section in Section 5.6 above. In addition to containment measures clean-up and containment materials will be available at accessible locations in chemical storage areas for use if spillages occur.

The Standard conditions 2.5.7 and 2.5.8 require the development of an Incident Prevention and Mitigation Plan (IPMP). The IPMP sets out the steps to ensure that all preventative measures are in place to avoid an incident to any medium. Key hazards include fire, spills due to vessel overfilling or leaks, problems with waste feeding leading to upset of combustion control and emissions due to equipment breakdowns or failures, for example on the incinerator, flue gas cleaning systems, fans, CEMS, containment etc.

Accident risk is managed through a combination of good design to appropriate standards including containment systems and locating the majority of the waste incineration plant inside buildings; equipment redundancy where appropriate (e.g. for CEMS); automated control systems with an uninterruptible power supply; procedural control and supervision; regular inspection; maintenance, and training.

The fire strategy for the DERC is subject to detailed design. However, either heat or smoke detectors will pick up the initial signs of a fire, sound the alarm and alert the control room. In the event of the alarm being activated, emergency procedures will be implemented for all personnel throughout the DERC to egress the building to their nearest fire evacuation muster point. The operators will then interrogate the main fire panel to determine the location of the fire. Dependant on the location of the fire, some of the suppression systems will automatically operate, such as sprinklers and gas suppression systems. Within the waste bunker area of the DERC, however, manual intervention will be required to the control room, feed hopper sprinklers and the water cannons. Fire detection and fire-fighting systems installed at the DERC will be in accordance with appropriate standards/design requirements.

The fire prevention and fire-fighting equipment which will be installed in the waste bunker of the DERC will include:

1. bunker fire detection system;
2. remote control operated fire cannons permanently mounted within the bunker area but outside of the normal crane operating window and positioned to provide full coverage of the bunker walls and floor;
3. automatic valves as required;
4. fire water sprays at each feed chute opening, automatically controlled on detection of fire or manually triggered on an individual basis from the Plant control room;
5. the complete piping, civil engineering works; and
6. all electric cabling, wiring, interlocks and alarms.

In the event of a fire at the DERC, contaminated water from process areas used for fighting fires will be diverted through the wastewater drainage system and collected in a wastewater chamber or pit. The waste bunker will be designed as a water-retaining structure and will be able to contain contaminated firewater resulting from a fire in the bunker or tipping hall area (with water collected via sloped floors). Site drainage for external areas will be fitted with an isolation system (automatic penstock valves, linked to the fire alarm system) to prevent the discharge of any contaminated water used for fire-fighting purposes off-site from the drainage system in the event of a fire. Additional storage may also be available from site kerbing and areas of hardstanding where appropriate in accordance with the guidelines of PPG18 and CIRIA C736. The waste bunker will be the primary source of firewater containment and will be constructed of reinforced concrete.

Following a fire event at the DERC, all firewater which is contained either within the site drainage or the waste bunker will be tested and analysed to establish its suitability for discharge off-site. Should the effluent be considered unsuitable for discharge, it will be pumped out and collected in tankers for disposal at a suitable off-site waste management facility. The parameters which would be tested will depend on the water quality standards required by the water treatment/waste management company who will collect and

dispose of the contaminated firewater. However, it is anticipated that typical 'trigger pollutants' such as ammonia, suspended solids and hydrocarbons will be included for in the analysis.

Further design details for firewater containment including detailed capacity calculations and associated assumptions will be provided by a prior operating condition in the Permit, 2.8.23.

The techniques and permit conditions described above are consistent with BAT for accident management.

5.17 Noise

Noise is covered by Section 3.4.6 of the PPC Application and Appendix C Noise Assessment [Ref. 1], with an additional BAT Assessment provided in the Third Further Information Notice response [Ref. 14].

Information on predicted noise emissions from the installation and the proposed MPT plant have been modelled and assessed against recent background levels around the site location. These indicate that the predicted noise impact from the installation will lead to very small increases at the closest Receptors as illustrated in Tables 8 and 9 below. and is therefore acceptable. Monitoring was also carried out at representative nearby sensitive receptors to determine the current background noise levels.

Table 8 – Daytime Noise Level Summary

Location	Time Period (0700-2300 Hours)	Predicted Rating[1] Noise Level from Site $LAeq_{1hr}$ dB	Assessment[2] Baseline Sound Level $LA90_{1hr}$ dB [LAeq]	Rating[1] Compared to Baseline Sound $LAeq_{1hr}$ dB	Noise Change[3] LAeq dB
R1. Meikle Drumgray Farm	Daytime	33	33 [45]	0	+0.3
R2. Laurel Grove	Daytime	27	36 [51]	-9	0
R3. Greengairs Road	Daytime	29	34 [46]	-5	0
R4. Meikle Crescent	Daytime	29	32 [54]	-3	0
R5. Stirling Road	Daytime	23	48 [56]	-25	0
R6. Arbuckle Road	Daytime	29	33 [41]	-4	+0.3
R7. Stirling Road (potential development)	Daytime	29	48 [56]	-19	0

Note 1: Noise characteristics at receptor locations do not include a penalty. This would be controlled by design.
Note 2: Based on a 7-day period of baseline sound monitoring including a weekend at NSRs.
Note 3: Column 6 is calculated by the logarithmic addition of columns 3 and column 4 **Leq** level in [ ] and subtraction of the background **Leq** noise level (i.e. column 4 in [ ]).

Table 9 – Night-time Noise Level Summary

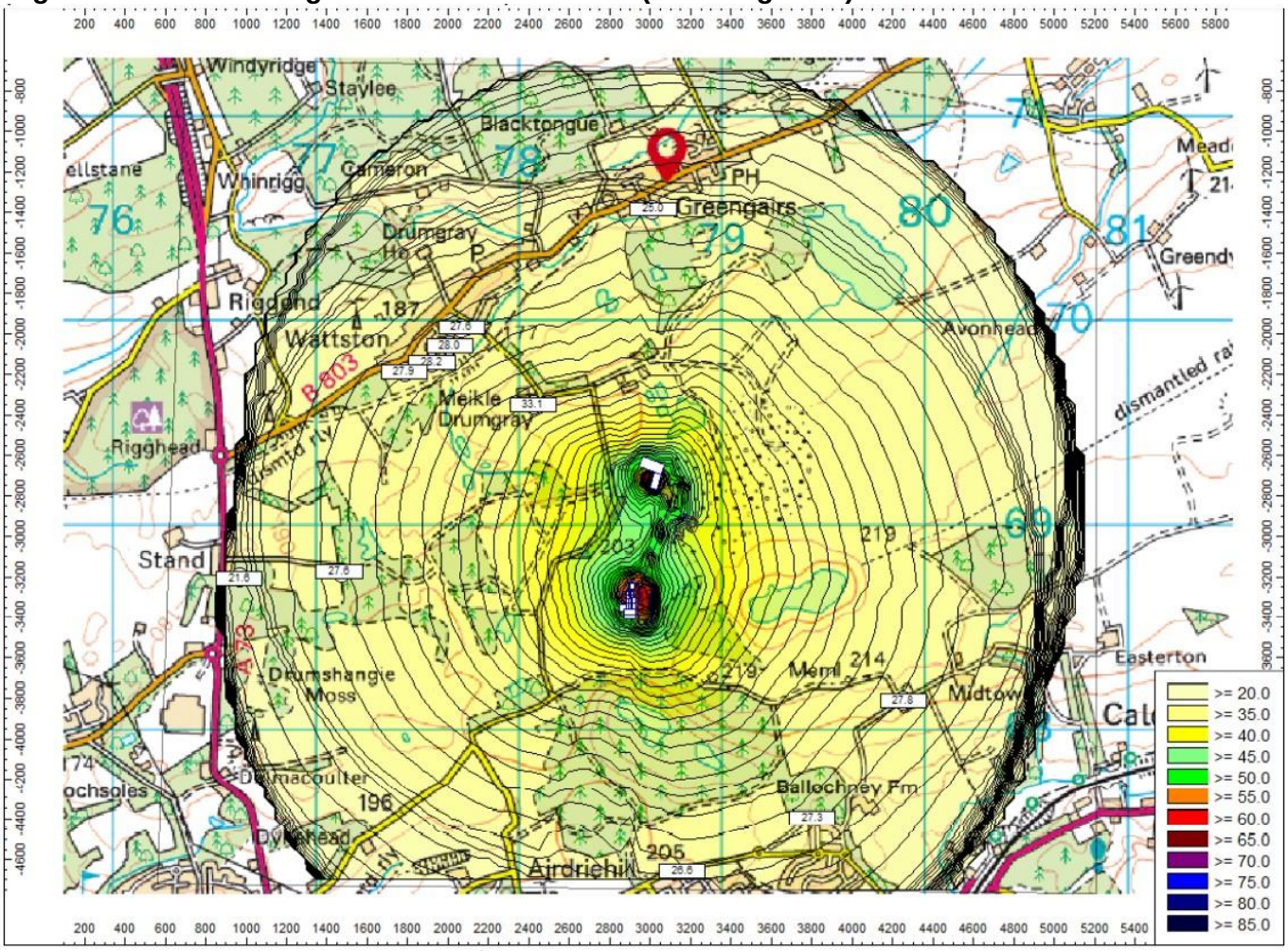
Nearest Sensitive Receptors (Refer to Figure 7.1)	Time Period (2300-0700) Hours)	Predicted Rating[1] Noise Level from Site $LAeq_{15mins}$ dB	Assessment[2] Baseline Sound Level LA90 dB [LAeq]	Rating[1] Compared to Background Sound $LAeq_{15mins}$ dB	Noise Change[3] LAeq dB
R1. Meikle Drumgray Farm	Night-time	33	29 [41]	+4	+0.6
R2. Laurel Grove	Night-time	25	27 [44]	-2	0
R3. Greengairs Road	Night-time	28	27 [42]	+1	+0.2
R4. Meikle Crescent	Night-time	28	26 [43]	+2	+0.1
R5. Stirling Road	Night-time	22	40 [51]	-18	0
R6. Arbuckle Road	Night-time	28	27 [36]	+1	+0.6
R7. Stirling Road (potential development)	Night-time	28	40 [51]	-12	0

Note 1: Noise characteristics at receptor locations do not include a penalty, this would be controlled by design.
Note 2: Based on a 5-day period of baseline sound monitoring including a weekend at NSRs.
Note 3: Column 6 is calculated by the logarithmic addition of columns 3 and column 4 **Leq** level in [ ] and subtraction of the background **Leq** noise level (i.e. column 4 in [ ]).

Following consultation by the applicant with the Environmental Health Officer at North Lanarkshire Council, it was agreed that in view of the low background sound levels (i.e. LA90 levels) and higher residual levels (i.e. LAeq levels), a rating noise limit not exceeding the representative background sound level by more than +4dB would be appropriate to ensure no adverse impacts and compliance with other guidance and standards including sleep disturbance criteria.

As can be seen above the largest increase will be seen at Meikle Drumgray Farm, during the Night-time period, comprising 0.6dB. It should be noted that this includes the MPT plant, which has subsequently been removed from the PPC Application. Without this element the noise levels will be considerably lower as the Nearest Sensitive Receptors (NSRs) are between approximately 940m to 1860m from the DERC. This is illustrated by Figure 6 below which shows the Noise contours during Night-time (including the MPT).

Figure 6 – Predicted night-time sound contours (including MPT)



The application recognises the need for active control of noise emissions to protect residential amenity and this is integral to the design. Significant measures are planned to control noise as close to source as possible, with examples including acoustic enclosures for noisy plant such as the Air Compressors, a dedicated structure for the steam turbine, noise treatments for building walls, acoustic louvres for air intakes, low speed air cooled condenser fans and good siting and silencers on stacks, steam vents and Pressure Safety Valves (PSVs).

Noise may be generated in broad terms by the equipment installed within buildings and in external areas of the installation and, during waste delivery periods, by waste and raw material delivery vehicles.

Key noise sources have been listed and measures to minimise emissions presented for each. Noise emissions are indicated as being taken into account when specifying equipment and low noise options are to be selected where practical. Additional options have been explored in the BAT Assessment to ensure that no design or specification options are being missed that could improve the performance of the site.

The fabric of the process buildings acts as noise attenuation (reduction) for noise sources within the buildings which is where the majority of the equipment will be located. Some openings in the building structure such as large vehicle access doors have reduced noise attenuation performance in comparison to the main building structure when closed and will allow noise to escape whilst open.

It is therefore important that the number of lower attenuation openings are minimised in line with best practise and that large access doors such as the reception hall vehicle doors are opened for as little time and as infrequently as practical whilst meeting operational needs. Equipment specified for installation

inside buildings should also be low noise to minimise the impact when the doors are open. The requirement of odour condition 3.2.6 in the permit to keep doors closed when not in immediate use will minimise the potential for fugitive emissions of noise as well as odour.

Waste handling vehicles will be fitted with broad spectrum or 'white noise' reversing alarms which are less intrusive and delivery HGV's will use a one-way system, only reversing within the tipping hall. During the night-time period, waste delivery is not anticipated, and the majority of processing operations will be carried out inside process buildings which will reduce the noise impact. Waste delivery times are limited to 0730 to 1930 Monday to Friday and 0730 to 1300 on Saturdays by planning condition 22 [Ref. 5] in order to minimise noise emissions during the night time period.

Controls and Conditions Proposed

A Prior Commissioning Condition 2.8.17 has been included to confirm that the proposed noise management techniques are in place in the final design and construction of the site.

A requirement to carry out noise monitoring within four months of the end of commissioning of the plant is included in the permit to confirm the design assumptions. Any deficiencies must be identified together with proposals for rectifying these within the shortest possible time. Conditions 3.1.6 and 3.1.7 refer.

The planning conditions do not set numerate noise limits for the allowable noise impact from this facility, however they do include limits on HGV delivery times to and from the DERC and also from the DERC to the IBA pad on the Greengairs Landfill. This is in line with the assumptions of the modelling work and so SEPA has not included delivery time limits within the permit.

A condition limiting the impact from tonal noise is considered necessary by SEPA. This comprises a condition to prevent audible tonal noise at noise sensitive receptors. Condition 3.1.5 refers.

Standard condition 3.1.1 for systematic noise assessment is proposed with a 2-year review frequency (or sooner if new equipment which could have an effect on noise emissions is installed or moved) to ensure that noise emissions from early operation of the installation is assessed to identify whether further reduction in noise impact is possible. Condition 3.1.1 refers.

Conditions to require the generation and implementation of a noise and vibration management plan (NVMP) are proposed to ensure that actions affecting the noise impact from the facility are identified and control measures put in place to manage the impact. Conditions 3.1.2 to 3.1.4 refer.

During inspection the performance of the facility in terms of noise emissions and effectiveness of noise management techniques will be assessed and corrective actions taken where necessary.

The proposed techniques and design of the plant are considered to be BAT for this type of plant and the measures included in the permit will ensure that they will be incorporated into the construction and operation of the plant.

5.18 Monitoring

Monitoring techniques are discussed in Section 3.5 of the PPC Application [Ref. 1]

5.18.1 Monitoring of Emissions to Air

a) Monitoring of Emission point A1 (the incinerator stack)

Monitoring requirements consistent with IED Annex VI Part 4 for Waste Incineration Plants [Ref. 15] and with BAT of the Waste Incineration BAT Conclusions [Ref. 13] have been specified in Schedule 6 of the Permit. The proposed techniques described in Section 3.5. of the PPC Application for monitoring of emissions to air from Emission Point A1 provide assurance that the requirements of Schedule 6 will be met for monitoring, recording, data handling, reporting and calibration.

Schedule 6 of the Permit requires Continuous Emission Monitoring Systems (CEMS) equipment to be used for continuous monitoring of particulate, oxides of nitrogen (NO and NO_2 expressed as NO_2), sulphur dioxide, carbon monoxide, total organic carbon, hydrogen chloride, ammonia and oxygen. The Applicant proposes to install duplicate CEMS so that there is redundancy in the event that one CEMS fails; this would allow the incineration line to continue incinerating waste. The techniques proposed for the CEMS equipment: an opacity meter for particulate; oxygen by zirconium probe; VOCs by Flame Ionisation Detector (FID); and, all other gases by Fourier-Transform Infra-Red (FTIR) type multi-gas analyser; are consistent with the Environment Agency (EA) Monitoring Technical Guidance Document M2 [Ref. 16].

Periodic rather than continuous monitoring has been specified in Table 6.2 and Table 6.2b for hydrogen fluoride (HF) monitoring as allowed for by IED Annex VII Part 6 para 2.3 because treatment stages for hydrogen chloride are used.

Other pollutants to be measured by periodic monitoring are as follows:

- Group 1 metals (cadmium and thallium and their compounds);
- Group 2 metals (mercury and its compounds) subject to prior commissioning condition 2.8.12;
- Group 3 metals (antimony, arsenic, chromium, cobalt, copper, lead, manganese, nickel and vanadium and their compounds);
- Nitrous oxide;
- Dioxins and furans subject to prior commissioning condition 2.8.13, Dioxin-like PCBs subject to prior commissioning condition 2.8.13; and,
- Total and speciated PAHs.

The number of runs specified for periodic monitoring in Table 6.2 and Table 6.2b for all parameters other than dioxins and furans and dioxin-like PCBs, is three with the average over the three runs being the reported value for compliance purposes. This is consistent with the periodic monitoring requirements of BAT 4 of the Waste Incineration BAT Conclusions [Ref. 13]. The frequency for monitoring is quarterly for the first year of operation and then six monthly; this is consistent with the monitoring frequency specified for heavy metals and dioxins and furans in Annex VI Part 6 paragraph 2. 1(c). EN standards for monitoring are generally required to be used where available.

(i) Monitoring of mercury

BAT 31 of the Waste Incineration BATCs specifies a BAT-AEL of <5-20 ug/Nm^3 for continuous or periodic monitoring of mercury, or 1-10 ug/Nm3 for long-term sampling. The technique required must be using CEMS where mercury is not proven to be 'low and stable', otherwise either long-term sampling or periodic monitoring can be carried out. A methodology for determining when mercury emissions can be considered to be low and stable is still under development at the time of this Permit determination. This work is being undertaken by the UK Environment Agencies as part of the development of a UK Interpretation document for the Waste Incineration BATCs. Therefore the following permit conditions have been specified in the Permit to determine whether CEMS or long-term sampling/periodic monitoring is the most appropriate technique for monitoring of mercury:

- Upgrade Condition 6.5.1 requires the operator to carry out a programme of mercury monitoring and submit a report to SEPA with an analysis of whether mercury emissions can be considered to be low and stable. This is to be completed within 6 months of First Operation.
- Prior commissioning Condition 2.8.12 requires the Operator to submit a report to confirm the proposals for monitoring of mercury as required by as required by Condition 6.5.1 six months prior to the Commencement of Commissioning.

The outcome of Condition 6.5.1 will determine whether mercury emissions from the DERC can be considered to be low and stable, and therefore whether periodic monitoring is an appropriate compliance method. If this is not confirmed the Operator will be required to fit mercury CEMS.

(ii) Monitoring of dioxins and furans and dioxin-like PCBs

BAT 30 of the Waste Incineration BATCs specifies a BAT-AEL of <0.01-0.06ng I-TEQ/Nm^3 for long-term sampling of dioxins and furans, or <0.01-0.04ng I-TEQ/Nm^3 for periodic monitoring. Long-term sampling is required for monitoring emissions of dioxins and furans unless it can be proved that emissions are sufficiently stable in which case periodic monitoring can be carried out.

A methodology for determining when emissions of dioxins and furans can be considered to sufficiently stable is still under development at the time of this Permit determination. This work is being undertaken by the UK Environment Agencies as part of the development of a UK Interpretation document for the Waste Incineration BATCs. BAT 4 requires that dioxin-like PCBs are also monitored using long-term sampling together with dioxins and furans where required for dioxins and furans unless the emission is <0.01 ng/Nm^3. The same rule applies for periodic monitoring of dioxin-like PCBs, however, monitoring of dioxin-like PCBs will still be required by Regulation 29(2) of PPC 2012.

The following permit conditions have been specified in the Permit to determine whether long-term sampling or periodic monitoring is the most appropriate technique for monitoring of dioxins and furans and dioxin-like PCBs:

- Upgrade Condition 6.5.2 requires the operator to carry out a programme of monitoring of dioxins and furans and dioxin-like PCBs, and to submit a report to SEPA with an analysis of whether these emissions can be considered to be stable. This is to be completed within 6 months of First Operation,
- Prior Commissioning Condition 2.8.13 requires the Operator to submit a report to confirm the proposals for monitoring of dioxins and furans and dioxin-like PCBs as required by Condition 6.5.2 six months prior to the Commencement of Commissioning.

(iii) Monitoring of nitrous oxide and PAHs

With the exception of total and speciated PAHs and nitrous oxide, the pollutants listed above are all required to be monitored by BAT 4 of the Waste Incineration BAT Conclusions. Whilst nitrous oxide is not specifically required to be monitored for a moving grate incinerator which doesn't use urea-based SNCR, experience at other moving grate incinerators with ammonia-based SNCR has also been found to emit nitrous oxide. A six-monthly periodic monitoring requirement has been incorporated in Table 6.2 and Table 6.2b of the Permit.

BAT 4 requires only benzo[a]pyrene, a PAH to be monitored on an annual basis. However, monitoring of PAHs, together with dioxin-like PCBs, is a requirement of Regulation 29(2) of PPC 2012 which specifies that where dioxins and furans are referred to in JED for waste incineration plants, specifically in Chapter IV and Annex VI, this is to be read as if it is substituted with the words "dioxins, furans, dioxin-like polychlorinated PCBs and PAHs". PPC Regulation 29(2) does not specify which PAHs require to be monitored, nor does the EA Monitoring Technical Guidance Note M2. A list of 16 PAHs, commonly known as the DEFRA 16 list is identified in Section 2.10.1 (Indicative BAT item 11) of the UK Incinerator Sector Guidance Note IPPC S5.01 Issue I [Ref. 9]. This is consistent with the suite of 16 PAHs commonly monitored by Stack Monitoring Contractors for existing operational Energy from Waste facilities in Scotland. Monitoring requirements have therefore been specified for Total PAHs expressed as benzo[a]pyrene (BaP), and for 16 speciated PAHs including BaP in Table 6.2 and 6.2b of the Permit.

The frequency specified for monitoring PAHs in Table 6.2 and Table 6.2b is the same as for dioxins and furans as recommended in Section 2.10. I of S5.01 (Indicative BAT 10) and implied by PPC Regulation 29(2).

Monitoring requirements during OTNOC including Start Up and Shutdown are discussed in Section 9.

b) Monitoring of Emission point A2 (the odour extraction stack) and site boundary

A requirement for odour monitoring has been specified both at the site boundary and at the inlet and outlet of the odour extraction system to measure odour control when the incinerator is shut down. The technique specified is BS EN 13725 which requires collection of samples for subsequent analysis by an odour panel. Table 6.2 and Table 6.2b require that 3 consecutive samples are taken at each location and the average reported, and in the case of the samples taken at the site boundary, used for checking compliance with the ELV.

During commissioning, tests are required by Condition 2.9.2 (i) to check compliance with the ELV for odour at the site boundary both during normal operation and when the incinerator is off-line.

Within 2 months of receiving the results of the monitoring required by Condition 2.9.2 (i) the operator must undertake a modelling exercise using this data to confirm that the ELV for odour emissions in Table 6.2 and Table 6.2b in Schedule 6 is achieved. Condition 3.2.15 requires that no later than 4 months after First Operation the Operator shall report the results of the modelling exercise required by Condition 3.2.14 to SEPA.

The frequency will be as required by Condition 3.2.14 and subsequently when the incinerator is shut-down to a frequency to be agreed in writing with SEPA — this will be determined by an upgrade report in response to Condition 6.5.5 of the Permit.

c) Monitoring of Emission point A3 (the standby generator stack)

In addition to emissions to air of carbon dioxide and water vapour from fuel combustion, the emergency standby generator will also emit carbon monoxide and NOx. Periodic monitoring will be required for NO_x and CO on the gas-oil fired standby generator at the most frequent interval of 1,500 hours of operation, or once every 5 years as detailed in Section 9 below. These monitoring requirements are detailed in Table 10.2 of the Permit. Prior commissioning condition 2.8.11 will require the details of the plans for continuous and periodic monitoring of emissions to air to be confirmed 6 months prior to commissioning of the installation. This includes details of diagrams of locations and access for sampling and monitoring facilities.

5.18.2 Monitoring of Point Source Emissions to Water

Monitoring proposals are described by the Applicant in section 3.5.1 of the PPC Application [Ref. 1]. Additional requirements specified by SEPA in Table 7.2 of the Permit are consistent with BAT. The requirements of IED Article 43(3) and 46(4) and Annex VI Part 6 (3) for monitoring of wastewater discharges from waste incineration plants and BAT 3 of the Waste Incineration BATCs do not apply because wet techniques for flue gas treatment are not used and the only discharge to the Water Environment is from uncontaminated surface water. However, in order to confirm that the discharge from emission Point W1 is uncontaminated, a requirement has been included for continuous flow monitoring and for the installation of a flow proportional water sampler. From the first introduction of chemicals, fuel or other raw materials at the installation the following monitoring requirements have been implemented to confirm that contaminants are not present in the discharge to the Cameron Burn. This is to continue for the First Year of Operation and then as agreed in writing with SEPA:

- Weekly testing for pH, temperature, conductivity, total suspended solids, BOD, ammoniacal nitrogen, Total Organic Carbon, Visible oil and hydrocarbons. This is to continue for the First Year of Operation and then as agreed in writing with SEPA;

- Monthly testing of heavy metals for the following speciated metals for the total metal and its compounds expressed as the metal: mercury, cadmium, thallium, arsenic, lead, chromium, copper, manganese, nickel, zinc and iron;
- Monthly testing of dioxins and furans, dioxin-like PCBs and PAHs.

For Emission Point W2, liquid effluent, which is expected to be produced infrequently. There is a requirement to undertake analysis to enable completion of a WM3 assessment as agreed in response to prior commissioning condition 2.8.27.

All analysis is to be undertaken on unfiltered samples.

5.18.3 Monitoring of wastes

In addition to monitoring of process effluent from W2 as discussed above, there are requirements for assessing the composition of solid residues of IBA and APCr — this is discussed further in Section 5.14 above.

5.18.4 Process Monitoring

Section 3.5.2 and Appendix L of the PPC Application [Ref. 1] outline the process monitoring which will be undertaken by the plant. The process will be controlled from a dedicated control room. A modern control system, incorporating the latest advances in control and instrumentation technology, will be utilised to control operations, optimising the process relative to efficient heat release, good burn-out and minimum particle carry-over. The system will control and/or monitor the main features of the plant operation including, but not limited to the following:

- combustion air;
- fuel feed rate;
- SNCR system;
- flue gas oxygen concentration at the boiler exit;
- flue gas composition at the stack;
- combustion process;
- boiler feed pumps and feedwater control;
- steam flow at the boiler outlet;
- steam outlet temperature;
- boiler drum level control;
- flue gas control;
- power generation;
- and steam turbine exhaust pressure.

The response times for instrumentation and control devices will be designed to be fast enough to ensure efficient control.

The following process variables have particular potential to influence emissions:

1. Fuel throughput will be recorded to enable comparison with the design throughput. As a minimum, daily and annual throughput will be recorded;
2. Combustion temperature will be monitored at a suitable position to demonstrate compliance with the requirement for a residence time of 2 seconds at a temperature of at least 850^{o}C;
3. The differential pressure across the bag filters will be measured, in order to optimise the performance of the cleaning system and to detect bag failures; and,
4. The concentration of HCl in the flue gases upstream of the flue gas treatment system will be measured in order to optimise the performance of the emissions abatement equipment.

Requirements for continuous monitoring of the exhaust gas from the main stack (A1) to meet the requirements of IED Annex VI and BAT 3 of the Waste Incineration BATCs for oxygen, water vapour (unless gas dried prior to analysis for CEMS), temperature, pressure and flow are inserted in Table 6.3 of the draft permit.

5.18.5 Environmental Monitoring

Soil Monitoring

Requirements for environmental monitoring have been specified for dioxins and furans, dioxin-like PCBs and for the following heavy metals: arsenic, cadmium, chromium and nickel in soil in Table 9.1 of the Permit at locations to be agreed in writing with SEPA. This is to be carried out initially prior to commissioning to establish a baseline level in soils prior to operation of the incineration line commencing. Further monitoring will be carried out after operation has commenced at periodic intervals to monitor how the baseline has changed over time. The locations will be chosen to reflect the point of maximum impact identified by the modelling and some of the sensitive receptors as well as a location 'upwind' of the prevailing wind direction.

Monitoring of ambient air

Requirements for environmental monitoring have been specified for PM_{10}, $PM_{2.5}$ and 4 heavy metals: cadmium, arsenic, chromium VI and nickel in air in Table 9.1 of the Permit at locations to be agreed in writing with SEPA. This monitoring has been required to check the actual levels of these pollutants in the air .

The monitoring is to be carried out initially prior to commissioning to establish a baseline level in ambient air prior to operation of the incineration line commencing. Further monitoring will be carried out after operation has commenced at periodic intervals to monitor how the baseline has changed over time. The locations will be designed to cover locations down-wind and upwind of the DERC based on the prevailing wind direction and will include some sensitive receptor locations.

Noise monitoring

The requirements for monitoring of noise discussed in Section 5.17 above are specified in section 3.1 of the Permit. The techniques described for monitoring are considered to be consistent with BAT for monitoring.

5.19 Closure

Closure is covered in Section 3.11.2 of the Permit Application. At the end of its operating life, the site could be demolished and cleared for a new use and left in a 'satisfactory state' as required by the PPC Regulations or redeveloped for extended use.

FCC have committed to developing a site closure plan prior to the commencement of operation to ensure the plant is designed, operated and maintained in such a way that decommissioning can be carried out in a safe and clean way and without risk of pollution. Some of the techniques in support of this are identified in section 3.11.2.1 to 3.11.2.3 of the Permit Application.

Standard permit conditions have been applied for closure in Condition 2.11 of the draft permit. The information provided together with permit conditions are consistent with BAT for site closure.

5.20 Site Condition Report (and where relevant the baseline report)

The site condition and baseline report were provided in Appendix B of the original application and an updated report was subsequently received in response to the Second Schedule 4 Notice [Ref. 2]. The

initial and updated reports were reviewed by a SEPA Contaminated Land Specialist. A detailed checklist on the updated report is included as Annex 2 to this document.

In summary, the updated Initial Site Condition Report (ISCR) dated 10 July 2020 is considered to have addressed all the previous comments provided on the Initial SCR Checklist and the Applicant has proposed further actions to supplement Baseline information that is still required. These requirements have been incorporated into Prior Commissioning Conditions 2.8.32 to 2.8.35 and Section 7.6 of the Permit. This means that an up-to-date Baseline Report will be in place before the Site begins Commissioning work and brings fuels and chemicals on site.

The information provided in support of the application together with the further information which will be obtained through the prior commissioning conditions and the standard permit conditions will ensure that IED requirements for site condition and baseline reports are met.

5.21 Consideration of BAT

The techniques described in 5.2 to 5.19 above and in Annexes 3 and 4 are considered to demonstrate that BAT requirements are met for the proposed facility in line with the requirements of the UK technical guidance note s5.01, Chapter 4 and Annex VI of IED [Ref. 15] and the recently published Waste Incineration BAT Conclusions [Ref. 13]. Further BAT considerations of the proposed installation are detailed below:

5.21.1 Choice of combustion technology for waste incineration
A number of alternative technologies for waste combustion were assessed as detailed in Section 3.6.2 of the PPC Application. These included: moving grate; fixed hearth; pulsed hearth; rotary and oscillating kilns; fluidised bed and pyrolysis/ gasification. A quantitative BAT assessment for a grate and conventional fluidised bed was undertaken and is presented in Appendix E, section 2. [Ref. 1]. The differences are considered marginal for global warming potential, ammonia consumption, residues, total materials cost and annual power revenue.

Grate combustion systems are designed for large quantities of heterogenous waste, whereas fluidised bed systems are more sensitive to inconsistencies within the fuel. The Operator has significant knowledge of moving grate systems; and does not consider that a fluidised bed is a suitable technology for the treatment of waste proposed to be processed at the DERC. Due to the robustness of grate combustion systems, they are considered to represent BAT for the DERC. SEPA accept that moving grate is a suitable BAT technique for the proposed installation.

5.21.2 Choice of steam condenser technology
The following technology types are identified in the UK Technical Guidance Note on Waste Incineration s5.01: air-cooled condenser (ACC); once-through cooling (OTC) and evaporative condenser [Ref. 9]. These were considered in Section 3.6.6. of the PPC Application [Ref. 1].

Water cooling can be achieved through once-through cooling systems or by a recirculating water supply to condense the steam. Both cooling systems require significant quantities of water and a receiving watercourse for the off-site discharge of cooling water. In addition, a water abstraction source is needed, with mains water not an economically viable option. The only watercourse in proximity to the DERC which would be available for the abstraction of water is the Cameron Burn. There is not sufficient flow within the Cameron Burn to satisfy the significant quantities of water required for either an OTC or an evaporative condenser. Taking this into consideration, water cooling (and the use of evaporative condensers) is not considered to be available technology for cooling in the DERC.

Evaporative condenser systems use water which is evaporated directly from the condenser surface and lost to the atmosphere to provide the required cooling. They also require large volumes of water and can create a visible plume from the condenser which will have a visual impact. As previously described,

suitable options for water abstraction and discharge have not been suitably identified. Should a source be identified, the costs of discharging large volumes of abstracted water to sewer would still be significant. Taking all points into consideration, the use of evaporative condensers is not considered to be a suitable technology for cooling in the DERC.

ACCs do not require significant quantities of water. It is acknowledged that ACC's can have noise impacts, but mitigation measures can be applied to the design to ensure that the noise impacts associated with the ACC's are at an 'acceptable' level. Furthermore, ACC's do not create a visual impact (visible plume), unlike that from evaporative cooling.

The ACC Unit will be designed and guaranteed by the technology supplier with enough additional capacity to maintain turbine efficiency during any warmer summertime periods. The ACC Unit will not contain any substances which are known ozone depleting substances and will comply with the European Union Ozone Depleting Substances Regulations.

SEPA has experience of ACCs having been used successfully at other locations and accept the technology is consistent with BAT for the proposed installation.

5.213 Compliance with requirements of IED
A summary of how the proposed design meets each of the requirements of IED Chapter 4 on waste Incineration is provided in Section 3.7 of the PPC Application and summarised in Annex 3 below.

6 OTHER LEGISLATION CONSIDERED
Nature Conservation (Scotland) Act 2004 & Conservation (Natural Habitats &c.) Regulations 1994
Is there any possibility that the proposal will have any impact on site designated under the above legislation? Yes
Screening distance(s) used – 15km
Are there any SSSIs within the area screened? Yes - see Section 4.4.4 and further details in Annex 1. **Has SNH (now NatureScot) been consulted under section 15(5) of the 2004 Act**? Yes **Date consultation letter sent** — December 2019 **Summary of response received including date** – See Section 2. **Has SEPA reached agreement with SNH on protection of the SSSI?** - Not Required. **Date SNH formally notified of SEPAs intention to issue a Permit which fails to incorporate all SNH requests** — Not applicable.
Are there any SPA or SAC designated areas within the area screened? Yes, See Section 4.4.4 and further details in Annex 1. **Have you carried out an appropriate assessment?** Yes — see Annex 1. **Date appropriate assessment consultation letter sent** - December 2019

Summary of responses received from SNH including date - See Section 2 and Annex 1.

Overall conclusion: Taking account of the issues considered in the Appropriate Assessment, in the view of SEPA then it is beyond reasonable scientific doubt that the proposal will not adversely affect the integrity of the West Fannyside SAC, Black Loch Moss SAC or Blawhorn Moss SAC.

7 ENVIRONMENTAL IMPACT ASSESSMENT AND COMAH

How has any relevant information obtained or conclusion arrived at pursuant to Articles 5, 6 and 7 of Council Directive 85/337/EEC on the assessment of the effects certain public and private projects on the environment been taken into account? See Planning permission 19/01284/FUL [Ref. 5].

How has any information contained within a safety report within the meaning of Regulation 7 (safety report) of the Control of Major Accident Hazards Regulations 1999 been taken into account? N/A

8 DETAILS OF PERMIT

Do you propose placing any non-standard conditions in the Permit - No, all Conditions taken from Westfield Permit – PPC/A/1181922, which has been updated to incorporate the requirements of the updated BREF and been legally reviewed.

Do you propose making changes to existing text, tables or diagrams within the permit? Yes

Table 6.2 has been amended to incorporate the BAT Conclusions requirements for Dioxins / Furans and Dioxins / Furans + Dioxin – like PCBs. As follows (extract):

Emission Point	Parameter	Limit (including unit)	Reference period	Monitoring frequency	Monitoring standard or method
A1	Dioxins / furans (I-TEQ)	0.06 ng I-TEQ/Nm^3 (Long-term sampling) or 0.04 ng I-TEQ/Nm3 (Periodic monitoring)	Monthly average or Average value over single measurement of 6 to 8 hours Note 3	Continuous sampling or Periodic Measurement - Quarterly for first year then bi-annual Note 3	No EN Standard for long-term sampling or BS EN 1948-2 and 3
	Dioxins / furans (WHO-TEQ Humans / Mammals)	-			
	Dioxins / furans (WHO-TEQ Fish)	-			
	Dioxins / furans (WHO-TEQ Birds)	-			
A1	Dioxins / furans + Dioxin-like PCBs	0.08 ng WHO-TEQ/ Nm^3 (Long-term sampling) or 0.06 ng WHO-TEQ/ Nm^3 (Periodic monitoring) Note 4	Monthly average or Average value over single measurement of 6 to 8 hours Note 4 and 5	Continuous sampling or Periodic Measurement - Quarterly for first year then bi-annual Note 4 and 5	No EN Standard for long-term sampling: BS EN 1948-2 and 3 or BS EN 1948-1, 2 and 4
	Dioxin-like PCBs (WHO-TEQ Humans / Mammals)	-			
	Dioxin-like PCBs (WHO-TEQ Fish)	-			
	Dioxin-like PCBs (WHO-TEQ Birds)	-			
A1	Total and speciated poly-cyclic aromatic hydrocarbons Note 6	-	Average over 3 consecutive samples	Periodic Measurement Quarterly for first year then bi-annual	BS ISO 11338-1 and BS-ISO 11338-2.

Notes:
1. Average values include the gaseous and vapour forms of the relevant heavy metal emissions as well as their compounds.
2. Long-term sampling applies where the report submitted under Condition 6.5.1 confirms that the waste feed does not have a proven low and stable mercury content.
3. The limit of 0.06 ng I-TEQ/Nm3 for long-term sampling of dioxins and furans applies where the report submitted under Condition 6.5.2 confirms that the emission levels of dioxins and furans are not sufficiently stable and the concentration of dioxin-like PCBs does not exceed 0.01 ng/Nm3.
4. The limit of 0.08 ng I-TEQ/Nm3 for long-term sampling of dioxins and furans and dioxin-like PCBs applies where the report submitted under Condition 6.5.2 confirms that the emission levels of dioxins and furans and dioxin-like PCBs are not sufficiently stable and the concentration of dioxin-like PCBs exceed 0.01 ng/Nm3.
5. The joint ELV for dioxins and furans and dioxin-like PCBs is only applicable where the report submitted under Condition 6.5.2 confirms that the concentration of dioxin-like PCBs exceed 0.01 ng/Nm3.
6. Total PAHs to be reported expressed as Benzo(a)pyrene and the following speciated PAHs require monitoring: anthanthrene, benzo[a]anthracene, benzo[b]fluoranthene, benzo[k]fluoranthene, benzo(b)naph(2,1-d)thiophene, benzo(c)phenanthrene, benzo(ghi)perylene, benzo(a)pyrene, cholanthrene, chrysene, cylclopenta (c,d)pyrene, dibenzo[ah]anthracene, dibenzo(ai)pyrene, fluoranthene, indeno(1,2,3-cd)pyrene and napthalene.

9 EMISSION LIMIT VALUES OR EQUIVALENT TECHNICAL PARAMETERS/ MEASURES

The principal emissions from the incineration line will be oxides of nitrogen (NO_x), sulphur dioxide (SO_2), carbon monoxide, hydrogen chloride and hydrogen fluoride gases, particulate matter (PM), heavy metals, and gaseous and vaporous organic substances known as volatile organic compounds (VOCs) which may include dioxins and furans, dioxin-like polychlorinated biphenyls (dioxin-like PCBs) and polycyclic aromatic hydrocarbons (PAHs). These substances when emitted from waste incineration plants are subject to the following requirements:

1. Chapter IV and Annex VI of the Industrial Emissions Directive (IED) [Ref. 15]. Part 3 of Annex VI of IED specifies Emission Limit Values (ELVs) which apply during the effective operating time of the waste incineration plant excluding start up and shutdown periods if no waste is being incinerated [Ref. Part 8 paragraph 1.2 in Annex VI of IED]. The ELVs specified are for the following averaging periods and detailed in Table 6.2a in Schedule 6 of the Permit:
    i. 30 minute averages for the following parameters which must be monitored on a continuous basis: particulate matter, NO_x, SO_2, CO, gaseous and vaporous organic substances, HCl and HF after the confidence interval (measurement

uncertainty) has been subtracted. Some exclusions apply to continuous monitoring of certain parameters where a justification is provided (see Section 5.18 for further details).

ii. 10 minute averages for CO; and,

iii. Daily averages of particulate matter, NOx, SO_2, CO, gaseous and vaporous organic substances, HCl, HF over the effective operating time based on the mean of the 10 minute averages for CO and the 30 minute averages for all other parameters.

iv. Average emission values over the sampling period where periodic monitoring is undertaken for the following parameters: dioxins and furans, cadmium and thallium, mercury, Group 3 heavy metals and other parameters such as HF where it has been agreed with SEPA that continuous monitoring is not required.

IED Chapter IV also specifies maximum emission limits for particulate matter, gaseous and vaporous organic substances and CO which must not be exceeded following an ELV breach due to disturbances, stoppages or failures of the abatement system or a breakdown — these effectively cover operation over the period it takes to either bring the plant back into compliance, or to shut the plant down. This is known as a period of 'Abnormal Operation' and is limited to a maximum of 4 hours per occasion of abnormal operation, and a total of 60 hours per annum after which any further Abnormal Operation would require an immediate plant shutdown. These ELVs are applied in Table 6.2a in Schedule 6 of the Permit. Specific permit conditions for Breakdown and Abnormal Operation are included in Schedule 5 in Condition 5.4 of the Permit — see Conditions 5.4.1 to 5.4.7.

2. The BAT Conclusions on Waste Incineration (WI BATCs) [Ref. 13] were published on 3 December 2019. These include a list of Best Associated Techniques — Associated Emission Levels (BAT-AELs) for new and existing facilities. These are usually specified as a range for either daily average emission values for continuously monitored parameters, or for average emission values over the sampling period where periodic monitoring is undertaken. Because the proposed facility will be permitted after the WI BATC publication date they are classed as a 'New Plant' and therefore the BAT-AELs applicable to new plants must apply when setting ELVs.

The BAT-AELs apply during normal operating conditions (NOC) and take precedence over IED ELVs for the same averaging periods during NOC. The specific ELVs based on BAT-AELs which have been set in the Permit are included in Table 6.2 in Schedule 6. The setting of specific ELVs based on the BAT-AEL ranges for new plants is discussed further in b) below.

There are some operating conditions known as "Other Than Normal Operating Conditions" (OTNOC) where BAT-AEL-based ELVs no longer apply, and compliance reverts to the IED Annex VI ELVs in Table 6.2a of Schedule 6 of the Permit. Specific permit conditions for OTNOC are included in Schedule 5 in Condition 5.4 of the Permit — see Conditions 5.4.2 and 5.4.8 to 5.4.10.

1. Additional emissions for which no basis for ELVs are included in either IED or the WI BATCs, but for which monitoring is required in the WI BATCs, are nitrous oxide and benzo(a)pyrene. Regulation 29(2) of PPC 2012 also requires that the monitoring requirements for dioxins and furans referred to in Part VI paragraph 2.1 (c) in Annex VI of IED are taken to include polycyclic aromatic hydrocarbons (PAHs) and dioxin-like polychlorinated biphenyls (PCBs). Monitoring requirements for a suite of PAHs including benzo(a)pyrene and nitrous oxide have therefore also been included in Table 6.2 and Table 6.2a of the Permit, but no ELVs have been set. See Section 5.18 for further details of monitoring requirements for emissions to air.

Table 9 Basis for setting of ELVs from Part 3 of Annex VI in IED [Ref. 15] and BAT-AELS for New Plant from WI BATCs [Ref. 13].

Parameter	[ED Annex VI Part 3		WI BATCs for New Plant	
	IED Daily average	IED Average over sampling period	BAT-AEL Daily average	BAT-AEL Average over sampling period
Particulate matter	10 mg/Nm ^{3}	Note 1	<2-5 mg/Nm ^{3}	Note 1
Oxides of nitrogen (NO and N02 expressed as N02	200 mg/Nm ^{3}	Note 1	5-120 mg/Nm ^{3} Note 3	Note 1
Sulphur dioxide	50 m /Nm^3	Note 1	5-30 m /Nm ^{3}	Note 1
Carbon monoxide	50 mg/Nm3 (97th percentile over calendar ear	Note 1	10-50 mg/Nm ^{3}	Note 1
Gaseous and vaporous organic substances expressed as Total Organic Carbon	10 mg/Nm^3	Note 1	<3-10 mg/Nm ^{3}	Note 1
Hydrogen chloride	10 mg/Nm ^{3}	Note 1	<2-6 mg/Nm ^{3} Note 4	Note 1
Hydrogen fluoride	1 mg/Nm ^{3} Note 5	None set	mg/Nm3 Note 5	mg/Nm3
Ammonia (NH3)	None set	None set	2-10 mg/Nm ^{3} Note 3	Note 1
Cadmium & thallium and their compounds total Note 6	Note 2	0.05 mg/Nm ^{3}	Note 2	0.005-0.02 mg/Nm3
Mercury and its compounds Note 6	None set	0.05 mg/Nm ^{3}	<5-20 ug/Nm ^{3} Continuous or 1-10 ug/Nm ^{3} Long-term sampling Note 7	<5-20 ug/Nm ^{3} Note 7
Sb, As, Pb, cr, co, cu, Mn, Ni and V and their compounds (total) Note 6	Note 2	0.5 mg/Nm ^{3}	Note 2	0.01-0.3 mg/Nm3
Dioxins / furans	Note 2	0.1 ng/Nm ^{3}	<0.01-0.06 I-TEQ/Nm3 Long-term sampling Note 8	<0.01-0.04 ng I-TEQ/Nm3 Note 8
Dioxins / furans Dioxin-like PCBs	Note 2	Note 9	<0.01-0.08 WHO-TEQ/ Nm3 Long-term sampling Note 8	<0.01-0.06 ng WHO-TEQ/ Nm3 Note 8

Notes

1. None set because continuous emission monitoring is mandatory.
2. None set because no technique available for continuous emission monitoring.
3. BAT-AEL for NO_X - Lower end of range can be achieved by Selective Catalytic Reduction (SCR) but may not be achievable for high nitrogen content wastes.
4. BAT-AEL for HCl - Lower end of range can be achieved by wet scrubber, higher end may be associated with the use of dry sorbent injection.
5. Continuous Monitoring for HF — This may be omitted if treatment stages for HCl are used according to IED Annex VII Part 6 para 2.3, and if HCl emissions are proved to be sufficiently stable (BAT 4 of WI BATCs); in practice HCl emissions will be considered to be sufficiently stable if they are compliant with the Permit ELVs — this will be checked during commissioning.
6. Heavy metals - average values include the gaseous and vapour forms of the relevant heavy metal emissions as well as their compounds.
7. Mercury BAT-AEL — Either the BAT-AEL for the daily average or average over sampling period, or the BAT-AEL for long term sampling period applies. The BAT-AEL for long-term sampling may apply in case of plants incinerating waste with a proven low and stable mercury content (e.g. mono - streams of waste with controlled composition). A Draft Mercury Monitoring protocol refers to a procedure for determining when continuous monitoring may be required for mercury.
8. Dioxins and furans and dioxin-like PCBs — BAT-AEL associated with long-term sampling. Either BAT-AEL applies. The BAT-AEL for long-term sampling does not apply if the emission levels are proven to be sufficiently stable. A Draft Dioxins and Furans Monitoring protocol refers to a procedure for determining when long-term sampling may be required for dioxins and furans.

The BAT-AELs are based on levels which should be achievable for new plants using BAT techniques identified in the WI BATCs and BREF [Ref. 13]. These are therefore the basis for setting Emission Limit Values (ELVs) during NOC. Specific setting of ELVs within the BAT-AEL ranges in Table 6.2 of the Permit has been based on both the data above and experience of typical emissions at modern operating EfW sites in Scotland, the output from the dispersion modelling discussed in Section 5.2.2 above, and for continuously monitored emissions to air, taking into account potential difficulties in calibration of CEMS where the limit is low (See 5.18 for further discussion on difficulties of calibration at low ELVs).

The Applicant provided continuous emission monitoring data from two other FCC Sites in the UK in Appendix 1 of the application to demonstrate that the proposed technology will be capable of meeting the new ELV requirements.

The details of the main stack (Emission Point A1) have been specified in Table 6.1 in Schedule 6 of the permit.

In addition to emissions to air of carbon dioxide and water vapour from fuel combustion, the emergency standby generator will also emit carbon monoxide and NO_x. Whilst the design is not yet finalised, the thermal input capacity of the standby generator will exceed the minimum threshold of 1 MW rated thermal input and will therefore be regulated as a Part B activity in Section 1.1 Part B (d) in Schedule 1 of the PPC (Scotland) Regulations 2012, as amended (known as PPC 2012). PPC 2012 implements the requirements of the Medium Combustion Plant Directive (EU) 2015/2193. These set specific requirements for operation of the generator, monitoring and recording of data.

The generator is predicted to operate well below 500 hours per annum, this means that ELVs will not apply. Periodic monitoring will however be required for NO_X and CO on the gasoil fired standby generator at the most frequent interval of 1,500 hours of operation, or once every 5 years. These monitoring requirements are detailed in Table 10.2 of the Permit, refer to Section 5.18 of this document for further details.

The specific requirements for the standby generator are detailed in Conditions in Schedule 10 of the Permit.

The vents from both the waste incineration plant and the standby generator are also required to meet the general standard requirement that all emissions to air "other than steam or water vapour, shall be colourless and free from persistent mist, fume and droplets" (Ref. Permit Conditions 6.1.11 and 10.1.7 respectively).

Are you are dealing with either a permit application, or a permit variation which would involve a review of existing ELVs or equivalent technical parameters? Yes

The WI BATCs specify BAT-Associated Emission levels (BAT-AELs) for pollutant emissions which must form the basis of ELV setting for daily average emissions, or for the ELV over the averaging period for any new waste incineration plant permitted after 3 December 2019. Daily average or period average ELVs have therefore been set within the range specified by the relevant new plant BAT-AEL in Table 6.2 of the Permit.

The existing 30 minute average ELVs specified in Part 3 of Annex VI of IED continue to apply in Table 6.2 for continuously monitored pollutants in addition to the revised Daily or period average ELVs — therefore these have not been repeated here.

Justification for the specific Daily or period average ELVs based on the BAT-AEL ranges for new plant from the WI BATCs are included in the Table below.

ELVs for periodic monitoring of pollutants which undergo continuous monitoring have also been updated from those specified in the waste incineration PPC Permit Template IED-T-14 to take account of the new Daily or period average ELV as per the Westfield application. See the table below for further details.

During periods of OTNOC, the IED Daily Average ELVs will apply together with the 30 minute IED ELVs - these are detailed in Table 6.2a of the Permit. When the waste incineration plant is in abnormal operation the IED back stop ELVs continue to apply, these are detailed in Table 6.2a of the Permit.

Substance	BAT-AEL Emission Benchmark range (Averaging period)	Proposed ELV (Averaging period)	Emission Point	Rationale
Particulate matter	<2-5 mg/Nm^3 (Daily average)	5 mg/Nm^3 (Daily average)	A1	Setting ELV at upper end of range, plant will generally run at <1-2 mg/Nm^3 but 5 mg/Nm^3 allows limited headroom for a spike. Setting the ELV lower will cause CEM calibration difficulties and potential need to use the CEM as an 'indicative monitor'. The new Daily ELV of 5 mg/Nm^3 is 50% of the mandatory ELV in IED which would previously been set as a Daily ELV.
	None specified for periodic sampling because CEMS are mandatory.	10 mg/Nm^3 (Average of 3 samples)		Reduced to 10 mg/Nm 3 from previous ELV of 30 mg/Nm^3 for periodic monitoring in IED-T-14 which seems excessive as the average of 3 results compared to the new daily ELV of 5 mg/Nm^3. This should be easily achievable with a modern bag filter and based on review of periodic monitoring results for dust from operating moving grate EfW Plant in Scotland. Any emissions above 10 mg/m^3 would be likely to indicate a problem with the performance of the bag filter.

Substance	BAT-AEL Emission Benchmark range (Averaging period)	Proposed ELV (Averaging period)	Emission Point	Rationale
Oxides of nitrogen (NO and NO_2 expressed as NO_2)	5 -120 mg/Nm^3 (Daily Average)	120 mg/Nm^3 (Daily Average)	A1	Daily ELV set at upper end of BAT-AEL range based on level achievable for ammonia based SNCR systems. The WI BATC states that the lower end of the BAT-AEL range can be achieved by SCR but SNCR has been determined to represent BAT for DERC. The new Daily ELV is a 40% reduction on the previous mandatory ELV in IED.
	None specified for periodic sampling because CEMS are mandatory.	200 mg/Nm^3 (Average of 3 consecutive samples)		This is the same as the current ELV for periodic monitoring in IED-T-14 but is still less than twice the new Daily ELV and is therefore considered to be reasonable.
Sulphur dioxide	5-30 mg/Nm^3	30 mg/Nm^3 (Daily Average)	A1	Daily ELV set at upper end of BAT-AEL range based on level achievable based on data provided in support of PPC Application and review of data for other operating EfW Plant. The new Daily ELV is a 40% reduction on the previous mandatory ELV in IED.
	None specified for periodic sampling because CEMS are mandatory.	60 mg/Nm3 (Average of 3 consecutive samples)		ELV reduced to 60 mg/Nm^3 from previous ELV for periodic monitoring in IED-T-14 of 200 mg/Nm^3 which seems excessive as the average of 3 results compared to the new daily ELV of 30 mg/Nm^3. 60 mg/Nm^3 is approximately twice the new Daily ELV and is considered fair. Any emission above 60 mg/Nm^3 could indicate an issue with the performance of the lime dosing and/ or the bag filter.
Carbon Monoxide	10-50 mg/Nm^3	50 mg/Nm^3 (Daily Average)	A1	Impact was insignificant when modelled at 50 mg/m^3. However, modern EfW Plants regularly achieve levels <10 mg/Nm^3 However, Daily Limit has been set at 50 mg/Nm^3 to allow for occasional CO spikes during the day. It is anticipated that the DERC will normally run at much lower levels. This is consistent with the current daily IED Limit for CO.
	None specified for periodic sampling because CEMS are mandatory.	100 mg/Nm^3 (Average of 3 consecutive samples)		This is same as the current ELV for periodic monitoring in IED-T-14 and double the new Daily ELV to allow for higher emissions during shorter periods of periodic monitoring.

Substance	BAT-AEL Emission Benchmark range (Averaging period)	Proposed ELV (Averaging period)	Emission Point	Rationale
Gaseous and vaporous organic substances expressed as Total Organic Carbon (TOC)	<3 — 10 mg/Nm^3 (Daily Average)	10 mg/Nm^3 (Daily Average)	A1	Experience of modern moving grate EfW Plant in Scotland suggests that the new Daily ELV should be set at the top of the BAT-AEL range,
	None specified for periodic sampling because CEMS are mandatory.	10 mg/Nm^3 (Average of 3 consecutive samples)		Reduced to 10 mg/Nm^3 from previous ELV for periodic monitoring in IED-T-14 of 20 mg/Nm^3. A review of recent periodic monitoring results from operating moving grate EfW plant in Scotland suggests this is achievable. Any emissions above 10 mg/Nm^3 would be likely to indicate performance issues.
Hydrogen chloride	<2-6 mg/Nm^3	6 mg/Nm^3 (Daily Average)	A1	Review of CEM data supplied in support of the PPC Application and experience of modern moving grate EfW Plant in Scotland suggests that the new Daily ELV should be set at the top of the BAT-AEL range.
	None specified for periodic sampling because CEMS are mandatory.	12 mg/Nm^3 (Average of 3 consecutive samples)		Limit based on twice the new Daily average ELV; a review of monitoring data from modern moving grate incinerator EfW in Scotland confirms this is achievable with similar abatement technology, given the ELV is the average of 3 consecutive sample results, any emissions above 12 mg/m^3 would indicate performance problems with the lime dosing and / or the bag filter.
Hydrogen fluoride	<1 mg/Nm^3	1 mg/Nm^3 (Average of 3 consecutive samples)	A1	There are limited options for setting the ELV for anything other than 1 mg/Nm^3 which is a low level but well above the limit of detection for the sampling and analytical method. A review of recent periodic monitoring results from modern moving grate EfW plant in Scotland suggests this is achievable.
Ammonia	2-10 mg/Nm^3	10 mg/Nm^3 (Daily Average)	A1	The Daily average ELV has been set at the upper end of the BAT-AEL range to allow for slippage in achieving the new Daily NO_X ELV of 120 mg/Nm^3 with ammonia SNCR.
	None specified for periodic sampling because CEMS are mandatory.	20 mg/Nm^3 (Average of 3 consecutive samples)		The new ELV for periodic monitoring is based on twice the new Daily average ELV. This is justified on the basis that: 1. ammonia slip levels are typically low for modern moving grate EfW plants, but may increase in order to achieve compliance with the new Daily ELV for NO_2 of 120 mg/Nm^3; and,

				2. the impact of ammonia emissions from modelling was insignificant.
Cadmium & thallium & their compounds (Total)	0.005-0.02 mg/Nm^3	0.02 mg/Nm^3	A1	A review of recent periodic monitoring results from modern moving grate EfW plant in Scotland suggests this is achievable.
Mercury & its compounds	<5-20 ug/Nm^3 (Continuous or periodic), or 1-10 ug/Nm^3 Long-term sampling	To be confirmed when condition 6.5.1 is complete to determine appropriate monitoring method.	A1	As left.
Group III Heavy metals	0.01-0.3 mg/Nm^3	0.3 mg/Nm^3	A1	A review of recent periodic monitoring results from modern moving grate EfW plant in Scotland suggests this is achievable.
Dioxins & furans	<0.01-0.06 ng ITEQ/Nm^3 (Long-term sampling) or <0.01-0.04 ng ITEQ/Nm3 (Periodic monitoring)	TBC when Condition 2.8.13 complete to determine appropriate monitoring method.	A1	As left.
Dioxin-like PCBs	Combined ELV with dioxins and furans: <0.01-0.08 ng WHOTEQ/ Nm3 (Long-term sampling) or <0.01-0.06 ng WHO-TEQ/ Nm3 (Periodic monitoring)	TBC when Condition 2.8.13 complete to determine appropriate monitoring method.	A1	As left.
Odour	N/A	1.5 OUE/m^3 as 98th percentile of hourly average to be determined at site boundary.	Site boundary and sensitive receptor locations to be agreed in writing with SEPA.	1.5 OUE/m^3 as the 98th percentile of hourly averages is the Indicative criterion of significant pollution for offensive odours for non-hypersensitive population from Table 2 of the SEPA Odour Guidance 2010 [Ref. 17], and must therefore be achieved at the site boundary, i.e. levels measured out-with the boundary should be below this level. This is anticipated to be most relevant when the incinerator is off-line and the odour extraction and abatement system is in use because during normal operation odorous air from the Waste Reception Area is incinerated as combustion air in the incinerator. See Condition 3.2.14.

Details of any equivalent technical parameters adopted to supplement or replace ELVs: None.

Details of any derogations from the ELVs set out in the BAT conclusions;
Not applicable - not relevant, application is for a new plant and therefore derogations from BAT-AELs are not permissible.

Has an Annex been inserted to the permit containing reasons, assessment and justifications for setting the value: No (Not applicable).

Details of any temporary derogation for the use of emerging techniques. NB Such temporary derogations do not require PPD consultation or the insertion of reasons etc. into the permit: None.

Emission Limit Values Water

Substance: None set.

Relevant emission benchmarks: N/A

ELV: N/A

Emission point: W1

Rationale: General Binding Rules 10 and 11 apply as specified as detailed below.

Details of any equivalent technical parameters adopted to supplement or replace ELVs:

At Emission point W1, for the discharge of uncontaminated surface water to the Cameron Burn from the SUDS system, the emissions must meet the requirements of General Binding Rules 10 & 11 as specified within Schedule 3 of The Water Environment (Controlled Activities) (Scotland) Regulations) 2011 under Activities 10 and 11. In summary these specify the following requirements [Ref.18]:

Activity 10: Applies to the discharge of run-off water from a surface water drainage system to the water environment from buildings, roads, yards or any other built developments, or construction sites for such developments and; if desired, the construction and maintenance of any water outfall in or near to inland surface water which forms, or will form, part of that system.

Activity 11: Applies to a discharge into a surface water drainage system.

General Binding Rule 10 consists of the following requirements:
Rule 10(a) "all reasonable steps must be taken to ensure that the discharge does not result in pollution of the water environment'

This is a general condition for protection of the water environment and requires that all reasonable steps are taken to avoid pollution. Pollution is explicitly defined in The Water Environment and Water Services (Scotland) Act 2003 (Part 1, Chapter 3, Section 20(6)) as follows:

"pollution", in relation to the water environment, means the direct or indirect introduction, as a result of human activity, of substances or heat into the water environment, or any part of it, which may give rise to any harm; and "harm" means:

(a) harm to the health of human beings or other living organisms,
(b) harm to the quality of the water environment, including —
  (i) harm to the quality of the water environment taken as a whole,
  (ii) Other impairment of, or interference with, the quality of aquatic ecosystems or terrestrial ecosystems directly depending on aquatic ecosystems
(c) Offence to the senses of human beings,
(d) Damage to property, or
(e) impairment of, or interference with, amenities or other legitimate uses of the water environment.

It should be noted that the requirement that 'the discharge must not result in pollution of the water environment' applies to all discharges covered by Activity 10, new and existing, regardless of whether a SUD system is present or not. This is also the case for Rules 10 (b), (c), (f) and (g).

Rule 10(b) "the discharge must not contain any trade effluent or sewage, and must not result in visible discolouration, iridescence, foaming or growth of sewage fungus in the water environment'

Rule 10(c) "the discharge must not result in the destabilisation of the banks or bed of the receiving surface water;"

Rule 10(d) requires that all run-off water (including roof water) from built developments completed after 1st April 2007 be 'drained by a SUD system equipped to avoid pollution of the water environment'.

Rule 10 (e) "the discharge must not contain any water run-off from:
(i) fuel delivery areas and areas where vehicles, plant and equipment are refuelled
vehicle loading or unloading bays where potentially polluting matter is handled
(iii) oil and chemical storage, handling and delivery areas
constructed after 1st April 2007'

Rule 10 (f) "all facilities with which the surface water drainage system is equipped to avoid pollution, including oil interceptors, silt traps and SUD system attenuation, settlement and treatment facilities, must be maintained in a good state of repair; and

Rule 10 (g) "all reasonable steps must be taken to ensure that any matter liable to block, obstruct, or otherwise impair the ability of the surface water drainage system to avoid pollution of the water environment is prevented from entering the drainage system."

Rule 10 (h) "the construction or maintenance of the outfall must not result in pollution of the water environment'

General Binding Rule 11 consists of the following requirements:

Rule 11a "oil, paint, paint thinners, pesticides, detergents, disinfectants or other pollutants must not be disposed of into a surface water drainage system or onto any surface that drains into a surface water drainage system;"

Rule 11b "any matter liable to block, obstruct, or otherwise impair the ability of the surface water drainage system to avoid pollution of the water environment must not be disposed of into a surface water drainage system or onto a surface that drains into a surface water drainage system"

Rule 11c "sewage or trade effluent must not be discharged into any surface water drainage system".

Rule 11d "on construction sites any area of exposed soil from which water drains into a surface water drainage system, and the period of time during which such water drains, must be the minimum reasonably necessary to facilitate the construction works being undertaken at that site.

Details of any derogations from the ELVs set out in the BAT conclusions; Not applicable - application is for a new plant and there are no BAT-AELs for emissions to surface water in the Waste Incineration BAT Conclusions; there are no discharges of wastewater from the proposed facility.

Has an Annex been inserted to the permit containing reasons, assessment and justifications for setting the value? No (Not Applicable).

Details of any temporary derogation for the use of emerging techniques. NB Such temporary derogations do not require PPD consultation or the insertion of reasons etc. into the permit
None (Not Applicable) because the proposed technology is not considered to represent 'emerging techniques'.

Emission limit values Land

Details of any equivalent technical parameters adopted to supplement or replace ELVs: None set.

Details of any derogations from the EL Vs set out in the BAT conclusions;
Not applicable - application is for a new plant and there are no BAT-AELs for land in the Waste Incineration BAT Conclusions.

Has an Annex been inserted to the permit containing reasons, assessment and justifications for setting the value: No (Not Applicable).

Details of any temporary derogation for the use of emerging techniques. NB Such temporary derogations do not require PPD consultation or the insertion of reasons etc. into the permit:
None (Not Applicable).

Emission limit values Noise and Vibration

Substance: Noise.

ELV: None set.

Emission point: No (Not Applicable).

Rationale: Not Applicable.

Details of any equivalent technical parameters adopted to supplement or replace ELVs: The following condition has been set:

"Noise emissions associated with the Permitted Activities shall not contain any Audible Tonal noise (as defined in BS4142:2014 and assessed using narrow band analysis defined in Annex D of BS4142:2014) at any noise sensitive receptor. See Section 5.17 for further details".

Details of any derogations from the ELVs set out in the BAT conclusions; No - not relevant application is for a new plant and there are no BAT-AELs for noise in the Waste Incineration BAT Conclusions.

Has an Annex been inserted to the permit containing reasons, assessment and justifications for setting the value: No (Not Applicable).

Details of any temporary derogation for the use of emerging techniques. NB Such temporary derogations do not require PPD consultation or the insertion of reasons etc. into the permit:
Not Applicable (No temporary derogations proposed for emerging techniques).

10 PEER REVIEW

Has the determination and draft permit been Peer Reviewed? **Yes**

11 FINAL DETERMINATION

Issue of a Permit - Based on the information available at the time

Issue a Permit – Based on the information available at the time of the determination SEPA is satisfied that

- The applicant will be the person who will have control over the operation of the installation/mobile plant,
- The applicant will ensure that the installation/mobile plant is operated so as to comply with the conditions of the Permit,
- The applicant is a fit and proper person (specified waste management activities only),
- Planning permission for the activity is in force (specified waste management activities only),
- That the operator is in a position to use all appropriate preventative measures against pollution, in particular through the application of best available techniques.
- That no significant pollution should be caused.

12 REFERENCES AND GUIDANCE

1. PPC Permit Application, Accepted 08 November 2019.
2. Schedule 4 Response 2, Ref. S2679-0330-0001JRS, dated 10 July 2020, Fichtner Consulting Engineers Ltd.
3. IPPC Environmental Assessment and Appraisal of BAT, Horizontal Guidance Note HI Environment Agency, V6.O, July 2003.
4. Releases from waste incinerators, Guidance on assessing group 3 metal stack emissions from incinerators, Environment Agency Version 4, 28 June 2016.
5. Planning application 19/01284/FUL. See North Lanarkshire Planning Portal.
6. Human Health Risk Assessment – Ref: S2679-0320-0010RDW, Dated 17 December 2020.
7. Email dated 02 September 2020 from SEPA to Fichtner detailing Cameron Burn discharge requirements for treated discharge from proposed package treatment plant.
8. WAT-RM-08 Sustainable Urban Drainage Systems, SEPA, v6.4, July 2019.
9. UK Technical Guidance s5.01 Incineration of Waste and Fuel Manufactured from or Including Waste, Issue I Version 5 July 2004.
10. Odour Management and Mitigation Strategy – Ref: S2679-0330-0004RSF, Dated 05 October 2020.
11. A Sampling and Testing Protocol to Assess the Status of Incinerator Bottom Ash", Ref. WRc Report Reference UC 9390.05, published by the Environmental Services Association, January 2018, as amended.
12. Thermal Treatment of Waste Guidelines 2014, SEPA, May 2014.
13. Commission Implementing Decision (EU) 2019/2010 of 12 November 2018 establishing the best available techniques (BAT) conclusions under Directive 2010/75/EU of the European Parliament and of the Council, for waste incineration, as published in the Official Journal of the European Union in 3 December 2019, these are known as the Best Available Techniques (BAT) Conclusions for Waste Incineration, or the WI BATCs.
14. Schedule 4 Response, Ref. S2679-0330-0002KLH, dated 12 August 2020, Fichtner Consulting Engineers Ltd.

15. Chapter 4 "Special provisions for Waste Incineration Plants and Waste Co-incineration Plants" of the Industrial Emissions Directive (IED) Dir 2010/75/EU.
16. Monitoring stack emissions: technical guidance for selecting a monitoring approach, EA, 11 Feb 2021 (Formerly M2).
17. SEPA Odour Guidance, Version 1, January 2010.
18. WAT-SG-12 General Binding Rules for Surface Water Discharges, SEPA, v4.1, March 2016.

ANNEX 1 – ECOLOGICAL ASSESSMENT

Record of the assessment of the conservation implications of Energy Recovery Centre at Greengairs Landfill Site, Meikle Drumgray Road, Greengairs, North Lanarkshire; Easting, Northing: 278850, 668674
PPC permit number: PPC/A/1187576
SEPA Planning reference: PCS168123; **Planning Authority reference:** 19/01284/FUL

The following document has been prepared by the Scottish Environment Protection Agency as the Competent Authority for the permitting of the above proposal. This document is also directly relevant to the Scottish Environment Protection Agency response as a statutory consultee, in order to advise North Lanarkshire Council which is the local planning authority for consenting the above proposal under the planning system.

This report should be read in conjunction with the following documents:

- EIA Technical Appendix 8.3, Drumgray Energy Recovery Centre Project, Dispersion Modelling Assessment (Fichtner Consulting Engineers Ltd, 2019)
- EIA Technical Appendix 8.4, Drumgray Energy Recovery Centre, Ecological assessment of air quality effects / HRA report (Argus Ecology, 2019)
- Figure 8.2 Muirhall Energy Greengairs East Wind Farm Peatland Restoration Area (27/09/2019)
- SNH Internal Memo from Andrew McBride to David Kelly re. Longriggend Moss site visit observations (17/05/2012)
- Longriggend Moss condition monitoring results (23/05/2005)

	Project and site description	
1	Brief description of the project	Construction and operation of the Drumgray Energy Recovery Centre (DERC) with associated Mechanical Pre-Treatment facility (MPT), Incinerator Bottom Ash (IBA) processing area and reorganisation of existing landfill infrastructure area at the entrance to the Greengairs Waste Management Complex (GWMC). Improvements to the private access road and associated infrastructure including a new internal access road, drainage infrastructure, lighting and landscaping. This development requires an Environmental Impact Assessment.

2 Special Areas of Conservation or Special Protection Areas within the screening distance of the project

Name	Distance(km)	Designation	Easting	Northing
Slamannan Plateau	3.515	SPA	279848	672044
West Fannyside Moss	4.164	SAC	279788	672731
Black Loch Moss	5.856	SAC	284704	668775
Blawhorn Moss	9.172	SAC	288000	668048
North Shotts Moss	10.864	SAC	286849	661323

3 Qualifying interests for the SAC/SPA (habitats and/or species) and site condition (and date of assessment) for each of these interests

Name	Qualifying interest	Condition	Negative pressures
Slamannan Plateau	Taiga bean goose, non-breeding	Favourable maintained, 2016	None
West Fannyside Moss	Blanket bog	Favourable maintained, 2002	None
Black Loch Moss	Active raised bog	Unfavourable no change, 2008	Over-grazing
	Degraded raised bog	Unfavourable no change, 2008	Over-grazing
Blawhorn Moss	Active raised bog	Unfavourable, recovering, 2014	None
	Degraded raised bog	Unfavourable, recovering, 2014	Burning Invasive species
North Shotts Moss	Active raised bog	Favourable maintained, 2013	None
	Degraded raised bog	Unfavourable no change, 2013	Dumping / storage of materials.

4	Designated features for the SSSIs, feature condition in latest assessment, and negative pressures for each feature.	

Name	Distance (km)	Easting	Northing	Designated features	Condition	Pressures
Longriggend Moss	1.837	280446	669582	Blanket bog	Favourable maintained, 2005	Grazing Water management
Slamannan Plateau	3.515	279848	672044	Taiga bean goose, non-breeding	Favourable maintained, 2016	None
Lady Bells Moss	3.761	280735	665419	Raised bog	Unfavourable, no change 2016	Burning, Water management
North Bellstane Plantation	3.931	276085	671469	Wet woodland	Unfavourable, no change 2009	Invasive species
West Fannyside Moss	4.164	279788	672731	Blanket bog	Favourable maintained, 2017	None
				Taiga bean goose, non-breeding	Favourable maintained, 2005	None
Black Loch Moss	5.856	284704	668775	Raised bog	Favourable recovered, 2012	Over grazing
Woodend Loch	7.95	271116	666831	Base-rich loch	Unfavourable declining, 2010	Invasive species Recreation Water management Water quality
Darnrig Moss	9.035	285160	675140	Raised bog	Unfavourable recovering, 2012	Water management
Blawhorn Moss	9.172	288000	668048	Raised bog	Unfavourable, recovering, 2008	Burning Invasive species
Bishop Loch	9.365	269569	667414	Base-rich loch	Favourable declining, 2009	Recreation /disturbance
				Open water transition fen	Unfavourable no change, 2008	None
Dullatur Marsh	9.46	275760	677614	Hydromorphological mire range	Favourable maintained, 2015	None

		Hassockrigg & North Shotts Mosses	9.967	286315	662070	Raised bog	Unfavourable, no change, 2008	Burning Over grazing Water management
		Howierig Muir	11.599	285137	678420	Raised bog	Unfavourable declining, 2001	Invasive species Water management
		Hamilton Low Parks	12.717	271349	658403	Grey heron, breeding	Favourable, maintained 2003	Invasive species Over grazing
		Bothwell Castle Grounds	12.869	269077	660300	Invertebrate assemblage	Favourable maintained 2016	None
						Upland mixed ash woodland	Unfavourable declining 2014	Recreation Wildlife crime Dumping INNS – beech, sycamore, rhododendron H. balsam Japanese knotweed
		Denny Muir	13.575	276227	681993	Basin fen	Favourable declining, 2009	Forestry operations Water management
						Blanket bog	Unfavourable, recovering 2013	Over grazing (sheep)
						Subalpine acid grassland	Unfavourable, no change, 2006	Over grazing (sheep)
		Carron Glen	14.365	279641	683017	Lowland neutral grassland	Favourable recovered, 2016	None
						Upland mixed ash woodland	Unfavourable recovering, 2011	Invasive beech, sycamore Overgrazing deer Ash dieback
						Upland oak woodland	Unfavourable, no change, 2018	Invasive beech Overgrazing deer
		The distances given in the table above are from source stack to the closest point on the boundary of the respective designated conservation site.						

		Corrie Burn and Mollinsburn Road Cutting SSSIs are also within the screening distance, however these sites are designated for geological features only, are considered insensitive to nitrogen and sulphur air pollution and therefore screened out from further assessment. The Taiga bean goose notified features at Slamannan Plateau SPA/SSSI are considered to be insensitive to nitrogen air pollution.
5	Is the proposal directly connected with, or necessary to, conservation management of the SAC/SPA?	The proposal is not directly connected with, or necessary to the conservation management of the Slamannan Plateau SPA, West Fannyside Moss SAC, Black Loch Moss SAC, Blawhorn Moss SAC or North Shotts Moss SAC. Therefore further consideration and an assessment of likely significant effect is needed.
	Assessment of likely significant effect	
6	Identify the individual elements or phases of the overall project that would give rise to a likely significant effect. Clearly identify any element of the project where the scale or magnitude of effect is not known or cannot be determined at this stage.	During operation, nitrogen and sulphur compounds, arising from combustion processes and emitted from a stack 90 metres above ground level, could have an adverse impact on sensitive habitats located downwind. The applicant has provided modelled predictions of the amount of each pollutant at each designated conservation site due to the proposed activity; this is called the process contribution (PC). It is literally the contribution of pollutant due to the proposed combustion process. Predicted process contributions were obtained by running ADMS 5.2 (CERC) to enable assessment of likely significant effect. The model input data including stack data and flue gas conditions are given in Table 8, on page 20 of the Dispersion Modelling Assessment (Fichtner, 2019). At this stage, the process contribution and background values for each designated nature conservation site are obtained for the point on the site boundary which is closest to the emission point. In this document the term benchmark is used to encompass the critical level for pollutant gas concentrations and the critical load for acid or nutrient nitrogen deposition to the habitat. Critical loads are habitat-specific. The relevant critical load can be obtained from the Site Relevant Critical Load section of the APIS database (**WWW.APIS.AC.UK**); critical levels and background values are also available on the APIS website. During screening, the critical level and the lowest of the European range for critical load of the most sensitive designated feature for each site are used in the assessment. The background plus process contribution, i.e. the total amount of pollutant expected to be experienced by the receptor, is called the Predicted Environmental Contribution (PEC). Where the PEC is less than the benchmark, or where the process contribution is less than 1% of the benchmark then it is considered unlikely that there will be a significant effect on the designated site as a consequence of the proposed regulated activity. Highlighted results: The following results are only for sites for which a significant effect due to the proposal cannot be ruled out as unlikely, based on the criteria described above. Reference to where the full results can be found in the submitted documents are also provided for each relevant pollutant. The background ambient deposition rates, critical levels, critical loads and critical load function parameters are provided in the Dispersion Modelling Assessment report, as follows:

- critical levels are provided in Table 4;
  critical loads for nitrogen deposition and background nitrogen deposition rates are in Annex C;
- critical load function parameters and background acid deposition rates in Appendix C.

Background ambient gas concentrations of ammonia and nitrogen oxides were obtained from the Air Pollution Information System (APIS) search by location tool (**HTTP://WWW.APIS.AC.UK/SEARCH-LOCATION**), on entering the grid references for the designated sites, which are provided in the Dispersion Modelling Assessment report (pages 17 – 18).

Results for non-statutory sites are provided for completeness and as advisory to Scottish Natural Heritage and the Local Planning Authority.

FOR THE DRUMGRAY ENERGY RECOVERY CENTRE EMISSIONS ALONE:

Full results of process contributions to nitrogen oxides, sulphur dioxide, hydrogen fluoride and ammonia concentrations are presented in Table 48 on pages 92-93 of the Dispersion Modelling Assessment.

Process contributions to sulphur dioxide and hydrogen fluoride concentrations are below screening threshold so pass screening for all nature conservation designated sites.

Long term nitrogen oxides concentration – Screening is passed for all nature conservation designated sites

The annual mean critical level for all vegetation is 30 μg NO_x /m^3

The process contribution component of the screening exceeds the screening threshold at Longriggend Moss SSSI (by 0.03%), Drumshange Moss: Dykehead North SINC (by (0.16%) and Avon Water Head SINC (by 0.45%) however the total (background plus predicted contribution, i.e. PEC) concentration is less than the critical level, therefore screening is passed as the sites are not at risk from the predicted total gas concentrations.

Long term ammonia concentration

The critical level for annual mean ammonia concentration is 1 μg NH_3/m^3 for lichens & bryophytes, and 3 μg NH_3/m^3 for all other vegetation:

Site	**PC (μg NH_3/ m^3)**	**PC (% of critical level)**	**Bkgd (μg NH_3/ m^3)**	**PEC (μg NH_3/ m^3)**	**PEC (% of critical level)**
Longriggend Moss	0.03	2.59	1.12	1.15	115

The process contribution to annual mean ammonia concentration is 2.59 (% of critical level) and the PEC (% of critical level) is >100% therefore the predicted ammonia concentration at Longriggend Moss as a consequence of the proposed activity breaches screening thresholds. Detailed assessment of the potential for damage to the bog notified feature will be required.

Non-statutory sites

Percentages given are percentages of the critical level of 1 μg NH_3/m^3, which was applied on a precautionary basis to all non-statutory sites, as information on whether lichens or bryophytes are an essential element of the features for which the sites are designated was not available.

	PC (μg NH_3/m^3)	PC (% of critical level)	Bkgd (μg NH_3/m^3)	PEC (μg NH_3/m^3)	PEC (% of critical level)
Ancient Woodland 1	0.0215	2.15	1.66	1.6815	168
Ancient Woodland 2	0.023	2.3	1.66	1.683	168
Greengairs Peatland	0.0148	1.48	1.35	1.3648	136
Drumshangie Moss: Dykehead North	0.0291	2.91	1.66	1.6891	169
Arden Glen	0.0217	2.17	1.12	1.1417	114
Avon Water Head	0.0363	3.63	1.66	1.6963	170

Nutrient nitrogen deposition

Site relevant critical loads applied are provided in Table 52 of the Dispersion Modelling Assessment, page 99.

The process contribution to nutrient nitrogen deposition is less than 1% of the annual mean critical load at all statutory designated sites with the exception of Longriggend Moss.

Site	Notified feature	Critical load (kg N /ha/yr)	PC (kg N /ha/yr)	PC (% of lower critical load)	PEC (kg N /ha/yr)	PEC (% of lower critical load)
Longriggend Moss SSSI	Blanket bog	5	0.17	3.31	13.05	261

A critical load of 5 kg N/ha/year was applied as this is the screening stage, as per **GUIDANCE ON APIS** regarding indicative critical loads to use in impact assessments.

Non-statutory sites

The process contribution and predicted environmental concentration breach the screening thresholds at the following non-statutory designated conservation sites (expressed as percentages of the lower Critical Load):

	PC (% of critical load)	**PEC (% of critical load)**
Ancient Woodland 1	2.19	250
Ancient Woodland 2	2.35	250
Greengairs Peatland	1.9	271
Drumshangie Moss: Dykehead North	3.72	312
Arden Glen	1.48	135
Avon Water Head	4.65	313

Acid deposition

The appropriate critical load of acid deposition rate is site-specific, based on the mineralogy and chemistry of the dominant soils series in the 1km grid square. The critical load function tool on **APIS** can be used to calculate exceedance as a function of both nitrogen and sulphur acidifying compounds.

Full results are presented in Table 53 of the Dispersion Modelling Assessment, page 102 (Fichtner 2019)

The process contribution to nutrient acid deposition is less than 1% of the long term Critical Load at all statutory designated sites with the exception of Longriggend Moss SSSI, Black Loch Moss SAC and West Fannyside Moss SAC. Appropriate assessment of the effect on the designated features and site integrity will be required.

Site	**PC ($kEq\ H_+$ /ha/yr)**	**PC (% of critical load function)**	**PEC ($kEq\ H_+$ /ha/yr)**	**PEC (% of critical load function)**
Longriggend Moss	0.012 N 0.016 S	4.66	0.932 N 0.326 S	211
Black Loch Moss SAC	0.003 N 0.004 S	1.27	0.923 N 0.314 S	207
West Fannyside Moss SAC	0.003 N 0.004 S	1.05	0.963 N 0.304 S	207

<table>
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<td>
<u>Non-statutory sites, advisory comments or concerns</u>
The process contribution and predicted environmental concentration breach the screening thresholds at the following non-statutory designated conservation sites (all expressed as percentages of the critical load function):
<table>
<tr><th></th><th>PC
(% of
critical load function)</th><th>PEC
(% of
critical load function)</th></tr>
<tr><td>Greengairs Peatland</td><td>2.67</td><td>215</td></tr>
<tr><td>Drumshangie Moss North</td><td>1.93</td><td>240</td></tr>
<tr><td>Drumshangie Moss: Dykehead North</td><td>5.3</td><td>244</td></tr>
<tr><td>Drumshangie Moss: Dykehead South</td><td>1.49</td><td>243</td></tr>
<tr><td>Avon Water Head</td><td>6.55</td><td>242</td></tr>
</table>

<u>Summary Screening Result: -</u>
Emissions predicted to arise from the proposed activity, Drumgray Energy Recovery Centre, alone, breach screening thresholds at the following statutory designated nature conservation sites on the basis of:

the annual mean acid deposition at Black Loch Moss SAC/SSSI and West Fannyside Moss SAC/SSSI
the annual mean ammonia concentration, nitrogen deposition and acid deposition at Longriggend Moss SSSI

Further assessment of the effect of the predicted emissions on these three sites are required.
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<td>7</td>
<td>Identify any likely direct, indirect or secondary impacts of the project, in combination with other plans or projects, on the SAC/SPA.</td>
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<u>Black Loch Moss SAC; West Fannyside Moss SAC; Blawhorn Moss SAC bog habitats:</u>
Nutrient Nitrogen: Increase in vascular plants, altered growth and species composition of bryophytes, increased N in peat and peat water
Acidity: Leaching will cause a decrease in soil base saturation, increasing the availability of Al3+ ions, mobilisation of Al3+ may cause toxicity to plants and mycorrhiza, may have direct effect on lower plants (bryophytes and lichens).
<u>CUMULATIVE EFFECTS ASSESSMENT</u>
Table 13 (page 24 of the Dispersion Modelling Assessment, Fichtner 2019) lists the schemes which have been accounted for in their assessment of cumulative effects. These comprise of Greengairs Waste Management Complex 4 landfill gas engines and one landfill gas flare; Drumshangie Energy from Waste facility (0.8 km from the proposed ERC); Greengairs Wind Farm (1 km from ERC) and Greengairs East Wind Farm (1.4 km from ERC) .
Full results of the cumulative effects are presented from page 105 of the Dispersion Modelling Assessment.
The Drumshangie Energy from Waste facility, whose emissions have been modelled as part of the cumulative assessment, has received consent but has not yet been built. A new Best Available Techniques Reference document
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(BRef) for waste combustion was published in December, and the emission limit values have been reduced. Drumshangie will have to comply with the new lower limits. The cumulative assessment modelling is based on the BRef lower emission limits.

The in-combination assessment is conducted for the combined impact of the proposed permitted activity in-combination with other combustion plant whose emissions are not yet in the background. However, the contribution of Greengairs Waste Management Complex landfill gas engines and landfill gas flare should also be included within the background concentrations and deposition rates, as these have been in operation for sufficient time. Therefore, the cumulative effects assessment differs from an in-combination assessment in that the PEC from the cumulative effects modelling may double-count the contribution from the landfill gas engines and landfill gas flare. As such, the results should be considered to be precautionary.

Long term nitrogen oxides concentration - Screening is passed for all nature conservation designated sites

Full results of process contributions for nitrogen oxides, sulphur dioxide, hydrogen fluoride and ammonia are presented in Table 54 on page 105 of the Dispersion Modelling Assessment.

The annual mean critical level for all vegetation is 30 μg NO_x /m^3.

The process contribution component of the screening exceeds the screening threshold at Longriggend Moss SSSI and West Fannyside Moss SAC/ SSSI, however, at these sites, the total (background plus predicted contribution, i.e. PEC) concentration is less than the critical level, therefore screening is passed as the sites are not at risk from the predicted total gas concentrations.

Non-statutory sites:

Process contributions at Ancient Woodland 1, Ancient Woodland 2, Greengairs Peatland SINC, Drumshangie Moss: Dykehead North SINC, Arden Glen SINC and Avon Water Head SINC exceed the 1% critical level screening threshold, however PEC is less than the critical level therefore screening is passed.

Long term ammonia concentration

The annual mean ammonia concentration critical levels are: 1 μg/m^3 for lichens & bryophytes, and 3 μg/m^3 for all other vegetation.

Screening thresholds are breached for the following designated statutory conservation sites:

Site	Critical level applied	PC (μg NH_3/ m^3)	PC (% of critical level)	Bkgd (μg NH_3/ m^3)	PEC (μg NH_3/ m^3)	PEC (% of critical level)

Longriggend Moss	1	0.06	5.65	1.12	1.15	115
Black Loch Moss	1	0.02	1.54	1.12	1.14	114
West Fannyside Moss	1	0.03	3.13	1.35	1.38	138

Process contributions at Bothwell Castle Grounds SSSI and Woodend Loch SSSI exceed the 1% critical level screening threshold, however the PEC is less than the critical level therefore screening is passed.

Non-statutory nature sites

Process contributions to annual mean ammonia concentration breach the screening threshold, and the PEC is exceeded by background ambient ammonia concentration, therefore screening is also failed for the following sites:

- Ancient Woodland 1
- Ancient Woodland 2
- Greengairs Peatland SINC
- Drumshangie Moss North SINC
- Drumshangie Moss: Dykehead North SINC
- Drumshangie Moss: Dykehead South SINC
- Arden Glen SINC
- Avon Water Head SINC.

Sulphur dioxide concentration – screening is passed for all nature conservation sites.

Critical levels of annual mean sulphur dioxide concentration are: 10 μg SO_2/ m^3 where lichens or bryophytes are present; 20 μg SO_2/ m^3 for all other vegetation.

The process contribution component of the screening exceeds the screening threshold at Longriggend Moss SSSI (by 0.69%), however the total (background plus predicted contribution, i.e. PEC) concentration is less than the critical level, therefore screening is passed as the sites are not at risk from the predicted total gas concentrations.

Depositions:

Nutrient nitrogen deposition

Full results of process contributions for nutrient nitrogen deposition are presented in Table 58 on page 112 of the Dispersion Modelling Assessment.

Site	**Lower Critical load (kg N /ha/yr)**	**PC (kg N /ha/yr)**	**PC (% of lower critical load)**	**Bkgd**	**PEC (kg N /ha/yr)**	**PEC (% of lower critical load)**

Longriggend Moss	5	0.362	7.24	12.88	13.242	265
West Fannyside Moss	5	0.201	4.01	13.44	13.641	273
Black Loch Moss	5	0.098	1.97	12.88	12.978	260
Darnrig Moss	5	0.079	1.58	14.56	14.639	293

Non-statutory sites-

The following non-statutory designated conservation sites also breached screening thresholds:

- Ancient Woodland 1;
- Ancient woodland 2;
- Greengairs Peatland SINC;
- Drumshangie Moss North SINC;
- Drumshangie Moss: Dykehead North SINC;
- Drumshangie Moss: Dykehead South SINC;
- Arden Glen SINC; and
- Avon Water Head SINC.

Acid deposition

Full results are presented in Table 59 on page 115 of the Dispersion Modelling Assessment (Fichtner 2019).

Screening thresholds are breached at the following statutory designated conservation sites:

Site	**PC (kEq H_+ /ha/yr)**	**PC (% of critical load function)**	**PEC (kEq H_+ /ha/yr)**	**PEC (% of critical load function)**
Longriggend Moss SSSI	0.026 N 0.034 S	10.12	0.946 N 0.344 S	216.84
West Fannyside SAC	0.014 N 0.019 S	5.49	0.974 N 0.319 S	211.04
Black Loch Moss SAC	0.007 N 0.009 S	2.76	0.927 N 0.319 S	208.79
Darnrig Moss SSSI	0.006 N 0.008 S	2.07	1.046 N 0.368 S	221.5

		<table><tr><td>Blawhorn Moss SAC</td><td>0.004 N 0.005 S</td><td>1.47</td><td>0.974 N 0.335 S</td><td>213.88</td></tr></table> <u>*Non-statutory sites, advisory comments or concerns -*</u> The following non-statutory designated conservation sites also breached screening thresholds: • Greengairs Peatland SINC; • Drumshangie Moss North SINC; • Drumshangie Moss: Dykehead North SINC; • Drumshangie Moss: Dykehead South SINC; and • Avon Water Head SINC. <u>Summary Screening Result – Cumulative assessment: -</u> The proposed activity, in combination with the other plans and projects which have approval but are not yet in the background, and accounting for the effect of the wind turbines on the turbulent air flow, breaches screening as follows: • the annual mean ammonia concentration, nutrient nitrogen deposition and acid deposition at Black Loch Moss SAC/SSSI and West Fannyside Moss SAC/SSSI; • acid deposition at Blawhorn Moss SAC / SSSI; and • the annual mean ammonia concentration, nutrient nitrogen deposition and acid deposition at Longriggend Moss SSSI • nutrient nitrogen deposition and acid deposition at Darnrig Moss SSSI.
8	Identify any likely direct, indirect or secondary impacts of the project on any relevant SSSIs.	<u>For bog habitats:</u> Nutrient Nitrogen: Increase in vascular plants, altered growth and species composition of bryophytes, increased N in peat and peat water. Acidity: Leaching will cause a decrease in soil base saturation, increasing the availability of Al3+ ions, mobilisation of Al3+ may cause toxicity to plants and mycorrhiza, may have direct effect on lower plants (bryophytes and lichens). <u>Summary Screening Result for SSSIs: -</u> Emissions predicted to arise from the proposed activity, Drumgray Energy Recovery Centre, alone, breaches screening thresholds for annual mean ammonia concentration, nitrogen deposition and acid deposition at Longriggend Moss SSSI. The proposed activity, in combination with the other plans and projects which have approval but are not yet in the background, and accounting for the effect of the wind turbines on the turbulent air flow, breaches screening as follows: • the annual mean ammonia concentration, nutrient nitrogen deposition and acid deposition at Longriggend Moss SSSI • nutrient nitrogen deposition and acid deposition at Darnrig Moss SSSI.

		Detailed assessment of the potential for damage to the notified features of these sites due to the predicted emissions will be required.
9	Identify standard conditions within the authorisation, or other conditions agreed with the applicant, which will remove the risk of likely significant effects listed above.	*n/a*
10	List any remaining likely significant effects, or identify those for which it is not possible to determine that there is no likely significant effect.	**Ammonia concentration** - The effects of ammonia concentration on plants and bryophytes above the critical level is direct toxicity. Mosses and lichens are particularly vulnerable as they do not have roots, and obtain all their needs from the air, hence the lower critical level where mosses or lichens are an important element of the designated feature. Sphagnum species associated with wetter conditions appear to be less sensitive to ammonia. ▪ Sphagnum may show leaf discolouration ▪ Algal growth over the Sphagnum especially where phosphorus and potassium are also high ▪ Damage to hummock species and disruption and physical breakdown of the hummock. ▪ Increase in nitrophilic (Nitrogen loving) species, including mosses able to capitalize on the increase in bare peat e.g. *Campylopus introflexus*. ▪ Which nitrophilic species are present will depend on other factors e.g. peat pH and which other nutrients are potentially limiting. ▪ Absence of habitat constants ie. those species which are considered to be integral components of an ecosystem e.g. *Sphagnum*. **Nitrogen deposition** - The effects of nitrogen deposition exceeding the critical load are accumulation of nitrogen in the ecosystem (eutrophication), enabling plant species which are able to capitalise on the increased fertility to increase in dominance, leading to a change in plant community structure, ultimately resulting in the small, low-growing bog plants which are adapted to low nutrient conditions being shaded and outcompeted by taller species, particularly grasses and opportunist nitrophilic (N loving) ruderal plant species. This has been shown in the Netherlands at very high nitrogen deposition levels where heathland became grassland as the grasses took over. In bog habitats the effect of hydrology is greater than that of the nitrogen air pollution. **Acid deposition** - Bog habitats are naturally acidic environments; acquiring all their nutrients and water from the atmosphere makes them extremely vulnerable to the effects of atmospheric pollutants. Plant community composition is partly determined by the acidity of peat bogs and can change in response to increasing levels of mineral acidity. However, since the existing H^+ pool in peats is so large, it may take years for sustained acid inputs to influence acidity. Much of the evidence of significant adverse effect to bog habitats through acidification was related to sulphate pollution; atmospheric sulphur air pollution is vastly reduced and reactive nitrogen compounds are now the main component of acid deposition.

		A low water table will concentrate acidity and exacerbate the effects, therefore raising the water table to at or close to the ground surface will reduce the effects and increase resilience. APIS summaries of effects of exceedance of critical load or level on bogs, with implications, processes and evidence: • Ammonia concentration **HTTP://WWW.APIS.AC.UK/NODE/866** • Nitrogen deposition **HTTP://WWW.APIS.AC.UK/NODE/964** • Acid deposition **HTTP://WWW.APIS.AC.UK/NODE/921**
	Conclusion of assessment of likely significant effect	
11	Is the plan/project likely to have a significant effect on the SAC/SPA, either alone or in combination, with other plans or projects?	The contributions to air pollution predicted to arise from the proposed activity, Drumgray Energy Recovery Centre, alone, breaches screening thresholds for annual mean acid deposition at Black Loch Moss SAC/SSSI and West Fannyside Moss SAC/SSSI. The contributions to air pollution predicted to arise from the proposed activity, in combination with the other plans and projects which have approval but are not yet in the background, and accounting for the effect of the wind turbines on the turbulent air flow, breaches screening threshold at European designated nature conservation sites as follows: • the annual mean ammonia concentration, nutrient nitrogen deposition and acid deposition at Black Loch Moss SAC/SSSI and West Fannyside Moss SAC/SSSI; • acid deposition at Blawhorn Moss SAC / SSSI; and It is SEPA's view that a significant effect on the Black Loch Moss SAC, West Fannyside Moss SAC and Blawhorn Moss SAC as a result of emissions to air from the Drumgray Energy Recovery Centre cannot be ruled out. Appropriate assessment is required.
	Appropriate Assessment	
12	Identify the relevant conservation objectives to consider for the SAC/SPA. Summarise relevant information as provided by SNH on consultation. Consider the risk of adverse effects to the integrity of SACs and SPAs, plus potential for damage to notified features of SSSIs.	The process contributions to acid deposition from Drumgray Energy Recovery Centre alone at Black Loch Moss SAC and West Fannyside Moss SAC are predicted to be 1.3% and 1.05% of their respective critical load functions. However, for comparison against the screening threshold of 1%, the percentage process contribution is rounded to the nearest integer (i.e. zero decimal places), in which case the process contributions of 1% for Black Loch Moss SAC and West Fannyside SAC do not breach screening thresholds, and can be screened out. Nutrient nitrogen deposition: At the Appropriate Assessment stage, the appropriate nutrient nitrogen deposition critical load for bog habitats is established as a function of site condition, water table depth and annual rainfall, (see **APIS FLOWCHART** for details). Longriggend Moss, West Fannyside Moss and Black Loch Moss are in favourable condition and have sufficient annual rainfall to meet the criteria for use of the 9 kg nitrogen per hectare per year critical load for nutrient nitrogen deposition.

Darnrig Moss remains unchanged as a critical load of 5 kg nitrogen per hectare per year continues to apply due to site condition being unfavourable.
Therefore, the process contributions and PEC as percentages of the critical load are now as follows:

Site	Critical load (kg N /ha/yr)	PC (kg N /ha/yr)	PC (% of critical load)	Bkgd	PEC (kg N /ha/yr)	PEC (% of critical load)
Longriggend Moss	9	0.362	4	12.88	13.242	147
West Fannyside Moss	9	0.201	2	13.44	13.641	152
Black Loch Moss	9	0.098	1	12.88	12.978	144
Darnrig Moss	5	0.079	2	14.56	14.639	293

Black Loch Moss process contribution no longer breaches screening thresholds, and is unlikely to cause a significant adverse effect to site integrity.

Consultation response from SNH:
The following response was received from Scottish Natural Heritage (SNH) in addition to information on Longriggend Moss SSSI condition and scope for restoration work to increase resilience to an increase in atmospheric deposition of nitrogen and sulphur compounds:

- In SNH's view, this proposal is therefore likely to have a significant effect on the qualifying interests of Black Loch Moss SAC, West Fannyside Moss SAC and Blawhorn Moss SAC. Consequently, SEPA, as competent authority for the PPC application, is required to carry out an appropriate assessment in view of the conservation objectives for the qualifying interests of these sites. To help you do this we advise that, in our view, based on the information provided in the Drumgray Energy Recovery Centre Habitats Regulations Appraisal (HRA) Report, the proposal will not adversely affect the integrity of the sites. We consider that the level of impact predicted, both for the development alone and in-combination, is unlikely to be detectable given current background levels.
- In SNH's view, the objectives of designation and the overall integrity of the SSSIs where an exceedance of the screening thresholds has been identified will not be compromised by the proposed development.
- Given the relatively higher level of impact on Longriggend Moss, we encourage the applicant to explore opportunities to undertake, or contribute to, habitat management within the SSSI in order to increase its long-term resilience to the effects of atmospheric emissions.

13	Identify any enforceable conditions agreed with the applicant, which will	The applicant must explore opportunities to undertake, or contribute to, habitat management within the SSSI in order to increase its long-term resilience to the effects of atmospheric emissions.

	remove the risk of likely significant effect from the elements of the project listed above.	SITE MANAGEMENT ACTIONS TO LONGRIGGEND MOSS THAT COULD INCREASE RESILIENCE TO AIR POLLUTION: By reference to the SNH internal memo from Andrew McBride (SNH wetland advisor, now Peatland Action programme manager) following a site visit to Longriggend Moss, the restoration actions on the SSSI that are likely to be effective in raising the water table across the site and thus increasing the resilience of the blanket bog to air pollution would be to: 1) reprofile the peat baulks/ridges and furrows, i.e. to smooth the surface so these are reduced to a microtopography (say +/- 10 cm), possibly also needing surface scraping where the surface has dried out; 2) block the ditches (as described in the internal memo); 3) remove the birch and outlier willows present on site; 4) It may be useful to consider carpet spreading of harvested seedheads etc from a local donor bog site to kickstart revegetation on bare areas. Other possible secondary actions relate to the adjacent conifer plantation if it is still there and having a notable effect on the water table (this may not be detectable until after the drains are blocked). Also, there is mention of the old mining of spoil heaps having an influence on the mineral and base-enrichment in proximity, and via water percolating through the spoil heaps – the enrichment will favour formation of a poor fen habitat instead of bog, therefore removal or other measures to reduce their influence may be beneficial.
14	List any remaining likely significant effects, or identify those for which it is not possible to determine that there is no likely significant effect.	
	Conclusion of Appropriate Assessment	
15	Can it be ascertained beyond reasonable scientific doubt that the proposal will not adversely affect the integrity of the SAC/SPA?	Taking account of the issues considered in the Appropriate Assessment, in the view of SEPA then it is beyond reasonable scientific doubt that the proposal will not adversely affect the integrity of the West Fannyside SAC, Black Loch Moss SAC or Blawhorn Moss SAC.

ANNEX 2 - SITE CONDITION AND BASELINE REPORT REVIEW

Item		Y/N	Comment
Stage 1: Identification of Substances Used at the Installation			
1	Has a list of substances at the installation been produced? (raw materials, products, by-products, intermediaries, wastes, auxiliaries)	Yes	
2	Are there any substances which have obviously been omitted?	No	
Stage 2: Identification of Relevant Hazardous Substances and which have a theoretical pollution potential			
3	Have Relevant Hazardous Substances been identified? Has the theoretical pollution potential of all other substances been determined based on chemical and physical data? e.g. mobility, persistence, state etc	Yes, but a few substances need questioned	Comments on Appendix D of the Site Condition Report (SCR): It is recognised that in the case of RDF it is difficult to be specific about RHS that might be present within this material, however it should still be considered as having a potential pollution risk due to the wide range of contaminants and the potential for liquids to be present. Similar comments apply to IBA and leachate from IBA. It is recommended that Appendix D is included within the body of the SCR instead of being in an appendix at the end of the report as it is an intrinsic stage of the SCR.
Stage 3: Assessment of site-specific pollution potential			
4	Has the site-specific pollution potential been determined based on an assessment of the quantity used, adequacy and integrity of containment mechanisms for delivery, handing, storage, use and disposal of substances etc?	Partially	Some information relevant to the site Pollution potential has been presented in Appendix D. Further detail on measures that will be implemented to limit/avoid pollution potential are addressed under sections 3.4. At present it is stated on the SCR that all the measures such as design, containment (primary, secondary, tertiary), construction, maintenance, inspection, etc., will adhere to BAT conclusions guidance for the incineration of Waste and Fuel Manufactured from or including Waste, will also follow the requirements of BS EN 1992-3 (Design of concrete structures – liquid retaining and containment structures) to prevent the released of liquid pollutants into the

Item		Y/N	Comment
			ground/groundwater and CIRIA 660. However, CIRIA 736 guidance on containment systems for the prevention of pollution has not been taken into consideration and it is recommended that it is since this guidance addresses the gaps on structural design of BS EN 1992-3:2006, which specifically excludes structures containing polluting materials. Particular attention should be paid to the need to install waterstops (including fire resistant waterstops where appropriate) in all concrete joints and not to rely solely on mastics. In addition, consideration should be given to the need for containment of pipework where necessary, particularly for underground pipework conveying potential pollutants. With regards to process effluent, the flow charts presented show the end point as 'wastewater pits' for both processes. Clarity will be required on the plans for process effluent. Should this be to send it to the landfill leachate treatment plant, evidence will be required that the plant is capable of treating the effluent from this site. Final design details will be required at some stage due to their relevance in setting soil and groundwater monitoring frequencies for the site. This can either be in advance of the permit or required as a permit condition to be complied with by reporting prior to construction.
5	Have the substances of concern been identified and their selection justified?	Mostly	As noted above in item 3.
6	Have the likely areas/points of emission been identified?	Yes	Potential emission points relate to storage areas. These are largely indicative just now in Appendix D and on the drawings presented. Section 7 includes details on the locations of storage as being the potential emission points and associated RHS.
Stage 4: Site History			
7	Has the potential for these substances to be present as a result of activities prior to operation under PPC been considered through review of site history?	Yes	A general suite of potential contaminants of concern from historic landuse is presented. Presence of landfill adjacent also noted and thus potential exists for most RHS to be present in groundwater already.
8	Do areas of historic contamination overlap with	Yes	Quarry infill is largely the made ground, but there are also leachate ponds present which

Item		Y/N	Comment
	potential future emission points?		could have contaminated sediments associated with adjacent landfill. Earthworks are required in advance however so these may change, and the baseline investigation needs to take this into account. Groundwater could have contaminants associated with the adjacent landfill.
Stage 5: Site Environmental Setting			
9	Has the environmental setting of the site been considered to determine which strata and groundwater bodies could be affected by emissions and the extent and depth to which the site should be characterised? e.g. by consideration of topography, geology, hydrogeology and hydrology.	Yes (although error noted)	This information is presented and discussed on section 5 of SCR. The report incorrectly identifies that it is not located within a Groundwater Source Protection Zone. This is terminology relevant to English law. All groundwater bodies that have been mapped in Scotland are considered to have potential resource value and are protected as such.
10	Have potential flow paths through the sub surface been considered? e.g. drains, services, faults, mines.	Yes	
Stage 6: Conceptual Site Models			
11	Has a cross section or conceptual site model been developed identifying emission points and the extent to which these may impact on the surface, sub-surface and groundwaters?	Partially	Although a CSM is included under Appendix C it is in a rather generic form of that often presented for a contaminated land assessment rather than PPC application (see Figure 3(a) & 3(b) in SEPA guidance IED-TG-02). It does not provide the relevant information for PPC purposes. The CSM should reflect potential emission points for RHS and any substance with theoretical pollution potential associated to the proposed PPC installation; relevant associated pathways for migration to surface, sub-surface, groundwater, surface water, etc. A site specific CSM should be developed in line with our guidance. It should inform the baseline site investigation and subsequent requirements for soil and groundwater monitoring.
Stage 7: Site Investigation (Required for Baseline Report)			
12	Can the site be adequately characterised without a site investigation?	No	
13	Has a site investigation been undertaken? (either specifically for PPC or has old data been used)	Yes/ Proposed	A site investigation is provided, along with extensive reports from historic investigations. Little or no information is available on potential contamination due to a

Item		Y/N	Comment
			lack of testing in these investigations that were largely undertaken for other purposes. It would help if the relevant historic investigation points could be plotted on the plans for the proposed facility and extracted from the existing reports if/when presented as part of the proposed baseline investigation. A further investigation is planned and proposed. The following comments relate to the need for a specific condition in the license: • It is noted that the scope of works is to be agreed with SEPA through determination of the PPC permit. • It is recommended that the permit includes a condition for approval of the detailed scope of works for the baseline report (this should include sampling proposals for each location. The remainder of the comments below relate to specific comments on the scope of the proposed site investigation as presented in the Site Condition Report: **DERC** • Table 9 – Why is WAC listed as potential contaminant? Perhaps some of the parameters in a WAC test may be relevant to inform the baseline? • Table 9 – Comments on PCBs in the MPT are relevant here too. • 7.3.2.1 – As per 7.3.1.1, VOCs and sVOCs are not listed here. Investigation locations are presented for both plants in 2 drawings but not referenced in the text. Further information is requested on the rationale and proposed testing suite for each of the investigation points as laid out. This could be provided as part of a permit condition as noted in item 4 above. There are limited, and likely insufficient investigation points for soils baseline directly beneath the potential sources. It is recommended that where appropriate, the existing groundwater monitoring network

Item		Y/N	Comment
			and results for the adjacent landfill is utilised to gain an understanding of the surrounding groundwater chemistry as part of the baseline in the vicinity of the proposed EfW facility. Information from the hydrogeological model developed for the landfill may also provide useful information to help understand the groundwater regime at the site. Section 7.7 – It is recommended that analytical suites are selected for each sampling location in advance and presented as part of a rationale for each location. Certain locations will only require analysis for certain substances depending on what will be used in particular areas of the site and unless required for planning purposes, the scope of analysis can be limited to the RHS at particular locations on the site. Section 8 – The Statement of site condition will need to be updated upon completion of the baseline site investigation.
14	Were samples obtained at appropriate depths in strata and groundwaters likely to be impacted by potential emissions / historic contamination?	N/A	See Item 13 for comments on proposed investigation.
15	Has analysis been undertaken for appropriate substances?	N/A	See Item 13 for comments on proposed investigation.
16	Where screening or marker substances have been used are these considered appropriate?	N/A	See Item 13 for comments on proposed investigation.
17	Were the samples taken and analysed using appropriate quality assured methods, acceptable limits of detection, accuracy and precision?	N/A	See Item 13 for comments on proposed investigation.
Stage 8: Statement of Site Condition			
18	Is a clear statement on site condition presented?	N	Section 8 – The Statement of site condition will need to be updated upon completion of the baseline site investigation It is important to remember that the statement of site condition is not a risk assessment or an assessment of whether the site is “suitable for use”, these are not of concern in respect of the requirements of the

Item		Y/N	Comment
			initial site condition report. It is simply a factual statement on the condition of the soil and groundwater beneath the site based in the information available from the baseline investigation to be carried out at a later date. Any assessment of the sites suitability for use is valuable in terms of planning and understanding potential liabilities associated with the land, however it should be presented in a separate section of the report so as not to confuse a contaminated land assessment with a PPC Statement of Site Condition.
19	Does it cover all substances which have a pollution potential?	N/A	See Item 13 for comments on proposed investigation.
20	Has groundwater quality been used as an indicator of ground / soil quality and is it an appropriate indicator?	N/A	See Item 13 for comments on proposed investigation.
21	Have soil and groundwater measurements been provided for relevant hazardous substances?	N/A	See Item 13 for comments on proposed investigation.
22	Has the statement on site condition been fully justified?	N/A	See Item 13 for comments on proposed investigation.
23	Is it considered to be representative of the actual site condition?	N/A	See Item 13 for comments on proposed investigation.

ANNEX 3 – COMPLIANCE WITH IED CHAPTER IV AND ANNEX VI

How design meets IED Chapter 4 requirements "Special provisions for waste incineration plants and waste co-incineration plants. Only relevant parts are included, and N/A parts are excluded.

Article	Requirement	How met or reference
46	Control of Emissions	
46 (1)	Waste gases from waste incineration plants and waste co-incineration plants shall be discharged in a controlled way by means of a stack the height of which is calculated in such a way as to safeguard human health and the environment.	Refer to Application - (Appendix D – Air Quality Assessment) + Section 5.2.2. of this document (stack height assessment)
46 (2)	Emissions into air from waste incineration plants and waste co-incineration plants shall not exceed the emission limit values set out in parts 3 and 4 of Annex VI or determined in accordance with Part 4 of that Annex.	Refer to Application - (Section 3.4.1 of the Supporting Information) + Refer to Section 5.2.2 and Section 9 of this document.
46 (5)	Waste incineration plant sites and waste co-incineration plant sites, including associated storage areas for waste, shall be designed and operated in such a way as to prevent the unauthorised and accidental release of any polluting substances into soil, surface water and groundwater. Storage capacity shall be provided for contaminated rainwater run-off from the waste incineration plant site or waste co-incineration plant site or for contaminated water arising from spillage or fire-fighting operations. The storage capacity shall be adequate to ensure that such waters can be tested and treated before discharge where necessary.	Refer to Application - section 3.4.5 of the Supporting Information + Sections 5.6 of this document
46 (6)	Without prejudice to Article 50(4)(c), the waste incineration plant or waste co-incineration plant or individual furnaces being part of a waste incineration plant or waste co-incineration plant shall under no circumstances continue to incinerate waste for a period of more than 4hours uninterrupted where emission limit values are exceeded. The cumulative duration of operation in such conditions over 1 year shall not exceed 60 hours.	Refer to Application - (Appendix D - Abnormal Emissions Assessment) + This requirement is implemented by Condition 5.4.3 in the draft permit with further supporting requirements included in Condition 5.4. This requirement is implemented via Condition 5.4.5 in the draft permit.

Article	Requirement	How met or reference
47	In the case of a breakdown, the operator shall reduce or close down operations as soon as practicable until normal operations can be restored.	Refer to Application - sections 3.2.4.6 and 2.6 of the Supporting Information + This requirement is implemented via Condition 5.4.1 in the draft permit.
48 (2)	The installation and functioning of the automated measuring systems shall be subject to control and to annual surveillance tests as set out in point 1 of Part 6 of Annex VI.	Refer to Application - section 3.5.1.1 of the Supporting Information + Implemented by Condition 6.2 of the Permit
48 (4)	All monitoring results shall be recorded, processed and presented in such a way as to enable the competent authority to verify compliance with the operating conditions and emission limit values which are included in the permit.	Refer to Application - section 3.5.1of the Supporting Information + Implemented by Conditions 6.3 and 6.4 of the Permit
49	The emission limit values for air and water shall be regarded as being complied with if the conditions described in Part 8 of Annex VI are fulfilled.	There will be no emissions from flue gas treatment systems to water/sewer from the waste incineration plant. + Emissions to air are covered in Schedule 6 of the Permit.
50 (1)	Waste incineration plants shall be operated in such a way as to achieve a level of incineration such that the total organic carbon content of slag and bottom ashes is less than 3% or their loss on ignition is less than 5% of the dry weight of the material. If necessary, waste pre-treatment techniques shall be used.	Refer to Application - section 3.5.2.1. of the Supporting Information (TOC or LOI testing) + Condition 5.1.1 of the Permit
50 (2)	Waste incineration plants shall be designed, equipped, built and operated in such a way that the gas resulting from the incineration of waste is raised, after the last injection of combustion air, in a controlled and homogeneous fashion and even under the most unfavourable conditions, to a temperature of at least 850°C for at least two seconds.	Refer to Application - section 3.2.4.6 of the Supporting Information + Condition 5.1.1 of the Permit

Article	Requirement	How met or reference
50 (3)	Each combustion chamber of a waste incineration plant shall be equipped with at least one auxiliary burner. This burner shall be switched on automatically when the temperature of the combustion gases after the last injection of combustion air falls below the temperatures set out in paragraph 2. It shall also be used during plant start-up and shut-down operations in order to ensure that those temperatures are maintained at all times during these operations and as long as unburned waste is in the combustion chamber. The auxiliary burner shall not be fed with fuels which can cause higher emissions than those resulting from the burning of gas oil as defined in Article 2(2) of Council Directive 1999/32/EC of 26April 1999 relating to a reduction in the sulphur content of certain liquid fuels (OJ L 121, 11.5.1999, p. 13.), liquefied gas or natural gas.	Refer to Application - sections 3.2.4.6 and 3.1.3.3 of the Supporting Information + Schedule 5 of the Permit
50 (4)	Waste incineration plants and waste co-incineration plants shall operate an automatic system to prevent waste feed in the following situations:	Refer to Application - section 3.2.4.6 of the Supporting Information + Condition 5.3.2 of the Permit
	(a) at start-up, until the temperature set out in paragraph 2 of this Article or the temperature specified in accordance with Article 51(1) has been reached;	
	(b) whenever the temperature set out in paragraph 2 of this Article or the temperature specified in accordance with Article 51(1) is not maintained;	
	(c) whenever the continuous measurements show that any emission limit value is exceeded due to disturbances or failures of the waste gas cleaning devices.	
50 (5)	Any heat generated by waste incineration plants or waste co-incineration plants shall be recovered as far as practicable.	Refer to Application - section 3.7.2 of the Supporting Information and Appendix F + Condition 2.7 of the Permit
50 (6)	Infectious clinical waste shall be placed straight in the furnace, without first being mixed with other categories of waste and without direct handling.	This requirement will not apply as the DERC will not be solely dedicated to the processing of clinical waste. In addition, the DERC will not receive hazardous clinical waste.

Article	Requirement	How met or reference
52 (1)	The operator of the waste incineration plant or waste co-incineration plant shall take all necessary precautions concerning the delivery and reception of waste in order to prevent or to limit as far as practicable the pollution of air, soil, surface water and groundwater as well as other negative effects on the environment, odours and noise, and direct risks to human health.	Refer to Application - section 3.2 of the Supporting Information + Schedule 4 of the Permit
52 (2)	The operator shall determine the mass of each type of waste, if possible, according to the European Waste List established by Decision 2000/532/EC, prior to accepting the waste at the waste incineration plant or waste co-incineration plant.	Refer to Application - section 3.2.1 of the Supporting Information + Condition 3.3 of the Permit
53 (1)	Residues shall be minimised in their amount and harmfulness. Residues shall be recycled, where appropriate, directly in the plant or outside	Refer to Application - section 3.2.4 and 3.9 of the Supporting Information + Schedule 8 of the Permit
53 (2)	Transport and intermediate storage of dry residues in the form of dust shall take place in such a way as to prevent dispersal of those residues in the environment.	Refer to Application - section 3.9 of the Supporting Information and Appendix B + Discussed in section 5.13 of this document
53 (3)	Prior to determining the routes for the disposal or recycling of the residues, appropriate tests shall be carried out to establish the physical and chemical characteristics and the polluting potential of the residues. Those tests shall concern the total soluble fraction and heavy metals soluble fraction.	Refer to Application - section 3.9 of the Supporting Information + Schedule 8 of the Permit and section 5.14 of this document

ANNEX 4 – COMPLIANCE WITH WASTE INCINERATION BAT CONCLUSIONS

BATC No.	Summary of requirement	How Met (from application)	Comment
1	In order to improve the overall environmental performance, BAT is to elaborate and implement an environmental management system (EMS) that incorporates all of the features as listed in BAT 1 of the BREF.	A general summary of the proposed EMS is presented in Section 3.10 of the Supporting Information, alongside a detailed summary in Appendix L. The EMS will be developed throughout the development stage of the project, and will be accredited to the ISO 14001 standard. It is proposed that a pre-operational condition in included within the PPC Permit which requires FCC to provide a summary of the proposed EMS prior to commencement of operation.	Prior Commissioning Condition 2.8.9 has been inserted into Permit.
2	BAT is to determine either the gross electrical efficiency, the gross energy efficiency, or the boiler efficiency of the incineration plant as a whole or of all the relevant parts of the incineration plant.	As stated in 3.8.2.4 of the Supporting Information, the gross electrical efficiency of the plant is calculated to be 30.3%. Therefore, FCC understand this to satisfy the requirements of BAT 2.	Compliance with the BAT-AEEL is required by BAT 20. BAT 2 explains the gross electrical efficiency should be determined by carrying out a performance test at full load. This has therefore been included as a requirement of the commissioning tests in Condition 2.9.2 h) of the Permit. Condition 2.8.10 is inserted to require the methodology for carrying out the performance test to be provided in advance of commissioning. In the absence of an EN standard for carrying out the performance test, BAT 2 explains this may follow FDBR Guideline RL7 'Acceptance Testing of waste Incineration Plants with Grate Firing Systems' 2013. Condition 2.8.10 therefore makes reference to this standard. Compliant with BAT 3 and IED Annex VI Part 6 2.1 b). These requirements have been incorporated in Schedule 5 and Table 6.3 in Schedule 6 of the PPC permit.

BATC No.	Summary of requirement	How Met (from application)	Comment
3	BAT is to monitor key process parameters relevant for emissions to air and water including those given in BAT 3 of the BREF.	As set out in Section 3.5 of the Supporting Information, the process parameters for monitoring of emissions to air are as follows: •water vapour content •temperature; and •pressure. The oxygen content and flow rate of the flue gases will also be monitored. Temperature will be monitored in the combustion chamber. There will be no emissions of water from FGC systems and there will be no bottom ash treatment undertaken at the DERC–therefore, the process parameters to be monitored for emissions to water as listed in BAT 3 do not apply to the DERC. FCC can confirm that the DERC will include monitoring of the key process parameters relevant for emissions to air in accordance with BAT 3.	Compliant with BAT 3 and IED Annex VI part 6 2.1 b. These requirements have been incorporated in Schedule 5 and Table 6.3 of the permit. The process parameters to be monitored for emissions to water as listed in BAT 3 therefore do not apply to the Facility.
4	BAT is to monitor channelled emissions to air with at least the frequency given in BAT 4 of the BREF and in accordance with EN standards. If EN standards are not available, BAT is to use ISO, national or other international standards that ensure the provision of data of an equivalent scientific quality.	As set out in section 3.5.1.1of the Supporting Information, emissions to air will be monitored with the following frequency: Continuous Monitoring •Oxygen; •Carbon monoxide; •Hydrogen chloride; •Sulphur dioxide; •Nitrogen oxides; •Ammonia; •Volatile organic compounds (VOCs); and •Particulates Periodic Monitoring •Group 3 heavy metals (Sb, As, Pb, Cr, Co, CU, Mn, Ni, V) –once every six months; •Cadmium and thallium –once every six months; •Mercury –once every six months; •Nitrous oxide –once every year; •Hydrogen fluoride –once every six months;	Compliant with BAT 4 apart from dioxins and furans and mercury monitoring which will require further consideration to determine whether long-term sampling, and continuous monitoring respectively are appropriate. Conditions 6.5.1 and 6.5.2 have been drafted to cover this requirement. See Section 5.18 of this document for further details. The response also provides compliance with the monitoring requirements in IED Annex VI Part 6 2.1 a) and c). These monitoring requirements have been incorporated into Table 6.2 in Schedule 6 of the PPC permit.

BATC No.	Summary of requirement	How Met (from application)	Comment
		•Dioxins and furans -once every six months (except long-term sampling of PCDD/F once every month); and •Dioxin-like PCBs (once every six months for short-term sampling, once every month for long-term sampling). As set out in section 3.5.1.1of the Supporting Information, the methods and standards used for emissions monitoring will be in compliance with S5.01 and the IED. In particular, the CEMS equipment will be certified to the MCERTS standard and will have certified ranges which are no greater than 1.5 times the relevant daily average emission limit. Sampling and analysis of all pollutants including dioxins and furans will be carried out to CEN or equivalent standards (e.g. ISO, national, or international standards). This ensures the provision of data of an equivalent scientific quality. FCC consider that the proposals for monitoring of emissions to air are in accordance with the requirements of BAT 4.	
5	BAT is to appropriately monitor channelled emissions to air from the incineration plant during Other Than Normal Operating Conditions (OTNOC).	FCC understand that the UK regulatory agencies are currently consulting with the UK waste incineration industry on the definition of 'appropriate monitoring' of emissions to air during OTNOC. On this basis, FCC are not able to confirm how the DERC will comply with BAT 5. FCC propose that a Pre-Operational Condition is included within the PPC permit which requires confirmation of the proposals for monitoring of emissions to air during OTNOC.	Agreed — Prior Commissioning Condition 2.8.14 has been inserted into Permit.
6	BAT is to monitor emissions to water from Flue Gas Cleaning (FGC) and/or bottom ash treatment with at	As explained in section 2.3.6of the Supporting Information, the DERC will utilise a dry flue gas treatment system. Therefore, there will not be any emissions to water from the FGC systems. Furthermore, there will not be any emissions to water from the treatment or handling bottom ash.	Agreed BAT 6 is not applicable

BATC No.	Summary of requirement	How Met (from application)	Comment
	least the frequencies set out in BAT 6 of the BREF and in accordance with EN standards. If EN standards are not available, BAT is to use ISO, national or other international standards that ensure the provision of data of an equivalent scientific quality.	Therefore, it is understood that the requirements of BAT 6 are not applicable to the DERC.	
7	BAT is to monitor the content of unburnt substances in slags and bottom ashes at the incineration plant with at least the frequency as given in BAT 7 of the BREF (at least once every 3 months) and in accordance with EN standards.	As explained in section 3.2.4.3 of the Supporting Information, Total Organic Carbon (TOC) will be measured in the bottom ash to confirm that it is less than 3%, and/or Loss on Ignition (LOI) will be measured to confirm it is less than 5%. Measurements will be taken at least once every 3 months and will be in accordance with EN standards. FCC consider that the proposals for monitoring of slags and bottom ashes are in accordance with the requirements of BAT 7.	BAT 7 requirement has been met. This is covered by standard conditions in Schedule 8 of the permit.
8	For the incineration of hazardous waste containing POPs, BAT is to determine the POP content in the output streams (e.g. slags and bottom ashes, flue-gas, wastewater) after plant and after each change that	The DERC will not incinerate hazardous waste. Therefore, FCC do not consider that the requirements of BAT8 are applicable to the DERC.	Agreed BAT 8 is not applicable.

BATC No.	Summary of requirement	How Met (from application)	Comment
	may significantly affect the POP content in the output streams. the commissioning of the incineration		
9	In order to improve the overall environmental performance of the incineration plant by waste stream management (see BAT 1), BAT is to use all of the techniques (a) to (c) as listed in BAT 9 of the BREF, and, where relevant, also techniques (d), (e) and (f).	As described in Section 3.2 of the Supporting Information, the DERC will employ the following techniques as required by the BREF: •Determination of the types of waste that can be incinerated. The DERC will incinerate waste in accordance with the list of EWC waste codes that will be listed in the PPC Permit, and waste that falls into the range of calorific values as per the firing diagram. The list of EWC codes will characterise the physical state, general characteristics and hazardous properties of the waste. •Implementation of waste characterisation and pre-acceptance procedures. Any supplier providing household waste under a 20 03 EWC code will be required to provide evidence that a Pre-Treatment Practicability (PTP) Test has been undertaken, and that further treatment is not required. In addition, suppliers providing household waste will be required to provide periodic evidence to ensure that capture rates of recyclates remain consistent with the performance submitted as part of the PTP test. Periodic waste sampling and characterisation will be undertaken for waste received at the DERC– refer to the paragraph below. •Implementation of waste acceptance procedures. The Operator will develop acceptance procedures for all wastes delivered to the DERC, in order to ensure that only the wastes which the DERC is permitted to receive are received at the DERC. Paperwork accompanying each delivery will be checked. Periodic inspections of the waste will be undertaken as part of the scope where practicable,	BAT 9 requirement has been met. This is covered by standard conditions in Schedule 4 of the permit.

BATC No.	Summary of requirement	How Met (from application)	Comment
		prior to transfer into the bunker, to confirm that it complies with the specifications of the waste transfer note (WTN). Waste delivered in road vehicles will be inspected by the tipping hall operator and crane operator as it is tipped and mixed. •FCC will develop and implement waste pre-acceptance and acceptance procedures at the DERC. The waste acceptance procedures will identify the records required for wastes to be accepted at the DERC and where records associated with the waste should be retained in the document management system which will be employed at the DERC. •Waste acceptance procedures will be used to identify any unacceptable wastes which are not suitable for processing within the DERC and require quarantine and transfer off-site. It is understood that technique (f) of BAT 9 does not apply as the DERC will not incinerate hazardous waste. FCC consider that the proposed arrangements for the receipt and segregation of waste complies with the requirements of BAT 9.	
10	In order to improve overall environmental performance of the bottom ash treatment plant, BAT is to set up and implement an output quality management system (see BAT 1).	The DERC will not include a bottom ash treatment plant within the installation boundary. Therefore, FCC do not consider that the requirements of BAT 10 apply to the DERC.	Agreed BAT 10 is not applicable.
11	In order to improve the overall	As described in Section 3.2.3.1 of the Supporting Information, and explained in relation to BAT 9	BAT 11 requirement has been met. This is covered by standard Conditions in Schedule 3 of the Permit.

BATC No.	Summary of requirement	How Met (from application)	Comment
	environmental performance of the incineration plant, BAT is to monitor the waste deliveries as part of the waste acceptance procedures (see BAT 9c) including, depending on the risk posed by the incoming waste, the elements as listed in BAT 11 of the BREF.	above, periodic monitoring of waste deliveries will be undertaken at the DERC. This will include the following elements in accordance with the BREF: •Weighing of the waste deliveries by use of a weighbridge at the entrance/exit of the DERC. •Periodic visual inspection of waste either prior to being tipped into the bunker, or where this is not practicable, as it is tipped into the bunker by the tipping hall operator and crane operator. •Periodic sampling of waste deliveries and analysis of key properties, such as calorific value and metal content. The DERC will not undertake radioactivity detection tests as it is not anticipated that any radioactive waste will be received. FCC consider that the proposed arrangements for monitoring the waste deliveries as part of the waste acceptance procedures complies with the requirements of BAT 11.	
12	In order to reduce the environmental risks associated with the reception, handling and storage of waste, BAT is to use both of the following techniques: Use impermeable surfaces with an adequate drainage infrastructure; and have adequate waste storage capacity.	The surfaces of the waste reception, handling and storage areas have been designed and will be constructed as impermeable structures. Adequate drainage infrastructure will be fitted to areas where receipt, handling and storage of waste takes place –these areas will have appropriate falls to the process water drainage system. The integrity of areas of hardstanding will be periodically verified by visual inspection. Regular maintenance of the drainage systems will be undertaken in accordance with documented management procedures to be developed for the DERC. Adequate waste storage capacity will be available on site –the maximum waste storage capacity of the waste bunker will be clearly established and not exceeded. The quantity of waste will be regularly monitored against the maximum storage capacity. During periods of planned maintenance, quantities of fuel within the bunker will be run down. During extended periods	BAT 12 requirement has been met. This is covered by standard Conditions in Schedule 4 (Condition 4.4) and Schedule 7 (Condition 7.5) of the Permit.

BATC No.	Summary of requirement	How Met (from application)	Comment
		of shutdown, provisions will be made for waste to be back-loaded from the bunker and transferred to alternative licensed waste management facilities. FCC consider that the proposed arrangements for environmental risks associated with the reception, handling and storage of waste comply with the requirements of BAT 11.	
13	In order to reduce the environmental risk associated with the storage and handling of clinical waste, BAT is to use a combination of the techniques as listed in BAT 13 of the BREF.	The DERC will not be dedicated to the processing of clinical waste. In addition, the DERC will not receive hazardous clinical waste. Therefore, FCC consider that the requirements of BAT 13 are not applicable to the DERC.	Agreed BAT 13 is not applicable
14	In order to improve the overall environmental performance of the incineration of waste, to reduce the content of unburnt substances in slags and bottom ashes, and to reduce emissions to air from the incineration of waste, BAT is to use an appropriate combination of the techniques given below:	Bunker crane mixing and advanced control systems will be employed at the DERC. A modern and advanced control system, incorporating the latest advances in control and instrumentation technology, will be utilised at the DERC to control operations, optimise the process relative to efficient heat release, good burn-out and minimum particle carry over. As described in Section 3.5.2 of the Supporting Information, the system will control and/or monitor the main features of the plant operation including, but not limited to the following: •combustion air; •fuel feed rate; •SNCR system; •flue gas oxygen concentration at the boiler exit; •flue gas composition at the stack (including HCl measurements); •combustion process •boiler feed pumps and feedwater control; •steam flow at the boiler outlet; •steam outlet temperature;	BAT 14 is met — Modern incinerators are capable of meeting TOC and LOI levels in the BAT-APLs ranges quoted in Table 1 of BAT 14. No additional permit conditions required. TOC and LOI levels are specified in standard Permit Condition 5.1.1 a).

BATC No.	Summary of requirement	How Met (from application)	Comment
		•boiler drum level control; •flue gas control (including differential pressure across the bag filters); •power generation; and •steam turbine exhaust pressure. Water, electricity and auxiliary fuel usage will also be monitored to highlight any abnormal usage. FCC consider that the proposed arrangements for ensuring the overall environmental performance of the incineration of waste, to reduce the content of unburnt substances in slags and bottom ashes, and to reduce emissions to air from the incineration of waste comply with the requirements of BAT 14.	
15	In order to improve the overall environmental performance of the incineration plant and to reduce emissions to air, BAT is to set up and implement procedures for the adjustment of the plant's settings e.g. through the advanced control system, as and when needed and practicable, based on the characterisation and control of the waste	The DERC will be controlled from a dedicated control room, with an advanced control system to optimise the process. The system will control and/or monitor the main features of the plant operation, as described in the response to BAT 14 above. Emissions to air will be reduced by the adjustment of the plants settings through the advanced control system: for example, SNCR reagent dosing will be optimised and adjusted to minimise ammonia slip. Lime usage will be minimised by trimming reagent dosing to accurately match the acid load using fast response upstream acid gas monitoring. Activated carbon dosing will be based on flue gas volume flow measurement. FCC consider that the proposed control systems will ensure that the DERC is designed to allow for the adjustment of the plant's settings to comply with the requirements of BAT 15.	BAT 15 is met — No additional permit conditions required. Compliance will be determined through routine plant inspections by SEPA, monitoring, the 4 yearly resource assessment returns and the notification and reporting requirements of the Permit.
16	In order to improve the overall environmental performance of the	The DERC will operate continuously, with planned shutdowns for maintenance limited as far as reasonably practicable. Waste will be kept at suitable levels in the waste bunker to maintain	This is covered by this is covered by Prior Commissioning Condition 2.8.15 in the Permit. Further details of preventative maintenance regimes, spares policy and call out contracts etc will be followed up on

BATC No.	Summary of requirement	How Met (from application)	Comment
	incineration plant and to reduce emissions to air, BAT is to set up and implement operational procedures (e.g. organisation of the supply chain, continuous rather than batch operation) to limit as far as practicable shutdown and start-up operations.	operation during holiday periods. Operational procedures will be developed to limit as far as practicable shutdown and start-up operations. FCC consider that the operation of the DERC will limit as far as practicable shutdown and start-up operations to comply with the requirements of BAT 16.	inspection during the operational phase of the DERC following receipt of report required by Condition 2.8.15.
17	In order to reduce emissions to air and, where relevant, to water from the incineration plant, BAT is to ensure that the FGC system and the wastewater treatment plant are appropriately designed (e.g. considering the maximum flow rate and pollutant concentration), operated within their design range, and maintained so as to ensure optimal availability.	The FGC and wastewater treatment systems will be appropriately designed and operated within the design range. The FGC and wastewater treatment systems will be subject to regular maintenance through the implementation of documented management procedures. FCC consider that the design and operation of the FGC and wastewater treatment plants will ensure that emissions to air (and water where applicable) are reduced, and will ensure their optimal availability, to comply with the requirements of BAT 17.	These are considered in Section 5.2 and 5.3 of this document and are agreed.
18	In order to reduce the frequency of the occurrence of	A risk-based OTNOC management plan will be incorporated into the DERC's EMS. This will include the following elements:	As discussed under BAT 5 above, the OTNOC management plan is covered by Condition 2.8.14.

BATC No.	Summary of requirement	How Met (from application)	Comment
	OTNOC and to reduce emissions to air and, where relevant, to water from the incineration plant during OTNOC, BAT is to set up and implement a risk-based OTNOC management plan as part of the EMS that includes the elements as identified in BAT 18 of the BREF.	•Identification of potential OTNOC, root causes and potential consequences. •Regular update of the list of identified OTNOC following periodic assessment. •Appropriate design of critical equipment (the ERC will utilise compartmentalisation of the bag filter and ensure that the bag filter is not bypassed during periods of start-up or shutdown). •Implementation of preventative maintenance plans for critical equipment. •Monitoring and recording of emissions during OTNOC and associated circumstances. •Periodic assessment of the emissions and circumstances occurring during OTNOC and implementation of corrective actions if necessary. FCC consider that the incorporation of a risk-based OTNOC management plan will ensure the DERC's compliance with BAT 18.	Possible OTNOC scenarios could include the following: • Blockage in waste hopper or waste feed chute Failure of the SNCR ammonia injection system to operate including blocked nozzles • Periods when the auxiliary burners are in operation to maintain minimum temperature requirement when waste is present in the incinerator. • Start-up from the first introduction of waste until emissions have stabilised etc At the time of determining the Permit a generic list of OTNOC was being discussed by UK Regulators and the Environmental Services Association (ESA) as part of ongoing discussions on the UK interpretation document for the WI BATCs. The list of scenarios provided in the OTNOC management plan required by Condition 2.8.14 should take the outcome of this work into account.
19	In order to increase resource efficiency of the incineration plant, BAT is to use a heat recovery boiler.	The DERC will use a heat recovery boiler to produce steam which is used to produce electricity. The DERC will also have the provision to export heat to local users. FCC consider that the use of a heat recovery boiler is in direct compliance with the requirements of BAT 19.	BAT 19 is met through the boiler design. Standard permit conditions in 2.7 cover the requirements for a heat and power plan which require the Operator to provide annual reports on their progress towards outlets for heat recovery and compliance with the energy efficiency targets in SEPA's Thermal Treatment of Waste Guidelines. Standard Condition 5.2.5 requires that a record is kept of all times when the incineration plant is operating and the heat recovery system is not utilised with the reason for the non-utilisation. This is subject to a quarterly reporting requirement.

BATC No.	Summary of requirement	How Met (from application)	Comment
20	In order to increase energy efficiency of the incineration plant, BAT is to use an appropriate combination of techniques as listed in BAT 20 of the BREF.	The DERC will use the following techniques to increase the energy efficiency of the plant: •Minimise heat losses via the use of an integral furnace boiler –heat will be recovered from the flue gases by means of a water tube boiler integral with the furnace; •Optimisation of the boiler design to improve heat transfer –the boiler will be equipped with economisers and superheaters to optimise thermal cycle efficiency without prejudicing boiler tube life, having regard for the nature of the waste fuel that is combusted; •High steam conditions (70 bar, 430°C), to increase electricity conversion efficiency; •Cogeneration of heat and electricity –the DERC has been designed as a combined heat and power plant and will have the capacity to provide heat to local users. Subject to commercial agreements with heat users, a scheme for the export of heat will be implemented. FCC consider that the techniques listed above will increase the energy efficiency of the plant and ensure that the DERC will comply with the requirements of BAT 20.	BAT 20 is met through the boiler design, no additional permit conditions required. In BAT 2, FCC state that 30.3% is achieved, this is close but slightly below the top end of the BAT-AEEL range of 35%.
21	In order to prevent or reduce diffuse emissions from the incineration plant, including odour emissions, BAT is to use the methods as stated in BAT 21 of the BREF.	In accordance with the BREF, the DERC will employ the following measures to reduce odour emissions: •Waste in the DERC will be stored in an enclosed building under negative pressure. The extracted air will be used as combustion air for incineration. •The operation of the DERC will not give rise of odorous liquid wastes. Therefore, the requirement to store liquid wastes in tanks under controlled pressure and duct the tank vents to the combustion air feed or other suitable abatement system will not apply to the DERC.	During incinerator shutdown when odorous air is not incinerated as combustion air in the incinerator, the odour extraction system will directly vent the extracted air via a 48m vent to atmosphere. Further discussion in section 5.6 of this document.

BATC No.	Summary of requirement	How Met (from application)	Comment
		•Odour will be controlled during shutdown periods by minimising the amount of waste in storage. Waste will be run-down prior to periods of planned maintenance, and there will also be provisions in place to back-load waste from the waste bunker during extended periods of unplanned shutdown. In addition, doors to the tipping hall will be kept shut during periods of shutdown. The measures listed above to reduce odour emissions will ensure that the DERC will comply with the requirements of BAT 21.	
22	In order to prevent diffuse emissions of volatile compounds from the handling of gaseous and liquid wastes that are odorous and/or prone to releasing volatile substances at incineration plants, BAT is to feed them to the furnace by direct feeding.	Gaseous wastes will not be accepted by the DERC. Any liquid wastes will be delivered in containers suitable for incineration (such as drums) and fed directly into the furnace. Therefore, the requirements of BAT 22 do not apply to the DERC.	Agreed BAT 22 is not applicable.
23	In order to prevent or reduce diffuse dust emissions to air from the treatment of slags and bottom ashes, BAT is to include in the EMS the following diffuse dust emission management features:	There will not be treatment of slags and/or bottom ashes undertaken on-site. Therefore, the requirements of BAT 23 do not apply to the DERC. However, identification of the most relevant diffuse dust emissions, and definition and implementation of appropriate actions and techniques, will be included within the scope of the EMS at the DERC.	Agreed BAT 23 is not applicable.

BATC No.	Summary of requirement	How Met (from application)	Comment
24	In order to prevent or reduce diffuse dust emissions to air from the treatment of slags and bottom ashes, BAT is to use an appropriate combination of the techniques as given in BAT 24 of the BREF.	There will not be treatment of slags and/or bottom ashes undertaken on-site. Therefore, the requirements of BAT 24 do not apply to the DERC. However, it can be confirmed that the following techniques will be employed at the DERC to minimise dust emissions: •All ash handling including conveying undertaken within enclosed buildings. •Where possible, minimising the height of ash discharge. • Use of a water ash quench to minimise the generation of dusts from ash handling activities.	Agreed BAT 24 is not applicable.
25	In order to reduce channelled emission to air of dust, metals and metalloids from the incineration of waste, BAT is to use one or a combination of the techniques as listed in BAT 25 of the BREF.	In accordance with the BREF, the following techniques will be utilised at the DERC to reduce channelled emissions to air: •Bag filters –to reduce particulate content of the flue gas. •Dry sorbent injection –adsorption of metals by injection of activated carbon in combination with injection of dry lime to abate acid gases. The concentrations of metals and metalloids will be monitored in accordance with the PPC Permit for the DERC. It is considered by FCC that the techniques listed above to reduce channelled emissions to air will ensure that the DERC will comply with the requirements of BAT 25.	BAT 25 is met (techniques used meet those described in a) (bag filter), c) (dry sorbent injection for volatile metals using powdered activated carbon) in Section 1.5.2.1 of WI BATCs — See Section 5.2 of this document for further details for flue gas abatement system.
26	In order to reduce channelled dust emissions to air from the enclosed treatment of slags and bottom ashes with extraction of air, BAT is to treat the extracted air with a bag filter.	There will not be treatment of slags and/or bottom ashes undertaken on-site. Therefore, the requirements of BAT 26 do not apply to the DERC. The bottom ash hall will not be held under negative pressure, however the methods as listed in response to BAT 24 will enable dust emissions to be minimised from the handling of bottom ash.	Agreed BAT 26 is not applicable.

BATC No.	Summary of requirement	How Met (from application)	Comment
27	In order to reduce channelled emissions of HCl, HF and SO2 to air from the incineration of waste, BAT is to use one or a combination of the techniques as listed in BAT 27 of the BREF.	In accordance with the BREF, the following techniques will be utilised at the DERC to reduce channelled emissions to air of HCl, HF and SO2: •Dry sorbent injection –adsorption of metals by injection of activated carbon in combination with injection of dry lime to abate acid gases. It is considered by FCC that the use of dry sorbent injection to reduce channelled emissions to air of acid gases is in compliance with the requirements of BAT 27.	BAT 27 is met (techniques used meet those described in d) dry sorbent injection for acid gases in Section 1.5.2.2 of WI BATCs) - See Section 5.2 for further details for flue gas abatement system. BAT-AELSs for new plant apply. HCl - this has been set at 6 mg/Nm^3 the top of the range in Table 6.2 in Schedule 6 because footnote 1 to the BAT-AELs in Table 5 of the WI BATC explains that the upper end of the range is associated with dry sorbent injection. HF - The current limit in the Permit Template based on the average over the sampling period for HF required by Annex VI of IED is 4 mg/Nm^3. The BAT-AEL for HF is a single value of < 1mg/m^3 rather than the range specified for other BAT-AELs. The ELV for the average over the sampling period has therefore been set at <1mg/m^3.
28	In order to reduce channelled peak emissions of HCl, HF and SO2 to air from the incineration of waste while limiting the consumption of reagents and the amount of residues generated from dry sorbent injection and semi-wet absorbers, BAT is to use optimised and automated reagent dosage, or both the previous technique	In accordance with the BREF, the following techniques will be employed at the DERC to reduce peak emissions of HCl, HF and SO2whilst limiting reagent consumption and residue generation form dry sorbent injection: •The concentration of hydrogen chloride in the flue gases upstream of the flue gas treatment system will be measured in order to optimise the performance of the emissions abatement equipment, including automated reagent dosage •A proportion of the APC residues will be recirculated to reduce the amount of unreacted reagent in the residues. •The concentrations of HCl, HF and SO2released from the DERC will comply with BREF limits. The techniques listed above to reduce channelled peak emissions to air of acid gases will ensure that	BAT 30 is met (techniques used meet those described). Upgrade Condition 6.5.2 requires a programme of monitoring to determine whether the dioxin and furan emissions are sufficiently stable; this will be used to determine whether periodic monitoring is acceptable, or whether long-term sampling is required for dioxins and furans.

BATC No.	Summary of requirement	How Met (from application)	Comment
	and the recirculation of reagents.	the DERC will comply with the requirements of BAT 28.	
29	In order to reduce channelled NOx emissions to air while limiting emissions of CO and N2O from the incineration of waste, and the emissions of NH3from the use of SNCR and/or SCR, BAT is to use an appropriate combination of the techniques as listed in BAT 29 of the BREF.	The following elements have been incorporated into the design of the DERC: •Optimisation of the incineration process via the use of an advanced control system and monitoring of process parameters (refer to the response to BAT 14); •An SNCR system; and •Optimisation of the design and operation of the SNCR system (through CFD modelling to optimise the location and number of injection nozzles, and optimisation of reagent dosing to minimise ammonia slip). As justified in section 2.6.2 of the Supporting Information, it is currently assumed that flue gas recirculation will not be employed at the DERC. The design elements listed above to reduce channelled NOx emissions to air (whilst limiting emissions of CO, N2O and NH3) will ensure that the DERC will comply with the requirements of BAT 29.	As discussed in General Consideration under 'BAT Techniques' in the WI BATC: *The techniques listed and described in these BAT conclusions are neither prescriptive nor exhaustive. Other techniques may be used that ensure at least an equivalent level of environmental protection.* For this reason SNCR is considered an appropriate BAT technique for NOX emissions on a new plant because the Applicant has a manufacturer's guarantee that the BAT-AELs for new plant can be achieved.
30	In order to reduce channelled emissions to air of organic compounds including PCDD/F and PCBs from the incineration of waste, BAT is to use techniques (a), (b), (c), (d), and one or a combination of techniques (e) to (i) as listed in BAT 30 of the BREF.	The DERC will employ the following techniques to reduce channelled emission to air of organic compounds: •Optimisation of the incineration process –the boiler will be designed to minimise the formation of dioxins and furans as follows: •Minimise residence time in critical cooling section to avoid slow rates of combustion gas cooling, minimising the potential for 'de-novo' formation of dioxins and furans. •Utilisation of an SNCR system which inhibits dioxin formation and promotes their destruction. •Keep transfer surfaces above a minimum 170°C subject to other reaction considerations. •Apply CFD modelling to the design where appropriate to ensure gas velocities are in a range	BAT 30 is met (techniques used meet those described). Upgrade Condition 6.5.2 requires a programme of monitoring to determine whether the dioxin and furan emissions are sufficiently stable; this will be used to determine whether periodic monitoring is acceptable, or whether long-term sampling is required for dioxins and furans. Long-term sampling, if required, is only required for dioxin-like PCBs where the emissions are not sufficiently stable and where they exceed 0.01 ng WHO-TEQ/Nm^3

BATC No.	Summary of requirement	How Met (from application)	Comment
		that negates the formation of stagnant pockets/low velocities. •Minimise volume in critical cooling sections. •Prevent boundary layers of slow-moving gas along boiler surfaces via good design and regular maintenance. •Online and offline boiler cleaning through a regular maintenance schedule to reduce dust residence time and accumulation in the boiler, thus reducing PCDD/F formation in the boiler. •Dry sorbent injection using activated carbon and dry lime, in combination with a bag filter. The concentrations of dioxins and furans released from the DERC will comply with BREF limits. The techniques listed above to reduce channelled emission to air of organic compounds will ensure that the DERC will comply with the requirements of BAT 30.	
31	In order to reduce channelled mercury emissions to air (including mercury emission peaks) from the incineration of waste, BAT is to use one or a combination of the techniques as listed in BAT 31 of the BREF.	In accordance with the BREF, dry sorbent injection of activated carbon will be employed at the DERC in combination with a bag filter. It is considered by FCC that the use of these techniques will ensure that the DERC will comply with the requirements of BAT 31.	BAT 31 is met (techniques used meet those described). Upgrade Condition 6.5.1 requires a programme of monitoring to determine whether the mercury emissions are proven to be low and stable; this will be used to determine whether periodic monitoring is acceptable, or whether long-term sampling is required.
32	In order to prevent the contamination of uncontaminated water, to reduce emissions to water, and to increase resource efficiency, BAT is to segregate	There will be separate foul/domestic water, process water and surface water drainage systems at the DERC. Foul effluents from domestic sources will be treated in a package treatment plant prior to discharge to the on-site surface water drainage network at the DERC. It can be confirmed that there will be no wastewater arising from flue gas treatment. Bottom ash handling will be undertaken	BAT 32 is met (techniques used meet those described). — See Sections 5.3 and 5.5 in this document for further details.

BATC No.	Summary of requirement	How Met (from application)	Comment
	waste water streams and to treat them separately, depending on their characteristics.	in an enclosed building with a dedicated drainage system. The drainage in the ERC waste reception, handling and storage areas will be contained, with any process water collected reused within the process (e.g. in the ash quench). Process water will be collected in an intermediate storage vessel prior to re-use. Uncontaminated water streams, such as surface water run-off, will be segregated from other wastewater streams requiring treatment. Surface water runoff from roadways and vehicle movement areas will pass through interceptors to contain oil and sediments prior to discharge. Indicative water flow diagrams depicting the segregation of different water streams for the DERC as presented in Appendix A. It is considered by FCC that the segregation and treatment of different waste water streams, as described above, will ensure that the DERC will comply with the requirements of BAT 32.	
33	In order to reduce water usage and to prevent or reduce the generation of wastewater from the incineration plant, BAT is to use one or a combination of the techniques as listed in BAT 33 of the BREF.	In accordance with the BREF, the following techniques will be utilised at the DERC to reduce water usage and prevent wastewater generation: •Use of an FGC system that does not generate wastewater –by utilising dry sorbet injection of lime and PAC. •Water reuse and recycling in the process – effluents generated by the process, (alongside the possibility of using harvested rainwater), will be re-used within the process, e.g. in the ash quench. Under normal operation the DERC will not generate process effluent. It is considered by FCC that the techniques listed above to reduce water usage and prevent/reduce the generation of wastewater will ensure that the DERC will comply with the requirements of BAT 33.	BAT 33 is met, (techniques used meet those described), in particular use of dry Flue Gas Treatment using lime and PAC and recycling of effluents in the process and consideration of rainwater harvesting during detailed design to off-set consumption of mains water.
34	In order to reduce emissions to water from FGC and/or	There will be no treatment of slags and bottom ashes undertaken on-site. In addition, there will be no emission to water from FGC. The risk of	Agreed BAT 34 is met through controls on IBC and APCr storage areas preventing fugitive air and water emissions.

BATC No.	Summary of requirement	How Met (from application)	Comment
	from the storage and treatment of slags and bottom ashes, BAT is to use an appropriate combination of the techniques as listed in BAT 34 of the BREF, and to use secondary techniques as close as possible to the source in order to avoid dilution.	emissions to water from the storage of bottom ash at the DERC will be minimised –any overflow from the ash quench will be contained in the process effluent drainage system and hence there will not be any release of effluent from the ash quench system. In accordance with BAT 34 (a), the incineration process and the FGC process will be optimised to target pollutants such as dioxins and furans, and ammonia –refer to the responses to BAT 29 and 30 above. It is considered by FCC that the DERC will comply with the requirements of BAT 34 by reducing emissions to water from the storage of bottom ash as per the design measures described above.	
35	In order to increase resource efficiency, BAT is to handle and treat bottom ashes separately from FGC residues.	It can be confirmed that bottom ash and APCr will be handled and disposed of separately at the DERC. Therefore, FCC consider that the DERC will comply with the requirements of BAT 35.	BAT 35 is met — this is implemented through standard Permit Condition 8.1.8; no additional conditions are required.
36	In order to increase resource efficiency for the treatment of slags and bottom ashes, BAT is to use an appropriate combination of the techniques as listed in BAT 36 of the BREF, based on a risk assessment depending on the hazardous properties of the slags and bottom ashes.	There will be no bottom ash treatment undertaken at the DERC. Therefore, it is understood that the requirements of BAT 36 do not apply to the DERC.	Agreed BAT 36 is not applicable.

BATC No.	Summary of requirement	How Met (from application)	Comment
37	In order to prevent or, where that is not practicable, to reduce noise emissions, BAT is to use one or a combination of the techniques as listed in BAT 37 of the BREF.	In accordance with the requirements of BAT 37, it can be confirmed that the following techniques will be employed at the DERC to prevent or reduce noise emissions: •Appropriate location of equipment and buildings – in accordance with normal industry practice, the technology provider will implement an efficient layout to result in relatively quiet operational noise levels. •Operational measures –regular inspection and maintenance of equipment will be undertaken. Doors to buildings will remain closed as far as is reasonably practicable. Waste deliveries will take place primarily during daytime hours. •Low-noise equipment –the proposed technology provider will optimise plant selection to ensure that the most efficient and 'quietest' technology is selected. •Noise attenuation –plant rooms will have been acoustically designed for limiting noise emissions to acceptable levels for compliance with relevant workplace regulations. •Noise-control equipment/infrastructure –where appropriate, acoustic cladding will be used on buildings (for example the tipping hall building). For a detailed list of principal noise sources and mitigation measures –refer to Section 3.4.6 of the Supporting Information. In addition, refer to the Noise Assessment presented in Appendix C. It is considered by FCC that the techniques listed above to reduce noise emissions will ensure that the DERC will comply with the requirements of BAT 37	The techniques described are generally compliant with BAT 37 for Noise. Refer to Section 5.17 of this document for further discussion.