Oldhall Energy Recovery Facility

DY Oldhall Energy Recovery Limited

Decision Document - Permit Application PPC/A/1197167

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1 Non-Technical Summary of Determination

Provide a non-technical summary of the process and determination

Oldhall Energy Recovery Facility

The proposed Oldhall Energy Recovery Facility (Oldhall ERF) is an Energy from Waste (EfW) plant operated by DY Oldhall Energy Recovery Limited, company number 12099664 (DY Oldhall) and is designed to incinerate and recover the energy from non-hazardous residual waste originating from municipal solid waste (MSW) and commercial and industrial (C&I) waste streams of a similar nature to MSW. The facility is designed to have a throughput capacity of 185,600 tonnes of residual waste per year and a design thermal capacity of 74.4MW based on 8000 operating hours per year.

All waste delivered to site will have the majority of recyclable materials removed to the point where further recovery is either not technically or economically viable: this is known as 'residual' waste. The residual waste is to be sourced from waste treatment facilities who either pretreat Municipal Solid Waste (MSW) from local authority areas and/or similar waste from commercial and industrial (C&I) facilities or, where SEPA have agreed the MSW has been subject to sufficient point source segregation of recyclable material, this may be supplied without further treatment to the ERF. C&I waste similar to MSW is also subject to source segregation requirements, and it can also be pre-treated to remove recyclates and supplied to the Oldhall ERF with residual waste from treated MSW to the same waste codes (19 12 10 or 19 12 12) and waste specification. SEPA will confirm during inspection that the waste fuel for incineration meets the requirements of the permit conditions which define the permitted types of waste which may be received (conditions 4.1.1 to 4.1.6 and Table 4.1).

The facility Planning Permission for a 180,000 tonnes per annum incineration facility was granted by North Ayrshire Council on 22/01/2020 (Ref. 19/00539/PPM). Changes have been made to the planning permission since it was originally granted and where relevant, these have been included in the discussion in the remainder of this document.

The original proposal for the facility included a Materials Recycling Facility [MRF] however the planning permission was amended in November 2021 to modify the site layout to remove the MRF activity and increase the throughput to 185,600 tonnes per annum. Further Information Notice Question 1 requested information on these changes. Information on planning permission for this facility is held on the North Ayrshire Council's planning portal. The facility is due to be operational in 2026. Further Information Notice Question 2 response.

The proposed 1.5-hectare brownfield site is located approximately 1.5km south of Irvine town within the Oldhall West Industrial estate at grid location NS 33678 36537 on the site of a former clinical waste incinerator and pet crematorium. Immediately adjacent to the proposed site are other industrial and waste activities, office accommodation and the Oldhall Ponds local wildlife site. Surrounding settlements include Irvine 1.5km to the north, Dreghorn 2km to the northeast, Drybridge 2km to the east and Dundonald 3km to the south.

Prescribed Activities to be carried out at the proposed installation

At the ERF DY Oldhall propose to carry out two Prescribed Activities which are described in the Pollution Prevention and Control (PPC) (Scotland) Regulations 2012 (The PPC Regulations). A permit is required to carry out these activities and DY Oldhall have therefore submitted an application for a permit to operate the following:

- A waste incinerator: described as a PPC Part A Activity under Chapter 5 Section 5.1 (b) of the PPC Regulations as the incineration of non-hazardous waste in an incineration or co-incineration plant, and
- An emergency generator: described as a PPC Part B Activity under Chapter 1, Section 1.1, Part B (d) of Schedule I of the PPC Regulations as a conventional combustion plant in the form of a diesel fuelled emergency electrical generator of between 1 – 5MW thermal input to which the Medium Combustion Plant Directive [MCPD] applies.

In addition to these Prescribed Activities, a number of other activities associated with the Prescribed Activities are proposed and also require to be controlled by the permit. These are known as Directly Associated Activities. This includes reception, handling and storage of raw materials, diesel fuel and waste, surface water collection and treatment etc. A complete description of the proposed installation Activities including the Directly Associated Activities are provided in Schedule 1 of the draft Permit.

Application Determination

The PPC Regulations require that Part A activities utilise Best Available Techniques (BAT) to prevent, or where that is not practicable, reduce emissions and therefore reduce the impact on the environment from the installation activities. To determine this application, the equipment design, operational techniques proposed and the impact of the emissions from the proposed incineration activity on the environment have been considered in detail. A summary of compliance with the IED and BAT conclusions is provided in Appendix A and B at the end of this document.

Activities carried out at the facility will include: waste reception; waste storage; a single moving grate waste incineration line; continuous emissions monitoring systems for flue gases and wastewater emissions; water, fuel oil and air supply systems; boilers; steam turbine/generator set; facilities for the treatment of flue gases; on-site facilities for treatment and storage of residues; wastewater collection and management systems; a flue contained within a 70m high stack; an air-cooled condenser unit; an emergency diesel generator for electricity; a standby system for odour extraction and abatement and systems for controlling combustion operations and recording and monitoring process conditions.

The nominal design throughput of the facility is approximately 23.2 tonnes per hour of non-hazardous residual waste with a net calorific value (NCV) of 10.5 MJ/kg, equating to a nominal design incineration capacity of up to 185,600t tonnes per annum (tpa) of waste assuming an annual operating period of approximately 8,000 hours. The facility will be capable of processing waste with an NCV as low as 9.0 MJ/kg at higher throughputs of up to 27t/h. Permitted throughput capacity will be limited to match the planning permission annual limit of 185,600 tpa and also limit processing of waste to 27t/h to reflect operation using lower NCV waste.

Incineration combustion gases are designed to be held at 850^{o}C for at least two seconds to ensure pollutants are denatured. The combustion gases pass through a water boiler to produce steam, and the combustion gases are treated with urea solution, lime and activated carbon in the flue gas abatement system to reduce pollutant concentrations. Treated flue gases are filtered to remove lime and carbon particulates and are finally discharged via the stack. Stack emissions will be subject to a mixture of continuous and periodic monitoring to ensure they remain compliant with the emission limits applied in the permit.

The steam produced is used to drive a turbine which has been designed to generate up to 19.3 megawatts of electricity (MWe). Site activities consume a parasitic electrical load of 2MWe of the generated output therefore up to 17.3MWe of electrical energy is available for export to the National Grid. Up to 10.4MWth of heat energy is also available from the steam produced and

this may be exported as hot water or steam. The potential for use of this available heat is being explored in line with SEPA's Thermal Treatment of Waste Guidance.

Combustion conditions in the incinerator are designed to reduce the combustible content of the bottom ash produced to within IED limits. Ash will be subject to routine monitoring to ensure the ash quality remains compliant with the emission limits applied in the permit.

Process effluents will be collected and reused within the process or, should excess process effluent be generated, discharged to combined sewer along with foul water and surface water from oily areas for appropriate treatment at the Meadowhead Wastewater Treatment Works.

The facility 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 where there is risk of release of pollutants and is discharged to the combined sewer operated by Scottish Water. Uncontaminated surface water will be subject to treatment in a Sustainable Urban Drainage System (SUDS) and is discharged into the Dundonald Burn.

Several ancillary systems require to be operated including systems to ensure: odours are extracted and abated; residual waste heat is safely dissipated to air, and emergency electricity generation capacity in the form of an emergency diesel generator to support plant operation in case of electrical supply failure.

The determination has considered all aspects of potential impact due to the proposed activities including the impact on human health and the environment. Section 5 below discusses the impact of emissions to air and water and the application of Best Available Techniques (BAT) to the proposed activities. This includes modelling of air emissions, abatement of air pollutants, odour and noise, energy and resource efficiency, environmental management systems etc.

Representations from the public and statutory consultees including those received after the end of the statutory consultation period have been considered and this is discussed in Section 2 below.

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 and will ensure that the installation is operated to comply with the draft Conditions proposed. SEPA is further satisfied that applicant will be able to operate the installation such that they will use all appropriate preventative measures against pollution, in particular through the application of Best Available Techniques (BAT) and that no significant pollution is caused.

SEPA is therefore minded to issue a permit to allow the proposed activity to operate. The draft permit provided contains standard conditions based on the activity template and bespoke conditions appropriate to the Oldhall ERF. Prior operating conditions in the permit draft require further information to confirm the final detailed design of some systems and the applicant will require to demonstrate that BAT is implemented before SEPA confirms that the incineration activity can commence. All submissions in relation to prior operating conditions would be publicly available.

Note - Impact due to SEPA Cyber-Attack

This application was received in November 2020. On 24 December 2020, SEPA was subject to a serious and complex cyber-attack, which significantly impacted our organisation and the services we provide. Information on the cyber-attack, its impact and SEPAs recovery can be found on our website: **Cyber-attack | Beta | SEPA | Scottish Environment Protection Agency**

It is SEPAs opinion that whilst the cyber-attack significantly impacted on progress with the determination, it has not impacted the final determination or the conclusions reached.

Glossary of Terms

ACC	Air Cooled Condenser
ADMS	A proprietary air dispersion modelling software programme
AERMOD	A proprietary air dispersion modelling software programme
APC	Air Pollution Control
APCr	Air Pollution Control residue
AQA	Air Quality Assessment
AQAL	Air Quality assessment level
BAT	Best Available Techniques
BAT-AEL	BAT Associated Emission Level. These are Emission levels associated with BAT for emissions to air.
BAT-AEEL	BAT Associated Energy Efficiency Level. These are Energy Efficiency levels associated with BAT.
BAT-AEPL	BAT Associated Environmental Performance Level
BATc	BAT Conclusions
BREF	BAT Reference Document
BSI	British Standards Institute
C&I	Commercial and industrial waste
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 Emission Monitoring Systems
DY Oldhall	Doveryard Oldhall Energy Recovery Ltd
ELV	Emission Limit Value
EMS	Environmental Management System
ERF	Energy Recovery Facility
FGC	Flue Gas Cleaning
FGT	Flue Gas Treatment
GCV	Gross Calorific Value (of a fuel)
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 of the European Parliament and the Council on Industrial Emissions
I-TEQ	International Toxic Equivalent according to the North Atlantic Treaty Organization (NATO) schemes.
LOI	Loss on Ignition
LT	Long-Term
MCPD	Medium Combustion Plant Directive (EU) 2015/2193 on the limitation of certain pollutants into the air from Medium Combustion Plants
MRF	Materials Recycling Facility
MSW	Municipal solid waste
MW, MWe and MWth	Respectively MegaWatts, MegaWatts electricity output and Megawatts thermal input or heat output
NCV	Net calorific value (of a fuel)
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, the estimated impact in the environment due to the proposed activity alone
PEC	Predicted Environmental Concentration, the estimated total impact in the environment i.e. Process Contribution + background
PCB	Polychlorinated biphenyls
POPs	Persistent Organic Pollutants as defined in The Persistent Organic Pollutants Regulations 2007
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+Co+Cu+Mn+Ni+V.
PPC	Pollution Prevention and Control
RDF	Refuse Derived Fuel
SAC	Special Area of Conservation
SO_2	Sulphur dioxide
SPA	Special Protection Areas
SSSI	Site of Special Scientific Interest
SUDs	Sustainable Urban Drainage System
STOR	Short Term Operating Reserve, reserve electrical generation capacity available at short notice and operating for short periods to boost electricity supply to the national grid when required
SWMA	Specified Waste Management Activity
ST	Short-Term
TOC	Total Organic Carbon
TPA	Tonnes Per Annum
TPH	Tonnes Per Hour
TTWG	SEPA's 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? (if no delete rows below)	**Yes**

Advertisement Check:	**Date**	**Compliance with advertising requirements**
Edinburgh Gazette	**11/12/2020**	**Yes**
Irvine Times	**14/12/2020**	**Yes**
Officer Checking advert: CO		

No of responses received	No public responses were received during the initial consultation on the PPC Application in late 2020 / early 2021. Although SEPA systems were affected by the cyber-attack during this period, recovered data confirmed no representations were received. Consultation responses have however been received throughout the determination period and these are discussed below. Around 800 responses have been received and have been considered as part of the determination including those from individuals and campaign groups.

Summary of responses and how they were taken into account during the determination:

The responses received have mainly been objections in the form of standard letters or emails highlighting a number of common themes, only a very small number of individual responses have been received. The responses normally included the Local Authority Planning reference in the title, and it is assumed that these were also directed to the Local Authority.

In order to provide a practical summary of the consultation responses received, the common themes raised in standard letters and in individual responses are discussed below and the specific text from all individual respondents may not be copied below but have been considered in the determination.

Theme	**Discussion**
General opposition / moratorium	Comments included: *'I strongly urge the Scottish Environment Protection Agency (SEPA) to refuse the PPC permit for this incinerator and promptly halt any further progress on this project.'* And *'I would therefore strongly suggest that SEPA refuse the PPC permit for this incinerator and halt any further work on it.'* *'There is a high level of anxiety among people who do not wish this plan to go ahead.'* *'I believe the Scottish Governments moratorium on new incinerators and the forthcoming ban on burning certain types of plastic, will have an impact on this project.'* *'In 2022 the Scottish Government introduced a moratorium on new incinerators being built in Scotland. This move was made after a review recommended this approach as a way to reduce the risk of incineration overcapacity in Scotland. Despite this moratorium, projects like the proposed Irvine plant have been allowed to continue developing. This is because the proposed Irvine plant was given planning permission prior to the pandemic following a limited consultation process. However, the Scottish Government's own independent review shows that there could be an over capacity of waste incineration facilities in Scotland by 2028 unless plants such as the Irvine project are halted before they begin operating. This could mean Councils paying for facilities which are not being used - placing another financial burden on local taxpayer.'* The 'moratorium' is in respect of the granting of planning permission for new incinerators. As this facility already had planning permission in place, the moratorium does not apply to this facility.

	The incineration activity applied for is one which is allowed for by the regulations and SEPA, on receipt of a duly made (valid) application, have duty under Regulation 13 of The Pollution Prevention and Control (Scotland) Regulations 2012 (as amended) to either (a) grant a permit subject to the conditions required or (b) refuse the application. The PPC Regulation set out specific circumstances in which SEPA would refuse to grant a permit (ied-ppc-tg4-ppc-part-a-practical-guide.pdf). These include for example where SEPA considers that the applicant will not be the person who will have control of the facility after granting of the permit or will not ensure the plant is operated so as to comply with the conditions which would be in the permit. SEPA therefore need to determine the application to decide whether a permit may be issued. EfW facilities cannot operate unless a permit to operate is in place. An applicant may however decide to construct a facility is before a license is in place and this is at the applicant's risk that a permit may be issued in future. SEPA cannot prevent the construction progressing as the construction activity does not require a permit from SEPA.
Waste hierarchy and recycling	Comments include: *'Scotland is working towards a circular economy and towards zero waste. I fear that if we rely on a waste incinerator for power there will be far less incentive to treat waste sustainably. It seems likely that the need for fuel will drive recycling, reuse and repair down.'* *'Moreover, recent findings published by Open Democracy highlight that incineration negatively affects rates of recycling, thus jeopardizing the Scottish Government's commendable efforts towards implementing a circular economy. By embracing waste reduction, reusability, and recycling, we can enhance resource conservation and mitigate the detrimental consequences associated with incineration.'* Scotland needs sufficient treatment capacity to manage our residual waste in compliance with the forthcoming landfill ban and to account for incinerator maintenance and downtime. As detailed in SEPAs Thermal Treatment of Waste Guidelines 2014, there continues to be waste that cannot be recycled either technically or economically, referred to as 'residual waste'. This waste is currently disposed of to landfill (lowest option in the waste hierarchy). While the fraction of 'residual waste' will decrease it is expected to persist for some time, even with high levels of recycling. Scotland have introduced a ban on landfilling biodegradable municipal waste, to take effect in 2025. Scottish Government's policy, while recognising energy recovery as being lower in the hierarchy than prevention, re-use and recycling, does identify thermal treatment to produce electricity, heat, fuels or chemicals as an alternative option to landfill for residual waste and which is higher up the waste hierarchy. It further recognises that recovering energy from residual waste should not be at the expense of actions taken to prevent, reuse or recycle waste and as such segregated, marketable recyclable waste must not be sent for energy recovery. Therefore, energy recovery plays a small but important role in the safe and responsible treatment of non-recyclable waste which would otherwise have gone to landfill.

	The draft conditions contained within the Permit have as far as is reasonably practicable taken steps to ensure that only the incineration of residual waste in the form of fuel arising from municipal solid waste (MSW) and commercial and industrial (C&I) waste of a similar nature is permitted. Specific Conditions relating to permitted types and quantities of waste, waste acceptance procedures and storage for incineration have been included in the draft permit (Schedule 4 conditions 4.1.1 to 4.1.6 and Table 4.1) and the permitted waste codes are restricted to refuse which will arise from MSW or similar Commercial and Industrial Waste (EWC 19 12 10 and 19 12 12).
Climate Change	Comments include: *'With regard to problems around climate change which already affects our environment, I understand that the carbon emissions from burning waste are higher than those from traditional fossil fuel power stations. I hope this can be taken into account when considering whether to grant a license.'* As detailed in SEPAs Thermal Treatment of Waste Guidelines 2014, SEPA has a key role in helping Scotland respond to climate change and sustainable resource use through our activities as a regulator, advisor and a statutory consultee. With respect to the recovery of the inherent energy in waste it needs to be borne in mind that the energy recovered in an incineration plant is from the fraction of the waste stream that that cannot be recycled either technically or economically, referred to as 'residual waste' that is currently being sent to landfill. Where this material is processed through a thermal treatment facility SEPA recognises the benefits in addressing a range of issues including climate change, energy security and resource efficiency. See Section 5.5.2 of this document for discussion on energy efficiency of the facility.
Energy Use & Heat Network Delivery	Comments received include: *'…it is disconcerting to witness the publicity disseminated by Doveryard, the company behind several incineration plants, claiming sufficient power production to meet the heating needs of 30,000 households. However, evidence establishes that no houses in mainland Scotland currently derive heating from such facilities. This raises questions about the accuracy and transparency of the information provided, requiring a thorough investigation.'* *'I understand that heat from CHP plants can be used to offset carbon footprint. However, there are no houses near this plant which could be heated with any heat from it. … The plan suggests that the heat might be used in local industrial buildings. Again, these buildings already have arrangements. Do they plan to change their source of heating? And if so, what percentage of heat can be used by existing businesses?'* SEPA has carried out an assessment of the heat and power plan submitted in the application. See Section 5.5.2 for details. In summary, SEPA has concluded that, in line with SEPAs Thermal Treatment of Waste Guidelines 2014, the applicant has provided the necessary level of detail at the application stage to demonstrate that the proposed facility can achieve at least 20% (gross calorific value basis) energy recovery through generation of electricity only on commissioning and, that within a period of seven years from cessation of commissioning, further energy could be recovered in the form of heat energy to meet longer term energy efficiency targets i.e. an indicative efficiency greater

	than 35%. It is the applicant's responsibility to ensure a high level of energy efficiency and that these targets are met. For this facility the available heat is proposed to be supplied to a nearby industrial user where the heat demand is a good fit with the heat available from the ERF. Delivery of heat into a heat distribution network to supply heat to domestic householders is not proposed for this facility. For this facility, minimum energy efficiency will be achieved at start up through export of electricity only and later export of heat is required to fulfil the Heat and Power Plan. Due to the uncertainties involved in defining such a project, it is not necessarily anticipated that all of the detail to deliver the heat export element of the Heat and Power Plan will be available at the commissioning stage. A further period after start up is allowed for the applicant to fully develop the heat plan, enter into supply agreements and install and commission the necessary infrastructure. The Heat and Power Plan identifies two potential individual industrial heat users who could each use all of the useful heat available from the facility and a further option for use of available heat via a heat distribution system supplying nearby commercial premises. The practicality and economics of setting up a heat network favours connection to a small number of larger heat users. It is not proposed that heat is supplied to domestic properties from this facility. SEPA will monitor the progress being made by the applicant in meeting the Heat and Power Plan targets and will take proportionate and appropriate action in line with SEPAs enforcement policy should sufficient progress not be made.
Public Consultation	Comments received include: *'I am writing to express my deep concerns regarding the proposed incinerator in Irvine, Scotland and the limited meaningful public consultation that has taken place both before and after the planning application was approved. As a concerned citizen and advocate for sustainable waste management, I believe it is crucial that these concerns are heard and carefully considered by the relevant authorities. Upon reviewing the publicly available information, I have found that the extent of public engagement has been inadequate. A meeting held at Gailes Lodge Hotel, for instance, was attended by a mere 12 individuals, with only 8 representing members of the public. This limited opportunity for the community to voice their questions and scrutinize the potential impact of the proposed incinerator on the local community is a matter of significant concern.', and* *'In my opinion there has been limited meaningful consultation before and after the planning application for this plant was approved.'* The PPC application was advertised in the local newspaper and in the Edinburgh, Gazette as required by the PPC Regulations. These directed the public to contact SEPA Registry to access information on the application from SEPA's Public Register. No enquiries were received by SEPA regarding access to the information for this application within the statutory 28-day consultation period. Restrictions due to the cyber-attack meant that there was a delay in setting up a SEPA consultation page, this is not a statutory requirement but may be set up

	for ease of public access. The consultation is on our Consultation Hub here: Application information: DY Oldhall Energy Recovery Limited, Oldhall Energy Recovery Facility - Scottish Environment Protection Agency - Citizen Space All of the representations received were after the statutory consultation period. SEPA has taken these into consideration as part of the determination. SEPA cannot comment on any concerns regarding consultation during the Planning stages for this facility. Please direct any remaining concerns regarding consultation during the Planning stages to the Planning Authority.
Stack Height	Comments received include: *'I also object about increasing the flue height to 70m.'* There is uncertainty whether this is an objection to the planning authority. SEPA have considered stack height when assessing the impact of air emissions. See Section 5.2 of this document for further detail.
Air Quality / Human Health	Comments received include: *'It is also important to note that incinerators have been proven to have adverse effects on the water, soil, and air quality of the surrounding areas. These repercussions extend to agriculture, causing contamination of chicken eggs, deterioration of soil health, and studies have shown a higher incidence of chronic respiratory problems and birth defects among individuals residing in close proximity to incinerator sites. Vulnerable individuals, including farmers, may be particularly impacted, as evidenced by a recent report indicating that North Ayrshire has regrettably experienced the highest rate of hospitalizations and deaths due to respiratory diseases in the entire UK.'* *'I am concerned about the danger of the release of toxic fumes into the environment … North Ayrshire has a very high incidence of respiratory disease and any release of pollution into the atmosphere is likely to cause further problems to those already suffering as well as new diagnoses.'* *'North Ayrshire has been identified by the charity Asthma + Lung UK as an area of the country which has one of the highest rates of emergency hospital admissions and deaths from lung conditions. In the light of research referenced below it would seem perverse to our group from a public health point of view to have a waste incinerator plant located within our area.'* A Human Health Risk Assessment has been carried out to assess the risk to human health from the proposed activity. The proposed facility will represent an additional emission into the local environment however the impact from the additional pollutant contributions on human health have been determined not to be significant. The assessment of potential air quality impacts has included consideration of normal and abnormal operation, dispersion model selection, pollutants of concern, stack height, meteorological conditions, ground conditions (terrain, building effects etc.). Ayrshire and Arran Health Board were consulted on the project and did not raise any objection. The Health Board recommended ambient air monitoring be carried out and the permit contains requirements for ambient air monitoring. See Section 5.2 of this document for details.

Environmental Monitoring	Comments received include: *'Should such a refusal [of the permit] not be possible, I respectfully request that comprehensive water, air, and soil samples be immediately undertaken around the proposed site. This will facilitate regular monitoring of the incinerator's ecological impact on an annual basis, ensuring accountability and maintaining the health and integrity of our local environment.'* The permit specifies extensive monitoring requirements summarised as follows: Onsite - for emission to air and water the permit requires monitoring of a wide range of parameters either on a continuous or periodic basis or both to ensure emissions remain in compliance and significant environmental impact is avoided. See Tables 6.2, 6.2a, 6.3, 7.2 and 10.2. Periodic sampling of onsite soil and groundwater is also specified to ensure the measures in place to protect soil and groundwater are effective. See Tables 7.3 and 7.4. Offsite - soil and vegetation sampling is periodically required for a range of parameters and ambient air quality will be monitored for a range of parameters. See Table 9.1.
Operation of the facility	Comments include: *'I am not confident that such a plant could be run as cleanly in practise as it looks on paper.'* The permit requires that the plant is controlled and operated by technically competent personnel in compliance with the permit. Key operational actions, conditions and control requirements including emission limits are set out in the permit and will be assessed through inspection and review of submissions. Review of operational emissions data indicates that the technology from the proposed incineration technology vendor, Standardkessel Baumgarte, is capable of meeting the limits imposed.

Summary of responses withheld from the public register on request and how they were taken into account during the determination:
No responses were requested to be withheld from the Public Register.

Is PPC Statutory Consultation Required? (if no delete rows below)	**Yes**
Food Standards Scotland:	No response received.
Health Board:	Consultation 02 Dec 2020, no response received from initial consultation. Pandemic recovery still ongoing at this point. Consultation 01 Dec 2022, no response received. Consultation 13 Apr 2023, response 11 May 2023. 'We note the detailed human health risk assessment that has been carried out by an external agency. We also note that section 2.10.1 of the PPC application (headed "Accident Management") refers to more details being provided in Appendix N of an environmental risk assessment – we don't seem to have a copy of this. We would advise that SEPA colleagues seek assurance that the contingency plans are adequate in the event of a reasonably foreseeable incident or accidental event, in order to protect the surrounding communities from any harm in as far as this is practical. If this

facility is a designated COMAH site, the NHS Ayrshire and Arran Resilience Team would request to be informed and advised about the development of more detailed contingency plans – please let us know if this is the case?'

08 June 2023 Appendix N provided. 16 June 2023 further response received.

'Thank you for sending on the Environmental risk assessment, and some information about the concerns that were expressed by some members of the local community about air pollution from this proposed facility. In the detailed Human Health risk assessment, which you included in the original correspondence, we note that the modelling analysis screened out most of the air pollutants as being insignificant in terms of any impact on the local community, bearing in mind that the chimney stack would be 70 metres high. However, four groups of air pollutants were not screened out as insignificant in this modelling analysis, and labelled as low risk to human health instead (NO2, SO2, VOCs and heavy metals). If SEPA grant this PPC permit, we would advise that SEPA arrange or request for some monitoring of these air pollutants at the site and in the immediate surrounding area at ground level – this would help to provide some assurance that the actual emissions of these air pollutants when the Energy Recovery Facility is operational, are in line with what the detailed modelling analysis has indicated (low risk to health).

Given that this is a Part A PPC application, it may be the case that SEPA were planning to request or arrange for some monitoring of air quality in any event, if the permit is granted. We would advise that the four air pollutant groups mentioned above be included in air quality monitoring, as a rate of discharge and as a concentration in the air, to be benchmarked against the recommended standards for air quality.'

SEPA response
Emissions to air from the facility will be limited to levels required by BAT and emissions will be monitored either by continuous or periodic monitoring. Health Board feedback identified NO_2 (oxides of nitrogen, SO_2 (oxides of sulphur), VOCs (volatile organic compounds) and heavy metals for consideration for monitoring in the locale as well as at site. All of the highlighted parameters noted will be monitored at the site in the incineration flue gases: NO_2, SO_2 and VOCs are monitored continuously, heavy metals are monitored periodically therefore the rate of discharge will be monitored. The permit also contains a requirement in Schedule 9.1 for an Environmental Monitoring Plan to be developed and implemented. This monitoring plan includes 'ambient' air monitoring in the locale for NO_2, SO_2 and VOCs and also particulate matter, condition 9.1.1 and Table 9.1. Heavy metal emissions to air will continue to be monitored at the source i.e. in the flue gases to ensure permit limits are complied with as well as in soil and vegetation samples from the locale to monitor for any impact from emissions, condition 9.1.1 and Table 9.1. Ambient air concentrations will therefore be measured and assessed.

The current air dispersion model predicts the impact based on worst case emissions from the incineration activity at all times i.e. at the emission limit

	value. When in operation, the ERF is anticipated to operate below the emission limits set and to inform on the impact due to actual emissions, the draft permit contains a requirement to repeat the air dispersion modelling and Human Health Risk Assessment using actual measured emission concentrations, condition 6.5.5. It is considered that the feedback from the Health Board concerning emission to air and their impact has been taken into account through implementing these measures in the draft permit. This facility is not a COMAH site, and a contingency plan is therefore not required under the Control of Major Hazard Regulations 2015. In terms of foreseeable accidents and incidents: The IED Regulations require that in the case of breakdown, operation be reduced or closed down as soon as practicable until normal operations can be restored (Article 47) and under no circumstances should incineration of waste be carried on for more than 4 hours if any emission limit is exceeded (Article 46 (6)). Emission limits are also applied under these circumstances in Annex VI Part 3 2. Conditions to implement these requirements are inserted into the draft permit in Section 5.4 and Table 6.2a. The draft permit requires that the operator develops and implements an Incident Prevention and Mitigation Plan and an Other Than Normal Operation Management Plan to ensure any periods where the plant is not operating normally are prevented or minimised. The draft permit also contains conditions relating to incidents in Schedule 2.5, these include a requirement that operation is suspended in the case where there is a breach of any permit condition which poses an immediate danger to human health. It is considered that the risk of significant incident will be minimised by the control measures proposed in the draft permit.
Local Authority	Response to confirm planning permission has been granted for the facility, no further comment or objection.
Scottish Water	No response received.
Health and Safety Executive	Discretionary consultee, not applicable.
NatureScot	02/12/2020 Consultation on application, no comment or objection. 05/01/2024 Re-consultation on updated Air Quality Assessment with revised habitats assessment. Response from Nature Scot with info to assist with Appropriate Assessment, no objection. 09/02/2024 Re-consultation providing SEPA Appropriate Assessment. No response received. See Section 6 for further detail.

Discretionary Consultation required? (if yes provide justification and details below, otherwise delete row)	**No**
Enhanced SEPA Consultation required? (if yes provide justification and details below, otherwise delete row)	**Yes**
Information available via SEPA webpage. Setting up the web page was delayed due to the cyber-attack.	
"Off site" consultation required (if yes provide justification and details below, otherwise delete row)	**No**
Transboundary Consultation required? (if yes provide justification and details below, otherwise delete row)	**No**
Is Public Participation Consultation Required? (if yes provide justification and details below, otherwise delete rows below)	**Yes**
Date SEPA notified applicant of draft determination	25/08/2025
Date draft determination placed on SEPA's Website	25/08/2025
Details of any other 'appropriate means' used to advertise the draft.	
Date public consultation on draft permit opened	25/08/2025
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:	
Officer:	CO

3 Administrative determinations

Determination of the Schedule 1 Activity

The activities applied for in the application are:

- The incineration of non-hazardous waste in a waste incineration plant being a prescribed activity described in Chapter 5, Section 5.1, Part A (b) of the Regulations, and
- Burning any fuel in a medium combustion plant with a rated thermal input equal to or greater than 1 megawatt and less than or equal to 20 megawatts being a prescribed activity described in Chapter 1, Section 1.1, Part B (d) of the Regulations.

Determination of the Stationary Technical Unit to be permitted

As discussed in the application documents and defined in Schedule 1 of the permit.

Determination of Directly Associated Activities

As discussed in the application documents and defined in Schedule 1 of the permit.

Determination of Site Boundary

All permitted activities are contained within the installation boundary as set out in Schedule 1 of the permit. The installation boundary was modified slightly during the determination period due to plant layout adjustments required during detailed design.

Officer:	CO

4 Introduction and Background

4.1 Historical Background to the activity

An application for planning permission was made in 2019 to North Ayrshire Council and permission was granted on 22 January 2020 for development of a materials recycling facility [MRF] and 180,000t/a non-hazardous waste incinerator in planning permission reference 19/00539/PPM.

Condition 1 of this permission was amended in November 2020 to remove the materials recycling facility and adjust the site building layout accordingly. The PPC application submitted later in 2020 therefore does not include a materials recycling facility.

Later, the annual throughput for planning purposes was increased to 185,600t/a.

The original PPC application received in November 2020 was for a non-hazardous residual waste incinerator of 182,400t/a capacity. The brownfield site proposed for the activity in Oldhall Industrial Estate has previously contained a pet crematorium, a clinical waste incinerator and other waste handling activities. Neither the pet crematorium or the clinical waste incinerator activity had operated for some time and the buildings and infrastructure associated with those activities which remained on site and the waste handling activities have been removed during preparations for construction of the proposed incinerator. In alignment with the planning permission, the maximum annual tonnage permitted in the PPC permit is limited to 185,600t/a and the assessments supporting the application are based on this throughput.

4.2 Description of activity

The application is for a permit to operate the activities listed below as described in the PPC Regulations:

- Chapter 5, Section 5.1, Part A (b) - The incineration of non-hazardous waste in a waste incineration plant
- Chapter 1, Section 1.1, Part B (d) - Burning any fuel in a medium combustion plant with a rated thermal input equal to or greater than 1 megawatt and less than or equal to 20 megawatts

The main operations at the facility include:

- The reception, inspection and storage of pre-treated non-hazardous residual waste arising from Municipal Solid Waste (MSW) and Commercial and Industrial (C&I) waste of a similar nature to MSW in an enclosed building, maintained under negative pressure. The building has two waste storage bunkers with a combined waste storage capacity of ca 2000 tonnes of waste. A grab crane transfers the waste to the incinerator chute and can be used for mixing and homogenising the waste in the bunkers. An area for inspection of delivered waste and quarantining of non-compliant waste is provided;
- A single line combustion grate and associated combustion chamber capable of incinerating the received waste and ensuring the flue gases are held at a temperature above 850°C for at least two seconds under the most adverse operation conditions. Waste with a design Net Calorific Value (NCV) of 10.5 MJ/Kg can be processed at a nominal design throughput of 23.2 tonnes per hour giving a capacity of 185,600 tonnes per year based on 8,000 hours operation. Lower NCV waste can be processed down to 9.0 MJ/kg at rates up to 27t/h;
- An integral waste heat recovery boiler which recovers heat from the combustion gases and generates superheated steam to feed a condensing steam turbine for the generation and export of electrical energy. The steam turbine is also equipped to allow the export of heat. Depending on the operational mode and how much heat is being exported, the facility can generate between 19.3 MWe to 17.1 MWe of electricity (gross) and, after accounting for the parasitic load of the site (2.0 MWe), an associated export of around 17.3 MWe to 15.1 MWe of electricity (net) to the National Grid and between 0 and 10.4 MW of heat respectively. The export of heat is being actively explored in line with SEPA's Thermal Treatment of Waste Guidelines;
- The separate collection, transfer, storage and removal from site of Incinerator Bottom Ash (IBA), Boiler ash and Air Pollution Control Residue (APCr);
- The treatment of flue gases to reduce pollutant loading, continuous monitoring of emissions within the flue gas and discharge of flue gas via a 70-metre stack;
- The treatment of odorous air extracted from the facility in a carbon bed filter during periods where the incineration activity is offline or running at low throughput and discharge of the treated air via a 43 metre stack;
- A surface water collection and treatment system for low-risk surface water runoff in the form of a Sustainable Urban Drainage System (SUDs) prior to discharge to the Dundonald burn;
- A surface water collection and treatment system for surface water other than low risk surface water runoff in the form of a Sustainable Urban Drainage System (SUDs) prior to discharge to the combined sewer along with excess process wastewater; and
- A gas oil fired emergency diesel electrical generator of 3.8MWth to provide emergency electrical power to the plant to allow safe shutdown in the event of loss of onsite generation capability or the grid supply.

The main activity is incineration of up to 185,600t/a of non-hazardous waste from which the majority of recyclable material has been removed prior to delivery, this is known as 'residual' waste. The activities carried out at the facility will include reception, storage and handling of residual waste, a single line moving grate incinerator, steam raising water boiler, steam turbine with electrical generator, waste steam condenser and combustion gas treatment and discharge systems. Residues in the form of incinerator bottom ash [IBA] and air pollution control residue [APCr] will be produced and stored prior to transport offsite.

An emergency generator operating on fuel oil and of 3.765 MW thermal input capacity will be installed to provide electricity to facilitate safe shutdown in case of failure of the site electrical supply.

Odours from reception, storage and handling of residual waste will be collected and treated either in the incineration unit or a standby odour abatement system prior to discharge. A number of other ancillary systems such as boiler water treatment will be required to support the activity.

Further details of the activity are available in the application Non-Technical Summary and Supporting Information. S2913-0420-0005KLH Non Technical Summary R2 and S2913-0420-0002TJM Oldhall EfW - Supporting Information R4. A Further Information Notice (FIN) was issued to require additional information to be submitted, and other information has been supplied as the design has evolved during the determination period.

Detailed design of some aspects of the facility remain to be finalised, it should therefore be noted that in preparing the impact assessments the applicant discusses the worst-case view, and information is provided to assure that Best Available Techniques will be employed, and legal and regulatory requirements will be met. The modelled impact of air emissions is therefore based on the maximum discharge concentration which may be allowed under the Regulations and/or guidance. It is anticipated that during operation the actual emissions and therefore impact will be lower than the modelled predictions.

Several pre-commissioning and pre-operational conditions are included in the draft permit to ensure finalised design details for key systems will be supplied prior to the activity commencing to verify that the final design as installed meets BAT requirements.

4.3 Outline details of the Permit applied for

The applicant is seeking a permit to operate a non-hazardous waste incinerator and the associated support activities which are required to operate the facility including a gas oil fuelled emergency diesel generator.

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

N/A

4.5 Identification of important and sensitive receptors

The installation is located in the Oldhall West Industrial Estate in Irvine Ayrshire around 2km from Irvine, Drybridge and Dreghorn and 3km from Dundonald. Immediately to the south of the site are the Oldhall ponds and the Dundonald Burn passes to the northeast of the site and discharges locally into the River Irvine.

Emissions to Air

Fifty-one sensitive human health receptor locations are identified and assessed in the Air Quality Assessment (AQA). The AQA model assesses the predicted air quality impacts on the surrounding local environment and receptors and the modelling predictions carry forward into the Human Health Risk Assessment (HHRA). Representative receptors were identified to include residential properties, schools, hospitals and commercial premises etc where people

may be present for a relevant period. A relevant period is the period indicated in the Air Quality Assessment Level (AQAL) used e.g. if the AQAL is a daily average concentration, then this refers to locations where people may be anticipated to be present for that period, for example in a dwelling house but not on a rural roadway or on agricultural land.

The Air Quality Assessment describes the identified sensitive receptors as shown in Figure 2 and listed in Table 11 replicated below.

Sixteen ecological receptors have been identified within 15km of the EfW and assessed in the Air Quality Assessment, 12 of which are Designated Sites. Designated Sites are those which have designations as Special Protection Areas (SPAs), Special Areas of Conservation (SACs), Ramsar sites (protected wetlands) or Sites of Special Scientific Interest (SSSIs). Local nature sites (ancient woodland, woodland, heathland, local wildlife sites, waterbodies and watercourses, and national and local nature reserves) have been assessed within ca 2km of the proposed EfW facility.

Twelve receptors are identified to inform on the effect of emissions at local air quality monitoring points.

HHRA

A subset of fifteen locations have been selected from the human health receptor locations as representative of the range of receptors which may be subject to impact from emissions based on the output from the AQA model. Table 9 and Figure 1 from the Human Health Risk Assessment are replicated below showing the receptors selected.

Noise

The facility is located within an industrial estate which has nearby residential properties. The three closest residential properties on Shewalton Road are identified in the External Noise Assessment Report and subject to noise impact assessment. Figure 1 from the External Noise Assessment is replicated below showing the receptors selected.

SEPA has determined that the receptors identified above are appropriate for the assessment of this application.

Air Quality and Human Health Receptors Location Map

Figure 2 The Local Setting Showing the Location of the Proposed ERF Development Site

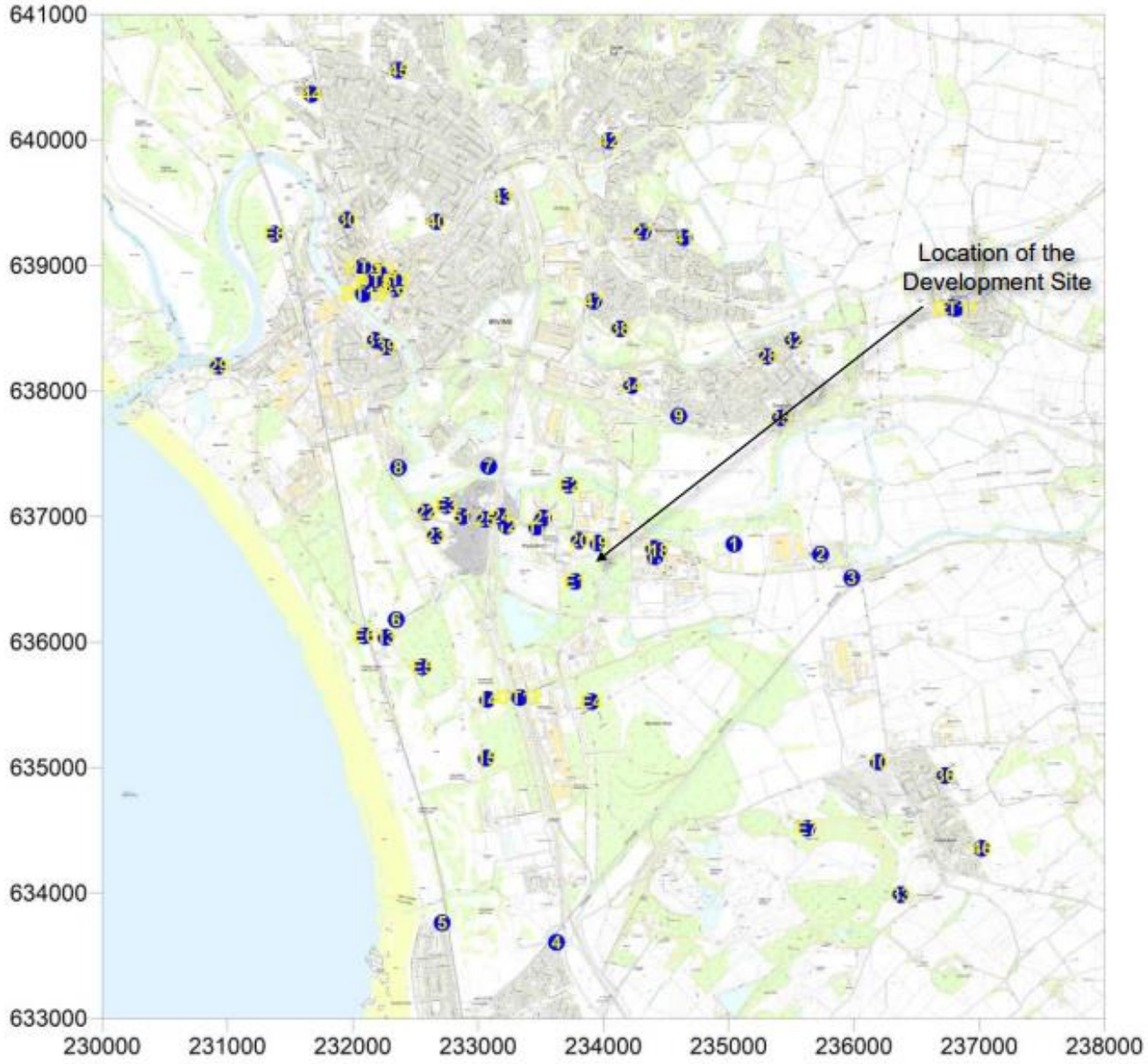


Figure 2 reproduced with kind permission of Ordinance Survey on behalf of the Controller of Her Majesty's Stationary Office, © Crown Copyright 1000055158 (2023) Environmental Visage Limited.

Air Quality and Human Health list of receptors

Table 11 Specific Receptors Included in Detailed Modelling

Receptor	X	Y	Distance from Site (m)	Receptor Name	Multiple Storeys
1	235041	636779	1,329	Residence - Drybridge	
2	235734	636697	2,013	Residence - Shewalton Moss	
3	235981	636511	2,260	Residence - Main Street, Drybridge	
4	233626	633605	3,004	Residence - Lochgreen Avenue, Loans	
5	232713	633762	3,019	Residence - Firth Road, Troon	
6	232345	636177	1,443	Glasgow Golf Club / Gailes Links	
7	233083	637400	1,018	Residence - Muirfield Court, Irvine	
8	232364	637390	1,568	Residence - Carson Drive, Irvine	
9	234602	637800	1,482	Residence - Monarch Gardens, Dreghorn	
10	236193	635043	2,924	Residence - Kilnford Drive, Dundonald	
11	233469	636915	385	Residence – The Haven	
12	233225	636925	573	Residence - Woodside Cottage	
13	232264	636037	1,549	Development at Gailes Farm	
14	233074	635541	1,239	New Sports Facility – location A	
15	233064	635076	1,661	New Sports Facility – location B	
16	234401	636747	712	Smithkline Beecham Office Block 1	2
17	234414	636680	715	Smithkline Beecham Office Block 2	2
18	234445	636726	751	Smithkline Beecham Outdoor Area	
19	233957	636789	311	Chalmers Place	2
20	233806	636810	226	Cockburn Place	2
21	233520	636988	421	Drummond Crescent	
22	232583	637035	1,198	Residence - Shewalton Road	
23	232659	636846	1,071	Residence - Ayr Road	
24	233182	637003	653	Residence - Shewalton Road	
25	233058	636977	743	Residence - Shewalton Road	
26	232342	638817	2,594	Townhead Surgery	
27	234315	639267	2,727	Bourtreehill Medical Practice	
28	235308	638276	2,314	Dundonald Medical Practice	
29	230929	638198	3,197	Harbourside Care Home	2
30	231954	639365	3,264	Abbeyfield Care Home	2
31	232180	638406	2,356	Fullerton Care Home	2
32	235516	638403	2,551	Shallom Care Home	2
33	236373	633986	3,743	Dundonald House Care Home	2

Receptor	X	Y	Distance from Site (m)	Receptor Name	Multiple Storeys
34	234227	638042	1,526	Greenwood Academy	3
35	235414	637788	2,078	Dreghorn Primary	
36	236727	634936	3,456	Dundonald Primary	
37	236779	638665	3,700	Springside Primary	
38	234132	638497	1,936	Elderbank / Broomlands Primary	2
39	232270	638351	2,256	Loudoun Montgomery Primary	
40	232669	639350	2,930	Woodlands Primary	
41	234645	639224	2,779	St John Ogilvie Primary	
42	234043	639994	3,402	Annick Primary	
43	233194	639551	2,986	St Marks Primary School	
44	231671	640365	4,270	Irvine Royal Academy	5
45	232364	640557	4,169	Castle Park Primary	
46	237020	634355	4,010	Residence towards the SE Dundonald	
47	233921	638717	2,119	Residence in Broomlands	
48	239879	638514	6,463	Uni. Hospital Crosshouse	2
49	231601	641112	4,969	Ayrshire Central Hospital	3
50	232007	640767	4,491	Cumbrae Lodge Care Home	
51	232875	637000	916	Proposed Short-Term Operator Reserve	

Table 11 Continued

Receptor	X	Y	Distance from Site (m)	Receptor Name
Air Quality Monitoring Locations				
Monitor	232189	638857	2,710	Irvine High Street AQ Monitor
DT1	232323	638892	2,679	DT1
DT2	232202	638952	2,783	DT2
DT3	232077	638990	2,883	DT3
DT5	232169	638878	2,739	DT5
DT10	232085	638774	2,716	DT10
DT11	236813	638659	3,709	DT11
DT12	233332	635558	1,120	DT12
SA Loans	234529	631708	4,970	30 Main Street Loans
SA DT2	232588	631277	5,447	South Ayrshire DT2 (Troon)
SA DT3	232292	631235	5,556	South Ayrshire DT3 (Troon)
SA Troon	232297	631393	5,402	11 North Shore (Troon)
Ecological Receptors				
E1	233773	636482	135	Oldhall Ponds Wildlife Site
E2	233725	637250	642	Dundonald Burn SSSI
E3	232745	637087	1,089	Shewalton Sandpits Nature Reserve
E4	233905	635524	1,099	Shewalton Wood Nature Reserve
E5	232555	635800	1,420	Gailes Marsh Nature Reserve
E6	232091	636049	1,725	Western Gailes SSSI
E7	235627	634515	2,829	Dundonald Wood SSSI
E8	231374	639251	3,536	Bogside Flats SSSI
E9	233375	629177	7,439	Ardrossan to Saltcoates Coast SSSI
E10	224619	641003	10,109	Troon Golf Links and Foreshore SSSI
E11	227654	644041	9,583	Ashgrove Loch SSSI
E12	241629	625913	13,313	Afton Lodge SSSI
E13	228199	648234	12,862	Lynn Spout SSSI
E14	234761	646727	10,173	Dykeneuk Moss SAC / SSSI
E15	235504	648529	12,055	Cockinhead Moss SAC / SSSI
E16	234643	650371	13,794	Bankhead Moss, Beith SAC / SSSI

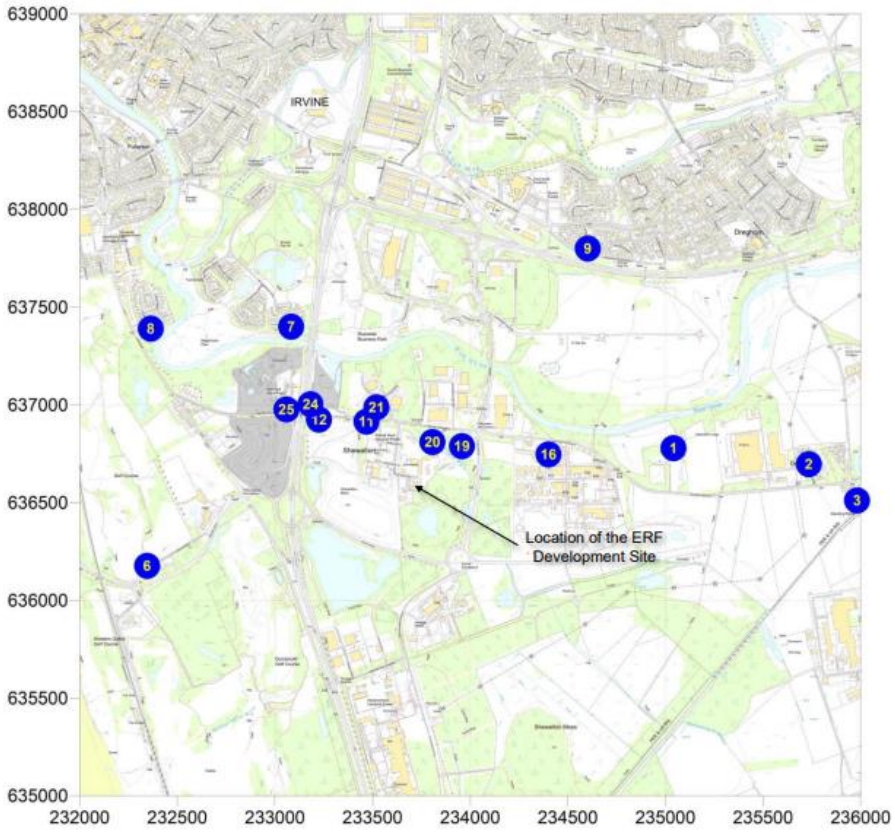
Human Health Risk Assessment List of specific receptors considered

Table 9 Specific Receptors Included in Dioxin Deposition Modelling

Receptor Number	Receptor Location	OS Coordinates X	OS Coordinates Y	Distance from Source (metres)
1	Residence - Drybridge	235041	636779	1,329
2	Residence - Shewalton Moss	235734	636697	2,013
3	Residence - Main Street, Drybridge	235981	636511	2,260
6	Glasgow Golf Club / Gailes Links, Irvine	232345	636177	1,443
7	Residence - Muirfield Court, Irvine	233083	637400	1,018
8	Residence - Carson Drive, Irvine	232364	637390	1,568
9	Residence - Monarch Gardens, Dreghorn	234602	637800	1,482
11	Residence – The Haven	233469	636915	385
12	Residence - Woodside Cottage	233225	636925	573
16	Smithkline Beecham Office Block	234401	636747	712
19	Chalmers Place	233957	636789	311
20	Cockburn Place	233806	636810	226
21	Drummond Crescent	233520	636988	421
24	Residence - Shewalton Road	233182	637003	653
25	Residence - Shewalton Road	233058	636977	743

Human Health Risk Assessment Figure 1 showing receptors included in the risk assessment

Figure 1 The Local Setting Showing the Vicinity of the ERF Development Site and the Receptors Included in the HHRA



Noise Receptors - Figure 1 from External Noise Assessment Report showing nearest noise sensitive receptors

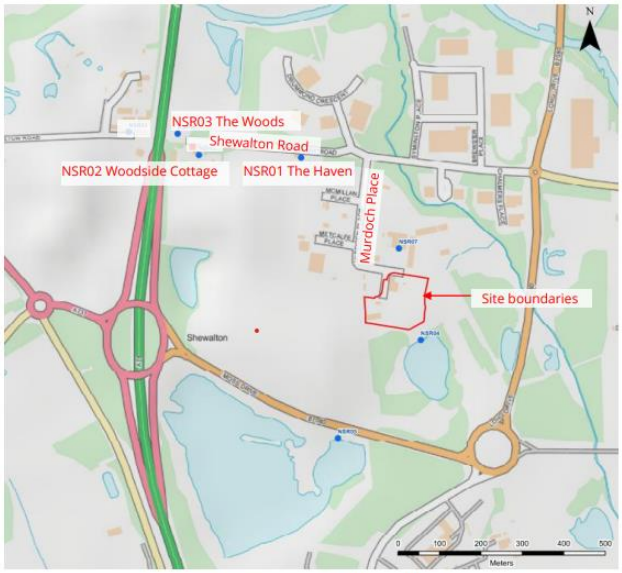


Figure 1: Site Location and Nearest NSRs

Officer:	CO

5 Key Environmental Issues

5.1 Summary of significant environmental impacts

Appendices A and B respectively provide SEPAs assessment of the proposal against the requirements of the principal legislation which applies to this activity, the Industrial Emissions Directive, and the Best Available Techniques conclusions document for waste incineration.

Potential significant environmental impacts are as listed and are described in greater detail in the relevant sections below:

5.2 – Emissions to Air including odour (Section 5.2.4)
5.3 – Emissions to Water including emissions to sewer (Section 5.3.1)
5.4 – Noise
5.5 – Resource Utilisation including energy generation and use (Section 5.5.2)
5.6 – Waste Management and Handling
5.7 – Environmental Management System
5.8 – Site Condition
5.9 – Monitoring of emissions to air and water
6 – Habitats Legislation

Appendix A – Compliance with IED Requirements
Appendix B – Compliance with Best Available Techniques guidance
Appendix C – Derivation of emission limits

5.2 Emissions to Air

5.2.1a Point Source emission to air: incineration

Information relevant to the emissions to air from the installation was originally provided in Supporting information section 2.4.1 and the Air Quality Assessment (AQA) in appendix D.

Since the original submission, the Air Quality Assessment, Habitats Assessment and Human Health Risk Assessment have been revised and updated to reflect the current design proposals.

The principal emissions from the incineration line at Energy from Waste (EfW) facilities 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).

Air Dispersion Modelling Approach

The impact of normal and abnormal emissions from the proposed facility have been estimated using ADMS modelling software. Other air dispersion modelling software is available including AERMOD and a sensitivity analysis has been provided in AQA Section 2.8.6 to confirm which model should be used for this proposal. AQA Table 10 compares the predicted impact from both models and AERMOD predictions are consistently lower than ADMS, therefore ADMS has been selected as the appropriate modelling software as it delivers higher and therefore more conservative impact estimates.

A number of other modelling parameters within ADMS have been sensitivity checked to ensure the model reflects the local environment as accurately as practical and delivers a conservative result. These modelling parameters include consideration of nearby buildings and features including the nearby wind turbines, terrain topology and allowance for coastal effects. See AQA sections 2.8.1 – 5.

Background air quality is estimated from existing data or where suitable local data is not available, taken from representative similar areas.

Emission Inputs to the Air Dispersion Model

Unless otherwise noted, inputs to the model assume emissions at the maximum allowed by the emission limit values (ELVs) imposed by the permit at the design waste tonnage throughput, at the design waste fuel calorific value, 10.5MJ/kg and for all 8760 hours per year. This is considered to be worst case conditions as the facility is designed to operate in a compliant manner at the design point with emissions below the ELVs and for only ca 8000 hours per year. A summary of the modelling inputs and the emission limits set is shown in Appendix C, this confirms that the modelling inputs are worst case.

The modelling software takes account of a large number of factors including weather to calculate the predicted impact across a period of five years and the results from the worst-case modelled year are used in assessment of the impact.

Emissions of pollutants from existing activities in the locale which are similar to those from this facility are accounted for in the background concentrations of pollutants which are used in the model. Where there is a proposal for a facility in the locale which has emissions similar to those from the EfW facility, but that activity was not yet in operation, these emissions would not be included in the background concentration of pollutants. Therefore, the emissions from that proposed facility require to be added into the model separately to predict the cumulative impact from emissions from both sites.

Planning permission for a Short-Term Operating Reserve (STOR) electricity generation facility nearby on Shewalton Road was given on 06 December 2017 (Planning Reference 17/01013/PP). The STOR generates electricity using engines fuelled by natural gas and therefore there are some similar combustion emissions to the EfW which need considered when

modelling the combined impact on receptors. The impact from cumulative emissions from the STOR and ERF is discussed in AQA Section 8.

Although planning permission was granted in 2017, the STOR facility has not been constructed, and the development had not started by the time the planning permission expired three years after granting. Therefore, planning permission 17/01013/PP has lapsed and the emissions from that facility need not be considered in the air quality assessment as there is no valid Planning Permission to construct the facility.

Therefore, in the interests of brevity and clarity, the modelling outcomes discussed in Section 8 of the AQA concerning cumulative emissions for the STOR and the ERF have not been incorporated into this decision document.

Modelling

Results from Air Quality Modelling Assessments are presented as follows:

5.2.1b The maximum impact from the EfW facility operating at maximum throughput and permitted flue gas concentrations at the top of the IED range of daily average emission limit values under normal operating conditions. See 5.2.1b below.
5.2.1c The maximum impact from the EfW facility operating at the maximum short term emission limits under normal operational conditions. See 5.1.2c below.
5.2.1d The maximum impact at sensitive receptors from the EfW facility operating normally. See 5.1.2d below
5.2.1e The EfW facility operating under 'Abnormal Operation' conditions as defined in Permit table 6.2a.
Discussion is also provided in 5.2.2 regarding emissions from the emergency generator

As noted above, although presented in Section 8 of the Air Quality Assessment, the cumulative impact from the EfW facility and the STOR is not extensively discussed in this decision document as the STOR facility was not constructed, and Planning Permission has lapsed (see above for more detailed explanation).

Stack Height

A stack height assessment has been carried out and the stack height raised to 70m from the original application proposal of 60m to provide improved dispersion. This is discussed in the Stack Height Assessment. The air quality modelling outcomes below were revised based on this increased stack height and the results are discussed throughout Section 5.2 of this document.

Assessing the Significance of the Modelling Predictions

The model outputs are the predicted ground level concentrations, known as the process contribution (PC). The maximum impact concentration found at any point in the model study area is compared to the long-term (LT) and short-term (ST) Air Quality Assessment Levels (AQALs) according to the methodology in IPPC H1 to assess the significance of the impact. 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:

The emissions can be considered as insignificant where:

Human and Ecological Receptors

The long-term process contribution is less than 1% of the LT environmental benchmark / critical level or the predicted environmental concentration is less than 70% of the LT environmental benchmark / critical level.

The short-term process contribution is less than 10% of the ST environmental benchmark / critical level or the process contribution is less than 20% of the ST environmental benchmark / critical level minus the background concentration.

Further assessment may be necessary if the emissions are not screened out by the above assessment.

5.2.1b Air Quality Assessment of the maximum predicted impact from the EfW facility operating at maximum throughput and flue gas concentrations at the top of the IED range of daily average emission limit values under normal operating conditions. AQA Section 3.

Oxides of Nitrogen as NO_2 (AQA Section 3.3)

The maximum predicted short-term process contribution is 7.8µg/m^3 which is 3.9% of the short-term environmental benchmark and can be screened out as insignificant. AQA Table 15.
The maximum long-term process contribution is 0.968µg/m^3 which is 2.4% of the long-term benchmark this cannot be immediately screened out and a further assessment stage is required.
The Predicted Environmental Concentration, the PEC (process contribution + background) is 29.9% of the Air Quality Standard which is below the 70% benchmark and the long-term impact can be screened out as insignificant.

Oxides of Sulphur as SO_2 (AQA Section 3.4)

The maximum predicted short-term process contribution is 4.5µg/m^3 which is 1.7% of the 15 minute 99.9th percentile average short-term environmental benchmark and can be screened out as insignificant. AQA Table 16.

The maximum long-term process contribution is 0.242µg/m^3 which is 1.2% of the long-term benchmark this cannot be immediately screened out and a further assessment stage is required.
The Predicted Environmental Concentration (process contribution + background) is 12.3% of the Air Quality Standard which is below the 70% benchmark and the long-term impact can therefore be screened out as insignificant.

Carbon monoxide, CO (AQA Section 3.5)

The maximum predicted short-term process contribution is 9.58µg/m^3 which is 0.1% of the short-term environmental benchmark and can be screened out as insignificant. AQA Table 17.

There is no long-term benchmark for carbon monoxide, the predicted long term process contribution is 0.36µg/m^3.

Particulate Matter, PM_{10} (AQA Section 3.6)

The maximum predicted short-term process contribution is 0.261µg/m^3 which is 0.52% of the short-term environmental benchmark and can be screened out as insignificant. AQA Table 18.
The maximum long-term process contribution is 0.04µg/m^3 which is 0.22% of the long-term benchmark this can be screened out as insignificant.

Note - the long term Predicted Environmental Concentration, (process contribution + background) is 78% of the Air Quality Standard which is above the 70% benchmark. This is due to a high background concentration: however the overall predicted concentration remains below the Air Quality Standard and the contribution from the Oldhall ERF is 0.04µg/m^3 which represents a negligible change in air quality.

Particulate Matter, $PM_{2.5}$ (AQA Section 3.7)

There is no short-term environmental benchmark.

The maximum long-term process contribution is 0.04µg/m^3 which is 0.4% of the long-term benchmark this can be screened out as insignificant. AQA Table 19

Note - the long term Predicted Environmental Concentration, (process contribution + background) is 80.4% which is above the 70% benchmark. This is due to a high background concentration: however the overall predicted concentration remains below the Air Quality Standard and the contribution from the Oldhall ERF is 0.04µg/m^3 which represents a negligible change in air quality.

Volatile Organic Matter, VOC (AQA Section 3.8)

There is no assessment level for 'VOC' which is a mixture of organic compounds, therefore the assessment is based on running annual means for two potential constituents of the discharge: benzene and 1,3-butadiene. As a worst case it is assumed in the assessments below that all of the VOC emission is either benzene or 1,3-butadiene. AQA Table 20.

Benzene

The maximum predicted short-term process contribution is 4.822µg/m^3 which is 2.5% of the 1 hour 100th percentile average short-term environmental benchmark and can be screened out as insignificant.

The maximum long-term process contribution is 0.081µg/m^3 which is 2.5% of the long-term benchmark this cannot be immediately screened out and a further assessment stage is required. The Predicted Environmental Concentration (process contribution + background) is 6.8% of the Air Quality Standard (or 8.3% if the more conservative background is used) which is below the 70% benchmark and the long-term impact can therefore be screened out as insignificant.

1,3-Butadiene

There is no short-term environmental benchmark.

The maximum long-term process contribution is 0.081µg/m^3 which is 3.6% of the long-term benchmark this cannot be immediately screened out and a further assessment stage is required. The Predicted Environmental Concentration (process contribution + background) is 5.9% of the Air Quality Standard which is below the 70% benchmark and the long-term impact can therefore be screened out as insignificant.

Hydrogen chloride, HCl (AQA Section 3.9)

The assessment levels for HCl are based on SEPA guidance and are not Air Quality Standards.

The maximum predicted short-term process contribution is 2.88µg/m^3 which is 0.4% of the short-term environmental benchmark and can be screened out as insignificant. AQA Table 21.

The maximum long-term process contribution is 0.05µg/m^3 which is 0.2% of the long-term benchmark this can be screened out as insignificant.

Hydrogen fluoride, HF (AQA Section 3.10)

The assessment levels for HF are based on SEPA guidance and are not Air Quality Standards.

The maximum predicted short-term process contribution is 0.482µg/m^3 which is 0.3% of the short-term environmental benchmark and can be screened out as insignificant. AQA Table 22.

The maximum long-term process contribution is 0.008µg/m^3 which is 0.05% of the long-term benchmark this can be screened out as insignificant.

Ammonia, NH_3 (AQA Section 3.11)

The assessment levels for NH_3 are based on SEPA guidance and are not Air Quality Standards.

The maximum predicted short-term process contribution is 4.82µg/m^3 which is 0.004%* of the short-term environmental benchmark and can be screened out as insignificant. AQA Table 23.

The maximum long-term process contribution is 0.081µg/m^3 which is 0.026%* of the long-term benchmark this can be screened out as insignificant.

*Figures from Table 22 have been recalculated, this does not affect the above outcome of the assessment.

Metals – cadmium and thallium, Cd and Tl (AQA Section 3.12)

As a worst case it is assumed in the assessments below that all of the emission is associated with release of particulate matter and is either cadmium or thallium. AQA Table 24.

Cadmium

The maximum predicted short-term process contribution is 0.0096µg/m^3 which is 0.6% of the short-term environmental benchmark and can be screened out as insignificant.

The maximum long-term process contribution is 0.00016µg/m^3 which is 3.2% of the long-term benchmark and this cannot be immediately screened out and a further assessment stage is required. The Predicted Environmental Concentration (process contribution + background) is 3.9% which is below the 70% benchmark and the long-term impact can therefore be screened out as insignificant.

Thallium

The maximum predicted short-term process contribution is 0.0096µg/m^3 which is 0.032% of the short-term environmental benchmark and can be screened out as insignificant.

The maximum long-term process contribution is 0.00016µg/m^3 which is 0.016% of the long-term benchmark this can be screened out as insignificant.

Metals – mercury, Hg (AQA Section 3.13)

The maximum predicted short-term process contribution is 0.0096µg/m^3 which is 0.13% of the short-term environmental benchmark and can be screened out as insignificant. AQA Table 25.

The maximum long-term process contribution is 0.00016µg/m^3 which is 0.06% of the long-term benchmark this can be screened out as insignificant.

Metals – Group 3 – antimony (Sb), arsenic (As), lead (Pb), chromium (Cr), cobalt (Co), copper (Cu), manganese (Mn), nickel (Ni) and vanadium (V) (AQA Section 3.14)

AQA Tables 26 - 30

A three-step assessment is carried out on this metals group according to the recommended Environment Agency methodology.

Step 1 assessment – a multiple screening assessment comparing:

- the process contribution against short-term (Table 27) and long-term (Table 26) standards assuming as a worst case each metal is emitted at the emission limit value. Metals with a predicted impact of greater than 1% of the long-term assessment standard or 10% of the short-term assessment standard are carried forward for further assessment.
- the predicted environmental concentration (process contribution + background) (Table 28) against assessment standards assuming as a worst case each metal is emitted at the emission limit value. Metals with a predicted environmental concentration greater than 100% of the assessment standard are also carried forward for assessment.

Metals whose process contribution is greater than 1% and whose predicted environmental contribution is below 100% are screened out as having an insignificant impact. The metals screened out in Step 1 are: antimony; arsenic; lead; chromium (short term); cobalt; copper; manganese; nickel and vanadium. The remaining metal, chromium$^{(VI)}$ (long term) is further assessed in Step 2.

Step 2 assessment – assessment of the metals carried forward from Step 1 now assuming their likely emission levels are as measured in other operational plants (and not at the worst-case emission levels as assumed in Step 1) (Table 30). For chromium$^{(VI)}$ the process contribution is 0.00000132µg/m^3 or 0.4% of the assessment level and can therefore be considered insignificant.

In summary, all Group 3 metals can be considered to have an insignificant impact.

Dioxins and furans, D+F (AQA Section 3.15)

AQA Table 31.

The maximum predicted long-term process contribution (annual mean) is *3.22x10^{-10} µg/m^3 and the maximum at any human health receptor is 2.5x10^{-10} µg/m^3.There are no air quality strategy objectives, European limit values or EALs for dioxins (polychlorinated dibenzo-p-dioxins, PCDDs) or furans (polychlorinated dibenzofurans, PCDFs). Assessment of impact from dioxins and furans is carried out via the Human Health Risk Assessment (HHRA), described in Section 5.2.4 of the Decision Document.

*for context, this is 0.000000000000000322 grams per cubic meter.

Poly Chlorinated biphenyls (PCBs), dioxins and furans, D+F (AQA Section 3.16)

AQA Tables 32 and 33.

The assessment level for PCBs in the BAT conclusions document is for a combined and total emission of PCBs plus dioxins and furans at a maximum of 0.06ng/Nm^3. As a worst-case, this modelling (Table 32) assumes all of the emission is as PCB.

The maximum predicted short-term process contribution is 2.89x10^{-8}µg/m^3 which is 0.00000048% of the short-term environmental benchmark and can be screened out as insignificant.

The maximum long-term process contribution is 4.84x10^{-10}µg/m^3 which is 0.00000024% of the long-term benchmark and this can be screened out as insignificant.

An additional assessment has been performed (Table 33) against the highest indicated potential emission levels as described in the original 2006 Waste Incineration BAT Reference document.

The maximum predicted short-term process contribution is 2.41x10^{-3}µg/m^3 which is 0.04% of the short-term environmental benchmark and can be screened out as insignificant.

The maximum long-term process contribution is 4.04x10^{-5}µg/m^3 which is 0.02% of the long-term benchmark and this can be screened out as insignificant.

Polycyclic Aromantic Hydrocarbons (PAH), F (AQA Section 3.17)

AQA Table 34.

The assessment of PAH assumes that all of the emission is benzo[a]pyrene for comparison against the long-term Air Quality Standard. The nearest comparator for assessment of short-term impact assessment is naphthalene.

There is no short-term environmental benchmark for benzo[a]pyrene and the short-term assessment levels for naphthalene is used. The maximum short term process contribution is 0.79µg/m^3 which is 0.003% of the Air Quality standard. Scaling up for total PAH emissions at an estimated 50x, the modelled impact gives a process contribution of 3.96µg/m^3 which is 0.132% of the Air Quality Standard and can be screened out as insignificant.

The maximum long-term process contribution is 0.0081µg/m^3 which is 3.2% of the long-term benchmark and this cannot be immediately screened out and a further assessment stage is required. The Predicted Environmental Concentration (process contribution + background) is

47.2% of the Air Quality Standard which is below the 70% benchmark and the long-term impact can therefore be screened out as insignificant.

Nitrous oxide, N_2O (AQA Section 3.18)

For information the impact from emissions of nitrous oxide have been estimated. The short-term process contribution is 9.63µg/m^3 and the long term is 0.16µg/m^3. AQA Table 35. As no Air Quality Standard is available for this parameter, the impact has been compared with workplace exposure limits as a broad comparator and the resulting impact at 0.005% of the assessment level can be considered insignificant.

Plume visibility (AQA Section 3.19)

The plume from the ERF may under certain atmospheric conditions become visible due to water vapour in the flue gases condensing into water droplets as the plume cools after being discharged. The water droplets will evaporate to leave no visible plume. The time it takes the water droplets to evaporate is dependent on the prevailing weather conditions and the model provides a prediction of how long this will take. An assessment of the likely frequency of a visible plume being present and the visible plume length has been provided. The percentage of the year a visible plume is likely to be present (day or night) is a maximum of 3.7% with a maximum visible plume length of ca 200m. The percentage of the year where the visible plume length is predicted to extend beyond the site boundary is a maximum of 2.4%. A plume maximum length of ca 200m indicates the plume will largely be over industrial and commercial properties and not domestic residences.

The SEPA Plume Visibility Matrix indicates the predicted impact due to plume visibility can be considered insignificant.

5.2.1c The maximum impact from the EfW facility operating at the maximum short term emission limits under normal operational conditions, (AQA Section 5)

Short term maximum emission levels are also set in the permit for some continuously monitored parameters: particulate matter, oxides of nitrogen, oxides of sulphur, hydrogen chloride, total organic carbon and carbon monoxide, the model additionally assesses hydrogen fluoride. The assumed emission rates are at the 100th percentile short term emission limit as set out in Table 6.2 of the permit or the emission limit values set out in IED Annex VI Part 3, 1.2. AQA Table 42 summarises the emission limits modelled.

The maximum predicted concentrations are initially assessed as a worst case at the 100th percentile, AQA Table 43. Carbon monoxide, hydrogen fluoride, hydrogen chloride and total organic carbon (VOC) have process contributions less than 10% of their short-term assessment levels and therefore can be considered as insignificant.

Further assessment is carried out taking account of the percentile compliance required by the Air Quality Standard or Environmental Assessment Level for the worst year for impact, AQA Table 44. Oxides of sulphur 99.73rd percentile hourly averages and particulate matter 98.08th percentile hourly screen out as insignificant as the impact is less than 10% of the short-term assessment level.

The remaining two emissions, oxides of nitrogen 99.79th percentile hourly averages and oxides of sulphur 99.9th percentile 15-minute averages also screen out as the short-term process contribution is less than 20% of the assessment level minus the background, AQA Table 45.

The predicted short term impacts can therefore be screened out as insignificant.

5.2.1d The impact on air quality at sensitive receptors from the EfW Facility operating normally

Whereas 5.1.2 b and c above discuss the maximum impact at any location, the discussion below focusses on the impact at the sensitive receptors identified in Section 4.5 above. In

summary, unless the location of the sensitive receptor coincides with the point of maximum impact, the predicted impact at the sensitive receptor is less than the maximum impact discussed in 5.2.1b and 5.2.1c above.

For simplicity, Section 4 of the Air Quality Assessment lists receptors where the long-term impact (Annual Average) cannot immediately be assessed as insignificant either because the Process Contribution is less than 1% of the long-term assessment threshold. Full results are available in Appendix 1, Tables A1.3 – A1.11. The long-term impact at sensitive receptors is screened out as insignificant according to the second stage of the screening process.

For short term impacts, see section 5.2.1c.

Oxides of Nitrogen as NO_2 (AQA Section 4 Table 37, Appendix Table A1.3)

The maximum long-term process contribution at any sensitive receptor is 0.753µg/m^3 which is 1.9% of the long-term benchmark this cannot be immediately screened out and a further assessment stage is required. The Predicted Environmental Concentration, the PEC (process contribution + background) is 29.4% of the Air Quality Standard which is below the 70% benchmark and the long-term impact can be screened out as insignificant.

All predicted short – term process contributions at sensitive receptors are below 10% of the assessment level and can therefore be screened out as insignificant.

Oxides of Sulphur as SO_2 (AQA, Appendix Table A1.4)

All predicted short – term process contributions at sensitive receptors are below 10% of the assessment level and can therefore be screened out as insignificant.

All predicted long – term process contributions at sensitive receptors are below 1% of the assessment level and can therefore be screened out as insignificant.

Particulate Matter, PM_{10} and $PM_{2.5}$ (AQA, Appendix Table A1.5)

There is no short-term environmental benchmark for $PM_{2.5}$. All predicted short – term process contributions for PM_{10} at sensitive receptors are below 10% of the assessment level and can therefore be screened out as insignificant.

All predicted long – term process contributions for both $PM_{2.5}$ and PM_{10} at sensitive receptors are below 1% of the assessment level and can therefore be screened out as insignificant.

Volatile Organic Matter, VOC (AQA Section 4 Table 38 and 39, Appendix Table A1.7)

There is no assessment level for 'VOC' which is a mixture of organic compounds, therefore the assessment is based on running annual means for two potential constituents of the discharge: benzene and 1,3-butadiene. As a worst case it is assumed in the assessments below that all of the VOC emission is either benzene or 1,3-butadiene.

Benzene

The maximum long-term process contribution at any sensitive receptor is 0.0628µg/m^3 which is 1.9% of the long-term benchmark this cannot be immediately screened out and a further assessment stage is required. The Predicted Environmental Concentration (process contribution + background*) is 7.8% of the Air Quality Standard which is below the 70% benchmark and the long-term impact can therefore be screened out as insignificant.

*the higher background figure from Auchencorth Moss is used in this part of the assessment compared to Section 3 of the AQA.

1,3-Butadiene

The maximum long-term process contribution at any sensitive receptor is 0.0628µg/m^3 which is 2.8% of the long-term benchmark this cannot be immediately screened out and a further assessment stage is required. The Predicted Environmental Concentration (process contribution

+ background**) is 3.7% of the Air Quality Standard which is below the 70% benchmark and the long-term impact can therefore be screened out as insignificant.

**the higher background from DEFRA UK AIR monitoring is used in this part of the assessment, the same as Section 3 of the AQA..

Hydrogen chloride, HCl and hydrogen fluoride, HF, (AQA, Appendix Table A1.6)

The assessment levels for HCl and HF are based on SEPA guidance and are not Air Quality Standards.

All predicted short – term process contributions for HCl and HF at sensitive receptors are below 1% of the assessment level and can therefore be screened out as insignificant.

All predicted long – term process contributions for HF at sensitive receptors are below 1% of the assessment level and can therefore be screened out as insignificant.

Metals – cadmium and thallium (as cadmium) Cd, and nitrous oxide, N2O, (AQA Section 4 Table 41, Appendix Table A1.9)

As a worst case it is assumed in the assessments below that all of the emission is associated with release of particulate matter is cadmium.

Cadmium

All predicted short – term process contributions at sensitive receptors are below 1% of the assessment level and can therefore be screened out as insignificant.

The maximum long-term process contribution at any sensitive receptor is 0.00012µg/m^3 which is 2.5% of the long-term benchmark and this cannot be immediately screened out and a further assessment stage is required. The Predicted Environmental Concentration (process contribution + background) is 3.2% which is below the 70% benchmark and the long-term impact can therefore be screened out as insignificant.

Nitrous oxide

For information the impact from emissions of nitrous oxide have been estimated: the long-term process contribution at any sensitive receptor is 0.13µg/m^3. As no Air Quality Standard is available for this parameter, the impact has been compared with workplace exposure limits as a broad comparator and the resulting impact at 0.001% of the assessment level can be considered insignificant.

Metals – mercury, Hg and Group 3 metals (as lead) (AQA, Appendix Table A1.8)

All predicted short – term process contributions for Hg and Group 3 metals at sensitive receptors are below 10% of the assessment level and can therefore be screened out as insignificant.

All predicted long – term process contributions for Hg and Group 3 metals at sensitive receptors are below 1% of the assessment level and can therefore be screened out as insignificant.

Poly Chlorinated biphenyls (PCBs), dioxins and furans, D+F (AQA Appendix Table A1.11)

Dioxins and furans

the maximum predicted long-term process contribution (annual mean) at any sensitive receptor is *2.5x10^{-10} µg/m^3.There are no air quality strategy objectives or environmental assessment levels for dioxins (polychlorinated dibenzo-p-dioxins, PCDDs) or furans (polychlorinated dibenzofurans, PCDFs). Assessment of the health impact from Dioxins and Furans is carried out via the Human Health Risk Assessment (HHRA), described in Section 5.2.4 of the Decision Document.

*for context, this is 0.00000000000000025 grams per cubic meter.

PCBs

As a worst-case, this modelling assumes all of the emission is as PCB.

The maximum predicted short-term process contribution at any sensitive receptor is 9.13×10^{-9}µg/m^3 which is 0.00000015% of the short-term environmental benchmark and can be screened out as insignificant.

The maximum long-term process contribution at any sensitive receptor is 13.8×10^{-10}µg/m^3 which is 0.00000019% of the long-term benchmark and this can be screened out as insignificant.

Polycyclic Aromantic Hydrocarbons (PAH), (AQA Appendix Table 1.10)

The assessment of PAH assumes that all of the emission is benzo[a]pyrene for comparison against the long-term Air Quality Standard and naphthalene for comparison against the short-term Air Quality Standard.

All predicted short – term process contributions for PAH as naphthalene at sensitive receptors are below 10% of the assessment level and can therefore be screened out as insignificant.

The maximum long-term process contribution for PAH as benzo[a]pyrene at any sensitive receptor is 0.006µg/m^3 which is 2.5% of the long-term benchmark and this cannot be immediately screened out and a further assessment stage is required. The Predicted Environmental Concentration (process contribution + background) is 46.5% of the Air Quality Standard which is below the 70% benchmark and the long-term impact can therefore be screened out as insignificant.

Air Quality Monitoring Receptors, (AQA Section 6, Table 46)

Twelve local air quality monitoring locations are individually modelled to assess the impact from emissions of oxides of nitrogen and particulate matter from the ERF. At all of the locations the impact due to emission of oxides of nitrogen is below 1% of the long-term assessment level and is therefore considered insignificant.

One monitoring location also monitors particulate matter (Irvine High Street). The impact due to emissions of $PM_{2.5}$ and PM_{10} are below 1% of the long-term assessment level and are therefore considered insignificant.

Environmental Receptors (AQA Section 7)

Ecological receptors within a 15km radius which have the potential to be affected by air emissions from the ERF and which have specified Critical Levels or Loads have been identified for assessment. Receptors potentially affected by emission to air are discussed here, receptors which may be affected by emissions to water are discussed in sections 5.3.1 and 6 below.

Assessments have been carried out against Critical Level Values and Loads for oxides of nitrogen (NO_x), oxides of sulphur (SO_2), ammonia (NH_3) and Hydrogen Fluoride (HF).

Critical Levels Assessment – NO_x and SO_2, Table 48

The long-term (annual) Critical Levels for NO_x and SO_2 at all receptors except the Shewalton Sandpits (E3) is less than 1% and can be considered insignificant. The (annual) Critical Level for NO_x at the Shewalton Sandpits is marginally above 1%. However, the Predicted Environmental Concentration (process contribution + background) is less than 30% of the Critical Level and therefore the impact can be considered not significant.

The short-term (daily) Critical Levels for NO_x is less than 10% at all receptors and can be considered insignificant.

Critical Levels Assessment – NH_3 and HF, Table 49 NO_x and SO_2, Table 49
The long-term (annual) Critical Levels for NH_3 at all receptors is less than 1% and can be considered insignificant.
The short-term (daily and weekly) Critical Levels for HF at all receptors is less than 10% and can be considered insignificant.

Note - the Air Quality Assessment also includes an assessment of the cumulative impact from the ERF and a proposed Short Term Operational Reserve (STOR) facility at Shewalton Road. As the Planning Permission for the STOR has lapsed, this is not discussed here.

For further information on the impact at designated ecological receptors including Critical Load, see Section 6 below.

5.2.1e Scenario 4, The maximum impact from EfW facility operating under Abnormal Operating conditions as defined in Permit Table 6.2a.

Air Quality Assessment Section 5 Impact of short-term releases.

Under abnormal operating conditions, increased emissions of particulate matter, total organic carbon and carbon monoxide are permitted for a short period to allow the plant to take actions to return to normal operation or stop processing waste. The permitted limits for abnormal operation are set out in Table 6.2a of the permit and reflect the allowable abnormal emissions as defined in IED Annex VI Part 3, 2. Emissions for Total Organic Carbon and carbon monoxide are not allowed above the limits already discussed for short term emissions in 5.1.2b above and are not developed further here.

Short Term Impacts, Abnormal Emissions Assessment Table 3.

Assessment of the modelling results is initially carried out against the short-term assessment criteria as emissions should only be for a short period until the plant is returned to normal operation or waste feed is stopped.

Particulate matter. Emission at the maximum permissible rate results in a short-term impact remains below 70% of the assessment level and is screened out as insignificant.

Total Organic Carbon. The emission limit in permit table 6.2b is the same as the short-term emission limit modelled in 5.1.2b above (20mg/m^3) and the outcome is the impact is screened out as insignificant.

Carbon monoxide. The emission limit in permit table 6.2b is the same as the short-term emission limit modelled in 5.1.2b above (100mg/m^3) and the outcome is the impact is screened out as insignificant.

Further parameters are modelled at plausible emission rates to inform on the potential impact. This is for illustrative purposes only: emissions above the permitted emission limit values would prompt immediate action to rectify the plant or stop waste incineration within a maximum of four hours.

Oxides of nitrogen. The emission limit in permit table 6.2b is the same as the short-term emission limit modelled in 5.1.2b above (400mg/m^3) and the outcome is the impact is screened out as insignificant. An estimate of the impact at 500mg/m^3 emission concentration is provided: the short-term impact remains below 70% of the assessment level and remains insignificant.

Oxides of sulphur. An estimate of the impact at 450mg/m^3 emission concentration is provided (normal short-term maximum 30mg/Nm^3), this assumes no acid gas abatement is taking place: the short-term impact remains below 70% of the assessment level and remains insignificant for

the daily and hourly assessment levels. The short-term impact for the 15-minute average is above 70% of the assessment level but is not predicted to breach the assessment level. This estimation assumes a number of worst-case scenarios coincide including worst dispersion conditions and wind direction and no acid gas abatement which is very unlikely.

Hydrogen chloride. An estimate of the impact at 990mg/m^3 emission concentration is provided (normal short-term maximum 60mg/Nm3), this assumes no acid gas abatement is taking place: the short-term impact remains below 70% of the assessment level and remains insignificant.

Hydrogen fluoride. An estimate of the impact at 20mg/m^3 emission concentration is provided (normal short-term maximum 1mg/Nm3), this assumes no acid gas abatement is taking place: the short-term impact remains below 70% of the assessment level and remains insignificant.

Metals. An estimate of the impact at 30 times their normal emission concentration is provided, this assumes reduced particulate abatement is taking place: the short-term impact remains below 70% of the assessment level and remains insignificant.

Long Term Impacts, Abnormal Emissions Assessment Table 4.

Assessment of the effects on long-term emissions is estimated by assuming abnormal operation for 60 hours per year (the total length of time allowed under abnormal operation as expressed in IED Article 46 (6)) and normal operation for the remaining 8700 hours. A small increase in the estimated impact for each parameter is predicted and the impact is discussed below.

Oxides of nitrogen. The Predicted Environmental Concentration, the PEC (process contribution + background) is 30.5% of the Air Quality Standard which is below the 70% benchmark and the long-term impact can be screened out as insignificant.

Particulate matter. The maximum long-term process contribution assuming all of the particles are PM2.5 is 0.05µg/m^3 which is 0.5% of the long-term benchmark this can be screened out as insignificant.

Note - the long term Predicted Environmental Concentration, (process contribution + background) is 78% which is above the 70% benchmark. This is due to a high background concentration: the overall predicted concentration remains below the Air Quality Standard and the contribution from the Oldhall ERF is 0.05µg/m^3 and represents a negligible change in air quality.

Hydrogen chloride. The maximum long-term process contribution is 0.10µg/m^3 which is 0.5% of the long-term benchmark this can be screened out as insignificant.

Hydrogen fluoride. The maximum long-term process contribution is 0.01µg/m^3 which is 0.06% of the long-term benchmark this can be screened out as insignificant.

Metals – cadmium and thallium. As a worst case it is assumed in the assessments below that all of the emission is associated with release of particulate matter and cadmium and thallium are 50% of the emission.

Cadmium. The maximum long-term process contribution is 0.0001µg/m^3 which is 2.0% of the long-term benchmark and this cannot be immediately screened out and a further assessment stage is required. The Predicted Environmental Concentration (process contribution + background) is 2.7% which is below the 70% benchmark and the long-term impact can therefore be screened out as insignificant.

Thallium. The maximum long-term process contribution is 0.0001µg/m^3 which is 0.01% of the long-term benchmark this can be screened out as insignificant.

Metals – mercury. The maximum long-term process contribution is 0.00027µg/m^3 which is 0.11% of the long-term benchmark, this can be screened out as insignificant.

Metals – Group 3 – antimony (Sb), arsenic (As), lead (Pb), chromium (Cr), cobalt (Co), copper (Cu), manganese (Mn), nickel (Ni) and vanadium (V). The assessment is carried out on this metals group assuming the abnormal emission is 30 times the normal emission level.

The impacts for antimony, lead, chromium, cobalt, copper, manganese and vanadium can be immediately screened out as the process contribution is below 1% of the long-term assessment level. Arsenic and nickel can also be screened out on the basis that the Predicted Environmental Concentration is less than 70% of the long-term assessment level.

Dioxins and dioxin like PCBs. Abnormal Emissions Assessment Table 5. It is assumed the abatement system will be 99% effective in removing these materials from the flue gases. The abnormal emission level has therefore been increased 100 times to model the emission impact assuming no abatement. This is a conservative assumption. This increases the impact by 68% and, when the increase in exposure is taken into account in the Health Impact Assessment, the overall exposure for the most sensitive receptor remains below the tolerable daily intake. Note – the tolerable daily intake is dominated by the background exposure.

5.2.2 Point source emissions to air: Emergency Generator

Medium Combustion Plant Emissions

Emissions to air will be generated from one medium combustion appliance i.e. a combustion appliance with energy input in the range 1 – 20 MW thermal input (MW_{th}). The 3.765 MW_{th} diesel emergency backup electrical generator automatically starts in the case of electrical supply failure to provide sufficient electricity to allow the safe shut down of the facility. The generator is fuelled by gas oil and is a self-contained containerised unit, acoustically shielded.

Other than for testing once per month for a short period up to a maximum of one hour, the appliance will operate very infrequently only in the case of electrical supply failure and only for the minimum period required to safely shut down the plant which is anticipated to be around four hours. The anticipated operating hours per year are therefore very low.

BAT for new medium combustion plant diesel engines operating up to 500 hours a year on a PPC installation requires that the engine must be optimised for reduced emissions (an ‘emissions optimised’ engine) where emissions meet 2g TA Luft guidance which requires that emissions of oxides of nitrogen are limited to less than 2,000mg/m^3 at 5% oxygen. The proposed emergency backup engine meets this criterion.

5.2.3 Human Health Risk Assessment

Information source Human Health Risk Assessment V6

It is a requirement for a PPC application for a waste incineration activity that an assessment of the specific risks to human health are considered. A human health risk assessment (HHRA) has been provided in Appendix D of the application Air Quality Assessment of the Application and a revised Human Health Risk Assessment submitted in response to update of the Air Quality Model.

The dispersion modelling study on which the HHRA is based assumes the worst-case operational scenario with all pollutants emitted at the permitted ELVs with additional comparison made to impacts at 'typical' emission rates for group 3 metals.

The HHRA is based on the US EPA Human Health Risk Assessment Protocol for Hazardous Waste Combustion Facilities. This methodology takes into account the impact of emissions of dioxins and furans, and dioxin-like PCBs from the consumption of potentially contaminated

locally grown foodstuffs due to emissions to atmosphere from the stack of the ERF to assess the potential risk to health of people living and working in the locality of the ERF. The assessment assumes an individual would always be present at the receptor location and would consume only food sourced local to the facility. Therefore, each part of the assessment is conservative in assuming and considering worst case emissions.

The assessment outcomes indicate that exposure to dioxins and furans in emissions from the facility at the point of maximum impact across the modelled area is likely to present a low risk to health for the local population. The Tolerable Daily Intake (TDI) is very small at less than 1% of the 2 picogrammes* per kilo TDI for adults. The TDI for children is lower and contributions are predicted to be 2.7 % of the TDI.

When dioxin-like PCBs are included in the assessment, the contribution to the Tolerable Daily Intake (TDI) remained very small at less than 1% of the 2 picogrammes* per kilo TDI for adults. The TDI for children is predicted to be 4.1 % of the TDI.

Exposure to emissions of Poly Aromatic Hydrocarbons (PAH) have been assessed using the health-based air quality standard of 0.25 nanograms* per m^3. The outcome indicates that Process Contributions would generally equate to less than 2.5% of the standard and the health risks associated with emissions of PAH are therefore not significant.

The HHRA has been assessed by a Human Health Specialist with the assessment conclusion being that SEPA is satisfied that the conclusions drawn in the HHRA are supported by the assessment and that no significant risk to human health is presented by the proposed activities.

The advice from health specialists such as Health Protection Scotland and the Health Protection Agency (now Public Health England) is that any damage to health from waste incineration plants is likely to be very small and probably not detectable.

* For context, a picogramme is 1 x 10^{-12} grams or 0.000000000001g, and a nanogram is 1x 10^{-9} grams or 0.000000001g

5.2.4 Fugitive emissions to air:

Information relevant to the fugitive emissions to air from the installation is provided in the Odour Management and Mitigation Strategy document and in Supporting information 2.4.2.

The applicant has carried out a review of the design of the proposed Facility in order to identify potential fugitive emissions to air from the plant and the appropriate mitigation measures required to minimise their release. These sources and techniques identified include:

- Vehicles transporting materials to and from the facilities will be appropriately enclosed or covered to minimise fugitive emissions of dust from material delivery vehicles. Where practical, emissions will be back balanced to the vehicle to eliminate emissions to atmosphere.
- Waste reception operations that have the potential to give rise to dust emissions will be carried out within enclosed buildings equipped with odour and dust extraction. This includes the tipping of waste into the waste storage bunkers and movement of the waste to the incinerator chute.
- Additional measures including fast acting roller shutter doors and management procedures to require regular cleaning of the waste reception areas will minimise the release of litter and dust.
- Raw material tanks and silos will be fitted with suitable emission control systems (dust filtration, high level alarms, overfill protection, delivery via closed coupling pipe connections

etc.) which will be appropriately inspected, managed and maintained according to the planned preventative maintenance programme.

- Systems for removal of residual materials from the combustion process including enclosed and extracted pipework systems for loading APCr dry solids into vehicles for removal and loading of water dampened IBA into transport vehicles inside the process building.
- Process buildings will be constructed to a standard which minimises emissions to air from the building structure. The air tightness of the buildings will be tested prior to acceptance of waste to demonstrate that fugitive emissions are minimised.
- Primary combustion air for the facility will be drawn from the waste bunker area to maintain negative pressure and ensure capture of potentially odorous air. See Section 5.2.5 for further details of odour control systems.
- Emergency response procedures will be in place with trained personnel, equipped to implement containment and clean up measures in the event of a spillage or loss of containment.
- Monitoring will be carried out to identify unanticipated odour or dust emission and implement any necessary remedial action.

The review of potential fugitive releases to air is considered to be robust and the techniques described in order to minimise their release in terms of the proposed design are determined to represent BAT.

Permit: Pre-operational conditions requires that the final design of the odour abatement system is confirmed (condition 2.8.12) and that the air tightness of the building is demonstrated (conditions 3.2.9 – 3.2.11) prior to receipt of odorous materials.

The management, performance and maintenance of the proposed EfW facility including the measures designed to prevent and mitigate fugitive releases to air will be reviewed against the overriding regulatory requirement that 'all the appropriate preventative measures are taken against pollution, in particular through application of the best available techniques'. The implementation and adequacy of the above techniques, systems and procedures will be confirmed at commissioning as required by condition 2.9.2 j) with ongoing compliance and any potential for improvement to be assessed through inspection. Standard Conditions are included in section 3.2 including the requirement for an odour management plan (3.2.2). Section 3.5 includes the requirement to prevent and minimise the escape of dust and litter.

Emissions from the discharge point for the standby odour abatement system are discussed in Section 5.2.5 below.

5.2.5 Odour

Supporting information 2.4.2, 2.4.7, Odour model V3 and Odour management and mitigation strategy r2.

Odour prevention and mitigation

Control of odour impact is achieved through implementation of several techniques and measures as described below.

Process buildings containing odorous materials will be constructed to minimise air leakage and will be subject to Building Standards testing for air tightness and to smoke testing prior to operation. This will identify any areas where fugitive air leaks may contribute to odour impact. Buildings containing odorous materials will be subject to air extraction and abatement.

The waste reception area is fitted with two fast acting roller doors to allow vehicle access and egress. The doors will open only for the time necessary to allow vehicle access or egress and

will close during waste delivery. To prevent tunnelling of air through the waste reception area, a condition has been included to prevent both vehicle doors being open at the same time, condition 3.2.6. A software interlock will be designed into the control software to comply with this requirement. Personnel doors into the odour controlled area will remain closed when not in use.

Odorous waste delivered to the facility in covered vehicles or produced by the facility will be stored and handled within odour controlled areas.

Control and management procedures for waste reception and waste handling will include controls to ensure odour emission and impact is prevented. All incoming waste will be delivered by enclosed road vehicles suitable for bulk transport of non-hazardous waste. Action will be taken to avoid vehicles being held on site outside the odour control area for long periods waiting to deposit waste. Waste will be received into the enclosed and extracted waste reception area and delivered into the waste reception bunker. A small negative air pressure is maintained in these areas by the odour abatement systems to reduce the risk of odorous air losses from the building. Waste will occasionally require to be unloaded from vehicles on to the waste reception area floor prior to entry into the waste reception bunker for inspection. As the waste reception area is extracted and maintained under slightly negative pressure, spreading out odorous waste outside the bunkers but inside the odour controlled area will not result in odour emission.

Air extraction and Odour abatement

BAT for odour extraction and abatement systems is described in SEPA's odour guidance. In summary the system must deliver a minimum of three air changes per hour in the odour control area and treat and disperse the residual odour such that the impact at sensitive receptors is less than the indicative criterion for the relative offensiveness of the odour. Given that residual waste from Municipal Solid Waste can be considered as a More Offensive odour, the indicative criterion for assessment against is 1.5 OUe/m^3 as a 98^{th} percentile of hourly averages. Where hypersensitive receptors are present, this criterion may be reduced to 1.0 OUe/m^3. A criterion of 1.5 OUe/m^3 is selected to assess the outputs from dispersion modelling.

During normal operation with the incinerator treating waste, odorous air from the waste reception and storage areas will be extracted by the incinerator to be used as primary combustion air. Extracted odorous air will therefore be thermally treated as part of the incineration flue gases prior to eventual discharge via the incineration stack. The Industrial Emissions Directive (IED) requires that any combustion gases passing through a waste incineration plant must be held at 850^oC for at least two seconds. This temperature and residence time is designed to denature pollutants and will effectively denature most of the odorous chemical species present. Further treatment of the flue gases with activated carbon in the flue gas treatment system will further reduce the odour content of the final flue gases prior to discharge from the incineration stack.

A standby carbon absorption-based odour abatement system will also be available for periods when the incineration process is not operational, and odour abatement needs to be carried out i.e. when there remains odorous waste on site. The standby system is designed to treat up to ca 66,000m^3/h of odorous air to less than 900 OU_e/m^3 (European odour units per cubic meter of air discharged) for discharge via the 43m odour abatement stack.

The air flow through the odour control area will be designed to allow fresh air to be drawn in via the vehicle doors when they are open or via compensation vents when they are closed. Compensation vents are weighted such that when the vehicle doors are open, the compensation vents close until they are required again when the vehicle doors close to avoid air leakage from the vents. Air from the waste reception area is then drawn through the waste storage areas and into the incinerators or standby odour abatement system. In this way the fresh air progresses

through different operational areas collecting increasing amounts of odour whilst maintaining the air in the waste reception area with as low an odour concentration as possible. A well designed and controlled odour extraction system which maintains the air in the reception area at as low an odour concentration as practical will reduce the risk of odour release due to the opening and closing of the large vehicle doors.

The flow of primary combustion air into the incinerator at an incineration throughput of greater than 85% is sufficient to ensure three air changes per hour within the odour control area. When incineration is operating at a throughput of less than 85% of design, the incineration process does not consume sufficient primary combustion air to achieve three air changes per hour in the odour control area, and the standby odour abatement system will require to operate at the same time to ensure three air changes are achieved. Condition 3.2.7 requires that the standby system must be in use when the incineration process is operating below 85% throughput to ensure a sufficient air extraction rate to achieve three air changes per hour.

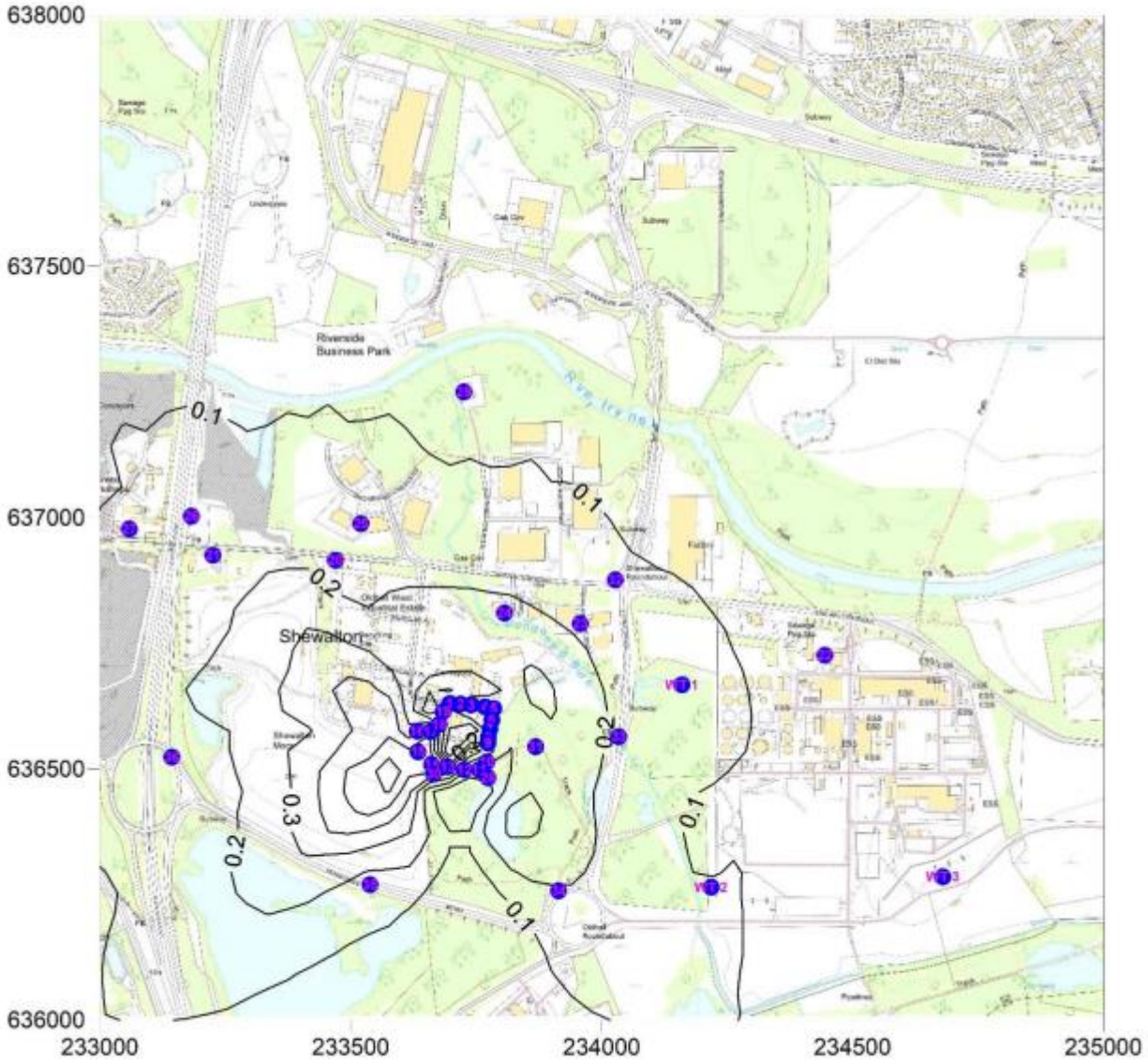
The extracted flowrate in each case above will result in at least three air changes per hour and ensure that the odour controlled waste handling areas are maintained at slight negative pressure in line with guidance and BAT.

Odour Impact Modelling

Odour impact modelling for emissions from the standby odour abatement system has been carried out as a worst case and this confirms that the predicted impact at nearby sensitive receptors will be below the selected assessment criterion of 1.5 OUe/m^3 as a 98^{th} percentile which meets guidance expectations. This odour impact model assumes as a worst case that there is a discharge from the standby odour system stack at design flow and emission rates for the whole year whereas the standby odour abatement system should operate for only short periods over the course of the year and deliver lower output odour concentrations than the design guarantee. The stack height is modelled at +3m above the height of the highest nearby building, the boiler hall.

Figure 6 reproduced below shows graphically the modelled extent of the predicted odour impact. It should be noted that the largest contours are for a modelled odour impact of 0.1 OUe/m^3, well below the assessment criterion. The 1.5 OUe/m^3 assessment criterion contour is at or inside the site boundary. The area where an impact above 1.5 OUe/m^3 as a 98^{th} percentile is anticipated therefore does not extend beyond the site boundary and the highest predicted impact outside the site boundary is 0.5 OUe/m^3, significantly below the assessment criterion and also below the indicative criterion for hypersensitive receptors. Worst worst-case modelling at the 100^{th} percentile also indicates that receptors outwith the site boundary should not experience odour above the assessment criterion. The detailed results from modelling are provided in Table 8 of the Odour Modelling report.

Figure 6 98th Percentile Hourly Average Odour Concentration (OU_E m^{-3}) 2016 Meteorological Conditions



The applicant has provided information to support that the odour control systems will meet BAT expectations and result in a modelled impact of less than 1.5 OUe/m^3 at the nearest sensitive receptors which is in line with guidance and BAT.

Final detailed design of the standby odour abatement system is under development and will be required to be confirmed through a submission to satisfy pre-operational conditions 2.8.12. and 2.8.25. Performance of the odour abatement system will be validated during commissioning, condition 2.9.2 j). An Odour Management Plan is required to be in place before any odorous materials are on site (condition 3.2.2) and that plan must include the proposals for undertaking olfactory monitoring surveys during normal and abnormal conditions (condition 3.2.3). Notification to SEPA is required when the odour abatement system is unavailable (condition 3.2.8) and the abatement system must have a support regime of checks, inspection and maintenance to ensure it functions as required (condition 3.2.12).

5.2.6 Air Emission Limits and Monitoring Frequency

Monitoring and Emission Limits During Normal Operation

Emissions to air from the incineration process may be monitored continuously by a Continuous Emissions Monitoring system (CEMs) or periodically by an external monitoring company or by both methods. IED Part 6 specifies parameters which require to be monitored continuously and those which require to be periodically monitored. Parameters which are monitored by CEMs are also periodically monitored.

The application confirms which parameters will be monitored and at what frequency (Supporting Information 1.3.7). In the draft permit monitoring is also specified for carbon dioxide and polybrominated dioxins and furans. It is planned that energy from waste facilities will become part of the Emissions Trading Scheme (ETS), and monitoring of carbon dioxide emissions will be necessary. Trace quantities of Waste Upholstered Domestic Seating and other wastes containing bromine based fire retardants may be present in in the residual waste fuel and monitoring for polybrominated dioxins and furans is required to inform on the emission levels of these materials which may be generated during incineration.

The application also confirms that the CEMs installation will be designed to comply with relevant guidance for monitoring systems (EA M1 Guidance and BS EN 15259) (FIN Response 18) and the monitoring instruments will be MCERTS approved (Supporting Information 1.3.7) and this aligns with permitting requirements. The final detailed design and specification of the CEMs system will be confirmed via prior operating permit condition 2.8.8. Condition 2.8.8 also requires the arrangements for periodic monitoring to be submitted.

For hydrogen fluoride, periodic monitoring may be used where treatment stages are in place which ensure that the emission of hydrogen chloride is not being exceeded. The ERF CEMs monitoring system adjusts the flue gas treatment lime addition system to ensure hydrogen chloride is controlled to within permit limits and therefore continuous monitoring of hydrogen fluoride is not proposed.

For mercury and dioxins and furans, emissions may be measured periodically if the emissions are stable and low. If they are not proven stable and low, then continuous or long-term monitoring is required. Accelerated periodic monitoring is required early in operation to generate the data required to assess whether continuous monitoring is required or not. The Environment Agency protocols will be used to assess the monitoring results, and these require six periodic monitoring results in a row which are below the protocol limits to demonstrate that emissions are low and stable and therefore periodic monitoring is sufficient. The permit requires accelerated periodic sampling and adherence to the protocols. Should the accelerated periodic testing indicate that continuous or long term monitoring is required then the permit will be varied to include this requirement.

Monitoring frequencies and emission limits for discharges to air for the incineration process have been determined according to the limits as set out in either the IED Regulations, the BRef or the BAT – Associated Emission Limits (BAT-AELs) in the BAT Conclusions document whichever has the lower limits.

IED Annex VI Part 3 lists limits which apply to incineration processes including daily, 30 minute and 10 minute averages. The waste incineration BAT conclusions reviewed and revised the daily averages to set new, lower BAT-AELs which are used to set ELVs in the permit. Where a BAT-AEL range is defined, the upper end of the range is selected as the facility is not in operation and the actual emission performance has yet to be confirmed. When sufficient

operational emissions data is available, emission limits may be reviewed and reset to reflect the demonstrated performance of the facility.

Odour emissions from the odour abatement stack are periodically monitored to ensure the emission is within the design performance level. No significant odour is anticipated from the incineration stack due to the process conditions effectively denaturing odorous species in the flue gases.

Monitoring and Emission Limits During Other Than Normal Operation (OTNOC)

BAT Conclusion 5 requires that monitoring is periodically carried out during planned startup and shutdown operations every three years including for dioxins and furans. An OTNOC Management Plan is required by condition 5.4.6 and this must contain plans for OTNOC monitoring during startup and shutdown, condition 5.4.6 e). CEMs will continue to monitor emissions during OTNOC operation. SEPA will review the OTNOC Management Plan to ensure the necessary periodic monitoring is defined and carried out.

The IED allows continued operation for a period of no longer than 4 hours per instance or a cumulative period of 60 hours per year in the case where emission limit values are exceeded due to certain circumstances (Article 46 6). During such periods the limits in IED annex VI Part 3 2 apply. These are incorporated into table 6.2a of the permit and condition 5.2.2, 5.2.4 and 5.2.5.

See Appendix C for additional details.

5.2.7 Incineration Technology Selection

Supporting information reference 2.6.1, Appendix E submission and the response to Further Information Notice Questions 13 and 7.

Supporting Information discusses the benefits and limitations of a range of potential combustion technologies and initially narrows down the viable options to grate, conventional fluidised bed and rotary kiln incinerator types. Each of these techniques has the capability of treating the waste in a manner which meets the requirements of the IED, the BRef and BAT conclusions. Taking into account the robustness of operation, waste fuel type, energy efficiency, emissions and residue production and capital and operating costs, moving grate furnace technology had been proposed as the optimal technology for this facility. This is the leading (most common) furnace technology in use in Scotland and is accepted as appropriate for this facility.

Computational Fluid Dynamics (CFD)

CFD modelling of the incinerator design is provided to demonstrate that the requirements of IED Article 50 2. will be met and that at worst case operational conditions, the flue gases will be subject to a temperature of at least 850°C for a residence time of 2 seconds. CFD can also be used to indicate whether there will be sufficient oxygen in the flue gases to promote good combustion: this is a residual oxygen level of ca 6%v/v dry gas basis.

Worst case operational conditions are at the minimum waste throughput rate. CFD modelling at worst case conditions is calculated to result in a flue gas residence time of 2.9 seconds at 850°C at a calculated oxygen level of 7%v/v dry basis. At the design throughput the residence time increases to 5.3 seconds. The requirements of BAT are therefore met.

CFD modelling of the final design is required through permit condition 2.8.6 to confirm the incineration unit as installed will continue to meet BAT requirements. Permit condition 2.9.2 also requires that tests are performed to demonstrate that the residence time above 850°C is greater

than 2 seconds. Condition 2.8.7 requires the test methodology proposed to measure the residence time to be submitted to SEPA in advance of the testing.

5.3 Emissions to Water

5.3.1 Point Source Emissions to Surface Water and Sewer

Supporting information 2.4.3 discusses point source emissions to water. This information has been superseded by later discussion. Originally all wastewater including excess process effluent and surface water was designed to be discharged to the combined sewer. A design change is necessary which now requires that low risk uncontaminated surface water be discharged after treatment to an unnamed tributary of the adjacent Dundonald Burn. Excess process effluent and higher risk surface waters will still be discharged to the local sewer. The final detailed design for this change to surface water drainage is still being developed.

The two wastewater discharges from the facility are referenced in Table 7.1 of the draft permit:

- W1 – excess process effluent, contaminated surface water and foul water to combined sewer
- W2 – low risk surface water to an unnamed tributary leading to the Dundonald Burn

Surface water from the facility is marshalled into three streams:

- Surface water from areas where there is a potential risk of contamination is collected and following treatment in an oil interceptor and silt separator, is discharged to the Scottish Water combined sewer via W1. This includes surface water from delivery and loading areas, and areas where vehicles may routinely stand such as the waste reception area etc.
- Surface water from lower risk roadway areas is collected and treated in an oil interceptor and silt separator, mixed with roof water and co-discharged via W2 to a tributary of the Dundonald burn.
- Surface water from roof areas is separately collected, treated in an oil interceptor and silt separator and co-discharged via W2 to a tributary of the Dundonald burn along with the other surface water from low risk roadway areas.

<u>W1</u>

Effluent generated from the process activities carried out at the site are reused on site where practical. Excess process effluent is collected in a dedicated drainage system, treated to remove oil and solids, combined with the treated higher risk surface water and discharged as a single stream to the Scottish Water combined sewer. Wastewater discharged to the combined sewer is routed to the Meadowhead wastewater treatment works and will be controlled by a Trade Effluent Consent issued by Scottish Water. The operational Trade Effluent Consent is not set in place until construction is near completion therefore a pre-operational condition requires submission of the Trade Effluent Consent, condition 2.8.26. The discharge to sewer is equipped with an isolation valve which can be remotely closed.

<u>W2</u>

Low risk surface water from roofs joins the low risk roadway surface water and after treatment is discharged as a single stream to a tributary of the Dundonald Burn at an attenuated flow. Lined offline SUDs ponds are designed into the drainage system to temporarily store on site any excess surface water above the design attenuated flow until it can be discharged. The outline SUDs design including treatment of each of the low risk surface waters for oil and solids,

attenuation and ability to isolate is suitable to satisfy the SUDs mitigation indices for each source.

The attenuated discharge flowrate is limited to the calculated greenfield runoff rate for the site therefore the impact on the watercourse from surface water is the same as if there was no development at the site.

Final detailed design of the system for management of surface water is under development and a permit pre-operational condition is included in the draft permit, 2.8.14 to require submission of the final design.

The Dundonald Burn has a geological SSSI feature at its confluence with the River Irvine downstream of the point where the discharge from this facility joins the burn. Therefore, the discharge from this facility will pass through that designated feature. See section 6 for further discussion.

Appropriate measures will be designed into the drainage system to ensure the surface water is marshalled, monitored and treated as necessary prior to discharge during normal operation and incident scenarios. Isolation valves are incorporated into the drainage design at various points which allow all drainage from the facility to be isolated if required.

Emission limits and monitoring requirements are defined for the surface water discharge to the Dundonald Burn to protect water quality and the SSSI, permit Table 7.1.

Firewater can be held in the waste fuel bunkers and adjacent firewater containment basin and is not anticipated to reach the surface water system. Should the containment capacity for firewater be exceeded and/or firewater be released to surface water such as from a vehicle fire on the roadway, surface water from roadways can be redirected to the firewater containment basin if required and the surface water flow to the Dundonald Burn and to the combined sewer can be isolated to prevent accidental releases from the activity being discharged into the water environment.

Drainage pipework, pits, sumps and structures will be subject to several checks and tests during construction to confirm they have been installed correctly and testing and inspection will continue through the life of the permit to ensure that they remain fit for purpose, conditions 2.8.25, 7.5.7 and 7.5.11 apply.

The BATc interpretation document indicates specific monitoring for water pollutants if ‘ash treatment’ is carried out at the facility. ‘Ash treatment’ does not include simple quenching of the incinerator bottom ash with water. The BATc emission limits to water for facilities which carry out ash treatment therefore do not apply. Any excess process effluent from the IBA quench system will be removed by tanker from site as waste to be treated in an appropriate offsite waste management facility and will be subject to the normal Waste Management Licensing controls applied to waste transfers.

Conditions in section 7.1 – 7.5 of the draft permit set out the controls on wastewater discharges. Controls are applied to require monitoring of the discharged wastewaters based on a typical TEC for similar projects. These controls will be reviewed when the final drainage design, SUDs design and operational Trade Effluent Consent is submitted to ensure they remain appropriate.

5.3.2 Point Source Emissions to Groundwater:

There are no point source emissions to groundwater proposed from this installation of List I & II substances or any other substances present on site. Techniques to limit pollution to soil and groundwater due to fugitive emissions are described across the application in relation to

measures to ensure containment of liquids e.g. in sections 1.1.3.1 and 1.3.11.1 of the Supporting Information.

Accidental discharges are not considered as point sources and steps to minimise probability and consequence of a loss of containment incidents are dealt with in section 5.7.3 (Accidents and Their Consequences) below.

All waste handling activities such as waste reception, storage of waste in the waste bunkers and bottom ash storage will be carried out over impervious surfaces or in impervious structures which incorporate measures to prevent the passage of pollutants direct to groundwater.

The application confirms that all impervious surfaced areas where materials with a pollution risk are handled including waste handling and storage areas and tanker delivery facilities are designed in accordance with BS EN 1992-3: Design of concrete structures — liquid retaining and containment structures and compliant with SEPA Pollution Prevention Guidance and CIRIA 736: Containment systems for the prevention of pollution. During construction, storage facilities and drainage will be tested to confirm they are watertight.

Residual waste fuel has the potential to generate leachate, and the above ground waste fuel bunkers are therefore designed to prevent release of liquid into ground / groundwater. Provisions have been included in the design to manage any excess leachate or other liquids such as firewater captured in the bunker.

The IBA bunker and associated settlement pits extend below ground level and the water table is high in the location of the site. The civil engineering construction design is to the same standard as noted above and includes measures to prevent infiltration of groundwater into the bunker as well as release of liquids out of the bunkers. The IBA bunker and associated drainage to collect and route any leachate from the quenched ash will be subject to a routine inspection programme to confirm integrity is maintained. Infiltration of groundwater into the bunker should be detectable via visual check.

The waste fuel bunkers and adjacent firewater bunker may be used for storage of firewater generated due to a fire in the tipping hall or a fire directly involving the waste in the bunker. Firewater containment measures are discussed further in Section 5.7.3 Accidents and their consequences.

Liquid materials presenting a pollution hazard will be held in vessels with integral secondary containment or in bunded storage facilities also engineered to BS EN 1992-3 to prevent loss to drains or to ground/groundwater during delivery, storage or use of these materials.

Standard permit conditions for the protection of soil and groundwater have been incorporated into the permit in Schedule 7.6. These prohibit the emission of pollutants to groundwater or soil from the Permitted Installation (condition 7.6.1). Additional control measures are also included in the groundwater monitoring requirements to ensure that there is no loss of containment from drainage systems or storage vessels including those associated with waste fuel and IBA storage.

In addition, Prior Operating Conditions are included to confirm the drainage details discussed above, these are considered sufficient to control this aspect. Refer to Section 5.3.2 for further details of techniques to prevent fugitive emissions to groundwater.

5.3.3 Fugitive Emissions to Water:

Techniques to limit pollution to soil and groundwater due to fugitive emissions are described across the application in relation to measures to ensure containment of liquids e.g. in sections

1.1.3.1 and 1.3.11.1 of the Supporting Information. Fugitive emissions to water will be minimised through use of the following techniques:

- The majority of process equipment / structures are located inside fully enclosed buildings therefore solid or liquid contact pollutant with surface water, groundwater and soils is prevented;
- Internal areas of hardstanding where polluting substances are handled or stored and underground structures e.g. the waste bunkers and the ash bunkers are designed in line with appropriate standards as discussed above, to prevent emission of pollutants into groundwater or soil. Drainage from the internal areas of hardstanding will be to a contaminated wastewater pit for collection and reuse or disposal;
- External areas of site will be constructed largely of impermeable hardstanding. Surface water from the lower risk areas will be treated in a SUDS system as discussed in 5.3.1 above prior to discharge to a tributary of the Dundonald Burn;
- The gas-oil storage tank and the urea storage tank will be located in 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 urea and any accumulation in the storage bunds will be segregated from the general surface water run-off from uncontaminated yard areas and discharged to combined sewer;
- Liquid containing storage tanks will be in covered areas 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. 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, inspections 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 in a concrete bunker extending underground. The IBA bunker has a dedicated drainage system and any run-off/leachate from the IBA will be collected for reuse in ash quenching;
- APCr is stored inside an external but fully enclosed silo and loading into tankers for removal from site will be carried out in an area from which surface water is discharged to the combined sewer after treatment; and,
- Housekeeping procedures will also ensure that any spills are cleaned up promptly and spill response equipment will be located on site at appropriate points.

The techniques described above will be compliant 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 2.8.25 d) and f) have been included in the permit to provide final design 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. This will prevent the external storage of any waste which may present a potential source of odour, fire risk, or which may attract vermin or could result in fugitive emissions to surface 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'. Firewater containment measures are discussed further in Section 5.7.3 Accidents and their consequences.

5.4 Noise

Supporting information 2.4.6 and Further Information Notice Question 8 response describes general measures to prevent or minimise noise emissions from the proposed facility during normal and abnormal operational conditions including the selection of equipment with inherently lower noise output and plant rooms designed to take account of the acoustic emissions from the contained equipment. Noise sources are identified, and mitigation measures are described. A noise assessment was included in the original application and further information was requested including to provide details of the turbine hall construction. As the project was at an early design stage, limited information was available at the time. Additional information was provided in November 2023 on the design of the turbine hall construction and a revised Noise Impact Assessment submitted which takes account of the updated design of the turbine hall.

The extract below from the revised assessment indicates that, with the exception of NSR01, the noise impact is predicted to be lower than the current measured background sound level during both day and night at the closest sensitive receptors. At NSR01 the unrated impact is predicted to be 2-3dB above background. The predicted specific rated night-time noise impact of 40dB at the 1st floor of The Haven (34dB at Woodside Cottage, and 33dB at The Woods) is viewed as reasonable in the context of the area. However, where specific sound from an installation is readily identifiable as ‘industrial sound’ SEPA typically expect a +3dB character rating correction to be applied. By not applying any rating penalty, the Applicant is stating that sound emissions from the plant will have no noticeable character at the nearby residential receptors.

Prior operational conditions have been inserted into the draft permit including to confirm the final arrangements for control of noise impact to take account of any changes since the November 2023 submission, condition 2.8.11. Validation of the predicted noise impact is required through a requirement to monitor noise when in operation and to address any uncertainties in the noise assessment, condition 3.1.6.

A requirement to develop and implement a Noise and Vibration Management Plan is also included in the draft permit, Condition 3.1.1.

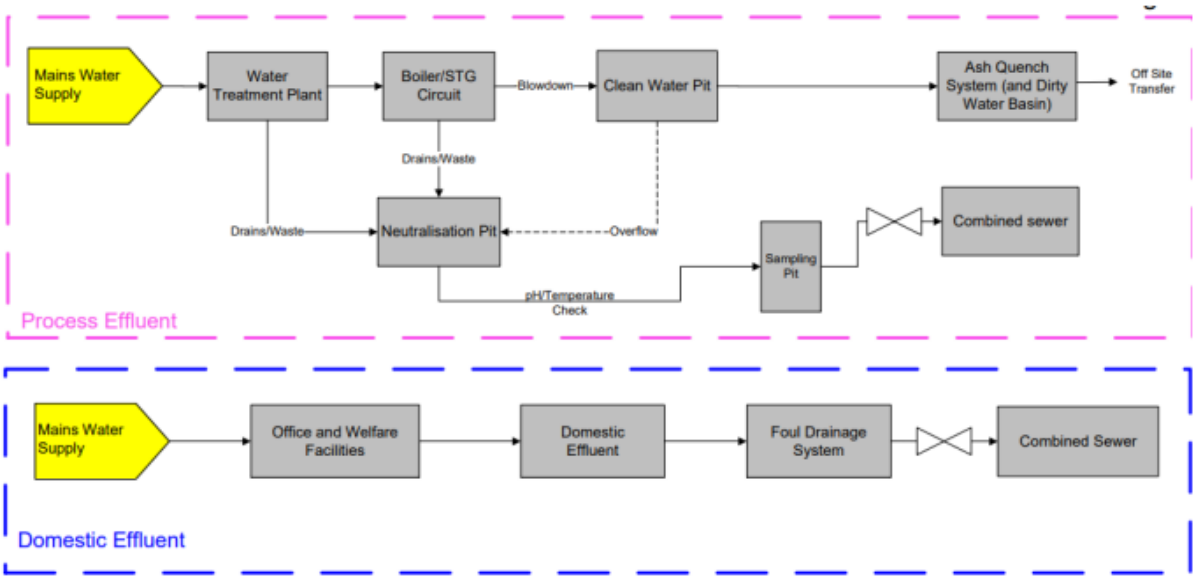
Commissioning operations may generate noise due to steam blowing to clean the steam pipework prior to supplying steam to the turbine to avoid turbine damage. Silencers will be fitted to minimise noise emissions during this operation and steam blowing will be minimised and carried out during periods of the day to avoid disturbance i.e. between 09:00 and 17:00. A prior operating condition is included to require submission of the details of the silencers to be fitted, condition 2.8.19.

Table 16: BS4142:2014+A1:2019 Assessment for Residential Receptors (dB)							
NSR ID	**NSR Name**	**Predicted Specific Sound Level $L_{Aeq,T}$**	**Rating Penalty**	**Rating Level $L_{Ar,T}$**	**Background Sound Level L_{A90}**	**Criterion L_{A90} + 5**	**Exceed-ing the Crite-rion**
Daytime							
NSR01	1st floor of The Haven	40	0	40	38	43	-3
NSR02	1st floor of Woodside Cottage	34	0	34	43	48	-14
NSR03	The Woods	33	0	33	43	48	-16
Night-time							
NSR01	1st floor of The Haven	40	0	40	37	42	-2
NSR02	1st floor of Woodside Cottage	34	0	34	37	42	-8
NSR03	The Woods	33	0	33	37	42	-10

5.5 Resource Utilisation

5.5.1 Water use

This is discussed in the application in Section 2.3 of the PPC Application supporting information and updated in the 2025 update on management of process water and contaminated firewater. The figure below shows in outline how water is consumed in the site and discharged in wastewaters.



Water is also consumed in the flue gas abatement selective non-catalytic reduction (SNCR) system which injects a urea solution into the flue gases to reduce pollutant concentrations and during soot blowing which uses steam to clean heat transfer areas in the flue gas path. All water used in the SNCR system and steam blowing is discharged as water vapour in the final treated flue gases.

The design and techniques described in the application to minimise water use, including use of a 'dry' abatement system, air-cooled condenser, minimisation of losses of steam and steam condensate, reuse of steam condensate and recycling of effluent are consistent with BAT for water use. 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.

5.5.2 Energy use and generation

Section 2.8 of the supplementary information document, Appendix F of the PPC Application and later updates and Further Information Notice Question 12 response discuss energy efficiency aspects and the Heat and Power Plan (HAPP) for the facility. The HAPP has been updated as the ERF design has evolved and is now in version 4 which is considered final.

The Oldhall ERF will incinerate waste to generate electricity or useable heat or a mixture of both. The ERF is designed to produce steam at ca 400^{o}C at a pressure of 51 barA which can be used for the generation of electricity or the production of useful heat or a mixture of both. Initially the steam will be used for electricity production, but the facility will be configured to be Combined Heat and Power (CHP) ready such that the steam produced can also be used to generate useable heat when there is a demand.

Basic Energy Efficiency Requirements are described in Section 2.8 of the Supporting information for the permit application and are consistent with BAT techniques and requirements described in the BRef Horizontal Guidance Note H2 on Energy Efficiency. This includes use of high efficiency motors, variable speed drives and high standards of cladding/ insulation etc.

SEPA's Thermal Treatment of Waste Guidelines (TTWG) were first issued in 2009 and updated in 2014. The PPC Regulations Schedule 4, Part 1, 3(b) and the 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 the 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 target materials for recycling should go forward for thermal treatment (See Section 5.6 of this document).

Best practice for thermal treatment of residual waste is deriving maximum benefit from the waste in the form of electrical energy and/or heat recovery during incineration. The proposed facility will be a Combined Heat and Power (CHP) plant with the capability of producing and exporting electrical energy and residual heat (as steam or heat in a water or thermal fluid circuit) when the demand is developed. The HAPP has been produced based on the nominal design capacity for processing 185,600 tonnes of residual waste per annum with a Net Calorific Value (NCV) of 10.5 MJ/Kg during 8,000 hours operation per annum.

Electrical Energy

The facility is designed to generate approximately 19.3 MWe of electricity in full condensing mode (only electricity produced from the turbine, no steam or heat export) with a parasitic site load (this is the electricity requirement to operate the equipment at the facility) of approximately

2.0 MWe. The excess 17.3 MWe of electricity available after satisfying the parasitic load is exported to the national grid. The Applicant has confirmation from Scottish Power Energy Networks that a grid connection with suitable input capacity will be in place before electrical generation commences. The connection to the grid will be capable of accommodating the maximum electrical output from the facility.

Heat Energy

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.

For potential existing heat consumers, the HAPP has investigated whether existing heat consumers within a 15 km radius could potentially receive heat from this facility which could partially or wholly replace their current energy provisions if they have a higher carbon intensity. The investigation consisted of a desktop study to produce potential heat demand data. The initial study assessment found that retrofitting a heat network to numerous dispersed dwellings within the study area was unlikely to be viable. This is due to a number of factors, most significantly the cost of retrofitting heat distribution equipment to provide heat to existing dwellings and the complexity in securing successful negotiations with numerous heat users in order to make a network viable. The desktop study therefore concentrated on the industrial agglomeration close to the location of the proposed facility. Fifteen heat users were identified in the locale including two nearby significant heat users. The HAPP concentrates on the two most significant local heat users as a system with fewer, larger users would be less complex to build and operate and the economics favour supply to a small number of large users.

A large local heat user was found to be a good match with the potential quantity of heat available and the steam production conditions which could be supplied. An assessment of feasibility was fully developed into a cost benefit analysis and feasibility study for steam pipework routing. Initial discussions have taken place with this heat user which have identified a potential 10.4 MW of heat demand which would consume all of the estimated 10.4 MW of available heat from this facility. The cost benefit analysis outcome indicates that supplying this heat would be a financial benefit in addition to an environmental benefit through displacement of fossil fuel use at the heat user. It should be noted that a number of technical, regulatory, legal and contractual aspects need to be concluded to pursue and realise this option.

The other large heat user was discounted from further assessment as their total heat demand could not be satisfied by the available steam from the Oldhall ERF. However, this user could still be potentially suitable for heat export to partially satisfy their heat demand if the identified optimal heat use is not realised.

The HAPP states that it should be technically possible to export up to approximately 10.4 MW of heat in the form of steam and/or hot water from the facility. Heat export reduces the steam available to the turbine and therefore has an adverse impact on power export and power efficiency. The heat network discussion provided in the HAPP takes into account the estimated local heat demand and reduced economic returns resulting from loss of electrical power generation.

Three methods of obtaining heat were considered in the HAPP, section 4.3;

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 HAPP section 6) 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 cool the flues gases and 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 facility and as such has not been included.
3. Steam take-off from the steam turbine offers the most flexibility in allowing heat to supply potentially variable future demands and different steam pressures to suit different consumer needs.
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.

Energy Efficiency

The TTWG requires that the Heat and Power Plan must show how facilities processing over 70,000 tpa of fuel will meet or exceed the specified energy efficiency criteria set out in Annex 1 of the TTWG within seven years from cessation of commissioning. The HAPP also requires the HAPP to set out the anticipated progress against the thresholds for each year up to the end of the heat plan period. The relevant efficiency criteria include meeting a Quality Index (QI) value or Indicative Efficiency.

QI values require to be 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. In order to demonstrate best practice for thermal treatment of waste facilities, 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 which require achievement of:

- a Quality Index (QI) value ≥ 93; **or**
- an indicative overall efficiency (gross calorific value (GCV) basis) greater than or equal to 35%,

Calculated QI and efficiency values for the facility have been provided in accordance with the TTWG for various load cases and the results are presented in in Table 11 of the HAPP and provided below.

The HAPP calculations indicate that the facility is designed to:

- meet the requirement for an energy efficiency of at least 20% GVC on start-up, as estimated for case 1 in the table above, and
- exceed the indicative overall efficiency threshold of 35% GCV for heat export at or above the average heat load case as estimated for load cases 3 or 4 above.

A minimum heat export of 8.7 MW is required to achieve an overall energy recovery efficiency of 35% as shown in case 2 below.

Load Case	Gross Power Efficiency %, Gross Calorific Value basis	Heat efficiency (%),Gross Calorific Value basis	Overall efficiency (%),Gross Calorific Value basis	TTWG Minimum Overall Efficiency criteria (Note 1)		CHPQA Quality Index	TTWG Minimum CHPQA Qualtiy Index criteria (Note 1)
1. Electricity only, no heat export	25.1	0	**25.1**	**20**		57.7	-
2. Heat load required for indicative overall efficiency of 35%, 8.7MW	22.3	12.8	35.1	-		66.6	93
3. Average network heat load, 10.4MW	21.7	15.3	**37.0**	**35**		68.3	93
4. Maximum heat export capacity, 10.4MW	21.7	15.3	**37.0**	**35**		68.3	93

Note 1 – to demonstrate compliance, EfW facilities require to meet **either** the overall efficiency criteria **or** the CHPQA QI.

A heat demand investigation is presented as required by PPC Regulations, Schedule 1A (energy efficiency). Based on cost benefit analysis information provided in HAPP Section 8.3 and appendix C, it is indicated that the heat demand capacity identified in the study area surrounding the facility would exceed the threshold to meet an overall efficiency of 35% and that the project would be technically and financially viable and it is therefore feasible for the facility to export at least the required minimum amount of heat, subject to the subsequent design processes.

The nature of the demand from a single heat customer and tying into an existing heat distribution system on their site means that the maximum heat demand will be established very quickly, within one year. There is therefore no evolution of heat demand such as would be the case if a new network was being established to several smaller heat users over a period of years. The annual progression of heat supply is therefore to full capacity within a very short period and not over several years.

Sufficient space is available on site to install the necessary heat recovery equipment to service the maximum heat demand as steam or hot water.

WI BATc BAT 20 requires that new facilities meet a gross electrical efficiency level in the range 25 – 35% based on a different calculation method from the QI and gross efficiency discussed above. See HAPP section 9.4. Using the BATc methodology, the gross electrical efficiency is 28.5% with no heat export and 25.2% with average heat export (10.4MW) as given in the Table below.

Table 12: BAT 20- Gross electrical efficiency

Load Case	Units	Formula	No heat export	Average network heat load
Annual Average Net Heat Export	MW		0	10.41
Net Thermal input from waste, NCV	MW	Q_{th}	67.7	67.7
Gross Power Generation	MW	W_e	19.3	17.1
Gross electrical efficiency, NCV	%	W_e/Q_{th}	28.5	25.2
BAT-AEEL (%) Gross electrical efficiency (NCV)	%		25-35	25-35

Both are within the BATc range and the reduction in gross electrical efficiency when exporting heat is expected and compensated for through the additional energy efficiency achieved due to the supply of heat energy.

SEPA considers that the HAPP presented indicates the facility should meet the required energy efficiency criteria, is credible and represents BAT.

Standard Permit Conditions have been included in Section 2.7 of the permit to require annual updates of the HAPP following cessation of commissioning and this includes a review of progress towards meeting the 7-year Energy Efficiency Recovery Target in TTWG.

Permit condition 2.8.5 also requires the Operator to confirm that all of the infrastructure for exporting electricity to the National Grid 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.

WI BATc BAT 2 indicates that 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 part of the commissioning tests in Condition 2.7.7 and 2.9.2 h) of the Permit.

5.5.3 Raw Materials Selection and Use

Raw materials and waste fuel inputs are discussed in the Supporting Information to the PPC Application in Section 2.1.1-3 and 2.2.1, the response to Further Information Notice Question 3 and the Site Condition Report in Appendix B.

The key material input is the non-hazardous residual waste used to fuel the incineration process, this is residual waste from treatment of non-hazardous waste such as Municipal Solid Waste or its equivalent from Commercial and Industrial sources. Offsite treatment in a Materials Recovery Facility or Local Authority measures for point segregation at source will ensure all waste delivered to site will have the majority of recyclable materials removed to the point where further recovery is either not technically or economically viable. European Waste Code 19 12 10 is an appropriate residual waste fuel for the incineration technology selected and up to 185,600 tonnes per year of waste will be delivered in enclosed or covered vehicles and will be incinerated at the facility. Waste will be handled and stored inside the Waste Reception area and in the waste bunkers (See Section 5.6 Waste Handling below). The full list of European Waste Codes (EWC) which may be processed at the facility is provided in the Table below.

Table 5: Waste to be processed in the Facility

EWC Code	Description of waste
19	**WASTES FROM WASTE MANAGEMENT FACILITIES, OFF-SITE WASTEWATER TREATMENT PLANTS AND THE PREPARATION OF WATER INTENDED FOR HUMAN CONSUMPTION AND WATER FOR INDUSTRIAL USE**
19 12	**wastes from the mechanical treatment of waste (for example sorting, crushing, compacting, pelletising) not otherwise specified**
19 12 10	combustible waste (refuse derived fuel)
19 12 12	other wastes (including mixtures of materials) from mechanical treatment of wastes other than those mentioned in 19 12 11

These EWC Codes have been inserted into Table 4.1 of the permit to ensure only pre-processed waste fuel may be received for thermal treatment. Section 4.1 of the permit also contains conditions to ensure recyclable material is removed as far as is practicable prior to incineration. Receipt of untreated Municipal Solid Waste as collected in refuse collection vehicles is therefore disallowed.

Pre-acceptance checks and supplier audits will be carried out by the applicant to ensure waste suppliers are pre-treating the waste as necessary prior to incineration. Periodic visual inspections will also be carried out at site to ensure the waste conforms with the contractual description summarised below. Occasional sampling and testing will also be carried out to ensure the calorific value of the fuel is within the waste specification. The design range of NCV the plant can combust is 8 – 14 Mj/kg, the limits in the waste specification are within the design range.

Table 1: Waste composition specification

Component	Units	Design Waste composition	Minimum value	Maximum value
Carbon	wt% dry basis	27.14%	-	-
Hydrogen	wt% dry basis	3.74%	-	-
Nitrogen	wt% dry basis	0.80%	-	1.8%
Oxygen	wt% dry basis	16.47%	-	-
Sulphur	wt% dry basis	0.13%	-	0.45%
Chlorine	wt% dry basis	0.86%	-	1.50%
Fluorine	wt% dry basis	0.05%	-	0.50%
Water	wt% as received	29.87%	20.00%	40.00%
Ash	wt% as received	20.93%	5.00%	30.00%
Total		**100.00%**	-	-
Net calorific value (MJ/kg)	wt% as received	10.5	9.0	12.5
Ferrous Metal	wt% dry basis	2.0%		5.0%
Non-Ferrous Metal	wt% dry basis	0.3%		2.0%

In addition to the chemical composition of the incoming waste, the waste specification also defined '*Unacceptable Waste*'. Unacceptable Waste is defined as:

a. machinery other than small household items;
b. radioactive waste;
c. explosives/munitions;
d. gas cylinders;
e. pathological and biological waste;
f. oil sludges, cesspool and other human waste, human and animal remains;
g. toxic and carcinogenic materials;
h. liquid wastes and sludges;
i. snow and ice;
j. non-combustible construction material and/or demolition debris;
k. hazardous refuse of any kind, such as cleaning fluids, crank case oils, cutting oils, paints acids, caustics, poisons, drugs, asbestos residues;
l. any items which are unable to fit through the feed chute or ash discharger;
m. motor vehicles, motor cycles, automobile engines, transmissions, rear ends, springs, bodywork or major parts of motor vehicles;
n. trailers, agricultural equipment, marine vessels or similar items, farm and other large machinery;
o. significant quantities of powders;
p. materials that emit offensive odours beyond that normally expected for mixed residual MSW;
q. significant quantities of any material that are unsuitable for use as fuel in an Energy from Waste plant; and
r. any materials, the acceptance and/or processing of which would constitute or result in a breach of any Consent.

In accordance with the waste acceptance procedures for the Facility, Dover Yard will undertake regular inspection and analysis of the incoming waste to ensure that it is in accordance with the specifications within the Waste Supply Contract.

Residual waste is inherently variable in quality, and the facility requires effective pre-reception and reception procedures to evaluate and control the risk from potential new waste suppliers and new waste streams to ensure that waste streams do not contain materials or items likely to compromise the operation or compliance of the facility such as gas containers or a significant quantity of gypsum. These are discussed in Supporting information, 2.2.2.1-2. Schedule 4.3 of the permit contains conditions in respect of waste acceptance and a pre-operational condition, condition 2.8.16, which requires confirmation of the waste acceptance procedures prior to first delivery of residual waste. Measures to reduce the variability of the waste being combusted will

include use of the waste crane to mix and homogenise the contents of the fuel bunker when not being used to load the incinerator chute.

Operational staff will require competence in controlling the quality of waste delivered and will receive training in reception procedures and in identification of non-conforming or problematic materials in the delivered waste stream.

Other key raw materials and estimated usage are summarised in the tables below. The main raw materials held and used at site which are likely to be used in a quantity greater than 5 tonnes per year are:

Table 2: Types and amounts of raw materials and consumption rate at design load (for Schedule 1 Activities)

Scheduled Activity	Material	CAS Number	Approximate storage capacity and type	Annual throughput (approximate)	Description
Section 5.1 Part A (b)	Natural gas	8006-14-2	N/A	220,000 m^3	Auxiliary fuel for auxiliary firing
	Liquid Urea	200-315-5	26 m^3, tank	1,044 tonnes	40% urea solution
	Hydrated Lime	1305-62-0	205 m^3, silo(s)	3,650 tonnes	Calcium hydroxide, powdered
	Activated carbon	7440-44-0	65 m^3, silo	55 tonnes	Powdered
	Boiler water treatment chemicals (hydrochloric acid, caustic soda)	N/A	Various	<50 tonnes	Solids and liquids including salts, oxygen scavenger, corrosion inhibitor, acid/alkali

Material	Storage Capacity	Predicted Annual Usage	Use/Fate
Gas oil (for emergency generator)	7m^3	Normally less than 25 tonnes per year for testing purposes	Fuel for the emergency electrical generator. Combusted and discharged as combustion gases.

Raw materials require to be of suitable quality to achieve the desired effect in an efficient and effective manner whilst not introducing unnecessary pollutants, for example in the form of contaminants in the raw materials. The Applicant recognises the need to maintain raw materials

under review to ensure that any developments and advances in raw materials are identified and implemented at the facility. Waste fuel quality, operational conditions and the design of the facility also require to be controlled to minimise the pollutants generated by the process as additional pollutant concentrations would consume raw materials to abate, Supporting information 2.2.3.

Purchase procedures will require to define the necessary raw material quality where this is essential to meet legislative requirements or BAT expectations e.g. to define sulphur content in fuel specification where gas oil fuel is used at the installation.

This is discussed in the permit application in Section 2.1.3.1-2 and Appendix E BAT Assessment.

Auxiliary Fuels to Support Incineration

Fuel is used in the auxiliary burners to support incineration during startup, shutdown and instances where the incineration temperature dips below 850°C.

Article 50(3) of the Industrial Emissions Directive requires that:

"*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*."

The available fuels that could be used for firing an auxiliary burner whilst meeting the requirements of Article 50(3) of the Industrial Emissions Directive are therefore liquefied petroleum gas (LPG), gas oil or natural gas. The auxiliary burner will be fired using natural gas and this is consistent with the requirements of the regulations to use fuels which result in emissions lower than gas oil.

A bunded low sulphur fuel oil tank will also be installed at the facility to supply the emergency generator. Fuel oil is classed as flammable and carries a pollution risk to the water environment. 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 and minimum use of the generator. It is anticipated that the generator will usually be required to operate only for testing purposes. Gas oil is an appropriate fuel for intermittent short-term operations such as this.

Reagent selection for NO_x Abatement

Liquid urea is proposed for use in the selective non-catalytic reduction (SNCR) abatement system to reduce the quantity of oxides of nitrogen emitted. Other materials may be used in SNCR systems such as ammonia solution or ammonia gas. Section 2.1.3.2 of the supporting information document and Further Information Notice Question 11 response discusses the choice of SNCR additive for control of NOx. The BAT conclusions document reports that either urea or ammonia may represent BAT in SNCR systems, and both suppress dioxin and furan production. This assessment concludes that although ammonia solution may be slightly more beneficial in terms of NO_x reduction, this is offset by the handling difficulties and safety concerns associated with ammonia solutions and that use of a urea solution represents BAT for this installation.

Use of urea can, if not effectively controlled, result in increased production of nitrous oxide (N_2O), a pollutant with high global warming potential. Production of N_2O can be controlled via optimum placement of the urea injection nozzles to add reagent at the point where the correct temperature is present to promote the abatement reaction. Computerised fluid dynamic [CFD]

modelling analysis will be used to define the optimum position of the injection points for the NO_x reduction additive. Computerised control systems will control the addition rate of urea to prevent over addition and formation of unnecessary N_2O and also to avoid generation of excess ammonia which is not consumed in abating NO_x and is discharged in the final flue gas. Emissions of N_2O and ammonia will be continuously monitored in the final flue gas. Use of urea is accepted as consistent with BAT for this installation.

Reagent Selection for Acid Gas Abatement

Hydrated lime is the selected acid gas abatement material, (Supporting Information, 1.3.6, 2.1.3.1 and Further Information Notice Question 11 response). Acid gases other than NO_x produced by incineration such as oxides of sulphur [SO_x], hydrogen fluoride and hydrogen chloride can be abated through scrubbing in a wet scrubber system or through addition of flue gas treatment chemicals such as sodium bicarbonate or lime (calcium carbonate). Addition of treatment chemicals to the flue gases may be achieved using a dry addition system or a semi dry system.

The operator BAT assessment concludes that the advantages of using lime outweigh any benefit from use of bicarbonate taking into account factors including energy recovery efficiency, raw materials usage, potential for partial reuse of reagents, global warming potential and local impact due to acid gas emissions and that lime application using a dry addition system represents the best available abatement technique. Use of lime is considered consistent with BAT (WI BATc 25, 30 and 33).

Activated carbon is selected for the reduction of metals, metalloids and organic species such as dioxins and is a good fit with use of lime. Use of activated carbon is consistent with BAT (WI BATc 25, 30 and 31). (Supporting Information, 1.3.6 and 2.2.3.2)

A number of other materials may be stored and used in smaller quantities including for example lubricating oils and greases, hydraulic oils, fire extinguishing media, etc. Such materials with pollution potential 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.

5.6 Waste Management and Handling

5.6.1 Waste Minimisation

Waste minimisation measures are discussed in Supporting information Section 2.2.3 of the Application and water use minimisation is discussed in 5.5.1 above.

Waste minimisation measures include:

- Improving feed-stock homogeneity to improve process stability and therefore minimise reagent use for flue gas treatment and result in reduced residue production associated with flue gas cleaning. This can be achieved though waste acceptance procedures and mixing of fuel from different loads/sources in the bunker prior to incineration;
- Optimising furnace waste feed rates and air flows at the grate to maximise bottom ash burn out to ensure compliance in achieving a Total Organic Carbon content of less than 3% as dry weight of the IBA;
- Modulating the dosing of hydrated lime into the flue gas treatment system is achieved by measuring the acid gas concentration in the flue gas using a fast response continuous emissions monitoring system. This not only reduces lime usage but also minimises the generation of APCr; The abatement effect of lime and carbon is not fully exhausted on first use and a portion of the APCr produced may be recycled back into the flue gas stream to

reduce the addition of fresh lime and carbon. The extent to which this may be achieved is subject to a pre-operational condition 2.8.18 e) and will be optimised during commissioning.

- Matching activated carbon dosing to flue gas flow to maintain a steady rate of adsorption of gaseous metals, organic materials and dioxins.
- Optimising the urea dose rate in relation to the continuously monitored emissions of NO_X in the flue gas to minimise consumption of urea and avoid excess ammonia generation and ammonia slip. The optimal location for SNCR dosing points will be determined by Computational Fluid Dynamics modelling of the combustion chamber required by prior commissioning condition 2.8.6 d); and,
- Reuse of effluent from the boiler water treatment plant and boiler blow down for ash quenching, thereby reducing wastewater production.

Standard permit conditions for Resource Utilisation (Conditions 2.6.1 to 2.6.5) have been included in the 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, energy and waste minimisation.

The main wastes arising from the facility will be Incinerator Bottom Ash [IBA] and Air Pollution Control Residues [APCr]. IED Article 44 (c) requires that waste materials (residues) are minimised in quantity and harmfulness.

Conditions 8.1.1, 8.1.2 and 8.1.4 require a Residue Management Plan to be produced and reviewed every 2 years in accordance with IED requirements. This will 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 not technically or economically possible, disposed of whilst avoiding or reducing any impact on the environment

The IBA quantity produced is dependent on the constituents of the waste being processed and the combustion conditions within the incinerator. Waste fuel is treated offsite to remove as far as practical non-conforming and target recyclable materials to produce residual waste. Residual waste arising from MSW is inherently variable but will be supplied to meet a specification. When incinerated, some variability in the quantity and quality of IBA can be expected. Materials remaining in the waste such as metals and other inorganic substances will not combust and will form part of the bottom ash. The performance of offsite pre-treatment in removal of such materials is therefore important in minimising the quantity of IBA produced. The operator has provided a specification for the residual waste fuel which includes limits on the ash content after incineration (See Raw materials selection and use above). Procedures will be in place to monitor the quality of the incoming waste and audit the waste producing facilities to ensure the quality of the waste fuel does not compromise ash quality and quantity.

Also important in ensuring the quantity and harmfulness of IBA is minimised are the operating conditions for the incinerator. Incinerator design and operational conditions are proposed to ensure that waste is held on the grate for sufficient time at the correct temperature and combustion conditions to reduce the organic and combustible load in the ash to within regulatory and BAT limits i.e. Total Organic Carbon (TOC) below 3% of the dry weight of the IBA. Combustion conditions will be optimised during commissioning including to ensure the IBA quality is compliant with permit conditions 5.1.1 and section 8.1 below.

APCr is automatically designated a hazardous waste under EWC 19 01 07* due to its residual lime content which results in high pH. Its constituents include unused lime, activated carbon and pollutants removed from the flue gases. The quantity generated is dependent on the dosing rate

of lime and activated carbon into the flue gases. The dose rate for lime is controlled via feedback from continuous monitors (NO_x emissions for lime) or the results of periodic monitoring (metals, organics etc for activated carbon). On first pass through the incinerator flue gases, the abatement capacity of the APCr is not exhausted and the APCr has the ability to abate further emissions. A portion of the APCr produced may therefore be recycled back into the flue gas stream to reduce the quantity of fresh lime and carbon consumed. Dosing rates for fresh lime and activated carbon addition and for APCr reuse will be optimised during commissioning.

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

5.6.2 Waste Handling

Information is contained in Supporting information section 2.2.2 and the response to Further Information Notice Question 3.

Waste Fuel

Up to 2000t (6000m^3) of residual waste received for incineration will be handled and stored in an area with impervious floors and in waste fuel bunkers capable of retaining liquid. The area will have odour control in the form of extraction and processing of odorous air as either primary combustion air in the incinerator or through extraction and treatment of odorous air in a standby carbon bed filter.

During reception and handling of the residual waste, items of non-conforming waste may be identified, and these will be quarantined within the odour-controlled waste reception area in safe containment awaiting removal from the facility.

Details of wastes which may be accepted at the facility are discussed in 5.5.3 ‘Raw Materials Selection and Use’ above. Residual waste will be prepared off-site at waste management facilities. Contracts will be in place with selected suppliers to supply the incoming residual waste in accordance with a fuel specification. All waste will have been pre-treated to remove as much recyclable material as practical prior to receipt at the ERF.

Documented procedures for pre-acceptance and acceptance of waste will be developed prior to the commencement of operation, in accordance with the documented management systems for the facility. Pre-acceptance and acceptance checks on waste being delivered to the facility 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 facility is in accordance with the relevant waste descriptions, specifications and EWC codes permitted and the conditions of the permit.

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 periodically depositing waste loads onto the waste reception area floor for 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, moved 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 detection and fire fighting measures will be designed in consultation with good industry practise, insurer requirements and advice from Local Fire Officers, with particular attention paid to the areas with the highest combustible loads i.e. 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 no significant dispersal of litter;
- Inspection procedures will be employed to ensure that any wastes which would prevent the facility 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 BATc, the following waste monitoring will be undertaken at the facility.

- Waste pre-receipt assessments must include assessment of the risk of the waste containing radioactive materials. It is not anticipated that the incoming waste will contain radioactive materials, therefore radioactivity detection will not be undertaken at the facility. This will be reviewed when the pre-receipt procedures are available;
- Waste deliveries will be weighed at the weighbridges upon arrival, with vehicles weighed again upon exit from the ERF;
- 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 or non-conforming items;
- Periodic samples of the waste will be taken to analyse for key properties such as caloric value;
- There will be no hazardous waste accepted at the facility.
- The waste codes applied for could allow the receipt of waste streams derived from Waste Upholstered Domestic Seating (WUDS) containing Persistent Organic Pollutants (POPs). These wastes can be appropriately treated in Municipal Waste Incinerators such as this facility. It is however not intended that POPs containing waste streams be accepted at the facility.

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 5.5.3 ‘Raw Materials Selection and Use’ above and in Table 4.1 in the Permit.

Schedule 4 of the Permit specifies conditions for permitted waste types including prohibited wastes such as hard/dense plastics and non-ferrous metals; permitted quantities of waste;

requirements for waste acceptance and waste storage. Prior Commissioning Condition 2.8.16 requires submission of the waste acceptance procedures and associated inspection schedule to SEPA prior to commissioning.

Incineration Residues

IBA residue from incineration is quenched in water as it leaves the incinerator bed to stop combustion, reduce its temperature, eliminate potential dust issues during handling and to begin the ash ageing process. Up to ca 600t of quenched IBA is then stored in an ash bunker with an impervious floor until it is manually loaded into a covered vehicle for removal from site. Vehicle loading is carried out within the process building. Any small amount of leachate being released from the quenched ash during storage will be captured by floor drains and reused in the quenching process.

APC residue from incineration is filtered out of the combustion flue gases in a bag filter house and stored in elevated enclosed silos with a total capacity of 270m^3 whilst awaiting removal from the site. Dust filters on the silo capture particulates and retain them within the silo. APCr will be offloaded from the silo through an enclosed chute in the base into a road tanker vehicle using gravity. Displaced air from the tanker will be captured and directed back to the silo where the silo dust filters will remove particulates prior to discharge of any excess air. The road tanker will be sealed prior to transport offsite.

Other Wastes

A number of smaller waste streams resulting from the operation of the plant and equipment will be stored in suitable containers or containment e.g. used lubricating oils and other waste liquids in liquid tight containers within a bunded area, waste metal components and wood generated during maintenance in skips, etc.

5.6.3 Waste Recovery or Disposal

Incineration combustion conditions will be selected to ensure that the IBA quality meets the regulatory control limits. IBA within regulatory limits has the capability of being recovered in a number of ways including through the recovery and reuse of aggregate from the IBA and use as a source of alkalinity to neutralise and stabilise acid wastes. The Residue Management Plan will define the waste management route(s) which are set in place for this IBA.

APCr generated by the facility is considered a hazardous waste and the options for reuse and recovery are currently limited. The facility is required to investigate and keep under review the treatment and disposal options available via a requirement to review the Residue Management Plan every two years, conditions 8.1.1 c), 8.1.2 c) and 8.1.4.

5.7 Management of the site

5.7.1 Environmental Management System

Information on the environmental management systems proposed for the site is provided in Supporting information 2.10, 2.10.1-3 and Further Information Notice Question 2 response.

The application confirms an Environmental Management System (EMS) to meet the accreditation requirements of the British Standard for Environmental Systems, BS EN ISO 14001:2015, and an associated Environmental Procedures Manual will be developed, implemented and maintained by the O&M contractor. This system will encompass all aspects of the activity including incidents and abnormal operation and comply with the 26 applicable requirements listed in BAT 1 of the Waste Incineration BAT conclusions. Permit condition 3.7.1 requires that a suitable EMS is developed and implemented. The adequacy of any EMS put in place, the adherence to it, the compliance with those aspects relating to the Permit and the

potential for improvement will be assessed through the commissioning phase and ongoing inspection. The companies involved in this project are familiar with the EMS in place for other similar activities.

Throughout the permit there are references to a number of management plans which require to be developed and implemented, such as the Odour Management Plan, Noise and Vibration Management Plan etc. Where a specific requirement to have a management procedure is not explicitly required by the Permit, the overriding regulatory requirement that 'all the appropriate preventative measures are taken against pollution, in particular through application of the best available techniques' is judged to be sufficient in ensuring the necessary overarching systems / procedures etc. are in place, maintained and adhered to. Examples of the procedures to be set in place are provided in the Further Information Notice response to question 2.

5.7.2 Personnel

Information on the staffing of the facility and their competence is discussed in Supporting information 2.10.4-5 in outline as the full organisational structure is not yet available and will not be in place until nearer the commissioning date. During the design and construction phase, vendor, contractor and consultant personnel familiar with this type of activity have been engaged to ensure the facility is designed and constructed to a high standard and compliant with permit requirements and BAT. Resources engaged during design and construction may join the commissioning team to assist in commissioning the activity.

DY Oldhall Energy Recovery Limited (DY Oldhall) are considered to be in overall control of the activity and ensure the facility is operated in compliance with the permit and therefore are the 'Operator'. DY Oldhall will engage an Operation and Maintenance (O&M) contractor to operate the facility on a day-to-day basis. DY Oldhall will ensure that suitable systems are in place to deliver compliance with the permit. The O&M agreement will include a requirement that the facility is operated in compliance with any regulatory requirements such as the environmental permit. DY Oldhall will also engage a management services provider for the facility to provide support in relation to environmental aspects of the activity. The management services contractor will review the operational performance against environmental requirements on behalf of DY Oldhall.

The O&M contractor will employ sufficient staff to operate the facility. The organisational structure is anticipated to include a General Manager, Environment Manager, Health and Safety Manager, Operations Manager and Maintenance Manager with sufficient operational and other support staff to ensure the facility is operated in a manner compliant with environment and health and safety regulations. One or more technically competent persons requires to be designated to manage and supervise the facility to ensure the permit conditions are complied with. Permit condition 2.12.4 requires that the technically competent person(s) for this installation are notified to SEPA before commissioning begins and condition 2.12.6 requires notification of any changes to technically competent personnel.

During commissioning there will be training and knowledge transfer from the Commissioning Team to the Operational Team to ensure knowledge and competence is built into the operational team through the commissioning stages.

Operational Team members will also receive bespoke training on the requirements of the permit, the potential impacts of their work and the key systems protecting the environment. Permit condition 2.12.1 is in place to require that staff are provided with sufficient training and instructions to carry out their duties.

Competencies will be defined according to the requirements of each role, and these may include relevant qualifications such as those provided by WAMITAB and previous experience in

operation of similar activities or specific site systems such as steam/boiler systems etc. Permit conditions 2.12.3 and 2.12.4 require that the facility be managed and supervised by a designated technically competent person(s) and that SEPA is notified who is designated as technically competent.

Activities considered to be 'Specified Waste Management Activities' such as the waste handling activities carried out at incineration facilities must be under the control of 'Fit and Proper Persons' (FAPP). The test to ensure the criteria to be considered a FAPP requires the Operator to demonstrate technical competency, that adequate financial provision is in place, that they have no relevant convictions and that there is valid Planning Permission for the proposed activity. SEPA is satisfied that these requirements have been met. The terms of the financial provision have been agreed, and financial provision would require to be set in place before any permit could be issued. See the discussion on Closure section 5.7.4.

Checks have been caried out to confirm that the persons associated with the company in overall control of this facility, the Operator, DY Oldhall Energy Recovery Limited, are Fit and Proper Persons. Permit conditions 2.12.5 and 2.12.6 require notification of a change in the Operator or any other relevant personnel involved in control of the facility.

5.7.3 Accidents and their Consequences

Information is contained in submissions Management of contaminated process water and fire water and the Environmental Risk Assessment

An Incident Prevention and Mitigation Plan will be set in place before incineration activities commence (condition 2.5.7). The plan will set out the measures in place to prevent incidents and, if they do occur, ensure that appropriate mitigation measures are available.

Potential accidents and their consequences are discussed in Section 2.10.1 of the Supporting Information, and in the Environmental Risk Assessment section 5. A number of potential hazard scenarios are identified, the consequences assessed, and risk management measures discussed. Some potential hazards are discussed below as examples.

Waste Fire - Fire in the waste fuel bunker. Supporting Information 1.3.11, Further Information Notice Question 10 response and later updates.

Passive fire protection measures such as detection systems will be in place to identify early signs of combustion in the fuel bunkers and active fire protection measures such as sprinklers and manual remote control water cannons will be installed to fight the fire. The bunkers are designed as water retaining structures to contain any firefighting water. The fuel bunkers can contain 900m^3 and 950m^3 of water respectively and when full, overflow to the adjacent firewater basin which can capture a further 1400m^3 of firewater giving a total firewater capture capacity of 3250m^3. The firefighting water holding tank which supplies water to the cannons and sprinklers has a capacity of 1126m^3. Therefore, there is sufficient capacity to capture all of the firefighting water which may be applied by the Operator plus significant additional capacity for firefighting water applied by Scottish Fire and Rescue if this is required. A duty electric firewater supply pump is installed and also a diesel fuelled backup pump should the duty pump be unavailable.

In the event of a fire, the fire alarm system will automatically isolate the discharge from the surface water drainage system and the discharge to the combined sewer to hold all liquid on site. Therefore, if the firewater containment capacity noted above is exceeded and/or firefighting water is discharged on to the roadways, this would be held on site in the surface water drainage system and lined attenuation ponds. This will protect soil, groundwater and surface waters.

Fire systems will be designed to comply with applicable guidance including the Waste Industry Safety and Health Forum: Reducing Fire Risk at Waste Management Facilities guidance and specialist vendor advice.

Loss of Containment

Liquid process material leaks during offloading, due to vessel overfill or leak or losses from pipelines will be captured in containment bunds or by the site drainage systems which can be isolated as noted above. Solids including lime, activated carbon, IBA and APCr are all handled over hard standing, and losses would be captured and recovered. All deliveries and tanker loading of liquid waste or solid residues will be attended and losses would therefore be identified rapidly. Continuous temperature, flow and pH instruments are installed in the drainage system to highlight any unidentified loss of containment.

Loss of Power

Power loss to the activity could shut down the incineration process in an uncontrolled fashion. An uninterruptible power supply will ensure critical systems in the digital control system remain operational and an independent gas oil fired emergency diesel generator will supply sufficient power to allow the activity to safely shut down. The generator will be tested periodically to ensure it will function when required.

Breakdowns or Abnormal Operation

In the case of breakdowns or periods of abnormal operation the digital control system will identify deviations from the required processing conditions such as low incineration temperatures and will stop waste feed. The continuous monitoring system will also highlight emission limit breaches. Permit conditions require that the feed of waste is ceased if the correct temperature is not achieved in the incinerator (condition 5.1.1 e)) or actions are taken promptly if an emission limit breach is detected (conditions 2.5.2, 2.5.3).

5.7.4 Site Closure

Information relevant to monitoring from the installation is provided in Section 2.11 (Site Closure) of the supporting information Report. This section describes the proposed measures to be implemented upon definitive cessation of activities to decommission and decontaminate the installation equipment. This will include removal of all polluting materials to eliminate any residual pollution risk, to remove the decontaminated equipment and civil engineering structures and to determine the condition of the soil and groundwater at the site in comparison to the site baseline and to define the actions required to return the site to a satisfactory state in preparation for surrender of the permit as described in SEPA guidance TG-02: PPC technical Guidance Note, Content and Scope of Site Reports.

The application notes that the design of the facility will take into account the eventual need to decommission the plant.

The permit requires a Site Decommissioning Plan to be developed and reviewed every 4 years or whenever there is a significant change at the activity (conditions 2.11.1 and 2.11.4). It is confirmed that a Site Closure Plan will be developed. It is anticipated this will be relatively high level at this point and detailed decontamination and decommissioning plans will be developed for all of the individual site systems nearer the time they will be required. The proposals for site closure have been adequately outlined in the application, with consideration in the initial design of the plant given to how it will be decommissioned in the future. Outline general requirements which require to be caried out during the decommissioning phase for the proposed facility are described.

Other parts of the application describe the design features which will be employed during the operational phase to minimise issues during decommissioning and decontamination such as the design, implementation, inspection and testing of containment facilities to prevent pollution of soil and groundwater.

Fit and Proper Person checks for the facility include consideration of whether adequate Financial Provision is in place and will be maintained to ensure that in case of need the site could be cleared of any pollution risk from raw materials or waste etc. The value of the Financial Provision has been agreed according to SEPA guidance and also the type of financial vehicle which will be used to provide the Financial Provision: in this case bank guarantee. Before any final permit may be issued, it will be confirmed that the correct Financial Provision is in place. Conditions in permit section 2.13 define the controls for Financial Provision.

Checks that the plans are fit for purpose and that the level of management and maintenance of the plans is appropriate will be carried out through inspection.

5.8 Site Condition report

An initial site condition report was submitted with the original application. A final updated site condition report and baseline is required before the incineration activity commences as the site has been extensively reworked during the demolition and removal of previous structures which included the removal and offsite treatment of contaminated soils and also during the construction phase. Pre-operational conditions 2.8.20 – 2.8.24 are included to require site ground and groundwater monitoring and a refreshed site baseline to be submitted prior to receiving any polluting materials on site which are associated with the proposed new activity.

Partial updates have been provided to inform on the site condition as it has changed during the progress through the main groundworks. Remediation has already been carried out on the site during the construction phase to remove historical contamination before the proposed incineration activity commences.

Site Installation Boundary

The installation boundary for the proposed activity is included in the permit as Figure 1 and this reflects the final layout of buildings, roadways and hard standing associated with the prescribed activity. As the design has evolved the installation boundary has been updated to take account of extending the boundary to accommodate equipment minor location changes, revised roadway routes, etc.

Standard Conditions are included in Section 7.6 of the draft permit in respect of site condition and baseline reports including to disallow any discharge to ground or groundwater, prevent spillages and to require monitoring of soil and groundwater on site. This topic will be discussed during inspection and controlled through application of residual BAT should that be necessary.

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.

5.9 Monitoring

5.9.1 Monitoring Emissions to Air

Information relevant to monitoring for the installation is provided in Supporting Information 1.3.7 and 2.5.1 and the response to Further Information Notice Question 18.

Emissions to Air from the Incineration Stack (Emission Point A1)

Continuous Emission Monitoring Equipment

Monitoring requirements consistent with IED Annex VI Part 4 for Waste Incineration Plants and with BAT for Waste Incineration (WI BATc BAT 4) have been specified in Schedule 6 of the Permit. The proposed techniques described in the PPC Application for monitoring of emissions to air from the main stack and the Schedule 6 permit conditions provide assurance that BAT requirements will be met for monitoring, recording, data handling, reporting and calibration. Condition 6.1.13 of the permit requires that emissions data will also be published on a web-based platform accessible via the internet.

Confirmation of the final design of the CEMs system and the sampling arrangements are required prior to commissioning by condition 2.8.8.

Emissions Monitoring

Table 6.1 in Schedule 6 of the Permit requires Continuous Emission Monitoring Systems (CEMs) to be used for continuous monitoring of particulates, oxides of nitrogen (NO and NO2 expressed as NO2), sulphur dioxide, carbon monoxide, total organic carbon, hydrogen chloride, ammonia, nitrogen dioxide, carbon dioxide and oxygen.

IED Annex VI Part 6 para 2.3 indicates that where treatment stages for hydrogen chloride are used then periodic monitoring for hydrogen fluoride is appropriate at a frequency of twice per year as defined in IED Annex VI Part 6 para 2.1(c). WI BATc BAT 4 also indicates that hydrogen fluoride should also be continuously monitored but may be periodically monitored where hydrogen chloride emission levels are proven to be sufficiently stable (note 7 to the BAT4 monitoring table).

Hydrogen chloride emissions at the facility will be treated through the addition of lime into the flue gases by the flue gas treatment system. Emission concentrations of hydrogen chloride from residual waste incinerators are usually stable and low. Therefore, in line with the IED and WI BATc guidance set out above, the alternative periodic monitoring approach for hydrogen fluoride is included in the permit i.e. periodic monitoring at least once every 6 months during ongoing operation. The monitoring frequency for hydrogen fluoride is increased to once every three months during the first year of operation to more rapidly generate emissions data to confirm that emissions are low. Hydrogen chloride emission levels will be kept under review during commissioning and, if required, an upgrade condition may be inserted into the permit to require continuous monitoring of hydrogen fluoride.

Periodic monitoring is also specified for all the pollutants described above which are continuously monitored. Additional pollutants to be monitored only periodically are:

Group 1 metals (cadmium and thallium and their compounds);

Group 2 metals (mercury and its compounds) subject to Conditions 2.8.9 & 6.5.1;

Group 3 metals (antimony, arsenic, chromium, cobalt, copper, lead, manganese, nickel and vanadium and their compounds);

Dioxins and furans and dioxin-like PCBs subject to Conditions 2.8.10 & 6.5.2; 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. 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 required to be used where available.

Visual monitoring of smoke emission is to be undertaken should there be a complaint of a visible smoke plume. It is not anticipated that there should be any visible smoke plume from the facility but, dependant on weather conditions, a visible plume may be present due to the water vapour in the flue gases condensing to water droplets as the plume is discharged. These water droplets will evaporate quickly as the plume disperses. See the discussion in 5.2.1b above.

Monitoring of mercury

BAT 31 of the Waste Incineration BATCs specifies a BAT-AEL of <5-20 µg/Nm^3 for continuous or periodic monitoring of mercury, or 1-10 µg/Nm3 for long-term sampling. Where mercury emissions are not proven to be low and stable then CEMs are required. If emissions are proven to be low and stable, then either long-term sampling or periodic monitoring is required. See Conditions 2.8.9 & 6.5.1. A period of higher frequency monitoring is required during early operation to provide an opportunity for new facilities to rapidly demonstrate that mercury emissions are low and stable. The results of this periodic monitoring will determine whether mercury emissions can be considered low and stable, and therefore whether periodic monitoring is the appropriate method for ongoing monitoring for this parameter or, mercury CEMs will be required. The Environment Agency Mercury CEMs Protocol will be used to assess the monitoring results and decide which monitoring route is appropriate for ongoing operation.

Monitoring of dioxin-like PCBs and dioxins and furans

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. WI BATc BAT 4 specifies that long-term sampling is required for monitoring emissions of dioxins and furans unless it can be proven that emissions are sufficiently stable. If emissions are sufficiently stable, then periodic monitoring can be carried out. See Conditions 2.8.10 & 6.5.2. A period of higher frequency monitoring is required during early operation to provide an opportunity for new facilities to rapidly demonstrate that dioxin and furan emissions are low and stable. The results of this periodic monitoring will determine whether dioxin and furan emissions can be considered stable and therefore periodic monitoring is the appropriate method for ongoing monitoring for this parameter or, whether long term sampling will be required. The Environment Agency PCCD-F Protocol will be used to assess the monitoring results and decide which monitoring route is appropriate for ongoing operation.

Monitoring of dioxin-like PCBs is required by Regulation 29(2) of PPC 2012 according to the requirements set out in IED Annex VI Part 6 para 2.1(c). WI BATc BAT 4 also requires that dioxin-like PCBs are monitored according to a similar approach as dioxins and furans i.e. that long-term sampling is required for monitoring emissions of dioxin-like PCBs unless it can be proven that emissions are sufficiently stable and below 0.01ng WHO-TEQ/Nm^3. If emissions are sufficiently stable, then ongoing periodic monitoring is appropriate. See Conditions 2.8.10 & 6.5.2. A period of higher frequency monitoring is required during early operation to provide an opportunity for new facilities to demonstrate that dioxin-like PCBs emissions are stable and

below the threshold of 0.01ng WHO-TEQ/Nm^3. The results of this periodic monitoring will determine whether dioxin-like PCB emissions can be considered stable and therefore periodic monitoring is the appropriate method for ongoing monitoring for this parameter or, whether long term sampling will be required.

Monitoring of PAHs

WI BATc BAT 4 requires only benzo[a]pyrene to be monitored on an annual basis as a PAH. However, Regulation 29(2) of PPC 2012 requires monitoring of PAHs according to the requirements set out in IED Annex VI Part 6 para 2.1(c). 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. 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 of the Permit.

The frequency specified for monitoring PAHs in Table 6.2 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).

Emissions to Air from the Odour Stack (Emission Point A2)

Odour monitoring at the stack will be carried out during commissioning to confirm that the system is abating odour to below the emission limit value in Table 6.2, condition 2.9.2 j).

Condition 3.2.2 of the permit sets out a requirement to develop and implement an Odour Management Plan (OMP) including the monitoring plan for the odour stack. The odour abatement system only operates when the incineration system is offline or running at low throughput therefore the odour stack is not a continuous emission source. Sampling is therefore anticipated to be carried out during planned shutdown periods.

The odour emission limit specified in Table 6.2 is the design emission concentration as discussed in the Supporting information and used in odour impact modelling. The monitoring technique specified is BS EN 13725 which requires collection of samples for subsequent analysis by an odour panel with the frequency set by the monitoring plan in the OMP.

The OMP also requires that subjective odour testing (sniff survey) is carried out daily at the site boundary and offsite location(s).

Emissions to air from the Emergency Diesel Generator Stack (Emission Point A3)

Schedule 10 of the permit sets out the conditions required to implement the requirements of the Medium Combustion Plant Directive as enacted by PPC Regulations Schedule 1B for the emergency diesel generator. Emission limits are not required for appliances operating less than 500h per year (Schedule 1B 2. (2)) but periodic flue gas monitoring for oxides of nitrogen (NOx) and carbon monoxide (CO) is required (Schedule 1B, 6. (5)(b) and Table 5). Conditions are therefore included to limit the operation of the emergency generator to a maximum of 500h per year and require emissions monitoring for NOx and CO at least once every 5 years or after 1500 hours of operation in line with Schedule 1B, 6. (3). The first monitoring is required within four months from either the grant of the permit or the start of operation of the medium combustion plant whichever is later. This will demonstrate that the emission meets the BAT requirements (NOx emissions of less than 2000mg/Nm^3 at 5% oxygen). These monitoring requirements are

detailed in Permit Table 10.1. See Section 5.2.4 above for further details on the emergency generator.

Ambient Air

Monitoring of ambient air quality for oxides of nitrogen, oxides of sulphur, total volatile organic carbon and particulate matter is specified in draft permit Table 9.1 as confirmation that no significant impact is being caused due to the operation of the facility.

A weather station is required to measure and record local weather conditions. The recorded data may be used in the event of an incident or complaint.

5.9.2 Monitoring Emissions to Water

Excess wastewaters from process sources and potentially contaminated surface waters are proposed to be discharged to the Scottish Water combined sewer, emission point W1. This discharge will be controlled by a Scottish Water Trade Effluent Consent. The details of the Trade Effluent Consent which covers the operational period will not be available until it is issued to replace the current construction phase Trade Effluent Consent. Permit Tables 7.1 and 7.2 specify parameters to be monitored in this discharge and these are typical parameters for similar operational Trade Effluent Consents. Condition 2.8.26 requires submission of the operational Trade Effluent Consent prior to commissioning. When received this will be reviewed against the wastewater monitoring requirements in the permit to ensure they remain valid and to decide whether emission limits may be necessary beyond those set in the Trade Effluent Consent.

Clean surface water from the facility is collected and proposed to be discharged to an unnamed tributary of the Dundonald Burn. The requirements of IED Article 46(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 BATc's do not apply as this discharge to the local Water Environment is from uncontaminated low risk surface water only, emission point W2 in Table 7.1. Monitoring requirements have however been set in line with indicative BAT. The maximum attenuated flow is set at 3.2 litres per second which is the greenfield run off rate. See Table 7.2 in the draft permit. See section 5.3.1 above for a description of wastewater management at the facility.

5.9.3 Monitoring Soil and Groundwater

Conditions relating to soil and groundwater monitoring on site are contained in Schedule 7.6 of the permit. No emissions to soil or groundwater are permitted, (condition 7.6.1). A soil and groundwater monitoring plan requires to be developed and submitted (conditions 2.8.20 and 7.6.7) with the first samples required prior to commissioning to allow a site baseline to be set before polluting materials are present on site (condition 2.8.21). A list of pollutants which require to be monitored in groundwater and soil is specified in Tables 7.4 and 7.5. These are based on the substances likely to be used, produced or stored at such facilities. These samples are required at a frequency of once every five years for groundwater samples and once every ten years for soil samples.

Samples from boreholes downfield of the drains on site are required at a higher, annual, frequency to monitor the drain condition.

Conditions relating to offsite environmental monitoring are in Schedule 9 of the permit. An Environmental Monitoring Programme will be prepared prior to commissioning, and this will define the locations where air, soil and vegetation require to be tested. Parameters and locations for testing will be agreed in the Environmental Monitoring Programme.

5.9.4 Monitoring Waste Fuel and Incineration Residues

Waste fuel as a raw material is discussed in section 5.5.1. above. Waste deliveries will be attended, and waste will be visually inspected and periodically sampled and analysed to ensure it meets the contract requirements. Any non-conforming waste will be quarantined and removed from site. Regular supplier audits are planned to ensure that the waste is being pre-treated as required.

Monitoring requirements for Incineration Bottom Ash (IBA) and Air Pollution Control Residues (APCr) are described by the applicant in section 2.5.2 of the Supporting information to the PPC Application and the response to Further Information Notice Question 9.

Conditions relating to incineration residues are in Schedule 8 of the permit and in prior operating condition 2.8.17. Condition 8.1.1 and 8.1.2 requires the preparation of a Residue Management Plan which includes plans for sampling to characterise the waste and assure compliance with Table 8.1 of the permit, conditions 8.1.2 e) and f). The monitoring specified in permit Table 8.1 meets the requirements of the relevant standards and guidance* and is based on accelerated sampling in the initial period to characterise each residue (condition 2.8.17) and demonstrate compliance with the Total Organic Carbon emission limit value for Incineration Bottom Ash to confirm good burn out of the waste fuel.

* including BS EN 14899 “Characterisation of waste – sampling of waste materials”, Environment Agency (EA) Technical Guidance Note (Monitoring) M4: Guidelines for Ash Sampling and Analysis (TGN M4) and for Incinerator Bottom Ash (IBA) from municipal waste incineration, and the voluntary protocol “A Sampling and Testing Protocol to Assess the Status of IBA”, WRc Report Reference UC 9390.05, published by the Environmental Services Association (ESA), January 2018.

5.9.5 Process Monitoring and Controls

Monitoring proposals are described by the applicant in Supporting information sections 2.2.3.6, 2.5.2 and in the BAT justifications in Tables 11 and 12.

Plant activities will be controlled by a digital control system which has built in logic and interlocks to provide controls in line with Chapters IV and VI of the Industrial Emissions Directive which describe special provisions for waste incineration plants. These controls will also meet BATc requirements and guidance. Control systems and interlocks will, for example, take automatic action to prevent waste fuel being fed to the incinerator until the temperature in the primary incineration chamber reaches 850^{o}C or in the case that the temperature falls to less than 850^{o}C. When the temperature falls below 850^{o}C the control system will automatically switch on the auxiliary gas fuelled burner to return the combustion temperature to above 850^{o}C. Process variables such as waste feed rate, abatement chemical feed rates and combustion temperatures are monitored and adjusted by the control systems.

5.10 Consideration of BAT and compliance with BAT-Cs if appropriate

The measures discussed above are considered to represent BAT for this facility. In reaching this conclusion, SEPA has considered Legislative requirements including Chapter IV of the Industrial Emissions Directive (IED)(2010/75/EU), Special provisions for waste Incineration Plants and waste co-incineration plants & Annex V, applicable BREFS and BAT Conclusions, the Best Available Techniques (BAT) Reference Document for Waste Incineration, Industrial Emissions Directive 2010/75/EU (Integrated Pollution Prevention and Control) (2019) and the potential impact of emissions on human health and the environment.

The permit contains a number of conditions requiring regular review of procedures, systems and operating practices and SEPA will continue to maintain a view on the application of BAT to the

site activities and operations through review of prior operating and ongoing submissions through the lifetime of the facility and during inspection.

A summary of compliance with the IED Legislation and the BAT requirements of the Waste Incineration BAT conclusions document is set out in Appendix A and B respectively.

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? If yes, provide information on the action and justification below:	**Yes**

Emissions to Air

As a combustion activity, emissions to air from the facility have the potential to impact nearby designated habitats sites. A habitats assessment was therefore carried out to inform on the potential impact on the designated habitats which are within the 15km screening distance from the facility. The assessments are based on the impact at worst case emissions and consider where appropriate Critical Levels, Critical Loads and Acid Deposition. Note - The Air Quality Assessment also includes an assessment of the cumulative impact from the ERF and a proposed Short Term Operational Reserve (STOR) facility at Shewalton Road. The Planning Permission for the STOR has lapsed but the Appropriate Assessment discussed below does take into account the contribution from the ERF and the STOR as a worst case: the contribution from the ERF alone will be lower.

Critical Levels are discussed in Section 5.2.1d of this document and indicate the emissions will not have a significant effect on Critical Levels of pollutants at the designated site locations.

In addition to Critical Levels, Critical Load is also assessed, and a summary is provided below in Table 50.

Table 50 Results from Detailed Modelling of Nitrogen Deposition in Relation to the Site-Specific Critical Load

Habitat	N Deposition (kgN/ha/yr)	Critical Load (kgN/ha/yr)	% Critical Load	Background (kgN/ha/yr)	Total N Deposition PEC (kgN/ha/yr)	PEC as % Critical Load
Oldhall Ponds Wildlife Site	0.01574	10	0.16%	23.38	23.396	**234%**
Shewalton Sandpits Nature Reserve	0.27025	10	**2.70%**	23.38	23.650	**237%**
Shewalton Wood Nature Reserve	0.03636	10	0.36%	23.38	23.416	**234%**
Gailes Marsh Nature Reserve	0.13928	20	0.70%	13.72	13.859	69%
Western Gailes SSSI	0.13436	8	**1.68%**	13.72	13.854	**173%**
Dundonald Wood SSSI	0.11226	10	**1.12%**	29.12	29.232	**292%**
Troon Golf Links and Foreshore SSSI	0.01702	8	0.21%	11.9	11.917	**149%**
Ashgrove Loch SSSI	0.01503	10	0.15%	14.28	14.295	**143%**
Dykeneuk Moss SAC / SSSI	0.01367	5	0.27%	16.52	16.534	**331%**
Cockinhead Moss SAC / SSSI	0.01113	5	0.22%	18.76	18.771	**375%**
Bankhead Moss, Beith SAC / SSSI	0.00932	5	0.19%	17.92	17.929	**359%**

Data is not provided for Dundonald Burn SSSI, Bogside Flats SSSI, Ardrossan to Saltcoates Coast SSSI, Afton Lodge SSSI and Lynn Spout SSSI as these sites are not sensitive to nutrient Nitrogen deposition.

Consideration of the Predicted Environmental Concentration of nutrient Nitrogen deposition is only provided where the Process Contribution exceeds 1 % of the critical load.

Modelling indicates that at two designated sites, Dundonald Wood SSSI and Western Gailes SSSI, the worst-case modelled impact for oxides of nitrogen is above the 1% assessment threshold for contribution to critical load. An 'appropriate assessment' is required under such circumstances. SEPA have completed an appropriate assessment[+] and consulted with Nature Scot on the findings: no objection was received. SEPA's assessment is that at both sites the process contribution to critical load is an order of magnitude smaller than the year-to-year

variability in the critical load and therefore the small additional impact above the assessment threshold will not have any perceptible effect on the notified features for Dundonald Wood SSSI or Western Gailes SSSI.

For the Shewalton Sandpits, although the Process Contribution exceeds 1% of the Critical Load, the Process Contribution remains below 100% of the Critical Load and can therefore be considered as not significant.

SEPA's appropriate assessment was based on the cumulative contribution including the STOR as a worst case. As the STOR development will not proceed, the predicted impact due to the ERF alone is lower than this worst case.

Acid Deposition is assessed, and a summary is provided in Table 51 below.

Table 51 Results from Detailed Modelling of Acid Deposition in Relation to Site-Specific Critical Loads

Habitat	N Based Acid Deposition	N Based Background	PEC	CLminN	Is PEC < CLminN	S Based Acid Deposition	H Based Acid Deposition (Total)	Total Acid Deposition (N, S and H / S and H)	Lowest CLmaxN	PC as % CLmaxN
	(keq/ha/yr)					(keq/ha/yr)				
Oldhall Ponds Wildlife Site	0.00112	1.34	1.3411	0.142	No	0.00109	0.00153	0.00374	1.44	0.26%
Shewalton Sandpits Nature Reserve	0.01924	1.34	1.3592	0.142	No	0.01871	0.02626	0.06421	1.438	**4.47%**
Shewalton Wood Nature Reserve	0.00259	1.34	1.3426	0.142	No	0.00252	0.00359	0.00870	1.441	0.60%
Western Gailes SSSI	0.00956	0.81	0.8196	0.892	Yes	0.00742	0.00929	0.01671	1.692	0.99%
Dundonald Wood SSSI	0.00799	2.04	2.0480	0.142	No	0.00777	0.01117	0.02694	3.571	0.75%
Troon Golf Links and Foreshore SSSI	0.0012	1.1	1.1012	0.892	No	0.0009	0.0011	0.0033	1.702	0.19%
Ashgrove Loch SSSI	0.00107	1	1.0011	0.438	No	0.00083	0.00104	0.00294	4.498	0.07%
Dykeneuk Moss SAC / SSSI	0.00097	1.3	1.3010	0.321	No	0.00075	0.00102	0.00275	0.695	0.40%
Cockinhead Moss SAC / SSSI	0.00079	1.3	1.3008	0.321	No	0.00061	0.00083	0.00224	0.707	0.32%
Bankhead Moss, Beith SAC / SSSI	0.00066	1.5	1.5007	0.321	No	0.00051	0.00069	0.00187	0.753	0.25%

Data is not provided for Dundonald Burn SSSI, Gailes Marsh Nature Reserve, Bogside Flats SSSI, Ardrossan to Saltcoates Coast SSSI, Afton Lodge SSSI and Lynn Spout SSSI as these sites are not sensitive to acid deposition.

The Process Contribution as a percentage of the Maximum Critical Load for Nitrogen (CLmaxN) for all receptors except Shewalton Sandpits is below 1% and can immediately be considered insignificant. For the Shewalton Sandpits, although the Process Contribution exceeds 1% of the Critical Load, the Process Contribution remains below 100% of the Critical Load and can therefore be considered as not significant.

Emissions to Water

Section 5.3.1 above describes the management of wastewater from the facility.

Uncontaminated wastewater is now proposed to be discharged to an unnamed tributary ditch leading to the Dundonald Burn. The Dundonald Burn SSSI is located ca 400m downstream of the discharge point. This is notified as a geological feature and the risk to the feature from the proposed activity is principally due to scouring/erosion due to the flow of surface water in the burn. To mitigate any effect from the proposed facility, the clean surface water drainage system includes flow attenuation to greenfield run off rates and the ability to isolate the flow completely if required.

Low risk surface water is treated prior to discharge to remove any trace oil and silt and controls are included in permit Tables 7.1 and 7.2 as a precaution to ensure the clean surface water discharge is monitored to prevent any unforeseen contamination affecting the SSSI. This includes continuous online monitoring for flow, temperature and pH and periodic sampling for hydrocarbons, biological oxygen demand conductivity, total suspended solids and total organic carbon. There is also the ability to isolate the discharge completely if required, for example in

the case of a fire or spillage. These control measures will identify unforeseen emissions from the facility, protect the Dundonald Burn and the SSSI from potential impact from pollutants not normally in the clean surface water discharge and the attenuated flow rate will ensure there are no peak flow run off events from the facility which are likely to contribute to damage to the designated feature.

SEPA's assessment is that the proposed discharge of clean surface water to the Dundonald burn will not result in likely damage to the SSSI.

Screening distance(s) used	15km for air emissions Local direct pathway for water emissions.

Is there any other legislation that was considered during determination of the permit (for example installations that may be impacted by the requirements of legislation involving Animal By Products, Food Standards, Waste, WEEE regulations etc). If yes, provide information on the legislation, action and justification below:	**No**

This facility will receive only residual wastes arising from Municipal Solid Waste or similar Commercial and Industrial waste sources.

Officer	CO

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?

An Environmental Impact Assessment (EIA) was undertaken for the proposed activity as part of the planning process. A copy of the EIA was submitted as Appendix M – Environmental Statement. This is available on North Ayrshire Council's Planning Portal, Reference 19 00539 PPM.

The information provided in the EIA has been considered in determining the PPC application. Some of the information in the EIA has now been superseded by later submissions during determination of the application.

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?

Not Applicable. The site is not subject to the Control Of Major Accident Hazards Regulations 2015 (COMAH).

Officer:	CO

8 Details of the permit

Do you propose placing any non standard conditions in the Permit?	**Yes**
Do you propose making changes to existing text, tables or diagrams within the permit?	**No**

Outline the changes required and provide justification below:

SEPA's Waste Incineration Template is used as the basis of the permit, this is adjusted to the specific requirements of this facility. In the interests of simplicity, where it is anticipated in the template that a small adjustment is routinely required or a change to a cross reference within the permit, these have not been detailed below.

Prior Commissioning Conditions in section 2.8 of the permit template have been included according to the requirement for this facility. Please refer to the draft permit for the wording of these conditions, their purpose is described below.

An additional Schedule is added to the Template, Schedule 10, which is required to insert the conditions associated with Medium Combustion Plant as required by the Medium Plant Combustion Directive.

Proposed Condition Number:	Proposed Change:	Justification:
Interpretation of terms	Include 'Diesel Engine', 'Engine', 'Fuel', 'Gas Oil', 'Operating Hours', 'rated thermal input' and 'Significant Environmental Harm' interpretations. (based on MCPD template)	Required as Schedule 10 is inserted into the permit to regulate Medium Plant Combustion Appliances: the emergency diesel generator.
1.1.1	Colour used to define site outline is green rather than red.	Map of site uses green outline to define the site.
2.8.1	Condition to prevent commissioning starting until all of the prior commissioning conditions are satisfied.	SEPA considers receipt and assessment of the information required by the prior commissioning conditions as necessary before commissioning can start to confirm final details of systems not fully defined at point of draft permit issue.
2.8.2	Prior commissioning condition for submission of a Construction and Commissioning Plan.	To inform on the construction and commissioning schedule.
2.8.3	Prior commissioning condition for submission of a Commissioning Plan	To inform on the proposed commissioning schedule and testing plan to allow review to ensure all essential commissioning testing and checks are planned.

Proposed Condition Number:	Proposed Change:	Justification:
2.8.4	Prior commissioning condition to submit any proposed temporary emission limits during commissioning.	For a very short period during the initial stages of commissioning until the plant sufficiently stabilises, temporary emission limits may be requested for consideration. A submission is required to describe any proposed temporary emission limits and their impact. If submitted, SEPA will review the proposal for acceptability.
2.8.5	Prior commissioning condition to confirm the ability to export electricity and/or heat.	To confirm the facility will be able to immediately export the electricity produced during commissioning.
2.8.6	Prior commissioning condition to submit the final design Computational Fluid Dynamics (CFD) model of the incinerator.	To demonstrate that the final detailed design of the incinerator as installed meets BAT requirements including for flue gas temperature, position of SNCR abatement equipment and residence time.
2.8.7	Prior commissioning condition to submit testing proposals to validate the flue gas residence time and temperature by on-plant testing during commissioning.	To allow review of the proposed methodology to ensure it meets good practise standards.
2.8.8	Prior commissioning condition to define in detail the proposals for continuous and periodic monitoring of emissions to air.	To demonstrate that the final detailed design of the Continuous Emissions Monitoring system as installed meets the requirements of the permit.
2.8.9	Prior commissioning condition to define the proposal for mercury monitoring during commissioning	To demonstrate that accelerated monitoring for mercury will be carried out according to protocol requirements during early operation to confirm whether continuous monitoring is required.
2.8.10	Prior commissioning condition to define the proposal for dioxin and furan monitoring during commissioning	To demonstrate that accelerated monitoring for dioxins and furans will be carried out according to protocol requirements during early operation to confirm whether long-term monitoring is required.
2.8.11	Prior commissioning condition to submit the final design controls for noise.	To demonstrate that the final facility design includes all necessary measures to prevent or minimise noise impact.
2.8.12	Prior commissioning condition to submit the final details of the odour abatement system design.	To demonstrate that the application proposals regarding odour abatement have been implemented.
2.8.13	Prior commissioning condition to require environmental monitoring results to be submitted before the activity starts.	To ensure a baseline for offsite soil and vegetation is available prior to the facility starting.
2.8.14	Prior commissioning condition to require confirmation of the final surface water drainage system design.	The surface water management system has been subject to late changes during the project. This requirement ensures the SUDs system as implemented meets the requirements of BAT.

Proposed Condition Number:	Proposed Change:	Justification:
2.8.15	Prior commissioning condition to confirm final design of containment for bulk storage areas.	To demonstrate that containment systems for all bulk storage as implemented meets BAT.
2.8.16	Prior commissioning condition to require waste acceptance procedures to be submitted. Standard condition uses the term 'first delivery of waste' which has been updated to First Acceptance of Waste' as this term is defined in the interpretation of terms.	To demonstrate that all necessary waste acceptance procedures are in place before any waste is received.
2.8.17	Prior commissioning condition to define the proposal for incinerator bottom ash (IBA) monitoring during commissioning	To ensure accelerated sampling is carried out to characterise the waste and allow accurate consignment.
2.8.18	Prior commissioning condition to define final design details of the incinerator.	To ensure the final design aligns with application information.
2.8.19	Prior commissioning condition to submit the design details for steam silencers and the controls to avoid noise impact due to steam blowing activities.	To ensure the design of the temporary steam blowing system will eliminate or reduce noise impact.
2.8.20	Prior commissioning condition to require submission of a Soil and Groundwater Monitoring Plan.	To allow review and agreement of the proposed Monitoring Plan prior to implementation.
2.8.21	Prior commissioning condition to submit an updated site condition report.	To ensure a new site condition report is submitted prior to acceptance of the main process materials on site as the original site condition report will no longer be valid due to the extensive groundworks which have been undertaken during construction.
2.8.22	Prior commissioning condition to require that the sampling arrangements agreed in the Soil and Groundwater Monitoring Plan are implemented.	To require the Soil and Groundwater Plan to be implemented and samples taken.
2.8.23	Prior commissioning condition to require information from the implementation of the Groundwater and Soil Monitoring Plan to be implemented.	To submit for review the installation information for the soil and groundwater sampling locations.
2.8.24	Prior commissioning condition to require a new site condition baseline to be submitted.	To ensure an assessment of Relevant Hazardous Substance and a new baseline is submitted prior to acceptance of pollutants on site as the original site baseline will no longer be valid due to the extensive groundworks which have been undertaken during construction.
2.8.25	Prior commissioning condition to require submission of a report to demonstrate that all necessary systems required to comply with the permit have been implemented and checked.	To ensure at start of commissioning that all necessary systems and measures are in place to comply with the permit.

Proposed Condition Number:	Proposed Change:	Justification:
2.8.26	Prior commissioning condition to supply a copy of the Trade Effluent Consent. This is a new bespoke prior operating condition.	The operational Trade Effluent Consent will not be available until nearer commissioning and is required to ensure the draft permit proposals for control of the discharge to sewer remain valid.
2.8.27	Prior commissioning condition to require submission of the final detailed design of the arrangements for sampling wastewater emissions to sewer and to surface water.	The surface water management system has been subject to late changes during the project. This requirement ensures the monitoring systems as implemented and those for the discharge to sewer meet the requirements of the permit.
2.9.2 j)	Include additional requirement to demonstrate 'the requirement for the odour abatement system to operate at below 85% striking rate' and to test under this condition.	The standby odour abatement system requires to operate when the incineration throughput is less than 85% to ensure sufficient air extraction to achieve three air changes per hour.
3.2.3 c)	Include additional clarification to ensure the Odour Management Plan includes procedures for managing odour 'when the incineration striking rate is below 85%.'	The standby odour abatement system requires to operate when the incineration throughput is less than 85% to ensure sufficient air extraction to achieve three air changes per hour.
3.2.3 g)	Include additional requirement to ensure the Odour Management Plan includes 'a monitoring plan for the odour abatement stack, emission point A2 in Table 6.1.'	To capture the odour monitoring plan in the Odour Management Plan.
3.2.6	Include a requirement that 'only one vehicle access door into or out of the waste tipping hall shall be open at any one time.'	To ensure air does not funnel through the waste reception hall carrying odour out into the external area.
3.2.7	Include requirement that the Odour Abatement/Extraction System must operate 'when the incineration striking rate is below 85% of design.'	To ensure sufficient air extraction to achieve three air changes per hour under all operational circumstances.
Table 4.1	Includes limitations in the list of wastes allowed to be incinerated to ensure 'Waste must be treated to recover recyclable materials'.	To ensure only residual waste not capable of being recycled is incinerated.
7.3.3	Include specifics on reporting of continuous water monitoring results: a) a trend chart of measured value(s) for the reporting period; and b) a summary setting out any date where an ELV was breached and the cause of that breach. ELV breaches must be notified immediately and investigated as required by Conditions 2.5.1 – 2.5.6.'	To summarise and report the results and compliance performance for continuously monitored parameters in wastewater.
7.4.2	To include a requirement to reporting periodic water monitoring results 'in tabular form and a 12-month rolling trend of the results of the analysis performed.'	To summarise and report the results and compliance performance for periodically monitored parameters in wastewater.

Proposed Condition Number:	Proposed Change:	Justification:
7.4.3	To include a requirement that 'The Operator shall report a summary of compliance with the Trade Effluent Consent for emission point W1.'	To maintain an overview of compliance with the discharge to sewer controlled by the Scottish Water Trade Effluent Consent.
Table 7.4	To include additional parameters for groundwater monitoring: ammoniacal nitrogen as N, biochemical oxygen demand, total phosphate, BTEX Benzene, Toluene, Ethylbenzene, Xylene) and MTBE (Methyl Tertiary Butyl Ether), Any other RHS or substance specified on the Soil and Groundwater Monitoring Plan not specifically listed above. And to require that: 'Boreholes downfield of the fuel bunker drainage system annually for: pH; all metals; ammoniacal nitrogen as N; biological oxygen demand; sulphate; total phosphorus, and BTEX, and for the first monitoring after First Operation, parameters as above and also: Polychlorinated dibenzo-p-dioxin/furan(s); Polybrominated dibenzo-p-dioxins and furans, and PAH (USEPA speciated.'	To ensure a comprehensive suite of monitoring parameters appropriate for this facility as recommended by SEPA Land Contaminated specialist.
Table 7.5	To include additional parameters for soil monitoring: as noted for Table 7.4 above.	As noted for Table 7.4 above.
Table 9.1	To include a requirement for ambient air monitoring in the locale.	To gather information on local air quality to verify the Air Quality Assessment modelling predictions.
Schedule 10	Conditions are taken from the Medium Combustion Plant template with inputs appropriate for this facility.	To regulate MCPD activities i.e. the diesel fuelled Emergency Diesel Generator which will operate for less than 500h per annum.
Officer:	CO	

9 Emission Limit Values or Equivalent Technical Parameters/Measures

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**

Outline the changes required and provide justification below:

9.1 Emission limit values – Air

The approach adopted in the setting of air Emission Limit Values (ELVs) was to consider and compare:

- Legislative requirements (Including BAT-AELs),
- Indicative BAT levels,

- Impact on the receiving environment,
- Likely variation which will arise during normal operation (BAT being employed)/Abnormal Operation,
- Possible future modes and their consequences,
- Capabilities of the monitoring and testing system employed,
- Operational performance/experience from similar systems operated elsewhere.

Legislative requirements (Including BAT-AELs) are set where considered to be applicable based on indicative BAT limits or levels from appropriate guidance, manufacturer's data/guarantees with respect to expected performance and the resultant predicted impact on the receiving environment. Limits are initially set at the top of the BAT-AEL range and will be reviewed when sufficient operational data is generated. See Appendix C.

Legislative Requirements (including BAT-AELs)

1. **Chapter IV of the Industrial Emissions Directive (IED)(2010/75/EU) - Special provisions for waste Incineration Plants and waste co-incineration plants confirms the following & Annex VI**

   Normal Operation

   IED Annex VI (Part 3) confirms the Emission Limit Values (ELVs) which apply during the normal operation of the waste incineration plant (excluding start up and shutdown periods where no waste is being incinerated). Note - BAT-AELs may require that ELVs are set which are lower than the IED ELVs.

   ELVs are specified for the following averaging periods and detailed in Table 6.2 in Schedule 6 of the Permit:

   a) 30 minute averages for the following parameters which must be monitored on a continuous basis: particulate matter, NOx, SO2, CO, gaseous and vaporous organic substances, HCI 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 below for further details).

   b) 10 minute averages for CO; and

   c) Daily averages of particulate matter, NOx, SO2, CO, gaseous and vaporous organic substances, HCI, HF over the effective operating time based on the mean of the 10 minute averages for CO or the 30 minute averages for all other parameters.

   d) 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). Note – periodic monitoring is also required for other continuously monitored parameters in Table 6.2. See Appendix C and Section 5.9.1 Monitoring for further detail.

   Abnormal Operation *(Article 46(6) (4 hours correction period) & Article 47 (Breakdown))*

   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.

Application supporting information Section 2.7 and Table 11 discusses compliance with IED Chapter IV - Special provisions for waste Incineration plants and waste co-incineration plants.

2. The Best Available Techniques (BAT) Conclusions for Waste Incineration (WI BATCs)

These were published on 3 December 2019 and include a list of BAT 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.

Application supporting information Section 2.7 and Table 12 discusses compliance with BAT conclusions.

The BAT-AELs take precedence over IED ELVs for the same averaging periods. The specific ELVs based on BAT-AELs which have been set in the Permit are included in Table 6.2 in Schedule 6. 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 (Abnormal Operation) 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 Condition 5.4.5.

Monitoring is also required by the WI BATCs for some additional parameters which do not have associated ELVs in either IED or the WI BATCs. These parameters 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 dioxin-like PCBs as well as nitrous oxide have therefore also been included in Table 6.2 and Table 6.2a of the Permit. See Section XXX for further details of monitoring requirements for emissions to air.

Application supporting information Section 2.5.5.1 discusses air monitoring requirements in compliance with IED, BRef and BATc.

3. Medium Combustion Plant

The Emergency Diesel Generator with a net rated thermal input of around 3.8 MW is a Medium Combustion Plant, described in Condition 1.1.3 b) of the draft permit. The generator is expected to operate well below 500 hours per annum and as such no ELVs apply. Periodic monitoring is required for NO_X and CO at whichever is most frequent; 1,500 hours of operation or once every 5 years. The specific requirements for the emergency diesel generator are detailed in Schedule 10 of the draft Conditions and discussed above in section 5.9.1.

The air ELVs set for the proposed EfW Facility are confirmed in Tables 6.2, 6.2a and 10.2 of the permit. As they are in line with legislative requirements and there is no significant impact on the

receiving environment, they have been determined to represent BAT for the proposed installation.

9.2 Emission limit values – Water

Discharge to Sewer

The facility has been designed to minimise water consumption and promote reuse of wastewater within the process. This includes provision for the collection, storage, distribution, and reuse of wastewater produced in the process in order to minimise potable water consumption. Any excess wastewater will be discharged to sewer for disposal along with contaminated surface water and foul water. See section 5.3.1 of this document.

The discharge to sewer will have emission limits imposed by the Scottish Water Trade Effluent Consent. The detail of this consent is not yet available. A requirement for monitoring has been set in permit Table 7.1 for a typical range of parameters for the discharge to sewer from EfW activities: temperature, flow, pH, Total Suspended Solids and Total Organic Carbon. The Trade Effluent Consent will be reviewed when it is submitted and the parameters in Table 7.1 reviewed and adjusted if required.

Discharge to Surface Water.

A surface water collection and treatment system for the uncontaminated surface water runoff is proposed in the form of a Sustainable Urban Drainage System (SUDS) prior to discharge to an unnamed tributary ditch discharging to the Dundonald Burn. The original application did not envisage this disposal route for wastewater. See Section 5.3.1 of this document. Monitoring of the following parameters for which ELVs have been set is proposed.

Parameter / Substance	Emission Benchmark	ELV	Rational
Flow (litres/second)	No applicable benchmarks identified as the discharge represents a non-continuous surface water discharge of low pollution risk .	7.6 l/s	The emission represents a non-continuous surface water discharge from areas of low pollution risk and as such the proposed ELVs have been set in line with the understood system capabilities and limiting any offsite impact.
pH		6 to 9	
Temperature (°C)		30 °C	
Total suspended solids (mg/l)		60 mg/l	
Total Organic Carbon (mg/l)		40 mg/l	

As it is assessed that there is no significant impact on the receiving environment and the Dundonald Burn SSSI, they have been determined to represent BAT for the proposed installation.

9.3 Emission Limit Values - Land

There are no proposed emissions to land of liquid or solid waste or pollutants.

9.4 Emission Limit Values – Noise and Vibration

There are no proposed emission limit values for noise or vibration. Controls for noise will be reviewed when monitoring is received.

Officer:	CO

10 Peer Review

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

Comments made:

Draft Permit – Fully updated in line with the latest SEPA and EA guidance, BAT Conclusions, Legislative Requirements and SEPA's EFW Permit template. Checked against numerous issued EFW permits to ensure all best practice is captured.

Draft decision document – Comprehensive document reviewing all relevant Environmental and Human Health aspects of the application and outlining how each part of the determination has been made with robust justification.

Determination – Determination approved and Permit to be issued subject to PPD responses.

Officer:	PR

11 Final Determination

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,
- Planning permission for the activity is in force,
- 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.

Appendix A – Summary of Compliance with Industrial Emissions Directive (2010/75/EU) CHAPTER IV - SPECIAL PROVISIONS FOR WASTE INCINERATION PLANTS AND WASTE CO-INCINERATION PLANTS and ANNEX VI – Technical Provisions Relating to Waste Incineration Plant and Waste Co-Incineration Plants

IED Article	Requirement from IED CHAPTER IV or ANNEX VI	Compliance
Article 42 – Scope		
42 (1)	Defines what plant the chapter applies to (incineration plants and waste co-incineration plants which incinerate or co-incinerate solid or liquid waste.) and what plant it doesn't (gasification or pyrolysis plants, if the gases resulting from this thermal treatment of waste are purified to such an extent that they are no longer a waste prior to their incineration and they can cause emissions no higher than those resulting from the burning of natural gas). Further defines what is considered within the definition of Incineration Plant (incineration lines, waste reception, storage, waste-, fuel- and air-supply systems, boilers etc.)	Oldhall ERF is a waste incineration plant falling within the scope of Chapter IV therefore these Special Provisions apply.
42 (2)	Confirms what would be considered excluded plant based on a) plant treating specific waste types and b) experimental plant with a throughput of <50 tonnes.	Exclusions do not apply.
Article 43 - Definition of residue		
43	'residue' shall mean any liquid or solid waste which is generated by a waste incineration plant or waste co-incineration plant.	Confirms Incinerator Bottom Ash and Air Pollution Control Residues are incineration residues.
Article 44 - Applications for permits		
44	An application for a permit for a waste incineration plant shall include a description of the measures which are envisaged to guarantee that the following requirements are met: (a) the plant is designed/equipped/maintained/operated to meet the requirements of this Chapter; (b) the heat generated during the incineration process is recovered as far as practicable through the generation of heat, steam or power; (c) the residues will be minimised in their amount and harmfulness and recycled where appropriate; (d) the disposal of the residues which cannot be prevented, reduced or recycled will be carried out in conformity with national and Union law.	The application documents with their associated reports and appendices as well as the response to SEPAs Further Information Notice are considered sufficient to satisfy this Article. **Article Met**
Article 45 – Permits conditions		
45 (1)	The permit shall include the following: (a) a list of all types of waste which may be treated …European Waste List …; (b) the total waste incinerating capacity of the plant; (c) the limit values for emissions into air and water; (d) the requirements for the pH, temperature and flow of wastewater discharges; (e) the sampling and measurement procedures / frequencies … for emission monitoring; (f) the maximum permissible period of any technically unavoidable stoppages, disturbances, or failures of the purification devices or the measurement devices, during which the emissions into the air and the discharges of waste water may exceed the prescribed emission limit values	The draft Conditions included within the draft Permit cover all of the aspects detailed and therefore satisfy the requirements of this Article. Note: no process effluent from flue gas abatement as the selected technique is dry abatement therefore ELVs to water do not apply. **Article Met**
45 (2)	In addition to the requirements set out in paragraph 1, the permit granted to a waste incineration plant or waste co-incineration plant using hazardous waste shall include the following:.	The facility will not be permitted to incinerate hazardous waste. **Article Not Applicable**
45 (3)	Member States may list the categories of waste to be included in the permit which can be co-incinerated in certain categories of waste co-incineration plants	The facility is not a co-incineration plant. **Article Not Applicable**
45 (4)	The competent authority shall periodically reconsider and, where necessary, update permit conditions.	Permit Conditions are kept under review on an ongoing basis and the permit will be reviewed in entirety on a periodic basis. **Article Met**
Article 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.	An appropriate air quality assessment has been undertaken that includes consideration of the proposed stack height. Considered sufficient to satisfy the requirements of this Article. **Article Met**

IED Article	Requirement from IED CHAPTER IV or ANNEX VI	Compliance
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. If in a waste co-incineration plant more than 40 % of the resulting heat release comes from hazardous waste, or the plant co-incinerates untreated mixed municipal waste, the emission limit values set out in Part 3 of Annex VI shall apply.	Emission limit values have been set in the draft Permit (Schedule 6) which meet or are more stringent than those defined in the IED. The facility is not a co-incineration plant and the second paragraph does not apply. **Article Met**
46 (3)	Discharges to the aquatic environment of waste water resulting from the cleaning of waste gases shall be limited as far as practicable and the concentrations of polluting substances shall not exceed the emission limit values set out in Part 5 of Annex VI.	Waste gases are not cleaned through use of wet techniques which generate wastewater. The facility has been designed to minimise water consumption and maximise reuse of waste water within the process to minimise channelled emissions of process water. **Articles Not Applicable**
46 (4)	The emission limit values shall apply at the point where waste waters from the cleaning of waste gases are discharged from the waste incineration plant or waste co-incineration plant. When waste waters from the cleaning of waste gases are treated outside the waste incineration plant … Under no circumstances shall dilution of waste water … (Refer to the IED for full text)	
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.	The measures proposed in the application, Further Information Notice and additional information are considered sufficient to satisfy the requirements of this Article. **Article Met**
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 4 hours uninterrupted where emission limit values are exceeded. The cumulative duration of operation in such conditions over 1 year shall not exceed 60 hours.	These requirements are implemented by Condition 5.4.2 (4 hours operation) and 5.4.4 (60 hours in a year) in the draft permit with further supporting requirements included in Condition 5.4. This satisfies the requirements of this Article. **Article Met**
Article 47 – Breakdown		
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.	This requirement is implemented via Condition 5.4.1 in the draft Permit. This satisfies the requirements of this Article. **Article Met**
Article 48 – Monitoring of emissions		
48 (1)	Member States shall ensure that the monitoring of emissions is carried out in accordance with Parts 6 and 7 of Annex VI	Schedule 6 of the draft Permit defines the monitoring required which meets or exceeds the requirements of the IED. This satisfies the requirements of this Article. **Article Met**
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.	Schedule 6 in the draft Permit implements these requirements. This satisfies the requirements of these Articles. **Articles Met**
48 (3)	The competent authority shall determine the location of the sampling or measurement points to be used for monitoring of emissions.	
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.	
48 (5)	As soon as appropriate measurement techniques are available within the Union, the Commission shall, by means of delegated acts in accordance with Article 76 and subject to the conditions laid down in Articles 77 and 78, set the date from which continuous measurements of emissions into the air of heavy metals and dioxins and furans are to be carried out.	Permit conditions require accelerated testing for emissions of mercury and dioxins and furans to assess during early operation whether continuous or long term monitoring is required for these parameters. **Article Met**

Article 49 – Compliance with emission limit values		
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.	This Article sets out how compliance with emission limits is assessed. Emission limit values and the requirements for compliance as set out in this Article have been set in the draft Permit for air in Schedule 6 and water in Schedule 7. This satisfies the requirements of this Article. **Article Met**
Article 50 – Operating conditions		
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.	This requirement is implemented in Schedule 5 and Condition 5.1.1 a) in the draft Permit and compliance will be confirmed through inspection and assessment of submitted analytical reports. This satisfies the requirements of this Article. **Article Met**
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. Waste co-incineration plants shall …. If hazardous waste ….	This requirement is implemented in Schedule 5 Conditions 5.1.1 c) & d) in the draft Permit. This satisfies the requirements of this Article. Oldhall ERF is not a co-incineration plant and is not permitted to take hazardous waste therefore second and third paragraphs do not apply. **Article Met**
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 26 April 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.	This requirement is implemented in Schedule 5 Conditions 5.1.2 and 5.1.3 in the draft Permit. The auxiliary burner will be fuelled by natural gas. This satisfies the requirements of this Article. **Article Met**
50 (4)	Waste incineration plants and waste co-incineration plants shall operate an automatic system to prevent waste feed in the following situations: 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	This requirement is implemented in Schedule 5 Condition 5.3.2 in the draft Permit and will be confirmed during commissioning tests. This satisfies the requirements of this Article. **Article Met**
50 (5)	Any heat generated by waste incineration plants or waste co-incineration plants shall be recovered as far as practicable.	This requirement is implemented in the Conditions in Schedule 2.7. Recovery of energy at high efficiency is also a requirement in the PPC Regulations and SEPAs TTWG. The application indicates that the facility should comply with the requirements for energy efficiency during startup and later export of heat. This satisfies the requirements of this Article. **Article Met**
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.	Not proposed or permitted to incinerate infectious clinical waste. **Article Not Applicable**

50 (7)	Member States shall ensure that the waste incineration plant or waste co-incineration plant is operated and controlled by a natural person who is competent to manage the plant.	This requirement is implemented in Schedule 2.12 Condition 2.12.3. Conditions 2.12.4 to 2.12.6 also require that SEPA be informed of any change of technically competent personnel or their status as a Fit and Proper Person to manage the facility. This satisfies the requirements of this Article. **Article Met**
Article 51 – Authorisation to change operating conditions		
51 (1)	Conditions different from those laid down in Article 50(1), (2) and (3) and as regards the temperature, paragraph 4 of that Article and specified in the permit for certain categories of waste may be authorised or for certain thermal processes, may be authorised by the competent authority provided the other requirements of this Chapter are met. Member States may lay down rules governing these authorisations.	Permit conditions align with the requirements of Article 50(1), (2) and (3) and the operational temperature proposed aligns with the IED requirements for non-hazardous waste. Oldhall ERF is not a co-incineration plant or bark boilers. **Articles Not Applicable**
51 (2)	For waste incineration plants, the change of the operating conditions shall not cause more residues or residues with a higher content of organic polluting substances compared to those residues which could be expected under the conditions laid down in Article 50(1), (2) and (3).	
51 (3)	Emissions of total organic carbon and carbon monoxide from waste co-incineration plants … Emissions of total organic carbon from bark boilers within the pulp and paper industry co-incinerating waste…	
51 (4)	Member States shall communicate to the Commission all operating conditions authorised under paragraphs 1, 2 and 3 and the results of verifications made as part of the information provided in accordance with the reporting requirements under Article 72.	
Article 52 – Delivery and reception of waste		
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.	This requirement is implemented in Schedule 4 in the draft Permit. Waste will be received in covered vehicles and unloaded directly into the waste bunker. The waste reception area and bunkers are subject to air extraction and odour abatement and the bunkers have been designed and constructed to be impermeable to liquids. This satisfies the requirements of this Article. **Article Met**
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.	This requirement is implemented via Schedule 3.3 Conditions and Schedule 4 of the draft Permit setting out wastes which are permitted to be received and how they must be managed. This satisfies the requirements of this Article. **Article Met**
52 (3)	Prior to accepting hazardous waste at the waste incineration plant or waste co-incineration plant, the operator shall collect available information about the waste for the purpose of verifying compliance with the permit requirements specified in Article 45(2). That information shall cover the following:	Oldhall ERF is not permitted to incinerate hazardous waste. **Article Not Applicable**
Article 53 – Residues		
53 (1)	Residues shall be minimised in their amount and harmfulness. Residues shall be recycled, where appropriate, directly in the plant or outside	This requirement is implemented in Schedule 8 of the draft Permit. Operational conditions will be optimised to ensure effective burn out for IBA. APCr is stored in contained silos and offloaded to road transport vehicles in a dust abated system. Test will be carried out to ensure each residue is characterised according to the parameters listed in Table 8.1 to allow allocation to the correct waste code including total soluble fraction and heavy metals soluble fraction. This satisfies the requirements of this Article. **Articles Met**
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.	
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.	

Article 54 – Substantial change		
54	A change of operation of a waste incineration plant or a waste co-incineration plant treating only non-hazardous waste in an installation covered by Chapter II which involves the incineration or co-incineration of hazardous waste shall be regarded as a substantial change.	Not applicable to this application. **Article Not Applicable**
Article 55 – Reporting and public information on waste incineration plants and waste co-incineration plants		
55 (1)	Applications for new permits for waste incineration plants and waste co-incineration plants shall be made available to the public at one or more locations for an appropriate period to enable the public to comment on the applications before the competent authority reaches a decision. That decision, including at least a copy of the permit, and any subsequent updates, shall also be made available to the public.	Application documents, SEPAs draft determination and draft permit are made available to the public for consideration and comment via the web based consultation hub. Submissions provided in connection with conditions in any issued Permit would be made available on SEPAs Public Register. This includes making monitoring data publicly available and an annual report detailing the performance of the facility. Monitoring data is also required to be published on a publicly accessible web page, draft condition 6.1.13. This satisfies the requirements of this Article. **Articles Met**
55 (2)	For waste incineration plants or waste co-incineration plants with a nominal capacity of 2 tonnes or more per hour, the report referred to in Article 72 shall include information on the functioning and monitoring of the plant and give account of the running of the incineration or co-incineration process and the level of emissions into air and water in comparison with the emission limit values. That information shall be made available to the public.	
55 (3)	A list of waste incineration plants or waste co-incineration plants with a nominal capacity of less than 2 tonnes per hour shall be drawn up by the competent authority and shall be made available to the public.	Not relevant to this application. **Article Not Applicable**
ANNEX VI - Technical provisions relating to waste incineration plants and waste co-incineration plants		
Part 1	Definitions (considered New Plant)	Where necessary these have been included in the draft permit Interpretation of Terms. **Article Met**
Part 2	Equivalence factors for dibenzo-p-dioxins and dibenzofurans	These are included in the permit in Tables 6.5. This satisfies the requirements of this Article. **Article Met**
Part 3	Air emission limit values for waste incineration plants, sections 1. Applicable ELVs and reference conditions – Normal Operation 2. Applicable ELVs when Article 46(6) (4 hours correction period) & Article 47 (Breakdown)	IED emission limits have been applied unless stricter limits are required by other guidance or the later published BAT Conclusions document. Permitted emission limits are contained in Tables 6.2 and 6.2a. This satisfies the requirements of this Article. **Article Met**
Part 4	Determination of air emission limit values for the co-incineration of waste	The Oldhall ERF is not a co-incinerator. **Article Not Applicable**
Part 5	Emission limit values for discharges of waste water from the cleaning of waste gases	The Oldhall ERF does not operate wet cleaning of flue gases. **Article Not Applicable**
Part 6	Monitoring of emissions	IED monitoring requirements have been applied unless alternative requirements are required by other guidance or the later published BAT Conclusions document. Permitted emission limits are contained in Tables 6.2 and 6.2a. This satisfies the requirements of this Article. **Article Met**

Part 7	Formula to calculate the emission concentration at the standard percentage oxygen concentration	Draft permit condition 6.1.5 defines the oxygen concentration for standardisation of monitored emissions to air from the incinerator and condition 6.1.4 requires all monitoring results be corrected to that level. The IED formula for correction is the standard industry methodology. This satisfies the requirements of this Article. **Article Met**
Part 8	Assessment of compliance with emission limit values	Draft permit conditions in Schedule 6.1 set out the compliance requirements for emissions to air to align with IED requirements for example conditions 6.1.6 to 6.1.10. This satisfies the requirements of this Article. **Article Met**

Appendix B – Summary of Compliance With Waste Incineration BAT Conclusions

The Waste Incineration BAT conclusions documents should be referred to for full text of BATc requirements.

BATc type: 'BAT-AEL' is where the BAT conclusion contains explicit BAT – Associated Emission Limits, 'narrative' is where BATc do not contain explicit emission limits

BAT Conclusions Reference No.	**Aspect**	**Type of BATc**	**Summary of BATc Requirement (**in **BOLD), Applicant Summary Information (**from Supporting Information Table 12, in *ITALIC*) **and Compliance Evidence and Permit Controls**	**Considered BAT**
1.1 Environmental Management Systems				
BAT 1	Environmental Management Systems (EMS)	Narrative	**In order to improve the overall environmental performance, BAT is to elaborate and implement an environmental management system (EMS) that incorporates all of the following features (see points (i) to (xxviii) under BAT1):** *A general summary of the proposed EMS is presented in Section 2.10 of the Supporting Information. The EMS will be developed throughout the development stage of the project and will be accredited to a suitably recognised standard. It is proposed that a pre-operational condition in included within the PPC Permit which requires Doveryard to provide a summary of the proposed EMS prior to commencement of operation.* See also the question 2 FIN response. The companies involved in this facility have wider experience of other similar solid fuel combustion activities and will draw on that experience to set in place a suitable EMS. A commitment is provided that the EMS will be accredited to ISO 14001 certification and examples of procedures have been provided with the question 2 FIN response. **Permit Controls:** Condition 3.7.1 sets out the requirement to define, record and implement systems to meet the requirements of BATc BAT1. In addition, there are permit conditions to explicitly require specific managements plans in relation to some aspects with the potential to impact on the immediate surrounding environment, such as odour (3.2.2), noise (3.1.3) and accidents (2.5.7). The adequacy of the EMS put in place, adherence to it and compliance with those aspects captured within the Permit will be assessed both during the commissioning and operational phases through ongoing inspection.	**Yes**
1.2 Monitoring				
2	Energy Efficiency See also BAT 20	Narrative	**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. (see also BAT 20)** *Section 2.8.2.4 of the Supporting Information states: In accordance with BAT 2 of the BREF, during commissioning of the Facility, the Performance Test will be undertaken at full load to assess the energy efficiency of the Facility.* *As stated in section 2.8.2.4 of the Supporting Information, the gross electrical efficiency of the plant is calculated to be approximately 29.02%. Therefore, Doveryard understands that this satisfies the requirements of BAT 2.* In the case of a new incineration plant with a condensing turbine, the gross electrical efficiency must be determined by carrying out a performance test at full load. The need to carry out a performance test at full load is acknowledged by the applicant and is to be undertaken during the commissioning of the plant. The gross electrical efficiency of the plant as stated in the revised Heat and Power Plan r4.0 is 28.5% when operating on electrical export alone and 25.2% when exporting the average heat demand. **Permit Controls:** Condition 2.7.7 requires the determination of the gross electrical efficiency. Condition 2.7.8 requires submission of 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. It should also be noted that there are additional drivers for ensuring energy efficiency than those described in the BAT Conclusions. These include the PPC Regulations, Energy Efficiency Directive and compliance with SEPAs Thermal Treatment of Waste Guidelines (TTWG). Further detail on the compliance with these aspects including the details of heat supply to a local district heating scheme can be found in Section 5.5.2 of this document. Compliance and potential for wider energy efficiency improvements will be assessed during commissioning and through ongoing inspection.	**Yes**

<table>
<tr><th colspan="2">BAT Conclusions Reference</th><th>Type of BATc</th><th>Summary of BATc Requirement (in BOLD), Applicant Summary Information (from Supporting Information Table 12, in ITALIC) and Compliance Evidence and Permit Controls</th><th>Considered BAT</th></tr>
<tr><th>No.</th><th>Aspect</th><th></th><th></th><th></th></tr>
<tr><td>3</td><td>Monitoring of Process Parameters</td><td>Narrative</td><td>
BAT is to monitor key process parameters relevant for emissions to air and water including those given below.

As set out in Section 2.5.2 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 Facility – therefore, the process parameters to be monitored for emissions to water as listed in BAT 3 do not apply to the Facility. Doveryard can confirm that the Facility will include for monitoring of the key process parameters relevant for emissions to air in accordance with BAT 3.

<table>
<tr><th>Stream/Location</th><th>Parameter(s)</th><th>Monitoring</th><th>Comment</th></tr>
<tr><td>Flue-gas from the incineration of waste</td><td>Flow, oxygen, pressure, temperature, water vapour content</td><td rowspan="2">Continuous</td><td rowspan="2">The applicant has identified the need to monitor these process parameters at the specified location and frequency. This has been formally captured in the Permit.</td></tr>
<tr><td>Combustion chamber</td><td>Temperature</td></tr>
<tr><td>Waste water from wet Flue Gas Cleaning</td><td colspan="3">Not Applicable – This activity is not carried out at site – dry flue gas treatment is proposed, and no process wastewater will be generated from flue gas treatment.</td></tr>
<tr><td>Waste water from bottom ash treatment plants</td><td colspan="3">Not Applicable – This activity is not carried out at site – ash is removed from site for treatment elsewhere.</td></tr>
</table>

Permit Controls:
Conditions to implement the BAT conclusion requirements for key process parameters for emissions to air from the incineration plant are contained within the Permit (Schedule 5 and 6, Table 6.3). The process parameters for emissions to water from wet flue gas cleaning do not apply and are not considered within the Permit. Details of the CEMs system will be confirmed prior to commissioning and assessed during inspection.
</td><td>Yes</td></tr>
<tr><td>4</td><td>Monitoring of Channelled Emissions to Air</td><td>Narrative</td><td>
BAT is to monitor channelled emissions to air with at least the frequency given below 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 2.5.1.1 of the Supporting Information, emissions to air will be monitored with frequencies in accordance with the requirements of the BREF. The methods and standards used for emissions monitoring will be in compliance with BREF requirements and other appropriate requirements. Doveryard considers that the proposals for monitoring of emissions to air are in accordance with the requirements of BAT 4.

The applicant has confirmed that they will monitor the following parameters at the frequency defined in the IED or relevant guidance. The SEPA Waste Incineration Permit Template defines the latest standard methodology and also includes additional monitoring.

<table>
<tr><th>Substance / Parameter</th><th>Frequency Indicated In The Application</th><th>Comment</th></tr>
<tr><td>NO_X</td><td>Continuous</td><td>The permit also requires this parameter is monitored once every six months during the periodic monitoring exercise.</td></tr>
<tr><td>NH_3</td><td>Continuous</td><td>The permit also requires this parameter is monitored once every six months during the periodic monitoring exercise.</td></tr>
<tr><td>N_2O</td><td>Periodic</td><td>The application states periodic measurement only however SEPA has included this as a continuous monitoring requirement as a BATc requirement, BAT 4.</td></tr>
<tr><td>CO</td><td>Continuous</td><td>The permit also requires this parameter is monitored once every six months during the periodic monitoring exercise.</td></tr>
<tr><td>SO_2</td><td>Continuous</td><td>The permit also requires this parameter is monitored once every six months during the periodic monitoring exercise.</td></tr>
<tr><td>HCl</td><td>Continuous</td><td>The permit also requires this parameter is monitored once every six months during the periodic monitoring exercise.</td></tr>
<tr><td>HF</td><td>Periodic</td><td>The permit also requires this parameter is monitored once every six months during the periodic monitoring exercise.</td></tr>
<tr><td rowspan="2">Dust (Particulates)</td><td>N/A</td><td>BAT 4 requires monitoring once per year if bottom ash treatment is caried out. Not applicable as no bottom ash treatment is carried out on the facility.</td></tr>
<tr><td>Continuous</td><td>The permit also requires this parameter is monitored once every six months during the periodic monitoring exercise.</td></tr>
<tr><td>Metals and metalloids except Hg (As, Cd, Co, Cr, Cu, Mn, Ni, Pb, Sb, Tl, V)</td><td>Once every 6 months</td><td>None</td></tr>
</table>
</td><td>Yes</td></tr>
</table>

BAT Conclusions Reference No.	BAT Conclusions Reference Aspect	Type of BATc	Summary of BATc Requirement (in **BOLD**), Applicant Summary Information (from Supporting Information Table 12, in *ITALIC*) and Compliance Evidence and Permit Controls	Considered BAT

Hg	Continuous / Once every 6 months	BAT Conclusion 31, Table 8 note (1) allows for plants incinerating wastes with a proven low and stable mercury content to monitor periodically with a minimum frequency of once every six months as opposed to continuously. A requirement to carry out a programme of accelerated periodic sampling has been incorporated into the permit to rapidly generate data on mercury emissions shortly after operation starts to confirm whether it is appropriate to continue with periodic sampling or whether continuous sampling is required, condition 6.5.1.
TVOC	Continuous	The permit also requires this parameter is monitored once every six months during the periodic monitoring exercise.
PBDD/F (brominated analogues of dioxins and furans)	None	This parameter is not discussed in the application as the application was received prior to confirmation that monitoring is required. SEPA has included monitoring for this parameter in the permit at a frequency once every six months.
PCDD/F (polychlorinated dibenzodioxins and furans)	Short Term Once every 6 months Long Term Once per month	BAT Conclusion 30, Table 7 note (2) allows for plants incinerating wastes with a proven stable dioxin and furan content to monitor periodically with a minimum frequency of once every six months as opposed to long term. A requirement to carry out a programme of accelerated periodic sampling has been incorporated into the permit to rapidly generate data on dioxin and furan emissions shortly after operation starts to confirm whether it is appropriate to continue with periodic sampling or whether continuous sampling is required, condition 6.5.2.
Dioxin-like PCBs	Short Term Once every 6 months Long Term Once per month	This monitoring does not apply if the emission levels are proven to be sufficiently stable. A programme of dioxin/furan and dioxin-like PCB monitoring to determine whether emissions are stable has been incorporated in the permit, condition 6.5.2.
Benzo[a]pyrene	Once every year	The permit requires that Polycyclic Aromatic Hydrocarbons will be monitored once every six months which exceeds the BAT requirement.

Section 2.5.1.1 of the Supporting Information confirms that the CEMS equipment will be certified to the MCERTS standard and periodic monitoring will be carried out to CEN or equivalent standards (e.g. ISO, national, or international standards).

Permit Controls:
Conditions to ensure the monitoring of channelled emissions to air in line with the BAT conclusion requirements are contained within Permit Schedule 5 and 6, and Tables 6.2 and 6.2a. Additional monitoring requirements have been included in Table 6.2 with respect to monitoring requirements for carbon dioxide and polybrominated dibenzodioxins and furans. Additional conditions requiring accelerated periodic sampling of mercury and polychlorinated dibenzodioxin and furans and dioxin-like PCB are also included in the permit:

6.5.1 Programme of mercury monitoring to determine whether emissions are low & stable
6.5.2 Programme of dioxin/furan and dioxin-like PCB monitoring to determine whether emissions are stable

Details of the CEMs system will be confirmed prior to commissioning and assessed during inspection.

BAT Conclusions Reference No.	Aspect	Type of BATc	Summary of BATc Requirement (in **BOLD**), Applicant Summary Information (from Supporting Information Table 12, in *ITALIC*) and Compliance Evidence and Permit Controls	Considered BAT
5	Monitoring of Emissions to Air during OTNOC (Other Than Normal Operating Conditions)	Narrative	**BAT is to appropriately monitor channelled emissions to air from the incineration plant during OTNOC.** *Doveryard Ltd 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, Doveryard Ltd are not able to confirm how the Facility will comply with BAT 5. Doveryard 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.* BAT 4 allows for monitoring to be carried out by direct emission measurements (installed CEMs) or by monitoring of surrogate parameters if this proves to be of equivalent or better scientific quality. Emissions during start-up and shutdown while no waste is being incinerated, including emissions of PCDD/F, are estimated based on measurement campaigns, e.g. every three years, carried out during planned start-up/shutdown operations. At the time of application, the monitoring requirements during OTNOC had not been confirmed. OTNOC monitoring is required through permit condition 5.4.6 e) and this will cover emissions of PCDD/F according to the issued OTNOC startup and shutdown guidance issued. During the period that the combustion process is operating, the continuous emission monitoring system (CEMS) will operate, including during OTNOC. **Permit Controls:** Conditions to ensure the monitoring of channelled emissions to air during OTNOC in line with the BAT conclusion requirements are contained within the Permit (Schedule 5 and 6, Table 6.2a). Details of the CEMs system will be confirmed prior to commissioning and assessed during inspection.	**Yes**
6	Monitoring of Emissions to Water	Narrative	**BAT is to monitor emissions to water from FGC and/or bottom ash treatment with at least the frequency given below 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 explained in section 1.3.6 of the Supporting Information, the Facility 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 of bottom ash. Therefore, it is understood that the requirements of BAT 6 are not applicable to the Facility.* The applicant has confirmed that: a) The FGC system will be a dry process, that will not result in any aqueous emissions. b) There is no IBA treatment on site. After quenching, IBA will be exported and treated off site, at an appropriately licensed facility. **BAT Conclusion not considered applicable.** Note – there will be a process wastewater emission from the facility to sewer which comprises excess boiler blow down and water treatment plant effluent which cannot be consumed in the IBA ash quench process. Process wastewater is co-discharged to sewer along with surface water collected from areas where there is potential for contamination. Discharges to sewer are primarily controlled through a Trade Effluent Consent issued by the sewerage provider, Scottish Water. This Trade Effluent Consent is not yet available. SEPA will review the controls and emission limits it contains and if necessary, adjust the permit to include additional controls. Although no limits are currently set in the permit, the permit contains conditions and monitoring requirements for the discharge to sewer in Schedule 7 and Table 7.1including continuous monitoring for flow, pH and temperature and periodic monitoring for BOD, TOC, suspended solids and hydrocarbons. In addition to process wastewater there will also be a surface water discharge to the adjacent Dundonald Burn. This is uncontaminated surface water but monitoring requirements have been incorporated into the permit	**N/A**
7	Monitoring of unburnt substances	Narrative	**BAT is to monitor the content of unburnt substances in slags and bottom ashes at the incineration plant with at least the frequency given below and in accordance with EN standards.** *Refer to section 2.5.2.1 of the Supporting Information. Doveryard considers that the proposals for monitoring of slags and bottom ashes are in accordance with the requirements of BAT 7.* Information is provided in the response to question 9 of the Further Information Notice which confirms that sampling, analysis and assessment of the analytical results will be carried out to the relevant standards and guidance. **Permit Controls:** Conditions requiring sampling and monitoring for unburnt substances in bottom ash are contained within the Permit (Schedule 8, Table 8.1). Monitoring procedures will be assessed during commissioning and through ongoing inspection.	**Yes**

<table>
<tr><th colspan="2">BAT Conclusions Reference</th><th rowspan="2">Type of BATc</th><th rowspan="2">Summary of BATc Requirement (in BOLD), Applicant Summary Information (from Supporting Information Table 12, in ITALIC) and Compliance Evidence and Permit Controls</th><th rowspan="2">Considered BAT</th></tr>
<tr><th>No.</th><th>Aspect</th></tr>
<tr><td>8</td><td>Monitoring of Persistent Organic Pollutants (POPs)</td><td>Narrative</td><td>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, waste water) after the commissioning of the incineration plant and after each change that may significantly affect the POP content in the output streams.

The Facility will not incinerate hazardous waste. Therefore, Doveryard does not consider that the requirements of BAT 8 are applicable to the Facility.

No Hazardous waste is permitted to be received or incinerated at the Installation.

The permitted EW codes which the facility can receive are EWC section 19 wastes: ‘WASTES FROM WASTE MANAGEMENT FACILITIES, OFF-SITE WASTEWATER TREATMENT PLANTS AND THE PREPARATION OF WATER INTENDED FOR HUMAN CONSUMPTION AND WATER FOR INDUSTRIAL USE’, Subsection 12: ‘wastes from the mechanical treatment of waste (for example sorting, crushing, compacting, pelletising) not otherwise specified’ and specifically:
19 12 10 combustible waste (refuse derived fuel), and
19 12 12 other wastes (including mixtures of materials) from mechanical treatment of wastes other than those mentioned in 19 12 11

EW code 19 12 10 and 19 12 12 can be used to consign POPs containing wastes such as shredded Waste Upholstered Domestic Seating. The applicant has confirmed the facility will not receive POPs waste streams.

BAT Conclusion not considered applicable.
Wastes prepared from Municipal Solid Waste may contain incidental traces of POPs therefore conditions have been applied in the permit to monitor for polybrominated dibenzo dioxin and furans in IBA and in incinerator flue gases to monitor for the presence of bromine which is a constituent of POPs fire retardants historically used in domestic seating and other items. Should POPs waste be received in future then review of this BATc should be undertaken.</td><td>Yes</td></tr>
<tr><td colspan="5">1.3 - General environmental and combustion performance</td></tr>
<tr><td>9</td><td>Prevent and reduce emissions to air when using a sour water steam stripping unit.</td><td>Narrative</td><td>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) given below, and, where relevant, also techniques (d), (e) and (f).

The relevant techniques are described in section 2.2 of the Supporting Information. It is understood that technique (f) of BAT 9 does not apply as the Facility will not incinerate hazardous waste. Doveryard considers that the proposed arrangements for the receipt and segregation of residual waste complies with the requirements of BAT 9.

<table>
<tr><th>Item</th><th>Technique</th><th>Comment</th></tr>
<tr><td>(a)</td><td>Determination of the types of waste that can be incinerated</td><td rowspan="4">The proposed facility is permitted to accept residual waste arising from municipal solid waste and commercial and industrial waste similar to municipal solid waste from which recyclable materials have been recovered to the point where further recovery is either not technically or economically viable.

The applicant has confirmed that procedures are to be implemented for the pre acceptance and acceptance of waste to site. Waste inspections will be carried out on deliveries and a quarantine area will be available where non-conforming waste can be temporarily stored awaiting removal from the facility. A contract is in place to define the waste specification.

Individual waste loads will be trackable until the waste is deposited in the facility fuel bunker. At this point, traceability is lost as the waste is mixed with the existing contents of the bunker to form a homogeneous fuel mix to feed the incinerator.</td></tr>
<tr><td>(b)</td><td>Set-up and implementation of waste characterisation and pre-acceptance procedures</td></tr>
<tr><td>(c)</td><td>Set-up and implementation of waste acceptance procedures</td></tr>
<tr><td>(d)</td><td>Set-up and implementation of a waste tracking system and inventory</td></tr>
<tr><td>(e)</td><td>Waste segregation (of different wastes)</td><td>Not applicable. Only defined waste streams arising from municipal solid waste and commercial and industrial waste of a similar nature are permitted to be accepted on site. Each waste load will therefore be from the same general waste source and segregation of different waste streams is not required.</td></tr>
<tr><td>(f)</td><td>Verification of waste compatibility prior to the mixing or blending of hazardous wastes</td><td>Not applicable. Hazardous waste is not permitted to be received or incinerated at the Installation.</td></tr>
</table>
It is considered that all applicable techniques have been adopted.

Permit Controls:
Conditions defining the wastes which are permitted to be accepted at the facility and the types of waste which are not permitted to be accepted are contained in permit Schedule 4. This includes a general requirement that no separately collected waste capable of being recycled is allowed to be incinerated (condition 4.1.3) and waste that is received must have been pre-treated to recover recyclable materials (Table 4.1).</td><td>Yes</td></tr>
</table>

BAT Conclusions Reference No.	Aspect	Type of BATc	Summary of BATc Requirement (in **BOLD**), Applicant Summary Information (from Supporting Information Table 12, in *ITALIC*) and Compliance Evidence and Permit Controls	Considered BAT
10	Improve Env performance of IBA treatment plant	Narrative	**In order to improve the overall environmental performance of the bottom ash treatment plant, BAT is to include output quality management features in the EMS (see BAT 1).** *The Facility will not include a bottom ash treatment plant within the installation boundary. Therefore, Doveryard does not consider that the requirements of BAT 10 apply to the Facility* No IBA treatment plant is proposed or permitted at the Installation. **BAT Conclusion not applicable.**	**N/A**
11	Waste Deliveries	Narrative	**In order to improve the overall environmental performance of the incineration plant, BAT is to monitor the waste deliveries as part of the waste acceptance procedures (see BAT 9(c)) including, depending on the risk posed by the incoming waste, the elements given below.** *Periodic monitoring of residual waste deliveries will be undertaken at the Facility - refer to section 2.2 of the Supporting Information. The Facility will not undertake radioactivity detection tests as it is not anticipated that any radioactive waste will be received. Doveryard considers that the proposed arrangements for monitoring the residual waste deliveries as part of the waste acceptance procedures complies with the requirements of BAT 11.*	**Yes**

Waste Type	Waste delivery monitoring
Residual fuel from treatment of municipal solid waste and other non-hazardous waste	Radioactivity detection is indicated as a potential monitoring requirement for incoming waste. SEPAs opinion is that in general terms UK radioactive substances regulation is sufficiently robust so as to minimise the risk of radioactive material inadvertently being sent to incinerators, therefore residual fuel arising from MSW and similar commercial and industrial waste poses a low risk. SEPA considers that the low general risk means that radioactivity detection does not represent BAT for the Installation and is not required. Monitoring including the weighing of the waste deliveries, visual inspection and periodic sampling and analysis of key properties/substances is proposed.
Sewage Sludge	Not applicable, this waste type is not permitted to be accepted at the facility
Hazardous waste other than clinical waste	Not applicable, this waste type is not permitted to be accepted at the facility
Clinical waste	Not applicable, this waste type is not permitted to be accepted at the facility

It is considered that the applicant has adopted all applicable monitoring requirements.

Permit Controls:
Conditions to control waste reception, inspection and storage in line with the BAT conclusion requirements are contained in permit Schedule 4. Waste reception procedures must be submitted to SEPA prior to First Acceptance of Waste, condition 2.8.16. Procedures will be assessed during commissioning and through ongoing inspection.

<table>
<tr><th colspan="2">BAT Conclusions Reference</th><th>Type of BATc</th><th>Summary of BATc Requirement (in BOLD), Applicant Summary Information (from Supporting Information Table 12, in ITALIC) and Compliance Evidence and Permit Controls</th><th>Considered BAT</th></tr>
<tr><th>No.</th><th>Aspect</th><th></th><th></th><th></th></tr>
<tr><td>12.</td><td>Reception, Handling and Storage of Waste</td><td>Narrative</td><td>In order to reduce the environmental risks associated with the reception, handling and storage of waste, BAT is to use both of the techniques given below.

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 Facility. 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 residual 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 of shutdown, provisions will be made for the residual waste to be backloaded from the bunker and transferred to alternative licensed waste management facilities. Doveryard considers that the proposed arrangements for environmental risks associated with the reception, handling and storage of residual waste comply with the requirements of BAT 11.

<table>
<tr><th>Item</th><th>Technique</th><th>Comment</th></tr>
<tr><td>(a)</td><td>Impermeable surfaces with an adequate drainage infrastructure</td><td>Waste reception, handling and storage areas are provided with impermeable surfacing and served by an appropriate drainage infrastructure. The integrity of all impermeable surfacing will be confirmed during construction and commissioning and then periodically through inspection. The applicant has confirmed the need to maintain the impermeable surfacing and the civil infrastructure (including drainage).</td></tr>
<tr><td>(b)</td><td>Adequate waste storage capacity</td><td>2000 tonnes of waste storage capacity is provided by the waste bunkers. The quantity of waste is to be regularly monitored against the maximum storage capacity to ensure the stated capacity is not exceeded. This is Conditioned within the Permit (4.2.1, 4.2.2 & 4.2.3).
The applicant has proposed measures to manage the waste loading on site during periods of planned maintenance as well as for extended periods of closure.

Other wastes will not be received at the facility and therefore the requirement to establish its residence time is not applicable.</td></tr>
</table>
It is considered that the applicant has adopted the necessary techniques.

Permit Controls:
Conditions to implement the techniques described above for example with respect to the maintenance of civil infrastructure (condition 3.7.2) and drainage (Schedule 7.5) as well as maximum storage capacity (4.2.1, 4.2.2 & 4.2.3) are defined in the permit. Waste controls will be assessed during commissioning and through ongoing inspection.
The maximum waste quantity to be stored at any one time is also linked to financial provision requirements (Schedule 2.13).</td><td>Yes</td></tr>
<tr><td>13</td><td>Storage and handling of clinical waste</td><td>BAT-AEL</td><td>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 given below.

The Facility will not be dedicated to the processing of clinical waste. In addition, the Facility will not receive hazardous clinical waste. Therefore, Doveryard considers that the requirements of BAT 13 are not applicable to the Facility.

Clinical waste is not permitted to be received or incinerated at the Installation.

BAT Conclusion not applicable.</td><td>N/A</td></tr>
<tr><td>14</td><td>Incineration Performance</td><td>BAT - AEL</td><td>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 Facility. A modern and advanced control system, incorporating the latest advances in control and instrumentation technology, will be utilised at the Facility to control operations, optimise the process relative to efficient heat release, good burn-out and minimum particle carry over. As described in Section 2.5.2 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; • 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. Doveryard considers that the proposed arrangements for ensuring the overall environmental performance of the incineration of residual waste, to reduce the content of unburnt substances in slags and bottom ashes, and to reduce emissions to air from the incineration of residual waste comply with the requirements of BAT 14.

<table>
<tr><th>Item</th><th>Technique</th><th>Comment</th></tr>
<tr><td>(a)</td><td>Waste blending and mixing</td><td>The applicant has confirmed that the overall operation of the facility will be governed by an advanced digital control system (DCS) monitored from a central control room.</td></tr>
</table></td><td>Yes</td></tr>
</table>

<table>
<tr><th colspan="2">BAT Conclusions Reference</th><th rowspan="2">Type of BATc</th><th rowspan="2">Summary of BATc Requirement (in BOLD), Applicant Summary Information (from Supporting Information Table 12, in ITALIC) and Compliance Evidence and Permit Controls</th><th rowspan="2">Considered BAT</th></tr>
<tr><th>No.</th><th>Aspect</th></tr>
<tr><td></td><td></td><td></td><td>
<table>
<tr><td></td><td></td><td>The applicant has confirmed that waste mixing will be carried out within the bunker through use of the fuel loading cranes when they are not employed in transferring waste to the incinerator fuel chute. This will ensure the waste introduced to the combustion chamber is as homogeneous as practical. Two bunkers are installed, the offloading bunker into which the incoming waste is tipped and the waste is then transferred to the fuelling bunker for transfer to the incinerator chute as demand requires.
The waste charging rate will also be monitored and recorded by the DCS, using automatic weighing cells fitted into the waste cranes that feed the waste into the furnace hopper.</td></tr>
<tr><td>(b)</td><td>Advanced control system</td><td>The DCS will control all process areas within the facility including incineration, steam systems and flue gas treatment. In addition, it will control the automatic emissions, process monitoring and waste interlocks etc. An uninterruptible power supply will be installed to provide power to maintain key control functions in the case of complete power loss should the emergency generator not start when required.</td></tr>
<tr><td>(c)</td><td>Optimisation of the incineration process</td><td>The application confirms that the design and the operation of the furnace will ensure effective combustion of waste through control of the waste feed rate to ensure proper fuel distribution on the grate, grate speed, the supply of primary and secondary combustion air and the addition of abatement chemicals into the flue gases. These will be regulated by the DCS which measures the steam flow rate, flue gas oxygen content and combustion temperature and controls the combustion process to ensure burnout of the waste, and minimisation of polluting emissions whilst controlling the rate of steam generation.
Optimisation of the incineration process will be carried out during commissioning.</td></tr>
</table>
BAT 14, Table 1 BAT-associated environmental performance levels for unburnt substances in slags and bottom ashes from the incineration of waste
<table>
<tr><th>Parameter</th><th>Unit</th><th>BAT-AEPL</th><th>Comment</th></tr>
<tr><td>TOC content in slags and bottom ashes</td><td>Dry wt-%</td><td>1–3</td><td rowspan="2">The applicant has confirmed that the TOC of the IBA will be monitored</td></tr>
<tr><td>Loss on ignition of slags and bottom ashes</td><td>Dry wt-%</td><td>1–5</td></tr>
</table>
Footnote (1) to the above Table confirms that either the BAT-AEPL for TOC content or the BAT-AEPL for the loss on ignition applies. It is the position of UK regulators that this means a single method needs to be adopted. Following discussion with the applicant it was confirmed that they will measure TOC. It is considered that the applicant has adopted all the necessary techniques and can meet the necessary BAT-AEPL.

Permit Controls:
Conditions are included to require a TOC level of less than 3% w/w dry basis to be met, condition 5.1.1 a). Limits for other combustion parameters are also defined such as the residual oxygen level, minimum flue gas combustion temperature and residence time. The performance and efficiency of the incineration process will be assessed during commissioning, through inspection and by assessment of submissions.
</td><td></td></tr>
<tr><td>15</td><td>Reduction in emissions to air – Plant Settings</td><td>Narrative</td><td>
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 (see description in Section 2.1), as and when needed and practicable, based on the characterisation and control of the waste (see BAT 11).

The Facility 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 (refer to section 2.2.3.4). Doveryard considers that the proposed control systems will ensure that the Facility is designed to allow for the adjustment of the plant’s settings to comply with the requirements of BAT 15

The applicant has confirmed that the facility operations will be controlled by an advanced control system operated and monitored from a central control room. The system will monitor key process variables and adjust the plant to optimise the process through, for example: taking account of the emission concentration of NOx to adjust the flue gas abatement urea addition system for optimal NOx reduction with minimum ammonia slip; monitoring flue gas oxygen concentration to adjust combustion airflows; measuring steam output to adjust waste fuel feed etc.

Permit Controls:
During commissioning and through ongoing inspection the performance and efficiency of the incineration plant will be broadly assessed against the overriding regulatory requirement that ‘all the appropriate preventative measures are taken against pollution, in particular through application of the best available techniques. Performance against permit conditions and the emission limits in the permit will be part of the assessment.
</td><td>Yes</td></tr>
</table>

BAT Conclusions Reference No.	Aspect	Type of BATc	Summary of BATc Requirement (in **BOLD**), Applicant Summary Information (from Supporting Information Table 12, in *ITALIC*) and Compliance Evidence and Permit Controls	Considered BAT
16	Reduction in emissions to air – Start Up Shut Down	Narrative	**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 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.** *The Facility will operate continuously, with planned shutdowns for maintenance limited as far as reasonably practicable. Residual waste will be kept at suitable levels in the waste bunker to maintain operation during holiday periods. Operational procedures will be developed to limit as far as practicable shutdown and start-up operations. Doveryard considers that the operation of the Facility will limit as far as practicable shutdown and start-up operations to comply with the requirements of BAT 16.* The applicant has confirmed that they intend to operate continuously with planned periods of downtime for maintenance. In addition, there will be periods of unplanned shutdown due to plant upset or breakdown. These periods are to be minimised through optimised fuel supply planning, good operational procedures, training and preventative maintenance procedures to ensure the plant remains in stable operation as long as practical between planned shutdowns. Operational control procedures will be developed to ensure efficient operation of equipment during start up and shut down to achieve stable normal operating conditions as rapidly as practical to minimise emissions. **Permit Controls:** Conditions relating to Start Up and Shut Down include 2.8.11 a) and b) to minimise noise during startup and Schedule 2.10 which requires a start-up and shut down plan which minimises pollution. The implementation and adequacy of the above systems and procedures will be reviewed during commissioning, inspection and ongoing compliance assessment.	**Yes**
17	Reduction in emissions to air & water – FGC / Water Treatment design	Narrative	**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 waste water treatment plant are appropriately designed (e.g. considering the maximum flow rate and pollutant concentrations), operated within their design range, and maintained so as to ensure optimal availability.** *The FGT 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. Doveryard considers 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.* Consideration has been given to the potential pollutant loading in the flue gases and subsequent design of the Flue Gas Cleaning system to ensure sufficient capacity will be available to abate the anticipated pollutant loading. The proposal is for a Flue Gas Cleaning system which does not generate wastewater and therefore no wastewater treatment plant is present to specifically serve the FGC system. Other process wastewaters which may potentially be discharged will be mainly confined to steam condensate blow down and wastewater from the boiler water treatment system. Steam condensate blow down will be used in the ash quench system and only discharged to sewer if there is any excess which cannot be used in the ash quench system. If required, the pH and temperature of the excess process wastewater can be adjusted in to meet the limits in the Trade Effluent Consent for the discharge to sewer. Discharge to sewer for treatment in the sewage treatment works is an appropriate disposal method for the excess process wastewaters. Wastewater flow from the boiler water treatment system is minimised by minimising the demand for fresh boiler water top up. This will be managed through control of steam and steam condensate leaks and blowdown frequencies to minimise losses from the steam circuit. Maintenance systems will be designed to ensure necessary availability of the above systems. Where there is excess wastewater in the ash quench loop, this will be removed by tanker to a suitably licenced waste treatment facility. This is only envisaged to occur very infrequently where parts of the quench system need to be emptied and decontaminated for inspection or maintenance. During commissioning until systems balance and stabilise, it is anticipated that there will be additional generation of process wastewaters and temporary increased discharge to sewer due to higher demand for boiler water including initially filling the boiler water system whilst there is no demand for quench system top up (as there will be no IBA being generated). **Permit Controls:** Conditions are contained in the permit to monitor the emissions to air (Tables 6.2 and 6.2a) and sewer (Table 7.1) and report the mass emissions. The management, performance and maintenance of the FGC system and wastewater treatment plant will be considered against the overriding regulatory requirement that 'all the appropriate preventative measures are taken against pollution, in particular through application of the best available techniques. Wastewater despatched to other licensed waste sites will be controlled via normal Waste Management Licensing controls. The implementation and adequacy of the above systems will be confirmed during commissioning with ongoing compliance and any potential for improvement to be assessed through inspection.	**Yes**

BAT Conclusions Reference No.	Aspect	Type of BATc	Summary of BATc Requirement (in **BOLD**), Applicant Summary Information (from Supporting Information Table 12, in *ITALIC*) and Compliance Evidence and Permit Controls	Considered BAT
18	Reduction in emissions - OTNOC	Narrative	**In order to reduce the frequency of the occurrence of 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 environmental management system (see BAT 1) that includes all of the following elements:** *A risk based OTNOC management plan will be incorporated into the Facility EMS. This will include the following elements: • 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 Facility 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. Doveryard considers that the incorporation of a risk based OTNOC management plan will ensure the Facility compliance with BAT 18.* A risk-based OTNOC management plan will be incorporated into the site EMS (See BAT 1) that meets guidance and incorporates the elements described in BAT 18. **Permit Controls:** Condition in Schedule 5.4 relate to OTNOC including the requirement to develop and implement an OTNOC Management Plan, condition 5.4.6. The implementation and adequacy of the OTNOC management systems and procedure will be reviewed during commissioning, inspection and ongoing compliance assessment.	**Yes**
1.4 - Energy Efficiency				
19	Heat Recovery Boiler	Narrative	**In order to increase the resource efficiency of the incineration plant, BAT is to use a heat recovery boiler.** *The Facility will use a heat recovery boiler to produce steam which is used to produce electricity. The Facility will also have the provision to export heat to local users. Doveryard considers that the use of a heat recovery boiler is in direct compliance with the requirements of BAT 19.* The incinerator design incorporates a heat recovery boiler to produce steam at 51 barA and approximately 400°C which can be used to produce electricity or may be exported as heat. Electricity will be generated by a steam turbine which will be equipped with a take-off which will supply a system to export heat to local users. **Permit Controls:** Permit conditions in Schedule 2.7 cover the requirements for a Heat and Power Plan which require the Operator to provide annual reports on their progress towards the energy efficiency targets in SEPA's Thermal Treatment of Waste Guidelines. 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 an annual reporting requirement. The efficiency of the heat recovery boiler will be confirmed at commissioning with ongoing compliance assessed through inspection and review of the annual Heat and Power Plan.	**Yes**
20	Energy efficiency	BAT-AEL	**In order to increase the energy efficiency of the incineration plant, BAT is to use an appropriate combination of the techniques given below.** *The Facility will use techniques as described in section 2.8 to increase the energy efficiency of the plant. Doveryard considers that the techniques listed above will increase the energy efficiency of the plant and ensure that the Facility will comply with the requirements of BAT 20.* Discussion on other energy efficiency measures are contained in the response to Further Information Notice question 13 and the Heat and Power Plan.	**Yes**

Item	Technique	Comment
(a)	Drying of sewage sludge	Not applicable, the facility is not permitted accept to this waste type.
(b)	Reduction of the flue-gas flow	Technique adopted through the design of plant including reduced flow and flue gas recirculation.
(c)	Minimisation of heat losses	Techniques adopted in the design of plant include: recovery of heat in a waste heat boiler; high standard of thermal insulation to be used, and flue gas recirculation.
(d)	Optimisation of the boiler design	Techniques adopted through the optimisation of the boiler design to improve heat transfer include economisers and superheaters to optimise thermal cycle efficiency without prejudicing boiler tube life.
(e)	Low-temperature flue-gas heat exchanger	A flue gas condenser downstream of the Flue Gas Treatment system is not included on the design. Introduction of a flue gas condenser caries the risk of adversely affecting flue gas dispersion, producing a visible plume, causing corrosion in the stack due to condensing of water vapour and increases the complexity and cost of the system. Use of the available heat from the ca 140°C flue gases would be restricted to a small number of uses on site and low-grade heat from the steam turbine is a better source of such heat. This technique is not employed at the facility.

<table>
<tr><th colspan="2">BAT Conclusions Reference</th><th rowspan="2">Type of BATc</th><th rowspan="2">Summary of BATc Requirement (in BOLD), Applicant Summary Information (from Supporting Information Table 12, in ITALIC) and Compliance Evidence and Permit Controls</th><th rowspan="2">Considered BAT</th></tr>
<tr><th>No.</th><th>Aspect</th></tr>
<tr><td></td><td></td><td></td><td>
<table>
<tr><td>(f)</td><td>High steam conditions</td><td>Technique adopted as the design includes high steam conditions (above 45 bar, 400 °C) at 51 bar and 400°C to increase electricity conversion efficiency whilst managing the need for the use of exotic metals in heat exchangers etc to address higher temperature and pressures and corrosion concerns.</td></tr>
<tr><td>(g)</td><td>Cogeneration</td><td>Technique adopted as the facility has been designed to be able to produce both heat and power and will have the capacity to provide heat to local users.</td></tr>
<tr><td>(h)</td><td>Flue-gas condenser</td><td>See (e) above. This technique is not employed at the facility.</td></tr>
<tr><td>(i)</td><td>Dry bottom ash handling</td><td>An air seal is required to prevent air being drawn in to the incinerator bed as IBA is discharged. The design proposed achieves an air seal by dropping IBA from the IBA discharger into a water filled quench trough. This immediately cools the IBA to a more manageable temperature, wets it to eliminate the potential for dust generation during storage and handling and allows the ash ageing process to begin.
An air based dry cooling system which pre-heats combustion air introduces the risk of dust emission and increases complexity and cost. This technique is not employed at the facility.</td></tr>
</table>
Table 2 - BAT-associated energy efficiency levels (BAT-AEELs) for the incineration of waste
<table>
<tr><th>BAT-AEEL</th><th>Gross electrical efficiency</th><th>Comment</th></tr>
<tr><td>Municipal solid waste, other non-hazardous waste and hazardous wood waste</td><td>New Plant 25-35%</td><td>Heat and Power Plan calculations indicate that the facility will have an electrical efficiency of 29.0% when operating in power only mode (no heat export). This is within the BAT-AEEL range.</td></tr>
</table>
SEPA's Thermal Treatment of Waste Guidelines also require that the facility meets an initial startup efficiency of 20% and a long-term energy efficiency of 35%. On startup the facility is predicted to have an efficiency of 25.5% and, with heat export, a long term efficiency of 36.3%. NB – the calculation basis for the Thermal Treatment of Waste Guideline efficiencies is different to the BAT conclusions calculation for Gross Electrical Efficiency discussed above.

Permit Controls:
Permit conditions in Schedule 2.7 require: operation of the facility with a high level of energy efficiency (2.7.1); annual submission of a Heat and Power Plan (2.7.2 and 2.7.3) which discusses progress towards the targets in SEPAs Thermal Treatment of Waste Guidelines, and a requirement to carry out tests to demonstrate the facility can achieve the gross electrical efficiency predicted (2.7.7). The energy efficiency of the facility will be confirmed at commissioning with ongoing compliance assessed through inspection and review of the annual Heat and Power Plan.
</td><td></td></tr>
<tr><td colspan="5">1.5 - Emissions to air</td></tr>
<tr><td>21</td><td>Diffuse emissions, Odour</td><td>Narrative</td><td>
In order to prevent or reduce diffuse emissions from the incineration plant, including odour emissions, BAT is to (use the techniques in the table below)

In accordance with the BREF, the Facility will employ the following measures to reduce odour emissions: • Residual waste in the Facility 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 Facility 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 Facility. • Odour will be controlled during shutdown periods by minimising the amount of residual waste in storage. Residual waste will be run-down prior to periods of planned maintenance, and there will also be provisions in place to back-load residual 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 Facility will comply with the requirements of BAT 21.
<table>
<tr><th>Item</th><th>Technique</th><th>Comment</th></tr>
<tr><td>(a)</td><td>store solid and bulk pasty wastes that are odorous and/or prone to releasing volatile substances in enclosed buildings under controlled sub atmospheric pressure and use the extracted air as combustion air for incineration or send it to another suitable abatement system in the case of a risk of explosion;</td><td>Techniques adopted through the design of the facility for areas involving the storage or handling of odorous materials include: use of enclosed buildings for the waste reception area and fuel bunkers; installation of fast acting roller doors on odour controlled buildings; buildings which are extracted to maintain a slight negative pressure with the extracted air used as combustion air or, when incineration is not operational, treated in a standby activated carbon odour abatement system.
There is no anticipated risk of explosion from the waste types which the facility is permitted to receive.</td></tr>
<tr><td>(b)</td><td>store liquid wastes in tanks ….</td><td>Not applicable, the facility is not permitted to accept this waste type.</td></tr>
<tr><td>(c)</td><td colspan="2">control the risk of odour during complete shutdown periods when</td></tr>
</table>
</td><td>Yes</td></tr>
</table>

BAT Conclusions Reference No.	Aspect	Type of BATc	Summary of BATc Requirement (in **BOLD**), Applicant Summary Information (from Supporting Information Table 12, in *ITALIC*) and Compliance Evidence and Permit Controls	Considered BAT
			no incineration capacity is available, e.g. by sending the vented or extracted air to an alternative abatement system, … — A standby activated carbon filtration abatement system is installed for operation when odorous materials are present on site but the incineration is not operating or operating at throughput below 85%. minimising the amount of waste in storage, e.g. by interrupting, reducing or transferring waste deliveries, as a part of waste stream management (see BAT 9) — Waste quantities will be reduced ahead of planned shutdowns. Maximum bunker storage levels will allow approximately 3.5 days of operation at maximum throughput and, in the case of extended unplanned shutdown, waste can be unloaded from the bunkers into road vehicles for removal from site. storing waste in properly sealed bales. — Not applicable, the facility is not equipped to accept baled waste. **Permit Controls:** Conditions are included in the permit in Schedule 3.2 including: a requirement for no offensive odour outwith the site boundary (3.2.1); development and implementation of an Odour Management Plan (3.2.2 and 3.2.3) with a requirement to conduct odour surveys (3.2.4); requirement to fit fast acting doors and have only one open at any time (3.2.6); requirement to fit a standby odour abatement system (3.2.7) and a requirement to smoke test buildings (3.2.10) to ensure the are air tight. Condition 2.8.12 requires confirmation of the final detailed design of the odour abatement system prior to delivery of odorous materials to site. Measures for controlling odour emissions will be reviewed during commissioning, inspection and ongoing compliance assessment	
22	Diffuse emissions, Gas & Liquid Waste, Odour	Narrative	**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 introduce them into the furnace by direct feeding.** *Gaseous wastes will not be accepted by the Facility. It is not anticipated that liquid wastes will be received at the Facility, but should any liquid wastes be received, they 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 Facility.* Further Information Notice response to Question 3c confirms liquid waste will not be accepted at the facility. As neither gaseous nor liquid wastes will be accepted, this BAT conclusion does not apply to this facility. **BAT Conclusion not applicable.**	**N/A**
23 & 24	Diffuse emissions, Dust, Ash Treatment	Narrative	**BAT 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 environmental management system (see BAT 1) the following diffuse dust emissions management features: identification of the most relevant diffuse dust emission sources (e.g. using EN 15445); definition and implementation of appropriate actions and techniques to prevent or reduce diffuse emissions over a given time frame.** **BAT 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 given below: (a) to (f) inclusive.** (See WI BAT conclusions for details, not replicated here as not applicable) *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 Facility. 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 Facility.* *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 Facility. However, it can be confirmed that the following techniques will be employed at the Facility 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.* No treatment of slags or ashes is proposed or permitted at the Installation. IBA will be quenched in water as it is discharged from the incinerator and exported as damp ash from the facility for treatment at another appropriately permitted waste management site. The general techniques proposed for the identification and prevention or reduction of dust emissions from slag/ash handling have however been considered in the design of the facility. These include handling wet ash and loading operations taking place within an enclosed building. **BAT Conclusions not applicable.**	**N/A**

<table>
<tr><th colspan="2">BAT Conclusions Reference</th><th rowspan="2">Type of BATc</th><th rowspan="2">Summary of BATc Requirement (in BOLD), Applicant Summary Information (from Supporting Information Table 12, in ITALIC) and Compliance Evidence and Permit Controls</th><th rowspan="2">Considered BAT</th></tr>
<tr><th>No.</th><th>Aspect</th></tr>
<tr><td>25</td><td>Channelled Emissions – Dust & Metals</td><td>Narrative and BAT-AEL</td><td>

In order to reduce channelled emissions to air of dust, metals and metalloids from the incineration of waste, BAT is to use one or a combination of the techniques given below.

In accordance with the BREF, the following techniques will be utilised at the Facility 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 Facility. It is considered by Doveryard that the techniques listed above to reduce channelled emissions to air will ensure that the Facility will comply with the requirements of BAT 25.

<table>
<tr><th>Item</th><th>Technique</th><th>Comment</th></tr>
<tr><td>(a)</td><td>Bag filter</td><td>Technique adopted as Air Pollution Control residues are removed from the flue gases through use of a fabric bag filter system. Fabric filter bag systems are also used on the lime and powdered activated carbon delivery silos and the Air Pollution Control residue collection silo.</td></tr>
<tr><td>(b)</td><td>Electrostatic precipitator</td><td>Electrostatic precipitators are noted as used for polishing or particulate removal after wet scrubbing. Wet scrubbing of flue gases in not proposed. The use of bag filters in MSW incinerators normally reduces the particulate to the lower end of the BAT emission range.</td></tr>
<tr><td>(c)</td><td>Dry sorbent injection</td><td>Technique adopted - injection of powdered activated carbon (PAC) and hydrated lime in the flue gas reactor tower upstream of the fabric bag filter for the abatement of dioxins/furans, other volatile organic compounds, heavy metals and acid gases respectively.</td></tr>
<tr><td>(d)</td><td>Wet scrubber</td><td>Not applicable, deployment of above techniques (a) and (c) represent BAT</td></tr>
<tr><td>(e)</td><td>Fixed- or moving-bed adsorption</td><td>Not applicable, deployment of above techniques (a) and (c) represent BAT</td></tr>
</table>

Table 3 - BAT-associated emission levels (BAT-AELs) for channelled emissions to air of dust, metals and metalloids from the incineration of waste

<table>
<tr><th>Parameter</th><th>BAT-AEL (mg/Nm^3)</th><th>Averaging Period</th><th>Comment</th></tr>
<tr><td>Dust</td><td>< 2–5</td><td>Daily average</td><td rowspan="3">The applicant has confirmed that the facility is cable of complying with BAT 25 and will therefore meet the upper range of the specified BAT AELs.

The value at the upper range has been used for modelling when considering potential impacts from emissions and has been adopted as the associated ELVs in the Permit for the averaging period specified.</td></tr>
<tr><td>Cd + Tl</td><td>0,005–0,02</td><td>Average over the sampling period</td></tr>
<tr><td>Sb + As + Pb + Cr + Co and Cu + Mn + Ni + V</td><td>0,01–0,3</td><td>Average over the sampling period</td></tr>
</table>

Permit Controls:
Conditions are included in the permit to require use of lime and activated carbon injection and a bag filter, 1.1.4 f). ELVs for the parameters above are defined in Tables 6.2 at the top of the BAT-AEL range. The effectiveness of the abatement techniques deployed and compliance with the emission limits will be assessed during commissioning and through ongoing inspection.

</td><td>Yes</td></tr>
</table>

<table>
<tr><th colspan="2">BAT Conclusions Reference</th><th>Type of BATc</th><th>Summary of BATc Requirement (in BOLD), Applicant Summary Information (from Supporting Information Table 12, in ITALIC) and Compliance Evidence and Permit Controls</th><th>Considered BAT</th></tr>
<tr><th>No.</th><th>Aspect</th><th></th><th></th><th></th></tr>
<tr><td>26</td><td>Channelled Emissions – Dust, Ash Treatment</td><td>BAT-AEL</td><td>In order to reduce channelled dust emissions to air from the enclosed treatment of slags and bottom ashes with extraction of air (see BAT 24(f)), BAT is to treat the extracted air with a bag filter (see Section 2.2).

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 Facility. 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.

Table 4 - BAT-associated emission levels (BAT-AELs) for channelled dust emissions to air from the enclosed treatment of slags and bottom ashes with extraction of air

<table><tr><th>Parameter</th><th>BAT-AEL (mg/Nm^3)</th><th>Averaging Period</th><th>Comment</th></tr><tr><td>Dust</td><td>2–5</td><td>Average over the sampling period</td><td>N/A</td></tr></table>
Treatment of slags or ashes is not permitted at the Installation, quenched IBA will be exported from the facility for treatment at another appropriately permitted site.

BAT Conclusion not applicable.</td><td>N/A</td></tr>
<tr><td>27</td><td>Channelled Emissions – HCl, HF and SO_2</td><td>Narrative</td><td>In order to reduce channelled emissions of HCl, HF and SO_2 to air from the incineration of waste, BAT is to use one or a combination of the techniques given below.

In accordance with the BREF, the following techniques will be utilised at the Facility 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 Doveryard 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

<table><tr><th>Item</th><th>Technique</th><th>Comment</th></tr><tr><td>(a)</td><td>Wet scrubber</td><td>Not applicable, deployment of technique (c) represents BAT</td></tr><tr><td>(b)</td><td>Semi-wet absorber</td><td>Not applicable, deployment of technique (c) represents BAT</td></tr><tr><td>(c)</td><td>Dry sorbent injection</td><td>Technique adopted - injection of hydrated lime and (powdered activated carbon (PAC)) in the flue gas duct upstream of the fabric bag filter for the abatement of acid gases (and organic compounds such as dioxins/furans and other volatile organic compounds and heavy metals).</td></tr><tr><td>(d)</td><td>Direct desulphurisation</td><td>Not applicable, technique only applicable to fluidised bed furnaces, deployment of technique (c) represents BAT</td></tr><tr><td>(e)</td><td>Boiler sorbent injection</td><td>Not applicable, deployment of technique (c) represents BAT</td></tr></table>
Permit Controls:
See BAT 28 below.</td><td>Yes</td></tr>
<tr><td>28</td><td>Channelled Emissions – HCl, HF and SO_2</td><td>Narrative and BAT-AEL</td><td>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 technique (a) or both of the techniques given below.

In accordance with the BREF, the following techniques will be employed at the Facility to reduce peak emissions of HCl, HF and SO2 whilst 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 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 SO2 released from the Facility will comply with BREF limits. The techniques listed above to reduce channelled peak emissions to air of acid gases will ensure that the Facility will comply with the requirements of BAT 28.

<table><tr><th>Item</th><th>Technique</th><th>Comment</th></tr><tr><td>(a)</td><td>Optimised and automated reagent dosage</td><td>Technique adopted - To optimise the consumption of hydrated lime, the concentration of hydrogen chloride (HCl) in the raw flue gases will be continuously measured and used to adjust the dosage of lime required to ensure emission limits are met.</td></tr><tr><td>(b)</td><td>Recirculation of reagents</td><td>Technique adopted - partial recirculation of Air Pollution Control residues from the bag filter to the flue gases to minimise the consumption of hydrated lime</td></tr></table></td><td>Yes</td></tr>
</table>

<table>
<tr><th colspan="2">BAT Conclusions Reference</th><th rowspan="2">Type of BATc</th><th rowspan="2">Summary of BATc Requirement (in BOLD), Applicant Summary Information (from Supporting Information Table 12, in ITALIC) and Compliance Evidence and Permit Controls</th><th rowspan="2">Considered BAT</th></tr>
<tr><th>No.</th><th>Aspect</th></tr>
<tr><td></td><td></td><td></td><td>
Table 5 - BAT-associated emission levels (BAT-AELs) for channelled emissions to air of HCl, HF and SO2 from the incineration of waste (Note – BAT AELs for New Plant apply)
<table>
<tr><th>Parameter</th><th>BAT-AEL (mg/Nm^3)</th><th>Averaging Period</th><th>Comment</th></tr>
<tr><td>HCl</td><td>< 2–6</td><td>Daily average</td><td rowspan="3">The applicant has confirmed that the facility is cable of complying with BAT 25 and will therefore meet the upper range of the specified BAT AELs.

The value at the upper range has been used for modelling when considering potential impacts from emissions and has been adopted as the associated ELVs in the Permit for the averaging period specified.</td></tr>
<tr><td>HF</td><td><1</td><td>Daily average or Average over the sampling period</td></tr>
<tr><td>SO_2</td><td>5–30</td><td>Daily average</td></tr>
</table>
Permit Controls:
Conditions are included in the permit to require use of lime and activated carbon injection and a bag filter, 1.1.4 f). ELVs for the parameters above are defined in Tables 6.2 at the top of the BAT-AEL range. The effectiveness of the abatement techniques deployed and compliance with the emission limits will be assessed during commissioning and through ongoing inspection.
</td><td></td></tr>
<tr><td>29</td><td>Channelled Emissions – NOx, CO & NH_3</td><td>Narrative and BAT-AEL</td><td>
In order to reduce channelled NOx emissions to air while limiting the emissions of CO and N_2O from the incineration of waste and the emissions of NH_3 from the use of SNCR and/or SCR, BAT is to use an appropriate combination of the techniques given below.

The following elements have been incorporated into the design of the Facility: • 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 Facility. The design elements listed above to reduce channelled NOx emissions to air (whilst limiting emissions of CO, N_2O and NH_3) will ensure that the Facility will comply with the requirements of BAT 29. (Note – later clarification confirmed flue gas recirculation will be used at this facility, response to FIN question 13 a.)
<table>
<tr><th>Item</th><th>Technique</th><th>Comment</th></tr>
<tr><td>(a)</td><td>Optimisation of the incineration process</td><td>Technique adopted - the furnace is designed to ensure the flue gases are held at 850°C for at least two seconds when operating at the most unfavourable operating conditions to achieve complete oxidation of the flue gas constituents. CFD modelling has been employed to ensure an effective design including the determination of the location, number and dimensions of the secondary air nozzles, flue gas recirculation nozzles and addition points for the NOx reduction agent used in the SNCR system. An advanced control and monitoring system will govern the regulation of primary air and operational oxygen content in the flue gases to ensure sufficient oxygen is present to complete combustion even during peak demand and avoid generation of carbon monoxide (CO).
See also BAT 14 for further detail on incineration process optimisation.</td></tr>
<tr><td>(b)</td><td>Flue-gas recirculation</td><td>Technique adopted - Flue gas recirculation has been employed. This will result in a decrease in NO_x emissions as well as improve the thermal efficiency of the process.</td></tr>
<tr><td>(c)</td><td>Selective non-catalytic reduction (SNCR)</td><td>Technique adopted – the facility is to use selective non-catalytic reduction (SNCR), using a 40% urea-solution, to convert the nitrogen oxide to nitrogen and water vapour and includes the following features:
- ELV 120 mg/Nm³ NO_x with an ammonia slip in the stack below 10 mg/Nm³, and nitrous oxide slip in the stack below 20 mg/Nm³.
- Optimization of SNCR efficiency through adjusting the addition point in the flue gas ducting to ensure the urea is added where the temperature of the flue gas is in the optimum range for maximum NO_x reduction with minimum unwanted byproducts.
- CFD modelling has been employed to ensure the location and number of injection points is optimised.</td></tr>
<tr><td>(d)</td><td>Selective catalytic reduction (SCR)</td><td>Not applicable, deployment of techniques (a) - (c) represents BAT</td></tr>
<tr><td>(e)</td><td>Catalytic filter bags</td><td>Not applicable, deployment of techniques (a) - (c) represents BAT</td></tr>
<tr><td>(f)</td><td>Optimisation of the</td><td>Technique adopted – See (c) above.</td></tr>
</table>
</td><td>Yes</td></tr>
</table>

<table>
<tr><th colspan="2">BAT Conclusions Reference</th><th rowspan="2">Type of BATc</th><th rowspan="2">Summary of BATc Requirement (in BOLD), Applicant Summary Information (from Supporting Information Table 12, in ITALIC) and Compliance Evidence and Permit Controls</th><th rowspan="2">Considered BAT</th></tr>
<tr><th>No.</th><th>Aspect</th></tr>
<tr><td></td><td></td><td></td><td>
<table>
<tr><td></td><td>SNCR/SCR design and operation</td><td></td></tr>
<tr><td>(g)</td><td>Wet scrubber</td><td>Not applicable, deployment of techniques (a) - (c) represents BAT</td></tr>
</table>
Table 6 - BAT-associated emission levels (BAT-AELs) for channelled NOX and CO emissions to air from the incineration of waste and for channelled NH3 emissions to air from the use of SNCR and/or SCR (Note – BAT AELs for New Plant apply)
<table>
<tr><th>Parameter</th><th>BAT-AEL (mg/Nm^3)</th><th>Averaging Period</th><th>Comment</th></tr>
<tr><td>NOx</td><td>50–120</td><td>Daily average</td><td rowspan="3">The applicant has confirmed that the facility is cable of meeting the upper range of the specified BAT AELs.
The value at the upper range has been used for modelling when considering potential impacts from emissions and has been adopted as the associated ELVs in the Permit on the averaging period described.</td></tr>
<tr><td>CO</td><td>10–50</td><td>Daily average</td></tr>
<tr><td>NH_3</td><td>2–10</td><td>Daily average</td></tr>
</table>
Permit Controls:
Conditions are included in the permit to require use of urea based SNCR, 1.1.4 f). ELVs for the parameters above are defined in Tables 6.2 at the top of the BAT-AEL range. The effectiveness of the abatement techniques deployed and compliance with the emission limits will be assessed during commissioning and through ongoing inspection. Condition 6.5.7 also requires a feasibility report to be prepared on the ability of the facility to operate at a reduced NO_x concentration of 100mg/Nm^3.
</td><td></td></tr>
<tr><td>30</td><td>Channelled Emissions – PCDD/F and PCBs</td><td>Narrative and BAT-AEL</td><td>
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) given below.

The Facility 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 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 Facility will comply with BREF limits. The techniques listed above to reduce channelled emission to air of organic compounds will ensure that the Facility will comply with the requirements of BAT 30.
<table>
<tr><th>Item</th><th>Technique</th><th>Comment</th></tr>
<tr><td>(a)</td><td>Optimisation of the incineration process</td><td>Technique adopted – the combustion chamber, flue gas path and boiler has been designed and will be operated (combustion temperature and residence time) to minimise the formation of dioxins and furans as follows (with any dioxins and furans that are formed being removed from the flue gas by the PAC injected upstream of the bag filter):

- The combustion gas path has been modelled using CFD to ensure an effective design which optimises the furnace and boiler configuration to ensure that complete combustion is achieved, combustion gas velocities are in a range that reduces the potential for the formation of stagnant pockets/low velocities and avoids internal flue gas recirculation, cleaning systems which minimise dust residence time in the combustion zone and maximises heat transfer.
- Provide good combustion conditions through control and distribution of the air requirements for combustion.
- Minimising as far as practicable the combustion gas residence time in the heat recovery zone between 450°C to 200°C where ‘De Novo’ dioxin and furan reformation can take place.
- Installation of an SNCR system which inhibits dioxin formation and promotes their destruction.
- CFD modelling has been employed.
- Prevent boundary layers of slow-moving gas along boiler surfaces via good design and regular maintenance.

See also BAT 14 & 29 for further detail on incineration process optimisation.</td></tr>
<tr><td>(b)</td><td>Control of the waste feed</td><td>Not applicable, deployment of technique is not required for incineration of municipal solid waste or clinical waste.</td></tr>
</table>
</td><td>Yes</td></tr>
</table>

<table>
<tr><th colspan="2">BAT Conclusions Reference</th><th rowspan="2">Type of BATc</th><th rowspan="2">Summary of BATc Requirement (in BOLD), Applicant Summary Information (from Supporting Information Table 12, in ITALIC) and Compliance Evidence and Permit Controls</th><th rowspan="2">Considered BAT</th></tr>
<tr><th>No.</th><th>Aspect</th></tr>
<tr><td></td><td></td><td></td><td>
<table>
<tr><td>(c)</td><td>On-line and off-line boiler cleaning</td><td>Technique adopted – Online and offline boiler cleaning techniques will be deployed. The cleaning system will reduce the boiler deposits through the provision of on-line cleaning, and offline cleaning during maintenance which will further reduce the potential for dioxin formation within the boiler.</td></tr>
<tr><td>(d)</td><td>Rapid flue-gas cooling</td><td>Technique adopted – flue gases will be rapidly cooled to below the identified De Novo dioxin and furan reformation temperature threshold of 250°C at the heat recovery system outlet, prior to dust abatement. The rapid drop in temperature will limit the potential for de-novo formation of dioxins and furans.</td></tr>
<tr><td>(e)</td><td>Dry sorbent injection</td><td>Technique adopted - injection of powdered activated carbon (PAC) (and hydrated lime) in the flue gas duct upstream of the fabric bag filter for the abatement of organic compounds such as dioxins/furans and other volatile organic compounds and heavy metals (and acid gases).</td></tr>
<tr><td>(f)</td><td>Fixed- or moving-bed adsorption</td><td>Not applicable, deployment of techniques (a) and (c) – (e) represents BAT</td></tr>
<tr><td>(g)</td><td>SCR</td><td>Not applicable, deployment of techniques (a) and (c) – (e) represents BAT</td></tr>
<tr><td>(h)</td><td>Catalytic filter bags</td><td>Not applicable, deployment of techniques (a) and (c) – (e) represents BAT</td></tr>
<tr><td>(i)</td><td>Carbon sorbent in a wet scrubber</td><td>Not applicable, deployment of techniques (a) and (c) – (e) represents BAT</td></tr>
</table>

Table 7 - BAT-associated emission levels (BAT-AELs) for channelled emissions to air of TVOC, PCDD/F and dioxin like PCBs from the incineration of waste (Note – BAT AELs for New Plant apply)
<table>
<tr><th>Parameter</th><th>BAT-AEL</th><th>Averaging Period</th><th>Comment</th></tr>
<tr><td>TVOC</td><td>< 3–10 (mg/Nm^3)</td><td>Daily average</td><td rowspan="5">The applicant has confirmed that the facility is cable of meeting the upper range of the specified BAT AELs.
The value at the upper range has been used for modelling when considering potential impacts from emissions and has been adopted as the associated ELVs in the Permit on the averaging period described.</td></tr>
<tr><td rowspan="2">PCDD/F</td><td>< 0,01–0,04 (ng I-TEQ/Nm^3)</td><td>Average over the sampling period</td></tr>
<tr><td>< 0,01–0,06 (ng I-TEQ/Nm^3)</td><td>Long-term sampling period</td></tr>
<tr><td rowspan="2">PCDD/F + dioxin-like PCBs</td><td>< 0,01–0,06 (ng I-TEQ/Nm^3)</td><td>Average over the sampling period</td></tr>
<tr><td>< 0,01–0,08 (ng I-TEQ/Nm^3)</td><td>Long-term sampling period</td></tr>
</table>
It should be noted that the BAT AELs have two associated notes:
1. Either the BAT-AEL for PCDD/F or the BAT-AEL for PCDD/F + dioxin-like PCBs applies. In this case the BAT-AEL for PCDD/F has been selected.
2. The BAT-AEL for Long-term sampling period does not apply if the emission levels are proven to be sufficiently stable. Permit condition 6.5.2 requires a programme of accelerated monitoring to determine whether the emissions of dioxin and furan and dioxin like PCBs are sufficiently stable and low. Results from this monitoring exercise will be used to determine whether periodic monitoring continues to be acceptable, or whether long-term sampling is required.

Permit Controls:
ELVs for the parameters above are defined in Tables 6.2 at the top of the BAT-AEL range. Condition 2.8.6 requires confirmation of the finalised CFD modelling and condition 2.8.18 requires confirmation of the final incinerator design prior to commissioning. Conditions 2.8.10 also requires prior confirmation of the accelerated monitoring proposals for dioxin and furan during commissioning. The effectiveness of the design and the abatement techniques deployed and compliance with the emission limits will be assessed during commissioning and through ongoing inspection.
Condition 6.5.7 also requires a feasibility report to be prepared on the ability of the facility to operate at a reduced NO_x concentration of 100mg/Nm^3.
</td><td></td></tr>
<tr><td>31</td><td>Channelled Emissions – Hg</td><td>Narrative and BAT-AEL</td><td>
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 given below.

In accordance with the BREF, dry sorbent injection of activated carbon will be employed at the Facility in combination with a bag filter. It is considered by Doveryard that the use of these techniques will ensure that the Facility will comply with the requirements of BAT 31
<table>
<tr><th>Item</th><th>Technique</th><th>Comment</th></tr>
<tr><td>(a)</td><td>Wet scrubber (low pH)</td><td>Not applicable, deployment of technique (c) represents BAT</td></tr>
</table>
</td><td>Yes</td></tr>
</table>

<table>
<tr><th colspan="2">BAT Conclusions Reference</th><th rowspan="2">Type of BATc</th><th rowspan="2">Summary of BATc Requirement (in BOLD), Applicant Summary Information (from Supporting Information Table 12, in ITALIC) and Compliance Evidence and Permit Controls</th><th rowspan="2">Considered BAT</th></tr>
<tr><th>No.</th><th>Aspect</th></tr>
<tr><td></td><td></td><td></td><td>
<table>
<tr><td>(b)</td><td>Dry sorbent injection</td><td>Technique adopted - injection of powdered activated carbon (PAC) (and hydrated lime) in the flue gas duct upstream of the fabric bag filter for the abatement of organic compounds such as dioxins/furans and other volatile organic compounds and heavy metals (and acid gases).</td></tr>
<tr><td>(c)</td><td>Injection of special, highly reactive activated carbon</td><td>Not applicable, deployment of technique (c) represents BAT.
Usually, this technique is used for control of peak mercury emissions and is best co-deployed with continuous monitoring. Continuous monitoring is not required at this stage, accelerated monitoring is proposed to give assurance that mercury emissions are low and stable.</td></tr>
<tr><td>(d)</td><td>Boiler bromine addition</td><td>Not applicable, deployment of technique (c) represents BAT.
Used for control of peak mercury emissions in combination with wet scrubbing or PAC use. Continuous monitoring is not required at this stage, accelerated monitoring is proposed to give assurance that mercury emissions are low and stable.</td></tr>
<tr><td>(e)</td><td>Fixed or moving-bed adsorption</td><td>Not applicable, deployment of technique (c) represents BAT.</td></tr>
</table>

Table 8 - BAT-associated emission levels (BAT-AELs) for channelled mercury emissions to air from the incineration of waste
<table>
<tr><th>Parameter</th><th>BAT-AEL (ug/Nm^3)</th><th>Averaging Period</th><th>Comment</th></tr>
<tr><td rowspan="2">Hg</td><td>< 5–20</td><td>Daily average or average over the sampling period</td><td rowspan="2">The applicant has confirmed that the facility is cable of meeting the upper range of the specified BAT AELs.
The value at the upper range has been used for modelling when considering potential impacts from emissions and has been adopted as the associated ELVs in the Permit on the averaging period described.</td></tr>
<tr><td>1–10</td><td>Long-term sampling period</td></tr>
</table>
It should be noted that the BAT AELs have two associated notes:
1. Either the BAT-AEL for daily average or average over the sampling period or the BAT-AEL for long-term sampling period applies. In this case the BAT-AEL for the Daily Average has been selected.
2. The BAT-AEL for long-term sampling may apply in the case of plants incinerating waste with a proven low and stable mercury content (e.g. mono-streams of waste of a controlled composition). Permit condition 6.5.3 requires a programme of accelerated monitoring to determine whether the emissions of dioxin and furan and dioxin like PCBs are sufficiently stable and low. Results from this monitoring exercise will be used to determine whether periodic monitoring continues to be acceptable, or whether long-term sampling is required.

Permit Controls:
Inclusion of standard Conditions with respect to the setting and monitoring of specified ELVs. Additional Condition referenced above regards establishing if emissions levels are sufficiently stable. The adequacy and management of the techniques described will be considered against the overriding regulatory requirement that ‘all the appropriate preventative measures are taken against pollution, in particular through application of the best available techniques’. The management and adequacy of the above techniques will be confirmed at commissioning with ongoing compliance and any potential for improvement to be assessed through inspection.
</td><td></td></tr>
<tr><td colspan="5">1.6 - Emissions to Water</td></tr>
<tr><td>32</td><td>Segregation of Waste Water Streams</td><td>Narrative</td><td>In order to prevent the contamination of uncontaminated water, to reduce emissions to water, and to increase resource efficiency, BAT is to segregate waste water streams and to treat them separately, depending on their characteristics.

There will be separate foul/domestic water, process water and surface water drainage systems at the Facility. Foul effluents from domestic sources will be discharged to foul sewer. It can be confirmed that there will be no wastewater arising from flue gas treatment. Bottom ash handling will be undertaken in an enclosed building with a dedicated drainage system. The drainage in the Facility 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. Areas where liquid raw materials are stored (e.g. liquid urea) will be covered to prevent contaminated surface water from leaving the site. An indicative water flow diagram depicting the segregation of different water streams for the Facility is presented in Appendix A. It is considered by Doveryard that the segregation and treatment of different wastewater streams, as described above, will ensure that the Facility will comply with the requirements of BAT 32.

The facility has been designed to segregate different effluent streams as far as possible in order to promote their reuse within the Installation and ensure that any resultant stream is treated in an appropriate manner and discharge of polluted wastewaters is minimised. The wastewater streams identified are:

• Surface water from areas where there is a potential risk of contamination is collected and following treatment in an oil interceptor and silt separator, is discharged to the Scottish Water combined sewer via discharge point W1. This includes surface water from delivery and loading areas, and areas where vehicles may routinely stand such as the waste reception area etc. Foul Water Drainage from toilets and sinks within the facility will also be collected and co-discharged</td><td>Yes</td></tr>
</table>

BAT Conclusions Reference No.	Aspect	Type of BATc	Summary of BATc Requirement (in **BOLD**), Applicant Summary Information (from Supporting Information Table 12, in *ITALIC*) and Compliance Evidence and Permit Controls	Considered BAT
			to the Scottish Water combined sewer system with the surface water. These activities are not considered to be part of the permitted Installation and are therefore not considered for control under the Permit. • Process wastewaters such as boiler blowdown is collected and used as far as practical in the ash quench system. Excess process wastewater is collected and co-discharged with surface waters where there is a risk of contamination to Scottish Water combined sewer via discharge point W1. • Surface water from lower risk roadway areas is collected and treated in an oil interceptor and silt separator, mixed with roof water and co-discharged via discharge point W2 to a tributary of the Dundonald burn. Use of harvested rainwater is not currently proposed but the potential for rainwater use will be examined in future. • Surface water from roof areas is separately collected, treated in an oil interceptor and silt separator and co-discharged via discharge point W2 to a tributary of the Dundonald burn along with the other surface water from low-risk roadway areas. **Permit Controls:** Condition 2.8.14 requires submission of the final wastewater drainage design prior to commissioning. Condition 7.5.7 requires that drainage systems are operated, inspected and maintained so as to be fit for purpose. Condition 7.5.11 requires annual inspection of drains.	
33	Waste Water Minimisation	Narrative	**In order to reduce water usage and to prevent or reduce the generation of waste water from the incineration plant, BAT is to use one or a combination of the techniques given below.** *In accordance with the BREF, the following techniques will be utilised at the Facility 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 will be re-used within the process, e.g. in the ash quench. Under normal operation the Facility will not generate process effluent. It is considered by Doveryard that the techniques listed above to reduce water usage and prevent/reduce the generation of wastewater will ensure that the Facility will comply with the requirements of BAT 33.*	**Yes**

Item	Technique	Comment
(a)	Waste-water-free FGC techniques	Technique adopted – wet flue gas scrubbing is not employed. Dry scrubbing is proposed using injection of powdered activated carbon (PAC) and hydrated lime in the flue gas reactor duct upstream of the fabric bag filter for the abatement of dioxins/furans, other volatile organic compounds, heavy metals and acid gases respectively.
(b)	Injection of waste water from FGC	Not applicable, wet Flue Gas Cleaning is not carried out at the facility.
(c)	Water reuse/recycling	Technique adopted - the facility has been designed to minimise water consumption through the reuse of waste water within the process as quench water for IBA.
(d)	Dry bottom ash handling	Not applicable, the process design is for water quenching of IBA to rapidly cool the ash and minimised dust emissions during handling.

Permit Controls:
Conditions 2.6.1 and 2.6.2 require water usage be considered when reviewing resource utilisation at the facility and how it may be minimised.

The design, management and maintenance of the systems associated with the above techniques will be considered against the overriding regulatory requirement that 'all the appropriate preventative measures are taken against pollution, in particular through application of the best available techniques. The implementation, management and adequacy of the described techniques will be confirmed at commissioning with ongoing compliance and any potential for improvement to be assessed through inspection.

BAT Conclusions Reference No.	Aspect	Type of BATc	Summary of BATc Requirement (in **BOLD**), Applicant Summary Information (from Supporting Information Table 12, in *ITALIC*) and Compliance Evidence and Permit Controls	Considered BAT
34	Channelled Emissions – Water	Narrative and BAT-AEL	**In order to reduce emissions to water from FGC and/or from the storage and treatment of slags and bottom ashes, BAT is to use an appropriate combination of the techniques given below, and to use secondary techniques as close as possible to the source in order to avoid dilution.** *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 emissions to water from the storage of bottom ash at the Facility 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 Doveryard that the Facility 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.* As noted in BAT 33, waste-water-free FGC techniques are to be employed at the facility by using dry scrubbing with the injection of powdered activated carbon (PAC) and hydrated lime to treat pollutants in the flue gas. The facility has been designed to minimise water consumption and reuse wastewater where practical within the process. Treatment of slags or ashes is not permitted at the Installation, quenched IBA will be exported from the facility for treatment at another appropriately permitted Waste Management site. Channelled emissions of process water from the Installation are discharged to combined sewer. It is not considered that this BAT Conclusion applies to such releases and that they are covered by BAT 32. **Table 9 - BAT-AELs for direct emissions to a receiving water body** **Table 10 - BAT-AELs for indirect emissions to a receiving water body** It should be noted that emissions to surface water and associated potential discharges to the environment are captured within the Permit including the setting of appropriate ELVs (see section 5.3 & 5.6 of this document), This is separate to the requirements of this BAT Conclusion and as the applicant has confirmed that: **BAT Conclusion and associated BAT AELs are not applicable.**	**N/A**
1.7 – Material Efficiency				
35	Ash Separation	Narrative	**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 Facility, refer to section 2.9. Doveryard considers that the Facility will comply with the requirements of BAT 35.* Air Pollution Control residue (APCr) is the residue from Flue Gas Cleaning and therefore the requirements of this BAT are met. **Permit Controls:** Condition 8.1.9 in the permit requires that bottom ash and air pollution control (APC) residues are not mixed. Design features and necessary procedures will be confirmed at commissioning with ongoing compliance and any potential for improvement to be assessed through inspection.	**Yes**
36	Slag and Bottom Ash Treatment	Narrative	**In order to increase resource efficiency for the treatment of slags and bottom ashes, BAT is to use an appropriate combination of the techniques given below 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 Facility. Therefore, it is understood that the requirements of BAT 36 do not apply to the Facility* The permit does not allow the treatment of slags or bottom ash (IBA) on site. All quenched IBA will be exported and treated off site, at an appropriately permitted waste management facility. **BAT Conclusion not applicable.**	**N/A**
1.8 - Noise				

<table>
<tr><th colspan="2">BAT Conclusions Reference</th><th rowspan="2">Type of BATc</th><th rowspan="2">Summary of BATc Requirement (in BOLD), Applicant Summary Information (from Supporting Information Table 12, in ITALIC) and Compliance Evidence and Permit Controls</th><th rowspan="2">Considered BAT</th></tr>
<tr><th>No.</th><th>Aspect</th></tr>
<tr><td>37</td><td>Noise Emissions</td><td>Narrative</td><td>
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 given below.

In accordance with the requirements of BAT 37, it can be confirmed that the following techniques will be employed at the Facility 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. Residual 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 a detailed list of principal noise sources and mitigation measures – refer to Section 2.4.6 of the Supporting Information. In addition, refer to the Noise Assessment presented in Appendix C. It is considered by Doveryard that the techniques listed above to reduce noise emissions will ensure that the Facility will comply with the requirements of BAT 37.

<table>
<tr><th>Item</th><th>Technique</th><th>Comment</th></tr>
<tr><td>(a)</td><td>Appropriate location of equipment and buildings</td><td>Technique adopted – the facility is located in a mainly industrial area and the applicant has where possible considered the siting of plant with respect to potential for noise emissions given the options for locating plant are limited due to the small site footprint. Wherever possible plant identified as a potential source for noise emission will be located within a building. Equipment with high noise emissions such as the turbine/generator are located in a specifically designed building with acoustic abatement.</td></tr>
<tr><td>(b)</td><td>Operational measures</td><td>Technique adopted – The applicant has confirmed that a series of operational measures including the following have been adopted in order to minimise noise emissions:
- Plant and equipment will be subject to regular inspection and maintenance, in line with the EMS proactive maintenance schedule;
- Fast acting vehicle doors that will only be opened for transit and will be kept closed at all times when not in use;
- Vehicle movements limited to daytimes hours circa 07:00 to 19:00 hrs with nighttime vehicle movements minimised;
- A largely circular vehicle route which minimises the need for reversing outwith the waste reception hall
- Silencers will be fitted to abate noise during steam blowing.</td></tr>
<tr><td>(c)</td><td>Low-noise equipment</td><td>Technique adopted – The applicant has confirmed that during the selection process for new plant and equipment consideration has been given to specifying low noise equipment. Items of plant identified as the main noise emission sources were identified for inclusion in noise modelling and for review. For example, selection of low noise fans for air cooled condensers.</td></tr>
<tr><td>(d)</td><td>Noise attenuation</td><td>Technique adopted – consideration has been given to measures to prevent noise propagation to protect offsite receptors including noise attenuating building cladding for rooms with a high presence of noisy equipment or equipment which has significant noise emissions such as the steam turbine.</td></tr>
<tr><td>(e)</td><td>Noise-control equipment / infrastructure</td><td>Technique adopted – the applicant has identified that where necessary, potentially noisy plant will be fitted with appropriate noise control equipment including:
- Silencers and mufflers
- Noise dampeners (ID-fan to avoid sound propagation to the stack)
- Insulation (turbine casing etc.)
- Isolation pads to limit transition of vibration and noise from equipment to the building structure or soil
- Installation of noise abating acoustic hoods and enclosures.
- Acoustically insulated buildings</td></tr>
</table>

Permit Controls:
Conditions are included in Schedule 3.1 to disallow noise emissions which cause significant pollution beyond the site boundary, condition 3.1.1 or which contain significant tonal noise audible at any noise sensitive receptor, condition 3.1.5. A noise and Vibration Management Plan requires to be drawn up and reviewed every 2 years, conditions 3.1.3 and 3.1.4. Prior to commissioning, a final noise control report requires to be submitted, condition 2.8.11 and, following commissioning a noise assessment is required, condition 3.1.2. The effectiveness of the abatement techniques deployed and compliance with the permit conditions will be assessed during commissioning and through ongoing inspection.
</td><td>Yes</td></tr>
</table>

APPENDIX C - Basis for Setting Emission Limit Values to Air in Draft Permit Tables 6.2 and 6.2a

Parameter	BREF (2006)	IED Chapter IV	BAT-AELs from BAT conclusions (New Plant)	Averaging Period	AQ Assessment Model Input	Permitted ELV	Notes
Dust (Particulate Matter, PM) (mg/Nm^3)							
Daily (used for PM_{10} and $PM_{2.5}$)	1 - 5	10	< 2 - 5	Daily average	5	**5**	Daily ELV - initially set at top of BATc range. Intent is to review when sufficient operational data becomes available.
1/2 hourly (100%)	1 - 20	30		30 min	30	**30**	Short term limits based on IED.
1/2 hourly (97%)		10		30 min	30	**10**	
Periodic				Ca 30 min		**30**	Set in line with the 100% ½hrly ELV.
Dust (Abnormal Operation) (Particulate Matter, PM) (mg/Nm^3)							
1/2 hourly (100%)		150		30 min	150	**150**	IED Article 46(6) (maximum 4 hours abnormal operational period) & Article 47 (Breakdown) with associated ELVs in Part 3 of Annex VI
Oxides of Nitrogen as Nitrogen Dioxide (NO_x as NO_2) (mg/Nm^3)							
Daily	40 - 100	200	50 - 120	Daily average	120	**120**	Daily ELV - initially set at top of BATc range. UK regulators now looking for new plant to meet daily limit of 100mg/Nm^3. Performance of the plant is to be reviewed with a view reducing the NO_2 ELV over time: condition 6.5.7 requires assessment of feasibility of complying with 100mg/Nm^3 limit. Intent is to review when assessment provided, and sufficient operational data becomes available.
1/2 hourly (100%)	40 - 300	400		30 min	400	**400**	
1/2 hourly (97%)		200		30 min	400	**200**	
Periodic				Ca 30 min		**400**	Set in line with the 100% ½hrly ELV.
Oxides of Sulphur as Sulphur dioxide (SO_x as SO_2) (mg/Nm^3)							
Daily	1 - 40	50	5 - 30	Daily average	30	**30**	Daily ELV - initially set at top of BATc range. Intent is to review when sufficient operational data becomes available.
1/2 hourly (100%)	1 - 150	200		30 min	200	**200**	
1/2 hourly (97%)		50		30 min	200	**50**	
Periodic				Ca 30 min		**200**	Set in line with the 100% ½hrly ELV.
Volatile Organic Compounds (VOC) (mg/Nm^3) (TOC)							
Daily	1 - 10	10	< 3 - 10	Daily average	10	**10**	Daily ELV - initially set at top of BATc range. Intent is to review when sufficient operational data becomes available.
1/2 hourly (100%)	1 - 20	20		30 min	20	**20**	
1/2 hourly (97%)		10		30 min	20	**10**	
Periodic				Ca 30 min		**20**	Set in line with the 100% ½hrly ELV.
Volatile Organic Compounds VOC (Abnormal Operation) (mg/Nm^3) (TOC)							
1/2 hourly (100%)		20			20	**20**	IED Article 46(6) (maximum 4 hours abnormal operational period) & Article 47 (Breakdown) with associated ELVs in Part 3 of Annex VI

Hydrogen Chloride (HCl) (mg/Nm^3)							
Daily	1 - 8	10	< 2 - 6	Daily average	6	**6**	Daily ELV - initially set at top of BATc range. Intent is to review when sufficient operational data becomes available.
1/2 hourly (100%)	1 - 50	60		30 min	60	**60**	
1/2 hourly (97%)		10		30 min	60	**10**	
Periodic				Ca 30 min		**60**	Set in line with the 100% ½hrly ELV.
Hydrogen Fluoride (HF) (mg/Nm^3)							
Daily	<1	1	<1	Daily average	1	**N/A**	The continuous measurement of HF may be replaced by periodic measurements with a minimum frequency of once every six months if the HCl emission levels are proven to be sufficiently stable. Periodic monitoring frequency set for every 3 months for 1st year and then every 6 months thereafter.
1/2 hourly (100%)	<2	4			4	**N/A**	
1/2 hourly (97%)		2			4	**N/A**	
Periodic				Average over the sampling period		**1**	
Carbon Monoxide (CO) (mg/Nm^3)							
Daily (mg/Nm3)	5 - 30	50	10 - 50	Daily average	50	**50**	Daily ELV - initially set at top of BATc range. Intent is to review when sufficient operational data becomes available.
1/2 hourly (100%)	5 - 100	100			100	**100**	For the assessment of compliance, the IED allows two different compliance routes involving short term limits which requires the setting of both a ½ hrly and 10 min average limit. See IED Annex VI Part 8 para 1.1 d)(i).
1/2 hourly (95% of 10-min averages in 24 hours)		150			100	**150**	
1-hour average for fluidised bed plants		100			N/A	**N/A**	Not applicable to grate fired plants
Periodic						**100**	2x Daily Limit Considered achievable
Carbon Monoxide (CO) (Abnormal Operation) (mg/Nm^3)							
1/2 hourly (100%)		100		30 min	100	**100**	IED Article 46(6) (maximum 4 hours abnormal operational period) & Article 47 (Breakdown) with associated ELVs in Part 3 of Annex VI
Carbon Dioxide (CO_2) (mg/Nm^3)							
Continuous						**N/A**	No ELV set. Monitoring only for mass release reporting purposes.
Ammonia (NH_3) (mg/Nm^3)							
Daily	<10		2 - 10	Daily average	10	**10**	Daily ELV - initially set at top of BATc range. Intent is to review when sufficient operational data becomes available.
Periodic				Ca 30 min		**20**	2x Daily Limit Considered achievable
Nitrous Oxide (N_2O) (mg/Nm^3)							
Daily				Daily average	20	**N/A**	No ELV set. Monitoring only.

Periodic							
Cadmium + Thallium (Cd + Tl) (mg/Nm^3)							
Periodic	0.005 - 0.05	0.05	0.005 - 0.02	Average over the sampling period	0.02	**0.02**	Periodic ELV - initially set at top of BATc range. Intent is to review when sufficient operational data becomes available.
Grp III metals Antimony, Arsenic, Lead, Chromium, Cobalt, Copper, Manganese, Nickel and Vanadium (Sb + As + Pb + Cr + Co + Cu + Mn + Ni + V) (mg/Nm^3)							
Periodic	0.005 - 0.5	0.5	0.01 - 0.3	Average over the sampling period	0.3	**0.3**	Periodic ELV - initially set at top of BATc range. Intent is to review when sufficient operational data becomes available.
Mercury (Hg) (ug/Nm^3) A period of higher frequency monitoring is required during early operation to provide an opportunity for new facilities to rapidly demonstrate that mercury emissions are low and stable and therefore confirm whether periodic monitoring is the appropriate method for ongoing monitoring for this parameter or, mercury CEMs will be required. The Environment Agency Mercury CEMs Protocol will be used to assess the monitoring results and decide which monitoring route is appropriate for ongoing operation.							
Daily average of average over sampling period	<50	50.00	<5 - 20	Daily average or average over the sampling period	20	**N/A**	Periodic ELV - The higher end of the BAT-AEL ranges may be associated with the use of dry sorbent injection therefore initially set at top of daily average BATc range. Intent is to review when sufficient operational data becomes available.
Long-term sampling			1 - 10	Long-term sampling period		**N/A**	
1/2 hourly				1/2 hourly average		**20**	
Polychlorinated Dioxins and Furans (PCDD/F) (ng ITEQ/Nm^3) A period of higher frequency monitoring is required during early operation to provide an opportunity for new facilities to rapidly demonstrate that dioxin and furan emissions are low and stable and therefore confirm whether periodic monitoring is the appropriate method for ongoing monitoring for this parameter or, dioxin and furan long term sampling will be required. The Environment Agency Dioxin and Furan Protocol will be used to assess the monitoring results and decide which monitoring route is appropriate for ongoing operation.							
Periodic	0.01-0.1	0.10	<0.01 - 0.04	Average over the sampling period	0.04	**0.04**	Periodic ELV - initially set at top of daily average BATc range. Intent is to review when sufficient operational data becomes available. Either the BAT-AEL for PCDD/F or the BAT-AEL for PCDD/F + dioxin-like PCBs applies.
Long-term sampling			<0.01 - 0.06	Long-term sampling period		**N/A**	Long term sampling does not apply if the emission levels are proven to be sufficiently stable.
Polychlorinated Dioxins and Furans (PCDD/F) & Dioxin like PCBs (ng WHOTEQ/Nm^3)							
Periodic			<0.01 - 0.06	Average over the sampling period	0.06	**N/A**	Either the BAT-AEL for PCDD/F or the BAT-AEL for PCDD/F + dioxin-like PCBs applies, the BAT-AEL for PCDD/F is applied as above.
Long-term sampling			<0.01 - 0.08	Long-term sampling period		**N/A**	Long term sampling does not apply if the emission levels are proven to be sufficiently stable.

Polybrominated Dioxins and Furans (PCDD/F) (ng ITEQ/Nm^3)							
Periodic				Average over the sampling period		**N/A**	This is a new monitoring requirement to gather information on emissions of brominated analogues of dioxins and furans.
Smoke (Ringlemann) NB during some atmospheric conditions the plume may be visible due to water droplets condensing in the plume which then evaporate to leave a colourless plume. Smoke would be the presence of other particulate material present in the plume as a persistent discolouration.							
During start up						**Shade 1**	Ringlemann shade 2 set. Operational conditions and bag filtration should ensure no significant smoke is emitted.
During normal operation						**Shade 1**	Lowest Ringlemann shade set. Operational conditions and bag filtration should ensure no smoke is emitted.
Odour (Odour units OU_E) on odour abatement equipment stack, A2							
Backup odour abatement plant in use						**900**	ELV set at the equipment design guarantee.

Reference Summary

Permit Documents as originally Duly Made and later revised during the determination process including:

Supporting Information

Further Information Notice responses: Consolidated FIN response and associated appendices

Revised Air Quality Assessment V10 and addendum to correct habitats tables

Human Health Risk Assessment V6

In addition to the Original Permit Application and later submission revisions, the main documents referenced in relation to this application include:

- Environmental Statement (ES), from the Environmental Impact Assessment (EIA) submitted to North Ayrshire Council for the proposed Oldhall Energy Recovery Facility (ERF) facility as part of the planning process which resulted in Planning Permission being granted on 22/01/2020, planning reference 19/00539/PPM.
- SEPA Permit Templates: General PPC Part A, Waste Incineration and Medium Combustion Plant.
- Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control) (Recast) (Text with EEA relevance) known as ‘The Industrial Emissions Directive’ as made at the time of the UK exit from the EU including Chapter 4 "Special provisions for Waste Incineration Plants and Waste Co-incineration Plants".
- The Pollution Prevention and Control (Scotland) Regulations 2012 known as “The PPC Regulations”.
- Best Available Techniques (BAT) Reference Document for Waste Incineration Industrial Emissions Directive 2010/75/EU Integrated Pollution Prevention and Control known as the WI BRef.
- 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 on 3 December 2019, these are known as the Best Available Techniques (BAT) Conclusions for Waste Incineration, or the WI BATCs.

SEPA guidance
TG02: SEPA site and baseline report guidance
TG42: SEPA soil and groundwater monitori9ng technical guidance
PPC Part A installations: Guide for Applicants
Noise – Summary guidance for PPC Applicants and Guidance on the control of noise at PPC installations
Quick guides on air monitoring: QG1 to QG7 on continuous monitoring techniques as applicable to energy from waste installations
Odour guidance 2025, V1
Thermal treatment of waste guidelines 2014

Guidance on the management of Waste Upholstered Domestic Seating (WUDS) containing Persistent Organic Pollutants (POPs) October 2023

Environment Agency guidance:
TGN M2 – Monitoring of stack emissions to air
Waste Classification, Guidance on the classification and assessment of waste Technical Guidance WM3.