FICHTNER

Consulting Engineers Limited

Kingmoor ERF

Fortum Carlisle Limited

Schedule 5 Response No.2

ENGINEERING CONSULTING

Document approval

	Name	Signature	Position	Date
Prepared by:	Katie Hampton		Environmental Consultant	18/08/2021
Checked by:	James Sturman		Lead Consultant	18/08/2021

Document revision record

Revision no	Date	Details of revisions	Prepared by	Checked by
00	11/08/2021	First revision for Client	KLH	JRS
01	18/08/2021	Updated following Client comments	KLH	JRS

Contents

1 Diesel generators

1. **Confirm the number of stand-by diesel generators and their sizes.**

   There will be one standby diesel generator at the site. The exact sizing and type of emergency generator to be used will be subject to detailed design of the Facility. However, it is expected that the generator will have an electrical capacity of approximately 2 MWe (equivalent to a thermal capacity of approximately 6 MWth).

2 Best Available Techniques

2. Provide an updated BAT assessment to include consideration of the following options for BAT 20:

b. Reduction of the flue gas flow

e. Low-temperature flue gas heat exchangers

i. Dry bottom ash handling

To increase the energy efficiency of the plant, BAT 20 requires an appropriate combination of techniques as stated in the BREF to be implemented. As described in section 2.7.2 of the Supporting Information, the Facility will implement techniques (c), (d), (f) and (g) to increase the efficiency of the process.

Technique (b)

Technique (b) relates to reducing the flue gas flow rate through either an improvement in the primary and secondary combustion air distribution, or through using flue gas recirculation (FGR). The Facility will be designed to optimise both primary and secondary combustion air distribution to improve the efficiency of the combustion process. The volume of both primary and secondary air will be regulated by a combustion control system. Primary combustion air will be optimised and improved through the continuous monitoring of process variables, including combustion air flow. Secondary combustion air distribution will be optimised through the use of Computational Fluid Dynamics (CFD) modelling, which will be used to select and optimise the location of secondary air inputs into the combustion chamber, to increase the efficiency of the SNCR system for NOx abatement.

The optimisation of the combustion control system, as described above, will reduce the resulting flue gas flow rate by reducing air intake, hence lowering the oxygen content within the furnace and reducing the air output at the boiler exit. However, to ensure that the combustion process remains stable, it is important to maintain a balance between the air intake and the resulting flue gas flow rate. The provision of some excess oxygen is essential to cover any fuel spikes and avoid incomplete combustion, reducing the risk of any spikes in carbon monoxide emissions.

FGR has the potential to improve the performance and efficiency of combustion systems, with some grate suppliers gaining benefits of reduced NOx generation from the use of FGR. However, other grate suppliers have focussed on reducing NOx generation through the control of primary and secondary air and the grate design, and these suppliers gain little if any benefit from the use of FGR. Adding FGR may even have the potential to cause additional problems relating to the availability of the plant, which would reduce the overall efficiency through reduced power generation and an increase in the number of shutdowns. As justified within section 2.6.2 of the Supporting Information, it is considered that the use of SNCR without FGR is considered to represent BAT for NOx abatement for the Facility. Fortum will comply with any Improvement Conditions (ICs) or Pre-operational Conditions (POCs) imposed by the EP, such as confirmation of details on the performance and optimisation of the SNCR system and confirmation of the boiler design through computational fluid dynamics (CFD) modelling.

Technique (e)

Technique (e) is to use low-temperature flue gas heat exchangers to recover additional energy from the flue gas at the boiler exit. The recovered heat could then be used for heating purposes and/or internally for preheating of boiler feedwater. It is acknowledged that the use of this technique must be applicable within the constraints of the operating temperature profile of the

flue gas treatment (FGT) system. Section 4.4.10 of the BREF states that at temperatures below 180°C, when using low-temperature heat exchangers, there is an increased risk of corrosion in the economiser and of the piping upstream of acid gas scrubbing. Corrosion risks can arise from HCl and SOx in MSW flue gases, which can attack the steel in the (cool) metal tubes of the heat exchanger. The boiler design has assumed a flue gas temperature of approximately 160°C at the exit of the boiler during normal operation, i.e. prior to the hot gases passing to the flue gas treatment system. As this temperature is below 180°C, this introduces a higher possibility for corrosion risks. It is acknowledged that it is possible to use heat exchangers made of special materials such as enamel to reduce corrosion, or to design the cycle to use a separate waste heat boiler after the main boiler to avoid corrosion conditions. However, this would require the system to be re-designed and may introduce additional capital costs.

In addition to the above, when considering the use of heat exchangers, it is important to ensure that the flue gas temperature is not lowered enough to impact the operation of the FGT system. The BREF states that a dry FGT process, such as that proposed for the Facility, can accept flue gas temperatures of around 130 – 300°C, with bag filters generally requiring temperatures in the region of 140 – 190°C. As the temperature of the flue gases at the boiler exit is expected to be approximately 160°C, and assuming a minimum required temperature of 130°C for the FGT process, this would only allow for a maximum temperature 'loss' of 30°C for the flue gases when passing through the heat exchanger. When accounting for efficiency losses in the heat exchanger, this would result in a very low exchange of heat overall. Furthermore, reagent consumption in the FGT system will increase as the temperature of the flue gases decreases due to reduced reaction rates. Should the flue gases be required to be reheated before entering the FGT system, this would be counterproductive from an energy efficiency point of view, allowing for the additional losses from the heat exchanger.

Additionally, lower flue gas temperatures at the stack exit, resulting from the use of additional heat exchangers, would affect plume buoyancy and the dispersion of emissions, resulting in a more visible condensed plumes and potentially result in stack corrosion.

Taking the above into consideration, the use of a low-temperature heat exchanger is not considered to represent BAT due to the corrosion risks, potential to increase capital costs, potential to affect the efficiency and operation of the FGT system, potential to affect dispersion and introduce a visible plume, and taking into account the current unviable opportunities for heat export from the Facility.

Technique (i)

Technique (i) relates to dry handling of bottom ash using ambient air for cooling, with useful energy subsequently recovered by using the cooling air for combustion. It is acknowledged that this technique is applicable to grate furnaces, such as proposed for the Facility, and can improve energy efficiency and reduce water consumption. However, dry bottom ash handling can introduce a risk of fugitive dust emissions associated with the bottom ash handling systems compared to a wet bottom ash handling system which is proposed for the Facility. This has the potential to increase the capital costs associated with bottom ash handling.

Furthermore, in a dry bottom ash handling system, the bottom ash discharger may be required to be flooded with water occasionally to prevent fire hazards.

Finally, using air from the bottom ash storage area will reduce the quantity of combustion air required to be extracted from the bunker and tipping hall areas, subsequently reducing the level of negative pressure that can be obtained in the bunker and tipping hall areas. This could result in increased odour emissions and odour risks from waste during periods of shutdown.

Taking the above into consideration, the use of a dry bottom ash system is not considered to represent BAT for the Facility. Overall water use will be minimised by the re-use of process effluent (including any leachate or effluent from bottom ash treatment) within the process; therefore minimizing the volumes of effluent generated, which may require off-site treatment prior to discharge to the aquatic environment.

3 Feedstock sampling

3. Confirm how sampling for analysis will be completed.

As stated within section 2.7.2 of the Supporting Information, in accordance with the requirements of BAT 11, periodic sampling of waste deliveries (and analysis of key properties such as NCV and metal content) will be undertaken.

Sampling will be undertaken when accepting a new waste stream at the Facility (e.g. from a new waste supplier), or to determine the NCV of waste sources accepted should the plant be operating outside the permitted range shown on the firing diagram. Periodic sampling of waste will also be undertaken for waste streams to ensure consistency in parameters.

Waste sampling and characterisation will be carried out in accordance with BS EN 14899:2005 '*Characterization of waste - Sampling of waste materials - Framework for the preparation and application of a Sampling Plan'*, and will be consistent with any additional requirements imposed by the EP.

It is expected that the waste delivery load to be sampled will be tipped onto the tipping hall floor. Sampling will typically be undertaken based on a nominal vehicle load (expected to be around 20 tonnes). Averaging over a larger quantity will not be permitted, as this will not be representative of the load delivered to the site.

A number of separate increments will be taken randomly from the waste delivery load. These will then be combined into a pile. Two representative samples of equal weight will then be taken from the combined pile, using a coning and quartering technique. One sample will be sent on for laboratory analysis, whilst the other will be kept as a reserve sample.

4. Provide clarity on how bulky waste EWC 20 03 07 will be managed to ensure a suitable size for the grate.

Waste classed under EWC code 20 03 07 typically comprises bulky items such as furniture or mattresses. This waste will likely have been processed at a waste transfer station or MRF prior to delivery to the site and so may be in shredded form. Due to robust waste acceptance and pre-acceptance checks in place at the site, it is unlikely that any particularly large and bulky items will be delivered to the site.

Waste will also be monitored as it is tipped into the bunker. In the unlikely event that any particularly large or bulky items are deposited into the waste bunker, these will be identified within the bunker by the crane operator and removed, using the crane, if they are deemed unsuitable for incineration. As stated within section 2.2.1 of the supporting information, the crane maintenance arrangement can be used as a back-loading facility to remove any oversized items or non-combustible items identified within the bunker.

4 Abatement/BAT

5. **SCR by catalytic filter bags**
   i. **Confirm if you considered their use in consideration of the BAT C – specifically for BAT 29 and BAT 30.**
   ii. **If not please carry out an assessment and provide justification/clarification as to why they are not appropriate.**

   A BAT review of the use of catalytic filter bags at the Facility has been undertaken and is presented below.

   Catalytic filter bags have the potential to reduce emissions of dioxins and furans, as well as NOx when used in combination with a source of ammonia. Catalytic filter bags are generally used as a replacement for other filter bags which may already absorb dioxins by the injection of activated carbon, as is proposed for the Facility. The removal of activated carbon injection from the process may result in an increase in mercury emissions to air. Therefore, the use of catalytic filter bags may require additional abatement techniques to be installed for the removal of mercury.

   Furthermore, it is stated within the BREF that the temperature of the flue gas when entering the filter bags should be above 170 – 190°C for effective destruction of dioxins and furans, and above 180 – 210°C for the effective destruction of NOx. However, as stated within the response to question 2 above, the temperature of flue gases at the boiler exit is expected to be approximately 160°C, and further down the process (after FGT and when leaving the stack) the flue gases are expected to be at a temperature of approximately 135°C, as stated within the Air Quality Assessment submitted with the application. Therefore, the flue gases would not be at a high enough temperature for treatment in catalytic filter bags regardless of what stage in the FGT process they are used. The flue gases would require re-heating which will reduce the overall efficiency of the process.

   Taking the above into consideration, the use of catalytic filter bags is not considered to represent BAT for the facility due to the requirement for additional mercury abatement techniques to be installed, and the requirement to re-heat the flue gases before treatment, which will reduce the overall efficiency of the process.

6. **Provide justification for not using direct boiler injection for acid gas abatement (BAT).**

   Direct boiler sorbent injection involves the injection of the reagent directly into the flue gas stream within the boiler. This only achieves partial abatement of the acid gases and does not eliminate the need for additional FGT stages. It is acknowledged that using a combination of both boiler sorbent injection and the additional acid gas abatement system would provide a higher level of abatement than either system alone, however the operating and maintenance costs and also reagent consumption would be higher. Due to the additional costs and reagent consumption associated with the use of direct boiler injection, this is not considered to represent BAT for the Facility.

   It is considered to represent BAT to use a dry sorbent injection system to abate acid gases, as justified within section 2.6.3 of the supporting information. The dry system would be designed to ensure that the Facility operates in accordance with the relevant ELVs, assumed to be the BAT-AELs, without the requirement for any additional abatement measures.

7. **Confirm that no by-pass will be used in the process.**

   It can be confirmed that no bypass will be used within the flue gas treatment process.

8. **Clarify the difference in lime and hydrated lime, specifically their handling, use and effectiveness.**

   Both are calcium compounds: lime (CaO) is in its pure state and hydrated lime ($Ca(OH)_2$) is in its hydrated state. Lime is more reactive than hydrated lime, but the principle of using either reagent in flue gas treatment is the same.

   In systems that demand large quantities of reagent, lime can be preferable as it is more dense than hydrated lime and so will have reduced storage and transportation costs. Lime is often delivered in a crushed or pebble form. The hydrophobic and exothermic reaction of lime with water requires a lime slaker to be used in the process. The lime is mixed with a small amount water ('conditioning') to create hydrated lime which is then injected into the flue gas treatment process.

   Hydrated lime is more suitable for processes with a small-to-medium demand. The equipment required to use hydrated lime is simpler and does not need to be designed to handle an exothermic reaction as is the case with lime. Hydrated lime is typically only available as a fine powder or slurry.

   Due to the increased reaction effectiveness, reduced storage and transportation costs and smaller consumption, the use of lime is considered to represent BAT for flue gas treatment at the Facility.

5 FPP – Quarantine area

9. **Provide a contingency plan for the quarantine area in the event it is required for a hot load while it is being used for an unacceptable load.**

   In the very unlikely event of a hot load requiring storage within the quarantine area whilst the quarantine area is already being used for the storage of an unacceptable load, contingency measures will be in place to segregate the loads and prevent the spread of fire.

   Metal skips will be provided within the quarantine area, where the hot load will be placed into in the event that an unacceptable load is already being stored within the quarantine area. The use of skips will prevent contact between the hot load and the unacceptable load. The hot load will be extinguished immediately upon placing into the skip.

10. **Provide a contingency plan for the quarantine area in the event it is required for two unacceptable loads, the response provided as part of your to the Schedule 5 dated 31/3/202 is not acceptable.**

    The robust waste pre-acceptance and acceptance measures in place at the site will minimise the risk of unacceptable waste being delivered to and accepted at the site. Typically, an unacceptable load would be identified immediately upon tipping into the bunker. In this case, the waste delivery driver would be asked to remain at the site, the load would be rejected and the waste backloaded into the delivery vehicle for transfer off-site. Should the delivery driver have left the site, waste would be removed from the bunker using the crane and deposited within the quarantine area.

    Unacceptable waste would not typically be stored within the quarantine area for periods longer than 24 hours, therefore it is highly unlikely that two unacceptable loads would require storage in the quarantine area.

    Notwithstanding the above, contingency measures will be in place in the unlikely event that more than one load is required to be stored within the quarantine are. As indicated in the response above, the contingency measure will be the provision of skips within the quarantine area to segregate different waste loads and prevent contact.

11. **Provide details of the timescales unacceptable waste will remain onsite.**

    As described within the responses above, unacceptable waste would not typically be stored within the quarantine area for periods of longer than 24 hours. The waste supplier would be contacted immediately upon identification of an unacceptable load, and provisions will be made for the waste to be collected and removed from the site. However, to allow for extended periods where waste deliveries are not occurring (such as bank holidays), the maximum time that waste could remain in the quarantine area will be up to 7 days.

12. **Provide an updated plan showing the receptors within 1km of the installation Appendix A12 provided as part of your response to the Schedule 5 dated 31/3/2021 only extends 920m to the east of the site.**

    An updated Fire Receptor Plan is presented within Appendix A.

6 Water quality

13. Please provide more information on the discharge to sewer and the associated risk assessment:

i. Demonstrating that the discharge to sewer for treatment is BAT and that it provides an equivalent level of treatment and protection of the environment as if the effluent were treated on-site, in accordance with Article 15 (1) of the Industrial Emissions Directive.

With regards potential options for the disposal of excess process effluents, these are listed as follows:

1. discharge of treated process effluents to surface water;
2. discharge of process effluents (treated or untreated) via tankering off-site; or
3. discharge of process effluents (treated or untreated) to sewer.

A BAT review of the potential disposal proposals for excess process effluents at the site has been undertaken and is presented below.

Discharge of treated process effluents to surface water

An on-site wastewater treatment system would be required, to ensure that any effluents discharged from the site do not have a negative impact on the water environment. This will have high associated capital and operational costs.

On-site wastewater treatment is typically used in more remote locations, where centralised wastewater treatment is not economically feasible.

The EA guidance 'Discharges to surface water and groundwater: environmental permits' states that "*you should discharge your wastewater to the public foul sewer whenever it's reasonable to do so*", which indicates the EA's preference for discharges of wastewater to sewer, rather than on-site treatment and discharge to surface waters.

Tankering process effluents off-site for disposal

This would require the effluent to be transferred, via road tanker to a wastewater treatment works, and so will have the same destination as if they were discharged into the foul sewer network. This will result in additional transport emissions; increase the risk for leaks or accidents during loading/unloading operations; and have higher capital and operating costs.

Discharge of process effluents to sewer

The Facility is to be located at an established industrial site (Kingmoor Park Industrial Estate), which is already served by an existing sewerage system which is operated by the Sewerage Undertaker (United Utilities). Therefore, the drainage works required to connect the Facility to the wider sewerage network will be relatively minor, and as such will have relatively low capital and operational costs.

Conclusion

Taking into consideration the above, the discharge of process effluents to sewer is considered to represent BAT for the Facility.

Article 15 (1) of the Industrial Emissions Directive states that "*the emission limit values for polluting substances shall apply at the point where the emissions leave the installation, and any dilution prior to that point shall be disregarded when determining those values*". It can be confirmed that the effluent will be discharged offsite in accordance with a Trade Effluent Consent first obtained by the Sewerage Undertaker. The Trade Effluent Consent will impose limits on the discharge, taking into consideration

the expected composition and quantity of the effluent, and the expected level of treatment to be undertaken at the wastewater treatment works (WWTW) which the effluent will be treated in. Considering the location of the Facility, it is expected that the treated effluent would be discharged to the same water body (the River Eden), regardless of whether treatment is undertaken at the site or at a nearby WWTW. The limits to be imposed within the Trade Effluent Consent will ensure that the effluent is acceptable for eventual discharge post-treatment. Furthermore, as demonstrated in response to item iii. the impact of discharges to sewer from the Facility are predicted to be 'insignificant', assuming that the effluent is discharged at the expected emission concentrations.

Taking the above into consideration, it is expected that the discharge of excess process effluents to sewer will provide an equivalent level of treatment and environmental protection as if the effluent were treated on-site.

i. **Information on the quality of the effluent discharged to sewer and the daily volume. This should include consideration of the boiler treatment water chemicals noted in Table 3 of the Supporting Information and any other potential pollutants (see tables listing hazardous chemicals and elements here: https://www.gov.uk/guidance/surface-water-pollution-risk-assessment-for-your-environmental-permit).**

Under normal operation, process effluents will be re-used within the process (e.g. in the ash quench). In the unlikely event that excess process effluents are generated, these will be discharged to sewer in accordance with a Trade Effluent Consent first obtained from the Sewerage Undertaker. It is expected that the daily volume of process effluents discharged to sewer will not exceed 121 m^3.

The generation of excess process effluents resulting in a requirement to discharge to sewer may be as a result of emptying of the boiler. As such, there is the potential for small amounts of water treatment chemicals to be present in the process effluents discharged to sewer. As outlined within section 2.1.1. of the supporting information submitted with the EP application, water treatment chemicals to be used at the Facility may include (but not be limited to) the following:

- sodium hydroxide (NaOH);
- sulphuric acid (H_2SO_4);
- hydrochloric acid (HCl);
- sodium chloride (NaCl);
- oxygen scavenger (Boilex 510A or equivalent);
- sodium phosphate (Na_3PO_4);
- ammonium hydroxide (NH_4OH).

As the plant is not yet operational, and the choice of water treatment chemicals is subject to the detailed design of the Facility, the exact composition of the effluent cannot be determined. Therefore, for the purposes of undertaking a risk assessment, reference monitoring data from another EfW plant has been used, as this is considered to be representative of the type of effluent that will be generated at the Facility.

ii. **Please include your risk assessment, you may use the H1 screening tool to complete this assessment. The relevant risk assessment for a discharge containing hazardous chemicals and elements is detailed here: https://www.gov.uk/guidance/surface-water-pollution-risk-assessment-for-your-environmental-permit (This methodology includes the use of sewage treatment reduction factors).**

iii. **We understand that you may need to estimate the quality and volume of the effluent. Justification for these should be provided and any permit would include an Improvement Condition to monitor the effluent once the process is operational, followed by an update to the H1 assessment.**

An H1 assessment has been undertaken for the discharge of process effluents to sewer from the Facility – refer to Appendix B.

The values and substances used in the assessment have been derived from representative data for a comparable EfW plant. It should be noted that the monitoring data reports concentrations of total chromium; to ensure that the assessment is suitably conservative it has been assumed that chromium III and IV are released at the monitored concentration value for total chromium.

Sewage treatment reduction factors (STRF) have been applied to the concentrations associated with the release of the effluents in accordance with Appendix B of EA guidance document H1 Annex D. It has been assumed that the process effluent discharged to sewer will be treated in a nearby wastewater treatment works before being discharged to the nearby River Eden (or a tributary of the river).

The monitoring data also included for the following substances which have not been included within the H1 assessment as no Environmental Quality Standards (EQS) are available for these substances:

- Chemical Oxygen Demand (COD);
- Oils and grease;
- Suspended solids; and
- Phosphate.

The assessment assumes continuous discharge of process effluent from the Facility at the maximum allowable flow rate from the reference monitoring data. This results in a highly conservative assessment as process effluents will not be discharged continuously from the Facility.

During normal operation, the Facility will not generate process effluents and will be a net consumer of water. Excess process effluents are only likely to be generated (and discharged) during periods of shutdown, maintenance and emptying of the boiler. Therefore, long-term impacts are not considered to be applicable to the proposed arrangements for the discharge of process effluent from the Facility. Nevertheless, the long-term impacts have been included to allow for a conservative assessment.

Test 1 of the assessment determines whether the concentration of the substance in the discharge exceeds 10% of the EQS. The test is designed to quickly screen out substances that cannot cause more than 10 percent deterioration in the watercourse, even if it receives no dilution.

The results of Test 1 of the H1 assessment (for discharges to rivers) are presented in the table below:

Table 1: H1 assessment results - Test 1

Substance	Annual average EQS			Short-term (MAC) EQS		
	Release concentration (µg/l)	EQS (µg/l)	Release <100% EQS?	Release concentration (µg/l)	MAC (µg/l)	Release <100% EQS?
Ammonia	3210	300	Fail	3210	-	N/A

Substance	Annual average EQS			Short-term (MAC) EQS		
	Release concentration (µg/l)	EQS (µg/l)	Release <100% EQS?	Release concentration (µg/l)	MAC (µg/l)	Release <100% EQS?
Chromium III	4.16	4.7	Fail	4.16	32	Fail
Chromium VI	4.16	3.4	Fail	4.16	-	N/A
Copper	5.44	1	Fail	5.44	-	N/A
Cyanide	6.4	1	Fail	6.4	5	Fail
Iron	1400	1000	Fail	1400	-	N/A
Nickel	11.88	20	Fail	11.88	-	N/A
Silver	0.8	0.05	Fail	0.8	0.1	Fail
Sulphate	34800	400000	Pass	34800	-	N/A
Zinc	24.7	8	Fail	24.7	-	N/A

Note: Concentrations include STRF

As can be seen from the results above, all pollutants fail Test 1 with the exception of sulphate. Therefore, these pollutants have been carried over onto the next stage of assessment.

Test 2 determines whether the process contribution (PC) exceeds 4% of the EQS and takes into account the dilution available in the receiving watercourse. PC is the concentration of a discharged substance in the receiving water after dilution.

The PC is calculated as follows:

$$PC = \frac{(EFR \times RC)}{(ERF + RFR)}$$

where:

- PC = Process Contribution (µg/l);
- EFR = Effluent Flow Rate (m3/s);
- RC = Release Concentration of the pollutant in the effluent (µg/l); and
- RFR = Q95 River Flow Rate (m^3/s).

Data on river flow rates was obtained from the National River Flow Archive (NRFA) for the Eden at Sheepmount monitoring station.

The results of Test 2 of the H1 assessment are presented in the table below:

Table 2: H1 assessment results - Test 2

Substance	Annual average EQS				Short-term (MAC) EQS			
	EQS (µg/l)	PC (µg/l)	% PC of EQS	<4%?	MAC (µg/l)	PC (µg/l)	% PC of MAC	<4%?
Ammonia	300	2.332	0.78	Pass	-	2.332	-	Pass
Chromium III	4.7	0.003023	0.06	Pass	32	0.003023	0.00945	Pass
Chromium VI	3.4	0.003023	0.09	Pass	-	0.003023	-	Pass
Copper	1	0.003953	0.40	Pass	-	0.003953	-	Pass
Cyanide	1	0.00465	0.47	Pass	5	0.00465	0.0931	Pass

Substance	Annual average EQS				Short-term (MAC) EQS			
	EQS (µg/l)	PC (µg/l)	% PC of EQS	<4% ?	MAC (µg/l)	PC (µg/l)	% PC of MAC	<4%?
Iron	1000	1.017	0.10	Pass	-	1.017	-	Pass
Nickel	20	0.00863	0.04	Pass	-	0.00863	-	Pass
Silver	0.05	0.000581	0.12	Pass	1	0.000581	0.0582	Pass
Zinc	8	0.0179	0.22	Pass	-	0.0179	-	Pass

As can be seen from the table above, for all pollutants the PC is less than 4% of the EQS/MAC, and the substances can be screened out as insignificant in accordance with the H1 guidance.

7 Water Management Systems

14. As part of your response to question 15 of the schedule 5 dated 11/05/21 Appendix H is referenced, however this has not been provided. Please provide this.

Please refer to Appendix C.

15. Provide a consolidated document to clarify the water systems and drainage system on site:

i. Clearly describe all drainage systems on site taking into consideration where the water is sourced from, its use on site and how it leaves site.

ii. Provide details of the source of the surface water that will go to Cargo Beck and confirm whether it is only 'uncontaminated' surface water going to Cargo Beck.

iii. Confirm the clean surface water system and dirty effluent water are totally separate systems.

iv. Provide clarify on whether the systems are sealed or contained.

v. Use consistent wording to distinguish between sources type and routes of all waters.

vi. Provide clarity on what the Make Up and Neutralisation Tanks are.

A consolidated document that clearly explains the water systems and drainage systems is presented within Appendix D.

16. Dirty water pits:

i. Clarify if they are covered tanks or open pits.

The process effluent pit (or 'dirty water pit') is subject to detailed design; however, at this stage it is expected that it will be an open concrete structure. The process effluent pit will be impermeable to the liquid that is being stored.

ii. Provide clarify how they will be maintained if they are underground tanks.

The process effluent pit (or 'dirty water pit') will be an open concrete structure. Regular preventative maintenance will ensure that the integrity of the pit is maintained throughout the lifetime of the Facility. Preventative maintenance will include for periodically emptying the pits and undertaking visual inspections of the concrete or other material from which the pits are constructed. In the event that the visual inspection identifies that the integrity of the pits has been compromised, additional pressure tests, leak tests and material thickness checks may be undertaken.

Should it be identified that damage has occurred to the structure, repairs will be undertaken to ensure that integrity is suitably maintained. These measures will ensure that liquids do not leak from the drainage pits/vessels and contaminate the underlying groundwater.

iii. Confirm they will meet containment conditions included in permit:

All liquids in containers, whose emission to water or land could cause pollution, shall be provided with secondary containment, unless the operator has used other appropriate measures to prevent or where that is not practicable, to minimise, leakage and spillage from the primary container.

The process effluent pit will be constructed from reinforced concrete material and will be designed as a water retaining structure. The process effluent pit will be constructed in accordance with the requirements of CIRIA 736 and in accordance with recognised standard '*Eurocode 2 – Design of Concrete Structures –Part 3: Liquid retaining and containment structures*'. The regular preventative maintenance (described in the response to question 16i) will ensure the integrity of the process effluent pit is maintained throughout the lifetime of the Facility. Therefore, although there will not be

any secondary containment (such as bunding) surrounding the process effluent pit, the proposed measures are considered to provide suitable containment *"to minimise, leakage and spillage from the primary container"*.

17. Assess risk and describe measures that will be used to minimise odour from process water.

The process drainage system itself will comprise fully sealed pipework, with the exception of the discharge to sewer. The only potential risk of odour may arise from the open process effluent concrete pit itself.

The nature of the process effluents themselves are not expected to be odorous, with any chemicals present (such as water treatment chemicals) significantly diluted by washdown water etc. Doors to the main buildings at the Facility will be kept shut during normal operations (with the exception of waste deliveries to the tipping hall), reducing the risk of fugitive emissions of odour.

Robust management systems will be in place which will include for regular olfactory surveys at the site to detect odour. In the unlikely event that odour emissions are attributed to the process effluent pit, the contents of the pit will be emptied/discharged to sewer.

8 Storage handling

18. Provide clarity on the storage details of all raw materials:

i. Confirm details of all materials brought onsite in bulk and then transferred to silos

ii. Confirm details of all materials brought onsite in containers

iii. Confirm the secondary containment of both of the above

Refer to the table within Appendix E, which clarifies the delivery, storage and handling measures for raw materials brought to the site. Quantities and storage capacities for each material have not been included in the table, as this information is already provided within the application documentation.

9 Compliance

19. Provide information as follows to show whether Fortum Carlisle limited will be able to comply with the conditions of an Environmental Permit should one be issued:

i. Details of emission limit breaches or incidents such as fires at other incinerator plants operated by Fortum that have resulted in formal or informal enforcement action.

There have been no major or substantial emissions breaches at plants operated by Fortum that resulted in either formal or informal enforcement actions, such as fines or penalties; therefore, details cannot be provided. Any minor incidents of non-compliance have not resulted in local authorities imposing any enforcement actions.

ii. Details of breaches of emission or breaches of other licences or regulations.

There have been no major breaches of other licences or regulations.

iii. Measures that were put in place to prevent re-occurrence and whether those measures were successful at preventing re-occurrence.

Fortum implements a comprehensive reporting logbook system to record all deviations related to plant operation at its sites. The logbook includes detail analysis of the root cause, a reflection on the lessons learnt, as well as any relevant closing protocols, to ensure (as well as improve) the operational excellence of the plant. The reporting and analysis of such incidents aims to prevent re-occurrence of the incident, and the system has proved successful on a number of occasions in preventing further deviations.

iv. Measures that will be put in place to prevent occurrence of such breaches or incidents *at the Kingmoor Energy Recovery Facility.*

The reporting system for the Kingmoor ERF (to be operated by Fortum Carlisle Ltd) will be tailored in accordance with UK-specific regulation, as well as the environmental permit, to comply with local legislation. The use of the logbook reporting system, as well as lessons learnt from previous experience with other plants, will ensure that permit breaches or incidents at the Kingmoor ERF can be effectively eliminated and prevented in the first cause. Furthermore, a Standard Operating Procedure (SOP) manual for the Kingmoor ERF will include for step-by-step instructions to assist the plant operators in carrying out routine operations as well as identifying any abnormal situations, in order react, record and correct any abnormalities without delay.

10 Odour and Odour Management Plan

20. Provide clarification on the documentation and acceptance procedures that will be in place in relation to odorous waste.

Fortum will have a small number of waste suppliers which will supply waste to the Facility. Agreements will be in place with the waste suppliers which will identify a waste specification for the incoming waste, which will include information on the composition and 'quality' of the waste which will be accepted at the Facility. If the waste delivered to the Facility is not in accordance with the relevant specification, it will not be accepted at the Facility, and will be returned to the waste supplier.

Prior to commencement of operations, waste pre-acceptance and waste acceptance procedures for the Facility will be developed. The procedures will detail the measures to be implemented at the Facility in the event that incoming waste which is received at the Facility is unacceptable, and as explained in section 4.2 of the OMP, this will include for potentially odorous wastes.

21. Clarify: 1. Whether you intend to receive odorous wastes. 2. Whether all waste deliveries will be suspended in the event of an odour issue.

As stated in response to item 20, a waste specification for the incoming waste will be agreed with a limited number of waste suppliers. It is not intended to receive odorous waste from these waste suppliers.

In the event that the waste which is received is odorous to an unacceptable level, it will be rejected and returned to the waste supplier. The reasons for the rejection of the waste will be reported to the waste supplier, and they will be requested to undertake an investigation to determine why the 'unacceptable' waste had been transferred to the Facility and implement corrective actions to prevent re-occurrence.

Fortum can confirm that it is not intended to suspend all waste deliveries in the event that a single load of waste is identified as being odorous to an unacceptable level.

22. Provide a definition of what 'Where appropriate' means in relation to the OMP

The phrase 'Where appropriate' is provided in two sections of the OMP, sections 4.2 and 4.2.1, in relation to the waste acceptance procedures (section 4.2); and planned maintenance (section 4.2.1).

The Facility is subject to detailed design and the development of documented management systems for its operation; therefore, at this stage it is not possible to identify all instances where an specific control measure may need to be implemented, and it may be preferable to implement an alternative control measure to provide the same level of environmental protection.

This is most easily explained against the reference in section 4.2.1, which states:

> *"Where appropriate, prior to periods of planned maintenance, waste stored within the waste bunker will be 'run-down' so that it does not contain significant quantities of old and potentially odorous material during planned shutdown periods."*

In most instances when there is a planned period of maintenance, the Facility will be shutdown, and therefore, it will be '*appropriate*' to reduce the levels of waste within the bunker prior to commencing maintenance. However, there will be some instances, such as changing the bag filters, where the Facility can continue to operate, due to redundancy in the bag filter system, where the maintenance can be undertaken whilst the Facility is in operation. In these instances, it will not be necessary (appropriate) to reduce the volumes of waste within the bunker whilst the planned maintenance is being undertaken.

23. Provide clarification:

i. when an air abatement system utilising carbon filters will be used to ensure negative pressure and reduction of odour; and

The carbon filter system will provide odour abatement during periods of planned or unplanned shutdown of the Facility. During these periods, all doors and louvres to the waste reception areas will be maintained closed to minimise uncontrolled fugitive emission of odour from the Facility. Therefore, any escape of odour from the building will be minimal given the containment of the waste storage areas and the odour extraction and abatement system.

ii. what is meant by 'deemed necessary' in the following statement in Section 4.2.1 Receipt and Management of Wastes: "*An air extraction and abatement system utilising carbon filters may be used if deemed necessary to maintain negative pressure and reduce odour within the waste bunker area*".

As explained in response to 23 i., the odour extraction and abatement system will provide odour abatement during periods of planned or unplanned shutdown.

In the event that the Facility is shutdown for a few minutes before it is able to be brought back online, it may not be necessary to operate the odour extraction and abatement system as any odours will be retained within the waste reception areas.

Alternatively, if the Facility is shutdown for an extended period, and the waste is required to be backloaded from the bunker, i.e. it is empty of waste it may not be necessary to maintain the operation of the odour extraction and abatement system as there is no odorous sources within the bunker.

In both of these 'alternative' scenarios, the operation of the odour extraction and abatement system may be required (necessary) to abate odour from the Facility.

24. Please amend the OMP to include:

i. the frequency of walkover surveys

ii. Whether staff not already exposed to odour will carry out olfactory surveys.

iii. Whether doors will be kept closed during normal operation to ensure minimal risk of escape of odours, other than as required for receipt of waste and other operational requirements (these should be specified).

iv. The waste acceptance criteria should specify that no malodorous materials will be accepted, and should set out suitable criteria for determining what constitutes a "malodorous" material.

An updated OMP is presented within Appendix F which includes for the points outlined above. To summarise:

- Walkover surveys will be undertaken approximately once per week during 'normal' operations. During periods of shutdown, this will be extended to daily surveys for odour.
- Staff undertaking olfactory surveys will do so upon arrival to site (i.e. before being exposed to odour at the site for a prolonged period of time).
- Doors to the tipping hall will be kept closed during normal operations unless waste deliveries are occurring.
- It can be confirmed that the waste acceptance procedures for the site will specify that no malodouous materials will be accepted at the site. The waste acceptance procedures will be further developed during the detailed design of the Facility and will

define criteria for determining what constitutes a 'malodorous' material. Upon refinement of the waste acceptance procedures for the site, the OMP will be updated to include for the agreed criteria and definitions in relation to odour.

25. **Provide clarification and evidence as to what is meant by the following statement: "High tolerance to odour/less annoyance due to industrial nature of premises".**

    In total, 11 odour sensitive receptors were identified in Appendix B of the OMP, which are located in different directions and distances from the Facility. These included a number of residential, commercial and industrial receptors. The six receptors which are identified as have a "High tolerance to odour/less annoyance due to industrial nature of premises" are all industrial receptors.

    In relation to identifying whether a specific site will result in unacceptable pollution, the EA's H4 Odour Management Guidance, states:

    - *Some receptors are more sensitive than others. Domestic residences, or a pub with a beer garden are more likely to be sensitive than an industrial complex or passers-by.*

    Therefore, the industrial receptors identified in the OMP are considered to be less sensitive to odour than the other residential and commercial receptors identified within the OMP, in accordance with EA guidance.

26. **Confirm whether the reception hall doors are self-closing and if the time they are open will be minimised.**

    It can be confirmed that the doors to the Tipping Hall will be self-closing doors. The doors to the Tipping Hall will be closed except for during periods when waste delivery vehicles are accessing/egressing the Tipping Hall (therefore minimising the time in which they are open and when fugitive emissions of odour are able to be released).

11 Noise

27. Provide clarification what is meant by in the 'event that low noise equipment is not deemed necessary'.

It is understood that this query related to information provided in the EP application in relation to BAT 37. The wording presented within the supporting information is:

> "*Low-noise equipment – the proposed technology provider will optimise plant selection, where appropriate, to reduce the noise level*."

Section 5.1 of the Noise Assessment submitted with the EP application (Appendix C) provides detail on the proposed noise mitigation measures (including low noise equipment) that have been incorporated into the design of the Facility. This includes details of key external plant noise levels, such as the ACC and Fan Stack which are considered to be of relatively low noise output. The detailed design process will enable this to be optimised and refined to reflect established and emerging best practice. For clarity, it can be confirmed that the Facility will be designed in accordance with the latest standards and regulations for noise.

The phrase 'where appropriate' in relation to plant selection means that low noise equipment will be installed unless this will have a significant effect on the efficiency of the Facility. In the event that low noise equipment will have a significant effect on the efficiency of the Facility, alternative noise mitigation measures, i.e. measures which provide the same level of noise attenuation, which have less effect on the efficiency of the plant, will be implemented. Therefore, the design of the Facility will ensure a balance between efficiency and noise impacts.

During detailed design, the selection of equipment will take into consideration the resulting noise impacts (including the results of the Noise Assessment), with low noise equipment selected wherever possible. In all instances, Fortum will ensure that the selection of equipment represents BAT from both a noise attenuation and energy efficiency perspective.

28. Provide details of the procedure(s) that will be 'in place in the event that low noise equipment is not deemed necessary'.

As explained in response to 27, low noise equipment will be selected where it is considered to represent BAT. Should this not be viable (e.g. in relation to efficiency or costs), Fortum will ensure that noise is reduced as far as reasonably practicable via other means, examples of this include:

1. In the tipping hall, this may include keeping doors shut when waste deliveries are not occurring.
2. In the turbine hall, this may include a requirement for staff to wear ear protection.

The Facility will be acoustically cladded, with certain areas (such as the turbine hall) having a higher acoustic rated cladding (as described within section 5.1.1 of the Noise Assessment submitted with the EP application).

29. Please clarify what is meant by 'normal industry practice' in relation to the appropriate location of the equipment and buildings.

The information provided in the EP application in relation to BAT 37 '*Appropriate location of equipment and buildings*' of the BREF states the that "*in accordance with normal industry practice, the technology provider will implement an efficient layout to result in relatively quiet operational noise levels*".

There are a number of factors in the design to be considered before deciding on an appropriate layout that is both efficient, practicable and considers all the parameters of impact relative to noise sensitive receptors. One of the factors which is considered is to minimise, wherever practicable, to minimise noise radiating from such source in the direction of receptors by

locating external plants away from receptors and having process buildings to screen the noise from the external plant reducing impacts at the receptors.

Fortum has designed the layout of the Facility to minimise noise impacts at sensitive receptors. For example, the Air Cooled Condensers (ACC's) are located to the northwest of the site which is the furthest away from the large residential area located to the southeast of the site. Fortum will ensure that the technology provider has optimises the plant design to ensure that the most efficient and `quietest' technologies are installed at the Facility.

Plant areas which contain higher than ambient noise sources (e.g. Turbine Hall, Boiler and Flue Gas Treatment rooms) contain a significant number of individual items of process equipment. Designing a Facility to abate noise from all sources independently is impracticable and will result in unforeseen consequences for temperature control; access for online operational maintenance; routine observation; and ventilation requirements which further limits noise attenuation at source.

30. **In relation to Mobile plants on site please provide a details of what broadband type noise reversing alarm are.**

    Historically, reversing alarms on mobile plant have been operating the tonal `beeper' type of reversing alarm, where a single stand-out repeating noise pulse is heard. This tends to be heard at great distance due to its single mid-frequency content.

    Modern reversing alarms, such as those which will be installed on the on-site mobile plant, use broadband noise, which contains a mixture of tones that do not stand out as discrete noise pulses and at frequencies that are attenuated to a greater extent over distance, compared with tonal `beeper' reversing alarms.

31. **Provide comment on whether any amendments are required to noise assessment (considering withdrawn application to make a non-material amendment to planning permission).**

    i. **Why was this application made and then withdrawn?**

    ii. **Are any changes required (e.g. noise or design of the plant)?**

    The detailed design of an ERF is a continuous process of optimisation and refinement, reflecting established and emerging best practice. The NMA application was developed to incorporate the following changes in relation to the design and planning for the Facility:

    - location and size of tanks and silos;
    - windows, doors, staircase, roof and flue structures;
    - circulation and location of weighbridges;
    - landscaping, externals and amendments to Condition 25 of the planning.

    However, the NMA application took significantly longer than expected to be determined. Therefore, Fortum decided to revisit the design optimization process and potential implications for any planning amendments. As such, it was determined not to proceed with the NMA application and it was withdrawn. Therefore, the design presented in the EP application is the 'latest'/current design and is consistent with the approved design within the planning consent (Ref: 1/18/9012) for the Facility.

    The Noise Assessment submitted with the EP application reflects the 'latest' design prior to the NMA application being developed. Therefore, no updates are required to the Noise Assessment.

32. **Provide clarification for following aspects within noise assessment that have been identified within representations:**

    i. **Baseline survey**

Prevailing weather conditions

As explained in section 3 of the Noise Assessment submitted with the EP application (Appendix C of the EP application), the baseline noise survey undertaken in November 2019, was carried out over a 5-day period, which included a weekend period to cover the lowest likely representative background sound levels. Details of the survey, the results, monitoring locations and statistical analysis of the monitoring are provided in the Noise Assessment. The Noise Assessment compared the results of the 2019 baseline noise survey with the results of a similar survey which was completed in 2016. As concluded in the Noise Assessment:

> *"the 2016 survey shows background sound levels at Lowry Hill Road to be similar or lower depending on the location along Lowry Hill Road. For the baseline levels at Cargo Road the latest baseline survey shows background sound levels to have slightly reduced by 2dB LA90."*

Appendix 2 of the Noise Assessment provides further information on the survey, together with weather station results for the monitoring period, which was set up in the area adjacent to one of the fixed monitoring positions. Detailed 15-minute contiguous results of the measured baseline levels are provided in detail within this Appendix. BS4142 requires that any baseline monitoring is carried out in dry weather conditions (i.e. no rain) and wind speeds below 5m/s. There is no requirement for weather condition analysis as normal and appropriate weather conditions would prevail during any compliance or assessment of site noise. The results of the weather station monitoring show that the weather conditions were suitable for monitoring baseline and conditions remained dry, with low winds and variable wind directions (i.e. ideal conditions). The noise model is set at industry accepted conditions for temperature and humidity (similar to, for example, the good practice guidelines for assessing wind turbine noise prediction as set out in ISO9612-3).

Monitoring of baseline was undertaken between 7 November 2019 and 11 November 2019 as indicated in the weather station and results tables in Appendix 2 of the Noise Assessment. The reference in the `Fieldwork Details' to the survey being undertaken between 7 June and 9 June 2019 are incorrect in terms of the date of the survey, but the dates from the weather station and the baseline monitoring are consistent. Therefore, it is acknowledged that there is a typographical error in the date stated for the Fieldwork.

The location for the weather station was considered to be suitable, as it was positioned in the most exposed area of monitoring (i.e. would have measured the highest likely wind speed) and close enough to the other monitoring positions to show that the conditions were suitable (i.e. shows no rain and light wind conditions). No data was removed for rain or high wind speed as the conditions showed all data was acceptable.

Night-time measurements

The baseline noise survey in November 2019 is the most appropriate data set for assessing noise impacts from the ERF as it is the most recent. It provides sufficient data to determine representative background and residual sound levels at the nearest sensitive receptors.

The noise survey referenced for BSW Saw Mills was undertaken in October 2019 prior to the NVC . Therefore, the November 2019 survey identified in the Noise Assessment is considered to be more relevant and applicable to the Facility as the location, methodology and accuracy of readings is known by the noise consultant that undertook the assessment. The assessment of background data for the BSW Saw Mills does not analyse the complete data set for establishing the representative level as required by

BS4142:2019. Therefore, this is not considered to be appropriate for the purposes of our assessment.

There are two accepted approaches to ensure protection of sleep disturbance during night-time periods when people are trying to sleep or in sleep:

1. ensure that the rating level from site does not exceed the representative background sound level at NSRs (for a low impact); or
2. ensure that the noise level inside bedrooms at night complies with BS8233:2014 and WHO guidance (i.e. 30dB LAeq,8hrs or lower with an open window and externally to bedroom no higher than 40dB LAeq,8hrs).

The representative background level has been determined using appropriate statistical analysis, provided in Table 3.2 of the Noise Assessment submitted with the EP application. Representative background and residual sound levels are based on the `most commonplace' or `median' result in accordance with BS4142:2014+A1:2019 (ref. paragraph 8.1.4 Note 4 & Figure 4). Using the minimum value is not considered to be appropriate for the assessment of noise in accordance with BS4142:2014+A1:2019 (ref. paragraph 8.1.4 and Note 1).

Noise assessment comparison

For reference purposes, paragraph 8.1.4 and Note 1 of BS4142:2014+A1:2019 state:

> *8.1.4 The monitoring duration should reflect the range of background sound levels for the period being assessed. In practice, there is no "single" background sound level as this is a fluctuating parameter. However, the background sound level used for the assessment should be representative of the period being assessed.*
>
> *NOTE 1 To obtain a representative background sound level a series of either sequential or disaggregated measurements should be carried out for the period(s) of interest, possibly on more than one occasion. A representative level should account for the range of background sound levels and should not automatically be assumed to be either the minimum or modal value.*

The baseline survey undertaken in November 2019 collated data over a day and weekend periods, including a period when lower background sound levels are expected. The baseline survey was undertaken under appropriate weather conditions; over a number of days with varying wind directions; over a sufficient monitoring period (245 to 249 readings daytime and 128 readings night-time at monitoring location) and considers median, mean and most commonplace statistical analysis in the determination of a reasonable and representative background levels.

For residual sound levels the logarithmic average for the monitoring period during daytime and night-time has been considered. Therefore, it is considered that the assumptions made are justified and in accordance with BS4142.

ii. Industrial activity

The query refers to the fact that changes may have occurred since 2016 which could have an effect on sound levels in the area. Clearly, this has been acknowledged and a further noise survey was undertaken in November 2019 to inform the assessment.

Cumulative effects from the commercial receptors identified would have formed part of the baseline study in November 2019 and as such would have been included in the residual noise measured at NSRs. The predicted noise contribution from the ERF is considered to be very low when compared with established residual sound levels. Therefore, it can be concluded that there are no significant cumulative effects identified upon sensitive receptors.

iii. Traffic

It can be confirmed that the noise model includes for HGV movements on site during daytime operations.

Road traffic impacts were covered in the S73 planning application submission under the Noise & Vibration Chapter in 2016 (Chapter 8). The baseline survey is used to establish background and residual sound levels and not specifically to identify any traffic, this simply forms part of the baseline. The EP determination process does not consider off-site traffic impacts. Therefore, the impact of off-site traffic has not been considered within the Noise Assessment. Monitoring of baseline was undertaken in appropriate positions that reflect what would be experienced by the nearest façade, i.e. facing the ERF, of the sensitive receptors.

iv. Uncertainty of any measurement device

Commentary on the uncertainty of the noise modelling is explained in section 6.3 to 6.6 of the Noise Assessment.

Noise level meters used for the baseline survey are precision grade Class 1 and microphones are Type 1. Calibration certificates are provided and attached and according to BS4142:2014+A1:2019 Appendix B.2.4.2 (Refer to Appendix G.4). Calibrators should be checked once a year and noise meters every two years.

The weather station does not have a means of calibration and the unit used for the monitoring was purchased in October 2019 and so was brand new and therefore accurate. All meters were time checked with GMT and set to `synchro' to ensure they would start at 15-minute intervals relative to the clock. Raw data files are provided for data validation – refer to Appendix G.2 of this response. Meters were calibrated using portable calibrator prior to and after the survey with no drift in calibration reported.

v. Classification / characterisation of locality type

The nearest sensitive receptors are those identified as residential dwellings and are characterised as having high sensitivity, which have been adopted in the Noise Assessment. The site and surrounding land uses has been classified/characterised as mixed industrial and residential in a suburban area, which is consistent with the location of the Facility as it is located on the urban fringe of Carlisle.

This classification/characterisation has no bearing on the assessment methodology or the conclusions of the assessment.

vi. Corrections with regard to the tonality, impulsivity and intermittency

The rating level for the site has been determined, and as stated in Appendix 3 of the Noise Assessment, any noise character would be removed by design. This is a common approach to `design and build' ERF projects. Where there any significant external plant is proposed that is not contained within the building envelope, they would be designed to ensure that they do not generate any tonal, impulse or intermittency character (this may be by control at source or via appropriate noise mitigation measures). This control requirement would form part of any technical specification for the design and construction of the Facility.

The noise consultants for the project have significant experience of ERF projects including the design, assessment and compliance monitoring of plant in the UK. In their experience, perceptible noise character is unlikely where design limits on character are defined. There are no significant intermittency characteristics (i.e. identifiable on/off conditions that are readily distinctive above the residual noise climate) associated with the operation of an energy from waste facility. HGV movements are intermittent but

during daytime they are not out of character with the industrial setting which the Facility is located and would not be readily distinctive from within the installation boundary.

The operation of safety valves is only necessary during occasional daytime safety valve tests and in an emergency situation and is not deemed to be a regular intermittent source.

vii. Any other potential sources of noise interference.

There are no other potential sources of noise interference have been identified in addition to those outlined in response to 32 vii.

33. Provide a detailed inventory of noise mitigation measures proposed to be employed – including acoustic design.

Section 5.1 and Appendix 3 of the Noise Assessment (Appendix C of the EP application) provides details of proposed noise mitigation measures. The detailed design of an energy from waste facility is a continuous process of optimisation and refinement, reflecting established and emerging best practice and so the mitigation strategy will be optimised through the design process. Therefore, at this stage it is not feasible to provide a detailed inventory of noise mitigation measures to be incorporated into the design of the Facility. Fortum would propose to provide this detail to the EA by way of a pre-commencement condition.

34. Confirm inconsistency with report referencing for R18.1107/DRK and R19.1109/DK.

The reference to R18.1107/DRK is a typographical error and report reference R19.1109/DRK dated 28 November 2019 is the correct document. R19.1109/1/DRK was submitted as part of the non-material amendment which was subsequently withdrawn as explained in response to question 31.

35. Confirm inconsistency with plant referencing (external plant) in section 1.3.

The plant listed in section 1.3 xii) within the Noise Assessment should be x). This was a typographical error. It can be confirmed that no items are missing.

36. Confirm inconsistency with 1.6.

- We have reviewed Figure 2 presented in the noise assessment against the Installation boundary drawing submitted with the EP application and can confirm that the site layouts are the same, with the exception of the colours of the boundaries.
- As requested, a higher resolution drawing of Figure 2 is presented within Appendix G.3.

37. Comment on date of guidance used (later version available).

The guidance referenced is in relation to planning practice, and therefore should not be relevant to the permit determination. Notwithstanding this, further discussion and commentary is provided below as to the date of guidance used.

In terms of noise the 2019 version includes two main additions to the guidance which relate to the potential that can occur when development is proposed in the vicinity of existing business and to the impact of aviation activities. The 2019 guidance sets out that it is the responsibility of the 'agent of change' to clearly identify the effects of existing businesses that may cause a nuisance and the likelihood that they could have a significant adverse effect on new residents/users. The new guidance also states that the agent of change must take into account not only current activities but also those that are permitted, even if they are not occurring at the time of the application being made. Where mitigation is identified it may be possible to work with owners/operators to explore whether potential adverse effects could be mitigated at source and where this is the case it may be necessary to ensure that the measures are in place prior to the occupation / operation of the new development (Paragraphs: 009 Reference ID: 30-009-20190722 and 010 Reference ID: 30-010- 20190722). This update to the PPG has no

bearing or effect on the noise impact assessment relating to the Environmental Permit or changes any conclusions in planning terms.

38. **Provide further details for the locations of measurements undertaken and justify how these are representative for locations suitable for the assessment.**

    The location of the baseline fixed noise monitoring is provided within section 3.12 of the Noise Assessment and indicated in Figure 1 as P1, P2 and P3.

    - Positions P1 and P2 were adjacent to the rear boundaries of residential properties off Lowry Hill Road, which are the nearest receptors to the southeast. These positions were in a wooded area but at the time in a clearing and clear of trees to the rear of the garden of each property, at a distance of circa 4m from the boundary fence, away from the effects of local road traffic and human activity.
    - Position P3 was in an open field at a similar distance from the road and other noise sources in the area compared with the nearest receptor dwellings off Cargo Road.

    Taking the above into consideration, all three locations are considered to be representative locations to determine the baseline levels in the area surrounding the Facility.

39. **Receptor location:**

    a. **Justify that receptor P3 grid reference is appropriate – representation received states that location used is by a road and not representative of the receptor.**

    b. **Justify that receptor P1 and P2 grid references are appropriate – representation received states that location used is within a woodland and not representative of Lowry Hill.**

    c. **Justify that receptor R2 grid references are appropriate – representation received states that 4 locations have been used at differing distances to proposed installation.**

    d. **Confirm single location for R2 or provide justification for the data provided in application. Multiple locations for receptor R2 are shown - so location used is unknown.**

    e. **Justify residential receptors assessed. Representation received states that numerous residential receptors have been missed.**

    f. **Provide a justification for the receptors used. Representation received states that the reasons for selection of local receptors has not been provided.**

    The location of Position P3 has been justified within the response to 38.

    The variation in baseline levels particularly with LA90 background measurements along a particular street would typically be negligible and, to ensure that the assessment is suitably robust, the lowest representative level for P1 & P2 has been chosen for all receptors on Lowry Hill Road. Where topography is similar, it is not necessary to measure baseline at all receptors, but to establish the baseline at the closest as likely to experience highest site noise levels, in accordance with BS4142.

    In the Noise Assessment submitted with the EP application, two locations circa 180m apart were chosen for a cross section and the lowest representative background level determined. This is considered to be a reasonable approach to determine representative baseline conditions at different receptors. The prediction noise model selects different receptors off Lowry Hill Road to show the variation in predicted noise impacts, and the highest level has been chosen for assessing the noise impact of the Facility (i.e. the lowest background level set against the highest predicted level for robustness). Therefore, the predicted noise levels would be lower at the other receptor locations. AQMAU will be able to verify that this approach has been adopted, through its audit of the noise modelling files provided.

40. **Provide clarification for which baseline survey is being referred to.**

The baseline data provided in Table 3.2 within the Noise Assessment is most recent assessment of background levels; therefore, this is considered to be the most relevant baseline data for the purposes of the assessment. The monitoring therefore relate to receptors (Table 3.2) and grid references (paragraph 3.12) presented in the noise assessment.

41. Provide clarification on tables 25 – 36 – where were measurements were undertaken?

Tables 25 to 36 refer to position 3 (or P3) which is the location shown in Figure 1 of the Noise Assessment, and the grid reference for P3 is identified in paragraph 3.12. The Location reference in Tables 25 to 36 should say `Kingmoor Park Industrial Estate, near Carlisle' (instead of 'Lowry Hill Road, Carlisle') and so it is acknowledged to be confusing in its current format, but the Data reference is the correct monitoring position for each location and recorded results.

42. Provide units of measurement for wind speed in Appendix 2.

The units of measurement for wind speed are m/s (metres per second).

43. Provide conclusion of ground attenuation effects and how it might affect the noise measurements.

The ground effect value (Agr) is defined in ISO9613-2: 1996. Ground attenuation is mainly the result of sound reflected by the ground surface interfering with the sound propagating directly from source to receiver. For hard ground such as concrete, paving or water the ground factor G = 0, for porous ground such as ground covered by grass, trees or other vegetation the ground factor G = 1. Mixed ground, is where the ground surface contains a mixture of porous and hard ground and can vary between 0 and 1.

As the intervening ground between the Facility and the receiver is a mixture of hard and porous surfaces (although more porous to the southeast) we have chosen a value of 0.5 for G, which is reasonable and is in line with other good practice (such as for wind turbine noise predictions). Experience of prediction and compliance monitoring at other similar sites in the UK has shown that this provides a robust method of calculation.

The effect of changing the G factor from 0.5 to 1 (mixed to porous) would reduce noise levels by between 0.7dB(A) and 1.5dB(A). The effect of changing the G factor from 0.5 to 0 (mixed to hard ground) would increase noise levels by between 1dB(A) and 2.9dB(A).

44. Clarify the headings in table 3.2 (1 day, 1 night, 2 day, 2 night).

The table header within Table 3.2 of the Noise Assessment has labels which define the receptor. The first two columns of date within Table 3.2 identify the relevant receptor locations as P1 - Lowry Hill Road (north) for day (column 1) & night (column 2); columns 3 and 4 relate to P2 Lowry Hill Road (south) day (column 3) & night (column 4); and columns 5 and 6 relate to P3 Cargo Road day (column 5) & night (column 6).

The number of measurements correlates with the corresponding daytime and night-time number of values in the results table in Appendix 2 of Noise Assessment. As the survey did not include any weather conditions that included rain or high wind speeds no values were excluded.

45. Please provide a justification for time used and under-representative claim.

The question raised in respect of the number of values is mis-calculated by CRAIN, and therefore, is not correct.

The example provided by CRAIN, of 248 for daytime at P1 compared with Table 3.2 of 249 incorrectly assumes the number of values for 11 November 19 should be 22 not 21 as the measurements are from 0700 to 1230.

The daytime levels are combined over the full five days of the baseline survey; therefore, the initial start time on day 1 and day 5 is not relevant as the survey period covers a number of days including a weekend. Furthermore, day 1 of the monitoring period does not commence until the middle of the day, and the monitoring period on day 5 ends in the early afternoon.

As explained in response to Q32, the baseline survey provides data over five days including a weekend (when lower background sound levels are expected), data was measured under appropriate weather conditions, under different wind directions, over a sufficient monitoring period (245-249 readings daytime and 128 readings night-time at each position) and considers median, mean and most commonplace statistical analysis in the determination of a reasonable and representative background levels. For residual sound levels the logarithmic average for the monitoring period during daytime and night-time has been considered, which is appropriate. Therefore, taking above into consideration, the assumptions made are justified and appropriate and provide a robust representative assessment of the baseline conditions.

Finally, the CRAIN query on the maximum night-time level of 52dB LA90 being higher is not correct. Scrutiny of the LA90 levels within Tables 2, 5, 8 & 11 of the Noise Assessment show a level of 52dB at 0215 hours on 11 November 2019 and no reading higher than this. The mean value is the mathematical average of all readings relating to the data set.

46. Section 5.2.11 – ecological receptors has used commercial assessment. Provide clarification on this aspect.

The reference to `ecological' receptors is a typographical error and should read `commercial'. This does not change any of the calculations or conclusions of the Noise Assessment as it has been assessed as a `commercial' receptor.

47. Provide clarification / justification for the following:-

a. Provide further detail on HGV movement, including the duration (time) spent within site perimeter. HGV recorded at 103 dB(A) ~ 20 per hour. It does not, however, state how long the noise assessment has assumed that each HGV will remain on site for.

The HGV movements occur during daytime hours and the 20 movements into and out of site and are associated with the delivery of waste to the Facility. These are included within the model as a `line' source running at 10 mph, moving into the tipping hall, and then exiting the site via the weighbridge and exit.

b. Predictive noise from HGVs stated as 103dB. Please confirm if this includes noise from delivery of waste. (BAT ref ~ Waste Incineration – noise from delivery of waste range from 104-109DB(A)

The noise level of 103dB(A) is a sound power level (or 75dB(A) @ 10m sound pressure level) measured of a moving HGV into a Tipping Hall at a number of similar sites in the UK. This value is deemed to be robust and is typically nearer to 98dB(A). The height of the source is also assumed to be 1.5m above ground. A level of 104-109dB(A) may be expected as a short-term level within a building during offloading activity but not for vehicle movements outside the Tipping Hall.

c. Appendix 3 lists fan stack noise as 95 dB(A) – above the BAT ref for chimney noise of 84-85 dB.

The fan stack noise in terms of sound power level is stated as 95dB(A) which is equivalent to a sound pressure level of circa 84-85dB(A) @ 1m distance.

d. Appendix 3 does not cover noise from energy transformation facility – aspect covered in BAT ref.

It is assumed that 'energy transformation facility' is the transformer. The transformer noise level assumed is defined in Appendix 3 of the NVC Report and so is covered.

e. Noise from disposal of residues – one source identified as 108 dB (front loader for slag handling) appears greater than indicative noise in BAT ref. Confirm if this value is Sound Power Level (SWL) or Sound Pressure Level (SPL)

The use of a front loader in the bottom ash hall would be intermittent and for short term period as required, during daytime periods. The level of 108dB(A) is a sound power level for the mobile plant. Internal levels are generally between 65dB(A) and 77dB(A) reverberant sound pressure for the majority of the time.

48. **Provide further clarification on frequency of noise level checks. Currently stated as 'noise level checks may be carried out regularly in operational areas').**

    Noise level checks will be carried out on a daily basis as part of the operating and maintenance procedures in the main process areas.

49. **Provide layout plans and elevations of the EfW that were used in the noise model in a readable and detailed form.**

    The layout plans and elevation drawings that were used and referenced when undertaking the noise assessment are presented within Appendix G.1 for reference purposes. These are consistent with the information provided with the designs presented within the EP application.

50. **Provide further detail on doors, including commitment for self-closing / fast closing as per EPR 5.01.**

    As per the response to question 26, it can be confirmed that fast-closing roller shutter doors will be installed at the entrance to the tipping hall in accordance with the requirements of EPR 5.01. This will ensure that doors are kept closed except for access to vehicles (for offloading and collection), with the exception of maintenance or emergency vehicles. The use of fast-acting roller shutter doors reduces the potential for emissions of odour and noise from the Facility.

    Further details on the expected acoustic rating of doors and louvres at the Facility are presented within section 5.1.1 of the Noise Assessment submitted with the EP application.

51. **Provide reference / details of source data used for SRI values provided in table 5.1 in section 5.1.3.**

    The detail for cladding type and specification will be determined at the detailed design stage. Reference Rw values have come from reference waste incineration facilities in the UK, and the cladding data has been taken from cladding manufacture data sheets. The level of Rw would enable the technology provider to determine what product is suitable when procuring the cladding for the Facility.

52. **Confirm details for assumption of 5dB lower at night time than day time operation, and how this will be achieved.**

    Waste will only be delivered to the Facility during day-time periods. Therefore, the modelling has assumed that there would be no HGV movements inside the Tipping Hall during night-time.

    The modelling has conservatively assumed a value of 5dB lower, with a reverberant sound pressure level of circa 75dB(A). Empirical data collected within Tipping Halls from reference waste incineration facilities in the UK indicate a reverberant sound pressure level of around 80dB(A) and 65-68dB(A) when vehicles are not in the Tipping Hall.

53. **Provide further clarification by layout diagram for the heights used in section 5.2.3.**

    The elevation drawing provided in Appendix G.1 was used to derive the height ranges stated within section 5.2.3 of the noise assessment.

54. **Confirm version number for CadnaA noise prediction modelling software used.**

    It can be confirmed that CadnaA version 4.6.155 of the modelling software was used.

55. **Provide clarification why the silencers on top of the boiler hall have not been considered.**

    Silencers for the boiler hall roof are included in the noise model and covered in paragraph 5.2.15 and Appendix 3.

56. Provide further detail to show how location of buildings and screenings have been considered (BAT37), and techniques employed in order to minimise and reduce noise.

The design and layout of the Facility has taken into consideration the location and sensitivity of receptors in the local area. As described in the response to Q29, the ACC's are located to the northwest of the site which is the furthest away from the large residential area located to the southeast of the site.

All significant noise sources from the Facility are located within fully enclosed and clad buildings. It is acknowledged that some significant noise sources have not been located within buildings, such as the ACC and the Turbine Cooler fans; however, these have been located away from the closest receptors to the south-east. Furthermore, the Turbine cooler fans are also located in a screened roof area above the residue building on the northwestern side of the site which will assist in reducing radiating noise levels.

The Tipping Hall has been located on the south-western façade of the building to minimise noise impacts for the receptors to the east-southeast of the Facility during daytime operations.

The final design of the Facility is subject to detailed design; therefore, at this stage, it is not possible to confirm all of the measures which will be incorporated into the final design to mitigate noise impacts from the Facility. However, the measures outlined above provide a general indication of how the location of buildings and equipment has been considered and techniques have been employed in order to minimise and reduce noise.

57. Provide additional information on employment of plant optimisation. Currently it is stated that this will be employed where appropriate – further detail of where this will be employed.

The detailed design of an EfW facility is a continuous process of optimisation and refinement, reflecting established and emerging best practice. Upon completion of detailed design of the Facility, further details will be provided to the EA in relation to plant optimisation. At this stage, information regarding detailed plant optimisation cannot be provided; however, general measures (such as those in relation to optimisation of the plant layout) have been described within the responses presented above.

58. Provide detail on noisy activities with commitment that these will not be carried out at night where possible.

Noisy activities will normally be limited to safety valve tests which would typically occur only during commissioning. Testing of the safety valves is a planned operational activity with a frequency driven by legislation. The mitigation strategy in Appendix 3 includes for a silencer to limit the noise from this testing and would be programmed during daytime periods (0900-1700) to avoid un-necessary short-term impacts at sensitive receptors.

Following commencement of operation of the Facility, steam purging would typically not occur during operation of the Facility. However, in the exceptional circumstance that there is an over-pressurisation and uncontrolled event within the pressurised boiler, the pressure relief valve system will function to release the pressure to safe levels within the boiler. This pressure relief event (via the safety valve) would occur for 2-4 minutes, thereby avoiding a significant incident and risk to personnel safety. If the cause of the over-pressurisation has been understood, resolved and stable conditions resumed within the boiler then normal operation will resume. However, if the cause of the over-pressurisation is not resolved, the boiler will shut down safely to enable the issue to be investigated and resolved prior to restarting the plant.

12 Other

59. Provide details on the maximum storage time of the bunker

As stated within section 1.4.1.1 of the supporting information, waste will typically be stored in the bunker for approximately 3 – 4 days; however, allowing for extended periods of shutdown, the maximum amount of time that waste will be stored in the bunker is 3 – 4 weeks.

60. Confirm that 250,000 tonnes per annum is the maximum capacity of the Installation

The maximum capacity of the installation is proposed to be 274,000 tonnes per annum, as outlined within section 1.3 of the supporting information submitted with the application.

250,000 tonnes per annum is the nominal capacity

61. Clarify and provide details on what the Raw Water H.E is and where it fits into the process.

The raw water heat exchanger (H.E) cools the hot boiler blowdown water to 40°C by using 20°C raw water. As shown in the indicative water flow diagram (refer to Appendix D), the boiler blowdown is then cool enough to be discharged into the clean water pit, where it can subsequently be used in the ash quench system or alternatively any excess can be discharged to sewer.

62. Clarify and provide details on what the driers are, specifically:

i. Where they fit into the process

ii. Their energy consumption – has this been included in your energy assessment.

iii. Their monitoring and maintenance regimes.

The driers shown within the site layout drawing remove moisture from the air that is fed into the air compressor station, to avoid damaging compressed air equipment with moisture.

The energy consumption of the driers will be low in comparison to other processes at the Facility. Notwithstanding this, the energy consumption of the driers is included within the overall Facility parasitic load and hence within the subsequent calculations in section 2.8 of the supporting information (energy efficiency).

Monitoring and maintenance will be undertaken in accordance with the manufacturers recommendations. At this stage, the exact manufacture of the driers to be used is subject to the detailed design of the Facility, and so further details on monitoring periods, maintenance etc cannot be provided. It can be confirmed that preventative maintenance of all equipment at the Facility will be undertaken in accordance with the documented management systems for the site.

Appendices

A Fire receptor plan

B H1 assessment

C Example APCr unloading chute datasheet

D Water management and drainage systems

E Storage and handling of raw materials

Material	Delivery details	Transfer for storage details	Storage containment details
Primary raw materials			
Low sulphur fuel oil	Delivered using tanker.	Unloading from delivery vehicle tanker into storage tank using sealed pipework. Storage tanks located in a covered area with a dedicated concrete sump or other bunding. Hardstanding in this area will also have links to process drainage system.	Primary: Tank Secondary: Bunding (110%) Tertiary: Hardstanding and contained drainage
Ammonia solution	Delivered using tanker.	Unloading from delivery vehicle into silo using sealed pipework. Storage tanks located in a covered area with a dedicated concrete sump or other bunding. Hardstanding in this area will also have links to process drainage system.	Primary: Tank Secondary: Bunding (110%) Tertiary: Hardstanding and contained drainage
Lime	Delivered using tanker.	Pneumatic unloading into silo, dusts abated using fabric filers, high level alarm to prevent overfilling, areas for delivery/transfer will have links to process drainage system.	Primary: Silo Secondary: Hardstanding Tertiary: Contained process drainage
Activated carbon	Delivered using tanker.	Pneumatic unloading into silo, dusts abated using fabric filers, high level alarm to prevent overfilling, areas for delivery/transfer will have links to process drainage system.	Primary: Silo Secondary: Hardstanding Tertiary: Contained drainage
Water treatment chemicals			
Sodium hydroxide	Delivered by HGV or other large vehicle.	IBC's unloaded using forklift or similar mobile plant and transferred to dedicated storage area.	Primary: IBC Secondary: Hardstanding Tertiary: Contained drainage
Sulphuric acid	Delivered by HGV or other large vehicle.	IBC's unloaded using forklift or similar mobile plant and transferred to dedicated storage area. Storage area will	Primary: IBC Secondary: Bunding (110%) Tertiary: Hardstanding and contained drainage

Material	Delivery details	Transfer for storage details	Storage containment details
		have bunding to 110% of the capacity of the IBC.	
Hydrochloric acid	Delivered by HGV or other large vehicle.	IBC's unloaded using forklift or similar mobile plant and transferred to dedicated storage area. Storage area will have bunding to 110% of the capacity of the IBC.	Primary: IBC Secondary: Bunding (110%) Tertiary: Hardstanding and contained drainage
Sodium chloride	Delivered by HGV or other large vehicle.	Consumer package or bag assumed to be delivered on a pallet or similar. Will be unloaded using forklift or similar mobile plant and transferred to dedicated storage area.	Primary: Consumer package or bag Secondary: Hardstanding Tertiary: Contained drainage
Oxygen scavenger (Boilex 510A or equal)	Delivered by HGV or other large vehicle.	Consumer package or bag assumed to be delivered on a pallet or similar. Will be unloaded using forklift or similar mobile plant and transferred to dedicated storage area.	Primary: Consumer package Secondary: Hardstanding Tertiary: Contained drainage
Sodium phosphate	Delivered by HGV or other large vehicle.	Consumer package or bag assumed to be delivered on a pallet or similar. Will be unloaded using forklift or similar mobile plant and transferred to dedicated storage area.	Primary: Consumer package Secondary: Hardstanding Tertiary: Contained drainage
Ammonium Hydroxide	Delivered by HGV or other large vehicle.	Consumer package or bag assumed to be delivered on a pallet or similar. Will be unloaded using forklift or similar mobile plant and transferred to dedicated storage area.	Primary: Consumer package Secondary: Hardstanding Tertiary: Contained drainage
Other raw materials			
Hydrated lime	Delivered using tanker.	Pneumatic unloading into silo, dusts abated using fabric filers, high level alarm to prevent overfilling, areas for delivery/transfer will have links to process drainage system.	Primary: Silo Secondary: Hardstanding Tertiary: Contained process drainage

Material	Delivery details	Transfer for storage details	Storage containment details
Lubrication and hydraulic oil	Delivered by HGV or other large vehicle.	IBC's unloaded using forklift or similar mobile plant and transferred to dedicated storage area. Storage area will have bunding to 110% of the capacity of the IBC.	Primary: Barrels or IBC Secondary: Bunding (110%) Tertiary: Hardstanding and contained drainage
Lubrication greases	Delivered by HGV or other large vehicle.	Consumer package or barrels assumed to be unloaded using forklift or similar mobile plant and transferred to dedicated storage area.	Primary: Barrels or consumer package Secondary: Bunding (110%) Tertiary: Hardstanding and contained drainage
Washing Solvent	Delivered by HGV or other large vehicle.	Consumer package or barrels assumed to be unloaded using forklift or similar mobile plant and transferred to dedicated storage area.	Primary: Barrels or consumer package Secondary: Bunding (110%) Tertiary: Hardstanding and contained drainage
Ethylene or propylene glycol	Delivered by HGV or other large vehicle.	IBC's unloaded using forklift or similar mobile plant and transferred to dedicated storage area. Storage area will have bunding to 110% of the capacity of the IBC.	Primary: Barrels or IBC Secondary: Bunding (110%) Tertiary: Hardstanding and contained drainage
Propane	Delivered by HGV or other large vehicle.	Unloaded using suitable mobile plant and transferred to dedicated storage area.	Primary: Bottles Secondary: Hardstanding Tertiary: Contained drainage
Calibration gases / liquids	Delivered by HGV or other large vehicle.	Unloaded using suitable mobile plant and transferred to dedicated storage area.	Primary: Bottles Secondary: Hardstanding Tertiary: Contained drainage
Fire extinguisher foam	Delivered by HGV or other large vehicle.	IBC's unloaded using forklift or similar mobile plant and transferred to dedicated storage area.	Primary: IBC Secondary: Hardstanding Tertiary: Contained drainage

F Odour management plan

G Noise data and information

G.1 Layout plans and elevations

G.2 Raw baseline data

G.3 Noise assessment Figure 2

G.4 Noise calibration certificate

ENGINEERING CONSULTING

FICHTNER

Consulting Engineers Limited

Kingsgate (Floor 3), Wellington Road North,
Stockport, Cheshire, SK4 1LW,
United Kingdom

t: +44 (0)161 476 0032
f: +44 (0)161 474 0618

www.fichtner.co.uk