Acoustics & Air Quality Modelling & Assessment Unit (AQMAU)

Audit of noise impact assessment

Table 1: Permit application details and AQMAU audit outcome.

AQMAU audit summary	Audit overview
Consultant BS4142 assessment outcome Day Weekday/Saturday (0700-1800): low impact Evening (1800-2300): low impact Night (2300-0700): low impact **AQMAU audit outcome** Day Weekday/Saturday/Sunday (0700-1800): low impact Evening Weekday/Saturday/Sunday (1800-2300): low impact Night Weekday/Saturday/Sunday (2300-0700): below adverse impact **AQMAU audit conclusion** AQMAU finds the potential for lower background sound levels when separating the assessment periods into weekday, Saturday and Sunday periods and predicts higher specific sound levels than the consultant as a result of sensitivity modelling. Nevertheless, AQMAU considers that low impacts are likely during weekday and weekend daytime and evening periods, and	AQMAU has reviewed a BS 4142[1] noise impact assessment (NIA)[2] prepared by Aardvark EM Limited/Inacoustic (the consultant) submitted by R&P Clean Power Limited (the applicant) in support of a bespoke environmental permit application for a proposed Energy Recovery Facility (ERF). The applicant initially sent a NIA[3] authored by Stantec, but this did not comply with EA guidance[4] or include a BS 4142 impact assessment. The NIA has presented BS 4142 impacts for daytime, evening and night-time operational scenarios. The ERF will operate on a 24/7 basis, which includes more sensitive night and weekend periods. The NIA refers to an existing Materials Recycling Facility (MRF) which operates during daytime hours and is not associated with the proposed permit application. The NIA concludes that low impacts are likely for all periods assessed. The NIA has presented background sound levels measured during October 2020 and July 2021. For daytime hours, the consultant has separated the measured data into weekdays and Saturdays, but has not considered Sundays separately. For evening and night periods, the consultant has not separated the data into weekdays, Saturdays or Sundays. AQMAU has separated the consultant's background sound survey data into weekdays, Saturdays and Sundays, for the daytime, evening and night-time periods. As a result, AQMAU has identified lower background sound levels during several periods at one or more receptors: weekday day, Saturday day, Sunday day, Saturday evening, Sunday evening, weekday night, Saturday night and Sunday night. AQMAU has also tested sensitivity to the use of the revised ISO 9613-2: 2024[5], which has resulted in higher specific sound levels than the consultant. With 'primary mitigation' and additional 'enhanced mitigation' measures in place, the consultant has presented very low impacts for daytime, evening and night operations associated with the ERF, with specific sound levels typically well below the background sound levels. Therefore, although AQMAU has identified lower background sound levels and higher specific sound levels as a result of our analysis, AQMAU's BS 4142 impacts are still low during weekday and weekend daytime and evening periods. There is a potential for below adverse impacts during weekday and weekend night periods, but this would still comply with EA guidance without the need for further action from the applicant.

[1] BS 4142: 2014 + A1: 2019. Methods for rating and assessing industrial and commercial sound. British Standards Institution

[2] Swadlincote Resource Recovery Park (SRRP). Environmental Statement – Chapter 9. Noise and Vibration. Prepared by Aardvark EM Limited. September 2022. Document Reference: R007.

[3] Swadlincote Energy Recovery Facility (SERF). Noise and Vibration Assessment

[4] Noise and vibration management: environmental permits - GOV.UK

[5] ISO 9613-2: 2024. Acoustics – Attenuation of sound during propagation outdoors. Part 2: Engineering method for the prediction of sound pressure levels outdoors"

below adverse impacts are likely during weekday and weekend night-time periods. The proposed bespoke permit application can be granted on noise grounds. However, the following action should be taken by the Determining Officer: - As the current proposals are based on outline design proposals, the Determining Officer should request a further NIA from the applicant following completion of the detailed design. This could be requested through a pre-operational condition. AQMAU will be required to review the follow-up NIA and associated noise modelling, and this should be indicated to Area colleagues in any permit decision related paperwork.	AQMAU considers that the proposed bespoke environmental permit can be granted on noise grounds at this stage, based on the current outline design. However, assumptions have been made by the consultant regarding the sound source levels for operational plant at the ERF, which are based *on "…historical data from comparable operational sites and information provided by the design engineers"*. Detailed specifications for the final plant which will operate at the ERF are not currently available and the current NIA is based on indicative assumptions. Furthermore, all conclusions of the NIA and AQMAU's audit are based on the implementation of 'primary mitigation' and additional 'enhanced mitigation' measures which are built into the current outline design. There is therefore a risk that sound emissions from the ERF could be higher than those assumed in the NIA. To reduce the risk to Permitting, but to also allow for the environmental permit application to be progressed, the Determining Officer should note the following recommendation: - AQMAU recommends that a further noise impact assessment (NIA) is requested from the applicant following completion of the detailed design and specification of plant and mitigation measures. This could be requested through a pre-operational condition. AQMAU will be required to review the follow-up NIA and associated noise modelling, and this should be indicated to Area colleagues in any permit decision related paperwork.

Permit application details	AQMAU details	Assessment details
Site name: Swadlincote Energy Recovery Facility (ERF) **Permit sector:** NPS Installations **Permit ref:** EPR/LP3327SK/A001 **Type:** Bespoke	**AQMAU report reference:** AQMAU-C2897-RP01 **AQMAU response date:** 25/02/2025	**NIA reference:** Swadlincote Resource Recovery Park (SRRP). Environmental Statement – Chapter 9. Noise and Vibration. Prepared by Aardvark EM Limited. September 2022. Document Reference: R007. **Acoustic consultant:** Aardvark EM Limited/Inacoustic **Applicant:** R&P Clean Power Limited

1. Site context

Site location and sensitive receptors

1.1 The proposed Swadlincote Energy Recovery Facility (ERF) site is located in South Derbyshire at Cadley Hill, approximately 2km west of Swadlincote, Derbyshire. The site is located in a mixed-use area, which includes industrial uses such as Willshee's Materials Recycling Facility (MRF) to the immediate north, Stanton Sewage Works to the north and transport infrastructure such as the A444 (Burton Road) to the east and a railways line to the west. There is also rural and residential land near the site.

1.2 The nearest residential properties are on Sandown House (180m to north-east), Breach Farm (310m to south-west), Cadley Hill (320m to east) and Council Farm (440m to north-east).

Proposed application and plant

1.3 The proposed bespoke permit application is for 24/7 operations related to an Energy Recovery Facility (ERF) Installation at the proposed site.

1.4 The main sound sources affecting the noise sensitive receptors (NSRs) will be the waste deliveries by HGVs, sound emitted from internal sound sources located inside the Fuel Reception Hall, Fuel Bunker, Boiler Hall, Transformer Room, Turbine Hall, FGT and Workshops, and sound emitted from external sound sources such as Air-Cooled Condensers, ID Fan and the primary Stack.

1.5 The NIA notes the following: *"Source noise emission levels for the operational assessment have been based on historical data from comparable operational sites and information provided by the design engineers".* The proposed design is therefore considered by AQMAU to be at the outline design stage, and detailed specifications for the final plant which will operate at the ERF are not currently available. Nevertheless, AQMAU is satisfied that the NIA and assumptions regarding sound source data are suitable to facilitate a decision being made regarding the permit determination, and AQMAU has been able to undertake an audit based on the information provided.

1.6 An additional assessment will be required from the applicant / consultant once the detailed design is completed and AQMAU will need to audit based on the final plant specifications and mitigation proposals.

1.7 AQMAU's audit of the NIA is summarised in Table 2 below.

Table 2: AQMAU risk grading of noise impact assessment elements.

NIA element	Risk grading	Summary of AQMAU audit	Actions for Schedule 5
Sensitive receptors	**Low risk**	- The consultant has identified the following nearest existing noise sensitive receptors (NSRs): - Sandown House (180m to north-east). - Breach Farm (310m to south-west) - Cadley Hill (320m to east). - Council Farm (440m to north-east). - AQMAU agrees that the NIA is based on the nearest existing NSRs to the site. - AQMAU has consulted South Derbyshire District Council's planning portal, to confirm that there are currently no proposed residential properties near the site.	-
Background sound levels	**Medium risk**	- An initial baseline sound data survey was undertaken by the consultant between Thursday 15th October and Tuesday 20th October 2020, with unattended measurements made at four locations which were representative of the nearest NSRs identified under 'Sensitive receptors' above. - An additional baseline sound data survey was undertaken at Sandown House, with unattended measurements made between Monday 5th July and Monday 12th July 2021. The NIA did not provide an explanation regarding why the additional survey was undertaken. - The consultant has presented L_{A90} background sound levels and L_{Aeq} residual sound levels for daytime periods (07:00 – 18:00, Monday to Friday and 07:00 – 14:00 Saturday), evening periods (18:00 – 23:00) and night-time periods (23:00 – 07:00). The ERF is proposed to operate 24/7, but the consultant has not identified background sound levels for the Sunday daytime period, or distinguished between weekday/Saturday/Sunday periods for the evening and night-time data. - AQMAU has analysed the consultant's measured data, and has derived background sound levels for these additional periods. AQMAU also notes that the data measured at Sandown House in 2021 is generally lower than that measured in 2020, so AQMAU has used this data. - As a result, AQMAU has identified lower background sound levels during several periods at one or more NSRs: weekday day, Saturday day, Sunday day, Saturday evening, Sunday evening, weekday night, Saturday night and Sunday night. - It is important to note that residual (L_{Aeq}, dB) sound levels are relatively high during daytime hours, due to the presence of the existing Wilshee's Materials Recycling Facility (MRF) immediately to the north of the proposed ERF site. The MRF is operated under a separate environmental permit and although the MRF will supply feedstock to the ERF, the MRF will not solely serve the ERF. The Determining Officer has advised that there is not a technical	-

NIA element	Risk grading	Summary of AQMAU audit	Actions for Schedule 5
		connection as defined by Regulatory Guidance Note 2[6], so the ERF and MRF can be regulated by the Environment Agency under separate environmental permits. - The MRF only operates during daytime hours (07:00 – 18:00, Monday to Friday and 07:00 – 14:00 Saturday). Residual sound levels reduce during evening (18:00- 23:00) and night (23:00 – 07:00) periods, and the proposed ERF could be more audible to NSRs during these times. - Additional residual sound sources in the area near the site and NSRs include road traffic, train movements, bird song and wind-induced vegetation sound.	
Sound source levels	**Medium risk**	- The NIA notes the following: *"Source noise emission levels for the operational assessment have been based on historical data from comparable operational sites and information provided by the design engineers".* The proposed design is therefore at the outline design stage, as detailed specifications for the final plant which will operate at the ERF are not currently available. - The NIA has presented indoor reverberant sound pressure levels inside the Fuel Reception Hall, Fuel Bunker, Boiler Hall, Transformer Room, Turbine Hall, FGT and Workshops. AQMAU considers that they are consistent with our assessment of similar sites. - The NIA has presented sound power levels for external sound sources such as Air-Cooled Condensers, ID Fan, the primary Stack and HGV movements. AQMAU considers that they are broadly in line with our assessment of similar sites. - The NIA has made assumptions regarding the sound insulation performance of the buildings (sound insulation of R_w 24 dB, increased to R_w 40 dB as part of 'enhanced mitigation' measures – this is discussed under 'Mitigation' section below) which AQMAU also considers is reasonable. - The NIA acknowledges that details have not been provided for the performance of ventilation louvres, and provides general design principles only. - The assumptions made by the consultant regarding the sound source levels are based on the incorporation of a 'primary mitigation' strategy, with additional 'enhanced mitigation' measures also proposed. Details of all proposed mitigation measures are shown under 'Mitigation' below. - At this current outline design stage, AQMAU is satisfied that the assumptions regarding sound source levels are in line with our experience of similar sites and sound sources. The NIA and assumptions regarding this data are therefore considered to be suitable to facilitate a decision being made regarding the permit determination. An additional BS 4142 impact assessment will be required from the applicant / consultant once the detailed design is completed and AQMAU will need to audit based on the final plant specifications and mitigation proposals.	- Detailed plant specifications to be submitted with follow-up NIA, following completion of detailed design.

[6] Regulated Guidance Note 2, available at RGN 2: Understanding the meaning of regulated facility - GOV.UK

NIA element	Risk grading	Summary of AQMAU audit	Actions for Schedule 5
Calculation method	**Medium risk**	- The consultant has modelled the specific sound levels associated with the ERF, using CadnaA noise modelling software, which calculates sound propagation according to ISO 9613-2[7]. - AQMAU notes that the consultant's modelling is based on the now superseded 1996 version of ISO 9613-2. However, the environmental permit application was submitted in 2024, so AQMAU has tested sensitivity to the revised version from 2024[8]. - The consultant's model has included the following assumptions: o Order of reflection: 2. o Ground absorption mixed (G=0.5). o Building absorption coefficient modelled at 0.21 (reflection loss 1 dB). o DTM grid data at 1m resolution to represent local topography. o Receiver heights at 1.5m to represent ground floor receptors at NSRs. There are also receptors at first floor height which have not been included. o HGVs modelled at 0.5m relative height, moving point source with 244 movements per hour, HGVs modelled on an 'access track' which includes an area outside of the site boundary. AQMAU considers that the consultant has modelled HGVs incorrectly, as the 244 movements refers to the number of movements per day, and HGV movements only need to be considered by the EA when they occur within the site boundary. o The NIA notes that HGVs will enter and leave the site between 07:00 – 18:00 Mondays to Fridays, and from 07:00 – 14:00 on Saturdays, with no evening and night-time HGV movements. - AQMAU has undertaken sensitivity modelling using CadnaA (Version 2025 64 Bit). - AQMAU has tested sensitivity to the following: o Order of reflection: 3. o Receiver heights of 4m added to account for first floor receptors at NSRs. o Revised calculation methodology from ISO 9613-2 2024. o Building absorption modelled at 0.1 (reflection loss 0.5dB). o HGV movements modelled at 2m relative height, and based on 22 movements per hour (244 total movements over an 11-hour day between 07:00 – 18:00). HGV sound emissions considered within the proposed permitted site boundary only. - AQMAU predicts higher specific sound levels than the consultant as a result of our checks.	- Revised noise modelling to be submitted with follow-up NIA, following completion of detailed design.

[7] ISO 9613-2: 1996. Acoustics – Attenuation of sound during propagation outdoors. Part 2: General Method of Calculation. International Standards Organisation (ISO)
[8] ISO 9613-2: 2024. Acoustics – Attenuation of sound during propagation outdoors. Part 2: Engineering method for the prediction of sound pressure levels outdoors. International Standards Organisation (ISO)

NIA element	Risk grading	Summary of AQMAU audit	Actions for Schedule 5
Acoustic feature correction	**Low risk**	- The consultant has considered the suitability of applying acoustic feature corrections (AFCs) to the predicted specific sound levels, to account for tonality, intermittency, impulsivity and site operations being audible against the underlying sound climate. - The consultant has applied an AFC of +3dB to the predicted specific sound levels during evening and night periods, to account for 'other sound characteristics' potentially being audible at the NSRs during these periods. The NIA states: *"The units will operate continuously and do not cycle on and off. The combination of plant does not give rise to readily discernible single tones or impulsive noises. Potential low-frequency bias might exist at source, but due to distance to receptors, the residual acoustic environment will mask any significant low frequency or other characteristics during the daytime. However, it is possible that during evenings or night-time, when residual acoustic environment is lower, some characteristics of the plant may become just noticeable at the NSRs. Therefore, a +3 dB penalty rating for 'other sound characteristics' is added to the assessment as a precautionary approach".* - AQMAU agrees that the high residual L_{Aeq} sound levels mean that an AFC is not necessary during daytime periods. AQMAU agrees that evening and night-time operations will be relatively consistent, and agrees with the application of a +3dB AFC for evening and night-time periods.	-
Mitigation	**Medium risk**	- As previously noted, the consultant has noted the incorporation of a 'primary mitigation' strategy into the current outline design – these are set out in the NIA as follows: - ***"9.7 Mitigation Measures adopted as part of the project*** o *Measures included as part of the project design (primary mitigation) include the following:* *• Turbine to be supplied with a noise enclosure (open roof type) suitable for indoor application to meet a noise level of 85 dB(A) at 1m from the Turbine and Gearbox during normal operation;* *• ID fan to be supplied with silencers to achieve 85 dB(A) at 1m;* *• ACC (Air-Cooled Condensers) to be designed to a maximum Sound Power Level of 97 dB(A) and provision of a gravel layer attenuation at the ACC ground area plus 1m around, with a depth of approximately 0.3m;* o *• Building panels to provide a minimum Sound Reduction Performance of 24 dB R_w, typical of standard thermally insulated cladding."*	- Detailed mitigation proposals to be included in updated NIA following completion of detailed design.

NIA element	Risk grading	Summary of AQMAU audit	Actions for Schedule 5
		- Following their initial modelling of specific sound levels and BS 4142 impact assessment for the ERF, the consultant has then set out additional mitigation options, as reproduced from the NIA below: - ***"9.9 Design Response and Mitigation*** ***Proposed mitigation for operational phase of ERF.*** *150. In addition to the embedded mitigations presented in Section 9.7, the following enhanced mitigations are required to reduce the potential of significant adverse effects due to the operation of the ERF. • Building panels should provide a Sound Reduction Performance of at least 40 dB R_w.* *• ID Fan noise emissions should be limited to a maximum of 88 dB Sound Power Level, by the use of quieter fan, noise silencer or acoustic enclosure. This is equivalent to a Sound Pressure Level of approximately 80 dB at 1 metre for a point source close to the ground.* *• Stack noise emissions should be limited to a maximum of 88 dB Sound Power Level, by the use of appropriate noise silencer. This is equivalent to a Sound Pressure Level of approximately 77 dB at 1 metre for a point source far from reflective surfaces.* *• Information about the buildings' ventilation louvres has not been developed at this stage. At further design stages, ventilation louvres on noisy process rooms should be such that is does not downgrade the acoustic performance of the building, either by orientation away from the direction of sensitive receptors or by the use of acoustically attenuated louvres where required."* - The additional mitigation measures further reduce the specific sound levels from the ERF at all NSRs. AQMAU considers that they are crucial to the outcome of the consultant's BS 4142 impact assessment and AQMAU's audit conclusions. - Following the detailed design and the revision of the NIA, and depending on the revised BS 4142 impacts, the mitigation proposals may need to be revised by the consultant. The detailed design should not incorporate measures which achieve a lower acoustic performance than those currently proposed	

NIA element	Risk grading	Summary of AQMAU audit	Actions for Schedule 5
Context	**Low risk**	- The NIA has provided an assessment of context, noting the following points: o The proposed ERF will generate sound levels which are well below the background sound levels at the nearest NSRs during the daytime period. o The proposed ERF will not change (increase) the existing ambient LAeq sound levels in the area and proposed sound sources are not dissimilar in character to those already operating in the area. o The residual sound levels from other sources are generally higher than the predicted sound levels from the ERF. - AQMAU agrees that for daytime operations, the consultant's points are favourable context. - For evening and night-time operations, road traffic and commercial/industrial uses will reduce, so NSRs will be more sensitive. It is also likely that the proposed ERF will be the only 24/7 industrial source in the area. However, as HGV deliveries will not occur during evening and night periods, the absolute specific sound levels during these periods will be relatively low. - Considering all context points for evening and night periods, based on the current outline design proposals, AQMAU considers that context cannot be used to increase or decrease the predicted impacts. This outcome may change following the completion of the detailed design.	-
BS 4142 conclusions	**Low risk**	- The consultant has presented the following numerical BS 4142 impacts: o Day Weekday (0700-1800): low impact o Day Saturday (0700-1800): low impact o Evening (1800-2300): low impact o Night (2300-0700): low impact - As previously noted, the consultant has separated the daytime period into weekdays and Saturdays, but has not considered Sundays separately. For evening and night periods, the consultant has not separated the data into weekdays, Saturdays or Sundays. - AQMAU has identified the BS 4142 impacts for additional periods which cover the scenarios which will occur for 24/7 operation. More sensitive periods such as Saturday evening and night, and Sunday day, evening and night have therefore been introduced. - AQMAU has identified the following BS 4142 impacts: • Day Weekday/Saturday/Sunday (0700-1800): low impact • Evening Weekday/Saturday/Sunday (1800-2300): low impact • Night Weekday/Saturday/Sunday (2300-0700): below adverse impact	- AQMAU recommends that a further noise impact assessment (NIA) is requested from the applicant following completion of the detailed design and specification of plant and mitigation measures. This could be requested through a pre-operational condition, and AQMAU will be required to review the follow-up NIA and associated noise modelling.

NIA element	Risk grading	Summary of AQMAU audit	Actions for Schedule 5
		- AQMAU considers that the proposed bespoke environmental permit can be granted on noise grounds at this stage, based on the current outline design. - However, as various assumptions have been made by the consultant regarding the sound source levels for operational plant at the ERF, the proposed ERF is considered to be at the outline design stage, with detailed specifications for the final plant which will operate at the ERF not currently available. - Furthermore, all conclusions of the NIA and AQMAU's audit are based on the implementation of 'primary mitigation' and additional 'enhanced mitigation' measures which are built into the current outline design. - There is therefore a risk that sound emissions from the ERF could be higher than those assumed in the NIA. To reduce the risk to Permitting, but to also allow for the environmental permit application to be progressed, the Determining Officer should note that AQMAU recommends that a further noise impact assessment (NIA) is requested from the applicant following completion of the detailed design and specification of plant and mitigation measures. This could be requested through a pre-operational condition, and AQMAU will be required to review the follow-up NIA and associated noise modelling. This should be indicated to Area colleagues in any permit decision related paperwork.	

Table 3: AQMAU risk grading key.

Risk Grading	Implications for AQMAU audit
Low Risk We don't see any risk with this element of the NIA.	We agree with their assumptions/conclusions in relation to this element of the NIA. Or We disagree, but this is not considered significant, and does not affect our assessment of risk.
Medium Risk We see some risk with this element of the NIA and have investigated further.	We don't agree with their assumptions/conclusions in relation to this element of the NIA. This will affect our assessment of risk, and further action may be required from the applicant / consultant.
High Risk We see major risk with this element of the NIA and it is likely to cause a problem.	We strongly disagree with their assumptions/conclusions in relation to this element of the NIA. This will strongly affect our assessment of risk and further action will be required from the applicant / consultant.

END OF DOCUMENT

Summary of AQMAU Recommendations to facilitate pre-operational condition

A further noise impact assessment (NIA) should be submitted by the applicant following completion of the detailed design and final specification of plant and mitigation measures. The NIA should be prepared in accordance with EA guidance (https://www.gov.uk/government/publications/noise-and-vibration-management-environmental-permits) and should include the following information:

- Detailed plant specifications, with supporting evidence.
- Detailed mitigation proposals, with supporting evidence.
- Revised noise modelling files.