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 Average Day (0900-1600): low impact Average Night (2300-0500): below adverse impact Peak Day (1400-1500): low impact Peak Night: below adverse impact Weekend Daytime: low impact Weekend Night-time: below adverse impact Emergency Diesel Generator: impacts as above (no change as a result of EDG plant)	AQMAU has reviewed a BS 4142[1] noise impact assessment (NIA)[2] submitted by Ramboll UK Limited (the consultant) on behalf of Viridor Tees Valley Limited (the applicant) in support of a bespoke environmental permit application for a proposed Energy Recovery Facility (ERF). AQMAU understands that three separate applications have been made for the proposed ERF under different permit application references. AQMAU previously audited a NIA[3] submitted in support of a separate environmental permit application reference EPR/ZP3309LW/A001, as documented in our audit report[4]. This application has been submitted by a different applicant for the same site, and therefore the two proposals have been considered separately. The NIA has presented BS 4142 impacts for four operational scenarios, and concludes that low to below adverse impacts are likely as a result. The NIA has presented background sound levels measured during January 2021, and derived using a noise modelling exercise. The measured data is significantly higher than the modelled values. The NIA notes that *"…the measured background noise levels at monitoring positions LT1-LT3 do not significantly vary between weekday and weekend periods."* AQMAU has analysed the consultant's background sound survey data and concludes that background sound levels for daytime during the week periods are higher than those at the weekend, by 5-7 dB depending on the location being assessed. In addition to this background sound levels for night-time periods during the week are higher than those at the weekend, by up to 2 dB depending on the location being assessed. Therefore, the noise sensitive receptors will be more sensitive to sound emissions from the proposed Installation during the weekend periods. AQMAU considers that lower background sound levels are likely during weekend night-time periods compared to the consultant. AQMAU has also tested sensitivity to the use of the revised ISO 9613-2: 2014[5], which has resulted in higher specific sound levels than the consultant.
AQMAU audit outcome Average Day (0900-1600): low impact (weekday and weekend) Average Night (2300-0500): adverse (weekday), adverse (weekend) Peak Day (1400-1500): low impact (weekday and weekend) Peak Night: adverse (weekday), adverse (weekend) Emergency Diesel Generator: impacts as above (no change as a result of EDG plant)	

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

[2] Tees Valley Energy Recovery Facility. Noise Impact Assessment. Document Number: 1620010534-RAM-XX-XX-RP-EV-00004. Date: 16 December 2021. Ramboll UK Limited

[3] Report ref: BWB-ZZ-ZZ-RP-YA-0001_NIA_S0_P05, Date: April 2023. BWB Consulting

[4] AQMAU audit report reference 'AQMAU-C2535-RP01', Date: 19/07/2023

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

AQMAU audit conclusion AQMAU predicts higher specific sound levels than the consultant, and finds the potential for lower background sound levels during weekend periods. AQMAU considers that adverse impacts are likely during weekday and weekend night-time periods. The proposed bespoke permit application can be granted on noise grounds, as long as the Determining Officer requests a noise management plan (NMP) which demonstrates Best Available Techniques (BAT) to minimise adverse impacts during weekday and weekend night-time periods. The NMP should also include specifications for roof, walls, glazing, louvres and roller shutter doors.	As a result of our audit, AQMAU considers that adverse impacts are likely during weekday and weekend night-time periods. In line with the aims of the Noise Policy Statement for England[6] and The Environment Agency's guidance[7] and standard permit condition for noise, this is only acceptable if the proposed Installation is working to Best Available Techniques (BAT)[8,9] to reduce sound emissions for night-time operations. AQMAU considers that the proposed bespoke environmental permit can be granted on noise grounds if the Determining Officer requests a noise management plan (NMP) which demonstrates Best Available Techniques (BAT) to minimise adverse impacts during weekday and weekend night-time periods. The NMP should also include specifications for roof, walls, glazing, louvres and roller shutter doors. For clarity, AQMAU is not requesting a revised noise impact assessment (NIA) from the applicant, or additional mitigation measures beyond the demonstration of BAT.

Permit application details	AQMAU details	Assessment details
Site name: Tees Valley Energy Recovery Facility **Permit sector:** NPS Installations **Permit ref:** EPR/AP3627SL/A001 **Type:** Bespoke	**AQMAU report reference:** AQMAU-C2894-RP01 **AQMAU response date:** 03/12/2024	**NIA reference:** Tees Valley Energy Recovery Facility. Noise Impact Assessment. Document Number: 1620010534-RAM-XX-XX-RP-EV-00004. 16 December 2021 **Acoustic consultant:** Ramboll UK Limited **Applicant:** Viridor Tees Valley Limited

[6] https://www.gov.uk/government/publications/noise-policy-statement-for-england
[7] https://www.gov.uk/government/publications/noise-and-vibration-management-environmental-permits
[8] https://www.gov.uk/guidance/best-available-techniques-environmental-permits
[9] https://eippcb.jrc.ec.europa.eu/reference

1. Site context

Site location and sensitive receptors

1.1 The site is located on the former South Tees Eco Park, Grangetown Prairie, located to the north of Grangetown approximately 5 miles to the northeast of Middlesbrough Town centre. National Grid Reference NZ 54424 21362 (nearest postcode TS6 6TZ).

1.2 The site lies within the southwest corner of the STDC regeneration area within the Grangetown Prairie Zone. The ERF site is a previously developed industrial site that was formerly used for the production of iron and steel (occupied by Eston Iron Works and Cleveland Steel Works). Following the closure of the steel works and cessation of industrial activities, the building complex was cleared in the 1980's. The site is now vacant and part of the South Tees Development Corporation ("STDC") and is contained within the Dorman Point Zone of the Teesworks Development, a 4,500-acre site comprising eleven zones on and around the banks of the River Tees.

1.3 The nearest residential properties are on Jones Road (640m to south-west), Bolckow Road (580m to south) and Bolckow Road/Cresswell Road (790m to south-east). There are non-residential receptors on John Boyle Road to (125m to the west).

Proposed application and plant

1.4 The proposed bespoke permit application is for 24-7 operations related to a Waste Incineration Installation at the proposed site. The NIA notes *"Tees Valley Authorities, Durham County Council and Newcastle City Council (the Councils) have joined together to create an opportunity for a contractor to design, build, finance and operate a new ERF to be located in the Tees Valley on a mandated site owned by the South Tees Development Corporation (STDC). Redcar & Cleveland Borough Council (RCBC), as the local planning authority, granted outline planning permission for the construction of an ERF and associated development at the site under reference R/2019/0767/OOM on 24 July 2020. Viridor is applying for reserved matters approval for the details of an ERF pursuant to this outline permission. The outline planning application refers to an ERF with a capacity of approximately 450,000 tonnes of residual waste per year"*.

1.5 The proposed Installation will operate 24/7 and the main sound sources affecting the noise sensitive receptors (NSRs) will be the waste deliveries by HGVs, deliveries/collections by Refuse Collection Vehicles (26t), sound emitted from internal sound sources located inside the Process Areas, Turbine Hall, Tipping Hall, Air Cooled Condensers (ACCs), flue stacks, transformer, Fin Fan Coolers (FFCs) and an Emergency Diesel Generator (EDG). The NIA notes that benchmarking measurements from an existing energy from waste facility (i.e. the Lakeside EfW facility at Slough) have been used to inform the operational noise assessment. AQMAU notes that additional data from EPC Contractor and BS 5228-1[10] has been referenced in the NIA.

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

[10] BS5228-1: 2009 + A1: 2014. Code of practice for noise and vibration control on construction and open sites. Noise. British Standards Institution

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

NIA element	Risk grading	Summary of AQMAU audit	Actions for Determining Officer
Sensitive receptors	**Low risk**	- The consultant has identified the following nearest existing noise sensitive receptors (NSRs): - Jones Road (640m to south-west). - Bolckow Road (580m to south). - Bolckow Road/Cresswell Road (790m to south-east). - There are non-residential (industrial) receptors on John Boyle Road to (125m to the west). - AQMAU agrees that the NIA is based on the nearest existing NSRs to the site. - AQMAU has consulted Redcar and Cleveland Borough Council planning portal, to confirm that there are currently no proposed residential properties near the site.	-
Background sound levels	**Medium risk**	- A baseline sound data survey was undertaken by the consultant between Friday 22nd and Tuesday 26th January 2021. The NIA notes that this was during a Covid-19 national lockdown and is therefore potentially conservative due to lower traffic levels at this time. - Unattended measurements were made at three locations, LT1 (south-west of site – Jones Road), LT2 (south of site – Bolckow Road) and LT3 (south-east of site - Bolckow Road/Cresswell Road). Additional attended measurements were made at two locations, ST1 (south-west of site, Uvedale Road) and ST2 (west of site, industrial estate on John Boyle Road). - The consultant has presented L_{A90} background sound levels and L_{Aeq} residual sound levels. - Despite the quantity of environmental sound measurement data obtained, the consultant has predicted the background sound levels using a modelling method. The NIA states: *"Background noise levels have been determined using the noise prediction model that is calibrated to road traffic noise sources and the transformer plant that is adjacent to the A66 (near to receptor location R3). This approach has been taken as it was not possible to measure the background noise levels at the façade locations of the residential receptors. As the dominant noise source was road traffic noise, this approach is deemed to be suitable and is equivalent to applying a distance correction to the receptor locations for road traffic noise sources."* - AQMAU has disregarded this approach, as there is no established method for modelling a statistical noise index such as an L_{A90} sound level (sound level exceeded for 90% of the time period being assessed). AQMAU has analysed the consultant's raw data to identify background L_{A90} and residual L_{Aeq} sound levels for weekday and weekend day and night periods. - AQMAU notes that the background sound levels predicted by the consultant using the 'noise prediction model' are significantly lower than those measured during the baseline sound survey.	-

NIA element	Risk grading	Summary of AQMAU audit	Actions for Determining Officer
		- The NIA notes that *"…the measured background noise levels at monitoring positions LT1-LT3 do not significantly vary between weekday and weekend periods."* - AQMAU disagrees with this statement: AQMAU has analysed the consultant's baseline sound survey and concludes that background sound levels for daytime periods during the week are higher than those at the weekend, by 4-8dB depending on the location being assessed. Additionally, background sound levels for night-time periods during the week are higher than those at the weekend, by up to 2dB depending on the location being assessed. Therefore, AQMAU concludes that the noise sensitive receptors will be more sensitive to sound emissions from the proposed Installation during the weekend periods. AQMAU has undertaken separate weekend BS 4142 assessments for all scenarios. - AQMAU considers that lower background sound levels are likely during weekend night-time periods than those presented in the NIA. - For daytime operations, residual sound levels are much higher than the predicted specific sound levels. However, residual sound levels reduce at night during weekday and weekend periods, so the proposed Installation would potentially be more audible to NSRs.	
Sound source levels	**Low risk**	- The NIA notes that benchmarking sound source level measurements of similar equipment at an existing energy from waste facility (i.e. the Lakeside EfW facility at Slough) have been used to inform the operational noise assessment. The consultant has also used data provided by EPC Contractor, data from previous schemes and from BS 5228-1[11]. - The main sound sources on site will be the waste deliveries by HGVs, deliveries/collections by Refuse Collection Vehicles (26t), sound emitted from internal sound sources located inside the Process Areas, Turbine Hall, Tipping Hall, Air Cooled Condensers (ACCs), flue stacks, transformer, Fin Fan Coolers (FFCs) and an Emergency Diesel Generator (EDG). - AQMAU has reviewed the sound source data used in the assessment, and agrees with the sound source levels used for the internal and external sound sources associated with the proposed Installation. - AQMAU considers that measured or estimated levels are comparable to their closest corresponding equivalent sound source levels from BS5228-1 and are in-line with AQMAU knowledge of sources from other sites.	-

[11] BS5228-1: 2009 + A1: 2014. Code of practice for noise and vibration control on construction and open sites. Noise. British Standards Institution

NIA element	Risk grading	Summary of AQMAU audit	Actions for Determining Officer
Calculation method	**Medium risk**	- The consultant has modelled the specific sound levels associated with the site, using CadnaA noise modelling software, which calculates sound propagation according to ISO 9613-2[12]. AQMAU notes that the consultant's modelling was undertaken in 2021, so is based on the now superseded 1996 version of ISO 9613-2. However, the environmental permit application was submitted in 2024, after the revised ISO 9613-2 was published. AQMAU has tested sensitivity to the revised version from 2024[13]. - The consultant's model has included the following assumptions: - Order of reflection of 3. - Ground absorption hard (G=0.0). - Building absorption coefficient modelled at 0.21 (reflection loss 1 dB). - Contour lines (unreferenced data) to represent local topography. - Receiver heights of 4m for 1st floor receptors, and 1.5m for ground floor receptors. - For HGVs serving the ERF, the model assumes that 65% are HGVs/lorries and 35% are Refuse Collection Vehicles (RCVs). - HGVs/RCVs modelled at 2m relative height. - Fin fan coolers modelled as point sources with 3.1m relative height. - The screen around the Air-Cooled Condensers (ACCs) comprises a minimum density of 10kg/m^2. The noise from the condensers is modelled as emitting from just below the bottom of the screen to provide a worst-case assessment. - Of the HGVs serving the ERF, the model assumes that 65% are lorries and 35% are Refuse Collection Vehicles (RCVs). - The model assumes that all RCVs will enter the tipping hall. Of the total number of lorries, based on values provided by Fichtner Consulting Engineers, 71% of lorries will enter the tipping hall, 3% will be for consumables and 26% will be for ash/residue collection. - Lorry and RCV speeds assumed to be 15mph on site access road and 10mph on site. The NIA notes that these are conservative assumptions as noise exposure will increase with lower HGV speeds. - Noise emissions from the fin fan coolers (FFCs) have been modelled at maximum speed (85 dB L_{pA} at 1m) to represent a worst-case scenario and also for typical operation (design speed) where noise levels are 5 dB lower, i.e. 80 dB L_{pA} at 1m.	-

[12] ISO 9613-2: 1996. Acoustics – Attenuation of sound during propagation outdoors. Part 2: General Method of Calculation. International Standards Organisation (ISO)
[13] 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 Determining Officer
		- The consultant has made the following assumptions regarding the building sound insulation: - Typical external envelope (including roof) to be a composite cladding panel system (or equivalent) rated at least R_w 23 dB. - Non-acoustic weather louvres, assumed to provide R_w 4 dB attenuation. - Standard roller shutter doors rated at least R_w 15 dB. - The NIA notes the following in relation to HGVs: - *"The number of HGVs accessing the site during evening and night-time periods have been input to the model as advised by the transport assessment. However, night-time HGV movements are understood to be confined to the hours of 05:00-07:00."* - The consultant has modelled 4 scenarios as a result: - Average hour 09:00-16:00 (the period of the day when most HGVs will occur, typically 20 two-way movements per hour). - Peak hour 14:00-15:00. - Night-time without HGVs 23:00-05:00. - Night-time with HGVs 05:00-07:00. - The NIA notes that additional scenarios have been considered for the operation of the Emergency Diesel Generator (EDG). - The NIA notes that a separate weekend assessment has not been included, as the consultant's derived background sound levels show that *"…the measured background noise levels at monitoring positions LT1-LT3 do not significantly vary between weekday and weekend periods."* As previously noted, AQMAU disagrees with this and has undertaken separate weekend assessments for all modelled scenarios. - AQMAU has undertaken sensitivity modelling using CadnaA (Version 2024 MR1). - AQMAU generally agrees with the calculation settings and assumptions made by the consultant, but has tested sensitivity to the following: - Building absorption modelled at 0.1 (reflection loss 0.5dB). - Revised calculation methodology from ISO 9613-2 2024[14]. - AQMAU predicts higher specific sound levels than the consultant as a result of our checks.	

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

NIA element	Risk grading	Summary of AQMAU audit	Actions for Determining Officer
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 not applied an AFC, due to the residual L_{Aeq} sound levels being higher than the predicted specific sound levels at LT1, LT2 and LT3. - AQMAU agrees that no acoustic feature corrections are applicable for this assessment due to the distance between then source and NSRs as well as the high residual sound levels at the NSRs, which are attributable to sound from commercial/industrial uses and road traffic movements on the nearby road (A66), and which are generally higher than the predicted specific sound levels from the Installation. While AQMAU has derived lower background sound levels for weekend night-time periods, the residual sound levels are still higher than the worst-case specific sound levels predicted by AQMAU.	-
Mitigation	**Medium risk**	- Due to the BS 4142 impacts predicted by the consultant (low to below adverse), additional mitigation measures were not considered to be necessary. This is based on the assumptions made in the NIA regarding sound source levels and the sound insulation performance for the external building envelope (roof and walls least R_w 23 dB), non-acoustic weather louvres, assumed to provide R_w 4 dB attenuation, standard roller shutter doors rated at least R_w 15 dB. - AQMAU considers adverse impacts to be likely during the weekday and weekend night-time periods. This is due to higher specific sound level predictions as a result of the revised ISO 9613-2 calculation methodology from 2024, and the potential for lower background sound levels during weekend night periods. - In line with the aims of the Noise Policy Statement for England[15] and The Environment Agency's guidance[16] and standard permit condition for noise, adverse impacts are only acceptable if the proposed Installation is working to Best Available Techniques (BAT)[17,18] to reduce sound emissions for weekday and weekend night periods.	- Determining Officer should request a noise management plan (NMP) which demonstrates Best Available Techniques to minimise operational sound emissions during weekday and weekend night periods. The NMP should include specifications for roof, walls, glazing, louvres, roller shutter doors.

[15] https://www.gov.uk/government/publications/noise-policy-statement-for-england
[16] https://www.gov.uk/government/publications/noise-and-vibration-management-environmental-permits
[17] https://www.gov.uk/guidance/best-available-techniques-environmental-permits
[18] https://eippcb.jrc.ec.europa.eu/reference

NIA element	Risk grading	Summary of AQMAU audit	Actions for Determining Officer
Context	**Low risk**	- The NIA has provided a limited assessment of context, stating: *"The context of the noise will be industrial, with the arrival and departure of HGVs. This context is expected to be similar to the current noise environment".* - AQMAU agrees that the proposed Installation will be similar to the existing sound climate, which includes residual sound sources such as commercial/industrial uses and road traffic on the A66. - For daytime operations, this could be considered favourable context. However, for night-time operations, road traffic and commercial/industrial uses will reduce, so noise sensitive receptors will be more sensitive. - AQMAU also considers that it is likely that the proposed Installation will be the only 24/7 industrial source in the area. Overall, AQMAU concludes that context cannot be used to reduce the potential adverse impacts during weekday and weekend night periods.	-
BS 4142 conclusions	**Low risk**	- The consultant has presented the following numerical BS 4142 impacts: - Average Day (0900-1600): low impact - Average Night (2300-0500): below adverse impact - Peak Day (1400-1500): low impact - Peak Night: below adverse impact - Weekend Daytime: low impact - Weekend Night-time: below adverse impact - Emergency Diesel Generator: impacts as above (no change as a result of EDG plant). - AQMAU predicts higher specific sound levels to the consultant for the four scenarios assessed, mainly due to the revised calculation methodology from ISO 9613-2 2024. This increases the risk of adverse impacts during weekday night periods. As AQMAU has also identified the potential for lower background sound levels during weekend night periods, this increases the risk of adverse impacts occurring during weekend night periods also. - AQMAU concludes that low to below adverse impacts are likely for weekday/weekend daytime operations, and adverse impacts are likely for weekday/weekend night-time operations. - As previously noted, in line with the aims of the Noise Policy Statement for England[19] and The Environment Agency's guidance[20] and standard permit condition for noise, adverse impacts are	- See comments under 'Mitigation' above.

[19] https://www.gov.uk/government/publications/noise-policy-statement-for-england
[20] https://www.gov.uk/government/publications/noise-and-vibration-management-environmental-permits

NIA element	Risk grading	Summary of AQMAU audit	Actions for Determining Officer
		only acceptable if the proposed Installation is working to Best Available Techniques (BAT)[21,22] to reduce sound emissions for weekday and weekend night periods. - AQMAU considers that the proposed bespoke environmental permit can be granted on noise grounds, if the Determining Officer is satisfied that the following point raised by AQMAU in this audit can be addressed. - A noise management plan should be requested which demonstrates Best Available Techniques (BAT) to minimise adverse impacts during weekday and weekend night-time periods. The NMP should include specifications for the external building envelope elements: roof, walls, glazing, louvres and roller shutter doors. - For clarity, AQMAU is not requesting a revised noise impact assessment (NIA) from the applicant, or additional mitigation measures beyond the demonstration of BAT.	

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

[21] https://www.gov.uk/guidance/best-available-techniques-environmental-permits
[22] https://eippcb.jrc.ec.europa.eu/reference