Knauf Queensferry Noise Risk Assessment

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SUBJECT:	Knauf Queensferry Noise Risk Assessment		
PROJECT:	Knauf Queensferry Permit Variation	**AUTHOR:**	Stuart Clayton
CHECKED:	Karen Phillipson	**APPROVED:**	Graham Jones- Knauf

1. Introduction

A permit variation was submitted by Knauf Insulated Limited (hereafter known as Knauf) to Natural Resources Wales (NRW) on the 17/06/25 for their Queensferry site. NRW issued a Not Duly Making letter on the 10/03/26 with a number of requirements to be undertaken within 10 working days. One of those is to provide a risk assessment in accordance with the guidance Noise and vibration management: environmental permits - GOV.UK. This technical note has been developed to address the requirement for a Noise Risk Assessment (NRA).

2. Noise Risk Assessment Requirements

As detailed above, NRW requires that a NRA be undertaken in accordance with guidance developed by the UK environmental regulatory bodies titled Noise and vibration management: environmental permits January 2022. This guidance requires the following stages to be undertaken:

1) A desktop risk assessment
2) Off-site survey
3) Source assessment
4) Best Available Technique (BAT) or Appropriate Measures justification

As this is an application to vary an existing permit, the assessment will only consider the proposed changes to be adopted at the installation as part of this variation.

3. About the Installation

3.1 Site Location

The site's address is:

Queensferry Mineral Fibre Works
Chemistry Lane
Queensferry
Deeside
Flintshire
CH5 2DA

The approximate grid reference for the site is SJ 32344 67775.

The installation is located within an area of industrial and commercial development on the Queensferry Industrial Estate (See Figure 1). A drainage channel is located along the north-eastern boundary, beyond which is the North Wales Coast railway and manufacturing facilities. The River Dee is located approximately 400 m to the North. The installation is not located within an Air Quality Management Area.

Figure 1– Site Location

The nearest residential receptor is 70m to the south-west off the B5129.

3.2 Proposed Changes to the Environmental Permit

Following a recent review of compliance with emission limit values, Knauf has undertaken trials to confirm the most appropriate techniques to improve abatement of:

- Hydrogen chloride and sulphur dioxide released via Emission Point A. Whilst hydrated lime provided effective abatement of hydrogen chloride, this gave rise to elevated emissions of sulphur dioxide. Trials demonstrated that the application of sodium bicarbonate (as a substitute for hydrated lime) is effective in ensuring compliance with the emission limit values for all pollutants released from Emission Point A. Consistent with the approach discussed with the site inspector for NRW, the Operator proposes to continue dosing this exhaust flow using sodium bicarbonate, using the injection rig that is currently described in the application for Variation Notice V012.
- Particulates and Ammonia released via Emission Point G through additional abatement in the form of an acid scrubber based on the results of the options appraisal.

The change of reagent from hydrated lime to sodium bicarbonate did not result in the addition of any new equipment and is therefore not considered further within this risk assessment given that this activity has been previously determined with respect to noise.

The acid scrubber to be installed, as already seen as Appendix F to the main application document, will comprise an acid mist scrubbing system in addition to the existing impact jet and cyclone system. Sulphuric acid is effective at removing gaseous ammonia by converting it to ammonium sulphate [$(NH_4)_2SO_4$] with the mist physically removing particulates. As this comprises new equipment to be installed, it is considered further in this risk assessment.

3.3 Identification of Nearby Sensitive Receptors

The Queensferry installation is located on Chemistry Lane, close to Deeside, Flintshire. The immediate surroundings of the site are largely utilised by light industrial and warehouse facilities which are not considered to be sensitive and are unlikely to be adversely affected by noise from the Knauf Insulation operations. The site has historically and is currently surrounded by industrial activities all of which may also have the potential to generate noise emissions.

Domestic residences, leisure facilities, offices, schools or hospitals can be highly sensitive to noise potential.

The nearest isolated residential receptor is located approximately 70m away from the main stack, with larger groups of residential receptors located approximately 220 m from the main stack and a primary school located approximately 355 m from the main stack.

The nearest residential receptors can be seen in Table 1 and Figure 2.

Table 1 Potential Sensitive Receptors Near to the Knauf Insulation Site

Closest Receptor Locations	Category	Grid reference	Approximate Distance from Main Stack	General Direction from Main Stack
Chemistry Lane	Residential	332314, 367798	400	West/North West
Rector's Cottage	Residential	3323758, 367669	70	South East
Church View	Residential	332644, 367485	245	South
Chester Road	Residential	332536, 367529	240	South/ South West
Leaches Lane	Residential	332570, 367406	350	South West
Sandycroft Primary School	School	332506, 367405	355	South West
Mancot Lane	Residential	332281,367661	425	West

Figure 2 Location of Knauf Insulation Site and Indicative Closest Residential Receptors

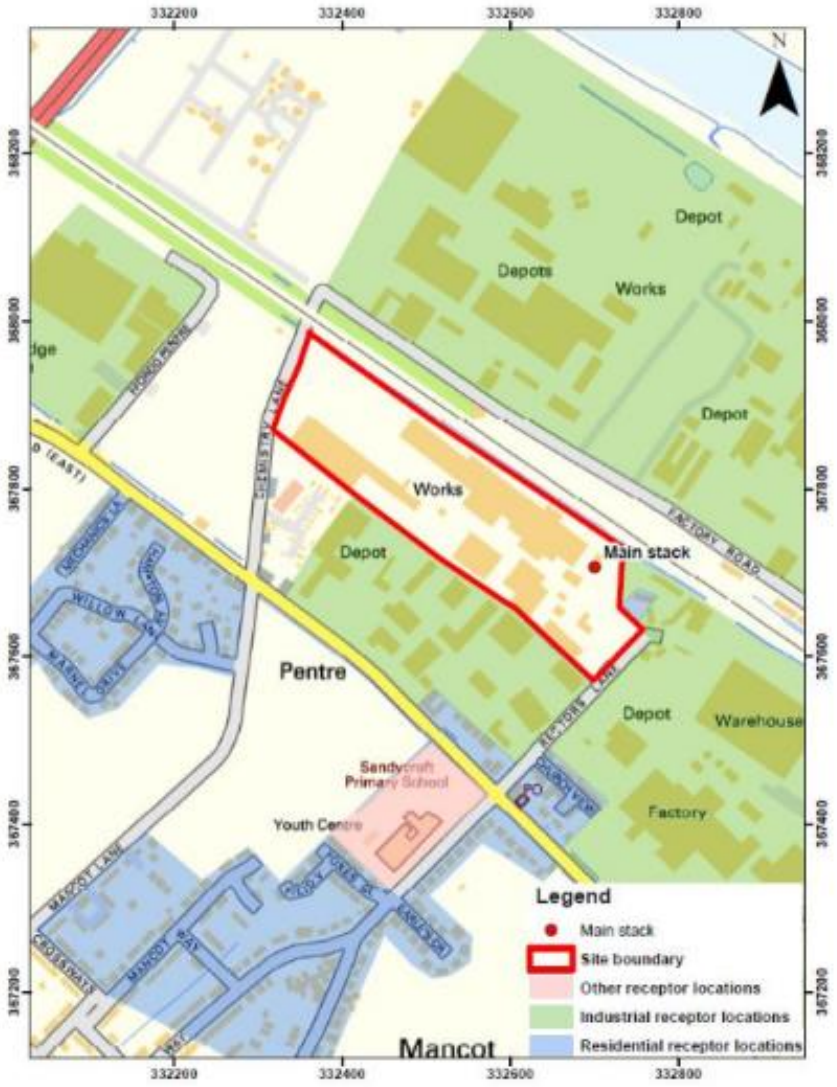
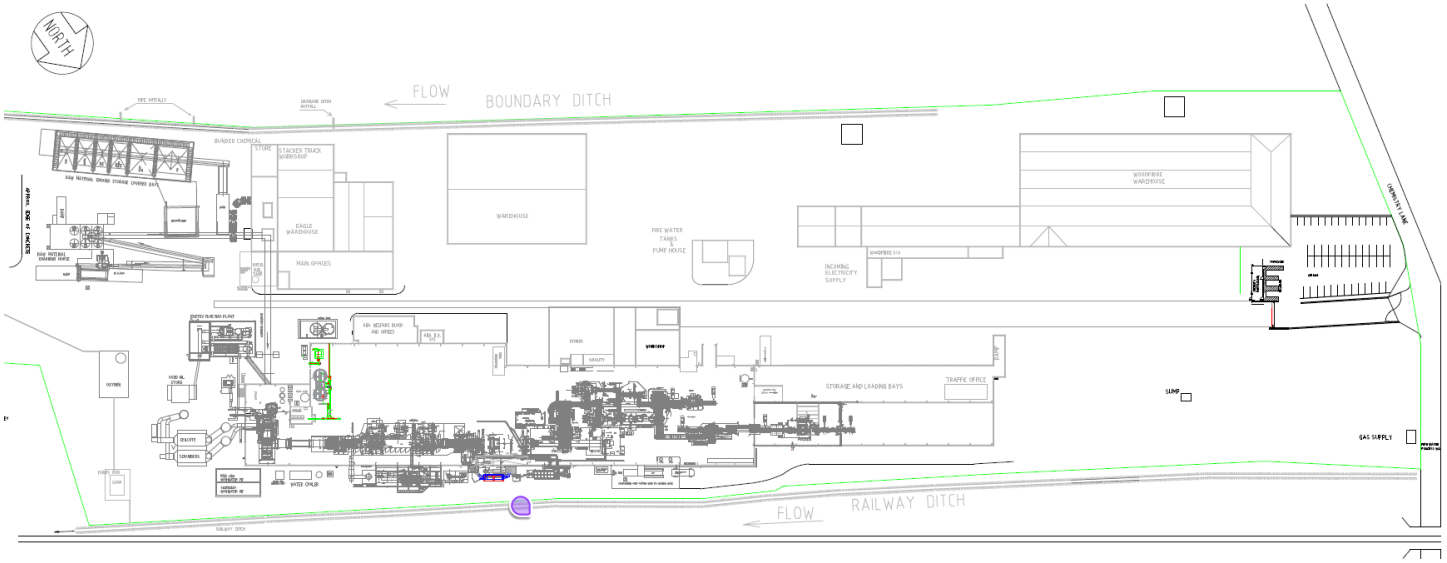


Figure 3 below shows the location of the acid scrubber in red and blue. The acid scrubber is located outside on the railway side of the main production hall away from sensitive receptors. Site production buildings provide an acoustic barrier between the acid scrubber noise sources and the nearest NSR.

Figure 3 Acid Scrubber Location



4. Desktop Risk Assessment

The noise sources associated with this variation application can be seen In Table 2 and are ranked in accordance with potential off-site impact.

Section 3.3 Table 1 details the nearest noise sensitive receptors (NSR) by name, type, location and distance from source.

The noise sources associated with this risk assessment are located outside on the railway side of the main production hall away from sensitive receptors. Site production buildings provide an acoustic barrier between the acid scrubber noise sources and the nearest NSR.

A risk assessment with regard to noise has been undertaken in accordance with https://www.gov.uk/guidance/risk-assessments-for-your-environmental-permit. The risk assessment in Table 2 considers the proposed changes as part of this variation application.

Table 2 - Assessment of Noise Risk

Hazard	Receptor	Pathway	Risk Management	Probability of Exposure	Consequence	What is the overall risk?
What has the potential to cause harm?	What is at risk? What do I wish to protect?	How can the hazard get to the receptor?	What measures will you take to reduce the risk?	How likely is this contact?	What is the harm that can be caused?	What is the risk that still remains?
Noise from upgraded fan	Residential receptors identified in Table 1	Noise propagation through atmosphere	Changes proposed will not increase noise significantly from current operation as the upgraded fan at 83 dB replaces an existing fan at 81 dB to allow for the addition of the wet scrubber equipment. Fan located outside on the railway side of the main production hall away from	Low	Minor / negligible	Low

			sensitive receptors and discharges vertically via the cooling zone stack which minimises emissions of noise to local receptors. Other on-site buildings such as the production hall itself, warehouse and main office buildings are in direct line of site with the nearest NSR and therefore act as a further acoustic barrier against potential noise impact. Any unusual noises (detected by site staff as part of routine site walkovers or complaints from off-site receptors) to be investigated immediately in accordance with procedures within the EMS and appropriate corrective action taken. Equipment subject to planned preventative maintenance in accordance with manufacturers' recommendations to ensure efficient operation. This should ensure that all equipment is operating within normal parameters. Record and act on complaints in accordance with the complaints procedure under the EMS.			
Noise from acid scrubber	Residential receptors identified in Table 1	Noise propagation through atmosphere	Acid scrubbing using an acid mist system does not have any significant noise sources. Acid scrubber located outside on the railway side of the main production hall away from sensitive receptors. Other on-site buildings such as the production hall, warehouse and main office buildings in direct line of site with the nearest NSR and therefore act as a further acoustic barrier against potential noise impact. Any unusual noises (detected by site staff as part of routine site walkovers or complaints from off-site receptors) to be investigated immediately in accordance with procedures within the EMS and appropriate corrective action taken. Equipment subject to planned	Low	Minor / negligible	Low

			preventative maintenance in accordance with manufacturers' recommendations to ensure efficient operation. This should ensure that all equipment is operating within normal parameters. Record and act on complaints in accordance with the complaints procedure under the EMS.			

It is considered that, because of the minimal new noise sources to be introduced by the activities subject to the permit variation application, in combination with the existing risk management measures in place as detailed in Table 2, there is no potential for noise impact at the nearest NSRs.

5. Off-Site Survey

A noise survey has previously been undertaken with regards the operations undertaken by Knauf. The survey has not been repeated given that the proposed changes associated with this variation application are minor in terms of additional equipment and therefore new noise sources.

Boundary noise levels have previously been established from the following noise surveys:

- Day-time noise levels: Industrial Noise and Vibration Centre Limited Report Ref:6707A June 2011
- Night-time noise levels: Diamond Environmental Limited Report Ref: KIQ2635 June 2010

Day-time considered to be 07.00-23.00 and night time considered to be 23.00 to 07.00 hours.

Figure 4 below shows the locations of the noise monitoring positions.

Figure 4 Noise Monitoring Positions

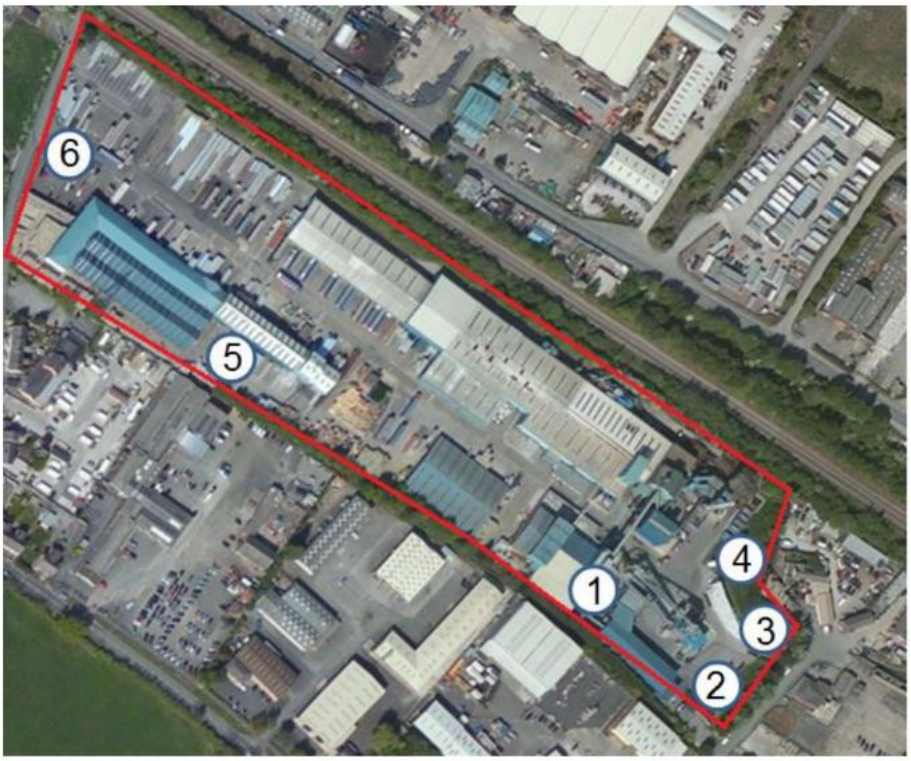


Table 3 to Table 6 detail the ambient (L_{Aeq}) and background (LA_{90}) broadband noise levels measured at each location with plant in normal operation and when the plant is shutdown.

Table 3 - Day-Time Noise Levels - Plant Operational

Position	Highest L_{Aeq}	Lowest L_{Aeq}	Average L_{Aeq}	Lowest L_{A90}
1	75	69	73	68
2	70	64	67	61
3	64	55	64	51
4	67	65	66	64
5	63	48	57	45
6	67	62	66	51

Table 4 - Day-Time Noise Levels - Plant Shutdown

Position	Highest L_{Aeq}	Lowest L_{Aeq}	Average L_{Aeq}	Lowest L_{A90}
1	68	66	67	65
2	56	56	56	50
3	55	48	54	46
4	67	56	63	55
5	46	43	46	42
6	65	65	65	53

Table 5 - Night-Time Noise Levels - Plant Operational

Position	Highest L_{Aeq}	Lowest L_{A90}		
1	68	67		
2	53	51		
3	53	52		
4	64	63		
5	48	43		
6	51	40		

Table 6 – Night-Time Noise Levels - Plant Shutdown

Position	Highest L_{Aeq}	Lowest L_{A90}		
1	54	47		
2	43	39		
3	44	38		
4	58	45		
5	47	39		
6	45	41		

6. Assessment of Noise Sources

Knauf as part of their existing Noise Management Plan (NMP) January 2018 have undertaken an assessment of noise sources for the currently permitted activities which was included as Appendix E to the current environmental permit application. An assessment of the noise sources has been undertaken on the changes as part of this proposed application variation; the results are presented in accordance with the assessment of the noise sources within the existing NMP and are detailed in Table 7 below.

Table 7 – Assessment of Noise Sources

Source Ref No.	Location	Source	Operation	Description / Character	Rating	Controls
1	Production Building	Injection dosing system	Intermittent	Hum	Low	Pulse driven injection of reagent by small electrical motors. No change to existing noise profile from this equipment as the only change is with regards the reagent.
2	Production Building	Fan	Constant	Whirring	Low	Electrically driven fan which is part of abatement system. Located outside on the railway side of the main production hall away from sensitive receptors. Discharges vertically at the cooling zone stack.
3	Production Building	Acid scrubber unit	Constant	Hum	Low	Acid scrubbing using an acid mist system does not have any significant noise sources. Located outside on the railway side of the main production hall away from sensitive receptors.

7. BAT Assessment/ Justification

BAT as detailed within COMMISSION IMPLEMENTING DECISION of 28 February 2012 establishing the best available techniques (BAT) conclusions under Directive 2010/75/EU of the European Parliament and of the Council on industrial emissions for the manufacture of glass for the control of noise can be seen in Table 8 below.

Table 8 – BAT Noise Requirements

BAT	Site Performance
15. BAT is to reduce noise emissions by using one or a combination of the following techniques: (i) Make an environmental noise assessment and formulate a noise management plan as appropriate to the local environment (ii) Enclose noisy equipment/operation in a separate structure/unit (iii) Use embankments to screen the source of noise iv) Carry out noisy outdoor activities during the day (v) Use noise protection walls or natural barriers (trees, bushes) between the installation and the protected area, on the basis of local conditions.	The site undertakes the following BAT requirements for the control of noise: (i) The site has in place a noise management plan which will be updated to incorporate the changes associated with this variation application (ii) Equipment associated with this variation is located within buildings. (iii) N/A (iv) N/A (v) The production hall, main office and warehouse buildings are located between the acid scrubber and the nearest NSR. As the site utilises multiple BAT requirements it is considered that the proposed changes associated with this variation are in accordance with BAT.

It is considered that there is no potential for an increased noise impact from the changes proposed as part of this variation application for the following reasons:

1) The existing injection dosing system to abate emissions associated with Emission Point A is currently located within the production building and comprises small electric motors and is considered to be an insignificant noise source. The change in reagent will not alter the noise profile for this activity which has previously been determined.
2) The wet scrubber will be located outside on the railway side of the main production hall away from sensitive receptors and noise emissions are also considered to be insignificant as the acid mist system does not have any significant noise sources. Other buildings such as the production hall, warehouse and main office buildings are in direct line of site with the nearest NSR and would act as an acoustic barrier against potential noise impact.
3) The upgraded fan is located outside on the railway side of the main production hall away from sensitive receptors and has only a 2dB increase in noise levels from the current fan. The fan is used to pull the air through the acid scrubber and discharges vertically via the cooling zone stack. In general, the site considers that noise levels at source have decreased since the fan associated with the scrubber was upgraded, this is due to lower revolutions per minute during operation and improvements in ducting.