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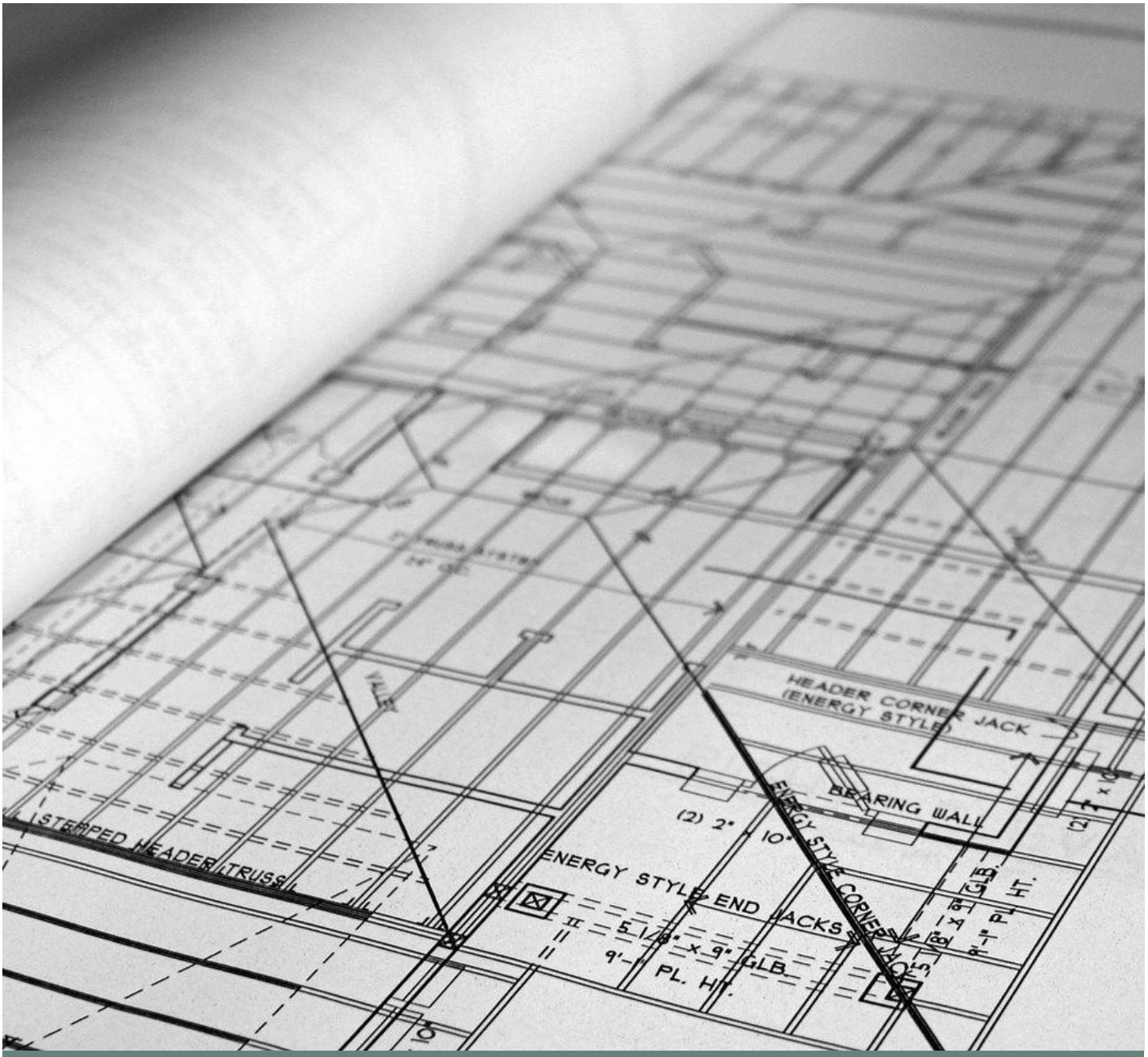

GAP Plant & Tools, Whitehaven

Noise Impact Assessment Report

Client: GAP Group Ltd

Project Number: 1982021

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REPORT ISSUE & STATUS LOG

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1 INTRODUCTION

1.1 OVERVIEW

1.1.1 JPM Acoustics Ltd has been appointed by GAP Group Ltd to undertake a noise impact assessment to support a retrospective planning application for a new building on the existing GAP site in Whitehaven.

1.1.2 This report presents an assessment of the potential noise impacts associated with the introduction of the new building on nearby noise sensitive receptors. The assessment has been undertaken with due consideration to relevant British Standards, Planning Policies and current guidance relating to noise.

1.1.3 This report is necessarily technical in nature. Therefore, to assist the reader, a glossary of acoustic terminology is included in **Appendix A**.

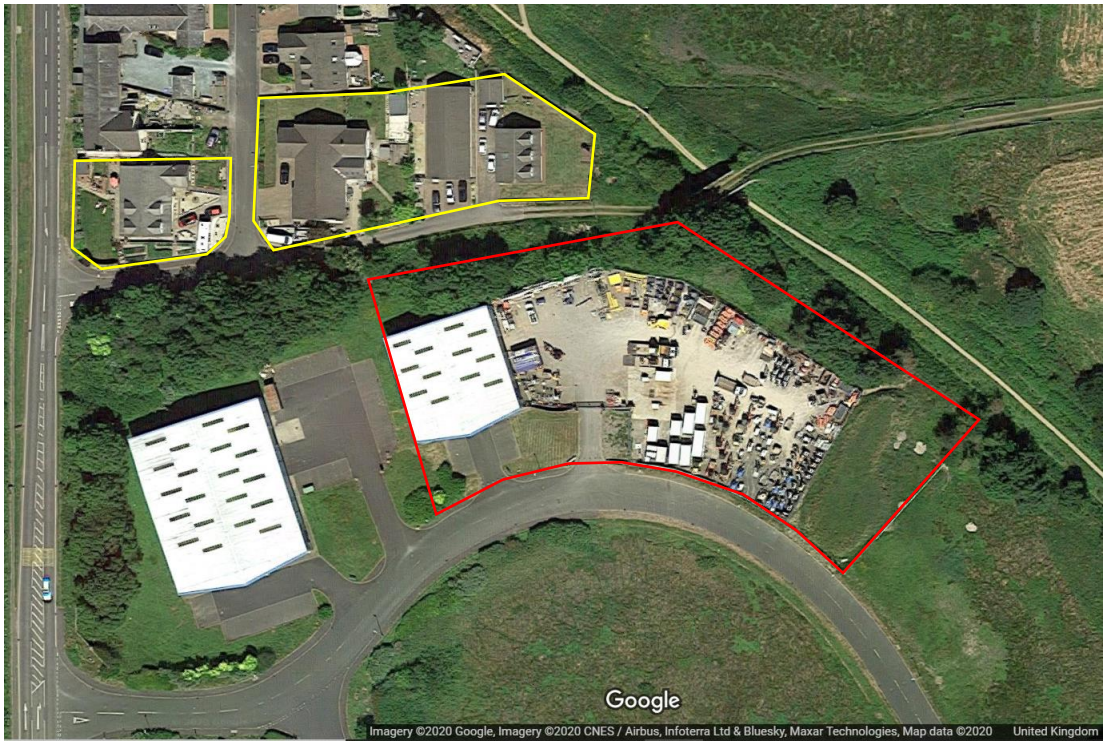
1.2 SITE DESCRIPTION

1.2.1 The GAP Plant & Tool Hire site is located on Joe McBain Avenue in Whitehaven. The site is bounded by Joe McBain Avenue to the south, an industrial/commercial unit to the west, a small area of trees to the north, beyond which is Whinrigg Drive, and open grassland to the east.

1.2.2 The nearest noise sensitive receptors to the development are those on Whinrigg Drive to the north.

1.2.3 **Figure 1-1** shows an indicative redline site boundary and the location of the nearest receptors outlined in yellow.

Figure 1-1: Site Location



1.3 DEVELOPMENT DESCRIPTION

1.3.1 GAP have recently erected a new building on the existing GAP site, which requires retrospective planning permission.

1.3.2 GAP have confirmed that the new building will be used to store and service items of plant and equipment (including welfare units), which is essentially the same use as the existing building on the site.

1.3.3 There will be a small office/store located to the rear corner of the new building, and all other areas will be open plan with perimeter workstations for repairs, servicing and testing.

1.3.4 The GAP site operates during daytime hours only. The operational hours of the site are between 07:30 and 18:00 on weekdays and 07:30 until 13:00 on Saturdays. **Figure 1-2** shows the location of the proposed building.

Figure 1-2: Location of Proposed Building

2 LEGISLATION AND GUIDANCE

2.1 BRITISH STANDARD 4142: 2014+A1:2019: METHODS FOR RATING AND ASSESSING INDUSTRIAL AND COMMERCIAL SOUND (BS 4142)

2.1.1 This British Standard describes methods for rating and assessing the following:

- Sound from industrial and manufacturing processes;
- Sound from fixed installations which comprise mechanical and electrical plant and equipment;
- Sound from the loading and unloading of goods and materials at industrial and/or commercial premises; and
- Sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from premises or processes, such as that from forklift trucks, or that from train movements on or around an industrial and/or commercial site.

2.1.2 The method uses outdoor sound levels to assess the likely effects of sound on people who might be inside or outside a dwelling or premises used for residential purposes upon which sound is incident.

2.1.3 In accordance with the assessment methodology, the specific sound level ($L_{Aeq,T}$) of the noise source being assessed is measured or predicted at a receptor location. A rating level ($L_{Ar,Tr}$) is then derived by adding a correction or penalty to the specific sound level for characteristic features, such as tonal qualities and/or distinct impulses, which make the source distinguishable against the residual noise climate. The British Standard effectively compares the difference between the rating level and the typical background sound level ($L_{A90,T}$) in the absence of the noise source being assessed.

2.1.4 It is advised that the time interval ('T') of the background sound measurement should be sufficient to obtain a representative or typical value of the background sound level at the time(s) when the noise source in question is likely to operate or is proposed to operate in the future.

2.1.5 Comparing the rating level with the background sound level, BS 4142 states:

"*Typically, the greater this difference, the greater the magnitude of impact.*

A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.

A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.

The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context."

1.2 BS 8233:2014: GUIDANCE ON SOUND INSULATION AND NOISE REDUCTION FOR BUILDINGS (BS 8233)

2.1.6 This standard provides guidance for the control of noise in and around buildings. The guidance provided within the document is applicable to the design of new buildings, or refurbished buildings undergoing a change of use.

2.1.7 The standard includes recommended internal and external noise level criteria which are applicable to dwellings for steady external noise sources. It is stated that it is desirable that the internal ambient noise level does not exceed the guideline values set out in **Table 2-1**.

Table 2-1: Desirable Guideline Values from BS 8233

Activity	Location	Period	
		07:00 to 23:00 Hours, i.e. Daytime	23:00 to 07:00 Hours, i.e. Night-time
Resting	Living Room	35 dB $L_{Aeq,\ 16\ Hour}$	-
Dining	Dining Room/area	40 dB $L_{Aeq,\ 16\ Hour}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,\ 16\ Hour}$	30 dB $L_{Aeq,\ 8\ Hour}$

2.1.8 With respect to external amenity space such as gardens and patios, it is stated that it is desirable that the noise level does not exceed 50 dB $L_{Aeq,T}$, with an upper guideline value of 55 dB $L_{Aeq,T}$ which would be acceptable in noisier environments.

3 BASELINE NOISE SURVEY

3.1 OVERVIEW

3.1.1 A baseline noise survey has been undertaken to determine the prevailing noise climate at a location on the boundary of the GAP site closest to the nearest noise sensitive receptors. The survey included periods between 07:00 and 19:00 on the 27th May 2020. **Figure 3-1** identifies the measurement location adopted during the survey.

Figure 3-1: Baseline Noise Survey Measurement Location

3.1.2 Measurement Location 1 (ML1) was on the northern site boundary at a height of approximately 2 m. The measurement location was used to determine noise levels from activities within the site during operational periods, and representative background noise levels during periods when the site was not operating.

3.1.3 The noise climate at Measurement Location 1 was dominated by noise from the GAP site during operational hours and was dominated by natural sounds and distant road traffic noise during periods when GAP were not operating.

3.2 EQUIPMENT

3.2.1 The baseline noise survey was undertaken using the Class 1 specification noise measurement equipment detailed in **Table 3-1**. The measurement equipment was calibrated using a portable calibrator immediately before and after the measurements with no significant drift in calibration observed. The sound level meter, pre-amplifier and microphone were calibrated to traceable standards within 24 months prior to the measurements. The portable calibrator was calibrated within 12 months prior to the measurements.

Table 3-1: Equipment Details

Item	Make & Model	Serial Number	Calibration Due
Sound Level Meter	Svantek 971	80344	March 2022
Pre-Amplifier	Svantek SV18	71577	
Microphone	ACO Pacific 7052E	69566	
Calibrator	01dB-Stell Cal 21	34675335	November 2020

3.3 WEATHER CONDITIONS

3.3.1 Weather conditions during the survey were conducive to environmental noise monitoring, it being dry with negligible winds.

3.4 RESULTS

3.4.1 A summary of the relevant survey results is included in **Table 3-2**.

Table 3-2: Measured Sound Pressure Levels at Measurement Location 1

Start Date and Time	Period	Sound Pressure Levels		Comment
		dB $L_{Aeq,T}$	dB $L_{A90,T}$	
27/05/2020 07:00	30-minutes	53	31	GAP Not Operating
27/05/2020 08:00	1-hour	59	40	GAP Operating
27/05/2020 09:00	1-hour	60	39	
27/05/2020 10:00	1-hour	66	38	
27/05/2020 11:00	1-hour	51	38	
27/05/2020 12:00	1-hour	49	37	
27/05/2020 13:00	1-hour	49	38	
27/05/2020 14:00	1-hour	58	35	
27/05/2020 15:00	1-hour	53	35	
27/05/2020 16:00	1-hour	58	35	
27/05/2020 17:00	1-hour	42	31	GAP Not Operating
27/05/2020 18:00	1-hour	50	31	GAP Not Operating

3.4.2 It can be seen from **Table 3-2** that during periods when GAP were not operating the background noise levels were consistently 31 dB $L_{A90,1h}$. Noise levels at Measurement Location 1 during operational periods ranged between 49 and 66 dB $L_{Aeq,1hr}$ with 56 dB $L_{Aeq,1hr}$ being the average level associated with the site.

4 ASSESSMENT

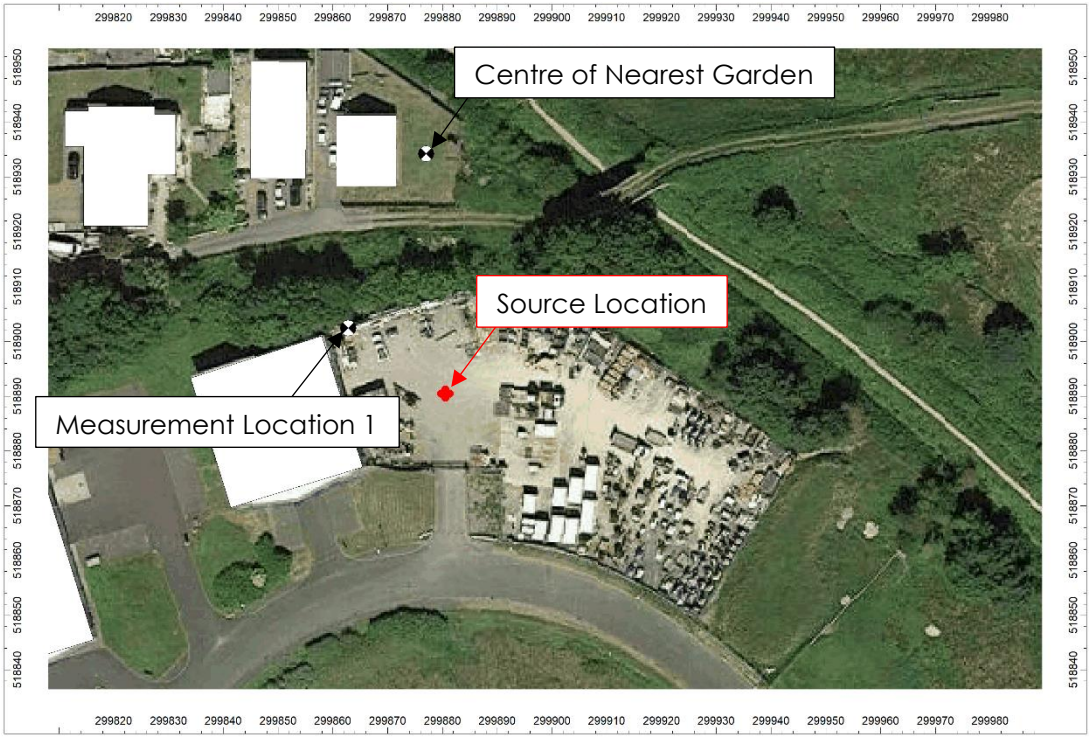
4.1 EXISTING NOISE LEVELS

4.1.1 A detailed noise model has been generated to calculate noise propagation from the existing site due to typical operations. The noise model was generated applying the following methodology:

- The model was generated using the PC based CadnaA® noise modelling package;
- The noise model was set to apply the prediction methodology from ISO 9613-2: *Acoustics – Attenuation of sound during propagation outdoors* – Part 2: *General method of calculation*;
- To reflect the local ground cover, ground absorption was set to G = 1 (100% acoustically absorptive ground) with the exception of the site, which was modelled as G=0 (100% acoustically reflective ground);
- Buildings associated with the development and existing buildings surrounding the site were incorporated into the noise model to account for acoustic screening effects;
- The noise model accounted for the topography of the site and surrounding area by including DTM data from data.gov.uk;
- A noise source was included at the location labelled in **Figure 4-1** at a height of 1 m to be representative of typical operations within the GAP site;
- Measurement Location 1 was included as a receiver in the noise model and was used to calibrate the noise source to the average noise level measured during operational hours; and
- A receiver has been included in the centre of the nearest residential garden at a height of 1.5 m.

4.1.2 **Figure 4-1** shows the location of the modelled noise source and receivers described above.

Figure 4-1: Noise Model Source and Receiver Locations



4.1.3 The results of the above modelling exercise predict a noise level in the centre of the nearest garden of 40 dB $L_{Aeq,1h}$ during current operations.

4.1.4 In accordance with guidance from BS 4142, a penalty of 6 dB should be applied where impulsivity is clearly perceptible. The resulting rating level would be 46 dB $L_{Ar,1h}$.

4.1.5 It can be seen from **Table 3-2** that the background sound level in the absence of noise from GAP during the daytime is 31 dB $L_{A90,1h}$. Therefore, the predicted rating level is 16 dB above the background sound level. This indicates a significant adverse impact in accordance with BS 4142, depending on the context.

4.1.6 The context for this assessment is that the site has been operational for several years with no noise complaints and that the area is subject to low background noise levels due to its rural setting. BS 4142 states the following regarding assessments in areas with low background noise levels:

> "*Where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night.*"

4.1.7 Therefore, it is considered appropriate to also consider the absolute noise levels generated by the site, rather than relying solely on a comparative assessment approach.

4.1.8 Comparing the predicted 40 dB $L_{Aeq,1h}$ noise level to the 50 dB desirable guideline value in gardens from BS 8233 indicates that noise from the site is low in absolute terms.

4.1.9 Even if a 6 dB correction were applied to account for the impulsivity of the source, the predicted level from current site operations would still be below the desirable guideline value by a margin of 4 dB.

4.1.10 In accordance with guidance from BS 8233, internal noise levels can be estimated by applying a -15 dB correction to external free-field noise levels. Based on the predicted 40 dB $L_{Aeq,1h}$ noise level in the garden of the nearest dwelling, internal noise levels within the adjacent dwelling would be expected to be circa 25 dB(A). Comparing this to the desirable guideline value of 35 dB $L_{Aeq,16h}$ for the daytime, indicates that internal noise levels from the site are low in absolute terms. Even if a 6 dB penalty were applied for clearly perceptible impulsivity, the predicted level would still be below the desirable guideline value by a margin of 4 dB.

4.1.11 Given that noise levels from the site at the nearest receptors have not caused complaints, are limited to the daytime period only, and are low in absolute terms, it is considered that current noise levels from the site are acceptable. The following section details the predicted change in noise levels due to the introduction of the new building.

4.2 IMPACT OF NEW BUILDING

4.2.1 The use of the new building is to be an extension of the operations currently undertaken in the existing building on the GAP site. It was noted during the baseline noise survey that operations in the external yard areas were dominant at ML1 and that noise break-out from the existing building was negligible. This is also anticipated to be the case for the new building given the similar usage and layout.

4.2.2 Given that external operations on the site are anticipated to still be dominant when accounting for the new building, and the new building does not screen the receptors from the nearest service yard area, the noise levels at the nearest receptors due to external operations in the closest service yard area are not anticipated to change.

4.2.3 It should be noted that although noise levels due to operations in the closest service yard are not anticipated to change, there will be a reduction in noise emissions from areas of the yard screened from the nearest receptors by the new building. Therefore, the building will reduce noise from some operations on the site.

4.2.4 Given the above, noise levels from operations in the nearest service yard at the nearest receptors are predicted to remain unchanged, and noise levels from operations screened by the new building will be reduced. As such, no mitigation measures are warranted and noise levels from the site are predicted to remain acceptable.

5 CONCLUSION

5.1.1 JPM Acoustics Ltd has been appointed by GAP Group Ltd to undertake a noise impact assessment to support a retrospective planning application for a new building on the existing GAP site.

5.1.2 This report presents an assessment of the potential noise impacts associated with the introduction of the new building on existing noise sensitive receptors. The assessment has been undertaken with due consideration to relevant British Standards, Planning Policies and current guidance relating to noise.

5.1.3 The assessment draws on the results of a baseline noise survey undertaken on the site in May 2020. A detailed noise model of the site and surrounding areas has been generated drawing on the results of the baseline noise survey.

5.1.4 An assessment of current noise emissions from the site undertaken in accordance with BS 4142 indicated a 'significant adverse impact' depending on the context. The context for the assessment is that the site has been operating for several years without complaint and is in an area with low prevailing background sound levels. Therefore, consideration has also been given to absolute noise levels.

5.1.5 The noise levels from the site are predicted to be well below the desirable guideline values from BS 8233, suggesting that noise levels from the site are low in absolute terms.

5.1.6 Consideration has been given to the impact of the new building on the predicted noise levels from current operations on the site. It was identified that noise levels from operations in the service yard nearest the noise sensitive receptors will remain unchanged. It was also identified that noise from some operations on the site will be screened from the receptors by the introduction of the building. Therefore, the noise levels will either be the same or slightly reduced due to the introduction of the building.

5.1.7 Given the findings of this assessment, it is considered that noise need not be a determining factor in granting planning consent for the ongoing operations at the site.

APPENDIX A: TECHNICAL GLOSSARY

Term	Descriptions
Sound Pressure	Sound, or sound pressure, is a fluctuation in air pressure over the static ambient pressure.
Sound Pressure Level (Sound Level)	The sound level is the sound pressure relative to a standard reference pressure of 20 µPa ($20x10^{-6}$ Pascals) on a decibel scale.
Decibel (dB)	A scale for comparing the ratios of two quantities, including sound pressure and sound power. The difference in level between two sounds S1 and S2 is given by 20 log10 (S1 / S2). The decibel can also be used to measure absolute quantities by specifying a reference value that fixes one point on the scale. For sound pressure, the reference value is 20µPa.
A-weighting, dB(A)	The unit of sound level, weighted according to the A-scale, which takes into account the increased sensitivity of the human ear at some frequencies.
Noise Level Indices	Noise levels usually fluctuate over time, so it is often necessary to consider an average or statistical noise level. This can be done in several ways, so a number of different noise indices have been defined, according to how the averaging or statistics are carried out.
$L_{eq,T}$	A noise level index called the equivalent continuous noise level over the time period T. This is the level of a notional steady sound that would contain the same amount of sound energy as the actual, possibly fluctuating, sound that was recorded.
$L_{max,T}$	A noise level index defined as the maximum noise level during the period T. L_{max} is sometimes used for the assessment of occasional loud noises, which may have little effect on the overall L_{eq} noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.
$L_{90,T}$	A noise level index. The noise level exceeded for 90% of the time over the period T. L_{90} can be considered to be the "average minimum" noise level and is often used to describe the background noise.
Free-Field	Far from the presence of sound reflecting objects (except the ground), usually taken to mean at least 3.5m.
Façade	At a distance of 1m in front of a large sound reflecting object such as a building façade.
Fast/Slow Time Weighting	Averaging times used in sound level metres.
Octave Band	A range of frequencies whose upper limit is twice the frequency of the lower limit.