Beechfield Design Consultancy Limited

Noise Impact Assessment

Job Number:	IA190523
Client:	I'Anson Brothers Ltd, The Mill, Thorpe Road, Masham, Ripon, North Yorkshire, HG4 4JB
Date of Survey:	05-07-2019 to 08-07-2019
Date of Issue:	15-07-2019

Proposed site:

I'Anson Brothers Ltd

Dalton New Bridge Mill
Dalton Industrial Estate
Off Dalton Lane
Thirsk
YO7 3HR

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Executive Summary

A daytime and night-time noise impact assessment has been carried out for I'Anson Brothers Ltd to assess the sound emanating from a proposed Mill and assess the likely effects on people who may reside nearby. A BS4142-2014+A1:2019 'Methods for rating and assessing industrial and commercial sound' assessment methodology has been used to assess the specific sound emanating from the Mill as a whole against the background sound levels allowing a rating level to be calculated.

The proposed Mill will have a Low Impact on any residents and it is recommended that planning is approved.

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1.0 Introduction

1.1 Experience and Qualifications

My name is Neil Durham and I am a director at Beechfield Design Consultancy Limited (BDC). The company has been operational since 1982 and specialises in fan system design and noise control.

As part of my role I attend industrial and commercial sites and perform BS4142 surveys for clients who wish to continually improve the noise environment, need to identify a specific noise source or who are reacting to a noise complaint. I have worked and liaised with Planners, Environmental Health officers, and Environment Agency officers along with company representatives and members of the public.

I regularly attend seminars and presentations at the Institute of Acoustics to keep up to date with developments in terms of latest thinking and changes to standards.

I hold a BEng (Hons) in Mechanical Engineering and a post graduate Diploma in Acoustics and Noise Control. I am a Chartered Mechanical Engineer (CEng), a Member of the Institute of Mechanical Engineers (MIMechE) and an associate member of the Institute of Acoustics (AMIOA). I am an acoustic consultant and specialise in industrial noise control and offer noise solutions for industrial clients.

1.2 Background

Beechfield Design Consultancy Limited has been commissioned by Mr. Chris I'Anson of I'Anson Brothers Ltd of Masham to conduct a noise impact assessment for a proposed new build Mill on the Dalton Industrial Estate near Thirsk.

A daytime and night-time noise impact assessment has been carried out for I'Anson Brothers Ltd to assess the sound emanating from the new Mill and assess the likely effects on people who may reside nearby.

A BS4142-2014+A1:2019 'Methods for rating and assessing industrial and commercial sound' assessment methodology has been used to assess the specific sound emanating from the Mill as a whole against the background sound levels allowing a rating level to be calculated.

I'Anson Brothers Ltd operate an animal feed mill and process and supply animal feeds to local farmers, businesses and the public across Yorkshire and employ circa 80 persons. The new Mill is in addition to the existing business and will create jobs and employment in the Dalton area.

The new Mill is a long term investment and has been designed using best available techniques for efficiency and noise reduction at the outset and will therefore offer a low impact on current residents.

I have worked with I'Anson Brothers for many years on noise improvement work, surveys and noise management plans and understand the processes and noise producers in detail.

1.3 Description of Source

The dominant noise sources at the new I'Anson Brothers Ltd Mill come from the compounding/pelletizing plant. The main noise sources are from the equipment that processes the feed.

There are elevators, a grinder, mixers, presses, coolers and filter units and associated equipment such as fans, blowers and compressors.

The main processing part of the plant is sandwiched between the intake storage bins to the north and the bulk outloading bins to the south. The main processing part of the plant is aligned west to east on the plan shown in 7.0 - Appendix 1 – Plan 2. Any noise emanating from the plant to the north or south will be screened by the bins which are in turn covered by cladding.

The main processing plant is clad at each end using insulated cladding keeping the break out noise to the design levels required.

The intake area is where the raw materials are unloaded from HGV's in bulk and is a totally enclosed area allowing for noise levels to be mitigated to a minimum. The raw materials are then fed by bucket elevator up to the raw material bins. A bucket elevator transfers the desired products into the grinder feed bins.

The grinder is located on a concrete floor with anti-vibration mounts and located in a purpose built acoustic room. The product from the grinder is mixed to homogenise the product. This product is then fed back up to the top floor in a central bucket elevator into the pre-press hoppers. The product is then mixed with molasses and steamed and then fed into two presses that form the pellets. These pellets are then fed into a cooler and cooled down. The cooler exits through a recovery cyclone filter and the fan stacks exit at the top of the central processing plant and are fitted with high efficiency attenuators.

The cooled pellets are transported by bucket elevators to the top of the central processing plant where they are coated with vegetable oil and then transported to the finishing blending bins. The finished blending bins are above the bulk outloading bins and a robot weigher picks the products required and transfers to the bulk outloading bins.

The bulk outloading HGV's enter from the east under the bulk outloading bins and a door closes allowing the loading to complete when the area is fully enclosed. The HGV's exit the bulk outloading to the west through another roller door. Doors remain closed during loading.

Dust filters are fitted with bespoke attenuators if required.

For noise purposes the Mill is essentially a 24h operation although shifts are removed during the summer as demand requires. Vehicle movements can occur anytime between the hours of 06.00 and 18.00 and occasionally outside these hours.

1.4 Subjective Impressions

The nearest noise sensitive receptor (NSR) is located 430m to the east from the proposed Mill on Dalton Lane shown as point 5 in 6.0 - Appendix 1 – Plan 1. There is also a caravan park located to the west and this is located 575m away shown as point 6 in 6.0 - Appendix 1 – Plan 1. In terms of context the NSR location is generally a noisy environment. The NSR location is residential and industrial/commercial and therefore mixed use.

Noise levels were measured at various locations around the site to get an overall view of noise levels the NSR's are experiencing.

The Inspired Pet Nutrition (Waggs) pet food factory located south east of the caravan park can be heard during the night.

There is some noise emanating from the factory on the Cod Beck Blending site to the north east of the site.

To the south of the site there is another Inspired Pet Nutrition pet food factory that can be heard during the day and night and the Cleveland Steel and Tubes company could also be heard.

Dalton Lane is a busy road and HGV's are seen on this road travelling to the Cod Beck Blending site and also beyond.

The A168 (A19) is situated to the north west at 900m from the proposed Mill and can be heard clearly during the day and night and is more prominent at the caravan park.

2.0 Assessment Criteria

2.1 BS4142: 2014+A1:2019 'Methods for rating and assessing industrial and commercial sound'

This standard describes methods for rating and assessing sound of an industrial or commercial nature which includes:

- 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 or ship movements on or around an industrial and/or commercial site

This standard is applicable to the determination of the following levels at outdoor locations:

Rating levels for sources of sound of an industrial and/or commercial nature; and ambient, background, and residual sound levels, for the purposes of:

- Investigating complaints
- Assessing sound from existing, proposed, new, modified or additional source(s) of sound of an industrial and/or commercial nature; and
- assessing sound at proposed new dwellings or premises used for residential purposes.

The assessor should gain a sufficient understanding of the situation (context) to be rated and assessed by conducting an appraisal, as appropriate, in order to:

- Identify and understand all the sounds that can be heard, and identify their sources
- Identify potential measurement locations
- Identify the necessary measurement frequencies, durations and timings; and
- where a new development is to be assessed, understand what kind of sound a new industrial and/or commercial source would introduce, or what potential impact would be imposed from an existing source on a new sensitive receptor

The specific noise level also acknowledges the following reference time intervals depending upon whether the noise source operates during daytime or night-time periods:

Daytime (07:00 – 23:00):	1 hr
Night-time (23:00 – 07:00):	15 minutes.

There are a number of 'penalties' which can be attributed to the specific sound level depending upon the 'acoustic features' of the sound level under investigation as follows. These penalties vary in their weighting depending upon the severity of the acoustic feature, as follows:

Tonality

+2dB: where the tonality is just perceptible;
+4dB: where the tonality is clearly perceptible; and,
+6dB: where the tonality is highly perceptible.

Impulsivity

+3dB: where the impulsivity is just perceptible;
+6dB: where the impulsivity is clearly perceptible; and,
+9dB: where the impulsivity is highly perceptible.

Intermittency

+3dB: where the intermittency is readily distinctive against the acoustic environment.

In addition to the above acoustic features, there is a penalty for 'other sound characteristics' of +3dB where a sound exhibits characteristics that are neither tonal nor impulsive, though are readily distinctive against the acoustic environment.

BS4142 goes on to state that the rating level is equal to the specific sound level if there are no such features present or expected to be present.

Assessment of the rating level relative to the background noise level can yield the following commentary:

- Typically the greater this difference (between the rating level and the background sound level), the greater the magnitude of impact;
- A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context;
- A difference of around +5dB is likely to be an indication of an adverse impact, depending on the context; and,
- 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. 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.

With the above in mind, it is common that a Local Planning Authority will specify the criteria for the rating level relative to the background sound level and, where this is the case, this criterion usually takes precedence over a simple comparison of the rating level against the background sound level.

2.2 World Health Organisation's (WHO) 'Guidelines for Community Noise'

The WHO 'Guidelines for Community Noise' offers advice with regard to setting noise criteria applicable to sleep disturbance and annoyance.

Section 3.4 states:

'If negative effects on sleep are to be avoided the equivalent sound pressure level should not exceed 30 dBA indoors for continuous noise. If the noise is not continuous, L_{Amax} or SEL are used to indicate the probability of noise-induced awakenings. Effects have been observed at individual L_{Amax} exposures of 45 dB or less. Noise events exceeding 45 dBA should therefore be limited if possible.'

The guidelines reference a study by Vallet & Vernet, 1991, which concluded that:

'For a good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45 dB $L_{AF,max}$ more than 10-15 times per night.'

Section 4.1 states:

By contrast, guideline values for annoyance have been set at 50 or 55 dBA, representing daytime levels below which a majority of the adult population will be protected from becoming moderately or seriously annoyed, respectively.

Section 4.2.7 states:

During the daytime, few people are seriously annoyed by activities with L_{Aeq} levels below 55 dB; or moderately annoyed with L_{Aeq} levels below 50 dB. Sound pressure levels during the evening and night should be 5 - 10 dB lower than during the day. Noise with low-frequency components require even lower levels, it is emphasized that for intermittent noise it is necessary to take into account the maximum sound pressure level as well as the number of noise events.

Section 4.3.1 goes on to state:

To protect the majority of people from being seriously annoyed during the daytime, the sound pressure level on balconies, terraces and outdoor living areas should not exceed 55 dB L_{Aeq} for a steady, continuous noise. To protect the majority of people from being moderately annoyed during the daytime, the outdoor sound pressure level should not exceed 50 dB L_{Aeq}.

'At night, sound pressure levels at the outside façades of the living spaces should not exceed 45 dB L_{Aeq} and 60 dB L_{Amax}, so that people may sleep with bedroom windows open. These values have been obtained assuming that the noise reduction from outside to inside with the window partly open is 15 dB.

Section 4.4 WHO guideline values contains the following table:

Specific Environment	Critical Health Effect(s)	L_{Aeq} (dB)	Time Base (hours)	L_{AFmax} (dB)
Outdoor Living Area	Serious annoyance, daytime and evening	55	16	—
	Moderate annoyance, daytime and evening	50	16	—
Dwelling, Indoors	Speech intelligibility & moderate annoyance, daytime and evening	35	16	—
Inside Bedrooms	Sleep disturbance, night-time	30	8	45
Outside Bedrooms	Sleep disturbance, window open (outdoor values)	45	8	60

3.0 Measurements

3.1 Measurement Locations

The proposed Mill is located just south of Dalton Lane and is shown on the Map in section 7.0 Appendix 1 - Plan 1. The measurement locations chosen surround the proposed Mill area and also are located between the proposed Mill and any noise sensitive receptors.

The area has very little in the way of noise sensitive receptors. The nearest noise sensitive receptor (NSR) is located 430m to the east from the proposed Mill on Dalton Lane shown as point 5 in 6.0 - Appendix 1 – Plan 1. There is also a caravan park located to the west and this is located 575m away shown as point 6 in 6.0 - Appendix 1 – Plan 1.

Measurement location 1 is chosen as it represents the land boundary of the proposed Mill to the south and encompasses the noise from existing industrial premises on Dalton Industrial Estate. The measurement location is approximately 300m from the processing part of the proposed Mill.

Measurement location 2 is chosen as it represents the boundary of the proposed Mill to the north east and encompasses the noise from existing industrial premises on Cod Beck Blending site and the traffic on Dalton Lane and the A168. The measurement location is approximately 50m from the processing part of the proposed Mill.

Measurement location 3 is chosen as it represents an area to the east between the proposed Mill and the nearest NSR (point 5) but also Dalton village located 1km away. The nearest NSR is nearer to the Cod Beck Blending site than the proposed Mill but the measurement location is far enough away from the Cod Beck Blending site to obtain good background readings. The measurement location is approximately 375m from the processing part of the proposed Mill.

Measurement location 4 is chosen as it represents the potential NSR's at the caravan park located 500m to the west of the proposed Mill. The measurement location is between the proposed Mill and the caravan park with the A168 beyond the caravan park and the background levels here include residual noise from the A168 and Dalton Lane. The measurement location is approximately 600m from the processing part of the proposed Mill.

3.2 Measuring Equipment

The measuring equipment used conforms to the recommended standards in BS4142:2014+A1:2019.

Equipment Description	Manufacturer and Type	Serial No.	Calibration Due Date
Class 1 Integrating Sound Level Meter	Cirrus, CR:171C	G071306	29-May-2020
Class 1 Microphone	Cirrus, MK:224	203150A	29-May-2020
Class 1 Acoustic Calibrator	Cirrus, CR:515	74750	29-May-2020

Calibration certificates are available on request. The measuring equipment was field calibrated before and after the survey with negligible deviation (<0.5dB). Calibration was verified at 94dB @ 1kHz.

Calibration level at start of survey	93.7	Calibration level at end of survey	93.7	Drift: <0.5dB

3.3 Weather Conditions

The weather conditions were very good for all the measurements with low wind and no precipitation during the measurements.

3.3.1 Weather Conditions – Daytime

Period	Date and time	Measured Wind Speed (m/s)	Wind Direction	Precipitation Occurred?	Fog or Mist Evident?	Was the Ground Wet, Frozen or Snow Covered?	Measured Temperature (°C)	Cloud Cover (%)
Start of Survey	05-07-2019 14:00	4.0	Westerly	No	No	No	20	100%
End of Survey	05-07-2019 19:00	3.5	Westerly	No	No	No	20	100%

3.3.2 Weather Conditions – Night

Period	Date and time	Measured Wind Speed (m/s)	Wind Direction	Precipitation Occurred?	Fog or Mist Evident?	Was the Ground Wet, Frozen or Snow Covered?	Measured Temperature (°C)	Cloud Cover (%)
Start of Survey	07-07-2019 23:00	0.5	South Westerly	No	No	No	14	100%
End of Survey	08-07-2019 00:40	0.5	South Westerly	No	No	No	13	100%

3.4 Noise Measurements

The noise measurement readings for each monitoring location showing overall levels as a residual sound (as there is no specific sound source to be measured) and background levels are summarised in the table below:

Measurement Location	Residual Sound L_{Aeq} (dB)	Background Sound L_{A90} (dB) rounded	Comments
Location 1 - Day	47.3	45	Distant aircraft Road Traffic A168 Steel Loading noise
Location 2 - Day	52.6	49	Road traffic noise from Dalton Lane
Location 3 - Day	45.5	44	Some distant road traffic noise from Dalton Lane
Location 4 - Day	56.0	52	Road Traffic noise from Dalton Lane and A168
Location 1 - Night	36.2	33	Noise from Waggs Distant road traffic
Location 2 - Night	32.6	26	Low overall levels
Location 3 - Night	30.4	24	Low overall levels
Location 4 - Night	37.4	30	Noise from Waggs Distant road traffic A168

Table 1

4.0 Calculations

4.1 General Calculations

Noise levels for equipment inside the processing part of the plant can be accurately estimated using existing data.

There are elevators, a grinder, mixers, presses, coolers and filter units and associated equipment such as fans, blowers and compressors. A summary table is shown below.

Item	Sound Level L_{Aeq} (dB) rounded	Distance (m)	Comments
Blending rotary valve	76	1	Normal running
Bucket elevator	81	1	
Screw conveyor	79	1	
Grinder	95	1	Not enclosed
Mixer	80	1	
Press	90	1	
Cooler fan outlet	87	1	Stack
Filter unit	82	1	

Table 2

All the above noise levels were taken inside an existing Mill with all items running and include reverberation and addition. The breakout from the proposed Mill can be estimated using the highest noise source of 90 L_{Aeq} dB. The grinder can be discounted as it will be installed using best available techniques and therefore be on a concrete floor, on anti-vibration mountings and inside an attenuated room providing external levels below 90 L_{Aeq} dB.

The specific sound inside the building is therefore a maximum of 90 L_{Aeq} dB and likely to be lower.

Sound Reduction from inside to outside of ~ Rw = 24dB is obtained with standard 0.65mm profiled steel cladding. Higher noise mitigation can be had by using composite panels ~ Rw = 26dB and even higher still by using an on-site assembled double skin construction with a soft mineral wool between the panels and ~ Rw = 30dB can be achieved.

This means that the noise levels at the outside façade would be a minimum of 90-24 = 66 L_{Aeq} dB

If the façade is considered a plane reflective surface then the attenuation due to distance can be calculated using

$$L_{Wfacade} = L_p + 10\log(S)\ where\ S\ is\ surface\ area\ of\ facade$$

$$L_W = 66 + 10\log(340) = 91.3dB$$

Then at 430m for the potential nearest noise sensitive receptor

$$L_P = 91.3 - 20\log(430) - 11 = 27.6dB$$

This level is near the background levels that have been measured and below the WHO guidelines.

The stacks from the cooling fans can be accurately estimated using manufacturers data and L_w = 98dB.

The stacks can be attenuated by using bespoke splitter attenuators with an insertion loss of 20dB. This is recommended as the fans have tonal elements at the blade pass frequency.

Then at 430m for the potential nearest noise sensitive receptor

$$L_P = 98 - 20\log(430) - 11 - 20(IL) = 14.3dB$$

This level is below the façade levels for the building, below the background levels that have been measured and below the WHO guidelines. All stacks can be noise treated.

The specific noise is therefore taken from the façade calculations at 27.6dB.

4.2 BS4142:2014+A1:2019 Calculations Day

Residual Sound Level Day $L_r = L_{Aeq,Tm}$ dB

Map Location	Data ID	Description of location and activity	Distance from Source (m)	Distance to Receptor (m)	Residual Sound Level $L_r = L_{Aeq,Tm}$ (dB)	$L_{Amax,fast}$ (dB)	Reference Time Interval T_r (min)	Measurement Time Interval T_m (min)	Commentary
3	44	375m east on runway near 2 farm buildings	375m	200m but 430m from Mill	45.5	55.7	60	62	A suitable location as the prevailing wind is also westerly

Specific Sound Level $L_s = L_{Aeq,Tr}$ dB = $10\log(10^{La/10} - 10^{Lr/10})$

Ambient Sound Level $L_a = L_{Aeq,T}$ (dB)	N/A dB	Residual Sound Level $L_r = L_{Aeq,T}$ (dB)	45.5 dB	$L_a - L_r$	N/A dB
$L_s = L_{Aeq,Tr}$ dB = $10\log(10^{La/10} - 10^{Lr/10})$ (rounded)		28 dB	Comments		

If $L_a - L_r \leq 3$ then determine the specific sound level by a combination of measurement and calculation unless the specific sound can be distinguished. Report the method of calculation in detail and give the reason for using it. May have to measure ambient and residual nearer to sound source. See Section 7 BS 4142:2014+A1:2019

Background Sound Level Day $L_{A90,Tm}$

Map Location	Data ID	Description of location and activity	Distance from Source (m)	Distance to Receptor (m)	Background Sound Level $L_{A90,Tm}$ (dB)	$L_{Amax,fast}$ (dB)	Reference Time Interval T_r (min)	Measurement Time Interval T_m (min) As long as is representative >15mi	Commentary
3	44	375m east on runway near two farm buildings	375m	200m but 430m from Mill	43.6	55.7	60	62	A suitable location as the prevailing wind is also westerly

Acoustic feature correction

Description of sound and activity	Penalty Type	Penalty Applicable?	Attributable Penalty	Commentary
Mill running at typical time levels	**Tonality 0-6 dB**	**No**	**0**	
Mill running at typical time levels	**Impulsivity 0-9 dB**	**No**	**0**	
Mill running at typical time levels	**Intermittency 0-3 dB**	**No**	**0**	
Mill running at typical time levels	**Other Sound Characteristics 0-3 dB**	**No**	**0**	

Rating Level and Impact Calculations Day

Item	Results	Commentary
Calculate Specific Sound Level $L_s = L_{Aeq,Tr}$ (dB) = 10log($10^{La/10} - 10^{Lr/10}$)	28 $L_{Aeq(60)}$ dB	
Acoustic Feature Correction	0 dB	
Calculate Rating Level $L_{Ar,Tr} = L_{s,Tr}$ + (any Penalties)	(28 + 0) dB = 28 dB	
Background Sound Level Day $L_{A90,Tm}$	44 $L_{A90(60)}$ dB	
Excess of Rating Over Background Sound Level	(28 - 44) dB = -16 dB	**LOW IMPACT**

Uncertainty	There is some uncertainty due to the measurement equipment tolerances. Weather conditions were favourable and there was little air movement and it was a good day for sound transmission. There is uncertainty in the overall sound levels as noise from other areas and factories may contribute. The measurements taken were taken in line with BS4142:2014+A1:2019 and some uncertainty must be assumed.
Initial Impact Assessment BS4142:2014	The specific sound levels are much lower than the background levels and unlikely to cause any impact when context is taken into consideration. The area around the proposed Mill does not have many NSR's and is a mixed use area. The industrial sites around the proposed Mill are all making some noise although the levels are low. In terms of context the overall background levels are reasonable high due to the proximity of the A168 and Dalton Road. The nearest noise sensitive receptors are likely to receive more noise from the A168 and Dalton Lane as they are located on Dalton Lane. There is birdlife and farming in the area in addition to the other manufacturing companies. The levels are also much lower than the WHO outdoor living area guidelines of 50 L_{Aeq} dB for annoyance.

4.3 BS4142:2014+A1:2019 Calculations Night

Residual Sound Level Night $L_r = L_{Aeq,Tm}$ dB

Map Location	Data ID	Description of location and activity	Distance from Source (m)	Distance to Receptor (m)	Residual Sound Level $L_r = L_{Aeq,Tm}$ (dB)	$L_{Amax,fast}$ (dB)	Reference Time Interval T_r (min)	Measurement Time Interval T_m (min)	Commentary
3	48	375m east on runway near two farm buildings	375m	200m but 430m from Mill	30.4	55.7	15	15	A suitable location as the prevailing wind is also westerly

Specific Sound Level $L_s = L_{Aeq,Tr}$ dB = $10\log(10^{La/10} - 10^{Lr/10})$

Ambient Sound Level $L_a = L_{Aeq,T}$ (dB)	N/A dB	Residual Sound Level $L_r = L_{Aeq,T}$ (dB)	30.4 dB	$L_a - L_r$	N/A dB
$L_s = L_{Aeq,Tr}$ dB = $10\log(10^{La/10} - 10^{Lr/10})$ (rounded)		28 dB	Comments		

If $L_a - L_r \leq 3$ then determine the specific sound level by a combination of measurement and calculation unless the specific sound can be distinguished. Report the method of calculation in detail and give the reason for using it. May have to measure ambient and residual nearer to sound source. See Section 7 BS 4142:2014+A1:2019

Background Sound Level Night $L_{A90,Tm}$

Map Location	Data ID	Description of location and activity	Distance from Source (m)	Distance to Receptor (m)	Background Sound Level $L_{A90,Tm}$ (dB)	$L_{Amax,fast}$ (dB)	Reference Time Interval T_r (min)	Measurement Time Interval T_m (min) As long as is representative >15mi	Commentary
3	48	375m east on runway near 2 farm buildings	375m	200m but 430m from Mill	24.4	55.7	15	15	A suitable location as the prevailing wind is also westerly

Acoustic feature correction

Description of sound and activity	Penalty Type	Penalty Applicable?	Attributable Penalty	Commentary
Mill running at typical time levels	**Tonality 0-6 dB**	**No**	**0**	
Mill running at typical time levels	**Impulsivity 0-9 dB**	**No**	**0**	
Mill running at typical time levels	**Intermittency 0-3 dB**	**No**	**0**	
Mill running at typical time levels	**Other Sound Characteristics 0-3 dB**	**No**	**0**	

Rating Level and Impact Calculations Night

Item	Results	Commentary
Calculate Specific Sound Level $L_s = L_{Aeq,Tr}$ (dB) = 10log($10^{La/10} - 10^{Lr/10}$)	28 $L_{Aeq(15)}$ dB	
Acoustic Feature Correction	0 dB	
Calculate Rating Level $L_{Ar,Tr} = L_{s,Tr}$ + (any Penalties)	(28 + 0) dB = 28 dB	
Background Sound Level Night $L_{A90,Tm}$	24 $L_{A90(15)}$ dB	
Excess of Rating Over Background Sound Level	(28 - 24) dB = 4 dB	**LOW IMPACT**

Uncertainty	There is some uncertainty due to the measurement equipment tolerances. Weather conditions were favourable and there was little air movement and it was a good day for sound transmission. There is uncertainty in the overall sound levels as noise from other areas and factories may contribute. The measurements taken were taken in line with BS4142:2014+A1:2019 and some uncertainty must be assumed.
Initial Impact Assessment BS4142:2014	The specific sound levels are slightly higher than the background levels but unlikely to cause any impact when context is taken into consideration. The area around the proposed Mill does not have many NSR's and is a mixed use area. The industrial sites around the proposed Mill are all making some noise although the levels are low and this is reflected in the low night-time background levels. The nearest noise sensitive receptors are likely to receive more noise from the A168 and Dalton Lane as they are located on Dalton Lane. In terms of context the night-time background levels are very low. There is birdlife and farming in the area in addition to the other manufacturing companies. The levels are much lower than the WHO outdoor bedroom guidelines of 45 L_{Aeq} dB for sleep disturbance and even below the indoor bedroom levels of 30 L_{Aeq} dB.

5.0 Conclusions and Recommendations

The noise impact assessment indicates that there will be low impact after context is taken into consideration.

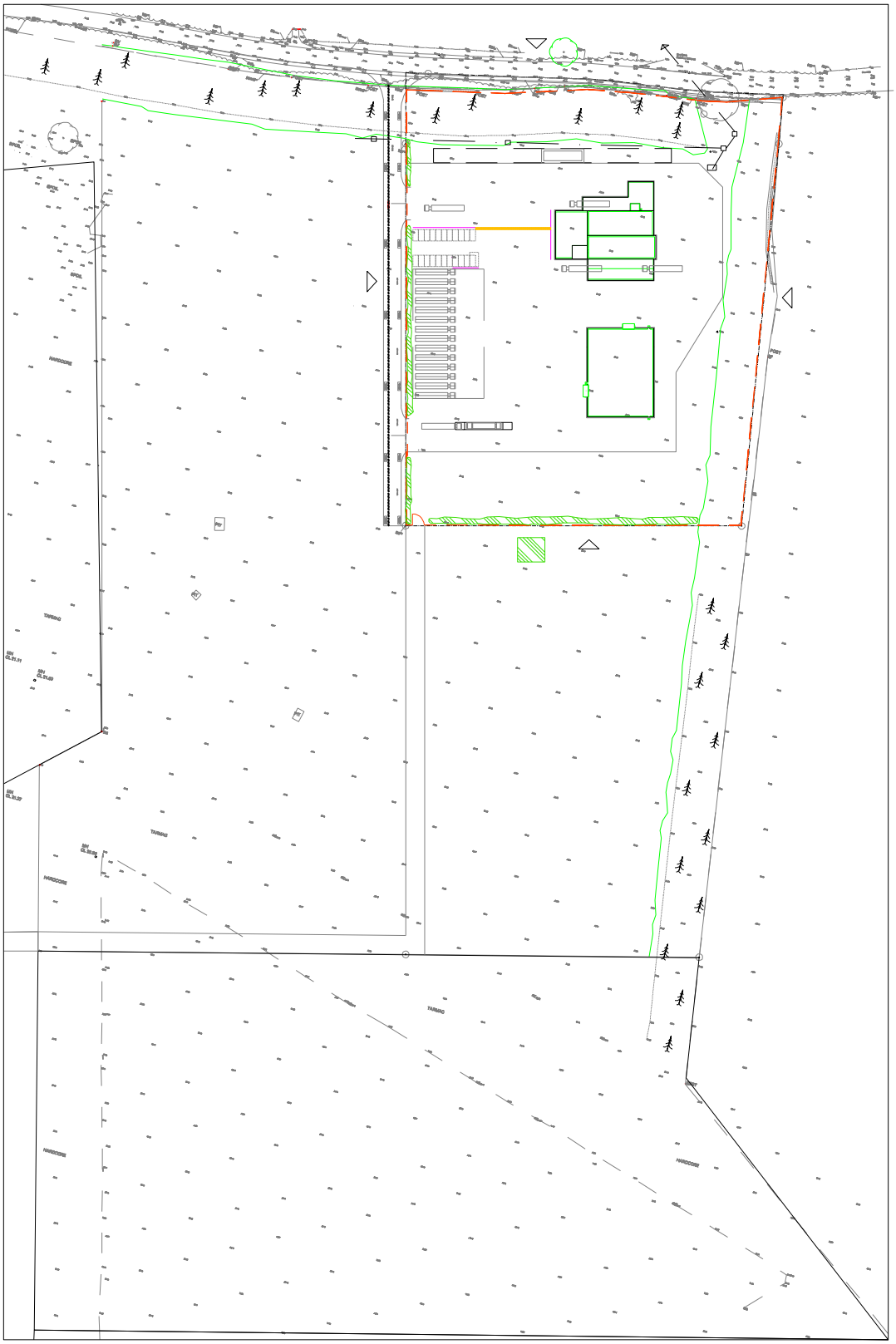
During the day the specific sound levels are much lower than the background levels and unlikely to cause any impact when context is taken into consideration. The area around the proposed Mill does not have many NSR's and is a mixed use area.

During the night the specific sound levels are slightly higher than the background levels but unlikely to cause any impact when context is taken into consideration as the overall levels are so low and below 30 L_{Aeq} dB.

The nearest noise sensitive receptors are likely to receive more noise from the A168 and Dalton Lane as they are located on Dalton Lane.

6.0 Appendix 1 – Plan 1

6.0 Appendix 1 – Plan 2



6.1 Appendix 2 -Acoustic Glossary

Ambient sound	Totally encompassing sound in a given situation at a given time, usually composed of sound from many sources near and far NOTE The ambient sound comprises the residual sound and the specific sound when present.
ambient sound level, $L_a = L_{Aeq,T}$	Equivalent continuous A-weighted sound pressure level of the totally encompassing sound in a given situation at a given time, usually from many sources near and far, at the assessment location over a given time interval, T NOTE The ambient sound level is a measure of the residual sound and the specific sound when present.
background sound level, $L_{A90,T}$	A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, T, measured using time weighting F and quoted to the nearest whole number of decibels
dB (decibel)	The scale on which sound pressure level is expressed. It is defined as 20 times the logarithm of the ratio between the root-mean-square pressure of the sound field and a reference pressure (2x10-5Pa).
dB(A)	A-weighted decibel. This is a measure of the overall level of sound across the audible spectrum with a frequency weighting (i.e. 'A' weighting) to compensate for the varying sensitivity of the human ear to sound at different frequencies.
L_{10} & L_{90}	If a non-steady noise is to be described it is necessary to know both its level and the degree of fluctuation. The Ln indices are used for this purpose, and the term refers to the level exceeded for n% of the time. Hence L_{10} is the level exceeded for 10% of the time and as such can be regarded as the 'average maximum level'. Similarly, L_{90} is the 'average minimum level' and is often used to describe the background noise. It is common practice to use the L_{10} index to describe traffic noise.
L_{Aeq} $L_{Aeq,T}$	Equivalent continuous A-weighted sound pressure level, defined as the notional steady sound level which, over a stated period of time (T), would contain the same amount of acoustical energy as the A - weighted fluctuating sound measured over that period.
measurement time interval, T_m	Total time over which measurements are taken NOTE This may consist of the sum of a number of non-contiguous, short-term measurement time intervals.
rating level, $L_{Ar,Tr}$	Specific sound level plus any adjustment for the characteristic features of the sound
reference time interval, T_r	Specified interval over which the specific sound level is determined NOTE This is 1 h during the day from 07:00 h to 23:00 h and a shorter period of 15 min at night from 23:00 h to 07:00 h. (can calculate 1hr using 15min)
residual sound	Ambient sound remaining at the assessment location when the specific sound source is suppressed to such a degree that it does not contribute to the ambient sound
residual sound level, $L_r = L_{Aeq,T}$	Equivalent continuous A-weighted sound pressure level of the residual sound at the assessment location over a given time interval, T
specific sound level, $L_s = L_{Aeq,Tr}$	Equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given reference time interval, T_r
specific sound source	Sound source being assessed