

ENVIRONMENT

Wilson Bowden Developments Ltd

Plot L, Kingsway Business Park, Rochdale

Noise Impact Assessment

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Noise Impact Assessment

Birmingham
Livery Place, 35 Livery Street, Colmore Business District
Birmingham, B3 2PB
T: 0121 233 3322

Leeds
Whitehall Waterfront, 2 Riverside Way
Leeds, LS1 4EH
T: 0113 233 8000

London
11 Borough High Street
London, SE1 9SE
T: 0207 407 3879

Manchester
11 Portland Street
Manchester, M1 3HU
T: 0161 233 4260

Nottingham
5th Floor, Waterfront House, Station Street
Nottingham, NG2 3DQ
T: 0115 924 1100

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EXECUTIVE SUMMARY

BWB Consulting has been instructed by Wilson Bowden Developments Ltd to undertake a Noise Impact Assessment for the Proposed Development, comprising planning use Classes E(g)(iii), B2 and B8.

Due consideration of potential noise impacts at nearby NSRs has been given at the design outset and measures to control noise have been embedded at the earliest point, which have been highlighted in this report.

This assessment of the Proposed Development predicts the likely noise generated from service yard activity and HGV movements to and from the Site, and determines suitable noise limits for any fixed plant which will be installed as part of the Proposed Development (details for which are currently unknown).

Given the results of the assessment presented herein this report, it is considered that noise need not be a determining factor in granting planning permission for the Proposed Development.

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1. INTRODUCTION

- 1.1 BWB Consulting (BWB) has been instructed by Wilson Bowden Developments Ltd (the Client) to undertake a Noise Impact Assessment to support a planning application for the Proposed Development, comprising planning use Classes E(g) (iii), B2 and B8. The site is located off John Milne Avenue, Rochdale.
- 1.2 The Client is seeking a self-contained full planning permission for the Site. However, for the purposes of this assessment, noise related conditions associated with the outline permission for the Site have been considered. This has been undertaken based on the previous limits and guidance contained within relevant British Standards relating to noise.
- 1.3 It is considered highly unlikely that operational activity within the Proposed Development Site would result in vibration impacts at the nearest sensitive receptors due to the intervening distance and the magnitude of vibration likely generated by those activities. Consequently, impacts as a result of vibration generated within the Proposed Development Site have not been considered within this assessment.
- 1.4 This report is necessarily technical in nature, so to assist the reader, a glossary of acoustic terminology can be found in **Appendix A**.

Site Details

- 1.5 The Site is located off John Milne Avenue on Kingsway Business Park and is located within the administrative area of Rochdale Borough Council (RBC). **Figure 1.1** details the location of the Proposed Development.
- 1.6 The Site is bound to the south by Lower Lane; to the east by John Milne Avenue; to the north by residential properties on Neston Road; and to the west by residential properties on Burnet Close.
- 1.7 The nearest noise sensitive receptors (NSRs) to the west is 2 Burnet Close. The nearest NSR to the north is 56 Neston Road. Further details are provided in **Table 1.1**.

Table 1.1: Noise Sensitive Receptors

Receptor Location	Type of Receptor	Description / Name	Distance from façade to nearest proposed Unit
NSR1	Residential	3 Burnet Close	38.61m
NSR2	Residential	60 Neston Road	24.78m

Figure 1.1: Site Location and NSRs



Existing Planning Permission

- 1.8 The Plot L Site already has outline planning permission for development (application ref: 14/00542/OUT). This permission allows for development across the Site in accordance with approved parameter plan (drawing ref: 2013-233/102revA) and is subject to several conditions. Condition 23 of planning permission 14/00542/OUT relates to noise emissions and states:

“23). Noise emitted from any building within the Site or from anything attached to any building or from plant and machinery used in connection with any building shall not exceed:

a) 58dB(A) L_{eq} (15 min.) between 0700 hours and 2300 hours and 48 dB(A) L_{eq} (5 min.) at any other time as measured at the facade of any noise sensitive property (or 55dB(A) L_{eq} (15 min.) and 45 dB(A) L_{eq} (5min.) as free field measurements within the curtilage of any noise sensitive building) outside the boundaries of the Site and to the south of the line A-A (or its linear projection) shown on

the Council's plan titled “Noise Control Plan”- condition 23, or within the boundary of the Site and to the south of the line A-A.

b) 52 dB(A) L_{eq} (15 min) between the hours of 0700 and 2300 and 48 dB(A) L_{eq} (5 min) at any other time as measured at the façade of any noise sensitive property, (or 49 dB(A) L_{eq} (15 min) and 45 dB(A) L_{eq} (5 min) as free field measurements within the curtilage of any noise sensitive building) outside the boundaries of the Site and to the north of the line A-A(or its linear projection) and to the

south of the line B-B (or its linear projection) shown on the Council's plan titled “Noise Control Plan”- condition 23, or within the boundary of the Site, and to the north of the line A-A and to the south of the line B-B.

c) 51 dB(A) L_{eq} (15 min) between the hours of 0700 and 2300 and 45 dB(A) L_{eq} (5 min) at any other time as measured at the façade of any noise sensitive property (or 48 dB(A) L_{eq} (15 min) and 42 dB(A) L_{eq} (5min) as free field measurements within the curtilage of any noise sensitive building) outside the boundaries of the Site, and to the north of line B-B (or its linear projection) and to the south of line C-C (or its linear projection) shown on the Council's plan titled “Noise Control Plan”- condition 23, or within the boundary of the Site and to the north of the line B-B and to the south of the line C-C.

d) 48 dB(A) L_{eq} (15 min) between the hours of 0700 and 2300 and 43 dB(A) L_{eq} (5 min) at any other time as measured at the façade of any noise sensitive property (or 45 dB(A) L_{eq} (15 min) and 40 dB(A) L_{eq} (5 min) as free field measurements within the curtilage of any noise sensitive building) outside the boundaries of the Site and to the north of the line C-C (or its linear projection) shown on Council's plan titled “Noise Control Plan”- condition 23, or within the boundary of the Site and to the north of the line C-C.

For the purposes of this condition, line A-A is from the rear of 13 Verdant Way to the rear of 66A Ashfield Lane, line B-B is from Turf Hill Community Centre to the

point where the path to the rear of 67 Beechfield Road crosses the boundary of the Site and line C-C is from the junction of Stiups Lane with Turf Hill Road to the junction of Knowl Road with Princess Road.

A noise sensitive property is defined as any occupied residential unit or similar property or school classroom, except insofar as the element of the condition which relates to the curtilage of the noise sensitive building shall not include any curtilage of any classroom.

Reason: In the interests of the amenity of the area, and in particular that of the nearest neighbouring residents and to prevent nuisance in accordance with policies EC/7-Kingsway Business Park and EM/3-Noise and New Development, of the Council's adopted Unitary Development Plan."

- 1.9 In summary, Condition 23 requires that 'noise emitted from any building within the Site or anything attached to any building or from plant and machinery used in connection with any building' shall not exceed prescribed noise limits, which vary depending on the location.
- 1.10 The stated noise limits and location zoning are shown in **Appendix B**. It should be noted that "South of BB & north of AA" is incorrectly labelled as "South of CC & north of BB", in the published plan.

Proposed Development

- 1.11 Proposals comprise the erection of four industrial units/warehousing (Classes E(g)(iii), B2 and B8) with ancillary office space, new access, car parking, servicing, boundary treatments, hard and soft landscaping, drainage works and other associated works. The proposed layout is illustrated in **Figure 1.2** below.
- 1.12 The following design features have been incorporated at the outset which are considered to be of benefit, acoustically, to nearby NSRs:
- The bund around the northern and western perimeter of the Site is to be retained. This bund provides a degree of acoustic screening to the nearby NSRs.
 - The service yards have been located on the screened side of the units 3 and 4, to limit the passage of noise from the unloading activity around the units to the NSRs on Neston Road.
 - The service yard has been located on the screened side of unit 2 from Burnet Close and Wrenbury Drive to limit the passage of noise from the unloading activity around the units to the NSRs. Whilst there is still a potential line of sight to the service yard from NSRs on Neston Road, the angle of view will be limited by the intervening bund, and the service yard being located perpendicular to the NSRs.
 - The loading bays associated with unit 2 have been set back from the NSRs on Neston Road, to the north, and have been located toward the southern portion of the unit.

Figure 1.2: Proposed Layout



2. STANDARDS AND GUIDANCE

BS 4142: 2014+A1:2019 Methods for Rating and Assessing Industrial and Commercial Sound

2.1 The BS 4142 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.
- 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.

2.2 The methods use 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. The Standard advises the purpose of the methodology includes the assessment of sound from any plant and activities associated with existing industrial and/or commercial uses at proposed residential dwellings.

2.3 If appropriate, the specific sound level of the source ($L_{Aeq,T}$) is corrected, by the application of one or more corrections for acoustic features such as tonal qualities and/or distinct impulses, to give a 'rating' level ($L_{Ar,Tr}$). The Standard effectively compares and rates the difference between the rating level of the specific sound and the typical background sound level ($L_{A90,T}$) in the absence of the specific sound.

2.4 The Standard advises 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) the source in question operates or is proposed to operate in the future.

2.5 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."

World Health Organisation (WHO) 1999: Guidelines for Community Noise

- 2.6 The World Health Organisation (WHO) guidance: 1999: Guidelines for community noise includes guidance for individual maximum noise events during the night-time. This document draws upon guidance from Vallet and Vernay, which states:

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

3. ASSESSMENT

3.1 Planning Condition 23 states that areas of the Site between lines A-A and B-B would be required to achieve:

- 52 dB(A) $L_{eq,15mins}$ between 0700 and 2300 hours and 48 dB(A) $L_{eq,5mins}$ at any other time as measured at the façade of any noise sensitive property, (or 49 dB(A) $L_{eq,15mins}$ and 45dB(A) $L_{eq(5mins)}$ as free measurements within the curtilage of any noise sensitive building.

3.2 An impact may be experienced at other receptors in other zones, however, given the greater distance, any impact is likely to be less than at those stated above.

Noise Model

3.3 In order to predict the noise levels from the Proposed Development Site at the NSRs, a detailed acoustic model of the Site has been generated applying the following prediction methodology:

- The model was generated using the PC based CadnaA® noise modelling package.
- For industrial/commercial noise sources, the noise model was set to apply the noise prediction methodology set out in ISO 9613-2: Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation.
- Mapping of the Site and the surrounding area was calibrated into the noise model based on known Ordinance Survey grid reference points.
- Topography across the area surrounding the Site has been modelled using the LIDAR 1m DTM information.
- Topography across the proposed Site has been modelled using the proposed Site level data provided by the project team.
- The model was set to include second order reflected noise from solid structures.
- The Site layout has been incorporated into the noise model in order to account for screening that is provided by the development itself.
- Off-Site buildings which would provide screening to the Site have been incorporated as reflective façades.

Noise from Service Yard Activity and HGV Trip Movements

3.4 It is assumed that 9 no. loading bays would be occupied at the same time during any 1-hour daytime period across the four units. During the night-time, it is assumed that 5 no. loading bays would be occupied at the same time during any 15-minute period across the four units. The number of occupied bays during the night-time is understood to be representative of the worst-case.

- 3.5 It is assumed that in a one hour daytime assessment period, the HGVs would have sufficient time to arrive unload and depart. In the 15 minute night-time assessment period, it is assumed that the HGVs would have sufficient time to arrive and unload, only.
- 3.6 In the absence of specific data for the key sources of noise anticipated within the Proposed Development, representative data have been sourced from surveys undertaken at similar developments. **Table 3.1** presents noise measurement data for HGV pass-bys, to represent HGVs travelling along the Site access road.

Table 3.1: Summary of Historic HGV Pass-by Noise Data used in Assessment

Source	Measurement distance (m)	Measurement duration (s)	Measured sound pressure level	
			dB, $L_{Aeq,T}$	dB, $L_{A,f,max}$
HGV Pass-by	5	6	73	78

- 3.7 For HGV movements, the calculations detailed in BS 5228-1:2019+A1:2014¹, for calculating sound power levels (SWL) from mobile plant and haulage routes have been used:

$$SWL = L_{Amax@10m} + 28$$

- 3.8 In calculating the level of noise produced by the Site access road, vehicle quantities and vehicle speed of 10mph (16kmph) have been accounted for. The following equation has been used:

$$L_{Aeq,1hr} = L_{WA} - 33 + 10 \log_{10} Q - 10 \log_{10} V - 10 \log_{10} (d) \quad (BS5228-1:2009+A1:2014(F.6)).$$

Where:

L_{WA}	sound power level of the plant;
Q	number of vehicles per hour; and
V	average vehicle speed in km/h.
d	distance in m.

- 3.9 In calculating the level of noise produced by deliveries in the service yard, **Table 3.2** considers vehicles manoeuvring during arrival, departure, and during loading/unloading operations.

¹ British Standards Institute (2014), BS 5228-1:2009+A1:2014 – Code of practice for noise and vibration control on construction and open Sites. Part 1:Noise

Table 3.2: Calculated Sound Pressure Level at 10m – Level Access Door

Event	Sound pressure level, $L_{Aeq,T}$ (dB)	Measurement distance (m)	Assumed, on-time per period (s)	Time corrected, sound pressure level @10m, $L_{Aeq,T}$ (dB)
Daytime 1-hour				
HGV Delivery including arriving/departing, impact noise and cases being wheeled	66	5	1800 ¹	57
Night-time 15-minutes				
HGV Delivery including arriving/departing, impact noise and cases being wheeled	66	5	900	60
¹ On-time during 3600s daytime period				
² On-time during 900s night-time period				

3.10 Using the data contained within **Tables 3.1** and **3.2**, the following noise inputs have been converted into sound power levels assuming line source and point source attenuation respectively, and subsequently included within the model as described below:

- Specific sound levels from the HGVs have been calculated using equation F.6 detailed in BS 5228-1:2009+A1:2014 based on an indicative number of HGV trips derived from the loading bay occupancy set out in Paragraph 3.4. These have been included in the model as a line source at a height of 1.5m; and
- Unloading operations associated with deliveries to Site within the service yards is based on the loading bay occupancy set out in Paragraph 3.4. These have been included in the model as a point source at a height of 1.5m using the combined, time-corrected sound pressure Level in **Table 3.2**.

3.11 Noise contour maps have been generated across the Site and surrounding area, including outdoor living areas of NSRs at heights of 1.5m for the daytime and 4m above ground for the night-time. The resultant daytime and night-time specific sound levels are presented in **Figure 3.1** and **Figure 3.2**.

Figure 3.1: Daytime Noise Contours of Specific Noise Levels – Calculation at 1.5m Above Ground

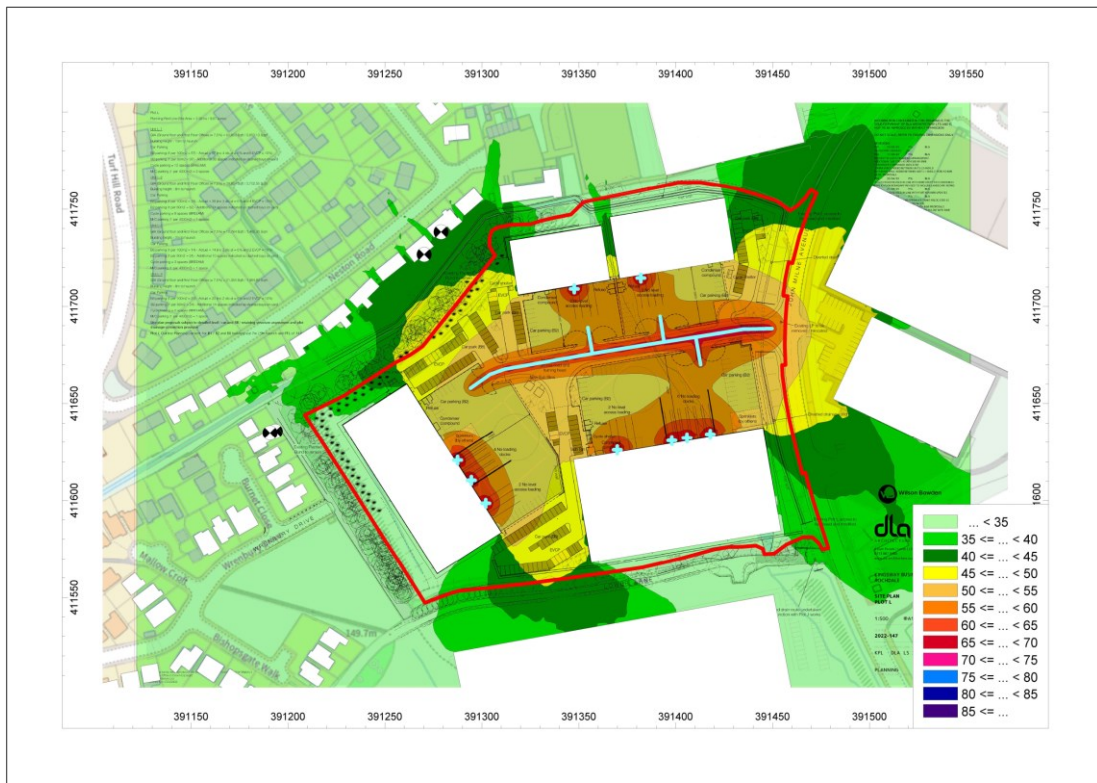
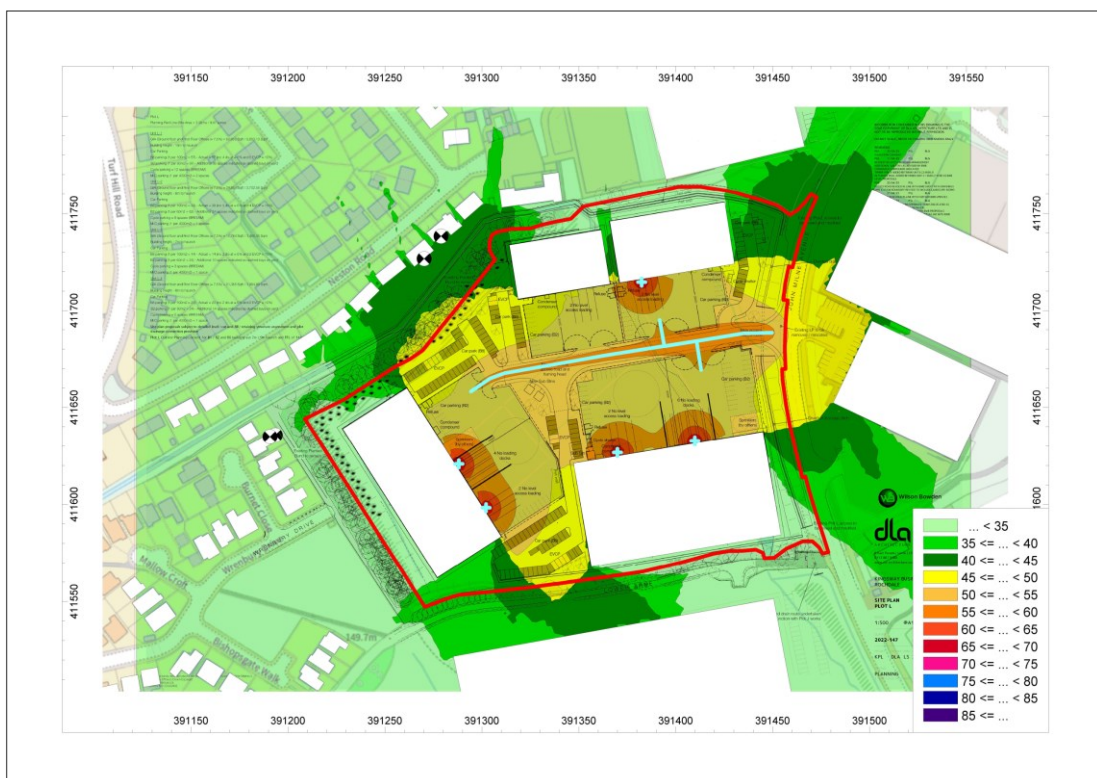


Figure 3.2: Night-time Noise Contours of Specific Noise Levels – Calculation at 4m Above Ground



3.12 The calculated specific sound levels at the NSRs are presented in **Table 3.3**.

Table 3.3: Predicted Specific Sound Level at NSRs, dB(A)

NSR	Daytime (0700 – 23:00)	Night-time (2300 – 0700)
1	33	29
2	43	42

3.13 The predicted specific sound levels in **Table 3.3** have been included within the subsequent assessment.

Assessment

3.14 In BS 4142: 2014+A1:2019, penalties are applied to the specific sound level in order to provide the rating level. These penalties relate to acoustic features which might make noise generated within the Proposed Development more perceptible at the NSRs. Accordingly, the following features have been accounted for as per **Table 3.4**, in accordance with the subjective methods detailed in BS 4142: 2014+A1:2019.

Table 3.4: Identification of Acoustic Penalties

Source	Penalty	Applicable?	Attributable penalty	Comment
HGV Movements and Breakout Noise	Tonality	Yes	2	It is considered that tonality from reverse alarms may be just perceptible at NSRs
	Impulsivity	No	-	It is considered impulsivity is unlikely to be perceptible due to the buffer distance and screening
	Intermittency	No	-	Given the limited number of HGV movements within the Site and the distance and screening between the service yard and the NSRs, It is considered that no penalty need be applied.
	Other Sound Characteristics	No	-	Not applicable as other penalties have been assigned.

3.15 **Table 3.5** and **3.6** present the assessments of the predicted noise levels from the Proposed Development at the NSRs. The assessments have been undertaken in accordance with the guidance in BS 4142 and are based on the limits prescribed in Planning Condition 23.

Table 3.5: BS 4142 Delivery Noise Assessment Daytime (NSR1)

Description	Weekday		Relevant BS 4142 clause
	Daytime (0700 – 2300) dB	Night-time (2300 – 0700) dB	
Specific sound level ($L_{Aeq,T}$)	33	29	7.3.5
Acoustic feature correction	+2		9.2
Rating level ($L_{Ar,T}$)	35	31	9.2
Limit in Planning Condition 23 ($L_{A90,T}$)	49	45	-
Difference from the limit in Planning Condition 23	-14	-14	-

- 3.16 Comparing the predicted rating levels against the requirements of Planning Condition 23, the predicted levels are 14 dB below the stipulated limit during both the daytime and the night-time.

Table 3.6: BS 4142 Delivery Noise Assessment Daytime (NSR2)

Description	Weekday		Relevant BS 4142 clause
	Daytime (0700 – 2300) dB	Night-time (2300 – 0700) dB	
Specific sound level ($L_{Aeq,T}$)	43	42	7.3.5
Acoustic feature correction	+2		9.2
Rating level ($L_{Ar,T}$)	45	44	9.2
Limit in Planning Condition 23 ($L_{A90,T}$)	49	45	-
Difference from the limit in Planning Condition 23	-4	-1	-

- 3.17 Comparing the predicted rating levels against the requirements of Planning Condition 23, the predicted levels are 4 dB below the stipulated limit during the daytime, and 1 dB below to the stipulated limit during the night-time.

Noise from Fixed Plant Items

- 3.18 It is anticipated that there may be fixed plant and equipment associated with the proposed warehouses that may have the potential to generate noise. At this stage however, the exact details of any proposed plant items are not known. It is understood that the plant is most likely to be located at the facades of the units which face inwardly, away from the nearby NSRs, minimising the potential for any noise impacts.

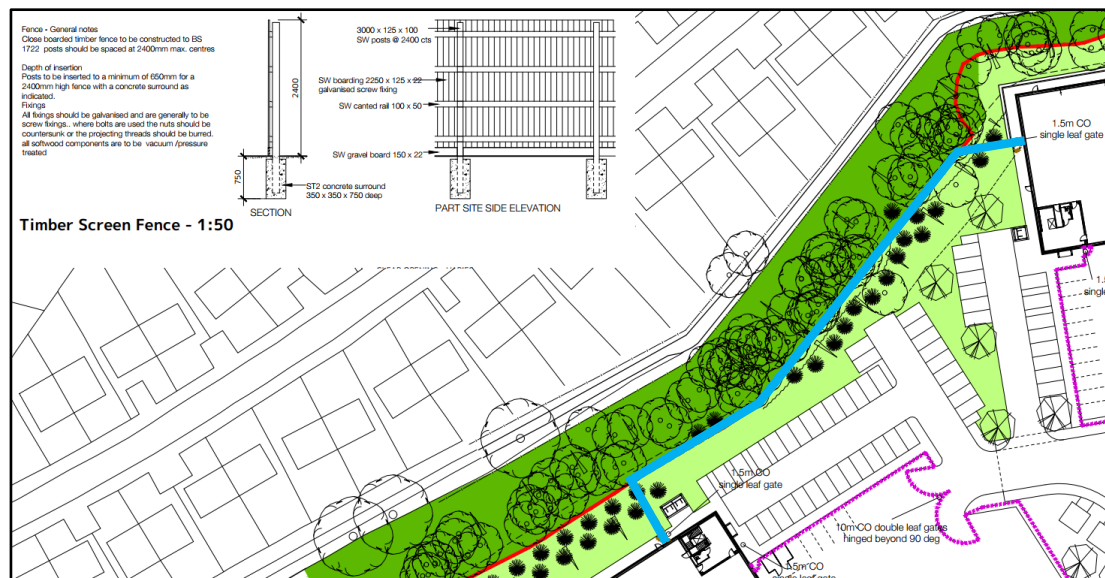
- 3.19 In the absence of detailed information, it is appropriate to specify suitable noise level limits to which any proposed plant should conform based on the requirements of Condition 23 and the prediction contribution of HGV noise.
- 3.20 Noise from fixed plant is considered for the area between A-A and B-B, as receptors further afield (i.e. in the zoning areas beyond this) are unlikely to be exposed to fixed plant noise from the development which would result in adverse impacts.
- 3.21 By subtracting the predicted worst case HGV noise levels from the noise limits in Condition 23 the following noise limits would be applicable for the cumulative effect of all other noise sources from the development between lines A-A and B-B:
- 52 dB(A) $L_{eq,15mins}$ between 0700 and 2300 hours and 47 dB(A) $L_{eq,5mins}$ at any other time as measured at the façade of any noise sensitive property, (or 48 dB(A) $L_{eq,15mins}$ and 43dB(A) $L_{eq,5mins}$) as free measurements within the curtilage of any noise sensitive building.
- 3.22 It should be noted that the derived limits would be applicable to the total noise from the simultaneous operation of all external plant serving the Proposed Development. As such, noise emissions from individual items of plant will need to be lower than the given limits, although the exact limit for each individual item of plant will be dependent upon its type, noise characteristics, location etc.
- 3.23 Plant manufacturers can typically design plant to meet required limits. Therefore, assuming plant are designed to meet the limits proposed above, no significant noise impacts are considered likely. This issue is best addressed during the detailed design stage and is typically controlled through a suitably worded planning condition.

Noise from the Car Park

- 3.24 The car parks associated with the Units of Plot L are generally located away from the NSRs, however it is noted that there is a car park located towards the northern boundary of the Site.
- 3.25 This car park is noted as being approximately 40m from the nearest sensitive receptor on Neston Road (NSR2) and benefits from a degree of acoustic screening which will be afforded by the intervening bund at the northern boundary.
- 3.26 Given the number of car parking spaces, and the intervening distance, it is considered unlikely that energy-averaged noise levels ($L_{Aeq,T}$), would result in impacts at the nearest sensitive receptors. However, noise from individual events within the car park (e.g. car doors slamming) require further consideration, particularly during the more sensitive night-time period when occupant of nearby NSRs may be subject to sleep disturbance. Such events are assessed in terms of the L_{AFmax} noise parameter during the night-time period (23:00 to 07:00) in accordance with the guidance set out in the *WHO Guidelines for Community Noise*.

- 3.27 Based on a maximum noise level of 72 dB L_{AFmax} for a car door slamming, measured at a distance of 10m, the resulting noise level at a distance of 36.9m away (i.e. the distance to the location of the nearest noise sensitive receptor, 40 Neston Road) is predicted to be 60 dB L_{AFmax} . Note that this is predicted solely using the distance attenuation correction for a point source and does not take into account any other environmental factors which may further attenuate noise from the car park (i.e. screening, or ground absorption from the intervening topography). Consequently, the predicted noise level is representative of the worst-case scenario.
- 3.28 Based on the assumption that a partially open window provides 15 dB of noise attenuation, as is stated in BS 8233², the 60 dB level at the façade of the nearest noise sensitive receptor, 40 Neston Road, would equate to an internal maximum noise level of 45 dB, which meets the guideline criterion set out in the WHO guidance. It should also be noted that the predicted noise level of 45 dB is based on a car door slamming at the nearest possible distance within the car park. The majority of parking spaces are located a greater distance away from 40 Neston Road, and consequently, would be exposed to noise levels which are further reduced.
- 3.29 It should also be noted that, whilst no mitigation is required to reduce noise levels, a 2.4m high close-boarded timber fence is recommended to be incorporated within the development design between the Unit L-2/L-3 car parks and the nearest receptors on Neston Road. Consequently, a degree of acoustic screening benefit would be anticipated as a result of this fence. The proposed location of the fence is indicated in **Figure 3.3**.

Figure 3.3: Location of the Proposed 2.4m High Close-Boarded Timber Fence



² British Standards Institute (2014), BS 8233:2014 – Guidance on sound insulation and noise reduction for buildings

4. CONCLUSION

- 4.1 BWB Consulting has been instructed by Wilson Bowden Developments Ltd to undertake a Noise Impact Assessment for the Proposed Development, comprising planning use Classes E(g)(iii), B2 and B8.
- 4.2 Due consideration of potential noise impacts at nearby NSRs has been given from the outset and measures to control noise have been embedded within the scheme design, which have been highlighted in this report.
- 4.3 This assessment of the scheme predicts the likely noise generated from service yard activity and HGV movements to and from the Site, and determines suitable noise limits for any fixed plant which will be installed as part of the scheme (details for which are currently unknown).
- 4.4 Given the results of the assessment presented herein this report, it is considered that noise need not be a determining factor in granting planning permission for the Proposed Development.

APPENDICES

APPENDIX A: Glossary of Terms

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 μ Pa (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 log ₁₀ (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 20 μ Pa.
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 3.5 m.
Façade	At a distance of 1 m 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.

APPENDIX B: Planning Condition 23

Planning Condition 23

