Acoustic Associates Sussex Ltd

Noise Impact Assessment (Garden Centre Extension)

Site: **Proposed Development at Mayberry Garden Centre**

Client: **Tates Bros**

Report by: George Orton BEng(Hons) MIOA
Date: 23/10/2020
Project: J2993

Acoustic Associates

ANC THE ASSOCIATION OF NOISE CONSULTANTS

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1 Introduction

Acoustic Associates has been appointed to undertake a noise assessment relating to the "Proposed Development at Mayberry Garden Centre" development.

The purpose of this assessment is to assess the following:

- Noise levels, created by the development, affecting nearby noise sensitive receptors.

It is understood that this report will form part of the planning application for the development.

The development will extend an existing garden center creating a new goods yard, goods warehouse as well as additional retail space.

The noise levels for the day time period (when deliveries may occur) have been assessed in terms of and following the guidelines of the documents listed below:

- National Planning Policy Framework (NPPF) 2019
- BS8233 (Sound insulation and noise reduction for buildings) 2014
- World Health Organisation (WHO) - Guidelines for Community Noise 1999
- BS4142 (2014) Method for rating and assessing industrial and commercial sound
- ISO9613 (Attenuation of sound during propagation outdoors) 1996

A commercial noise assessment has been completed, in respect of nearby existing noise sensitive receptors, which calculated that noise impact would be, at worst, low. Noise from the new goods yard have been assessed and also compared to the current scenario.

The revised location for the goods entrance results in lower noise levels, incident to the closest noise sensitive receptors, than at present.

Furthermore the noise criteria adopted by the Local Authority will also be easily achieved.

The assessment concludes that planning permission would not be refused on noise grounds albeit with possible planning conditions relating to noise created by the proposed development.

2 Planning Policy, Context, Noise Criteria & Noise Assessment Methodology

2.1 Context

The development will extend an existing garden center creating a new goods yard, goods warehouse as well as additional retail space.

There are nearby noise sensitive receptors (NSRs) to the East of the proposed development.

To the north of the proposed development is the busy A259 Old Shoreham Road

The proposed layout, in terms of noise impact, will be an improvement due to the relocation of the goods yard.

At present the delivery vehicles enter through the site and pass the rear of houses on Park Crescent. The new route and yard are further from the NSRs. The proposed building will also act as a barrier reducing the delivery noise levels further. The layout is shown below:

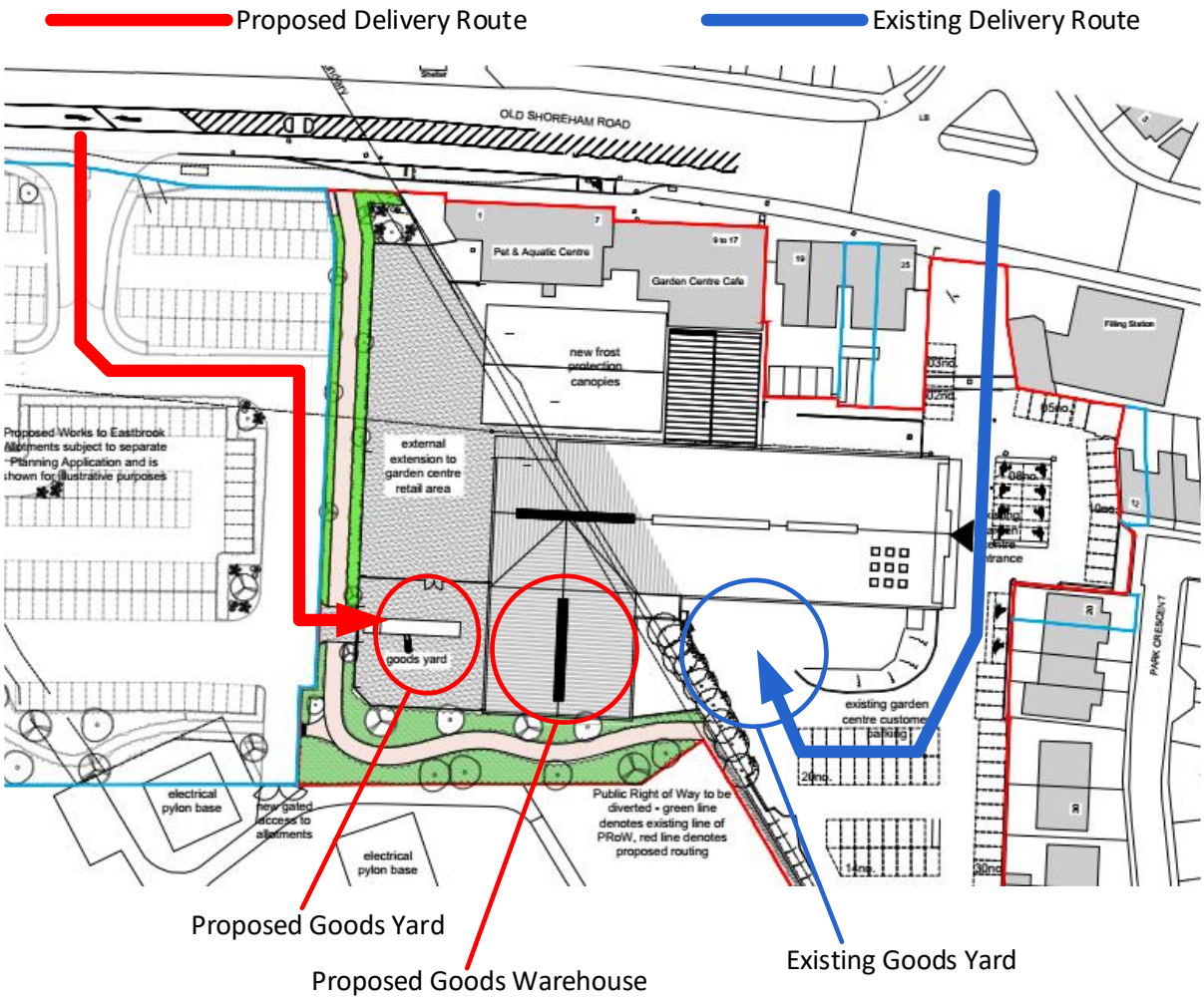

Figure 1: Development layout.

2.2 National Planning Policy Framework 2019

The National Planning Policy Framework (2019) defines the Government's planning policies for England and how these are expected to be applied. It sets out the Government's requirements for the planning system only to the extent that it is relevant, proportionate and necessary to do so.

The document recommends: *preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability.*

Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

- *Mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;*
- *Identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason;*

Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed.

The Framework states that the planning system should contribute to and enhance the natural and local environment by preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of noise pollution. It does not, however, provide any specific formal guidelines.

Based upon Local Authority guidance documents it is recommended in this case that appropriate criteria are provided by:

- BS8233 (Sound insulation and noise reduction for buildings) 2014
- World Health Organisation (WHO) - Guidelines for Community Noise 1999
- BS4142 (2014) Method for rating and assessing industrial and commercial sound

Assessment methodology, predictions of building envelope sound insulation and calculations of noise propagation will follow the principles detailed within:

- ISO9613 (1996) Attenuation of sound during propagation outdoors
- BS8233 (Sound insulation and noise reduction for buildings) 2014

2.3 BS8233 Noise Criteria

Table 5 of BS8233 provides the following guideline values:

Activity	Location	Time period of day	
		07:00-23:00	23:00-07:00
Resting	Living Rooms	35dB $L_{Aeq,16hour}$	-
Dining	Dining Room/Area	40dB $L_{Aeq,16hour}$	-
Sleeping (daytime resting)	Bedroom	35dB $L_{Aeq,16hour}$	30dB $L_{Aeq,8hour}$

Table 1: BS8233 Criteria

With regard to external amenity areas BS8233 (7.7.3.2 Design criteria for external noise) states the following:

For traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed 50 dB LAeq,T, with an upper guideline value of 55 dB LAeq,T which would be acceptable in noisier environments. However, it is also recognized that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited.

2.4 WHO Noise Criteria

The target internal levels are based on guidelines laid out by the World Health Organisation (WHO) and are as follows:

Room Type	**Target Maximum Internal Level - L_{Aeq} dB (A)**
Living rooms	35 (Daytime only)
Bedrooms	30 (Night)
Room Type	**Maximum Internal Level – L_{Amax} dB(A)**
Bedrooms	45 (not more than 10-15 times per Night)

The target maximum internal noise level for a bedroom during the night time corresponds to the threshold of sleep disturbance. WHO state that the noise level outside a bedroom window should be less than 45dB(A) this assumes that an open window provides 15dB attenuation.

With regard to outdoor amenity areas WHO states the following:

To protect the majority of people from being seriously annoyed during the daytime, the outdoor sound level from steady, continuous noise should not exceed 55dB(A) on balconies, terraces and in outdoor living areas.

To protect the majority of people from being moderately annoyed during the daytime, the outdoor sound level from steady, continuous noise should not exceed 50dB(A) on balconies, terraces and in outdoor living areas.

2.5 BS4142: 2014: Method for rating and assessing industrial and commercial sound

This document provides a means of assessing the impact of industrial or commercial sound upon nearby noise-sensitive receptors, including residential properties.

It does this by comparing the Rating Level of the noise from the industrial or commercial source with the pre-existent L_{90} background noise level affecting the same noise-sensitive premises. The Standard provides guidance that:

a) Typically, the greater the difference, the greater the magnitude of the impact.

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

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

d) 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 noise level, this is an indication of the specific sound source having a low impact, depending on the context.

3 Example Noise Levels

Acoustic associates have conducted sound surveys for other developments that require HGV deliveries and material handling with forklifts.

3.1 Goods Yard Noise Levels

The noise measurements detailed below related to operations in a roofing supplies yard. The yard was busy with lorry's idling as they were being loaded by forklift trucks (including reversing alarm on some occasions). During the survey lorry's entered and left the yard.

3 fifteen measurements were conducted that encompassed all the activities detailed above (each minute long measurement contained fifteen minute long segment measurements).

A segment of one of the fifteen minute measurements has also been evaluated to give an idea of the forklift reversing alarm noise level. The results of the measurements can be found in the table below:

Plant	Notes	Distance	L_{Aeq} dBA	Lw* dBA
Builders Merchant	15mins Outside	15	59.3	91
Builders Merchant	15mins Outside	15	54	86
Builders Merchant	15mins Outside	15	60.1	92
Average:				**89**
Fork Lift Reverse Beacon	Outside	20	67	101
Average:				**101**

Table 2: Builders Yard Noise Levels

* Sound Power = Sound Pressure + 20Log (Distance) + 8

3.2 HGV Pass-by Noise Levels

The noise levels below were completed at a Biogas plant where there were several HGV movements (at a distance of approximately 8m from the road):

Description	Duration (s)	LAeq (dBA)	SEL (dBA)
HGV arriving empty	46	64.9	81.6
tanker leaving - loaded	35	63	78.4
HGV leaving - loaded	49	66.2	83.1
HGV tractor unit only	18	65	77.6
HGV flat bed leaving empty	40	63.5	79.6
HGV arriving loaded	25	66.8	80.9
HGV leaving loaded	24	66.6	76.4

Table 3: MOT Workshop Noise Levels

3.3 HGV Pass-by Noise

It is proposed HGV route noise level is calculated using a basic acoustic equation:

SPL = Sound Exposure Level – 10LogT +10LogN

- T = reference time (1 hour as detailed in BS4142)
- N = number of vehicle movements (assumed to be 2 in an hour I.E. arriving being unloaded and then leaving)
- Sound Exposure Level = 83dBA (worst case)

Delivery Route L_{Aeq1Hr} = 50dBA @8m

4 External Environmental Noise Survey Baseline Conditions and Results

A noise survey was carried out between the 21st and the 26th September 2020 to assess the existing noise levels close to the proposed development

4.1 Baseline Conditions

- Survey carried out by: George Orton BEng (Hons) MIOA
- Equipment used: Castle MIRUS - Type 1 Sound Level Meter
- Weather conditions: Dry, Wind speed average less than 5ms^{-1} ,

The meter was calibrated before and after commencing the noise measurements (@94dB with no drift). All measurements were taken with the microphone 1.5m above ground level and away from any reflective surfaces i.e. a free-field measurement. All noise levels in this report will be free-field noise levels unless stated otherwise. All measurements were conducted prior to the construction of the proposed development. Wind speed data was also logged at a similar position

4.2 Location

The survey Location can be seen below:

Figure 2: Survey Location Plan

4.3 Residual Sound Levels

The residual sound levels, for the likely operating time of the garden centre, have been summarised below:

- 08:00-18:00hrs – Average $L_{Aeq,1Hr}$ = 60dBA
- 08:00-18:00hrs – Lowest $L_{Aeq,1Hr}$ = 57 dBA
- 08:00-18:00hrs – Highest $L_{Aeq,1Hr}$ = 62 dBA

4.4 Background Sound Levels

The Background sound levels (LA90.15min) have been displayed along with the wind speed survey data:

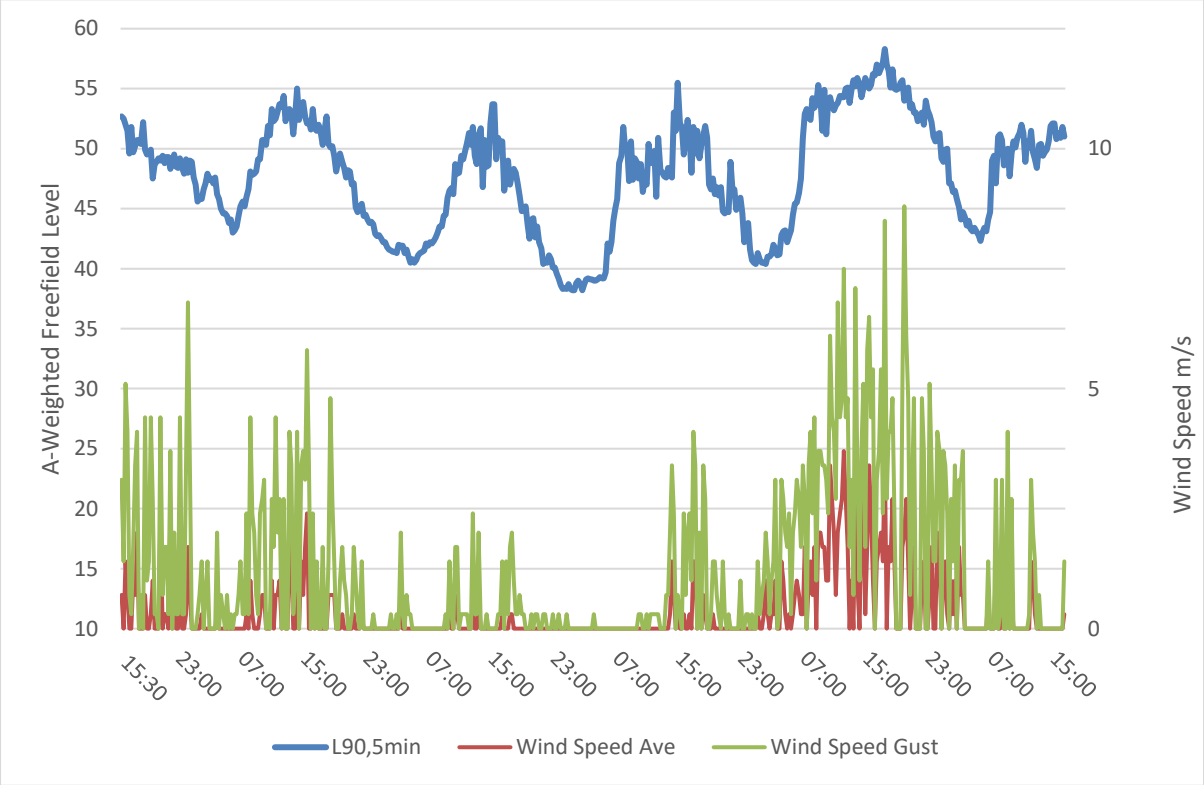

Figure 3: Background Sound and Wind Speed Graph

BS4142 states the following on page 11 (Note 1):

To obtain a representative background sound level a series of either sequential or disaggregated measurements ought to be carried out for the period(s) of interest, possibly on more than one occasion. A representative level ought to account for the range of background sound levels and ought not automatically to be assumed to be either the minimum/modal value.

Further statistical analysis has been completed to establish the most commonly occurring value for the 08:00-18:00hrs period:

- Daytime modal value = 52dBA (all days between 08:00-18:00hrs)

The wind speed average was always below 5m/s. However for the last full day the wind gusts look relatively high and may possibly have adversely affected the measured levels.

This was proved not to be the case as even If this day is not included the modal value is still 52dBA

4.5 Background Sound Levels at NSR

The background survey data was required for another planning application on the neighbouring site (same developer). However the survey position is also relatively close to the garden centre. The noise at the NSRs close to the garden centre will be marginal lower as they are further away (around 70m from road centre line compared to survey being around 30m from the road centre line).

The road is relatively busy and as such the background noise level at the NSRs (circled in figure above) is likely to be around 45dBA for the day time period (unlikely to be in excess of 7dB lower than as measured at the less sheltered position close to the road).

5 Computer Noise Model

A computer noise model has been completed using the computer package IMMI. IMMI faithfully implements the propagation method of ISO-9613:1996; Acoustics – Attenuation of sound during propagation outdoors.

Reception points were added to the model at plan/height position corresponding to nearest noise sensitive properties (NSRs). Reception points (RPs) predict the noise level at a discreet position within the noise model space.

5.1 Garden Centre Delivery Yard Noise Model Methodology

5.1.1 Delivery Route

The delivery route was added to the noise model as a line source with a reception point at 8m away. The line source sound power was adjusted until the level at 8m equalled 50dB as detailed in 3.3.

5.1.2 Loading Noise

Fork lift maneuvering and reverse beacon have been added to the model as point sources. The sound power levels were entered as the average measured levels from the past surveys (see section3.1). On time corrections were also added as detailed below (the beacon on time is short as reversing beacons operate intermittently emitting a short burst of sound):

Noise Source	Sound Power	On Time	Model Sound Power
Unloading	89	60/60 mins	89
Beacon	101	0.5/60mins	80

Table 4: Model Sound Power Data

A model was completed for the current and proposed scenarios. The proposed development noise model can be seen below:

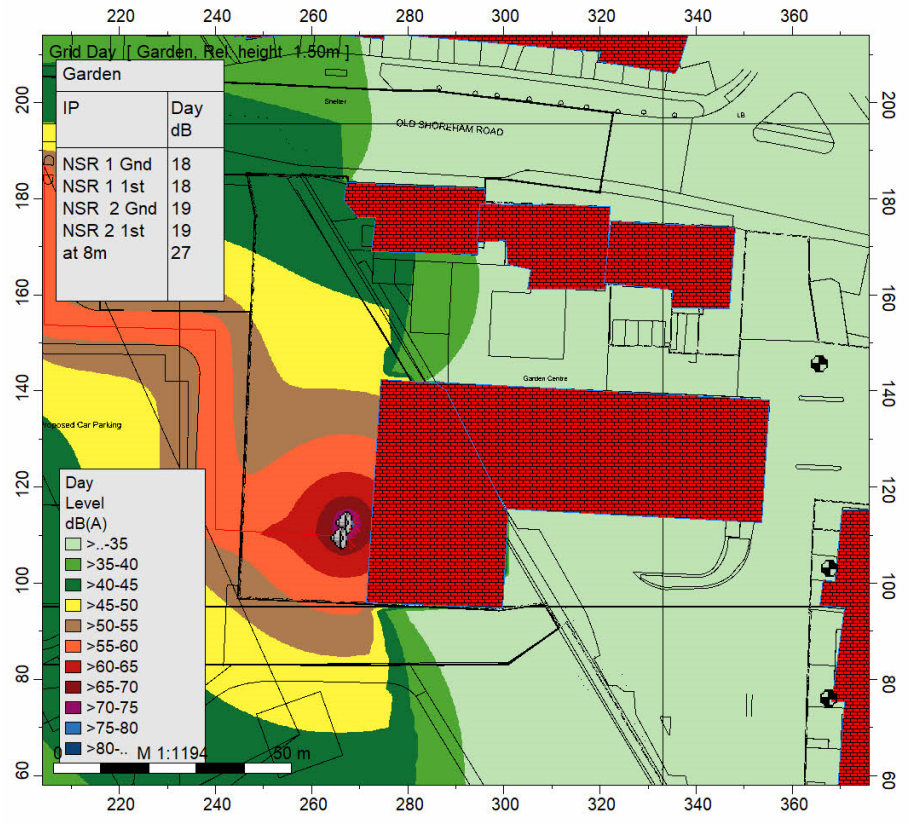

Figure 4: Proposed Development Noise Model

6 BS4142 Assessment – New Dwellings and Commercial Noise

As the garden center deliveries will be during the day time the BS4142 assessment will be completed for the ground floor reception points

Figure 4 above shows that the dwellings close to the proposed development are exposed to daytime specific sound levels of approximately $L_{eq(1\ hr)}$ 19dB(A).

6.1 Rating Level

It is important to differentiate between noise rating level and specific noise level. Certain acoustic features can increase the likelihood of complaint. BS4142 states the following:

- *Tonality*

  A Subjective assessment could apply a penalty of 2 dB for a tone which is just perceptible at the noise receptor, 4 dB where it is clearly perceptible, and 6 dB where it is highly perceptible.

The reversing beacon noise from forklifts would be described as tonal.

It should be noted that the predicted specific sound level is 26dB lower than the background sound level which would make the tonal sounds harder to perceive. To err on the side of caution the following corrections will be applied:

- +2dB tonal penalty

The above demonstrates that the noise rating level will be 21dBA for a typical one hour reference period.

6.2 Assessment

Based on the survey data the representative L_{A90} background sound level would be 45dBA

The Rating Level of the industrial noise is 24dB lower than representative background sound level and therefore the following is applicable (Excerpt from BS4142):

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 noise level, this is an indication of the specific sound source having a low impact, depending on the context.

6.3 Uncertainty

Due to the rating level being significantly below the background sound level any uncertainties would not be sufficient to change the outcome of the assessment (I.E. rating level still lower than background)

6.4 Context

It should be noted that existing residual and background sound levels are relatively high. This may result in a higher chance of noise impact if the rating level is at a similar level to the background sound level. For this reason it would be recommended that any future calculations/conditions etc. target a noise rating level/ that is at least 5dB lower than background. The noise affecting the nearby NSRs should be lower than for the current scenario due to the relocation of the delivery yard. The negative noise change is another indicator that noise impact should be low at worst.

7 Summary and Conclusion

Noise levels have been measured where the proposed development will be built.

The dominant source of noise affecting the development is created by vehicular traffic on the Old Shoreham Road

7.1 BS4142 Assessment

A commercial noise assessment has been completed, in accordance with BS4142, which calculated that the noise rating level, for a busy delivery hour, will be 24dB below the background noise level. This demonstrates that the noise impact would be at worst low.

In this case due to the high residual and background sound levels achieving a rating level at least 5dB below background would be recommended.

7.2 WHO/BS8233 Assessments

7.2.1 Internal Noise Criteria

The model has been used to predict that, for the worst case area the external level will be 19dBA (Freefield level predicted incident to the nearby NSRs)

The internal level would be around 12-13dB lower if windows were open. The inside level of 16-17dBA is considerably lower than the day time target of ≤35dBA as detailed in BS8233 and WHO.

7.2.2 External Noise Criteria

The predicted delivery yard noise level, outside the nearest NSRs, are significantly lower than the WHO lower limit of 50dBA. However it should be noted that the existing noise levels created by the nearby road are higher.

7.3 Mitigation Measures

No mitigation measures have been recommended. The design itself helps reduce noise levels incident to the nearest noise sensitive receptors

7.4 Noise Change

The noise model was used to predict the noise level from deliveries for both the proposed scheme as well as the current scenario. The “before” noise model predicted a level of 49dBA at the most affected NSR. The “after” or proposed development model predicted a worst case level of 19dBA which is considerably lower. Even with any unfavourable uncertainties the proposed scheme will significantly reduce noise, created by delivery activities, incident to the NSRs.

7.5 Conclusion

Due to the improvements that the proposed development twill yield itis considered that the planning application would not be refused on noise grounds.