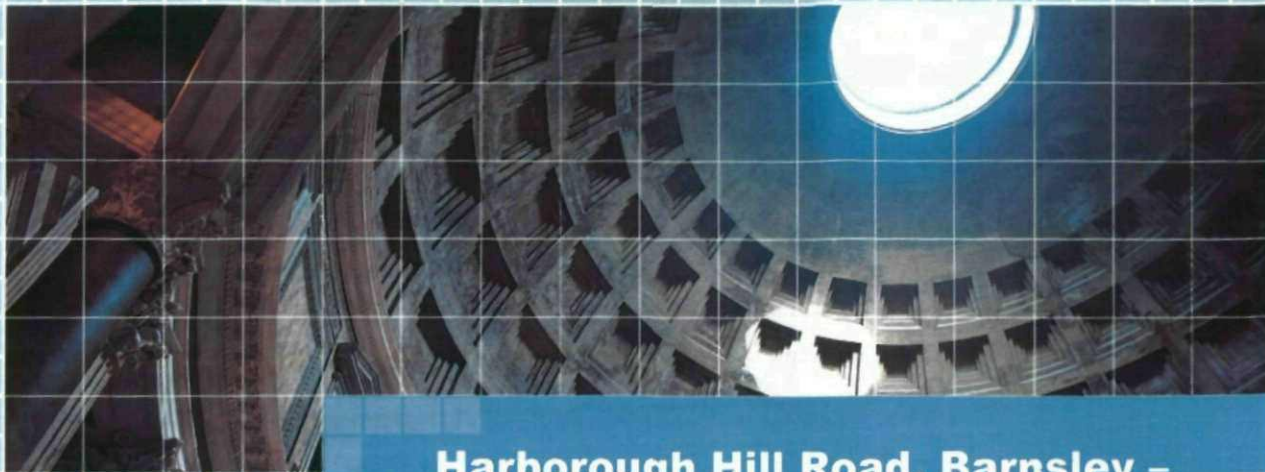


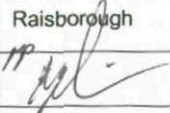


Harborough Hill Road, Barnsley – Acoustic Design Advice Report

RWE Npower plc

22 September 2008

QM

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1 Introduction

1.1 SUMMARY

1.1.1 WSP Acoustics has been appointed to undertake an environmental noise assessment and provide acoustic design advice for a proposed retail development off Harborough Hill Road in Barnsley. The site is known as the former Yorkshire Electricity Board (YEB) site.

1.1.2 On 17 October 2005 Barnsley Metropolitan Borough Council granted outline planning permission (ref B/05/1339/BA) for retail development subject to a number of conditions. Condition No 2 relates to the approval of reserved matters for siting, design, appearance and landscaping. Condition 12 requires that a noise assessment be undertaken in relation to the proposed development on Mottram Street, considering potential noise impact from the operational development, and that the results of this assessment be used in the design of suitable noise mitigation for incorporation into the scheme.

1.1.3 The purpose of this report is therefore to present the results of a baseline noise survey and assessment undertaken for the outline scheme design, and provide advice on noise mitigation options, such that the necessary measures can be incorporated into the scheme design.

1.1.4 It is proposed that a supplementary letter report be prepared for submission to Barnsley Metropolitan Borough Council alongside this report, which will enable Condition 12 to be discharged. The supplementary report will summarise the noise mitigation measures subsequently incorporated into the final scheme design, and will also include an assessment of significance on any residual noise impacts associated with the operation of the scheme on adjacent dwellings on Mottram Street.

1.1.5 This assessment has been based on the results of a detailed environmental noise survey, undertaken over the course of typical weekday and Saturday morning periods. The survey was undertaken in the vicinity of dwellings on Mottram Street to establish the current baseline noise climate at these properties.

1.1.6 At the outset of this project, the Environmental Protection Department of Barnsley Metropolitan Borough Council were consulted over their requirements for the assessment, and also to discuss the approach to the baseline noise survey. In accordance with these discussions, this assessment has been undertaken following the guidance presented in Planning Policy Guidance Note 24: *Planning and noise* (as also referenced in condition 12), the documents referenced therein, including BS8233: 1999: *Sound insulation and noise reduction for buildings-Code practice* and BS4142: 1997: *Method for rating industrial noise affecting mixed residential and industrial areas*, the guidance contained within the draft *Guidelines for environmental noise impact assessment* produced by the joint working party of the Institute of Acoustics & Institute of Environmental Management and Assessment, and the specific noise assessment criteria adopted by Barnsley Metropolitan Borough Council.

1.1.7 This report is necessarily technical in nature so to assist the reader, a glossary of acoustic terminology is presented in Appendix A.

2 Site Description

2.1 SITE LOCATION

2.1.1 The site is located on the west side of Harborough Hill Road, on the north-east side of the centre of Barnsley.

2.1.2 The site is bounded by Harborough Hill Road to the east, Interchange Way to the west, beyond which is Barnsley Railway station and associated rail lines, and a retail/commercial development to the south. To the north, the site is bounded by residential dwellings and gardens on Mottram Street.

2.1.3 The key noise sources in the vicinity of the site are local road traffic movements, rail traffic movements and a continuous 'humming' noise that is emitted by the electricity transformers which are located towards the southern end of the site. The audibility of the transformers depends upon local screening effects and the significance of other local sources which tend to vary according to the time of day.

2.2 NOISE SENSITIVE RECEPTORS

2.2.1 The closest noise-sensitive receptors to the site are the residential dwellings on Mottram Street. These dwellings are located adjacent to Mottram Street with gardens to the rear abutting the site boundary.

2.2.2 The lie of the local ground is such that it falls away beyond the western and northern boundaries, with dwellings on Mottram Street being circa 3m below the level of the site. These dwellings appear as two storey, but many have roof skylights and a small number have dormer windows suggesting that there may be bedroom accommodation at 2nd floor height.

2.3 DEVELOPMENT DESCRIPTION AND POTENTIAL NOISE SOURCES:

2.3.1 The purpose of this assessment is to provide acoustic design advice to the on-going scheme design. Accordingly, at this stage, it is appropriate to consider the latest scheme layout design, as presented in Figure B1 of Appendix B.

2.3.2 It can be seen that proposed development comprises car parking to the south, and a retail unit to the north, with vehicular access provided via Interchange Way to the west. The design also includes for a vehicle manoeuvre area towards the north-west corner of the site, and an access way to the rear of the retail unit between the unit and the northern site boundary.

2.3.3 Following discussions with Barnsley Metropolitan Borough Council, the following potential noise sources were identified as those which should be considered by this assessment:

- Any proposed future plant items that are to be incorporated into the scheme;
- Noise from vehicle manoeuvres, e.g. HGV's, within the proposed vehicle manoeuvre area;
- Noise from the loading, unloading and vehicles; and
- Noise from any anticipated future HGV chillers, e.g. those associated with cold food deliveries (N.B. the outline approval for the scheme includes for the option of food retail).

2.3.4 It was agreed that the above sources should be assessed based upon their potential impact on dwellings on Mottram Street.

3 Legislation, Planning Guidance And Noise Related Planning Conditions

3.1 PLANNING POLICY GUIDANCE NOTE 24: 1994: PLANNING AND NOISE

3.1.1 Planning Policy Guidance Note 24: *Planning and Noise* (PPG 24), published in September 1994, sets out the governments policies on noise related planning issues. It gives guidance to Local Authorities in England on the use of their planning powers to minimise the adverse impact of noise. Specifically, it:

- outlines the considerations to be taken into account when determining planning applications for both noise-sensitive developments and for those activities which will generate noise;
- sets out Noise Exposure Categories for residential development, encourages their use and recommends appropriate levels for exposure to different sources of noise; and
- advises on the use of planning conditions to minimise the impact of noise.

3.1.2 PPG 24 advises that for industrial noise, "where the standard is appropriate", an assessment in accordance with BS4142:1990: *Method for rating industrial noise affecting mixed residential and industrial areas* (updated in 1997) should be performed to identify the likelihood of complaints. It goes on to state that additional guidance can be found in BS8233:1987: *Sound insulation and noise reduction for buildings - Code of practice* (updated in 1999).

3.1.3 The requirements of BS4142: 1997 and BS8233: 1999 are summarised below along with other relevant guidance and standards.

3.1.4 BS4142 sets out a method to assess whether noise from factories, industrial premises or fixed installations and sources of an industrial nature in commercial premises are likely to give rise to complaints from noise-sensitive receptors in the vicinity. In the case of this development, therefore, it is appropriate to use this standard in the assessment of noise from any proposed fixed plant items.

3.1.5 For noise from other 'non-fixed' commercial sources such as vehicle operations within the vehicle manoeuvre area, in accordance with PPG 24, the default guidance is BS8233 which provides guidance on acceptable noise levels within and outside residential accommodation. However, this approach does not account for a situation where the prevailing baseline noise levels already exceed the guidance contained within BS8233. Accordingly, consideration has also been given to guidance contained within the draft *Guidelines for environmental noise impact assessment*, produced by the joint working party of the Institute of Acoustics and Institute of Environmental Management and Assessment. This guidance considers the significance of impacts as a result of changes in environmental noise conditions and can reasonably be considered to fall between BS4142 and BS8233 in its approach.

3.2 BRITISH STANDARD 4142:1997: METHOD FOR RATING INDUSTRIAL NOISE AFFECTING MIXED RESIDENTIAL AND INDUSTRIAL AREAS

3.2.1 BS 4142 sets out a method to assess whether noise from factories, industrial premises or fixed installations and sources of an industrial nature in commercial premises is likely to give rise to complaints from noise-sensitive receptors in the vicinity.

3.2.2 The procedure contained in BS 4142 for assessing the likelihood of complaint is to compare the measured or predicted noise level from the source in question, known as the $L_{Aeq,T}$ specific noise level, immediately outside the dwelling, with the $L_{A90,T}$ background noise level that exists in the absence of the source in question.

3.2.3 Where the noise contains a "distinguishable discrete continuous note (whine, hiss, screech, hum etc.)" or if there are "distinct impulses (bangs, clicks, clatters or thumps)", or if "the noise is irregular enough to attract attention", then a correction of +5 dB is added to the specific noise level to obtain the $L_{A,T}$ rating level.

3.2.4 The likelihood of the noise giving rise to complaints is assessed by subtracting the background noise level from the rating noise level. BS 4142 states:

"A difference of around +10 dB or more indicates that complaints are likely. A difference of around +5 dB is of marginal significance. If the rating level is more than 10dB below the measured background then this is a positive indication that complaints are unlikely."

3.3 BRITISH STANDARD 8233:1999: SOUND INSULATION AND NOISE REDUCTION FOR BUILDINGS - CODE OF PRACTICE

3.3.1 The scope of this Standard is the provision of recommendations for the control of noise in and around buildings. It suggests appropriate criteria and limits for different situations, which are primarily intended to guide the design of new buildings or refurbished buildings undergoing a change of use, rather than to assess the effect of changes in the external noise climate.

3.3.2 The Standard suggests suitable internal noise levels within different types of buildings, including dwellings, and these are repeated in Table 1 below.

TABLE 1 RECOMMENDED INTERNAL NOISE LEVELS $L_{Aeq,T}$ dB

Criterion	Typical Situation	Design Range $L_{Aeq,T}$ dB	
		Good	Reasonable
Suitable resting/sleeping conditions	Living Rooms	30	40
	Bedroom	30	35
For a reasonable standard in bedrooms at night, individual noise events (measured with fast time weighting should not normally exceed 45 dB L_{Amax}).			

3.3.3 BS8233 goes on to recommend noise levels for gardens. According to BS8233, it is desirable that the daytime steady noise level does not exceed $L_{Aeq,T}$ 50dB, and 55dB should be regarded as the upper limit.

3.4 INSTITUTE OF ACOUSTICS/INSTITUTE OF ENVIRONMENTAL MANAGEMENT AND ASSESSMENT WORKING PARTY

3.4.1 The draft *Guidelines for environmental noise impact assessment* produced by the joint working party of the Institute of Acoustics and Institute of Environmental Management and Assessment have been referenced in relation to the change in ambient noise as a result of the operations within the vehicle manoeuvre area.

3.4.2 Whilst this document is currently draft, the guidance it contains is of assistance in establishing environmental noise impacts. The guidance provides an example of how changes in noise level can be categorised by significance, based on key benchmarks that relate to human perception of sound. For example, a change of 3dB is generally considered to be the smallest change in noise that is perceptible and a 10dB change in noise represents a doubling or halving of the noise level.

3.4.3 This guidance is contained in Table 2 below and has been split to provide greater definition to the rating of noise level changes.

TABLE 2 IMPACT SCALE FOR COMPARISON OF FUTURE NOISE AGAINST EXISTING NOISE

Change in Noise Level dB(A)	Subjective Response	Significance
0 – 0.9	No change	No Impact
1.0-2.9	Barely perceptible	Minor Impact
3.0-4.9	Noticeable	Moderate Impact
5.0-9.9	Up to a doubling or halving in loudness	Substantial Impact
10.0 or more	More than a doubling or halving in loudness	Major Impact

3.4.4 The draft guidelines present an example of how basic noise changes may be categorised and that in any assessment the noise level threshold and significance statement should be determined by the assessor, based upon the specific evidence and likely subjective response to the noise.

3.4.5 It is considered that the descriptions specified in the above table provide a good indication of the likely significance of changes in noise levels in this case. Therefore, these have been used to supplement the assessment of potential impacts from the proposed development.

3.5 CONSULTATION RESPONSE FORM BARNSELEY METROPOLITAN BOROUGH COUNCIL

3.5.1 At the outset of the project, the Environmental Protection Department of Barnsley Metropolitan Borough Council were consulted, and the approach to the assessment and baseline noise survey was agreed with Ms S Newman. A summary of the consultation is presented below:

- It was anticipated that measured background levels at the site may be lower than those anticipated based on map reviews, as the site is located on the brow of a hill;
- A continuous 24 hour weekday noise survey was considered to be acceptable to determine the prevailing baseline environment. Notwithstanding this, measurements were also carried out over a Saturday morning period;
- Where site security is an issue for continuous measurements, periodic shorter measurements were agreed to be acceptable, provided that they covered the quietest parts of the day and night-time, which were anticipated to be circa 03:00 to 04:00 hours, shortly before other industrial facilities in the area begin operations;
- Plant noise limits should be proposed for plant items, based on the guidance contained within BS4142;
- Noise from delivery vehicles can be assessed in accordance with BS8233, or by comparing current and future ambient noise levels, and determining resulting ambient noise level changes;
- Barnsley Metropolitan Borough Council will, where necessary, consider control of delivery and collection noise by conditioning operational hours;
- Particular attention should be given to potential impacts associated with mobile chiller units, e.g. those on refrigerated HGV's, and that these should be assessed based on achieving Noise Rating Curve 35 at the adjacent properties.

4 Environmental Noise Survey

4.1 APPROACH AND MEASUREMENT LOCATION

4.1.1 To inform the assessment, a detailed baseline noise survey was undertaken to establish the current prevailing noise climate in the vicinity of the dwellings on Mottram Street. In agreement with Barnsley Metropolitan Borough Council, this survey was undertaken over the course of a typical 24 hour weekday period, to allow daytime, evening and night-time noise environments to be established. In addition the survey was extended to also cover Friday evening, Friday night-time and Saturday morning periods.

4.1.2 The noise survey commenced at approximately 13:00 hours on Thursday the 11th September 2008, concluding at approximately 13:00 hours on Saturday the 13th September 2008.

4.1.3 The adopted baseline noise measurement location is shown in Figure B2 of Appendix B. It can be seen the measurement location was positioned close to the northern boundary of the site, in the immediate vicinity of the adjacent dwellings on Mottram Street and the proposed vehicle manoeuvre area. The location was also well screened from the on-site electricity transformers by existing on-site buildings.

4.1.4 The measurement location was subject to free-field conditions, and was positioned at a height of 1.5m above local ground.

4.1.5 Over the course of the survey, the measurement location was subject to periodic attendance such that the noise environment could be observed and noted, including attendance during the middle of the night-time.

4.1.6 The weather conditions over the course of the survey remained conducive to noise measurement being dry throughout. Wind speed measurements were undertaken during the periods of attendance, and recorded to range between 0 and 3m/s and where therefore appropriate for environmental noise measurement.

4.2 EQUIPMENT

4.2.1 The following Type 1 noise measurement equipment was used for the survey:

TABLE 3 NOISE MEASUREMENT EQUIPMENT

Equipment Description	Manufacturer & Type No.	Serial No.
Sound level meter	01dB SIP 95	10565
Preamplifier	01dB PRE 12 N	002557
Microphone	Microtech Gefell MK250	42589
Acoustic Calibrator	01dB Cal 21	51031290

4.2.2 All equipment had been calibrated to traceable standards within the previous 2 years, and the calibrator within the previous 12 months. The noise meter was calibrated both prior to and upon completion of the survey and no significant drift was noted.

4.3 RESULTS

4.3.1 A summary of the measured ambient and background noise levels is presented in Table 4 below with the full tabulated survey results presented in Appendix C.

TABLE 4 SUMMARY OF MEASURED AMBIENT BACKGROUND NOISE LEVELS, FREE-FIELD, dBA

Measurement Position	Day Start	Measurement Start	Period	Noise Levels, dB	
				L _{Aeq,T}	L _{A90,T}
1	Thursday	13:00:00 11/09/08	Daytime 12 hours ¹	56.5	52.3
		19:00:00 11/09/08	Evening 4 hours	52.0	44.6
		23:00:00 11/09/08	Night- time 8 hours	49.2	35.4
	Friday	07:00:00 12/09/08	Daytime 12 hours	56.0	51.0
		19:00:00 12/09/08	Evening 4 hours	54.4	46.7
		23:00:00 12/09/08	Night- time 8 hours	49.6	39.1
	Saturday	07:00:00 12/09/08	Morning ² 5 hours	56.1	49.9

¹ Afternoon period between 13:00 and 19:00 hours considered representative of full 12 hour daytime period.

² Measurement finished at 13:00 hours

4.3.2 It can be seen from Table 4 above that there are generally only small variations in the measured period noise levels from day to day, e.g. daytime ambient noise levels range from 56.0, to 56.5 dBA, evening ambient noise levels range from 52.0 to 54.4 dBA, and the night-time ambient noise level ranges from 49.2 to 49.6 dBA.

4.3.3 Daytime background noise levels were identified to range from 49.9 to 52.3 dBA with evening and night-time background noise levels ranging from 44.6 to 46.7 dBA and 35.4 and 39.1 dBA respectively.

5 Assessments

5.1 NOISE LIMITS FOR PROPOSED FUTURE PLANT ITEMS

5.1.1 At this stage, the precise details of any future plant associated with the proposed development are not known, i.e. any compactors, chillers / extract plant etc, and are only likely to be confirmed once the future tenants of the facility are known. Accordingly, precise plant noise predictions cannot be undertaken at this stage. As such, it is appropriate to specify suitable noise limits to which any such plant or operations should conform.

5.1.2 BS4142 states that a rating noise level of +5 dB above background is of only 'marginal significance' when assessing the likelihood of complaints. Accordingly, noise limits are presented in Table 5 below based on a difference of 0dB between the rating noise level and the background noise level, such that any impacts would be of less than marginal significance. These noise limits are proposed based on the results of the lowest measured background noise levels taken from Table 4 above.

TABLE 5 RECEPTOR NOISE LIMITS FOR PROPOSED PLANT, dB(A)

Receptors	Time Period	Proposed Rating Noise Level Limit based on BS4142
Residential Dwellings on Mottram Street	Daytime	49.9
	Evening	44.6
	Night-time	35.4

5.1.3 The above limits correspond to the total rating noise level from all plant items operating at any one time. Before comparison with the above limits, any applicable corrections for acoustic characteristics, e.g. tonality should be applied.

5.1.4 It is anticipated that at this stage of the development, the specification and location of any plant is sufficiently flexible to ensure suitably quiet plant can be procured, and/or mitigation options investigated as necessary to ensure meeting the above limits.

5.2 ASSESSMENT OF NOISE FROM DELIVERIES, LOADING AND UNLOADING OPERATIONS

5.2.1 The outline planning approval for this development is for a "small scale food store" or "restricted non food A1 uses". Based on this, and experience of working on similar projects, it is considered reasonable to assume that deliveries would be infrequent and would amount to one or two isolated HGV deliveries each day.

5.2.2 The following assessment therefore considers the amount by which the measured prevailing ambient noise levels would change during a HGV delivery undertaken during daytime, evening, and night-time periods.

5.2.3 Table 6 below details typical source noise levels associated with vehicular deliveries, likely to take place at the proposed service yard. These figures are based on historical field measurements undertaken by WSP Acoustics. The source noise levels are presented as single event noise exposure levels, SEL's. The distance between the measurement position and the activity has been corrected to 10 metres in each case.

TABLE 6 TYPICAL SOURCE SINGLE EVENT LEVELS ASSOCIATED WITH HGV DELIVERIES, FREE-FIELD, dB

Operation	SEL at 10 m
HGV Forward Pass-by	77
HGV Reversing Pass-by	85
Driver Door Close	59
Opening and Closing Rear Tailgate and Opening Roller shutter Doors	94
Loading / Unloading HGV (Transportation of goods on Pallets)	85
Arranging Load within HGV (Preparing for Transit)	77
HGV Pulling Away	84

5.2.4 The likely changes in the ambient noise levels as a result of the operations within the vehicle manoeuvre area have been predicted at the centre of the adjacent residential gardens on Mottram Street. It is assumed that over the course of a 1 hour period during the day, a HGV arrival / departure would comprise the following:

- 1 forward pass-by to access the vehicle manoeuvre area;
- 1 reversing operation within the vehicle manoeuvre area;
- 2 driver door closes (one on arrival and one on departure);
- 1 opening and 1 closing of the rear tail gate and a roller shutter door;
- 2 loading / unloading pallets operations (one for unloading and one for loading);
- 1 arranging load within HGV following loading; and
- 1 pulling away operation to exit the site.

5.2.5 During the night-time, an assessment period of 5 minutes has been adopted, so to represent a worst case, the loudest period of the above operation has been considered, i.e. HGV reversing, door closes, opening and closing of tailgate and a rollershutter doors, and loading and unloading operations.

5.2.6 Table 7 below presents the existing, daytime and evening ambient noise levels taken from Table 4, the predicted total HGV arrival / departure, loading and unloading operation, the corresponding noise level changes and the significance ratings for these periods of the day. This assessment does not account for the affect of any acoustic screening along the site boundary, which is considered further in Section 6 below. The impact significance has been determined based on the guidance contained within the IOA/IEMA guidelines as presented earlier in Section 3.

5.2.7 Table 8 below, presents the same assessment for the night-time period, for which a shorter 5 minute assessment period is adopted.

TABLE 7 DAYTIME AND EVENING ASSESSMENT OF AMBIENT NOISE LEVEL CHANGES DURING HGV ARRIVAL, UNLOADING, LOADING AND DEPARTURE ACTIVITY, FREE-FIELD, dBA

Receptor	Period	Lowest Measured Ambient Noise Levels ($L_{Aeq,T}$) [A]	Assumed Operations	Predicted Operational Level ($L_{Aeq,1hour}$) [B]	Future Ambient Level [C = A+B]	Change [A-C] / Significance
Dwellings on Mottram Street	Daytime	56.0	HGV arrival, reversing within manoeuvre area, unloading, loading and departure	49.2	56.8	+0.8 / No Impact
	Evening	52.0		49.2	53.8	+1.8 / Minor Adverse

TABLE 8 NIGHT-TIME ASSESSMENT OF AMBIENT NOISE LEVEL CHANGES DURING HGV ARRIVAL, UNLOADING, LOADING AND DEPARTURE ACTIVITY, FREE-FIELD, dBA

Receptor	Period	Lowest Measured Ambient Noise Levels ($L_{Aeq,T}$) [A]	Assumed Operations	Predicted Operational Level ($L_{Aeq,5minutes}$) [B]	Future Ambient Level [C = A+B]	Change [A-C] / Significance
Dwellings on Mottram Street	Night-time	49.2	HGV reversing within manoeuvre area, unloading and loading	59.8	60.2	+11 / Major Adverse

5.2.8 It can be seen from Table 8 above that, even without mitigation, the noise level changes predicted to arise at the centre of adjacent gardens from a typical HGV event, correspond to 'no impact' during the daytime and only a 'minor' impact during the evening. During the night-time, due to the shorter assessment period, noise level changes are predicted to give rise to major adverse noise level impacts. Accordingly, consideration has been given to necessary noise mitigation measures in Section 6 below.

5.3 ASSESSMENT OF NOISE FROM THE TRANSFER OF GOODS ALONG THE REAR ACCESS WAY

5.3.1 The above assessments consider operations within the vehicle manoeuvre area. It is also appropriate to consider the noise levels that would typically be generated as a result of the moving of goods along the access way proposed between the retail store and adjacent dwellings. Accordingly, a series of noise level predictions have been undertaken based on the data presented in Table 6 above corresponding to the movement of palletised goods.

5.3.2 Tables 9 below presents the existing daytime and evening ambient noise levels taken from Table 4, the predicted noise level associated with the movement of palletised goods along the access way, and the corresponding noise level changes and significance ratings for these periods of the day. Again, this assessment does not account for the effect of any acoustic screening along the site boundary, or other mitigation, which is considered further in Section 6 below. It is assumed that the movement of goods would typically prevail for 50% of a 1 hour assessment period.

5.3.3 Table 10 below presents the corresponding assessment for the night-time, adopting a 5 minute assessment period, and assuming that the movement of good would prevail for 100% of that period.

TABLE 9 DAYTIME AND EVENING ASSESSMENT OF AMBIENT NOISE LEVEL CHANGES DURING TRANSFER OF GOODS ALONG REAR ACCESS WAY, FREE-FIELD, dBA

Receptor	Period	Lowest Measured Ambient Noise Levels ($L_{Aeq,T}$) [A]	Assumed Operations	Predicted Operational Level ($L_{Aeq,1hour}$) [B]	Future Ambient Level [C = A+B]	Change [A-C] / Significance
Dwellings on Mottram Street	Daytime	56.0	HGV arrival, reversing within manoeuvre area, unloading, loading and departure	55.4	58.7	+2.7 / Minor Adverse
	Evening	52.0		55.4	57.0	+5 / Substantial Adverse

TABLE 10 NIGHT-TIME ASSESSMENT OF AMBIENT NOISE LEVEL CHANGES DURING TRANSFER OF GOOD ALONG REAR ACCESS WAY, FREE-FIELD, dBA

Receptor	Period	Lowest Measured Ambient Noise Levels ($L_{Aeq,T}$) [A]	Assumed Operations	Predicted Operational Level ($L_{Aeq,5minutes}$) [B]	Future Ambient Level [C = A+B]	Change [A-C] / Significance
Dwellings on Mottram Street	Night-time	49.2	HGV reversing within manoeuvre area, unloading and loading	58.4	58.9	+9.7/ Substantial Adverse

5.3.4 It can be seen from Table 9 above that the noise level changes at the centre of adjacent gardens resulting from the movement of palletised goods along the access way, without any mitigation, correspond to 'minor' and 'substantial' impacts during the daytime and evening. During the night-time (Table 10), noise level changes are predicted to give rise to 'substantial' adverse noise level impacts. Accordingly, consideration has been given to necessary noise mitigation measures in Section 6 below.

5.4 ASSESSMENT OF NOISE FROM HGV CHILLER PLANT

5.4.1 Table 11 below presents the linear sound power level data for a sample of diesel power, HGV chillers, based on measurements undertaken of 21 such operational HGV chiller units. These measurements can be considered worst case in that they are not for modern chiller units, which are typically quieter.

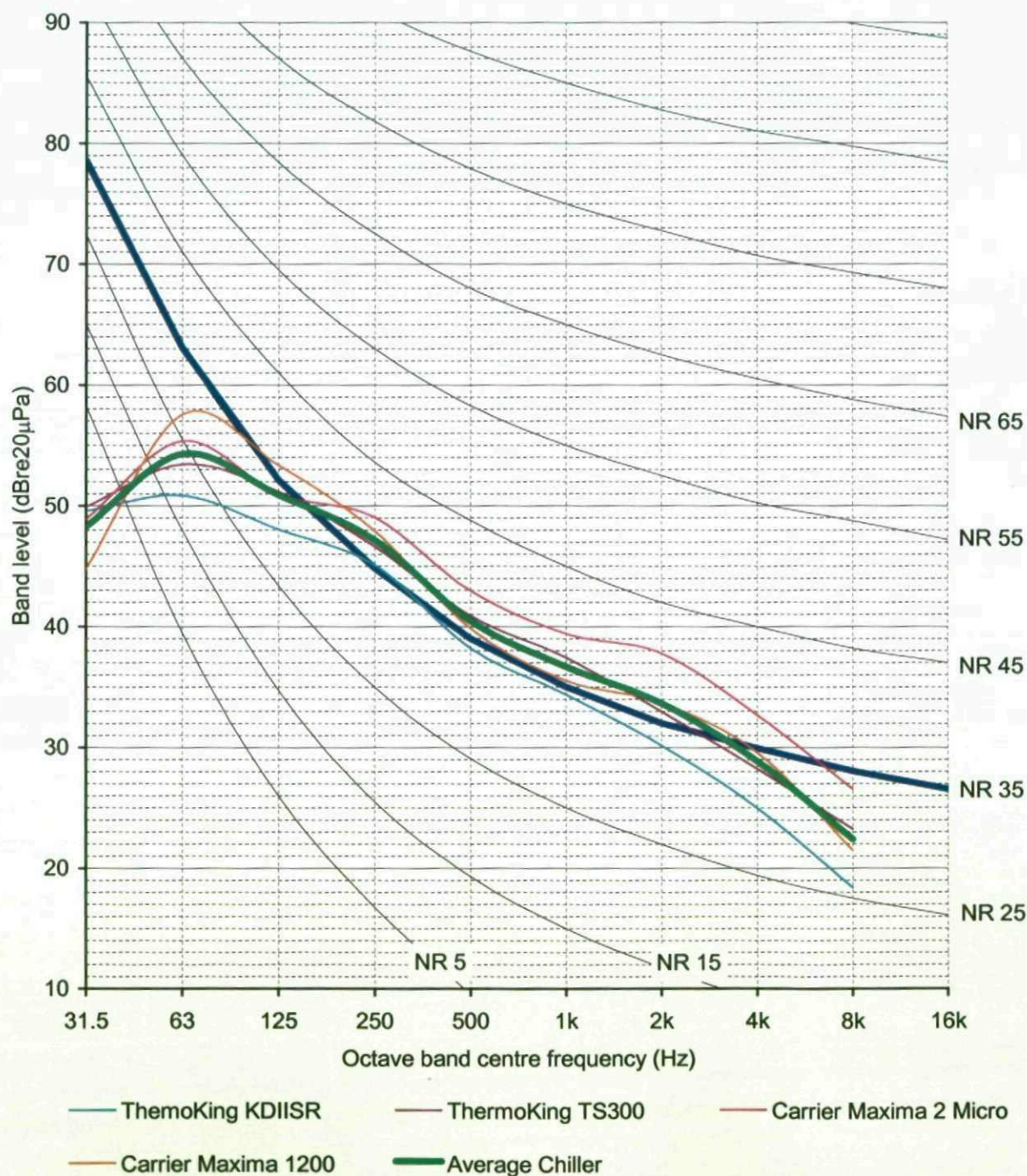
TABLE 11 SOUND POWER LEVEL DATA FOR SAMPLE DIESEL POWER CHILLERS, NO SCREENING, L_w dBA

Chiller Type	Octave Band Centre Frequency (Hz)								
	32	65	125	250	500	1k	2k	4k	8k
ThermoKing KDIISR	100	101	98	95	88	84	80	75	68
ThermoKing TS300	100	103	101	97	91	87	83	78	73
Carrier Maxima 2 Micro	99	105	101	99	93	89	88	83	76
Carrier Maxima 1200	95	107	103	98	90	85	84	80	71
Average	98	104	101	97	90	87	84	79	72

5.4.2 Typically, these chillers are positioned approximately 3.5 to 4m above ground, at the front of a HGV trailer used to deliver refrigerated food goods.

5.4.3 The above measurements correspond to the sound power levels derived from measurements undertaken in direct line of sight to the source. Figure 1 below presents the predicted linear sound pressure level spectra for these chillers at the distance of closest garden centre on Mottram Street. It is proposed that the HGV's would park facing away from these receptors such that some acoustic screening would be afforded by the HGV trailer itself. The completed predictions assume that a nominal 5dB noise reduction would be afforded by the screening associated with the trailer. This figure also presents the Noise Rating Curve 35 criterion adopted by Barnsley Metropolitan Borough Council for this assessment.

FIGURE 1 PREDICTED UNMITIGATED CHILLER NOISE LEVELS AT MOTTRAM STREET VERSUS NOISE RATING CURVE CRITERIA





5.4.4 It can be seen from Figure 1 above that the Noise Rating Curve 35 criterion is predicted to be exceeded at some frequencies, by between 1 and 6dB. Accordingly, consideration has been given to appropriate mitigation measures in Section 6 below.

6 Mitigation

6.1 MITIGATION FOR FUTURE PLANT

6.1.1 In section 5.1 above, a series of noise limits have been proposed based on the guidance contained within BS4142. It is anticipated that these limits could be complied with by selection of appropriate plant, location considerations, or mitigation at source.

6.1.2 Provided that the derived limits are complied with, no further mitigation measures are considered warranted.

6.1.3 If necessary, the proposed noise limits could be incorporated into a conditional planning discharge to ensure future compliance with.

6.2 MITIGATION FOR DELIVERIES, LOADING AND UNLOADING OPERATIONS

6.2.1 As impacts ranging in significance from 'no impact' to only 'minor adverse' are predicted to arise from this source during the daytime and evening period, no mitigation measures are considered warranted for these periods.

6.2.2 For the night-time period the following mitigation measures are available for consideration:

- Installation of a northern boundary bund, acoustic fence, or combination thereof, to obstruct the line of sight between the manoeuvre area and upper floor bedroom windows at the adjacent properties;
- Incorporation of an enclosed, or open fronted vehicle manoeuvre area, or cantilever structure with acoustically rated rear wall and roof, designed to ensure that the line of sight between the manoeuvre area and adjacent upper floor bedroom windows is fully obscured; or
- Control on the hours that operations undertaken within the vehicle manoeuvre area if either of the first two options can not be incorporated;

6.2.3 It is anticipated that if either of the first two measures are incorporated, this would provide sufficient acoustic screening to ensure that night-time noise impacts from operations within the vehicle manoeuvre area are limited to be 'minor adverse' at worst, and would therefore avoid any need to impose controls on the hours of operation within this area.

6.3 ASSESSMENT OF NOISE FROM THE TRANSFER OF GOODS ALONG THE REAR ACCESS WAY

6.3.1 During the daytime, impacts from this source are predicted to be minor adverse at worst. Accordingly, consideration to mitigation measures for this period is unwarranted.

6.3.2 For the evening and night-time periods, the following mitigation measures are available for consideration:

- Installation of a northern boundary bund, acoustic fence, or combination thereof, to obstruct the line of sight between the access way and upper floor bedroom windows at the adjacent properties;
- Incorporation of a fully enclosed access way, with acoustically rated rear wall and roof; or
- Control on the hours that operations undertaken within the rear access way if options 1 or 2 can not be incorporated;

6.3.3 It is anticipated that if either of the first two measures are incorporated, this would provide sufficient acoustic screening to ensure that night-time noise impacts from operations on the access way are limited to be 'minor adverse' at worst, and would therefore avoid any need to impose controls on the hours of operation within this area.

6.4 ASSESSMENT OF NOISE FROM HGV CHILLER PLANT

6.4.1 It has been identified that noise from possible future HGV chillers within the vehicle manoeuvre area could be between 1 and 6dB above the Barnsley Metropolitan Borough Council assessment criterion of achieving Noise Rating Curve 35.

6.4.2 To address this source, the following mitigation measures are available:

- Installation of a northern boundary bund, acoustic fence, or combination thereof, to obstruct the line of sight between the manoeuvre area and upper floor bedroom windows at the adjacent properties;

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- Incorporation of an enclosed or open fronted vehicle manoeuvre area, or cantilever structure with acoustically rated rear wall and roof, designed to ensure that the line of sight between the chillers and adjacent upper floor bedroom windows is fully obscured; or
 - Control on the hours that chillers can be operated within the vehicle manoeuvre area if options 1 or 2 can not be incorporated;

6.4.3 Again, it is anticipated that if either of the first two measures are incorporated, this would provide sufficient acoustic screening to ensure that the Barnsley Noise Rating Curve 35 criterion is achieved, and would therefore avoid any need to impose controls on the hours of operation within this area.

6.5 MITIGATION SUMMARY

6.5.1 In summary it is recommended that the proposed scheme drawings are updated to include acoustic screening between dwellings on Mottram Street, and the proposed vehicle manoeuvre area and rear access way. This screening should be sufficient to ensure that the line of sight between upper floor dwelling windows and the vehicle manoeuvre area and access way is fully obscured. Alternatively, the rear access way could be fully enclosed, and the manoeuvre area could also be either enclosed, open fronted, or screened with use of a cantilever barrier along the northern site boundary and extending over the manoeuvre area in part.

6.5.2 Provided that the above measures are incorporated into the scheme, there would be no need to limit the hours of operation within the manoeuvre area, or rear access way.

7 Conclusion

7.1 SUMMARY

7.1.1 WSP Acoustics has been appointed to undertake an environmental noise assessment and provide acoustic design advice for a proposed retail development off Harborough Hill Road in Barnsley. The site is known as the former Yorkshire Electricity Board (YEB) site.

7.1.2 On 17 October 2005 Barnsley Metropolitan Borough Council granted outline planning permission (ref B/05/1339/BA) for retail development subject to a number of conditions. Condition No 2 relates to the approval of reserved matters for siting, design, appearance and landscaping. Condition 12 requires that a noise assessment be undertaken in relation to the proposed development on Mottram Street, considering potential noise impact from the operational development, and that the results of this assessment be used in the design of suitable noise mitigation for incorporation into the scheme.

7.1.3 It is proposed that a supplementary letter report be prepared for submission to Barnsley Metropolitan Borough Council, along side this report, to allow discharge of Condition 12. The letter report will summarise the noise mitigation measures subsequently incorporated into the final scheme design, and will also include an assessment of significance on any residual noise impacts associated with the operation of the scheme on adjacent dwellings on Mottram Street.

7.1.4 The completed assessment has been based on national planning policy regarding potential noise impact, and the specific requirements of Barnsley Metropolitan Borough Council, as determined at the outset of the project through consultation with the authority's Environmental Protection Department.

7.1.5 In accordance with the requirements of Barnsley Metropolitan Borough Council, this assessment has been based on the results of a detailed environmental noise, undertaken over the course of typical weekday and Saturday morning periods. The survey was undertaken in the vicinity of dwellings on Mottram Street to establish the current baseline conditions at these properties.

7.1.6 The report presents the results of the baseline noise survey and subsequent assessments, and provides advice on noise mitigation options, such that appropriate measures can be incorporated, into the developing scheme design.

7.1.7 In summary it is recommended that the proposed scheme drawings are updated to include acoustic screening between dwellings on Mottram Street, and the proposed vehicle manoeuvre area and rear access way. This screening should be sufficient to ensure that the line of sight between upper floor dwelling windows and the vehicle manoeuvre area and access way is fully obscured. Alternatively, the rear access way could be fully enclosed, and the manoeuvre area either enclosed, open fronted, or screened with use of a cantilever barrier along the northern site boundary and extending over the manoeuvre area in part.

7.1.8 Provided that the above measures are incorporated into the scheme, there would be no need to limit the hours of operation within the manoeuvre area, or access way.

WSP ACOUSTICS

Appendix A Glossary Of Acoustic Terminology

NOISE

Noise is defined as unwanted sound. Human ears are able to respond to sound in the frequency range 20 Hz (deep bass) to 20,000 Hz (high treble) and over the audible range of 0 dB (the threshold of perception) to 140 dB (the threshold of pain). The ear does not respond equally to different frequencies of the same magnitude, but is more responsive to mid-frequencies than to lower or higher frequencies. To quantify noise in a manner that approximates the response of the human ear, a weighting mechanism is used. This reduces the importance of lower and higher frequencies, in a similar manner to the human ear.

Furthermore, the perception of noise may be determined by a number of other factors, which may not necessarily be acoustic. In general, the impact of noise depends upon its level, the margin by which it exceeds the background level, its character and its variation over a given period of time. In some cases, the time of day and other acoustic features such as tonality or impulsiveness may be important, as may the disposition of the affected individual. Any assessment of noise should give due consideration to all of these factors when assessing the significance of a noise source.

The most widely used weighting mechanism that best corresponds to the response of the human ear is the 'A'-weighting scale. This is widely used for environmental noise measurement, and the levels are denoted as dB(A) or L_{Aeq} , L_{A90} etc, according to the parameter being measured.

The decibel scale is logarithmic rather than linear, and hence a 3 dB increase in sound level represents a doubling of the sound energy present. Judgement of sound is subjective, but as a general guide a 10 dB(A) increase can be taken to represent a doubling of loudness, whilst an increase in the order of 3 dB(A) is generally regarded as the minimum difference needed to perceive a change under normal listening conditions.

An indication of the range of sound levels commonly found in the environment is given in the following table.

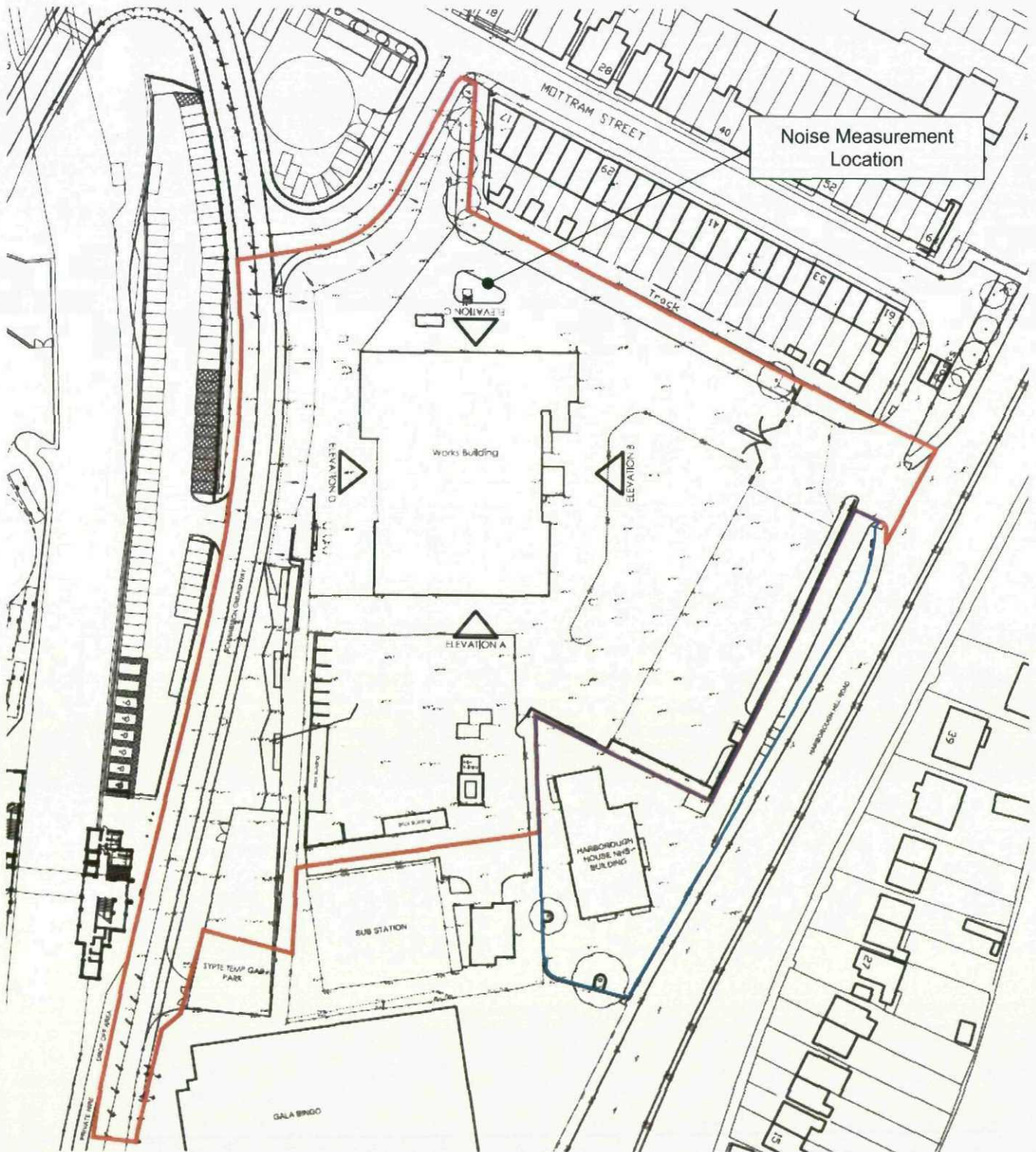
TYPICAL SOUND LEVELS FOUND IN THE ENVIRONMENT

Sound Level	Location
0 dB(A)	Threshold of hearing
20 to 30 dB(A)	Quiet bedroom at night
30 to 40 dB(A)	Living room during the day
40 to 50 dB(A)	Typical office
50 to 60 dB(A)	Inside a car
60 to 70 dB(A)	Typical high street
70 to 90 dB(A)	Inside factory
100 to 110 dB(A)	Burglar alarm at 1m away
110 to 130 dB(A)	Jet aircraft on take off
140 dB(A)	Threshold of pain

ACOUSTIC TERMINOLOGY

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 ($2 \times 10^{-5} \text{Pa}$).
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.
$L_{Aeq, T}$	L_{Aeq} is 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.
L_{Amax}	L_{Amax} is the maximum A - weighted sound pressure level recorded over the period stated. L_{Amax} is sometimes used in assessing environmental noise where occasional loud noises occur, 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_{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 L_n 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.
Free-field Level	A sound field determined at a point away from reflective surfaces other than the ground with no significant contributions due to sound from other reflective surfaces. Generally as measured outside and away from buildings.
Façade Level	A sound field determined at a point 1 metre away from a vertical reflective surface. The acoustic contribution from reflections is generally taken to increase measured noise levels by 3 dB.
Ambient Noise Level	The all encompassing noise level measured in $L_{Aeq, T}$. The Ambient Noise Level incorporates background sounds as well as the industrial source noise under consideration.
Residual Noise Level	The Ambient Noise Level in the absence of the industrial source noise under consideration, measured in $L_{Aeq, T}$.
Specific Noise Level	The noise level measured in $L_{Aeq, T}$ attributed to the industrial noise source under consideration alone.
Background Noise Level	The noise level in the absence of the industrial source noise under consideration, measured in L_{A90} .
Fast	A time weighting used in the root mean square section of a sound level meter with a 125 millisecond time constant.
Slow	A time weighting used in the root mean square section of a sound level meter with a 1000 millisecond time constant.

FIGURE B2 BASELINE NOISE SURVEY MEASUREMENT LOCATION - NOT TO SCALE



Appendix C Full Tabulated Measurement Results

TABLE C1 FULL TABULATED NOISE SURVEY RESULTS FOR MEASUREMENT LOCATION 1, FREE-FIELD, dB

Period Start	Duration	L _{Aeq,T}	L _{AFmax,T}	L _{A90,T}	L _{A10,T}
11/09/2008 11:59:59	01:00:00	62.4	85.8	52.8	62.2
11/09/2008 12:59:59	01:00:00	55.9	67.1	52.1	58.1
11/09/2008 13:59:59	01:00:00	56.1	72.2	52.2	58.2
11/09/2008 14:59:59	01:00:00	55.9	65.0	52.1	58.0
11/09/2008 15:59:59	01:00:00	56.4	70.8	52.7	58.4
11/09/2008 16:59:59	01:00:00	57.7	70.4	53.4	60.1
11/09/2008 17:59:59	01:00:00	57.4	71.4	51.7	59.6
11/09/2008 18:59:59	01:00:00	55.5	71.9	49.7	57.8
11/09/2008 19:59:59	01:00:00	54.4	72.1	47.4	56.6
11/09/2008 20:59:59	01:00:00	52.7	65.1	44.0	56.0
11/09/2008 21:59:59	01:00:00	52.0	67.9	41.5	54.8
11/09/2008 22:59:59	01:00:00	49.6	63.5	37.4	53.6
11/09/2008 23:59:59	01:00:00	46.8	67.1	35.4	50.3
12/09/2008 00:59:59	01:00:00	42.1	60.3	34.9	44.5
12/09/2008 01:59:59	01:00:00	42.4	58.8	35.2	45.4
12/09/2008 02:59:59	01:00:00	44.5	59.6	35.8	49.2
12/09/2008 03:59:59	01:00:00	46.0	63.2	37.3	49.7
12/09/2008 04:59:59	01:00:00	50.1	64.1	40.3	53.8
12/09/2008 05:59:59	01:00:00	55.1	68.3	46.7	58.3
12/09/2008 06:59:59	01:00:00	55.7	65.1	50.4	58.4
12/09/2008 07:59:59	01:00:00	56.5	71.7	51.4	58.7
12/09/2008 08:59:59	01:00:00	55.5	66.7	50.6	58.2
12/09/2008 09:59:59	01:00:00	55.5	67.5	50.7	58.3
12/09/2008 10:59:59	01:00:00	55.4	67.7	50.5	57.9
12/09/2008 11:59:59	01:00:00	55.5	67.2	50.8	58.3
12/09/2008 12:59:59	01:00:00	55.8	71.5	51.0	58.3
12/09/2008 13:59:59	01:00:00	55.8	65.8	51.2	58.4
12/09/2008 14:59:59	01:00:00	56.3	73.2	51.6	58.2
12/09/2008 15:59:59	01:00:00	57.2	70.3	52.5	59.4
12/09/2008 16:59:59	01:00:00	55.9	64.7	51.4	58.5
12/09/2008 17:59:59	01:00:00	56.3	69.1	50.8	59.0
12/09/2008 18:59:59	01:00:00	56.2	73.8	49.6	58.3
12/09/2008 19:59:59	01:00:00	55.0	73.6	48.4	57.4
12/09/2008 20:59:59	01:00:00	52.5	65.0	45.8	55.6
12/09/2008 21:59:59	01:00:00	52.6	66.9	45.2	55.4
12/09/2008 22:59:59	01:00:00	52.0	69.9	43.9	54.9
12/09/2008 23:59:59	01:00:00	50.3	69.6	41.7	52.9
13/09/2008 00:59:59	01:00:00	48.9	65.6	40.7	52.2
13/09/2008 01:59:59	01:00:00	46.8	60.7	38.9	50.9
13/09/2008 02:59:59	01:00:00	46.4	60.3	38.2	50.3
13/09/2008 03:59:59	01:00:00	47.2	63.7	37.6	51.0
13/09/2008 04:59:59	01:00:00	49.9	64.1	38.8	53.9
13/09/2008 05:59:59	01:00:00	51.9	64.4	42.0	55.7
13/09/2008 06:59:59	01:00:00	54.0	68.0	46.1	57.3
13/09/2008 07:59:59	01:00:00	55.7	76.2	49.1	57.6
13/09/2008 08:59:59	01:00:00	54.8	68.9	49.7	57.6
13/09/2008 09:59:59	01:00:00	58.0	75.9	54.1	59.6
13/09/2008 10:59:59	01:00:00	56.8	66.6	53.3	59.0
13/09/2008 11:59:59	01:00:00	56.1	65.4	52.1	58.3
13/09/2008 12:59:59	01:00:00	59.7	78.6	52.4	61.5



Appendix D Limitations

NOTES ON LIMITATIONS

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