SHARPS REDMORE PARTNERSHIP

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ACOUSTIC CONSULTANTS

PROPOSED CONCRETE BATCHING PLANT AT CRANFORD WAY, FERME PARK, HORNSEY

APP/Y5420/A/05/1189822

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PROOF OF EVIDENCE - London Concrete Limited

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1.0 Introduction

1.1 The Sharps Redmore partnership was instructed by London Concrete Limited to undertake an assessment of a proposed concrete batching plant at Ferme Park, Hornsey, in February 2003.

1.2 Our report containing the findings and recommendations of my noise assessment in relation to the proposal at that time (referred to as "Scheme A") is dated 22nd April 2003.

1.3 Following the issue of that report extensive discussions were held with officers of the Council and third parties. As a result of these discussions the scheme was revised so as to minimise noise emission levels in general and specifically to the residents that would be most affected by noise from the proposal, these being the residents of Chettle Court. In my judgement, the noise emissions from the site would be lower at Uplands Road properties than at Chettle Court. However, my general findings in relation to Chettle Court are also applicable at Uplands Road.

1.4 The scheme was subsequently revised and it is this revised proposal that is before the inquiry (referred to as Scheme B).

1.5 My assessment report showing the impact of this appeal scheme is dated 21st June 2005. My April 2003 report was appended to this June 2005 report. Accordingly, I have attached my June 2005 report with the appendices which include my April 2003 report, as appendix A to my proof of evidence. For clarity, I have paginated this appendix A1, A2 ... etc, in red.

1.6 At this juncture I will explain the main difference between Scheme A and B in terms of their acoustic impact. I do so, not because the former of these two proposals is for consideration at this inquiry but to illustrate the further noise mitigation measures that have been incorporated into the appeal scheme.

1.7 As I explained in my April 2003 report, the two main sources of noise associated with a concrete batching plant are from *lorry movements* around the site and from the *loading of vehicles* with the individual materials that constitute concrete (see appendix A20 to A21).

1.8 In my judgement, other noise sources on site such as conveyors and mechanical equipment would be inaudible at the most affected residential premises, Chettle Court, some 132 metres distance.

1.9 A concrete batching plant does not involve inherently noisy activity. Vehicles move around the site slowly and with engines under low load.

1.10 The noisiest activity is that of the loading of vehicles. This activity entails the concrete mixer vehicle reversing under a supply chute. Whilst reversing, the vehicle's reversing alarm is activated for a short duration. When under the supply chute the vehicle is be filled with the components necessary to make concrete, these being: mineral aggregate (sand and gravel), a cement binder and water. During this fill operation the vehicle's engine must run above idle speed in order to provide the necessary power to rotate the mixer barrel so as to mix the materials.

1.11 The site layouts for the original scheme (Scheme A) and for the appeal scheme (Scheme B) are shown on the plans 2416/01 Rev. E and 2416/10 Rev. D respectively.

1.12 The main difference in layout between Scheme A and Scheme B, is that the batching plant has been turned through 90° so that the bay that contains the supply chute faces towards the rail lines and away from Chettle Court. This measure has allowed a substantial acoustic screen to be provided between the main noise source and Chettle Court. This screen is shown on drawing 2416/10 Rev. D and 2416/20 Rev. C. Alongside this measure, the appeal proposal allows more efficient vehicle manoeuvring by a reduction in the length of a rail spur.

1.13 The local planning authority deemed that had an appeal not been lodged then it would have refused the application for three reasons.

1.14 The first of these reasons relates to the impact of traffic. Policy RIM 3.2 of the Council's 1998 adopted UDP is mentioned in this reason for the refusal. This states:

> "when considering applications for new developments and change of use, the Council will seek to protect or enhance the amenities of the area. In particular planning permission: will not normally be granted to developments which cause noise... vibration... above acceptable levels."

1.15 The second reason for refusal also relates to traffic asserting that noise from vehicle movements would be detrimental to the working conditions of properties in Cranford Way "which are predominantly of a storage/light industrial character, rather than general industrial". This second reason for refusal also quotes policy RIM 3.2 set out at paragraph 1.14 above.

1.16 The third reason for refusal states that:

> "The applicants have not adequately demonstrated that the proposal will not be harmful to the amenity of nearby residents by means of noise *nuisance*. In particular, the Council is not satisfied that the rejection of BS 4142 is justified, and that the applicants have used the correct methodology for assessing the noise impacts of the scheme. As such, the proposal would be contrary to RIM 3.2 'Pollution and nuisance from new Development' of the Adopted Haringey Unitary Development Plan 1998, and Policy UD2 of the Revised Unitary Development Plan 2004" (emphasis added).

1.17 Policy UD2 of the Revised UDP, 2004 (the "revised deposit consultation draft" of September 2004) states:

> "The Council will require development proposals to demonstrate that: a) there is no significant adverse impact on residential amenity or other surrounding uses in terms of... noise."

1.18 Before discussing the structure of my proof of evidence and considering the impact of the appeal scheme it is worth mentioning two items. Firstly, I have contacted the Council's Environmental Health Officer on six occasions; on each of these I asked him if he required any further information or assessments. I have also made the same offer to the case planning officer. Secondly, deemed reason for refusal 3 asserts that "nuisance" will be caused and suggests that BS 4142 should be employed as an assessment mechanism. However, the foreword of BS 4142 states that quantitative assessment of annoyance "is beyond the scope of this standard, *as is the assessment of nuisance*" (emphasis added).

1.19 On a similar subject, I am afraid that the officer's report to committee on the appeal application contains a fundamental error in relation to noise and a BS 4142 analysis.

1.20 The committee report explains that the Council have commissioned independent consultants (RPS) to conduct "peer reviews" into various subjects including noise. Under the heading "Council's assessment" [having considered the peer review on noise] the report states the following in relation to noise levels at Chettle Court:

> "The average of the readings taken in this survey gives a figure of 42 dB as the existing average background noise level. This compares unfavourably [on a BS 4142 analysis] with the predicted overall site noise emission level at Chettle Court of $L_{Aeq12hr}$ = **52** dB" (emphasis added).

1.21 The 52 dB figure is applicable to the first scheme and not the improved appeal scheme that was the subject of the committee report (and this inquiry).

1.22 My report of June 2005 relating to the appeal scheme makes it clear that:

> "3.12 The noise emission level of the revised scheme of <u>41 dB</u> is 11 dB lower than that of the original scheme ($L_{Aeq12hr}$ = 52 dB - see paragraph 2.3 vi above)" (emphasis added).

and under conclusions:

> "The prevailing noise level at Chettle Court (the critical property in noise assessment terms), from site activity, is estimated to be a maximum of $L_{Aeq12hr}$ = 41 dB" (emphasis added).

1.23 Using the correct level of 41 dB it can be seen that the noise emission level of site activity is lower than the typical background noise level of 42 dB. Accordingly, the scheme compares favourably with the provisions of BS 4142.

1.24 Moreover, the appeal scheme complies with the requirements of the Council's Environmental Health Officer; his consultation response in the committee report is stated to be:

> "Noise - this service have no objections on noise nuisance grounds subject to imposition of a condition requiring that the development does not cause any increase in the pre-existing background noise level."

1.25 The appellant is willing to agree such a condition. In short, that should be the end of the matter in relation to noise from the development.

1.26 In summary, in relation to noise from site activity, the planning officer has reported that a level of 52 dB would be generated at Chettle Court. This figure relates to the first scheme. The correct figure for the improved appeal scheme is 41 dB. In making this error, the officer has incorrectly concluded that an analysis by BS 4142 would be unfavourable. I do not believe that BS 4142 should be used in this case, for the reasons discussed in Section 2.0 below. Certainly BS 4142 should not be used in the assessment of *nuisance* asserted in the third reason for refusal. However, if a BS 4142 assessment were undertaken then it would not show that complaints would be likely from site activity.

1.27 This state of affairs could easily have been avoided if the officers had accepted one of my numerous invitations to discuss the scheme or to provide additional information.

1.28 My proof of evidence has been structured as follows:

Section 2.0. In this section I have discussed the available advice in relation to noise and its effect. From this advice I have proposed criteria that I believe are applicable when seeking to assess the noise impact from the appeal proposal.

Section 3.0. In this section I have summarised the findings of noise surveys, undertaken in 2005.

Section 4.0. Details of my noise assessments are set out in this section of my proof of evidence.

Section 5.0. My assessment conclusions are set out in this section.

1.29 I have provided a glossary of terms at the end of the body of my proof of evidence.

2.0 Assessment methodology and criteria

2.1 I considered the subject of assessment methodology and criteria in my report (appendix A15 to A17). I have produced key items from this section, below:

2.2 *The impact of noise from a new source may be assessed by several generic methods that may be summarised as follows:*

i. the effect may be determined by comparing the noise level of the source with recommended, absolute, noise limits contained within guidance documents;

ii. the effect may be gauged by considering the change in noise level, that would result from the proposal, against advice in guidance documents;

iii. the impact may be determined by considering the noise level that would result from the proposal relative to pre-existing background noise level of the area (a BS 4142 approach).

Each of these methods of assessment has advantages and disadvantages in relation to the assessment of a particular noise source in a particular area.

The use of fixed limits (method i, above) is appropriate for the assessment of sources that are contained within a finite boundary, particularly where noise sensitive receptors are few or are grouped together. This assessment method has been employed in this assessment for the analysis of noise from activity on the appeal site.

The assessment of impact against changes in noise level (method ii, above) is well suited to the analysis of road traffic since such analysis is normally determined entirely by calculation (using the "with scheme" and "without scheme", traffic flows). This is the method usually employed for the assessment of traffic noise but this is not applicable in this case. [Note: Since making these comments, road traffic has become an issue and so I have addressed this subject in section 6.0, below].

The use of BS 4142 type assessment (method iii, above) is only appropriate to the analysis of noise that is industrial in nature. Moreover, BS 4142 is better suited to the assessment of steady noise. The use of BS 4142 is not applicable here.

2.3 There are several guidance documents that contain recommended fixed limits. Of these the World Health Organisation *Guidelines for Community Noise* is the most comprehensive. My report states (my appendix A17):

2.4 *The WHO advice is the most useful, comprehensive, and pertinent advice in this case, because it is not specific to the circumstances of the assessment. Instead, it provides guidance on acceptable noise values in for example schools, dwellings and offices.*

The WHO guideline values are appropriate to what are termed "critical health effects". This means that they are at the lowest noise level that would result in any psychological, physiological or sociological effect. A report written by the National Physical Laboratory and commissioned by the DETR summarises the status of the WHO values thus "In essence, the WHO guidelines represent a consensus view of international expert opinion on the lowest threshold noise levels below which the occurrence rates of particular effects [in this case "annoyance"] *can be assumed to be negligible" (NPL report CMAM 16).*

The WHO criteria for daytime (moderate or serious annoyance) are $L_{Aeq,16hr}$ *= 50 to 55 dB.*

2.5 The WHO criteria for daytime are set in terms of "annoyance". This may be described as the subjective reaction to a history of repeated disturbance.

2.6 The noise levels within the WHO *Guidelines* are "guideline values" for "community noise" this being defined in the *Guidelines* as "Noise emitted from all sources except noise at the industrial workplace. Main sources of community noise include road, rail and air traffic, industries, construction and public works, and the neighbourhood".

2.7 The *Guidelines* advise that "for outdoor playgrounds the sound level of the noise from external sources should not exceed 55 dB L_{Aeq}, the same value given for residential areas in daytime".

2.8 The guideline values are applicable over a 16 hour time-base (usually taken to be the PPG 24 day period of 0700 to 2300 hours). In this case, the operating time is intended to be 0700 to 1900 hours and so I have employed the index $L_{Aeq12hr}$ for assessment purposes.

2.9 I must stress that the guideline values for annoyance of 50-55 dB are levels below which effects can be assumed to be negligible not levels above which significant annoyance may necessarily result. As such the guideline values are very stringent. They are much more stringent, for example, than the Policy UD2 requirement of "no significant adverse impact on residential amenity" (see paragraph 1.17 above).

2.10 A noise limit of $L_{Aeq16hr}$ = 55 dB is also employed by PPG 24 *Planning and Noise* in relation to proposed residential development near to transportation noise or mixed transportation/industrial noise. In areas where the noise level is less than 55 dB, PPG 24 advises that "noise need not be considered as a determining factor in granting planning permission [for residential property]" (ref PPG 24 Annex 1 paragraph 1).

2.11 A noise limit of L_{Aeq1hr} = 55 dB is also recommended in MPG 11 *The Control of Noise at Surface Mineral Workings*, 1993. In relation to this limit MPG 11 states:

> "The Government takes the view that during the working week, except in the circumstances outlined below [evenings and rural areas], the daytime nominal limit at noise-sensitive properties used as dwellings should normally be 55 dB L_{Aeq1h} (free field) where 1 h means any of the one hour periods during the defined working day". (MPG 11 paragraph 34).

2.12 The MPG 11 night-time nominal limit is L_{Aeq1hr} = 42 dB.

2.13 In summary, a noise emission level from site activity of less than $L_{Aeq12hr}$ = 50 to 55 dB would not be such as to disturb local residents. Indeed, insofar as the guideline values are highly precautionary and are set at levels that would protect even those that are particularly sensitive to noise, they are very robust assessment criteria. I have employed these criteria as such, here.

2.14 I have carefully considered the use of BS 4142 in this case. On balance, I do not believe that it is correct to undertake a BS 4142 analysis because in my judgement it is more appropriate to employ the provisions of the WHO *Guidelines*. This is because BS 4142 is appropriate to the assessment of the likelihood of complaint from noise that is "industrial in nature". The examples within BS 4142 relate to noise from factories and fixed plant and equipment within factory premises. When analysing such noise sources, the provisions of BS 4142 work well. With the appeal proposal, the noise sources are principally vehicle movements around the site and of the varying noise of the vehicle engine and exhaust. In my view, BS 4142 is not intended for the assessment of such noise sources, because they are not "industrial in nature" and are not steady in level but are constantly changing.

2.15 Although I do not believe that a BS 4142 analysis is appropriate in this case, I have undertaken one (see section 4.0 below) in response to the local planning authority's assertion that such an analysis would be unfavourable (paragraph 1.20 above) and in order to provide a comparison with the analysis undertaken using the WHO *Guidelines*.

3.0 Survey results

Chettle Court

3.1 Of the surveys undertaken in 2003 and 2005, the survey undertaken in June 2005, within the grounds of Chettle Court (see appendix B for location), provides a more recent and comprehensive indication of the noise climate. Accordingly, I have relied solely on the results of this survey in my analysis below.

3.2 However, it is possible, in my judgement, that the prevailing background noise levels at Chettle Court could revert to higher levels recorded in 2003, should the vacant units on the nearby commercial/industrial estate become occupied.

3.3 The results of my 14th/15th June 2005 survey are displayed in my report, reproduced at appendix A43 and A44 of my proof of evidence. These may be summarised as follows:

i. The background noise level (L_{A90}) varied from 40.0 to 43.5 dB with an arithmetic average of 41.9 rounded to 42 dB.

ii. The ambient noise level (L_{AeqT}) varied from 50.5 to 54.0 dB with a logarithmic average of 52.1 rounded to 52 dB.

3.4 I consider that the average background noise level of L_{A90} = 42 dB can be taken to be a "typical" level for BS 4142 assessment purposes (see section 4.0 below). I note that RPS's surveyed levels showed good agreement with my own (appendix D4).

3.5 As discussed, in my June 2005 report (appendix A44), the background noise level (L_{A90}) at Chettle Court is dictated by road traffic. It appears that this level varies with wind direction - Chettle Court is a large building and provides screening of noise when the wind is from the south - the wind direction during the survey (note: the main roads within a kilometre of Chettle Court are situated to the north of the appeal site). Ambient noise levels (L_{AeqT}) are dictated by nearby train activity and more local traffic with some noise from the adjacent commercial/industrial estate.

Wightman Road

3.6 I have also undertaken a noise survey at the rear of properties in Wightman Road – (see appendix B for location) to the east of the railway.

3.7 These properties are a long way (some 170 metres) from the site of the proposed batching plant (Chettle Court is 132 metres), are part screened from the site, and are directly adjacent to a very busy complex of rail lines and shunting spurs. As such, in my opinion, the effect of noise at these premises would be minimal.

3.8 Nevertheless, I undertook a survey to determine the prevailing noise climate. I recorded levels along the New River Path at a point shown on the plan at appendix B. This was the closest location that I could find opposite the appeal site - the properties in Wightman Road directly opposite the site are a continuous terrace.

3.9 The following levels were recorded on Monday 10th October 2005:

Time (hrs)	Sound Level dB		
	L_{A90}	L_{AeqT}	L_{AMAX}
1130-1200	49.0	56.5	82.1
1200-1230	48.5	58.0	79.6
1230-1300	49.5	59.0	77.8
1300-1330	48.5	58.0	81.0
Average =	**48.9 dB**		

3.10 These levels were dictated by road traffic (Wightman Road), aircraft, train activity, commercial activity.

3.11 The above levels were measured using a precision sound level meter (Bruel and Kjaer 2231) that was calibrated before and after the survey. The weather during the survey was good for noise measurements being dry, warm (14°C) with a light breeze (<3m/sec) from the south.

4.0 Assessment details

Chettle Court

4.1 An assessment of noise emission levels from Scheme A was provided in my original April 2003 report (appendix A20 to A22). This data largely applies to the appeal scheme (Scheme B) and so for ease of reference I have reproduced key elements of this section below:

> *The main sources of noise on a concrete batching plant site are: a) vehicle movements, and b) the concrete fill operation. Of these, the fill operation is the noisier due to the requirement for the vehicle engine to operate at fast idle, in order to power the rotating mixing barrel on the vehicle during the pour.*
>
> *A series of measurements were made at a similar London Concrete facility at Wembley. These measurements were undertaken on the 23rd April 2003 using a Bruel and Kjaer type 2260 precision sound level meter. This meter enabled the collection of noise data in octave bands for a subsequent ISO 9613 prediction of environmental noise levels.*

4.2 An assessment of noise emission levels from the appeal scheme (Scheme B) was provided in my June 2005 report (see appendix A5 and A6). For ease of reference I have reproduced this section below:

> *The principal revisions to the scheme are as follows:*
>
> *i. a reorientation of the batching plant so that it faces away from Chettle Court and Uplands Road properties, and across the rail tracks;*
> *ii. the provisions of an acoustic barrier to screen the mixer lorry during the fill operation;*
> *iii removal of a section of rail sidings to allow more efficient manoeuvring of the mixer lorry; and*
> *iv. further enclosure of the conveyors, particularly at the aggregate bins.*

Of these, the most important in terms of noise reduction is the re-orientation of the batching plant through 90° and the screening, from Chettle Court, of the mixer lorry during the fill operation (the noisiest activity).

The site layout plant for the previous scheme and for the revised scheme that is the subject of this assessment report are shown at appendix B and C respectively.

A detailed section through the mixer lorry and acoustic screen is shown at appendix D.

During the fill operation the engine of the mixer lorry must run at a speed above idle in order to generate the power necessary to rotate the mixer barrel as it receives materials. It is the noise of the vehicle engine operating at speed that is the main source of noise during the fill operation. The main noise source is casing radiation from the engine itself (diesel "knock") with effective silencers making noise from the exhaust a secondary source.

Appendix E1 and E2 show the calculation sheets for screening effect from the engine = 18.2 dBA (height = 1 metre) and exhaust = 11.5 dBA (height = 3.2 metres).

In our judgement, a reasonable screening attenuation to ascribe to the joint noise sources is 13 dB. This screening loss is understated in order to provide for a safety margin in the calculations.

A further reduction is applicable for source directivity. The previous scheme showed the batching plant directly facing Chettle Court. In such a case the directivity effect is 0 dB. The revised scheme shows the plant facing 90° to Chettle Court. The directivity loss in such a case would be a minimum of 5 dB. However, because it is difficult to be precise about this loss, it has been ignored in this assessment. This does mean that the resultant noise levels, shown below, will be overstated.

This, it is concluded that the noise of the fill operation would be reduced by 13 dB relative to the previous scheme, that is $L_{Aeq12hr}$ *= 52.1 - 13 = 39.1 dB (see paragraphs 2.3v and 3.7 above).*

The combined noise level of the fill operation and of vehicle movements would be $L_{Aeq12hr}$ *= 39.1 + 37.5 = 41.4 rounded to 41 dB.*

This noise emission level, applicable at Chettle Court, may be considered to be maximum.

The noise emission level of the revised scheme of 41 dB is 11 dB lower than that of the original scheme ($L_{Aeq12hr}$ *= 52 dB - see paragraph 2.3vi above).*

A 10 dB difference is around a halving of loudness (ref. PPG 24 Glossary).

In preparation of this assessment report, the opportunity was taken to survey noise levels within the grounds of Chettle Court. Previously we were unable to gain access to this property and so had to rely on measurements of background and ambient noise levels outside the grounds of the property.

The findings of two surveys are set out in detail at appendix F of this addendum report. However, in summary, it was found that noise levels between the original survey conducted in April 2003 and recent surveys conducted in June 2005 have reduced markedly. This may be in part due to the wind direction. However, it is also possible that this reduction is due to the significant reduction in activity on that part of the commercial estate nearest to Chettle Court. In particular, the substantial TNT operations have moved off the commercial estate in the interim period between the surveys.

4.3 Summarising the findings of my assessments in relation to the original scheme (Scheme A) and the appeal scheme (Scheme B), the noise emission levels from the proposal would be 52 dB from Scheme A and 41 dB from Scheme B. These levels are "free-field" levels applicable in the grounds of Chettle Court. These levels are applicable in downwind conditions.

4.4 In relation to Chettle Court, noise levels generated by activity associated with the appeal scheme would be 11 dB quieter than the original scheme. This is around a halving of loudness.

4.5 The noise emission levels that would result from the appeal scheme, of 41 dB, is well within the WHO guideline values of 50-55 dB, below which effects in terms of annoyance can be assumed to be negligible (see section 2.0 above).

Wightman Road

4.6 I have undertaken the same set of calculations, in relation to the appeal scheme, for Wightman Road. These show the following resultant levels:

Lorry fill = 46.8 dB
Lorry movement = 32.2 dB

(see appendix C for calculation sheets)

4.7 The overall noise emission level at Wightman Road properties from the combination of the two sources would be 46.8 rounded to 47 dB. This calculation does <u>not</u> allow for any screening provided by the railway embankment.

4.8 A level of 47 dB is well within the WHO guideline values of 50-55 dB below which annoyance can be assumed to be negligible.

Change in noise level

4.9 At both Chettle Court and Wightman Road, the noise from the activity (L_{AeqT}) would be 10 dB below the existing ambient noise level (L_{AeqT}). Accordingly, there would not be any material increase in noise level (L_{AeqT}) as a result of the appeal proposal.

BS 4142 assessment

4.10 As discussed above, I do not believe that a BS 4142 assessment is appropriate; however I have undertaken one below.

4.11 Such an assessment provides an indication of the "likelihood of complaints" by a comparison of the "rating [noise] level" of the noise being assessed with the "typical", "background noise level" of the area.

4.12 The rating level of noise is the L_{Aeq1hr} level of the source noise with a +5 dB correction (penalty) if the noise is of a certain character and level sufficient to attract attention.

4.13 The background noise level is the L_{A90} value. BS 4142 requires that the "typical" level be determined. This has been determined by survey to be 42 dB at Chettle Court (paragraph 3.4 above) and 48.9 rounded to 49 dB at Wightman Road (table, paragraph 3.9 above).

4.14 The difference between the rating level of the source and the background noise level values is indicative of the likelihood of complaint as follows:

- a difference of around +10 dB is - complaints are likely;
- a difference of around +5 dB - of marginal significance; and
- a difference of -10 dB - positive indication that complaints are unlikely

(note the negative sign denotes that the rating level is lower than the background noise level).

4.15 BS 4142 requires that a +5 dB correction should be applied if the character of the noise source is such as to attract attention. This is a judgement based on sound level and character of the noise relative to other sources in the area. I do not believe that a +5 dB correction is applicable in this case. However, if this correction were applied, then the level differences would become:

Chettle Court

rating level	= 41 + 5 = 46 dB
background noise level (2005)	= 42 dB
difference	= +4 dB
complaints	= of marginal significance (i.e. around +5 dB)

Wightman Road

rating level	= 47 + 5 = 52 dB
background noise level (2005)	= 49 dB
difference	= +3 dB
complaints	= of marginal significance (i.e. around +5 dB)

4.16 On a BS 4142 assessment, I conclude that the noise emission levels from the appeal scheme would not be of a magnitude such that complaints would be likely.

4.17 This BS 4142 assessment is robust because: a) the site noise emission levels displayed are maxima being in downwind conditions; b) the background noise levels are understated because part of the industrial estate is vacant.

5.0 Analysis of RPS noise report

5.1 I was provided with a copy of the RPS noise report on the 27th October 2005 (this is attached as appendix D). The report is dated "November 05". I understand that a draft of this report was provided to the local planning authority and it was this draft that assisted the planning officer in the preparation of a committee report (paragraph 1.20 above). The appellant has requested a copy of this draft report but the local planning authority has declined to provide one.

5.2 I have the following comments to make on the RPS report.

5.3 The report states that monitoring was undertaken at Chettle Court on the 22nd September 2005 and that "the results showed good agreement with the monitoring carried out by SRP in June 2005 ..." (my appendix D4)

5.4 On this basis RPS has employed a background noise level at Chettle Court of L_{A90} = 42 dB for BS 4142 assessment purposes. This is the same level that I have employed (see paragraph 4.13 above).

5.5 RPS state that "the appropriate standard that should be used to assess the proposal is the British Standard 4142:1990 (sic) which is dismissed by SRP as only being appropriate to the analysis of noise that is industrial in nature and is better suited to the assessment of steady noise" (my appendix D5).

5.6 In fact, BS 4142:1990 has been superceded by BS 4142:1997. For the reasons set out above, I do not believe that it is appropriate to employ BS 4142:1997 in this case.

5.7 RPS employed the SRP baseline noise levels (recorded at London Concrete, Wembley) in its calculation of noise levels at Chettle Court.

5.8 However, when undertaking this calculation, RPS have increased my calculated levels for the lorry fill operation by 3 dB. The reason given by RPS for this is that "the predicted level for lorry fill of 52.1 includes a correction of -3 dB for ground effects .... and therefore this should have been excluded due to the presence of a barrier that negates ground **attenuation** ..." (emphasis added).

5.9 In fact, it is clear from my calculation sheets (appendix A30 and A31) that the 3 dB factor discussed is a negative attenuation, that is, it has been added to the source sound level. This is because the ISO 9613 calculation views the ground around the sound source as hard and so reflective.

5.10 Accordingly, RPS are wrong to reduce my barrier attenuation in the way that they have in calculating a level at Chettle Court of 43.4 dB (my appendix D6). The correct level at Chettle Court is as per my report, this being 41 dB (see paragraph 4.2 above).

5.11 At paragraph 3.11 (my appendix D6), RPS undertake a calculation based on 5 lorries being filled in an hour rather than the prevailing activity level that I assumed of 25 lorry fills in a 12 hour day (2.1 lorry fills per hour).

5.12 In my opinion, it is appropriate to employ a figure that reflects the prevailing degree of activity within an hour rather than a maximum. This is made clear in both BS 4142 and in the Standard referred to by BS 4142 that details the methodology of noise measurement (BS 7445).

5.13 This said, my assessment of noise levels at Chettle Court is very conservative. My report states, for example, that:

> "In our judgement, a reasonable screening attenuation to ascribe to the joint noise source is 13 dB. This screening loss is understated in order to provide for a safety margin in the calculations" (my appendix A5)
>
> and
>
> "The revised [appeal] scheme shows the plant facing 90° to Chettle Court. The directivity loss in such a case should be a minimum of 5 dB. However, because it is difficult to be precise about this loss, it has been ignored in this assessment. This does mean that the resultant noise levels, shown below, will be overstated" (my appendix A6).

5.14 Accordingly, my report states that "This noise emission level [41 dB], applicable at Chettle Court, may be considered to be a maximum" (my appendix A6).

5.15 I remain of this view to the extent that I have advised the appellant that my predicted level at Chettle Court of 41 dB would be acceptable as a condition.

5.16 This would comply with the requirement of the EHO discussed at paragraph 1.24 above.

6.0 Traffic noise and vibration

6.1 I have been supplied with traffic flow data by Mr. Bellamy of Bellamy Roberts, traffic consultants.

6.2 This data is summarised in the following table:

Road link	Existing -with scheme total (HGV)	Future - with scheme (HGV)
Cranford Way	939 (122)	1021 (184)
Tottenham Lane (west of Cranford Way)	7128 (394)	7169 (425)
Tottenham Lane (west of Church Lane)	11760 (546)	11776 (558)
Tottenham Lane (east of Cranford Way)	7001 (378)	7042 (409)
Church Lane	5520 (194)	5545 (213)

6.3 The traffic data upon which these figures rely is attached as appendix E of my proof of evidence.

6.4 Traffic noise is conventionally determined by the use of the Department of Transport document *Calculation of Road Traffic Noise*, CRTN.

6.5 This document allows the noise level of traffic to be accurately predicted by factoring for: traffic flow, speed, percentage heavy vehicles, gradient, road surface, distance, screening and reflections.

6.6 At any given location most of these factors will remain constant between the existing without scheme situation and the future with scheme situation that would occur should this appeal be allowed.

6.7 The CRTN calculation spreadsheets shown at appendix F have assumed default figures for the non-variable factors: speed = 48 kph; gradient = 0°; road surface - impervious; distance = 10 metres; screening and reflections = none. CRTN requires that the percentage heavy lorries be determined above 1525 kg. In this case I have shown the percentage of heavy vehicles above 7500 kg. This will have the effect of reducing the existing number of vehicles in this category and consequently will show a higher increase due to appeal traffic. This will introduce a safety margin into the calculation process.

6.8 These figures will inevitably be wrong at any particular property. However, although this means that the overall noise level shown will also be wrong, this will not affect the key information required in this case, this being the change in noise level that would result from the introduction of appeal traffic (and the consequent impact of the scheme).

6.9 The calculation results are summarised as follows:

Road link (without/with scheme)	Appendix ref	Sound level (dB)	Difference (dB) (without v with scheme)
Cranford Way - without scheme	F1	59.8	1.5
Cranford Way - with scheme	F2	61.3	
Tottenham Lane (west of Cranford Way) - without scheme	F3	67.8	0.1
Tottenham Lane (west of Cranford Way) - with scheme	F4	67.9	
Tottenham Lane (west of Church Lane) - without scheme	F5	69.8	0
Tottenham Lane (west of Church Lane) - with scheme	F6	69.8	
Tottenham Lane (east of Cranford Way) - without scheme	F7	67.6	0.4
Tottenham Lane (east of Cranford Way) - with scheme	F8	68.0	
Church Lane - without scheme	F9	66.3	0
Church Lane - with scheme	F10	66.3	

6.10 It can be seen that the largest percentage increase in traffic that would result from the scheme would be along Cranford Way at the exit of the Industrial Estate. This equates to an increase in noise level of 1.5 dB. This change in noise level is well below the 3 dB level that PPG 24 considers is the minimum perceptible change under normal conditions.

6.11 The increase in noise in any public highway link would be very low; the largest change would be 0.4 dB on Tottenham Lane, east of Cranford Way (i.e. vehicles travelling to the appeal site). A change of 0.4 dB would not perceptible. To put this change in noise level into the perspective of traffic flows on this link - the appeal proposal would increase overall flows from 7128 to 7169, an increase over 12 hours of 41. This equates to some 3 or 4 vehicle movements an hour. The change in heavy vehicle movements would be from 394 to 425 over the 12 hour period. From these figures, it can be seen that the appeal proposal would have no material effect in terms of traffic noise at properties adjacent to key road links feeding the appeal site.

6.12 As appeal traffic moves further from the appeal site on the highway network, the effect in terms of noise impact would become even more diluted.

6.13 There are no objective assessment criteria that would allow a parallel analysis of traffic vibration (either airborne or ground-borne). However the Design Manual for Roads and Bridges suggests that the impact from traffic vibration will be similar or slightly less than the effects from traffic noise. This is a reasonable assumption to make in my judgement since all environmental effects from traffic (noise, vibration, air pollution) are broadly dictated by the same set of variables: particularly traffic flow, speed and percentage heavy vehicles.

6.14 On this basis, I conclude that the degree of change in the traffic conditions that would result from the appeal proposal would not result in any perceptible change in traffic vibration at properties adjacent to key road links.

7.0 Assessment conclusions

7.1 In relation to the appeal scheme, site activity would generate a noise level at Chettle Court of $L_{Aeq12hr}$ = 41 dB and at Wightman Road properties of 47 dB. These levels are maxima.

7.2 The appellant would be willing to accept a condition limiting noise emissions to these levels.

7.3 The noise emission levels from site activity, of 41 dB and 47 dB would be lower than (within) the WHO guideline values of 50 to 55 dB below which annoyance (moderate or serious) can be assumed to be negligible and would be lower than (within) the MPG 11 and PPG 24 limit of 55 dB.

7.4 The noise level from site activity would be below the typical background noise level (L_{A90}) at Chettle Court and Wightman Road.

7.5 The noise level from site activity (L_{AeqT}) would be some 10 dB below the existing prevailing ambient noise level (L_{AeqT}) at Chettle Court and Wightman Road. Accordingly, noise from the proposal would not materially increase existing ambient levels in the area.

7.6 I do not believe that it is correct to employ BS 4142 in this case. However, I have undertaken a BS 4142 assessment and on this basis conclude that noise emission levels from the site would not be such that complaints would be likely at either Chettle Court or Wightman Road properties. These conclusions are based on the typical background noise levels recorded during 2005. Background noise levels recorded in 2003 at Chettle Court were much higher than the 2005 levels due to vacant units and consequently less activity on the nearby industrial estate. Should these units become occupied again these levels may well revert to the higher levels recorded in 2003.

7.7 I believe that the local planning authority concluded that a BS 4142 assessment at Chettle Court would be unfavourable because it had incorrectly assumed a level for site activity associated with Scheme A (52 dB). However, the appeal scheme incorporates several mitigation features which has reduced levels of the appeal scheme (to 41 dB).

7.8 For the reasons discussed above, I conclude that the noise level of site activity would not disturb, or harm the amenity of, residents of Chettle Court or Wightman Road. In this respect, the appeal scheme would comply with policy UD2 of the revised UDP that requires that proposals should not result in "significant adverse impact on residential amenity".

7.9 In relation to the subject of impact from traffic noise and vibration, I conclude that there would be no perceptible change in either the existing prevailing noise levels or vibration levels, at properties adjacent to key road links, as a result of the appeal proposal.

7.10 My assessment of impact in relation to site noise and road traffic noise and vibration has been made against the baseline of a vacant site. This is an artificially rigorous exercise since if the site were not developed as envisaged by the appeal proposals it would likely be developed for another similar use.

7.11 Having considered all matters relating to noise and vibration it is my professional opinion that in relation to these issues, the appeal should be allowed.

Glossary of terms

Sound:

Sound is defined as a pressure fluctuation. The source of sound is anything that stimulates the surrounding particles of air (or liquids/solids) into motion. This motion spreads to adjacent air particles further from the source in a way that can be visualised by the ripples that emanate around a stone dropped into a pond (but in three dimensions). The speed of sound in air is around 340 metres a second.

Noise:

Noise is defined as unwanted sound. It follows that if noise (or sound) is audible then it is detectable by the human ear. Noise ranges from the threshold of hearing to the threshold of pain. The ratio between these two extremes is very large being in linear terms more than a million to one. To describe different noise values using a linear scale would be cumbersome and so a logarithmic scale is employed.

decibel (dB):

The logarithmic scale is described in terms of decibel levels . . . dB. On this scale the numbers are compressed into a range from 0 dB (threshold of hearing) to 130 dB (threshold of pain). The following semantic scale shows noise (sound) levels for typical everyday sources and recognised noise criteria.

Noise level (dBA)	Example
130	Threshold of pain
120	Jet aircraft take-off at 100 metres
110	Chainsaw at 1 metre
100	Inside disco - general level
90	Heavy lorries at 5 metres. Shout at 1 metre
80	Kerbside of busy street
70	Loud radio (in typical domestic room). Car at 7.5 metres
60	Office or restaurant - general level. Normal conversation at 1 metre
50-55	WHO guideline values (external day) - at sound levels lower than these values moderate/serious annoyance can be assumed to be negligible
50	Domestic fan heater at 1 metre. Background noise - urban, night
45	WHO Guideline value (external night) - at sound levels lower than this value sleep disturbance can be assumed to be negligible (windows open)
40	Living room - typical, day
30	Theatre. Whisper at 1 metre
25-35	Background noise - typical, rural, night
10	Sound insulated test chamber
0	Threshold of hearing

Sound levels:

A sound level 10 dB higher than another contains 10 times as much energy; a sound 20 dB than another contains 100 times as much energy and so on. However, the human perception of these noise levels is different to the true energy relationships (see perception of noise levels, below).

Adding and subtracting noise levels:

The logarithmic way by which noise levels are described mean that they cannot be added or subtracted in the conventional way. Two sounds of a level of 50 dB equal 53 dB; a level of 50 dB and 60 dB equals 60.4 dB. It can be seen that when two sound levels are around 10 dB apart then the lower sound level does not materially influence the higher.

Perception of noise levels:

For a given noise, a change in level of 3 dB is not perceptible in normal environmental conditions and a change of around 10 dB is perceived as a doubling of loudness. The following semantic "dose-response" scale is often employed in Environmental Impact Assessments:

Increase in noise level L_{AeqT} dB	Effect/impact
<3	imperceptible/none
3-5	perceptible/slight
6-10	less than a doubling of loudness/significant
11-15	more than a doubling of loudness/substantial
>15	approximately a trebling of loudness/severe

Frequency:

The number of pressure variations in each second (cycles per second) is displayed in terms of "hertz" (Hz). The range of frequencies that a (young) person can hear ranges from around 20Hz to 20000Hz. Middle C is 256Hz. Frequency is split into octaves with centre frequencies of 31.5, 63, 125, 250, 500, 1k, 2k, 4k and 8k (Hz). Low frequency noise is normally described as having significant acoustic energy in the frequency range 8 to 100Hz.

Frequency weighting:

The human ear is less sensitive to low and high frequency than it is to medium frequency. In order to accommodate this variation in response, noise is conventionally measured in terms of the A-weighted sound level (dBA). The measuring equipment has the ability to weight (or filter) sound to this "A" scale so that the sound level it measures best correlates to the response of the human ear. The "A" is often transferred to the statistical index if noise is described in this way (see below).

Types of noise:

Most environmental noise sources can be described as: steady, continuous, intermittent or impulsive.

- a steady noise is one that is produced by say a machine operating at the same speed and duty;
- a continuous noise may vary in level all the time - this is the normal noise found in the environment;
- intermittent noise is often caused by equipment that operates in cycles or when a single vehicle (car, aircraft, train) passes; and
- impulsive noise is that associated with explosions (fireworks, gunfire) or say a pile driver.

Statistical indices:

It is not possible to reasonably describe a given noise in terms of one level . . . since with most environments the noise will be continuous but the level will usually be changing continually. Instead, a set of statistical indices have been developed to describe particular types of noise:

L_{A90}: This is the A-weighted sound level (in dB) exceeded for 90% (i.e. almost all of) the time. It is used to describe the background noise level.

L_{AeqT}: This is the A-weighted noise level that is equivalent (in energy terms) to a continuously changing noise level. It is effectively the average noise energy level. L_{AeqT} is used to describe most environmental noise.

L_{AMAX}: This is the A-weighted maximum noise level recorded over a given survey period.

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