

Ref: PJB5190/28321

Date: 8 December 2008

Spectrum
ACOUSTIC CONSULTANTS

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Dear Matthew

H420 WAITES HOUSES - NOISE ISSUES RELATING TO ELECTRICAL SUBSTATION

Further to your instruction, Spectrum have carried out an assessment of the noise from the electrical substation at the above site affecting the proposed new residences, in accordance with Camden Council's requirements, as discussed below.

We are not fully aware of the planning status of the development or the electrical substation, however, we understand that you have received the following correspondence from Camden Council:

Other Issues

There is an existing EDF substation located adjacent to the south boundary of the site onto Woodchurch Road. The electricity sub-station was installed in the 1970s and is to remain on the site. The proposed new residential accommodation would be located in closer proximity to this structure than the existing accommodation. No acoustic information has been submitted in support of the proposed development to indicate that noise levels from the existing EDF substation will comply with Appendix 1 and Policies SD6, SD7B and SD8A of the Unitary Development Plan (2006) when measured 1m from the nearest new residential window. The permission should therefore be refused on the grounds that insufficient information has been submitted to demonstrate that the proposed residential accommodation will not be unduly harmed by the presence of the EDF substation in terms of noise pollution.

The Policies and Appendix referred to above are attached. Of these, Table D of Appendix 1 is the most relevant in assessing noise from the existing substation. It states that plant at 1m external to a sensitive façade should have noise levels that are at least 5 dBA below the background LA90, unless it has a distinguishable discrete continuous note (whine, hiss, screech, hum) or distinct impulses (bangs, clicks, clatters, thumps) in which case plant should be 10 dBA below the background LA90.

Prior to commencing this survey, Spectrum spoke to Anone Arthur of Camden Council's Environmental Health Department to discuss their requirements for this survey. She agreed that attended monitoring of background noise levels were acceptable, in the absence of a secure location for long-term unattended monitoring. However, this survey should be conducted between 2am and 4am.

The assessment here is carried out following the guidance in BS 4142:1997 "Method for rating industrial noise affecting mixed residential and industrial areas".

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The principal of assessment under BS4142 is to compare the noise from the source under investigation (with adjustments for duration and character) with the background LA90 (the typical minimum noise level) in the absence of the noise to be assessed. A difference of 10 dB indicates that complaints are likely. A difference of -10 dB is a positive indication that complaints are unlikely. A difference of 5 dB is considered marginal.

It was agreed that at-source measurements would be carried out of the substation itself, along with representative background noise levels at nearby residential locations. Section 6.3.5 of BS4142 states that *"Where it is not possible to determine the specific noise level [in this case of the substation] directly at the assessment location, for example because of the influence of noise from other sources, determine the specific noise level by a combination of measurement and calculation. Report the method of calculation in detail and give a reason for using it"*.

It also states, at 7.4 that, where the specific noise source operates continuously, *"Measure the background noise level at a position which is not influenced by the specific noise and where the background noise level is considered to be equivalent to that of the assessment location and report the reasons for presuming it to be equivalent"*.

Measurement Survey

At-source measurements of the noise level of the substation consisted of space-averaged Leq measurements over 30 second periods across each of the 6 wall faces of the substation as well as across the roof. These measurements were carried out at approximately 1.30am on Thursday 4 December, to minimise the effect of extraneous noise.

Background noise levels were monitored in contiguous 5 minute periods over a 2 hour period between 2am and 4am on Thursday 4 December. This background monitoring location is at approximately the same distance from the main noise source in the area, Priory Road, as the residences nearest to the substation. This location is therefore representative of background noise levels at the proposed residences nearest to the substation.

The location of the substation, the proposed new residences and the background noise monitoring location are as shown in the attached figure.

Background measurements consisted of Leq and L90 sound pressure levels measured at 1.2m height, more than 3m from the reflecting surfaces of buildings. The following equipment was used for the survey:

- Bruel & Kjaer Type 2260 Sound Level Meter s/n 1772229
- Bruel & Kjaer Type 4189 Microphone s/n 2199530
- Bruel & Kjaer Type 4231 Acoustic Calibrator s/n 2229957

The measurement equipment was field calibrated before and after measurements and drift was less than 0.2dB and therefore acceptable. Both overall and 1/3rd octave band sound pressure levels were measured.

The lowest LAeq,5 min that was recorded at the background location was LA90 41.0 dB. A chart showing the measured noise levels is attached.

Noise Level Prediction

The noise level at the nearest proposed residences was predicted in the following way.

The space-averaged Leq noise levels on all sides of the substation were corrected for the influence of extraneous noise (distant traffic noise), by logarithmically subtracting the Leq of the noise level measured at the background noise monitoring location at a similar time.

Then, noise levels on the 3 sides of the substation nearest to the proposed residences were logarithmically averaged. Separately, the Leq on the 3 sides of the substation opposite the proposed residences (i.e. facing Woodchurch Road) were also logarithmically averaged. Measurements of Leq above the roof of the unit are

representative of the whole of that surface. This then determines the average noise level across all of the substation surfaces.

The result was converted to equivalent sound power levels for each surface by adding the logarithm of the relevant surface area multiplied by 10. These 3 individual sound power components radiate noise to the nearest residence to different extents. Therefore, they are considered as three different sources in the noise level prediction.

The sound pressure at the nearest proposed residence was calculated taking into account the particular noise propagation characteristics between each noise source and the receiver location, such as distance attenuation and directivity. Finally, each of the individual sound pressure level components from the substation were summed to produce the total predicted Leq sound pressure level at the nearest proposed residence.

The resulting calculation of specific noise level for the nearest location is as shown attached.

The substation operation is continuous and does not contain any impulsive noise. Further, the predicted resultant 1/3rd octave band sound pressure level at the residence shows that there is no single band which is 5 dB or more above both of its neighbours. Therefore, the noise is not tonal. Accordingly, the noise rating level is equal to the predicted noise level, that is, 36 dB. This is 5 dB below the background noise level.

Assessment

It must be borne in mind that the influence of extraneous noise, such as distant road traffic can have a significant effect on predicted noise levels. Because we are trying to determine the noise level of a unit that is very much quieter than other noises in the area, small changes in the measured level can have a big influence on predicted levels. This is exacerbated by having to take residual LAeq noise level measurements at a different location. When substation noise emission analysis is carried out using the L90 noise descriptor throughout (rather than Leq) the resultant noise level at the nearest residence is 31 dB. The actual substation noise will be much nearer to this level than the 36 dB predicted using Leq.

However, even when using the Leq descriptor, predicted substation noise meets the Council's guidelines for acceptability. Also, this is a situation where complaints are unlikely, according to BS4142.

Accordingly, no additional control measures are necessary to prevent noise nuisance. It is recommended that a copy of this letter be provided to the Planning Department of Camden Council toward addressing their concerns on this point.

If you require further information, or have any questions, please get back to me.

Yours sincerely



Phill Banks
Principal Consultant

APPENDIX 1 - NOISE AND VIBRATION THRESHOLDS

Table A: Noise levels on residential sites adjoining railways and roads at which planning permission will not be granted

| Noise description and location of measurement | Period | Time | Sites adjoining railways | Sites adjoining roads |
|---|---------|-----------|--------------------------|-----------------------|
| Noise at 1 metre external to a sensitive façade | Day | 0700-1900 | 74 dB $L_{Aeq,12h}$ | 72 dB $L_{Aeq,12h}$ |
| Noise at 1 metre external to a sensitive façade | Evening | 1900-2300 | 74 dB $L_{Aeq,4h}$ | 72 dB $L_{Aeq,4h}$ |
| Noise at 1 metre external to a sensitive façade | Night | 2300-0700 | 66 dB $L_{Aeq,8h}$ | 66 dB $L_{Aeq,8h}$ |

Table B: Noise levels on residential sites adjoining railways and roads at and above which attenuation measures will be required

| Noise description and location of measurement | Period | Time | Sites adjoining railways | Sites adjoining roads |
|---|---------|-----------|--|--|
| Noise at 1 metre external to a sensitive façade | Day | 0700-1900 | 65 dB $L_{Aeq,12h}$ | 62 dB $L_{Aeq,12h}$ |
| Noise at 1 metre external to a sensitive façade | Evening | 1900-2300 | 60 dB $L_{Aeq,4h}$ | 57 dB $L_{Aeq,4h}$ |
| Noise at 1 metre external to a sensitive façade | Night | 2300-0700 | 55 dB $L_{Aeq,1h}$ | 52 dB $L_{Aeq,1h}$ |
| Individual noise events several times an hour | Night | 2300-0700 | >82dB L_{Amax} (S time weighting) | >82dB L_{Amax} (S time weighting) |

Table C: Vibration levels on residential sites adjoining railways and roads at which planning permission will not be granted (BS 6472:1992)

| Vibration description and location of measurement | Period | Time | Vibration levels |
|--|------------------------|-----------|------------------------|
| Vibration inside critical areas such as a hospital operating theatre | Day, evening and night | 0000-2400 | 0.1 VDV ms-1.75 |
| Vibration inside dwellings | Day and evening | 0700-2300 | 0.2 to 0.4 VDV ms-1.75 |
| Vibration inside dwellings | Night | 2300-0700 | 0.13 VDV ms-1.75 |
| Vibration inside offices | Day, evening and night | 0000-2400 | 0.4 VDV ms-1.75 |
| Vibration inside workshops | Day, evening and night | 0000-2400 | 0.8 VDV ms-1.75 |
| Where dwellings may be affected by ground-borne regenerated noise internally from, for example, railways or underground trains within tunnels, noise levels within the rooms should not be greater than 35dB(A)max | | | |

Table D: Noise levels from places of entertainment on adjoining residential sites at which planning permission will not be granted

| Noise description and measurement location | Period | Time | Sites adjoining places of entertainment |
|---|-----------------|-------------|--|
| Noise at 1 metre external to a sensitive façade | Day and evening | 0700 - 2300 | L_{Aeq} , 5m shall not increase by more than 5dB* |
| Noise at 1 metre external to a sensitive façade | Night | 2300-0700 | L_{Aeq} , 5m shall not increase by more than 3dB* |
| Noise inside any living room of any noise sensitive premises, with the windows open or closed | Night | 2300-0700 | L_{eq} , 5m (in the 63Hz Octave band measured using the "fast" time constant) should show no increase in dB* |
| * As compared to the same measure, from the same position, and over a comparable period, with no entertainment taking place | | | |

Table E: Noise levels from plant and machinery at which planning permission will not be granted

| Noise description and location of measurement | Period | Time | Noise level |
|---|------------------------|-----------|----------------------|
| Noise at 1 metre external to a sensitive façade | Day, evening and night | 0000-2400 | 5dB(A) <LA90 |
| Noise that has a distinguishable discrete continuous note (whine, hiss, screech, hum) at 1 metre external to a sensitive facade | Day, evening and night | 0000-2400 | 10dB(A) <LA90 |
| Noise that has distinct impulses (bangs, clicks, clatters, thumps) at 1 metre external to a sensitive façade | Day, evening and night | 0000-2400 | 10dB(A) <LA90 |
| Noise at 1 metre external to sensitive façade where LA90 >60dB | Day, evening and night | 0000-2400 | 55dB _{LAeq} |

development in these areas have been thoroughly assessed before edge-of-centre and, finally, sites outside these areas are considered for development. Policy SD5 does not apply to residential development, general industry or warehousing (within Use Classes C3, B2 and B8). General industry and warehousing are often not well suited to the Central London Area or the Town Centres as they need sites that can support a low employment density and spaces for machinery, processing, storage or loading / unloading.

- 1.38 The Council will also have regard to the detailed locational policies for different uses in this Plan. The fact that sites are accessible by public transport will not override these policies, which take into account the character, scale and capacity of individual areas to accommodate new uses that attract a significant number of trips. Further details are given in the Transport section and in locational policies relating to land uses with potential to significantly increase trips.
- 1.39 The Council will also be concerned to make sure, in line with policies contained elsewhere in this Plan, that the impact on residential amenity, the built and natural environment and transport networks can be kept to a minimum. As part of this assessment, the Council will consider the likely impact of development on the public transport system. In general, planning permission will only be granted if the Council is satisfied that the walking, cycling and public transport system in the vicinity of the site will have sufficient capacity to cope with additional passengers and that traffic generation arising from essential operational trips can be accommodated on the surrounding road network.

AMENITY

SD6 - Amenity for occupiers and neighbours

The Council will not grant planning permission for development that it considers causes harm to the amenity of occupiers and neighbours. The factors the Council will consider include:

- a) visual privacy and overlooking;
- b) sunlight and daylight levels;
- c) artificial light levels;
- d) noise and vibration levels;
- e) odour, fumes and dust;
- f) the adequacy of facilities for storage, recycling and disposal of waste; and
- g) microclimate.

- 1.40 At the local level, the protection of amenity needs to be a major consideration in assessing development proposals. Almost all developments will have some impact on their surroundings. The main impacts against which it will be necessary to protect amenity are set out in factors a) to g) in policy SD6.
- 1.41 Harmful effects to the amenity of existing and future occupiers on a development site and to nearby properties should be avoided, especially in the case of residential buildings. The design of development should give consideration to overlooking and the potential effects on privacy, and allow sufficient daylight and sunlight into buildings and land. Occupiers and neighbourhoods should also be protected from excessive artificial light, noise and vibration pollution and from odour, fumes and dust. Adequate provision should be made for waste facilities and the effect of the design of any development on the surrounding microclimate should also be taken into consideration.
- 1.42 Privacy and overlooking are very much a function of distance, vertical levels of

onlooker and subject, as well as the horizontal angle of the view. Roof terraces and balconies should not result in unacceptable disturbance to the privacy of neighbouring habitable rooms and any garden space that is in separate occupation. Overlooking from the public highway and from neighbouring private gardens and parking areas will also be considered. On sunlight and daylight, the Council will apply the standards recommended in the Building Research Establishment's 'Site Layout Planning for Daylight and Sunlight - A Guide to Good Practice' (1991). Policy SD7A deals further with light pollution, and noise and vibration are addressed in policy SD7B. Policies SD8A and SD8B address amenity disturbance due to the specific harm that can be caused by plant and machinery, and demolition and construction. Policy SD12A addresses the sorting and storage of waste. Supplementary guidance contains further information on microclimate.

SD7 - Light, noise and vibration pollution

A - Light pollution

The Council will not grant planning permission for floodlighting or other forms of lighting, if it creates light pollution.

B - Noise/vibration pollution

Unless appropriate attenuation measures are available and are included, the Council will not grant planning permission for:

- a) development likely to generate noise/vibration pollution; or
- b) development sensitive to noise/vibration in locations with noise/vibration pollution.

In assessing applications against these criteria, the Council will have regard to the levels set out in Appendix 1 to this Plan.

Light pollution

- 1.43 Lighting has a positive effect in increasing a sense of security for activities in the evenings and at night. It can enable outdoor recreation at night time and it can be used to highlight landmark buildings and add vitality to the street. However, poorly designed internal and external lighting or lighting that operates excessive hours is a form of pollution that can diminish the quality of life for residents. Excessive illumination is also a waste of energy. Poorly designed illumination can cause glare and light spillage. Glare makes it less easy to see things at night and light spillage can create unwanted light. As well as the effect on people, this can also cause harm to wildlife.
- 1.44 In circumstances where there is a potential for light pollution, the Council will require a light impact survey outlining possible attenuation. To control the potential harm caused by light pollution, the Council will use planning conditions to control the level of illumination, any spillage of light and hours of operation. The Institution of Lighting Engineers 'Guidance Notes for the Reduction of Light Pollution' (1994) and supplementary guidance contain further guidance on managing light pollution.

Noise/vibration pollution

- 1.45 Noise/vibration pollution has a major effect on amenity and health and therefore the quality of life in general. Its effect can be minimised by separating uses sensitive to noise/vibration from development that generates noise/vibration and by taking measures to reduce any impact. Noise/vibration sensitive development includes housing, schools and hospitals as well as offices, workshops and open spaces, while noise/vibration is generated by rail and road traffic, air traffic, industry,

entertainment and other uses. Plant and machinery, and demolition and construction also generate noise and vibration; however, these are addressed in policies SD8A and SD8B as they also have a variety of other effects on local amenity.

- 1.46 It is not always possible to separate noise/vibration sensitive and noise/vibration generating development. Planning Policy Guidance (PPG) 24: Planning and Noise and Tables A-D in Appendix 1 set out unacceptable noise/vibration levels for adjoining residential sites.
- 1.47 When development likely to generate noise/vibration pollution is proposed, attenuation measures to mitigate the impact of the noisy development on its surroundings will be required if planning permission is to be granted. Table D sets out the noise levels from places of entertainment (in relation to adjoining residential sites) at which planning permission will not be granted for the entertainment use. Annex 3 in PPG 24 contains more detail on noise generating developments.
- 1.48 The Council will only grant planning permission for development sensitive to noise/vibration in locations that experience noise/vibration pollution if appropriate attenuation measures are taken. Table B sets out noise pollution levels from road and rail at and above which attenuation measures will be required before planning permission is granted for adjoining residential sites.
- 1.49 Planning permission will not be granted for development sensitive to noise/vibration in locations that have unacceptable levels of noise/vibration. Tables A and C set out unacceptable noise and vibration levels from road and rail at and above which planning permission will not be granted for adjoining residential sites.
- 1.50 Where uses sensitive to noise/vibration are proposed close to an existing source of noise/vibration or when development that generates noise/vibration is proposed, the Council may require an acoustic report to ensure compliance with PPG 24 and Tables A-D. A condition may be imposed to require that the plant and equipment which may be a source of noise pollution is kept working efficiently and within the required noise limits. Conditions may also be imposed to ensure that attenuation measures are kept in place and effective throughout the life of the development. Supplementary guidance contains design solutions that can be used to minimise noise as well as definitions relating to noise and noise measuring methods. Regard should also be had to 'City Soundings - the Mayor's London Ambient Noise Strategy' (2004).

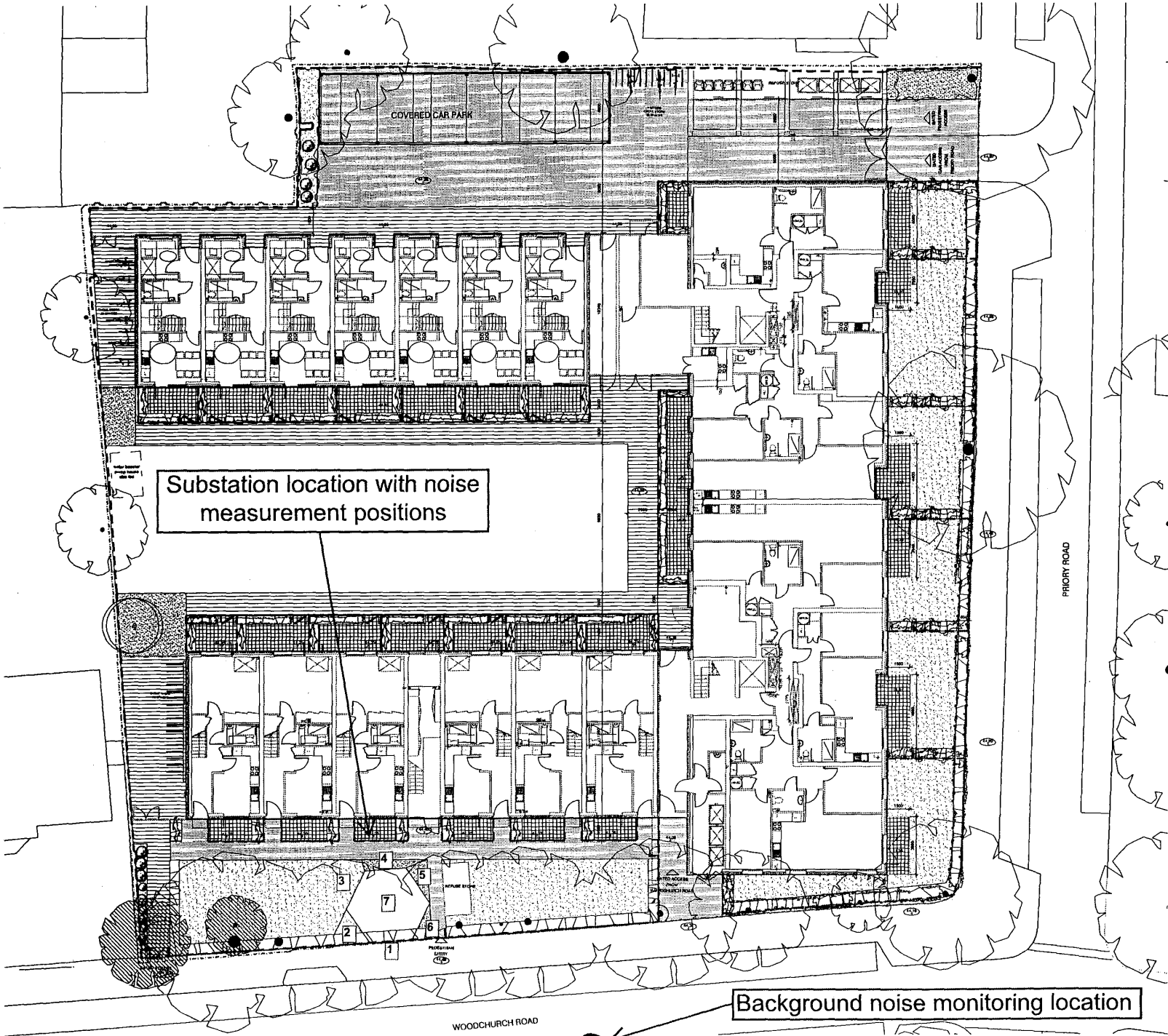
SD8 - Disturbance

A - Disturbance from plant and machinery

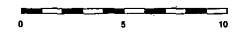
The Council will only grant planning permission for plant or machinery, including ventilation or air handling equipment, if it can be operated without causing a loss to local amenity and does not exceed the thresholds set out in Appendix 1 - Noise and Vibration (Table E).

B - Disturbance from demolition and construction

The Council will seek to minimise the impact on local amenity from the demolition and construction phases of development. Where these phases are likely to cause harm, due to their duration, scale, location or complexity, planning conditions may be used to minimise the impact.



| Symbol | Material | Drawing/Image (L(90)02,03,04) |
|--------|--|-------------------------------|
| 01. | Existing trees | |
| 02. | Removed trees | |
| 03. | Proposed trees | |
| 04. | Small size flowering trees | Image L(90)04 |
| 05. | New tree grilles | Image L(90)04 |
| 06. | Lawn | |
| 07. | No dig, permeable paving system | Image L(90)04 |
| 08. | Unit paving-communal areas -regula concrete sett | Image L(90)04 |
| 09. | Unit paving-residential areas -concrete pavers | |
| 10. | Evergreen hedge | Image L(90)04 |
| 11. | Benches | |
| 12. | Works boundary | |
| 13. | Site boundary | |
| 14. | Existing back boundary walls (made good and walls added) | |
| 15. | Railings and gates | |
| | Type A- Front gardens to Priory Rd and Woodchurch Rd | Image + Drawing L(90)02 |
| | Type B-Private Back Gardens in block A and D | Image + Drawing L(90)02 |
| | Type C-Vehicular and Pedestrian gates | Image + Drawing L(90)02 |
| | Type D- Bin store gate | Image + Drawing L(90)03 |
| 16. | Car Park | Drawing L(90)03 |
| 17. | Water booster pump house | Drawing L(90)03 |
| 18. | Existing level | |
| 19. | New paving level | |



NOTES
 1. This drawing is copyright of PTE Architects
 2. Use figured dimensions only. Do not scale

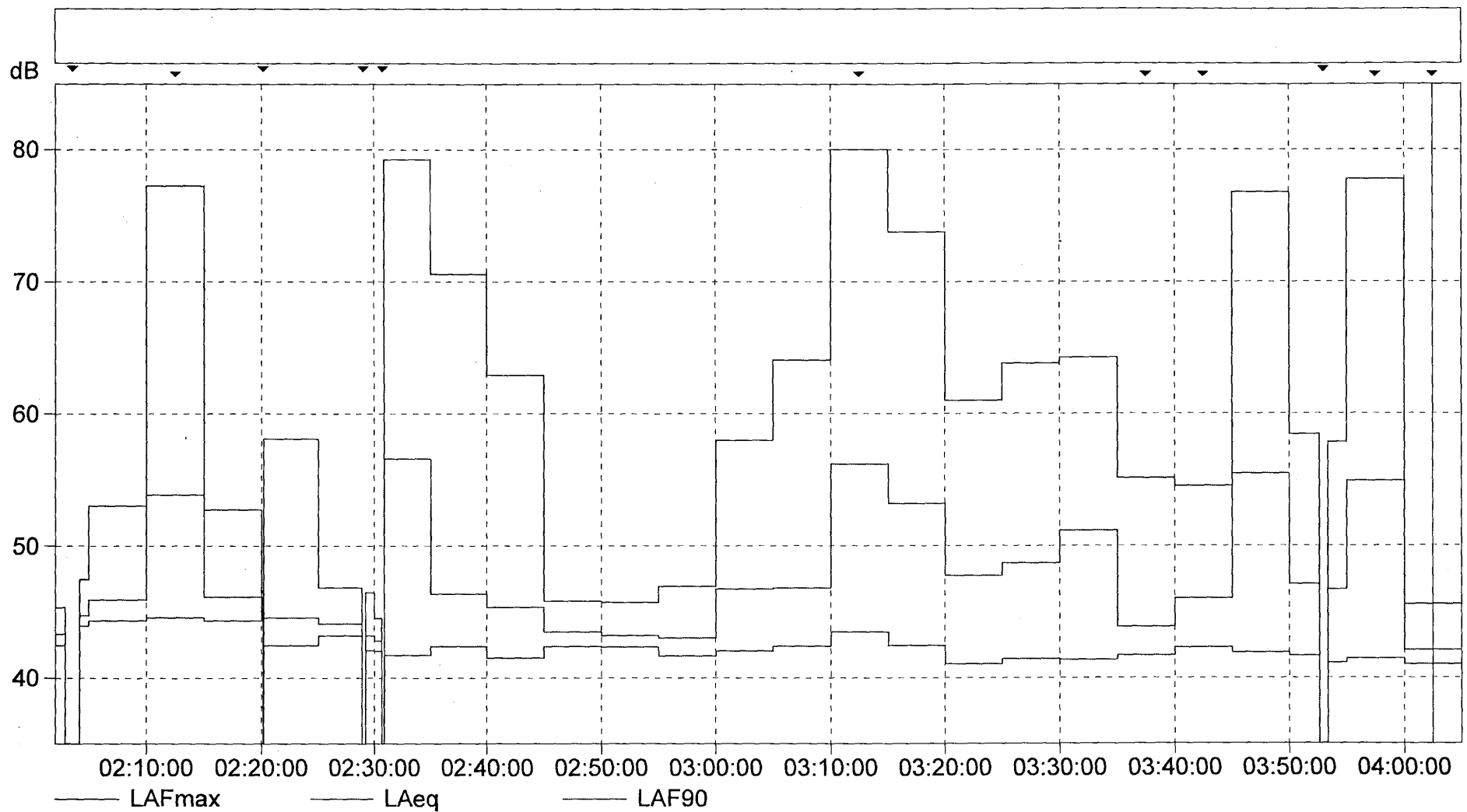
| | | | | | | | |
|-----|------|----------|------|--|------|-----|------|
| A | | 21-10-08 | | Refer to site plan for details and images added. | | 07 | AS |
| REV | DATE | BY | CHKD | APPD | DATE | REV | DATE |
| | | | | | | | |

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| | | | |
|------------------------|------------------|-----------------|----------------|
| PROJECT: PRIORITY ROAD | DATE: 07-029 | SCALE: 1:125@A1 | DATE: 20.07.07 |
| CLIENT: EXTERNAL WORKS | PROJECT: L(90)01 | SCALE: A | |

Background noise monitoring results in Woodchurch Lane, Camden - 4 December, 2008



Cursor: 04/12/2008 04:00:00 - 04:05:00 LAFmax=45.6 dB LAeq=42.1 dB LAF90=41.0 dB

Predicted substation noise level at nearest proposed residence

| | dBA | 25Hz | 31.5Hz | 40Hz | 50Hz | 63Hz | 80Hz | 100Hz | 125Hz | 160Hz | 200Hz | 250Hz | 315Hz | 400Hz | 500Hz | 630Hz | 800Hz | 1kHz | 1.25kHz | 1.6kHz | 2kHz | 2.5kHz | 3.15kHz | 4kHz | |
|---|------------|-------------|---------------|-------------|-------------|-------------|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-------------|----------------|---------------|-------------|---------------|----------------|-------------|----|
| Measured residual Leq level | 42.3 | 42 | 40 | 43 | 45 | 46 | 41 | 42 | 40 | 38 | 39 | 38 | 36 | 38 | 37 | 36 | 37 | 37 | 32 | 26 | 19 | 14 | 12 | 12 | |
| Measurements around surface of substation corrected for background | dBA | 25Hz | 31.5Hz | 40Hz | 50Hz | 63Hz | 80Hz | 100Hz | 125Hz | 160Hz | 200Hz | 250Hz | 315Hz | 400Hz | 500Hz | 630Hz | 800Hz | 1kHz | 1.25kHz | 1.6kHz | 2kHz | 2.5kHz | 3.15kHz | 4kHz | |
| Position 1. | 45.0 | 47 | 49 | 49 | 53 | 52 | 49 | 51 | 48 | 44 | 44 | 44 | 41 | 36 | 36 | 36 | 37 | 37 | 32 | 25 | 19 | 16 | 17 | 14 | |
| Position 2. | 43.6 | 47 | 48 | 49 | 52 | 51 | 49 | 51 | 45 | 41 | 39 | 41 | 41 | 37 | 37 | 34 | 32 | 28 | 30 | 28 | 26 | 25 | 26 | 25 | |
| Position 3. | 44.1 | 53 | 50 | 51 | 56 | 52 | 45 | 49 | 41 | 42 | 43 | 35 | 39 | 33 | | 31 | 33 | | 32 | 29 | 26 | 26 | 24 | 21 | |
| Position 4. | 38.8 | 44 | 46 | 49 | 53 | 50 | 48 | 47 | 46 | 38 | 37 | 38 | 36 | | | | 29 | 29 | 27 | 21 | 18 | 18 | 17 | 15 | |
| Position 5. | 43.8 | 46 | 49 | 49 | 51 | 51 | 52 | 50 | 48 | 47 | 46 | 45 | 43 | 40 | 32 | 25 | 30 | 24 | | | 3 | 13 | 14 | 11 | |
| Position 6. | 46.0 | 38 | 41 | 41 | 43 | | 38 | 40 | 43 | 42 | 48 | 42 | 47 | 45 | 38 | 36 | 35 | 33 | 29 | 17 | | | | | |
| Position 7. | 42.8 | 39 | 42 | 39 | 43 | | 38 | 42 | 46 | 39 | 37 | 37 | 36 | 36 | 37 | 36 | 36 | 34 | 31 | 26 | 22 | 17 | 18 | | |
| Average of Positions 3, 4 & 5 | | 25Hz | 31.5Hz | 40Hz | 50Hz | 63Hz | 80Hz | 100Hz | 125Hz | 160Hz | 200Hz | 250Hz | 315Hz | 400Hz | 500Hz | 630Hz | 800Hz | 1kHz | 1.25kHz | 1.6kHz | 2kHz | 2.5kHz | 3.15kHz | 4kHz | |
| | | 50 | 49 | 50 | 54 | 51 | 49 | 49 | 46 | 44 | 43 | 41 | 40 | 38 | 32 | 29 | 31 | 27 | 31 | 27 | 22 | 22 | 20 | 20 | 17 |
| Average of Positions 1, 2 & 6 | | 45 | 47 | 48 | 51 | 52 | 48 | 49 | 46 | 43 | 45 | 43 | 44 | 41 | 37 | 35 | 35 | 34 | 31 | 25 | 24 | 23 | 23 | 22 | |
| Sound Power of 3, 4 & 5 | dBA | 25Hz | 31.5Hz | 40Hz | 50Hz | 63Hz | 80Hz | 100Hz | 125Hz | 160Hz | 200Hz | 250Hz | 315Hz | 400Hz | 500Hz | 630Hz | 800Hz | 1kHz | 1.25kHz | 1.6kHz | 2kHz | 2.5kHz | 3.15kHz | 4kHz | |
| | 53.2 | 61 | 59 | 60 | 65 | 62 | 60 | 60 | 57 | 55 | 54 | 52 | 51 | 49 | 42 | 40 | 42 | 38 | 41 | 38 | 32 | 33 | 31 | 28 | |
| Sound Power of 1, 2 & 6 | 55.8 | 56 | 58 | 58 | 62 | 62 | 59 | 60 | 56 | 53 | 56 | 53 | 55 | 52 | 48 | 46 | 46 | 45 | 41 | 36 | 34 | 34 | 34 | 33 | |
| Sound Power of Roof | 49.8 | 47 | 49 | 46 | 50 | | 46 | 49 | 53 | 46 | 44 | 44 | 43 | 43 | 44 | 43 | 44 | 41 | 38 | 33 | 29 | 24 | 26 | 27 | |
| Lp at nearest residence from 3, 4 & 5 | | 43 | 42 | 43 | 47 | 44 | 42 | 42 | 39 | 37 | 37 | 35 | 34 | 31 | 25 | 23 | 24 | 21 | 24 | 20 | 15 | 15 | 14 | 11 | |
| Lp at nearest residence from roof | | 24 | 25 | 22 | 25 | | 20 | 23 | 27 | 20 | 17 | 17 | 16 | 17 | 18 | 16 | 17 | 14 | 10 | 6 | 1 | -4 | -2 | -1 | |
| Lp at nearest residence from 1, 2 & 6 | | 28 | 28 | 28 | 31 | 31 | 26 | 28 | 23 | 19 | 22 | 18 | 18 | 16 | 12 | 9 | 9 | 8 | 3 | -2 | -4 | -6 | -5 | -6 | |
| Resultant Sound Pressure Level At Residence | dBA | 25Hz | 31.5Hz | 40Hz | 50Hz | 63Hz | 80Hz | 100Hz | 125Hz | 160Hz | 200Hz | 250Hz | 315Hz | 400Hz | 500Hz | 630Hz | 800Hz | 1kHz | 1.25kHz | 1.6kHz | 2kHz | 2.5kHz | 3.15kHz | 4kHz | |
| | 36.0 | 43 | 42 | 43 | 48 | 45 | 43 | 42 | 40 | 37 | 37 | 35 | 34 | 32 | 26 | 24 | 25 | 22 | 24 | 20 | 15 | 15 | 14 | 11 | |

**N.B: Blank cells indicate that the background Lp was greater than the measured Lp at the substation
These components are therefore excluded from the calculations**