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Procedure for the assessment of low frequency noise complaints

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CONTENTS

1. INTRODUCTION AND SCOPE

Low frequency noise (LFN) is now a recognised problem in many countries in the world. Experience of LFN complaints from the last 30 years has built up a good picture of the typical situations in which disturbance arises. While only a relatively small number of people are affected, those who are tend to suffer severe distress. It is not unusual for sufferers to sleep in a car or shed to avoid the sound, and they may suffer various symptoms such as depression or even feel suicidal. In some cases a source of LFN is found and can be dealt with. However, in many cases (typically 50% to 80% of cases), no environmental sound that could account for the sufferer's reaction can be found, and the cause of the disturbance remains a mystery.

This guidance leads on from previous reports published by Defra: [Le03] and [Mo05].

Most Local Authorities will receive complaints about LFN at some point, and usually find them particularly difficult to deal with for several reasons. Firstly, existing noise criteria are not appropriate for evaluating LFN; in almost all other situations the established noise descriptors are based on the A weighted sound level (dB(A)) which effectively filters out low frequency sounds.

Secondly, LFN cannot be reliably evaluated on the basis of the investigator's experience; indeed, officers investigating a case of LFN may not even be able to hear the LFN themselves. This is possible because disturbance by LFN is known to occur at levels only slightly higher than hearing threshold, which varies from one individual to the next. Also, the rate of growth of perceived loudness with level is more rapid at low frequencies so that a sound could appear loud to one person whilst still inaudible to another. An additional factor is that 'sensitisation' to low frequency sound appears to occur over time, and therefore a brief visit may not give an accurate impression of what it is like to live with the sound.

Thus, the investigator is left with no suitable criteria and without even personal experience to guide them. Thirdly, the measurement of low frequency sound can be technically difficult. Against this background, criteria for determining acceptable levels of LFN have been introduced in Germany, Denmark, Sweden, Poland and the Netherlands since 1997; the guidance presented in this document has been requested and funded by Defra with the aim of developing a method for the assessment of low frequency noise suitable for use by Environmental Health practitioners in the UK.

1.1. Objective

The objective of this document is to assist Environmental Health practitioners[1] to handle complaints of low frequency noise as efficiently and correctly as possible. In particular, it aims to assist them to distinguish cases where an environmental sound that could account for the disturbance is present, in which case some remedial action may be possible within their remit, from those where no such action is feasible. Thus, this guidance provides a procedure to determine whether low frequency sound that might be expected to cause disturbance is present in a complainant's premises.

The guidance given applies to low frequency noise, excluding traffic noise and entertainment noise. It is not appropriate to include traffic noise because this is not specifically a low frequency issue and in any case is not generally actionable by local authorities. Low frequency noise from entertainment was not considered in the development of the method and is outside the scope of this document.

This document does not specifically provide guidance in locating the source of the LFN. However, it is usually found that the most difficult part of the assessment is to determine the existence or otherwise of a sound that correlates with the disturbance, and if this can be established then the source can usually be found. Thus, it is expected that, whilst not a specific aim, the analysis outlined here will form a significant step in the diagnosis of cases requiring treatment.

The procedure is intended to assist in the evaluation of existing problems. It is not intended as a means of predicting when disturbance might occur, for example in a planning situation, and would not be reliable to use as such. This is because disturbance by LFN depends on a number of factors, such as the character of the sound, whose effects are neither well understood, nor readily predictable. Levels of sound above criteria based on the average threshold of hearing are frequently found to be acceptable and levels falling marginally below can occasionally cause disturbance, so no generic approach to prediction of disturbance appears to be possible.

[1] Environmental Health practitioners is taken to include Environmental Health Officers and Environmental Health Technicians etc.

2. INTERVIEWS

Before undertaking measurements the complainant should be interviewed in order:

- to determine whether the complaint should be classed as a low frequency noise complaint
- to collect data on the times when, and places where the noise occurs to assist in planning measurements
- to gather descriptions of the noise in order to assist with the analysis of recorded data
- to provide other background information to assist the analysis.

2.1 Personal details

The complainant's gender and age should be determined as this may give some indication as to whether the complaint is consistent with other LFN complaints. Typically complainants tend to be female and over 55 years of age. However, caution must be taken as falling outside these categories does not rule out a LFN problem.

2.2. Current and previous occupation

The complainants should be asked their current and previous occupations to determine whether they may have been exposed to LFN in the past. There are theories that people who have been exposed to LFN may have become sensitised to it, although further research in this area is necessary. Also, it is important to establish whether they may have been at risk of noise induced hearing damage which is often associated with hearing problems such as tinnitus, recruitment etc. Always prompt for further details if the person's job title itself doesn't give enough information.

2.3. Terms of residence

The complainant should be asked how long they have lived at the current residence and how long they have heard the LFN. This may give an indication of what may be causing the LFN.

2.4. Daily routine

The complainant should be asked about their daily routine. Knowledge of what time they get up and go to bed may be useful in determining good quality recording periods. Knowledge of what wakes them up and at what times will help determine if there are good night time recording periods. Knowledge of what they do when they get up will give an indication of the effects of the problem and their ability to find successful coping strategies.

2.5. Health

The complainant should be asked to describe their general health and the way in which suffering from a LFN has affected their health. They should also be asked whether they have had a recent hearing test and the outcome of that test. This will help determine whether it is advisable to recommend a further hearing test if no solution can be found. However, recommendations of further hearing tests should not be used at the initial stages of an investigation and should be approached sensitively.

2.6. When the noise is heard

The times when the sound is typically heard or absent should be determined. The questioner should try to determine if there are times of the day, times of the week or year when the noise is absent or is worse than usual in order to determine the best periods for recording.

2.7. Others who hear the noise

The complainant should be asked whether anyone else hears the noise. This may be used as an opportunity to reassure the complainant that it is a common experience for some people to hear the noise while others cannot hear it at all.

2.8. Where the noise is heard

The complainant should be asked to indicate a position where they can hear the noise, preferably where they can actually hear it at the time of the interview. This information will be required to assist in choosing a position for the microphone. A suitable position should be determined precisely (within a few centimetres) since sound levels in a room can vary strongly with position.

2.9. General description of the noise

The complainant should be asked to give a general description of the noise. The descriptions given in low frequency noise cases tend to be fairly consistent, common descriptions including variations on the following:

- *"Like a diesel engine idling in the distance"*
- *"A low throbbing, beating, rumbling ..."*
- *"Pressure on the ears"*

Any form of wording reminiscent of the above is likely to indicate a low frequency noise case. However, it is increasingly possible that the complainant may have picked up these descriptions from written material on the subject and the interviewer should try to ascertain as far as possible if this is the case.

2.10. Suspected source

The complainant should be asked if they have an idea as to the source of the noise. This may be helpful, but should not necessarily be taken as an accurate indication. If they do not know the source they should be asked if they suspect a particular source. Clarification should be sought as to what measures, if any, had already been taken to approach those responsible for the suspected source, and to the outcome.

The most common sources of LFN disturbance are rotating machinery of one sort or another. This may range from large industrial equipment, at distances up to several kilometres away (low frequency sounds travel with far less attenuation than higher frequency sounds), to small domestic items (fridges, fish tank pumps, central heating pumps), perhaps in a neighbouring property.

2.11. Ambient noise levels

The complainants should be asked to describe the ambient noise level in their home. Typical descriptions include ‘quiet’ and ‘very quiet’ (apart from the LFN). Asking about how the complainant responds to other environmental noises may be instructive. In many cases the complainant feels frustrated that the noise is beyond their control and that they don’t know exactly when to expect it.

2.12. Strategies to relieve the effects of the noise

It is useful to know what strategies, if any, the complainant has adopted to avoid the noise or relieve its effects. This may give a more accurate impression of the seriousness of the problem than relying on a description of symptoms. In many cases they may go to extreme lengths to avoid the noise such as sleeping in a garage or garden shed. In less extreme cases they may have moved rooms or changed the position of the bed, which may give information about the direction in which the sound arrives. It is useful to know which relief strategies were most successful, if any. These questions will help determine whether the complainant will be open to further suggestions about relief strategies.

2.13. Other locations

It should be ascertained if the sound is heard at other locations. If it is heard elsewhere, particularly at locations well away from any likely source, this raises the possibility that the complainant is responding to an ‘internal’ sound (not necessarily tinnitus). If there are locations where the sound is not heard this could be because the sound is absent, but it may also be due to higher levels of masking noise at that location. For this reason the complainant should be asked to describe the background noise at the other locations. The investigator should be careful about concluding that tinnitus is causing the complaint since, when tested, only a minority of complainants are found to suffer from tinnitus, and the suggestion can cause offence if not handled sensitively.

Some sufferers may have tried earplugs or muffs at some point. This may have made the sound more or less prominent, which could provide useful information regarding the source. Questions about earplugs should be handled carefully to avoid any inference that earplugs are being suggested as a solution.

3. MEASUREMENT

3.1. Instrumentation

A sound level meter kit is required consisting of:

- a sound level meter
- a field calibrator or pistonphone.

It is preferable that the sound level meter has third octave filters from 10Hz to 160Hz, i.e. over the range covered by the criterion curve. If the filters do not extend down to 10Hz then the instrument will be adequate provided it can be demonstrated that the sound pressure in the 'missing' bands is not significant with respect to the criterion curve. This will be the case if the overall 'C' weighted levels (L_C) given in Table 1 are not exceeded. For example, on many meters the lowest band is 20Hz; if L_C<66dB(C) (which will usually be the case) then we can discount any significant contribution in the 10Hz, 12.5Hz or 16Hz bands and the meter will be adequate.

Table 1: Overall 'C' weighted levels (L_C) below which the given 1/3 octave band is not required

Maximum L_C	76dB(C)	71dB(C)	66dB(C)	60dB(C)	54dB(C)
1/3 octave band not required	10 Hz	12.5 Hz	16 Hz	20 Hz	25 Hz

In almost all cases it will be necessary to log measurements with the meter unattended in which case a logging function will be needed.

The ability to record audio samples is not essential, but it is a distinct advantage when it comes to the analysis so should be considered highly desirable (there could be an issue with confidentiality here). An ability to produce narrow band frequency plots is also an advantage.

3.2. Calibration

Both the meter and calibrator should have a UKAS calibration certificate, preferably issued within the two years preceding the measurements[2].

[2] LFN is often at the extreme of the usable frequency range of the instrumentation, and so special care is required to ensure the reliability of the results. If the meter has a UKAS calibration certificate this usually means that it underwent the 'verification' procedure for sound level meters according to BS7580 Part 1 (1997) on the date of the certificate. In the verification test the lowest frequency for a full acoustic check is 125Hz: third octaves down to 31.5Hz are checked electrically but not acoustically. This is sufficient for the majority of sound measurements, and is also probably satisfactory for LFN in most cases. However, there is no guarantee of accuracy without an acoustic check at the frequency being measured, which in the case of LFN is often around 40Hz, and could extend down to 10Hz. An acoustic check at lower frequencies than is normally carried out during verification is therefore advisable if possible. This could be achieved for example using a calibrator such as a multi-frequency calibrator which itself has a traceable calibration at low frequency, or by making a special request to a calibration laboratory.

Field calibration should be carried out before and after each test and the results recorded.

A suitable calibration signal should be recorded on tape recordings (if used) at the beginning and end of each recording.

3.3. Measurement location

Measurement should be taken inside at a position where the complainant says the noise is present. The measurement position should be located precisely (within a few centimetres), since low frequency sound levels can vary significantly with position in a room.

Preferably an unoccupied room should be used since there will be less interference from internal sounds.

3.4. Measurement times

In rare cases, where the low frequency noise is obvious and constant it will be possible to carry out an assessment on the spot.

In most cases a period of unattended monitoring will be required. If possible, recordings should be made continuously for a minimum of three days since the complainant's response can be affected by the presence of the equipment and is often untypical immediately after it is installed. If data storage capacity is limited then choose a period when the noise is typically at its most disturbing (usually this is night time). Recordings made during the night are usually considerably easier to analyse. This is because there is minimum interference from other sources. For example, movements within the building always produce elevated levels of low frequency noise that can be difficult to distinguish from 'true' low frequency noise. Therefore, night time recordings are preferred. However, the overriding consideration is that the recordings are made at a time when the complainant says the sound is present.

3.5. Measured parameters

The $L_{eq,T}$, should be recorded in the third octave bands between 10Hz and 160Hz for comparison with the criterion curve. An averaging time, T, of 5 minutes is usually appropriate, although there may be good reasons to use a different value in other situations. It is also advisable to record L_{10} and L_{90} in the same bands since these provide information about the character of the sound and how it fluctuates which can be useful in analysis. Many modern meters allow continuous logging of short term Leq, in which case a sample time of 1 second will be sufficient to allow the variation of sound with time to be examined. If a short term Leq facility is not available then a longer averaging time may be used provided it allows 5 minute values to be derived.

3.6. Domestic equipment

Domestic equipment may produce low frequency noise that will appear on the recordings. In particular fridges produce a tone, typically at between 49 and 50 Hz and cycling in and out with a period of between 5 and 60 minutes. It is not generally possible to switch fridges off for the measurement period. In any case, it has been found that the sound from fridges may interact with low frequency noise from an external source to produce a more disturbing effect. Therefore, to turn off domestic equipment may produce untypical conditions that could make it more difficult to identify the cause of the disturbance.

The recommended approach is to leave domestic equipment running which is normally left on. A set of preliminary recordings should be taken with all such equipment on and off in turn for a few minutes. This will identify the level and character of the sound produced by each at the measurement location so that these sources can be identified on unattended recordings. The best time to conduct these tests is immediately after the instrumentation is installed, but prior to the measurement run.

4. ASSESSMENT

In this section guidance is given to help determine if there is an environmental sound that could be responsible for the disturbance. There are two aspects to the guidance:

- comparison of the level of recorded sound with a third octave band criterion curve
- evaluation of the correlation between the recorded sound and the complainant's log.

It is common for officers to use their own subjective judgement to help them decide whether a sound should be classed as a nuisance. However, this approach should be used with caution for low frequency sound because differences in personal hearing thresholds can be significant and because loudness varies rapidly with level.

4.1. The criterion curve

The criterion curve is given in Table 2 and Figure 1.

If the noise occurs only during the day then 5dB relaxation may be applied to all third octave bands.

Table 2 Proposed reference curve

Hz	10	12.5	16	20	25	31.5	40	50	63	80	100	125	160
dB, Leq	92	87	83	74	64	56	49	43	42	40	38	36	34

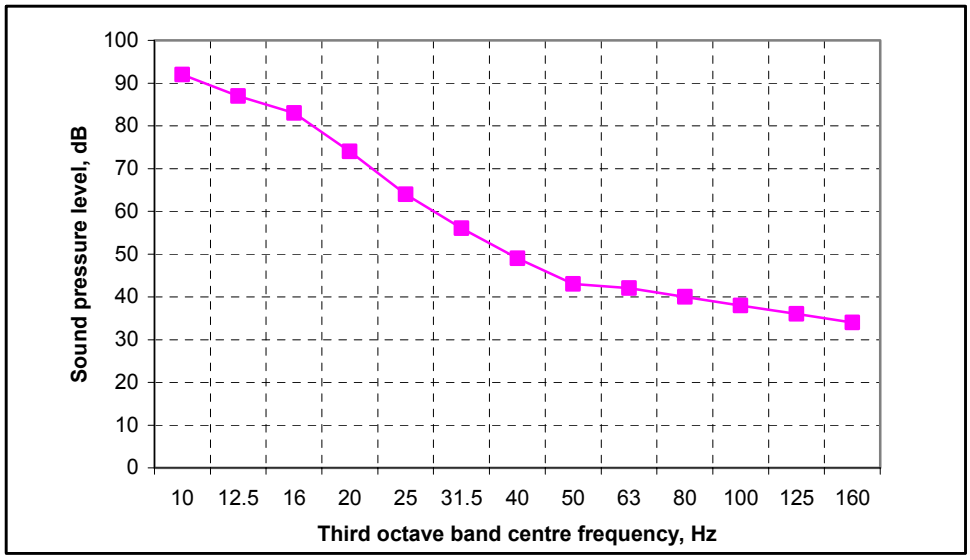

Figure 1 Criterion curve for assessment of low frequency noise

4.2. Step-by-step guide to assessment

The following provides a step-by-step guide to analysis.

i. Consult the complainant's log to find times when the sound was considered to be most disturbing.
ii. If possible, check the character of the sound at these times by audio playback.
iii. If the sound is predominantly due to traffic or movement within the building then reject this sample.
iv. For the chosen time obtain the third octave band spectrum of $L_{eq,T}$ samples
v. Compare the $L_{eq,T}$ spectrum to the criterion curve to find any third octave bands for which the criterion curve is exceeded.
vi. For the third octave band which exceeds the curve by the greatest margin plot the time variation of the $L_{eq,T}$ for the 24 hour period in which the event occurred.
vii. Compare the complainant's log with the time history to see whether there is correlation between the two.

Notes

In order to listen to recordings an appropriate low frequency loudspeaker, such as a subwoofer is required. The lower limiting frequency needed will depend on the sound being investigated. Recordings can be played back at elevated level to assist identification.

If the Leq in the 50Hz third octave band exceeds the curve this may be due to a domestic fridge. Almost all fridges produce a tone at 49.5Hz and cycle on and off on a fairly regular cycle, typically with a period of 5-60 minutes which can usually be recognised from the time history plots.

If the 80, 100, 125, or 160Hz bands exceed the curve, this may be due to traffic (occasionally this may apply to the 63Hz band). Traffic noise may be recognised by listening to audio recordings. Also, traffic noise levels tend to show time patterns that are recognisable with peaks at rush hour and a 'trough' in the small hours of the morning between 2 and 4am.

Plots of the $L_{eq,5\ minute}$ over 24 hours will reveal patterns that are useful in identifying environmental sounds. In particular, it is usually obvious from the shape of the plot when people are moving around in the building, and when traffic noise is present.

In cases where no low frequency environmental noise can be found it is fairly common that the sound is reported by the complainant to have disappeared during the measurement period, or to be much less prominent than usual. Sometimes this is taken as evidence of collusion between the authorities and those thought to be responsible for causing the noise.

The criterion curve below 31.5Hz is based on average threshold of audibility for steady sounds. However, individual thresholds vary considerably. Also, unsteady sounds with an Leq lower than the threshold curve may be audible. Therefore, if a

sound is recorded as up to say 5dB below the criterion curve this does not necessarily mean it is inaudible to the complainant.

Fluctuating sounds are known to be more disturbing than steady sounds by an equivalent of about 5dB. The criterion curve should be relaxed by 5dB for steady sounds to take account of this. If the sound is audible then a subjective judgement may be made as to whether it should be considered fluctuating. If not, the sound can be amplified on playback, or the fluctuation of measured sound level can be used as a guide. More specific guidance on the evaluation of fluctuations is given in [Mo05].

4.3. Comments on the assessment of nuisance

This document is intended to provide a procedure to help determine whether a low frequency environmental noise exists that could be the cause of complaints. It is not intended to provide a prescriptive indicator of nuisance since there are other factors that may need to be considered in reaching this decision. However, the results may be used by Local Authorities to support their decisions.

In forming a decision it should be borne in mind that low frequency noise only slightly above threshold of audibility can cause considerable disturbance and appears to be more difficult to shut out or get used to than other types of noise. This may be counter intuitive when compared with the annoyance caused in other (not low frequency) situations where the level needs to be significantly higher than threshold before the noise could be considered a nuisance. The guidelines presented here are broadly consistent with National criteria in Germany, Sweden, Denmark, Poland and the Netherlands.

REFERENCES

[Le03] Leventhall G. A review of published research on low frequency noise and its effects. Report for Defra, London 2003.
[Mo05] Moorhouse A T, Waddington D C, Adams M D. Proposed criteria for the assessment of low frequency noise disturbance. Report for Defra, London 2005.

APPENDIX A: REPORT PRO-FORMA

A1. Checklist for when equipment is set up

Interview

1. Personal details

Gender	
Date of Birth / Age	

2. Current and previous occupations

What is your current occupation? (prompt if further details required)	
How long have you worked there?	
What was your previous occupation? (prompt if further details required)	
How long did you work there?	

(Establish any current or previous exposure to noise or LFN at work)

3. Terms of residence

How long in current property?	
How long have you heard the noise?	

(Establish whether noise predates occupancy)

4. Daily routine

What time do you go to bed?	
What time do you get up?	
Do you wake up in the night?	
What wakes you up?	
What do you do when you wake up?	

(Establish quality recording periods and whether complainant has found any successful coping strategies)

5. Health

Describe your general health	
Has the LFN affected your health? In what way?	
Have you had a recent hearing test? When? What was the outcome?	

(Establish whether health has deteriorated as a result of LFN exposure. Also establish whether hearing problems have been ruled out).

6. When the noise is heard

When is the noise worst? Times of day and night.	
Are there any particularly noisy or quiet periods?	
Has the noise ever stopped completely?	

(Establish quality recording periods, especially good night time recording periods. Also establish if the noise may be related to local industry by establishing annual shutdown periods).

7. Others who hear LFN

Do other people hear the noise? Who?	
Does the noise annoy them?	

(Establish the difference in ability to detect LFN. Presents case for reassuring complainant about the nature of LFN – it's normal that some people hear it and others don't)

8. Where the noise is heard

Which rooms do you hear the noise in most?	
What positions in the room do you hear it most?	

(Establish best recording position. Also helps establish possible direction from which noise might be coming and whether noise is internal or external to the dwelling).

9. General description of the noise

How would you describe the noise you hear?	
How have other people described the noise?	

(Establish whether description consistent with 'typical' descriptions of LFN).

10. Suspected source

Do you know the source of the LFN? Please describe.	
Do you suspect a source of the LFN? Please describe.	
Have you been in contact with the source / suspected source? What was the outcome?	

(Establish the history of the problem and the relationship between complainant and suspected source).

11. Ambient noise levels

How would you describe the ambient noise level in your home excluding the LFN?	
How do you feel about other noises outside your home? (eg traffic, neighbour noise etc)	

(Establish levels of noise in home; most low frequency noise sufferers describe their dwelling as quiet or very quiet apart from the LFN. Also establish expectations of noise levels and whether being able to control the noise is important.)

12. Strategies to relieve the effects of the noise

What activities does the noise prevent you undertaking, if any?	
What measures have you taken to avoid the noise? (prompt one at a time – slept in different positions or rooms?, gone on holiday?, slept at another house?, earplugs?, produced other background noises?, other?	
What strategies have you used to relieve the effects of the noise?	

(Establish the measures complainant has already taken to avoid the noise and the effect on their life. Also establish whether any relief strategies have worked and whether the complainant may be open to new ideas about relief strategies).

13. Other locations

Have you heard the noise in other locations? Where?	
How would you describe the ambient noise level at these locations excluding the LFN?	
Have you found places that are free from the noise? Where?	
How would you describe the ambient noise level at these locations?	
Some people in this situation have tried earplugs or muffs. If you have tried earplugs did this make the sound more or less prominent?	

(Establish whether the noise is always present, or always present when masking noise levels are low).

14. Log sheets

The complainant should be asked to complete a log sheet (attached as Appendix B). Stress that it is important to record times to the nearest minute as accurately as possible. Consider leaving a clock with the equipment and ask the complainant to take the time from it.

How will the complainant know the time?	
Living room	
Bedroom	
Other position	

Synchronise watches and clocks with the logging device before starting measurements and decide whether to use 12 or 24 hour clock.

Measurements

1. Measurement location

Which room is the microphone to be set up?	
What position in the room (sketch)?	
Does the complainant say they can hear the noise at this position?	

2. Instrumentation

Meter type	
Serial number	
Last UKAS calibration	
1/3 octaves available	
Date/time	
Battery check	
Field calibration level before test	
Is audio to be recorded?	
If so has a calibration tone been recorded?	

3. Measurement times

What time(s) of day are to be monitored?	
Does this accord with the times the complainant hears the sound?	

4. Domestic equipment

Record a spectrum with domestic equipment on and off

Fridge on	
Fridge off	
Other equipment (central heating pump, central heating fan, fish tanks) on	
Off	
Other equipment (central heating pump, central heating fan, fish tanks) on	
Off	
Other equipment (central heating pump, central heating fan, fish tanks) on	
Off	

A2. Checklist when equipment is collected

1. Calibration check

Date/time	
Battery check	
Field calibration after tests	
Field calibration before tests (from page 16)	
Difference	

2. Timing devices

Record the time on any clocks or watches used for the log sheet

Time on logging device	
Living room	
Bedroom	
Other position	

A3. Checklist for assessment

1. Description

Is the description consistent with other descriptions of LFN? ("Low throbbing", "idling diesel engine" etc.)	
Are the times when and locations where the sound is heard consistent with an environmental LFN?	

(Establish whether this LFN procedure is appropriate to evaluate the complaint. Give an indication whether an environmental sound is present)

2. Worst case events

From the log sheets, identify times when the noise was most significant

Date									
Time									

3. Comparison with criterion curve

For each time, record by how much the 1/3 octave band $L_{eq,5\ minute}$ exceeds the criterion curve

Hz	10	12.5	16	20	25	31.5	40	50	63	80	100	125	160
Criterion curve, night dB	92	87	83	74	64	56	49	43	42	40	38	36	34
Criterion curve, day dB	97	92	88	79	69	61	54	48	47	45	43	41	39
$L_{eq,5\ minute}$ at time:													
Exceeds curve by, dB													
$L_{eq,5\ minute}$ at time:													
Exceeds curve by, dB													
$L_{eq,5\ minute}$ at time:													
Exceeds curve by, dB													
$L_{eq,5\ minute}$ at time:													
Exceeds curve by, dB													

4. Audio check on the event

Time								
Nature of sound								

Times for which the sound was traffic noise or movement in the building may be rejected.

5. Is the sound fluctuating or steady?

If the sound is steady then the criterion curve should be relaxed (increased) by 5dB

Fluctuating or steady?	

6. Correlation of log with recorded sound levels

For the 1/3 octave band which exceeds the curve by the greatest margin plot the L_{eq} versus time for the 24 hour period containing the event

Does the sound show a time pattern typical of traffic noise?	
Is there a cyclic, on-off variation?	
Could this be due to a fridge or other domestic equipment (refer to preliminary measurements)?	
Is there correlation between the complainant's log and the 1/3 octave band sound level profile?	

7. Concluding remarks

APPENDIX B: LOG SHEET

Name:
Please complete the following log sheet filling in the date and time (to the nearest minute) when you hear the noise being studied, rating the noise along the scale from 'Not at all disturbing' to 'Intolerable' and adding any other comment you feel may be important. It is useful to us to have information about when you are not disturbed as well as when you are. Please add any other comments that may help us. Please use as many sheets as necessary.

Date and Time	Rating (please place a tick along the line)	Comments (e.g. whether it interfered with your activities, whether it woke you up, whether other people heard it, whether it suddenly got worse etc.)
	Not at all disturbing ... Intolerable |----|-----|-----|-----|-----|-----|-----|-----|-----|	
	Not at all disturbing ... Intolerable |----|-----|-----|-----|-----|-----|-----|-----|-----|	
	Not at all disturbing ... Intolerable |----|-----|-----|-----|-----|-----|-----|-----|-----|	
	Not at all disturbing ... Intolerable |----|-----|-----|-----|-----|-----|-----|-----|-----|	