

# Land at Wenny Road, Chatteris

## Noise Impact Assessment

On behalf of **Savills**






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## Document Control Sheet

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## Executive Summary

Peter Brett Associates LLP has been commissioned by Savills to undertake an environmental noise survey in order to provide preliminary advice to inform the masterplan for the proposed residential development at Wenny Road, Chatteris.

The dominant noise source around the site is deemed to be due to road traffic. The predicted incident noise levels have identified the requirement for mitigation measures which can be used to inform the masterplan proposals.

Amelioration measures for outdoor incident noise levels in amenity areas include suitable positioning, orientation and internal layout of dwellings alongside the erection of earth bunds/acoustic barriers. Mitigation measures to ensure suitable internal noise levels in habitable rooms also include the incorporation of alternative means for background ventilation in order for the windows to be kept closed.

# 1 Introduction

## 1.1 Background

- 1.1.1 Peter Brett Associates LLP (PBA) has been appointed by Savills to undertake a noise survey at the proposed development at land next to A142 Isle of Ely Way and Wenny Road in Chatteris. An indicative site boundary is provided in **Figure 1**.
- 1.1.2 The proposed development may consist of up to 300 residential dwellings. A land use plan has been provided by Fenland DC and is provided in **Figure 2**.

## 1.2 Site Description

- 1.2.1 The site is a part of the former historical park and garden of the nearby Manor House.
- 1.2.2 The A142 Isle of Ely Way bounds the site to the east and Wenny Road to the south-west. Road traffic is the dominant noise source at the site. Existing dwellings are situated to the north of the site.
- 1.2.3 Other features around the site include a recreational park located to the north-west of the site. To the north of Chatteris approximately 2 miles away there is a runway used for parachuting and light aircraft.

## 1.3 Scope of Assessment

- 1.3.1 The purpose of this report is to describe the existing noise climate at the proposed development site in order to offer advice which could be used to inform the masterplan.
- 1.3.2 Whilst every effort has been made to ensure that this report is easy to understand, it is technical in nature. To assist the reader, an explanation of the terminology used in this report is contained in **Appendix A**.

## 2 Legislation, Planning and Guidance

### 2.1 National Policy

#### The National Planning Policy Framework (NPPF)

2.1.1 The NPPF was published in March 2012. In respect of noise, the document states that:

*“The planning system should contribute to and enhance the natural and local environment by ... preventing both new and existing development from contributing to or being put at unacceptable risk from or being adversely affected by unacceptable levels of ... noise pollution.”*

2.1.2 The NPPF goes on to advise that:

*“Planning policies and decisions should aim to:*

- *Avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development;*
- *Mitigate and reduce to a minimum other adverse impacts on health and quality of life arising from noise from new development, including through the use of conditions;*
- *Recognise that development will often create some noise and existing business should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established; and*
- *Identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.”*

2.1.3 The NPPF indicates that the Noise Policy Statement for England (NPSE) should be used to define the “significant adverse impacts”.

#### Noise Policy Statement for England (NPSE)

2.1.4 The Noise Policy Statement for England was published in March 2010. The document seeks to clarify the underlying principles and aims in existing policy documents, legislation and guidance that relate to noise. It also sets out the long term vision of Government noise policy:

*“To promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development.”*

2.1.5 The NPSE clarifies that noise should not be considered in isolation of the wider benefits of a scheme or development, and that the intention is to minimise noise and noise effects as far as is reasonably practicable having regard to the underlying principles of sustainable development.

2.1.6 The first two aims of the NPSE follow established concepts from toxicology that are applied to noise impacts, for example, by the World Health Organisation. They are:

NOEL – No Observed Effect Level - the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise; and



**LOAEL** – Lowest Observed Adverse Effect Level - the level above which adverse effects on health and quality of life can be detected.

2.1.7 The NPSE extends these to the concept of a significant observed adverse effect level.

**SOAEL** – Significant Observed Adverse Effect Level - The level above which significant adverse effects on health and quality of life occur.

2.1.8 The NPSE notes "It is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise in all situations. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times".

### **Planning Practice Guidance - Noise (2014)**

2.1.9 Government's Planning Practice Guidance on noise (PPG) provides guidance on the effects of noise exposure, relating these to people's perception of noise, and linking them to the NOEL and, as exposure increases, the LOAEL and SOAEL.

2.1.10 As exposure increases above the LOAEL, the noise begins to have an adverse effect and consideration needs to be given to mitigating and minimising those effects, taking account of the economic and social benefits being derived from the activity causing the noise. As the noise exposure increases, it will then at some point cross the SOAEL boundary.

2.1.11 The LOAEL is described in PPG as the level above which "noise starts to cause small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life."

2.1.12 PPG identifies the SOAEL as the level above which "noise causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area."

## **2.2 Guidance**

### **British Standard 8233: 2014 'Guidance on Sound Insulation and noise reduction for buildings**

2.2.1 BS 8233, in relation to this planning application, sets out desirable guideline values in habitable rooms, such as living rooms and bedrooms.

2.2.2 The guideline values relate to steady external noise without a specific character, previously termed 'anonymous noise'. According to the standard, noise has a specific character if it contains features such as a distinguishable, discrete and continuous tone, is irregular enough to attract attention, or has strong low-frequency content, in which case lower noise limits might be appropriate. Examples of noise with a character may include tonal/intermittent plant noise emissions, music playback, and workshop noise. Examples of external steady noise sources may include environmental noise sources such as busy road traffic.

2.2.3 The desirable internal ambient noise levels for dwellings are presented in **Table 2.1**.

Activity	Location	07:00 to 23:00 hours	23:00 to 07:00 hours
Resting	Living room	35 dB $L_{Aeq,16h}$	-
Dining	Dining room/area	40 dB $L_{Aeq,16h}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16h}$	30 dB $L_{Aeq,8h}$
* Note 4 Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or $L_{Amax,f}$ , depending on the character and number of events per night. Sporadic noise events could require separate values.			
Note 5 If relying on closed windows to meet the guide values, there needs to be an appropriate alternative source of ventilation that does not compromise the façade insulation or the resulting noise levels.			
Note 7 Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal target levels may be relaxed by up to 5dB and reasonable internal conditions still achieved.			

Table 2.1: BS 8233 Desirable Internal Ambient Noise Levels for Dwellings

2.2.4 The standard also provides advice in relation to design criteria for external noise. It states that:

*“for traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed 50 dB  $L_{Aeq,T}$ , with an upper guideline value of 55 dB  $L_{Aeq,T}$  which would be acceptable in noisier environments. However, it is also recognized that these guideline values are not achievable in all circumstances where development might be desirable.*

*In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited.*

*Other locations, such as balconies, roof gardens and terraces, are also important in residential buildings where normal external amenity space might be limited or not available, i.e. in flats, apartment blocks, etc. In these locations, specification of noise limits is not necessarily appropriate.*

*Small balconies may be included for uses such as drying washing or growing pot plants, and noise limits should not be necessary for these uses. However, the general guidance on noise in amenity space is still appropriate for larger balconies, roof gardens and terraces, which might be intended to be used for relaxation.*

*In high-noise areas, consideration should be given to protecting these areas by screening or building design to achieve the lowest practicable levels. Achieving levels of 55 dB  $L_{Aeq,T}$  or less might not be possible at the outer edge of these areas, but should be achievable in some areas of the space.”<sup>1</sup>*

<sup>1</sup> \*A selection of the available notes

## British Standard 7445: 2003 Description and Measurement of Environment Noise – Part 1: Guide to Quantities and Procedures

- 2.2.5 BS 7445-1 describes methods and procedures for measuring noise from all sources which contribute to the total noise climate of a community environment, individually and in combination. The results are expressed as equivalent continuous A-weighted sound pressure levels,  $L_{Aeq,T}$ .
- 2.2.6 BS 7445-1 states that sound level meters that are used should conform to Type 1 (or Type 2 as a minimum) as described in BS EN 61672:2013 Electroacoustics. Sound Level Meters should be calibrated according to the instructions of the manufacturer and field calibration should be undertaken at least before and after each series of measurements.

## World Health Organization, Guidelines for Community Noise, 1999 (WHO)

- 2.2.7 The World Health Organisation (WHO) *Guidelines for Community Noise* (1999) also sets out guidance on suitable internal and external noise levels in and around residential properties. The following internal noise levels are recommended by the WHO:
- 35 dB  $L_{Aeq,T}$  in living rooms over a 16 hour day; and
  - 30 dB  $L_{Aeq,T}$  in bedrooms during the 8 hour night.
- 2.2.8 With respect to the night-time maximum noise levels, the WHO guidelines state:
- “For a good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45 dB LAFmax more than 10-15 times per night.”*
- 2.2.9 In section 4.2.1. the guidelines state that:
- “For speaker-to-listener distance of about 1 m:*
- *Speech in relaxed conversation is 100% intelligible in background noise levels of about 35 dBA, and can be understood fairly well in background levels of 45 dBA.*
  - *Speech with more vocal effort can be understood when the background sound pressure level is about 65 dBA.”*
- 2.2.10 A report compiled by the National Physical Laboratory for the Department for Environment Transport and the Regions concluded that the W.H.O. guidelines might be considered as highly precautionary. In considering how the W.H.O. guidelines should be interpreted, the report states that:
- “In essence the W.H.O. guidelines represent a consensus view of international expert opinion on the lowest threshold noise levels below which the occurrence rates of particular effects can be assumed to be negligible. Exceedances of the W.H.O. guideline values do not necessarily imply significant noise impact and indeed, it may be that significant impacts do not occur until much higher degrees of noise exposure are reached”.*
- 2.2.11 The National Physical Laboratory report also states:
- “The most constructive use for the W.H.O. guidelines will be to set thresholds above which greater attention should be paid to the various possibilities for noise control action when planning new developments. It is important to make clear at this point that exceedances do not necessarily imply an overriding need for noise control, merely that the relative advantages and disadvantages of noise control action should be weighed in the balance. It is all a*

*question of balance and mere exceedance of the W.H.O. guidelines just starts to tip the scales”.*

- 2.2.12 Finally, the National Physical Laboratory (NPL) report notes that “We know from the most recent national survey of noise exposure carried out in England and Wales (SARGENT 93) that around 56% of the population are exposed to daytime noise levels exceeding 55 dB(A)  $L_{\text{Aeq},16\text{hr}}$ ” and “In addition there is no evidence that anything other than a small minority of the population exposed at such noise levels find them to be particularly onerous in the context of their daily lives”.

### **World Health Organisation (WHO) 2009: Night Noise Guidelines for Europe**

- 2.2.13 The introduction of the Directive on Environmental Noise obliges Member States to assess and manage noise levels. With the support of the European Commission, the WHO Regional Office for Europe has developed night noise guidelines for Europe to help Member States develop legislation to control noise exposure.
- 2.2.14 The guidelines are based on scientific evidence on the effects of noise and the thresholds above which these effects appear to harm human health.
- 2.2.15 There is limited evidence that night noise is related to hypertension, heart attacks, depression, changes in hormone levels, fatigue and accidents.
- 2.2.16 The WHO report summarised the threshold levels of night noise above which a negative effect starts to occur or above which the impact becomes dependent on the level of exposure. For example, the threshold level for waking in the night and/or too early in the morning was 42 dB.
- 2.2.17 It also established that there are differences in the intensity and frequency of noise depending on the source, which lead to different impacts. Road traffic is characterised by low levels of noise per event, but as there are a high number of events, on average it has a greater effect on awakenings than air traffic, which has high levels of noise per event but fewer events.
- 2.2.18 Integrating these findings, the report proposed a guideline target limit of outdoor night noise of 40 dB (annual average defined as ‘L<sub>night</sub>’ in the Environmental Noise Directive). There is not sufficient evidence that the biological effects observed below this level are harmful to health but adverse effects are observed above 40 dB.
- 2.2.19 Member States can adopt this night noise guideline to reduce noise using measures such as house insulation, locating offices in noise-exposed areas and creating zones where a certain level of noise cannot be exceeded. It can also be used for health impact assessment of new projects such as roads, airports or residential areas.

### **LOAELs for transportation airborne noise affecting outdoor amenity areas.**

- 2.2.20 Outdoor sound levels of 50 dB  $L_{\text{Aeq},16\text{h}}$  during the daytime and 40 dB  $L_{\text{Aeq},8\text{h}}$  during the night-time are considered the LOAELs for operational airborne noise from altered roads and the operational railway
- 2.2.21 In the WHO Night Noise Guidelines for Europe a free field level of 40 dB  $L_{\text{Aeq},8\text{h}}$  during the night-time is said to be “equivalent to the LOAEL for night noise”.
- 2.2.22 For the daytime level, the information used to support the WHO Guidelines for Community Noise indicate that daytime sound levels of less than 50 dB  $L_{\text{Aeq},16\text{h}}$  cause little or no serious annoyance in the community.

- 2.2.23 The WHO Guidelines for Community Noise also identify 60 dB  $L_{AFMax}$  outside as the guideline value for sleep disturbance with windows open. For this reason, sound levels of 60 dB  $L_{AFMax}$  at the façade are also considered the LOAEL for individual noise events. The above assumes a 15 dB difference when a window is partially open.

### SOAELs for transportation airborne noise affecting outdoor amenity areas.

- 2.2.24 Sound levels of 65 dB  $L_{Aeq,16h}$  during the daytime and 55 dB  $L_{Aeq,8h}$  during the night-time are considered the SOAEL's for transportation noise for outdoor amenity areas at residential dwellings.
- 2.2.25 The daytime SOAEL is consistent with the daytime trigger level in the UK's Noise Insulation (Railways and Other Guided Transport Systems) Regulations. The WHO Night Noise Guidelines for Europe sets the Interim Target at 55 dB  $L_{Aeq,8h}$  during the night-time outside dwellings. This noise threshold has been taken to be the night-time SOAEL. However, as outdoor amenity areas are not routinely occupied during the night-time, exceedance of the night-time level may be considered acceptable.
- 2.2.26 The application of these levels for outdoor amenity areas should take into consideration the advice within BS8233:2014. Due to the advice contained herein, these levels may not be considered appropriate in all circumstances.

### LOAEL and SOAEL for transportation airborne noise affecting indoor residential levels.

- 2.2.27 Incident façade levels should not be considered in isolation of the sound reduction provided by the external building fabric. The guidance within Planning Policy Guidance states that *"consideration should also be given to whether adverse internal effects can be completely removed by closing windows and, in the case of new residential development, if the proposed mitigation relies on windows being kept closed most of the time. In both cases a suitable alternative means of ventilation is likely to be necessary. Further information on ventilation can be found in the Building Regulations."*
- 2.2.28 Based on the advice within BS:8233:2014 an indoor noise level of 35 dB  $L_{Aeq,16h}$  during the daytime and 30 dB  $L_{Aeq,8h}$  during the night-time may be considered as the LOAEL for transportation noise.
- 2.2.29 Similarly an indoor noise level 50 dB  $L_{Aeq,16h}$  and 45 dB  $L_{Aeq,8h}$  during the night-time may be considered as the SOAEL for transportation noise.
- 2.2.30 Research findings on adverse effects on non-restorative sleep which indicate that adverse effects on sleep can be avoided if the maximum noise level inside the bedroom do not exceed 65 dB when more than 20 discreet events occur. This may be considered the SOAEL level. It may also be argued that if less than 20 discreet events occur during the night-time, the internal  $L_{Amax}$  SOAEL level could be 70 dB.
- 2.2.31 A summary of the proposed LOAEL and SOAEL noise levels are provided in **Table 2.2** below. These levels will form the basis of the assessment.

<b>Proposed LOAEL and SOAEL levels for transportation noise affecting new residential premises</b>		
<b>Level</b>	<b>Daytime (07:00 hours to 23:00 hours)</b>	<b>Night-time (23:00 hours to 07:00 hours)</b>
<b>Internal Noise Levels</b>		
LOAEL	35 $L_{Aeq,16h}$ (dB)	30 $L_{Aeq,8h}$ (dB)
SOAEL	50 $L_{Aeq,16h}$ (dB)	45 $L_{Aeq,8h}$ (dB)
LOAEL	Not applicable	45 dB $L_{Amax}$ if more than 20 events
	Not applicable	50 dB $L_{Amax}$ if less than 20 events
SOAEL	Not applicable	65 dB $L_{Amax}$ if more than 20 events
	Not applicable	70 dB $L_{Amax}$ if less than 20 events
<b>External Noise Levels</b>		
LOAEL	50 $L_{Aeq,16h}$ (dB)	45 $L_{Aeq,8h}$ (dB)
SOAEL	65 $L_{Aeq,16h}$ (dB)	55 $L_{Aeq,8h}$ (dB)

Table 2.2: Proposed LOAEL and SOAEL noise levels

## 3 Methodology

### 3.1 Consultation with the Local Authority

3.1.1 The Environmental Health Department at Fenland District Council agreed that the residential development should meet the requirements of the national policy<sup>2</sup>. Therefore the information contained in Table 2.2 should be used for the purposes of the assessment.

### 3.2 Baseline Noise

3.2.1 An environmental noise survey was undertaken between 9<sup>th</sup> and 10<sup>th</sup> December 2014 in order to determine the current noise climate at the site.

3.2.2 Noise measurements were taken at three locations around the site. The noise survey locations are described in Table 3.1 and are also presented in the enclosed Figure 1.

Survey Locations	Description	Dominant Source
LT1	24 hours – North-West Boundary, along Recreation Ground	Distant road traffic
LT2	24 hours – South-West Boundary, along Wenny Road	Road Traffic, Wenny Road
LT3	24 hours – East Boundary, along A142, Isle of Ely Way	Road Traffic, A142

Table 3.1: Noise survey Long Term locations

3.2.3 Measurements were taken during the week when typical traffic noise levels are expected.

3.2.4 Locations LT2 and LT3 were selected in order to establish typical incident noise levels along the two roads around the proposed site. LT1 was selected in order to establish the typical incident noise levels from natural sources, distant road traffic and nearby dwellings.

3.2.5 Due to the nature of the survey, i.e. unmanned, it is not possible to accurately comment on the weather conditions throughout the entire survey period. However at the beginning and end of the survey period the weather conditions were slightly windy and dry. The air temperature was around 7°C during the daytime with maximum wind speeds of 2.3 m/s, clear sky and no precipitation. These meteorological conditions are considered acceptable for environmental noise surveys.

3.2.6 A large range of statistical noise parameters were acquired, but the A-weighted noise parameters  $L_{Aeq,T}$ ,  $L_{A90,T}$ ,  $L_{A10,T}$ , and  $L_{AFmax}$  are considered to be the most relevant in the context of planning and noise. These are presented in the results section of this report.

3.2.7 The measurements were undertaken under free-field conditions. The microphones were located approximately 1.5 m above the ground.

3.2.8 The noise instrumentation used during the survey has valid laboratory certification, which is available upon request. Field calibrations were performed before and after the measurements

<sup>2</sup> Email received from Steven Bass (Senior Environmental Health Protection Officer) FDC Council on the 05/12/2014 at 11:03 hours.

with no significant fluctuation recorded. The instrumentation used in the survey is listed in **Table 3.2**.

Item	Type	Manufacturer	Serial Number	Laboratory Calibration Date
Sound Level Meter	NL-52	Rion	542901	31.07.2014
Microphone	UC-59	Rion	6478	31.07.2014
Pre-Amplifier	NH-25	Rion	42929	31.07.2014
Sound Level Meter	NL-52	Rion	542902	31.07.2014
Microphone	UC-59	Rion	6479	31.07.2014
Pre-Amplifier	NH-25	Rion	42930	31.07.2014
Sound Level Meter	NL-52	Rion	542903	31.07.2014
Microphone	UC-59	Rion	6480	31.07.2014
Pre-Amplifier	UC-59	Rion	42931	31.07.2014
Anemometer	3500	Kestrel	1667363	-

Table 3.2: Instrumentation Used in the Survey

### 3.3 Assessment

#### Noise Levels

- 3.3.1 The noise survey results established the noise climate of the site at the specific time and locations of the survey. The baseline noise survey results have been used to determine the likely internal noise levels in the proposed dwellings due to environmental noise.
- 3.3.2 Mitigation measures in order to meet the internal noise levels for proposed dwellings have been based on the measured levels across the site. Mitigation measures have been proposed in order for internal noise to approach the suggested LOAEL as presented in Table 2.2.
- 3.3.3 The internal noise levels have been assessed for the proposed residential land use areas.
- 3.3.4 The assessment also determines whether noise levels in outdoor amenity areas would comply with the suggested criteria.

### 3.4 Assumptions/Limitations

- 3.4.1 It is considered that the environmental noise survey was undertaken during typical conditions. It was undertaken during the school term, there were no observed accidents on the local road network and there were no known events taking place in the local area.



- 3.4.2 The site engineer noticed nothing unusual in terms of the noise climate at the beginning and end of the noise survey.
- 3.4.3 This report refers, within the limitations stated, to the environment of the site in the context of the surrounding area at the time of the inspections. Environmental conditions can vary and no warranty is given as to the possibility of changes in the environment of the site and surrounding area at differing times.

## 4 Results

### 4.1 Noise Survey Results

4.1.1 A summary of the noise survey results is presented in **Table 4.1**. A complete set of results is presented in **Appendix B**.

Location	LAeq,16hr (Day) dB(A)	LAeq,8hr (Night) dB(A)	Typical LA90 (Night) dB(A)
LT1	54	47	38
LT2	59	52	42
LT3	70	65	43

Table 4.1: Summary of Survey Results

## 5 Assessment

### 5.1 Internal Noise Levels

5.1.1 In relation to the noise reduction from partially open windows BS 8233 states:

*"If partially open windows were relied upon for background ventilation, the insulation would be reduced to approximately 15 dB ..."*

5.1.2 Therefore, in order to approach the BS:8233 criteria as shown in **Table 2.1**, opening windows for background ventilation purposes will not be possible at dwellings where incident noise levels are predicted to be above 50 dB  $L_{Aeq,16h}$  during the daytime or 45 dB  $L_{Aeq,8h}$  (and  $L_{Amax}$ ) during the night-time. Background ventilation would need to be provided using an alternative ventilation method so that the windows can remain closed.

5.1.3 Based on the results of the noise survey, the internal noise criteria would not be met at any dwellings when windows are partially open.

### 5.2 Outdoor Environmental Noise Levels

5.2.1 The noise criterion for outdoor living spaces such as gardens is likely to be exceeded for any areas overlooking the roads.

## 6 Mitigation Measures

### 6.1 Outdoor Living Space

- 6.1.1 The proposed LOAEL level for outdoor living spaces such as gardens is likely to be exceeded for gardens near the two roads.
- 6.1.2 Partial noise screening may be provided by placing garden areas to the rear of the dwellings. In addition, due to transportation noise infiltrating through the gaps between detached or semi-detached dwellings, the garden fence panels may have to comprise dense acoustic fence panels.
- 6.1.3 The use of continuous earth bunds or noise barriers (or a combination of the two) may be utilized near the roads but this will only slightly reduce incident noise levels (and gardens will still have to be placed behind dwellings).
- 6.1.4 The measured noise levels at location LT1 imply the need for mitigation for outdoor areas. However, the existing levels at that location include contributions from road traffic along the A142 and Wenny Road. However, the future construction of dwellings facing the two main thoroughfares will result in noise reduction to the “rear” of the development and hence any suggested mitigation measures at this stage may not be necessary. This will be reviewed further when the first noise model of the masterplan is prepared.
- 6.1.5 Noise levels at outdoor garden areas in the land between A142 and Wenny Road may not meet a level of 55dB  $L_{Aeq,16h}$  at all cases. It should be noted that BS 8233:2014 states that:

*“In high-noise areas, consideration should be given to protecting these areas by screening or building design to achieve the lowest practicable levels. Achieving levels of 55dB  $L_{Aeq,T}$  or less might not be possible at the outer edge of these areas, but should be achievable in some areas of the space.”*

### 6.2 Internal Noise Levels

- 6.2.1 The suggested LOAEL levels could be achieved with closed windows alongside the provision of an alternative mean of background ventilation. It should be highlighted that due to the onerous requirements in Approved Document F, the provision of mechanical ventilation (System 4) may be the only suitable ventilation solution on facades with high incident noise levels i.e. near the A142. Additionally, the external building fabric should be of a masonry construction and the size of the windows should be small. The acoustic reduction properties of access doors may also require an upgrade.
- 6.2.2 It is recommended that openable windows are still provided to allow for purge ventilation in emergencies and during summer overheating. Opening the windows to the rear (screened from the road) for purge ventilation should be considered appropriate.

## 7 Conclusions

- 7.1.1 PBA was commissioned to provide a noise impact assessment for an outline planning application in relation to a proposed residential development at a site along A142 and Wenny Road in Chatteris.
- 7.1.2 A noise survey was undertaken between 9<sup>th</sup> and 10<sup>th</sup> December 2014 to determine the current noise climate at the site.
- 7.1.3 The information presented herein should be used to inform the masterplan.

# Figure 1



Figure 1: Aerial photograph showing approximate location of measurement positions

# Figure 2

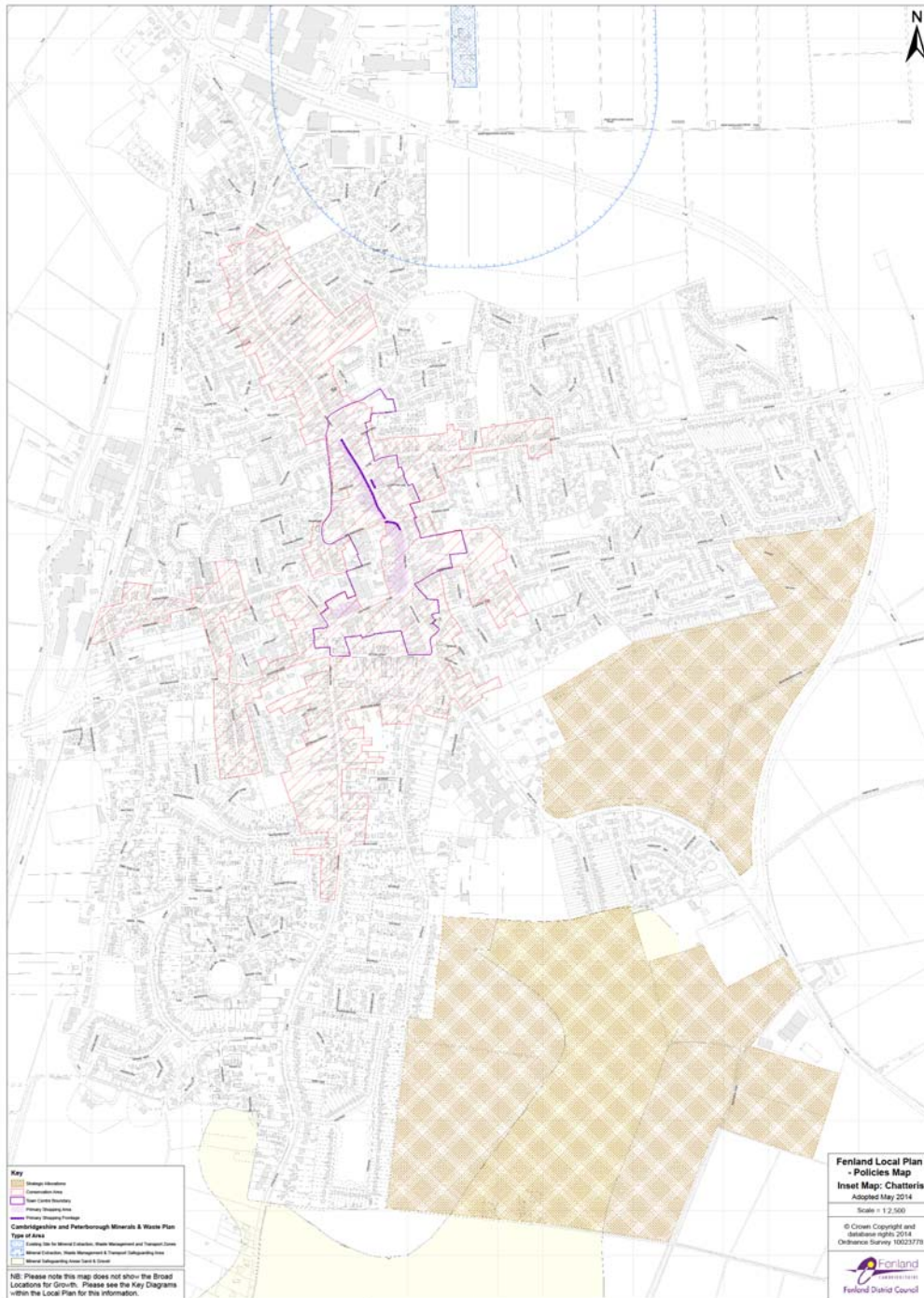


Figure 2: Land Use Plan

## Appendix A Glossary of Acoustic Terminology

The following glossary of terms has been produced using information contained in BS 5228-1:2009, BS 8233:1999 and BS 4142:1997.

Ambient Noise	Total encompassing sound in a given situation at a given time, usually composed of sound from many sources far and near.
Background Noise	In BS 4142 this is defined as the A weighted sound pressure level of the residual noise at the assessment position that is exceeded for 90% of a given time interval, T ( $L_{A90,T}$ )
Daytime	For assessment of internal and external noise levels to the development, the daytime is extrapolated from BS 8233 as the period from 07:00 to 23:00 hours (as night-time is from 23:00 to 07:00 hours). For construction noise it is defined in BS 5228-1 as the period from 07:00 to 19:00 hours.
Decibel (dB)	A unit of level derived from the logarithm of the ratio between the value of a quantity and a reference value. It is used to describe the level of many different quantities. For sound pressure levels the reference quantity is 20 uPa. The threshold of normal hearing is in the region of 0 dB and 140 dB is the threshold of pain. A change of 1 dB is only perceptible under controlled conditions.
dB(A), $L_{Ax}$	Decibels measured on a sound level meter incorporating a frequency weighting (A weighting) which differentiates between sounds of different frequency (pitch) in a similar way to the human ear. Measurements in dB(A) broadly agree with people's assessment of loudness. A change of 3 dB(A) is the minimum perceptible under normal conditions, and a change of 10 dB(A) corresponds roughly to halving or doubling the loudness of a sound. The background noise in a living room may be about 30 dB(A); normal conversation about 60 dB(A) at 1 metre; heavy road traffic about 80 dB(A) at 10 metres; the level near a pneumatic drill about 100 dB(A).
Evening	Defined in BS 5228-1 as the period from 19:00 to 23:00 hours.
$L_{A10,T}$	The A weighted noise level exceeded for 10% of the measurement period, T. It gives an indication of the upper limit of fluctuating noise such as that from road traffic. $L_{A10,18h}$ is the arithmetic average of the 18 hourly $L_{A10,1h}$ values from 06:00 to 24:00 hours.
$L_{AE}$	The sound exposure level – the level of a sound with a period of 1 second that has the same sound energy as the event considered.
$L_{Aeq,T}$	The equivalent continuous sound level – the sound level of a notionally steady sound having the same energy as a fluctuating sound over a specified measurement period (T). $L_{Aeq,T}$ is used to describe many noises and can be measured directly with an integrating sound level meter.
$L_{Amax}$ ,	The highest A weighted noise level recorded during a noise event. The time weighting (slow or fast) should be stated.
Night-time	Defined in BS 8233 and BS 5228-1 as the period from 23:00 to 07:00 hours.
Specific Noise Level, $L_{Aeq,Tr}$	The equivalent continuous A-weighted sound pressure level at the assessment position produced by the specific noise source over a given reference time interval



## Appendix B Time History Graphs

