

Benson noise assessment

South Oxfordshire District Council

23 February 2015

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1 Introduction

Within their Core Strategy South Oxfordshire District Council have identified the village of Benson for the provision of an additional housing allocation of 125 new homes. Eight potential sites have been identified in the area - as set out in the Strategic Housing Land Availability Assessment (SHLAA) - however, each of the sites is likely to be impacted to some degree by the noise generated from helicopter traffic from RAF Benson.

It is understood that some concern has been expressed that the development of some of the eight sites for residential purposes could potentially give rise to unsatisfactory conditions for future residents due to aircraft noise.

In view of the foregoing, South Oxfordshire District Council are seeking to undertake a study to evaluate the potential noise impacts and effects at each of the eight prospective development sites, which will enable recommendations to be made regarding their suitability for development. The assessment covers the eight SHLAA sites around Benson but considers BEN 7 and BEN 8 together as a single site.

The assessment also considers the potential impact of noise and vibration from twin rotor heavy lift helicopters (for example Chinooks) should they be employed at RAF Benson in future.

2 Planning policy context

2.1 Background

The Government's planning policies for England are contained in the [National Planning Policy Framework 2012](#)¹ (NPPF). This sets out key requirements for the planning system and provides a framework by which local policy should be made to reflect local needs and priorities.

NPPF policies are supplemented by additional advice contained in [National Planning Practice Guidance](#)² (NPPG), which provides advice on how planning can help to manage potential noise impacts.

The NPPF does not contain specific policies for nationally significant infrastructure projects for which particular considerations apply. These considerations are set out in the relevant national policy statements. These [national policy statements](#)³ form part of the overall framework of national planning policy.

The long term vision and aims of the Government's policy on noise is contained in the [Noise Policy Statement for England](#)⁴ (NPSE).

National Planning Policy Framework 2012

The NPPF must be taken into account in the preparation of local and neighbourhood plans, and is a material consideration in planning decisions.

¹ <http://www.communities.gov.uk/documents/planningandbuilding/pdf/2116950.pdf>

² <http://planningguidance.planningportal.gov.uk/>

³ <http://infrastructure.planningportal.gov.uk/legislation-and-advice/national-policy-statements/>

⁴ https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69533/pb13750-noise-policy.pdf

Paragraph 14 of the NPPF states that *“At the heart of the National Planning Policy Framework is a presumption in favour of sustainable development, which should be seen as a golden thread running through both plan-making and decision-taking”*.

At Paragraph 6 the purpose of the planning system is described as *“to contribute to the achievement of sustainable development”*. The planning system has to perform a number of roles – economic, social and environmental. When expanding on these roles the NPPF encourages *“creating a high quality built environment”*, *“contributing to protecting and enhancing our natural, built and historic environment”* and *“minimise waste and pollution”*.

Paragraph 17 of the NPPF states that planning should *“contribute to conserving and enhancing the natural environment and reducing pollution”* and *“always seek to secure high quality design and a good standard of amenity for all existing and future occupants of land and buildings”*.

There are two paragraphs (Paragraphs 109 and 123) in the NPPF that directly mention noise.

Paragraph 109 states:

“...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 soil, air, water or noise pollution or land instability...”

Paragraph 123 states:

“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 businesses wanting to develop in continuance of their 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.”*

The previous guidance contained in Planning Policy Guidance Note 24: Planning and Noise has now been withdrawn with the implementation of the NPPF.

Noise Policy Statement for England 2010

[The Noise Policy Statement for England](#) (NPSE) sets out the long term vision of Government noise policy, which is to:

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

This long term vision is supported by the following aims:

“Through the effective management of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:

- avoid significant adverse impacts on health and quality of life;*
- mitigate and minimise adverse impacts on health and quality; and*
- where possible, contribute to the improvement of health and quality of life.”*

When discussing the meaning of *“significant adverse”* and *“adverse”* within an Explanatory Note the NPSE states:

“There are two established concepts from toxicology that are currently being applied to noise impacts for example, by the World Health Organisation. They are

NOEL – No Observed Effect Level - This is 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.

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

For the purposes of the NPSE, the Government added the following related concept:

“SOAEL – Significant Observed Adverse Effect Level - This is the level above which significant adverse effects on health and quality of life occur.”

It is also noted that 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 sources, for different receptors and at different times.

National Planning Practice Guidance 2014

The National Planning Practice Guidance (NPPG) was published as an online resource in March 2014; the most recent advice on managing potential noise impacts through planning can be found in a specific part of the NPPG located [here](#)⁵.

The NPPG includes guidance on how to recognise when noise could be a concern in planning decisions and includes advice that the planning process should be used to “avoid” significant observed adverse effects occurring, by use of appropriate mitigation such as altering design and layout. The NPPG also states that the planning process should be used to “prevent” unacceptable adverse effects where noise is noticeable and very disruptive leading to extensive and regular changes in behaviour and/or an inability to mitigate the effect of noise leading to psychological stress or physiological effects.

The NPPG provides a summary table setting out the noise exposure hierarchy based on the likely average response, reproduced below.

⁵ <http://planningguidance.planningportal.gov.uk/blog/guidance/noise/noise-guidance/>

Perception	Examples of outcomes	Increasing effect level	Action
Not noticeable	No effect	No observed effect	No specific measures required
Noticeable and not intrusive	Noise can be heard, but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No observed adverse effect	No specific measures required
<i>Lowest Observed Adverse Effect Level</i>			
Noticeable and intrusive	Noise can be heard and causes 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.	Observed adverse effect	Mitigate and reduce to a minimum
<i>Significant Observed Adverse Effect Level</i>			
Noticeable and disruptive	The 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.	Significant observed adverse effect	Avoid
Noticeable and very disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent

2.2 Impacts and effects on noise sensitive development

The stated aim of South Oxfordshire District Council in undertaking the noise assessment of the potential development sites is:

“Using the WHO Guidelines for the Community Noise 1999, WHO Night Noise Guidelines for Europe 2009 and British Standard 8233:2014- “Guidance on sound insulation and noise reduction for buildings” the report will conclude whether recorded noise on any of the sites exceed the limits of the guidance. The report will then conclude which sites are the most suitable for development in terms of noise impact on future residents.”

The assessment will be conducted according to the stated guidelines and standard, however, for these guidance documents to be used to assess the suitability for development they will need to be used within the proper context of the NPPF and, in particular, paragraph 123.

It can be seen that a key requirement of planning policy is to minimise adverse effects and avoid significant adverse effect on health and quality of life within the context of sustainable development. Therefore, it is necessary to establish those levels which can be considered to be adverse and significant adverse for the noise sources in question. A significant adverse effect is by definition greater than an adverse effect and a SOAEL is greater than a LOAEL. The effect level will be defined for each of the relevant noise sources by reference to the best available evidence on each of the relevant effects, including: annoyance, sleep, speech interference and cardiovascular effects. The effect levels developed will refer explicitly to external noise levels to provide a comparison between the various sites as to the extent of noise impacts and potential consequent effects, including any which might be deemed unsuitable for development.

In many cases it should be possible to design and construct a development in such a manner as to avoid, or reduce to a minimum, any adverse effects. Consideration will therefore also be given to appropriate target design levels for any noise sensitive residential scheme and the possible means by which these might be achieved, in keeping with the principles of good design espoused by the Planning Practice Guidance.

3 Adverse effects and internal design levels

3.1 Consideration of adverse effect levels

Night time

In considering the onset of effects during the night, the WHO Night Noise Guidelines (NNG) for Europe (2009) indicates adverse health effects, such as self-reported sleep disturbance and environmental insomnia are observed at a level above 40dB $L_{\text{night, outside}}$, with no sufficient evidence to suggest that levels below this give rise to biological effects which are harmful to health. The 40dB $L_{\text{night, outside}}$ has therefore been adopted as the night noise guideline and is explicitly referred to as equivalent to the lowest observed adverse effect level (LOAEL). This guideline is an 'annual average' as it relates to the Environmental Noise Directive, with an 8-hour time base (23:00 - 07:00 hours).

The Night Noise Guidelines also go on to state that at levels above 55dB the cardiovascular effects become the major public health concern (adopted as an Interim Target by the WHO), which are less likely to be dependent upon the nature of the noise. Furthermore, between the onset of effects and this value the precise impact will depend upon the specific circumstances.

The nature of individual events, and specifically aircraft movements, suggests that it is also necessary to consider transient noise levels and the possible effects. L_{Amax} or SEL parameters are generally used to indicate the probability of noise-induced awakenings and the WHO 1999 Community Guidelines states that effects have been observed at internal L_{Amax} levels of 45 dB or less and that the number of events exceeding this should be limited. A guideline value for the maximum noise level outside bedrooms (assuming partially open windows) is therefore stated as 60 dB $L_{\text{Amax,F}}$ in order to avoid sleep effects and is considered to represent the LOAEL for transient events.

In considering higher levels of exposure, the Department of Transport Summary of the Report of a Field Study of Aircraft Noise and Sleep Disturbance, (CAA, 1992) states: "The results indicate that, below outdoor event levels of 90 dBA SEL (80 dBA L_{max}), aircraft noise events are most unlikely to cause any measurable increase in the overall rates of sleep disturbance experienced during normal sleep. For outdoor event levels in the range 90-100 dBA SEL (80-

95 dBA L_{max}) the chance of the average person being wakened is about 1 in 75. Again, individual deviations from the average are substantial.”

Due to the nature of the helicopter activities, the events include low altitude hovering and ground movements which may extend for prolonged periods. In such circumstances the SEL may be significantly elevated above the L_{max} levels and would be better accounted for within the period Leq values. Consequently, it is considered that the SOAEL for exposure to transient night time aircraft noise events is best considered as an L_{max} value, which will be taken to be 80 dB L_{Amax,S}.

For sources other than aircraft, where individual events regularly exceed a free field level of 82 dB L_{Amax,S} during the night this will be considered to represent the onset of significant effects.

Daytime

The WHO Guidelines for Community Noise (1999) advises in relation to dwellings that “To protect the majority of people from being seriously annoyed during the daytime, the outdoor sound level from steady, continuous noise should not exceed 55 dB LAeq on balconies, terraces and in outdoor living areas. To protect the majority of people from being moderately annoyed during the daytime, the outdoor sound level should not exceed 50 dB LAeq.”

There is also consensus, which is reflected in European noise policy, that the difference in the sensitivity between day and night is 10 dB. Given a night time LOAEL of 40 dB, this would suggest a daytime level in keeping with that of the WHO guidance that there is little or no serious annoyance to the community 50 dB.

On this basis 50 dB is taken to represent the LOAEL during the daytime period and is a free-field L_{Aeq,T} over a 16-hour time base (07:00 - 23:00 hours).

In considering of the onset of significant adverse effects the assumption of a 10 dB difference in the sensitivity between day and night, would suggest a SOAEL of 65 dB. Such a level is in keeping with the qualification criteria for the Noise Insulation Regulations and the Noise Insulation (railways and other guided transport systems) Regulations, recognising that the former of these adopts different parameters for assessment ie. L10 18-hour.

In terms of commercial aircraft noise from airports, however, the level for noise insulation would generally be 2 dB lower. Ahead of the development of a National Policy Statement for airports, the government has published the Aviation Policy Framework, which makes recommendations for noise insulation, stating:

“Where airport operators are considering developments which result in an increase in noise, they should review their compensation schemes to ensure that they offer appropriate compensation to those potentially affected. As a minimum, the Government would expect airport operators to offer financial assistance towards acoustic insulation to residential properties which experience an increase in noise of 3dB or more which leaves them exposed to levels of noise of 63 dB L_{Aeq,16h} or more.”

Assuming that the guidance effectively aligns SOAELs with noise insulation trigger thresholds, this might suggest a daytime SOAEL of 63 dB L_{Aeq,16hr} for aircraft noise and a higher value of 65 dB L_{Aeq,16hr} for road and rail traffic.

3.2 Summary of Adverse and Significant Adverse Effect Levels

Table 1. Summary of external adverse effect levels

Lowest Observed Adverse Effect Levels	
All sources	Day 50 dB L _{Aeq,16hr}
	Night 40 dB L _{Aeq,8hr}
	Night > 60 dB L _{Amax,F}

<i>Significant Observed Adverse Effect Levels</i>	
Aircraft	Day > 63 dB $L_{Aeq,16hr}$ Night > 55 dB $L_{Aeq,8hr}$ Night > 80 dB $L_{Amax,S}$
Road, rail and mixed sources	Day > 65 dB $L_{Aeq,16hr}$ Night > 55 dB $L_{Aeq,8hr}$ Night > 82 dB $L_{Amax,S}$

The foregoing sound pressure levels are free field (excluding façade reflections) at the position of any proposed building facades, should assume typical worst case conditions and include the consequences of any noise mitigation and management measures applied to the development site.

$L_{Aeq,T}$ where T for 16 hour day is 0700 -2300 and T for 8 hour night is 2300 – 0700.

3.3 Helicopter noise

As acknowledged within the NPPG, various factors can influence the impact of a specific noise, including: the absolute level and time of day; for non-continuous sources, the number and pattern of events; the character and spectral content of the noise. It is acknowledged that whilst fixed wing noise levels can awaken people, the likelihood of the average person having their sleep noticeably disturbed due to an individual aircraft noise event is relatively low. However, sleep disturbance from helicopter operations may differ considerably due to its unique modes of flight such as hovering and low flying. Furthermore, helicopter noise characteristics differ markedly between types and they are also sensitive to flight configuration, particularly during manoeuvres involving accelerations and turns.

In terms of defining the LOAELs and SOAELs it is important to consider and allow for the different features and characteristics of the specific noise source in question. Research carried out on behalf of Defra (NANR 235: Research into the Improvement of the Management of Helicopter Noise) highlights that response to helicopter noise is not well correlated with generally accepted acoustic parameters and that non-acoustic factors may be of equal or greater importance.

Studies attempting to relate dose-response with annoyance due to helicopter operations have produced poor correlation and no generally accepted simple relationship between objective noise and subjective annoyance. Similarly, little correlation between established acoustic parameters and complaints has been found.

The Defra report notes that '*Helicopters can be up to 15 dB more annoying than fixed-wing aircraft. However, helicopter noise levels alone do not account for annoyance trends in communities*'. This is based upon social surveys carried out by the CAA which found that helicopters in the London area were up to 15dBA more annoying than fixed wing aircraft, whilst helicopters operated in Aberdeen, servicing the North Sea oil industry, generated a similar annoyance as fixed wing aircraft for a similar sound level. This discrepancy suggests the significance of the non-acoustic factors in the perception of helicopter noise, which it has been suggested might include soundscape, flight safety, poor community relations with or a negative attitude towards the operators.

The study also considers evidence for the way in which particular features of helicopter noise such as low frequencies, the impulsive features and amplitude modulation (often described as blade slap) could influence perception. Whilst various corrections for the specific acoustic artefacts associated with helicopters have previously been suggested, these have not gained

widespread approval, with other studies (Fields and Powell, NASA, Passchier-Vermeer) failing to support the addition of a penalty for blade slap or impulsivity. These studies have established the existence of only minor differences in annoyance between more or less impulsive helicopter noise, with the Federal Aviation Administration considering that *"There is general agreement among a wide range of experts that adding a penalty to the A-weighted SEL to account from the annoyance of blade slap is not justified."*

In reviewing the available literature for helicopter noise, the Defra study concludes that *"there is no single satisfactory noise index for the measurement or prediction of the impact of noise on the community"* and that *"while Leq or Lden are not ideal, currently there is not a better option"*, with further research being required in order to develop a dose-response relationship to correlate helicopter noise with annoyance.

It is worth noting that the foregoing considerations apply to the perception and conscious effects of noise. There are few, if any, significant studies specifically regarding the effects of helicopter noise on sleep patterns - such studies generally consider fixed wing aircraft. Whilst certain studies suggest there may be some difference in perception of noise between fixed wing aircraft and rotary wing aircraft, it is also suggested that any difference may largely relate to attitudinal, non-acoustic factors, which would not apply to sleep effects. Consequently, there is no reason to suppose that effects of helicopter noise on sleep and sleep disturbance cannot be adequately described using the criteria recommended for aircraft noise in Section 3.2.

In the absence of robust evidence that the response to helicopter noise can be better characterised through consideration of and correction for specific acoustic features, it is proposed that no modifier or penalty will be applied for the assessment of helicopter noise over and above the parameters and criteria established for fixed wing aircraft.

3.4 Target design noise levels

For residential developments which might be subjected to noise above the Lowest Observed Adverse Effect Levels, the principles of the NPPF require that any adverse effects should be mitigated and reduced to a minimum. In doing so, it is necessary to consider the design noise levels that should be adopted to demonstrate that this has been achieved.

Guidance on suitable internal noise levels for dwelling houses and flats can be found in 'BS8233:2014: Guidance on sound insulation and noise reduction for buildings. In general, it is desirable that for steady external noise sources the internal ambient noise levels set out within Table 4 therein, are not exceeded (reproduced below). It should however be noted that within the footnotes it is advised that *"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. Internal ambient noise levels for dwellings (as per BS8233:2014)

Activity	Location	07:00 – 23:00	23:00 – 07:00
Resting	Living room	35 dB L _{Aeq,16 hour}	-
Dining	Dining room/area	40 dB L _{Aeq, 16 hour}	-
Sleeping (daytime resting)	Bedroom	35 dB L _{Aeq,16 hour}	30 dB L _{Aeq, 8 hour}

Notes:

1. Table [1] provides recommended levels for overall noise in the design of a building. These are the sum total of structure-borne and airborne noise sources. Groundborne noise is assessed separately and is not included as part of these targets, as human response to groundborne noise varies with many factors such as level, character, timing, occupant expectation and sensitivity.
2. The levels shown in Table [2] are based on the existing guidelines issued by the WHO and

assume normal diurnal fluctuations in external noise. In cases where local conditions do not follow a typical diurnal pattern, for example on a road serving a port with high levels of traffic at certain times of the night, an appropriate alternative period, e.g. 1 hour, may be used, but the level should be selected to ensure consistency with the levels recommended in the Table.

3. These levels are based on annual average data and do not have to be achieved in all circumstances. For example, it is normal to exclude occasional events, such as fireworks night or New Year's Eve.
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.
5. If relying on closed windows to meet the guide values, there needs to be appropriate alternative ventilation that does not compromise the façade insulation or the resulting noise level. If applicable, any room should have adequate ventilation (e.g. trickle ventilators should be open) during assessment.
6. Attention is drawn to the Building Regulations.
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 5 dB and reasonable internal conditions still achieved.

As stated previously, in considering noise arising from individual events at night the WHO Community Noise Guidelines indicate that suggest that effects have been observed at individual noise levels of 45 dB $L_{Amax,F}$ and that this level should not normally be exceeded on more than 10 occasions per night. This should therefore be adopted as a target design noise level within noise sensitive rooms at night i.e. bedrooms.

It is also necessary, however, to consider any noise impacts which might affect external amenity areas associated with any residential dwellings. The noise levels referred to within the WHO Guidelines for Community Noise (1999) in relation to balconies, terraces and in outdoor living areas have been transferred in to BS8233, which 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.”

3.5 Acoustic design

Whilst the external noise levels will be used to provide an initial comparison as to the potential adverse effects on the various prospective sites, the adoption of the principles of good design for a scheme will also be key to avoiding or reducing to a minimum any adverse effects on any sensitive internal or external spaces, within the context of sustainable development. In considering the principles of good acoustic design, consideration should be given by the developer to the management of noise through a hierarchy of possible mitigation measures, which may include:

- Maximising the spatial separation of noise source(s) and receptor(s),
- Incorporating noise barriers as part of the scheme to screen the proposed development site from significant sources of noise,
- Using the layout of the scheme to reduce noise propagation across the site,
- Using the orientation of buildings to reduce the noise exposure of habitable rooms,
- Using the building envelope to mitigate noise to acceptable levels, whilst providing adequate ventilation.

On this last point, it is noted that where openable windows are used for the purposes of ventilation the acoustic performance of the building envelope will be compromised, such that the noise insulation will typically be reduced to 10-15dBA. It is desirable that target internal noise levels be maintained in noise sensitive rooms with windows partially open and mitigation measures - such as those outlined above - should therefore be considered before relying upon the building envelope sound insulation (including fixed or closed windows and the adoption of alternative means of ventilation). Where such measures are proposed, the developer should be required to justify that the scheme design has been developed in keeping with the principles of good acoustic design.

Where fixed or closed windows and alternative means of ventilation are employed it is generally feasible to attenuate transportation noise by up to 35 dBA. Where higher levels of sound insulation are required it may become necessary to employ increasingly enhanced forms of construction, particularly in relation to windows systems / glazing and the means of ventilation. Specialist acoustic glazing systems or secondary glazing can, however, achieve weighted sound reduction in excess of R_w 40 dB.

4 Benson development sites

4.1 Development sites

Benson is one of South Oxfordshire's larger villages with a population of around 4,500. Within the Core Strategy South Oxfordshire District Council has identified Benson for the provision of an additional housing allocation of 125 new homes. Eight potential sites have been identified in the area however, each of the sites is likely to be impacted to some degree by the noise generated from helicopter traffic from RAF Benson. RAF Benson is located to the south of the village, in the immediate proximity of site BEN7/8.

A plan taken from the South Oxfordshire Strategic Housing Land Availability Assessment for Benson of showing each of the eight development sites - known as BEN 1-8 - is presented in Appendix 1.

As requested by the Council, the assessment will consider sites BEN 7 and BEN 8 together as a single site.

The A4074 runs along the south western boundary of the village and is also a significant source of road traffic noise, which is likely to affect sites BEN 1 and BEN7/8. Other roads in the area are have comparatively low volumes of road traffic, although noise from vehicles

entering Benson on Oxford Road from the A4074 may impact locally on areas of BEN 1, whilst road traffic through the village on The Sands may impact on locally on areas of BEN 4,5 and 6.

4.2 RAF Benson

In order to understand the typical operations and to establish an appropriate period for undertaking a representative noise survey a meeting was held with the operations staff at RAF Benson.

RAF Benson is a frontline support helicopter base that is home to squadrons operating Puma and Merlin helicopters. Helicopter flights to and from the base include extensive training operations, service operations, along with Thames Valley Police and Air Ambulance flights. In addition, a number of light, fixed wing aircraft operate from the site. It is understood that police and air ambulance services potentially operate on a 24 hr basis, whilst the RAF/Navy operations can take place at any time, but are primarily undertaken between 0800 - 0200 hrs; regular updates of anticipated flight times are published by RAF Benson. Training activities generally take place during week days (and nights).

The usage of the base, and consequently the resulting noise impacts on Benson, can vary significantly from week to week depending upon the deployment of the squadrons and patterns of training etc. Through liaison with the operations staff it was established that helicopter flights during the latter half of August would represent an appropriate assessment period for flight activity, including significant training activity.

In undertaking helicopter activities from the base, there are no specified flight corridors which must be adopted. Indeed, nor are military helicopters required to comply with the low flying regulations laid down for helicopters registered for civil aviation purposes; the very nature of the operations requiring them to fly at low levels, including night flying. Notwithstanding this, it is understood that RAF Benson has in place voluntary procedures to minimise the impacts of noise on local noise sensitive areas. As part of these, all aircraft aim to avoid overflights of Ewelme, Benson and Wallingford below 1500 ft agl. Aircraft also aim to avoid overflights of other local villages below 500 ft agl unless necessary for operational reasons. Other limitations are also in place for circuit flying of fixed wing aircraft and ground operation of helicopters.

Discussion was also had regarding the proximity of the BEN7/8 sites to the landing/take-off area known as Point West. Operations originating from this area are understood to favour a north west route due to safety issues, which would pass over the BEN7/8 sites.

Unlike the helicopter movements, the fixed wing aircraft generally operate within regular flight corridors, with the north-south alignment of the runway meaning that any overflights of the prospective development sites are constrained to the eastern areas Benson.

The possibility of the introduction of twin rotor heavy lift helicopters (Chinook) to the base was also discussed. This would involve the potential relocation of resources from RAF Odiham, which is currently home to the Chinook, and could potentially begin towards to end of 2015, although such arrangements have yet to be confirmed.

It is worth noting that for the remainder of this report, all references to aircraft refer to helicopters and to fixed wing aircraft.

5 Noise survey

5.1 Methodology

In order to evaluate the noise exposure of the various prospective development sites to each of the relevant noise sources, a programme of monitoring was undertaken over a seven day period commencing Wednesday 13 August 2014. The survey comprised 5 long term monitoring locations supplemented by short term measurements at 4 further locations. The

long term monitoring was primarily used to evaluate any aircraft overflights, but at relevant locations also represents road traffic noise exposure and enables the scaling of short term measurement data attributable to road traffic. Measurement locations were as follows:

- L1** - Long term measurement location on the boundary between BEN 7/8 at a distance of approximately 130m east of the A4074 with soft intervening ground conditions.
- L2** - Long term measurement location on the boundary between BEN 5/6 at a distance of approximately 150m south of The Sands and 400m north of RAF Benson with soft intervening ground conditions.
- L3** - Long term measurement location on the boundary between BEN 3/4 at a distance of approximately 150m north of The Sands with soft intervening ground conditions.
- L4** - Long term measurement location on the boundary between BEN 1/2 to the rear of properties on Sunnyside. The A4074 runs to the west at a distance of 500m or more with soft intervening ground conditions.
- L5** - Long term measurement location on the western boundary of BEN 1 at a distance of approximately 25m from Oxford Road and 100m or more to the east of the A4074 with soft intervening ground conditions.
- S1** - Short term measurement location on the eastern boundary of BEN 7 at a distance of 5m from the nearside carriageway of St Helen's Avenue.
- S2** - Short term measurement location on the western boundary of BEN 7 at a distance of 5m from the nearside carriageway of the A4074.
- S3** - Short term measurement location at a distance of 10m from the nearside carriageway of The Sands.

Long term monitoring was undertaken using 01dB Duo sound level meters certified to Class 1 IEC-61672 and filters to IEC 61260/A1. The microphones were fitted with a wind-shield and mounted in free-field conditions at a height of 1.5m above the local ground plane. Each meter underwent a field calibration check on site prior.

Measurement data, including 1/3 octave bands, were logged on a 1s basis throughout the duration of the survey. In addition, trigger levels were set, above which audio recordings of events were obtained. The default value was for a trigger where a value of 55dB $L_{Aeq,1s}$ was exceeded for 10s, although this was varied depending upon the presence of any specific sources (such as the A4074) which were consistently in excess of this. Each audio recording has been evaluated to identify helicopter and other aircraft events to be disaggregated from the residual noise, thereby allowing each of the sources to be assessed against the screening criteria for adverse effects identified in section 3.2. All data have been post-processed to evaluate the appropriate periods and parameters. Periods of rainfall or wind noise have been excluded from the data.

Short term measurement data ($L_{eq,T}$, $L_{max,F}$, and L_{10} and L_{90} percentiles, including 1/3 octave bands) were obtained at each of the additional measurement locations, to allow for scaling of long term measurements or use of the shortened measurement procedure defined within the DoT publication *Calculation of Road Traffic Noise, 1998* (CRTN). This procedure allows the determination of the $L_{A10,18h}$ noise level from the arithmetic average of the values of hourly L_{10} , measured over any three consecutive hours between 10:00 and 17:00 hours. The $L_{Aeq,16h}$ noise level can then be calculated from the $L_{A10,18h} - 2dB$, as advised within BS8233.

Weather data for the survey period was obtained from the weather station located at RAF Benson itself. Temperatures throughout were generally mild, however there was rainfall on Thursday 14 August (3mm of precipitation). Mean wind speeds were below 5m/s with the exception of Sunday 17 August, where this value was slightly exceeded, and generally in a westerly or south-westerly direction. Summary charts of the weather data are presented in Appendix 2.

Data pertaining to the 1-hour periods are presented in Appendix 3 for each of the measurement locations, whilst summary tables of relevant data for use in the assessment are presented in the following sections. Individual aircraft events are presented in Appendix 4 in terms of event L_{Aeq} , L_{Amax} and SEL, which form the basis of the transient assessment against the L_{max} criteria.

5.2 Long term measurement data

A summary of the calculated free-field period data for each of the measurement locations is presented below, considering aircraft, residual and over noise exposure separately. Data highlighted in grey represent incomplete measurement periods and the results may therefore be skewed by the typical flight pattern, which sees fewer helicopter movements during the morning period.

As can be seen from the data, the aircraft noise exposure at each of the sites is significantly reduced over weekend periods, reflecting the fact that training activities are limited at this time. In order to derive data suitable for assessment purposes, the weekday and weekend noise exposure has therefore been considered separately. It was also evident from the data that whilst the majority of the aircraft movements take place during daytime hours (07:00-23:00), there were also a proportion of helicopter movements taking place after this time, up to 02:00 hrs.

Table 3. Summary period data - Location L1

Location L1		51° 36' 57.84 N 01° 06' 27.88 W		
Date	Period	Aircraft	Residual	Overall
Wed 13/08/2014	Day $L_{Aeq,16hr}$	53.8	50.0	55.3
	Night $L_{Aeq,8hr}$	35.7	45.2	45.6
Thu 14/08/2014	Day $L_{Aeq,16hr}$	50.5	50.0	53.3
	Night $L_{Aeq,8hr}$	31.9	43.9	44.2
Fri 15/08/2014	Day $L_{Aeq,16hr}$	53.7	49.2	55.0
	Night $L_{Aeq,8hr}$	35.1	45.4	45.8
Sat 16/08/2014	Day $L_{Aeq,16hr}$	37.4	50.4	50.6
	Night $L_{Aeq,8hr}$	-	44.4	44.4
Sun 17/08/2014	Day $L_{Aeq,16hr}$	37.7	50.6	50.8
	Night $L_{Aeq,8hr}$	-	45.4	45.4
Mon 18/08/2014	Day $L_{Aeq,16hr}$	54.2	49.5	55.5
	Night $L_{Aeq,8hr}$	45.2	44.5	47.9
Tue 19/08/2014	Day $L_{Aeq,16hr}$	54.3	50.2	55.7
	Night $L_{Aeq,8hr}$	48.7	46.9	50.9
Wed 20/08/2014	Day $L_{Aeq,16hr}$	39.5	49.5	50.0
Monday - Friday	Day $L_{Aeq,16hr}$	53.4	49.7	55.0
	Night $L_{Aeq,8hr}$	43.6	45.3	47.6
Saturday - Sunday	Day $L_{Aeq,16hr}$	37.5	50.5	50.7
	Night $L_{Aeq,8hr}$	-	44.9	44.9

Table 4. Summary period data - Location L2

Location L2		51° 37' 33.91 N	01° 06' 02.05 W		
Date	Period	Aircraft	Residual	Overall	
Wed 13/08/2014	Day L _{Aeq} ,16hr	50.9	46.6	52.3	
	Night L _{Aeq} ,8hr	45.5	39.2	46.4	
Thu 14/08/2014	Day L _{Aeq} ,16hr	52.7	45.9	53.5	
	Night L _{Aeq} ,8hr	44.0	38.9	45.2	
Fri 15/08/2014	Day L _{Aeq} ,16hr	49.6	46.0	51.2	
	Night L _{Aeq} ,8hr	-	37.8	37.8	
Sat 16/08/2014	Day L _{Aeq} ,16hr	38.6	45.4	46.2	
	Night L _{Aeq} ,8hr	35.6	37.3	39.5	
Sun 17/08/2014	Day L _{Aeq} ,16hr	40.0	46.6	47.5	
	Night L _{Aeq} ,8hr	40.2	39.9	43.1	
Mon 18/08/2014	Day L _{Aeq} ,16hr	51.9	46.4	53.0	
	Night L _{Aeq} ,8hr	52.1	40.5	52.4	
Tue 19/08/2014	Day L _{Aeq} ,16hr	54.5	46.8	55.2	
	Night L _{Aeq} ,8hr	50.6	40.6	51.0	
Wed 20/08/2014	Day L _{Aeq} ,16hr	39.5	43.9	45.2	
Monday - Friday	Day L _{Aeq} ,16hr	52.5	46.3	53.5	
	Night L _{Aeq} ,8hr	49.2	39.5	48.8	
Saturday - Sunday	Day L _{Aeq} ,16hr	39.4	46.0	46.9	
	Night L _{Aeq} ,8hr	38.5	38.8	41.6	

Table 5. Summary period data - Location L3

Location L3		51° 37' 39.04 N	01° 06' 17.74 W		
Date	Period	Aircraft	Residual	Overall	
Wed 13/08/2014	Day L _{Aeq} ,16hr	43.4	45.1	47.3	
	Night L _{Aeq} ,8hr	36.6	39.6	41.3	
Thu 14/08/2014	Day L _{Aeq} ,16hr	49.8	43.3	50.6	
	Night L _{Aeq} ,8hr	45.1	35.3	45.5	
Fri 15/08/2014	Day L _{Aeq} ,16hr	42.3	36.8	43.4	
	Night L _{Aeq} ,8hr	-	-	-	
Sat 16/08/2014	Day L _{Aeq} ,16hr	-	-	-	
	Night L _{Aeq} ,8hr	-	-	-	
Sun 17/08/2014	Day L _{Aeq} ,16hr	-	-	-	
	Night L _{Aeq} ,8hr	-	-	-	
Mon 18/08/2014	Day L _{Aeq} ,16hr	-	-	-	
	Night L _{Aeq} ,8hr	-	-	-	
Tue 19/08/2014	Day L _{Aeq} ,16hr	-	-	-	
	Night L _{Aeq} ,8hr	-	-	-	
Wed 20/08/2014	Day L _{Aeq} ,16hr	-	-	-	
Monday - Friday	Day L _{Aeq} ,16hr	47.5	41.2	48.4	
	Night L _{Aeq} ,8hr	42.6	37.9	43.9	
Saturday - Sunday	Day L _{Aeq} ,16hr	-	-	-	
	Night L _{Aeq} ,8hr	-	-	-	

Table 6. Summary period data - Location L4

Location L4		51° 37' 29.50 N	01° 06' 40.43 W		
Date	Period	Aircraft	Residual	Overall	
Wed 13/08/2014	Day L _{Aeq} ,16hr	-	44.9	44.9	
	Night L _{Aeq} ,8hr	-	42.4	42.4	
Thu 14/08/2014	Day L _{Aeq} ,16hr	39.8	48.3	48.8	
	Night L _{Aeq} ,8hr	37.9	41.6	43.1	
Fri 15/08/2014	Day L _{Aeq} ,16hr	39.5	45.6	46.6	
	Night L _{Aeq} ,8hr	-	41.4	41.4	
Sat 16/08/2014	Day L _{Aeq} ,16hr	32.8	47.2	47.3	
	Night L _{Aeq} ,8hr	-	40.1	40.1	
Sun 17/08/2014	Day L _{Aeq} ,16hr	26.5	48.3	48.3	
	Night L _{Aeq} ,8hr	-	41.0	41.0	
Mon 18/08/2014	Day L _{Aeq} ,16hr	36.0	47.9	48.1	
	Night L _{Aeq} ,8hr	39.8	41.3	43.6	
Tue 19/08/2014	Day L _{Aeq} ,16hr	42.1	46.7	48.0	
	Night L _{Aeq} ,8hr	42.3	42.4	45.4	
Wed 20/08/2014	Day L _{Aeq} ,16hr	33.6	46.3	46.6	
Monday - Friday	Day L _{Aeq} ,16hr	39.9	47.2	48.0	
	Night L _{Aeq} ,8hr	40.4	41.8	43.4	
Saturday - Sunday	Day L _{Aeq} ,16hr	30.7	47.8	47.8	
	Night L _{Aeq} ,8hr	-	40.6	40.6	

Table 7. Summary period data - Location L5

Location L5		51° 37' 24.65 N	01° 07' 04.91 W		
Date	Period	Aircraft	Residual	Overall	
Wed 13/08/2014	Day L _{Aeq} ,16hr	45.3	50.8	51.9	
	Night L _{Aeq} ,8hr	-	45.4	45.4	
Thu 14/08/2014	Day L _{Aeq} ,16hr	39.0	49.8	50.1	
	Night L _{Aeq} ,8hr	33.0	42.0	42.5	
Fri 15/08/2014	Day L _{Aeq} ,16hr	33.3	47.5	47.7	
	Night L _{Aeq} ,8hr	-	44.6	44.6	
Sat 16/08/2014	Day L _{Aeq} ,16hr	31.7	50.5	50.5	
	Night L _{Aeq} ,8hr	-	44.4	44.4	
Sun 17/08/2014	Day L _{Aeq} ,16hr	33.1	49.1	49.2	
	Night L _{Aeq} ,8hr	-	45.5	45.5	
Mon 18/08/2014	Day L _{Aeq} ,16hr	42.2	50.9	51.4	
	Night L _{Aeq} ,8hr	35.2	45.5	45.9	
Tue 19/08/2014	Day L _{Aeq} ,16hr	43.0	50.8	51.4	
	Night L _{Aeq} ,8hr	38.9	45.3	46.2	
Wed 20/08/2014	Day L _{Aeq} ,16hr	32.2	50.7	50.7	
Monday - Friday	Day L _{Aeq} ,16hr	40.7	49.9	50.4	
	Night L _{Aeq} ,8hr	36.4	44.7	45.1	
Saturday - Sunday	Day L _{Aeq} ,16hr	32.5	49.8	49.9	
	Night L _{Aeq} ,8hr	-	44.9	44.9	

5.3 Short term monitoring data

Short term measurement data ($L_{eq,T}$, $L_{max,F}$, and L10 and L90 percentiles, including 1/3 octave bands) were obtained at each of the additional measurement locations, to allow for scaling of long term measurements or use of the shortened measurement procedure defined within the DoT publication Calculation of Road Traffic Noise, 1998 (CRTN). This procedure allows the determination of the $L_{A10,18h}$ noise level for road traffic noise from the arithmetic average of the values of hourly L10, measured over any three consecutive hours between 10:00 and 17:00 hours. The $L_{Aeq,16h}$ noise level can then be calculated from the $L_{A10,18h} - 2dB$, as advised within BS8233.

The $L_{Aeq,8hr}$ has subsequently been calculated using the method promulgated in the Highways Agency document HS 213/11, *Design Manual for Roads and Bridges*, Volume 11, Section 3, Part 7, for estimating night-time noise levels from calculated or measured $L_{A10,18hr}$ values. For non-motorway roads the L_{night} ($L_{Aeq,8hr}$) can be estimated as follows:

$$L_{night} = 0.90 \times L_{A10,18hr} - 3.77 \text{ dB}$$

In the absence of specific information regarding the potential scheme layout at each of the locations, the measurement data have been corrected to a normalised distance of 10m from the nearside carriageway. A summary of the calculated free-field data for each of the short term measurement locations is presented below.

Table 8. Short term data @10m from nearside carriageway

Parameter	Location S1	Location S2	Location S3
$L_{A10,1hr}$	56.0	72.4	56.1
$L_{A10,1hr}$	52.4	72.2	56.2
$L_{A10,1hr}$	49.7	73.1	55.8
$L_{A10,3hr}$	52.7	72.5	56.0
$L_{A10,18hr}$	51.7	71.5	55.0
$L_{Aeq,16hr}$	49.7	69.5	53.0
$L_{Aeq,8hr}$	42.8	60.6	45.8
$L_{Amax,F}$	70.5	81.7	69.3

5.4 Aircraft event data

Inspection of the measurement data across the whole duration of the survey has been undertaken in order to identify aircraft movements (both helicopter and fixed wing). L_{eq} and $L_{max,S}$ data were evaluated for each movement, whilst statistical data including the event L_{Amax} mean level, standard deviation and 90th percentile were subsequently calculated.

As stated previously, it was evident from the data that whilst the majority of the aircraft movements take place during daytime hours (07:00-23:00), there were also a proportion of helicopter movements taking place after this time, up to 02:00 hrs. Significant numbers (>10 during the period) of night time helicopter events were recorded on 19 August and 20 August, whilst fewer night time movements were recorded on other days.

In addition to the variation from day to day (and potentially week to week) in the numbers of movements, the unspecified nature of the flight corridors means there is also a significant variability in noise exposure - and particularly the maximum transient noise level from helicopter movements - at any given point within each of the prospective residential development areas. Given this temporal and spatial variation, the survey data set should be seen as a sample of a population.

Consideration of night time effects from aircraft L_{max} would usually consider the number of events exceeding a given criterion, as this is one of the determinants of effects on sleep disturbance. Because of the unrestricted nature of the military operations at RAF Benson and

the consequent variability in flight paths and patterns, it is not possible to definitively evaluate the level and number of night time movements. This is evidenced by the spread of noise levels and variation in number of night time helicopter movements across the survey period. It is therefore necessary to adopt an alternative approach to deriving a suitable datum for assessment.

Given that the number of aircraft events, as well of their level, is of importance in evaluating effects, it not considered appropriate to take the single highest event level. Instead, the Lmax of all helicopter events across the survey period has been evaluated and the 90th percentile (i.e. the Lmax exceeded by 10% of helicopter events) taken. This method accounts for both the number and level of events and provides a reasonable basis for the evaluation of effects arising from helicopter events during the night time. Using the 90th percentile in this manner is considered a reasonably conservative approach as it is representative of the noisier events within the sample and is significantly higher than the mean or the modal value, as can be seen from the presented data.

The full data set for all aircraft is presented at Appendix 4 and helicopter data are summarised below.

Table 9. Summary helicopter event data - Location L1

Location L1					
Source	Count	Duration	Leq	Lmax	SEL
Helicopter	Total: 201	06:50:10	63.9	92.4	107.8
Helicopter events L _{AMax,S}		>80 dB		18	
		>85 dB		8	
		>90 dB		2	
		Max		92.4	
		Mean		68.5	
		St Dev.		7.6	
		Mean+1sd		76.1	
		90 percentile		79.0	20

Table 10. Summary aircraft event data - Location L2

Location L2					
Source	Count	Duration	Leq	Lmax	SEL
Helicopter	Total: 244	04:34:50	65	84	107.2
Helicopter events L _{AMax,S}		>80 dB		3	
		>85 dB		0	
		>90 dB		0	
		Max		84	
		Mean		71.1	
		St Dev.		5.1	
		Mean+1sd		76.1	
		90 percentile		76.9	22 events

Table 11. Summary aircraft event data - Location L3

Location L3					
Source	Count	Duration	Leq	Lmax	SEL
Helicopter	Total: 60	00:52:10	63.7	87	98.6
Helicopter events $L_{A_{Max,S}}$		>80 dB		3	
		>85 dB		1	
		>90 dB		0	
		Max		87	
		Mean		65.3	
		St Dev.		5.1	
		Mean+1sd		70.4	
		90 percentile		70.7	6 events

Table 12. Summary aircraft event data - Location L4

Location L4					
Source	Count	Duration	Leq	Lmax	SEL
Helicopter	Total: 68	00:48:40	59.9	73.7	94.6
Helicopter events $L_{A_{Max,S}}$		>80 dB		0	
		>85 dB		0	
		>90 dB		0	
		Max		73.7	
		Mean		64.9	
		St Dev.		3.8	
		Mean+1sd		68.7	
		90 percentile		69.9	7 events

Table 13. Summary aircraft event data - Location L5

Location L5					
Source	Count	Duration	Leq	Lmax	SEL
Helicopter	Total: 23	00:14:20	60.7	71.2	90.1
Helicopter events $L_{A_{Max,S}}$		>80 dB		0	
		>85 dB		0	
		>90 dB		0	
		Max		71.2	
		Mean		64.8	
		St Dev.		3.7	
		Mean+1sd		68.5	
		90 percentile		69.0	2 events

6 Assessment of proposed residential sites

Each if the prospective development sites will be considered in terms of the external noise exposure in order to identify potential adverse or significant adverse effects (see Table 1), in line with government planning policy and the criteria set out in Section 2 and 3 herein, and to assess the various sites and their suitability for development.

It is important to recognise that the assessment of the open sites using external noise levels can only provide an indication of risk that the occupants of any future dwellings may suffer significant adverse or adverse effects. In some cases the level of noise exposure may be so great that it may render a site of part of a site unacceptable for development. However, in many cases it may be possible to design and construct a development in such a manner as to avoid, or reduce to a minimum, any adverse effects. Outline consideration of mitigation measures is therefore presented within this report, which could be used to inform the further design development of the sites should any of them progress to the stage where planning permission is sought to develop the sites for residential use.

6.1 BEN 1

The A4074 runs to west of Benson and is potentially a significant source of road traffic noise, which is likely to affect areas of the BEN 1 site. Other roads bounding the site in the area are have comparatively low volumes of road traffic, although noise from vehicles entering Benson on Oxford Road may impact locally on the south western area of BEN 1. Both fixed wing aircraft and helicopter noise impacted on the site. Although at the west of the site the overall ambient noise, $L_{Aeq,T}$, is dominated by road traffic, the night time transient events, L_{Amax} may be dominated by aircraft events.

Long term measurement location L5 is representative of road traffic noise from the A4074 at the western edge of the site and of aircraft noise exposure, whilst L4 is representative of the eastern area of the site.

Table 14. BEN 1 - Assessment of potential effects

Period exposure	Dominant source	Assessment
Location L5 - western boundary of BEN 1		
Day 50 dB $L_{Aeq,16hr}$	Road traffic	<i>No adverse effect</i>
Night 45 dB $L_{Aeq,8hr}$	Road traffic	<i>Adverse effect</i>
Night 69 dB L_{Amax}	Aircraft	<i>Adverse effect</i>
Location L4 - eastern boundary of BEN 1		
Day 48 dB $L_{Aeq,16hr}$	Road traffic	<i>No adverse effect</i>
Night 43 dB $L_{Aeq,8hr}$	Mixed (aircraft and road)	<i>Adverse effect</i>
Night 70 dB L_{Amax}	Aircraft	<i>Adverse effect</i>

As can be seen from the foregoing assessment table, based upon the external noise exposure of the BEN 1 site there is potential for adverse effects during the night time period. Daytime noise exposure is such that sensitive internal spaces and external amenity areas would not, however, be subject to adverse effects.

In line with government planning policy it is therefore necessary to consider potential mitigation methods which may minimise the extent of adverse effects. It is considered likely that the adverse effects could be effectively avoided or minimised using some or all of the following measures:

- the use of the screening (including earth mounds) and the site layout in order to reduce the propagation of road traffic noise across the site;
- orientation of buildings and rooms within dwellings to reduce exposure of habitable rooms to road traffic noise;
- use the building envelope to mitigate noise to acceptable levels within habitable rooms, whilst providing adequate ventilation and maintaining comfortable living conditions.

As stated previously, where openable windows are to be used for the purposes of ventilation the acoustic performance of the building envelope will be compromised, such that the noise insulation will typically be reduced to 10-15dBA. Noise from night time aircraft events will therefore exceed an internal level of L_{Amax} 45dB if windows are opened for ventilation. Alternative means of ventilation and cooling might therefore be considered.

The provision of whole house ventilation could be used as a means of supplementing purge ventilation. If so, acoustically treated inlets and outlets should ideally be located away from

the façade(s) most exposed to noise (and any local sources of air pollution). All schemes for ventilation shall comply with Approved Document F Building Regulations .

6.2 BEN 2

The A4074 runs along the south western boundary of the Benson and is potentially a source of road traffic noise, which is likely to affect site BEN 2. Traffic using other local roads are not considered likely to significantly influence the noise exposure of the site . Both fixed wing aircraft and helicopter noise impacted on the site. Although at the west of the site the overall ambient noise, $L_{Aeq,T}$, is dominated by road traffic, the night time transient events, L_{Amax} may be dominated by aircraft events.

The long term measurement location at L4 is considered representative of road traffic noise from the A4074 at the western edge of the site and of aircraft noise exposure.

Table 15. BEN 2 - Assessment of potential effects

Period exposure	Dominant source	Assessment
Location L4 - eastern boundary of BEN 2		
Day 48 dB $L_{Aeq,16hr}$	Road traffic	<i>No adverse effect</i>
Night 43 dB $L_{Aeq,8hr}$	Mixed (aircraft and road)	<i>Adverse effect</i>
Night 70 dB L_{Amax}	Aircraft	<i>Adverse effect</i>

As can be seen from the foregoing assessment table, there is potential for adverse effects during the night time period. Daytime noise exposure is such that sensitive internal spaces and external amenity areas would not, however, be subject to adverse effects.

In line with government planning policy it is therefore necessary to consider potential mitigation methods which may minimise the extent of adverse effects. It is considered likely that the adverse effects could be effectively avoided or minimised using some or all of the following measures:

- the use of screening (including earth mounds) and the site layout in order to reduce the propagation of road traffic noise across the site;
- orientation of buildings and rooms within dwellings to reduce exposure of habitable rooms to road traffic noise;
- use the building envelope to mitigate noise to acceptable levels within habitable rooms, whilst providing adequate ventilation and maintaining comfortable living conditions.

As stated previously, where openable windows are to be used for the purposes of ventilation the acoustic performance of the building envelope will be compromised, such that the noise insulation will typically be reduced to 10-15dBA. Noise from night time aircraft events will therefore exceed an internal level of L_{Amax} 45dB if windows are opened for ventilation. Alternative means of ventilation and cooling might therefore be considered.

The provision of whole house ventilation could be used as a means of supplementing purge ventilation. If so, acoustically treated inlets and outlets should ideally be located away from the façade(s) most exposed to noise (and any local sources of air pollution). All schemes for ventilation shall comply with Approved Document F Building Regulations.

6.3 BEN 3

Aircraft noise is considered to be the dominant source for all periods and road traffic noise is relatively unimportant. Both fixed wing aircraft and helicopter noise do, however, impact upon the site.

Long term measurement location L3 is considered representative of aircraft noise exposure. It should however be noted that, compared to other locations, it was only possible to obtain a limited sample of aircraft event data at L3 and the data should be treated with a degree of caution.

Table 16. BEN 3 - Assessment of potential effects

Period exposure		Dominant source	Assessment
Location L3 - southern boundary of BEN 3			
Day	48 dB $L_{Aeq,16hr}$	Aircraft	<i>No adverse effect</i>
Night	44 dB $L_{Aeq,8hr}$	Aircraft	<i>Adverse effect</i>
Night	71 dB L_{Amax}	Aircraft	<i>Adverse effect</i>

As can be seen from the foregoing assessment table, there is potential for adverse effects during the night time period. Daytime noise exposure is such that sensitive internal spaces and external amenity areas would not, however, be subject to adverse effects.

In line with government planning policy it is therefore necessary to consider potential mitigation methods which may minimise the extent of adverse effects. It is considered likely that the adverse effects could be effectively avoided or minimised using some or all of the following measures:

- use the building envelope to mitigate noise to acceptable levels within habitable rooms, whilst providing adequate ventilation and maintaining comfortable living conditions.

As stated previously, where openable windows are to be used for the purposes of ventilation the acoustic performance of the building envelope will be compromised, such that the noise insulation will typically be reduced to 10-15dBA. Noise from night time aircraft events will therefore exceed an internal level of L_{Amax} 45dB if windows are opened for ventilation. Alternative means of ventilation and cooling might therefore be considered.

The provision of whole house ventilation could be used as a means of supplementing purge ventilation. If so, acoustically treated inlets and outlets should ideally be located away from the façade(s) most exposed to noise (and any local sources of air pollution). All schemes for ventilation shall comply with Approved Document F Building Regulations

6.4 BEN 4

Road traffic passing through Benson on The Sands road may impact on the BEN 4 site and specifically at areas at the south of the site. Both fixed wing aircraft and helicopter noise impact across the site. Whilst at the south of the site the overall ambient noise is dominated by road traffic, the night time transient event L_{Amax} may still be dominated by aircraft events.

Long term measurement location L3 is considered representative of aircraft noise exposure across the majority of the site. It is however noted that the easternmost area of BEN 4 may potentially be subject to greater transient noise events from aircraft and helicopter movements, due to the different flight paths in use. L_{Amax} data obtained at L2 are considered to represent the highest possible level of exposure.

Short term measurement location S3 has been used to evaluate road traffic noise from The Sands to the south of the site.

Table 17. BEN 4 - Assessment of potential effects

Period exposure		Dominant source	Assessment
Location L3 - western boundary of BEN 4			
Day	48 dB $L_{Aeq,16hr}$	Aircraft	<i>No adverse effect</i>
Night	44 dB $L_{Aeq,8hr}$	Aircraft	<i>Adverse effect</i>
Night	71* dB L_{Amax}	Aircraft	<i>Adverse effect</i>
Location S3 - southern boundary of BEN 4			
Day	53 dB $L_{Aeq,16hr}$	Road traffic	<i>Adverse effect</i>
Night	46 dB $L_{Aeq,8hr}$	Road traffic	<i>Adverse effect</i>
Night	69 dB L_{Amax}	Road traffic	<i>Adverse effect</i>

*Helicopter L_{max} at Location L2 of upto 77 dB

As can be seen from the foregoing assessment table, based upon the external noise exposure of the BEN 4 site there is potential for adverse effects arising from road traffic noise during both the daytime and night time periods at southern areas of the site in the vicinity of The Sands. In the absence of mitigation, such effects would potentially extend to both sensitive internal spaces and external amenity areas (during the daytime).

Furthermore, there is potential for aircraft noise to give rise to adverse effects across all areas of the site during the night time period in terms of both period exposure and transient events.

In line with government planning policy it is therefore necessary to consider potential mitigation methods which may minimise the extent of adverse effects. It is considered likely that the adverse effects could be effectively avoided or minimised using some or all of the following measures:

- the use of the screening (including earth mounds) and the site layout in order to reduce the propagation of road traffic noise across the site;
- orientation of buildings and rooms within dwellings to reduce exposure of habitable rooms to road traffic noise;
- use the building envelope to mitigate noise to acceptable levels within habitable rooms, whilst providing adequate ventilation and maintaining comfortable living conditions.

As stated previously, where openable windows are to be used for the purposes of ventilation the acoustic performance of the building envelope will be compromised, such that the noise insulation will typically be reduced to 10-15dBA. Noise from night time aircraft events will therefore exceed an internal level of L_{Amax} 45dB if windows are opened for ventilation. Alternative means of ventilation and cooling might therefore be considered.

The provision of whole house ventilation could be used as a means of supplementing purge ventilation. If so, acoustically treated inlets and outlets should ideally be located away from the façade(s) most exposed to noise (and any local sources of air pollution). All schemes for ventilation shall comply with Approved Document F Building Regulations.

6.5 BEN 5

Road traffic passing through Benson on The Sands road may impact on the BEN 5 site and specifically at areas at the north of the site. Both fixed wing aircraft and helicopter noise impact across the site, including ground noise from helicopter activities at RAF Benson. At the north of the site, both road traffic and aircraft contribute to the overall ambient noise level, $L_{Aeq,T}$, whilst the night time transient event L_{Amax} are likely to be dominated by aircraft events.

Long term measurement location L2 is considered representative of aircraft noise exposure across the site. Short term measurement location S3 has been used to evaluate road traffic noise from The Sands to the north of the site.

Table 18. BEN 5 - Assessment of potential effects

Period exposure	Dominant source	Assessment
Location L2 - eastern boundary of BEN 5		
Day 54 dB $L_{Aeq,16hr}$	Aircraft	<i>Adverse effect</i>
Night 49 dB $L_{Aeq,8hr}$	Aircraft	<i>Adverse effect</i>
Night 77 dB L_{Amax}	Aircraft	<i>Adverse effect</i>
Location S3 - northern boundary of BEN 5		
Day 53 dB $L_{Aeq,16hr}$	Road traffic	<i>Adverse effect</i>
Night 46 dB $L_{Aeq,8hr}$	Road traffic	<i>Adverse effect</i>
Night 69 dB L_{Amax}	Road traffic	<i>Adverse effect</i>

As can be seen from the foregoing assessment table, there is potential for adverse effects arising from road traffic noise during both the daytime and night time periods at northern areas of the site in the vicinity of The Sands. In the absence of mitigation, such effects would potentially extend to both sensitive internal spaces and external amenity areas (during the daytime).

Furthermore, there is potential for aircraft noise to give rise to adverse effects across all areas of the site during the both the daytime and night time period, such effects would potentially extend to both sensitive internal spaces and external amenity areas (during the daytime). See also Section 7 regarding the increase in night time L_{max} which may arise with the potential introduction of Chinook helicopters at RAF Benson, bringing about a *significant adverse effect*.

In line with government planning policy it is therefore necessary to consider potential mitigation methods which may minimise the extent of adverse effects. Whilst it is unlikely to be possible to mitigate the adverse effects of aircraft noise on external amenity spaces during the daytime, other adverse effects of noise (on internal spaces and of road traffic noise on external amenity areas) could be avoided or reduced using some or all of the following measures:

- the use of screening (including earth mounds) and the site layout in order to reduce the propagation of road traffic noise across the site;
- orientation of buildings and rooms within dwellings to reduce exposure of habitable rooms to road traffic noise;
- use the building envelope to mitigate noise to acceptable levels within habitable rooms, whilst providing adequate ventilation and maintaining comfortable living conditions.

As stated previously, where openable windows are to be used for the purposes of ventilation the acoustic performance of the building envelope will be compromised, such that the noise insulation will typically be reduced to 10-15dBA. Noise from night time aircraft events will therefore exceed an internal level of L_{Amax} 45dB if windows are opened for ventilation. Alternative means of ventilation and cooling might therefore be considered along with specialist high performance glazing systems.

The provision of whole house ventilation could be used as a means of supplementing purge ventilation. If so, acoustically treated inlets and outlets should ideally be located away from the façade(s) most exposed to noise (and any local sources of air pollution). All schemes for ventilation shall comply with Approved Document F Building Regulations .

6.6 BEN 6

Road traffic passing through Benson on The Sands road may impact on the BEN 6 site and specifically at areas at the north of the site. Both fixed wing aircraft and helicopter noise impact across the site, including ground noise from helicopter activities at RAF Benson. At the north of the site, both road traffic and aircraft contribute to the overall ambient noise level, $L_{Aeq,T}$, whilst the night time transient event L_{Amax} are likely to be dominated by aircraft events.

The long term measurement location at L2 is considered representative of aircraft noise exposure across the site. Short term measurement location S3 has been used to evaluate road traffic noise from The Sands to the north of the site.

Table 19. BEN 6 - Assessment of potential effects

Period exposure	Dominant source	Assessment
Location L2 - western boundary of BEN 6		
Day 54 dB $L_{Aeq,16hr}$	Aircraft	<i>Adverse effect</i>
Night 49 dB $L_{Aeq,8hr}$	Aircraft	<i>Adverse effect</i>
Night 77 dB L_{Amax}	Aircraft	<i>Adverse effect</i>
Location S3 - northern boundary of BEN 6		
Day 53 dB $L_{Aeq,16hr}$	Road traffic	<i>Adverse effect</i>
Night 46 dB $L_{Aeq,8hr}$	Road traffic	<i>Adverse effect</i>
Night 69 dB L_{Amax}	Road traffic	<i>Adverse effect</i>

As can be seen from the foregoing assessment table, there is potential for adverse effects arising from road traffic noise during both the daytime and night time periods at northern areas of the site in the vicinity of The Sands. In the absence of mitigation, such effects would potentially extend to both sensitive internal spaces and external amenity areas (during the daytime).

Furthermore, there is potential for aircraft noise to give rise to adverse effects across all areas of the site during the both the daytime and night time period , such effects would potentially extend to both sensitive internal spaces and external amenity areas (during the daytime). See also Section 7 regarding the increase in night time L_{max} which may arise with the potential introduction of Chinook helicopters at RAF Benson, bringing about a *significant adverse effect*.

In line with government planning policy it is therefore necessary to consider potential mitigation methods which may minimise the extent of adverse effects. Whilst it is unlikely to be

possible to mitigate the adverse effects of aircraft noise on external amenity spaces during the daytime, other adverse effects of noise (on internal spaces and of road traffic noise on external amenity areas) could potentially be avoided or reduced using some or all of the following measures:

- the use of the screening (including earth mounds) and the site layout in order to reduce the propagation of road traffic noise across the site;
- orientation of buildings and rooms within dwellings to reduce exposure of habitable rooms to road traffic noise;
- use the building envelope to mitigate noise to acceptable levels within habitable rooms, whilst providing adequate ventilation and maintaining comfortable living conditions.

As stated previously, where openable windows are to be used for the purposes of ventilation the acoustic performance of the building envelope will be compromised, such that the noise insulation will typically be reduced to 10-15dBA. Noise from night time aircraft events will therefore exceed an internal level of L_{Amax} 45dB if windows are opened for ventilation. Alternative means of ventilation and cooling might therefore be considered along with specialist high performance glazing systems.

The provision of whole house ventilation could be used as a means of supplementing purge ventilation. If so, acoustically treated inlets and outlets should ideally be located away from the façade(s) most exposed to noise (and any local sources of air pollution). All schemes for ventilation shall comply with Approved Document F Building Regulations .

6.7 BEN 7 / 8

The A4074 runs along the south western boundary of the BEN 7 / 8 site and is a significant source of road traffic noise. Other roads bounding the site in the area have comparatively low volumes of road traffic, although noise from vehicles on St Helen's Avenue may impact locally on the north eastern area of BEN 7 / 8. Both fixed wing aircraft and helicopter noise impact on the site, including ground noise from helicopter activities at RAF Benson.

The long term measurement location at L1 is considered representative of aircraft noise exposure, across the site. Short term measurement location S2 has been used to evaluate the impacts of road traffic from the A4074 on the western areas of the site, whilst short term measurement location S1 has been used to evaluate the impacts of road traffic from St Helen's Avenue on the north eastern areas of the site.

Table 20. BEN 7 / 8 - Assessment of potential effects

Period exposure	Dominant source	Assessment
Location L1 - centre of BEN 7 / 8		
Day 55 dB $L_{Aeq,16hr}$	Aircraft	<i>Adverse effect</i>
Night 48 dB $L_{Aeq,8hr}$	Mixed (aircraft and road)	<i>Adverse effect</i>
Night 79 dB L_{Amax}	Aircraft	<i>Adverse effect</i>
Location S1 - north eastern boundary of BEN 7 / 8		
Day 50 dB $L_{Aeq,16hr}$	Road traffic	<i>Adverse effect</i>
Night 43 dB $L_{Aeq,8hr}$	Road traffic	<i>Adverse effect</i>
Night 71 dB L_{Amax}	Road traffic	<i>Adverse effect</i>

Location S2 - western boundary of BEN 7 / 8			
Day	70 dB $L_{Aeq,16hr}$	Road traffic	<i>Significant adverse effect</i>
Night	61 dB $L_{Aeq,8hr}$	Road traffic	<i>Significant adverse effect</i>
Night	82 dB L_{Amax}	Road traffic	<i>Adverse effect</i>

As can be seen from the foregoing assessment table, based upon the external noise exposure of the BEN 7 / 8 site there is potential for significant adverse effects arising from road traffic noise during both the daytime and night time periods at western areas of the site in the vicinity of the A4074. In the absence of mitigation, such effects would potentially extend to both sensitive internal spaces and external amenity areas (during the daytime).

Furthermore, there is potential for aircraft noise to give rise to adverse effects across all areas of the site during the both the daytime and night time periods , such effects would potentially extend to both sensitive internal spaces and external amenity areas (during the daytime). See also Section 7 regarding the increase in night time L_{max} which may arise with the potential introduction of Chinook helicopters at RAF Benson, bringing about a *significant adverse effect*.

In line with government planning policy it is therefore necessary to consider potential mitigation methods which may avoid significant effects and minimise the extent of adverse effects. Whilst it is unlikely to be possible to mitigate the adverse effects of aircraft noise on external amenity spaces during the daytime, other adverse effects of noise (on internal spaces and of road traffic noise on external amenity areas) could potentially be avoided or minimised using some or all of the following measures:

- separation between the dwellings and the A4074;
- the use of screening (including earth mounds) and the site layout in order to reduce the propagation of road traffic noise across the site;
- orientation of buildings and rooms within dwellings to reduce exposure of habitable rooms to road traffic noise;
- use the building envelope to mitigate noise to acceptable levels within habitable rooms, whilst providing adequate ventilation and maintaining comfortable living conditions.

As stated previously, where openable windows are to be used for the purposes of ventilation the acoustic performance of the building envelope will be compromised, such that the noise insulation will typically be reduced to 10-15dBA. Noise from night time aircraft events will therefore exceed an internal level of L_{Amax} 45dB if windows are opened for ventilation. Alternative means of ventilation and cooling might therefore be considered along with specialist high performance glazing systems.

The provision of whole house ventilation could be used as a means of supplementing purge ventilation. If so, acoustically treated inlets and outlets should ideally be located away from the façade(s) most exposed to noise (and any local sources of air pollution). All schemes for ventilation shall comply with Approved Document F Building Regulations.

7 Introduction of twin rotor helicopters

In considering the potential impact of noise and vibration from twin rotor heavy lift helicopters (for example Chinooks) should they be employed at RAF Benson it is necessary to consider the noise emissions relative to the existing helicopter fleet. Given the variation in helicopter movements and the significant influence of such matters as air speed, rotor speed and trim, altitude etc, it is not possible to carry out such an evaluation based on the measurement of

operational helicopter movements out of RAF Benson and RAF Odiham. Instead, consideration is given to historic noise data obtained under suitable reference conditions at a reference altitude and compiled by the US Department of Transportation [Rickley E. 1990. Helicopter Noise Data, July 1990, DTS-75-FA053-LR8].

Data within the report represent 15 different types of helicopter - including Puma SA 330J and Boeing CH-47D Chinook - under reference conditions at an altitude of 1000 ft and consider take off, approach and level flyover. SEL data pertaining to the Puma and Chinook are summarised below:

Table 21. Comparison of Chinook and Puma SEL data

Helicopter	Takeoff	Approach	Flyover
<i>Puma SA330J</i>			
SEL	84.9 dBA	86.5 dBA	85.2 dBA
<i>Boeing CH-47D Chinook</i>			
SEL	83.3 dBA	93.3 dBA	81.5 dBA

Taking a simplified approach and assuming that the SEL is proportionate to the L_{max} under given conditions it might be expected that Chinook helicopters could give rise to L_{max} levels upto 7dB higher than that of Puma helicopters on approach. Takeoff and flyover levels for Chinook may however be similar or slightly lower.

Assuming that similar flight patterns (including night time flying) would prevail for use of Chinook helicopter at RAF Benson as for the existing helicopter fleet, the night time L_{max} levels experienced at prospective sites could potentially increase on approach paths. Existing event levels for sites BEN 5 and 6 (L_{Amax} 77 dB) and BEN 7/8 (L_{Amax} 79 dB) are only slightly below the night time SOAEL of 80 dB and, on approach, the Chinook may increase these levels to 84 dB and 86 dB respectively. At sites BEN 5, BEN 6 and BEN 7 / 8 this increase would therefore give rise to *significant adverse effects*.

Given the location of these prospective sites (BEN 5,6 and 7/8) in relation to RAF Benson, they are considered to be the sites most likely to be affected by helicopter approach paths, with other sites more likely to be exposed only to level flyover.

Whilst the additional use of Chinooks could also lead to an increase in the Leq, it is not possible to robustly predict this in the absence of detailed modelling of flight paths (which is not practical due to the unrestricted nature of the military operations). This is especially so as the CH-47D test data indicates that it is only on approach that the Chinook is noisier than the other helicopters in use. Notwithstanding this, it is anticipated that the L_{max} parameter will remain the determining factor in both the identification of any significant adverse effects and the acoustic performance of any mitigation within the design development of any approved scheme.

8 Summary of assessment

A summary of the noise exposure of each prospective site and the subsequent evaluation against the screening criteria for the identification of adverse effects is presented in Table 22, below. The noise exposure refers explicitly to external noise levels to provide a comparison between the various sites as to the extent of noise impacts and potential consequent effects.

During the daytime period no adverse effects have been identified for sites **BEN 1**, **BEN 2**, **BEN 3**, which would include both internal noise sensitive areas and external amenity spaces. At these sites, potential *adverse effects* have however been identified during the night time

period due to noise arising from both aircraft and road traffic. It is considered likely that the adverse effects could be effectively avoided or minimised through adoption of the principles of good design espoused by the Planning Practice Guidance and the development of the mitigation measures outlined in Section 6. In doing, so consideration should be given to the target internal design levels for sensitive residential areas set out within Table 2.

During the daytime period a potential *adverse effect* due to road traffic noise has been identified for site **BEN 4**, which would include both internal noise sensitive areas and external amenity spaces. Potential *adverse effects* have also been identified during the night time period due to noise arising from both aircraft and road traffic. It is considered likely that the adverse effects could be effectively avoided or minimised through adoption of the principles of good design espoused by the Planning Practice Guidance and the development of the mitigation measures outlined in Section 6. In doing, so consideration should be given to the target internal design levels for sensitive residential areas set out within Table 2.

During the daytime period potential *adverse effects* due to both road traffic and aircraft noise have been identified for sites **BEN 5** and **BEN 6**, which would include both internal noise sensitive areas and external amenity spaces. Potential *adverse effects* have also been identified during the night time period due to noise arising from both aircraft and road traffic. Whilst it is unlikely to be possible to mitigate the adverse effects of aircraft noise on external amenity spaces during the daytime, other adverse effects of noise (on internal spaces and of road traffic noise on external amenity areas) could be avoided or reduced through adoption of the principles of good design espoused by the Planning Practice Guidance and the development of the mitigation measures outlined in Section 6. In doing, so consideration should be given to the target design levels for sensitive internal areas set out within Table 2 and for external amenity areas in Section 3.4.

Assuming that similar flight patterns (including night time flying) would prevail for use of Chinook helicopter at RAF Benson as for the existing helicopter fleet, the night time L_{max} levels experienced at prospective sites could potentially increase on approach paths. Existing event levels for sites BEN 5 and 6 (L_{Amax} 77 dB) are only slightly below the night time SOAEL of 80 dB and, on approach, the Chinook may increase these levels to 84 dB. At sites **BEN 5** and **BEN 6** this increase would therefore give rise to *significant adverse effects*.

During both the daytime and night time periods potential *adverse effects* due to both road traffic and aircraft noise have been identified for site **BEN 7/ 8**, which would include both internal noise sensitive areas and external amenity spaces. A *significant adverse effect* has also been identified due to road traffic noise from the A4074 acting upon western areas of the site. Whilst it is unlikely to be possible to mitigate the adverse effects of aircraft noise on external amenity spaces during the daytime, the significant adverse effects from road traffic noise could be avoided and other adverse effects of noise (on internal spaces and of road traffic noise on external amenity areas) could be minimised through adoption of the principles of good design espoused by the Planning Practice Guidance and the development of the mitigation measures outlined in Section 6. In doing, so consideration should be given to the target design levels for sensitive internal areas set out within Table 2 and for external amenity areas in Section 3.4.

Assuming that similar flight patterns (including night time flying) would prevail for use of Chinook helicopter at RAF Benson as for the existing helicopter fleet, the night time L_{max} levels experienced at prospective sites could potentially increase on approach paths. Existing event levels for BEN 7/8 (L_{Amax} 79 dB) are only slightly below the night time SOAEL of 80 dB and, on approach, the Chinook may increase these levels 86 dB. This increase would therefore give rise to *significant adverse effects* at **BEN 7/8**.

The foregoing assessment (based on external noise levels) provides a comparison as to the potential adverse effects on the various prospective sites. All sites are, to a varying degree, subject to *adverse effects* of noise, which should be mitigated and reduced to a minimum. In addition, BEN7 / 8 is subject to a *significant adverse effect* from road traffic noise, whilst the

introduction of heavy lift twin rotor helicopters (Chinook) may also give rise to *significant adverse effects* at sites BEN 5, BEN 6 and BEN 7 / 8; significant adverse effects should be avoided.

The success of any prospective scheme in avoiding or minimising any adverse effects of noise will ultimately depend upon the specification of suitable mitigation measures during the design process. Clearly, where there is a greater noise impact upon any given site there will be a concomitant need for enhanced acoustic mitigation measures. Where high levels of building envelope sound insulation (greater than approximately R_w 35 dB) may be required, it is likely to be necessary to employ substantially enhanced forms of construction, including specialist acoustic glazing and acoustically treated ventilation systems.

In some cases it may not be possible to avoid all adverse effects, such as where aircraft noise impacts upon external amenity spaces. It should also be recognised that the transient aircraft noise levels used in the assessment have been developed on a statistical basis (90th percentile of aircraft L_{max} levels) using the acquired data set, and that consequently some aircraft events should be expected to exceed this level.

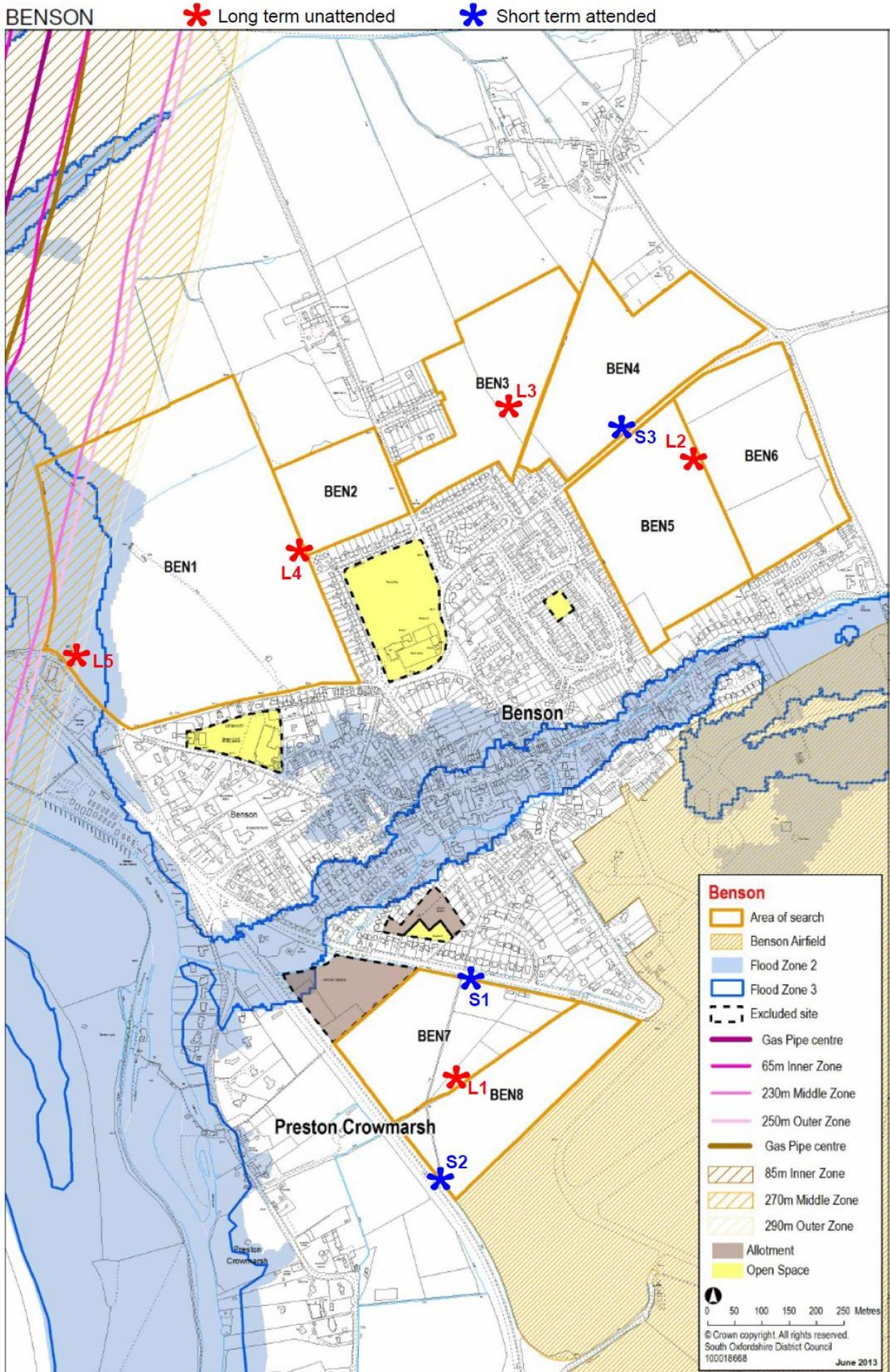
Table 22. Summary assessment table - unmitigated

Period exposure	Site/ location						
	BEN 1	BEN 2	BEN 3	BEN 4	BEN 5	BEN 6	BEN 7 / 8
	L5 - Air / Road	L4 - Air / Road	L3 - Aircraft	L3 - Aircraft	L2 - Aircraft	L2 - Aircraft	L1 - Aircraft
Day $L_{Aeq,16hr}$	50 dB	48 dB	48 dB	48 dB	54 dB	54 dB	55 dB
Night $L_{Aeq,8hr}$	45 dB	43 dB	44 dB	44 dB	49 dB	49 dB	48 dB
Night L_{Amax}	69 dB (76 dB)	70 dB (77 dB)	71 dB (78 dB)	71 dB (78 dB)	77 dB (84 dB)	77 dB (84 dB)	79 dB (86 dB)
	L4 - Air / Road			S3 -Road traffic	S3 -Road traffic	S3 -Road traffic	S1 -Road traffic
Day $L_{Aeq,16hr}$	48 dB	-	-	53 dB	53 dB	53 dB	50 dB
Night $L_{Aeq,8hr}$	43 dB	-	-	46 dB	46 dB	46 dB	43 dB
Night L_{Amax}	70 dB	-	-	69 dB	69 dB	69 dB	71 dB
							S2 -Road traffic
Day $L_{Aeq,16hr}$	-	-	-	-	-	-	70 dB
Night $L_{Aeq,8hr}$	-	-	-	-	-	-	61 dB
Night L_{Amax}	-	-	-	-	-	-	82 dB

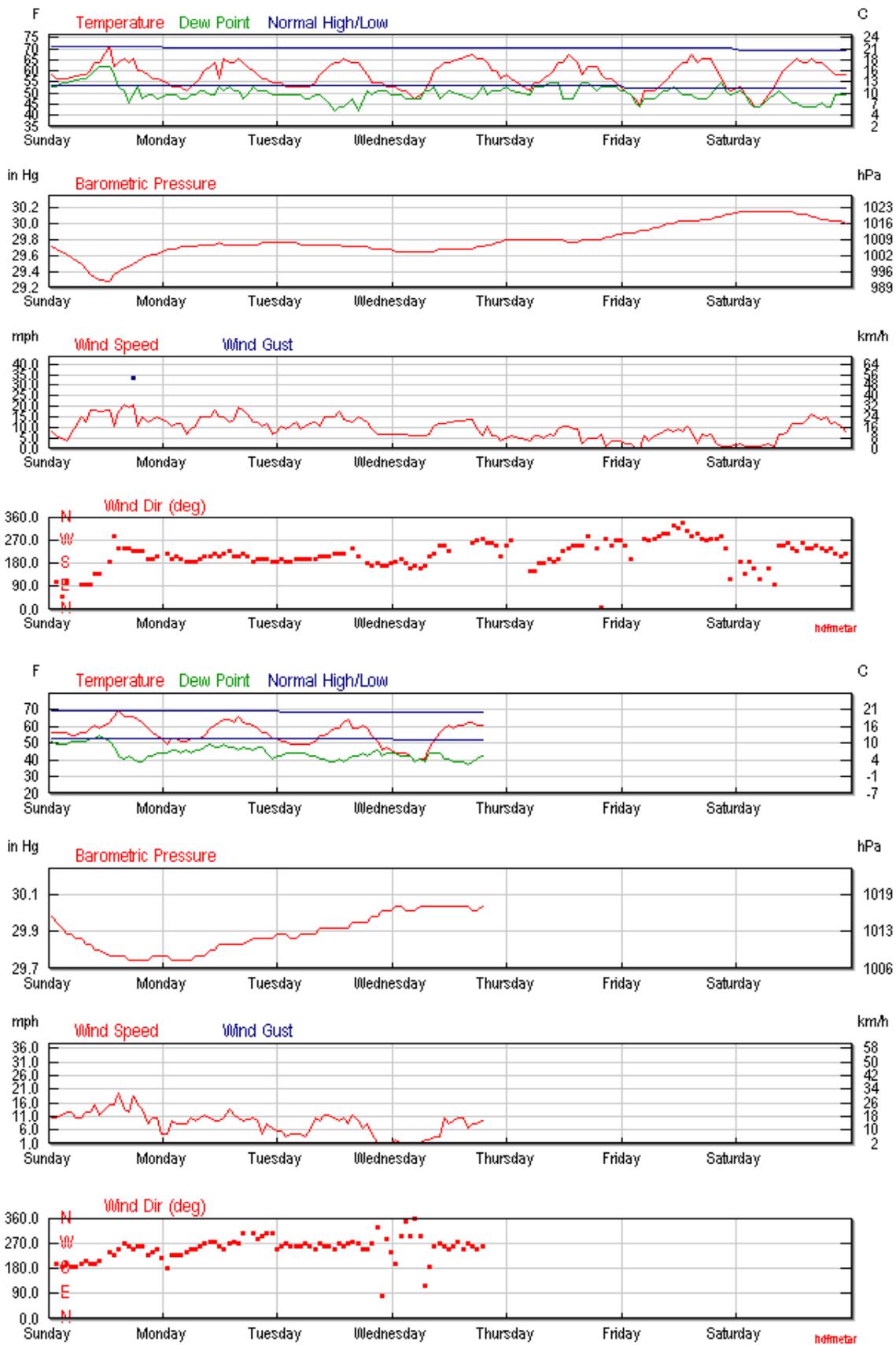
	No adverse effect
	Adverse effect
	Significant adverse

NB. Figures in brackets indicate potential increase in L_{max} due to introduction of Chinook. Text in red indicates where this gives rise to significant adverse effects ($L_{max} > 80$ dB)

Appendix 1 -Site Plan



Appendix 2 -Weather data



Appendix 3 -Long term measurement data

File	20140813_115332_Event.CMG				
Periods	1h				
Start	13/08/2014 12:00				
End	20/08/2014 12:00				
Location	L1				
DUO_10510	51° 36' 57.84 N	01° 06' 27.88 W			
Weighting	A				
Data type	Leq				
Unit	dB				
Period start	L_{eq}	L_{min}	L_{max,F}	L₉₀	L₁₀
13/08/2014 12:00	53	44.9	71.9	48	53.5
13/08/2014 13:00	51.7	44.1	64.1	47.7	53.7
13/08/2014 14:00	50.6	42.9	65.2	46.9	52.5
13/08/2014 15:00	63.3	43.2	92.4	48.2	55.1
13/08/2014 16:00	52.4	46.5	63.1	49.5	54.1
13/08/2014 17:00	53.9	45.1	75.4	49.1	53.4
13/08/2014 18:00	49.6	41.7	59.4	46.5	51.1
13/08/2014 19:00	56.7	42.6	83.3	46.7	52.4
13/08/2014 20:00	50.4	38.3	69.9	45.4	52.1
13/08/2014 21:00	48.3	38.1	62.2	43.5	50.5
13/08/2014 22:00	46.9	31.8	62.8	40.6	48.8
13/08/2014 23:00	45.4	28.5	64.6	33.3	47.5
14/08/2014 00:00	43	28.9	63.5	31.8	45.2
14/08/2014 01:00	43	25.9	66.1	29.2	43
14/08/2014 02:00	38.2	25.1	54.8	27.1	42
14/08/2014 03:00	40.3	24.8	57.2	28.4	44.2
14/08/2014 04:00	43.7	28	57.6	30.2	48
14/08/2014 05:00	47.6	33.3	59.6	38.6	50.9
14/08/2014 06:00	51.5	38.6	59.8	46.2	54.1
14/08/2014 07:00	53	45.3	58.1	50.2	54.8
14/08/2014 08:00	53.7	46.2	74.2	49.6	54.7
14/08/2014 09:00	50.6	42.6	64.9	46.8	52.4
14/08/2014 10:00	52.4	42.8	67.1	48	54.5
14/08/2014 11:00	52	44.8	64.1	48.5	53.9
14/08/2014 12:00	54.5	43.8	77.6	47.7	53.8
14/08/2014 13:00	53.4	44	76.7	47.3	54.4
14/08/2014 14:00	53.5	44	70.9	48.1	55.8
14/08/2014 15:00	51.9	43.4	66	47.5	53.8
14/08/2014 16:00	55.2	42.3	78.7	46.7	53.1
14/08/2014 17:00	54.4	43.9	78.5	47.9	52
14/08/2014 18:00	55.1	43.2	77.4	47.5	55
14/08/2014 19:00	51.5	41.3	65.8	45.7	53.6
14/08/2014 20:00	56.5	39.4	73	46.3	59.8
14/08/2014 21:00	54.5	37.8	71.8	44.8	54.7
14/08/2014 22:00	46.9	32.7	60.8	40.8	49.4
14/08/2014 23:00	44.2	27.9	61.4	33.5	47.4
15/08/2014 00:00	43.6	27.5	64.2	30.5	45.3
15/08/2014 01:00	43	27.2	64.1	29.1	46.1
15/08/2014 02:00	41.1	25.3	56.2	27.4	45.4
15/08/2014 03:00	42.2	27.7	57.7	30.1	46.7
15/08/2014 04:00	41	27.7	54.4	30.7	45.1
15/08/2014 05:00	45	29.9	57.2	35.8	48.5
15/08/2014 06:00	48.3	36.7	62.2	42.5	50.8
15/08/2014 07:00	50.3	42.3	59.6	47.1	52

15/08/2014 08:00	50.2	42.7	62.1	47.4	51.6
15/08/2014 09:00	50.6	41.7	64.9	46.9	51.8
15/08/2014 10:00	50.2	42.3	61.8	46.5	52.1
15/08/2014 11:00	58.5	43.8	86.2	46.6	54.8
15/08/2014 12:00	51.2	42.1	64.4	44.7	54.8
15/08/2014 13:00	57.9	41.3	83.2	45.3	54.5
15/08/2014 14:00	54.6	42.3	78.5	45.4	54
15/08/2014 15:00	60.8	41.1	82.9	46	59
15/08/2014 16:00	55.9	39.6	79.6	45.9	51.5
15/08/2014 17:00	56.4	43.3	83.6	46.9	51.4
15/08/2014 18:00	57.8	39	85.7	45.8	50.6
15/08/2014 19:00	50.6	41.3	64	47	52.6
15/08/2014 20:00	50	37.8	64.4	45.2	52.4
15/08/2014 21:00	48.6	35	61.1	42.2	51.4
15/08/2014 22:00	48.9	35.3	58.8	43.3	51.7
15/08/2014 23:00	46.6	29.9	58.6	37.4	49.7
16/08/2014 00:00	44.7	29	58.7	32.9	48.3
16/08/2014 01:00	47.1	27.2	68.4	30.5	48.6
16/08/2014 02:00	42.5	27.9	58.7	32	46.6
16/08/2014 03:00	44.4	27.8	60.7	31.2	48.2
16/08/2014 04:00	43.6	29	57	31.8	47.9
16/08/2014 05:00	45.7	29.6	60.9	34.3	49.6
16/08/2014 06:00	49.2	34.7	61.1	40.6	53
16/08/2014 07:00	46.4	37.7	59.6	41.9	48.8
16/08/2014 08:00	49.8	38.3	75.1	43.5	50.4
16/08/2014 09:00	49.7	42.4	59.6	46.2	51.8
16/08/2014 10:00	50.5	42.5	62.2	46.9	52.7
16/08/2014 11:00	52.5	43.9	66.2	48.5	54.5
16/08/2014 12:00	51.2	42.4	66.6	47.8	53.3
16/08/2014 13:00	50.9	43.6	65.7	47.5	52.8
16/08/2014 14:00	51.1	42.5	60.2	47.8	53.1
16/08/2014 15:00	52	43.7	65.7	48.4	54.1
16/08/2014 16:00	51.9	42.4	67.9	48.2	53.6
16/08/2014 17:00	52.5	43.6	65.5	48.8	54.5
16/08/2014 18:00	53.7	45	69.6	49.4	55.5
16/08/2014 19:00	50.8	41.9	68.5	46.6	52.8
16/08/2014 20:00	52.1	38.5	72.8	44.9	52.5
16/08/2014 21:00	48.4	35.7	62.5	41.9	51.1
16/08/2014 22:00	48.4	34.9	59.8	42.6	51.1
16/08/2014 23:00	47.4	33	57.1	39.9	50.6
17/08/2014 00:00	45.4	29.3	62.7	34.2	48.9
17/08/2014 01:00	44	29.3	60.6	32.8	48.2
17/08/2014 02:00	42.2	29.8	57.5	32.1	46.4
17/08/2014 03:00	40.8	28.2	58.1	30.8	44.2
17/08/2014 04:00	39.8	28.2	58.4	30.9	43.5
17/08/2014 05:00	44.6	29.8	65.8	32.5	48.6
17/08/2014 06:00	45.9	31.1	66.4	34.9	49.6
17/08/2014 07:00	50.8	36.3	74.5	41.6	51.3
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17/08/2014 09:00	52.6	43.1	62.1	47.9	55.1
17/08/2014 10:00	54.4	46.4	76.9	49.9	56
17/08/2014 11:00	51.8	43.8	62.4	48.3	53.5
17/08/2014 12:00	52.2	45.7	63.8	49	54
17/08/2014 13:00	52.5	45.3	61.4	49.4	54.5
17/08/2014 14:00	52.9	45.1	68.3	49.1	54.7
17/08/2014 15:00	50.4	41.6	62.3	47	52.5
17/08/2014 16:00	52.7	43.4	73.3	48.5	54.2
17/08/2014 17:00	52.8	40.7	73.8	48.2	54.2

17/08/2014 18:00	51.5	41.9	65.8	46.9	53.6
17/08/2014 19:00	51.4	42.6	70.5	46.5	52.3
17/08/2014 20:00	48.8	37.9	59.9	44.5	51
17/08/2014 21:00	47.3	36.3	60.5	42	49.9
17/08/2014 22:00	46.2	34.1	54.5	39.4	49.1
17/08/2014 23:00	45.8	31.4	62.6	37.5	48.3
18/08/2014 00:00	43.7	29.1	56.1	33.2	47.5
18/08/2014 01:00	41.1	29.3	55.6	32.1	45.2
18/08/2014 02:00	38.9	28.7	51.9	31.3	43.2
18/08/2014 03:00	39	28.5	55	31.2	41.9
18/08/2014 04:00	41.6	29.4	55	32.7	45.5
18/08/2014 05:00	46.7	33.3	61.4	37.7	50.1
18/08/2014 06:00	51.2	37.5	62.7	45.4	53.7
18/08/2014 07:00	52.5	45.8	60.7	49.5	54.3
18/08/2014 08:00	57.7	44.6	82.4	49.3	54.4
18/08/2014 09:00	51.5	43.8	75.1	47.6	52.5
18/08/2014 10:00	49.9	42.7	58.7	46	51.8
18/08/2014 11:00	52.6	43.1	77.7	46	51.7
18/08/2014 12:00	50.5	42.5	69.8	46.1	51.9
18/08/2014 13:00	54.1	44	74.5	46.9	54.1
18/08/2014 14:00	55.8	42.3	81.9	46.9	52.6
18/08/2014 15:00	50.5	43.6	60.7	47.3	52.5
18/08/2014 16:00	62.7	41.5	92.2	47.3	52.4
18/08/2014 17:00	59.1	43.7	84.4	47.4	54.4
18/08/2014 18:00	56.8	42.7	85.1	47.6	54.1
18/08/2014 19:00	51.3	40.7	72.3	45.2	51.2
18/08/2014 20:00	53.8	40.3	72.5	44	57.3
18/08/2014 21:00	46.8	32.8	68	38.9	48.6
18/08/2014 22:00	51.7	33.6	73.6	37.8	54.3
18/08/2014 23:00	53.1	32.3	72.3	38.4	54.6
19/08/2014 00:00	50.6	28	74.2	30.8	48
19/08/2014 01:00	38.3	25.9	53.9	28.3	42.2
19/08/2014 02:00	37.8	25.1	53.7	27.7	41.9
19/08/2014 03:00	36.9	25.5	59.6	27.6	40.1
19/08/2014 04:00	41.3	28.4	56.3	31.3	45.1
19/08/2014 05:00	45.3	29.9	56.6	35.7	48.6
19/08/2014 06:00	50.5	35.8	62.7	44.4	53
19/08/2014 07:00	52.2	46.5	60.4	49.6	53.6
19/08/2014 08:00	57.9	45.9	85.1	49.3	53.3
19/08/2014 09:00	54.8	44.9	78.2	48.2	53.8
19/08/2014 10:00	51.3	45.3	63.5	47.7	53
19/08/2014 11:00	50.1	42.6	61	46.9	52.1
19/08/2014 12:00	50.9	43.7	64.1	47.1	52.6
19/08/2014 13:00	57.8	44.5	85	48	52.7
19/08/2014 14:00	50	43.1	63.1	46.6	52.1
19/08/2014 15:00	52.7	44.6	67.5	47.9	54.7
19/08/2014 16:00	61.9	46.6	86.1	48.9	55.9
19/08/2014 17:00	57.5	45.1	85.3	48.4	52.7
19/08/2014 18:00	57.3	45.4	82.9	48.7	54.6
19/08/2014 19:00	51.4	39.6	69.7	45.8	53.1
19/08/2014 20:00	54.2	38	76.3	44.6	53.6
19/08/2014 21:00	55.1	39.2	71.7	44	58.9
19/08/2014 22:00	54.8	41	68.5	47.1	58
19/08/2014 23:00	55.4	35.7	73.5	41.3	57.2
20/08/2014 00:00	55.4	27.8	72.9	32.1	57.6
20/08/2014 01:00	41.7	26.4	54.8	28.4	46.3
20/08/2014 02:00	46.7	25.1	69.8	27	47.5
20/08/2014 03:00	42.5	25.3	59.5	28.6	45.6

20/08/2014 04:00	44	27.3	57.2	30.4	48.6
20/08/2014 05:00	49.1	30.9	59.2	38.1	52.8
20/08/2014 06:00	53.1	35.7	62.5	45.4	56.1
20/08/2014 07:00	51.1	43.3	60.4	47.1	53.5
20/08/2014 08:00	49.3	41.2	61	46.6	50.8
20/08/2014 09:00	49	40.5	62.2	45.4	51.1
20/08/2014 10:00	51	42.9	65.3	46.5	52.9
20/08/2014 11:00	50.4	44.1	63.2	47	51.9
Overall	52.8	24.8	92.4	34.7	53

File	20140813_113826_000000_1.CMG				
Periods	1h				
Start	13/08/2014 11:00				
End	20/08/2014 11:00				
Location	L2				
DUO_10516	51° 37' 33.91 N 01° 06' 02.05 W				
Weighting	A				
Data type	Leq				
Unit	dB				
Period start	Leq	L_{min}	L_{max,F}	L₉₀	L₁₀
13/08/2014 11:00	52.9	37.5	78.9	40.8	50.4
13/08/2014 12:00	49.7	37.2	71.4	41.9	49.8
13/08/2014 13:00	53.5	37.4	72.8	41.9	52.6
13/08/2014 14:00	49.2	36.8	71.8	41.7	49.6
13/08/2014 15:00	55.8	39.2	75.7	43.1	53.2
13/08/2014 16:00	49.8	41.5	65.6	44.7	51.9
13/08/2014 17:00	50.1	39.3	61.8	45.3	52.5
13/08/2014 18:00	53.3	34.1	77.8	41.1	51
13/08/2014 19:00	52	36	75.9	40.4	50.6
13/08/2014 20:00	54.9	34.8	78.7	39	48.1
13/08/2014 21:00	52.6	32.8	73.3	37.5	49.4
13/08/2014 22:00	46.6	30.1	70.5	34.3	44.6
13/08/2014 23:00	50.9	26.2	72.4	29.4	46.9
14/08/2014 00:00	52.1	24.5	75	26.7	42.4
14/08/2014 01:00	45.2	21.9	70	24.5	36.7
14/08/2014 02:00	29.4	22.2	45	23.9	31.6
14/08/2014 03:00	30.2	22.1	48.7	23.8	31.6
14/08/2014 04:00	34.5	23.8	47.8	27.1	37.8
14/08/2014 05:00	42.7	29.8	52.7	35.2	47.4
14/08/2014 06:00	44.3	36.8	52.4	41.1	46.2
14/08/2014 07:00	46.2	41.4	54.2	43.6	47.8
14/08/2014 08:00	46.3	38.6	59.5	42.3	47.7
14/08/2014 09:00	47.3	36.8	70.2	39.8	48.5
14/08/2014 10:00	51.7	37.3	72.6	41.8	51.5
14/08/2014 11:00	52.3	37	76.9	40.9	50.2
14/08/2014 12:00	54.3	36.2	77.5	41.7	52.3
14/08/2014 13:00	52.3	38.1	76.2	42.5	53.7
14/08/2014 14:00	57.9	39.3	84	42.5	51.4
14/08/2014 15:00	51.2	38.1	70.3	42.6	51.3
14/08/2014 16:00	52.5	36.7	72.3	41.8	50.5
14/08/2014 17:00	53.1	36	75.2	42.7	50.8
14/08/2014 18:00	55.4	34.3	76.3	41	51.5
14/08/2014 19:00	53.6	35.3	76.6	40.1	48.9
14/08/2014 20:00	55.6	31.5	76.9	38.4	54.4
14/08/2014 21:00	58.3	32	75	36.1	62.2
14/08/2014 22:00	49.9	29.8	75.9	33.4	44.1
14/08/2014 23:00	46.1	24.9	68.5	29.4	43.2

15/08/2014 00:00	51.2	25.1	74.5	27	40.3
15/08/2014 01:00	46.4	24.8	74.8	26	37
15/08/2014 02:00	33.4	25.1	56.9	26.6	34.5
15/08/2014 03:00	32.9	24.7	49.1	25.9	35.9
15/08/2014 04:00	37	25.4	52.3	27.2	39.7
15/08/2014 05:00	40	27.5	54	31.7	43.8
15/08/2014 06:00	44.9	32.3	57.9	36.5	48
15/08/2014 07:00	48	38	57	43	50.6
15/08/2014 08:00	52.2	36.9	76.9	42.6	50.9
15/08/2014 09:00	51.5	33.4	68.5	42	52.4
15/08/2014 10:00	54	35.8	73	41.1	55.5
15/08/2014 11:00	55.7	37.6	78.1	42.3	53.4
15/08/2014 12:00	52.4	35	75	42.1	50.6
15/08/2014 13:00	54.7	34.4	76.7	40	52.8
15/08/2014 14:00	53.9	32.5	71.9	38.9	57.7
15/08/2014 15:00	52	32.5	65.9	41.2	54.8
15/08/2014 16:00	49.7	32.7	67.9	39.2	51.1
15/08/2014 17:00	49.1	33.9	67.5	40.7	50.5
15/08/2014 18:00	47.1	32.2	67.5	38.7	48.7
15/08/2014 19:00	43.2	30.7	51.5	36.7	46.3
15/08/2014 20:00	47.2	30.5	74.3	36.8	45.5
15/08/2014 21:00	41.2	30	65.4	33.1	43.9
15/08/2014 22:00	39.6	29	50.5	33	43
15/08/2014 23:00	37.4	25.2	47.9	30.3	41.1
16/08/2014 00:00	36.8	24.9	52.4	26.8	40.9
16/08/2014 01:00	40	23.9	72.6	24.5	39.5
16/08/2014 02:00	32	23.7	48.5	24.6	32.2
16/08/2014 03:00	32.1	24.4	47.9	25.3	35.3
16/08/2014 04:00	34.2	25.3	49.3	26.6	37.8
16/08/2014 05:00	37.2	26.9	52.8	29.9	40
16/08/2014 06:00	42.4	31.7	57.9	35.8	45.2
16/08/2014 07:00	44.1	35.9	56.5	39.5	46.6
16/08/2014 08:00	46.2	35.2	61.5	39.8	48.5
16/08/2014 09:00	44.9	35.7	63.5	39.6	47.5
16/08/2014 10:00	46.1	34.7	64.8	40.1	48.2
16/08/2014 11:00	49.2	35.7	71.3	41.8	49.6
16/08/2014 12:00	49.1	35.1	69.5	40.2	48.5
16/08/2014 13:00	47.3	36.1	69.3	40.5	48
16/08/2014 14:00	46.3	37.9	58.9	41.4	48.8
16/08/2014 15:00	46.3	37.4	59.5	41.5	48.8
16/08/2014 16:00	47.3	37.8	60.9	42.3	49.6
16/08/2014 17:00	45.9	36.9	59.5	40.9	48.3
16/08/2014 18:00	48	38.9	61	42.7	50.7
16/08/2014 19:00	44.4	35.3	58.1	38.2	47.4
16/08/2014 20:00	42.6	33.4	56.7	36.8	45.2
16/08/2014 21:00	40.9	31.7	58	35.6	43
16/08/2014 22:00	45.5	32.2	69.1	35.5	44
16/08/2014 23:00	39.4	31.2	54.9	33.6	41
17/08/2014 00:00	40.3	28.3	66.6	31.2	39.3
17/08/2014 01:00	35.1	28.1	47	30.4	37.8
17/08/2014 02:00	45.2	26.5	70.5	29.7	40.2
17/08/2014 03:00	33.7	26.6	47.6	28.7	36.4
17/08/2014 04:00	33.8	27.2	46.6	29.1	36.9
17/08/2014 05:00	37.8	28.4	59.2	31	38.9
17/08/2014 06:00	37.7	29.3	52.9	32.5	40.1
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17/08/2014 09:00	50.4	36.1	74.9	40.7	50

17/08/2014 10:00	46.6	38.5	59.5	41.6	49.1
17/08/2014 11:00	48.3	36.7	60	42.3	50.8
17/08/2014 12:00	47.2	38	66.7	41.7	48.9
17/08/2014 13:00	48	39	63.1	42.1	50.8
17/08/2014 14:00	50	39.4	65.1	44	52.8
17/08/2014 15:00	49.1	36.7	67	42.6	52
17/08/2014 16:00	48.9	38.2	66	43.1	51.5
17/08/2014 17:00	48.8	38.1	60.3	42.9	51.8
17/08/2014 18:00	50.5	38	72.7	42.4	51.5
17/08/2014 19:00	46.5	36.4	65.2	40.4	48.3
17/08/2014 20:00	47.9	36.2	74.6	39.5	47.5
17/08/2014 21:00	42.3	31.3	56.1	35.4	45.3
17/08/2014 22:00	39.7	30.1	58.3	33.3	43
17/08/2014 23:00	37.7	27.6	51.1	31.6	41
18/08/2014 00:00	41.2	24.9	67.8	29.1	39.7
18/08/2014 01:00	48.9	25	73.2	27.4	37.1
18/08/2014 02:00	33.5	25.1	47.8	27	36.5
18/08/2014 03:00	33.8	25.5	51.8	27.6	36.3
18/08/2014 04:00	35.1	26.5	56.1	29.4	37.3
18/08/2014 05:00	41.7	30	56.5	34.2	45
18/08/2014 06:00	46.3	34.6	58.6	40.2	49.3
18/08/2014 07:00	47.8	39.4	59	43.5	50.1
18/08/2014 08:00	48.6	39	59.4	42.9	51.3
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18/08/2014 13:00	47.2	35.6	65.6	40.6	49.9
18/08/2014 14:00	49.2	35.7	70.8	40.4	50.2
18/08/2014 15:00	47.4	36.4	62.7	41.1	49.7
18/08/2014 16:00	50.1	35.7	72.7	42.7	51.2
18/08/2014 17:00	55.9	36	74.7	43	54.7
18/08/2014 18:00	59	37.3	78.3	44	55.2
18/08/2014 19:00	51.9	36	74.9	40.2	48.7
18/08/2014 20:00	58.3	34.6	78.6	39.2	50.6
18/08/2014 21:00	49.7	30.5	75.7	35.3	46.1
18/08/2014 22:00	54.9	24.7	76.4	30.2	46.7
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19/08/2014 00:00	55.8	23.9	77.6	26.1	48
19/08/2014 01:00	39.1	23.3	64.4	25.1	35.6
19/08/2014 02:00	29.9	23.1	45.3	24.8	32.2
19/08/2014 03:00	33	23.8	51.7	25.2	34.8
19/08/2014 04:00	34.4	24.9	52.6	27.3	35.9
19/08/2014 05:00	40.5	26.5	52.1	32.9	43.8
19/08/2014 06:00	46.2	35.3	57.3	39.2	49
19/08/2014 07:00	48.1	40.1	56.5	44.1	50.3
19/08/2014 08:00	49	39.1	64.5	43.8	51.2
19/08/2014 09:00	55.5	38.6	80.6	42.9	51.2
19/08/2014 10:00	52.5	35.4	73.9	43	52.4
19/08/2014 11:00	51	35.9	72.1	41.6	53
19/08/2014 12:00	51.8	34.7	73.3	40.6	49.6
19/08/2014 13:00	53.6	37.3	77.7	41.5	50.2
19/08/2014 14:00	53	36.3	77.9	40.7	50.8
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19/08/2014 17:00	52.3	35.9	75.4	42.2	50.5
19/08/2014 18:00	56.5	37.7	74.3	42.2	53.8
19/08/2014 19:00	54.5	35.8	72.5	40.5	50.9

19/08/2014 20:00	57	35.2	77.4	38.8	55.1
19/08/2014 21:00	58.7	35.8	80.2	40.4	56.6
19/08/2014 22:00	60.1	33.6	74.2	42	65.2
19/08/2014 23:00	55.8	29.2	76.1	32.7	50.5
20/08/2014 00:00	57.5	22.9	76	27.3	52.6
20/08/2014 01:00	33	23.2	47.3	25.2	36.6
20/08/2014 02:00	35.4	23.1	57	25.1	35.2
20/08/2014 03:00	32.6	23	48.1	25	35.9
20/08/2014 04:00	35.2	23.6	49.7	27	38
20/08/2014 05:00	41.8	27.7	54.3	32.6	45.8
20/08/2014 06:00	45.9	32.1	55.7	39.5	48.7
20/08/2014 07:00	44.5	36.8	56.5	40.4	46.3
20/08/2014 08:00	43.2	34.4	56	38.7	45.7
20/08/2014 09:00	43.8	31.5	62.3	36.5	46.3
20/08/2014 10:00	49	34.8	67.8	39.4	50.4
Overall	51.1	21.9	84	29.7	49.5

File	20140813_104648_142406_1.CMG				
Periods	1h				
Start	13/08/2014 10:00				
End	20/08/2014 13:00				
Location	L3				
DUO_10507	51° 37' 39.04 N 01° 06' 17.74 W				
Weighting	A				
Data type	Leq				
Unit	dB				
Period start	Leq	L_{min}	L_{max,F}	L₉₀	L₁₀
13/08/2014 10:00	48.1	38.4	64.1	40.3	48.9
13/08/2014 11:00	47.2	35.3	67.6	38.9	49.1
13/08/2014 12:00	46.6	36	73.4	38.7	46.8
13/08/2014 13:00	49.1	35.6	70	38.9	50.7
13/08/2014 14:00	49.4	35.2	76.4	39.2	50.8
13/08/2014 15:00	48.5	35.6	65.7	39.3	51.5
13/08/2014 16:00	47.4	37.7	63.4	40.8	50.5
13/08/2014 17:00	47.7	37.2	64	40.8	51.1
13/08/2014 18:00	51.4	32.5	79.2	34.7	44.2
13/08/2014 19:00	48.4	33	69.1	36.3	46.7
13/08/2014 20:00	43.5	30.6	68.2	34.8	42.7
13/08/2014 21:00	42.5	29.9	63.5	33.3	43.3
13/08/2014 22:00	41.4	28.8	63.6	32.5	39.9
13/08/2014 23:00	44.2	23.6	64.9	27.5	44.7
14/08/2014 00:00	40.3	23.8	61.5	25.9	34.9
14/08/2014 01:00	49.2	21	79.5	23.9	42.2
14/08/2014 02:00	27.6	20.6	42.2	22.6	30.1
14/08/2014 03:00	28.6	20.9	45	22.8	31.3
14/08/2014 04:00	35.6	23	48.7	27.5	39.4
14/08/2014 05:00	40.3	29.2	50.9	33.6	43.6
14/08/2014 06:00	43.3	37.1	54.6	40.4	44.9
14/08/2014 07:00	46.8	41.3	63.5	43.1	47.4
14/08/2014 08:00	44.2	36.2	60	39.8	45.3
14/08/2014 09:00	42.3	33.1	61	36.2	44.2
14/08/2014 10:00	46.3	35.8	64.4	38.5	47.7
14/08/2014 11:00	47.2	35.2	67.5	39.5	47.2
14/08/2014 12:00	49.4	33.7	71	37.6	48.3
14/08/2014 13:00	47.6	35.9	64.7	38.6	49.6
14/08/2014 14:00	53.8	35.4	80.9	38.3	48.8
14/08/2014 15:00	48.2	34	67.3	37.5	46.4

14/08/2014 16:00	46.1	31.6	66.2	34.6	45.8
14/08/2014 17:00	47.3	31.3	68.9	34.4	46.6
14/08/2014 18:00	49.8	31.4	72.7	34.8	46.8
14/08/2014 19:00	59.2	30.3	87	33.8	43.2
14/08/2014 20:00	49.5	30.7	69.1	35.4	50
14/08/2014 21:00	50.6	28.4	70.7	32.7	53.3
14/08/2014 22:00	38.3	27.5	63.1	30.9	38.9
14/08/2014 23:00	39.4	22.9	60.5	27.1	37.8
15/08/2014 00:00	54.1	21.8	81.2	24.8	34.9
15/08/2014 01:00	30.3	22.2	50.2	24	32
15/08/2014 02:00	30.2	22.2	43	24.5	33.6
15/08/2014 03:00	30	22.8	44.3	24.2	33.4
15/08/2014 04:00	31.3	23.1	46.1	25.1	34.5
15/08/2014 05:00	35.4	27.1	45.6	30.4	38.2
15/08/2014 06:00	38.8	30	55.9	34.3	40.6
15/08/2014 07:00	41.1	34.8	57.1	37.2	43
15/08/2014 08:00	43.7	32.1	67.7	34.6	41.2
15/08/2014 09:00	48	32.2	69	35	46
15/08/2014 10:00	51.7	30.8	68.9	34.4	53.3
15/08/2014 11:00	50.4	31.6	69.4	35.5	51.6
15/08/2014 12:00	71.1	32.6	102.4	37.4	58.5
15/08/2014 13:00	67.9	33.8	96.5	41.2	65.8
15/08/2014 14:00	63.9	33.6	92.3	39.1	63.3
15/08/2014 15:00	51	30.2	71.4	34.6	55.1
15/08/2014 16:00	49.1	30.9	64.9	34.9	53.1
15/08/2014 17:00	51.5	29.7	71.2	35	54.2
15/08/2014 18:00	64.3	31.8	94.4	37.1	63.6
15/08/2014 19:00	63.5	27.2	93.3	33.4	45.6
15/08/2014 20:00	62.6	28.8	97.8	33.6	42.1
15/08/2014 21:00	50.7	27.7	85.2	32.1	40.9
15/08/2014 22:00	35.7	27.6	48	30.8	38
15/08/2014 23:00	34.8	21.9	47.1	27.8	37.7
16/08/2014 00:00	31.9	22.2	47.5	24.5	34.5
16/08/2014 01:00	29.5	20.2	42.4	21.9	32.4
Overall	57.1	20.2	102.4	27.8	48.3

File	20140813_184118_000000_1.CMG				
Periods	1h				
Start	13/08/2014 18:00				
End	20/08/2014 12:00				
Location	L4				
DUO_10500	51° 37' 29.50 N 01° 06' 40.43 W				
Weighting	A				
Data type	Leq				
Unit	dB				
Period start	L_{eq}	L_{min}	L_{max,F}	L₉₀	L₁₀
13/08/2014 18:00	46.6	38.3	68	41	47.3
13/08/2014 19:00	50.4	38.2	71.7	41.9	50.1
13/08/2014 20:00	46.7	35.5	58.2	40.7	50.1
13/08/2014 21:00	43.8	34.9	59	39.1	45.8
13/08/2014 22:00	42.3	32.9	57.4	37.9	44.4
13/08/2014 23:00	41.7	27.9	63.3	32.4	44
14/08/2014 00:00	37.1	26.9	53	30.3	40
14/08/2014 01:00	38.6	24.8	60.9	28.4	39
14/08/2014 02:00	33.5	25.1	45	27.8	36.7
14/08/2014 03:00	34.6	25.5	49	29.1	37.4
14/08/2014 04:00	41	28.9	56.3	33	44.9

14/08/2014 05:00	43.4	34.1	53.3	37.5	46.2
14/08/2014 06:00	48.6	40.1	60.2	44.4	50.6
14/08/2014 07:00	50.8	45.1	66	47.3	52.4
14/08/2014 08:00	53.9	45.5	64.9	48.1	57.8
14/08/2014 09:00	54.6	42	67.1		58.5
14/08/2014 10:00	50.8	41.7	63.7	45	54.8
14/08/2014 11:00	53.6	43.1	65.7	47.1	56.8
14/08/2014 12:00	52.1	39.6	66.9	43.9	55.8
14/08/2014 13:00	51	42.4	68.4	45.7	53.8
14/08/2014 14:00	59.5	45	77	49	62.2
14/08/2014 15:00	60.6	41.1	82.1	49.2	63.4
14/08/2014 16:00	52.2	41.5	65.7	45.8	54.9
14/08/2014 17:00	49.1	40.5	67.2	43.4	51.1
14/08/2014 18:00	49.7	39.9	71.5	43.6	50
14/08/2014 19:00	49.5	31.9	73.7	35.2	46.9
14/08/2014 20:00	45.9	33	62.8	38.7	47.4
14/08/2014 21:00	47	36	64.3	40.3	48.6
14/08/2014 22:00	42.2	32.9	53.1	37.4	44.6
14/08/2014 23:00	40.5	29.3	55.4	33.2	42.9
15/08/2014 00:00	47.3	26.9	72.5	30.7	40.2
15/08/2014 01:00	35.3	26.3	50.8	29.6	38.5
15/08/2014 02:00	37	25.8	52.7	29	40.6
15/08/2014 03:00	36.4	25.7	51.2	29.1	40.2
15/08/2014 04:00	37.7	26.8	48.7	31	41.1
15/08/2014 05:00	46.9	30.7	71.6	36.2	44.7
15/08/2014 06:00	45.5	36.6	67.7	40.4	47.2
15/08/2014 07:00	47.2	40.1	67.5	43.7	48.8
15/08/2014 08:00	45.6	39.4	60.9	42.4	46.7
15/08/2014 09:00	47.1	38.6	64.7	41.5	47.8
15/08/2014 10:00	49.9	37.5	64.7	43.1	51.8
15/08/2014 11:00	49.9	36.9	69.5	41.4	51.3
15/08/2014 12:00	48.6	33	73	39	48.7
15/08/2014 13:00	49.3	33.4	69.5	36.9	50.9
15/08/2014 14:00	49	33.2	69.3	37.5	51.1
15/08/2014 15:00	49.4	36	68.8	39.5	50.8
15/08/2014 16:00	48	35.1	69.4	41	49.1
15/08/2014 17:00	47.4	38.5	65.2	41.8	48.4
15/08/2014 18:00	46.3	37.5	69.8	40.8	46.1
15/08/2014 19:00	45.1	37.9	57.2	41.4	46.7
15/08/2014 20:00	45.2	35.7	61.8	41.7	47
15/08/2014 21:00	43.9	28.3	57.2	37.8	46.7
15/08/2014 22:00	42.2	32	53.6	37.3	44.7
15/08/2014 23:00	41.5	27.1	51.9	33.3	44.7
16/08/2014 00:00	39	27.4	50	31.2	42.3
16/08/2014 01:00	36.1	24.9	50.2	27.8	39.2
16/08/2014 02:00	35.5	26.9	45.9	29.6	38.9
16/08/2014 03:00	38.2	28.8	53	30.8	41.4
16/08/2014 04:00	40.8	28.2	54.7	31.7	44.4
16/08/2014 05:00	42.6	28.9	56.7	35.9	45.5
16/08/2014 06:00	46.5	35	62	40.3	48.9
16/08/2014 07:00	46.5	37.8	64	41.9	48.9
16/08/2014 08:00	47.8	37.9	71.5	41.4	46.5
16/08/2014 09:00	45.4	38.5	65.7	41.7	47
16/08/2014 10:00	46.2	38.9	63.6	42.2	48
16/08/2014 11:00	50.4	38.8	61.8	44.3	53.4
16/08/2014 12:00	47.8	36.9	62.7	42.5	50.5
16/08/2014 13:00	46.6	41.1	61.9	43.4	48.1
16/08/2014 14:00	47.6	41.3	60.3	43.7	49.9

16/08/2014 15:00	48.9	41.3	61.3	44.2	51.6
16/08/2014 16:00	49.4	41.2	64.5	44.5	51.5
16/08/2014 17:00	48.6	40.8	66.5	44.2	50.5
16/08/2014 18:00	51.1	41.7	63.7	45.3	54.2
16/08/2014 19:00	47.1	38.2	71.3	42.2	48.8
16/08/2014 20:00	46	37.4	65	41	47.3
16/08/2014 21:00	44.2	36	63.1	39.4	44.9
16/08/2014 22:00	42.9	36.2	51.6	39.6	44.9
16/08/2014 23:00	41.7	34.4	50	38	43.9
17/08/2014 00:00	40.3	31.5	49.8	35.4	42.9
17/08/2014 01:00	39.7	31.7	53	34.7	42.6
17/08/2014 02:00	39.6	31	49.4	34.5	42.4
17/08/2014 03:00	37.9	29	51.3	32.3	40.8
17/08/2014 04:00	38	30.1	49.6	33	40.7
17/08/2014 05:00	40.6	30.7	61.1	34.1	42.8
17/08/2014 06:00	42.8	32.7	66.5	36.7	44.1
17/08/2014 07:00	45.7	36	61.9	40.4	47.7
17/08/2014 08:00	47	38.7	68.4	41.5	47.9
17/08/2014 09:00	51.6	41.7	66.4	46	54.3
17/08/2014 10:00	50.3	42.5	69.7	45.1	52.2
17/08/2014 11:00	47.2	39.9	63	43.2	48.1
17/08/2014 12:00	47.4	41.5	61.1	44.5	49.2
17/08/2014 13:00	51	42.6	63.4	45.9	54
17/08/2014 14:00	52.6	42.6	64.4	46.3	55.8
17/08/2014 15:00	48.9	40.8	61.2	43.3	51.9
17/08/2014 16:00	49.8	40.7	65.5	44.5	52.3
17/08/2014 17:00	50.7	41.5	63.4	44.7	53.9
17/08/2014 18:00	49.9	41.5	66.3	45.1	52.3
17/08/2014 19:00	48.3	39.6	66.4	44.2	49.9
17/08/2014 20:00	47.7	40.6	58.4	43.8	50
17/08/2014 21:00	45.9	35.3	56.2	39	49
17/08/2014 22:00	41.3	33.7	50	37.4	43.6
17/08/2014 23:00	40.7	32.1	54.3	35.6	42.9
18/08/2014 00:00	38.4	28.7	52.3	32.2	41.2
18/08/2014 01:00	37.5	27.7	50.6	31.3	40.6
18/08/2014 02:00	36.9	28.1	49.3	31.4	40
18/08/2014 03:00	37.6	28.8	50.6	32.2	40.4
18/08/2014 04:00	38.1	30.8	48.1	33.3	41.1
18/08/2014 05:00	42.6	32	51.2	38.3	45.3
18/08/2014 06:00	46.2	38.6	64.8	42.2	47.8
18/08/2014 07:00	47.4	42.4	54.2	45.2	48.9
18/08/2014 08:00	48.3	41.5	65.8	44.4	48.6
18/08/2014 09:00	46.3	39.6	63.3	42.8	47.6
18/08/2014 10:00	47.2	37.5	75.4	40.9	47.5
18/08/2014 11:00	47.9	36.3	61.4	42.3	50.9
18/08/2014 12:00	49	38	57.5	44.4	51.6
18/08/2014 13:00	49.2	38.8	68	43.2	51.3
18/08/2014 14:00	58.4	40	85.7	43.9	52.6
18/08/2014 15:00	59.4	41.6	78.8	45.7	61.3
18/08/2014 16:00	53.4	41.4	69.5	44.6	56.9
18/08/2014 17:00	53.6	43	69	46.9	55.6
18/08/2014 18:00	53.9	42.2	73.2	45	54.9
18/08/2014 19:00	50.3	37.5	73.7	42.8	51.2
18/08/2014 20:00	50.1	35.8	64	43.2	52.8
18/08/2014 21:00	43.5	33.7	58	37.6	46.2
18/08/2014 22:00	43.4	26.5	67.8	34.2	41.7
18/08/2014 23:00	46.4	29.6	65.2	33.4	46.5
19/08/2014 00:00	47.7	26.7	67.9	30.1	48.3

19/08/2014 01:00	34.4	25.3	48.8	28.7	37.2
19/08/2014 02:00	35	24.8	48.7	28.4	38.4
19/08/2014 03:00	37.7	24.7	62.3	28.6	38.6
19/08/2014 04:00	37.7	28	51.4	31.3	40.8
19/08/2014 05:00	42.9	30.2	61.2	36.7	45.2
19/08/2014 06:00	46.6	37.8	56.8	41.9	48.8
19/08/2014 07:00	48	41.9	57.2	45.6	49.4
19/08/2014 08:00	49.1	41.4	70.9	44.3	48.7
19/08/2014 09:00	49.8	39.7	70.9	43.5	50.3
19/08/2014 10:00	48	39.7	64	43.2	49.7
19/08/2014 11:00	47.1	39.9	66	42.7	47.9
19/08/2014 12:00	47.5	40.3	67	43.4	48.8
19/08/2014 13:00	51.1	39.7	73.5	43.9	50.8
19/08/2014 14:00	46.4	35.4	62.9	40.8	48
19/08/2014 15:00	48	36.9	69	41.9	49.2
19/08/2014 16:00	50.7	39.9	67.2	43.8	52.3
19/08/2014 17:00	49.1	41	71.2	44	48.8
19/08/2014 18:00	50	40.2	75.2	43.9	51.6
19/08/2014 19:00	48	38.6	68.2	42	48.1
19/08/2014 20:00	49.1	38	67.7	41.2	49.4
19/08/2014 21:00	47.5	38.1	67	41.2	48.6
19/08/2014 22:00	46.1	33.9	61.5	39.8	48.8
19/08/2014 23:00	46	28.3	66.4	33.4	45.1
20/08/2014 00:00	50.9	26.5	70	30.6	47.7
20/08/2014 01:00	36.6	26.3	49.3	28.2	40.3
20/08/2014 02:00	38.3	26.4	51.7	29.8	42.4
20/08/2014 03:00	34.2	27.2	48.5	29.2	37.2
20/08/2014 04:00	38.8	28	50.6	30.9	42.2
20/08/2014 05:00	43.3	29.8	53.7	36.7	46.1
20/08/2014 06:00	48.6	36.4	55.3	43.4	51.3
20/08/2014 07:00	47.7	41.6	64.2	44	50.3
20/08/2014 08:00	47.1	39.7	65.5	41.8	48.4
20/08/2014 09:00	43.6	35.3	63.1	38.5	45.3
20/08/2014 10:00	46.9	37.6	63	41.5	48.2
20/08/2014 11:00	48.7	38.4	70.8	42	49.5
Overall	49	24.7	85.7	34	50.4

File	20140813_111405_000000_1.CMG				
Periods	1h				
Start	13/08/2014 11:00				
End	20/08/2014 12:00				
Location	L5				
DUO_10427	51° 37' 24.65 N		01° 07' 04.91 W		
Weighting	A				
Data type	Leq				
Unit	dB				
Period start	L_{eq}	L_{min}	L_{max,F}	L₉₀	L₁₀
13/08/2014 11:00	53.8	43.4	82.4	47.3	54.3
13/08/2014 12:00	52.3	44.1	71.5	47.5	54.4
13/08/2014 13:00	52.3	44	65.6	48.3	54.3
13/08/2014 14:00	52.6	43.9	74.5	47.2	53.9
13/08/2014 15:00	54.1	42.9	69.2	48.9	55.6
13/08/2014 16:00	54.2	46.3	68.8	50.4	56.1
13/08/2014 17:00	55.4	47.3	77.6	50.1	56.1
13/08/2014 18:00	53.2	44.1	68.3	48.4	55.1
13/08/2014 19:00	57.5	43.4	84.5	47.4	54.7
13/08/2014 20:00	50.4	40.1	62.2	44.9	53.2

13/08/2014 21:00	49.9	39.6	66.7	43.4	52.6
13/08/2014 22:00	47.5	39.6	61.5	41.9	50.6
13/08/2014 23:00	45.3	37.4	59.2	39.6	48.6
14/08/2014 00:00	42.9	37.2	55.8	38.4	45.4
14/08/2014 01:00	42.4	36.6	59.2	38	44.3
14/08/2014 02:00	41	36.9	57.2	37.9	42.7
14/08/2014 03:00	40.8	36.4	55.4	37.8	42.9
14/08/2014 04:00	42.3	37.3	55.7	38.4	44.3
14/08/2014 05:00	51.2	38.9	66.4	41.5	54.8
14/08/2014 06:00	50.7	40.4	68.1	44.1	53.9
14/08/2014 07:00	52.8	45	65.4	48.1	55.4
14/08/2014 08:00	53.4	44.5	67.6	48.2	55.8
14/08/2014 09:00	52.6	41.5	73.3	46.7	54.5
14/08/2014 10:00	52.1	43.7	65.9	47.5	54.4
14/08/2014 11:00	51.8	43.9	65.8	47.3	53.9
14/08/2014 12:00	52.2	43.8	65.2	47.6	54.5
14/08/2014 13:00	55.3	44.9	71.5	48.5	58
14/08/2014 14:00	54.4	43.5	75.2	48	55.6
14/08/2014 15:00	55.8	44.2	70	48.1	59.5
14/08/2014 16:00	52.2	40.8	67.8	45.6	55.4
14/08/2014 17:00	48.8	39.8	62.1	44.2	51.2
14/08/2014 18:00	49.5	39	74.5	42.7	50.4
14/08/2014 19:00	60.8	33.5	90.5	38.2	48
14/08/2014 20:00	55.4	34.4	90.6	38.8	47.6
14/08/2014 21:00	45.4	36	61	40.2	48
14/08/2014 22:00	43.4	35.2	55	38.1	46.1
14/08/2014 23:00	42	31.9	58.8	34.7	45.1
15/08/2014 00:00	42.9	27.8	68.8	29.7	38.5
15/08/2014 01:00	57.4	27.5	90.2	28.9	35.4
15/08/2014 02:00	55.2	28	90.7	29.7	37.2
15/08/2014 03:00	33.3	28.2	48.5	29.6	35.1
15/08/2014 04:00	35.8	28.1	48.2	29.2	39.4
15/08/2014 05:00	44.1	32.9	61.5	36.4	47.4
15/08/2014 06:00	49.2	38.7	67.2	42	51.7
15/08/2014 07:00	52.4	42.9	65.1	47.3	55.1
15/08/2014 08:00	53.1	45	65.8	48.5	55.5
15/08/2014 09:00	51.2	39.2	68.9	43.8	53.7
15/08/2014 10:00	47.5	38.7	60.7	42.2	50
15/08/2014 11:00	48.2	38.6	65.1	41.3	50.1
15/08/2014 12:00	57.9	36.8	86.7	40.3	48.1
15/08/2014 13:00	68	33.7	92.1	37.8	46
15/08/2014 14:00	68.4	32.3	95.4	36.4	45.2
15/08/2014 15:00	64.8	31.2	93.7	35.8	44.8
15/08/2014 16:00	68.8	32.1	98	35.9	44.3
15/08/2014 17:00	70.6	31.4	99.6	35.6	43.6
15/08/2014 18:00	64.7	32.3	99.8	44.6	53.5
15/08/2014 19:00	53.1	42.4	70.3	47.1	55.6
15/08/2014 20:00	49.9	41.8	60.5	44.9	52.9
15/08/2014 21:00	49.5	40.3	69.3	43.2	51.8
15/08/2014 22:00	48.1	39.3	62.8	42.5	51.1
15/08/2014 23:00	45.9	37.7	58	39.9	49
16/08/2014 00:00	45.3	38.5	63	39.5	47.6
16/08/2014 01:00	43.6	37.1	57.4	38.1	46.4
16/08/2014 02:00	41.6	36.5	56.7	37.6	43.8
16/08/2014 03:00	43.1	36.9	56.7	38	45.9
16/08/2014 04:00	42.6	37.6	55.9	38.4	44.6
16/08/2014 05:00	44.6	38	62.3	39.5	46.9
16/08/2014 06:00	48	39.2	66.5	42.2	51

16/08/2014 07:00	49.4	41.4	66.9	43.6	52.7
16/08/2014 08:00	53.3	40.7	76.3	44.9	54.1
16/08/2014 09:00	52.2	43.1	71.3	47.1	54.5
16/08/2014 10:00	52.2	43.1	68.4	47.6	54.4
16/08/2014 11:00	53.3	44.5	69	48.1	55.2
16/08/2014 12:00	51.9	41.7	69.4	47.3	53.8
16/08/2014 13:00	54	44.1	76.7	47.8	54.9
16/08/2014 14:00	52.6	43.6	68.3	47.9	54.8
16/08/2014 15:00	52.6	44.3	72.9	48.2	54.5
16/08/2014 16:00	53.5	44.9	71.9	48.5	55.2
16/08/2014 17:00	52.8	43.8	66.6	48	55
16/08/2014 18:00	54.9	44	76.9	48.7	56.1
16/08/2014 19:00	51.9	41.9	74.1	46.7	54.2
16/08/2014 20:00	50.3	40.5	67.5	44.4	52.9
16/08/2014 21:00	48.5	39.8	62.9	42.8	51.2
16/08/2014 22:00	48.1	40.5	62.4	43.3	51
16/08/2014 23:00	46	39.2	58.7	41.4	48.6
17/08/2014 00:00	44.4	38.6	56.4	40.4	46.9
17/08/2014 01:00	43.4	38.5	54.5	39.9	45.7
17/08/2014 02:00	43.2	37.8	57.9	39.8	44.9
17/08/2014 03:00	42.1	37.7	53.6	39.2	44
17/08/2014 04:00	42.1	38.4	56.6	39.6	43.4
17/08/2014 05:00	44.9	38.6	59.9	40.2	47
17/08/2014 06:00	47.5	38.8	66.4	41	50.5
17/08/2014 07:00	49.7	40.4	67.5	43.2	52.1
17/08/2014 08:00	50.2	41.4	69	44.4	52.3
17/08/2014 09:00	53.2	41.9	71.1	47.3	55.2
17/08/2014 10:00	54.9	45	78.4	48.9	56.7
17/08/2014 11:00	55.3	44.4	84.6	49	55.9
17/08/2014 12:00	51.4	43.2	66	47	53.8
17/08/2014 13:00	64.4	35.8	88.2	40.3	47.5
17/08/2014 14:00	68.8	36	95.2	38.7	45.6
17/08/2014 15:00	66.4	33.4	95.7	36.8	44.1
17/08/2014 16:00	71.2	33.1	100.1	36.5	43.8
17/08/2014 17:00	69.4	32	100.2	38.2	53.8
17/08/2014 18:00	53.3	44.6	70.6	48.9	55.5
17/08/2014 19:00	51.8	42.3	70.6	47	54
17/08/2014 20:00	50.3	41.3	59	45.1	53.2
17/08/2014 21:00	48.5	39.8	62.7	42.8	51.4
17/08/2014 22:00	47.4	38.2	57.3	41	50.7
17/08/2014 23:00	45.5	36.8	58.9	39.4	48.5
18/08/2014 00:00	42.6	36.7	55	38.1	45.4
18/08/2014 01:00	40.8	36.4	53	37.6	43.4
18/08/2014 02:00	42.3	36.4	72.2	38	42.4
18/08/2014 03:00	41.3	36.7	63.4	38	43
18/08/2014 04:00	43	37.2	62.5	38.7	45.1
18/08/2014 05:00	48.4	38.6	69.2	40.9	51
18/08/2014 06:00	51.6	41.7	66.1	45.4	54.5
18/08/2014 07:00	53.8	43.5	67.3	49.6	55.9
18/08/2014 08:00	54.3	46.3	68.8	50.1	56.1
18/08/2014 09:00	53.5	43.3	81.7	47.9	54.6
18/08/2014 10:00	54.5	41.7	71.6	47.9	57.4
18/08/2014 11:00	52.5	44.2	65.2	47.5	54.7
18/08/2014 12:00	52.4	44.4	65.4	48.4	54.7
18/08/2014 13:00	53.1	44.6	69.7	48.3	55.5
18/08/2014 14:00	53.4	43	67.7	48.5	55.6
18/08/2014 15:00	52.9	44	68	48.3	55.3
18/08/2014 16:00	54.4	45.2	74.4	48.9	55.4

18/08/2014 17:00	56.4	44.5	75.8	49.8	56.4
18/08/2014 18:00	55.7	44.8	74.6	49.6	56.2
18/08/2014 19:00	53.3	43.1	72.4	47.3	55.2
18/08/2014 20:00	53	41.3	74.4	46.5	55
18/08/2014 21:00	49.3	39.2	62.5	42.7	52.2
18/08/2014 22:00	47.6	36.9	63.3	40	50.8
18/08/2014 23:00	46.6	36.7	61.3	38.9	49.9
19/08/2014 00:00	47.3	36.1	65.4	37.5	50.2
19/08/2014 01:00	39.8	35.9	55.3	36.9	41.9
19/08/2014 02:00	40.5	35.9	54.3	37	42.4
19/08/2014 03:00	42.9	36	66.1	36.9	42.8
19/08/2014 04:00	42.9	36.4	56.3	37.5	46.2
19/08/2014 05:00	47.8	36.5	60	40.1	51.1
19/08/2014 06:00	52.1	40.9	68.3	45.1	54.6
19/08/2014 07:00	54	44.7	68.5	50	56
19/08/2014 08:00	54.4	43.8	73	49.5	55.4
19/08/2014 09:00	53.7	43.5	74.7	48.5	55.3
19/08/2014 10:00	53.4	42.7	73.7	48.4	54.9
19/08/2014 11:00	53.1	43.6	71	47.5	54.7
19/08/2014 12:00	52.3	43.8	66.6	47.6	54.6
19/08/2014 13:00	52.7	44.2	68	47.7	54.6
19/08/2014 14:00	52.4	42.6	73.2	47.1	54.2
19/08/2014 15:00	53.9	42.6	71.2	48.2	55.9
19/08/2014 16:00	56.1	45.7	78.9	49.1	56.2
19/08/2014 17:00	55.4	45.3	70.8	49	57.1
19/08/2014 18:00	54.3	43.9	77.3	48.7	55.7
19/08/2014 19:00	52.3	42.2	69.3	46	54.7
19/08/2014 20:00	51.7	40.9	71.2	44.6	53.4
19/08/2014 21:00	50.1	40.8	64.6	43.7	53.1
19/08/2014 22:00	47.9	39.2	62.4	42.5	51.1
19/08/2014 23:00	47.4	37.3	68.9	39.6	49.1
20/08/2014 00:00	50.9	36.9	69.8	38.2	49.7
20/08/2014 01:00	42.1	36.2	65.6	37.4	43.7
20/08/2014 02:00	41.9	36.9	56	38.2	43.6
20/08/2014 03:00	41.1	36.7	53.6	37.9	42.8
20/08/2014 04:00	43.5	36.7	56.8	38	46.6
20/08/2014 05:00	47.7	36.8	59.3	41	51.2
20/08/2014 06:00	51.2	41.1	70.5	45.4	54.3
20/08/2014 07:00	52.5	42.7	67.2	47	55.3
20/08/2014 08:00	52.3	44.3	65.2	47.1	54.9
20/08/2014 09:00	51.2	41.6	65.4	45.1	53.9
20/08/2014 10:00	52.5	43	74.4	47	54
20/08/2014 11:00	52.1	42.8	70.7	46.9	54.1
Overall	57.7	27.5	100.2	38.7	53.9

Appendix 4 - Aircraft event data

File	20140813_115332_Event.CMG				
Location	L1				
Data type	Leq				
Weighting	A				
Unit	dB				
Start	13/08/2014 11:53				
End	20/08/2014 11:26				
Source	Appearance	Duration	Leq	Lmax	SEL
Fixed wing	13/08/2014 12:19	00:00:30	56.8	62.5	71.6
Helicopter	13/08/2014 12:30	00:01:40	64	71.9	84
Fixed wing	13/08/2014 12:57	00:00:30	54.1	59.3	68.9
Fixed wing	13/08/2014 12:59	00:00:40	57.7	65.4	73.7
Aircraft?	13/08/2014 13:00	00:00:20	57.4	61.8	70.4
Helicopter	13/08/2014 13:18	00:00:30	53.8	55.8	68.6
Aircraft?	13/08/2014 13:20	00:01:00	57.5	64.1	75.3
Fixed wing	13/08/2014 13:22	00:00:40	56	62.5	72
Aircraft?	13/08/2014 13:57	00:00:40	56.1	62.3	72.1
Helicopter	13/08/2014 14:06	00:00:50	58.2	65.2	75.2
Helicopter	13/08/2014 14:57	00:00:30	55.4	57.3	70.2
Helicopter	13/08/2014 14:58	00:00:30	55.6	58.3	70.4
Helicopter	13/08/2014 15:00	00:00:50	66.5	73.2	83.5
Helicopter	13/08/2014 15:10	00:01:10	70.1	76.9	88.5
Helicopter	13/08/2014 15:23	00:01:00	63.6	72.2	81.4
Fixed wing	13/08/2014 15:27	00:00:50	56.3	60.8	73.3
Fixed wing	13/08/2014 15:41	00:00:40	56	62.6	72
Helicopter	13/08/2014 15:48	00:01:50	62.8	73.4	83.2
Helicopter	13/08/2014 15:51	00:00:40	81.8	92.4	97.8
Fixed wing	13/08/2014 16:13	00:00:40	57.9	61.7	74
Fixed wing	13/08/2014 16:22	00:00:30	54.5	58.1	69.3
Fixed wing	13/08/2014 16:51	00:00:40	55.5	61.2	71.5
Helicopter	13/08/2014 17:41	00:00:30	57.3	62.7	72.1
Helicopter	13/08/2014 17:51	00:00:50	57	63.1	74
Helicopter	13/08/2014 17:57	00:01:00	67.1	75.4	84.9
Fixed wing	13/08/2014 18:57	00:00:30	54.4	58.8	69.2
Helicopter	13/08/2014 19:06	00:00:50	65.4	73.7	82.4
Helicopter	13/08/2014 19:13	00:01:00	72.6	83.3	90.4
Helicopter	13/08/2014 20:40	00:00:50	56.2	60.2	73.2
Helicopter	13/08/2014 20:41	00:00:50	58.3	69.9	75.3
Helicopter	13/08/2014 20:51	00:00:50	57.1	62.3	74.1
Helicopter	13/08/2014 21:00	00:00:40	55	57.9	71
Helicopter	13/08/2014 22:31	00:01:00	57.2	62.8	75
Helicopter	13/08/2014 23:19	00:00:40	59.6	64.6	75.6
Helicopter	14/08/2014 00:12	00:00:40	58	63.5	74
Helicopter	14/08/2014 01:10	00:00:50	59.6	66.1	76.6
Fixed wing	14/08/2014 08:40	00:01:00	56.4	60.4	74.1
Helicopter	14/08/2014 08:50	00:00:50	65.6	74.2	82.5
Fixed wing	14/08/2014 09:32	00:00:30	54.4	59.1	69.1
Fixed wing	14/08/2014 09:44	00:00:30	57.7	63.9	72.5
Fixed wing	14/08/2014 09:46	00:00:30	55.5	61.3	70.3
Fixed wing	14/08/2014 10:17	00:00:50	55.7	63.1	72.7
Fixed wing	14/08/2014 10:46	00:00:40	54.1	57.6	70.2
Fixed wing	14/08/2014 10:50	00:00:40	56.9	62.8	72.9
Fixed wing	14/08/2014 10:52	00:00:30	55.6	60	70.4
Helicopter	14/08/2014 10:53	00:01:00	56.9	62.4	74.7
Fixed wing	14/08/2014 11:00	00:00:30	53.5	57.3	68.3
Fixed wing	14/08/2014 11:18	00:00:30	55	59.6	69.8

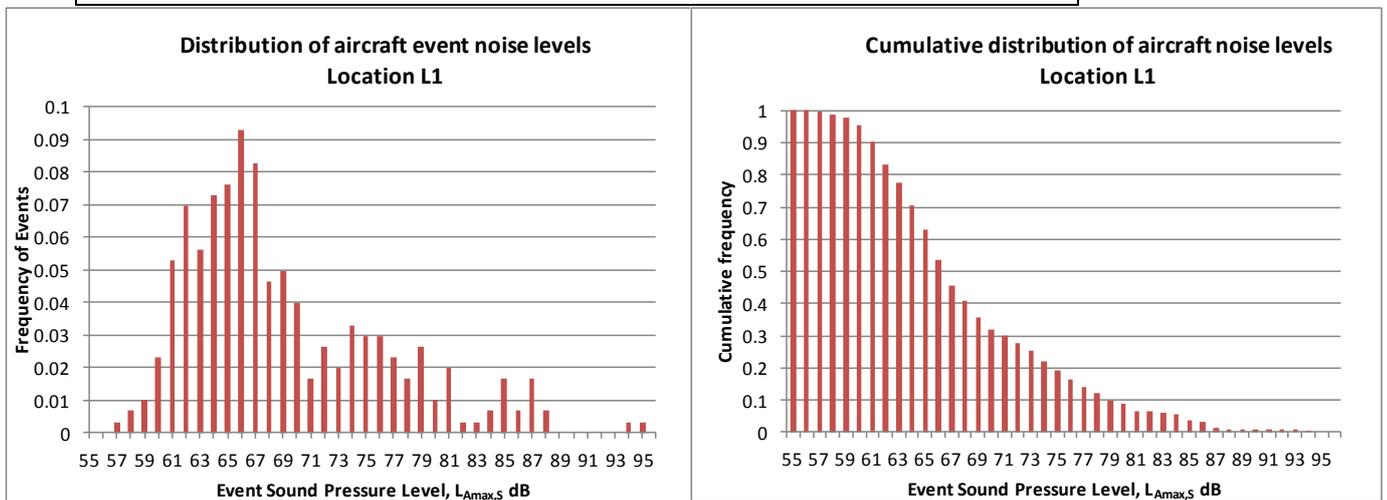
Fixed wing	14/08/2014 11:20	00:00:30	58.5	64.1	73.2
Fixed wing	14/08/2014 11:26	00:00:40	55.6	58.5	71.6
Fixed wing	14/08/2014 11:28	00:00:30	55.4	61.6	70.2
Helicopter	14/08/2014 12:03	00:01:00	65.5	75.2	83.3
Fixed wing	14/08/2014 12:08	00:01:10	57.6	63.9	76.1
Helicopter	14/08/2014 12:12	00:00:50	57.9	63.1	74.9
Helicopter	14/08/2014 12:35	00:01:00	66.9	77.6	84.7
Fixed wing	14/08/2014 12:54	00:00:30	55.7	61.8	70.5
Fixed wing	14/08/2014 13:21	00:00:30	55.6	60.7	70.3
Fixed wing	14/08/2014 13:41	00:00:30	57	62.1	71.7
Aircraft?	14/08/2014 13:46	00:00:30	56.2	59.7	71
Helicopter	14/08/2014 13:52	00:00:50	58.6	65.9	75.5
Fixed wing	14/08/2014 13:53	00:00:40	54.9	58.7	70.9
Fixed wing	14/08/2014 13:58	00:01:10	65.4	76.7	83.8
Aircraft?	14/08/2014 14:01	00:00:30	54.3	59.4	69.1
Aircraft?	14/08/2014 14:06	00:00:40	56.5	59.4	72.5
Fixed wing	14/08/2014 14:09	00:00:50	58.7	67.9	75.7
Aircraft?	14/08/2014 14:13	00:00:40	57.5	61.3	73.5
Aircraft?	14/08/2014 14:16	00:00:50	60.2	66.1	77.2
Helicopter	14/08/2014 14:36	00:01:20	56.8	66.8	75.8
Fixed wing	14/08/2014 14:43	00:00:30	54.6	58.8	69.4
Helicopter	14/08/2014 14:44	00:00:30	55	60	69.8
Helicopter	14/08/2014 15:23	00:00:30	55.3	58.3	70.1
Helicopter	14/08/2014 15:42	00:01:00	58.6	65.8	76.3
Helicopter	14/08/2014 15:51	00:01:00	58.9	66	76.7
Helicopter	14/08/2014 16:02	00:00:40	55	59.4	71
Fixed wing	14/08/2014 16:19	00:01:00	62.5	69.4	80.3
Helicopter	14/08/2014 16:26	00:01:10	70.2	78.7	88.6
Helicopter	14/08/2014 17:01	00:01:10	68.9	78.5	87.4
Helicopter	14/08/2014 17:24	00:00:50	58.7	63.9	75.7
Helicopter	14/08/2014 17:34	00:00:30	60	66.5	74.8
Helicopter	14/08/2014 18:00	00:01:00	68.6	77.4	86.3
Helicopter	14/08/2014 18:02	00:01:00	58.2	66.8	76
Helicopter	14/08/2014 18:34	00:01:00	57.9	62.4	75.7
Helicopter	14/08/2014 18:43	00:01:40	61.7	68.3	81.7
Helicopter	14/08/2014 18:52	00:01:30	61.6	70	81.2
Helicopter	14/08/2014 18:55	00:00:40	54.9	57.6	70.9
Helicopter	14/08/2014 19:48	00:00:40	55	59.3	71
Helicopter	14/08/2014 19:49	00:01:20	59.7	65.6	78.7
Helicopter	14/08/2014 19:57	00:00:30	53.5	56.8	68.2
Helicopter	14/08/2014 19:58	00:02:30	59.1	65.8	80.9
Helicopter	14/08/2014 20:04	00:05:10	61.5	73	86.4
Helicopter	14/08/2014 20:12	00:11:10	60.1	70.4	88.4
Helicopter	14/08/2014 20:26	00:12:40	53.8	69.4	82.6
Helicopter	14/08/2014 20:56	00:08:40	53.6	61.8	80.8
Helicopter	14/08/2014 21:08	00:02:40	55	63.7	77
Helicopter	14/08/2014 21:20	01:07:50	53.7	71.8	89.8
Helicopter	15/08/2014 00:02	00:05:20	51.4	64.2	76.5
Helicopter	15/08/2014 08:58	00:01:00	56	62.1	73.8
Fixed wing	15/08/2014 09:39	00:00:30	57	62.6	71.8
Aircraft?	15/08/2014 09:45	00:00:50	54.8	59.9	71.7
Aircraft?	15/08/2014 09:52	00:00:40	57.2	63.5	73.3
Fixed wing	15/08/2014 09:56	00:00:30	57	61.5	71.8
Aircraft?	15/08/2014 10:36	00:00:50	54.8	61.2	71.8
Fixed wing	15/08/2014 10:39	00:00:40	52.8	59.5	68.8
Aircraft?	15/08/2014 10:49	00:00:30	55.8	60.2	70.6
Aircraft?	15/08/2014 10:58	00:00:30	54.9	58.9	69.6
Helicopter	15/08/2014 11:08	00:00:30	55.2	59.7	70

Helicopter	15/08/2014 11:10	00:00:30	55.9	61	70.7
Helicopter	15/08/2014 11:14	00:01:00	55.3	59.2	73.1
Aircraft?	15/08/2014 11:18	00:00:50	55.7	59.1	72.7
Helicopter	15/08/2014 11:20	00:03:10	54.9	61.5	77.7
Aircraft?	15/08/2014 11:26	00:00:30	55.1	59.2	69.9
Helicopter	15/08/2014 11:38	00:00:40	57.9	64.7	73.9
Aircraft?	15/08/2014 11:42	00:00:30	56.4	62.8	71.1
Helicopter	15/08/2014 11:55	00:01:20	74	86.2	93.1
Aircraft?	15/08/2014 12:10	00:00:40	56.9	62.8	72.9
Helicopter	15/08/2014 12:40	00:02:20	57.3	63.4	78.7
Helicopter	15/08/2014 12:49	00:03:50	57.4	64.4	81.1
Helicopter	15/08/2014 13:17	00:01:20	71.6	83.2	90.7
Fixed wing	15/08/2014 13:19	00:00:30	53.3	58.6	68
Aircraft?	15/08/2014 13:23	00:00:30	53.8	58.6	68.6
Helicopter	15/08/2014 13:28	00:02:00	63.8	75.3	84.6
Aircraft?	15/08/2014 13:40	00:00:40	55.6	60.9	71.7
Aircraft?	15/08/2014 13:42	00:00:30	56.8	62.5	71.5
Aircraft?	15/08/2014 13:44	00:01:10	65.9	73.7	84.3
Fixed wing	15/08/2014 13:48	00:00:30	55.6	61.6	70.4
Aircraft?	15/08/2014 13:56	00:01:00	65.7	72.9	83.5
Aircraft?	15/08/2014 14:00	00:00:30	54	59.3	68.8
Aircraft?	15/08/2014 14:07	00:00:30	55.8	61.3	70.6
Fixed wing	15/08/2014 14:18	00:00:30	53.3	57.7	68.1
Aircraft?	15/08/2014 14:28	00:00:30	55.7	59.8	70.4
Aircraft?	15/08/2014 14:35	00:02:00	54.9	62	75.6
Aircraft?	15/08/2014 14:46	00:00:30	54.5	59.7	69.2
Aircraft?	15/08/2014 14:50	00:00:40	57	63.1	73
Helicopter	15/08/2014 14:55	00:01:30	68.3	78.5	87.8
Aircraft?	15/08/2014 14:58	00:01:00	59	66.3	76.8
Helicopter	15/08/2014 15:03	00:02:10	66.1	77.3	87.2
Helicopter	15/08/2014 15:14	00:01:00	69	76.3	86.7
Aircraft?	15/08/2014 15:19	00:00:30	55.5	59.3	70.3
Helicopter	15/08/2014 15:26	00:01:10	63.6	74	82.1
Helicopter	15/08/2014 15:33	00:02:10	69.6	82.9	90.7
Helicopter	15/08/2014 15:38	00:00:40	56	61.6	72.1
Helicopter	15/08/2014 15:41	00:05:20	64	77.4	89.1
Helicopter	15/08/2014 15:49	00:02:40	67.4	77.6	89.4
Helicopter	15/08/2014 16:16	00:01:30	66.3	75.2	85.9
Helicopter	15/08/2014 16:21	00:01:10	69.9	79.6	88.4
Helicopter	15/08/2014 17:04	00:00:30	54.6	59.1	69.4
Helicopter	15/08/2014 17:07	00:00:30	55.1	57.9	69.9
Helicopter	15/08/2014 17:12	00:01:00	73	83.6	90.8
Aircraft?	15/08/2014 17:38	00:00:40	58	65.5	74
Helicopter	15/08/2014 18:35	00:00:50	75.4	85.7	92.3
Helicopter	15/08/2014 18:51	00:01:00	64.3	73	82.1
Helicopter	15/08/2014 21:45	00:00:40	55.9	61.1	71.9
Helicopter	16/08/2014 01:55	00:01:10	61.2	68.4	79.7
Aircraft?	16/08/2014 10:46	00:00:30	55.1	57.9	69.9
Fixed wing	16/08/2014 14:03	00:00:40	54.8	58.6	70.8
Fixed wing	16/08/2014 17:07	00:01:30	56.6	64.1	76.1
Fixed wing	16/08/2014 20:51	00:00:50	66.7	72.8	83.7
Fixed wing	16/08/2014 21:43	00:00:30	56.6	62.5	71.4
Aircraft?	17/08/2014 07:42	00:00:40	66.7	74.5	82.7
Fixed wing	17/08/2014 18:54	00:01:00	56.5	63	74.3
Aircraft?	17/08/2014 19:42	00:01:00	63.2	70.5	81
Aircraft?	18/08/2014 08:38	00:01:00	73.4	82.4	91.1
Helicopter	18/08/2014 08:52	00:01:00	65.9	77	83.7
Aircraft?	18/08/2014 09:20	00:00:30	54.7	58.7	69.5

Aircraft?	18/08/2014 11:37	00:00:30	56.6	62.5	71.4
Helicopter	18/08/2014 12:27	00:00:50	62	69.8	79
Aircraft?	18/08/2014 13:23	00:00:30	54.3	60.6	69.1
Helicopter	18/08/2014 13:25	00:02:20	65.6	74.5	87
Helicopter	18/08/2014 14:15	00:00:50	64.4	72	81.4
Helicopter	18/08/2014 14:20	00:01:00	71.6	81.9	89.4
Aircraft?	18/08/2014 15:11	00:00:50	55.1	60.4	72.1
Helicopter	18/08/2014 16:23	00:01:00	71.2	79.2	89
Helicopter	18/08/2014 16:32	00:01:00	67.9	76.7	85.6
Helicopter	18/08/2014 16:35	00:00:50	80.2	92.2	97.2
Helicopter	18/08/2014 17:11	00:03:10	68.9	84.4	91.7
Helicopter	18/08/2014 17:16	00:01:00	63.8	71.7	81.6
Helicopter	18/08/2014 17:21	00:01:50	62.1	70.7	82.5
Helicopter	18/08/2014 17:46	00:00:40	53.5	57.8	69.6
Helicopter	18/08/2014 17:54	00:10:10	61.6	79	89.5
Helicopter	18/08/2014 18:10	00:06:20	51.9	60.4	77.7
Helicopter	18/08/2014 18:19	00:11:20	62.7	85.1	91.1
Helicopter	18/08/2014 18:41	00:01:20	59.1	70	78.2
Helicopter	18/08/2014 18:50	00:01:40	57.7	64.4	77.7
Helicopter	18/08/2014 19:33	00:01:00	58.4	69.3	76.2
Helicopter	18/08/2014 19:37	00:01:00	63.6	72.3	81.4
Helicopter	18/08/2014 19:48	00:00:50	56.9	65.6	73.9
Helicopter	18/08/2014 20:11	00:01:00	62.7	72.5	80.5
Helicopter	18/08/2014 20:24	00:00:40	55.9	64.7	71.9
Helicopter	18/08/2014 20:27	00:03:20	59.5	69.4	82.5
Helicopter	18/08/2014 20:33	00:10:10	55.4	65.1	83.2
Helicopter	18/08/2014 20:47	00:02:40	58.1	66.6	80.1
Helicopter	18/08/2014 20:54	00:08:20	53.5	67.6	80.5
Helicopter	18/08/2014 22:14	00:03:40	57.7	66.2	81.1
Helicopter	18/08/2014 22:22	00:03:20	58.6	66	81.7
Helicopter	18/08/2014 22:56	00:01:00	64.9	73.6	82.7
Helicopter	18/08/2014 23:03	00:03:00	58.4	70	80.9
Helicopter	18/08/2014 23:33	00:00:50	54.6	63.3	71.6
Helicopter	18/08/2014 23:36	00:00:50	56.1	61.5	73
Helicopter	18/08/2014 23:39	00:00:50	56.7	64.5	73.7
Helicopter	18/08/2014 23:40	00:01:20	63.5	71.8	82.6
Helicopter	18/08/2014 23:42	00:01:20	58.3	65.5	77.3
Helicopter	18/08/2014 23:46	00:00:50	55.1	63	72.1
Helicopter	18/08/2014 23:52	00:01:50	61.6	72.3	82
Helicopter	18/08/2014 23:57	00:00:40	56.4	61.9	72.4
Helicopter	19/08/2014 00:13	00:00:50	58.5	66.4	75.5
Helicopter	19/08/2014 00:23	00:01:00	63.6	73.9	81.3
Helicopter	19/08/2014 00:32	00:01:00	64.4	74.2	82.2
Helicopter	19/08/2014 08:54	00:01:10	73.9	85.1	92.3
Helicopter	19/08/2014 09:05	00:01:00	68.4	78.2	86.2
Aircraft?	19/08/2014 09:23	00:01:50	62.9	73.8	83.3
Aircraft?	19/08/2014 09:26	00:01:10	56	61.2	74.4
Aircraft?	19/08/2014 10:05	00:00:40	56	63.5	72
Aircraft?	19/08/2014 10:15	00:00:40	55.1	62	71.1
Aircraft?	19/08/2014 10:17	00:00:50	55.3	60.3	72.2
Aircraft?	19/08/2014 10:40	00:00:50	52.8	59.4	69.7
Aircraft?	19/08/2014 10:45	00:00:40	55.4	61.2	71.4
Aircraft?	19/08/2014 10:47	00:00:40	55.3	61.6	71.3
Aircraft?	19/08/2014 11:19	00:00:40	55.3	61	71.3
Aircraft?	19/08/2014 12:34	00:00:40	53.8	57.6	69.8
Aircraft?	19/08/2014 12:36	00:00:40	56.6	63.4	72.6
Aircraft?	19/08/2014 12:39	00:00:50	56.8	63.6	73.8
Fixed wing	19/08/2014 13:03	00:00:50	53.9	59.7	70.9

Helicopter	19/08/2014 13:49	00:01:00	74.5	85	92.3
Helicopter	19/08/2014 15:02	00:06:40	54.6	62.1	80.6
Helicopter	19/08/2014 15:17	00:00:40	54.9	62.3	70.9
Helicopter	19/08/2014 15:40	00:01:00	60	66.4	77.8
Helicopter	19/08/2014 15:51	00:04:00	57.8	67.5	81.6
Helicopter	19/08/2014 16:00	00:01:20	55.4	60.6	74.4
Helicopter	19/08/2014 16:03	00:01:50	73	86.1	93.4
Helicopter	19/08/2014 16:08	00:01:00	57.3	65.4	75.1
Helicopter	19/08/2014 16:26	00:00:40	56.4	62.6	72.4
Helicopter	19/08/2014 16:28	00:00:50	71.8	80.5	88.8
Helicopter	19/08/2014 16:30	00:00:40	56.3	60.7	72.3
Helicopter	19/08/2014 16:34	00:01:00	57.2	64.6	75
Helicopter	19/08/2014 16:37	00:00:30	55.1	59.6	69.8
Helicopter	19/08/2014 16:41	00:00:50	58.4	64.7	75.4
Helicopter	19/08/2014 16:43	00:00:50	63.2	71.8	80.2
Helicopter	19/08/2014 16:50	00:01:00	57.1	62.7	74.9
Helicopter	19/08/2014 16:57	00:01:00	75.1	84.4	92.9
Helicopter	19/08/2014 17:01	00:00:40	58.1	63	74.1
Helicopter	19/08/2014 17:32	00:00:50	74.8	85.3	91.8
Aircraft?	19/08/2014 17:46	00:01:20	60.9	69.1	79.9
Helicopter	19/08/2014 17:56	00:00:50	54.4	60.8	71.4
Helicopter	19/08/2014 18:05	00:00:40	56.1	60.6	72.1
Helicopter	19/08/2014 18:07	00:00:50	73.7	82.9	90.7
Helicopter	19/08/2014 18:18	00:00:50	56.8	63.1	73.8
Helicopter	19/08/2014 18:29	00:01:00	63.7	71.3	81.5
Helicopter	19/08/2014 18:33	00:01:20	57.9	67.9	77
Helicopter	19/08/2014 18:42	00:01:20	58.2	64.8	77.3
Helicopter	19/08/2014 18:54	00:00:30	54.8	58.3	69.6
Aircraft?	19/08/2014 19:09	00:01:10	59.3	67.8	77.7
Helicopter	19/08/2014 19:12	00:00:50	55	62.1	72
Helicopter	19/08/2014 19:20	00:00:50	61.2	69.7	78.2
Helicopter	19/08/2014 19:44	00:00:50	55.3	62.1	72.3
Helicopter	19/08/2014 20:15	00:00:30	57.4	61.8	72.2
Helicopter	19/08/2014 20:17	00:01:20	66.3	76.3	85.4
Helicopter	19/08/2014 20:23	00:00:50	56.9	64	73.9
Helicopter	19/08/2014 20:29	00:01:10	64.4	72.6	82.8
Helicopter	19/08/2014 20:40	00:01:00	57.6	65.4	75.4
Helicopter	19/08/2014 20:42	00:00:40	55.3	60.6	71.4
Helicopter	19/08/2014 20:44	00:01:20	58.7	65.9	77.8
Helicopter	19/08/2014 21:03	00:01:40	64	69.2	84
Helicopter	19/08/2014 21:06	00:01:30	59.3	65.3	78.9
Helicopter	19/08/2014 21:12	00:01:20	59.1	64	78.2
Helicopter	19/08/2014 21:14	00:01:20	58.2	65.2	77.2
Helicopter	19/08/2014 21:19	00:01:40	62.9	68.9	82.9
Helicopter	19/08/2014 21:26	00:00:40	55.3	63.5	71.3
Helicopter	19/08/2014 21:30	00:01:50	61.3	67.4	81.7
Helicopter	19/08/2014 21:35	00:00:50	54.5	59.6	71.5
Helicopter	19/08/2014 21:51	00:02:20	60.5	71.7	82
Helicopter	19/08/2014 22:05	00:05:30	57.2	68.4	82.4
Helicopter	19/08/2014 22:16	00:01:00	58.9	64.4	76.7
Helicopter	19/08/2014 22:23	00:01:20	57.8	65.8	76.8
Helicopter	19/08/2014 22:27	00:01:50	58.7	68.5	79.2
Helicopter	19/08/2014 22:31	00:02:50	55.3	64	77.6
Helicopter	19/08/2014 22:34	00:01:00	58.8	66.9	76.6
Helicopter	19/08/2014 22:36	00:04:10	56.8	67.4	80.8
Helicopter	19/08/2014 22:41	00:01:00	58.2	65.6	76
Helicopter	19/08/2014 22:44	00:01:30	54.5	57.1	74
Helicopter	19/08/2014 22:47	00:01:10	57.8	65.2	76.2

Helicopter	19/08/2014 22:49	00:01:10	53.8	59.3	72.3
Helicopter	19/08/2014 22:53	00:02:00	58	63.9	78.8
Helicopter	19/08/2014 22:56	00:01:10	58.3	64.1	76.8
Helicopter	19/08/2014 22:58	00:00:50	57.3	63	74.3
Helicopter	19/08/2014 23:32	00:03:20	58.1	64.9	81.1
Helicopter	19/08/2014 23:38	00:01:50	63.5	68.5	83.9
Helicopter	19/08/2014 23:47	00:01:30	64.4	72.7	84
Helicopter	19/08/2014 23:53	00:02:20	64.1	73.5	85.5
Helicopter	19/08/2014 23:58	00:04:10	56.5	63.7	80.5
Helicopter	20/08/2014 00:06	00:01:50	62.8	72.9	83.2
Helicopter	20/08/2014 00:08	00:01:20	63.1	71.2	82.1
Helicopter	20/08/2014 00:10	00:01:00	61.6	68.2	79.4
Helicopter	20/08/2014 00:13	00:01:40	58.8	64.9	78.8
Helicopter	20/08/2014 00:18	00:01:10	64.5	71.2	82.9
Helicopter	20/08/2014 00:26	00:01:40	56.6	60.9	76.6
Helicopter	20/08/2014 00:33	00:01:20	64.9	72.1	83.9
Helicopter	20/08/2014 00:48	00:00:50	55.9	60.5	72.9
Aircraft?	20/08/2014 10:03	00:01:00	57.4	63.9	75.2
Helicopter	20/08/2014 10:09	00:01:30	57	62.9	76.6
Aircraft?	20/08/2014 10:50	00:01:20	55	65.3	74.1
Aircraft?	20/08/2014 11:09	00:00:30	55.6	62.6	70.3
Aircraft?	20/08/2014 11:12	00:00:30	56.9	63.2	71.6
Fixed wing	Total: 44	00:29:20	58.4	76.7	90.9
Helicopter	Total: 201	06:50:10	63.9	92.4	107.8
Aircraft?	Total: 57	00:43:10	61.1	82.4	95.2
Overall aircraft events $L_{A_{Max,F}}$			>80 dB	19	
			>85 dB	8	
			>90 dB	2	
			Mean	66.5	
			St Dev.	7.3	
			Mean+1sd	73.8	



File	20140813_113826_Event.CMG				
Location	L2				
Data type	Leq				
Weighting	A				
Unit	dB				
Start	13/08/2014 11:38				
End	20/08/2014 11:06				
Source	Appearance	Duration	Leq	Lmax	SEL
Helicopter	13/08/2014 11:39	00:01:00	65.1	78.9	82.9
Helicopter	13/08/2014 12:17	00:00:40	64	70.7	80
Aircraft?	13/08/2014 12:30	00:00:50	54.2	61	71.2
Aircraft?	13/08/2014 12:57	00:00:40	53.6	61.4	69.6
Aircraft?	13/08/2014 12:58	00:00:40	61.5	71.4	77.5
Aircraft?	13/08/2014 13:00	00:00:40	58.9	66.1	74.9
Helicopter	13/08/2014 13:10	00:01:10	66.3	72.6	84.8
Aircraft?	13/08/2014 13:21	00:00:40	55	63.4	71
Aircraft?	13/08/2014 13:22	00:00:40	57.7	64.9	73.8
Aircraft?	13/08/2014 13:27	00:00:30	58.1	65.1	72.9
Aircraft?	13/08/2014 13:29	00:00:20	59.3	65.5	72.3
Helicopter	13/08/2014 13:57	00:01:00	64.8	72.8	82.6
Helicopter	13/08/2014 14:05	00:00:40	53.6	63	69.6
Aircraft?	13/08/2014 14:25	00:00:40	61.2	71.8	77.3
Aircraft?	13/08/2014 14:33	00:00:50	55.8	62.1	72.8
Helicopter	13/08/2014 14:35	00:00:40	60.4	67.1	76.4
Helicopter	13/08/2014 14:54	00:00:40	58.7	68	74.8
Helicopter	13/08/2014 15:10	00:00:50	56.4	64.3	73.4
Helicopter	13/08/2014 15:19	00:01:30	67.6	75.7	87.1
Helicopter	13/08/2014 15:27	00:01:10	63.9	73.4	82.3
Helicopter	13/08/2014 15:33	00:01:10	64.8	73.2	83.3
Aircraft?	13/08/2014 15:40	00:01:20	60.9	73.7	79.9
Aircraft?	13/08/2014 15:45	00:00:30	58.2	64.9	73
Helicopter	13/08/2014 15:53	00:00:30	64.5	74.8	79.2
Aircraft?	13/08/2014 16:13	00:00:40	56.7	64.4	72.7
Aircraft?	13/08/2014 16:58	00:00:40	57.5	63.9	73.6
Aircraft?	13/08/2014 17:57	00:00:50	56.8	61.8	73.8
Helicopter	13/08/2014 18:34	00:01:00	65.8	72.6	83.6
Helicopter	13/08/2014 18:58	00:00:50	68.5	77.8	85.5
Helicopter	13/08/2014 19:03	00:01:20	64.9	75.9	84
Helicopter	13/08/2014 19:13	00:01:20	58.6	67	77.6
Helicopter	13/08/2014 19:31	00:01:00	63.1	73.6	80.8
Helicopter	13/08/2014 20:40	00:00:50	66.3	71.7	83.3
Helicopter	13/08/2014 20:50	00:01:10	67.2	75.9	85.6
Helicopter	13/08/2014 20:59	00:01:00	68.7	78.7	86.4
Helicopter	13/08/2014 21:16	00:00:50	63	68.5	80
Helicopter	13/08/2014 21:33	00:01:20	62.3	69.4	81.3
Helicopter	13/08/2014 21:45	00:01:20	63.8	69.6	82.9
Helicopter	13/08/2014 21:50	00:01:10	62.8	73.3	81.3
Helicopter	13/08/2014 22:50	00:01:40	60.7	70.5	80.7
Helicopter	13/08/2014 23:18	00:01:30	63.8	72.4	83.3
Helicopter	13/08/2014 23:41	00:01:20	63.5	69.1	82.5
Helicopter	14/08/2014 00:11	00:01:30	66.4	73.4	85.9
Helicopter	14/08/2014 00:38	00:00:50	63.7	75	80.7
Helicopter	14/08/2014 01:37	00:01:10	61.9	70	80.4
Aircraft?	14/08/2014 09:44	00:00:30	62	70.2	76.8
Aircraft?	14/08/2014 09:45	00:00:40	58.4	64.4	74.4
Aircraft?	14/08/2014 10:02	00:00:30	60.3	67.5	75.1

Helicopter	14/08/2014 10:10	00:00:40	53	61.6	69
Fixed wing	14/08/2014 10:17	00:00:20	62	67.5	75
Fixed wing	14/08/2014 10:19	00:00:30	58.6	65.1	73.4
Fixed wing	14/08/2014 10:41	00:00:50	59.9	68.3	76.8
Fixed wing	14/08/2014 10:49	00:00:40	60.3	68.9	76.3
Aircraft?	14/08/2014 10:52	00:01:00	57.1	63.9	74.9
Helicopter	14/08/2014 10:53	00:00:50	56.3	63.8	73.3
Helicopter	14/08/2014 11:02	00:00:50	66.7	76.9	83.7
Helicopter	14/08/2014 11:13	00:01:10	61.9	70.6	80.3
Fixed wing	14/08/2014 11:20	00:00:50	61.5	71.6	78.4
Helicopter	14/08/2014 11:24	00:00:50	59.4	68	76.4
Aircraft?	14/08/2014 11:28	00:01:10	56.5	65.5	74.9
Helicopter	14/08/2014 12:03	00:01:30	66.8	77.5	86.4
Aircraft?	14/08/2014 12:08	00:01:00	59.1	69.3	76.9
Helicopter	14/08/2014 12:25	00:01:20	65.2	77.5	84.2
Helicopter	14/08/2014 12:35	00:00:30	55.5	65.1	70.3
Fixed wing	14/08/2014 12:44	00:00:40	55.4	61.1	71.4
Fixed wing	14/08/2014 12:53	00:00:40	56.5	64.8	72.5
Fixed wing	14/08/2014 13:17	00:00:50	56.6	62.8	73.6
Fixed wing	14/08/2014 13:21	00:00:30	55	61.3	69.8
Fixed wing	14/08/2014 13:30	00:00:30	59.4	67	74.2
Fixed wing	14/08/2014 13:35	00:00:50	57.3	67.4	74.3
Fixed wing	14/08/2014 13:40	00:00:50	57.7	64.8	74.7
Helicopter	14/08/2014 13:45	00:01:30	63.9	76.2	83.5
Aircraft?	14/08/2014 13:57	00:00:30	55.9	63.3	70.7
Aircraft?	14/08/2014 14:05	00:00:50	67.5	76.3	84.5
Aircraft?	14/08/2014 14:08	00:01:00	55.8	62.4	73.6
Aircraft?	14/08/2014 14:12	00:01:00	56.9	65.7	74.7
Aircraft?	14/08/2014 14:16	00:00:40	61.1	67.8	77.1
Helicopter	14/08/2014 14:32	00:01:10	64	71.7	82.5
Helicopter	14/08/2014 14:36	00:01:00	73.9	84	91.7
Aircraft?	14/08/2014 14:49	00:00:30	57.5	64.1	72.3
Helicopter	14/08/2014 15:41	00:01:10	64.1	70.3	82.6
Helicopter	14/08/2014 15:43	00:01:10	60.8	67.5	79.2
Helicopter	14/08/2014 16:08	00:01:00	63.9	68.9	81.6
Helicopter	14/08/2014 16:26	00:01:20	58.8	67	77.8
Helicopter	14/08/2014 16:33	00:00:50	66	72.3	82.9
Aircraft?	14/08/2014 17:01	00:00:50	61.2	73	78.2
Helicopter	14/08/2014 17:23	00:01:20	64.8	71.5	83.8
Helicopter	14/08/2014 17:53	00:01:10	65.4	75.2	83.8
Helicopter	14/08/2014 18:24	00:01:00	66.5	73.1	84.3
Helicopter	14/08/2014 18:34	00:00:50	69.3	76.3	86.3
Helicopter	14/08/2014 18:42	00:01:00	63.7	71.8	81.5
Helicopter	14/08/2014 18:51	00:01:10	65.1	73	83.5
Helicopter	14/08/2014 19:15	00:01:30	66.7	75.7	86.3
Helicopter	14/08/2014 19:49	00:00:50	67.4	76.6	84.4
Helicopter	14/08/2014 20:04	00:01:20	64	73	83.1
Helicopter	14/08/2014 20:12	00:01:30	63.4	70.8	82.9
Helicopter	14/08/2014 20:15	00:01:40	58.5	65.8	78.5
Helicopter	14/08/2014 20:26	00:02:20	66.4	76.9	87.9
Helicopter	14/08/2014 20:49	00:01:10	62.3	68.2	80.8
Helicopter	14/08/2014 21:08	00:01:30	63	70.8	82.5
Helicopter	14/08/2014 21:13	00:01:20	62.4	69.5	81.4
Helicopter	14/08/2014 21:32	00:01:00	65.4	74.1	83.2
Helicopter	14/08/2014 21:41	00:01:30	66.2	73.1	85.7
Helicopter	14/08/2014 21:45	00:01:10	65.9	74.4	84.3
Helicopter	14/08/2014 21:47	00:01:20	63.3	67.7	82.3
Helicopter	14/08/2014 21:49	00:01:20	66.9	75	86

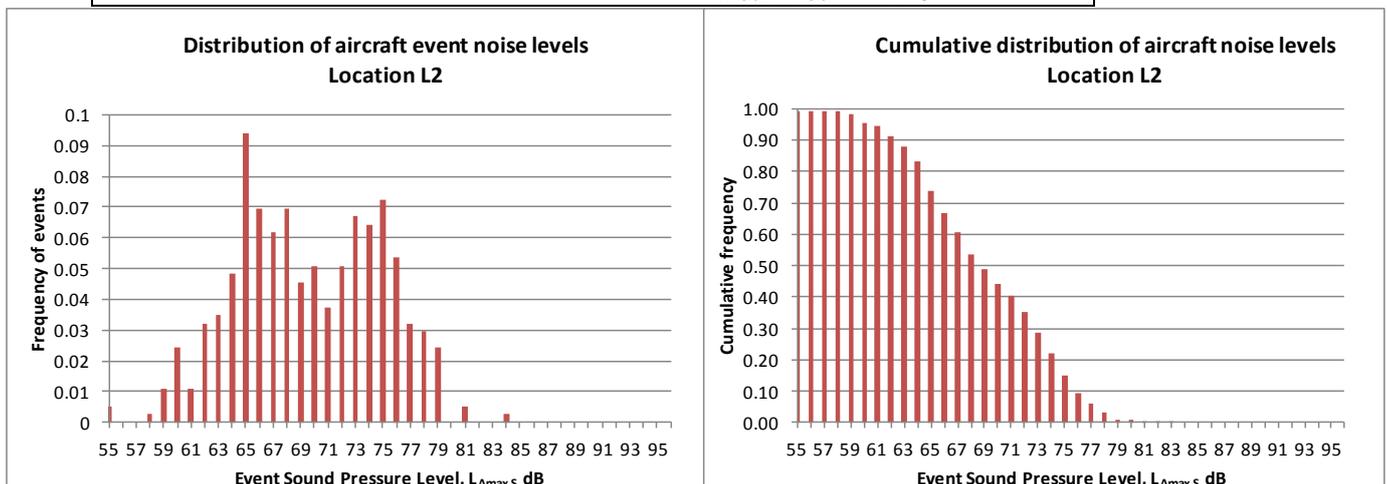
Helicopter	14/08/2014 21:58	00:02:20	67.5	75.9	88.9
Helicopter	14/08/2014 23:03	00:01:30	61.1	68.5	80.6
Helicopter	15/08/2014 00:02	00:01:20	67.4	74.5	86.4
Helicopter	15/08/2014 00:15	00:01:10	55.2	62.5	73.7
Helicopter	15/08/2014 01:44	00:00:50	64.8	74.8	81.8
Fixed wing	15/08/2014 08:14	00:00:40	56.6	61.1	72.6
Helicopter	15/08/2014 08:40	00:00:50	51.5	59.2	68.5
Helicopter	15/08/2014 08:51	00:00:50	56.2	64.8	73.2
Helicopter	15/08/2014 08:58	00:00:50	68.3	76.9	85.3
Helicopter	15/08/2014 09:17	00:00:50	52.6	58.3	69.6
Fixed wing	15/08/2014 09:30	00:00:50	59	65.8	76
Aircraft?	15/08/2014 09:34	00:01:20	60.3	68.5	79.3
Fixed wing	15/08/2014 09:39	00:01:30	60.4	67.9	80
Aircraft?	15/08/2014 09:45	00:00:50	61.6	68	78.6
Fixed wing	15/08/2014 10:05	00:00:50	58.7	65.1	75.7
Aircraft?	15/08/2014 10:06	00:00:10	48.6	50.6	58.6
Fixed wing	15/08/2014 10:06	00:01:00	56.6	61.9	74.4
Aircraft?	15/08/2014 10:13	00:00:10	48.5	50.5	58.5
Fixed wing	15/08/2014 10:13	00:01:20	60.6	66.9	79.6
Fixed wing	15/08/2014 10:19	00:01:00	62.1	70.6	79.8
Aircraft?	15/08/2014 10:39	00:00:50	59.4	67	76.4
Helicopter	15/08/2014 10:42	00:01:20	64	73	83.1
Aircraft?	15/08/2014 10:49	00:01:10	62.9	69.8	81.4
Aircraft?	15/08/2014 10:58	00:01:20	60.2	65.4	79.3
Helicopter	15/08/2014 11:10	00:01:00	67.6	77.6	85.4
Helicopter	15/08/2014 11:17	00:00:50	56.6	64.4	73.6
Aircraft?	15/08/2014 11:18	00:00:50	59.7	66.1	76.7
Aircraft?	15/08/2014 11:26	00:01:10	60.5	66.7	79
Helicopter	15/08/2014 11:38	00:01:00	68.4	78.1	86.2
Aircraft?	15/08/2014 11:42	00:01:20	59.5	66.5	78.6
Helicopter	15/08/2014 11:57	00:00:50	65.3	74.5	82.3
Helicopter	15/08/2014 12:10	00:00:50	61.1	69.4	78.1
Helicopter	15/08/2014 12:51	00:02:00	64.7	75	85.5
Aircraft?	15/08/2014 12:56	00:00:50	58.6	64.1	75.6
Aircraft?	15/08/2014 13:19	00:01:10	58.4	65	76.9
Aircraft?	15/08/2014 13:21	00:00:50	57.2	63.7	74.2
Aircraft?	15/08/2014 13:23	00:01:10	59.4	67.1	77.8
Aircraft?	15/08/2014 13:26	00:00:40	55.2	60.4	71.3
Aircraft?	15/08/2014 13:39	00:00:40	57.5	63	73.6
Aircraft?	15/08/2014 13:42	00:00:40	52.1	60	68.1
Helicopter	15/08/2014 13:56	00:01:10	67.8	76.7	86.2
Helicopter	15/08/2014 14:01	00:01:00	59.2	65	77
Helicopter	15/08/2014 14:04	00:00:50	60.5	67.5	77.5
Helicopter	15/08/2014 14:06	00:01:00	63.8	71.5	81.6
Aircraft?	15/08/2014 14:18	00:00:50	57.2	63.1	74.2
Helicopter	15/08/2014 14:29	00:00:40	58.3	64.6	74.3
Helicopter	15/08/2014 14:29	00:00:40	53.8	58.7	69.8
Helicopter	15/08/2014 14:31	00:00:50	63.3	71.9	80.3
Aircraft?	15/08/2014 14:32	00:00:40	58.9	65.4	74.9
Helicopter	15/08/2014 14:35	00:00:50	55.8	62.1	72.8
Helicopter	15/08/2014 14:36	00:01:00	59.4	66.3	77.2
Aircraft?	15/08/2014 14:39	00:00:40	59.1	64.5	75.2
Aircraft?	15/08/2014 14:43	00:00:50	59.6	65.6	76.6
Aircraft?	15/08/2014 14:46	00:01:40	59.6	65.2	79.6
Aircraft?	15/08/2014 14:51	00:00:50	57.1	63.4	74.1
Aircraft?	15/08/2014 14:55	00:01:30	58.2	64.6	77.8
Aircraft?	15/08/2014 14:58	00:00:30	54.4	59.3	69.2
Aircraft?	15/08/2014 15:19	00:00:50	57.3	64.1	74.3

Aircraft?	15/08/2014 15:23	00:00:50	59.5	65.6	76.5
Helicopter	15/08/2014 15:27	00:00:50	59	64.2	76
Helicopter	15/08/2014 15:30	00:00:40	58.1	64.4	74.1
Helicopter	15/08/2014 15:33	00:00:50	57.6	64.7	74.6
Aircraft?	15/08/2014 15:38	00:00:40	56.1	63.4	72.1
Helicopter	15/08/2014 15:41	00:01:10	58.7	63.8	77.2
Helicopter	15/08/2014 15:43	00:01:00	59.2	65.9	77
Helicopter	15/08/2014 15:45	00:00:50	57.4	63.1	74.4
Helicopter	15/08/2014 15:48	00:00:50	56.4	63.2	73.4
Helicopter	15/08/2014 15:50	00:00:40	56.2	61.8	72.2
Helicopter	15/08/2014 15:51	00:01:00	58.8	64.1	76.5
Aircraft?	15/08/2014 16:04	00:00:50	58.1	64.7	75.1
Aircraft?	15/08/2014 16:17	00:01:30	58.1	64.2	77.7
Aircraft?	15/08/2014 16:26	00:01:10	58.3	67.9	76.8
Aircraft?	15/08/2014 16:52	00:00:40	53.1	59.7	69.1
Helicopter	15/08/2014 16:55	00:00:50	58.7	64.3	75.7
Helicopter	15/08/2014 16:59	00:01:50	58.9	67.5	79.3
Helicopter	15/08/2014 17:04	00:00:50	57.8	63.7	74.8
Helicopter	15/08/2014 17:07	00:00:40	57.5	63.4	73.5
Aircraft?	15/08/2014 18:08	00:00:50	60.1	67.5	77.1
Helicopter	15/08/2014 20:45	00:00:40	64.6	74.3	80.6
Fixed wing	16/08/2014 10:46	00:00:50	55.9	64.2	72.9
Helicopter	16/08/2014 11:40	00:00:50	63.6	71.3	80.6
Helicopter	16/08/2014 12:02	00:00:50	62.6	69.5	79.6
Helicopter	16/08/2014 12:14	00:00:50	59.5	68.4	76.5
Helicopter	16/08/2014 12:23	00:00:50	56.5	64.1	73.5
Helicopter	16/08/2014 12:46	00:01:00	54.5	65.1	72.3
Helicopter	16/08/2014 13:03	00:00:50	56.2	67.2	73.2
Helicopter	16/08/2014 13:58	00:00:40	57.5	66.2	73.5
Helicopter	16/08/2014 22:03	00:01:00	60.6	69.1	78.3
Helicopter	17/08/2014 00:40	00:01:00	55.8	66.6	73.5
Helicopter	17/08/2014 02:14	00:01:00	61.4	70.5	79.2
Helicopter	17/08/2014 09:45	00:01:20	64.3	74.9	83.4
Helicopter	17/08/2014 11:59	00:00:50	57.8	66.7	74.7
Helicopter	17/08/2014 18:37	00:01:00	61.6	72.7	79.4
Fixed wing	17/08/2014 18:54	00:00:50	62.3	68.6	79.3
Helicopter	17/08/2014 19:43	00:01:00	58	65.2	75.8
Helicopter	17/08/2014 20:35	00:01:30	61.4	74.6	81
Helicopter	18/08/2014 00:21	00:00:50	58.3	67.8	75.3
Helicopter	18/08/2014 01:57	00:01:20	65.3	73.2	84.3
Aircraft?	18/08/2014 08:38	00:00:50	54.7	59.2	71.7
Fixed wing	18/08/2014 10:16	00:00:50	56.5	65.8	73.5
Helicopter	18/08/2014 11:05	00:01:00	66	74.3	83.7
Fixed wing	18/08/2014 11:37	00:00:30	57.9	66	72.7
Aircraft?	18/08/2014 11:42	00:01:20	66.7	77.5	85.7
Aircraft?	18/08/2014 11:50	00:00:50	56.7	64.8	73.7
Helicopter	18/08/2014 11:53	00:00:50	61.8	69.4	78.8
Fixed wing	18/08/2014 13:22	00:00:30	57.2	65.6	72
Aircraft?	18/08/2014 13:31	00:00:40	52.7	61	68.7
Fixed wing	18/08/2014 14:15	00:00:40	57.9	66.3	73.9
Aircraft?	18/08/2014 14:29	00:00:40	55.5	64	71.6
Aircraft?	18/08/2014 14:30	00:00:50	58.7	66.1	75.7
Helicopter	18/08/2014 14:34	00:00:40	60.7	70.8	76.7
Aircraft?	18/08/2014 14:49	00:00:40	58	66.7	74
Aircraft?	18/08/2014 15:03	00:00:30	56.2	62.7	70.9
Aircraft?	18/08/2014 15:11	00:00:30	55.1	58.4	69.9
Fixed wing	18/08/2014 15:49	00:00:30	55.9	60	70.7
Helicopter	18/08/2014 16:03	00:01:10	62.1	72.7	80.5

Helicopter	18/08/2014 16:17	00:00:30	55.2	59.7	69.9
Helicopter	18/08/2014 16:23	00:00:30	55.6	61.4	70.3
Helicopter	18/08/2014 17:12	00:02:10	63.2	71.7	84.4
Helicopter	18/08/2014 17:22	00:01:00	63.6	72.8	81.4
Helicopter	18/08/2014 17:24	00:00:50	63.3	73.6	80.2
Helicopter	18/08/2014 17:49	00:00:40	55	60.7	71
Helicopter	18/08/2014 17:50	00:00:50	65.2	74.7	82.2
Helicopter	18/08/2014 17:54	00:01:20	67	74.3	86
Helicopter	18/08/2014 17:56	00:01:30	61.6	69.1	81.1
Helicopter	18/08/2014 18:03	00:00:50	68.1	74.8	85.1
Helicopter	18/08/2014 18:05	00:01:00	60.5	68.6	78.3
Helicopter	18/08/2014 18:09	00:01:30	66.8	77.7	86.4
Helicopter	18/08/2014 18:16	00:00:50	64	72.7	81
Helicopter	18/08/2014 18:19	00:00:40	55.8	60	71.8
Helicopter	18/08/2014 18:28	00:01:20	62.1	70.6	81.1
Helicopter	18/08/2014 18:29	00:01:00	57.4	64.5	75.2
Helicopter	18/08/2014 18:41	00:01:10	67.6	75.9	86
Helicopter	18/08/2014 18:51	00:01:10	71.8	78.3	90.3
Helicopter	18/08/2014 19:39	00:01:10	61.1	69.6	79.6
Helicopter	18/08/2014 19:48	00:01:10	66.8	74.9	85.2
Helicopter	18/08/2014 20:00	00:01:00	69.6	78	87.4
Helicopter	18/08/2014 20:27	00:01:00	70.1	78.6	87.9
Helicopter	18/08/2014 20:29	00:01:00	65.9	74.7	83.7
Helicopter	18/08/2014 20:36	00:00:50	67.9	76.7	84.9
Helicopter	18/08/2014 20:43	00:01:00	66.9	75.5	84.7
Helicopter	18/08/2014 20:49	00:00:50	68.2	75.2	85.2
Helicopter	18/08/2014 21:01	00:00:50	67.3	75.7	84.3
Helicopter	18/08/2014 22:17	00:01:10	69.5	76.4	88
Helicopter	18/08/2014 22:56	00:01:20	67.4	75.7	86.4
Helicopter	18/08/2014 23:04	00:01:10	67.8	74.9	86.3
Helicopter	18/08/2014 23:06	00:01:20	62.3	68.7	81.4
Helicopter	18/08/2014 23:14	00:01:30	62.2	71.7	81.7
Helicopter	18/08/2014 23:32	00:01:10	66	75.1	84.5
Helicopter	18/08/2014 23:38	00:01:00	67.1	74.1	84.8
Helicopter	18/08/2014 23:41	00:01:20	67	74.5	86
Helicopter	18/08/2014 23:46	00:01:00	66.2	73.7	84
Helicopter	18/08/2014 23:52	00:02:20	67	76	88.5
Helicopter	18/08/2014 23:57	00:01:00	70	78.6	87.8
Helicopter	19/08/2014 00:13	00:01:20	67.6	77.6	86.6
Helicopter	19/08/2014 00:23	00:01:10	67.8	75.7	86.3
Helicopter	19/08/2014 00:32	00:01:10	68	75.6	86.5
Helicopter	19/08/2014 01:40	00:00:50	56.7	64.4	73.7
Helicopter	19/08/2014 08:54	00:00:50	57.6	64.5	74.6
Helicopter	19/08/2014 09:23	00:01:20	68.9	80.6	88
Helicopter	19/08/2014 09:25	00:01:00	67.6	78.8	85.4
Fixed wing	19/08/2014 09:44	00:00:40	55.2	64.8	71.3
Aircraft?	19/08/2014 10:05	00:00:40	59.1	68.5	75.1
Aircraft?	19/08/2014 10:10	00:00:40	59.8	69.9	75.8
Aircraft?	19/08/2014 10:17	00:01:00	57.9	69.3	75.7
Helicopter	19/08/2014 10:29	00:00:50	64.8	73.9	81.8
Aircraft?	19/08/2014 10:40	00:00:40	59.2	68	75.2
Aircraft?	19/08/2014 10:41	00:00:40	58.8	68.1	74.8
Aircraft?	19/08/2014 10:45	00:00:30	63.3	71.4	78.1
Aircraft?	19/08/2014 10:47	00:00:40	57	65.2	73
Aircraft?	19/08/2014 10:48	00:00:30	54.9	59.4	69.6
Aircraft?	19/08/2014 11:13	00:00:50	59.5	67.5	76.5
Aircraft?	19/08/2014 11:14	00:00:40	61.1	72.1	77.1
Aircraft?	19/08/2014 11:19	00:00:30	57	64.4	71.7

Fixed wing	19/08/2014 11:47	00:00:40	58.2	66.2	74.3
Aircraft?	19/08/2014 12:31	00:01:20	58.1	67.1	77.2
Aircraft?	19/08/2014 12:34	00:00:40	60.4	69.2	76.4
Aircraft?	19/08/2014 12:36	00:00:50	57.4	64.7	74.4
Helicopter	19/08/2014 12:37	00:01:50	63.8	73.3	84.2
Aircraft?	19/08/2014 12:39	00:00:40	60	66.1	76.1
Fixed wing	19/08/2014 13:03	00:00:30	57.7	66.3	72.4
Fixed wing	19/08/2014 13:04	00:00:40	58.8	67.8	74.8
Aircraft?	19/08/2014 13:12	00:00:30	58.5	63.9	73.2
Aircraft?	19/08/2014 13:24	00:00:40	58.7	68.6	74.7
Helicopter	19/08/2014 13:30	00:00:50	70.4	77.7	87.4
Fixed wing	19/08/2014 13:39	00:00:40	56.9	65.5	72.9
Aircraft?	19/08/2014 14:01	00:01:20	57	65.4	76.1
Helicopter	19/08/2014 14:15	00:00:40	57.4	65.7	73.4
Helicopter	19/08/2014 14:16	00:00:40	58.6	66.6	74.6
Helicopter	19/08/2014 14:20	00:01:00	68.7	77.9	86.5
Aircraft?	19/08/2014 14:39	00:00:40	57.2	67	73.3
Aircraft?	19/08/2014 14:45	00:00:40	55	62.5	71
Helicopter	19/08/2014 15:13	00:00:50	64.7	73.4	81.7
Helicopter	19/08/2014 15:20	00:01:00	59.3	67.3	77
Helicopter	19/08/2014 15:24	00:01:10	62.1	73.3	80.6
Helicopter	19/08/2014 15:31	00:00:40	53	58.1	69.1
Helicopter	19/08/2014 15:34	00:00:40	61.7	68.7	77.7
Helicopter	19/08/2014 15:40	00:02:20	62.5	71.6	84
Aircraft?	19/08/2014 15:53	00:01:00	61.2	67.6	79
Helicopter	19/08/2014 15:58	00:01:00	60.2	67.1	78
Helicopter	19/08/2014 16:00	00:01:10	69	78.2	87.4
Helicopter	19/08/2014 16:02	00:02:30	62.6	74.4	84.4
Helicopter	19/08/2014 16:22	00:00:40	62.5	69.9	78.5
Helicopter	19/08/2014 16:28	00:01:00	60.5	66.4	78.3
Helicopter	19/08/2014 16:30	00:01:40	64.1	72.6	84.1
Helicopter	19/08/2014 16:37	00:01:40	66.6	78.7	86.6
Helicopter	19/08/2014 16:47	00:01:00	61.1	72.3	78.9
Helicopter	19/08/2014 16:57	00:01:10	61.7	72.2	80.2
Helicopter	19/08/2014 17:01	00:00:50	56.3	61.4	73.3
Helicopter	19/08/2014 17:12	00:01:20	64.5	75.4	83.5
Helicopter	19/08/2014 17:31	00:00:40	55.1	61.9	71.1
Helicopter	19/08/2014 17:46	00:02:10	62	73.6	83.1
Helicopter	19/08/2014 18:07	00:00:30	54.3	57.8	69.1
Helicopter	19/08/2014 18:18	00:01:10	66.9	74.1	85.3
Helicopter	19/08/2014 18:21	00:01:00	64.8	73.3	82.5
Helicopter	19/08/2014 18:29	00:01:00	65.6	74.3	83.3
Helicopter	19/08/2014 18:32	00:01:10	63.9	74.1	82.4
Helicopter	19/08/2014 18:42	00:01:20	64.9	73.3	84
Helicopter	19/08/2014 18:53	00:01:10	63.6	74	82
Helicopter	19/08/2014 18:55	00:00:50	63.2	71.8	80.2
Helicopter	19/08/2014 19:03	00:01:10	64.4	72.4	82.9
Helicopter	19/08/2014 19:12	00:01:20	65.4	71.8	84.4
Helicopter	19/08/2014 19:41	00:00:50	64	72.5	81
Helicopter	19/08/2014 19:44	00:01:10	63.1	71.4	81.6
Helicopter	19/08/2014 19:46	00:01:00	63.5	71.9	81.3
Helicopter	19/08/2014 20:14	00:01:10	55.3	61.1	73.8
Helicopter	19/08/2014 20:16	00:01:00	66	72.1	83.8
Helicopter	19/08/2014 20:21	00:01:10	64.8	73.5	83.3
Helicopter	19/08/2014 20:26	00:01:10	63	71	81.4
Helicopter	19/08/2014 20:28	00:01:10	68.1	77.4	86.5
Helicopter	19/08/2014 20:32	00:01:20	63.9	73.9	83
Helicopter	19/08/2014 20:43	00:01:00	66.9	76.8	84.7

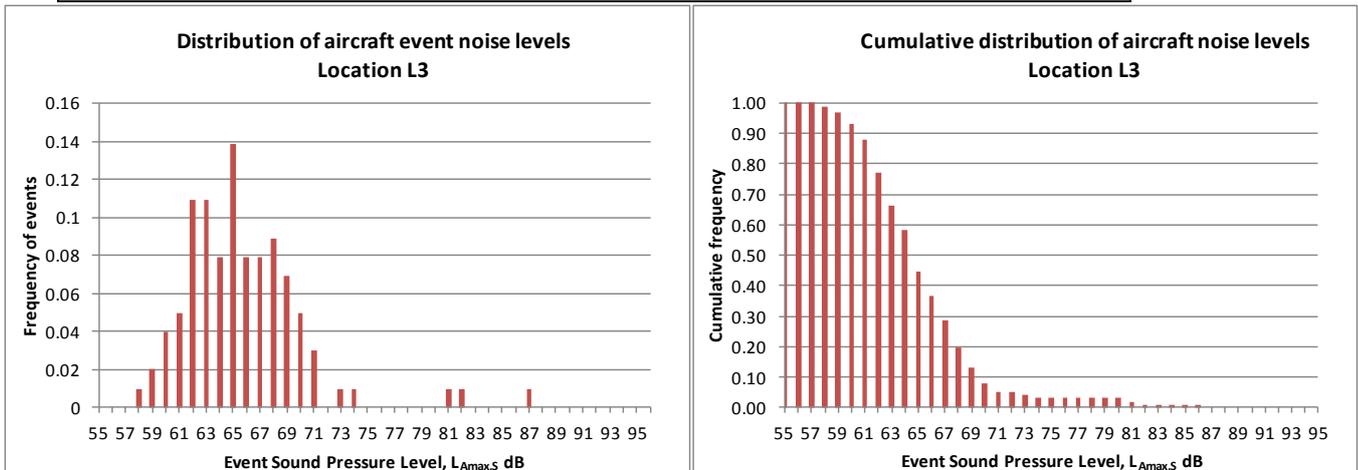
Helicopter	19/08/2014 20:54	00:01:00	63.3	68.8	81.1
Helicopter	19/08/2014 21:03	00:01:10	66.1	73	84.5
Helicopter	19/08/2014 21:06	00:01:10	58.3	62.5	76.8
Helicopter	19/08/2014 21:11	00:02:20	67.9	75.5	89.3
Helicopter	19/08/2014 21:15	00:00:30	56.7	62.3	71.5
Helicopter	19/08/2014 21:16	00:00:50	65	70.3	82
Helicopter	19/08/2014 21:18	00:01:10	67.5	74	85.9
Helicopter	19/08/2014 21:29	00:01:20	69.7	80.2	88.7
Helicopter	19/08/2014 21:51	00:01:00	59.2	64.4	77
Helicopter	19/08/2014 22:04	00:03:30	61.9	69.4	85.1
Helicopter	19/08/2014 22:16	00:01:00	62.5	68.7	80.3
Helicopter	19/08/2014 22:21	00:02:20	66.6	72.9	88.1
Helicopter	19/08/2014 22:30	00:02:00	65.3	72.5	86.1
Helicopter	19/08/2014 22:38	00:02:00	67.8	74.2	88.6
Helicopter	19/08/2014 22:42	00:01:30	65.4	70.8	85
Helicopter	19/08/2014 22:44	00:01:20	66	72.6	85
Helicopter	19/08/2014 22:49	00:01:30	64.2	73.2	83.7
Helicopter	19/08/2014 22:52	00:01:50	65.1	71.2	85.5
Helicopter	19/08/2014 23:33	00:01:20	66.1	75.1	85.1
Helicopter	19/08/2014 23:39	00:01:40	58.3	64.6	78.3
Helicopter	19/08/2014 23:48	00:01:10	68.3	76.1	86.7
Helicopter	19/08/2014 23:54	00:01:10	68.1	74.2	86.5
Helicopter	20/08/2014 00:06	00:01:40	68	76	88
Helicopter	20/08/2014 00:09	00:01:00	67.9	74	85.7
Helicopter	20/08/2014 00:10	00:00:50	60.8	66	77.8
Helicopter	20/08/2014 00:17	00:00:50	63.3	69.2	80.3
Helicopter	20/08/2014 00:18	00:01:30	66.1	72.7	85.6
Helicopter	20/08/2014 00:33	00:01:10	68	75.9	86.4
Fixed wing	20/08/2014 09:20	00:00:40	55.6	62.3	71.6
Aircraft?	20/08/2014 10:03	00:00:40	56.6	62.3	72.6
Fixed wing	20/08/2014 10:10	00:00:40	59.6	67.8	75.6
Fixed wing	20/08/2014 10:35	00:00:40	55.8	63.2	71.8
Aircraft?	20/08/2014 10:39	00:00:30	57.8	63.9	72.6
Aircraft?	20/08/2014 10:42	00:00:40	59.5	65.5	75.5
Aircraft?	20/08/2014 10:50	00:00:40	57.8	66.9	73.8
Helicopter	Total: 244	04:34:50	65	84	107.2
Aircraft?	Total: 95	01:15:40	59.4	77.5	95.9
Fixed wing	Total: 34	00:25:00	58.8	71.6	90.6
Overall aircraft events $L_{Amax,F}$			>80 dB	3	
			>85 dB	0	
			>90 dB	0	
			Mean	69.1	
			St Dev.	5.4	
			Mean+1sd	74.5	



File	20140813_104648_142406_1.CMG				
Location	L3				
Data type	Leq				
Weighting	A				
Unit	dB				
Start	13/08/2014 10:46				
End	20/08/2014 13:16				
Source	Appearance	Duration	Leq	Lmax	SEL
Fixed wing	13/08/2014 10:55	00:00:30	54.7	61.4	69.5
Fixed wing	13/08/2014 10:57	00:00:30	57.8	64.1	72.6
Fixed wing	13/08/2014 11:01	00:00:30	54.6	59.3	69.4
Helicopter	13/08/2014 11:11	00:00:50	55.8	60.1	72.8
Fixed wing	13/08/2014 11:28	00:00:30	54.2	59.6	69
Fixed wing	13/08/2014 11:30	00:01:10	55.6	62.2	74.1
Fixed wing	13/08/2014 11:33	00:00:30	58.8	67.6	73.6
Helicopter	13/08/2014 12:17	00:00:30	56.3	62.1	71
Helicopter	13/08/2014 12:30	00:00:20	61.1	70.1	74.1
Fixed wing	13/08/2014 12:58	00:00:30	57.6	65.1	72.4
Helicopter	13/08/2014 13:10	00:01:00	58.5	64.3	76.2
Fixed wing	13/08/2014 13:21	00:00:40	55.5	61.9	71.5
Fixed wing	13/08/2014 13:22	00:00:40	55	64.1	71
Fixed wing	13/08/2014 13:27	00:00:40	54.2	61.7	70.2
Fixed wing	13/08/2014 13:57	00:00:40	63.1	70	79.1
Fixed wing	13/08/2014 14:25	00:00:30	55.5	61.8	70.3
Helicopter	13/08/2014 14:54	00:00:50	54.7	62.6	71.6
Helicopter	13/08/2014 15:26	00:00:30	55	62.2	69.8
Helicopter	13/08/2014 15:33	00:00:30	55.8	61.1	70.6
Fixed wing	13/08/2014 15:36	00:00:30	55	58.9	69.8
Fixed wing	13/08/2014 15:41	00:00:30	59.2	65.7	74
Fixed wing	13/08/2014 16:58	00:00:40	55.4	63.4	71.5
Helicopter	13/08/2014 18:34	00:01:00	66.3	73.7	84
Helicopter	13/08/2014 18:58	00:00:40	58	67.7	74
Helicopter	13/08/2014 19:02	00:01:00	58	62.7	75.8
Helicopter	13/08/2014 19:13	00:01:10	62.2	69.1	80.7
Helicopter	13/08/2014 19:31	00:00:40	58.7	66.5	74.7
Helicopter	13/08/2014 20:40	00:00:30	54.6	61.6	69.3
Helicopter	13/08/2014 20:51	00:00:40	59.2	68.2	75.2
Helicopter	13/08/2014 21:46	00:00:30	56.1	61.5	70.8
Helicopter	13/08/2014 21:50	00:00:30	55.5	63.5	70.3
Helicopter	13/08/2014 22:49	00:00:40	57.7	63.6	73.7
Helicopter	13/08/2014 23:18	00:01:10	57.4	64.9	75.8
Helicopter	13/08/2014 23:41	00:00:30	58.5	62.7	73.3
Helicopter	14/08/2014 00:11	00:01:10	55.7	61.5	74.2
Helicopter	14/08/2014 01:38	00:00:40	60.5	68	76.6
Fixed wing	14/08/2014 08:41	00:00:20	56	59.7	69
Helicopter	14/08/2014 09:44	00:00:30	56.1	61	70.8
Helicopter	14/08/2014 10:01	00:00:40	55.5	62.1	71.5
Fixed wing	14/08/2014 10:16	00:00:30	55.4	60.9	70.2
Fixed wing	14/08/2014 10:42	00:00:30	57.5	64.4	72.3
Fixed wing	14/08/2014 10:49	00:00:30	56.1	63	70.9
Helicopter	14/08/2014 11:02	00:00:40	58.1	67.5	74.1
Helicopter	14/08/2014 11:13	00:00:50	59.4	65.1	76.4
Fixed wing	14/08/2014 11:20	00:00:20	58.5	64.4	71.5
Fixed wing	14/08/2014 11:28	00:00:30	55	60.6	69.8
Helicopter	14/08/2014 12:03	00:01:10	61.6	71	80.1
Fixed wing	14/08/2014 12:07	00:01:00	55.7	63.4	73.5
Helicopter	14/08/2014 12:25	00:00:50	60.8	68.2	77.8
Fixed wing	14/08/2014 13:30	00:00:30	54.9	61.7	69.7

Fixed wing	14/08/2014 13:35	00:00:30	56.6	63.7	71.4
Helicopter	14/08/2014 13:45	00:01:10	59	64.7	77.5
Fixed wing	14/08/2014 14:05	00:00:40	56.9	65.4	72.9
Fixed wing	14/08/2014 14:12	00:00:40	56.3	61.6	72.3
Helicopter	14/08/2014 14:35	00:01:10	70	80.9	88.5
Helicopter	14/08/2014 15:41	00:01:10	59.9	65	78.3
Helicopter	14/08/2014 15:42	00:01:00	62.1	67.3	79.8
Helicopter	14/08/2014 16:08	00:00:40	58.5	64.8	74.5
Fixed wing	14/08/2014 16:27	00:00:40	57.2	63.7	73.2
Helicopter	14/08/2014 16:34	00:00:40	59.4	66.2	75.4
Fixed wing	14/08/2014 17:01	00:00:30	57.6	65.1	72.4
Helicopter	14/08/2014 17:23	00:01:10	61.2	68.9	79.7
Helicopter	14/08/2014 17:53	00:00:50	57.6	64.2	74.6
Fixed wing	14/08/2014 18:00	00:01:00	56.6	61.1	74.3
Helicopter	14/08/2014 18:24	00:00:50	59.2	66.4	76.2
Helicopter	14/08/2014 18:34	00:01:10	64.2	72.7	82.7
Helicopter	14/08/2014 18:42	00:00:40	57.8	65	73.8
Helicopter	14/08/2014 18:51	00:00:20	52.6	57.8	65.6
Helicopter	14/08/2014 19:14	00:01:20	75.7	87	94.7
Helicopter	14/08/2014 19:49	00:00:40	60.6	69.9	76.7
Helicopter	14/08/2014 20:04	00:00:50	58.4	66.4	75.4
Helicopter	14/08/2014 20:12	00:00:40	57.8	62.1	73.8
Helicopter	14/08/2014 20:26	00:00:50	61.7	69.1	78.7
Helicopter	14/08/2014 20:27	00:00:50	61.5	68.6	78.5
Helicopter	14/08/2014 20:49	00:01:10	55.6	63.4	74.1
Helicopter	14/08/2014 21:08	00:00:40	55.6	62.4	71.6
Helicopter	14/08/2014 21:13	00:00:50	55.2	62.3	72.2
Helicopter	14/08/2014 21:31	00:01:10	56.9	64.7	75.3
Helicopter	14/08/2014 21:41	00:01:20	60.2	66.4	79.2
Helicopter	14/08/2014 21:45	00:01:10	60.2	66	78.7
Helicopter	14/08/2014 21:47	00:01:10	56.6	63.3	75.1
Helicopter	14/08/2014 21:49	00:01:00	57.5	65.3	75.3
Helicopter	14/08/2014 21:58	00:01:40	59.4	70.7	79.4
Helicopter	15/08/2014 00:02	00:01:20	70.6	81.2	89.6
Fixed wing	15/08/2014 08:14	00:00:50	53.2	59	70.2
Helicopter	15/08/2014 08:58	00:01:00	59.2	67.7	77
Fixed wing	15/08/2014 09:34	00:01:10	59.6	69	78.1
Fixed wing	15/08/2014 09:39	00:01:00	61.2	68.8	79
Fixed wing	15/08/2014 09:45	00:00:40	57.2	64.4	73.2
Fixed wing	15/08/2014 10:07	00:00:50	56.1	60.6	73.1
Fixed wing	15/08/2014 10:13	00:01:20	61.1	66.6	80.2
Fixed wing	15/08/2014 10:19	00:01:20	58.6	65	77.6
Helicopter	15/08/2014 10:42	00:01:10	62.5	67.6	80.9
Fixed wing	15/08/2014 10:49	00:01:10	61.2	68.9	79.7
Fixed wing	15/08/2014 10:58	00:01:10	60	66.9	78.5
Helicopter	15/08/2014 11:10	00:00:40	60.6	68	76.7
Fixed wing	15/08/2014 11:18	00:00:30	55.9	59.7	70.7
Fixed wing	15/08/2014 11:26	00:01:00	60.2	66.5	78
Helicopter	15/08/2014 11:38	00:00:50	61.7	69.4	78.7
Fixed wing	15/08/2014 11:42	00:01:10	59.4	67.3	77.8
Helicopter	15/08/2014 11:57	00:01:00	57.4	65.1	75.2
Fixed wing	Total: 41	00:29:20	58.2	70	90.6
Helicopter	Total: 60	00:52:10	63.7	87	98.6
Overall aircraft events					
L _A Max,F			>80 dB	3	
			>85 dB	1	
			>90 dB	0	
			Mean	64.6	

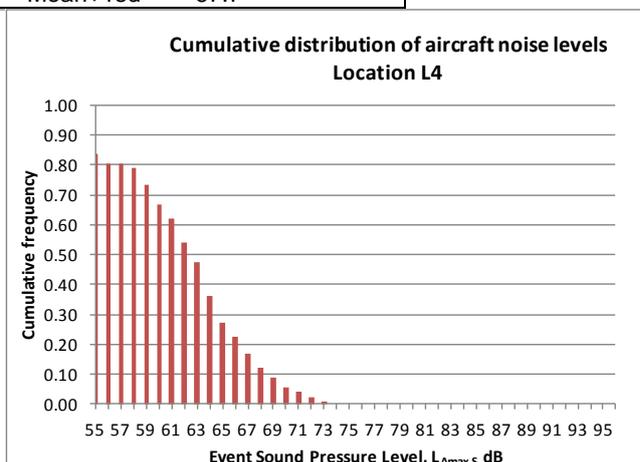
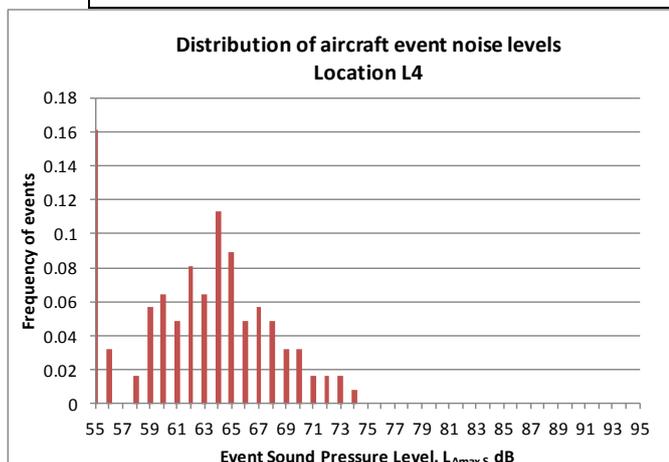
St Dev. 4.5
 Mean+1sd 69.2



File	20140813_184118_000000_1.CMG				
Location	L4				
Data type	Leq				
Weighting	A				
Unit	dB				
Start	13/08/2014 18:41				
End	20/08/2014 11:59				
Source	Appearance	Duration	Leq	Lmax	SEL
Aircraft?	14/08/2014 12:25	00:00:06	51.6	53	59.4
Aircraft?	14/08/2014 12:26	00:00:05	50.9	51.4	57.9
Helicopter	14/08/2014 14:36	00:00:40	64.9	72.2	80.9
Helicopter	14/08/2014 17:02	00:00:30	58	64.8	72.7
Helicopter	14/08/2014 17:24	00:00:30	56.6	60.5	71.4
Aircraft?	14/08/2014 18:01	00:00:10	48.9	50.5	58.9
Helicopter	14/08/2014 18:34	00:01:00	60.7	71.5	78.5
Helicopter	14/08/2014 19:15	00:01:00	66	73.7	83.8
Helicopter	14/08/2014 20:04	00:00:30	54.2	58.6	68.9
Helicopter	14/08/2014 20:13	00:00:20	54.8	60.3	67.9
Helicopter	14/08/2014 20:26	00:00:40	55.3	62.6	71.4
Helicopter	14/08/2014 21:42	00:00:30	56.4	60.1	71.2
Helicopter	14/08/2014 21:45	00:00:50	59	64.3	76
Helicopter	15/08/2014 00:02	00:01:10	64	72.5	82.5
Helicopter	15/08/2014 10:42	00:01:00	58.8	63.5	76.6
Helicopter	15/08/2014 11:56	00:00:50	62	69.5	79
Aircraft?	15/08/2014 12:11	00:00:10	50.3	55.1	60.3
Fixed wing	15/08/2014 12:52	00:00:50	57.5	64.3	74.5
Fixed wing	15/08/2014 13:27	00:00:30	57.8	63.1	72.6
Aircraft?	15/08/2014 13:44	00:00:03	60.4	62.9	65.2
Aircraft?	15/08/2014 13:45	00:00:04	54.4	58.4	60.4
Aircraft?	15/08/2014 13:57	00:00:09	48.3	50.8	57.9
Fixed wing	15/08/2014 14:02	00:00:50	57.1	65	74.1
Aircraft?	15/08/2014 14:07	00:00:04	49.4	52.6	55.5
Fixed wing	15/08/2014 14:47	00:00:40	57.6	63.1	73.6
Fixed wing	15/08/2014 14:58	00:00:40	60.2	66.5	76.2
Aircraft?	15/08/2014 15:05	00:00:07	54.5	59	62.9
Helicopter	15/08/2014 15:14	00:00:30	57.5	65.2	72.2
Fixed wing	15/08/2014 15:19	00:00:30	53.9	58.9	68.6
Helicopter	15/08/2014 15:35	00:00:50	59.5	65.2	76.5
Aircraft?	15/08/2014 15:43	00:00:07	49.9	51.4	58.3

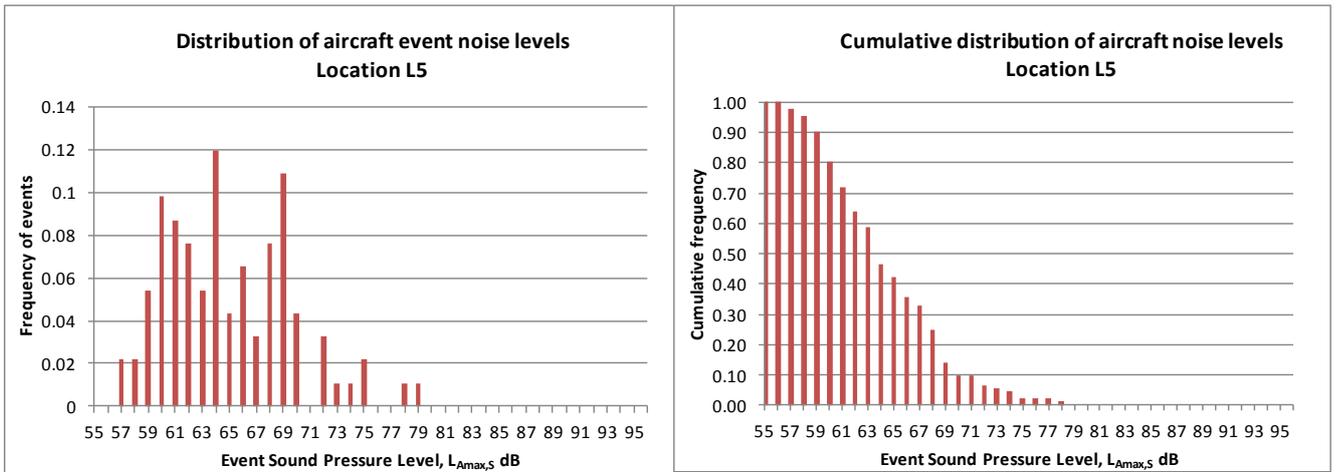
Aircraft?	15/08/2014 15:44	00:00:06	50.5	52.4	58.3
Helicopter	15/08/2014 15:49	00:01:00	61.9	68.8	79.7
Helicopter	15/08/2014 16:16	00:00:40	56.5	65.1	72.5
Aircraft?	15/08/2014 16:21	00:00:01	47.5	47.5	47.5
Helicopter	15/08/2014 18:35	00:00:40	61.8	69.8	77.8
Helicopter	15/08/2014 20:45	00:00:20	55.4	61.8	68.4
Fixed wing	16/08/2014 10:46	00:00:30	57.7	63.6	72.5
Fixed wing	16/08/2014 14:03	00:00:30	54.9	57.9	69.6
Fixed wing	16/08/2014 17:07	00:00:50	59.3	66.5	76.3
Fixed wing	16/08/2014 20:52	00:00:20	59.9	63.6	72.9
Fixed wing	16/08/2014 21:44	00:00:30	58.4	63.1	73.2
Aircraft?	17/08/2014 07:42	00:00:08	52.7	55.9	61.7
Aircraft?	17/08/2014 07:43	00:00:06	52.5	54.5	60.3
Fixed wing	17/08/2014 18:54	00:00:30	58.8	63.2	73.6
Aircraft?	18/08/2014 13:25	00:00:02	46.1	46.2	49.1
Aircraft?	18/08/2014 13:25	00:00:03	47.8	48.2	52.6
Aircraft?	18/08/2014 14:20	00:00:01	50.9	50.9	50.9
Helicopter	18/08/2014 16:35	00:00:40	63.2	69.5	79.2
Aircraft?	18/08/2014 17:14	00:00:10	54	55.6	64
Aircraft?	18/08/2014 17:20	00:00:07	47.3	47.6	55.8
Aircraft?	18/08/2014 17:22	00:00:07	50.5	52.5	58.9
Helicopter	18/08/2014 17:54	00:00:30	55.5	57.6	70.2
Aircraft?	18/08/2014 17:57	00:00:06	53.2	53.7	61
Helicopter	18/08/2014 18:03	00:00:30	57.8	66.6	72.5
Helicopter	18/08/2014 18:05	00:00:30	55.5	60	70.2
Helicopter	18/08/2014 20:00	00:00:50	57.1	64	74.1
Aircraft?	18/08/2014 20:28	00:00:08	50.1	54.7	59.1
Helicopter	18/08/2014 20:43	00:00:40	55.4	62.8	71.4
Helicopter	18/08/2014 20:50	00:00:40	54.2	61	70.2
Helicopter	18/08/2014 22:18	00:00:40	57.9	67.8	74
Helicopter	18/08/2014 22:56	00:00:30	59.3	64	74
Helicopter	18/08/2014 23:04	00:00:40	56.8	64.1	72.8
Helicopter	18/08/2014 23:33	00:00:30	54.4	59.4	69.2
Helicopter	18/08/2014 23:39	00:00:30	56.4	63.6	71.2
Helicopter	18/08/2014 23:41	00:00:50	58.1	65.2	75.1
Helicopter	18/08/2014 23:46	00:00:40	53.6	61.1	69.6
Helicopter	18/08/2014 23:53	00:00:30	55.4	61.6	70.2
Helicopter	18/08/2014 23:54	00:00:30	56.3	61.5	71.1
Helicopter	18/08/2014 23:58	00:00:30	55.4	62.9	70.2
Helicopter	19/08/2014 00:13	00:00:40	59.7	67.9	75.8
Helicopter	19/08/2014 00:23	00:00:50	59.2	65.7	76.2
Helicopter	19/08/2014 00:25	00:00:30	56.5	60.6	71.2
Helicopter	19/08/2014 00:33	00:00:40	60.9	67.6	76.9
Helicopter	19/08/2014 00:34	00:00:40	57.1	62	73.1
Helicopter	19/08/2014 08:54	00:00:50	63.5	70.9	80.5
Aircraft?	19/08/2014 09:22	00:00:08	53.4	55.1	62.4
Aircraft?	19/08/2014 09:24	00:00:07	56.9	61.3	65.4
Fixed wing	19/08/2014 09:58	00:00:30	54.3	59.8	69.1
Fixed wing	19/08/2014 10:10	00:00:30	51.8	59.4	66.5
Aircraft?	19/08/2014 10:29	00:00:06	49.7	51.8	57.5
Fixed wing	19/08/2014 10:45	00:00:30	55.1	62	69.9
Fixed wing	19/08/2014 11:00	00:00:30	57.7	62.7	72.5
Fixed wing	19/08/2014 11:13	00:00:30	54.3	62	69
Fixed wing	19/08/2014 11:14	00:00:30	55.1	61.5	69.9
Fixed wing	19/08/2014 11:31	00:00:30	54.9	59.7	69.7
Fixed wing	19/08/2014 11:47	00:00:30	55.1	66	69.9
Helicopter	19/08/2014 12:37	00:00:50	58.3	67	75.3
Fixed wing	19/08/2014 13:24	00:00:30	54.9	63.9	69.7

Aircraft?	19/08/2014 13:30	00:00:05	45.6	46.1	52.6
Fixed wing	19/08/2014 13:32	00:00:40	52.5	59.1	68.5
Fixed wing	19/08/2014 13:44	00:01:00	56.8	64.9	74.5
Helicopter	19/08/2014 15:40	00:00:50	55.7	64.5	72.7
Helicopter	19/08/2014 15:53	00:00:40	61.1	69	77.2
Aircraft?	19/08/2014 16:31	00:00:18	49.2	52.1	61.8
Aircraft?	19/08/2014 16:31	00:00:06	53.8	58.5	61.6
Aircraft?	19/08/2014 16:38	00:00:03	58.8	60	63.5
Helicopter	19/08/2014 16:57	00:00:50	58.2	62.9	75.2
Aircraft?	19/08/2014 17:13	00:00:08	51.7	54.7	60.8
Helicopter	19/08/2014 17:31	00:00:50	62.9	71.2	79.9
Fixed wing	19/08/2014 17:46	00:00:30	57.9	64.7	72.7
Helicopter	19/08/2014 18:06	00:00:40	61.3	68.4	77.3
Helicopter	19/08/2014 18:19	00:00:50	56.7	62.9	73.7
Helicopter	19/08/2014 19:12	00:01:00	61.9	68.2	79.7
Helicopter	19/08/2014 20:15	00:01:00	60	67.7	77.8
Helicopter	19/08/2014 20:26	00:00:30	54.5	59	69.3
Helicopter	19/08/2014 20:29	00:00:50	59.1	67.7	76.1
Helicopter	19/08/2014 20:33	00:00:50	55.2	64.6	72.2
Helicopter	19/08/2014 20:42	00:00:50	58.3	63.5	75.2
Helicopter	19/08/2014 20:44	00:00:30	56.2	64	71
Helicopter	19/08/2014 21:03	00:00:50	59.6	67	76.6
Helicopter	19/08/2014 21:06	00:00:50	55.4	59.2	72.4
Helicopter	19/08/2014 21:12	00:00:40	56.8	64.1	72.8
Helicopter	19/08/2014 22:22	00:00:30	54.2	61.5	69
Helicopter	19/08/2014 23:33	00:00:40	54.8	60.8	70.9
Helicopter	19/08/2014 23:48	00:00:40	56.9	62.1	72.9
Helicopter	19/08/2014 23:54	00:01:00	60.2	66.4	78
Helicopter	20/08/2014 00:06	00:01:10	62.9	66.8	81.3
Helicopter	20/08/2014 00:09	00:00:50	57.6	64.6	74.6
Helicopter	20/08/2014 00:10	00:00:50	64.3	70	81.3
Helicopter	20/08/2014 00:19	00:01:00	59	63.8	76.8
Helicopter	20/08/2014 00:34	00:00:50	59.8	67.3	76.8
Fixed wing	20/08/2014 11:09	00:00:30	53.1	58.7	67.9
Fixed wing	20/08/2014 11:40	00:00:40	59.3	70.8	75.4
Aircraft?	Total: 30	00:03:11	52.4	62.9	75.2
Helicopter	Total: 68	00:48:40	59.9	73.7	94.6
Fixed wing	Total: 26	00:15:00	57.1	70.8	86.6
Overall aircraft events $L_{A_{Max,F}}$			>80 dB	0	
			>85 dB	0	
			>90 dB	0	
			Mean	61.7	
			St Dev.	6.0	
			Mean+1sd	67.7	



File	20140813_111405_000000_1.CMG				
Location	L5				
Data type	Leq				
Weighting	A				
Unit	dB				
Start	13/08/2014 11:14				
End	20/08/2014 11:43				
Source	Appearance	Duration	Leq	Lmax	SEL
Aircraft?	13/08/2014 11:29	00:01:40	56.8	62	76.8
Aircraft?	13/08/2014 11:31	00:00:30	54	59.7	68.8
Aircraft?	13/08/2014 12:30	00:00:40	62.4	71.5	78.4
Fixed wing	13/08/2014 13:21	00:00:50	57.8	63.2	74.8
Aircraft?	13/08/2014 13:57	00:00:30	54.1	56.5	68.8
Fixed wing	13/08/2014 15:10	00:00:50	62.7	69.2	79.7
Fixed wing	13/08/2014 15:27	00:00:30	58.9	62.1	73.7
Aircraft?	13/08/2014 15:30	00:00:30	54.6	57.7	69.3
Aircraft?	13/08/2014 15:35	00:01:00	57.5	63	75.3
Helicopter	13/08/2014 15:50	00:00:50	61.7	69	78.7
Aircraft?	13/08/2014 17:57	00:00:40	68.2	77.6	84.2
Aircraft?	13/08/2014 18:34	00:00:30	62.7	67.5	77.5
Aircraft?	13/08/2014 19:07	00:00:30	62.1	68.4	76.9
Aircraft?	13/08/2014 19:14	00:00:40	72	78.9	88.1
Aircraft?	14/08/2014 08:51	00:00:40	62.7	67.6	78.7
Aircraft?	14/08/2014 10:45	00:00:30	55.9	58.6	70.6
Aircraft?	14/08/2014 11:13	00:00:30	56.8	61	71.5
Helicopter	14/08/2014 12:04	00:00:40	58.1	63.1	74.2
Aircraft?	14/08/2014 12:08	00:00:40	55.7	59.8	71.7
Aircraft?	14/08/2014 12:25	00:00:50	57.2	62.7	74.2
Aircraft?	14/08/2014 12:35	00:00:50	56.6	61.5	73.6
Aircraft?	14/08/2014 13:26	00:00:40	56.3	59.1	72.3
Aircraft?	14/08/2014 13:58	00:00:40	64.4	71.5	80.4
Aircraft?	14/08/2014 14:09	00:00:30	54.4	58.3	69.1
Aircraft?	14/08/2014 14:13	00:00:50	55.9	60	72.9
Helicopter	14/08/2014 14:36	00:01:00	60.7	68.9	78.5
Helicopter	14/08/2014 19:15	00:00:40	57.9	61.9	74
Helicopter	14/08/2014 20:26	00:00:30	53.2	61.6	68
Aircraft?	14/08/2014 21:45	00:00:30	55	61	69.8
Helicopter	15/08/2014 00:02	00:00:40	61.5	68.8	77.6
Fixed wing	15/08/2014 09:40	00:00:20	52.9	58.2	66
Fixed wing	15/08/2014 10:14	00:00:30	55	60.2	69.8
Fixed wing	15/08/2014 11:02	00:00:20	56.8	60	69.9
Helicopter	15/08/2014 11:56	00:00:30	59.5	65.1	74.3
Aircraft?	15/08/2014 12:11	00:00:20	57.8	61.7	70.8
Aircraft?	15/08/2014 18:35	00:00:50	60.9	69.2	77.9
Fixed wing	16/08/2014 10:46	00:00:40	55.5	60.1	71.5
Aircraft?	16/08/2014 11:56	00:00:20	55	57	68
Fixed wing	16/08/2014 17:07	00:00:30	60.1	66.6	74.8
Aircraft?	16/08/2014 20:52	00:00:20	58.2	64.6	71.2
Aircraft?	16/08/2014 21:44	00:00:30	58.2	62.9	73
Aircraft?	17/08/2014 07:43	00:00:40	61.6	67.5	77.6
Fixed wing	17/08/2014 09:42	00:00:30	58.4	63.6	73.2
Fixed wing	17/08/2014 18:54	00:00:40	56.3	64.2	72.3
Aircraft?	17/08/2014 19:43	00:00:40	57.5	63.5	73.6
Aircraft?	18/08/2014 08:38	00:01:00	63	68.6	80.8
Fixed wing	18/08/2014 13:21	00:00:20	53.4	59.6	66.4
Aircraft?	18/08/2014 13:25	00:00:40	60.6	69.7	76.6

Fixed wing	18/08/2014 13:32	00:00:20	53.5	60	66.5
Aircraft?	18/08/2014 14:16	00:00:30	55.1	58.5	69.9
Helicopter	18/08/2014 14:21	00:00:50	61.8	67.7	78.8
Aircraft?	18/08/2014 15:11	00:00:40	56.9	60	72.9
Fixed wing	18/08/2014 16:03	00:00:30	57.6	63.3	72.4
Helicopter	18/08/2014 16:23	00:00:50	62.5	68.9	79.5
Aircraft?	18/08/2014 16:35	00:00:50	66.3	74.4	83.3
Helicopter	18/08/2014 17:13	00:00:50	63.6	69.5	80.6
Aircraft?	18/08/2014 17:21	00:00:50	61.6	68.3	78.6
Helicopter	18/08/2014 17:54	00:00:30	54.6	57.5	69.3
Aircraft?	18/08/2014 18:52	00:00:30	66.4	73.3	81.2
Aircraft?	18/08/2014 20:00	00:00:20	56.8	58.8	69.8
Aircraft?	18/08/2014 20:43	00:00:20	55.8	61	68.8
Helicopter	18/08/2014 22:56	00:00:40	56.1	63.3	72.1
Helicopter	18/08/2014 23:41	00:00:20	57.5	61.3	70.5
Helicopter	19/08/2014 00:13	00:00:30	55.3	60.6	70.1
Helicopter	19/08/2014 00:24	00:00:30	57.5	63.6	72.3
Aircraft?	19/08/2014 00:25	00:00:40	57.9	65.4	73.9
Aircraft?	19/08/2014 00:33	00:00:20	58.2	63.5	71.2
Helicopter	19/08/2014 00:35	00:00:30	58	63.2	72.8
Aircraft?	19/08/2014 08:54	00:01:00	65.4	73	83.2
Aircraft?	19/08/2014 09:06	00:00:40	55.7	59.5	71.7
Aircraft?	19/08/2014 09:23	00:00:50	62.7	74.7	79.7
Aircraft?	19/08/2014 10:08	00:01:00	61.4	69	79.2
Aircraft?	19/08/2014 12:37	00:00:50	58.1	66.6	75.1
Aircraft?	19/08/2014 13:29	00:01:00	59.5	68	77.3
Aircraft?	19/08/2014 13:50	00:00:40	62.1	67.3	78.1
Aircraft?	19/08/2014 15:53	00:00:40	62.2	67.2	78.2
Aircraft?	19/08/2014 16:03	00:01:10	62.4	67	80.9
Aircraft?	19/08/2014 17:31	00:00:50	60.9	68.9	77.9
Aircraft?	19/08/2014 17:45	00:01:00	59.4	66	77.2
Aircraft?	19/08/2014 18:06	00:00:40	58.1	64.8	74.1
Helicopter	19/08/2014 19:12	00:00:30	60.8	65.3	75.6
Helicopter	19/08/2014 19:24	00:00:20	54.8	61.4	67.8
Helicopter	19/08/2014 20:15	00:00:50	64	71.2	81
Aircraft?	19/08/2014 20:29	00:00:40	57	63	73
Aircraft?	19/08/2014 20:42	00:01:00	59	65.6	76.8
Aircraft?	19/08/2014 21:06	00:00:50	57.6	60.7	74.6
Aircraft?	19/08/2014 23:55	00:00:20	60.1	63.8	73.1
Helicopter	20/08/2014 00:07	00:01:00	63.8	68.8	81.6
Helicopter	20/08/2014 00:09	00:00:20	56.8	60.8	69.8
Helicopter	20/08/2014 00:19	00:00:30	57.9	65.4	72.6
Helicopter	20/08/2014 00:34	00:00:30	59.6	64	74.4
Aircraft?	20/08/2014 10:10	00:00:40	58.8	64.5	74.8
Aircraft?	Total: 56	00:38:30	61.7	78.9	95.3
Fixed wing	Total: 13	00:06:50	58.3	69.2	84.5
Helicopter	Total: 23	00:14:20	60.7	71.2	90.1
Overall aircraft events $L_{A_{Max,F}}$			>80 dB	0	
			>85 dB	0	
			>90 dB	0	
			Mean	64.6	
			St Dev.	4.7	
			Mean+1sd	69.3	



Glossary of terms

'A' weighting (dBA): A frequency dependent correction which weights sound to correlate with the sensitivity of the human ear to sounds of different frequencies.

Ambient Noise: A measure of the typical noise (excluding any unusual events) present at a site, or in a room. This is usually described in terms of $L_{Aeq,T}$.

Audible: Sound that can be heard or is perceptible by the human ear.

Background Noise: A measure of the underlying noise (excluding any unusual events) which is present at a site before a new noise source is introduced. This is usually described in terms of the $L_{A90,T}$ level: the sound pressure level exceeded for 90% of the time.

Decibel (dB): A unit used for many acoustic quantities to indicate the level of sound with respect to a reference level.

External Amenity Space: An outdoor area near to a residential building which is designed and intended primarily for leisure and recreational use by the occupants of the dwelling. This will include gardens, patios, balconies, roof gardens and terraces.

Façade level: Sound level existing immediately external to a facade or reflecting surface (usually at 1 metre from the surface), accounting for reflections.

Habitable room: A room used for sleeping or recreation / relaxation.

$L_{A90,T}$: Sound pressure level exceeded for 90% of the measurement period "T" or 'background level'.

$L_{Aeq,T}$: Equivalent continuous sound pressure level measured over the time period "T".

L_{Amax} : The maximum RMS A weighted sound pressure level. Usually measured using either the *fast* (F) time constant of 125ms, or *slow* (S) time constant of 1s.

Noise: Unwanted sound.

Noise impact: the noise level of the source under consideration, and/or any change in noise levels due to the scheme, and/or the relationship between the noise level of the source under consideration and a descriptor of the existing noise climate; at a receptor or group of receptors.

Noise effect: the consequence of the noise impact e.g. annoyance, sleep disturbance, speech interference, disruption of learning/teaching, health consequences, fauna displacement etc. Noise impact and noise effect are related to each other and the noise effect is related to the magnitude of the noise impact as well as other factors e.g. sensitivity of the receptor, duration of the noise, how frequently it occurs, the time of day or night it occurs, whether the noise is temporary, reversible or permanent etc.

sound pressure level (L_p): the logarithmic measure of the RMS sound pressure of a sound relative to a reference value that represents the threshold of hearing. It is measured in decibels (dB) e.g. $L_p = 20 \lg (p/p_0)$ dB re 20 μ Pa for air.

Noise sensitive premises / developments: Principally comprising residential premises, hospitals, schools and hotels. Other premises and sites may be deemed to be noise sensitive depending upon circumstances.

SEL: Sound Exposure Level – The equivalent continuous sound pressure level, L_{eq} , of an acoustic event normalised to a 1 second reference period.