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Ringstone Hill Farm Wind Turbine

ETSU R97: Noise Impact Assessment







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ETSU R97: Noise Impact Assessment

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Project:	Ringstone Hill Farm Wind Turbine
Site:	Ringstone Hill Farm, Common Road, Brierley, Barnsley S72 9HF
For:	Empirica Investments
Status:	SHF309.001.R.014
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SUMMARY

Enzygo have been commissioned by Knight Frank Ltd, on behalf of Empirica Investments, to undertake a noise assessment of the proposal to develop a single 900kW wind turbine on land in the vicinity of Ringstone Hill Farm, Common Road, Brierley, Barnsley S72 9HF.

A Simplified ETSU R97 assessment was undertaken to the 14 (fourteen) of the closest sensitive residential receptors to the proposed turbine location based upon a candidate turbine specification. Of these only 6 (six) demonstrated predicted noise levels in excess of the 35dB(A) ETSU R97 Simplified Assessment criteria. Predicted noise levels at the remaining 8 (eight) locations were demonstrated to be below this limit are therefore considered to be acceptable.

In accordance with the agreements made with Barnsley and Wakefield LPA's an abridged ETSU R97 assessment was undertaken at these 6 (six) locations based upon 7 - 14 days of background noise monitoring undertaken at the site. The results of this assessment demonstrated that the predicted noise levels from the turbine would not be in excess of the derived ETSU R97 criteria.

Based upon the information supplied and the methodologies employed, the proposed turbine would not result in any adverse effects relating to noise at sensitive residential receptors within the immediate vicinity. Therefore, subject to the implementation of an appropriate planning condition relating to operational noise criteria, noise should not be considered a material factor for the refusal of planning permission to develop the site for a single turbine wind development.

An example planning condition relating to noise is included within Section 7.4 of this report.

1.0 INTRODUCTION

1.1 Project Introduction

Enzygo Limited (Enzygo) have been commissioned by Knight Frank LLP, on behalf of Empirica Investments, to undertake a noise assessment associated with a proposal to develop a single wind turbine on land belonging to Ringstone Hill Farm, Common Road, Brierley, Barnsley S72 9HF.

The purpose of this assessment is to quantify any potential impacts associated with the proposed wind turbine and to confirm whether this would be within acceptable levels and, where appropriate recommend suitable mitigation measures.

It is understood that this report will support a planning application compiled by Knight Frank LLP, which is to be submitted to the local planning authority, Barnsley Metropolitan Borough Council (BMBC).

Details regarding the assessment methodology used, together with results of the survey undertaken, and the subsequent conclusions and recommendations drawn are presented within the following report.

1.2 Site Description

1.2.1 General Environment

The proposed development site is situated approximately 1.5km to the south east of Brierley, South Yorkshire. The turbine site is on land owned by Ringstone Hill Farm that is currently used for agricultural purposes. Following installation of the turbine the land will return to agricultural use with little acreage lost.

The site is immediately constrained on all sides by features which govern the noise climate of the area. Detailed below are the area classifications and descriptions in the given directions from the turbine location:

- To the north the site is bounded by agricultural land with isolated residential and commercial (public house and hotel complex) buildings, leading onto the village of Brierley approximately some 1.0km away;
- To the east the site is bordered by Common Road and Southmoor Road (B6273) at an approximate distance of 150/200m. Beyond this, further to the east, is open agricultural land with isolated residential and commercial (public house) buildings, leading on to the western extent of the village of South Kirkby some 1.2km away;
- To the south is open agricultural land with isolated residential and agricultural properties; and
- To the west of the site is again bounded by agricultural land with isolated residential and agricultural buildings, leading onto the village of Grimethorpe approximately some 1.4km away.

The closest residential dwellings are located to the north, east and south of the turbine location at separation distances of approximately 400m, 275m, and 310m respectively. Further residential dwellings lie to the north in Brierley, to the east in South Kirkby and to the west in Grimethorpe.

1.2.2 Key Features of the Proposed Development

The proposed turbine is to be located as identified within Figure 1 below.



Figure 1: Approximate Turbine Location

The candidate turbine identified by the design team for the purposes of assessment is as follows:

Manufacturer:	Enercon
Type:	E-44: 900Kw
Hub Height:	45m
Tip Height:	67m
Location:	SE (4)42551, (4)10378

The specifics of the candidate turbine are detailed within the test Report within Appendix 1.

1.3 Scope of Assessment

This noise assessment seeks to cover noise associated with the development of a single turbine within the site area detailed above. This section of the report outlines the scope of the assessment undertaken.

1.3.1 Operational Phase

The main issue with regard to noise is considered to be the operational phase of the turbine, which would be a potential long term impact.

Both the construction and installation of the turbine and the eventual decommissioning would only be expected to last for relatively short periods. Whilst noise and vibration generated during these phases can have the potential to result in adverse impacts in the immediate close vicinity, the scale of the development is a major factor when considering the level of assessment required. In this instance the proposal is for a single turbine, which is located in the region of 300m away from any

sensitive receptors. As a result of this construction and decommissioning noise and vibration are not expected to represent significant impacts, provided that appropriate consideration is given to the proposed working methods. Accordingly, construction noise is not considered within the scope of this report.

1.4 Consultation

Within the scope of this study detailed consultation was undertaken with representatives of the Environmental Health department(s) at the surrounding local planning authorities within an influencing distance of the development. Contact was undertaken as follows:

Local Planning Authority:	Barnsley MBC	Wakefield MDC
Contact name:	Lucy Allen	Gerard McCormack
Job Title:	Senior Environmental Health Officer	Senior Environmental Health Officer
Consultation Date:	November 2011 to February 2012	
Method of Consultation:	Telephone and e-mail	

The consultation agreed the scope and methodology of the assessment required to ensure a robust consideration of the noise issues, whilst reflecting the scale of the proposals, as follows;

1. *Background noise monitoring locations;* It was agreed that monitoring would be undertaken at 3 locations in the vicinity of the proposed turbine site. The locations were selected based upon a process whereby the 35dB ETSU simplified methodology was used as an indicator as to where monitoring should be undertaken.

2. *Appropriate monitoring durations;* it was agreed that approximately 2 weeks (14 days) of survey information would be sufficient providing that a minimum of 7 days of usable data was amassed in that period. However, due to issues with regard to access permission at the Robin Hood Public House it was agreed with the appropriate LPA that 1 week would be sufficient at this location;

3. *Assessment methodologies to be utilised;* it was agreed that assessment would be undertaken broadly in line with the guidance of the ETSU R97 document and the later IOA agreement. However, again due to the scale of the development certain deviations from the full ETSU R97 assessment were agreed as appropriate. These are outlined within Section 3.7.

Copies of the main consultation documents are contained within Appendix 3.

1.5 Noise Assessment Methodology

In order to assess the impact of the proposed wind turbine, a number of elements of work have been completed. These are as detailed below:

- A predictive, desk based assessment of the suitability of the site for a wind turbine development. Consideration would be based upon the specified candidate turbine and the ETSU R97 simplified criteria;

- Detailed consultation with the LPA to discuss and agree an appropriate assessment methodology and scope having regard to the nature of the proposals;

- If required baseline and ambient on site noise surveys would be undertaken at selected noise sensitive receptors in conjunction with localised wind speed measurements. Determination of whether a baseline noise survey was required would be based upon the results of the ETSU R97 Simplified assessment. If baseline surveys are required the following step would be undertaken:

    - Assessment of the suitability of the site for a wind turbine development referencing the existing baseline noise climate of the area (cross referenced to indicative wind speed) and predicted future levels associated with the proposed candidate turbine.

- Where necessary and appropriate the quantification of suitable acoustic mitigation measures and strategies that could be employed within the design of the site to control noise to within acceptable levels.

- Production of a report suitable for submission as part of the planning application to develop the site outlining scope, methodology and results of the noise study.

2.0 NOISE UNITS AND WIND TURBINE DESCRIPTION

2.1 Noise

Before presenting the results of the noise assessment, it is considered useful to provide some background information on noise, the units of measurement and perception of changing levels by people.

Noise is defined as unwanted sound. The range of audible sound is taken to be from 0 dB to 140 dB. Examples of typical noise levels relating to everyday occurrences are presented within Table 2-1 below:

Table 2-1: Typical Noise Levels

Source	Sound Pressure Level in dB(A)	Subjective Level
Traffic at kerb edge	70 – 85	Loud
Raised voice at 1 metre	80	Loud
Normal voice at 1 metre	60	Moderate
Residential area at night	40	Quiet

The frequency response of the human ear to noise is usually taken to be about 18-20Hz (number of oscillations per second) to 18,000-20,000Hz. However, the human ear does not respond equally to different frequencies at the same level, it is more sensitive in the mid-frequency range than the lower and higher frequencies and, because of this, when undertaking the measurement of noise the low and high frequency components of any given sound are reduced in importance by applying a filtering (weighting) circuit to the noise measuring instrument. The weighting which correlates best with the subjective nature of human response to noise and is most widely used to quantify this is the A-weighted filter set. This is an internationally accepted standard for noise measurements.

For variable noise sources within an area an increase of 3 dB(A) would be considered to be the minimum perceptible to the human ear under normal conditions. It is generally accepted that an increase/decrease of 10 dB(A) corresponds to a doubling or halving in perceived loudness. The 'loudness' of a noise, however, is a purely subjective parameter, dependant not only upon the sound pressure of the event but also on the dynamics of the listener's ear, the time of the day and the general mood of the person.

With regard to environmental noise levels (in the open air), these are rarely steady, but rise and fall according to the activities being undertaken within the surrounding area at any given time. In an attempt to produce a figure that relates this variable nature of noise to human subjective response, a number of statistical noise metrics have been developed. These include:

2.1.1 L_{Aeq} Noise Level

This is the 'equivalent continuous A-weighted sound pressure level, in decibels', and is defined in British Standard BS7445 as the '*value of the A-weighted sound pressure level of a continuous, steady*

sound that, within a specified time interval, T, has the same mean square sound pressure as a sound under consideration whose level varies with time'.

It is the unit most suitable for the description of ambient environmental noise.

2.1.2 L_{A90} Noise Level

The L_{A90} is the noise level that is exceeded for 90% of the measurement period and gives an indication of the noise level during the quieter periods.

It is often referred to as the 'background' noise level.

2.2 Wind Turbine Acoustics

The following section outlines the acoustic issues relating to noise associated with wind turbines.

2.2.1 General Noise Emissions

In practice, there are two distinct types of noise emissions associated with operational wind turbines, these are outlined within the bullet points below:

- **Aerodynamic noise** – This noise emission is produced as a result of the passage of air over the wind turbine blades as they rotate. It is described as a natural sounding broadband noise, sometimes characterised as a modulating sound, or "swishing".
  Aerodynamic noise generally occurs at lower wind speeds. However, when the wind drops very low insufficient energy is present to turn the blades or alternatively they turn very slowly at which point any generated aerodynamic noise would be negligible. At higher wind speeds aerodynamic noise would generally be masked by natural wind noise (wind in trees etc..).

- **Mechanical noise** – this noise emission arises from the mechanical components of the turbines located within the nacelle; the gears, generators and control equipment. It is generally characterised as a tonal noise, perceived sometimes as a "hum" or "whine".
  As a result of the nature of this type of noise and associated perception within the typical localities selected for turbine developments, modern nacelle design has sought to minimise this noise to the point where it could be considered as minimal/negligible.

During the construction of a single turbine the likely noise sources would be vehicle movements and construction plant and equipment operations associated with the installation activities.

2.2.2 Low Frequency Noise – Wind Farms

Low frequency noise associated with wind turbines is a generalised term used to classify three categories of sound emissions, namely:

- Low frequency noise, in the audible range of between 20 Hz to 200 Hz;
- Infrasound (very low frequency noise), in the inaudible range below 20 Hz; and
- Amplitude Modulation (AM), the swishing sound sometimes associated with rotating wind turbine blades.

Details on each of these categories will be presented within the following sections.

Low Frequency and Infrasound

Low frequency noise and infrasound are present within the environment all around us, key sources include both natural and manmade noise (associated with modern life), examples include (BWEA February 2005):

- Natural sources - thunder, waves, wind;
- Machinery, including pumps, compressors, diesel and combustion engines, refrigerators and fans;
- All forms of transport;
- Structure-borne noise, which originates in vibration;
- Neighbour-noise heard through a wall;

As stated above the main distinction between "low frequency noise" and "infrasound" is the frequency ranges at which they occur. Low frequency noise occurs in the audible range (between 20Hz to 200Hz), whereas infrasound occurs within the inaudible range below the typical human perception threshold (below 20Hz).

Low frequency noise and infrasound is less prevalent in modern "upwind" turbines, where the turbine blades are upwind of the tower, than it was in the earlier "downwind" generation of turbines (where the rotor was down wind of the tower). The effect of the tower being in front of the blades created a pocket of still air directly behind the tower, through which the blade travelled. Low frequency noise was found to be generated as the blade passed through this still air and then back into the main wind stream, resulting in what was commonly described as a "thumping" noise. This led to the development of the upwind designs, which have been proven to reduce low frequency noise to sub-audible (infrasound) levels by eliminating this sheltered air pocket.

However, the key question with low frequency noise lies in how to assess it due to the varying level of perception to the human ear. There is a much wider diversity of perception to these frequencies of sound than in the normal, audible frequencies. However, generally low frequency noise needs to be at a higher level to be perceived due to the human ear being more effective at filtering out noise at these frequencies.

With regard to infrasound from wind turbines a number of studies have been undertaken into this phenomena dating back to 1997. The following recent studies have been undertaken in this field specifically considering the health effects of noise in these frequencies:

- DEFRA 2003 - *'A review of published research on low frequency noise and its effects'*;
- P. Styles et al; 2005, *Microseismic and Infrasound Monitoring of Low Frequency Noise and Vibrations from Wind farms:, Recommendations on the Siting of Wind farms in the Vicinity of Eskdalemuir, Scotland*
- DTI report: 2006; 'The measurement of low frequency noise at three UK wind farms'

These studies generally conclude that whilst both low frequency noise and infrasound can be generated by wind farms and are present in the noise climate at distance from the developments, it can only be perceivable by extremely sensitive equipment specifically designed for the purpose. This equipment was therefore significantly more sensitive than the human ear at low frequencies. As such the reports generally concluded that infrasound was not an issue requiring significant concern, with statements being published to this effect.

The conclusions of these studies are supported by the World Health Organisation (WHO) who states within the 'Community Noise' document that *"there is no reliable evidence that infrasound below the hearing threshold produce physiological or psychological effects"*.

In conclusion, with regard to low frequency noise the Government released a statement in 2006 stating that:

> *"The Department for Communities and Local Government (DCLG) has written to all Local Planning Authorities and the Planning Inspectorate to confirm that the advice in PPS22 and its Companion Guide that ETSU-R-97 should be used for the assessment and rating of noise from wind farms should continue to be followed."*

Amplitude Modulation

Amplitude Modulation (AM) is the technical term for a 'thump' and 'swish' that can sometimes be heard from the passing of the blades on wind turbines. It tends (Department of Trade and Industry [DTI] report) to be more prevalent in the evening and night time periods most likely as a result of the increased stability of the atmosphere, hence the increased occurrence of the effect at these times.

Whilst blade swish may be an issue to local residents it only actually occurs at only a small number of the active sites in the UK. The DTI report considered 3 (of the 5) sites in the UK which, at the time, where reporting an issue with amplitude modulation, out of the total of 126 onshore wind farms operational at the time. Furthermore it is only reported to occur under certain weather conditions.

The following studies have been commissioned by the government and other agencies to investigate this phenomenon.

- DEFRA 2003 - *'A review of published research on low frequency noise and its effects'*
- University of Salford 2007 - 'Research into Aerodynamic Modulation of Wind Turbine Noise'
- Department for Business Enterprise & Regulatory Reform (BERR) Statement 2007/033 - 'Government statement regarding the findings of the Salford University report into Aerodynamic Modulation of Wind Turbine Noise'

The outcome of the studies undertaken, specifically the 'University of Salford's' study, was that AM associated with wind farms was an infrequent issue that should not be considered specifically outside of the scope of the ETSU R97 methodology. On the basis of this conclusion the Government maintained the same advice as for low frequency noise stating that PPS22 and ETSU-R-97 should continue to be followed.

A statement released by BERR in 2007 relating to the University of Salford report states the following with regard to AM:

> *"The study concluded that although AM cannot be fully predicted, the incidence of AM resulting from wind farms in the UK is low. Out of the 133 wind farms in operation at the time of the study, there were four cases where AM appeared to be a factor. Complaints have subsided for three out of these four sites, in one case as a result of remedial treatment in the form of a wind turbine control system. In the remaining case, which is a recent installation, investigations are on-going.*

Based on these findings, Government does not consider there to be a compelling case for further work into AM and will not carry out any further research at this time; however it will continue to keep the issue under review.

Government continues to support the approach set out in Planning Policy Statement (PPS) 22 – Renewable Energy. This approach is for local planning authorities to "ensure that renewable energy developments have been located and designed in such a way to minimise increases in ambient noise levels", through the use of the 1997 report by ETSU to assess and rate noise from wind energy developments.

3.0 STANDARDS AND GUIDANCE

3.1 Introduction

Within the following section of the report, details will be presented relating to the planning policy guidance documents and assessment methodologies appropriate for noise assessments of wind power developments.

The following legislation, policies and guidance have been taken into consideration during this assessment:

- Planning Policy Guidance Note 24 (PPG24): Planning and Noise, September 1994
- Planning Policy Statement 22 (PPS22): Renewable Energy;
- Draft Overarching National Policy Statement for Energy (EN-1): 2009
- Draft National Policy Statement for Renewable Energy Infrastructure (EN-3): 2009
- ETSU R 97 – The Assessment and Rating of Noise from Wind Farms; and
- Institute of Acoustics (IOA) agreement relating to the "Prediction and assessment of wind turbine noise" IOA bulletin March/April 2009 (Erratum - November/December 2009)

Detailed descriptions of these documents are contained within the following sections

3.2 Planning Policy Guidance Note 24: Planning and Noise

Planning Policy Guidance 24 is the Government's primary, overarching, national noise guidance. It provides guidance to local authorities in England on the use of their planning powers to minimise the adverse impact of noise. PPG24 sets out to:

- outline the considerations to be taken into account in determining planning applications both for noise-sensitive developments and for those activities which will generate noise;
- introduces the concept of noise exposure categories for residential development, encourages their use and recommends appropriate levels for exposure to different sources of noise; and
- advises Local planning authorities on the use of planning conditions to minimise the impacts of noise.

Whilst PPG 24 is the overarching UK guidance with regard to noise within the planning system, it unfortunately presents no specific guidance relating to noise associated with wind turbine or other renewable energy developments.

3.3 Planning Policy Statement 22 (PPS22): Renewable Energy, 2004

PPS22 sets out the Government's guidance and policy with regard to renewable energy, and seeks to aid positive planning to facilitate renewable energy development.

The PPS also sets out considerations that should be borne in mind by planning authorities when looking to deliberate on a renewable scheme within the planning system. This includes guidance with regard to international, national and local designations, green belt development, appropriate "buffer zones", as well as guidance on the environmental considerations that should be borne in mind.

With regard to noise PPS22 states the following:

> *"Local planning authorities should ensure that renewable energy developments have been located and designed in such a way to minimise increases in ambient levels.*

PPS 22 references the use of the ETSU R97 methodology for the assessment and rating of noise from wind energy developments.

3.4 Draft Overarching National Policy Statement for Energy (EN-1): 2009 and Draft National Policy Statement for Renewable Energy Infrastructure (EN-3): 2009

NPS EN-1 sets out the national policy with regard to the main types of energy developments and is an overarching document. It is supported by a suite of technology specific NPS documents, which in combination provides the encompassing guidance for decisions made by the Infrastructure Planning Commission (IPC). There are 5 technology specific NPS documents which are designed to cover the whole of the energy sector. NPS EN-3, *Renewable electricity generation (both onshore and offshore)* is appropriate for wind farm developments.

The NPS guidance is not relevant to this development as the proposed turbine is significantly below the 50 MW generating capacity for onshore wind farms (100MW off shore wind farms) set as the threshold of the guidance.

However, with regard to the assessment of noise associated with wind developments the NPS guidance, published in 2009, references the use of *"ETSU R97 in accordance with latest industry good practice which should reflect any updated guidance issued in relation to ETSU R97 and accepted by Government"*. The *"updated guidance issued in relation to ETSU R97 and accepted by Government"* is taken to be the Institute of Acoustics (IOA) agreement relating to the *"Prediction and assessment of wind turbine noise"* IOA bulletin March/April 2009 which will be discussed further later within this section.

NPS EN-3 states within Part 2, Section 2.7; Onshore Wind, paragraph 2.7.66 that:

> *"Where the correct methodology has been followed and a wind farm is shown to comply with ETSU R97 it should be reasonable for the IPC to conclude that it may give little or no weight to adverse noise impacts from the operation of the wind turbines."*

3.5 ETSU R97 – The Assessment and Rating of Noise from Wind Farms

ETSU R-97 provides a framework for the assessment and rating of noise from wind turbine installations within the UK. It has become the accepted standard for the consideration of noise associated with wind farm developments, and the methodology has therefore been adopted for the presented assessment.

ETSU R-97 recommends the application of noise limits at the nearest noise-sensitive properties in order to protect outside amenity and prevent sleep disturbance. It proposes that site-specific noise criteria be adopted, based on the existing background noise levels of the area across a range of wind speeds. This method is considered appropriate as noise from wind turbines will generally vary with wind speed, as does the background noise level.

The initial stage of the ETSU R97 process is to consider the site in light of the "Simplified Assessment" criteria. The simplified method is derived to cover single turbine developments such as

that proposed, and removes some of the complexity of the ETSU methodology. Where the predicted noise from the turbine, at wind speeds of up to $10ms^{-1}$, can be demonstrated to be below a level of 35dB(A), then this condition alone would be considered (by the Working Group) to offer sufficient protection of amenity and as such no further assessment would be required.

Should the simplified assessment result demonstrate predicted levels in excess of the specified criteria then a more detailed ETSU R97 assessment would be necessary. The more detailed assessment requires considering the site-specific relationship between wind speed and background noise, along with the particular noise emission characteristics of the proposed wind turbine.

The main aspects of an ETSU R97 assessment are contained within the following sections

Assessment of Existing Background Noise

Determination of the existing background noise levels of the area at varying wind speeds. ETSU provides specific guidance within Section 7 of the consideration and methodologies to be employed within the quantification of the baseline climate including equipment, survey periods and analysis. Typically the baseline assessment requires the measurement of background noise (L_{A90}) at sensitive receptors, along with associated wind speed at the proposed turbine location, at a height of 10m above ground level over a period in excess of 14 days.

Noise Limits

The noise limits proposed by ETSU R-97 are based on the $L_{A90,10\ minute}$ statistical noise parameter, and assume free field, external conditions.

ETSU R-97 proposes the adoption of a site standard of 5dB above the background noise level. This is based on the wide experience in environmental acoustics of the Working Group, that noise from a new source is unlikely to cause annoyance where the predicted increase is less than 5dB(A) above the existing background. Separate noise limits apply for quiet day-time and night time, as outlined below.

> ***Quiet daytime*** *is defined in ETSU-R-97 to be 18:00 – 23:00 every day, as well as 13:00 – 18:00 on Saturday and 07:00 – 18:00 on Sundays.*
> *As a minimum, the daytime noise limit in a low noise environment (where the background noise level is below 30-35 dB* $L_{A90\ 10\ minutes}$*) should be set within the range of 35-40dB* L_{A90}*. Higher noise levels from wind turbines are permitted provided the predicted turbine noise at the particular wind speed does not exceed the existing baseline at that speed by more than 5 dB(A).*
>
> ***Night-Time*** *is defined as 23:00 to 07:00 Monday to Sunday.*
> *Different standards apply at night, where sleep disturbance is the primary concern rather than the requirement to protect outdoor amenity. A minimum limit of 43 dB* $L_{A90\ 10\ minutes}$ *is recommended for the night-time derived from the WHO Guidelines. At night, higher noise limits may be acceptable provided the predicted turbine noise at the particular wind speed does not exceed the existing night time baseline at that speed by more than 5 dB (A). Night-time is usually considered to be between the hours of 23:00 and 07:00.*

Where the property in question has a financial interest in the development the ETSU R97 guidance considers a slightly higher minimum limit to be appropriate stating that *"The noise working group recommends that both daytime and night-time lower fixed limits can be increased to 45dB(A) and that consideration should be given to increasing the permissible margin above background where the occupier of the property has some financial involvement in the wind farm"*

The ETSU R97 guidance further considers that the noise levels recommended *"take into account the character of noise described as blade swish"*.

3.6 IOA: "Prediction and assessment of wind turbine noise" 2009

In an attempt to address a number of concerns relating to the ETSU R97 assessment methodology the IOA published additional guidance for use in conjunction with the ETSU Methodology.

The document aimed to address the following concerns:

1) *The acquisition of baseline noise data at receptor locations and the analysis of this data to take account of site specific wind shear;*
   Additional consideration of the ETSU methodology was deemed to be required as a result of a potential mismatch between the referenced wind speeds for baseline noise surveys and wind farm predictions. The relationship between wind speed at different heights above ground level (wind shear) and in particular between the hub height wind speed (which determines the turbine sound power) and the actual wind speed that would be measured at 10m varies from site to site and in differing weather conditions. This can lead to potential errors in comparisons between the two.
   The IOA methodology recommends the use of a derived 10m wind speed rather than a measured one, this effectively results in an assessment based upon wind speeds at hub height level (for both background levels and turbine levels) even though referenced in terms of "derived 10m high wind speed".
   An appropriate procedure for the determination of site specific wind shear is outlined within the scope of the IOA document.

2) *The prediction of wind turbine noise at receptor locations;*
   The document sets out modelling parameters and considerations that should be inherent within the scope of any noise predictions. These are broadly detailed below:
   - The methodology of ISO 9613-2 should be used for the prediction of noise associated with wind developments;
   - A uniform approach to the prediction of noise was put forward covering the following parameters:
     - The turbine sound power levels used as input. Documented and supported levels should be used and stated in the report. Either test levels (including those with uncertainty), warranted levels or generic levels could be used;
     - The atmospheric Conditions. The input parameters of the calculation software should be set to 10ºC and relative humidity set at 70%;
     - Ground factors. The calculation area should be set to either G=0 (hard ground) or G=0.5 (with a prediction height of 4m above AOD). This, coupled

with warranted levels for the candidate turbine is considered to result in a realistic prediction;

- The effects of barriers. No account should be taken of barriers by landforms unless there is no line of sight between the receptor and the tip of the rotor blade – in this instance a maximum attenuation of 2dB(A) is considered appropriate. Higher levels can be used but would require significant supporting evidence and justification.
- The relationship between predicted L_{Aeq} and L_{A90} for wind turbine prediction is as stated in ETSU R97 remains valid at:

$$L_{A90,\ 10min} = L_{Aeq,\ 10min} - 2dB$$

3) *The significance of low-frequency noise, infrasound and ground-borne vibration from wind farms.*

With regard to low frequency noise and infrasound, the document concurs with the 2006 DTI report by Hayes McKenzie concluding that neither was a significant factor at the separation distances at which people typically live from wind developments. The guidance references a study undertaken by Keele University with respect to Ground borne vibration from the Eskdalemuir wind farms which concluded that *"the levels of vibration from wind turbines are so small that only the most sophisticated instrumentation and data processing can reveal their presence, and they are almost impossible to detect"*

With regard to low frequency noise, infrasound and ground borne vibration the IOA document concludes that *"there is no robust evidence that low frequency noise (including infrasound) or ground-borne vibration from wind farms, generally has adverse effects on wind farm neighbours."*

In the November/December 2009 issue of the Acoustics Bulletin an Erratum was issued concerning a correction to the text. The correction concerned where confusion had occurred relating to the accidental transposition of the references to U1 and U2 in situations where the higher wind speed is less than the wind speed at the lower height. The original text was revised to read:

> "On some sites and in some wind conditions the situation may arise that the wind speed U2 (at the greater height H2) is equal to or lower than the wind speed U1 at the lower height H1. In this situation, the wind shear calculation specified above should not be performed and our suggestion at this time is that the hub height wind speed should be assessed to be the same as the wind speed at the upper height H2."

3.7 Agreed Deviations from the ETSU R97 and IOA Methodologies

For the following reasons deviations from the full requirements of the ETSU and IOA methodologies were agreed with BDC:

- The development proposed is for a single 900kW turbine, located a minimum of 275m from the nearest noise sensitive receptor;

- As the development is not a commercial multi turbine wind farm development, centralised 60% and 40% hub height meteorological information is not available for the site at the present time.

As such the following deviations were agreed.

- Assessment of the baseline noise climate of the area has been undertaken referencing wind speed at approximately 5m above local ground level as measured at Ringstone Hill Farm.

4.0 PREDICTION OF WIND TURBINE NOISE

4.1 Introduction

Within the following section, detail will be presented relating to the specifics of the noise modelling and prediction undertaken within the scope of the assessment.

4.2 Modelling Software

In order to assess the noise levels generated by the proposed turbine, a detailed noise model has been constructed. The model was constructed using the Braunstein + Berndt GmbH (commercially available) computer mapping software SoundPLAN 7.1.

The SoundPLAN software was set to implement the appropriate noise prediction methodologies as referenced below.

4.3 Prediction Methodology

Within the UK, current government guidance with regard to noise prediction from open sites is contained within BS5228: Pt1: 2009. However, in accordance with the guidance of the IOA agreement (Section 3.6) the modelling exercise was undertaken in accordance with ISO 9613-2: *Acoustics – Attenuation of sound during propagation outdoors: Part 2: General method of calculation.*

Furthermore, the requirements of the 2009 IOA agreement on the prediction and assessment of wind turbine noise have been implemented within the scope of this study, namely:

- Test data (with uncertainty) noise levels have been used (Appendix 1);
- Atmospheric conditions have been appropriately specified;
- Ground type has been specified as "hard reflective" and set at G=0;
- Barrier effects have been limited to a maximum of 2dB(A); and
- Appropriate L_{Aeq} to L_{A90} corrections have been implemented (-2dB)

4.4 Foundation of the Model

The noise model was constructed utilising the following information:

- Detailed OS Mastermap Topographical data from commercial sources;
- Site layout arrangement supplied by Enzygo/Empirica Investments;
- Test data with uncertainty and separate acoustic frequency test data (Operational Mode 1) for the Enercon E-44 acquired from Enercon as detailed within Appendix 1.

4.5 Assumptions

Within the construction of the noise model, certain information has required to be assumed. All assumptions embodied within the scope of the modelling exercise are detailed below.

Turbine specifics

The data supplied to Enzygo for the Enercon E-44, detailed that the operational turbine would generate sound power levels (SWL) as detailed within Table 4-1 below. Appropriate tonal and uncertainty corrections for the turbine have been taken from the test report (Appendix 1) and are included within the table information. Furthermore Enercon supplied additional data with regard to frequency spectra for the E-44 turbine which has also been taken account of within the scope of the model as detailed below:

Table 4-1: Noise Levels – Ennercon E-44

Wind Speed (ms^{-1})	4-6	7	8	9	10	11	12
SWL	No data supplied by Enercon, used 7ms^{-1} dataset as an exaggerated worst case	99.9	101.5	102.1	102.1	103.0	103.0
Tonality		≤ 2	≤ 2	≤ 2	≤ 2	≤ 2	≤ 2
ETSU R97 Correction		0.0	0.0	0.0	0.0	0.0	0.0
Test Uncertainty		+/- 1	+/- 1	+/- 1	+/- 1	+/- 1	+/- 1
Frequency Data		1/3 Octave Spectra data available				Assumed 10m/s	
Modelled SWL		100.9	102.5	103.1	103.1	104.0	104.0

No verification checks on the data provided by Enercon have been undertaken within the scope this report.

As detailed within Table 4-1 above the assessment has been based upon test data corrected for an appropriate level of uncertainty (as specified within the supplied dataset), which assumes that no tonal component is present associated with the operation of the E-44 turbine. As such following planning warranties will be sought from Enercon relating to guaranteed noise levels at appropriate wind speeds for the E-44 turbine and that the noise output would not require any level of correction under ETSU R97.

In the event that for economic, availability or any other reasons the Enercon E-44 turbine is not the model eventually specified on site within the design stage, the turbine chosen will require to have comparable noise emissions to the E-44 and accordance with the assessment criteria of ETSU R97 will need to be demonstrated to the LPA.

Enzygo have been informed by the design team that the specifics of the proposed turbine are as detailed below:

Location: Grid reference SE (4)42551, (4)10378

Hub Height: 45m Above Ordnance Datum (AOD)

Tip Height: 67m above AOD

Wind and Meteorological Conditions

The prediction methodology utilised takes account of wind and meteorological conditions in the following ways.

Wind Direction - The software assumes a positive wind vector in all directions from the source. The worst case assumption is therefore made within the calculation protocol that the wind is emanating from the centre of the sources and blowing in all directions simultaneously.

Humidity - 70%

Air Pressure - 1013.5mbar

Temperature - 10°C

5.0 NOISE MONITORING

5.1 Introduction

This section of the report describes the specifics of the noise survey undertaken in the vicinity of the site.

5.2 Survey Details

In order to determine the existing noise climate of the area, a noise monitoring survey was undertaken in February 2012 in the vicinity of the proposed development site.

Prior to the any aspect of the assessment being undertaken, the Local Planning Authority (LPA) were contacted and it was agreed that monitoring would be undertaken associated with the development as follows. The specifics of the consultation made are contained within Section 1.4 and Appendix 3.

Table 5-1: Agreed Noise Monitoring Locations and Periods

Location Number and Description		Time Period
MP A	**Ringstone Hill Farm** **Noise Monitoring** - The noise meter was positioned in the front garden of the property at Approx. NGR. 442641, 410070. **Wind Monitoring** – The anemometer was positioned in the front garden of the farm property with the anemometer assembly at a height of approximately 4.5m above local ground level. Again the equipment was located approximately at NGR. 442641, 410070.	Continuously logging 10 minute auto repeat periods from the 3rd to the 20th February 2012
MP B	**Crickett Villa, Common Road** **Noise Monitoring** – The noise monitoring equipment is in the rear garden of the property at Approx. NGR. 442181, 410703.	
MP C	**The Robin Hood Public House (currently closed to business)** **Noise Monitoring** – The noise meter was positioned in the former Children's play area to the rear of the pub away from the busy Common Road/Southmoor Road Junction at Approx. NGR. 442839, 410338.	Continuously logging 10 minute auto repeat periods from the 14th to the 20th February 2012

The approximate noise monitoring locations are further presented graphically on the map below within Figure 2. The approximate turbine location is also identified to provide a context to the measurement positions.



Figure 2: Approx. Noise Monitoring Locations (Map ref. Google)

Obtaining ambient and background noise measurements at the above locations around the site has informed the assessment of potential impacts of the proposed wind turbine on the residential properties within the vicinity.

5.3 Monitoring Equipment

Noise Monitoring Equipment

The monitoring of noise was undertaken in line with the guidance set out within BS7445: 1991. The sound level meters were programmed to monitor over 10 minute periods continuously day and night for 7 days. The equipment used was set to record the following statistical parameters:

L_{Aeq} in dB
L_{A90} in dB
L_{Amax} in dB

The following sound level meter equipment was used in order to undertake the noise survey at the site;

Table 5-2: Noise Monitoring Equipment

Manufacturer		Type	Location MP A	Location MP B	Location MP C
Meter	01dB	Black Solo (type 1)	Solo1 - 65396	Solo2 - 65446	Solo3 - 65445
Preamp	01dB	PRE21	15479	15989	16016
Mic	GRAS	MCE 212	142607	142686	142693
Calibrator	Cirrus	CR:515 (type 1)	59522		

The sound level meters were mounted at each location on a tripod at a height of approximately 1.5m above the ground and a minimum of 3.5m from any reflecting surfaces where possible. Each was fitted with a relevant manufacturer's specification windshield and weather proof housing.

The following set-up parameters were used on the sound level meter during all of the noise measurements undertaken:

Time Weighting:	Fast
Frequency Weighting:	"A"
Auto repeat Periods:	10 minutes

The sound level meters used were field calibrated using an electronic calibrator prior to commencement and upon completion of the surveys, no significant drift in calibration was observed. The instrumentation calibration documentation for the equipment used can be supplied upon request.

Wind Monitoring Equipment

The monitoring of wind was undertaken for the duration of the noise monitoring survey. The anemometer equipment used is as specified below and was installed at Location MP A, Ringstone Hill Farm.

Due to the lay of the land in the vicinity of the proposed turbine site and surrounding area it was deemed that the wind characteristics would remain relatively constant across the area. The only variations to this would be considered to be localised influences due to buildings. As such it was deemed acceptable that wind speeds be amassed at one of the three locations and used in the consideration of all.

Table 5-3: Wind Monitoring Equipment

Manufacturer		Type	Accuracy
Anemometer	Inspeed	Vortex Wind Sensor - 3-Cup switch/magnet rotor.	0.5 mph from 4 to 10 mph, +/-4% from 10 to 50 mph, estimated within 4% above 50 mph
Display	CATEYE	BC1200 display	Display is limited to 0.5mph intervals but this does not affect the pulse logging equipment
Data Logger	MadgeTech	Pulse110 Data Logger	Limited to 16,300 single logging intervals from 1sec to 12hr intervals
Mast	Enzygo	5m mast	+/- 0.1m in setup (due to ground insertion amount)

Notes to Table 5-3

1. **Vortex anemometer accuracy was verified by lab tests, the anemometer was noted to be within 0.5 mph From 5 to 10mph (the readout was noted to be the limiting factor but is eliminated with the pulse 110 data logger), 4% from 10 to 50 mph. Above 50 mph the anemometer, whilst not tested is conjectured from the test data to be accurate to speeds well over 100 mph.**

The anemometer was mast mounted at a height of approximately 4.5m above the ground and in an exposed, secure location at Ringstone Hill Farm.

The anemometer was set to log average wind speeds over auto-repeat 2 minute periods in miles per hour (mph) and corrected to meters per second (ms^{-1}) using the following conversion factor:

$$1.0 \text{ mph} = 0.44704 \text{ ms}^{-1}$$

5.4 Measurement data

Noise Data

The results of the noise surveys undertaken are presented, summarised, within the relevant graphical plots within Chapter 6.0, and the entire dataset used (quiet daytime and night-time) for each location is presented within Appendix 2.

Wind Data

The results of the wind speed survey were averaged over each 10 minute period such that the total number of pulses in 5 x 2 minute periods were converted to an average ms^{-1} value and are presented within the relevant graphical plots within Chapter 6.0.

The entire dataset in 10 minute periods is presented graphically within Appendix 2.

6.0 NOISE IMPACT ASSESSMENT

6.1 Introduction

This section of the report details the results of the initial, screening assessment undertaken. The assessment is based on a purely predictive methodology referencing the simplified criteria of ETSU R97.

6.2 ETSU R97 Simplified Methodology

In line with the requirements of the simplified ETSU (and IOA) methodology relating to small scale wind developments a predictive noise model of the development was constructed. Prediction of noise was then undertaken to the following locations at varying distances around the perimeter of the turbine (Figure 3):

Loc. 1 - Windmill Hill
Loc. 2 - Willowgarth High School
Loc. 3 - Manor Farm/Brierley Manor
Loc. 4 - Ringstone Hall Farm (Financial Interest)
Loc. 5 - Robin Hood Pub (Closed)
Loc. 6 - The Lodge
Loc. 7 - South Kirkby Common
Loc. 8 - Burntwood Hotel
Loc. 9 - Common Road
Loc. 10 - Puddinghill Farm
Loc. 11 - Lindley House, Brierley
Loc. 12 - Kirkby Common Farm
Loc. 13 - Reservoir House
Loc. 14 - Clear View, Grimethorpe

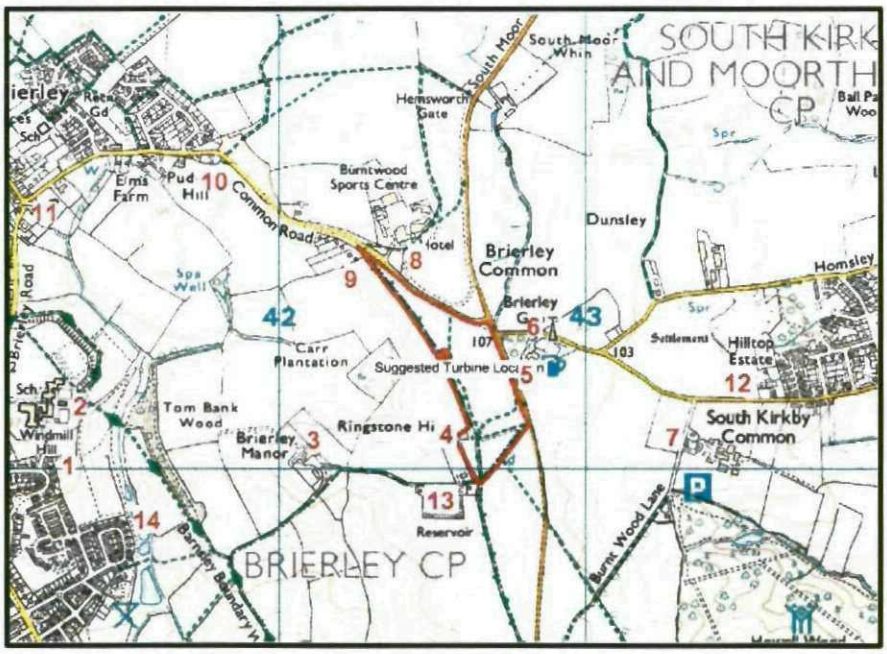


Figure 3: Simplified Assessment Prediction Locations

Noise levels were predicted in terms of $L_{Aeq,10min}$ and then corrected to $L_{A90,10min}$ for assessment and reporting purposes. The results of the predictive exercise are presented numerically within Table 6-1 and graphically within Figure 16 ($10ms^{-1}$). Within the table the predicted levels up to wind speeds of $10ms^{-1}$ have been compared to the 35dB(A) criteria of the simplified ETSU guidance.

Table 6-1: Predicted turbine noise levels (Candidate Turbine Ennercon E44)

Name	Predicted Noise level in $L_{90,10min}$ dB(A)							Simplified method 35 dB Comparison						
	4ms^{-1}	5ms^{-1}	6ms^{-1}	7ms^{-1}	8ms^{-1}	9ms^{-1}	10ms^{-1}	4ms^{-1}	5ms^{-1}	6ms^{-1}	7ms^{-1}	8ms^{-1}	9ms^{-1}	10ms^{-1}
Loc. 1 - Windmill Hill	21.6	21.6	21.6	21.6	21.6	21.6	22.9	-13.4	-13.4	-13.4	-13.4	-13.4	-13.4	-12.1
Loc. 2 - Willowgarth High School	22.7	22.7	22.7	22.7	22.7	22.7	24.0	-12.3	-12.3	-12.3	-12.3	-12.3	-12.3	-11.0
Loc. 3 - Manor Farm/Brierely Manor	31.6	31.6	31.6	31.6	31.6	31.6	32.9	-3.4	-3.4	-3.4	-3.4	-3.4	-3.4	-2.1
Loc. 4 - Ringstone Hill Farm (Financial Interest)	38.8	38.8	38.8	38.8	38.8	38.8	40.1	3.8	3.8	3.8	3.8	3.8	3.8	5.1
Loc. 5 - Robin Hood Pub (Closed)	40.3	40.3	40.3	40.3	40.3	40.3	41.6	5.3	5.3	5.3	5.3	5.3	5.3	6.6
Loc. 6 - The Lodge	39.1	39.1	39.1	39.1	39.1	39.1	40.4	4.1	4.1	4.1	4.1	4.1	4.1	5.4
Loc. 7 - South Kirkby Common	26.7	26.7	26.7	26.7	26.7	26.7	28.0	-8.3	-8.3	-8.3	-8.3	-8.3	-8.3	-7.0
Loc. 8 - Burntwood Hotel	37.9	37.9	37.9	37.9	37.9	37.9	39.2	2.9	2.9	2.9	2.9	2.9	2.9	4.2
Loc. 9 - Common Road	36.9	36.9	36.9	36.9	36.9	36.9	38.2	1.9	1.9	1.9	1.9	1.9	1.9	3.2
Loc. 10 - Puddinghill Farm	25.3	25.3	25.3	25.3	25.3	25.3	26.6	-9.7	-9.7	-9.7	-9.7	-9.7	-9.7	-8.4
Loc. 11 - Lindley House, Brierley	21.4	21.4	21.4	21.4	21.4	21.4	22.7	-13.6	-13.6	-13.6	-13.6	-13.6	-13.6	-12.3
Loc. 12 - Kirkby Common Farm	26.3	26.3	26.3	26.3	26.3	26.3	27.6	-8.7	-8.7	-8.7	-8.7	-8.7	-8.7	-7.4
Loc. 13 - Reservoir House	37.2	37.2	37.2	37.2	37.2	37.2	38.5	2.2	2.2	2.2	2.2	2.2	2.2	3.5
Loc. 14 - Clear View, Grimethorpe	22.5	22.5	22.5	22.5	22.5	22.5	23.8	-12.5	-12.5	-12.5	-12.5	-12.5	-12.5	-11.2

Note to Table: Green text denotes predicted levels are below the 35dB(A) criteria; red text denotes predicted levels are above the 35dB(A) criteria.

It can be seen, with reference to Table 6-1 above, that the predicted noise levels from the candidate turbine (Ennercon E-44) are only expected to breach the simplified criteria of 35dB(A) (required to be considered at wind speeds of up to 10ms^{-1}) at the following locations:

4). Ringstone Hill Farm	Exceedances of the 35dB criteria are predicted to occur at all wind speeds from 4ms^{-1} to 10ms^{-1}. The maximum level of exceedance of 5.1dB(A) occurs at the higher wind speed of 10ms^{-1}.
5). Robin Hood Pub	Exceedances of the 35dB criteria are predicted to occur at all wind speeds from 4ms^{-1} to 10ms^{-1}. The maximum level of exceedance of 6.6dB(A) occurs at the higher wind speed of 10ms^{-1}.
6). The Lodge	Exceedances of the 35dB criteria are predicted to occur at all wind speeds from 4ms^{-1} to 10ms^{-1}. The maximum level of exceedance of 5.4dB(A) occurs at the higher wind speed of 10ms^{-1}.
8). Burntwood Hotel	Exceedances of the 35dB criteria are predicted to occur at all wind speeds from 4ms^{-1} to 10ms^{-1}. The maximum level of exceedance of 4.2dB(A) occurs at the higher wind speed of 10ms^{-1}.
9). Common Rd	Exceedances of the 35dB criteria are predicted to occur at all wind speeds from 4ms^{-1} to 10ms^{-1}. The maximum level of exceedance of 3.2dB(A) occurs at the higher wind speed of 10ms^{-1}.
13). Reservoir House	Exceedances of the 35dB criteria are predicted to occur at all wind speeds from 4ms^{-1} to 10ms^{-1}. The maximum level of exceedance of 3.5dB(A) occurs at the higher wind speed of 10ms^{-1}.

Of these breaches, Location 4, Ringstone Hill Farm, has a financial interest in the development and as such under the guidance of ETSU R97 *"both daytime and night-time lower fixed limits can be increased to 45dB(A)"*. ETSU R97 further states with regard to properties with a financial interest in a development that *"consideration should be given to increasing the permissible margin above background where the occupier of the property has some financial involvement in the wind farm"*. The predicted noise levels from the Turbine at the residential aspect of Ringstone Hill Farm does not breach the 45dB(A)$_{L90,\ 10min}$ criteria at any of the wind speeds considered.

All other locations assessed within Table 6-1 are considered by the guidance of ETSU R97 to be appropriate, based upon this simplified assessment criteria. Therefore, there is neither a requirement to undertake baseline noise monitoring nor any further assessment with regard to these locations.

6.3 ETSU R97 Detailed Methodology

As agreed with the BMBC and WMDC only those locations presented within Table 6-1 as having predicted noise levels in excess of 35dB(A) require additional consideration. The additional

consideration includes quantification, and assessment against the existing noise climate of each locality.

The following locations therefore require additional consideration with regard to noise:

- Ringstone Hill Farm to the south of the turbine site;
- The Robin Hood Pub (closed) to the east of the turbine site;
- The Lodge to the east of the turbine site;
- The Burntwood Hotel to the north of the turbine site;
- Residential properties along Common Road to the north northwest of the turbine site; and
- Reservoir House to the south of the turbine site

The following qualifications are made with regard to the monitoring surveys undertaken as either agreed with the LPA or due to site specific access reasons:

- On the basis of the geographic spacing of the above 6 assessment locations there was an opportunity to reduce the number of monitoring locations whilst maintaining a robust assessment. As such the following was agreed with both LPA's prior to the surveys being undertaken:
    - One monitoring location to be representative of Ringstone Hill Farm and Reservoir Lodge (Survey ref MP A);
    - One monitoring location to be representative of The Robin Hood Public House and The Lodge (Survey ref MP C); and
    - One monitoring location to be representative of the Burntwood Hotel Complex and the residential properties on Common Road (Survey ref MP B).

Within Figures 4 to 15 below, graphical plots are presented for each location showing the assessment of noise levels during the quiet daytime and night-time periods as defined within ETSU R97. The plots present the predicted turbine noise levels at varying wind speeds, against the averaged background noise climate related to wind speeds and the derived ETSU R97 limits (L_{90} +5dB(A)). The predicted noise levels are further represented within the noise contour plots within Figures 16 and 17.

6.3.1 Location 4 (MP A)) Ringstone Hill Farm

Figures 4 and 5 relate to the assessment of Location 4 (MP A), Ringstone Hill Farm. The farm is located to the south of the turbine location separated by agricultural land. The baseline dataset (noise and wind speed) used in the assessment was established at monitoring location MP A and is presented within Appendix 2.

The baseline noise climate of the location was noted by the field engineer to be dominated by road traffic noise in the general area coupled with sporadic human, natural and agricultural noises.

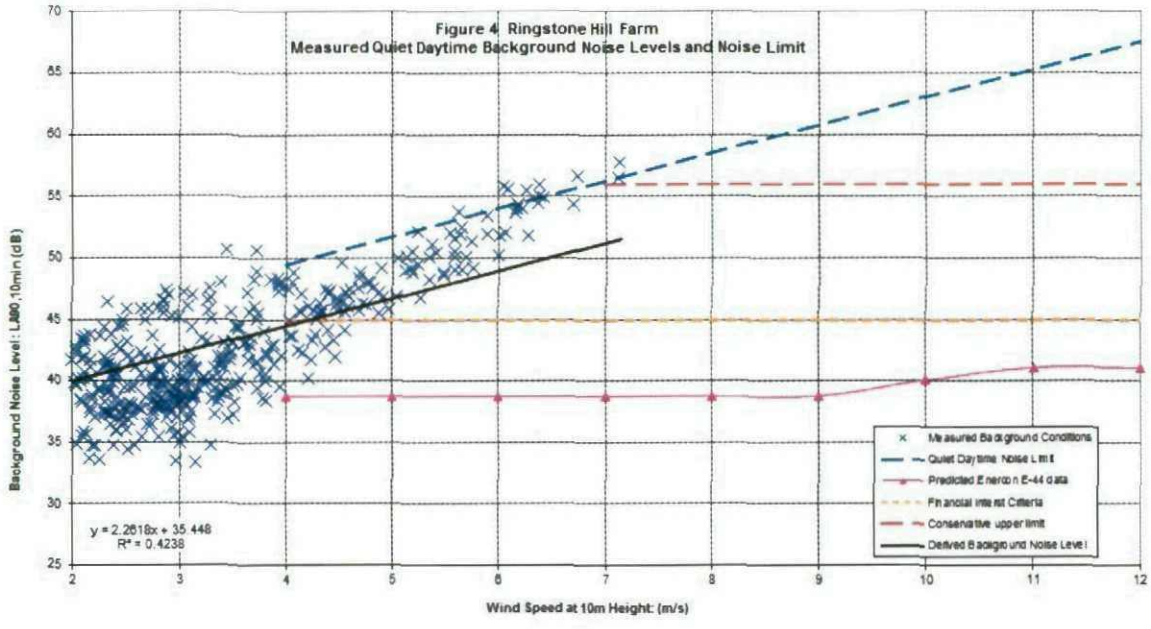
Various trend lines were tested to best describe the dataset during the daytime and night-time periods. These are discussed below:

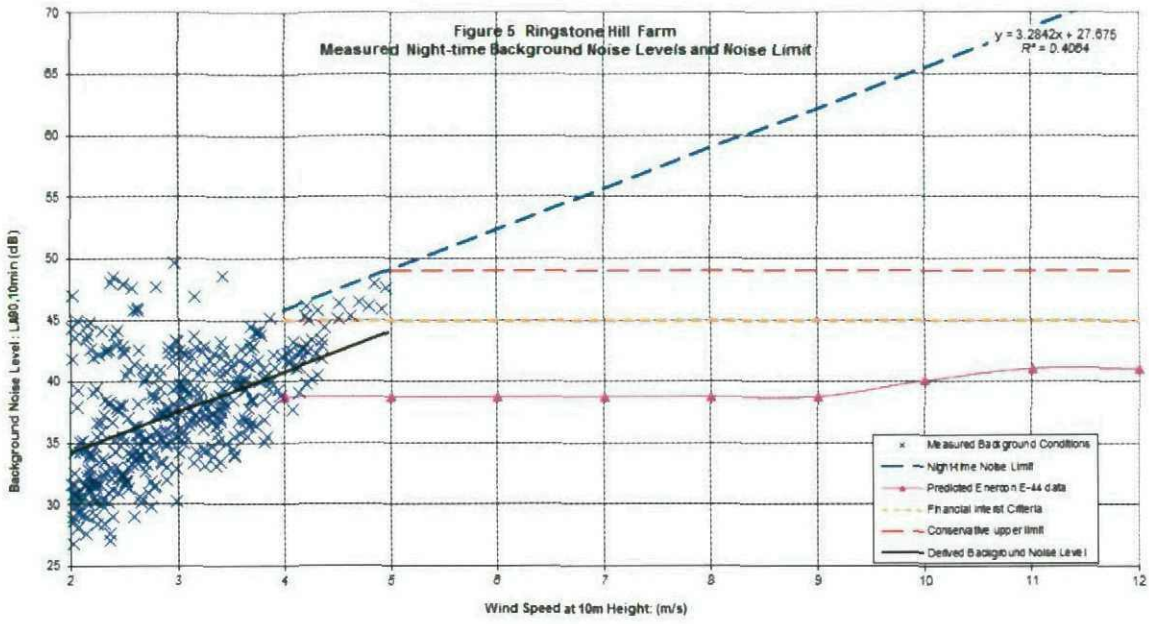
- Quiet Daytime Periods: The use of a linear trend line is considered to provide a good description of the general trend of noise/wind at the location; however, the forward projection has become extremely exaggerated at wind speeds of 10 to 12ms^{-1} where the appropriate limits would be implied to be greater than 65dB. As such to provide a robust consideration the trend lines have been forward projected based upon a flattened off trend from 8ms^{-1} as a result of a lack of information at these upper speeds.

- Night-time Period: Again due to the correlation between the noise levels and the low wind speeds experienced during the survey period (all less than 5ms^{-1} during the night-time) the forward projection of the noise limit is deemed to be exaggerated, However, the linear line is considered to describe the dataset well and as such to provide a robust consideration the trend lines have been forward projected based upon a flattened off trend from 5ms^{-1} as a result of a lack of information at these upper speeds.

- Additionally as the Ringstone Hill Farm location has a financial interest in the development the appropriate ETSU criteria for "properties with a financial interest in the development" is also presented within the plots during both the daytime and night-time periods.

However, we would note that whilst the assessment presented within the Figures below considers a flat trend from the level of the upper monitoring points any conditions set for the turbine should remain based upon the ETSU R97 criteria (and qualifications for quiet sites and financial interest) of measured L_{90} +5dB at any given wind speed. The following figures are therefore presented for assessment consideration only.





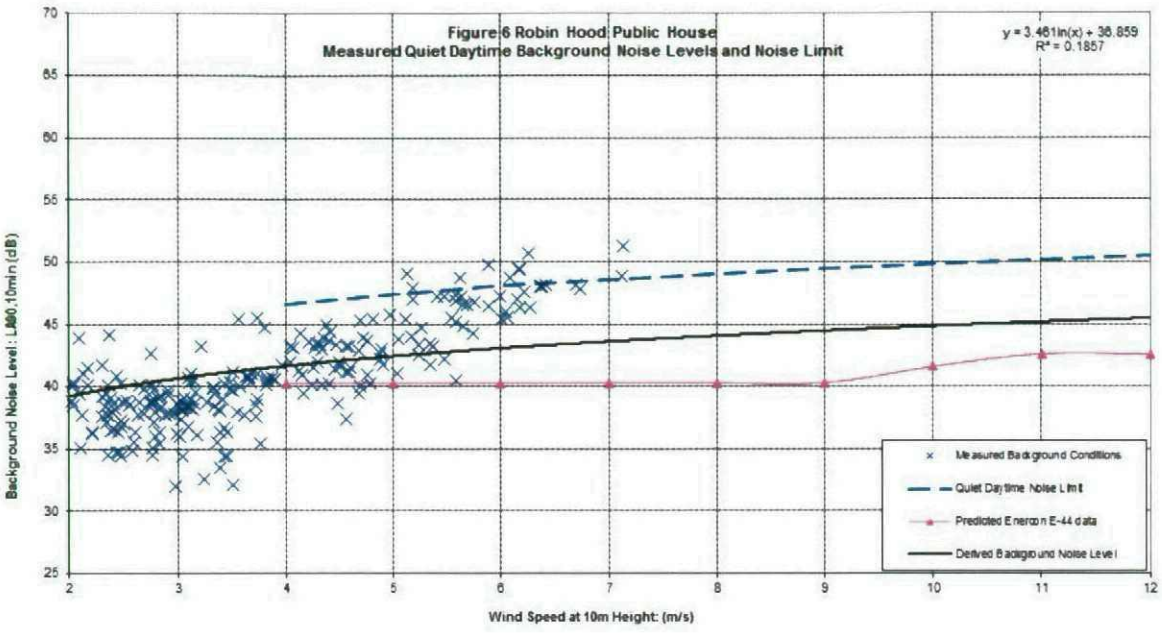
As Ringstone Hill Farm has a financial interest in the development ETSU advises a limit of 45dB $L_{10, 10min}$ is appropriate for both the daytime and night-time periods (orange line). The predicted noise levels from the Enercon turbine do not breach this criterion at any time as demonstrated within Table 6-1 and Figures 4 and 5.

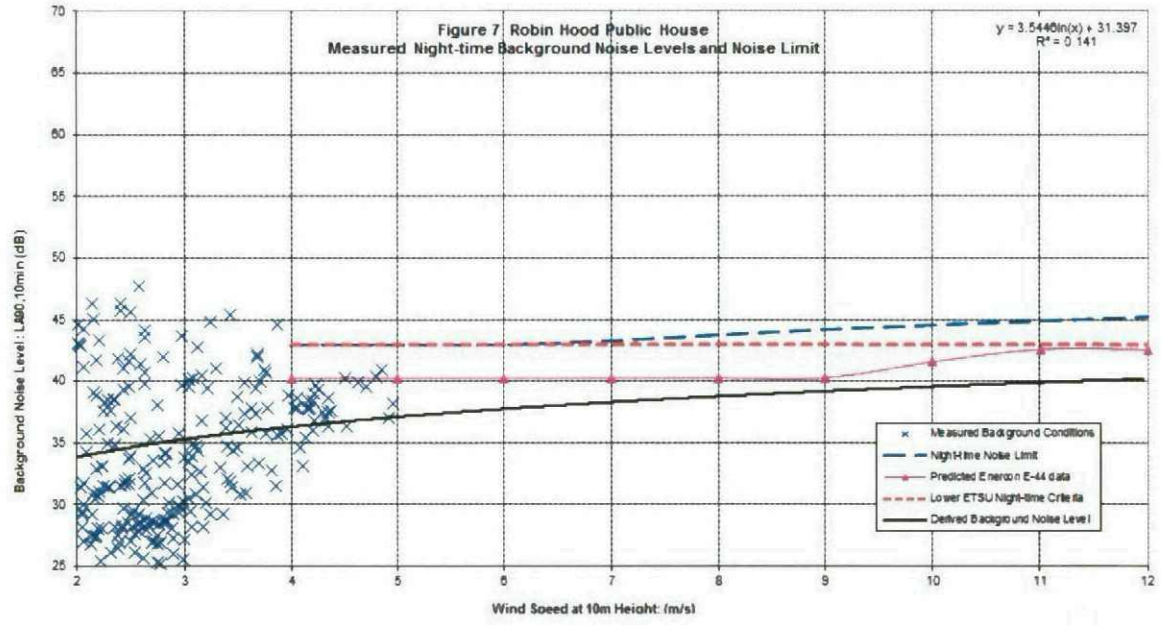
6.3.2 Location 5 (MP C)) Robin Hood Public House

Figures 6 and 7 relate to the assessment of Location 5 (MP C), Robin Hood Pub. The building is located to the east of the turbine location separated by agricultural land and a main road. As detailed earlier within this report due to access permission the baseline dataset used in the assessment of the Robin Hood Pub was established over a 7 day period, which was agreed with WMDC. The baseline noise dataset was established at monitoring position MP C (in the sheltered former children's play area to the rear of the pub, away from the busy Common Road/Southmoor Road Junction) and is presented within Appendix 2. The wind speed data referenced was measured at Location MP A) Ringstone Hill Farm.

The baseline noise climate of the location was noted by the field engineer to be dominated by road traffic noise in the general area coupled with sporadic human, natural and agricultural noises.

Reference to Figure 6 demonstrates a logarithmic trend line to adequately describe the trend of the baseline data, whilst remaining on the conservative side of the upper wind speeds captured. As such it is considered that the forward projection also looks relatively realistic upon which to base an assessment. There is a commonly accepted relationship between increased wind speed and increased noise which is demonstrated clearly in the measured data presented for wind speeds of up to 7 - 8ms^{-1}, above this it has been required to be projected based upon the trend of the best fit line/curve. Reference to Figure 7 demonstrates a similar situation and trend for the night-time period.





It is shown that based upon the data monitored and the projected noise limits for the upper wind speeds, the predicted turbine noise levels would not be expected to breach the appropriate ETSU R97 limits of $L_{90,\ 10min}$ +5dB.

Furthermore, as the upper ends of the graphs are projected from the trends of the lower data additional consideration has been given to the overnight assessment. In order to present confidence that the predicted turbine levels are acceptable during this period, when people are either asleep or trying to sleep, the lower ETSU night-time limit of 43dB(A) $L_{90,\ 10min}$ is also presented. Reference to Figure 7 demonstrates that the predicted turbine noise would be below this limit at this location.

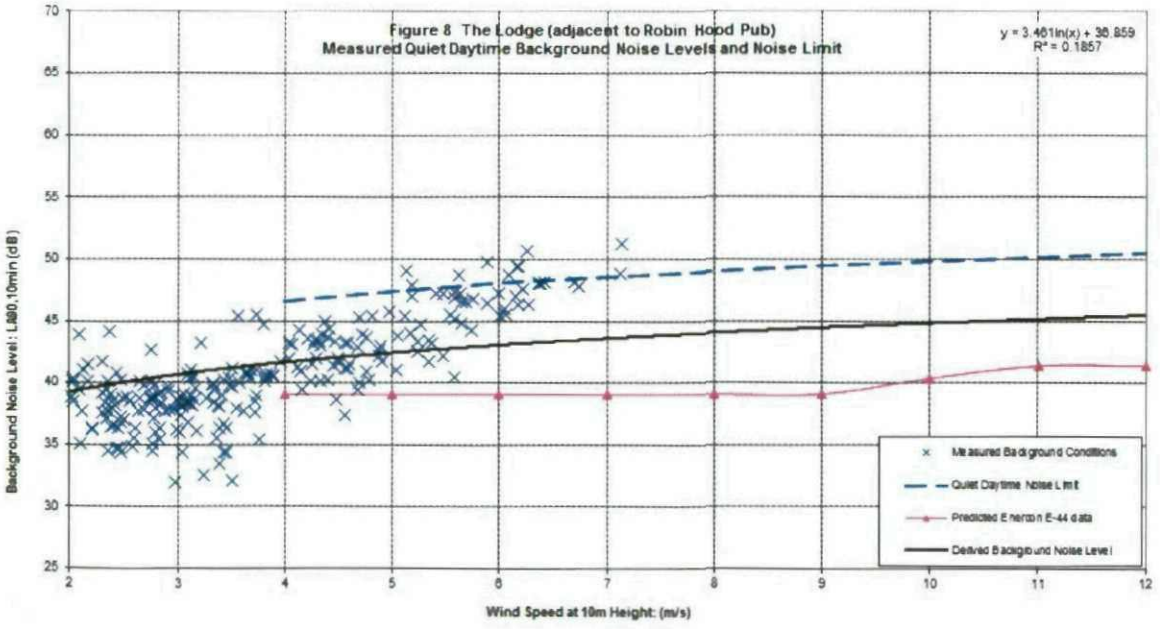
It is also noted that the baseline noise climate established at the Robin Hood pub was collected from a monitoring position within the former children's play area to the rear (east of the pub) elevation of the building. This location is sheltered significantly from noise generated by the passage of vehicles on the busy Common Road/Southmoor Road Junction to the west. However, the proposed turbine is located to the west of the building and as such noise generated by the turbine would impact on the westerly elevations and garden areas, which are more affected by noise from Common Road and Southmoor Road. The result would be higher existing noise levels on these western areas of the property than those quantified on the more sheltered rear elevations in the lea of the building, upon which this assessment is based.

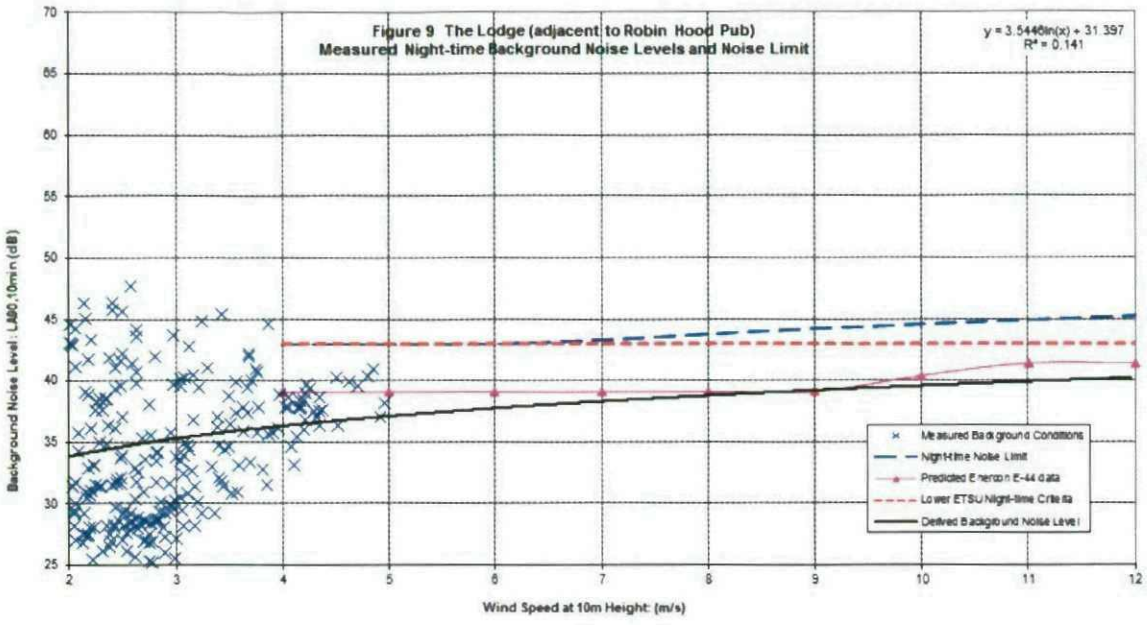
6.3.3 Location 6) The Lodge

Figures 8 and 9 relate to the assessment of Location 6, The Lodge. This property is the residential aspect of the Robin Hood Pub and is located to the east of the turbine location separated by agricultural land and a main road. The baseline noise dataset used in the assessment of The Lodge was established at Location MP C, The Robin Hood Pub and is presented within Appendix 2. Again the wind speed data referenced was measured at Location MP A) Ringstone Hill Farm.

The description of the baseline climate and the justification of the trend lines/curves used are presented within Section 6.3.2.

The baseline noise climate of the location was noted by the field engineer to be dominated by road traffic noise in the general area coupled with sporadic human, natural and agricultural noises. It is further noted that the property The Lodge is more exposed to road traffic noise on Common Road and Southmoor Road than the monitoring position in the lea of the pub building.





It is shown that based upon the data monitored and the projected noise limits for the upper wind speeds, the predicted turbine noise levels would not be expected to breach the appropriate ETSU R97 limits of $L_{90,\ 10min}$ +5dB.

Furthermore, as the upper ends of the graphs are projected from the trends of the lower data additional consideration has been given to the overnight assessment. In order to present confidence that the predicted turbine levels are acceptable during this period, when people are either asleep or trying to sleep, the lower ETSU night-time limit of 43dB(A) $L_{90,\ 10min}$ is also presented. Reference to Figure 9 demonstrates that the predicted turbine noise would be below this limit at this location.

It is also reiterated that the baseline noise levels assumed at this location are considered to be conservative based upon the level of traffic noise experienced at The Lodge, when compared to those at the monitoring location MP C in the lea of the pub building.

6.3.4 Location 8) Burntwood Hotel, Health Club and Restaurant

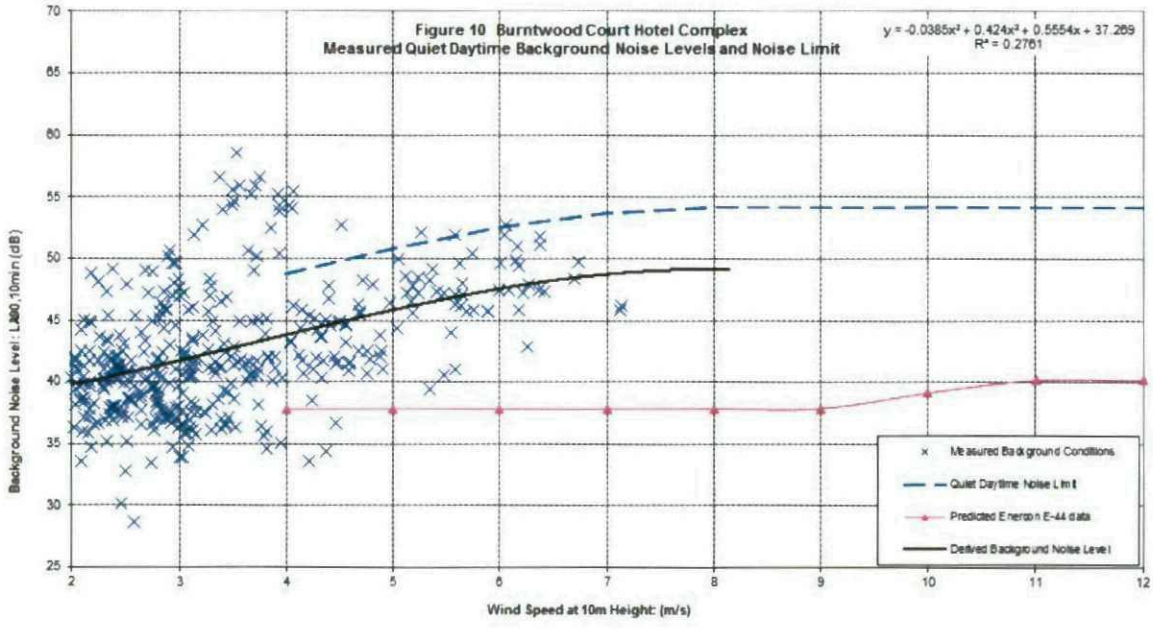
Figures 10 and 11 relate to the assessment of Location 8, The Burntwood Hotel Complex. This location, whilst mainly a commercial property is considered to be a sensitive land use as a result of the hotel aspect to the complex. Furthermore, directly adjacent to the complex (to the north) are two residential houses which are believed to be currently occupied by the owners. The complex is located to the north of the turbine location separated by agricultural land and a main road.

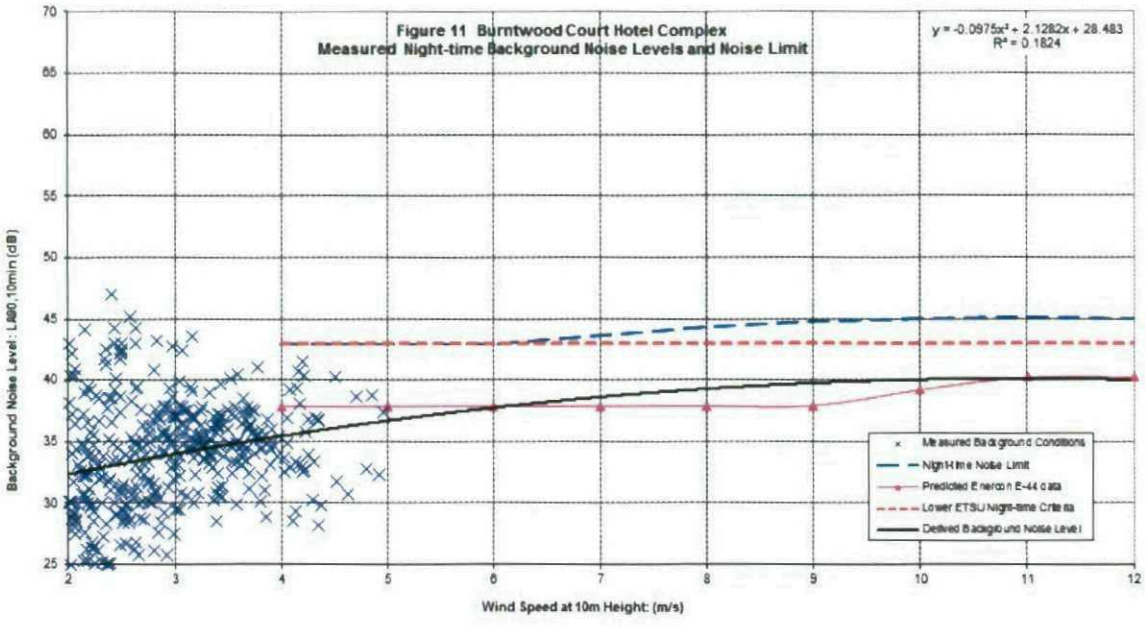
Numerous approaches were made to the company to request permission to monitor noise within the curtilage of the complex; however, no response was received. As such the baseline noise dataset used in the assessment of the Burntwood Hotel Complex was established in the rear garden of Location MP B, Crickett Villa on Common Road and is presented within Appendix 2. Again the wind speed data referenced was measured at Location MP A, Ringstone Hill Farm.

The baseline noise climate of the locality was noted to be dominated by road traffic noise, coupled with sporadic human, natural and agricultural noises. However, the noise climate of the hotel complex is likely to be further affected, and potentially elevated, by noise associated with the commercial operations such as cars within the car park, operational noise and patrons within the complex.

Analysis of the dataset collected again concluded maximum wind speeds of around 7ms^{-1} during the daytime period. As with the other locations considered this has resulted in a requirement to forward project the noise limit to the upper wind speeds. The use of a 3rd order polynomial trend line is considered to provide a good description of the general trend of noise/wind in this instance, however, for assessment purposes the forward projection has been flattened off from 8ms^{-1} as a result of a lack of information at these upper speeds.

The same apples during the overnight period only applying a 2nd order polynomial trend curve to the dataset.





It is shown that based upon the data monitored and the projected noise limits for the upper wind speeds, the predicted turbine noise levels would not be expected to breach the appropriate ETSU R97 limits of $L_{90,\ 10min}$ +5dB.

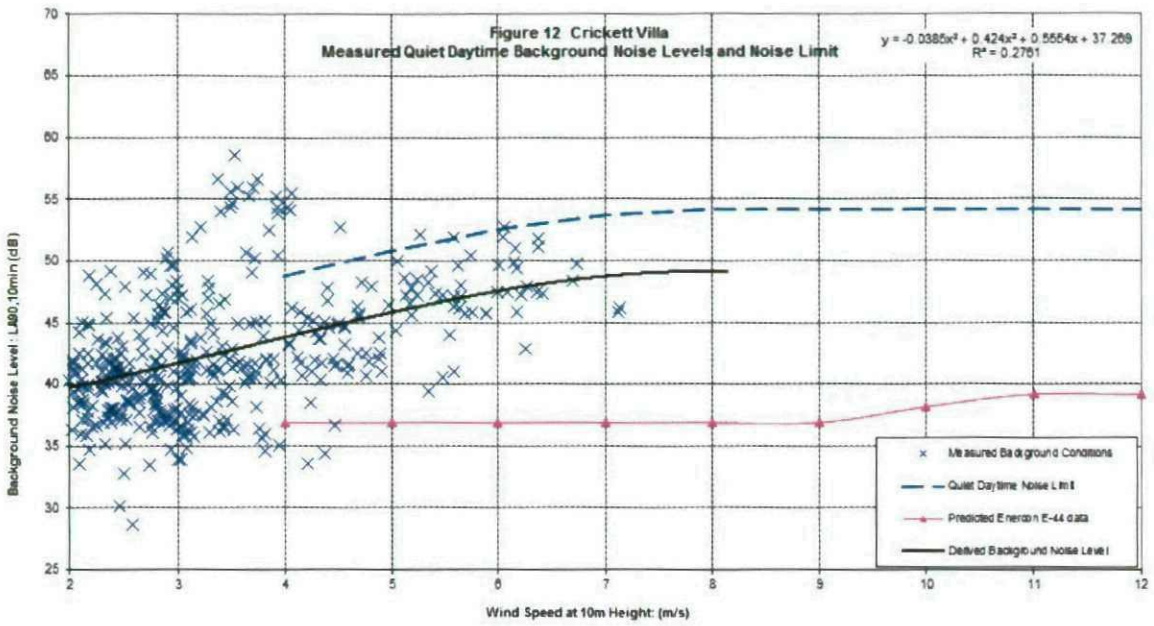
Furthermore, as the upper ends of the graphs are projected from the trends of the lower data additional consideration has been given to the assessment of the overnight period. In order to present confidence that the predicted turbine levels are acceptable during this period, when people are either asleep or trying to sleep, the lower ETSU night-time limit of 43dB(A) $L_{90,\ 10min}$ is also presented. Reference to Figure 11 demonstrates that the predicted turbine noise would be below this limit at this location.

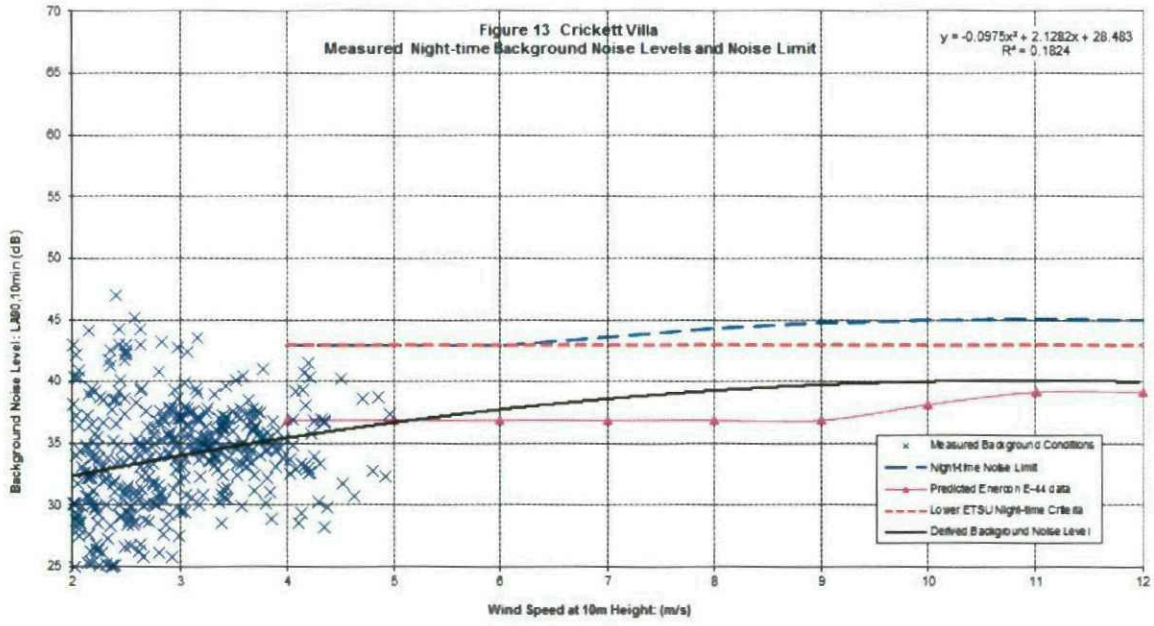
6.3.5 Location 9) Residential dwellings on Common Road

Figures 12 and 13 relate to the assessment of Location 9, which is representative of the residential dwellings to the south of Common Road. These properties are located to the north northwest of the turbine location separated by agricultural land and rear gardens. The baseline noise dataset used in the assessment of these properties was established at Location MP B, within the rear garden of Crickett Villas and is presented within Appendix 2. Again the wind speed data referenced was measured at Location MP A, Ringstone Hill Farm.

The baseline noise climate of the location was noted by the field engineer to be dominated by road traffic noise in the general area coupled with sporadic human, natural and agricultural noises.

The description of the trend lines/curves as detailed within Section 6.3.4 also applies to this location as the baseline dataset is the same. As such reference to Section 6.3.4 should be made within the consideration of this location.





It is shown that based upon the data monitored and the projected noise limits for the upper wind speeds, the predicted turbine noise levels would not be expected to breach the appropriate ETSU R97 limits of $L_{90,\ 10min}$ +5dB.

Furthermore, as the upper ends of the graphs are projected from the trends of the lower data additional consideration has been given to the assessment of the overnight period. In order to present confidence that the predicted turbine levels are acceptable during this period, when people are either asleep or trying to sleep, the lower ETSU night-time limit of 43dB(A) $L_{90,\ 10min}$ is also presented. Reference to Figure 13 demonstrates that the predicted turbine noise would be below this limit at this location.

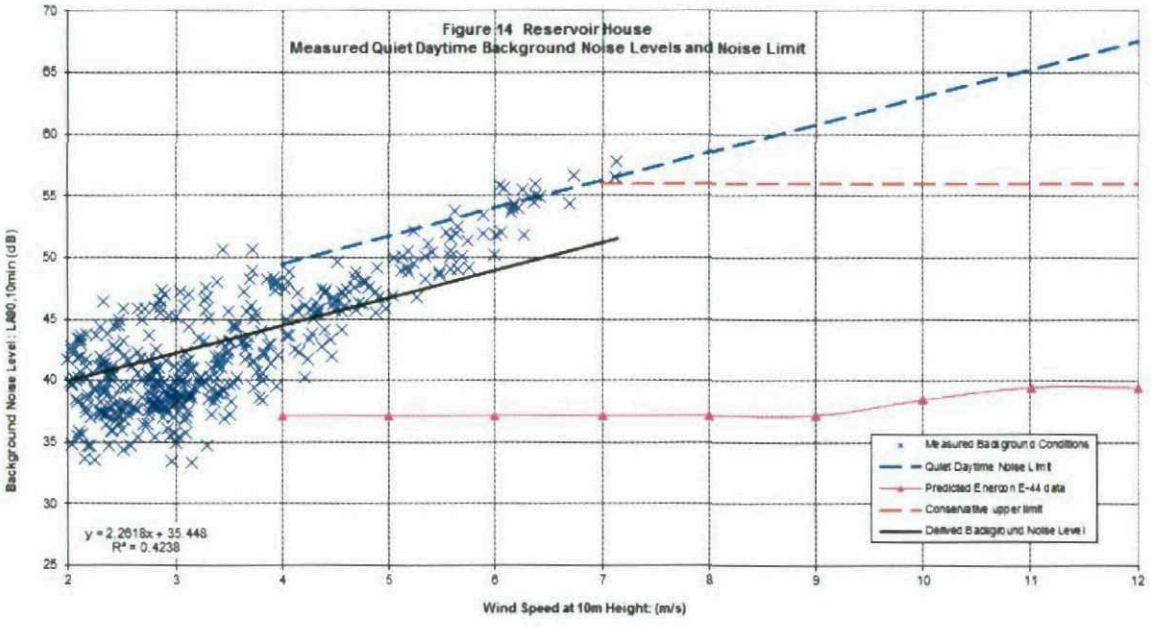
© Enzygo Ltd 2011

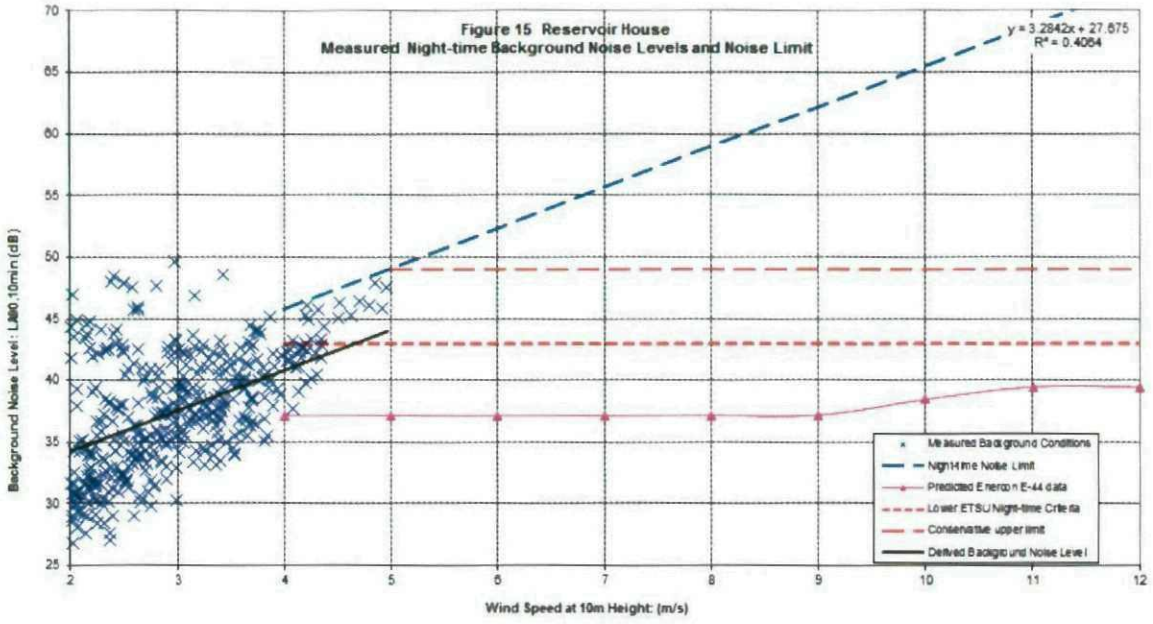
6.3.6 Location 13) Reservoir House

Figures 14 and 15 relate to the assessment of Location 13, Reservoir House. This property is located to the south of the turbine location separated by the farm complex of Location 4 (MP A), Ringstone Hill Farm and agricultural land. The baseline noise and wind speed dataset used in the assessment of this property was established at Location MP A, Ringstone Hill Farm and is presented within Appendix 2.

The baseline noise climate of the monitoring location and general area was noted by the field engineer to be dominated by road traffic noise in the general area coupled with sporadic human, natural and agricultural noises.

The description of the trend lines/curves as detailed within Section 6.3.1 for the assessment of Ringstone Hill Farm applies to this location as the baseline dataset is the same. As such reference to Section 6.3.1 should be made within the consideration of this location.





It is shown that based upon the data monitored and the projected noise limits for the upper wind speeds, the predicted turbine noise levels would not be expected to breach the appropriate ETSU R97 limits of $L_{90,\ 10min}$ +5dB. Furthermore, assessment based upon a flattened off, rationalised forward projection of noise levels at upper wind speeds also demonstrates a favourable assessment result.

As the upper ends of the graphs are projected from the trends of the lower data additional consideration has been given to the assessment of the overnight period. In order to present confidence that the predicted turbine levels are acceptable during this period, when people are either asleep or trying to sleep, the lower ETSU night-time limit of 43dB(A) $L_{90,\ 10min}$ is also presented. Reference to Figure 15 demonstrates that the predicted turbine noise would be below this limit at this location.

6.3.7 Overall Assessment

Reference to Figures 4, 6, 8, 10, 12 and 14 details the following conclusion. During the daytime period, the predicted turbine levels are shown to be below the derived ETSU R97 quiet daytime limits.

During the night-time period (Figures 5, 7, 9, 11, 13 and 15) the predicted levels are again shown to be below both the derived ETSU R97 overnight limits and the lower ETSU R97 overnight limit of 43dB $L_{A90,\ 10min}$.

7.0 CONCLUSIONS

7.1 Introduction

As previously discussed, this noise assessment forms part of an application for planning permission to develop a single 900kW wind turbine at the Ringstone Hill Farm site.

This section discusses the findings of the assessment undertaken.

7.2 ETSU R97 Simplified Assessment

The initial step undertaken within the scope of this assessment was to predict the noise associated with the proposed candidate turbine, and compare it to the simplified assessment criteria of the ETSU R97 guidance. For these purposes the Ennercon E-44 900kW turbine was selected by the design team as an appropriate candidate turbine.

The assessment was undertaken at 14 (fourteen) of the closest noise sensitive receptors to the turbine position. Of the sensitive receptors considered only 6 (six) are demonstrated within Table 6-1 to breach the Simplified Assessment criteria level of 35dB(A). These are:

4). Ringstone Hill Farm (MP A)

5). Robin Hood Pub (MP C)

6). The Lodge

8). Burntwood Hotel

9). Common Rd (MP B)

13). Reservoir House

However, as stated within Section 6.2, Location 4, Ringstone Hill Farm has a financial interest in the development and as such is afforded an increased noise limit under the ETSU R97 guidance. The predicted noise levels at Ringstone Hill Farm are demonstrated within Table 6-1 and Section 6.3.1 to be wholly within this financial interest criteria limit of 45dB(A) $_{L90,\ 10min}$ at wind speeds of up to 12m/s as modelled.

It was agreed with the LPA that further assessment would only be necessary at those receptors breaching the Simplified Criteria as outlined above. The assessment to the other locations, demonstrated to be below the ETSU R97 simplified criteria limit, is considered to be wholly acceptable and adverse impacts associated with noise would not be expected to occur at these receptors.

7.3 ETSU R97 Detailed Assessment

For the reasons stated within the scope of this report, including the scale of the development, an abridged ETSU assessment methodology was agreed with the LPAs (cf. Appendix 3).

As agreed with the LPAs background noise levels were quantified for a period of one to two weeks (depending upon location) during February 2012 at 3 locations around the site representative of locations where the ETSU R-97 simplified criteria was breached.

Assessment of the predicted turbine noise levels at these six receptors shown to exceed the 35dB(A) criteria concludes the following. None of these receptors is shown to breach the derived ETSU R97 criteria for daytime or night-time based upon the quantified backgrounds and the assumptions made. Furthermore, during the overnight period none of the locations are shown to be in excess of the 43dB(A) $L_{90,\ 10min}$ lower overnight limit to protect internal amenity.

7.4 General Conclusion

Based upon the works undertaken within the scope of this study, it is not considered that the proposed turbine would result in adverse effects relating to noise. Therefore, it is concluded that noise should not be considered a material factor for refusal of planning permission to develop the site for a single wind turbine. However, the following condition is presented as an example of the type of condition that could be used within any planning permission to control noise:

1. *The noise level specifically attributable to the operational turbine must not exceed the following:*
   - *a day time (7am to 11pm) level of 35 dB LA90, 10 mins, or the background, expressed as LA90, 10 mins, plus 5dB, whichever is the higher, measured at any residential property not owned by the applicant or a member of their family.*
   - *a night time (11pm to 7am) level of 43dB LA90, 10 mins, or the background, expressed as LA90, 10 mins, plus 5dB whichever is the higher, measured at any residential property not owned by the applicant or a member of their family.*

REFERENCES

- DEFRA - 'A review of published research on low frequency noise and its effects' 2003;
- P. Styles et al; Microseismic and Infrasound Monitoring of Low Frequency Noise and Vibrations from Wind farms, Recommendations on the Siting of Wind farms in the Vicinity of Eskdalemuir, Scotland; 2005;
- Letter by Prof P Styles and S Toon printed in The Scotsman, August 2005;
- DTI report: 'The measurement of low frequency noise at three UK wind farms' 2006;
- University of Salford - 'Research into Aerodynamic Modulation of Wind Turbine Noise' 2007;
- World Health Organisation - Guidelines for Community Noise 1999
- Department for Business Enterprise & Regulatory Reform (BERR) Statement 2007/033 - 'Government statement regarding the findings of the Salford University report into Aerodynamic Modulation of Wind Turbine Noise' 2007;
- Planning Policy Guidance Note 24, Planning and Noise 1994;
- Planning Policy Statement 22 (PPS22): Renewable Energy 2004;
- Draft Overarching National Policy Statement for Energy (EN-1): 2009;
- Draft National Policy Statement for Renewable Energy Infrastructure (EN-3): 2009;
- ETSU R 97 – The Assessment and Rating of Noise from Wind Farms;
- Institute of Acoustics (IOA) agreement relating to the "Prediction and assessment of wind turbine noise" IOA bulletin March/April 2009;
- British Standards Institution. British Standard 5228: Code of practice for noise and vibration control and open sires – part 1 : Noise, 2009;
- International Organisation for Standardisation 9613 Acoustics – Attenuation of Sound during Propagation Outdoors, 1993.

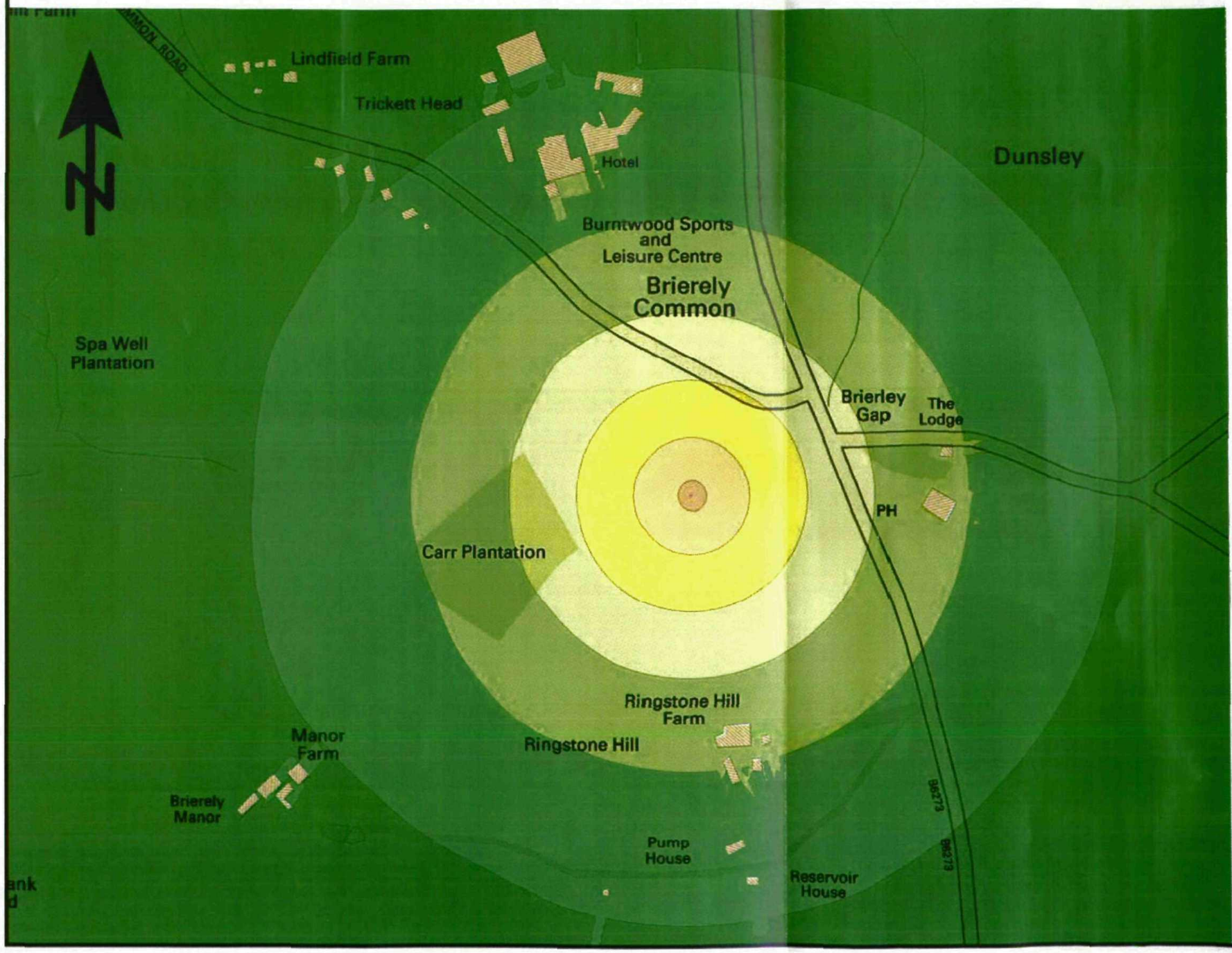
FIGURES

Figure 17

Ringstone Hill Farm Wind Turbine

Calculated Grid Noise Map in $L_{A90\ 10min}$

Ennercon E-44 Turbine, Operational Mode 1, 12m/s Wind Speed



Noise levels in dB $L_{A90, 10min}$

35 <=	< 35
40 <=	< 40
45 <=	< 45
50 <=	< 50
55 <=	< 55
60 <=	< 60

Signs and symbols

- Main building
- Point source

Date - 28th February 2012

Enzygo Ref: SHF.309.001

Produced by: PT

Length Scale 1:6534

0 35 70 140 210 280 m

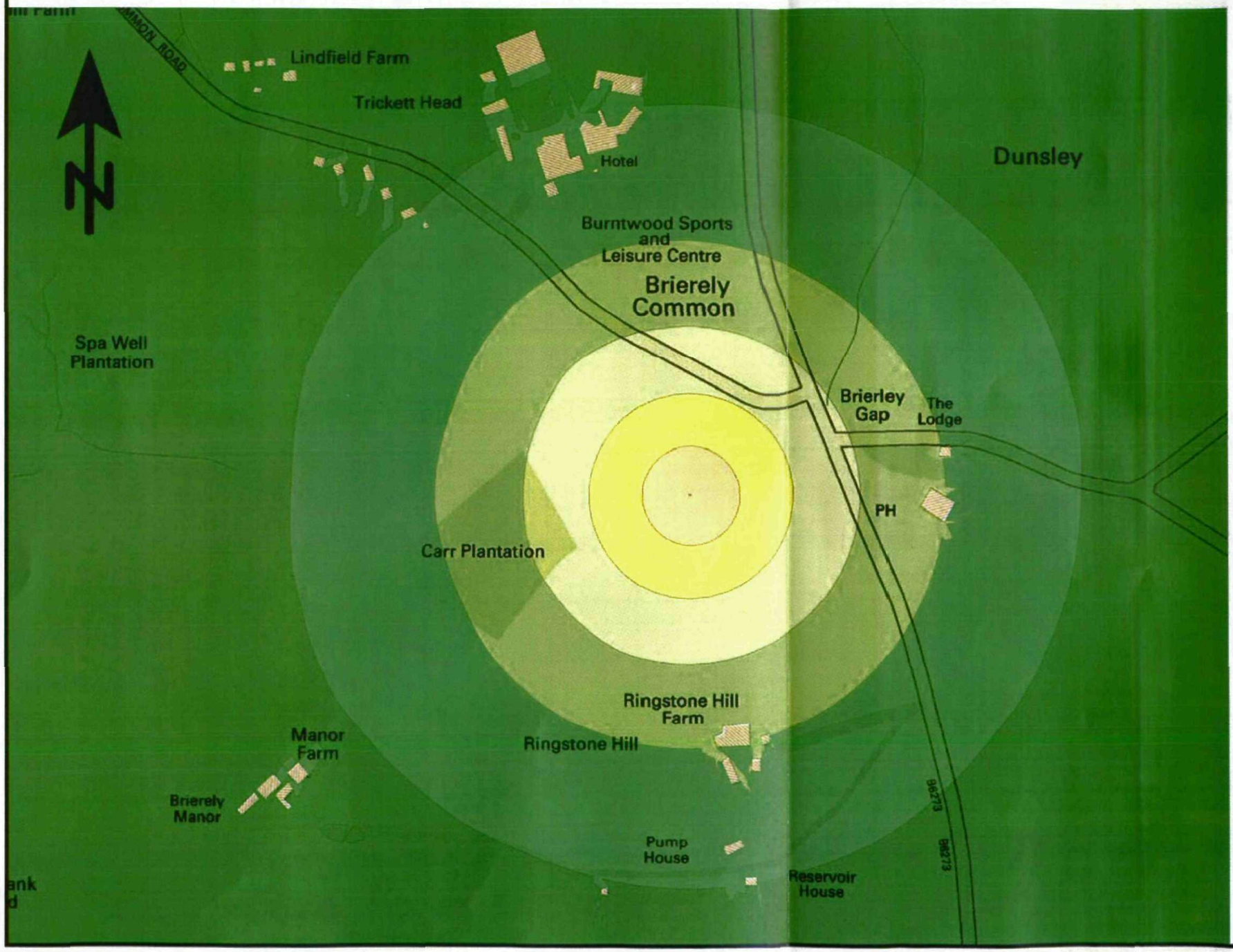
enzygo environmental consultants

Figure 16

Ringstone Hill Farm Wind Turbine

Calculated Grid Noise Map in $L_{A90\ 10min}$

Ennercon E-44 Turbine, Operational Mode 1, 10m/s Wind Speed



Noise levels in dB $L_{A90, 10min}$

35 <=	< 35
40 <=	< 40
45 <=	< 45
50 <=	< 50
55 <=	< 55
60 <=	< 60

Signs and symbols

- Main building
- Point source

Date - 28th February 2012
Enzygo Ref: SHF.309.001
Produced by: PT

Length Scale 1:6534

0 35 70 140 210 280 m

enzygo environmental consultants

APPENDIX 1

Noise Level Report Ennercon E-44, 900kW

Sound Power Level

of the

ENERCON E-44

Operational Mode I

(Data Sheet)

Imprint

Publisher: ENERCON GmbH • Dreekamp 5 • 26605 Aurich • Germany
Phone: +49 4941 927-0
Fax: +49 4941 927-109

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Revision

Revision: 2.0

Department: ENERCON GmbH / Site Assessment

Glossary

WEC means an ENERCON wind energy converter.

WECs means more than one ENERCON wind energy converter.

Sound Power Level of the E-44 with 900 kW rated power

hub height / V_s in 10 m height		45 m	55 m	
7 m/s		100.7 dB(A)	101.1 dB(A)	
8 m/s		102.3 dB(A)	102.6 dB(A)	
9 m/s		103.0 dB(A)	103.0 dB(A)	
10 m/s		103.0 dB(A)	103.0 dB(A)	
95% rated power		103.0 dB(A)	103.0 dB(A)	

Measured value at 95% rated power			***102,1 dB(A)*** *WICO 042SE207*	

in relation to wind speed at hub height					
wind speed at hub height [m/s]	**9**	**10**	**11**	**12**	**13**
Sound Power Level [dB(A)]	100.7	102.0	103.0	103.0	103.0

1. The relation between the sound power level and the standardized wind speed v_S in 10 m height as shown above is valid on the premise of a logarithmic wind profile with a roughness length of 0.05 m. The relation between the sound power level and the wind speed at hub height applies for all hub heights. During the sound measurements the wind speeds are derived from the power output and the power curve of the WEC.

2. A tonal audibility of $\Delta L_{a,k} \leq 2$ dB can be expected over the whole operational range (valid in the near vicinity of the turbine according to IEC 61 400 -11 ed. 2).

3. The sound power level values given in the table are valid for the **Operational Mode I** (defined via the rotational speed range of 12 – 34 rpm). The respective power curve is the calculated power curve E-44 dated November 2009 (Rev. 3.x).

4. The values displayed in the tables above are based on official and internal measurements of the sound power level. If available the official measured values are given in this document as a reference (in italic print). The extracts of the official measurements can be made available upon request. The values given in the measurement extracts do not replace the values given in this document. All measurements have been carried out according to the recommended German and international standards and guidelines as defined in the measurement reports, respectively.

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5. Due to the typical measurement uncertainties, if the sound power level is measured according to one of the accepted methods the measured values can differ from the values shown in this document in the range of +/- 1 dB.

   Accepted measurement methods are:

   a) IEC 61400-11 ed. 2 („Wind turbine generator systems – Part 11: Acoustic noise measurement techniques; Second edition"), and

   b) the FGW-Guidelines („Technische Richtlinie für Windenergieanlagen – Teil 1: Bestimmung der Schallemissionswerte", published by the association "Fördergesellschaft für Windenergie e.V.", 18th revision).

   If the difference between total noise and background noise during a measurement is less than 6 dB a higher uncertainty must be considered.

6. For noise-sensitive sites it is possible to operate the E-44 with reduced rotational speed and reduced rated power during night time. The sound power levels resulting from such operational mode can be provided in a separate document upon request.

7. The sound power level of a wind turbine depends on several factors such as but not limited to regular maintenance and day-to-day operation in compliance with the manufacturer's operating instructions. Therefore, this data sheet can not, and is not intended to, constitute an express or implied warranty towards the customer that the E-44 WEC will meet the exact sound power level values as shown in this document at any project specific site.

Extract of test report

Master Information „Noise", according to "Wind turbine generator systems - Part 11: Acoustic noise measurement techniques."

IEC 61400-11 ED. 2 from 2002 (published by: Central Office of the IEC, Geneva, Switzerland)

Extract of test report 042SE207
regarding noise emission of wind turbine (WT) type ENERCON E-44

General		Technical specifications (manufacturer)	
Manufacturer:	ENERCON GmbH	Rated power (generator):	900 kW
	Dreekamp 5	Rotor diameter:	44 m
	D-26605 AURICH, GERMANY	Hub height above ground:	50 m
Serial number:	48001	Tower design:	Tubular steel tower
WT-location:	X:3372564 Y:5919928	Power control:	pitch/stall/active-stall
Complementations of rotor (manufacturer)		**Complementations of gear and generator (manufacturer)**	
Manufacturer of rotor blades	ENERCON	Manufacturer of gear:	-
Type of blades:	E44/1	Type of gear:	-
Pitch angel:	Variabel	Manufacturer of generator:	ENERCON
Number of blades	3	Type of generator:	E-44
Rated speed(s)/speed range:	16-34.8 rpm	Rated speed(s)	16-34.8 rpm
Report power curve: WICO 212LK504/07			

	Reference			Noise emission parameter	Remarks
	Standardized wind speed at 10 m above ground	Electric power			
Sound power level L_{WA}	6 m/s	222	KW	- dB(A)	(1)
	7 m/s	363	kW	99.9 dB(A)	
	8 m/s	538	kW	101.5 dB(A)	
	9 m/s	722	kW	102.1 dB(A)	
	10 m/s	856	kW	102.1 dB(A)	
Tonal components ΔL_a (near proximity)	6 m/s	222	kW	- at - Hz	(1)
	7 m/s	363	kW	0.1 dB at 186 Hz	
	8 m/s	538	kW	-1.5 dB at 198 Hz	
	9 m/s	722	kW	- dB no tone	
	10 m/s	856	kW	- dB no tone	

One third octave sound power level at reference point v_{10} = 7 m/s [dB(A)]												
Frequency	50	63	80	100	125	160	200	250	315	400	500	630
L_{WA}	72.7	75.5	78.1	80.6	82.2	84.4	89.8	84.6	87.2	88.4	87.9	89.7
L_{WA}	80.7			87.5			92.5			93.5		
Frequency	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000
L_{WA}	90.0	90.5	89.6	88.8	87.2	84.6	81.5	80.4	79.3	77.7	75.6	73.1
L_{WA}	94.8			92.0			85.3			80.6		

One third octave sound power level at reference point v_{10} = 8 m/s [dB(A)]												
Frequency	50	63	80	100	125	160	200	250	315	400	500	630
L_{WA}	77.0	78.0	80.8	83.1	84.4	85.5	89.3	85.9	88.1	89.7	89.1	91.3
L_{WA}	83.7			89.2			92.8			94.9		
Frequency	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000
L_{WA}	91.8	92.5	92.0	91.1	89.4	86.5	83.4	82.7	79.4	77.9	75.8	73.2
L_{WA}	96.9			94.2			86.9			80.8		

One third octave sound power level at reference point v_{10} = 9 m/s [dB(A)]												
Frequency	50	63	80	100	125	160	200	250	315	400	500	630
L_{WA}	77.0	79.1	81.6	84.1	87.1	86.6	88.5	86.9	89.3	90.8	90.4	92.3
L_{WA}		84.4			90.9			93.1			96.0	
Frequency	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000
L_{WA}	92.6	93.1	92.3	91.2	89.1	86.1	83.1	82.7	79.0	77.5	75.4	72.8
L_{WA}		97.5			94.0			86.7			80.4	

One third octave sound power level at reference point v_{10} = 10 m/s [dB(A)]												
Frequency	50	63	80	100	125	160	200	250	315	400	500	630
L_{WA}	76.7	79.1	81.3	83.3	85.2	86.3	88.5	87.3	89.4	91.3	90.6	92.4
L_{WA}		84.2			89.9			93.3			96.3	
Frequency	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000
L_{WA}	92.7	92.9	92.2	91.2	89.2	86.4	83.6	82.6	78.5	77.0	74.9	72.4
L_{WA}		97.4			94.1			86.8			79.9	

This extract of test report is valid only in connection with the enclosed „Manufacturer's certificate" from 2007-03-14.
This declaration does not replace above-mentioned report.

Notes: (1) In the wind speed class of 6 m/s no data were measured.

measured by: WIND-consult GmbH
Reuterstraße 9
D-18211 Bargeshagen

date: 2007-03-16

Dipl.-Ing. W.Wilke

Dipl.-Ing. J. Schwabe

APPENDIX 2

Baseline Noise Monitoring Dataset

Quiet Daytime periods (18:00 – 23:00 Monday to Friday, 13:00 – 23:00 Saturday and 07:00 – 23:00 Sunday)

Date	Time	Location 1 Ringstone Hill Fm LA90	Location 2 Cricket Villa LA90	Location 3 Robin Hood Pub LA90	Location 4 Reservoir Hse LA90	Location 5 Burntwood Hotel LA90	Location 6 The Lodge LA90	MEASURED Windspeed 5M
03/02/2012	18:00	38.1	45.2		38.1	45.2		0.6
03/02/2012	18:10	41.1	47.4		41.1	47.4		0.9
03/02/2012	18:20	40.0	47.5		40.0	47.5		0.2
03/02/2012	18:30	39.2	46.6		39.2	46.6		0.3
03/02/2012	18:40	39.2	41.6		39.2	41.6		0.3
03/02/2012	18:50	39.4	39.3		39.4	39.3		0.4
03/02/2012	19:00	37.3	38.9		37.3	38.9		0.8
03/02/2012	19:10	37.4	40.8		37.4	40.8		0.9
03/02/2012	19:20	36.6	41.0		36.6	41.0		0.7
03/02/2012	19:30	37.9	39.3		37.9	39.3		0.9
03/02/2012	19:40	34.9	40.2		34.9	40.2		0.9
03/02/2012	19:50	35.2	41.0		35.2	41.0		1.1
03/02/2012	20:00	35.5	40.1		35.5	40.1		0.8
03/02/2012	20:10	35.2	39.0		35.2	39.0		0.4
03/02/2012	20:20	36.6	38.8		36.6	38.8		0.5
03/02/2012	20:30	36.1	37.8		36.1	37.8		0.6
03/02/2012	20:40	35.3	37.7		35.3	37.7		0.6
03/02/2012	20:50	35.8	37.7		35.8	37.7		0.5
03/02/2012	21:00	35.8	37.6		35.8	37.6		0.4
03/02/2012	21:10	34.9	38.6		34.9	38.6		0.6
03/02/2012	21:20	35.9	37.6		35.9	37.6		0.5
03/02/2012	21:30	34.7	36.5		34.7	36.5		0.6
03/02/2012	21:40	32.1	36.6		32.1	36.6		0.5
03/02/2012	21:50	34.6	36.4		34.6	36.4		0.5
03/02/2012	22:00	34.4	36.0		34.4	36.0		0.5
03/02/2012	22:10	35.4	33.6		35.4	33.6		0.5
03/02/2012	22:20	34.7	35.3		34.7	35.3		0.1
03/02/2012	22:30	34.6	35.0		34.6	35.0		0.1
03/02/2012	22:40	32.4	32.6		32.4	32.6		0.2
03/02/2012	22:50	32.8	35.0		32.8	35.0		0.2
04/02/2012	13:00	45.5	44.4		45.5	44.4		2.9
04/02/2012	13:10	45.9	47.2		45.9	47.2		2.7
04/02/2012	13:20	46.5	47.4		46.5	47.4		2.9
04/02/2012	13:30	45.3	47.0		45.3	47.0		2.9
04/02/2012	13:40	47.0	50.2		47.0	50.2		2.9
04/02/2012	13:50	45.8	48.4		45.8	48.4		3.3
04/02/2012	14:00	44.9	49.1		44.9	49.1		2.7
04/02/2012	14:10	46.8	47.8		46.8	47.8		3.3
04/02/2012	14:20	47.4	45.9		47.4	45.9		2.9
04/02/2012	14:30	47.3	47.2		47.3	47.2		3.0
04/02/2012	14:40	46.1	45.9		46.1	45.9		3.1
04/02/2012	14:50	45.2	47.7		45.2	47.7		3.0
04/02/2012	15:00	46.0	46.1		46.0	46.1		2.9
04/02/2012	15:10	48.0	46.5		48.0	46.5		3.4
04/02/2012	15:20	50.7	46.9		50.7	46.9		3.4
04/02/2012	15:30	47.6	47.0		47.6	47.0		3.3
04/02/2012	15:40	48.3	49.1		48.3	49.1		3.7
04/02/2012	15:50	49.0	50.2		49.0	50.2		3.7
04/02/2012	16:00	47.2	50.7		47.2	50.7		3.6
04/02/2012	16:10	47.8	50.4		47.8	50.4		3.9
04/02/2012	16:20	48.3	52.5		48.3	52.5		3.9
04/02/2012	16:30	49.6	52.8		49.6	52.8		4.5
04/02/2012	16:40	47.4	54.4		47.4	54.4		3.9
04/02/2012	16:50	48.1	54.1		48.1	54.1		4.1
04/02/2012	17:00	47.5	54.3		47.5	54.3		4.0
04/02/2012	17:10	48.1	53.9		48.1	53.9		3.9
04/02/2012	17:20	48.4	55.3		48.4	55.3		3.9
04/02/2012	17:30	48.8	55.5		48.8	55.5		4.1
04/02/2012	17:40	46.1	55.9		46.1	55.9		3.7
04/02/2012	17:50	45.5	56.7		45.5	56.7		3.7
04/02/2012	18:00	45.6	55.3		45.6	55.3		3.7
04/02/2012	18:10	45.6	55.6		45.6	55.6		3.5
04/02/2012	18:20	44.5	58.6		44.5	58.6		3.5
04/02/2012	18:30	44.5	56.0		44.5	56.0		3.5
04/02/2012	18:40	43.1	54.7		43.1	54.7		3.5
04/02/2012	18:50	41.5	54.0		41.5	54.0		3.4
04/02/2012	19:00	42.4	54.4		42.4	54.4		3.5
04/02/2012	19:10	42.0	56.7		42.0	56.7		3.4
04/02/2012	19:20	40.0	52.8		40.0	52.8		3.2
04/02/2012	19:30	39.0	51.9		39.0	51.9		3.1
04/02/2012	19:40	37.9	50.7		37.9	50.7		2.9
04/02/2012	19:50	40.0	48.4		40.0	48.4		3.0
04/02/2012	20:00	40.0	49.0		40.0	49.0		2.8
04/02/2012	20:10	38.6	46.4		38.6	46.4		2.8
04/02/2012	20:20	39.5	45.8		39.5	45.8		2.8
04/02/2012	20:30	39.2	44.6		39.2	44.6		3.0
04/02/2012	20:40	39.9	45.2		39.9	45.2		2.8
04/02/2012	20:50	39.5	49.7		39.5	49.7		2.9
04/02/2012	21:00	38.8	49.7		38.8	49.7		3.0
04/02/2012	21:10	38.2	47.0		38.2	47.0		3.0
04/02/2012	21:20	35.5	48.1		35.5	48.1		3.0
04/02/2012	21:30	34.8	48.9		34.8	48.9		2.2
04/02/2012	21:40	33.6	48.2		33.6	48.2		2.2
04/02/2012	21:50	34.4	47.9		34.4	47.9		2.5
04/02/2012	22:00	34.7	49.2		34.7	49.2		2.4
04/02/2012	22:10	32.2	45.3		32.2	45.3		1.9
04/02/2012	22:20	30.1	43.2		30.1	43.2		1.3
04/02/2012	22:30	29.7	41.8		29.7	41.8		1.2

07/02/2012	03:40	32.8	22.3	32 8	22.3	1.3
07/02/2012	03:50	32.8	23 2	32.8	23 2	1.4
07/02/2012	04:00	33 6	23.9	33 6	23.9	1.2
07/02/2012	04:10	34 2	23 5	34.2	23 5	1 3
07/02/2012	04:20	33 8	23 3	33.8	23 3	1.2
07/02/2012	04:30	37.2	24.8	37.2	24 8	1.1
07/02/2012	04:40	35 1	24 1	35,1	24.1	0.8
07/02/2012	04:50	35.9	23.2	35.9	23 2	0 7
07/02/2012	05:00	35.7	24.7	35.7	24 7	1.3
07/02/2012	05:10	36.4	25.2	36 4	25 2	1.2
07/02/2012	05.20	38.4	23 9	38.4	23 9	0 9
07/02/2012	05:30	39.9	27.3	39.9	27.3	0.7
07/02/2012	05:40	39.4	26 0	39 4	26 0	0.7
07/02/2012	05:50	39.2	27.0	39.2	27.0	1.2
07/02/2012	06 00	36.2	27.5	36 2	27.5	1.0
07/02/2012	06:10	39 8	27.4	39.8	27.4	1.0
07/02/2012	06:20	41.8	29.7	41.8	29.7	1.2
07/02/2012	06:30	42.7	31.3	42.7	31.3	0.7
07/02/2012	06:40	43.8	33.1	43 8	33.1	0.8
07/02/2012	06:50	43 4	31.1	43.4	31.1	1.3
07/02/2012	23:00	33.4	37.1	33 4	37.1	3.1
07/02/2012	23:10	30.0	36 7	30.0	36.7	2 3
07/02/2012	23:20	29 1	37.2	29.1	37.2	1.5
07/02/2012	23:30	29.5	34 4	29 5	34.4	2.1
07/02/2012	23:40	29.1	34.7	29.1	34.7	2.2
07/02/2012	23:50	27.5	32.5	27.5	32.5	1.8
08/02/2012	00.00	30.5	32.3	30.5	32.3	1.6
08/02/2012	00:10	29.0	32.6	29 0	32 6	1.2
08/02/2012	00:20	27.0	30 8	27.0	30 8	0 9
08/02/2012	00:30	27.3	30.0	27.3	30 0	1.0
08/02/2012	00:40	27.8	30 3	27 8	30.3	1.1
08/02/2012	00.50	28.2	30.3	28 2	30 3	0.9
08/02/2012	01:00	27.2	30.7	27.2	30.7	1.2
08/02/2012	01:10	27.8	29 9	27 8	29.9	1.3
08/02/2012	01:20	26 3	27.9	26.3	27.9	1.0
08/02/2012	01:30	27.4	28.5	27 4	28 5	1.2
08/02/2012	01 40	26 5	28.7	26 5	28 7	1.3
08/02/2012	01:50	26 1	28 6	26 1	28 6	0 8
08/02/2012	02 00	28.4	27.7	28.4	27.7	0.9
08/02/2012	02:10	27.2	27.9	27.2	27.9	0.8
08/02/2012	02.20	28.3	28 8	28 3	28 8	0 3
08/02/2012	02:30	26 8	30 2	26 8	30 2	0.0
08/02/2012	02:40	26.4	29.3	26 4	29 3	0.1
08/02/2012	02.50	27 7	27.3	27.7	27.3	0.0
08/02/2012	03:00	28 6	28.1	28 6	28.1	0.1
08/02/2012	03.10	29.6	28.3	29.6	28 3	0.1
08/02/2012	03:20	29.2	28 5	29 2	28.5	0 5
08/02/2012	03:30	29 8	27.3	29 8	27.3	0.8
08/02/2012	03:40	28 1	26 9	28.1	26.9	0 9
08/02/2012	03:50	29.4	26 1	29 4	26.1	0.7
08/02/2012	04.00	29 6	26 3	29 6	26 3	0 6
08/02/2012	04:10	31.4	26 5	31 4	26 5	0 3
08/02/2012	04:20	30 9	26.2	30 9	26 2	0.0
08/02/2012	04:30	31.5	28 5	31.5	28.5	0.0
08/02/2012	04:40	32.0	30.7	32.0	30.7	0.0
08/02/2012	04 50	32 3	31.1	32.3	31.1	0 0
08/02/2012	05:00	32.8	30 8	32 8	30 8	0.0
08/02/2012	05:10	33 2	31.0	33 2	31.0	0 1
08/02/2012	05:20	37.0	29.1	37 0	29 1	0.0
08/02/2012	05:30	38 6	28.8	38 6	28 8	0 0
08/02/2012	05:40	38 8	29.3	38 8	29.3	0.0
08/02/2012	05:50	37.0	29.6	37.0	29 6	0.0
08/02/2012	06:00	36 2	32.0	36 2	32.0	0 2
08/02/2012	06.10	41,1	30.7	41,1	30 7	0.1
08/02/2012	06 20	41,4	31.5	41.4	31.5	0 4
08/02/2012	06.30	41,6	33.6	41 6	33 6	0.0
08/02/2012	06:40	41 0	34 4	41,0	34 4	0 3
08/02/2012	06:50	42.8	33.6	42 8	33 6	0.1
08/02/2012	23 00	27,1	32.0	27.1	32.0	0.7
08/02/2012	23.10	27.5	34.1	27,5	34.1	1.0
08/02/2012	23:20	27,0	32.5	27,0	32.5	1 5
08/02/2012	23:30	25.1	31.8	25.1	31.8	0.9
08/02/2012	23:40	24.7	30.4	24,7	30.4	1.2
08/02/2012	23:50	24.5	29.2	24 5	29 2	1.1
09/02/2012	00:00	23 9	29.0	23 9	29 0	0.6
09/02/2012	00.10	24.0	29 6	24 0	29 6	0 6
09/02/2012	00:20	24 4	28 7	24.4	28 7	1.2
09/02/2012	00:30	23 8	28.3	23.8	28 3	1.1
09/02/2012	00:40	26 4	26 4	26 4	26 4	1.2
09/02/2012	00.50	25 3	26.4	25.3	26.4	1.1
09/02/2012	01:00	24.4	26 2	24 4	26 2	1.2
09/02/2012	01:10	24 2	27.5	24.2	27.5	0 9
09/02/2012	01:20	25 2	30.7	25 2	30.7	1.3
09/02/2012	01:30	24 0	29 2	24.0	29 2	1.1
09/02/2012	01:40	25 8	28.7	25.8	28 7	1.3
09/02/2012	01:50	26 3	28 0	26 3	28.0	1.4
09/02/2012	02 00	25 0	26.3	25 0	26 3	1 6
09/02/2012	02:10	22 5	27.4	22.5	27.4	0.9
09/02/2012	02 20	22.7	27,8	22,7	27.8	0 4

05/02/2012	22.30	32.3	35.7	32.3	35.7	0.8
05/02/2012	22.40	29.0	37.1	29.0	37.1	0.7
05/02/2012	22.50	28.3	35.3	28.3	35.3	0.7
06/02/2012	18.00	46.6	45.6	46.6	45.6	0.1
06/02/2012	18.10	45.3	44.8	45.3	44.8	0.3
06/02/2012	18.20	45.3	46.3	45.3	46.3	0.7
06/02/2012	18.30	44.7	44.2	44.7	44.2	0.9
06/02/2012	18.40	40.7	40.8	40.7	40.8	0.8
06/02/2012	18.50	44.2	41.8	44.2	41.8	0.1
06/02/2012	19.00	42.0	40.0	42.0	40.0	0.3
06/02/2012	19.10	42.0	39.9	42.0	39.9	0.6
06/02/2012	19.20	41.7	39.7	41.7	39.7	0.8
06/02/2012	19.30	41.8	39.3	41.8	39.3	1.1
06/02/2012	19.40	42.1	38.7	42.1	38.7	1.2
06/02/2012	19.50	42.9	38.6	42.9	38.6	1.0
06/02/2012	20:00	43.1	37.7	43.1	37.7	0.6
06/02/2012	20:10	42.0	36.4	42.0	36.4	0.4
06/02/2012	20.20	42.9	34.3	42.9	34.3	0.5
06/02/2012	20.30	41.4	36.9	41.4	36.9	0.9
06/02/2012	20:40	40.2	35.0	40.2	35.0	1.5
06/02/2012	20.50	40.6	37.5	40.6	37.5	1.6
06/02/2012	21:00	41.9	34.6	41.9	34.6	1.6
06/02/2012	21:10	40.3	35.6	40.3	35.6	1.5
06/02/2012	21:20	41.7	34.1	41.7	34.1	1.4
06/02/2012	21:30	38.7	35.8	38.7	35.8	1.7
06/02/2012	21:40	38.2	36.1	38.2	36.1	1.8
06/02/2012	21:50	39.0	36.5	39.0	36.5	1.7
06/02/2012	22.00	37.8	36.9	37.8	36.9	1.7
06/02/2012	22:10	39.7	35.2	39.7	35.2	1.7
06/02/2012	22:20	38.6	36.7	38.6	36.7	1.5
06/02/2012	22.30	38.9	33.1	38.9	33.1	1.5
06/02/2012	22.40	37.0	32.2	37.0	32.2	1.5
06/02/2012	22.50	35.9	33.4	35.9	33.4	1.5
07/02/2012	18:00	47.9	35.7	47.9	35.7	0.5
07/02/2012	18:10	47.2	41.1	47.2	41.1	0.9
07/02/2012	18.20	49.6	39.6	49.6	39.6	1.3
07/02/2012	18.30	47.7	39.2	47.7	39.2	2.0
07/02/2012	18:40	43.2	35.2	43.2	35.2	2.5
07/02/2012	18:50	40.8	38.1	40.8	38.1	2.4
07/02/2012	19.00	43.7	38.8	43.7	38.8	2.1
07/02/2012	19.10	42.1	38.8	42.1	38.8	2.5
07/02/2012	19.20	40.9	38.9	40.9	38.9	2.8
07/02/2012	19.30	38.4	40.6	38.4	40.6	3.0
07/02/2012	19.40	42.0	39.3	42.0	39.3	3.4
07/02/2012	19.50	38.5	38.2	38.5	38.2	3.3
07/02/2012	20.00	38.5	36.1	38.5	36.1	3.1
07/02/2012	20.10	40.2	37.6	40.2	37.6	3.2
07/02/2012	20:20	39.9	37.4	39.9	37.4	2.9
07/02/2012	20.30	36.8	34.9	36.8	34.9	3.1
07/02/2012	20.40	40.6	36.0	40.6	36.0	3.8
07/02/2012	20.50	38.3	36.3	38.3	36.3	3.5
07/02/2012	21:00	38.1	35.9	38.1	35.9	3.1
07/02/2012	21:10	38.6	34.7	38.6	34.7	2.9
07/02/2012	21:20	36.5	33.5	36.5	33.5	2.7
07/02/2012	21.30	35.0	34.0	35.0	34.0	3.0
07/02/2012	21:40	39.6	35.1	39.6	35.1	4.0
07/02/2012	21:50	42.0	36.7	42.0	36.7	4.5
07/02/2012	22.00	40.3	33.6	40.3	33.6	4.2
07/02/2012	22:10	42.8	34.4	42.8	34.4	4.4
07/02/2012	22.20	38.4	34.6	38.4	34.6	3.8
07/02/2012	22:30	38.6	35.7	38.6	35.7	3.8
07/02/2012	22:40	33.4	35.8	33.4	35.8	3.1
07/02/2012	22.50	33.5	38.0	33.5	38.0	3.0
08/02/2012	18.00	47.4	44.5	47.4	44.5	1.4
08/02/2012	18.10	43.5	41.4	43.5	41.4	1.4
08/02/2012	18:20	46.1	41.4	46.1	41.4	1.7
08/02/2012	18:30	43.1	39.2	43.1	39.2	1.8
08/02/2012	18.40	41.2	37.8	41.2	37.8	1.2
08/02/2012	18.50	42.5	38.1	42.5	38.1	1.3
08/02/2012	19.00	43.8	37.9	43.8	37.9	1.5
08/02/2012	19.10	39.0	37.9	39.0	37.9	1.6
08/02/2012	19.20	35.7	38.4	35.7	38.4	1.7
08/02/2012	19.30	38.6	37.7	38.6	37.7	1.8
08/02/2012	19.40	38.7	38.8	38.7	38.8	1.7
08/02/2012	19.50	39.5	35.7	39.5	35.7	2.0
08/02/2012	20:00	40.1	35.4	40.1	35.4	1.7
08/02/2012	20:10	37.9	37.9	37.9	37.9	2.2
08/02/2012	20.20	41.0	35.2	41.0	35.2	1.6
08/02/2012	20.30	37.7	37.9	37.7	37.9	0.7
08/02/2012	20.40	36.9	36.8	36.9	36.8	0.8
08/02/2012	20:50	36.7	36.2	36.7	36.2	1.1
08/02/2012	21:00	37.4	37.0	37.4	37.0	0.7
08/02/2012	21:10	37.0	37.5	37.0	37.5	0.3
08/02/2012	21:20	41.5	36.7	41.5	36.7	0.5
08/02/2012	21.30	35.7	35.0	35.7	35.0	0.2
08/02/2012	21:40	33.9	35.4	33.9	35.4	0.2
08/02/2012	21:50	31.1	34.1	31.1	34.1	0.3
08/02/2012	22.00	31.7	34.3	31.7	34.3	0.2
08/02/2012	22.10	40.3	33.6	40.3	33.6	0.2
08/02/2012	22:20	32.7	34.8	32.7	34.8	0.3
08/02/2012	22:30	29.7	33.1	29.7	33.1	0.7
08/02/2012	22.40	28.6	33.2	28.6	33.2	1.1
08/02/2012	22.50	27.0	32.8	27.0	32.8	0.6
09/02/2012	18:00	46.7	42.6	46.7	42.6	1.6
09/02/2012	18:10	50.5	43.7	50.5	43.7	1.7

09/02/2012	18:20	46.4	43.5	46.4	43.5	2.3
09/02/2012	18:30	41.4	45.4	41.4	45.4	2.3
09/02/2012	18:40	43.7	43.7	43.7	43.7	2.3
09/02/2012	18:50	38.7	41.3	38.7	41.3	2.4
09/02/2012	19:00	41.8	41.8	41.8	41.8	2.8
09/02/2012	19:10	41.9	42.4	41.9	42.4	2.7
09/02/2012	19:20	42.9	41.4	42.9	41.4	2.4
09/02/2012	19:30	39.4	40.0	39.4	40.0	2.5
09/02/2012	19:40	39.8	39.7	39.8	39.7	2.6
09/02/2012	19:50	41.1	39.5	41.1	39.5	2.8
09/02/2012	20:00	39.4	39.9	39.4	39.9	2.5
09/02/2012	20:10	36.5	40.4	36.5	40.4	2.7
09/02/2012	20:20	38.8	38.4	38.8	38.4	2.8
09/02/2012	20:30	37.3	38.6	37.3	38.6	2.6
09/02/2012	20:40	35.4	38.5	35.4	38.5	2.8
09/02/2012	20:50	36.8	38.7	36.8	38.7	2.5
09/02/2012	21:00	37.6	37.7	37.6	37.7	2.6
09/02/2012	21:10	35.9	37.6	35.9	37.6	2.4
09/02/2012	21:20	38.2	37.2	38.2	37.2	2.5
09/02/2012	21:30	37.9	37.1	37.9	37.1	2.9
09/02/2012	21:40	38.3	37.2	38.3	37.2	2.9
09/02/2012	21:50	35.4	36.6	35.4	36.6	2.6
09/02/2012	22:00	35.8	36.4	35.8	36.4	3.0
09/02/2012	22:10	37.6	36.6	37.6	36.6	2.7
09/02/2012	22:20	36.1	36.7	36.1	36.7	2.9
09/02/2012	22:30	35.4	37.7	35.4	37.7	3.0
09/02/2012	22:40	35.8	36.4	35.8	36.4	3.1
09/02/2012	22:50	34.7	36.1	34.7	36.1	3.3
10/02/2012	18:00	46.5	41.2	46.5	41.2	3.3
10/02/2012	18:10	47.0	43.6	47.0	43.6	3.1
10/02/2012	18:20	46.0	42.0	46.0	42.0	2.8
10/02/2012	18:30	44.5	42.1	44.5	42.1	2.4
10/02/2012	18:40	45.9	40.7	45.9	40.7	2.5
10/02/2012	18:50	43.3	41.3	43.3	41.3	2.1
10/02/2012	19:00	41.2	39.7	41.2	39.7	2.3
10/02/2012	19:10	42.0	40.3	42.0	40.3	2.3
10/02/2012	19:20	43.0	39.9	43.0	39.9	2.1
10/02/2012	19:30	40.8	39.4	40.8	39.4	1.6
10/02/2012	19:40	40.3	40.4	40.3	40.4	2.1
10/02/2012	19:50	37.4	40.3	37.4	40.3	2.3
10/02/2012	20:00	38.5	39.7	38.5	39.7	2.1
10/02/2012	20:10	40.0	38.5	40.0	38.5	2.1
10/02/2012	20:20	39.7	39.4	39.7	39.4	2.0
10/02/2012	20:30	37.6	39.7	37.6	39.7	1.7
10/02/2012	20:40	37.2	38.3	37.2	38.3	1.2
10/02/2012	20:50	37.7	37.2	37.7	37.2	1.7
10/02/2012	21:00	42.3	38.4	42.3	38.4	1.0
10/02/2012	21:10	35.2	38.2	35.2	38.2	1.1
10/02/2012	21:20	32.7	37.1	32.7	37.1	1.4
10/02/2012	21:30	33.8	37.0	33.8	37.0	1.7
10/02/2012	21:40	33.5	36.1	33.5	36.1	1.8
10/02/2012	21:50	33.1	37.1	33.1	37.1	1.7
10/02/2012	22:00	32.7	35.9	32.7	35.9	1.6
10/02/2012	22:10	36.1	35.1	36.1	35.1	1.5
10/02/2012	22:20	34.4	35.0	34.4	35.0	1.6
10/02/2012	22:30	33.7	35.9	33.7	35.9	2.2
10/02/2012	22:40	32.7	35.5	32.7	35.5	1.3
10/02/2012	22:50	31.3	37.0	31.3	37.0	0.9
11/02/2012	13:00	40.2	40.0	40.2	40.0	1.5
11/02/2012	13:10	43.9	38.7	43.9	38.7	1.4
11/02/2012	13:20	44.2	40.3	44.2	40.3	1.7
11/02/2012	13:30	41.6	40.3	41.6	40.3	1.4
11/02/2012	13:40	42.0	40.0	42.0	40.0	1.3
11/02/2012	13:50	43.5	38.1	43.5	38.1	1.5
11/02/2012	14:00	39.3	41.3	39.3	41.3	1.5
11/02/2012	14:10	42.4	37.9	42.4	37.9	1.5
11/02/2012	14:20	43.2	37.9	43.2	37.9	1.0
11/02/2012	14:30	43.9	38.2	43.9	38.2	1.1
11/02/2012	14:40	44.9	37.2	44.9	37.2	0.5
11/02/2012	14:50	41.4	38.9	41.4	38.9	0.5
11/02/2012	15:00	44.4	36.9	44.4	36.9	0.7
11/02/2012	15:10	42.9	35.3	42.9	35.3	1.0
11/02/2012	15:20	43.9	34.5	43.9	34.5	0.7
11/02/2012	15:30	44.2	34.3	44.2	34.3	0.7
11/02/2012	15:40	42.7	36.0	42.7	36.0	0.9
11/02/2012	15:50	45.5	34.2	45.5	34.2	0.9
11/02/2012	16:00	43.6	35.4	43.6	35.4	0.3
11/02/2012	16:10	42.6	37.6	42.6	37.6	0.0
11/02/2012	16:20	39.2	39.0	39.2	39.0	0.0
11/02/2012	16:30	40.5	36.7	40.5	36.7	0.1
11/02/2012	16:40	40.5	38.2	40.5	38.2	0.0
11/02/2012	16:50	42.6	38.9	42.6	38.9	0.0
11/02/2012	17:00	43.5	35.3	43.5	35.3	0.0
11/02/2012	17:10	40.4	37.1	40.4	37.1	0.1
11/02/2012	17:20	38.5	39.0	38.5	39.0	0.2
11/02/2012	17:30	37.4	38.1	37.4	38.1	0.4
11/02/2012	17:40	38.3	35.0	38.3	35.0	0.5
11/02/2012	17:50	38.4	35.5	38.4	35.5	0.4
11/02/2012	18:00	38.0	35.4	38.0	35.4	0.4
11/02/2012	18:10	37.9	37.2	37.9	37.2	0.6
11/02/2012	18:20	38.8	39.5	38.8	39.5	0.7
11/02/2012	18:30	37.9	40.0	37.9	40.0	0.7
11/02/2012	18:40	37.9	37.6	37.9	37.6	0.8
11/02/2012	18:50	37.2	38.8	37.2	38.8	0.7
11/02/2012	19:00	36.5	40.0	36.5	40.0	0.9

11/02/2012	19:10	37.6	38.7	37.6	38.7	0.8
11/02/2012	19:20	38.6	37.7	38.6	37.7	0.5
11/02/2012	19:30	38.5	37.6	38.5	37.6	1.1
11/02/2012	19:40	38.1	36.9	38.1	36.9	1.2
11/02/2012	19:50	37.3	37.3	37.3	37.3	0.6
11/02/2012	20:00	37.1	36.9	37.1	36.9	0.8
11/02/2012	20:10	36.4	38.6	36.4	38.6	0.9
11/02/2012	20:20	37.2	38.3	37.2	38.3	1.0
11/02/2012	20:30	35.7	39.4	35.7	39.4	0.7
11/02/2012	20:40	36.7	38.1	36.7	38.1	1.2
11/02/2012	20:50	35.5	38.1	35.5	38.1	1.0
11/02/2012	21:00	35.5	37.7	35.5	37.7	1.0
11/02/2012	21:10	37.0	37.9	37.0	37.9	1.1
11/02/2012	21:20	36.0	37.3	36.0	37.3	1.3
11/02/2012	21:30	36.8	35.4	36.8	35.4	1.0
11/02/2012	21:40	36.3	36.4	36.3	36.4	1.1
11/02/2012	21:50	35.2	34.3	35.2	34.3	1.2
11/02/2012	22:00	37.8	35.2	37.8	35.2	1.6
11/02/2012	22:10	36.3	35.5	36.3	35.5	1.4
11/02/2012	22:20	36.3	35.0	36.3	35.0	0.9
11/02/2012	22:30	36.3	35.9	36.3	35.9	0.9
11/02/2012	22:40	35.4	34.2	35.4	34.2	0.9
11/02/2012	22:50	34.9	33.2	34.9	33.2	1.3
12/02/2012	07:00	37.0	27.6	37.0	27.6	1.7
12/02/2012	07:10	36.5	28.8	36.5	28.8	1.8
12/02/2012	07:20	38.0	29.2	38.0	29.2	1.8
12/02/2012	07:30	36.5	29.4	36.5	29.4	1.8
12/02/2012	07:40	42.8	30.9	42.8	30.9	1.5
12/02/2012	07:50	42.1	32.0	42.1	32.0	1.3
12/02/2012	08:00	40.0	38.5	40.0	38.5	1.6
12/02/2012	08:10	36.0	39.2	36.0	39.2	1.9
12/02/2012	08:20	37.2	38.0	37.2	38.0	2.5
12/02/2012	08:30	39.1	37.7	39.1	37.7	2.9
12/02/2012	08:40	38.3	42.4	38.3	42.4	2.3
12/02/2012	08:50	38.5	44.8	38.5	44.8	2.2
12/02/2012	09:00	37.4	40.9	37.4	40.9	1.9
12/02/2012	09:10	38.3	41.6	38.3	41.6	1.9
12/02/2012	09:20	41.4	42.9	41.4	42.9	1.9
12/02/2012	09:30	40.3	42.6	40.3	42.6	2.2
12/02/2012	09:40	43.0	39.7	43.0	39.7	2.0
12/02/2012	09:50	40.1	37.0	40.1	37.0	1.7
12/02/2012	10:00	41.8	40.4	41.8	40.4	2.0
12/02/2012	10:10	41.9	41.9	41.9	41.9	1.9
12/02/2012	10:20	42.7	42.8	42.7	42.8	1.9
12/02/2012	10:30	42.4	38.2	42.4	38.2	2.0
12/02/2012	10:40	43.3	39.9	43.3	39.9	1.8
12/02/2012	10:50	42.1	44.2	42.1	44.2	1.9
12/02/2012	11:00	41.8	44.9	41.8	44.9	2.2
12/02/2012	11:10	40.9	43.0	40.9	43.0	1.5
12/02/2012	11:20	40.4	41.5	40.4	41.5	1.2
12/02/2012	11:30	43.1	42.0	43.1	42.0	1.1
12/02/2012	11:40	42.2	40.5	42.2	40.5	1.7
12/02/2012	11:50	42.8	40.9	42.8	40.9	1.6
12/02/2012	12:00	42.4	41.3	42.4	41.3	1.5
12/02/2012	12:10	39.4	42.4	39.4	42.4	1.4
12/02/2012	12:20	42.2	41.8	42.2	41.8	1.2
12/02/2012	12:30	41.4	41.1	41.4	41.1	1.2
12/02/2012	12:40	45.7	41.6	45.7	41.6	0.9
12/02/2012	12:50	41.5	43.3	41.5	43.3	1.0
12/02/2012	13:00	40.7	38.1	40.7	38.1	0.9
12/02/2012	13:10	43.0	37.3	43.0	37.3	1.1
12/02/2012	13:20	41.7	41.6	41.7	41.6	1.2
12/02/2012	13:30	41.1	41.9	41.1	41.9	1.2
12/02/2012	13:40	41.0	39.5	41.0	39.5	1.0
12/02/2012	13:50	40.3	41.6	40.3	41.6	1.3
12/02/2012	14:00	40.4	41.1	40.4	41.1	1.2
12/02/2012	14:10	41.3	40.9	41.3	40.9	1.3
12/02/2012	14:20	40.8	39.7	40.8	39.7	1.4
12/02/2012	14:30	39.2	44.2	39.2	44.2	1.2
12/02/2012	14:40	38.7	39.9	38.7	39.9	1.3
12/02/2012	14:50	38.5	43.3	38.5	43.3	1.2
12/02/2012	15:00	38.4	41.7	38.4	41.7	1.2
12/02/2012	15:10	39.9	43.2	39.9	43.2	1.3
12/02/2012	15:20	40.6	46.7	40.6	46.7	1.3
12/02/2012	15:30	39.2	44.6	39.2	44.6	1.5
12/02/2012	15:40	40.0	44.2	40.0	44.2	1.3
12/02/2012	15:50	40.7	46.1	40.7	46.1	1.2
12/02/2012	16:00	40.8	46.8	40.8	46.8	1.3
12/02/2012	16:10	40.9	42.9	40.9	42.9	1.1
12/02/2012	16:20	40.8	41.3	40.8	41.3	1.1
12/02/2012	16:30	41.9	41.9	41.9	41.9	1.7
12/02/2012	16:40	41.2	38.9	41.2	38.9	1.3
12/02/2012	16:50	40.7	40.6	40.7	40.6	1.1
12/02/2012	17:00	40.4	43.7	40.4	43.7	1.2
12/02/2012	17:10	38.8	39.6	38.8	39.6	1.2
12/02/2012	17:20	40.6	43.9	40.6	43.9	1.2
12/02/2012	17:30	40.6	39.9	40.6	39.9	1.3
12/02/2012	17:40	39.8	41.8	39.8	41.8	1.1
12/02/2012	17:50	40.0	40.9	40.0	40.9	1.1
12/02/2012	18:00	40.7	41.6	40.7	41.6	0.9
12/02/2012	18:10	40.4	38.0	40.4	38.0	1.0
12/02/2012	18:20	39.4	42.4	39.4	42.4	1.1
12/02/2012	18:30	39.2	44.3	39.2	44.3	0.9
12/02/2012	18:40	38.9	39.3	38.9	39.3	1.5
12/02/2012	18:50	38.5	38.7	38.5	38.7	0.9

12/02/2012	19:00	39.7	37.2		39.7	37.2		1.0
12/02/2012	19.10	38.8	39.6		38.8	39.6		1.2
12/02/2012	19.20	38.5	38.3		38.5	38.3		1.5
12/02/2012	19.30	37.4	37.8		37.4	37.8		1.4
12/02/2012	19:40	36.8	38.0		36.8	38.0		1.5
12/02/2012	19.50	35.8	38.4		35.8	38.4		1.4
12/02/2012	20.00	37.7	36.6		37.7	36.6		1.1
12/02/2012	20:10	38.4	35.2		38.4	35.2		1.5
12/02/2012	20:20	37.0	35.5		37.0	35.5		1.5
12/02/2012	20.30	33.6	36.6		33.6	36.6		1.5
12/02/2012	20.40	34.5	34.6		34.5	34.6		1.4
12/02/2012	20.50	34.2	32.9		34.2	32.9		1.5
12/02/2012	21:00	31.9	31.8		31.9	31.8		1.2
12/02/2012	21:10	34.0	33.8		34.0	33.8		0.9
12/02/2012	21.20	34.1	32.6		34.1	32.6		0.9
12/02/2012	21.30	33.4	33.4		33.4	33.4		1.3
12/02/2012	21:40	31.9	33.1		31.9	33.1		1.0
12/02/2012	21:50	34.0	33.4		34.0	33.4		0.8
12/02/2012	22:00	31.3	30.9		31.3	30.9		0.9
12/02/2012	22.10	35.0	32.1		35.0	32.1		1.0
12/02/2012	22.20	31.9	31.4		31.9	31.4		1.2
12/02/2012	22.30	28.5	29.9		28.5	29.9		1.5
12/02/2012	22:40	30.4	30.2		30.4	30.2		1.0
12/02/2012	22:50	28.7	31.5		28.7	31.5		1.0
13/02/2120	18.00	45.9	44.0		45.9	44.0		2.7
13/02/2121	18:10	44.4	46.1		44.4	46.1		3.1
13/02/2122	18:20	43.2	45.7		43.2	45.7		3.3
13/02/2123	18:30	47.1	45.9		47.1	45.9		4.1
13/02/2124	18:40	45.1	45.0		45.1	45.0		3.3
13/02/2125	18:50	46.5	42.4		46.5	42.4		2.8
13/02/2126	19.00	45.1	42.1		45.1	42.1		1.8
13/02/2127	19:10	42.3	40.2		42.3	40.2		0.7
13/02/2128	19:20	42.2	42.9		42.2	42.9		1.4
13/02/2129	19.30	42.1	46.0		42.1	46.0		1.8
13/02/2130	19:40	42.0	45.1		42.0	45.1		2.1
13/02/2131	19:50	42.6	43.8		42.6	43.8		2.5
13/02/2132	20:00	41.2	41.7		41.2	41.7		2.2
13/02/2133	20.10	41.3	36.9		41.3	36.9		2.3
13/02/2134	20.20	41.8	35.2		41.8	35.2		2.3
13/02/2135	20.30	41.0	37.6		41.0	37.6		1.6
13/02/2136	20.40	40.4	37.9		40.4	37.9		2.4
13/02/2137	20:50	39.4	37.3		39.4	37.3		1.5
13/02/2138	21:00	37.0	36.3		37.0	36.3		1.1
13/02/2139	21:10	40.2	37.3		40.2	37.3		2.2
13/02/2140	21:20	42.5	37.0		42.5	37.0		2.8
13/02/2141	21:30	39.1	35.2		39.1	35.2		2.0
13/02/2142	21:40	39.8	34.7		39.8	34.7		1.9
13/02/2143	21:50	38.8	36.4		38.8	36.4		1.3
13/02/2144	22.00	38.0	36.7		38.0	36.7		1.6
13/02/2145	22:10	38.6	37.5		38.6	37.5		0.9
13/02/2146	22:20	39.2	36.9		39.2	36.9		1.6
13/02/2147	22.30	39.2	36.7		39.2	36.7		2.2
13/02/2148	22.40	38.9	34.8		38.9	34.8		2.2
13/02/2149	22:50	38.3	33.6		38.3	33.6		2.1
14/02/2012	18:00	47.4	44.6	44.4	47.4	44.6	44.4	4.4
14/02/2012	18.10	47.5	45.1	44.9	47.5	45.1	44.9	4.4
14/02/2012	18:20	46.1	45.4	43.6	46.1	45.4	43.6	4.2
14/02/2012	18.30	45.7	45.2	43.1	45.7	45.2	43.1	4.3
14/02/2012	18:40	47.1	47.8	43.7	47.1	47.8	43.7	4.4
14/02/2012	18:50	45.7	43.7	43.0	45.7	43.7	43.0	4.3
14/02/2012	19:00	46.3	43.7	43.3	46.3	43.7	43.3	4.3
14/02/2012	19.10	48.1	42.5	43.7	48.1	42.5	43.7	4.8
14/02/2012	19.20	49.2	42.5	43.0	49.2	42.5	43.0	4.9
14/02/2012	19.30	46.7	41.5	43.4	46.7	41.5	43.4	4.5
14/02/2012	19:40	46.8	41.1	41.8	46.8	41.1	41.8	4.9
14/02/2012	19:50	47.5	41.6	41.5	47.5	41.6	41.5	4.6
14/02/2012	20:00	47.3	43.2	41.2	47.3	43.2	41.2	4.6
14/02/2012	20.10	46.9	41.5	43.2	46.9	41.5	43.2	4.6
14/02/2012	20.20	47.2	42.1	42.2	47.2	42.1	42.2	4.9
14/02/2012	20:30	48.4	42.6	42.9	48.4	42.6	42.9	4.7
14/02/2012	20:40	46.1	40.9	41.2	46.1	40.9	41.2	4.6
14/02/2012	20.50	46.2	40.7	40.9	46.2	40.7	40.9	4.8
14/02/2012	21:00	45.4	40.4	40.1	45.4	40.4	40.1	4.3
14/02/2012	21:10	43.4	41.0	41.5	43.4	41.0	41.5	4.2
14/02/2012	21:20	43.0	41.2	40.6	43.0	41.2	40.6	3.9
14/02/2012	21:30	43.1	41.5	37.7	43.1	41.5	37.7	3.6
14/02/2012	21:40	41.2	41.3	38.1	41.2	41.3	38.1	3.4
14/02/2012	21:50	39.8	40.4	38.4	39.8	40.4	38.4	3.1
14/02/2012	22:00	39.4	39.1	39.8	39.4	39.1	39.8	2.8
14/02/2012	22:10	40.0	40.1	39.8	40.0	40.1	39.8	2.7
14/02/2012	22.20	40.9	37.6	39.6	40.9	37.6	39.6	3.2
14/02/2012	22.30	39.9	37.6	38.3	39.9	37.6	38.3	2.8
14/02/2012	22.40	39.1	36.6	36.0	39.1	36.6	36.0	3.0
14/02/2012	22:50	38.5	36.1	34.5	38.5	36.1	34.5	2.8
15/02/2012	18:00	45.7	41.7	43.9	45.7	41.7	43.9	4.3
15/02/2012	18.10	45.7	44.4	44.3	45.7	44.4	44.3	4.1
15/02/2012	18:20	43.5	43.8	43.2	43.5	43.8	43.2	3.2
15/02/2012	18.30	43.7	44.9	42.7	43.7	44.9	42.7	2.8
15/02/2012	18:40	43.7	46.2	43.1	43.7	46.2	43.1	4.1
15/02/2012	18.50	45.1	44.3	42.0	45.1	44.3	42.0	4.3
15/02/2012	19.00	44.9	43.4	42.0	44.9	43.4	42.0	4.0
15/02/2012	19.10	43.2	42.9	41.2	43.2	42.9	41.2	3.5
15/02/2012	19:20	41.1	42.4	39.1	41.1	42.4	39.1	3.1
15/02/2012	19:30	43.2	40.1	40.8	43.2	40.1	40.8	3.6
15/02/2012	19.40	43.1	42.4	40.3	43.1	42.4	40.3	3.4

15/02/2012	19:50	41.0	41.3	40.5	41.0	41.3	40.5	3.1
15/02/2012	20:00	41.0	41.5	39.2	41.0	41.5	39.2	2.8
15/02/2012	20:10	40.3	40.7	40.1	40.3	40.7	40.1	2.6
15/02/2012	20:20	40.7	40.7	39.1	40.7	40.7	39.1	2.8
15/02/2012	20:30	40.0	41.4	38.3	40.0	41.4	38.3	3.1
15/02/2012	20:40	41.2	39.7	38.6	41.2	39.7	38.6	3.0
15/02/2012	20:50	41.0	38.4	40.4	41.0	38.4	40.4	3.1
15/02/2012	21:00	40.6	38.9	38.8	40.6	38.9	38.8	2.7
15/02/2012	21:10	38.1	38.4	38.5	38.1	38.4	38.5	2.6
15/02/2012	21:20	38.9	39.1	37.4	38.9	39.1	37.4	3.0
15/02/2012	21:30	38.1	38.1	36.0	38.1	38.1	36.0	2.8
15/02/2012	21:40	38.2	38.4	38.0	38.2	38.4	38.0	2.8
15/02/2012	21:50	38.1	38.1	36.2	38.1	38.1	36.2	3.0
15/02/2012	22:00	37.8	37.9	35.4	37.8	37.9	35.4	2.8
15/02/2012	22:10	39.0	37.2	37.9	39.0	37.2	37.9	2.9
15/02/2012	22:20	40.3	37.0	36.4	40.3	37.0	36.4	3.4
15/02/2012	22:30	41.1	36.5	36.7	41.1	36.5	36.7	3.4
15/02/2012	22:40	38.8	35.9	34.4	38.8	35.9	34.4	3.0
15/02/2012	22:50	39.2	37.2	34.4	39.2	37.2	34.4	3.5
16/02/2012	18:00	44.0	43.9	44.7	44.0	43.9	44.7	3.8
16/02/2012	18:10	44.3	44.9	45.4	44.3	44.9	45.4	3.6
16/02/2012	18:20	45.1	45.1	45.5	45.1	45.1	45.5	3.7
16/02/2012	18:30	46.6	45.0	41.6	46.6	45.0	41.6	4.5
16/02/2012	18:40	46.3	48.3	43.9	46.3	48.3	43.9	4.7
16/02/2012	18:50	45.8	45.5	45.3	45.8	45.5	45.3	4.7
16/02/2012	19:00	45.6	44.6	43.2	45.6	44.6	43.2	4.6
16/02/2012	19:10	43.7	43.2	43.2	43.7	43.2	43.2	4.0
16/02/2012	19:20	43.8	42.0	43.5	43.8	42.0	43.5	4.3
16/02/2012	19:30	50.7	41.7	37.6	50.7	41.7	37.6	3.7
16/02/2012	19:40	41.6	43.0	39.3	41.6	43.0	39.3	2.9
16/02/2012	19:50	38.4	42.5	38.4	38.4	42.5	38.4	3.0
16/02/2012	20:00	37.8	43.1	38.8	37.8	43.1	38.8	2.5
16/02/2012	20:10	38.0	41.9	38.9	38.0	41.9	38.9	2.8
16/02/2012	20:20	38.1	41.0	40.8	38.1	41.0	40.8	2.4
16/02/2012	20:30	37.8	40.8	36.4	37.8	40.8	36.4	2.6
16/02/2012	20:40	37.5	39.9	39.7	37.5	39.9	39.7	2.9
16/02/2012	20:50	36.9	39.2	36.4	36.9	39.2	36.4	3.5
16/02/2012	21:00	39.4	38.2	39.0	39.4	38.2	39.0	3.7
16/02/2012	21:10	41.8	38.5	40.1	41.8	38.5	40.1	4.2
16/02/2012	21:20	41.5	40.6	38.5	41.5	40.6	38.5	3.7
16/02/2012	21:30	39.3	36.7	34.4	39.3	36.7	34.4	3.4
16/02/2012	21:40	37.9	37.0	37.2	37.9	37.0	37.2	2.8
16/02/2012	21:50	38.3	38.7	35.6	38.3	38.7	35.6	3.4
16/02/2012	22:00	39.0	36.2	33.5	39.0	36.2	33.5	3.4
16/02/2012	22:10	37.5	37.6	38.3	37.5	37.6	38.3	3.1
16/02/2012	22:20	37.1	37.1	32.0	37.1	37.1	32.0	3.0
16/02/2012	22:30	37.3	38.7	32.1	37.3	38.7	32.1	3.5
16/02/2012	22:40	40.7	36.5	35.4	40.7	36.5	35.4	3.8
16/02/2012	22:50	39.7	37.5	32.6	39.7	37.5	32.6	3.2
17/02/2012	18:00	42.8	41.5	44.3	42.8	41.5	44.3	0.7
17/02/2012	18:10	43.1	41.1	46.3	43.1	41.1	46.3	0.6
17/02/2012	18:20	44.5	42.2	47.1	44.5	42.2	47.1	0.7
17/02/2012	18:30	42.4	40.7	43.7	42.4	40.7	43.7	0.7
17/02/2012	18:40	41.7	42.4	46.2	41.7	42.4	46.2	0.7
17/02/2012	18:50	42.2	38.7	43.6	42.2	38.7	43.6	0.6
17/02/2012	19:00	38.2	37.3	42.8	38.2	37.3	42.8	0.8
17/02/2012	19:10	40.2	38.2	44.6	40.2	38.2	44.6	0.9
17/02/2012	19:20	38.9	39.7	41.7	38.9	39.7	41.7	0.7
17/02/2012	19:30	36.5	39.1	38.7	36.5	39.1	38.7	0.9
17/02/2012	19:40	37.3	38.8	39.1	37.3	38.8	39.1	0.7
17/02/2012	19:50	36.4	37.0	40.9	36.4	37.0	40.9	1.0
17/02/2012	20:00	37.7	37.3	41.5	37.7	37.3	41.5	1.5
17/02/2012	20:10	39.1	37.8	41.1	39.1	37.8	41.1	1.6
17/02/2012	20:20	38.6	37.9	41.5	38.6	37.9	41.5	1.5
17/02/2012	20:30	39.8	37.9	39.5	39.8	37.9	39.5	1.9
17/02/2012	20:40	40.1	36.6	38.2	40.1	36.6	38.2	3.0
17/02/2012	20:50	41.5	36.9	40.7	41.5	36.9	40.7	3.1
17/02/2012	21:00	41.1	38.0	40.1	41.1	38.0	40.1	2.4
17/02/2012	21:10	41.2	38.1	38.7	41.2	38.1	38.7	2.4
17/02/2012	21:20	39.8	38.1	36.5	39.8	38.1	36.5	2.4
17/02/2012	21:30	39.0	39.6	35.1	39.0	39.6	35.1	2.8
17/02/2012	21:40	37.4	39.4	39.2	37.4	39.4	39.2	2.3
17/02/2012	21:50	37.4	39.3	37.8	37.4	39.3	37.8	1.8
17/02/2012	22:00	37.1	40.6	36.8	37.1	40.6	36.8	3.1
17/02/2012	22:10	40.5	40.2	38.2	40.5	40.2	38.2	2.4
17/02/2012	22:20	36.4	39.4	34.4	36.4	39.4	34.4	1.5
17/02/2012	22:30	35.4	39.7	37.1	35.4	39.7	37.1	1.8
17/02/2012	22:40	40.7	37.2	37.7	40.7	37.2	37.7	2.1
17/02/2012	22:50	40.4	36.9	39.1	40.4	36.9	39.1	2.4
18/02/2012	13:00	57.8	46.2	51.2	57.8	46.2	51.2	7.1
18/02/2012	13:10	53.4	45.8	49.8	53.4	45.8	49.8	5.9
18/02/2012	13:20	50.1	47.2	49.1	50.1	47.2	49.1	5.1
18/02/2012	13:30	55.5	42.9	50.7	55.5	42.9	50.7	6.3
18/02/2012	13:40	54.9	47.4	48.2	54.9	47.4	48.2	6.4
18/02/2012	13:50	54.4	48.4	48.2	54.4	48.4	48.2	6.7
18/02/2012	14:00	55.9	51.1	48.1	55.9	51.1	48.1	6.4
18/02/2012	14:10	51.8	49.7	45.4	51.8	49.7	45.4	6.0
18/02/2012	14:20	46.8	52.2	44.7	46.8	52.2	44.7	5.3
18/02/2012	14:30	51.6	51.9	47.4	51.6	51.9	47.4	5.6
18/02/2012	14:40	55.0	51.8	48.0	55.0	51.8	48.0	6.4
18/02/2012	14:50	54.0	51.0	49.4	54.0	51.0	49.4	6.2
18/02/2012	15:00	53.8	49.6	48.7	53.8	49.6	48.7	5.6
18/02/2012	15:10	48.8	47.8	47.9	48.8	47.8	47.9	5.2
18/02/2012	15:20	49.1	46.3	46.9	49.1	46.3	46.9	5.6
18/02/2012	15:30	48.6	47.3	47.2	48.6	47.3	47.2	5.5

18/02/2012	15:40	54.5	47.5	48.0	54.5	47.5	48.0	6.4
18/02/2012	15:50	56.7	49.8	47.8	56.7	49.8	47.8	6.7
18/02/2012	16:00	51.4	50.4	44.3	51.4	50.4	44.3	5.7
18/02/2012	16:10	52.1	52.7	45.5	52.1	52.7	45.5	6.1
18/02/2012	16:20	54.0	47.3	47.6	54.0	47.3	47.6	6.2
18/02/2012	16:30	50.6	45.6	47.0	50.6	45.6	47.0	5.2
18/02/2012	16:40	50.2	47.5	47.2	50.2	47.5	47.2	6.0
18/02/2012	16:50	49.0	48.6	45.4	49.0	48.6	45.4	5.1
18/02/2012	17:00	50.1	45.8	46.6	50.1	45.8	46.6	5.7
18/02/2012	17:10	49.2	45.9	46.8	49.2	45.9	46.8	5.8
18/02/2012	17:20	49.5	47.2	42.5	49.5	47.2	42.5	5.2
18/02/2012	17:30	47.6	47.9	45.4	47.6	47.9	45.4	4.8
18/02/2012	17:40	45.9	46.4	45.7	45.9	46.4	45.7	5.0
18/02/2012	17:50	50.6	47.1	45.2	50.6	47.1	45.2	5.6
18/02/2012	18:00	49.1	47.1	44.8	49.1	47.1	44.8	5.6
18/02/2012	18:10	50.5	47.4	47.2	50.5	47.4	47.2	5.4
18/02/2012	18:20	51.8	47.9	46.3	51.8	47.9	46.3	6.3
18/02/2012	18:30	56.5	45.9	48.9	56.5	45.9	48.9	7.1
18/02/2012	18:40	54.4	45.9	49.4	54.4	45.9	49.4	6.2
18/02/2012	18:50	55.6	47.5	48.7	55.6	47.5	48.7	6.1
18/02/2012	19:00	52.1	44.0	45.5	52.1	44.0	45.5	5.5
18/02/2012	19:10	52.0	45.8	46.4	52.0	45.8	46.4	5.9
18/02/2012	19:20	51.9	46.2	47.3	51.9	46.2	47.3	5.6
18/02/2012	19:30	53.7	49.9	47.0	53.7	49.9	47.0	6.2
18/02/2012	19:40	55.8	52.0	46.0	55.8	52.0	46.0	6.0
18/02/2012	19:50	54.4	49.4	46.3	54.4	49.4	46.3	6.2
18/02/2012	20:00	50.0	50.0	43.8	50.0	50.0	43.8	5.1
18/02/2012	20:10	49.2	46.6	44.0	49.2	46.6	44.0	5.2
18/02/2012	20:20	50.1	48.3	43.5	50.1	48.3	43.5	5.3
18/02/2012	20:30	52.5	48.1	46.6	52.5	48.1	46.6	5.7
18/02/2012	20:40	52.2	48.5	43.3	52.2	48.5	43.3	5.2
18/02/2012	20:50	51.1	49.2	43.2	51.1	49.2	43.2	5.4
18/02/2012	21:00	48.8	45.7	40.0	48.8	45.7	40.0	4.7
18/02/2012	21:10	44.1	44.7	37.4	44.1	44.7	37.4	4.6
18/02/2012	21:20	46.9	44.4	41.0	46.9	44.4	41.0	5.0
18/02/2012	21:30	47.6	46.3	39.5	47.6	46.3	39.5	4.7
18/02/2012	21:40	44.1	46.8	40.3	44.1	46.8	40.3	4.4
18/02/2012	21:50	45.7	44.8	42.0	45.7	44.8	42.0	4.5
18/02/2012	22:00	45.5	43.8	42.7	45.5	43.8	42.7	4.9
18/02/2012	22:10	46.3	39.5	41.8	46.3	39.5	41.8	5.3
18/02/2012	22:20	46.9	40.6	42.2	46.9	40.6	42.2	5.5
18/02/2012	22:30	50.1	41.1	40.5	50.1	41.1	40.5	5.6
18/02/2012	22:40	48.1	41.9	40.2	48.1	41.9	40.2	4.8
18/02/2012	22:50	46.2	41.6	38.6	46.2	41.6	38.6	4.5
19/02/2012	07:00	34.8	28.7	34.9	34.8	28.7	34.9	2.6
19/02/2012	07:10	37.2	30.2	34.8	37.2	30.2	34.8	2.5
19/02/2012	07:20	36.0	32.8	37.0	36.0	32.8	37.0	2.5
19/02/2012	07:30	36.3	33.9	36.9	36.3	33.9	36.9	3.0
19/02/2012	07:40	36.0	40.4	36.4	36.0	40.4	36.4	2.8
19/02/2012	07:50	37.4	40.9	34.8	37.4	40.9	34.8	2.4
19/02/2012	08:00	37.3	42.1	37.2	37.3	42.1	37.2	2.3
19/02/2012	08:10	36.0	42.1	36.6	36.0	42.1	36.6	2.4
19/02/2012	08:20	36.5	41.9	34.5	36.5	41.9	34.5	2.4
19/02/2012	08:30	41.2	45.4	35.5	41.2	45.4	35.5	2.6
19/02/2012	08:40	40.4	39.7	38.8	40.4	39.7	38.8	2.8
19/02/2012	08:50	38.8	38.2	38.2	38.8	38.2	38.2	3.1
19/02/2012	09:00	37.0	45.9	37.7	37.0	45.9	37.7	2.9
19/02/2012	09:10	42.3	41.2	38.4	42.3	41.2	38.4	3.1
19/02/2012	09:20	39.8	41.6	38.0	39.8	41.6	38.0	3.5
19/02/2012	09:30	39.9	42.1	38.1	39.9	42.1	38.1	3.0
19/02/2012	09:40	39.0	43.1	39.0	39.0	43.1	39.0	3.4
19/02/2012	09:50	43.0	40.7	40.4	43.0	40.7	40.4	3.7
19/02/2012	10:00	41.7	39.9	39.6	41.7	39.9	39.6	3.5
19/02/2012	10:10	41.7	40.6	40.7	41.7	40.6	40.7	3.7
19/02/2012	10:20	45.6	41.8	40.9	45.6	41.8	40.9	4.2
19/02/2012	10:30	42.2	42.1	40.4	42.2	42.1	40.4	3.5
19/02/2012	10:40	39.3	41.6	38.4	39.3	41.6	38.4	3.3
19/02/2012	10:50	39.7	41.4	39.7	39.7	41.4	39.7	3.5
19/02/2012	11:00	41.6	43.3	41.1	41.6	43.3	41.1	3.1
19/02/2012	11:10	42.9	40.1	40.7	42.9	40.1	40.7	3.9
19/02/2012	11:20	41.1	44.1	39.9	41.1	44.1	39.9	3.3
19/02/2012	11:30	43.3	42.1	41.4	43.3	42.1	41.4	4.4
19/02/2012	11:40	43.6	44.9	41.1	43.6	44.9	41.1	3.7
19/02/2012	11:50	42.3	40.7	39.4	42.3	40.7	39.4	4.2
19/02/2012	12:00	40.3	41.9	40.0	40.3	41.9	40.0	3.6
19/02/2012	12:10	40.2	41.0	39.9	40.2	41.0	39.9	3.3
19/02/2012	12:20	42.1	42.0	40.7	42.1	42.0	40.7	3.8
19/02/2012	12:30	42.5	42.2	41.3	42.5	42.2	41.3	4.1
19/02/2012	12:40	41.4	42.1	40.6	41.4	42.1	40.6	3.9
19/02/2012	12:50	42.3	42.1	40.5	42.3	42.1	40.5	3.8
19/02/2012	13:00	42.1	40.4	41.8	42.1	40.4	41.8	4.0
19/02/2012	13:10	41.6	41.0	41.1	41.6	41.0	41.1	3.7
19/02/2012	13:20	42.6	41.6	40.8	42.6	41.6	40.8	3.7
19/02/2012	13:30	40.0	45.2	40.1	40.0	45.2	40.1	3.8
19/02/2012	13:40	40.0	42.7	38.8	40.0	42.7	38.8	3.3
19/02/2012	13:50	38.8	40.6	39.0	38.8	40.6	39.0	3.1
19/02/2012	14:00	39.4	42.0	36.1	39.4	42.0	36.1	3.2
19/02/2012	14:10	37.3	40.7	39.5	37.3	40.7	39.5	3.3
19/02/2012	14:20	38.7	41.8	38.6	38.7	41.8	38.6	3.1
19/02/2012	14:30	38.6	43.4	37.8	38.6	43.4	37.8	2.7
19/02/2012	14:40	37.9	40.9	38.9	37.9	40.9	38.9	2.5
19/02/2012	14:50	38.7	41.2	38.2	38.7	41.2	38.2	3.4
19/02/2012	15:00	36.8	41.4	36.4	36.8	41.4	36.4	2.4
19/02/2012	15:10	37.7	37.5	37.3	37.7	37.5	37.3	2.5
19/02/2012	15:20	38.0	41.0	37.8	38.0	41.0	37.8	3.0

19/02/2012	15.30	37.3	39 6	38.9	37.3	39 6	38 9	2 8
19/02/2012	15.40	36 6	41.0	36 8	36 6	41.0	36 8	2.5
19/02/2012	15.50	38 0	40 4	38 0	38.0	40.4	38 0	2.4
19/02/2012	16 00	37 6	41.1	37.6	37 6	41.1	37.6	2.3
19/02/2012	16:10	37.7	38 6	37.7	37.7	38 6	37.7	2.6
19/02/2012	16.20	37.3	37 4	37.7	37.3	37.4	37.7	2 4
19/02/2012	16 30	42 3	39 2	40.1	42.3	39 2	40.1	2 6
19/02/2012	16:40	39 9	36.3	38 9	39 9	36 3	38.9	2.0
19/02/2012	16:50	39 1	40 0	38 4	39 1	40 0	38.4	2.3
19/02/2012	17:00	48 1	39 2	37.8	48.1	39 2	37.8	2.0
19/02/2012	17.10	47.5	38 9	41.3	47.5	38 9	41.3	1.5
19/02/2012	17 20	46 8	38 5	40.7	46 8	38.5	40.7	1 2
19/02/2012	17.30	40.9	40 3	40.5	40 9	40 3	40.5	1.1
19/02/2012	17.40	39 0	41.9	42.4	39 0	41.9	42 4	1.2
19/02/2012	17.50	38 0	37.3	39 8	38 0	37.3	39 8	1 8
19/02/2012	18 00	34.9	41.3	38 5	34.9	41.3	38.5	2 0
19/02/2012	18:10	35.7	38.5	41.1	35 7	38 5	41.1	2.1
19/02/2012	18:20	35 6	44.3	39.5	35 6	44 3	39 5	2.1
19/02/2012	18 30	37.5	39.7	40 1	37.5	39 7	40 1	2.2
19/02/2012	18.40	39.1	43 4	39.5	39.1	43.4	39 5	2.3
19/02/2012	18 50	37.4	40.3	37.7	37 4	40 3	37.7	2 4
19/02/2012	19 00	37.0	36 6	36 2	37.0	36 6	36 2	2 2
19/02/2012	19:10	35 9	36 0	35.1	35.9	36 0	35 1	2.1
19/02/2012	19 20	36 2	37.8	40 0	36.2	37 8	40 0	1.9
19/02/2012	19 30	34.1	37.4	35 9	34.1	37.4	35.9	1.7
19/02/2012	19 40	34.7	38 3	36.3	34.7	38.3	36.3	2.2
19/02/2012	19:50	44.9	37.2	34.4	44.9	37 2	34 4	2 5
19/02/2012	20:00	35 0	37.3	36.0	35.0	37 3	36 0	1.9
19/02/2012	20:10	35 0	36 9	35 0	35.0	36 9	35 0	1.2
19/02/2012	20 20	32 6	37.1	31.5	32 6	37.1	31.5	1.4
19/02/2012	20 30	32.4	36 5	34.7	32 4	36.5	34.7	1 6
19/02/2012	20:40	34 8	36 1	34.7	34 8	36 1	34 7	1.1
19/02/2012	20:50	33 6	35 5	29 8	33 6	35 5	29 8	1.2
19/02/2012	21:00	33 6	35 6	31.9	33.6	35 6	31.9	1.4
19/02/2012	21:10	31.8	36 3	32 6	31.8	36.3	32 6	1.1
19/02/2012	21:20	32.6	34.9	33.1	32 6	34.9	33.1	0.7
19/02/2012	21:30	31.1	35.1	32.5	31.1	35.1	32 5	0 4
19/02/2012	21:40	28 8	35 7	29 5	28 8	35 7	29 5	0.3
19/02/2012	21:50	29 2	33 4	29 8	29 2	33 4	29 8	1.0
19/02/2012	22 00	29.9	35 1	27.1	29 9	35 1	27.1	1.7
19/02/2012	22:10	29 2	35 3	37.6	29 2	35 3	37.6	1 6
19/02/2012	22:20	29 2	35 3	26.0	29 2	35 3	26 0	1 6
19/02/2012	22.30	29 1	34 5	27.1	29.1	34.5	27 1	1.6
19/02/2012	22.40	29 1	32.8	29 9	29 1	32.8	29 9	1.4
19/02/2012	22:50	29 8	32.9	28 3	29 8	32.9	28.3	1 6
20/02/2012	18 00	48 1	45 9	48.5	48.1	45 9	48.5	1 6
20/02/2012	18.10	46 0	46 6	48 5	46 0	46 6	46 5	1.5
20/02/2012	18 20	44 8	43 8	48 1	44 8	43 8	48 1	1.6
20/02/2012	18:30	49 2	44 8	48 0	49 2	44.8	48.0	1 6
20/02/2012	18:40	44 4	44.7	45 6	44 4	44.7	45.6	1.8
20/02/2012	18 50	44 1	45 2	45 4	44.1	45 2	45 4	1.7
20/02/2012	19 00	44 8	45 5	45 2	44 8	45 5	45 2	1.7
20/02/2012	19:10	44.7	43 6	44 4	44.7	43 6	44 4	1.9
20/02/2012	19 20	44 6	44.7	43.8	44 6	44.7	43 8	1.7
20/02/2012	19 30	44 2	44 8	45.0	44 2	44 8	45 0	1 5
20/02/2012	19 40	44 2	43 9	44 5	44.2	43 9.	44.5	1.4
20/02/2012	19.50	42.4	43 3	41.8	42.4	43 3	41 8	1.5
20/02/2012	20 00	43 1	44.7	40 8	43.1	44.7	40 8	1.5
20/02/2012	20 10	42.3	43 4	41 6	42 3	43 4	41.6	1 5
20/02/2012	20 20	41 2	43 2	43 9	41 2	43 2	43 9	1 5
20/02/2012	20.30	42.9	41.2	43.1	42.9	41 2	43.1	1.7
20/02/2012	20 40	41.3	41.8	40 8	41.3	41 8	40 8	1.7
20/02/2012	20 50	43.1	41.6	40.7	43.1	41.6	40 7	1.9
20/02/2012	21:00	41.3	43 0	40.9	41.3	43 0	40.9	2 0
20/02/2012	21:10	43 8	40 5	40.9	43 8	40 5	40.9	1 8
20/02/2012	21:20	42 8	41.7	40.1	42 8	41.7	40 1	2 0
20/02/2012	21:30	39 7	42.0	40.4	39.7	42 0	40 4	2.0
20/02/2012	21:40	42 0	45.7	39 7	42 0	45.7	39 7	2.0
20/02/2012	21:50	44.5	42.6	40 3	44.5	42 6	40 3	2.5
20/02/2012	22:00	43 8	40 0	41.5	43 8	40 0	41.5	2 2
20/02/2012	22:10	43 8	41.0	44.2	43 8	41 0	44 2	2 4
20/02/2012	22 20	43 5	38 7	43 9	43 5	38 7	43 9	2.1
20/02/2012	22 30	40 6	39 3	42.3	40 6	39 3	42 3	1 6
20/02/2012	22 40	44.4	39.5	41 8	44 4	39 5	41.8	2.3
20/02/2012	22:50	41 8	41.3	38.7	41 8	41.3	38 7	2.7

Night-time period (23:00 – 07:00 Monday to Sunday)

Date	Time	**Location 1** Ringstone Hill Fm LA90	**Location 2** Cricket Villa LA90	**Location 3** Robin Hood Pub LA90	**Location 4** Reservoir Hse LA90	**Location 5** Burntwood Hotel LA90	**Location 6** The Lodge LA90	MEASURED Windspeed 5M
03/02/2012	23:00	33.2	34.0		33.2	34.0		0.7
03/02/2012	23:10	32.8	35.6		32.8	35.6		0.9
03/02/2012	23:20	32.6	34.3		32.6	34.3		0.3
03/02/2012	23:30	30.8	32.1		30.8	32.1		0.0
03/02/2012	23:40	31.9	31.7		31.9	31.7		0.1
03/02/2012	23:50	33.5	30.5		33.5	30.5		0.1
04/02/2012	00:00	32.1	28.9		32.1	28.9		0.1
04/02/2012	00:10	30.6	29.9		30.6	29.9		0.1
04/02/2012	00:20	30.2	30.7		30.2	30.7		0.1
04/02/2012	00:30	30.0	30.8		30.0	30.8		0.1
04/02/2012	00:40	30.5	31.3		30.5	31.3		0.1
04/02/2012	00:50	30.2	30.7		30.2	30.7		0.1
04/02/2012	01:00	28.7	30.0		28.7	30.0		0.1
04/02/2012	01:10	29.6	29.4		29.6	29.4		0.1
04/02/2012	01:20	26.1	28.9		26.1	28.9		0.1
04/02/2012	01:30	27.0	27.2		27.0	27.2		0.0
04/02/2012	01:40	28.3	29.0		28.3	29.0		0.1
04/02/2012	01:50	27.2	27.6		27.2	27.6		0.1
04/02/2012	02:00	26.1	26.2		26.1	26.2		0.1
04/02/2012	02:10	25.5	27.0		25.5	27.0		0.0
04/02/2012	02:20	27.9	23.8		27.9	23.8		0.1
04/02/2012	02:30	26.6	24.1		26.6	24.1		0.2
04/02/2012	02:40	25.0	24.4		25.0	24.4		0.6
04/02/2012	02:50	26.7	26.2		26.7	26.2		0.8
04/02/2012	03:00	25.3	23.8		25.3	23.8		0.5
04/02/2012	03:10	26.6	24.2		26.6	24.2		0.8
04/02/2012	03:20	25.5	25.5		25.5	25.5		0.7
04/02/2012	03:30	25.8	26.6		25.8	26.6		0.5
04/02/2012	03:40	27.7	22.9		27.7	22.9		0.9
04/02/2012	03:50	27.5	23.6		27.5	23.6		0.7
04/02/2012	04:00	26.4	24.9		26.4	24.9		0.8
04/02/2012	04:10	25.4	26.7		25.4	26.7		0.4
04/02/2012	04:20	26.8	25.2		26.8	25.2		0.6
04/02/2012	04:30	26.6	25.9		26.6	25.9		0.8
04/02/2012	04:40	27.2	26.1		27.2	26.1		0.2
04/02/2012	04:50	26.7	27.7		26.7	27.7		1.0
04/02/2012	05:00	27.3	28.0		27.3	28.0		0.8
04/02/2012	05:10	25.8	30.3		25.8	30.3		0.9
04/02/2012	05:20	26.1	31.2		28.1	31.2		1.5
04/02/2012	05:30	31.2	28.9		31.2	28.9		0.7
04/02/2012	05:40	31.4	29.6		31.4	29.6		0.7
04/02/2012	05:50	30.1	28.0		30.1	28.0		0.7
04/02/2012	06:00	29.3	28.6		29.3	28.6		0.5
04/02/2012	06:10	30.7	33.9		30.7	33.9		0.5
04/02/2012	06:20	31.8	31.5		31.8	31.5		0.5
04/02/2012	06:30	34.6	32.6		34.6	32.6		0.4
04/02/2012	06:40	31.4	33.8		31.4	33.8		0.5
04/02/2012	06:50	33.1	32.9		33.1	32.9		0.1
04/02/2012	23:00	29.0	41.6		29.0	41.6		1.0
04/02/2012	23:10	27.4	37.2		27.4	37.2		0.5
04/02/2012	23:20	26.6	36.9		26.6	36.9		0.0
04/02/2012	23:30	27.4	34.8		27.4	34.8		0.7
04/02/2012	23:40	27.9	34.7		27.9	34.7		0.7
04/02/2012	23:50	27.3	34.4		27.3	34.4		0.5
05/02/2012	00:00	28.0	33.0		28.0	33.0		0.1
05/02/2012	00:10	27.3	31.0		27.3	31.0		0.1
05/02/2012	00:20	26.1	29.4		26.1	29.4		0.1
05/02/2012	00:30	26.7	29.1		26.7	29.1		0.0
05/02/2012	00:40	26.3	31.0		26.3	31.0		0.1
05/02/2012	00:50	27.3	31.5		27.3	31.5		0.5
05/02/2012	01:00	26.8	30.6		26.8	30.6		1.0
05/02/2012	01:10	25.8	29.8		25.8	29.8		1.2
05/02/2012	01:20	25.0	28.9		25.0	28.9		1.0
05/02/2012	01:30	25.7	27.8		25.7	27.8		1.2
05/02/2012	01:40	26.3	29.1		26.3	29.1		1.6
05/02/2012	01:50	25.4	27.8		25.4	27.8		1.2
05/02/2012	02:00	25.7	27.5		25.7	27.5		1.3
05/02/2012	02:10	26.8	27.1		26.8	27.1		1.6
05/02/2012	02:20	28.5	24.9		28.5	24.9		1.8
05/02/2012	02:30	28.4	26.0		28.4	26.0		1.9
05/02/2012	02:40	27.5	26.0		27.5	26.0		1.9
05/02/2012	02:50	28.7	24.7		28.7	24.7		2.0
05/02/2012	03:00	30.4	24.9		30.4	24.9		2.3
05/02/2012	03:10	29.0	25.1		29.0	25.1		2.4
05/02/2012	03:20	28.4	24.2		28.4	24.2		2.3
05/02/2012	03:30	28.5	25.1		28.5	25.1		2.2
05/02/2012	03:40	30.2	25.8		30.2	25.8		2.7
05/02/2012	03:50	27.4	24.5		27.4	24.5		2.0
05/02/2012	04:00	27.1	25.1		27.1	25.1		2.4
05/02/2012	04:10	27.7	25.0		27.7	25.0		2.4
05/02/2012	04:20	26.8	25.0		26.8	25.0		2.0
05/02/2012	04:30	26.4	24.6		26.4	24.6		2.0
05/02/2012	04:40	27.6	25.4		27.6	25.4		2.1

05/02/2012	04:50	29.1	24.2	29.1	24 2	2.1
05/02/2012	05:00	30 2	23.1	30.2	23.1	2 4
05/02/2012	05.10	29 0	24.6	29 0	24 6	2.2
05/02/2012	05:20	29.4	24.3	29.4	24.3	2.1
05/02/2012	05.30	31.4	24.4	31.4	24 4	2.2
05/02/2012	05 40	32.7	24.9	32.7	24 9	2.3
05/02/2012	05:50	32.3	25 4	32.3	25 4	2.2
05/02/2012	06.00	31.7	26.4	31.7	26 4	2.2
05/02/2012	06:10	30.5	24 8	30 5	24.8	2.1
05/02/2012	06:20	30 3	24.4	30.3	24 4	2.2
05/02/2012	06.30	33 5	25 2	33 5	25 2	2.3
05/02/2012	06:40	30.9	25.6	30.9	25.6	2 0
05/02/2012	06.50	29 5	27.7	29.5	27.7	1.3
05/02/2012	23:00	27.5	34.7	27.5	34.7	0 8
05/02/2012	23.10	27.5	33.8	27.5	33 8	1.3
05/02/2012	23:20	29.1	33 5	29.1	33.5	1 2
05/02/2012	23:30	27.5	31.8	27.5	31.8	1.0
05/02/2012	23:40	27.1	30.9	27.1	30 9	0.9
05/02/2012	23:50	26 8	30 5	26 8	30.5	0.7
06/02/2012	00 00	27.7	30.1	27.7	30 1	0.7
06/02/2012	00:10	27 9	28 8	27.9	28.8	0 8
06/02/2012	00:20	27.4	30.4	27.4	30 4	0.6
06/02/2012	00:30	28.5	28.7	28 5	28.7	0.1
06/02/2012	00:40	26 2	30 2	26 2	30 2	0 4
06/02/2012	00.50	25.8	29 6	25 8	29 6	0.5
06/02/2012	01:00	26 1	29.4	26.1	29 4	0.4
06/02/2012	01:10	27.1	28 2	27.1	28 2	0.3
06/02/2012	01:20	26 5	27.9	26.5	27.9	0.5
06/02/2012	01:30	26.3	28.7	26 3	28.7	0.5
06/02/2012	01:40	26.4	27.9	26 4	27.9	0 6
06/02/2012	01:50	26.3	26 5	26.3	26 5	0 6
06/02/2012	02:00	26.3	27.1	26 3	27.1	0 3
06/02/2012	02:10	26 8	26.9	26 8	26 9	0.2
06/02/2012	02:20	26.0	25 7	26 0	25.7	0 3
06/02/2012	02:30	26.3	25 6	26 3	25 6	0.4
06/02/2012	02:40	26 5	24 8	26 5	24.8	0 3
06/02/2012	02:50	27.0	25 6	27.0	25 6	0.1
06/02/2012	03:00	25.5	24.2	25.5	24 2	0.2
06/02/2012	03 10	25 2	25.0	25 2	25.0	0.0
06/02/2012	03:20	25.5	24.9	25.5	24 9	0.0
06/02/2012	03:30	26 0	25.2	26.0	25 2	0.0
06/02/2012	03:40	26 8	22.7	26 8	22 7	0.0
06/02/2012	03:50	28 8	24.0	28 8	24 0	0.3
06/02/2012	04:00	30 2	25 0	30 2	25.0	0.5
06/02/2012	04:10	32.3	25.0	32.3	25 0	0.3
06/02/2012	04 20	29.5	25 5	29.5	25 5	0.5
06/02/2012	04:30	28 4	27.0	28 4	27 0	0.6
06/02/2012	04 40	30 3	25 8	30 3	25 8	0 4
06/02/2012	04:50	31.5	26 7	31.5	26.7	0.3
06/02/2012	05.00	31 2	29.0	31.2	29 0	0 2
06/02/2012	05:10	32.9	27.4	32.9	27.4	0.4
06/02/2012	05 20	36 9	29 2	36.9	29 2	0.7
06/02/2012	05:30	37.8	28 0	37.8	28.0	0.7
06/02/2012	05:40	36 5	29 8	36 5	29 8	0.7
06/02/2012	05:50	38 1	30 6	38 1	30.6	0 3
06/02/2012	06:00	35.1	31.7	35.1	31.7	0.5
06/02/2012	06.10	36 5	32.1	36.5	32.1	0.7
06/02/2012	06:20	39 6	33 1	39 6	33 1	0.5
06/02/2012	06.30	41.3	35 0	41.3	35.0	0 4
06/02/2012	06:40	40.5	34 0	40 5	34 0	0.9
06/02/2012	06:50	41.4	35 6	41.4	35.6	0 8
06/02/2012	23:00	34.4	32.2	34 4	32.2	1.2
06/02/2012	23:10	35 6	34.3	35.6	34 3	1.3
06/02/2012	23 20	35 0	32.5	35 0	32.5	1.4
06/02/2012	23:30	33 0	32.8	33 0	32 8	1.1
06/02/2012	23 40	31.1	30 6	31.1	30.6	0 9
06/02/2012	23:50	33 1	28 3	33 1	28 3	1.3
07/02/2012	00.00	33 2	28 7	33 2.	28.7	1.2
07/02/2012	00:10	31.8	29 3	31.8	29 3	1 6
07/02/2012	00:20	32.2	26 6	32.2	26 6	1.7
07/02/2012	00:30	32.9	27.0	32.9	27.0	1.6
07/02/2012	00:40	31 4	25.2	31.4	25 2	1.2
07/02/2012	00.50	34.0	27.0	34 0	27.0	1.1
07/02/2012	01:00	34 0	25.7	34.0	25.7	1.7
07/02/2012	01:10	33 2	24 8	33 2	24.8	1.5
07/02/2012	01:20	34.9	23 0	34.9	23 0	1.6
07/02/2012	01:30	30 4	25.9	30.4	25 9	1.8
07/02/2012	01.40	32.6	24.7	32 6	24 7	1.8
07/02/2012	01:50	31.1	26.0	31.1	26 0	1.7
07/02/2012	02.00	31.2	25 3	31.2	25.3	1.6
07/02/2012	02:10	32 2	23 6	32 2	23.6	1.6
07/02/2012	02.20	30.6	26 9	30 6	26.9	1.7
07/02/2012	02:30	30.9	23 4	30 9	23 4	1.7
07/02/2012	02:40	31.9	24.3	31.9	24 3	1.9
07/02/2012	02.50	32.0	23 4	32.0	23 4	1.8
07/02/2012	03:00	32 4	23.0	32.4	23 0	1.9
07/02/2012	03:10	34.8	22 5	34.8	22.5	1 8
07/02/2012	03:20	33.3	22.7	33 3	22.7	1.3
07/02/2012	03:30	33 0	21.8	33.0	21.8	1.4

09/02/2012	02:30	23 4	30.7	23 4	30.7	0 6
09/02/2012	02:40	25.1	33 4	25.1	33 4	0.7
09/02/2012	02:50	25 0	30.8	25 0	30 8	0 8
09/02/2012	03:00	26.9	26 6	26 9	26 6	1.1
09/02/2012	03:10	26 8	26 0	26 8	26 0	1.1
09/02/2012	03:20	27.8	27,1	27.8	27,1	0 6
09/02/2012	03:30	27.8	27.4	27.8	27,4	0 6
09/02/2012	03 40	28 7	27.8	28.7	27.8	0.7
09/02/2012	03:50	29 2	29.0	29.2	29 0	0 6
09/02/2012	04:00	29 2	28.2	29 2	28 2	0.3
09/02/2012	04:10	29 3	27.6	29 3	27.6	0 6
09/02/2012	04:20	30 0	28.3	30 0	28 3	0.3
09/02/2012	04:30	30 9	29.0	30.9	29.0	0 2
09/02/2012	04:40	31.7	30.9	31.7	30 9	0 0
09/02/2012	04:50	31.4	29.2	31 4	29.2	0.5
09/02/2012	05:00	31.3	29.0	31.3	29 0	0 4
09/02/2012	05:10	32.0	28 8	32 0	28 8	0 2
09/02/2012	05:20	32.7	29 8	32.7	29 8	0 0
09/02/2012	05:30	35.3	29 6	35 3	29 6	0.0
09/02/2012	05:40	37.2	31.1	37.2	31.1	0 0
09/02/2012	05:50	35.3	32.2	35 3	32 2	0.1
09/02/2012	06:00	35 5	33.7	35 5	33.7	0.0
09/02/2012	06:10	38.1	34 0	38.1	34 0	0 0
09/02/2012	06:20	39 6	34.6	39 6	34 6	0.0
09/02/2012	06:30	40 4	35.0	40.4	35 0	0 0
09/02/2012	06:40	39 5	35.7	39 5	35.7	0.0
09/02/2012	06:50	38 6	35.1	38 6	35.1	0 0
09/02/2012	23:00	34 5	35 5	34 5	35.5	3.2
09/02/2012	23:10	31.5	36.8	31.5	36.8	2.8
09/02/2012	23:20	34.3	34 6	34.3	34 6	3 3
09/02/2012	23:30	34 3	33.7	34.3	33.7	3.2
09/02/2012	23:40	35 0	33 8	35.0	33 8	3 5
09/02/2012	23:50	34.1	32.5	34.1	32.5	3.5
10/02/2012	00:00	34.0	33.4	34.0	33 4	3 5
10/02/2012	00:10	33.5	31.3	33.5	31.3	3 4
10/02/2012	00:20	36 7	31.2	36.7	31.2	3.7
10/02/2012	00:30	35.6	31.1	35 6	31,1	3 8
10/02/2012	00.40	37,7	32.9	37.7	32.9	4.1
10/02/2012	00:50	39.8	33 0	39.8	33 0	4 2
10/02/2012	01:00	35.1	34 5	35 1	34,5	3.8
10/02/2012	01:10	40 1	33.9	40.1	33.9	4.3
10/02/2012	01:20	39.1	33 4	39.1	33 4	4.1
10/02/2012	01:30	40 5	33.4	40 5	33 4	4 3
10/02/2012	01:40	35.6	37.4	35.6	37 4	3 7
10/02/2012	01:50	36 8	38 5	36 8	38 5	3 6
10/02/2012	02.00	36 3	36.1	36.3	36.1	3.7
10/02/2012	02:10	35.6	37.3	35 6	37.3	3 5
10/02/2012	02.20	34.5	40.1	34.5	40.1	3 5
10/02/2012	02:30	35.8	40 5	35.8	40 5	3 6
10/02/2012	02.40	38 4	37 4	38.4	37.4	3.7
10/02/2012	02:50	36 9	35 3	36.9	35 3	3 8
10/02/2012	03.00	38 0	34.5	38 0	34.5	3 9
10/02/2012	03:10	36 8	33 4	36.8	33 4	3 6
10/02/2012	03:20	37.8	34 4	37 8	34,4	3.7
10/02/2012	03:30	35 8	34.3	35.8	34 3	3 4
10/02/2012	03:40	34.0	36 1	34 0	36 1	3 3
10/02/2012	03.50	33.1	37.8	33.1	37 8	3 3
10/02/2012	04:00	35.2	36 4	35 2	36.4	3.4
10/02/2012	04:10	33 2	37.1	33 2	37.1	3 4
10/02/2012	04:20	36.5	35 8	36.5	35 8	3.7
10/02/2012	04.30	38 6	35 9	38 6	35.9	3.8
10/02/2012	04:40	39.3	34 6	39.3	34 6	3 9
10/02/2012	04:50	37.1	34 2	37,1	34 2	3.6
10/02/2012	05:00	37.2	34 8	37.2	34 8	3 3
10/02/2012	05:10	37.4	35.1	37.4	35.1	3 3
10/02/2012	05:20	42.3	33 7	42.3	33 7	3.3
10/02/2012	05:30	42.3	35 9	42 3	35,9	2.9
10/02/2012	05.40	42 6	37.0	42.6	37.0	3 0
10/02/2012	05:50	40.4	36 5	40 4	36 5	3.1
10/02/2012	06:00	37.0	37.3	37.0	37.3	3.4
10/02/2012	06:10	42.6	37.2	42 6	37.2	3.4
10/02/2012	06:20	42 0	36 4	42 0	36 4	3.4
10/02/2012	06:30	42 2	37.8	42.2	37.8	3,1
10/02/2012	06:40	43,7	39.5	43,7	39 5	3.2
10/02/2012	06:50	42,3	38.0	42.3	38 0	3.0
10/02/2012	23:00	30 3	36 5	30 3	36 5	0.9
10/02/2012	23:10	32.5	37.3	32.5	37.3	0.8
10/02/2012	23:20	32.5	35 3	32.5	35 3	0.7
10/02/2012	23:30	31.3	35.9	31.3	35 9	0 8
10/02/2012	23:40	32.9	34.0	32.9	34 0	0.8
10/02/2012	23:50	29 2	34.1	29 2	34.1	0.9
11/02/2012	00:00	27.7	33.1	27.7	33 1	0.9
11/02/2012	00:10	26.9	33.8	26 9	33 8	1.2
11/02/2012	00 20	29.5	34.2	29.5	34.2	1.2
11/02/2012	00:30	27.2	33.1	27.2	33.1	1.2
11/02/2012	00 40	26 4	34.0	26 4	34.0	1.0
11/02/2012	00:50	27.0	32.7	27.0	32.7	1.1
11/02/2012	01:00	26 5	33.5	26 5	33.5	1.0
11/02/2012	01:10	28.7	32.9	28.7	32.9	0.9

11/02/2012	01:20	27.8	33.9	27.8	33.9	2.0
11/02/2012	01:30	29.0	35.3	29.0	35.3	2.6
11/02/2012	01:40	31.5	34.9	31.5	34.9	2.1
11/02/2012	01:50	29.1	34.9	29.1	34.9	1.7
11/02/2012	02:00	27.9	30.8	27.9	30.8	1.4
11/02/2012	02:10	28.0	31.8	28.0	31.8	1.3
11/02/2012	02:20	26.4	30.6	26.4	30.6	1.7
11/02/2012	02:30	25.5	32.1	25.5	32.1	1.4
11/02/2012	02:40	25.5	33.9	25.5	33.9	1.2
11/02/2012	02:50	26.2	35.8	26.2	35.8	1.6
11/02/2012	03:00	26.5	34.7	26.5	34.7	1.1
11/02/2012	03:10	27.3	32.1	27.3	32.1	1.8
11/02/2012	03:20	28.9	31.2	28.9	31.2	1.5
11/02/2012	03:30	28.6	30.5	28.6	30.5	1.5
11/02/2012	03:40	27.3	30.1	27.3	30.1	1.7
11/02/2012	03:50	27.6	31.9	27.6	31.9	1.4
11/02/2012	04:00	28.7	34.2	28.7	34.2	1.6
11/02/2012	04:10	29.0	33.1	29.0	33.1	1.4
11/02/2012	04:20	27.9	39.1	27.9	39.1	1.4
11/02/2012	04:30	29.5	35.3	29.5	35.3	1.5
11/02/2012	04:40	28.1	32.1	28.1	32.1	1.3
11/02/2012	04:50	28.9	34.4	28.9	34.4	1.5
11/02/2012	05:00	29.1	36.1	29.1	36.1	1.5
11/02/2012	05:10	27.8	35.6	27.8	35.6	1.2
11/02/2012	05:20	29.6	36.8	29.6	36.8	1.4
11/02/2012	05:30	33.7	39.0	33.7	39.0	1.5
11/02/2012	05:40	31.6	39.3	31.6	39.3	1.5
11/02/2012	05:50	30.3	36.6	30.3	36.6	1.5
11/02/2012	06:00	30.7	34.3	30.7	34.3	1.5
11/02/2012	06:10	31.0	31.6	31.0	31.6	1.6
11/02/2012	06:20	32.4	34.5	32.4	34.5	1.8
11/02/2012	06:30	36.3	35.1	36.3	35.1	1.5
11/02/2012	06:40	34.6	35.6	34.6	35.6	1.8
11/02/2012	06:50	34.2	35.0	34.2	35.0	2.0
11/02/2012	23:00	35.7	34.1	35.7	34.1	1.8
11/02/2012	23:10	35.9	35.4	35.9	35.4	1.7
11/02/2012	23:20	34.4	35.0	34.4	35.0	1.6
11/02/2012	23:30	35.0	34.3	35.0	34.3	1.9
11/02/2012	23:40	34.3	34.0	34.3	34.0	1.8
11/02/2012	23:50	34.3	34.1	34.3	34.1	2.0
12/02/2012	00:00	35.2	32.7	35.2	32.7	2.1
12/02/2012	00:10	35.1	34.6	35.1	34.6	2.0
12/02/2012	00:20	33.2	33.1	33.2	33.1	2.0
12/02/2012	00:30	33.7	32.2	33.7	32.2	1.7
12/02/2012	00:40	31.7	32.5	31.7	32.5	1.7
12/02/2012	00:50	32.1	34.0	32.1	34.0	1.7
12/02/2012	01:00	32.7	35.0	32.7	35.0	1.8
12/02/2012	01:10	32.3	35.1	32.3	35.1	2.0
12/02/2012	01:20	32.8	32.3	32.8	32.3	2.2
12/02/2012	01:30	31.8	31.9	31.8	31.9	2.0
12/02/2012	01:40	31.3	29.9	31.3	29.9	1.8
12/02/2012	01:50	31.6	30.2	31.6	30.2	2.0
12/02/2012	02:00	31.3	29.6	31.3	29.6	2.0
12/02/2012	02:10	29.4	29.2	29.4	29.2	2.0
12/02/2012	02:20	30.9	30.1	30.9	30.1	2.0
12/02/2012	02:30	31.7	28.8	31.7	28.8	2.0
12/02/2012	02:40	30.5	28.6	30.5	28.6	2.1
12/02/2012	02:50	31.1	29.6	31.1	29.6	1.8
12/02/2012	03:00	31.0	28.9	31.0	28.9	1.8
12/02/2012	03:10	28.9	28.2	28.9	28.2	1.9
12/02/2012	03:20	30.0	27.5	30.0	27.5	2.1
12/02/2012	03:30	29.3	26.9	29.3	26.9	1.9
12/02/2012	03:40	29.8	26.8	29.8	26.8	1.9
12/02/2012	03:50	28.9	28.6	28.9	28.6	1.9
12/02/2012	04:00	29.1	27.2	29.1	27.2	1.8
12/02/2012	04:10	30.0	26.5	30.0	26.5	1.7
12/02/2012	04:20	28.0	26.3	28.0	26.3	1.7
12/02/2012	04:30	28.8	25.5	28.8	25.5	1.6
12/02/2012	04:40	29.6	26.7	29.6	26.7	2.0
12/02/2012	04:50	30.0	26.3	30.0	26.3	2.2
12/02/2012	05:00	31.6	26.2	31.6	26.2	2.3
12/02/2012	05:10	31.9	26.9	31.9	26.9	2.2
12/02/2012	05:20	32.0	25.9	32.0	25.9	1.6
12/02/2012	05:30	31.0	26.3	31.0	26.3	1.7
12/02/2012	05:40	32.9	26.3	32.9	26.3	1.7
12/02/2012	05:50	32.3	26.2	32.3	26.2	1.5
12/02/2012	06:00	32.2	27.5	32.2	27.5	1.6
12/02/2012	06:10	32.1	27.8	32.1	27.8	1.7
12/02/2012	06:20	32.7	27.3	32.7	27.3	1.6
12/02/2012	06:30	34.8	27.8	34.8	27.8	1.8
12/02/2012	06:40	35.5	31.2	35.5	31.2	1.8
12/02/2012	06:50	34.0	27.8	34.0	27.8	1.8
12/02/2012	23:00	29.8	30.2	29.8	30.2	1.2
12/02/2012	23:10	29.3	30.4	29.3	30.4	0.9
12/02/2012	23:20	26.6	32.3	26.6	32.3	1.0
12/02/2012	23:30	29.4	30.6	29.4	30.6	0.8
12/02/2012	23:40	29.5	30.7	29.5	30.7	1.4
12/02/2012	23:50	29.9	29.9	29.9	29.9	1.5
13/02/2012	00:00	28.1	29.3	28.1	29.3	1.5

13/02/2013	00:10	26.7	30 0	26.7	30 0	1 6
13/02/2014	00 20	27.0	28.5	27.0	28 5	1,4
13/02/2015	00:30	24.0	27,1	24 0	27.1	0 8
13/02/2016	00.40	24.1	28 1	24.1	28.1	1.0
13/02/2017	00:50	22.5	25 9	22.5	25.9	1 2
13/02/2018	01:00	23.1	25 9	23.1	25 9	1.2
13/02/2019	01:10	24.2	23 7	24 2	23 7	1,1
13/02/2020	01:20	24 4	22,9	24 4	22.9	1,2
13/02/2021	01:30	24 4	22.3	24.4	22.3	1,1
13/02/2022	01:40	22 2	23.1	22 2	23.1	0 8
13/02/2023	01:50	23.1	24.3	23.1	24 3	1.0
13/02/2024	02:00	23 8	24.9	23 8	24.9	1 1
13/02/2025	02:10	25.3	25.5	25.3	25 5	1.1
13/02/2026	02:20	23.5	23.9	23 5	23.9	0.7
13/02/2027	02.30	23.9	24,7	23.9	24.7	1,1
13/02/2028	02:40	24 2	25.6	24.2	25 6	0.5
13/02/2029	02:50	23 0	25 2	23 0	25.2	0 4
13/02/2030	03 00	23 8	25.1	23.8	25.1	0.4
13/02/2031	03:10	25.8	27.9	25 6	27.9	0 9
13/02/2032	03 20	27,2	26.7	27.2	26 7	1.7
13/02/2033	03:30	30.6	26 4	30 6	26.4	2 2
13/02/2034	03.40	32.5	26 6	32.5	26 6	2.5
13/02/2035	03:50	34.2	26.7	34 2	26.7	2.5
13/02/2036	04:00	35.1	26 2	35.1	26.2	2.8
13/02/2037	04:10	33 4	26.9	33.4	26 9	2.6
13/02/2038	04:20	35.7	26.3	35.7	26.3	2.6
13/02/2039	04:30	37.8	25.8	37.8	25 8	2.9
13/02/2040	04:40	37.4	28 4	37 4	28.4	2.9
13/02/2041	04:50	37.2	30 6	37.2	30.6	2.8
13/02/2042	05:00	37.4	30.4	37 4	30 4	2.9
13/02/2043	05:10	40.9	30 8	40.9	30.8	3 4
13/02/2044	05:20	40 6	32.4	40.6	32 4	3.2
13/02/2045	05:30	41.0	33 6	41.0	33 6	3 3
13/02/2046	05:40	43 2	34.8	43.2	34 8	3.4
13/02/2047	05:50	42.4	34.9	42 4	34 9	3.2
13/02/2048	06:00	41.0	34.1	41,0	34 1	3.2
13/02/2049	06:10	39 8	34.3	39 8	34 3	3.0
13/02/2050	06:20	40.9	35.7	40 9	35.7	2,8
13/02/2051	06:30	41,5	37.8	41.5	37 8	3.0
13/02/2052	06:40	42.8	39,1	42 8	39.1	3 2
13/02/2053	06:50	44 0	37 6	44.0	37 6	3.7
13/02/2150	23:00	38.1	34 5	38 1	34.5	2.5
13/02/2151	23:10	40 9	35.3	40 9	35 3	2 8
13/02/2152	23 20	37,1	34.0	37,1	34 0	2.5
13/02/2153	23:30	37.8	34,1	37.8	34.1	2.9
13/02/2154	23:40	39 6	32.0	39.6	32.0	3.0
13/02/2155	23:50	38 5	32.5	38 5	32 5	3.7
14/02/2012	00.00	42.2	33,1	42.2	33 1	3,9
14/02/2012	00 10	39 4	33 7	39 4	33.7	3 6
14/02/2012	00:20	41 4	34.7	41 4	34 7	3 6
14/02/2012	00:30	42.3	32.6	42.3	32 6	4 0
14/02/2012	00:40	41.0	34 4	41.0	34 4	3.8
14/02/2012	00:50	41.8	34.9	41 8	34.9	3 6
14/02/2012	01:00	38.8	35 5	38 8	35.5	3 2
14/02/2012	01:10	35 0	35 6	35 0	35 6	2.9
14/02/2012	01:20	37.5	36.7	37.5	36.7	3 4
14/02/2012	01:30	36 1	37.5	36 1	37.5	3 3
14/02/2012	01:40	34,7	39 0	34.7	39.0	3 3
14/02/2012	01:50	37.3	37.0	37.3	37.0	3 2
14/02/2012	02.00	36 2	33 2	36 2	33 2	3 0
14/02/2012	02:10	38 3	31.4	38 3	31 4	3 4
14/02/2012	02.20	40 2	30.2	40.2	30 2	3.8
14/02/2012	02:30	39.4	30 6	39 4	30.6	3 4
14/02/2012	02.40	37.4	29.6	37.4	29 6	3 0
14/02/2012	02.50	38.2	32.9	38 2	32.9	3,0
14/02/2012	03.00	38 7	32.9	38.7	32.9	3 4
14/02/2012	03:10	41.7	34 1	41,7	34.1	3 8
14/02/2012	03:20	40 2	34.8	40 2	34 8	3 6
14/02/2012	03 30	38.3	34.1	38 3	34.1	3 3
14/02/2012	03:40	37.4	33 3	37 4	33.3	3.3
14/02/2012	03 50	37.8	33 6	37 8	33 6	3.3
14/02/2012	04:00	35 9	35 2	35 9	35 2	2.9
14/02/2012	04:10	38 2	34.8	38 2	34 8	3 3
14/02/2012	04:20	34 2	34,3	34 2	34 3	3,0
14/02/2012	04:30	34,3	33.3	34 3	33 3	2,7
14/02/2012	04:40	36.7	31.1	36 7	31.1	2.4
14/02/2012	04:50	33 5	31.8	33.5	31.8	1.9
14/02/2012	05:00	36 6	30 4	36 6	30 4	1,9
14/02/2012	05:10	34 5	30.7	34 5	30 7	2 2
14/02/2012	05 20	38.5	27,3	38.5	27.3	2.3
14/02/2012	05:30	40.9	29 3	40 9	29.3	2,5
14/02/2012	05:40	41.1	28 8	41.1	28 8	2.7
14/02/2012	05.50	40.5	29 4	40 5	29 4	2.5
14/02/2012	06:00	40 3	30 2	40 3	30 2	2.7
14/02/2012	06:10	41,4	31 2	41.4	31.2	2.6
14/02/2012	06 20	42.4	33 8	42 4	33 8	2.3
14/02/2012	06:30	42.8	37.8	42 8	37.8	2,9
14/02/2012	06 40	43 2	37,1	43 2	37,1	3 0
14/02/2012	06.50	43 3	35 1	43 3	35.1	3 0

14/02/2012	23 00	38 6	36 2	35.5	38 6	36.2	35 5	2.8
14/02/2012	23:10	38.7	37.6	33 5	38.7	37.6	33 5	2 8
14/02/2012	23:20	37.9	37.1	33.8	37.9	37.1	33.8	3.0
14/02/2012	23:30	39.0	36 5	35 0	39.0	36 5	35 0	3.1
14/02/2012	23:40	38 4	35.4	32.5	38 4	35 4	32.5	3.1
14/02/2012	23:50	36 8	34 5	34.4	36 8	34.5	34.4	3.1
15/02/2012	00.00	37.3	34.4	36 8	37.3	34 4	36 8	3.2
15/02/2012	00:10	39 8	34.9	36.5	39 8	34.9	36.5	3.5
15/02/2012	00:20	38.9	33 8	36.1	38 9	33.8	36.1	4 0
15/02/2012	00.30	40 0	33.2	37.9	40 0	33 2	37.9	3.6
15/02/2012	00 40	41.6	34 9	37.8	41.6	34.9	37.8	4.1
15/02/2012	00.50	41.9	33.1	37.7	41.9	33.1	37.7	4.2
15/02/2012	01.00	41.6	33.7	37.9	41 6	33.7	37.9	4.0
15/02/2012	01:10	41.2	36 0	35 8	41.2	36.0	35 8	3 9
15/02/2012	01:20	40 0	34.9	35.7	40 0	34.9	35.7	3.9
15/02/2012	01:30	40 0	35.3	35 8	40 0	35.3	35 8	3 8
15/02/2012	01:40	39 3	36.5	35.9	39.3	36 5	35.9	3.6
15/02/2012	01:50	38.7	36 3	33.4	38.7	36.3	33 4	3.7
15/02/2012	02.00	36 8	36.1	32.1	36.8	36.1	32.1	3 4
15/02/2012	02:10	36.8	33.9	33.0	36 8	33.9	33 0	3.3
15/02/2012	02:20	36.5	34 4	30.9	36 5	34.4	30.9	3.1
15/02/2012	02:30	36 6	33.7	29 8	36 6	33.7	29.8	3 0
15/02/2012	02:40	36.9	35.0	30.2	36 9	35.0	30 2	3 2
15/02/2012	02:50	38.5	34.6	30 8	38.5	34 6	30.8	3 5
15/02/2012	03 00	40.5	32.2	32.8	40 5	32 2	32.8	3 6
15/02/2012	03:10	42 4	32.7	36.8	42.4	32.7	36.8	4.2
15/02/2012	03:20	42 2	30 3	37.5	42.2	30 3	37.5	4 3
15/02/2012	03:30	42.9	28 2	37.5	42.9	28 2	37.5	4 4
15/02/2012	03 40	44 4	29 8	37.6	44.4	29.8	37.6	4 4
15/02/2012	03:50	45.3	30 7	39.9	45.3	30.7	39 9	4 6
15/02/2012	04:00	46.1	32.8	40.4	46.1	32.8	40.4	4.8
15/02/2012	04:10	45.0	35 8	39.7	45 0	35.8	39.7	4 2
15/02/2012	04:20	43 4	36 8	38.7	43 4	36 8	38.7	4.3
15/02/2012	04:30	42.1	35 4	38.9	42.1	35.4	38 9	4 0
15/02/2012	04:40	42.7	38 1	37.9	42.7	38.1	37.9	4 2
15/02/2012	04:50	43 4	36 8	39 3	43 4	36 8	39.3	4 3
15/02/2012	05 00	42.3	39 3	37.8	42 3	39.3	37.8	4 2
15/02/2012	05:10	39.7	37.9	37.4	39.7	37.9	37.4	3 6
15/02/2012	05:20	41.3	36 8	39.4	41.3	36 8	39 4	3 7
15/02/2012	05:30	40 5	37.1	39.9	40.5	37.1	39 9	3 6
15/02/2012	05:40	41 8	36.0	38 8	41.8	36 0	38.8	3 5
15/02/2012	05:50	42.6	36 9	38.7	42 6	36.9	38.7	4.1
15/02/2012	06.00	42.9	36.3	40.0	42.9	36 3	40.0	3.7
15/02/2012	06:10	44.1	35 6	40.7	44.1	35 6	40.7	3.8
15/02/2012	06:20	42.7	36 0	42.0	42.7	36 0	42.0	3.7
15/02/2012	06:30	44 0	37.5	40.9	44 0	37.5	40.9	3 7
15/02/2012	06:40	44 5	37.8	42 2	44.5	37 8	42 2	3.7
15/02/2012	06.50	45 2	36 8	44 6	45 2	36 8	44.6	3 9
15/02/2012	23 00	38.9	35 8	36.2	38 9	35 8	36 2	3 4
15/02/2012	23:10	40 8	36 3	34.4	40 8	36 3	34.4	3.5
15/02/2012	23:20	39.5	35 3	32.7	39 5	35.3	32.7	3.2
15/02/2012	23:30	35 0	34.8	31 8	35.0	34 8	31.8	2.6
15/02/2012	23:40	37.3	35 4	31.7	37.3	35.4	31.7	2.9
15/02/2012	23:50	35.3	34 5	31.0	35 3	34.5	31.0	2.7
16/02/2012	00 00	34 4	35 0	30.4	34 4	35.0	30 4	2.6
16/02/2012	00:10	34.3	34.9	28.3	34.3	34.9	28 3	2.4
16/02/2012	00:20	32 4	33.5	28 6	32 4	33 5	28 6	2.5
16/02/2012	00:30	33.7	32 8	31.4	33.7	32.8	31 4	2.3
16/02/2012	00 40	31.6	33.9	28 1	31.6	33.9	28.1	2.2
16/02/2012	00:50	31.2	32 0	27.0	31 2	32.0	27.0	2.4
16/02/2012	01.00	32 2	31.0	27.1	32 2	31.0	27.1	2.5
16/02/2012	01:10	33.3	32 3	27.1	33 3	32.3	27.1	2.7
16/02/2012	01:20	32 0	29.9	25 5	32.0	29.9	25.5	2.2
16/02/2012	01:30	31.3	29 9	27.6	31 3	29.9	27.6	2.5
16/02/2012	01:40	33.0	30 1	29.7	33 0	30.1	29.7	2.4
16/02/2012	01:50	33 0	29.8	26.1	33 0	29 8	26 1	2.5
16/02/2012	02 00	34.3	30 0	27.0	34 3	30 0	27.0	2.8
16/02/2012	02:10	36.7	30.1	28.2	36.7	30.1	28 2	3 2
16/02/2012	02:20	35.6	29 5	27.2	35 6	29.5	27.2	3 0
16/02/2012	02:30	33 8	30.5	25 7	33.8	30.5	25.7	2.6
16/02/2012	02:40	31.9	31.7	25.3	31.9	31.7	25 3	2 8
16/02/2012	02:50	34 0	29.9	28 5	34.0	29.9	28.5	2.7
16/02/2012	03 00	33 9	28.5	28.5	33 9	28.5	28 5	2 6
16/02/2012	03:10	36 0	31.7	28 6	36 0	31.7	28.6	2.8
16/02/2012	03:20	31.2	30.1	24.7	31.2	30.1	24 7	2 2
16/02/2012	03:30	31.0	29.1	24 8	31.0	29.1	24.8	2.5
16/02/2012	03:40	29 0	30.2	24 5	29.0	30 2	24.5	2.0
16/02/2012	03 50	30.6	30 7	26 8	30 6	30.7	26 8	2.1
16/02/2012	04.00	31 6	32.2	29 3	31.6	32 2	29.3	2.1
16/02/2012	04:10	31.3	32.2	27.4	31.3	32 2	27 4	2.2
16/02/2012	04:20	30.3	29 4	28.1	30 3	29 4	28.1	2.2
16/02/2012	04 30	32 1	29.0	32 0	32.1	29.0	32 0	2 4
16/02/2012	04:40	33.9	29.7	31.1	33.9	29.7	31.1	2.2
16/02/2012	04:50	35 3	28.7	33 6	35.3	28.7	33.6	2.7
16/02/2012	05:00	35.1	31.3	33.9	35 1	31.3	33 9	2.5
16/02/2012	05:10	37.6	30 6	34.7	37 6	30 6	34.7	3.1
16/02/2012	05:20	39.3	30.8	39 4	39.3	30 8	39 4	3 2
16/02/2012	05:30	40 5	28 6	37.0	40.5	28 6	37.0	3 4
16/02/2012	05:40	39.5	32.2	39 6	39.5	32 2	39 6	3 0

16/02/2012	05:50	39 0	33.4	38.1	39.0	33.4	38.1	2.7
16/02/2012	06:00	38.2	33.1	39.8	38.2	33.1	39 8	2.6
16/02/2012	06:10	39.7	33.8	40.1	39.7	33.8	40.1	3.0
16/02/2012	06:20	41.7	35 6	41.0	41.7	35.6	41.0	3.3
16/02/2012	06:30	41.3	37.5	40 3	41.3	37.5	40.3	3 1
16/02/2012	06:40	42.1	37.6	42 8	42.1	37.6	42.8	3 1
16/02/2012	06:50	42.9	36 4	44.8	42.9	36 4	44 8	3 2
16/02/2012	23.00	38.5	37.1	31.9	38.5	37.1	31.9	3.4
16/02/2012	23:10	38 5	36 8	31.4	38.5	36.8	31.4	3.2
16/02/2012	23:20	36 0	35.8	28 1	36.0	35 8	28 1	2.9
16/02/2012	23:30	35 6	35.8	28.2	35 6	35.8	28.2	3.1
16/02/2012	23:40	33 8	35.0	28 4	33.8	35 0	28 4	2 8
16/02/2012	23:50	34 3	35 1	27.0	34 3	35.1	27.0	2.7
17/02/2012	00 00	31.7	34.6	27.5	31,7	34 6	27.5	2.1
17/02/2012	00:10	32.9	35.2	27.5	32.9	35.2	27.5	2.4
17/02/2012	00:20	34.0	33 6	27.9	34 0	33.6	27.9	2 6
17/02/2012	00:30	35.7	32.3	28.9	35.7	32.3	28.9	2.7
17/02/2012	00:40	37.9	32.5	34.7	37.9	32.5	34.7	3 4
17/02/2012	00:50	45.3	32.6	36 0	45.3	32 6	36.0	4.2
17/02/2012	01:00	45 9	32.3	37.1	45 9	32.3	37.1	4 9
17/02/2012	01:10	46.3	31.8	36.3	46 3	31.8	36.3	4 5
17/02/2012	01:20	36 3	30.3	29 3	36.3	30.3	29.3	3,4
17/02/2012	01:30	32.3	30 0	26.2	32.3	30.0	26 2	2.3
17/02/2012	01:40	32.0	34.3	27.3	32.0	34.3	27.3	2.9
17/02/2012	01:50	35.3	37.0	29.4	35.3	37.0	29.4	2.8
17/02/2012	02:00	37.3	37.0	29.4	37.3	37.0	29 4	3.0
17/02/2012	02:10	37.2	35.6	29 3	37.2	35 6	29.3	3.2
17/02/2012	02:20	35.5	31.9	27.5	35 5	31.9	27.5	2.7
17/02/2012	02:30	35 8	31.1	28 8	35.8	31.1	28.8	2.8
17/02/2012	02:40	36.3	30 7	28.6	36 3	30.7	28 6	2.6
17/02/2012	02:50	34 3	33.5	28.1	34.3	33 5	28.1	2.4
17/02/2012	03:00	34.1	33.8	27.5	34.1	33 8	27.5	2.2
17/02/2012	03:10	30.6	34.5	25.9	30 6	34.5	25.9	1.7
17/02/2012	03:20	27.9	32.9	26 5	27.9	32.9	26.5	1 4
17/02/2012	03:30	27.7	31.5	26.6	27 7	31.5	26 6	0.7
17/02/2012	03:40	29 3	33.1	27.8	29.3	33.1	27.8	1.2
17/02/2012	03:50	32 9	31 2	30.7	32.9	31.2	30 7	2.2
17/02/2012	04:00	35.6	30 8	32.1	35 6	30.8	32.1	2.5
17/02/2012	04:10	37.4	30 9	31 8	37.4	30 9	31.8	2 8
17/02/2012	04:20	38.5	29 5	33.5	38 5	29 5	33 5	3 0
17/02/2012	04:30	34.1	30.6	30 4	34.1	30 6	30.4	2.0
17/02/2012	04:40	33.1	31.5	30.0	33 1	31.5	30 0	1 6
17/02/2012	04:50	33.9	32.7	30 5	33.9	32.7	30.5	2.2
17/02/2012	05:00	36.3	34 2	32.9	36 3	34.2	32 9	2 6
17/02/2012	05:10	35 5	33.8	31.5	35.5	33 8	31.5	2.2
17/02/2012	05:20	33 8	33 9	36 4	33 8	33.9	36 4	1 6
17/02/2012	05:30	36.7	32 8	37.6	36.7	32 8	37.6	2.2
17/02/2012	05:40	37.3	32.1	37 6	37.3	32.1	37.6	2.3
17/02/2012	05:50	36.7	33 2	35.0	36 7	33 2	35 0	2 3
17/02/2012	06:00	35.1	33.2	35 8	35.1	33 2	35.8	2.1
17/02/2012	06:10	37.0	32 3	39.1	37.0	32.3	39.1	1.6
17/02/2012	06:20	36 9	34.7	42:1	36.9	34 7	42.1	1.9
17/02/2012	06.30	39.1	35.8	43 4	39 1	35 8	43 4	2 2
17/02/2012	06:40	39 4	36 2	43.8	39 4	36.2	43.8	1.5
17/02/2012	06:50	40 5	34.8	42.9	40.5	34.8	42.9	1.7
17/02/2012	23.00	42.7	36 6	38.9	42.7	36.6	38 9	2 2
17/02/2012	23:10	44.8	39.5	41.7	44.8	39.5	41.7	2.2
17/02/2012	23 20	41.3	37.0	39.4	41.3	37.0	39 4	1.7
17/02/2012	23:30	40.5	37.5	41.1	40 5	37.5	41.1	1.6
17/02/2012	23:40	47.1	37.0	44.1	47.1	37.0	44.1	2.0
17/02/2012	23:50	45.0	40 4	44 3	45.0	40 4	44.3	2.1
18/02/2012	00:00	45 8	40.6	42 0	45 8	40.6	42.0	1 9
18/02/2012	00:10	43 2	41.6	41.4	43.2	41 6	41.4	1.9
18/02/2012	00:20	45 3	40.3	44.7	45.3	40 3	44 7	2 0
18/02/2012	00.30	47.9	42.3	45.6	47.9	42.3	45 6	2.5
18/02/2012	00:40	47.9	42.5	42 2	47.9	42.5	42.2	2.5
18/02/2012	00:50	43 0	44 3	39.3	43.0	44.3	39 3	2.4
18/02/2012	01:00	41.3	45.4	40 4	41.3	45 4	40.4	1.9
18/02/2012	01:10	45 7	44.3	44.2	45 7	44.3	44.2	2.6
18/02/2012	01:20	46.9	43.6	40.5	46.9	43 6	40.5	3.2
18/02/2012	01:30	41,3	47.3	39.3	41.3	47.3	39 3	1.9
18/02/2012	01:40	39 1	43 2	36 7	39.1	43 2	36.7	1.8
18/02/2012	01:50	41.6	43.9	39.1	41.6	43.9	39 1	1.8
18/02/2012	02:00	40 4	38 4	37.7	40.4	38 4	37.7	1.6
18/02/2012	02.10	40 7	41.8	35.8	40.7	41.8	35 8	1 7
18/02/2012	02 20	39.3	40.9	41 2	39.3	40.9	41.2	2:1
18/02/2012	02:30	48 1	38.5	41 9	48.1	38 5	41.9	2.4
18/02/2012	02:40	42.1	37.8	38.9	42.1	37 8	38 9	2.0
18/02/2012	02:50	38.7	38 4	38 2	38.7	38 4	38.2	1.9
18/02/2012	03 00	42 4	37.4	41.6	42 4	37.4	41.6	2.5
18/02/2012	03:10	42 6	39 3	43.6	42 6	39.3	43 6	2.6
18/02/2012	03.20	48 6	39.7	45 4	48.6	39 7	45 4	3 4
18/02/2012	03.30	49.6	38 6	43.7	49 6	38.6	43.7	3.0
18/02/2012	03:40	47.7	40 8	42.0	47.7	40 8	42.0	2.8
18/02/2012	03.50	45.7	38.3	41 4	45 7	38.3	41.4	2.6
18/02/2012	04:00	46.0	43 0	40.7	46.0	43.0	40.7	2 6
18/02/2012	04:10	41 0	44 8	36.1	41.0	44 8	36 1	1.8
18/02/2012	04:20	35 8	46.9	35.9	35 8	46.9	35 9	1 4
18/02/2012	04:30	38 2	46 0	37 6	38.2	46 0	37.6	1.9

18/02/2012	04:40	44.6	44.1	39.1	44.6	44.1	39.1	2.2
18/02/2012	04:50	44.1	43.0	41.0	44.1	43.0	41.0	2.4
18/02/2012	05:00	42.9	41.7	39.6	42.9	41.7	39.6	2.5
18/02/2012	05:10	44.2	38.5	38.5	44.2	38.5	38.5	2.3
18/02/2012	05:20	41.8	34.2	41.4	41.8	34.2	41.4	1.9
18/02/2012	05:30	48.5	38.5	46.3	48.5	38.5	46.3	2.4
18/02/2012	05:40	43.8	39.0	45.1	43.8	39.0	45.1	2.2
18/02/2012	05:50	47.0	40.4	43.0	47.0	40.4	43.0	2.0
18/02/2012	06:00	44.8	39.5	42.9	44.8	39.5	42.9	1.9
18/02/2012	06:10	43.6	42.2	42.9	43.6	42.2	42.9	2.0
18/02/2012	06:20	41.9	43.0	43.1	41.9	43.0	43.1	2.0
18/02/2012	06:30	45.2	45.1	44.6	45.2	45.1	44.6	2.0
18/02/2012	06:40	43.8	47.0	45.8	43.8	47.0	45.8	2.4
18/02/2012	06:50	47.6	45.2	47.7	47.6	45.2	47.7	2.6
18/02/2012	23:00	46.1	40.4	39.0	46.1	40.4	39.0	4.2
18/02/2012	23:10	43.8	41.0	37.9	43.8	41.0	37.9	3.8
18/02/2012	23:20	42.7	40.7	38.4	42.7	40.7	38.4	4.2
18/02/2012	23:30	43.0	41.5	38.4	43.0	41.5	38.4	4.2
18/02/2012	23:40	45.1	40.2	40.2	45.1	40.2	40.2	4.5
18/02/2012	23:50	46.4	38.6	39.6	46.4	38.6	39.6	4.7
19/02/2012	00:00	47.9	38.8	40.9	47.9	38.8	40.9	4.9
19/02/2012	00:10	47.6	37.4	38.2	47.6	37.4	38.2	5.0
19/02/2012	00:20	45.8	36.9	37.0	45.8	36.9	37.0	4.3
19/02/2012	00:30	43.2	39.2	34.6	43.2	39.2	34.6	4.1
19/02/2012	00:40	34.8	37.9	29.3	34.8	37.9	29.3	2.9
19/02/2012	00:50	32.3	38.7	31.6	32.3	38.7	31.6	2.5
19/02/2012	01:00	34.0	39.4	32.6	34.0	39.4	32.6	2.6
19/02/2012	01:10	35.8	39.9	30.5	35.8	39.9	30.5	3.0
19/02/2012	01:20	33.4	36.8	30.2	33.4	36.8	30.2	2.9
19/02/2012	01:30	32.7	36.3	28.7	32.7	36.3	28.7	2.7
19/02/2012	01:40	29.9	31.8	28.2	29.9	31.8	28.2	2.0
19/02/2012	01:50	29.8	30.2	26.8	29.8	30.2	26.8	2.8
19/02/2012	02:00	30.6	31.3	28.0	30.6	31.3	28.0	2.6
19/02/2012	02:10	31.9	31.5	28.2	31.9	31.5	28.2	2.5
19/02/2012	02:20	35.0	30.9	29.5	35.0	30.9	29.5	3.1
19/02/2012	02:30	38.0	30.5	31.4	38.0	30.5	31.4	3.4
19/02/2012	02:40	41.2	29.4	35.4	41.2	29.4	35.4	4.1
19/02/2012	02:50	41.1	28.6	33.1	41.1	28.6	33.1	4.1
19/02/2012	03:00	39.5	28.9	31.5	39.5	28.9	31.5	3.9
19/02/2012	03:10	40.0	29.9	31.0	40.0	29.9	31.0	3.6
19/02/2012	03:20	33.0	29.2	26.0	33.0	29.2	26.0	2.9
19/02/2012	03:30	31.4	30.0	25.2	31.4	30.0	25.2	2.8
19/02/2012	03:40	30.3	33.1	25.6	30.3	33.1	25.6	3.0
19/02/2012	03:50	31.0	33.9	28.6	31.0	33.9	28.6	2.7
19/02/2012	04:00	35.1	31.3	29.9	35.1	31.3	29.9	2.9
19/02/2012	04:10	32.1	31.8	26.5	32.1	31.8	26.5	2.4
19/02/2012	04:20	28.1	28.7	27.1	28.1	28.7	27.1	2.1
19/02/2012	04:30	32.9	27.5	30.3	32.9	27.5	30.3	3.0
19/02/2012	04:40	33.5	27.7	28.7	33.5	27.7	28.7	2.8
19/02/2012	04:50	31.9	28.8	29.5	31.9	28.8	29.5	2.5
19/02/2012	05:00	31.7	28.5	29.3	31.7	28.5	29.3	2.5
19/02/2012	05:10	30.8	28.1	30.1	30.8	28.1	30.1	2.1
19/02/2012	05:20	32.2	27.6	31.0	32.2	27.6	31.0	2.2
19/02/2012	05:30	30.7	29.1	29.5	30.7	29.1	29.5	2.0
19/02/2012	05:40	33.3	28.7	29.2	33.3	28.7	29.2	2.6
19/02/2012	05:50	31.0	28.3	28.2	31.0	28.3	28.2	2.4
19/02/2012	06:00	31.0	29.3	29.3	31.0	29.3	29.3	2.1
19/02/2012	06:10	30.5	28.1	30.7	30.5	28.1	30.7	1.6
19/02/2012	06:20	31.6	29.7	31.3	31.6	29.7	31.3	1.7
19/02/2012	06:30	34.3	29.9	34.3	34.3	29.9	34.3	2.1
19/02/2012	06:40	34.1	30.5	32.9	34.1	30.5	32.9	2.2
19/02/2012	06:50	34.8	28.6	33.2	34.8	28.6	33.2	2.2
19/02/2012	23:00	28.8	31.6	28.6	28.8	31.6	28.6	1.7
19/02/2012	23:10	28.9	31.8	26.8	28.9	31.8	26.8	1.4
19/02/2012	23:20	27.4	31.7	26.7	27.4	31.7	26.7	0.8
19/02/2012	23:30	26.6	31.3	26.4	26.6	31.3	26.4	0.2
19/02/2012	23:40	27.4	31.4	26.8	27.4	31.4	26.8	0.3
19/02/2012	23:50	25.2	30.4	24.2	25.2	30.4	24.2	0.3
20/02/2012	00:00	25.6	30.8	24.9	25.6	30.8	24.9	0.1
20/02/2012	00:10	25.9	31.9	25.8	25.9	31.9	25.8	0.3
20/02/2012	00:20	25.8	30.5	24.4	25.8	30.5	24.4	0.3
20/02/2012	00:30	25.1	30.4	25.0	25.1	30.4	25.0	0.3
20/02/2012	00:40	23.6	31.0	22.7	23.6	31.0	22.7	0.9
20/02/2012	00:50	24.1	29.7	22.5	24.1	29.7	22.5	1.0
20/02/2012	01:00	24.8	29.1	24.0	24.8	29.1	24.0	1.0
20/02/2012	01:10	25.8	29.5	23.6	25.8	29.5	23.6	0.8
20/02/2012	01:20	24.4	29.5	22.8	24.4	29.5	22.8	0.7
20/02/2012	01:30	24.3	28.7	22.2	24.3	28.7	22.2	0.5
20/02/2012	01:40	24.3	26.9	23.1	24.3	26.9	23.1	0.6
20/02/2012	01:50	24.7	27.7	23.5	24.7	27.7	23.5	1.0
20/02/2012	02:00	25.3	28.1	24.2	25.3	28.1	24.2	0.7
20/02/2012	02:10	24.9	30.2	24.2	24.9	30.2	24.2	0.3
20/02/2012	02:20	25.0	28.7	24.4	25.0	28.7	24.4	0.3
20/02/2012	02:30	25.5	28.9	24.5	25.5	28.9	24.5	0.4
20/02/2012	02:40	25.4	28.2	24.6	25.4	28.2	24.6	0.4
20/02/2012	02:50	25.4	28.9	24.7	25.4	28.9	24.7	0.4
20/02/2012	03:00	26.6	28.5	25.8	26.6	28.5	25.8	0.5
20/02/2012	03:10	26.3	28.6	26.5	26.3	28.6	26.5	0.4
20/02/2012	03:20	27.8	28.6	28.4	27.8	28.6	28.4	0.4

20/02/2012	03:30	27.5	28.6	26.8	27.5	28.6	26.8	0.4
20/02/2012	03:40	26.8	28.9	25.0	26.8	28.9	25.0	0.5
20/02/2012	03:50	27.7	28.8	27.6	27.7	28.8	27.6	0.7
20/02/2012	04:00	28.3	29.7	28.2	28.3	29.7	28.2	0.6
20/02/2012	04:10	27.5	29.8	26.8	27.5	29.8	26.8	0.4
20/02/2012	04:20	27.3	30.9	27.4	27.3	30.9	27.4	0.5
20/02/2012	04:30	28.9	31.0	29.1	28.9	31.0	29.1	0.4
20/02/2012	04:40	29.9	29.9	28.9	29.9	29.9	28.9	0.2
20/02/2012	04:50	29.4	31.0	29.9	29.4	31.0	29.9	0.6
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20/02/2012	05:10	34.7	34.2	36.4	34.7	34.2	36.4	0.4
20/02/2012	05:20	36.1	33.1	40.8	36.1	33.1	40.8	0.6
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20/02/2012	05:40	38.8	32.6	40.5	38.8	32.6	40.5	1.8
20/02/2012	05:50	35.8	34.9	36.3	35.8	34.9	36.3	1.4
20/02/2012	06:00	36.0	35.9	39.8	36.0	35.9	39.8	1.5
20/02/2012	06:10	42.3	35.9	41.2	42.3	35.9	41.2	1.4
20/02/2012	06:20	38.7	36.7	42.7	38.7	36.7	42.7	1.6
20/02/2012	06:30	44.4	38.2	44.6	44.4	38.2	44.6	2.0
20/02/2012	06:40	40.6	38.6	44.5	40.6	38.6	44.5	1.9
20/02/2012	06:50	43.5	37.3	46.3	43.5	37.3	46.3	2.1
20/02/2012	23:00	42.5	41.3	38.5	42.5	41.3	38.5	2.4
20/02/2012	23:10	42.3	42.8	39.7	42.3	42.8	39.7	3.0
20/02/2012	23:20	42.7	41.7	38.5	42.7	41.7	38.5	2.3
20/02/2012	23:30	42.3	43.0	37.0	42.3	43.0	37.0	2.5
20/02/2012	23:40	38.2	42.5	34.9	38.2	42.5	34.9	2.3
20/02/2012	23:50	39.3	39.3	35.8	39.3	39.3	35.8	3.0
21/02/2012	00:00	38.1	42.2	33.7	38.1	42.2	33.7	2.5
21/02/2012	00:10	39.4	43.2	34.2	39.4	43.2	34.2	2.8
21/02/2012	00:20	39.3	42.4	33.9	39.3	42.4	33.9	3.1
21/02/2012	00:30	37.6	40.1	31.7	37.6	40.1	31.7	2.4
21/02/2012	00:40	37.6	39.3	37.3	37.6	39.3	37.3	1.9
21/02/2012	00:50	39.6	37.4	36.2	39.6	37.4	36.2	1.7
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21/02/2012	01:10	42.0	39.2	36.1	42.0	39.2	36.1	2.2
21/02/2012	01:20	38.0	36.5	31.8	38.0	36.5	31.8	2.1
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21/02/2012	01:40	37.8	34.9	35.6	37.8	34.9	35.6	2.0
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21/02/2012	02:20	38.8	37.6	35.9	38.8	37.6	35.9	1.8
21/02/2012	02:30	40.0	37.6	35.3	40.0	37.6	35.3	2.7
21/02/2012	02:40	39.5	35.5	33.2	39.5	35.5	33.2	2.2
21/02/2012	02:50	35.2	36.6	31.5	35.2	36.6	31.5	2.4
21/02/2012	03:00	30.6	37.3	28.3	30.6	37.3	28.3	1.8
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21/02/2012	03:40	42.7	35.1	33.1	42.7	35.1	33.1	3.6
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21/02/2012	04:40	41.3	37.6	34.6	41.3	37.6	34.6	3.5
21/02/2012	04:50	38.3	37.7	36.3	38.3	37.7	36.3	2.4
21/02/2012	05:00	37.9	39.2	36.1	37.9	39.2	36.1	2.4
21/02/2012	05:10	35.1	34.3	34.3	35.1	34.3	34.3	1.7
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21/02/2012	05:30	37.3	35.2	38.6	37.3	35.2	38.6	1.7
21/02/2012	05:40	38.7	39.1	36.2	38.7	39.1	36.2	1.7
21/02/2012	05:50	37.2	35.4	39.8	37.2	35.4	39.8	1.0
21/02/2012	06:00	38.0	34.3	36.5	38.0	34.3	36.5	1.0
21/02/2012	06:10	37.0	34.6	41.8	37.0	34.6	41.8	1.6
21/02/2012	06:20	39.2	33.7	44.1	39.2	33.7	44.1	1.6
21/02/2012	06:30	41.5	35.8	46.1	41.5	35.8	46.1	1.3
21/02/2012	06:40	41.0	35.9	43.4	41.0	35.9	43.4	1.4
21/02/2012	06:50	41.8	36.6	47.2	41.8	36.6	47.2	1.6

APPENDIX 3

Consultation

Peter Tallantyre

From: Peter Tallantyre
Sent: 23 January 2012 12:17
To: 'Allen , Lucy'
Cc: 'gmccormack@wakefield.gov.uk'
Subject: RE: Ringstone Single Turbine Development

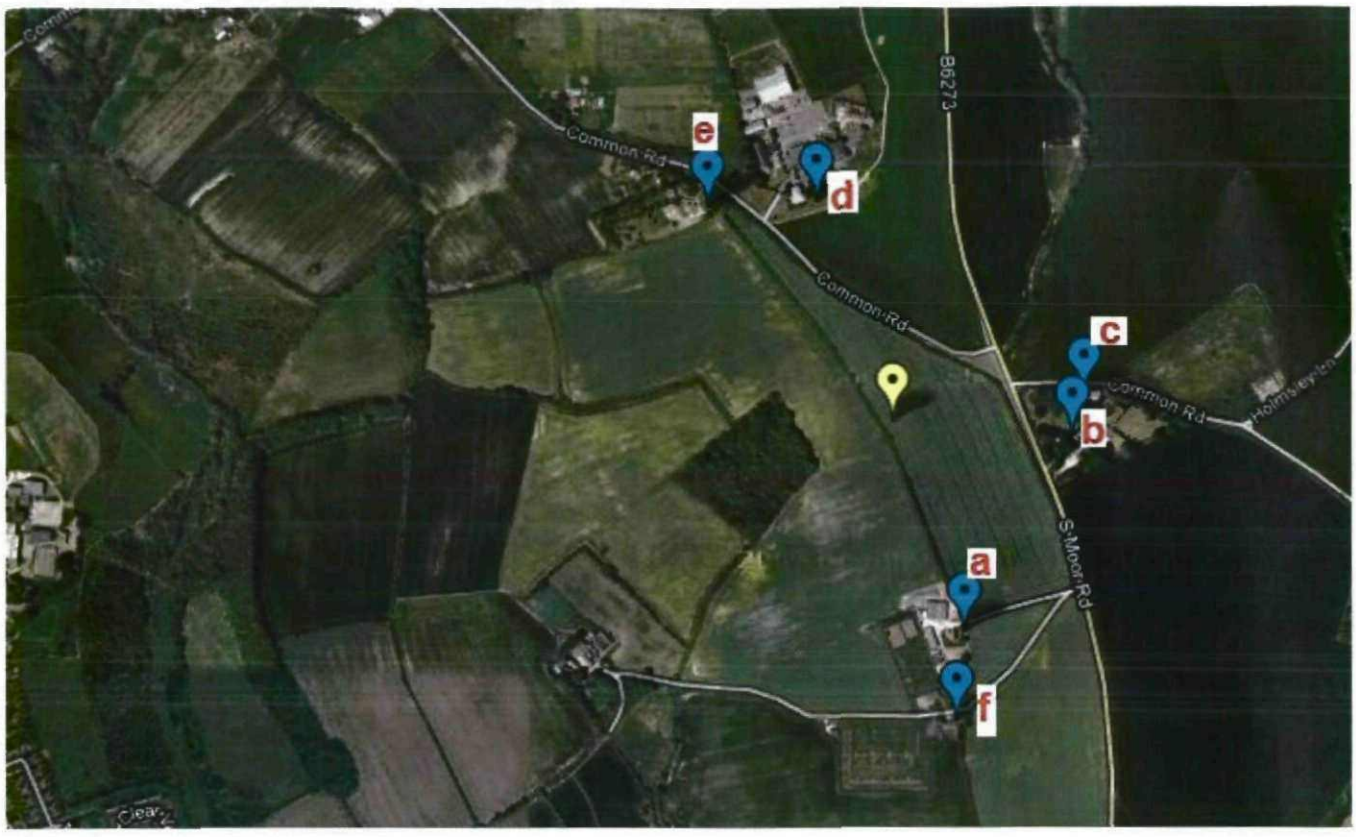
Hi Lucy, many thanks for your time today it was good to talk to you.

Please find below a list of the key points we discussed. I hope that you agree with my interpretation of our discussions, however, should you feel that I have misinterpreted any aspect then please let me know.

- We further discussed the issue of noise measurements and met data with the conclusion that surveys undertaken without the met data would be ok provided we were happy that we had a good range of wind conditions through the monitoring period (and no bias toward very high wind periods or very low quiet condition). As such we will survey for up to 2 weeks at each location in order to achieve a minimum of 7 days usable data.
- The potential to condition later surveys with met data at the site will be investigated in conjunction between ourselves to try to derive an appropriate condition for inclusion in the planning permission doc if necessary and acceptable.
- During the survey we will try to find a suitable commercial wind data source such as websites etc to attempt to give some clarity on the wind conditions prevalent through the period. I will keep you posted as to how we do with this.
- We confirm that the site can be suitably considered with monitoring at 3 locations (one representing each group of 2 – "a and f", "b and c" and "d and e" as shown on the plan below taken from our original e-mail in November).
- With regard to locations c and b below we confirm our discussions that these may be unoccupied. As such if we feel it inappropriate to leave our kit for safety reasons we will look for alternative methodologies/locations and keep you posted and consulted.
- We appreciate your offer to assist us with access if we draw a blank when on site.

Many thanks again for your help, we will proceed to organise the monitoring surveys etc. and let you know when we intend to be on site.

Kind regards, Pete



Pete Tallantyre
Technical Director (Acoustics)

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environmental consultants

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From: Allen , Lucy [mailto:LucyAllen@barnsley.gov.uk]
Sent: 06 January 2012 12:03
To: Peter Tallantyre
Subject: RE: Ringstone Single Turbine Development

Dear Peter,

Happy New Year! Sorry for the delay in responding but I have only today spoken to Helen Joyce at Wakefield HJoyce@wakefield.gov.uk and she has yet to review the information that we have already discussed via email.

If I understand you correctly you are proposing to use the quiet background noise (day and night) gained from monitoring, across all wind speeds, to assess the noise impact at locations that modelling has shown will not meet the simplified criteria. Obviously this is more stringent than the requirements of ETSU and I am concerned that given the distances involved, it may be hard to achieve. The results will be interesting but I am comfortable with the methodology you have proposed.

Just a further note... while we, as an Authority, have yet to formally consider how we would respond to queries regarding the safety of turbines in very high wind speeds, given recent reports of turbines catching fire, exploding, shedding their blades etc it is likely that residents and Council Members will be looking for reassurance. It would therefore be useful if, at the time of application, specific reference was made to how damage to the turbine in very strong winds will be prevented, whether it's inherent in the design ie safety cut out or whether it requires action by the turbine's owner eg applying a break.

Regards

Lucy Allen
Senior Environmental Health Officer
Pollution Control
Regulatory Services
PO Box 604
Barnsley
S70 9FE

Tel. 01226 772455
Fax. 01226 775699
E-mail: LucyAllen@barnsley.gov.uk

From: Peter Tallantyre [mailto:Peter.Tallantyre@enzygo.com]
Sent: 06 December 2011 15:56
To: Allen , Lucy
Subject: RE: Ringstone Single Turbine Development

Hi Lucy,

Many thanks for your response, I will try to chase up the guys at Wakefield and sort out a consultation with them also. In response to your queries I would respond as follows and suggest a discussion once we have Wakefield's view on the methodology.

I have responded to your comments but would appreciate a chance to have another chat with you once we know where Wakefield are coming from and I have bottomed out costs for wind measurement at the site. Thank you for your comments and consideration – we are keen to commence the surveys and assessment in a manner that would be acceptable to you through the planning process so appreciate the opportunity to debate the assumptions and limitations

Kind regards, Pete

Location 3 should be added to the monitoring locations as the modelling shows noise levels are approaching 35dB.

I appreciate what you are saying here as the predicted level at 12m/s is 33.9dB(A) however the guidance of ETSU is quite clear with regard to consideration of sites where noise is below the 35dB(A). The Simplified criteria only requires consideration up to 10m/s at which point we are predicting 32.9dB(A). We would conclude that the predicted levels at the higher wind speeds whilst approaching 35dB are still below this simplified criteria based upon the turbine noise levels supplied by Ennercon and the appropriate prediction methodology of ISO9613/IOA relating

to wind farms, ground absorption and screening consideration. However, we can discuss this point in more detail once we understand Wakefield's position as providing my client is happy to pay and we can gain access I do not have a major issue with this extra location if you do feel it necessary.

You need to demonstrate how you will use the baseline noise data to demonstrate compliance with ETSU, in the absence of measured wind data.

We are currently looking into the costs associated with the equipment required to quantify wind speeds following on from your comment to Knight Frank during the meeting last week and will hopefully have something when we have our follow up call. My worry is that it will be extremely expensive and what options we have. However, we can discuss this at a later date and if there is a possibility that we can look at this as a condition maybe.

In the absence of any wind data Initially what we have agreed with other LPA's is to use the quiet daytime and night-time levels (as a single figure across all wind speeds) from the week long survey and using this to calculate the limits from ETSU

I also had a question about whether it's fair to assume that tonal characteristics wont be present at lower wind speeds, but I'm happy to discuss these matters once I've had input from Wakefield.

As you will be aware the general noise characteristics of the turbines tends to be an arc starting at the lowest noise levels at lower wind speeds and peaking at the highest noise levels at the upper wind speeds. We have requested warranted noise levels from Ennercon and been supplied with data for 9ms to 13ms which is limited based upon the site at which the data was amassed and the wind not dropping below 9ms during the investigations. We have subsequently been supplied with additional data from Ennercon for wind speeds down to 7m/s which again shows no tonal correction being required. Our view would be that the machine is showing a definite trend to be non tonal from 7 – 13m/s and as such this assumption is deemed appropriate. The noise from the Turbine would be quieter as the blades rotate slower so to assume a noise level at a higher speed for a prediction at a lower wind speed in the absence of specific data would be a worst case and as such appropriate based upon the limitations of the information available

Kind Regards

Lucy Allen

Pete Tallantyre
Technical Director (Acoustics)

enzygo
environmental consultants

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From: Allen , Lucy [mailto:LucyAllen@barnsley.gov.uk]
Sent: 06 December 2011 14:23
To: Peter Tallantyre
Subject: RE: Ringstone Single Turbine Development

Hi Peter,

Sorry I have not responded to your email as yet. I am waiting for a response from Wakefield, who I contacted on Friday morning, as the Robin Hood Pub and The Lodge at Brierley Gap are the closest premises to the proposed turbine location. I was hoping to discuss with them what their requirements will be as we would have to consult with them at a formal application stage. I didn't want to agree the scope of the assessment with you and then find out that Wakefield would ask for something different / more onerous.

I have been told that I would need to speak to someone in Gerard McCormack's Team, possibly Helen Joyce. The general number is 08458 506 506 if you want to chase them up; I've tried today but they're both out the office.

My initial thoughts are as follows:

Location 3 should be added to the monitoring locations as the modelling shows noise levels are approaching 35dB. You need to demonstrate how you will use the baseline noise data to demonstrate compliance with ETSU, in the absence of measured wind data.
I also had a question about whether it's fair to assume that tonal characteristics wont be present at lower wind speeds, but I'm happy to discuss these matters once I've had input from Wakefield.

Kind Regards

Lucy Allen
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Fax. 01226 775699
E-mail: LucyAllen@barnsley.gov.uk

From: Peter Tallantyre [mailto:Peter.Tallantyre@enzygo.com]
Sent: 29 November 2011 23:03
To: Allen , Lucy
Subject: Ringstone Single Turbine Development

Hi Lucy,

I contacted your office earlier today following being given your name by Matthew Woodward of your planning department via our design team. The reason for the contact was to provide an opportunity to discuss and agree the scope of a noise assessment associated with a small scale single wind turbine development at a site in your district. The specifics of what we are proposing are outlined below but I would be extremely grateful of the opportunity to discuss the issue further with you such that we can ensure you are happy with our proposals prior to us proceeding and further with our assessment.

The specifics of what we have done to date and what we are proposing to undertake to take the assessment forward are outlined below:

Proposed Candidate Turbine Specifics:

Manufacturer: Ennercon

Type: E-44 – 900kW

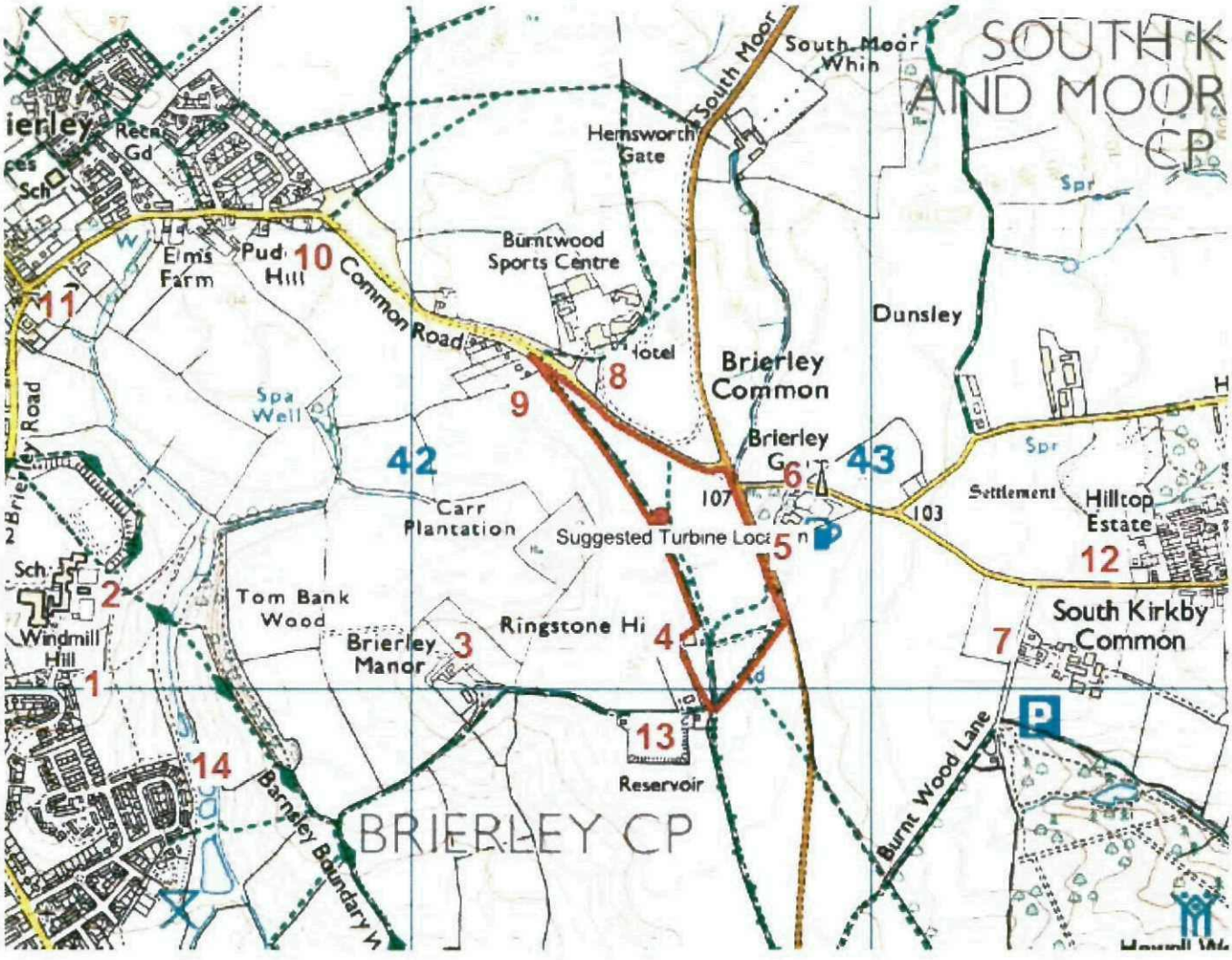
Hub: 45m

Tip: 67m

Tonality corr. (ETSU): 0.0 (Based upon Warranted noise levels from 9m/s to 13m/s. Assumed noise levels at 4m/s to 8m/s to be as per levels reported by Ennercon at 9m/s. This is considered to be appropriate as the noise levels from the turbine should be quieter at lower wind speeds, so assuming the noise level for 9m/s at 4m/s would be considered to be an over estimation of generated noise at this lower wind speed.

Proposed Scheme:

The proposal is to site a single turbine in a field near to Ringstone Hill Farm near to Brierley as approximately detailed on the figure below. The approximate grid reference of the site is SE 425 103:

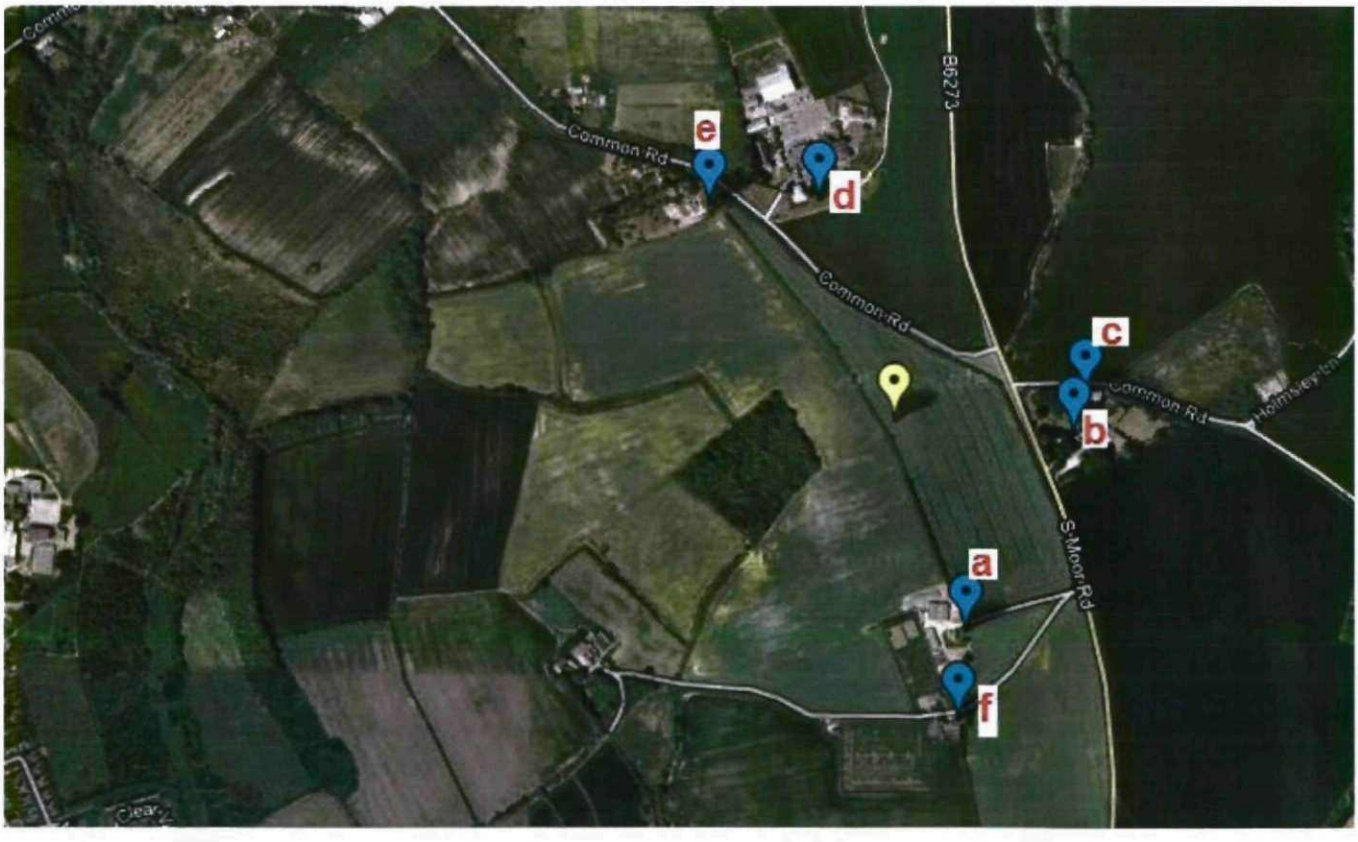


We have undertaken the first part of the assessment process and completed the modelling of noise from the turbine. The modelling has been undertaken based upon the methodology of ISO9613 and incorporating the requirements of the IOA guidance. The turbine noise has been corrected for tonal qualities as per the warranted noise level report and the ETSU guidelines, and the noise levels predicted presented as LA90, 10min levels. Modelling has been undertaken to a number of locations representing the closest noise sensitive receptors in all directions from the Turbine, the results of which are presented within the table below. The rows highlighted in red relate to any properties at which the ETSU simplified criteria limits are predicted to be breached at any of the considered wind speeds.

Name	Noise level in L90 dB(A) at quoted wind speed (10m)							
	4ms	5ms	6ms	7ms	8ms	9ms	10ms	11m
Loc 1 - Windmill Hill	21.6	21.6	21.6	21.6	21.6	21.6	22.9	23.9
Loc 2 - Willowgarth High School	22.7	22.7	22.7	22.7	22.7	22.7	24.0	25.0
Loc 3 - Manor Farm/Brierely Manor	31.6	31.6	31.6	31.6	31.6	31.6	32.9	33.9
Loc 4 - Ringstone Hall Farm (Vested)	38.8	38.8	38.8	38.8	38.8	38.8	40.1	41.1
Loc 5 - Robin Hood Pub	40.3	40.3	40.3	40.3	40.3	40.3	41.6	42.6
Loc 6 - The Lodge	39.1	39.1	39.1	39.1	39.1	39.1	40.4	41.4
loc 7 - South Kirkby Common	26.7	26.7	26.7	26.7	26.7	26.7	28.0	29.0
loc 8 - Burntwood Hotel	37.9	37.9	37.9	37.9	37.9	37.9	39.2	40.2
loc 9 - Common Road	36.9	36.9	36.9	36.9	36.9	36.9	38.2	39.2
loc 10 - Puddinghill Farm	25.3	25.3	25.3	25.3	25.3	25.3	26.6	27.6
loc 11 - Lindley House, Brierley	21.4	21.4	21.4	21.4	21.4	21.4	22.7	23.7
loc 12 - Kirkby Common Farm	26.3	26.3	26.3	26.3	26.3	26.3	27.6	28.6
loc 13 - Reservoir House	37.2	37.2	37.2	37.2	37.2	37.2	38.5	39.5
loc 14 - Clear View, Grimethorpe	22.5	22.5	22.5	22.5	22.5	22.5	23.8	24.8

As can be seen from the Table above in the main at the surrounding properties the predicted LA90, 10min levels are within the 35dB simplified criteria of ETSU. The exceptions to this are Ringstone Hall Farm, The Robin Hood Pub (currently unoccupied), The Lodge, Burntwood Hotel, Common road (closest properties) and Reservoir House. Of these Ringstone Hall Farm has a financial interest in the development and as such is afforded a limit of 45dB LA90, 10min during both the daytime and night-time periods by the ETSU guidance methodology. The predicted noise levels at Ringstone Hill Farm are shown to be below this limit and as such acceptable with regard to the criteria of the ETSU guidelines.

Each of the locations showing breaches of the 35dB(A) criteria are detailed on the map below (The approximate Turbine Location is presented in yellow):



On the basis of the scale of the project (one turbine) and the results of the ETSU simplified assessment we are proposing to undertake the following monitoring works. We would view it as sensible to establish baseline noise

Property and Sites

Waste Planning

Waste Technologies

Landscape Architecture

Environmental Co-ordination

Hydrology and Flood Risk

Waste Contract Procurement

Minerals Planning

Noise and Vibration

PPC – Permitting

Environmental Planning

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data at any residential properties showing an exceedance of the ETSU Simplified criteria and not having a financial interest in the site. These would be as follows:

a. Ringstone Hall Farm (Financial Interest in the development)
b. The Robin Hood Pub
c. The Lodge
d. Burntwood Hotel
e. Common road (closest properties)
f. Reservoir House

Reference to the map above demonstrates that the 6 locations breaching the ETSU simplified criteria are collected into 3 main pockets as outlined below:

Locations a and f to the south of the turbine site
Locations b and c to the east of the site
Locations d and e to the north west of the site

Therefore it would be considered appropriate to undertake a single survey to represent each of these grouped locations and reduce the survey implications from 6 locations to 3. As such we would propose to undertake surveys at either location a or f, either b or c and either d or e.

Based upon the nature of the development (a single small scale turbine) we would propose to monitor noise at each location for a period of up to 1 week, 24 hours per day (unattended) subject to access such that we can process quiet daytime (Mon to Fri 18:00 to 23:00, Sat 13:00 – 23:00 and Sun 07:00 to 23:00) and night-time (Mon to Sun 23:00 – 07:00) levels. Again based upon the size of the development met data will not be being amassed at the site so there will not be the option to relate the baseline monitored noise data to the measured wind data at the time.

We would be grateful of your comments and consideration on the scope and scale of the assessment based upon the interim outputs of the modelling and the scale of the project. We hope that you are in agreement that what we are proposing is reasonable but would welcome your comments and a chance to discuss further the best way forward that is both cost considerate and acceptable to yourselves and reflects the nature of the development.

As discussed our client is keen to submit the planning application before Christmas so we would appreciate your response or comments as soon as you are able, such that we can get the surveys up and running and give ourselves the best chance of meeting said deadline.

I look forward to you response, Kind regards, Pete

Pete Tallantyre
Technical Director (Acoustics)

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Peter Tallantyre

From: McCormack, Gerard <gmccormack@wakefield.gov.uk>
Sent: 13 February 2012 12:53
To: Peter Tallantyre
Cc: 'lucyallen@barnsley.gov.uk'
Subject: RE: Ringstone Wind Turbine Noise monitoring

Thanks Pete.

All the best

Gerard

Gerard McCormack
Environmental Health
Team Leader (Communities)
Newton Bar
Lower Building
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Wakefield
WF1 2TX

Tel 08458 506 506
Mob 07810 152 578

From: Peter Tallantyre [mailto:Peter.Tallantyre@enzygo.com]
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Subject: Ringstone Wind Turbine Noise monitoring

Hi Gerard,

Many thanks again for your efforts to get us into the pub location (Robin Hood), your help is greatly appreciated. Just to confirm our discussions of this morning:

- You have agreed access with Mr Roger and we will arrange the survey;
- You would be happy with the remaining survey time at that location (equipment will be removed from the other locations on Monday).

We have been in contact with Roger already to arrange access to set the equipment up today, unfortunately he is away from the property today and cannot accommodate us. The equipment will therefore be set up tomorrow morning as he is at the property and available.

Many thanks again for your help

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All the best

Gerard

Gerard McCormack
Environmental Health
Team Leader (Communities)
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Lower Building
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