

PARKER DANN

LAND AT CLYMPING, WEST SUSSEX

NOISE ASSESSMENT

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NOISE ASSESSMENT REPORT

southdowns
environmental consultants

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NOISE ASSESSMENT

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1. INTRODUCTION

1.1.1 Southdowns Environmental Consultants Ltd (Southdowns) was commissioned in November 2015 by Parker Dann to undertake an acoustic survey and assessment of the existing acoustic environment at the site of a proposed residential development, with community assets (village hall, shop and office), located between the B2233 Yapton Road and Church Lane in Clymping, West Sussex.

1.1.2 This noise assessment was updated in April 2016, following revisions to the masterplan and has been prepared to accompany an outline planning application for the proposed residential development, with community assets.

1.1.3 The principle source of noise affecting the proposed development site is road traffic on the A259 and other roads adjacent to the site.

1.1.4 Noise levels monitored on the site, along with calculated road traffic noise levels, have been assessed using noise criteria contained within the Sussex and local authority's (Arun District Council) planning policy on noise, along with noise criteria contained in British Standard BS 8233:2014 and World Health Organisation guidelines on noise, to determine the acoustic suitability of the site for residential development.

1.1.5 The findings of the assessment have been used to identify noise mitigation options for consideration in the development's design proposals.

1.1.6 The assessment measurements and calculations were undertaken by Nathan Gregory (MIOA), who also authored this report. Stuart Berry (MIOA) undertook the checking of the calculations, with the report reviewed by Adam Glass (MIOA). Nathan is experienced in the production of noise impact assessments following the methodology required by the ADC noise criteria for site suitability. He has assessed internal noise levels in accordance with BS 8233 for assessing the internal noise levels and also those for outdoor amenity areas at proposed developments, undertaking the calculations to produce the assessments. Nathan has produced a number of noise assessments including undertaking the measurements, calculations and authoring of reports. Adam has over 10 years of experience in the production and review of noise assessments.

1.1.7 The noise levels, guidance and assessment criteria are summarised in Section 2 of this report. The existing site and the development proposals are described in Section 3. The site noise survey is described in Section 4, and the survey results are presented in Section 5. The noise assessment is presented in Section 6. Mitigation options are presented in Section 7, and conclusions of the assessment are presented in Section 8. Figures and tables referred to in the report are presented in Appendices A and B respectively.

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2. NOISE LEVELS, GUIDANCE AND CRITERIA

2.1 Noise and Sound Levels

2.1.1 Noise and sound are measured on a logarithmic scale in decibels (dB) because of the ears' sensitivity to a wide range of pressure changes. The sound pressure level (SPL) of a signal is denoted by the symbol L_p and defined by the equation $L_p = 10 \log (p/p_o)^2$ where p is the root mean square pressure of the signal and p_o is the reference sound pressure (2×10^{-5} Pa).

2.1.2 The human auditory system is capable of detecting sounds over a frequency range of 20 Hz to 20 kHz. Because the ear is most sensitive to sounds with frequencies between 1 and 5 kHz, an A-weighting network is used to reflect the differential sensitivity of human hearing to sounds of different frequency. The A-weighting sound pressure level, L_{pA}, is measured on a scale defined by the dB(A).

2.1.3 Community response to environmental noise sources is dependent on both acoustic and non-acoustic factors. The acoustic factors include absolute sound level, changes or exceedances of background or ambient levels as well as the characteristics, time, duration and frequency of noise. National and local planning guidelines for noise assessment are set out below.

2.1.4 The dB(A) level is commonly used for the measurement and assessment of environmental noise due to the relationship between the subjective impression of the auditory strength of a sound, otherwise known as loudness, and the A-weighted sound pressure level of that sound. A change in 3 dB is the minimum perceptible change in event noise levels under normal everyday listening conditions, whilst a 10 dB increase or decrease in the sound pressure level of a steady sound generally corresponds to a perceived doubling or halving of loudness.

2.1.5 An indication of the range of sound pressure levels commonly found in the environment is given below:

Location	L_p dB(A)
Normal threshold of hearing	-10 to 20
Music halls and theatres	20 to 30
Living rooms and offices	30 to 50
Inside motor vehicles	50 to 70
Industrial premises	70 to 100
Burglar alarms at 1 m	100 to 110
Jet aircraft on take-off	110 to 130
Threshold of pain	130 to 140

2.1.6 The $L_{A90,T}$ *background* sound level is defined by the A-weighted sound pressure level of the ambient sound exceeded for 90% of a given time interval, T. This provides a measure of the lower levels of a fluctuating sound and is normally defined separately for day and night-time periods. Other percentiles are also sometimes used to describe the levels of ambient sound exceeded for different periods of time. The $L_{A50,T}$ and $L_{A10,T}$ sound levels denote the level of ambient sound exceeded for 50 and 10% of the time T, respectively whilst the $L_{Amax,F}$ sound level denotes the maximum instantaneous sound level in any given period of time obtained using the FAST time weighting.

2.1.7 The equivalent continuous sound pressure level is denoted by the symbol $L_{Aeq,T}$ and is defined as the notional steady sound which, at a given position over a defined period of time, T, has the same A-weighted acoustic energy as the actual fluctuating sound. This average sound level is used in the UK for the measurement of noise from most sources including industry, construction, railways and aircraft and is widely used for the measurement of ambient sound, which comprises sound from all sources in the environment.

2.2 National Noise Policy and Planning Policy Framework

Noise Policy Statement for England (NPSE)

2.2.1 The Noise Policy Statement for England (March 2010) [1], sets out the long term vision of Government noise policy.

2.2.2 The vision of the NPSE is to 'Promote good health and a good quality of life through the effective management and control of noise within the context of Government policy on sustainable development'. This vision is supported by three key aims:

"The first aim of the Noise Policy Statement for England

Avoid significant adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.

2.23 The first aim of the NPSE states that significant adverse effects on health and quality of life should be avoided while also taking into account the guiding principles of sustainable development.

The second aim of the Noise Policy Statement for England

Mitigate and minimise adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.

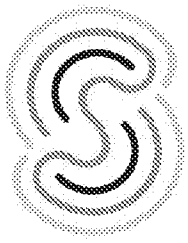
2.24 The second aim of the NPSE refers to the situation where the impact lies somewhere between LOAEL and SOAEL. It requires that all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life while also taking into account the guiding principles of sustainable development. This does not mean that such adverse effects cannot occur.

The third aim of the Noise Policy Statement for England

Where possible, contribute to the improvement of health and quality of life through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.

2.25 This aim seeks, where possible, positively to improve health and quality of life through the pro-active management of noise while also taking into account the guiding principles of sustainable development (paragraph 1.8), recognising that there will be opportunities for such measures to be taken and that they will deliver potential benefits to society. The protection of quiet places and quiet times as well as the enhancement of the acoustic environment will assist with delivering this aim."

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2.2.3 The NPSE applies to most forms of noise, including environmental noise, neighbour noise and neighbourhood noise, but not occupational noise in the workplace.

2.2.4 The NPSE has adopted the following concepts to help consider whether noise is likely to have 'significant adverse' or 'adverse' effects on health and quality of life:

NOEL – No Observed Effect Level

This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to noise.

LOAEL – Lowest Observed Adverse Effect Level

This is the level above which adverse effects on health and quality of life can be detected.

SOAEL – Significant Observed Adverse Effect Level

This is the level above which significant adverse effects on health and quality of life occur.

2.2.5 The NPSE goes on to state that:

"it is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise in all situations. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times. It is acknowledged that further research is required to increase our understanding of what may constitute a significant adverse impact on health and quality of life from noise. However, not having specific SOAEL values in the NPSE provides the necessary policy flexibility until further evidence and suitable guidance is available."

National Planning Policy Framework

2.2.6 The Government's National Planning Policy Framework (NPPF) came into force in March 2012 [2] and sets out the Government's planning policy for England and how it should be applied. The NPPF replaced a number of planning policy guidance documents, including the now archived Planning Policy Guidance 24: Planning and Noise.

2.2.7 The NPPF defines the Government's planning policy for England and sets out the framework within which local authorities should prepare their local and neighbourhood plans, reflecting the needs and priorities of their communities.

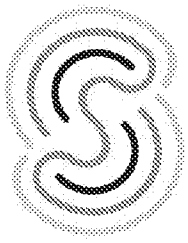
2.2.8 The main references to noise in the NPPF are found in paragraphs 109 and 123, where it states that:

" 109. The planning system should contribute to and enhance the natural and local environment by:…

- *preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability;…*

123. Planning policies and decisions should aim to:

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- *avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development;*

- *mitigate and reduce to a minimum other adverse impacts on health and quality of life arising from noise from new development, including through the use of conditions;*

- *recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established; and*

- *identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason. "*

2.2.9 In the preparation of local plans, the NPPF specifies that local planning authorities should:

"set out environmental criteria, in line with the policies in this Framework, against which planning applications will be assessed so as to ensure that permitted operations do not have unacceptable adverse impacts on the natural and historic environment or human health, including from noise, dust, visual intrusion…

when developing noise limits, recognise that some noisy short-term activities, which may otherwise be regarded as unacceptable, are unavoidable to facilitate minerals extraction;"

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Planning Practice Guidance - Noise

2.2.10 Planning Practice Guidance (PPG) on noise [3] was issued in March 2014. This guidance document advises local planning authorities to take into account the acoustic environment, and in doing so consider the following:

- whether or not a significant adverse effect is occurring or likely to occur;
- whether or not an adverse effect is occurring or likely to occur; and
- whether or not a good standard of amenity can be achieved.

2.2.11 The PPG includes examples of how to recognise when noise could be a concern and provides example outcomes to which the Observed Effect Levels can apply. The PPG noise exposure hierarchy is presented in Table 2.1 below and covers the likely average response and example outcomes.

Perception	Examples of Outcomes	Increasing Effect Level	Action
Not Noticeable	No Effect	No Observed Effect	No specific measures required
Noticeable and not intrusive	Noise can be heard, but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No Observed Adverse Effect	No specific measures required
		Lowest Observed Adverse Effect Level	
Noticeable and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
		Significant Observed Adverse Effect Level	
Noticeable and disruptive	The noise causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Noticeable and very disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory	Unacceptable Adverse Effect	Prevent

Table 2.1: PPG NOISE EXPOSURE HIERARCHY

2.2.12 The PPG guidance states that "*if external amenity spaces are an intrinsic part of the overall design, the acoustic environment of those spaces should be considered so that they can be enjoyed as intended.*" Furthermore the guidance goes on to so say "*Although the existence of a garden or balcony is generally desirable, the intended benefits will be*

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reduced with increasing noise exposure and could be such that significant adverse effects occur."

2.3 Local Authority Noise Criteria

2.3.1 The Land at Clymping development site is located within the area of Arun District Council (ADC).

2.3.2 The 'Planning Noise Advice Document: Sussex' [4], applicable for developers and their consultants when making a planning application, is understood to provide appropriate advice on noise assessments for developments within ADC's district.

2.3.3 In relation to residential developments, the Planning Noise Advice Document: Sussex refers to both the World Health Organization Guidelines for Community Noise (2009) (WHO) [5] and British Standard 8233:2014 Guidance on Sound Insulation and Noise Reduction for Buildings [6] to guide planning application assessments.

2.3.4 The Clymping Neighbourhood Plan (2015-2030) [7] allows for sensitive appropriate, well designed development that is sympathetic to the character of the neighbourhood. The good design criteria given do not cover acoustic matters. The Neighbourhood Plan states it is essential that the various impacts on Clymping roads from development are properly evaluated and that the necessary mitigation measures are implemented.

2.3.5 The Arun District Local Plan [8] does not contain housing allocations for Clymping.

2.3.6 The Arun District Local Plan Policy QE SP1 'Quality of the environment' requires that all development contributes positively to the quality of the environment and that development does not have a significantly negative impact upon residential amenity, the natural environment or upon leisure and recreational activities.

2.3.7 The Local Plan details 'First Priority Areas' from the noise mapping for the Brighton Agglomeration [9] where the noise index exceeds 76 dB. These areas do not include the A259 at Clymping.

2.3.8 Policy QE DM1 'Noise pollution' requires that where residential development is proposed within First Priority Areas, or in close proximity to noise sources from road, rail or air the site must:

- Be supported by an assessment to determine the Noise Exposure Category (NEC) and designed to ensure that residents will not be adversely affected by noise; and
- Consider both the likely level of exposure at the time of application and any increase that might be reasonable expected in the foreseeable future.

2.3.9 Where the NEC assessment has shown that habitable rooms will be exposed to noise levels in excess of NEC A, noise mitigation will be required as part of the design of the development. Guidance set out in the BRE document 'Sound Control for Homes' [10] is recommended.

2.3.10 The NEC categories are shown below in Table 2.2. and the noise level categories for road noise in Table 2.3.

NEC Category	Category Description
A	Noise need not be considered as a determining factor in granted planning permission, although the noise level at the high end of the category should not be regarded as a desirable level.
B	should be taken into account when determining planning applications and, where appropriate, conditions imposed to ensure an adequate level of protection against noise.
C	permission should not normally be granted. Where it is considered that permission should be given, for example because there are no alternative quieter sites available, conditions should be imposed to ensure a commensurate level of protection against noise.
D	Planning permission should normally be refused.

Table 2.2: NOISE EXPOSURE CATEGORIES FOR RESIDENTIAL DEVELOPMENT

Road Noise	NEC A	NEC B	NEC C	NEC D
07:00-23:00	<55	55-63	63-72	>72
23:00-07:00	<45	45-57	57-66	>66

Table 2.3: LAEQ NOISE LEVELS CORRESPONDING TO THE NEC FOR NEW DWELLINGS

2.3.11 Night-time noise levels (23.00-07.00): sites where individual noise events regularly exceed 82dB L_{Amax} (S time weighting) several times in any hour should be treated as being in NEC C, regardless of the $L_{Aeq,8h}$ (except where the $L_{Aeq,8h}$ already puts the site in NEC D).

2.4 British Standard 8233

2.4.1 BS 8233:2014 *Guidance on sound insulation and noise reduction for buildings* gives recommendations for the control of noise in and around buildings. The Standard suggests appropriate criteria and limits for different situations to guide the design of new or refurbished buildings undergoing a change of use.

2.4.2 Desirable upper noise levels inside residential habitable rooms, for anonymous noise sources such as road noise, are specified in the Standard and are reproduced below in Table 2.4.

Activity	Room	Ambient Indoor Noise Level 07:00 to 23:00 hrs, dB $L_{Aeq,16\ hr}$	Ambient Indoor Noise Level 23:00 to 07:00 hrs, dB $L_{Aeq,8\ hr}$
Resting	Living Room	35	-
Dining	Dining room/ area	40	-
Sleeping (daytime resting)	Bedroom	35	30

Table 2.4: BS 8233 INDOOR AMBIENT NOISE LEVELS FOR DWELLINGS
Notes:

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1. The table provides recommended levels for overall noise in the design of a building. These are the sum total of structure-borne and airborne noise sources. Groundborne noise is assessed separately and is not included as part of these targets, as human response to groundborne noise varies with many factors such as level, character, timing, occupant expectation and sensitivity.
2. The levels shown are based on the existing guidelines issued by the WHO and assume normal diurnal fluctuations in external noise. In cases where local conditions do not follow a typical diurnal pattern, for example on a road serving a port with high levels of traffic at certain times of the night, an appropriate alternative period, e.g. 1 hour, may be used, but the level should be selected to ensure consistency with the levels recommended.
3. These levels are based on annual average data and do not have to be achieved in all circumstances. For example, it is normal to exclude occasional events, such as fireworks night or New Year's Eve.
4. Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or $L_{Amax,F}$, depending on the character and number of events per night. Sporadic noise events could require separate values.
5. If relying on closed windows to meet the guide values, there needs to be appropriate alternative ventilation that does not compromise the façade insulation or the resulting noise level.
   If applicable, any room should have adequate ventilation (e.g. trickle ventilators should be open) during assessment.
6. Attention is drawn to the Building Regulations.
7. Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved.

2.4.3 Note 4 of the above table refers to regular individual noise events, such as aircraft, and indicates a guideline night-time level in terms of Sound Exposure (L_{AE}) or $L_{Amax,F}$ may be set depending on the character and number of noise events per night.

2.4.4 In external amenity spaces, such as private gardens and patios, BS 8233 indicates that it is desirable that the external noise level in these areas does not exceed 50 dB $L_{Aeq,T}$ with an upper guideline value of 55 dB $L_{Aeq,T}$ in noisier environments.

2.4.5 The standard does recognise that these guideline values for outdoor noise levels are not achievable in all circumstances where development might be desirable. In higher noise areas, such as in city centres or urban areas adjoining a strategic transport network a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited.

2.5 World Health Organisation

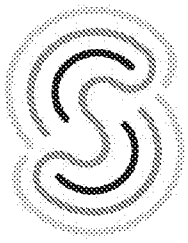
2.5.1 Guideline values for community noise in specific environments are presented in the WHO's Guidelines for Community Noise document. The guideline values pertinent to this noise assessment are presented in Table 2.5.

Specific Environment	Critical Health Effect(s)	dB $L_{Aeq,T}$	Time Base hours	dB $L_{Amax,F}$
Outdoor living area	Serious annoyance, daytime and evening	55	16	-
	Moderate annoyance, daytime and evening	50	16	-
Dwelling indoors	Speech intelligibility and moderate annoyance, daytime and evening	35	16	-
Inside bedrooms	Sleep disturbance, night-time	30	8	45

Table 2.5: WHO GUIDELINE NOISE VALUES

2.5.2 The guidelines presented in this WHO document reflect conclusions drawn up after consideration of the most recent international research evidence on the health effects of

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exposure to noise. The guidelines define the goal of noise management as 'to maintain low noise exposures such that human health and well-being are protected', with 'specific objectives to develop criteria for the maximum safe exposure levels and to promote noise assessment and control as part of environmental health programmes'.

2.5.3 The guideline values presented for outdoor living areas indicate that few people may be moderately or seriously annoyed below the criteria levels of 50 dB $L_{Aeq,T}$ and 55 dB $L_{Aeq,T}$ respectively.

2.6 British Standard 7445

2.6.1 BS 7445-1:2003 *Description and measurement of environmental noise. Guide to quantities and procedures for information in relation to the description and measurement of environmental noise* [11] provides guidance on the procedure and methodology that should be adopted for environmental noise measurements in order to carry out an accurate assessment of a noise environment.

2.6.2 The standard recommends that noise measurements can be undertaken either during specific meteorological conditions or over a range of meteorological conditions. Measurements undertaken during a range of meteorological conditions should be averaged to determine a representative noise level.

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3. SITE DESCRIPTION AND DEVELOPMENT PROPOSAL

3.1 Site Description

3.1.1 The development site is located north of the A259, between Church Lane and the B2233 Yapton Road, in Clymping, a small village further north of the A259. The proposed development site is illustrated in Figure A1 of Appendix A.

3.1.2 The existing site is an agricultural field. To the north of site are residential properties. The site lies to the west of Church Lane, which provides one of the two access routes to the site. The second access route is located to the north on Horsemere Green Lane. The A259 main road is located directly to the south of site, c.50m from the closest proposed development facade.

3.1.3 The principle source of noise affecting the site is road traffic associated with the A259. Other sources of environmental noise heard on site included traffic on local roads, occasional air traffic movements and wildlife.

3.1.4 At the outline planning application stage there are no planned commercial or industrial sources of noise within the proposed development. If the community assets are to include plant generating noise then an assessment of potential noise from the community assets will be submitted as part of a BS4142 [12] assessment at a later date.

3.2 Proposed Residential Development

3.2.1 The proposed development involves the construction of up to 300 residential properties of different sizes as indicated on Figure A2 of Appendix A. Also located within the planned development are community asset buildings. It is likely that these will be made up of the following: a village hall; a village shop and an three no. two storey B1 office with a floor space of 5,000 sq. ft. each.

3.2.2 Further details of the development are not known at the outline planning stage.

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4. NOISE SURVEY

4.1 Noise Monitoring

4.1.1 Continuous unattended noise measurements were obtained in three locations on site over a period of 10 days to measure the diurnal variation in noise over weekday and weekend periods.

4.1.2 Attended short-term noise measurements were undertaken at a further three locations on site to obtain observations of ambient noise levels which affect the proposed development site and particularly to obtain a measure of $L_{Aeq,T}$ and $L_{Amax,F}$ levels across the site.

4.1.3 The unattended, long term (LT) and short term (ST) measurement locations are displayed on Figure A1 of Appendix A.

4.2 Continuous Unattended Noise Monitoring

4.2.1 Continuous unattended noise monitoring was undertaken between 18:30 hrs on Tuesday 8th December and 11:00 hrs on Friday 18th December 2015. The noise monitoring equipment was situated with the microphone positioned c. 1.5 m above local ground, in free-field locations. Unattended monitoring locations are labelled as LT1, LT2 and LT3 on Figure A1 of Appendix A.

4.2.2 Noise measurements were undertaken using Rion NL-32 precision integrating sound level meters fitted with a weatherproof windshield. The sound level meters were powered by gel cell batteries and stored inside weatherproof security boxes.

4.2.3 Consecutive 15-minute measurements of noise indices which included $L_{Amax,F}$, $L_{A10,15min}$, $L_{Aeq,15min}$, and $L_{A90,15min}$ noise levels were measured over the 10 day monitoring period, to reduce uncertainty associated with the measurement duration.

4.2.4 Measurements were undertaken in accordance with the principles of BS 7445.

4.3 Attended Noise Monitoring

4.3.1 Supplementary short-term attended noise measurements were obtained on Friday 18th December between 11:15 hrs and 14:10 hrs at three monitoring locations labelled as ST1, ST2 and ST3 on Figure A1 of Appendix A.

4.3.2 These attended noise measurements were obtained using a Rion NL-32 precision integrating sound level meter fitted with a windshield and mounted on a tri-pod to elevate the microphone 1.5 m above local ground.

4.3.3 The sound level meter was configured to measure A-weighted noise indices, which included $L_{Amax,F}$, $L_{A10,5min}$, $L_{Aeq,5min}$ and $L_{A90,T}$ levels, in consecutive 5 minute intervals over a 15 minute measurement period. Three sets of 15-minute measurements were obtained at each attended noise monitoring location.

4.3.4 During the attended monitoring, each unattended monitor was configured to measure the same 5 minute period noise indices, with the times of the meters synchronised. This enabled comparison and extrapolation between the attended and unattended noise measurements.

4.3.5 During the attended monitoring and other site visits no noise of an industrial or commercial characters was heard.

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4.4 Measurement Settings

4.4.1 All measurements were obtained using the 'Fast' time weighting and A-weighting frequency network. The sound level meters were given field verification checks before and after using a Rion NC-74 Class 1 Acoustic Calibrator to generate a calibration level of 94 dB at 1 kHz, with no drift observed. The calibration certificates for the equipment can be found in Appendix C.

4.5 Weather Conditions

4.5.1 Weather conditions during the attended survey on 18th December 2015 were overcast, with 90% cloud cover. An average wind speed of 3 ms^{-1} was measured, with a maximum wind speed of 6 ms^{-1}. The air temperature was around 12 °C, with approximately 85 % relative humidity.

4.5.2 An unattended meteorological monitoring kit was located on site throughout the unattended noise monitoring period to reduce uncertainty associated with the data. The results of this unattended meteorological monitoring are summarised in Table B5 of Appendix B and presented graphically in Figure A6 of Appendix A. The weather during the survey period was varied, with daily average wind speeds ranging between 2.3 and 5.5 ms^{-1} and 10 minute average wind speeds ranging between 0.0 and 9.4 m^{s-1}. Gust speeds ranged from 0.0 to 14.8 ms^{-1}.

4.5.3 On two days, daily rainfall levels exceeded 4 mm with 11.6 mm on 10/12/2015 and 8 mm on 15/12/2015 though the measured noise levels on these dates are similar to the noise levels measured on other dates.

4.5.4 The Sussex Noise Guidelines recommend the noise measurements are conducted when wind speeds are less than 5 ms^{-1} and for periods where average wind speeds have exceeded 5 ms^{-1}, noise measurements have been excluded and where data has been excluded the periods have been marked on Figures A3-A5.

4.5.5 Though the Calculation of Road Traffic Noise [13] (CRTN) requires roads to be dry during measurements to use the "measurement procedure" to establish noise levels this has not been possible during the survey because of ongoing autumnal wet and windy conditions throughout the end of 2015. The data obtained during the survey is valid for the derivation of typical baseline noise levels and the method of considering the noise levels over a range of meteorological conditions follow BS 7445. Additionally, the calculations of current and future road traffic noise levels, and the determination of the noise change, across the site and at receptors external to the development are not affected by the weather conditions.

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5. NOISE SURVEY RESULTS

5.1 Noise Survey Results

5.1.1 Results of the unattended noise survey are presented in Tables B1 to B3 of Appendix B and graphically on Figures A3 to A5 of Appendix A. The results are summarised below in Table 5.1. The presented daytime $L_{Aeq,16hr}$ and night-time $L_{Aeq,8hr}$ ambient noise levels have been calculated using logarithmic averaging, whilst mean $L_{Amax,F}$ and $L_{A90,T}$ noise levels have been calculated using arithmetic averaging. The range of 15-minute values over which each logarithmic or mean value has been calculated is shown in parenthesis the table.

Location	Measured Noise Levels, dB re. 2 x 10^{-5} Pa.							
	Mean Daytime (07:00 to 23:00 hrs)				Mean Night-time (23:00 to 07:00 hrs)			
	$L_{Amax,F}$	$L_{A10,16hr}$	$L_{Aeq,16hr}$	$L_{A90,16hr}$	$L_{Amax,F}$	$L_{A10,8hr}$	$L_{Aeq,8hr}$	$L_{A90,8hr}$
LT1	64 (57-84)	57 (51-62)	55 (47-61)	52 (39-58)	60 (46-76)	50 (38-61)	47 (36-59)	39 (28-56)
LT2	67 (61-87)	62 (57-66)	60 (53-64)	55 (40-61)	65 (58-75)	56 (41-65)	52 (42-62)	39 (26-58)
LT3	69 (60-92)	61 (55-65)	59 (52-66)	56 (43-61)	63 (56-81)	54 (44-67)	51 (41-63)	41 (29-59)

Table 5.1: SUMMARY OF FREE-FIELD UNATTENDED CONTINUOUS NOISE MONITORING RESULTS AT LT1, LT2 AND LT3
Note: [1] values in parenthesis 15 minute values

5.1.2 The results of the unattended noise monitoring show that during the daytime periods free-field $L_{Aeq,16hr}$ noise levels across the proposed site ranged between 50 and 62 dB. Measured mean $L_{Aeq,16hr}$ noise levels at LT1, LT2 and LT3 were 55, 60 and 59 dB $L_{Aeq,16hr}$, respectively.

5.1.3 During the night-time periods free-field noise levels across site ranged between 45 and 56 dB $L_{Aeq,8hr}$ with overall mean values of 47, 52 and 51 dB $L_{Aeq,8hr}$ at LT1, LT2 and LT3, respectively.

5.1.4 The results of the short-term attended noise monitoring undertaken on Friday 18th December 2015 are presented in Table B4 of Appendix B and summarised below in Table 5.2.

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Monitoring Location	Start Time	Duration (mins)	Measured Noise Levels, dB re. 2 x 10^{-5} Pa.			
			$L_{Amax,F}$	$L_{A10,15min}$	$L_{Aeq,15min}$	$L_{A90,15min}$
ST1	11:15	15	70.3	57.1	55.7	53.5
ST1	12:15	15	71.5	57.3	56.1	54.4
ST1	13:15	15	63.6	57.1	55.6	53.8
ST2	11:35	15	65.0	58.1	56.6	54.4
ST2	12:35	15	67.0	58.4	56.7	54.5
ST2	13:35	15	64.4	57.4	56.0	54.4
ST3	11:55	15	67.0	51.6	50.9	48.6
ST3	12:55	15	58.5	51.9	50.4	48.6
ST3	13:55	15	67.1	53.5	51.7	48.9

Table 5.2: ATTENDED NOISE SURVEY RESULTS, FRIDAY 18TH DECEMBER 2015

5.1.5 The results of the short term attended noise measurements indicate that there is a trend in noise levels across the development site, with levels to the north of site around 5 dB lower than those measured further south. This variation in noise level is due to the distance from the main road in the area, the A259.

5.2 Derived Ambient Noise Levels

5.2.1 Level differences between synchronised attended and unattended noise measurements have been calculated. Ambient daytime free-field $L_{Aeq,16hr}$ and nigh-time $L_{Aeq,8hr}$ noise levels at each of the attended measurement locations have then been derived using the diurnal noise variations measured at the closest unattended location to correct the short term measurements made at ST1-ST3. The levels, presented in Table 5.3, are considered representative of a summary of the noise levels across the current site.

5.2.2 L_{AFmax} levels at night did not exceeded 75 dB at LT1 and LT2 during the survey. L_{AFmax} levels at night exceeded 75 dB three times during the night period at LT3.

Monitoring Location	Derived Noise Levels, dB re. 2 x 10^{-5} Pa.	
	Daytime	Night-Time
	$L_{Aeq,16hr}$	$L_{Aeq,8hr}$
LT1	55.4	49.4
LT2	60.0	53.7
LT3	59.4	52.7
ST1	53.6	47.3
ST2	55.6	48.9
ST3	49.5	43.5

Table 5.3: CURRENT SITE FREE-FIELD NOISE LEVELS

6. NOISE ASSESSMENT

6.1 Assessment of Outdoor Amenity Noise Levels

6.1.1 BS 8233:2014 states that a desirable level for steady continuous noise should not exceed 50 dB, with an upper guideline value of 55 dB $L_{Aeq,16hr}$, which should be acceptable in noisier environments. Similar criteria levels are also presented in WHO noise guidelines for the identification of 'moderate' and 'serious' annoyance critical health effects.

6.1.2 In order to predict the noise levels within the gardens of the development properties it is necessary to take into account the sound reduction to be achieved by the close boarded fencing that is to be installed along the garden perimeters. Barrier attenuation can be calculated in accordance with the methodology provided in CRTN. Calculations of barrier attenuation have been undertaken assuming 1.8 m high garden fencing on the boundary of the southernmost proposed properties. The predicted free-field garden noise levels, including the sound attenuation from fencing, range up to 54.9 dB $L_{Aeq,16hr}$, which conforms with BS8233 reasonable level of 55 dB at the properties most exposed to road noise from the A259. With the provision of a 2m roadside bund with 1 m barrier on top the noise levels are calculated to be reduced to below 50 dB $L_{Aeq,16hr}$. Providing that the road barriers and the garden fences are installed as described above, or there are bunds constructed between the A259 and the development, the gardens achieve BS 8233's desirable level of 50 dB for outdoor amenity areas.

6.1.3 It is recommended that when the layout design is finalised detailed calculations of noise levels are undertaken to confirm that the criteria is still predicted to be achieved.

6.2 Calculation of Road Traffic Levels

6.2.1 Road traffic counts have been provided to Southdowns by the project's transport consultants, Bellamy Roberts [14]. The existing traffic flows and future traffic flows associated with the development are presented in Tables 6.1 and 6.2, respectively. Details of the AM/PM peak hour flows on each stretch of road are presented in Figures A7 and A8 of Appendix A.

Road Link	Average Peak Hour Flow	18hr Flow
Church Lane	1037	9897
A259 Site frontage	2008	22891
Horsemere Green Lane	193	1637

Table 6.1: EXISTING TRAFFIC NETWORK FLOWS

Road Link	Average Peak Hour Flow	18hr Flow
Horsemere Green Lane	48	470
Church Lane (S of site access)	98	958
Church Lane (N of site access)	27	262
A259 W	50	487
A259 E	48	472

Table 6.2: ESTIMATED DEVELOPMENT TRAFFIC FLOWS

6.2.2 The traffic flows presented in Tables 6.1 and 6.2 have been incorporated into a NoiseMap Five noise calculation model. This software enables the calculation of road traffic noise levels to the CRTN methodology, as well as presentation of noise contour plots. The contour plots showing the existing and future traffic noise levels are presented in Figures

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A9 and A10 of Appendix A, respectively. The future traffic flows are shown to have a negligible impact on both existing properties and those which are part of the planned development with the maximum calculated increase of less than $L_{Aeq,16hr}$ 1 dB at existing noise sensitive receptors close to as a result of the increase in traffic flows associated with the development and reductions of up to $L_{Aeq,16hr}$ 2 dB from the barrier effect of the buildings introduced by the proposed developments reducing the road noise from the A259.

6.2.3 The change in calculated CRTN noise levels for the receptors closest to the roads and the survey measurement locations are shown below in Table 6.3.

Receiver Number	Receiver Name	Current Baseline dB $L_{Aeq,16hr}$	Future with development dB $L_{Aeq,16hr}$	Change in dB $L_{Aeq,16hr}$
R1	Flettons (Horsemere Green Lane)	58.2	59.1	0.9
R2	Church Farm House	67.7	67.7	0.0
R3	23 Waterford Gardens	50.7	49.2	-1.5
R4	1 Cropthorne Drive	58.9	59.8	0.9
LT1	LT1	54.2	54	-0.2
LT2	LT2	56.4	56.5	0.1
LT3	LT3	58.8	59.9	1.1
ST1	ST1	49.7	51.7	2.0
ST2	ST2	50.7	44.8	-5.9
ST3	ST3	48.3	48.8	0.5

Table 6.3: CALCULATED WITH AND WITH OUT DEVELOPMENT CRTN NOISE LEVELS

6.3 Assessment of Internal Noise Levels

6.3.1 BS 8233:2014 contains recommended daytime guideline levels of 35 dB $L_{Aeq,T}$ for resting inside bedrooms and living rooms during the daytime, 40 dB $L_{Aeq,T}$ for dining areas and 30 dB $L_{Aeq,T}$ for sleeping inside bedrooms at night.

Outline Planning Stage Assessment – Simple Calculation

6.3.2 The approximate sound reduction value, provided in Annex G of BS 8233:2014, for a closed insulating glass window unit is 33 dB R_w. With a window open to provide background ventilation, the sound insulation of the window reduces to approximately 15 dB from a free-field sound level outside to an internal level.

6.3.3 Taking the typical sound reduction performance into consideration, internal noise levels have been predicted inside the dwellings, assuming windows are fully closed or partially open for ventilation purposes. Worst case façade levels have been derived by applying a + 2.5 dB façade correction to the measured free-field noise levels presented in Table 5.3. This method follows the simple procedure provided in BS 8233 to derive internal levels from free-field external noise levels.

6.3.4 Table 6.4 presents the predicted façade noise levels along with the internal noise levels at each of the measurement locations, with LT2 and LT3 being representative of the closest façades to the A259.

Meas. Location	Daytime Worst Façade Noise Level $L_{Aeq,16hr}$	Predicted Daytime Internal Noise Level, dB $L_{Aeq,16hr}$		Night-Time Façade Noise Level dB $L_{Aeq,8hr}$	Predicted Night-Time Internal Noise Level, dB $L_{Aeq,8hr}$	
		Windows Partially Open	Windows Closed		Windows Partially Open	Windows Closed
LT1	57.9	40.4	22.4	51.9	34.4	16.4
LT2	62.5	45.0	27.0	56.2	38.7	20.7
LT3	61.9	44.4	26.4	55.2	37.7	19.7
ST1	56.1	38.6	20.6	49.8	32.3	14.3
ST2	58.1	40.6	22.6	51.4	33.9	15.9
ST3	52.0	34.5	16.5	46.0	28.5	10.5

Table 6.4: PREDICTED INTERNAL NOISE LEVELS

Notes:
-red text indicates internal predicted noise levels which exceed the BS 8233 criteria;
-with windows closed the assumed composite façade reduction is 33 dB from the free-field noise level; and
-with an open window, the assumed composite facade reduction is 15 dB from the free-field noise level.

6.3.5 Based on the assumed typical façade reductions, the noise predictions show that internal noise levels remain below the daytime and night-time criterion of 35 and 30 dB $L_{Aeq,T}$, respectively, with closed insulating windows, assuming a sound reduction of 33 dB R_w.

6.3.6 With windows partially open, the 35 dB(A) day criterion is exceeded by up to +10 dB $L_{Aeq,16hr}$ and the 30 dB night-time criterion is also exceeded by up to 9 dB $L_{Aeq,8hr}$.

Maximum ($L_{Amax,F}$) Noise Levels

6.3.7 Maximum $L_{Amax,F}$ noise levels generated by road traffic during the attended monitoring (daytime) were noted to reach a maximum façade level of 84 dB at LT2. The maximum level was attributable to a motorbike passing on the A259. The maximum $L_{AMax,F}$ noise level at night measured during the attended monitoring was at LT1 with 81 dB $L_{AMax,F}$.

6.3.8 WHO guideline noise criteria sets an internal sleep disturbance noise limit of 45 dB $L_{Amax,F}$ for the onset of critical health effects from repeated events and inspection of the 15-minute $L_{AMax,F}$ does not regularly exceed 75dB. To achieve this noise criterion, the composite building envelope will need to achieve a minimum sound reduction of 30 dB.

6.4 NEC Assessment

6.4.1 From the façade corrected mean measured noise levels the site is in NEC A or B (dependent on location and façade) for both day and night for road noise. The $L_{AMax,F}$ at night did not regularly exceed the 75 dB criteria to categorise the site in NEC C.

6.4.2 For NEC B the Arun District Local Plan states "*Noise should be taken into account when determining planning applications and, where appropriate, conditions imposed to ensure an adequate level of protection against noise*".

6.4.3 It is recommended that planning conditions are put in place for:

- Detailed BS 8233 and CRTN calculations to detailed design and specifications for the dwellings and garden fences;
- Mitigation measures of fencing to the gardens and alternative ventilation to the habitable rooms;

6.5 PPG Assessment

6.5.1 For existing noise sensitive receptors the calculated change in noise levels from the increase in traffic flows and the barrier effect of the proposed development is below the threshold of noticeable changes in noise levels. As such the change to existing noise sensitive receptors is considered as a Not Noticeable and at the No Observed Effect Level.

6.5.2 For noise sensitive receptors introduced by the development considering the measured sound levels and the anonymous nature of road noise it is considered that the perception of the road noise will be noticeable and not intrusive, with alternative ventilation and close board fencing in place in place. With the mitigation in place the noise levels will be within BS8233 and WHO criteria and is considered unlikely to cause change in behaviour or attitude for new noise sensitive receptors introduced by the proposed development. This would place the development in the No Observed Adverse Effect Level (NOAEL) category for noise sensitive receptors introduced by the development. From the NOAEL classification no specific mitigation measures (beyond the garden fences and ventilation measures discussed in the following section) are required.

6.6 BS4142 Assessment

6.6.1 No assessment has been made to BS4142:2014 for the proposed dwellings as the noise sources noted on site were road noise and aircraft noise and no noise of an industrial or commercial nature was noted during the course of the survey.

6.6.2 At the outline planning stage detailed design of the plant and activities at the proposed village community hall, shop and the B1 office are not known and so it is recommended the BS4142 assessment is conducted at the detailed design stage and secured through a planning condition. Given the distance from the locations of the proposed facilities in the masterplan and the barrier effects of the introduced buildings the impacts on the existing dwellings is expected to be minimal.

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7. MITIGATION OPTIONS

7.1.1 The results of the noise assessment indicate that the Clymping development site is predicted to achieve BS 8233:2014 internal $L_{Aeq,T}$ noise criteria for living rooms and bedrooms with closed windows. However, with windows partially open, internal noise levels are unlikely to achieve BS 8233 criteria in bedrooms and living rooms facing the A259.

7.1.2 One method to mitigate the effects of noise on occupants of the proposed development would be to position habitable rooms, such as living rooms and bedrooms, on the north façades. Given the additional screening of the building, all of the properties are predicted to achieve BS 8233 internal $L_{Aeq,T}$ noise criteria on the east façade, with windows open or closed. It is noted that the practicality of resolving all noise issues by the strategic positioning of habitable rooms is unlikely.

7.1.3 BS 8233 notes that, if relying on closed windows to meet the guide values, there needs to be an appropriate alternative ventilation system that does not compromise the façade insulation or the resulting noise level and meets the ventilation requirements.

7.1.4 Suggested additional ventilation options for the proposed residential dwellings include:

- sound attenuating ventilators installed in the window units;
- acoustics air bricks installed in the façade; and/or
- passive whole house ventilation with air drawn from the north facade; or
- mechanical silenced ventilation.

7.1.5 With a composite R_w of 30 dB the internal $L_{Aeq,16hr}$, $L_{Aeq,18hr}$ and $L_{AMax,F}$ criteria would be met

7.1.6 In order to provide purge ventilation when required it is acceptable to provide opening windows.

7.1.7 It is recommended that 'detailed' BS 8233 calculations are undertaken to guide the design of building envelope constructions, as well as the selection of window and ventilation units for each dwelling. It is also recommended that noise measurements are carried out inside the dwellings after construction in order to confirm the sound insulation performance of the buildings.

7.1.8 The possibility of using noise barriers or bunds close to the A259 to effectively reduce noise levels has been investigated but the upper storeys do not benefit from the screening. The barriers or bunds could be used to reduce the noise levels in gardens, however, to below the guidance levels.

7.1.9 Garden noise levels have been assumed to be mitigated through the use of 1.8 m high close boarded fences to achieve BS8233 'reasonable' levels and with a 3 m high combined bund and barrier at the boundary with the A259 'desirable' levels can be achieved. The barriers and fencing should have no gaps and be continuous to the ground and have a surface density of at least 10 kg/m^2 and calculations should be conducted at the detailed design stage to confirm that external noise criteria are still predicted to be achieved.

7.1.10 Mitigation options for plant and activities associated with the proposed village hall, B1 office and shop will be established during the BS4142 assessment at the detailed design stage, when details are available.

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7.1.11 The proposed development will act as a barrier to noise propagation from the A259 to the existing dwellings to the north.

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8. CONCLUSIONS

8.1.1 A noise assessment has been undertaken to inform an outline planning application of the proposed residential development at Land at Clymping, West Sussex.

8.1.2 Noise affecting the proposed development from road traffic, aircraft and other noise sources has been measured and the noise impact of the development has been calculated.

8.1.3 The results of the noise survey undertaken across the site show mean free-field daytime and night-time ambient noise levels at LT1, LT2 and LT3 of 55, 59 and 60 dB $L_{Aeq,16hr}$ and 47, 52 and 51 dB $L_{Aeq,8hr}$ respectively which would put the propose residential parts of the site in NEC B. For NEC B the Arun states "*Noise should be taken into account when determining planning applications and, where appropriate, conditions imposed to ensure an adequate level of protection against noise*"

8.1.4 These mean ambient noise levels would be higher than the levels expected once the properties and associated fencing is erected. However, as detailed plans are not available at this stage, the measured noise levels have been assumed as representative of noise levels following the development's construction.

8.1.5 The predicted daytime maximum outdoor amenity area free-field $L_{Aeq,T}$ noise level of 49 dB meets the WHO guideline noise level for moderate annoyance of 50 dB(A), recommended for private outdoor areas with mitigation in the form of close boarded fences and the road noise bund and barrier in place.

8.1.6 Internal noise levels have been predicted using BS 8233 typical R_w sound insulation values for a façade construction with double glazed windows. With windows closed, all properties are predicted to achieve BS 8233 internal guideline noise levels during both daytime and night-time periods. However, with windows partially open to allow for natural air ventilation, the guideline levels are exceeded by a significant margin across the majority of the development site.

8.1.7 Alternative forms of ventilation to opening a window are therefore required for the site's development proposals, such as trickle vents, mechanical ventilation or whole house ventilation.

8.1.8 For the control of road traffic $L_{Amax,F}$ inside bedrooms at night, a minimum composite sound reduction of 30 dB R_w is required to mitigate current $L_{Amax,F}$ levels in order to achieve the WHO's 45 dB $L_{Amax,F}$ guideline noise level.

8.1.9 With these design and mitigation measures in place the internal noise levels should not exceed the internal ambient noise level guidelines in BS8233 and WHO guidance.

8.1.10 It is recommended that detailed noise calculations using the procedure set out in BS 8233 and CRTN are undertaken to guide the selection of specific building elements and the requirement for close board gardens fences, during the detailed design stage of the project. It is also recommended that noise measurements are carried out after construction to verify the overall sound insulation performance of the dwellings.

8.1.11 It is also recommended that a planning condition is set to require the BS 4142 assessment of potential impacts from plant or activities associated with the offices and village hall and detailed BS8233 calculations of the proposed dwellings to ensure good internal acoustic conditions.

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8.1.12 Calculations of existing and future traffic noise levels have shown a negligible change in noise levels due to traffic movements associated with the development properties. If the alignment of the A259 is amended this may trigger the requirement for the highways authority to conduct an assessment into any eligibility under the Noise Insulation Regulations [15].

8.1.13 Based on the information and assessments contained within this report there is no apparent conflict on matters of noise between proposed development and the policy requirements of the Arun District Local Plan, NPPF and NPSE for either the noise impact on existing noise sensitive receptors or new noise sensitive receptors introduced by the development.

9. REFERENCES

1. Department for Environment, Food and Rural Affairs (DEFRA). 2010. Noise Policy Statement for England (NPSE).

2. Department for Communities and Local Government. 2012. National Planning Policy Framework. March 2012.

3. Department for Communities & Local Government. Planning Practice Guidance – Noise. Revision date 06/03/14.

4. Planning Noise Advice Document: Sussex. 2015.

5. World Health Organisation. Guidelines for Community Noise. 1999.

6. British Standards Institution. BS 8233: 2014: Guidance on Sound Insulation and Noise Reduction for Buildings.

7. Clymping Parish Council. Clymping Neighbourhood Plan 2015 – 2030. 2015.

8. Arun District Council. Arun District Local Plan 2011 – 2031. October 2014.

9. Department for Environment, Food and Rural Affairs (DEFRA). 2010. Noise Action Plan: Brighton Agglomeration. Environmental Noise (England) Regulations 2006, as amended.

10. Building Research Establishment. Sound Control for Homes. 1993.

11. British Standards Institution. BS 7445: 2003. Description and measurement of environmental noise. Guide to quantities and procedures.

12. British Standards Institution. BS 4142: 2014: Method for rating and assessing industrial and commercial sound.

13. Her Majesty's Stationery Office (HMSO). 1988. Calculation of Road Traffic Noise.

14. Bellamy Roberts. 2016. Clymping Traffic Flow Data.

15. SI. The Noise Insulation Regulations 1975 (as amended 1996).

APPENDIX A: FIGURES

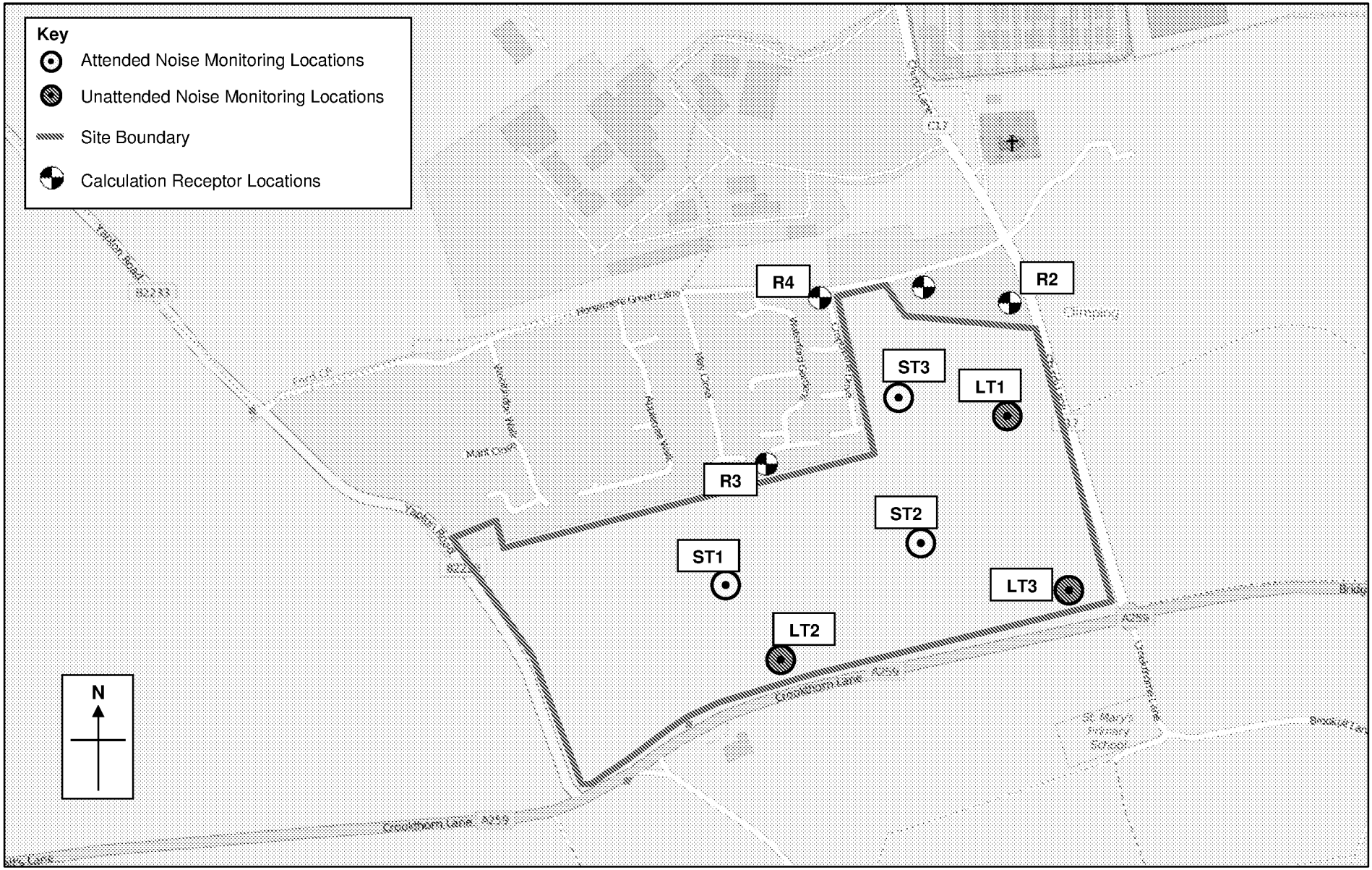


FIGURE A1: SITE AND NOISE MEASUREMENT LOCATIONS



FIGURE A2: PROPOSED DEVELOPMENT LAYOUT

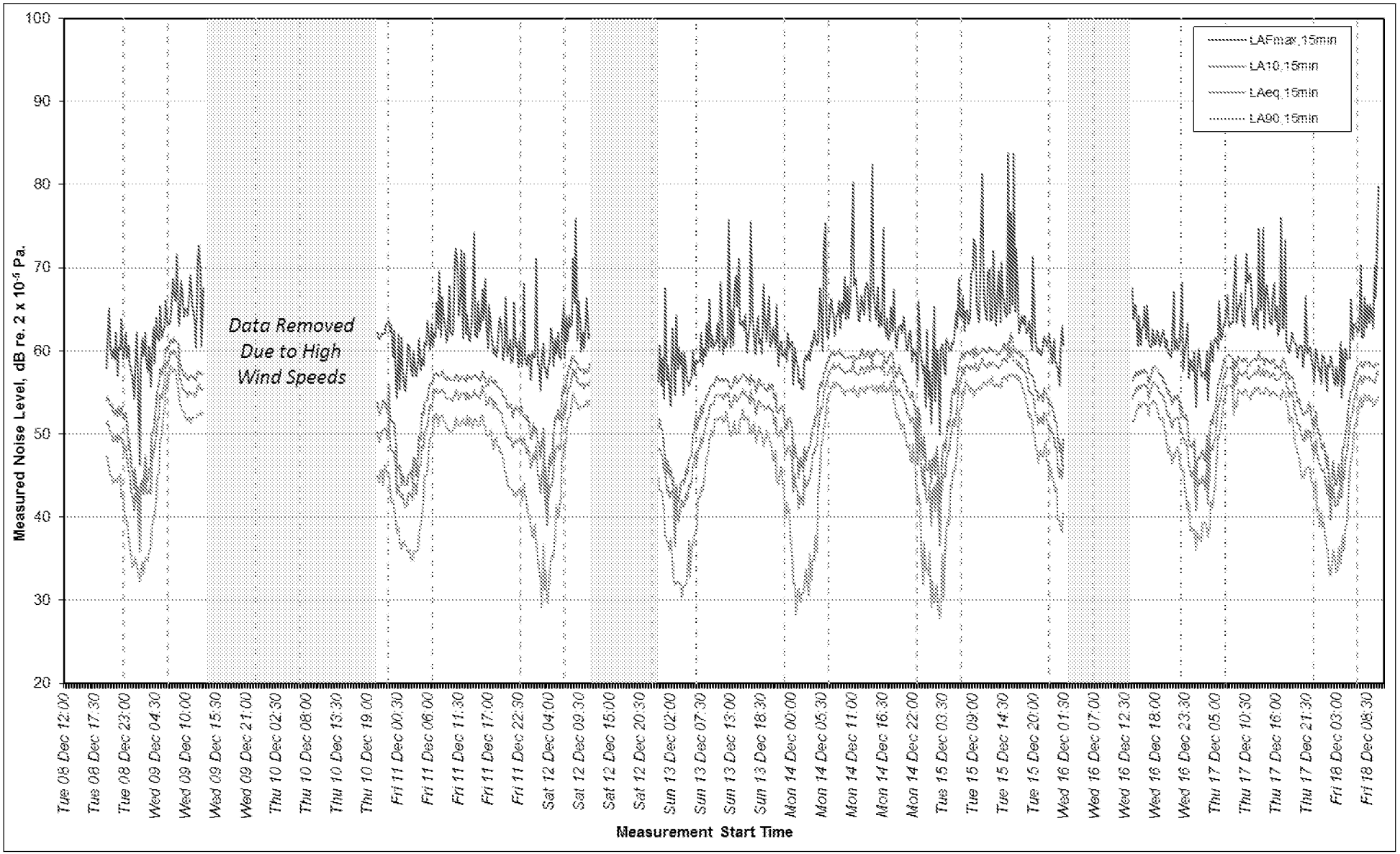


FIGURE A3: UNATTENDED CONTINUOUS NOISE MONITORING RESULTS AT LT1, TUESDAY 8TH DECEMBER TO FRIDAY 18TH DECEMBER 2015

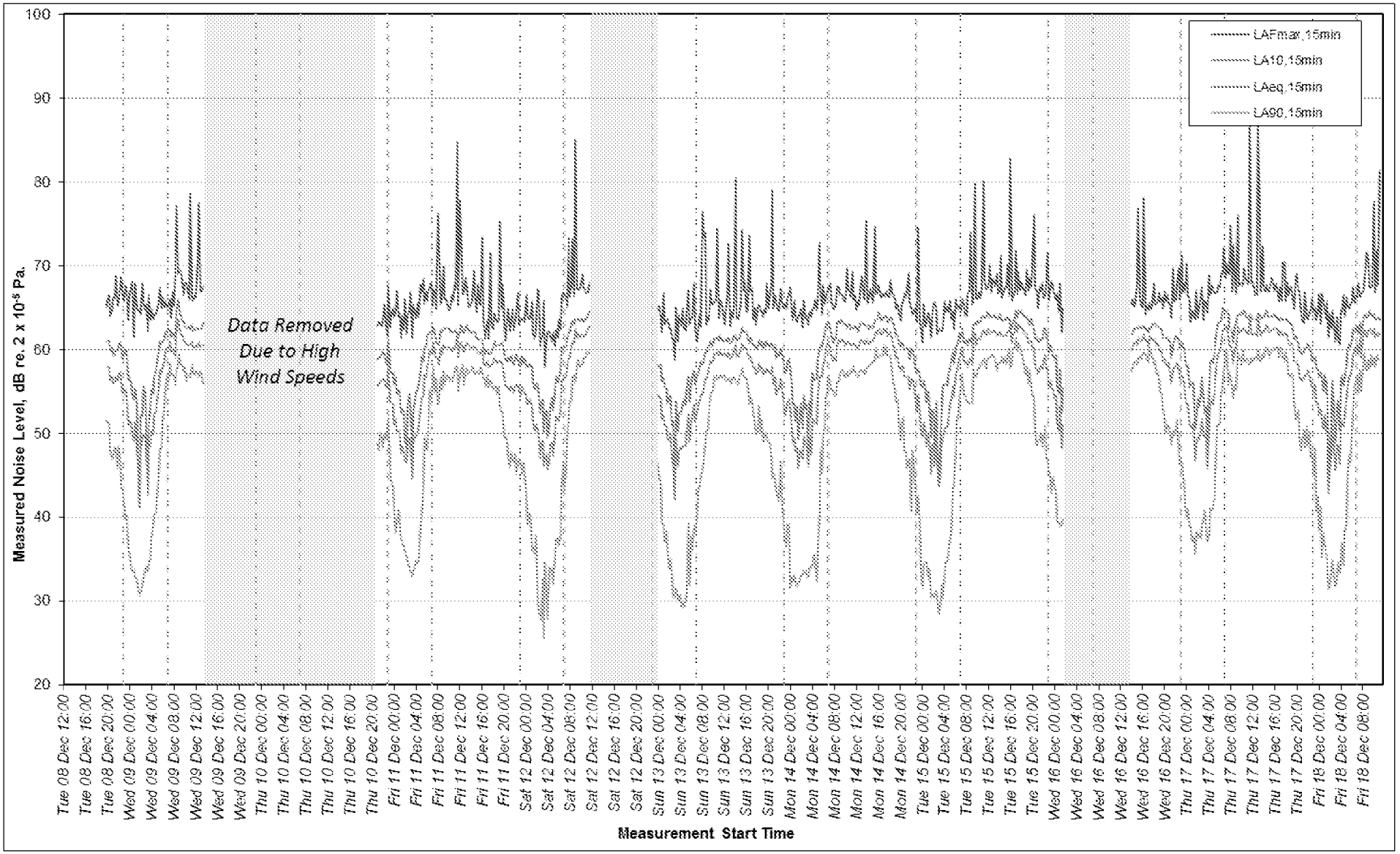


FIGURE A4: UNATTENDED CONTINUOUS NOISE MONITORING RESULTS AT LT2, TUESDAY 8TH DECEMBER TO FRIDAY 18TH DECEMBER 2015

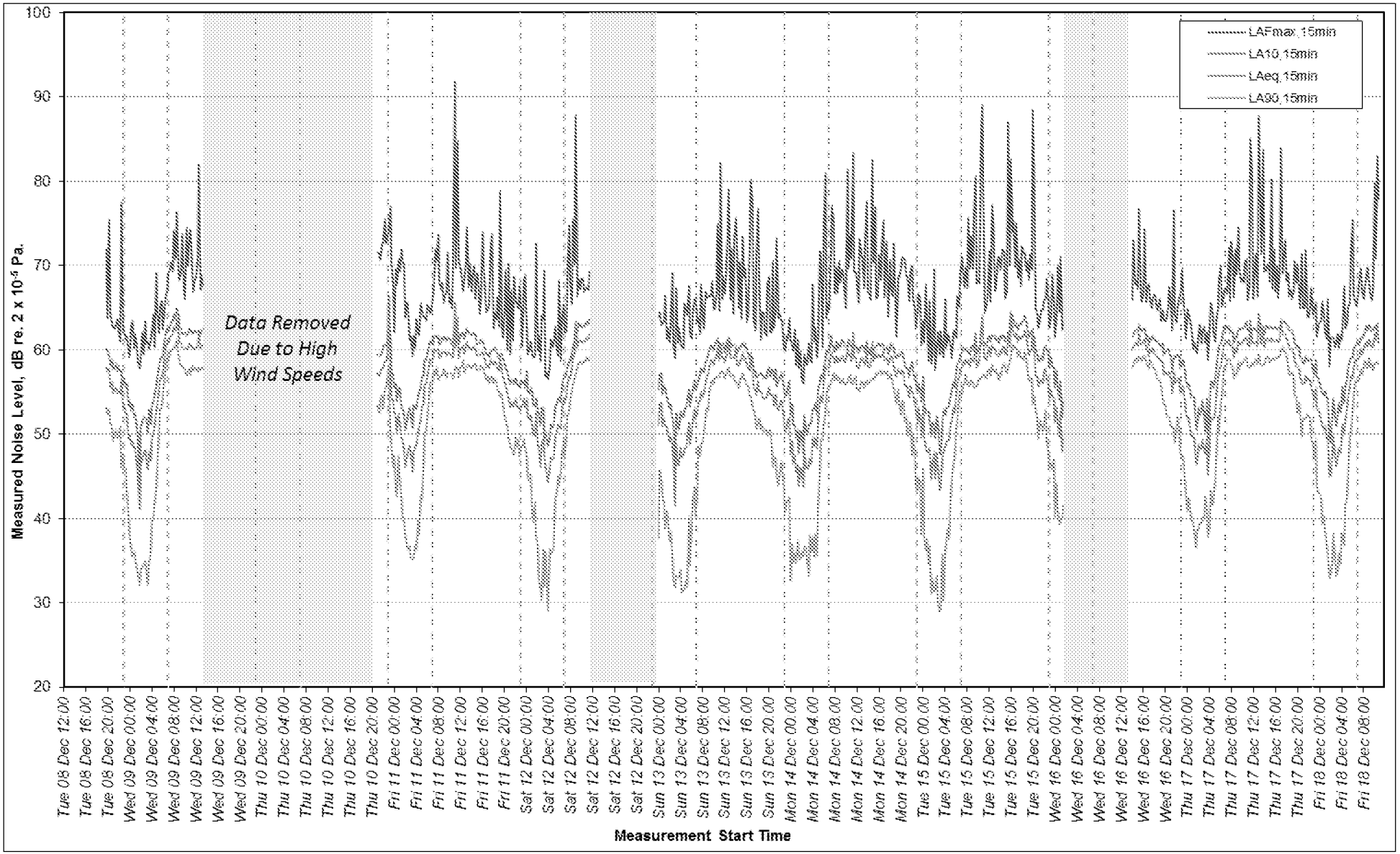


FIGURE A5: UNATTENDED CONTINUOUS NOISE MONITORING RESULTS AT LT3, TUESDAY 8TH DECEMBER TO FRIDAY 18TH DECEMBER 2015

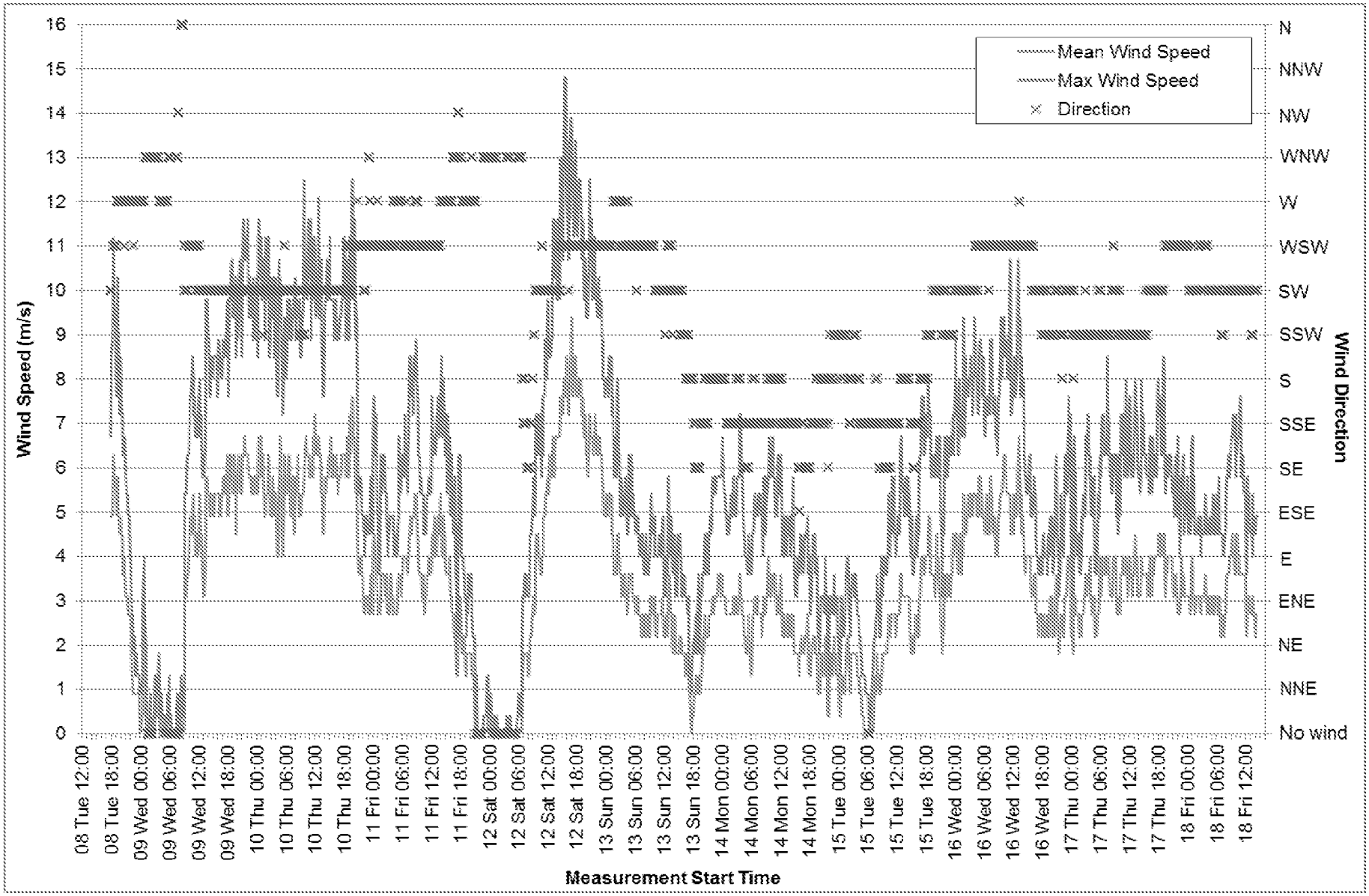


FIGURE A6: UNATTENDED CONTINUOUS WEATHER MONITORING RESULTS AT LT1, TUESDAY 8TH DECEMBER TO FRIDAY 18TH DECEMBER 2015

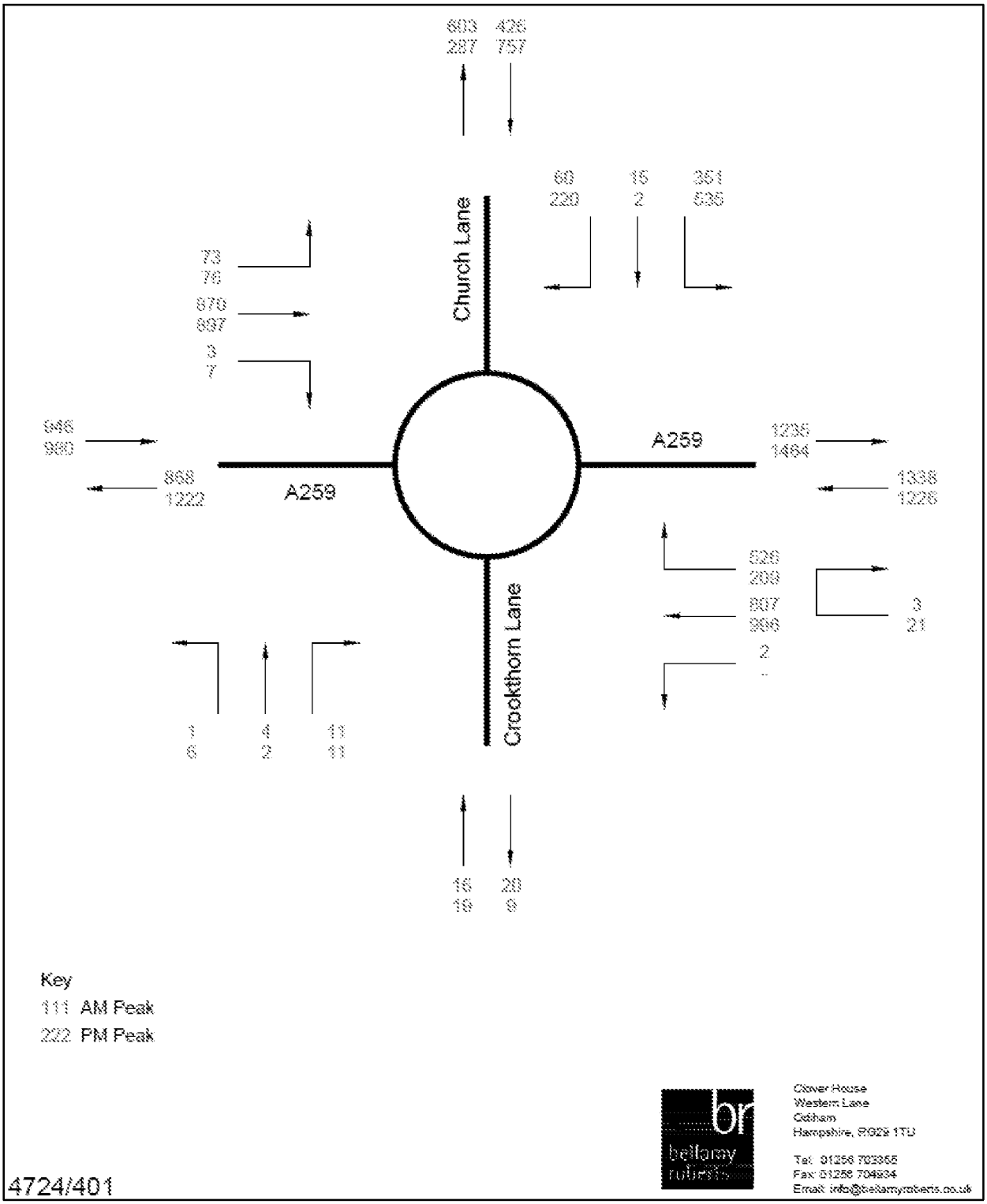


FIGURE A7: EXISTING AM/PM PEAK HOUR TRAFFIC FLOWS

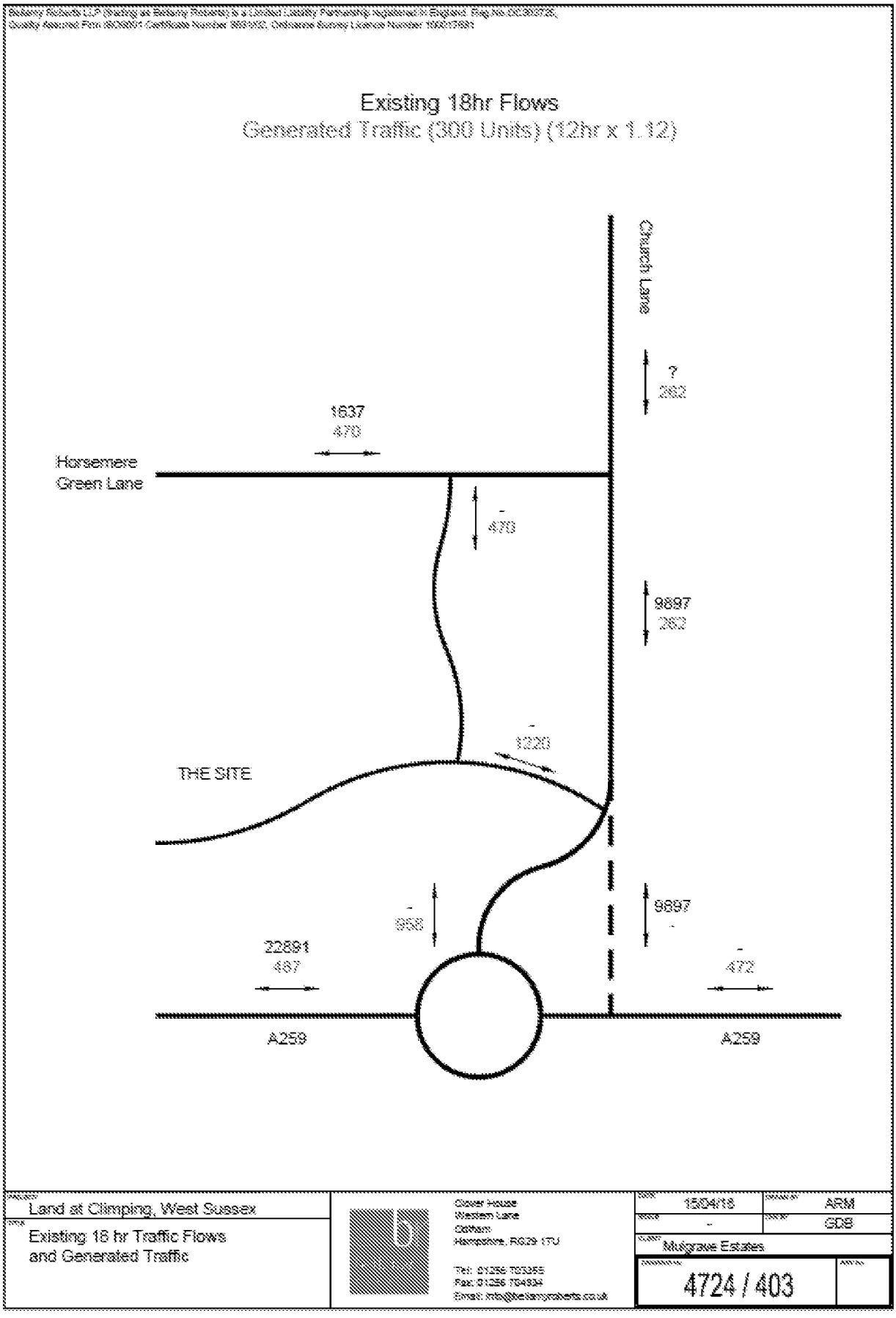


FIGURE A8: PREDICTED SITE TRAFFIC AM/PM PEAK HOUR FLOW

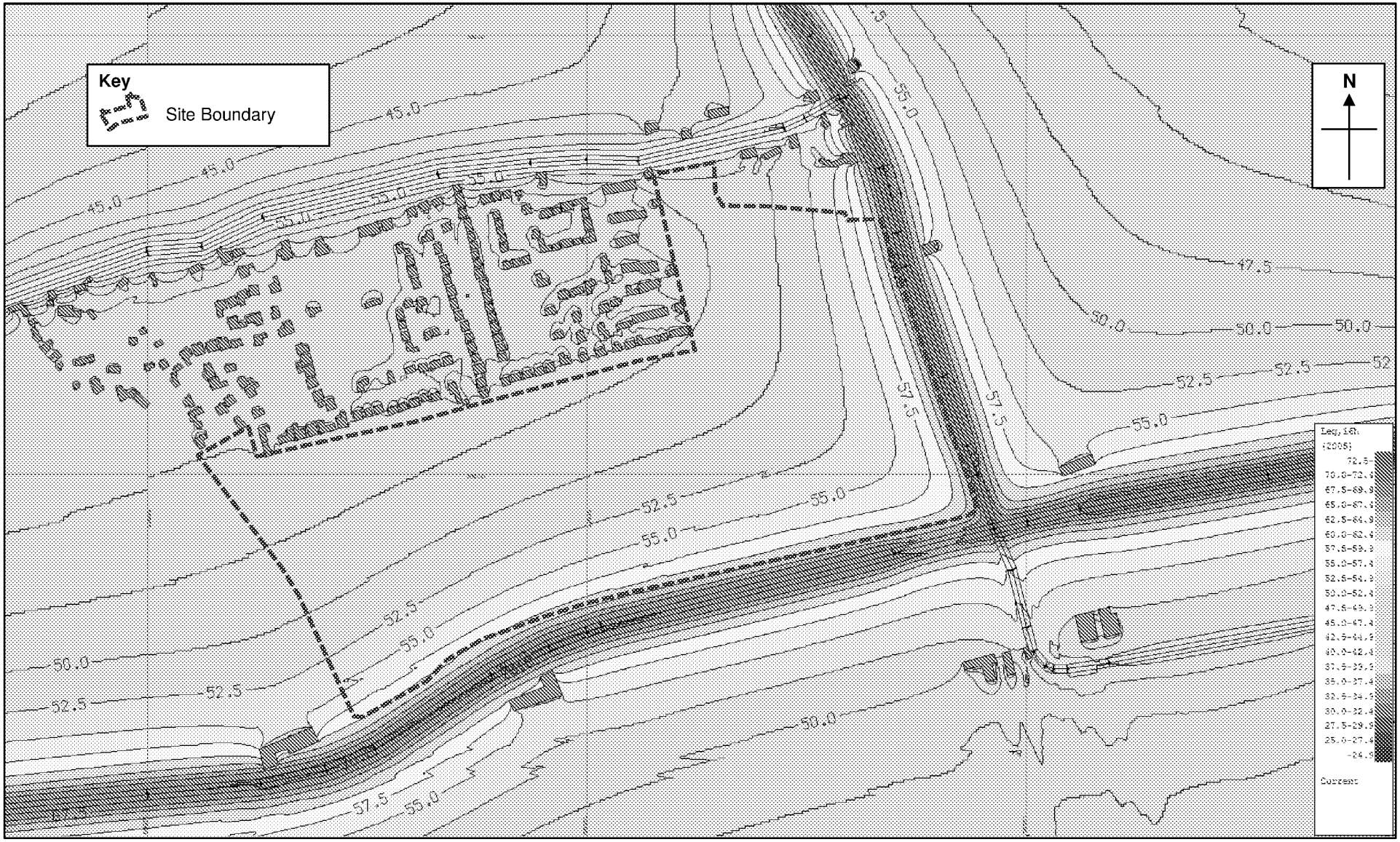


FIGURE A9: LAEQ,16HR CONTOUR PLOT (FREE-FIELD) WITH CURRENT TRAFFIC CONDITIONS

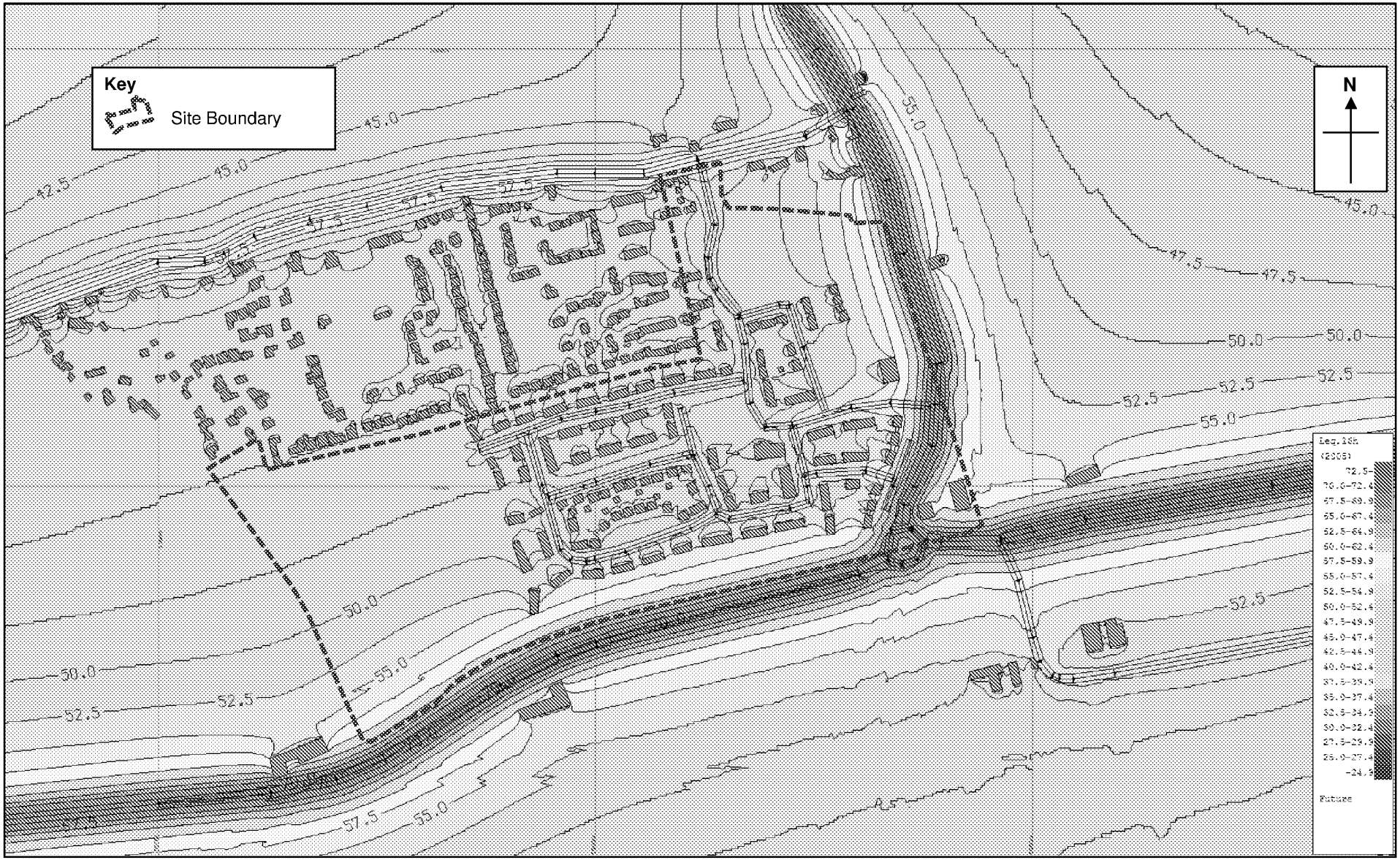


FIGURE A10: LAEQ,16HR CONTOUR PLOT (FREE-FIELD) WITH FUTURE TRAFFIC CONDITIONS

APPENDIX B: TABLES

Day	Date	LT1 Measured Noise Levels, dB re. 2 x 10^{-5} Pa.							
		Daytime (07:00 to 23:00 hrs)				Night-time (23:00 to 07:00 hrs)			
		$L_{Amax,F}$	$L_{A10,16hr}$	$L_{Aeq,16hr}$	$L_{A90,16hr}$	$L_{Amax,F}$	$L_{A10,8hr}$	$L_{Aeq,8hr}$	$L_{A90,8hr}$
Tuesday	08-Dec-15	60 (57-65)	53 (52-55)	50 (49-52)	45 (43-47)	60 (46-66)	50 (38-61)	51 (36-59)	40 (32-56)
Wednesday	09-Dec-15	66 (60-73)	58 (56-62)	57 (55-60)	54 (51-58)	***Data Removed Due to High Wind Speeds***			
Thursday	10-Dec-15	62 (61-63)	53 (52-54)	50 (49-51)	45 (44-46)	59 (54-64)	49 (44-56)	48 (41-54)	40 (35-50)
Friday	11-Dec-15	64 (58-74)	56 (52-58)	54 (48-56)	49 (42-52)	60 (55-71)	50 (41-56)	48 (39-53)	38 (29-49)
Saturday	12-Dec-15	64 (59-76)	58 (55-59)	56 (52-58)	53 (48-55)	58 (53-68)	46 (39-52)	45 (37-48)	36 (30-45)
Sunday	13-Dec-15	63 (58-76)	55 (51-57)	53 (47-55)	49 (39-53)	61 (55-76)	51 (45-59)	50 (41-57)	38 (28-55)
Monday	14-Dec-15	65 (59-82)	59 (52-60)	57 (49-59)	54 (44-56)	60 (50-69)	50 (42-59)	49 (37-57)	38 (28-53)
Tuesday	15-Dec-15	66 (60-84)	59 (54-62)	58 (51-61)	54 (47-57)	60 (56-63)	51 (46-54)	48 (45-51)	42 (38-46)
Wednesday	16-Dec-15	62 (59-68)	56 (53-58)	55 (50-56)	51 (46-54)	60 (53-68)	51 (44-59)	50 (41-57)	42 (36-54)
Thursday	17-Dec-15	64 (58-76)	57 (51-60)	56 (48-58)	53 (44-56)	59 (54-66)	49 (42-58)	48 (40-55)	40 (33-51)
Friday	18-Dec-15	66 (62-80)	58 (58-59)	57 (56-58)	54 (53-55)	-	-	-	-
Mean Average		64 (57-84)	57 (51-62)	55 (47-61)	52 (39-58)	60 (46-76)	50 (38-61)	47 (36-59)	39 (28-56)

TABLE B1: UNATTENDED NOISE SURVEY RESULTS AT LT1, TUESDAY 8TH DECEMBER TO FRIDAY 18TH DECEMBER 2015

Note: [1] values in parenthesis 15 minute values

Day	Date	LT2 Measured Noise Levels, dB re. 2 x 10^{-5} Pa.							
		Daytime (07:00 to 23:00 hrs)				Night-time (23:00 to 07:00 hrs)			
		$L_{Amax,F}$	$L_{A10,16hr}$	$L_{Aeq,16hr}$	$L_{A90,16hr}$	$L_{Amax,F}$	$L_{A10,8hr}$	$L_{Aeq,8hr}$	$L_{A90,8hr}$
Tuesday	08-Dec-15	66 (64-69)	60 (59-61)	57 (55-58)	48 (43-52)	65 (62-68)	56 (41-62)	54 (43-60)	39 (31-57)
Wednesday	09-Dec-15	68 (64-79)	63 (61-66)	61 (59-64)	57 (56-60)	***Data Removed Due to High Wind Speeds***			
Thursday	10-Dec-15	63 (62-65)	59 (58-60)	56 (55-56)	49 (48-50)	65 (62-69)	56 (48-62)	54 (45-60)	41 (33-55)
Friday	11-Dec-15	66 (61-85)	61 (58-63)	59 (55-62)	55 (45-58)	63 (58-67)	56 (50-60)	52 (46-56)	36 (26-47)
Saturday	12-Dec-15	69 (65-85)	63 (60-65)	61 (57-63)	56 (43-60)	64 (59-68)	54 (45-58)	51 (42-55)	35 (29-46)
Sunday	13-Dec-15	66 (61-81)	61 (57-63)	58 (53-61)	52 (40-58)	65 (63-73)	56 (48-63)	54 (46-61)	37 (32-55)
Monday	14-Dec-15	67 (63-75)	62 (58-64)	60 (54-63)	55 (41-61)	64 (61-75)	55 (45-62)	53 (44-59)	37 (29-54)
Tuesday	15-Dec-15	68 (64-83)	63 (61-65)	61 (57-63)	56 (47-61)	66 (62-68)	58 (52-61)	54 (48-56)	42 (39-46)
Wednesday	16-Dec-15	67 (64-78)	62 (59-63)	60 (56-62)	55 (46-60)	67 (63-72)	58 (48-65)	56 (46-62)	43 (36-58)
Thursday	17-Dec-15	68 (63-87)	63 (59-65)	61 (55-64)	57 (47-61)	64 (61-68)	56 (44-63)	54 (43-60)	40 (31-56)
Friday	18-Dec-15	70 (66-81)	64 (62-65)	62 (59-63)	58 (55-60)				
Mean Average		67 (61-87)	62 (57-66)	60 (53-64)	55 (40-61)	65 (58-75)	56 (41-65)	52 (42-62)	39 (26-58)

TABLE B2: UNATTENDED NOISE SURVEY RESULTS AT LT2, TUESDAY 8TH DECEMBER TO FRIDAY 18TH DECEMBER 2015

Note: [1] values in parenthesis 15 minute values

Day	Date	LT3 Measured Noise Levels, dB re. 2 x 10^{-5} Pa.							
		Daytime (07:00 to 23:00 hrs)				Night-time (23:00 to 07:00 hrs)			
		$L_{Amax,F}$	$L_{A10,16hr}$	$L_{Aeq,16hr}$	$L_{A90,16hr}$	$L_{Amax,F}$	$L_{A10,8hr}$	$L_{Aeq,8hr}$	$L_{A90,8hr}$
Tuesday	08-Dec-15	66 (61-77)	58 (56-60)	56 (53-58)	50 (46-53)	62 (58-69)	54 (44-63)	54 (41-61)	41 (32-59)
Wednesday	09-Dec-15	71 (66-82)	63 (62-65)	61 (60-64)	58 (57-61)	***Data Removed Due to High Wind Speeds***			
Thursday	10-Dec-15	73 (71-76)	60 (59-61)	58 (57-59)	54 (52-57)	66 (59-77)	56 (51-67)	55 (46-63)	44 (35-58)
Friday	11-Dec-15	68 (60-92)	60 (56-63)	59 (53-66)	56 (48-59)	62 (57-73)	53 (49-57)	51 (44-54)	40 (29-49)
Saturday	12-Dec-15	69 (62-88)	61 (57-64)	60 (54-63)	56 (47-59)	63 (59-69)	54 (46-57)	50 (42-54)	38 (31-48)
Sunday	13-Dec-15	67 (60-82)	59 (55-62)	57 (52-61)	53 (43-58)	62 (56-81)	53 (48-60)	52 (44-58)	40 (33-56)
Monday	14-Dec-15	70 (62-83)	60 (56-62)	59 (53-62)	55 (44-58)	62 (58-70)	53 (48-59)	51 (43-58)	39 (29-55)
Tuesday	15-Dec-15	71 (63-89)	61 (59-64)	60 (56-65)	56 (48-61)	65 (62-71)	56 (52-59)	53 (48-55)	43 (39-47)
Wednesday	16-Dec-15	67 (62-77)	61 (57-63)	59 (55-62)	56 (48-59)	63 (59-70)	56 (49-63)	54 (45-61)	44 (36-58)
Thursday	17-Dec-15	70 (64-88)	62 (58-64)	61 (55-64)	57 (49-60)	64 (58-76)	55 (49-61)	53 (45-59)	42 (33-56)
Friday	18-Dec-15	70 (66-83)	62 (61-63)	61 (59-63)	58 (56-59)				
Mean Average		69 (60-92)	61 (55-65)	59 (52-66)	56 (43-61)	63 (56-81)	54 (44-67)	51 (41-63)	41 (29-59)

TABLE B3: UNATTENDED NOISE SURVEY RESULTS AT LT3, TUESDAY 8TH DECEMBER TO FRIDAY 18TH DECEMBER 2015

Note: [1] values in parenthesis 15 minute values

Monitoring Location	Start Time	Dur. (mins)	Measured Noise Levels, dB re. 2 x 10^{-5} Pa.				Comments
			$L_{Amax,F}$	$L_{A10,5min}$	$L_{Aeq,5min}$	$L_{A90,5min}$	e.g. Main Sources, Maximum Levels and No. of Events
ST1	11:15	5	70.3	56.6	55.3	53.3	Dominant noise source is road traffic 55 dB(A), fairly constant. Mixture of a259 and road to the west (mostly a259). Light air craft ~53 dB(A).
	11:20	5	66.5	58.6	56.6	54.0	Distant air craft 54 dB(A). Level occasionally drops down to 53 dB when minimal traffic. Moped on a259 66 dB(A).
	11:25	5	60.6	56.1	54.9	53.3	Leq 55 dB dominated by road traffic.
			70.3	57.1	55.7	53.5	
ST2	11:35	5	60.3	57.9	56.3	53.9	Dominant noise source is road traffic 56 dB(A), fairly constant. Mixture of a259 and road to the East (mostly a259).
	11:40	5	65.0	58.2	56.9	54.6	Leq 56 dB dominated by road traffic. Light aircraft 56 dB(A). Distant aircraft 57 dB(A).
	11:45	5	62.4	58.3	56.7	54.7	L90 55 dB(A). Dominated by road traffic.
			65.0	58.1	56.6	54.4	
ST3	11:55	5	57.9	51.0	49.9	48.7	Dominant source is road traffic (mostly on A259) ~49 dB(A). Also contribution from road to East and local traffic on horseman green lane.
	12:00	5	67.0	52.6	52.5	48.9	Birdsong 55 dB(A).
	12:05	5	55.3	51.1	49.9	48.1	Leq 50 dB(A). Dominated by road traffic.
			67.0	51.6	50.9	48.6	

TABLE B4: ATTENDED NOISE SURVEY RESULTS, FRIDAY 18TH DECEMBER 2015

Monitoring Location	Start Time	Dur. (mins)	Measured Noise Levels, dB re. 2 x 10^{-5} Pa.				Comments
			$L_{Amax,F}$	$L_{A10,5min}$	$L_{Aeq,5min}$	$L_{A90,5min}$	e.g. Main Sources, Maximum Levels and No. of Events
ST1	12:15	5	61.9	57.4	56.0	54.5	Dominant source is road traffic. Constant 54-56 dB(A).
	12:20	5	67.9	57.7	56.4	54.1	Motorbike 67 dB(A).
	12:25	5	71.5	56.7	55.8	54.6	Distant aircraft 56 dB(A). Leq 56 dB(A) dominated by road traffic with some contribution from aircraft.
			71.5	57.3	56.1	54.4	
ST2	12:35	5	67.0	60.4	57.7	54.3	Road traffic is dominant 54-58 dB(A). Light aircraft 64 dB(A). Seagull 62 dB(A).
	12:40	5	60.8	57.6	56.4	54.8	Leq 56 dB(A). Dominated by road traffic with some aircraft noise and birdsong.
	12:45	5	60.0	57.1	55.7	54.4	L90 54 dB(A). Dominated by constant flow of traffic on a259.
			67.0	58.4	56.7	54.5	
ST3	12:55	5	54.9	51.4	50.3	48.9	Measurement dominated by road traffic - mostly a259. Distant aircraft 51 dB(A).
	13:00	5	58.5	51.6	50.1	47.9	Distant aircraft 52 dB(A).
	13:05	5	57.1	52.8	50.9	49.0	Distant and closer light aircraft 54 dB(A). Leq 51 dB(A) road traffic dominant with contribution from air traffic.
			58.5	51.9	50.4	48.6	

TABLE B4 (CTD): ATTENDED NOISE SURVEY RESULTS, FRIDAY 18TH DECEMBER 2015

Monitoring Location	Start Time	Dur. (mins)	Measured Noise Levels, dB re. 2 x 10^{-5} Pa.				Comments
			$L_{Amax,F}$	$L_{A10,5min}$	$L_{Aeq,5min}$	$L_{A90,5min}$	e.g. Main Sources, Maximum Levels and No. of Events
ST1	13:15	5	63.6	57.8	56.2	54.4	Dominant source is road traffic. Leq ~56 dB(A). Light aircraft 59 dB(A).
	13:20	5	60.6	56.5	54.9	52.9	L90 53 dB(A) - dominated by constant road traffic on a259.
	13:25	5	61.3	57.1	55.7	54.1	Constant flow of traffic 54-57 dB(A).
			63.6	57.1	55.6	53.8	
ST2	13:35	5	61.1	57.8	56.2	54.5	Dominant source is road traffic - predominantly on the a259. Light aircraft 56 dB(A).
	13:40	5	64.4	57.6	56.1	54.3	Seagull - up to 60 dB(A). Leq 56 dB(A).
	13:45	5	63.3	56.9	55.8	54.4	L90 54 dB(A) - dominated by constant road traffic on a259.
			64.4	57.4	56.0	54.4	
ST3	13:55	5	62.6	52.7	51.1	49.1	Distant aircraft 52 dB(A). Dominant source is road traffic - mostly on a259. Light aircraft 55 dB(A).
	14:00	5	67.1	52.5	50.9	48.9	Seagulls 54 dB(A). Leq 51 dB(A). Dominated by road traffic.
	14:05	5	65.5	55.2	52.8	48.8	Seagull ~54 dB(A) - up to 60 dB(A).
			67.1	53.5	51.7	48.9	

TABLE B4 (CTD): ATTENDED NOISE SURVEY RESULTS, FRIDAY 18TH DECEMBER 2015

Day	Date	Temperature, ºC			Rainfall, mm	Relative Humidity, %	Mean Wind Speed, ms^{-1}
		Mean	Max	Min			
Tuesday	08/12/15	8.9	10.5	6.2	0.0	64.6	3.3
Wednesday	09/12/15	8.4	12.1	1.7	0.0	63.9	3.3
Thursday	10/12/15	11.3	11.9	10.3	11.6	67.4	5.5
Friday	11/12/15	10.3	11.8	7.1	1.2	72.6	3.0
Saturday	12/12/15	10.4	12.6	5.8	0.2	74.9	4.2
Sunday	13/12/15	11.5	12.4	9.5	0.0	77.0	2.7
Monday	14/12/15	10.0	10.9	9.0	3.4	76.8	2.3
Tuesday	15/12/15	11.8	12.8	10.9	8.0	78.6	2.3
Wednesday	16/12/15	13.0	13.8	12.3	0.8	80.9	4.2
Thursday	17/12/15	12.8	13.7	11.6	1.8	81.3	3.4
Friday	18/12/15	12.2	12.9	11.6	0.0	82.4	3.2

TABLE B5: MEASURED WEATHER RECORD OBTAINED FOR THE SURVEY PERIOD

APPENDIX C: CALIBRATION CERTIFICATES

MEASUREMENT SYSTEMS

CERTIFICATE OF CALIBRATION

Date of Issue: 28 January 2014 **Certificate Number: TCRT14/1031**

Issued by:
ANV Measurement Systems
Beaufort Court
17 Rosebuck Way
Milton Keynes MK5 8HL
[redacted]

Page 1
Approved [redacted]
M. Bresslin [redacted]

Customer	Southdowns Environmental Consultants Limited Suite A3 16 Station Street Lewes East Sussex BN7 2DB
Order No.	01-24012014-jhp-Nceq
Description	Sound Level Meter / Pre-amp / Microphone / Associated Calibrator

Identification

Manufacturer	*Instrument*	*Type*	*Serial No. / Version*
Rion	Sound Level Meter	NL-32	01213685
Rion	Firmware		1.400AN1003
Rion	Pre Amplifier	NH-21	36316
Rion	Microphone	UC-53A	318700
Rion	Calibrator	NC-74	34536109
	Calibrator adaptor type if applicable		NC-74-002

Performance Class 1
Test Procedure TP 2.SLM 61672-3 TPS-49
Procedures from IEC 61672-3:2006 were used to perform the periodic test.
Type Approved to IEC 61672-1:2002 No Approval Number
If YES above there is public evidence that the SLM has successfully completed the applicable pattern evaluation tests of IEC 61672-2:2003
Date Received 27 January 2014 ANV Job No. TRAC14/01019
Date Calibrated 28 January 2014

The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3:2006, for the environmental conditions under which the tests were performed. However, no general statement or conclusion can be made about conformance of the sound level meter to the full requirements of IEC 61672-1:2002 because evidence was not publicly available, from an independent testing organisation responsible for pattern approvals, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2002 and because the periodic tests of IEC 61672-3:2006 cover only a limited subset of the specifications in IEC 61672-1:2002.

Previous Certificate	*Dated*	*Certificate No.*	*Laboratory*
	26 January 2013	TCRT13/1028	ANV Measurement Systems

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FIGURE C1 – CALIBRATION CERTIFICATE, LT1, 01213685

MEASUREMENT SYSTEMS

CERTIFICATE OF CALIBRATION

Date of Issue: 01 May 2015 **Certificate Number: TCRT15/1124**

Issued by:
ANV Measurement Systems
Beaufort Court
17 Roebuck Way
Milton Keynes MK5 8HL
[redacted]

Page 1 of 3 Pages
Approved Signatory
[redacted]
M. Breslin [ ] K. Mistry [ ]

Customer	Southdowns Environmental Consultants Limited Suite A3 16 Station Street Lewes East Sussex BN7 2DB
Order No.	01-30042015-def-NC
Description	Sound Level Meter / Pre-amp / Microphone / Associated Calibrator

Identification

Manufacturer	*Instrument*	*Type*	*Serial No. / Version*
Rion	Sound Level Meter	NL-32	01213697
Rion	Firmware		1.400AN1003
Rion	Pre Amplifier	NH-21	36328
Rion	Microphone	UC-53A	318716
Rion	Calibrator	NC-74	34536109
	Calibrator adaptor type if applicable		NC-74-002

Performance Class 1
Test Procedure TP 2.SLM 61672-3 TPS-49
Procedures from IEC 61672-3:2006 were used to perform the periodic test.
Type Approved to IEC 61672-1:2002 No Approval Number
If YES above there is public evidence that the SLM has successfully completed the applicable pattern evaluation tests of IEC 61672-2:2003
Date Received 30 April 2015 ANV Job No. TRAC15/04061
Date Calibrated 01 May 2015

The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3:2006, for the environmental conditions under which the tests were performed. However, no general statement or conclusion can be made about conformance of the sound level meter to the full requirements of IEC 61672-1:2002 because evidence was not publicly available, from an independent testing organisation responsible for pattern approvals, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2002 and because the periodic tests of IEC 61672-3:2006 cover only a limited subset of the specifications in IEC 61672-1:2002.

Previous Certificate	*Dated*	*Certificate No.*	*Laboratory*
	30 April 2014	UCRT14/1093	ANV Measurement Systems

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FIGURE C2 – CALIBRATION CERTIFICATE, LT2, 01213697

MEASUREMENT SYSTEMS

CERTIFICATE OF CALIBRATION

Date of Issue: 18 March 2015 **Certificate Number: TCRT15/1097**

Issued by:
ANV Measurement Systems
Beaufort Court
17 Roebuck Way
[redacted]

Approved Signatory [redacted]

M. Breslin [✓] K. Mistry [ ]

Customer	Southdowns Environmental Consultants Limited Suite A3 16 Station Street Lewes East Sussex BN7 2DB
Order No.	01-110315-JHP-NCEqui
Description	Sound Level Meter / Pre-amp / Microphone / Associated Calibrator

Identification

Manufacturer	*Instrument*	*Type*	*Serial No. / Version*
Rion	Sound Level Meter	NL-32	01213686
Rion	Firmware		1.400AN1003
Rion	Pre Amplifier	NH-21	36317
Rion	Microphone	UC-53A	320146
Rion	Calibrator	NC-74	34536109
	Calibrator adaptor type if applicable		NC-74-002

Performance Class	1
Test Procedure	TP 2.SLM 61672-3 TPS-49
	Procedures from IEC 61672-3:2006 were used to perform the periodic test.
Type Approved to IEC 61672-1:2002	No Approval Number
	If YES above there is public evidence that the SLM has successfully completed the applicable pattern evaluation tests of IEC 61672-2:2003
Date Received	11 March 2015 ANV Job No. TRAC15/03039
Date Calibrated	18 March 2015

The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3:2006, for the environmental conditions under which the tests were performed. However, no general statement or conclusion can be made about conformance of the sound level meter to the full requirements of IEC 61672-1:2002 because evidence was not publicly available, from an independent testing organisation responsible for pattern approvals, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2002 and because the periodic tests of IEC 61672-3:2006 cover only a limited subset of the specifications in IEC 61672-1:2002.

Previous Certificate	*Dated*	*Certificate No.*	*Laboratory*
	30 January 2014	TCRT14/1035	ANV Measurement Systems

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FIGURE C3 – CALIBRATION CERTIFICATE, LT3, 01213686

CERTIFICATE OF CALIBRATION

Date of Issue: 03 November 2015 **Certificate Number: TCRT15/1299**

Issued by:
ANV Measurement Systems
Beaufort Court
17 Roebuck Way
Milton Keynes MK5 8HL

Approved Signatory [redacted]

[redacted] K. Mistry [ ] J. Harriman [✓]

Customer	Southdowns Environmental Consultants Limited Suite A3 16 Station Street Lewes East Sussex BN7 2DB			
Order No.	01-261015-kdb-1815m			
Description	Sound Level Meter / Pre-amp / Microphone / Associated Calibrator			
Identification	*Manufacturer*	*Instrument*	*Type*	*Serial No. / Version*
	Rion	Sound Level Meter	NL-32	00423746
	Rion	Firmware		1.400
	Rion	Pre Amplifier	NH-21	36620
	Rion	Microphone	UC-53A	319211
	Rion	Calibrator	NC-74	34536109
		Calibrator adaptor type if applicable		NC-74-002
Performance Class	1			
Test Procedure	TP 2.SLM 61672-3 TPS-49 *Procedures from IEC 61672-3:2006 were used to perform the periodic test.*			
Type Approved to IEC 61672-1:2002	No	Approval Number		
	If YES above there is public evidence that the SLM has successfully completed the applicable pattern evaluation tests of IEC 61672-2:2003			
Date Received	27 October 2015	ANV Job No.	TRAC15/10160	
Date Calibrated	03 November 2015			

The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3:2006, for the environmental conditions under which the tests were performed. However, no general statement or conclusion can be made about conformance of the sound level meter to the full requirements of IEC 61672-1:2002 because evidence was not publicly available, from an independent testing organisation responsible for pattern approvals, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2002 and because the periodic tests of IEC 61672-3:2006 cover only a limited subset of the specifications in IEC 61672-1:2002.

Previous Certificate	*Dated*	*Certificate No.*	*Laboratory*
	28 October 2013	TCRT13/1328	ANV Measurement Systems

This certificate provides traceability of measurement to recognised national standards, and to units of measurement realised at the National Physical Laboratory or other recognised national standards laboratories. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

FIGURE C4 – CALIBRATION CERTIFICATE, ATTENDED MONITORING, 00423746