RSK Acoustics

Medmerry Holiday Park, Chichester

Noise Impact Assessment

2061695-RSK-RP-001-(03)

Medmerry Holiday Park, Chichester

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RSK Environment Ltd

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1 Introduction

1.1 Background

1.1.1 RSK Acoustics Limited (RSKA) has been commissioned by RSK Environment Limited, on behalf of Cove Communities, to undertake a noise assessment report to support an outline planning application for the proposed Holiday Park development at Medmerry, Chichester, West Sussex.

1.1.2 The proposal is for the demolition/dismantling of the buildings currently on the Medmerry Park site and the redevelopment of 308 holiday lodges.

1.1.3 An explanation of the acoustic terminology used in this report has been appended at the end of the document.

1.2 Site Description and Location

1.2.1 The development site is located at land east of Bracklesham Bay, approximately 9.5 km south of Chichester in Chichester District Council.

1.2.2 The site is bounded to the west by agricultural land and the Bracklesham Caravan and Boat Club, by the beach front to the south and by open land and agricultural land to the east and north.

1.2.3 Figure 1 overleaf presents the site location.

Figure 1 Site Location

1.3 Scope of Report

1.3.1 The scope of this report is to:

- Detail appropriate assessment criteria based on the requirements of the local authority and industry standard guidance.
- Present the results of the environmental sound survey undertaken at the site.
- Determine the suitability of the site for the proposed uses.
- Assess the change in noise level at existing receptor due to the change in traffic flow, in accordance with DMRB (Design Manual for Roads and Bridges).
- Assess the impact of the demolition and construction phases on existing and proposed noise sensitive receptors.
- Suggest, if appropriate, measures to mitigate any noise impact associated with the proposed development.

1.3.2 Following concerns raised by the adjacent Royal Society for the Protection of Birds (RSPB) Medmerry Nature Reserve, the potential noise impact from the proposed open amenity area on birds will be assessed. The RSPB reserve and the Bracklesham Bay Site of Special Scientific Interest (SSSI) have also been considered noise sensitive receptors in the assessment of construction noise.

2 Policy, Guidance and Standards

2.1 National Policy

<u>The National Planning Policy Framework (NPPF)</u>

2.1.1 The revised National Planning Policy Framework (NPPF) (MHCLG, 2021) was published in July 2021. In respect of noise, paragraph 174 states that in relation to conserving and enhancing the natural environment:

"Planning policies and decisions should contribute to and enhance the natural and local environment by…

e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of … noise pollution..."

2.1.2 In relation to ground conditions and pollution, paragraph 185 states that:

"Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health,

living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and quality of life;

- *Identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason…"*

2.1.3 In relation to the integration of new development with existing premises and community facilities, paragraph 187 states that:

"Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed."

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

Planning Practice Guidance: Noise

2.1.5 The Planning Practice Guide (PPG) was launched in 2014 (with the latest update being in 2019) and provides additional guidance and interpretation to the Government's strategic policies outlined within the NPPF in a regularly updated, web-based resource.

2.1.6 Paragraph: 001 Reference ID: 30-001-20190722, "When is noise relevant to planning?" states:

"Noise needs to be considered when development may create additional noise, or would be sensitive to the prevailing acoustic environment (including any anticipated changes to that environment from activities that are permitted but not yet commenced). When preparing plans, or taking decisions about new development, there may also be opportunities to make improvements to the acoustic environment. Good acoustic design needs to be considered early in the planning process to ensure that the most appropriate and cost-effective solutions are identified from the outset."

2.1.7 PPG provides advice on how noise impacts should be determined. Paragraph: 003 Reference ID: 30-003-20190722 states the plan-making and decision makes processes should consider:

- 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.

2.1.8 This paragraph also refers to the Noise Policy Statement for England (NPSE), in stating that the overall effect of the noise exposure (including the impact during the construction phase where applicable) should be identified against the significant observed adverse effect level (SOAEL) and the lowest observed adverse effect level (LOAEL) for the given situation.

Noise Policy Statement for England

2.1.9 The Noise Policy Statement for England (NPSE) was published in March 2010 and clarifies the underlying principles and aims of existing policy documents that relate to noise. It also sets out the long-term vision of Government noise policy which is: "to promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development".

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

2.1.11 Paragraphs 2.20 and 2.21 define 'significant adverse' and 'adverse' impacts as applied to noise as follows:

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

NOEL – No Observed Effect Level

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

LOAEL – Lowest Observed Adverse Effect Level

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

Extending these concepts for the purpose of this NPSE leads to the concept of a significant observed adverse effect level.

SOAEL – Significant Observed Adverse Effect Level

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

2.1.12 Paragraph 2.22 clarifies 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."

2.1.13 The three aims of the NPSE are defined as follows:

"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."

"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." (Note: Applies when the impact lies somewhere between the LOAEL and SOAEL and does not mean that adverse effects cannot occur)."

"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."

2.1.14 It is necessary to define the LOAEL and SOAEL for the potential source of noise to relate the potential impact to the aims and requirements of the NPSE.

2.2 Local Policy

Chichester Local Plan: Key Policies 2014-2029

2.2.1 The Chichester Local Plan: Key Policies 2014-2029 includes development management policies and is designed to provide the vision and framework that will shape the future of Chichester District outside the South Downs National Park area.

2.2.2 Regarding Health Protection, the document states:

"Develop safe and secure living and working environments, including the monitoring of potential health hazards (e.g. noise, air pollution and land contamination) and mitigating risks to health and well-being."

Planning Noise Advice Document: Sussex

2.2.3 The Planning Noise Advice Document: Sussex (Sept 2021) has been adopted by Chichester District Council as a Technical Advice Note. The document provides the assessment criteria for a variety of development types and scenarios.

2.3 Guidance and Standards

British Standard 7445-1:2003 'Description and measurement of environmental noise. Guide to quantities and procedures'

2.3.1 The three-part standard BS 7445 provides the framework within which environmental noise should be quantified. Part 1 provides a guide to quantities and procedures and Part 2 provides a guide to

the acquisition of data pertinent to land use. Part 3 provides a guide to the application of noise limits.

2.3.2 BS 7445 also refers to a further standard, BS EN 61672, which prescribes the equipment necessary for such measurements. Whilst BS 7445 does not prescribe the meteorological conditions under which noise measurements should or should not be taken, it does (part 2, paragraph 5.4.3.3) recommend that in order

"…to facilitate the comparison of results (measurements of noise from different sources), it may be necessary to carry out measurements under selected meteorological conditions which are reproducible and correspond to quite stable propagation conditions."

2.3.3 These conditions include:

- wind speed not exceeding 5 m/s (measured at a height of 3 to 11 m above the ground);
- no strong temperature inversions near the ground; and
- no heavy precipitation.

British Standard 8233: 2014 'Guidance on Sound Insulation and Noise Reduction for Buildings'

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

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

2.3.6 The desirable internal ambient noise levels for dwellings are presented in Table T1.

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

T1 Summary of Internal Noise Levels

2.3.11 The Standard also provides advice in relation to desirable levels for external noise. It states that:

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

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

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

<u>British Standard 4142:2014+A1:2019 Methods for Rating and Assessing Industrial and Commercial Sound</u>

2.3.12 BS 4142 describes methods for rating and assessing sound of an industrial and/or commercial nature. The methods described in the standard use outdoor sound levels to assess the likely effects of sound on people who might be inside or outside a dwelling or premises used for residential purposes upon which sound is incident.

2.3.13 The standard is used to determine the rating levels for sources of sound of an industrial and/or commercial nature and the ambient, background and residual sound levels at outdoor locations. These levels could be used for the purposes of investigating complaints; assessing sound from the

proposed, new, modified or additional source(s) of sound of an industrial and/or commercial nature; and assessing sound at proposed new dwellings or premises used for residential purposes. However, the determination of noise amounting to a nuisance is beyond the scope of the standard.

2.3.14 We would also highlight that the standard is not intended to be applied to the rating of music (or other entertainment), construction and demolition, people and public address systems.

2.3.15 The procedure contained in BS 4142 assesses the significance of sound which depends upon the margin by which the rating level of the specific sound sources exceeds the background sound level and the context in which the sound occurs/will occur.

2.3.16 An initial estimate of the impact of the specific sound is obtained by subtracting the measured background sound level from the rating level and considering the following:

- Typically, the greater this difference, the greater the magnitude of impact;
- A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context;
- A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context; and
- The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.

2.3.17 Where the initial estimate of the impact needs to be modified due to the context, the following factors should be considered:

- The absolute level of sound;
- The character and level of the residual sound compared to the character and level of the specific sound; and
- The sensitivity of the receptor and whether dwellings or other premises used for residential purposes will already incorporate design measures that secure good internal and/or outdoor acoustic conditions such as:
  - Façade insulation treatment;
  - Ventilation and/or cooling that will reduce the need to have windows open so as to provide rapid or purge ventilation; and
  - Acoustic screening.

British Standard 5228:2009+A1:2014 '*Code of Practice for Noise and Vibration Control on Construction and Open Sites*' Part 1 Noise & Part 2 Vibration

2.3.18 BS 5228: 2009+A1:2014 gives recommendations for basic methods of noise and vibration control relating to construction and open sites where work activities/operations generate significant noise and/or vibration levels.

Calculation of Road Traffic Noise, 1988

2.3.19 The Calculation of Road Traffic Noise (CRTN) (Department for Transport Welsh Office) describes the standard procedures for the measurement and calculation of traffic noise. It includes consideration of a number of factors including vehicle class, speed, road surface, distance attenuation and barrier attenuation.

DEFRA '*Method for Converting the UK Road Traffic Noise Index $L_{A10,18h}$ to the EU Noise Indices for Road Noise Mapping*', 2006

2.3.20 The '*Method for Converting the UK Road Traffic Index $L_{A10,18h}$ to the EU Noise Indices For Road Noise Mapping*' was published by Defra, TRL and Casella Stanger in 2006 and is used to convert noise levels from $L_{A10,18h}$ to day, evening and night-time $L_{Aeq,T}$. This methodology has been adopted in the noise model to convert $L_{A10,18h}$ to $L_{Aeq,16h}$ and $L_{Aeq,8h}$ for the day and night-time periods respectively.

Design Manual for Roads and Bridges, LA111 (DMRB), 2020

2.3.21 LA 111 of the DMRB provides guidance on the assessment and the reporting of the impacts that projects relating to roads (including change of traffic flows) may have on the levels of noise.

2.3.22 The impact of the proposed development on the noise climate in the surrounding areas is based on the change in noise levels at noise sensitive receptors due to the changes in the volume of road traffic generated by the proposed development.

Environmental Noise Guidelines for the European Region, World Health Organization, 2018

2.3.23 The World Health Organization (WHO) Environmental Noise Guidelines for the European Region (2018) sets out guidance on suitable external noise levels from specific noise sources including road traffic railway, aircraft, wind turbine and leisure noise, based on evidence, to inform policy makers.

2.3.24 The guidelines refer to L_{den} and L_{night} dB values for road traffic, railway, aircraft and railway noise, which is a sound descriptor not commonly used to assess site suitability within the UK. More commonly utilised descriptors are the daytime average ($L_{Aeq,16h}$) and night-time average ($L_{Aeq,8h}$) noise levels.

2.3.25 With respect to indoor noise levels, the guideline document states that "*the GDG (Guideline Development Group) recommends that all CNG indoor guideline values and any values not covered by the current guidelines (such as industrial noise and shopping areas) should remain valid*." As such, further reference is made to the World Health Organization, Guidelines for Community Noise (CNG), 1999.

Guidelines for Community Noise, World Health Organization, 1999

2.3.26 The WHO '*Guidelines for Community Noise'* details guidance on suitable internal and external sound levels in and around residential properties. The following internal sound levels are recommended by the WHO:

- 35 dB $L_{Aeq,16h}$ in living rooms during the daytime (07:00 to 23:00 hours); and
- 30 dB $L_{Aeq,8h}$ in bedrooms during the night-time (23:00 to 07:00 hours).

2.3.27 With respect to the night-time maximum noise levels, the WHO guidelines state:

"For a good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45 dB L_{Afmax} more than 10-15 times per night."

2.3.28 In addition to the above, the guidelines suggest that daytime sound levels of above 50 dB $L_{Aeq,16h}$ are of '*moderate annoyance'* in the community with daytime sound levels above 55 dB $L_{Aeq,16h}$ of '*serious annoyance'*.

2.3.29 The above levels are in-line with guidance detailed in BS8233:2014 and ProPG Planning and Noise.

Professional Practice Guidance on Planning and Noise, 2017

2.3.30 The Professional Practice Guidance on Planning and Noise (ProPG) was overseen by a Working Group consisting of representatives of the Association of Noise Consultants (ANC), Institute of Acoustics (IOA) and Chartered Institute of Environmental Health (CIEH), together with practitioners from a planning and local authority background. It provides guidance on a recommended approach to the management of noise within the planning system in England.

2.3.31 The scope of ProPG is limited to new residential development that will be predominantly exposed to airborne noise from transport sources.

2.3.32 2.3.13 With respect to internal ambient noise levels in habitable rooms, ProPG recommends that noise levels set out in BS 8233 are used for residential development. However, an additional criterion is proposed by ProPG for night-time L_{Amax} levels as follows:

"[…] In most circumstances in noise-sensitive rooms at night (e.g. bedrooms) good acoustic design can be used so that individual noise events do not normally exceed 45 dB $L_{Amax,F}$ more than 10 times a night. However, where it is not reasonably practicable to achieve this guideline then the judgement of acceptability will depend not only on the maximum noise levels but also on factors such as the source, number, distribution, predictability and regularity of noise events."

Waterbird Disturbance Mitigation Toolkit: Informing Estuarine Planning & Construction Projects, 2013

2.3.33 The toolkit was produced by the Institute of Estuarine & Coastal Studies (IECS) University of Hull. It is designed for use by works planners and site managers to initially assess whether impacts to

migrating and wintering waterbirds are likely to arise from a proposed project, and to identify additional information requirements to meet consenting needs.

2.3.34 The guidance document also defines high, moderate and low noise level effect as follows.

High Noise Level Effect

- Sudden single noise of over 60 dB L_{Aeq} (at the bird)
- Continuous/repetitive noise over 72 dB L_{Aeq} (at the bird)

Moderate Noise Level Effect

- Sudden noises of 55-60 dB L_{Aeq} (at the bird)
- Continuous/repetitive noises 60-72 dB L_{Aeq} (at the bird)

Low Noise Level Effect

- Noise of less than 55 dB L_{Aeq} (at bird)
- Noise of 55-72 dB L_{Aeq} in a highly disturbed environment

2.3.35 The guidance has been used for the assessment of both the construction and the operational phases.

2.4 Consultation with Local Authority

2.4.1 Consultation with Chichester District Council (CDC) was sought by RSK Acoustics in March 2023.

2.4.2 An email was sent to CDC on Wednesday 22 February 2023 detailing the proposed survey methodology. The proposed methodology was considered to be acceptable by the Planning Authority as per the email issued by the Senior Environmental Health Officer on Thursday 02 March.

2.4.3 Comments about the assessment methodology were also provided during the pre-application stage, in which it was stated that:

"It shall have to be demonstrated that any neighbouring sensitive receptors shall not be adversely impacted as a result of the development. The noise sources could be from general site activities, traffic movements or external mechanical plant. Likewise, it shall have to be demonstrated that the proposed development site shall not be significantly adversely impacted by any neighbouring noise sources, for example the industrial units to the east of the proposed development."

2.4.4 It should be noted that no external mechanical plant is proposed as part of this development.

2.5 Proposed Assessment Criteria

Demolition and Construction Noise

2.5.1 BS 5228:2009+A1:2014 'Code of Practice for Noise and Vibration Control on Construction and Open Sites' does not provide specific limits for construction noise, but it does define methods of assessing the significance. The standard also provides information on demolition and construction noise and vibration reduction measures promoting a 'Best Practice Means' approach to control noise and vibration. A method for determining the sound levels associated with demolition and construction activities is also detailed and considers the numbers and types of equipment operating, their associated Sound Power Level (L_w), and the distance to receptors, along with the effects of any screening.

2.5.2 Normal demolition and construction hours are assumed to be Monday to Friday between 08:00 to 18:00 and Saturday 08:00 to 13:00. No demolition or construction works are anticipated to take place outside of these times. For any works outside of these times, agreement with the local authority will be required.

2.5.3 Based on the guidance detailed in the BS 5228:2009+A1:2014 construction noise adverse effect levels have been derived and are presented in Table T2.

Time Period	LOAEL	SOAEL
Day (0700-1900 weekday and 0700-1300 Saturdays)	Baseline Noise Levels $L_{Aeq,T}$	Above the Threshold Level*

*Threshold level determined as per BS 5228:1 Section E3.2 and Table E.1 "*Example threshold of potential significant effect at dwellings*"

T2 Demolition and Construction Noise Adverse Effect Levels

2.5.4 The threshold levels have been calculated, based on the survey results, for each of the identified receptors and are presented in Table T14, in the assessment section of this report.

2.5.5 An assessment of noise due to construction traffic was not undertaken due to the small number of additional movements expected during the construction phase.

Demolition and Construction Vibration

2.5.6 The effects of human response to whole body vibration in buildings are defined in BS 6472-1: 2008 *'Guide to evaluation of human exposure to vibration in buildings - Vibration sources other than blasting'* in terms of Vibration Dose Value (VDV). However, for human response to construction-related vibration, it is considered more appropriate to use the Peak Particle Velocity (PPV) measure, as suggested in BS 5228-2:2009+ A1:2014 Code of practice for noise and vibration control on construction and open sites. Part 2: Vibration.

2.5.7 The limit of human perception to vibration is between approximately 0.15 mm/s and 0.3 mm/s PPV. The sensitivity of the human body also varies according to different frequencies of vibration, with perception generally possible between 1 Hz to 80 Hz.

2.5.8 Based on the above guidance Table T3 details the proposed assessment criteria.

Vibration Adverse Effect Levels	Vibration Level PPV, mm/s
SOAEL	Greater than or equal to 5.0
LOAEL	Greater than or equal to 3.0

T3 Construction Vibration Adverse Effect Levels

Operational External Environmental Noise Levels

2.5.9 With reference to BS8233 and WHO Guidelines, Table T4 details the proposed assessment criteria for environmental noise levels affecting proposed residential receptors on the Site before mitigation.

Noise Adverse Effect Levels	External Environmental Sound Levels $L_{Aeq,T}$ (dB)	
	Daytime (07:00 – 23:00 hours)	Night-time (23:00 – 07:00 hours)
SOAEL	> 65	> 55 80 dB L_{Amax} > 10 events
LOAEL	> 50	> 40 60 dB L_{Amax} > 10 events

T4 Environmental Sound Adverse Effect Levels - Residential

Operational Road Traffic Noise Affecting Existing Receptors

2.5.10 The assessment of noise due to the Proposed Development on the existing sound climate in surrounding areas is based on the change in sound levels at noise sensitive receptors due to a change in the volumes of road traffic generated by the Proposed Development.

2.5.11 The assessment uses both the short-term and long-term assessment criteria taken from LA111/ DMRB. Table T5 below details the proposed assessment criteria.

Noise Adverse Effect Levels	Change in Noise Levels, $L_{A10, 18hr}$	
	Short term	Long term
SOAEL	Greater than or equal to 5.0	Greater than or equal to 10.0
LOAEL	Greater than or equal to 3.0	Greater than or equal to 5.0

T5 Operational Traffic Noise Adverse Effect Levels

Industrial and Commercial Noise

2.5.12 BS 4142 describes methods for rating and assessing sound of an industrial and/or commercial nature. The methods described in the standard use outdoor sound levels to assess the likely effects of sound on people who might be inside or outside a dwelling or premises used for residential purposes upon which sound is incident.

2.5.13 Based on BS 4142: 2014, the proposed LOAEL and SOAEL values are provided in Table T6 below, these apply to existing industrial and/or commercial having the potential to affect the site.

Noise Adverse Effect Levels	Rating Level ($L_{Ar,Tr}$ dB) at Noise Sensitive Residential Receptor
SOAEL	Greater than or equal to 10 dB above the typical background sound level, depending on context.
LOAEL	Greater than or equal to the typical background sound level, depending on context.

T6 Proposed LOAEL and SOAEL for Existing Industrial/Commercial Sources

3 Environmental Sound Survey

3.1 Methodology

3.1.1 An unattended environmental sound survey was undertaken between approximately 11:00 on Tuesday 4 April and 11:00 on Tuesday 11 April 2023 in order to determine the existing sound climate across the site and in the surrounding area.

3.1.2 The survey was undertaken over a period which included both weekdays and weekend periods. Measurements were made over 15-minute periods of the L_{Aeq}, L_{A10}, L_{A90} and L_{AFMax} sound levels.

3.1.3 Sound measurements were undertaken at four positions described in Table T7 and presented graphically in Figure 2.

Ref.	Measurement type	Description
UT1	Unattended	The microphone was located at the north-western site boundary, approximately 5 m east of the access road, Drove Lane, at a height of 1.5 m in a free field position. The main noise source affecting this location was vehicular movement on local roads. This survey location was selected to measure the noise levels along the access road. It is also deemed representative of Marsh Farm, which is one of the nearest sensitive receptors to the development site.
UT2	Unattended	The microphone was located at the eastern site boundary, approximately 5 m west of the industrial units, at a height of 1.5 m in a free field position. The main noise source affecting this location was vehicular movement on local roads. This survey location was selected to pick up noise from the storage facilities to the west of the site.
UT3	Unattended	The sound level meter was located on the south-western part of the land under ownership but outside of the redline, approximately 280 m west of Stoney Lane and adjacent to the Bracklesham Caravan and Boat Club, at a height of 1.5 m in a free field position. The main noise source affecting this location was vehicular movement on local roads. This survey location was selected to represent the noise levels at the nearest noise sensitive receptors along East Bracklesham Drive.
UT4	Unattended	The sound level meter was located on the southern part of the land under ownership but outside of the redline, at a height of 1.5 m in a free field position. The main noise source affecting this location was vehicular movement on local roads. This location was selected as the quietest part of the site, away from all sources of noise.

T7 Noise Monitoring Locations

Figure 2 Sound Survey Locations

3.2 Survey Equipment

3.2.1 The sound level meters were located in environmental cases. The microphones were connected to the meters via an extension cable and fitted with the manufacturer's windshield.

3.2.2 The noise measurements were undertaken using the following equipment:

Equipment	Type	Serial Number	Calibration Date
Class 1 sound level meters	Rion NL-52	00553876	27/01/2022
	Rion NL-52	00553877	27/09/2021
	Rion NL-52	00142653	25/08/2022
	Rion NL-52	01054197	28/01/2022
Acoustic calibrator	Rion NC-75	35236428	25/08/2022

T8 Survey Equipment

3.2.3 The sound level meters conformed to the Class 1 requirements of *BS EN 61672-1:2013 'Electroacoustics. Sound level meter, Specifications'*. The calibrator used conformed to the Class 1 requirements of *BS EN IEC 60942:2018 'Electroacoustics, Sound calibrators'*. The equipment used had a calibration history that is traceable to a certified calibration institution. Under BS EN 61672-1, Sound Level Meters are required for calibration every two years, with acoustic calibrators requiring calibration annually.

3.2.4 The calibration of the sound level meters was field checked prior to commencing measurements and prior to removing the equipment from site upon completion; no significant calibration drift was observed i.e., within a +/- 0.5 dB tolerance.

3.3 Meteorological Conditions

3.3.1 Due to the nature of the survey which includes unattended noise measurements, it is not possible to accurately comment on the meteorological conditions throughout the entire survey period. However, based on a review of publicly available monitored data from Weather Station ID ICHICH106[1], installed at East Wittering, and observations at the beginning and end of the survey period, the weather conditions were considered suitable for obtaining representative sound level measurements. They are detailed in Table T9.

[1] https://www.wunderground.com/

Date	Temperature range (°C)	Precipitation (mm)	Wind Speed Range (m/s)	Prevailing Wind Direction
Tuesday 04 April	1 - 11	0	0 - 8	E
Wednesday 05 April	0 - 13	2.3	0 - 2	SSW
Thursday 06 April	6 - 17	1.5	0 - 3	SSW
Friday 07 April	2 - 20	0	0 - 2	SSW
Saturday 08 April	2 - 15	0	0 - 3	SSE
Sunday 09 April	4 - 15	0	0 - 3	SE
Monday 10 April	9 - 15	10.7	0 - 6	S
Tuesday 11 April	8 - 13	78.9	0 - 6	SE

T9 Meteorological Conditions

3.3.2 Data collected on Monday 04, Monday 10 and Tuesday 11 April have not been used in the calculations and assessment due to the high level of wind and/ or precipitation affecting the measurements. These have not been presented in the survey results tables below.

3.4 Environmental Sound Survey Results

3.4.1 Due to the nature of the survey involving unattended measurements, it is not possible to accurately comment on the dominant noise sources or specific noise events during the entire survey period. However, at the beginning and end of the survey period it was noted that on-site sound levels were dominated by vehicle movements on the local road network.

3.4.2 Audio files recorded during the survey were also checked in order to further understand the noise sources currently affecting the site. The audio confirmed the above.

3.4.3 A summary of the unattended sound survey results is presented in Tables T10 to T13. Time history graphs detailing the full set of noise data for the unattended locations are contained in Appendix A.

3.4.4 The tables below exclude data collected during high level of wind and precipitation days.

Date	Time Period	Measured noise levels, dB*		
		$L_{Aeq, T}$	$L_{Afmax,15min}$	$L_{A90, T}$
Wednesday 05/04/2023	Daytime (07:00-23:00)	49	-	38
	Night-time (23:00-07:00)	44	57	44
Thursday 06/04/2023	Daytime (07:00-23:00)	48	-	44
	Night-time (23:00-07:00)	38	52	34
Friday 07/04/2023	Daytime (07:00-23:00)	46	-	36
	Night-time (23:00-07:00)	44	54	32
Saturday 08/04/2023	Daytime (07:00-23:00)	47	-	35
	Night-time (23:00-07:00)	42	54	34
Sunday 09/04/2023	Daytime (07:00-23:00)	43	-	36
	Night-time (23:00-07:00)	41	51	40
Averaged Sound Levels	Daytime (07:00-23:00)	46	-	38
	Night-time (23:00-07:00)	42	54	37

*$L_{Aeq, T}$ values are the logarithmic average of $L_{Aeq,15min}$ samples. $L_{A90, T}$ are calculated based on the statistical distribution of background sound levels during the measurement period in general accordance with guidance in BS 4142:2014+A1:2019. $L_{AFmax,15min}$ is based on the 10th highest measured L_{AFmax} sample within the period. All values rounded to the nearest whole number.

T10 Summary of Measured Environmental Sound Survey Results at Location UT1

Date	Time Period	Measured noise levels, dB*		
		$L_{Aeq, T}$	$L_{Afmax,15min}$	$L_{A90, T}$
Wednesday 05/04/2023	Daytime (07:00-23:00)	51	-	38
	Night-time (23:00-07:00)	45	56	39
Thursday 06/04/2023	Daytime (07:00-23:00)	46	-	45
	Night-time (23:00-07:00)	40	56	34
Friday 07/04/2023	Daytime (07:00-23:00)	44	-	36
	Night-time (23:00-07:00)	44	57	31
Saturday 08/04/2023	Daytime (07:00-23:00)	45	-	33
	Night-time (23:00-07:00)	41	55	35
Sunday 09/04/2023	Daytime (07:00-23:00)	41	-	35
	Night-time (23:00-07:00)	41	51	42
Averaged Sound Levels	Daytime (07:00-23:00)	45	-	37
	Night-time (23:00-07:00)	42	55	36

*$L_{Aeq, T}$ values are the logarithmic average of $L_{Aeq,15min}$ samples. $L_{A90, T}$ are calculated based on the statistical distribution of background sound levels during the measurement period in general accordance with guidance in BS 4142:2014+A1:2019. $L_{AFmax,15min}$ is based on the 10th highest measured L_{AFmax} sample within the period. All values rounded to the nearest whole number.

T11 Summary of Measured Environmental Sound Survey Results at Location UT2

Date	Time Period	Measured noise levels, dB*		
		$L_{Aeq, T}$	$L_{Afmax,15min}$	$L_{A90, T}$
Wednesday 05/04/2023	Daytime (07:00-23:00)	52	-	40
	Night-time (23:00-07:00)	48	57	44
Thursday 06/04/2023	Daytime (07:00-23:00)	46	-	46
	Night-time (23:00-07:00)	39	51	34
Friday 07/04/2023	Daytime (07:00-23:00)	43	-	37
	Night-time (23:00-07:00)	45	55	43
Saturday 08/04/2023	Daytime (07:00-23:00)	45	-	31
	Night-time (23:00-07:00)	44	52	41
Sunday 09/04/2023	Daytime (07:00-23:00)	43	-	41
	Night-time (23:00-07:00)	44	54	42
Averaged Sound Levels	Daytime (07:00-23:00)	46	-	39
	Night-time (23:00-07:00)	44	54	41

*$L_{Aeq, T}$ values are the logarithmic average of $L_{Aeq,15min}$ samples. $L_{A90, T}$ are calculated based on the statistical distribution of background sound levels during the measurement period in general accordance with guidance in BS 4142:2014+A1:2019. $L_{AFmax,15min}$ is based on the 10th highest measured L_{AFmax} sample within the period. All values rounded to the nearest whole number.

T12 Summary of Measured Environmental Sound Survey Results at Location UT3

Date	Time Period	Measured noise levels, dB*		
		$L_{Aeq, T}$	$L_{Afmax,15min}$	$L_{A90, T}$
Wednesday 05/04/2023	Daytime (07:00-23:00)	51	-	42
	Night-time (23:00-07:00)	48	56	43
Thursday 06/04/2023	Daytime (07:00-23:00)	47	-	43
	Night-time (23:00-07:00)	41	53	37
Friday 07/04/2023	Daytime (07:00-23:00)	43	-	34
	Night-time (23:00-07:00)	45	56	39
Saturday 08/04/2023	Daytime (07:00-23:00)	45	-	34
	Night-time (23:00-07:00)	43	54	38
Sunday 09/04/2023	Daytime (07:00-23:00)	43	-	38
	Night-time (23:00-07:00)	44	52	42
Averaged Sound Levels	Daytime (07:00-23:00)	46	-	38
	Night-time (23:00-07:00)	44	54	40

*$L_{Aeq, T}$ values are the logarithmic average of $L_{Aeq,15min}$ samples. $L_{A90, T}$ are calculated based on the statistical distribution of background sound levels during the measurement period in general accordance with guidance in BS 4142:2014+A1:2019. $L_{AFmax,15min}$ is based on the 10th highest measured L_{AFmax} sample within the period. All values rounded to the nearest whole number.

T13 Summary of Measured Environmental Sound Survey Results at Location UT3

4 Demolition and Construction

4.1 Demolition and Construction Noise

4.1.1 Construction noise could potentially increase the ambient noise levels at existing noise-sensitive receptors on and off-site and proposed noise-sensitive receptors on-site if inhabited during the construction works.

4.1.2 Precise details of the types of construction methods and plant are still to be determined; however, the assessment considers construction activities during the following principal stages.

- Site preparation works;
- Demolition, foundations and substructure works;
- Building erection and superstructure works;
- Road works; and
- Landscaping works, internal building construction and fit-out.

4.1.3 It should be noted that activities related to both the internal building construction and the servicing and fitting-out of the new buildings are normally considered not to be a significant source of noise or vibration, and therefore these activities are not considered further within this report.

4.1.4 A detailed construction methodology and sequence is yet to be determined. However reasonable assumptions have been made to inform the assessment of construction noise presented in this assessment.

4.1.5 An assessment of construction noise at each receptor has been undertaken, based on typical plant noise level data contained within Annex C of BS 52881:2009+A1:2014. The assessment has been undertaken based on spreadsheets calculations and assumes that the construction activities are distributed across the Site.

4.1.6 It has been assumed that the construction activities will be undertaken during core working hours Mon to Fri (0800-1800) only.

4.1.7 It has been assumed that hoarding will be erected between the construction phase and the nearest noise sensitive receptors. A sound reduction of 10 dB has therefore been included in the calculations in order to account for the noise mitigation provided by the site hoarding.

4.1.8 Noise Sensitive Receptors considered in the demolition and construction noise assessment include the Bracklesham Bay SSSI and the Medmerry RSPB Reserve.

4.1.9 The existing receptors on site and the proposed development receptors have also been included as sensitive, as certain existing receptors will still be occupied during some phases of the construction;

and certain phases of the development will be constructed and occupied whilst other phases are still being constructed.

4.1.10 Figure 3 presents the location of the Noise Sensitive Receptors.

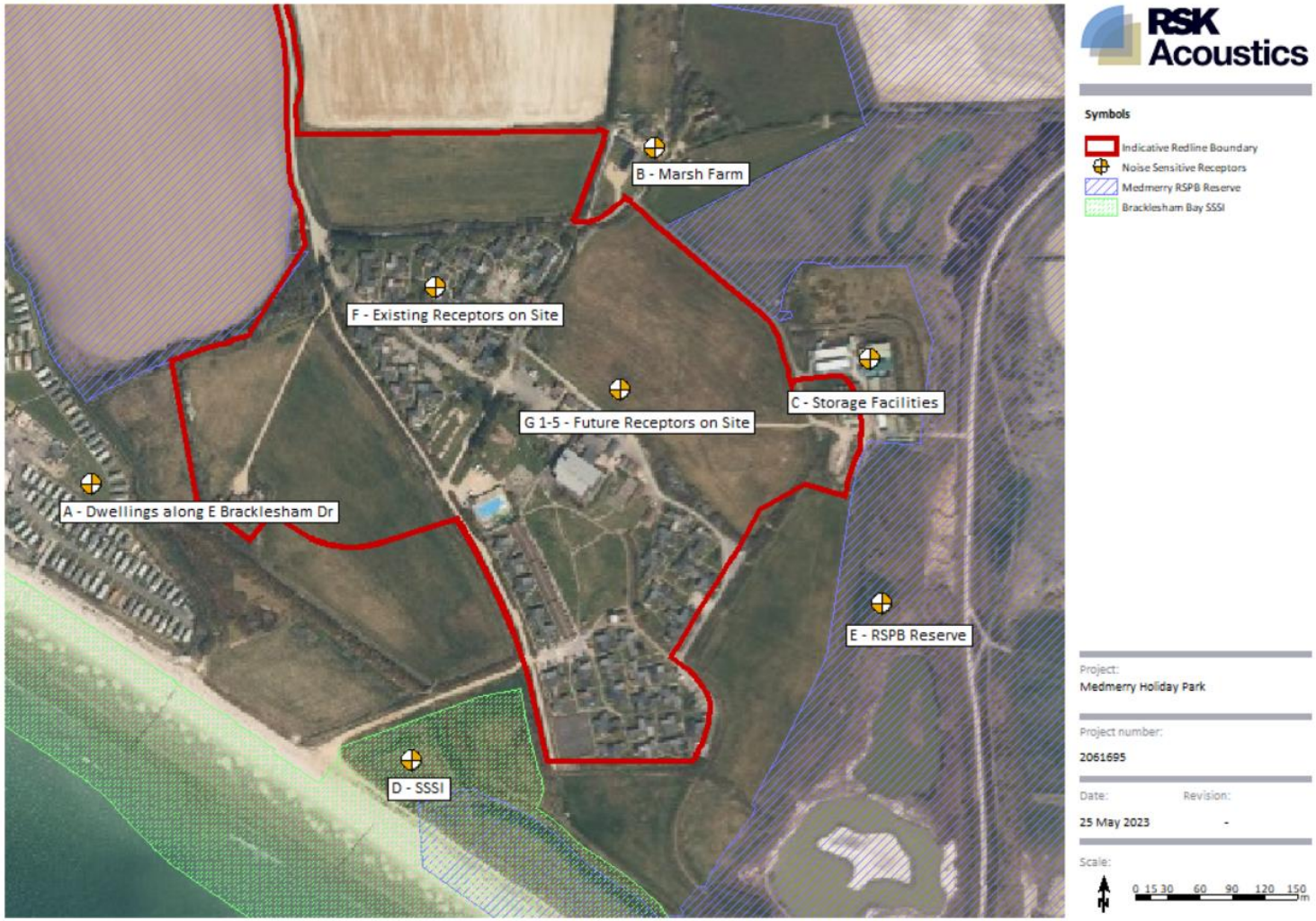

Figure 3 Noise sensitive receptors location

4.1.11 For the purposes of the construction noise assessment, Table T14 details the measured ambient noise levels at the identified receptors and the associated threshold level determined in accordance BS5228:1 Section E3.2 and Table E.1. As per Table T2, these are the proposed construction noise LOAEL and SOAEL respectively.

4.1.12 For the SSSI and RSPB Reserve, the threshold has been set at 72 dB $L_{Aeq,10h}$, as per the Waterbird Disturbance Mitigation Toolkit.

4.1.13 The most exposed receptors to the construction activities at each of the five different phases of the development have been assessed separately when relevant. The construction phases as presented in the construction chapter have been named G1-G5 for clarity.

4.1.14 The existing receptors on site, which will be demolished and replaced throughout the five phases have been called F. For calculation purposes, the nearest existing receptor to the construction activity has been assumed for each phase of works.

Receptor	Noise Sensitive Receptor Description	Ambient Noise Level (dB $L_{Aeq,16h}$)	Threshold Level, Core hours (dB $L_{Aeq,10h}$)
A	Dwellings along East Bracklesham Dr	46	65
B	Marsh Farm	46	65
C	Storage facilities	45	65
D	Bracklesham Bay SSSI	46	72
E	Medmerry RSPB Reserve	46	72
F	Existing Receptors on Site	46	65
G – Phases 1-5	Proposed Residential Development Receptors	46	65

T14 Calculated Ambient Level and Associated Threshold Level at each Receptor

4.1.15 The construction assumptions including a list of plant for each of the construction activities can be found in Appendix B.

4.1.16 Tables T15 to T19 detail the results of the assessment for typical construction activities, calculated as the dB $L_{Aeq,10h}$ (i.e. 08:00-18:00 hr Monday to Friday, as per the assumed working hours) to the noise sensitive receptors for phases 1 to 5.

Receptor	Calculated Construction Noise Level (dB $L_{Aeq,10h}$) during Construction Stage at Noise Sensitive Receptor				
	Site Preparation Works	Demolition, Foundations and Substructure Works	Building Erection and Superstructure Works	Road Works	Landscaping Works and Fit-Out
A	57	46	44	47	36
B	58	44	52	56	44
C	61	49	55	58	47
D	54	57	46	50	38
E	54	51	49	52	41
F	62	64	54	57	46

T15 Typical Construction Plant Noise Levels for Phase 1

Receptor	Calculated Construction Noise Level (dB $L_{Aeq,10h}$) during Construction Stage at Noise Sensitive Receptor				
	Site Preparation Works	Demolition, Foundations and Substructure Works	Building Erection and Superstructure Works	Road Works	Landscaping Works and Fit-Out
A	49	43	46	50	38
B	48	42	46	49	38
C	49	44	47	50	41
D	56	52	52	56	46
E	53	49	48	51	44
F	60	56	57	61	49
G1	58	48	51	54	47

T16 Typical Construction Plant Noise Levels for Phase 2

Receptor	Calculated Construction Noise Level (dB $L_{Aeq,10h}$) during Construction Stage at Noise Sensitive Receptor				
	Site Preparation Works	Demolition, Foundations and Substructure Works	Building Erection and Superstructure Works	Road Works	Landscaping Works and Fit-Out
A	55	45	53	56	45
B	54	50	46	49	38
C	49	45	44	47	36
D	50	44	48	51	40
E	47	42	43	46	35
F	63	59	59	63	51
G1	60	56	47	50	39
G2	61	57	50	53	42

T17 Typical Construction Plant Noise Levels for Phase 3

Receptor	Calculated Construction Noise Level (dB $L_{Aeq,10h}$) during Construction Stage at Noise Sensitive Receptor				
	Site Preparation Works	Demolition, Foundations and Substructure Works	Building Erection and Superstructure Works	Road Works	Landscaping Works and Fit-Out
A	51	47	47	50	39
B	55	47	52	55	44
C	50	44	47	50	39
D	50	45	46	49	38
E	47	43	44	47	36
F	63	60	60	64	52
G1	61	53	58	62	50
G2	62	53	60	63	52
G3	66	62	56	59	48

T18 Typical Construction Plant Noise Levels for Phase 4

During Phase 5 of the proposed work, all currently existing receptors on site will have been demolished, the construction noise levels at receptor F have therefore not been calculated.

Receptor	Calculated Construction Noise Level (dB $L_{Aeq,10h}$) during Construction Stage at Noise Sensitive Receptor				
	Site Preparation Works	Demolition, Foundations and Substructure Works	Building Erection and Superstructure Works	Road Works	Landscaping Works and Fit-Out
A	52	47	49	52	41
B	51	47	48	52	41
C	48	44	46	49	38
D	50	45	47	51	39
E	47	42	44	47	36
F	All current receptors on site will have been demolished before phase 5				
G1	56	52	54	57	46
G2	58	53	55	58	47
G3	66	62	63	67	55
G4	68	64	65	69	57

T19 Typical Construction Plant Noise Levels for Phase 5

4.1.17 Calculations indicate that, construction noise levels are likely to be above the proposed LOAEL (i.e. baseline noise levels for each considered receptor), at most receptor for most of the phases of work.

4.1.18 Calculation also indicate that , construction noise levels are likely to be below the proposed SOAEL at all of the identified existing receptors. The SOAEL is likely to be exceeded at some of the future receptors during the construction of adjacent phases.

4.1.19 The proposed SOAEL will be slightly exceeded at some of the new phase 3 receptors during the site preparation works construction stage and at some of the new phase 3 and phase 4 receptors during the site preparation and road works construction phase. However the impact will be temporary and is not expected to be significant.

4.1.20 Further assessment of construction noise mitigation should be undertaken when a detailed method statements, the construction programme and descriptions of the proposed plant are available. With the Construction Environmental Management Plan (CEMP) and Best Practicable Means (BPM) in place, it is likely that the impact would be lowered further at all considered receptors.

4.2 Construction Vibration

4.2.1 During the construction phase the only likely source of vibration will be from vibratory compaction and piling works; these construction activities will be required during tasks ‘Demolition, Foundation Works/Substructure’ and ‘Road Works’.

4.2.2 Taking into account the lack in relevant information as previously noted, a simple exercise has been undertaken to identify the risk of significant levels being experienced at the sensitive receptor locations.

4.2.3 Vibration predictions for the most intrusive construction activities based on methodology within BS5228 – Part 2 indicate that potential exceedance of the vibration criteria (refer to Section 2.3) can occur to residential properties or lightweight structures located within 10 m from proposed construction works.

4.2.4 No sensitive receptors are likely to be located within 10 metres of the construction areas. Taking this into account, it can be concluded that there is no potential for perceptible vibration levels affecting the closest sensitive receptors to the construction site; therefore, the potential annoyance due to construction vibration is unlikely to result in significant impacts.

4.2.5 Despite this, a number of BPM will be considered for construction activities being developed in proximity to existing sensitive receptors These could include the use of smaller plant items, which will generate lower levels of vibration.

5 Operational Noise Assessment

5.1 **Acoustic Model**

5.1.1 A computer noise model of the site has been constructed using SoundPLAN (v8.2) noise prediction software. The baseline noise model is validated to the measured noise levels during the day and night-time periods. The model has been set up with the following parameters and best practice assumptions as listed below in Table T20.

Ref.	Location
Algorithms	CRTN:1998.
Ground Absorption	Hard, acoustically reflective ground (0.2 coefficient) – Roads, pavements and hard standing areas including the development site; and Acoustically soft (assumed 0.8 coefficient) – grass or vegetated areas.
Met Conditions	10 degrees Celsius; 70% humidity; and Wind from source to receiver.
Receptor Height	Ground Floor 1.5 m above 4.44 m AODN, representative of living rooms. Used for daytime calculations; and First Floor between 4 m above 4.44 m AODN, representative of bedrooms. Used for night-time calculations.
Source Modelling	External noise sources, such as road traffic have been treated as line sources.
Buildings and barriers	All the existing structures and buildings in the immediate surroundings of the site have been incorporated into the model.
Terrain	Terrain data (2 m resolution contour lines) has been included within the model.
Illustrative Masterplan	As shown in the drawing ref '*1000.2 Proposed Masterplan*', Revision P1 dated 10/07/23.

T20 Modelling Parameters

5.1.2 The sound transmission calculations for the proposed dwellings have been carried out using the calculation method set out in Section G.2.1 of BS 8233, which is based on the method presented in BS EN ISO 12354-3:2017 '*Building acoustics. Estimation of acoustic performance of buildings from the performance of elements. Airborne sound insulation against outdoor sound*'.

5.2 Validation of the Acoustic Model

5.2.1 The model has been validated using the measured sound levels at the unattended survey locations.

5.2.2 It is assumed that measured sound levels are representative of typical traffic flows around the site and therefore measured noise levels can be used in order to validate the model.

5.2.3 The model has been calibrated to the recorded daytime $L_{Aeq,16hr}$ and night-time $L_{Aeq,8hr}$ presented in Table T8.

5.3 Suitability of Site for Residential Development

External Amenity Noise Levels

5.3.1 Figure 4 presents the result of the acoustics model with the proposed development in place during the daytime. With reference to the BS8233 criteria for external amenity areas, daytime calculations indicate that sound levels at proposed external amenities are likely to fall below the proposed LOAEL of 50 dB $L_{Aeq,16h}$ across the Site.

Internal Noise Levels

5.3.2 The calculated incident sound levels have been used to determine the likely internal sound levels in the proposed dwellings due to environmental sound.

5.3.3 Preliminary calculations are based on background ventilation being provided through natural ventilation solutions in the form of trickle vents.

5.3.4 Based on a 30 dB sound reduction, that could typically be expected from conventional double glazing and hit and miss trickle vents, it is expected that appropriate internal noise levels can be achieved during both the daytime and night-time periods across the site without the requirement for any specific mitigation.

5.3.5 Purge ventilation is required throughout the proposed buildings to aid the removal of high concentrations of pollutants and water vapour. It is commonly provided by simply opening windows and doors. Due to the temporary and intermittent use of purge ventilation this does not normally result in an unacceptable increase of internal noise levels.

5.3.6 On the basis that a partially open window provides approximately 13 dB of attenuation, it is likely that the internal levels during both the daytime and night-time would still be below the proposed criteria for internal noise with the windows open to provide purge ventilation.

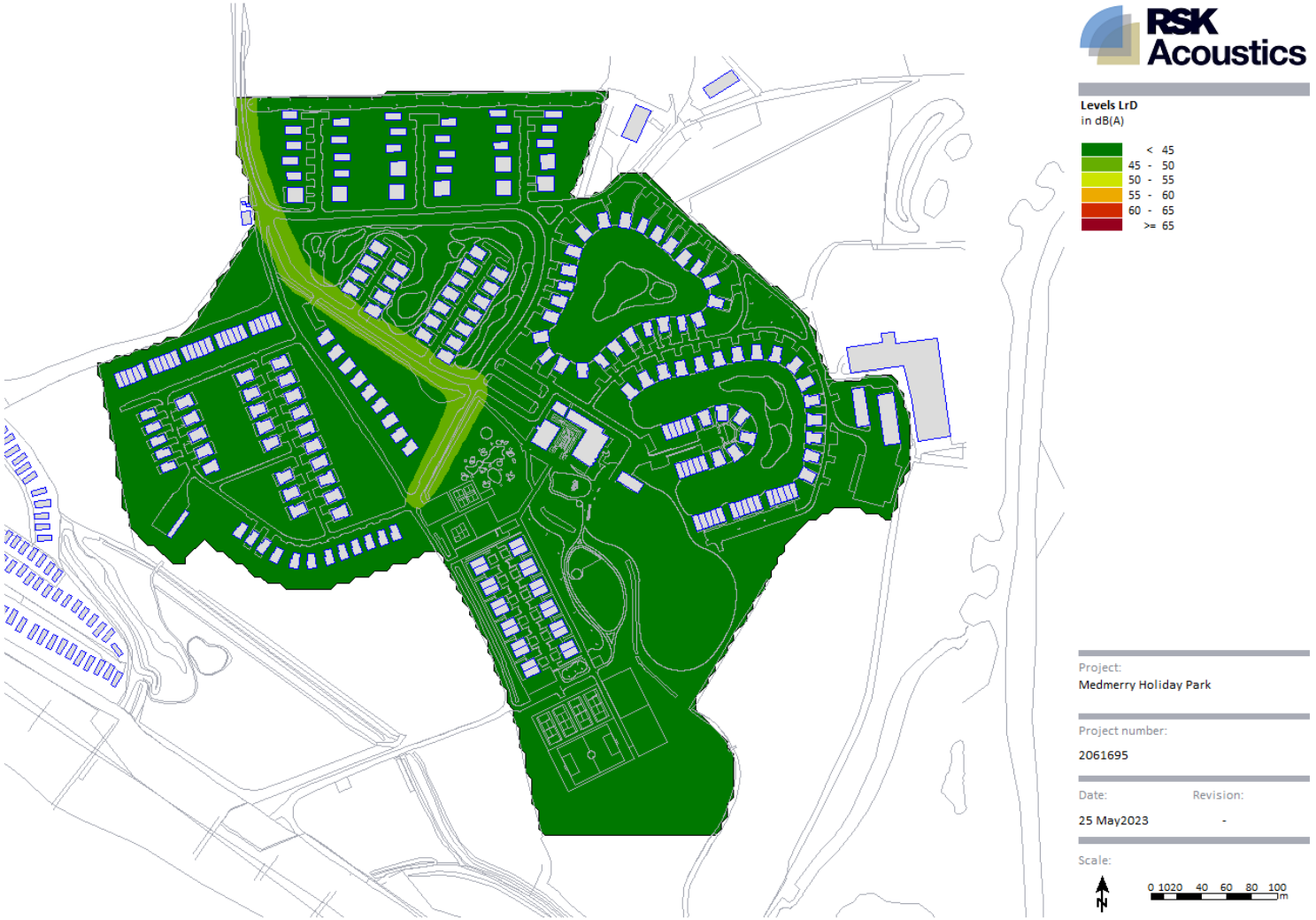

Figure 4 Ambient Noise Levels during the Daytime, $L_{Aeq,16h}$

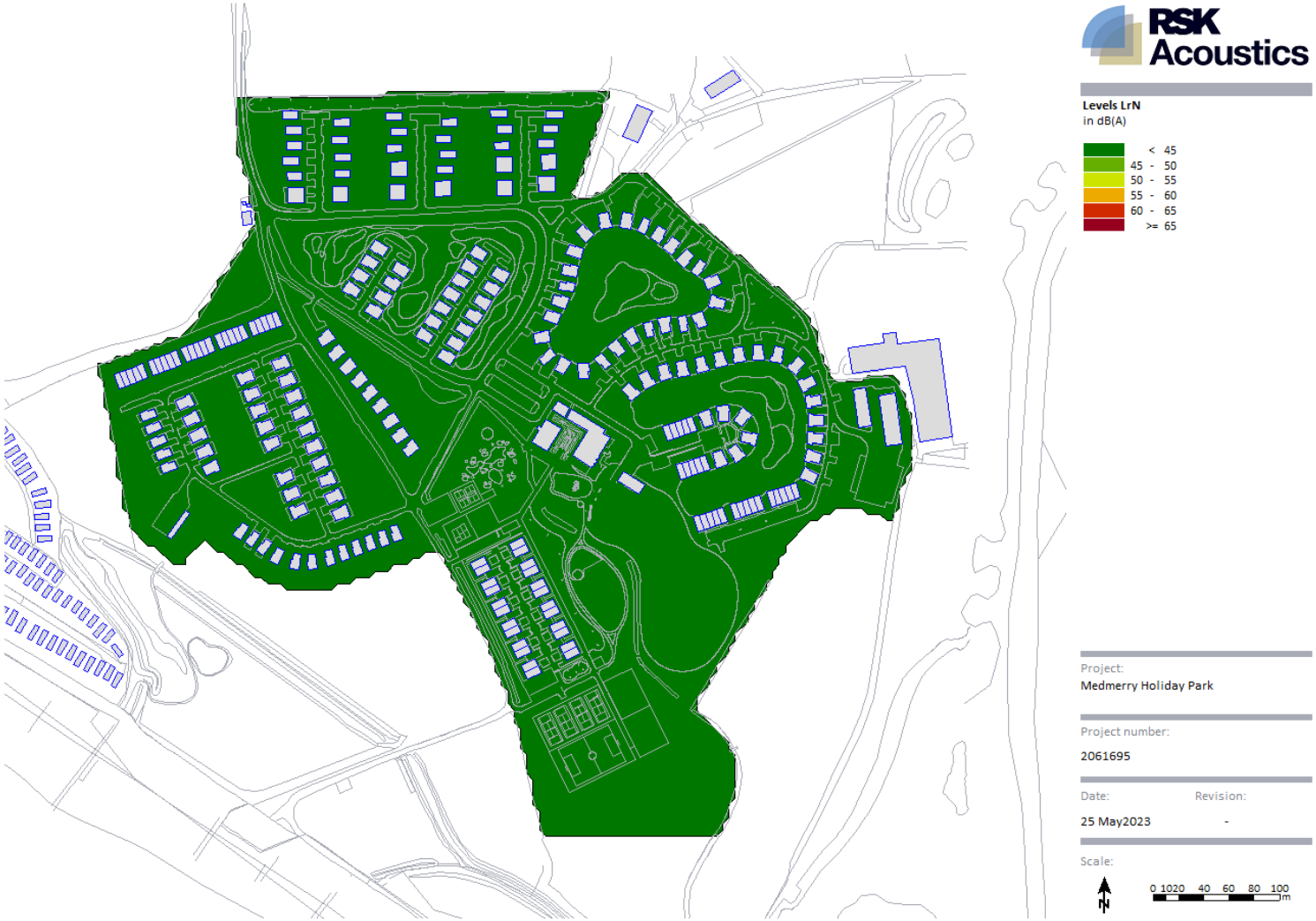

Figure 8 Predicted change in noise levels in the long term, in dB

5.4 Operational Road Traffic Noise Affecting Existing Receptors

5.4.1 The assessment of noise due to the Proposed Development on the existing sound climate in surrounding areas is based on the change in sound levels at noise sensitive receptors due to a change in the volumes of road traffic generated by the Proposed Development.

5.4.2 Figures 7 and 8 present the predicted change in noise levels, in the short term and in the long term respectively, based on the traffic flow predictions along the road links provided by the transport consultants, ITP, in May 2023.

5.4.3 The traffic data used for the assessment is presented in the transport assessment, Chapter 15 of the ES.

Figure 7 Predicted change in noise levels in the short term, in dB

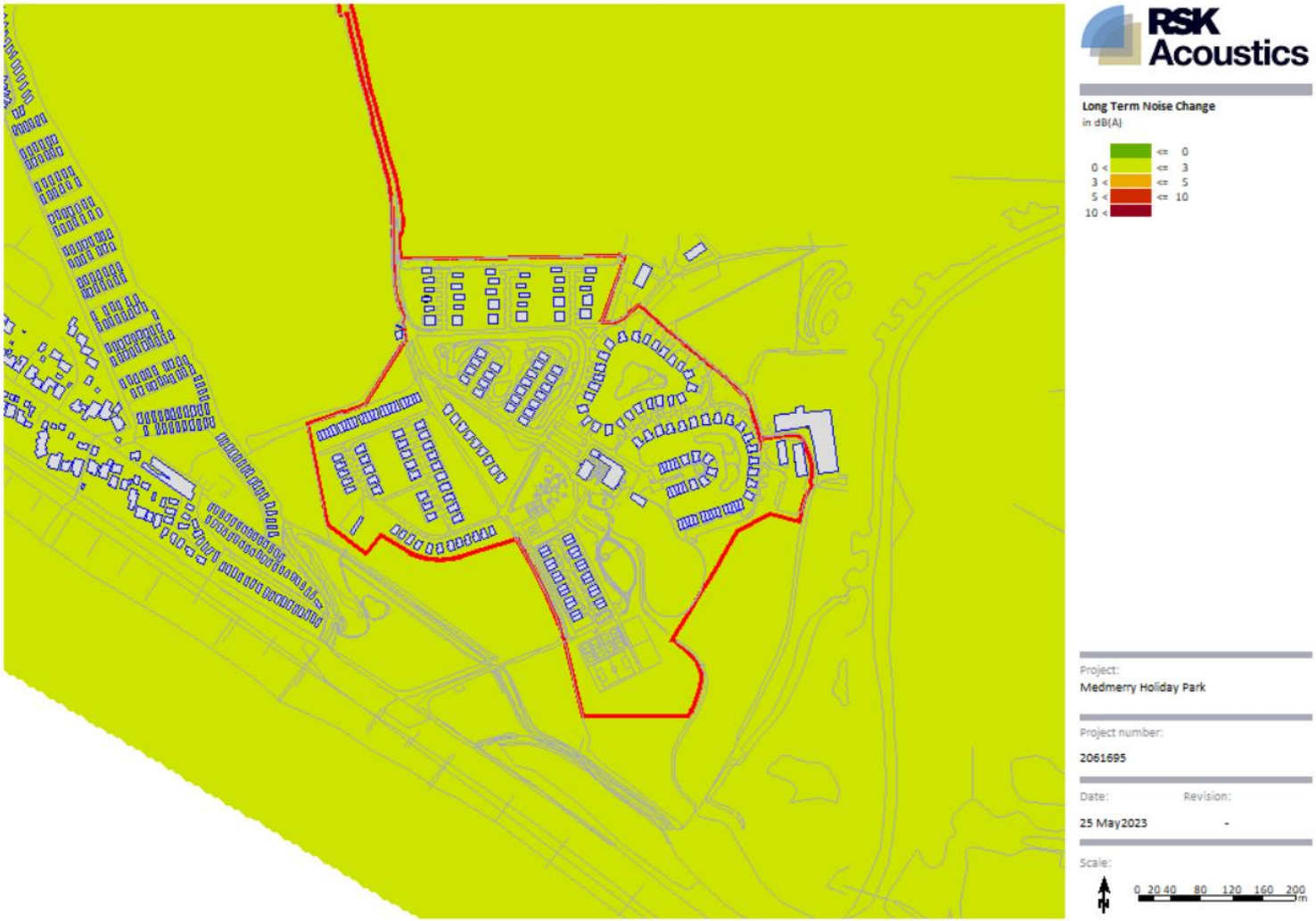

Figure 8 Predicted change in noise levels in the long term, in dB

5.4.4 The change in noise levels at noise sensitive receptors as a result of traffic generated by the proposed development is likely to be below the LOAEL at all existing noise sensitive receptors in both the short and the long term.

5.4.5 No mitigation measured has therefore been deemed necessary.

5.5 Operational Noise from Open Amenity Area Affecting RSPB Reserve and SSSI

5.5.1 An open amenity area is proposed as part of the development. The amenity area could include the irregular installation of a projector to show films or sporting events, which could have the potential to affect the nearby RSPB Reserve and SSSI.

5.5.2 Measured Cinema data, from RSKA's library, has been used in order to ascertain a representative source sound level. A level of 72 L_{Aeq} at 10 m was measured in a cinema which, due to the more comprehensive sound system installed, is thought to be a worst-case assessment.

5.5.3 The boundary of the RSPB Reserve is located approximately 250 m from the proposed open amenity area and the boundary of the SSSI approximately 270 m.

5.5.4 Table 21 below shows the preliminary results of the calculated sound levels from the open amenity area at the receptors.

Description	Receptor D	Receptor E
Distance from Open Amenity Area	270 m	250 m
Distance Attenuation	-29 dB	-28 dB
Calculated Level from Open Amenity Area	43	44

T21 Survey Equipment

5.5.5 The calculated sound levels from the open amenity area are likely to be below 55 dB, as recommended in the Waterbird Disturbance Mitigation Toolkit, at the boundary of the receptors. The noise impact on birds is therefore likely to be low at both the SSSI and the RSPB reserve.

5.6 Industrial and Commercial Noise

5.6.1 There is no fixed plant proposed associated with the operation of the site, an assessment in accordance with BS4142 for any new plant items has therefore not been undertaken.

5.6.2 However, during consultation with the environmental health department, it was requested that the report includes an assessment of the potential noise impact from the storage facilities to the east of site.

5.6.3 During both site visits to set up and pick up the equipment, there was no noticeable activities from the storage facilities. It has therefore not been possible to measure specific noise levels from the facilities and it is not possible to undertake an assessment in accordance with BS4142.

5.6.4 However, looking at the daily survey results presented in table T11, the measured levels at location UT2, adjacent to the storage facilities are similar to the levels measured at location UT4, away from any specific noise sources.

5.6.5 Table T22 below show the differences between the measured noise level at UT2, next to the storage facilities, and UT4 away from noise sources.

Date	Time Period	Measured noise levels, L_{Aeq}, T in dB		Difference in Measured Level, dB
		At UT2	At UT4	
Wednesday 05/04/2023	Daytime	51	51	0
	Night-time	45	48	-3
Thursday 06/04/2023	Daytime	46	47	-1
	Night-time	40	41	-1
Friday 07/04/2023	Daytime	44	43	+1
	Night-time	44	45	-1
Saturday 08/04/2023	Daytime	45	45	0
	Night-time	41	43	-2
Sunday 09/04/2023	Daytime	41	43	-2
	Night-time	41	44	-3

T22 Difference in measured levels between UT2 and UT4

5.6.6 There are also no noticeable activities on the time history graph and the audio recording didn't pick up anything specific to the industrial units.

5.6.7 It is therefore likely that the storage facilities will have a low impact on the proposed development.

6 Conclusions

6.1.1 RSK Acoustics Limited has been commissioned by RSK Environment Limited, on behalf of Cove Communities, to undertake a noise assessment report to support a planning application for a proposed Holiday Park development at Medmerry, Chichester.

6.1.2 The proposal is for the demolition of the buildings currently on the Medmerry Park site and the redevelopment of 308 holiday home units.

6.1.3 An unattended environmental sound survey was undertaken between Tuesday 4 April and Tuesday 11 April 2023 in order to determine the existing sound climate across the site and in the surrounding area.

6.1.4 An acoustic model of the site has been developed based on the survey data and the traffic information provided by the transport consultants, ITP.

6.1.5 Assessment criteria have been proposed based on relevant guidance and standards.

6.1.6 An indicative construction noise and vibration assessment has been undertaken for the site. Calculations indicate that, construction noise levels are likely to be above the proposed LOAEL but below the proposed SOAEL at all of the identified receptors.

6.1.7 Further assessment of construction noise mitigation should be undertaken when a detailed method statements, the construction programme and descriptions of the proposed plant are available. With the Construction Environmental Management Plan and Best Practicable Means in place, it is likely that the impact would be lowered further at all considered receptors, and no additional mitigation is proposed.

6.1.8 Calculations conclude that there is no potential for perceptible vibration levels affecting the closest sensitive receptors to the construction site and no additional mitigation is proposed.

6.1.9 Based on the noise modelling results for the operational phase, appropriate internal noise levels can be achieved during both the daytime and night-time periods across the site without the requirement for any specific mitigation.

6.1.10 During the operational phase the predicted sound levels in external amenity areas are likely to meet the proposed criteria, without specific mitigation measures across the site.

6.1.11 During the operational phase the change in noise levels as a result of traffic generated by the proposed development has been assessed. The results of the assessment show that the changes in noise levels due to the changes in road traffic are likely to be acceptable at all noise sensitive receptors and no specific mitigation is proposed.

6.1.12 Following concerns raised by the adjacent RSPB reserve, the potential noise impact from the construction phase and from the operation of the proposed open amenity area on birds has been assessed at both the RSPB reserve and the Bracklesham Bay SSSI. Calculations show that the noise impact from the construction phase and from the operation of the proposed open amenity area will be low at both the RSPB reserve and the SSSI.

6.1.13 In summary, the assessment has demonstrated that the site should be considered suitable for the proposed development in terms of noise.

7 References

- Noise Policy Statement for England (NPSE). DEFRA, 2010.
- National Planning Policy Framework. Department for Communities and Local Government. July 2021.
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End of Section

Glossary of Acoustic Terms

L_{Aeq}:

The notional steady sound level (in dB) which over a stated period of time, would have the same A-weighted acoustic energy as the A-weighted fluctuating noise measurement over that period. Values are sometimes written using the alternative expression dB(A) L_{eq}.

L_{Amax}:

The maximum A-weighted sound pressure level recorded over the period stated. L_{Amax} is sometimes used in assessing environmental noise when occasional loud noises occur, which may have little effect on the L_{Aeq} noise level. Unless described otherwise, L_{Amax} is measured using the "fast" sound level meter response.

L_{A10} and L_{A90}:

If non-steady noise is to be described, it is necessary to know both its level and degree of fluctuation. The L_{An} indices are used for this purpose. The term refers to the A-weighted level (in dB) exceeded for n % of the time specified. L_{A10} is the level exceeded for 10 % of the time and as such gives an indication of the upper limit of fluctuating noise. Similarly, L_{A90} gives an indication of the lower levels of fluctuating noise. It is often used to define the background noise.

L_{A10} is commonly used to describe traffic noise. Values of dB L_{An} are sometimes written using the alternative expression dB(A) L_n.

L_{AX}, L_{AE} or SEL

The single event noise exposure level which, when maintained for 1 second, contains the same quantity of sound energy as the actual time varying level of one noise event. L_{AX} values for contributing noise sources can be considered as individual building blocks in the construction of a calculated value of L_{Aeq} for the total noise. The L_{AX} term can sometimes be referred to as Exposure Level (L_{AE}) or Single Event Level (SEL).

$L_{Ar,Tr}$:

The rating level $L_{Ar,Tr}$ is the specific sound level of the source under assessment plus any adjustment for the characteristic features of the sound.

Peak Particle Velocity (PPV):

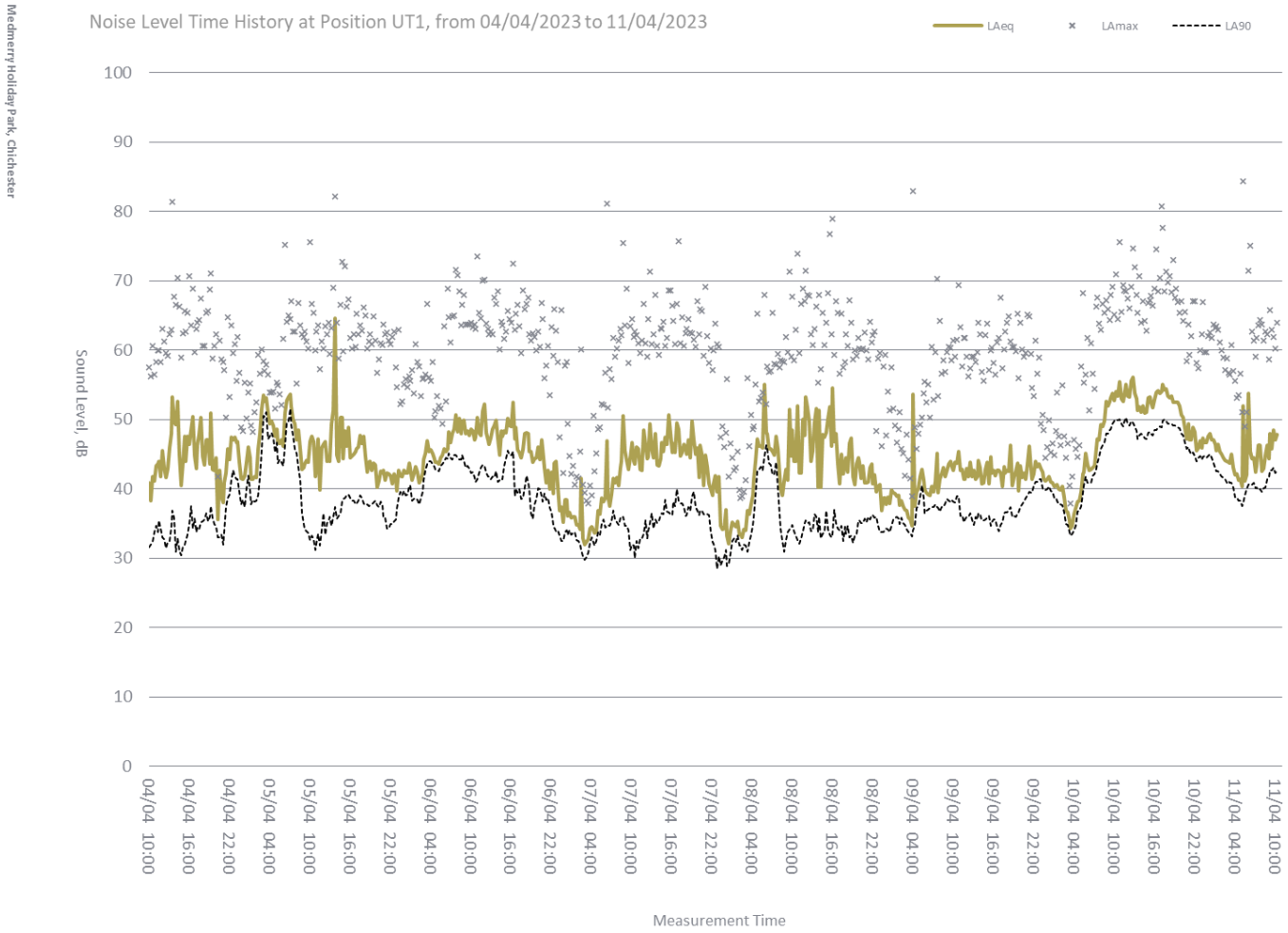
The maximum instantaneous velocity of a particle at a point during a given time interval.

Vibration Dose Value (VDV):

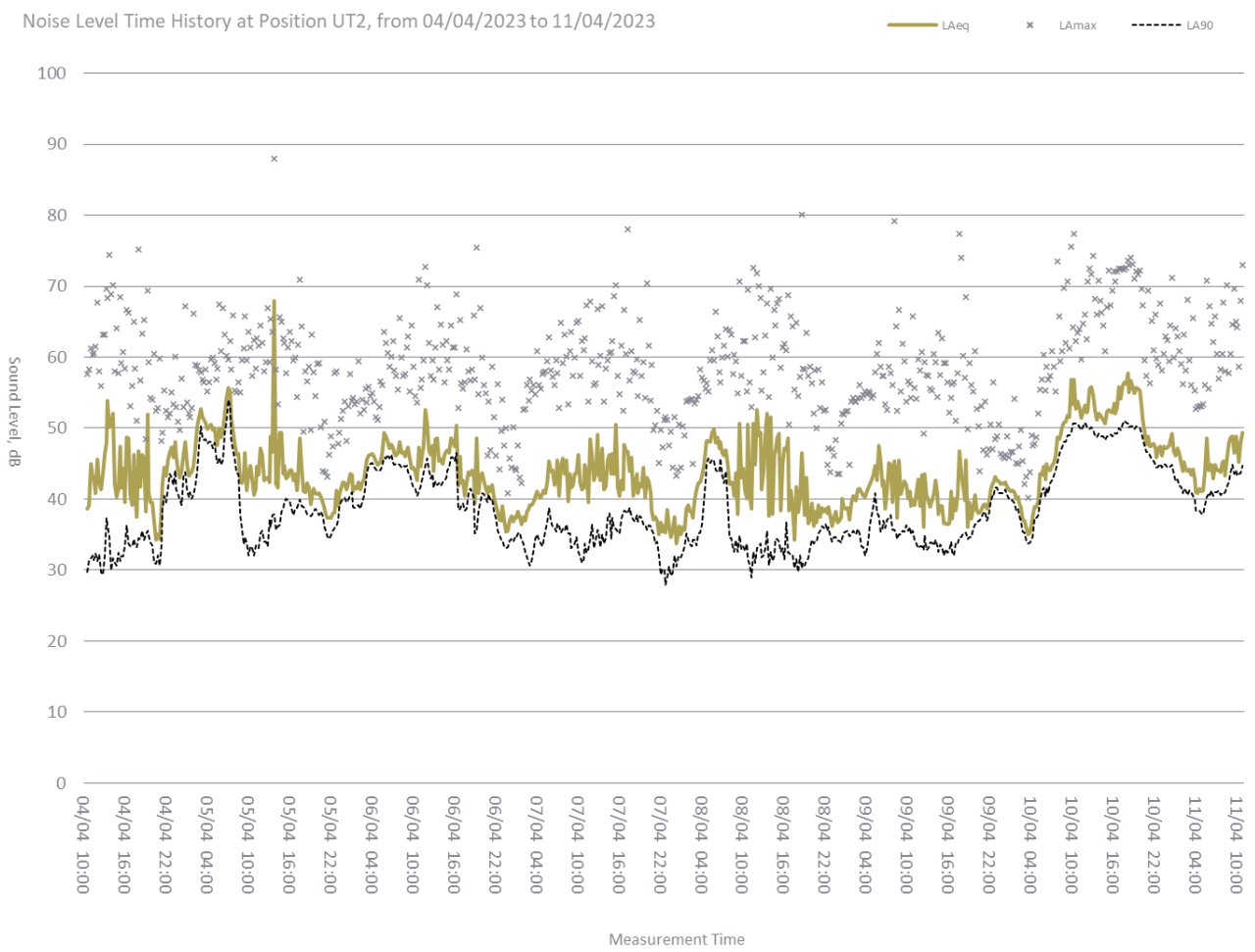
The fourth root of the time integral of the fourth power of frequency-weighted acceleration. Used to measure the total vibration experienced over a specified period of time.

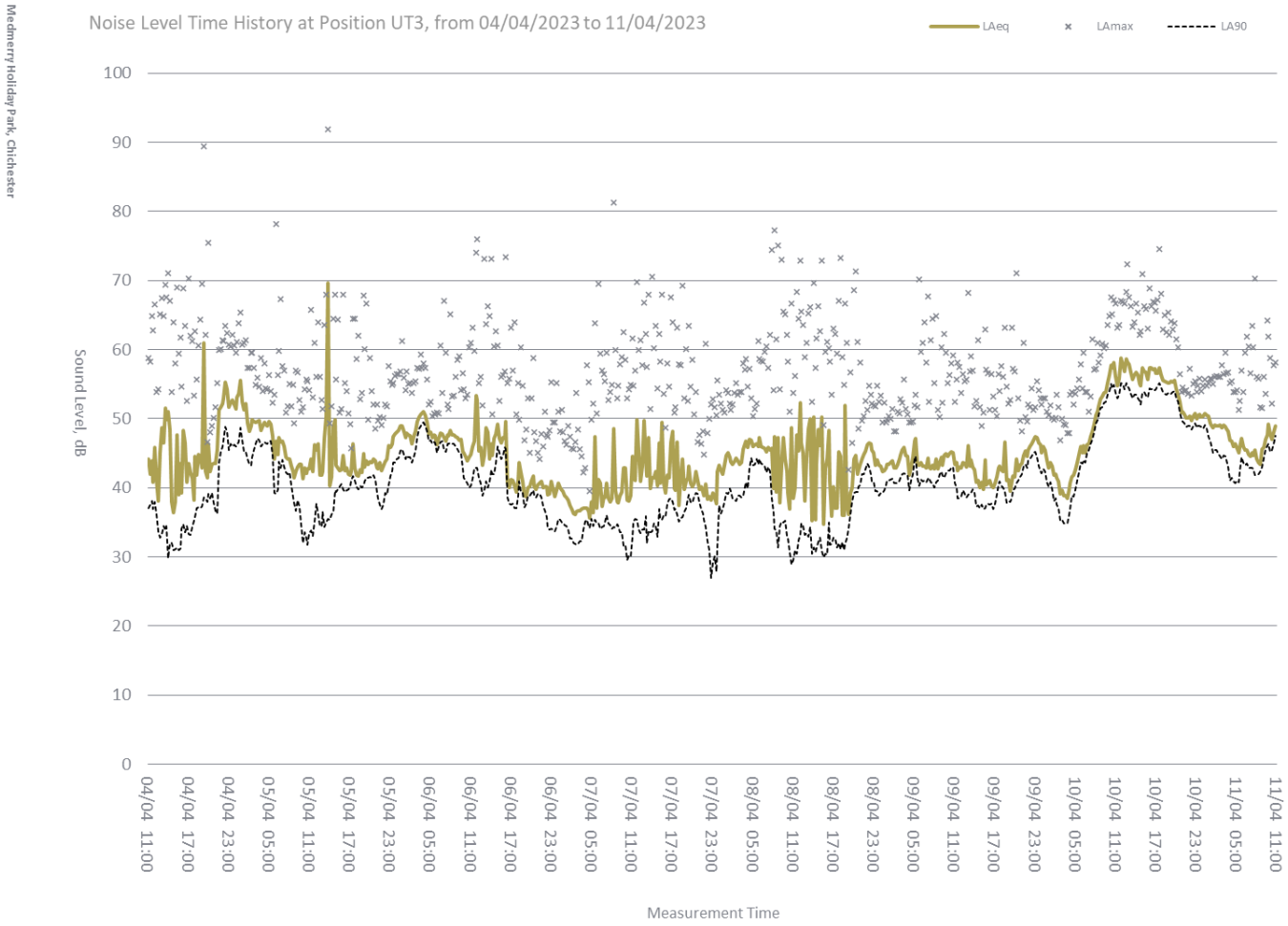
End of Section

Appendix A - Time History Graphs


Medmerry Holiday Park, Chichester
Noise Level Time History at Position UT1, from 04/04/2023 to 11/04/2023
LAeq
LAmax
LA90
Sound Level, dB
100
90
80
70
60
50
40
30
20
10
0
04/04 10:00
04/04 16:00
04/04 22:00
05/04 04:00
05/04 10:00
05/04 16:00
05/04 22:00
06/04 04:00
06/04 10:00
06/04 16:00
06/04 22:00
07/04 04:00
07/04 10:00
07/04 16:00
07/04 22:00
08/04 04:00
08/04 10:00
08/04 16:00
08/04 22:00
09/04 04:00
09/04 10:00
09/04 16:00
09/04 22:00
10/04 04:00
10/04 10:00
10/04 16:00
10/04 22:00
11/04 04:00
11/04 10:00
Measurement Time

Medmerry Holiday Park, Chichester




Medmerry Holiday Park, Chichester
Noise Level Time History at Position UT3, from 04/04/2023 to 11/04/2023
LAeq
LAmax
LA90
Sound Level, dB
100
90
80
70
60
50
40
30
20
10
0
04/04 11:00
04/04 17:00
04/04 23:00
05/04 05:00
05/04 11:00
05/04 17:00
05/04 23:00
06/04 05:00
06/04 11:00
06/04 17:00
06/04 23:00
07/04 05:00
07/04 11:00
07/04 17:00
07/04 23:00
08/04 05:00
08/04 11:00
08/04 17:00
08/04 23:00
09/04 05:00
09/04 11:00
09/04 17:00
09/04 23:00
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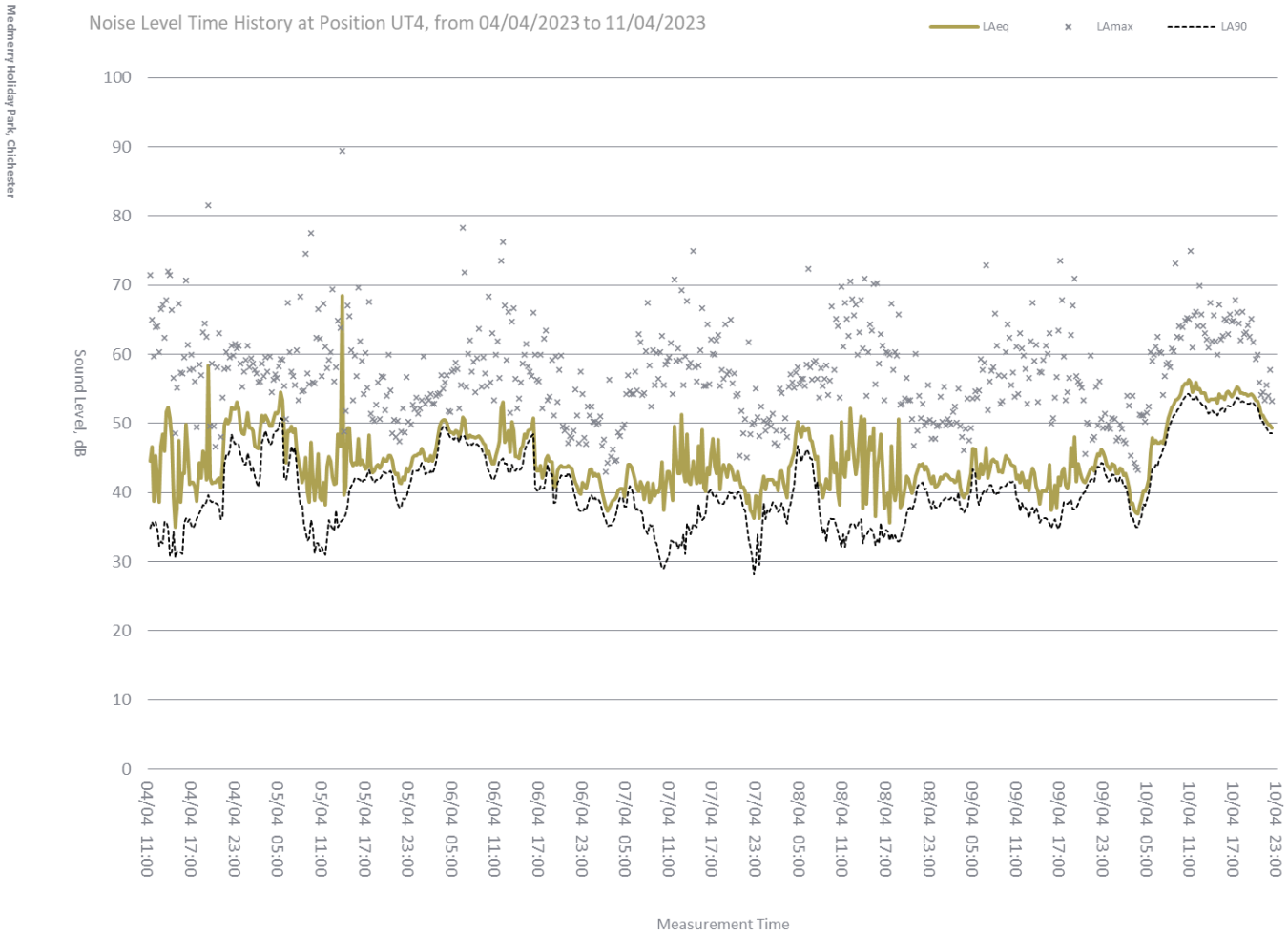
10/04 23:00
11/04 05:00
11/04 11:00
Measurement Time


Medmerry Holiday Park, Chichester
Noise Level Time History at Position UT4, from 04/04/2023 to 11/04/2023
LAeq
LAmax
LA90
Sound Level, dB
100
90
80
70
60
50
40
30
20
10
0
04/04 11:00
04/04 17:00
04/04 23:00
05/04 05:00
05/04 11:00
05/04 17:00
05/04 23:00
06/04 05:00
06/04 11:00
06/04 17:00
06/04 23:00
07/04 05:00
07/04 11:00
07/04 17:00
07/04 23:00
08/04 05:00
08/04 11:00
08/04 17:00
08/04 23:00
09/04 05:00
09/04 11:00
09/04 17:00
09/04 23:00
10/04 05:00
10/04 11:00
10/04 17:00
10/04 23:00
Measurement Time

Appendix B - Construction Assumptions

Activity	Plant / Equipment	Power rating, kW	Equipment size, weight (mass), capacity	Data Source	No(s)	Plant / Equipment dB L_{Aeq} at 10 m	Percentage On-time (%)
Site Preparation Works - Establishment and Hoarding	Dozer	142	20 t	BS 5228-1:2009+A1:2014 Table C.2:1	1	75	60%
	Tracked excavator	102	22 t	BS 5228-1:2009+A1:2014 Table C.2:3	1	78	55%
	Tracked excavator (idling)	102	22 t	BS 5228-1:2009+A1:2014 Table C.2:4	1	52	25%
	Wheeled loader	209	—	BS 5228-1:2009+A1:2014 Table C.2:26	1	79	50%
	Dump truck (tipping fill)	306	29 t	BS 5228-1:2009+A1:2014 Table C.2:30	1	79	40%
	Dump truck	306	29 t	BS 5228-1:2009+A1:2014 Table C.2:31	1	87	40%
	Roller (rolling fill)	145	18 t	BS 5228-1:2009+A1:2014 Table C.2:37	1	79	40%
	Roller	145	18 t	BS 5228-1:2009+A1:2014 Table C.2:38	1	73	40%
	Grader	205	25 t	BS 5228-1:2009+A1:2014 Table C.6:31	1	86	30%
Demolition, Foundation Works/Substructure	Dozer	239	41 t	BS 5228-1:2009+A1:2014 Table C.2:10	1	80	60%
	Tracked excavator	226	40 t	BS 5228-1:2009+A1:2014 Table C.2:14	1	79	55%
	Tracked excavator (idling)	125	25 t	BS 5228-1:2009+A1:2014 Table C.2:20	1	68	25%
	Wheeled loader	209	—	BS 5228-1:2009+A1:2014 Table C.2:26	1	79	50%
	Cement mixer truck (discharging)	—	—	BS 5228-1:2009+A1:2014 Table C.4:18	1	75	20%
	Cement mixer truck (idling)	—	—	BS 5228-1:2009+A1:2014 Table C.4:19	1	71	40%
	Poker vibrator	—	—	BS 5228-1:2009+A1:2014 Table C.4:33	1	78	40%

Activity	Plant / Equipment	Power rating, kW	Equipment size, weight (mass), capacity	Data Source	No(s)	Plant / Equipment dB L_{Aeq} at 10 m	Percentage On-time (%)
	Large rotary bored piling rig	—	110 t / 20 m deep / 1.2 m diameter	BS 5228-1:2009+A1:2014 Table C.3:14	1	83	30%
Building Erection Works/Superstructure	Dumper	81	7 t	BS 5228-1:2009+A1:2014 Table C.4:3	1	76	60%
	Large concrete mixer	167	26 t	BS 5228-1:2009+A1:2014 Table C.4:22	1	76	40%
	Wheeled mobile telescopic crane	610	400 t	BS 5228-1:2009+A1:2014 Table C.4:38	1	78	60%
	Lorry with lifting boom	50	6 t	BS 5228-1:2009+A1:2014 Table C.4:53	1	77	40%
	Tracked excavator	223	40 t	BS 5228-1:2009+A1:2014 Table C.4:63	1	77	20%
	Mini tracked excavator	—	5 t	BS 5228-1:2009+A1:2014 Table C.4:67	1	74	50%
	Circular bench saw (petrol-cutting concrete blocks)	—	—	BS 5228-1:2009+A1:2014 Table C.4:71	1	85	30%
	Hand-held circular saw (petrol-cutting concrete blocks)	3	9 kg	BS 5228-1:2009+A1:2014 Table C.4:72	1	79	60%
	Diesel generator	6.5	—	BS 5228-1:2009+A1:2014 Table C.4:76	1	61	90%
Road Works	Road planer	185	17 t	BS 5228-1:2009+A1:2014 Table C.5:7	1	82	30%
	Road planer (idling)	185	17 t	BS 5228-1:2009+A1:2014 Table C.5:8	1	62	30%
	Bulldozer	250	35 t	BS 5228-1:2009+A1:2014 Table C.5:14	1	86	50%
	Articulated dump truck	194	25 t	BS 5228-1:2009+A1:2014 Table C.5:16	1	81	50%
	Road roller	95	22 t	BS 5228-1:2009+A1:2014 Table C.5:19	1	80	75%
	Asphalt paver (+ tipper lorry)	112	12 t hopper	BS 5228-1:2009+A1:2014 Table C.5:30	1	75	50%

Activity	Plant / Equipment	Power rating, kW	Equipment size, weight (mass), capacity	Data Source	No(s)	Plant / Equipment dB L_{Aeq} at 10 m	Percentage On-time (%)
	Vibratory roller	95	12 t	BS 5228-1:2009+A1:2014 Table C.5:21	1	80	50%
	Vibratory roller	98	8.9 t	BS 5228-1:2009+A1:2014 Table C.5:20	1	75	50%
	Grader	205	25 t	BS 5228-1:2009+A1:2014 Table C.6:31	1	86	30%
Landscaping works and Fit-Out	Lorry with lifting boom	50	6 t	BS 5228-1:2009+A1:2014 Table C.4:53	1	77	40%
	Tracked excavator	223	40 t	BS 5228-1:2009+A1:2014 Table C.4:63	1	77	20%
	Mini tracked excavator	—	5 t	BS 5228-1:2009+A1:2014 Table C.4:67	1	74	50%

End of Section

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