

Foreman Homes Ltd

Land to the South of Romsey Avenue, Fareham
Updated Environmental Statement Volume 2: Main Text
Chapter 7: Noise and Vibration



TEMPLE

CHAPTER 7: NOISE & VIBRATION

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7.0 NOISE AND VIBRATION

7.1 Introduction

- 7.1.1 This chapter of the ES assesses the likely significant effects of the Proposed Development in terms of noise and vibration and is supported by **Volume 4, Appendix C**.
- 7.1.2 The chapter describes: the assessment methodology; the baseline conditions currently existing at the Site and in the surrounding area; the likely significant environmental effects; the mitigation measures required to prevent, reduce or offset any significant adverse effects; the likely residual effects after these measures have been employed; and the 'Inter- project effects' cumulative effects associated with the Proposed Development in combination with other developments within the vicinity of the Site.
- 7.1.3 'Intra-project effects' which are the combined effects of individual topic impacts on a particular sensitive receptor are considered in **Volume 2, Chapter 11: Effect Interactions**.
- 7.1.4 Impacts are considered during the construction phase and on completion and operation of the Proposed Development. In particular, the chapter considers potential impacts on identified receptors (residential properties and businesses i.e. AFC Portchester Football Stadium), in terms of:
- noise and vibration from construction works; and
 - any increases to road traffic noise during construction and operation attributed to the Proposed Development.
- 7.1.5 This chapter also provides an assessment of the suitability of the Site for the proposed uses, in terms of existing exposure to noise and vibration, and of the need to provide an appropriate internal and/or external noise environment for noise sensitive uses.

7.2 Key Legislation, Policy and Guidance

- 7.2.1 The noise assessment has been undertaken within the context of relevant planning policies, guidance documents and legislative instruments. These are summarised below.

Legislation and Regulation

Control of Pollution Act 1974

- 7.2.2 The Control of Pollution Act 1974¹ (CoPA) requires that 'Best Practicable Means' (as defined in section 72 of CoPA) are adopted to control construction noise on any given site. CoPA refers to BS 5228 as best practicable means. Section 61 sets out the process for application to the local authority for prior consent to carry out works.

¹ Control of Pollution Act 1974.

National Policy

National Planning Policy Framework

- 7.2.3 The National Planning Policy Framework² (NPPF) sets out the government's planning policies for England and how these are expected to be applied. The revised NPPF comments on noise in the following ways:
- 7.2.4 Paragraph 170: *"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 soil, air, water or noise pollution or land instability."*
- 7.2.5 Paragraph 180: *"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:*
- *a) 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 the quality of life; and*
 - *b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason."*

Noise Policy Statement for England

- 7.2.6 The Noise Policy Statement for England³ (NPSE) seeks to clarify the underlying principles and aims in existing policy documents, legislation and guidance that relate to noise. The statement applies to all forms of noise, including environmental noise, neighbour noise, and neighbourhood noise.
- 7.2.7 The statement sets out the long-term vision of the government's noise policy, which is to: *"promote good health and a good quality of life through the effective management of noise within the context of policy on sustainable development"*.
- 7.2.8 The guidance promotes the effective management and control of noise, within the context of Government policy on sustainable development and thereby aims to:
- avoid significant adverse impacts on health and quality of life;
 - mitigate and minimise adverse impacts on health and quality of life; and
 - where possible, contribute to the improvements of health and quality of life.
- 7.2.9 The statement adopts established concepts from toxicology that are currently being applied to noise impacts. The concept details noise levels, at which the effects of an

² Ministry of Housing, Communities and Local Government (February 2019). The National Planning Policy Framework

³ Department for Environment, Food and Rural Affairs (March 2014). Noise Policy Statement for England

exposure may be classified into a specific category. The classification categories as detailed within NPSE are as follows:

- No Observed Effect Level (NOEL) - the level below which no effect can be detected. Below this level no detectable effect on health and quality of life due to noise can be established;
- Lowest Observable Adverse Effect Level (LOAEL) - the level above which adverse effects on health and quality of life can be detected; and
- Significant Observed Adverse Effect Level (SOAEL) - the level above which significant adverse effects on health and quality of life occur.

It is recognised that SOAEL does not have a single objective noise-based level that is applicable to all sources of noise in all situations and therefore the SOAEL is likely to be different for different sources, receptors and at different times of the day.

7.2.10 No guidance has been issued at the time of writing to identify the SOAEL and LOAEL for typical noise sources and receptors.

Planning Practice Guidance (PPG) – Noise

7.2.11 The National Planning Practice Guidance⁴ (PPG) expands on the use of SOAEL:

“if the exposure is above this level the planning process should be used to avoid this effect occurring, for example through the choice of sites at the plan making stage or by use of appropriate mitigation such as by altering the design and layout. While such decisions must be made taking account of the economic and social benefit of the activity causing or affected by the noise, it is undesirable for such exposure to be caused.”

7.2.12 The PPG also goes on to identify unacceptable noise exposure:

“at the highest extreme, noise exposure would cause extension and sustained adverse changes in behaviour and/or health without an ability to mitigate the effect of noise. The impacts on health and quality of life are such that regardless of the benefits of the activity causing the noise, this situation should be avoided.”

7.2.13 In addition, the PPG refers to further considerations to mitigating noise on residential developments. The PPG states that the noise impact may be partially offset if the residents of those dwellings have access to:

- *‘a relatively quiet façade (containing windows to habitable rooms) as part of their dwelling, and/or;*
- *a relatively quiet external amenity space for their sole use, (e.g. a garden or balcony). Although the existence of a garden or balcony is generally desirable, the intended benefits will be reduced with increasing noise exposure and could be such that significant adverse effects occur, and/or;*

⁴ Ministry of Housing, Communities and Local Government (March 2014, Last updated 22 July 2019). Planning Practice Guidance - Noise

- *a relatively quiet, protected, nearby external amenity space for sole use by a limited group of residents as part of the amenity of their dwellings, and/or;*
- *a relatively quiet, protected, external publicly accessible amenity space (e.g. a public park or a local green space designated because of its tranquillity) that is nearby (e.g. within a 5 minutes walking distance).*

Regional and Local Policy

Fareham Borough Local Plan

7.2.14 The Fareham Borough Local Plan consists of three parts (Core Strategy, Development Sites & Policies and The Welbourne Plan) and sets out the Planning Strategy for the Borough up to 2026.

Local Plan Part 1: Core Strategy

7.2.15 The Core Strategy⁵ sets out the key elements of the planning framework for the Borough. It includes policies for areas and issues requiring development or protection and sets the principles of strategic Sites. The Core Strategy was adopted on 4th August 2011.

Local Plan Part 2: Development Sites and Policies

7.2.16 The Development Sites and Policies Plan⁶ (June 2015) allocates sites and land for housing, retail, economic development, leisure, recreation and community uses, whilst also recommending areas for protection such as green spaces and conservation areas. The plan also sets out a vision for the future of Fareham Town Centre and sets out a number of policies which influence the way land is developed around the Borough and helps guide decisions on planning applications.

7.2.17 Policy DSP2: Environmental Impact states:

“Development proposals should not, individually, or cumulatively, have significant adverse impacts, either on neighbouring development, adjoining land, or the wider environment, by reason of noise, heat, liquids, vibration, light or air pollution (including dust, smoke, fumes or odour).”

7.2.18 The document expands on Policy DSP2 with regards to noise, stating the following:

“Noise pollution can be particularly detrimental to the amenity of neighbouring residents. Certain uses should not be located adjacent to residential properties in order to protect them from the potential impact of noise. Alternatively, where residential or similarly sensitive development is proposed adjacent to a use likely to create noise, it should be demonstrated in the planning application how this can be mitigated.

Other elements of pollution, such as heat, smoke, liquids, and vibration, should be treated in a similar way.”

⁵ Fareham Borough Council (August 2011). Local Plan Part 1: Core Strategy

⁶ Fareham Borough Council (June 2015). Local Plan Part 2: Development Sites and Policies

Draft Fareham Local Plan 2036

- 7.2.19 The Draft Fareham Local Plan 2036⁷ is currently in the consultation stage. As of 21st February 2021, the Executive Leader announced that, following the publication of the revised Planning Practice Guidance on housing need, a further consultation will take place on changes to the Publication Local Plan in early summer.
- 7.2.20 Policy D2: Impact on Living Conditions states:
- “All development proposals will ensure appropriate living conditions for new and existing residents, and occupiers and users of buildings and space.*
- 7.2.21 *Development proposals will be permitted where they:*
- a) Do not have a significant adverse impact on the living conditions of adjacent/nearby occupants and potential occupiers and users through ensuring appropriate outlook and ventilation and providing daylight, sunlight and privacy; and*
- b) Do not, individually, or cumulatively, have a significant adverse impact, either on neighbouring occupants, adjoining land, or the wider environment, by reason of noise, heat, liquids, vibration, light or air pollution.”*
- 7.2.22 Paragraph 10.17 expands on Policy D2 with regards to noise, stating the following:
- “In instances where additional acoustic glazing measures are required (to address noise amenity concerns) it is highly likely that an appropriate ventilation system will need to be provided (controlled by the individual residential units) to enable windows to remain closed whilst ensuring the property is also appropriately ventilated. Policy D2 should be read in conjunction with the Borough Design Guidance SPD, which provides detailed requirements in respect of living conditions.”*

Technical Standards and Guidance

Planning & Noise Professional Practice Guidance on Planning & Noise New Residential Development, May 2017

- 7.2.23 Current Government guidance on planning and noise for new residential developments is found in the NPPF. One of the strengths of the NPPF is that it sets clear objectives. However, the Institute of Acoustics (IOA), Association of Noise Consultants (ANC) and the Chartered Institute of Environmental Health (CIEH) felt there was insufficient technical guidance for practitioners and developers on how to deliver the Government’s objectives. Therefore, these professional bodies jointly produced the Professional Practice Guidance on Planning and Noise⁸ (ProPG) which aims to complement existing Government advice and provides a recommended approach that can be applied proportionately to each development site to encourage good acoustic design.
- 7.2.24 The ProPG seeks to promote the use of good acoustic design to:

⁷ Draft Fareham Local Plan 2036. (2017) Fareham Borough Council

⁸ ANC, IOA, CIEH (May 2017). ProPG Planning and Noise: Professional Practice Guidance on Planning & Noise

- enable new homes to be built in areas previously considered unsuitable because of noise by appropriate evaluation and careful use of suitable mitigation;
- allow rapid identification of sites where noise is unlikely to be a constraint for new residential developments;
- permit swift recognition of noisy sites that are very unlikely to be suitable for new residential developments; and
- help to reduce the harmful impacts of noise on those moving into the properties and the surrounding communities.

7.2.25 The ProPG recommends the following:

“Where there is a justification that the internal target noise levels can only be practically achieved with windows closed, which may be the case in urban areas and at sites adjacent to transportation noise sources, special care must be taken to design the accommodation so that it provides good standards of acoustics, ventilation and thermal comfort without unduly compromising other aspects of the living environment. In such circumstances, internal noise levels can be assessed with windows closed but with any façade openings used to provide “whole dwelling ventilation” in accordance with Building Regulations Approved Document F (e.g. trickle ventilators) in the open position.”

“It should also be noted that the internal noise level guidelines are generally not applicable under “purge ventilation” conditions as defined by Building Regulations Approved Document F, as this should only occur occasionally (e.g. to remove odour from painting and decorating or from burnt food).”

“In addition to providing purge ventilation, open windows can also be used to mitigate overheating. Therefore, should the scheme be assessed with windows closed, but is reliant on open windows to mitigate overheating, it is also necessary to consider the potential noise impact during the overheating condition”.

[British Standard 7745](#)

- 7.2.26 British Standard (BS) 7445-2:1991 ‘Description and measurement of Environmental Noise’⁹ defines parameters, procedures and instrumentation required for noise measurement and analysis.

[British Standard 8233](#)

- 7.2.27 British Standard 8233:2014 ‘Guidance on Sound Insulation and Noise Reduction for Buildings’¹⁰ (BS 8233) provides criteria for the assessment of internal noise levels for various uses including dwellings and commercial properties.

⁹ British Standard 7445-2:1991 Description and measurement of environmental noise, Part 2: Guide to the acquisition of data pertinent to land use, BSI, London.

¹⁰ British Standard 8233:2014 ‘Guidance on Sound Insulation and Noise Reduction for Buildings’, BSI, London.

British Standard 5228

- 7.2.28 British Standard 5228:2009+A1:2014, Part 1 and Part 2 ‘Code of practice for noise and vibration control on construction and open sites’¹¹ (BS 5228) provides a ‘best practice’ guide for noise and vibration control. It includes sound power level (SWL) data for individual plant as well as a calculation method for noise from construction activities. Part 1 of the standard relates to noise and part 2 relates to vibration.

Calculation of Road Traffic Noise

- 7.2.29 The Department of Transport/Welsh Office Memorandum ‘Calculation of Road Traffic Noise’¹² (CRTN) describes procedures for traffic noise calculation; it is suitable for environmental assessments of schemes where road traffic noise may have an impact.

Design Manual for Roads and Bridges

- 7.2.30 The Highways England ‘Design Manual for Road and Bridges Volume 11 Section 3 Part 7 – Traffic Noise and Vibration’¹³ (DMRB) provides guidance on the appropriate level of assessment to be used when assessing the noise and vibration impacts arising from all road projects, including new construction, improvements and maintenance.

WHO Guidelines for Community Noise 1999

- 7.2.31 The World Health Organisation (WHO) Guidelines for Community Noise (1999)¹⁴ provides recommendations aimed to limit the adverse effects of noise on health.

ISO 9613

- 7.2.32 ISO 9613 ‘Attenuation of sound during propagation outdoors – Part 2: A general method of calculation’¹⁵ gives general methods of calculating sound propagation outdoors including attenuation due to geometrical divergence (distance); air and ground absorption; screening; reflections and other effects.

Acoustics, Ventilation and Overheating (AVO) Residential Design Guide

- 7.2.33 The ‘Acoustics, Ventilation and Overheating Residential Design Guide’ (AVO Guide)¹⁶ recommends an approach to acoustic assessments for new residential development that takes due regard of the interdependence of provisions for acoustics, ventilation, and overheating. Application of the AVO Guide is intended to form part of demonstrating good acoustic design as described in the ProPG when considering internal noise level guidelines.

¹¹ British Standard 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Part 1: Noise

¹² Calculation of Road Traffic Noise, Department of Transport Welsh Office, HMSO, 1988

¹³ Design Manual for Roads and Bridges, Volume 11, Environmental Assessment, Section 3, Environmental Assessment Techniques, Part 7, LA 111, Noise and Vibration, (formerly HD 213/11, IAN 185/15), The Highways Agency, May 2020

¹⁴ World Health Organisation (1995), WHO Guidelines for Community Noise.

¹⁵ ISO 9613 Attenuation of sound during propagation outdoors – Part 2: A general method of calculation

¹⁶ Acoustics Ventilation and Overheating: Residential Design Guide, January 2020, Version 1.1

IEMA and IOA Guidelines for Noise Impact Assessment 2014

- 7.2.34 The Institute of Environmental Management and Assessment (IEMA) and IOA Guidelines for Noise Impact Assessment¹⁷ sets good practice standards for scope content and methodology of noise impact assessment. The guidelines present categories of significance relating to the change of basic noise levels.

7.3 Assessment Methodology

Determination of Baseline

- 7.3.1 To assess the potential noise impact of the Proposed Development, it is necessary to determine the baseline conditions. The baseline conditions are typically the current (at the time of writing the ES) environmental and socio-economic conditions of the Proposed Development and surroundings. An attended baseline noise survey was undertaken in May 2021.
- 7.3.2 Based on observations during the noise survey, the Proposed Development is exposed to sound from the following sources:
- birdsong;
 - outdoor activity noise associated with Wicor Primary School;
 - intermittent light aircraft noise;
 - road traffic noise from A27 Portchester Road, Romsey Avenue and Cranleigh Road; and
 - domestic noise from dwellings along Romsey Avenue and Southfields.
- 7.3.3 The AFC Portchester Football Stadium's pitch is located approximately 15 m from the southern Site boundary, running adjacently along its width. On the opposing side of the pitch is a small, seated spectator stand, located approximately 120 m from the southern Site boundary. On the eastern side of the pitch, there is also a standing spectator stand which is approximately 30 m from the southern Site boundary at the closest side. In the southeast corner of the grounds, there are a couple of small buildings providing facilities and a space for events hire; these are located approximately 80 m to the south of the southern Site boundary. There are also several other areas of external pitch space to the west and south of the main grounds.
- 7.3.4 Due to its proximity to the Site boundary and absence of any acoustic screening, it is likely that activity noise associated with AFC Portchester Football Stadium's grounds is audible at the Site during matches and training sessions in the day, and from events during the night. However, due to limitations imposed by COVID-19, it has not been possible to measure the noise levels of the football club activities to inform this assessment. Within this limitation, a worst-case qualitative assessment has been completed and is presented below. Should the Proposed Development be approved, a more comprehensive assessment will be undertaken at the Reserved Matters stage, once details of layout, orientation of buildings and specification of building fabric of the Proposed Development

¹⁷ Institute Of Environmental Management and Assessment, (2014) Guidelines for Environmental Noise Impact Assessment

are known. This will enable a more accurate prediction of mitigation measure should they be necessary.

- 7.3.5 Due to the absence of secure monitoring locations on-Site, an attended noise survey exercise was undertaken by Temple on 12th May 2021. Measurements were taken at six locations around the Site perimeter, each considered to be representative of the most exposed areas of the Proposed Development. As it was not possible to measure noise levels during the night-time, a worst-case assessment has been undertaken assuming noise levels do not reduce and are similar to the daytime results. The measurement locations are shown in **Figure 7.1**.

Figure 7.1 Attended Survey Measurement Locations



Prediction Methodology and Significance Criteria

- 7.3.6 A noise impact is a change in the acoustic environment. This may be through the introduction of a new noise source, a change to an existing source causing change to the noise climate at existing receptors or the introduction of a new noise sensitive development.
- 7.3.7 The magnitude of the noise impact can depend on the absolute noise level, change in noise level, duration of the exposure and the time of day at which it occurs.
- 7.3.8 Noise impacts can lead to effects on receptors, such as annoyance or sleep disturbance for residential receptors or disturbance to non-residential receptors.
- 7.3.9 The significance of a noise effect can vary depending on the type of receptor and its sensitivity to noise, such as residential, commercial, or educational land uses.

7.3.10 **Table 7.1** below details how this relates to the national noise policy effect levels and therefore the action to be taken.

Table 7.1 Significance of Adverse Effect Related to National Noise Policy

Significance of Effect	Increasing Effect level	Action to be taken
Negligible	Noise impact exceeding NOEL	No Specific measures
Minor adverse	Noise impact exceeding LOAEL, just below SOAEL	Mitigate and reduce to a minimum
Moderate adverse	Noise impact exceeding SOAEL	Avoid
Major adverse	Unacceptable Adverse Effect	Prevent

Construction Noise

Prediction Methodology

7.3.11 To quantify potential construction noise impacts, typical worst-case construction activity noise levels, $L_{Aeq,10hr}$ from the assumed construction activities have been predicted in accordance with BS 5228: Part 1 at a point located 1 m from the façade of the relevant receptor. Calculations have been based on anticipated construction methods and mechanical plant likely to be used.

Impact Assessment Threshold

7.3.12 Construction noise impacts have been assessed using the predicted noise levels in accordance with the evaluation criteria set out in **Table 7.2**. These criteria are based on the construction evaluation criteria set out in BS 5228: Part 1.

Table 7.2 Construction Evaluation Criteria

Assessment category and threshold value period	Threshold value, in decibels (dB) ($L_{Aeq,T}$)		
	Category A ^{A)}	Category B ^{B)}	Category C ^{C)}
Night-time (23:00 – 07:00)	45	50	55
Evening and weekends ^{D)}	55	60	65
Daytime (07:00 -19:00) and Saturdays (07:00 – 13:00)	65	70	75
<p><i>Note 1: A potential significant effect is indicated if the $L_{Aeq,T}$ noise level arising from the site exceeds the threshold level for the category appropriate to the ambient noise level.</i></p> <p><i>Note 2: If the ambient noise level exceeds the Category C threshold values given in the table (i.e. the ambient noise level is higher than the above values), then a potential significant effect is indicated if the total $L_{Aeq,T}$ noise level for the period increases by more than 3 dB due to site noise.</i></p> <p><i>Note 3: Applied to residential receptors only.</i></p>			
<p>^{A)} Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are less than these values.</p> <p>^{B)} Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are the same as category A values.</p> <p>^{C)} Category C: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are higher than category A values.</p> <p>^{D)} 19:00 – 23:00 weekdays, 13:00 – 23:00 Saturdays and 07:00 – 23:00 Sundays.</p>			

7.3.13 The noise levels presented in **Table 7.2** are not intended to be used as a limit for noise emission from construction activities but rather as a guide to determine the significance or otherwise of the noise effects during the construction phase.

- 7.3.14 When rounding the ambient noise levels to the nearest 5 dB from all attended monitoring positions, daytime noise levels are below 65 dBA. As a result, the threshold category for construction noise used for daytime assessment is category A.
- 7.3.15 The magnitude of impact from noise can be summarised as shown in **Table 7.3**.

Table 7.3 Magnitude of Impact from Construction Noise

Magnitude of Impact	Total Construction Noise Level
Negligible	< Assessment Category
Minor adverse	0 to 5 dB > Assessment Category
Moderate adverse	5 to 10 dB > Assessment Category
Major adverse	+10 dB > Assessment Category

- 7.3.16 The construction noise evaluation criteria shall apply to existing residential buildings and to occupied non-residential buildings, for example commercial and educational institutions.
- 7.3.17 The SOAEL is considered to be the level at which the predicted construction noise level (based on professional judgement / guidance and industry norms) exceeds the construction noise evaluation 'Moderate Adverse' criteria. Construction noise levels which fall into the 'Minor Adverse' criteria are considered to fall in between the SOAEL and the LOAEL.
- 7.3.18 Calculations have been carried out in accordance with BS 5228: Part 1 to calculate the likely noise levels at the closest receptors to the Site during the worst-case construction periods. The assessment includes corrections for façade reflections, likely percentage on times for the construction plant and assumes screening provided by Site hoarding where required. Further information regarding the calculations is given in **ES Volume 4, Appendix C**.

Construction Vibration

- 7.3.19 It is not expected that any of the proposed construction activities have the potential to lead to significant vibration levels at nearby sensitive receptors, as such, no further assessment of construction vibration has been completed.

Off-Site Construction Traffic Noise

- 7.3.20 The change in noise associated with increased construction traffic on the surrounding road network has been calculated in accordance with the Calculation for Road Traffic Noise (CRTN).
- 7.3.21 The potential impacts as a result of off-Site road traffic have been evaluated in accordance with the Design Manual for Roads and Bridges (DMRB) short term traffic noise effect criteria given in **Table 7.4**. The change has been calculated as the difference between the baseline scenario and peak construction traffic.

Table 7.4 DMRB Short Term Traffic Noise Effect Criteria

Noise Change, $L_{A10,18hr}$ dB	Magnitude of Impact
< 0.9	Negligible
1 – 2.9	Minor
3 – 4.9	Moderate
> 5	Major

7.3.22 The SOAEL is considered to be equivalent to a 3 dB change and the LOAEL a 1 dB change. The change in noise level is calculated on individual road links, however the effect criteria apply to the total road traffic noise change at receptors, so in some cases additional calculations have been completed (e.g. if there are no noise sensitive receptors on the road, then there is no effect or the change at a receptor may be lower than the change on a road link due to the contribution from more than one road impacting the receptor).

Operational Noise

Off-Site Operational Traffic Noise

7.3.23 The change in noise associated with increased operational traffic on the surrounding road network has been calculated in accordance with CRTN.

7.3.24 The potential impacts as a result of off-Site road traffic have been evaluated in accordance with DMRB¹³ traffic noise effect criteria. The change has been calculated as the difference between the baseline year and the baseline with scheme traffic to form a worst-case assessment.

7.3.25 Short to medium term effects have been assessed against the short term DMRB criteria given in **Table 7.4**.

7.3.26 Long term effects of traffic noise from the Proposed Development have been assessed against the long-term DMRB criteria given in **Table 7.5**.

Table 7.5 DMRB Long Term Traffic Noise Effect Criteria

Noise Change, $L_{A10,18hr}$ dB	Magnitude of Effect
0.0	No Change
0.1 – 2.9	Negligible
3 – 4.9	Minor
5 – 9.9	Moderate
10+	Major

7.3.27 The SOAEL is considered to be equivalent to be a 3 dB change for short to medium term effects and a 5 dB change for long term effects; the LOAEL is a 1 dB and 3 dB change respectively. The change in noise level is calculated on individual road links, however the effect criteria apply to the total road traffic noise change at receptors, so in some cases additional calculations have been completed.

Proposed Development Site Suitability

7.3.28 The introduction of a noise sensitive development into areas exposed to noise requires a site suitability assessment to be completed to assess whether the new noise sensitive

uses would be undermined. The uses within the Proposed Development consist of residential dwellings which have noise sensitive internal rooms and external spaces.

- 7.3.29 With the Proposed Development being operational, the area will be exposed to noise from the existing noise sources, including birdsong, activity noise from Wicor Primary School, road traffic, aircraft noise and domestic noise.
- 7.3.30 An assessment of the Proposed Development has been based on survey data from the attended baseline noise measurements.
- 7.3.31 The Site suitability assessment involves comparison of measured noise levels to various internal and external guidelines which the Proposed Development should be designed to meet. Where the Proposed Development is predicted to meet these guidelines, it is expected that the noise levels experienced by future users will be below the LOAEL and adverse effects will be unlikely to occur.

Residential Uses – Internal Rooms

- 7.3.32 The following guideline for internal ambient noise levels for habitable rooms, shown in **Table 7.6**, are given in BS 8233. The feasibility of the Proposed Development achieving these guideline levels has been assessed to determine the suitability of the Site for the proposed noise sensitive uses.

Table 7.6 BS 8233 Residential Internal Ambient Noise Level Criteria

Activity	Typical Situation	Average Ambient Day time Noise Level L _{Aeq,16hr} , dB	Average Ambient Night-time Noise Level L _{Aeq,8hr} , dB
Resting	Living rooms	35	N/A
Dining	Dining rooms	40	N/A
Sleeping (Daytime resting)	Bedrooms	35	30

- 7.3.33 In locations where regular individual noise events occur (such as scheduled aircraft or passing trains) which can cause sleep disturbance, BS 8233 recommends that a guideline value be set in terms of SEL (or L_{AE}) or L_{AFmax} depending on the character and number of events per night. Where development is considered necessary or desirable, the BS 8233 internal guideline levels may be relaxed (increased) by up to 5 dB.
- 7.3.34 The WHO Guidelines of Community Noise 1999 recommends that a 'Typical night-time L_{AFmax} value of 45 dB should not be exceeded more than 10 to 15 times inside bedrooms during the night-time period to avoid potential sleep disturbance.

Residential Uses – External Spaces

- 7.3.35 The suitability of the use of outdoor amenity spaces within the Proposed Development has been assessed using BS 8233 criteria. BS 8233 states;

“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 recognised that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city

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

“Other locations, such as balconies, roof gardens and terraces, are also important in residential buildings where normal external amenity space might be limited or not available, i.e. in flats, apartment blocks, etc. In these locations, specification of noise limits is not necessarily appropriate. Small balconies may be included for uses such as drying washing or growing pot plants, and noise limits should not be necessary for these uses. However, the general guidance on noise in amenity space is still appropriate for larger balconies, roof gardens and terraces, which might be intended to be used for relaxation. In high-noise areas, consideration should be given to protecting these areas by screening or building design to achieve the lowest practicable levels. Achieving levels of 55 dB $L_{Aeq,T}$ or less might not be possible at the outer edge of these areas, but should be achievable in some areas of the space.”

Site Vibration Exposure

- 7.3.36 The nearest potential vibration source to the Site is local road traffic along Romsey Avenue which is located approximately 50 m north of the Site boundary.
- 7.3.37 Heavy road traffic would only be expected to cause significant vibration levels within 5 to 10 m and if the roads are in poor condition, neither of which apply to Romsey Avenue.
- 7.3.38 The closest railway line is approximately 360 m from the Site. At this distance it is highly unlikely that vibration levels will give rise to significant vibration effects as the propagation distance required to maintain significant levels of vibration at the receptor would be far lower than this.
- 7.3.39 Subsequently, no further assessment of vibration exposure on the Site has been completed.

Limitations and Assumptions

Construction Phase

Construction Noise

- 7.3.40 Detailed methodology for the construction of the Site is not available for this phase of the project and would be determined by the appointed contractor. However, an outline construction programme and construction information have been provided, as set out in **ES Volume 2, Chapter 5: The Proposed Development and Construction Overview**.
- 7.3.41 The construction of the Proposed Development is anticipated to commence in January 2023 and be completed by August 2027.
- 7.3.42 Based on the current available works description, it is considered that the noise impact would be greatest during enabling and Site preparation works, and general construction activities. These activities will take place at various locations across the Site.

- 7.3.43 Within **ES Volume 2, Chapter 5: The Proposed Development and Construction Overview**, an indicative list of the mechanical plant and equipment likely to be used per construction activity has been included. Noise generating activities during the works could include the following:
- enabling and site preparation works – may include tracked / wheeled 360-degree excavators, cranes, generators; and
 - construction activities – may include tracked / wheeled 360-degree excavators concrete pumps and articulated dump trucks.
- 7.3.44 Noise impacts from services installation, fit-out and landscaping are likely to be lower than the enabling works and site preparation, and construction stages of works.
- 7.3.45 Detailed phasing of the activities is currently not available. The assessment considers the loudest activity for the overall construction process.
- 7.3.46 The core working hours for Site preparation and construction are expected to be:
- 08:00 – 18:00 hours weekdays; and
 - 08:00 – 13:00 hours Saturday.
- 7.3.47 These core hours are in line with guidance in BS 5228; any work outside these hours would be subject to prior agreement, and / or reasonable notice given to Fareham Borough Council (FBC) and its respective Environmental Health Officer (EHO). Restricted operations are proposed to continue outside of these hours with regulatory approval.

Construction Vibration

- 7.3.48 Of the works described above, it is unlikely that any of the activities have the potential to lead to significant levels of vibration at receptors, as no surface compaction or piling activities are expected. Subsequently, no further assessment of construction vibration has been completed.

Construction Road Traffic Noise

- 7.3.49 The assessment year 2021 is assumed to represent the worst-case noise change (due to traffic growth) on the surrounding roads as a result of the Site construction activities.
- 7.3.50 The assessment is based on traffic data provided by the Appellant's Transport Consultants.

Operational Noise

Operational Mechanical Plant

- 7.3.51 No mechanical plant or equipment will be installed as part of the Proposed Development, as such, it is not necessary to specify any plant noise limits within this assessment.

Operational Road Traffic

- 7.3.52 The assessment year 2021 (baseline year) is assumed to represent the worst-case noise change (due to traffic growth) on the surrounding roads, when compared with when the Site is fully operational, and all dwellings are occupied.

7.3.53 The assessment is based on traffic data provided by the Appellant’s Transport Consultants.

Site Suitability

7.3.54 Due to limitations imposed by COVID 19, it was not possible to assess typical noise exposure from AFC Portchester Football Stadium. Within this limitation, a worst-case qualitative assessment has been completed and is presented below. Should permission be granted, it is recommended that the Site suitability assessment is revised during the Reserved Matters stage to include a comprehensive quantitative assessment, once details of layout, orientation of buildings and specification of building fabric of the Proposed Development are known. Should mitigation measures be necessary, they will be defined at this point.

7.4 Baseline Assessment and Identification of Key Receptors

Noise Sensitive Receptors

7.4.1 The following existing noise sensitive receptors in proximity to the Site have been taken into consideration when assessing the impacts associated with noise from both the construction and operational phases of the Proposed Development.

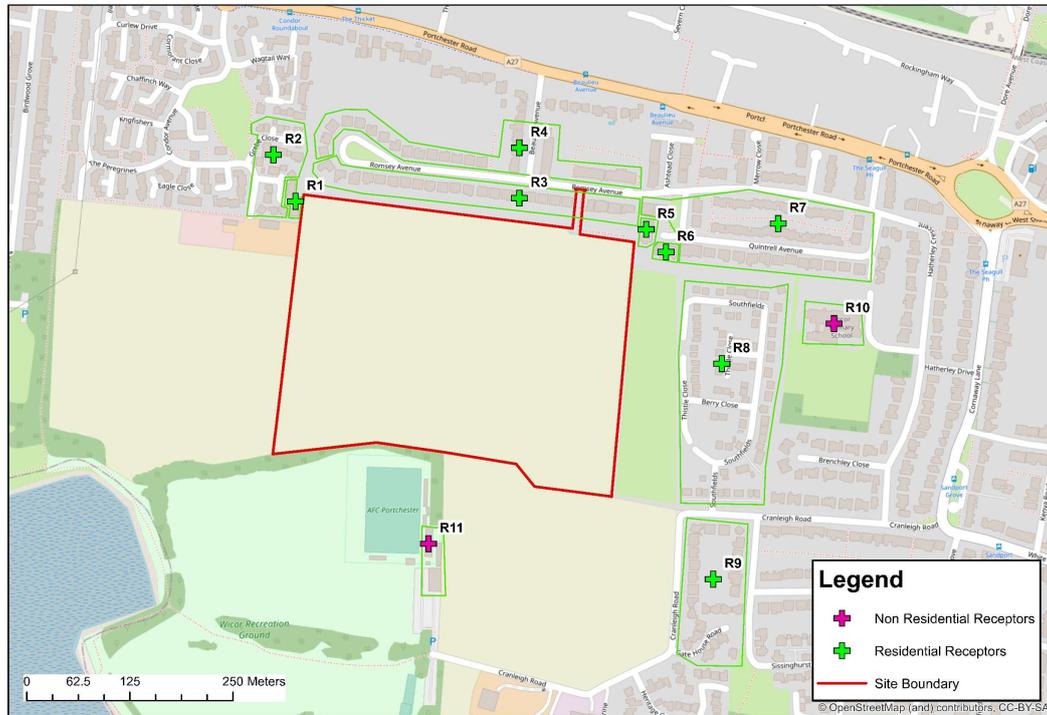
7.4.2 The existing receptors and type of receptor are presented in **Table 7.7** as follows:

Table 7.7 Existing Noise Sensitive Receptors

Receptor ID	Receptor	Type	Distance
R1	Properties on The Linnets	Residential	10m
R2	Properties on The Linnets	Residential	25m
R3	Properties on Romsey Avenue	Residential	25m
R4	Properties on Romsey Avenue	Residential	50m
R5	81-87 Quintrel Avenue	Residential	10m
R6	73-79 Quintrel Avenue	Residential	25m
R7	Properties on Quintrel Avenue	Residential	>50m
R8	Properties on Southfields	Residential	>50m
R9	Properties on Cranleigh Road	Residential	>50m
R10	Wicor Primary School	Non-Residential	>50m
R11	AFC Portchester Football Stadium	Non-Residential	>50m

7.4.3 **Figure 7.2** shows the locations of the existing noise sensitive receptors.

Figure 7.2 Noise Sensitive Receptors



Noise Survey Results

- 7.4.4 During the daytime visit to the Site, it was noted that the noise climate was generally dominated by regular birdsong. Across the majority of the Site, outdoor activity noise associated with Wicor Primary School was audible when present (whilst the playground was in use), and continuous distant road traffic noise from the A27 Portchester Road was only just perceptible. Infrequent road traffic noise was dominant when present in the north east and south east corners of the Site from Romsey Avenue and Cranleigh Road, respectively. Light aircraft noise was also dominant across the Site when present, although also infrequent. Along the northern and eastern boundaries of the Site, domestic noise from properties along Romsey Avenue, Southfields and Berry Close also contributed to the overall noise climate. Along the southern and western boundaries of the Site, pedestrian noise from the coastal footpath was also audible.
- 7.4.5 **Table 7.8** presents a summary of the results of the attended daytime noise survey. The noise levels presented are representative of free field conditions.

Table 7.8 Summary of Attended Daytime Survey Results

Position	Date/Start Time	L _{Aeq,10min}	Calculated L _{Aeq,30 min}	L _{Amax, 10min}	L _{A90, 10min}
MP1	12/05/2021 11:08	41.2	40.7	55.4	37.7
MP1	12/05/2021 12:22	40.7		62.4	37.1
MP1	12/05/2021 13:54	40.0		58.6	36.6
MP2	12/05/2021 11:25	41.9	44.2	62.5	36.7
MP2	12/05/2021 12:09	40.6		63.9	37.6
MP2	12/05/2021 13:20	47.2		68.7	39.9
MP3	12/05/2021 11:53	39.0		61.0	35.6

Position	Date/Start Time	L _{Aeq,10min}	Calculated		L _{Amax, 10min}	L _{A90, 10min}
			L _{Aeq,30 min}			
MP3	12/05/2021 13:04	41.2	42.8		59.4	38.4
MP3	12/05/2021 14:42	45.5			64.3	36.9
MP4	12/05/2021 12:49	41.4	41.3		56.0	37.8
MP4	12/05/2021 14:27	41.6			57.6	37.4
MP4	12/05/2021 15:36	41.0			63.1	37.0
MP5	12/05/2021 12:36	45.5	43.6		73.0	39.7
MP5	12/05/2021 14:12	42.8			63.6	36.8
MP5	12/05/2021 15:17	41.6			54.9	36.1
MP6	12/05/2021 13:39	39.5	41.2		54.5	36.1
MP6	12/05/2021 15:03	41.2			57.5	36.7
MP6	12/05/2021 15:51	42.4			57.9	36.9

7.5 Identification and Description of Changes Likely to Generate Effect

Construction Phase

- 7.5.1 Construction activities close to sensitive receptors could potentially generate noise impacts, particularly when more than one noisy activity coincides. These construction noise impacts can lead to temporary direct, reversible effects in the form of annoyance, speech interference and disturbance and are confined to the local scale (i.e. surrounding buildings).
- 7.5.2 Construction road traffic could potentially generate additional noise impacts at noise sensitive receptors surrounding the Site. These impacts can lead to temporary effects in the form of annoyance and disturbance of short to medium duration and are generally confined to the local scale (i.e. surrounding roads) but has the potential to lead to effects on the district scale (i.e. roads further afield).

Operational Phase

- 7.5.3 During the operation of the Site, a change in road traffic could potentially generate noise impact. This can lead to direct and temporary effects in the form of annoyance and disturbance of short to medium duration, then potentially lead to effects of long-term duration and are generally confined to the local scale (i.e. surrounding roads) but has the potential to lead to effects on the district scale (i.e. roads further afield).

7.6 Assessment of Likely Significant Effects

Construction Phase

Embedded Mitigation Measures

Construction Noise and Vibration

- 7.6.1 Impacts during the noisiest periods should be considered and addressed in terms of “Best Practicable Means” and controlled and managed through the Section 61 process of the Control of Pollution Act 1974.
- 7.6.2 BS 5228 does not state criteria for acceptable levels of construction noise; therefore, the preferred approach is to reduce noise levels where possible, but with due regard to

practicability. Sometimes, a higher noise level may be acceptable if the overall construction time, and therefore length of disruption, is reduced.

7.6.3 A Construction Environmental Management Plan (CEMP) will be implemented by the contractor during construction which will act as the means for delivering the mitigation described below. General construction noise and vibration mitigation measures include, but are not limited to, the following:

- unnecessary revving of engines should be avoided, and equipment switched off when not in use;
- internal haul routes should be kept well maintained;
- drop heights of materials should be minimised;
- plant and vehicles should be sequentially started up rather than all together;
- as far as reasonably practicable, sources of significant noise should be enclosed;
- plant should always be operated and maintained in accordance with manufacturers' instructions;
- care should be taken to locate equipment away from noise-sensitive areas;
- where possible, loading and unloading should also be carried out away from such areas; and
- regular and effective maintenance by trained personnel should be undertaken to keep plant and equipment working to manufacturers' specifications.

7.6.4 Screening such as noise barriers (in the form of Site hoarding) will be used as appropriate.

Construction off-site Traffic Noise

7.6.5 The CEMP will be implemented to manage vehicle routing, access to Site, on-Site management and vehicle movements and working hours.

7.6.6 Provision should be made, wherever possible, to ensure that unloading of vehicles will be carried out on-Site rather than on the adjacent roads. All construction traffic entering and leaving the Site should be closely controlled. Vehicles making deliveries or removing spoil from the Site should travel via designated traffic routes previously agreed with local authorities and interested parties. Construction traffic should be controlled by means of a vehicle arrival and departure management plan to achieve an even spread of vehicle movements during the working day.

Anticipated Effects

Construction Noise

7.6.7 The assessment of construction impacts was undertaken regarding potential noise impacts at the nearest receptors to the Site.

7.6.8 Predictions of noise levels associated with construction activities (listed in the indicative construction programme set out in **Volume 2, Chapter 5: The Proposed Development**

and Construction Overview) have been undertaken at a distance representative of the closest receptor from the construction activities, circa 10 m.

- 7.6.9 The BS 5228 Part 1 prediction method uses the shortest distance from the receptor to the construction activities. The nearest boundary of respective working areas was used as the calculation point for equipment / plant classed as 'mobile' (including excavators) and from equipment / plant classed as 'fixed' (including generators).
- 7.6.10 Prediction of construction activity noise levels at each receptor considers features that may affect propagation, such as ground absorption. Other factors, such as the length of the working traverse and the machinery 'on-time', were also included within the calculations.

Table 7.9 presents the predicted $L_{Aeq,10hr}$ levels for a working day ($L_{Aeq,5hr}$ for Saturdays) at distance representative of the closest receptor for each activity.

Table 7.9 Worst Case $L_{Aeq,10hr}$ at Distance Representative of the Closest Receptor

Activity	Construction noise level at distance representative of the closest receptor, circa 10 m*, $L_{Aeq,10hr}$ ($L_{Aeq,5hr}$ for Saturdays) (dB)
Enabling and Site Preparation	69
Construction	75
Services Installation	72
Fit Out	74
Landscaping	74

- 7.6.11 Noise levels relate only to isolated activities and do not consider other activities that may be working simultaneously across the Site. Where this were to occur, this may result in marginally higher noise levels at receptors, but this situation is considered unlikely.
- 7.6.12 Based on **Table 7.9** the assessment indicates that, with all plant working at the closest location, the predicted noise levels would have a moderate adverse impact at neighbouring sensitive receptors within 10 m (i.e. Receptors located on The Linnets and Quintrel Avenue (R1 and R5)).
- 7.6.13 There is a potential for short term minor adverse effects at the receptors approximately 25 m from the Site perimeter (i.e. Receptors located on The Linnets (R2), Romsey Avenue (R3) and 73-79 Quintrel Avenue (R6)).
- 7.6.14 There will be a negligible effect at receptors located 50 m and beyond of the Site perimeter (R4, R7, R8, R9, R10 and R11). Details of the calculations are presented in **Volume 4, Appendix C**.
- 7.6.15 It should be noted that the calculation methodology used assumes that no acoustic screening or other forms of attenuation are provided (except site hoarding), and a worst-case distance has been used for all work activities.
- 7.6.16 Predicted noise levels are therefore generous, and in practice the actual noise levels would likely be lower than those predicted.

- 7.6.17 The nature of the construction works mean that the generous situation predicted may only exist for a matter of days, or even hours. As discussed earlier, all works would be undertaken in accordance with best practice, and appropriate mitigation adopted where applicable.

Construction Off-site Traffic Noise

- 7.6.18 **Table 7.10** presents the predicted change in noise levels associated with increased construction traffic on the surrounding road network during peak construction traffic. As no further detail is available regarding phased construction traffic data, the assessment has been based on peak construction traffic levels, which represents a worst-case scenario. Details of the calculations are presented in **Volume 4, Appendix C**.

Table 7.10 Peak Construction Road Traffic Noise Assessment

Road	Predicted Change in Traffic Noise Level, $L_{A10,18hr}$ dB	Short Term Impact Level
Romsey Avenue	1.8	Minor
Beaulieu Avenue	1.7	Minor
Hatherley Crescent	0.0	No Change
A27 (West of Site access)	0.1	Negligible
A27 (East of Site access)	0.1	Negligible

- 7.6.19 HGV and LGV traffic during the peak construction periods on the Proposed Development construction route is likely to lead to minor adverse effects due to road traffic noise at dwellings along Romsey Avenue and Beaulieu Avenue. There will be a negligible effect along the A27.
- 7.6.20 Baseline traffic flows along the short section of Romsey Avenue (approximately 50 m between 14 and 16 Romsey Avenue) leading to Site are expected to be lower than sections used for the traffic flow calculation / count points. Therefore, this may lead to short term impacts greater than minor adverse at these two properties.

Operational Phase

Embedded Mitigation Measures

Operational Traffic Noise

- 7.6.21 There are no embedded mitigation measures proposed for operational traffic noise.

Anticipated Effects

Operational Road Traffic Noise Assessment

- 7.6.22 **Table 7.11** presents the predicted change in noise level associated with increased Proposed Development traffic on the surrounding road network against the baseline year 2021. Details of the calculations are presented in **Volume 4, Appendix C**.

Table 7.11 Operational Road Traffic Noise Assessment

Road	Predicted Change in Traffic Noise Level, $L_{A10,18hr}$ dB	Short Term Impact Level	Long Term Impact Level
Romsey Avenue	4.0	Moderate	Minor
Beaulieu Avenue	3.8	Moderate	Minor
Hatherley Crescent	0.9	Negligible	Negligible
A27 (West of site access)	0.1	Negligible	Negligible
A27 (East of site access)	0.1	Negligible	Negligible

7.6.23 The worst-case assessment indicates that changes in road traffic noise due to the operation of the Proposed Development will cause a moderate impact along Romsey and Beaulieu Avenue in the short term. This is reduced to a minor impact in the long term. Due to the residential nature of these roads, baseline traffic flows are relatively modest, and therefore increases in operational movements are more prominent and perceptible. The impact along all other road links will be negligible in both the short term and long term.

Proposed Development Site Suitability (Consideration of Noise Effects on the Proposed Development)

Site Suitability

- 7.6.24 Attended survey data has been compared against the ProPG initial site risk assessment from exposure to transport noise for an undeveloped site. During the daytime, the risk level across the Site is ‘Negligible’.
- 7.6.25 At ‘Negligible’ risk noise levels, the Site is likely to be acceptable from a noise perspective, and the Appeal need not be delayed on noise grounds.
- 7.6.26 As it was not possible to measure noise levels during the night-time, it has been assumed that the noise levels will not reduce and will be similar to those measured during the day to form a worst-case assessment. When comparing the daytime survey data against the night-time risk levels the Site varies from ‘Negligible’ to ‘Low’.
- 7.6.27 At ‘Low’ risk noise levels, the Site is likely to be acceptable from the noise perspective provided that a good acoustic design process is followed and is demonstrated in an Acoustic Design Statement (ADS) which confirms how the adverse impacts of noise will be mitigated and minimised in the completed Proposed Development.
- 7.6.28 **Table 7.12** presents a summary of the typical noise exposure levels identified for the Proposed Development. The typical $L_{Aeq,16hr}$ has been derived based on the log average of noise levels during daytime survey. Night-time ($L_{Aeq,8hr}$) noise levels assume no change from daytime noise levels to form a worst-case assessment.
- 7.6.29 During the attended survey it was noted by the surveyor that L_{Amax} events were caused by birdsong and outdoor domestic noise, it is likely that neither of these will be present during the night-time. L_{Amax} events from transportation noise are also unlikely to drive the assessment due to the distance from the A27 to the Site perimeter and screening provided by properties on Romsey Avenue, as a result the night-time site suitability assessment has been based on L_{Aeq} values.

Table 7.12 Summary of Noise Exposure at Proposed Development

Receptors	Daytime $L_{Aeq,16hr}$ dB and assumed worst case Night-time $L_{Aeq,8hr}$ dB
North east boundary (facing dwellings on Romsey Avenue MP1)	41
East boundary (MP2)	44
Southern Boundary (MP3)	43
Western Boundary (MP4)	42
North west boundary (facing dwellings on Romsey Avenue MP5)	44
North boundary (facing dwellings on Romsey Avenue MP6)	41

- 7.6.30 The guideline indoor noise levels which would be targeted are 35 dB $L_{Aeq,16hr}$ during the day in bedrooms and 30 dB $L_{Aeq,8hr}$ at night. Where development is considered necessary or desirable, these may be relaxed (increased) by up to 5 dB.
- 7.6.31 The ProPG states that open windows typically reduce the sound insulation performance to no more than 10 to 15 dB(A). The survey results show that guideline indoor noise levels can be achieved with windows open.
- 7.6.32 External noise ingress calculations have been undertaken and indicate that it is feasible to meet the internal noise level criteria outlined in BS 8233 at the most exposed façades using standard double glazing, and typical sound insulation for walls and ventilation.
- 7.6.33 The site suitability assessment has been undertaken to demonstrate the feasibility of achieving internal guideline noise levels and evaluate any risks arising as a result of transportation noise. It should be noted that night-time noise levels are expected to be lower than daytime noise levels and that the assumed levels provide a worst-case scenario.
- 7.6.34 Specific calculated assessment of the sound insulation for all elements of the building envelope should be completed based on detailed design proposals to demonstrate that the guideline internal noise levels can be met with the proposed design.

AVO Guide Site Risk Assessment

- 7.6.35 **Table 7.13** shows the results of the initial AVO Guide site risk assessment of noise from transport noise sources relating to overheating condition. For developments on ‘Negligible’ risk sites, a Level 1 assessment is sufficient. For ‘Low’ and ‘Medium’ risk sites, a Level 2 assessment can optionally be undertaken to give more confidence regarding the suitability of internal noise conditions.
- 7.6.36 For the purposes of the Level 1 assessment, it is assumed that a partially open window will provide an outside-to-inside level difference of 13 dB. This level difference is considered representative of typical domestic rooms with simple façade openings of around 2% of the floor area.

Table 7.13 Assessment Considering Effect of Potential Overheating Mitigation Strategies on the Acoustic Conditions

Receptors	Daytime $L_{Aeq,16hr}$ dB	Night-time $L_{Aeq,8hr}$ dB
North east boundary (facing dwellings on Romsey Avenue MP1)	41	41
East boundary (MP2)	44	44
Southern Boundary (MP3)	43	43
Western Boundary (MP4)	42	42
North west boundary (facing dwellings on Romsey Avenue MP5)	44	44
North boundary (facing dwellings on Romsey Avenue MP6)	41	41
Receptors	Level 1 risk assessment (in line with Table 3-2 of AVO Guide)	
North east boundary (facing dwellings on Romsey Avenue MP1)	Negligible	Negligible
East boundary (MP2)	Negligible	Negligible
Southern Boundary (MP3)	Negligible	Negligible
Western Boundary (MP4)	Negligible	Negligible
North west boundary (facing dwellings on Romsey Avenue MP5)	Negligible	Negligible
North boundary (facing dwellings on Romsey Avenue MP6)	Negligible	Negligible
Receptors	Standard Opening Windows: outside-to-inside level difference of 13 dB (in line with Table B-5 of AVO Guide)	
North east boundary (facing dwellings on Romsey Avenue MP1)	28	28
East boundary (MP2)	31	31
Southern Boundary (MP3)	30	30
Western Boundary (MP4)	29	29
North west boundary (facing dwellings on Romsey Avenue MP5)	31	31
North boundary (facing dwellings on Romsey Avenue MP6)	28	28

7.6.37 The assessment indicates that the internal levels are expected to achieve BS 8233 reasonable conditions if overheating control is provided by means of partially open windows. The anticipated worst-case internal levels with a partially open window (13 dB attenuation) to control overheating would be 31 dB during the day and night.

- 7.6.38 The use of opening windows as primary means of mitigating overheating is not likely to result in an adverse effect. An overheating mitigation strategy may therefore assume opening windows without acoustic constraint, and no special façade sound insulation features are required. The Level 2 assessment is therefore not required on the basis of Level 1 assessment.
- 7.6.39 Any strategy for mitigating overheating should however be undertaken, during the detailed design stage, to demonstrate that the ventilation and thermal comfort requirements will be achieved.

External Amenity Areas Noise Levels

- 7.6.40 It is desirable that the external noise level in amenity spaces such as gardens does not exceed 50 dB $L_{Aeq,16hr}$, with an upper guideline value of 55 dB $L_{Aeq,16hr}$ which would be acceptable in noisier environments.
- 7.6.41 The assessment of external noise levels to BS 8233 and WHO guideline levels indicates that the guideline level of 50 dB $L_{Aeq,16hr}$ would be achieved in all gardens and external amenity areas under typical ambient noise conditions.

Noise from AFC Portchester Football Stadium

- 7.6.42 Objections were previously received prior to the determination of the 2018 planning application, in relation to the potential noise levels from the AFC Portchester Football Stadium and the potential for them to affect the Proposed Development's new residential dwellings. Concern was expressed regarding the potential for restrictions to be imposed on the operations of the AFC Portchester Football Stadium. This assessment has, therefore, been undertaken consider the noise effects from AFC Portchester on the Proposed Development.
- 7.6.43 Due to its proximity to the Proposed Development and the absence of any acoustic screening, it is likely that activity noise associated with AFC Portchester Football Stadium's grounds is audible at the Site during matches and training sessions in the daytime. Temple attempted to contact AFC Portchester Football Stadium in order to confirm operating hours of the events hire space, but were unsuccessful; therefore, it has been assumed that during the night-time it is also likely that events noise is perceptible, to form a worst-case assessment.
- 7.6.44 Due to limitations imposed by COVID-19 it has not been possible to measure the noise levels of the football club activities to inform the assessment, as activities at the football grounds have not been operating under typical conditions. Within this limitation, a worst-case qualitative assessment has been completed and is presented below. Should the development be approved it is recommended that measurements are undertaken at the Reserved Matters stage (once details of layout, building orientation, building fabric are known), if possible, capturing full day and night-time noise levels at the Site during the typical operation of AFC Portchester Football Stadium, to inform a more detailed assessment. The results of this assessment will inform precise mitigation requirements (if required) of any affected dwellings as part of the Proposed Development's Reserved Matters application.
- 7.6.45 The following potential noise sources associated with AFC Portchester Football Stadium have been identified:

- Football game noise consisting of players shouting, whistles and balls striking a perimeter fence, occurring at a minimum distance of approximately 15 m from the southern Site boundary and limited to the daytime.
- Spectator noise from the seated and standing stands located approximately 120 m and 30 m from the southern Site boundary respectively, limited to the daytime.
- Events noise consisting of amplified music or speech from a Public Address (PA) system and attendees talking outside, assumed to be present during the day and night.

7.6.46 For the purpose of this assessment, the risks associated with and feasibility of controlling any increase in noise levels (that were not possible to capture) within this assessment have been considered below.

Daytime Noise Levels

7.6.47 Noise from matches and training sessions is likely to consist of impulsive noises such as whistles, shouting and cheering from both players and spectators, and will mostly affect daytime L_{Amax} values in the southwest corner of the Site. However, for L_{Aeq} values (which the BS 8233 daytime criteria are based on), previous assessments undertaken for developments adjacent to similar sized football grounds have shown it is likely that ambient noise levels over a 16-hour day will be lower than the WHO external amenity area guideline level of 50 dB $L_{Aeq, 16hr}$. In the event that, upon a more detailed assessment, this level is exceeded, mitigation may include acoustic screening, enhanced sound insulation and / or an alternative ventilation strategy at the affected dwellings. As a result, it is considered unlikely that significant noise impacts will occur during the daytime at the Proposed Development or that noise restrictions will be imposed on the daytime operations of the AFC Portchester Football Stadium.

Night-time Noise Levels

- 7.6.48 During the night-time, there is a greater potential for events noise to lead to impacts due to lower baseline noise levels and greater sensitivity to noise, with lower impact thresholds and also the consideration of L_{Amax} values. It is expected that night-time noise will be limited to events held at AFC Portchester Football Stadium and not from football games or training sessions (i.e. football games will not be undertaken past 11pm).
- 7.6.49 The closest existing sensitive receptor to AFC Portchester (32 Heritage Gardens) is located approximately 290 m away from the buildings where events would be held, in the eastern corner of the grounds. The closest proposed dwelling from AFC Portchester Football Stadium will be located approximately 150 m away from this building. This difference in distance from the source equates to a worst-case increase in noise level from AFC Portchester activities at the proposed dwellings of up to 6 dB when compared to noise levels at existing residential receptors. If required, mitigating this increase of 6 dB may be achieved through acoustic screening, enhanced sound insulation and / or an alternative ventilation strategy at the affected dwellings.
- 7.6.50 Properties requiring this additional mitigation are likely to be limited to those within the south west corner of the Proposed Development due to acoustic screening and distance attenuation, as the majority of proposed dwellings will be located at greater than 290 m

away from the buildings where events would be held at AFC Portchester Football Stadium.

- 7.6.51 Should they be required, measures are likely able to be incorporated into the Proposed Development design, so that future residents of the Proposed Development will not be exposed to any greater noise exposure than existing residential receptors. Should mitigation measures be necessary, they will be defined at the Reserved Matters stage, once details of layout, building orientation and specification of building fabric of the Proposed Development are known. As a result, it is considered unlikely that significant noise impacts will occur during the night-time at the Proposed Development or that noise restrictions will be imposed on the night-time operations of the AFC Portchester Football Stadium.
- 7.6.52 Should the development be granted permission, it is recommended that the site suitability assessment is updated during the Reserved Matters stage to consider noise from AFC Portchester Football Stadium when it is operating under typical conditions (usual spectator capacity). Specific calculated assessment of the sound insulation for all elements of the building envelope should be completed based on detailed design proposals to demonstrate that the guideline internal noise levels can be met with the proposed design.

7.7 Scope for Additional Mitigation Measures

Potential Additional Mitigation Measures

Construction Phase

Construction Noise and Vibration

- 7.7.1 Prior warning and sufficient information about the nature of the works should be given to residents who are likely to be impacted by noise from construction activities.

Construction Off Site Traffic Noise

- 7.7.2 No additional mitigation measures are proposed for construction road traffic noise.

Operational Phase

Operational Traffic Noise

- 7.7.3 No additional mitigation measures are proposed for operational road traffic noise.

Likely Effectiveness of Additional Mitigation Measures

Construction Phase

Construction Noise

- 7.7.4 With the additional mitigation measures listed above, minor adverse effects are still likely at the closest residential properties surrounding the Site; however, they will be minimised as far as is practicable and, in some cases, reduced to negligible effects.

Construction Off Site Traffic Noise

- 7.7.5 With the additional mitigation measures listed above, construction off-site traffic is likely to lead to short term minor adverse effects due to road traffic noise at dwellings along Romsey Avenue and Beaulieu Avenue.

7.8 Residual Effects

- 7.8.1 **Table 14** provides a summary of the residual effects resulting from the Proposed Development after effective implementation of the embedded and additional mitigation measures proposed above.

Table 14 Residual Effects

Phase	Resource or Receptor affected	Residual Effect
Construction	Existing residential receptors within 10 m of the Site perimeter. (R1 and R5)	Temporary minor adverse effect from construction noise due to close proximity to the Site boundary.
	Existing residential receptors approximately 25 m of the Site perimeter. (R2, R3, and R6)	Negligible effect from construction noise.
	Existing residential and non-residential receptors 50 m or more from the Site perimeter (R4, R7, R8, R9, R10 and R11)	Negligible effect from construction noise.
	Existing residential properties on Romsey Avenue and Beaulieu Avenue along the construction traffic route	Temporary minor adverse effect from construction traffic noise.
	Existing residential properties on the A27	Negligible effect from construction traffic noise.
Operation	All existing and future noise sensitive receptors.	Moderate short-term and minor long-term effect from operational road traffic noise along Romsey Avenue and Beaulieu Avenue.
		Negligible effect from operational road traffic noise along all other road links.
	All existing and future noise sensitive receptors.	Negligible effect from exposure of future residents to existing noise.

7.9 Cumulative Effects

- 7.9.1 Cumulative effects are the combined effects of several development schemes (in conjunction with the Proposed Development) which may, on an individual basis be insignificant but, cumulatively, have a significant effect.
- 7.9.2 The ES has given consideration to ‘Cumulative ‘Effects’ for schemes likely to cause significant effects. These committed schemes have been listed in **Volume 2, Chapter 3: EIA Methodology, Table 3.9**.
- 7.9.3 The closest of these schemes is Land to the East of Down End Road, Fareham (Ref: P/20/0912/OA), which is located approximately 560 m to the north of the Proposed Development.

- 7.9.4 Due to the large distance between the schemes, cumulative construction and operational impacts of an adverse nature are highly unlikely.

7.10 Summary and Conclusions

- 7.10.1 The assessment has been based on an environmental noise survey, predictions and calculations undertaken for the Site.
- 7.10.2 The main sources of noise incident on the Site and surrounding receptors are birdsong, activity noise from Wicor Primary school, domestic noise, distant road traffic noise and light aircraft noise.
- 7.10.3 The impact of noise during construction of the Proposed Development has been predicted and assessed in accordance with BS 5228. Impacts from construction activities are predicted at the closest noise sensitive receptors to the works, with temporary minor adverse (not significant) effects considered likely. Best practicable means measures have been recommended to minimise noise from the construction Site, which when implemented are capable of ensuring that the impact of noise during the construction is reduced from moderate to minor effect (not significant).
- 7.10.4 The assessment of the increase in road traffic noise change due to construction of the Proposed Development has been assessed. It is predicted that changes in road traffic noise are likely to give rise to short term minor adverse effects (not significant) to properties along the construction traffic route on Romsey and Beaulieu Avenue.
- 7.10.5 The assessment of the increase in road traffic noise change during the operational phase of the Proposed Development has also been assessed. It is predicted that changes in road traffic noise are likely to give rise to short term moderate adverse effects and long-term minor adverse effects to properties along Romsey and Beaulieu Avenue.
- 7.10.6 For the operational phase, a site suitability assessment has been completed in accordance with the adopted criteria to determine whether the new sensitive receptors would be undermined by exposure from existing noise and vibration sources. The assessment indicates that it is feasible to meet required criteria using openable windows.
- 7.10.7 Due to limitations imposed by COVID 19, it was not possible to quantitatively assess typical noise exposure from AFC Portchester Football Stadium. Should the Proposed Development be approved, it is recommended that the Site suitability assessment is revised during the Reserved Matters stage to include a comprehensive quantitative assessment from AFC Portchester Football Stadium (both from the football matches and events), once details of layout, orientation of buildings and specification of building fabric of the Proposed Development are known.
- 7.10.8 Should mitigation measures be required they are likely able to be incorporated into the Proposed Development design, so that future residents of the Proposed Development will not be exposed to any greater noise exposure than existing residential receptors. These will be defined at the Reserved Matters stage once further details are known. As a result, it is considered unlikely that significant noise impacts will occur during the night-time at the Proposed Development or that noise restrictions will be imposed on the day time or night-time operations of the AFC Portchester Football Stadium.

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- 7.10.9 The assessment of external noise levels indicates that the guideline level of 50 dB $L_{Aeq,16hr}$ would be achieved in all of gardens and external amenity areas under typical ambient noise conditions.
- 7.10.10 Schemes that are located within approximately 200 m of the identified sensitive receptors can give rise to a potential cumulative noise and vibration impacts should construction works take place simultaneously on all sites. There are no developments within this distance of the Proposed Development, and therefore, cumulative noise and vibration impacts of an adverse nature are considered highly unlikely during the construction and operation phases.
- 7.10.11 A summary of effects is presented in **Table 7.15**.

Table 7.15 Summary of Residual Effects

Receptor/ Affected Group	Value or Sensitivity (Significance) of Receptor	Activity or Impact	Embedded Design Mitigation	Magnitude/ Spatial Extent/ Duration/ Likelihood of Occurrence	Significance of effect	Additional Mitigation	Residual Magnitude of Impact	Significance of Residual effect				
Construction												
Existing residential receptors within 10 m of the Site perimeter (R1 and R5)	High	Construction Noise	Screening Section 61	Moderate	Moderate Adverse	Engagement and prior warning to local residents	Minor	Minor adverse				
				Direct								
				Local								
				Temporary								
				Likely								
				Minor					Minor Adverse	Engagement and prior warning to local residents	Negligible	Negligible
				Direct								
				Local								
Temporary												
				Likely								
				Negligible					Negligible	Engagement and prior warning to local residents	Negligible	Negligible
				Direct								
				Local								
Temporary												
				Likely								
				Minor					Minor	None	Minor	Minor adverse
				Direct								
				Local								
Temporary												
			Construction traffic management plan and best practicable Means controlled through EMP	Likely								

Operation								
All existing and future noise sensitive receptors	High	Internal and external noise exposure	Design layout and sound insulation	Negligible	Negligible	None	Negligible	Negligible
				Direct				
				Local				
				Permanent				
				Likely				
				Minor				
				Direct				
				Local				
Existing residential receptors on Romsey Avenue and Beaulieu Avenue	High	Operational traffic noise	None	Permanent	Minor	None	Minor	Short term - moderate adverse to Long term - Minor adverse
				Likely				
				Direct				
				Local				
Existing residential receptors on all other road links	High	Operational traffic noise	None	Negligible	Negligible	None	Negligible	Negligible
				Direct				
				Local				
				Permanent				
				Likely				
				Minor				
				Direct				
				Local				
Cumulative Effects - Construction								
No cumulative effects likely								
Cumulative Effects - Operation								
No cumulative effects likely								