MOTT MACDONALD

# North Wales Border Control Post

Noise Impact Assessment
BCP21-002-06-00

September 2021

Mott MacDonald
2 Callaghan Square
Cardiff CF10 5BT
United Kingdom

T +44 (0)29 2046 7800
mottmac.com

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# Issue and Revision Record

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# 1 Introduction

Mott MacDonald has been appointed by Welsh Government (WG) to undertake an analysis of the likely environmental effects of the development at Plot 9 Parc Cybi, Holyhead, for a permanent Border Control Post (BCP) (hereafter referred to as the 'scheme').

Further details on the scheme including a description of the location of the site is provided in the Environment Report (BCP21-002-00-00)[1].

The objective of this noise impact assessment report is to identify any likely adverse or beneficial significant noise effects as a result of the scheme, and, where relevant, outline the measures incorporated into the scheme design and delivery method to avoid, eliminate or reduce what might otherwise have been significant adverse effects on the environment.

[1] Mott MacDonald (2021) North Wales Border Control Post Environment Report, September 2021. Document Number: BCP21-002-00-00

# 2 Guidance and Standards

## 2.1 Planning Policy Wales

Planning Policy Wales (PPW)[2] was last updated in February 2021 and is currently in its 11th edition.

Paragraph 6.7.5 states that the *"key planning policy principle is to consider the effects which proposed developments may have on air or soundscape quality and the effects which existing air or soundscape quality may have on proposed developments. Air Quality and soundscape influence choice of location and distribution of development and it will be important to consider the relationship of proposed development to existing development and its surrounding area and its potential to exacerbate or create poor air quality or inappropriate soundscapes."*

Paragraph 6.7.6 states that when "*proposing a new development, planning authorities and developers must, therefore:*

- *address any implication arising as a result of its association with, or location within, air quality management areas, noise action planning priority areas or areas where there are sensitive receptors;*
- *not create areas of poor air quality or inappropriate soundscape; and*
- *seek to incorporate measures which reduce overall exposure to air and noise pollution and create appropriate soundscapes."*

Furthermore, Paragraph 6.7.14 states that the "*Proposed development should be designed wherever possible to prevent adverse effects to amenity, health and the environment but as a minimum to limit or constrain any effects that do occur.*"

## 2.2 Technical Advice Note 11

PPW is supplemented by a series of Technical Advice Notes (TANs). TAN 11: Noise[3] "*provides advice on how the planning system can be used to minimise the adverse impact of noise without placing unreasonable restrictions on development or adding unduly to the costs and administrative burdens of business.*" TAN 11 predominantly outlines how local planning authorities should establish local policies and development plans and how to give conditions to planning permissions relating to noise.

The following is stated regarding noise generating development:

"*Local planning authorities must ensure that noise generating development does not cause an unacceptable degree of disturbance."*

In relation to noise from construction sites TAN 11 states:

"*Detailed guidance on assessing noise from construction sites can be found in BS 5228, parts 1-4. In particular, Part 1: 1984, "Code of practice for basic information and procedures for noise control" describes a method for predicting noise from construction and open sites as well as giving general advice."*

[2] Welsh Government (2021) Planning Policy Wales, Edition 11. [Online] Available at: Planning Policy Wales - Edition 11 (gov.wales)

[3] Welsh Government (1997) Planning Guidance (Wales), Technical Advice Note11: Noise. [Online] Available at: Technical advice note (TAN) 11: noise | GOV.WALES

## 2.3 British Standard 5228-1

BS5228-1:2009+A1:2014 entitled *'Code of practice for noise and vibration control on construction and open sites – Part 1:* Noise'[4] provides a methodology for predicting and assessing noise levels generated by fixed and mobile plant used for a range of typical activities on construction and open sites. The standard gives typical sound pressure level data for fixed and mobile plant items, including generators.

## 2.4 British Standard 4142

BS4142:2014+A1:2019 entitled '*Methods for rating and assessing industrial and commercial sound'*[5] provides guidance for determining sound rating levels and assessing the likely effects from sound of an industrial and/or commercial nature on people who might be inside or outside a dwelling or premises used for residential purposes upon which sound is incident.

The rating method detailed within the standard is widely accepted as an effective means of assessing the significance of fixed plant noise. The level of sound from proposed new plant (the overall rating level) is predicted in terms of $L_{Aeq,T}$ and compared to the existing background sound level, in terms of $L_{A90,T}$. If the new sound source is impulsive, intermittent or tonal in nature, then a penalty is added to the specific sound level to account for the character of the noise to give an overall rating level.

Definitions of all four levels are:

- Ambient sound level – The total A-weighted sound pressure level for a given scenario.
- Background sound level – The A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval.
- Specific sound level – The equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given time interval.
- Rating level – The specific sound level plus any adjustment for the characteristic features of the sound.

While the standard states that it is applicable for the determination of the rating level of sources of sound of an industrial and/or commercial nature, it also explains sound of an industrial and/or commercial nature does not include sound from the passage of vehicles on public roads and railway systems.

## 2.5 WHO Night Noise Guidelines for Europe 2009

Although WHO guidance is not adopted by the Welsh Government, WHO Night Noise Guidelines[6] (NNG) provide guidance on noise levels within residential dwellings during night-time periods which can cause sleep disturbance. Guidance advises that internal noise levels should not exceed 45 dB $L_{Amax,f}$ due to regular individual events (not to be exceeded 10-15 times a night).

## 2.6 WHO Environmental Noise Guidelines for the European Region 2018

The WHO Environmental Noise Guidelines for the European Region[7] (ENG) were published in October 2018. These superseded aspects of the WHO Community Noise Guidelines (CNG) published in 1999 but complement the WHO Night Noise Guidelines. The document proposes

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

[5] British Standard 4142:2014+A1:2019 "Methods for rating and assessing industrial and commercial sound", 2019

[6] World Health Organization (2009) Night Noise Guidelines for Europe. [Online] Available at: Night noise guidelines for Europe (who.int)

[7] World Health Organization (2018) Environmental Noise Guidelines for the European Region. [Online] Available at: noise-guidelines-eng.pdf (who.int)

recommended levels for dwellings in terms of both internal and external ambient noise levels which are generally similar with levels outlined in BS8233. This guidance also states that a partially open window for ventilation provides an attenuation of 15dB between external and internal noise levels.

## 2.7 British Standard 8233

BS8233:2014 entitled *'Guidance on sound insulation and noise reduction for buildings'*[8] offers advice on indoor and outdoor noise levels. Paragraph 7.7.3.2 in BS8233 recommends that *"traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise levels does not exceed 50dB $L_{Aeq,T,}$ with an upper guideline value of 55dB $L_{Aeq,T}$ which would be acceptable in noisier environments. However, it is also recognised that these guideline values are not achieved 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."*

BS8233 also notes that it is desirable that internal ambient noise levels do not exceed daytime guideline values of $L_{Aeq,16h}$ 35dB in living rooms, 40dB in dining rooms/areas and 35dB in bedrooms. The night-time guideline value for bedrooms is 30dB $L_{Aeq,8h}$. Using the WHO ENG assumption for ventilation through a partially open window, the following desirable external ambient noise levels can be derived from BS8233 internal ambient noise levels:

**Table 2.1: External Ambient Noise Levels for Dwellings (Adapted from BS8233)**

| Activity | Location | 07:00 to 23:00 (Daytime) | 23:00 to 07:00 (Night-time) |
|---|---|---|---|
| Resting | Living room | 50 dB $L_{Aeq,16hr}$ | – |
| Dining | Dining room/area | 55 dB $L_{Aeq,16hr}$ | – |
| Sleeping (daytime resting) | Bedroom | 50 dB $L_{Aeq,16hr}$ | 45 dB $L_{Aeq,8hr}$ |

Source: BS8233 – adapted using partial open window assumption

## 2.8 The Design Manual for Roads and Bridges, LA 111 – Noise and Vibration

The Design Manual for Roads and Bridges LA 111 – Noise and Vibration, Revision 2 (DMRB LA 111)[9] describes a methodology for the assessment of the impacts of noise and vibration for road projects in the UK. It includes a procedure for the calculation of an operational noise study area, a method for the classification of the magnitude of impact, and examples of design and mitigation techniques that may influence noise and vibration impacts.

## 2.9 Calculation of Road Traffic Noise

Calculation of Road Traffic Noise (CRTN)[10] provides procedures for predicting noise levels for a given flow of road traffic at sensitive receptors. This methodology is used within the acoustic model to determine the noise changes arising from site access roads.

[8] British Standard 8233:2014, "Guidance on sound insulation and noise reduction for buildings", 2014

[9] Highways England (2020) DMRB LA 111 – Noise and vibration Revision 2. [Online] Available at: cc8cfcf7-c235-4052-8d32-d5398796b364 (standardsforhighways.co.uk)

[10] Department of Transport "Calculation of Road Traffic Noise", 1988

## 2.10 Control of Pollution Act 1974 – Section 61 – Prior consent for work on construction sites

Section 61 of the Control of Pollution Act 1974[11] regulates the prior consent for construction work. Consent under this section may be sought by a contractor or developer when construction work is likely to lead to significant adverse impacts due to noise and vibration.

*"An application under this section shall contain particulars of—*

*(a) the works, and the method by which they are to be carried out; and*

*(b) the steps proposed to be taken to minimise noise resulting from the works."*

This application would be made as part of a Construction Environmental Management Plan (CEMP) and as advised by the Local Authority. It is seen as a proactive approach to construction and environment management as it reduces the likelihood of complaints from the community and protects the developer from being served a Section 60 notice (closure of construction site).

[11] Control of Pollution Act 1974, c.40. Available at: Control of Pollution Act 1974 (legislation.gov.uk)

# 3 Baseline

A baseline survey was not conducted as part of this assessment as levels would not be considered representative due to existing COVID-19 conditions. Instead it was agreed that the assessment could be performed as part of a desktop study with baseline measurements that were obtained from recent surveys submitted for other planning applications. This approach was agreed with the Environmental Health Officer (EHO) for Anglesey County Council.

Baseline ambient ($L_{Aeq,T}$) and background ($L_{A90,T}$) levels were obtained from the Horizon Nuclear Power: Wylfa Newydd Project Environmental Statement[12], as recommended by the EHO. Within this document are results from baseline noise measurements undertaken by Jacobs in May 2017: "*Short term measurements consisted of three daytime (between 10:00 and 18:00) and two night-time (between 23:00 and 04:00) measurements at each location."* Each measurement was of 15-30 minutes duration. The ambient noise levels for the daytime, evening/weekend and night-time periods at each location were evaluated using the measurements and summarised to the nearest whole decibel whereas the background noise levels were selected based on the mode (or the lowest value if no mode was present in order to remain conservative).

The acoustically sensitive receptors within 600m of the site have all been recognised as dwellings. These residential receptors are located at Kingsland Road (Receptor 1/PC3), northwest of the site, Penrhyn Geiriol (Receptor 2/PC4), southwest of the site, and Tyddyn-Uchaf (Receptor 3/PC5), southeast of the site.

The three closest receptor locations to the proposed site have been identified as being the most susceptible to any potentially adverse and significantly adverse effects due to noise and vibration from the scheme. These three selected receptors are summarised in Table 3.1 below. Figure 3.1 shows the selected baseline noise measurement locations which have been marked up by the blue crosses in relation to the proposed developable area boundary. The baseline environment is dominated by passing traffic on the A55, A5153 and B4545 as well as lorry movements to and from the adjacent Roadking Truckstop.

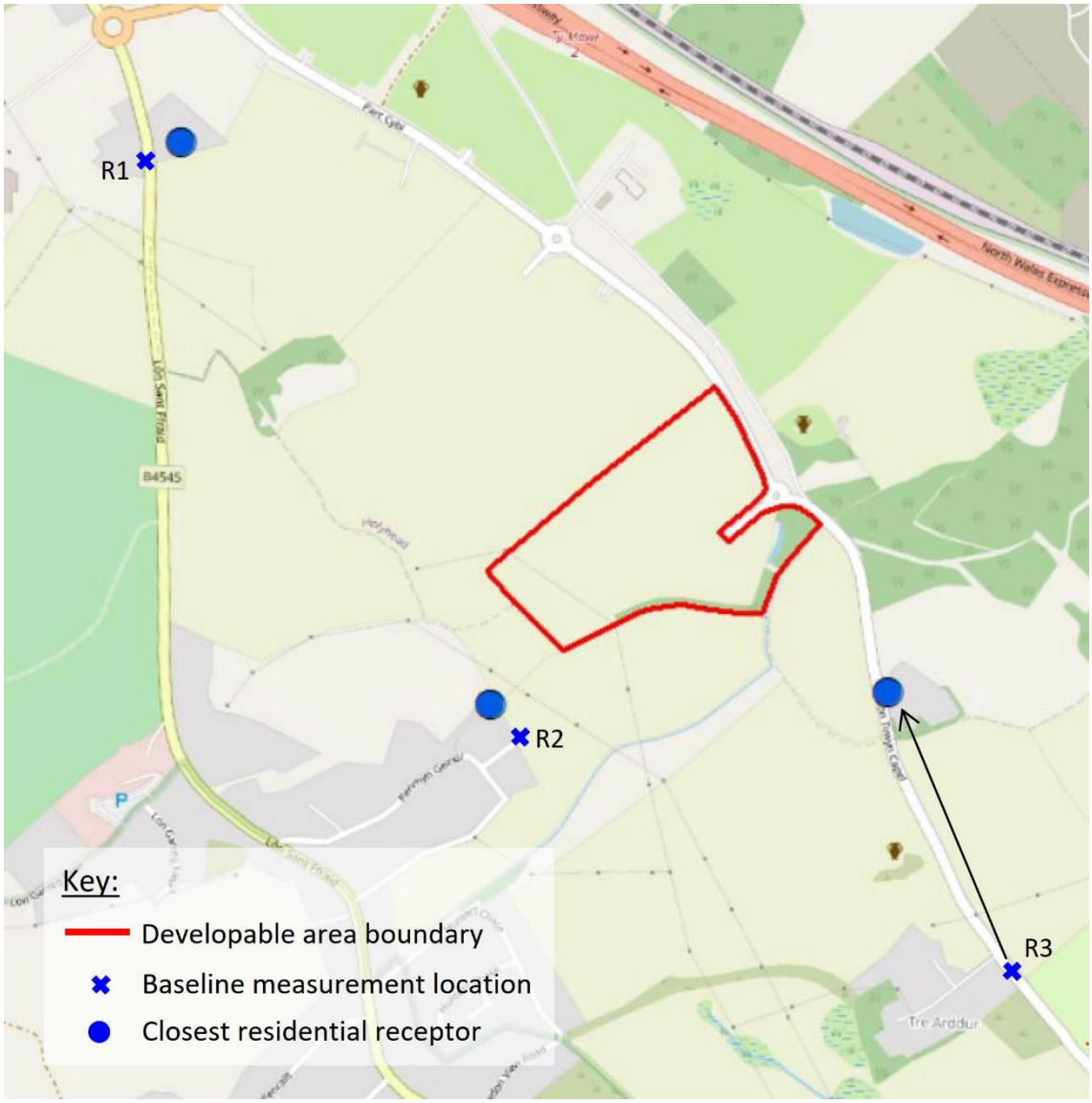
**Table 3.1: Baseline Noise Measurements for Day and Night-Time Periods**

| Receptor | Document location ID | Approximate address | Daytime $L_{Aeq,16hour}$ dB | Night-time $L_{Aeq,8hour}$ dB | Daytime $L_{A90,30min}$ dB | Night-time $L_{A90,15min}$ dB |
|---|---|---|---|---|---|---|
| R1 | PC3 | Kingsland Road | 67 | 51 | 44 | 29 |
| R2 | PC4 | Penrhyn Geiriol | 56 | 36 | 33 | 32 |
| R3 | PC5 | Tyddyn-Uchaf | 56 | 37 | 32 | 31 |

Source: Horizon Nuclear Power – Wylfa Newydd Project Environmental Statement

[12] Jacobs (2018) Horizon Nuclear Power Wylfa Newydd Project Environmental Statement. "6.2.20 ES Volume B – Introduction to the environmental assessments App B6-1 – Baseline noise Monitoring" June 2018. Document Reference: WN0902-JAC-PAC-REP-00068

**Figure 3.1: Indicative Location Plan Showing the Baseline Measurement Positions and the Closest Affected Residential Receptors in Relation to the Developable Area Boundary**




Source: Adapted from OpenStreetMap Contributors + Mott MacDonald, 2021

# 4 Methodology

This section describes the methodology which has been used for the assessment of noise and vibration from the scheme. The assessment has been undertaken in accordance with guidance from the following key documents: PPW (and TAN 11), BS5228, BS4142, DMRB, WHO Night Noise Guidelines and BS8233.

The main purpose of this assessment is to identify noise and vibration impacts associated with the scheme. Part of the assessment process is to identify measures to reduce adverse effects and potential for significant adverse effects arising.

## 4.1 Construction Noise and Vibration

A qualitative assessment for construction has been carried out as part of this proposal as a quantitative assessment cannot be performed. A programme of works is not yet available, however it is understood that construction is scheduled to begin from Spring 2022 and continue until Autumn 2022 for a maximum of eight months. Construction activities and plant items are not yet available but it is possible that rock blasting may be required before any surfacing or hardstanding can be completed. However, the extent or duration of this is not known at this stage.

A CEMP would be produced by the contractor upon appointment. Where necessary, measures would be agreed with the consenting authority prior to works commencing. The CEMP would outline measures taken to control and reduce noise and vibration from construction activities including the use of Best Practicable Means (BPM) which are measures recommended in BS5228-1 as well as an established complaints procedure for the local neighbourhood. With regards to the rock blasting activity, BPM including screening from receptors and daytime working methods may not prove to be the most effective method to mitigate against potential significant adverse effects. A more efficient approach to carrying out noisy construction activities, such as rock blasting, may involve night-time working over fewer days compared to working during daytime hours only over a longer duration. Liaison with the local authority would be carried out as early as possible to establish mitigation methods, scope of works and construction schedule which may result in the requirement of a Section 61 application under the Control of Pollution Act 1974 to minimise the likelihood of significant adverse effects arising during construction.

Residential receptors are mainly located to the south-west and south-east in relation to the site, the closest of which (R2) is situated approximately 100m from the developable area boundary. Therefore, it is unlikely that there would be any potentially significant adverse effects due to construction vibration.

## 4.2 Operational Road Traffic Noise

DMRB LA 111 is typically used for the assessment of changes in road traffic noise involving the development of all road projects including new construction, improvements and maintenance.

A quantitative assessment for road traffic noise impacts has not been carried out as part of this assessment due to the low volume of traffic involved with this scheme as well as the considerable distance from any affected roads to the sensitive receptors.

Lorries would access the site via the A5 roundabout and Parc Cybi. Traffic impacts along this route are limited to non-residential receptors, the impacts of which are likely to be negligible or minor and is therefore not likely to cause adverse effects due to the small scale of the

development and low capacity of the site for staff cars and Heavy Goods vehicles (HGVs). Road traffic noise impacts are not considered further in this assessment.

## 4.3 Operational Site Noise and Vibration

The PPW and TAN 11 emphasise how proposed developments should be designed to prevent adverse effects wherever possible but that this should be done "*without placing unreasonable restrictions*" on the development. TAN 11 also states that the development should not cause an "*unacceptable degree of disturbance*".

The potential impacts arising as a consequence of this scheme is assessed in accordance with BS4142 criteria. This includes all noise impacts from within the BCP due to vehicle movements, activities and fixed plant noise.

A noise model for the site has been constructed using the noise modelling software Datakustik's CadnaA v2021 MR, which calculates the sound levels from all site activity, the propagation losses between the source and the receptors, and the resulting noise levels at the receptors in the study area. The propagation correction includes most OS topography but excludes some specific topographical features in the vicinity of the scheme that are likely to influence noise levels (such as noise bunds) and is therefore conservative.

The BS4142 assessment method is used to consider the noise impacts from the site (or the specific noise level) in terms of a rating sound level. The guidance states that significance of noise of an industrial and commercial nature depends upon both "*the margin by which the rating level of the specific sound source exceeds the background sound level and the context in which the sound occurs."*

Therefore, the following conclusions may be drawn based upon the difference between the rating level and background sound level:

- "*Typically, the greater this difference, the greater the magnitude of the impact;*
- *A difference of around +10dB or more is likely to be an indication of a significant adverse impact depending on the context;*
- *A difference of around +5dB 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 would 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."*

In order to inform the 'context', noise from the site is compared to the existing ambient noise levels prevalent at the receptor locations, and sets them into context by reference to BS8233, which provides a threshold or "upper guideline" value for external and internal noise levels which would be "acceptable in noisier environments". This can be interpreted as a threshold level for noise levels outside dwellings and any exceedance of this level may lead to less acceptance or disruption which may lead to a potentially significant adverse effect. In addition to BS8233 criteria, the WHO NNG have also been used to inform the context of noise at night to avoid sleep disturbance.

Vibration impacts are expected to be negligible due to the distance between the developable area boundary and the nearest residential receptors – the closest residential receptor is located approximately 100m from the developable area boundary.

#### 4.3.1.1 Assumptions

The following assumptions were made to estimate the site noise from fixed plant sources and vehicle movements/activities:

- The assessment was carried out at the closest receptors to the site as shown in Figure 3.1 and the noise measurements, denoted by crosses, were used as baseline values.
- The contributing noise sources were the idling HGV engine sources, (mains powered) refrigeration units, site access roads, reversing lorry bleeper alarms and a single generator.
- The site access roads were modelled using Noise Advisory Council (NAC) methods used for Low Flow vehicle movements – this was the case for both daytime and night-time flows over the 16hour daytime and 8hour night-time periods.
- Ferry arrivals are expected four times throughout a 24-hour period (00:01-00:20, 05:25-05:45, 11:30-11:50 and 18:00-18:20). It is assumed that a worst case condition of 41 HGVs enter and leave the site (24 HGVs during the daytime and 17 HGVs during the night-time).
- 62 staff members (travelling alone in one car) are assumed to be present on site at any one time and a shift change is expected three times – once during the night-time period and twice during the daytime period.
- Vehicles entering and leaving the site are assumed to be travelling at speed of 20 km/h.
- All vehicles entering and leaving the BCP for inspection are assumed to be HGVs (and not Light Goods Vehicles (LGVs) or cars) as a worst case noise assumption.
- The site has mains power and so all lighting columns and lorries proposing to refrigerate goods on site do not depend on external generator operations.
- There are a number of fixed plant items including Heating, Ventilation and Air Conditioning (HVAC) and standby generators planned for the site. In the absence of data for this plant, it is assumed that there are 15 items of plant each with a sound power level $L_{wA}$ of 91dB, or with a sound pressure level $L_{pA}$ of 80dB at 1m. A single point source representing all of the fixed plant noise was modelled in the centre of the site as shown in Figure 4.1. Spectrum data for a generator was obtained from BS5228-1 and scaled accordingly to a total sound power level $L_{wA}$ of 103dB. The generators are understood to be used in emergency back-up cases only and may be tested for one hour every six months and for one 24-hour period once a year.
- Noise data for HGV refrigeration units could not be obtained so noise data from an industrial refrigeration unit was used. This spectrum was adjusted to give a sound power level $Lw_A$ of 92dB based on a literature review. These sources are assumed to propagate in a spherical direction, modelled at a height of 4m and have no on-time corrections.
- Reversing vehicle alarms (at 1m height) are modelled alongside an HGV engine source (at 2m height). Spectral data and sound pressure levels for reversing alarms were obtained from '*Acoustics Bulletin Vol 33, No 3*' June 2008. An HGV idling and reversing source level was obtained from library data. These sources are assumed to propagate in a hemispherical direction and on-time corrected so that each HGV is anticipated to reverse once per visit for a period of 60 seconds.
- HGV engines were also used as point sources to represent idling vehicles in the eleven proposed swim lane bays and further six temporary inspection zones along the northern-western boundary for a period of five minutes. These were modelled at a 2m height, are assumed to propagate in a hemispherical direction and the sources were on-time corrected to represent each of the 24 vehicles idling in the daytime and 17 vehicles idling in the night-time for a period of five minutes each.
- The ground forming the parking bays and access roads was modelled as reflective and the intervening ground between the receptors and the site was modelled as absorptive to

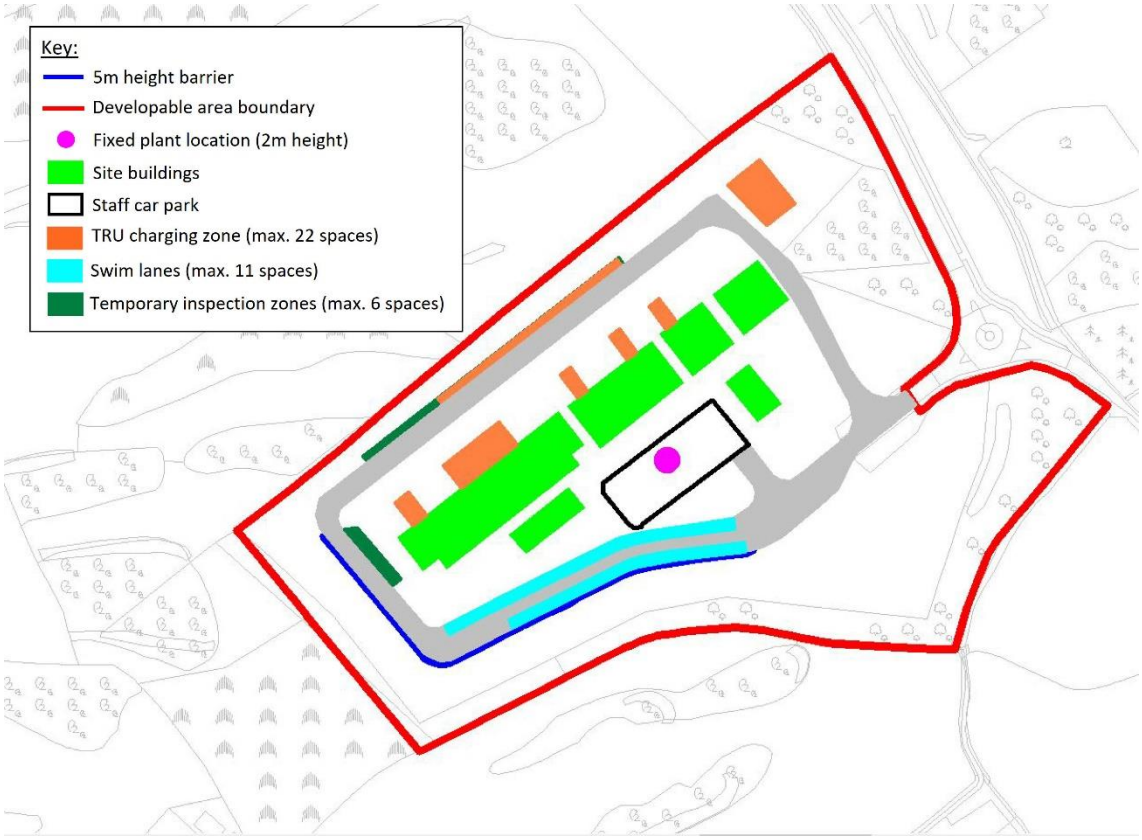
represent grass. The adjacent Roadking Truck Stop and Premier Inn were both modelled as reflective.

- All site buildings are assumed to be at various heights between five and seven metres in height with the exception of the gatehouse near the entrance, as specified by the scheme's Architect. The buildings are assumed to be reflective and provide screening for receptors, particularly for the Transport Refrigerator Units (TRUs) charging zone located to the north/north-east of the site as shown in Figure 4.1 below.

The site noise model was run as a mitigated case with the following measures in place:

- A 5m height barrier (of length 240m) is positioned alongside the access road. The position is intended to fully screen the swim lanes from the receptors to the south-west and south-east (R2 and R3). The height and positioning would be subject to change once the detailed design of the scheme has been completed, to ensure the required amount of noise attenuation is provided.
- Twenty two TRUs running at any one time during the daytime and night-time periods in the positions as shown in Figure 4.1 below.
- It is anticipated that reversing manoeuvres would be carried out once per inspection vehicle and that they sound for an average duration of 60s.
- It is anticipated that a maximum of two inspection vehicles may perform a reversing manoeuvre at any one time.
- It is anticipated that vehicles entering the site for inspection would not idle in the swim lanes or temporary inspection zones for more than five minutes each.

**Figure 4.1: Indicative Location Plan Showing Mitigation Assumed in Place for the Operational Noise Assessment**




Source: Mott MacDonald 2021

# 5 Assessment of Potentially Significant Adverse Effects

The scheme has the potential to give rise to permanent noise impacts in the daytime and night-time.

Potential impacts that may arise from the operation of the scheme are predominantly due to an increase in HGVs using access roads, noise from HGVs on the site and also fixed plant operations.

## 5.1 Noise from Site Activities

The results of the BS4142 rating method assessment are shown in Table 5.1 and Table 5.2 for the selected receptors. For both the daytime and night-time period, an intermittency correction has been accounted for as noise from site activities is likely to be sporadic, depending on flows and presence of vehicles for inspection. Tonal and impulsivity features are assumed not to be present as these can be designed out when selecting fixed plant items. The overall acoustic character of the area is assumed to remain similar to the existing character due to the presence of the adjacent Roadking Truckstop and the A55.

**Table 5.1: BS4142 Assessment of Significant Effects – Daytime**

| | R1 | R2 | R3 | Commentary |
|---|---|---|---|---|
| Background sound level (dB $L_{A90,30min}$) | 44 | 33 | 31 | Measured at location or considered representative for receptor |
| Predicted specific sound level (dB $L_{Aeq,60min}$) | 32.7 | 43.0 | 39.5 | Predicted using modelling software (CADNA) for each receptor |
| Acoustic feature correction (dB) | +3 | +3 | +3 | Using the subjective method, an intermittency correction is applied |
| Rating level (dB) | 35.7 | 46.0 | 42.5 | |
| Excess of rating over background sound level | -8.3 | +13.0 | +11.5 | |
| Initial estimate of likely impact | Low | Significant adverse | Significant adverse | +10dB difference of rating over background level may be significant |
| Assessment of impact, taking context into account | Unlikely to lead to significant adverse impacts | | | See Section 5.1.1 and Table 5.3 |
| Uncertainty of the assessment | Specific sound level was determined using modelling software which uses a variety of assumptions to predict sound levels. Worst case situations were modelled, and input noise data was either measured or taken from relevant standards. The assessment of impact is an indication of results only. | | | |

Source: Mott MacDonald

As can be seen from Table 5.1, noise from the site during the daytime period, is not likely to cause any significant adverse effects for R1. For R2 and R3, the predicted specific sound level is higher than the required specific sound level derived and this is an indication of significant adverse effects, depending on the context.

During the night-time period, Table 5.2 shows that adverse effects are likely to arise due to noise from site operations at R1. The specific sound level predicted indicates that there is potential for significant adverse effects at R2 and R3, depending on the context.

**Table 5.2: BS4142 Assessment of Significant Effects and Derivation of Fixed Plant Sound Power Level Design Limit – Night-time**

| | R1 | R2 | R3 | Commentary |
|---|---|---|---|---|
| Background sound level (dB $L_{A90,15min}$) | 29 | 32 | 31 | Measured at location or considered representative for receptor |
| Predicted specific sound level (dB $L_{Aeq,15min}$) | 34.7 | 43.7 | 40.3 | Predicted using modelling software (CADNA) for each receptor |
| Acoustic feature correction (dB) | +3 | +3 | +3 | Using the subjective method, an intermittency correction is applied |
| Rating level (dB) | 37.7 | 46.7 | 43.3 | |
| Excess of rating over background sound level | +8.7 | +14.7 | +12.3 | |
| Initial estimate of impact | Adverse | Significant adverse | Significant adverse | +10dB difference of rating over background level may be significant |
| Assessment of impact, taking context into account | Unlikely to lead to significant adverse impacts | | | See Section 5.1.1 and Table 5.3 |
| Uncertainty of the assessment | Specific sound level was determined using modelling software which uses a variety of assumptions to predict sound levels. Worst case situations were modelled, and input noise data was either measured or taken from relevant standards. The assessment of impact is an indication of results only. | | | |

Source: Mott MacDonald

### 5.1.1 Assessment of Context

As stated in Section 2.4, BS4142 methodology states that the significance of the scheme noise depends not only on the margin by which the rating level exceeds the background sound level but also the context in which the sound occurs.

Therefore receptors R2 and R3, which are predicted to have large exceedances (10dB or more) of rating levels above background sound level, have been subjected to a further assessment using BS8233 criteria to consider whether, contextually, there is potential for significant adverse effects to arise. This involves the consideration of the total ambient sound level (baseline noise level plus scheme (or specific) noise level) as well as the residual sound level (baseline noise level without scheme (or specific) noise level).

**Table 5.3: Noise Change due to scheme for Selected Representative Receptors**

| Receptor | Period, T | Baseline $L_{Aeq,T}$ dB | $L_{Aeq,T}$ with Scheme, dB | $L_{Aeq,T}$ Change, dB | Scheme Noise $L_{Aeq,T}$ dB | Significance |
|---|---|---|---|---|---|---|
| R2 | 16h (Day) | 56 | 56.2 | 0.2 | 43.0 | Not significant |
| | 8h (Night) | 36 | 44.4 | 8.4 | 43.7 | Not significant |
| R3 | 16h (Day) | 56 | 56.1 | 0.1 | 39.5 | Not significant |
| | 8h (Night) | 37 | 42.0 | 5.0 | 40.3 | Not significant |

Source: Mott MacDonald

Table 5.3 shows the predicted specific (or scheme) noise level, baseline noise level without the scheme, predicted total ambient noise level, and the noise level increase due to operational site noise. As shown in Table 2.1, the desirable external ambient noise level thresholds derived from BS8233 are 50dB $L_{Aeq}$ for daytime and 45dB $L_{Aeq}$ for night-time. For the two selected receptors, the predicted total ambient noise level is below this threshold for the night-time period, using the significance criteria outlined in Section 2.7, and is therefore unlikely to lead to potentially significant adverse effects.

For the daytime, the predicted ambient noise level with scheme noise at R2 and R3 is higher than the daytime BS8233 threshold value. However, this is attributed to the high existing baseline (or residual) noise level. BS4142 highlights that for receptors, such as R2 and R3, with high residual levels compared to rating and background levels, it is likely that adverse (or even significantly adverse effects) already exist. It is therefore necessary to consider this and whether the impact of this scheme would exacerbate this.

However, considering the small ambient noise level change brought about by the scheme for both receptors, the similar daytime site noise level compared to night-time site noise level and existing acoustic character of the area, it is unlikely that this noise change would be discernible and that any significant adverse effects would arise due to noise from site activities during the daytime.

Noise impacts from the site are not anticipated to significantly affect any of the receptors within 600m of the site. This has been checked for dwellings located along the B4545 which are not screened by the 5m height barrier.

In order to predict the noise impacts due to maximum ($L_{Amax}$) levels experienced at night-time due to site activities, all on-time corrections for individual site noise sources were removed to replicate a worst case $L_{Amax}$ level for the night-time period. This provided a worst case $L_{Amax}$ of 49.7dB external to R2, or an internal level of 34.7dB, which is well below the WHO criteria of 45dB.

## 5.2 Noise from Animals

It is understood that the scheme would lead to inspections of small animals, large animals and horses. The location of the inspection facility for animals is expected to be near the northern/north-eastern boundary of the site premises.

Impacts due to animal noise, particularly dog barking, is unlikely to produce any significant adverse effects due to the infrequency of animals on site, the permanent on-site staff presence, and inspections being carried out inside a building facility.

## 5.3 Specific Mitigation Measures

The assessment of the scheme has been made with a number of mitigation measures in place and it is expected that the following measures are adopted within the developable area. These measures consist of:

- A noise barrier (of provisional height 5m and length 240m) to be positioned alongside the access road, as shown in Figure 4.1 above. The position is intended to fully screen the swim lanes from the receptors to the south-west and south-east (R2 and R3). The height and positioning would be subject to change once the detailed design of the scheme has been completed, to ensure the required amount of noise attenuation is provided.
- Site management controls would be in place to ensure that:
  - No more than twenty two TRUs are running at any one time during the daytime and night-time periods in the positions as shown in Figure 4.1 above;
  - Reversing manoeuvres are minimised as far as possible for HGVs. (Note, there is no need for a restriction on LGVs and staff car movements and reversing);
  - No more than two HGVs performing reversing manoeuvres on site at any one time; and
  - Idling in the swim lanes and temporary inspection zones to be minimised to be no more than five minutes per vehicle.

For all on-site fixed plant items (including any standby equipment), the total sound power of all plant should not exceed $L_{wA}$ of 103dB at the 'equivalent' position shown in Figure 4.1 above, at a height of 2m. This is equivalent to 15 items of plant each with a sound power level $L_{wA}$ of 91dB, or with a sound pressure level, $L_{pA}$ of 80dB at 1m. It is recommended that an acoustician is consulted to ensure that this design limit is apportioned appropriately for each plant item taking into account their respective locations within the site.

These measures balance the need to reduce noise levels from the site with other potential adverse effects, meeting the requirement of the PPW (TAN 11) to minimise noise impacts.

No further physical mitigation has been proposed however the site operators should consider other mitigation actions as discussed below.

## 5.4 Additional Mitigation Measures

Although the assessment shows that noise from the site is not expected to cause any significant effects, the application of Statutory Nuisance provisions would require discussion with the local authority in the event of a justified complaint.

The CEMP and operating management for the site should detail a procedure to handle complaints alongside other measures which may help to alleviate complaints. Measures could include:

- Engagement with the local authority;
- A straightforward complaints handling procedure; and,
- Noise monitoring on the site boundary.

The site operator should consider ways to engage the community with the proposal and also consider mitigation methods. It is advised that the operators engage with the local authority to understand their opinion on the site. Opening and maintaining a dialogue with the local authority could give the operators insight into what is expected of them in relation to noise and could also help the local authority understand the need for the project and the restrictions of what is achievable. The local authority will likely have their own criteria on the difference between current background noise levels and the noise levels created using the site which is important for the operators to understand and aim for.

The implementation of a complaints handling procedure which is straightforward for complainants to use and quick for the operator to respond to may help to alleviate feelings of frustration from local residents. If complaints are dealt with directly and in a considerate manner, this may also help to reduce the negative perception of the site.

Noise monitoring can be used to collect data on operational activities coming from the site which could be analysed against complaints logs. For example, if a log of site operations was kept, this could be cross-referenced with the noise data and complaints occurrence to establish if certain activities were likely to trigger complaints. This could then be used to inform changes in the site operation plan. It should be noted that any noise data captured would include all ambient noise from the local area and separating site noise from local sources would be difficult. A tool like this could be used in discussions with the local authority to demonstrate the effectiveness of on-site management measures.

# 6 Conclusions

The assessment has considered the maximum operating capacity of the scheme and presents a worst-case assessment. It has concluded that no significant adverse effects would arise due to the operation of the scheme from changes in road traffic noise, site noise due to vehicle movements and activities, and also from fixed plant noise.

Construction noise (and road traffic noise) have been assessed qualitatively due to availability of information at this stage. It is understood that there may be rock blasting as part of construction works which may lead to adverse effects depending on proximity to receptors and duration of works. It is recommended that liaison with the local authority is carried out as soon as possible to establish mitigation methods, scope of works and construction schedule.

As fixed plant layouts and inventories are not yet finalised, a total sound power level for all plant has been assumed. An acoustician should be engaged to ensure that this design limit is apportioned appropriately for each plant item taking into account their respective locations within the site.

The assessment has found that the closest sensitive receptors are not expected to experience any significant adverse effects due to the scheme provided the above mitigation measures are implemented. Should any mitigation measures not be followed, there is a risk of potentially significant adverse effects arising.

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