

Subject: MFG Halewood Service Station
Client: Wyeth Project Services Ltd
Address: Halewood Service Station, 195 Higher Road, Liverpool, L26 1UN
Date: 20/06/2023
Our ref: 39004

Introduction

This note has been prepared in relation to application 22/00738/FUL and noise report 39004 R2, following online meeting of 20/06/2023 with Sound Solution Consultants (SSC), Carney Sweeney planning consultants, and representatives of Liverpool City Council.

Following comments from the Senior Planning Officer 06/06/2023, it was agreed that noise mapping would be useful in ascertaining the potential daytime noise impact on surrounding residents. The resulting IMMI™ noise mapping outputs have been provided within this technical note for reference.

Modelling assumptions

Sound pressure level calculations have been undertaken using IMMI™ (v2021) prediction software using octave-band sound levels of proposed operations. Calculations for emission have been made in accordance with ISO 9613, describing an industry standard method for environmental noise prediction as applicable to commercial operations.

It has been noted that the accuracy of a noise model is dependent on the software user to generate both valid and representative results, accounting for proposed topography and form. Equated values have been verified by manual calculation methods to ensure that the modelled results have been considered accurate for the scope of this report, to absolve the likelihood of modelling error.

The following, general modelling assumptions have been made when reviewing the sound level emission from proposed noise generating items at the nearest noise sensitive receptors:

- Site geometry and the proposed development layout has been taken from architectural scheme drawings, calibrated to online satellite mapping.
- Screens and building structures have been modelled based on supplied drawings of site proposals, including EV canopies, jetwash bays and the proposed substation enclosure, as described in Appendix A of this note.
- Surface attenuation factors have been considered, where all hard surfaces/concrete surfaces would be reflective $G = 0.0$, and soft areas as 1.0 (as defined by ISO 9613-2).
- The model incorporates worst-case reflections, where all surfaces on site have been assumed perfectly reflective and non-diffusive.
- Receiver locations have been taken 1.5 m and 4.5 m above relative ground level at the façades of the nearby dwellings, and at 1.5 m in rear external amenity areas.

Jet wash noise levels (based on measured $L_{Aeq,T}$)

The original noise assessment submission (39004 R1) assumed jet wash activity levels of 78 dB L_{WA} , based on typical commercial noise levels measured by SSC and specified by the proposed jet wash manufacturer (*Istobal*).

Following EHO comments, in the second iteration of the report (39004 R2) these were increased by a precautionary 2-3 dB.

Figure 1 below shows the daytime noise emission level for the development assuming these increased jet wash noise levels (81 dB L_{WA}).

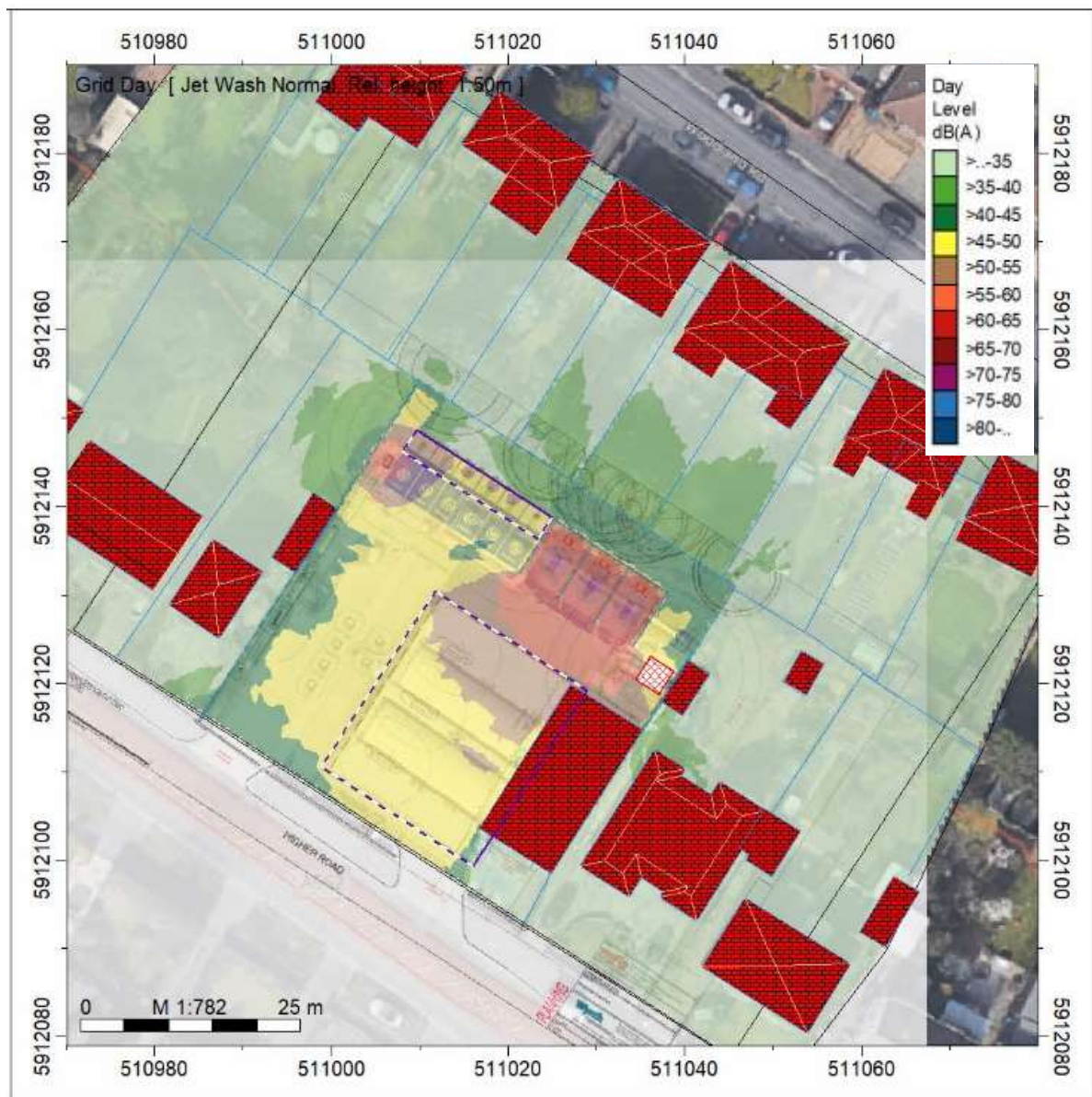


Figure 1 – IMMI Noise Modelling Output - Daytime Grid – Jet Wash + 3 dB (81 dB L_{WA}).

Jet wash noise levels (based on measured L_{Amax})

The EHO later requested that the L_{Amax} jet wash sound levels be considered, rather than the approved method using the measured specific sound level, $L_{Aeq, T}$ (as specified in BS 4142).

The measured L_{Amax} of a jet wash (89 dB L_{WA}) has been established to be approximately 11 dB higher than the $L_{Aeq, T}$ for a typical operation (78 dB L_{WA}). Events of this maximum level generally only take place for very short periods of time, however, to inform an absolute worst-case scenario, these maximum events have been modelled to take place for the full assessment period, as shown in the figure below.

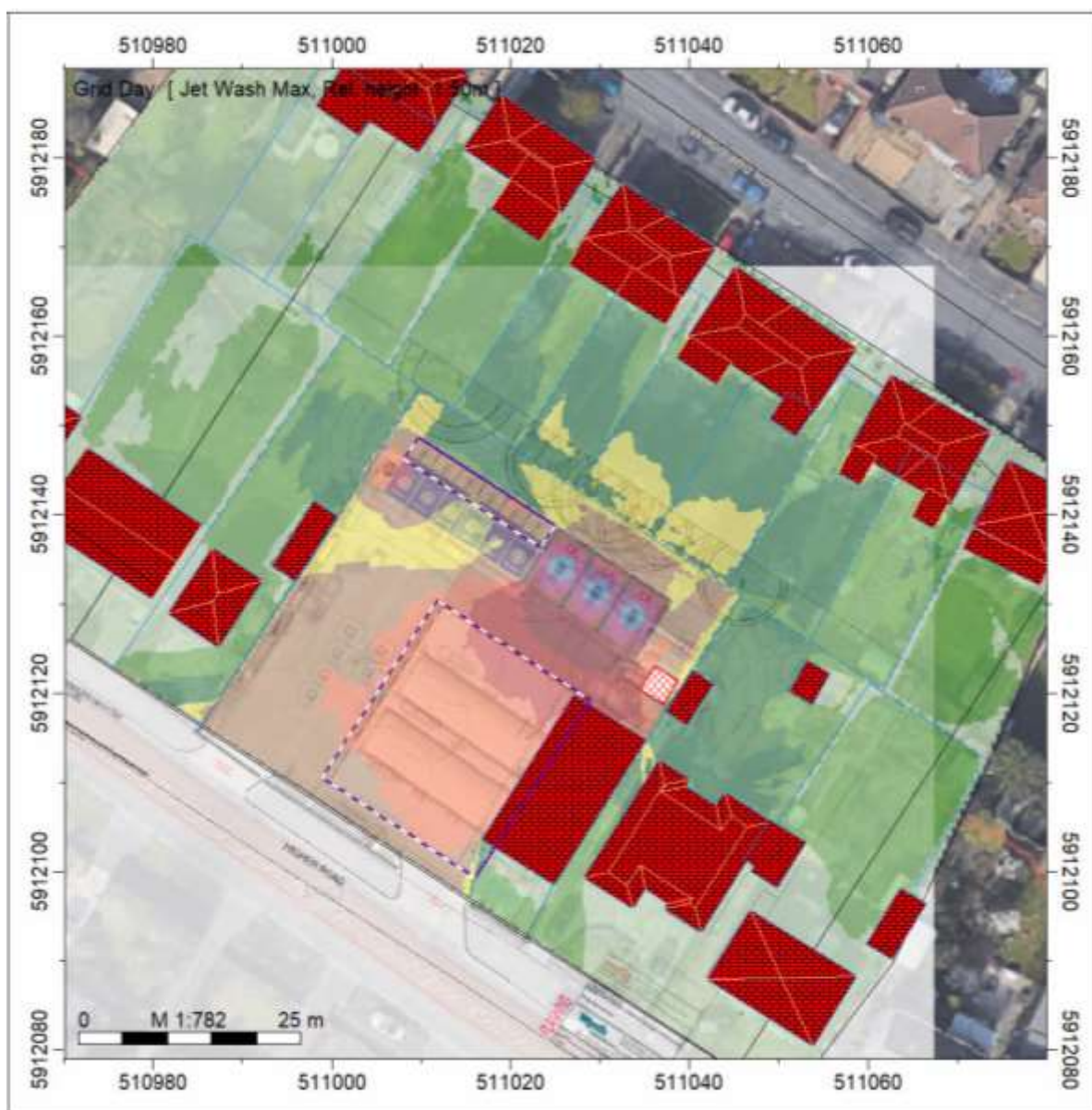


Figure 2 – IMMI Noise Modelling Output - Daytime Grid – Jet Wash Max (89 dB L_{WA}).

The table on the following page has provided a comparison with the average jet wash modelling results ($L_{Aeq, T}$) compared to the maximum level results (L_{Amax}).



Modelled using noise propagation software						
Receptor	Using Jet Wash Average Levels ($L_{Aeq,T}$) + Precautionary 3 dB			Using Jet Wash Maximum Levels (L_{Amax}) + 11 dB over $L_{Aeq,T}$		
	Daytime 07:00 - 23:00		Night 23:00 - 07:00	Daytime 07:00 - 23:00		Night 23:00 - 07:00
	GF Garden	GF Façade	1F Façade	GF Garden	GF Façade	1F Façade
185 Higher Road	36	31	33	40	37	33
197 Higher Road	33	36	n/a	41	43	n/a
88 Woodland Road	35	31	19	43	40	19
Comparison with background (+ character)	-12	-12	-5	-5	-5	-5

Table 1 – IMMI Noise Modelling Outputs - Jet Wash Average Vs Jet Wash Max Levels.

It is evident from these findings that the resultant sound level would remain notably below the representative background sound level in the day and night (Appendix B), even when considering the absolute worst-case sound levels that would likely only take place for very short periods of time.

The modelled results above have had an additional 3 dB correction applied to account for any distinguishable character which may occur as a result of the development. In principle, this correction should not be applied as the existing site already incorporates sounds of a commercial nature, including jet wash activity, automated car wash noise, EV chargers and combi units.

Sound levels within the rear gardens would be very low compared to the existing environment, and significantly below the guidance values for desirable external amenity, 50 – 55 dB $L_{Aeq, 16hr}$ (as set out in BS 8233:2014 / WHO), even when assessed in a worst-case hour and including a character correction.

The numerical results in Table 1 have highlighted a low impact at the worst-case receptors during periods of proposed day and night-time operation, where the rating sound level has been predicted to lie at least 5 dB below the representative background sound level in the day and night (even when considering L_{Amax} sound levels from jet wash units and a precautionary character correction).

Summary

Conservative estimations of screening attenuation (5 – 10 dB) were used in the original manual calculations, and therefore, the modelled outputs have shown that the sound levels at the receptors would generally be lower than predicted in the original robust assessment.

Even in the absolute worst-case scenario (using L_{Amax} levels of jet wash units), the results at the receptors would be below the measured background sound level, and significantly below the typical baseline L_{Amax} levels (which were measured in the region of 66 – 72 dB).

The modelled results strengthen the likelihood that the development would result in a low impact at all receptors, even in an absolute worst-case.

Appendix A: Scheme Drawings

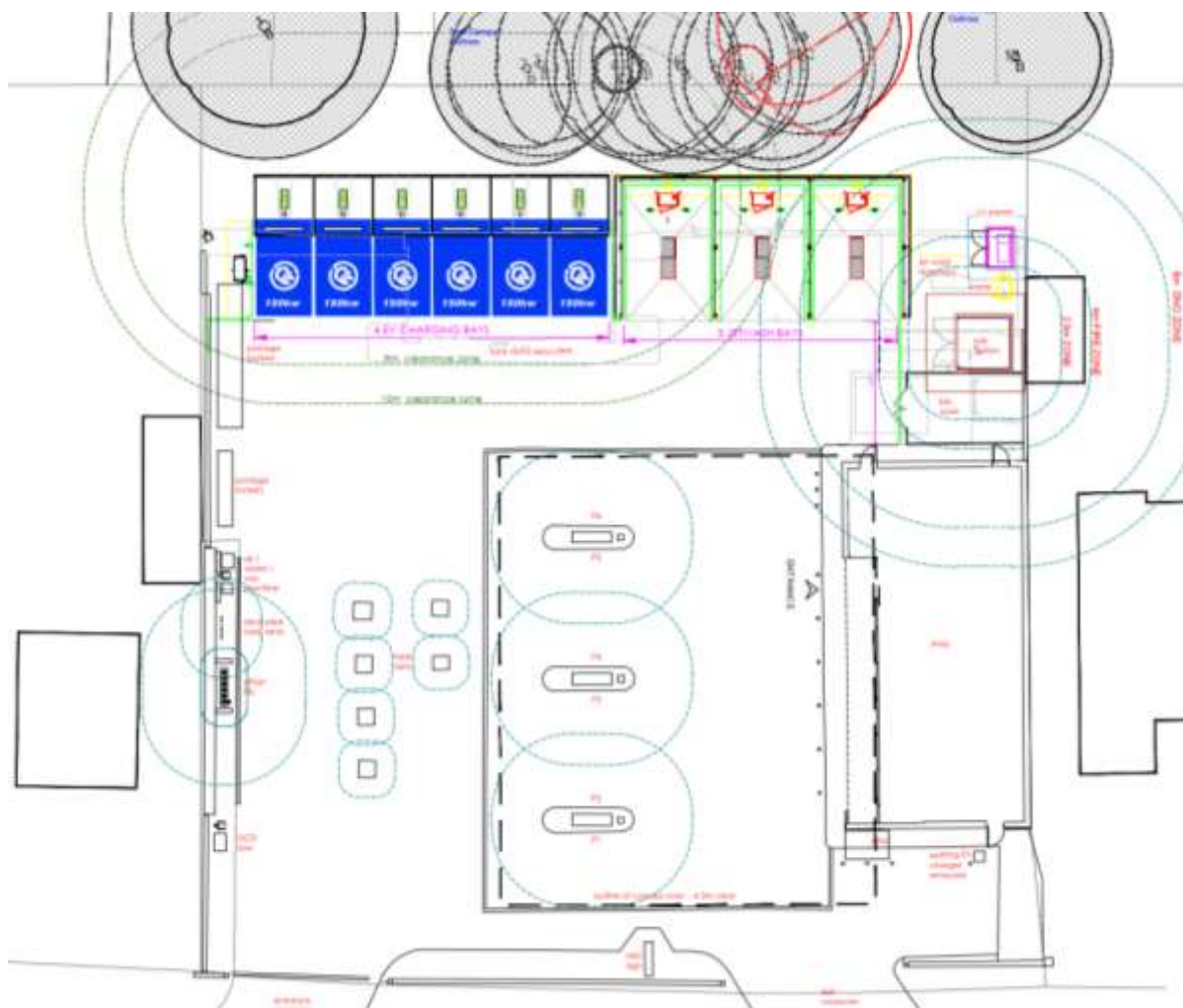


Figure A1 – Development scheme plan.



Photo
Representative Example - refer to drawing for accurate interpretation



Photo
Representative Example - refer to drawing for accurate interpretation

Figure A2 – Proposed EV charger bay design plans.

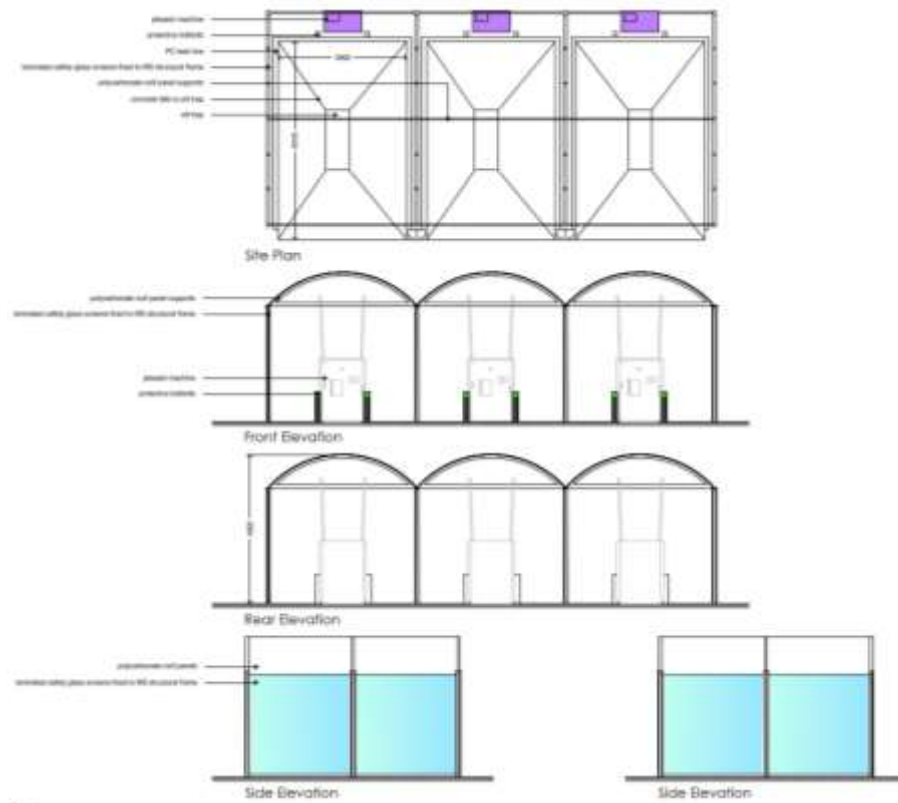


Figure A3 – Proposed jetwash bay design plans.

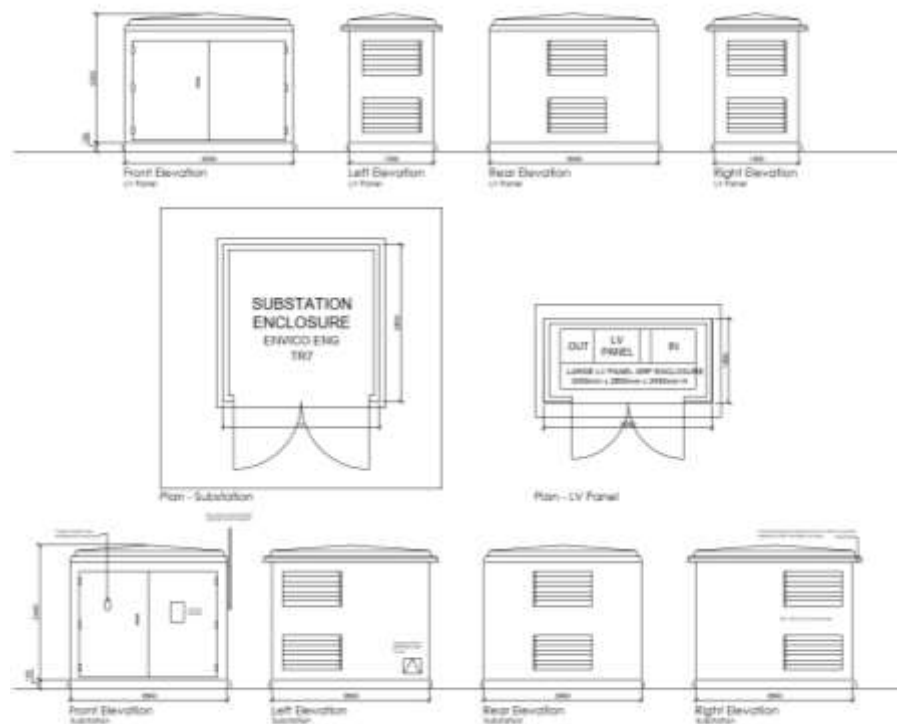


Figure A4 – Proposed substation enclosure (Envico ENG TR7).

Technical Specification - Istobal Valeting Equipment



4CA2000 Jet Wash

Water consumption	12 Litres per minute on highest the function
Operating Pressure	65 Bar
Sound level	70 db
Electrical supply requirement	Single phase 40 amp or 3 phase N + E 20 amp
Water supply requirement	Recommended 20mm MDPE with isolation valve or a suitable pipe capable of delivering a minimum of 12 litres per minute.

4KA0000 Combo Unit

Water consumption	4 Litres per minute
Sound level	65.6 db
Electrical supply requirement	Single phase 16 amp
Water supply requirement	Recommended 20mm MDPE with isolation valve or a suitable pipe capable of delivering a minimum of 4 litres per minute.

4AA1000 Vacuum

Sound level	65.6 db
Electrical supply requirement	Single phase 16 amp
Water supply requirement	N/A

4VA1100 Air / Water / Screenwash

Water consumption	4 Litres per minute (If an Air only is being installed this is N/A)
Sound level	70 db
Electrical supply requirement	Single phase 16 amp
Water supply requirement	Recommended 20mm MDPE with isolation valve or a suitable pipe capable of delivering a minimum of 4 litres per minute. (If an Air only is being in-

Figure A5 – Technical specifications of equivalent valeting equipment installed at similar MFG sites.

Appendix B: Environmental Survey Summary

An environmental survey has been undertaken between 31st October - 4th November 2022 to quantify sound levels at the development site in accordance with BS 4142. Details of the study have been provided in Appendix D with results summarised herein this section.

BACKGROUND AND RESIDUAL SOUND LEVELS

The 'typical' background sound levels have been reported in this section in accordance with BS 4142 as established from histograms of the recorded dB $L_{A90, 15min}$ data at Position 1, shown in Appendix D. The measurement location has been used to describe the underlying climate at the boundary of the nearest noise sensitive location during proposed operating periods.

In line with Section 8.1.4 of BS 4142, the monitoring duration should reflect the range of background noise levels for the period assessed. In practice, there is no single level for background sound as this is a fluctuating parameter, although a representative value of the period should be used. Note this is not either the lowest or mean average value of dB $L_{A90, 15min}$.

Measurement Data		Free Field Sound Pressure Level, dB $L_{A90, T}$ re. 20 μ Pa		
Date Range	Time HH:MM	Position 1, at boundary of The Site		
		Range	Representative	Period Description
31/10/2022 – 04/11/2022	07:00 – 23:00	44 – 64	51	Day
	23:00 – 07:00	33– 50	41	Night

Table B1 – Background sound level summary, dB $L_{A90, T}$.

The residual sound level data in this section have been summarised from raw data in Appendix D, generally in accordance with the requirements of BS 4142. The snapshots of environmental sound are taken to be representative of the underlying noise climate without the development in operation and are used to evaluate the environmental noise impact for the development.

Measurement Data		Free Field Sound Pressure Level, dB $L_{Aeq, T}$ re. 20 μ Pa		
Date Range	Time HH:MM	Position 1, at boundary of The Site		
		Range	Representative*	Period Description
31/10/2022 – 04/11/2022	07:00 – 23:00	53 – 67	57	Day
	23:00 – 07:00	42 – 62	47	Night

* Representative values of residual have been noted at times of representative background sound.

Table B2 – Residual sound level summary, dB $L_{Aeq, T}$.