12 AIR (NOISE AND VIBRATION)

12.1 INTRODUCTION

The following chapter presents an assessment of the effects of impact of the proposed large-scale residential development (LRD) at Mount Avenue large-scale residential development located at lands in Castletown, Dundalk, Co. Louth, in terms of noise and vibration on the local environment. The assessment for noise and vibration is based on the most up to date applicable guidance and assessment documents available both nationally and internationally.

The noise and vibration assessment has been prepared by Abe Scheele (Acoustic Consultant). Abe holds a City and Guilds Level 1 and 2 in Sound Engineering and City and Guilds Music Technology and has completed the Institute of Acoustics (IOA) Diploma in Acoustics and Noise Control. Abe has been working in the field of acoustics since 2016. He is experienced in environmental, building and architectural acoustics. He has knowledge of surveying, computer modelling, impact assessment of environmental noise and architectural acoustic assessments for various sectors including industrial, commercial, and residential.

Noise and vibration will be considered in terms of two aspects. The first is the outward effect of the development on its surrounding environment, and the second is the inward effect of the existing noise sources in the surrounding environment on the development itself. A full project description is included in Chapter 3 of this Environmental Impact Assessment Report (EIAR).

12.2 ASSESSMENT METHODOLOGY

The assessment of effects of impact has been undertaken with reference to the most appropriate guidance documents relating to environmental noise and vibration which are set out within the relevant sections of this report. In addition to specific guidance documents for the assessment of noise and vibration effects of impact which are discussed further in the relevant sections, the following guidelines were considered and consulted for the purposes of this report:

- EPA Guidelines on the information to be contained in Environmental Impact Assessment Reports, 2022; and
- EPA Advice Notes on current practise in the preparation of Environmental Impact Statements, 2003.

The study has been undertaken using the following methodology:

- A review of the most applicable standards and guidelines has been conducted in order to set a range of acceptable noise and vibration criteria for the construction and operational phases of the proposed development;
- An environmental noise survey has been undertaken in the vicinity of the subject site in order to characterise the existing baseline noise environment;
- Predictive calculations have been performed to estimate the likely noise emissions during the construction phase of the proposed development at the nearest noise sensitive locations (NSLs) to the site;
- Predictive calculations have been performed to assess the potential effects associated with the operation of the development at NSLs surrounding the development site;
- An assessment has been completed of potential cumulative effects that may arise as a result of the proposed development and other existing or proposed plans and projects;
- A schedule of mitigation measures has been proposed, where relevant, to control the noise and vibration emissions associated with both the construction and operational phases of the proposed development; and

- The inward effect of noise from the surrounding environment into the proposed residential buildings has also been assessed to determine the requirements, for additional noise mitigation to ensure a suitable internal noise environment for residential amenity.

12.2.1 Construction Phase

Criteria for Assessing Construction Noise Impacts

There is no published statutory Irish guidance relating to the maximum permissible noise level that may be generated during the construction phases of a project. Local authorities normally control construction activities by imposing limits on the hours of operation and consider noise limits at their discretion.

In the absence of specific noise limits, appropriate criteria relating to permissible construction noise levels for a development of this scale may be found in the British Standard BS 5228 – 1: 2009+A1:2014: *Code of practice for noise and vibration control on construction and open Site – Noise.*

The approach adopted here calls for the designation of a NSL into a specific category (A, B or C) based on existing ambient noise levels in the absence of construction noise. This then sets a Construction Noise Threshold (CNT) that, if exceeded, indicates a potential significant noise effect is associated with the construction activities.

This document sets out guidance on permissible noise levels relative to the existing noise environment. Table 12-1 sets out the values which, when exceeded, signify a potential significant effect at the façades of residential receptors, as recommended by BS 5228-1:2009+A1:2014.

Assessment category and threshold value period (L_{Aeq})	**Construction Noise Threshold (CNT), in decibels (dB)**		
	Category A[1]	**Category B[2]**	**Category C[3]**
Night-time (23:00 to 07:00hrs)	45	50	55
Evenings and weekends[4]	55	60	65
Daytime (07:00 - 19:00) and Saturdays (07:00 – 13:00hrs)	65	70	75

Table 12-1: Example thresholds of potential significant effect at dwelling.

It should be noted that this assessment method is only valid for residential properties, and if applied to commercial premises without consideration of other factors, may result in an excessively onerous thresholds being set.

Proposed Threshold Levels for Noise

Taking into account the proposed document outlined above and making reference to the baseline noise environment monitored around the Masterplan development site (referred to in Section 13.3), CNTs are set using Category A for the closest NSLs to the proposed development.

Interpretation of the Construction Noise Levels (CNL)

In order to assist with interpretation of the significance of a CNL, Table 12-2 includes guidance as to the likely magnitude of impact associated with construction activities, relative to the CNT. This guidance is taken from the UK document Design Manual for Roads and Bridges (2020) LA 111

[1] Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are less than these values.
[2] Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are the same as category A values.
[3] Category C: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are higher than category A values.
[4] 19:00 – 23:00 weekdays, 13:00 – 23:00 Saturdays and 07:00 – 23:00 Sundays.

Sustainability & Environmental Appraisal. Noise and Vibration Rev 2 (DMRB: Noise and Vibration - UKHE 2020) and adapted to include the EPA 2022 EIAR Guidelines.

Guidelines for Noise Impact Magnitude Assessment of Significance (DMRB)	CNL per Assessment Category and Threshold Value Period	EPA EIAR Significance Effects	Determination of Significance in EIAR Terms
Negligible	Below or equal to baseline noise level	Not Significant	Not Significant
Minor	Above baseline and below or equal to CNT	Slight to Moderate	CNLs at the upper end of this range will result in higher potential impacts, therefore this range is categorised as Slight to Moderate, acknowledging that values approaching the CNT are greater than Slight. In accordance with DMRB Noise and Vibration (UKHE 2020) and BS 5228-1 ((BSI 2009 +A1 2014a), noise levels below the CNT are deemed 'Not Significant'.
Moderate	Above CNT and below or equal to CNT +5dB	Moderate to Significant	CNLs at the upper end of this range will result in higher potential impacts, therefore this range is categorised as Slight to Moderate, acknowledging that values approaching the CNT are greater than Slight. In accordance with DMRB Noise and Vibration (UKHE 2020) and BS 5228-1 ((BSI 2009 +A1 2014a), noise levels below the CNT are deemed 'Not Significant'.
Major	Above CNT +5 to +15 dB	Significant, to Very Significant	Depending on CNT, duration and baseline noise level. In accordance with the DMRB Noise and Vibration (UKHE 2020), construction noise impacts shall constitute a significant effect where it is determined that a moderate or major magnitude of impact will occur for a duration exceeding: • Ten or more days or night in any 15 consecutive day or nights; and • A total number of days exceeding 40 in any six consecutive months.
	Above CNT +15 dB	Very Significant to Profound	

Table 12-2: Interpretation of CNL at dwelling.

The adapted DMRB guidance outlined will be used to assess the predicted construction noise levels at NSLs and comment on the likely impacts during the construction stages.

Construction Vehicular Traffic

In order to assist with interpretation of construction traffic noise, Table 12-3 includes guidance as to the likely magnitude of impact associated with changes in traffic noise levels along an existing road. This guidance is taken from the DMRB: Noise and Vibration (UKHE 2020). For construction traffic, due to the short-term period over which this impact occurs, the magnitude of impacts is assessed against the 'short-term' period in accordance with the DMRB document.

Increase in Traffic Noise Level (dB)	DMRB Magnitude of Impact	EPA Significance of Effect
<1.0	Negligible	Imperceptible
1.0 – 2.9	Minor	Not Significant to Slight
3 – 4.9	Moderate	Slight to Moderate
<5.0	Major	Significant

Table 12-3: Likely effect associated with change in traffic noise level – construction noise (DMRB 2020).

The DMRB guidance outlined will be used to assess the predicted increases in traffic levels on public roads associated with the proposed development and comment on the likely impacts during the construction stage.

For both construction noise and construction traffic, a significant effect is deemed to occur where a moderate or major impact is likely to occur for a period of greater that 10 days/nights over 15 consecutive day/nights, or greater than 40 days over 6 consecutive months.

Criteria for Assessing Construction Vibration Impacts

Vibration standards come in two varieties: those dealing with human comfort and those dealing with cosmetic or structural damage to buildings. For the purpose of the proposed development, the range of relevant criteria used for surface construction works for both building protection and human comfort are expressed in terms of Peak Particle Velocity (PPV) in mm/s.

Peak Particle Velocity (PPV)

PPV is commonly used to assess the structural response of buildings to vibration. Reference to the following documents has been made for the purposes of this assessment in order to discuss appropriate PPV limit values:

- British Standard BS 7385: 1993: Evaluation and measurement for vibration in buildings Part 2: Guide to damage levels from ground borne vibration, and;
- British Standard BS 5228: 2009 +A1 2014: Code of practice for noise and vibration control on construction and open Site – Part 2: Vibration (BS5228-2).

BS7385-2:1993 and BS5228-2:2009+A1:2014 advise that, for soundly constructed residential properties and similar structures that are generally in good repair, a threshold for minor or cosmetic (i.e. non-structural) damage should be taken as a peak component particle velocity (in frequency range of predominant pulse) of 15 mm/s at 4 Hz increasing to 20 mm/s at 15 Hz and 50 mm/s at 40 Hz and above for transient vibration. Where the dynamic loading caused by continuous vibration is such as to give rise to dynamic magnification due to resonance, especially at the lower frequencies where lower guide values apply, then the guide values in Table B.2 of BS5228-2:2009+A1:2014 might need to be reduced by up to 50%. On a cautious basis, therefore, continuous vibration limits are set as 50% of those for transient vibration across all frequency ranges. For buildings or structures that are structurally unsound, lower vibration magnitudes will apply, typically 50% of those for structurally sound buildings. Protected or historic buildings are not automatically assumed to be more vulnerable to vibration unless they have existing structural defects.

The documents note that minor structural damage can occur at vibration magnitudes that are greater than twice those presented in Table 12-4. Major damage to a building structure is possible at vibration magnitudes greater than four times the values set out in the Table. It should be noted that these values refer to the vibration at base of the building.

Table 12-4 sets out the limits as they apply to vibration frequencies below 4 Hz, where the most conservative limits are required.

Structure Type	**Allowable vibration (in terms of PPV) at closest part of sensitive property to source of vibration, at frequency of ≤4 Hz**	
	Transient vibration	**Continuous vibration**
Reinforced or framed structures. Industrial and heavy commercial buildings	50 mm/s	25 mm/s
Unreinforced or light framed structures. Residential or light commercial-type buildings	15 mm/s	7.5 mm/s

Table 12-4: Recommended construction vibration thresholds for buildings.

Human Perception

Humans are sensitive to vibration stimuli, and perception of vibration at high magnitudes may cause concern to building occupants. BS5228-2:2009+A1:2014 notes that vibration typically becomes perceptible at around 0.15 to 0.3 mm/s and may become disturbing or annoying at higher magnitudes. Higher levels of vibration are typically tolerated for single events or events of short-term duration, particularly during construction projects and when the origin of vibration is known.

Table 12-5 presents the significance table relating to potential impacts to building occupants during construction based on guidance from BS5228-2:2009+A1:2014 and the DMRB Noise and Vibration (UKHE 2020) document and the associated EPA significant ratings.

Criteria	**BS 5228-2**	**DMRB Impact Magnitude**	**EPA Significance Rating**
≥10 mm/s PPV	Vibration is likely to be intolerable for any more than a very brief exposure to this level in most building environments.	Very High	Very Significant
≥1 to <10 mm/s mm/s	Increasing likelihood of perceptible vibration in residential environments but can be tolerated at the lower end of the scale if prior warning and explanation has been given to residents	Moderate	Moderate to Significant
0.3 to <1 mm/s	Increasing likelihood of perceptible vibration in residential environments	Minor	Slight
<0.3 mm/s PPV	Vibration is unlikely to be perceptible in even the most sensitive situations for most vibration frequencies associated with construction	Negligible	Not Significant

Table 12-5: Guidance on effects of human response to PPV magnitudes.

12.2.2 Operational Phase

Criteria for Assessing Operational Outward Noise Impacts

The main potential source of outward noise from the proposed development will be limited to traffic flows to and from the development site onto the public roads. There will also be an element of mechanical and electrical plant required to service apartment buildings. The relevant guidance documents used to assess potential operational noise and vibration impacts on the surrounding environment are summarised in the following sections.

Change in Traffic Noise Levels

In the absence of any Irish guidelines or standards describing the effects associated with changes in road traffic noise levels, reference has been made to the DMRB Noise and Vibration (UKHE 2020) document, refer to Table 12-6. This document provides magnitude rating tables relating to changes in road traffic noise. For the operational phase of the development, changes in traffic noise are assessed against the long-term magnitude criteria based on the future design year traffic flows along the surrounding road network (i.e. 15 years post opening). In summary, the assessment looks at the impact with and without development at the nearest noise sensitive locations.

Change in Noise Level (dB L_{A10})	DMRB Long-Term Term Magnitude	EPA Classification Magnitude of Impact
<0.1	Negligible	Imperceptible
0.1 – 2.9		Not significant
3 – 4.9	Minor	Slight to Moderate
5 – 9.9	Moderate	Moderate to Significant
10+	Major	Significant to Very Significant

Table 12-6: Likely impact associated with long-term change in traffic noise level (DMRB 2020).

The criteria above reflect the key benchmarks that relate to human perception of sound. A change of 3 dB(A) is generally considered to be the smallest change in environmental noise that is perceptible to the human ear. A 10 dB(A) change in noise represents a doubling or halving of the noise level. The difference between the minimum perceptible change and the doubling or halving of the noise level is split to provide greater definition to the assessment of changes in noise level.

Mechanical and Electrical Plant

The proposed development is largely residential in nature comprising a mixture of houses and duplex. There will be minimal mechanical and/ or electrical plant items required to service the development that will generate noise levels outside of the site boundary or at the developments buildings themselves. Plant contained within plant rooms has the least potential for impact, once consideration is given to appropriate design of the space.

The closest noise sensitive locations to any operational plant items are the residential dwellings within the proposed development. To ensure there is no adverse impact on the future inhabitants of the proposed development itself, it is appropriate to refer to internal noise targets derived from BS 8233: 2014: *Guidance on Sound Insulation and Noise Reduction for Buildings*. The recommended indoor ambient noise levels are set out in Table 12-7 and are based on annual average data.

The derived external levels are based on the approximate attenuation provided by a partially open window of 15 dB, as advised in BS 8233 (BSI 2014c), and represent the appropriate noise level at the external façade of the building. For mechanically ventilated buildings, higher external noise levels will achieve the same internal noise levels with closed windows.

Activity	Location	Internal Noise Design	Derived External Levels
Residential Day	Living room	35 dB $L_{Aeq,16hr}$	50 dB $L_{Aeq,16hr}$
	Dining room/area	40 dB $L_{Aeq,16hr}$	55 dB $L_{Aeq,16hr}$
	Bedroom	35 dB $L_{Aeq,16hr}$	50 dB $L_{Aeq,16hr}$
Residential Night	Living room	35 dB $L_{Aeq,8hr}$	50 dB $L_{Aeq,8hr}$

	Dining room/area	40 dB $L_{Aeq,8hr}$	55 dB $L_{Aeq,8hr}$
	Bedroom	30 dB $L_{Aeq,8hr}$	45 dB $L_{Aeq,8hr}$

Table 12-7: Internal noise design range for residential buildings (BS 8233:2014).

Criteria for Assessing Inward Noise Impacts

Louth County Council Noise Action Plan 2024 – 2028

The Louth Noise Action Plan (NAP) 2024 – 2028 states the following with respect to assessing the noise impact on new residential development:

> *"To successfully use the planning process to avoid, or minimise, noise exposure in a consistent manner, it is considered necessary to issue guidance on noise exposure levels for a proposed development. Such guidance will apply on a countywide basis and is not restricted solely to the area covered by the strategic noise mapping*
>
> *There are two scenarios to consider when issuing guidance. Firstly, where new residential development or other noise sensitive development is proposed in an area with an existing climate of environmental noise. There is currently no clear national guidance on appropriate noise exposure levels in this scenario. Pending the introduction of such guidance, the following UK Guidelines shall apply:*
>
> - *The Scottish Office, PAN 1/2011: March 2011 Planning Advice Note (PAN) provides advice on the role of the planning system in helping to prevent and limit the adverse effects of noise.*
>
> *In the second scenario, where new, or altered, sources of noise are introduced to existing residential or other noise sensitive locations, there are currently a number of guidance documents, which cover some of these situations as previously outlined. Where existing guidance does not cover the situation under consideration, the following UK Guidelines shall apply:*
>
> - *The Scottish Office, PAN 1/2011: March 2011 Planning Advice Note (PAN) provides advice on the role of the planning system in helping to prevent and limit the adverse effects of noise*
> - *BS 4142:2014 Method for Rating Industrial and Commercial Sound, British Standards Institution (BSI), London 2014*
> - *ProPG Planning and Noise Guidance note (May 2017)."*

The PAN 1/2011 document does not contain guidance for assessment of new residential developments into existing environments. The ProPG document is the most relevant and recent document used to assess new residential development in an area with an existing climate of environmental noise. This has therefore been used for the development site in question.

Professional Practice Guidance on Planning & Noise (ProPG 2017)

The *Professional Practice Guidance on Planning & Noise* (ProPG 2017)[5] has been generally considered best practice guidance adopted in Ireland the absence of equivalent Irish guidance for inward noise impact assessments.

The ProPG outlines a systematic risk based 2-stage approach for evaluating noise exposure on prospective Site for residential development. The two primary stages of the approach can be summarised as follows: -

- ***Stage 1:*** Comprises a high-level initial noise risk assessment of the proposed site considering either measured and or predicted noise levels.

[5] Association of Noise Consultants (ANC), the Institute of Acoustics (IOA) and the Chartered Institute of Environmental Health (CIEH).

- ***Stage 2:*** Involves a full detailed appraisal of the Proposed Development covering four "key elements" that include: -

    1. ***Element 1*** – Good Acoustic Design Process
    2. ***Element 2*** – Noise Level Guidelines
    3. ***Element 3*** – External Amenity Area Noise Assessment
    4. ***Element 4*** – Other Relevant Issues

The initial noise risk assessment is intended to provide an early indication of any acoustic issues that may be encountered. It calls for the categorisation of the site as a negligible, low, medium or high risk, based on the pre-existing noise environment. Figure 12-1 presents the basis of the initial noise risk assessment; it provides appropriate risk categories for a range of continuous noise levels either measured and / or predicted on site.

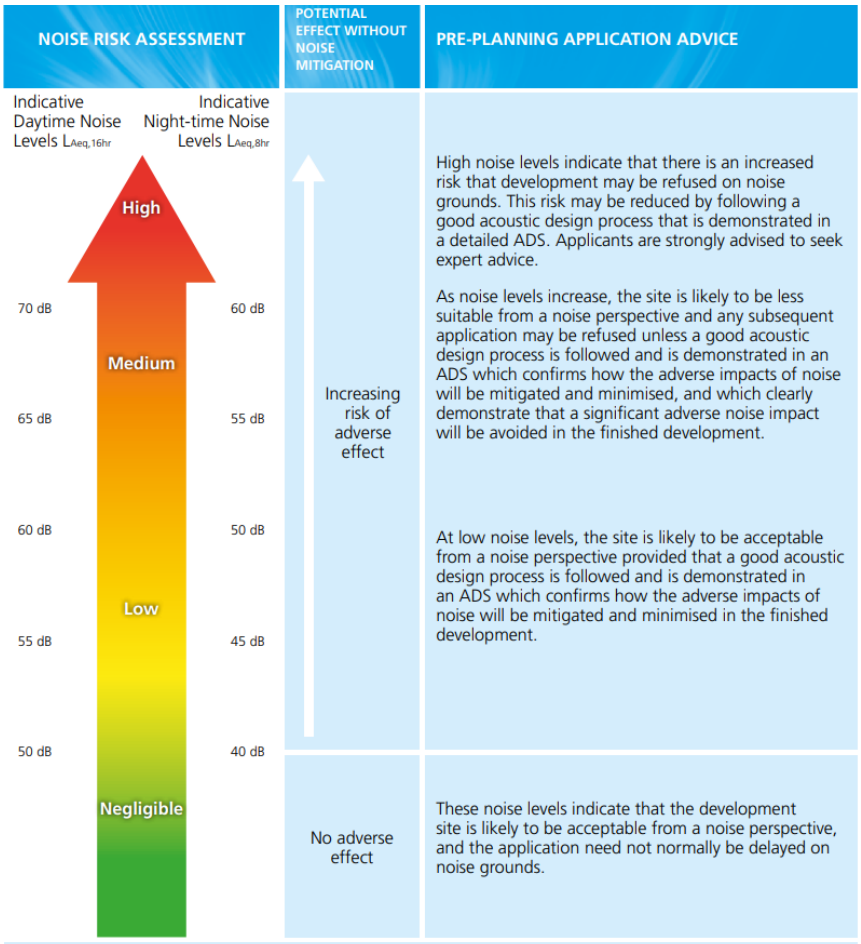

Figure 12-1: ProPG Stage 1 - Initial noise risk assessment

It should be noted that a site should not be considered a negligible risk if more than 10 no. L_{AFMax} events exceed 60 dB during the night period, and the site should be considered a high risk if the L_{AFMax} events exceed 80 dB more than 20 times a night.

Element 2 of the ProPG document sets out recommended internal noise targets derived from BS 8233: 2014. The recommended indoor ambient noise levels are set out in Table 12-7 previously and are based on annual average data.

In addition to these absolute internal noise levels, ProPG provides guidance on flexibility of these internal noise level targets. For instance, in cases where the development is considered necessary or desirable, and noise levels exceed the external noise guidelines, then a relaxation of the internal L_{Aeq} values by up to 5 dB can still provide reasonable internal conditions.

ProPG provides the following advice with regards to external noise levels for amenity areas in the development: -

> *"The acoustic environment of external amenity areas that are an intrinsic part of the overall design should always be assessed and noise levels should ideally not be above the range 50 – 55 dB $L_{Aeq,16hr}$."*

Criteria for Assessing Operational Vibration Impacts

There are no noteworthy sources of vibration associated with the operational stage, therefore vibration criteria have not been specified.

12.3 RECEIVING ENVIRONMENT

12.3.1 Proposed Development-

The proposed development is located at lands in the Townlands of Newtownbalregan, Castletown and Farrandreg, at Mount Avenue, Castletown, Dundalk, Co. Louth.

The existing noise and vibration environments across the Site and in the vicinity of the nearest existing NSLs are dictated by transportation sources in the study area including the existing local road network to the east and north of the site.

Baseline Noise Environment

An environmental noise survey has been conducted to quantify the existing noise environment. The survey was conducted in general accordance with ISO 1996: 2017: *Acoustics – Description, measurement and assessment of environmental noise.*

A noise survey was undertaken at three locations at the Proposed Development Application Site. One survey position was unattended to measure typical baseline noise levels over the day and night period. Attended surveys were carried out at three locations in proximity of the nearest noise sensitive locations (NSLs).

The selected survey locations were appropriate to determine baseline incident noise at the Proposed Development Applications Site and the baseline noise at the nearest noise sensitive locations (NSLs). The selected measurement positions are described in the following sections and indicated in Figure **12-2** and Figure 12-3.

Monitoring Positions

UN1 The unattended monitoring equipment was installed on the northern boundary of site at a height of 3.5 m. The position is representative of incident noise to Proposed Development Site and background noise levels in the surrounding environment.

AN1 Positioned to the west of the site at on the roadside at Grayacre Road.

AN2 Positioned to the east of the site on the roadsidet at Mount Avenue.

AN3 Positioned to the south of the southern site boundary at Mount Avenue.

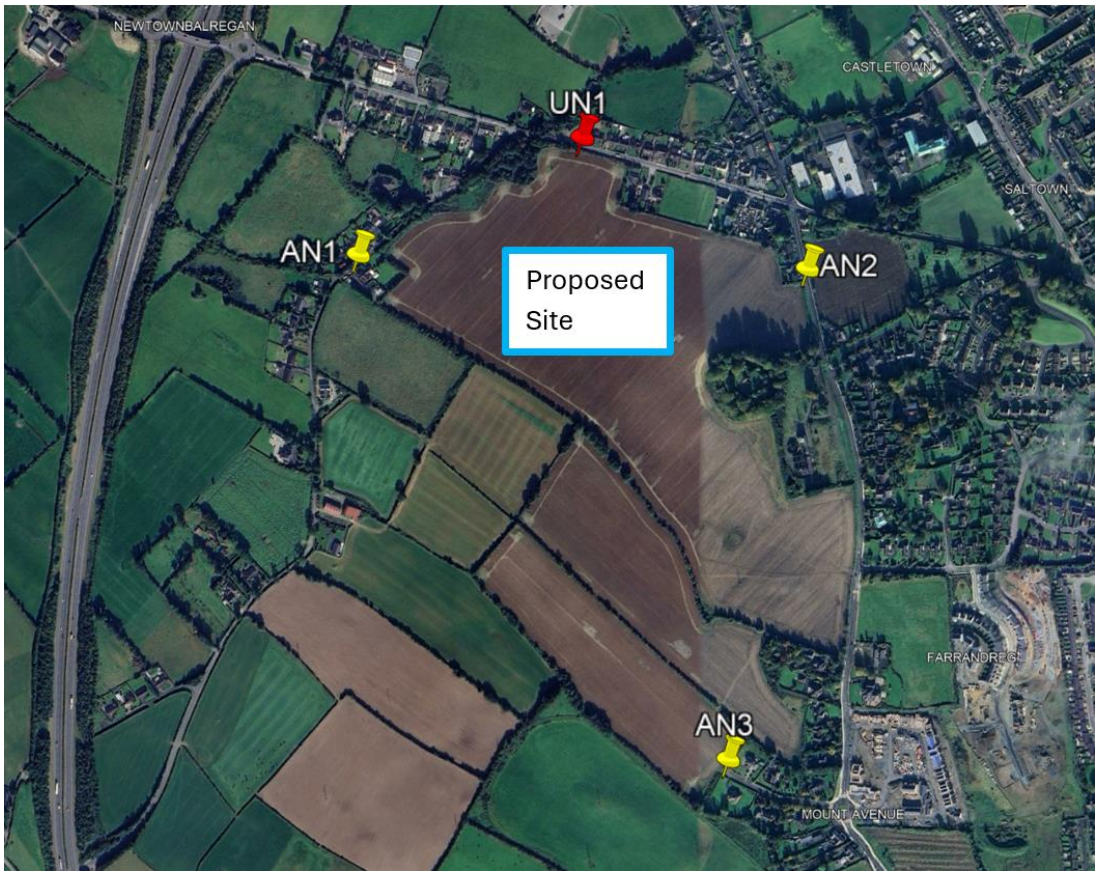

Figure 12-2: Noise monitoring locations (Source Google Earth).

Figure 12-3: UN1 installation.

Survey Periods

At UN1 continuous noise measurements were logged at intervals of 5 minutes between 10:45 hrs on Wednesday 16th July and 07:00 hrs on Friday 18th July 2025.

The attended surveys were carried out during the morning and afternoon of Wednesday 16th July. Three 15-minute measurements were cyclically measured at each of the three locations.

The weather during the period were calm and dry.

Personnel and Instrumentation

AWN staff installed and collected the noise monitoring equipment. The following instrumentation was used in conducting the noise surveys.

Equipment	Type	Serial Number	Calibration Date
Sound Level Meter	RION NL-52	586940	20/02/2024
Sound Level Meter	Rion NL-53	16/04/2025	16/04/2025
Sound Calibrator	Brüel & Kjær Type 4231	34313057	28/11/2024

Table 12-8: Instrumentation details.

Measurement Parameters

The noise survey results are presented in terms of the following three parameters:

L_{Aeq} is the equivalent continuous sound level. It is a type of average and is used to describe a fluctuating noise in terms of a single noise level over the sample period.

L_{A90} is the sound level that is exceeded for 90% of the sample period. It is typically used as a descriptor for background noise.

L_{Amax} is the maximum sound level that is measured during the sample period.

The "A" suffix denotes the fact that the sound levels have been "A-weighted" to account for the non-linear nature of human hearing. All sound levels in this report are expressed in terms of decibels (dB) relative to 2x10-5 Pa.

Results and Discussion

Attended Daytime Noise Survey Position AN1 Results

The daytime survey results for Location AN1 are presented in Table 12-9. During the daytime period intermittent local road traffic, distant road traffic and running water were the dominant noise sources, with intermittent dogs barking and bird song also audible.

Date	Time Period	L_{Aeq}	L_{Amax}	L_{A90}
16th July 2025	11:54	57	82	45
	13:00	56	78	45
	13:55	56	75	49

Table 12-9: Measured noise levels at location AN1.

Noise levels were in the range of 56 to 57 dB $L_{Aeq,15min}$ and in the range of 45 to 49 dB $L_{A90,15min}$ during the measurement periods.

No significant level of vibration was noted at this location during site attendance.

Attended Daytime Noise Survey Position AN2 Results

The daytime survey results for Location AN2 are presented in Table 12-10. During the daytime period intermittent local road traffic from mount avenue was the dominant noise source. ,distant road traffic was audible in lulls, with bird song also audible.

Date	Time Period	L_{Aeq}	L_{Amax}	L_{A90}
16th July 2025	11:35	59	83	38
	12:38	57	80	40
	13:37	57	76	40

Table 12-10: Measured noise levels at location AN2.

Noise levels were in the range of 57 to 59 dB $L_{Aeq,15min}$ and in the range of 38 to 40 dB $L_{A90,15min}$ during the measurement periods.

No significant level of vibration was noted at this location during site attendance.

Attended Daytime Noise Survey Position AN3 Results

The daytime survey results for Location AN3 are presented in Table 12-11. During the daytime period was the dominant noise source was distant road traffic, occasional distant construction noise wiith bird song also audible.

Date	Time Period	L_{Aeq}	L_{Amax}	L_{A90}
16th July 2025	11:14	40	63	35
	12:14	44	58	41
	13:18	44	54	41

Table 12-11: Measured noise levels at location AN3.

Noise levels were in the range of 40 to 44 dB $L_{Aeq,15min}$ and in the range of 35 to 41 dB $L_{A90,15min}$ during the measurement periods.

No significant level of vibration was noted at this location during site attendance.

Unattended Noise Survey Results

Table 12-12 summarises the measured day, evening and night-time noise levels for location UN1. Subjective observations during the setup and removal of the monitoring equipment noted that the primary contributor to noise build-up was distant road traffic noise with audible foliage and birdsong.

Day / Date	Sound Pressure Level (dB re. $2x10^{-5}$ Pa)			
	Daytime (07:00 to 23:00 hrs)		Night (07:00 to 23:00 hrs)	
	L_{Aeq}	L_{A90}	L_{Aeq}	L_{A90}
2025/07/16-Day	44	39	38	34
2025/07/17-Day	47	43	45	37
2025/07/18-Day	49	47	--	--

Average	46[6]	42[7]	43[8]	35[9]

Table 12-12: Measured noise levels at Location UN1.

The L_{AFMax} values were measured at 5 minute intervals over the duration of the unattended monitoring survey. Figure 12-4 presents the distribution of the magnitude of L_{AFMax} events during the night-time period.

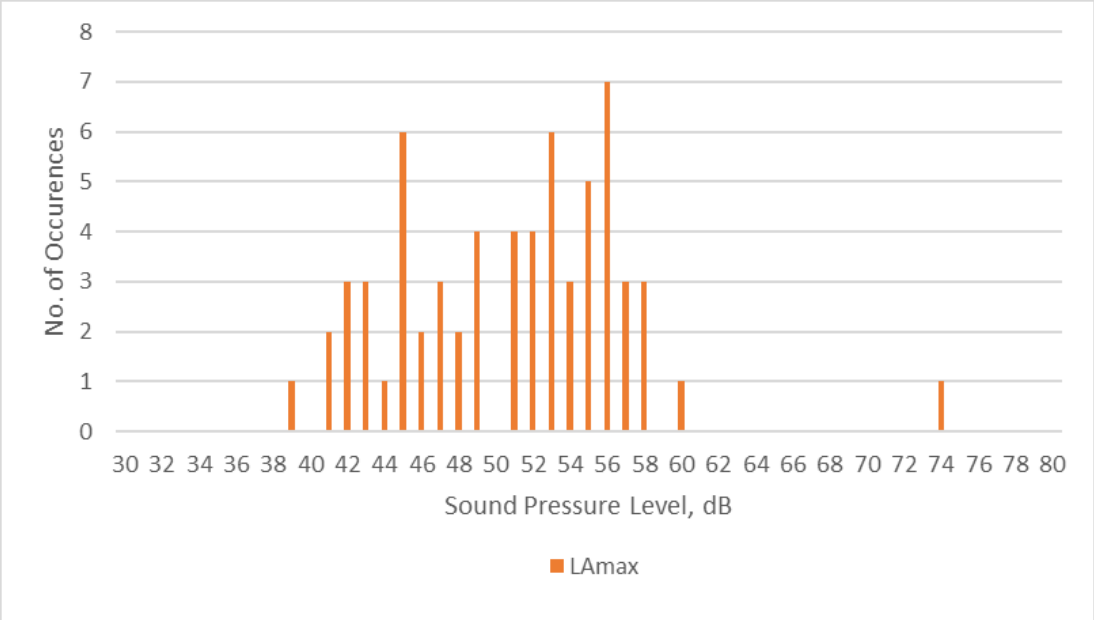

Figure 12-4: Number of L_{AFMax} events at each decibel level measured at UN1 during night-time.

During the two day unattended survey period the night-time L_{AFMax} events ranged between 39 to 74 dB $L_{AFMax.}$ There were only 2 events that measured above 60 dB L_{AFmax} over the 2 nights of monitoring.

The most commonly occurring L_{AFMax} value is 56 dB.

Review of EPA Noise Mapping

A desktop review of publicly available data has been undertaken to characterise the baseline noise environment. Reference has been made to the most recent Round 4 noise maps published by the Environmental Protection Agency (EPA) (https://gis.epa.ie/EPAMaps/) for road traffic noise. The published noise maps are provided for the overall day-evening- night period in terms of L_{den} and the 8-hour night-time period, L_{night}, defined as follows:

L_{den} is the 24hour noise rating level determined by the averaging of the L_{day} with the $L_{evening}$ (plus a 5dB penalty) and the L_{night} (plus a 10dB penalty). L_{den} is calculated using the following formula:

$$L_{\text{den}} = 10log\ (\frac{1}{24})(12 * (10^{\frac{Lday}{10}}) + 4 * (10^{\frac{Levening+5}{10}}) + 8 * (10^{\frac{Lnight+10}{10}}))$$

Where:

[6] Logarithmically averaged.
[7] Arithmetically averaged.

L_{day} is the A-weighted long-term average sound level as defined in ISO 1996-2, determined over all the day periods of a year. The 12hr daytime period is between 07:00 to 19:00hrs.

$L_{evening}$ is the A-weighted long-term average sound level as defined in ISO 1996-2, determined over all the evening periods of a year. The 4hr evening period is between 19:00 to 23:00hrs.

L_{night} is the A-weighted long-term average sound level as defined in ISO 1996-2, determined over all the night periods of a year. The 8hr night- time period is between 23:00 to 07:00hrs.

Road Traffic Noise

Figure 12-5 presents the road traffic noise levels across the site in terms of the L_{den} parameter and sourced from the EPA Round 4 noise maps.

The western and northern portion of the proposed development site is located within the 55 to 60 L_{den} noise contours, reducing to within the 50 to 55dB L_{den} further south east into the proposed development site.

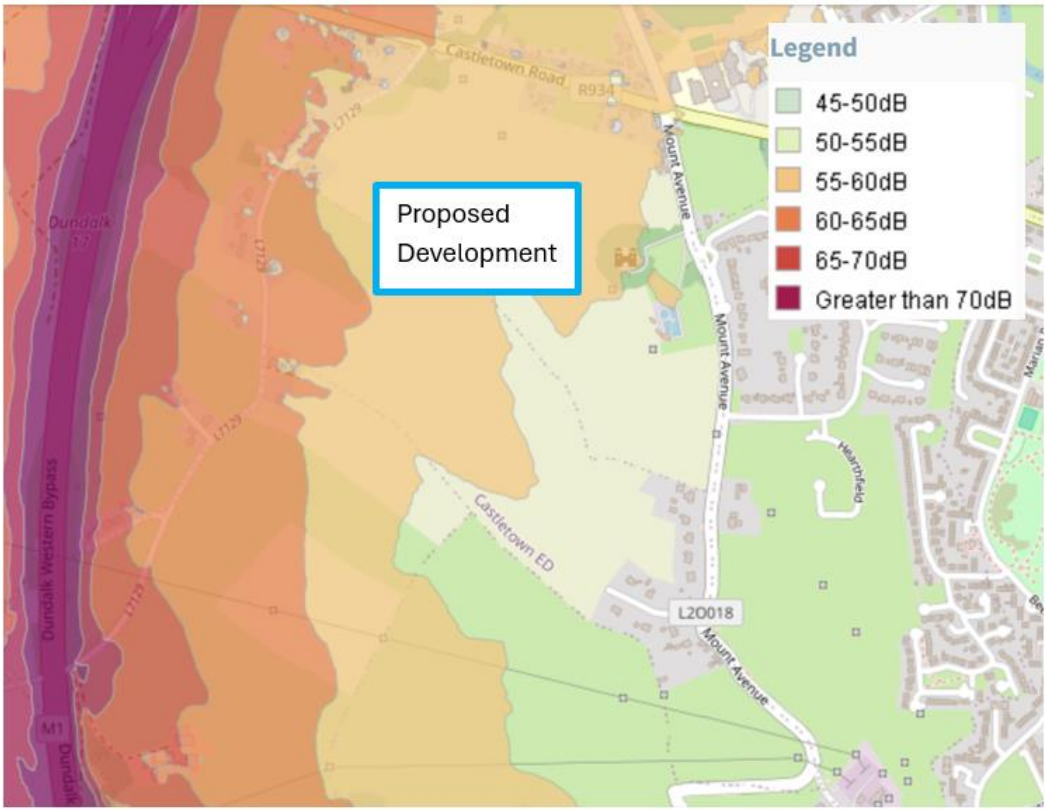

Figure 12-5 Existing Lden Road Traffic Noise Level (Source: http://gis.epa.ie accessed November 2025)

Figure 12-5 presents the night-time road traffic noise levels across the site in terms of the L_{night} parameter and sourced from the EPA noise maps.

The western portion of the proposed development site is located within the 50 to 55 L_{night} noise contours, reducing to within the 45 to 50dB L_{night} further north west into the proposed development site.

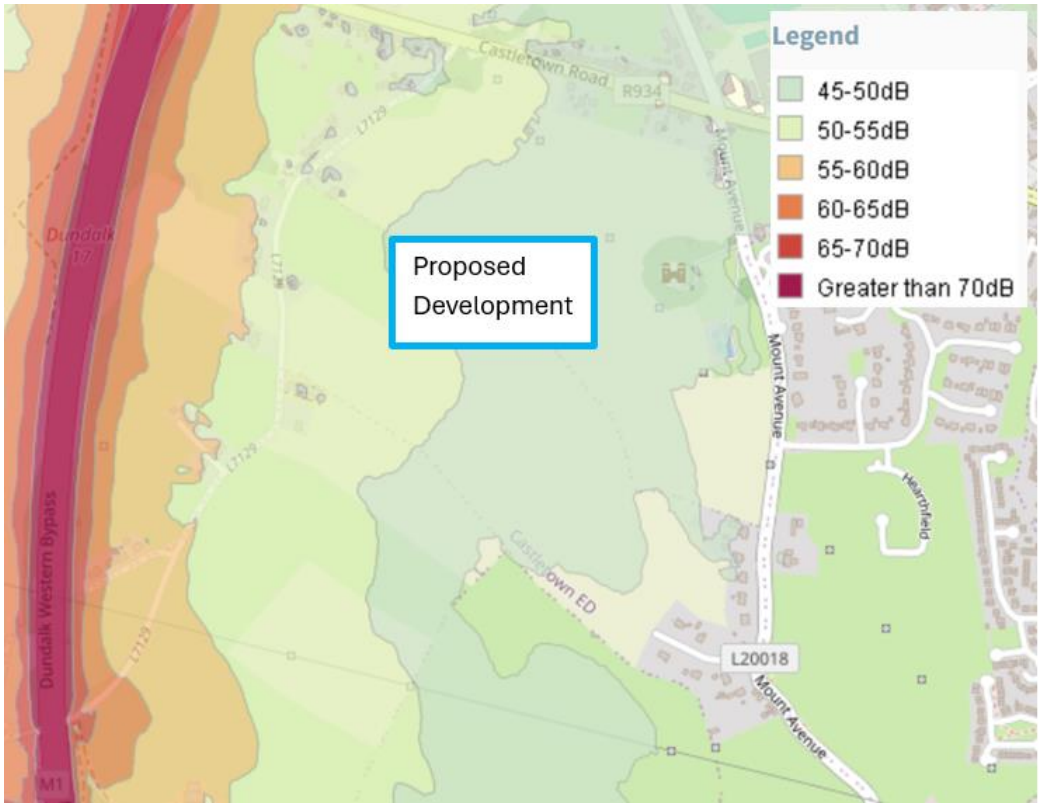

Figure 12-6 Existing Lnight Road Traffic Noise Level (Source: http://gis.epa.ie accessed November 2025)

Whilst the maps do not display the L_{day} parameter, an estimation of daytime noise levels has been determined by subtracting 2dB from the L_{den} values. This is based on the recommended approach set out in the *Brink 2018 - Conversion_between_noise_exposure_indicators*, document[1]. Table 12-13 presents the resultant noise level from road traffic.

Noise Source	Majority of Proposed Site			Western Portion		
	L_{den}	L_{day}	L_{night}	L_{den}	L_{day}	L_{night}
Road	50 – 55	48 – 53	45 – 50	55 - 60	53 - 58	50 - 55

Table 12-13 Existing Noise Levels Across Study Area

Review of the noise maps indicates that existing noise levels across the study area are dominated by road traffic noise.

The measured baseline noise levels at UN1 and AN3 are lower in level than the mapped contour noise levels during the daytime period. While Attended noise levels measured at the road edge (AN1 and AN2) are higher in level than the mapped contours.

12.3.2 Cumulative

The cumulative development under assessment is considered to be the proposed applications site in addition to other nearby permitted sites in the locality.

The nearest existing residential NSLs are those at the immediate northern, western, eastern and southern boundaries of the site boundary.

12.4 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

When considering a development of this nature, the potential noise and vibration impacts on the surroundings are considered for each of two distinct stages, the short to medium-term construction stage and the long term operational stage. The full description of the development can be found in Chapter 3.

12.4.1 Proposed Development-

The proposed development is located at lands in the Townlands of Newtownbalregan, Castletown and Farrandreg, at Mount Avenue, Castletown, Dundalk, Co. Louth.

The proposed development comprises 1,058no. dwellings (765no. houses, 150no. duplex units, and 143no. apartments) including 2no. duplexes with an option to accommodate a childcare facility at ground floor level; a local centre comprising ground floor retail units, a medical unit, and mobility hub; provision of a childcare facility; all in buildings ranging in height from 1 to 6 storeys. All associated and ancillary site development and infrastructural works, hard and soft landscaping and boundary treatment works, including public, communal and private open space; public lighting; surface car parking spaces; bicycle parking; ESB substations; bin stores; provision of a foul sewage pumping station; laying a foul rising main along Castletown Road from the proposed new access to the development eastward to the Castletown Road and Bellewsbridge Road Junction. The proposed development will be accessed from two new combined vehicular, cyclist and pedestrian junction at Castletown and at Mount Avenue. A separate pedestrian and cyclist access is also provided at Mount Avenue. A Heritage Park, a playing pitch and a site reserved for a future educational/school facility are also being provided.

12.5 POTENTIAL IMPACT OF THE PROPOSED DEVELOPMENT

12.5.1 Construction Noise Assessment Introduction

12.5.1.1 Construction Noise

During the short-term construction stage, the following construction noise threshold levels are proposed for the construction stage of the Proposed Development Site.

- NSLs external to the proposed development, Construction Category A values are appropriate, which sets a daytime construction noise threshold value of 65 dB(A).

A variety of items of plant will be in use for the purpose of site clearance and construction works. There will also be vehicular movements to and from the site that will make use of existing roads. Due to the nature of these activities, there is potential for the generation of elevated levels of noise in the vicinity of existing noise sensitive properties.

The proposed general construction hours are 08:00 to 18:00 hrs, Monday to Friday and 08:00 to 14:00 hrs on Saturdays.

Due to the fact that the construction programme has been established in outline form, construction noise associated with activities on site during this phase are reviewed for the purposes of determining the likely significant effects. Indicative ranges of noise levels associated with construction may be calculated in accordance with the methodology set out in BS 5228-1:2009+A1:2014. This standard sets out sound power and sound pressure levels for plant items normally encountered on construction Site, which in turn enables the prediction of noise levels. However, it is not possible to conduct detailed accurate prediction calculations for the construction phase of a project due to the level of variability during different construction stages over short periods of time.

Reference to BS 5288-1 indicates that highest noise levels on the site are associated with activities associated with any piling and breaking activities.

For construction works associated with activities such as excavation and structural works including excavators, loaders, dozers, cranes, generators, concreting works and continuous flight augured piling etc. noise levels are typically in the range of 70 to 82 dB L_{Aeq} at 10m.

For construction activities associated with surface ground breaking and excavation a total construction noise level of 92 dB $L_{Aeq,T}$ at 10m has been used for the purposes of indicative calculations. This would involve for example, one item of plant at 90 dB L_{Aeq} and two items of plant at 85 dB L_{Aeq} and one item of plant at 80 dB L_{Aeq} operating simultaneously within one work area which is considered a highly worst-case scenario.

Construction noise levels have been calculated at distances representative of the closest NSLs, assuming the construction noise levels discussed above. For the purpose of the assessment, partial site screening (5 dB) has been assumed from the use of a standard site hoarding of 2.4 m high for noise sensitive boundaries. The calculations also assume that the equipment will operate for 66% of the working time over a construction working day. Table 12-14 summarises the result of this assessment.

Construction Activity	**Calculated Noise Levels at Varying Distances, dB $L_{Aeq,T}$**			
	20m	**40m**	**50m**	**100m**
Break-Out Works	79	73	71	65
Piling and Excavation	69	63	61	56
General Construction	63	59	57	55

Table 12-14 Potential Construction Noise Levels at Varying Distances

12.5.1.2 Construction Traffic

Based on the information provided by DBFL Consulting Engineers it is anticipated that no more than 8 HGV peak vehicle movements will be carried out in any one-hour period during the construction works. It is assumed that all of the HGVs will enter / exit the site via Mount Avenue and Castletown Road. The NSLs are closest to the route at 15m distance along the Mount Avenue entrance.

An increase of 25% in traffic is required to increase overall traffic noise levels by 1 dB, which is insignificant in the overall context of the noise environment along the wider road network in the vicinity of the proposed development. Therefore, the short-term noise environment assumed for this project is expected to be within at least 1 dB of the baseline scenario, which would give a magnitude of increase in traffic noise that is *not significant.*

The noise level associated with an event of short duration, such as a passing vehicle movement, may be expressed in terms of its Sound Exposure Level (L_{AX}). The mean value of Sound Exposure Level (SEL) for a truck at low to moderate speeds (i.e. 15 to 45km/hr) is of the order of 85 dB L_{AX} at a distance of 5 metres from the vehicle. This figure is based on a series of measurements conducted under controlled conditions. The SEL can be used to calculate the contribution of an event or series of events to the overall noise level in a given period.

The appropriate formula is given below.

$$L_{Aeq,T} = L_{AX} + 10Log_{10}(N) - 10Log_{10}(T) + 20Log_{10}\left(\frac{r_1}{r_2}\right) dB$$

where: -

$L_{Aeq,T}$ is the equivalent continuous sound level over the time period T in seconds).

L_{AX} is the "A-weighted" Sound Exposure Level of the event considered (dB).

N is the number of events over the course of time period T.

r_1 is the distance at which L_{AX} is expressed.

r_2 is the distance to the assessment location.

Using the equation detailed above, the predicted noise level at the nearest residential NSLs is in the order of 54 $L_{Aeq,1hr}$. Levels of this order would not be expected to exceed the significance threshold of 65 dB $L_{Aeq,1hr}$ at the closest residential NSLs along Mount Avenue.

12.5.1.3 Construction Vibration

Site Clearance and Foundation

During site clearance and Foundation activities, there is the potential for vibration to be generated through the ground. Empirical data for this activity is not provided in BS 5228–2, however the likely levels of vibration from this activity will be significantly below the vibration criteria for building damage based on monitoring data and experience from other Site. AWN Consulting has previously conducted vibration measurements under controlled conditions, during trial construction works on a sample site where concrete slab breaking was carried out. The trial construction works consisted of the use of the following plant and equipment when measured at various distances:

- 3 tonne hydraulic breaker on small CAT tracked excavator; and
- 6 tonne hydraulic breaker on large Liebherr tracked excavator.

Vibration measurements were conducted during various staged activities and at various distances.

Peak vibration levels during staged activities using the 3 tonne breaker ranged from 0.48 to 0.25 PPV (mm/s) at distances of 10 to 50m respectively from the breaking activities. Using a 6 tonne breaker, measured vibration levels ranged between 1.49 to 0.24 PPV (mm/s) at distances of 10 to 50m respectively.

Whilst these measurements relate to a solid concrete slab, the range of values recorded provides some context in relation to typical ranges of vibration generated by general construction activity.

12.5.2 Operational Noise Assessment Introduction

Once the proposed development is operational, the potential noise impacts to the surrounding environment are expected to be minimal. The residential aspect of the development is not expected to generate any significant noise sources over and above those which form part of the existing environment at neighbouring residential areas (road traffic noise, estate vehicle movements, children playing, etc.) and, hence, no significant effects are predicted in this regard.

The main potential noise impact associated with the proposed development is considered, therefore, to relate to the generation of additional traffic to and from the site as a result of the new residential buildings and noise associated with the proposed creche. Potential noise impacts also relate to operational plant serving the buildings where relevant.

Once operational, there are no noteworthy sources of vibration associated with the development site.

12.5.2.1 Additional Vehicular Traffic on Surrounding Roads

For the purposes of assessing the potential noise impact, it is appropriate to consider the relative increase in noise level associated with traffic movements on existing roads and junctions with and without the proposed development, given that traffic from the development will make use of the existing road network.

A traffic impact assessment relating to the proposed development has been prepared by the DBFL Consulting Engineers. Figure 12-7 illustrates the road links assessed as part of this study.

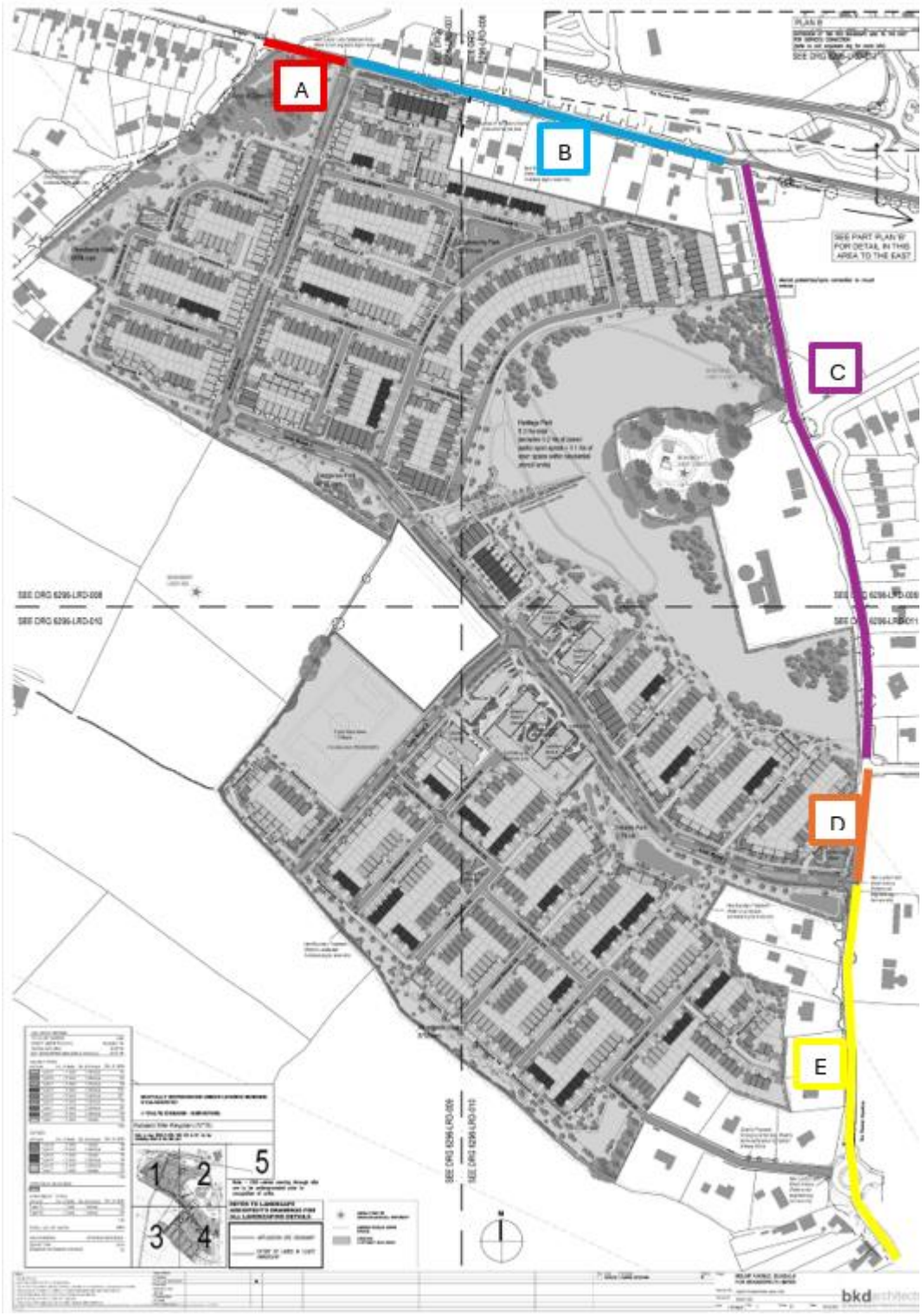

Figure 12-7: Road links for traffic assessment (Source: DBFL Consulting Engineers).

Traffic flows along the surrounding road network in terms of Annual Average Daily Traffic (AADT) for the Do Minimum and Do Something scenarios have been reviewed to calculate the change in traffic noise.

12.5.2.2 Building Services Plant

Once operational, there will be building services plant items required to serve the residential aspects of the proposed development. The specific requirements for mechanical and electrical plant items for

each element of the residential buildings has not yet been progressed at this stage of the design. Most of this plant will be capable of generating noise to some degree and may operate 24 hours a day. It would, therefore, be most noticeable during quiet periods (i.e. overnight). Noisy plant with a direct line-of-sight to noise sensitive properties as well as louder plant areas on roofs would potentially have the greatest impact.

12.5.2.3 Outward Nosie from Creche

Measurement of noise levels generated by children playing outdoors at several crèches and kindergartens indicate typical noise levels in the order of 56 dB $L_{Aeq,1hr}$ at distance of 5 metres. Considering the usage of the creche area (e.g. external areas are only expected to be in use for a portion of the 16 hour daytime period) and the expected standard noise insulation of the façade, it is predicted that the internal criteria within Table 12-7 will be met in all residential units and the resultant noise effect due to the creche is negative, not significant and long term.

12.5.3 Proposed Development-

12.5.3.1 Construction Stage

Construction Noise

The closest residential NSLs to the application site are those at (NSLs 3 and 4,) east of the application site directly adjacent to the closest site boundary at a distance of approximately 20m. The residential receivers (NSL1, 2, 5 and 6) are approximately 40m from the closest proposed buildings.

Figure 12-8 illustrates the closest NSLs (N1 to N6) to the development site and illustrates the approximate boundary of the site.

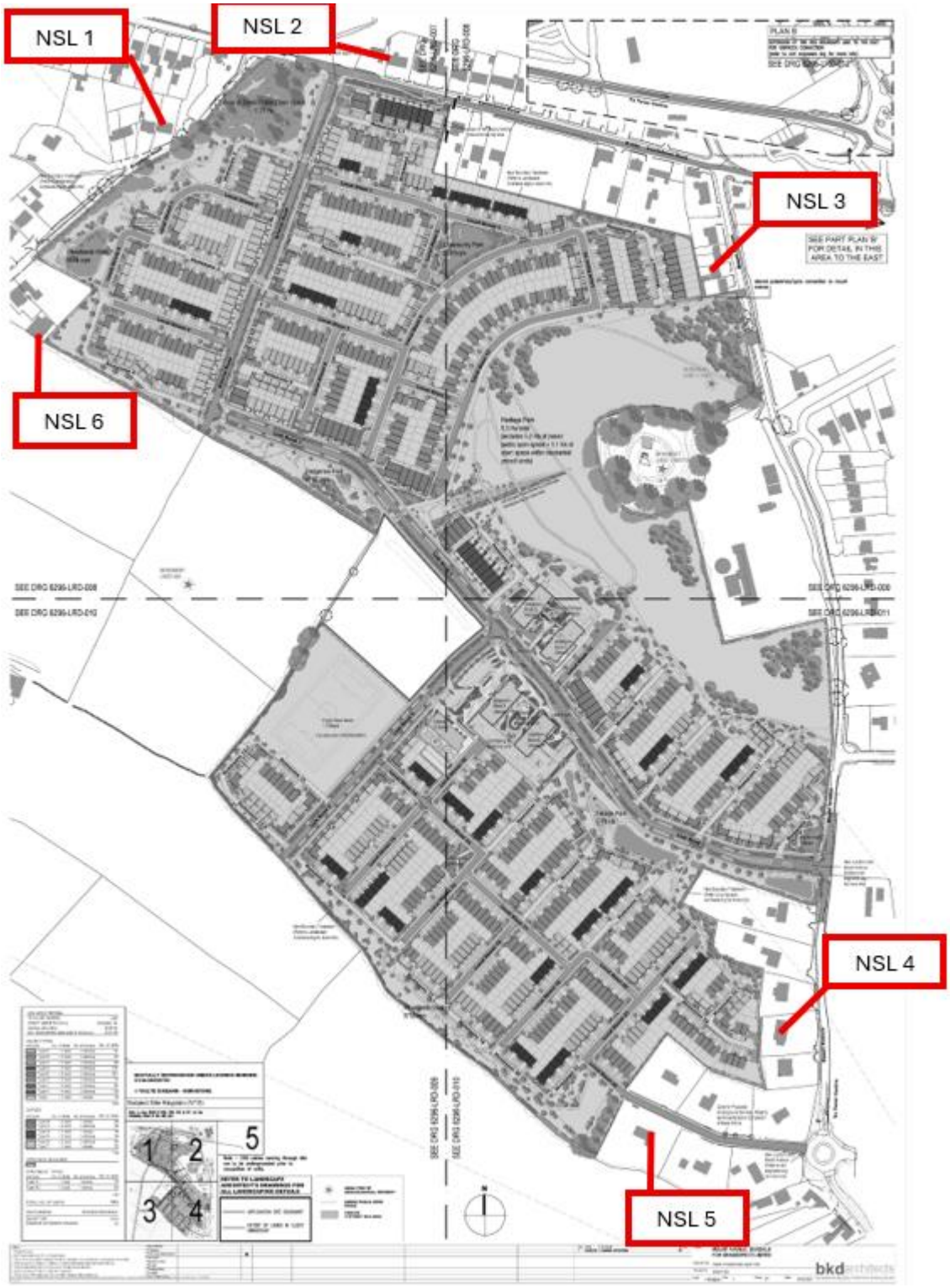

Figure 12-8: Noise sensitive locations in the vicinity of the proposed development-

Reference to the construction noise levels in Table 12-14 indicate that the CNT of 65 dB $L_{Aeq,T}$ will be exceeded at the closest NSLs when piling, rock breaking and excavation activities are occurring along the at the closest buildings to NSLs. However, a range of noise levels will occur as works take place across the site.

During early works, the CNT is likely to be exceeded at the closest NSLs when breakers are operating on site and other high noise activities associated with this phase. This will be the shortest phase of works and the use of breakers will only occur for a portion of this phase at the site.

During piling works, there is potential for the CNT to be exceeded at distances of 30m and closer, however the duration of this works is limited in the overall period of the construction phase of the project. At distances of 20m and beyond construction noise levels are calculated at 70 dB $L_{Aeq,T}$ and lower. Whilst the calculated noise levels are above the significance threshold of 65 dB $L_{Aeq,T}$, construction noise levels reaching 70 dB for temporary periods of time can be tolerated once advance notice is given to NSLs of the extent, timing and duration of the works.

During the general site construction works involving construction of the site buildings, lower noise levels will be generated on site. There is potential for the CNT to be exceeded by a small margin at 20m and closer if working along the immediate boundaries. When works are occurring at 20m or greater distances from NSLs the works are likely to be within the CNT.

Noise mitigation measures will therefore be required on site to reduce construction noise levels along these boundaries to reduce any potential significant effects. Recommended mitigation measures are presented in Section 12.6.

Further discussion on construction noise and vibration control measures are included in Section 12.6.

Construction Traffic

Accounting for the propagation of sound over distance and making reference to the baseline noise levels made at AN3 in the vicinity of the site indicates that the calculated noise levels are 10 – 14 dB above the measured noise noise levels at AN3. It should be noted that, in order to assess a worst-case scenario, a large proportion of the daily vehicle numbers have been assumed to depart over an hour-long period. Therefore, it is expected in the absence of specific mitigation measures that there will be a negative, significant and short-term effect at the closest receptors.

Construction Vibration

With respect to the potential vibration impact, the only significant source of vibration is expected to be due to rock breaking and piling activities. Whilst the measurements outlined in section 12.5 relate to a breaking of concrete, the range of values recorded provides some context in relation typical ranges of vibration generated by construction breaking activity. The vibration levels experienced at surrounding receptors will be well below the criteria of cosmetic building damage, however, it will likely be perceptible when work is taking place at the closest locations to the receptors. It is not anticipated that the limit values presented in Table 12-4 would be exceeded. Therefore, it is expected in the absence of specific mitigation measures that there will be a negative, slight to moderate to significant and short-term effect at the closest receptors at NSL 3 and NSL 4. For all other NSL's in the absence of mitigation measures there will be a neutral, not significant effect.

Notwithstanding the above, any construction activities undertaken on the site will be required to operate below the recommended vibration criteria set out in Table 12-4. Mitigation measures and recommended good practices have been outlined in Section 12.6.

12.5.3.2 Operational Stage

Additional Vehicular Traffic on Surrounding Roads

Figure 12-7 presents the road links external to the proposed development (A to E). The results of this assessment have been reviewed to predict any impact of the proposed development on traffic flows in the area. The calculated change in noise levels during Opening Year (2027) and Future Design Years (2032 and 2042) are summarised in Table 12-15,

Junction Ref.	Opening Year (2032)		
	Do Nothing AADT	Do Something AADT	Increase in noise level (all vehicles) dB
A	11773	13,535	0.6
B	11790	13,012	0.4
C	3170	3,516	0.5
D	3009	3,355	0.5
E	5,255	7,183	1.4

Table 12-16 and .

Junction Ref.	Opening Year (2027)		
	Do Nothing AADT	Do Something AADT	Increase in noise level (all vehicles) dB
A	11077	11,394	0.1
B	11094	12,009	0.3
C	3028	3,141	0.2
D	2876	3,066	0.3
E	4,981	5,171	0.2

Table 12-15: Summary of change in noise level (Opening Year 2027)

Junction Ref.	Opening Year (2032)		
	Do Nothing AADT	Do Something AADT	Increase in noise level (all vehicles) dB
A	11773	13,535	0.6
B	11790	13,012	0.4
C	3170	3,516	0.5
D	3009	3,355	0.5
E	5,255	7,183	1.4

Table 12-16 Summary of change in noise level (Design Year 2032)

Junction Ref.	Opening Year (2032)		
	Do Nothing AADT	Do Something AADT	Increase in noise level (all vehicles) dB
A	12666	14,592	0.6
B	12683	14,049	0.4
C	3351	3,758	0.5
D	3179	3,586	0.5
E	5,604	7,714	1.4

Table 12-17 Summary of change in noise level (Design Year 2042)

The predicted increase in AADT traffic levels with links (A to E) to the associated development are between 0.1 – 0.3 dB(A) in the vicinity of the roads assessed for the Opening Year and between 0.4 – 1.4 dB(A) in the vicinity of the roads assessed for the Future Design Years. Reference to Table 12-6 confirms that the increases in the Opening Year, predicted effects are neutral to neutral, imperceptible, and short-term.

Reference to Table 12-6 confirms that the increases in the Future Design Years 2032 and 2042, effects are neutral to negative, not significant, and long-term.

Building Services Plant

Once operational, there will be building services plant items required to serve the residential aspects of the proposed development. The specific requirements for mechanical and electrical plant items for each element of the residential buildings have not yet been progressed at this stage of the design. Most of this plant will be capable of generating noise to some degree and may operate 24 hours a day. It would, therefore, be most noticeable during quiet periods (i.e. overnight). Noisy plant with a direct line-of-sight to noise sensitive properties as well as louder plant areas on roofs would potentially have the greatest effect.

Plant items will be selected, designed and located so that there is no adverse impact on sensitive receivers within the development itself. The cumulative operational noise level from building services plant at the nearest noise sensitive location within the proposed development will be designed/attenuated to not exceed the internal noise levels discussed in Table 12-7.

Taking into account that sensitive receptors within the proposed development are much closer than off-site sensitive receptors, once the relevant noise criteria are achieved within the proposed development, it is expected that there will be no significant negative effect to sensitive receptors off site.

Creche

Measurement of noise levels generated by children playing outdoors at several crèches and kindergartens indicate typical noise levels in the order of 56 dB $L_{Aeq,1hr}$ at distance of 5 metres. Considering the usage of the creche area (e.g. external areas are only expected to be in use for a portion of the 16 hour daytime period) and the expected standard noise insulation of the façade, it is predicted that the internal criteria within Table 12-7 will be met in all residential units and the resultant noise effect due to the creche is negative, not significant and long term.

12.5.3.3 Do-Nothing Impact

The 'Do Nothing' scenario includes retention of the current site without the proposed development in place. In the absence of the proposed development being constructed, the noise environment at the nearest noise sensitive locations and across the development site itself will remain largely unchanged. The 'Do Nothing' scenario is therefore considered to have a neutral effect.

12.5.4 Cumulative

12.5.4.1 Construction Stage

Construction Noise

In terms of construction noise, there is potential for construction works to occur concurrently. A review of the planned and permitted projects within the vicinity of the site was undertaken in order to identify developments with the potential for cumulative construction phase impacts. There was a site identified which may have coinciding construction phases with that of the proposed development:

- Mount Avenue Farrandreg (Planning Ref. 2460792)

In the scenario whereby construction on multiple activities is ongoing simultaneously there is potential for significant noise impact at nearby NSL's. Typically the construction process follows a sequence of various construction activities thereby reducing the risk of cumulative noise impacts. For the worst case scenario where both sites are equidistant from a noise sensitive location and producing the same level concurrently, a significant effect which based on table 12.2 is slight to moderate - significant to very significant and short-term is predicted.

Cumulative impacts will need to be considered and managed during the construction phase. It is recommended that liaison between construction sites is on-going throughout the duration of the

construction phase. Contractors should schedule work in a co-operative effort to limit the duration and magnitude of potential cumulative impacts on nearby sensitive receptors. Cumulative construction noise impacts are expected to be a significant effect which based on table 12.2 is slight to moderate - significant to very significant and temporary.

Construction Traffic

There is a potential for cumulative impacts associated with construction noise traffic, with an increase of +3 dB representing the worst case scenario of a doubling of construction traffic when compared to either site operating in isolation. The effects presented in Section 12.5.3.12, are also applicable to the cumulative assessment.

Construction Vibration

With respect to the potential vibration impact, the only significant source of vibration is expected to be due to excavations and foundation activities. Whilst the measurements outlined in section 13.5 relate to a breaking of concrete, the range of values recorded provides some context in relation typical ranges of vibration generated by construction breaking activity. The vibration levels experienced at surrounding receptors will be well below the criteria of cosmetic building damage, however, it will likely be perceptible when work is taking place at the closest locations to the receptors. It is not anticipated that the limit values presented in Table 12-4 would be exceeded. Therefore, it is expected in the absence of specific mitigation measures that there will be a negative, moderate to significant and short-term effect at the closest receptors at NSL 3 and NSL 4.

Notwithstanding the above, any construction activities undertaken on the site will be required to operate below the recommended vibration criteria set out in Table 12-4. Mitigation measures and recommended good practices have been outlined in Section 12.6.

12.5.4.2 Operational Stage

Additional Vehicular Traffic on Surrounding Roads

At operational stage, cumulative noise impacts associated with the proposed development and other developments in the area are most likely to be associated with increase noise associated with traffic. An increase of +3 dB represents a worst case scenario of a doubling in volume of traffic, representing a perceptible change with a significant effect, based on table 12.3 , slight to moderate and long-term.

Building Services Plant

Once the relevant noise criteria are not exceeded within the proposed development, the related noise effect to existing NSLs offsite will be neutral, imperceptible and long-term.

Creche

Once the relevant noise criteria are not exceeded within the proposed development, the related noise effect to existing NSLs offsite will be neutral, imperceptible and long-term.

12.5.4.3 Do-Noting Impact

The ‘Do Nothing’ impact is the same as presented in Section 12.5.3.

12.6 MITIGATION MEASURES (AMELIORATIVE, REMEDIAL OR REDUCTIVE MEASURES)

12.6.1 Proposed Development-

12.6.1.1 Construction Stage

The assessment detailed in Section 12.5.3.1 has determined that construction activities can typically operate within the adopted construction noise threshold levels at the closest off-site NSLs when carried out at distances greater than 40m from the construction works. Predicted construction noise levels do exceed the threshold during the worst case assessment at NSLs within 100m of the site boundary.

Vibration levels at the closest neighbouring buildings are expected to be orders of magnitude below the limits set out in Table 12-4 to avoid any cosmetic damage to buildings.

Best practice noise and vibration control measures will be employed by the contractor during the construction phase in order to avoid exceedance of the adopted construction noise threshold values at the nearest NSLs. The best practice measures set out in BS 5228 (2009 +A1 2014) Parts 1 and 2 will be complied with. This includes guidance on several aspects of construction site mitigation measures, including, but not limited to:

- Selection of quiet plant;
- Noise control at source;
- Screening;
- Liaison with the public, and;
- Project programme.

Further comment is offered on these items in the following paragraphs. Noise control measures that will be considered include the selection of quiet plant, enclosures and screens around noise sources, limiting the hours of work and noise monitoring, where required.

Selection of Quiet Plant

This practice is recommended in relation to static plant such as compressors and generators. It is recommended that these units be supplied with manufacturers' proprietary acoustic enclosures. The potential for any item of plant to generate noise will be assessed prior to the item being brought onto the site. The least noisy item will be selected wherever possible. Should a particular item of plant already on the site be found to generate high noise levels, the first action will be to identify whether said item can be replaced with a quieter alternative.

Noise Control at Source

If replacing a noisy item of plant is not a viable or practical option, consideration will be given to noise control at source. This refers to the modification of an item of plant or the application of improved sound reduction methods in consultation with the supplier. For example, resonance effects in panel work or cover plates can be reduced through stiffening or application of damping compounds; rattling and grinding noises can often be controlled by fixing resilient materials in between the surfaces in contact.

The following best practice migration measures will be considered:

- Site compounds will be located away from noise sensitive boundaries within the site constraints.
- The use lifting bulky items, dropping and loading of materials within these areas will be restricted to normal working hours.
- For mobile plant items such as cranes, dump trucks, excavators and loaders, maintaining enclosure panels closed during operation can reduce noise levels over normal operation. Mobile plant will be switched off when not in use and not left idling.

- For steady continuous noise, such as that generated by diesel engines, it may be possible to reduce the noise emitted by fitting a more effective exhaust silencer system.
- For percussive tools such as pneumatic breakers, a number of noise control measures include fitting muffler or sound reducing equipment to the breaker tool and ensuring any leaks in the air lines are sealed.
- Erecting localised screens around breaker or drill bit when in operation in close proximity to noise sensitive boundaries.
- For concrete mixers, control measures will be employed during cleaning to ensure no impulsive hammering is undertaken at the mixer drum.
- For all materials handling, ensure that materials are not dropped from excessive heights, lining drops chutes and dump trucks with resilient materials.
- For compressors, generators and pumps, these can be surrounded by acoustic lagging or enclosed within acoustic enclosures providing air ventilation.
- All items of plant will be subject to regular maintenance. Such maintenance can prevent unnecessary increases in plant noise and can serve to prolong the effectiveness of noise control measures.

Screening

Screening is an effective method of reducing the noise level at a receiver location and can be used successfully as an additional measure to all other forms of noise control. Standard construction site hoarding (2.4 m in height) with a mass per unit of surface area greater than 7 kg/m^2 can provide adequate sound insulation.

Liaison with the Public

A designated Community Liaison Officer (CLO) will be appointed to site during construction works. Any noise complaints will be logged and followed up in a prompt fashion by the CLO. In addition, prior to particularly noisy construction activity the CLO will inform the nearest noise sensitive locations of the time and expected duration of the noisy works.

Project Programme

The phasing programme will be arranged so as to control the amount of disturbance in noise and vibration sensitive areas at times that are considered of greatest sensitivity. If works are in progress on another site at the same time as other works of construction that themselves may generate significant noise and vibration, the working programme will be phased so as to ensure noise limits are not exceeded due to cumulative activities. This will be reviewed in relation to other potential cumulative works occurring on adjacent construction site in close proximity to noise sensitive properties which have the potential to lead to significant construction noise impacts.

12.6.1.2 Operational Stage

Additional Traffic on Surrounding Road

During the operational phase of the development, noise mitigation measures with respect to the impact of traffic from the development are not deemed necessary.

Building Services and Plant

Proprietary noise and vibration control measures will be employed as part of the detailed design in order to ensure that noise emissions from building services plant do not exceed the relevant internal noise criteria within Table 12-7 for residential dwellings within the proposed development. In addition, noise emissions should be broadband in nature and should not contain any tonal or impulsive elements.

Considering that sensitive receivers within the development are much closer than off-site sensitive receivers, once the relevant noise criteria is achieved within the development, there are no mitigation requirements to control building services and plant at off-site NSLs.

Creche

The creche will operate during daytime hours. No mitigation is required.

12.6.2 Cumulative

12.6.2.1 Construction Stage

The mitigation measures presented in Section 12.6.1.1 are also applicable to the cumulative assessment.

12.6.2.2 Operational Stage

The mitigation measures presented in Section 12.6.1.2 are also applicable to the cumulative assessment.

12.7 RESIDUAL IMPACT OF THE PROPOSED DEVELOPMENT

12.7.1 Proposed Development-

12.7.1.1 Construction Stage

During the construction phase of the proposed development, there is the potential for temporary to short-term noise impacts on nearby noise sensitive properties due to noise emissions from site activities. The application of binding noise limits and hours of work, along with implementation of appropriate noise and vibration control measures, will ensure that noise and vibration impact is kept to a minimum as far as practicable. For the duration of the construction period, construction noise impacts will be short-term and negative, depending on the proximity of the works to the site boundary. Along with the 5 dB reduction from partial screening from a suitable site hoarding it would be expected that a further 5 dB reduction would be achieved through on-site control measures, selection of quiet plant etc as per the mitigation described in Section 12.6.1.1.

The construction scenario is a robust assumption made for a development of this size, however at the site boundaries directly adjacent to permitted NSLs, it is unlikely 3 no. items of large plant/equipment would be operating simultaneously in such close proximity to each other at all times. In reality items of construction plant and machinery will be operating at varying distances from any one NSL. During break out works the residual effect is negative, significant to very significant and temporary at distances up to 50m) if all plant items were assumed to work simultaneously while adjacent to the closest building to an NSL. In line with DMRB Noise and Vibration (UKHE 2020) document, a significant effect relating to construction noise is deemed to occur where a moderate or major impact is likely to occur for a period of greater that 10 days/nights over 15 consecutive day/nights, or greater than 40 days over 6 consecutive months. In the case of this activity, it is unlikely the durations for significant effects will be exceeded and hence the overall significance of effects are categorised as *negative, moderate – significant and temporary.* At NSLs at greater than 50m distance, the CNT would not be exceeded and the residual significance of effect *is negative, not significant to moderate and short-term.*

Vibration effects of impact during the construction phase will be *negative, moderate to significant and short-term.*

12.7.1.2 Operational Stage

Additional Traffic on Roads

The predicted change in noise levels associated with additional traffic is expected to be ***neutral to negative, imperceptible to not significant, and long-term*** along the existing road network.

Building Services and Plant

The effect of impact from building services and plant is predicted to be *neutral, not significant and long term.*

Creche

The effect of impact from the creche related noise is predicted to be ***neutral, not significant and long term.***

12.7.1.3 Worst Case Impact

The impacts presented in the preceding sections have assessed the worst case and there is no variation in significance of the effects presented in Section 12.7.1.1 and Section 12.7.1.2.

12.7.2 Cumulative

12.7.2.1 Construction Stage

The residual impacts presented in Section 12.7.1.1 are also applicable to the cumulative assessment.

12.7.2.2 Operational Stage

The residual impacts presented in Section 12.7.1.2 are also applicable to the cumulative assessment.

12.7.2.3 Worst Case Impact

The residual impacts Sections 12.7.1.3, 12.7.1.2 and Section 12.7.1.1 are also applicable to the cumulative assessment.

12.8 MONITORING

12.8.1 Proposed Development-

12.8.1.1 Construction Stage

During the construction phase, spot check noise monitoring may be required where the construction noise thresholds have the potential to be exceeded at NSLs (N1 to N6). The monitoring shall be carried out by the contractor and used to inform the requirement for any control measures on site to reduce construction noise levels. There are vulnerable structures identified adjacent to the site, hence vibration monitoring is not proposed during this phase.

Noise monitoring will be conducted in accordance with the International Standard ISO 1996: 2017: *Acoustics – Description, measurement and assessment of environmental noise* and be located a

distance of greater than 3.5m away from any reflective surfaces, e.g. walls, in order to ensure a free-field measurement without any influence from reflected noise sources.

12.8.1.2 Operational Stage

There is no monitoring recommended for the operational phase of the development as effect of impact to noise and vibration are predicted to be imperceptible.

12.8.2 Cumulative

12.8.2.1 Construction Stage

The monitoring requirements are the same across both applications and therefore the those presented in Section 12.8.1.1 are also applicable to the cumulative assessment.

12.8.2.2 Operational Stage

The monitoring requirements are the same across both applications and therefore the those presented in Section 12.8.1.2 are also applicable to the cumulative assessment.

12.9 REINSTATEMENT

12.9.1 Proposed Development-

12.9.1.1 Construction Stage

During reinstatement the construction phase noise and vibration effects outlined in Section 12.5.3.1 will apply.

12.9.2 Cumulative

12.9.2.1 Construction Stage

During reinstatement the construction phase noise and vibration effects outlined in Section 12.5.4.1 will apply.

12.10 DIFFICULTIES ENCOUNTERED

No difficulties were encountered in the preparation of this report.

12.11 OPERATIONAL PHASE –ACOUSTIC DESIGN STATEMENT (ADS)

The ADS has been presented separately as it refers to the inward impact assessment of the residential properties within the development, rather than the outward impact assessment carried out in Section 12.5. As discussed in Section 12.2.2, an acoustic design statement is required for new residential developments as per the current Louth Noise Action Plan (NAP) 2024 – 2028.

12.11.1 Stage 1 – Noise Risk Assessment

12.11.1.1 Methodology

The initial noise risk assessment is intended to provide an early indication of any acoustic issues that may be encountered. It calls for the categorisation of the site as a negligible, low, medium or high risk based on the pre-existing noise environment. Figure 12-1 previously presents the basis of the initial

noise risk assessment, it provides appropriate risk categories for a range of continuous noise levels either measured and/or predicted on site.

It should be noted that a site should not be considered a negligible risk if more than 10 L_{AFmax} events exceed 60 dB during the night period, and the site should be considered a high risk if the L_{AFmax} events exceed 80 dB more than 20 times a night.

Paragraph 2.9 of ProPG states that:

"The noise risk assessment may be based on measurements or prediction (or a combination of both) as appropriate and should aim to describe noise levels over a "typical worst case" 24 hour day either now or in the foreseeable future."

ProPG states the following with respect to the initial risk assessment:

"The risk assessment should not include the impact of any new or additional mitigation measures that may subsequently be included in development proposals for the site and proposed as part of a subsequent planning application. In other words, the risk assessment should include the acoustic effect of any existing site features that will remain (e.g. retained buildings, changes in ground level) and exclude the acoustic effect of any site features that will not remain (e.g. buildings to be demolished, fences and barriers to be removed) if development proceeds."

In this instance there are no buildings to be demolished and the site topography is not expected to change significantly during construction. Permitted developments external to the Proposed Development have been included in the model.

It should be noted that ProPG states the following with regard to how the initial site noise risk is to be used:

"2.12: It is important that ***the assessment of noise risk at a proposed residential development site is not the basis for the eventual recommendation to the decision maker****. The recommended approach is intended to give the developer, the noise practitioner, and the decision maker an early indication of the likely initial suitability of the site for new residential development from a noise perspective and the extent of the acoustic issues that would be faced. Thus, a site considered to be high risk will be recognised as presenting more acoustic challenges than a site considered as risk. A site considered as negligible risk is likely to be acceptable from a noise perspective and need not normally be delayed on noise grounds. A potentially problematical site will be flagged at the earliest possible stage, with an increasing risk indicating the increasing importance of good acoustic design."*

Therefore, following the guidance contained in ProPG does not preclude residential development on Site that are identified as having medium or high noise risk. It merely identifies the fact that a more considered approach will be required to ensure the developments on the higher risk Site are suitably designed to mitigate the noise levels. The primary goal of the approach outlined in ProPG is to ensure that the best possible acoustic outcome is achieved for a particular site.

12.11.1.2 Predicted Noise Levels Across the Site

The baseline noise monitoring outlined out in Section 12.3. Measured Day time site noise levels are determined to be in the range of 40 dBA to 57 dBA, with highest levels experienced at the western site boundary, while night time noise levels are typically in the range of 45 to 50 dBA with highest levels of 50 to 55 dBA experienced at the western of the site.

12.11.1.3 Noise Risk Assessment Conclusion - Proposed Development –

Considering the measured noise levels presented in Section 12.3 and predicted noise levels in the night time EPA maps, the initial site noise risk assessment has concluded the dominant noise sources on the site are from the M1 to the west of the site. The level varies from negligible to low during the daytime period when the predicted noise levels are between 40-57 dB $L_{Aeq,16hr}$ across the site, and from low to medium during the night-time period when the predicted noise levels are between 45-55 dB $L_{Aeq,8hr}$.

ProPG states the following with respect to medium and high levels of risk:

- **Low Risk:** "*At low noise levels, the site is likely to be acceptable from a noise perspective provided that a good acoustic design process is followed and is demonstrated in an ADS which confirms how the adverse impacts of noise will be mitigated and minimised in the finished development."*
- **Medium Risk:** *"As noise levels increase, the site is likely to be less suitable from a noise perspective and any subsequent application may be refused unless a good acoustic design process is followed and is demonstrated in an ADS which confirms how the adverse impacts of noise will be mitigated and minimised, and which clearly demonstrate that a significant adverse noise impact will be avoided in the finished development."*

Given the above an Acoustic Design Strategy is required to demonstrate that suitable care and attention has been applied in mitigating and minimising noise impact to such an extent that an adverse noise impact will be avoided in the final development Stage 2 – Full Acoustic Assessment-Proposed Development –

12.11.1.4 Element 1 – Good Acoustic Design Process

Based on the ProPG guidance, in practice, good acoustic design (GAD) should deliver the optimum acoustic design for a particular site without adversely affecting residential amenity or the quality of life of occupants or compromising other sustainable design objectives. It is important to note that ProPG specifically states that good acoustic design is not equivalent to overdesign or 'gold plating' of a new development but that it seeks to deliver the optimum acoustic environment for a given site.

Section 2.23 of the ProPG outlines the following checklist for Good Acoustic Design:

- Check the feasibility of relocating, or reducing noise levels from relevant sources;
- Consider options for planning the site or building layout;
- Consider the orientation of proposed building(s);
- Select construction types and methods for meeting building performance requirements;
- Assess the viability of alternative solutions; and
- Assess external amenity area noise.

In the context of the Proposed Development – , each of the considerations listed above have been addressed in the following subsections.

Application of GAD Process to Proposed Application

Relocation or Reduction of Noise from Source

The main noise sources are located outside the site boundary and, therefore, it is beyond the scope of this proposed development to introduce any noise mitigation at source.

Planning, Layout and Orientation

Consideration has been given to the location of both the buildings and external amenity areas. In the first instance, a primary consideration was to ensure that residential buildings are located as far as possible from the busy roads. Where this cannot be accommodated additional façade noise attenuation measures will be incorporated into the design.

The orientation of the site is such that the residential buildings themselves screen many of the common external amenity areas associated with the development.

Select Construction Types for meeting Building Regulations

A mixture of masonry, brick and timber insulated constructions will be used in the external walls of the proposed development. These construction types offers high levels of sound insulation performance. However, as is typically the case, the glazed elements and any required ventilation paths to achieve compliance with Part F of the Building Regulations will be the weakest elements in the façade in terms of sound insulation performance.

Consideration will therefore be given to the provision of upgraded glazing and acoustic ventilators, where required. For units where it will not be possible to achieve the desirable internal acoustic environments with windows open, the proposal here will be to provide dwelling units with glazed elements and ventilators that have good acoustic insulation properties so that when the windows are closed the noise levels internally are good. Inhabitants will be able to open the windows if they wish. However, doing so will increase the internal noise level. This approach to mitigation is supported in ProPG where it states the following (emphasis has been added in bold):

> *"2.22: Using fixed unopenable glazing for sound insulation purposes is generally unsatisfactory and should be avoided;* ***occupants generally prefer the ability to have control over the internal environment using openable windows, even if the acoustic conditions would be considered unsatisfactory when open****. Solely relying on sound insulation of the building envelope to achieve acceptable acoustic conditions in new residential development, when other methods could reduce the need for this approach, is not regarded as good acoustic design. Any reliance upon building envelope insulation with closed windows should be justified in supporting documents."*
>
> *"Note 5: Designing the site layout and the dwellings so that the internal target levels can be achieved with open windows in as many properties as possible demonstrates good acoustic design. Where it is not possible to meet internal target levels with windows open, internal noise levels can be assessed with windows closed, however any façade openings used to provide whole dwelling ventilation (e.g. trickle ventilators) should be assessed in the "open" position and, in this scenario, the internal L_{Aeq} target levels should not normally be exceeded."*
>
> *"2.34: Where the LPA accepts that 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 Site 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 (see Supplementary Document 2). Furthermore, in this scenario the internal L_{Aeq} target noise levels should not generally be exceeded."*

It is very important to note that it is impractical to achieve the good internal noise levels with windows open across the vast majority of development Site in close proximity to major infrastructure such as roads. Such Site would need to be classified as having a negligible risk in accordance with the ProPG noise risk assessment approach. For this reason, there are no guidance documents either at a local level or an international level that AWN is aware of which would support the approach of achieving the ideal internal noise levels in the open window scenario. It is, therefore, considered entirely justifiable to provide building façades with a moderate degree of sound insulation, such that with windows closed but vents opened, a good internal acoustic environment is achieved.

Impact of Noise Control Measures on Fire, Health and Safety

The good acoustic design measures that have been proposed on site do not have any significant impact on other issues.

Assess Viability of Alternative Solutions

Due to the height and location of the proposed buildings it is considered that any acoustic screens along the boundary of the site to attenuate traffic noise would be ineffective and is not proposed anywhere on the site.

Assess External Amenity Area Noise

ProPG provides the following advice with regards to external noise levels for amenity areas in the development:

> "The acoustic environment of external amenity areas that are an intrinsic part of the overall design should always be assessed and noise levels should ideally not be above the range 50 – 55 dB $L_{Aeq,16hr}$."

Noise levels across external amenity areas associated with the development are presented in Section 12.11.1.6.

Summary

Considering the constraints of the site, in so far as possible and without limiting the extent of the development area, the principles of GAD have been applied to the Proposed Development – .

In terms of viable alternatives to acoustic treatment of façade elements, currently it is not considered likely that there will be further options for mitigation outside of proprietary acoustic glazing and ventilation.

12.11.1.5 Element 2 – Internal Noise Guidelines

Internal Noise Criteria

Element 2 of the ProPG document sets out recommended internal noise targets derived from BS8233:2014. The recommended indoor ambient noise levels are set out previously in Table 12-7**.**

In addition to these absolute internal noise levels, ProPG provides guidance on flexibility of these internal noise level targets. For instance, in cases where the development is considered necessary or desirable, and noise levels exceed the external noise guidelines, then a relaxation of the internal L_{Aeq} values by up to 5 dB can still provide reasonable internal conditions.

Façade Noise Levels

Where façade noise levels are less than 55 dB $L_{Aeq,16hr}$ during the day and 50 dB $L_{Aeq,8hr}$ at night it is possible to achieve reasonable internal noise levels while also ventilating the dwellings with open windows. Therefore, for those properties where the façade noise levels are less than 55 dB $L_{Aeq,16hr}$ during the day and 50 dB $L_{Aeq,8hr}$ at night no further mitigation is required.

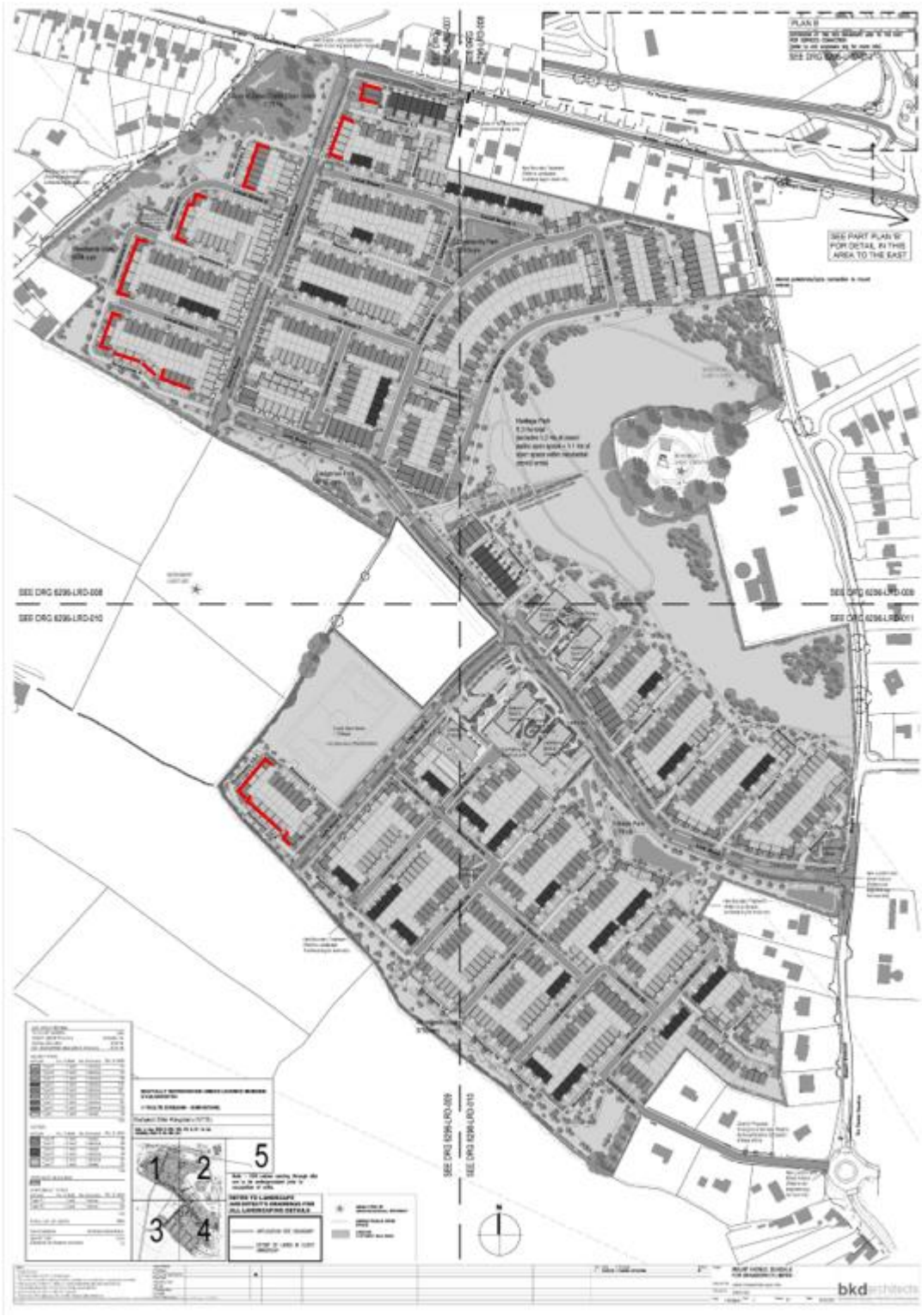

Figure 12-9 Proposed Facade Treatment Areas

Proposed Façade Treatment

The British Standard BS EN 12354-3: 2000: *Building acoustics – Estimation of acoustic performance of buildings from the performance of elements – Part 3: Airborne sound insulation against outdoor sound* provides a calculation methodology for determining the sound insulation performance of the external envelope of a building. The method is based on an elemental analysis of the building envelope and can take into account both the direct and flanking transmission paths.

The Standard allows the acoustic performance of the building to be assessed taking into account the following:

- Construction type of each element (i.e. windows, walls, etc.);
- Area of each element;
- Shape of the façade, and;
- Characteristics of the receiving room.

The principles outlined in BS EN 12354-3 are also referred to in BS8233 and Annex G of BS8233 provides a calculation method to determine the internal noise level within a building using the composite sound insulation performance calculated using the methods outlined in BS EN 12354-3. The methodology outlined in Annex G of BS8233 has been adopted here to determine the required performance of the building facades.

Glazing

As is the case in most buildings, the glazed elements and ventilation elements of the building envelope are typically the weakest element from a sound insulation perspective. In this instance it has been calculated that the various facades are to be provided with glazing that, when closed, achieve the minimum sound insulation performance as set out in Table 12-7.

Zone	Nominal R_w (dB)	Octave Band Centre Frequency (Hz)					
		125	250	500	1k	2k	4k
Red (see Figure 12-9)	30	22	17	26	36	40	43

Table 12-18: Sound insulation performance requirements for glazing, SRI (dB)

In this instance the specification can be achieved with standard double or triple glazing, as outlined in Table 12-18.

It is important to note that the acoustic performance specifications detailed herein are minimum requirements which apply to the overall glazing system. In the context of the acoustic performance specification the 'glazing system' is understood to include any and all of the component parts that form part of the glazing element of the façade, i.e. glass, frames, seals, openable elements etc.

The assessment has demonstrated that the recommended internal noise criteria can be achieved through consideration of the proposed façade elements at the design stage. At this stage, there is no requirement for additional mitigation through glazing. The calculated glazing specifications are preliminary and are intended to form the basis for noise mitigation at the detailed design stage if there are changes to the design. Consequently, these may be subject to change as the project progresses.

Wall Construction

In general, all wall constructions (i.e. block work or concrete) offer a high degree of sound insulation, much greater than that offered by the glazing systems. Therefore, noise intrusion via the wall construction will be minimal. The calculated internal noise levels across the building façade have assumed a minimum sound reduction index of 54 dB R_w for this construction.

Ventilation

In this instance it has been calculated that the various facades are to be provided with ventilation that achieves the minimum sound insulation performance as set out in Table 12-7.

Zone	Nominal R_w (dB)	Octave Band Centre Frequency (Hz)					
		125	250	500	1k	2k	4k
Red (see Figure 12-9)	32	25	28	28	34	32	28

Table 12-19: Sound insulation performance requirements for glazing, SRI (dB)

In this instance the specification can be achieved with enhanced acoustic vents or mechanical ventilation, as outlined in Table 12-19.

The assessment has demonstrated that the recommended internal noise criteria can be achieved through consideration of the proposed façade elements at the design stage. At this stage, there is no requirement for additional mitigation through glazing. The calculated glazing and ventilation specifications are preliminary and are intended to form the basis for noise mitigation at the detailed design stage if there are changes to the design. Consequently, these may be subject to change as the project progresses.

Internal Noise Levels

Taking into account the external façade levels and the specified building envelope, the internal noise levels have been calculated. In all instances the good internal noise criteria are achieved for daytime and night-time periods with the use of standard glazing and enhanced ventialtion, as outlined in Table 12-18.

12.11.1.6 Element 3– External Amenity Area Noise Assessment

External Noise Levels

Section 12.3 presents the measured day time noise levels across the site.

ProPG provides the following advice with regards to external noise levels for amenity areas in the development:

"The acoustic environment of external amenity areas that are an intrinsic part of the overall design should always be assessed and noise levels should ideally not be above the range 50 – 55 dB $L_{Aeq,16hr}$."

It is noted that whilst external amenity areas to the western portion of the development would be above the desirable level of 55 dB $L_{Aeq,16hr}$, For the majority of private gardens extenal noise levels will be in the range of 50 – 60 dB $L_{Aeq,16hr}$. Where amenity areas with lower external noise levels is desired, nearby amenity areas to the centre and eastern portion of the site are provided.

12.11.1.7 Element 4– Assessment of Other Relevant Issues

Element 4 gives consideration to other factors that may prove pertinent to the assessment, these are defined in the document as:

- 4(i) compliance with relevant national and local policy;
- 4(ii) magnitude and extent of compliance with ProPG;
- 4(iii) likely occupants of the development;
- 4(iv) acoustic design v unintended adverse consequences; and
- 4(v) acoustic design v wider planning objectives.

Each is discussed in turn below.

Compliance with Relevant National and Local Policy

There are no National policy documents relating to the acoustic design of residential dwellings. Locally the Louth County Council Noise Action Plan 2024 – 2028 specifies that the guidance contained within ProPG should be used in assessing the noise impact on new residential developments.

This Acoustic Design Statement has been prepared in compliance with the requirements of ProPG and therefore complies with the requirements of local policy.

Magnitude and Extent of Compliance with ProPG

The following conclusion has been drawn with regards to the extent of compliance with ProPG:

- All dwellings as part of the development have been designed to achieve the good level of internal noise levels specified within ProPG. The units require closed windows to achieve this level at the closest facades facing onto the dominant roads external to the site.
- External amenity areas have been assessed, External amenity areas in the southern-portion of the site will be significantly shielded from road traffic noise and will achieve road traffic noise levels within or below 55 dB $L_{Aeq,16hr}$. Nearby additional amenity areas in phases to the south of the phase 13 site with desirable external noise levels can be accessed.

Based on the preceding, it is concluded that the proposed development is in compliance with the requirements of ProPG.

Likely Occupants of the Development

The criteria adopted as part of this assessment are based on those recommended for permanent dwellings and are, therefore, considered robust and appropriate for the likely occupants.

Acoustic Design v Unintended Adverse Consequences

Unintended adverse consequences did not occur in relation to this proposed development.

Acoustic Design v Wider Planning Objectives

There are no wider planning objectives that effect the acoustic design that are apparent at the time of writing.

12.11.2 Acoustic Design Statement Conclusion -

An initial site noise risk assessment has been carried out in respect of the proposed development. The assessment has classified the site as having negligible to low noise risk during daytime periods and low to medium risk during the night-time period. This was determined through a review of measured noise levels in the vicinity of the proposed development and EPA noise maps.

Further discussion is presented in terms of the likely noise impact of both the external and internal areas of the proposed development. Through the provision of enhanced ventilation at the facades predicted to receive the highest level of traffic noise and standard ventilation to all other facades, it is determined that when windows are closed that the internal noise environment is good. The noise level internally with the windows open will be higher than ideal during the night time period at the most western facades. However, inhabitants will have the option to close the window to reduce the noise level internally.

The residual inward effect of impact on the proposed development is expected to be neutral, not significant and long-term.