



ACOUSTIC CONSULTANTS LTD
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Noise Impact Assessment

**Proposed Residential Development
Land off Springfield Lane**

**Reference: 8073/RD
Date: November 2019**

Proposed Residential Development Land off Springfield Lane



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The report has been prepared in good faith, with all reasonable skill and care, based on information provided or available at the time of its preparation and within the scope of work agreement with the Client. We disclaim any responsibility to the Client and others in respect of any matters outside the scope of the above. The report is provided for the sole use of the named Client and is confidential to them and their professional advisors. No responsibility is accepted to other parties.

The report limits itself to addressing solely on the external noise aspects as included in this report. We provide advice only in relation to noise and acoustics. It is recommended that appropriate expert advice is sought on all the ramifications (e.g. CDM, structural, condensation, fire, legal, etc.) associated with any proposals in this report or as advised and concerning the appointment. It should be noted that noise predictions are based on the current information as we understand it and on the performances noted in this report. Any modification to these parameters can alter the predicted level. All predictions are in any event subject to a degree of tolerance of normally plus or minus three decibels. If this tolerance is not acceptable, then it would be necessary to consider further measures.



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1. Introduction

WJ Morris appointed Acoustic Consultants Ltd. to undertake a noise impact assessment for the proposed residential development at the land off of Springfield Lane, NP10 8QZ.

The purpose of this report is to assess the suitability of the proposed site for residential use in terms of noise. A site noise survey has been undertaken, the results of which are provided in this report. The survey data and site plans have been used to create a computer generated noise model to predict the propagation of noise across the site and how this might affect the proposed dwellings.

The noise impact assessment has been undertaken in accordance with Planning Policy Wales, the Technical Advice Notes for Wales (TAN11), British Standard 8233:2014 and the local authority criteria.

The report is based upon noise level data measured on the development site and reasonable assumptions. This report limits itself to addressing solely on the noise aspects as included in this report and is intended for planning purposes only.

2. The Site and Proposals

The proposed site is located on a plot of land off of Springfield lane adjacent to the rail line and A468. The A467 is located north of the site at a distance of approximately 1.3 km. There are residents north and east of the proposed site location. The site lies in a primarily residential area.

The predominant noise source in the area is from traffic on the A468 as well as train noise.

The proposal is to construct a residential development of two houses within the area highlighted within Figure 1. The proposed development location is as follows:

Figure 1: Approximate proposed development site





3. Planning and Noise

3.1. Planning Policy Wales

Planning Policy Wales (PPW) Edition 10 dated December 2018 sets out the land use planning policies of the Welsh Government. Section 1 states:

"1.1 Planning Policy Wales (PPW) sets out the land use planning policies of the Welsh Government. It is supplemented by a series of Technical Advice Notes (TANs), Welsh Government Circulars, and policy clarification letters, which together with PPW provide the national planning policy framework for Wales. PPW, the TANs, MTANs and policy clarification letters comprise national planning policy."

The most relevant statements for noise affecting a residential use are provided in Section 6.7 and summarised below:

"6.7.1 Clean air and an appropriate soundscape, contribute to a positive experience of place as well as being necessary for public health, amenity and well-being. They are indicators of local environmental quality and integral qualities of place which should be protected through preventative or proactive action through the planning system. Conversely, air, noise and light pollution can have negative effects on people, biodiversity and the resilience of ecosystems and should be reduced as far as possible."

6.7.4 The planning system should maximise its contribution to achieving the well-being goals, and in particular a healthier Wales, by aiming to reduce average population exposure to air and noise pollution alongside action to tackle high pollution hotspots. In doing so, it should consider the long-term effects of current and predicted levels of air and noise pollution on individuals, society and the environment and identify and pursue any opportunities to reduce, or at least, minimise population exposure to air and noise pollution, and improve soundscapes, where it is practical and feasible to do so.

6.7.5 In taking forward these broad objectives the key planning policy principle is to consider the effects which proposed developments may have on air or soundscape quality and the effects which existing air or soundscape quality may have on proposed developments. Air Quality and soundscape influence choice of location and distribution of development and it will be important to consider the relationship of proposed development to existing development and its surrounding area and its potential to exacerbate or create poor air quality or inappropriate soundscapes. The agent of change principle says that a business or person responsible for introducing a change is responsible for managing that change.



In practice, for example, this means a developer would have to ensure that solutions to address air quality or noise from nearby pre-existing infrastructure, businesses or venues can be found and implemented as part of ensuring development is acceptable.

6.7.6 In proposing new development, planning authorities and developers must, therefore:

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

6.7.7 To assist decision making it will be important that the most appropriate level of information is provided and it may be necessary for a technical air quality and noise assessment to be undertaken by a suitably qualified and competent person on behalf of the developer."

6.7.8 Good design, for example setting back buildings from roads to avoid canyon effects and using best practice in terms of acoustic design to ensure the appropriate and intended acoustic environment of completed developments should be incorporated at an early consideration in the design and planning process. Other mitigation measures must be capable of being effectively implemented for their intended purpose, and could include those related to:

- traffic management and road safety;*
- ensuring progress towards a shift to low or zero emissions means of road transport, such as electrical charging points;*
- supporting low or zero emissions public transport;*
- providing active travel infrastructure; and*
- incorporating green infrastructure, where it can improve air quality by removing air pollution and aiding its dispersal, reduce real or perceived noise levels by absorbing and scattering noise and introducing natural sounds to soften man-made noise, provide areas of relative tranquillity, and reduce exposure by putting a buffer between sources of pollution and receptors.*

6.7.14 Proposed development should be designed wherever possible to prevent adverse effects to amenity, health and the environment but as a minimum to limit or constrain any effects that do occur. In circumstances where impacts are unacceptable, for example where adequate mitigation is unlikely to be sufficient to safeguard local amenity in terms of air quality and the acoustic environment it will be appropriate to refuse permission. Location of Commercial, Industrial and other Potentially Polluting Development.



6.7.19 The health imperative of good air quality and appropriate soundscapes in contributing to the overall character and quality of places and the health and well-being of people and wildlife should be fully recognised. It will not be appropriate to locate sensitive uses, such as hospitals, schools, care homes and housing adjacent to busy roads or other transport routes, where there are no connectivity benefits to be gained and where health and amenity impacts associated with increased exposure of people to pollution will be unacceptable. Whilst some uses may be appropriate with the aid of good design air quality and soundscape considerations can be overriding factors, especially for sensitive uses, if they cannot be adequately mitigated and impacts minimised.

6.7.20 Where sensitive developments need to be located close to existing transportation infrastructure for sustainable movement and access they should be designed, as far as practicable, to limit harmful substances and noise levels within and around those developments both now and in the future. This may include employing the principles of good acoustic design and the inclusion of active travel or travel management measures as part of development proposals. Such development, however, should preferably be located away from existing sources of significant noise, which may include aircraft noise or roads, particularly new roads or those with programmed route improvements.

6.7.21 Regard should be paid to current air quality and noise levels and the quality of the existing soundscape and account taken of any relevant local air quality action plan, noise action plan and/ or local or regional air quality strategy as part of development strategies and proposals in development plans and before determining planning applications. Soundscapes and Compatibility of Uses

6.7.24 The potential impacts of noise pollution arising from existing development, be this commercial, industrial, transport related or cultural venues (such as music venues, theatres or arts centres), must be fully considered to ensure the effects on new development can be adequately controlled to safeguard amenity and any necessary measures and controls should be incorporated as part of the proposed new development. This will help to prevent the risk of restrictions or possible closure of existing premises or adverse impacts on transport infrastructure due to noise and other complaints from occupiers of new developments. It will be important that the most appropriate level of information is provided and assessment undertaken.

PPW does not provide any quantifiable criteria and directs you to the Technical Advice Notes (TAN 11).

3.2. Technical Advice Note (Wales) – Noise

The relevant planning criteria for proposed residential development is in Technical Advice Note (Wales) 11 entitled "Noise" which was published in October 1997. The introduction states:



"This note provides advice on how the planning system can be used to minimise the adverse impact of noise without placing unreasonable restrictions on development or adding unduly to the costs and administrative burdens of business. It outlines some of the main considerations which local planning authorities should take into account in drawing-up development plan policies and when determining planning applications for development which will either generate noise or be exposed to existing noise sources".

Table 1 provides Noise Exposure Categories, which relate to proposed residential developments near to a transportation noise source. Noise Exposure Categories, (NEC's) in relation to road traffic noise are addressed in ranges according to the free-field equivalent noise levels ($L_{Aeq, T}$) measured at the position of the proposed dwellings.

Table 1: TAN 11 Noise Exposure Categories

NOISE SOURCE	NOISE EXPOSURE CATEGORY			
	A	B	C	D
Road Traffic				
07.00 - 23.00 hrs	<55	55 – 63	63 – 72	>72
23.00 - 07.00 hrs	<45	45 – 57	57 – 66	>66

The Technical Advice Note (Wales) 11 gives advice to Local Planning Authorities on assessing proposals for residential developments near a source of noise, depending upon which of the four Noise Exposure Categories the proposed site falls into:

- NEC A. *Noise need not be considered as a determining factor in granting planning permission, although the noise level at the high end of the category should not be regarded as desirable.*
- NEC B. *Noise should be taken into account when determining planning applications and where appropriate, conditions imposed to ensure an adequate level of protection.*
- NEC C. *Planning permission should not normally be granted. Where it is considered that permission should be given, for example because there are no alternative quieter sites available, conditions should be imposed to ensure a commensurate level of protection against noise.*
- NEC D. *Planning permission should normally be refused.*

In addition, it states: *"Night-time noise levels (23.000 - 07.00): sites where individual noise events regularly exceed 82 dB L_{Amax} (S time weighting) several times in any hour should be treated as being in NEC C, regardless of the $L_{Aeq, 8h}$ (except where the $L_{Aeq, 8h}$ already puts the site in NEC D)."*

Where the Noise Exposure Category for a site falls into NEC B, C or D mitigation is necessary to control external noise.



4. Assessment Criteria

The following criteria is what is considered most relevant for a development of this type. These criteria are also referred to in most planning conditions imposed by the local authority for sites exposed to road traffic noise.

4.1. Internal Ambient Noise Levels

Section 7.7.2 Table 4 of the British Standard 8233:2014 provides internal ambient noise levels for dwellings from noise sources 'without a specific character'. The British Standard guideline states that noise levels should not exceed those as noted in Table 4 of the British Standard and this is summarised below:

Table 2: British Standard 8233:2014 Internal Noise Criteria

Activity	Location	Daytime (07:00 to 23:00)	Night-time (23:00 to 07:00)
Resting	Living Room	35 dB $L_{Aeq,16\text{ hour}}$	-
Dining	Dining room	40 dB $L_{Aeq,16\text{ hour}}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16\text{ hour}}$	30 dB $L_{Aeq,8\text{ hour}}$

Section 7.7.2 Note 4 of the British Standard states *"Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or $L_{Amax,F}$ depending on the character and number of events per night. Sporadic noise events could require separate values"*.

Section 3.4 of the "Guidelines for Community Noise" published by the World Health Organisation in 1999 (WHO 1999) states *"For a good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45 L_{Amax} more than 10-15 times per night (Vallet & Verbey 1991)"*.

As such, maximum noise levels are considered acceptable if they do not exceed 45 dB $L_{Amax(F)}$ no more than 10 to 15 times during the night-time period.

4.2. External Amenity Spaces

British Standard 8233:2014 also addresses external amenity noise within residential developments.

In section 7.7.3.2 it states *"For traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed 50 dB $L_{Aeq, T}$, with an upper guideline value of 55 dB $L_{Aeq, T}$ "*.



5. Baseline Noise Monitoring

A noise survey was completed at the site between 12th November and 13th November 2019, to determine the existing noise climate at the site.

5.1. Monitoring Equipment

Sound Pressure Levels were measured using a Class 1 sound level meter with a half-inch condenser microphone, using the 'fast' setting. The equipment is checked regularly using a Quality System meeting the requirements of British Standard EN ISO/IEC 17025:2017 "General requirements for the competence of testing and calibration laboratories"; in accordance with British Standard EN 10012:2003 "Measurement management systems. Requirements for measurement processes and measuring equipment"; and traceable to the National Standards.

This equipment was checked and calibrated as noted below and the certificates are available for inspection. The table below provides the equipment and calibration status.

Table 3: Equipment and Calibration Status

Equipment Description / Manufacturer / Type	Serial Number	Date of Calibration	Certification Number
SLM, NTI, XL2	A2A-11053-E0	17/04/2018	28365
Pre-Amp, NTI, MA220	5871	17/04/2018	28365
Microphone, NTI, MC230A	9276	16/04/2018	28364
Calibrator, Nor-1251	35227	27/08/2019	32692

The measurement system was checked before and after use with the noted calibrators and no significant drift was detected.

5.2. Weather Conditions

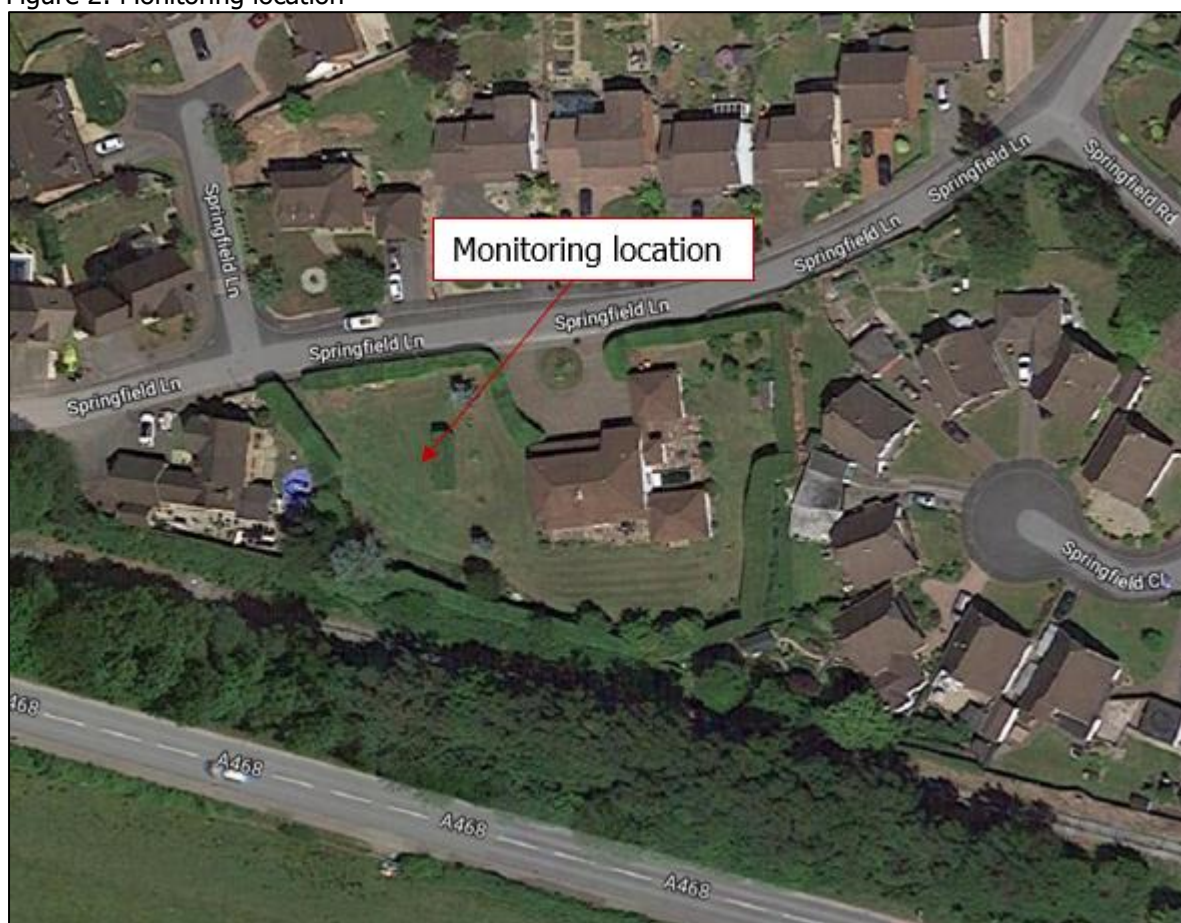
During the measurement the weather was generally dry with an average temperature of approximately 0-5 degrees Celsius, with wind speeds not exceeding 5 m/s. The weather conditions are not expected to have adversely affected the measured noise data.

5.3. Monitoring Procedure

A long-term noise measurement was carried out at the site between 12:20 on 12th November 2019 and 12:20 on 13th November 2019.

The microphone was elevated on a tripod of height 1.5 metres above the ground in a free-field position. The noise climate was determined by regular road traffic on the A468 as well as occasional traffic on Springfield Lane. The monitoring location, provided in Figure 2, was chosen at a position representative of the noise climate at the site.

Figure 2: Monitoring location



The noise climate at the site was determined by road traffic from surrounding roads and rail noise. There was no other significant source of noise.

5.4. Measured Noise Levels

The measured data for the long-term baseline noise survey consists of the Equivalent Noise Level ($L_{Aeq,15min}$), Background Noise Level ($L_{A90,15min}$) and Maximum Noise Level (L_{AFmax}) in dB(A). These results are displayed in Chart 1.

Chart 1: Variation in sound pressure level over time (long term)

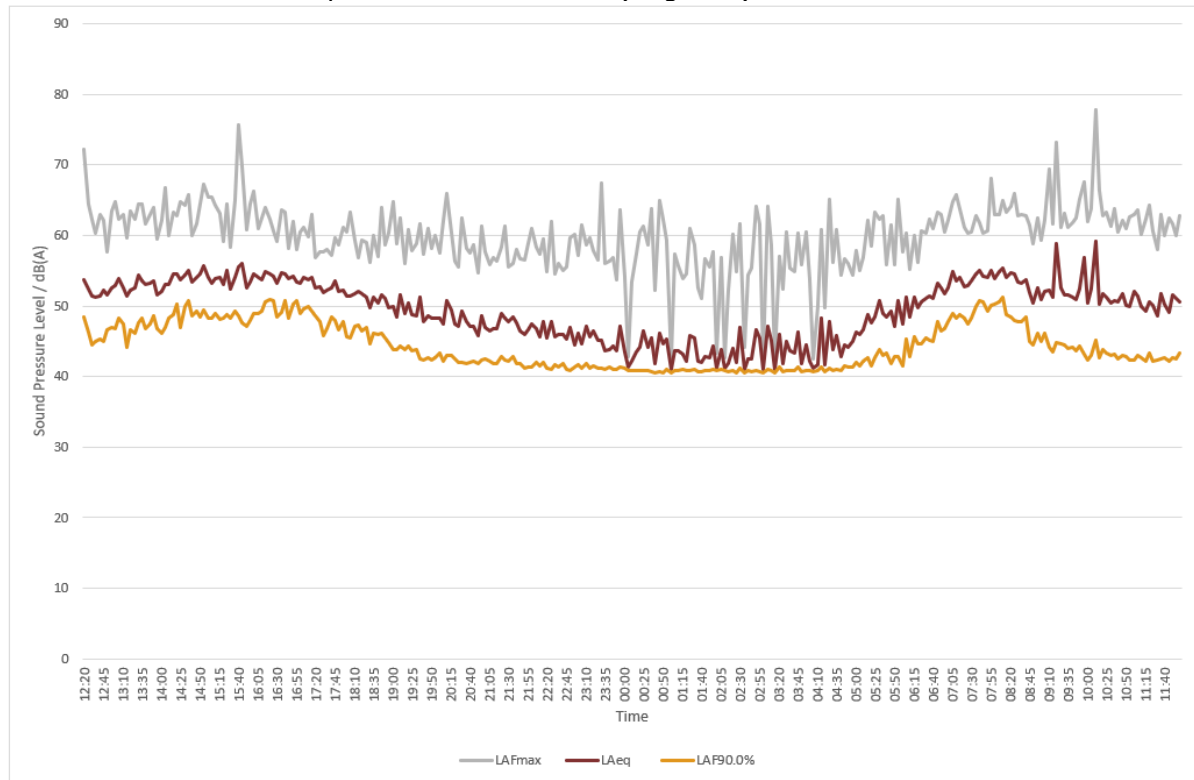


Table 4: Measured free-field noise levels

Period	Parameter	Sound Pressure Level per Octave Band / dB								dB(A)
		63	125	250	500	1000	2000	4000	8000	
Day	L_{eq16hr}	58	50	47	47	49	45	36	28	52
Night	L_{eq8hr}	53	46	40	42	43	39	33	28	47
	L_{Fmax}^*	70	59	57	60	59	55	47	52	63

* Taken as 10th Highest max as defined in WHO1999.



6. Noise Modelling

To determine noise levels across the site, noise modelling has been undertaken using computer modelling package Cadna:A by DataKustik and the measured data noted in Section 5.

The software predicts road traffic noise propagation using the method of 'The Calculation of Road Traffic Noise 1988', and a verification model has been created to ensure the measured and predicted levels are comparable. This model is available upon request.

The ground is generally considered to be 'soft'. The site layout follows the drawings provided in planning. The noise level for all plots are predicted at the worst-case receiver height based on the supplied drawings.

Noise maps have been generated to determine the required Noise Exposure Category across the site for 'mixed noise' sources. The noise maps are colour-coded to show the Noise Exposure Categories and equivalent noise level.

The NEC noise maps are provided in Figures 4-6. The colour key is as follows:

Table 5: NEC Noise map colour coding key

NEC A	Daytime equivalent noise levels up to 55 dB L_{Aeq} (16 hour), night-time equivalent noise levels up to 45 dB L_{Aeq} (8 hour).
NEC B	Daytime equivalent noise levels of between 55-63 dB L_{Aeq} (16 hour), night-time equivalent noise levels of between 45-57 dB L_{Aeq} (8 hour).
NEC C	Daytime equivalent noise levels of between 63-72 dB L_{Aeq} (16 hour), night-time equivalent noise levels of between 57-66 dB L_{Aeq} (8 hour). Night-time maximum noise levels in excess of 82 dB L_{Amax} (slow). No part of the site falls into this category.
NEC D	Daytime equivalent noise levels in excess of 72 dB and night-time equivalent noise levels in excess of 66 dB.

Figure 3: Daytime $L_{Aeq}(16\text{hour})$ noise prediction map



Figure 4: Night-time $L_{Aeq}(8\text{hour})$ noise prediction map



Figure 5: Night-time L_{AFmax} noise prediction map





7. Noise Exposure Category

From the modelling above it can be seen that this site falls into NEC B.

Noise Exposure Category B states *"Noise should be taken into account when determining planning applications and where appropriate, conditions imposed to ensure an adequate level of protection"*.

It should be noted that the maximum noise levels do not have an affect toward the NEC for the site.



8. Noise Mitigation Measures

It will be necessary to design the building fabric of the proposed dwellings to control the equivalent noise level and maximum noise levels internally to achieve acceptable levels.

The required mitigation has been calculated using worst-case values predicted within the Cadna:A model. Lower mitigation measures will be acceptable for facades facing and further away from the primary noise source of the A468.

8.1. Calculation Method

Calculations for the internal ambient noise levels have been undertaken using the calculation method provided in Annex G of British Standard 8233:2014. The calculations have been undertaken using the building façade constructions below and the worst-case noise map single figure values noted in Section 6 adjusted to the measured spectrum in Table 4.

The calculations assume the following:

- Room size: 16m² to daytime rooms and 9m² to bedrooms
- Windows: 4m² to daytime rooms and 2m² to bedrooms
- Façade: 6m² to daytime rooms and 5m² to bedrooms
- Vents: 2 to daytime rooms and 1 to bedroom (vents open)

We advise that building elements, having the sound insulation performances noted below, be incorporated into the design of the façades including the windows and the building roof.

8.2. External Wall Construction

The external walls to the proposed façades can be of a conventional construction comprising either masonry or light weight metal/timber frame make-up.

- The masonry construction could comprise of at least two skins of block (one of density 1880 Kg/m³, 100mm cavity, 100mm block (density of 400 Kg/m³). Room side of the block work would be plastered.
- The light weight construction could comprise of a single frame (minimum 100mm) construction with two layers of board each side of the stud (mass ≥ 20 Kg/m²) and 50 millimetre of mineral wool insulation within the cavity.

The above constructions are expected to achieve the following sound reduction indices.



Table 6: Required Minimum Sound Reduction Indices of External Walls

Element	R (Octave Band Centre Freq. Hz), dB								R _w
	63	125	250	500	1000	2000	4000	8000	
Wall	31	38	46	45	55	66	77	70	52

8.3. Roof Construction

For all plots the roof could be constructed using traditional timber construction with concrete/slate tiles (mass ≥ 30 Kg/m²) with a loft space and a plasterboard ceiling above the habitable rooms. This construction is expected to achieve the following sound reduction indices:

Table 7: Required Minimum Sound Reduction Indices of Roof

Element	R (Octave Band Centre Freq. Hz), dB								R _w
	63	125	250	500	1000	2000	4000	8000	
Roof	25	39	47	53	58	56	60	55	56

8.4. Window Construction

On all façades the windows could be openable. However, they need to be sealed airtight to control external noise and should be normally closed. There should be no unattenuated vents or openings in the building façade.

The minimum sound reduction and typical glazing specification for all areas is provided below. The supplier should provide test data confirming the glazing specification meets the below performance.

Table 8: Required minimum sound insulation of windows

Element	SRI at Octave Band Frequency								R _w	Typical Glazing
	63	125	250	500	1k	2k	4k	8k		
Windows	20	24	20	25	35	38	35	36	31	4-12-4*

* This build up is the minimum build up for most windows.

8.5. Ventilation Provisions

There will need to be suitably attenuated ventilation provisions in the habitable rooms where specific noise mitigation measures are required. The ventilation provisions should include the necessary sound attenuation in order that the ingress of external noise is controlled to be compatible with the building fabric. The supplier should provide test data confirming the ventilation system meets the performance criteria listed in Table 9.

For the rooms we have assumed one vent for night time rooms and 2 vents for daytime rooms. The minimum performance for these vents is provided in the following tables.

The supplier should provide test data confirming ventilation meets the stated performance.

Table 9: Required minimum sound insulation performance of ventilation

Element	D _{ne} at Octave Band Frequency								D _{new}	Typical Vent
	63	125	250	500	1k	2k	4k	8k		
Ventilation	30	35	35	36	34	29	33	34	32	Standard trickle vent

8.6. Predicted Internal Noise Levels

With the mitigation methods provided, the predicted internal noise levels within the proposed residential development achieve the British Standard 8233:2014 criteria of 35 dB L_{Aeq} (16 hour) in daytime rooms and 30 dB L_{Aeq} (8 hour), 45 dB L_AF_{max} within the night-time rooms.

The internal levels for the worst-case rooms, after the application of the suggested mitigation measures, can be found in Figure 6 and Figure 7 below.

Figure 6: Estimated level after suggested mitigation for daytime rooms

Free Field Level at Façade										
Octave Band	63	125	250	500	1000	2000	4000	8000		dBA
Day L _{Aeq} (16hr)	60	52	49	43	51	47	38	30		54
Night L _{Aeq} (8hr)	55	48	42	44	45	41	35	30		49
Night-time L _{max} (fast)	73	64	65	62	61	57	48	53		65
Building Façade Construction										
External Element	63	125	250	500	1000	2000	4000	8000		
Standard Trickle – 8000mm ² hole in wall – 32 D _{new}	D _{new}	30	35	35	36	34	29	33		34
	Number of	2								
		0.00208	0.00066	0.00066	0.00052	0.00083	0.00262	0.00104		0.00083
2x100mm block plastered/render both sides 100mm void, 1880 Kg/m ³ + 400 kg/m ³ – 52 Rw	Area	31	38	46	45	55	66	77		70
		6								
		0.00046	0.00009	0.00001	0.00002	0.00000	0.00000	0.00000		0.00000
Double Glazed: 4/12/4 – 31 Rw	Area	20	24	20	25	35	38	35		36
		4								
		0.00417	0.00166	0.00417	0.00132	0.00013	0.00007	0.00013		0.00010
Roof: User Defined	Area	1	2	3	4	5	6	7		8
		0	0	0	0	0	0	0		0
Calculations to BS EN 12354										
Sum	63	125	250	500	1000	2000	4000	8000		
	0.008713	0.00241004	0.004840127	0.001853372	0.000962996	0.002688945	0.001175313	0.0003411		
10log sum	-21.7306	-26.1797578	-23.1514323	-27.3063372	-30.1637544	-25.7041808	-23.2962471	-30.2960188		
10log SIA	-0.57539	-0.57539321	0.621479067	1.627272975	2.14373617	-0.10723865	-1.33006358	-1.33006358		
correction factor +3	3	3	3	3	3	3	3	3		
Octave Band	63	125	250	500	1000	2000	4000	8000		dBA
Day L _{Aeq} (16hr)	41.0	27.9	29.0	28.6	25.9	24.0	10.6	15		30
Night L _{Aeq} (8hr)	35.6	24.5	22.8	21.5	20.1	18.6	7.2	13		25
Night-time L _{max} (fast)	53.3	40.2	45.1	39.2	36.2	34.0	20.3	24.4		42

Figure 7: Estimated level after suggested mitigation for worst-case night rooms

Free Field Level at Façade									
Octave Band	63	125	250	500	1000	2000	4000	8000	dBA
Day $L_{Aeq}(16hr)$	80	52	43	43	51	47	38	30	54
Night $L_{Aeq}(16hr)$	55	48	42	44	45	41	35	30	49
Night-time $L_{Aeq}(16hr)$	73	64	65	62	61	57	48	53	65
Building Façade Construction									
External Element	63	125	250	500	1000	2000	4000	8000	
Standard Trickle – 8000mm ² hole in wall – 32 Dnew	30	35	35	36	34	29	33	34	
Number of	1								
2x100mm block plastered/tender both sides 100mm void, 1880 Kg/m ³ + 400 kg/m ³ – 52 Rw	0.00062	0.00020	0.00020	0.00016	0.00025	0.00078	0.00031	0.00025	
Area	31	38	46	45	55	66	77	70	
Double Glazed: 4/12/4 – 31 Rw	0.00025	0.00005	0.00001	0.00001	0.00000	0.00000	0.00000	0.00000	
Area	20	24	20	25	35	38	35	36	
Pitched Roof – 56 Rw	0.00123	0.00049	0.00123	0.00039	0.00004	0.00002	0.00004	0.00003	
Area	25	39	47	53	58	56	60	55	
	0.001756821	6.39403E-05	1.10848E-05	2.78437E-06	8.80436E-07	1.39549E-06	5.55556E-07	1.75682E-06	
Calculations to BS EN 12354									
Sum	0.003864	0.000807506	0.00148318	0.000558394	0.000286681	0.000738157	0.000348377	0.000278545	
10log sum	-24.13	-30.328542	-28.3895623	-32.5305905	-35.4260082	-30.9791153	-34.5720287	-35.5510453	
10log SIA	3.467875	3.467874862	4.707344561	5.821491579	6.496083895	4.416173985	3.252862449	3.252862449	
correction factor +3	3	3	3	3	3	3	3	3	
Octave Band	63	125	250	500	1000	2000	4000	8000	dBA
Day $L_{Aeq}(16hr)$	42.6	27.2	27.8	25.5	24.9	23.3	9.9	0.6	30
Night $L_{Aeq}(16hr)$	37.3	23.8	21.7	20.4	19.2	17.9	6.5	0.7	24
Night-time $L_{Aeq}(16hr)$	54.9	39.5	43.9	38.2	35.2	33.2	19.6	23.7	41

8.7. Predicted Level within External Amenity Areas

Figure 8 provides the daytime noise map of external noise to the site. It can be seen that predicted noise levels across the development are within the BS8233:2014 and WHO amenity guideline levels of 50-55 L_{Aeq} , 16hours.

Figure 8: Daytime L_{Aeq} , 16hour noise map – amenity areas





9. Summary and Conclusions

WJ Morris appointed Acoustic Consultants Ltd to undertake a noise impact assessment for the proposed residential development at Springfield Lane, Rhiwderin, NP10 8QZ.

This report identifies relevant planning and noise guidance whilst establishing the impact of external noise sources and relevant noise mitigation measures in support of a planning application.

The prominent noise source at the site was road traffic from the A468 with secondary sources from the railway line and distant traffic on the M4. The report assesses the suitability of the site with respect to the Planning Policy Wales, TAN 11, British Standard 8233:2014 and WHO (1999).

This report is based upon noise levels measured at the site and proposal drawings of the development. The proposed site falls into Noise Exposure Category B which therefore requires noise mitigation measures, namely window construction and ventilation to habitable rooms.

With the proposed noise mitigation measures stated within the report, acceptable levels can be achieved within the habitable rooms of the development and amenity areas; as such, we would consider the site suitable for residential use.



10. Appendix 1 – Glossary of Acoustic Terminology

Decibel (dB) – The decibel is the unit used to quantify sound pressure levels. The human ear has an approximately logarithmic response to acoustic pressure over a very large dynamic range (typically 20 micro-pascals to 100 pascals). Therefore, a logarithmic scale is used to describe sound pressure levels and also sound intensity and power levels. The logarithms are taken to base 10. Hence an increase of 10 dB in sound pressure level is equivalent to an increase by a factor of 10 in the sound pressure level (measured in pascals). Subjectively, this increase would correspond to a doubling of the perceived loudness of sound.

Equivalent sound absorption area of a room, A - hypothetical area of a totally absorbing surface without diffraction effects, expressed in square metres (m^2), which, if it were the only absorbing element in the room, would give the same reverberation time as the room under consideration.

Octave and Third Octave Bands – The human ear is sensitive to sound over a range of frequencies between approximately 20 Hz to 20 kHz and is generally more sensitive to medium and high frequencies than to low frequencies within the range. There are many methods of describing the frequency content of a noise. The most common methods split the frequency range into defined bands, in which the mid-frequency is used as the band descriptor and in the case of octave bands is double that of the band lower. For example, two adjacent octave bands are 250 Hz and 500 Hz. Third octave bands provide a fine resolution by dividing each octave band into three bands. For example, third octave bands would be 160 Hz, 250 Hz, 315 Hz for the same 250 Hz octave band.

Reverberation time, T – time that would be required for the sound pressure level to decrease by 60 dB after the sound source has stopped NOTE Reverberation time is usually measured in octave or third octave bands. It is not necessary to measure the decay over the full 60 dB range. The decay measured over the range 5 dB to 35 dB below the initial level is denoted by T_{30} , and over the range 5 dB to 25 dB below the initial level by T_{20} .

Weighted sound reduction index, R_w – single-number quantity which characterizes the airborne sound insulating properties of a material or building element over a range of frequencies NOTE The weighted sound reduction index is used to characterize the insulation of a material or product that has been measured in a laboratory (see Annex C and BS EN ISO 717-1).

Sound pressure level – Sound pressure level is stated on many of the charts. It is the amplitude of the acoustic pressure fluctuations in a sound wave, fundamentally measured in pascals (Pa), typically from 20 micro-pascals to 100 pascals, but commonly simplified onto the decibel scale.



Weighted standardized impact sound pressure level, $L'_{nT,w}$ - single-number quantity used to characterize the impact sound insulation of floors over a range of frequencies. NOTE weighted standardized impact sound pressure level is used to characterize the insulation of floors in buildings (see Annex C and BS EN ISO 717-2).

Weighted standardized level difference, $D_{nT,w}$ - single-number quantity that characterizes the airborne sound insulation between rooms. NOTE Weighted standardized level difference is used to characterize the insulation between rooms in a building (see Annex C and BS EN ISO 717-1).



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