

REPORT

Stone Close, West Drayton

Noise Impact Assessment

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1 Introduction

1.1 Background

Royal HaskoningDHV was commissioned by Feasibility Ltd to undertake a noise impact assessment for a proposed MOT and vehicle servicing facility in Stone Close, West Drayton.

The report describes the assessment methodology; the baseline noise conditions at the Application Site and surroundings; the likely significant environmental effects; the mitigation measures required to prevent, reduce or offset any significant adverse effects; and the likely residual effects after these measures have been employed. This report has been prepared by Royal HaskoningDHV.

1.2 Site Description and Surrounding Area

The proposed development is located in Stone Close, West Drayton. The site is situated on currently vacated land within an industrial estate, accessed via Stone Close. The site is bounded by residential receptors to the south off Horton Road, industrial facilities to the east and west and Stockley Park grass patches to the north.

The proposed development site is located within the Hillingdon Borough Council (HBC) administrative area. The site location is detailed in **Appendix A, Figure A1**.

2 Legislative Framework and Planning Policy

2.1 National Legislation

2.1.1 Environmental Protection Act 1990¹

Section 79 of the Act defines statutory nuisance with regard to noise and determines that local planning authorities have a duty to detect such nuisances in their area.

The Act also defines the concept of “Best Practicable Means” (BPM):

“ ‘practicable’ means reasonably practicable having regard among other things to local conditions and circumstances, to the current state of technical knowledge and to the financial implications; the means to be employed include the design, installation, maintenance and manner and periods of operation of plant and machinery, and the design, construction and maintenance of buildings and structures; the test is to apply only so far as compatible with any duty imposed by law; and the test is to apply only so far as compatible with safety and safe working conditions, and with the exigencies of any emergency or unforeseeable circumstances.”

Section 80 of the Act provides local planning authorities with powers to serve an abatement notice requiring the abatement of a nuisance or requiring works to be executed to prevent their occurrence.

2.1.2 The Control of Pollution Act 1974²

Section 60 of the Act provides powers to Local Authority Officers to serve an abatement notice in respect of noise nuisance from construction works.

Section 61 provides a method by which a contractor can apply for ‘prior consent’ for construction activities before commencement of works. The ‘prior consent’ is agreed between the Local Authority and the contractor and may contain a range of agreed working conditions, noise limits and control measures designed to minimise or prevent the occurrence of noise nuisance from construction activities. Application for a ‘prior consent’ is a commonly used control measure in respect of potential noise impacts from major construction works.

2.2 National Policy Guidance

2.2.1 National Planning Policy Framework³

The National Planning Policy Framework (NPPF) was introduced in March 2012 replacing the former Planning Policy Guidance 24: Planning and Noise. Paragraph 123 of the National Planning Policy Framework states that planning policies and decisions should aim to:

“avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development;

mitigate and reduce to a minimum other adverse impacts on health and quality of life arising from noise from new development, including through the use of conditions;

¹ Her Majesty's Stationery Office (1990) Environmental Protection Act. HMSO, London.

² Her Majesty's Stationery Office (1974) Control of Pollution Act. HMSO, London.

³ Department for Communities and Local Government (2012) National Planning Policy Framework. DCLG, London.

recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established; and identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason."

The NPPF also refers to the Noise Policy Statement for England (NPSE) (Defra, 2010).

2.2.2 NPSE⁴

The Noise Policy Statement for England (NPSE) document was published by Defra in 2010 and paragraph 1.7 states three policy aims:

*"Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:
avoid significant adverse impacts on health and quality of life;
mitigate and minimise adverse impacts on health and quality of life; and
where possible, contribute to the improvement of health and quality of life."*

The first two points require that significant adverse impact should not occur and that, where a noise level falls between a level which represents the lowest observable adverse effect and a level which represents a significant observed adverse effect:

"...all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life whilst also taking into consideration the guiding principles of sustainable development. This does not mean that such effects cannot occur." (Paragraph 2.24, NPSE, March 2010).

Section 2.20 of the NPSE introduces key phrases including "Significant adverse" and "adverse" and two established concepts from toxicology that are being applied to noise impacts:

"NOEL – No Observed Effect Level

This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise.

LOAEL – Lowest Observed Adverse Effect Level

This is the level above which adverse effects on health and quality of life can be detected".

Paragraph 2.21 of the NPSE extends the concepts described above and leads to a significant observed adverse effect level – SOAEL, which is defined as the level above which significant effects on health and quality of life occur.

The NPSE states:

"it is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise in all situations". (Paragraph 2.22, NPSE, March 2010).

Furthermore paragraph 2.22 of the NPSE acknowledges that:

⁴ Department for Environment, Food and Rural Affairs (2010) Noise Policy Statement for England. DEFRA, London.

“further research is required to increase understanding of what may constitute a significant adverse effect on health and quality of life from noise”.

2.2.3 National Planning Practice Guidance for Noise⁵

The National Planning Practice Guidance for Noise (NPPG Noise, December 2014), issued under the NPPF, states that noise needs to be considered when new developments may create additional noise and when new developments would be sensitive to the prevailing acoustic environment. When preparing local or neighbourhood plans, or taking decisions about new development, there may also be opportunities to consider improvements to the acoustic environment.

2.3 Guidance

The following guidance has been used for the purpose of the noise and vibration assessment:

British Standard (BS) 4142:2014 – Method for rating and assessing industrial and commercial sound⁶

BS 4142 describes methods for rating and assessing sound of an industrial and/or commercial nature. The methods use outdoor sound levels to assess the likely effects of sound on people who might be inside or outside a dwelling or premises used for residential purposes upon which sound is incident. Where new residential receptors are proposed close to existing industrial/commercial noise sources the standard allows for, and encourages, the use of other standards such as BS 8233 (detailed below).

British Standard (BS) 7445:2003 Parts 1 and 2 - Description and measurement of environmental noise^{7,8}

This Standard provides details of the instrumentation and measurement techniques to be used when assessing environmental noise, and defines the basic noise quantity as the continuous A-weighted sound pressure level (L_{Aeq}). Part 2 of BS 7445 replicates ISO standard 1996-2.

British Standard (BS) 8233:2014 – Guidance on Sound Insulation and Noise Reduction for Buildings⁹

Provides a methodology to calculate the noise levels entering a building through facades and façade elements and provides details of appropriate measures for sound insulation between dwellings. It includes recommended internal noise levels which are provided for a variety of situations.

World Health Organisation (WHO) (1999) Guidelines for community noise¹⁰

These guidelines present health-based noise limits intended to protect the population from exposure to excess noise. They present guideline limit values at which the likelihood of particular effects, such as sleep disturbance or annoyance, may increase. The guideline values are 50 or 55dB L_{Aeq} during the day, related to annoyance, and 45 dB L_{Aeq} or 60dB L_{Amax} at night, related to sleep disturbance.

Calculation of Road Traffic Noise (CRTN)¹¹

The Calculation of Road Traffic Noise (CRTN) document provides a method for assessing noise from road traffic in the UK and a method of calculating noise levels from the Annual Average Weekday Traffic (AAWT) flows and from measured noise levels. Since published in 1988 this document has been the nationally accepted standard in predicting noise levels from road traffic. The calculation methods provided include correction factors to take account of variables affecting the creation and propagation of road traffic

⁵ Department for Communities and Local Government (2014) National Planning Practice Guidance Noise. DCLG, London.

⁶ British Standards Institute (2014) BS 4142:2014 Methods for rating and assessing industrial and commercial sound. BSI, London.

⁷ British Standards Institute (2003) BS 7445-1:2003 Description and measurement of environmental noise. Guide to quantities and procedures. BSI, London.

⁸ British Standards Institute (2003) BS 7445-2:2003 Description and measurement of environmental noise. Guide to the acquisition of data pertinent to land use. BSI, London.

⁹ British Standards Institute (2014) BS 8233:2014 Sound Insulation and Noise Reduction for Buildings. BSI, London.

¹⁰ Berglund et al (1999) Guideline for Community Noise. WHO, Geneva.

¹¹ Department of Transport Welsh Office (1988) Calculation of Road Traffic Noise. HMSO, London.

noise, accounting for the percentage of heavy goods vehicles, different road surfacing, inclination, screening by barriers and relative height of source and receiver.

2.4 Local Planning Policy Guidance

HBC guidance and policy specifically relating to noise and vibration is detailed in the following documents:

A Vision for 2026, Local Plan: Part1 Strategic Policies (Adopted November 2012)¹² states:

"Land, Water, Air and Noise Strategic Objectives

SO10: Improve and protect air and water quality, reduce adverse impacts from noise including the safeguarding of quiet areas and reduce the impacts of contaminated land.

SO11: Address the impacts of climate change, and minimise emissions of carbon and local air quality pollutants from new development and transport."

Paragraph 8.120 of the 2012 Local Plan states:

"Noise: For the purpose of the Hillingdon Local Plan: Part 1- Strategic Policies, noise (including vibration) means:

- *"environmental noise" which includes noise from transportation sources;*
- *"neighbour noise" which includes noise from inside and outside peoples homes; and*
- *"neighbourhood noise" which includes noise arising from within the community such as industrial and entertainment premises, trade and business premises, construction sites and noise in the street."*

Policy EM8: Land, Water, Air and Noise states:

"Noise

The Council will investigate Hillingdon's target areas identified in the Defra Noise Action Plans, promote the maximum possible reduction in noise levels and will minimise the number of people potentially affected.

The Council will seek to identify and protect Quiet Areas in accordance with Government Policy on sustainable development and other Local Plan policies.

The Council will seek to ensure that noise sensitive development and noise generating development are only permitted if noise impacts can be adequately controlled and mitigated."

Section 5.15 of Supplementary Planning Document Planning Obligations, July 2014)¹³ states:

"As stated in Hillingdon's SPD on Noise, the Council exercises its land use planning controls to seek the physical separation of noise and noise sensitive development. Planning obligations may be applied if separation or planning conditions cannot be used to control or reduce noise levels or to mitigate the impact of noise."

¹² London Borough of Hillingdon (2012), A Vision For 2026 Local Plan: Part 1 Strategic Policies (Adopted November 2012). London.

¹³ London Borough of Hillingdon (2014), Supplementary Planning Document Planning Obligations. London.

3 Noise Survey and Assessment Methodology

3.1 Methodology

3.1.1 Study Area

This section describes the assessment methodologies, including data collation and consultation, which were used in the noise assessment.

The Study Area for the noise and vibration assessment comprises the area of the Proposed Development and the surrounding closest noise sensitive receptors. The baseline noise measurement locations are illustrated in **Appendix A, Figure A2**.

3.1.2 Baseline Noise Survey

In order to establish the baseline conditions at the development site, a noise measurement survey was undertaken at one location next the site considered representative of the closest noise sensitive receptors. The survey was conducted between 11th and 17th January 2018 at the location shown in **Appendix A, Figure A2** and specified in **Table 3.1**.

Table 3.1: Baseline noise survey location

Receptor ID	Receptor Description	Corresponding Noise Sensitive Receptor Point
MP1	Representative of residential property situated off Horton Road	NSR1
		NSR2
		NSR3

The noise measurements were taken using the instrumentation detailed in **Table 3.2**.

Table 3.2: Noise survey instrumentation

Instrument	Type	Serial Number	Calibration due date at time of survey
Sound Level Meter	Rion NL 52	00864984	27 th October 2018
Preamp	Rion NH-25	65111	27 th October 2018
Microphone	Rion UC-59	09914	27 th October 2018
Calibrator	B&K Type 4231	2525097	27 th January 2019

All noise measurements were conducted with regard to the procedure and guidance contained in BS 7445, parts 1 and 2. Microphones were positioned a minimum distance of 1.5 metres from the ground and all instrumentation was fully calibrated to traceable UKAS standards and satisfied the requirements for Class1 instruments described in BS EN 61672-1:2013. The calibration of the Sound Level Meters (SLMs) was checked before and after each of the surveys, with no significant drift in sensitivity observed.

The surveys were conducted during periods of weather favourable for noise measurements, i.e. no rainfall and wind speeds below 5m/s.

The noise levels measured during the surveys included the following noise indices:

- L_{Aeq} – the equivalent continuous sound pressure level over the measurement period;
- L_{Amax} – the maximum sound pressure level occurring within the defined measurement period;
- L_{A90} – the sound pressure level exceeded for 90% of the measurement period and is used within BS 4142 as a descriptor of background noise level; and
- L_{A10} – the sound pressure level exceeded for 10% of the measurement period.

The equivalent continuous sound pressure level (L_{Aeq}) is the conventional descriptor of environmental noise and is defined below.

$$L_{eq,T} = 10 \times \log \left[\frac{1}{T} \int \frac{\rho^2(t) \partial t}{\rho_0^2} \right] dB$$

Noise measurements are normally taken with an A-weighting (denoted by a subscript 'A') to approximate the frequency response of the human ear. The time constant of the SLMs were set to 'Fast' during all measurements. **Appendix B** presents descriptions of these terms.

Statistical analysis methods have been applied to the resulting data sets in order to assess the background noise levels with a greater degree of scrutiny before presenting final levels which form the basis for the operational noise assessment. The modal value for L_{A90} values was calculated for the daytime and night time periods. A strong correlation was determined for the data with further statistical analysis which included a comparison of the calculated value with 1 standard deviation and the 90% confidence value.

Based on this correlation the standard deviation plus one value was considered representative for the background noise levels and selected for use in the BS4142 assessment for daytime and night time periods.

3.2 Measured Baseline Noise Data

Measured baseline sound levels at the monitoring location MP1 are presented in **Table 3.3**.

Table 3.3: Baseline noise level summary – MP1

Period	Date	L_{Aeq}	dB L_{Amax}	dB L_{A10}^*	dB L_{A90}^*
Day	11th January	47.9	79.5	51.3	40.5
Night	11th to 12th January	39.0	78.7	41.8	30.0
Day	12th January	50.5	81.8	53.7	44.9
Night	12th to 13th January	43.9	70.5	46.0	39.4
Day	13th January	50.4	85.6	53.1	45.9
Night	13th to 14th January	40.5	89.3	42.9	33.8

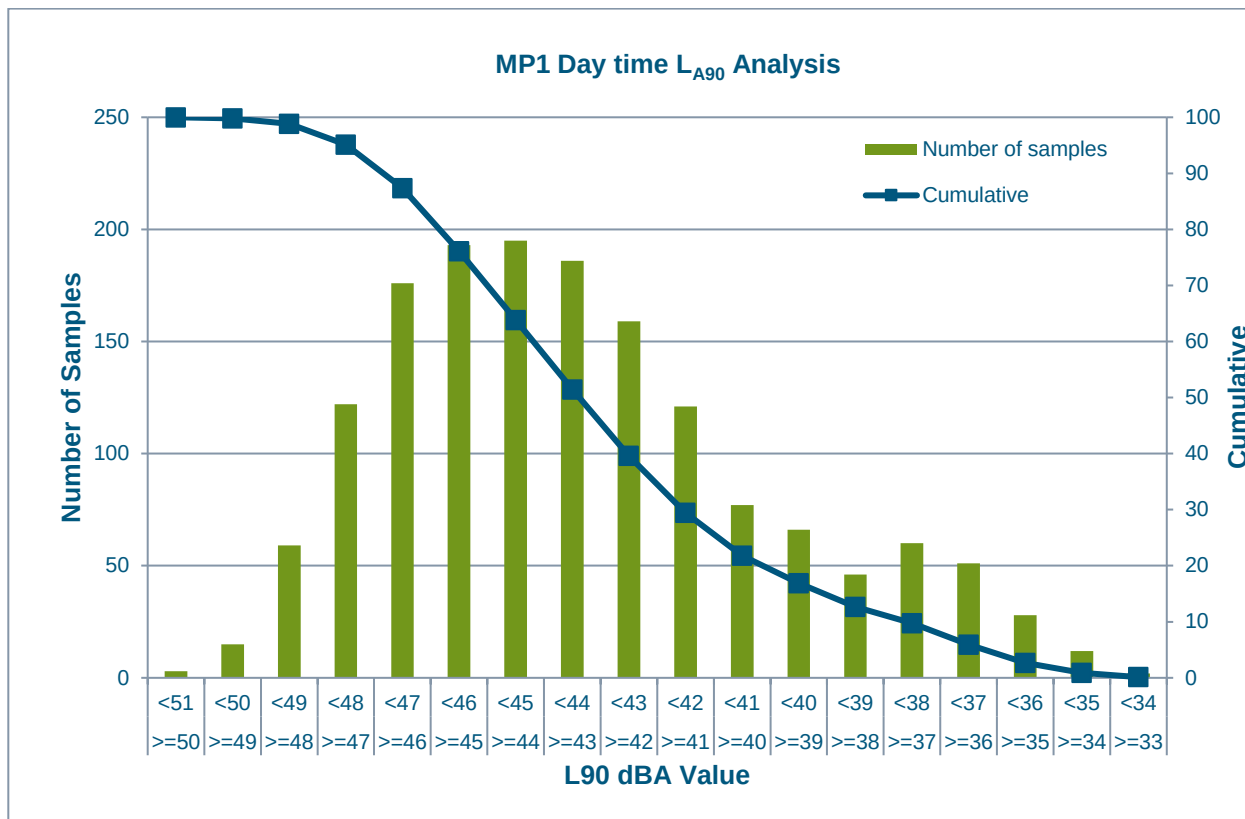
Period	Date	L _{Aeq}	dB L _{Amax}	dB L _{A10} *	dB L _{A90} *
Day	14th January	47.0	87.6	50.3	39.7
Night	14th to 15th January	41.1	71.4	42.8	37.3
Day	15th January	50.1	82.6	53.5	43.8
Night	15th to 16th January	42.3	70.6	44.5	37.5
Day	16th January	50.5	87.0	53.7	44.2
Night	16th to 17th January	41.6	72.3	43.5	35.8
Day	17th January	51.2	74.8	54.5	44.7

*- taken as the arithmetic mean of the individual 15min results

It was noted that the noise climate in the area consisted of intermittent traffic noise, bird song and people from the residential houses and industrial estate.

As the mean average of a series of measured background sound levels (LA90) is not numerically equal to the overall background sound level the assessment value has been obtained through statistical analysis following the guidance within BS4142:2014.

Graph 3.1 details the results of the statistical analysis. From the daytime L_{A90} distribution, a value of 43.4dB is considered to be representative for the day time as this is the most commonly occurring value and correlates with the calculated mean. Since the site is not anticipated to operate during the night time no analysis was performed on the night time data.



Graph 3.1: Daytime L_{A90} Analysis

4 Noise Impact Methodology and Assessment Criteria

4.1 Consultation

Consultation was undertaken with HBC via telephone and later confirmed in email¹⁴ to agree the appropriate method of assessment for the potential noise generating activities at the site and to determine the effects on the surrounding Noise Sensitive Receptors (NSRs).

4.2 Assessment Methodology

The following sections describe the impact methodology and assessment criteria used to determine the significance of noise impact from the simultaneous operation of the generators.

The study area for the noise impact assessment comprised the area immediately adjacent to the proposed development site and the receptors in closest proximity to the site likely to be affected.

4.2.1 Construction Noise

Noise generated by the construction of the development is inevitable, therefore to minimise the potential for noise impacts generic mitigation measures are provided within Section 7. These include Best Practicable Means (BPM) as defined in The Control of Pollution Act 1974.

4.2.2 Industrial and Commercial Sound Assessment

BS4142:2014

Noise from fixed plant is typically assessed in the context of BS 4142:2014, which involves a comparison of the rating level and the measured background (L_{A90}) noise level at potential receptor locations.

BS 4142 describes methods for rating and assessing sound of an industrial and/or commercial nature. The methods use outdoor sound levels to assess the likely effects of sound on people who might be inside or outside a dwelling or premises used for residential purposes upon which sound is incident and combines procedures for assessing the impact in relation to the development of new industrial and/or commercial sources affecting existing receptors.

The standard applies to industrial/commercial and background noise levels outside residential buildings and for assessing whether existing and new industrial/commercial sound sources are likely to give rise to significant adverse impacts on the occupants living in the vicinity.

The assessment is undertaken by subtracting the measured background noise level from the derived rating level; the greater this difference, the greater the magnitude of the impact.

BS 4142 refers to the following;

"A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.

A difference of around + 5 dB is likely to be an indication of an adverse impact, depending on the context.

¹⁴ Telephone call between Royal HaskoningDHV and HBC Environmental Health Department, 24th January 2018, follow up email titled "Baseline Noise Assessment (Hillingdon)" sent 24th January 2018

The lower the rating level relative to the measured background sound level the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context".

Taking the above guidance into account, the impact magnitude criteria presented in **Table 4.1** were applied to this assessment.

Table 4.1: Operational noise impact magnitude criteria for industrial/commercial sound sources

Rating level dB $L_{A,T,r}$	Impact criteria
$\leq$ Measured L_{A90}	No impact
= Measured L_{A90} dB and up to +3 dB	Negligible
Measured L_{A90} + 3 dB to 5 dB	Minor
Measured L_{A90} + 5 dB to 9.9 dB	Moderate
$\geq$ Measured L_{A90} + 10 dB	Major

4.2.3 Noise from Operational Activities

A detailed SoundPLAN noise model was created to predict the noise effects from operational activities associated with the development. It is understood that the facility will house 20 workshop ramps with each ramp servicing approximately 4 vehicles per day¹⁵. At the time of the assessment no noise data was available for the activities occurring on-site.

Therefore, assumptions were made regarding the activities and associated noise levels based on previous project experience. **Table 4.2** below details the assumed operational activities at each of the workshop ramps and the associated noise levels based on previous similar project experience.

Table 4.2: Assumed Operational Activities and Associated Noise Levels

Operation	Noise Level (L_{Aeq} , dB) @10m	On-time per Hour (mins)
Battery Impact Drills	81.0	2
Pneumatic Air Tools	83.0	2
Vehicle Emission Test	74.0	10
Vehicle driving on to 2 post vehicle lift	63.0	10
Vehicle driving off a 2 post vehicle lift	66.0	10
Vehicle driving on to 4 post vehicle lift	66.0	5
Vehicle driving off a 4 post vehicle lift	61.0	5
Hammering using Lump Hammer	91.0	2
Compressor	64.0	20

¹⁵ Email titled "Stone Close – Pre-App" dated 22nd March 2018 sent to RHDHV by Feasibility Ltd.

To calculate the overall noise level at each workshop ramp from the activities listed in **Table 4.2** above the overall one hour equivalent noise level, representing a worst case scenario, has been calculated and is presented in **Table 4.3** below:

Table 4.3: Calculated Overall Reverberant Noise Level from Activities at Each Ramp

Frequency (Hz)	125	250	500	1000	2000	4000	dBA
L _{Aeq, 1hr} (dB)	83.8	66.3	66.0	60.7	61.5	59.4	71.0

The resultant overall noise level of 84 dBA was used for each workshop ramp. The noise model assumes a worst-case scenario of all 20 ramps operating simultaneously and therefore the reverberant sound pressure level within the facility was calculated based on this scenario.

In order to calculate the noise breakout from the facility the noise reduction (R_w) achieved by the walls was calculated using Insul Sound Insulation Prediction Software. The composite sound insulation performance of the walls and floors was calculated based on a combination of gypsum board, rockwool insulation and sheet metal facing which was assumed based on the drawing referenced below:

- 443-PL-030-P5 Sections

The noise reduction achieved by the proposed wall construction was predicted to be R_w 39dB and the certificate of prediction can be found in **Appendix C**. It is recommended that the performance is specified to ensure a 40dB R_w as detailed in **Table 4.4**.

Table 4.4: Wall Performance

Frequency (Hz)	63	125	250	500	1000	2000	4000	R _w
Performance	16	16	31	44	52	59	48	40

It is understood that all workshop plant equipment would be housed within the facility and not outside where it would be exposed to the receptors.

The building was modelled as an industrial building in SoundPLAN and noise breakout was calculated based on the calculated reverberant sound pressure level and sound insulation achieved by the wall design. The model assumes a worst-case scenario in terms of operating parameters and an on-time of 100% was used. Operations were modelled based on the following expected hours:

- Monday to Friday 07:00 to 22:00; and
- Saturday and Sunday 08:00 to 18:00.

The model was created using topographical data of the local area and the site plan of the proposed development. This site plan can be found in **Appendix, Figure A1**. Ground absorption was incorporated into the SoundPLAN model using a coefficient of 0 to represent the hard ground conditions between the sound sources and receiver.

External activity includes a designated area comprising of two bays for vehicle valet. The sound levels associated with each activity and included cumulatively in the noise model are detailed in **Table 4.5**.

Table 4.5: Calculated Overall Noise Level from Valet Activities Per Bay

Plant		63	125	250	500	1000	2000	4000	8000	dBA
Jet Wash L _{WA} , (dB)	Frequency (Hz)	63.4	71.0	77.8	83.4	86.3	86.0	84.8	82.3	92
Vacuum L _{WA} , (dB)		52.6	60.2	67.0	72.3	75.5	75.2	74.0	71.5	82

Assumptions for the valet area include:

- Each bay with a 15 minute on-time per Jet wash in any hour;
- Each bay with a 15 minute on-time per vacuum in any hour;
- Valet area enclosed to three sides with a 1.8m screen.

Garden fences at receptor locations have been incorporated within the model, using a standard 1.8 metre height. BS5228:2009+A1:2014 states that, “as a working approximation, if there is a barrier or other topographic feature between the source and the receiving position, assume an approximate attenuation of 5dB when the top of the plant is just visible to the receiver over the noise barrier, and of 10dB when the noise screen completely hides the sources from the receiver”.

4.2.4 Noise from Road Traffic

It is understood that predicted traffic flows indicate that frequency of vehicles on the local road network are anticipated to decrease as a result of the development. Since no increase in traffic is predicted, a traffic assessment has been scoped out and not considered further in this assessment.

5 Noise Assessment

5.1 Construction Noise and Vibration

Noise and vibration associated with the construction Phase of the proposed development has the potential to temporarily increase noise levels at nearby residential properties. Due to the temporary nature of construction activities the potential for receptors to be affected will depend on where within the application site the noisy activity takes place, the nature of the activity and controls and meteorological conditions.

Although the construction works will be carried out during the day time, some equipment, such as power generation plant for security or lighting, may be required to run at night. Old or ill-maintained equipment is likely to generate higher noise levels; however 'silenced' plant is available, which would reduce noise impacts at nearby residences.

Mitigation measures using BPM for construction noise and vibration are presented in Section 7 of this report.

5.2 BS4142 Assessment

The baseline measurement location was selected to represent the existing residential receptors or groups of sensitive receptors, closest to the application site. The receptors are listed in **Table 3.1**.

Tonality

Standard AHU plant equipment is expected for use in the site. Due to the separation distance and orientation of the facility entrance away from the closest noise sensitive receptors, tonality is not expected to be perceptible. Therefore, no penalty for tonality was applied for workshop activity.

A +2dB penalty was applied to the operation of the vacuum cleaners in the valet area due to the proximity of the designated area to the nearest residential property.

5.2.1 BS4142 Assessment Context

Intermittency

Intermittent sound sources originating on site could include noise from operational activities. Since the activities are largely internal, intermittent operation of plant and equipment is considered unlikely to be perceptible at the nearest noise sensitive receptors. Therefore, no penalty for intermittency from workshop activity was applied.

A +3dB penalty was applied for the valet area activities, due to the proximity of the designated area to the nearest residential property.

5.2.2 BS4142 Assessment Context

BS4142:2014 advises the estimated impact must be considered within the context of the site and the surrounding acoustic environment. The following must, therefore, also be taken into consideration when determining the overall potential impact at the identified receptors:

- The existing noise climate is dominated by road traffic using the surrounding network during the daytime and night time period with road surface noise and engine/exhaust sound from passing vehicles;
- A cumulative assessment of workshop and external valeting activities was undertaken;
- Further to provide a conservative approach all workshop ramps have been modelled operating simultaneously to simulate a worst-case scenario of noise breakout.

5.3 Uncertainty of Measurements:

Uncertainty in this assessment was minimised by incorporating the following steps:

- A good correlation was shown between the model L_{A90} values and the mean; therefore, the mean value has been selected for the assessment.
- The meter and calibrator used have a traceable laboratory calibration and the meter was field calibrated before and after the measurements.
- Uncertainty in the calculated impact was reduced by the use of representative source noise levels in the calculation method.
- The measurement locations were agreed with HBC and considered to be representative to establish the noise climate outside the nearby residential dwellings within the vicinity of the proposed development.

The results of the SoundPLAN modelling are detailed in **Table 5.1** for plant noise representing the daytime and night time reference periods. Predicted noise levels at ground floor are provided as the operational hours are daytime only.

Table 5.1: Predicted noise impact of proposed workshop and valet plant daytime (free-field)

Receptor	Floor	Calculated fixed plant rating level, free field, dB $L_{Aeq,1hr}$	Background noise level at receptor dB L_{A90}	BS 4142 Assessment
NSR1	Ground Floor	46.0	43.4	Negligible Impact
NSR2	Ground Floor	44.5		Negligible Impact
NSR3	Ground Floor	42.9		No Impact

The BS 4142 assessment detailed in **Table 5.1** determined that simultaneous operation of all the activities would have at most a **Negligible Impact** at the residential premises around the site during the daytime reference period provided that the facility walls have a sound reduction index of R_w 40.

6 Mitigation Measures

6.1 Construction Noise Mitigation

It is inevitable that there would be some increases in noise levels local to works from the required construction activity; however these changes in noise level would be short term and temporary.

Mitigation measures include good practice construction management to reduce impacts from the noise generated by the construction Phase of the proposed development, as described below.

6.1.1 Noise Management Plan

The Control of Pollution Act and BS 5228 define a set of Best Practice working methods and mitigation measures, referred to as BPM. Examples of these measures include:

- Where possible, locating temporary plant so that it is screened from receptors by on-site structures, such as site cabins;
- Using modern, quiet equipment and ensuring such equipment is properly maintained and operated by trained staff;
- Applying enclosures to particularly noisy equipment where possible;
- Ensuring that mobile plant is well maintained such that loose body fittings or exhausts do not rattle or vibrate;
- Ensuring plant machinery is turned off when not in use;
- Providing local residents with 24-hour contact details for a site representative in the event that disturbance due to noise from the construction works is perceived;
- Informing local residents about the construction works, including the timing and duration of any particularly noisy elements, and providing a contact telephone number to them; and
- Keeping noisy deliveries, such as skips and concrete, to the middle of the day where possible.

Although the effect of adopting such methods cannot be precisely quantified, it is possible that these methods would reduce noise levels by between 5 - 10dBA.

6.1.2 Training

The site induction programme and site rules should include good working practice instructions for site staff, managers, visitors and contractors to help minimise noise whilst working on the site.

Good working practice guidelines/instructions could include, but not be limited to, the following points:

- Avoiding unnecessary revving of engines;
- Plant used intermittently should be shut-down between operational periods, where possible;
- Avoiding reversing wherever possible;
- Reporting any defective equipment/plant as soon as possible so that corrective maintenance can be undertaken; and
- Handling material in a manner that minimises noise.

6.1.3 Maintenance

Maintenance of temporary plant should be carried out routinely and in accordance with the manufacturers' guidance.

A regular inspection of all plant and equipment could be undertaken to ensure that:

- all plant is in a good state of repair and fully functional;
- any plant found to be requiring interim maintenance has been identified and taken out of use;
- acoustic enclosures fitted to plant are in a good state of repair;
- doors and covers to such enclosures remain closed during operation; and
- any repairs are being undertaken by a fully qualified maintenance engineer.

6.1.4 Acoustic Treatment

Noise breakout from the facility is dependent upon the sound reduction achieved by the building envelope and quality of the workmanship. In order to ensure that noise impacts do not occur it is recommended that the building envelope is designed to achieve a minimum sound reduction of Rw 40 in all locations.

Furthermore, acoustic treatment such as soft finishes within the building will reduce the reverberant sound pressure level which reduces the noise breakout. Finishes to the internal walls can be considered to further reduce noise impacts.

Care should be taken to ensure that all gaps and joints in the walls are carefully sealed so that sound cannot leak through the walls. It is recommended that inspection is undertaken during the construction process to ensure this occurs.

7 Conclusions

A noise impact assessment has been undertaken to assess the potential noise impacts due to operational activities at the proposed Stone Close site.

The BS 4142:2014 assessment of the operational activities associated with the site predicted at most a **Negligible Impact** for the closest noise sensitive receptors during the proposed daytime operational period. This is provided that the building envelope achieves a minimum sound reduction of Rw 40. Consideration can be given to finishes within the building to reduce the reverberant sound pressure level.

Appendix A: Figures

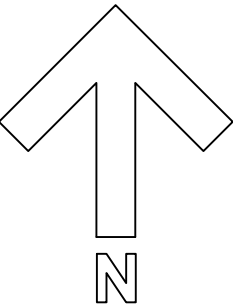
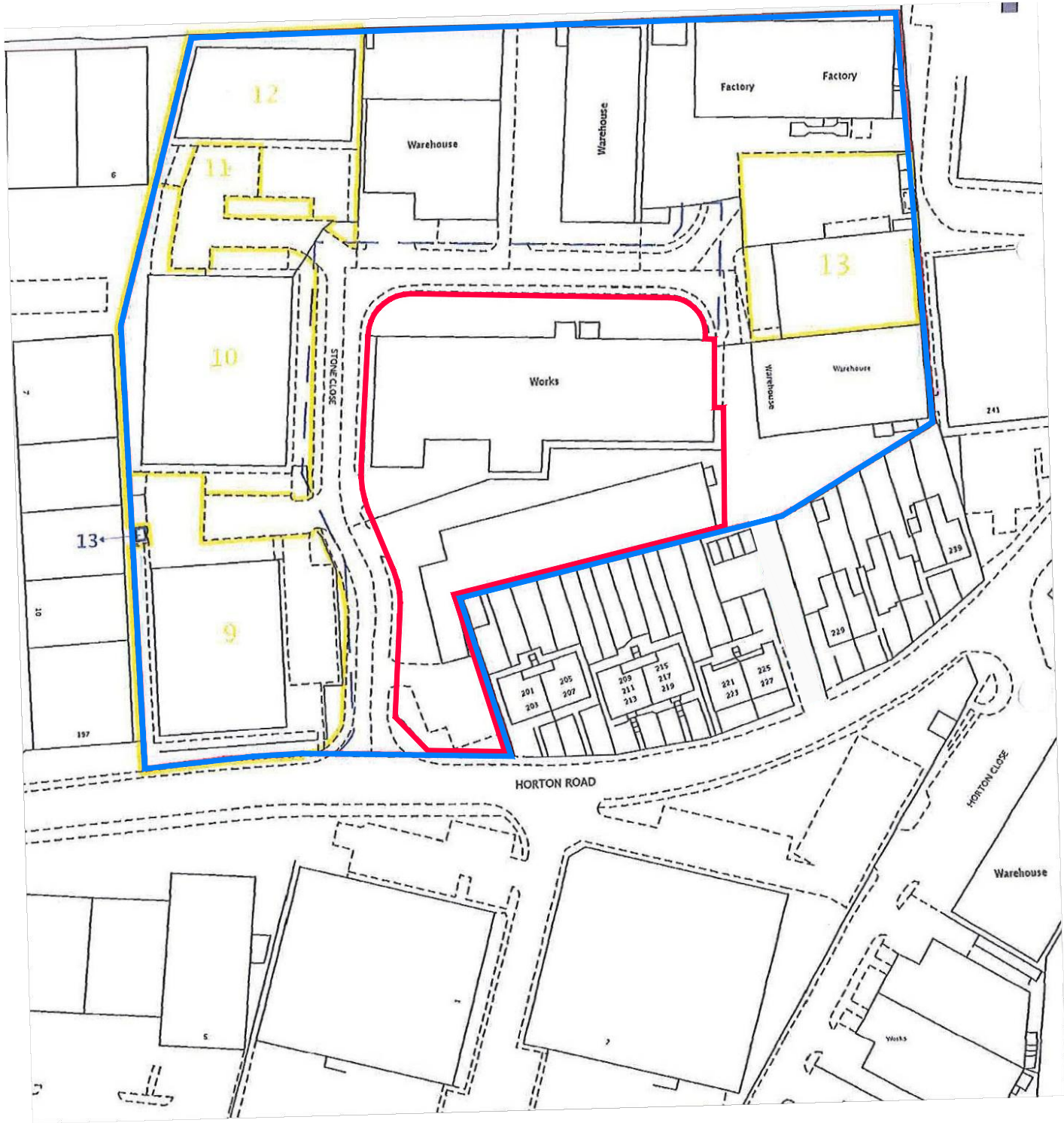
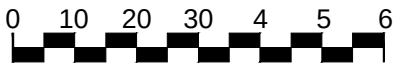


Figure A1



Scale 1:1250 @ A3



Revisions

Job Title

PROPOSED B1/B2/B8 REDEVELOPMENT

Location

STONE CLOSE
WEST DRAYTON

Drawing Title

SITE LOCATION PLAN

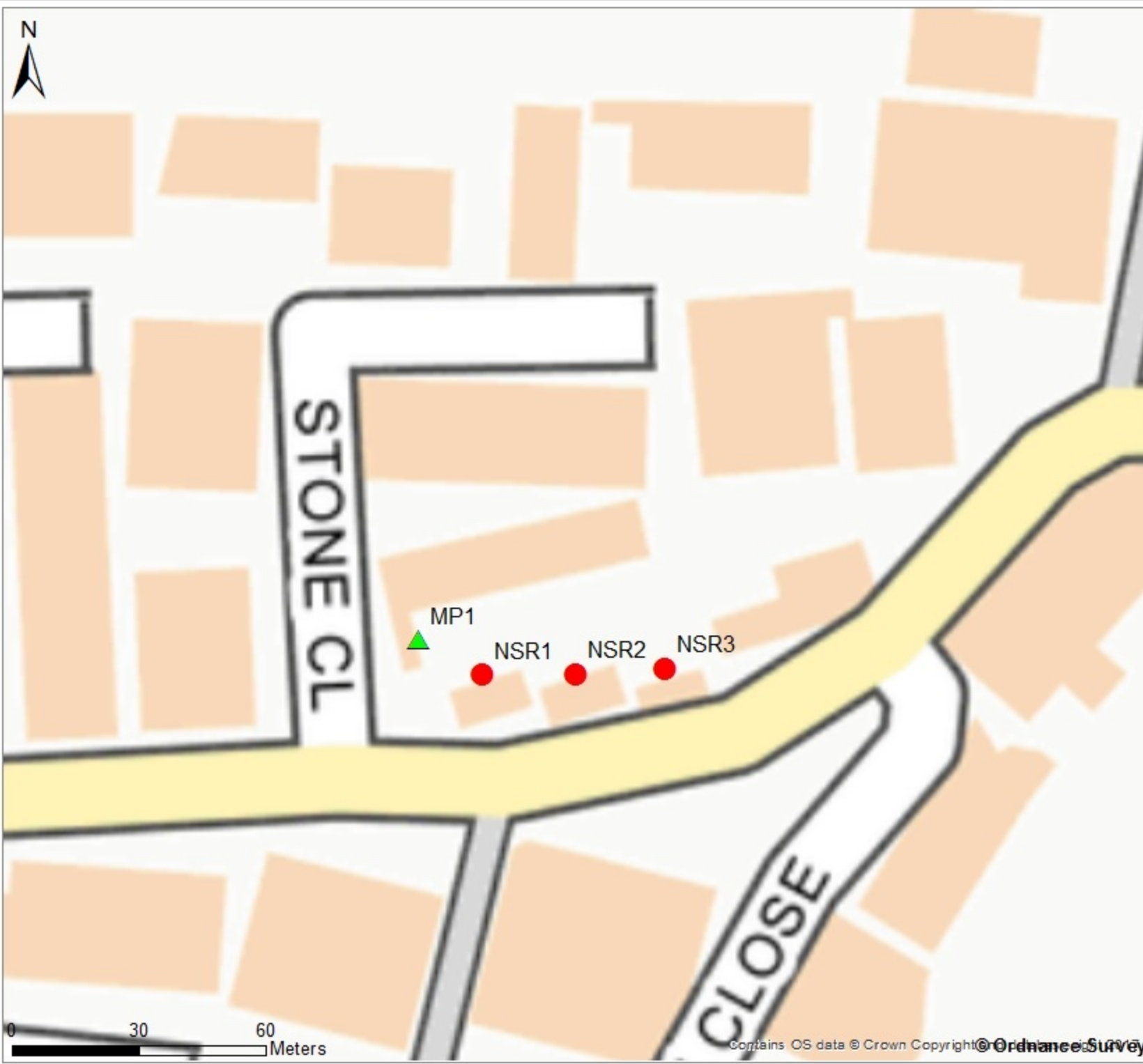
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Scale 1:1250 at A3 Checked

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Dwg no. 4435-PL-001 Revision P1



Key:

-  Baseline Measurement Point
-  Noise Sensitive Receptors

Title
Stone Close Baseline Measurement Point and Noise Sensitive Receptors

Project
Stone Close

Client
Feasibility Ltd

Date 02/05/2018	Scale 1:1250
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Figure
A2

Drawn by Nick Fry	Number 1
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Royal HaskoningDHV
Enhancing Society Together

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Appendix B: Acoustic Terminology

Term	Description
Decibel (dB)	A unit of noise level derived from the logarithm of the ratio between the value of a quantity and a reference value. It is used to describe the level of many different quantities. For sound pressure level the reference quantity is 20 μ Pa, the threshold of normal hearing is 0dB, and 140dB is the threshold of pain. A change of 1dB is only perceptible under controlled conditions. Under normal conditions a change in noise level of 3dB(A) is the smallest perceptible change.
dB(A)	Decibels measured on a sound level meter incorporating a frequency weighting (A weighting) which differentiates between sounds of different frequency (pitch) in a similar way to the human ear. Measurements in dB(A) broadly agree with people's assessment of loudness. A change of 3 dB(A) is the minimum perceptible under normal conditions, and a change of 10 dB(A) corresponds roughly to halving or doubling the loudness of a sound. The background noise level in a living room may be about 30 dB(A); normal conversation about 60 dB(A) at 1 metre; heavy road traffic about 80 dB(A) at 10 metres; the level near a pneumatic drill about 100 dB(A).
L_{Aeq,T}	The equivalent continuous sound level – the sound level of a notionally steady sound having the same energy as a fluctuating sound over a specified measurement period (T). L _{Aeq,T} is used to describe many types of noise and can be measured directly with an integrating sound level meter.
L_{A10,T}	The A weighted noise level exceeded for 10% of the specified measurement period (T). L _{A10} is the index generally adopted to assess traffic noise.
L_{A90,T}	The A weighted noise level exceeded for 90% of the specified measurement period (T). In BS 4142:2014 it is used to define the 'background' noise level.
L_{Amax}	The maximum A-weighted sound pressure level recorded during a measurement.
L_{Amin}	The minimum A-weighted sound pressure level recorded during a measurement.
R_w	The weighted sound reduction index, R _w , is a single figure description of sound reduction index which is defined in BS EN ISO 717-1: 1997. The R _w is calculated from measurements in an acoustic laboratory to BS EN ISO 140-3:1997 and ratings to BS EN ISO 717-1:1997. Sound insulation ratings derived from site (which are invariably lower than the laboratory figures) are referred to as the R' _w ratings (apparent weighted sound reduction index) and measured to BS EN ISO 140-4:1998

Appendix C: Predicted Sound Insulation Performance of Facility Walls

Sound Insulation Prediction (v8.0.9)

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Royal HaskoningDHV - Key No. 5502

Margin of error is generally within $R_w \pm 3$ dB

Job Name:

Job No.:

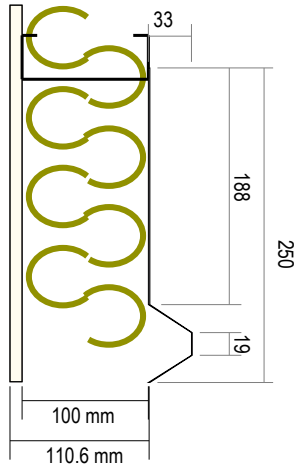
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Page No.:

Initials:304670

Notes:



R_w 39 dB

C -3 dB

C_{tr} -10 dB

D_{nTw} 41 dB [V:50m3]
[A:11m2]

System description

Panel 1 : 1 x 10.0 mm mm Plasterboard (ρ :710 kg/m³, E :2GPa, η :0.01)

Cavity: Steel stud (1.0-1.6 mm): Stud spacing 600 mm , Infill Fibreglass (22kg/m³) Thickness 90 mm (ρ :10 kg/m³, R_f :10000 Pa.s/m²)

Panel 2 + 1 x 0.6 mm Roof Cladding Windex (ρ :7800 kg/m³, E :2.1E02GPa, η :0.01)

Mass-air-mass resonant frequency =94 Hz

Panel Size 2.7x4 m; Mass 13.3 kg/m²

frequency (Hz)	R(dB)	R(dB)
50	13	
63	13	13
80	13	
100	11	
125	15	14
160	20	
200	26	
250	31	29
315	36	
400	40	
500	43	42
630	44	
800	47	
1000	51	50
1250	53	
1600	56	
2000	57	57
2500	58	
3150	58	
4000	45	46
5000	44	

