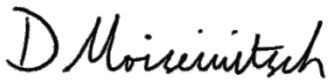
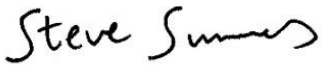
Report for:

Asif Riaz Meer

69-71 Fairfield Road, West Drayton, UB7 8EZ

Noise Impact Assessment

Status: Final **Date: 26.02.2024**

Author	 Daniel Moiseiwitsch MSci AMIMA Junior Acoustic Consultant
Reviewed and Approved By	 Steve Summers BSc MSc MIOA AMICE CEng Associate Director
Report For	Asif Riaz Meer 69-71 Fairfield Road West Drayton UB7 8EZ
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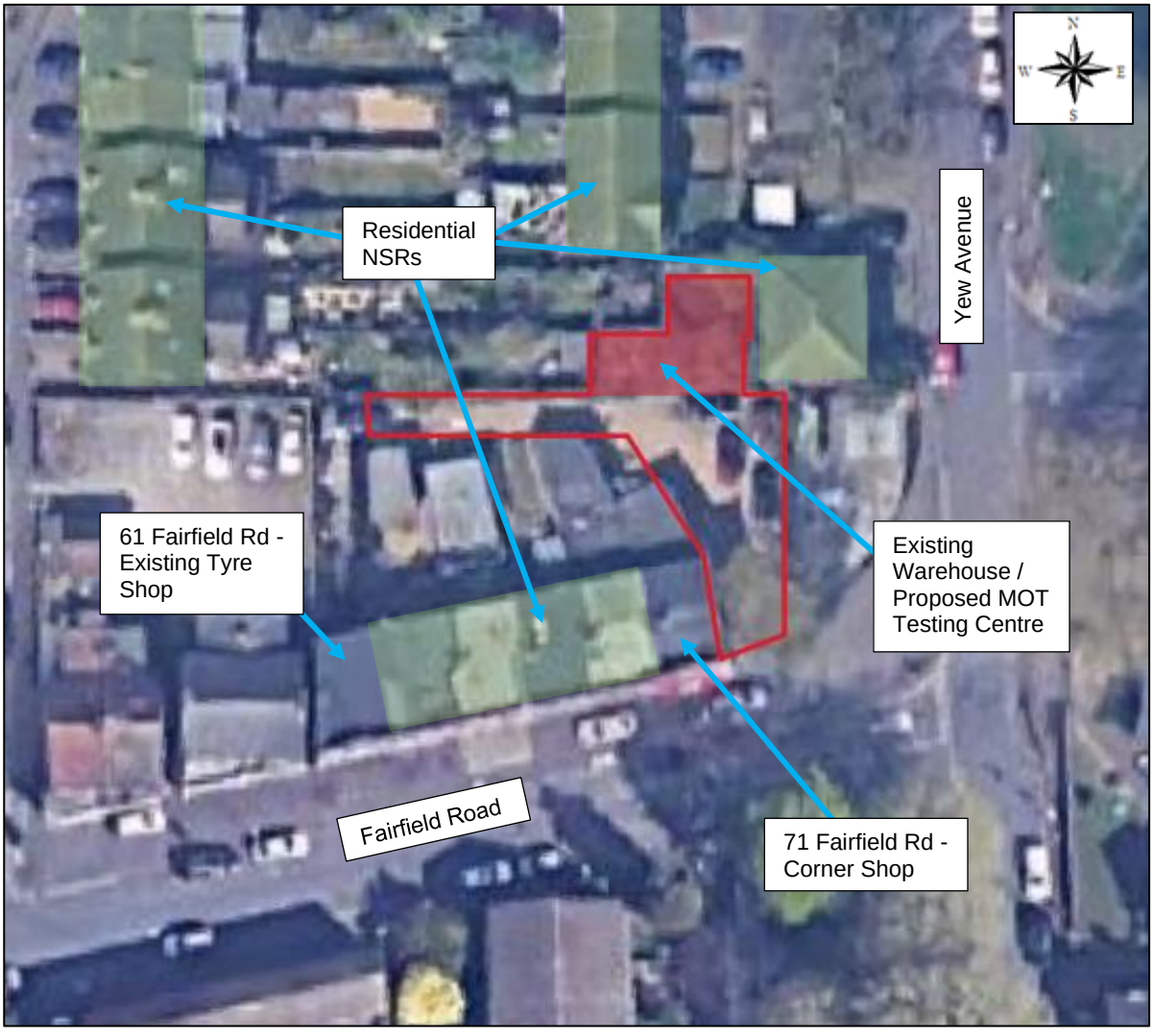
1. INTRODUCTION

ACCON UK Limited (ACCON) has been commissioned by Professional Plans, on behalf of Asif Riaz Meer, to provide a noise impact assessment for 69-71 Fairfield Road, West Drayton. The noise assessment is required to support the change of use from a warehouse (Class B2) to an MOT testing centre (sui generis).

The site is located on land to the rear of 61-71 Fairfield Road, approximately 25 m northeast of an existing tyre shop, with a gated entrance to Fairfield Road adjacent to a corner shop. The existing warehouse is located in a primarily residential area, with the nearest noise sensitive receptors (NSRs) being residential properties to the north and on Fairfield Road. The existing tyre shop and corner shop to the south of the development site also contain first floor flats which are included as NSRs in the assessment.

A site location plan is provided in **Figure 1.1** with the development site boundary in red, the existing warehouse shaded in red, and the nearest residential NSRs shaded in green. The site is located within the administrative boundary of the London Borough of Hillingdon (LBH).

Figure 1.1: Site Location Plan



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2. THE NATURE, MEASUREMENT AND EFFECT OF NOISE

Noise is often defined as sound that is undesired by the recipient. Whilst it is impossible to measure nuisance caused by noise directly, it is possible to characterise the loudness of that noise. 'Loudness' is related to both sound pressure and frequency, both of which can be measured. The human ear is sensitive to a wide range of sound levels. The sound pressure level of the threshold of pain is over a million times that of the quietest audible sound. In order to reduce the relative magnitudes of the numbers involved, a logarithmic scale of decibels (dB) is normally used, based on a reference level of the lowest audible sound.

The response of the human ear is not constant over all frequencies. It is therefore usual to weight the measured frequencies to approximate the human response. The resulting 'A' weighted decibel, dB(A), has been shown to correlate closely to the subjective human response.

When related to changes in noise, a change of ten decibels, for example, from 60 dB(A) to 70 dB(A), would represent a doubling in 'loudness'. Similarly, a decrease in noise, for example, from 70 dB(A) to 60 dB(A), would represent a halving in 'loudness'. A change of 3 dB(A) is generally considered to be just perceptible[1]. **Table 2.1** provides typical noise levels of common sources.

Table 2.1: Typical Noise Levels

Approximate Noise Level (dB(A))	Example
0	Limit of hearing
30	Rural area at night
40	Library
50	Quiet office
60	Normal conversation at 1 m
70	In car noise without radio
80	Household vacuum cleaner at 1 m
100	Pneumatic drill at 1 m
120	Threshold of pain

A glossary of acoustic terminology is presented in **Appendix 1**.

[1] Institute of Environmental Management and Assessment (2014). Guidelines for environmental noise impact assessment.

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3. NOISE GUIDANCE

This section of the report identifies relevant National and Local Authority policy and guidance. Additionally, appropriate British Standards and guidance documents are also referenced.

3.1. National Planning Policy Framework

The revised National Planning Policy Framework (NPPF as revised in December 2023) supersedes the 2012, 2018, 2019, 2021 and updated September 2023 versions of the NPPF. The purpose of the planning system is to contribute to the achievement of sustainable development. There are three dimensions to sustainable development: economic, social, and environmental. The environmental role is to contribute to protecting and enhancing our natural, built, and historic environment; and as part of this, make effective use of land, help to improve biodiversity, use natural resources prudently, minimise waste and pollution, and mitigate to adapt to climate change including moving to a low carbon economy.

One of the core planning principles is to contribute to conserving and enhancing the natural environment and reducing pollution. Allocations of land for development should prefer land of lesser value, where consistent with other policies in the Framework. The planning system should contribute to and enhance the natural and local environment by preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability.

Paragraph 191 of the NPPF states:

"*Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:*

a) Mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life (see Explanatory Note to the Noise Policy Statement for England (Department for Environment, Food and Rural Affairs, 2010));

b) Identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason."

Additionally, Paragraph 193 states:

"*Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed.*"

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3.2. Noise Policy Statement for England

The Noise Policy Statement for England (NPSE) aims to "*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*".

Based on concepts from toxicology, it introduces three 'Effect Levels' relevant to the assessment of noise. These are:

- 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; and
- SOAEL: Significant Observed Adverse Effect Level: This is the level above which significant adverse effects on health and quality of life occur.

3.3. Planning Practice Guidance

The Planning Practice Guidance for Noise (PPG-N) was published in March 2014 and most recently updated in July 2019. The PPG-N suggests that the most appropriate and cost-effective solutions to potential noise issues are best identified when good acoustic design is considered early in the planning process.

The PPG-N provides the following advice on how to determine the noise impact on development:

"*Plan-making and decision making need to take account of the acoustic environment and in doing so consider:*

- *Whether or not a significant adverse effect is occurring or likely to occur;*
- *Whether or not an adverse effect is occurring or likely to occur; and*
- *Whether or not a good standard of amenity can be achieved.*

In line with the Explanatory Note of the Noise Policy Statement for England, this would include identifying whether the overall effect of the noise exposure (including the impact during the construction phase wherever applicable) is, or would be, above or below the significant observed adverse effect level and the lowest observed adverse effect level for the given situation. As noise is a complex technical issue, it may be appropriate to seek experienced specialist assistance when applying this policy." (Paragraph 003 Reference ID 30-003-20190722)

The document goes on to acknowledge the levels of noise exposure at which an effect may occur as provided in the NPSE and introduces a fourth effect level:

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- UAE: Unacceptable Adverse Effect: Extensive and regular changes in behaviour and/or an inability to mitigate the effect of noise lead to psychological stress or physical effects.

Where residential development is proposed in the vicinity of existing businesses, community facilities or other activities that produce noise, the PPG-N advises that the applicant (or 'agent of change') need to clearly identify the effects of the existing businesses that may cause a nuisance (including noise) and clearly define the mitigation measures being proposed to address any potential significant adverse effects that are identified. The agent of change needs to not only consider the current activities of the business, but the permitted activities too, even if they are not occurring at the time of the application being made. The PPG-N acknowledges that "*It can be helpful for developers to provide information to prospective purchasers or occupants about mitigation measures that have been put in place, to raise awareness and reduce the risk of post-purchase/occupancy complaints.*" (Paragraph 009 Reference ID 30-009-20190722).

It is important to understand that as the PPG-N does not specifically provide any advice with respect to noise levels/limits for different sources of noise, it is appropriate to consider other sources of advice and guidance documents when considering whether new developments would be sensitive to the prevailing acoustic environment and the PPG-N signposts a number of appropriate guidance documents.

3.4. Local Authority Policy and Guidance

3.4.1. London Borough of Hillingdon (LBH)

London Borough of Hillingdon Local Plan: Part 1 Strategic Policies adopted November 2012, Strategic Objective SO10, states the following objective: *"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."*

The relevant supporting paragraphs for SO10 have been reproduced below.

*"**8.121** Noise can have a significant effect on the environment and on the quality of life enjoyed by individuals and communities. In Hillingdon, environmental noise arises from a variety of different sources, in particular aircraft (Heathrow Airport & RAF Northolt), major roads (M4, A4 and A40) and railways (London Underground, the Paddington, Marylebone and Heathrow Express lines).*

***8.122** The GLA forecasts Hillingdon to be the largest outer London growth borough and estimates that a large proportion of new jobs will be accommodated within the Heathrow Opportunity Area. These uses play a vital role in promoting a successful and vibrant economy in the borough, creating jobs and attracting business, though it is also important to note that such uses can create neighbourhood noise impacts.*

***8.123** As such, noise remains a main challenge in the borough. The impact of existing noise and the possible impact of future noise remains a challenge to be considered as part of the Hillingdon Local Plan: Part 1 – Strategic Policies."*

The noise section of Policy EM8: Land, Water, Air and Noise states:

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"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 the 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."

3.4.2. EHO Consultation

In December 2023 ACCON sent an email to Hillingdon Environmental Health about the planned methodology for the noise measurement survey and assessment. In January 2024 an Environmental Protection Officer confirmed that the approach to the noise impact assessment was suitable. The Environmental Protection Officer pointed out that the character of the various sound sources that occur as part of MOT testing should be considered in the BS 4142 assessment.

3.5. British Standard BS 8233:2014

BS 8233 *Guidance on sound insulation and noise reduction for buildings* has a number of design criteria for intrusive external noise without a specific character. The guidelines are designed to achieve reasonable resting/sleeping conditions in bedrooms and good listening conditions in other rooms. The most appropriate noise levels for the residential environment are reproduced in **Table 3.1**.

Table 3.1: Indoor Ambient Noise Levels for Dwellings

Activity	Location	Daytime 0700 hrs to 2300 hrs	Night-time 2300 hrs to 0700 hrs
Resting	Living room	35 dB $L_{Aeq,16hr}$	-
Dining	Dining room/area	40 dB $L_{Aeq,16hr}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16hr}$	30 dB $L_{Aeq,8hr}$

Although there are no limits set for external noise levels in BS 8233 the following guidance is provided at paragraph 7.7.3.2:

"*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 $L_{Aeq,T}$ which would be acceptable in noisier environments. However, it is also recognized that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of*

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land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited."

Regarding balconies, BS 8233 states:

"*Other locations, such as balconies, roof gardens and terraces, are also important in residential buildings where normal external amenity space might be limited or not available, i.e. in flats, apartment blocks, etc. In these locations, specification of noise limits is not necessarily appropriate. Small balconies may be included for uses such as drying washing or growing pot plants, and noise limits should not be necessary for these uses. However, the general guidance on noise in amenity space is still appropriate for larger balconies, roof gardens and terraces, which might be intended to be used for relaxation. In high-noise areas, consideration should be given to protecting these areas by screening or building design to achieve the lowest practicable levels. Achieving levels of 55 dB $L_{Aeq,T}$ or less might not be possible at the outer edge of these areas, but should be achievable in some areas of the space.*"

3.6. World Health Organization Guidelines for Community Noise (1999)

The World Health Organization (WHO) has developed the Guidelines for Community Noise (CNG) designed to minimise the adverse effects of noise. The guidelines relevant to residential noise exposure are detailed in **Table 3.2**. For each specific environment, the stated noise levels are the maximum noise levels to avoid the health effect noted.

Table 3.2: WHO Community Noise Guideline Values

Specific Environment	Critical Health Effect(s)	Period Noise Level	Maximum Noise Level
Outdoor Living Area	Serious annoyance, daytime and evening	55 dB $L_{Aeq,16hr}$	-
	Moderate annoyance, daytime and evening	50 dB $L_{Aeq,16hr}$	-
Dwelling, Indoors	Speech intelligibility and moderate annoyance, daytime and evening	35 dB $L_{Aeq,16hr}$	
Inside bedrooms	Sleep disturbance, night-time	30 dB $L_{Aeq,8hr}$	45 dB L_{AFmax}
Outside bedrooms	Sleep disturbance with window open	45 dB $L_{Aeq,8hr}$	60 dB L_{AFmax}

The WHO guidelines state, with respect to the L_{Amax} threshold, that "*for a good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45 dB L_{Amax} more than 10 -15 times per night (Vallet and Vernet 1991)*". Therefore, ACCON consider that it is appropriate to assess against the tenth highest L_{Amax} level during the night-time period

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as opposed to the highest level in order to represent typical L_{Amax} levels and provide a realistic compromise between protection from sleep disturbance and achievable mitigation.

3.7. World Health Organization Environmental Noise Guidelines for the European Region

The World Health Organization (WHO) issued the *Environmental Noise Guidelines for the European Region* (ENG) in October 2018. The guidelines state that the main intended purpose is to "*provide recommendations for protecting human health from exposure to environmental noise…*" As the guidelines, which are source specific and not environment specific, are intended to be suitable for policy-making they focus on the most used noise indicators L_{den} and/or L_{night} for exposure at the most exposed façade outdoors. The ENG recommends that indoor guideline values within the WHO CNG (see **Section 3.7**) and "*any values not covered by the current guidelines*" should remain valid.

Table 3.3 provides a summary of the WHO ENG recommendations for road traffic noise, railway noise, aircraft noise and wind turbine noise.

Table 3.3: WHO Environmental Noise Guidelines Recommendations

Source	Average Noise Exposure (External)	Night Noise Exposure (External)
Road traffic noise	53 dB L_{den}	45 dB L_{night}
Railway noise	54 dB L_{den}	44 dB L_{night}
Aircraft noise	45 dB L_{den}	40 dB L_{night}
Wind turbine noise	45 dB L_{den}	No recommendation made
Leisure noise	70 dB $L_{Aeq,24h}$	Not applicable

In addition to the specific recommendations the following guiding principles have been developed:

- "*Reduce exposure to noise, while conserving quiet areas;*
- *Promote interventions to reduce exposure to noise and improve health;*
- *Coordinate approaches to control noise sources and other environmental health risks;*

Inform and involve communities potentially affected by a change in noise exposure".

3.8. British Standard 4142:2014

BS 4142 *Methods for rating and assessing industrial and commercial sound* provides a method for the measurement and rating of industrial type noise sources and background noise levels outside dwellings. The rating level (defined in the BS) is used to rate the noise level of the source (this is defined as the 'specific sound level') outside residential dwellings.

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The rating level is determined by assessing the character of the noise and applying an acoustic feature correction, if appropriate, to the specific sound level. Corrections are applied for the tonality, impulsivity and intermittency of the noise source which can all increase the impact of noise.

The initial assessment described in BS 4142 to determine whether an adverse impact is likely is based on establishing the difference between the rating level and the background noise level outside the residential property of interest. The British Standard states that the following points should be considered:

- "*Typically, the greater this difference, the greater the magnitude of the impact.*
- *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.*
- *The lower the rating level is 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.*"

Where it is considered that the initial assessment of the impact needs to be modified due to the context in which the noise is occurring, BS 4142 suggests that all pertinent factors are taken into consideration, including:

1) *The absolute level of sound. For a given difference between the rating level and the background sound level, the magnitude of the overall impact might be greater for an acoustic environment where the residual sound level is high than for an acoustic environment where the residual sound level is low.*

   Where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night.

   Where residual sound[2] levels are very high, the residual sound might itself result in adverse impacts or significant adverse impacts, and the margin by which the rating level exceeds the background might simply be an indication of the extent to which the specific sound source is likely to make those impacts worse.

2) *The character and level of the residual sound compared to the character and level of the specific sound. Consider whether it would be beneficial to compare the frequency spectrum and temporal variation of the specific sound with that of the ambient or residual sound, to assess the degree to which the specific sound source is likely to*

[2] The residual sound is defined as the ambient sound level at the assessment location in the absence of the specific sound source

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be distinguishable and will represent an incongruous sound by comparison to the acoustic environment that would occur in the absence of the specific sound. Any sound parameters, sampling periods and averaging time periods used to undertake character comparisons should reflect the way in which sound of an industrial and/or commercial nature is likely to be perceived and how people react to it.

3) *The sensitivity of the receptor and whether dwellings or other premises used for residential purposes will already incorporate design measures that secure good internal and/or outdoor acoustic conditions, such as:*

   i. facade insulation treatment;

   ii. ventilation and/or cooling that will reduce the need to have windows open so as to provide rapid or purge ventilation; and

   iii. acoustic screening.

There is also a requirement within BS 4142:2014 to consider the uncertainty in the measurement and assessment procedure.

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4. NOISE MEASUREMENT SURVEYS

A background noise measurement survey was carried out between 0745 hrs and 1215 hrs on Saturday 13th January 2024 at the development site. The noise measurements were required to determine the typical background sound levels at the nearby noise sensitive receptors and are detailed in **Section 4.1**.

An additional noise measurement survey was previously carried out by ACCON in November 2020 to identify typical source noise levels for an MOT testing centre in a different location. These results have been utilised for the noise modelling and assessment of the proposed development in **Section 5**, and have therefore been detailed within **Section 4.2**.

4.1. Background Noise Measurement Survey

A noise measurement survey was carried out between 0745 hrs and 1215 hrs on Saturday 13th January 2024 to determine the typical background sound levels at the nearby noise sensitive receptors.

ACCON understands that the proposed MOT testing centre will be operational during weekdays and Saturday mornings only, with the noise measurement period covering the complete period of proposed Saturday opening hours. Background noise levels will typically be lowest during weekend mornings, so as a worst-case assessment it has been assumed that the background sound levels measured are representative of both weekday and weekend periods when the proposed MOT testing centre will be operational.

The proposed testing centre is approximately 4 km north of Heathrow airport; however, the flight paths are predominantly east-west. Therefore, there is no significant contribution to the background noise level from aircraft noise.

The weather conditions throughout the noise measurements on Saturday 13th January 2024 were dry with 100% cloud cover. Weather conditions were measured during the noise survey. The temperature was 5°C and there was a westerly wind of 1 m/s.

The noise measurements utilised a Rion NL-52, a Class 1 Sound Level Meter holding a current certificate of calibration (available upon request). Before and after the noise measurement period the equipment was field calibrated in order to ensure that the equipment had remained within reasonable calibration limits (±0.5 dB).

During the survey a van entered the development site, temporarily raising the measured noise above typical levels. Therefore, it was considered appropriate to exclude this period from any further analysis.

The noise measurement location is identified in **Figure F.1**. **Table 4.1** presents a summary of the noise measurement data. More detailed measurement results are presented in **Appendix 2**.

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Table 4.1: Summary of Measured Free-Field Noise Levels

Period	$L_{Aeq,T}$ (dB)	Highest L_{AFmax} (dB)	Average $L_{A90,5mins}$ (dB)	Typical (Modal) $L_{A90,5mins}$ (dB)
0745 hrs to 1215 hrs	50	78	43	43

4.2. Source Noise Measurements

4.2.1. Background Noise Measurement Survey

During the background noise measurement survey at the development site, additional source measurements were also taken of two condenser units, the location of which has been identified in **Figure F.1**.

The condenser units were observed to switch on alternately, with one condenser at a time operating continuously for approximately 2 minutes. In total, a condenser was noted to be operational in this manner approximately 3 times per hour, with the condensers being off for the remainder of the measurement period.

The source noise measurements utilised a B&K 2250, a Class 1 Sound Level Meter holding a current certificate of calibration (available upon request). Before and after the noise measurement period the equipment was field calibrated in order to ensure that the equipment had remained within reasonable calibration limits (±0.5 dB).

Due to the low noise level from the extract fans, the dominant source of background noise during their operation was traffic noise from the local traffic network. Therefore, the measurement results have not been presented in this report.

Additionally, the relatively short duration of operation, and the fact that the primary measurement position was selected to minimise the impact from the condenser units fans, the influence on the measured background noise level will be negligible. The condenser units are likely to operate for longer periods when the weather is warmer. However, using the measured background noise levels with a negligible contribution from the condensers will tend to make the resulting noise assessment more worst-case.

4.2.2. Noise Measurements at an Operational Garage

ACCON carried out noise measurements at a garage in November 2020, including noise measurements over a one-hour period of general activity noise (over separate 19-minute and 40-minute periods). The general activity included carrying out MOT tests. **Table 4.2** presents a summary of the noise measurements obtained.

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Table 4.2: Summary of Previous General Activity Noise Measurements

Activity/ Source	Duration of Measurment	$L_{Aeq,T}$ (dB)	L_{AFmax} (dB)	Notes
General Noise 1	19 minutes	66.0	86.8	Noise associated with checking underside of vehicle in MOT bay (raising and lowering ramp, shouting, engine idling); ramps at other two bays being raised and lowered, oil change at one service bay, hand tools (i.e. ratcheted socket), telephone ringing; and unit doors opening and closing.
General Noise 2	40 minutes	67.3	95.2(1)	Ramp raising and lowering (twice); hand tools (occasionally dropped or unintentionally hit against other metal objects); speech; electric torque wrench used to remove wheels (generating highest L_{AFmax} noise level); telephone ringing; and unit doors opening and closing.

Note (1): The LAFmax value was due the use of the electric torque wrench.

Note that the noise measurements were carried out internally in the garage which had three testing bays.

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5. NOISE MODELLING AND ASSESSMENT INPUT DATA

5.1. Noise Modelling

The CadnaA noise modelling software has been utilised to calculate the external noise levels at noise sensitive receptors as a result of the predicted activities at the proposed MOT testing centre. CadnaA is a three-dimensional noise model developed by DataKustik and has been extensively used by ACCON and others to develop noise models for a wide variety of situations and noise sources. CadnaA utilises the methodology in *ISO 9613: Acoustics – Attenuation of sound during propagation outdoors* to predict the sound levels from area sources (e.g. breakout noise from the proposed MOT centre).

5.2. Proposed Development

The proposed MOT centre building will contain one MOT bay and a brake test ramp, with two roller shutter doors providing access to the area for vehicles. The activities which will occur in the building are MOT testing and repairs such as replacing tyres involving a tyre bolt opening gun (as part of necessary vehicle repairs). A low noise air compressor has also been proposed by the client.

An MOT test generally comprises a series of checks which do not generate sustained periods of noise. The emissions test is likely to generate the greatest levels of noise. However, it is understood this typically takes approximately one minute to complete. The sound of a vehicle engine idling in the MOT bay is unlikely to be intrusive at the noise sensitive receptors; however, the character of the noise associated with the revving of the engines for the emissions tests may be noticeable at the nearest receptors.

To avoid a build-up of harmful emissions in the MOT bay, doors are expected to be kept open. During colder months, the doors are likely to be lowered for the thermal comfort of the tester, but the worst-case noise impact will occur if the doors are fully open.

It is assumed that noise breakout from the MOT bay via the offices to the west of the building will be negligible.

Figure F.1 and **Figure F.2** present the proposed site layout and floorplan respectively.

5.3. Building Envelope Sound Insulation

Breakout noise through the building façades and roof of the MOT test centre building has been calculated from the measured noise levels and using assumptions of these building envelope elements. The wall comprises a single skin of brick work of 103 mm thick brick. The sound insulation modelling software INSUL predicts a sound reduction of 44 dB R_w for a single skin of 100 mm thick brick.

The roof consists of 200 mm joists and a felt covering providing minimal sound insulating properties. In lieu of more detailed information, the roof has been modelled as a single layer of 19 mm plywood, for which INSUL predicts a sound reduction of 24 dB R_w.

A window is located in the northeast corner of the proposed building, for which a typical double glazing specification has been assumed.

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The sound reductions for the building elements above are presented in **Table 5.1**.

Table 5.1: Sound Reduction Properties of Building Elements

Building Element	Sound Reduction Index, R_w (dB)
Brick Wall (100 mm thickness)	44
Roof (Plywood 19 mm thickness)	24
Window (assumed to be standard double glazing, 4/16/4 mm)	29

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6. ASSESSMENT OF NOISE IMPACTS

6.1. Noise Sensitive Receptors

There are a number of noise sensitive receptors around the proposed MOT testing centre. The assessment has considered the noise impacts at twelve receptor locations:

- 61-71 Fairfield Road (odd numbers only)
- 2-8 Otterfield Road (even numbers only)
- 1 Elder Close
- 1 Yew Avenue

ACCON understands that the receptor on Yew Avenue has no habitable rooms overlooking the proposed MOT centre.

The receptor locations are identified in **Figure F.3**. Note that for each receptor, the position worst affected by the proposed MOT testing centre (i.e., external amenity areas, or closest window of a habitable room) has been utilised to present a worst-case assessment.

6.2. Background Sound Levels

The typical background sound level during the daytime is 43 dB $L_{A90,5mins}$. This has been established from noise measurement survey results, presented in **Table 4.1**. It is considered that utilising background noise measurements from a Saturday morning will result in a worst-case assessment, since it is likely that traffic noise would increase on a weekday. Additionally, background sound levels may be higher than those measured if the condenser units associated with the shop at 71 Fairfield Road operate for longer durations.

There will be no activities during the night-time period (2300 hrs to 0700 hrs). Therefore, no assessment for night-time is required.

6.3. Specific Sound Levels

The specific sound levels have been calculated using the CadnaA noise model at the noise sensitive receptors for two typical scenarios. For the first scenario, all roller shutters have been left open, and in the second scenario they are closed.

Both scenarios utilise the general noise measurements in an MOT test centre, as presented in **Table 4.2**, which features:

- Raising and lowering of MOT bay ramps
- Engine idling
- Hand tools (ratcheted socket, electric torque wrench, sometimes dropped or unintentionally hit against other metal objects)
- Communication (speech, shouting, telephone ringing).

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As the sound of the telephone ringing was audible above other activities, it is considered likely to be representative of the sound of vehicle horns when operated for short periods as required for an MOT test.

6.4. Acoustic Feature Corrections

6.4.1. Tonality

Acoustic feature corrections have been applied for tonality using the subjective scale identified in Section 9.2 of BS 4142:2014+A1:2019. Activities that are likely to be tonal in nature include:

- Engines being revved at a constant RPM for emissions test
- Use of metal hand tools
- Use of electric impact wrenches
- Raising of ramps
- Testing of vehicle horn during MOT test

A correction of +4 dB for clearly perceptible tonality has been applied at all receptor locations.

6.4.2. Impulsivity

Acoustic feature corrections have been applied for impulsivity using the subjective scale identified in Section 9.2 of BS 4142:2014+A1:2019. Activities that are likely to be impulsive in nature include:

- Use of air compressor tools
- Use of metal hand tools

A correction of +6 dB for clearly perceptible impulsivity has been applied at all receptor locations.

6.5. Rating Levels and Initial Assessment of Impact

Both of the acoustic feature corrections have been added to the predicted specific sound levels for both scenarios to obtain rating levels for both assessments. The background sound level has then been subtracted from the rating level to establish the initial estimate of impact. **Table 6.1** provides a summary of the initial estimate of impact for both scenarios. **Table 1** and **Table 2** of **Appendix 3** present the detailed BS 4142 calculations for each receptor.

Table 6.1: Initial Estimate of Impact

Receptor	Roller Shutter Open		Roller Shutter Closed	
	Excess of Rating Level over Background Sound Level	Initial Estimate of Impact	Excess of Rating Level over Background Sound Level	Initial Estimate of Impact
61 Fairfield Rd	-9	Low	-21	Low

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Receptor	Roller Shutter Open		Roller Shutter Closed	
	Excess of Rating Level over Background Sound Level	Initial Estimate of Impact	Excess of Rating Level over Background Sound Level	Initial Estimate of Impact
63 Fairfield Rd	-7	Low	-20	Low
65 Fairfield Rd	-5	Low	-18	Low
67 Fairfield Rd	-3	Low	-17	Low
69 Fairfield Rd	0	Low	-14	Low
71 Fairfield Rd	+4	Adverse	-12	Low
2 Otterfield Rd	-5	Low	-19	Low
4 Otterfield Rd	-8	Low	-20	Low
6 Otterfield Rd	-11	Low	-20	Low
8 Otterfield Rd	-13	Low	-21	Low
1 Elder Close	-11	Low	-17	Low
1 Yew Ave	-15	Low	-26	Low

According to BS 4142:2014+A1:2019, a difference of "*around +5 dB*" is "*likely to be an indication of an adverse impact, depending on the context*", and where the "*rating level does not exceed the background level*" it is "*an indication of the specific sound source having a low impact, depending on context*".

The initial BS 4142 assessment therefore indicates an adverse impact at 71 Fairfield Road when the roller shutter is open. The initial BS 4142 assessment indicates a low impact in all other cases.

6.6. Discussion of Context

The predicted specific sound levels are considered to represent worst-case scenarios for the following reasons:

- The measured background noise level was undertaken on a Saturday morning, when the background noise level is expected to be lower than during a weekday.
- Worst-case sound reductions for the building elements in the proposed MOT centre building have been utilised.

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- The measurements of "general noise" used to provide source noise levels were conducted at a garage with three MOT testing bays, compared to the proposed single bay for the MOT testing centre at Fairfield Road. This has likely resulted in higher source noise levels than are likely to occur at the proposed MOT testing centre.

The existing tyre shop has been utilised for vehicle maintenance and repairs for a significant number of years. The proposed development therefore does not introduce a new type of noise source to the area.

The assessment for open roller shutter doors has been carried out on the basis that doors to the testing area will be fully open. In practice, it is likely that one or both of the roller shutter doors will remain fully or partially closed, particularly on cooler days, for the comfort of the staff.

The specific sound levels (without acoustic feature corrections) are low when compared against the ambient noise levels in the area. The noise survey identified that daytime noise level was 50 dB $L_{Aeq,4hr}$.

Furthermore, 71 Fairfield Road, the only receptor with an initial estimate of an adverse impact, has no external amenity areas. Therefore, the internal noise levels at this receptor should be considered. BS 8233 states that "*if partially open windows were relied upon for background ventilation, the insulation would be reduced to approximately 15 dB*". The WHO guidelines also state that a slightly open window would result in "*a* [sound] *reduction from outside to inside of 15 dB*".

Table 6.2 identifies the likely internal Rating Level, and also demonstrates compliance with the WHO internal daytime noise level criterion of 35 dB $L_{Aeq,16hr}$ as set out in **Table 3.2**. It is further noted that the predicted internal noise level, without character corrections, is 22 dB $L_{Aeq,1h}$. This indicates that noise from the proposed development is unlikely to be audible for significant periods of time, even with windows partially open.

Table 6.2: Predicted Internal Noise Levels (Roller Shutter Open, Daytime)

Receptor	Calculated External Rating Level ($L_{Ar,Tr}$, dB)	Calculated Internal Rating Level ($L_{Ar,Tr}$, dB)	Compliance with WHO Community Noise Guideline Values (dwelling, indoors)
71 Fairfield Road	47	32	✓

Therefore, assuming 71 Fairfield Road relies on open windows for ventilation, the likely noise impact is low. The consideration of context therefore alters the results of the initial BS 4142 assessment for 71 Fairfield Road in this instance. It is therefore concluded that the impact of noise from proposed development will be low at all receptors.

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6.7. Discussion of Uncertainty

Uncertainty in the background sound levels is considered to be negligible and represent a worst case. The typical background sound level has been derived from noise measurements across an entire Saturday morning period (0745 hrs to 1215 hrs) representing the principal part of the anticipated weekend opening hours of the MOT centre (0800 hrs to 1300 hrs), rather than the proposed weekday opening hours. This is likely to have resulted in a lower background sound level than would be expected on a typical weekday.

The noise survey was undertaken with other commercial uses around the site operating as normal. Therefore, the noise measurement data is considered to be representative for all noise sensitive receptors considered in this assessment and the noise survey was undertaken during suitable weather conditions using Class 1 (BS EN 61672-1:2013) sound level meters.

Worst-case assumptions have been utilised for the proposed MOT centre building. For example, assuming that the walls are a single layer of brick and the roof consists of only a layer plywood in lieu of more detailed information. It is therefore assumed that predicted noise levels from the breakout of those elements of the existing building are higher than expected.

Sound reduction properties of the proposed building have been predicted using INSUL which has a prediction uncertainty of ±3 dB. This uncertainty has been reduced by utilising over-estimated assumptions of noise inside the proposed MOT centre building.

Overall, uncertainty has been minimised through the over-estimation of activity noise levels and under-estimation of background sound level and building element sound insulation properties. It is concluded that overall uncertainty is low.

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7. SUMMARY

A noise assessment has been carried out to determine the noise impact of the proposed MOT testing centre at 69-71 Fairfield Road, West Drayton, on the nearest existing noise sensitive receptors (NSRs) to the site.

ACCON have carried out background sound level measurements at the proposed MOT testing centre site. This measurement data, combined with previously undertaken source noise measurements, has been used to carry out an assessment of the noise impact of the proposed development on residential NSRs in line with the methodology provided in BS 4142:2014+A1:2019. The BS 4142 assessment indicates that, when context is taken into account, the operation of the proposed development would have a low noise impact at all of the nearest existing NSRs.

As it has been concluded that the proposed development of an MOT testing station will have a low noise impact on surrounding noise sensitive receptors, ACCON recommend that there should be no objection to the proposed development on noise grounds.

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ADDITIONAL FIGURES

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Figure F.1: Noise Measurement Locations and Proposed Site Plan

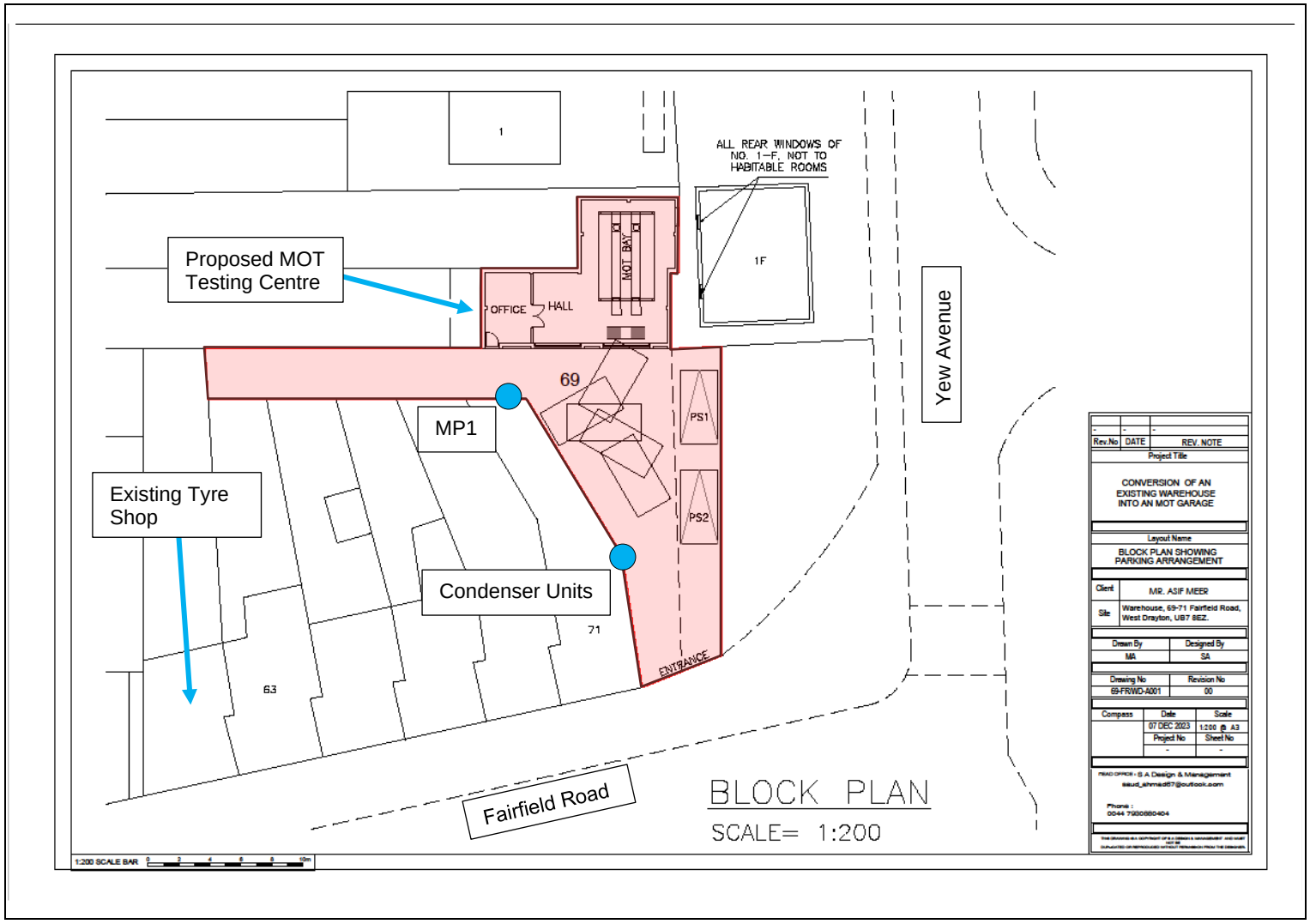

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Figure F.2: Proposed Site Floorplan

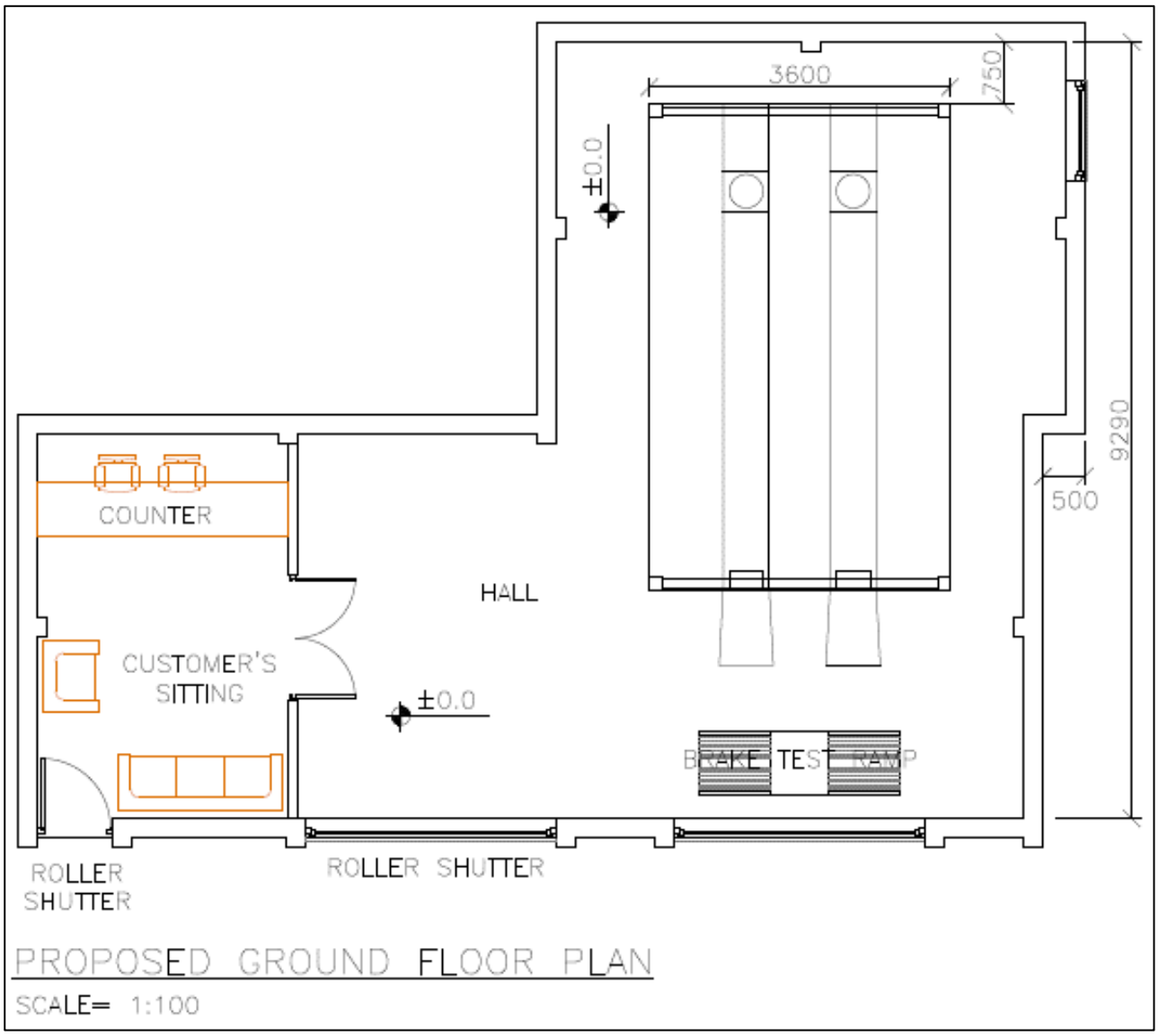

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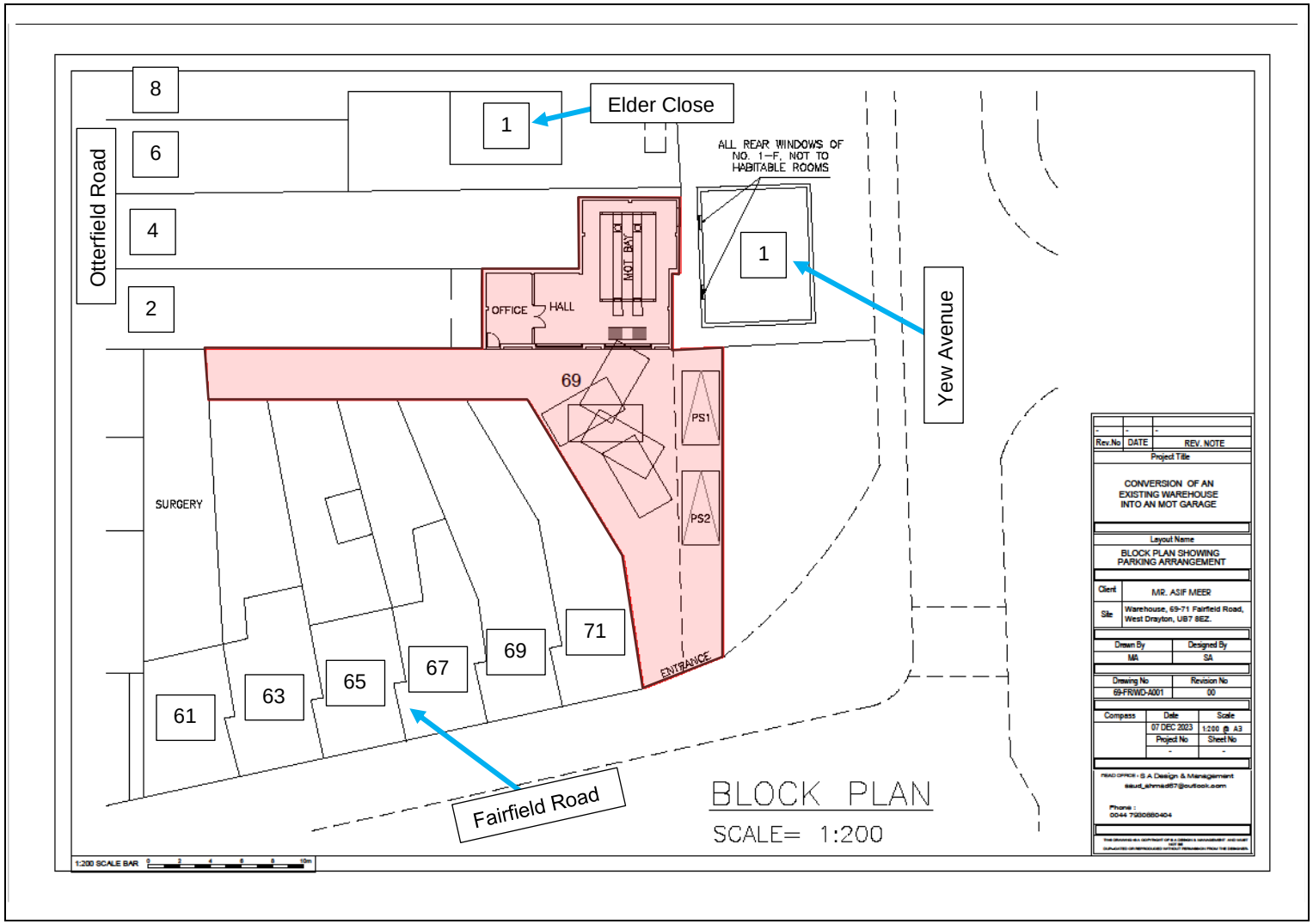
Figure F.3: Noise Sensitive Receptor Locations



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APPENDICES

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Appendix 1
Glossary of Acoustic Terminology

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Term	Description
'A'-Weighting	*This is the main way of adjusting measured sound pressure levels to take into account human hearing, and our uneven frequency response.*
Decibel (dB)	*This is a tenth (deci) of a bel. A decibel can be a measure of the magnitude of sound, changes in sound level and a measure of sound insulation. Decibels are not an absolute unit of measurement but are an expression of ratio between two quantities expressed in logarithmic form.*
Frequency	*Frequency is related to sound pitch; frequency equals the ratio between velocity of sound and wavelength.*
$L_{Aeq,T}$ (Ambient /Period Sound Level)	*The equivalent steady sound level in dB containing the same acoustic energy as the actual fluctuating sound level over the given period, T. T may be as short as 1 second when used to describe a single event, or as long as 24 hours when used to describe the noise climate at a specified location. $L_{Aeq,T}$ can be measured directly with an integrating sound level meter.*
$L_{A10,T}$ (Road Traffic Noise Level)	*The 'A'-weighted sound pressure level of the residual noise in decibels exceeded for 10 per cent of a given time. The $L_{A10,T}$ is used to describe road traffic noise levels at a particular location.*
$L_{A90,T}$ (Background Sound Level)	*The 'A'-weighted sound pressure level of the residual noise in decibels exceeded for 90 per cent of a given time. The $L_{A90,T}$ is used to describe the background noise levels at a particular location.*
L_{Amax}	*The 'A'-weighted maximum sound pressure level measured over a measurement period.*
Sound Power Level	*The total sound energy radiated by a sound source in all directions. In decibels with a reference level of 1 $x10^{-12}$ Watts*
Rating Level, $L_{Ar,Tr}$	*The specific sound level plus any adjustment for the characteristic features of the sound.*
Residual Sound Level, $L_r = L_{Aeq,T}$	*Ambient sound remaining at the assessment location when the specific sound source is suppressed to such a degree that it does not contribute to the ambient sound.*
Specific Sound Level, $L_s = L_{Aeq,Tr}$	*The equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given reference time interval, Tr.*

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Appendix 2
Noise Measurement Results

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Time	$L_{Aeq,T}$ (dB)	L_{AFmax} (dB)	$L_{A10,T}$ (dB)	$L_{A90,T}$ (dB)
07:45 - 08:00	46.8	71.3	46.7	40.7
08:00 - 08:15	47.8	65.9	49.7	42.1
08:15 – 08:30	46.7	69.7	48.9	43.4
09:15 - 09:30	49.5	71.7	50.4	44.7
09:30 - 09:45	52.8	75.7	51.4	45.3
09:45 - 10:00	49.1	69.6	50.2	44.8
10:00 - 10:15	53.0	77.7	50.7	44.0
10:15 - 10:30	46.2	55.5	48.4	43.5
10:30 - 10:45	51.2	71.6	50.9	43.3
10:45 - 11:00	51.6	78.0	49.7	43.4
11:00 - 11:15	46.9	66.8	49.0	43.5
11:15 - 11:30	52.7	76.8	52.4	43.3
11:30 - 11:45	46.3	64.7	48.7	42.5
11:45 - 12:00	54.4	78.0	54.2	41.4
12:00 - 12:15	47.9	67.8	49.7	42.1
07:45 - 12:15	**50**	**78**	**50**	**43**

Notes:

1) The period 08:30 – 09:15 has been excluded due to the presence of a van, see **Section 4.1**
2) The levels stated in bold are logarithmic averages for $L_{Aeq,T}$ and arithmetic averages for $L_{A10,T}$ and $L_{A90,T}$. The L_{AFmax} values are the maximum sound levels measured during each measurement period, measured with a fast time-weighting, and the value in bold is the highest L_{AFmax} noise level measured.

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Appendix 3
BS 4142 Calculations

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Table 1: Initial BS 4142 Assessment (Open Roller Doors)

Assessment Item	Commentary	Relevant Clause of BS 4142:2014 +A1:2019	Receptor											
			61 Fairfield Rd	63 Fairfield Rd	65 Fairfield Rd	67 Fairfield Rd	69 Fairfield Rd	71 Fairfield Rd	2 Otterfield Rd	4 Otterfield Rd	6 Otterfield Rd	8 Otterfield Rd	1 Elder Close	1 Yew Avenue
Typical Background Sound Level $L_{A90,5mins}$ (dB)	The typical (modal) background sound level measured at MP1	8.1, 8.2	43	43	43	43	43	43	43	43	43	43	43	43
Specific Sound Level $L_{Aeq,1hr}$ (dB)	Determined from the CadnaA noise model	7.3.7, 7.3.9, 7.3.11	24	26	28	30	33	37	28	25	22	20	22	18
Acoustic Feature Correction (dB)	Acoustic feature corrections for tonality, impulsivity and intermittency. Refer to **Section 6.4**.	9.2	10	10	10	10	10	10	10	10	10	10	10	10
Rating Level $L_{Ar,Tr}$ (dB)	(Specific Sound Level plus Acoustic Feature Correction)	9.2	34	36	38	40	43	47	38	35	32	30	32	28
Difference between Rating Level and Background Sound Level	Rating Level minus Background Sound Level	9.2	-9	-7	-5	-3	0	4	-5	-8	-11	-13	-11	-15
Initial Estimate of Impact		11	Low					Adverse	Low					

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Table 2: Initial BS 4142 Assessment (Closed Roller Doors)

Assessment Item	Commentary	Relevant Clause of BS 4142:2014 +A1:2019	Receptor											
			61 Fairfield Rd	63 Fairfield Rd	65 Fairfield Rd	67 Fairfield Rd	69 Fairfield Rd	71 Fairfield Rd	2 Otterfield Rd	4 Otterfield Rd	6 Otterfield Rd	8 Otterfield Rd	1 Elder Close	1 Yew Avenue
Typical Background Sound Level $L_{A90,5mins}$ (dB)	The typical (modal) background sound level measured at MP1	8.1, 8.2	43	43	43	43	43	43	43	43	43	43	43	43
Specific Sound Level $L_{Aeq,1hr}$ (dB)	Determined from the CadnaA noise model	7.3.7, 7.3.9, 7.3.11	12	13	15	16	19	21	14	13	13	12	16	7
Acoustic Feature Correction (dB)	Acoustic feature corrections for tonality, impulsivity and intermittency. Refer to **Section 6.4**.	9.2	10	10	10	10	10	10	10	10	10	10	10	10
Rating Level $L_{Ar,Tr}$ (dB)	(Specific Sound Level plus Acoustic Feature Correction)	9.2	22	23	25	26	29	31	24	23	23	22	26	17
Difference between Rating Level and Background Sound Level	Rating Level minus Background Sound Level	9.2	-21	-20	-18	-17	-14	-12	-19	-20	-20	-21	-17	-26
Initial Estimate of Impact		11	Low											

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