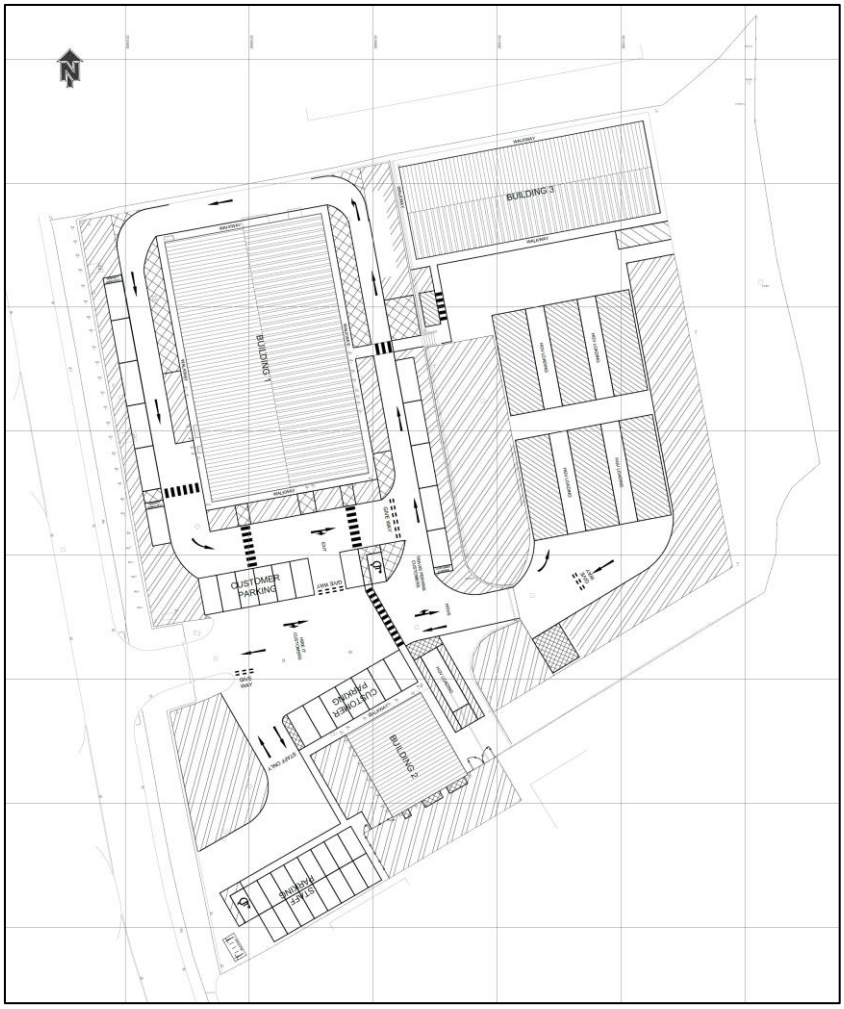
Travis Perkins, Forest Hill



784-B059716

Noise Assessment

Travis Perkins

October 2024

TETRA TECH

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Appendix A – Acoustic Terminology

Appendix B – References

Acronyms/Abbreviations

Acronyms/Abbreviations	Definition
CADNA	Computer Aided Noise Abatement
DMRB	Design Manual for Roads and Bridges
HGV	Heavy Goods Vehicle
PPG	Planning Practice Guidance
UDP	Unitary Development Plan
UKAS	United Kingdom Accreditation Service

Executive Summary

A noise assessment has been undertaken in support of a planning application to undertake a refurbishment and conversion of the former Dickens Car Dealership at Croesfoel Industrial Park to a Travis Perkins builders' merchant & supplies store.

Long-term noise monitoring was undertaken to determine baseline levels at nearby sensitive receptors during the representative opening times for the proposed development.

The noise levels associated with the proposed development have been assessed at the nearest noise sensitive receptors against relevant criteria established within BS4142.

On the basis of the assessments undertaken, mitigation in the form of a 1.8 m barrier alongside the southern border of the site has been included within the design. This is due to the initial BS4142 assessment indicating an adverse impact.

With the mitigation measures in place, the BS4142 assessment indicates a low impact at all nearest noise sensitive receptors, resulting in a No Observed Adverse Effect (NOAEL).

1.0 Introduction

1.1 Purpose of this Report

This report presents the findings of a noise assessment to support a planning application to undertake a refurbishment and conversion of the former Dickens Car Dealership at Croesfoel Industrial Park to a Travis Perkins builders' merchant & supplies store. A description of the existing noise environment in and around the site is provided. Noise surveys have been undertaken and the results used to verify predictions of the short-term and long-term effects of noise.

A list of acoustic terminology used in this report is provided in Appendix A. Report Conditions are available upon request.

1.2 Legislative Context

This report is intended to provide information relevant to the local planning authority and their consultees in support of a planning application for the above proposed development. Policy guidance with respect to noise is found in the National Planning Policy Framework (NPPF), published in December 2023. With regard to noise and planning, the NPPF contains the following statement at Paragraph 191:

> "191. 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;
>
> (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 […]

> "193. 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.
>
> "194. The focus of planning policies and decisions should be on whether proposed development is an acceptable use of land, rather than the control of processes or emissions (where these are subject to separate pollution control regimes). Planning decisions should assume that these regimes will operate effectively. Equally, where a planning decision has been made on a particular development, the planning issues should not be revisited through the permitting regimes operated by pollution control authorities."

Planning Practice Guidance (PPG): Noise provides further guidance with regard to the assessment of noise within the context of Planning Policy. The overall aim of this guidance, tying in with the principles of the NPPF and the Explanatory Note of the Noise Policy Statement for England (NPSE), is to **"identify whether the overall effect of noise exposure is, or would be, above or below the significant observed adverse effect level and the lowest observed adverse effect level for the given situation."**

A summary of the effects of noise exposure associated with both noise generating developments and noise sensitive developments is presented within the PPG and repeated below in Table 1.1.

Table 1.1: NPPG Noise Exposure Hierarchy

Perception	Examples of Outcomes	Increasing Effect Level	Action
Not present	No Effect	No Observed Effect	No Specific Measures Required
Present and not intrusive	Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a change in the quality of life.	No Observed Adverse Effect	No Specific Measures Required
Lowest Observed Adverse Effect Level (LOAEL)			
Present and intrusive	Noise can be heard and causes small changes in behaviour, attitude or other physiological response, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a small actual or perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level (LOAEL)			
Present and disruptive	The noise causes a material change in behaviour, attitude or other physiological response, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Present and very disruptive	Extensive and regular changes in behaviour, attitude or other physiological response and/or an inability to mitigate effect of noise leading to psychological stress, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent

The NPPF, NPSE and PPG do not, however, present absolute noise level criteria which define SOAEL, LOAEL and NOEL which is applicable to all sources of noise in all situations. Therefore, within the context of the Proposed Development, national planning policy and appropriate guidance documents including ‘BS 4142:2014+A1:2019 Methods for Rating and Assessing Industrial and Commercial Sound’ (2014) has been used. Section 2.0 presents the noise level criteria used as a basis of this assessment.

The PPG also states that neither the NPSE nor the NPPF (which reflects the Noise Policy Statement) expects noise to be considered in isolation, separately from the economic, social and other environmental dimensions of the proposed development.

Furthermore, the PPG: Noise identifies at Paragraph: 011 Reference ID: 30-011-20190722 the requirement for developments proposals to incorporate measures to mitigating the impact of noise on residential developments. In particular:

"*Noise impacts may be partially offset if residents have access to one or more of:*

- *a relatively quiet facade (containing windows to habitable rooms) as part of their dwelling;*
- *a relatively quiet external amenity space for their sole use, (e.g. a garden or balcony). Although the existence of a garden or balcony is generally desirable, the intended benefits will be reduced if this area is exposed to noise levels that result in significant adverse effects;*
- *a relatively quiet, protected, nearby external amenity space for sole use by a limited group of residents as part of the amenity of their dwellings; and/or*
- *a relatively quiet, protected, external publicly accessible amenity space (e.g. a public park or a local green space designated because of its tranquillity) that is nearby (e.g. within a 5 minute walking distance).*

Local & Regional Policy Context

The Wrexham Borough Unitary Development Plan was adopted by Wrexham Borough Council in February 2005. The plan states in relation to noise:

Development Principle; Development Objectives;

"Policy GDP1: All new development should:-

[…]

f) Ensure the safety and amenity of the public and safeguard the environment from the adverse effects of pollution of water, land or air, hazards from industry and quarrying, and associated noise, odour or vibration arising from development."

1.3 Acoustic Consultants' Qualifications and Professional Memberships

The lead project Acoustic Consultant is Sarah Cook. The report has been checked by David Fink and verified by Dawit Abraham. Relevant qualifications, membership and experience are summarised in Table 1.2 below.

Table 1.2: Acoustic Consultants' Qualifications & Experience

Name	Education	Experience in Undertaking Noise Assessments (Start date of working in noise & acoustics)	Attained Associate Membership of the Institute of Acoustics (date)	Attained Membership of the Institute of Acoustics (date)
Sarah Cook	BSc 2022	Dec 2022	-	-
Travis Smith	BSc 2022	Jul 2022	-	-
David Fink	BEng 2016	Mar 2017	Jul 2017	-
Dawit Abraham	BSc 2008 MSc 2010	Oct 2010	Jan 2011	Jan 2015

2.0 Assessment Criteria

In order to enable the assessment of the proposed development in terms of LOAEL and SOAEL, Table 2.1 presents equivalent noise levels and associated actions with the target noise level criteria identified. The noise level criteria detailed below have been derived from standards and design guidance:

- BS4142:2014 ‘Method for rating industrial and commercial sound’
- World Health Organisations (1999) ‘Guidelines for Community Noise’

A full bibliography of documents referenced within this report is provided within Appendix B.

Table 2.1: Noise Level Criteria and Actions

Noise Sources	Noise Level Criteria	Justification for Effect Level-Action Required
No Observed Adverse Effect Level (NOAEL)		
Fixed plant and equipment located externally or internally with louvered ventilation grilles	Difference between Rating Level ($L_{Ar,T}$) dB and existing background level $L_{A90,T}$ dB is less than or equal to 0dB	**Justification for Effect Level:** Below low impact threshold in BS4142:2014 **Action Required:** None
Lowest Observed Adverse Effect Level (LOAEL)		
Fixed plant and equipment located externally or internally with louvered ventilation grilles	Difference between Rating Level ($L_{Ar,T}$) dB and existing background sound level $L_{A90,T}$ dB is between 1-4dB.	**Justification for Effect Level:** Within less likely for adverse or significant adverse impact to occur low impact threshold in BS4142:2014 **Action Required:** Mitigate and reduce to a minimum the exceedance over 0dB above background threshold
Significant Observed Adverse Effect Level (SOAEL)		
Fixed plant and equipment located externally or internally with louvered ventilation grilles	Difference between Rating Level ($L_{Ar,T}$) dB and existing background sound level $L_{A90,T}$ dB is between 5-9dB.	**Justification for Effect Level:** Within adverse impact threshold in BS4142:2014. **Action Required** Additional mitigation required to achieve effect of LOAEL or less.
Unacceptable Observed Adverse Effect Level (UOAEL)		
Fixed plant and equipment located externally or internally with louvered ventilation grilles	Difference between Rating Level ($L_{Ar,T}$) dB and existing background sound level $L_{A90,T}$ dB is equal to or greater than 10dB	**Justification for Effect Level:** Within significant adverse impact threshold in BS4142:2014 **Action Required:** Additional mitigation required to achieve effect of LOAEL or less.

3.0 Assessment Methodology

3.1 Noise Modelling Methodology

Three-dimensional noise modelling has been undertaken based on the monitoring data to predict noise levels at a number of locations both horizontally and vertically. CADNA noise modelling software has been used. This model is based on ISO 9613-2 noise propagation methodology and allows for detailed prediction of noise levels to be undertaken for large numbers of receptor points and different noise emission scenarios both horizontally and vertically. The modelling software calculates noise levels based on the emission parameters and spatial settings that are entered. Input data and model settings as given in Table 3.1 below have been used.

Table 3.1: Modelling Parameters Sources and Input Data

Parameter	Source	Details
Horizontal distances – around site	Ordnance Survey	Ordnance Survey
Ground levels – around site	Ordnance Survey	LIDAR 2m DTM
Building heights – around site	Tetra Tech Observations	• 4.0m height for one-storey properties • 8.0 m height for two storey properties • 3.0m per additional storey
Receptor positions*	Tetra Tech	• 1.5 m for ground floor properties • 4.0m height for first-floor properties
Modelling Parameters	Tetra Tech	• Ground Absorption: 0.5 • Order of Reflections: 2
Proposed Plans	MJM Consulting Engineers	Drawing Title: Proposed Site Layout Drawing No: 9003-MJM-XX-XX-DR-D-6691
*All receptors modelled 1.0m from building façade unless otherwise stated.		

It is acknowledged that a number of the values of parameters chosen will affect the overall noise levels presented in this report. However, it should be noted that the values used, as identified above, are worst-case.

3.2 Model Input Data

Information regarding noise emissions from customer cars and delivery HGV movements has been determined using previous data collected from other Travis Perkins assessments carried out by Tetra Tech.

Data contained within Table 3.2 below presents noise information for the customer cars, HGV movements and racking sources

Table 3.2: Modelling Inputs

Noise Source	Height (m)	Source Type	Sound Power Level (dB)
HGV Unloading	2	Point	76.4
Customer Car Loading	1	Point	68.8
Racking	1	Area	67.5

Operating hours have been confirmed to be the following:

- Monday-Friday: 07:00 – 18:00
- Saturday: 08:00 – 12:00

As such, an assessment of daytime operational noise levels only has been undertaken.

3.3 Sensitive Receptors

3.3.1 Existing Sensitive Receptor Locations

Table 3.5 below summarises receptor locations that have been selected to represent worst-case sensitive receptors with respect to direct noise from the site. Façades of the nearest noise sensitive properties to the development site have been represented. The locations of the receptors are presented within Figure 3.5 below.

Table 3.3 Existing Sensitive Receptor Locations

Ref.	Description	Type of Use	Height (m) Daytime
R01	22 Ferndale Avenue	Residential	1.5
R02	31 Ferndale Avenue	Residential	1.5
R03	30 Tudor Avenue	Residential	1.5
R04	27 Tudor Avenue	Residential	1.5
R05	4 Tudor Court	Residential	1.5
R06	10 Tudor Court	Residential	1.5

Figure 3.1 Sensitive Receptor Locations



4.0 Noise Survey

A monitoring survey was undertaken to characterise baseline ambient noise levels currently experienced on the site and to establish the relative local background and traffic noise levels. Equipment used during the survey included:

Rion NL-52	Environmental Noise Analyser	s/n	1176464
Rion NL-52	Environmental Noise Analyser	s/n	1021257
Rion NC-74	Sound Calibrator	s/n	35270131

The measurement equipment was checked against the appropriate calibrator at the beginning and end of the measurements, in accordance with recommended practice, a negligible drift was observed on both used. The accuracy of the calibrators can be traced to National Physical Laboratory Standards, calibration certificates for which are available on request.

A baseline monitoring survey was undertaken at two locations (as specified in Table 4.1 and shown in Figure 4.1 below) from Friday 24th May 2024 to Thursday 30th May 2024. The raw data collected from the long-term monitoring is available upon request.

Measurements were taken in general accordance with BS 7445-1:2003 The Description and Measurement of Environmental Noise: Guide to quantities and procedures. Weather conditions during the survey period were observed as being dry. Anemometer readings confirmed that wind speeds were less than 5 ms^{-1} at all times during the survey, with a predominant north-eastern wind direction during the survey.

Table 4.1 Noise Monitoring Locations

Ref	Description
LT1	North-east corner of site
LT2	Southern border of site

Figure 4.1: Noise Monitoring Locations



4.1 Noise Survey Results

The dominant noise sources found in the area include road traffic noise from A483 and activities associated to the other industrial sites adjacent to the site. Other contributions to the ambient noise environment consist of birdsong/insect noise (crickets) and trees rustling in the wind.

Ambient and background noise levels are usually described using the L_{Aeq} index (a form of energy average) and the L_{A90} index (i.e. the level exceeded for 90% of the measurement period) respectively. Road traffic noise is generally described using the L_{A10} index (i.e. the level exceeded for 10% of the measurement period). For the long-term (LT) locations, the presented $L_{Aeq,T}$ and $L_{A10,T}$ are average noise levels whilst the L_{A90} is the modal noise level of each 5 minute measurement over the stated survey period.

Table 4.2: Meteorological Conditions During the Survey

Survey Location	Date & Time	Temperature (ºC)	Wind Speed (m/s)	Wind Direction	Cloud Cover (Oktas)	Dominant Noise Source
LT1	24th May – 30th May	13	2	West	5	Local road noise, activities from adjacent industrial sites
LT2	24th May – 30th May	13	2	West	5	Local road noise, activities from adjacent industrial sites

The results of the statistical measurements and frequency measurements conducted during the survey are summarised in the following table. All values are sound pressure levels in dB (re: 2 x 10^{-5} Pa).

Table 4.3: Results of Baseline Noise Monitoring Survey (Average Levels)

Period	Duration (T)	Monitoring Date and Times	Location	$L_{Aeq,T}$ (dB)	$L_{Amax,T}$ (dB)	$L_{Amin,T}$ (dB)	$L_{A10,T}$ (dB)	$L_{A90,T}$ (dB)
Weekday Daytime 07:00 - 23:00	8 hours	24th May – 30th May	LT1	57.1	92.7	32.0	56.8	50.0
Weekday Night-time 23:00 – 07:00	8 hours	24th May – 30th May		49.7	73.7	25.0	51.0	38.0
Weekend Daytime 07:00 - 23:00	16 hours	24th May – 30th May		53.9	79.4	35.5	54.6	50.0
Weekend Night-time 23:00 – 07:00	8 hours	24th May – 30th May		47.7	81.1	25.0	48.6	37.0
Weekday Daytime 07:00 - 23:00	8 hours	24th May – 30th May	LT2	56.1	90.2	32.0	57.0	54.0
Weekday Night-time 23:00 – 07:00	8 hours	24th May – 30th May		50.0	82.8	23.4	50.8	48.0
Weekend Daytime 07:00 - 23:00	16 hours	24th May – 30th May		53.6	81.6	33.3	53.8	39.0
Weekend Night-time 23:00 – 07:00	8 hours	24th May – 30th May		47.3	80.0	24.7	47.9	36.0

4.2 Representative Background Levels

Using the data collected during the baseline survey, representative background noise levels have been derived for all receptor locations presented in Figure 4.1 for the proposed operating hours (weekdays – 07:00-18:00, Saturdays – 08:00-12:00). Table 4.4 presents the representative background noise levels considered appropriate for the existing sensitive receptors within the area (the lower of the respective daytime and evening measurements have been used to represent daytime noise levels, where appropriate).

Table 4.4: Representative Background Noise Levels (All Receptors)

Receptors	Monitoring Location	Time Period	Representative Background Noise Level ($L_{A90,T}$ dB)*
R01, R02, R03	LT1	Daytime (during operating hours)	57.0
R04, R05 and R06	LT2	Daytime (during operating hours)	57.0

*Lowest $L_{A90,T}$ value selected from either Weekday or Weekend.

The representative noise levels presented in Table 4.4 have been used to inform the assessment presented in Section 5.

5.0 Assessment of Effects

5.1 Operational Phase

This assessment has been undertaken in order to establish the maximum permissible external noise levels from the proposed site.

The results of the plant noise assessment are presented within Table 5.1. A penalty of +3 dB has been applied for impulsivity that are associated to the HGV/racking activity, in accordance with guidance provided within BS4142.

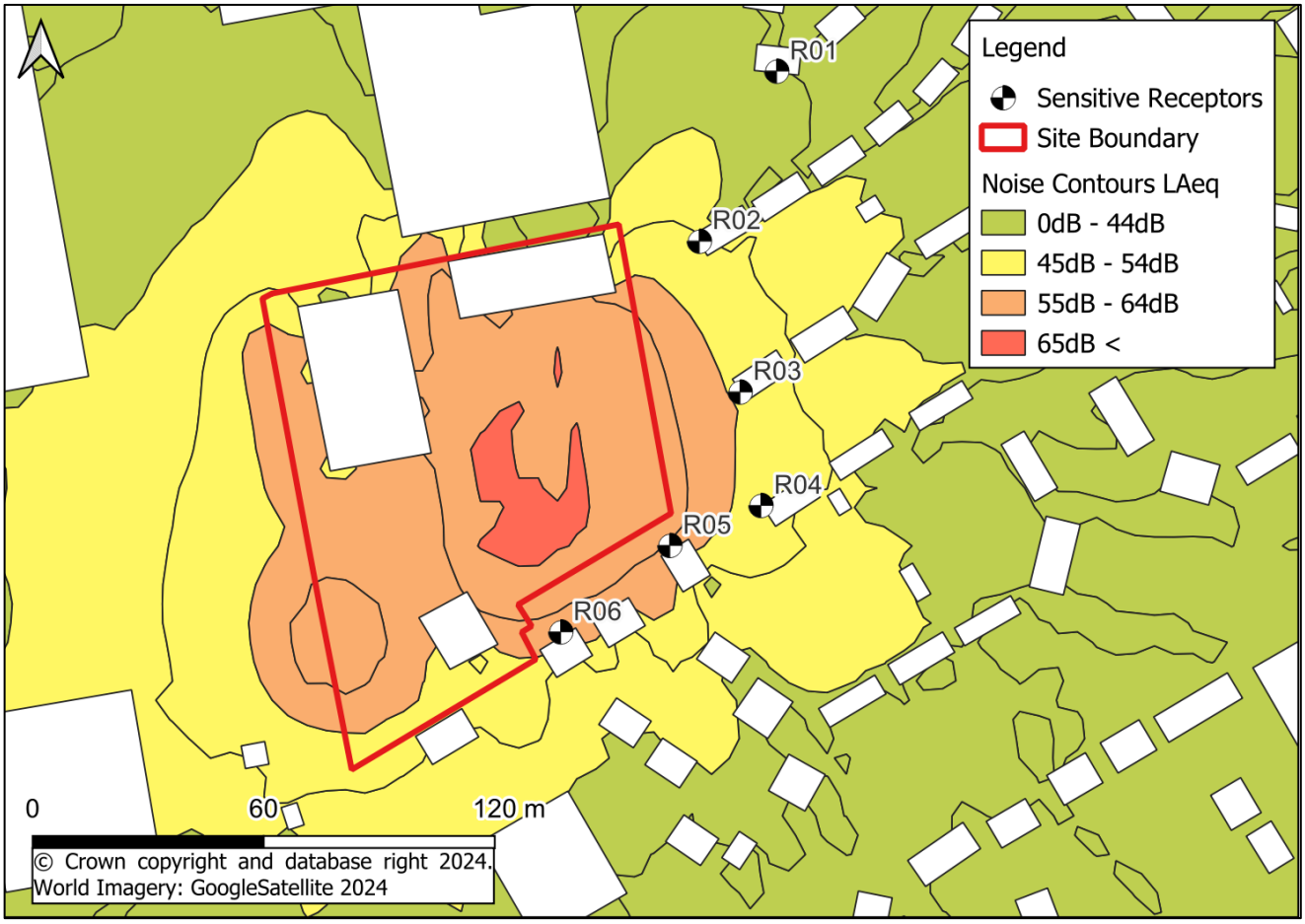
Table 5.1: BS4142 Assessment

Location	Existing Daytime Measured Background L_{A90}	Daytime Noise Rating Level	Daytime BS 4142 Score
R01	57	46	-11
R02	57	54	-3
R03	57	56	-1
R04	57	55	-2
R05	57	63	6
R06	57	60	3

All values are sound pressure levels in dBA re: 2x 10^{-5} Pa.
All calculations used to derive the above table (including averaging of background noise levels and predicted source noise levels) have been undertaken to 1 decimal place to avoid perpetuation of rounding errors. However, in accordance with BS4142 para 8.6 the levels are expressed as integers (with 0.5 dB being rounded up). This may mean that the arithmetic in the above table may appear to be up to 1 dB incorrect due to this rounding.

As demonstrated within Table 5.1, the results of the assessment indicate that the BS4142 Noise Rating Levels at the majority of sensitive façades are predicted to be below the existing background noise levels during the operating hours apart from R05 and R06, where there is an exceedance of up to +6 dB. In accordance with BS4142:2014, this is considered to represent an adverse impact. Therefore, additional mitigation has been advised and presented in section 6 below.

Figure 5.1 Noise Contour Plot Daytime (LAeq,T) @1.5m



6.0 Site Design & Mitigation

6.1 Additional Mitigation

As detailed in section 5 above, noise levels at R05 result in a Significant Observed Adverse Effect Level (SOAEL) during daytime operating hours, when assessed in accordance with BS4142.

Therefore, the following mitigation has been implemented within the design:

- 1.8m barrier at the south of the site

Figures 6.1 presents the noise contour plot with the proposed barrier in place and Figure 6.2 present the locations of the proposed 1.8m barrier.

Figure 6.1 Site Plan with Proposed Barriers

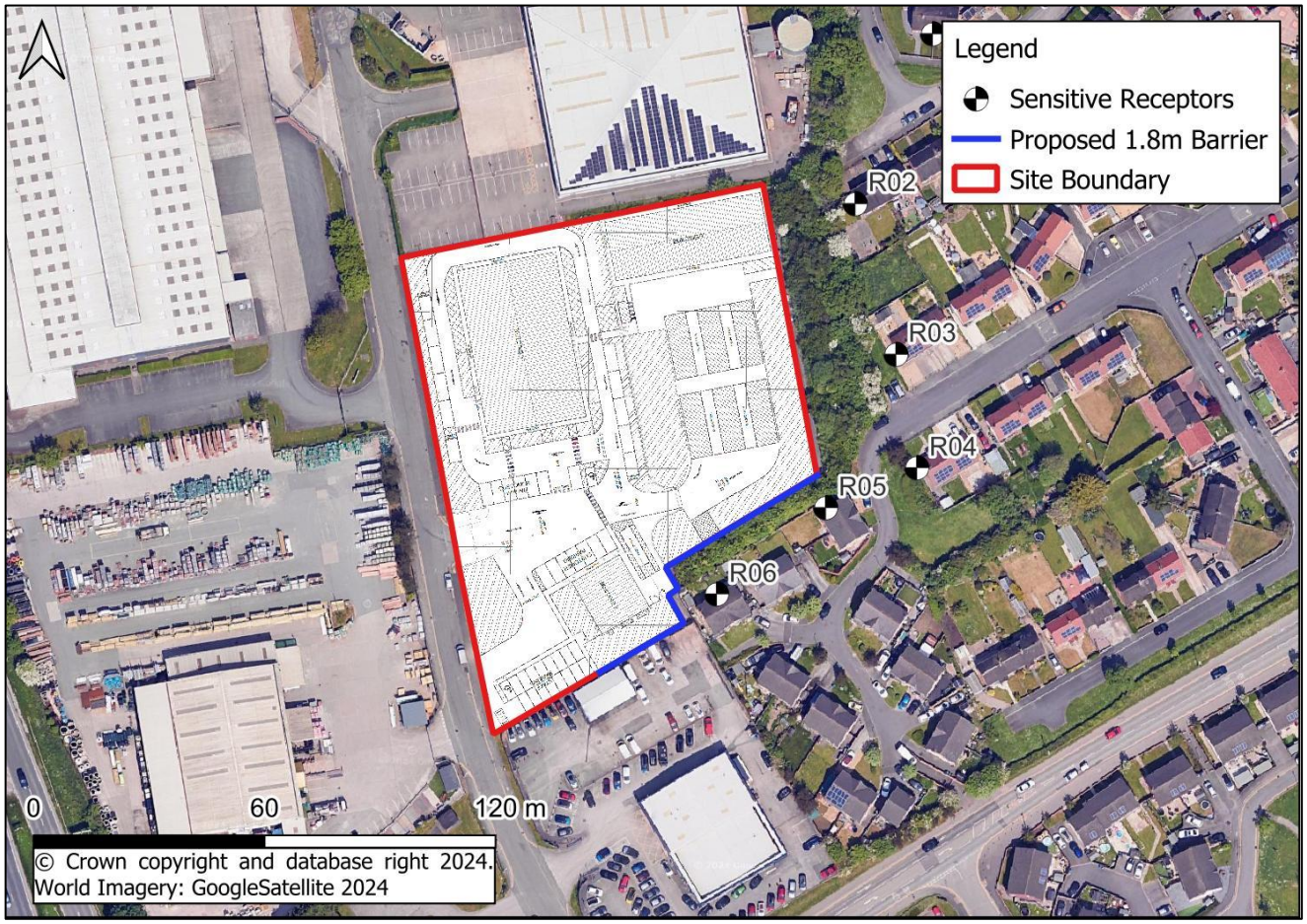


Table 6.1 provides the updated BS4142 assessment with physical mitigation measures in place.

Table 6.1: Updated BS4142 Assessment

Location	Existing Daytime Measured Background L_{A90}	Daytime Noise Rating Level	Daytime BS 4142 Score
R01	57	46	-11
R02	57	53	-4
R03	57	56	-1
R04	57	54	-3
R05	57	56	-1
R06	57	56	-1

All values are sound pressure levels in dBA re: $2x\ 10^{-5}$ Pa.
All calculations used to derive the above table (including averaging of background noise levels and predicted source noise levels) have been undertaken to 1 decimal place to avoid perpetuation of rounding errors. However, in accordance with BS4142 para 8.6 the levels are expressed as integers (with 0.5 dB being rounded up). This may mean that the arithmetic in the above table may appear to be up to 1 dB incorrect due to this rounding.

As demonstrated within Table 6.1, the BS4142 assessment at all receptors now indicates predicted noise levels below background noise levels, indicative of a low impact.

7.0 Conclusion

A noise assessment has been undertaken in support of a planning application for a proposed Travis Perkins to undertake a refurbishment and expansion of the Dickens Car Dealership at Croesfoel Industrial Park.

A noise survey was undertaken to ascertain the existing background noise levels. CadnaA noise modelling was used to predict the noise levels from the proposed site using noise levels collected from previous noise surveys at other Travis Perkins sites.

A BS 4142 assessment of the impact of the proposed development against existing background sound levels at the closest receptors has been undertaken. Rating noise levels were initially predicted to be above existing predicted background noise levels at two of the six identified noise sensitive receptors, suggesting an adverse impact.

Therefore, mitigation measures have been advised to reduce the impact of the development, in the form of a 1.8m solid barrier alongside the southern border of the site. A markup of the location of the advised barrier is provided in Figure 6.2.

It is considered that the noise levels from the proposed development are now predicted to be below existing background noise levels at all receptors, resulting in a No Observed Adverse Effect (NOAEL).

Appendices

Appendix A – Acoustic Terminology

Acoustic Terminology

dB — Sound levels from any source can be measured in frequency bands in order to provide detailed information about the spectral content of the noise, i.e. whether it is high-pitched, low-pitched, or with no distinct tonal character. These measurements are usually undertaken in octave or third octave frequency bands. If these values are summed logarithmically, a single dB figure is obtained. This is usually not very helpful as it simply describes the total amount of acoustic energy measured and does not take any account of the ear's ability to hear certain frequencies more readily than others.

dB(A) — Instead, the dBA figure is used, as this is found to relate better to the loudness of the sound heard. The dBA figure is obtained by subtracting an appropriate correction, which represents the variation in the ear's ability to hear different frequencies, from the individual octave or third octave band values, before summing them logarithmically. As a result the single dBA value provides a good representation of how loud a sound is.

L_{Aeq} — Since almost all sounds vary or fluctuate with time it is helpful, instead of having an instantaneous value to describe the noise event, to have an average of the total acoustic energy experienced over its duration. The $L_{Aeq,\ 07:00\ –\ 23:00}$ for example, describes the equivalent continuous noise level over the 16-hour period between 7 am and 11 pm. During this time period the L_{pA} at any particular time is likely to have been either greater or lower that the $L_{Aeq,\ 07:00\ –\ 23:00}$.

L_{Amin} — The L_{Amin} is the quietest instantaneous noise level. This is usually the quietest 125 milliseconds measured during any given period of time.

L_{Amax} — The L_{Amax} is the loudest instantaneous noise level. This is usually the loudest 125 milliseconds measured during any given period of time.

L_n — Another method of describing, with a single value, a noise level which varies over a given time period is, instead of considering the average amount of acoustic energy, to consider the length of time for which a particular noise level is exceeded. If a level of x dBA is exceeded for say. 6 minutes within one hour, then that level can be described as being exceeded for 10% of the total measurement period. This is denoted as the $L_{A10,\ 1\ hr}$ = x dB.

The L_{A10} index is often used in the description of road traffic noise, whilst the L_{A90}, the noise level exceeded for 90% of the measurement period, is the usual descriptor for underlying background noise. L_{A1} and L_{Amax} are common descriptors of construction noise.

R_w — The *weighted sound reduction index* determined using the above *measurement* procedure, but weighted in accordance with the procedures set down in BS EN ISO 717-1. Partitioning and building board manufacturers commonly use this index to describe the inherent sound insulation performance of their products.

Appendix B – References

British Standards Institute (BSI). (2003). BS 7445:2003. Description and Measurement of Environmental Noise. United Kingdom.

British Standards Institute (BSI). (2009). BS 5228-1:2009+A1:2014. Code of Practice for Noise and Vibration Control on Construction and Open Sites – Part 1: Noise. United Kingdom.

British Standards Institute (BSI). (2009). BS 5228-2:2009+A1:2014. Code of Practice for Noise and Vibration Control on Construction and Open Sites – Part 2: Vibration. United Kingdom.

British Standards Institute (BSI). (2014). BS 4142:2014+A1:2019. 'Method for Rating Industrial and Commercial Sound'. United Kingdom.

British Standards Institute (BSI). (2014). BS 8233:2014. 'Guidance on Sound Insulation and Noise Reduction for Buildings'. United Kingdom.

Department for Communities and Local Government (DCLG). (2012). National Planning Policy Framework. United Kingdom.

Department for the Communities and Local Government (DCLG). (2014). National Planning Practice Guidance. United Kingdom.

Institute of Environmental Management & Assessment (IEMA). (2014). Guidelines for Environmental Noise Impact Assessment. United Kingdom.

World Health Organisation (WHO). (1999). Guidelines for Community Noise.