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Proposed Drive-Thru Coffee Shop
Waterloo Road, Tandem, Huddersfield, HD5 0AJ

Noise Impact Assessment

For:
Cubic Expressions (UK) Ltd

3rd June 2025

Ref: NIA-12020-25-12281-v3 Waterloo Road
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Contents

1 Introduction

1.1 Overview

Environmental Noise Solutions Ltd (ENS) has been commissioned by Cubic Expressions (UK) Ltd to undertake a noise impact assessment for a proposed drive-thru coffee shop at Waterloo Road, Tandem, Huddersfield, HD5 0AJ (hereafter referred to as 'the site').

The objectives of the noise impact assessment were to:

- Establish the baseline noise levels at the site and its surrounding environs during representative periods of the daytime and night time
- Assess the potential impact of the proposed development with reference to pertinent guidelines
- Provide recommendations, as necessary, to protect the noise amenity of the nearest residential dwellings

This report details the methodology and results of the noise assessment. It has been prepared to accompany a planning application to be submitted to Kirklees Council.

The report has been prepared for Cubic Expressions (UK) Ltd for the sole purpose described above and no extended duty of care to any third party is implied or offered. Third parties referring to the report should consult Cubic Expressions (UK) Ltd and ENS as to the extent to which the findings may be appropriate for their use.

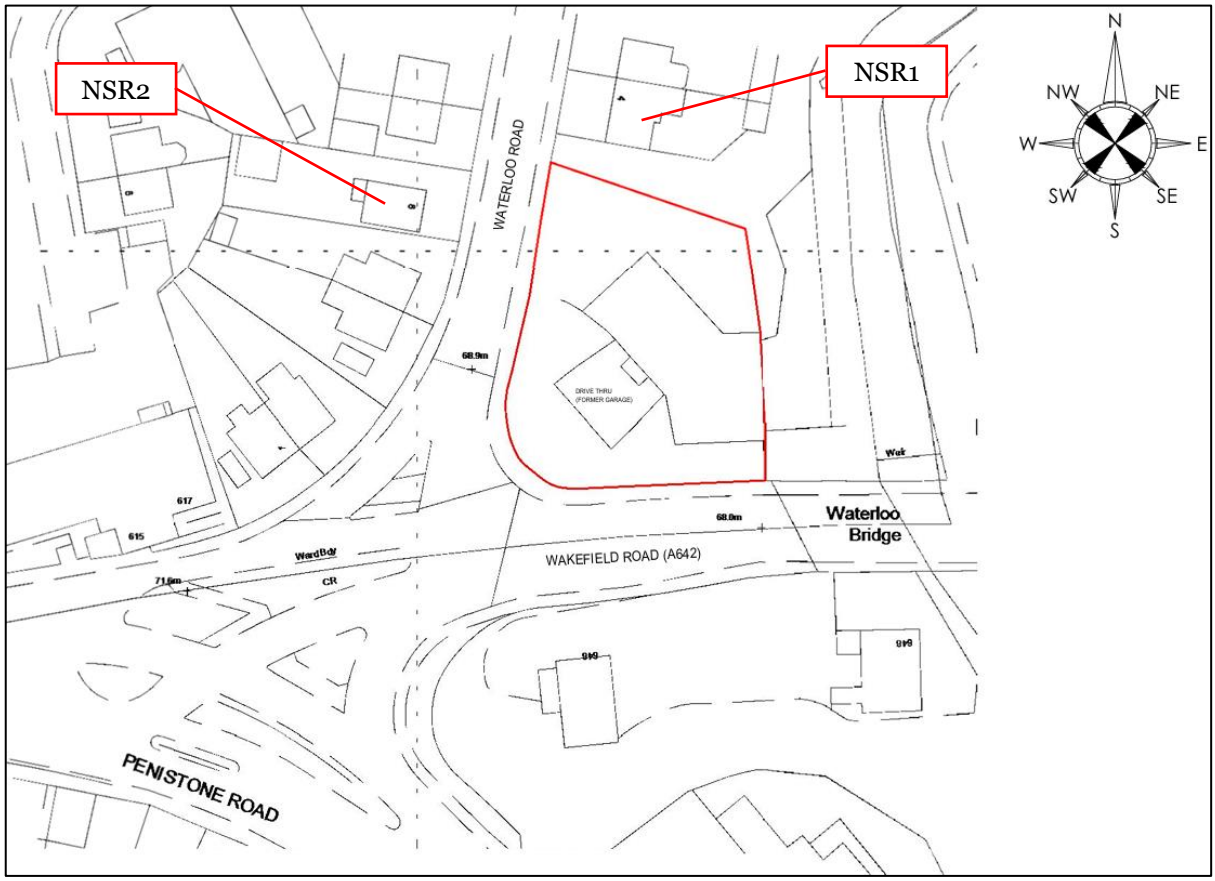
A glossary of acoustic terms used in the main body of the text is contained in Appendix 1.

1.2 Site Description

The site is currently a drive-thru fast food restaurant, and is located in a mixed-use area in the Tandem area of Huddersfield, with residential and commercial premises in the vicinity.

See Figure 1.1 for site location, with the nearest residential receptors also identified.

Figure 1.1: Location of Site



The site is bound by:

- Wakefield Road to the south, with commercial premises beyond
- Fenay Beck to the east, with drive-thru fast food restaurant beyond
- Waterloo Road to the west, with residential dwellings opposite
- Residential dwellings along Waterloo Road to the north

The nearest noise sensitive receptors (NSRs) to the development are considered to be:

- NSR1 – No. 4 Waterloo Road, circa 10 metres north of the site.
- NSR2 – Nos. 5-13 Waterloo Road, circa 20 metres west of the site.

1.3 Planning History

In relation to relevant planning history at the site, it is noted that Planning Permission ref: 2021/62/91172/W for the existing use as a hot food takeaway was granted in January 2022. Conditions 6 and 7 relate to the control of noise as follows:

> *6. The use hereby permitted shall not begin until details of the installation and/or erection of any kitchen extract ventilation system, including details of the methods of treatments of emissions and filters to remove odours and control noise emissions have been submitted to and approved in writing by the Local Planning Authority and the works specified in the approved scheme have been installed. Such works shall thereafter be retained, operated at all times when the takeaway is in use and maintained in accordance with the manufacturer's instructions.*
>
> *Reason: This is a pre-commencement condition to ensure that the proposed development does not give rise to loss of amenity to residential properties in the vicinity of the site arising from odours and to accord with the aims of Policies LP16(b) and LP52 of the Kirklees Local Plan and Chapter 15 of the National Planning Policy Framework.*
>
> *7. Before the development is first brought into use, a noise assessment report by a suitably competent person shall be submitted to and approved in writing by the Local Planning Authority. The report shall include: - a) an assessment of all of the noise emissions from the proposed development b) details of existing background and predicted future noise levels at the boundary of 4 Waterloo Road, Waterloo, Huddersfield, HD5 0AH and 5-13 Waterloo Road, Waterloo, Huddersfield, HD5 0AH. c) a written scheme of how the occupants of the above-mentioned noise sensitive premises will be protected from noise from the proposed development including details of all necessary noise attenuation. The development shall not be brought into use until all works comprised within the measures specified in the approved report have been carried out in full and such works shall be thereafter retained.*
>
> *Reason: This is a pre-commencement condition to ensure that the proposed development does not give rise to loss of amenity to residential properties in the vicinity of the site arising from noise disturbance, and that any necessary measures to attenuate noise are installed before first use, and to accord with the aims of Policies LP16(b) and LP52 of the Kirklees Local Plan and Chapter 15 of the National Planning Policy Framework.*

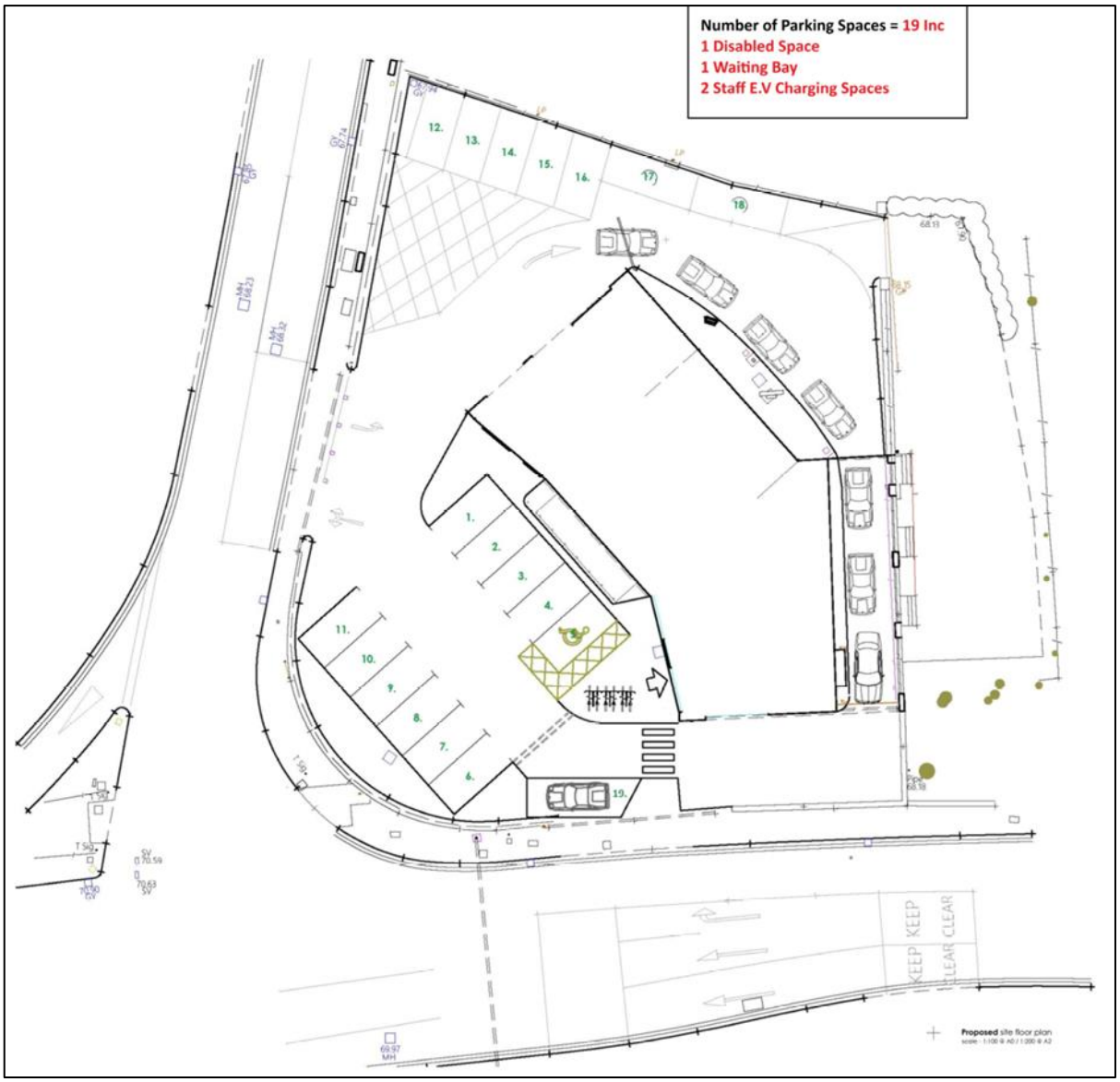
It is evident that the principle of commercial development at the site has been established, and the proposed scheme does not represent a significant change to that already permitted. It is considered that the conditions outlined above may also be applied to the proposed scheme.

1.4 Development Proposals

The proposals are for the existing drive-thru hot food restaurant at the site to be converted to a drive-thru coffee shop. Proposals are for the site to operate from 06:30 to 22:00 Monday to Saturday, and 07:30 to 21:00 on Sundays.

The proposed site layout is illustrated in Figure 1.2 below.

Figure 1.2: Proposed Site Layout



2 Assessment Guidance

2.1 National Planning Policy Framework

The National Planning Policy Framework (NPPF)[1] was updated in December 2024 and sets out the Government's planning policies for England and how these are expected to be applied.

Where issues of noise impact are concerned the NPPF provides brief guidance in paragraph 187 where it states that planning policies and decisions should contribute to and enhance the natural and local environment by:

'preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of…..noise pollution'.

Paragraph 198 advises that:

'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…..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'.

The NPPF also refers to the 2010 DEFRA publication, the Noise Policy Statement for England (NPSE) which reinforces and supplements the NPPF.

2.2 Noise Policy Statement for England

The Noise Policy Statement for England[2] (NPSE) sets out the long-term vision of promoting good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development. This long-term vision is supported by the following aims:

- Avoid significant adverse impacts on health and quality of life
- Mitigate and minimise adverse impacts on health and quality of life
- Where possible, contribute to the improvement of health and quality of life

The NPSE describes the following levels at which noise impacts may be identified:

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

According to the explanatory notes in the statement, where a noise level falls between the lowest observable adverse effect level (LOAEL) and a level which represents a significant observable adverse effect level (SOAEL):

'….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.'

1 National Planning Policy Framework. Ministry of Housing, Communities and Local Government (2023)
2 Government Department for Environment, Food and Rural Affairs. Noise Policy Statement for England (2010)

2.3 Planning Practice Guidance on Noise

Planning Practice Guidance[3] (PPG) is an online resource providing additional guidance and elaboration on the NPPF. It advises that the Local Planning Authority should consider the acoustic environment in relation to:

- 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
- Whether or not a good standard of amenity can be achieved

In line with the Explanatory Note of the NPSE, the PPG references the LOAEL and SOAEL in relation to noise impact. It also provides examples of outcomes that could be expected for a given perception level of noise, plus actions that may be required to bring about a desired outcome. However, in line with the NPSE, no objective noise levels are provided for LOAEL or SOAEL although the PPG acknowledges that: *'…the subjective nature of noise means that there is not a simple relationship between noise levels and the impact on those affected. This will depend on how various factors combine in any particular situation'.*

Table 2.1 summarises the PPG noise exposure hierarchy.

Table 2.1: PPG Noise Exposure Hierarchy

Perception	Examples of Outcomes	Increasing Effect Level	Action
Not Noticeable	No Effect	No Observed Effect	No specific measures required
Noticeable and not intrusive	Noise can be heard, but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No Observed Adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level			
Noticeable and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, 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 perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level			
Noticeable and disruptive	The noise causes a material change in behaviour and/or attitude, 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
Noticeable and very disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory	Unacceptable Adverse Effect	Prevent

3 Planning Practice Guidance on Noise: http://planningguidance.planningportal.gov.uk/blog/guidance/noise/

2.4 British Standard BS 4142:2014+A1:2019

BS 4142:2014+A1-2019 'Methods for Rating and Assessing Industrial and Commercial Sound' (BS 4142)[4] describes methods for determining, at the outside of a building, noise levels from factories or industrial premises and a method for assessing whether the noise is likely to give rise to adverse impacts, and states:

'*The significance of sound of an industrial and/or commercial nature depends upon both the margin by which the rating level of the specific sound source exceeds the background sound level and the context in which the sound occurs. Typically, the greater this difference, the greater the magnitude of the impact. For example:*

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'

The rating level is described as the specific sound level (the equivalent continuous A-weighted sound pressure level at the assessment position (NSR) produced by the specific sound source over the given reference time interval) plus any adjustment for the characteristic features of the sound. The character correction relates to whether and to what degree the specific sound is assessed to have an element of tonality, impulsivity and/or characteristics that are readily distinctive against the residual acoustic environment.

The background noise level is the A–weighted sound pressure level of the residual noise at the assessment position that is exceeded for 90 percent of a given time interval, T, measured using time weighting 'F' and quoted to the nearest whole number of decibels.

The reference time interval of the specific sound is 1 hour during the daytime and 15 minutes during the night-time.

4 British Standard 4142:2014+A1-2019 Methods for rating and assessing industrial and commercial sound, BSI (2014)

2.5 World Health Organisation Guidance

The World Health Organisation's Guidelines for Community Noise (1999) state '*At night, sound pressure levels at the outside façades of the living spaces should not exceed 45 dB L_{Aeq} and 60 dB L_{AFMax}, so that people may sleep with bedroom windows open. These values have been obtained by assuming that the noise reduction from outside to inside with the window partly open is 15 decibels.*'

2.6 IEMA Guidelines for Environmental Noise Impact Assessment

The IEMA Guidelines for Environmental Noise Impact Assessment provide recommendations for approaches to noise impact assessment in the context of the Environmental Impact Assessment (EIA) process. However, the principles in the guidelines are relevant to all types of project where noise effects are likely to occur, regardless of size including small developments which are not screened as EIA development.

The guidelines provide a number of examples regarding approach to impact assessment. In circumstances where a noise environment may be altered by addition or removal of a noise source, considered to be within the prevailing acoustic character of an area, assessment of impact magnitude may be performed by considering the relative change in ambient noise level, as shown in Table 2.2.

Table 2.2: Example Noise Impact Magnitude Descriptors

Relative Change (dB(A))	Magnitude / Scale of Change
≤ 2.9	Negligible
3.0 – 4.9	Small
4.9 – 9.9	Medium
≥ 10.0	Large

3 Noise Survey

3.1 Overview

In order to establish ambient and background noise levels in the vicinity of site, baseline noise measurements were undertaken on Friday 4th April through to Monday 7th April 2025.

For the purpose of the assessment, the following noise monitoring positions were adopted (see Appendix 2 for the approximate monitoring positions):

- MP1 was located in the vicinity of No. 4 Waterloo Road (NSR1), 1.5 metres above ground level
- MP2 was located adjacent to Nos. 5 and 13 Waterloo Road (NSR2), 1.5 metres above ground level

Noise measurements were undertaken using NTi Audio XL3 and Bruel & Kjaer 2250 Type 1 integrating sound level meters. The meter was connected to a windshield covered microphone positioned at the locations detailed above.

The measurement system calibration was verified immediately before and after the survey period using a Bruel & Kjaer Type 4231 calibrator. No drift in calibration levels greater than 0.5 dB was noted. The noted weather conditions during the survey were dry with wind speeds < 5 m/s.

Measurements consisted of A–weighted broadband parameters including L_{Aeq} and L_{A90}, together with linear 1/3rd octave band data.

3.2 Summary

The ambient and background noise climate in the vicinity of the site was characterised (dominated) by road traffic on Waterloo Road and the more distant A642 Wakefield Road, with no other significant noise sources noted.

Table 3.1 overleaf presents a summary of the noise data for each measurement session, at each measurement position, rounded to the nearest decibel.

Table 3.1: Summary of Noise Measurement Data

Position	Date	Time	L_{Aeq} (dB)	L_{A90} (dB)	Comment
MP1	04/04/25	1043-2300	56	54 [2]	Road traffic on the surrounding road network.
	05/04/25	0700-2300	56	54 [2]	
	06/04/25	0700-2300	56	54 [2]	
	07/04/25	0700-0940	60	54 [2]	
	04-05/04/25	2300-0700	50	43 [2]	
	05-06/04/25	2300-0700	49	43 [2]	
	06-07/04/25	2300-0700	52	43 [2]	
MP2	04/04/25	1146-1201	68	57 [1]	Road traffic on the surrounding road network.
	04/04/25	1235-1305	68	57 [1]	
	04/04/25	1337-1407	67	59 [1]	
	04/04/25	1439-1509	68	58 [1]	

[1] L_{A90} given for full measurement period
[2] L_{A90} determined by modal analysis of the $L_{A90,15\text{-min}}$, as per BS 4142

Background noise levels at all monitoring positions were found to be driven by road traffic on Waterloo Road/Wakefield Road.

Noise levels at MP2 (representative of NSR2) were found to be higher than at MP1 during the daytime due to proximity to Waterloo Road. Long-term background noise data measured at MP1 has been robustly adopted for NSR2, as a worst-case.

Based on the noise measurements undertaken at MP1, typical background noise levels are determined to be circa **48 dB $L_{A90\ (15\ min)}$** during the early morning (0500-0700), **54 dB $L_{A90\ (15\ min)}$** during the daytime (0700-2300), and **43 dB $L_{A90\ (15\ min)}$** during the night-time (2300-0500).

Typical background levels have been derived based on a modal analysis of the $L_{A90,15min}$, in accordance with BS 4142:2014.

4 Noise Assessment

4.1 Overview

The principal noise sources potentially associated with the proposed drive-thru coffee store are considered to be:

- Noise associated with any fixed external plant
- Noise associated with external service yard operations
- Noise associated with use of the drive-thru

The following sections of the noise impact assessment discuss the potential noise impacts of the above activities on the amenity of the nearest NSRs.

4.2 Fixed External Plant

It is understood that no fixed mechanical plant is currently proposed for the development.

Should fixed installations be proposed in the future, based upon the principles of BS 4142, it is considered appropriate that sound rating levels from fixed installations do not exceed the background sound levels detailed in Table 4.1 below in a free field position at the location of the nearest NSRs.

Table 4.1: Existing Background Noise Levels at the Nearest Receptors

NSR	Period	Existing Background Noise Level
All NSRs	Early Morning (0500-0700)	48 dB $L_{A90,T}$
	Daytime (0700–2300)	54 dB $L_{A90,T}$
	Night-Time (2300–0500)	43 dB $L_{A90,T}$

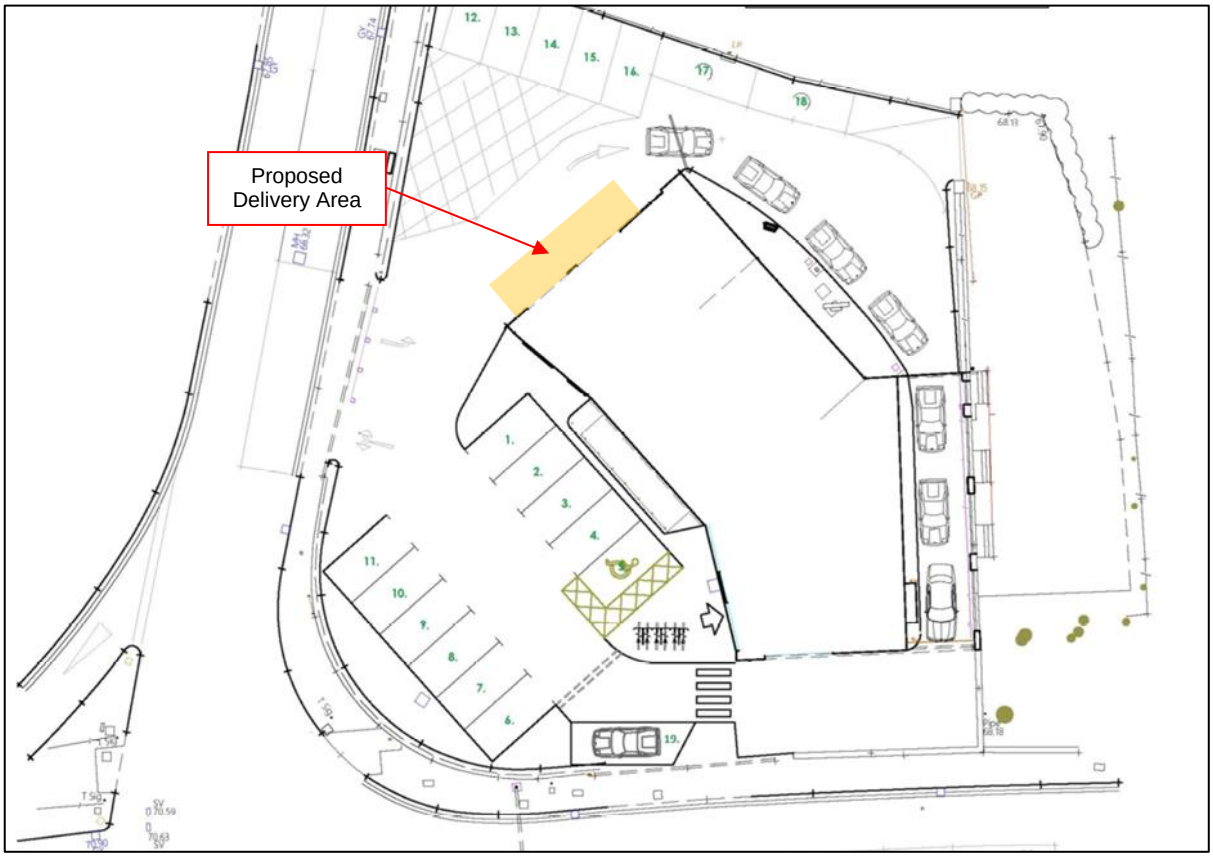
It is considered that this is amenable to a suitably worded planning condition and that appropriate noise control can be achieved by the judicious selection and siting of plant and/or standard noise mitigation techniques.

4.3 External Service Yard Operations

It is understood that deliveries are expected at the store once per day, and these would typically occur during the opening hours of the store (0630-2200).

The proposed delivery area is identified in Figure 4.1 below.

Figure 4.1: Delivery Bay Location



It is assumed that deliveries are to be made via a rigid bodied vehicle with a tail lift to allow plastic trays on trolleys to be wheeled into the store.

The principal noise associated with these deliveries is trolleys being wheeled into the store. Noise levels from comparable deliveries have previously been measured by ENS at 62 dB $L_{Aeq,\,T}$ and 76 dB L_{AFMax} at a distance of 3 metres.

In order to predict noise levels at the nearest receptors, distance attenuation has been calculated based on point source propagation (i.e. 20 x log (D_{source} / D_{rec})).

In relation to screening attenuation (SA), BS 5228:2009 Part 1 states 'In the absence of spectral data, 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 5 dB when the top of the plant is just visible to the receiver over the noise barrier, and of 10 dB when the noise screen completely hides the sources from the receiver. High topographical features and specifically designed and positioned noise barriers could provide greater attenuation'.

Windows of NSR1 do not have line of sight to the delivery bay due to the orientation of the receptor building. As such, screening attenuation is taken to be 5 dB to account for partial line of sight.

The resultant delivery noise levels at the nearest NSRs are set out in Table 4.2 below.

Table 4.2: Resultant Delivery Noise Levels at the Nearest Receptors

Receptor	Delivery Noise Level at 3 metres	Distance Attenuation	Screening Attenuation	Resultant Noise Level
NSR1	62 dB $L_{Aeq, T}$	–18 dB [= 20*log(3/24)]	–5 dB	39 dB $L_{Aeq, T}$
	76 dB L_{AFMax}			53 dB L_{AFMax}
NSR2	62 dB $L_{Aeq, T}$	–20 dB [= 20*log(3/30)]	0 dB	42 dB $L_{Aeq, T}$
	76 dB L_{AFMax}			56 dB L_{AFMax}

It is robustly assumed that service yard operations may occur for 100% of the assessment period.

In accordance with BS 4142, a character correction should be applied where the specific sound is assessed to have an element of tonality, impulsivity and/or characteristics that are readily distinctive against the residual acoustic environment. To account for potential impulsivity, a +3 dB penalty have been robustly applied.

Tables 4.3 and 4.4 present a BS 4142 assessment of deliveries at the development.

Table 4.3: Daytime BS 4142 Assessment (Service Yard Operations)

Results	NSR1	NSR2	Comment
Resultant noise level	39 dB $L_{Aeq\ (1\ hour)}$	42 dB $L_{Aeq\ (1\ hour)}$	Calculated level at NSRs
Specific sound level	39 dB $L_{Aeq\ (1\ hour)}$	42 dB $L_{Aeq\ (1\ hour)}$	Operations assumed to occur for full assessment period
Acoustic feature correction	+3 dB	+3 dB	For potential impulsivity
Rating level	42 dB $L_{Ar\ (1\ hour)}$	45 dB $L_{Ar\ (1\ hour)}$	Rating level at NSRs
Background sound level	54 dB $L_{A90\ (15min)}$	54 dB $L_{A90\ (15min)}$	Background sound levels at NSRs
Excess of rating over background sound level	-12 dB	-9 dB	-
Assessment	Indication of a low impact, subject to context	Indication of a low impact, subject to context	-

Table 4.4: Early Morning (0500-0700) BS 4142 Assessment (Service Yard Operations)

Results	NSR1	NSR2	Comment
Resultant noise level	39 dB $L_{Aeq\ (15\ min)}$	42 dB $L_{Aeq\ (15\ min)}$	Calculated level at NSRs
Specific sound level	39 dB $L_{Aeq\ (15\ min)}$	42 dB $L_{Aeq\ (15\ min)}$	Operations assumed to occur for full assessment period
Acoustic feature correction	+3 dB	+3 dB	For potential impulsivity
Rating level	42 dB $L_{Ar\ (15\ min)}$	45 dB $L_{Ar\ (15\ min)}$	Rating level at NSRs
Background sound level	48 dB $L_{A90\ (15min)}$	48 dB $L_{A90\ (15min)}$	Background sound levels at NSRs
Excess of rating over background sound level	-6 dB	-3 dB	-
Assessment	Indication of a low impact, subject to context	Indication of a low impact, subject to context	-

Noise levels associated with deliveries to the drive-thru units are at least 6 dB below existing *early morning* background noise levels at the nearest NSRs and are therefore assessed as a **low impact**, subject to context, in accordance with BS 4142.

The specific noise level at the nearest receptors is predicted to be up to **42 dB $L_{Aeq,T}$**, and such levels are considered to be relatively low. To provide context, Saturday early morning (0500-0700) ambient noise levels were measured at circa 52 dB $L_{Aeq,T}$. The specific noise level associated with deliveries at NSR2 is expected to be 10 dB lower than the existing ambient noise level.

It should also be noted that maximum noise levels are at least 4 dB below the sleep disturbance threshold described in the WHO Guidelines for Community Noise.

It is therefore considered that noise associated with deliveries is at the No Observed Adverse Effect Level.

In conclusion, the potential noise impact of deliveries (even during early morning period) is considered to be low at the nearest NSRs and therefore the drive-thru readily supports deliveries during the proposed opening hours of the store.

4.4 Noise Impact of Proposed Drive-Thru

The drive-thru process includes customers placing orders (circa 20 seconds), driving to the collection point (circa 10 seconds), and collecting orders from the collection window (circa 60 seconds).

ENS has previously been provided with data for comparable drive-thru coffee stores, with circa 21 no. drive-thru transactions during the peak 1-hour daytime period. The predicted trip rate of 21 no. drive-thru customers for the daytime peak hour was robustly adopted for the assessment of drive-thru noise during the daytime and early morning.

During ordering and collection, the dominant noise source is that of idling vehicle engines. Using library data collected by ENS for vehicle movements, the following tables detail the potential noise sources, including corrections for reference periods and the typical number of vehicles.

Table 4.5: Vehicle Movement Noise Levels

Vehicle Movements	Sound Pressure Level at 1 metre (dB(A))	Duration	Time Weighting	Correction for no. of Vehicles	Specific Noise Level at 1 metre
Car Idling (ordering)	59	20 seconds	–23 dB (10*log(20/3600))	+13 dB (10*log(21))	49 dB $L_{Aeq\ (1\ hour)}$
Car Slowly Pulling Forward	64	10 seconds	–26 dB (10*log(10/3600))		51 dB $L_{Aeq\ (1\ hour)}$
Car Idling (collection)	59	60 seconds	–18 dB (10*log(60/3600))		54 dB $L_{Aeq\ (1\ hour)}$

The resultant daytime and night-time noise levels at the nearest noise sensitive receptor (NSR1) are set out below. The drive-thru collection window is partially screened from NSR1 by the store building, therefore screening attenuation is taken to be 5 dB. The drive-thru lane is partially screened, and the collection window is fully screened, from NSR2 by the store building, therefore screening attenuation is taken to be 5 dB for the drive-thru lane, and 10 dB for the collection point.

Table 4.5: Predicted Resultant Drive-Thru Noise Levels (NSR1)

Vehicle Movements	Specific Noise Level at 1 metre	Distance Attenuation	Screening Attenuation	Resultant Noise Level at Receptor
Car Idling (ordering)	49 dB $L_{Aeq\ (1\ hour)}$	–26 decibels (20*log(1/20)	–0 dB	23 dB $L_{Aeq\ (1\ hour)}$
Car Slowly Pulling Forward	51 dB $L_{Aeq\ (1\ hour)}$	–30 decibels (20*log(1/30)	–0 dB	21 dB $L_{Aeq\ (1\ hour)}$
Car Idling (collection)	54 dB $L_{Aeq\ (1\ hour)}$	–32 decibels (20*log(1/40)	–5 dB	17 dB $L_{Aeq\ (1\ hour)}$
Cumulative Daytime Noise Level at NSR1				**26 dB $L_{Aeq\ (1\ hour)}$**

Table 4.6: Predicted Resultant Drive-Thru Noise Levels (NSR2)

Vehicle Movements	Specific Noise Level at 1 metre	Distance Attenuation	Screening Attenuation	Resultant Noise Level at Receptor
Car Idling (ordering)	49 dB $L_{Aeq\ (1\ hour)}$	–32 decibels (20*log(1/40)	–5 dB	12 dB $L_{Aeq\ (1\ hour)}$
Car Slowly Pulling Forward	51 dB $L_{Aeq\ (1\ hour)}$	–33 decibels (20*log(1/45)	–5 dB	13 dB $L_{Aeq\ (1\ hour)}$
Car Idling (collection)	54 dB $L_{Aeq\ (1\ hour)}$	–35 decibels (20*log(1/54)	–10 dB	9 dB $L_{Aeq\ (1\ hour)}$
Cumulative Daytime Noise Level at NSR2				**16 dB $L_{Aeq\ (1\ hour)}$**

Based on the above, noise levels associated with use of the drive-thru are expected to be up to 26 dB $L_{Aeq,1hr}$ at the nearest receptors. Such levels are very low and would typically not be audible against the existing ambient noise levels at the site.

Ambient noise levels at the site during the daytime and early morning were circa **56 dB $L_{Aeq,\ T}$** and **52 dB $L_{Aeq,\ T}$**, respectively, and were wholly due to road traffic noise.

The predicted worst-case resultant drive-thru noise levels are significantly (at least 26 dB) below the existing ambient noise levels and therefore there is no increase to the ambient noise level. With reference to Table 2.2, the impact is deemed to be 'Negligible'.

It is therefore considered that noise associated with use of the drive-thru is at the No Observed Effect Level.

5 Summary and Conclusions

A noise survey and assessment has been performed for the proposed conversion of a drive-thru hot food restaurant to form a drive-thru coffee shop at Waterloo Road, Tandem, Huddersfield, HD5 0AJ.

The ambient and background noise climate in the vicinity of the site is characterised (dominated) by road traffic on Waterloo Road and Wakefield Road, with no other significant noise sources noted.

It is understood that no external fixed plant is currently proposed. Rating noise limits, with respect to BS 4142, have been specified for any future fixed mechanical plant associated with the development.

Assessment of noise associated with deliveries has been undertaken. Noise associated with the operational development is considered to be at the No Observed Adverse Effect Level.

Assessment of noise associated with use of the drive-thru has been undertaken. Noise associated with the operational development is considered to be at the No Observed Effect Level.

Appendix 1 – Abbreviations and Definitions

Sound Pressure Level (L_p)
The basic unit of sound measurement is the sound pressure level. As the pressures to which the human ear responds can range from 20 μPa to 200 Pa, a linear measurement of sound levels would involve many orders of magnitude. Consequently, the pressures are converted to a logarithmic scale and expressed in decibels (dB) as follows:

$L_p = 20 \log_{10}(p/p_o)$

Where L_p = sound pressure level in dB; p = rms sound pressure in Pa; and p_o = reference sound pressure (20 μPa).

A-weighting
A frequency filtering system in a sound level meter, which approximates under defined conditions the frequency response of the human ear. The A-weighted sound pressure level, expressed in dB(A), has been shown to correlate well with subjective response to noise.

Equivalent continuous A-weighted sound pressure level, $L_{Aeq, T}$
The value of the A-weighted sound pressure level in decibels of continuous steady sound that within a specified time interval, T, has the same mean-square sound pressure as a sound that varies with time. $L_{Aeq, 16h}$ (07:00 to 23:00 hours) and $L_{Aeq, 8h}$ (23:00 to 07:00 hours) are used to qualify daytime and night time noise levels.

$L_{A10, T}$
The A-weighted sound pressure level in decibels exceeded for 10% of the measurement period, T. $L_{A10, 18h}$ is the arithmetic mean of the 18 hourly values from 06:00 to 24:00 hours.

$L_{A90, T}$
The A-weighted sound pressure level of the residual noise in decibels exceeded 90% of a given time interval, T. L_{A90} is typically taken as representative of background noise.

$L_{AF\ max}$
The maximum A-weighted noise level recorded during the measurement period. The subscript 'F' denotes fast time weighting, slow time weighting 'S' is also used.

Single Event Level / Sound Exposure Level (SEL or L_{AE})
The energy produced by a discrete noise event averaged over one second, regardless of the event duration. This allows for comparison between different noise events which occur over different lengths of time.

Weighted Sound Reduction Index (R_W)
Single number quantity which characterises the airborne sound insulation properties of a material or building element over a defined range of frequencies (R_W is used to characterise the insulation of a material or product that has been measured in a laboratory).

Appendix 2 – Approximate Noise Measurement Positions