



Onewood Group
Land Adjacent to 260 Bradford Road
Noise Impact Assessment
DC3473-R1



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Limitations to this Report

This report entails a physical investigation of the site with a sufficient number of sample measurements to provide quantitative information concerning the type and degree of noise affecting the site. The objectives of the investigation have been limited to establishing sources of noise material to carrying out an appropriate assessment.

The number and duration of noise measurements have been chosen to give reasonably representative information on the environment within the agreed time, and the locations of measurements have been restricted to the areas unoccupied by building(s) that are easily accessible without undue risk to our staff.

As with any sampling, the number of sampling points and the methods of sampling and testing cannot preclude the existence of “hotspots” where noise levels may be significantly higher than those actually measured due to previously unknown or unrecognised noise emitters. Furthermore, noise sources may be intermittent or fluctuate in intensity and consequently may not be present or may not be present in full intensity for some or all of the survey duration.

CONTENTS

1.0	INTRODUCTION	1
2.0	SITE DESCRIPTION	2
2.1	Existing Site Conditions	2
2.2	Proposed Site Conditions	2
3.0	GUIDANCE	3
3.1	Association of Noise Consultants (ANC) and Institute of Acoustics (IOA) Joint Guidance on the Impact of COVID-19 on the Practicality and Reliability of Baseline Sound Level Surveying and the Provision of Sound & Noise Impact Assessments.....	3
3.2	Consultation with Local Authority	3
3.3	Noise Policy Statement for England	3
3.4	British Standard 4142	4
3.5	IEMA Guidelines for Environmental Noise Impact Assessment.....	6
4.0	ENVIRONMENTAL NOISE SURVEY	7
4.1	Survey Methodology	7
4.2	Survey Results.....	7
4.3	Observations and Comments	8
5.0	ASSESSMENT	8
5.1	Assessment of Noise from Fixed Plant – Maximum Limits	8
5.2	Uncertainty of the Assessment	10
5.3	Assertion of Competence	11
6.0	CONCLUSIONS	12
6.1	Assessment of Noise from Fixed Plant – Maximum Limits	12

List of Appendices

Appendix A	Glossary of Terminology
Appendix B	Measurement Locations

1.0 INTRODUCTION

Onewood Group has appointed Dragonfly Consulting to carry out a Noise Impact Assessment for a proposed commercial development on Land Adjacent to 260 Bradford Road.

The noise assessment has been conducted with reference to the National Planning Policy Framework, appropriate British Standards and recognised guidance.

This report therefore describes a noise survey of the site and the subsequent analysis to determine the noise environment of the proposed development. It then compares the results with the adopted criteria. Recommendations are also made with respect to the design of the development.

It should be noted that this assessment has been conducted during the COVID lockdown period and baseline noise levels are lower than typical therefore presenting a worst-case. Where appropriate reference has been made to Association of Noise Consultants (ANC) and Institute of Acoustics (IoA) Joint Guidance on the Impact of COVID-19 where appropriate.

Whilst reasonable effort has been made to ensure that this report is easy to understand, it is technical in nature; to assist the reader, a glossary of terminology is included in Appendix A.

2.0 SITE DESCRIPTION

2.1 Existing Site Conditions

To the immediate West of the site is a gym and a restaurant, with further commercial premises to the West of Bradford Road. Further west are residential dwellings. To the East of the site is woodland, a railway line and residential dwellings beyond.

To the North and South of the site are commercial properties with a wide mix of uses.

The closest Noise Sensitive Receptors (NSRs) to the site are as follows:

- **NSR 1** - Approx 100m to the West of the site on Bradford Road
- **NSR 2** - Approx 125m to the East of the site on Bromley Street .

2.2 Proposed Site Conditions

The site currently benefits from planning permission (ref: 2020/62/91376/E) for the erection of a Class D2 Leisure Building and a building for B1C /B8 Trade Counter/Light Warehousing and Distribution.

Condition 18 of this permission relates to noise and states as follows:

“Before construction work commences, 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 any noise sensitive premises*
- 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”

It is proposed to construct two shell units on the site. The units will be handed over to future occupiers at the shell stage for occupier fit out and as such no detailed plant scheme is available at the shell construction stage.

3.0 GUIDANCE

3.1 Association of Noise Consultants (ANC) and Institute of Acoustics (IOA) Joint Guidance on the Impact of COVID-19 on the Practicality and Reliability of Baseline Sound Level Surveying and the Provision of Sound & Noise Impact Assessments

The ANC and IOA COVID-19 guidance, as amended 1st September 2020, sets out the guiding principles which have been adopted across the industry to ensure that sound and noise impact assessments are able to continue throughout the pandemic. It recommends that surveys should continue unless they cannot be carried out in complete accordance with current Government requirements, and additional sources of data may be used to support the characterisation of the baseline.

3.2 Consultation with Local Authority

Dragonfly Consulting has not undertaken any direct discussions with Kirklees Council with regard to this site.

3.3 Noise Policy Statement for England

The document 'Noise Policy Statement for England' sets out the following vision for ongoing noise policy:

"Promote good health and a quality of life through the effective management of noise within the context of Government policy on sustainable development."

This vision should be achieved through the following Noise Policy Aims:

"Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:

- *avoid significant adverse impacts on health and quality of life;*
- *mitigate and minimise adverse impacts on health and quality of life; and*
- *where possible, contribute to the improvement of health and quality of life."*

To achieve this vision, the Noise Policy Statement sets 3 noise levels to be defined by the assessor:

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.

The Noise Policy Statement considers that noise levels above the SOAEL would be seen to have, by definition, significant adverse effects and would be considered unacceptable. Where the assessed noise levels fall between the LOAEL and the SOAEL noise levels, the Policy Statement requires that:

“...all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life while also taking into account the guiding principles of sustainable development... This does not mean that such adverse effects cannot occur.”

Where noise levels are below the LOAEL, it is considered there will be no adverse effect. Once noise levels are below the NOEL, there will be no observable change.

Summaries of the relevant standards are given below.

3.4 British Standard 4142

British Standard 4142:2014 – *Methods for rating and assessing industrial and commercial sound*. This new edition of BS4142 clarifies the application of the standard and introduces the consideration of uncertainty as part of the assessment methodology. The standard provides a method for rating and assessing sound of an industrial or commercial nature, including:

- Sound from industrial and manufacturing process;
- Sound from fixed installations which comprise mechanical and electrical plant and equipment;
- Sound from the loading and unloading of goods and materials at industrial and/or commercial premises;
- Sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from premises or processes, such as from FLT's or that from train or ship movements on or around an industrial/commercial site.

The standard is intended for use for both the assessment of complaints and the assessment of the impact of commercial and industrial noise on both new and existing residential developments.

The method described in this British Standard use outdoor sound levels to assess the likely effects of sound on people who might be inside or outside a dwelling or premises used for residential purposes at which the sound is incident. The standard specifically excludes itself for the use of determination of nuisance.

The procedure contained in BS4142 for assessing the likelihood of complaint requires the calculation of the noise level from the source to be assessed at a location immediately outside the relevant dwelling; this is described as the 'specific sound level'. Where the specific noise source already exists, its noise level can be derived by measuring the total noise present, or 'ambient noise', and subtracting from it the noise from sources that are not under consideration. Noises not under consideration are called the 'residual noise'.

A 'rating level' is then calculated from the specific sound level. The rating level is then compared with the measured background noise level at that measurement location. If the specific noise source does not yet exist but the details of the intended plant are known, the specific sound level can be derived from first principles using manufacturers' and other data.

The specific, ambient and residual noise levels are measured in terms of $L_{Aeq,T}$ values and the background noise level is measured in terms of an L_{A90} value.

BS4142 considers that certain acoustic features can increase impact of a new noise source over that expected from a simple comparison between the specific noise level and the background noise level. These features can be assessed in one of three ways:

- Objective method - comparing adjoining third octave band noise levels (if available) for the sound source;
- The reference method by analysing measured plant noise levels using the Joint Nordic method;
- Using the prescribed subjective methodology.

These features and the penalties applied to calculate a rating level when assessing subjectively as defined by BS4142 are as follows:

- Tonality – For sound ranging from not tonal to prominently tonal, the Joint Nordic Method gives a correction of between 0 and +6dB for tonality.
 - 2dB for a tone which is just perceptible;
 - 4dB where it is clearly perceptible;
 - 6dB where it is highly perceptible.
- Impulsivity – A correction of up to 9dB can be applied for sound that is highly impulsive, considering both the rapidity of change in sound level and the overall change in sound level.
 - 3dB just perceptible impulsivity;
 - 6dB clearly perceptible impulsivity;
 - 9db highly perceptible impulsivity.
- Intermittency – Where the specific sound has identifiable on/off conditions, the specific sound level ought to be representative of the time period of length equal to the reference time period that contain the greatest amount of 'on' time. This can necessitate measuring the specific sound over a number of shorter periods that are in combination less than the reference time interval in total.
 - If the intermittency is readily distinctive against the residual acoustic environment, a penalty of 3dB can be applied.
- Where the specific sound features characteristics that are neither tonal nor impulsive, though otherwise are readily distinctive from the residual acoustic environment, a 3dB penalty can be applied.

In order to assess the significance of the impact, the background noise level is subtracted from the rating level. The standard considers that the greater the difference, the greater the significance.

- 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 standard goes on to highlight that these values are not absolute. There are a number of factors that should be taken in to account when assessing the impact and significance of the noise including:

- 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 levels are very high, the residual sound might itself result in adverse impacts or significant adverse impacts. 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;
- The character and level of the residual sound compared to the character and level of the specific sound;
- The sensitivity of the receptor and if the receptor already includes acoustic design features to mitigate noise.

3.5 IEMA Guidelines for Environmental Noise Impact Assessment

The guidelines state that, for any assessment, the noise level threshold and significance statements should be determined by the assessor, based upon the specific evidence and likely subjective response to the noise.

The impact scale adopted in this assessment is shown in Table 3.1 below:

Table 3.1
Impact Scale for Comparison of Future Noise against Existing Noise

Degree of Effect	Effect Descriptor
None / Not Significant	Less than 2.9dB L_{Aeq} change in sound level and/or all receptors are of negligible sensitivity to noise or marginal to the zone of influence of the proposals
Slight	A 3.0 to 4.9dB L_{Aeq} change in sound level at a receptor of some sensitivity
Moderate	A 3.0 to 4.9dB L_{Aeq} change in sound level at a sensitive or highly sensitive noise receptor, or a greater than 5dB L_{Aeq} change in sound level at a receptor of some sensitivity

Substantial	Greater than 5.0dB L_{Aeq} change in sound level at a noise sensitive receptor or a 5.0 to 9.9dB L_{Aeq} change in sound level at a receptor of great sensitivity to noise
Very Substantial	Greater than 10.0dB L_{Aeq} change in sound level perceived at a receptor of great sensitivity to noise

The criteria above reflect key benchmarks that relate to human perception of sound. A change of 3dB(A) is generally considered to be the smallest change in noise that is perceptible. A 10dB(A) change in noise represents a doubling or halving of the noise level.

It is considered that the criteria specified in the above table do provide a good indication as to the likely significance of changes in noise levels in this case. Therefore, the above noise threshold levels and significance statements have been used to supplement the criteria provided by the British Standard in order to assess the impact on a listener.

4.0 ENVIRONMENTAL NOISE SURVEY

Due to the Covid -19 restrictions brought into force in England on the 5th of January 2021, no specific noise survey has been completed for this development.

In the absence of any site specific measured noise data, noise levels from a noise assessment completed by ADC Acoustics for the 'Starbucks Drive' Thru Coffee Shop, located at the southern end of the development site (ref: ARR/C/2565.35 dated 18th September 2019 and submitted to Kirklees Council as part of a discharge of conditions application (ref: 2019/44/92988/E)), have been utilised.

4.1 Survey Methodology

The measurement equipment utilised by ADC Acoustics to complete the survey is confirmed below:

'Instrumentation used was a Rion N28. This is a precision grade sound level meter which holds a current calibration certificate and which was field-calibrated as necessary. The meter was set up to measure consecutive 5 minute samples of background noise. All measurements have been gathered in terms of dB L_{eq} , dB L_{max} and dB L_{90} in overall A-weighted terms, and in octave bands across the frequency range'

The measurement location that was surveyed is considered to cover typical ambient and background noise levels at the proposed development site. The measurement location is hereby referred to in this report as follows:

- 'Location 1' – sound level meter positioned approximately 1.7m from the ground adjacent to the A652, in proximity to NSR1.

The measurement location is shown in Appendix C.

4.2 Survey Results

ADC Acoustics state in their report that the weather during the survey was suitable for noise measurements, it occasional spells of very light rain with low wind speeds.

Summaries of the measured noise levels given in the ADC Acoustics report are given in Table 4.1 below:

Table 4.1
Summary of Measured Noise Levels – 09/09/19 to 10/09/19 – free field, dB

Location	Date	Period	Time (h)	L _{Aeq, T}	L _{A90}	L _{AFMax}
1	09/09/19	Daytime	2200-2300	59	43	75
	10/09/19	Night-Time	0300-0415	57	33	79
	10/09/19	Daytime	0700-0900	69	52	89

It is worthy of note that the measured levels stated in the above table are the lowest 15-minute period measured throughout that portion of the survey.

4.3 Observations and Comments

The on-site observations and comments from the ADC report confirm that:

‘The general noise climate appeared to be normal and representative and was completely dominated by traffic’

5.0 ASSESSMENT

5.1 Assessment of Noise from Fixed Plant – Maximum Limits

For the purpose of this assessment the noise levels detailed for Location 1 are believed to be representative of NSR1.

The assumption has been made that the dominant noise in the area is noise from the industrial units and road traffic noise from Bradford road, which is confirmed in the ADC report.

It has therefore been assumed that the levels from Bradford road would be similar to that on Bromley road (NSR2), once the road traffic noise has subsided in the night time period. However, to assess a worst case scenario a further 5dB reduction has been applied to the measured L₉₀ to represent this location. This approach follows the IOA and ANC Joint Guidance on the Impact of COVID-19 on the Practicality and Reliability of Baseline Sound Level Surveying and the Provision of Sound & Noise Impact Assessments

For this assessment, the values of the NOEL, LOAEL and SOAEL are drawn from the criteria and values detailed in BS4142:2014. The standard sets very clear values and these are interpreted as follows:

NOEL – No Observed Effect Level – Rating Noise Level is below the measured background noise level. The Standard considers that *“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”*.

LOAEL – Lowest Observed Adverse Effect Level – This has been set as a Rating Noise Level of 5dB above the background noise level. The standard considers *“A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context”*.

SOAEL – Significant Observed Adverse Effect Level – Rating Noise Level is 10dB above background noise level. The standard considers *“A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context”*.

An assessment has been carried out in accordance with the requirements of BS4142 to quantify the level and significance of any noise impacts on residents of the properties due to the noise generated by the proposed fixed plant units.

In the absence of detailed information regarding the plant items, the potential impact has been assessed by providing a maximum allowable noise limit at source.

In order to assess a worst-case scenario for the site, the lowest the background noise level for the 15-minute period (night time) with the lowest measured L_{A90} noise level throughout the survey have been used in the calculations. These periods are as follows:

- For the assessment of plant operating during the night time period (2300h-0700h):
 - ‘Location 1’ Lowest $L_{A90,15min}$ – 33dB(A) – 10/09/2019 (0300h-0415h).
 - ‘Location 2’ Lowest Assumed $L_{A90,15min}$ – 28dB(A) – 10/09/2019 (0300h-0415h).

When calculating the rating level, there are four correction types that can be considered. They are:

- Tonality;
- Impulsivity;
- Intermittency;
- Specific noise readily distinctive from the residual environment.

It is considered that the plant noise will be similar in character and nature to the existing noise that pervades the site from nearby premises. It is therefore considered that no character corrections are required for the NSR.

As there is currently insufficient detail available as to the type, size and exact location of the fixed plant to permit a detailed assessment, limits will be provided for the maximum allowable plant noise levels at the nearest noise sensitive receptor, based on the lowest background noise levels.

It is considered that a criterion that sits between the ‘NOEL’ and ‘LOAEL’ will be suitable for this site (i.e. below the LOAEL). As such, a criterion that limits the overall rating noise level such that it does not exceed a level of 5dB(A) above the measured background noise levels (L_{A90}) at the nearest NSRs is considered appropriate for this site.

The nearest NSRs and their respective distances from the proposed site boundary are shown in Table 5.1. Distance correction has been calculated using standard point-source formulae with no consideration for directivity or order reflections:

Table 5.1
Distance Attenuation from Proposed Sites to NSR

NSR	Distance, m	Distance Correction, dB
1	100	-40
2	125	-42

The noise level limits shown below in Tables 5.2 to 5.3 are based on not exceeding the adopted noise level criterion of 5dB above background noise level:

Table 5.2
Rating Noise Level Limit at NSR1 in dB(A) – Night Time

Criterion	Lowest Measured LA90,15mins	Maximum Permissible Rating Level at NSR (dB)	Distance Correction (dB)	Maximum Permissible Rating Level at Source (dB)
NOEL	33	33	-40	73
LOAEL		38		78

Table 5.3
Rating Noise Level Limit at NSR2 in dB(A) – Night Time

Criterion	Lowest Measured LA90,15mins	Maximum Permissible Rating Level at NSR (dB)	Distance Correction (dB)	Maximum Permissible Rating Level at Source (dB)
NOEL	28	28	-42	70
LOAEL		33		75

Table 5.2 and table 5.3 shows that, using the adopted criteria for any plant items in operation on site in the Night Time period (2300h-0700h), a maximum plant level of 73dB(A) would fall below the 'NOEL' for this assessment and a maximum plant level of 78dB(A) would fall below the 'LOAEL' at the nearest NSRs.

The 'LOAEL' is defined as follows:

LOAEL – Lowest Observed Adverse Effect Level – This has been set as a Rating Noise Level of 5dB above the background noise level. The standard considers *"A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context"*.

It is the opinion of Dragonfly Consulting that the above noise levels would be acceptable within this assessment.

5.2 Uncertainty of the Assessment

Following current good practice, an appraisal of the uncertainty within both the on-site noise survey and the prediction calculations has been completed.

The following negative factors have been noted in considering the uncertainty of the on-site noise survey:

- Sound level meter located at head height level for NSRs.
- Assumptions made to noise environment at NSR2

- Limited measurement data availability

The following positive factors have been noted in considering the uncertainty of the on-site noise survey:

- Low winds and low precipitation.

As such, it is considered that the uncertainty for the on-site noise survey element of the work is $\pm 2\text{dB}$. Uncertainty for the prediction elements of the work has been considered in line with the normal use of ISO9613 based point source propagation calculations and is predicted at $\pm 3\text{dB}$.

Utilising the root sum of squares method, this gives a combined uncertainty for this assessment of approximately $\pm 4\text{dB}$.

5.3 Assertion of Competence

This assessment has been completed by Michael Shepherd, Acoustic Consultant with responsibilities for completing acoustic reports on behalf of Dragonfly Consulting.

I studied Acoustics at the University of Salford and I am an Associate Member of the Institute of Acoustics.

I have completed several assessments under BS4142:2014 and I assert that I am competent to undertake this assessment under the requirements of BS4142:2014.

6.0 CONCLUSIONS

Onewood Group has appointed Dragonfly Consulting to carry out a Noise Impact Assessment for a proposed commercial development at Land Adjacent to 260 Bradford Road.

The noise assessment has been conducted in accordance with the National Planning Policy Framework.

This report therefore describes a noise survey of the site and the subsequent analysis to determine the noise environment of the proposed development. It then compares the results with the adopted criteria. Recommendations are also made with respect to the design of the development.

Measurement of external noise levels have been completed for the proposed development to allow demonstration by calculation that suitable noise levels will be achieved at the façade of the most noise exposed dwellings.

6.1 Assessment of Noise from Fixed Plant – Maximum Limits

The assessment has shown that, using the adopted criteria for any plant items in operation on site in the Night Time period (2300h-0700h), a maximum plant level of 73dB(A) would fall below the 'NOEL' for this assessment and a maximum plant level of 78dB(A) would fall below the 'LOAEL' at the nearest NSRs.

The assessment has shown that, using the adopted criteria for any plant items in operation at Unit A

The 'LOAEL' is defined as follows:

LOAEL – Lowest Observed Adverse Effect Level – This has been set as a Rating Noise Level of 5dB above the background noise level. The standard considers *"A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context."*

It is the opinion of Dragonfly Consulting that the above noise levels would be acceptable within this assessment.

Appendix A – Glossary of Terminology

In order to assist the understanding of acoustic terminology and the relative change in noise, the following background information is provided.

The human ear can detect a very wide range of pressure fluctuations, which are perceived as sound. In order to express these fluctuations in a manageable way, a logarithmic scale called the decibel, or dB scale is used. The decibel scale typically ranges from 0dB (the threshold of hearing) to over 120dB. An indication of the range of sound levels commonly found in the environment is given in the following table.

Table A-1
Sound Levels Commonly Found in the Environment

Sound Level	Location
0dB(A)	Threshold of hearing
20 to 30dB(A)	Quiet bedroom at night
30 to 40dB(A)	Living room during the day
40 to 50dB(A)	Typical office
50 to 60dB(A)	Inside a car
60 to 70dB(A)	Typical high street
70 to 90dB(A)	Inside factory
100 to 110dB(A)	Burglar alarm at 1m away
110 to 130dB(A)	Jet aircraft on take off
140dB(A)	Threshold of Pain

Acoustic Terminology

dB (decibel) The scale on which sound pressure level is expressed. It is defined as 20 times the logarithm of the ratio between the root-mean-square pressure of the sound field and a reference pressure ($2 \times 10^{-5} \text{Pa}$).

dB(A) A-weighted decibel. This is a measure of the overall level of sound across the audible spectrum with a frequency weighting (i.e. 'A' weighting) to compensate for the varying sensitivity of the human ear to sound at different frequencies.

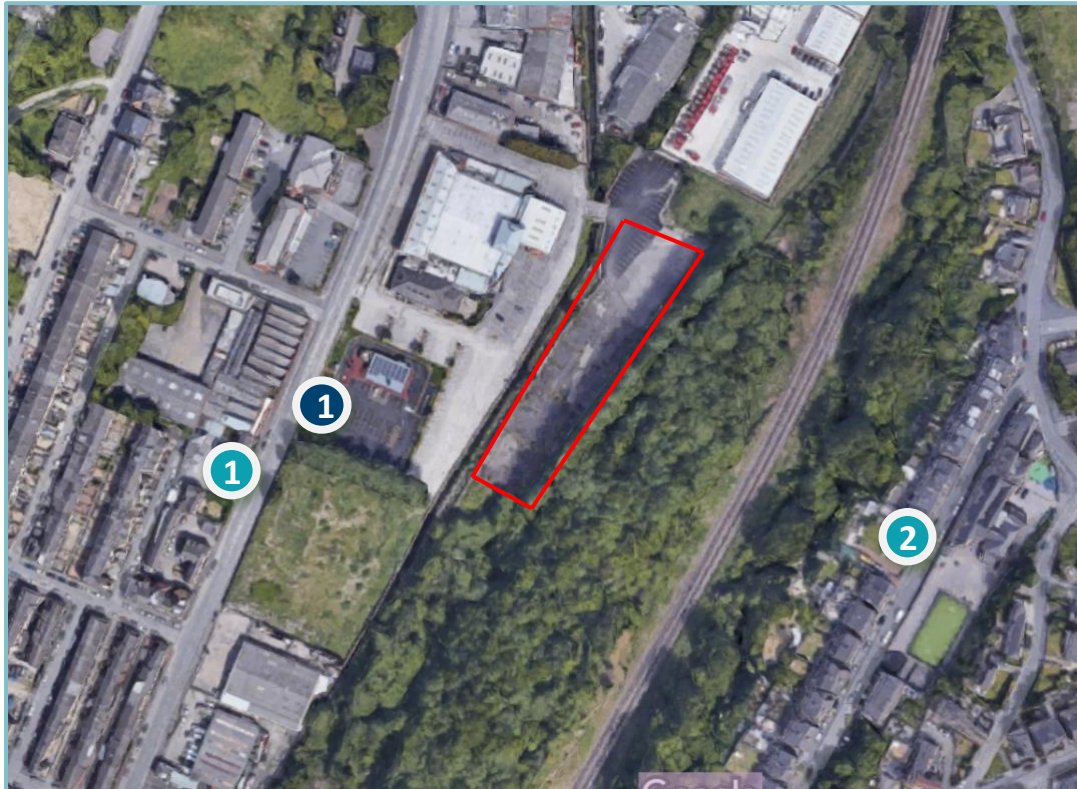
L_{Aeq} This is defined as the notional steady sound level which, over a stated period of time, would contain the same amount of acoustical energy as the A-weighted fluctuating sound measured over that period.

L_{10} & L_{90} If a non-steady noise is to be described, it is necessary to know both its level and the degree of fluctuation. The L_n indices are used for this purpose, and the term refers to the level exceeded for n% of the time. Hence L_{10} is the level exceeded for 10% of the time and as such can be regarded as the 'average maximum level'. Similarly, L_{90} is the 'average minimum level' and is often used to describe the background level. It is common practice to use the L_{10} index to describe traffic noise.

L_{AMax} This is the maximum A-weighted sound pressure level recorded over the period stated. L_{AMax} is sometimes used in assessing environmental noise where occasional loud noises occur, which may have little effect on the overall L_{eq} noise level but will still affect the noise environment.

Appendix B – Measurement Locations

Figure B-1
Measurement Location Plan



-  Measurement Locations
-  Noise Sensitive Receptors
-  Development Site