KR06815

Darfield Express

Noise Impact Assessment…

Standard: British Standard 4142: 2014

Site: Darfield Express

Address: Unit 1
Nanny Marr Road
Darfield
Barnsley

Postcode: S73 9AB

Customer: Tesco Stores Ltd

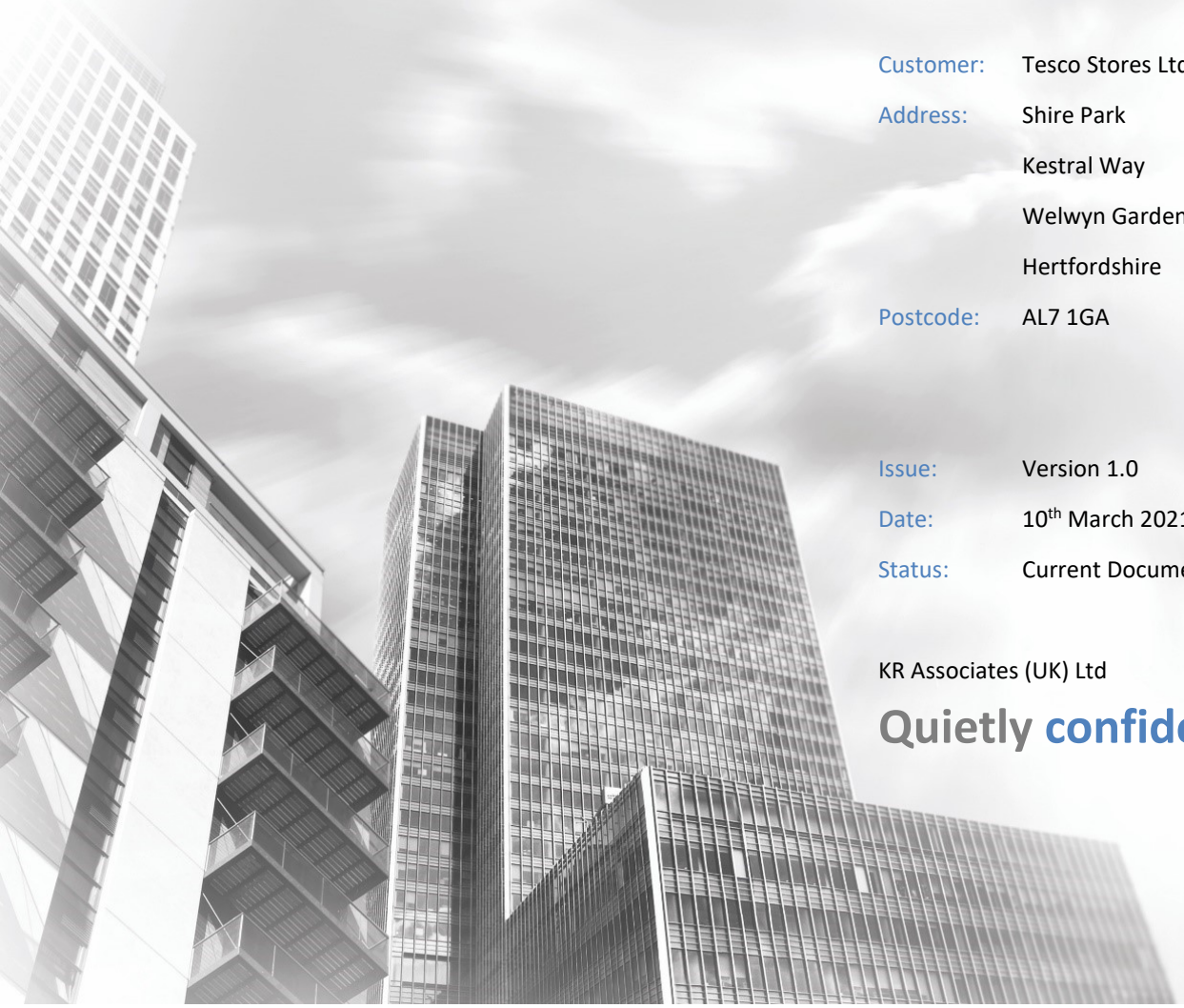
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Issue: Version 1.0

Date: 10th March 2021

Status: Current Document



KR Associates (UK) Ltd

Quietly confident…

Revisions…

KR06815		Project	Darfield Express		
		Title	Noise Impact Assessment - Proposed Additional Plant		
		Standard	British Standard 4142: 2014		
Issue	Date	Details of Revision			
v1_0	10/03/2021	Description	Report issue for submission to Local Authority		
		Signature			
		Name	Mr. R. Scrivener	Miss N Truman	Mr R Scrivener
		Position	Technical Director	Project Manager	Technical Director

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KR Associates…

KR Associates (UK) Ltd (Company No. 04813349) registered office at 56 Bassett Green Road, Southampton. SO16 3DX.

Table of Contents….

1. Executive Summary…. 5
1.1. Instruction 5
1.2. Executive Summary (Repeated at Section 7) 5
1.2.1 Assessment Position 5
1.2.2 Background Noise Measurements 5
1.2.3 Criterion at Assessment Position 5
1.2.4 Mitigation Measures 5
1.2.5 Assessment of Noise Levels 5
1.2.6 Conclusions 5
2. Site Location… 6
2.1. General Location of Site 6
2.2. Key Positions (Source, Assessment & Background) 7
2.3. Free Field Source Sound Pressure Levels at 10m 7
2.4. Maximum Ambient Temperature in the UK 8
2.4.1 Maximum Monthly Temperature 8
2.4.2 Maximum 24-hour Temperature 8
2.5. Mechanical Equipment Manufacturers Sound Power Levels 9
2.5.1 Source 1 – Packaged Gas Cooler 9
2.5.2 Source 2, 3 and 4 – Low Noise Air Conditioning Heat Pumps 10
3. Background Noise Levels… 11
3.1. Weather During Survey 11
3.1.1 Wind Speed, Gust and Direction 11
3.1.2 Rainfall, Temperature and Dew Point 11
3.1.3 Impact of Weather 11
3.2. 24-hour Background Measurements 12
3.3. Modal Analysis of Background Data 12
4. Criterion… 13
4.1. National Planning Policy Framework 2019 13
4.1.1 Scope of Standard 13
4.1.2 Conserving and Enhancing the Natural Environment 13
4.1.3 Appropriate Development 13
4.2. Noise Policy Statement for England: 2010 13
4.2.1 Scope of Standard 13
4.2.2 Criterion 14
4.3. Night Noise Guidelines (“NNG”) 14
4.3.1 Recommendation for Health Protection 14
4.3.2 Description of Effect of Change in Noise Level 14
4.4. British Standard 4142: 2014 + A1: 2019 15
4.4.1 Testing Standard… 15
4.4.2 Criterion 15
4.4.3 Feature Correction 15
4.5. Local Authority Requirements 16
4.5.1 Local Plan 16
4.5.2 Proposed Criterion 16

5. Calculations of Plant Noise Levels… 17
5.1. ISO 9613 – Part 2:1996 17
5.1.1 Source Directivity (D_c) 17
5.1.2 Geometric Divergence (A_{div}) 17
5.1.3 Ground Absorption (A_{gr}) 17
5.1.4 Atmospheric Absorption (A_{atm}) 17
5.1.5 Barrier Effect (A_{bar}) 18
5.2. Calculation of Plant Noise Levels 18
5.2.1 Day Time (07:00 to 23:00) 18
5.2.2 Night Time (23:00 to 07:00) 18
5.3. Assessment of Average Plant Noise Levels (BS 4142: 2014 + A1: 2019) 19
6. Calculation of Delivery Noise Levels… 20
6.1. Calculation Methodology 20
6.1.1 Measurement of Truck Arriving / Departing 20
6.1.2 Measurement of Delivery Events 20
6.1.3 Individual Delivery Events 20
6.2. 3D Noise Maps of Delivery 21
6.2.1 3D Noise Map 21
6.2.2 Discussion of Results 21
6.3. Assessment of Average Delivery Noise Levels (BS 4142: 2014 + A1: 2019) 22
6.4. Conclusions 22
7. Conclusions… 23
7.1. Plant Noise 23
7.1.1 Assessment Position 23
7.1.2 Background Noise Measurements 23
7.1.3 Criterion at Assessment Position 23
7.1.4 Mitigation Measures 23
7.1.5 Assessment of Plant Noise Levels 23
7.1.6 Conclusions 23
7.2. Delivery Noise 23
8. Appendix A - BS 4142:2014 + A1: 2019 Information to Be Reported… 24
8.1. a) Competency 24
8.2. b) Source Under Investigation 24
8.3. c) Subjective Impression of Source at Assessment Position 24
8.4. d) Existing Contexts 25
8.5. e) Relative Positions 25
8.6. f) Noise Measurement Equipment Calibration 26
8.7. g) Noise Measurement Equipment Operation Test 26
8.8. h) Weather Conditions 26
8.9. i) Date of Measurements 26
8.10. j) Measurement Time Interval 27
8.11. k) Reference Time Interval 27
8.12. l) Specific Noise / m) Background Noise / n) Rating / o) Assessment / p) Conclusions 27

1. Executive Summary….

1.1. Instruction

KR Associates (UK) Ltd have been instructed by Tesco Stores Ltd to undertake an environmental noise survey at the proposed Darfield Express located at Unit 1, Nanny Marr Road, Darfield, Barnsley to determine if the installation of the proposed plant will have a significant adverse impact in terms of noise on the local noise sensitive properties. Furthermore, a separate assessment is made on the impact of the deliveries to the side of the store.

1.2. Executive Summary (Repeated at Section 7)

1.2.1 Assessment Position

The residential dwellings at the rear of the store are located 17 m from the dedicated plant area at the rear of the store. The deliveries to the side of the store have the potential to impact the residents at the front, rear and side of the store.

1.2.2 Background Noise Measurements

Day Time (07:00 – 19:00)			Evening (19:00 – 23:00)			Night Time (23:00 – 07:00)		
$L_{Amax,1h}$	$L_{Aeq,1h}$	$L_{A90,1h}$	$L_{Amax,1h}$	$L_{Aeq,1h}$	$L_{A90,1h}$	$L_{Amax,15m}$	$L_{Aeq,15m}$	$L_{A90,15m}$
46 - 83 dB	42 - 62 dB	39 - 45 dB	48 - 68 dB	42 - 51 dB	38 - 45 dB	38 - 63 dB	32 - 46 dB	28 - 40 dB
Modal Background		42 dB	Modal Background		41 dB	Modal Background		31 dB

1.2.3 Criterion at Assessment Position

To comply with the revised version of the National Planning Policy Framework (“NPPF”) and the guidance within the Local Plan, the resultant noise levels at the nearest residential dwellings are at least -5 dB below the underlying background noise levels when assessed in accordance with British Standard 4142: 2014 + A1: 2019.

1.2.4 Mitigation Measures

It will be necessary to install a 2.4m high solid timber fence along the rear and side façade of the Tesco unit.

1.2.5 Assessment of Noise Levels

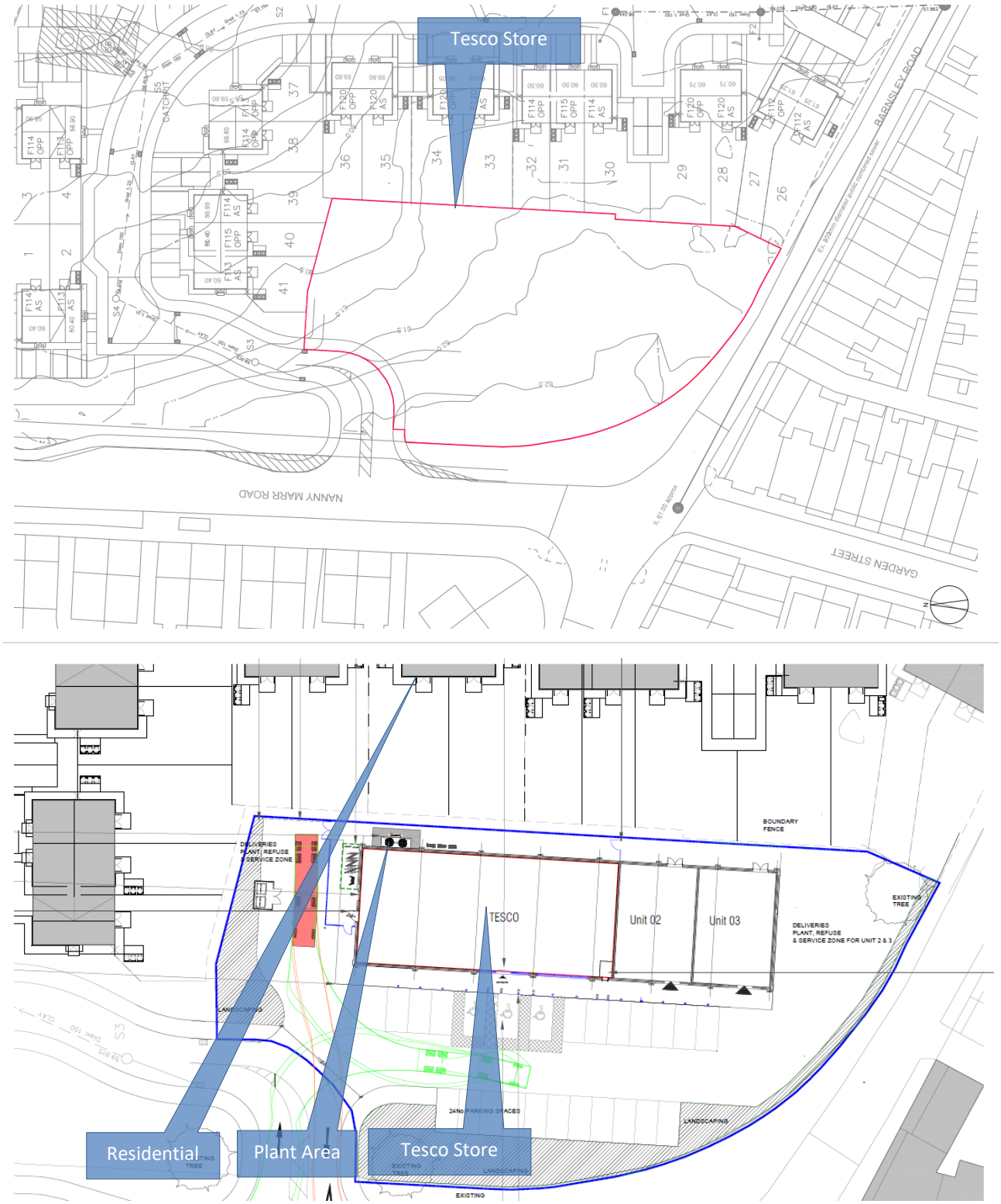
Day Time (07:00 – 19:00)			Evening (19:00 – 23:00)			Night Time (23:00 – 07:00)		
$L_{Aeq,1h}$	$L_{A90,1h}$	BS4142	$L_{Aeq,1h}$	$L_{A90,1h}$	BS4142	$L_{Aeq,1h}$	$L_{A90,1h}$	BS4142
29 dB	42 dB	-13 dB	27 dB	41 dB	-14 dB	21 dB	31 dB	-10 dB

1.2.6 Conclusions

The resultant noise levels from the proposed mechanical equipment will result in noise levels that comply in full with the Local Plan and are at levels that are very unlikely to give rise to complaints from residents.

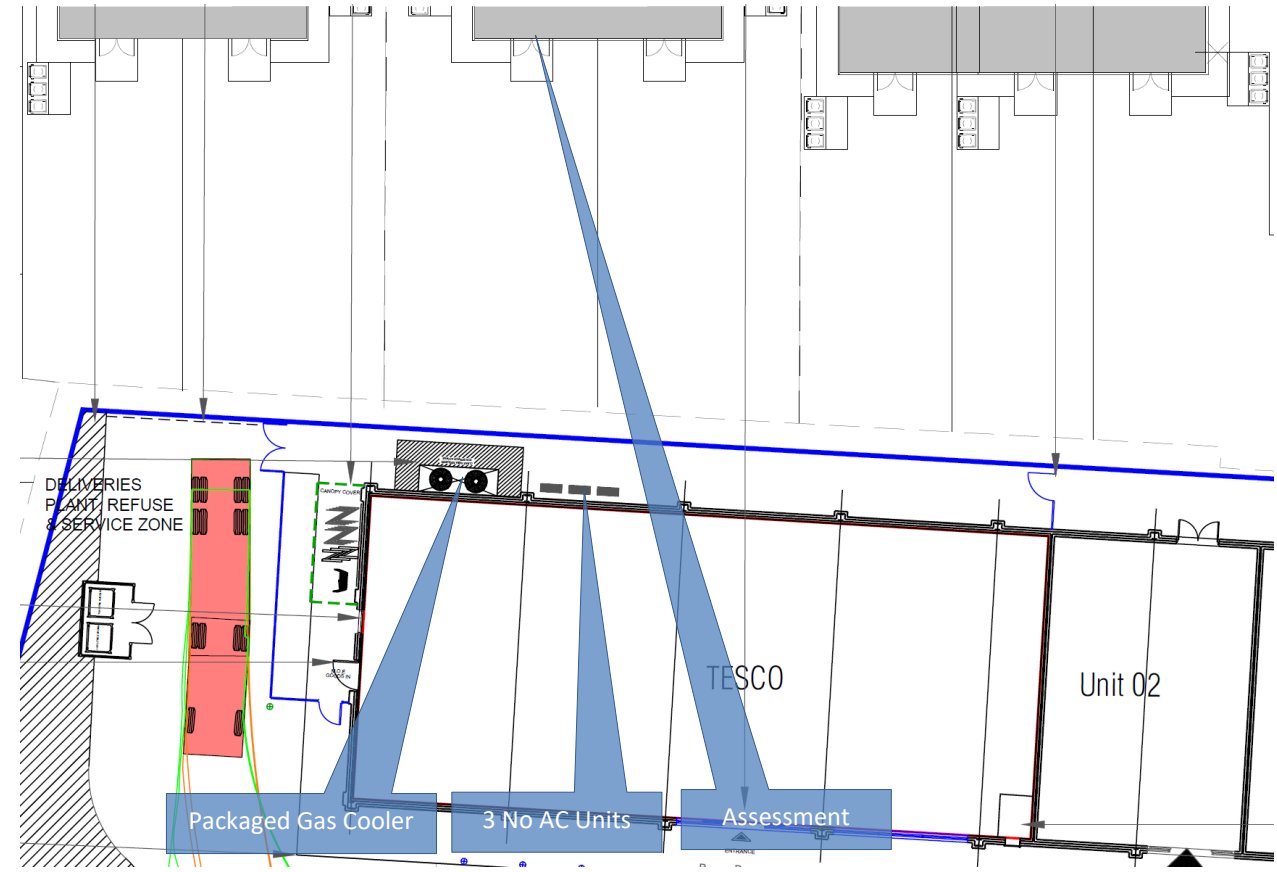
2. Site Location…

2.1. General Location of Site



3 new retail units are to be located in a small parade with a shared dedicated car park at the junction of Nanny Marr Road and Barnsley Road. There is a dedicated plant area at the rear of the store and the nearest residential dwellings are around 17m away at the rear of the site.

2.2. Key Positions (Source, Assessment & Background)



2.3. Free Field Source Sound Pressure Levels at 10m

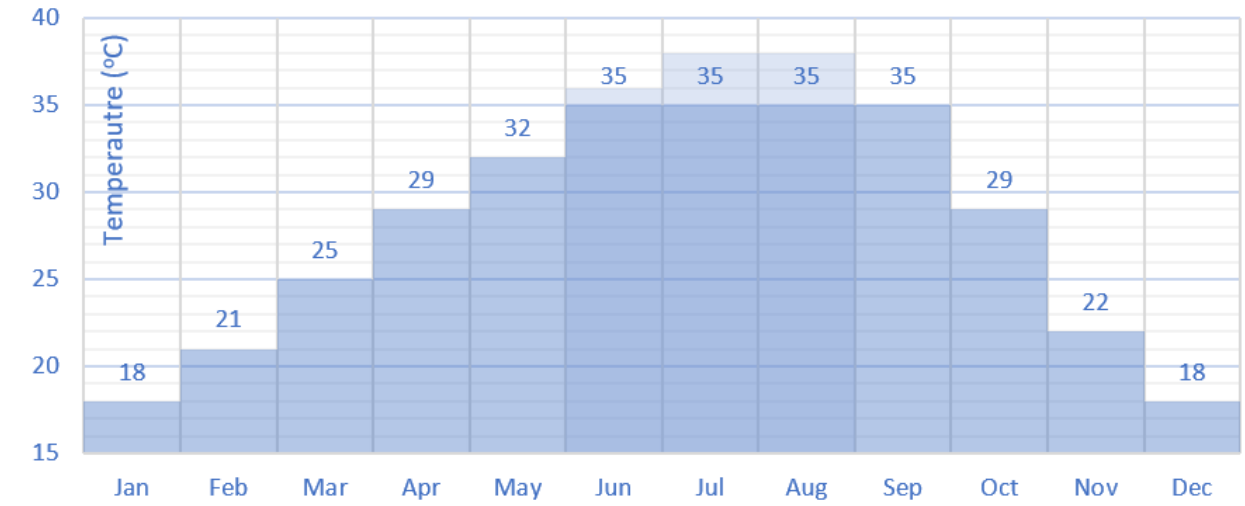
Source	Description of Source	Sound Pressure at 10m – Annex C 13487: 2003		
		07:00 – 19:00	19:00 – 23:00	23:00 – 07:00
Source 1	Packaged Gas Cooler Eco Pack	$L_{p(10)}$ 34 dB	$L_{p(10)}$ 31 dB	$L_{p(10)}$ 29 dB
Source 2	Daikin AZAS 140 AC Heat Pump (Low Noise Card)	$L_{p(10)}$ 26 dB	$L_{p(10)}$ 24 dB	$L_{p(10)}$ -20 dB
Source 3	Daikin AZAS 140 AC Heat Pump (Low Noise Card)	$L_{p(10)}$ 26 dB	$L_{p(10)}$ 24 dB	$L_{p(10)}$ -20 dB
Source 4	Daikin AZAS 140 AC Heat Pump (Low Noise Card)	$L_{p(10)}$ 26 dB	$L_{p(10)}$ 24 dB	$L_{p(10)}$ -20 dB
Combined Sound Pressure Level at 10m (1 Reflective Surface)		$L_{p(10)}$ 36 dB	$L_{p(10)}$ 33 dB	$L_{p(10)}$ 29 dB

2.4. Maximum Ambient Temperature in the UK

The proposed refrigeration unit will produce higher noise levels when the ambient temperature is higher as they must work harder to reject the same amount of heat energy.

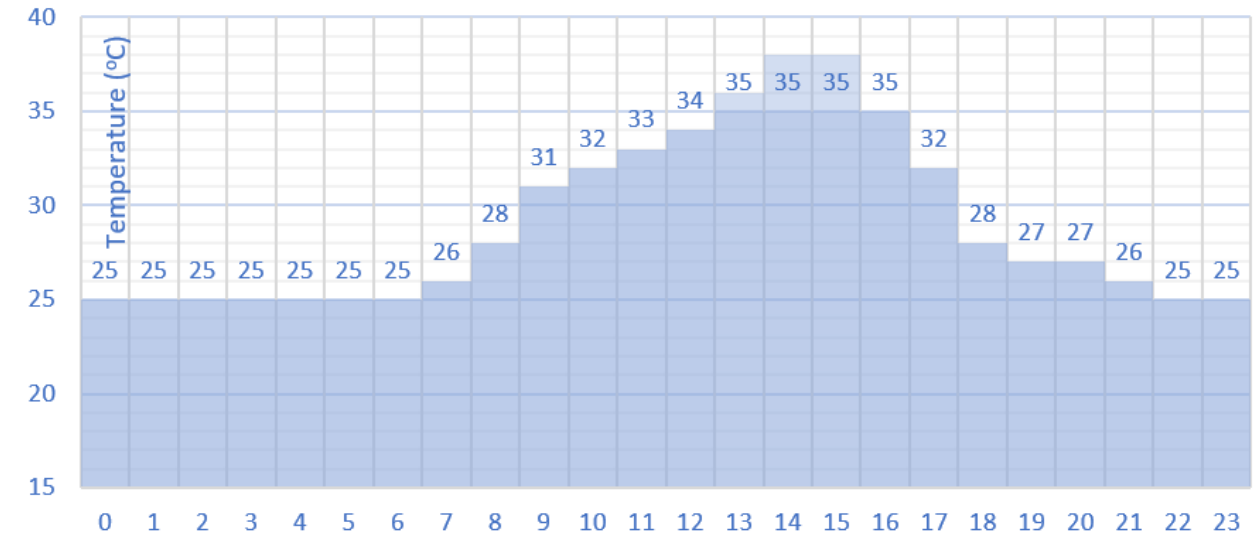
2.4.1 Maximum Monthly Temperature

The following graph shows the maximum 1-hour ambient temperatures recorded anywhere in the UK on a month-by-month basis.



2.4.2 Maximum 24-hour Temperature

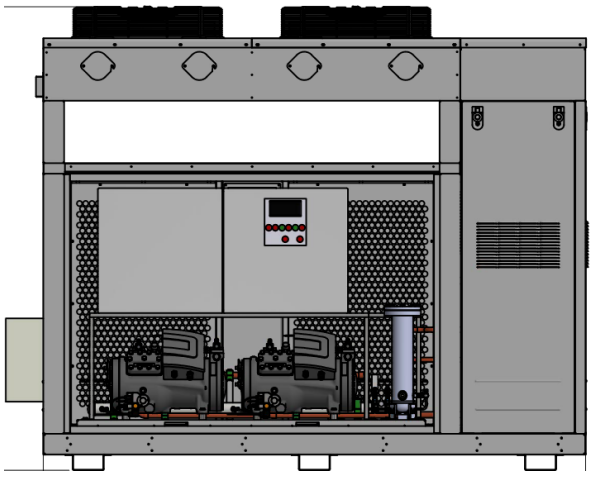
The following graph shows the maximum 1-hour ambient temperatures recorded anywhere in the UK over the worst-case day.

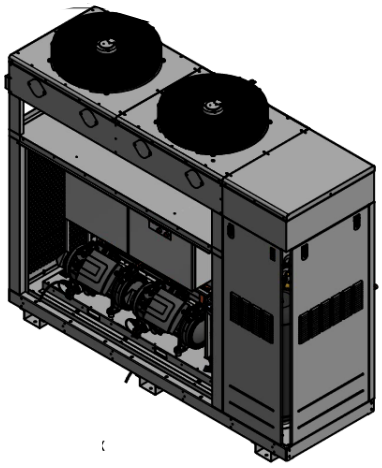


2.5. Mechanical Equipment Manufacturers Sound Power Levels

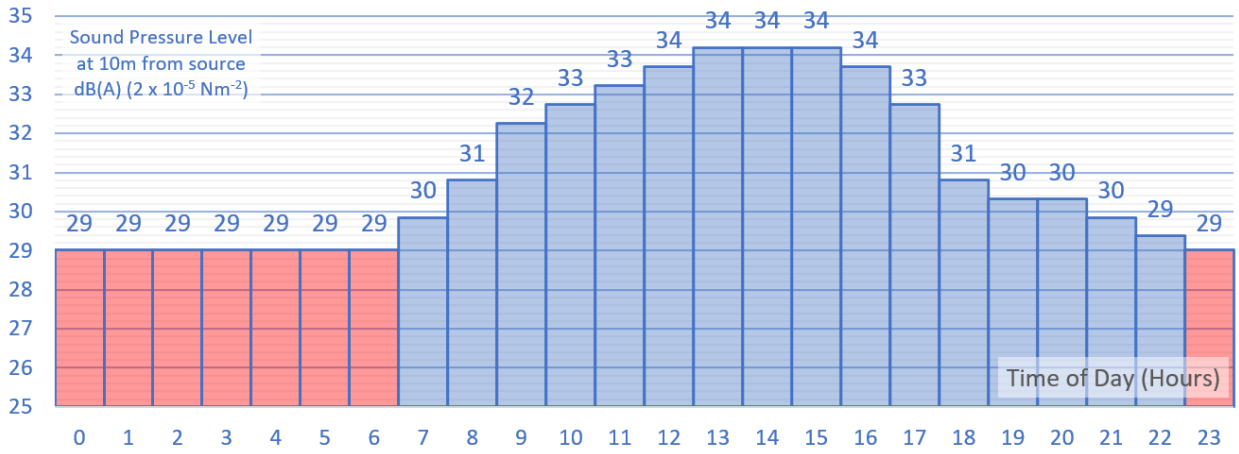
2.5.1 Source 1 – Packaged Gas Cooler

Manufacturer	Space Engineering			Standard	BS EN ISO 3744: 2010				
Model	EC02 MINI P S			Description	Packaged Gas Cooler				
Operation	Continuous operation against Total Heat Rejection (THR) at 35°C Ambient								
Uncertainty	Octave Band Frequency (Hz)	(A)	63	125	250	500	1K	2K	4K
	Engineering (Grade 2)	1.5	3.0	3.0	2.0	2.0	1.5	1.5	1.5
Dimensions	2,604mm long x 828 mm wide x 2,227 mm high nominal								





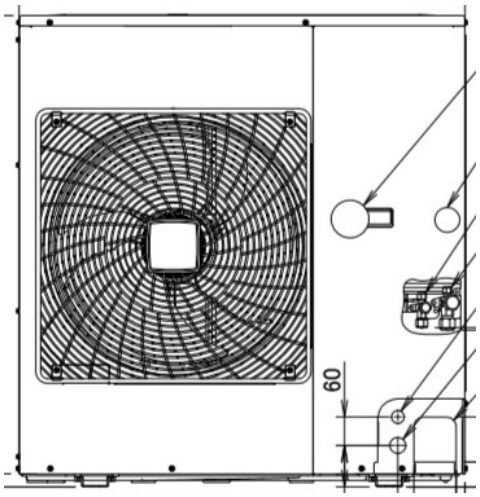
Manufacturers Data	Octave Band Frequency (Hz)	(A)	63	125	250	500	1K	2K	4K
	Day Time Levels	34	34	38	36	31	27	25	21
	Night Time Levels	29	31	35	32	26	23	19	16

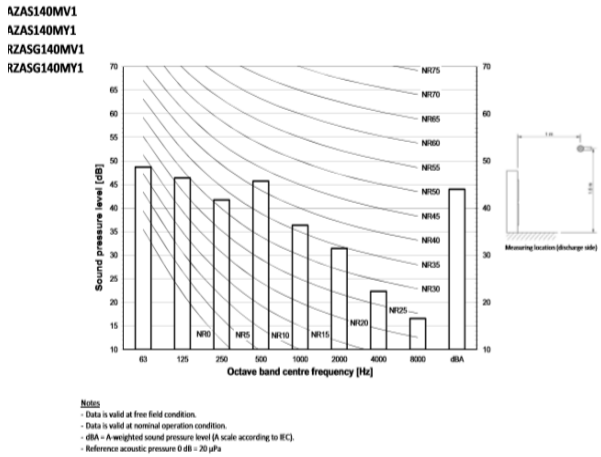


Sound Pressure Level @ 10m from the Packaged Gas Cooler – $L_{Aeq,\ 5\ minutes}$ (dB) Ref 2 x 10^{-5} Nm^{-2}

2.5.2 Source 2, 3 and 4 – Low Noise Air Conditioning Heat Pumps

Manufacturer	Daikin		Standard	JSA – JIS Z 8732 – Part 1					
Model	AZAS 140 MV1 (Low Noise Card)		Description	Air Conditioning Heat Pump					
Operation	Continuous operation against Total Heat Rejection (THR) at 35°C Ambient								
Uncertainty	Octave Band Frequency (Hz)	(A)	63	125	250	500	1K	2K	4K
	Engineering (Grade 2)	1.2	2.5	2.2	1.8	1.5	1.4	1.4	1.4
Unit Dimensions	940 mm long x 350 mm wide x 990 mm high nominal								



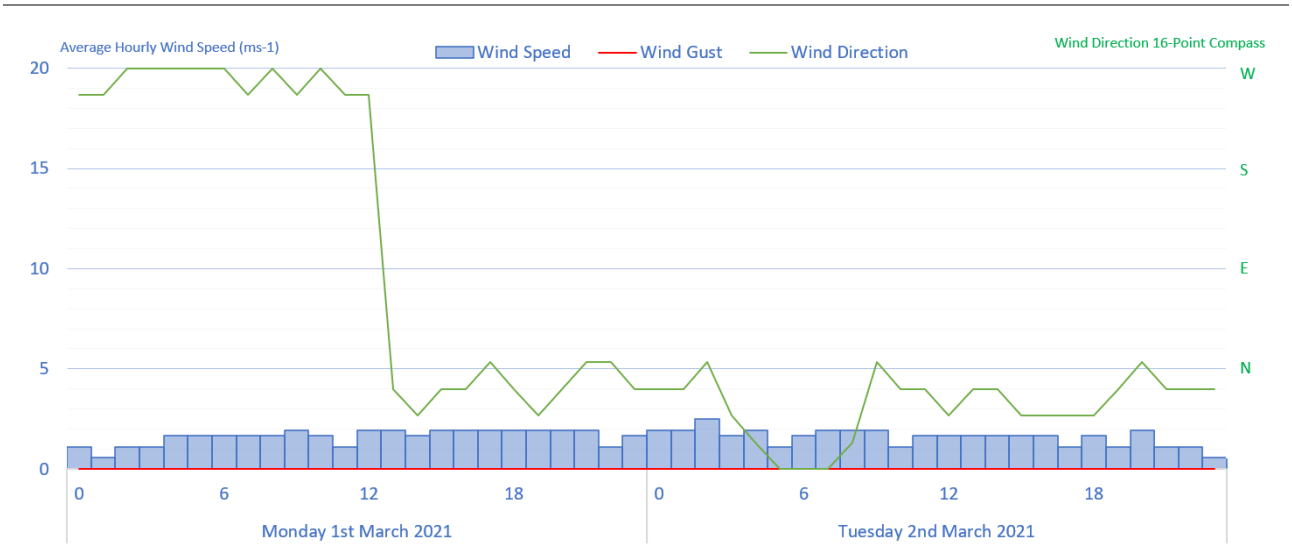


anufacturers Data	Octave Band Frequency (Hz)	(A)	63	125	250	500	1K	2K	4K
	Day Time Levels	25	29	27	22	26	17	12	3
	Night Time Levels	22	27	25	20	24	15	10	1

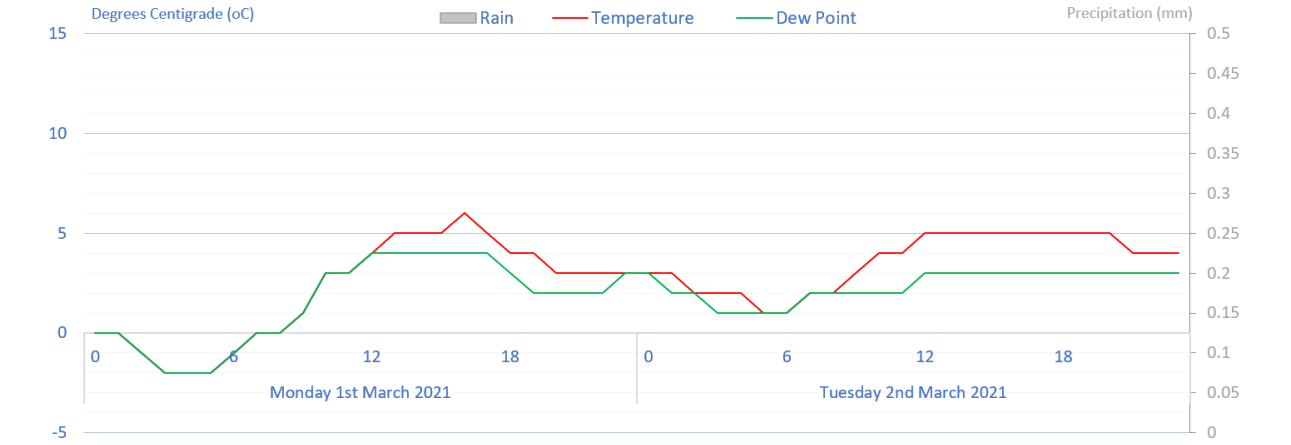
3. Background Noise Levels…

3.1. Weather During Survey

3.1.1 Wind Speed, Gust and Direction



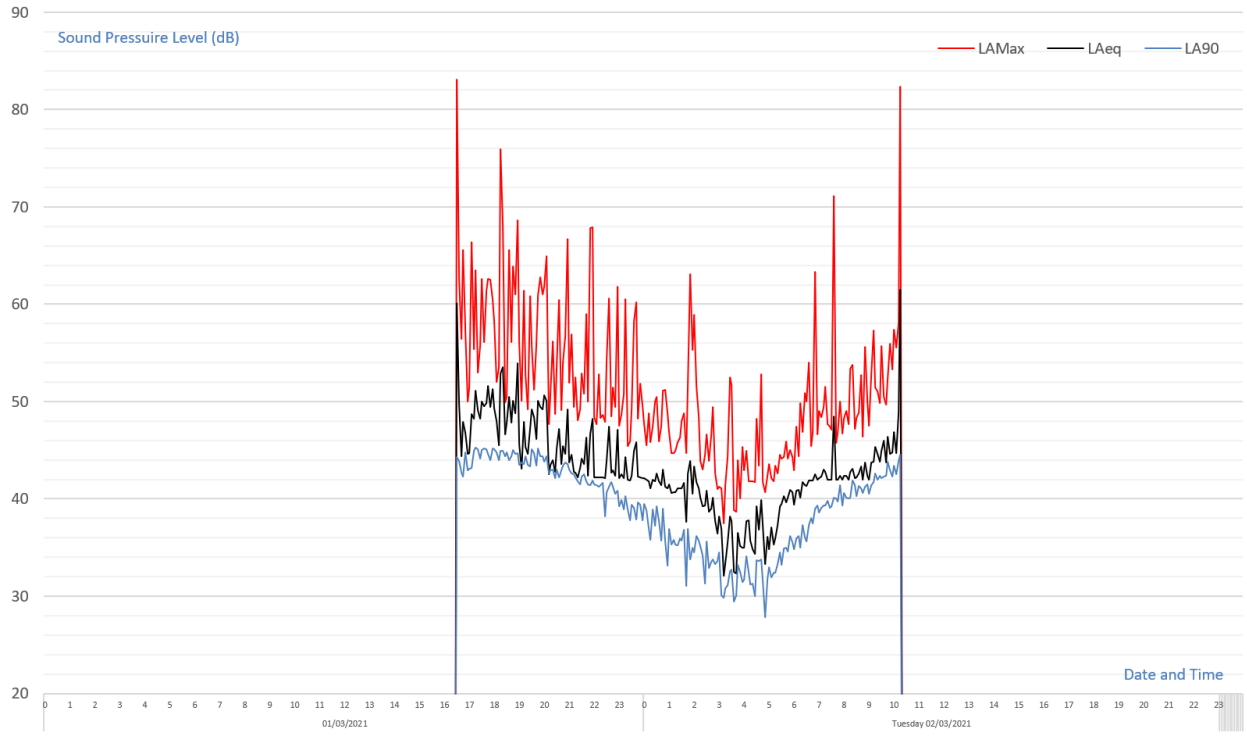
3.1.2 Rainfall, Temperature and Dew Point



3.1.3 Impact of Weather

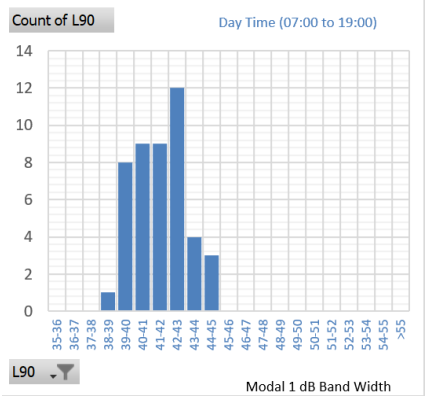
An analysis of the background data recorded on site indicates that the prevailing weather did not adversely impact the results. In particular the wind speed was on average below 5.0ms^{-1} and there was no precipitation during the survey period.

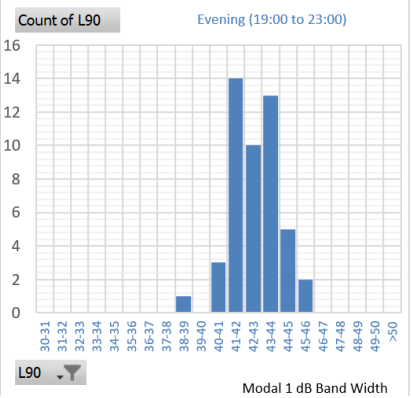
3.2. 24-hour Background Measurements

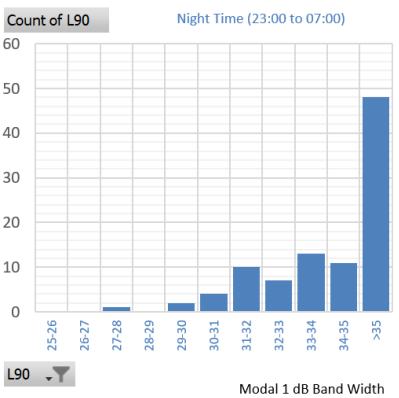


Day Time (07:00 – 19:00)			Evening (19:00 – 23:00)			Night Time (23:00 – 07:00)		
$L_{Amax,1h}$	$L_{Aeq,1h}$	$L_{A90,1h}$	$L_{Amax,1h}$	$L_{Aeq,1h}$	$L_{A90,1h}$	$L_{Amax,15m}$	$L_{Aeq,15m}$	$L_{A90,15m}$
46 - 83 dB	42 - 62 dB	39 - 45 dB	48 - 68 dB	42 - 51 dB	38 - 45 dB	38 - 63 dB	32 - 46 dB	28 - 40 dB

3.3. Modal Analysis of Background Data







Day Time (07:00 to 19:00)		Evening (19:00 to 23:00)		Night Time (23:00 to 07:00)	
Standard Deviation (σ)	2.02	Standard Deviation (σ)	1.36	Standard Deviation (σ)	2.87
Geometric Average	43 dB	Geometric Average	43 dB	Geometric Average	35 dB
Modal Value	42 dB	Modal Value	41 dB	Modal Value	31 dB

4. Criterion…

4.1. National Planning Policy Framework 2019

4.1.1 Scope of Standard

The revised National Planning Policy Framework published in 2019 provides an assumption in favour of sustainable development that meets the three overarching objectives: economic, social, and environmental. Paragraph 11 provides guidance for decision makers:

> *"For decision-taking this means:…*
> *c) approving development proposals that accord with an up-to-date development plan without delay; or*
> *d) …granting permission unless…*
> *i) the application of policies in this Framework… provides a clear reason for refusing development proposed; or*
> *ii) any adverse impacts of doing so would significantly and demonstrably outweigh the benefits.''*

4.1.2 Conserving and Enhancing the Natural Environment

Paragraph 170 of the NPPF provides the following guidance on noise:

> *"Planning policies and decisions should contribute to and enhance the natural and local environment by:*
> *e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of …noise pollution…"*

4.1.3 Appropriate Development

Paragraph 180 of the NPPF requires the development to be appropriate for its location:

> *"Planning… decisions should also ensure that new development is appropriate for its location…*
> *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 quality of life [60]*
> *b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for the recreational and amenity value…*
>
> *60 See Explanatory Note to the Noise Policy Statement for England: 2010"*

4.2. Noise Policy Statement for England: 2010

4.2.1 Scope of Standard

The Noise Policy Statement for England was published in 2010 defines three aims:

> *"**Avoid** significant adverse impact on health and the quality of life.*
> ***Mitigate** and minimise adverse impacts on health and quality of life; and*
> ***Contribute** to the improvement of health and the quality of life."*

4.2.2 Criterion

The NPSE defines significant adverse and adverse impact in terms of 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."*

4.3. Night Noise Guidelines ("NNG")

The European Union and the World Health Organisation published the document *"Night Noise Guidelines for Europe"* in 2009.

4.3.1 Recommendation for Health Protection

> *"Below the level of 30 dB $L_{night,\ outside}$ no effects on sleep are observed except for a slight increase in the frequency of body movements during sleep due to night noise.*
>
> *…. 40 dB $L_{night,\ outside}$ is equivalent to the lowest observed adverse effect level (LOAEL) for night noise.*
>
> *Above 55 dB the cardiovascular effects become the major public health concern."*

For reference the $L_{night,\ outside}$ is the average outside noise level calculated over an 8-hour period (EU: 2002/49/EC).

4.3.2 Description of Effect of Change in Noise Level

Noise Level Change (dB)	Subjective Response	Significance
0.1 – 2.9	Barely perceptible	Minor Impact
3.0 – 5.9	Noticeable	Moderate Impact
6.0 – 9.9	Up to a doubling of loudness	Substantial Impact
10.0 or more	More than a doubling of loudness	Major Impact

4.4. British Standard 4142: 2014 + A1: 2019

4.4.1 Testing Standard…

British Standard 4142: 2014 + A1: 2019 provides a method for assessing the likely effects of sound from industrial or commercial nature on *"people who might be inside or outside a dwelling used for residential purposes"*.

4.4.2 Criterion

The standard provides 3-levels of impact based on the calculated Rating Levels:

> *"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 +5dB is likely to be an indication of an adverse impact, depending on the context.*
> *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."*

4.4.3 Feature Correction

It is appropriate to add a character correction where there is a new source that cannot be measured in line with British Standard 4142: 2014 + A1: 2019. The 3 methods for approaching this are the subjective, objective, and reference methods. In this report the subjective method is used.

Section 9.2 Subjective Method	Perceptibility to noise sensitive façades	Correction
Tonality Ranging from not tonal to prominently tonal	Not tonal	+0
	Just perceptible	+2
	Clearly perceptible	+4
	Highly perceptible	+6
Impulsivity Considering both the rapidity and any overall change in sound levels	Not impulsive	+0
	Just impulsive	+3
	Clearly impulsive	+6
	Highly impulsive	+9
Readily Distinctive Characteristic is neither tonal nor impulsive	Is not present	+0
	Is present	+3
Intermittency Identifiable "on/off" conditions	Is not present	+0
	Is present	+3

4.5. Local Authority Requirements

4.5.1 Local Plan

The Barnsley Metropolitan Borough Council Local Plan was fully adopted in January 2019 including Policy Poll1 entitled *"Pollution Control and Protection.''*

> *"Development will be expected to demonstrate that it is not likely to result, directly or indirectly, in an increase in…. noise, ….. vibration, light or other pollution which would unacceptably affect or cause a nuisance to the natural and built environment or to people.*
>
> *We will not allow development of new housing or other environmentally sensitive development where existing ….. noise, ….. vibration, light or other pollution levels are unacceptable and there is no reasonable prospect that these can be mitigated against.*
>
> *Developers will be expected to minimise the effects of any possible pollution and provide mitigation measures where appropriate. ''*

4.5.2 Proposed Criterion

The Local Authority will require the plant to be at least 5 dB(A) below the background noise level to comply with the Local Plan and ensure complaints are not received from the local residents. In terms of the delivery noise the noise levels should not cause a significant adverse impact and ideal be no more than 5 dB(A) above the background noise levels. Furthermore, the maximum noise levels from the delivery should not exceed L_{AMax} 60 dB.

5. Calculations of Plant Noise Levels…

5.1. ISO 9613 – Part 2:1996

The International Standards Organisation ("ISO") published ISO 9613 – Part 2: 1996 entitled *"Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculations"* details the corrections that are required to establish the resultant noise levels of the existing and proposed plant at the assessment position.

5.1.1 Source Directivity (D_c)

A correction is made to account for the location of the source and the effect of additional reflective surfaces excluding the ground and is contained within section 6 of ISO 9613 - Part 2:1996.

Number of Surfaces	Correction in dB (D_c)
1 Reflective Surface	+3 dB
2 Reflective Surfaces	+6 dB
3 Reflective Surfaces	+9 dB

5.1.2 Geometric Divergence (A_{div})

A correction is made for the distance between the source and assessment position using the following formula defined in section 7.1 of ISO 9613-Part 2:1996.

Formula	Symbols
$A_{div} = 20 . Log_{10} (d/d_0) +11$	A_{div} = Reduction due to Geometric Divergence (dB) d = Distance from source to receiver (m) d_0 = reference distance (1m)

5.1.3 Ground Absorption (A_{gr})

A correction is made for the effect of the ground between the source and receiver depending on whether it is considered hard or soft ground.

Type of ground	Correction in dB (A_{gr})
Hard Ground	+ 3 dB
Soft Ground	+ 0 dB

5.1.4 Atmospheric Absorption (A_{atm})

As the source was less than 100m from the receiver position (assessment position) no correction was made for atmospheric absorption.

5.1.5 Barrier Effect (A_{bar})

A correction is made for any barrier in the direct line of sight between the source and the assessment position and is detailed in section 7.4 of ISO 9613-Part 2:1996. For clarity, the K_{met} meteorological correction has been ignored and C_2 equals 40 and C_3 equals 1.

Formula	Symbols
$A_{bar} = 10 . Log_{10} [3 + (40 . \delta / \lambda) - A_g]$ *Note 1 where $\delta = a + b - r$ and $\lambda = c / f$	A_{bar} = Effective barrier attenuation (dB) A_{gr} = Total Ground Absorption (dB) *Note 1: Only apply the A_{gr} correction if $A_{gr} > 0$ δ = Path difference (m) a = Distance from source to barrier head (m) b = Distance from barrier head to assessment position (m) r = Distance from source to assessment position (m) λ = Wavelength of sound (m) c = Speed of sound – Assumed to be 342 ms^{-1} f = Octave band centre frequency (Hz)

5.2. Calculation of Plant Noise Levels

5.2.1 Day Time (07:00 to 23:00)

Day Time (07:00 to 19:00)		Source	ISO 9613 – Part 2: 1996 Corrections					Assessment
Ref	Description	L_w	D_c	A_{div}	A_{gr}	A_{atm}	A_{bar}	Lp
1	Packaged Gas Cooler Eco Pack	62 dB	+6 dB	-36 dB	+3 dB	-0 dB	-9 dB	26 dB
2	Daikin AZAS 140 AC Heat Pump (Low Noise Card)	54 dB	+9 dB	-36 dB	+3 dB	-0 dB	-9 dB	21 dB
3	Daikin AZAS 140 AC Heat Pump (Low Noise Card)	54 dB	+9 dB	-36 dB	+3 dB	-0 dB	-9 dB	21 dB
4	Daikin AZAS 140 AC Heat Pump (Low Noise Card)	54 dB	+9 dB	-36 dB	+3 dB	-0 dB	-9 dB	21 dB
TOT	Total Noise Levels	64 dB	-35 dB					29 dB

5.2.2 Night Time (23:00 to 07:00)

Night Time (23:00 to 07:00)		Source	ISO 9613 – Part 2: 1996 Corrections					Assessment
Ref	Description	L_w	D_c	A_{div}	A_{gr}	A_{atm}	A_{bar}	Lp
1	Packaged Gas Cooler Eco Pack	57 dB	+6 dB	-36 dB	+3 dB	-0 dB	-9 dB	21 dB
TOT	Total Noise Levels	57 dB	-36 dB					21 dB

5.3. Assessment of Average Plant Noise Levels (BS 4142: 2014 + A1: 2019)

The following assessment is based on the current version of British Standard 4142: 2014 + A1: 2019 to determine the impact of the proposed packaged CO2 gas cooler and the three air conditioning heat pumps all located at the rear of the proposed Tesco Express Store.

BS 4142: 2014	Day Time - 07:00 to 19:00	Evening – 19:00 to 23:00	Night Time – 23:00 to 07:00
Residual Noise Levels	$L_{Aeq,1\ hours}$ 46 dB	$L_{Aeq,1\ hours}$ 45 dB	$L_{Aeq,15\ minutes}$ 40 dB
Specific Noise Levels	$L_{Aeq,1\ hours}$ 44 dB	$L_{Aeq,1\ hours}$ 44 dB	$L_{Aeq,\ 15\ minutes}$ 44 dB
Impulsivity Feature	+0 dB	+0 dB	+0 dB
Tonality Feature	+0 dB	+0 dB	+0 dB
Rating Noise Levels	$L_{Aeq,1\ hours}$ 29 dB	$L_{Aeq,1\ hours}$ 27 dB	$L_{Aeq,\ 15\ minutes}$ 21 dB
Background Noise Levels	$L_{A90,1\ hours}$ 42 dB	$L_{A90,1\ hours}$ 41 dB	$L_{A90,\ 15\ minutes}$ 31 dB
BS 4142 Assessment	-13 dB	-14 dB (Low Impact)	-10 dB (Low Impact)
Uncertainty (95% Confidence, k=2)	+- 1.80 dB	+- 1.74 dB	+- 1.89 dB

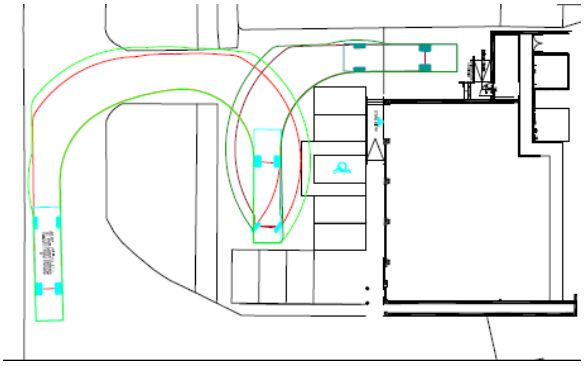
6. Calculation of Delivery Noise Levels…

6.1. Calculation Methodology

A delivery was undertaken at a vacant site using a rigid 14m lorry to establish the noise emissions from the individual events that make up a typical delivery. The results were then used to create a noise map of the delivery and establish sources that could be used to assess the delivery at the proposed site. The overall delivery took 30 minutes.

6.1.1 Measurement of Truck Arriving / Departing





6.1.2 Measurement of Delivery Events





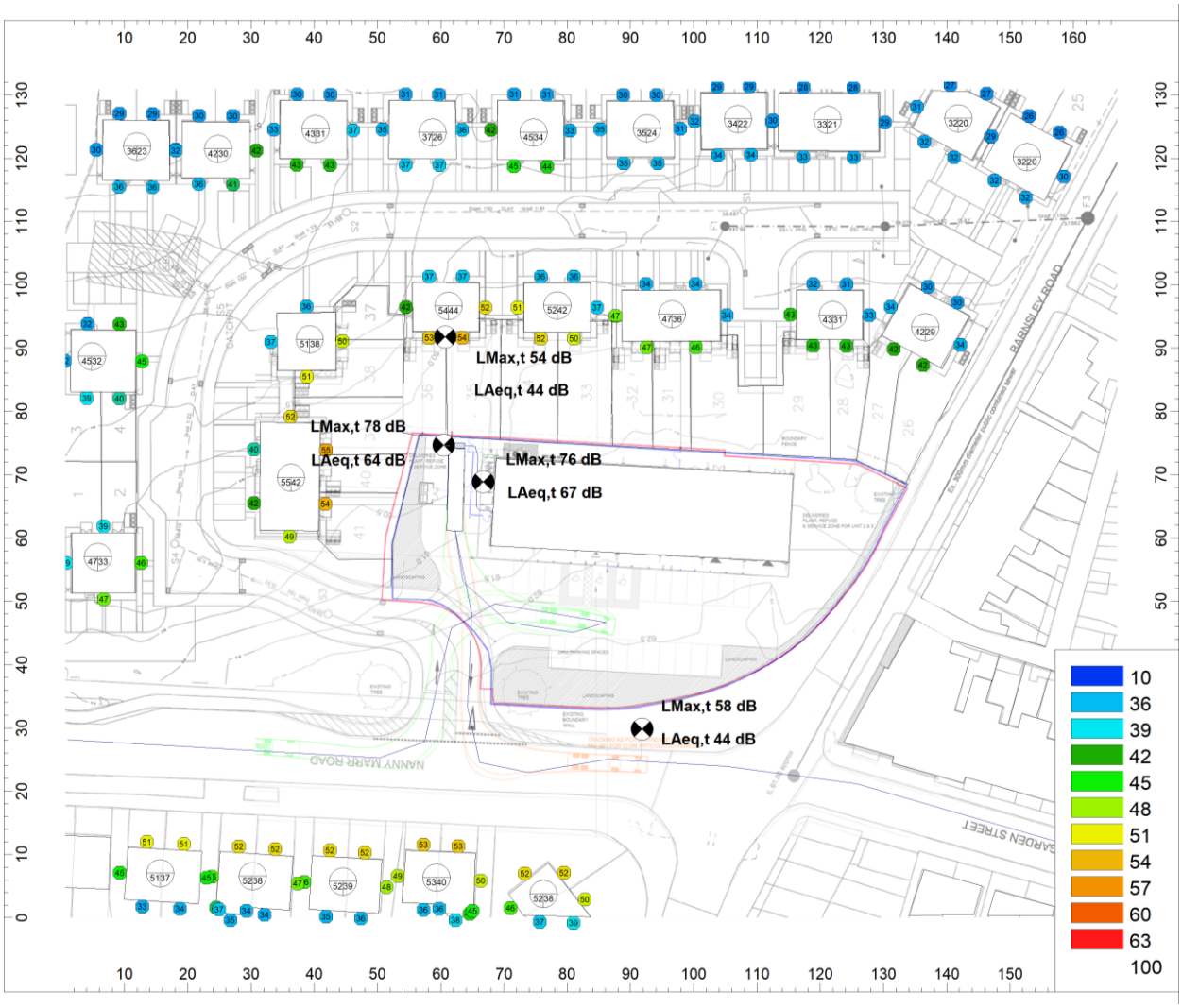
6.1.3 Individual Delivery Events

Delivery Event	Duration of Single Event	$L_{Aeq\ 30\ minutes}$ (Average Level)	$L_{Amax,\ t}$ (Maximum Level)
Truck Arriving and Departing @ 5m	168 Seconds	44 dB	58 dB
Operation of Tail Lift @ 1m	43 seconds	65 dB	76 dB
Operation of Rear Roller Shutter @ 1m	12 seconds	69 dB	73 dB
Movement of Roll Cage on Lorry @1m	34 seconds	64 dB	71 dB
Dropping Tail Flap onto Pavement @1m	3 seconds	68 dB	78 dB
Movement of Roll Cage on Pavement @1m	56 seconds	67 dB	76 dB

6.2. 3D Noise Maps of Delivery

Using the measurements undertaken at a similar site and the standard data within the Cadna A Noise Mapping platform the following noise map was created to predict the maximum and average noise levels at all the surrounding residential dwellings as a result of a 30-minute delivery with the activities described in section 6.1.3. above taking place.

6.2.1 3D Noise Map



6.2.2 Discussion of Results

The noise map has been created assuming the boundary fence running along the back of the Tesco Express and up the side of the yard is 2.4m high and constructed from solid timber.

The results indicate that a continuous delivery will result in the following noise levels.

- Maximum Noise Levels: $L_{Max,\ 30\ minutes}$ 54 dB Movement of Roll Cages.
- Average Noise Levels: $L_{Aeq,\ 30\ minutes}$ 44 dB Complete Delivery.

6.3. Assessment of Average Delivery Noise Levels (BS 4142: 2014 + A1: 2019)

The following assessment is based on the current version of British Standard 4142: 2014 + A1: 2019 to determine the impact of the proposed deliveries on the most sensitive residential dwellings.

BS 4142: 2014	Day Time - 07:00 to 19:00	Evening – 19:00 to 23:00	Night Time – 23:00 to 07:00
Residual Noise Levels	$L_{Aeq,1\ hours}$ 46 dB	$L_{Aeq,1\ hours}$ 45 dB	$L_{Aeq,15\ minutes}$ 40 dB
Specific Noise Levels	$L_{Aeq,1\ hours}$ 44 dB	$L_{Aeq,1\ hours}$ 44dB	$L_{Aeq,\ 15\ minutes}$ 44 dB
Impulsivity Feature	+3 dB	+6 dB	+9 dB
Tonality Feature	+0 dB	+0 dB	+0 dB
Rating Noise Levels	$L_{Aeq,1\ hours}$ 47 dB	$L_{Aeq,1\ hours}$ 50 dB	$L_{Aeq,\ 15\ minutes}$ 53 dB
Background Noise Levels	$L_{A90,1\ hours}$ 42 dB	$L_{A90,1\ hours}$ 41 dB	$L_{A90,\ 15\ minutes}$ 31 dB
BS 4142 Assessment	+5 dB	-9 dB	+22 dB
Uncertainty (95% Confidence, k=2)	+- 1.80 dB	+- 1.74 dB	+- 1.89 dB

6.4. Conclusions

The above assessment indicates that delivering to the Tesco Express store between 07:00 and 19:00 hours 7-days per week will not result in a significant adverse impact on the local residents. The above is based on the large deliveries to the site. It should be possible for deliveries of newspapers, milk and bread to be undertaken outside of these times in smaller transit size vehicles without disturbing the residents.

7. Conclusions…

7.1. Plant Noise

7.1.1 Assessment Position

The residential dwellings at the rear of the store are located 17 m from the dedicated plant area at the rear of the store. The deliveries to the side of the store have the potential to impact the residents at the front, rear and side of the store.

7.1.2 Background Noise Measurements

Day Time (07:00 – 19:00)			Evening (19:00 – 23:00)			Night Time (23:00 – 07:00)		
$L_{Amax,1h}$	$L_{Aeq,1h}$	$L_{A90,1h}$	$L_{Amax,1h}$	$L_{Aeq,1h}$	$L_{A90,1h}$	$L_{Amax,15m}$	$L_{Aeq,15m}$	$L_{A90,15m}$
46 - 83 dB	42 - 62 dB	39 - 45 dB	48 - 68 dB	42 - 51 dB	38 - 45 dB	38 - 63 dB	32 - 46 dB	28 - 40 dB
Modal Background		42 dB	Modal Background		41 dB	Modal Background		31 dB

7.1.3 Criterion at Assessment Position

To comply with the revised version of the National Planning Policy Framework ("NPPF") and the guidance within the Local Plan, the resultant noise levels at the nearest residential dwellings are at least -5 dB below the underlying background noise levels when assessed in accordance with British Standard 4142: 2014 + A1: 2019.

7.1.4 Mitigation Measures

It will be necessary to install a 2.4m high solid timber fence along the rear and side façade of the Tesco unit.

7.1.5 Assessment of Plant Noise Levels

Day Time (07:00 – 19:00)			Evening (19:00 – 23:00)			Night Time (23:00 – 07:00)		
$L_{Aeq,1h}$	$L_{A90,1h}$	BS4142	$L_{Aeq,1h}$	$L_{A90,1h}$	BS4142	$L_{Aeq,1h}$	$L_{A90,1h}$	BS4142
29 dB	42 dB	-13 dB	27 dB	41 dB	-14 dB	21 dB	31 dB	-10 dB

7.1.6 Conclusions

The resultant noise levels from the proposed mechanical equipment will result in noise levels that comply in full with the Local Plan and are at levels that are very unlikely to give rise to complaints from residents.

7.2. Delivery Noise

The above assessment indicates that delivering to the Tesco Express store between 07:00 and 19:00 hours 7-days per week will not result in a significant adverse impact on the local residents. The above is based on the large deliveries to the site. It should be possible for deliveries of newspapers, milk and bread to be undertaken outside of these times in smaller transit size vehicles without disturbing the residents.

8. Appendix A - BS 4142:2014 + A1: 2019 Information to Be Reported…

8.1. a) Competency

	Name	Role	Competency
1)	Mr. R. Scrivener	Director	Master of Science Degree in Acoustics and Noise Control (MSc) Member of the Institute of Acoustics (MIOA)

8.2. b) Source Under Investigation

	Source Number	Description		
1)	Source 1	Packaged Gas Cooler Eco Pack		
	Source 2	Daikin AZAS 140 AC Heat Pump (Low Noise Card)		
	Source 3	Daikin AZAS 140 AC Heat Pump (Low Noise Card)		
	Source 4	Daikin AZAS 140 AC Heat Pump (Low Noise Card)		
	Source 5	Deliveries to the side of the store		
2) 3) 4) 5)	Description of Source	Source Location	Hours of Operation	Mode of Operation
	Source 1	Dedicated plant area at the rear of the store	24-hour	Continuously on Demand
	Source 2		07:00 - 23:00	
	Source 3		07:00 - 23:00	
	Source 4		07:00 - 23:00	
	Source 5	Side of the Store	07:00 – 19:00	Delivery Window
	Description of Operation	Period	Conditions	Load
	All Sources	Day Time (07:00 to 19:00)	Ambient Temp 32°C	Maximum Load (100%)
		Evening (19:00 to 23:00)	Ambient Temp 28°C	Part Load (60%)
		Night Time (23:00 to 07:00)	Ambient Temp 24°C	Part Load (40%)
	Description of Premises	3 new retail units are to be located in a small parade with a shared dedicated car park at the junction of Nanny Marr Road and Barnsley Road. There is a dedicated plant area at the rear of the store and the nearest residential dwellings are around 17m away at the rear of the site.		

8.3. c) Subjective Impression of Source at Assessment Position

1)	Dominance	Source will not be dominant at residential facade
	Audibility	Source will not be audible at residential facade
2)	Residual Noise Sources	Residual noise due to local road traffic

8.4. d) Existing Contexts

	Type of Receptor	Period	Sensitivity	Description
1)	Residential	Day Time (07:00 to 19:00)	Low	Noise can disturb outside amenity space and internal living space
		Evening (19:00 to 23:00)	Moderate	Noise can interrupt people trying to get to sleep
		Night Time (23:00 to 07:00)	High	Noise can disturb sleeping

8.5. e) Relative Positions

1)	Assessment Position	Residential dwellings at the rear of the store		
		BS 4142:2014 Criteria	Details	Compliance with Criteria
		Section 6	1.0m from façade (external)	Position is valid
2)	Source Measurement	The source sound power levels were supplied by the client. It is believed the sound power levels were established in accordance with BS EN 13487:2003.		
	Justification	The client supplied the noise levels for the proposed plant.		
3)	Background Position	Adjacent to the rear of plot 27 adjacent to Barnsley Road		
	Justification	BS 4142:2014 Criteria	Details	Compliance with Criteria
		Section 6.2	3.5m to any reflecting surface	Complies
		Section 6.2	Height 1.2m to 1.5m	Complies
		Section 6.2	1st floor 1m to facade	Not applicable
		Section 6.2	Measurement Height	3.5m
			Distance to Reflecting Surface	1.0m
		To record remote background levels, the noise meter had to be left in a secure position. The position represented the assessment position within the constraints of the site.		
4)	Topography, surfaces etc.	Hard and Flat		
5)	Relative Distances	The plant is located approximately 17.0 m from the assessment position.		
6)	Dimensioned sketch	See maps and images.		

8.6. f) Noise Measurement Equipment Calibration

1)	Type	Sound Level Meter	Microphone	Calibrator
		KRE/05 - CEL 633.C1	KRE/05 - CEL 251	KRE/05 - CEL 120/1
2)	Manufacturer	Casella	Casella	Casella
3)	Serial Number	2145360	00709	5231047
4)	Certificate Number	Certificate: U36894	Certificate: U36894	Certificate: U36892
	Calibration Date=	27th January 2021	27th January 2021	27th January 2021

8.7. g) Noise Measurement Equipment Operation Test

1)	Ref. Level of Calibrator	94 dB
2)	Meter Reading Before	94 dB – Meter operation checked. Meter in good working order.
	Meter Reading After	94 dB - Meter operation checked. Meter in good working order.

8.8. h) Weather Conditions

1)	Wind Speed	See weather information
	Wind Direction	
2)	Temperature Inversion	Unlikely to have occurred
3)	Precipitation	None – See Appendix B
4)	Fog	None
5)	Wet Ground	Not within the measurement period – See Appendix B
6)	Frozen Ground or Snow	Not within the measurement period – See Appendix B
7)	Temperature	See Appendix B
8)	Cloud Cover	Partly Cloudy

8.9. i) Date of Measurements

1)	Source Measurements	Unknown
	Background Measurements	01/03/2021

8.10. j) Measurement Time Interval

1)	Source Measurements	T_m = 15 minutes	
	Background Measurements	Day Time (07:00 to 19:00)	T_m = 12 hours
		Evening (19:00 to 23:00)	T_m = 4 hours
		Night Time (23:00 to 07:00)	T_m = 8 hours

8.11. k) Reference Time Interval

1)	Reference Time Interval	Day Time (07:00 to 19:00)	T_r = 1 hour
		Evening (19:00 to 23:00)	T_r = 1 hour
		Night Time (23:00 to 07:00)	T_r = 15 minutes

8.12. l) Specific Noise / m) Background Noise / n) Rating / o) Assessment / p) Conclusions

These details are all included within the body of the report and are not replicated within this section.

END OF REPORT (1st and last page not numbered)



KR Associates (UK) Ltd

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