

KR06649

Woodgate Co-Op

Noise Impact Assessment...

Standard: British Standard 4142: 2014

Site: Woodgate Co-Op

Address: Green Hedges
Westergate Road
Woodgate

Postcode: PO20 3QL

Customer: RPM Group

Address: 13 Swan Yard
London

Postcode: N1 1SD

Issue: v1_0

Date: 5th November 2020

Status: Current Document

KR Associates (UK) Ltd

Quietly confident...



Revisions...

KR06649		Project	Woodgate Co-Op		
		Title	Noise Impact Assessment - Proposed Additional Plant		
		Standard	British Standard 4142: 2014 (amended 2019)		
Issue	Date	Details of Revision			
v1_0	05/11/2020	Description	Report issue for submission to Local Authority		
		Signature	<div></div>		
		Name	Mr. R. Scrivener	Miss N Truman	Mr R Scrivener
		Position	Technical Director	Project Manager	Technical Director

Disclaimer...

This report is strictly confidential and is designed to meet the requirements of the customer. It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party. No Liability is accepted outside the scope of this report in strict accordance with the standard terms and conditions.

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	8
2.4. Locations and Distances of Individual Source Positions.....	8
2.5. Maximum Ambient Temperature in the UK.....	9
2.5.1 Maximum Monthly Temperature	9
2.5.2 Maximum 24-hour Temperature	9
3. Background Noise Levels.....	10
3.1. 24-hour Background Measurements (26 th to 27 th March 2020)	10
3.2. Modal Analysis of Background Data.....	10
4. Criterion.....	11
4.1. National Planning Policy Framework 2019.....	11
4.1.1 Scope of Standard	11
4.1.2 Conserving and Enhancing the Natural Environment.....	11
4.1.3 Appropriate Development.....	11
4.2. Noise Policy Statement for England: 2010	11
4.2.1 Scope of Standard	11
4.2.2 Criterion	12
4.3. Night Noise Guidelines (“NNG”).....	12
4.3.1 Recommendation for Health Protection	12
4.3.2 Description of Effect of Change in Noise Level	12
4.4. British Standard 4142: 2014.....	12
4.4.1 Testing Standard.....	12
4.4.2 Criterion	13
4.4.3 British Standard 4142: 2014 Feature Correction	13
4.5. Local Authority Requirements.....	14
4.5.1 Local Plan	14
4.5.2 Proposed Criterion.....	14

5. Calculations of Noise Levels...	15
5.1. ISO 9613 – Part 2:1996	15
5.1.1 Source Directivity (D_c)	15
5.1.2 Geometric Divergence (A_{div})	15
5.1.3 Ground Absorption (A_{gr})	15
5.1.4 Atmospheric Absorption (A_{atm})	15
5.1.5 Barrier Effect (A_{bar})	16
5.2. British Standard 4142: 2014 (Amended 2019) Feature Correction	16
5.3. Calculation of Plant Noise Levels	17
5.3.1 Day Time (07:00 to 19:00)	17
5.3.2 Evening (19:00 to 23:00)	17
5.3.3 Night Time (23:00 to 07:00)	17
6. Assessment of Noise Levels	18
6.1. Night Noise Guidelines	18
6.2. Assessment of Average Noise Levels (BS 4142: 2014)	18
7. Conclusions	19
7.1. Assessment Position	19
7.1.1 Background Noise Measurements	19
7.1.2 Criterion at Assessment Position	19
7.2. Mitigation Measures	19
7.3. Assessment of Noise Levels	19
7.4. Conclusions	19
7.5. Uncertainty	19
8. Appendix A - BS 4142:2014 Information to Be Reported... ..	20
8.1. a) Competency	20
8.2. b) Source Under Investigation	20
8.3. c) Subjective Impression of Source at Assessment Position	20
8.4. d) Existing Contexts	21
8.5. e) Relative Positions	21
8.6. f) Noise Measurement Equipment Calibration	22
8.7. g) Noise Measurement Equipment Operation Test	22
8.8. h) Weather Conditions	22
8.9. i) Date of Measurements	22
8.10. j) Measurement Time Interval	23
8.11. k) Reference Time Interval	23
8.12. l) Specific Noise / m) Background Noise / n) Rating / o) Assessment / p) Conclusions	23

1. Executive Summary....

1.1. Instruction

KR Associates (UK) Ltd have been instructed by RPM Group to undertake an environmental noise survey at the proposed Co-Op Store at Green Hedges, Westergate Road in Woodgate 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.

1.2. Executive Summary (Repeated at Section 7)

1.2.1 Assessment Position

The residential dwelling to the south of the site on the other side of Hook Lane is located between 18 m and 20 m from the dedicated plant area on the side of the store facing Hook Lane.

1.2.2 Background Noise Measurements

Day Time (07:00 – 19:00)			Evening (19:00 – 23:00)			Night Time (23:00 – 07:00)		
L _{Amx,1h}	L _{Aeq,1h}	L _{A90,1h}	L _{Amx,1h}	L _{Aeq,1h}	L _{A90,1h}	L _{Amx,15m}	L _{Aeq,15m}	L _{A90,15m}
56 - 86 dB	48 - 62 dB	41 - 54 dB	54 - 83 dB	43 - 65 dB	36 - 49 dB	54 - 87 dB	37 - 70 dB	30 - 47 dB
Modal Background		44 dB	Modal Background		38 dB	Modal Background		34 dB

1.2.3 Criterion at Assessment Position

It would be recommended that to comply with the revised version of the National Planning Policy Framework (“NPPF”) and the guidance within the Local Plan that 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 (amended 2019).

1.2.4 Mitigation Measures

No specific mitigation measures will be required at this site as the refrigeration and air conditioning equipment has been selected to meet the specific Local Authority criterion.

1.2.5 Assessment of Noise Levels

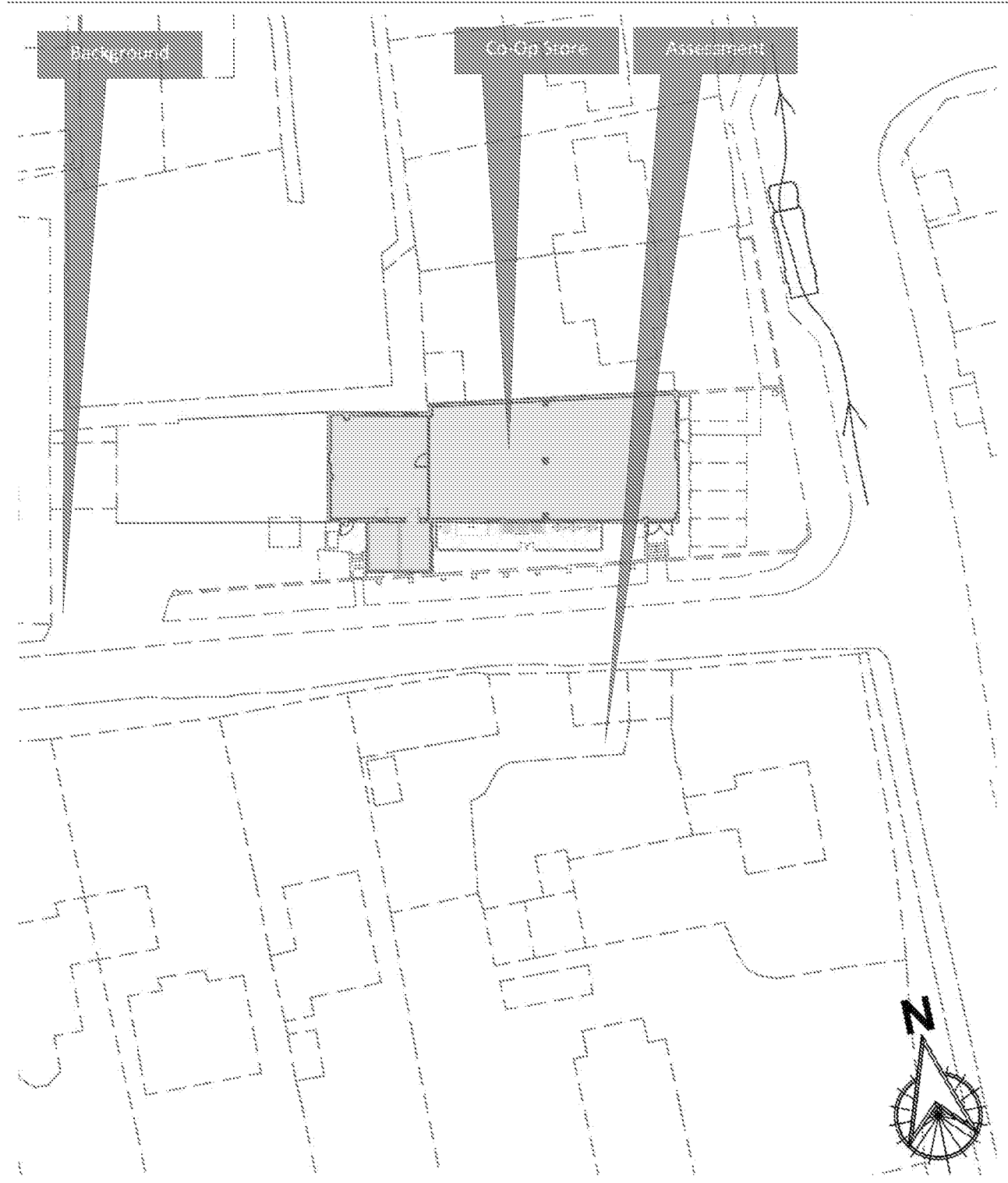
Day Time (07:00 – 19:00)			Evening (19:00 – 23:00)			Night Time (23:00 – 07:00)		
L _{Aeq,1h}	L _{A90,1h}	BS4142	L _{Aeq,1h}	L _{A90,1h}	BS4142	L _{Aeq,1h}	L _{A90,1h}	BS4142
35 dB	44 dB	-9 dB	33 dB	38 dB	-5 dB	29 dB	34 dB	-5 dB

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 a level that is very unlikely to give rise to complaints from residents.

2. Site Location...

2.1. General Location of Site



Site Plan (Imagery © Google 2019)

It is proposed to convert the existing retail unit facing onto Westergate Road at the junction of Hook Road in Woodgate into a Co-Op Convenience store. The plant area is located at the side of the store facing Hook Lane with the nearest noise sensitive property on the other side of Hook Lane.

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	Space Engineering ST-3A Pack	L _{p(10)} 30 dB	L _{p(10)} 30 dB	L _{p(10)} 30 dB
Source 2	Kelvion GF-SA103 Gas Cooler	L _{p(10)} 24 dB	L _{p(10)} 24 dB	L _{p(10)} 24 dB
Source 3	3 No PUZ AM 140 AC Units	L _{p(10)} 37 dB	L _{p(10)} 34 dB	L _{p(10)} 0 dB
Source 4	Hubbard Low Noise Condensing Unit	L _{p(10)} 23 dB	L _{p(10)} 23 dB	L _{p(10)} 18 dB
Combined Sound Pressure Level at 10m (1 Reflective Surface)		L _{p(10)} 38 dB	L _{p(10)} 36 dB	L _{p(10)} 31 dB

2.4. Locations and Distances of Individual Source Positions

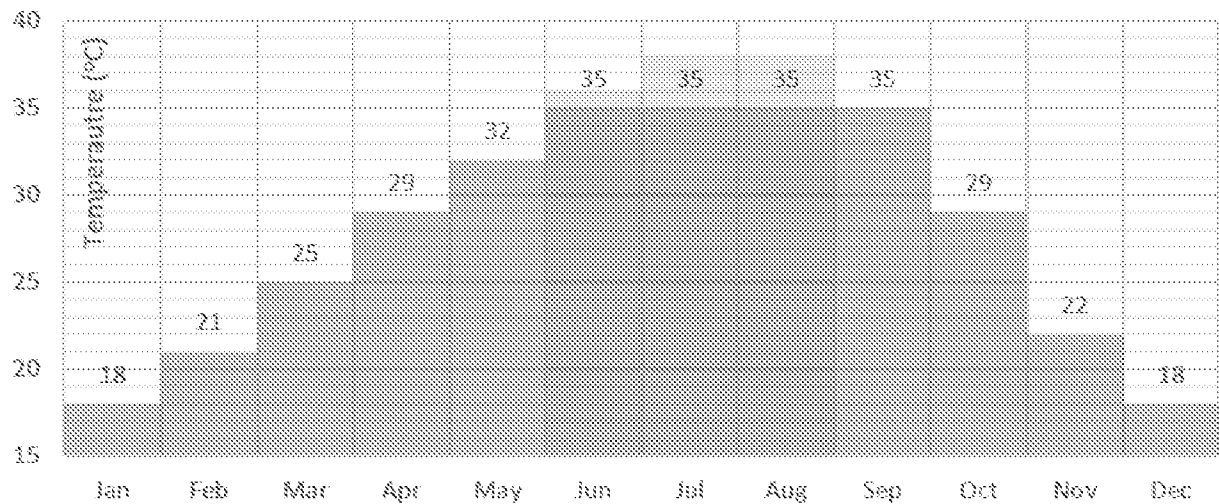
Position	Relative Distance	Latitude	Longitude	Elevation
Source 1	18 m to assessment position	50.831476 ⁰	-0.670029 ⁰	1 m
Source 2	18 m to assessment position	50.831467 ⁰	-0.669968 ⁰	2 m
Source 3	20 m to assessment position	50.831461 ⁰	-0.669905 ⁰	1 m
Source 4	19 m to assessment position	50.831481 ⁰	-0.670060 ⁰	1 m

2.5. Maximum Ambient Temperature in the UK

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

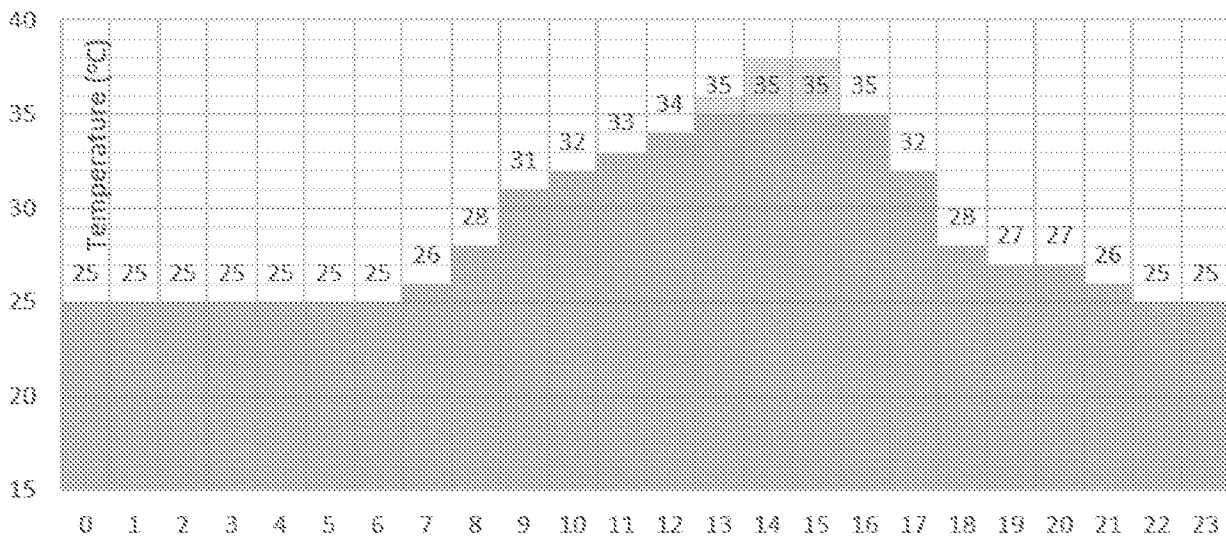
2.5.1 Maximum Monthly Temperature

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



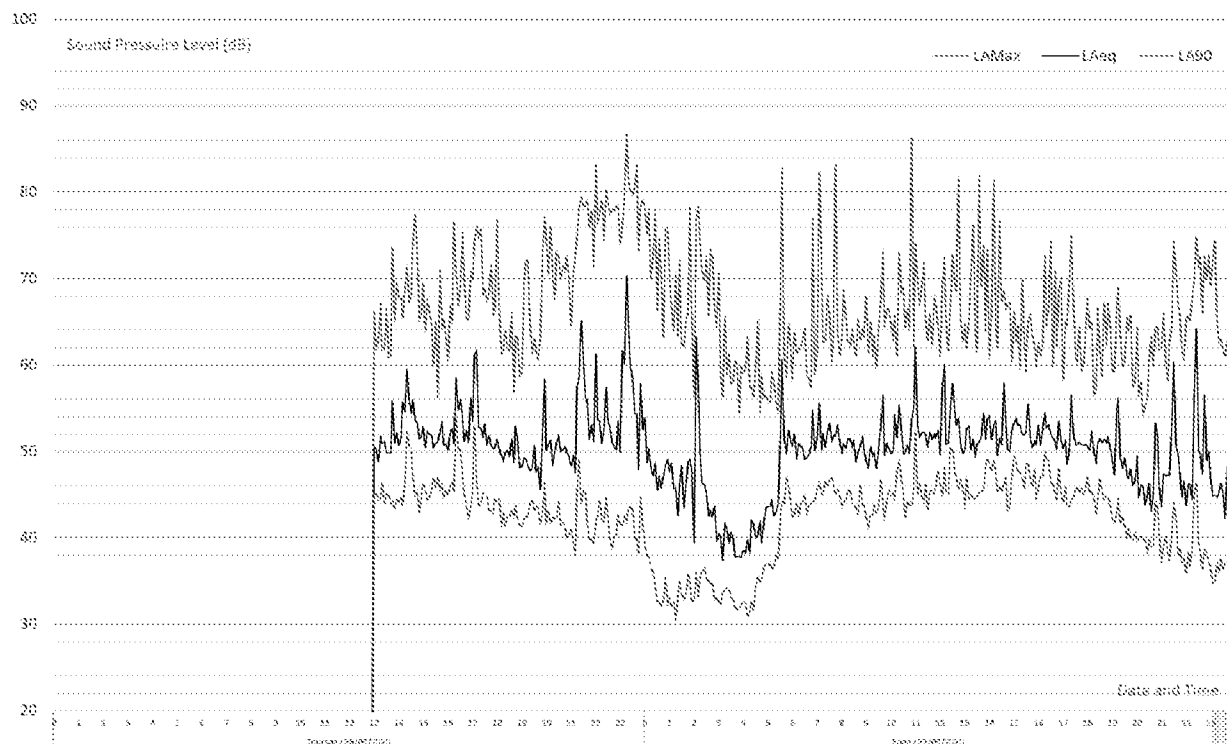
2.5.2 Maximum 24-hour Temperature

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



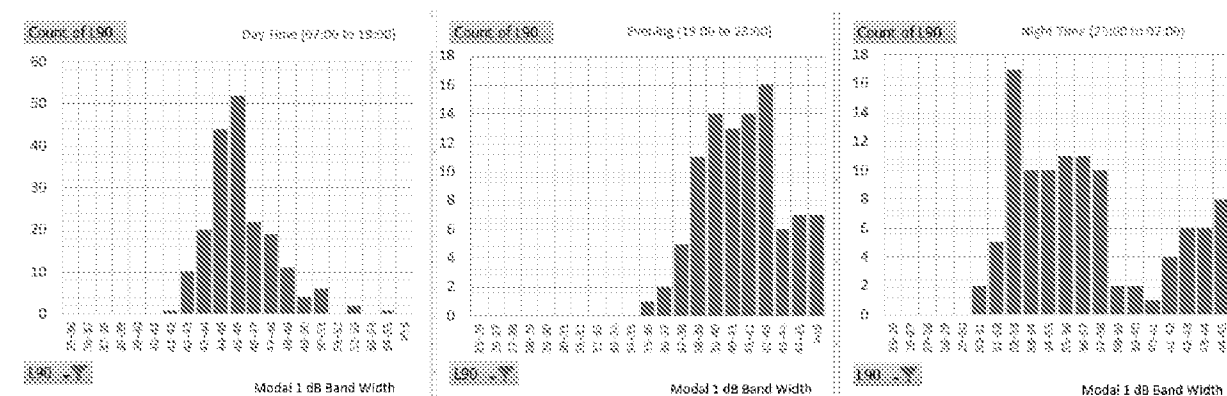
3. Background Noise Levels...

3.1. 24-hour Background Measurements (26th to 27th March 2020)



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}
56 - 86 dB	48 - 62 dB	41 - 54 dB	54 - 83 dB	43 - 65 dB	36 - 49 dB	54 - 87 dB	37 - 70 dB	30 - 47 dB

3.2. 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)	2.13	Standard Deviation (σ)	2.50	Standard Deviation (σ)	4.32
Geometric Average	46 dB	Geometric Average	41 dB	Geometric Average	37 dB
Modal Value	44 dB	Modal Value	38 dB	Modal Value	34 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 means:...

c) approving development proposals that accord with an up-to-date development without delay; or

d) ...granting planning permission...

i) the application of polices in this Framework... provides a clear reason for refusing development proposal; 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 impact 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 over 8 hour calculated over a year (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...

4.4.1 Testing Standard...

British Standard 4142: 2014 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 British Standard 4142: 2014 Feature Correction

It is appropriate to add a character correction where there is a new source that cannot be measured in line with BS4142:2014. 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 Arun Local Plan was fully adopted in July 2018 including Policy QE DM11 entitled “Noise Pollution.”

“...2. New noise generating development

Developers proposing new noise generating development must seek advice from an early stage to determine the level of noise assessment required. Proposals will need to be supported by:

A noise report which provides accurate information about the existing noise environment, and the likely impact of the proposed development upon the noise environment. The report must also demonstrate that the development meets appropriate national and local standards for noise, as set out in Annex 1 of the Planning Noise Advice Document: Sussex...”

4.5.2 Proposed Criterion

The Local Authority will require the plant to be at least 10 dB(A) below the background noise level to comply with the Local Plan and ensure complaints are not received from the residents.

5. Calculations of 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” which 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_s)

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_s)
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
$A_{div} = 20 \cdot \log_{10} (d/d_0) + 11$	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_g)

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

5.2. British Standard 4142: 2014 (Amended 2019) Feature Correction

It is appropriate to add a feature correction where there is a new source that cannot be measured in line with BS4142:2014. 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
<p>Tonality</p> <p>Ranging from not tonal to prominently tonal</p>	Not tonal	+0
	Just perceptible	+2
	Clearly perceptible	+4
	Highly perceptible	+6
<p>Impulsivity</p> <p>Considering both the rapidity and any overall change in sound levels</p>	Not impulsive	+0
	Just impulsive	+3
	Clearly impulsive	+6
	Highly impulsive	+9
<p>Readily Distinctive</p> <p>Characteristic is neither tonal nor impulsive</p>	Is not present	+0
	Is present	+3
<p>Intermittency</p> <p>Identifiable “on/off” conditions</p>	Is not present	+0
	Is present	+3

5.3. Calculation of Plant Noise Levels

5.3.1 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}	L _p
1	Space Engineering ST-3A Pack	58 dB	+3 dB	-36 dB	+3 dB	-0 dB	0 dB	28 dB
2	Kelvion GF-SA103 Gas Cooler	52 dB	+3 dB	-36 dB	+3 dB	-0 dB	0 dB	22 dB
3	3 No PUZ AM 140 AC Units	65 dB	+3 dB	-37 dB	+3 dB	-0 dB	0 dB	34 dB
4	Hubbard Low Noise Condensing Unit	51 dB	+3 dB	-37 dB	+3 dB	-0 dB	0 dB	21 dB
TOT	Total Noise Levels	66 dB	-31 dB					35 dB

5.3.2 Evening (19:00 to 23:00)

		Source	ISO 9613 – Part 2: 1996 Corrections					Assessment
Ref	Description	L _w	D _c	A _{div}	A _{gr}	A _{atm}	A _{bar}	L _p
1	Space Engineering ST-3A Pack	58 dB	+3 dB	-36 dB	+3 dB	-0 dB	0 dB	28 dB
2	Kelvion GF-SA103 Gas Cooler	52 dB	+3 dB	-36 dB	+3 dB	-0 dB	0 dB	22 dB
3	3 No PUZ AM 140 AC Units	62 dB	+3 dB	-37 dB	+3 dB	-0 dB	0 dB	31 dB
4	Hubbard Low Noise Condensing Unit	51 dB	+3 dB	-37 dB	+3 dB	-0 dB	0 dB	21 dB
TOT	Total Noise Levels	64 dB	-31 dB					33 dB

5.3.3 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}	L _p
1	Space Engineering ST-3A Pack	58 dB	+3 dB	-36 dB	+3 dB	-0 dB	0 dB	28 dB
2	Kelvion GF-SA103 Gas Cooler	52 dB	+3 dB	-36 dB	+3 dB	-0 dB	0 dB	22 dB
3	3 No PUZ AM 140 AC Units	Not Operating						
4	Hubbard Low Noise Condensing Unit	46 dB	+3 dB	-37 dB	+3 dB	-0 dB	0 dB	16 dB
5	0	28 dB	+3 dB	-115 dB	+3 dB	-0 dB	-25 dB	-106 dB
TOT	Total Noise Levels	59 dB	-30 dB					29 dB

6. Assessment of Noise Levels...

6.1. Night Noise Guidelines

Night Noise Guidelines	Day Time - 07:00 to 19:00	Evening -- 19:00 to 23:00	Night Time -- 23:00 to 07:00
Specific Sound	L _{Aeq,1 hour} 35 dB	L _{Aeq,1 hours} 33 dB	L _{Aeq,15 minutes} 29 dB
NPPF -- Improve Quality of Life	Less than L _{Aeq,1 hour} 40 dB	Less than L _{Aeq,1 hour} 40 dB	Less than L _{Aeq,1 hour} 40 dB
NPPF -- Paragraph 123	Complies	Complies	Complies

6.2. Assessment of Average Noise Levels (BS 4142: 2014)

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} 52 dB	L _{Aeq,1 hours} 50 dB	L _{Aeq,15 minutes} 47 dB
Specific Noise Levels	L _{Aeq,1 hours} 35 dB	L _{Aeq,1 hours} 33 dB	L _{Aeq, 15 minutes} 29 dB
Impulsivity Feature	+0 dB	+0 dB	+0 dB
Tonality Feature	+0 dB	+0 dB	+0 dB
Rating Noise Levels	L _{Aeq,1 hours} 35 dB	L _{Aeq,1 hours} 33 dB	L _{Aeq, 15 minutes} 29 dB
Background Noise Levels	L _{A90,1 hours} 44 dB	L _{A90,1 hours} 38 dB	L _{A90, 15 minutes} 34 dB
BS 4142 Assessment	-9 dB	-5 dB (Low Impact)	-5 dB (Low Impact)
NPPF -- Paragraph 123	-0 dB (Low Impact)	-0 dB (Low Impact)	-0 dB (Low Impact)
Uncertainty (95% Confidence, k=2)	+ 1.81 dB	+ 1.85 dB	+ 2.03 dB

7. Conclusions...

7.1. Assessment Position

The residential dwelling to the south of the site on the other side of Hook Lane is located between 18 m and 20 m from the dedicated plant area on the side of the store facing Hook Lane.

7.1.1 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}
56 - 86 dB	48 - 62 dB	41 - 54 dB	54 - 83 dB	43 - 65 dB	36 - 49 dB	54 - 87 dB	37 - 70 dB	30 - 47 dB
Modal Background		44 dB	Modal Background		38 dB	Modal Background		34 dB

7.1.2 Criterion at Assessment Position

It would be recommended that to comply with the revised version of the National Planning Policy Framework (“NPPF”) and the guidance within the Local Plan that 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.

7.2. Mitigation Measures

No specific mitigation measures will be required at this site as the refrigeration and air conditioning equipment has been selected to meet the specific Local Authority criterion.

7.3. 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
35 dB	44 dB	-9 dB	33 dB	38 dB	-5 dB	29 dB	34 dB	-5 dB

7.4. 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 a level that is very unlikely to give rise to complaints from residents.

7.5. Uncertainty

Day Time (07:00 – 19:00)	Evening (19:00 – 23:00)	Night Time (23:00 – 07:00)
+1.81 dB (k=2, 95% Confidence)	+1.85 dB (k=2, 95% Confidence)	+2.03 dB (k=2, 95% Confidence)

8. Appendix A - BS 4142:2014 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

1)	Source Number	Description		
	Source 1	Space Engineering ST-3A Pack		
	Source 2	Kelvion GF-SA103 Gas Cooler		
	Source 3	3 No PUZ AM 140 AC Units		
	Source 4	Hubbard Low Noise Condensing Unit		
2) 3) 4) 5)	Description of Source	Source Location	Hours of Operation	Mode of Operation
	Source 1	dedicated plant area on the side of the store facing Hook Lane	24-hour	Continuously on Demand
	Source 2		24-hour	
	Source 3		07:00 - 23:00	
	Source 4		24-hour	
	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	It is proposed to convert the existing retail unit facing onto Westergate Road at the junction of Hook Road in Woodgate into a Co-Op Convenience store. The plant area is located at the side of the store facing Hook Lane with the nearest noise sensitive property on the other side of Hook Lane.		

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	to the south of the site on the other side of Hook Lane		
		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	further down Hook Lane		
	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	1 st floor 1m to facade	Not applicable
		Section 6.2	Measurement Height	3.5
			Distance to Reflecting Surface	1.0
		To record remote background levels, the noise meter had to be left in a secure position. The position represented the assessment position with the constraints of the site.		
4)	Topography, surfaces etc.	Hard and Flat		
5)	Relative Distances	The plant is located approximately 18.2 m to 19.6 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/086/01 - 633.C1	KRE/086/03 - 251	KRE/086/04 - 120/1
2)	Manufacturer	Casella	Casella	Casella
3)	Serial Number	2145356	00598	5231002
4)	Certificate Number	Certificate: U30501	Certificate: U30500	Certificate: U33740
	Calibration Date=	4th January 2020	4th January 2020	7th January 2020

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	variable
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	26/03/2020

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
Quietly confident...