Acoustic Report

Environmental Noise Impact Assessment

British Standard 4142:1997

Proposed Refrigeration and Air Conditioning Equipment

Tesco Express

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London,

NS5 2JU.

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1. INTRODUCTION.

1.1. Instruction.

KR Associates (UK) Ltd have been instructed by Tesco Stores Ltd to undertake an assessment in line with the requirements of British Standard 4142:1997 [reference 1] on the likelihood of complaints from the installation of the proposed external refrigeration and air conditioning units at new Tesco Express located at 199 - 203 Kentish Town Road, London, NS5 2JU.

1.2. Confidentiality.

This report is strictly confidential and is written without prejudice. This report may only be disseminated by the relevant departments within Tesco Stores Ltd, the appointed and approved contractors of Tesco Stores, and the relevant departments of the Local Authority with jurisdiction over the site under investigation.

1.3. Competence.

In line with the requirements of British Standard 4142:1997 [reference 1] the author of this report holds a Masters of Science Degree in Acoustics and Noise Control and has been practicing as a noise consultant for more than 5 years and holds full corporate membership of the Institute of Acoustics. It is considered by KR Associates (UK) Ltd that the internal procedures have been followed in the writing of this report and that the author has taken a reasonable duty of care. This report is submitted by KR Associates (UK) Ltd and therefore any comments or criticisms regarding the content of the report should be addressed to the company and not the individual author.

1.4. Scope of Report.

This report details the likelihood of complaints strictly in accordance with British Standard 4142 [reference 1] from the installation of the proposed refrigeration and air conditioning equipment on the noise sensitive properties within the vicinity of the specific source.

2. INFORMATION TO BE REPORTED.

2.1. Scope.

2.1.1. With reference to the guidance within section 10 of British Standard 4142 [reference 1]; the following information is reported to enable an assessment of the likelihood of complaints from the specific source under investigation. The proposed external refrigeration and air conditioning condenser units are considered to be of an industrial nature and will be located within commercial premises and within the vicinity of residential properties.

2.1.2. Background and Specific Noise Levels.

Though in this case the background noise level and the specific noise level at the assessment position are unlikely to comply with the requirements of note 1 of section 1 in British Standard 4142 [reference 1] and are therefore considered 'very low' the assessment undertaken is considered to be appropriate in this case.

2.1.3. Definitions and Symbols.

To ensure clarity and understanding details of the quantities and symbols used within the assessment are included for reference in Appendix B. These definitions are inline with the descriptions contained within section 3 of British Standard 4142 [reference 1].

2.1.4. Source.

For clarity this British Standard 4142 [reference 1] assessment is undertaken on the proposed installation of external refrigeration and air conditioning units as part of the development of the site to a Tesco Express.

2.2. Source Under Investigation.

British Standard 4142 – Section 10.a.

2.2.1. Description of Source.

Refrigeration Units

The compressor condenser units that supply the refrigeration duty for the store are to be located within an internal plant room located at the rear of the store. The system uses scroll compressors linked to individual condensers with ventilation fans. The airflow to the plant room is provided via attenuated inlet and outlet ducts.

Air Conditioning Units

It has been proposed to install 3 No small Haier Condenser located above the entrance canopy and shielded with a hit and miss fence. There are 2 No. double fan units provide air conditioning to the sales floor and 1 No. single fan unit providing cooling for the cash office.

The small Haier air conditioning unit consists of an integral compressor and condenser block and fan installed within a white housed unit. The unit is mounted on the wall with the condenser fan visible.

2.2.2. Proposed Hours of Operation.

Refrigeration Units

Due to the duty requirements of the internal cabinets and the need to keep the stock at specific temperatures 24 hours a day the proposed internal plant room will operate 24 hours a day 7 days a week. However, due to the underlying ambient temperature the unit will only operate at maximum when the ambient temperature exceeds 32°C which is only likely to occur during a few mid day periods within the summer months.

Air Conditioning Units

As the proposed Tesco Express store will not be open 24 hours per day the proposed external 3 No Haier Condenser air conditioning unit will not operate between the hours of 23:00 and 07:00.

2.2.3. Proposed Mode of Operation.

Refrigeration Units

The units operates on demand from store cabinets. The compressors are designed to provide ever increasing duty by turning on in stages. The condenser fans are controlled simultaneously from a head pressure fan speed controller. The unit will only operate under full load when the ambient temperature is above 30oC. Therefore at night the unit is unlikely under normal night time ambient temperatures likely to operate above 30% capacity.

Air Conditioning Units

The air conditioning unit only provide cooling / heating during the store opening hours therefore the units are timed not to operate between the hours of 23:00 and 07:00 hours. During the day time period the unit will cycle on and off when the internal cassette units demands a refrigeration load and should only operate continuously in very high or low ambient conditions.

2.2.4. Description of Premises.

Building

The store is located within a four storey end of terrace building constructed mainly from brick under a flat roof. The plant area is likely to be located internally within the building.

Local Area

The area surrounding the store is mainly retail with some residential properties and is located within the centre of Kentish Town. There are other retail units at the front of the store with retail properties to the side and a dedicated service yard to the rear. There are residential properties above the store.

Noise Sensitive Properties

The nearest residential properties to the proposed source position are located over the rear of the store.

2.3. Subjective Impressions.

British Standard 4142 – Section 10.b.

2.3.1. Dominance or Audibility.

From the experience gained on previous sites the noise emissions from the installation of the internal plant room will be perceivable at the assessment position but not audible or distinct. Due to the operational nature of the proposed refrigeration and air conditioning units and the likelihood that full design ambient temperatures of 32oC will not be reached between 23:00 and 07:00 hours, it is unlikely that the units will ever be the dominate source at the assessment position.

2.3.2. Main Sources of Residual Noise.

The residual noise levels were influenced mainly by a combination of local and distant traffic in the vicinity of the site. After approximately 02:00 the residual noise levels were effected by distant traffic noise.

2.4. Measurement Location.

British Standard 4142 – Section 10.c.

2.4.1. Location, Topography.

Position 1.

Noise levels were recorded at the rear of the store in order to ascertain the underlying background noise level at the assessment position.

Assessment Position.

The assessment position is located 1m from the residential property located generally at the rear of the store.. The ground between the proposed source location and the assessment position is mainly concrete.. There is not likely to be a direct line of site between the assessment position and the proposed specific source location.

2.4.2. Measurements.

Noise levels were recorded at position 1 using the equipment detailed in section 2.4. mounted on a standard tripod such that the microphone top was 1.35m above the average ground level complying with the requirements of Note 1 in section 5.3 of British Standard 4142 [reference 1].

2.4.3. Precautions Against Interference.

Wind over the Microphone.

The measurements described within section 2.7.1. indicated that there was unlikely to be interference from wind passing over the diaphragm of the instruments microphone.

Heavy Rain.

The measurements described within section 2.7.3. indicated that there was unlikely to be interference from heavy rain falling on the microphone windshield or surrounding surfaces.

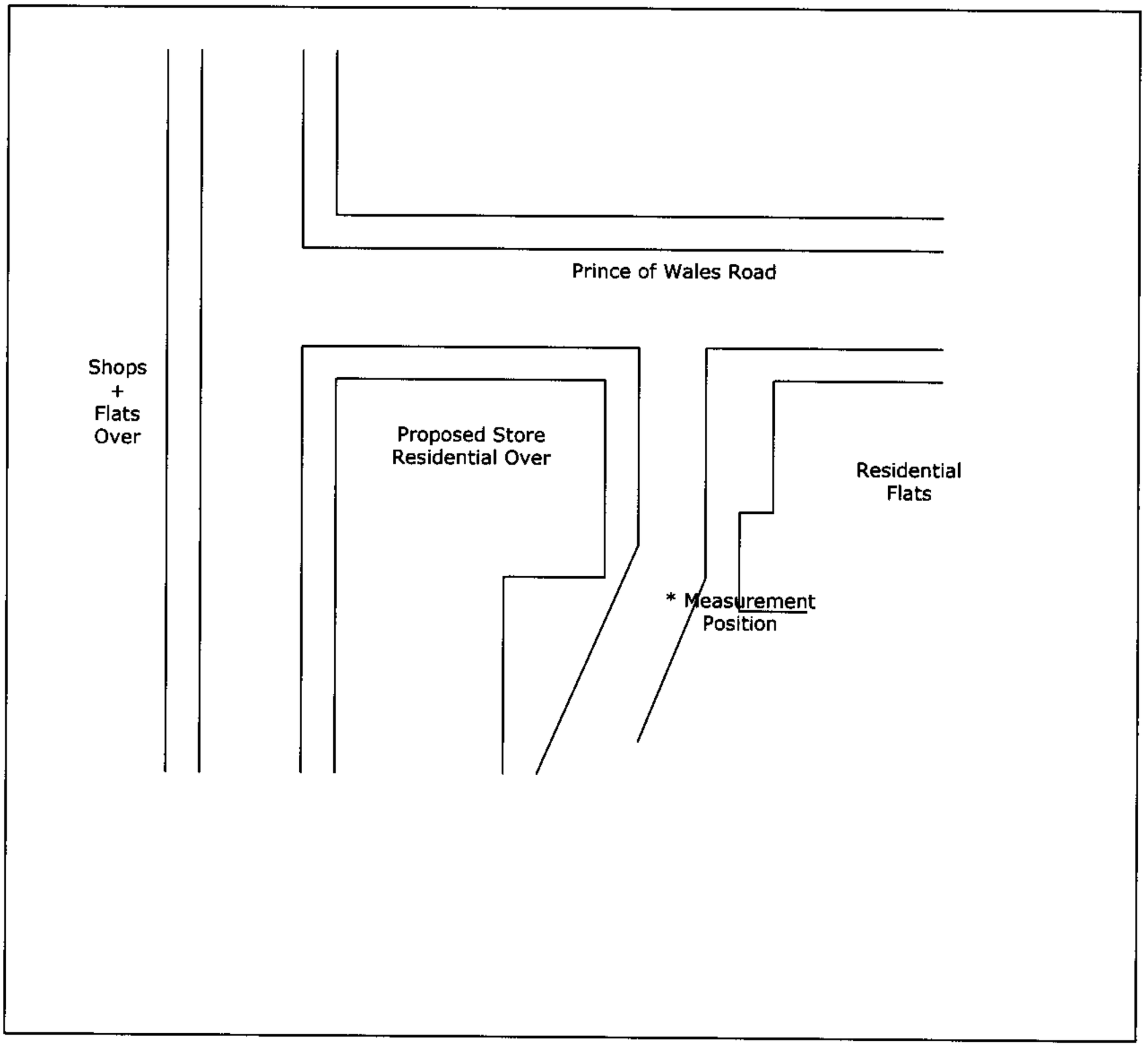
Electrical.

Observations and the operational tests detailed within section 2.6. indicated that there was unlikely to be any interference from the presence of electrical or electromagnetic sources.

The measurements undertaken were considered valid as the contribution from the above interferences and the weather conditions detailed in section 7. as they were at least 10 dB below the sound pressure levels being recorded and therefore complies with the requirements of section 5.4 of British Standard 4142 [reference 1].

2.4.4. Location Sketch.

The following ordnance survey map is supplied by Gormans of Southampton under license to KR Associates (UK) Ltd. (Agreement available upon request).



2.5. Measurement Instrument.

British Standard 4142 – Section 10.d.

2.5.1. Type.

Precision sound level analyzer:	573.C1.
Preamplifier:	527.
Half inch condenser microphone:	192 / 2F.
Foam windshield:	2962.
Associated calibrator:	284 / 2.

2.5.2. Manufacturer.

All of the measurement equipment detailed within section 2.5.1. is manufactured by Casella CEL Instruments based at Regent House, Wolsey Road, Kempston, Bedford, MK42 7JY.

2.5.3. Serial Number.

Precision sound level analyzer:	3 / 0691568.
Preamplifier:	3 / 0691494.
Half inch condenser microphone:	17483.
Foam windshield:	Not required.
Associated calibrator:	4 / 07920858.

2.5.4. Verification Test Details.

The equipment detailed in section 5 above was verified by A.V. Calibrations Limited (Laboratory reference 0653) of 13c Old Bridge Way, Shefford, Bedfordshire, SG17 5HQ which issued a certificate of calibration number 01291 dated 11th May 2004 complying with the requirements of the laboratory accreditation of the United Kingdom Accreditation Service (UKAS). The equipment was tested and its overall sensitivity adjusted in accordance with clause 5 of British Standard 7580 - Part 1:1987. The equipment was found to conform in full with the requirements of British Standard 7580 – Part 1 : 1997 and was rated as a Type 1 instrument. For reference the self generated noise recorded in accordance with British Standard 7580 – Part 1 : 1997, sub clause 5.5.2. was found to be 12dB(A).

2.6. Operational Test.

British Standard 4142 – Section 10.e.

2.6.1. Reference Level.

Before and after the measurements were undertaken on 8th March 2005 the associated calibrator detailed in section 2.5. above was applied to the equipment and in line with the calibrators accreditation a level of 114 dB at 1000 Hz was applied to the measurement equipment.

2.6.2. Meter Reading.

The equipment detailed above was set to calibration mode and the corresponding readings at the 1000 Hz 1/3rd octave band centre frequency were noted before and after the measurements were undertaken on site.

Before measurements were undertaken:	114.0 dB.
After measurements were undertaken:	114.0 dB.

Therefore in accordance with British Standard 7580 Part 1 : 1997 the measurement equipment was considered to an appropriate level of confidence for Type 1 instrumentation. The associated calibrator conforms to the requirements of British Standard 7189 : 1989.

2.7. Weather Conditions.

British Standard 4142 – Section 10.f.

2.7.1. Wind Speed and Direction.

The wind direction was mainly from the north west. and 0.9 ms^{-1}. Measurements of the wind speed and direction using a Kestral 4000 Weather Tracker indicated that on average over the measurement periods. It should be noted that the weather equipment is not calibrated and so the confidence of the measurements is unknown. However, it should be noted that neither British Standard 4142 [reference 1] or British Standard 7445 require the weather conditions to be measured by a calibrated or traceable instrument.

2.7.2. Temperature Inversion.

Observations were made during the measurements to quantify the possibility of conditions that would likely lead to temperature inversion which could under certain conditions adversely affect the accuracy of the results. However, inline with the Concawe determination of Pasquill stability categories it is not possible to categorize the meteorological conditions when measurements are made under 100m from a source as the effects are minimal and well below the confidence limits of the measurement equipment. Though the measurements were taken on a fairly calm and still night temperature inversion was not considered to have effected the measurements taken. For reference the ambient temperature during the measurement periods was 7°C.

2.7.3. Precipitation.

The roads were generally wet. There was total and heavy cloud cover at low level.

2.7.4. Fog.

During the measurement period there did not appear to be any cloud or fog with a relative humidity reading from the Kestral 4000 Weather Tracker of 69 % RH.

2.7.5. British Standard 7445.

Though not required by British Standard 4142 [reference 1] it was considered appropriate to measure the barometric pressure as required under section 6.2. sub section (a) of British Standard 7445 – Part 1 : 1991. The average barometric pressure during all the measurements was found to be using the Kestral 4000 Weather Tracker 1026 mBar.

2.7.5. Weather Conditions.

Observations on site indicate that the above weather conditions did not significantly alter during any of the measurements and therefore in line with section 5.5 of British Standard 4142 [reference 1] all weather conditions have been recorded during all noise measurements.

2.7.7. The measurements undertaken were considered valid as the contribution form the above weather conditions were at least 10 dB below the sound pressure levels being recorded and therefore complies with the requirements of section 5.4 of British Standard 4142 [reference 1].

2.8. Date and Time of Measurements.

British Standard 4142 – Section 10.g.

2.8.1. Date and Time of Measurements.

The measurements were undertaken 8th March 2005 on between 00:01 and 04:00 hours.

2.9. Specific Noise Levels.

British Standard 4142 – Section 10.h.

2.9.1. Manufacturers Data.

The following data has been supplied by the appropriate manufacturer of the units which indicates the typical noise emissions with all the equipment operating under full load at an ambient temperature of 32°C. The measurements were obtained by the procedures detailed within ISO 3740 and to an accuracy to enable a category 3 rating.

Table 1 – Internal Plant Room External Refrigeration Units Noise Levels

A-Weighted	Octave Band Center Frequency (Hz)						
	63	125	250	500	1000	2000	4000
52	53	57	56	49	43	42	38
Sound Power Level - $L_{eq,5\ Min}$ (dB) re 1×10^{-12} watts							

Table 2 - 3 No Haier Condenser Air Conditioning Units Noise Levels

A-Weighted	Octave Band Center Frequency (Hz)						
	63	125	250	500	1000	2000	4000
48	53	54	50	45	41	37	35
Sound Power Level - $L_{eq,5\ Min}$ (dB) re 1×10^{-12} watts							

2.9.2. Residual Noise Levels.

The residual noise levels were recorded at position 1 as detailed in section 2.4. and are summarized within the tables 3 and 4 below.

Table 3 – Residual Broad Band Levels.

Time Period	Environmental Levels						
	$L_{eq,5\ Min}$	$L_{eq,1\ Min}$	L_{10}	L_{90}	L_{max}	L_{min}	$L_{A,5\ Min}$
00:00 – 01:00	47	65	76	48	44	53	64
01:00 – 02:00	48	64	71	47	40	49	61
02:00 – 03:00	47	58	70	42	37	46	56
03:00 – 04:00	47	60	66	40	34	45	52
Sound Pressure Level (dB) re 2×10^{-5} (N/Nm^2)							

Table 4 – Residual Frequency Levels.

Time Period	Octave Band Centre Frequency (Hz)						
	63	125	250	500	1000	2000	4000
00:00 – 01:00	65	53	49	43	39	38	36
01:00 – 02:00	64	54	52	44	42	36	38
02:00 – 03:00	56	50	53	41	38	40	31
03:00 – 04:00	58	54	52	42	41	35	34
Sound Pressure Level – $L_{eq,5min}$ (dB re 2×10^{-5} Nm^{-2}							

2.9.3. Specific Noise Levels.

With consideration to the guidance within British Standard 4142 [reference 1] the specific noise level at the assessment position detailed in section 2.4 is calculated by applying appropriate corrections details of which are contained within section 2.9.5.

Night Time – 23:00 to 07:00

The specific noise level at the assessment position was calculated as found to be $L_{Aeq,5min}$ 21 dB with reference to an absolute level of 2×10^{-5} Nm^{-2} as a result of the normal operation of the internal plant room under normal ambient conditions.

Day Time – 07:00 to 23:00

The specific noise level at the assessment position was calculated as found to be $L_{Aeq,1hour}$ 22 dB with reference to an absolute level of 2×10^{-5} Nm^{-2} as a result of the normal operation of the internal plant room and the 3 No Haier Condenser air conditioning units under normal ambient conditions.

2.9.4. Justifications of Methods.

Specific Noise Level.

The specific noise level is calculated from the manufacturers data supplied to KR Associates (UK) Ltd. The specific noise level at the assessment position was calculated in accordance with the guidance of section 6.3.5. of British Standard 4142 [reference 1]. Reference is also made to the scope of British Standard 4142 which allows assessments of calculated noise levels at the assessment position when specific sources have yet to be installed.

Residual Noise Level.

The residual noise level was recorded at position 1 and as the specific source has yet to be installed did not contain an influence from the specific source. Further more care was taken to ensure the residual noise measurements did not contain an influence from the existing refrigeration equipment which is to be removed from the site when the equipment detailed in section 2.2. is installed.

2.9.5. Details of Corrections.

Distance Correction.

The assessment position is located approximately 13m from the centre of the proposed position for the installation of the refrigeration plant room outlet.

Night Time Combined Sound Power Levels (Internal plant room under normal load)	52 dB
Day Time Combined Sound Power Levels (Internal plant room and 3 No Haier Condenser air conditioning equipment Both under normal load)	55 dB
Correction for distance of 13 m (No barrier correction has been assumed)	22 dB
Directivity of Source (The source is to be positioned against 1 reflective surfaces_	3 dB
Correction for Sound Pressure Levels	-11 dB

Barrier Correction.

At this time no barrier correction has been allowed for as it froms part of the safety margin for the risk associated with noise on the operation of this site.

2.10. Measurement Time Intervals.

British Standard 4142 – Section 10.i.

2.10.1. Measurement Time Intervals.

Measurements of the background noise levels were taken over a continuous 5 minute period and encompassed all other sources. No on-time correction is made as the units are designed to work under full load with an ambient temperature of 32 °C which is very likely to exist for any 5 minute period between the hours of 23:00 and 07:00. The manufacturer's data is considered to have included all temporal and level variations of the specific source.

2.11. Reference Time Interval(s).

British Standard 4142 – Section 10.j.

2.11.1. Reference Time Interval(s).

The reference time interval as described in section 6.2 of British Standard 4142:1997 was set at 5 minutes as the assessments are undertaken within the 'Night Time' period. 'Night Time' was considered between the hours of 23:00 and 07:00 in line with the guidance within note 1 of section 6.2 of British Standard 4142 [reference 1] and the current European Union guidelines on community noise.

2.12. Rating Level.

British Standard 4142 – Section 10.k.

2.12.1. Specific Noise Level.

As detailed within section 2.9.3. the specific noise level at the assessment position detailed within section 2.4. and located 1m from the nearest noise sensitive façade is

Night Time – 23:00 to 07:00
The specific noise level was calculated as $L_{Aeq,5min}$ 21 dB with reference to an absolute level of 2×10^{-5} Nm^{-2} as a result of the normal operation of the internal plant room unit under normal ambient conditions.

Day Time – 07:00 to 23:00
The specific noise level at the assessment position was calculated as found to be $L_{Aeq,1hour}$ 25 dB with reference to an absolute level of 2×10^{-5} Nm^{-2} as a result of the normal operation of the internal plant room and the 3 No Haier air conditioning units under normal ambient conditions.

2.12.2. Acoustic Features.

With consideration to the observations made and experience of the refrigeration and air conditioning sources detailed within section 2.3. it was considered appropriate to apply a character correction of +5 dB.

2.12.3. Rating Level.

The rating level at the assessment located 1m from the nearest noise sensitive façade is found by adding the specific noise level and the character correction together.

Night Time – 23:00 to 07:00
The rating level during the nighttime at the assessment position will be $L_{Aeq,5min}$ 26 dB with reference to an absolute level of 2×10^{-5} Nm^{-2}.

Day Time – 07:00 to 23:00
The rating level during the daytime at the assessment position will be $L_{Aeq,1hour}$ 30 dB with reference to an absolute level of 2×10^{-5} Nm^{-2}.

2.13. Background Noise Levels.

British Standard 4142 – Section 10.l.

2.13.1. Recorded Noise Levels.

In line with the requirements of British Standard 4142 [reference 1] and the details within British Standard 7445 the following background noise levels were measured at position 1 as detailed in section 2.4. and are summarized in tables 5 and 6 below.

Table 5 – Background Broad Band Levels.

Time Period	Environmental Levels						
	$L_{eq,5\,min}$	$L_{90,5\,min}$	$L_{max,5\,min}$	$L_{10,5\,min}$	$L_{eq,1\,hr}$	$L_{90,1\,hr}$	$L_{10,1\,hr}$
00:00 – 01:00	47	65	76	48	44	53	64
01:00 – 02:00	48	64	71	47	40	49	61
02:00 – 03:00	47	58	70	42	37	46	56
03:00 – 04:00	47	60	66	40	34	45	52
Sound Pressure Level (dB) re 2×10^{-5} Nm^{-2}							

Table 6 – Background Frequency Levels.

Time Period	Octave band Center Frequency (Hz)						
	63	125	250	500	1000	2000	4000
00:00 – 01:00	65	53	49	43	39	38	36
01:00 – 02:00	64	54	52	44	42	36	38
02:00 – 03:00	56	50	53	41	38	40	31
03:00 – 04:00	58	54	52	42	41	35	34
Sound Pressure Level - $L_{eq,5\,min}$ (dB) re 2×10^{-5} Nm^{-2}							

2.13.2. Meaurement Time Interval.

Measurements of the background noise levels were taken over a continuous 5 minute period and did not include a contribution of the specific source levels. The measurements were considered to have included all reasonable temporal and level variations of the background noise levels and other none specific sources.

2.13.3. Equivalent Location.

The background measurements were taken at position 1 as detailed in section 2.4. As the assessment position was influenced by other sources that would not be present once the specific source is installed reference is made to the guidance given in section 7.4. of British Standard 4142 [reference 1]. It is considered that position 1 is equivalent to the assessment position in terms of the recorded background noise levels.

2.13.4. Background Noise Levels

For average background noise levels during the following periods are taken from the above table. It should be noted that whereas the night time background noise levels have been measured the day time background noise levels have been estimated.

Night Time – 23:00 to 07:00

The average background noise level during the night time period is unlikely to fall below a value of $L_{A90,5min}$ 34 dB with reference to an absolute level of 2×10^{-5} Nm^{-2}.

Day Time – 07:00 to 23:00

The average background noise level during the day time period is unlikely to fall below a value of $L_{A90,5min}$ 53 dB with reference to an absolute level of 2×10^{-5} Nm^{-2}.

2.14. Rating Level and Assessment.

British Standard 4142 – Section 10.m.

2.14.1. Rating Level.

Night Time – 23:00 to 07:00

The rating noise level at the assessment position was calculated as $L_{Aeq,5min}$ 26 dB with reference to an absolute level of 2 x 10^{-5} Nm^{-2} as a result of the normal operation of the internal plant room under normal ambient conditions.

Day Time – 07:00 to 23:00

The rating noise level at the assessment position was calculated as $L_{Aeq,1hour}$ 30 dB with reference to an absolute level of 2 x 10^{-5} Nm^{-2} as a result of the normal operation of the internal plant room and the 3 No Haier air conditioning units under normal ambient conditions.

2.14.2. Assessment.

In line with the guidance of section 8 of British Standard 4142 [reference 1] the rating level of the refrigeration units operating under maximum load conditions at the assessment position described in section 2.4. is that the likelihood of complaints is described below.

Night Time – 23:00 to 07:00	Complaints Marginal
Day Time – 07:00 to 23:00	Complaints Unlikely

3. EXECUTIVE SUMMARY.

The following is an executive summary of section 2 of the report with reference to the example detailed within Appendix A of British Standard 4142 [reference 1]

3.1. Night Time – 23:00 to 07:00

3.1.1.	Quantity:	Calculated Specific Noise at Assessment Position: $L_{Aeq,5min}$ = 21 dB.
	Relevant Clause:	Section 6.3 of British Standard 4142.
	Commentary:	The specific noise is calculated at the assessment position by applying the appropriate corrections
3.1.2.	Quantity:	Character Correction: + 5 dB.
	Relevant Clause:	Table 1 of British Standard 4142.
	Commentary:	Observations on site and experience of these units indicated that the source is unlikely to attract a correction
3.1.3.	Quantity:	Rating Level: $L_{Aeq,5min}$ = 26 dB.
	Relevant Clause:	Section 8 of British Standard 4142.
	Commentary:	The rating level is calculated by adding the calculated specific noise Level and character correction together.
3.1.4.	Quantity:	Background Noise Level: $L_{A90,5min}$ = 34 dB.
	Relevant Clause:	Section 7 of British Standard 4142.
	Commentary:	The background noise level was measured at an equivalent position to ensure no contribution from the existing equipment.
3.1.5.	Quantity:	Excess of Rating over Background: -8. dB.
	Relevant Clause:	Section 9 of British Standard 4142.
	Commentary:	The numerical difference between the background noise level and the rating level at the assessment position.
3.1.6.	Quantity:	Assessment: Complaints Marginal
	Relevant Clause:	Section 9 of British Standard 4142.
	Commentary:	Indicates the likelihood of complaints from the specific source at the nearest noise sensitive property within the vicinity.

3.2. Day Time – 07:00 to 23:00

3.2.1. Quantity: Calculated Specific Noise at Assessment Position: $L_{Aeq,5min}$ = 25 dB.
Relevant Clause: Section 6.3 of British Standard 4142.
Commentary: The specific noise is calculated at the assessment position by applying the appropriate corrections

3.2.2. Quantity: Character Correction: + 5 dB.
Relevant Clause: Table 1 of British Standard 4142.
Commentary: Observations on site and experience of these units indicated that the source is unlikely to attract a correction

3.2.3. Quantity: Rating Level: $L_{Aeq,5min}$ = 30 dB.
Relevant Clause: Section 8 of British Standard 4142.
Commentary: The rating level is calculated by adding the calculated specific noise Level and character correction together.

3.2.4. Quantity: Background Noise Level: $L_{A90,5min}$ = 53 dB.
Relevant Clause: Section 7 of British Standard 4142.
Commentary: The background noise level was measured at an equivalent position to ensure no contribution from the existing equipment.

3.2.5. Quantity: Excess of Rating over Background: -23 dB.
Relevant Clause: Section 9 of British Standard 4142.
Commentary: The numerical difference between the background noise level and the rating level at the assessment position.

3.2.6. Quantity: Assessment: Complaints Unlikely
Relevant Clause: Section 9 of British Standard 4142.
Commentary: Indicates the likelihood of complaints from the specific source at the nearest noise sensitive property within the vicinity.

APPENDIX A - REFERENCE DOCUMENTS.

A.1. BS 4142 [Reference 1].

British Standard 4142:1997.

Method for rating industrial noise affecting mixed residential and industrial areas.

A.1.1. This document is used to rate external noise and to give an indication if complaints are likely to be received. This document is not widely used for the assessment of music noise but the guidance contained within the document is very useful and the spirit of the standard is widely used.

A.1.2. Background Noise Level.

The background noise level is the sound pressure level of the residual noise at an assessment position measured as an $L_{A90,t}$ (The level which ignores the top 90% of the levels).

A.1.3. Rating Noise Level.

The corrected specific sound pressure level of the source measured as an $L_{Aeq,t}$. A correction is applied for the influence of the background residual noise level and a character correction for distinctive noises such as bass thumps, screech etc.

A.1.4. Section 9 gives an indication of the likelihood of complaints based on the assessment level, which is the numerical difference between the background noise level and the rating level. i.e. the higher the difference the greater likelihood there is of complaints.

a) If the rating level is more than 10 dB below the background level then there is a positive indication that complaints are unlikely.

b) A difference of around +5 dB is of marginal significance

c) A difference of around +10 dB or more indicates that complaints are likely.

A.1.5. It should be noted that compliance with the requirements of BS4142:1997 does not in itself negate a tort and does not give an assessment of public, private or statutory nuisance or the specific requirements of a planning condition or any other specific site criteria.

A.2. BS 7445:1991 [Reference 2]

British Standard 7445 – Part 1 : 1991.

Description and measurement of environmental noise – Part 1. Guide to quantities and procedures.

A.2.1. Though this standard does not specify limits of environmental noise it details how to measure and present valid data for environmental noise levels.

A.2.2. Section 3 of the standard defines the descriptors for environmental noise including equivalent continuous level and the percentile level. The standard clearly details the required time intervals for any measurements, the position of any measurements and the observations to be made during the measurements. The type of instrumentation is also clarified, as is the calibration procedure before, during and after the measurements.

A.3. Statutory Nuisance [Reference 3].

Environmental Protection Act 1990 and Noise and Statutory Nuisance Act 1993.

A.3.1. Section 79 of the act contains a list of statutory nuisance, one of which is noise from premises such as to be prejudicial to health or a nuisance (s79(g)). If the Local Authority are satisfied that a noise nuisance exists, or is likely to occur, or likely to recur, then they are obliged to serve a noise abatement notice under section 80 of the act. This will require the abatement of the nuisance, or prohibiting or restricting its occurrence, or requiring the execution of such works or steps as are necessary. They will also specify the time within which the notice is to be complied with.

A.3.2. The notice is served upon the person or persons responsible except in the cases where the person responsible cannot be found or the nuisance has not yet occurred, then it is served upon the owner or occupier of the premises.

A.3.3. The recipient of the notice has 21 days right of appeal to the magistrates court, after which time he is deemed to have accepted the notice. The grounds for appeal are contained within the Statutory Nuisance Appeals Regulations 1990.

APPENDIX B – DEFINITIONS AND SYMBOLS.

B.1. Equivalent Continuous A – Weighted Sound.

The value of the A-Weighted sound pressure level in decibels of continuous steady sound that within a specified time interval has the same mean-squared sound pressure as a sound that varies with time. Reference should be made to the equation (1) in section 3.1 of British Standard 4142 [reference 1].

B.2. Specific Noise Source.

The noise source under investigation for assessing the likelihood of complaints.

B.3. Reference Time Interval.

The specified interval over which an equivalent continuous A-Weighted sound pressure is determined.

B.4. Specific Noise Level.

The equivalent continuous A-Weighted sound pressure level at the assessment position produced by the specific noise source over a given time reference.

B.5. Measurement Time Interval.

The total time over which the measurements are taken.

B.6. Rating Level.

The specific noise level plus any adjustments for the characteristic features of the noise at the assessment position.

B.7. Ambient Noise.

Totally encompassing sound at a given position in a given situation when the specific noise source is suppressed to a degree such that it does not contribute to the ambient noise.

B.8. Residual Noise.

The ambient noise remaining at a given position in a given situation when the specific noise source is suppressed to a degree such that it does not contribute to the ambient noise.

B.9. Residual Noise Level.

The equivalent continuous A-Weighted sound pressure level of the residual noise.

B.10. Background Noise Level.

The A-Weighted sound pressure level of the residual noise at the assessment position that is exceeded for 90% of a given time interval.