Philip Acoustics Ltd.

Consultants in Noise & Vibration
Building Regulations Certification Sound Insulation Testing

REPORT TITLE: NOISE ASSESSMENT FOR MECHANICAL SERVICES PLANT TO SERVE A PROPOSED HOT FOOD TAKEAWAY AT UNIT 2, 53-57 BERRY LANE, LONGRIDGE, PRESTON PR3 3NH

REPORT REF: 22125-002

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SUMMARY

- This report provides a noise assessment for mechanical services plant to serve a proposed change of use to hot food takeaway at an existing vacant commercial property Unit 2, 53-57 Berry Lane, Longridge, Preston PR3 3NH. Previous use of the property was a retail shop - Swift's Hardware, now ceased trading.

- The proposed development is for a pizza format takeaway with operating hours 11am to 11pm.

- Plant (equipment) to be installed to serve the use comprises a supply air system fan and oven extract system fan (both with associated external apertures) plus an air conditioning unit and cold room unit.

- As part of the assessment a plant noise criterion (limit) is set with reference to the guidance of British Standard BS4142:2014. The set limit is that the noise Rating Level of proposed plant shall not exceed existing background noise levels at nearest noise sensitive (residential) properties.

- Full title of the current edition of this standard is BS4142:2014+A1:2019 "*Methods for rating and assessing industrial and commercial sound*". Reference throughout this report to BS4142:2014 relates to this current edition. Note that as an aid to clarity, this report retains use of the more familiar term *"noise"* as opposed to the replacement term *"sound"* of BS4142:2014, both terms are interchangeable in the context of this assessment report.

- In accordance with the noise assessment procedures of BS4142:2014 a survey has been conducted to establish existing minimum background noise levels during the range of operational times of the plant, as representative of at nearest residential properties.

- Based on results of the background noise survey and acoustic calculations using plant manufacturer's data, noise from the plant (with the specified noise reduction treatment fitted) complies with the noise criterion limit.

- The specified noise reduction treatment comprises conventional atmosphere side duct silencers (attenuators) to the supply air fan and oven extract fan systems. Specification details for the noise reduction treatment are provided in Section 7.1 of the report.

- The report also considers plant vibration. It is advised the plant is installed using proprietary vibration isolators. Specification details for suitable vibration isolators are provided in Section 7.2 of the report.

1. INTRODUCTION

A change of use to hot food takeaway (Sui-Generis) development is proposed at an existing vacant commercial property Unit 2, 53-57 Berry Lane, Longridge, Preston PR3 3NH.

Previous use of the property was a retail shop - Swift's Hardware, now ceased trading.

The development is for a pizza format takeaway and will require the installation of new mechanical services plant (equipment). Sought operating times for the use are 11am to 11pm.

The plant (equipment) comprises a supply air system fan and oven extract system fan (both with associated external apertures) plus an air conditioning unit and cold room unit.

This report provides a noise assessment for the mechanical services plant. The assessment is to determine specifications for noise reduction treatment and vibration isolation measures to the plant, in the interest of safeguarding the amenity of neighbouring residential occupiers.

The report includes:

- Qualifications & experience;
- Noise assessment methodology & criterion; with reference to British Standard BS4142:2014 and other guidance;
- Measurement survey of existing background noise levels;
- Details of proposed plant including location & noise data;
- Calculation & assessment of plant noise levels;
- Consideration of vibration from the plant;
- Specification as necessary for noise reduction treatment & vibration isolation measures.

***Informative*: Existing Commercial Premises Plant / Equipment Precedent**

As forward to this noise assessment report, it is noted by the author that the items of mechanical services plant to serve the proposed pizza format hot food takeaway are of similar function / type to existing installed plant / equipment to other commercial / retail use premises in the local and wider Longridge town centre vicinity and including in the general proximity to residential properties.

Much of the existing plant / equipment in the general vicinity is observed to be installed without clearly identifiable noise reduction treatment or vibration isolation.

Notwithstanding this, assessment of noise from plant to serve the proposed pizza format takeaway in this report is only with reference to the noise criterion (limit) set with reference to the guidance of BS4142:2014. The report and noise assessment takes no account of any precedent there is existing similar plant / equipment already installed in the vicinity without noise reduction treatment or vibration isolation.

2. QUALIFICATIONS & EXPERIENCE

This report is prepared and issued by David Philip. David Philip graduated in 1989 from The University of Salford Department of Applied Acoustics with a BEng Honours degree in Electroacoustics. David Philip has been since 1995, and continues to be, a fully elected Member of the Institute of Acoustics (MIOA).

David Philip has been the owner / managing director of Philip Acoustics since the firm was formed in 2002. Prior to the formation of Philip Acoustics, David Philip held senior acoustic consultant positions at Sound Research Laboratories (London office) and Spectrum Acoustic Consultants.

Philip Acoustics has held full membership of the Association of Noise Consultants (ANC) since 2003 and is also a full member of the ANC Registration Scheme of approved independent organisations to undertake Building Regulations Approved Document Part E pre-completion certification sound insulation testing.

David Philip has some 32+ years-experience as an Acoustic Consultant both in the UK and internationally and has considerable experience undertaking noise surveys and noise assessments for a wide range of commercial uses and also residential developments.

This experience includes a substantial quantity of noise assessments specifically associated with pizza format hot food takeaway developments in mixed use commercial/retail and residential areas.

David Philip is fully familiar with the provisions of the current (and previous) editions of British Standard BS4142, as well as other acoustics related standards and guidance documents.

The opinions expressed in this report are the true and professional opinions of David Philip. Neither David Philip nor Philip Acoustics is appointed on any incentive fee basis.

3. NOISE ASSESSMENT METHODOLOGY & CRITERION *(BS4142:2014)*

Appropriate relevant design standards and guidance (i.e. noise assessment methodology & criterion) applicable for plant associated with the proposed development are:

- **EMAQ+ document "*Control of Odour and Noise from Commercial Kitchen Exhaust Systems"*;**
- **British Standard BS4142:2014.**

EMAQ+ Document

***Informative*: Scope of EMAQ+ Document**

The details below are only with respect to noise (& vibration) as per guidance of the EMAQ+ document. Information regarding odour or other issues associated with the extraction system would be by others.

EMAQ+ document "*Control of Odour and Noise from Commercial Kitchen Exhaust Systems"* has published date September 2018 and provides a comprehensive technical overview of Regulatory procedures, as well as Best Practice design procedures guidance, for commercial kitchen extract ventilation systems.

The EMAQ+ document does not provide any specific guidance or information on noise limits / criteria and instead refers to BS4142:2014 as being relevant for noise assessments.

The noise criterion (limit) used for the assessment is set with reference to the guidance of BS4142:2014 as outlined below. The criterion applicable for all plant items to serve the change of use pizza format hot food takeaway, including the oven extract system (i.e. kitchen exhaust).

Thus, compliance with the noise criterion by use of noise attenuation plus with vibration isolation to the plant, as specified in Section 7 of this report, by default demonstrates compliance with the Regulatory and Best Practice Design procedures guidance of the EMAQ+ document.

British Standard BS4142:2014

Full title of the current edition of the standard is BS4142:2014+A1:2019 "*Methods for rating and assessing industrial and commercial sound*". Reference throughout this report to BS4142:2014 relates to this current edition standard.

As an aid to clarity this report retains use of the more familiar term "*noise*" as opposed to the replacement term "*sound*" of BS4142:2014. The two terms are interchangeable in the context of this assessment report.

BS4142:2014 provides a well-established methodology to assess the likely effect (impact) to people regarding noise of an "industrial" nature from commercial or other premises.

Consequently, in requesting noise assessments for mechanical plant, including equipment such as extraction/ventilation systems and air conditioning / refrigeration units serving such as hot food takeaways or similar premises, most Local Planning Authorities refer to BS4142:2014.

In this scenario of proposed new mechanical services plant, the BS4142:2014 assessment method requires that source noise data for the plant is established, and pre-existing background noise levels be measured. The assessment is then carried out by comparing the overall plant noise Rating Level with background noise levels, at assessment positions; normally to outside nearest residential properties or similar.

The (plant noise) Rating Level in this scenario is the Specific Noise Level of the plant plus with any corrections applied to account for subjective characteristics of the noise that might mean it is more noticeable and potentially have more impact.

The BS4142:2014 assessment method then provides guidance on the likely noise impact (effect) to people depending on the magnitude of the excess of the (plant noise) Rating Level over the pre-existing background noise; the higher the excess the more likely there would be an adverse impact and correspondingly, the lower the excess (or no excess) the less likely there would be an adverse impact.

BS4142:2014 does not provide any specific guidance on suitable noise limits / criteria or standards including for proposed new plant / equipment, only guidance on how to determine the likelihood of adverse impact.

In terms of likelihood of adverse (noise) impact, BS4142:2014 advises the following dependent upon context:

i) **Where the (plant noise) Rating Level is around +10dB or more above the background, this is likely to be an indication of significant adverse impact;**

ii) **Where the (plant noise) Rating Level is around +5dB above the background then this is likely to be an indication of adverse impact;**

iii) **Where the (plant noise) Rating Level does not exceed the background then this is an indication of low impact.**

It is important to note the BS4142:2014 assessment methodology does not have a “no impact” indication categorisation. “Indication of low impact” for where the Rating Level does not exceed the pre-existing background is the lowest / least likely noise impact categorisation of BS4142:2014.

Different Local Planning Authorities interpret and apply the guidance of BS4142:2014 differently, some require the noise Rating Level of proposed new plant / equipment be not higher than +5dB above the pre-existing background level, majority require not higher than the background and some require a certain amount below the background. Some do not have a set requirement and consider each situation individually.

It is the author’s experience that most Local Authorities for this context of new plant to serve an existing, albeit proposed change of use commercial / retail premises, apply the guidance of BS4142 with a requirement that the noise Rating Level of plant be not higher than the pre-existing background noise; applicable to (assessment) positions externally to (outside of) nearest noise sensitive (residential) properties and applicable to the representative minimum pre-existing background noise during plant operational times.

Based on the above and with consideration of context that the proposed plant is to serve an existing, albeit changed use commercial / retail property, it is appropriate to apply the guidance of BS4142:2014 with the common requirement that the noise Rating Level of proposed plant shall not exceed existing background noise levels.

It is the author's experience of undertaking many noise surveys and assessments of noise from ventilation fans and condenser units in similar scenarios and contexts to 53-57 Berry Lane, Longridge that at this level, plant noise would not be expected to be of detrimental impact, or otherwise affect the amenity of nearby residents.

Additional clarification points in respect to the noise assessment and criterion are provided below:

a) Plant Operating Conditions

The assessment and noise criterion is cautiously/robustly applied to all proposed plant items operating cumulatively at full (100%) duty and during times as relevant; all plant operating during opening times of the premises, and with the cold room unit operable over 24 hours.

b) Rating Noise Level

The noise criterion is applied in terms of a noise Rating Level ($L_{Ar,Tr}$ dB) and thus with any corrections (such as for tonal character noise) applied as necessary to the plant noise at the assessment position as per the BS4142:2014 assessment methodology.

c) Assessment Position

As per normal noise assessment procedures / convention (plus with reference to BS4142:2014), the plant noise criterion is applied to an assessment position directly outside nearest noise sensitive (residential) properties.

d) Background Noise Level

The noise criterion is applied to the measured representative minimum (lowest) pre-existing background noise level $L_{A90,T}$ dB as representative of at the assessment position for times of operation of the plant.

e) Very Low Background Noise Levels *(for information only – not applicable to the noise assessment)*

In accordance with the guidance and assessment provisions of BS4142, then for scenarios of very low background noise it is generally unreasonable / unnecessary to apply a Rating Level noise limit directly relative to the background level, in terms of ensuring amenity protection such that noise from plant / equipment does not cause disturbance or is otherwise of adverse impact.

This simply due to that there is a lower threshold level at which plant noise would become inaudible / not noticeable to neighbouring residential occupiers and thus it being unreasonable and unnecessary to further reduce the plant noise below that level.

BS4142:2014 advises "*Where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night*."

Where background levels are very low it is instead appropriate to apply a minimum (lower level) threshold cap plant Rating Level limit of $L_{Ar,Tr}$ 30dB at assessment positions. BS4142:1997 advised that noise Rating Levels of below 35dB be considered very low.

Thus a minimum threshold cap plant noise limit (Rating Level) set at $L_{Ar,Tr}$ 30dB is significantly below (i.e. as 5dB betterment to) this guidance and for scenarios of very low background noise levels (i.e. regardless of the low background noise) will maintain surety of protection for the occupants of neighbouring properties from loss of amenity due to noise disturbance.

4. BACKGROUND NOISE SURVEY

To assess noise from the proposed plant it is necessary to establish pre-existing background noise levels during the range of operational times for the plant.

4.1 Survey Instrumentation

Details of instrumentation used for the noise survey are provided in Appendix A. The sound level meter was calibration verified before and after the survey.

4.2 Survey Details & Procedure

The supply air system, oven extract system and air conditioning unit will operate as required during opening times of the takeaway (11am to 11pm). The cold room unit provides an essential refrigeration function and is required to be operable over 24-hours.

An attended background noise survey was conducted by the author for the period approximately 9:30pm to 4am of 13 November 2022 through 14 November 2022 so as to include sample late evening and night periods as "worse-case" when representative minimum (lowest) levels of background noise will occur for various operational times of the plant.

Weather conditions were monitored and suitable for the survey in accordance with BS4142:2014; weather was dry and with light wind (wind speed up to circa 2 to 3m/s recorded at survey position).

Location of the site and proposed plant is indicated on an aerial image, site location plan and block plan drawing plus proposed layout plan / elevation drawings in Appendix B.

Nearest exiting noise sensitive (residential) properties to the site and proposed plant are:

- Flat at 59A Berry Lane, at first floor above the adjacent ground floor commercial / retail premises 59 Berry Lane;
- Dwellings at 2 & 4 Towneley Road, east from the site. The rear elevation of these dwellings faces in direction towards rear of the site;
- Dwellings at 1 to 4 Auction Court, to the opposite side of Warwick Street, south of, and beyond rear of, the site.

The background noise survey position was externally adjacent to the rear of the site, selected as near as practicably possible / representative of outside nearest residential properties, conducted in accordance with the procedural guidance of BS4142:2014. The survey position is indicated on the site ariel image in Appendix B.

Measurements of background noise were recorded continually in terms of consecutive 15-minute samples of overall $L_{A90,T}$ dB values (T= 15 minutes) throughout the survey duration.

4.3 Survey Observations, Results & Plant Noise Limit

Background noise levels during the late evening and night period are low and observed to be due to traffic on surrounding roads and streets plus with some underlying faintly noticeable (just / barely audible) noise all through the late evening and night from existing unidentified plant / equipment as likely to be serving other commercial premises in the wider vicinity.

The background noise profile is normal for this relatively rural town centre location, with levels reducing gradually during the late evening and into the night as traffic locally and in the wider vicinity reduces, lowest during the night between circa 1am to 3am, before gradually starting to rise after about 4am as traffic starts to increase.

Complete raw data results of the background noise survey are provided in Appendix C.

Summary of measured representative minimum background noise levels and the associated plant noise limit requirements are shown in Table 1.

Background noise levels and noise limits are split into opening hours values (range 11am to 11pm) and night period values such that all plant as operating during opening hours is assessed using representative minimum background noise during that time range, whilst the cold room unit operable over 24 hours is assessed using the typical representative minimum background noise during the night.

Description	**Plant Operating Times**	**Representative Minimum Background Noise Level $L_{A90,\ 15\ min}$**	**Plant Noise Limit *(Rating Level)***
Assessment to outside nearest noise sensitive (residential) properties	All Plant: Operating during opening hours *(range 11am to 11pm)*	36dB	$L_{Ar,Tr} \leq$ 36dB
	Cold Room Unit: Operable over 24 hours *(including during the night)*	32dB *(occurs circa 1am to 3am)*	$L_{Ar,Tr} \leq$ 32dB

Table 1: Measured representative minimum background noise & associated plant noise limits

5. NOISE FROM MECHANICAL SERVICES PLANT

The proposed mechanical services plant comprises the following items as indicated on the drawings in Appendix B:

- **Supply Air System Fan**: S&P CBM/6-320/240-550W low pressure type centrifugal fan, located internally within the building with fresh air intake via ducting (with silencer – see Section 7.1 of the report) from an inlet cowl aperture to the rear flat roof area of the building;
- **Oven Extract System Fan**: S&P TCBT/4-450/H cased axial flow fan, located internally within the building with exhaust to atmosphere via filters and ducting (with silencer – see Section 7.1 of the report) to a high roof level vertical discharge aperture to the rear of the building;
- **Air Conditioning Unit**: Toshiba RAV-GM1401ATP-E condenser unit (cooling mode operation), located externally at ground level to the rear yard area of the building;
- **Cold Room Unit**: Tecumseh Wintsys WINAJ4519Z condenser unit, located externally at ground level to the rear yard area of the building (adjacent to air conditioning unit).

Copy of available manufacturer noise data for the plant is provided in Appendix D.

Summary of noise data for the plant items in terms of equivalent overall dBA and linear dB octave band sound power levels is shown in Table 2. The summary noise data is without any noise reduction treatment applied (i.e. is for un-silenced manufacturer noise data).

Description	Overall dBA	Octave Band Centre Frequency (Hz) Lin dB							
		63	125	250	500	1k	2k	4k	8k
Supply Air System Fan: S&P CBM/6-320/240-550W (1) *(Inlet – induct sound power level)*	79	80	78	77	76	74	70	67	63
Oven Extract System Fan: S&P TCBT/4-450/H (2) *(Outlet – induct sound power level)*	77	72	74	74	74	73	70	66	60
Air Conditioning Unit: Toshiba RAV-GM1401ATP-E (3) *(unit configured cooling mode)*	63	65	64	63	58	58	55	50	42
Cold Room Unit: Tecumseh Wintsys WINAJ4519Z (4)	63	65	63	61	59	58	55	51	43

Note (1): *Sound power level overall dBA & linear dB octave band values for supply air system fan S&P CBM/6-320/240-550W based on limited available manufacturer noise data which is in terms of overall sound pressure level 67dBA at 1.5m from the fan inlet side (free field) & example operating curve.*

Note (2): *Manufacturer octave band noise data for oven extract system fan S&P TCBT/4-450/H is in terms of "A-Weighted" dBA octave band values. The values stated above are equivalent linear dB octave band values (i.e. not "A-Weighted").*

Note (3): *Sound power level overall dBA & linear dB octave band values for air conditioning unit are based on manufacturer noise data free-field sound pressure levels at 1m from the unit.*

Note (4): *No manufacturer octave band noise data available for cold room unit, linear dB octave band sound power levels are based on octave band sound pressure level measurements undertaken by the author of this make / model cold room unit as installed at other premises.*

Table 2: Summary plant noise data *(sound power levels)*

To calculate the overall plant noise contribution to the assessment position outside nearest noise sensitive properties a spreadsheet noise model calculation has been used.

The model takes account of the accumulation of noise from the worse-case scenario of all plant items operating simultaneously, distance between the plant locations and assessment position, acoustic directivity, acoustic reflections and any natural / default line of sight acoustic screening due to orientation and intervening buildings structures.

The calculation model also takes account of the specified noise reduction treatment applied to the plant as detailed in Section 7.1 of the Report.

Noise assessment positions and noise model calculation details are provided in Appendix E.

The noise model overall calculated noise Rating Levels from the plant to outside nearest noise sensitive properties compared with the noise limits are shown in Table 3.

Description	**Plant Operating Times**	**Plant Overall Noise Level *(Rating Level)***	**Noise Limit *(Rating Level)***	**Comment**
Assessment Position A: Flat 59A Berry Lane, above adjacent ground floor commercial / retail premises	All Plant Items : Operating during opening hours *(range 11am to 11pm)*	$L_{Ar,Tr}$ 35dB	$L_{Ar,Tr} \leq$ 36dB	Complies
	Cold room unit: Operable over 24 hours *(including during the night)*	$L_{Ar,Tr}$ 31dB	$L_{Ar,Tr} \leq$ 32dB	Complies
Assessment Position B: Dwellings at 2 & 4 Towneley Road, east from the site	All Plant Items : Operating during opening hours *(range 11am to 11pm)*	$L_{Ar,Tr}$ 29dB	$L_{Ar,Tr} \leq$ 36dB	Complies
	Cold room unit: Operable over 24 hours *(including during the night)*	$L_{Ar,Tr}$ 21dB	$L_{Ar,Tr} \leq$ 32dB	Complies
Assessment Position C: Dwellings at 1 to 4 Auction Court, to the opposite side of Warwick Street, beyond rear of the site	All Plant Items : Operating during opening hours *(range 11am to 11pm)*	$L_{Ar,Tr}$ 23dB	$L_{Ar,Tr} \leq$ 36dB	Complies
	Cold room unit: Operable over 24 hours *(including during the night)*	$L_{Ar,Tr}$ 18dB	$L_{Ar,Tr} \leq$ 32dB	Complies

Table 3: Noise from plant to assessment positions *(outside nearest residential properties)*

The assessment demonstrates that with the specified noise reduction treatment fitted as detailed in Section 7.1, noise from the proposed plant will comply with the limit / criterion.

Although the noise reduction treatment will tend to supress any tonal noise characteristics of the supply air and oven extract systems, plus noise of the air conditioning unit and cold room unit is nominally broadband in nature, the assessment cautiously includes a +2dBA correction as BS4142:2014, added to the overall calculated plant noise levels to give the plant noise Rating Levels, to account that residual noise from the plant could potentially have a just perceptible tonal characteristic to the assessment positions.

6. VIBRATION FROM MECHANICAL SERVICES PLANT

Location of the plant is structurally linked, albeit indirectly and at distance, to adjoining (attached) neighbouring properties; therefore it is possible that plant vibration could transmit to these properties.

It is advised the plant is installed using proprietary vibration isolators, as good practice and to minimise any vibration from the plant to the development itself and adjoining neighbouring properties.

Outline specification details for suitable vibration isolators are provided in Section 7.2 of the report.

7. SPECIFICATIONS FOR NOISE & VIBRATION TREATMENTS

***Informative*: Proposed Plant**

This report is based on the specific proposed make and models of plant as detailed in Section 5.

If during later design stages, during installation or as part of future plant / equipment replacement, an alternative make and model of plant item is selected, it is important that noise levels for the alternative item be checked by Philip Acoustics or another acoustic consultant to ensure the treatments specified below remain valid and noise emissions remain compliant with the noise limit.

Philip Acoustics can only advise on noise and vibration issues and therefore it is recommended that professional advice from others may need to be sought to confirm suitability of noise control treatments with regard to non-acoustic issues such as ventilation system airflow rates & system pressure drop. Suppliers for the specified noise control treatments would be able to assist with advice on these aspects.

7.1 Noise Reduction

To comply with the noise criterion limit it is necessary to specify noise reduction treatment to some of the plant items. Specification details for the proposed noise reduction treatments are provided below and are as included in the noise model calculation in Appendix E.

7.1.1 Supply Air System

A silencer (attenuator) is required to the supply air system to reduce fan noise transmission externally out of the intake aperture. The silencer to be fitted within the supply air system atmosphere side duct, located between the fan and external intake aperture.

The proposed silencer is a conventional 2D circular podded type; Acoustica product code CP03-C*P-0450-2D, 450mm internal diameter and 900mm length.

Specification for the silencer is shown in Table 4, data sheet for the silencer is provided in Appendix F.

Description	Octave Band Centre Frequency (Hz)							
	63	125	250	500	1k	2k	4k	8k
Supply Air System: 2D circular podded type silencer - Acoustica product code CP03-C*P-0450-2D								
Silencer Insertion Loss (attenuation dB)	3	7	12	22	29	29	25	20
Regenerated Noise Limits Lw (dB)	*Not applicable for circular type silencers*							

Table 4: Specification details for Supply Air System silencer

7.1.2 Oven Extract System

As for the supply air system, a silencer (attenuator) is required to the oven extract system to reduce fan noise transmission externally out of the discharge aperture. The silencer to be fitted within the oven extract system atmosphere side duct, located between the fan and external discharge aperture.

The proposed silencer is a conventional 2D circular podded type; Acoustica product code CP03-C*P-0450-2D, 450mm internal diameter and 900mm length (same silencer as for the supply air system).

Specification for the silencer is shown in Table 5, data sheet for the silencer is provided in Appendix F.

Description	Octave Band Centre Frequency (Hz)							
	63	125	250	500	1k	2k	4k	8k
Oven Extract System: 2D circular podded type silencer - Acoustica product code CP03-C*P-0450-2D								
Silencer Insertion Loss (attenuation dB)	3	7	12	22	29	29	25	20
Regenerated Noise Limits Lw (dB)	*Not applicable for circular type silencers*							

Table 5: Specification details for Oven Extract System silencer

The normal build-up of deposits inside kitchen / oven extract ductwork can degrade the performance of silencers over time. It is important therefore to clean the inside of the oven extract system silencer at regular intervals depending up on the level of deposit build up. This would normally take place during routine oven extract fan and ductwork cleaning.

7.1.3 Air Conditioning Unit & Cold Room Unit

The air conditioning unit & cold room unit located externally at ground level to the rear yard area of the site as indicated on the proposed layout plan general arrangement and elevation drawings in Appendix B do not require noise reduction treatment.

7.2 Vibration Isolation

As detailed in Section 6, it is advised the plant is required to be installed using proprietary vibration isolators. Outline specification detail for suitable vibration isolators are provided below.

7.2.1 Supply Air Fan & Oven Extract Fan Systems

It is recommended the supply air fan and oven extract fan be installed using high performance spring type vibration isolator hangers or mounts having a nominal static deflection minimum 15mm under the installed total weights of the supply air fan and oven extract fan. The spring type vibration isolators to incorporate rubber or neoprene noise stop pads.

Four isolators are normally required per fan unit, one for each corner support position. The vibration isolator hangers or mounts should only take weight of the supply air fan and oven extract fan. Associated ductwork either side (including silencers) should be supported by other separate rubber or neoprene vibration isolator hangers / mountings.

The supply air fan and oven extract fan should also have ductwork flexible connections fitted. To be effective the flexible connections need to be “loose” (not taught) when installed and would be typically formed using rubber or neoprene sheet material. Standard size flexible connections are available from most duct component suppliers.

7.2.2 Air Conditioning Unit & Cold Room Unit

It is recommended the air conditioning unit & cold room unit are installed off the ground using proprietary rubber or neoprene turret type vibration isolator mountings. The isolators should be selected to each have a static deflection ≥3mm under the installed total weights of the units.

Suitable turret type vibration isolators are approximately 25 to 30mm high and are available in various load capacities. Four isolators are required per unit (one to each corner mounting foot position).

APPENDIX A

Noise Survey Instrumentation

Site: Unit 2, 53-57 Berry Lane, Longridge, Preston PR3 3NH

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Date: November 2022

NOISE SURVEY INSTRUMENTATION

Instrumentation Used:

- Rion sound level meter type NL-32 Class 1 serial number 01103430, Rion preamplifier type NH-21, Rion microphone type UC-53A serial number 317947, Rion microphone windshield type WS-10, Rion microphone extension cable type EC-04A and tripod / boom arrangement;
- Bruel & Kjaer calibrator type 4231 serial number 2454786.
- Speedtech Instruments Skymaster model SM-28 serial number 19370 (weather conditions data).

Instrumentation Calibration Certification:

Description	Type Number	Manufacturer	Date of Calibration Expiration	Calibration Certificate Number
Class 1 Sound Level Meter *s/n 01103430*	NL-32	Rion	18/02/2024	TCRT22/1132
Microphone *s/n 317947*	UC-53A			
Preamplifier *s/n 34369*	NH-21			
Calibrator *s/n 2454786*	4231	Bruel & Kjaer	20/01/2023	TCRT21/1036

Instrumentation On-Site Calibration Check:

Description	Calibrator Reference Level *(as applicable to sound level meter)*	Measured Level	Comment
Before survey measurements	94.0dB	94.1dB	Pass
After survey measurements		94.1dB	Pass *(nil significant drift)*

APPENDIX B

Aerial Image, Site Location Plan, Block Plan & Proposed Layout Plan / Elevation Drawings

Site: Unit 2, 53-57 Berry Lane, Longridge, Preston PR3 3NH

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AERIAL IMAGE

Site: Unit 2, 53-57 Berry Lane, Longridge, Preston PR3 3NH

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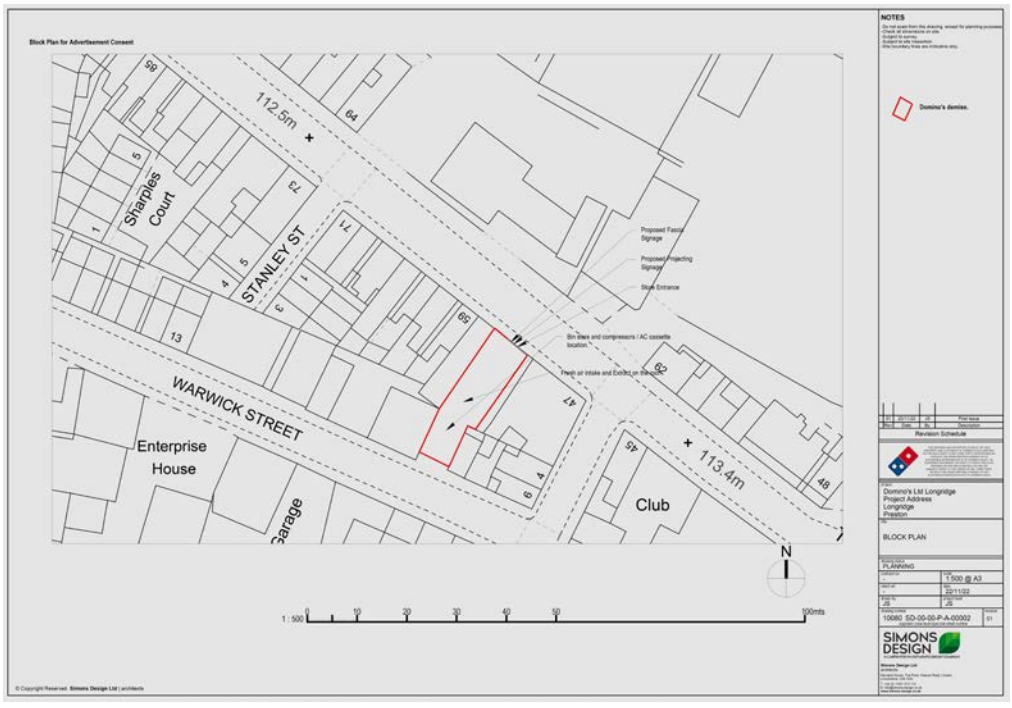
SITE LOCATION PLAN & BLOCK PLAN



Site: Unit 2, 53-57 Berry Lane, Longridge, Preston PR3 3NH

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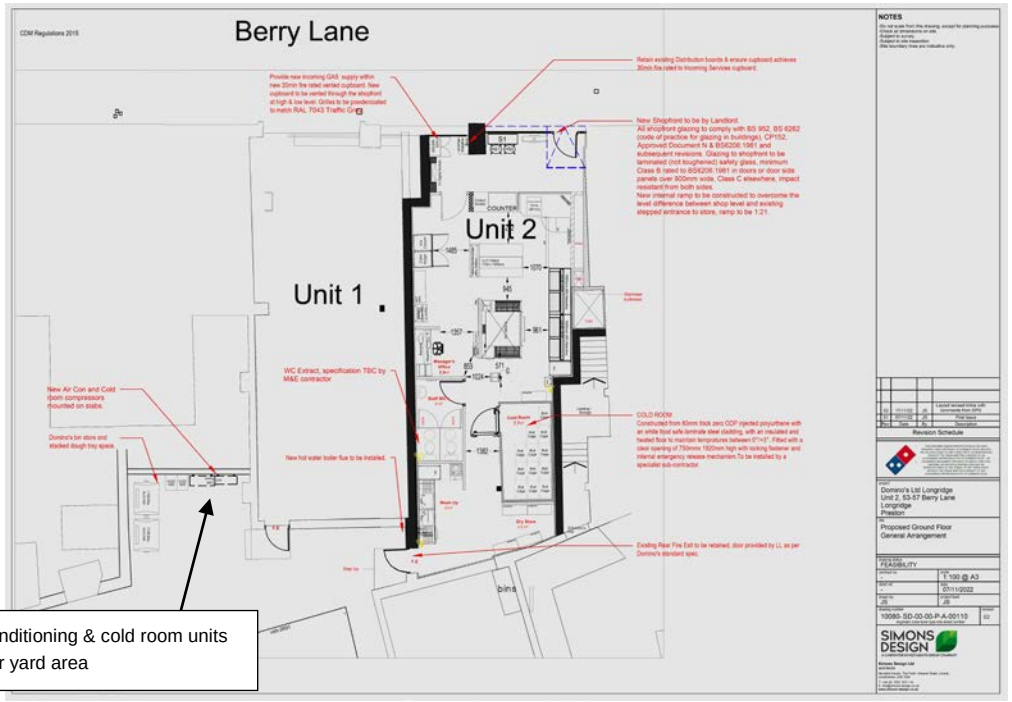
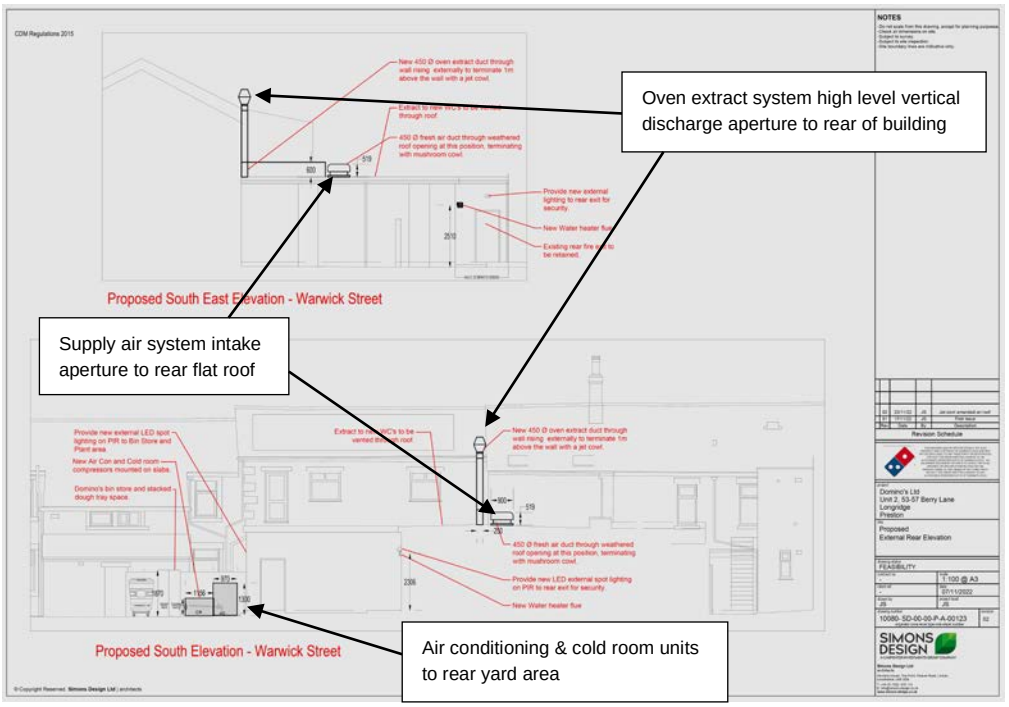
Date: November 2022

PROPOSED LAYOUT PLAN / ELEVATION DRAWINGS





APPENDIX C

Background Noise Survey Results

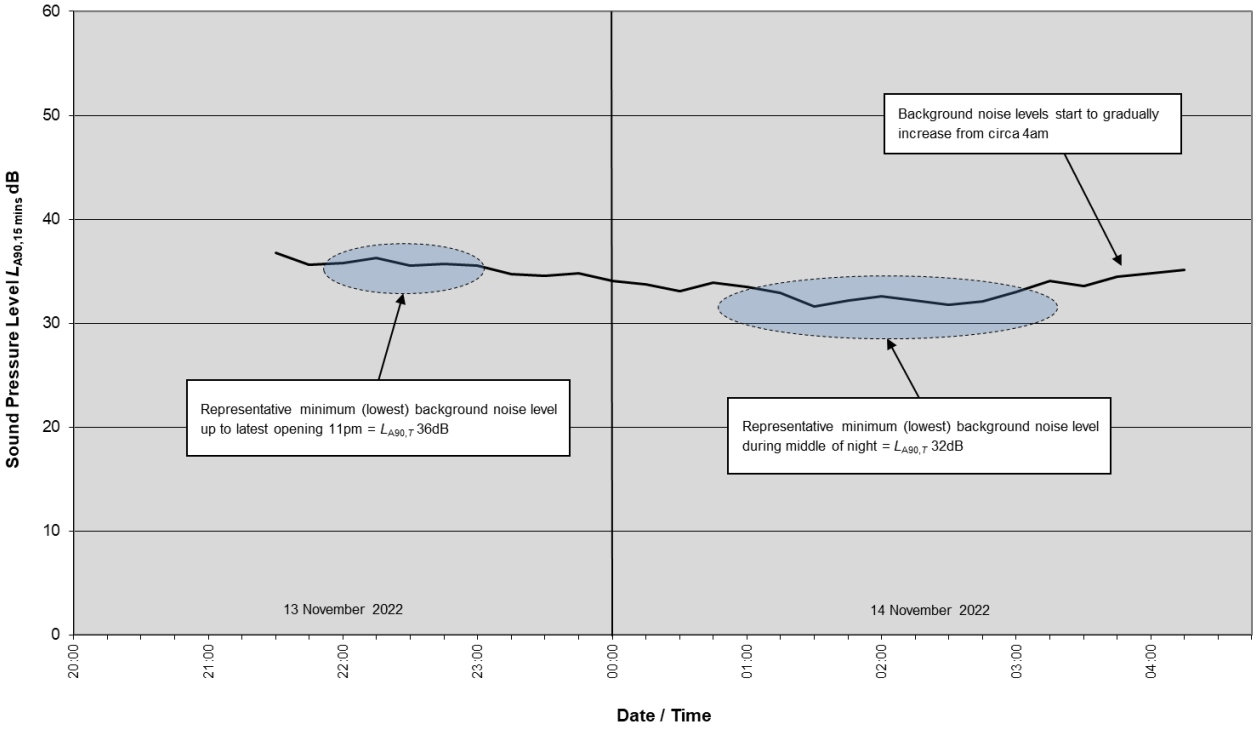
Site: Unit 2, 53-57 Berry Lane, Longridge, Preston PR3 3NH

Report: 22125-002 Appendix C *(page 1 of 1)*

Date: November 2022

BACKGROUND NOISE SURVEY RESULTS

Raw Data Survey Results *(measurement position externally to rear of site)*



APPENDIX D

Manufacturer's Plant Noise Data

Site: Unit 2, 53-57 Berry Lane, Longridge, Preston PR3 3NH

Report: 22125-002 Appendix D *(page 1 of 4)*

Date: November 2022

MANUFACTURER'S PLANT NOISE DATA

Supply Air System Fan: S&P CBM/6-320/240-550W

Technical characteristics

Before installation check that the product electrical characteristics listed on the data plate label (Voltage, power, frequency etc) match those of the intended electrical supply.

Model	Motor power (W)	Motor power (PK)	Equiv. in inches	Poles	Speed (r.p.m.)	Capacitor (µF / V)	Maximum current absorbed 230/1/50 (A)	Maximum current absorbed 230-400/3/50 (A)	Airflow (m³/h)	Sound pressure level * (dB(A))	Weight (kg)
CBM/6-180/180-72W	72	1/10	7/7	6	960	4/400	1,0	–	1400	56	9
CBM/4-180/180-147W	150	1/5	7/7	4	1350	6/400	1,5	–	1565	59	10
CBM/6-240/180-122W	120	1/6	9/7	6	900	8/500	2,1	–	2430	63	15
CBM/6-240/180-245W	250	1/3	9/7	6	920	10/450	2,45	–	2680	65	16
CBM/6-240/240-122W	120	1/6	9/9	6	850	8/500	2,1	–	2500	61	16
CBM/6-240/240-245W	250	1/3	9/9	6	900	10/450	2,75	–	2900	63	17
CBM/4-240/240-373W	370	1/2	9/9	4	1350	10/400	3,8	–	2650	65	19
CBM/6-270/200-245W	250	1/3	10/8	6	900	10/400	3,0	–	3480	65	18
CBM/6-270/200-373W	370	1/2	10/8	6	970	15/400	4,0	–	4000	68	19
CBM/4-270/200-373W	370	1/2	10/8	4	1300	12/400	5,0	–	3150	66	21
CBM/6-270/270-245W	250	1/3	10/10	6	900	10/400	3,0	–	3550	63	20
CBM/6-270/270-373W	370	1/2	10/10	6	900	15/400	4,0	–	4500	67	21
CBM/4-270/270-550W	550	3/4	10/10	4	1400	15/400	5,9	–	3540	66	23
CBM/6-320/240-550W	550	3/4	12/9	6	900	18/400	5,8	–	4700	67	28
CBM/6-320/240-1100W (trif.)	1100	1,5 (3f)	12/9	6	900	–	–	7,0/4,2	7000	75	28
CBM/6-320/320-550W	550	3/4	12/12	6	900	18/400	5,8	–	5250	66	30
CBM/6-320/320-1100W (trif.)	1100	1,5 (3f)	12/12	6	900	–	–	7,0/4,0	7900	78	30
CBM-RTC/6-380/380-2200W (trif.)	2200	3 (3f)	15/15	6	940	–		10,4/6,0	9000	70	45

* Measured at 1,5 meters at the fan inlet side in free field.

Manufacturer data in terms of overall sound pressure level 67dBA at 1.5m distance (free field) from fan inlet side

Site: Unit 2, 53-57 Berry Lane, Longridge, Preston PR3 3NH

Report: 22125-002 Appendix D *(page 2 of 4)*

Date: November 2022

MANUFACTURER'S PLANT NOISE DATA

Oven Extract System Fan: S&P TCBT/4-450/H


CYLINDRICAL CASED AXIAL FLOW FANS
COMPACT TCBB / TCBT Series - ALUMINIUM IMPELLERS

Range of cylindrical cased axial flow fans fitted with aluminium impellers and manufactured from high grade rolled galvanised steel and protected against corrosion by cataforesis primer and black polyester paint finish.
All models are supplied with pre-wired wiring junction box located on the outside of the fan casing for easy wiring access.
Available, depending upon the model, with single or three phase motors in 2, 4 or 6 poles.

Motors
Single phase motor (TCBB) or three phase motor (TCBT).
Models 250, 315, 355 and 400: External rotor motor, IP54, Class F, thermal protection, working temperature from -40°C to +40°C.
Models 450, 500, 560, 630 and 6/710: IP65, Class F, thermal protection, working temperature from -40°C to +70°C.
Models 4/710 and 800: IP55, Class F, working temperature from -40°C to +40°C.

All motors are speed controllable by autotransformer except models /4-560H, /4-630, 710 and T/800.
Three phase motors are speed controllable by inverter.
Electrical supplies:
Single phase 220-240V-50Hz.
(Capacitor located inside the wiring terminal box).
Three phase 220-240/380-415V-50Hz or 380-415V-50Hz.
(See characteristic chart).

Additional information
Standard air direction: form (B) configuration (impeller over motor).

On request
Air direction: form (A) configuration (motor over impeller).
From Ø450 to Ø800, three phase motors 2 speed, 4/8 poles.

ATEX versions TCBT
On request, explosion proof versions in accordance with ATEX Directive, for 3 phase models.
For ambient working temperatures:
From -20°C to +55°C: models TCBT/4-315 to 630mm
models TCBT/4-355 to 710mm
From -20°C to +40°C: models TCBT/4-710 to 800mm
models TCBT/4-800mm
Motors IP55 Class F
- ATEX Flameproof - Gas
In standard ATEX version flameproof motors are without thermal protection.
If used with frequency inverter, flameproof motors with a PTC-type thermal protection must be specified at order.
For models TCBT/4-710 and 800mm
models 2G Exd IIB T4
models 2G Exd IIB(H2) T4 (with Ex d IIC T4 motor)
- ATEX increased safety - Gas
Not available TCBT/2-250/H 400V-50Hz
TCBT/4-250/H 400V-50Hz
TCBT/4-355/H 400V-50Hz
TCBT/6-400/H 400V-50Hz
Available for TCBT/6-400/H 230/400V-50Hz and larger sizes.
models 2D Exe II T3
- ATEX - Dust
In standard ATEX version, ATEX motors for dust are without thermal protection.
If used with frequency inverter, ATEX motors for dust with a PTC-type thermal protection must be specified at order.

Corrosion resistance
Rolled steel casings and motor support protected by cataforesis primer and black polyester paint finish.
Stainless steel screws.

Terminal box
Wiring terminal box with cable gland PG-11 (except ATEX models).

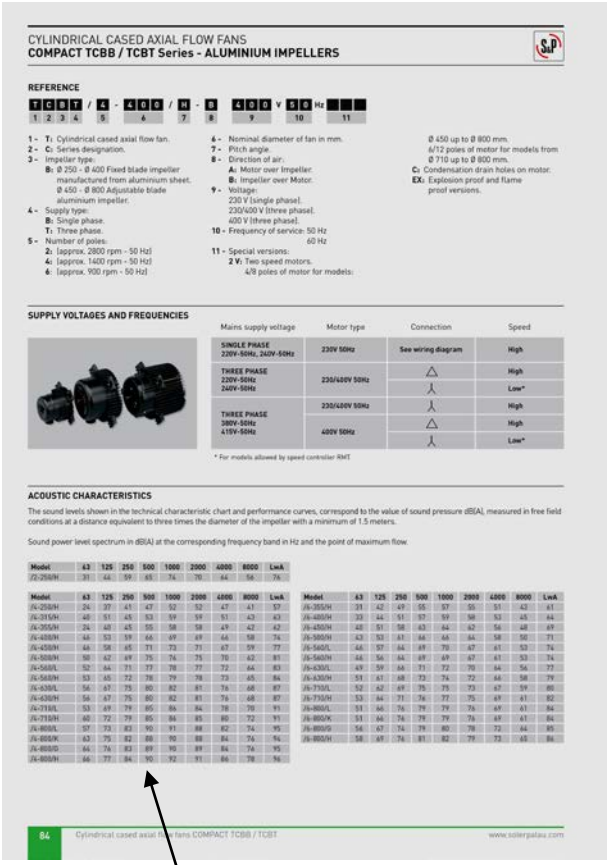
Impeller dynamically balanced
Impellers are dynamically balanced, according to ISO 1940 standard, giving vibration free operation.

Configuration for models /4-710 and 800.

Constructive configuration models 250, 315, 355 and 400 (excepted 6-355, 6-400 and ATEX)

Specific applications
For models TCBT/4-710 and 800mm
Suspended flammable particles and non-conductive dust:
II 3D Ex tc IIIB T125°C
Conductive dust:
II 3D Ex tc IIIC T125°C (with IP65 motor)
To select TCBT ATEX refer to performance curves, or Easywnt.
Note electrical data may vary for ATEX motors.

82 Cylindrical cased axial flow fans COMPACT TCBB / TCBT www.solerpalau.com


CYLINDRICAL CASED AXIAL FLOW FANS
COMPACT TCBB / TCBT Series - ALUMINIUM IMPELLERS

REFERENCE
T C B T / 4 - 4 0 0 / H - 0 4 0 0 V 5 0 Hz
1 2 3 4 5 6 7 8 9 10 11

1 - T: Cylindrical cased axial flow fan.
2 - C: Series designation.
3 - Impeller type:
B: Ø 250 - Ø 400 Fixed blade impeller manufactured from aluminium sheet.
Ø 450 - Ø 800 Adjustable blade aluminium impeller.
4 - Supply type:
B: Single phase.
T: Three phase.
5 - Number of poles:
2: (approx. 2800 rpm - 50 Hz)
4: (approx. 1400 rpm - 50 Hz)
6: (approx. 900 rpm - 50 Hz)
6 - Nominal diameter of fan in mm.
7 - Pitch angle.
8 - Direction of air:
A: Motor over Impeller.
B: Impeller over Motor.
9 - Voltage:
230 V (single phase).
230/400 V (three phase).
400 V (three phase).
10 - Frequency of service: 50 Hz / 60 Hz
11 - Special versions:
2 V: Two speed motors.
4/8 poles of motor for models:
Ø 450 up to Ø 800 mm.
6/12 poles of motor for models from Ø 710 up to Ø 800 mm.
C: Condensation drain holes on motor.
EX: Explosion proof and flame proof versions.

SUPPLY VOLTAGES AND FREQUENCIES

Mains supply voltage	Motor type	Connection	Speed
SINGLE PHASE 220V-50Hz, 240V-50Hz	230V 50Hz	See wiring diagram	High
THREE PHASE 220V-50Hz 240V-50Hz	230/400V 50Hz	△	High
		Y	Low*
THREE PHASE 380V-50Hz 415V-50Hz	230/400V 50Hz	Y	High
	400V 50Hz	△	High
		Y	Low*

* For models allowed by speed controller RMT

ACOUSTIC CHARACTERISTICS
The sound levels shown in the technical characteristic chart and performance curves, correspond to the value of sound pressure dB(A), measured in free field conditions at a distance equivalent to three times the diameter of the impeller with a minimum of 1.5 meters.
Sound power level spectrum in dB(A) at the corresponding frequency band in Hz and the point of maximum flow.

Model	63	125	250	500	1000	2000	4000	8000	LwA
/2-250/H	31	44	59	65	74	70	64	56	76

Model	63	125	250	500	1000	2000	4000	8000	LwA
/4-250/H	24	37	41	47	52	52	47	41	57
/4-315/H	40	51	45	53	59	59	51	43	63
/4-355/H	24	40	45	55	58	58	49	42	62
/4-400/H	46	53	59	66	69	69	66	58	74
/4-450/H	46	58	65	71	73	71	67	59	77
/4-500/H	50	62	69	75	76	75	70	62	81
/4-560/L	52	64	71	77	78	77	72	64	83
/4-560/H	53	65	72	78	79	78	73	65	84
/4-630/L	56	67	75	80	82	81	76	68	87
/4-630/H	56	67	75	80	82	81	76	68	87
/4-710/L	53	69	79	85	86	84	78	70	91
/4-710/H	60	72	79	85	86	85	80	72	91
/4-800/L	57	73	83	90	91	88	82	74	95
/4-800/K	63	75	82	88	90	88	84	76	94
/4-800/G	64	76	83	89	90	89	84	76	95
/4-800/H	66	77	84	90	92	91	86	78	96

84 Cylindrical cased axial flow fans COMPACT TCBB / TCBT www.solerpalau.com

Manufacturer noise data is in terms of overall dBA & A weighted octave band sound power level values

Model	63	125	250	500	1000	2000	4000	8000	LwA
/4-250/H	24	37	41	47	52	52	47	41	57
/4-315/H	40	51	45	53	59	59	51	43	63
/4-355/H	24	40	45	55	58	58	49	42	62
/4-400/H	46	53	59	66	69	69	66	58	74
/4-450/H	46	58	65	71	73	71	67	59	77
/4-500/H	50	62	69	75	76	75	70	62	81
/4-560/L	52	64	71	77	78	77	72	64	83
/4-560/H	53	65	72	78	79	78	73	65	84
/4-630/L	56	67	75	80	82	81	76	68	87
/4-630/H	56	67	75	80	82	81	76	68	87
/4-710/L	53	69	79	85	86	84	78	70	91
/4-710/H	60	72	79	85	86	85	80	72	91
/4-800/L	57	73	83	90	91	88	82	74	95
/4-800/K	63	75	82	88	90	88	84	76	94
/4-800/G	64	76	83	89	90	89	84	76	95
/4-800/H	66	77	84	90	92	91	86	78	96

Site: Unit 2, 53-57 Berry Lane, Longridge, Preston PR3 3NH

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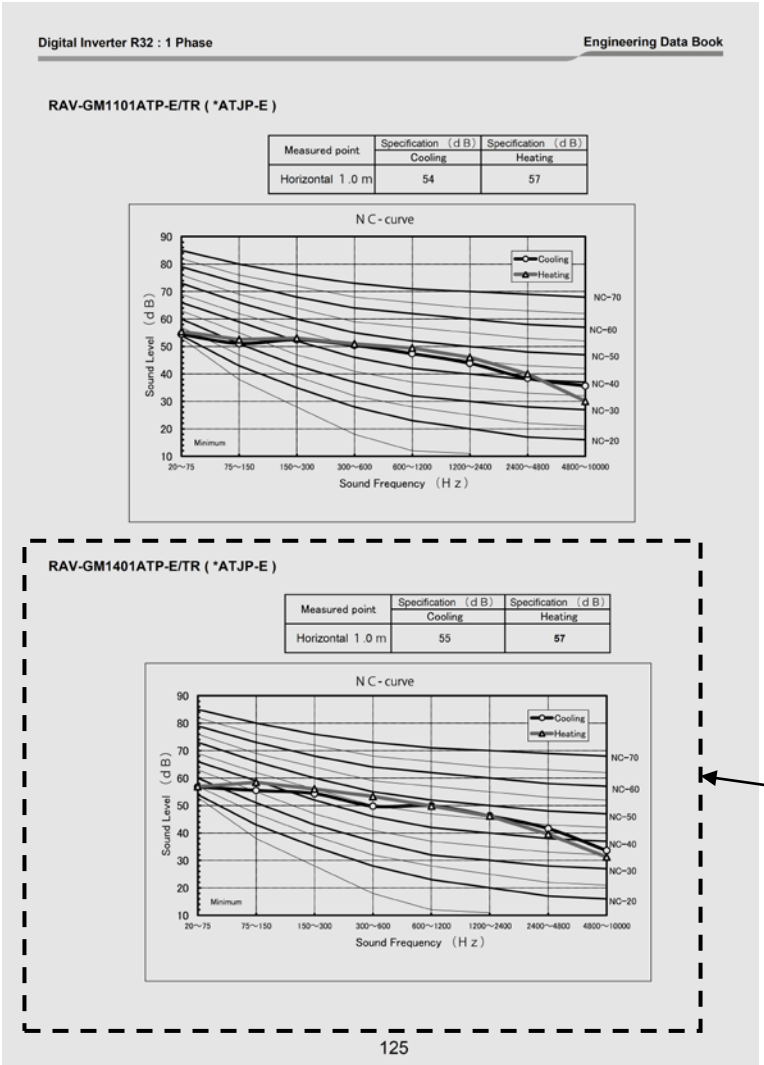
MANUFACTURER'S PLANT NOISE DATA

Air Conditioning Unit: Toshiba RAV-GM1401ATP-E



Manufacturer noise data is in terms of overall dBA & linear dB octave band free-field sound pressure levels at 1m

Site: Unit 2, 53-57 Berry Lane, Longridge, Preston PR3 3NH

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Date: November 2022

MANUFACTURER'S PLANT NOISE DATA

Cold Room Unit: Tecumseh Wintsys WINAJ4519Z

Tecumseh

Condensing unit
Voltage Code : FZ

WINAJ4519Z-FZ

High Temp. Commercial (HP)

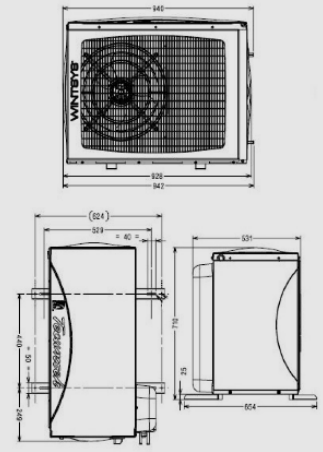
220 - 240V 1~ 50 Hz

R452A / R404A / R448A / R449A

WINAJ4519Z-FZ

Conditions	Frequency	Nominal Cooling Capacity Watts	Nominal Cooling Capacity BTU/h	Sound Power ISO3745 / ISO 3743-1
EN13215 / R452A	50 Hz	2729	9306	63 dBA
EN13215 / R404A	50 Hz	2860	9754	63 dBA
EN13215 / R448A	50 Hz	2501	8528	63 dBA
EN13215 / R449A	50 Hz	2502	8532	63 dBA

Manufacturer noise data is in terms of overall dBA sound power level



* EN13215 : T°Ambient 32.0°C / T°Evap. -10.0°C / T°Return gas temp.. 20.0°C T°Subcooling. 3.0K

Net Weight (Kg)	65.0
Expansion device	Expansion_Valve
Air Flow (m³/h)	1650
Compo Data Sheet	224ST-FZ
Elec Comp Type	CSR
Current (Amp)	
Load Rated Amp	10.2
Max Cont Current	15.5
Lock Rotor Amp	45
Fan	
Speed (rpm)	546
Power (W)	65.0
Diameter (mm)	360
Protection	Overload
IP Level	IP44
Condenser	360/14100
Liquid Receiver	
Capacity (L)	2.35
Maximum Pressure (Bars)	32.0
Suction Line	
Suction Type	Tube / Tube
For Tubing Out Diam	15.9 (5/8")
Suction Connection Type	Brased
Liquid Line	
Liquid Line Type	Tube
For Tubing Out Diam	9.5 (3/8")
Liquid Connecton Type	Brased
Connection Type	TT
Fan Guard	maille < à 8mm

Note : Tecumseh reserves the right to change information contained in this document without notification.

Selection program - V4.6_2020072 - 06/05/2020

APPENDIX E

Noise Assessment Positions & Plant Noise Model Calculation

Site: Unit 2, 53-57 Berry Lane, Longridge, Preston PR3 3NH

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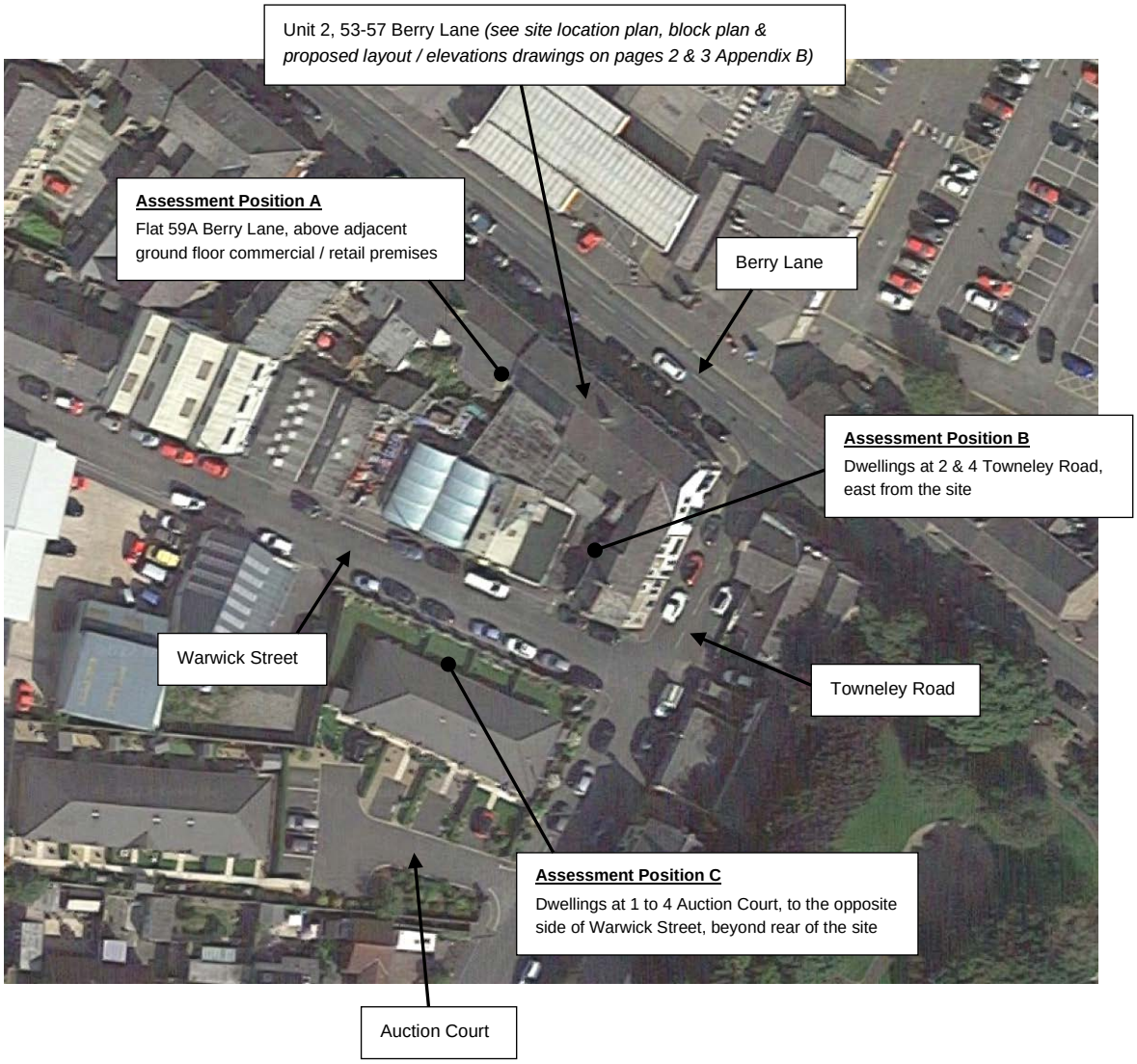
Date: November 2022

NOISE ASSESSMENT POSITIONS



Site: Unit 2, 53-57 Berry Lane, Longridge, Preston PR3 3NH

Report: 22125-002 Appendix E *(page 2 of 4)*

Date: November 2022

PLANT NOISE MODEL CALCULATION

ASSESSMENT POSITION A: Flat 59A Berry Lane, above adjacent ground floor commercial / retail premises

NOISE CONDITION: Opening hours; all plant items operating full duty

NOISE MITIGATION: Silencers to supply air system & oven extract system *(see Section 7.1 Report 22125-002)*

		Lin dB at Octave Band Centre Frequency Hz							
Plant & Description	**Overall dBA**	**63**	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**
SUPPLY AIR AHU SYSTEM - INTAKE APERTURE: S&P CBM/6-320/240-550W Fan									
Sound pow er level Lw dB; *fan inlet induct*	79	80	78	77	76	74	70	67	63
Duct Loss; *duct length between fan & aperture (excluding silencer) - allow ≈3m nominal 450mm Ø*		0	0	0	0	0	0	0	0
Duct Loss; *duct bends between fan & aperture - allow 1 x 90 ° radius bend nominal 450mm Ø*		0	0	0	-1	-2	-3	-3	-3
Duct Loss; *aperture end reflection 450mm Ø duct to external intake aperture*		-10	-6	-2	0	0	0	0	0
Noise Mitigation; *atmosphere side silencer to system (Acoustica podded silencer code CP03-C*P-0450-2D)*		-3	-7	-12	-22	-29	-29	-25	-20
Sound pow er level Lw dB; *external aperture Lw*	57	67	65	63	53	43	38	39	40
Distance; *free-field correction for ≈12m from aperture to assessment position*		-30	-30	-30	-30	-30	-30	-30	-30
Screening; *nil line of sight acoustic screening correction applicable*		0	0	0	0	0	0	0	0
Directivity; *≈90 ° off-axis aperture directivity applicable, limit to -10dB*		-1	-2	-3	-4	-6	-10	-10	-10
Non Free-Field / Reflections; *nil correction applicable for intake aperture over flat roof area*		0	0	0	0	0	0	0	0
Individual contribution at assessment position	24	36	33	30	19	7	-2	-1	0
OVEN EXTRACT SYSTEM - DISCHARGE APERTURE: S&P TCBT/4-450/H Fan									
Sound pow er level Lw dB; *fan outlet induct Lw*	77	72	74	74	74	73	70	66	60
Duct Loss; *duct length between fan & aperture (excluding silencer) - allow ≈8m nominal 450mm Ø*		0	0	0	0	-1	-1	-1	-1
Duct Loss; *duct bends between fan & aperture - allow 3 x 90 ° radius bends nominal 450mm Ø*		0	-1	-2	-3	-6	-9	-9	-9
Duct Loss; *aperture end reflection 450mm Ø duct to external discharge aperture*		-10	-6	-2	0	0	0	0	0
Noise Mitigation; *atmosphere side silencer to system (Acoustica podded silencer code CP03-C*P-0450-2D)*		-3	-7	-12	-22	-29	-29	-25	-20
Sound pow er level Lw dB; *external aperture Lw*	52	59	60	58	49	37	31	31	30
Distance; *free-field correction for ≈9m from aperture to assessment position*		-27	-27	-27	-27	-27	-27	-27	-27
Screening; *nil line of sight acoustic screening correction applicable*		0	0	0	0	0	0	0	0
Directivity; *≈ 90° off-axis aperture directivity applicable (vertical discharge), limit to -10dB*		-1	-2	-3	-4	-6	-10	-10	-10
Non Free-Field / Reflections; *nil correction applicable for high level vertical discharge aperture*		0	0	0	0	0	0	0	0
Individual contribution at assessment position	22	31	31	28	18	4	-6	-6	-7
AIR CONDITIONING UNIT: Toshiba RAV-GM1401ATP-E									
Sound pow er level Lw dB *(unit installed for cooling mode operation)*	63	65	64	63	58	58	55	50	42
Quantity; *0dB quantity correction applicable for 1 x unit*		0	0	0	0	0	0	0	0
Noise Mitigation; *non applied*		0	0	0	0	0	0	0	0
Distance; *free-field correction for ≈8m from unit to assessment position*		-26	-26	-26	-26	-26	-26	-26	-26
Screening; *line of sight acoustic screening correction applicable, limit to -15dB*		-8	-9	-11	-14	-15	-15	-15	-15
Directivity; *nil directivity correction applicable (unit radiates noise equally all directions)*		0	0	0	0	0	0	0	0
Non Free-Field / Reflections; *+6dB correction applied for unit adjacent to walls*		6	6	6	6	6	6	6	6
Individual contribution at assessment position	29	37	35	32	24	23	20	15	7
COLD ROOM UNIT: Tecumseh Wintsys WINAJ4519Z									
Sound pow er level Lw dB	63	65	63	61	59	58	55	51	43
Quantity; *0dB quantity correction applicable for 1 x unit*		0	0	0	0	0	0	0	0
Noise Mitigation; *non applied*		0	0	0	0	0	0	0	0
Distance; *free-field correction for ≈8m from unit to assessment position*		-26	-26	-26	-26	-26	-26	-26	-26
Screening; *line of sight acoustic screening correction applicable, limit to -15dB*		-8	-9	-11	-14	-15	-15	-15	-15
Directivity; *nil directivity correction applicable (unit radiates noise equally all directions)*		0	0	0	0	0	0	0	0
Non Free-Field / Reflections; *+6dB correction applied for unit adjacent to walls*		6	6	6	6	6	6	6	6
Individual contribution at assessment position	29	37	34	30	25	23	20	16	8
Cumulative Plant Noise (Specific Noise Level) At Assessment Position									
All Plant: Operating during opening hours (range 11am to 11pm)	**33**	**42**	**39**	**36**	**29**	**26**	**23**	**19**	**11**
Cold Room Unit: Operable over 24 hours (including through the night)	**29**	**37**	**34**	**30**	**25**	**23**	**20**	**16**	**8**

The overall cumulative sound pressure (noise) level at the assessment position due to all plant items operating is 33dBA. For only the cold room unit operating during the middle of the night, the noise level of plant at the assessment position is 29dBA.

Although the specified noise reduction treatment will tend to supress any tonal characteristics of the plant, plus noise from the air conditioning & cold room units is nominally broadband in nature, a +2dBA penalty (correction) as per the assessment guidance of BS4142:2014 is cautiously added to the overall calculated plant noise levels to give plant noise Rating Levels to account that residual noise from the plant could potentially have a just perceptible tonal characteristic to the assessment position (although considered unlikely in practice).

Site: Unit 2, 53-57 Berry Lane, Longridge, Preston PR3 3NH

Report: 22125-002 Appendix E *(page 3 of 4)*

Date: November 2022

PLANT NOISE MODEL CALCULATION

ASSESSMENT POSITION B: Dwellings at 2 & 4 Towneley Road, east from the site

NOISE CONDITION: Opening hours; all plant items operating full duty

NOISE MITIGATION: Silencers to supply air system & oven extract system *(see Section 7.1 Report 22125-002)*

		Lin dB at Octave Band Centre Frequency Hz							
Plant & Description	**Overall dBA**	**63**	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**
SUPPLY AIR AHU SYSTEM - INTAKE APERTURE: S&P CBM/6-320/240-550W Fan									
Sound pow er level Lw dB; *fan inlet induct*	79	80	78	77	76	74	70	67	63
Duct Loss; *duct length between fan & aperture (excluding silencer) - allow ≈3m nominal 450mm Ø*		0	0	0	0	0	0	0	0
Duct Loss; *duct bends between fan & aperture - allow 1 x 90 ° radius bend nominal 450mm Ø*		0	0	0	-1	-2	-3	-3	-3
Duct Loss; *aperture end reflection 450mm Ø duct to external intake aperture*		-10	-6	-2	0	0	0	0	0
Noise Mitigation; *atmosphere side silencer to system (Acoustica podded silencer code CP03-C*P-0450-2D)*		-3	-7	-12	-22	-29	-29	-25	-20
Sound pow er level Lw dB; *external aperture Lw*	57	67	65	63	53	43	38	39	40
Distance; *free-field correction for ≈12m from aperture to assessment position*		-30	-30	-30	-30	-30	-30	-30	-30
Screening; *nil line of sight acoustic screening correction applicable*		0	0	0	0	0	0	0	0
Directivity; *≈90 ° off-axis aperture directivity applicable, limit to -10dB*		-1	-2	-3	-4	-6	-10	-10	-10
Non Free-Field / Reflections; *nil correction applicable for intake aperture over flat roof area*		0	0	0	0	0	0	0	0
Individual contribution at assessment position	24	36	33	30	19	7	-2	-1	0
OVEN EXTRACT SYSTEM - DISCHARGE APERTURE: S&P TCBT/4-450/H Fan									
Sound pow er level Lw dB; *fan outlet induct Lw*	77	72	74	74	74	73	70	66	60
Duct Loss; *duct length between fan & aperture (excluding silencer) - allow ≈8m nominal 450mm Ø*		0	0	0	0	-1	-1	-1	-1
Duct Loss; *duct bends between fan & aperture - allow 3 x 90 ° radius bends nominal 450mm Ø*		0	-1	-2	-3	-6	-9	-9	-9
Duct Loss; *aperture end reflection 450mm Ø duct to external discharge aperture*		-10	-6	-2	0	0	0	0	0
Noise Mitigation; *atmosphere side silencer to system (Acoustica podded silencer code CP03-C*P-0450-2D)*		-3	-7	-12	-22	-29	-29	-25	-20
Sound pow er level Lw dB; *external aperture Lw*	52	59	60	58	49	37	31	31	30
Distance; *free-field correction for ≈15m from aperture to assessment position*		-32	-32	-32	-32	-32	-32	-32	-32
Screening; *nil line of sight acoustic screening correction applicable*		0	0	0	0	0	0	0	0
Directivity; *≈ 90° off-axis aperture directivity applicable (vertical discharge), limit to -10dB*		-1	-2	-3	-4	-6	-10	-10	-10
Non Free-Field / Reflections; *nil correction applicable for high level vertical discharge aperture*		0	0	0	0	0	0	0	0
Individual contribution at assessment position	17	26	26	23	13	-1	-11	-11	-12
AIR CONDITIONING UNIT: Toshiba RAV-GM1401ATP-E									
Sound pow er level Lw dB *(unit installed for cooling mode operation)*	63	65	64	63	58	58	55	50	42
Quantity; *0dB quantity correction applicable for 1 x unit*		0	0	0	0	0	0	0	0
Noise Mitigation; *non applied*		0	0	0	0	0	0	0	0
Distance; *free-field correction for ≈22m from unit to assessment position*		-35	-35	-35	-35	-35	-35	-35	-35
Screening; *line of sight acoustic screening correction applicable, limit to -15dB*		-15	-15	-15	-15	-15	-15	-15	-15
Directivity; *nil directivity correction applicable (unit radiates noise equally all directions)*		0	0	0	0	0	0	0	0
Non Free-Field / Reflections; *+6dB correction applied for unit adjacent to walls*		6	6	6	6	6	6	6	6
Individual contribution at assessment position	19	21	20	19	14	14	11	6	-2
COLD ROOM UNIT: Tecumseh Wintsys WINAJ4519Z									
Sound pow er level Lw dB	63	65	63	61	59	58	55	51	43
Quantity; *0dB quantity correction applicable for 1 x unit*		0	0	0	0	0	0	0	0
Noise Mitigation; *non applied*		0	0	0	0	0	0	0	0
Distance; *free-field correction for ≈22m from unit to assessment position*		-35	-35	-35	-35	-35	-35	-35	-35
Screening; *line of sight acoustic screening correction applicable, limit to -15dB*		-15	-15	-15	-15	-15	-15	-15	-15
Directivity; *nil directivity correction applicable (unit radiates noise equally all directions)*		0	0	0	0	0	0	0	0
Non Free-Field / Reflections; *+6dB correction applied for unit adjacent to walls*		6	6	6	6	6	6	6	6
Individual contribution at assessment position	19	21	19	17	15	14	11	7	-1
Cumulative Plant Noise (Specific Noise Level) At Assessment Position									
All Plant: Operating during opening hours (range 11am to 11pm)	**27**	**37**	**35**	**32**	**22**	**18**	**14**	**10**	**4**
Cold Room Unit: Operable over 24 hours (including through the night)	**19**	**21**	**19**	**17**	**15**	**14**	**11**	**7**	**-1**

The overall cumulative sound pressure (noise) level at the assessment position due to all plant items operating is 27dBA. For only the cold room unit operating during the middle of the night, the noise level of plant at the assessment position is 19dBA.

Although the specified noise reduction treatment will tend to supress any tonal characteristics of the plant, plus noise from the air conditioning & cold room units is nominally broadband in nature, a +2dBA penalty (correction) as per the assessment guidance of BS4142:2014 is cautiously added to the overall calculated plant noise levels to give plant noise Rating Levels to account that residual noise from the plant could potentially have a just perceptible tonal characteristic to the assessment position (although considered unlikely in practice).

Site: Unit 2, 53-57 Berry Lane, Longridge, Preston PR3 3NH

Report: 22125-002 Appendix E *(page 4 of 4)*

Date: November 2022

PLANT NOISE MODEL CALCULATION

ASSESSMENT POSITION C: Dwellings at 1 to 4 Auction Court, opposite side of Warwick Street, beyond rear of site

NOISE CONDITION: Opening hours; all plant items operating full duty

NOISE MITIGATION: Silencers to supply air system & oven extract system *(see Section 7.1 Report 22125-002)*

		Lin dB at Octave Band Centre Frequency Hz							
Plant & Description	**Overall dBA**	**63**	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**
SUPPLY AIR AHU SYSTEM - INTAKE APERTURE: S&P CBM/6-320/240-550W Fan									
Sound pow er level Lw dB; *fan inlet induct*	79	80	78	77	76	74	70	67	63
Duct Loss; *duct length between fan & aperture (excluding silencer) - allow ≈3m nominal 450mm Ø*		0	0	0	0	0	0	0	0
Duct Loss; *duct bends between fan & aperture - allow 1 x 90 ° radius bend nominal 450mm Ø*		0	0	0	-1	-2	-3	-3	-3
Duct Loss; *aperture end reflection 450mm Ø duct to external intake aperture*		-10	-6	-2	0	0	0	0	0
Noise Mitigation; *atmosphere side silencer to system (Acoustica podded silencer code CP03-C*P-0450-2D)*		-3	-7	-12	-22	-29	-29	-25	-20
Sound pow er level Lw dB; *external aperture Lw*	57	67	65	63	53	43	38	39	40
Distance; *free-field correction for ≈31m from aperture to assessment position*		-38	-38	-38	-38	-38	-38	-38	-38
Screening; *nil line of sight acoustic screening correction applicable*		0	0	0	0	0	0	0	0
Directivity; *≈90 ° off-axis aperture directivity applicable, limit to -10dB*		-1	-2	-3	-4	-6	-10	-10	-10
Non Free-Field / Reflections; *nil correction applicable for intake aperture over flat roof area*		0	0	0	0	0	0	0	0
Individual contribution at assessment position	16	28	25	22	11	-1	-10	-9	-8
OVEN EXTRACT SYSTEM - DISCHARGE APERTURE: S&P TCBT/4-450/H Fan									
Sound pow er level Lw dB; *fan outlet induct Lw*	77	72	74	74	74	73	70	66	60
Duct Loss; *duct length between fan & aperture (excluding silencer) - allow ≈8m nominal 450mm Ø*		0	0	0	0	-1	-1	-1	-1
Duct Loss; *duct bends between fan & aperture - allow 3 x 90 ° radius bends nominal 450mm Ø*		0	-1	-2	-3	-6	-9	-9	-9
Duct Loss; *aperture end reflection 450mm Ø duct to external discharge aperture*		-10	-6	-2	0	0	0	0	0
Noise Mitigation; *atmosphere side silencer to system (Acoustica podded silencer code CP03-C*P-0450-2D)*		-3	-7	-12	-22	-29	-29	-25	-20
Sound pow er level Lw dB; *external aperture Lw*	52	59	60	58	49	37	31	31	30
Distance; *free-field correction for ≈35m from aperture to assessment position*		-39	-39	-39	-39	-39	-39	-39	-39
Screening; *nil line of sight acoustic screening correction applicable*		0	0	0	0	0	0	0	0
Directivity; *≈ 90° off-axis aperture directivity applicable (vertical discharge), limit to -10dB*		-1	-2	-3	-4	-6	-10	-10	-10
Non Free-Field / Reflections; *nil correction applicable for high level vertical discharge aperture*		0	0	0	0	0	0	0	0
Individual contribution at assessment position	10	19	19	16	6	-8	-18	-18	-19
AIR CONDITIONING UNIT: Toshiba RAV-GM1401ATP-E									
Sound pow er level Lw dB *(unit installed for cooling mode operation)*	63	65	64	63	58	58	55	50	42
Quantity; *0dB quantity correction applicable for 1 x unit*		0	0	0	0	0	0	0	0
Noise Mitigation; *non applied*		0	0	0	0	0	0	0	0
Distance; *free-field correction for ≈29m from unit to assessment position*		-37	-37	-37	-37	-37	-37	-37	-37
Screening; *line of sight acoustic screening correction applicable, limit to -15dB*		-15	-15	-15	-15	-15	-15	-15	-15
Directivity; *nil directivity correction applicable (unit radiates noise equally all directions)*		0	0	0	0	0	0	0	0
Non Free-Field / Reflections; *+6dB correction applied for unit adjacent to walls*		6	6	6	6	6	6	6	6
Individual contribution at assessment position	16	19	18	17	12	12	9	4	-4
COLD ROOM UNIT: Tecumseh Wintsys WINAJ4519Z									
Sound pow er level Lw dB	63	65	63	61	59	58	55	51	43
Quantity; *0dB quantity correction applicable for 1 x unit*		0	0	0	0	0	0	0	0
Noise Mitigation; *non applied*		0	0	0	0	0	0	0	0
Distance; *free-field correction for ≈29m from unit to assessment position*		-37	-37	-37	-37	-37	-37	-37	-37
Screening; *line of sight acoustic screening correction applicable, limit to -15dB*		-15	-15	-15	-15	-15	-15	-15	-15
Directivity; *nil directivity correction applicable (unit radiates noise equally all directions)*		0	0	0	0	0	0	0	0
Non Free-Field / Reflections; *+6dB correction applied for unit adjacent to walls*		6	6	6	6	6	6	6	6
Individual contribution at assessment position	16	19	17	15	13	12	9	5	-3
Cumulative Plant Noise (Specific Noise Level) At Assessment Position									
All Plant: Operating during opening hours (range 11am to 11pm)	**21**	**29**	**27**	**25**	**17**	**15**	**12**	**7**	**0**
Cold Room Unit: Operable over 24 hours (including through the night)	**16**	**19**	**17**	**15**	**13**	**12**	**9**	**5**	**-3**

The overall cumulative sound pressure (noise) level at the assessment position due to all plant items operating is 21dBA. For only the cold room unit operating during the middle of the night, the noise level of plant at the assessment position is 16dBA.

Although the specified noise reduction treatment will tend to supress any tonal characteristics of the plant, plus noise from the air conditioning & cold room units is nominally broadband in nature, a +2dBA penalty (correction) as per the assessment guidance of BS4142:2014 is cautiously added to the overall calculated plant noise levels to give plant noise Rating Levels to account that residual noise from the plant could potentially have a just perceptible tonal characteristic to the assessment position (although considered unlikely in practice).

APPENDIX F

Noise Reduction Treatment For Plant

Site: Unit 2, 53-57 Berry Lane, Longridge, Preston PR3 3NH

Report: 22125-002 Appendix F *(page 1 of 1)*

Date: November 2022

NOISE REDUCTION TREATMENT FOR PLANT

Data sheet for specified 2D circular podded type silencer; Acoustica product code CP03-C*P-0450-2D

CP03
C Series

ACOUSTICA

CP03 - CA - 0450 Silencer

Available in two standard lengths C Series silencers have excellent attenuation properties, achieved with sound absorbing infill retained in the attenuator casing by a perforated liner. The central pod (code P) is an option to increase the insertion loss, however it will add resistance.

- Fits directly onto 450mm diameter fans
- Standard lengths 450mm (1D) & 900mm (2D)
- Use up to 70°C (standard construction)
- Systems up to 1000 Pascals
- Special lengths on request

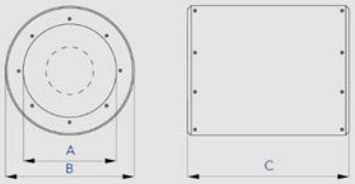
Insertion Loss (dB) - Centre Band Frequency

Product Code	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
CP03 - C* - 0450 - 1D	2	3	6	12	13	11	9	7
CP03 - C* - 0450 - 2D	3	4	8	17	18	15	11	10
CP03 - C*P - 0450 - 1D	2	6	8	16	23	23	21	16
CP03 - C*P - 0450 - 2D	3	7	12	22	29	29	25	20

Replace * in code with A or B for connection pattern. Insertion loss data is derived from continual testing to BS4718 and other standards in independent UKAS certified laboratories, which includes where appropriate, re-generated or self noise testing in both forward and reverse flow conditions. If you request system analysis from our technicians all predictions will be assessed using the relevant certified insertion loss data together with relevant dynamic corrections.

Dimensional Data

Product Code	A (mm)	B (mm)	C (mm)	Weight (kg)
CP03 - CA - 0450 - 1D	450	590	450	15
CP03 - CA - 0450 - 2D	450	590	900	27
CP03 - CAP - 0450 - 1D	450	590	450	18
CP03 - CAP - 0450 - 2D	450	590	900	32



Pattern A
8 x M10 - 500 PCD

Pattern B
12 - M8 - 487 PCD

Acoustica product code CP03-C*P-0450-2D circular podded type silencer (attenuator) specified for the supply air system & oven extract system

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