

Plant Assessment for Proposed Refrigeration / Air-Conditioning Plant

Co-op, Hoyland Road, Hoyland, Barnsley S74 0NE
Report Reference: B4365 20160707 R

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- 1.1 The Refrigeration & Air-Conditioning Plant Selection Acoustic Assessment Report Reference B4365 20160629 R concluded that:

A maximum cumulative design Rating Level of 45dBA in the closest garden during the day and 35dBA outside the nearest dwelling during the night-time will ensure that the neighbouring residents are not disturbed by noise from new plant at the site.

In order to achieve the identified suitable Design Criteria at the closest receptors all proposed fixed plant and equipment should be selected based on a maximum cumulative sound power level of 73dBA during the daytime and 64dBA during the night-time.

- 1.2 Previously a rating correction of 0dB was applied to the Design Criteria. However, the manufacturer's specifications for the proposed Hubbard refrigeration pack does not contain any spectral data. From experience, the proposed unit can produce some low frequency content when operating under higher load. Additionally, the unit may emit certain impulsive characteristics between changes in plant operation and can operate intermittently under lower demand or during times of the year with reduced ambient temperatures. However, given the context of the assessment, any potential acoustic characteristics emitted by the plant are likely to be masked by the residual soundscape and due to the specific sound level being somewhat lower than the residual and background sound level at the closest receptors, therefore an acoustic feature correction is not deemed applicable.
- 1.3 Furthermore, extensive experience of the proposed Searle Condenser and AC units have informed us that these types of units contain no significantly tonal characteristics which may attract a listener's attention. These units are fitted with EC or inverter driven fans which slowly adjust the fan speed to meet the demands on the unit and therefore will not start / stop frequently, when the fans do start and stop they do so gradually, thus avoiding any impulsive type this unit. Therefore, it is deemed that a Rating Penalty is not appropriate.
- 1.4 Calculation Sheet 1 below, presents an extract from the plant selection assessment report that details how the suitable cumulative Design Criteria has been derived. Calculation Sheet 2 details the calculated cumulative sound power level from selected plant against the identified cumulative Design Criterion. The manufacturer's data sheets are included with the submissions.
- 1.5 It has been proposed that absorptive acoustic panels should be fixed to the two external walls behind the AC units and refrigeration pack in order to reduce the reflective characteristics of the plant location. This will provide at least 6dBA reduction in sound level at the closest receptors.

- 1.6** The selected plant complies with the Design Criteria and therefore will achieve suitable sound levels at the closest sensitive properties and the amenity of those residents will be properly protected.

Calculation Sheet 1 – Preliminary Plant Selection Guidance Extract from Report

Daytime Cumulative Design Rating Level

		Right of the store	
Design Criterion			45 dBA
Corrections	Distance Attenuation	20m	+34 dB
	Screening Attenuation	None	+0 dB
	Source Reverberant Factor	Corner	-6 dB
	Receptor Directivity	In front	+0 dB
	Receptor Reverberant Factor	Flat surface	+0 dB
	Estimated Rating Penalty	None	+0 dB
	Existing Plant correction	None	+0 dB
Cumulative Design Sound Power Level			73 dBA
Indicative Sound Pressure Level at 10m			43 dBA

Night-Time Cumulative Design Rating Level

		Right of the store	
Design Criterion			35 dBA
Corrections	Distance Attenuation	22m	+35 dB
	Screening Attenuation	None	+0 dB
	Source Reverberant Factor	Corner	-6 dB
	Receptor Directivity	In front	+0 dB
	Receptor Reverberant Factor	Flat surface	+0 dB
	Estimated Rating Penalty	None	+0 dB
	Existing Plant correction	None	+0 dB
Cumulative Design Sound Power Level			64 dBA
Indicative Sound Pressure Level at 10m			34 dBA

Calculation Sheet 2 – Calculation of Cumulative Sound Power Level from Selected Plant

Daytime Cumulative Sound Power Level Calculation

	Searle Condenser	Hubbard Pack	Existing AC1 & Daikin AC2	Daikin AC3
Sound Power Level	65 dBA	60 dBA	76 dBA	61 dBA
Corrections				
Attenuation Performance	None +0 dB	Acoustic Panels -6 dB	Acoustic Panels -6 dB	Acoustic Panels -6 dB
Additional Source Directivity Correction	None +0 dB	None +0 dB	None +0 dB	None +0 dB
Rating Penalty Correction from Estimate	None +0 dB	None +0 dB	None +0 dB	None +0 dB
Other Correction	None +0 dB	None +0 dB	None +0 dB	None +0 dB
Corrected Individual Sound Power Level	65 dBA	54 dBA	70 dBA	55 dBA
Cumulative Sound Power Level				71 dBA
Maximum Identified Cumulative Design Sound Power Level				73 dBA
Corresponding Rating Level at Receptor (LAeq,1h)				43 dBA
Identified Suitable Design Criterion at Receptor				45 dBA
Difference Between Rating Level and Design Criterion at Receptor				-2 dBA

Night-Time Cumulative Sound Power Level Calculation

	Searle Condenser	Hubbard Pack	Existing AC1 & Daikin AC2	Daikin AC3
Sound Power Level	58 dBA	57 dBA		
Corrections				
Attenuation Performance	None +0 dB	Acoustic Panels -6 dB	NOT OPERATING	NOT OPERATING
Additional Source Directivity Correction	None +0 dB	None +0 dB		
Rating Penalty Correction from Estimate	None +0 dB	None +0 dB		
Other Correction	None +0 dB	None +0 dB		
Corrected Individual Sound Power Level	58 dBA	51 dBA	0 dBA	0 dBA
Cumulative Sound Power Level				59 dBA
Maximum Identified Cumulative Design Sound Power Level				64 dBA
Corresponding Rating Level at Receptor (LAeq,15m)				30 dBA
Identified Suitable Design Criterion at Receptor				35 dBA
Difference Between Rating Level and Design Criterion at Receptor				-5 dBA