ACOUSTICAL CONTROL Engineers & Consultants

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Plant Assessment for Proposed
Refrigeration / Air-Conditioning Plant

Co-op, Blacker Road, Mapplewell, Barnsley S75 6BW

Report Reference: B4503 20160729 R

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1.1 The Refrigeration & Air-Conditioning Plant Selection Acoustic Assessment Report Reference B4503 20160728 R concluded that:

> *A maximum cumulative design Rating Level of 45dBA outside the nearest dwellings during the day and 35dBA 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 79dBA during the daytime and 69dBA during the night-time.*

1.2 Previously a rating correction of -3dBA was applied to the Design Criteria. However, the manufacturer's specifications for the proposed refrigeration pack's do 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 similar to the background sound level, an acoustic feature correction is not deemed applicable.

1.3 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.

1.4 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

		Service yard	
Design Criterion			**45 dBA**
Corrections	Distance Attenuation	40m	+40 dB
	Screening Attenuation	None	+0 dB
	Source Reverberant Factor	1 w all	-3 dB
	Receptor Directivity	In front	+0 dB
	Receptor Reverberant Factor	Flat surface	+0 dB
	Estimated Rating Penalty	Slight	-3 dB
	Existing Plant correction	None	+0 dB
Cumulative Design Sound Power Level			**79 dBA**
Indicative Sound Pressure Level at 10m			**49 dBA**

Night-Time Cumulative Design Rating Level

		Service yard	
Design Criterion			**35 dBA**
Corrections	Distance Attenuation	40m	+40 dB
	Screening Attenuation	None	+0 dB
	Source Reverberant Factor	1 w all	-3 dB
	Receptor Directivity	In front	+0 dB
	Receptor Reverberant Factor	Flat surface	+0 dB
	Estimated Rating Penalty	Slight	-3 dB
	Existing Plant correction	None	+0 dB
Cumulative Design Sound Power Level			**69 dBA**
Indicative Sound Pressure Level at 10m			**39 dBA**

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

Daytime Cumulative Sound Power Level Calculation

		Arctic Circle Pack 1		Arctic Circle Pack 2		
Sound Power Level			**65 dBA**		**74 dBA**	
Corrections	Attenuation Performance	None	+0 dB	None	+0 dB	
	Additional Source Directivity Correction	None	+0 dB	None	+0 dB	
	Rating Penalty Correction from Estimate	N/A	-3 dB	N/A	-3 dB	
	Other Correction	Correction from 40m to 50m	-2 dB	Correction from 40m to 50n	-2 dB	
Corrected Individual Sound Power Level			**60 dBA**		**69 dBA**	
		Cumulative Sound Power Level				**70 dBA**
		Maximum Identified Cumulative Design Sound Power Level				79 dBA
		Corresponding Rating Level at Receptor (LAeq,1h)				**36 dBA**
		Identified Suitable Design Criterion at Receptor				45 dBA
		Difference Between Rating Level and Design Criterion at Receptor				-9 dBA

Night-Time Cumulative Sound Power Level Calculation

		Arctic Circle Pack 1		Arctic Circle Pack 2		
Sound Power Level			**62 dBA**		**69 dBA**	
Corrections	Attenuation Performance	None	+0 dB	None	+0 dB	
	Additional Source Directivity Correction	None	+0 dB	None	+0 dB	
	Rating Penalty Correction from Estimate	N/A	-3 dB	N/A	-3 dB	
	Other Correction	Correction from 40m to 50m	-2 dB	Correction from 40m to 50n	-2 dB	
Corrected Individual Sound Power Level			**57 dBA**		**64 dBA**	
		Cumulative Sound Power Level				**65 dBA**
		Maximum Identified Cumulative Design Sound Power Level				69 dBA
		Corresponding Rating Level at Receptor (LAeq,15m)				**31 dBA**
		Identified Suitable Design Criterion at Receptor				35 dBA
		Difference Between Rating Level and Design Criterion at Receptor				-4 dBA