ARUP

Subject	Environmental noise assessment		
Date	27 May 2014	Job No/Ref	231368\NC

Parker Street Cinemas – Environmental Noise

1 Introduction

This note summarises the work carried out by Arup and Services Engineer SGA to demonstrate compliance with Camden Council's building services noise emission requirements under Planning Conditions 7 and 8 for the development of the proposed cinema at 39 Parker Street.

The assessment includes:

- A summary of the noise levels of the AHUs and outdoor condensing units selected by SGA
- An environmental noise assessment based on this plant

The assessment has been made with reference to the following documents:

- Design & Access Statement and Heritage Statement
- Planning decision letter dated 27 January 2014
- Architect's drawings
- Services engineer's drawings

2 Mechanical services design

2.1 Ventilation

The design incorporates two new air handling units:

- AHU01 will serve the cinemas and will be located on isolation supports in the place of the existing AHU in a garage in the basement.
- AHU02 will serve the café and toilets and will be suspended from the soffit above the ramp to the basement car park

Outside air will be drawn from a louvre located in place of the existing grille above the car park's roller shutter and ducted to serve both of the AHUs.

Air from the internal spaces will be extracted back to the AHUs and then exhausted into the basement car park.

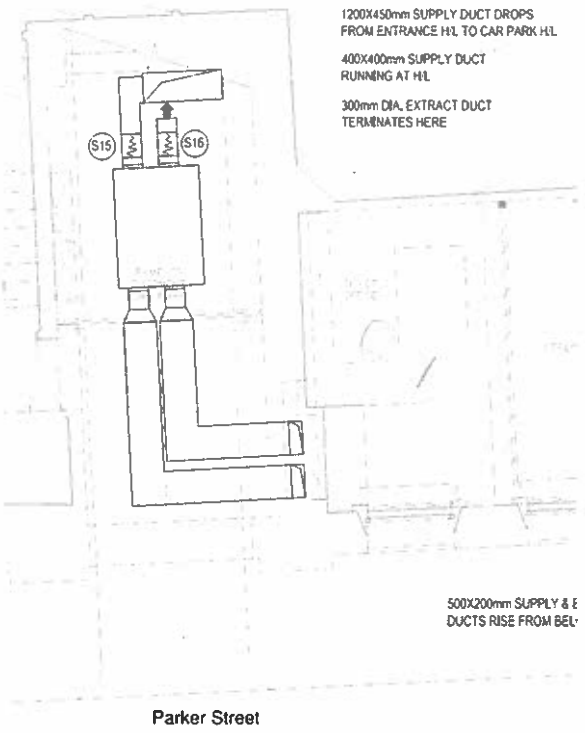


Figure 1: Design location of AHU02 (extract from SGA drawing U[10]-002)

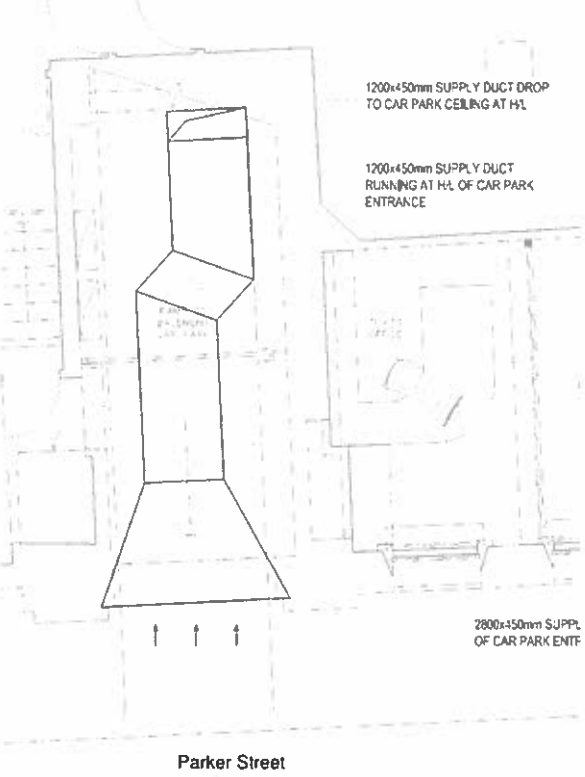
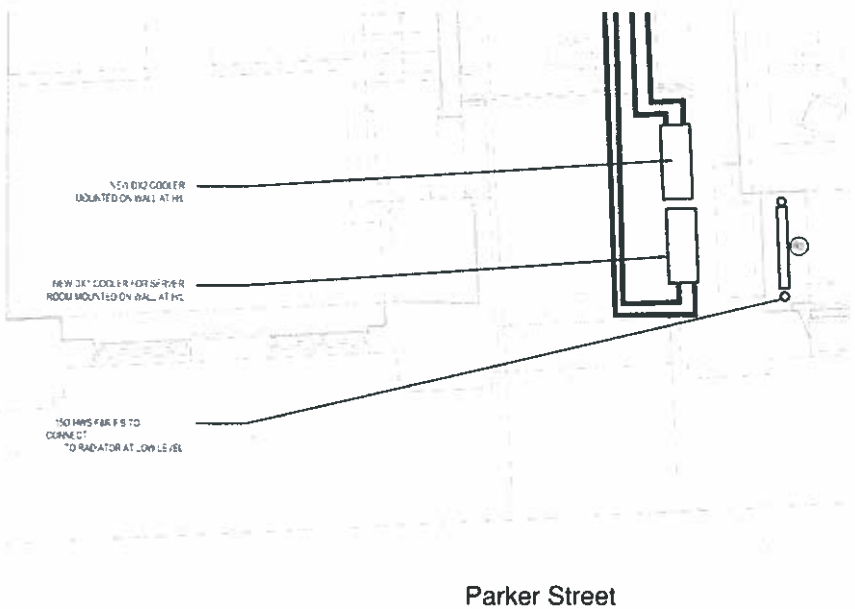


Figure 2: Design location of AHU02 (extract from SGA drawing U[10]-002)

2.2 Cooling

Cooling to the AHUs will be provided by three external wall mounted condensers.

The new condenser units will be mounted directly opposite two existing units, adjacent to an existing roller shutter at the entrance to the car park as shown below.



Parker Street

Figure 3: Design location of new external condenser units (extract from SGA drawing T[32]-002)

Figure 2: Nearest residential window to the new plant

3 Environmental Noise Assessment

Arup has conducted an environmental noise survey to set limits for plant noise emission in line with the requirements of Camden Council. The measured noise levels and plant noise emission limits were presented in *AAc/231368/R01-nc Environmental Noise Assessment*, issued on 9 July 2013.

The report states the following:

Based on the measured background noise levels and the Camden requirements noise emission from new plant must be less than 47dB(A) at 1m outside the adjacent hostel building during the hours of plant operation (up to 2330). If the plant has a distinctive sound characteristic (whine, hiss, screech, hum, bangs, clicks, clatters, thumps), it must be less than 42dB(A) at the same location.

The adjacent hostel building is 10m to the south west of the loading bay entrance where the proposed fresh air intake and condensers will be located.

The proposed air handling units have the sound power levels set out in Table 1:

In-duct fresh air intake	**Sound Power Level dB re 10^{-12} W Octave Band Centre Frequency, Hz**							
	63	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**
AHU01	59	69	66	58	51	48	42	39
AHU02	66	68	70	71	69	68	63	54

Table 1: In-duct fresh air intake sound power levels of selected air handling units

A 900mm long attenuator is proposed on the fresh air intake to each AHU with the following dynamic insertion loss:

	Dynamic Insertion Loss dB Octave Band Centre Frequency, Hz							
	63	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**
900mm long attenuator to fresh air intakes	7	13	17	30	36	33	26	13

Table 2: Dynamic insertion loss of attenuators to fresh air intakes of AHU01 and AHU02

	Sound Power Level dB re 10^{-12} W Octave Band Centre Frequency, Hz							
	63	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**
Regenerated noise of each attenuator at 4m/s	48	46	46	46	52	53	45	29

Table 3: Regenerated noise of attenuators to fresh air intakes of AHU01 and AHU02

Applying these insertion losses to the in-duct sound power levels, regenerated noise at 4m/s and taking into account that the louvres do not face the adjacent hostel building, but are at 90° to it, the expected noise level at 10m from the louvres, outside the hostel building, is 31dB(A) from the combined intake.

Whilst appropriate attenuators are selected to control exhaust noise with the car park, noise from the AHU exhausts and from AHU casing radiation will not contribute to the external noise environment due to their location inside the car park.

The sound power levels of the three proposed wall mounted condenser units are set out below:

Unit	Sound Power Level dB re 10^{-12} W Octave Band Centre Frequency, Hz						
	125	250	500	1k	2k	4k	8k
Cinema 1 – Daikin ERQ125AV1	71	66	66	62	57	49	46
Cinema 2 – Daikin ERQ100AV1	70	67	66	61	55	49	45
Server Room – Daikin RZQG71L8V1	72	64	62	59	53	52	47

Table 4: Air condenser sound power levels

Using the parallelepiped method for noise propagation, the sound level from all units at 10m is 40dB(A). Since there will be no direct line of sight between the proposed location of the condensers and the adjacent hostel building, there will be at least 5dB further reduction in the sound level due to acoustic screening from the brick entrance to the loading bay, reducing the expected noise level to 35dB(A).

The sum of the calculated noise levels from the intake and condenser units is 36dB(A), which is compliant with the requirements of Camden Council.