

ENVIROCONSULT
Environmental and acoustic consultancy
[redacted]
www.enviroconsult.uk
Our Ref: 484/DPM(SherlockSt)
Your Ref:

FAO Davd Pattison
9 Marlborough Way,
Ashby De La Zouch,
Leicestershire,
LE65 2NN.

28 October 2025

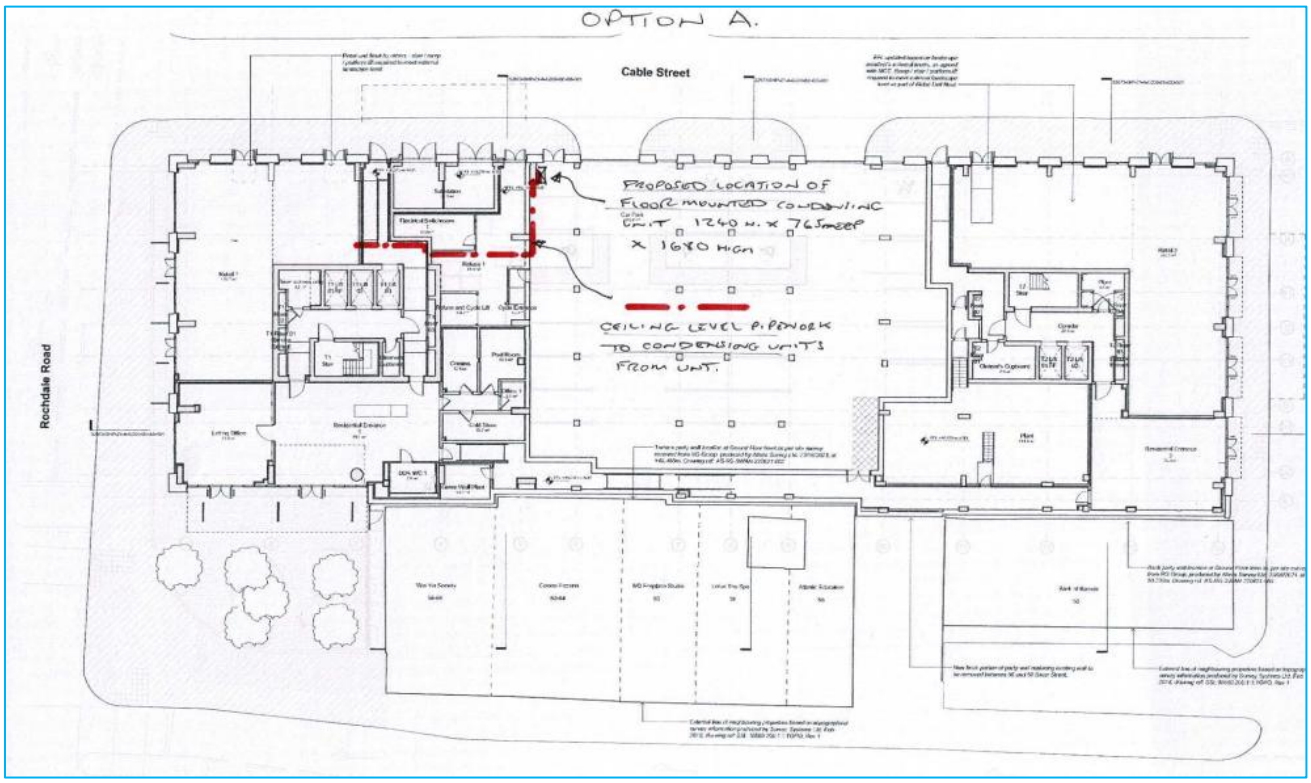
Dear David,

Re: Technical Assessment for condenser plant noise breakout
Proposed Budgens store Unit 1 Swan House Rochdale Road Manchester.

Further to the instruction to provide an acoustic assessment of the installation of condenser plant for the proposed Budgens Store at Unit 1, Swan House, Rochdale Road, Manchester, I note that that:

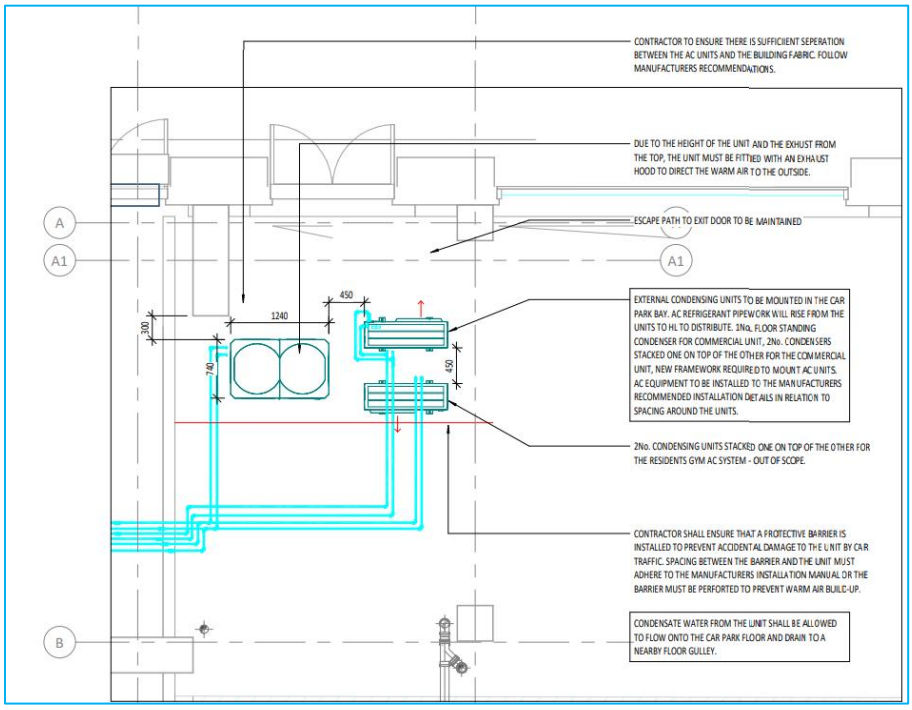
The plant is to be installed in the Ground Floor Car Park facility as indicated in the site ground floor plan identified as option A below.

Site location plan



Enviroconsult Limited Registered Office: Brockton Farm Bungalow, Brockton, Sutton Maddock, Shifnal, Shropshire. TF11 9NA
Companies House registration number: 9597398
VAT registration: 265 4601 05

The plant is identified as an 18.7 kW Daikin LRYEQ16AY - Heat pump condensing unit with multi-fan condensing units arranged as per the diagram below with a manufacturer stated sound pressure of 42 dB @ 10m.



The plant is to be located in the open carpark within a protective cage and directly adjacent to a locked access. The plant is located ~ 5m from the open car park entrance.

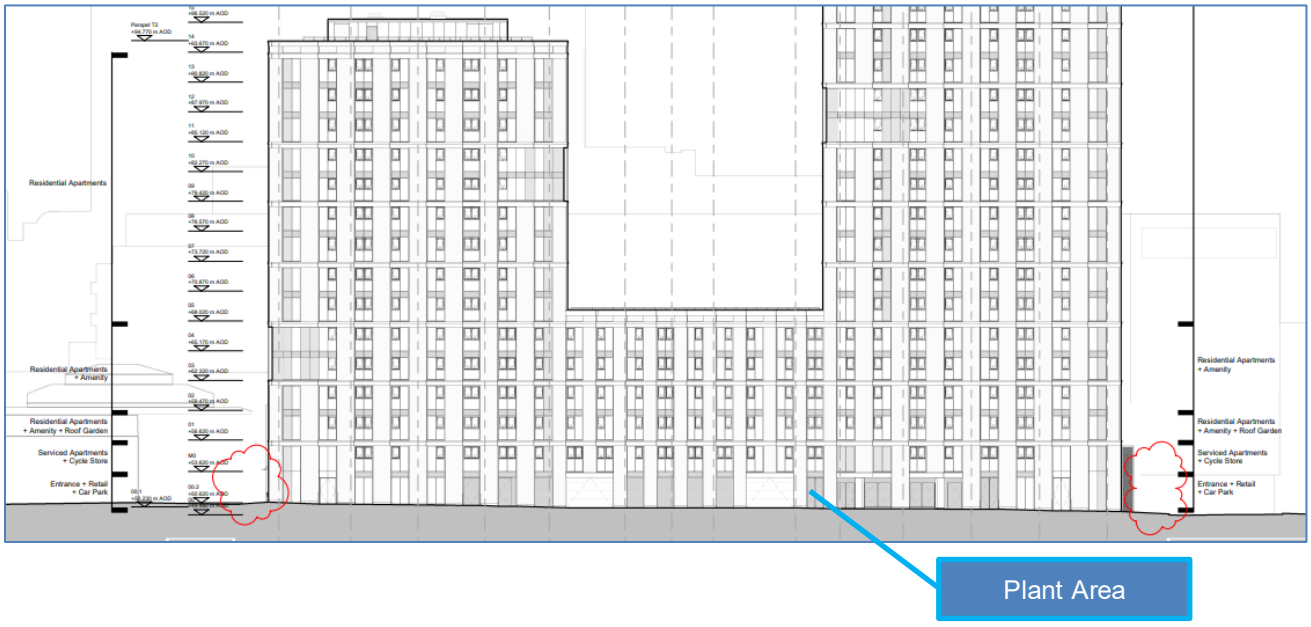
The external plant to be installed comprises:

DAIKIN HEAT PUMP CONDENSER UNIT LRYEQ16AY installation sound power L_w 71 dB 42 dB @ 10m.

Receptors

The closest receptors are immediately above the car park opening and the access door to the installation.

Site Elevation



Plant area construction

The Plant area is constructed within the Car Parking area, as indicated in the Site Location plan above. The construction of the building is a steel framework with concrete floors and ceilings. Estimated sound reduction steel frame is at least 51 dB (as shown in BS8233:2014 Table E.1C).

The main building ceiling is precast concrete block. The main ceiling is assumed to have a sound reduction sound reduction of at least 50 dB (ref: BS8233:2014 table E.2B – E-FC-1).

The plant room is ventilated into the car park area, but also through the passive vent on the door.

Total Plant Area Sound levels and break-in calculation

The total plant area sound level is the sum of the sound power of all plant contained therein.

Plant	sound power level L_W	number	calculation
DAIKIN HEAT PUMP CONDENSER UNIT LRYEQ16AY		$L_{W,total} = 10Log(10^{LW1/10}+10^{LW1/10})$	
LRYEQ16AY	71	4	50,357,016.5
Total sound power L_W	77		

Assuming a reverberant field within the area a 5m x 3m x 5m, and assuming a reflective surfaces with a minimal 0.1 absorption coefficient the following reverberant room formula is used where Area (A) is ~80m^2 x 0.1 (8):

$$L_p = L_W + 10\log_{10}\left(\frac{4}{A}\right)$$

L_p = 77 + 10log (4/8)
L_p = 77 + 10 log(0.741)
L_p = **74 dB**

Break-in from the plant area into the building (ground floor) will reduce sound pressure by the amount of transmission loss from the walls of the plant room, and by the so that the ground floor outside the pant room will receive 74 dB – 51 dB = 23 dB. This is acceptable for a business premises.

Break-in to the apartments above the plant area will reduce sound levels by at 50 dB plus any additional reduction from floor of the flats above (thermal insulation, carpeting etc), (assumed to be at least another 10 dB). This is a room within a room scenario. The total reduction is therefore >60 dB in theory, and the likely building transmission is <15 dB (again negligible).

However, installation of the plant should ensure that the plant is isolated from the main structure (antivibration mountings) and installation should consider:

- Steel framework construction isolation,
- Piping penetrations of the structure and appropriate antivibration,
- Mounting hardware,
- Floor slab connections,
- *Flanking transmission.*

The sound transmission from the plant area to the apartments would be negligible. However, in practice the only significant source of noise transmission would be due to flanking transmission through the open parking area access or through the door to the plant area onto the street.

Flanking transmission calculation

Noise emission from the door

The plant area has a predicted sound power is 74 dB L_w.

The proportion of noise leaving the plant area room through the door to the area, and through the (open) carpark access require consideration. Only the energy impacting on the door and exiting directly through the opening are emitted. This can be calculated from:

Fraction of radiated sound power (α)= $\frac{A_{door}}{A_{total}} = \frac{(2.6 \times 2.2)}{80} = 0.0715$

Sound power escaping louvre = $L_{Wtotal} + 10\text{Log}(\alpha)$

$74 + 10\text{Log}(0.0.715)$
$74 - 11.5$
$L_{Wlouvre}$ **63 dB**

The door is assumed to be kept closed but will have ventilation above it, allowing a small amount of air/heat exchange. It is assumed that the reduction in sound escaping this area is therefore minimal around 3dB.

Emitted sound power from the door is therefore assumed to be 60 dB Lw, (assuming minimal reduction – may be up to 20 dB in reality).

The proportion of noise leaving the plant area room through the main carpark entrance, is similarly reduced but is also ~ 5m distant from the plant and not in the reverberant field.

Assuming that a sound presume for the installation is 42 dB @ 10m the level at 5m will be 48 dB.

A sound power of 58 dB at any point on the main car park entrance can be estimated as only the energy impacting on the entrace and exiting directly through the opening are emitted. This can be calculated from:

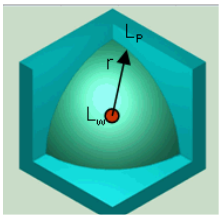
$L_w = L_p + 20\log(r) + 2$
$L_w = 42 + 20\log(5) + 2$
$L_w = 42 + 14 + 2$
$L_w = 58$ dB

For $Q = 1$ is $L_W = L_p + [20 \times \log_{10}(r)] + 11$ dB (full)

For $Q = 2$ is $L_W = L_p + [20 \times \log_{10}(r)] + 8$ dB (half)

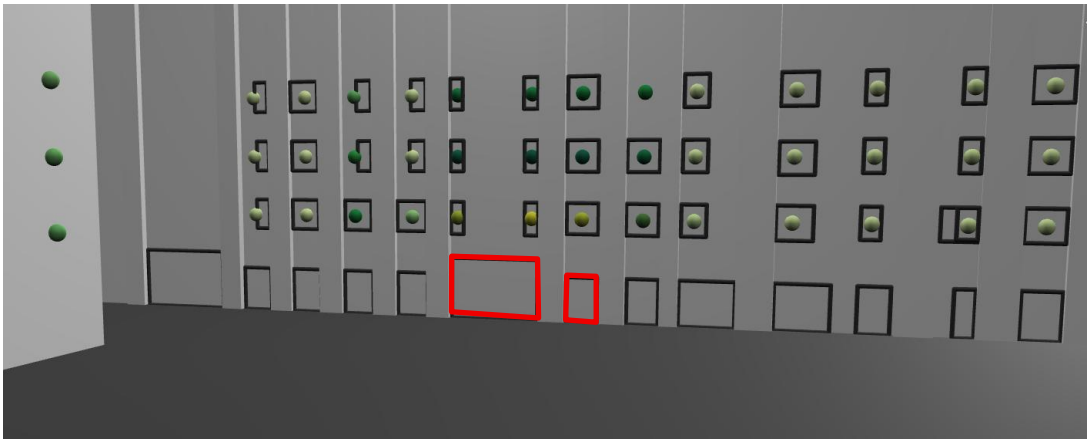
For $Q = 4$ is $L_W = L_p + [20 \times \log_{10}(r)] + 5$ dB (quarter)

For $Q = 8$ is $L_W = L_p + [20 \times \log_{10}(r)] + 2$ dB (eighth)



For the open area, a sound power of 58 dB has been assumed.

The model below has been used to calculate the incident sound level for flanking noise.



Planar sources



The results of the modelling are provided in detail in **Appendix 1**.

The predicted sound levels at the façade of residential receptors on the floors above are <44 dB. This is well below the existing ambient sound level and assuming a reduction for an open window of 15 dB, the internal level of noise would be <30 dB.

Conclusion

Subject to appropriate installation of the plant and ensuring that vibrating elements are acoustically isolated with antivibration mountings the modelling indicates negligible potential impact.

The noise emitted from the plant area has a very low impact on AC Hotel Manchester building opposite (<32 dB) and is unlikely to be audible at that location.

I note that the location is a busy city centre location and that glazing specifications have considered noise from road traffic, pubs and clubs and other local businesses. I also note that, the adjacent AC Hotel Manchester, and The Angel Public House are within close proximity, it is likely that noise from both venues will be prominent in the area in addition to road traffic.

Whilst I have not conducted a site inspection, or a formal assessment of either of the site, both the public house and hotel would appear to have the potential for a greater level of noise emission than the proposed plant area and, alongside road traffic, will be the dominant features of noise in the area.

It is my opinion, subject to the caveat above, that the plant area will have negligible acoustic impact on residential premises above the plant installation area.

Yours sincerely

[redacted]

Tony Higgins
Director

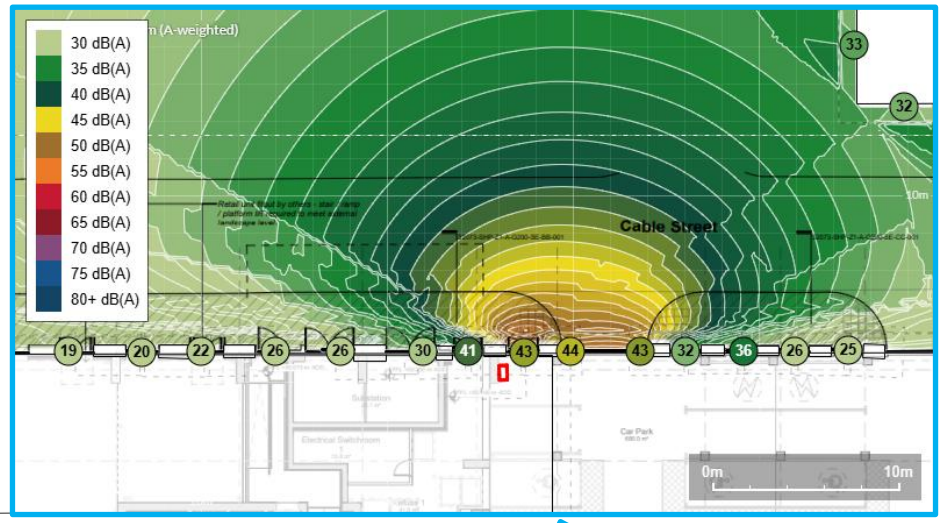
Appendix 1 Modelling

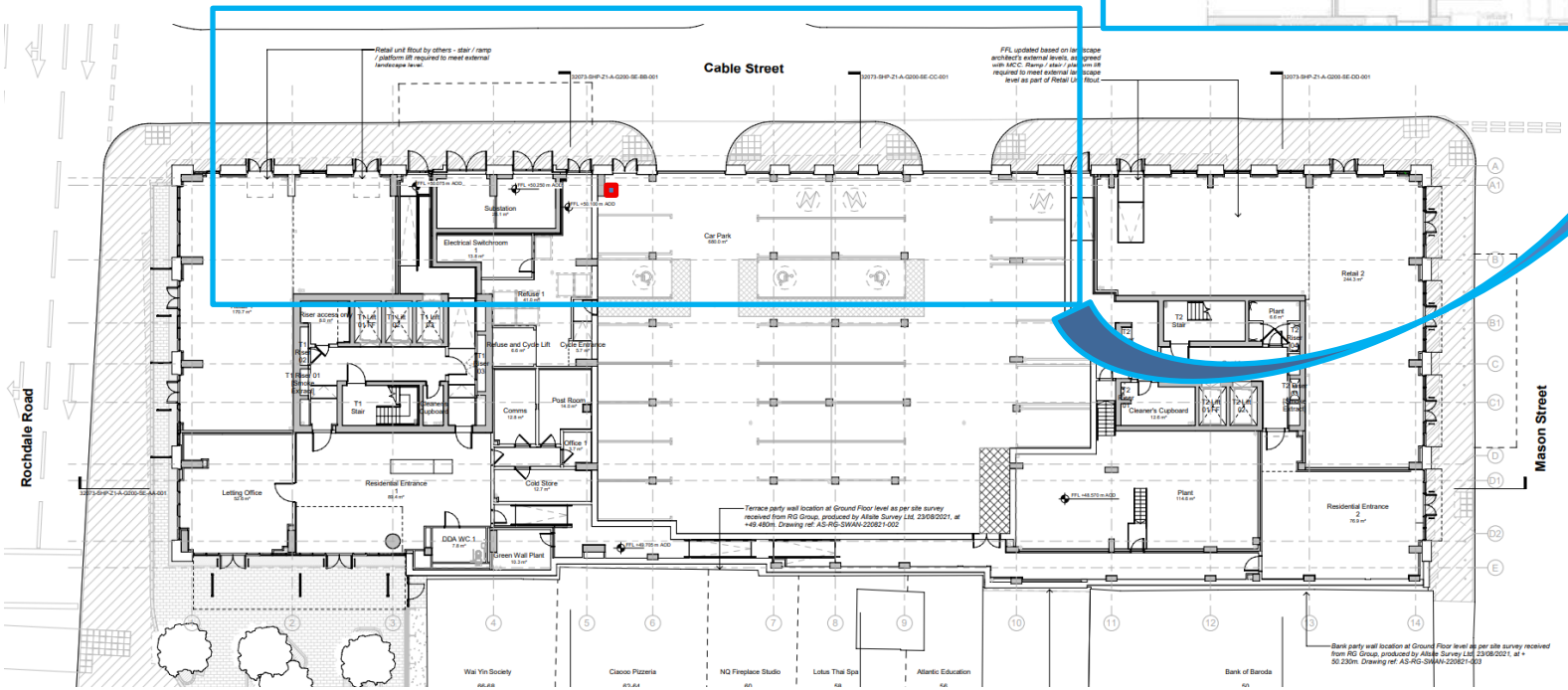
ENVIROCONSULT
Environmental and acoustic consultancy

Plan View Results

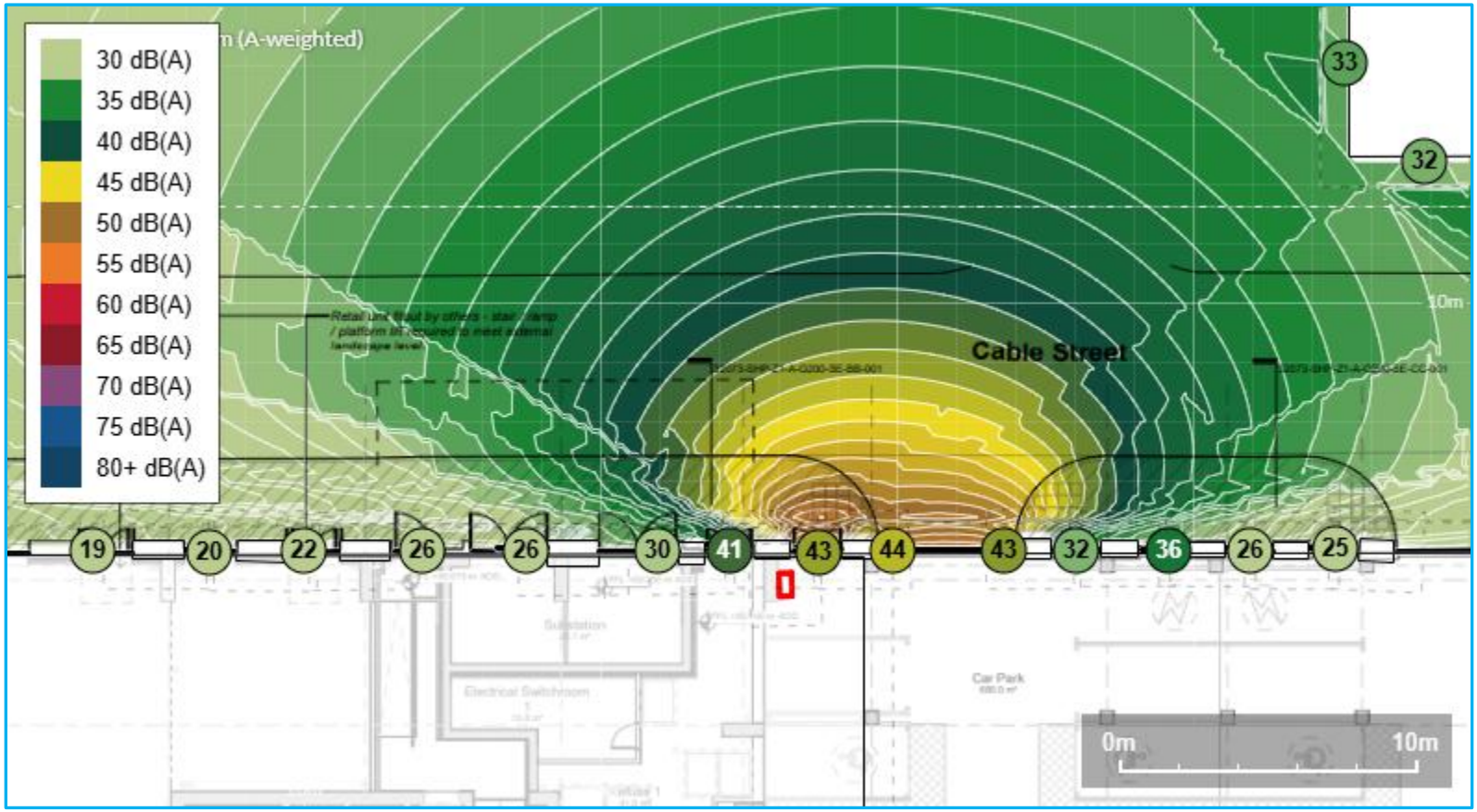
Plant location

Modelled section
Modelled area

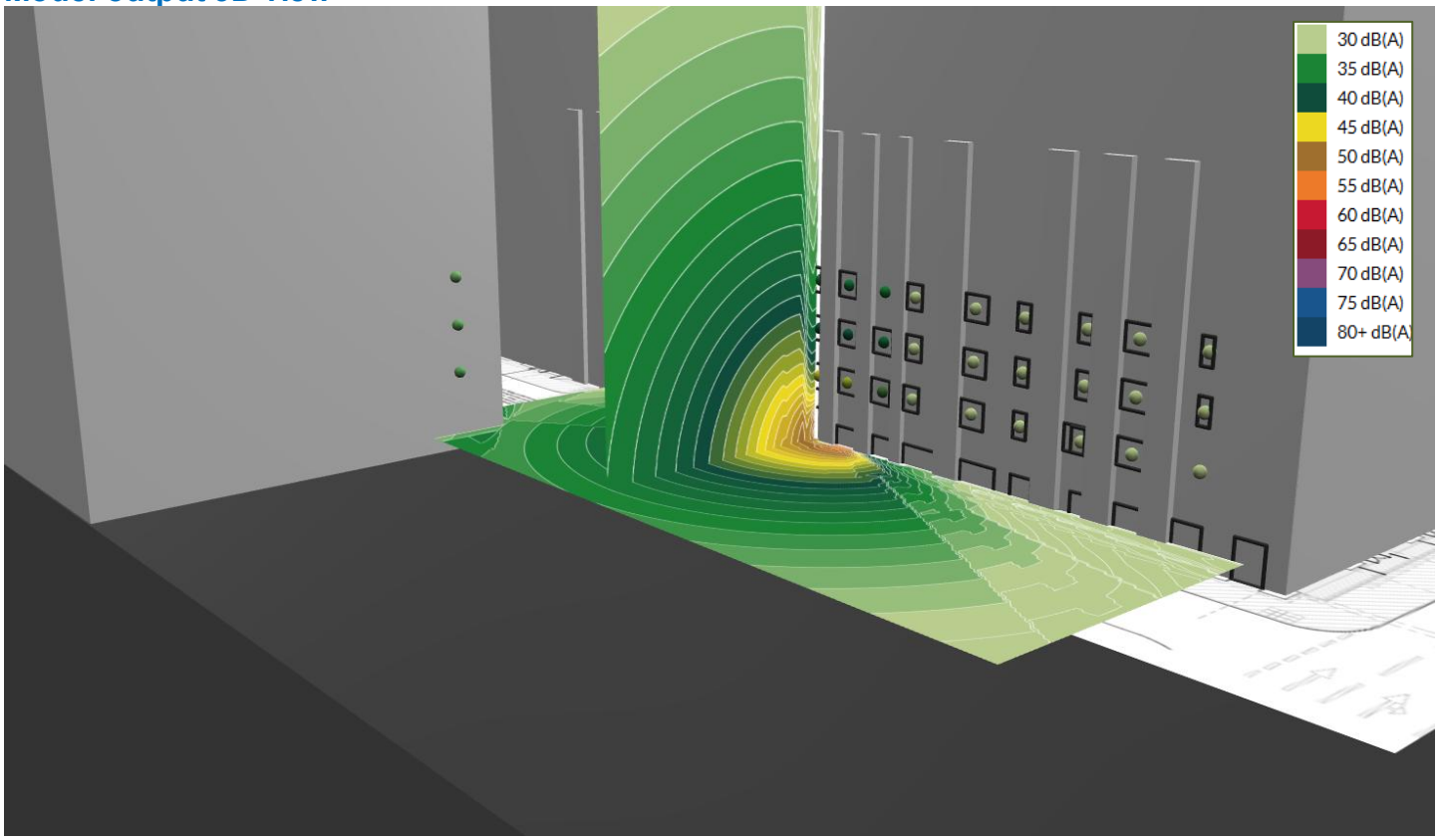




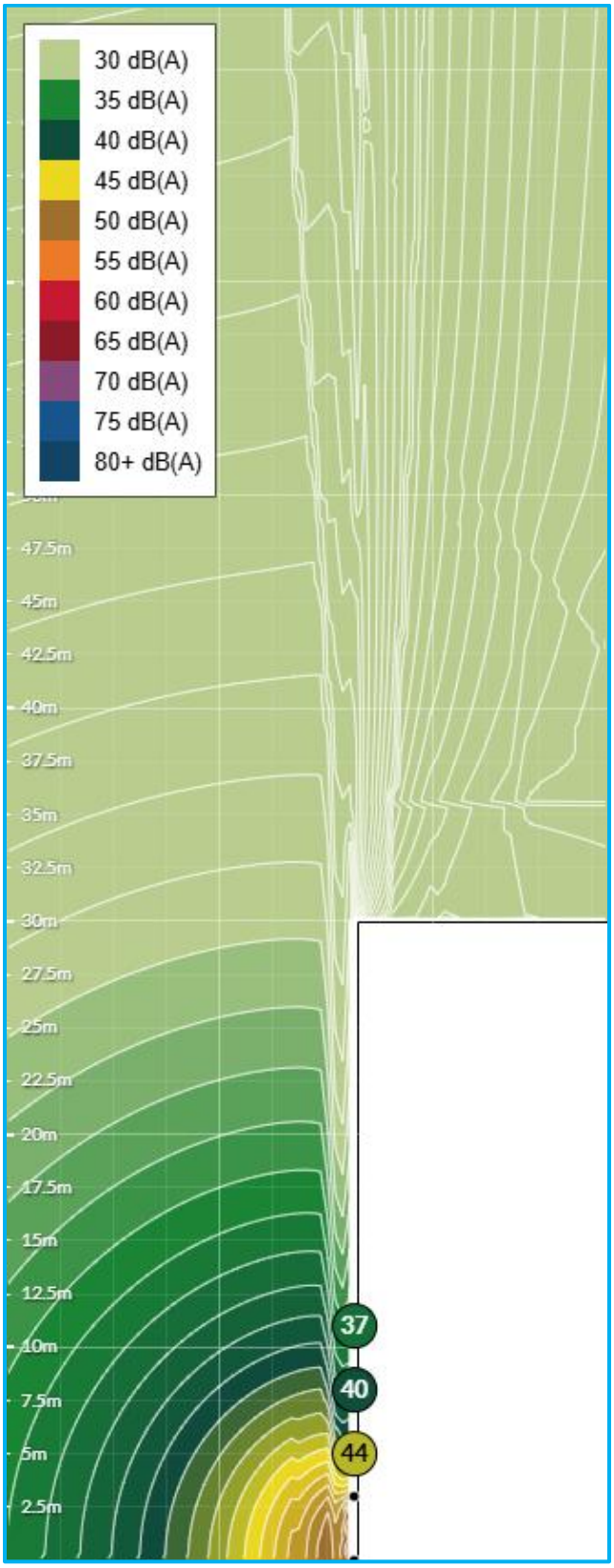
Model Plan view @ 5m above ground level (1st floor)



Model output 3D view



Cross section results



Receiver Name	Height (m)	LAeq (dB)
2	5	19
2	8	19
2	11	19
3	5	20
3	8	20
3	11	19
4	5	22
4	8	22
4	11	21
5	5	26
5	8	25
5	11	25
6	5	26
6	8	25
6	11	24
7	5	30
7	8	29
7	11	27
8	5	41
8	8	38
8	11	36
9	5	43
9	8	39
9	11	37
10	5	44
10	8	40
10	11	37
11	5	43
11	8	39
11	11	37
12	5	32
12	8	30
12	11	28
13	5	36
13	8	35
13	11	33
14	5	26
14	8	25
14	11	24
15	5	25
15	8	24
15	11	23
AC Hotel S	5	33
AC Hotel S	8	33
AC Hotel S	11	32
AC Hotel W	5	32
AC Hotel W	8	32
AC Hotel W	11	31