

8th February 2019

Sent by email

Our Ref: 404.08071.00001

Your Ref: 182242

Dear Mr Scholes,

RE: AMP - CARDIFF: URBAN RESERVE GAS FIRED POWER PLANT

PROPOSED PLANT

Noise Model Assumptions

The sound predictions in this assessment have been undertaken using a proprietary software-based noise model, CadnaA, which implements the full range of UK calculation methods. The calculation algorithms set out in ISO 9613-2:1996 Acoustics – *Attenuation of sound during propagation outdoors* – Part 2 General method of calculation have been used and the model assumes:

- A reflection factor of 2.
- A daytime receiver height of 1.5m and a night-time receiver height of 4.0m.

At this stage it is understood that the applicant is considering the installation of two PPU2500NG Natural Gas Genset provided by VPower Holdings Ltd. The technical specification of this equipment states that at 1m from the container the $L_{Aeq,T}$ noise level is 75dB(A). The quoted noise level will include noise from the engine operating within the container, the exhaust, and the fans. To predict the noise level of the Site, it is necessary to develop a noise model that includes the containers, the exhausts, and the fans.

As the technical description does not include a breakdown of the noise sources that contributed to the measured noise level of 75dB(A) at 1m, data measured by SLR of a comparable 2MW containerised genset, has been used.

The noise sources included in the model are shown in Table 1.

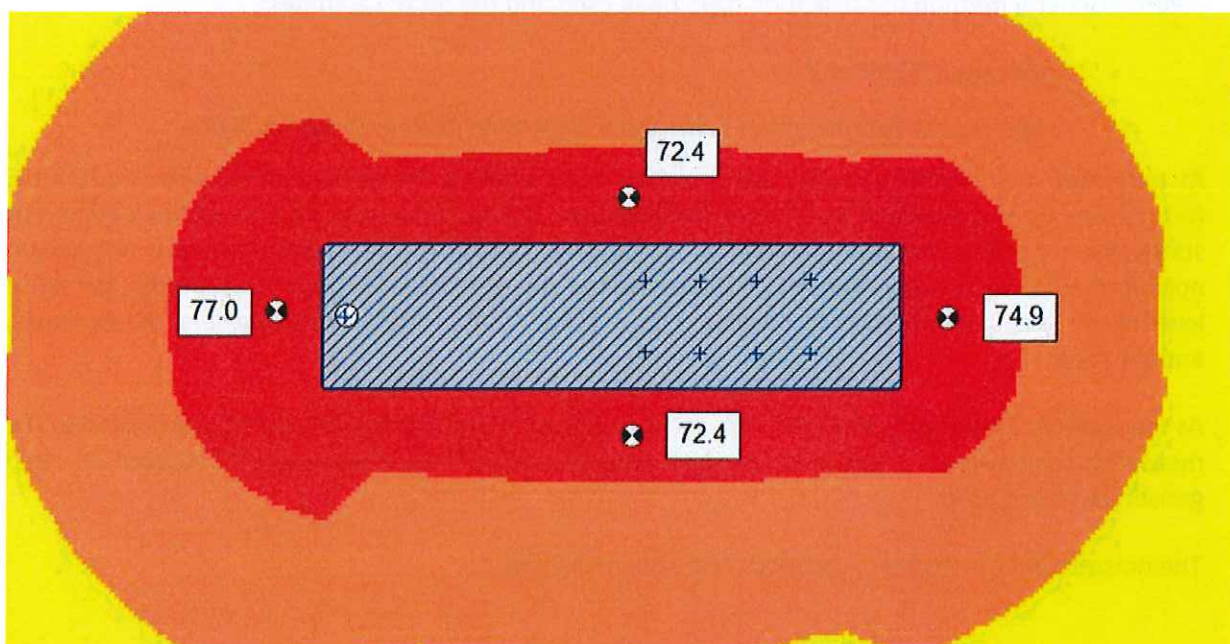


Table 1
Plant Sound Power Levels Included in the Assessment

Name	31.5 Hz	63Hz	125Hz	250Hz	500Hz	1KHz	2KHz	4KHz	8KHz	A
Container Air Intake	96.8	95.2	88.4	86.5	85.6	75.7	71.8	68.0	54.3	85.1
Container Side	91.9	85.3	86.0	80.1	80.0	74.8	71.2	64.3	53.1	80.9
Container Air Out Take	100.2	94.6	93.6	83.2	78.3	74.9	69.6	69.3	62.7	82.6
Cooling Fan	83.2	77.6	78.2	70.2	70.1	67.6	64.0	58.4	49.9	72.6
Stack	89.6	91.8	87.1	81.7	78.0	73.8	72.6	67.1	53.9	80.8

A noise model of one engine configuration, using the data listed in Table 1, is shown in Figure 1. The logarithmic average of the four measurements at 1m is 74.6dB(A), which is comparable to the 75dB(A) at 1m quoted by VPower.

Figure 1
Noise Model of One Containerised 2 MW Engine – dB(A)



Residential Assessment Predicted Specific Noise Levels

The predicted sound levels of the two power plants are shown in Table 2 below.

Daytime sound levels have been predicted to 1.5m above ground level the approximate height of ground floor window. Night-time sound levels have been predicted to 4m above ground level the approximate height of a first-floor window.

Table 2
Predicted Specific Sound Levels of Proposed Plant (Two Power Plants), free-field dB

Location	Period	Predicted Sound Level, $L_{Aeq,T}$
Salisbury Road	Daytime	18.4
	Night-Time	22.5
George Street	Daytime	21.0
	Night-Time	24.3
Great Knolleys Street	Daytime	23.1
	Night-Time	24.2
Civitas Academy	Daytime	22.5
	Night-Time	-

A map of the daytime specific sound level can be seen in Figure 2, whilst a map of the night-time specific sound level can be seen in Figure 3.

Figure 2
Daytime Specific Sound Level – dB(A)

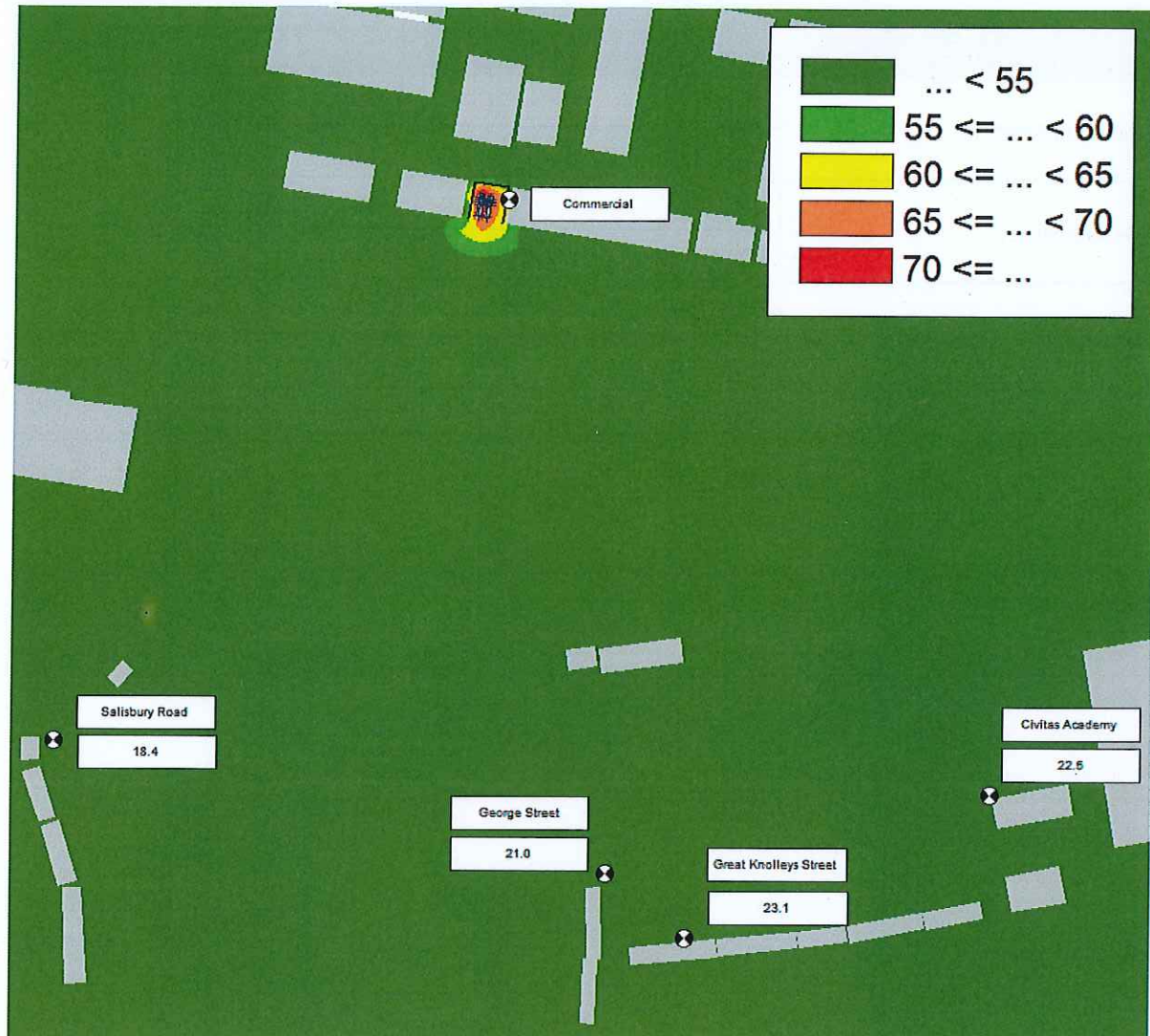
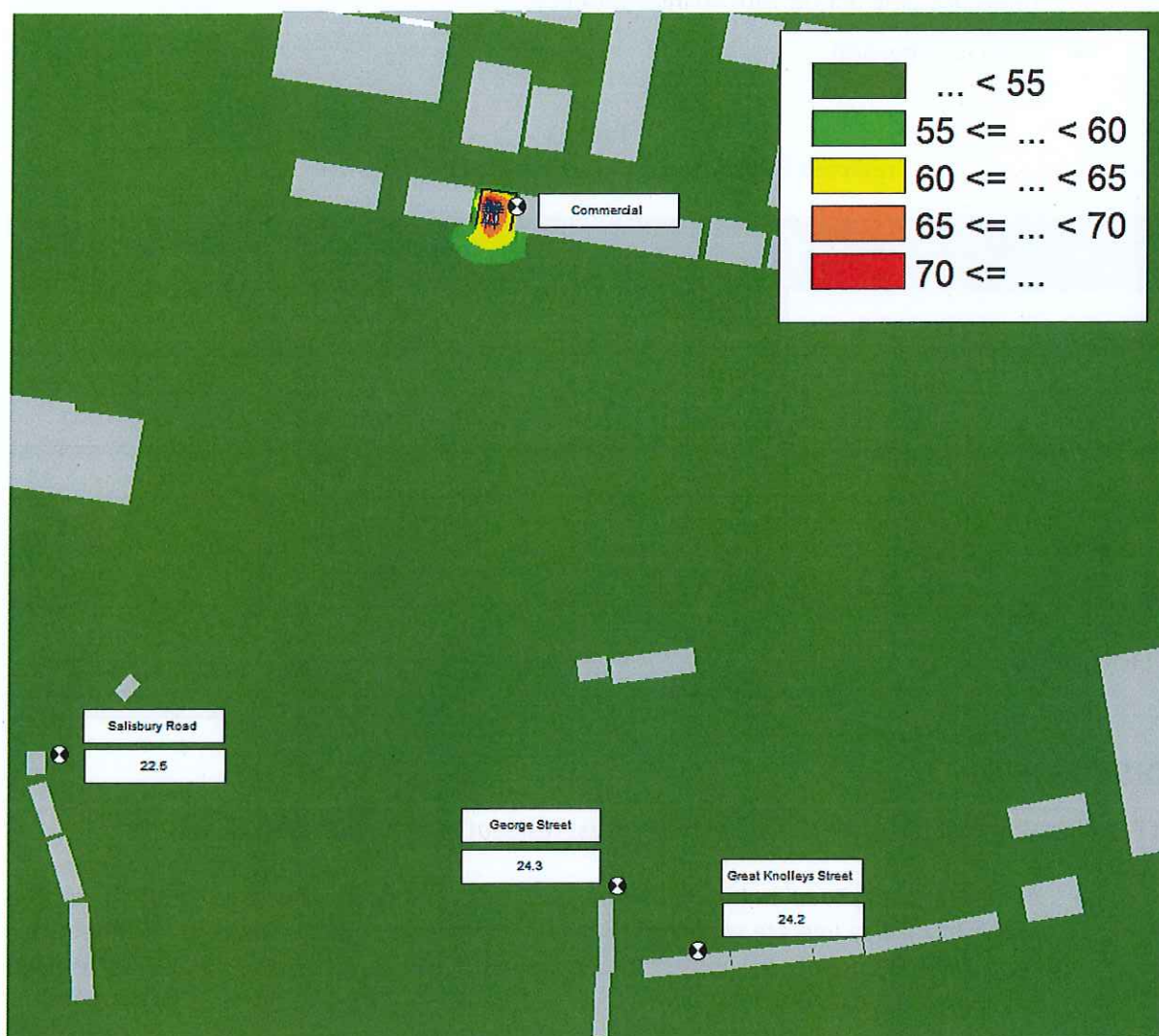


Figure 3
Night-Time Specific Sound Level – dB(A)



BS4142:2014 ASSESSMENT

With the inclusion of the following penalties the rating level of the proposed development at the noise sensitive receptors assessed are detailed in Table 3. In accordance with BS4142:2014 the levels have been rounded to the nearest whole number.

- Tonal Penalty: 0dB. Experience by SLR at other similar sites has determined that noise from the Site will not be tonal.
- Impulsive Penalty: 0dB. Noise from the proposed development is not expected to be impulsive.
- Other sound characteristics: 3dB. It is anticipated that noise from the proposed development may be audible above the residual acoustic environment.

- Intermittency: 0dB. Over the reference time of 1-hour during the day, and 15-minutes during the night, if the site is operating it is expected that noise would be constant over the reference time period with no intermittency.
- Total penalty: 3dB.

Table 3
Predicted Rating Levels of Proposed Plant, free-field dB

Location	Period	Predicted Rating Level
Salisbury Road	Daytime	21.4
	Night-Time	25.5
George Street	Daytime	24.0
	Night-Time	27.3
Great Knolleys Street	Daytime	26.1
	Night-Time	27.2
Civitas Academy	Daytime	25.5
	Night-Time	-

DISCUSSION

It is anticipated that the noise climate at the nearest residential receptors is as follows:

- Salisbury Road: Road traffic noise from the local road network and rail traffic from the adjacent railway line are expected to be audible during both the daytime and the night-time periods. Commercial noise from the industrial area to the north may also be included in the soundscape.
- George Street: Road traffic noise from the local road network and rail traffic from the adjacent railway line are expected to be audible during both the daytime and the night-time periods. Commercial noise from the industrial area to the north may also be included in the soundscape.
- Great Knowley Street: Road traffic noise from the local road network and rail traffic from the railway line to the north are expected to be audible during both the daytime and the night-time periods. Commercial noise from the industrial area to the north may also be included in the soundscape.
- Civitas Academy: Road traffic noise from the local road network, including the A329, and rail traffic from the railway line to the north are expected to be audible during both the daytime and the night-time periods. Commercial noise from the industrial area to the north may also be included in the soundscape.

To complete the BS4142:2014 assessment a baseline background noise survey may be required.

In accordance with BS4142:2014:

- Typically, the greater the difference between the rating level and the background sound level, the greater the magnitude of the impact.
- A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context.
- A difference of around +5dB is likely to be an indication of an adverse impact, depending on the context.
- The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. It is an indication that the specific sound source has a low impact.

Based upon the anticipated soundscape at each receptor, and the low predicted rating levels (especially during the day), SLR consider that the baseline background sound level at each receptor would be equal to or above the predicted rating level at the receptors assessed. Consequently, the Site would be unlikely to have an adverse noise impact, and noise would not pose a material constraint to the proposed development at the Site.

COMMERCIAL ASSESSMENT - PREDICTED NOISE LEVELS

With regards to commercial receptors, as there is typically no external amenity, BS4142:2014 is not the appropriate guidance as the scope of the standard only applies to outdoor locations, and it is not intended to be applied to the derivation of indoor sound levels arising from sound levels outside.

To assess the impact on nearby commercial receptors Noise Rating curves developed by the International Organization for Standardization (ISO) will be referred to. In this instance SLR consider that NR Curve 45 for general offices would be applicable.

At the commercial receptor shown on Figure 2 and 3 the noise level (at 1.5m) in each third octave frequency and the NR Curve 45 limit, is shown in Table 4. The calculations assume a 15dB reduction for an open window, and the model has been adjusted to hard ground.

Table 4
NR Curve 45 Assessment –Internal to Nearest Commercial Receptor

NR 45 Frequency	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz
Limit	71.0	61.1	53.6	48.6	45.0	42.2	40.0	38.3
Nearest Commercial Receptor	48.4	44.0	33.4	28.9	21.2	15.8	10.6	1.2

It can be seen from Table 4 that the operation of the Site would meet the NR Curve 45 internal to the nearest commercial receptor assessed. Consequently, the Site would be unlikely to have an adverse noise impact, and noise may not pose a material constraint to the proposed development at the Site.

Yours sincerely
SLR Consulting Limited



Michelle Dawson
Principle Acoustician