

The Co-operative
Lord Street
Wrexham
LL11 1LF

**Plant Noise
Impact Assessment**

On behalf of



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For and on behalf of Noise Solutions Ltd				

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Executive Summary

Noise Solutions Limited has undertaken a noise impact assessment of plant at the proposed Co-operative store at Lord Street, Wrexham.

The assessment shows that noise from the new plant will not lead to excessive noise levels within the nearest commercial receptor. There are no residential or similar noise-sensitive properties in the vicinity of the plant.

Plant noise should therefore not present an obstacle to obtaining planning permission for the proposed store.

1.0 Introduction

- 1.1. Noise Solutions Ltd (NSL) has been commissioned by RPM Consult to provide a noise impact assessment of plant serving the proposed Co-operative store at Lord Street, Wrexham.
- 1.2. Noise levels from the new plant have been predicted at the nearest noise-sensitive windows and assessed against the local and national standards and guidance.
- 1.3. To assist with the understanding of this report a glossary of acoustic terms can be found in **Appendix A**. An in-depth glossary of acoustic terms can be viewed online at www.acoustic-glossary.co.uk.

2.0 Details of development proposals

- 2.1. The proposed Co-operative store is to occupy part of the ground floor of the existing commercial building at the corner of Lord Street and King Street, Wrexham.
- 2.2. It is proposed to install new refrigeration and air conditioning plant to service the store. This is to be located on the first floor terrace on the east side of the building.
- 2.3. Plant is to comprise two air conditioning units and a refrigeration pack and gas cooler. The AC plant will operate only when the store is open; refrigeration plant will run at all times, but typically at a lower duty when the store is closed, due to reduced cooling loads. To reduce noise levels as far as is practical, the AC units will be housed within acoustic enclosures.
- 2.4. The store and plant locations are shown in **Appendix B**. Noise data for the plant is given in **Appendix C**.

3.0 Nearest noise sensitive receptors

- 3.1. The area around the store is predominantly commercial, with no residential dwellings within the immediate area.
- 3.2. The nearest windows to the plant are on the first floor above the store (Receptor R1), approximately 5m from the nearest plant item. These windows are to commercial premises.
- 3.3. All other windows are at a greater distance from the louvres.

4.0 Existing noise climate

- 4.1. It should be noted that this assessment was undertaken in May 2020, at a time when the coronavirus pandemic was causing a disruption to working patterns and other activity.

- 4.2. Since Government advice at this time is to avoid any unnecessary travel, traffic noise levels are currently likely to be much lower than normal – and certainly not higher. Many potentially noise generating commercial premises in the area may also be closed. It is likely that any noise survey at the site would therefore measure lower background sound levels than would usually prevail, and give more onerous limits on plant noise than is necessary.
- 4.3. Since the nearest noise-sensitive premises are all commercial rather than residential a robust noise assessment can be made against the objective guidance given BS 8233:2014 *'Guidance on sound insulation and noise reduction for buildings'*.

5.0 Plant noise design criteria

Planning Policy Wales and TAN 11

- 5.1. Planning Policy Wales (PPW) sets out the land use planning policies for the Welsh Government.
- 5.2. Paragraph 13.15.1 of the PPW states that: *"Noise can be a material planning consideration, for example in proposals to use or develop land near an existing source of noise or where a proposed new development is likely to generate noise. Local planning authorities should make a careful assessment of likely noise levels and have regard to any relevant Noise Action Plan before determining such planning applications and in some circumstances it will be necessary for a technical noise assessment to be provided by the developer."*
- 5.3. PPW refers to *Technical Advice Note (Wales) 11 – Noise* (TAN 11) for specific guidance regarding noise assessments. TAN 11 was updated by a Policy Clarification Letter CL-01-15 to refer to the latest British Standards BS 4142:2014 and BS 8233:2014.

Wrexham County Borough Council

- 5.4. It is understood that Wrexham County Borough Council's typical condition for noise from fixed plant is:
- "The rating level of any noise generated by plant associated with the development shall not exceed the pre-existing background level by more than 5dB(A) at any time. The noise levels shall be determined at nearby noise sensitive premises, and measurements and assessment shall be made in accordance with BS4142:2014 Methods for rating and assessing industrial and commercial sound"*
- 5.5. The above typical condition relates to plant noise affecting residential or similar noise-sensitive premises. Since there are no such premises within the area immediately around the proposed store, it is appropriate to draw on other Standards and Guidance.

Criterion at commercial windows

- 5.6. Typically, local authorities do not consider offices and other commercial premises to be as sensitive to noise as residential properties and, therefore, emissions criteria are generally relaxed at these locations.
- 5.7. However, it is considered appropriate to control plant noise levels within offices to meet the recommended internal noise levels provided in BS 8233:2014 '*Guidance on sound insulation and noise reduction for buildings*'. The standard states a range of noise levels for various spaces used for 'study and work requiring concentration' between 35 and 50dB L_{Aeq}.
- 5.8. In addition, BS8233 provides general guidance on the expected sound insulation performance of a given building façade, with details of how various elements can affect the overall performance. Concerning windows, it states that:

If partially open windows were relied upon for background ventilation, the insulation would be reduced to approximately 15dB.

- 5.9. This implies that should windows on a noise affected façade be openable, a sound insulation value of 15dB should be applied to the whole façade to an internal room being assessed. It should be noted that a sound insulation performance of much greater than 15dB is expected for non-openable standard double-glazed windows. However, in order to assess the worst-case scenario, this report assumes that windows may be opened if desired.
- 5.10. Based on the above and assuming a worst-case internal criterion of 35dB L_{Aeq}, cumulative plant noise levels at the façade of the nearest office premises should not exceed 50dB L_{Aeq}.

6.0 Plant noise assessment

- 6.1. The plant noise levels at the nearest noise sensitive receptors have been predicted. The assessment has considered distance losses and surface acoustic reflections.
- 6.2. Table 1 summarises the results of the assessment at the most affected residential properties. All other nearby receptors benefit from increased distance/screening to the plant. The full set of calculations can be found in [Appendix D](#).

Table 1 Plant noise assessment

Receptor	Period	Predicted plant noise level, dB L _{Aeq}	Proposed criterion, dB L _{Aeq}	Difference, dB
R1 (commercial)	Daytime (07.00 – 23.00 hours)	31	50	-19
	Night-time (23.00 – 07.00 hours)	30	50	-20

6.3. Where possible uncertainty in the above assessments has been minimised by taking the following steps:

- Uncertainty in the calculated impacts has been reduced by the use of a well-established calculation method.
- Although the coronavirus pandemic has prohibited a noise survey from being undertaken at this time, reasonable steps have been taken within this assessment to establish appropriate background noise levels.

Plant vibration

6.4. It is recommended that all plant, and connected ducts and pipes, is resiliently isolated to reduce the risk of vibration entering the building structure.

7.0 Summary

- 7.1. Noise Solutions Ltd (NSL) has been commissioned by RPM to provide a noise impact assessment of plant serving the proposed Co-operative store at Lord Street, Wrexham.
- 7.2. Guidance on the maximum noise emissions from the proposed plant has been provided. NSL should be consulted once the final layout/selections have been confirmed.
- 7.3. All proposed plant and associated pipework will be fitted with suitable vibration isolation mounts in order to control structure-borne sound transmission to the adjoining premises.
- 7.4. As the store potentially introduces a change in the character of noise within the building, it is recommended that a sound insulation assessment is made of the separating floor between the store and the offices above. Acoustic treatment of the floor of the store and back of house may also be required to control structure-borne noise due to trolley and roll cage movement.

Appendix A Acoustic terminology

Parameter	Description
Ambient Noise Level	The totally encompassing sound in a given situation at a given time, usually composed of a sound from many sources both distant and near ($L_{Aeq,T}$).
Decibel (dB)	A scale for comparing the ratios of two quantities, including sound pressure and sound power. The difference in level between two sounds s_1 and s_2 is given by $20 \log_{10} (s_1/s_2)$. The decibel can also be used to measure absolute quantities by specifying a reference value that fixes one point on the scale. For sound pressure, the reference value is $20\mu\text{Pa}$. The threshold of normal hearing is in the region of 0 dB and 140 dB is the threshold of pain. A change of 1 dB is only perceptible under controlled conditions.
dB(A), L_{Ax}	Decibels measured on a sound level meter incorporating a frequency weighting (A weighting) which differentiates between sounds of different frequency (pitch) in a similar way to the human ear. Measurements in dB(A) broadly agree with people's assessment of loudness. A change of 3 dB(A) is the minimum perceptible under normal conditions, and a change of 10 dB(A) corresponds roughly to halving or doubling the loudness of a sound. The background noise in a living room may be about 30 dB(A); normal conversation about 60 dB(A) at 1 metre; heavy road traffic about 80 dB(A) at 10 metres; the level near a pneumatic drill about 100 dB(A).
Fast Time Weighting	Setting on sound level meter, denoted by a subscript F that determines the speed at which the instrument responds to changes in the amplitude of any measured signal. The fast time weighting can lead to higher values than the slow time weighting when rapidly changing signals are measured. The average time constant for the fast response setting is 0.125 (1/8) seconds.
Free-field	Sound pressure level measured outside, far away from reflecting surfaces (except the ground), usually taken to mean at least 3.5 metres
Façade	Sound pressure level measured at a distance of 1 metre in front of a large sound reflecting object such as a building façade.
$L_{Aeq,T}$	A noise level index called the equivalent continuous noise level over the time period T. This is the level of a notional steady sound that would contain the same amount of sound energy as the actual, possibly fluctuating, sound that was recorded.
$L_{max,T}$	A noise level index defined as the maximum noise level recorded during a noise event with a period T. L_{max} is sometimes used for the assessment of occasional loud noises, which may have little effect on the overall L_{eq} noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.
$L_{10,T}$	A noise level index. The noise level exceeded for 10% of the time over the period T. L_{10} can be considered to be the "average maximum" noise level. Generally used to describe road traffic noise. $L_{A10,18h}$ is the A-weighted arithmetic average of the 18 hourly $L_{A10,1h}$ values from 06:00-24:00.
$L_{90,T}$	A noise level index. The noise level that is exceeded for 90% of the measurement time interval, T. It gives an indication of the lower levels of fluctuating noise. It is often used to describe the background noise level and can be considered to be the "average minimum" noise level and is a term used to describe the level to which non-specific noise falls during quiet spells, when there is lull in passing traffic for example.

Appendix B Photograph showing areas of interest

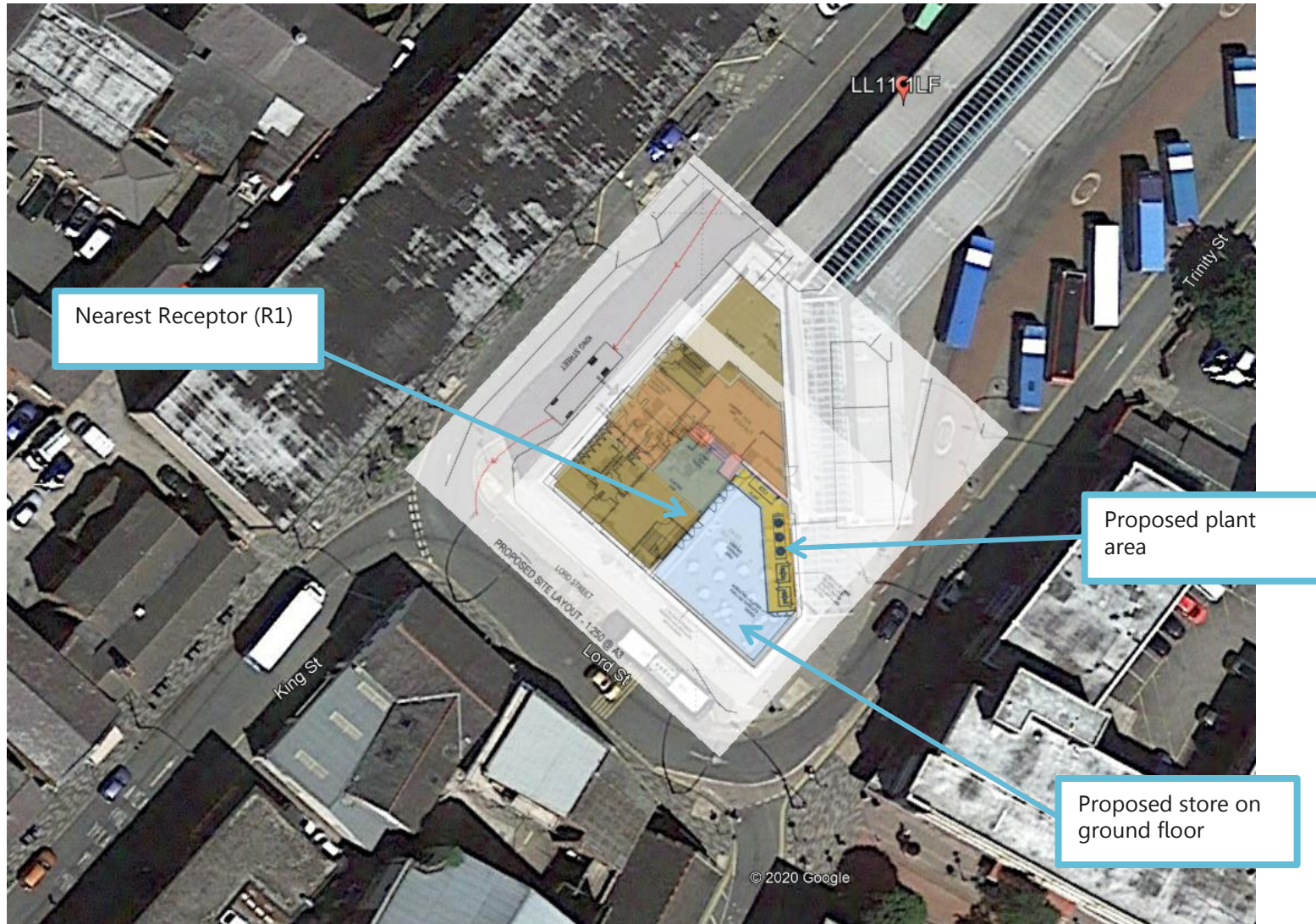
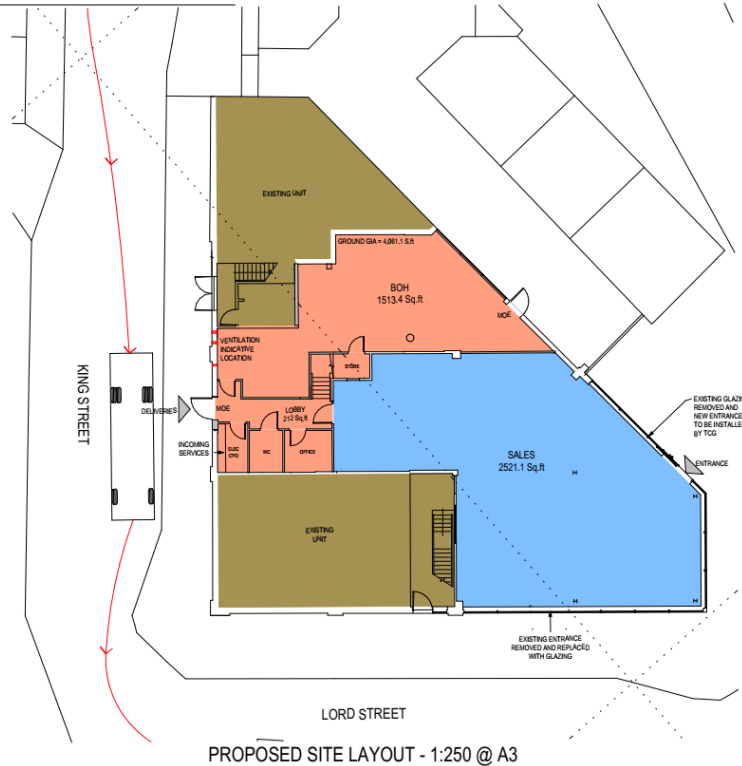


Image © Google 2020

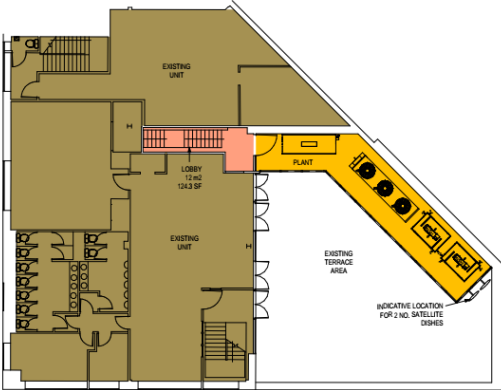
Store plans

STAGE 1

NOTE:
VENTILATION APERTURES:
INDICATED ON EXTERNAL WALL IN BOH AREA;
- RECEPTION AREA: 2 NO. 150x150mm
- MANAGERS OFFICE: 1 NO. 150x150mm
- COLLABORATIVE MEET AREA: 1 NO. 150x150mm
- BOH: 1 NO. 150x150mm
BACK OF HOUSE WALL:
TO ACHIEVE 60 MINUTES FIRE RATING
ROOF PARTITIONS:
TO ACHIEVE 30 MINUTES FIRE RATING



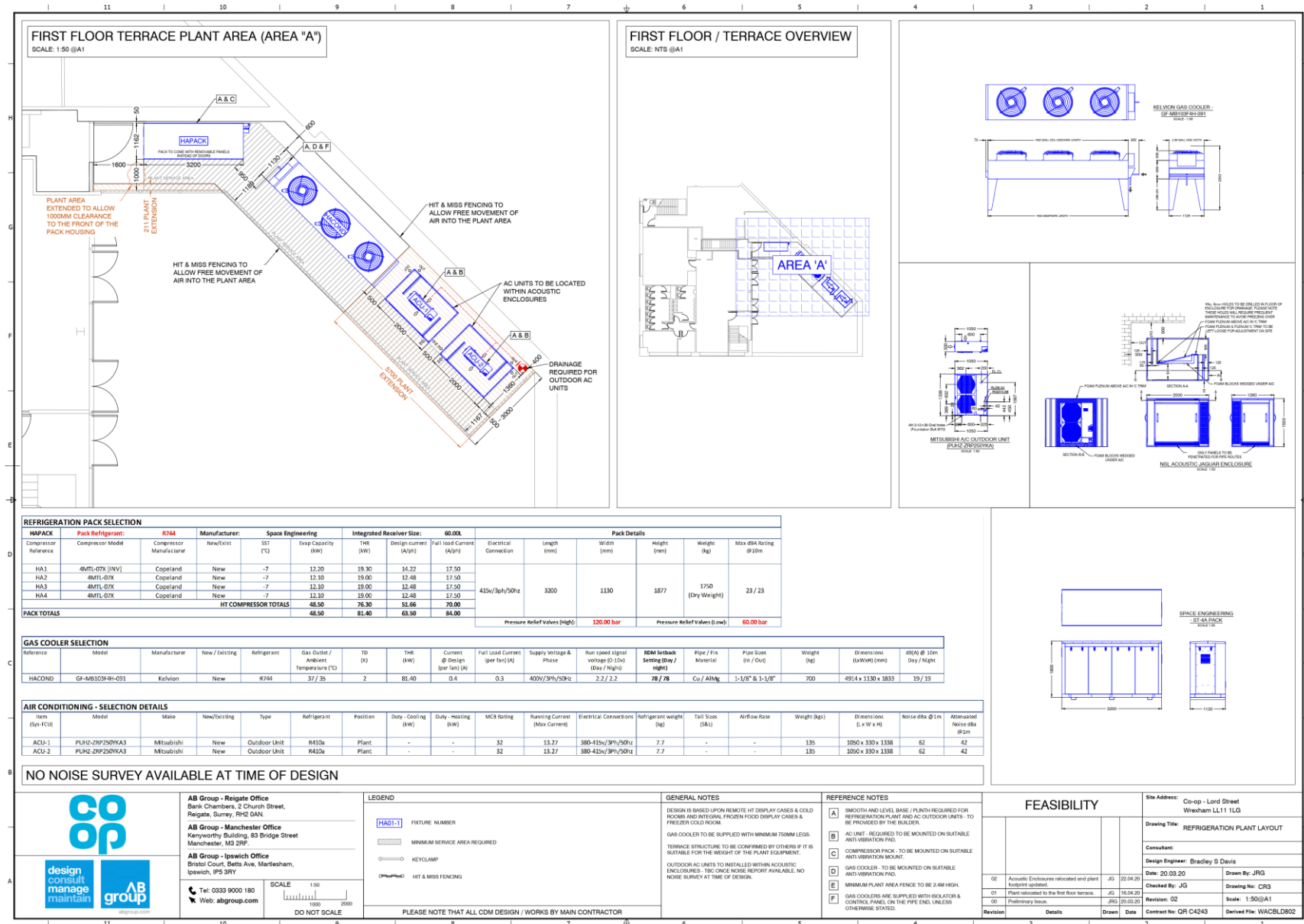
INPUT FROM TCG RISK ASSESSOR REQUIRED



NOTES:		INSPIRE DESIGN LIMITED		Drawn By: JB		Checked By: AC	
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ALL WORKS ARE TO BE UNDERTAKEN IN ACCORDANCE WITH BUILDING REGULATIONS AND THE LATEST BRITISH STANDARDS.							
ALL PROPRIETARY MATERIALS AND PRODUCTS ARE TO BE USED STRICTLY IN ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATIONS.							
STAGE 1							
ISSUED TO INSPIRE							
SITE AREA APPROX.							
STORE TYPE							
PROJECT POSTCODE							
PROPOSED DELIVERY PULL DISTANCE							
LENGTH OF SHOP FRONT							
STORE TYPE							
TYPE OF DEVELOPMENT							
LOCALE							
SALES AREA							
BACK OF HOUSE AREA EXC. PLANT							
TOTAL GROSS INT. AREA							
SALES / BACK OF HOUSE (% OF GIA)							
EXPECTED FORMAL SALES / BOH							
STANDARD PARKING SPACES							
PARENT & CHILD SPACES							
ACCESSIBLE SPACES							
TOTAL SPACES							
CYCLE SPACES							
CO-OPERATIVE SALES FLOOR AREA							
CO-OPERATIVE BACK OF HOUSE AREA							
PROPOSED PLANT AREA							
RISK RATING:							
DELIVERIES:							
EXISTING LAYBY FOR UNLOADING DELIVERIES							
NEAR KINGS ROAD TOWARDS THE NORTHWEST.							
TO BE APPROVED BY DELIVERY RISK ASSESSOR.							
PLANT SOLUTION:							
MECHANICAL PLANT TO BE LOCATED ON ROOF.							
PLANT LAYOUT IN ACCORDANCE WITH AB GROUPS DESIGN.							
MEANS OF ESCAPE:							
ADEQUATE MEANS OF ESCAPE.							
PLANNING:							
CONSENT REQUIRED FOR: BUILD							
USE GLASS							
SHOP FRONT							
SIGNAGE							
SATELLITE							
ATM							
PLANT							
TCG TO SUBMIT PLANNING APPLICATIONS FOR PLANT, ATM, SIGNAGE, ALTERATIONS TO STORE FRONT AND INSTALLATION OF ANY STREET FURNITURE.							
STRUCTURE:							
SUBJECT TO INPUT FROM DEVELOPER'S STRUCTURAL ENGINEER.							
SECURITY:							
SCORE 0-10 (AWAITING FURTHER INFORMATION).....							
REFER TO ABNORMAL CHECKLIST PRODUCED BY THE PROJECT MANAGER.							



Plant details



Appendix C Plant noise data

Plant item	Make/Model	Quantity	Period	Sound pressure level, dB(A)
ACU-1, ACU-2	Mitsubishi PHUZ-ZRP250 YKA3	2	Daytime only	62 at 1m each*
HACOND gas cooler	Kelvion GF-MB103F4H-091	1	Day and night	19 at 10m
HAPACK	Space Engineering	1	Day and night	23 at 10m

**42 dB(A) at 1m each, when acoustically-enclosed*

Appendix D Plant noise calculations

Receptor R1 - Commercial

Plant item	Manufacturer noise data		Distance correction		Directivity correction (dB)	Resultant at receptor, L_{Aeq} (dB)
	Noise level, L_{Aeq} (dB)	Distance (m)	Distance (m)	Correction (dB)		
ACU-1	42	1	10	-20	0	22
ACU-2	42	1	10	-20	0	22
HACOND	19	10	7	3	0	22
HAPACK	23	10	5	6	0	29
Cumulative sound pressure level (Daytime)						31
Cumulative sound pressure level (Night time)						30