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Noise Impact Assessment...

Proposed Tesco Express, Building 2, New Square, Princess Steet / Whitworth Street, Manchester. M1 3AR.

Discharge of Condition 17b of planning permission 11385/FO/2016

KR06971

Version 1.2 - 1st December 2022

Report Conclusion...

The proposed acoustic mitigation strategy included within the development of the three retail units in building 2 to a Tesco Express convenience store will ensure the external noise levels are 5 dB below the octave band L_{90} values and the internal noise levels within the residential dwellings are inaudible.

This report should be submitted to Manchester City Council to discharge part b of condition 16 and 17 of planning permission 11385/FO/2016.



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Version History...

Reference	Version	Date	Author	Position	Document Status
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1. Technical Note...

1.1. Introduction

KR Associates have been instructed by Tesco Stores Ltd to provide the technical details to discharge condition 17b of planning permission 11385/FO/2016 relating to the development of a Tesco Express within building 2 of New Square located between Princess Street and Whitworth Street in the centre of Manchester.

1.2. Original Planning Permission

The original development was granted planning permission by Manchester City Council on 9th March 2017 under application 11385/FO/2016 with the following two conditions relating to noise.

“16) Prior to occupation of the development a scheme for the acoustic insulation of any externally mounted ancillary equipment associated with: (a) the residential development; and (b) any of the commercial uses; to ensure that it achieves a background noise level of 5dB below the existing background (La90) in each octave band at the nearest noise sensitive location shall be submitted to and approved in writing by the City Council as local planning authority in order to secure a reduction in the level of noise emanating from the equipment. The approved scheme shall be implemented prior to occupancy and shall remain operational thereafter.”

“17) Before the development commences an acoustic attenuation scheme including particulars of the acoustic glazing and acoustically treated ventilation to be installed as part of (a) the residential development and (b) the ground floor uses within these blocks; shall be submitted to and approved in writing by the City Council as local planning authority. The approved scheme shall be implemented in full before use of the residential premises first commences.”

“Reason - To protect the amenity of the occupants of the premises once the development hereby approved is occupied, pursuant to policies SP1, H1 and DM1 of the Core Strategy.”

1.3. Correction to Condition 16b

There is a typing error in condition 16b. The condition should read *“a level (Leg,t) of 5 dB below the existing background (L90,t) in each octave band...”*. The background noise level index in each octave band will be linear and not A-weighted. The corrected part has been underlined.

1.4. Previous Application to Discharge Condition 16 and 17...

A previous application was submitted to Manchester City Council under reference CDC/22/0264 to discharge condition 16 and 17. However, the application was refused on 18th August 2022 for the following reason.

“Condition 17(b) (Acoustic insulation - ground floor)

On the basis of the information submitted the condition cannot be discharged.

Internal limits for the units and that lobbied doors have been provided but additional mitigation may be required depending on the tenants. No details of the measures that have been installed in the base unit i.e., window specs, wall/ceiling construction, alternative ventilation have been provided nor has information that the base build will be suitable for without any additional mitigation. The information provided is not really an acoustic scheme and more information is required.

Until a tenant is known for the units this condition cannot be discharged as the base unit build may not be sufficient for their needs and we would need to agree a specific mitigation scheme for the proposed use.”

1.5. Scope of this Report

This report will detail the noise levels generated within the shop floor, back of house storage area and internal plant room and determine the resultant noise levels at the surrounding residential dwellings through the following transmission paths:

- External noise through the glazed façade of the building.
- External noise through the internal plant room ventilation ductwork.
- Internal transfer to the residential dwellings directly above.

1.6. Reliance on third Party Reports

This report will rely on the following external reports by third party consultants.

- Mach Acoustic – Environmental Noise Levels – Revision 01 dated 1st July 2019 (*details of the external background noise levels*)
- Noise Solutions Ltd report reference 91023/NIA/Rev 01 dated 12th October 2022 (*prediction of the external noise levels from the internal plant room*)

1.7. External Background Noise Levels

The following are the external noise levels recorded by Mach Acoustics in May 2019 during the day and night time period based on the minimum levels recorded on a Sunday day and over-night to Monday and is replicated from section 3.1 of the report.

Ref	Time Period	L _{p(1m facade)} – Octave Band Centre Frequency (Hz)							
		(A)	63	125	250	500	1K	2K	4K
L _{Aeq,16h}	Day Time (07:00-23:00)	58	61	56	56	54	54	51	45
L _{Aeq,8h}	Night Time (23:00 to 07:00)	57	59	54	56	54	53	49	43
L _{AMax} Sound Pressure Levels (dB) – reference level 2 x 10 ⁻⁵ Nm ⁻²									

At the time of writing KR Associates (UK) Ltd has not received the octave band L₉₀ background noise levels. It is therefore assumed in determining the external criterion detailed in part b of condition 16 that the L₉₀ levels are around 8 dB below the equivalent continuous levels (Leq, t) in each octave band. The criterion is established as 5 dB below the night time levels.

1.8. Proposed External Noise Criterion

The operation of the Tesco Express will need to meet the following external noise level 1m from any residential dwelling.

Ref	Time Period	L _{p(1m facade)} – Octave Band Centre Frequency (Hz)							
		(A)	63	125	250	500	1K	2K	4K
Criteria	24 hours per day, L _{Aeq,15m}	44	61	56	58	56	55	51	45
L _{AMax} Sound Pressure Levels (dB) – reference level 2 x 10 ⁻⁵ Nm ⁻²									

As a point of reference, the Noise Solutions Ltd background noise survey established a minimum L_{A90,15 min} background noise level between 23:00 and 07:00 of L_{A90, 15 min} 52 dB, so the above criterion would appear to be appropriate.

1.9. Proposed Internal Noise Criterion

The original planning permission does not establish any suitable internal noise criterion within the residential flats above. Therefore, it is considered appropriate to ensure that the internal noise levels as a result of the internal noise transfer should be inaudible to the occupiers of the flats.

For reference the threshold of hearing is taken from BS EN ISO 389: Part 7: 2019 entitled “Acoustics: Reference zero for the calibration of audiometric equipment. Reference threshold of hearing under free-field and diffuse-field listening conditions.”. The threshold of hearing within the 1st floor flat above the proposed Tesco Express will depend on the existing background noise levels and will be higher than this absolute criterion.

Ref	Measurement Location	Octave Centre Band Frequency (Hz)							
		(A)	63	125	250	500	1K	2K	4K
Aud	Threshold of Inaudibility	--	45	28	17	10	8	6	5
L _{AMax} Sound Pressure Levels (dB) – reference level 2 x 10 ⁻⁵ Nm ⁻²									

1.10. Internal Noise Levels

The following internal noise levels are the highest noise levels that are likely to occur on the sales floor / back of house and within the internal plant room:

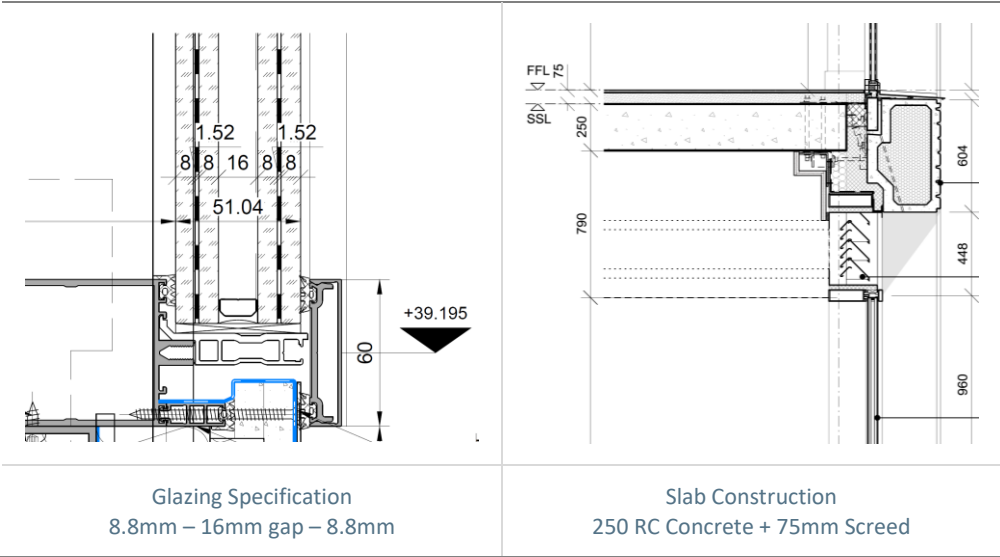
Ref	Receiver Position	L _{p(1m facade)} – Octave Band Centre Frequency (Hz)							
		(A)	63	125	250	500	1K	2K	4K
Sales	Maximum Levels	69	69	68	62	63	62	64	62
	Average Levels	61	61	63	59	58	55	52	52
Plant Room	Maximum Levels	93	85	89	86	85	88	87	85
	Average Levels	90	81	85	83	82	85	84	82
L _{AMax} Sound Pressure Levels (dB) – reference level 2 x 10 ⁻⁵ Nm ⁻²									

1.11. Landlord’s As-built Construction

The following assessments of the external and internal noise levels impacting the residential dwellings rely on the information within the following two drawings provided by the Landlord.

- 252194-CLM-29-BX-LXX-DET-0414 AB (As Built) for the glazing specification.
- 11-BO-A-G251-S-A:-101 Revision R (As Built) for the slab construction.

For reference, the following shows an exert from each drawing.



1.12. Proposed Mitigation Measures

1.12.1 Slab

The separating slab between the ground floor Tesco Express demise and the 1st floor residential dwellings is a 250mm post tensioned RC concrete slab with a 75mm screed. It is proposed to install the following acoustic ceiling only within the internal plant room to control flanking transmission.

- British Gypsum RB1 17mm resilient bar.
- 2 x 12mm of British Gypsum Fireline plasterboard.

1.12.2 Plant Room Wall Lining

It is proposed to line the internal plant room walls with the following construction which has been selected to provide the necessary thermal protection from the internal plant room i.e. a U-value of at least 0.22 Wm⁻²K⁻¹.

- ISO Clad 175mm Firestop 10 Panel (26.89 Kg^m-²)
- The panel on its own has an overall acoustic performance of R_w 31 – 33 dB.

1.12.3 Performance of Separating Elements

Ref	Details	L _p (1m facade) – Octave Band Centre Frequency (Hz)							
		R _w	63	125	250	500	1K	2K	4K
Glazing	Curtain Glazing	42	27	25	30	41	48	51	61
Slab 1	250 RC +75mm Screed	57	43	44	46	51	57	58	58
Slab 2	250 RC + Acoustic Lining	82	50	62	69	78	83	85	85
Plant	Plant Room Walls	56	33	37	44	51	57	60	61

Transmission Loss (dB) – R_w between 100 and 3,150 Hz.

1.12.4 Supporting Mechanical Equipment

Any mechanical equipment including AC cassettes, door heaters or any other equipment should be installed on pre-installed drop rods incorporating spring hangers located below the acoustic ceiling with a minimum isolation efficiency of 90%.

1.12.5 Internal Plant Room Attenuators

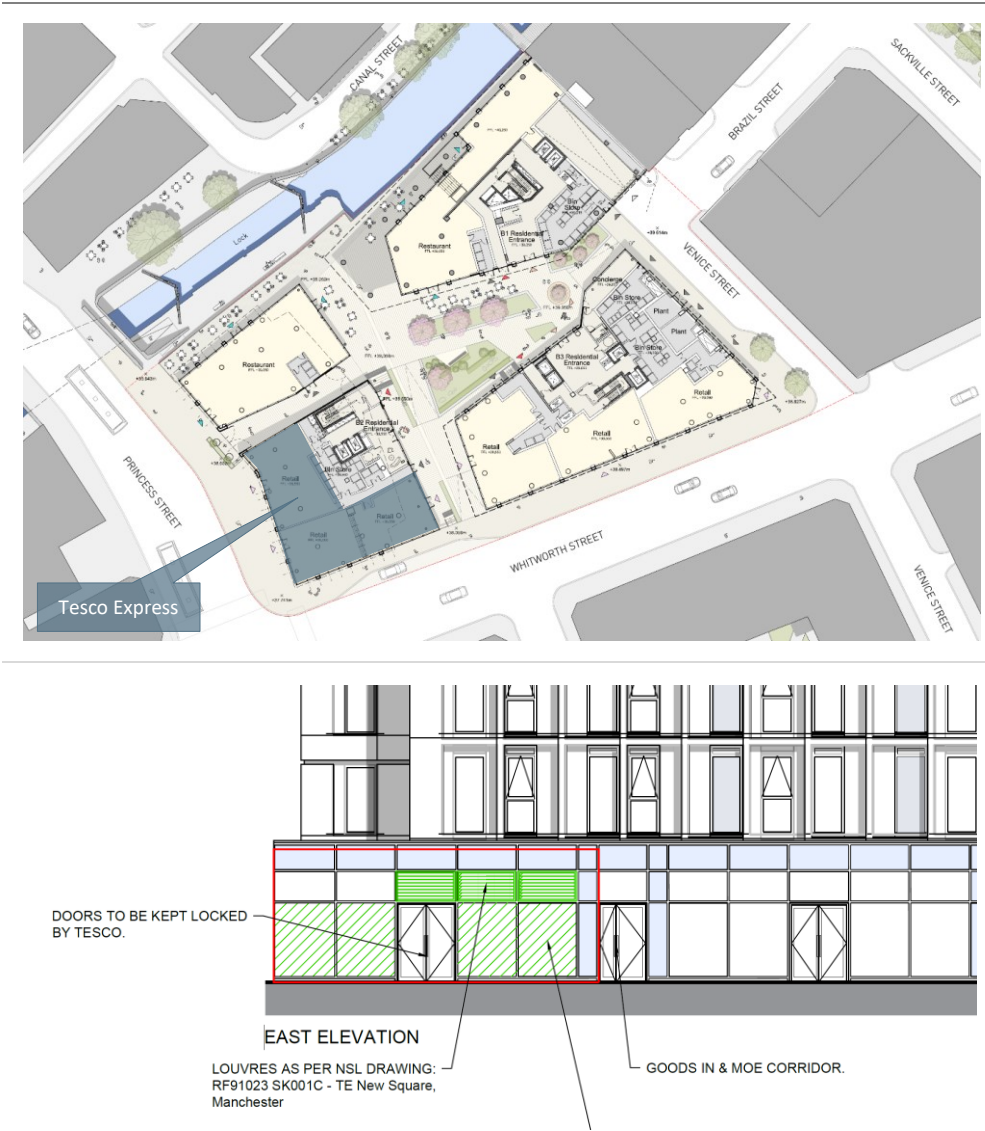
The internal plant room will be fitted with the following splitter type attenuators. A copy of the proposed internal plant room design is included in Appendix A.

Ref	Details	L _p (1m facade) – Octave Band Centre Frequency (Hz)							
		R _w	63	125	250	500	1K	2K	4K
In	Inlet Attenuator	--	5	8	15	25	32	31	28
Out	Outlet Attenuator	--	5	8	15	25	32	31	28

Transmission Loss (dB) – R_w between 100 and 3,150 Hz.

1.13. Layout of Site

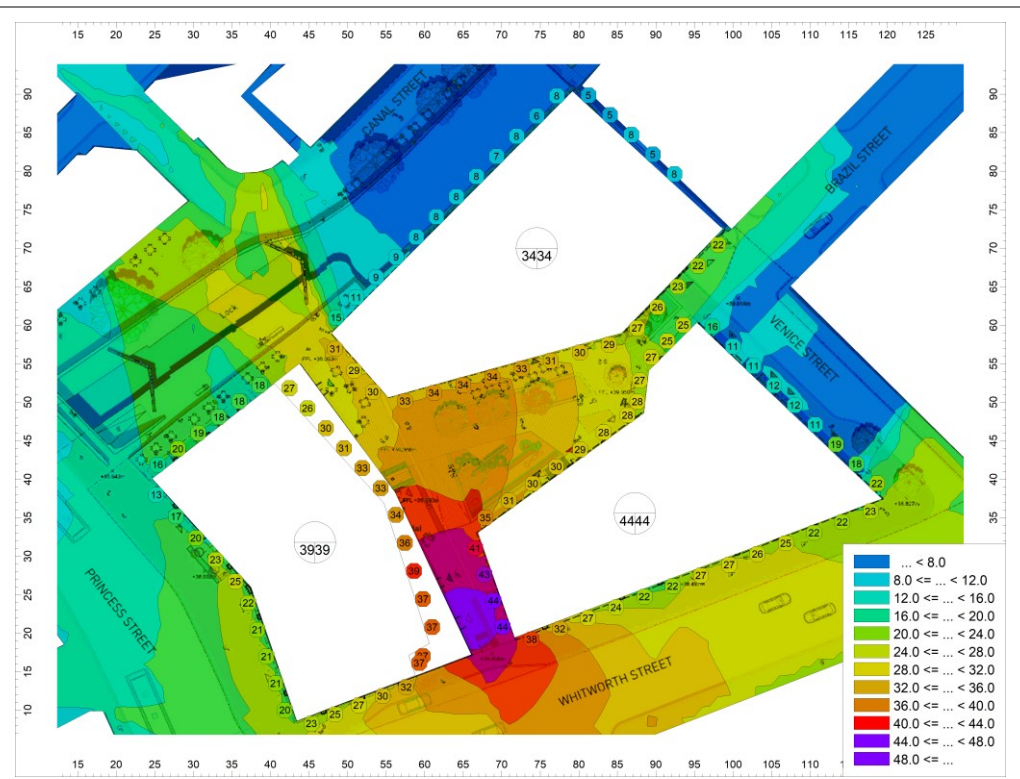
The following shows the overall plan layout of the site. The proposed Tesco Express will occupy the three retail units within Building 2 facing Princess Street and Whitworth Street. The internal plant room will be located on the façade of the building which faces the walkway running from Whitworth Street towards the canal and the centre of the site.



1.14. Resultant External Noise Levels

The following calculations are undertaken using the LAeq values within the sales floor and internal plant room and the noise breakout from the inlet and extract ventilation systems of the internal plant room. The calculations are undertaken using Datakustik's CadnaA 3D noise mapping software to calculate the highest resultant façade noise levels at any height.

1.14.1 3D Noise Map



Ref	Time Period	L _p (1m facade) – Octave Band Centre Frequency (Hz)							
		(A)	63	125	250	500	1K	2K	4K
L _{Aeq,15m}	Highest Façade Level	44	54	56	51	45	38	37	43

L_AMax Sound Pressure Levels (dB) – reference level 2 x 10⁻⁵ Nm⁻²

1.14.2 Assessment of External Noise Levels

The following table provides an assessment of the worst-case external noise levels to ensure compliance with the underlying principle of part b of condition 16.

Ref	Receiver Position	L _{p(1m facade)} – Octave Band Centre Frequency (Hz)							
		(A)	63	125	250	500	1K	2K	4K
Res	Resultant External Level	44	54	56	51	45	38	37	43
Criteria	24 hours per day, L _{Aeq,15m}	44	61	56	58	56	55	51	45
Ass	Assessment of Levels	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
L _{AMax} Sound Pressure Levels (dB) – reference level 2 x 10 ⁻⁵ Nm ⁻²									

1.14.3 Conclusion

The noise emissions 1m externally from the surrounding residential dwellings will be 5 dB below the underlying L₉₀ background noise levels in each octave band and will therefore comply with the underlying requirements of part b of condition 16.

1.15. Resultant Internal Noise Levels

The following calculations are undertaken using the L_{Max} levels within the sales floor and internal plant room to determine if the resultant internal noise levels within the residential dwellings directly above the 1st floor will be audible to the future occupiers.

1.15.1 Internal Noise Transfer from Sales Floor

Ref	Receiver Position	L _{p(1m facade)} – Octave Band Centre Frequency (Hz)							
		(A)	63	125	250	500	1K	2K	4K
Sales	Sales Floor Levels, L _{Max}	69	69	68	62	63	62	64	62
Slab 1	250 RC +75mm Screed	--	43	44	46	51	57	58	58
Res	Resultant level in Res	15	26	24	16	12	5	6	4
Aud	Threshold of Inaudibility	21	45	28	17	10	8	6	5
Ass	Assessment of Levels	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
L _{AMax} Sound Pressure Levels (dB) – reference level 2 x 10 ⁻⁵ Nm ⁻²									

1.15.2 Internal Noise Transfer from Internal Plant Room

Ref	Receiver Position	L _{p(1m facade)} – Octave Band Centre Frequency (Hz)							
		(A)	63	125	250	500	1K	2K	4K
Plant	Internal Plant Room, L _{Max}	93	85	89	86	85	88	87	85
Slab 2	250 RC – Acoustic Ceiling	--	50	62	69	78	83	85	85
Res	Resultant level in Res	16	35	27	17	7	5	2	0
Aud	Threshold of Inaudibility	21	45	28	17	10	8	6	5
Ass	Assessment of Levels	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
L _{AMax} Sound Pressure Levels (dB) – reference level 2 x 10 ⁻⁵ Nm ⁻²									

1.15.3 Conclusion

The internal noise transfer from the main sales floor and internal plant room are unlikely to be audible to the occupiers of the residential dwellings above.

1.16. Conclusions and Discussions

1.16.1 Overall Conclusion

The proposed acoustic mitigation strategy included within the development of the three retail units in building 2 to a Tesco Express convenience store will ensure the external noise levels are 5 dB below the octave band L₉₀ values and the internal noise levels within the residential dwellings are inaudible.

This report should be submitted to Manchester City Council to discharge part b of condition 16 and 17 of planning permission 11385/FO/2016.

1.16.2 Exclusions

Condition 16 and 17 relate in general to the internal operation of the retail unit in terms of noise breaking out through the glazing and ventilation terminations to the outside and the internal noise transfer through the building to the residential dwellings above.

The above assessments exclude the external noise from deliveries to the site and of customers entering and leaving the building.

1.16.3 Mitigation Measures

The landlord’s glazing has provided suitable attenuation for the noise breakout from the sales floor as it includes two layers of 8.8mm laminated glass separated by a 16mm airgap. The higher internal noise levels within the internal plant room are controlled by the wall linings on all sides of the plant room including the glazing façade and the inclusion of an acoustic ceiling to fully control flanking transmission to other parts of the building. To confirm, the mitigation measures include the following:

- Acoustic ceiling within the internal plant room.
- Acoustic wall lining within the plant room on all sides (including glazed façade).
- Isolation of all mechanical equipment on suitable AV mounts.

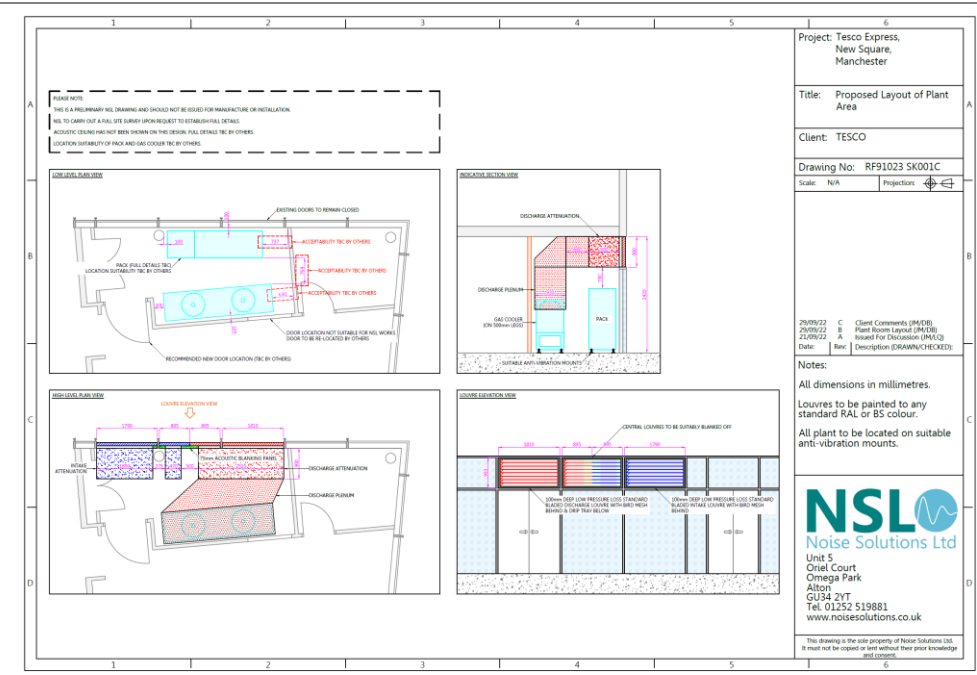
1.16.4 Nosie Solutions Ltd – Internal Plant Room

The following table shows the levels predicted by Noise Solutions Ltd at the nearest noise sensitive façade.

Ref	Receiver Position	Lp(1m facade) – Octave Band Centre Frequency (Hz)							
		(A)	63	125	250	500	1K	2K	4K
Res	Noise Solution Ltd – R2	44	54	57	51	45	38	37	43

LAMax Sound Pressure Levels (dB) – reference level 2 x 10⁻⁵ Nm⁻²

2. Appendix A...



end of technical note

