

ACOUSTIC DESIGN TECHNOLOGY
Noise and Vibration Consultants

ADT 3139

05 February 2021

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ADDINGTON STREET, MANCHESTER
SCHEME OF SOUND INSULATION
ACOUSTIC CONSULTANCY REPORT ADT 3139/ENIA

Revision	Date	Issued By	Checked by	Revision Notes
-	05/02/2021	Rob Ashby	Chris Middleton	first issue

1.0 SUMMARY

Planning Permission has been granted for the erection of a new 6-9 storey residential building comprising 90 dwellings plus residents lounge and external living areas. A number of Planning Conditions have been attached to the granted planning Permission. This report presents a scheme of sound insulation specifications for the development, as required by Planning Condition 13 which states:

13) Notwithstanding the environmental noise assessment prepared by Cundall stamped as received by the City Council, as Local Planning Authority, on the 19 September 2019 and the email from Paul Nellist dated 8 November 2019, (a) prior to the first occupation of the development a scheme for acoustically insulating the proposed residential accommodation against noise from Addington Street and local traffic network shall be submitted for approval in writing by the City Council, as Local Planning Authority. The approved noise insulation scheme shall be completed before the first occupation of the development.

Noise survey data must include measurements taken during a rush-hour period and night time to determine the appropriate sound insulation measures necessary. The following noise criteria will be required to be achieved:

Bedrooms (night time - 23.00 - 07.00) 30 dB L Aeq (individual noise events shall not exceed 45 dB L Amax,F by more than 15 times)
Living Rooms (daytime - 07.00 - 23.00) 35 dB L Aeq
Gardens and terraces (daytime) 55 dB L Aeq

Acoustic Design Technology Limited have undertaken an environmental survey to confirm the typical levels of noise generated by the main sources impacting on the proposed development site.

Calculations have been undertaken to determine the minimum sound insulation performance of the glazed elements of the façade to achieve the indoor noise levels set out in Condition 13, based on the survey data.

2.0 BASIS OF ASSESSMENT

2.1 Site Location

The proposed development is located at Addington Street, Manchester, centred on grid reference 384656,398837 in an area of mixed commercial and residential land uses.

The site is bounded to the north east by existing surface car parking. New residential developments are located approximately 11m east and 15m west of the site boundary. The site is bounded to the north west by a disused warehouse, and to the south west by the A665 with further commercial properties beyond.

A local one-way system is in place on the roads immediately surrounding the site. At the time of ADT's noise survey, both Chadderton Street and Cross Keys Street were closed at the intersection with the A665 Ring Road.

The closest major road to the site is the A62 Oldham Road which lies approximately 50m south east of the site.

2.2 Proposed Development

Planning Permission has been granted for the erection of a new 6-8 storey residential building comprising 90 dwellings plus resident's lounge and external living areas.

2.3 Assessment Criteria

The L_{Aeq} criteria in planning condition 13 have no defined timebase, although it is reasonable to assume that they are drawn from Section 7.7.2 of BS 8233:2014, as follows:

Activity	Location	Day (07:00 - 23:00)	Night (23:00 - 07:00)
Resting	Living room	35 dB $L_{Aeq, 16hour}$	-
Dining	Dining room / area	40 dB $L_{Aeq, 16hour}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq, 16hour}$	30 dB $L_{Aeq, 16hour}$

There is also a requirement for individual L_{AFmax} events not to exceed 45 dB within bedrooms more than 15 times per night. This is based on recommendations drawn from ProPG: 2017, which in turn is derived from the WHO Guidelines for Community Noise which was first published in 1999.

3.0 ENVIRONMENTAL NOISE SURVEY

3.1 Introduction

An environmental noise survey was previously undertaken by Cundall, with results presented in their Environmental Noise Assessment Report reference 1021864-RPT-AS-001, Revision B dated 19 August 2019.

Additional noise monitoring was undertaken by ADT on 25 January 2021 to provide a more detailed analysis of the spectral noise levels likely to be incident on the façade of the proposed development.

3.2 Instrumentation

The survey was conducted using the instrumentation detailed in Appendix A of this report.

The sound level meter was calibrated at the beginning of the survey period, and the calibrations checked at the end. No significant drift occurred.

3.3 Procedure

Measurement positions were selected as described below and indicated on the attached site plan 3139/SP1:

- i Approximately 50m north west of the site at the intersection of the A665 and Mason Street
- ii At the south west site boundary;
- iii At the south east site boundary intersection with Chadderton Street and the A665
- iv on King Street, approximately 3 metres in from the kerb

At all positions the microphone was mounted on a tripod approximately 1.5 metres above the ground and least 3.5 metres from any other acoustically reflective surface.

Measurements were taken at each location with the Norsonic 140 sound level meter set to store the octave band and A-weighted 100ms short-term L_{eq} levels for subsequent post processing.

3.4 Results

The logged data has been post processed to determine $L_{Aeq,T}$ and L_{Amax} levels for each 15 minute period, and these are listed in the attached table 3139/T1.

Octave band $L_{eq, 15 mins}$ averaged over the survey period are listed in the attached table 3139/T2.

Please refer to Appendix B for an explanation of the noise units and the A-weighting term used in this report.

3.5 Weather Conditions

For the duration of the survey weather conditions were generally dry with wind speeds $< 5ms^{-1}$, although the ground was damp from earlier rainfall. The survey was terminated at approximately 12:45 when significant sleet showers began.

3.6 Description of Existing Acoustic Environment

The noise climate across the site was mainly controlled by a combination of noise from the A665 and the surrounding road network as well as a distant traffic from the A62.

At the time of the noise survey, a number of noise generating activities were occurring on and proximate to the site. These included resurfacing works close to the junction of the A665 and the A62, and construction works between Mason Street and Cross Keys street. Monitoring positions and periods were chosen to minimise the influence of these noise sources.

Works were also on-going at the site during some of the monitoring period, including mucking out with an excavator. An on-site generator and water pump were also operating, however these were temporarily shut down whilst monitoring at positions 2 and 3 were undertaken.

Noise levels measured by ADT are summarised in Tables 3139/T1 to 3139/T2.

4.0 NOISE IMPACT ASSESSMENT

4.1 Introduction

The guidance in the following sections is intended to demonstrate how suitable noise levels could be achieved inside dwellings and in outdoor living areas, to support the discharge of planning condition 13.

4.2 Site Noise Levels

When assessing external noise intrusion into new dwellings it must be borne in mind that the noise climate may change in the future, including changes to the one way system and the re-opening of roads which are currently closed due to construction activities. The following discussion is by necessity based on the results of both the original Cundall report and the environmental noise survey described in Section 3.0 above.

The ADT noise survey was undertaken in January 2021, whilst the UK was subject to national lockdown restrictions intended to control the spread of Covid 19. As such, traffic flows are expected to be reduced relative to those during the previous measurements, however the Calculation of Road Traffic Noise (CRTN: 1996) suggests that a doubling or halving of traffic flows would result in a change in noise level of $\leq 3\text{dB}$, which is the lowest perceptible change in road traffic noise over the long term. Since the results of the ADT noise survey are similar in level to those reported in the Cundall report, traffic flows are considered to be of a similar magnitude. Noise levels presented below for the day and night time period have been drawn from the original Cundall report.

Facade	Noise levels	
	Day $L_{Aeq, 15min}$ dB	Night $L_{Aeq, 15min}$ dB
North east façade	63	63
South west facade	72	72

The $L_{Aeq,T}$ noise levels presented in the Cundall report for the daytime period correlate well with the monitoring undertaken by ADT. Therefore in the absence of long-term monitoring, the noise levels presented above are considered representative of the highest day and night time noise levels likely to occur at the site, and will form the basis of the proposed mitigation measures.

4.3 Noise Design Criteria

BS 8233:2014 noise criteria for indoor living areas are provided in Section 2.3 above and provided again for quick reference:

Activity	Location	Day (07:00 - 23:00)	Night (23:00 - 07:00)
Resting	Living room	35 dB $L_{Aeq, 16hour}$	-
Dining	Dining room / area	40 dB $L_{Aeq, 16hour}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq, 16hour}$	30 dB $L_{Aeq, 8hour}$

There is also a requirement that night time L_{AFmax} do not exceed 45 dB more than 15 times per night within bedrooms.

4.4 Noise Impact Assessment

To assess noise levels incident on the external façades of the development, a three-dimensional Cadna-A noise model has been developed. The noise model is based on ordnance survey mapping and terrain data, as well as drawings and information provided by the client. All buildings barriers and ground surfaces are assumed to be acoustically reflective.

Noise sources surrounding the development have been calibrated based on spectral noise data from ADT measurements, as well as information provided by Cundall. Propagation has been calculated according to ISO 9613: 1996.

4.5 Noise Levels Within Dwellings

Based on the predicted noise levels, a series of calculations have been undertaken to determine the minimum sound insulation performance for the glazed façade elements to achieve the noise criteria set out in Section 4.3. The calculations assume windows would remain closed, with ventilation provided by mechanical means.

A series of marked up drawings reference 3139/GS1 to 3139/GS4 have been prepared, which indicate the required glazing sound insulation performance for each residential window in the development, based on glazing systems proposed by the client. Each window is marked up with a minimum performance corresponding to the octave band sound insulation of the client's proposed glazing systems.

Calculations are based on achieving the indoor ambient noise criteria specified in Planning Condition 13 as set out in Section 4.2 above, including not more than 15 exceedances of 45 dB L_{AFmax} internally within bedrooms.

Based on the information provided in the Cundall report, noise levels at the beginning and end of the night time period are similar to those recorded throughout the daytime period. The scheme of sound insulation has therefore been formulated to achieve the IANL set out in Section 2.3 based on the spectral measurements undertaken by ADT between 11:00 and 13:00. This is considered to be an onerous approach, as it is likely that noise levels during the quietest part of the night time would reduce significantly, resulting in a much lower average noise level over the whole of the night time period, (dB $L_{Aeq, 8hour}$).

The octave band sound insulation performance of the proposed glazing systems are presented in the table below, which should be read in conjunction with drawings 3139/GS1 to 3139/GS4 appended to this report.

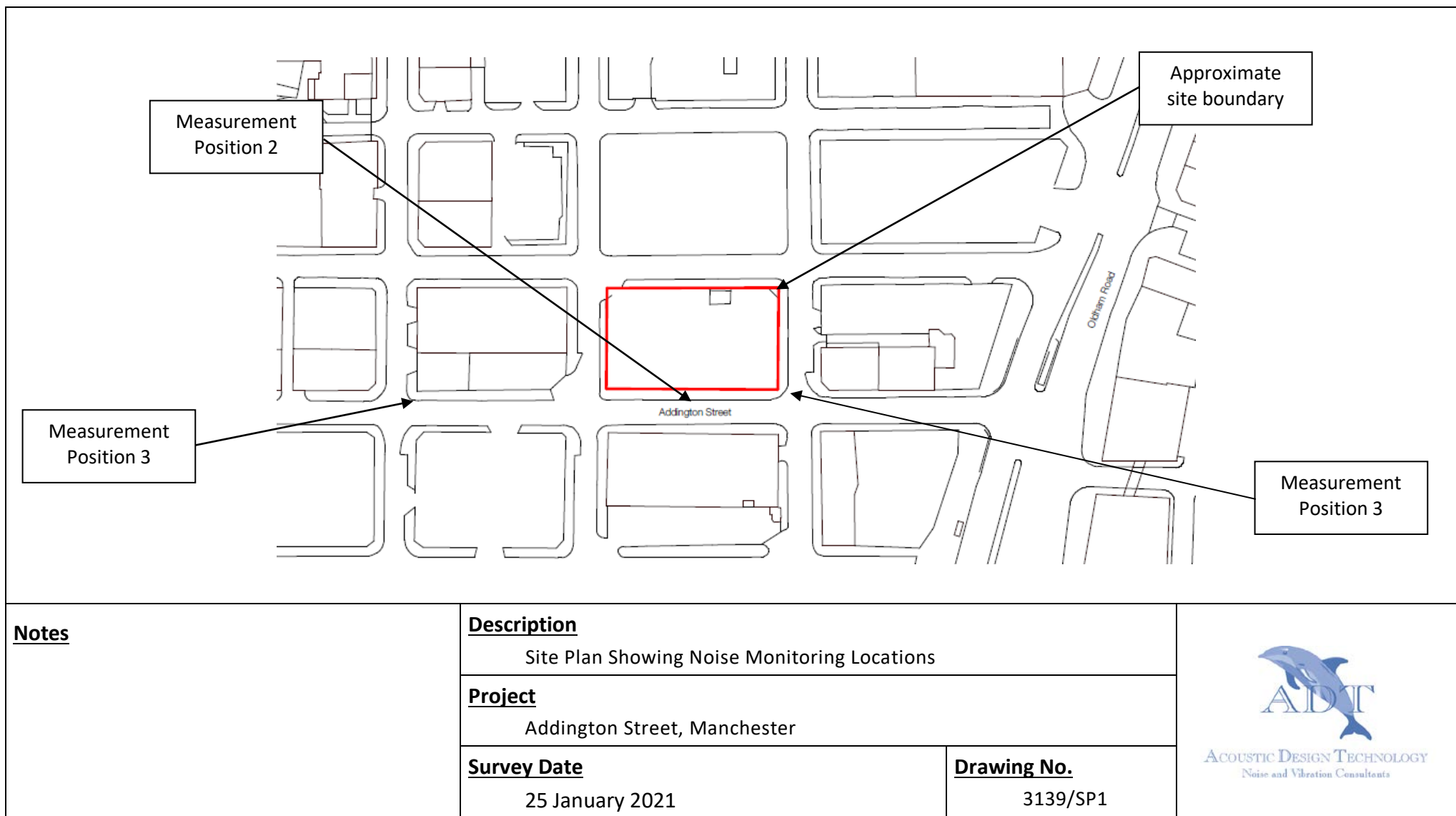
An example calculation is appended to this report as Table 3139/T3.

Glazing system reference	Octave band sound insulation performance (dB R_w)							dB $R_w + C_{tr}$
	63Hz	125Hz	250Hz	500	1kHz	2kHz	4kHz	
PLU-LYD0008	20	20	22	31	35	38	39	29
PLU-LYD0002	22	19	23	33	42	39	39	30
PLU-LYD0054	23	22	24	35	43	46	47	32
PLU-LYD0055	24	23	27	37	43	42	48	34
PLU-LYD0056	26	25	31	39	42	43	50	36
PLU-LYD0057	25	29	36	41	42	45	51	40

Note that in some areas, the weight and thickness of high performance glazing panes precludes their use as openable windows. In these areas, glazing separate specifications have been presented for the fixed and operable leaves of the window. The resulting composite sound insulation performance has been calculated to achieve the minimum sound insulation requirements.



FOR ACOUSTIC DESIGN TECHNOLOGY



SURVEY RESULTS (A WEIGHTED TIME HISTORY)

Position	Period	$L_{Aeq, T}$ dB	Range of L_{AFmax} dB ^[1]
1	11:00-12:05	72	67 - 93
2	12:15-12:30	70	74 - 88
3	12:40-12:46	70	75 - 81

NOTES: [1] Range of 1 minute L_{AFmax} measured during stated period.

Table 2449/T1

AVERAGED OCTAVE BAND $L_{eq, T}$ BY POSITION

Position	$L_{eq, T}$ (dB) Octave band centre frequency (Hz)								$L_{Aeq, T}$ (dB)
	63	125	250	500	1k	2k	4k	8k	
1	71	68	67	66	69	65	56	47	72
2	70	64	64	63	67	62	52	43	70
3	69	65	65	64	68	63	52	42	70

Table 2449/T2

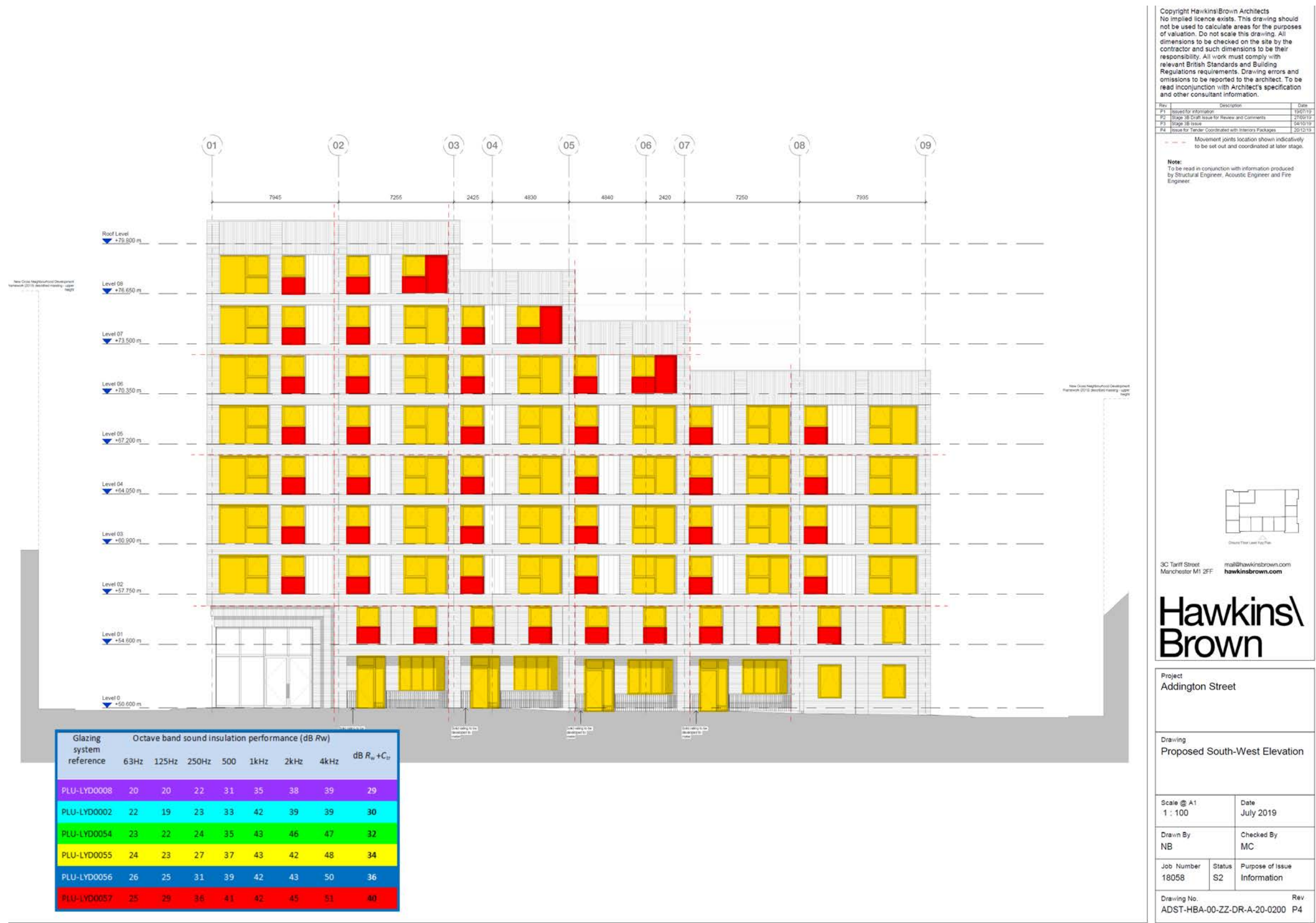
SAMPLE FAÇADE CALCULATION

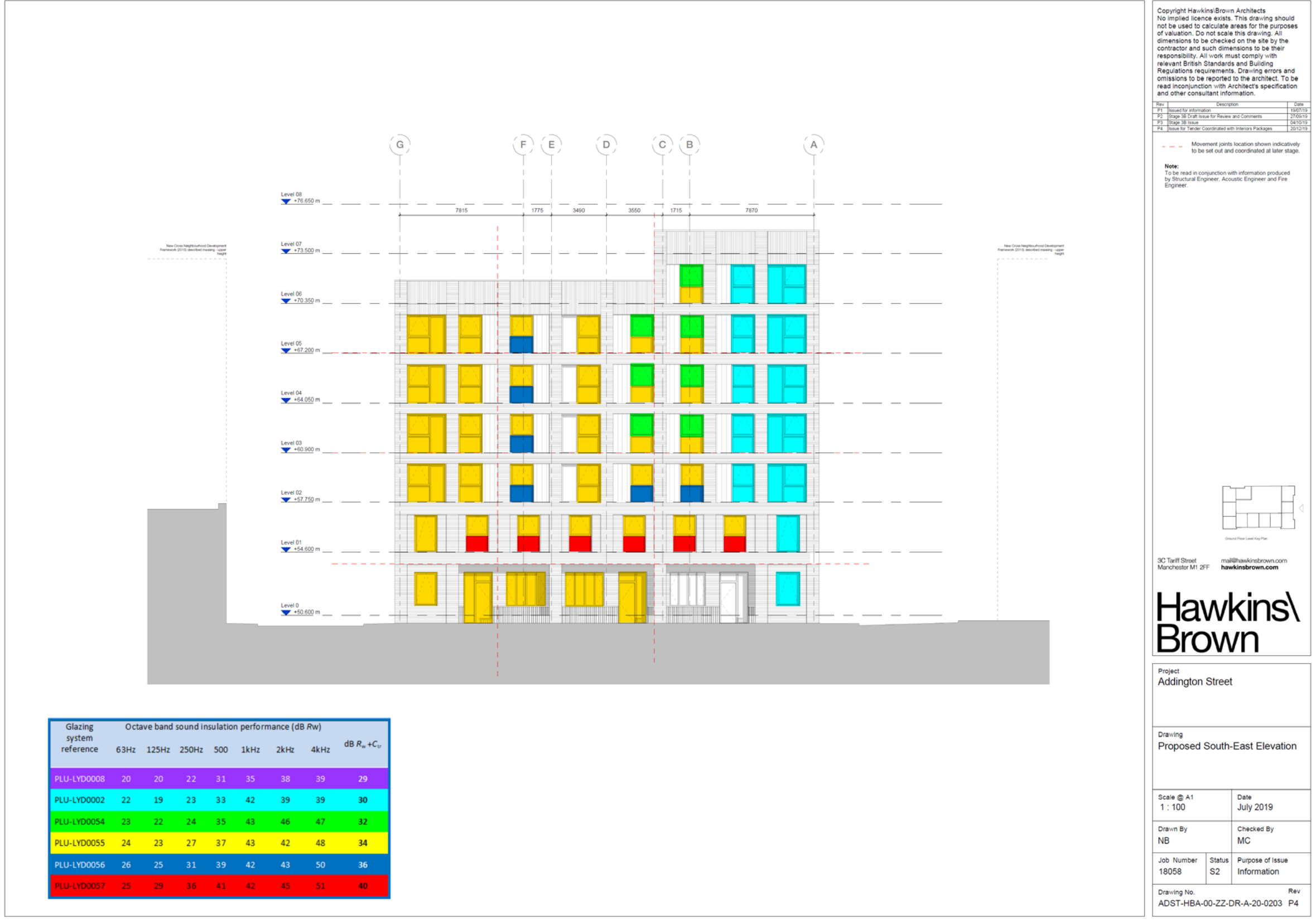
First Floor Bedroom – Flat 00.09

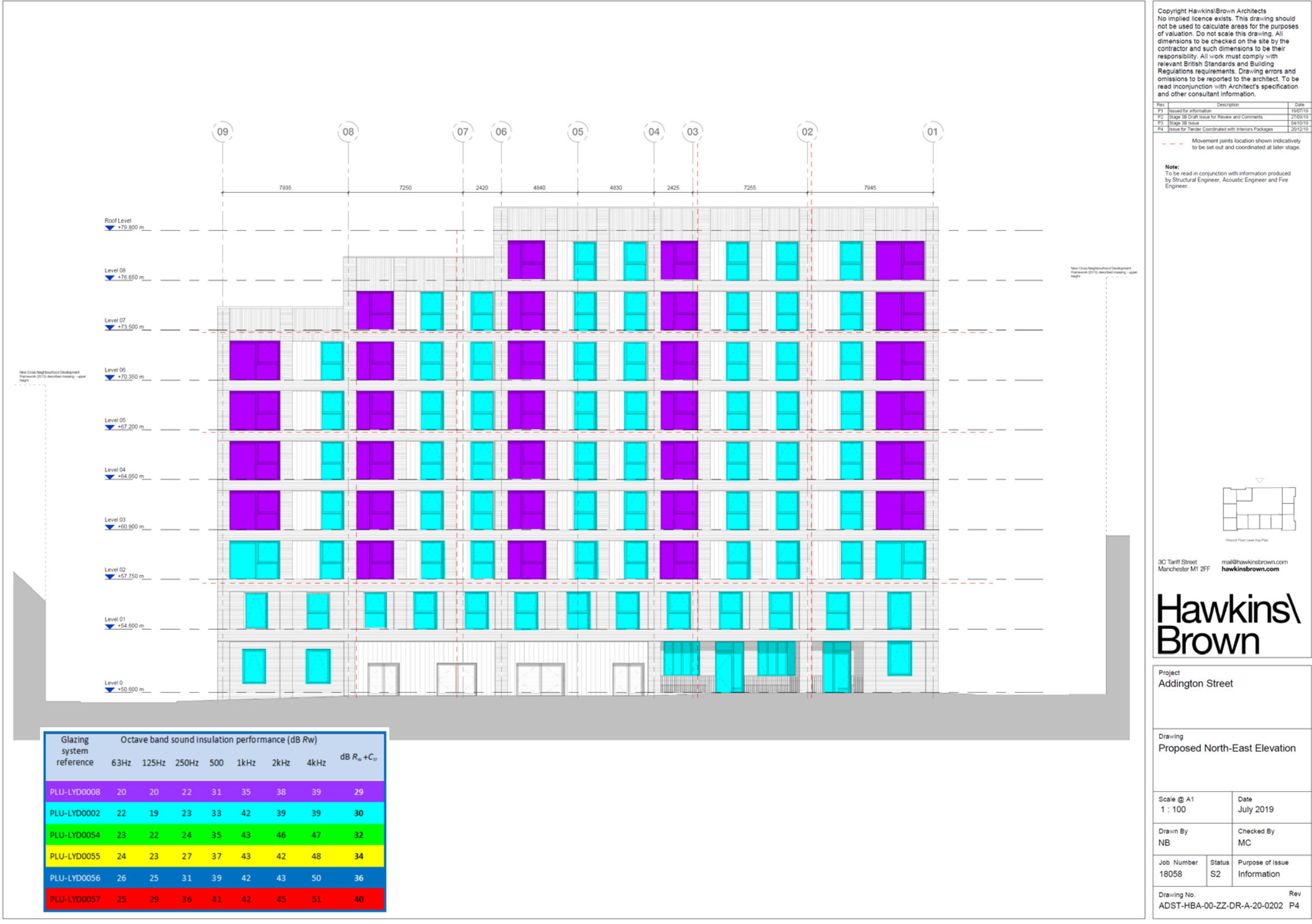
	Area	Octave Band Centre Frequency - Hz								
		63	125	250	500	1k	2k	4k	8k	dB(A)
Incident noise level L_{Amax}		77	75	75	75	76	72	65	57	79
Direct Field										
Direct L_p		51	47	42	34	30	25	13	5	38
Reverberant Field										
Composite SRI of structure (from below)		26	28	33	41	46	47	52	52	
10 log (S / A)		3	2	0	-2	-3	-3	-3	-3	
Constant (for point source)		1	1	1	1	1	1	1	1	
Reverberant L_p		55	50	43	33	28	23	11	3	39
Total L_p		56	52	46	37	32	27	15	7	42
Composite SRI Calculation										
LYD0057	?	25	29	36	41	42	45	51	51	
LYD0055	?	24	23	27	37	43	42	48	48	
103 mm brick + 100 mm block with ties	4.5	28	34	40	45	50	55	55	55	
Composite SRI		26	28	33	41	46	47	52	52	

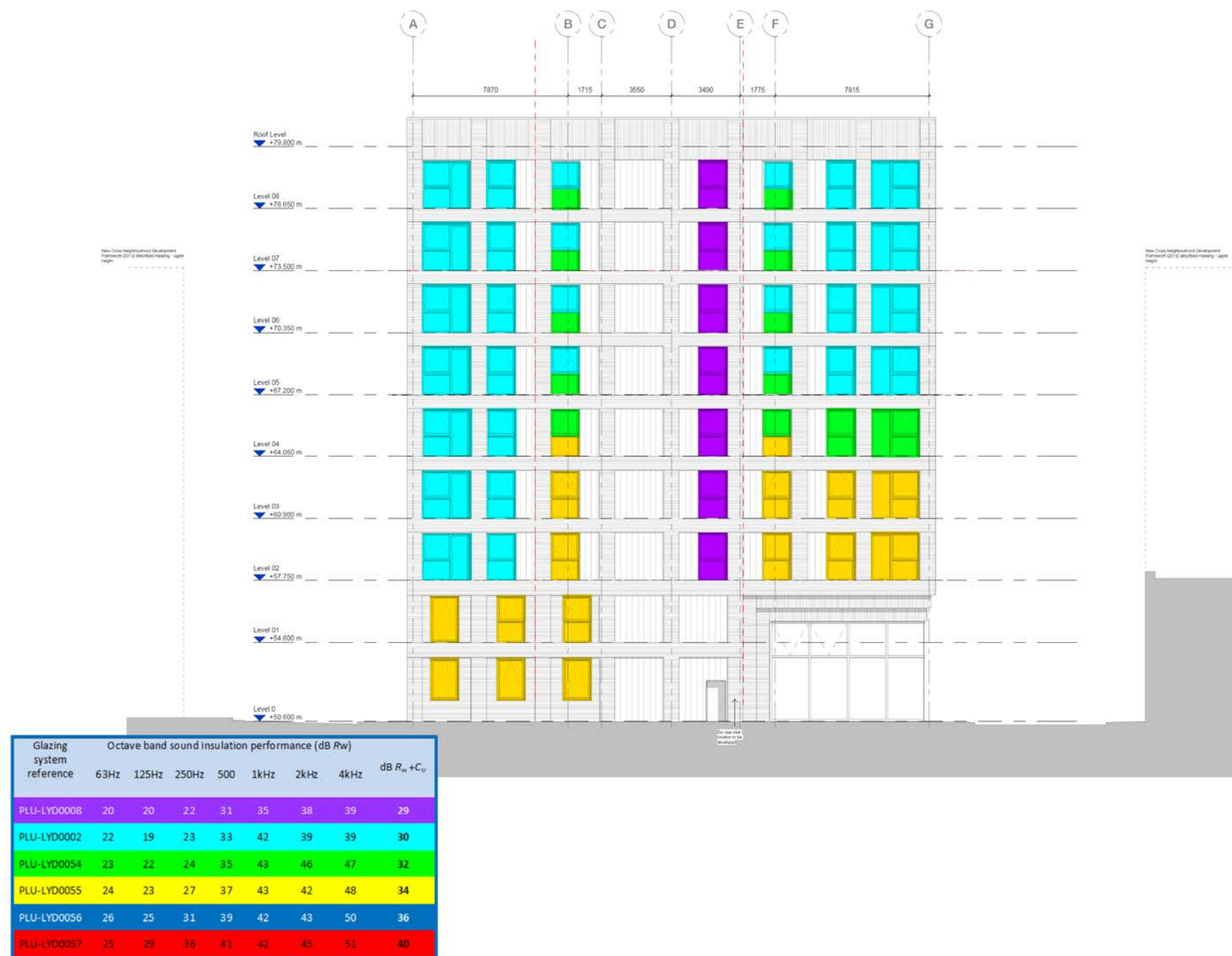
APPENDIX A - INSTRUMENTATION

Manufacturer	Type and / or Model	Serial No.	Last Laboratory Calibration	Calibrator Output (dB)	Free Field Correction (dB)	Initial reading (dB)	Final reading (dB)
Norsonic	Nor 140 Class 1 Sound Level Meter	1404515	March 2019				
Norsonic	Nor1225 ½" Microphone	142527			-0.2	113.8	113.8
Norsonic	Nor1209 Preamplifier	13885					
Norsonic	Nor1251 Calibrator (Cal 5)	34220	February 2020	114.01			







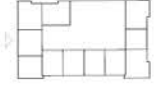


No implied licence exists. This drawing should not be used to calculate areas for the purposes of valuation. Do not scale this drawing. All dimensions to be checked on the site by the contractor and such dimensions to be their responsibility. All work must comply with relevant British Standards and Building Regulations requirements. Drawing errors and omissions to be reported to the architect. To be read in conjunction with Architect's specification and other consultant information.

Rev	Description	Date
P1	Issued for information	19/07/19
P2	Stage 3B Draft Issue for Review and Comments	27/09/19
P3	Stage 3B Issue	04/10/19
P4	Issue for Tender Coordinated with Interiors Packages	20/12/19

--- Movement joints location shown indicatively to be set out and coordinated at later stage.

Note:
To be read in conjunction with information produced by Structural Engineer, Acoustic Engineer and Fire Engineer.



Ground Floor Level Plan

3C Tariff Street
Manchester M1 2FF
mail@hawkinsbrown.com
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Hawkins\Brown

Project
Addington Street

Drawing
Proposed North-West Elevation

Scale @ A1 1 : 100		Date July 2019
Drawn By NB	Checked By MC	
Job Number 18058	Status S2	Purpose of Issue Information
Drawing No. ADST-HBA-00-ZZ-DR-A-20-0201		Rev P4

APPENDIX B

Acoustic Terminology

The annoyance produced by noise is dependent upon many complex interrelated factors such as 'loudness', its frequency (or pitch) and any variations in its level. In order to have some objective measure of the annoyance, scales have been derived to allow for these subjective factors.

A-weighting The human ear is more susceptible to mid-frequency noise than the high and low frequencies. To take account of this when measuring noise, the A-weighting scale is used so that the measured noise corresponds roughly to the overall level of noise that is discerned by the average person. It is also possible to calculate the A-weighted noise level by applying certain corrections to an un-weighted spectrum.

When the noise being measured has variable amplitude, such as traffic noise, it is necessary to qualify the basic dB unit. This may be done using a statistical index L_n dB, where n is any value between 0 and 100, and is the percentage of the sample time for which the stated level is exceeded. In defining the use of the index, both the value of n and the length of the sample period must be stated.

L_{10} L_{10} , being the level exceeded for 10% of the time, has been shown to be a good indicator for traffic noise intrusion, and is used in assessing the effect of traffic noise on residential or commercial premises.

L_{90} L_{90} is the level exceeded for 90% of the time, and is used as a measure of background noise level, as it excludes the effects of occasional transient levels, such as individual passing cars or aircraft.

In addition to the statistical noise indices defined above, the following noise units are also used to define variable amplitude noise sources:

$L_{eq,T}$ $L_{eq,T}$ is defined as the notional steady sound pressure level which, over a stated period of time, would contain the same amount of acoustical energy as the actual fluctuating sound measured over the same period. In other words, it is a measure of the "average" noise level

L_{max} L_{max} is the maximum time-weighted sound pressure level recorded over the stated time period