CUNDALL

Memorandum

From:	Date
Simon Everett	01/12/2023
To	**cc**
Mark Roles	Robert Nissen, Ollie Thomas, Matthew Hayward, Chris Singh

Subject

One Medlock Street, Manchester – Planning Condition 57a

Document validation (latest issue)

01/12/2023	01/12/2023	01/12/2023
X	X	X
Principal author: Simon Everett	Checked by: Michael Pimlott	Verified by: Michael Pimlott
Signed by: Simon Everett	Signed by: Simon Everett	Signed by: Rob Turner

1.1 Requirements

This memorandum has been prepared in response to the predevelopment Planning Condition 57a provided by Manchester City Council (MCC) with regards to the One Medlock Street Planning Application (Ref: 135419/FO/2022). The planning condition relates to several acoustic items and states the following:

Notwithstanding the approved details, prior to the commencement of the Block B phase of development, with the exception of site clearance and demolition, a scheme for acoustically insulating the proposed student accommodation against noise from Medlock Street and Mancunian Way shall be submitted to and approved in writing by the City Council as local planning authority. There may be other actual or potential sources of noise which require consideration on or near the site, including any local commercial/industrial premises. The potential for overheating shall also be assessed and the noise insulation scheme shall take this into account. The approved noise insulation scheme shall be completed before any of the dwelling units are occupied. 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 shall be required to be achieved when providing adequate ventilation as defined by Approved Document F of the Building Regulations (whole building ventilation):

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 $L_{Aeq.}$

Higher internal noise levels than those specified above may be allowed when higher rates of ventilation are required in relation to the overheating requirement.

Additionally, where entertainment noise is a factor in the noise climate the sound insulation scheme shall be designed to achieve internal noise levels in the 63Hz and 125Hz octave centre frequency bands so as not to exceed (in habitable rooms) 47dB and 41dB.

The following sub sections detail how the current acoustic sound proposals will satisfy the criteria highlighted in the above planning condition.

1.2 Façade element performance

The following section details suitable façade acoustic performance that will see internal noise level targets achieved when providing adequate ventilation as defined by Approved Document F of the Building Regulations.

Full details of the baseline noise survey undertaken and subsequent calculations of façade noise levels is included in Cundall's Noise and Vibration Chapter 8 in the ES supporting the planning application.

1.2.1 Insulated ventilation panels

Bedrooms across the development are proposed to include inward opening vents within the Unitised Curtain Walling System (UCWS). The estimated sound insulation performance of these panels when closed has been calculated using acoustic prediction software Insul 9.0 assuming the following build up:

- 3 mm aluminium casing (external and internal)
- 75 mm cavity fully filled with mineral wool of minimum density 22 kg/m^3

This has resulted in the following estimated acoustic performance.

Sound reduction index dB						dB R_w	dB $R_w + C_{tr}$
125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz		
16	31	42	49	53	48	41	31

Table 1: Estimated sound reduction indices for UCWS vent panels

1.2.2 Façade cladding panels with internal plasterboard lining

The façade build up for façade cladding panels with internal plasterboard linings has been based on current RIBA Stage 3 board lining types and is summarised Table 2:

Sound reduction index dB						dB R_w	dB $R_w + C_{tr}$
125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz		
40	44	45	51	56	60	41	31

Table 2: Assumed minimum sound reduction indices for façade cladding panels with internal linings

1.2.3 Minimum glazing performance requirements

Based on the level of sound insulation provided by other façade elements detailed in Table 1 and Table 2, a 3D noise modelling exercise has been undertaken to determine the minimum recommended sound insulation performance for external glazing to all areas of the Development.

Due to the varying levels of noise incident on the building facades, four separate recommended glazing conditions have been determined, as detailed in Table 3.

Example glazing configuration [1]	Sound reduction index dB						dB R_w	dB R_w + C_{tr}
	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz		
▪ 6 mm pane ▪ 6 to 20 mm air gap ▪ 4 mm pane As rated in BS 12354	21	20	26	38	37	39	32	28
▪ 10 mm pane ▪ 6 to 20 mm air gap ▪ 6 mm pane As rated in BS 12354	24	24	32	37	37	44	35	32
▪ 6 mm pane ▪ 12 mm air gap ▪ 8.4 mm Stadip Silence Laminated Pane ▪ As rated by Pilkington	25	25	33	44	44	49	38	33
▪ 8.4 mm Stadip Silence Laminated Pane ▪ 12 mm air gap ▪ 10.8 mm Stadip Silence Laminated Pane As rated by Pilkington	28	29	39	44	50	61	43	37
[1] These are example configurations only. Glazing arrangements which provide equal or better sound insulation would also be suitable subject to further review by Cundall								

Table 3: Minimum sound reduction indices for external glazing

The mark-ups presented in Appendix I detail the proposed location of each glazing across the development based on the above assumptions.

1.3 Overheating

The following sub sections detail assessments for periods of overheating in line with Approved Document O and the Association of Noise Consultants (ANC) Acoustics Ventilation and Overheating Residential Design Guide (AVO).

1.3.1 Approved Document O

Overheating: Approved Document O is a part of the Building Regulations that came into force in June 2022 and specifically covers the control of overheating and suitable mitigation for new residential buildings.

Approved Document O mandates that night-time internal noise levels should be limited to see that should open windows be required to control overheating, this does not come at the cost of adverse overnight noise levels to occupants. The limiting levels are as follows:

a. 40 dB $L_{Aeq,T}$, averaged over 8 hours (between 11pm and 7am)
b. 55 dB L_{AFmax}, more than 10 times a night (between 11pm and 7am)

Unlike overheating parameters, these levels are not targeted according to a percentage occurrence over a year. Should these levels be exceeded on any night of the year, the approach is considered non-compliant with Approved Document O.

Overheating analysis has been carried out by Ridge and Partners LLP in accordance with the Part O requirement to use the guidance contained within CIBSE TM59:2017 ‘Design methodology for the assessment of overheating

risk in homes'. This assessment has indicated compliance with Part O whereby opening panels are not to be opened overnight between the hours of 23:00 – 07:00. As opening windows and/or ventilation panels are not required for cooling at night, the night-time internal ambient noise level requirements of Approved Document O during periods of opening windows cooling are therefore complied with by default.

1.3.2 ANC AVO Design Guide

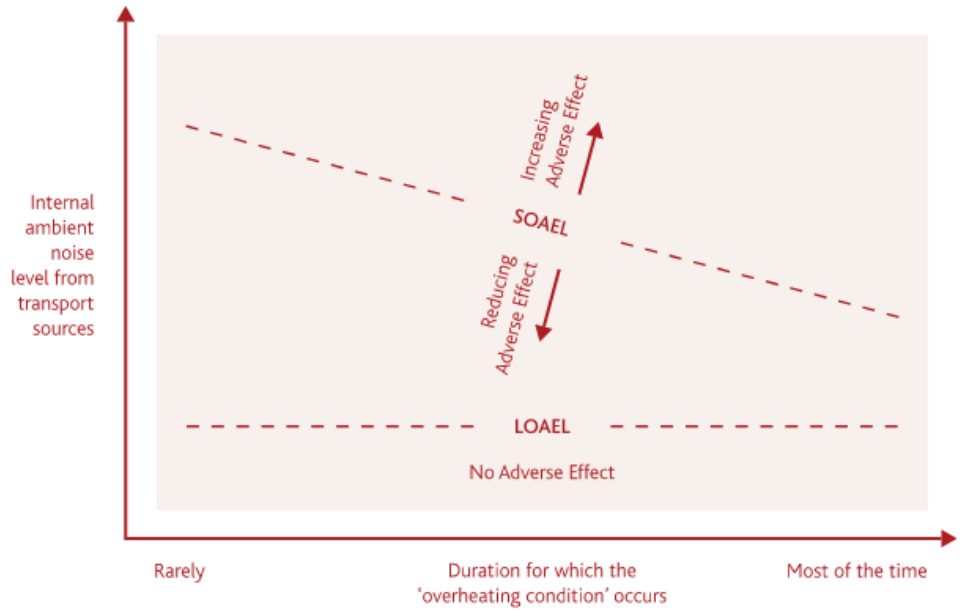
In January 2020, the Association of Noise Consultants (ANC) published the Acoustics Ventilation and Overheating Residential Design Guide (AVO) which provides guidance on internal noise levels and overheating. The AVO Guide seeks to:

- *encourage an assessment of noise that recognises the interdependence between the acoustics, ventilation and overheating designs;*
- *provide a means of assessment to satisfy the need to consider acoustics, ventilation and overheating at the planning stage;*
- *assist in educating clients, environmental health/planning officers and other stakeholders of the interdependence of design for acoustics, ventilation and overheating.*

As the ProPG emphasises the importance and principles of good acoustic design, the AVO Guide is intended to "*contribute to the practice of good acoustic design*". In particular, it is noted that the over-arching aspiration of good acoustic design is that residents may open windows without any adverse acoustic impact (ProPG paragraph 2.33) and the AVO Guide provides a practical method to address these requirements.

Where an AVO Guide Level 2 assessment is required for transport noises sources, Table 3-3 of the document presents a summary of the assessment of adverse effect based on internal ambient noise level and duration.

Whilst Table 3-3 provides no quantitative guidance regarding the combined effect of level and duration for the overheating condition, the situation is summarised qualitatively in Figure 3-2 of the AVO Guide, as reproduced below.



Whilst the above figure does not give exact labels on its axis, for the daytime period, the upper category in Table 3-3 is defined on the basis that 50 dB $L_{Aeq,T}$ represents "*the upper end of the range for reliable speech communication*".

The following daytime noise break-in assessment has therefore considered this 50 dB $L_{Aeq,T}$ value as the upper desirable IANL value in bedrooms during the daytime.

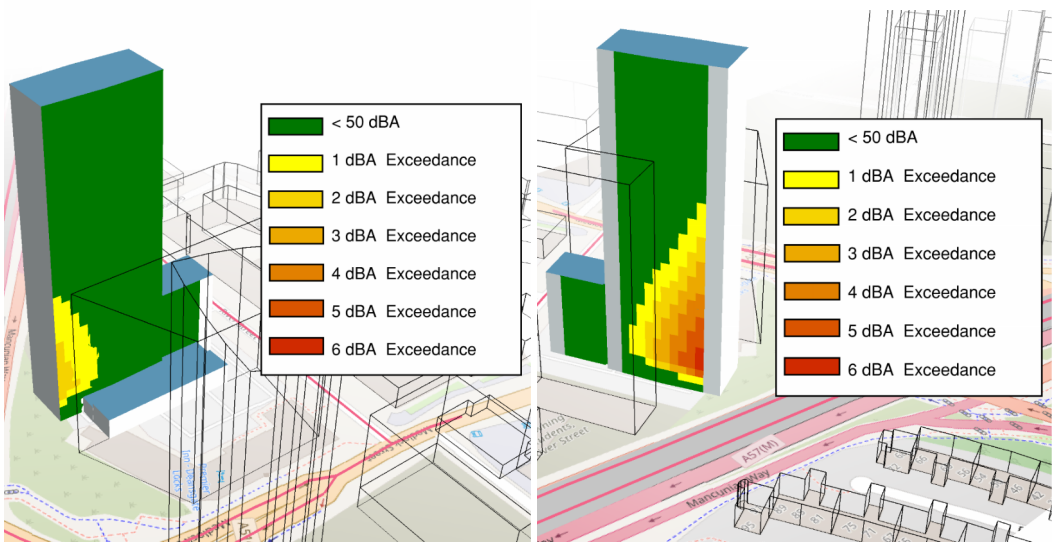
It should, however, be noted that the NPSE states that it is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise in all situations. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times, and an internal ambient noise level of ≥ 50 dB $L_{Aeq,T}$ should not automatically be considered as resulting in the SOAEL.

From the ADO compliance report produced by Ridge for the project (Ref: 5016684-RDG-XX-XX-DOC-ME-001 V1.0), compliance has been achieved with the following openings and timings:

- Overheating condition expected to occur for only 0.4% Total Annual Hours for worst case affected Bedroom
- During this overheating condition, bedroom windows only required to be open between 6pm – 11pm
- Maximum bedroom window openable area of 0.55 m^2

Based on the openable area listed above and the dimensions of proposed bedrooms, the external to internal noise reduction provided by the façade with a partially open window to control overheating is expected to be 8 dB.

Based on the external noise levels measured during the periods of 6pm – 11pm when windows may be open (full details of Cundall's noise survey and initial modelling process are detailed within the Noise and Vibration Chapter of the ES) and the internal noise levels being compliant with Local Authority requirements for the rest of the daytime 16 hour period when windows are closed, the following façade map figures show the results of noise modelling to determine the exceedance over the 50 dB $L_{Aeq,T}$ upper IANL values during hours with the aforementioned requirement for partially open windows.



The table below indiactes the execeedances above as listed as a percentage of overall bedrooms which experience it.

Exceedance	% Development occurrence
None – worst-case IANL ≤ 50 dB $L_{Aeq,day}$	76.9
1 dB Exceedance	9.2
2 dB Exceedance	6.0
3 dB Exceedance	3.1
4 dB Exceedance	2.2
5 dB Exceedance	1.9
6 dB Exceedance	0.6

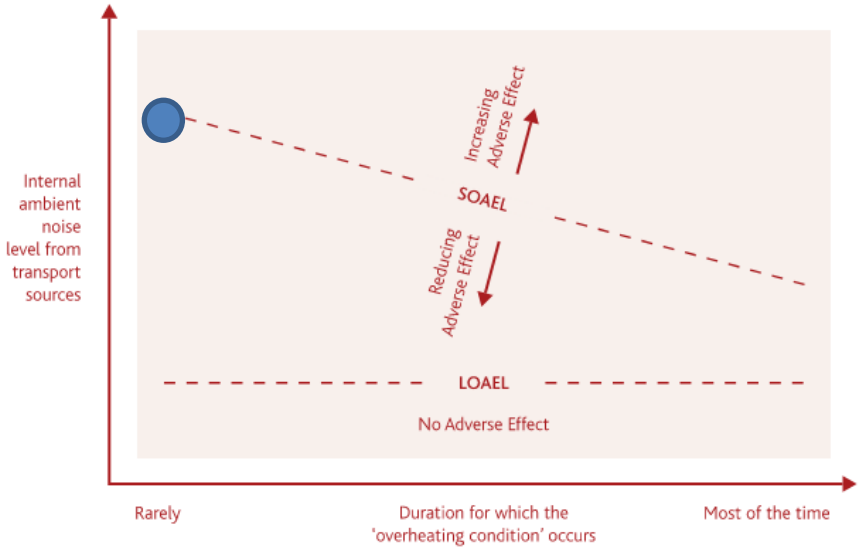
It can be seen that the vast majority of bedrooms will not see exceedances of 50 dBA with windows open for periods of overheating, with progressively smaller percentages of bedrooms experiencing the higher levels of exceedance to the guide values. For shared living areas in dwellings, the 5 dB relaxation of noise criteria in these spaces (in line with BS 8233 and requirements of the Local Authority) mean that exceedances will be lower than those experienced in bedrooms by default.

The following context is considered applicable to the Development and should be considered when determine the outcomes of the AVO Guide Part 2 assessment and context within the Noise Exposure Hierarchy.

- Over 75% of bedrooms won't see an exceedance to the 50 dB upper guide value, with most exceedances occurring being low exceedances and a very small fraction of 0.6% experiencing the worst exceedances.
- All of the above exceedances described would at a maximum occur over very short periods over the whole year of 0.4% of annual hours.
- The road transport network is expected to be mostly electric vehicles in future years (as a result of both UK wide policy of the ban of new diesel and petrol cars by 2030 and MCCs own target of Manchester being a zero carbon city by 2038), and this would see over 95% of bedrooms not seeing exceedances of 50 dB $L_{eq,16\ hour}$, with the worst-case exceedance of 3 dB only being experienced in 0.6% of bedrooms
- As a result of complying with the acoustic requirements of Approved Document O, all above exceedances would be confined to daytime hours, with night-time noise levels being complaint with BS 8233 internal noise limits all year round.
- The current interdependency between acoustics, ventilation and overheating has been designed in line with the Noise Policy Statement for England (NPSE) vision of promoting good health and a good quality of life through the effective management of noise within the context of Government policy on 'sustainable development'. In clarifying how the term 'the context of Government policy on sustainable development' should be interpreted, some assistance can be obtained from the Government decision letter associated with the Thames Tideway Tunnel project. In that letter, it is stated that:

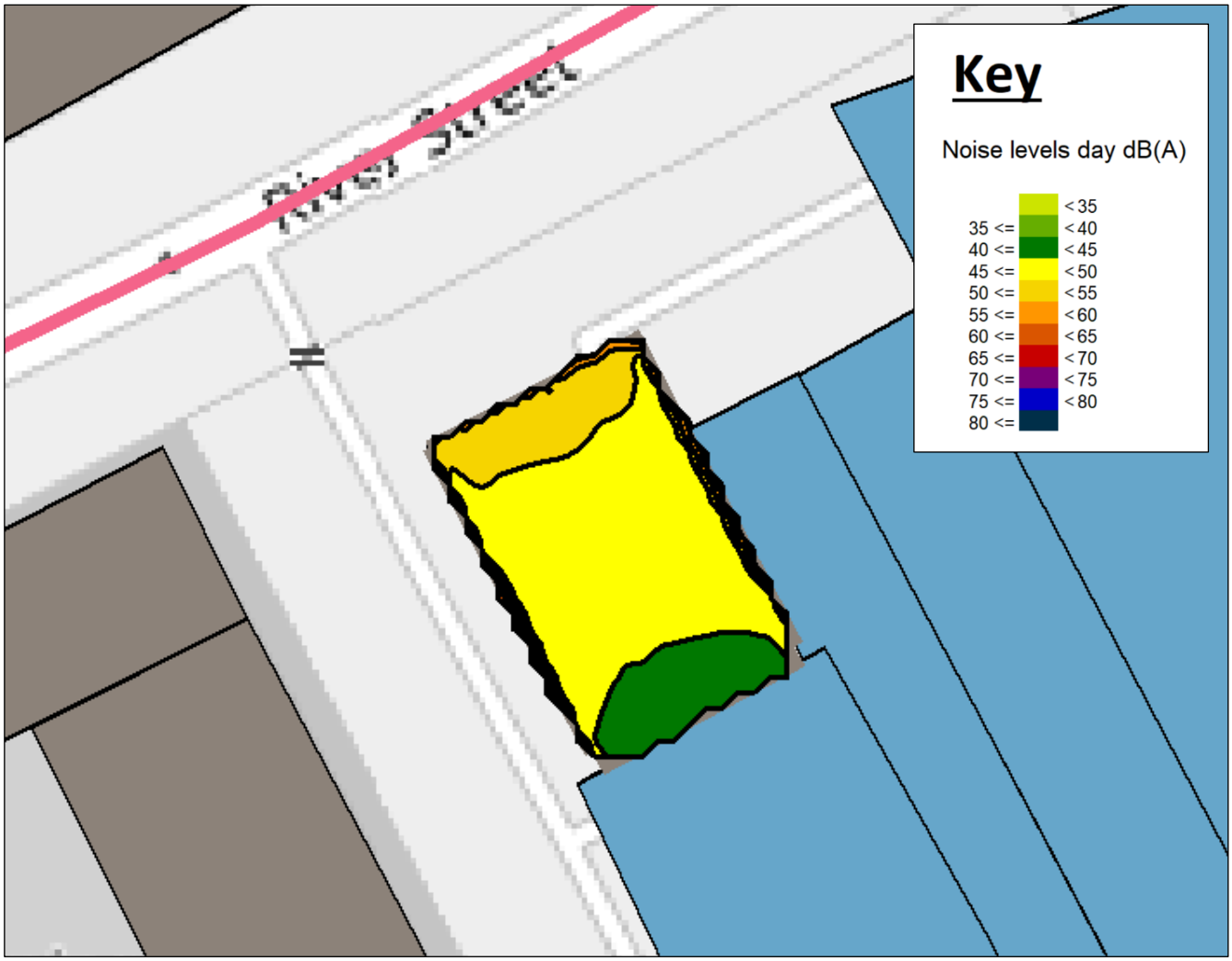
  "The National Planning Policy Framework, the National Planning Practice Guidance on noise and the Noise Policy Statement for England are all clear that noise management should be determined in the context of sustainable development including the environmental, economic and social benefits of the proposal."
- The Planning Policy Guidance Noise (PPG(N)) states that local authority planning policies can include noise standards which apply to various forms of proposed development and locations in their area. The PPG(N), however, states that care should be taken to avoid these standards from being applied as rigid thresholds as specific circumstances may justify some variation being allowed.

Considering the above, and the illustration of the Cundall's interpretation of the daytime condition in the AVO diagram below, the predicted levels are below the "SOAEL" level, and below a level at which noise causes a material change in behaviour in Table 3-3 of the AVO Guide. They are therefore considered to be suitable for occupants given the very low overheating risk, and hence limited periods of time that windows are required to be open to mitigate overheating during the day (and with no requirement to open windows to mitigate cooling at night).



1.4 Terrace noise

It is proposed to incorporate rooftop terraces on floor eleven of the proposed development. The following figure details the calculated external daytime levels within this area.



Predicted values from the 3D noise model indicate that the noise impact throughout the terrace is anticipated to be ≤ 55 dB $L_{Aeq,daytime}$, therefore conforming with limits in Planning Condition 57a.

1.5 Entertainment noise

The planning condition states that internal noise levels in the 63Hz and 125Hz octave centre frequency bands shall not exceed 47dB and 41dB in habitable rooms.

If amplified music is proposed within the Gym area, this condition requires that a noise limiter system would need to be installed to see that the internal ambient noise limits described above are not exceeded when measured in adjoining habitable room.:

To see that these limits are not exceeded, a sound limiter system must be installed within the Gym to control maximum output levels from the loudspeaker system. Prior to occupation, validation measurements will be undertaken within habitable rooms above to demonstrate that appropriate amplified sound limits have been set to achieve the values identified above.

Appendix I Glazing strategy mark-ups

Copyright of this drawing is vested in Jon Matthews Architects and it must not be copied or reproduced without written consent. Figured dimensions only are to be taken from this drawing. Do not scale from this drawing.

All Contractors must visit the site and are responsible for taking and checking all dimensions relative to their work. Jon Matthews Architects are to be advised of any variation between drawings and site conditions.

Electronic data/ drawings issued as 'read only' and should not be interrogated for measurement. All dimensions and levels should be 'read only' from those values stated in text, on the drawings

⚠ CONSTRUCTION - It is considered that the proposed works are within the scope of a competent Contractor and as such no unusual hazards have been identified, refer to relevant Key/ Schedule/ Designers Risk Assessment

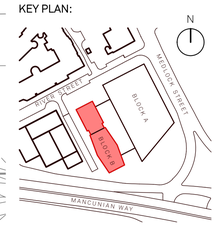
32 (-4) dB Rw (Ctr) (Example Glazing 6 / 60 to 20 mm / 4 as Rated in BS 12354)

35 (-3) dB Rw (Ctr) (Example Glazing 10 / 6 to 20 mm / 6 as Rated in BS 12354)

38 (-5) dB Rw (Ctr) (Example Glazing 6 / 12 / 8.4 Stadip Silence as Rated in Stadip Silence Literature)

43 (-6) dB Rw (Ctr) (Example Glazing 8.4 Stadip Silence - 12 - 10.8 Stadip Silence as Rated in Stadip Silence Literature)

KEY PLAN:



GENERAL NOTES:

A. To be read in conjunction with all design consultant's drawings and reports.
B. All materials within external wall to be signed off by Fire Engineer and Building Control.
C. Final selection and specification of products and materials during design development to be checked by DFC to ensure compliance with BSA and related legislation and standards.
D. All insulation to meet acoustic and thermal requirements.

This information is an interim issue to describe the design intent.
The information is based on Stage 2 information from others and Stage 3 coordination will be required.

P01 01/09/23 For Coordination
Rev: Date: Details:

Jon Matthews Architects
Union, 2-10 Albert Square, Manchester, M2 6LW

Project:
One Medlock Street
PBSA

Title:
Ground Floor GA Plan

Scale:	Origin Date:	Drawn:	Checked:
1:100@A1	01/09/23	DO	MH

Status:
Stage 3

Drawing No: 100-JMA-ZZ-00-DR-A-022200 Rev: P01

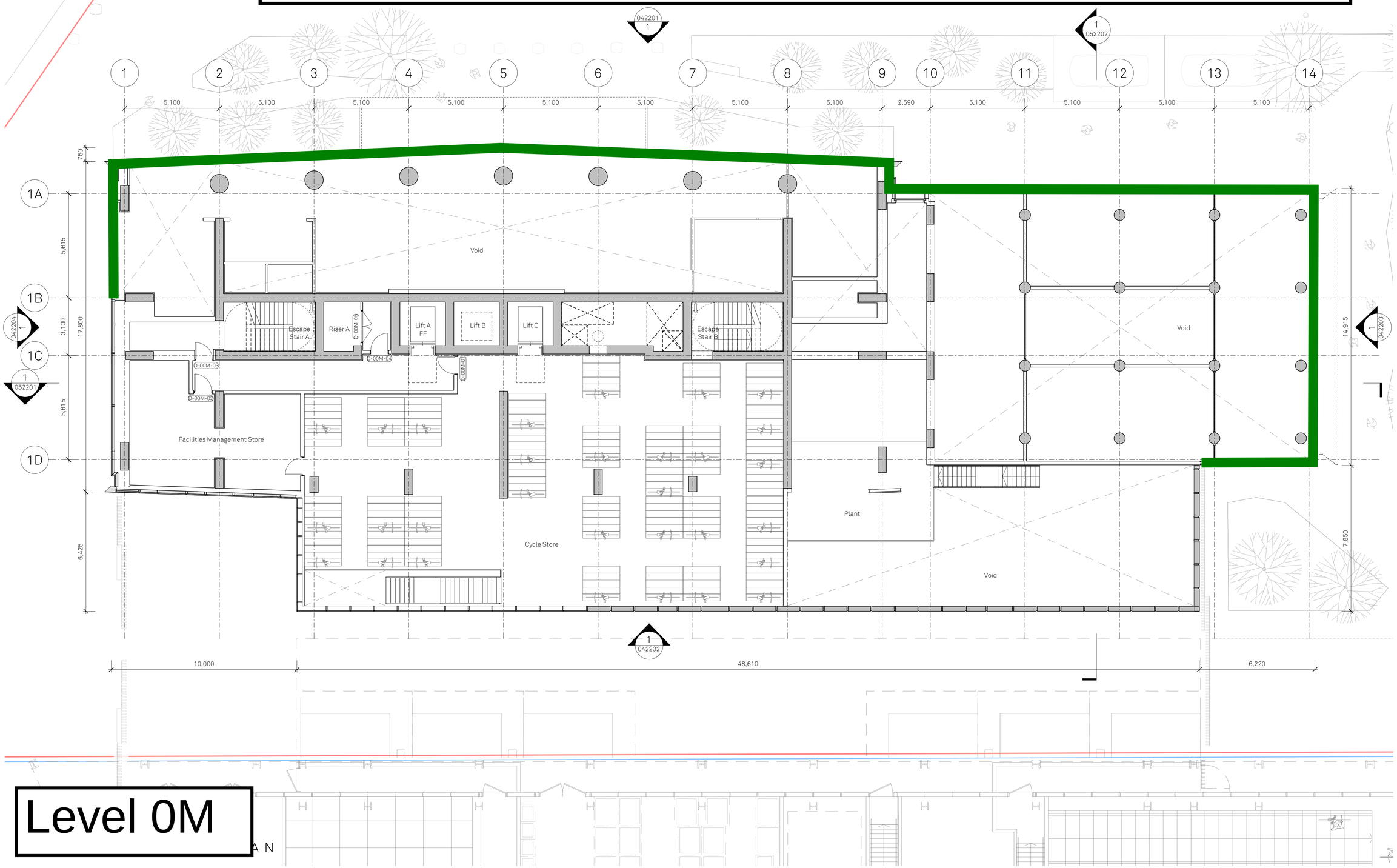
Level 00

32 (-4) dB Rw (Ctr) (Example Glazing 6 / 60 to 20 mm / 4 as Rated in BS 12354)

35 (-3) dB Rw (Ctr) (Example Glazing 10 / 6 to 20 mm / 6 as Rated in BS 12354)

38 (-5) dB Rw (Ctr) (Example Glazing 6 / 12 / 8.4 Stadip Silence as Rated in Stadip Silence Literature)

43 (-6) dB Rw (Ctr) (Example Glazing 8.4 Stadip Silence - 12 - 10.8 Stadip Silence as Rated in Stadip Silence Literature)



Level 0M

32 (-4) dB Rw (Ctr) (Example Glazing 6 / 60 to 20 mm / 4 as Rated in BS 12354)

35 (-3) dB Rw (Ctr) (Example Glazing 10 / 6 to 20 mm / 6 as Rated in BS 12354)

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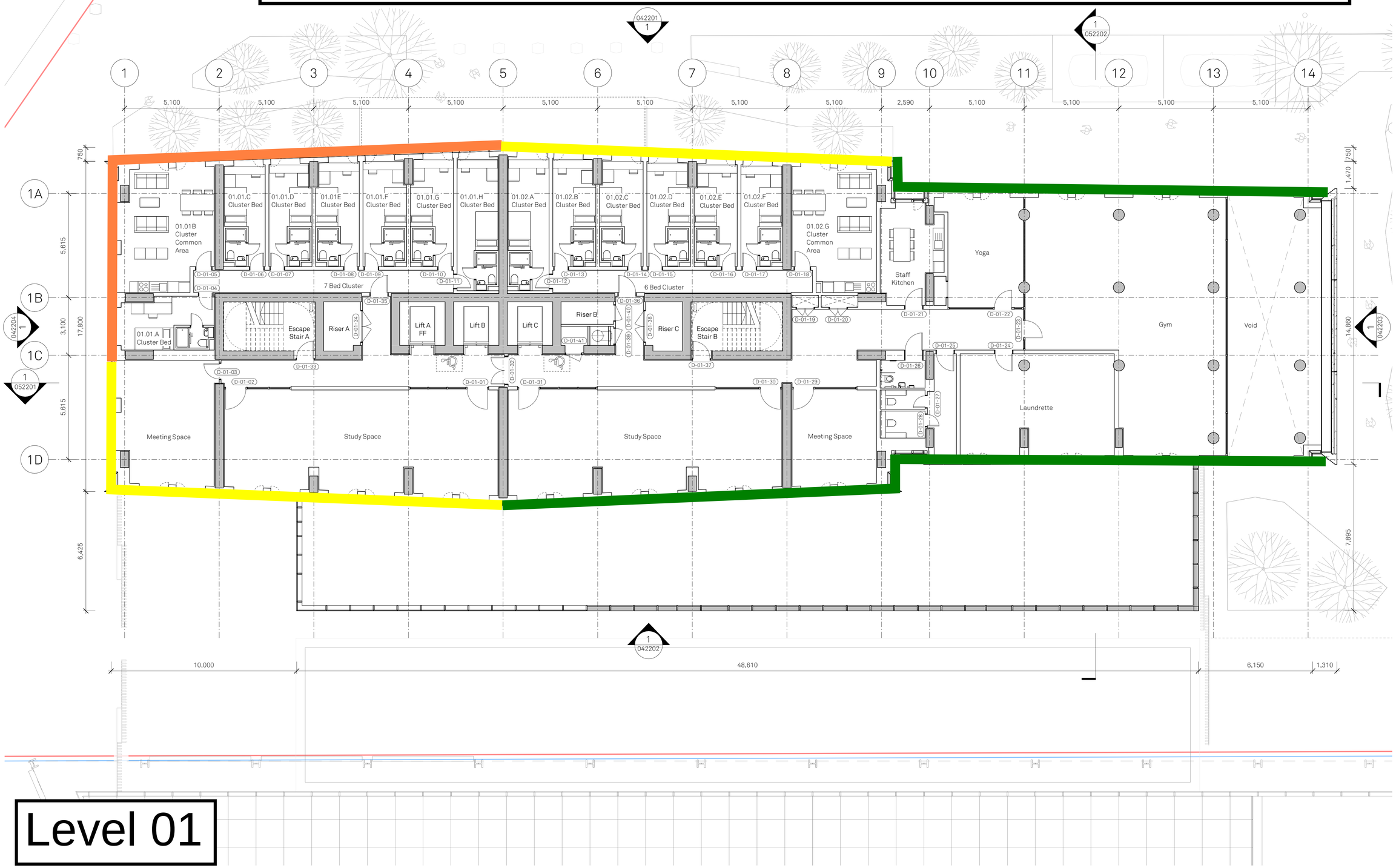

Level 01

32 (-4) dB Rw (Ctr) (Example Glazing 6 / 60 to 20 mm / 4 as Rated in BS 12354)

35 (-3) dB Rw (Ctr) (Example Glazing 10 / 6 to 20 mm / 6 as Rated in BS 12354)

38 (-5) dB Rw (Ctr) (Example Glazing 6 / 12 / 8.4 Stadip Silence as Rated in Stadip Silence Literature)

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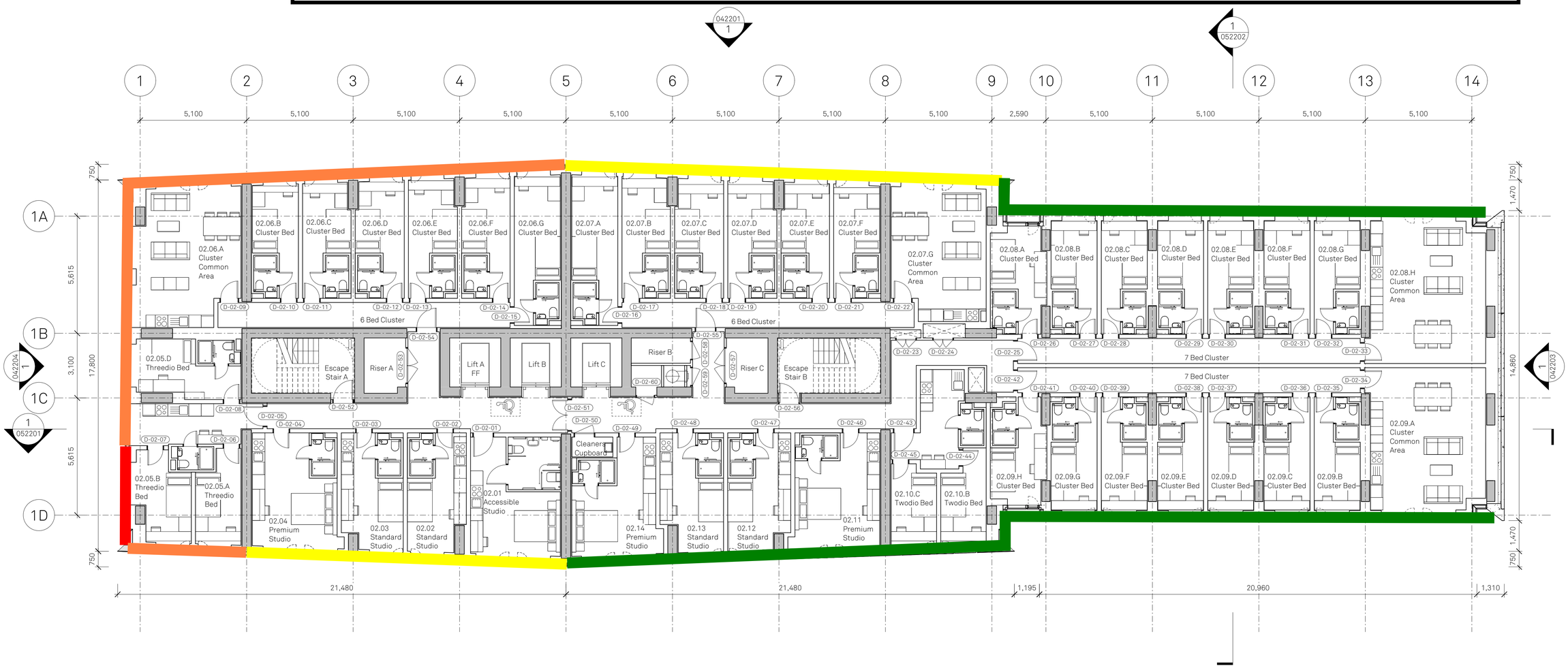

Level 02 - 10

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35 (-3) dB Rw (Ctr) (Example Glazing 10 / 6 to 20 mm / 6 as Rated in BS 12354)

38 (-5) dB Rw (Ctr) (Example Glazing 6 / 12 / 8.4 Stadip Silence as Rated in Stadip Silence Literature)

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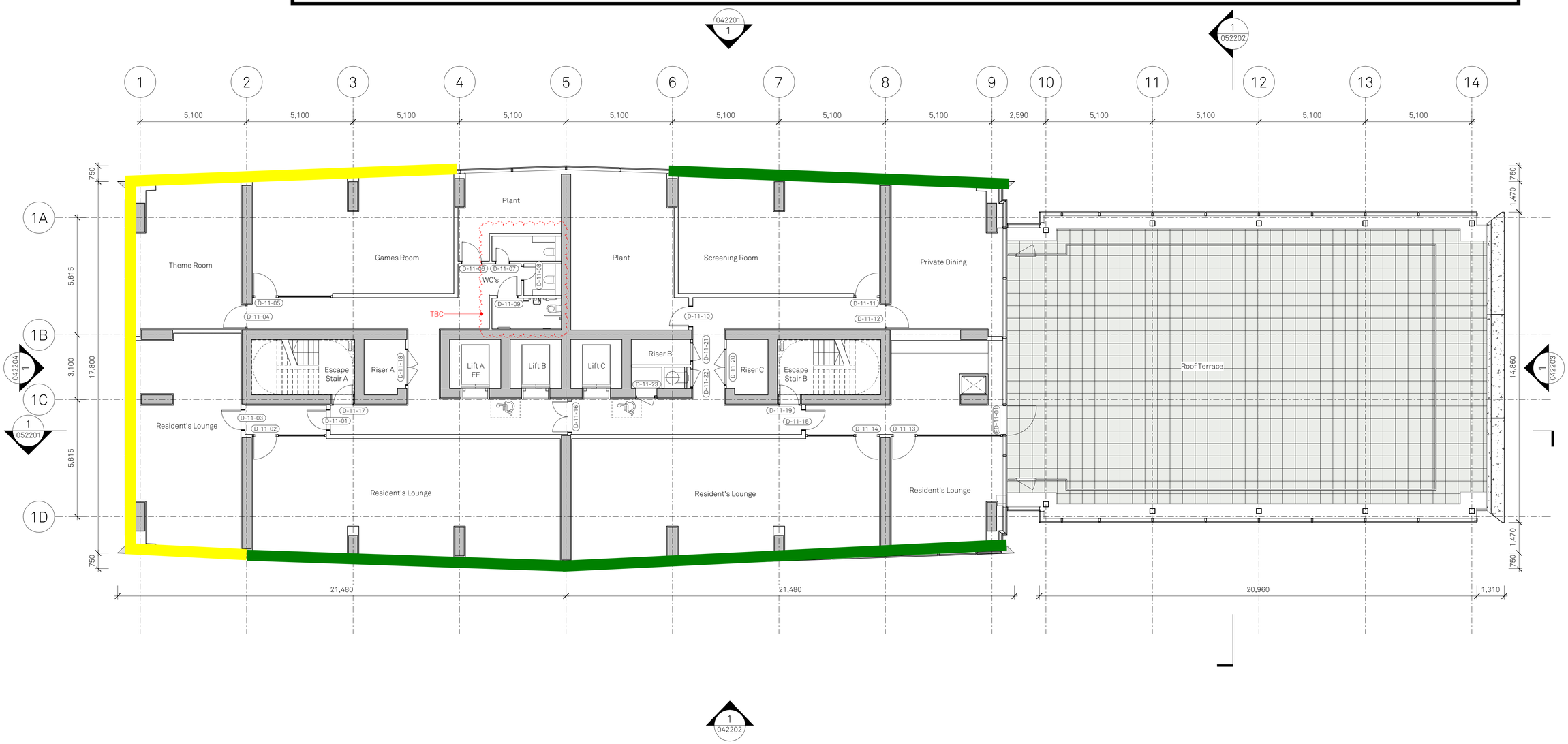

Level 11

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35 (-3) dB Rw (Ctr) (Example Glazing 10 / 6 to 20 mm / 6 as Rated in BS 12354)

38 (-5) dB Rw (Ctr) (Example Glazing 6 / 12 / 8.4 Stadip Silence as Rated in Stadip Silence Literature)

43 (-6) dB Rw (Ctr) (Example Glazing 8.4 Stadip Silence - 12 - 10.8 Stadip Silence as Rated in Stadip Silence Literature)

Level 12 - 19

32 (-4) dB Rw (Ctr) (Example Glazing 6 / 60 to 20 mm / 4 as Rated in BS 12354)

35 (-3) dB Rw (Ctr) (Example Glazing 10 / 6 to 20 mm / 6 as Rated in BS 12354)

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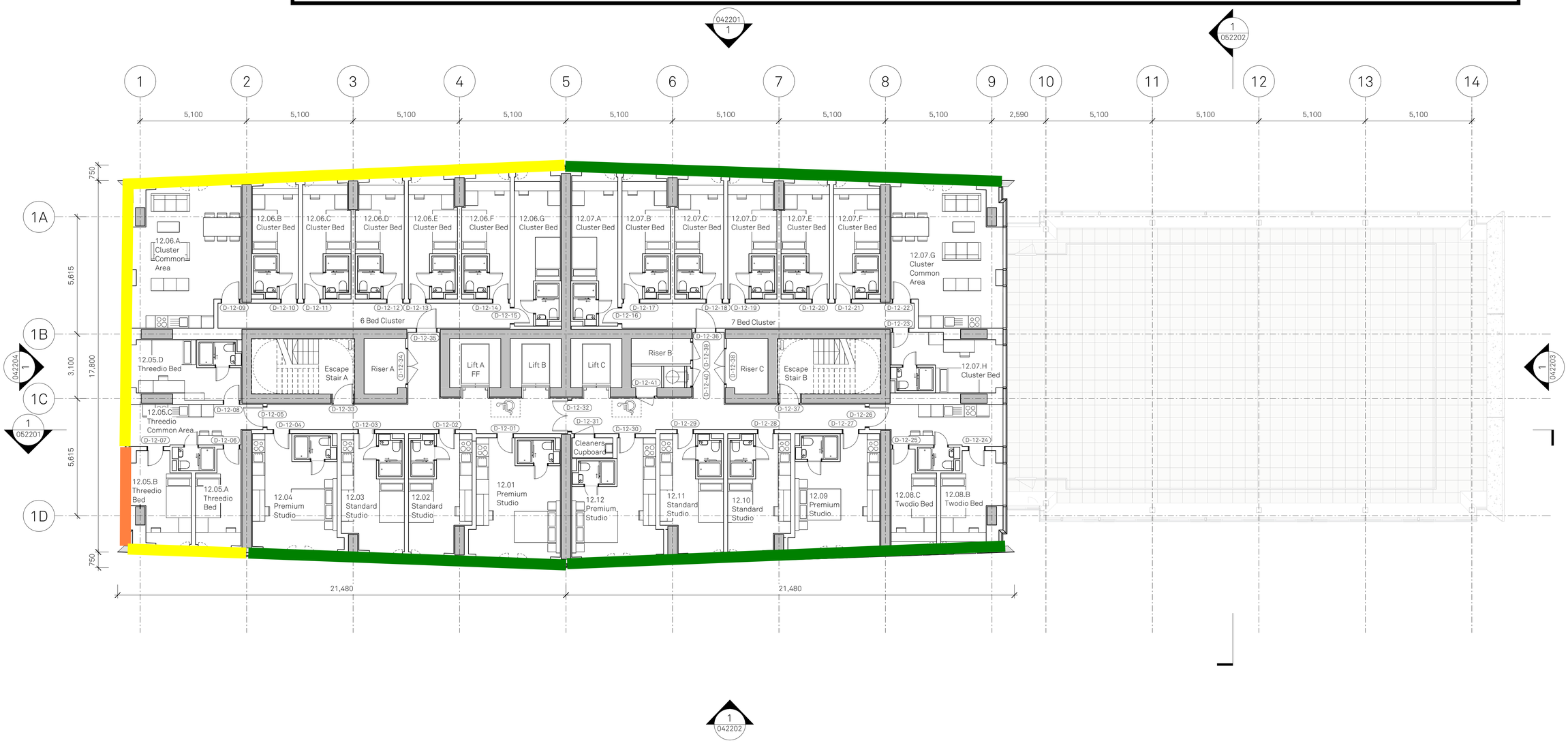

Level 20 - 28

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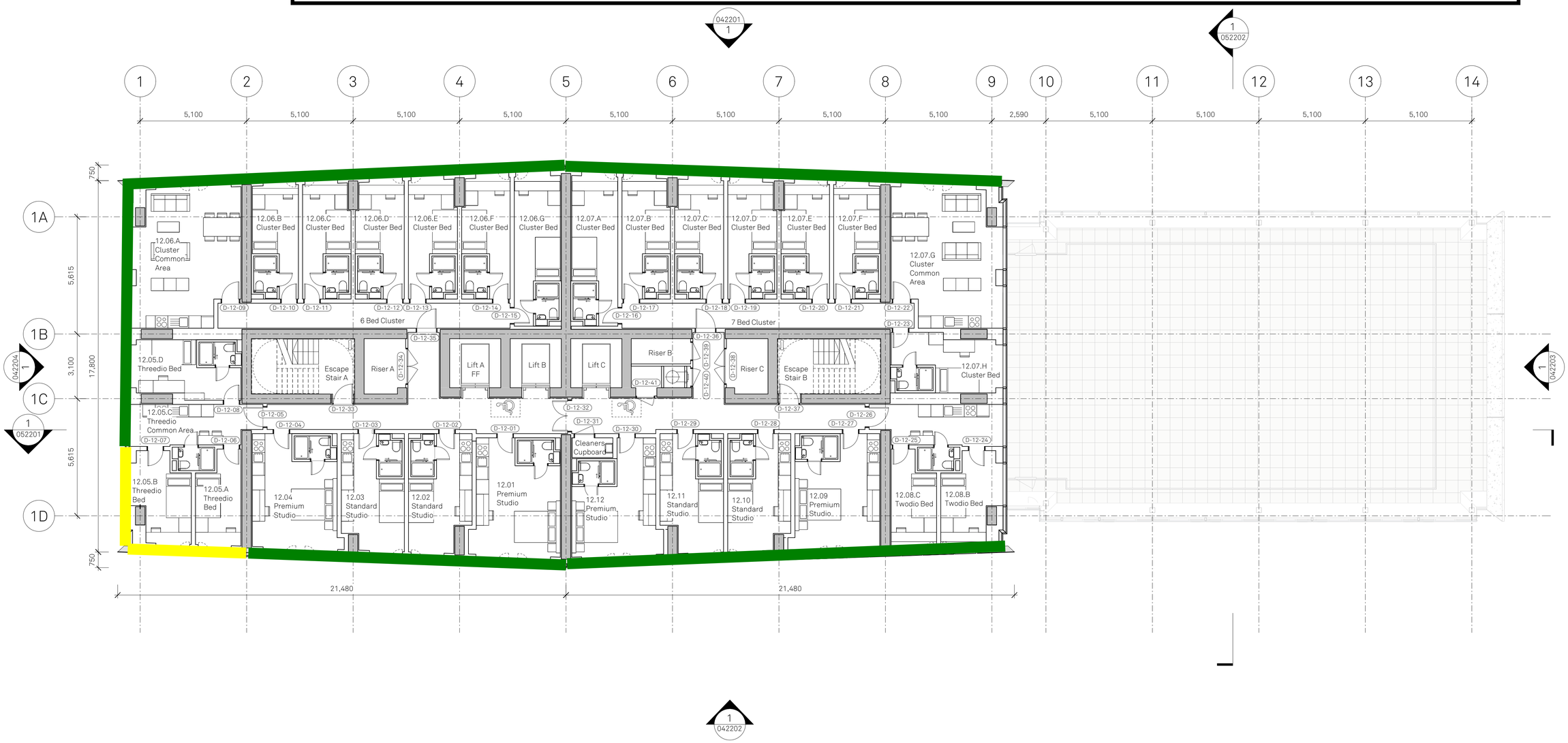
35 (-3) dB Rw (Ctr) (Example Glazing 10 / 6 to 20 mm / 6 as Rated in BS 12354)

38 (-5) dB Rw (Ctr) (Example Glazing 6 / 12 / 8.4 Stadip Silence as Rated in Stadip Silence Literature)

43 (-6) dB Rw (Ctr) (Example Glazing 8.4 Stadip Silence - 12 - 10.8 Stadip Silence as Rated in Stadip Silence Literature)



Level 29 - 36