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NCC Section J 2016 JV3 Alternate Solution Assessment

167 Northumberland Street
Meriton Group

To be built at **167 Northumberland Street, Liverpool, NSW 2170**

Attention: Anthony Vardas
Company: Meriton Group Pty Ltd

Document Control

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APPENDICES

1. Executive Summary

Efficient Living has been engaged by Meriton Group Pty Ltd to determine the required measures for the Development at 167 Northumberland Street, Liverpool to meet Section J requirements of the 2016 National Construction Code (NCC) through a JV3 Alternate Solution assessment. This advice covers Section J Parts J1-J8.

The intent of carrying out a JV3 Verification Method is to allow flexibility in achieving the following outcomes:

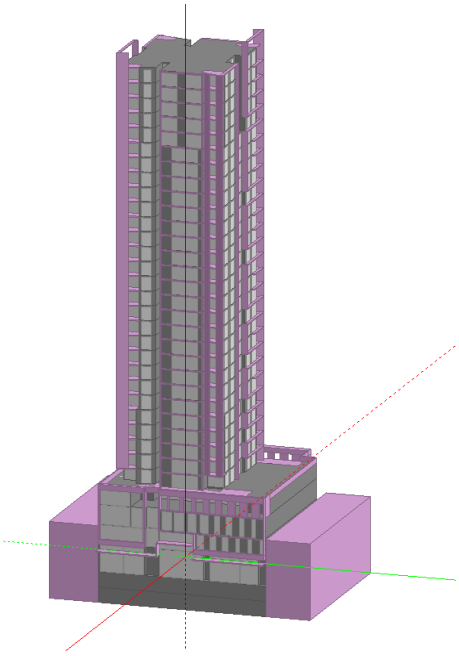
- More consistency in the glazing specifications;
- Allow 'trade-offs' in improving the building envelope as a system;
- Allow innovation and better interaction of building fabric.

To follow the JV3 Verification Method, annual energy consumption of the proposed building is to be not more than the annual energy consumption of a reference building which complies with all the Deemed-to-Satisfy requirements under the following scenario:

- The proposed building is modelled with proposed fabric and the same services as the reference building.

Table 1: Reference & Proposed Model Results

End Use	Reference Building with Reference Fabric, Glazing and Services (kWh)	Proposed Building with proposed Fabric, Glazing and Reference Services (kWh)
Cooling	219959	186590
Heating	35807	60856
Lighting	287412	287412
Equipment	491813	491813
Total	1,034,991	1,026,672
% Improvement over DtS		0.80%



The following section provides a summary of the fabric requirements for the development.

1.1. Proposed Building Fabric Performance Requirements

Proposed Building Fabric Performance Requirements

Fabric Element	Required Total System R-Value	Notes
External Walls	R2.80	See body of the report
Internal Walls	R1.80	See body of the report
External Floors	Nil	External floor insulations have been removed in the JV3 modelling
Roofs	R3.20	Solar absorptance value of the proposed roof on outer surface must be less than 0.70
Floors to Unconditioned Spaces	Nil	Floors/ceilings insulations have been removed in the JV3 modelling

Roof Light Performance Requirements

Fabric Element	Location	Maximum Total System U-Value	Maximum Total System SHGC	Skylight shaft Insulation
Roof Light	Pool	3.40	0.34	R2.80

Proposed Building Glazing Performance Requirements

Level	Orientation	Maximum Total System U-Value	Maximum Total System SHGC
All levels	All	4.50	0.30

Mark ups showing locations where insulation should be applied are contained in Appendix B. A detailed breakdown of the glazing calculator inputs are contained in Appendix C.

The following sections contain a breakdown of the information used to carry out the assessment, as well as details on the Section J performance requirements to be adopted throughout the development.

2. Introduction

Efficient Living has been engaged by Meriton Group Pty Ltd to determine what measures are required for the proposal to meet the 2016 National Construction Code (NCC) Section J requirements via *JV3 Alternate Solution Assessment*.

Project Address & NCC Climate Zone

The proposal is located at 167 Northumberland Street, Liverpool, NSW 2170, therefore being located within NCC Climate Zone 6.

Building Classes

The proposal consists of 2 levels of underground car park, ground floor retail tenancies, commercial spaces, a childcare centre, a pool and gym and 27 stories apartments above. The proposal dictates the following NCC classes are applicable:

- Class 3: Serviced Apartments and Lobbies
- Class 9b: Pool, Gym and Childcare
- Class 5: Commercial Spaces
- Class 6: Ground floor retail
- Class 7a: Carpark

Information used for Assessment

The following architectural drawings were used to complete the assessment:

Documents prepared by: PTW Architects: Job No. PA018110 Drawing Reference: DA-00-0000 [A], DA-00-0100 [A], DA-00-0200 [A], DA-10-0080 [A], DA-10-0090 [A], DA-10-1000 – DA-10-1500 [A], DA-10-1800 [A], DA-10-1900 [A], DA-10-3700[A], DA-10-4200 [A], DA-20-0100 [A], DA-20-0200 [A], DA-20-0300 [A], DA-20-0400 [A], DA-30-0200 [A], DA-30-0300 [A] Dated: 24th February 2020

It should be understood that this report is a design report only and confirmation of the final built compliance is outside of the agreed scope of works. This report should be used as reference to ensure final built compliance and if construction is consistent with the referenced plans and specifications contained within this report Section J compliance shall be achieved

Disclaimer

This report has been prepared in accordance with the agreed scope of works between Efficient Living and Meriton Group Pty Ltd. At all times Efficient Living has acted diligently and employed all reasonable care in the preparation of this report. The information contained within is based upon the documents and information, accepted in good faith as being true and accurate, provided by the Client, architects and consultants. Should subsequent amendments occur to the documents referenced this report may require an update or else non-compliance with the NCC Section J may result.

The following Sections contain a detailed assessment against NCC2016 Section J, Parts J1 – J8.

3. JV3 Input Summary

The following tables contain the input data used in the JV3 Reference Model.

Input Data Summary – Reference & Proposed	
Building floor Areas:	Total building area: 21,503m^2
	Net conditioned building area: 15,696m^2
Please note the area input in the model is only related to the relevant areas for the energy simulation purpose. It may not reflect the actual building floor areas of the proposed development.)	
Building Energy Simulation Software Used:	DesignBuilder v6.1.2.009 + EnergyPlus Simulation Engine v8.9.0
Weather Data For Simulation:	Sydney Airport AMO IWEC
Occupant Density (Table D.1.13)	
Type of use	Occupant Density (m^2/person)
Café	1 m^2/person
Storage Space and Plant Room	30 m^2/person
Swimming Pool	1.5 m^2/person
Meeting Room	1 m^2/person
Office, Kitchen & WC	10 m^2/person
Hotel	15 m^2/person
Board Room	2 m^2/person
Early Childhood centre	4 m^2/person
Internal Heat Gains for Appliances and Equipment (JV (2) Table 2h)	
Application	Internal sensible heat gain rate (W/m^2)
Class 5 - Office	15 W/m^2
Class 6 – Café/Restaurant/Shop	5 W/m^2
Other applications	No load
Internal Heat Gains for Occupants and Hot Meals	
Application	Internal sensible heat gain per person (W)
Café	80W sensible heat gain and 80W latent heat gain
Other	75W sensible heat gain and 55W latent heat gain
Maximum Illumination Power Density (Section J - Part J6.2 Table J6.2a)	
Space	Maximum illumination power density (W/m^2)
Meeting room	10 W/m^2
Café	18 W/m^2
Kitchen and food preparation area	8 W/m^2
Control room, switch room, and the like	9 W/m^2

Space	Maximum illumination power density (W/m²)
Office	7 W/m²
Plantroom	5 W/m²
Toilet, locker room, staff room or the like	6 W/m²
Storage area	10 W/m²
System	As detailed HVAC design is not finalised at this stage, a Package Terminal Heat Pumps (PTHP) system (electricity as the energy source for both heating and cooling) is modelled for each zone. Please note compliance with Part J5, NCC shall be confirmed in design by the project mechanical engineer.
Zoning	Each level has been allocated a perimeter zone of depth equal to the floor-to-ceiling height for large open conditioned areas.
Infiltration	1.5 AC per hour when pressurizing plant is not operating. 1.0 AC per hour for perimeter zone when pressurizing plant is operating.
Temperature control	For all models, conditioned space temperature falls within the range of 18 °CDB to 26 ° CDB for 98% of the plant operation time.

Assumptions for Building Simulation

- All input is established on the base that the information provided is accurate, complete and adequate.
- All operation profiles are set in accordance with Table 2a to 2g, NCC 2016.
- Energy consumption of domestic hot water systems and lifts in both of the reference and proposed building models is not modelled as per JV3 (e).
- No on-site renewable energy and reclaimed energy process have been modelled for simulation.
- No facilities for energy monitoring has been modelled for simulation.

Building Fabric Summary – Reference & Proposed Models		
Element	Reference Model (DTS)	Proposed Model
Roof/Ceiling	R3.20	R3.20
Solar absorptance of roofs	0.70	0.90
External walls	R2.30/2.80	R2.80
Solar absorptance of external walls	0.60	0.65
Internal partition walls forming part of the envelope	R1.80	R1.80
Glazing Area and Shading		
Element	Reference Model (DTS)	Proposed Model
External Glazing	Various inputs in compliance with the DTS glazing calculator, which is contained in Appendix C.	U-value = 4.50 SHGC = 0.30
Shading	Shading modelled in accordance with proposed architectural.	Shading modelled in accordance with proposed architectural.

Model Verification:

In accordance with JV3 verification JV3 verification, JV3 (d)(i)(D), the space temperature of the reference building must be between 18°C and 26°C for 98% of the plant operating hours. Hence, DesignBuilder v6.1.2.009+ EnergyPlus Simulation Engine is utilized to determine the percentage of total operation hours per annum that the space temperature was outside the specified set-points. The results are shown below:

Model	Air temperature (°C) % hours in range	Air temperature (°C) % hours in range	Air temperature (°C) % hours in range	Total operation hours per annum outside 18oC – 26oC
	< 18°C	18°C – 26°C	< 26°C	%
Reference	0	100	0	0
Proposed	0	100	0	0

Operational schedules used in the JV3 models are contained in Appendix D.

4. Section J Requirement Breakdown: Parts J1-J8

In the report that follows items located within the shaded column "Required action(s) for compliance" are the requirements that must be adhered to, to ensure compliance. The comments to the right explain these specifications in greater detail to help the reader better understand how each individual requirement has been reached.

4.1. J1 Building Fabric

The following requirements must be implemented in design:

J1.2 Thermal Construction

Insulation must be installed in compliance with AS/NZS 4859.1:

- adjoining insulation must abut / overlap and butt up against studs, joists, noggins, etc;
- it must form a continuous barrier & must not interfere with services or fittings.

Reflective insulation must be installed with:

- the necessary airspace to achieve the required R-Value between the reflective side of the insulation and the building lining or cladding;
- the reflective insulation closely fitted against any penetration, door or window opening;
- the reflective insulation adequately supported by framing members;
- each adjoining sheet must either overlap not less than 50mm or be taped together.

Bulk insulation must be installed so that:

- it maintains its position and thickness, other than where it is compressed between cladding and supporting members, water pipes, electrical cabling or the like in a ceiling, where there is no bulk insulation or reflective insulation in the wall beneath, it overlaps the wall by not less than 50mm.

J1.3 Roof & Ceiling

Insulation should be applied to areas highlighted in Appendix B, according to the values contained in the following table:

Concrete roof – Required R3.20 Total System

Component	R-Value
Outdoor air film (7m/s)	0.04
300mm Concrete	0.20
Roof airspace (unventilated, non-reflective)	0.18
Plasterboard, gypsum (10mm, 880 kg/m^3)	0.06
Indoor air film (still air)	0.12
Total	**0.60**
0.60 – 0.18(airspace) = 0.42	
3.20 (Required Total R-Value) - 0.42 = 2.78	
Additional insulation required	**2.78**

Insulation provider shall confirm insulation being provided is sufficient for proposed wall types.

J1.3(c) Loss of insulation through ceiling penetrations

No loss of insulation through ceiling penetrations calculations have been completed regarding the insulation build ups outlined in previous pages. It is therefore assumed that any lighting installed will not impact on the required ceiling/roof insulation.

J1.4 Roof Lights

All roof lights to have a maximum U-value of 3.40 and SHGC of maximum 0.34

J1.5 Walls

External Walls

Insulation should be applied to areas highlighted in Appendix B, according to the values contained in the following table/s:

Indicative Build-up of concrete external walls - Required R2.80 Total System

Component	R-Value
Outdoor air film (7m/s)	0.04
Solid Concrete (150mm,2400 kg/m^3)	0.10
Airspace (20mm to 40mm non-reflective and unventilated)	0.17
Plasterboard, gypsum (10mm, 880 kg/m^3)	0.06
Indoor air film (still air)	0.12
Total	**0.49**
0.49 - 0.17 = 0.32	
2.80 (Required Total R-Value) - 0.32 = 2.48	
Additional insulation required	**2.48**

Insulation provider shall confirm insulation being provided is sufficient for proposed wall types.

Indicative Build-up of clad stud framed external walls and Spandrel - Required R2.80 Total System

Component	R-Value
Outdoor air film (7m/s)	0.04
Metal cladding*	0.00
Airspace (90mm non-reflective and unventilated)	0.17
Plasterboard, gypsum (10mm, 880 kg/m^3)	0.06
Indoor air film (still air)	0.12
Total	**0.39**
2.8 (Required Total R-Value) – 0.39 = 2.41	
Additional insulation required	**2.41**

*The likely range of these product R-Values for lightweight cladding is minimal (0.00 – 0.03). Metal cladding has been used in the calculation so a consistent insulation can specified to all walls and compliance is ensured for all proposed cladding materials.

Indicative Build-up of Hebel external walls - Required 2.80 Total System

Component	R-Value
Outdoor air film (7m/s)	0.04
90mm lightweight concrete block	0.12
Airspace (20mm to 40mm non-reflective and unventilated)	0.17
Plasterboard, gypsum (10mm, 880 kg/m³)	0.06
Indoor air film (still air)	0.12
Total	0.51
0.51 – 0.17 (airspace) = 0.34	
2.8 (Required Total R-Value) – 0.34 = 2.46	
Additional insulation required	2.46

Internal Walls

Insulation should be applied to areas highlighted in Appendix B, according to the values contained in the following tables:

Indicative Build-up of stud framed internal walls – Required R1.80 Total System

Component	R-Value
Indoor air film (still air)	0.12
Plasterboard, gypsum (10mm, 880 kg/m³)	0.06
Airspace (90mm non-reflective and unventilated)	0.17
Plasterboard, gypsum (10mm, 880 kg/m³)	0.06
Indoor air film (still air)	0.12
Total	0.53
0.53 – 0.17 (airspace) = 0.36	
1.8 (Required Total R-Value) – 0.36 = 1.44	
Additional insulation required	1.44

Indicative Build-up of concrete internal walls – Required R1.80 Total System

Component	R-Value
Indoor air film (7m/s)	0.12
Solid Concrete (150mm,2400 kg/m³)	0.10
Airspace (20mm to 40mm non-reflective and unventilated)	0.17
Plasterboard, gypsum (10mm, 880 kg/m³)	0.06
Indoor air film (still air)	0.12
Total	0.57
0.57 - 0.17 = 0.40	
1.80 (Required Total R-Value) - 0.40 = 1.40	
Additional insulation required	1.40

Indicative Build-up of Hebel internal walls - Required 1.80 Total System

Component	R-Value
Outdoor air film (7m/s)	0.12

90mm concrete block	0.12
Airspace (20mm to 40mm non-reflective and unventilated)	0.17
Plasterboard, gypsum (10mm, 880 kg/m^3)	0.06
Indoor air film (still air)	0.12
Total	0.59
0.59 – 0.17 (airspace) = 0.42	
1.8 (Required Total R-Value) – 0.42 = 1.38	
Additional insulation required	1.38

Insulation provider shall confirm insulation being provided is sufficient for proposed wall types.

Thermal Breaks - Walls

External walls that have lightweight cladding fixed to a metal frame and have a wall lining fixed directly to the same metal frame must have a thermal break installed as per J1.5(c).

J1.6 Floors

No insulation required to Floors as per JV3 outcomes

4.2. J2 Glazing

Table below contains a summary of the proposed glazing performance requirements to be achieved for the development.

Part J2 Total System Glazing Performance Requirements

Level	Orientation	Required Total System U-Value	Required Total System SHGC
All levels	All	4.50	0.30

The glazing calculators and their inputs used in the reference model are contained in Appendix C.

Please note the above performance requirements are total system values, including the frame and glass.

All awnings and shading structures to be installed as per plans and elevations referenced. Should there be any changes to the glazing or shading configuration, the new layouts will need to be re-assessed to verify compliance with Section J.

4.3. J3 Building Sealing

The following requirements relating to building sealing must be achieved in design. The below requirements shall be verified, if required, by the architect or builder.

J Part	Requirement
J3.2 - Chimneys & Flues	Any new exhaust fans, located within conditioned area**s** indicated in the project reference, must be fitted with a sealing device such as a self-closing damper or the like
J3.3 - Roof Lights	There are three options for compliance with J3.3, these are: A roof light required […] to be sealed, or capable of being sealed, must be constructed with – (i) an imperforate ceiling diffuser or the like installed at the ceiling or internal lining level; or (ii) a weatherproof seal; or (iii) a shutter system readily operated either manually, mechanically or electronically by the occupant. It has been assumed that the proposed skylights will be fitting with weatherproof seals and therefore they will be compliant with J3.3. If, however there is no seal provided either option (i) or (iii) will be required.
J3.4 - Windows and Doors	The window supplier must provide verification that all glazing is sealed to comply with AS 2047 or BCA J3.4. A seal to restrict air infiltration must be fitted to each edge of a door, openable window or the like forming part of: (i) the envelope of a conditioned space; or (ii) the external fabric of a habitable room or public area in climate zones 4, 5, 6, 7 or 8. All doors forming part of the buildings thermal envelope must have a draft protection device installed to the bottom edge. All other edges of a window or door forming part of the building's thermal envelope The above requirements do not apply to a window complying with AS 2047 or any fire or smoke door, roller shutter doors/grilles or security doors installed for out of hours security. An entrance to a building, if leading to a conditioned space must have an airlock, self-closing door, revolving door or the like, other than: (i) where the conditioned space has a floor area of not more than 50 m2; or (ii) where a café, restaurant, open front shop or the like has— (a) a 3 m deep un-conditioned zone between the main entrance, including an open front, and the conditioned space; and (b) at all other entrances to the café, restaurant, open front shop or the like, self-closing doors.
J3.5 - Exhaust Fans	Any exhaust fans, located within conditioned areas indicated in the project reference, must be fitted with a sealing device such as a self-closing damper or the like.
J3.6 Roof, Walls & Floors	Construction forming elements of the envelope or external fabric must be enclosed by internal lining systems that are close fitting at ceiling, wall and floor junctions or sealed by caulking, skirting, architraves, cornices or the like.
J3.7	An evaporative cooler must be fitted with a self-closing damper or the like when serving— (a) a heated space; or

Evaporative Coolers	(b) a habitable room or a public area of a building in climate zones 4, 5, 6, 7 or 8

4.4. J5 Air Conditioning and Ventilation Systems

The project mechanical engineer shall be responsible for ensuring compliance with NCC Section J5. A summary of the requirements has been provided below for reference.

J Part	Requirement
J5.2 Air conditioning systems	Control (i) An air-conditioning system: (A) must be capable of being deactivated when the building or part of a building served by that system is not occupied; and (B) when serving more than one air-conditioning zone or area with different heating or cooling needs, must: (aa) thermostatically control the temperature of each zone or area; and (bb) not control the temperature by mixing actively heated air and actively cooled air; and (cc) limit reheating to not more than: (AA) for a fixed supply air rate, a 7.5 K rise in temperature; and (BB) for a variable supply air rate, a 7.5 K rise in temperature at the nominal supply air rate but increased or decreased at the same rate that the supply air rate is respectively decreased or increased; and (C) which provides the required mechanical ventilation, other than in process-related applications where humidity control is needed, must have an outdoor air economy cycle— (aa) in climate zones 2 or 3, when the air-conditioning system capacity is more than 50 kWr; or (bb) in climate zones 4, 5, 6, 7 or 8, when the air-conditioning system capacity is more than 35 kWr; and (D) which contains more than one water heater, chiller or coil, must be capable of stopping the flow of water to those not operating; and (E) except for a packaged air-conditioning system, must have a variable speed fan when its supply air quantity is capable of being varied; and (F) when serving a sole-occupancy unit in a Class 3 building, must not operate when any external door of the sole-occupancy unit that opens to a balcony or the like, is open for more than one minute. (ii) When an air-conditioning system is deactivated, any motorised outside air and return dampers must close. (iii) Compliance with (i) must not adversely affect: (A) smoke hazard management measures required by Part E2; and (B) ventilation required by Part E3 and Part F4.

J5.3 Mechanical Ventilation Systems	Fans Fans of an air-conditioning system must comply with **Specification J5.2a.** Pumps: (i) An air-conditioning system, where water is circulated by pumping at more than 2 L/s, must be designed so that the maximum pump power to the pump complies with Table J5.2. (ii) An air-conditioning system pump that is rated at more than 3 kW of pump power and circulates water at more than 2 L/s must be capable of varying its speed in response to varying load. (iii) A spray water pump of an air-conditioning system's closed circuit cooler or evaporative condenser must not use more than 150 W of pump power for each L/s of spray water circulated. Insulation: (i) The ductwork of an air-conditioning system must be insulated and sealed in accordance with **Specification J5.2b.** (ii) Piping, vessels, heat exchangers and tanks containing heating or cooling fluid that are part of an air-conditioning system, other than those with insulation levels covered by MEPS, must be insulated in accordance with **Specification J5.2c.** Space heating: A heater used for air-conditioning or as part of an air-conditioning system must comply with **Specification J5.2d.** Energy efficiency ratios — (i) refrigerant chillers used as part of an air-conditioning system; and (ii) packaged air-conditioning equipment, must comply with **Specification J5.2e.** Time switches: (i) A time switch complying with Specification J6 must be provided to control— (A) an air-conditioning system of more than 10 kWr; and (B) a heater of more than 10 kWheating used for air-conditioning. (ii) The requirements of (i) do not apply to (A) an air-conditioning system that serves (aa) only one sole-occupancy unit in a Class 2 or 3 building; or (bb) a Class 4 part of a building; or (cc) only one sole-occupancy unit in a Class 9c building; or (B) a building where air-conditioning is needed for 24-hour occupancy.
J5.3 Mechanical Ventilation Systems	Control (i) A mechanical ventilation system, including one that is part of an air-conditioning system, except where the mechanical system serves only one sole-occupancy unit in a Class 2 building or serves only a Class 4 part of a building, must: (A) be capable of being deactivated when the building or part of the building served by that system is not occupied; and (B) when serving a conditioned space: (aa) not exceed the minimum outdoor air quantity required by Part F4, where relevant, by more than 20%; and (bb) in other than climate zone 2, where the number of square metres per person is not more than 1 as specified in D1.13 and the air flow rate is more than 1000 L/s, have: (AA) an energy reclaiming system that preconditions outside air; or (BB) the ability to automatically modulate the mechanical ventilation required by Part F4 in proportion to the number of occupants. (ii) The requirements of (a)(i)(B)(aa) do not apply where:

	(A) additional unconditioned outside air is supplied for free cooling or to balance process exhaust; or (B) additional exhaust ventilation is needed to balance the required mechanical ventilation; or (C) an energy reclaiming system preconditions all the outside air. (iii) Compliance with (a)(i) must not adversely affect— (A) smoke hazard management measures required by Part E2; and (B) ventilation required by Part E3 and Part F4. Fans Fans of a mechanical ventilation system covered by (a) must comply with **Specification J5.2a.** Time switches: (i) A time switch complying with Specification J6 must be provided to control a mechanical ventilation system with an air flow rate of more than 1000 L/s. (ii) The requirements of (i) do not apply to: (A) a mechanical ventilation system that serves: (aa) only one sole-occupancy unit in a Class 2 or 3 building; or (bb) a Class 4 part of a building; or (cc) only one sole-occupancy unit in a Class 9c building; or (B) a building where mechanical ventilation is needed for 24 hour occupancy.
J5.4 Miscellaneous Exhaust Systems	A miscellaneous exhaust system with an air flow rate of more than 1000 L/s, that is associated with equipment having a variable demand, must: (i) be capable of stopping the motor when the system is not needed; and (ii) have a variable speed fan or the like. The requirements of (a) do not apply: (i) to a miscellaneous exhaust system in: (A) a sole-occupancy unit in a Class 2, 3 or 9c building; or (B) a Class 4 part of a building; or (ii) where additional exhaust ventilation is needed to balance the required outside air for ventilation.

4.5. J6 Artificial Lighting and Power

The project electrical engineer shall be responsible for ensuring the design complies with NCC Section J6. A summary of the requirements has been provided below for reference:

<table>
<tr><th>J Part</th><th>Requirements</th></tr>
<tr><td>J6.2
Interior Artificial Lighting</td><td>
The design illumination power load must not exceed the sum of the allowances obtained by multiplying the area of each space by the maximum illumination power density in Table J6.2a. .

Allowable maximum illumination power density
<table>
<tr><th>Space</th><th>Maximum W/m²</th><th>Space</th><th>Maximum W/m²</th></tr>
<tr><td>Retail, whose purpose is the sale of objects</td><td>22 W/m2</td><td>Restaurant, café, bar and space for the serving and consumption of food and drink</td><td>18 W/m2</td></tr>
<tr><td>Gymnasium and Pool</td><td>10 W/m2</td><td>Sauna</td><td>7 W/m2</td></tr>
<tr><td>Playrooms</td><td>8 W/m2</td><td>Office</td><td>9 W/m2</td></tr>
<tr><td>Entry lobby from outside the building</td><td>15 W/m2</td><td>Board room or conference room</td><td>10 W/m2</td></tr>
<tr><td>Sole occupancy unit of a Class 3 building</td><td>5 W/m2</td><td>Storage areas</td><td>8 W/m2</td></tr>
<tr><td>Kitchen and food preparation areas</td><td>8 W/m2</td><td>Communal lounge areas</td><td>10 W/m2</td></tr>
<tr><td>Toilet, locker room, staff room or the like</td><td>6 W/m2</td><td>Carpark – entry zone (first 20m of travel)</td><td>25 W/m2</td></tr>
<tr><td>Carpark - general</td><td>6 W/m2</td><td>Corridors</td><td>8 W/m2</td></tr>
<tr><td>Plant areas</td><td>5 W/m2</td><td></td><td></td></tr>
</table>
If lighting will not comply with the W/m² detailed above an ABCB Lighting calculator can be completed and adjustment factors considered in order to ensure compliance.

No loss of insulation through ceiling penetrations has been completed in regards to the ceiling where roof is above. It is therefore assumed that any lighting installed will not impact on the ceiling/roof insulation. If ceiling/roof insulation is impacted by the installation on new lighting a loss of insulation calculation will need to be completed.

These requirements to not apply for:
1. Emergency lighting in accordance with Part E4
2. Signage and display lighting within cabinets and display cases that are fixed in place.
3. A heater where the heater also emits light, such as in bathrooms.
</td></tr>
</table>

J6.3 Interior Artificial Lighting and Power Control	Artificial lighting of a room or space is to be individually switched or operated. These switches or devices must be located in a visible position- •in the room or space being switched; or •in an adjacent room or space from where the lighting being switched is visible Sole-occupancy units, except for those rooms specifically for people with a disability or the aged, are to have an occupant sensing device such as a card reader, motion detector in accordance with **Specification J6** or the like installed to cut power to lighting, air-conditioner and exhaust fans when these rooms are unoccupied. This requirement is only applicable to sole-occupancy units. Further advice can be given on suitable devices if desired. For any non-residential building that exceeds 250m² 95% of light fittings need to be controlled by either a time switch in accordance with **Specification J6**, a security card reader or motion detector in accordance with **Specification J6.** Other than in a single functional space, lighting controls or switches within each room, cannot operate lighting for an area of more than: (a) 250m² for a space of less than 2000m²; or (b) 1000m² for a space of more than 2000m²; These requirements do not apply to emergency lighting in accordance with **Part E4**
J6.4 Interior decorative and display lighting	If installing lighting for the display of art work / photographs or the like, it must be controlled by a manual switch and operated separately from other artificial lighting. This display lighting can be combined on one switch if the operating times for the display lighting are the same in a number of areas. If the display lighting exceeds 1kW in total then it must have a time switch in accordance with Specification J6. Any window display lighting to be separately switched from other display lighting.
J6.5 Artificial lighting around the perimeter of a building	If installing artificial lighting around the perimeter of the building, it is to be controlled by a daylight sensor or time switch with pre-programmable times. If total perimeter lighting load exceeds 100W it must have an average light source efficacy of not less than 60 Lumens/W ; or be controlled by a motion detector in accordance with **Specification J6*** Lighting that is used for decorative purposes, such as façade lighting or signage lighting must have a separate time switch in accordance with **Specification J6**. *these requirements do not apply to emergency lighting in accordance with **Part E4**
J6.6 Boling water and chilled water storage units	Any boiling water or chilled water storage unit must be controlled by a time switch in accordance with Specification J6.

4.6. J7 Heated Water Supply and Swimming/Spa Pool Plant

The project hydraulic engineer shall be responsible for ensuring the design complies with NCC Section J6. A summary of the requirements has been provided below for reference:

J Part	Requirements
J7.2 Hot water Supply	Any new heated water supply system for food preparation must be designed and installed in accordance with Part B2 of NCC Volume Three – Plumbing Code of Australia.
J7.3 Swimming Pool Heating and Plumbing	Pool heating must be provided by one of the following: •solar heater not boosted by electric resistance heating •a heater using reclaimed energy •gas heating •heat pump •or a combination of these options
J7.4 Spa Pool Heating and Pumping	Spa heating must be provided by one of the following: •solar heater •a heater using reclaimed energy •gas heating •heat pump •or a combination of these options *It has been assumed that the method of spa heating will be either gas or heat pump. Therefore the spa must have cover and the spa heater will also need push button and a time switch.

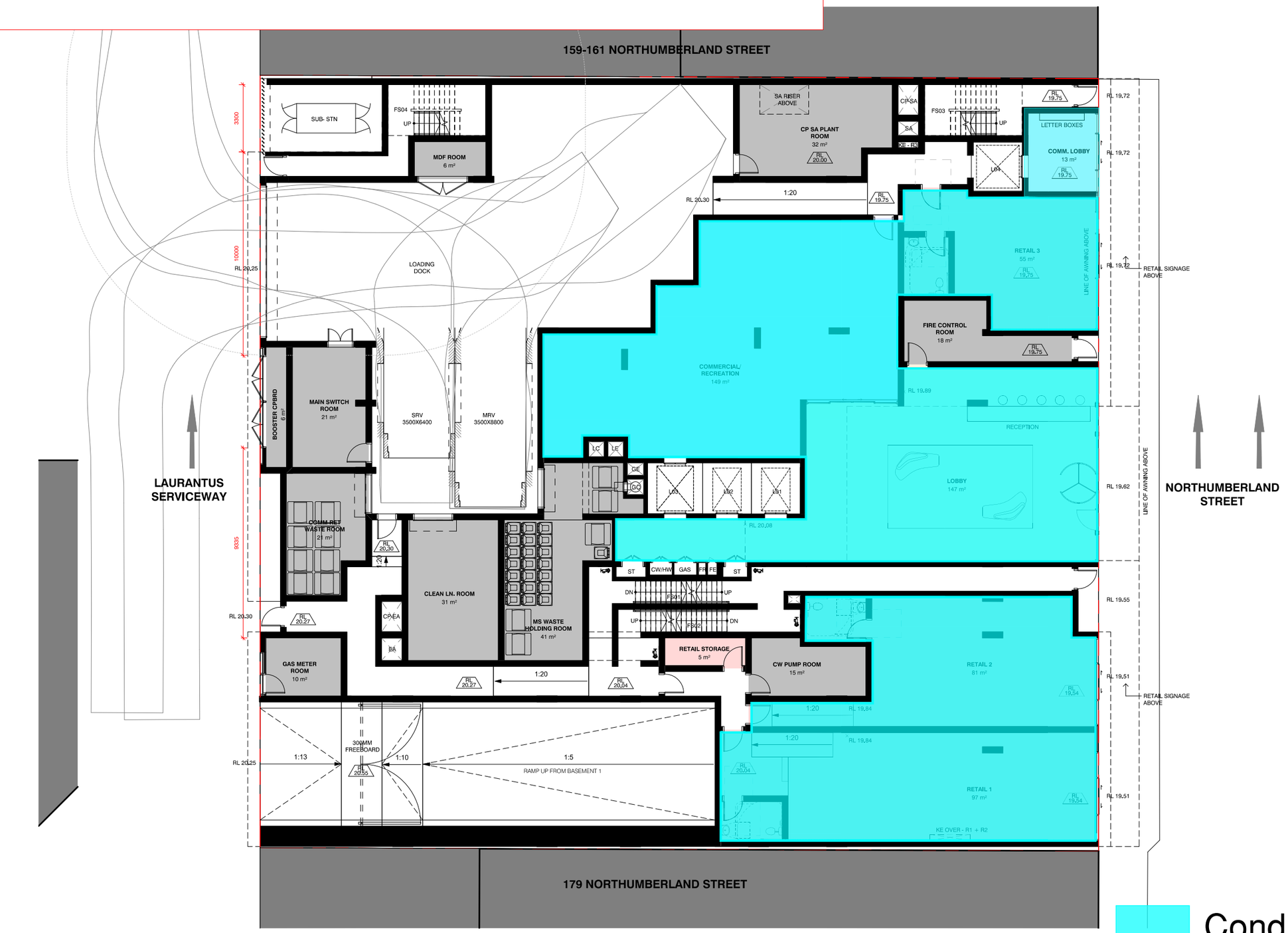
4.7. J8 Facilities for Energy Monitoring

The project electrical engineer shall be responsible for ensuring the design complies with NCC Section J6. A summary of the requirements has been provided below for reference:

J Part	Requirements
J8.3 Facilities for Energy Monitoring	The developments floor area is over 2500m^2, therefore must have the facility to individually record the energy consumption of: (i) air-conditioning plant including where appropriate, heating plant, cooling plant and air handling fans; and (ii) artificial lighting; and (iii) appliance power; and (iv) central hot water supply; and (v) internal transport devices including lifts, escalators and travelators where there is more than one serving the building; and (vi) other ancillary plant.

Appendix A

167 Northumberland Liverpool– Mark Up Identifying Conditioned Areas
Level G



Conditioned area

2 GROUND FLOOR PLAN
1 : 100 @A1

Key Plan:

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D Jones Architect No.4778

0 1 2 5 8m

Project PA018110
MERITON SUITES
167 Northumberland, Liverpool

Status
DEVELOPMENT APPLICATION

Title
10-GENERAL ARRANGEMENT PLAN_DA
LEVEL G PLAN

Drawing Number DA-10-1000
Revision A

A1

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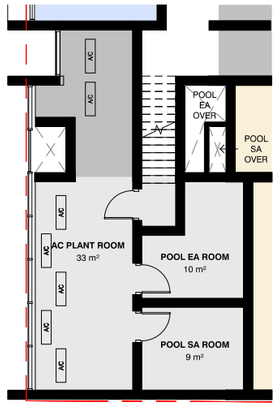
167 Northumberland Liverpool– Mark Up Identifying Conditioned Areas
Level 01



1 LEVEL 01 MEZZANINE
1 : 100 @A1

2 LEVEL 01 PLAN
1 : 100 @A1

Conditioned area

Key Plan:

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Project PA018110
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Status
DEVELOPMENT APPLICATION

Title
10-GENERAL ARRANGEMENT PLAN_DA
LEVEL 01 PLAN

Drawing Number DA-10-1100
Revision A

A1

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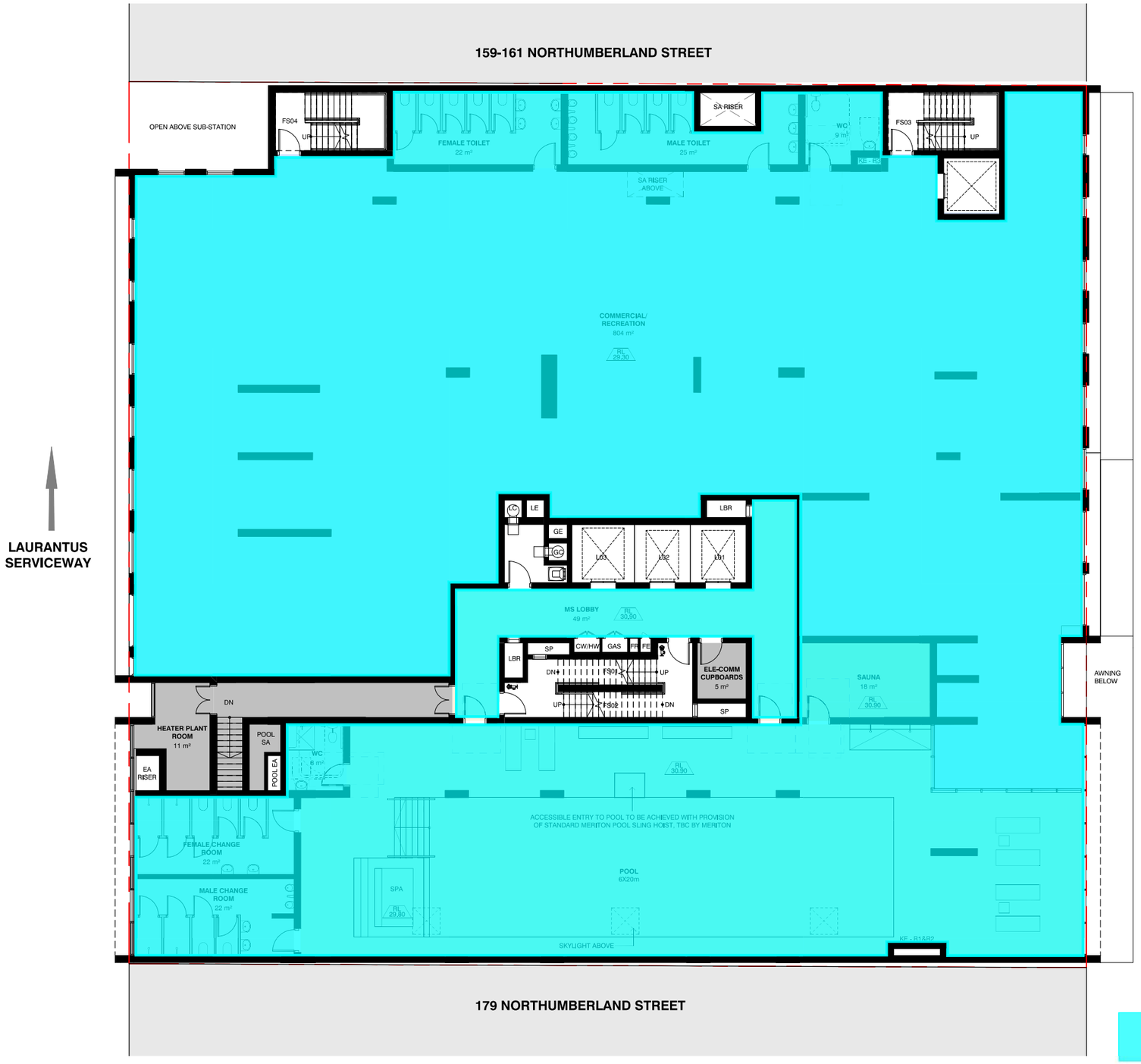
167 Northumberland Liverpool– Mark Up Identifying Conditioned Areas
Level 02



Conditioned area

2 LEVEL 02 PLAN
1 : 100 @A1

Key Plan:

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Project PA018110
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167 Northumberland, Liverpool

Status
DEVELOPMENT APPLICATION

Title
10-GENERAL ARRANGEMENT PLAN_DA
LEVEL 02 PLAN

Drawing Number DA-10-1200
Revision A

A1

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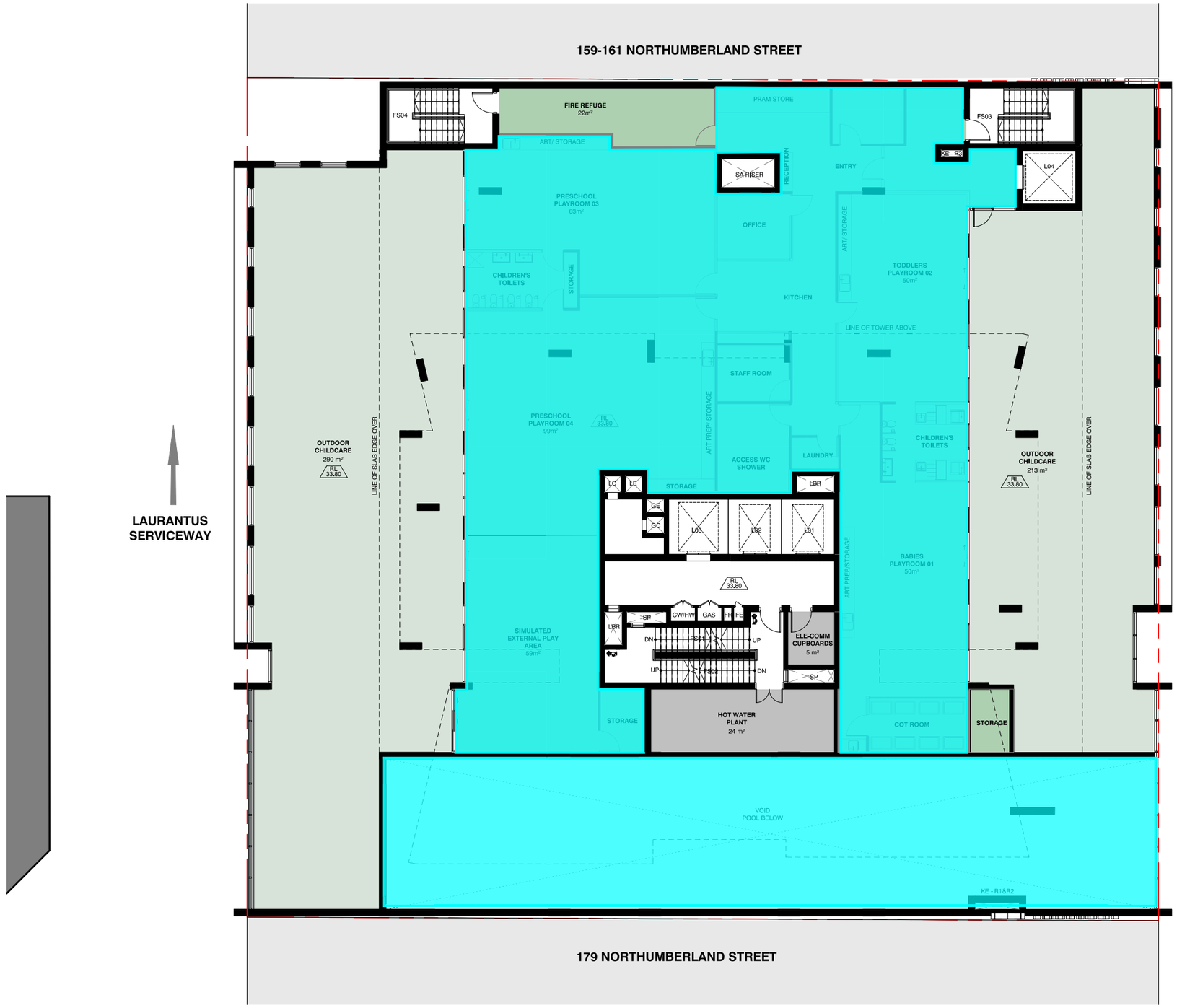
167 Northumberland Liverpool– Mark Up Identifying Conditioned Areas
Level 03



Conditioned area

REFER TO CHILDCARE ARCHITECT'S DRAWINGS FOR DETAILS

1 LEVEL 03 PLAN
1 : 100 @A1

Key Plan:

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Project PA018110
MERITON SUITES
167 Northumberland, Liverpool

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DEVELOPMENT APPLICATION

Title
10-GENERAL ARRANGEMENT PLAN_DA
LEVEL 03 PLAN

Drawing Number DA-10-1300

Revision A

A1

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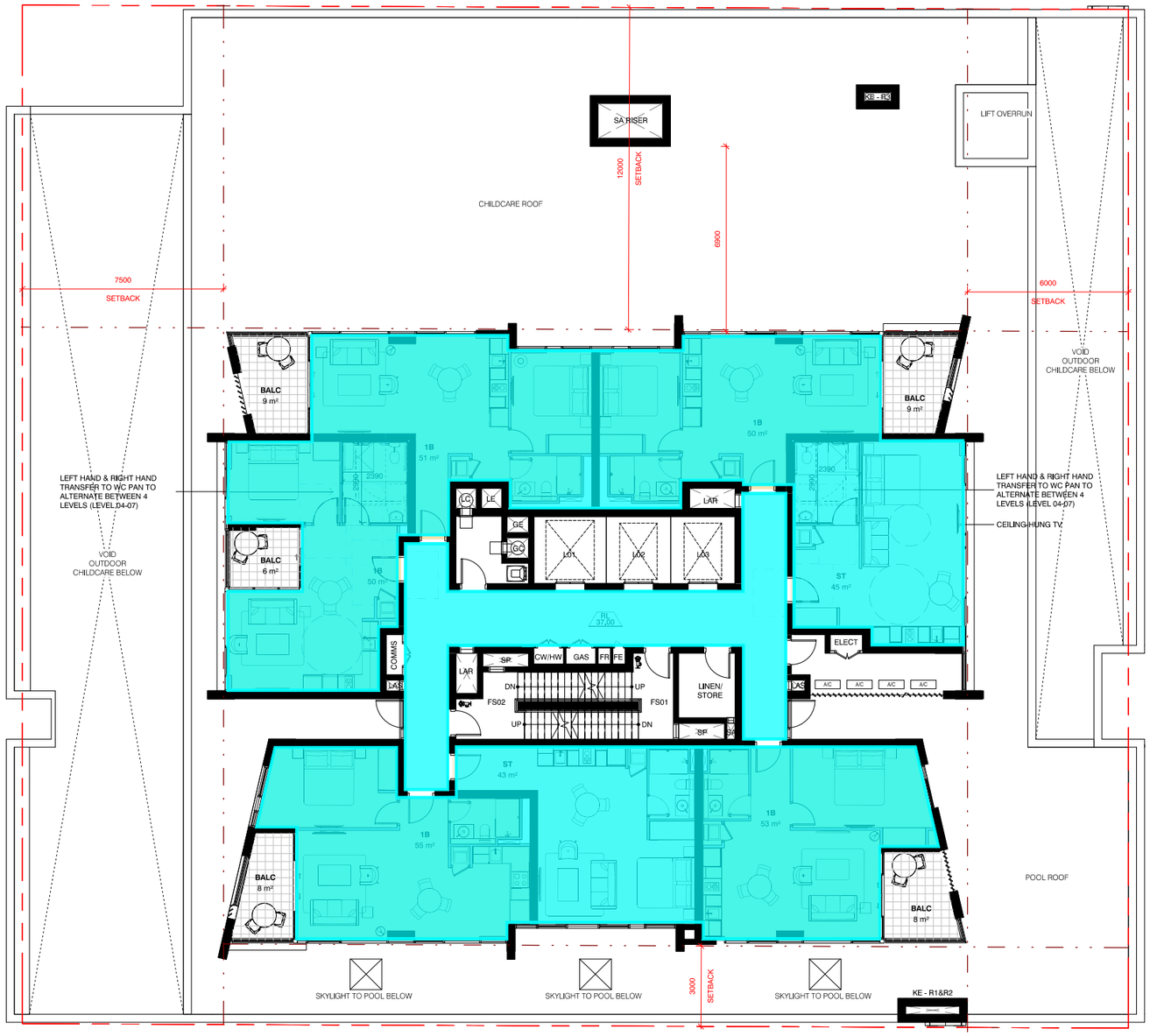
167 Northumberland Liverpool– Mark Up Identifying Conditioned Areas
Level 04



Conditioned area

1 LEVEL 04 PLAN
1 : 100 @A1

Key Plan:

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MERITON SUITES
167 Northumberland, Liverpool

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DEVELOPMENT APPLICATION

Title
10-GENERAL ARRANGEMENT PLAN_DA
LEVEL 04 PLAN

Drawing Number DA-10-1400
Revision A

A1

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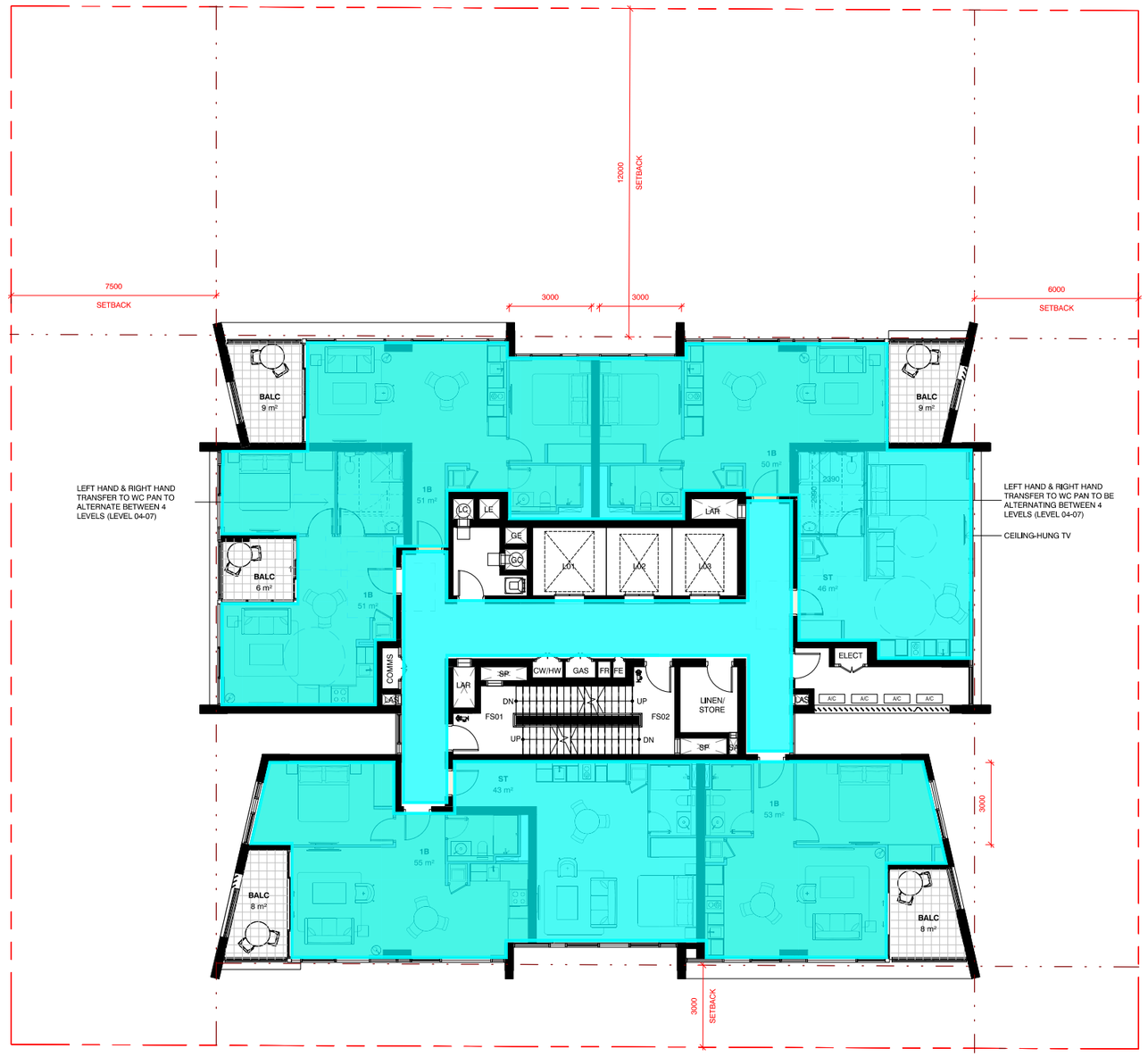
167 Northumberland Liverpool– Mark Up Identifying Conditioned Areas
Level 05-07



Conditioned area

1 LEVEL 05-07 PLAN
1 : 100 @A1

Key Plan:

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Title
10-GENERAL ARRANGEMENT PLAN_DA
LEVELS 05-07 PLAN

Drawing Number DA-10-1500
Revision A

A1

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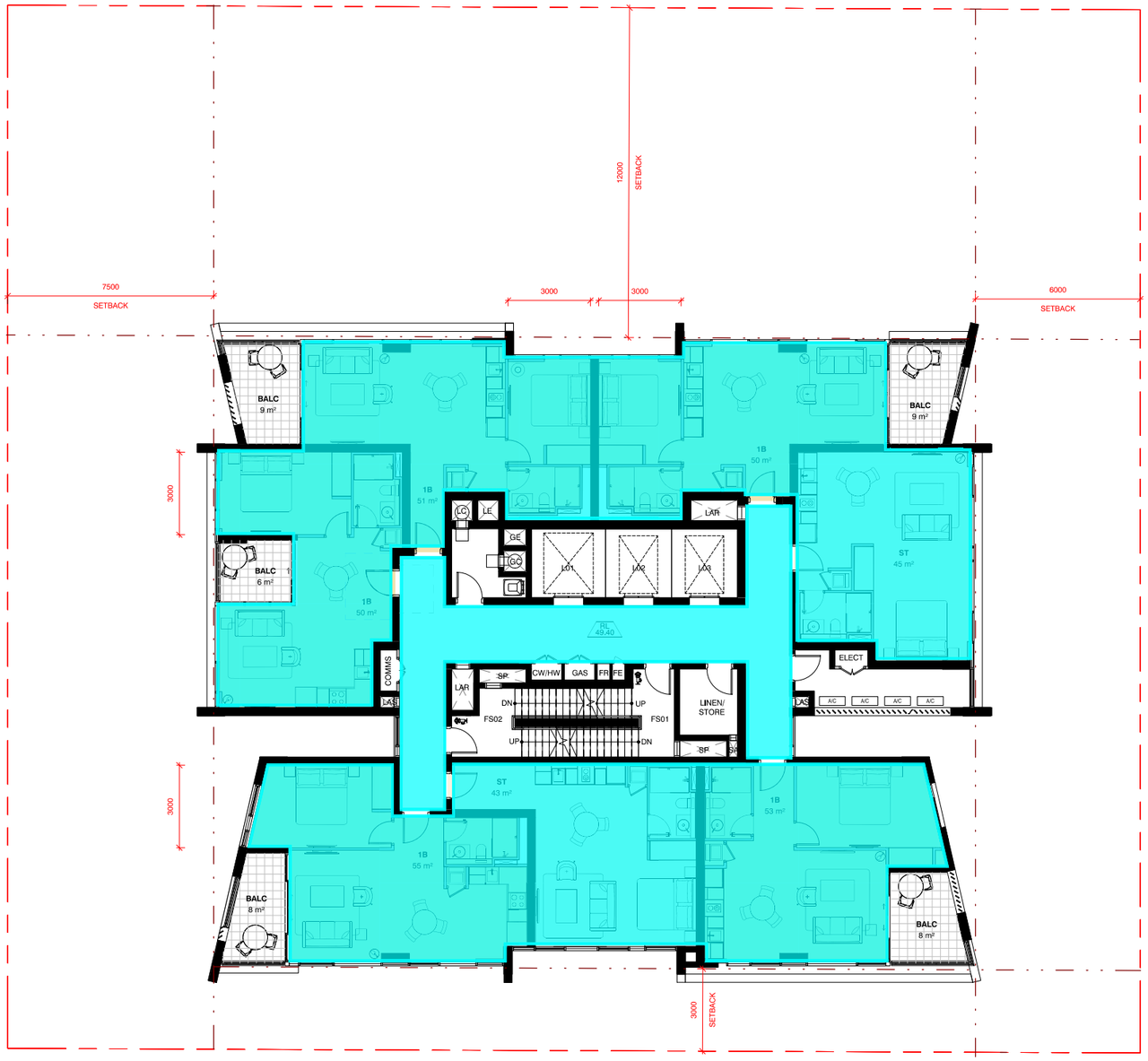
167 Northumberland Liverpool– Mark Up Identifying Conditioned Areas
Level 08



Conditioned area

1 LEVEL 08 PLAN
1 : 100 @A1

Key Plan:

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MERITON SUITES
167 Northumberland, Liverpool

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DEVELOPMENT APPLICATION

Title
10-GENERAL ARRANGEMENT PLAN_DA
LEVELS 08 PLAN

Drawing Number DA-10-1800
Revision A

A1

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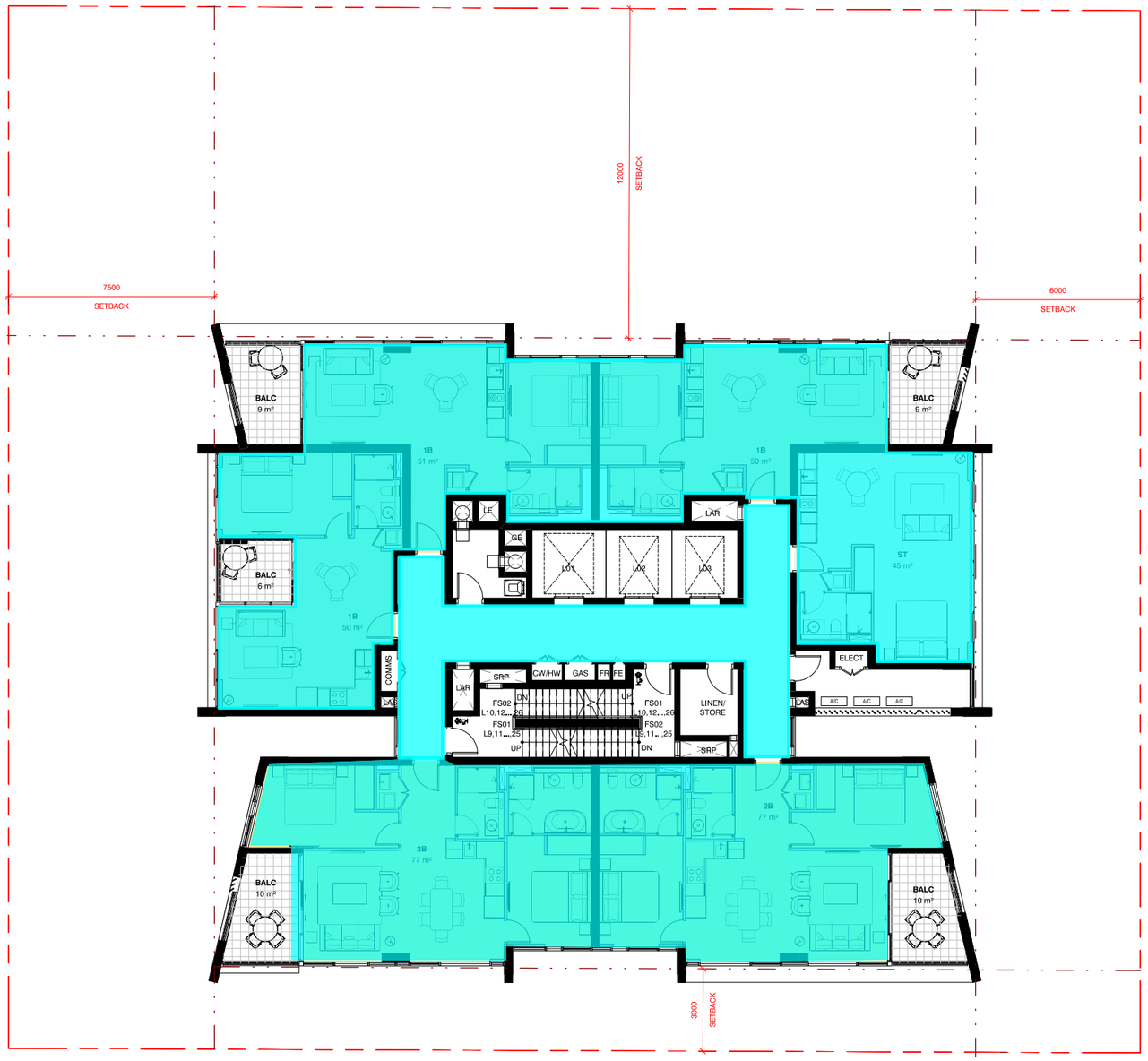
167 Northumberland Liverpool– Mark Up Identifying Conditioned Areas
Level 09-26



Conditioned area

1 LEVEL 09-26 PLAN
1 : 100 @A1

Key Plan:

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Project PA018110
MERITON SUITES
167 Northumberland, Liverpool

Status
DEVELOPMENT APPLICATION

Title
10-GENERAL ARRANGEMENT PLAN_DA
LEVEL 09-26 PLAN

Drawing Number DA-10-1900
Revision A

A1

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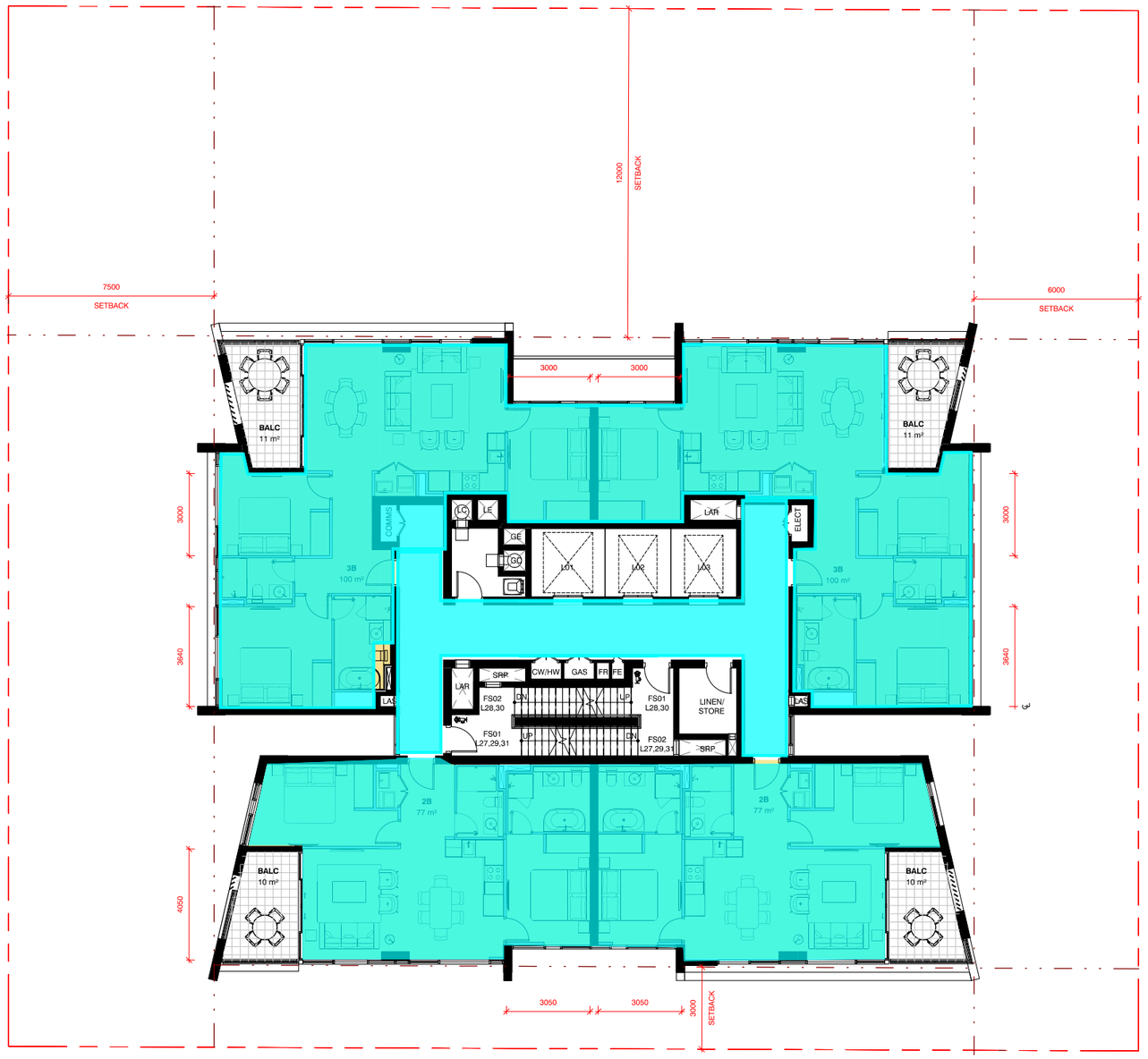
21/02/2020 11:24:16 AM

167 Northumberland Liverpool– Mark Up Identifying Conditioned Areas
Level 27-31



Conditioned area

1 LEVEL 27-31 PLAN
1 : 100 @A1

Key Plan:

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Project PA018110
MERITON SUITES
167 Northumberland, Liverpool

Status
DEVELOPMENT APPLICATION

Title
10-GENERAL ARRANGEMENT PLAN_DA
LEVELS 27-31 PLAN

Drawing Number DA-10-3700
Revision A

A1

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Appendix B

167 Northumberland Liverpool– Mark Up Identifying Areas of Required Roof/ceiling Insulation
Level 02

Roof Insulation Requirements

$R_{total\ system}$ **3.20 =**

2 LEVEL 02 PLAN
1 : 100 @A1

Key Plan:

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Project PA018110
MERITON SUITES
167 Northumberland, Liverpool

Status
DEVELOPMENT APPLICATION

Title
10-GENERAL ARRANGEMENT PLAN_DA
LEVEL 02 PLAN

Drawing Number DA-10-1200
Revision A

A1

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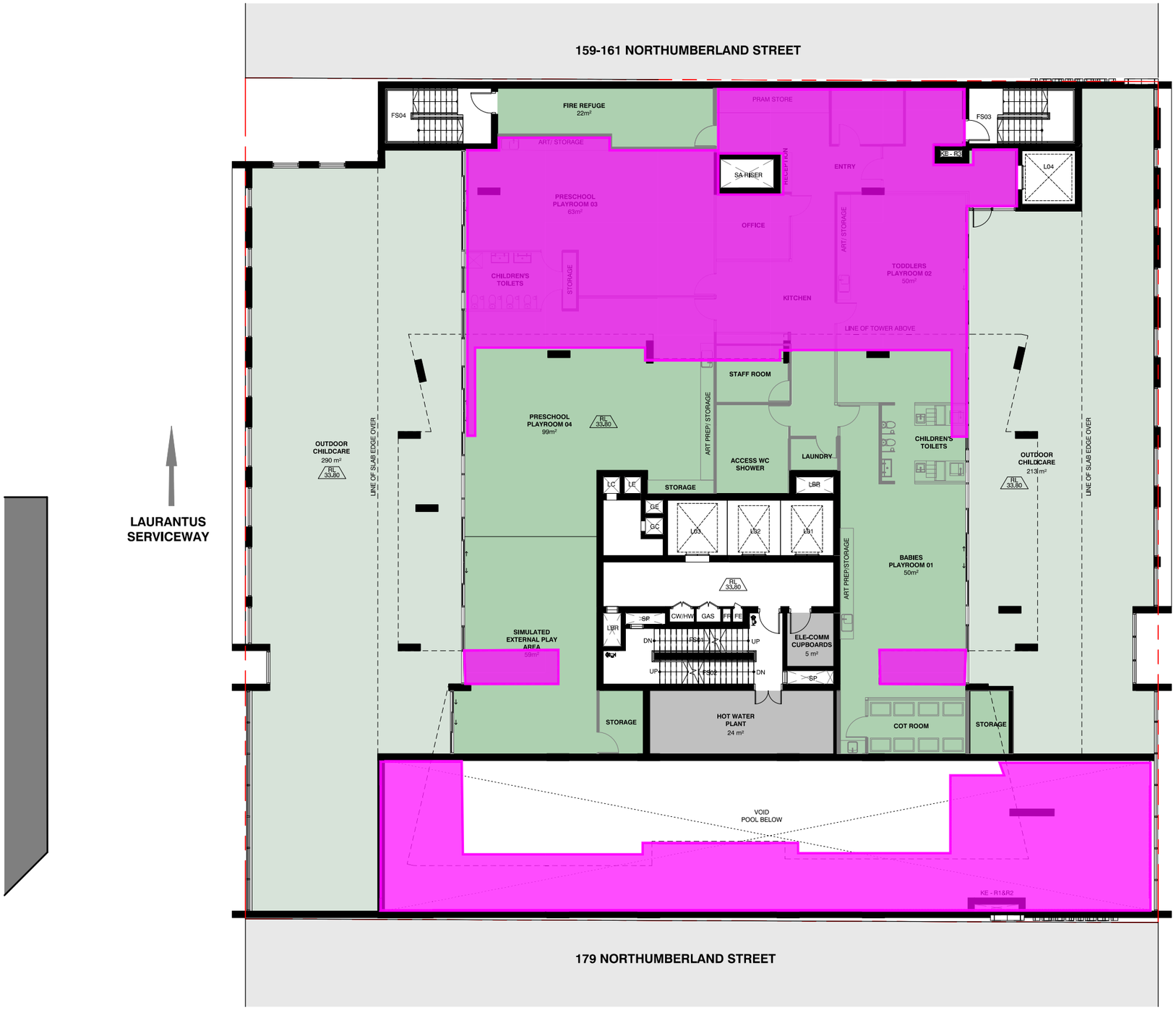
167 Northumberland Liverpool– Mark Up Identifying Areas of Required Roof Insulation
Level 03



Roof Insulation Requirements

$R_{total\ system}$ **3.20 =**

REFER TO CHILDCARE ARCHITECT'S DRAWINGS FOR DETAILS

1 LEVEL 03 PLAN
1 : 100 @A1

Key Plan:

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Project PA018110
MERITON SUITES
167 Northumberland, Liverpool

Status
DEVELOPMENT APPLICATION

Title
10-GENERAL ARRANGEMENT PLAN_DA
LEVEL 03 PLAN

Drawing Number DA-10-1300
Revision A

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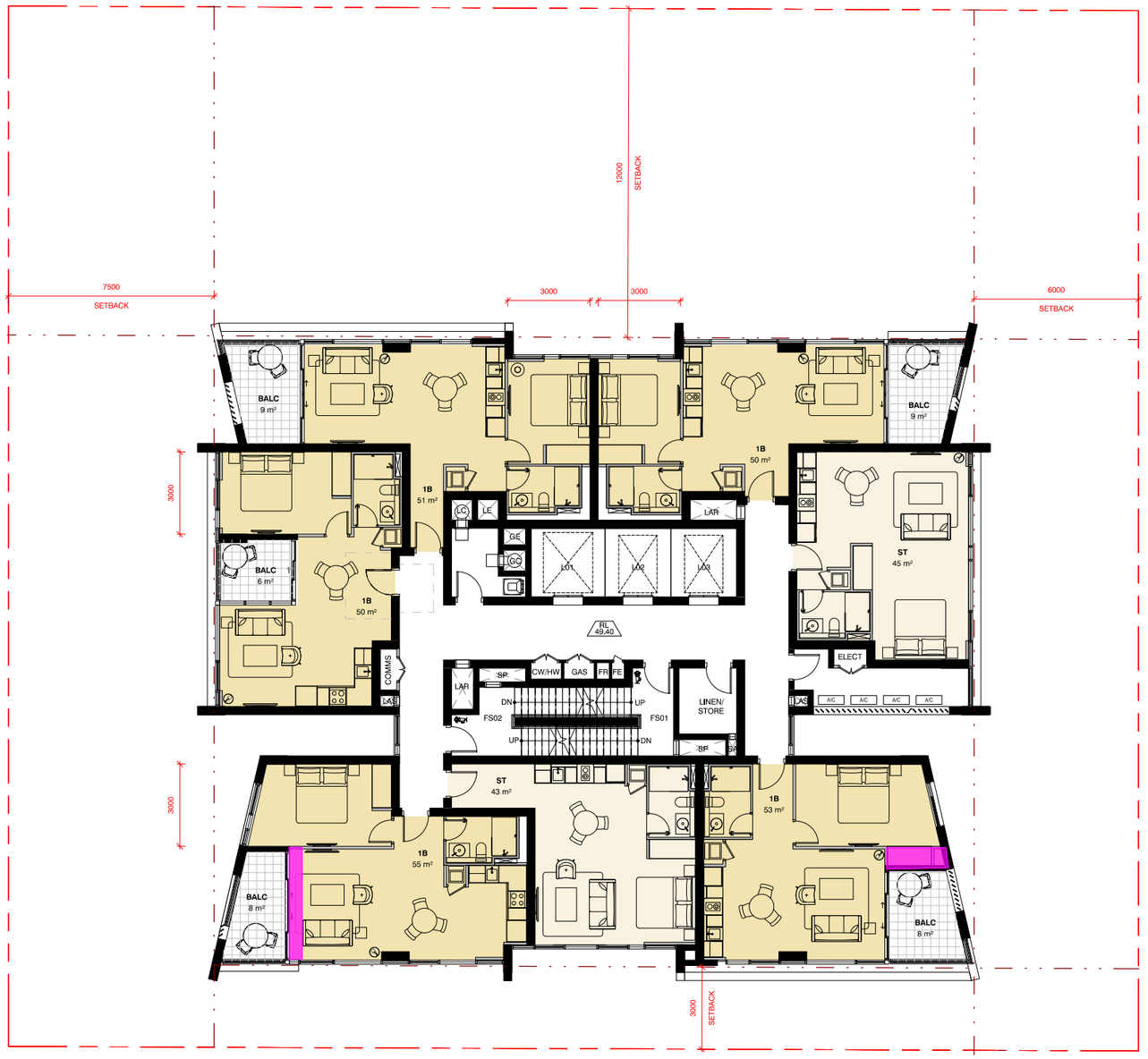
A1

167 Northumberland Liverpool– Mark Up Identifying Areas of Required Roof/ceiling Insulation
Level 08



Roof Insulation Requirements

$R_{total\ system}$ **3.20 =**

1 LEVEL 08 PLAN
1 : 100 @A1

Key Plan:

Client
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Project PA018110
MERITON SUITES
167 Northumberland, Liverpool

Status
DEVELOPMENT APPLICATION

Title
10-GENERAL ARRANGEMENT PLAN_DA
LEVELS 08 PLAN

Drawing Number DA-10-1800
Revision A

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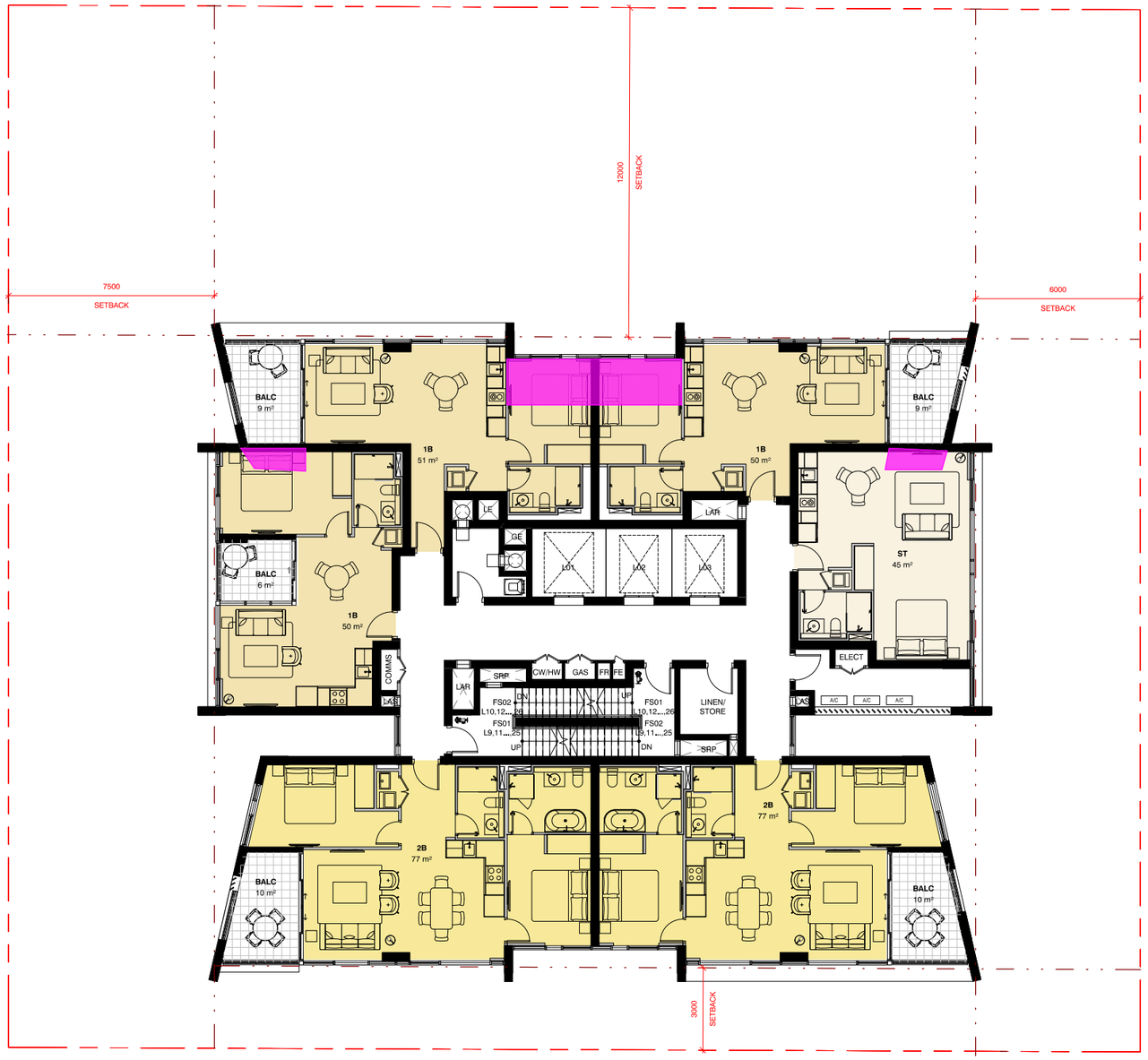
A1

167 Northumberland Liverpool– Mark Up Identifying Areas of Required Roof/ceiling Insulation Level 26



Roof Insulation Requirements

$R_{total\ system}$ **3.20 =**

1 LEVEL 09-26 PLAN
1 : 100 @A1

Key Plan:

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0 1 2 5 8m

Project PA018110
MERITON SUITES
167 Northumberland, Liverpool

Status
DEVELOPMENT APPLICATION

Title
10-GENERAL ARRANGEMENT PLAN_DA
LEVEL 09-26 PLAN

Drawing Number DA-10-1900
Revision A

A1

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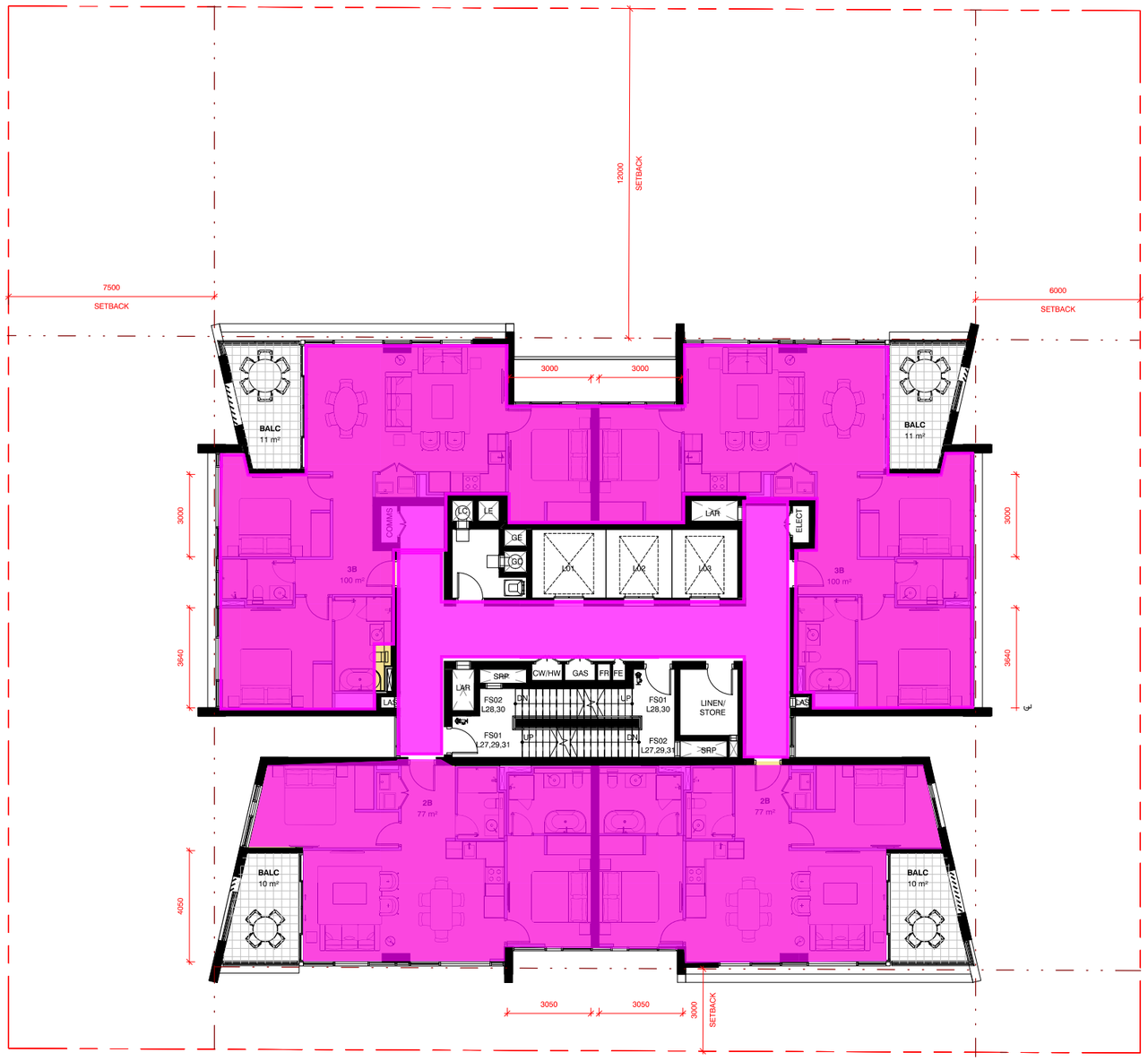
167 Northumberland Liverpool– Mark Up Identifying Areas of Required Roof/ceiling Insulation Level 31



Roof Insulation Requirements

$R_{total\ system}$ **3.20 =**

1 LEVEL 27-31 PLAN
1 : 100 @A1

Key Plan:

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0 1 2 5 8m

Project PA018110
MERITON SUITES
167 Northumberland, Liverpool

Status
DEVELOPMENT APPLICATION

Title
10-GENERAL ARRANGEMENT PLAN_DA
LEVELS 27-31 PLAN

Drawing Number DA-10-3700
Revision A

A1

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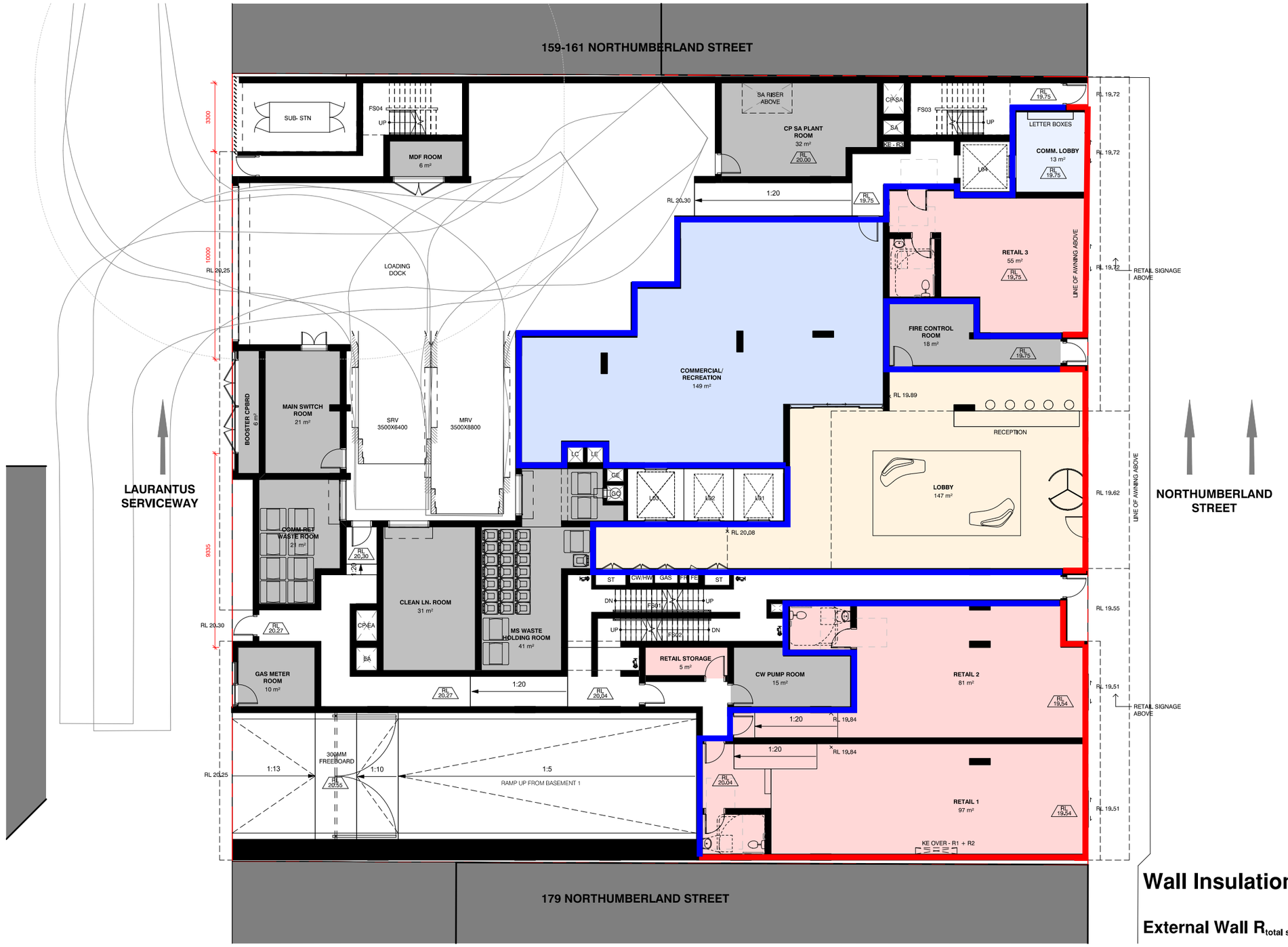
21/02/2020 11:24:22 AM

167 Northumberland Liverpool– Mark Up Identifying Areas of Required Wall Insulation
Level G



Wall Insulation Requirements

External Wall $R_{total\ system}$ 2.80 -

Internal Wall $R_{total\ system}$ 1.80 -

2 GROUND FLOOR PLAN
1 : 100 @A1

Key Plan:

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Project PA018110
MERITON SUITES
167 Northumberland, Liverpool

Status
DEVELOPMENT APPLICATION

Title
10-GENERAL ARRANGEMENT PLAN_DA
LEVEL G PLAN

Drawing Number DA-10-1000
Revision A

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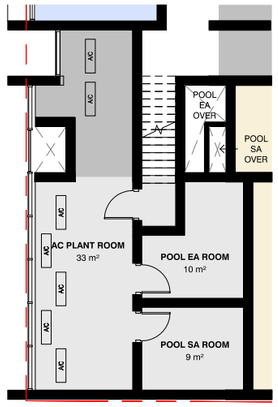
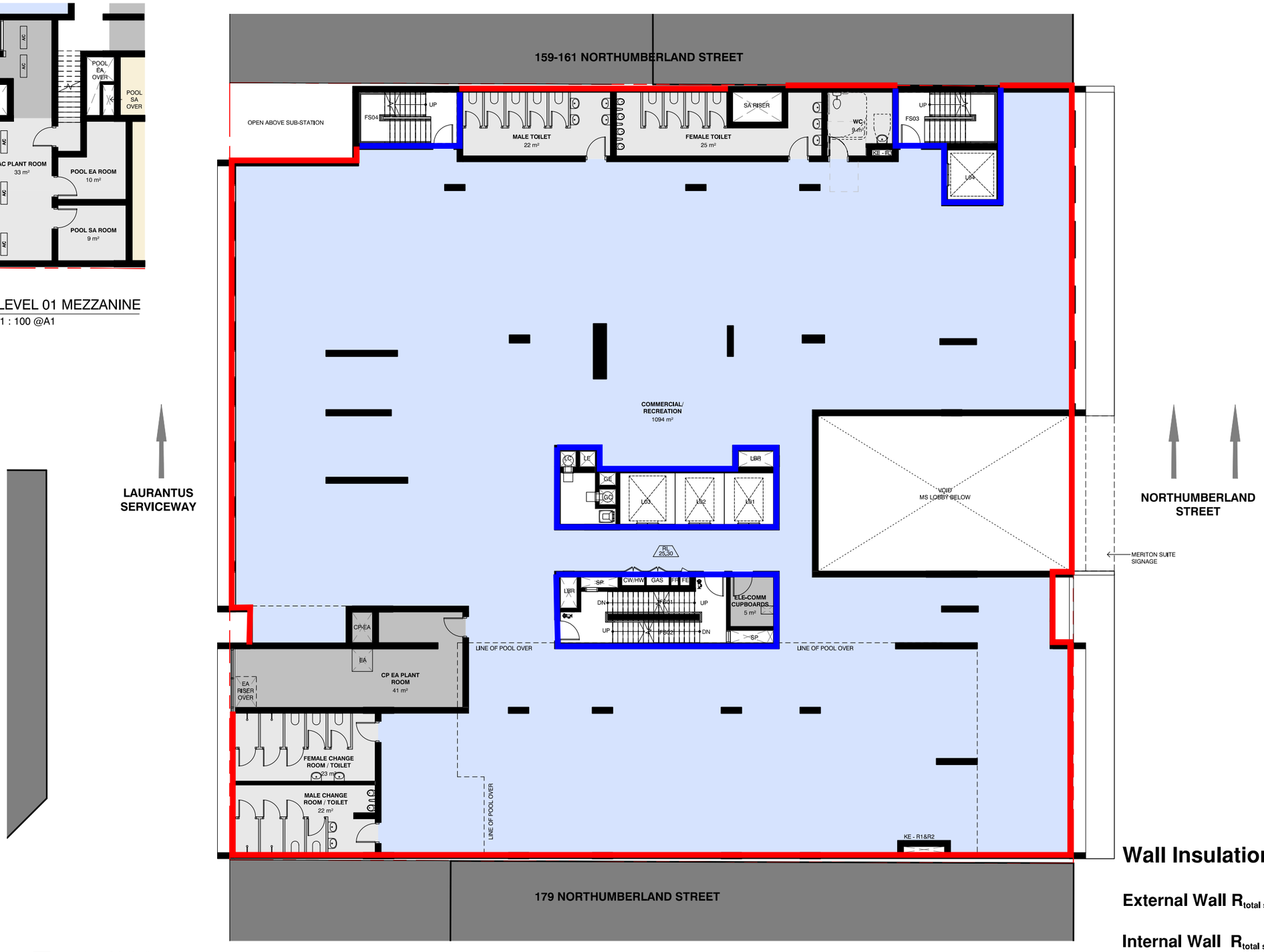
A1

167 Northumberland Liverpool– Mark Up Identifying Areas of Required Wall Insulation
Level 01



1 LEVEL 01 MEZZANINE
1 : 100 @A1



2 LEVEL 01 PLAN
1 : 100 @A1

Wall Insulation Requirements

External Wall $R_{total\ system}$ 2.80 -

Internal Wall $R_{total\ system}$ 1.80 -

Key Plan:

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NSW Nominated Architects
S Parsons Architect No.6098
D Jones Architect No.4778

0 1 2 5 8m

Project PA018110
MERITON SUITES
167 Northumberland, Liverpool

Status
DEVELOPMENT APPLICATION

Title
10-GENERAL ARRANGEMENT PLAN_DA
LEVEL 01 PLAN

Drawing Number DA-10-1100
Revision A

21/02/2020 11:23:19 AM

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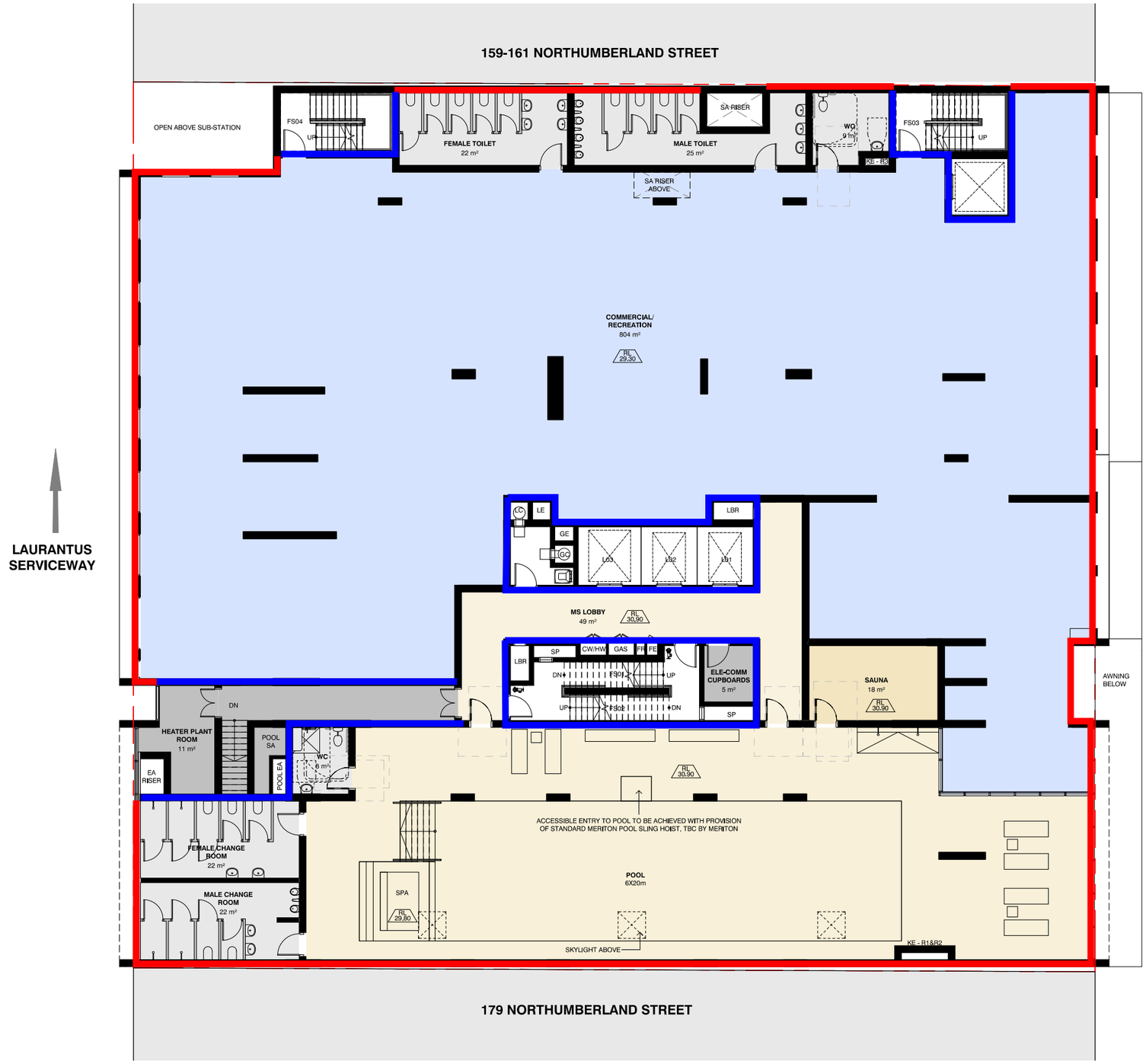
A1

167 Northumberland Liverpool– Mark Up Identifying Areas of Required Wall Insulation
Level 02



Wall Insulation Requirements

External Wall $R_{total\ system}$ 2.80 -

Internal Wall $R_{total\ system}$ 1.80 -

2 LEVEL 02 PLAN
1 : 100 @A1

Key Plan:

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0 1 2 5 8m

Project PA018110
MERITON SUITES
167 Northumberland, Liverpool

Status
DEVELOPMENT APPLICATION

Title
10-GENERAL ARRANGEMENT PLAN_DA
LEVEL 02 PLAN

Drawing Number DA-10-1200
Revision A

A1

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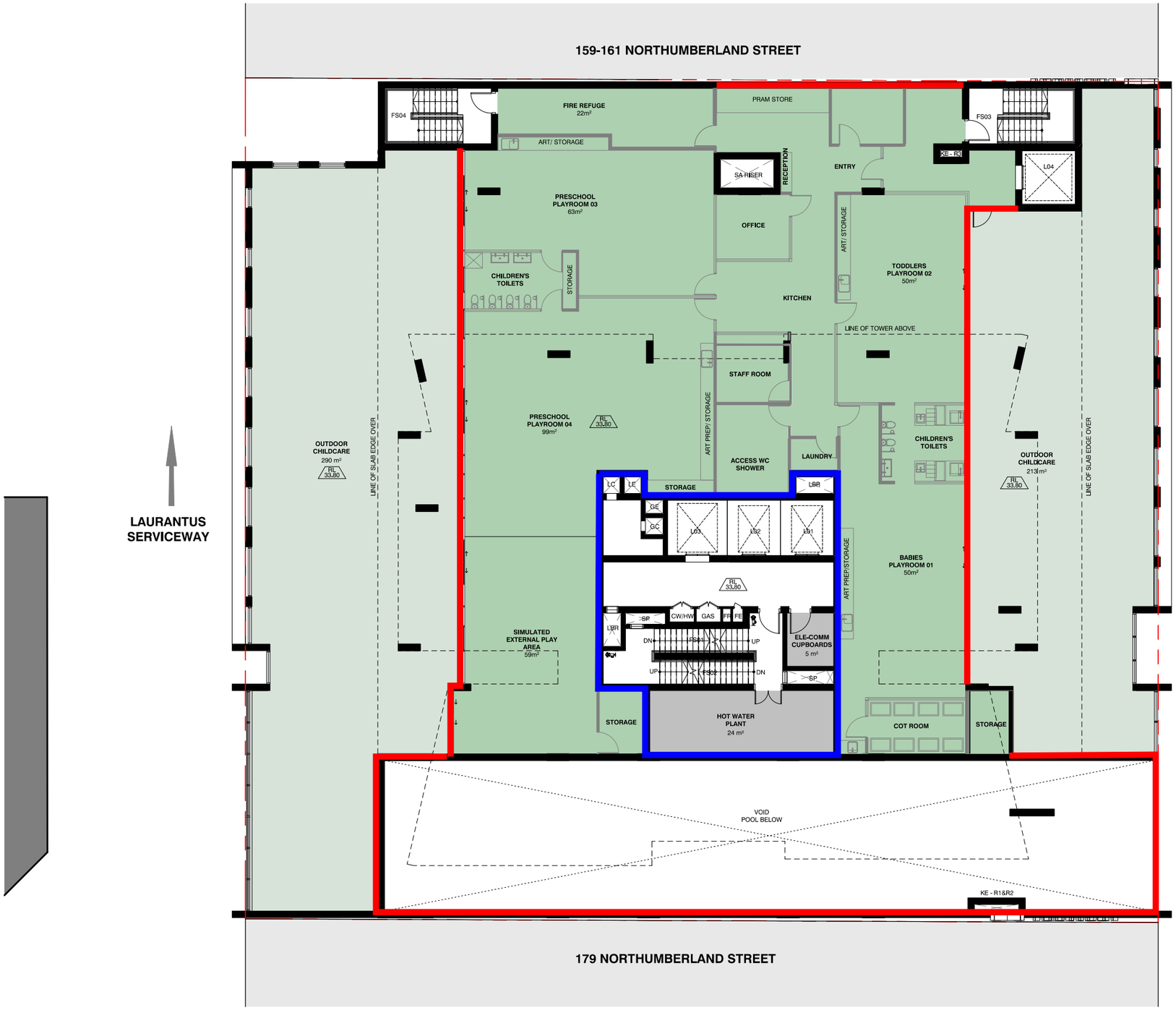
167 Northumberland Liverpool– Mark Up Identifying Areas of Required Wall Insulation
Level 03



REFER TO CHILDCARE ARCHITECT'S DRAWINGS FOR DETAILS

Wall Insulation Requirements

External Wall $R_{total\ system}$ 2.80 -

Internal Wall $R_{total\ system}$ 1.80 -

1 LEVEL 03 PLAN
1 : 100 @A1

Key Plan:

Client
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Project PA018110
MERITON SUITES
167 Northumberland, Liverpool

Status
DEVELOPMENT APPLICATION

Title
10-GENERAL ARRANGEMENT PLAN_DA
LEVEL 03 PLAN

Drawing Number DA-10-1300
Revision A

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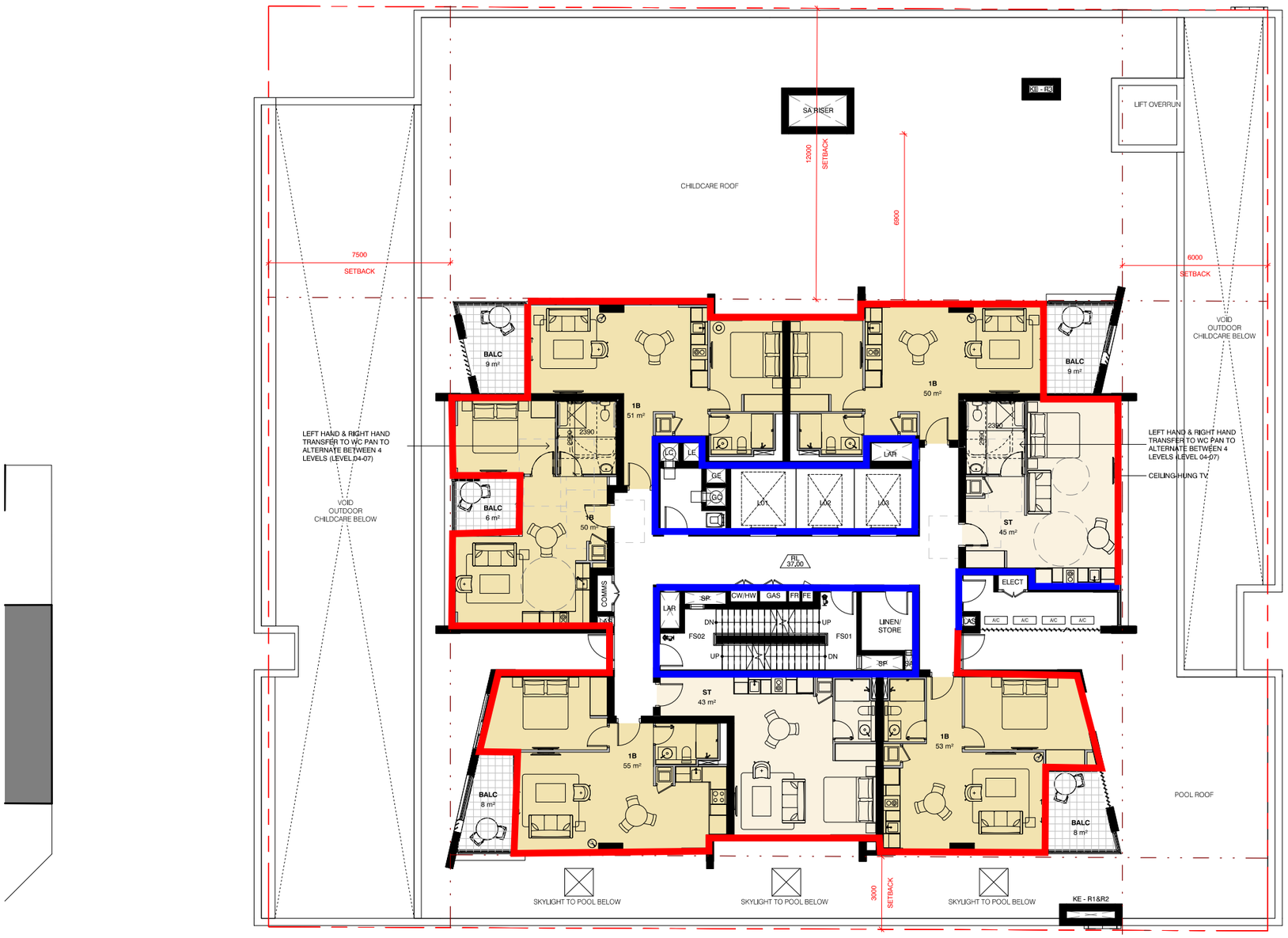
A1

167 Northumberland Liverpool– Mark Up Identifying Areas of Required Wall Insulation
Level 04



Wall Insulation Requirements

External Wall $R_{total\ system}$ 2.80 -

Internal Wall $R_{total\ system}$ 1.80 -

1 LEVEL 04 PLAN
1 : 100 @A1

Key Plan:

Client
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Project PA018110
MERITON SUITES
167 Northumberland, Liverpool

Status
DEVELOPMENT APPLICATION

Title
10-GENERAL ARRANGEMENT PLAN_DA
LEVEL 04 PLAN

Drawing Number DA-10-1400
Revision A

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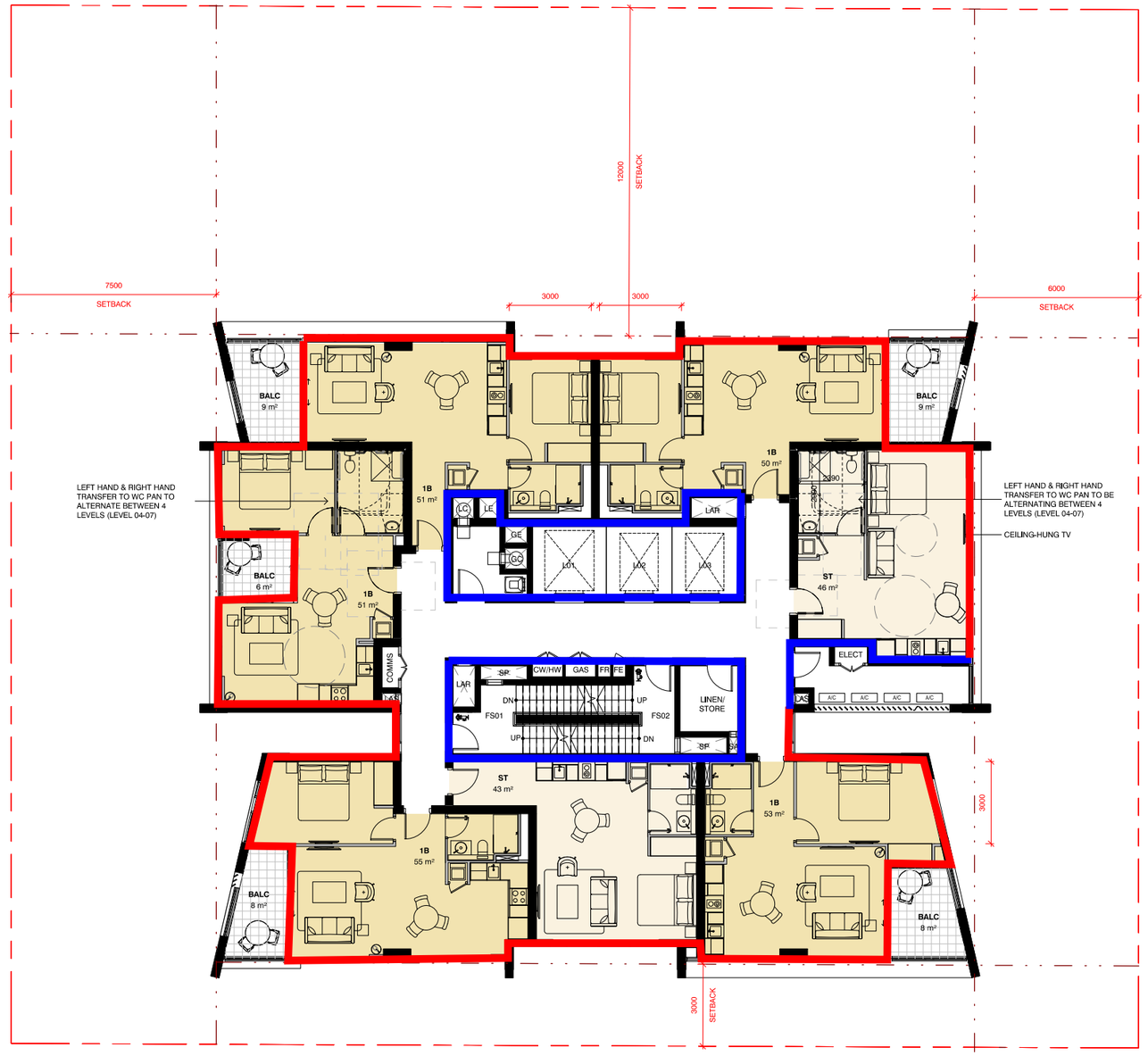
A1

167 Northumberland Liverpool– Mark Up Identifying Areas of Required Wall Insulation
Level 05-07



Wall Insulation Requirements

External Wall $R_{total\ system}$ 2.80 -

Internal Wall $R_{total\ system}$ 1.80 -

1 LEVEL 05-07 PLAN
1 : 100 @A1

Key Plan:

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0 1 2 5 8m

Project PA018110
MERITON SUITES
167 Northumberland, Liverpool

Status
DEVELOPMENT APPLICATION

Title
10-GENERAL ARRANGEMENT PLAN_DA
LEVELS 05-07 PLAN

Drawing Number DA-10-1500
Revision A

A1

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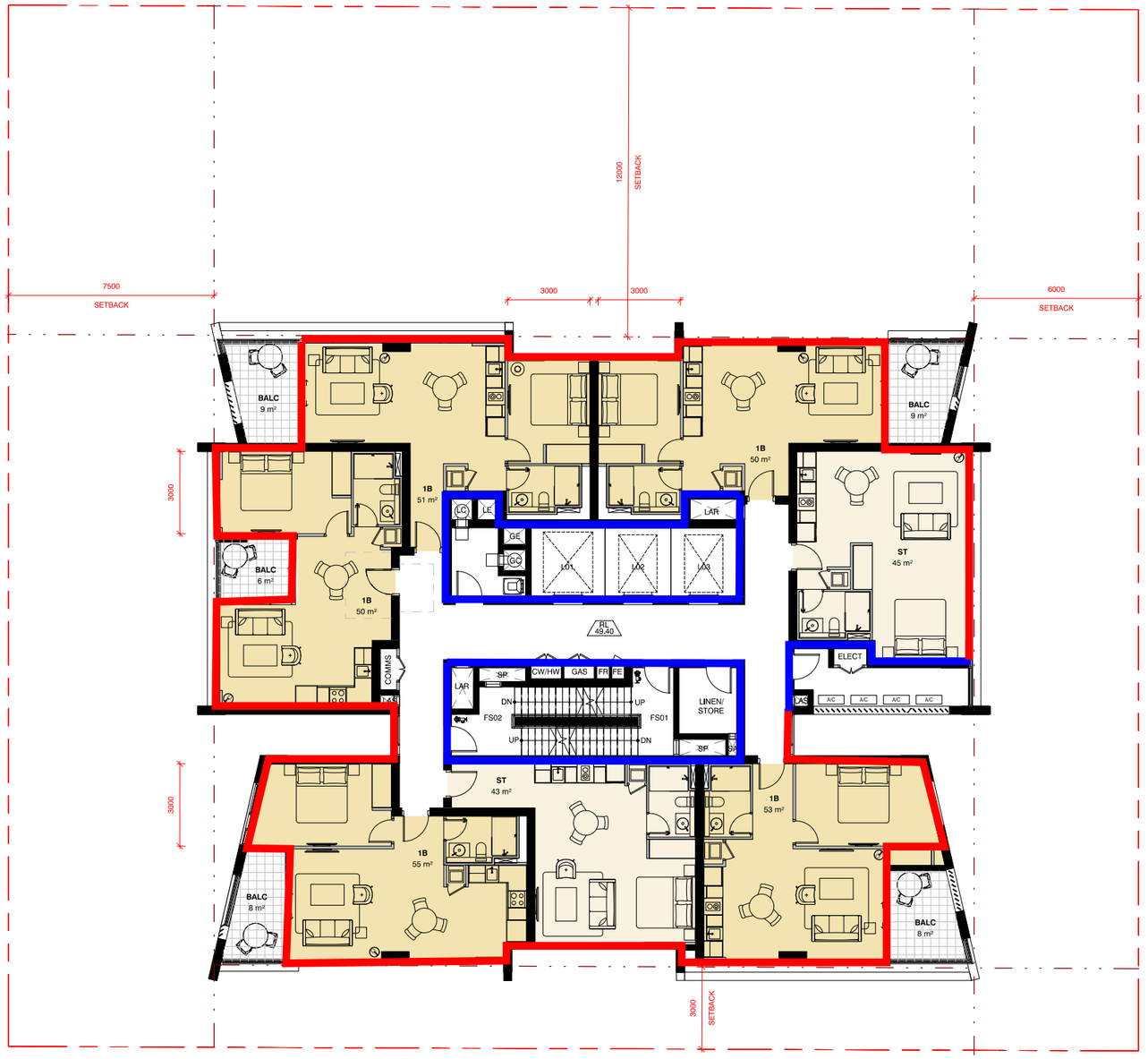
167 Northumberland Liverpool– Mark Up Identifying Areas of Required Wall Insulation
Level 08



Wall Insulation Requirements

External Wall $R_{total\ system}$ 2.80 -

Internal Wall $R_{total\ system}$ 1.80 -

1 LEVEL 08 PLAN
1 : 100 @A1

Key Plan:

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0 1 2 5 8m

Project PA018110
MERITON SUITES
167 Northumberland, Liverpool

Status
DEVELOPMENT APPLICATION

Title
10-GENERAL ARRANGEMENT PLAN_DA
LEVELS 08 PLAN

Drawing Number DA-10-1800
Revision A

A1

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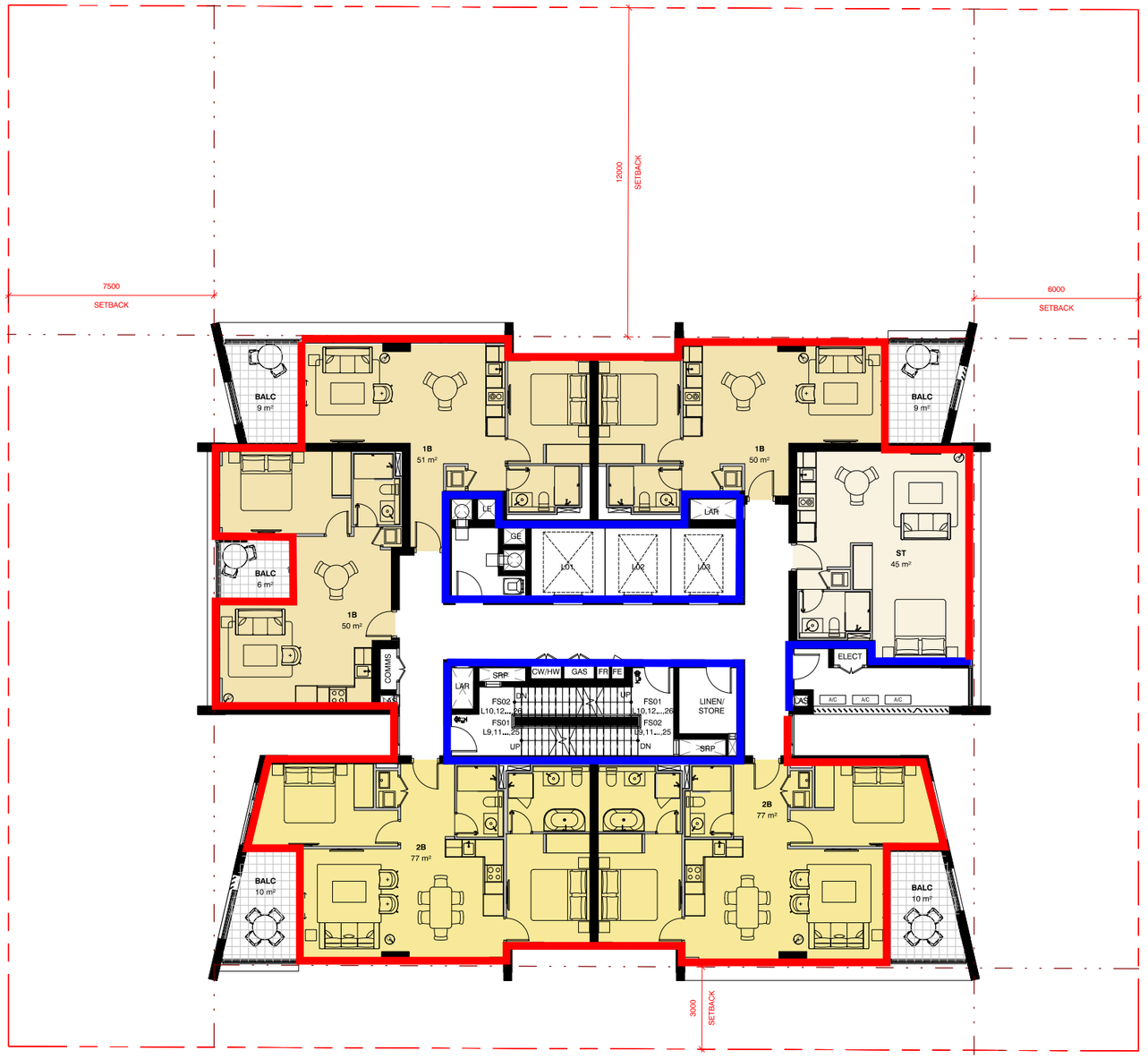
21/02/2020 11:24:08 AM

167 Northumberland Liverpool– Mark Up Identifying Areas of Required Wall Insulation
Level 09-26



Wall Insulation Requirements

External Wall $R_{total\ system}$ 2.80 -

Internal Wall $R_{total\ system}$ 1.80 -

1 LEVEL 09-26 PLAN
1 : 100 @A1

Key Plan:

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Project PA018110
MERITON SUITES
167 Northumberland, Liverpool

Status
DEVELOPMENT APPLICATION

Title
10-GENERAL ARRANGEMENT PLAN_DA
LEVEL 09-26 PLAN

Drawing Number DA-10-1900
Revision A

A1

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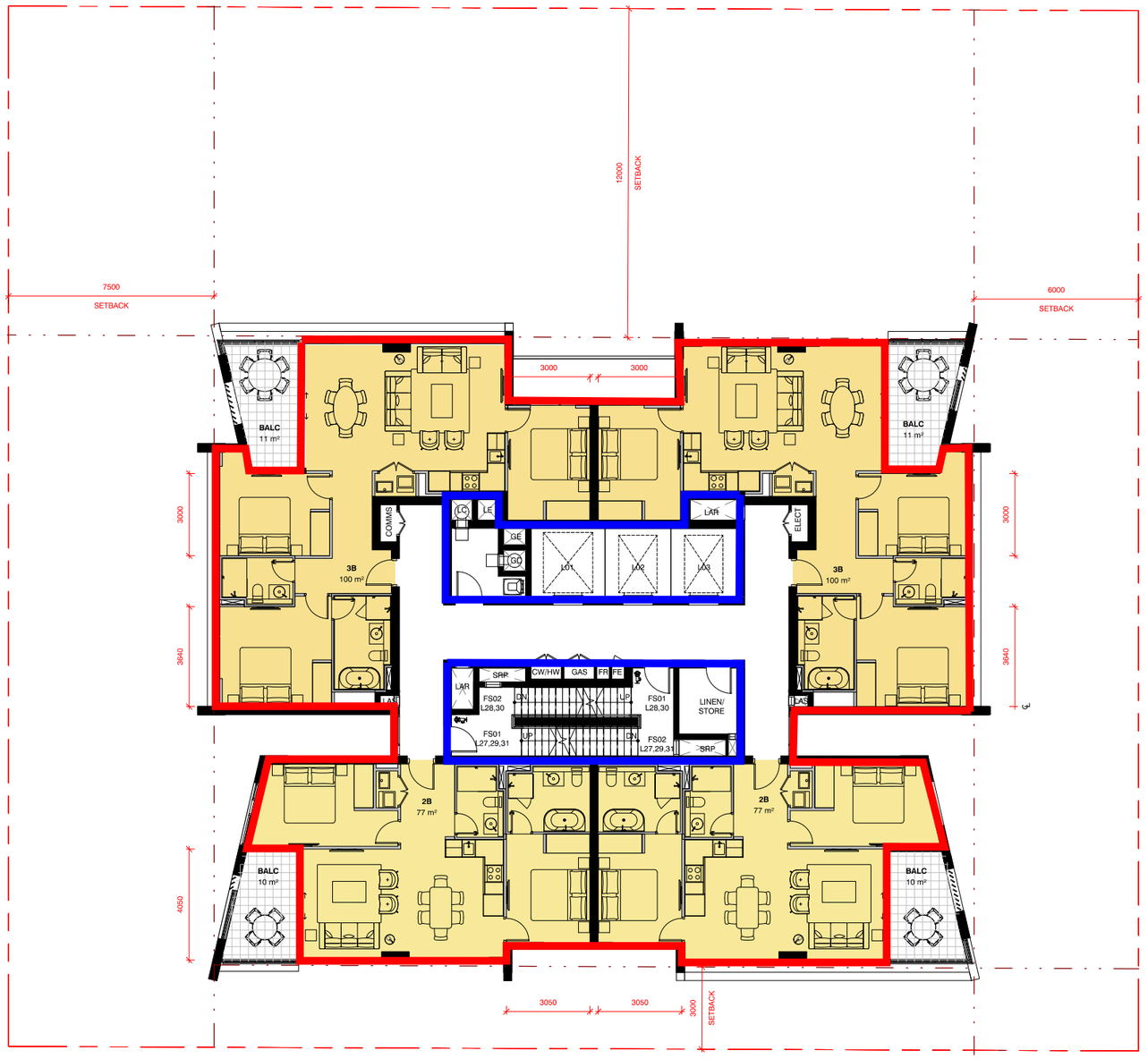
21/02/2020 11:24:16 AM

167 Northumberland Liverpool– Mark Up Identifying Areas of Required Wall Insulation
Level 27-31



Wall Insulation Requirements

External Wall $R_{total\ system}$ 2.80 -

Internal Wall $R_{total\ system}$ 1.80 -

1 LEVEL 27-31 PLAN
1 : 100 @A1

Key Plan:

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Project PA018110
MERITON SUITES
167 Northumberland, Liverpool

Status
DEVELOPMENT APPLICATION

Title
10-GENERAL ARRANGEMENT PLAN_DA
LEVELS 27-31 PLAN

Drawing Number DA-10-3700
Revision A

A1

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Appendix C – Glazing Calculators

NCC VOLUME ONE GLAZING CALCULATOR (first issued with NCC 2014)

HELP

Building name/description: 167 Northumberland St Liverpool

Application: other

Climate zone: 6

Storey: GF Lobby

Facade areas

	N	NE	E	SE	S	SW	W	NW	internal
Option A			107m²						
Option B									n/a

Glazing area (A) 107m²

Number of rows preferred in table below: 7 *(as currently displayed)*

GLAZING ELEMENTS, ORIENTATION SECTOR, SIZE and PERFORMANCE CHARACTERISTICS								SHADING		CALCULATED OUTCOMES OK (if inputs are valid)					
Glazing element		Facing sector		Size			Performance		P&H or device		Shading		Multipliers		Size	Outcomes
ID	Description (optional)	Option A facades	Option B facades	Height (m)	Width (m)	Area (m²)	Total System U-Value (AFRC)	Total System SHGC (AFRC)	P (m)	H (m)	P/H	G (m)	Heating (S_H)	Cooling (S_C)	Area used (m²)	Element share of % of allowance used
1	Comm Lobby	E		4.50	3.85		1.1	0.12	1.700	4.450	0.38	-0.05	0.79	0.73	17.33	13% of 100%
2	Lobby	E		4.45	1.90		1.1	0.12				0.00	1.00	1.00	8.46	8% of 100%
3	Lobby Cont	E		5.75	7.60		1.1	0.12				0.00	1.00	1.00	43.70	44% of 100%
4	CLB above Lobby	E		0.90	10.33		1.1	0.12	0.600	0.900	0.67	0.00	0.59	0.57	9.29	6% of 100%
5	Lourves above Lobby	E		0.90	1.80		1.1	0.12				0.00	1.00	1.00	1.62	2% of 100%
6	Lobby Void	E		1.50	7.60		1.1	0.12				0.00	1.00	1.00	11.40	11% of 100%
7	Lobby Void	E		2.00	7.60		1.1	0.12				0.00	1.00	1.00	15.20	15% of 100%

IMPORTANT NOTICE AND DISCLAIMER IN RESPECT OF THE GLAZING CALCULATOR

The Glazing Calculator has been developed by the ABCB to assist in developing a better understanding of glazing energy efficiency parameters. While the ABCB believes that the Glazing Calculator, if used correctly, will produce accurate results, it is provided "as is" and without any representation or warranty of any kind, including that it is fit for any purpose or of merchantable quality, or functions as intended or at all. Your use of the Glazing Calculator is entirely at your own risk and the ABCB accepts no liability of any kind.

if inputs are valid

NCC VOLUME ONE GLAZING CALCULATOR (first issued with NCC 2014)

HELP

Building name/description: 167 Northumberland St Liverpool

Application: shop display

Climate zone: 6

Storey: GF Retail

Facade areas

	N	NE	E	SE	S	SW	W	NW	internal
Option A			101m²						
Option B									n/a

Glazing area (A) 79.7m²

Number of rows preferred in table below: 6 *(as currently displayed)*

GLAZING ELEMENTS, ORIENTATION SECTOR, SIZE and PERFORMANCE CHARACTERISTICS								SHADING		CALCULATED OUTCOMES OK (if inputs are valid)					
Glazing element		Facing sector		Size			Performance		P&H or device		Shading		Multipliers		Size	Outcomes
ID	Description (optional)	Option A facades	Option B facades	Height (m)	Width (m)	Area (m²)	Total System U-Value (AFRC)	Total System SHGC (AFRC)	P (m)	H (m)	P/H	G (m)	Heating (S_H)	Cooling (S_C)	Area used (m²)	Element share of % of allowance used
1	Retail 3 CLB	E		4.45	0.68		1.5	0.42	2.000	4.450	0.45	0.00	0.75	0.69	3.00	4% of 100%
2	Retail 3 CLB	E		4.45	5.80		1.5	0.42	2.000	4.450	0.45	0.00	0.75	0.69	25.81	30% of 100%
3	Retail 2	E		4.46	4.30		1.5	0.42	2.000	4.450	0.45	-0.01	0.75	0.69	19.18	22% of 100%
4	Retail 1	E		4.45	4.30		1.5	0.42	0.300	4.450	0.07	0.00	0.97	0.96	19.14	31% of 100%
5	Retail 1 CLB	E		4.45	0.90		1.5	0.42	2.000	4.450	0.45	0.00	0.75	0.69	4.01	5% of 100%
6	CLB above Retail 1&2	E		0.90	9.50		1.5	0.42	0.800	0.900	0.89	0.00	0.43	0.48	8.55	8% of 100%

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if inputs are valid

NCC VOLUME ONE GLAZING CALCULATOR (first issued with NCC 2014)

HELP

Building name/description: **167 Northumberland St Liverpool**

Application: **other**

Climate zone: **6**

Storey: **L1 Commercia**

Facade areas

	N	NE	E	SE	S	SW	W	NW	internal
Option A			110m²				114m²		
Option B									n/a
Glazing area (A)			*78.7m²*				*77.4m²*		

Number of rows preferred in table below: **7** *(as currently displayed)*

GLAZING ELEMENTS, ORIENTATION SECTOR, SIZE and PERFORMANCE CHARACTERISTICS								SHADING		CALCULATED OUTCOMES OK (if inputs are valid)					
Glazing element		Facing sector		Size			Performance		P&H or device		Shading		Multipliers		Size	Outcomes
ID	Description (optional)	Option A facades	Option B facades	Height (m)	Width (m)	Area (m²)	Total System U-Value (AFRC)	Total System SHGC (AFRC)	P (m)	H (m)	P/H	G (m)	Heating (S_H)	Cooling (S_C)	Area used (m²)	Element share of % of allowance used
1	Commercial 01(Combine	E		3.20	7.05		1.1	0.17	0.600	3.200	0.19	0.00	0.92	0.88	22.56	26% of 100%
2	Commercial 02	E		3.80	3.20		1.1	0.17				0.00	1.00	1.00	12.16	16% of 100%
3	Commercial 03 CLB	E		4.40	10.00		1.1	0.17				0.00	1.00	1.00	44.00	58% of 100%
4											ROW SKIPPED (OK if intentional)					
5	Commercial 01(Combine	W		3.60	12.05		1.0	0.48	0.600	3.600	0.17	0.00	0.93	0.89	43.38	53% of 100%
6	Commercial 02	W		2.70	1.50		1.0	0.48				0.00	1.00	1.00	4.05	6% of 100%
7	Change RM CLB	W		4.40	6.80		1.0	0.48				0.00	1.00	1.00	29.92	42% of 100%

if inputs are valid

NCC VOLUME ONE GLAZING CALCULATOR (first issued with NCC 2014)

HELP

Building name/description: **167 Northumberland St Liverpool**

Application: **other**

Climate zone: **6**

Storey: **L2 Commercia**

Facade areas

	N	NE	E	SE	S	SW	W	NW	internal
Option A	130m²		164m²				125m²		
Option B									n/a
Glazing area (A)	*10.1m²*		*131m²*				*47.5m²*		

Number of rows preferred in table below: **8** *(as currently displayed)*

GLAZING ELEMENTS, ORIENTATION SECTOR, SIZE and PERFORMANCE CHARACTERISTICS								SHADING		CALCULATED OUTCOMES OK (if inputs are valid)					
Glazing element		Facing sector		Size			Performance		P&H or device		Shading		Multipliers		Size	Outcomes
ID	Description (optional)	Option A facades	Option B facades	Height (m)	Width (m)	Area (m²)	Total System U-Value (AFRC)	Total System SHGC (AFRC)	P (m)	H (m)	P/H	G (m)	Heating (S_H)	Cooling (S_C)	Area used (m²)	Element share of % of allowance used
1	Commercial 01(Combine	E		4.20	12.60		1.0	0.15	0.500	4.200	0.12	0.00	0.95	0.92	52.92	40% of 100%
2	Commercial 02	E		4.20	3.20		1.0	0.15				0.00	1.00	1.00	13.44	11% of 100%
3	Commerical 03	E		4.20	2.80		1.0	0.15	0.600	4.200	0.14	0.00	0.94	0.91	11.76	9% of 100%
4	Swimming Pool	E		7.50	7.10		1.0	0.15	0.600	7.500	0.08	0.00	0.96	0.95	53.25	41% of 100%
5											ROW SKIPPED (OK if intentional)					
6	Commercial 01(Combine	N		4.20	2.40		5.8	0.80				0.00	1.00	1.00	10.08	100% of 59%
7											ROW SKIPPED (OK if intentional)					
8	Commercial 01(Combine	W		4.20	11.30		2.5	0.60	0.600	4.200	0.14	0.00	0.94	0.91	47.46	100% of 100%

if inputs are valid

efficient LIVING

29 April 2020

Meriton Group Pty Ltd
167 Northumberland Street

NCC VOLUME ONE GLAZING CALCULATOR (first issued with NCC 2014)

HELP

Building name/description: 167 Northumberland St Liverpool
Application: other
Climate zone: 6

Storey: L3 Childcare

Facade areas

	N	NE	E	SE	S	SW	W	NW	internal
Option A			61.9m²		5.8m²		78.2m²		
Option B									n/a
Glazing area (A)			61.9m²		5.8m²		78.2m²		

Number of rows preferred in table below: 6 *(as currently displayed)*

GLAZING ELEMENTS, ORIENTATION SECTOR, SIZE and PERFORMANCE CHARACTERISTICS								SHADING		CALCULATED OUTCOMES OK (if inputs are valid)					
Glazing element		Facing sector		Size			Performance		P&H or device	Shading		Multipliers		Size	Outcomes
ID	Description (optional)	Option A facades	Option B facades	Height (m)	Width (m)	Area (m²)	Total System U-Value (AFRC)	Total System SHGC (AFRC)	P (m)	H (m)	P/H	G (m)	Heating (S_H)	Cooling (S_C)	Area used (m²)	Element share of % of allowance used
1	Childcare	E		2.90	21.34		1.0	0.21	5.000	2.900	1.72	0.00	0.07	0.32	61.89	100% of 100%
2											ROW SKIPPED (OK if intentional)					
3	Childcare 01	W		2.90	24.10		1.0	0.19	3.800	2.900	1.31	0.00	0.26	0.39	69.89	90% of 100%
4	Childcare 02	W		2.90	2.85		1.0	0.19	3.280	2.900	1.13	0.00	0.33	0.42	8.27	10% of 100%
5											ROW SKIPPED (OK if intentional)					
6	Childcare	S		2.90	2.00		2.7	0.80	3.000	2.900	1.03	0.00	0.69	0.63	5.80	100% of 100%

if inputs are valid

NCC VOLUME ONE GLAZING CALCULATOR (first issued with NCC 2014)

HELP

Building name/description: 167 Northumberland St Liverpool
Application: Class 3
Climate zone: 6

Storey: L4/8 Class 3

Facade areas

	N	NE	E	SE	S	SW	W	NW	internal
Option A	109m²		59.7m²		93.4m²		64.7m²		
Option B									n/a
Glazing area (A)	45.6m²		45.9m²		40.7m²		51.8m²		

Number of rows preferred in table below: 20 *(as currently displayed)*

GLAZING ELEMENTS, ORIENTATION SECTOR, SIZE and PERFORMANCE CHARACTERISTICS								SHADING		CALCULATED OUTCOMES OK (if inputs are valid)					
Glazing element		Facing sector		Size			Performance		P&H or device	Shading		Multipliers		Size	Outcomes
ID	Description (optional)	Option A facades	Option B facades	Height (m)	Width (m)	Area (m²)	Total System U-Value (AFRC)	Total System SHGC (AFRC)	P (m)	H (m)	P/H	G (m)	Heating (S_H)	Cooling (S_C)	Area used (m²)	Element share of % of allowance used
1	Class 3 01	N		2.80	5.10		5.8	0.26	0.600	2.800	0.21	0.00	0.94	0.81	14.28	25% of 100%
2	Class 3 02	N		2.80	8.60		5.8	0.26				0.00	1.00	1.00	24.08	60% of 100%
3	Class 3 03 Balcony	N		2.80	2.60		5.8	0.26	0.300	2.800	0.11	0.00	0.97	0.90	7.28	15% of 100%
4											ROW SKIPPED (OK if intentional)					
5	Class 3 01	S		2.80	5.75		3.9	0.80				0.00	1.00	1.00	16.10	38% of 100%
6	Class 3 02	S		2.80	4.00		3.9	0.80				0.00	1.00	1.00	11.20	27% of 100%
7	Class 3 03	S		2.80	4.80		3.9	0.80	0.600	2.800	0.21	0.00	0.93	0.89	13.44	35% of 100%
8											ROW SKIPPED (OK if intentional)					
9	Class 3 01 Balcony	W		2.80	3.65		1.0	0.18	0.800	2.800	0.29	0.00	0.85	0.81	10.22	18% of 100%
10	Class 3 02 Balcony	W		2.80	2.20		1.0	0.18	3.070	2.800	1.10	0.00	0.35	0.43	6.16	12% of 100%
11	Class 3 03(Combined)	W		2.80	4.85		1.0	0.18	0.300	2.800	0.11	0.00	0.95	0.93	13.58	27% of 100%
12	Class 3 04 Corridor Door	W		2.80	1.50		1.0	0.18				0.00	1.00	1.00	4.20	9% of 100%
13	Class 3 05	W		2.80	2.30		1.0	0.18				0.00	1.00	1.00	6.44	13% of 100%
14	Class 3 06 Balcony	W		2.80	4.00		1.0	0.18	0.400	2.800	0.14	0.00	0.94	0.91	11.20	22% of 100%
15											ROW SKIPPED (OK if intentional)					
16	Class 3 01 Balcony	E		2.80	3.65		1.0	0.12	0.450	2.800	0.16	0.00	0.93	0.90	10.22	22% of 100%
17	Class 3 02	E		2.80	6.36		1.0	0.12	0.300	2.800	0.11	0.00	0.95	0.93	17.81	39% of 100%
18	Class 3 03 Corridor	E		2.80	1.50		1.0	0.12				0.00	1.00	1.00	4.20	10% of 100%
19	Class 3 04	E		2.80	1.64		1.0	0.12				0.00	1.00	1.00	4.59	11% of 100%
20	Class 3 05 Balcony	E		2.80	3.25		1.0	0.12	0.450	2.800	0.16	0.00	0.93	0.90	9.10	19% of 100%

if inputs are valid

NCC VOLUME ONE GLAZING CALCULATOR (first issued with NCC 2014)

HELP

Building name/description: **167 Northumberland St Liverpool**

Application: **Class 3**

Climate zone: **6**

Storey: **L05-07**

Facade areas

	N	NE	E	SE	S	SW	W	NW	internal
Option A	102m²		59.6m²		86m²		65m²		
Option B									n/a
Glazing area (A)	*46.6m²*		*46.1m²*		*40.6m²*		*52.1m²*		

Number of rows preferred in table below: **17** *(as currently displayed)*

GLAZING ELEMENTS, ORIENTATION SECTOR, SIZE and PERFORMANCE CHARACTERISTICS									SHADING		CALCULATED OUTCOMES OK (if inputs are valid)					
Glazing element		Facing sector		Size			Performance		P&H or device		Shading		Multipliers		Size	Outcomes
ID	Description (optional)	Option A facades	Option B facades	Height (m)	Width (m)	Area (m²)	Total System U-Value (AFRC)	Total System SHGC (AFRC)	P (m)	H (m)	P/H	G (m)	Heating (S_H)	Cooling (S_C)	Area used (m²)	Element share of % of allowance used
1	N_Class 3 01	N		2.80	5.65		5.8	0.25	0.600	2.800	0.21	0.00	0.94	0.81	15.82	28% of 100%
2	N_Class 3 02+03	N		2.80	8.38		5.8	0.25				0.00	1.00	1.00	23.45	58% of 100%
3	N_Class 3 04 Balcony	N		2.80	2.60		5.8	0.25	0.450	2.800	0.16	0.00	0.96	0.86	7.28	14% of 100%
4											ROW SKIPPED (OK if intentional)					
5	W_Class 3 01 Balcony	W		2.80	3.65		1.0	0.18	0.800	2.800	0.29	0.00	0.85	0.81	10.22	18% of 100%
6	W_Class 3 02+04	W		2.80	4.95		1.0	0.18	0.300	2.800	0.11	0.00	0.95	0.93	13.86	27% of 100%
7	W_Class 3 03 Balcony	W		2.80	2.25		1.0	0.18	3.070	2.800	1.10	0.00	0.35	0.43	6.30	12% of 100%
8	W_Class 3 05+06	W		2.80	3.82		1.0	0.18				0.00	1.00	1.00	10.70	22% of 100%
9	W_Class 3 07 Balcony	W		2.80	3.95		1.0	0.18	0.400	2.800	0.14	0.00	0.94	0.91	11.06	21% of 100%
10											ROW SKIPPED (OK if intentional)					
11	E_Class 3 01 Balcony	E		2.80	3.65		1.0	0.12	0.450	2.800	0.16	0.00	0.93	0.90	10.22	22% of 100%
12	E_Class 3 02	E		2.80	5.85		1.0	0.12	0.300	2.800	0.11	0.00	0.95	0.93	16.38	36% of 100%
13	E_Class 3 03+04	E		2.80	3.70		1.0	0.12				0.00	1.00	1.00	10.36	24% of 100%
14	E_Class 3 05 Balcony	E		2.80	3.25		1.0	0.12	0.750	2.800	0.27	0.00	0.87	0.82	9.10	18% of 100%
15											ROW SKIPPED (OK if intentional)					
16	S_Class 3 01-04	S		2.80	9.62		3.8	0.80				0.00	1.00	1.00	26.92	64% of 100%
17	S_Class 3 05+06	S		2.80	4.90		3.8	0.80	0.600	2.800	0.21	0.00	0.93	0.89	13.72	36% of 100%

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if inputs are valid

NCC VOLUME ONE GLAZING CALCULATOR (first issued with NCC 2014)

HELP

Building name/description: **167 Northumberland St Liverpool**

Application: **Class 3**

Climate zone: **6**

Storey: **L9-26**

Facade areas

	N	NE	E	SE	S	SW	W	NW	internal
Option A	102m²		54.7m²		83.8m²		63.8m²		
Option B									n/a
Glazing area (A)	*47.5m²*		*48.2m²*		*41.8m²*		*52m²*		

Number of rows preferred in table below: **17** *(as currently displayed)*

GLAZING ELEMENTS, ORIENTATION SECTOR, SIZE and PERFORMANCE CHARACTERISTICS									SHADING		CALCULATED OUTCOMES OK (if inputs are valid)					
Glazing element		Facing sector		Size			Performance		P&H or device		Shading		Multipliers		Size	Outcomes
ID	Description (optional)	Option A facades	Option B facades	Height (m)	Width (m)	Area (m²)	Total System U-Value (AFRC)	Total System SHGC (AFRC)	P (m)	H (m)	P/H	G (m)	Heating (S_H)	Cooling (S_C)	Area used (m²)	Element share of % of allowance used
1	N_Class 3 01	N		2.80	5.60		5.8	0.24	0.600	2.800	0.21	0.00	0.94	0.81	15.68	27% of 100%
2	N_Class 3 03 04 05 06	N		2.80	8.76		5.8	0.24				0.00	1.00	1.00	24.53	60% of 100%
3	N_Class 3 07 Balcony	N		2.80	2.60		5.8	0.24	0.450	2.800	0.16	0.00	0.96	0.86	7.28	14% of 100%
4											ROW SKIPPED (OK if intentional)					
5	W_Class 3 01 Balcony	W		2.80	3.65		1.0	0.17	0.750	2.800	0.27	0.00	0.87	0.82	10.22	18% of 100%
6	W_Class 3 02+04	W		2.80	4.93		1.0	0.17	0.300	2.800	0.11	0.00	0.95	0.93	13.79	27% of 100%
7	W_Class 3 03 Balcony	W		2.80	2.20		1.0	0.17	3.050	2.800	1.09	0.00	0.36	0.43	6.16	12% of 100%
8	W_Class 3 05 Balcony	W		2.80	3.80		1.0	0.17				0.00	1.00	1.00	10.64	22% of 100%
9	W_Class 3 06	W		2.80	4.00		1.0	0.17	0.400	2.800	0.14	0.00	0.94	0.91	11.20	21% of 100%
10											ROW SKIPPED (OK if intentional)					
11	E_Class 3 01 Balcony	E		2.80	3.65		1.0	0.10	0.450	2.800	0.16	0.00	0.93	0.90	10.22	21% of 100%
12	E_Class 3 02	E		2.80	5.85		1.0	0.10	0.300	2.800	0.11	0.00	0.95	0.93	16.38	35% of 100%
13	E_Class 3 03+04	E		2.80	3.70		1.0	0.10				0.00	1.00	1.00	10.36	23% of 100%
14	E_Class 3 05 Balcony	E		2.80	4.00		1.0	0.10	0.800	2.800	0.29	0.00	0.85	0.81	11.20	21% of 100%
15											ROW SKIPPED (OK if intentional)					
16	S_Class 3 01-04	S		2.80	9.10		3.8	0.80				0.00	1.00	1.00	25.48	58% of 100%
17	S_Class 3 05+06	S		2.80	5.83		3.8	0.80	0.600	2.800	0.21	0.00	0.93	0.89	16.31	42% of 100%

if inputs are valid

NCC VOLUME ONE GLAZING CALCULATOR (first issued with NCC 2014)

HELP

Building name/description: **167 Northumberland St Liverpool**

Application: **Class 3**

Climate zone: **6**

Storey: **L27-31**

Facade areas

	N	NE	E	SE	S	SW	W	NW	internal
Option A	102m²		54.7m²		83.8m²		63.8m²		
Option B									n/a
Glazing area (A)	*47.5m²*		*48.2m²*		*41.8m²*		*52m²*		

Number of rows preferred in table below: **17** *(as currently displayed)*

GLAZING ELEMENTS, ORIENTATION SECTOR, SIZE and PERFORMANCE CHARACTERISTICS									SHADING		CALCULATED OUTCOMES OK (if inputs are valid)					
Glazing element		Facing sector		Size			Performance		P&H or device		Shading		Multipliers		Size	Outcomes
ID	Description (optional)	Option A facades	Option B facades	Height (m)	Width (m)	Area (m²)	Total System U-Value (AFRC)	Total System SHGC (AFRC)	P (m)	H (m)	P/H	G (m)	Heating (S_H)	Cooling (S_C)	Area used (m²)	Element share of % of allowance used
1	N_Class 3 01	N		2.80	5.60		5.8	0.24	0.600	2.800	0.21	0.00	0.94	0.81	15.68	27% of 100%
2	N_Class 3 03 04 05 06	N		2.80	8.76		5.8	0.24				0.00	1.00	1.00	24.53	60% of 100%
3	N_Class 3 07 Balcony	N		2.80	2.60		5.8	0.24	0.450	2.800	0.16	0.00	0.96	0.86	7.28	14% of 100%
4											ROW SKIPPED (OK if intentional)					
5	W_Class 3 01 Balcony	W		2.80	3.65		1.0	0.17	0.750	2.800	0.27	0.00	0.87	0.82	10.22	18% of 100%
6	W_Class 3 02+04	W		2.80	4.93		1.0	0.17	0.300	2.800	0.11	0.00	0.95	0.93	13.79	27% of 100%
7	W_Class 3 03 Balcony	W		2.80	2.20		1.0	0.17	3.050	2.800	1.09	0.00	0.36	0.43	6.16	12% of 100%
8	W_Class 3 05 Balcony	W		2.80	3.80		1.0	0.17				0.00	1.00	1.00	10.64	22% of 100%
9	W_Class 3 06	W		2.80	4.00		1.0	0.17	0.400	2.800	0.14	0.00	0.94	0.91	11.20	21% of 100%
10											ROW SKIPPED (OK if intentional)					
11	E_Class 3 01 Balcony	E		2.80	3.65		1.0	0.10	0.450	2.800	0.16	0.00	0.93	0.90	10.22	21% of 100%
12	E_Class 3 02	E		2.80	5.85		1.0	0.10	0.300	2.800	0.11	0.00	0.95	0.93	16.38	35% of 100%
13	E_Class 3 03+04	E		2.80	3.70		1.0	0.10				0.00	1.00	1.00	10.36	23% of 100%
14	E_Class 3 05 Balcony	E		2.80	4.00		1.0	0.10	0.800	2.800	0.29	0.00	0.85	0.81	11.20	21% of 100%
15											ROW SKIPPED (OK if intentional)					
16	S_Class 3 01-04	S		2.80	9.10		3.8	0.80				0.00	1.00	1.00	25.48	58% of 100%
17	S_Class 3 05+06	S		2.80	5.83		3.8	0.80	0.600	2.800	0.21	0.00	0.93	0.89	16.31	42% of 100%

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if inputs are valid

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Appendix D – Simulation Operational Profiles

Class 3

Time Period (local standard time)	Occupancy		Artificial lighting	Air-Conditioning	
	Mon - Fri	Sat, Sun and holidays	Daily	Mon - Fri	Sat, Sun and holidays
12:00am to 1:00am	85%	85%	5%	On	On
1:00am to 2:00am	85%	85%	5%	On	On
2:00am to 3:00am	85%	85%	5%	On	On
3:00am to 4:00am	85%	85%	5%	On	On
4:00am to 5:00am	85%	85%	5%	On	On
5:00am to 6:00am	85%	85%	25%	On	On
6:00am to 7:00am	85%	85%	80%	On	On
7:00am to 8:00am	80%	85%	80%	On	On
8:00am to 9:00am	50%	50%	50%	On	On
9:00am to 10:00am	10%	50%	20%	Off	On
10:00am to 11:00am	10%	20%	20%	Off	Off
11:00am to 12:00pm	10%	20%	20%	Off	Off
12:00pm to 1:00pm	10%	20%	20%	Off	Off
1:00pm to 2:00pm	10%	20%	20%	Off	Off
2:00pm to 3:00pm	10%	20%	20%	Off	Off
3:00pm to 4:00pm	10%	30%	20%	On	On
4:00pm to 5:00pm	50%	50%	20%	On	On
5:00pm to 6:00pm	50%	50%	50%	On	On
6:00pm to 7:00pm	70%	50%	50%	On	On
7:00pm to 8:00pm	70%	70%	50%	On	On
8:00pm to 9:00pm	80%	80%	50%	On	On
9:00pm to 10:00pm	85%	80%	50%	On	On
10:00pm to 11:00pm	85%	85%	50%	On	On
11:00pm to 12:00am	85%	85%	5%	On	On

Class 5 Office

Time Period (local standard time)	Occupancy	Artificial Lighting		Appliance and equipment		Air-Conditioning
	Mon - Fri	Mon - Fri	Sat, Sun & holidays	Mon - Fri	Sat, Sun and holidays	Mon - Fri
12:00am to 1:00am	0%	10%	10%	10%	10%	Off
1:00am to 2:00am	0%	10%	10%	10%	10%	Off
2:00am to 3:00am	0%	10%	10%	10%	10%	Off
3:00am to 4:00am	0%	10%	10%	10%	10%	Off
4:00am to 5:00am	0%	10%	10%	10%	10%	Off
5:00am to 6:00am	0%	10%	10%	10%	10%	Off
6:00am to 7:00am	15%	10%	10%	10%	10%	Off
7:00am to 8:00am	60%	40%	10%	25%	10%	On
8:00am to 9:00am	100%	80%	10%	70%	10%	On
9:00am to 10:00am	100%	100%	10%	100%	10%	On
10:00am to 11:00am	100%	100%	10%	100%	10%	On
11:00am to 12:00pm	100%	100%	10%	100%	10%	On
12:00pm to 1:00pm	100%	100%	10%	100%	10%	On
1:00pm to 2:00pm	100%	100%	10%	100%	10%	On
2:00pm to 3:00pm	100%	100%	10%	100%	10%	On
3:00pm to 4:00pm	100%	100%	10%	100%	10%	On
4:00pm to 5:00pm	100%	100%	10%	100%	10%	On
5:00pm to 6:00pm	50%	80%	10%	60%	10%	On
6:00pm to 7:00pm	15%	60%	10%	25%	10%	Off
7:00pm to 8:00pm	5%	40%	10%	15%	10%	Off
8:00pm to 9:00pm	5%	20%	10%	15%	10%	Off
9:00pm to 10:00pm	0%	10%	10%	10%	10%	Off
10:00pm to 11:00pm	0%	10%	10%	10%	10%	Off
11:00pm to 12:00am	0%	10%	10%	10%	10%	Off

Class 6 Retail

Time Period (local standard time)	Occupancy	Artificial lighting	Appliance and equipment	Air-Conditioning
	Daily	Daily	Daily	Daily
12:00am to 1:00am	0%	10%	10%	Off
1:00am to 2:00am	0%	10%	10%	Off
2:00am to 3:00am	0%	10%	10%	Off
3:00am to 4:00am	0%	10%	10%	Off
4:00am to 5:00am	0%	10%	10%	Off
5:00am to 6:00am	0%	10%	10%	Off
6:00am to 7:00am	0%	10%	10%	Off
7:00am to 8:00am	10%	100%	70%	On
8:00am to 9:00am	20%	100%	70%	On
9:00am to 10:00am	20%	100%	70%	On
10:00am to 11:00am	15%	100%	70%	On
11:00am to 12:00pm	25%	100%	70%	On
12:00pm to 1:00pm	15%	100%	70%	On
1:00pm to 2:00pm	15%	100%	70%	On
2:00pm to 3:00pm	15%	100%	70%	On
3:00pm to 4:00pm	15%	100%	70%	On
4:00pm to 5:00pm	5%	100%	70%	On
5:00pm to 6:00pm	5%	100%	70%	On
6:00pm to 7:00pm	0%	10%	10%	Off
7:00pm to 8:00pm	0%	10%	10%	Off
8:00pm to 9:00pm	0%	10%	10%	Off
9:00pm to 10:00pm	0%	10%	10%	Off
10:00pm to 11:00pm	0%	10%	10%	Off
11:00pm to 12:00am	0%	10%	10%	Off

Class 6 Restaurant / Café

Time Period (local standard time)	Occupancy	Artificial lighting		Appliance and equipment		Air-Conditioning
	Mon to Sat	Mon to Sat	Sun	Mon to Sat	Sun	Mon to Sat
12:00am to 1:00am	0%	5%	5%	15%	5%	Off
1:00am to 2:00am	0%	5%	5%	15%	5%	Off
2:00am to 3:00am	0%	5%	5%	15%	5%	Off
3:00am to 4:00am	0%	5%	5%	15%	5%	Off
4:00am to 5:00am	0%	5%	5%	15%	5%	Off
5:00am to 6:00am	0%	5%	5%	15%	5%	Off
6:00am to 7:00am	5%	40%	5%	40%	5%	Off
7:00am to 8:00am	5%	40%	5%	40%	5%	On
8:00am to 9:00am	5%	60%	5%	60%	5%	On
9:00am to 10:00am	5%	60%	5%	60%	5%	On
10:00am to 11:00am	20%	90%	5%	90%	5%	On
11:00am to 12:00pm	50%	90%	5%	90%	5%	On
12:00pm to 1:00pm	80%	90%	5%	90%	5%	On
1:00pm to 2:00pm	70%	90%	5%	90%	5%	On
2:00pm to 3:00pm	40%	90%	5%	90%	5%	On
3:00pm to 4:00pm	20%	90%	5%	90%	5%	On
4:00pm to 5:00pm	25%	90%	5%	90%	5%	On
5:00pm to 6:00pm	50%	90%	5%	90%	5%	On
6:00pm to 7:00pm	80%	90%	5%	90%	5%	On
7:00pm to 8:00pm	80%	90%	5%	90%	5%	On
8:00pm to 9:00pm	80%	90%	5%	90%	5%	On
9:00pm to 10:00pm	50%	90%	5%	90%	5%	On
10:00pm to 11:00pm	35%	50%	5%	50%	5%	On
11:00pm to 12:00am	20%	30%	5%	30%	5%	On

Class 9b School

Time Period (local standard time)	Occupancy		Artificial lighting		Air-Conditioning	
	Mon to Fri	Sat and Sun	Mon to Fri	Sat and Sun	Mon to Fri	Sat and Sun
12:00am to 1:00am	0%	0%	5%	5%	Off	Off
1:00am to 2:00am	0%	0%	5%	5%	Off	Off
2:00am to 3:00am	0%	0%	5%	5%	Off	Off
3:00am to 4:00am	0%	0%	5%	5%	Off	Off
4:00am to 5:00am	0%	0%	5%	5%	Off	Off
5:00am to 6:00am	0%	0%	5%	5%	Off	Off
6:00am to 7:00am	0%	0%	5%	5%	Off	Off
7:00am to 8:00am	5%	0%	30%	5%	On	Off
8:00am to 9:00am	75%	0%	85%	5%	On	Off
9:00am to 10:00am	90%	0%	95%	5%	On	Off
10:00am to 11:00am	90%	0%	95%	5%	On	Off
11:00am to 12:00pm	90%	0%	95%	5%	On	Off
12:00pm to 1:00pm	50%	0%	80%	5%	On	Off
1:00pm to 2:00pm	50%	0%	80%	5%	On	Off
2:00pm to 3:00pm	90%	0%	95%	5%	On	Off
3:00pm to 4:00pm	70%	0%	90%	5%	On	Off
4:00pm to 5:00pm	50%	0%	70%	5%	On	Off
5:00pm to 6:00pm	20%	0%	20%	5%	Off	Off
6:00pm to 7:00pm	20%	0%	20%	5%	Off	Off
7:00pm to 8:00pm	20%	0%	20%	5%	Off	Off
8:00pm to 9:00pm	10%	0%	10%	5%	Off	Off
9:00pm to 10:00pm	5%	0%	5%	5%	Off	Off
10:00pm to 11:00pm	5%	0%	5%	5%	Off	Off
11:00pm to 12:00am	5%	0%	5%	5%	Off	Off