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NCC Section J 2019 Deemed-to-Satisfy (DTS) Assessment

Nursing Home Renewal
Hardi Aged Care

To be built at **57 Mulgoa Road, Penrith, NSW 2750**

Attention: John Flower
Company: Flower Architect

Document Control

Issue	File Ref	Description	Author	Checked	Date
A	20-0522	Section J DTS Assessment and report	Justin Jiang	Niall Madden	10/06/20

Sustainable Building Consultants

[redacted]

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1. Executive Summary

The following tables provides a quick reference summary of the building fabric performance requirements for the development. The appendix at the end of this report shows the conditioned area mark-up and locations of required insulations.

Please Note: Information in this table shall not relieve the reader of reviewing the performance requirements in the main body of this report.

Part J1 Building Fabric Performance Requirements

Fabric Element	Required Total System R-Value	Notes
External Walls	R2.80	See body of report. It is recommended that the continuous insulation shall be used to eliminate thermal bridging for this project. Fire and acoustic engineers to confirm if the continuous insulation can be used for this project.
Internal Walls	R2.30	See body of the report. It is recommended that the continuous insulation shall be used to eliminate thermal bridging for this project. Fire and acoustic engineers to confirm if the continuous insulation can be used for this project.
Roofs	R3.20	NCC Section J 2019 now limits external roof colour to a maximum solar absorptance of 0.45.
Existing building fabrics	Nil	All existing building fabrics and glazing are not subject to NCC 2019 Section J provisions as the building classification has not changed.

Part J1.5 Glazing Performance Requirements

Level	Orientation	Total System U-Value	Maximum SHGC
All levels	All new external glazing	3.3	0.34

2. Introduction

Efficient Living has been engaged by Flower Architect to determine what measures are required for the proposal to meet the 2019 National Construction Code (NCC) Section J requirements via *Deemed-to-Satisfy Provisions*.

Report Contact

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Architectural Documents

Documents prepared by: Flower Architects
Job No. 1903192
Drawing Reference: DA01-15[A].
Received: 28th May 2020

Project Address & NCC Climate Zone

The proposal is located at 57 Mulgoa Road, Penrith, NSW 2750, therefore being located within NCC Climate Zone 6.

Building Classes

The proposal dictates the following NCC classes are applicable:

- Class 9c: Residential Aged Care Facility

Climate Zone Characteristics

Climate zone 6 – Mild temperate
Thermal treatment of the building envelope is beneficial in both hotter and colder weather. In summer, limiting heat gain can reduce the desire of occupants to run any cooling services installed. In winter, the building fabric can reduce the heat loss to the outside and can also promote solar heat gains through good orientation and treatment of glazing to offset the conductive heat losses.

Section J Part	Comment
Part J1 – Building Fabric	Performance requirements outlined in this report will achieve compliance with DTS provisions.
Part J3 – Building Sealing	DTS Compliance to be documented by Architect
Part J5 – Air Conditioning and Ventilation Systems	DTS Compliance to be documented by Services engineer
Part J6 – Artificial lighting and Power	DTS Compliance to be documented by Electrical Engineer
Part J7 – Hot Water Supply	DTS compliance to be documented by Hydraulics Engineer

Part J8 – Access for Maintenance and Facilities for Monitoring	DTS Compliance to be documented by Electrical engineer

Disclaimer

This report has been prepared in accordance with the agreed scope of works between Efficient Living and our client. 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.

3. Section J DTS Requirement Breakdown: Parts J1-J8

Envelope for the purpose of the Section J report means the parts of the building fabric that separate a conditioned space or habitable room from-

(a) the exterior of the building; or
(b) a non-conditioned space including
    (i) the floor of a rooftop plant room, lift machine room or the like; and
    (ii) the floor above a carpark or warehouse; and
    (iii) the common wall with a carpark, warehouse or the like

3.1. 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 where the insulation must be against the member;
- 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.

The required Total R-Value and Total System U-Value, including allowance for thermal bridging, must be;

- calculated in accordance with AS/NZS 4859.2 for a roof or floor; or
- determined in accordance with Specification J1.5a for wall-glazing construction; or
- determined in accordance with Specification J1.6 or Section 3.5 of CIBSE Guide A for soil or sub-floor spaces.

Total System Values;

- The required total wall-glazing system U-Value must achieve an average U1.1 across the entire system, which must account for thermal losses due to thermal bridging as per J1.2(e).

J1.3 Roof & Ceiling

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

Thermal Bridging assumed at 15%. (Areas where insulation cannot be installed due to timber framework)

Metal roof with Horizontal ceiling - Required R3.20 Total System

Component	R-Value
Outdoor air film (7m/s)	0.04
Metal cladding	0.00
Roof airspace (unventilated, non-reflective)	0.28
Additional insulation required assuming 15% timber frame area	3.50
Plasterboard, gypsum (10mm, 880 kg/m^3)	0.06
Indoor air film (still air)	0.16
Total System R-Value	**3.20**

Concrete roof with continuous insulation - Required R3.20 Total System

Component	R-Value
Outdoor air film (7m/s)	0.04
Solid concrete(200 mm,2400 kg/m^3)	0.14
Roof airspace (Assume zero if insulation will fill cavity)	0
Additional insulation required assuming continuous insulation	2.80
Plasterboard, gypsum (10mm, 880 kg/m^3)	0.06
Indoor air film (still air)	0.16
Total System R-Value	**3.20**

The Insulation provider / installer is responsible to ensure the type and location of insulation is fit for purpose and the total system values are achieved with the allowance for thermal bridging and condensation risk is mitigated. It is recommended that the continuous insulation option shall be used to eliminate thermal bridging for this assessment. Fire and acoustic engineers to confirm whether the continuous insulation can be used for this project.

Thermal Breaks - Ceilings

A roof that has metal sheet roofing fixed to metal purlins, metal rafters or metal battens and has a ceiling lining fixed directly to the metal purlins, metal rafters or metal battens is to have a thermal break installed.

A thermal break, consisting of a material with an R-Value of at least R0.2 is to be installed between metal sheet roofing and supporting construction if the construction is a metal frame and the construction is consistent with the comments.

J1.4 Roof Lights

There are no roof lights proposed to conditioned

J1.5 Walls and Glazing

The total System U-Value of the wall-glazing construction must not be greater than U1.1

External Walls

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

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

Component	R-Value
Outdoor air film (7m/s)	0.04
Autoclaved aerated concrete block (Assume 75 mm thickness with the density of 350 kg/m³)	0.75
Airspace (Assume zero if insulation will fill cavity)	0
Additional insulation required (assuming continuous insulation)	**1.83**
Plasterboard, gypsum (10mm, 880 kg/m³)	0.06
Indoor air film (still air)	0.12
Total System R-Value	**2.80**

The R-Value of the hebel wall is directly related to its thickness, with a thicker wall having a higher R-Value. As such, the additional insulation requirement from the table above shall be adjusted accordingly with the final design.

For example other thicknesses have the following R-Values:
75mm – R0.75, 100mm- R1.00, 200mm – R2.00; 250mm – R2.50;
These values can be exchanged with the value for 75mm if applicable

The Insulation provider / installer is responsible to ensure the type and location of insulation is fit for purpose and the total system values are achieved with the allowance for thermal bridging and condensation risk is mitigated. It is recommended that the continuous insulation option shall be used to eliminate thermal bridging Fire and acoustic engineers to confirm whether the continuous insulation can be used for this project.

Internal Walls

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

Thermal Bridging assumed at 15%. (Areas where insulation cannot be installed due to framework)

Indicative Build-up of stud framed internal walls - Required 2.30 Total System

Component	R-Value
Indoor air film (still air)	0.12
Plasterboard, gypsum (10mm, 880 kg/m³)	0.06
Airspace (Assume zero if insulation will fill cavity)	0
Additional insulation required assuming 15% timber frame area	**2.32**
Plasterboard, gypsum (10mm, 880 kg/m³)	0.06
Indoor air film (still air)	0.12
Total System R-Value	**2.30**

Indicative Build-up of concrete internal walls - Required 2.30 Total System

Component	R-Value

Indoor air film (still air)	0.12
200 mm solid concrete wall	0.14
Airspace (Assume zero if insulation will fill cavity)	0
Additional insulation required assuming continuous insulation	**1.86**
Plasterboard, gypsum (10mm, 880 kg/m³)	0.06
Indoor air film (still air)	0.12
Total System R-Value	**2.30**

Indicative Build-up of hebel internal walls - Required 2.30 Total System

Component	R-Value
Indoor air film (7m/s)	0.12
Autoclaved aerated concrete block (Assume 75 mm thickness with the density of 350 kg/m³)	0.75
Airspace (Assume zero if insulation will fill cavity)	0
Additional insulation required assuming continuous insulation	**1.25**
Plasterboard, gypsum (10mm, 880 kg/m³)	0.06
Indoor air film (still air)	0.12
Total System R-Value	**2.30**

The Insulation provider / installer is responsible to ensure the type and location of insulation is fit for purpose and the total system values are achieved with the allowance for thermal bridging and condensation risk is mitigated. It is recommended that the continuous insulation option shall be used to eliminate thermal bridging for this assessment. Fire and acoustic engineers to confirm whether the continuous insulation can be used for this project.

Glazing Requirements

Glazing has been assessed using the NCC Glazing Calculator 2019. Table below contains a summary of the glazing performance requirements to be achieved for the development. Please note the below performance requirements are total system values, including the frame and glass.

Part J1.5 Total System Glazing Performance Requirements

Level	Orientation	Required Total System U-Value	Required Total System SHGC
All	All external glazing	3.3	0.34

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.

J1.6 Floors

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

Suspended Concrete floor with enclosed unconditioned areas below - Required 2.00 Total System

Component	R-Value

Indoor air film (still air)	0.16
Solid Concrete (200mm, 2400 Kg/m³)	0.14
Additional insulation required assuming continuous insulation	**1.54**
Indoor air film (still air)	0.16
Total System R-Value	**2.00**

The R-Value of the concrete is directly related to the thickness of the slab, with a thicker slab having a higher R-Value. As such, all floor areas will comply with the requirements for J1.6 with the above levels of insulation.

For example other thicknesses have the following R-Values:
200mm – R0.14, 250mm- R0.17, 300mm – R0.21; 500mm – R0.35; 600mm – R0.42; 900mm – R0.62
These values can be exchanged with the value for 150mm if applicable (e.g. transfer slab or similar) and as a result the level of insulation may be reduced.

3.2. 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 areas 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 fitted 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.
J3.3 - Roof Lights	No Roof Lights
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. A loading dock entrance, if leading to a conditioned space, must be fitted with a rapid roller door or the like.
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 Evaporative Coolers	An evaporative cooler must be fitted with a self-closing damper or the like when serving— (a) a heated space; or (b) a habitable room or a public area of a building in climate zones 4, 5, 6, 7 or 8

3.3. J5 Air Conditioning and Ventilation Systems

The project mechanical engineer shall be responsible for ensuring compliance with NCC Section J5 parts J5.1-J5.12.

3.4. 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>Stairways</td><td>2 W/m²</td><td>Storage/service/cleaners room and the like</td><td>1.5 W/m²</td></tr>
<tr><td>Entry lobby from outside the building</td><td>9 W/m²</td><td>Office</td><td>4.5 W/m²</td></tr>
<tr><td>Sole occupancy unit of a Class 9c building</td><td>5 W/m²</td><td>Control room, switch room or the like – intermittent monitoring</td><td>3 W/m²</td></tr>
<tr><td>Kitchen and food preparation areas</td><td>4 W/m²</td><td>Lift cars</td><td>3 W/m²</td></tr>
<tr><td>Toilet, locker room, staff room or the like</td><td>3 W/m²</td><td>Communal lounge areas</td><td>4.5 W/m²</td></tr>
<tr><td>Carpark - general</td><td>2 W/m²</td><td>Carpark – entry zone (first 15m of travel during day time)</td><td>11.5 W/m²</td></tr>
<tr><td>Plant areas</td><td>2 W/m²</td><td>Corridors</td><td>5 W/m²</td></tr>
</table>
If lighting will not comply with the W/m² detailed above an ABCB Lighting calculator can be completed and adjustment factors through the use of control devices or the like 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:

Emergency lighting in accordance with Part E4
Signage and display lighting within cabinets and display cases that are fixed in place.
A heater where the heater also emits light, such as in bathrooms.
Lighting of performances such as theatrical or sporting.
Lighting installed solely for indoor plant growth on green walls or the like.

</td></tr>
<tr><td>J6.3
Interior Artificial Lighting and Power Control</td><td>
Artificial lighting of a room or space is to be individually switched or operated or both.

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.
</td></tr>
</table>

	Other than a space where a sudden loss of light would result in an unsafe situation, any non-residential building that exceeds 250m² will require 95% of light fittings 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; Artificial lighting in a fire isolated stairway must be controlled by a motion detector. Artificial lighting in a foyer, corridor and other circulation spaces with more than 250W within a single zone and adjacent to windows must be controlled by a daylight sensor and lighting controls in accordance with **Specification J6.** Artificial lighting for daytime travel in the first 19m of a car park entry must be controlled by a daylight sensor. These requirements do not apply to emergency lighting in accordance with **Part E4,** or areas with 24 hour occupancy
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: use LED luminaires for 90% of the total lighting load; 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 Boiling 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.
J6.7 Lifts	Lifts must – (a) be configured to ensure artificial lighting and ventilation in the car are turned off when it is unused for 15 minutes; and (b) achieve the idle and stanby performance level in Table 6.7a; and (c) achieve - (i) the energy efficiency class in Table 6.7b; or (ii) if a dedicated goods lift, energy efficiency class D in accordance with ISO 25745-2
J6.8 Escalators and moving walkways	Escalators and moving walkways must have the ability to slow to between 0.2m/s and 0.05m/s when unused for more than 15 minutes.

3.5. 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	No Swimming Pool
J7.4 Spa Pool Heating and Pumping	No proposed spa

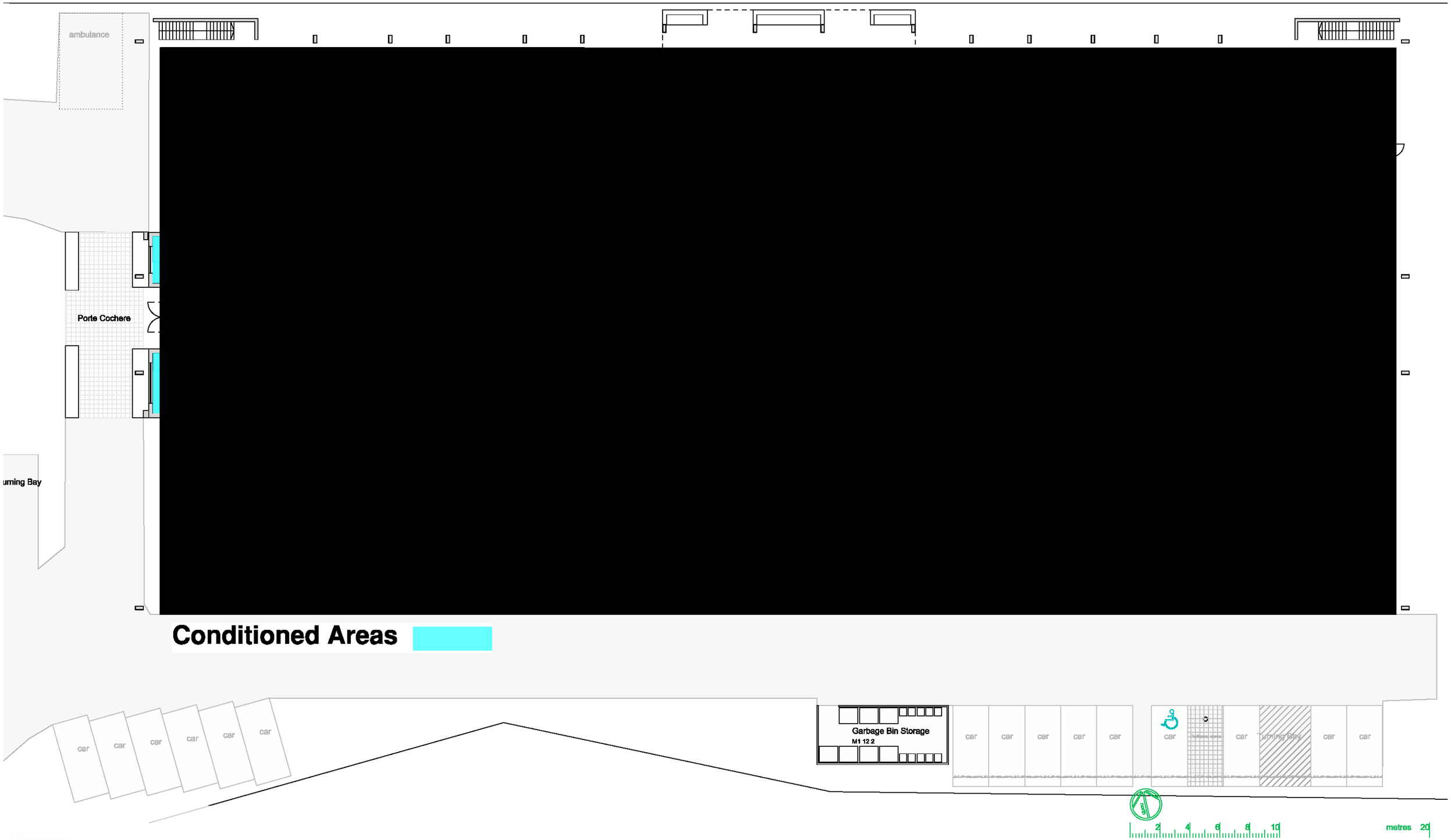
3.6. J8 Facilities for Energy Monitoring

The project electrical engineer shall be responsible for ensuring the design complies with NCC Section J8. 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 2500m², 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 other ancillary plant.

Appendix A

57 Mulgoa Road Penrith – Mark Up Identifying Conditioned Areas



JOHN W. FLOWER ARCHITECT

HARDI AGEDCARE

Mountainview 57 Mulgoa Road Penrith
Nursing Home Renewal

Project No 1903192

Drawing Title Plan Level 1 New

DA 04

Issue A

24/04/2020 Development Application A
Date Revision Rev Issue

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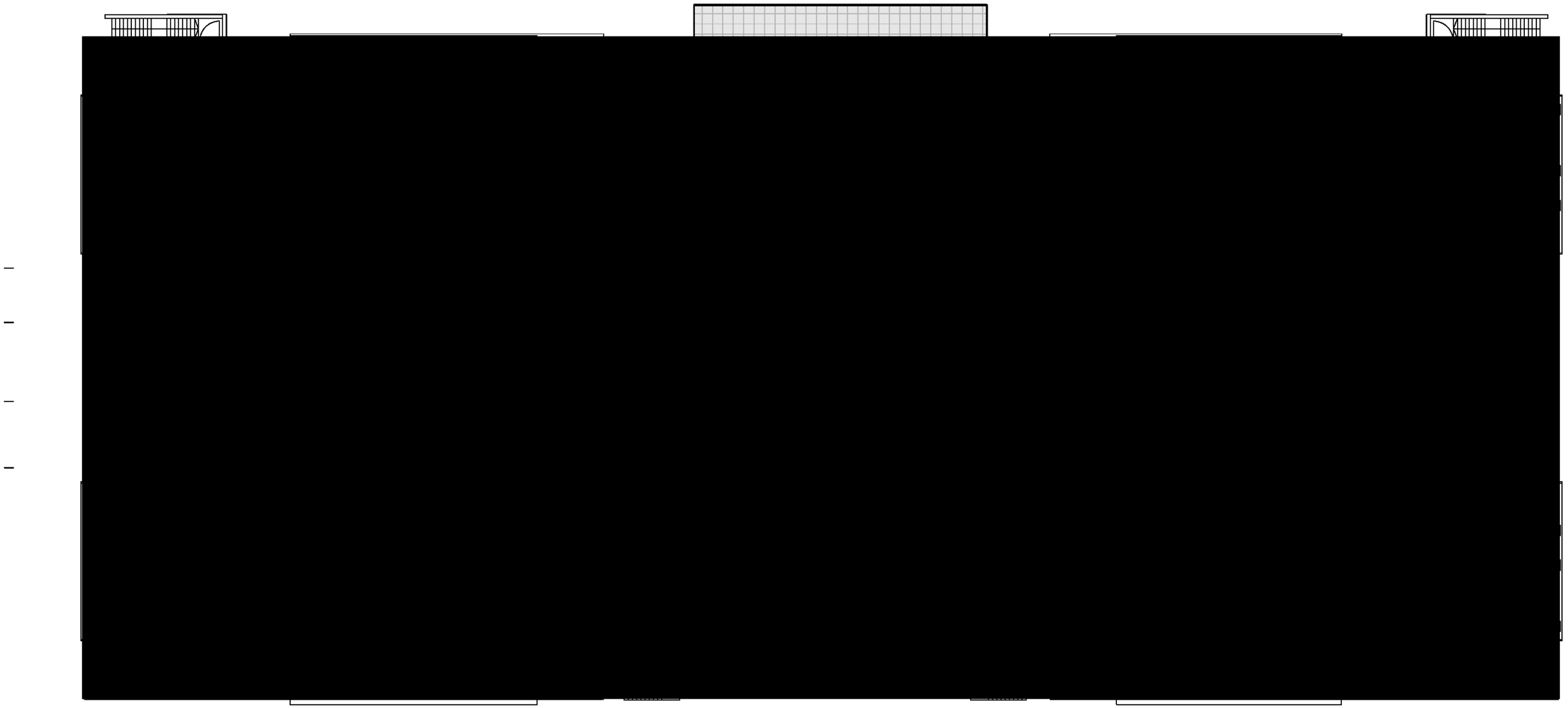
Appendix A

57 Mulgoa Road Penrith – Mark Up Identifying Conditioned Areas



Conditioned Areas

2 4 6 8 10 metres 20

JOHN W FLOWER ARCHITECT

HARDI AGEDCARE

Mountainview 57 Mulgoa Road Penrith
Nursing Home Renewal

Project No 1903192

Drawing Title Plan Level 2 new

DA 05

Issue A

24/04/2020 Development Application A
Date Revision Rev Issue

Appendix B

57 Mulgoa Road Penrith NSW – Mark Up Identifying Areas of Required Insulation

Insulation Requirements

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

Int Wall $R_{total\ system}$ 2.30 -

Roof/Ceiling $R_{total\ system}$ 3.20 -

[redacted]

Porte Cochere

urning Bay

car car car car car car

Garbage Bin Storage
M1 12 2

car car car car car car car car car car

2 4 6 8 10 metres 20

JOHN W. FLOWER ARCHITECT

HARDI AGEDCARE

Mountainview 57 Mulgoa Road Penrith
Nursing Home Renewal

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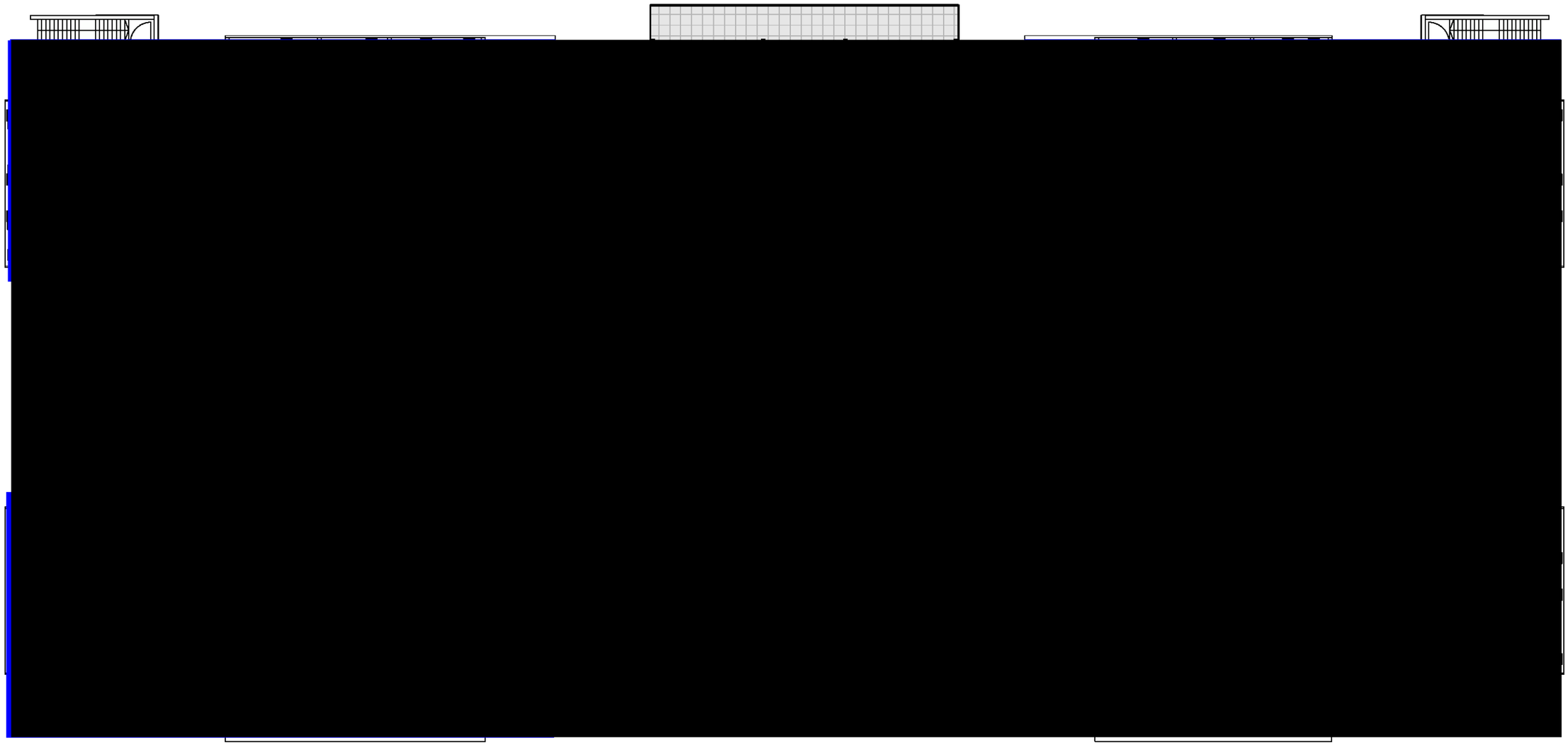

Insulation Requirements

Ext Wall Rtotal system 2.80 -

Int Wall Rtotal system 2.30 -

Roof/Ceiling Rtotal system 3.20 -

2 4 6 8 10 metres 20

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HARDI AGEDCARE

Mountainview 57 Mulgoa Road Penrith Nursing Home Renewal

24/04/2020 Development Application A
Date Revision Rev Issue

Project No 1903192

Drawing Title Plan Level 2 new

DA 05

Issue A