

**PIECHOWSKI
ENERGY**

CONSULTANT ADVICE - CA M01

16/06/2025

PROJECT	Sydney Metal Traders Recycling Facility	
PROJECT NO	25134	
SUBJECT	Sustainability Assessment	
TO	Sincorp	
ATTENTION	Craig Sinclair	craig@sincorp.com.au
FROM	Dr Mirek Piechowski	mirek.piechowski@piechowskienergy.com
CONTRACT	Mechanical	

1. Introduction

This report presents relevant components of the design response to the sustainability provisions of Section 3.2 of the SEPP (Sustainable Buildings), demonstrating compliance for the proposed recycling facility.

2. Project Description

Sydney Metal Traders Pty Ltd proposes to develop and operate a Metal Recycling Facility (the Facility) designed to process up to 30,000 tonnes per annum (tpa) of ferrous and non-ferrous scrap metals through receipt, sorting, cutting, shredding and storage operations.

The Site is located within the Goulburn Mulwaree Local Government Area and is zoned E4 General Industrial under the *Goulburn Mulwaree Local Environmental Plan 2009*. Development of a metal recycling facility is permissible with consent in this zone. The total lot area is approximately 32.3 hectares, with the operational footprint occupying 6.6 hectares along the western portion of the site. Importantly, the Site is located within the Sydney Drinking Water Catchment, and the Proposal is therefore classified as Designated Development under Clause 45(4)(c) of Schedule 3 of the *Environmental Planning and Assessment Regulation 2021*. As a result, an Environmental Impact Statement (EIS) is required, and the application will be assessed by the Southern Regional Planning Panel as Regionally Significant Development.

The Facility will include the following components and infrastructure:

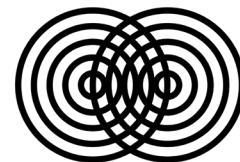
- Receipt and Sorting Areas – Bays for the tipping, inspection, and initial sorting of incoming scrap metals;
- Pre-Shredding and Shredding Zones – Equipped with pre-shredders, hammermill shredders, stationary shears and oxy-cutting facilities;
- Post-Processing Separation Facility – Bays for the separation, recovery, and temporary storage of processed ferrous and non-ferrous metals;

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- Administrative Infrastructure – Adaptation of the existing on-site cottage into office and staff amenity space including staff parking area;
- Workshop and Maintenance Shed – A fully enclosed 32m x 15m x 12m structure for plant maintenance and operations;
- Mobile and Stationary Equipment – Including loaders, shears, conveyors, radiation detection equipment, and sorting systems;
- Weighbridges – Two entry/exit weighbridges for the accurate measurement of materials and heavy vehicle management and one internal weighbridge;
- Fuel Storage – A 50,000L self-bunded diesel tank, installed on a concrete hardstand with protective bunding and rain cover;
- Landscaping and Visual Screening – A 20-metre-wide landscaped setback along the western and southern site boundaries;
- Traffic Management and Site Circulation – Paved hardstand access ways using existing access points with the addition of a new exit closer to the Hume Highway to minimise impacts on local roads and residential areas; and
- Stormwater Management – All operational areas will be constructed of compacted road base incorporating HDPE liners beneath operational areas, stormwater capture systems, and detention basins.

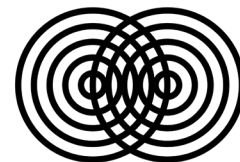
The Facility will receive, and process scrap metal sourced from Sydney, Goulburn, the ACT, Southern Highlands, and surrounding regional areas. Processed materials will be transported to both local and overseas markets for recycling and end use.

3. Site Sustainability Requirements Under SEPP (Sustainable Building)

Under Section 3.2 (1) of the SEPP (Sustainable Buildings), in deciding whether to grant development consent to non-residential development, the consent authority must consider whether the development is designed to enable the following:

- a) the minimisation of waste from associated demolition and construction, including by the choice and reuse of building materials
- b) a reduction in peak demand for electricity, including through the use of energy efficient technology,
- c) a reduction in the reliance on artificial lighting and mechanical heating and cooling through passive design,
- d) the generation and storage of renewable energy,
- e) the metering and monitoring of energy consumption,
- f) the minimization of the consumption of potable water.

Section 3.2 (2) of the SEPP states that the development consent must not be granted to non-residential,



development unless the consent authority is satisfied with the embodied emissions attributable to the development have been quantified.

4. Proposed design response

The following sections outline the proposed design response to the site sustainability requirements under Section 3.2 (1) of the SEPP (Sustainable Buildings) as set out in Section 3 of this report.

4.1. Minimisation of waste from associated demolition and construction

The proposed site is a greenfield site and as such there will be no demolition waste. The construction waste management will adopt the NSW EPA 'Construction and Demolition Waste Management Toolkit'. Key measures include:

- Developing Waste Management Plans (WMPs) during tender and contract phases.
- Specifying waste responsibilities in contracts.
- Monitoring compliance throughout the project lifecycle.

4.2. Reduction in Peak Electricity Demand

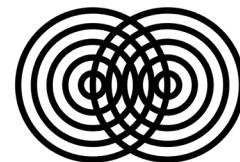
The development will incorporate high efficiency motors with Variable Speed Drives (VSDs) for all shredders, conveyers, etc. These motors will meet Minimum Energy Performance Requirements (MEPS) under the Greenhouse and Energy Minimum Standards (GEMS) Act 2012. (See Appendix B).

Main distribution boards serving major plant and equipment will be fitted with suitable power factor correction (PFC) equipment to minimize the site power demand.

Soft-start and staged equipment startup plan will be developed to avoid high peak demand due to the simultaneous activation of high-power equipment. A central Energy Management System (EnMS) will be developed to effectively manage peak electricity demand. Electricity submetering for all major equipment will allow for real time demand monitoring and management to minimize the site's maximum power demand. Where appropriate, large equipment will be turned off when not in use or set in a minimum power consumption mode.

The HVAC systems proposed for any area(s) of the development must have a minimum CoP/EER value to meet MEPS requirements as set out in Greenhouse and Energy Minimum Standards (Air Conditioners up to 65kW) Determination 2019. (See Appendix D)

Office and sheds will be constructed to meet the DTS requirements as per NCC Volume 1 2022, Section J4 to reduce mechanical heating and cooling requirements. Passive features such as operable louvres and ridge vents will be considered to further reduce mechanical heating, cooling and ventilation requirements.



LED lighting will be zoned appropriately, and smart controls will be implemented, including motion and daylight sensors, as appropriate, to minimize unnecessary daytime usage.

Solar-PV system will be considered to reduce demand during daytime hours; the additional integration of a battery energy storage system (BESS) will provide further flexibility to shift energy demand and avoid drawing grid power for nighttime use such as security lighting and HVAC.

4.3. A reduction in the reliance on artificial lighting and mechanical heating and cooling through passive design

The warehouses and processing facilities will include skylights and walls translucent panels, as appropriate, to minimize reliance on artificial lighting during daylight hours. When designing the skylights and/or translucent wall panels, consideration will be given to minimizing the unwanted solar gain in summer, while maximizing the daylight availability.

NCC Section J7D3 provides allowable maximum illumination power density (W/m²) based on class of building, the proposed development will meet these requirements. (See Appendix C)

The repurposed administrative building should implement north-facing windows, high performance glazing and layout optimization to maximize natural lighting penetration.

4.4. The generation and storage of renewable energy

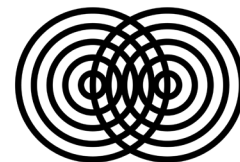
The maintenance sheds at the site will provide significant area for implementation of a solar PV system which would contribute a significant amount to daytime baseload. NCC 2022 J9D5 sets out requirements for solar photovoltaic and battery systems:

(1) The main electrical switchboard of a building must—

- a. contain at least two empty three-phase circuit breaker slots and four DIN rail spaces labelled to indicate the use of each space for—
 - i. a solar photovoltaic system; and
 - ii. a battery system; and
- b. be sized to accommodate the installation of solar photovoltaic panels producing their maximum electrical output on at least 20% of the building roof area.

(2) At least 20% of the roof area of a building must be left clear for the installation of solar photovoltaic panels.

Electrical design will consider the optimal specification for the Solar PV system based on 20% of the available roof areas to be fitted with solar panels. The matching battery energy storage system (BESS) will be specified.



4.5. Metering and monitoring of energy consumption

For the effective monitoring, demand management and reporting of energy consumption, the electricity sub-metering will be installed on the following systems and equipment:

1. Shearing
2. Conveyers
3. Cyclone plant
4. Hammer mill
5. Pre-shredding
6. Post-shredder processing
7. HVAC
8. Lighting
9. On-site renewables

In addition, NCC Part J9D3 requires that energy meters must be interlinked by a communication system that collates the time-of-use energy data to a single interface monitoring system where it can be stored, analysed and reviewed.

4.6. The minimization of the consumption of potable water

In order to minimise the use of potable water, the facility will capture and store stormwater runoff from roofs.

The rainwater tank supply is to be configured and plumbed for maximum water reuse and as a minimum to service all toilets, irrigation of landscaped areas and all washdown areas for non-residential developments. **(Goulbourn Mulwaree Council, Stormwater Drainage and Rainwater Collection Systems Policy, Section 2.1)**

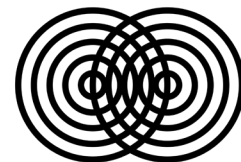
If the site is serviced by reticulated water, the minimum rainwater tank size is to be a minimum of 10,000 litres. **(Goulbourn Mulwaree Council, Stormwater Drainage and Rainwater Collection Systems Policy, Section 2.2, C.)**

If the site is not serviced by reticulated water, the minimum rainwater tank volume is to be calculated in accordance with Section 2.2.B **(Goulbourn Mulwaree Council, Stormwater Drainage and Rainwater Collection Systems Policy).**

For this site, assuming it is without reticulated water service, the required rainwater tank size is:

$$\left(\frac{\text{Sloped roof area}}{10}\right) \times 1,000 \text{ liters} = \frac{2,430}{10} * 1000 = 243,000 \text{ liters}$$

The proposed development will be fitted with four (4) rainwater storage tanks with the combined volume in the order of 310,000 liters.



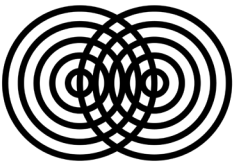
4.7. Calculations of the embodied emissions attributable to the development.

Calculations of the embodied emissions attributable to the development are detailed in Appendix A.

Kind Regards,
Piechowski Energy Pty Ltd

Dr Mirek Piechowski
RBP PE0002475

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5. Appendix A – Calculations of the embodied emissions

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Step 1: About the building

Fill out blue cells

Building location and site data	Value	Unit	Note	Comment
Building address	88 Murrays Flat Road, Towrang			
Postcode	2580		Required	Postcode of building
Town/city	BANNABY + 53 other localities		Town/city/suburb/region automated from postcode (may not give exact town name)	Town/city/suburb/region of the building site.
Distance to nearest major city/town		km	Enter for rural/regional locations only	Declare the shortest route by road to your site from the centre of your nearest major city (>100,000 people). The route must be traversable by a semi-trailer truck.
Project stage	Development Application		Required	Stage of development
New build or major renovation?	New build		Required	
Brownfield or greenfield site?	Greenfield		Required	

Floor area by NCC building classification	Gross (GFA)	Net (NLA/NSA/UFA)	Unit	Note
Please enter all floor areas relevant to your building. Leave areas blank if not applicable. Please enter Gross Floor Area (GFA) for all building classifications. Please also enter the corresponding net area (Net Lettable Area, Net Sellable Area or Usable Floor Area) where it is commonly used for that building classification.				
Class 1a: Detached residential buildings			m²	Required for Class 1a: Detached residential houses, townhouses
Class 1b: Boarding houses and hostels			m²	Required for Class 1b: Boarding house, guest house, hostel
Class 2: Multi-unit residential buildings			m²	Required for Class 2: Multi-unit residential, including apartment buildings
Class 3: Other residential buildings			m²	Required for Class 3: Other residential buildings
Class 4: Residential inside non-residential			m²	Required for Class 4: Residential building inside a non-residential building, e.g., caretaker residence
Class 5: Office buildings			m²	Required for Class 5: Office building
Class 6: Retail buildings			m²	Required for Class 6: Retail building, e.g., shop, restaurant, café
Class 7a: Carparks			m²	Required for Class 7a: Carparks
Class 7b: Warehouse-type buildings			m²	Required for Class 7b: Warehouses, wholesalers and storage facilities
Class 8: Industrial buildings			1,790 m²	Required for Class 8: Industrial buildings, e.g., factories and workshops
Class 9a: Healthcare buildings			m²	Required for Class 9a: Healthcare, e.g., hospitals, clinics, day surgeries
Class 9b: Civic buildings			m²	Required for Class 9b: Civic buildings, e.g., theatres, civic centres, train stations
Class 9c: Aged care and personal care buildings			m²	Required for Class 9c: Aged care and personal care
Class 10a: Non-habitable buildings			m²	Required for Class 10a: Non-habitable buildings including sheds, carports and private garages
Class 10b: Miscellaneous structures			m²	Required for Class 10b: Miscellaneous structures, including fences, masts, antennas, retaining walls and swimming pools
Class 10c: Bushfire shelters			m²	Required for Class 10c: Bushfire shelters not attached to a Class 1a building
Total	0		1,790 m²	Required: Sum of m² inputs must be more than 0.

Project information	Value	Unit	Note
Total cost of project	25,104,298	AUD excl. GST	Required
Building design life	50	years	Required
Estimated envelope life		years	Optional
Estimated replacement cycle for mechanical services		years	Optional
Estimated replacement cycle for vertical transportation		years	Optional

Dimensions of the building and the site	Value	Unit	Note
Site area	66,500	m²	Required
Shared services or infrastructure	No		Required
Building footprint area	1,790	m²	Required
Typical floor area (if different to building footprint area)		m²	Only needed if different to row above
Typical floor perimeter	128	m	Required
Area of external carpark (not included in GFA)		m²	Required. Enter 0 if not applicable.
Area of external hardstand (not included in GFA)		m²	Required. Enter 0 if not applicable.
Area of other hard landscaping (not included in GFA)		m²	Required. Enter 0 if not applicable.
Number of floors/storeys above ground, including ground floor	1	no.	Required
Number of floors/storeys below ground	0	no.	Required. Enter 0 if not applicable.
Number of floors/storeys of car parking	0	no.	Required. Enter 0 if not applicable.
Total height above ground	12	m	Required

Structural material choices	Value	Unit	Note
Foundation type	Slab-on-ground		Required
Frame type (dominant)	Steel		Required
Suspended floor type (typical)	Please select		Only needed for multi-storey buildings
Describe low carbon materials specified in your building (e.g. green concrete, low carbon bricks)	Nil		Required
Describe recycled content specified in your building (e.g. recycled steel)	Nil		Required

Step 2: Quantity of materials

Complete all blue cells that are applicable to the building. Leave items that aren't applicable blank.

Fill out blue cells

Material category	Sub-category 1	Sub-category 2	Sub-category 3	Value	Unit of measure	Comment	AIQS ACMM Code	ICMS3 (Level 3 Codes Construction)
Structure								
The structural parts of the building that are below ground (substructure) and above ground (superstructure). This includes fill below the substructure, foundations, basement levels, suspended floors, wall structure, roof structure, stairs, lift shafts and balconies. It excludes external areas such as hardstands, carpark, patios, etc.								
Coverage of structural material spend	-	-	-	80	%	Required. Coverage of spend for structural elements entered below. Minimum requirement = 80%. Exclude head contractor preliminaries and margins.		
Concrete in-situ	≤10 MPa	-	-		m³	Please enter reinforcing steel as part of "Reinforcing steel" below	01_SB or 02-11	02 or 03
Concrete in-situ	>10 MPa to ≤20 MPa	-	-		m³	Please enter reinforcing steel as part of "Reinforcing steel" below	01_SB or 02-11	02 or 03
Concrete in-situ	>20 MPa to ≤32 MPa	-	-	174.7	m³	Please enter reinforcing steel as part of "Reinforcing steel" below	01_SB or 02-11	02 or 03
Concrete in-situ	>32 MPa to ≤40 MPa	-	-	250.5	m³	Please enter reinforcing steel as part of "Reinforcing steel" below	01_SB or 02-11	02 or 03
Concrete in-situ	>40 MPa to ≤50 MPa	-	-		m³	Please enter reinforcing steel as part of "Reinforcing steel" below	01_SB or 02-11	02 or 03
Concrete in-situ	>50 MPa to ≤60 MPa	-	-		m³	Please enter reinforcing steel as part of "Reinforcing steel" below	01_SB or 02-11	02 or 03
Concrete in-situ	>60 MPa to ≤80 MPa	-	-		m³	Please enter reinforcing steel as part of "Reinforcing steel" below	01_SB or 02-11	02 or 03
Concrete in-situ	>80 MPa to ≤100 MPa	-	-		m³	Please enter reinforcing steel as part of "Reinforcing steel" below	01_SB or 02-11	02 or 03
Concrete in-situ	>100 MPa	-	-		m³	Please enter reinforcing steel as part of "Reinforcing steel" below	01_SB or 02-11	02 or 03
Concrete pre-cast panel	-	-	-		m³	Please enter reinforcing steel in relevant line items below. If not known at DA stage, please make your best estimate. If not known at CC stage, please ask your supplier.	01_SB or 02-11	02 or 03
Concrete block	Hollow core	-	-		m³	Enter as cubic metres, calculated as (area in m²) * (thickness in mm / 1000).	01_SB	02 or 03
Concrete block/brick	Solid	-	-		m³	Please include all block fill concrete and all reinforcing steel in relevant line items above/below.	01_SB	02 or 03
Concrete block/brick	Solid AAC	-	-		m³	Enter as cubic metres, calculated as (area in m²) * (thickness in mm / 1000).	01_SB	02 or 03
Mortar	-	-	-	0	kg	Solid Aerated Autoclaved Concrete (AAC) block.	01_SB	02 or 03
Reinforcing steel	Bar & mesh	-	-	28,734	kg	Include all reinforcing steel bar/mesh in the building's structure in this row. Usually this is calculated as kg/m³ per concrete element and then summed. Example: 10 m³ of 40 MPa concrete @ 100 kg/m³ + 5 m³ of 50 MPa concrete @ 150 kg/m³ = 1,750 kg reinforcing steel.	01_SB or 02-11	02 or 03
Reinforcing steel	Fibre & strand	-	-		kg	Include all steel fibre reinforcing and steel strand in the building's structure in this row.	01_SB or 02-11	02 or 03
Structural steel	Hot rolled structural	-	-		t	Examples include universal beams, universal columns and welded beams	01_SB	02 or 03
Structural steel	Cold formed structural	-	-	44	t	Examples include C purlins, Z purlins and all light gauge steel framing	01_SB	02 or 03
Structural steel	Other welded structural	-	-		t		01_SB	02 or 03
Structural steel	Plate	-	-		t	Include any allowance for connections here	01_SB	02 or 03
Structural steel	Sheet	-	-		t		01_SB	02 or 03
Stainless steel	-	-	-		t		02_11	02 or 03
Reinforced concrete piles	Concrete	-	-		m³	Primarily for engineered timber structure connections	01_SB	02 or 03
Reinforced concrete piles	Steel reinforcing	-	-		kg	Please enter reinforcing steel in the line below. If not known at DA stage, please make your best estimate. If not known at CC stage, please ask your supplier.	01_SB	02 or 03
Steel piles	-	-	-		t	If not known at DA stage, please make your best estimate. If not known at CC stage, please ask your supplier.	01_SB	02 or 03
Timber poles/piles	-	-	-		m³	Where concrete and reinforcing steel are also used, enter these in the rows above.	01_SB	02 or 03
Timber (solid)	Sawn softwood	-	-		m³	Where concrete and reinforcing steel are also used, enter these in the rows above.	02_11	02 or 03
Timber (solid)	Sawn hardwood	-	-		m³		02_11	02 or 03
Timber (engineered)	CLT	-	-		m³		02_11	02 or 03
Timber (engineered)	Glulam	-	-		m³		02_11	02 or 03
Timber (engineered)	LVL	-	-		m³		02_11	02 or 03
Timber (engineered)	OSB	-	-		m³		02_11	02 or 03
Brick	Heat cured	-	-		m³	Enter as cubic metres, calculated as (area of wall in m²) * (thickness in mm / 1000)	02_11	02 or 03
Structural Insulated Panel (SIP)	Steel outer	-	-		m²	Enter as cubic metres, calculated as (area of wall in m²) * (thickness in mm / 1000)	01_SB	02 or 03
Structural Insulated Panel (SIP)	Aluminium outer	-	-		m²		01_SB	02 or 03
Structural Insulated Panel (SIP)	Engineered timber outer	-	-		m²		01_SB	02 or 03
Fill	-	-	-		t	Include purchased material only. Exclude site-won material.	01_SB	01
Sand & gravel	-	-	-		t	Include purchased material only. Exclude site-won material and sand/gravel in concrete.	01_SB	01
Waterproofing membrane	Bituminous	-	-		m²		01_SB	01 or 02 or 03
Waterproofing membrane	Polyethylene	-	-		m²		01_SB	01 or 02 or 03
Other structural (Describe and add unit >>)		-	-			Please enter a description for any structural material that does not fit a predefined classification		
Other structural (Describe and add unit >>)		-	-			Please enter a description for any structural material that does not fit a predefined classification		
Other structural (Describe and add unit >>)		-	-			Please enter a description for any structural material that does not fit a predefined classification		

Envelope

The skin of the building that separates the internal building from the external environment. This includes the roof cladding, wall cladding, windows, doors and internal/external shading. It also includes insulation and the internal wall lining of envelope walls.

Coverage of envelope material spend	-	-	-	80	%	Required. Coverage of spend for the envelope items you have entered below. Minimum requirement = 80%. Exclude head contractor preliminaries and margins.		
Roof cladding	Profiled steel	-	-		m²	Enter as m² of roof area. Exclude allowances for overlap in the roofing sheets. This row includes all metal-coated and pre-painted steel sheets where steel is the base metal. Examples include: galvanised steel, zinc-aluminium (zincalume) coated steel and zinc-aluminium-magnesium (ZAM) coated steel, whether painted or unpainted.	05_RF	03 or 04
Roof cladding	Profiled aluminium	-	-	1,879	m²	Enter as m² of roof area. Exclude allowances for overlap in the roofing sheets. This row also includes pre-painted aluminium sheets.	05_RF	03 or 04
Roof cladding	Profiled zinc	-	-		m²	Enter as m² of roof area. Exclude allowances for overlap in the roofing sheets. This row also includes pre-painted zinc sheets.	05_RF	03 or 04
Roof cladding	Membrane	-	-		m²	Enter as m² of roof area. Exclude allowances for overlap in the membrane sheets.	05_RF	03 or 04
Roof cladding	Tiles (traditional clay)	-	-		m²	Enter as m² of roof area. Exclude allowances for overlap between the tiles.	05_RF	03 or 04
Roof cladding	Tiles (concrete)	-	-		m²	Enter as m² of roof area. Exclude allowances for overlap between the tiles.	05_RF	03 or 04
Roof cladding	Other (Please describe >>)		-		m²	Please enter a description for any roofing that does not fit a predefined classification	05_RF	03 or 04
Wall cladding	Bricks (heat cured)	-	-		m²	Enter as m² of wall area. Heat-cured bricks use a kiln or furnace to raise the brick temperature above ambient temperature during curing process.	06_EW	03 or 04
Wall cladding	Bricks (air dried)	-	-		m²	Enter as m² of wall area. Air-dried bricks are cured using ambient temperature.	06_EW	03 or 04
Wall cladding	Bricks (under fired)	-	-		m²	Enter as m² of wall area.	06_EW	03 or 04
Wall cladding	Bricks (concrete)	-	-		m²	Enter as m² of wall area	06_EW	03 or 04
Wall cladding	Mortar and render	-	-	0	kg		06_EW	03 or 04
Wall cladding	Profiled steel	-	-		m²	Enter as m² of wall area. Exclude allowances for overlap in the cladding sheets, offcuts, etc. This row includes all metal-coated and pre-painted steel sheets where steel is the base metal. Examples include: galvanised steel, zinc-aluminium (zincalume) coated steel and zinc-aluminium-magnesium (ZAM) coated steel, whether painted or unpainted.	06_EW	03 or 04
Wall cladding	Profiled aluminium	-	-	3,556	m²	Enter as m² of wall area. Exclude allowances for overlap in the cladding sheets, offcuts, etc. This row also includes pre-painted aluminium sheets.	06_EW	03 or 04
Wall cladding	Profiled zinc	-	-		m²	Enter as m² of wall area. Exclude allowances for overlap in the cladding sheets, offcuts, etc. This row also includes pre-painted zinc sheets.	06_EW	03 or 04
Wall cladding	GRC cladding	-	-		m²	Enter as m² of wall area. GRC = Glass Reinforced Concrete.	06_EW	03 or 04
Wall cladding	Timber weatherboards	-	-		m²	Enter as m² of wall area. Exclude allowances for overlap between weatherboards, offcuts, etc.	06_EW	03 or 04
Wall cladding	Fibre cement board	-	-		m²	Enter as m² of wall area. Exclude allowances for offcuts, etc.	06_EW	03 or 04
Wall cladding	Terracotta	-	-		m²	Enter as m² of wall area. Exclude allowances for offcuts, etc.	06_EW	03 or 04
Wall cladding	Brick tiles / veneers	-	-		m²	Enter as m² of wall area. Exclude allowances for offcuts, etc.	06_EW	03 or 04
Wall cladding	Plasterboard	-	-		m²	Enter as m² of wall area. Exclude allowances for offcuts, etc. Include both external wall linings and internal wall linings for envelope walls.	12_WF or 06_EW	03 or 04
Wall cladding	Plywood	-	-		m²	Enter as m² of wall area. Exclude allowances for offcuts, etc. Include both external wall linings and internal wall linings for envelope walls.	12_WF or 06_EW	03 or 04
Wall cladding	Other (Please describe >>)		-		m²	Please enter a description for any wall cladding that does not fit a predefined classification	06_EW or 12_WF	03 or 04
Windows & doors	Aluminium frame	Single glazed	-		m²	Include all single glazing, including standard, toughened, laminated and low-E	07_WW or 08_ED	03 or 04
Windows & doors	Aluminium frame	Double glazed	-		m²	Include all double glazing, including standard, toughened, laminated and low-E	07_WW or 08_ED	03 or 04
Windows & doors	Aluminium frame	Triple glazed	-		m²	Include all triple glazing, including standard, toughened, laminated and low-E	07_WW or 08_ED	03 or 04
Windows & doors	Timber frame	Single glazed	-		m²	Include all single glazing, including standard, toughened, laminated and low-E	07_WW or 08_ED	03 or 04
Windows & doors	Timber frame	Double glazed	-		m²	Include all double glazing, including standard, toughened, laminated and low-E	07_WW or 08_ED	03 or 04
Windows & doors	Timber frame	Triple glazed	-		m²	Include all triple glazing, including standard, toughened, laminated and low-E	07_WW or 08_ED	03 or 04
Windows & doors	uPVC frame	Single glazed	-		m²	Include all single glazing, including standard, toughened, laminated and low-E	07_WW or 08_ED	03 or 04
Windows & doors	uPVC frame	Double glazed	-		m²	Include all double glazing, including standard, toughened, laminated and low-E	07_WW or 08_ED	03 or 04
Windows & doors	uPVC frame	Triple glazed	-		m²	Include all triple glazing, including standard, toughened, laminated and low-E	07_WW or 08_ED	03 or 04
Windows & doors	Frameless	Single glazed	-		m²	Include all single glazing, including standard, toughened, laminated and low-E	07_WW or 08_ED	03 or 04
Windows & doors	Frameless	Double glazed	-		m²	Include all double glazing, including standard, toughened, laminated and low-E	07_WW or 08_ED	03 or 04
Windows & doors	Frameless	Triple glazed	-		m²	Include all triple glazing, including standard, toughened, laminated and low-E	07_WW or 08_ED	03 or 04
Windows & doors	Other (Please describe >>)		-		m²	Please enter a description for any windows or doors that do not fit a predefined classification	07_WW or 08_ED	03 or 04
Curtain wall	Single skin façade	Glazed panel	Single glazed		m²	Please declare all single-skin façade area in this section. All double-skin façade area should be entered in the next section. Include all single glazing, including standard, toughened, laminated and low-E	06_EW	03 or 04
Curtain wall	Single skin façade	Glazed panel	Double glazed		m²	Include all double glazing, including standard, toughened, laminated and low-E	06_EW	03 or 04
Curtain wall	Single skin façade	Glazed panel	Triple glazed		m²	Include all triple glazing, including standard, toughened, laminated and low-E	06_EW	03 or 04
Curtain wall	Single skin façade	Opaque panel	Aluminium cladding		m²		06_EW	03 or 04
Curtain wall	Single skin façade	Opaque panel	GRC cladding		m²	GRC = Glass-fibre Reinforced Concrete	06_EW	03 or 04
Curtain wall	Single skin façade	Opaque panel	Insulated shadow box		m²		06_EW	03 or 04
Curtain wall	Single skin façade	Opaque panel	Brick cladding		m²		06_EW	03 or 04
Curtain wall	Single skin façade	Opaque panel	Stone cladding		m²		06_EW	03 or 04
Curtain wall	Double skin façade	Glazed panel	Single glazed		m²	Please declare all double-skin façade area in this section. Please declare as the area of the curtain wall and do not enter the inner and outer skins twice.	06_EW	03 or 04
Curtain wall	Double skin façade	Glazed panel	Double glazed		m²	Include all single glazing, including standard, toughened, laminated and low-E.	06_EW	03 or 04
Curtain wall	Double skin façade	Glazed panel	Triple glazed		m²	The type of glazing refers to the building's envelope wall, not including the outer skin	06_EW	03 or 04
Curtain wall	Double skin façade	Opaque panel	Aluminium cladding		m²	The type of glazing refers to the building's envelope wall, not including the outer skin	06_EW	03 or 04
Curtain wall	Double skin façade	Opaque panel	GRC cladding		m²	GRC = Glass-fibre Reinforced Concrete	06_EW	03 or 04
Curtain wall	Double skin façade	Opaque panel	Insulated shadow box		m²		06_EW	03 or 04
Curtain wall	Double skin façade	Opaque panel	Brick cladding		m²		06_EW	03 or 04
Curtain wall	Double skin façade	Opaque panel	Stone cladding		m²		06_EW	03 or 04
Curtain wall	Other (Please describe >>)		-		m²	Please enter a description for any curtain wall that does not fit a predefined classification	06_EW	03 or 04
Stick-framed wall system	Aluminium frame	Glazed section	Single glazed		m²	Include all single glazing, including standard, toughened, laminated and low-E	06_EW	03 or 04
Stick-framed wall system	Aluminium frame	Glazed section	Double glazed		m²	Include all double glazing, including standard, toughened, laminated and low-E	06_EW	03 or 04
Stick-framed wall system	Aluminium frame	Glazed section	Triple glazed		m²	Include all triple glazing, including standard, toughened, laminated and low-E	06_EW	03 or 04
Stick-framed wall system	Aluminium frame	Opaque section	Aluminium cladding		m²		06_EW	03 or 04
Stick-framed wall system	Aluminium frame	Opaque section	GRC cladding		m²	GRC = Glass-fibre Reinforced Concrete	06_EW	03 or 04
Stick-framed wall system	Aluminium frame	Opaque section	Insulated shadow box		m²		06_EW	03 or 04
Stick-framed wall system	Aluminium frame	Opaque section	Brick cladding		m²		06_EW	03 or 04
Stick-framed wall system	Aluminium frame	Opaque section	Stone cladding		m²		06_EW	03 or 04
Stick-framed wall system	Steel frame	Glazed section	Single glazed		m²	Include all single glazing, including standard, toughened, laminated and low-E	06_EW	03 or 04
Stick-framed wall system	Steel frame	Glazed section	Double glazed		m²	Include all double glazing, including standard, toughened, laminated and low-E	06_EW	03 or 04
Stick-framed wall system	Steel frame	Glazed section	Triple glazed		m²	Include all triple glazing, including standard, toughened, laminated and low-E	06_EW	03 or 04
Stick-framed wall system	Steel frame	Opaque section	Aluminium cladding		m²		06_EW	03 or 04
Stick-framed wall system	Steel frame	Opaque section	GRC cladding		m²	GRC = Glass-fibre Reinforced Concrete	06_EW	03 or 04

Step 2: Quantity of materials

Complete all blue cells that are applicable to the building. Leave items that aren't applicable blank.

Fill out blue cells

Material category	Sub-category 1	Sub-category 2	Sub-category 3	Value	Unit of measure	Comment	AIQS ACMM Code	ICMS3 (Level 3 Codes Construction)
Stick-framed wall system	Steel frame	Opaque section	Insulated shadow box		m²		06_EW	03 or 04
Stick-framed wall system	Steel frame	Opaque section	Brick cladding		m²		06_EW	03 or 04
Stick-framed wall system	Steel frame	Opaque section	Stone cladding		m²		06_EW	03 or 04
Stick-framed wall system	Other (Please describe >>)		-		m²	Please enter a description for any wall system that does not fit a predefined classification	06_EW	03 or 04
Wall louvre system	Aluminium	-	-		m²		06_EW	03 or 04
External shading system	Aluminium frame	Aluminium cladding	-		m²	Please enter as m² of shaded area = linear metres * (width in mm / 1000)	06_EW	03 or 04
External shading system	Aluminium frame	GRC cladding	-		m²	Please enter as m² of shaded area = linear metres * (width in mm / 1000). GRC = Glass-fibre Reinforced Concrete.	06_EW	03 or 04
External shading system	Aluminium frame	Terracotta cladding	-		m²	Please enter as m² of shaded area = linear metres * (width in mm / 1000)	06_EW	03 or 04
External shading system	Aluminium frame	Stone cladding	-		m²	Please enter as m² of shaded area = linear metres * (width in mm / 1000)	06_EW	03 or 04
External shading system	Aluminium frame	Pre-cast concrete	-		m²	Please enter as m² of shaded area = linear metres * (width in mm / 1000)	06_EW	03 or 04
External shading system	Aluminium frame	Timber	-		m²	Please enter as m² of shaded area = linear metres * (width in mm / 1000)	06_EW	03 or 04
External shading system	Aluminium frame	Glass (opaque)	-		m²	Please enter as m² of shaded area = linear metres * (width in mm / 1000)	06_EW	03 or 04
External shading system	Aluminium frame	Steel	-		m²	Please enter as m² of shaded area = linear metres * (width in mm / 1000)	06_EW	03 or 04
External shading system	Other (Please describe >>)		-		m²	Please enter as m² of shaded area = linear metres * (width in mm / 1000)	06_EW	03 or 04
Roller doors	Steel profile	-	-	392		Please note unit is <u>square metres</u> , not quantity	08_ED	03 or 04
Roller doors	Hardwood over steel	-	-		m²	Please note unit is <u>square metres</u> , not quantity	08_ED	03 or 04
Roller doors	Softwood over steel	-	-		m²	Please note unit is <u>square metres</u> , not quantity	08_ED	03 or 04
Revolving doors	Glass/aluminium/steel	-	-		no.		08_ED	03 or 04
Fire-rated doors	Engineered timber	-	-	6	no.	Please enter as single-leaf equivalent. For double-leaf doors, multiply the quantity by 2.	08_ED	03 or 04
Fire-rated doors	Steel	-	-		no.	Please enter as single-leaf equivalent. For double-leaf doors, multiply the quantity by 2.	08_ED	03 or 04
Fire-rated doors	Aluminium/glass	-	-		no.	Please enter as single-leaf equivalent. For double-leaf doors, multiply the quantity by 2.	08_ED	03 or 04
Insulation	Glass wool / fibreglass	-	-	0.0	m²	Please include both wall and ceiling insulation	05_RF or 06_EW	03 or 04
Insulation	Stone wool	-	-		m²	Please include both wall and ceiling insulation	05_RF or 06_EW	03 or 04
Insulation	Polyester	-	-		m²	Please include both wall and ceiling insulation	05_RF or 06_EW	03 or 04
Insulation	Expanded polystyrene	-	-		m²	Please include both wall and ceiling insulation	05_RF or 06_EW	03 or 04
Insulation	Other (Please describe >>)		-		m²	Please include both wall and ceiling insulation	05_RF or 06_EW	03 or 04
Other (Please describe and add unit >>)		-	-			Please enter a description for any envelope material that does not fit a predefined classification		
Other (Please describe and add unit >>)		-	-			Please enter a description for any envelope material that does not fit a predefined classification		
Other (Please describe and add unit >>)		-	-			Please enter a description for any envelope material that does not fit a predefined classification		

Permanent internal walls and doors

Walls and doors within the building that are either structural or designed to be permanent.

Coverage of material spend on permanent internal walls and doors				80	%	Enter the % coverage of <u>spend</u> for the items you have entered below. There is no minimum requirement: enter what you know. This should include all structural walls. Exclude head contractor preliminaries and margins.		
Interior wall (permanent)	Steel (light framing)	-	-	1	t		09_NW	03 or 04
Interior wall (permanent)	Timber framing	-	-		m³		09_NW	03 or 04
Interior wall (permanent)	AAC panel (reinforced)	-	-		m²	Panels of autoclaved aerated concrete (AAC) with reinforcing steel. E.g., Hebel.	09_NW or 12_WF	03 or 04
Interior wall (permanent)	Concrete-filled steel panel	-	-		m²	Panels made from a steel sheet outer with an aerated concrete core. E.g., Speedpanel.	09_NW or 12_WF	03 or 04
Interior wall (permanent)	Plasterboard	-	-	575	m²	Enter as single-layer equivalent. If using 2 layers, multiply the area by 2.	09_NW or 12_WF	03 or 04
Interior wall (permanent)	Plywood	-	-		m²	Enter as single-layer equivalent. If using 2 layers, multiply the area by 2.	09_NW or 12_WF	03 or 04
Interior wall (permanent)	Fibre cement sheet	-	-		m²	Enter as single-layer equivalent. If using 2 layers, multiply the area by 2.	09_NW or 12_WF	03 or 04
Interior wall (permanent)	Insulation	-	-		m²		09_NW or 12_WF	03 or 04
Interior wall (permanent)	Glass	-	-		m²		09_NW or 12_WF	03 or 04
Interior wall (permanent)	Other (Please describe >>)		-		m²	Please enter a description for any internal wall that does not fit a predefined classification	09_NW or 12_WF	03 or 04
Internal door (permanent)	Aluminium/glass	-	-		no.	Please enter as single-leaf equivalent. For double-leaf doors, multiply the quantity by 2.	11_ND	03 or 04
Internal door (permanent)	Timber/glass	-	-		no.	Please enter as single-leaf equivalent. For double-leaf doors, multiply the quantity by 2.	11_ND	03 or 04
Internal door (permanent)	Timber solid lightweight	-	-	16	no.	Please enter as single-leaf equivalent. For double-leaf doors, multiply the quantity by 2.	11_ND	03 or 04
Internal door (permanent)	Fire resistant	-	-		no.	Please enter as single-leaf equivalent. For double-leaf doors, multiply the quantity by 2.	11_ND	03 or 04
Internal door (permanent)	Steel	-	-		no.	Please enter as single-leaf equivalent. For double-leaf doors, multiply the quantity by 2.	11_ND	03 or 04
Internal door (permanent)	Other (Please describe >>)		-		no.	Please enter a description for any internal door that does not fit a predefined classification	11_ND	03 or 04
Other (Please describe and add unit >>)		-	-			Please enter a description for any material that does not fit a predefined classification		
Other (Please describe and add unit >>)		-	-			Please enter a description for any material that does not fit a predefined classification		
Other (Please describe and add unit >>)		-	-			Please enter a description for any material that does not fit a predefined classification		

Services

Unit of measure

Building services included within the main building contract. If the building components that are the subject of the development application or the construction certificate are base building only, then only enter these items. If you cannot split services by type, please enter them all in the "Other services" category at the bottom.

Enter all values as material costs in dollars.

Mechanical services	-	-	-	59,048	AUD excl. GST	Where possible, enter material costs excluding labour, plant, equipment, margins and taxes	28_SS	05
Vertical transportation					AUD excl. GST	Where possible, enter material costs excluding labour, plant, equipment, margins and taxes	28_SS	05
Electrical services	-	-	-	336,925	AUD excl. GST	Electrical services including the main power supply, backup generators, security and communications. Excluding solar installations.	26_LP	05
Solar photovoltaic installations	-	-	-		AUD excl. GST	Where possible, enter material costs excluding labour, plant, equipment, margins and taxes.	26_LP_LPGP	05
Plumbing/hydraulic services	-	-	-	1,019,433	AUD excl. GST	Where possible, enter material costs excluding labour, plant, equipment, margins and taxes	18_PD and 19_XW	05 or 06
Fire services				146,580	AUD excl. GST	Where possible, enter material costs excluding labour, plant, equipment, margins and taxes	25_FPSS04 or 39_XWAW_03 or 41_XF	05
Other services (Please describe)		-	-		AUD excl. GST	Please group all other services here, meaning that coverage will always be 100% for services. Enter only the material costs (excluding labour, plant, equipment, margins and taxes).	29_SS or multiple	

External works

The materials associated with hard landscaping and outbuildings on the site but outside the building envelope.

This includes hardstands, carparks, driveways, covered walkways, decks, patios, awnings, fences, gates, etc. Soft landscaping should be excluded.

Coverage of spend on external works	-	-	-		%	Required. Coverage of <u>spend</u> for external works (excluding soft landscaping) entered below. Minimum requirement = 80%. Exclude head contractor preliminaries and margins.		
Asphalt	-	-	-		t		33_XR	07
Concrete in-situ	≤10 MPa	-	-		m³	Please enter reinforcing steel as part of "Reinforcing steel" below	33_XR or 34_XN or 35_XB or 36_XL	07
Concrete in-situ	>10 MPa to ≤20 MPa	-	-		m³	Please enter reinforcing steel as part of "Reinforcing steel" below	33_XR or 34_XN or 35_XB or 36_XL	07
Concrete in-situ	>20 MPa to ≤32 MPa	-	-	201.3	m³	Please enter reinforcing steel as part of "Reinforcing steel" below	33_XR or 34_XN or 35_XB or 36_XL	07
Concrete in-situ	>32 MPa to ≤40 MPa	-	-	223.3	m³	Please enter reinforcing steel as part of "Reinforcing steel" below	33_XR or 34_XN or 35_XB or 36_XL	07
Concrete in-situ	>40 MPa to ≤50 MPa	-	-		m³	Please enter reinforcing steel as part of "Reinforcing steel" below	33_XR or 34_XN or 35_XB or 36_XL	07
Concrete in-situ	>50 MPa	-	-		m³	Please enter reinforcing steel as part of "Reinforcing steel" below	33_XR or 34_XN or 35_XB or 36_XL	07
Pavers, bricks and blocks	Concrete	-	-		m²		33_XR	07
Pavers, bricks and blocks	Clay	-	-		m²		33_XR	07
Reinforcing steel	Bar & mesh	-	-	28,973	kg	Include all reinforcing steel bar/mesh in the external works in this row. Usually this is calculated as kg/m³ per concrete element and then summed. Example: 10 m³ of 40 MPa concrete @ 100 kg/m³ + 5 m³ of 50 MPa concrete @ 150 kg/m³ = 1,750 kg reinforcing steel.	33_XR or 34_XN or 35_XB or 36_XL	07
Reinforcing steel	Fibre & strand	-	-		kg	Include all steel fibre reinforcing and steel strand in the external works in this row.	33_XR or 34_XN or 35_XB or 36_XL	07
Structural steel	-	-	-		t		02_11	07
Structural aluminium	-	-	-		t	Includes structures, louvre systems, etc.	35_XB	07
External roof/wall cladding	Polycarbonate	-	-		m²	Enter as profiled polycarbonate sheet that would ordered, including allowance for overlap	35_XB	07
External roof/wall cladding	PVC	-	-		m²	Enter as profiled PVC sheet that would ordered, including allowance for overlap	35_XB	07
External roof/wall cladding	Bitumen sheet	-	-		m²	Enter as bituminous sheet that would ordered, including allowance for overlap	35_XB	07
External roof/wall cladding	Steel profile	-	-		m²	Enter as profiled steel sheet that would ordered, including allowance for overlap	35_XB	07
Fill	-	-	-		t	Include purchased material only. Exclude site-won material.	33_XR or 34_XN or 35_XB or 36_XL	07
Sand & gravel	-	-	-		t	Include purchased material only. Exclude site-won material and sand/gravel in concrete.	33_XR or 34_XN or 35_XB or 36_XL	07
Timber (solid)	Sawn softwood	-	-		m³		33_XR or 34_XN or 35_XB or 36_XL	07
Timber (solid)	Sawn hardwood	-	-		m³		33_XR or 34_XN or 35_XB or 36_XL	07
Timber (engineered)	CLT	-	-		m³		33_XR or 34_XN or 35_XB or 36_XL	07
Timber (engineered)	Glulam	-	-		m³		33_XR or 34_XN or 35_XB or 36_XL	07
Timber (engineered)	LVL	-	-		m³		33_XR or 34_XN or 35_XB or 36_XL	07
Timber (engineered)	OSB	-	-		m³		33_XR or 34_XN or 35_XB or 36_XL	07
Fabric (awning/sunshade)					m²		35_XB or 36_XL	07
Other (Please describe and add unit >>)		-	-			Please enter a description for any external works that does not fit a predefined classification		
Other (Please describe and add unit >>)		-	-			Please enter a description for any external works that does not fit a predefined classification		
Other (Please describe and add unit >>)		-	-			Please enter a description for any external works that does not fit a predefined classification		

Step 3: Certifier details

Fill out blue cells

The material quantities must be determined through an itemised list of building materials (such as a bill of quantities) and certified by a quantity surveyor, designer, engineer or NABERS Assessor.

Person that completed this form	Value	Note
Name	Asela Abayaratne	Required
Company	Napier & Blakeley	Required
ABN	87601474307	
Profession	Quantity Surveyor	Required
Qualification or registration	MAIQS 18471	Required

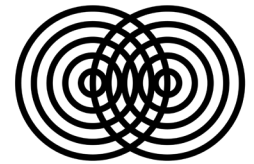
Person that certified the details in this form	Value	Note
Name	Peter Hammond	Required
Company	Napier & Blakeley	Required
ABN	87601474307	
Profession	Director	Required
Qualification or registration	AAIQS 9898	Required

Confirmation of certification	Value	Note
Are 80% of material costs captured for the building's structure, envelope and external works?	Yes	Required
If no - why not?		

Additional comments from data provider

Additional comments of certifier

Attach this Excel spreadsheet to your development application or construction certificate application.

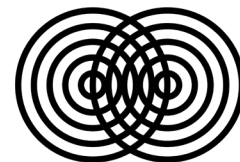


6. Appendix B – GEMS Minimum Efficiency Requirements

Rated output power (kW)	50 Hz motors Minimum efficiency (%)				60 Hz motors Minimum efficiency (%)			
	2-pole	4-pole	6-pole	8-pole	2-pole	4-pole	6-pole	8-pole
0.73	77.4	79.6	75.9	66.2	75.5	78.0	73.0	66.0
0.75	77.4	79.6	75.9	66.2	75.5	78.0	73.0	66.0
1.1	79.6	81.4	78.1	70.8	82.5	84.0	85.5	75.5
1.5	81.3	82.8	79.8	74.1	84.0	84.0	86.5	82.5
2.2	83.2	84.3	81.8	77.6	85.5	87.5	87.5	84.0
3	84.6	85.5	83.3	80.0	87.5	87.5	87.5	85.5
4	85.8	86.6	84.6	81.9	87.5	87.5	87.5	85.5
5.5	87.0	87.7	86.0	83.8	88.5	89.5	89.5	85.5
7.5	88.1	88.7	87.2	85.3	89.5	89.5	89.5	88.5
11	89.4	89.8	88.7	86.9	90.2	91.0	90.2	88.5
15	90.3	90.6	89.7	88.0	90.2	91.0	90.2	89.5
18.5	90.9	91.2	90.4	88.6	91.0	92.4	91.7	89.5
22	91.3	91.6	90.9	89.1	91.0	92.4	91.7	91.0
30	92.0	92.3	91.7	89.8	91.7	93.0	93.0	91.0
37	92.5	92.7	92.2	90.3	92.4	93.0	93.0	91.7
45	92.9	93.1	92.7	90.7	93.0	93.6	93.6	91.7
55	93.2	93.5	93.1	91.0	93.0	94.1	93.6	93.0
75	93.8	94.0	93.7	91.6	93.6	94.5	94.1	93.0
90	94.1	94.2	94.0	91.9	94.5	94.5	94.1	93.6
110	94.3	94.5	94.3	92.3	94.5	95.0	95.0	93.6
132	94.6	94.7	94.6	92.6	95.0	95.0	95.0	93.6
160	94.8	94.9	94.8	93.0	95.0	95.0	95.0	93.6
185	95.0	95.1	94.9	93.3	95.4	95.0	95.0	93.6

Figure 1: Greenhouse and Energy Minimum Standards (Three Phase Cage Induction Motors) Determination 2019, Schedule 1 – Minimum efficiency levels, Table 1 – GEMS level requirements

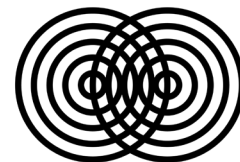
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7. Appendix C – NCC 2022 Volume 1, Table J7D3a: Maximum Illumination Power Density

Space	Maximum illumination power density (W/m ²)
Auditorium, church and public hall	8
Board room and conference room	5
<i>Carpark</i> - general	2
<i>Carpark</i> - entry zone (first 15 m of travel) during the daytime	11.5
<i>Carpark</i> - entry zone (next 4 m of travel) during the day	2.5
<i>Carpark</i> - entry zone (first 20 m of travel) during night time	2.5
Common rooms, spaces and corridors in a Class 2 building	4.5
Control room, switch room and the like - intermittent monitoring	3
Control room, switch room and the like - constant monitoring	4.5
Corridors	5
Courtroom	4.5
Dormitory of a Class 3 building used for sleeping only	3
Dormitory of a Class 3 building used for sleeping and study	4
Entry lobby from outside the building	9
Health-care - infants' and children's wards and emergency department	4
Health-care - examination room	4.5
Health-care - examination room in intensive care and high dependency ward	6
Health-care - all other <i>patient care areas</i> including wards and corridors	2.5
Kitchen and food preparation area	4
Laboratory - artificially lit to an ambient level of 400 lx or more	6
Library - stack and shelving area	2.5
Library - reading room and general areas	4.5
Lounge area for communal use in a Class 3 or 9c building	4.5
Museum and gallery - circulation, cleaning and service lighting	2.5
Office - artificially lit to an ambient level of 200 lx or more	4.5
Office - artificially lit to an ambient level of less than 200 lx	2.5
Plant room where an average of 160 lx vertical illuminance is required on a vertical panel such as in switch rooms	4
Plant rooms with a horizontal illuminance target of 80 lx	2
Restaurant, café, bar, hotel lounge and a space for the serving and consumption of food or drinks	14
Retail space including a museum and gallery whose purpose is the sale of objects	14
<i>School</i> - general purpose learning areas and tutorial rooms	4.5
<i>Sole-occupancy unit</i> of a Class 3 or 9c building	5
Storage	1.5
Service area, cleaner's room and the like	1.5
Toilet, locker room, staff room, rest room and the like	3
Wholesale storage area with a vertical illuminance target of 160 lx	4
Stairways, including <i>fire-isolated stairways</i>	2
Lift cars	3

Figure 2: Table J7D3a: Maximum illumination power density.



8. Appendix D – GEMS Minimum Efficiency Requirements for Air Conditioners up to 65 kW

Kind of product	Product class	Characteristics	Value of R	MEPS value
Air-to-air unitary air conditioners	1	Wall mounted unitary double duct air conditioners	$R \leq 65\text{kW}$	3.10
	2	Portable unitary double duct air conditioners	$R \leq 65\text{kW}$	2.50
	3	Wall mounted unitary single duct air conditioners	$R \leq 65\text{kW}$	3.10
	4	Portable unitary single duct air conditioners	$R \leq 65\text{kW}$	2.50
	5	Ducted or non-ducted, excluding product classes 1 to 4	$R < 10\text{kW}$	3.10
	6	Ducted or non-ducted, excluding product classes 1 to 4	$10\text{kW} \leq R \leq 39\text{kW}$	3.10
	7	Ducted or non-ducted, excluding product classes 1 to 4	$39\text{kW} < R \leq 65\text{kW}$	2.90
Air-to-air single-split systems	8	Non-ducted	$R < 4\text{kW}$	3.66
	9	Non-ducted	$4\text{kW} \leq R < 10\text{kW}$	3.22
	10	Ducted	$R < 10\text{kW}$	3.10
	11	Ducted or non-ducted	$10\text{kW} \leq R \leq 39\text{kW}$	3.10
	12	Ducted or non-ducted	$39\text{kW} < R \leq 65\text{kW}$	2.90
Air-to-air single-split outdoor units	13	Supplied or offered for supply to create a non-ducted system	$R < 4\text{kW}$	3.66
(not supplied or offered for supply as part of a single-split system)	14	Supplied or offered for supply to create a non-ducted system	$4\text{kW} \leq R < 10\text{kW}$	3.22
	15	Supplied or offered for supply to create a ducted system	$R < 10\text{kW}$	3.10
	16	Whether supplied or offered for supply to create a ducted or a non-ducted system	$10\text{kW} \leq R \leq 39\text{kW}$	3.10
	17	Whether supplied or offered for supply to create a ducted or a non-ducted system	$39\text{kW} < R \leq 65\text{kW}$	2.90
Air-to-air multi-split outdoor units (whether or not supplied or offered for supply as part of a multi-split system)	18		$R < 4\text{kW}$	3.66
	19		$4\text{kW} \leq R < 10\text{kW}$	3.22
	20		$10\text{kW} \leq R < 39\text{kW}$	3.10
	21		$39\text{kW} \leq R \leq 65\text{kW}$	2.90
Water-to-air air conditioners	22		$R < 39\text{kW}$	3.50
	23		$39\text{kW} \leq R \leq 65\text{kW}$	3.20

Figure 3: Greenhouse and Energy Minimum Standards (Air Conditioners up to 65kW) Determination 2019, Schedule 1 - Product classes and minimum energy performance standards