MIDTOWN S2

C2 Community Centre

Lot C2 Epping Road, Macquarie Park

DA Sustainability Report

05.08.2021 V.3

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INTEGRAL GROUP

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ACKNOWLEDGEMENT OF COUNTRY

This project acknowledges the Gadigal People of the Eora Nation as the traditional owners of land at the site. It acknowledge their elders, past, present and emerging.

1. INTRODUCTION

1.1 PROJECT DESCRIPTION

The Ivanhoe Estate precinct has been rezoned by the Department of Planning and Environment as part of the Macquarie University Station Priority Precinct. Currently owned by NSW Land and Housing Corporation, its redevelopment is part of the NSW Government Communities Plus program, which seeks to deliver new communities where social housing blends with private and affordable housing, with good access to transport, employment, improved community facilities and open space.

The Midtown Precinct at Macquarie Park is set to become an exemplar master planned community and the benchmark for 21st century integrated communities; characterised by attractive and vibrant lifestyle offerings as well as diverse social, economic and housing opportunities.

Midtown is located a short walk away from both Macquarie university and Macquarie shopping centre. Macquarie is renowned for being an Innovation District and is the second largest business district in NSW, home to various top 100 ASX listed companies.

The Midtown precinct will add to this growing area offering a fully resolved master planned community with an activated Village Green which will be framed with retail offerings, community uses and an extensive network of, walkways and cycleway linkages to nearby Shrimptons creek. The entire Midtown precinct when complete, will accommodate over 3,300 market, social and affordable dwellings.

The **C2** site envisions to become the heart of the Midtown Precinct. The central communal area will consist of the 3,300 sqm Village Green, a 1,122 sqm pool and gym on the lower ground and additional 500 sqm allocated to community space to the upper floor which looks to service residents with an active flexible space adjacent to the School and Aged Care facility with space for an enterprise café.

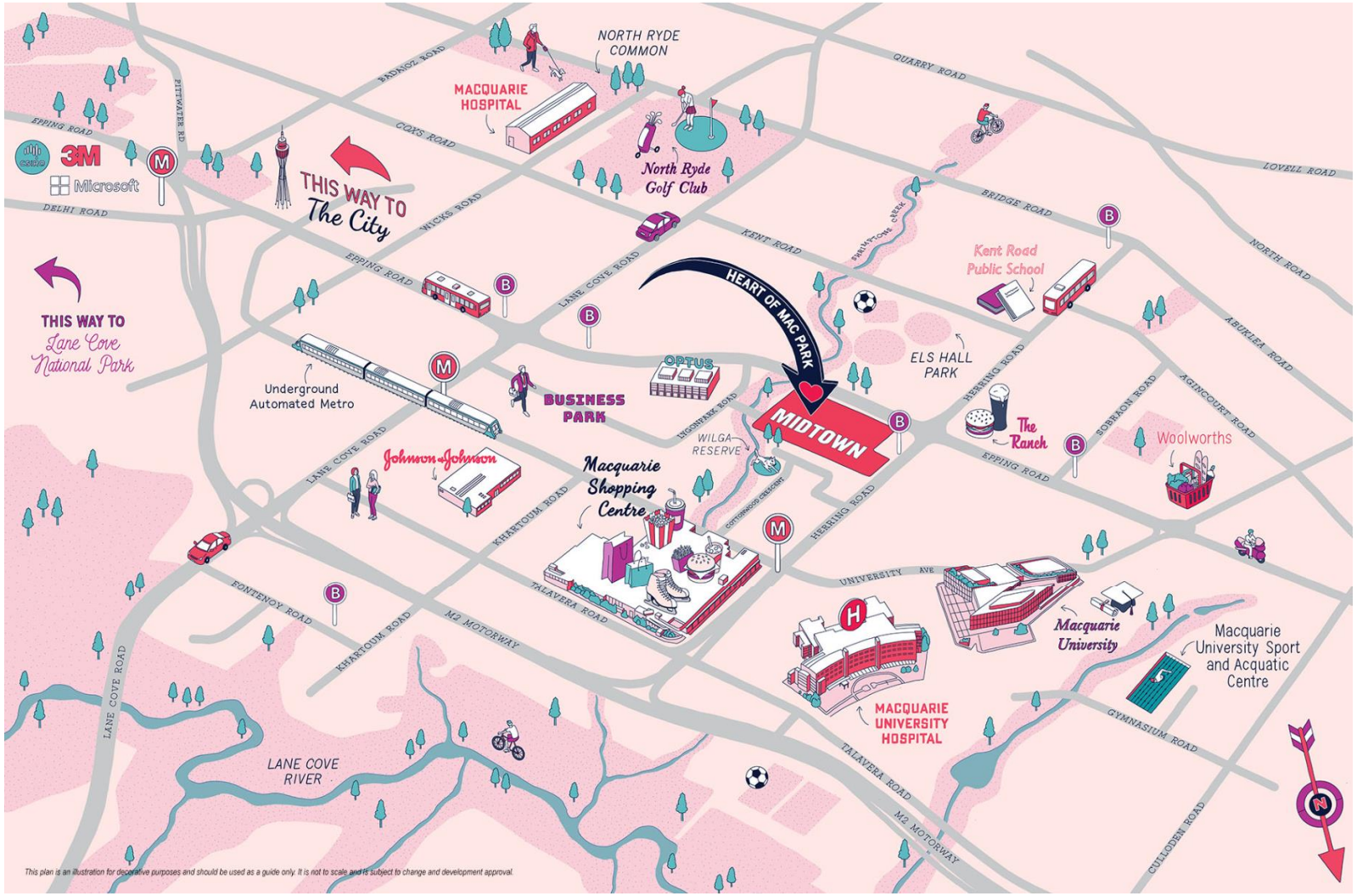


Figure 1 – Midtown map from www.frasersproperty.com.au

2. PERFORMANCE BRIEF

2.1 SEARS REQUIREMENTS

The main purpose of this report is to address SEARs ESD requirements for the project:

- Identify how ESD principles (as defined in clause 7 (4) of Schedule 2 of the regulation) will be incorporated into the design, construction and ongoing operation of the proposed development;
- Demonstrate how the development will achieve the commitments identified in the approved concept plan;
- Demonstrate how future buildings will meet or exceed the relevant industry recognised building sustainability and environmental performance standards, including any green accreditation;
- Demonstrate how the proposal incorporates measures to minimize carbon emissions from both construction/waste materials and in built, embodied design; reflecting the Government's goal of net zero emissions by 2050, and the consumption of resources, water (including through water sensitive design principles and water re-use) and energy.

2.2 APPROVED COMMITMENTS

The precinct is targeting the following sustainability outcomes:

- Sustainability Benchmark #1: 5-star Green Star Design and As-Built v1.3;
- Sustainability Benchmark #2: 6-star Green Star Communities v1.1;
- Sustainability Benchmark #3: Integrated Infrastructure Solution

The repot describes a range of building design and urban infrastructure opportunities for the project to embed the principles of sustainability and give effect to the global, state and local policy relating to amenity, climate change and biodiversity.

It provides a framework with which the project can be made future-proof and responsive to the major challenges that Australian cities are facing.
Sustainability strategies will be presented for the following major components:

- *Architectural design*
- *Building systems design and renewable energy*
- *Materials and procurement*
- *Landscape and site water systems*
- *Offsite opportunities*
- *Transport and mobility.*

Figure 2 – Midtown Artist impression

2. PERFORMANCE BRIEF

2.3 LAND AND HOUSING CORPORATION VISION

NSW Land and Housing Corporation (LAHC) is here to serve the people of New South Wales by developing well-connected communities, preserving our environment, supporting our industries and contributing to a strong economy.

The Department of Planning, Industry and Environment brings together specialists in urban and regional planning, natural resources, industry, environment, Aboriginal and social housing and regional New South Wales.

LAHC shares a common goal to maximise the long-term wellbeing of New South Wales. they do this by protecting and improving:

- Prosperity;
- Environmental sustainability;
- Safety and security;
- Social inclusion and cohesion; and
- Attractiveness as a place for recreation and relaxation.

They strive to be a global leader in the planning and management of resources, environmental and socio-economic security, financial affordability, land use and carbon emissions.

The Department of Planning, industry and Environment cluster is responsible for delivering:

- A strong and liveable New South Wales;
- Maximum community benefit from government land and property;
- Resilient and sustainable environment and energy;
- Sustainable and productive regional industries and communities;
- Sustainable and secure water resources.

2.4 PROJECT OBJECTIVES

The ongoing challenges of increasing urban density, housing affordability and climate change mean we all share the responsibility to improve the liveability of our towns and cities and minimise the impacts of development on our natural environment.

The project will aim to achieve a high level of environmental performance for both the precinct and individual buildings through its design and materials.

By doing this, the project will improve sustainability by reducing water usage and energy costs for residents.

The project will seek to deliver new dwellings with high levels of residential amenity and which also reduce living costs through water and energy efficiency:

- ***To minimize resultant carbon emissions in both the delivery and operation of the building;***
- ***To substantially reduce the water usage in both the delivery and operation of the building;***
- ***To improve building efficiency and reduce operational costs;***
- ***To create a healthy and resilient environment for the community to live and work in, well into the future;***
- ***To demonstrate leadership in sustainable development for social and affordable housing in New South Wales through sustainability measurement tools and policy; and***
- ***To demonstrate effective use of materials to minimise waste in construction and lifestyle.***

Climate Active

NABERS

greenstar

BASIX®
Building Sustainability Index

Figure 3 – Ratings Frameworks for demonstrating leadership

3. PLANNING AND POLICY CONTEXT

3.1 SUPPORTING POLICY

The site will provide a vehicle for the advancement of the comprehensive sustainability-related policy framework in NSW; considering global, Commonwealth, State and Local government policy.

3.2 GLOBAL & COMMONWEALTH POLICY

UN Sustainable Development Goals | At least seven of the UN Sustainable Development Goals are advanced through sustainability in cities and urban renewal and the site provides a material contribution to each:

- *SDG3 – Good Health and Wellbeing* | Ensuring healthy lives and promoting the well-being for all at all ages is essential to all sustainable development.
- *SDG7 – Affordable & Clean Energy* | Ensure access to affordable, reliable, sustainable and modern energy for all
- *SDG8 – Decent Work & Economic Growth* | Promote inclusive and sustainable economic growth, employment and decent work for all
- *SDG9 – Industry, Innovation & Infrastructure* | Build resilient infrastructure, promote sustainable industrialization and foster innovation
- *SDG11 – Sustainable Cities & Communities* | Make cities inclusive, safe, resilient and sustainable
- *SDG12 – Responsible Consumption & Production* | Ensure sustainable consumption and production patterns
- *SDG13 – Climate Action* | Take urgent action to combat climate change and its impacts
- *SDG15 – Life on Land* | Sustainably manage forests, combat desertification, halt and reverse land degradation, halt biodiversity loss.

Figure 4 – UN SDGs relevant to the project

Commitments under the Paris Agreement | Cities are critical to the global goal to reduce GHG emissions in order to hold average temperature increase to well below 2°C and pursue efforts to keep warming below 1.5°C above pre-industrial levels.

The project can provide an approach to net zero emissions, supporting competitiveness in an emissions-constrained global economy.

Smart Cities Plan | The project includes a range of liveability, housing and affordability measures in support of the Smart Cities Plan and the advancement of the City Performance Indicators.

3.3 NSW STATE GOVERNMENT POLICY

NSW Office of Environment and Heritage | The project will give effect to the NSW climate change framework.

It can provide a pathway to the NSW ambition for net zero emissions by 2050 by showcasing a GHG emissions strategy that includes electrification, on-site energy generation, off-site renewable energy procurement, incentivising fuel switching for transport options and offsetting residual emissions with a robust, future ready negative emissions strategy.

NSW Environmental Protection Agency | The site can be an urban exemplar of the Circular Economy, giving effect to the NSW Circular Economy Policy Statement.

NSW Procurepoint | Supporting and advancing the opportunities for Aboriginal and Torres Strait Islander Australians through the procurement and design approaches to the site.

Transport for NSW | The site can be an exemplar for future mobility, including active mobility, movement and place and vehicle electrification.

NSW State Environment Planning Policy – Affordable Rental Housing | The site can be a benchmark project for the Affordable Rental Housing 2009 of the NSW Government policy.

The policy's intent is to facilitate the increased supply and diversity of affordable rental and social housing in NSW. The ARHSEPP covers housing types including in-fill affordable housing, along with secondary dwellings (granny flats), boarding houses, group homes, social housing and supportive accommodation.

The policy seeks to help facilitate development carried out by LAHC and its developer partners by amending provisions for in-fill affordable housing development and LAHC's self-assessment provisions. These include:

- Increasing the maximum number of dwellings that LAHC can self-assess on a single
- A mixture of private, affordable and social housing in a single development.
- Consider its design guidelines 'Good design for social housing', dated September 2020 and 'Land and Housing Corporation Dwelling Requirements' dated September 2020 when self-assessing development proposals.
- Allowing LAHC to self-assess manor house and multi dwelling housing (terraces
- Expansion of the range of residential accommodation dwelling types that attract a density bonus under the in-fill affordable housing provisions to include, manor houses and multi dwelling houses (terraces).
- Expansion of the areas where the in-fill affordable housing provisions apply to include the Central Coast, Wollongong and Newcastle regions as well as Greater Sydney to better capture 'accessible areas' across the State.
- The requirement for all development under the in-fill affordable housing provisions to deliver a minimum 20 per cent of gross floor area as affordable housing.

4. FRAMING NET ZERO OPERATIONS

4.1 DEFINING NET ZERO

The World Green Building Council defines Net Zero Carbon for operating emissions as "highly efficient with all remaining energy from on-site and/or off-site renewable sources".

Many leading global frameworks have expanded the net zero definition to include embodied emissions, and to be more prescriptive in the nature of off-site renewable energy and negative emissions instruments (offsets).

The Green Building Council of Australia has defined 'climate positive' in preference to 'net zero':

1. Fossil Fuel Free
2. Highly efficient
3. Powered by renewable energy
4. Built with low-carbon materials
5. Offset with nature, i.e. re- and afforestation.

4.2 CERTIFICATION

There are a number of options for certification with Net Zero Emissions:

- Certify with Climate Active, an Australian emissions certification scheme;
- Certify with Green Star, within the framework of the Energy category (in design and as-built);
- Certify with the International Living Futures Institute (available for operations only).

4.3 FOSSIL FUEL FREE

Electrification of all building service is crucial to Net Zero Carbon ambition by eliminating the burning of fossil fuels (gas) for building services which cannot be offset by on-site renewables.

4.4 HIGHLY EFFICIENT

A global best practice benchmark for highly efficient residential dwellings is Passive House; requiring exceptional insulation and building sealing with efficient fresh-air delivery.

A best practice benchmark aligned with NSW planning policy is NatHERS: 7 star average.

4.5 POWERED BY RENEWABLE ENERGY

The project will integrate on-site renewable energy and provide mechanisms for off-site renewable energy procurement.

4.6 BUILT WITH LOW-CARBON MATERIALS

The approach to Net Zero Emissions includes consideration of embodied emissions and efforts to reduce the life-cycle impact of greenhouse gasses.

4.7 OFFSET WITH NATURE

All construction projects have some residual emissions – whether as a result of embodied emissions in the materials that are used, refrigerant impacts or residual operating emissions.

To advance to net zero whole-of-life emissions, projects must use off-site negative emissions instruments such as nature-based offset schemes (afforestation or reforestation among others).

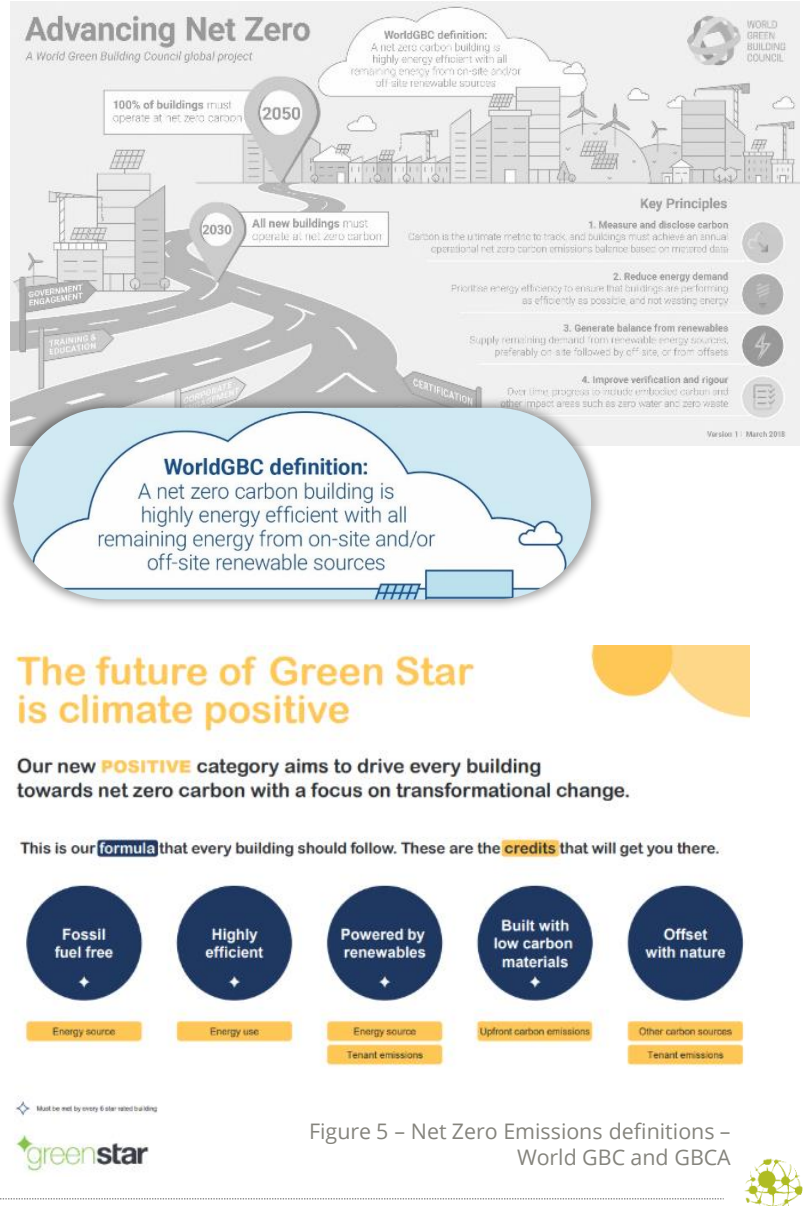


Figure 5 – Net Zero Emissions definitions – World GBC and GBCA

5. DESIGN OPPORTUNITES

5.1 PASSIVE DESIGN

There are a range of passive opportunities to reduce the resource consumption of the building, provide healthy and comfortable spaces for occupants and enable high-efficiency systems.

The Green Star framework provides some guidance for passive design; however the thermal comfort requirements for the project are set by the Nationwide House Energy Rating Scheme (NatHERS) and BASIX. This report identifies a level of performance based on NatHERS requirements.

Certification with the NatHERS will consider the following passive design principles.

- Natural ventilation
- Solar access
- Building fabric
- Shading

5.2 GREEN ROOFS AND WALLS

Roof-top greening will be implemented alongside renewable energy for occupant amenity, building fabric performance and heat island mitigation.

Rainwater harvesting will be implemented precinct-wide for re-use in irrigation and washdown.

5.3 WASTE MANAGEMENT

Smart waste collection to improve separation, recycling and spatial efficiency and organic waste management have been considered.

5.4 EFFICIENT HVAC AND DHW SERVICES

The opportunities that have been explored for efficient building services include:

- Electrification; providing systems that reduce the future reliance of the project on fossil fuels.
- Efficient HVAC and advanced commissioning for heating/cooling with mechanical ventilation to mitigate condensation risk and filter external pollutants.
- Refrigerants in HVAC systems will minimize global warming and ozone-depleting potential.
- Domestic hot water (DHW) systems will efficient, zero fossil-fuels options.
- Occupant education with a building user guide for building occupants to support optimal use of efficient buildings systems.

5.5 LIGHTING & ELECTRICAL SYSTEMS

- Daylight maximization
- Energy efficient fittings.
- Controls such as automated occupancy controls on lighting and ventilation, using motion-sensor technology.

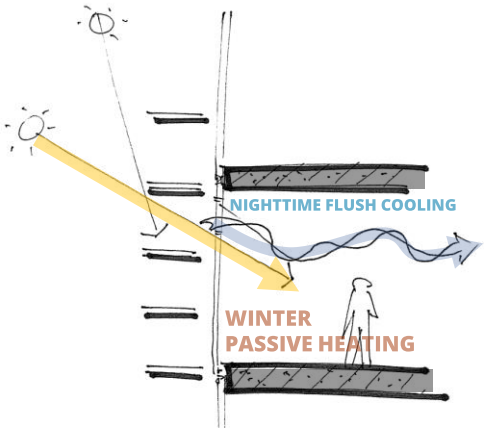


Figure 6 – Passive Design Strategies to create a comfortable environment.

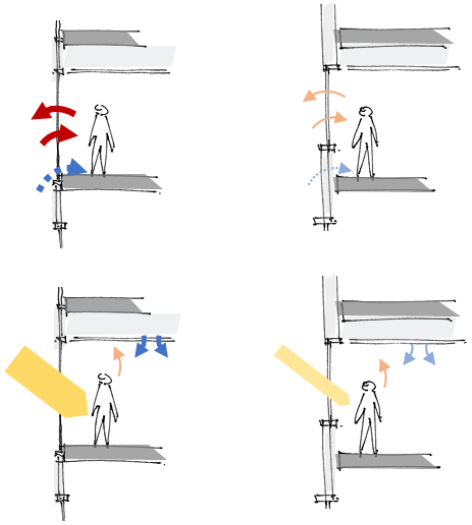


Figure 7 – Efficient Integrated systems on precinct

6. RENEWABLE ENERGY OPPORTUNITIES

6.1 RENEWABLE ENERGY AND STORAGE

On-site renewable energy generation through rooftop PV can provide the most cost-effective mitigation of GHG emissions and create a low-carbon utility grid.

Preliminary analysis indicates a plausible solar arrangement as shown in the opposite plan.

Onsite renewable energy can support shared facilities, or with an embedded network operator can be operated allocated to residents too.

On-site battery storage can support the optimization of on-site solar and also improve the reliability of power for emergency purposes during any loss of power.

Batteries are increasingly important for grid stability and the firming of renewable generation.

The precinct is targeting a 1.5MW PV System covering approximately 50% of site roof space. The balance of roof space will be green roofs and open areas.

Figure 8 – Solar PV

7. MOBILITY AND PUBLIC REALM OPPORTUNITIES

7.1 CLIMATE RISK

Climate risk mitigation related to heat is a necessity in Sydney.

Prolonged periods of time of extreme heat and drought will be more frequent in the future and affect health and wellbeing of the community.

Urban heat island mitigation will be supported with shading, green infrastructure and high SRI surfaces.

7.2 GREEN & BLUE INFRASTRUCTURE

Water sensitive urban design will contribute to measurable improvements to local air and water quality as well as thermal comfort in the public realm.

7.3 ACTIVE TRANSPORT

The approach to mobility will prioritize active transport options:

- Bicycles – end of trip facilities and secure storage
- Pedestrians – public spaces and intersections that are safe and amenable

7.4 FUTURE MOBILITY

The project will also consider the future of mobility:

- Electric vehicles
- Shared vehicles
- Connected & autonomous vehicles
- E-mobility.

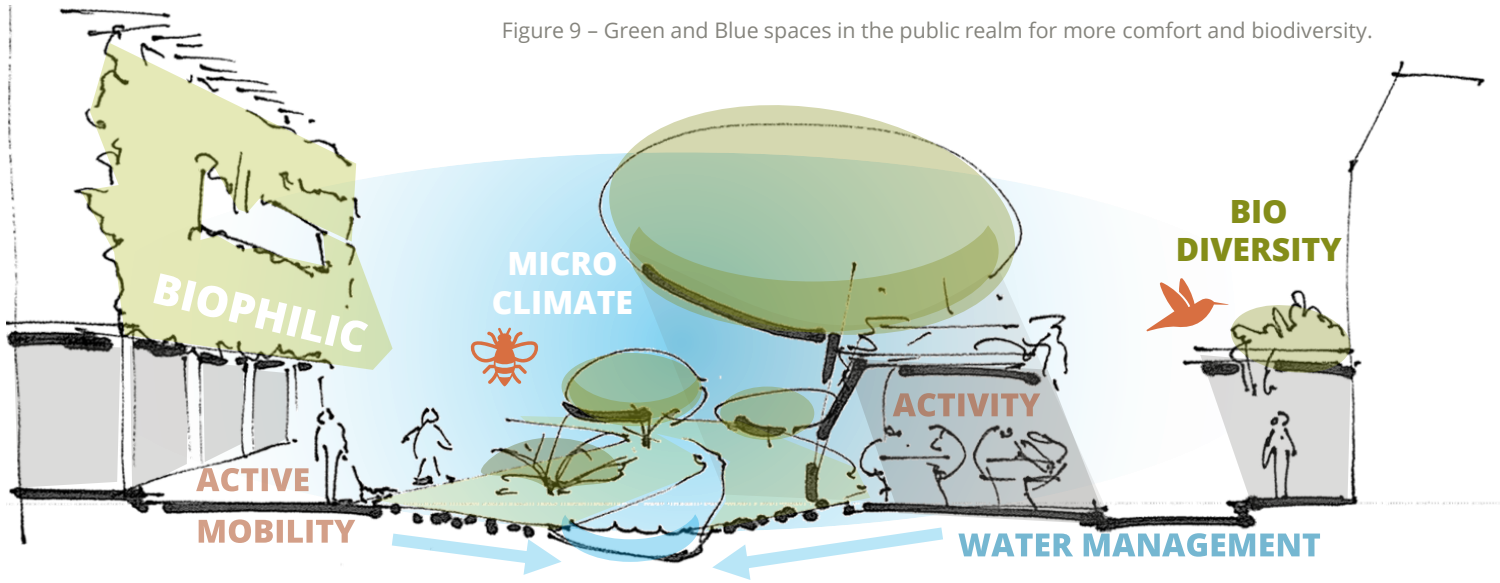


Figure 9 – Green and Blue spaces in the public realm for more comfort and biodiversity.

Figure 10 – Active Transport facilities combined with Smart Mobility to future-proof the public domain.

8. SECTION J COMPLIANCE

Section J Energy Efficiency of Volume One of the National Construction Code (NCC) Series 2019 provides minimum performance requirements for the building to incorporate energy efficiency in the building and services design.

The building services for The Proposal must be designed to meet the minimum Deemed To Satisfy provisions of the relevant parts.

Recommendations for compliance have been addressed in our preliminary design analysis. We have assessed the proposal in terms of recommended window to wall ratios, glazing specification and building fabric thermal performance. By doing so we are confident that Section J compliance is achievable.

The project shall continue to address the opposite NCC requirements through the design of construction elements as well as product specification, during design development stages.

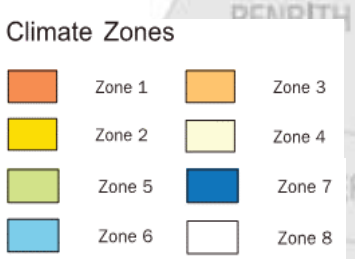
8.1 PROJECT DETAILS

BUILDING CLASS

- 9b – Pool, Gym, Community and Multipurpose
- 6 - Cafe

CLIMATE ZONE

- 5 - Warm temperate



8.2 GENERAL REQUIREMENTS

ROOF AND CEILING CONSTRUCTION

- R3.7 for a downward direction of heat flow; and
- Upper surface of the roof must be ≤ 0.45

TOTAL SYSTEM WALL-GLAZING CONSTRUCTION

	Class 9B	Class 6
U-Value	≤ 2.0	≤ 2.0
Solar Admittance	≤ 0.13	≤ 0.13

WALL COMPONENT

	< 80% of system	≥ 80% of system
R-Values	≥ 1.0	≥ 1.4

SPANDREL COMPONENT

	Insulation	Total R-value
Configuration 4: Thermally broken frame, Double glazed low-e clear + 50mm air gap + 3mm aluminium, 0.8mm galvanized steel or zinc back pan.	**R-2.0**	**R-1.11**

SHADING DEVICES

- Able to restrict at least 80% of summer solar light incidence; and
- If adjustable, will automatically respond to solar radiation levels.

FLOOR CONSTRUCTION

- R2.0 for a downward direction of heat flow

THERMAL BRIDGING

- Needs to be calculated for compliance with the required Total System R-values for both wall-glazing and roof construction in accordance with AS/NZS 4859.2

9. GREEN STAR INITIATIVES

The project has committed to achieving a *5-star Green Star Design and As-Built* rating for each separate building, as well as *6-star Green Star Communities* for the whole precinct.

Green Star is a comprehensive environmental rating system for buildings and communities. Green Star separately evaluates the environmental initiatives of design, projects and/or buildings based on several criteria, including energy and water efficiency, indoor environmental quality and resource conservations.

The Green Star environmental rating system for buildings was created for the property industry in order to:

- Establish a common language;
- Set a standard of measurement for green buildings;
- Promote integrated, whole-building design;
- Recognise environmental leadership;
- Identify building life-cycle impacts; and
- Raise awareness of green building benefits.

6 STAR COMMUNITIES RATING TARGETS

Sustainable Site	Maximise the ecological value of site to be close to or exceeding existing (biodiversity, permeable surfaces, urban greening): 1. Protect the existing Turpentine Ironbark Forest 2. Maintain its functional connection to Shrimptons Creek riparian habitat through the site and with fauna crossings at road intersections. 3. Mitigating the urban heat island effect with extensive landscaped public domain, green roofs, low-SRI roofs and solar PV.
	Mitigating the urban heat island effect with extensive landscaped public domain, light coloured roofs, green roofs and solar PV.
	Employ Water Sensitive Urban Design Manage stormwater. Manage urban stormwater with water sensitive urban design including swales and permeable detention basins
Transport & Connectivity	A connected and permeable site to encourage active transport and use of public transport
	At least one bicycle parking space to be provided for each dwelling and at least 200 provided for visitors
	Provision of 50 GoGet spaces
	Electric vehicle ready
	End of trip facilities for non-residential buildings
Community Health & Happiness	To fully quantify and track tangible health and well-being metrics through programs and partnerships including Live Life Get Active and Mission Australia's Strengthening Communities amongst others.
	Public domain that encourages social interaction, has activated street frontages, is adaptable and comfortable, and is pedestrian-oriented
	A minimum 200 volunteer hours on various community activities specifically for Ivanhoe Estate.
Living Costs	Development reduces average living costs for households, and average operating costs for businesses, compared with business as usual
	Whole of life affordability strategy considering: Housing, Utilities, Food and Transit
	The CCAP Precinct report indicates in excess of a 40% reduction in living costs.
Local Economy	Integrate commercial opportunities within precinct, including spaces suitable for small business or home business operations and / or work from- home 1. Community Hub – fitted out with offices and session rooms for the delivery of MA's tenant support programs and also drop-in offices for the delivery of community services 2. Social Enterprise Space – opportunities for social enterprise development in conjunction with the community.
	The Strengthening Communities program will deliver opportunities that MA and MAH can create through the operation of the residential community such as: 1) Landscaping, 2)Common area maintenance, 3) Administration of the Community Hub, and 4) Live Work Dwellings are incorporated in buildings along the main street which will be suitable for small business or home business

9. GREEN STAR | PATHWAY TO GREEN STAR D&AB

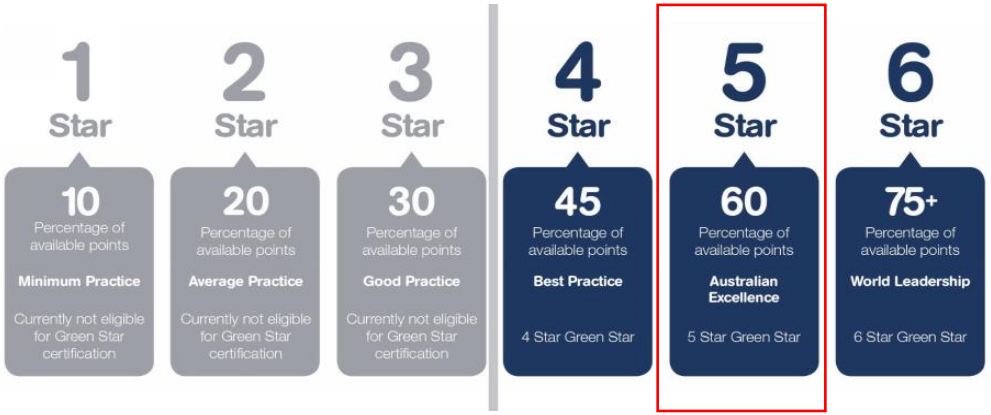
Green Star - Design & As Built Scorecard

Project: Midtwon C2 Frasers Residential Project

Targeted Rating: **5 Star – Australian Excellence**

CATEGORY / CREDIT	POINTS AVAILABLE	POINTS TARGETED
Management	14	11
Indoor Environment Quality	17	12
Energy	17	11
Transport	7	7
Water	6	5
Materials	12	10
Land Use & Ecology	6	4
Emissions	5	4
Innovation	10	5

	AVAILABLE	TARGETED
Core	100	64
Innovation	10	5
Total Score Targeted		**69**



Green Star - Design & As Built Scorecard

5 Star – Australian Excellence

Project:	**Round:**	Please select the round of assessment	
Targeted Rating:			

Core Points Available	Total Score Targeted
100	64

greenstar

AVAILABLE	TARGETED
100	64
10	5
	69

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9. GREEN STAR | MANAGEMENT

1.1 Accredited Professional
- No special requirements to plan.

2.0, 2.2, 2.1 & 2.4 – Commissioning & Tuning
- Services & Maintainability review during design
- Comprehensive pre commissioning and commissioning
- Commit to tuning process after PC

3.1 - Climate Adaptation Plan
- Develop Climate Adaptation Plan during design
- Include solutions suggested in CAP in the design

4.1 – Building Information
- Develop Operations & Maintenance manual
- Develop building log-book
- Building user information documents

6.1 – Metering and Monitoring
- Common area sub-metering requirements:
  - All floors to be separately metered
  - Metering split by all major usages
- Install automatic monitoring system
- Implement monitoring strategy
- Smart BMS required to provide data hourly/daily/monthly/annually

CATEGORY / CREDIT	CODE	CREDIT CRITERIA	POINTS AVAILABLE	POINTS TARGETED
Management			**14**	
Green Star Accredited Professional	1.1	Accredited Professional	1	1
Commissioning and Tuning	2.0	Environmental Performance Targets	-	Complies
	2.1	Services and Maintainability Review	1	1
	2.2	Building Commissioning	1	1
	2.3	Building Systems Tuning	1	1
	2.4	Independent Commissioning Agent	1	0
Adaptation and Resilience	3.1	Implementation of a Climate Adaptation Plan	2	2
Building Information	4.1	Building Information	1	1
Commitment to Performance	5.1	Environmental Building Performance	1	0
	5.2	End of Life Waste Performance	1	0
Metering and Monitoring	6.0	Metering	-	Complies
	6.1	Monitoring Systems	1	1
Responsible Construction Practices	7.0	Environmental Management Plan	-	Complies
	7.1	Environmental Management System	1	1
	7.2	High Quality Staff Support	1	1
Operational Waste	8A	Performance Pathway: Specialist Plan	1	1
	8B	Prescriptive Pathway: Facilities	1	0
Total			**14**	**11**

7.0 -, 7.1 & 7.2 – Responsible Construction Practices
- Best Practice EMP is minimum requirement
- Environmental Management System during construction
- High Quality Staff support practices in place: contractor programs & workshops.

8A – Operational Waste – Performance Pathway
- Waste specialist plan
- Waste streams shall be separate by landfill, co-mingled recycling and at least on other waste stream (eg. organics or e-waste).
- Provide dedicated waste storage areas adequately sized as per third-party best practice guidelines, according to waste generation and collection frequency.
- Access to waste storage areas to meet third-party best practice guidelines.

9. GREEN STAR | INDOOR ENVIRONMENT QUALITY

9 – Indoor Air Quality

- **9.1** Ventilation system complies with: minimum distances between air intakes and pollutant sources (eg. exhausts) as per ASHRAE 62.1:2013; design for easy maintenance; cleaning prior to use/occupation
- **9.2A** OA provided at least at 50% higher than AS 1668.2:2012.
- **9.3** Sources of indoor pollutants should be eliminated or exhausted directly to the outside (Eg. printers and kitchen equipment)

10 – Acoustic Comfort

- **10.1 Internal Noise Level** measurement and documentation must be provided by a qualified acoustic consultant. For naturally ventilated buildings, all measurements must be carried out with natural ventilation openings in the open position.
- **10.2 Reverberation** measurements to achieve the 'Recommended Reverbetaion Times' recommended in Table 1 of AS/NZ 2017:2016
- **10.3 Acoustic Separation _ Sound Reduction**
    - Fixed partitions without a door (including glazed) must achieve an Rw of at least 45.
    - All partition types containing a door must achieve an Rw of at least 35.
    - Compliance demonstrated through measurements.

11 – Lighting Comfort

- **11.0 Minimum:** Ensure flicker-free lighting and colour quality as a minimum.
- **11.1.1 Illuminance:** Lighting levels comply with best practice guidelines and glare is eliminated.
- **11.1.2 Localised lighting control:** Ensure that occupants have the ability to control the lighting in their immediate environment.

CATEGORY / CREDIT	CODE	CREDIT CRITERIA	POINTS AVAILABLE	POINTS TARGETED
Indoor Environment Quality			**17**	
Indoor Air Quality	9.1	Ventilation System Attributes	1	1
	9.2C	Provision of Outdoor Air _ Natural Ventilation	2	1
	9.3	Exhaust or Elimination of Pollutants	1	1
Acoustic Comfort	10.1	Internal Noise Levels	1	1
	10.2	Reverberation	1	1
	10.3C	Acoustic Separation _ Residential Projects	1	1
Lighting Comfort	11.0	Minimum Lighting Comfort	-	Complies
	Illuminance and Glare Reduction	11.1.1B General Illuminance _Residential Spaces 11.1.2A Glare Reduction_Prescriptive Method	1	1
	11.2C	Surface Illuminance _ Residential Spaces prescriptive method	1	0
	11.3	Localised Lighting Control	1	1
Visual Comfort	12.0B	Glare Reduction _Blinds or Screens	-	Complies
	12.1A	Daylight _ Prescriptive Method	2	0
	12.2	Views	1	1
Indoor Pollutants	Adhesives, Sealants and Carpets	13.1.1A Paints, Adhesives and Sealants_Product Certification 13.1.2A Carpets _ Product Certification	1	1
	13.2A	Engineered Wood Products _ Product Certification	1	1
Thermal Comfort	14.1B	Thermal Comfort _Mechanically ventilated spaces	1	1
	14.2	Advanced Thermal Comfort	1	0
Total			**17**	12

9. GREEN STAR | INDOOR ENVIRONMENT QUALITY

12 – Visual Comfort

- **12.0 Glare reduction:**
  - Install blinds/screens for all areas, controlled by occupants, VLT <10%. These must reduce at least 95% of the viewing façade and skylights; **OR**
  - Skylights and 1.5m of floor plane along all viewing facades, to be shaded from direct sunlight during 80% of the nominated hours through the seasons.

- **12.1A Daylight Prescriptive Methodology**: use hand calc to determine zone of compliance (minimum 60%)
- **12.2 Views:** 60% of nominated area has a clear line of sight to high quality internal or external view.

12.2 Views

At least 60% of the nominated areas has a clear line of sight to a high quality internal or external view. All floor areas within 8m from a compliant view can be included in this criterion.

13 – Indoor Pollutants

- Paints, Adhesives, Sealants, Carpets and Engineered Wood Products need to be certified under a recognised Product Certification Schemes or laboratory testing.

14.1B – Thermal Comfort – Mechanically ventilated spaces

Nominated spaces meet specified prescriptive criteria for thermal comfort or the Predicted Mean Vote levels are between -1 and +1.

CATEGORY / CREDIT	CODE	CREDIT CRITERIA	POINTS AVAILABLE	POINTS TARGETED
Indoor Environment Quality			**17**	
Indoor Air Quality	9.1	Ventilation System Attributes	1	1
	9.2C	Provision of Outdoor Air _ Natural Ventilation	2	1
	9.3	Exhaust or Elimination of Pollutants	1	1
Acoustic Comfort	10.1	Internal Noise Levels	1	1
	10.2	Reverberation	1	1
	10.3C	Acoustic Separation _ Residential Projects	1	1
Lighting Comfort	11.0	Minimum Lighting Comfort	-	Complies
	Illuminance and Glare Reduction	11.1.1B General Illuminance _Residential Spaces 11.1.2A Glare Reduction_Prescriptive Method	1	1
	11.2C	Surface Illuminance _ Residential Spaces prescriptive method	1	0
	11.3	Localised Lighting Control	1	1
Visual Comfort	12.0B	Glare Reduction _Blinds or Screens	-	Complies
	12.1A	Daylight _ Prescriptive Method	2	0
	12.2	Views	1	1
Indoor Pollutants	Adhesives, Sealants and Carpets	13.1.1A Paints, Adhesives and Sealants_Product Certification 13.1.2A Carpets _ Product Certification	1	1
	13.2A	Engineered Wood Products _ Product Certification	1	1
Thermal Comfort	14.1B	Thermal Comfort _Mechanically ventilated spaces	1	1
	14.2	Advanced Thermal Comfort	1	0
Total			**17**	12

9. GREEN STAR | ENERGY

15A – Greenhouse Gas Emissions – Prescriptive Pathway

15A.0 Conditional
- Exceed Part J1 by 5%.

15A.1 Building Envelope
- Points awarded based on calculated on the basis of improvement in building performance for roofs, ceilings, floors and roof lights .

15A.2 Glazing
- Solar admittance and u-value in excess of the code

15A.3 Lighting
- At least 10% better aggregated illumination power than the code
- Automated lighting controls systems required throughout 95% of the nominated area.

15A.5 Domestic Hot Water
- Powered by renewable energy or waste heat; or
- Primary source is a heat pump with COP > 3.5.

15A.6 Transition Plan
- Commit to the transition away from fossil fuels.

15A.7 Fuel Switching
- No fossil fuels are burned on-site for electricity generation, heating or cooling.
- 15% of energy from on-site renewables.

CATEGORY / CREDIT	CODE	CREDIT CRITERIA	POINTS AVAILABLE	POINTS TARGETED
Energy			**22**	
	15A.0	Conditional Requirement: Prescriptive Pathway	1	-
	15A.1	Building Envelope	1	1
	15A.2	Wall-Glazing Construction and Retail Display Glazing	1	1
	15A.3	Lighting	1	1
	15A.4	Ventilation and Air Conditioning	1	
	15A.5	Domestic Hot Water	1	1
	15A.6	Transition Plan	1	1
	15A.7	Fuel Switching	1	1
	15A.8	On-Site Storage	1	
	15A.9	Vertical Transportation	1	
	15A.10	Off-Site Renewables	5	5
Peak Electricity Demand Reduction	16A	Prescriptive Pathway: On-Site Energy Generation	2	1
Total			**17**	**11**

15B.10 Off-site Renewables
- At least 10 points in this pathway have been achieved, AND
- A supply contract is in place to procure 100% of the building's electricity consumption through off-site renewable electricity solutions.

Minimum time of procurement: 10 years after PC.

16A – Peak Electricity Demand Reduction - Prescriptive Pathway
- On-site renewable energy sources reduces peak electricity demand by at least 15%.
- Peak Electricity demand must be calculated in accordance with AS/NZS 3000:2007, including all building end-use loads except for process loads.

9. GREEN STAR | TRANSPORT

17B – Sustainable Transport – Prescriptive Pathway

17B.1 Access by Public Transport
- Minimum 15% of people within the Greater Capital City Statistical Area can access the site by public transport within 45 min during peak hour.

17B.2 Reduced Car Parking Provision
- A reduction of car parking spaces compared to the local planning allowance. Points are awarded based on the level of the reduction and the site's access to public transport.

17B.3 Low Emission Vehicle Infrastructure

17B.3B Parking for Electric Vehicles
- 5% of parking is dedicated to electric vehicles and charging infrastructure is provided for each space. Charging infrastructure must be easily accessed by the users of dedicated electric vehicle charging spaces. **OR**

17B.3C Parking for Shared vehicles
- For residential projects (at least 80% GFA Class 1 or 2), dedicated and clearly designated car share spaces and vehicles are provided at the rate of 1 per 70 project occupants.

17B.4 Active Transport Facilities
- Bicycle parking and associated facilities are provided to a proportion of the building's regular occupants and visitors.

17B.5 Walkable Neighborhoods
A. Proximity to Amenities
- At least 8 amenities are within 400 m of the project.

CATEGORY / CREDIT	CODE	CREDIT CRITERIA	POINTS AVAILABLE	POINTS TARGETED
Transport			**10**	
Sustainable Transport	17A	Performance Pathway	0	0
	17B.1	Access by Public Transport	3	3
	17B.2	Reduced Car Parking Provision	1	1
	17B.3A	Low Emission Vehicle Infrastructure _ Parking for fuel-efficient vehicles	1	1
	17B.4	Active Transport Facilities	1	1
	17B.5A	Walkable Neighbourhoods _ Proximity to Amenities	1	1
Total			**7**	**7**

CATEGORY / CREDIT	CODE	CREDIT CRITERIA	POINTS AVAILABLE	POINTS TARGETED
Water			**12**	
Potable Water	18A	Potable Water - Performance Pathway	12	0
	18B.1	Sanitary Fixture Efficiency	1	1
	18B.2	Rainwater Reuse	1	0
	18B.3	Heat Rejection	2	2
	18B.4	Landscape Irrigation	1	1
	18B.5	Fire Protection System Test Water	1	1
Total			**12**	5

18B – Potable Water - Prescriptive Pathway B

18B.1 Efficient Sanitary Fixtures
All fixtures are within one star of specified WELS ratings:

- Taps: 6 star
- Urinals: 6 Star
- Toilet: 5 Star
- Showers: 3 Star
- Dishwashers: 6 Star

18B.3 Heat rejection
- No water is used for heat rejection. For example, by using natural ventilation.

18B.4 Landscape irrigation
- Drip irrigation, OR moisture sensors are installed; OR No potable water is used for irrigation.

18B.5 Fire Protection System Test Water
- No water is used for fire system testing, **OR** at least 80% of test water is captured and reused

9. GREEN STAR | MATERIALS

19A – Life Cycle Impacts - Performance Pathway

19A.1 + 19A.2 – Comparative Life Cycle Assessment

- A whole of building, whole of life LCA is conducted for the project and a reference building
- Additional Reporting is included

20 - Responsible Building Materials

20.1 – Structural and reinforcing steel

20.1.0 – Responsible Steel Maker:

- The steel making facility has an ISO 14001 Environmental Management System (EMS) in place.
- The steel maker supplying the steel is a member of the World Steel Association (WSA) Climate Action Programme (CAP).

20.1A Responsible Steel Fabricator:

- The steel fabricator must be a member of the ASI's Environmental Sustainability Charter Group

20.2 – Timber

20.2.A – Certified Timber:

- Timber must be certified by a forest certification scheme (FSC, PEFC)

20.3 – Permanent Formwork, Pipes, Flooring, Blinds and Cables

20.3.B – Best Practice Guidelines for PVC:

- A valid audit verification certificate for each of the PVC products specified or used in the project. Show compliance against GBCA's Best Practice Guidelines for PVC.

CATEGORY / CREDIT	CODE	CREDIT CRITERIA	POINTS AVAILABLE	POINTS TARGETED
Materials			**14**	
Life Cycle Impacts	19A.1	Life Cycle Assessment	6	4
	19A.2	Additional Reporting	4	1
Responsible Building Materials	20.1 A	Structural and Reinforcing Steel _ Responsible Steel Fabricator	-	Complies
	B.2		1	1
	20.2 A	Timber _ Certified Timber	1	1
	20.3 A	Permanent Formwork, Pipes, Flooring, Blinds and Cables _ No PVC	1	1
Sustainable Products	21.1	Product Transparency and Sustainability	3	1
Construction and Demolition Waste	22.0	Reporting Accuracy	-	Complies
	22A	Fixed Benchmark	0	0
	22B	Percentage Benchmark	1	1
Total			**12**	**10**

21.1 Sustainable Products

> 3% Eligible products meet the following pathways for compliance: Reused, Recycled content, EPD, Third party certified, OR Stewardship Programs. A combination of pathways can be used.

22 – Construction and Demolition Waste

22.0 – Reporting Accuracy:

Waste contractors and waste processing facilities servicing the project demonstrate compliance with the Green Star Construction and Demolition Waste Reporting Criteria.

- Either show a Compliance Verification Summary issued by a Suitably Qualified Auditor, or;
- Complete a Disclosure Statement outlining how much of the Green Star Construction and Demolition Waste Reporting Criteria has been implemented.

22B – Percentage Benchmark

Demonstrate that >90% of construction and demolition waste has been diverted from landfill.

9. GREEN STAR | LAND USE & ECOLOGY and EMISSIONS

23.0C Ecological Value Professional report confirming the site does not contain any critically endangered or vulnerable species or communities.

24 – Sustainable Sites

24.0 Previously Developed land
Demonstrate previous condition of the site by reporting that the project site was previously developed.

24.1 Reuse of Land
>75% of the site was previously developed at the time of purchase. Aerial photographs and As-built drawings as evidence.

24.2 Contamination and Hazardous Materials
Site contamination to be remediated in accordance to best practice.

25.1 Heat Island Effect Demonstrate that at least 75% of the whole site area comprises of heat island mitigation solutions. The most applicable for this project are:

- Vegetation
- Green Roof
- Cool roof materials
- Shaded hardscaping

26 – Stormwater

26.1 Peak Stormwater Discharge
Post-development peak Average Recurrence Interval (ARI) event discharge from the site does not exceed pre-development levels.
- Roof collection & use
- Infiltration in soil
- Water retention

26.2 Stormwater Pollution Targets
- Credit 26.1 needs to be achieved in order to target 26.2
- Post-development situation meets pollution reduction targets compared to untreated runoff.
- Shown through modelling or manual calculation.

CATEGORY / CREDIT	CODE	CREDIT CRITERIA	POINTS AVAILABLE	POINTS TARGETED
Land Use & Ecology				
Ecological Value	23.1	Ecological Value	3	1
Sustainable Sites	24.0	Conditional Requirement	-	Complies
	24.1	Reuse of Land	1	1
	24.2	Contamination and Hazardous Materials	1	1
Heat Island Effect	25.1	Heat Island Effect Reduction	1	1
Total			**6**	**4**

CATEGORY / CREDIT	CODE	CREDIT CRITERIA	POINTS AVAILABLE	POINTS TARGETED
Emissions			**5**	
Stormwater	26.1	Stormwater Peak Discharge	1	1
	26.2	Stormwater Pollution Targets	1	1
Light Pollution	1.	Light Pollution to Neighbouring Bodies	-	Complies
	2.	Light Pollution to Night Sky	1	1
Microbial Control		Legionella Impacts from Cooling Systems	1	1
Refrigerant Impacts	29.1	Refrigerants Impacts	1	0
Total			**5**	**4**

27 – Light Pollution

27.0 Light Pollution to neighbouring bodies
- All outdoor lighting complies with AS 4282:1997 Control of the obtrusive effects of outdoor lighting.

27.1 Light pollution to night sky
- Control of Upward Light output ratio (ULOR): no external luminaire has a ULOR higher than 5%.

28 – Microbial Control

28B Waterless Heat Rejection Systems
- Any building cooling rejection system do not use or contain water

9. GREEN STAR | INNOVATION

30 – Innovation

Preselected Innovation Credits are;

1. Community Benefits
2. Financial transparency
3. Local procurement 1
4. Local procurement 2
5. Marketing Excellence

CATEGORY / CREDIT	CODE	CREDIT CRITERIA	POINTS AVAILABLE	POINTS TARGETED
Innovation			**10**	
Innovative Technology or Process	30A	Innovative Technology or Process	10	
Market Transformation	30B	Market Transformation		
Improving on Green Star Benchmarks	30C	Improving on Green Star Benchmarks		
Innovation Challenge	30D	Innovation Challenge		5
Global Sustainability	30E	Global Sustainability		
Total			**10**	**5**

AVAILABLE	TARGETED
100	**64**
10	**5**
TOTAL	**69**

10. SUMMARY

The precinct is achieving the planning requirements through a series of strategies, which are captured in the summary matrix below.

PLANNING REQUIREMENT	PRECINCT PROJECT RESPONSE
Identify how ESD principles will be incorporated into the design, construction and ongoing operation of the proposed development	Incorporated through: • Architectural design • Building systems design and renewable energy • Materials and procurement • Landscape and site water systems • Offsite opportunities • Transport and mobility.
Demonstrate how the development will achieve the commitments identified in the approved concept plan:	
• 5-star Green Star Design and As-Built v1.3;	Committed to 5 stars GS D&AB v1.3. Refer to targeted pathway in Section 9
• 6-star Green Star Communities v1.1;	Committed to 6 stars GS Communities v1.1. Refer to Section 9
• Precinct wide averaged Basix 40 Energy target;	Passive design strategies, On-site renewable energy generation, efficient systems
• Precinct wide averaged Basix 45 Water target;	Water efficient fixtures/fittings, rainwater tank and reuse for landscape irrigation
• 6 Stars average NatHERS;	Passive design strategies
• NABERS 5-star water for all commercial components;	Water efficient fixtures/fittings, rainwater tank and reuse for landscape irrigation
• Carbon Neutral in operations;	• Green power procurement • 1.5 MW Solar PV System precinct-wide • Reduction in Embodied carbon • Integrated utilities infrastructure
• Materials sustainability & Waste reduction	Achieved through Green Star certification
• Sustainable transport and mobility	Achieved through Green Star certification
Demonstrate how future buildings will meet or exceed the relevant industry recognised building sustainability and environmental performance standards, including any green accreditation;	Committed to 5 stars Green Star D&AB v1.3 and 6 stars Green Star Communities
Demonstrate how the proposal incorporates measures to minimize carbon emissions from both construction/waste materials and in built, embodied design; reflecting the Government's goal of net zero emissions by 2050, and the consumption of resources, water (including through water sensitive design principles and water re-use) and energy.	• Achieved through commitment to carbon zero operations; • Green Star certifications; and • Integrated utilities infrastructure

11. ANNEXES

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PROJECT CORRESPONDENCE

Date: Tuesday, June 29, 2021
To: Frasers Property
Attention: Liz Yao
From: David Arnott
Project Name: **C2_Midtown Precinct S2**
Project No: 640018.000
Email: liz.yao@fraserspropery.com.au

Sent	Company	Name	Email
cc	Frasers Property	Hallum Jennings	hallum.jennings@fraserspropery.com.au
cc	Frasers Property	Robert Cauchi	Robert.Cauchi@fraserspropery.com.au
cc	CHROFI	Hugo Raggett	hugo@chrofi.com
cc	Integral Group	Melissa Nouel	melissa.nouel@integralgroup.com

RE: Section J – Review of DTS provisions

This correspondence provides an update of Integral Group's preliminary assessment of the Section J DTS provisions for C2 of the Midtown Precinct S2. The compliance of the current design with the provisions of the National Construction Code (NCC) version 2019 is reviewed in this document.

The below advice is limited to Part J1 – Building Fabric. More detail will be included in the final Section J compliance report at the end of the current stage.

Table 1 outlines the documentation provided by CHROFI, which was used as the basis of this assessment.

***Table 1** Reference Documentation*

Drawing Title / Number	*Author*	*Date*	*Issue*
A-A-002 – Site Plan	CHROFI	31/05/21	01
A-A-101 – Basement Plan	CHROFI	31/05/21	05
A-A-102 – Lower Ground Plan	CHROFI	31/05/21	05
A-A-103 – Upper Ground Plan	CHROFI	31/05/21	05
A-A-104 – Roof Plan	CHROFI	31/05/21	05
A-A-201 – Elevations 1	CHROFI	31/05/21	05
A-A-202 – Elevations 2	CHROFI	31/05/21	03
A-A-203 – Elevations 3	CHROFI	31/05/21	03
A-A-301 – Section A & B	CHROFI	31/05/21	05
A-A-302 – Section C & D	CHROFI	31/05/21	05
A-A-303 – Section E	CHROFI	31/05/21	05

Project Location & Classification

Table 2 Project Location & Climate Zone provides a summary of the project location and applicable climate zone as defined within the NCC.

***Table 2** Project Location & Climate Zone*

Address	*Local Government Area*	*Climate Zone*
Ivanhoe Precinct – Midtown, Macquarie Park	Ryde, NSW	Zone 5 – Warm temperate

Table 3 NCC classification & building areas provides a summary of the building classification, as assumed until provided by the relevant consultant, and a summary of building areas as per the architectural documentation.

***Table 3** NCC classification & building areas*

Level	*Space Type(s)*	*NCC Class*
Basement Floor	Basement carpark and Pool Plant areas	Class 7a
Ground Floor	Pool, Gym, Office, Reception and amenities	Class 5 & 9b
First Floor	Community room, Café and support spaces	Class 6 & 9b

Deemed-to-Satisfy requirements

The minimum Deemed-to-Satisfy (DTS) requirements for building fabric are provided below and comments have been included to provide further details on the requirements.

***Table 4** Deemed-to-Satisfy General requirements*

Envelope Components	*DTS Requirements*	*Comments*
J1.3 Roof & Ceiling Construction	- Total R-value **≥ 3.7 m²K/W** (downward direction of heat flow) - Solar absorptance **≤ 0.45** (upper surface).	- Total R-values must account for thermal bridging. - For the solar absorptance requirement only light colours are allowed under DTS.
J1.4 Roof Lights	- Skylight area **< 5%** of the floor area of the room or space served. - Total U-Value **≤ 3.9 W/m²K** - Total system Solar Admittance **≤ 0.29**	- NCC defines the area of a roof light as: *'the area of the roof opening that allows light to enter the building.'* - The roof light shaft index is determined by the geometry of the shaft, following the calculations under NCC2019 Table J1.4 Note 1
J1.5 Walls & Glazing	- Total system U-Value **≤ 2 W/m²K** - Total system Solar Admittance **≤ 0.13** (for all façade aspects) (For specific requirements of glazing components refer to Table 6)	- Wall-glazing construction is calculated as a whole, rather than separately. Achieving compliant values can be difficult with higher glass to façade ratios. - Total U-values must be total system inclusive of framing and any thermal loss.

Envelope Components	DTS Requirements	Comments
	Additionally, for wall components only - Where wall is less than 80% of the area of wall-glazing construction, wall components Total R-Value **≥ R1.0 m²K/W**. (Refer to Table 5 for specific requirements of walls); OR - Where wall is greater than 80% of the area of wall-glazing construction wall components must be a **≥ R1.4 m²K/W**	- Requirements for Wall-glazing construction as a whole are based on the proportion of wall to glazing. If the wall is greater than 80% climate zone specific requirements also apply. - Any areas of spandrel panels (as defined by NCC) must be calculated as per Specification J1.5b. NCC defines spandrel panels as follows: *"[…] means the opaque part of a façade in curtain wall construction which is commonly adjacent to, and integrated with, glazing."*
J1.6 Floors	- Floor without in-slab heating or cooling Total R-value **≥ 2.0** m²K/W (downwards); OR - Floor with in-slab heating or cooling ≥ 3.25 m²K/W (downwards).	- Total R-Value is applicable to all floor types including concrete slab on ground. - Concrete slab on ground calculations required to factor thermal resistance of ground.

Thermal bridges

Total System R-Value and Total System U-Value calculations under NCC 2019 require detailed thermal bridge analysis in accordance with AS/NZS 4859.2. This has a significant impact on construction methods and detailing. If the thermal bridges are not adequately addressed, the product R-Value of the insulation can greatly exceed the DTS Total R-Value requirement. For example, a roof Total System requirement of R3.7 may in-fact require R4.5 insulation, once thermal bridging is considered.

Specific Wall and Glazing requirements

The following tables show the Total System Values for both windows and walls, as well as Total System SHGC for windows. These values have been input into the NCC 2019 facade calculator to assess the compliance of preliminary performance values. Results from the calculator have been included in Appendix B. Note that U-Value is the inverse of R-Value.

Table 5 Preliminary Wall Systems – Project requirements

Wall Reference	Total System R-value [m².K/W]	Total System U-value [W/m².K]	Solar Absorptance
All external walls	1.60	0.625	0.65
All internal walls (which form part of the envelope)	1.60	0.625	

Note: The performance values for all wall constructions have accounted for thermal bridging assuming frame values.

Table 6 Preliminary Glazing Systems – Project requirements

Window Reference	Indication of System Type (for guidance only)	Total System U-value [W/m².K]	Total System SHGC
Lower Ground Floor	Tinted, double glazing in aluminium frames	4.0	0.21
Upper Ground Floor	Tinted, double glazing in aluminium frames	3.8	0.23

Note: Shading from Vertical Blades to the East and West has not been considered in this preliminary assessment. Vertical shading should be capable to block at least 80% of summer solar radiation to be considered under a DTS pathway. This should be demonstrated through modelling or any alternative method.

Roof lights compliance

The skylight areas of the assessed design do not exceed the maximum allowed 5% of the floor area of the room/space served. However the area is almost exactly 5% and therefore any further increase will result in a non-compliant design under DtS provisions.

Summary

Table 4 lists the general DTS provisions applicable to the project. According to this preliminary assessment, the proposed performance values for the glazing and walls show compliance with J1.5 (NCC 2019) as per Calculation Method 2 (Multiple Aspects). The current areas of roof light areas should not be increased.

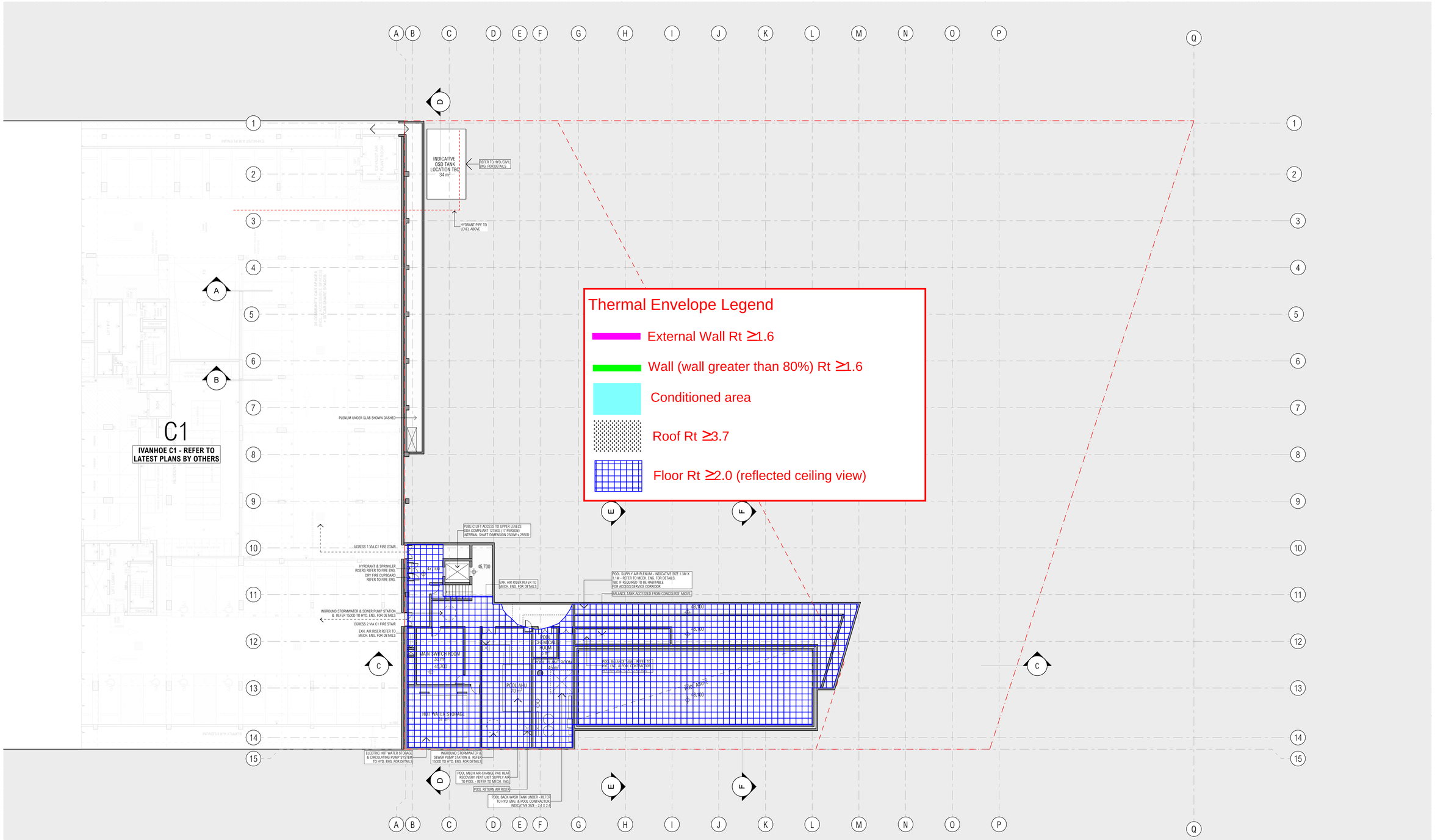
As the design progresses, updates may require verification for compliance at the end of the current stage.

Should you wish to discuss further, please do not hesitate to contact me.

Kind regards,

David Arnott
Associate
INTEGRAL GROUP

Appendix A: Thermal Envelope Mark-ups



ARCHITECT

CHROFI

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T +61 2 8096 8500 E info@chrofi.com

CLIENT

FRASERS PROPERTY

LANDSCAPE ARCHITECT

MCGREGOR COXALL

REV	DATE	ISSUE
01	23/04/2021	CONCEPT DESIGN ISSUE
02	30/04/2021	ISSUE FOR COORDINATION
03	14/05/2021	DRAFT DA ISSUE 1
04	21/05/2021	DRAFT DA ISSUE 2
05	31/05/2021	DRAFT DA ISSUE 3

REV	DATE	ISSUE

PROJECT

Ivanhoe Village Green & Community Centre

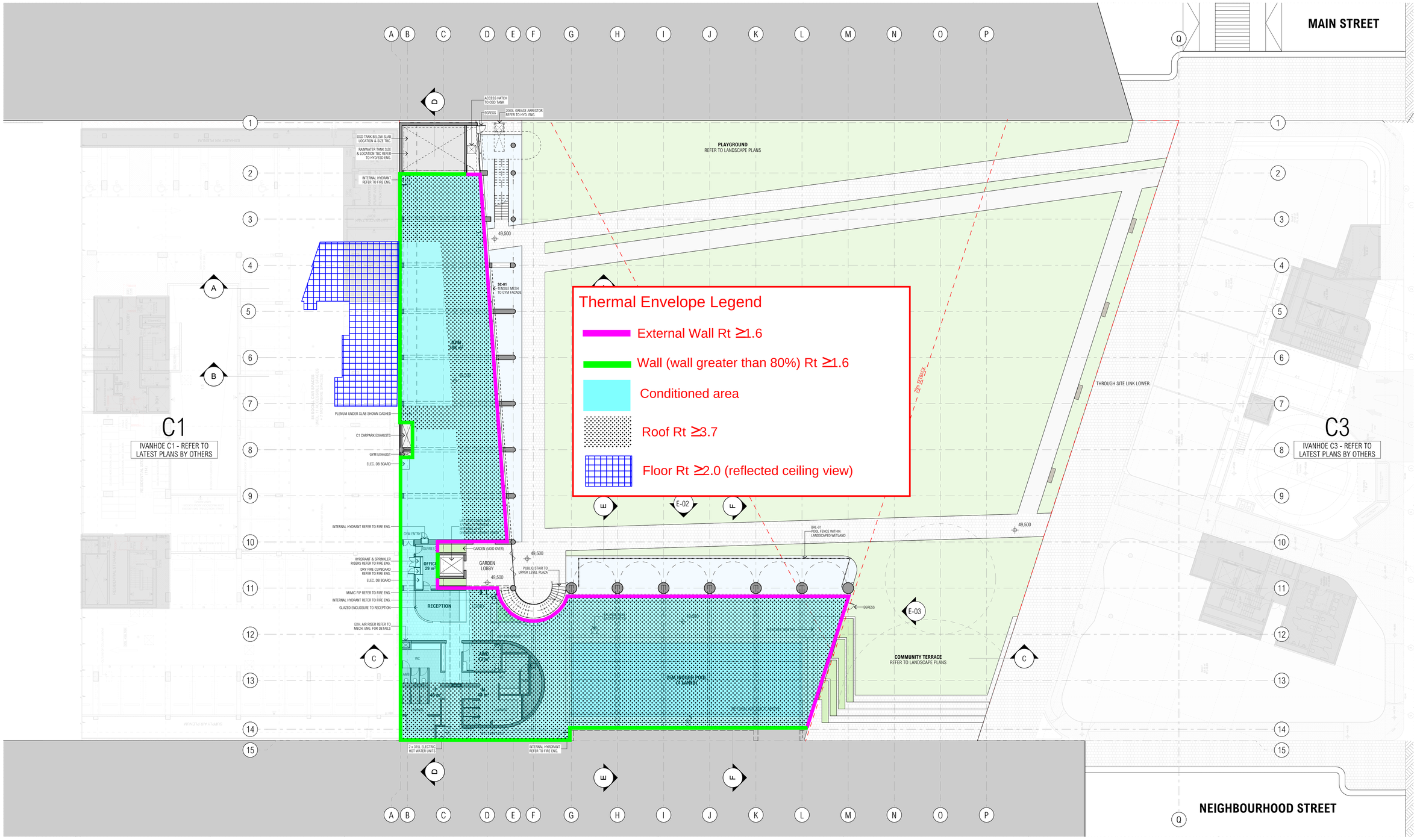
Ivanhoe Precinct - Midtown MacPark

PROJECT NUMBER	PLOT DATE	DRAWN	CHECKED	SHEET SCALE	SHEET SIZE	NORTH
2041	31/05/2021	LH	HR	1:200	A1	

DRAWING TITLE

BASEMENT PLAN

DRAWING NUMBER	REVISION
A-A-101	05



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LANDSCAPE ARCHITECT
MCGREGOR COXALL

REV	DATE	ISSUE
01	23/04/2021	CONCEPT DESIGN ISSUE
02	30/04/2021	ISSUE FOR COORDINATION
03	14/05/2021	DRAFT DA ISSUE 1
04	21/05/2021	DRAFT DA ISSUE 2
05	31/05/2021	DRAFT DA ISSUE 3

REV	DATE	ISSUE

PROJECT
Ivanhoe Village Green & Community Centre
Ivanhoe Precinct - Midtown MacPark

PROJECT NUMBER	PLOT DATE	DRAWN	CHECKED	SHEET SCALE	SHEET SIZE	NORTH
2041	31/05/2021	LH	HR	1:200	A1	

DRAWING TITLE
LOWER GROUND PLAN

DRAWING NUMBER	REVISION
A-A-102	05

MAIN STREET

NEIGHBOURHOOD STREET

Thermal Envelope Legend

- External Wall Rt ≥1.6
- Wall (wall greater than 80%) Rt ≥1.6
- Conditioned area
- Roof Rt ≥3.7
- Floor Rt ≥2.0 (reflected ceiling view)

C1
IVANHOE C1 - REFER TO LATEST PLANS BY OTHERS

C3
IVANHOE C3 - REFER TO LATEST PLANS BY OTHERS

PLAZA
REFER TO LANDSCAPE PLANS

OFFICE (LOCATION, ENTRY & OPENINGS TBC) 35 m²

COMMUNITY 165 m²

AWNING LINE ABOVE

2 x 315L ELECTRIC HOT WATER UNITS EXTERNAL HYDRANT TO FIRE ENG. DETAILS

VESTIBULE 4 m²

Community 1 64 m²

M 13 m²

F 13 m²

AWC 5/m²

BIN ROOM 6 m²

STORE ROOM 6 m²

2 x 1100L BINS

C1 CARPARK EXHAUSTS

GYM EXHAUST

ELEC. DB BOARD

Community 2 74 m²

THROUGH SITE LINK UPPER

HYDRANT & SPRINKLER RISERS REFER TO FIRE ENG.

DRY FIRE CUPBOARD REFER TO FIRE ENG.

ELEC. DB BOARD

LIFT DDA COMPLIANT 1275KG (17 PERSON) INTERNAL SHAFT DIMENSION 2300W x 2650D

PUBLIC STAIR DOWN TO LOWER LEVEL PARK

1:20 RAMP

SEAT

COMMUNITY TERRACE
REFER TO LANDSCAPE PLANS
54,000

INDIGENOUS GARDEN

BENCH SEAT

BBQ

MECH. PLENUM UNDER PLANTER

FIXED SKYLIGHT TO POOL BELOW

55,000 SUBSTATION 19 m²

MECH. POOL AHU / OA RISER

EXTERNAL HYDRANT REFER TO FIRE ENG. DETAILS

PROPERTY BOUNDARY WATER METER ASSEMBLY

PUBLIC STAIR UP TO COMMUNITY TERRACE

C1 BASEMENT LINE BELOW

WALL BELOW

20m SETBACK

52,875 · 53,437 · 53,750 · 54,000 · 54,400 · 49,500 · 54,198 · 54,300 · 52,485 · 48,641 · 51,335

E-01 · E-02 · E-03 · E-04 · E-05

ARCHITECT	CLIENT	LANDSCAPE ARCHITECT
CHROFI	FRASERS PROPERTY	MCGREGOR COXALL

3/1 THE CORSO MANLY NSW 2095 AUSTRALIA
T +61 2 8096 8500 E info@chrofi.com

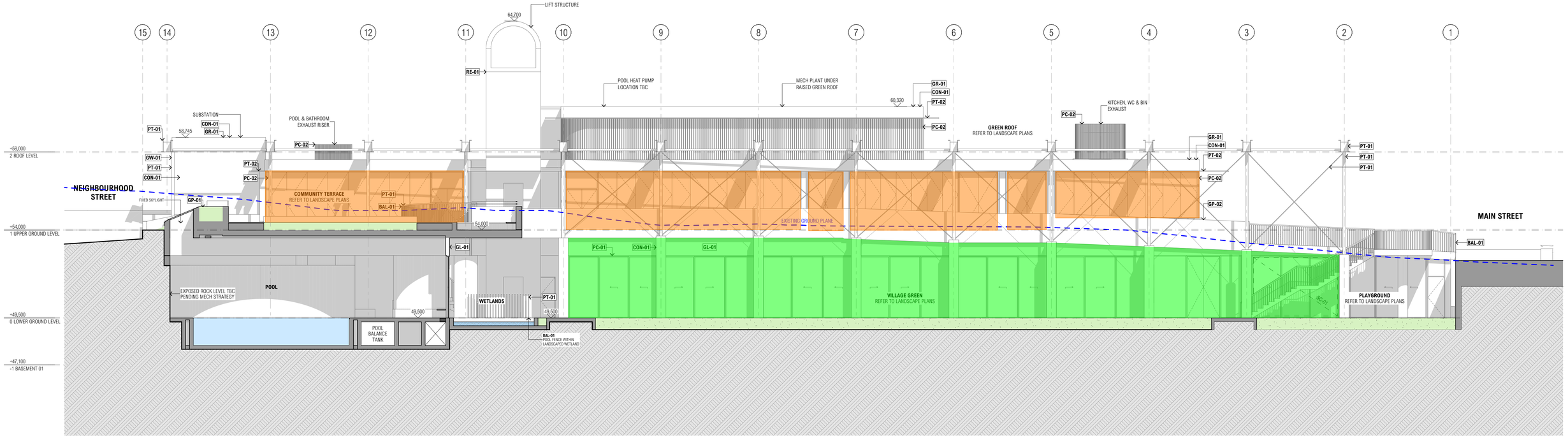
REV	DATE	ISSUE
01	23/04/2021	CONCEPT DESIGN ISSUE
02	30/04/2021	ISSUE FOR COORDINATION
03	14/05/2021	DRAFT DA ISSUE 1
04	21/05/2021	DRAFT DA ISSUE 2
05	31/05/2021	DRAFT DA ISSUE 3

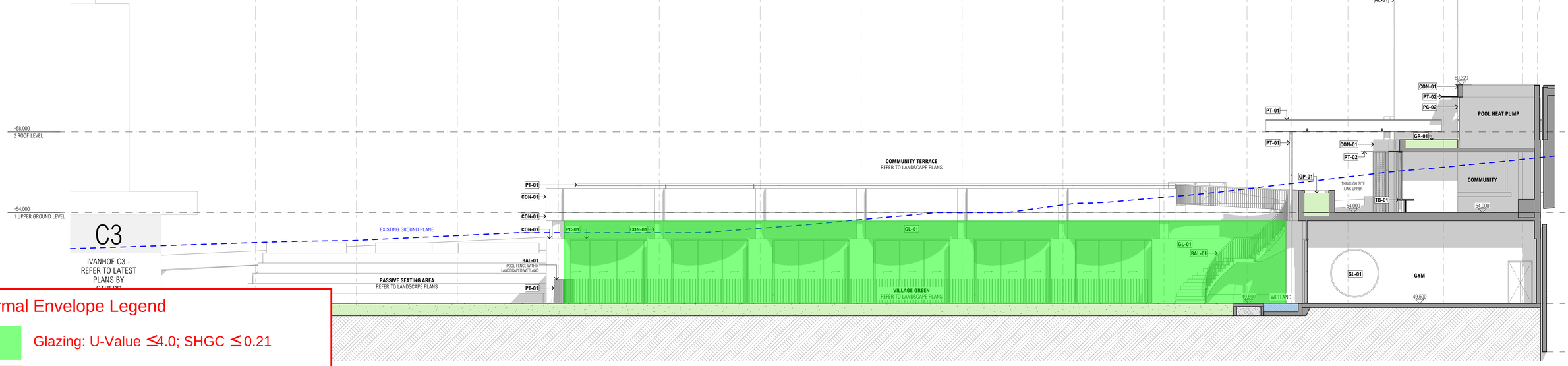
PROJECT
Ivanhoe Village Green & Community Centre
Ivanhoe Precinct - Midtown MacPark

PROJECT NUMBER	PLOT DATE	DRAWN	CHECKED	SHEET SCALE	SHEET SIZE	NORTH
2041	31/05/2021	LH	HR	1:200	A1	

DRAWING TITLE
UPPER GROUND PLAN

DRAWING NUMBER	REVISION
A-A-103	05





Thermal Envelope Legend

- Glazing: U-Value ≤4.0; SHGC ≤0.21
- Glazing: U-Value ≤3.8; SHGC ≤0.23
- Roof light: U-Value ≤3.9; SHGC ≤0.29

BAL-01 STEEL BALUSTRADE
CON-01 IN SITU CONCRETE
CON-02 IN SITU CONCRETE - COLOURED
FL-01 PORPHYRY PAVING
GL-01 CLEAR GLASS
GP-01 GREEN PLANTER
GR-01 GREEN ROOF
GW-01 GREEN WALL

PC-01 POWDERCOATED ALUMINIUM - DULUX ELECTRO 'SILVER REIGN'
PC-02 POWDERCOATED ALUMINIUM - DULUX DURALLOY 'WILDERNESS'
PT-01 PAINTED STEEL - DULUX ELECTRO 'FLAT WHITE'
PT-02 PAINTED STEEL - DULUX DURALLOY 'WILDERNESS'
RE-01 RENDERED MASONRY WALL - CAMEO PINK
SC-01 TENSILE MESS
TB-01 TIMBER BENCH

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CLIENT
FRASERS PROPERTY

LANDSCAPE ARCHITECT
MCGREGOR COXALL

REV	DATE	ISSUE
01	23/04/2021	CONCEPT DESIGN ISSUE
02	30/04/2021	ISSUE FOR COORDINATION
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04	21/05/2021	DRAFT DA ISSUE 2
05	31/05/2021	DRAFT DA ISSUE 3

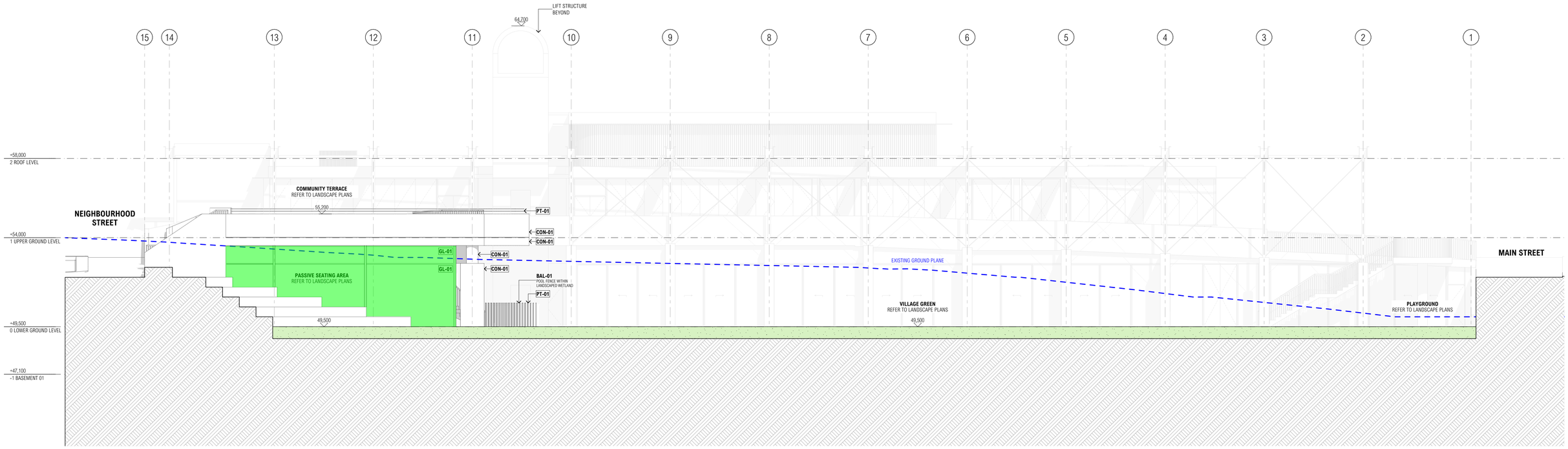
REV	DATE	ISSUE

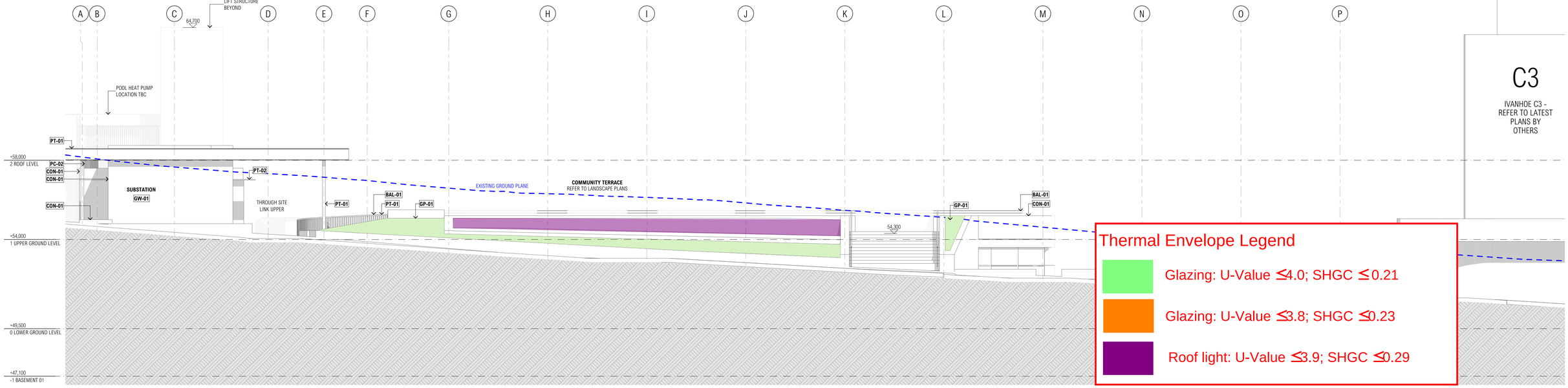
PROJECT
Ivanhoe Village Green & Community Centre
Ivanhoe Precinct - Midtown MacPark

PROJECT NUMBER	PLOT DATE	DRAWN	CHECKED	SHEET SCALE	SHEET SIZE	NORTH
2041	31/05/2021	LH	HR	1:100	A1	

DRAWING TITLE
ELEVATIONS 1

DRAWING NUMBER	REVISION
A-A-201	05





C3

IVANHOE C3 - REFER TO LATEST PLANS BY OTHERS

Thermal Envelope Legend

- Glazing: U-Value ≤4.0; SHGC ≤0.21
- Glazing: U-Value ≤3.8; SHGC ≤0.23
- Roof light: U-Value ≤3.9; SHGC ≤0.29

BAL-01 STEEL BALUSTRADE
CON-01 IN SITU CONCRETE
CON-02 IN SITU CONCRETE - COLOURED
FL-01 PORPHYRY PAVING
GL-01 CLEAR GLASS
GP-01 GREEN PLANTER
GR-01 GREEN ROOF
GW-01 GREEN WALL

PC-01 POWDERCOATED ALUMINIUM - DULUX ELECTRO 'SILVER REIGN'
PC-02 POWDERCOATED ALUMINIUM - DULUX DURALLOY 'WILDERNESS'
PT-01 PAINTED STEEL - DULUX ELECTRO 'FLAT WHITE'
PT-02 PAINTED STEEL - DULUX DURALLOY 'WILDERNESS'
RE-01 RENDERED MASONRY WALL - CAMEO PINK
SC-01 TENSILE MESH
TB-01 TIMBER BENCH

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FRASERS PROPERTY

LANDSCAPE ARCHITECT
MCGREGOR COXALL

REV	DATE	ISSUE
01	14/05/2021	DRAFT DA ISSUE 1
02	21/05/2021	DRAFT DA ISSUE 2
03	31/05/2021	DRAFT DA ISSUE 3

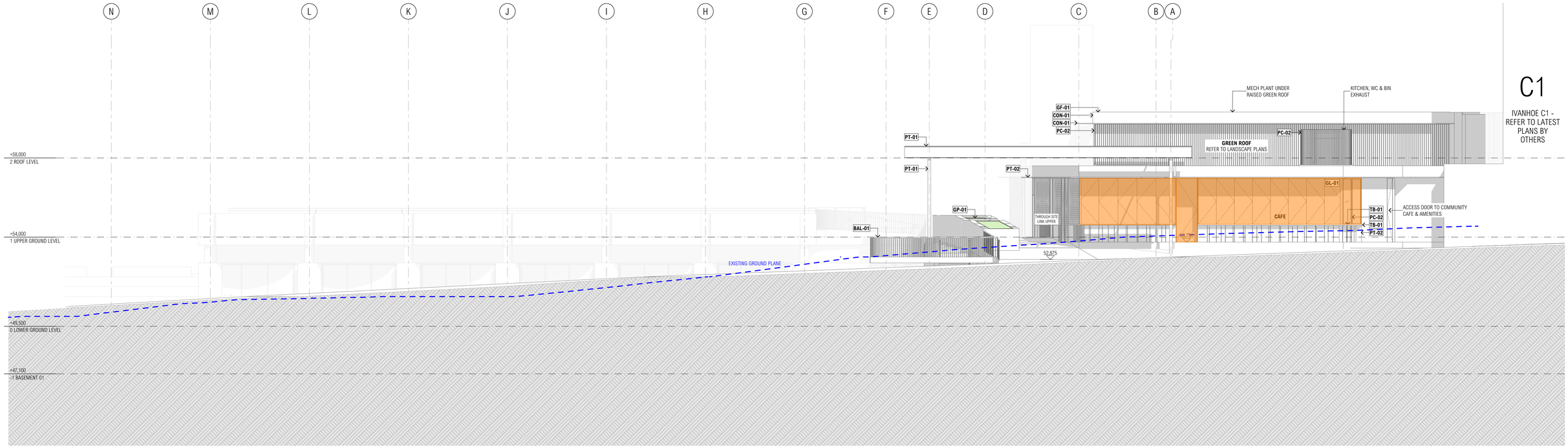
REV	DATE	ISSUE

PROJECT
Ivanhoe Village Green & Community Centre
Ivanhoe Precinct - Midtown MacPark

PROJECT NUMBER	PLOT DATE	DRAWN	CHECKED	SHEET SCALE	SHEET SIZE	NORTH
2041	31/05/2021	LH	HR	1:100	A1	

DRAWING TITLE
ELEVATIONS 2

DRAWING NUMBER	REVISION
A-A-202	03



Thermal Envelope Legend

- Glazing: U-Value ≤4.0; SHGC ≤0.21
- Glazing: U-Value ≤3.8; SHGC ≤0.23
- Roof light: U-Value ≤3.9; SHGC ≤0.29

BAL-01 STEEL BALUSTRADE
CON-01 IN SITU CONCRETE
CON-02 IN SITU CONCRETE - COLOURED
FL-01 PORPHYRY PAVING
GL-01 CLEAR GLASS
GP-01 GREEN PLANTER
GR-01 GREEN ROOF
GW-01 GREEN WALL
PC-01 POWDERCOATED ALUMINIUM - DULUX ELECTRO 'SILVER REIGN'
PC-02 POWDERCOATED ALUMINIUM - DULUX DURALLOY 'WILDERNESS'
PT-01 PAINTED STEEL - DULUX ELECTRO 'FLAT WHITE'
PT-02 PAINTED STEEL - DULUX DURALLOY 'WILDERNESS'
RE-01 RENDERED MASONRY WALL - CAMEO PINK
SC-01 TENSILE MESH
TB-01 TIMBER BENCH

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CLIENT
FRASERS PROPERTY

LANDSCAPE ARCHITECT
MCGREGOR COXALL

REV	DATE	ISSUE
01	14/05/2021	DRAFT DA ISSUE 1
02	21/05/2021	DRAFT DA ISSUE 2
03	31/05/2021	DRAFT DA ISSUE 3

PROJECT
Ivanhoe Village Green & Community Centre
Ivanhoe Precinct - Midtown MacPark

PROJECT NUMBER	PLOT DATE	DRAWN	CHECKED	SHEET SCALE	SHEET SIZE	NORTH
2041	31/05/2021	LH	HR	1:100	A1	

DRAWING TITLE
ELEVATIONS 3

DRAWING NUMBER	REVISION
A-A-203	03

Appendix B: Façade Calculator Report

Façade

Report

Calculator

Project Summary

Date
29/06/2021

Name
0

Company
0

Position
0

Building Name / Address
0
0

Building State
NSW

Climate Zone
Climate Zone 5 - Warm temperate

Building Classification
Class 9b - public halls, function rooms or the like

Storeys Above Ground
0

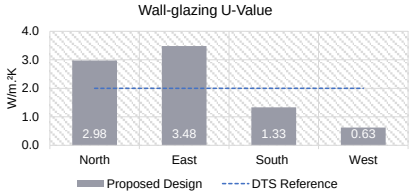
Tool Version
1.2 (June 2020)

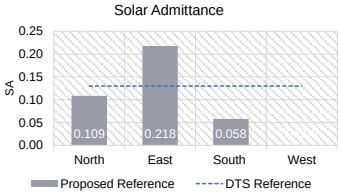
The summary below provides an overview of where compliance has been achieved for Specification J1.5a - Calculation of U-Value and solar admittance - Method 1 (Single Aspect) and Method 2 (Multiple Apects).

Compliant Solution =
Non-Compliant Solution =

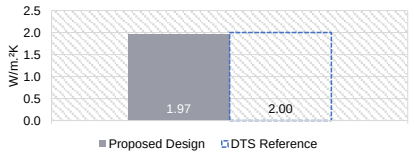
	Method 1				Method 2
	North	East	South	West	All
Wall-glazing U-Value (W/m².K)	2.98	3.48	1.33	0.63	1.97
Solar Admittance	0.11	0.22	0.06		
AC Energy V					146

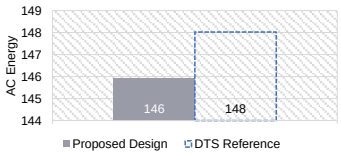
Method 1





Method 2





Project Details

	North	East	South	West
Glazing Area (m²)	150.224	169.933	63.254	0
Glazing to Façade Ratio	70%	85%	21%	0%
Glazing References	Pool North Lobby Curved Stair North	Gym Curved Stair East East Office Glazing East Office 2	Pool South Gym	
Glazing System Types	0	0	0	
Glass Types	0	0	0	
Frame Types	0	0	0	0
Average Glazing U-Value (W/m².K)	4.00	4.00	4.00	
Average Glazing SHGC	0.29	0.29	0.29	0.00
Shading Systems	Horizontal Device	Horizontal Device	Horizontal Device	Horizontal Device
Wall Area (m²)	65.33	30.62	238.99	240.47
Wall Types	Wall	Wall	Wall	Wall
Methodology	Wall			
Wall Construction	Alex's Wall	Alex's Wall	Alex's Wall	Alex's Wall
Wall Thickness	200	200	200	200
Average Wall R-value (m².K/W)	1.60	1.60	1.60	1.60
Solar Absorptance	0.65	0.65	0.65	0.65

Façade

Report

Calculator

Project Summary

Date
29/06/2021

Name
0

Company
0

Position
0

Building Name / Address
0
0

Building State
NSW

Climate Zone
Climate Zone 5 - Warm temperate

Building Classification
Class 9b - public halls, function rooms or the like

Storeys Above Ground
0

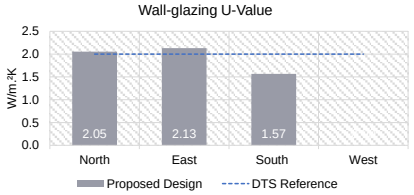
Tool Version
1.2 (June 2020)

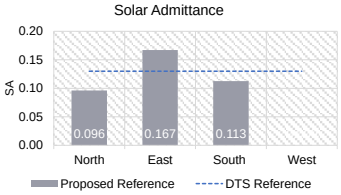
The summary below provides an overview of where compliance has been achieved for Specification J1.5a - Calculation of U-Value and solar admittance - Method 1 (Single Aspect) and Method 2 (Multiple Apects).

Compliant Solution =
Non-Compliant Solution =

	Method 1				Method 2
	North	East	South	West	All
Wall-glazing U-Value (W/m².K)	2.05	2.13	1.57		1.97
Solar Admittance	0.10	0.17	0.11		
AC Energy V					106

Method 1





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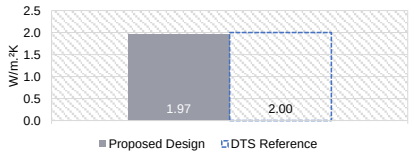
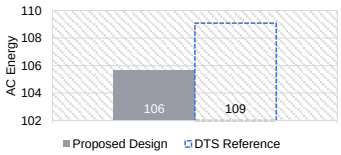




Project Details

	North	East	South	West
Glazing Area (m²)	150.224	169.933	63.254	
Glazing to Façade Ratio	85%	90%	56%	
Glazing References	Pool North Lobby Curved Stair North	Gym Curved Stair East East Office Glazing East Office 2	Pool South Gym	
Glazing System Types	0	0	0	
Glass Types	0	0	0	
Frame Types	0	0	0	0
Average Glazing U-Value (W/m².K)	2.30	2.30	2.30	
Average Glazing SHGC	0.21	0.21	0.21	0.00
Shading Systems	Horizontal Device	Horizontal Device	Horizontal Device	Horizontal Device
Wall Area (m²)	25.84	19.14	49.21	
Wall Types	Wall	Wall	Wall	
Methodology	Wall			
Wall Construction	Alex's Wall	Alex's Wall	Alex's Wall	Alex's Wall
Wall Thickness	200	200	200	
Average Wall R-value (m².K/W)	1.60	1.60	1.60	
Solar Absorptance	0.65	0.65	0.65	0.65

Façade

Report

Calculator

Project Summary

Date
29/06/2021

Name
0

Company
0

Position
0

Building Name / Address
0
0

Building State
NSW

Climate Zone
Climate Zone 5 - Warm temperate

Building Classification
Class 9b - public halls, function rooms or the like

Storeys Above Ground
0

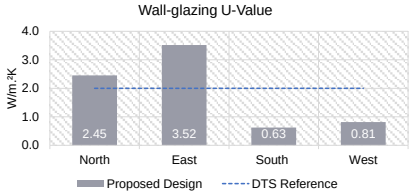
Tool Version
1.2 (June 2020)

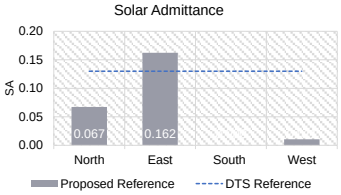
The summary below provides an overview of where compliance has been achieved for Specification J1.5a - Calculation of U-Value and solar admittance - Method 1 (Single Aspect) and Method 2 (Multiple Apects).

Compliant Solution =
Non-Compliant Solution =

	Method 1 North	Method 1 East	Method 1 South	Method 1 West	Method 2 All
Wall-glazing U-Value (W/m².K)	2.45	3.52	0.63	0.81	1.98
Solar Admittance	0.07	0.16		0.01	
AC Energy V					47

Method 1





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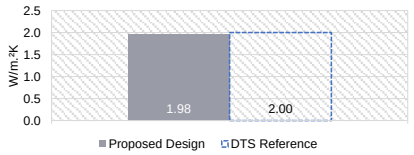
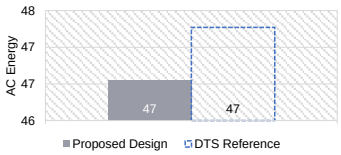




Project Details

	North	East	South	West
Glazing Area (m²)	33.143	123.0885	0	7.08
Glazing to Façade Ratio	58%	91%	0%	6%
Glazing References	Café 3 Café 4 Café 5	Community 2.1 Louvre 1 Louvre 2 Community 2.2 Community 2.3 Community 2.4 Community 1.1 Community 1.2 Community 1.3 Café 1 Café 2		Café 6
Glazing System Types	0	0		0
Glass Types	0	0		0
Frame Types	0	0		
Average Glazing U-Value (W/m².K)	3.80	3.80		3.80
Average Glazing SHGC	0.23	0.23	0.00	0.23
Shading Systems	Horizontal	Horizontal	Horizontal	Horizontal
Wall Area (m²)	24.44	11.99	71.89	111.9
Wall Types	Wall	Wall	Wall	Wall
Methodology	Wall			
Wall Construction	Alex's Wall	Alex's Wall	Alex's Wall	Alex's Wall
Wall Thickness	200	200	200	200
Average Wall R-value (m².K/W)	1.60	1.60	1.60	1.60
Solar Absorptance	0.65	0.65	0.65	0.65

Façade

Report

Calculator

Project Summary

Date
29/06/2021

Name
0

Company
0

Position
0

Building Name / Address
0
0

Building State
NSW

Climate Zone
Climate Zone 5 - Warm temperate

Building Classification
Class 9b - public halls, function rooms or the like

Storeys Above Ground
0

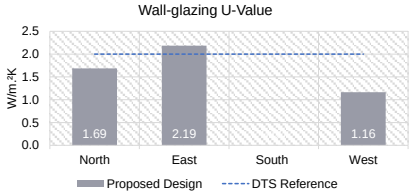
Tool Version
1.2 (June 2020)

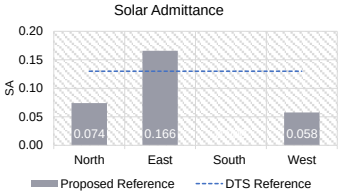
The summary below provides an overview of where compliance has been achieved for Specification J1.5a - Calculation of U-Value and solar admittance - Method 1 (Single Aspect) and Method 2 (Multiple Apects).

Compliant Solution =
Non-Compliant Solution =

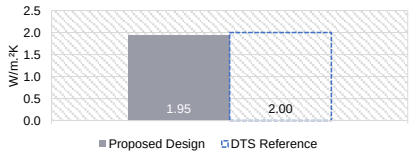
	Method 1 North	Method 1 East	Method 1 South	Method 1 West	Method 2 All
Wall-glazing U-Value (W/m².K)	1.69	2.19		1.16	1.95
Solar Admittance	0.07	0.17		0.06	
AC Energy V					49

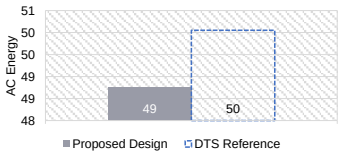
Method 1





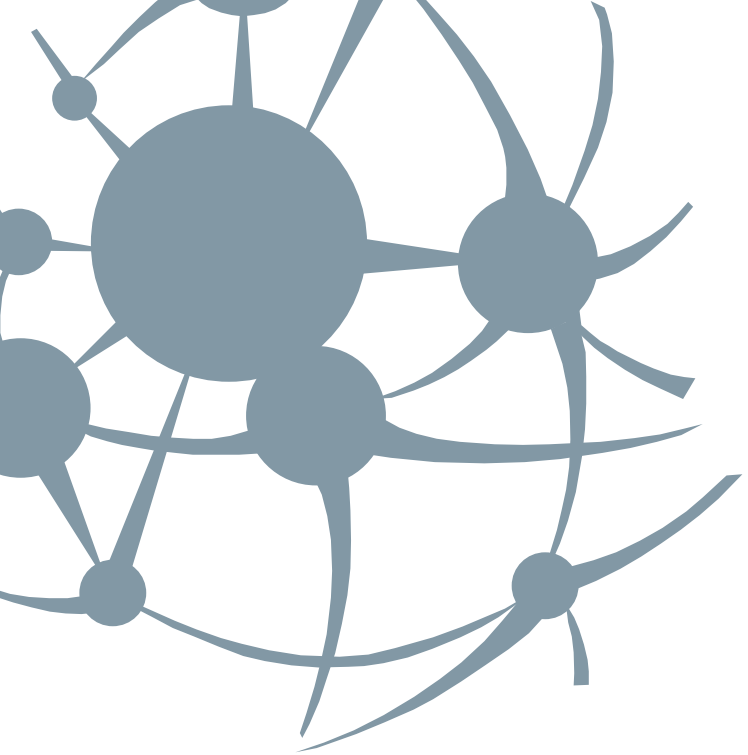
Method 2





Project Details

	North	East	South	West
Glazing Area (m²)	33.143	123.0885		7.08
Glazing to Façade Ratio	63%	93%		32%
Glazing References	Café 3 Café 4 Café 5	Community 2.1 Louvre 1 Louvre 2 Community 2.2 Community 2.3 Community 2.4 Community 1.1 Community 1.2 Community 1.3 Café 1 Café 2		Café 6
Glazing System Types	0	0		0
Glass Types	0	0		0
Frame Types	0	0		
Average Glazing U-Value (W/m².K)	2.30	2.30		2.30
Average Glazing SHGC	0.23	0.23	0.00	0.23
Shading Systems	Horizontal	Horizontal	Horizontal	Horizontal
Wall Area (m²)	19.17	9.06		14.89
Wall Types	Wall	Wall		Wall
Methodology	Wall			
Wall Construction	Alex's Wall	Alex's Wall		
Wall Thickness	200	200		200
Average Wall R-value (m².K/W)	1.60	1.60		1.60
Solar Absorptance	0.65	0.65	0.65	0.65



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INTEGRAL GROUP