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ADVERTISED PLAN

ESD Services
Sustainable Management Plan

Ivanhoe Girls Grammar School – Enterprise Centre
123 Marshall Street
Ivanhoe VIC 3079

Project No: 24059
Date: 23/01/2025

Level 4, 108 Elizabeth Street,
Melbourne VIC 3000
Web: www.igs.com.au

ADVERTISED PLAN

Document Control

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Executive Summary

The proposed development at 123 Marshall Street, Ivanhoe VIC 3079 has been designed to meet the objectives of the City of Banyule's Planning Scheme Clause 15.01-2L-02 'Environmentally sustainable development', and NCC2022 Section J energy efficiency requirements.

The development has achieved an overall BESS score of above 50% of nine key BESS categories which is generally in line with 'Best practice' sustainable design.

Category	Contributes to Overall Score	Project Category Score
Management	4.5%	62%
Water	9.0%	78%
Energy	27.5%	78%
Stormwater	13.5%	100%
IEQ	16.5%	50%
Transport	9.0%	0%
Waste	5.5%	66%
Urban Ecology	5.5%	50%
Innovation	9%	30%
Total Rate	**100%**	**62%**

Based on the level of information available at this stage of the design process, the proposed School building at 123 Marshall Street, Ivanhoe VIC 3079 - demonstrates 'Best practice' in BESS and meets the City of Banyule's objectives.

1. Introduction

The Sustainable Management Plan (SMP) has been prepared to summarise the environmental objectives and initiatives incorporated into the design of the proposed development and demonstrates how these components incorporate environmentally sustainable design initiatives in accordance with the City of Banyule's Planning Scheme ESD objectives.

The ESD initiatives proposed for this development are based on:

- Architectural Drawing Package dated 16/01/2025 Issued for Town Planning prepared by COX Architecture;
- Discussions and correspondence with the Architects and Services Engineers.

The Site

The proposed 4-storey school building is located at 123 Marshall Street, Ivanhoe VIC 3079 with convenient access to the gardens and public transport. There are train stations and tram stop located within 5 minutes walking distance from the development. The development is in nearby parks include Bryant Reserve, Ivanhoe Park and Nellie Ibbott Park.

The development is located within the City of Banyule and consists of:

- Ground: Communal Spaces, Staffrooms, Lab and Learning area;
- Level 01: Communal Spaces, Kitchen, Staffrooms, Lab and Office;
- Level 02: Communal Spaces, Lab, Learning areas and Meeting rooms and Graden;
- Level 03: Multipurpose Rooms and Plant.

2. Summary of key ESD Initiatives

The SMP provides a detailed sustainability assessment of the proposed development. It assesses all key sustainable design initiatives outlined in BESS sustainable design rating tool, demonstrates that a holistic ESD review has been undertaken during the project early design stage and sets up the environmental benchmarks with quantifiable and measurable performance indicators. These indicators will be achieved by the project as evidence demonstrating the development achieves 'Best Practice'.

2.1 Incorporation of Environmentally Sustainable Design Objectives

The proposed development aims to incorporate the following Environmentally Sustainable Design initiatives to comply with the City of Banyule Planning Scheme.

2.2 Utilise Energy Efficiently and Sustainably

Energy Efficient Lighting – Lighting power density is designed to be more than 20% below NCC 2022 Section J7 lighting power density requirement; LED light fittings will be installed as much as practicable throughout the development; and occupancy and daylight sensors will be provided for common area lighting to minimise lighting energy use when unoccupied.

2.3 Utilise Potable Water Use Efficiently and Sustainably

To minimise the amenity water consumption and discharge to the municipal sewerage system, water efficient fixtures with the WELS rating as summarised below are to be used for the development.

- Kitchen Taps - 6 Star WELS Rating
- Bathroom Taps - 6 Star WELS Rating
- Dishwasher - 5 Star WELS Rating
- WCs - 4 Star WELS Rating
- Urinals - 5 Star WELS Rating

Alternative Water Sources – Minimum 25,000 litre rainwater tank will be installed for the development and will be used for toilet flushing and landscaping.

2.4 Minimising Waste Going to Landfill

Construction Waste - the building contractor will be engaged to prepare a Waste Management Plan (WMP) which forms part of a Site Management Plan (SMP) and 80% (by mass) of all demolition & construction waste to be reused or recycled.

Operational Waste – A Waste management strategy has been developed by the Ivanhoe Girls Grammer School management and will implement efficient operational waste management initiatives within the proposed development to ensure the recycling facilities are as convenient for occupants as facilities for general waste.

2.5 Use Sustainable Sourced Materials

Internal paints, adhesives, sealants and flooring are selected with low VOC content; engineered wood is to be selected to have low formaldehyde emissions.

3. BESS Sustainable Assessment

The Built Environment Sustainability Scorecard (BESS) assesses energy and water efficiency, thermal comfort, and overall environmental sustainability performance of the proposed development. It assesses the project against a standard design practice building in nine environmental categories and the percentage contribution of each category varies depending on the scale and typology of the development.

A score of 50% and higher equates to 'Best Practice' via BESS rating. In order to meet BESS 'Best Practice' requirement, the development is targeting an overall score of above 50% and exceeds the pass rates on four mandatory categories.

- Water;
- Energy;
- Stormwater; and
- Indoor Environment Quality (IEQ)

The proposed development achieves an overall score of above 50% and the BESS assessment report is enclosed as Appendix A for details.

3.1 Management

Best practice for building management means that sustainability is integrated from concept design through the construction process. Good decisions made early will always deliver the maximum benefit for the lowest cost.

For that reason, all the key credits available in this category are being targeted and incorporated in the design:

- An ESD Consultant has been engaged from the schematic design stage to construction stage to provide sustainable design advice;
- A preliminary façade assessment will be undertaken in accordance with NCC2022 Section J4D6;
- Install utility meters (electricity and water) for the proposed development;
- Provide sub-metering facilities for common area energy and water monitoring and control; and
- A Building User's Guide covering topics such as Security, Public Transport Accessibility, building facilities access and building features such as Heating and cooling systems, Water and waste management and Building energy efficiency will be produced to enable building users to optimise the building's environmental performance.

3.2 Water

Water will be used efficiently throughout the whole building development with inclusion of efficient fixtures and fittings, collection and reuse of rainwater and water efficient landscaping design.

These water saving initiatives are proposed to ensure the efficient use of water and collection and re-use of stormwater and to minimise the associated water costs.

BESS rating tool is used to assess the overall development water efficiency and demonstrates the design potential to achieve an over 50% improvement compared to an identical size 'reference' project and meet the Excellence sustainable design.

3.2.1 Water Efficient Fixtures

To minimise the amenity water consumption and discharge to the municipal sewerage system, water efficient fixtures will be used for the development.

- Kitchen Taps - 6 Star WELS Rating
- Bathroom Taps - 6 Star WELS Rating
- Dishwasher - 5 Star WELS Rating
- WCs - 4 Star WELS Rating
- Urinals - 5 Star WELS Rating

3.2.2 Rainwater Harvesting

Rainwater will be harvested from the roof areas. A minimum of 25,000-litre rainwater tank is proposed to collect rainwater from the roof and will be used for toilet flushing and landscaping.

3.2.3 Building Systems Water Use Reduction

The building services design will incorporate measures to reduce potable water consumption by at least 80% during fire safety systems testing. The chillers serving the building will be air-cooled.

3.3 Energy Performance

Energy efficiency and low Greenhouse Gas Emissions (GHG) will be a key feature in the development. A significant reduction in greenhouse gas emissions in comparison with standard buildings of this type is targeted.

The whole development will benchmark BESS Energy Efficiency as followings:

- **BESS Energy 1.1 and 2.1**: The energy efficient building services are proposed for the whole development to reduce energy use and greenhouse gas emissions by more than 10% compared to NCC 2022 Section J reference building;
- **BESS Energy 2.1**: More than 10% reduction in Green House Gas emissions for the development;
- **BESS Energy 2.2**: Reduce instantaneous (peak-hour) cooling demand for the development.
- **BESS Energy 2.6**: The development is proposed to be all-electric;
- **BESS Energy 2.7**: The energy efficient building services are proposed for the whole development to reduce the electricity consumption by more than 10% compared to NCC 2022 Section J reference building;
- **BESS Energy 3.1:** The enclosed carpark to be fully naturally ventilated;
- **BESS Energy 3.2:** Electric heat pump or equivalent are proposed to be highly efficient, achieving performance within one star of the best available rating or meeting at least 85% of the efficiency of the most efficient equivalent capacity unit.
- **BESS Energy 3.7:** Lighting power density is proposed to meet the requirements in Table J7D3a of NCC 2022; and
- **BESS Energy 4.2:** A minimum 10kW-e solar PV system is proposed to development as renewable energy sources. The level 01 pergola will consist of a 4kW-e Solar PV system with the remaining solar panels being located on the Swimming Pool building roof totalling to at least 10kW-e solar PV provisions.

Overall, the development is targeting to achieve over 50% energy category score and meet the Best Practice sustainable design.

3.3.1 Thermally Enhanced Building Envelope

The architectural and facade design will ensure the windows location, orientation and sizes are assessed carefully to ensure excellent solar control and daylight transmission and the overall arrangement will provide the building with low façade loads allowing highly efficient energy systems to be used to maintain occupant comfort.

Insulation R-values (Low U-value) equivalent or better than NCC Section J is targeted to the building thermal envelope in conjunction with double glazed windows to prevent heat loss during winter and improve occupants' thermal comfort.

Building Fabric and Windows

i) **External and Internal Wall**

Total Construction	Overall Thermal Resistance R-value to NCC 2022
External Wall – Insulated External Wall	R value ≥ 2.0
External Wall - Insulated Spandrel Panels	R value ≥ 2.0
Internal Wall between conditioned and unconditioned spaces	R value ≥ 1.4
Internal Wall between conditioned and conditioned spaces	N/A

Note: The required Total R-Value must include allowance for thermal bridging in accordance with AS/NZS 4859.2 or Specification 38 of NCC2022 Section J.

ii) **Floor Construction**

Total Construction	Overall Thermal Resistance R-value to NCC 2022
Floor Construction	2.0

Note: The required Total R-Value must include allowance for thermal bridging in accordance with AS/NZS 4859.2.

iii) **Roof and Ceiling Construction**

Total Construction	Overall Thermal Resistance R-value to NCC 2022
Roof and Ceiling Construction	R value ≥ 3.2 with roof upper surface solar absorptance not more than 0.45

Note: The required Total R-Value must include allowance for thermal bridging in accordance with AS/NZS 4859.2.

iv) **Window**

Window Type	U-Value and SHGCw (Frame + Glass)	Window VLT (%)
Fixed Windows	$U_w \leq 2.7$ W/ (m2. K) and $SHGC_w \leq 0.25$	≥ 40%
Glazed Doors	$U_w \leq 3.2$ W/ (m2. K) and $SHGC_w \leq 0.25$	≥ 40%

Note: The required Total R-Value must include allowance for thermal bridging in accordance with AS/NZS 4859.2 or Specification 38 of NCC2022 Section J.

Refer to Appendix C – NCC Façade Calculation Report for more details.

3.3.2 Energy Efficient System

For the proposed development, energy efficient HVAC, lighting and domestic hot water systems will be designed to minimize operational energy use and greenhouse gas emissions and reduce peak energy demand.

The energy efficient system for the whole building will include:

- The building fabric will meet and exceed the NCC2022 Section J requirements;
- Heating and cooling systems to be within one Star of the most efficient equivalent capacity unit available, or Coefficient of Performance (CoP) & Energy Efficiency Ratios (EER) not less than 85% of the CoP & EER of the most efficient equivalent capacity unit available. The specified hot water system will be a centralised heat pump type DHW unit with a minimum COP of 3.5. The hot water piping will be provided with lagging throughout the building to minimize the energy loss; and
- Water heating systems to be within one star of the best available, or 85% or better than the most efficient equivalent capacity unit.

3.3.3 Car Park ventilation

Carparking spaces will be fully naturally ventilated or where mechanically ventilated, will be provided with CO monitoring to control the operation and speed of the ventilation fans.

3.4 Stormwater

Stormwater quality is a significant issue as the high levels of impervious surfaces transport stormwater quickly into the drainage system along with sediment and pollutants.

The strategy for improving stormwater quality in the proposed development include:

- Minimum 25kL rainwater tank is connected to the building main roof and terraces for rainwater collection and will be used for toilet flushing and landscaping.

The STORM Calculation has been undertaken as shown below to demonstrate 100% on BESS Stormwater score.

Melbourne Water **STORM Rating Report**

TransactionID:	0	
Municipality:	BANYULE	
Rainfall Station:	BANYULE	
Address:	123 Marshall St	
	Ivanhoe	
	VIC	3079
Assessor:	IGS ESD Team	
Development Type:	Other	
Allotment Site (m2):	2,548.00	
STORM Rating %:	105	

Description	Impervious Area (m2)	Treatment Type	Treatment Area/Volume (m2 or L)	Occupants / Number Of Bedrooms	Treatment %	Tank Water Supply Reliability (%)
Roof and Terraces	1,482.00	Rainwater Tank	25,000.00	100	144.60	74.00
Hard Landscaping	559.00	None	0.00	0	0.00	0.00

3.4.1 Site Management Plan

A stormwater pollution reduction strategy will be contractually required to be adopted by the Main Contractor to ensure the earth is not eroded and prevent construction debris and litter from entering the stormwater systems.

The strategy will be required to specifically address the following in respect to stormwater:

- No impact on offsite surface or ground water(s) due to construction activities;
- Site stormwater to be managed to minimise any contaminated water discharged from site, such as:
  - Materials and waste to be stored at least 2m away from drainage lines;
  - All inadvertent chemical spills will be required to be cleaned up immediately;
  - The road will be required to be kept clean, with the number of sweepers cleaning the road to be in response to mess created;
  - Application and inclusion of a range of mitigation measures for soil depositing on roads, stormwater, dust and noise;
  - Incorporate prevention measures to stormwater from adjacent properties from entering site;
  - Removal of sediment and rubbish from sediment fences and stormwater inlet filters after storm events, and checking of sediment traps after storm events;
  - Capping and bunding of stockpiled or treatment piles of contaminated spoils;
  - Stormwater discharge quality will be required to meet SEPP (Waters of Victoria) standards; and

- Regular inspections of the effectiveness of sediment control and surface run-off measures, including during and immediately after storm events, with necessary improvements.

3.4.2 Maintenance Program

The maintenance procedure shall be in conjunction with the building maintenance and specification and shall comply with relevant / applicable authority design guidelines and codes of practice requirements. The stormwater management strategy shall adopt the following maintenance procedures.

- Quarterly routine maintenance procedure to thoroughly maintain raingarden free of debris and general clean-up process by building management as part of building maintenance programme.
- Annually / 6-month drain and flushing of rainwater tank cleaning tank internally from debris and sediment collection captured from roof surface, by building management as part of building maintenance programme.
- Quarterly inspection of gutters to ensure they are free of debris and clean as required.
- Quarterly inspection of stormwater downpipes and grates to ensure no water leakage, they are free of debris and clean as required.
- Yearly inspections of rainwater tanks and supports to ensure no leakage, inspect joints and clean as required.
- Water storage tanks should be inspected, cleaned and disinfected in accordance with AS 3500.
- Bi-annual inspection of pumps to ensure correct operation, no leakage and clean as required.
- Service items and equipment in conformance with the maintenance schedules as per the operation and maintenance manuals.

  - Carry out the manufacturers' recommended maintenance instruction.
  - Attend to reported defects and complaints.
  - Check for and repair corrosion.
  - Check for and rectify any unsafe conditions.
  - Replace faulty or damaged parts and consumable components.
  - connections, for deterioration and for freedom of movement of assembly.
  - Identification of pipes, conduits and ducts maintenance: To AS 1345.
  - Safety signs maintenance: To AS 1319.
  - Remove waste and clean all parts of the installation.
  - Remove temporary protective coatings, packaging and labels.
  - Clean screens and strainer baskets.

3.5 Indoor Environment Quality

The proposed development will improve the indoor environment quality and achieve a healthy indoor environment quality for the wellbeing of building occupants through adoption of the followings into the design.

3.5.1 Overall Daylight Access

For the regularly occupied spaces, the results indicate that more than 50% of the development achieve a daylight factor of at least 2% of the floor area.

3.5.2 Ventilation

For regularly occupied spaces, the mechanical ventilation systems will be designed to provide outdoor air levels to be at least 60% above AS 1668:2012 to the all the regularly occupied spaces with CO_2 sensors proposed for the development to maintain a maximum CO_2 concentration of 700ppm.

3.5.3 VOC and Formaldehyde Minimisation

- Low Volatile Organic Compound (VOC) paints, adhesive and sealant to be used in the development.

Product Type Category	Max TVOC Content (g/l of ready-to-use product)
General purpose adhesives	50
Design & As Built wall and ceiling paint, all sheen levels	16
Trim, varnishes and wood stains	75
Primers, sealers and prep coats	65
One and two pack performance coatings for floors	140
Acoustic sealants, architectural sealant, waterproofing membranes and sealant, fire retardant sealants and adhesives	250
Structural glazing adhesive, wood flooring and laminate adhesives and sealants	100

- Low VOC Carpets to be used in the development.

Test protocol	Limit
ASTM D5116 – Total VOC limit	0.5mg/m²/h per hour
ASTM D5116 – 4 – PC (4-Phenylcyclohexene)	0.5mg/m²/h per hour
ISO 16000/EN 13419 – TVOC at three days	0.5mg/m²/h per hour
ISO 10580/ISO/TC 219 (Document N238) – TVOC at 24 hours	0.5mg/m²/h per hour

- Low formaldehyde wood products to be used in the development.

Test protocol	Emission limit/ Unit of Measurement
AS/NZS 2269:2004, testing procedure AS/NZS 2098.11:2005 method 10 for Plywood	≤1.0mg/L
AS/NZS 1859.1:2004 – Particle Board, with use of testing procedure AS/NZS 4266.16:2004 method 16	≤1.5mg/L
AS/NZS 1859.2:2004 – MDF, with use of testing procedure AS/NZS 4266.16:2004 method 16	≤1.0mg/L
AS/NZS 4357.4 – Laminated Veneer Lumber (LVL)	≤1.0mg/L

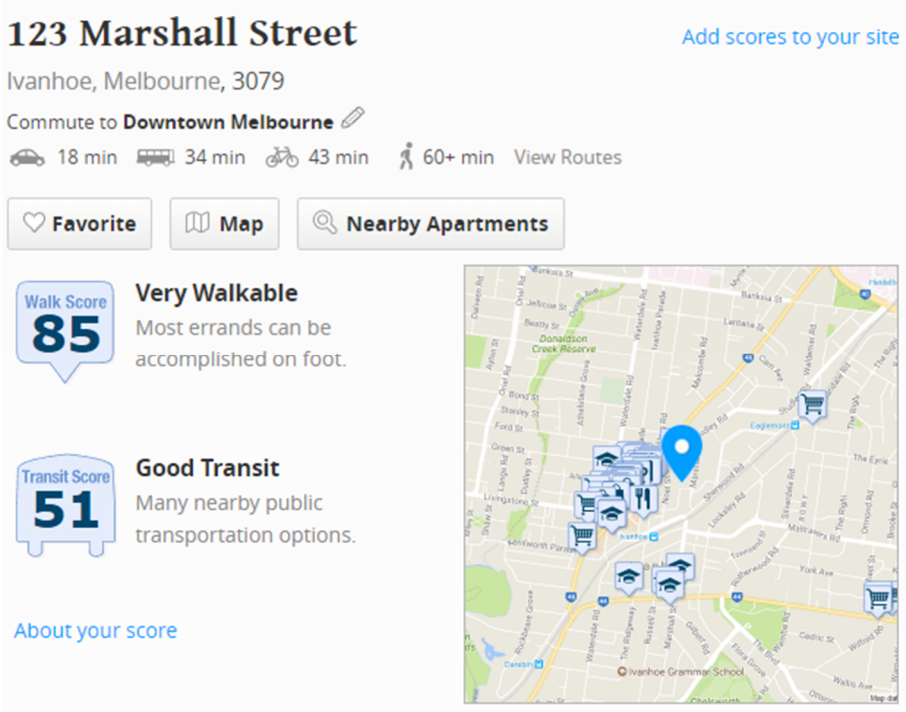
Japanese Agricultural Standard MAFF Notification NO.701 Appendix Clause 3 (11) - LVL	≤1.0mg/L
JIS A 5908:2003 – Particle Board and Plywood, with use of testing procedure JISA 1460	≤1.0mg/L
JIS A 5905:2003 – MDF, with use of testing procedure JIS A 1460	≤1.0mg/L
JIS A1901 (not applicable to Plywood, applicable to high pressure laminates and compact laminates)	≤0.1mg/m^2hr
ASTM D5116 (applicable to high pressure laminated and compact laminates	≤0.1mg/m^2hr
ISO 16000 part 9, 10 and 11 (also known as EN 13419), applicable to high pressure laminates and compact laminates	≤0.1mg/m^2hr (at 3 days)
ASTM D6007	≤0.12mg/m^3
ASTM E1333	≤0.12mg/m^3
EN 717-1 (also known as DIN EN 717-1)	≤0.12mg/m^3
EN 717-2 (also known as DIN EN 717-2)	≤3.5mg/m^3hr

3.6 Transport

3.6.1 Proximity to Public Transport

123 Marshall Street is five-minute walk from the Hurstbridge City (Flinders Street) - Hurstbridge at the Ivanhoe Railway Station (Ivanhoe) stop. This location is in nearby parks include Bryant Reserve, Ivanhoe Park and Nellie Ibbott Park.

123 Marshall Street has a Walk Score of 85 out of 100. This location is Very Walkable so most errands can be accomplished on foot. Hence, the building's design and location will be shown to reduce emissions from transport, encourage walkability and public transport use, and reduce vehicle kilometres travelled.



3.7 Waste Management

BESS rating tool has been used to assess the overall development waste collection and reuse and demonstrate the project has the design potential to achieve the Excellence design for the Waste Management.

3.7.1 Construction Waste Management Plan

Building Contractor will provide Construction Site Management Plan prior to any construction works.

As part of the Construction Site Management Plan, a Construction Waste Management Plan will be prepared to encourage waste avoidance, reuse, and recycling during the construction and at least 80 per cent of construction and demolition waste are to be reused or recycled.

3.7.2 Construction Phase Stormwater Pollution Reduction

The Building Contractor will implement an Environmental Management Plan (EMP) to include the site management procedures to reduce the stormwater pollution during construction phase.

3.7.3 Waste Management Plan

A Waste Management Plan will be prepared for this development to assess the requirements for waste storage including size, location and accessibility and the recycling facilities are proposed as convenient for occupants as facilities for general waste.

3.7.4 Operational Waste – Food & Garden Waste

The development shall provide recycling facilities for the provision of the council's collection and recycling of food and garden organic (FOGO) materials.

3.7.5 Operational Waste – Convenience of Recycling

The recycling facilities are proposed as convenient for building users as facilities for general waste.

3.8 Urban Ecology

3.8.1 Communal Spaces

At least 244m^2 of communal space is provided for building occupants gathering and interaction.

3.8.2 Vegetation

Minimum 10% of the total site will be covered with vegetation.

3.8.3 Green Roofs

The development will incorporate a green roof.

3.8.4 Urban Cooling

For roofs and exposed driveways, paints and materials with an SRI value of at least 50 will be specified. The Solar Reflective Index (SRI) demonstrates a material's ability to reflect solar heat from its surface back into the atmosphere.

An SRI value of 50 represents roofing and exposed driveways having a light/neutral colour finish (i.e., tan, brownstone, grey etc.)

3.8.5 Dedicated Food Production Area

Dedicated planting area will be provided for food production on-site. This will be located in the Level 01 Urban Farming Terrace space.

3.8.6 Eco-Friendly Gardening Practices

Garden waste collected from Level 01 Urban Farming terrace will be collected and stored in a compost bin for reuse as organic fertilisers for the plants reducing the organic waste produced from the site.

3.8.7 Site Biodiversity

Flowering native and indigenous species have been selected for the entry plaza to create an inviting atmosphere for students, teachers, and visitors. A Eucalyptus leucoxylon tree, an indigenous species, will mark the entrance, complemented by proposed understorey plants such as cultivars of Banksia, Correa, and Goodenia. Low shrubs and grass species are planned to subtly delineate pedestrian pathways from maintenance access areas, enhancing both the visual appeal and environmental quality of the space.

A proposed street-front garden, ranging from 2 to 3 meters in width along Upper Heidelberg Road, has been designed to enhance biodiversity in the area. The plant selection includes tree species such as Acacia and Leptospermum, along with grass species like Lomandra and Dianella. Several of these plants, including Lemon Myrtle (Backhousia citriodora), Lemon Scented Tea Tree (Leptospermum petersonii), and River Mint (Mentha australis), are also recognized as Bushtucker species.

To maximize biodiversity, the planting strategy incorporates four structural layers: canopy, medium shrubs, grasses, and ground covers.

All selected indigenous species are as specified by 'Vegetation Communities of the City of Banyule'.

3.9 Innovation

3.9.1 Artificial Lighting Quality

The lighting (except decorative fixtures, emergency and signage lighting) within the building will meet the following requirements:

- All LED lighting installed across the whole project has no observable effect as per the standard IEEE 1789-2015 - IEEE Recommended Practices for Modulating Current in High-Brightness LEDs for Mitigating Health Risks to Viewers.
- Light sources must have a minimum Colour Rendering Index (CRI) 85 or higher, in all internal and external applications
- Light sources must meet best practice illuminance levels for each task within each space type with a maintained illuminance that meets the levels recommended in AS/NZS 1680.1:2006 series applicable to the project type and including maintenance
- The maintained Illuminance values must achieve a uniformity of no less than that specified in Table 3.2 of AS/NZS 1680.1:2006, with a maintenance factor method as defined in AS/NZS 1680.4
- All light sources must have a MacAdam Ellipse or a Standard Deviation Colour Matching (SDCM) of 3 or lower.

Bare light sources will be fitted with baffles, louvers, translucent diffusers, ceiling design, or other means that obscures the direct light source from all viewing angles of occupants, including occupants looking directly upwards.

Alternatively, for LED luminaires the Unified Glare Rating (UGR), as estimated from the manufacturers data sheets for a standard room, will not exceed the maximum values listed in Table 8.2 of AS/NZS 1680.1:2006.

The artificial lighting solution will address the quality of light in the space, provide highlights and contrasts, and seek to avoid excessive lighting or overly uniform solutions.

Horizontal illuminance levels will meet or exceed the recommended levels in AS/NZS 1680 for the relevant task for at least 90% of the GFA.

At least one wall in the field of view of a regularly occupied area is to be illuminated to create demonstrable contrast and visual interest. The total area of illuminated wall will represent at least 20% of the area of walls in the field of view

All blinds or screens in the regularly occupied areas will meet the following requirements:

- The blinds will provide glare reduction to at least 95% of the area of viewing façades and skylights
- Blinds will be controlled by all affected occupants within each individual space
- Blinds will have a visual light transmittance (VLT) of ≤ 10%.

Manual or automated internal, in-glazing, or external blinds can be used. Where automated blinds are used, they will be controlled either by a management system or by a manually activated switch. If blinds and screens are automatically controlled, they will also be equipped with a manual override function accessible by occupants in each of the adjacent spaces served.

The lighting control system will be based on Zencontrol, which is DALI-2 compatible, offering efficient lighting management and automation. This system enables users to adjust settings such as brightness, colour temperature, and on/off functions according to their needs. Each zone will be equipped with local control panels (LCPS), providing users with the flexibility to manage their own environment. Motion detectors will be strategically placed throughout the space to automatically activate or deactivate the lighting when not in use, ensuring energy efficiency.

3.9.2 Sustainability Reporting

All sustainability goals and achievements by the building will be prominently and publicly will be available on school website. Furthermore, the building will display screens showcasing all sustainability features, achievements and goals to students and staff. The display screens will promote health and wellbeing amongst building users by showing drinking water points, food produced on-site, promoting use of stairs in lieu of elevators, etc.

4. Overall BESS Scores Aiming to Target

With inclusion of all ESD initiatives summarised above, the proposed design is estimated to be able to achieve an overall score of above 50% of nine key BESS categories and demonstrating 'Best Practice sustainable design.

Category	Contributes to overall Score	Project Category Score
Management	4.5%	62%
Water	9.0%	78%
Energy	27.5%	78%
Stormwater	13.5%	100%
Indoor Environment Quality (IEQ)	16.5%	50%
Transport	9.0%	0%
Waste	5.5%	66%
Urban Ecology	5.5%	50%
Innovation	9%	30%
Total Rate	**100%**	**62%**

5. Conclusion

This SMP provides a summary of sustainable design features, which are integrated into the design of the proposed development at 123 Marshall Street, Ivanhoe VIC 3079 to demonstrate 'Best Practice' in ESD to meet the City of Banyule's Planning Scheme.

In terms of the building performance, the ESD strategy for the proposed development has incorporated all key sustainable initiatives addressed by the City of Banyule and BESS (Built Environment Sustainability Scorecard) to the City of Banyule sustainability requirements.

- Building Services energy consumption reduced by 20% compared to NCC 2022 Section J;
- 25,000 litres rainwater harvesting system for toilet flushing and landscaping;
- Minimum 10kW-e solar PV provision to the whole building;
- Water efficient fixtures and fittings with minimum WELS rating specified;
- Improved stormwater quality via rainwater harvesting system and landscaping design;
- Provision for high levels of natural light into the primary spaces;
- A construction Waste Management Plan (WMP) to be prepared and implemented and a minimum 80% of all demolition and construction waste to be reused or recycled;
- An operational WMP to be prepared in accordance with the current version of the City of Banyule's ESD objectives;
- Provision of a Building User's Guide for occupants to optimise the building's environmental performance;
- Meet Best Practice Sustainable Design using BESS rating tool; and

Therefore, the proposed development has been designed to meet the City of Banyule's ESD objectives and the project team will ensure the performance outcomes proposed in this Sustainable Management Plan be implemented prior to occupancy at no cost to the City of Banyule and be to the satisfaction of the Responsible Authority.

Appendix A – BESS Report

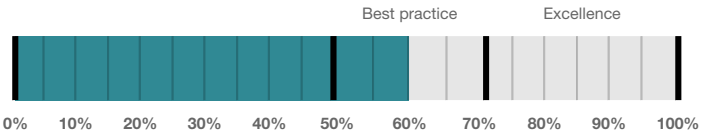
BESS Report

Built Environment Sustainability Scorecard

This BESS report outlines the sustainable design commitments of the proposed development at 123 Marshall St Ivanhoe Victoria 3079. The BESS report and accompanying documents and evidence are submitted in response to the requirement for a Sustainable Design Assessment or Sustainability Management Plan at Banyule City Council.

Note that where a Sustainability Management Plan is required, the BESS report must be accompanied by a report that further demonstrates the development's potential to achieve the relevant environmental performance outcomes and documents the means by which the performance outcomes can be achieved.

Your BESS Score

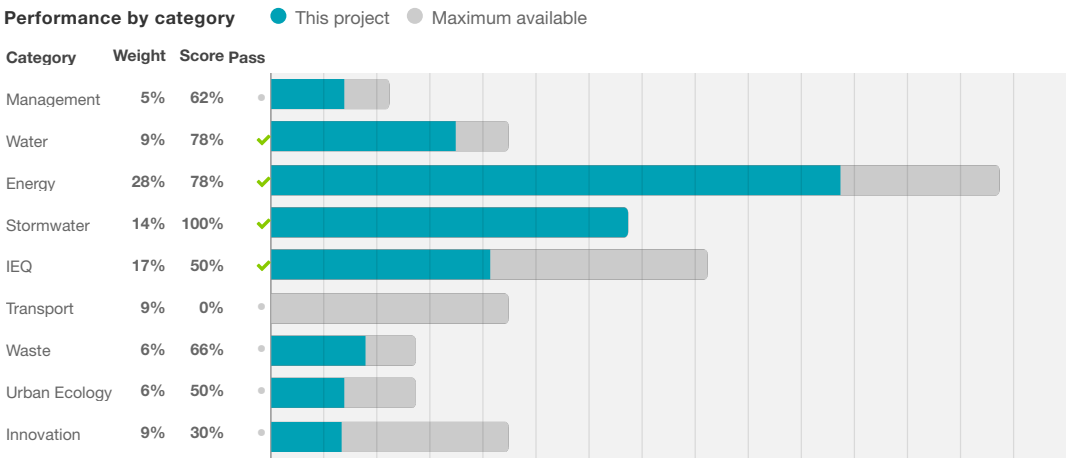


62%

Project details

Name	IGGS Ivanhoe
Address	123 Marshall St Ivanhoe Victoria 3079
Project ID	09DE67F2-R3
BESS Version	BESS-8
Site type	Non-residential development
Account	li.huan@igs.com.au
Application no.	
Site area	5,522 m²
Building floor area	4,297 m²
Date	21 January 2025
Software version	2.0.1-B.574

Performance by category



Buildings

Name	Height	Footprint	% of total footprint
School Building	4	1,291 m²	100%

Dwellings & Non Res Spaces

Non-Res Spaces

Name	Quantity	Area	Building	% of total area
Public building				
School	1	4,297 m²	School Building	100%
Total	**1**	**4,297 m²**	**100%**	

Supporting Evidence

Shown on Floor Plans

Credit	Requirement	Response	Status
Management 3.2	Annotation: Individual utility meters to be provided to all individual commercial tenancies		-
Management 3.3	Annotation: Sub-meters to be provided to all major common area services (list each)		-
Energy 3.1	Carpark with natural ventilation or CO monitoring system		-
Energy 4.2	Location and size of solar photovoltaic system		-
Stormwater 1.1	Location of any stormwater management systems (rainwater tanks, raingardens, buffer strips)		-
Waste 2.1	Location of food and garden waste facilities		-
Waste 2.2	Location of recycling facilities		-
Urban Ecology 1.1	Location and size of communal spaces		-
Urban Ecology 2.1	Location and size of vegetated areas		-
Urban Ecology 2.2	Location and size of green roof		-

Supporting Documentation

Credit	Requirement	Response	Status
Management 2.3a	Section J glazing assessment		-
Management 2.3b	Preliminary modelling report		-
Energy 1.1	Energy Report showing calculations of reference case and proposed buildings		-
Energy 3.1	Details of either the fully natural carpark ventilation or CO monitoring system proposed		-
Energy 3.7	Average lighting power density and lighting type(s) to be used		-
Energy 4.2	Specifications of the solar photovoltaic system(s)		-
Stormwater 1.1	STORM report or MUSIC model		-
IEQ 1.4	A short report detailing assumptions used and results achieved.		-

Credit summary

Management Overall contribution 4.5%

	62%		

1.1 Pre-Application Meeting	0%	
2.3 Thermal Performance Modelling - Non-Residential	100%	
3.2 Metering - Non-Residential	100%	
3.3 Metering - Common Areas	100%	
4.1 Building Users Guide	100%	

Water Overall contribution 9.0%

Minimum required 50%	78%	✔ Pass	

1.1 Potable Water Use Reduction	74%	
3.1 Water Efficient Landscaping	N/A	Scoped Out
	Irrigation via rainwater tank collection and reuse.	
4.1 Building Systems Water Use Reduction	100%	

Energy Overall contribution 27.5%

Minimum required 50%	78%	✔ Pass

1.1 Thermal Performance Rating - Non-Residential	37%	
2.1 Greenhouse Gas Emissions	100%	
2.2 Peak Demand	100%	
2.6 Electrification	100%	
2.7 Energy consumption	100%	
3.1 Carpark Ventilation	100%	
3.2 Hot Water	100%	
3.7 Internal Lighting - Non-Residential	100%	
4.1 Combined Heat and Power (cogeneration / trigeneration)	N/A	Scoped Out
	No cogeneration or trigeneration system in use.	
4.2 Renewable Energy Systems - Solar	100%	
4.4 Renewable Energy Systems - Other	N/A	Scoped Out
	No other (non-solar PV) renewable energy is in use.	

Stormwater Overall contribution 13.5%

Minimum required 100%	100%	✔ Pass

1.1 Stormwater Treatment	100%

IEQ Overall contribution 16.5%

Minimum required 50%	50%	✔ Pass
1.4 Daylight Access - Non-Residential	50%	✔ Achieved
2.3 Ventilation - Non-Residential	75%	✔ Achieved
3.4 Thermal comfort - Shading - Non-Residential	0%	
3.5 Thermal Comfort - Ceiling Fans - Non-Residential	0%	
4.1 Air Quality - Non-Residential	100%	

Transport Overall contribution 9.0%

	0%	
1.4 Bicycle Parking - Non-Residential	0%	
1.5 Bicycle Parking - Non-Residential Visitor	0%	
1.6 End of Trip Facilities - Non-Residential	0%	⊘ Disabled
	Credit 1.4 must be complete first.	
2.1 Electric Vehicle Infrastructure	0%	
2.2 Car Share Scheme	0%	
2.3 Motorbikes / Mopeds	0%	

Waste Overall contribution 5.5%

	66%	
1.1 - Construction Waste - Building Re-Use	0%	
2.1 - Operational Waste - Food & Garden Waste	100%	
2.2 - Operational Waste - Convenience of Recycling	100%	

Urban Ecology Overall contribution 5.5%

	50%	
1.1 Communal Spaces	100%	
2.1 Vegetation	50%	
2.2 Green Roofs	100%	
2.3 Green Walls and Facades	0%	
3.2 Food Production - Non-Residential	0%	

Innovation Overall contribution 9.0%

	30%	
1.1 Innovation	30%	

Credit breakdown

Management Overall contribution 4.5%

62%

1.1 Pre-Application Meeting	0%
Score Contribution	This credit contributes 37.5% towards the category score.
Criteria	Has an ESD professional been engaged to provide sustainability advice from schematic design to construction? AND Has the ESD professional been involved in a pre-application meeting with Council?
Question	Criteria Achieved ?
Project	No

2.3 Thermal Performance Modelling - Non-Residential	100%
Score Contribution	This credit contributes 25% towards the category score.
Criteria	Has a preliminary facade assessment been undertaken in accordance with NCC2022 Section J4D6?
Question	Criteria Achieved ?
Public building	Yes
Criteria	Has preliminary modelling been undertaken in accordance with either NCC2022 Section J (Energy Efficiency), NABERS or Green Star?
Question	Criteria Achieved ?
Public building	Yes

3.2 Metering - Non-Residential	100%
Score Contribution	This credit contributes 12.5% towards the category score.
Criteria	Have utility meters been provided for all individual commercial tenants?
Question	Criteria Achieved ?
Public building	Yes

3.3 Metering - Common Areas	100%
Score Contribution	This credit contributes 12.5% towards the category score.
Criteria	Have all major common area services been separately submetered?
Question	Criteria Achieved ?
Public building	Yes

4.1 Building Users Guide	100%
Score Contribution	This credit contributes 12.5% towards the category score.
Criteria	Will a building users guide be produced and issued to occupants?
Question	Criteria Achieved ?
Project	Yes

Water Overall contribution 9.0%

	Minimum required 50%	78%	✔ Pass

Water Approach	
What approach do you want to use for Water?:	Use the built in calculation tools
Do you have a reticulated third pipe or an on-site water recycling system?:	No
Are you installing a swimming pool?:	No
Are you installing a rainwater tank?:	Yes
Fixtures, fittings & connections profile	
Showerhead:	Scope out
Bath:	Scope out
Kitchen Taps:	>= 6 Star WELS rating
Bathroom Taps:	>= 6 Star WELS rating
Dishwashers:	>= 5 Star WELS rating
WC:	>= 4 Star WELS rating
Urinals:	>= 5 Star WELS rating
Washing Machine Water Efficiency:	Scope out
Which non-potable water source is the dwelling/space connected to?:	RWT
Non-potable water source connected to Toilets:	Yes
Non-potable water source connected to Laundry (washing machine):	No
Non-potable water source connected to Hot Water System:	No
Rainwater tank profile	
What is the total roof area connected to the rainwater tank?: RWT	1,470 m²
Tank Size: RWT	25,000 Litres
Irrigation area connected to tank: RWT	507 m²
Is connected irrigation area a water efficient garden?: RWT	No
Other external water demand connected to tank?: RWT	-
1.1 Potable Water Use Reduction	74%

Score Contribution	This credit contributes 83.3% towards the category score.
Criteria	What is the reduction in total potable water use due to efficient fixtures, appliances, rainwater use and recycled water use? To achieve points in this credit there must be >25% potable water reduction.
Output	Reference
Project	7584 kL
Output	Proposed (excluding rainwater and recycled water use)
Project	4613 kL
Output	Proposed (including rainwater and recycled water use)
Project	3722 kL
Output	% Reduction in Potable Water Consumption
Project	50 %
Output	% of connected demand met by rainwater
Project	40 %
Output	How often does the tank overflow?
Project	Never / Rarely
Output	Opportunity for additional rainwater connection
Project	635 kL

3.1 Water Efficient Landscaping		N/A	Scoped Out
			Irrigation via rainwater tank collection and reuse.

This credit was scoped out	Irrigation via rainwater tank collection and reuse.

4.1 Building Systems Water Use Reduction		100%

Score Contribution	This credit contributes 16.7% towards the category score.
Criteria	Where applicable, have measures been taken to reduce potable water consumption by >80% in the buildings air-conditioning chillers and when testing fire safety systems?
Question	Criteria Achieved ?
Project	Yes

Energy Overall contribution 27.5%

	Minimum required 50%	78%	✔ Pass

Use the BESS Deem to Satisfy (DtS) method for Non-residential spaces?:	Yes
Do all exposed floors and ceilings (forming part of the envelope) demonstrate meeting the required NCC2022 insulation levels (total R-value upwards and downwards)?:	Yes
Does all wall and glazing demonstrate meeting the required NCC2022 facade calculator (or better than the total allowance)?:	Yes
Are heating and cooling systems within one Star of the most efficient equivalent capacity unit available, or Coefficient of Performance (CoP) & Energy Efficiency Ratios (EER) not less than 85% of the CoP & EER of the most efficient equivalent capacity unit available?:	Yes
Are water heating systems within one star of the best available, or 85% or better than the most efficient equivalent capacity unit?:	Yes

Solar Photovoltaic system profile

System Size (lesser of inverter and panel capacity):	Solar PV	10.0 kW peak
Orientation (which way is the system facing)?:	Solar PV	North
Inclination (angle from horizontal):	Solar PV	10.0 Angle (degrees)

1.1 Thermal Performance Rating - Non-Residential 37%

Score Contribution	This credit contributes 34.8% towards the category score.
Criteria	What is the % reduction in heating and cooling energy consumption against the reference case (NCC2022 Section J)?

2.1 Greenhouse Gas Emissions 100%

Score Contribution	This credit contributes 8.7% towards the category score.
Criteria	What is the % reduction in annual greenhouse gas emissions against the benchmark?

2.2 Peak Demand 100%

Score Contribution	This credit contributes 4.3% towards the category score.
Criteria	What is the % reduction in the instantaneous (peak-hour) demand against the benchmark?

2.6 Electrification 100%

Score Contribution	This credit contributes 13% towards the category score.
Criteria	Is the development all-electric?
Question	Criteria Achieved?
Project	Yes

2.7 Energy consumption 100%

Score Contribution	This credit contributes 17.4% towards the category score.
Criteria	What is the % reduction in annual energy consumption against the benchmark?

3.1 Carpark Ventilation	100%
Score Contribution	This credit contributes 4.3% towards the category score.
Criteria	If you have an enclosed carpark, is it: (a) fully naturally ventilated (no mechanical ventilation system) or (b) 40 car spaces or less with Carbon Monoxide monitoring to control the operation and speed of the ventilation fans?
Question	Criteria Achieved ?
Project	Yes

3.2 Hot Water	100%
Score Contribution	This credit contributes 4.3% towards the category score.
Criteria	What is the % reduction in annual energy consumption (gas and electricity) of the hot water system against the benchmark?

3.7 Internal Lighting - Non-Residential	100%
Score Contribution	This credit contributes 8.7% towards the category score.
Criteria	Does the maximum illumination power density (W/m2) in at least 90% of the area of the relevant building class meet the requirements in Table J7D3a of the NCC 2022 Vol 1?
Question	Criteria Achieved ?
Public building	Yes

4.1 Combined Heat and Power (cogeneration / trigeneration)	N/A Scoped Out
	No cogeneration or trigeneration system in use.
This credit was scoped out	No cogeneration or trigeneration system in use.

4.2 Renewable Energy Systems - Solar	100%
Score Contribution	This credit contributes 4.3% towards the category score.
Criteria	What % of the estimated energy consumption of the building class it supplies does the solar power system provide?
Output	Solar Power - Energy Generation per year
Public building	12,118 kWh
Output	% of Building's Energy
Public building	7 %

4.4 Renewable Energy Systems - Other	N/A Scoped Out
	No other (non-solar PV) renewable energy is in use.
This credit was scoped out	No other (non-solar PV) renewable energy is in use.

Stormwater Overall contribution 13.5%

	Minimum required 100%	100%	Pass

Which stormwater modelling software are you using?:	Melbourne Water STORM tool
1.1 Stormwater Treatment	100%
Score Contribution	This credit contributes 100% towards the category score.
Criteria	Has best practice stormwater management been demonstrated?
Question	STORM score achieved
Project	100
Output	Min STORM Score
Project	100

IEQ Overall contribution 16.5%

	Minimum required 50%	50%	✔ Pass

1.4 Daylight Access - Non-Residential		50%	✔ Achieved
Score Contribution	This credit contributes 35.3% towards the category score.		
Criteria	What % of the nominated floor area has at least 2% daylight factor?		
Question	Percentage Achieved?		
Public building	50 %		
2.3 Ventilation - Non-Residential		75%	✔ Achieved
Score Contribution	This credit contributes 35.3% towards the category score.		
Criteria	What % of the regular use areas are effectively naturally ventilated?		
Question	Percentage Achieved?		
Public building	0 %		
Criteria	What increase in outdoor air is available to regular use areas compared to the minimum required by AS 1668.2:2012?		
Question	Percentage Achieved?		
Public building	60 %		
Criteria	What CO2 concentrations are the ventilation systems designed to achieve, to monitor and to maintain?		
Question	Value		
Public building	700 ppm		
3.4 Thermal comfort - Shading - Non-Residential		0%	
Score Contribution	This credit contributes 17.6% towards the category score.		
Criteria	What percentage of east, north and west glazing to regular use areas is effectively shaded?		
Question	Percentage Achieved?		
Public building	0 %		
3.5 Thermal Comfort - Ceiling Fans - Non-Residential		0%	
Score Contribution	This credit contributes 5.9% towards the category score.		
Criteria	What percentage of regular use areas in tenancies have ceiling fans?		
Question	Percentage Achieved?		
Public building	-		
4.1 Air Quality - Non-Residential		100%	
Score Contribution	This credit contributes 5.9% towards the category score.		

Criteria	Do all paints, sealants and adhesives meet the maximum total indoor pollutant emission limits?
Question	Criteria Achieved ?
Public building	Yes

Criteria	Does all carpet meet the maximum total indoor pollutant emission limits?
Question	Criteria Achieved ?
Public building	Yes

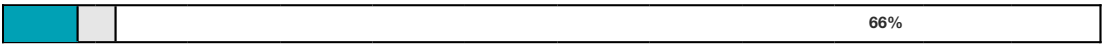
Criteria	Does all engineered wood meet the maximum total indoor pollutant emission limits?
Question	Criteria Achieved ?
Public building	Yes

Transport Overall contribution 9.0%

		0%

1.4 Bicycle Parking - Non-Residential		0%
Score Contribution	This credit contributes 22.2% towards the category score.	
Criteria	Have the planning scheme requirements for employee bicycle parking been exceeded by at least 50% (or a minimum of 2 where there is no planning scheme requirement)?	
Question	Criteria Achieved ?	
Public building	No	
Question	Bicycle Spaces Provided ?	
Public building	-	
1.5 Bicycle Parking - Non-Residential Visitor		0%
Score Contribution	This credit contributes 11.1% towards the category score.	
Criteria	Have the planning scheme requirements for visitor bicycle parking been exceeded by at least 50% (or a minimum of 1 where there is no planning scheme requirement)?	
Question	Criteria Achieved ?	
Public building	No	
Question	Bicycle Spaces Provided ?	
Public building	-	
1.6 End of Trip Facilities - Non-Residential		0% ⊘ Disabled
		Credit 1.4 must be complete first.
This credit is disabled	Credit 1.4 must be complete first.	
2.1 Electric Vehicle Infrastructure		0%
Score Contribution	This credit contributes 22.2% towards the category score.	
Criteria	Are facilities provided for the charging of electric vehicles?	
Question	Criteria Achieved ?	
Project	No	
2.2 Car Share Scheme		0%
Score Contribution	This credit contributes 11.1% towards the category score.	
Criteria	Has a formal car sharing scheme been integrated into the development?	
Question	Criteria Achieved ?	
Project	No	
2.3 Motorbikes / Mopeds		0%
Score Contribution	This credit contributes 22.2% towards the category score.	
Criteria	Are a minimum of 5% of vehicle parking spaces designed and labelled for motorbikes (must be at least 5 motorbike spaces)?	
Question	Criteria Achieved ?	
Project	No	

Waste Overall contribution 5.5%



1.1 - Construction Waste - Building Re-Use	0%
Score Contribution	This credit contributes 33.3% towards the category score.
Criteria	If the development is on a site that has been previously developed, has at least 30% of the existing building been re-used?
Question	Criteria Achieved ?
Project	No

2.1 - Operational Waste - Food & Garden Waste	100%
Score Contribution	This credit contributes 33.3% towards the category score.
Criteria	Are facilities provided for on-site management of food and garden waste?
Question	Criteria Achieved ?
Project	Yes

2.2 - Operational Waste - Convenience of Recycling	100%
Score Contribution	This credit contributes 33.3% towards the category score.
Criteria	Are the recycling facilities at least as convenient for occupants as facilities for general waste?
Question	Criteria Achieved ?
Project	Yes

Urban Ecology Overall contribution 5.5%

50%

1.1 Communal Spaces	100%
Score Contribution	This credit contributes 12.5% towards the category score.
Criteria	Is there at least the following amount of common space measured in square meters : * 1m² for each of the first 50 occupants * Additional 0.5m² for each occupant between 51 and 250 * Additional 0.25m² for each occupant above 251?
Question	Common space provided
Public building	244 m²
Output	Minimum Common Space Required
Public building	244 m²

2.1 Vegetation	50%
Score Contribution	This credit contributes 50% towards the category score.
Criteria	How much of the site is covered with vegetation, expressed as a percentage of the total site area?
Question	Percentage Achieved ?
Project	10 %

2.2 Green Roofs	100%
Score Contribution	This credit contributes 12.5% towards the category score.
Criteria	Does the development incorporate a green roof?
Question	Criteria Achieved ?
Project	Yes

2.3 Green Walls and Facades	0%
Score Contribution	This credit contributes 12.5% towards the category score.
Criteria	Does the development incorporate a green wall or green façade?
Question	Criteria Achieved ?
Project	No

3.2 Food Production - Non-Residential	0%
Score Contribution	This credit contributes 12.5% towards the category score.
Criteria	What area of space per occupant is dedicated to food production?
Question	Food Production Area
Public building	0.0 m²
Output	Min Food Production Area
Public building	108 m²

Innovation Overall contribution 9.0%

30%

Innovations	
Description:	
Sustainability Reporting	All sustainability goals and achievements by the building will be prominently and publicly will be available on school website. Furthermore, the building will display screens showcasing all sustainability features, achievements and goals to students and staff.
3.9.1 Artificial Lighting Quality	The lighting (except decorative fixtures, emergency and signage lighting) installed in the building will implement superior lighting design and controls solutions.
Points Targeted:	
Sustainability Reporting	1
3.9.1 Artificial Lighting Quality	2

1.1 Innovation	30%
Score Contribution	This credit contributes 100% towards the category score.
Criteria	What percentage of the Innovation points have been claimed (10 points maximum)?

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Appendix B – Daylight Modelling Report

IGS INTEGRATED GROUP SERVICES

Value | Innovation | Trust

ADVERTISED PLAN

DAYLIGHT ACCESS MODELLING REPORT

Ivanhoe Girls Grammar School – Enterprise Centre
123 Marshall Street,
Melbourne VIC 3079

Project No.: 24059
Date: 21/01/2025

ADVERTISED PLAN

Level 4, 108 Elizabeth Street
Melbourne VIC 3000
Web: www.igs.com.au

Document Control

Version	Date	Issue	Author		Reviewer	
00	13/09/2024	Issue for Review	Gokul Nisha	GN	Earnest Joseph	EJ
01	29/10/2024	Issue for Submission	Gokul Nisha	GN	Earnest Joseph	EJ
02	21/01/2025	Issue for Submission	Gokul Nisha	GN	Earnest Joseph	EJ

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1. Executive Summary

IGS was engaged to undertake a daylight simulation on the proposed development at 123 Marshall Street, Ivanhoe, Melbourne to identify the BESS Indoor Environment Quality (IEQ) Daylight Access for the proposed development daylight availability compliances.

The daylight availability simulation has been undertaken above the 100 mm above the finished floor for the development under the Uniform Cloudy Sky. A Uniform Cloudy Sky represents a sky with a constant value of luminance. The values are derived from a statistical analysis of outdoor illuminance levels. They represent a horizontal illuminance level that exceeds 85% of the time between the hours of 9am and 5pm throughout the year. They also represent that the building has been designed to meet the modelled daylight levels for at least 85% of the daytime annually.

BESS IEQ category requires a minimum 33% of the floor area achieves at least 2% daylight factor for non-residential developments.

The daylight modelling results indicate the proposed development will achieve at least 2% of daylight factor to a minimum 40% of the floor area meet the BESS daylight requirements.

2. Introduction

2.1 Key Assumptions

The proposed external windows visible light transmissions (VLTs) are recommended to be:

- All External windows (Non-Residential Spaces): VLT ≥ 40%

Finishes Reflectance Values

The following default reflectance values are used for the building finishes daylight availability modelling.

- Floor covering reflectance = 0.4
- Walls and Internal Partitions reflectance= 0.9
- Ceiling reflectance = 0.9
- Surrounding Buildings reflectance =0.5

2.2 Sky Model

The Uniform Cloudy Sky of horizontal external illuminance of 10,000 Lux is used for daylight availability simulation. A Uniform Cloudy Sky represents a sky with a constant value of luminance. The values are derived from a statistical analysis of outdoor illuminance levels. They represent a horizontal illuminance level that exceeds 85% of the time between the hours of 9am and 5pm throughout the year. Thus, they also represent that the building has been designed to meet the modelled daylight levels for at least 85% of the daytime annually.

2.3 Building Shape

The building physical shape is modelled in accordance with TP Package Issued for Town Planning on 16/01/2025.

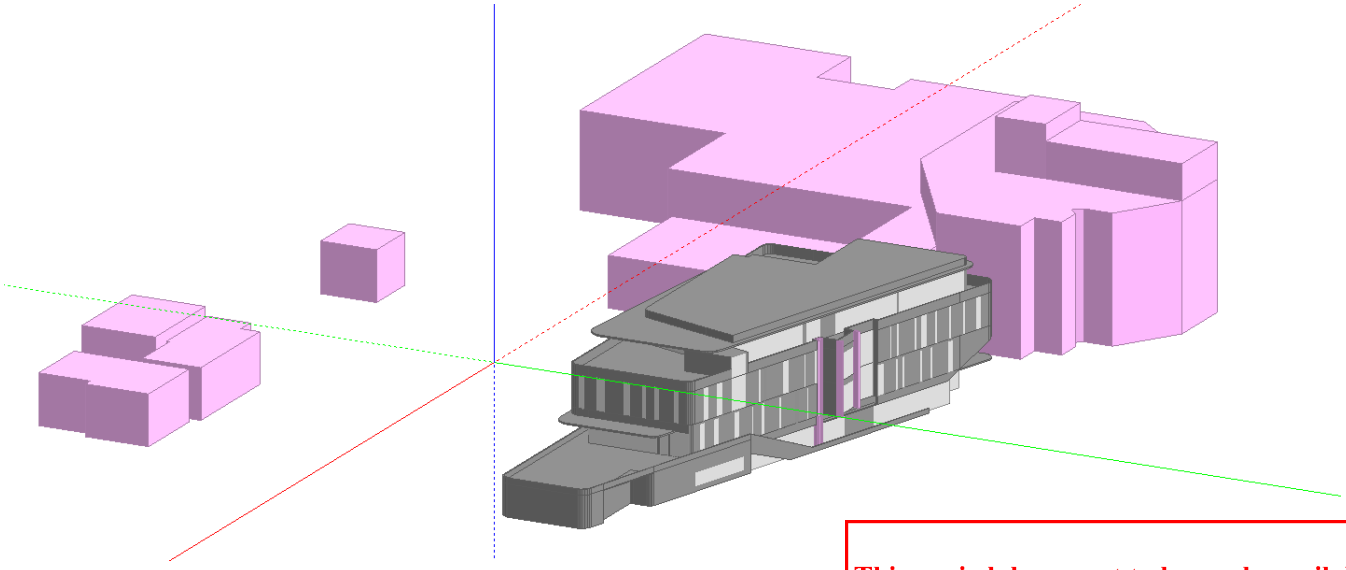


Figure 1 – Building Model of the site

3. BESS IEQ Daylight Assessment

3.1 Daylight Result – Non-Residential Component

For Non-residential component, BESS Indoor Environment Quality (IEQ) category requires the daylight modelling to be undertaken to demonstrate more than 33% of the nominated area achieves a daylight factor of at least 2% assuming a uniform design sky. Points are awarded as follows:

- 33% score for 30% of the nominated floor area achieves the daylight of at least 2%;
- 66% score for 60% of the nominated floor area achieves the daylight of at least 2%;
- 100% score for 90% of the nominated floor area achieves the daylight of at least 2%.

3.1.1 Ground Floor Non-Residential Daylight Result - Contour Plot

Below is the daylight contour plot extracted from Design Builder daylight modelling result showing daylight availability across the Ground Floor Non-Residential spaces.

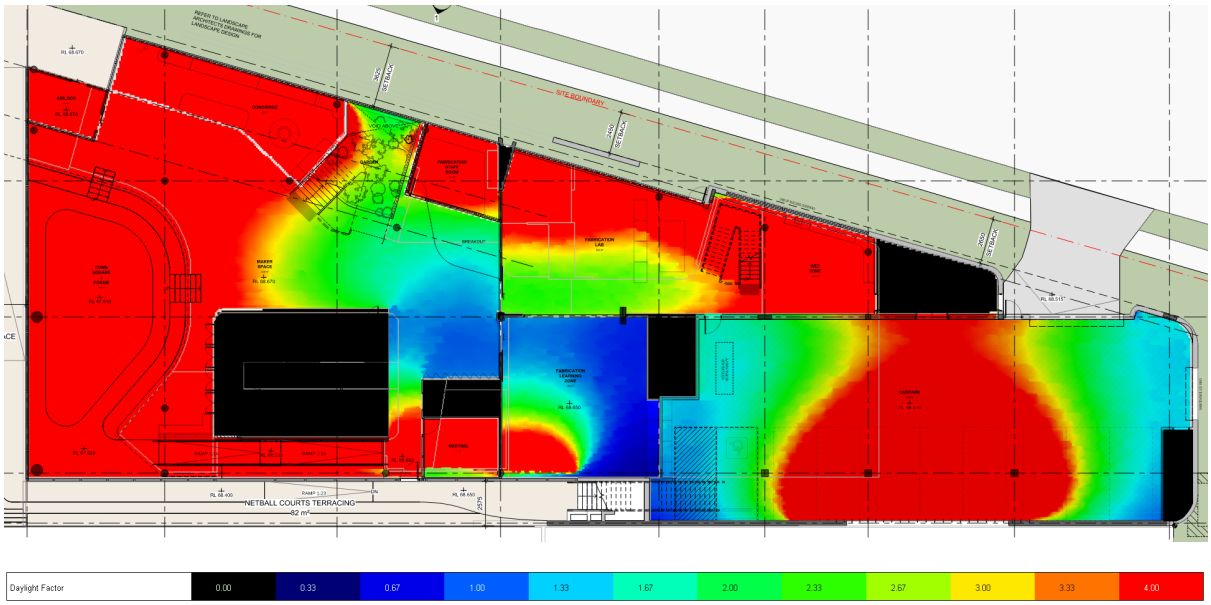


Figure 2 – Ground Floor Daylight Contour Plot

3.1.2 Level 1 Floor Non-Residential Daylight Result - Contour Plot

Below is the daylight contour plot extracted from Design Builder daylight modelling result showing daylight availability across Level 1.

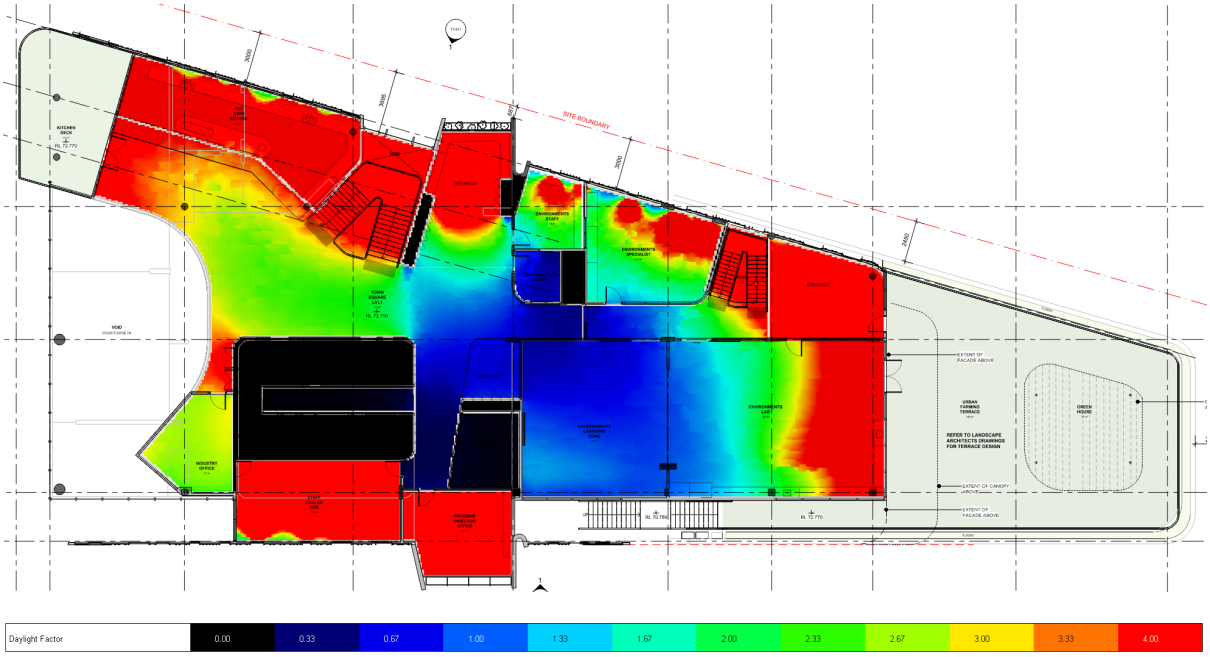


Figure 3 – Level 1 Daylight Contour Plot

3.1.3 Level 2 Floor Non-Residential Daylight Result - Contour Plot

Below is the daylight contour plot extracted from Design Builder daylight modelling result showing daylight availability across Level 2.

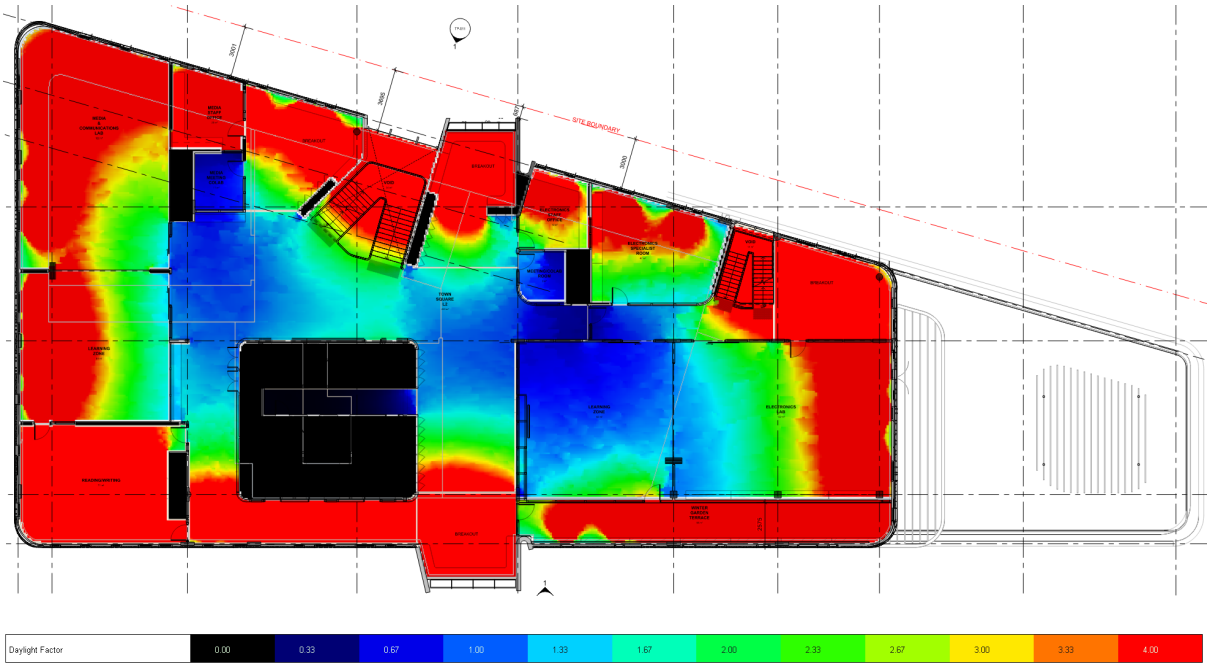


Figure 4 – Level 2 Daylight Contour Plot

3.1.4 Level 3 Floor Non-Residential Daylight Result - Contour Plot

Below is the daylight contour plot extracted from Design Builder daylight modelling result showing daylight availability across Level 3.

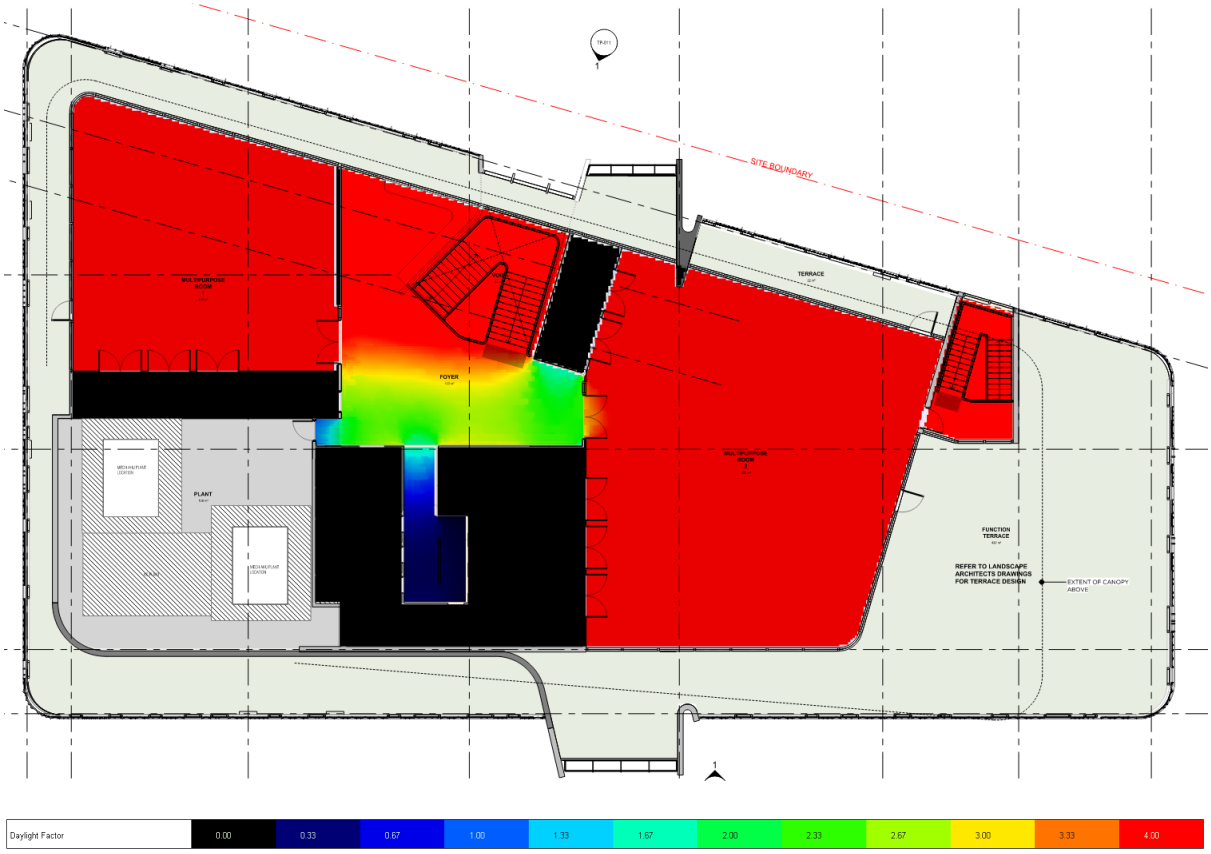


Figure 5 – Level 3 Daylight Contour Plot

3.1.5 Non-Residential Daylight Result – Summary Table

Daylight availability output of Non-Residential space is tabulated below:

Block	Zone	Floor area (m^2)	Floor Area above Threshold (m^2)	Floor Area above Threshold (%)
Ground Floor	Fabrication Staff Room	22.2	19.3	87%
Ground Floor	Fabrication Lab	152.5	93.8	62%
Ground Floor	Fabrication Learning Zone	81.4	8.2	10%
Ground Floor	Meeting	15.3	13.1	85%
Ground Floor	Concierge	50.4	50.4	100%
Level 1	Environments Specialist	45.1	9.4	21%
Level 1	Breakout 1	35.2	35.0	99%
Level 1	Breakout 2	39.3	23.6	60%
Level 1	Environments Staff	16.7	2.4	14%
Level 1	Environments Lab	198.2	35.9	18%
Level 1	Program Director Office	30.1	30.1	100%
Level 1	Staff Collab Hub	46.2	44.5	96%
Level 1	The Cafe Kitchen	61.3	57.8	94%
Level 2	Breakout 1	38.9	23.7	61%
Level 2	Breakout 2	35.7	34.7	97%
Level 2	Breakout 3	39.9	24.8	62%
Level 2	Breakout 4	28.4	28.4	100%
Level 2	Electronics Lab	203.7	39.0	19%
Level 2	Learning Zone	77.2	35.2	46%
Level 2	Electronics Specialist Room	45.1	13.8	31%
Level 2	Media and Communications Lab	117.0	70.4	60%
Level 2	Electronics Staff Office	16.7	7.2	43%
Level 2	Media Staff Office	19.1	18.7	98%
Level 2	Reading Writing	62.7	60.5	96%
Level 3	Multipurpose Room 1	129.8	129.8	100%
Level 3	Multipurpose Room 2	227.3	225.0	99%

Overall Total Area (m^2)	1836.5
Overall Total Compliant Area (m^2)	1135.9
Overall Total Compliant Area (%)	**62%**

4. Conclusion

BESS IEQ category requires at least 33% of total proposed development floor area to achieve 2% DF to meet minimum BESS requirements for daylight availability.

The daylight modelling results more than 40% of the proposed development floor area achieve at least 2% DF the BESS daylight requirements. Overall, the result indicates the development has met the BESS IEQ daylight access requirement.

Appendix C – NCC2022 Façade Calculation Report

Façade

Report

Calculator

Project Summary

Date
20/09/2024

Name
IGS ESD

Company
Integrated Group Services

Position
IGS ESD Team

Building Name / Address
IGGS, 123 Marshall St, Ivanhoe Melbourne

Building State

VIC

Climate Zone
Climate Zone 6 - Mild temperate

Building Classification

Class 9b - schools

Storeys Above Ground
14

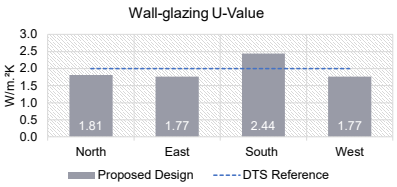
Tool Version
1.2 (June 2020)

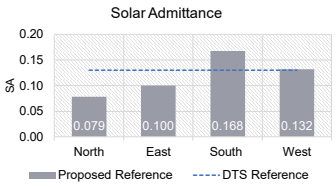
The summary below provides an overview of where compliance has been achieved for Specification J1.5a - Calculation of U-Value and solar admittance - Method 1 (Single Aspect) and Method 2 (Multiple Apects).

Compliant Solution =
Non-Compliant Solution =

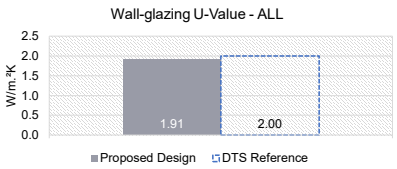
	Method 1				Method 2
	North	East	South	West	All
Wall-glazing U-Value (W/m².K)	1.81	1.77	2.44	1.77	1.91
Solar Admittance	0.08	0.10	0.17	0.13	
AC Energy Value					343

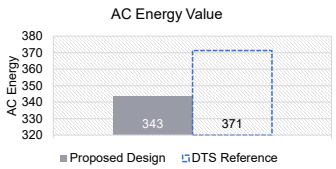
Method 1





Method 2





Project Details

	North	East	South	West
Glazing Area (m²)	88.162	337	326.57	416.89
Glazing to Façade Ratio	58%	57%	88%	58%
Glazing References	IGS_Glazing_1 IGS_Glazing_2 IGS_Glazing_3 IGS_Glazing_4 IGS_Glazing_G1 IGS_Glazing_G2 IGS_Glazing_G3	IGS_Glazing_1 IGS_Glazing_2 IGS_Glazing_3 IGS_Glazing_4 IGS_Glazing_5 IGS_Glazing_6 IGS_Glazing_G1	IGS_Glazing_1 IGS_Glazing_2 IGS_Glazing_3 IGS_Glazing_4 IGS_Glazing_5 IGS_Glazing_6 IGS_Glazing_7 IGS_Glazing_8 IGS_Glazing_G1 IGS_Glazing_G2	IGS_Glazing_1 IGS_Glazing_2 IGS_Glazing_3 IGS_Glazing_G1
Glazing System Types	Fixed Sliding Door	Fixed Sliding Door	Fixed Sliding Door	Fixed Sliding Door
Glass Types	IGS Glazing - Type 2 IGS Glazing - Type 1 IGS Glazing - Type 3	IGS Glazing - Type 2 IGS Glazing - Type 1 IGS Glazing - Type 3	IGS Glazing - Type 2 IGS Glazing - Type 1 IGS Glazing - Type 3	IGS Glazing - Type 2 IGS Glazing - Type 1 IGS Glazing - Type 3
Frame Types	Aluminium	Aluminium	Aluminium	Aluminium
Average Glazing U-Value (W/m².K)	2.77	2.71	2.71	2.70
Average Glazing SHGC	0.25	0.25	0.25	0.25
Shading Systems	Horizontal	Horizontal	Horizontal	Horizontal
Wall Area (m²)	64.238	250.3	46.63	306.41
Wall Types	Wall	Wall	Wall	Wall
Methodology	Wall			
Wall Construction	IGS_General Wall	IGS_General Wall	IGS_General Wall	IGS_General Wall
Wall Thickness	80	80	80	80
Average Wall R-value (m².K/W)	2.00	2.00	2.00	2.00
Solar Absorptance	0.6	0.6	0.6	0.6

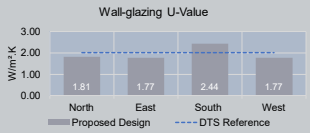
Façade

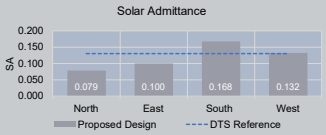
Wall Glazing Areas + Results

User Input | Active Row - All Inputs Required | User Dropdown | Calculator

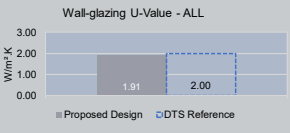
Results — Class 9b - schools — Climate Zone 6 - Mild temperate

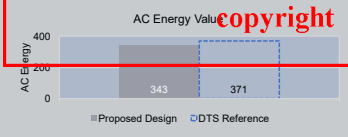
Method 1





Method 2





Wall Glazing Area

Compliant Solution =
Non-Compliant Solution =

North

	Glazing Reference	Height (m)	Width (m)	Glazing Area (m²)	Shading Reference	Wall Reference	Wall Area (m²)	Total Area (m²)	Internal
1	IGS_Glazing_1			25.85		IGS-Wall	64.238	90.09	
2	IGS_Glazing_2			22.94	3PX3.1H			22.94	
3	IGS_Glazing_3			8.06	5.9PX3.1H			8.06	
4	IGS_Glazing_4			19.84	7.6PX3.8H			19.84	
5	IGS_Glazing_G1			2.39	3PX3.1H			2.39	
6	IGS_Glazing_G2			3.162	5.9PX3.1H			3.16	
7	IGS_Glazing_G3			5.92	3PX3.1H			5.92	
8									
9									
10									
11									
12									
13									
14									
15									
16									

	Result	Target				
Wall-glazing U-Value (W/m².K)	1.81	2.00	Glazing Area (m²)	88.162	Average Glazing U-Value (W/m².K)	2.77
Solar Admittance	0.079	0.130	Wall Area (m²)	64.238	Average Glazing SHGC	0.25
			Glazing to Façade Ratio	58%	Average Wall R-Value (m².K/W)	2.00

East

	Glazing Reference	Height (m)	Width (m)	Glazing Area (m²)	Shading Reference	Wall Reference	Wall Area (m²)	Total Area (m²)	Internal
1	IGS_Glazing_1			71.9		IGS-Wall	250.3	322.20	
2	IGS_Glazing_2			109.98	2.6PX8H			109.98	
3	IGS_Glazing_3			68.55	2.6PX3.9H			68.55	
4	IGS_Glazing_4			35.85	0.5PX3.4H			35.85	
5	IGS_Glazing_5			37.57	2.1PX3.1H			37.57	
6	IGS_Glazing_6			9.2	12PX3.1H			9.20	
7	IGS_Glazing_G1			3.95	2.6PX8H			3.95	
8									
9									
10									
11									
12									
13									
14									
15									
16									

	Result	Target				
Wall-glazing U-Value (W/m².K)	1.77	2.00	Glazing Area (m²)	337	Average Glazing U-Value (W/m².K)	2.71
Solar Admittance	0.100	0.130	Wall Area (m²)	250.3	Average Glazing SHGC	0.25
			Glazing to Façade Ratio	57%	Average Wall R-Value (m².K/W)	2.00

South

	Glazing Reference	Height (m)	Width (m)	Glazing Area (m²)	Shading Reference	Wall Reference	Wall Area (m²)	Total Area (m²)	Internal
1	IGS_Glazing_1			34.2		IGS-Wall	46.63	80.83	
2	IGS_Glazing_2			7.4	1.8PX3.4H			7.40	
3	IGS_Glazing_3			68.82	1.92PX7.6H			68.82	
4	IGS_Glazing_4			12.16	7.6PX3.8H			12.16	
5	IGS_Glazing_5			26.2	4.6PX3.9H			26.20	
6	IGS_Glazing_6			72.15	1.92PX3.9H			72.15	
7	IGS_Glazing_7			50.31	12.9PX3.9H			50.31	
8	IGS_Glazing_8			45.78	1PX3.1H			45.78	
9	IGS_Glazing_G1			2.07	1PX3.1H			2.07	
10	IGS_Glazing_G2			7.48	4.6PX3.9H			7.48	
11									
12									
13									
14									
15									
16									

	Result	Target				
Wall-glazing U-Value (W/m².K)	2.44	2.00	Glazing Area (m²)	326.57	Average Glazing U-Value (W/m².K)	2.71
Solar Admittance	0.168	0.130	Wall Area (m²)	46.63	Average Glazing SHGC	0.25
			Glazing to Façade Ratio	88%	Average Wall R-Value (m².K/W)	2.00

West

	Glazing Reference	Height (m)	Width (m)	Glazing Area (m²)	Shading Reference	Wall Reference	Wall Area (m²)	Total Area (m²)	Internal
1	IGS_Glazing_1			155.04		IGS-Wall	306.41	461.45	
2	IGS_Glazing_2			112.54	0.42PX3.9H			112.54	
3	IGS_Glazing_3			147.15	0.5PX3.4H			147.15	
4	IGS_Glazing_G1			2.16	0.42PX3.9H			2.16	
5									
6									

	Result	Target				
Wall-glazing U-Value (W/m².K)	1.77	2.00	Glazing Area (m²)	416.89	Average Glazing U-Value (W/m².K)	2.70
Solar Admittance	0.132	0.130	Wall Area (m²)	306.41	Average Glazing SHGC	0.25
			Glazing to Façade Ratio	58%	Average Wall R-Value (m².K/W)	2.00

Reference Building

Include shading?

	Glazing to Façade Ratio	Method 1 Wall U-Value (W/m².K)	Method 1 Glazing U-Value (W/m².K)	Method 1 Shading Multiplier	Method 1 SHGC	Method 2 Wall U-Value (W/m².K)	Method 2 Glazing U-Value (W/m².K)	Method 2 SHGC
North	58%	0.50	3.09	0.544	0.41	0.50	2.86	0.00
East	57%	0.50	3.11	0.700	0.32			
South	88%	0.50	2.21	0.766	0.19			
West	58%	0.50	3.10	0.918	0.25			