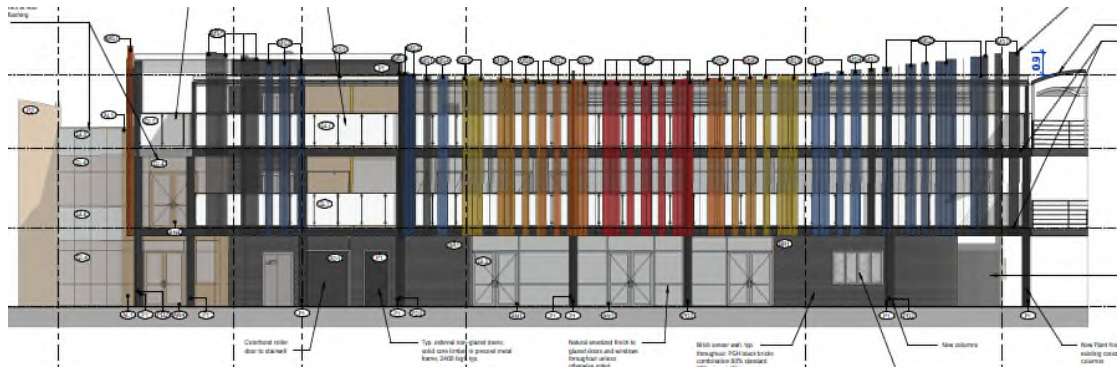




SUSTAINABLE MANAGEMENT PLAN

Nazareth College Student Hub 13-17 Manning Drive Noble Park North VIC 3174

Consultant: Karim Ghobrial
Client: Cotter Reid Architects
Suite 10 / 18-20 Riversdale Rd
Newtown VIC 3220
Date: November 2024



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Issue	Comments	Revision
Oct, 2024	For TP approval	0



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SMP Summary and Commitments by Owner/Builder

<p>Energy Efficiency</p>	<ul style="list-style-type: none"> • Energy efficient airconditioning to be within one point of the highest available Star efficiency or at least 85% Energy Efficient Ratios (EER). • Water heating units to be within one point of the highest available Star efficiency or at least 85% energy efficient. • Lighting to be at least 10% more efficient than NCC Section J energy efficiency minimum requirements. • Building fabric to be 10% better than NCC Section J energy efficiency minimum requirements. • Motion detectors to be used for common areas, toilets, storage, cleaners and amenities for lighting. • Install check sub-meters for lighting, A/C and other ancillaries. • Heat pump or solar boosted heating for the hot water unit. • Opting for an electric development except for cooking appliances.
<p>Material Fabric</p>	<p>This copied document to be made available for the sole purpose of enabling its consideration and review as part of a planning process under the Planning and Environment Act 1987. The document must not be used for any purpose which may breach any copyright.</p> <ul style="list-style-type: none"> • Insulation to be in accordance to minimum requirements: R3.5 and sarking insulation. • Walls insulation R2.5 and sarking. • Glazing to have minimum VLT (visible light transmittance) of 70% for a better daylight. double-glazed Clear type for conditioned spaces. • Amenities and louvers may be standard glazing. • Light colour roof to reduce the Urban Heat Island Impact.
<p>Water Efficiency and STORM Management</p>	<ul style="list-style-type: none"> • Toilets to be minimum 4 Star WELS rating. • Taps to be minimum 5 Star WELS rating. • L7,000 for water collection from roofs as depicted on civil drawings. • Hard surfaces to be treated by a HumeFilter device system. Design TBC with civil engineer. • Water tank to be issued for toilets flushing.
<p>Construction & Building Waste Management</p>	<ul style="list-style-type: none"> • Waste storage size to be minimum 4m2 for dedicated spaces within the building for general and recycling waste bins for occupants. • Commitment: Timber used to be certified by a forest certification scheme (FSC or PEFC/AFS). • Provide bins for materials and general recycling. • Commitment to have minimum 30% replacement of cement with SCMs such as flyash (averaged over the project). <u>This is subject to engineer's sign off.</u>



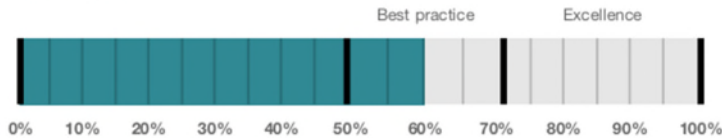
	<ul style="list-style-type: none">• Commitment to recycle at least 80% of construction waste.
Indoor Environment Quality	<ul style="list-style-type: none">• Commitment to use low VOC materials on paints and adhesives.• Commitment to meet the maximum total indoor pollutant emission limits for carpets.• Windows and doors to be openable to allow for natural ventilation.• Ceiling fans: 2no. to the Wellbeing Lounge and 1no. to the Career's Lounge.• CO2 ventilation system to have a maximum of 500ppm in habitable spaces.• CO2 sensor system to be used to open and close louvers to bring in natural ventilation when required.• Carbon dioxide monitoring devices to be installed in rooms (two devices per room).• KDF monitoring device or similar approved.
Transport	<ul style="list-style-type: none">• Student Hub to use existing bike racks.
Urban Ecology	<ul style="list-style-type: none">• Light roof colour. Roof solar absorptance to be 0.45 or less.

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BESS Verdict

Your BESS Score



60%

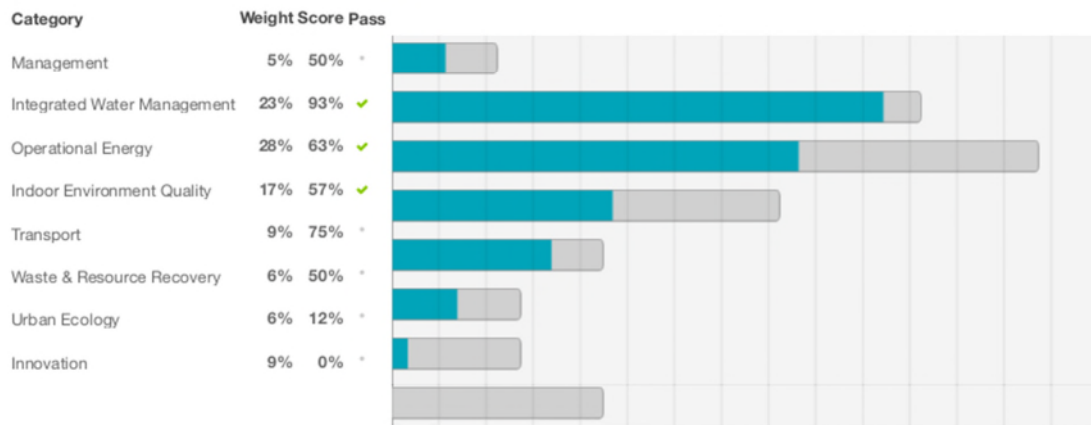
Project details

Address	13-17 Manning Drive Noble Park North Victoria 3174
Project no	67C2DAA7-R2
BESS Version	BESS-9
Site type	Non-residential development
Account	info@efficientenergychoices.com.au
Application no.	
Site area	1,282.00 m ²
Building floor area	1,452.00 m ²
Date	04 November 2024
Software version	2.0.1-B.570



Performance by category

● Your development ● Maximum available



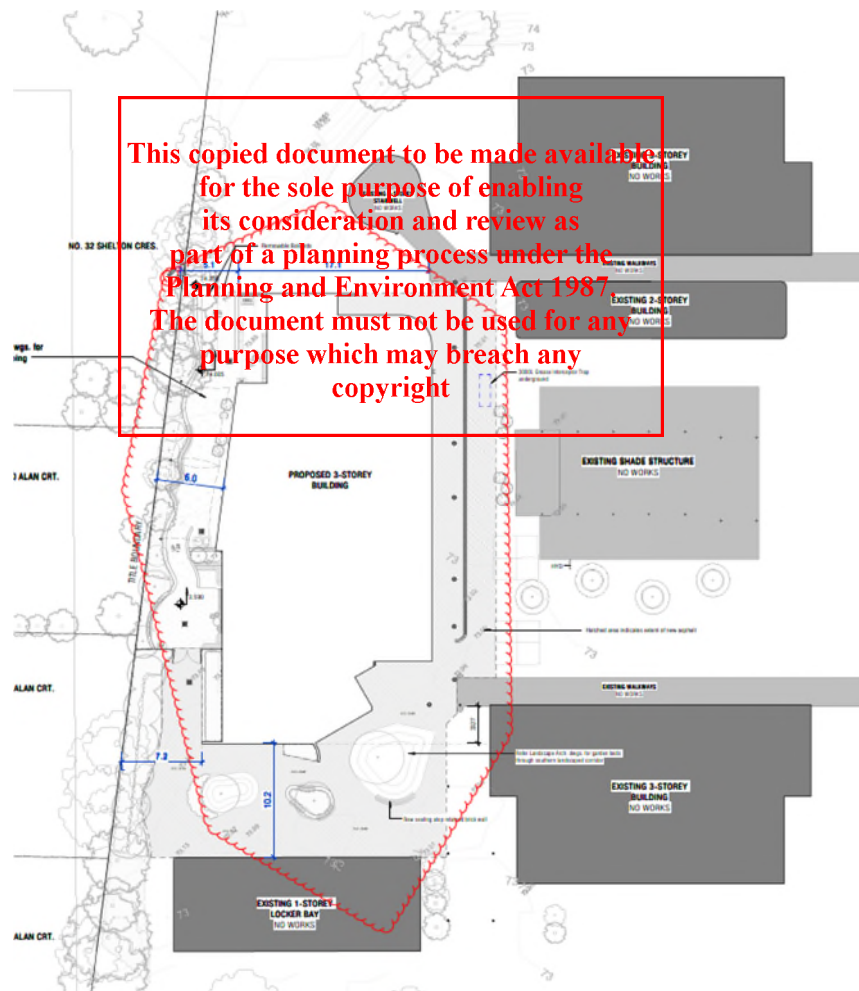
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1.0 Project Scope

The proposed project is a proposed Student Hub at Nazareth College, 13-17 Manning Drive, Noble Park North VIC 3174. This is a proposed new building development comprising of new rooms, amenities and assembly spaces. This proposed building is amongst other existing and future structures. See below Master Plan. This SMP is for the clouded buildings in red colour.

Refer to drawings by Cotter Reid Architects, Dated: August 2024, Drawing no: TP00 to TP16, Rev C. This report addresses Council sustainability Clause and for Stormwater Management Clause. in conjunction with civil and drainage engineer.





2.0 Design Process

Environmental Sustainable Design (ESD) initiatives were carried out using the following:

- BESS stands for (Built Environment Sustainability Scorecard) Tools for Environmental Performance Strategy. Average rating was obtained for heating, cooling and star rating. Refer to attached energy report rating. The BESS design tool was used to achieve the following report. Refer to Appendix A and BESS report;
- NCC 2022 Section J energy efficiency chapter and requirement

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3 Management, Application and Commissioning

Item	Requirement	Comments
Management Pre-Application Meeting	ESD professional been engaged to provide sustainability advice from schematic design to construction.	ESD consultant has not been engaged from the start.
Thermal Performance Modelling - non-Residential	Provide a preliminary facade assessment in accordance with NCC Section J4D6. Provide a draft Section J energy report or NABERS or Green Star.	Included. Has been carried out by ESD consultant. Section draft JV3 has been carried out by the ESD consultant.
Metering – non-Residential	Provide utility meters for all individual commercial tenants.	Scoped out. Not relevant to this project. Only one building owner.
Metering - Common Areas	Have all major common area services been separately sub-metered.	Yes. To install check meters to monitor energy consumption for common areas and services such as lighting, A/C, fans and other ancillaries. To be carried out by builder and electrician.
Building Users Guide	Produce a building users guide and issue to occupants.	To be provided by builder at occupancy.
Commissioning	Services to be commissioned.	By builder and appropriate trades and service engineers.

Provide utility meters to be made available for the sole purpose of enabling its consideration and review as part of a planning process under the Planning and Environment Act 1987. The document must not be used for any purpose which may breach any copyright





ESD inspection	Inspect the site during construction and at least two weeks prior to completion to ensure the ESD items have been supplied and installed on site.	By ESD consultant the author of this report.
----------------	---	--

Additional requirements

For town planning submission, the following are required:

- Submit SMP report.
- Ensure the SMP requirements are clearly noted or depict on the drawings for endorsement by Council Planners.
- Commitment for a thorough commissioning program to be undertaken to ensure that systems are effectively and efficiently operating.
- Ensure that the ESD recommendations in this report will be incorporated in the project and services documentation for building permit stage.

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Implementation and Maintenance Schedule

Actions	Responsibility	Completion Date
Prelim section J assessment	ESD Consultant, Architect	During documentation
Materials, recycling, sustainable items	Architect, Builder	During documentation
Insulation & sealing	Architect, Builder	during construction
Air-conditioning systems	Services Engineer, Builder	prior to building permit. Maintenance schedule by School
Hot water heating	Services Engineer, Builder	As above
Lighting	Architect, Builder	As above
Motion / time switch controls	Services Engineer, Builder	As above
Bike storage	Architect, Builder	during construction or on site already
Metering	Services Engineer, Builder	prior to building permit
Energy efficient lifts	Services Engineer, Builder	As above. Maintenance schedule by school.
Rainwater tank	Services Engineer, Builder	As above
Water efficient toilets	Architect, Builder	As above
Water efficient taps	Architect, Builder	As above
Water efficient showers	Architect, Builder	As above
Water efficient appliances	Architect, Builder	As above
Fire system test water capture	Builder, Services Engineer	As above
Concrete	Builder	during construction
Plasterboard	Builder	during construction
Timber	Builder	during construction
Material Re-use	Architect, Builder	during construction
Topsoil	Builder	during construction
Construction Management Plan	Builder	during construction
Low VOC paints, sealants, adhesives	Architect, Builder	during construction
Building Users Guide	Owner's Corporation, ESD Consultant, Building Services	Upon CoF
Building tuning	Owner's Corporation, Building Services	Yearly Maintenance schedule by school
Commissioning	Builder and appropriate trades and service engineers.	Prior to occupancy
SMP inspection	ESD consultant	Prior to occupancy

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4 Water

Item	Requirement	Comments
Water tank	To be installed to satisfy the Stormwater requirement. Other items may be required like a raingarden or a media filtration pit subject to STORM verdict.	RWT L7k to treat roofs. Refer to MUSIC verdict and WSUD layout. RWT to be used for toilets flushing and irrigation (if applicable). Hard surfaces to be treated by a HumeFilter device system. Design TBC by civil engineer. Refer to Appendices.
		 <p>Photo above is example only.</p>
		<p style="color: red; border: 1px solid red; padding: 5px;">This copied document to be made available for the sole purpose of enabling its consideration and review as part of a planning process under the Planning and Environment Act 1987. The document must not be used for any purpose which may breach any copyright</p>
Water Efficient Landscaping	Provide water efficient landscaping.	Yes. To be depicted on landscaped drawings. Responsibility by landscape architect and builder.
Building Systems Water Use Reduction	Where applicable reduce potable water consumption by >80% in the buildings air-conditioning chillers and when testing fire safety systems.	Yes, if building will be sprinkled. The building will not have chillers but simply A/C split systems. A sprinkler system TBC later during documentation or by the fire engineer as required by the NCC. To be arranged by architect, services engineer and building surveyor.
Water fixtures, fittings and connections.	Refer to summary at start of report.	All fittings to be of high-level WELS efficiency. Toilets to be connected to water tank for toilets flushing.



4.1 Stormwater Management

Collection of water to be from roofs. Collected water to be used directly (without any treatment) for connection to toilets for flushing.



Total collection tank size per modelling report to satisfy the Melbourne Storm Rating requirement. The whole site meeting Melbourne Storm Rating requirement of 100%. Refer to the Appendices.

In addition to above items, should the tank have a significant buildup of sediment it is to be removed and cleaned by a suitable professional using appropriate measures.

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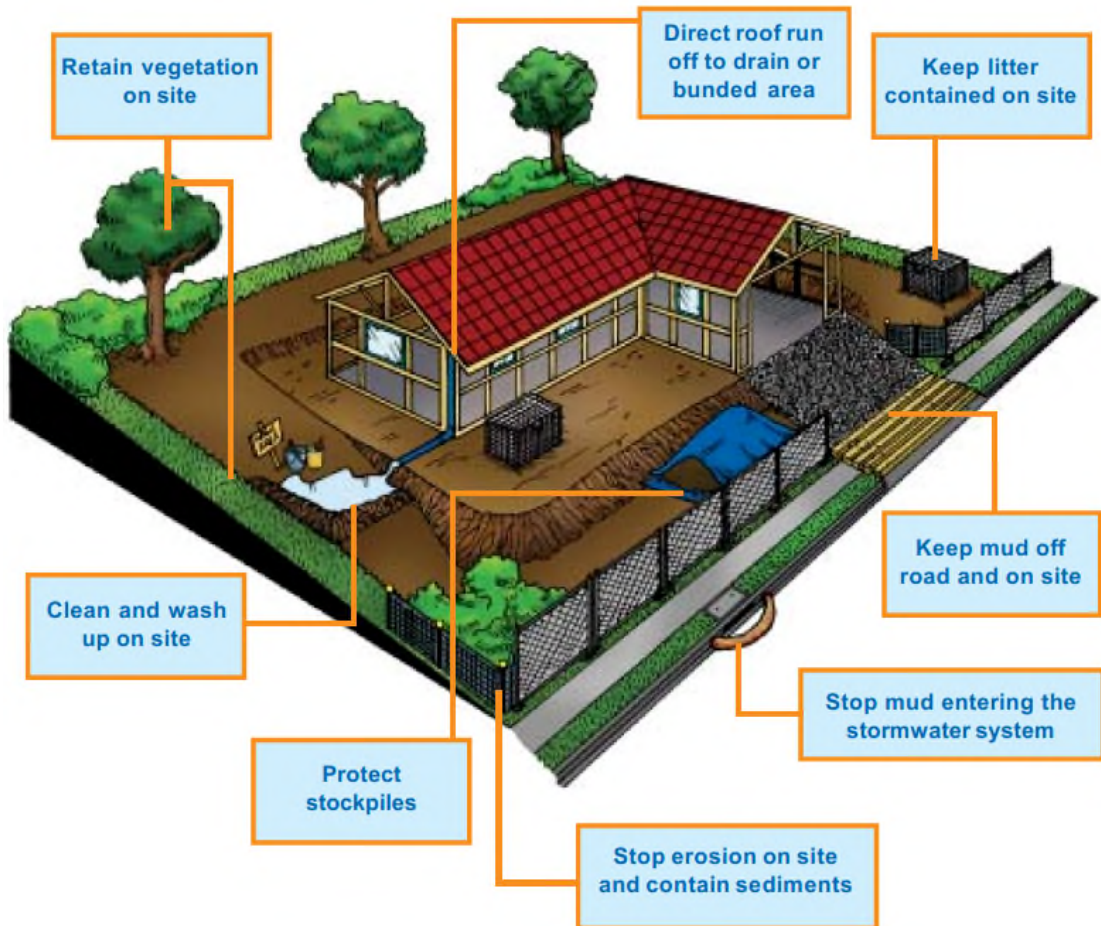
6 SITE RULES TO KEEP STORMWATER CLEAN

	SITE RULE 1	Check Council requirements and plan before you start work on site. Page 4
	SITE RULE 2	Stop erosion onsite and contain sediments. Page 6
	SITE RULE 3	Protect stockpiles. Page 12
	SITE RULE 4	Keep mud off road and on site. Page 16
	SITE RULE 5	Keep litter contained on site. Page 18
	SITE RULE 6	Clean and wash up on site. Page 21

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Check Council requirements and plan before you start work on site



Above is taken from Melbourne Water “Keeping Our Stormwater Clean”

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4.2 Objectives

Prevent stormwater pollution from construction sites. Ensure construction site is regularly cleaned from rubbish and any debris to prevent them from entering storm system.

- Ensure also to mitigate detrimental effect of development on downstream waterways by the application of best practice stormwater management by regular cleaning of site and blocking off certain areas.
- Minimise peak stormwater flows and stormwater pollutants to improve health of water bodies.
- To reintegrate urban water into the landscape and provide attractive spaces for community use.

4.3 Application and Implementation

Treatment of stormwater measures to improve quality and reduce flow of water discharged to waterways.

- Install appropriate storage bins and waste enclosures
- HumeFilter as per MUSIC verdict.
- Builder to have a site management plans and measures during construction to prevent litter, sediments and pollution entering waterways.
 - Regular cleaning of site
 - Appropriate waste storage and regular pick up of waste
 - If necessary, use litter traps where necessary.

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4.4 Maintenance

Once rainwater tank installed and associated collection areas are to be regularly inspected. The following measures are to be carried out through inspections every 3 to 6 monthly basis:

Gutters: to be inspected for integrity and debris buildup. Debris to be cleared up and gutters made good as required.

Roof: to be inspected for debris build up. Debris should be cleared. Tree/plant growth resulting in increased debris.

Tank: to be inspected for integrity. Repair/replace as required.

Filtration: inspect every six months, clean and rectify as required. The occupant to arrange with the supplier of the system.

Cleanness of site: to be inspected and cleared of debris on a daily basis.

First flush device: inspect and clean if required.

Inlet/overflow screen: inspect and clean if required.

Sludge accumulation: every 2 to 3 years and desludge if required.

Removal of sludge and organic sediments that accumulate in the base of a rainwater tank may be necessary if buildup is excessive and as such as suitable outlet should be provided. This sludge layer and biofilms that develop on the walls of a tank, may be important in the natural purification processes occurring in the tank; therefore, removing a sludge layer should only occur when buildup impedes the tank operation.

Pump system as required/specified by pump manufacturer.

Following acceptance of design, when project moves to construction, defects periods and ultimately transfer of the asset to owners. the inspection forms, asset transfer checklists and maintenance schedules can be used to help ensure WSUD elements are built as designed are maintained and are in good operating condition prior to asset transfer to owner.

4.5 Commissioning

For town planning submission, the following are recommended:

- Submit stormwater report.
- Ensure that the water tank and permeable areas are clearly noted on the drawings for endorsement by council planners.
- Ensure that this report will be incorporated in the project and services documentation for building permit stage.



Rainwater Tank Maintenance Recommendations

Things to look for and how to fix them.

Leaf litter / debris in gutters	Pump not working
Regularly clear your gutters. Make sure you cover the tank inlet if you're rinsing down the gutters to avoid debris entering the tank.	Check operating instructions for your pump. Check that pumps are kept clear of surface water (flooding), vegetation, and have adequate ventilation. Pumps should be serviced every few years to prolong the pump life.
Blocked downpipe	Mains backup or pump not working
If you see water spilling from the edge of the gutters check that the downpipe is not blocked, removing any debris.	Have you heard the pump operating? If the mains backup switching device fails many people do not notice for a long time. Consider a manual system if the switching device is problematic and you don't mind operating it manually.
First flush diverter clogging	Overflow
To clean out, unscrew the cap at the base of the diverter and remove the filter. Wash the filter with clean water and the flow restrictor inside the cap.	Check that the overflow is not blocked and that there is a clear path for water to safely spill from the tank through the overflow pipe when full. Check that a clean mesh screen is safely in place to prevent mosquitoes entering the tank.
Debris on the mesh cover over inlets / outlets	Sediment / debris build-up in tank (more than 20mm thick)
The fine stainless steel mesh is similar to fly screen mesh. It should be cleaned regularly to ensure it does not become blocked with leaves and other material.	Over time a small amount of fine sediment will collect in the bottom of your tank and this is harmless and natural. It should not be disturbed until it is approx 20 mm thick which may take many years. To clean your tank out simply empty your tank and wash out with a high-pressure washer or hose.
Dirt and debris around the tank base or side.	Base area
Keep leaf build-up, sticks, pot plants and other items off the lid of your tank. Use a hose to remove dust and dirt from the outside of the rainwater tank and ensure there is no debris on the base, bottom lip and walls of your tank.	Tanks must be fully supported by a flat and level base. Check for any movement, cracks or damage to the slab or pavers. If damage is observed, empty the tank to remove the weight and have the fault corrected to prevent damage to the tank. There is no warranty from suppliers for damage to a rainwater tank if the base has failed.
Smelly water or mosquitos	Monitoring the water level
Rainwater tanks can smell if there is debris in the gutters. Check the gutters and leaf strainers are clean. Mosquitos or wrigglers can make their way into your tank if they are small enough to pass through the inlet strainer. A very small amount of chlorine (approx 4 parts per million) can be put in the tank to kill off mosquitos or the bacteria causing odours. The chlorine will disinfect the water and then evaporate. Chlorine tablets from a pool supplier can be used (but check the recommended dose based on your tank capacity).	A range of devices are available to monitor water level. Some simple float systems can be used effectively.

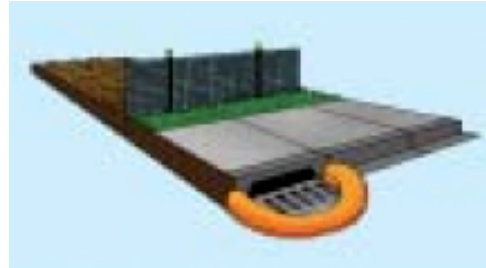
Acknowledgement: Information from PJT Green Plumbing's 'Maintenance Guide for Your Rainwater Tank' was used to develop this fact sheet.

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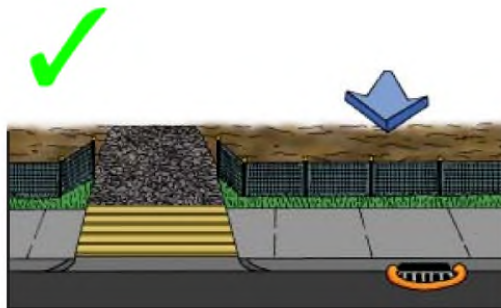


4.6 Site Management Plan

- Plan before starting work
- Stop erosion and keep sediment on site. Use a gravel sausage or sediment log.



- Keep mud off road and on site



Putting crushed rock on the access point of your site is a good way to prevent damage and provide a dry access point for vehicles. Where possible park vehicles off site.

Make sure gravel does not collect in the gutter or on the footpath.

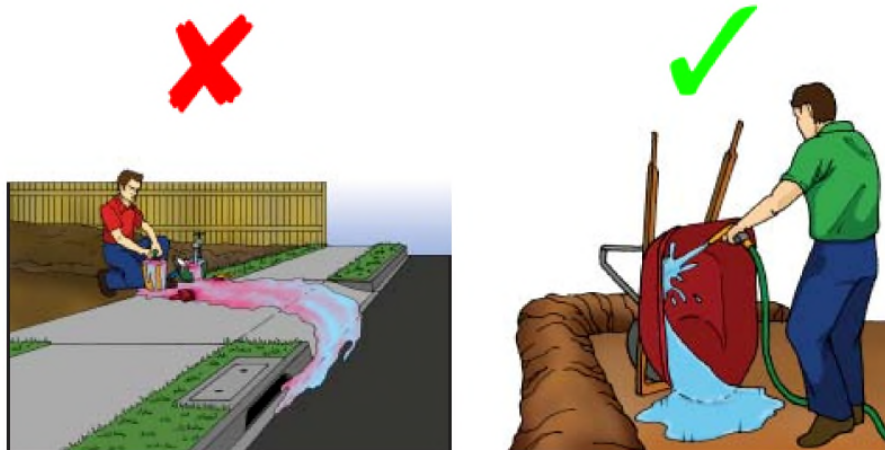
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- Keep litter contained on site




- Clean up and wash on site



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5.0 Energy

Item	Requirement	Comments
Solar photovoltaic (PV) system.	Required to minimise energy load and peak power demand. To offset some of the electrical power consumption from carpark mechanical fans, common lighting and others.	There is an existing 340kW PV Solar power panels on site. 
Energy supply	Gas and/or electricity of enable	Development to be gas free type except for cooking appliances.
Electric appliances and services.	To be of high energy efficiency and performance.	All appliances and services to be of high-level efficiency: <ul style="list-style-type: none"> • Energy efficient airconditioning to be within one point of the highest available Star efficiency or at least 85% Energy Efficient Ratios (EER). • Heat pump or solar boosted heating for the hot water unit. To be one star of best available or at least 85% better than most efficient capacity. TBC with services engineer in conjunction with the builder. • Gas cooking appliances. • LED energy efficiency lighting. • Refer to summary at start of report for efficiency requirements.
Thermal energy efficiency	To meet and exceed Section J energy efficiency benchmark.	Will be achieved by high level of insulation and good quality double-glazing for conditioned spaces. The building fabric to be at least 10% better than Section J energy efficiency. Refer to wall-glazing calculation in the Appendices.

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A Section JV3 energy report has been carried out by ESD consultant.

Internal Lighting	Maximum illumination power density (W/m ²) to be at least 90% of the relevant building class at least 10% more efficient than required by Table J7D3a of the NCC 2022 Vol 1 (Class 2-9).	To have energy efficient LED lighting type in offices, admin, amenities and rooms. To be 10% more energy efficient than Table J7D3a. This should be easily achieved by LED lighting. To be designed by services engineer and installed by builder.
Unoccupied spaces	Use Motion and daylight sensors.	To be installed in common areas, circulation space, rooms and amenities to minimise unnecessary lighting consumption. To be designed by services engineer and installed by builder.

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6 Indoor Environment Quality

This section is about improving thermal comfort, lighting, ventilation, internal noise and minimisation of indoor VOCs.

Item	Requirement	Comments
Daylight Access – Non residential	Recommended minimum 80% to achieve a daylight factor greater than 2%	Complies. Refer to daylight modelling and report in the Appendices.
Effective Natural Ventilation	To be effectively naturally ventilated. This may be achieved by either openable glazing for ventilation or cross-flow natural ventilation.	This is critical for healthy living and thermal comfort. To also avoid condensation and mould. At least 27% of glazing surface area to be openable. Drawings depict doors and windows as openable. Louvers will also operate on sensors. This is a positive contribution to the indoor quality. The louvers will purge out the heat and allow for greater natural ventilation. To be depicted on drawings for Council approval.
<div style="border: 2px solid red; padding: 10px; width: fit-content; margin: 0 auto;"> <p>This copied document to be made available for the sole purpose of enabling its consideration and review as part of a planning process under the Planning and Environment Act 1987. The document must not be used for any purpose which may breach any copyright</p> </div>		
More on ventilation	To increase in outdoor air for regular use areas compared to the minimum required by AS 1668.2:2012.	Not achieved.
CO2 monitors	Ensure the ventilation systems are designed to achieve, to monitor and to maintain the CO2.	For the room and learning spaces, CO2 concentration monitors not to exceed 500ppm. To be designed by services engineer or mechanical contractor. To be installed by builder.
External shading	Provide external shading.	Glazing to have external eaves to the north, east and west habitable rooms.



Thermal comfort	Install ceiling fans in spaces.	Ceiling fans: 2no. to the Wellbeing Lounge and 1no. to the Career's Lounge.
VOC	Minimise VOC materials on paints and adhesives.	To be carried out by builder.
Wood products	Use either E0 or E1 grade engineered wood products (e.g. MDF, plywood, engineered wood flooring).	To be carried out by builder.

6.1 VOC

It is required to use low Volatile Organic Compounds (VOC) for:

- Internal finishes and internal painted surfaces. Not to exceed 50g/L
- Ceramic tile adhesive. Not to exceed 65g/L
- Structural glazing adhesive. Not to exceed 100g/L
- Adhesives and sealants. Not to exceed 50g/L
- All paints, sealants and adhesives, carpet and engineered wood products will meet current GECA, Global Green Tag GreenRate, carpet institute Australia.
- Environmental Classification Scheme Level 2, Green Star or WELL standards for TVOC in paints, adhesives and sealants (by volume) and carpets (by area) and for Formaldehyde in engineered wood (by area).



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Refer to table below for requirements and also attached appendix.

Product Type/Sub Category	Max TVOC (g/L)
Paints, varnishes and protective coatings	
walls and ceilings - interior gloss	75
walls and ceilings - interior semi gloss	16
walls and ceilings - interior low sheen	16
walls and ceilings - interior flat washable	16
ceilings - interior flat	14
trim - gloss, semi gloss, satin, varnishes and woodstains	75
timber and binding primers	30
latex primer for galvanized iron and zincalume	60
interior latex undercoat	65
interior sealer	65
one and two pack performance coatings for floors	140
others: any solvent-based coatings	200
Adhesives and sealants	
indoor carpet adhesive	50
carpet pad adhesive	50
wood flooring and laminate adhesive	100
rubber flooring adhesive	60
sub-floor adhesive	50
ceramic tile adhesive	65
cove base adhesive	50
dry wall and panel adhesive	50
multipurpose construction adhesive	70
structural glazing adhesive	100
architectural sealants	250

- paints, sealants and adhesives.
Paints to be low VOC (<16g/L) with 50% of paints to be ultra-low VOC (<5g/L)
- carpets
- engineered wood

The above products to meet current GECA, Global GreenTag GreenRate, Carpet Institute Australia Environmental Classification Scheme Level 2, Green Star or WELL standards for TVOC in paints, adhesives and sealants (by



volume) and carpets (by area) and for Formaldehyde in engineered wood (by area).

Product Category	Max TVOC content in grams per litre (g/L) of ready to use product.
General purpose adhesives and sealants	50
Interior 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

The product complies with the Total VOC (TVOC) limits specified in the Table below.

Carpet Test Standards and TVOC Emissions Limits

Test protocol	Limit
ASTM D5116 - Total VOC limit	0.5mg/m ² per hour
ASTM D5116 - 4-PC (4-Phenylcyclohexene)	0.05mg/m ² per hour
ISO 16000 / EN 13419 - TVOC at three days	0.5 mg/m ² per hour
ISO 10580 / ISO/TC 219 (Document N238) - TVOC at 24 hours	0.5mg/m ² per hour

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Test Protocol	Emission Limit/ Unit of Measurement
AS/NZS 2269:2004, testing procedure AS/NZS 2098.11:2005 method 10 for Plywood	≤1 mg/ L
AS/NZS 1859.1:2004 - Particle Board, with use of testing procedure AS/NZS 4266.16:2004 method 16	≤1.5 mg/L
AS/NZS 1859.2:2004 - MDF, with use of testing procedure AS/NZS 4266.16:2004 method 16	≤1 mg/ L
AS/NZS 4357.4 - Laminated Veneer Lumber (LVL)	≤1 mg/ L
Japanese Agricultural Standard MAFF Notification No.701 Appendix Clause 3 (11) - LVL	≤1 mg/ L
JIS A 5908:2003- Particle Board and Plywood, with use of testing procedure JIS A 1460	≤1 mg/ L
JIS A 5905:2003 - MDF, with use of testing procedure JIS A 1460	≤1 mg/ L
JIS A1901 (not applicable to Plywood, applicable to high pressure laminates and compact laminates)	≤0.1 mg/m ² hr*
ASTM D5116 (applicable to high pressure laminates and compact laminates)	≤0.1 mg/m ² hr
ISO 16000 part 9, 10 and 11 (also known as EN 13419), applicable to high pressure laminates and compact laminates	≤0.1 mg/m ² hr (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 ² hr

*mg/m²hr may also be represented as mg/m²/hr.

Source: Green Star Manual www.gbca.com.au

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7 Transport

Item	Requirement	Comments
Bicycle Parking – non Residential	Secure and undercover bicycle spaces.	School has an existing bike racks.
Bicycle Parking – non Residential Visitor	Secure bicycle spaces for visitors.	School has an existing bike storage facility.
End of Trip Facilities - Non-Residential	Showers and lockers	No showers for students. But they will have lockers.
Electric Vehicle Infrastructure	Provide facilities for the charging of electric vehicles.	Scoped out.
Car Share Scheme	Provide formal car sharing scheme to be integrated into the development.	Scoped out.
Motorbikes / Mopeds	Minimum of 5% of vehicle parking spaces designed and labelled for motorbikes (must be at least 5 motorbike spaces)	Scoped out.

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8 Waste

Item	Requirement	Comments
Construction Waste - Building Re-Use	A site that has been previously developed, has at least 30% of the existing building been re-used.	N/A.
Operational Waste - Food & Garden Waste	Provide facilities for on-site management of food and garden waste.	Not achieved.
Operational Waste - Convenience of Recycling	Provide recycling facilities for occupants as facilities for general waste.	<p>To have storages and collection of waste, mixed recycling, glass, organics and e-waste. Each of these waste streams to have its designated space.</p> <p>Recycling and landfill waste is collected within the building before being moved to the school's main collection point/bins area . Other waste streams are collected in other locations within the school grounds outside of our project's area.</p>

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9 Urban Ecology

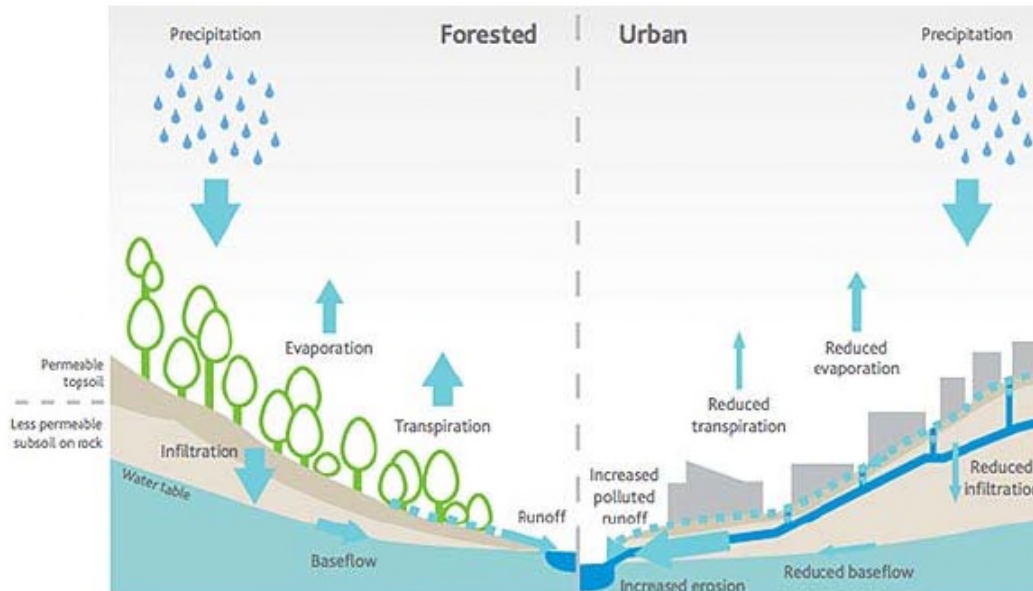
Item	Requirement	Comments
Communal Spaces	Communal space to be provided.	Plenty of recreation and play spaces for the students on site.
Vegetation	How much of the site is covered with vegetation, expressed as a percentage of the total site area.	Refer to drawings by architect. Most of the site is permeable green surface areas.
Green Roofs	Provide a green roof in the development. To be designed by architect.	Not achieved.
Green walls and Facades	Provide a green walls or green façade in the development. To be designed by architect.	Not achieved.
Food Production - Residential	Provide space per resident for dedicated food production.	Some food production at the school site in the veggie garden pots.
Urban heat	Mitigate urban heat island effect.	Not in the scope.
Colour	Light colours for roof and paving.	Light roof colour and paving. Roof solar absorptance to be 0.45 or less.

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Contribution to cooling and improving local habitat

Urban development dramatically changes the local habitat. It will reduce the process of rainwater evaporation and its plants absorption or soaking it into the ground.



This happens when clearing land of vegetation and increasing impervious surfaces, which will cause the following:

- Put pressure and pollute the local stormwater in a very short time after a rain.
- Unnatural flows to the local waterways or rivers for a few hours after it rains.
- Making beaches unsuitable for swimming for 1-2 days after heavy rain
- Eroding stream banks and degrading streams
- Increase in pollutant runoff

Implementing rainwater tanks and/or raingardens will reduce these negative impacts to the local habitat.

Advantages of rainwater tanks are:

- Minimise water usage when used in the toilet, laundry or garden
- Reduce strain on the stormwater drainage system
- Retain water close to source
- Reduce site run-off and flood peaks

Advantages of raingardens are:

- Reduce pollutant runoff to the creeks and bay
- Increase green space to assist with cooling.

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Disclaimer

The above are guidelines and recommendations are to assist the above project to meet the required ESD requirements. It is the responsibility of the owner/builder to follow the above guidelines to meet these requirements. It is not the responsibility of Efficient Energy Choices.

Kind Regards,
Karim Ghobrial
Bach of Electrical and Electronic Engineering
Energy and Sustainability Consultant

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Green Star Accredited Professional by Green Building Council Australia

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Appendix A - BESS Report

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BESS Report

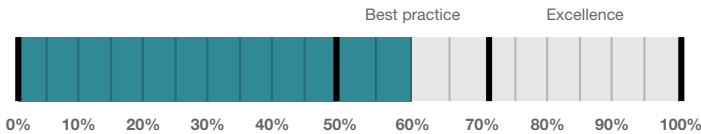
Built Environment Sustainability Scorecard



This BESS report outlines the sustainable design commitments of the proposed development at 13-17 Manning Drive Noble Park North Victoria 3174. 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 Greater Dandenong 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



60%

Project details

Address	13-17 Manning Drive Noble Park North Victoria 3174
Project no	67C2DAA7-R2
BESS Version	BESS-9
Site type	Non-residential development
Account	info@efficientenergy.com.au
Application no.	
Site area	1,282.00 m ²
Building floor area	1,452.00 m ²
Date	04 November 2024
Software version	2.0.1-B.570

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Performance by category

● Your development ● Maximum available

Category	Weight	Score	Pass
Management	5%	50%	•
Integrated Water Management	23%	93%	✓
Operational Energy	28%	63%	✓
Indoor Environment Quality	17%	57%	✓
Transport	9%	75%	•
Waste & Resource Recovery	6%	50%	•
Urban Ecology	6%	12%	•
Innovation	9%	0%	•

Buildings

Name	Height	Footprint	% of total footprint
Student Hub	3	700 m ²	100%

Dwellings & Non Res Spaces

Non-Res Spaces

Name	Quantity	Area	Building	% of total area
Other building				
Student Hub	1	1,452 m ²	Student Hub	100%
Total	1	1,452 m²	100%	

Supporting information

Floorplans & elevation notes

Credit	Requirement	Response	Status
Management 3.3	Annotation: Sub-meters to be provided to all major common area services (list each)		-
Integrated Water Management 2.1	Location of any stormwater management systems (rainwater tanks, raingardens, buffer strips)		-
Operational Energy 4.2	Location and size of solar photovoltaic systems		-
Transport 1.4	Location of non-residential bicycle parking spaces		-
Transport 1.5	Location of non-residential visitor bicycle parking spaces		-
Waste & Resource Recovery 2.2	Location of recycling facilities		-
Urban Ecology 1.1	Location and size of communal spaces		-

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Supporting evidence

Credit	Requirement	Response	Status
Management 2.3a	Section J glazing assessment		-
Management 2.3b	Preliminary modelling report		-
Integrated Water Management 2.1	STORM report or MUSIC model		-
Operational Energy 1.1	Energy Report showing calculations of reference case and proposed buildings		-
Operational Energy 3.7	Average lighting power density and lighting type(s) to be used		-
Operational Energy 4.2	Specifications of the solar photovoltaic system(s)		-
Indoor Environment Quality 1.4	A short report detailing assumptions used and results achieved.		-

Credit summary

Management Overall contribution 4.5%

		50%
1.1 Pre-Application Meeting		0%
2.3 Thermal Performance Modelling - Non-Residential		100%
3.2 Metering - Non-Residential		0%
3.3 Metering - Common Areas		100%
4.1 Building Users Guide		100%

IWM Overall contribution 22.5%

		93% ✔ Pass
1.1 Potable Water Use		82% ✔ Achieved
2.1 Stormwater Treatment		100% ✔ Achieved
3.1 Water Efficient Landscaping		N/A ✦ Scoped Out
The scope for this project does not include soft landscaping. This project does not require selection of plants.		
4.1 Building Systems Water Use		N/A ✦ Scoped Out
The air conditioning system has no water to be used for cooling. There is no other water usage. The building is not sprinkled.		

Operational Energy Overall contribution 37%

		63% ✔ Pass
1.1 Thermal Performance Rating - Non-Residential		37%
2.1 Greenhouse Gas Emissions		100%
2.2 Peak Demand		100%
2.6 Electrification		0% ⊘ Disabled
Credit is available when the energy supply is set to all-electric (no gas or wood).		
2.7 Energy consumption		100%
3.1 Carpark Ventilation		N/A ✦ Scoped Out
there is a general external to elements carpark for the school.		
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.		

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IEQ Overall contribution 16.5%

		Minimum required 50%	57%	✓ Pass
1.4 Daylight Access - Non-Residential			55%	✓ Achieved
2.3 Ventilation - Non-Residential			50%	✓ Achieved
3.4 Thermal comfort - Shading - Non-Residential			83%	
3.5 Thermal Comfort - Ceiling Fans - Non-Residential			0%	
4.1 Air Quality - Non-Residential			100%	

Transport Overall contribution 9.0%

			75%	
1.4 Bicycle Parking - Non-Residential			100%	
1.5 Bicycle Parking - Non-Residential Visitor			100%	
1.6 End of Trip Facilities - Non-Residential			0%	
2.1 Electric Vehicle Infrastructure			N/A	✦ Scoped Out
				No reason provided
2.2 Car Share Scheme			N/A	✦ Scoped Out
				No reason provided
2.3 Motorbikes / Mopeds			N/A	✦ Scoped Out
				carpark is already existing.

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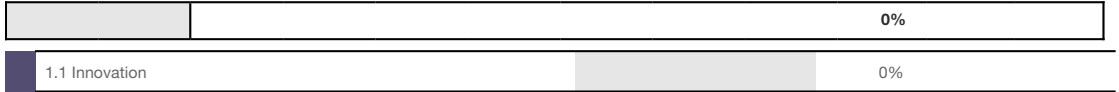
Waste & Resource Recovery Overall contribution 5.5%

			50%	
1.1 Construction Waste - Building Re-Use			N/A	✦ Scoped Out
				This is a new development.
2.1 Operational Waste - Food & Garden Waste			0%	
2.2 Operational Waste - Convenience of Recycling			100%	

Urban Ecology Overall contribution 5.5%

			12%	
1.1 Communal Spaces			100%	
2.1 Vegetation			0%	
2.2 Green Roofs			0%	
2.3 Green Walls and Facades			0%	
3.2 Food Production - Non-Residential			0%	

Innovation Overall contribution 9.0%



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Credit breakdown

Management Overall contribution 2%

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.	
Annotation	Section JV3 energy report Verification has been carried out. Aim to be 10% better than BCA.	
Criteria	Has a preliminary facade assessment been undertaken in accordance with NCC2022 Section J4D6?	
Question	Criteria Achieved ?	
Other building	Yes	
Criteria	Has preliminary modelling been undertaken in accordance with either NCC2022 Section J (Energy Efficiency), NABERS or Green Star?	
Question	Criteria Achieved ?	
Other building	Yes	
3.2 Metering - Non-Residential		0%
Score Contribution	This credit contributes 14% towards the category score.	
Criteria	Have utility meters been provided for all individual commercial tenants?	
Annotation	Project is a school and is centrally metered. Only one tenant which is the school.	
Question	Criteria Achieved ?	
Other building	No	
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?	
Annotation	Project is a school and is centrally metered. Install check meters for lighting, A/C, lifts and other ancillaries.	
Question	Criteria Achieved ?	
Other building	Yes	

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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

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Integrated Water Management

Overall contribution 21%

Minimum required 0%

Do you have a reticulated third pipe or an on-site water recycling system?:	No
Are you installing a swimming pool?:	No
Stormwater profile	
Which stormwater modelling software are you using?:	MUSIC or other modelling software
STORM score achieved:	100
Flow:	28 %
Total Suspended Solids:	86 %
Total Phosphorus:	70 %
Total Nitrogen:	51 %
Rainwater tank profile	
What is the total roof area connected to the rainwater tank?: Student Hub	700 m ²
Tank Size: Student Hub	5,000 Litres
Irrigation area connected to tank: Student Hub	50.0 m ²
Is connected irrigation area a water efficient garden?: Student Hub	Yes
Other external water demand connected to tank?: Student Hub	0.0 Litres/Day
Fixtures, fittings & connections profile	
Building:	Student Hub
Showerhead:	Scope out
Bath:	Scope out
Kitchen Taps:	>= 5 Star WELS rating
Bathroom Taps:	>= 5 Star WELS rating
Dishwashers:	>= 5 Star WELS rating
WC:	>= 4 Star WELS rating
Urinals:	Scope out
Washing Machine Water Efficiency:	Scope out
Which non-potable water source is the dwelling/space connected to?:	Student Hub
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

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1.1 Potable Water Use		82%	✓ Achieved
Score Contribution	This credit contributes 35.7% 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	1345 kL		
Output	Proposed (excluding rainwater and recycled water use)		
Project	989 kL		
Output	Proposed (including rainwater and recycled water use)		
Project	576 kL		
Output	% Reduction in Potable Water Consumption		
Project	57 %		
Output	% of connected demand met by rainwater		
Project	56 %		
Output	How often does the tank overflow?		
Project	Very Often		
Output	Opportunity for additional rainwater connection		
Project	143 kL		
2.1 Stormwater Treatment	100%		✓ Achieved
Score Contribution	This credit contributes 9.3% towards the category score.		
Criteria	Has best practice stormwater management been demonstrated?		
Output	Flow		
Project	28 %		
Output	Min Suspended Solids reduction		
Project	80 %		
Output	Total Suspended Solids reduction		
Project	86 %		
Output	Min Phosphorus reduction		
Project	45 %		
Output	Total Phosphorus reduction		
Project	70 %		
Output	Min Nitrogen reduction		
Project	45 %		
Output	Total Nitrogen reduction		
Project	51 %		
3.1 Water Efficient Landscaping		N/A	✦ Scoped Out
This credit was scoped out	The scope for this project does not include soft landscaping. This project does not require selection of plants.		

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4.1 Building Systems Water Use

N/A  Scoped Out

This credit was scoped out

The air conditioning system has no water based heat rejection and therefore will not have any water usage. The building is not sprinkled.

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Operational Energy Overall contribution 18% Minimum required 50%

Project profile	
Use the BESS Deem to Satisfy (DTS) method for Non-residential spaces?:	Yes
Are you installing any renewable energy system(s) (other than solar photovoltaic)?:	No
Energy Supply:	Electricity & Natural Gas
Are you installing a cogeneration or trigeneration system?:	No
Solar Photovoltaic system profile	
System Size (lesser of inverter and panel capacity): PV (340kW is for the whole site).	40.0 kW peak
Orientation (which way is the system facing)?: PV (340kW is for the whole site).	North
Inclination (angle from horizontal): PV (340kW is for the whole site).	5.0 Angle (degrees)
Non-residential Deemed-to-Satisfy profile	
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 for 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
1.1 Thermal Performance Rating - Non-Residential 37%	
Score Contribution	This credit contributes 36.4% 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 9.1% towards the category score.
Criteria	What is the % reduction in annual greenhouse gas emissions against the benchmark?
Annotation	aiming towards at least 10% better than BCA Benchmark
2.2 Peak Demand 100%	
Score Contribution	This credit contributes 4.5% towards the category score.
Criteria	What is the % reduction in the instantaneous (peak-hour) demand against the benchmark?

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2.6 Electrification	0%	⊘ Disabled
This credit is disabled	Credit is available when the energy supply is set to all-electric (no gas or wood).	
2.7 Energy consumption	100%	
Score Contribution	This credit contributes 18.2% towards the category score.	
Criteria	What is the % reduction in annual energy consumption against the benchmark?	
3.1 Carpark Ventilation	N/A	⊕ Scoped Out
This credit was scoped out	there is a general external to elements carpark for the school.	
3.2 Hot Water	100%	
Score Contribution	This credit contributes 4.5% 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 9.1% 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 ?	
Other building	This copied document to be made available for the sole purpose of enabling its consideration and review as part of a planning process under the Planning and Environment Act 1987. The document must not be used for any purpose which may breach any copyright	
4.1 Combined Heat and Power (cogeneration/trigeneration)	N/A	⊕ Scoped Out
This credit was scoped out	This credit was scoped out as it is not applicable to the school.	
4.2 Renewable Energy Systems - Solar	100%	
Score Contribution	This credit contributes 4.5% towards the category score.	
Criteria	What % of the estimated energy consumption of the building class it supplies does the solar power system provide?	
Annotation	school has an existing 340kW PV on site.	
Output	Solar Power - Energy Generation per year	
Other building	46,649 kWh	
Output	% of Building's Energy	
Other building	114 %	
4.4 Renewable Energy Systems - Other	N/A	⊕ Scoped Out
This credit was scoped out	No other (non-solar PV) renewable energy is in use.	

Indoor Environment Quality Overall contribution 10% Minimum required 50%

1.4 Daylight Access - Non-Residential		55%	✓ 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?		
Other building	55 %		
2.3 Ventilation - Non-Residential		50%	✓ 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?		
Other building	50 %		
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?		
Other building	0 %		
Criteria	What CO2 concentrations are the ventilation systems designed to achieve, to monitor and to maintain?		
Question	Value		
Other building	500 ppm		
3.4 Thermal comfort - Shading - Non-Residential		83%	
Score Contribution	This credit contributes 17.6% towards the category score.		
Criteria	What percentage of regular use areas is effectively shaded?		
Question	Percentage Achieved?		
Other building	75 %		
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?		
Other building	20 %		
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 ?		
Other building	Yes		
Criteria	Does all carpet meet the maximum total indoor pollutant emission limits?		
Question	Criteria Achieved ?		
Other building	Yes		

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

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Transport Overall contribution 7%

1.4 Bicycle Parking - Non-Residential		100%
Score Contribution	This credit contributes 50% 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)?	
Annotation	School has an existing bike storage facility.	
Question	Criteria Achieved ?	
Other building	Yes	
Question	Bicycle Spaces Provided ?	
Other building	16	
1.5 Bicycle Parking - Non-Residential Visitor		100%
Score Contribution	This credit contributes 25% 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)?	
Annotation	School has an existing bike storage facility.	
Question	Criteria Achieved ?	
Other building	Yes	
Question	Bicycle Spaces Provided	
Other building	2	
1.6 End of Trip Facilities - Non-Residential		0%
Score Contribution	This credit contributes 25% towards the category score.	
Criteria	When adequate bicycle parking has been provided, is there also: * 1 shower for the first 5 employee bicycle spaces and 1 to each 10 employee bicycles spaces thereafter, * changing facilities adjacent to showers, and * one secure locker per employee bicycle space in the vicinity of the changing / shower facilities?	
Annotation	the students have their own lockers.	
Question	Number of showers provided ?	
Other building	0	
Question	Number of lockers provided ?	
Other building	20	
Output	Min Showers Required	
Other building	1	
Output	Min Lockers Required	
Other building	16	
2.1 Electric Vehicle Infrastructure	N/A	✦ Scoped Out
This credit was scoped out	None	
2.2 Car Share Scheme	N/A	✦ Scoped Out
This credit was scoped out	None	

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2.3 Motorbikes / Mopeds	N/A	✦ Scoped Out
This credit was scoped out	carpark is already existing.	

Waste & Resource Recovery Overall contribution 3%

1.1 Construction Waste - Building Re-Use	N/A	✦ Scoped Out
This credit was scoped out	This is a new development.	
2.1 Operational Waste - Food & Garden Waste	0%	
Score Contribution	This credit contributes 50% towards the category score.	
Criteria	Are facilities provided for on-site management of food and garden waste?	
Question	Criteria Achieved ?	
Project	No	
2.2 Operational Waste - Convenience of Recycling	100%	
Score Contribution	This credit contributes 50% 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	

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Urban Ecology Overall contribution 1%

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 : * 1m ² for each of the first 50 occupants * Additional 0.5m ² for each occupant between 51 and 250 * Additional 0.25m ² for each occupant above 251?
Annotation	outdoor learning areas
Question	Common space provided
Other building	61.0 m ²
Output	Minimum Common Space Required
Other building	61 m ²
2.1 Vegetation	0%
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	0 %
2.2 Green Roofs	0%
Score Contribution	This credit contributes 12.5% towards the category score.
Criteria	Does the development incorporate a green roof?
Question	Criteria Achieved ?
Project	No
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
Other building	0.0 m ²
Output	Min Food Production Area
Other building	19 m ²

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Innovation Overall contribution 0%

1.1 Innovation	0%
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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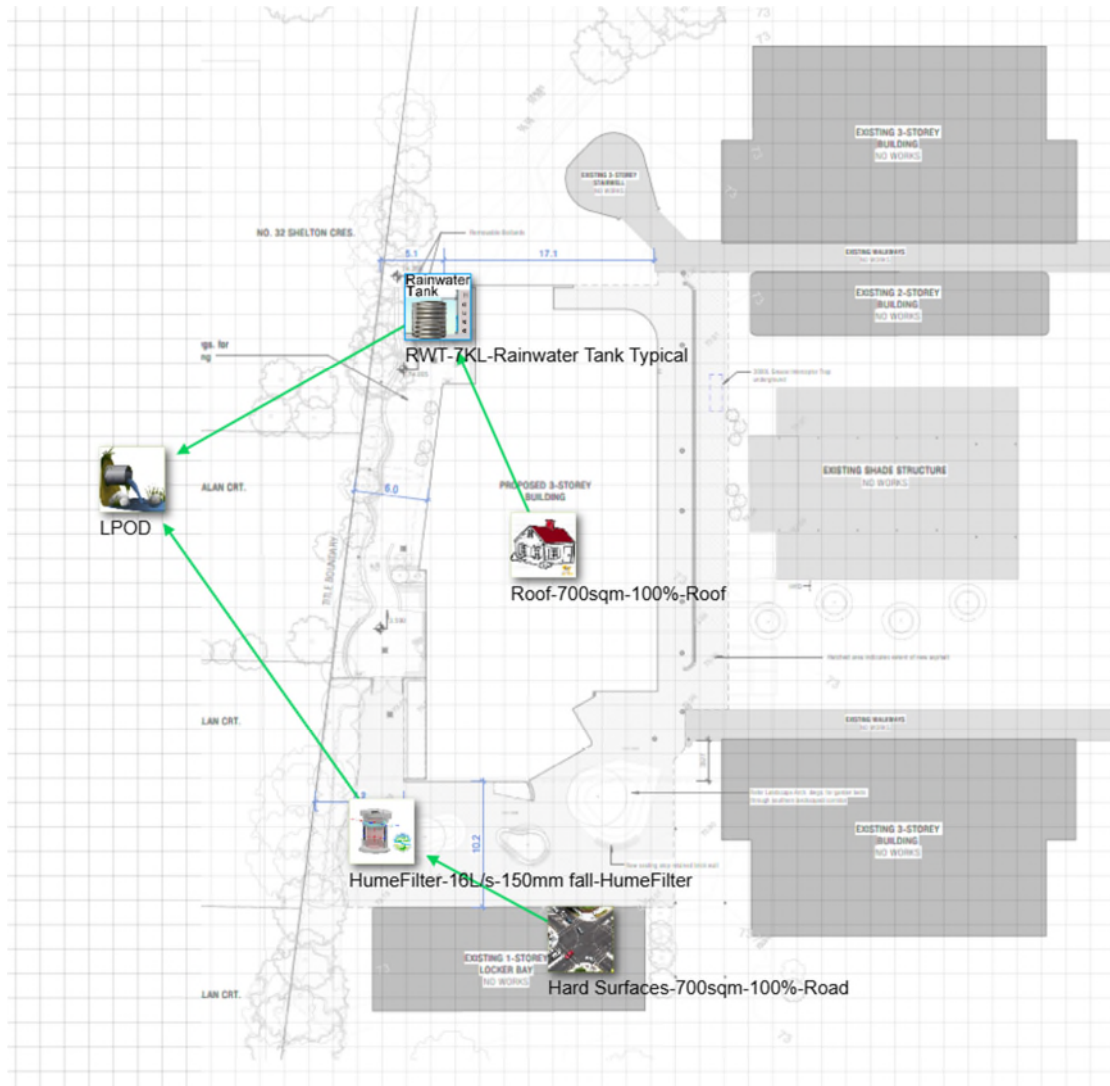
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Appendix B – WSUD Layout



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Appendix C – MUSIC Verdict

Treatment Train Effectiveness

	Sources	Residual Load	% Reduction	Authority's Target Reduction	Green Star Buildings Target Reductions	
					Credit Achievement	Exceptional Performance
Flow (ML/yr)	1.11	0.78	29.63	N/A	40.00	80.00
Total Suspended Solid (kg/yr)	218.70	27.82	87.28	80.00	85.00	90.00
Total Phosphorus (kg/yr)	0.41	0.11	71.94	45.00	65.00	70.00
Total Nitrogen (kg/yr)	2.60	1.17	54.84	45.00	45.00	60.00
Gross Pollutants (kg/yr)	39.56	1.98	95.00	70.00	90.00	95.00

Mass Balance

Treatment Name	Treatment Type	GP Captured (kg/yr)	Sediment Captured (kg/yr)	Cleanout Frequency (x/yr)	GP storage required (L)	Sediment Storage required (L)	Total Storage required (L)
RWT-7KL-Rainwater Tank Typical	Rainwater Tank Typical	19.78	4.08	2.00	57.05	1.70	58.75
HumeFilter-16L/s-150mm fall-HumeFilter	HumeFilter	17.80	182.13	2.00	51.35	75.89	127.24

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Appendix D Section J Energy Report

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BCA Section J (J1P1) Assessment Performance Requirement J1V3 Energy Verifications Provision Methodology

Nazareth College Student Hub Development 13-17 Manning Drive Noble Park North

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Consultant: Karim Ghobrial
Client: Nazareth College
13-17 Manning Drive
Noble Park North
Date: August 2024

SUBJECT SITE AND PROPOSED BUILDING LOCATION





Building Details

General Information	
Climate Zone for Thermal Design	6
Building Class	Class 9b
Property Address	Student Hub building 13-17 Manning Drive, Noble Park North
New or alteration to existing building	New
Reference no	13587 Drawings by Cotter Reid Architects, A0.00 to A901, Dated 07/08/2024, Rev G, Tender Package, Project no. 23-860.
Building area (sqm)	As per drawings.
Estimated Hours of Operation	8am to 5pm 7.5 days a week
Electrical design submitted	By services engineer if applicable.
Mechanical design submitted	By services engineer if applicable.

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Background

Efficient Energy Choices has been engaged to carry out a Section J report for the above proposed project. Section J assessment and report will be carried out by Energy Verification methods from BCA Section J chapter of Energy Efficiency. The focus of this Section J1V3 is the conditioned spaces. An assessment has been carried out first using DtS provision to work out predicted energy consumptions in kWh/m². Then a second assessment has also been carried out to improve building energy performance. Total energy kWh/m² of Verification Method must not exceed total energy kWh/m² of DtS method for compliance.

This assessment has been carried out by Design Builder Energy Plus Platform which is in accordance with latest NCC, ASHRAE Standard 140 and specifications 34.



J1V3 System Summary of Energy Calculations

Compliance: Using Verification Method, total Summary of Energy must be either equal or less than DtS method Summary of Energy.

	DtS (Reference) Summary of Energy KWhr/m2	Proposed Summary of Energy KWhr/m2
Building	87,802	83,316 COMPLIES
Comments for compliance		Building fabric walls and roof insulation upgraded for compliance.

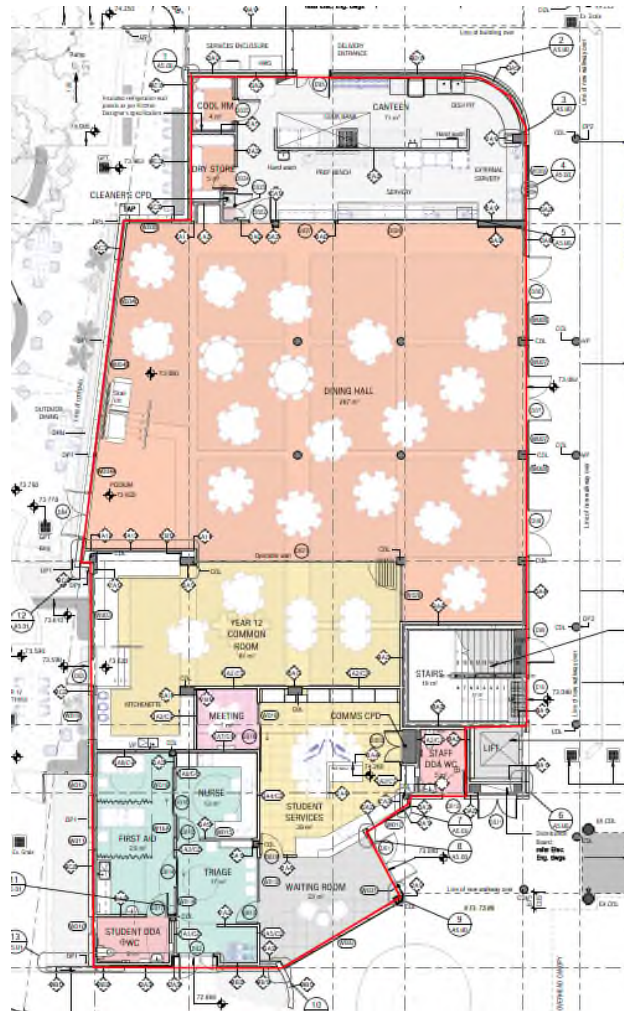
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J4 Building Fabric

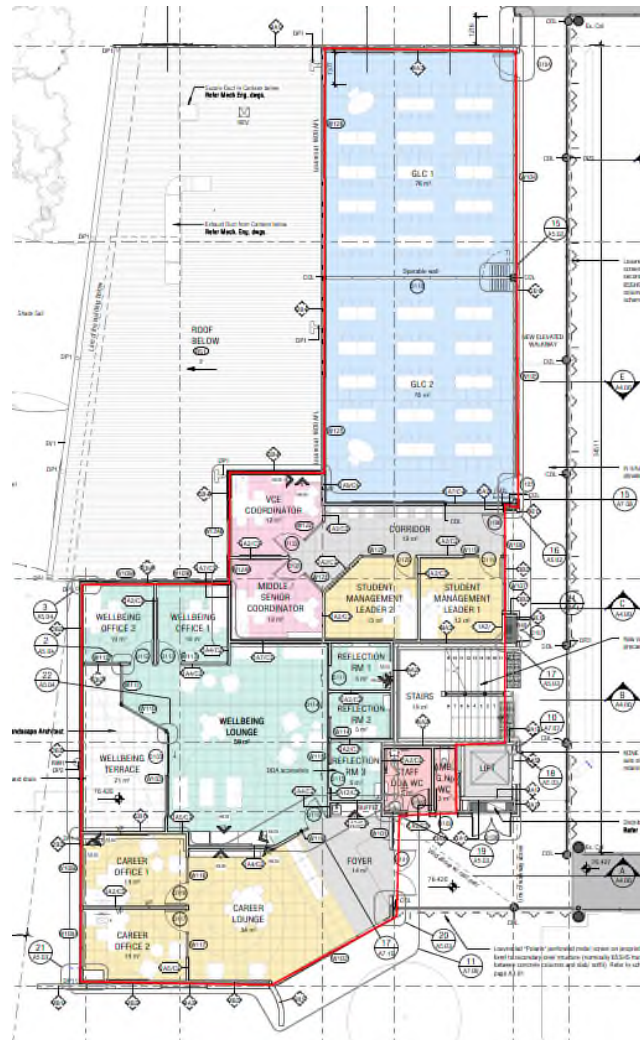
Item	Requirement	Comments
J4D2 application of part	General	Compliance not required.
J4D3 Thermal construction general	Required	<p>Where required, Install insulation to AS4859.1. Insulation to be installed to form a continuous barrier with ceilings, walls, bulkheads, floors or the like that inherently contributes to the thermal barrier. It must also be water resistant. Ensure that it does not affect operation of a service or fitting.</p> <p>Bondor or Kingspan or Rockwool thermal insulation or approved equivalent is recommended. Thermal insulation with inherent acoustic performance is also recommended to decrease noise levels. This is not a mandatory requirement for the BCA Section J, but it is only voluntary.</p>
J4D4 Roof and ceiling insulation	Total R3.5 min	<p>For J1V3 Verification, it is required to install minimum insulation R3.5 and sarking. Roof colour to be light Shale Grey type or similar. Solar absorptance not to exceed 0.45. This is satisfactory and meets the BCA requirement.</p>
J4D5 Roof lights	Required	If applicable, to be single-glazed type. U value of 6.4 or less. SHGC of 0.45 or less.
J4D6 Walls	Total R2.0 min	<p>Maximum allowable U value is 0.7, giving R value of R2.0 with thermal bridging. For JV3 Verification, with thermal bridging It is recommended to install R2.5 insulation. This is over and above. This insulation applies to external walls. See following page and Wall-Glazing Calculator for further details. This is satisfactory and meets BCA requirement.</p>
J4D7 Floors	Not required	N/A

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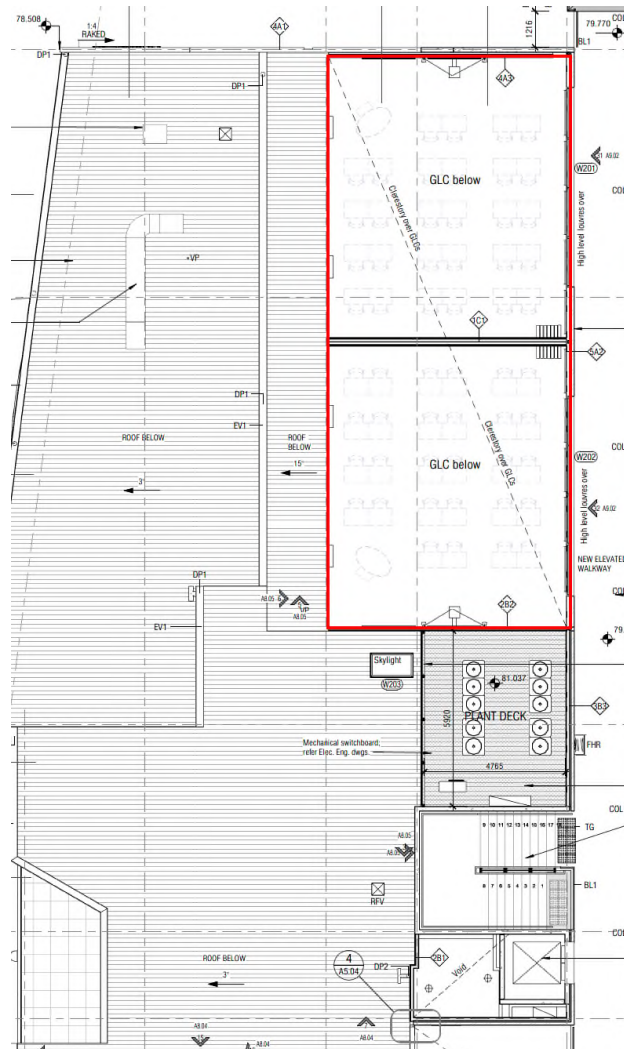
Walls insulation perimeter highlighted in Red.

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Walls insulation permitter highlighted in Red.

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Walls insulation permitter highlighted in Red.

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J4D6 External Glazing

Glazing method	Required	Glazing to be as per doors and window schedule. Pages A9.00 to A9.02. This is satisfactory and meets NCC requirement.
Shading	Required	N/A

BCA Requirements Part J4D6	Assessment	Comments
a) (i) U Value not greater than 2.0 (minimum R=0.5) for: Class 2, 5, 6, 7, 8, 9b.	Assessed. See Wall-Glazing Calculator	Complies
a) (ii) U Value not great than 1.1 (minimum R=1) for: Class 3, 9c. for Climates 1,3,4,6 or 7. U Value of 2 (R=0.5) for Climates 2 or 5.	Assessed. See Wall-Glazing Calculator N/A	Complies
b) U Value of not greater than 5.8 for display glazing	Assessed. See Wall-Glazing Calculator	N/A
c) System U Value of wall-glazing construction must be calculated in accordance with Specification 37	Assessed. See Wall-Glazing Calculator	Complies
d) Wall components of a wall-glazing construction much achieve a minimum Total R Value of: (i) Walls are less than 80% of area, Wall-Glazing construction of R1.0; (ii) Wall is 80% or more of the area of the wall-glazing construction, the value specified in Table J4D6A.	Assessed. See Wall-Glazing Calculator	Complies

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J5 Building Sealing

(Deemed-to-Satisfy Provisions Methodology)

Item	Requirement	Comments
J5D2 Application of part	General	N/A
J5D2 Chimneys and flues	Required	If applicable, must be provided with a damper or flap that can be closed to seal the chimney or flue.
J5D4 Roof lights	General	Must be sealed or capable of being sealed when service a conditioned space or habitable room. If applicable, must be constructed with an imperforate ceiling diffuser or the like OR weatherproof seal OR have a shutter system readily operated manually, mechanically or electronically.
J5D5 Windows and doors	Required	Seal to restrict air infiltration to the entry doors and windows. Main entrance doors are to be self-closing type.
J5D6 Exhaust fans	Required	Seal exhaust fans.
J5D7 Construction of roofs, walls	Required	Must be constructed in a fashion to minimise air leakage.
J5D8 Evaporative coolers	N/A	If applicable, must be constructed with a self-closing damper or the like.

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J6 Air Conditioning and Ventilation Systems

Refer to services engineer report and certificate.

Item	Requirement	Comments
J6D2 Application of Part	General	Applies to conditioned areas.
J6D3 Air Conditioning system control	Required	<p>Refer <i>Table A</i> below.</p> <p>a) To be capable to be deactivated when area is not occupied. A remote control may be used. Thermostatically control temperature of each zone. Limit reheating to save energy. Provide mechanical ventilation. To have an economy cycle if flow rate is greater than Table J6D3 Use variable speed drive for air flow greater than 1000L/s. For Class 3, must not operate when any external door is opened to a balcony or like for more than one minute.</p> <p>b) Must work together when two or more A/C systems are in the same area.</p> <p>c) Must have a time switch for greater than 2kW. Not required for Class 2,3 and 4.</p> <p>d) Must have an air economy cycle when the air flow rate is greater than the flow rates in Table J6D3.</p> <p>e) Must have a variable speed fan when airflow of more than 1000L/s and supply air quantity is capable of being varied.</p>
J6D4 Mechanical ventilation system control	Required	<p>a) For other than Class 2 and 4, to be capable to be deactivated when building is not occupied. Have energy reclaiming system that preconditions outdoor ai at a minimum heat transfer effectiveness of 60%. OR demand control ventilation as per AS1668.2. refer to Table J6D4. Exhaust systems for air flow greater than 1000L/s to be capable to stop when system is not needed. Other than Class 2,3 or 9c.</p>

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		Time switch to be used when air flow rate is greater than 1000L/s. b) Exhaust systems: if air flow is greater than 1000L/s must be capable of stopping the motor when the system is not needed except for Class 2,3 or 9c building. c) Carpark exhaust systems: must have a control system with AS1668.2.
J6D5 Fan systems	Required	To comply with b,c,d and e in this clause.
J6D5-D7 Ductwork	Required	To comply with AS/NZS4859.1; and insulation of R1.0 for flexible ductwork. Insulation to be protected against effects of weather and sunlight. Form a continuous barrier. Be protected by vapour barrier on the outside of the insulation. For any air-conditioning of 3000L/s or greater to be in accordance with AS4254.1 and AS4254.2.
J6D9 Pipework Insulation	Required	To comply with items 1 to 5 in this Clause.
J6D10 Space heating	Required	A heater used for airconditioning must be solar heater or gas or heat pump or heating using reclaimed energy. For electric heating: annual energy consumption not to exceed 15kW/m2 of the floor area.

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The ductwork must be insulated with R2.0 insulation where not exposed to direct sunlight. Where exposed to direct sunlight, ductwork must be insulated with R3.0.

Any additional unconditioned outside air supplied is to provide free cooling or balance required exhaust ventilation such as toilet exhaust. The system must not inhibit smoke hazard management operation. The kW rating is a guide. Unit sizes are to be finalised by mechanical contractor on site.



J7 Artificial Lighting and Power

(Deemed-to-Satisfy Provisions Methodology)

Item	Requirement	Comments
J7D2 Application of part	Required	Applies to this part. Installation to be carried out by tenant or builder.
J7D3 Artificial lighting	Required	Maximum illumination power density as per Table J7D3a. Allowing that at least 25% of the floor area to be controlled by one or more motion detectors, the illumination power density adjustment factor is 0.7 as per Table J7D3b. Total maximum illumination power load allowed is 6,233W . For a breakdown, refer to Lighting Calculator.
J7D4 Interior artificial lighting and power control	Required	To be controlled by a time switch and a motion detector. Each zone is to have a motion detector. At least 20% of the floor is required to be switched and monitored by motion detectors such as: toilets, storage, offices and amenities. The motion detector must be capable of sensing movement such as by infra-red, ultrasonic or microwave detection or by a combination of these means.
J7D5 Interior decorative and display lighting	N/A	N/A
J7D6 Exterior artificial lighting	Required	If to be installed, it must be controlled by either a daylight sensor or a time switch. If the total perimeter lighting load exceeds 100W: a) it is to have average light source efficacy of not less than 60 Lumens/W; or b) be controlled by a motion detector. This requirement does not apply to emergency lighting.
J7D7 Boiling water and chilled water storage units	Required	A Stiebel Eltron hot water instantaneous system or approved equivalent is recommended. This system has a micro-processor control which is energy efficient and is satisfactory. The system is to be controlled by a time switch.
J7D8 Lifts	N/A	a) Be configured to ensure artificial lighting and ventilation in the car are turned off when it is unused for 15min; and

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		<ul style="list-style-type: none"> b) Achieve the idle and standby energy performance level Table 6.7a. c) i- Achieve energy efficiency in Table 6.7b; or ii- for a dedicated goods lift, energy efficiency class D in accordance with ISO 25745-2.
J7D9 Escalators and moving walkways	N/A	Must have ability to slow between 0.2m/s and 0.05m/s when unused for more than 15min.

J8 Heated Water Supply and Swimming Pool and Spa Pool Plant

(Deemed-to-Satisfy Provisions Methodology)

Item	Requirement	Comments
J8D1	N/A	N/A
J8D2 Hot water supply	Required	Refer to J7D7. Must be designed and installed in accordance with Part B2 of NCC Vol Three, Plumbing Code of Australia.
J8D3 Swimming pool heating and pumping	Required	N/A
J8D4 Spa pool heating and pumping	Required	N/A

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J9 Energy Monitoring and On-site Distributed Energy Resources

(Deemed-to-Satisfy Provisions Methodology)

Item	Requirement	Comments
J9D2 Application of Part	N/A	N/A
J9D3 Facilities for energy monitoring: <ul style="list-style-type: none"> to apply for buildings over 500m² for gas and electricity; for buildings over 2500m² for energy consuming items such as: A/C, lighting, appliance power, hot water supply, transport and other ancillary plan; central HWS; lifts, escalators and moving walkways where there is more than one serving the building; on-site renewable energy equipment; on-site EV charging equipment; on-site battery systems. Meters to be interlined and communication to collate data for analysis and review and to be stored. 	Required	If floor area is greater than 500m ² , must energy meters for record gas and electricity consumption.
J9D4 Facilities for EV charging equipment: <ul style="list-style-type: none"> A carpark with Class 2,3,5,6,7b,8 or 9, must provide an electrical distribution (DB) board dedicated to EV charging as per Table J9D4. Typically one DB per 24 parking spaces. To be also labelled. EV charging equipment to have control systems to manage and schedule charging in response to total building demand; Class 2, each circuit to support EV charger to deliver a minimum of 12kWh from 11pm to 7am daily; Class 5-9, each circuit to support EV charger to deliver a minimum of 12kWh from 9am to 5pm daily; Class 3, each circuit to support EV charger to deliver a minimum of 48kWh from 11pm to 7am daily; 	N/A	Does not apply to his building.

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- The DB to be sized up to support future installation of a 7kW (32) type 2 charging.

J9D5 Facilities for solar photovoltaic and battery systems:

- The main electrical switchboard must have: two empty three-phase circuit breaker slots and four DIN rail spaces labelled to indicate the use of solar photovoltaic and a battery system;
- The main electrical switchboard to be sized to accommodate the installation of solar photovoltaic panels to at least 20% of the building roof;
- 20% of building roof to be left clear to future solar photovoltaic panels installation.

Required

Required spaces to be determined and incorporated.

At least 20% of roof space to be available for future solar photovoltaic panels. *This is not required only where 100% of the roof area is shaded for more than 70% of daylight hours OR roof area is less than 55m².*

Also not required, where more than 50% of roof area is used as a terrace, carpark, roof garden, roof lights, etc..

By applying the above recommendations, the proposed project will be compliant to BCA Section J energy efficiency requirements.

Kind Regards,
Karim Ghobrial
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Energy and Sustainability Consultant
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Disclaimer

The above are guidelines to assist the above property to meet the Deemed-to-Satisfy provisions for BCA J1P1. It is the responsibility of the owner/builder to follow the above guidelines to meet requirements of BCA J1P1. It is not the responsibility of Efficient Energy Choices.



Appendix A Design Builder Energy Plus Simulation

Project Data

Program Version: **EnergyPlus, Version 9.4.0-217a24fc09, YMD=2024.08.22 14:57**

Tabular Output Report in Format: **HTML**

Building: **Building**

Environment: **SCHOOL (01-01:31-12) ** MELBOURNE - AUS IWEC Data WMO#=948660**

Simulation Timestamp: **2024-08-22 14:57:53**

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Report: **Annual Building Utility Performance Summary**

For: **Entire Facility**

Timestamp: **2024-08-22 14:57:53**

Values gathered over 8760.00 hours

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REFERENCE BUILDING SUMMARY OF ENERGY

Site and Source Energy

	Total Energy [kWh]	Energy Per Total Building Area [kWh/m ²]	Energy Per Conditioned Building Area [kWh/m ²]
Total Site Energy	87801.54	72.89	72.89
Net Site Energy	87801.54	72.89	72.89
Total Source Energy	239146.71	198.54	198.54
Net Source Energy	239146.71	198.54	198.54

Site to Source Energy Conversion Factors

	Site=>Source Conversion Factor
Electricity	3.167
Natural Gas	1.084
District Cooling	1.056
District Heating	3.613
Steam	0.250
Gasoline	1.050
Diesel	1.050
Coal	1.050
Fuel Oil No 1	1.050
Fuel Oil No 2	1.050
Propane	1.050
Other Fuel 1	1.000
Other Fuel 2	1.000

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Building Area

	Area [m2]
Total Building Area	1204.52
Net Conditioned Building Area	1204.52
Unconditioned Building Area	0.00

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End Uses

	Electricity [kWh]	Natural Gas [kWh]	Gasoline [kWh]	Diesel [kWh]	Coal [kWh]	Fuel Oil No 1 [kWh]	Fuel Oil No 2 [kWh]	Propane [kWh]	Other Fuel 1 [kWh]	Other Fuel 2 [kWh]	District Cooling [kWh]	District Heating [kWh]	Water [m3]
Heating	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	15084.24	0.00
Cooling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	22458.87	0.00	0.00
Interior Lighting	13443.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exterior Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Interior Equipment	32861.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exterior Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fans	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pumps	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heat Rejection	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Humidification	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heat Recovery	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Systems	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3953.97	61.92
Refrigeration	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generators	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00



Total End Uses	46304.47	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	22458.87	19038.20	61.92
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Note: District heat appears to be the principal heating source based on energy usage.

End Uses By Subcategory

	Subcategory	Electricity [kWh]	Natural Gas [kWh]	Gasoline [kWh]	Diesel [kWh]	Coal [kWh]	Fuel Oil No 1 [kWh]	Fuel Oil No 2 [kWh]	Propane [kWh]	Other Fuel 1 [kWh]	Other Fuel 2 [kWh]	District Cooling [kWh]	District Heating [kWh]	Water [m ³]
Heating	General	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	15084.24	0.00
Cooling	General	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	22458.87	0.00	0.00
Interior Lighting	ELECTRIC EQUIPMENT#GF:Other Spaces#GeneralLights	2333.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	ELECTRIC EQUIPMENT#GF:CircSpaces#GeneralLights	376.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	ELECTRIC EQUIPMENT#GF:Dinning#GeneralLights	2984.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	ELECTRIC EQUIPMENT#GF:Canteen#GeneralLights	960.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	ELECTRIC EQUIPMENT#FF:OtherSpaces#GeneralLights	3012.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	ELECTRIC EQUIPMENT#FF:CircSpaces#GeneralLights	386.57	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	ELECTRIC EQUIPMENT#FF:GLC1X2#GeneralLights	1674.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	ELECTRIC EQUIPMENT#SF:GLC1X2#GeneralLights	1714.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exterior Lighting	General	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

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Interior Equipment	General	32861.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exterior Equipment	General	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fans	General	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pumps	General	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heat Rejection	General	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Humidification	General	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heat Recovery	General	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Systems	DHW GF:OtherSpaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	686.45	10.75
	DHW GF:CirSpaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	110.74	1.73
	DHW GF:Dinning	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	877.73	13.74
	DHW GF:Canteen	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	282.62	4.43
	DHW FF:OtherSpaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	885.99	13.87
	DHW FF:CirSpaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	113.70	1.78
	DHW FF:GLC1X2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	492.38	7.71
	DHW SF:GLC1X2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	504.36	7.90
	Refrigeration	General	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generators	General	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

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Normalized Metrics

Utility Use Per Conditioned Floor Area

	Electricity Intensity [kWh /m2]	Natural Gas Intensity [kWh /m2]	Gasoline Intensity [kWh /m2]	Diesel Intensity [kWh /m2]	Coal Intensity [kWh /m2]	Fuel Oil No 1 Intensity [kWh /m2]	Fuel Oil No 2 Intensity [kWh /m2]	Propane Intensity [kWh /m2]	Other Fuel 1 Intensity [kWh /m2]	Other Fuel 2 Intensity [kWh /m2]	District Cooling Intensity [kWh /m2]	District Heating Intensity [kWh /m2]	Water Intensity [m3/ m2]
Lighting	11.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HVAC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	18.65	15.81	0.05
Other	27.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	38.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	18.65	15.81	0.05

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Utility Use Per Total Floor Area

	Electricity Intensity [kWh /m2]	Natural Gas Intensity [kWh /m2]	Gasoline Intensity [kWh /m2]	Diesel Intensity [kWh /m2]	Coal Intensity [kWh /m2]	Fuel Oil No 1 Intensity [kWh /m2]	Fuel Oil No 2 Intensity [kWh /m2]	Propane Intensity [kWh /m2]	Other Fuel 1 Intensity [kWh /m2]	Other Fuel 2 Intensity [kWh /m2]	District Cooling Intensity [kWh /m2]	District Heating Intensity [kWh /m2]	Water Intensity [m3/ m2]
Lighting	11.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HVAC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	18.65	15.81	0.05
Other	27.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	38.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	18.65	15.81	0.05



Electric Loads Satisfied

	Electricity [kWh]	Percent Electricity [%]
Fuel-Fired Power Generation	0.000	0.00
High Temperature Geothermal*	0.000	0.00
Photovoltaic Power	0.000	0.00
Wind Power	0.000	0.00
Power Conversion	0.000	0.00
Net Decrease in On-Site Storage	0.000	0.00
Total On-Site Electric Sources	0.000	0.00
Electricity Coming From Utility	46304.469	100.00
Surplus Electricity Going To Utility	0.000	0.00
Net Electricity From Utility	46304.469	100.00
Total On-Site and Utility Electric Sources	46304.469	100.00
Total Electricity End Uses	46304.469	100.00

On-Site Thermal Sources

	Heat [kWh]	Percent Heat [%]
Water-Side Heat Recovery	0.00	
Air to Air Heat Recovery for Cooling	0.00	
Air to Air Heat Recovery for Heating	0.00	
High-Temperature Geothermal*	0.00	
Solar Water Thermal	0.00	
Solar Air Thermal	0.00	
Total On-Site Thermal Sources	0.00	

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Water Source Summary

	Water [m3]	Percent Water [%]
Rainwater Collection	0.00	0.00
Condensate Collection	0.00	0.00
Groundwater Well	0.00	0.00
Total On Site Water Sources	0.00	0.00
-	-	-
Initial Storage	0.00	0.00
Final Storage	0.00	0.00
Change in Storage	0.00	0.00
-	-	-
Water Supplied by Utility	61.92	100.00
-	-	-
Total On Site, Change in Storage, and Utility Water Sources	61.92	100.00
Total Water End Uses	61.92	100.00

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PROPOSED BUILDING SUMMARY OF ENERGY

Site and Source Energy

	Total Energy [kWh]	Energy Per Total Building Area [kWh/m2]	Energy Per Conditioned Building Area [kWh/m2]
Total Site Energy	83316.16	69.42	69.42
Net Site Energy	83316.16	69.42	69.42
Total Source Energy	233545.44	194.58	194.58
Net Source Energy	233545.44	194.58	194.58

Site to Source Energy Conversion Factors

	Site=>Source Conversion Factor
Electricity	3.167
Natural Gas	1.084
District Cooling	1.056
District Heating	3.613
Steam	0.250
Gasoline	1.050
Diesel	1.050
Coal	1.050
Fuel Oil No 1	1.050
Fuel Oil No 2	1.050
Propane	1.050
Other Fuel 1	1.000
Other Fuel 2	1.000

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Building Area

	Area [m2]
Total Building Area	1200.24
Net Conditioned Building Area	1200.24
Unconditioned Building Area	0.00

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End Uses

	Electricity [kWh]	Natural Gas [kWh]	Gasoline [kWh]	Diesel [kWh]	Coal [kWh]	Fuel Oil No 1 [kWh]	Fuel Oil No 2 [kWh]	Propane [kWh]	Other Fuel 1 [kWh]	Other Fuel 2 [kWh]	District Cooling [kWh]	District Heating [kWh]	Water [m3]
Heating	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	14895.48	0.00
Cooling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	18340.87	0.00	0.00
Interior Lighting	13395.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exterior Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Interior Equipment	32744.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exterior Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fans	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pumps	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heat Rejection	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Humidification	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heat Recovery	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Systems	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3939.92	61.70
Refrigeration	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generators	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00



Total End Uses	46139.89	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	18340.87	18835.39	61.70
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Note: District heat appears to be the principal heating source based on energy usage.

End Uses By Subcategory

	Subcategory	Electricity [kWh]	Natural Gas [kWh]	Gasoline [kWh]	Diesel [kWh]	Coal [kWh]	Fuel Oil No 1 [kWh]	Fuel Oil No 2 [kWh]	Propane [kWh]	Other Fuel 1 [kWh]	Other Fuel 2 [kWh]	District Cooling [kWh]	District Heating [kWh]	Water [m ³]
Heating	General	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	14895.48	0.00
Cooling	General	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	18340.87	0.00	0.00
Interior Lighting	ELECTRIC EQUIPMENT#GF:Other Spaces#GeneralLights	2327.78	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	ELECTRIC EQUIPMENT#GF:CircSpaces#GeneralLights	374.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	ELECTRIC EQUIPMENT#GF:Dinning#GeneralLights	2978.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	ELECTRIC EQUIPMENT#GF:Canteen#GeneralLights	956.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	ELECTRIC EQUIPMENT#FF:OtherSpaces#GeneralLights	3002.65	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	ELECTRIC EQUIPMENT#FF:CircSpaces#GeneralLights	384.48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	ELECTRIC EQUIPMENT#FF:GLC1X2#GeneralLights	1666.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	ELECTRIC EQUIPMENT#SF:GLC1X2#GeneralLights	1705.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exterior Lighting	General	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

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Interior Equipment	General	32744.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exterior Equipment	General	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fans	General	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pumps	General	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heat Rejection	General	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Humidification	General	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heat Recovery	General	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Systems	DHW GF:OtherSpaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	684.65	10.72
	DHW GF:CirSpaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	110.14	1.72
	DHW GF:Dinning	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	875.94	13.72
	DHW GF:Canteen	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	281.30	4.40
	DHW FF:OtherSpaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	883.15	13.83
	DHW FF:CirSpaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	113.09	1.77
	DHW FF:GLC1X2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	490.07	7.67
	DHW SF:GLC1X2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	501.57	7.85
Refrigeration	General	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Generators	General	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

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Normalized Metrics

Utility Use Per Conditioned Floor Area

	Electricity Intensity [kWh /m2]	Natural Gas Intensity [kWh /m2]	Gasoline Intensity [kWh /m2]	Diesel Intensity [kWh /m2]	Coal Intensity [kWh /m2]	Fuel Oil No 1 Intensity [kWh /m2]	Fuel Oil No 2 Intensity [kWh /m2]	Propane Intensity [kWh /m2]	Other Fuel 1 Intensity [kWh /m2]	Other Fuel 2 Intensity [kWh /m2]	District Cooling Intensity [kWh /m2]	District Heating Intensity [kWh /m2]	Water Intensity [m3 /m2]
Lighting	11.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HVAC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	15.28	15.69	0.05
Other	27.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	38.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	15.28	15.69	0.05

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Utility Use Per Total Floor Area

	Electricity Intensity [kWh /m2]	Natural Gas Intensity [kWh /m2]	Gasoline Intensity [kWh /m2]	Diesel Intensity [kWh /m2]	Coal Intensity [kWh /m2]	Fuel Oil No 1 Intensity [kWh /m2]	Fuel Oil No 2 Intensity [kWh /m2]	Propane Intensity [kWh /m2]	Other Fuel 1 Intensity [kWh /m2]	Other Fuel 2 Intensity [kWh /m2]	District Cooling Intensity [kWh /m2]	District Heating Intensity [kWh /m2]	Water Intensity [m3 /m2]
Lighting	11.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HVAC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	15.28	15.69	0.05
Other	27.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	38.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	15.28	15.69	0.05



Electric Loads Satisfied

	Electricity [kWh]	Percent Electricity [%]
Fuel-Fired Power Generation	0.000	0.00
High Temperature Geothermal*	0.000	0.00
Photovoltaic Power	0.000	0.00
Wind Power	0.000	0.00
Power Conversion	0.000	0.00
Net Decrease in On-Site Storage	0.000	0.00
Total On-Site Electric Sources	0.000	0.00
Electricity Coming From Utility	46139.893	100.00
Surplus Electricity Going To Utility	0.000	0.00
Net Electricity From Utility	46139.893	100.00
Total On-Site and Utility Electric Sources	46139.893	100.00
Total Electricity End Uses	46139.893	100.00

On-Site Thermal Sources

	Heat [kWh]	Percent Heat [%]
Water-Side Heat Recovery	0.00	
Air to Air Heat Recovery for Cooling	0.00	
Air to Air Heat Recovery for Heating	0.00	
High-Temperature Geothermal*	0.00	
Solar Water Thermal	0.00	
Solar Air Thermal	0.00	
Total On-Site Thermal Sources	0.00	

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Water Source Summary

	Water [m3]	Percent Water [%]
Rainwater Collection	0.00	0.00
Condensate Collection	0.00	0.00
Groundwater Well	0.00	0.00
Total On Site Water Sources	0.00	0.00
-	-	-
Initial Storage	0.00	0.00
Final Storage	0.00	0.00
Change in Storage	0.00	0.00
-	-	-
Water Supplied by Utility	61.70	100.00
-	-	-
Total On Site, Change in Storage, and Utility Water Sources	61.70	100.00
Total Water End Uses	61.70	100.00

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Appendix B Thermal Bridging Calculations

Air Film (Outdoor)	0.04
Cladding	0.02
Insulation allowing for Thermal Bridging	1.66
Plasterboard	0.06
Air Film (Indoor)	0.12

Total 1.90

R ₁ Insulation R-Value	2
R ₂ Framing R-Value	0.75
Wall Height (mm)	3000
Stud width (mm)	70
Stud breadth (mm)	45
Stud spacing (mm)	600
Top Plate thickness (mm)	90
Nogging (mm)	35
Bottom Plate thickness (mm)	35

f₁ 0.876

f₂ 0.124

1/R_b 0.604

R_b R-Value of wall (incl Thermal bridging) 1.70

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Appendix C Lighting & Power Calculations Part J7

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Non-residential Lighting



Calculator

Building name/description	
Nazareth College Student Hub at 13-17 Manning Drive, Noble Park North	
Number of rows preferred in table below	24 (as currently displayed)

Classification
Class 9b

ID	Description	Floor area of the space	Perimeter of the space	Floor to ceiling height	Design illumination power load	Space	Illuminance		Adjustment factor 1		Adjustment factor 2		Light colour adjustment factors		SATISFIES PART J7D3	
							Designed lux level	Recommended lux level	Adjustment factor 1	Dimming % area	Illuminance	Adjustment factor 2	Dimming % area	Illuminance	Light colour adjustment factor 1	Light colour adjustment factor 2
1	canteen	71.0 m ²	40 m	3.0 m	150 W	Kitchen and food preparation area							a) CRI ≥ 90	c) CCT ≥ 4500 K	410 W	6% of 37%
2	din hall	267.0 m ²	71 m	3.0 m	550 W	School - general purpose learning areas and tutorial rooms									1307 W	24% of 37%
3	year 12 com room	81.0 m ²	43 m	3.0 m	240 W	School - general purpose learning areas and tutorial rooms									514 W	10% of 37%
4	services	39.0 m ²	25 m	3.0 m	60 W	School - general purpose learning areas and tutorial rooms									263 W	3% of 37%
5	stairs	19.0 m ²	19 m	3.0 m	20 W	Stairways, including fire-isolated stairways									62 W	1% of 37%
6	dda wc	5.0 m ²	10 m	3.0 m	10 W	Toilet, locker room, staff room, rest room and the like									45 W	0% of 37%
7	waiting	23.0 m ²	20 m	3.0 m	80 W	School - general purpose learning areas and tutorial rooms									165 W	3% of 37%
8	first aid	23.0 m ²	21 m	3.0 m	40 W	School - general purpose learning areas and tutorial rooms									280 W	2% of 37%
9	nurse	13.0 m ²	15 m	3.0 m	20 W	School - general purpose learning areas and tutorial rooms									164 W	1% of 37%
10	triage	17.0 m ²	18 m	3.0 m	30 W	School - general purpose learning areas and tutorial rooms									128 W	1% of 37%
11	student dda	6.0 m ²	11 m	3.0 m	10 W	Toilet, locker room, staff room, rest room and the like									54 W	0% of 37%
12	GLC1&2	154.0 m ²	47 m	5.0 m	630 W	School - general purpose learning areas and tutorial rooms									963 W	27% of 37%
13	corridor	19.0 m ²	23 m	3.0 m	30 W	School - general purpose learning areas and tutorial rooms									146 W	1% of 37%
14	vce cord	12.0 m ²	15 m	3.0 m	20 W	School - general purpose learning areas and tutorial rooms									92 W	1% of 37%
15	mid cord	12.0 m ²	15 m	3.0 m	20 W	School - general purpose learning areas and tutorial rooms									92 W	1% of 37%
16	wellbeing 1&2	20.0 m ²	20 m	3.0 m	40 W	School - general purpose learning areas and tutorial rooms									148 W	2% of 37%
17	wellb lounge	59.0 m ²	33 m	3.0 m	80 W	School - general purpose learning areas and tutorial rooms									380 W	3% of 37%
18	car offices 1&2	28.0 m ²	22 m	3.0 m	40 W	School - general purpose learning areas and tutorial rooms									197 W	2% of 37%
19	car lounge	34.0 m ²	30 m	3.0 m	100 W	School - general purpose learning areas and tutorial rooms									243 W	4% of 37%
20	wellb terrace	21.0 m ²	21 m	3.0 m	40 W	School - general purpose learning areas and tutorial rooms									156 W	2% of 37%
21	reflec 1-3	15.0 m ²	16 m	3.0 m	30 W	School - general purpose learning areas and tutorial rooms									113 W	1% of 37%
22	wc	8.0 m ²	12 m	3.0 m	20 W	Toilet, locker room, staff room, rest room and the like									70 W	1% of 37%
23	stud mgt 1&2	25.0 m ²	22 m	3.0 m	40 W	School - general purpose learning areas and tutorial rooms									179 W	2% of 37%
24	stairs	19.0 m ²	19 m	3.0 m	20 W	Stairways, including fire-isolated									62 W	1% of 37%

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Total 2320 W

Total 6233 W



Non-residential Lighting



Calculator

Building name/description	
Nazareth College Student Hub at 13-17 Manning Drive, Noble Park North	
Number of rows preferred in table below	24 <small>(as currently displayed)</small>

Classification
Class 9b

ID	Description	Floor area of the space	Perimeter of the space	Floor to ceiling height	Design illumination power load	Space	Illuminance		Adjustment factor 1			Adjustment factor 2			Light colour adjustment factors		SATISFIES PART J7D3	
							Designed lux level	Recommended lux level	Adjustment factor 1	Dimming % area	Illuminance turndown	Adjustment factor 2	Dimming % area	Illuminance turndown	Light colour adjustment factor 1	Light colour adjustment factor 2	System illumination power load allowance	Lighting system share of % of aggregate allowance used
							<i>These columns do not represent a requirement of the NCC and are suggestions only.</i>		Adjustment factors			Adjustment factors						

if inputs are valid



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Appendix D Wall-Glazing Calculations Part J4D6

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NCC 2019 Wall-Glazing Calculator v3.0																																																			
Wall and glazing energy efficiency in Class 2-9 buildings - Method 2 of Specification J1.5a, NCC 2019																																																			
Building name and description			Classification		Climate Zone		Building Check-Values																																												
Nazareth College Student Hub at 13-17 Manning Drive, Noble Park North			Other		6		<table border="1"> <thead> <tr> <th></th> <th>Walls</th> <th>Glazing</th> <th>Sub-total</th> <th>Display</th> <th>Glazing Percentage (non display)</th> </tr> </thead> <tbody> <tr> <td>North</td> <td>140.0</td> <td>0.0</td> <td>140.0</td> <td>0.0</td> <td>0%</td> </tr> <tr> <td>East</td> <td>252.7</td> <td>133.1</td> <td>385.8</td> <td>0.0</td> <td>34%</td> </tr> <tr> <td>South</td> <td>202.3</td> <td>27.7</td> <td>230.0</td> <td>0.0</td> <td>12%</td> </tr> <tr> <td>West</td> <td>181.4</td> <td>58.6</td> <td>240.0</td> <td>0.0</td> <td>24%</td> </tr> <tr> <td>Internal</td> <td>0.0</td> <td>0.0</td> <td>0.0</td> <td>0.0</td> <td>0%</td> </tr> <tr> <td>Total</td> <td>776.5</td> <td>217.3</td> <td>993.8</td> <td>0.0</td> <td>22%</td> </tr> </tbody> </table>				Walls	Glazing	Sub-total	Display	Glazing Percentage (non display)	North	140.0	0.0	140.0	0.0	0%	East	252.7	133.1	385.8	0.0	34%	South	202.3	27.7	230.0	0.0	12%	West	181.4	58.6	240.0	0.0	24%	Internal	0.0	0.0	0.0	0.0	0%	Total	776.5	217.3	993.8	0.0	22%
	Walls	Glazing	Sub-total	Display	Glazing Percentage (non display)																																														
North	140.0	0.0	140.0	0.0	0%																																														
East	252.7	133.1	385.8	0.0	34%																																														
South	202.3	27.7	230.0	0.0	12%																																														
West	181.4	58.6	240.0	0.0	24%																																														
Internal	0.0	0.0	0.0	0.0	0%																																														
Total	776.5	217.3	993.8	0.0	22%																																														
Calculated Area-Weighted U-Value: 1.60 Allowable Area-Weighted U-Value: 2.00 Building total U-Value allowance met: 80%			Calculated Representative Air-Conditioning Energy Value: 69.5 Allowable Representative Air-Conditioning Energy Value: 132.9 Building total SHGC allowance met: 53%			Element Limits Wall U-Value*: 1.00 Display Glazing U-Value: 5.8 Display Glazing Solar Admittance: 0.81 <small>*The wall u-value limit will update based on building class and glazing %</small>																																													
Check Values Visible			Wall Element Requirements Met		Display Glazing Element Requirements -																																														
Use of this calculator does not guarantee compliance with the NCC. The disclaimer and a version update check are available at the bottom of the page.																																																			
Element Description																																																			
ID	Description (optional)	Element Type	Facing Sector	Area (m ²)	U-Value		SHGC and Shading				Element Check-Values																																								
					U-Value	U-Value Element share of allowance used	SHGC	Glazing Height (m)	Shading Height (m)	Shading Projection (m)	SHGC Element share of allowance used	Rounded G/H	Rounded P/H	Shading Factor	Solar Admittance	AC Energy Value																																			
1	Student Hub	Wall	North	140.00	0.70	6% of building total						Not counted	0	0	1	0	0																																		
2	Student Hub	Wall	South	202.34	0.70	9% of building total						Not counted	0	0	1	0	0																																		
3	Student Hub	Glazing	South	10.35	6.40	4% of building total	0.5	1.5				0% of building total	0	0	1	0.5	0																																		
4	Student Hub	Glazing	South	6.75	4.50	2% of building total	0.5	1.5				0% of building total	0	0	1	0.5	0																																		
5	Student Hub	Glazing	South	10.56	4.50	3% of building total	0.5	2.4	2.4			1% of building total	0	0.4	0.77	0.385	0																																		
6	Student Hub	Wall	West	181.44	0.70	8% of building total						Not counted	0	0	1	0	0																																		
7	Student Hub	Glazing	West	41.01	4.50	12% of building total	0.5	2.3	2.4			2.23% of building total	0.1	0.8	0.47	0.235	16.0943745																																		
8	Student Hub	Glazing	West	17.55	4.50	5% of building total	0.5	1.5				21% of building total	0	0	1	0.5	14.65425																																		
9	Student Hub	Wall	East	252.67	0.70	11% of building total						Not counted	0	0	1	0	0																																		
10	Student Hub	Glazing	East	46.24	4.50	13% of building total	0.5	3	3			3.19% of building total	0	1	0.35	0.175	13.10904																																		
11	Student Hub	Glazing	East	61.09	4.50	17% of building total	0.5	2	2			3.25% of building total	0	1.5	0.35	0.175	17.319015																																		
12	Student Hub	Glazing	East	2.40	6.40	1% of building total	0.1	2.4	3			3.0% of building total	0.2	1	0.47	0.047	0.182736																																		
13	Student Hub	Glazing	East	21.36	6.40	9% of building total	0.5	1.4	1.7			3.12% of building total	0.2	1.7	0.47	0.235	8.131752																																		
14						Not counted						Not counted	0	0	1	0	0																																		
15						Not counted						Not counted	0	0	1	0	0																																		
16						Not counted						Not counted	0	0	1	0	0																																		
17						Not counted						Not counted	0	0	1	0	0																																		
18						Not counted						Not counted	0	0	1	0	0																																		
19						Not counted						Not counted	0	0	1	0	0																																		
20						Not counted						Not counted	0	0	1	0	0																																		
21						Not counted						Not counted	0	0	1	0	0																																		
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45						Not counted						Not counted	0	0	1	0	0																																		
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47						Not counted						Not counted	0	0	1	0	0																																		
48						Not counted						Not counted	0	0	1	0	0																																		
49						Not counted						Not counted	0	0	1	0	0																																		
50						Not counted						Not counted	0	0	1	0	0																																		

Disclaimer:
 This calculator has been developed to assist in developing a better understanding of the glazing energy efficiency parameters of NCC 2019. While the author believes that the calculator, if used correctly, is likely to produce accurate results, it is provided "as is" and without any representation or warranty of any kind, including that it is fit for any purpose or of merchantable quality, or functions as intended or at all. Your use of this calculator is entirely at your own risk and the author accepts no liability of any kind.

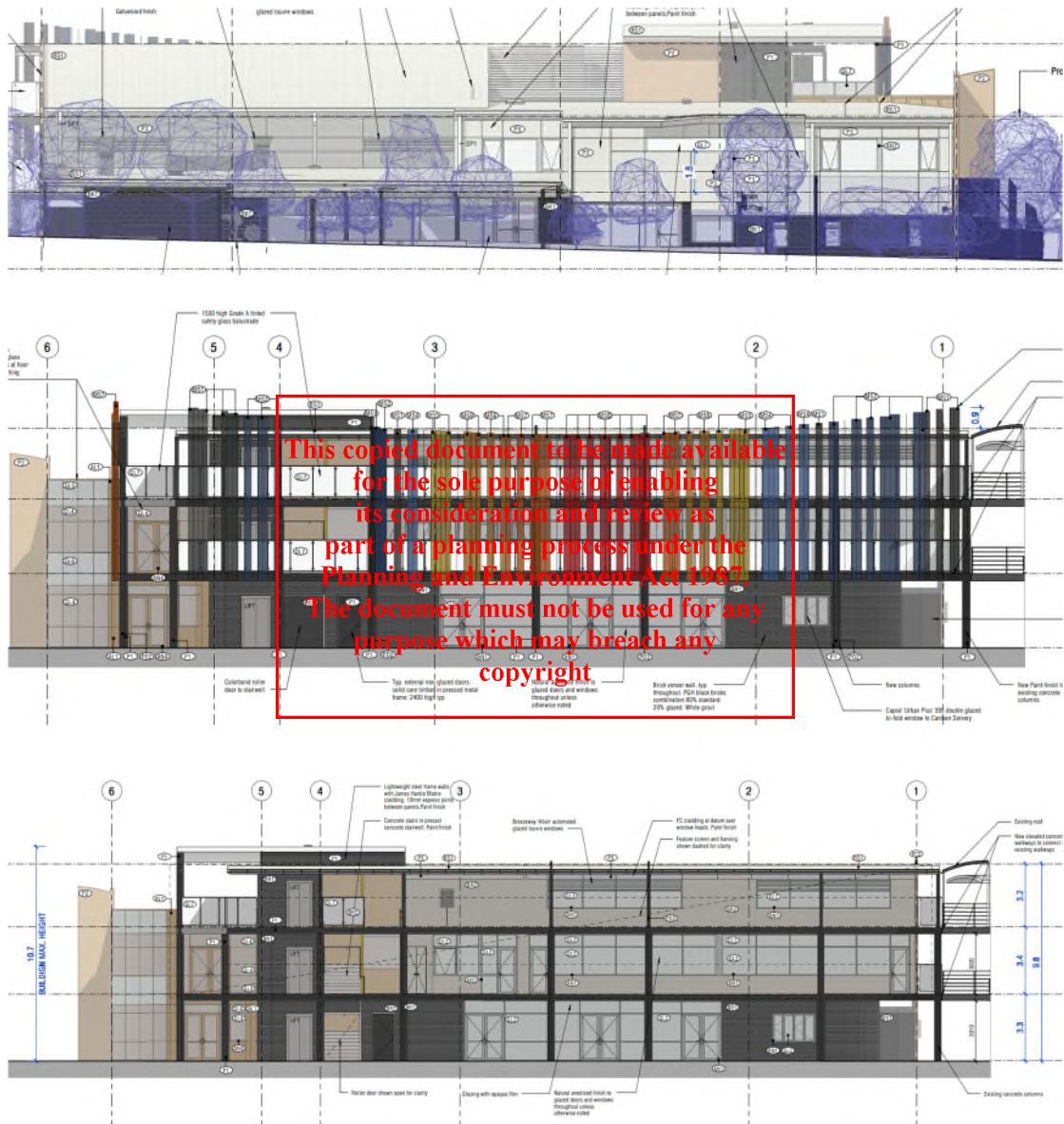
Made by Alex Zeller
 Email alex.wallglazingcalculator@gmail.com with any suggestions for improvement

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Appendix E – Ventilation Requirements



There are openable glazing surface areas. And there are openable louvers for natural and cross-flow ventilation.



Appendix F – Daylight Modelling and Report

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DAYLIGHT ASSESSMENT

Nazareth College
13-17 Nanning Drive, Noble Park North

Consultant: Sherif Ghobrial
Client: Cotter Reid Architects

Date: 08/10/2024

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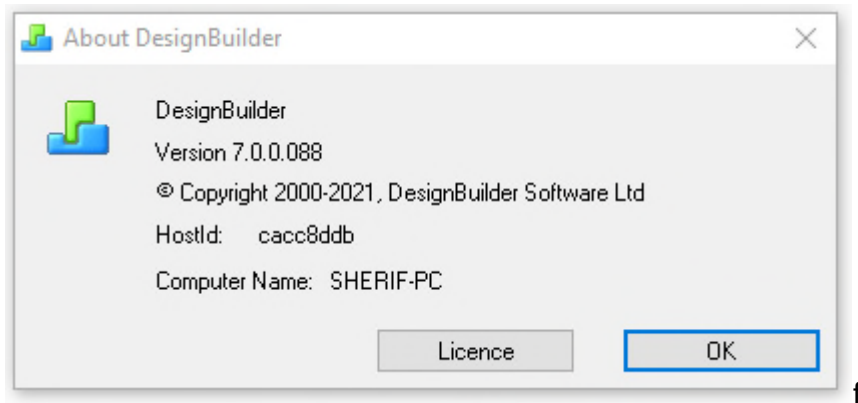
1.0 Project Scope

The project is Nazareth College, 13-17 Nanning Drive, Noble Park North. Refer to drawings **dated 08 August 2024** by Cotter Reid Architecture Pty Ltd.

Purpose of this exercise is to carry out daylight assessment for the rooms and offices to provide daylight calculations to indicate at minimum 35% of the floor areas is achieving 2% DF (Daylight factor).

2.0 Methodology and Process

Daylight assessment has been carried out by computer daylight modelling for the zones as requested by Council. Design Builder Platform Ver 7.0.0.088 has been used for the modelling:



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3.0 Computer Daylight Modelling

As noted earlier, computer daylight modelling has been used to assess. This does not represent the whole building.

Some assumptions for the Visible Light Transmittance (VLT) for the glazing values and the internal surfaces reflectance were made to complete the analysis; the assumptions are as follow:

- **Glazing:** 80% (clear glazing)
- **skylight** 30% (dark tinted/Translucent)
- **Floors:** 30% reflectivity
- **Walls:** 70% reflectivity
- **Ceilings:** 80% reflectivity
- CIE Overcast Design Sky (10000Lux)

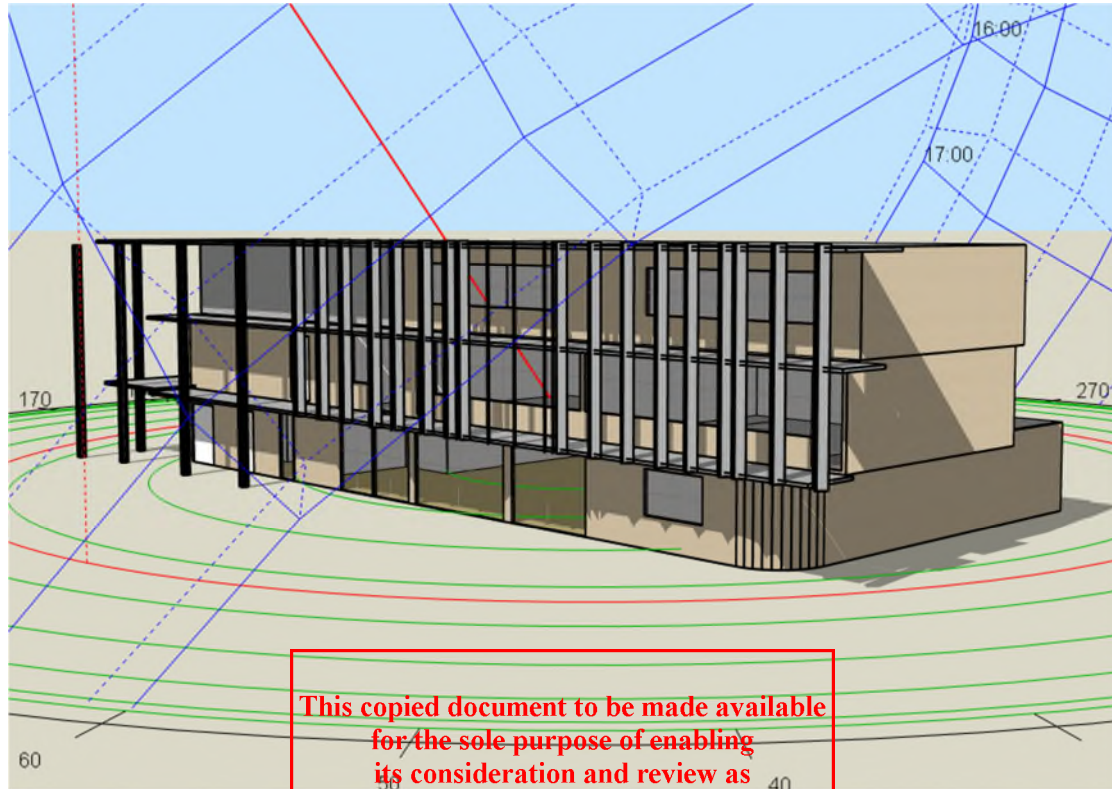
Table 2 Summary Outcome as per drawings

all relevant zones						
Block	Zone	Floor Area (m2)	Floor Area within Limits (m2)	Floor Area above Threshold (%)	Average Daylight Factor (%)	
ground floor	canteen	88.349	3.504	3.966	0.404	
1st floor	career office 1	13.003	10.836	83.333	7.707	
1st floor	career office 2	14.903	14.903	100	8.756	
1st floor	foyer and career lounge	50.689	48.164	95.019	7.014	
1st floor	GLC 1	78.002	72.565	93.029	3.33	
1st floor	GLC 2	74.971	62.042	82.754	2.998	
ground floor	meeting	6.503	0	0	0	
1st floor	studen management leader 1	14.068	0.197	1.399	0.371	
1st floor	studen management leader 2	12.311	0	0	0	
1st floor	VCE coordinator	12.455	11.199	89.916	7.267	
1st floor	wellbeing lounge	57.753	16.899	29.26	2.532	
1st floor	wellbeing office 1	10.461	0	0	0	
total average		433	240	55%	3.4	

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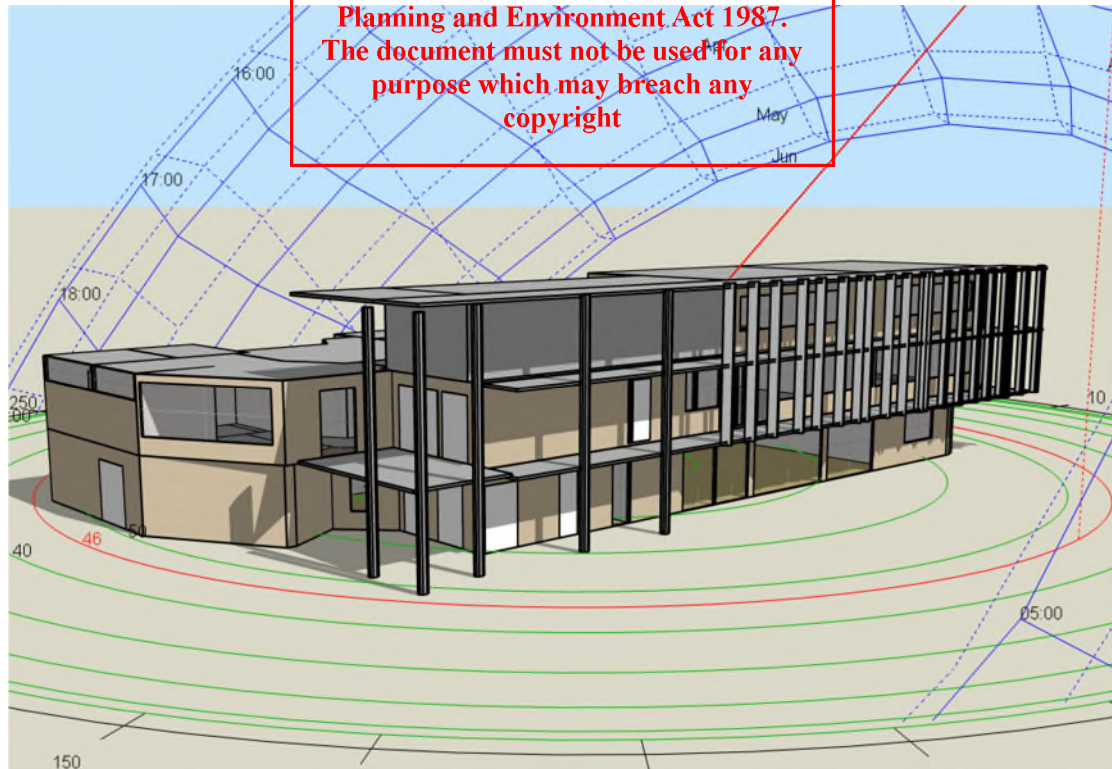


View 1



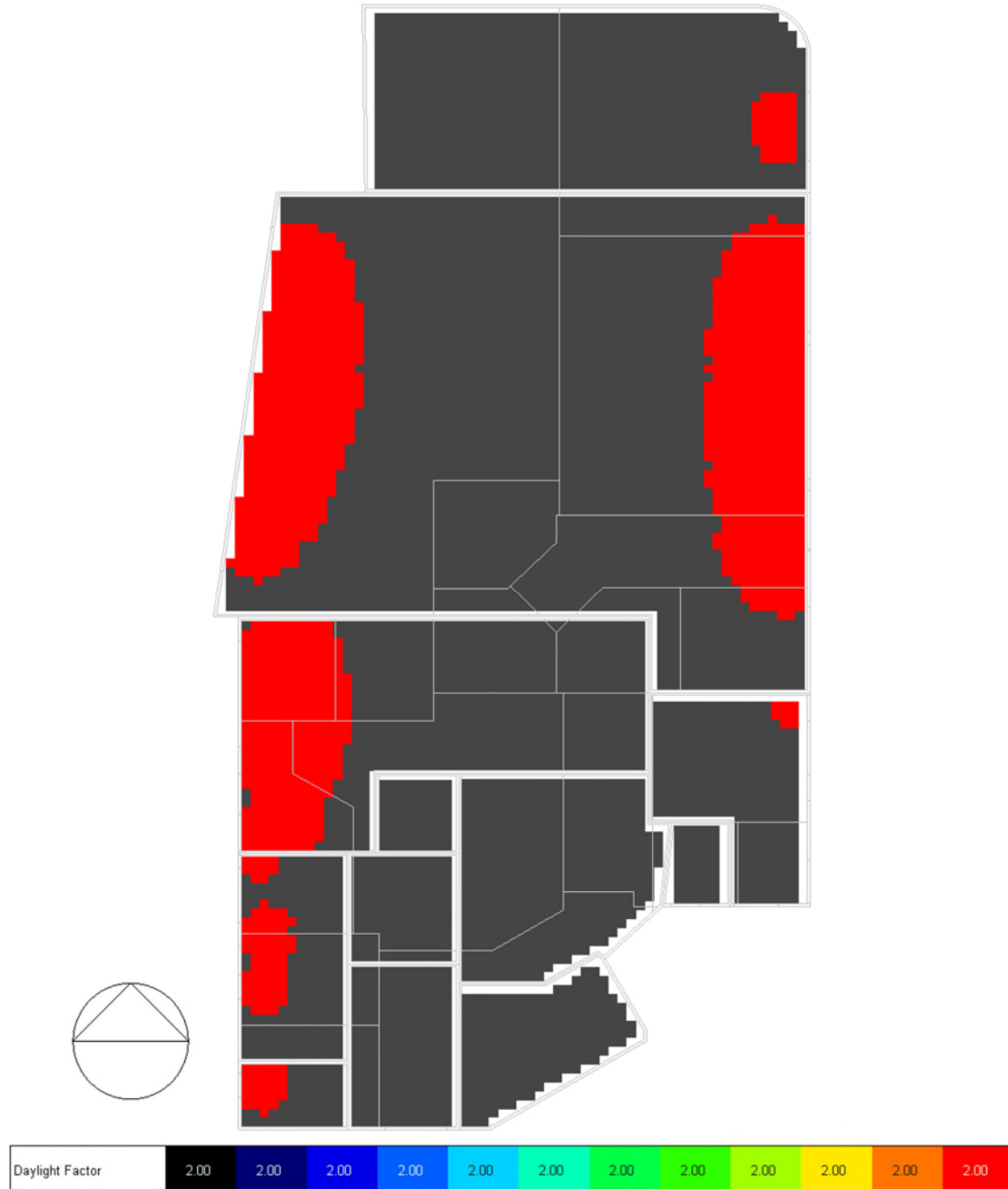
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View 2





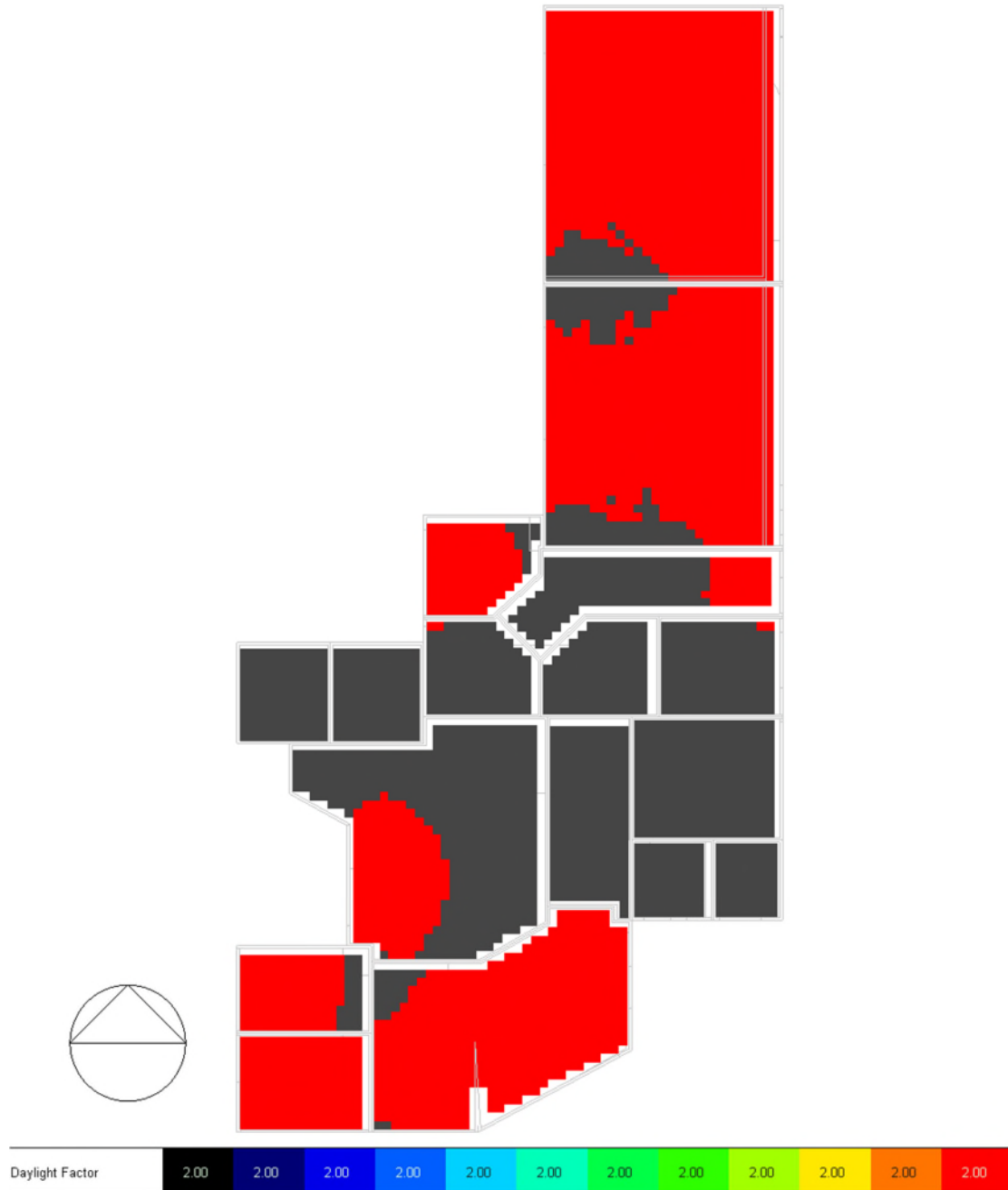
Ground floor heat map (red indicates DF of 2.0 or greater)



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1st floor heat map



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4.0 Conclusions and Summary

Daylight computer modelling has been carried out for the relevant rooms, offices and other relevant rooms as requested by Council.

BESS requirements for the relevant zones is to achieve a daylight factor greater than 2.0% to 35% of the floor area. **Table 2**, shows we are not meeting the requirements at 55%.

Kind Regards,
Karim Ghobrial
Bach of Electrical Engineering
Energy and Sustainability Consultant

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