All Saints College Multi-Purpose Centre

SEPP Requirements

Catholic Diocese of Newcastle and Maitland

26 April 2024

→ **The Power of Commitment**

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1. Introduction

GHD has been engaged by Catholic Diocese of Newcastle and Maitland (CDNM) to provide ESD inputs into the Development Application as required by the Sustainability Buildings State Environmental Planning Policies (SEPP) for the new Multi-Purpose Centre and St Pauls Parish Hall Restoration at All Saints College, Maitland.

1.1 Purpose of this Report

The purpose of this report is to outline the sustainable design strategies employed in the design of the Multi-Purpose Centre and St Pauls Parish Hall Restoration at All Saints to meet the general sustainability requirements specified in the 2022 SEPP (applicable since 1st of October 2023). As part of these requirements, this report outlines the sustainable design decisions made to avoid reliance on fossil fuel as required under the NSW Buildings SEPP. Section 3 is the Net Zero Statement in response to this requirement.

1.2 Scope and limitations

This report has been prepared by GHD for Catholic Diocese of Newcastle and Maitland. It is not prepared as, and is not represented to be, a deliverable suitable for reliance by any other person for any other purpose than that outlined in chapter 1.1. It is not intended for circulation or incorporation into other documents other than for the project Development Application to Maitland City Council.

At the time of preparing this report, the design was in the early stages therefore all sustainability requirements are not fully resolved or documented yet. This document summarises the intent of the design team. All nominated initiatives require further design development and will need to be incorporated into final design and construction documentation.

2. SEPP General Requirements

The following table describes the SEPP General sustainability requirements and provide a summary of the design response.

Table 2.1 SEPP General Sustainability Requirements

Reference in SEPP	Design response	Supporting Evidence	Comply Y/N?
3.2.1.a - Minimisation of Waste from Demolition and Construction	– The appointed contractor will be required to develop a construction waste management plan and ensure at least 90% of construction waste is diverted from landfill.	– The project is targeting a 5-Star Green Star Buildings rating. Credit 2: Responsible Construction, is targeted, which required 90% diversion of waste from landfill.	Y
3.2.1.b - Peak Electricity Demand reduction	– Passive design features to reduce peak electricity demand incorporated into the design include: • Positioning of windows to optimise daylight and reduce reliance on artificial lighting during daytime. • Optimised glazing to wall ratios to reduce thermal loads and need for active air conditioning. • Insulation of the thermal envelope to target improvement over Section J minimum requirements. • Ground floor slab thermal mass to act as thermal storage and will both reduce and shift demand for air conditioning energy use. – HVAC system will achieve efficiencies as per section J or better. – HVAC system controls strategy will consider how to make best use of solar energy at times of maximum generation – e.g. through precooling the building to shift thermal load outside of peak times. – Lighting power densities will be reduced as much as possible to achieve a saving compared to section J maximum power densities. – A 30 kWp roof top photovoltaics system is proposed. This is estimated to provide approximately 242% of the building's electricity needs	– Architectural floor plans and elevations. Drawing numbers – WD2204, WD2205, WD2401, WD3101, and WD3102. – DOMN -AC-100 Air Conditioning Guidelines – DOMN-SUST-101 - Sustainable Design Standard – DOMN-E-101 General Electrical Specification	Y
3.2.1.c - Reduction In the Reliance on Artificial Lighting and Mechanical heating and cooling through passive design	– The passive design features introduced in item 3.2.1.b to lower the peak electricity demand will also save energy.	– As above	Y
3.2.1.d - Generation and Storage of Renewable Energy	– A 30 kWp solar array will be installed on the roof to generate renewable energy used directly on site. This is 242% of the energy expected to be consumed by the building.	– Drawing number 4367-WD1003-B – Appendix B-Electrical Designer's Response	Y

Reference in SEPP	Design response	Supporting Evidence	Comply Y/N?
	– The design of the building roof and electricals system allows for future expansion of solar PV systems, ensuring adaptability to increased energy needs. – The building will comply with NCC2022 J9D5 – the main electrical switchboard will contain at least two empty three-phase circuit breaker slots and four DIN rail spaces labelled to indicate the use of each space for a battery system. – At least 15% of roof space has been allocated for Solar PV. – 100% of energy demand is covered by PV with a surplus of 22,840 kWh per annum. There is potential for battery storage on site in future.	– Appendix E- Solar PV Generation Modelling – Architectural Drawing Set-REV E- Consultant Issue	
3.2.1.e - Metering and monitoring	– The design will follow NCC2022 section J9D3 requirements as well as meet the minimum requirements for metering and monitoring under a 5 Star Green Star Buildings rating. This requires submetering of all major energy end uses and an automatic monitoring system.	– NCC 2022 J9D3	Y
3.2.1.f - Minimisation of Consumption of Potable Water	To minimize potable water consumption, the community centre incorporates the following features: – Minimum WELS rating as follows: • Taps – 6 Stars • Urinals – 5 Stars or waterless • Toilets – 4 Stars • Showers – 3 Stars (average use of 5.5L/min) – rainwater harvested water in a minimum capacity rainwater tank of 20kL will be used for toilet/urinal flushing and irrigation. – Sub-surface drip with moisture sensor override will be considered for irrigation demand.	– DOMN-SUST-101 - Sustainable Design Standard – The project is targeting a 5-Star Green Star Buildings rating. At a minimum, the project will achieve a 15% reduction in water use when compared to a reference case building. – Drawing number CC-C04.01 (Civil Engineering Package)	Y

3. Net Zero Statement

Table 3.1 NET Zero Design Initiatives

Net Zero Requirements	Design Responses	Supporting Evidence	Comply? Y/N?
Zero-on-site fossil fuel usage	– The building will be all electric. Gas, and other form of fossil fuel will not be considered in the design. – Refrigerant base air conditioning system will be considered for heating. Natural gas system will not be considered. – Domestic hot water system will be all electric. Natural gas system will not be considered.	– DOMN-SUST-101 - Sustainable Design Standard – DOMN -AC-100 Air Conditioning Guidelines – DOMN-SUST-101 - Sustainable Design Standard – Appendix A-HVAC Designer's Responses – Appendix C-Hydraulic Designer's Response –	– Y
Energy Efficiency	– Building orientation: the building is oriented towards the north, with smaller façade areas to the east and west. – Building fabric: Insulation of the thermal envelope to target improvement over Section J minimum requirements. – Roof colour to have low SA value to meet the NCC requirement. Consideration will be made for meeting Green Star Credit Heat Resilience, which requires the upper roof surface to be at least 82. – Space Conditioning: 1. Natural ventilation • Gym area to be naturally ventilated via high and low-level louvres. 2. Mechanical ventilation • Mechanical ventilation design to target improvements over NCC reference case. • In-line fans that forms part of a ducted network to be incorporated with EC motor and capable of reduced speed operation. • ERV units are provided as part of the HVAC system. – Airtightness: Building sealing will be designed in accordance with the NCC2022 and Green Star Buildings airtightness requirements. – Efficient lighting: LED lights will be specified in the design. – Lighting control design to have the following functions: Occupancy Sensing, push button timer, automatic timer, and security/Access lighting control as a minimum.	– DOMN-SUST-101 - Sustainable Design Standard – DOMN -AC-100 Air Conditioning Guidelines – DOMN-E-101 General Electrical Specification – DOMN-E-102 Emergency Lighting and Exit Signage – DOMN-E-103 Electrical Approved Equipment List – Appendix A-HVAC Designer's Responses – Appendix B-Electrical Designer's Response – Architectural Drawing Set-REV E- Consultant Issue	– Y
Renewable energy generation and storage	– A 30 kWp solar array will be installed on the roof to generate renewable energy used directly on site. This is 242% of the energy expected to be consumed by the building. – The design of the building roof and electricals system allows for future expansion of solar PV systems, ensuring adaptability to increased energy needs.	– Drawing number 4367-WD1003-B – Appendix B-Electrical Designer's Response – Appendix E- Solar PV Generation Modelling	– Y

Net Zero Requirements	Design Responses	Supporting Evidence	Comply? Y/N?
	– The building will comply with NCC2022 J9D5 – the main electrical switchboard will contain at least two empty three-phase circuit breaker slots and four DIN rail spaces labelled to indicate the use of each space for a battery system. – At least 15% of roof space has been allocated for Solar PV. – 100% of energy demand is covered by PV with a surplus of 22,840 kWh per annum. There is potential for battery storage on site in future.	– Architectural Drawing Set-REV E- Consultant Issue	
Estimated energy consumptions	– At the time of preparing this report, the design was in the early stages therefore all sustainability requirements are not fully resolved or documented yet. Data below has been extracted from 2022 Commercial Building Baseline Study, prepared for the Australian Government Department of Industry, Science, Energy & Resources and adapted for usage for the proposed building. – Energy consumption of the proposed building: 16,060 kWh/year • Classrooms: 7,080 kWh/year • St Pauls Parish Hall: 3,061 kWh/year • Basketball Courts: 5,919 kWh/year – Solar energy generation: 38,900 kWh/year – Total energy consumption with Solar PV: -22,840 kWh/year. The building will be net zero in its first year of operation. Refer to Appendix D for Energy consumptions calculation assumption. Refer to Appendix E for Solar PV generation modelling.	– 2022 Commercial Building Baseline Study, prepared for the Australian Government Department of Industry, Science, Energy & Resources – Appendix D-Energy Consumptions Assumptions. – Appendix E-Solar PV Generation Modelling	– Y
Estimated GHC emissions for energy use	– NCC greenhouse gas emissions factors (electricity) NSW: 0.85 kgCO2-e/kWh – Proposed building GHG emissions: -19,405 $kgCO^2_e$/Annum (SCOPE 2) – Solar electricity generation is projected to fully cover the building's demand with excess generation exported.	– NCC2022	– Y

Appendices

Appendix A

HVAC Designer's Responses

From: Hayden Pritchard <hayden@shac.com.au>
Sent: Friday, April 19, 2024 2:33 PM
To: Luke Barry <Luke.Barry@ghd.com>
Subject: NZ Statement - Mechanical

Hi Luke,

See below answers from mechanical:

Mechanical

1. Provide drawings and narratives on how natural ventilation can be achieved through openings at the GYM. For an area to be considered naturally ventilated the area of openable/operable façade is to equal greater than 5% of the floor area of the area served. Counting only the louvres for the gym we are currently sitting at ~9% of floor area, meaning natural ventilation is readily achieved here. I am happy to place air flow arrows on our existing mechanical drawings to indicate this area is naturally ventilated however we have not allowed to produce separate drawings for this.
2. Confirmation that mechanical ventilation design is 10% better the NCC reference case. Mechanical ventilation is provided to classrooms through an ERV which is controlled to ramp up/down via CO2 monitoring within the classrooms. NCC calls for CO2 levels to not exceed 850ppm, we have specified this is to be set to 700ppm for this project, greater than a 10% increase in performance.
3. Mechanical schedule demonstrating the below:
    a. Type of HVAC system Mitsubishi Hybrid VRF System.
    b. Cooling energy rating of AC unit (aiming for 5 stars cooling energy rating) We are not sure what this is referring to, the star rating typically only applies to residential style units.
    c. Inline fans forming part of duct network to include EC motor and capable of reduced speed operation. We are happy to include this on our drawings to ensure this provisioned for.
    d. Provision of ERV. ERVs have been used for precondition the outside air entering each GLA.
4. Confirmation that natural gas is not used for heating the buildings. Natural gas has not been included in our mechanical design, we have proposed heating is provided via the Hybrid VRF system.

Regards,
Hayden Pritchard
Architectural Graduate
B Design(Arch) M(Arch) M Proj. Management (B.E)

SHAC

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SHAC acknowledges Traditional Custodians as the first placemakers of lands, waters and skies throughout Australia, and pays respect to Elders past & present.

Appendix B

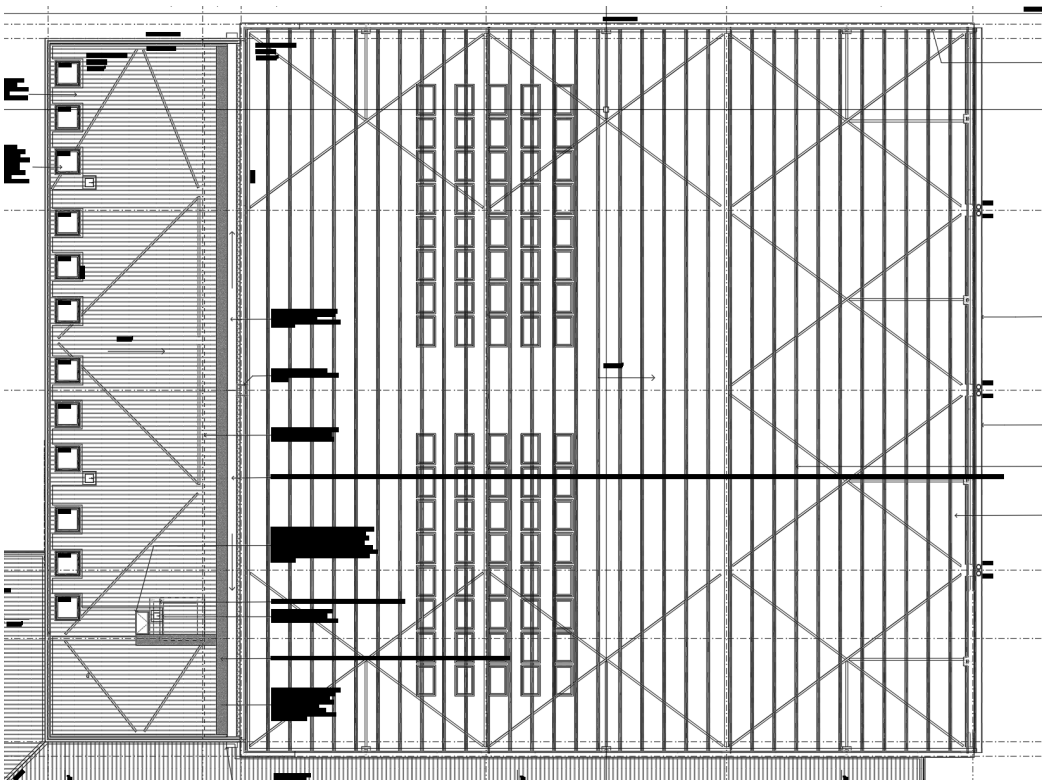
Electrical Designer's Responses

From: Paul Malanchuk <paul@epa.energy>
Date: Friday, 19 April 2024 at 12:38 pm
To: Hayden Pritchard <hayden@shac.com.au>
Subject: RE: Net Zero/Greenstar Statement

Hi Hayden,

Responses are as follows.

1. The PV solar system is rated at 30kW (as based on inverter rating as panel capacity is slightly higher) The 30 KW requires around 80 panels on the roof so layout like below, so if you include the space between panels for access each of the 2 clusters of panels is 120sqm so it is around 240sqm total. The main roof is 1583 sqm so it is about 15% of the main roof area a percentage.
2. Yes all lights are LED.
3. Yes we most of these items but there is no site BMS so nothing to interface with as they want to keep the controls basic and there is dimming to main hall only, but not daylight dimming. We have the rest in terms of occupancy sensing, timers and security/access lighting control.



Regards,

Paul Malanchuk
Director
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P: (02) 4967 5999 **F:** (02) 4967 5933
E: paul@epa.energy
W: www.epa.energy

Appendix C

Hydraulic Designer's Responses

From: Robert McCallum <rob@pfca.net.au>
Date: Tuesday, 23 April 2024 at 2:55 pm
To: Hayden Pritchard <hayden@shac.com.au>
Cc: Albab Fatmi <albab@pfca.net.au>
Subject: Re: Net Zero/Greenstar Statement

REF:5051

Hi Hayden, Rheem has finally come back to us with some information on the heat efficiency of the hot water unit. Please let us know if this is not the information required.

Heat Loss in model 6133150* heavy duty electric storage.

11.3Mj/Day

3.1Kwh/Day

Test method AS1056.1

Best Regards

Robert McCallum / Managing Director
McCallum PFCA
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Appendix D

Energy Consumptions Assumptions

1) Energy Consumptions for the Classrooms were estimated using "The Commercial Buildings Energy Consumption Baseline Study 2022" published by the Department of Climate Change, Energy, the Environment and Water"

2) Basketball courts are naturally ventilated and lighting energy consumptions was estimated using lighting energy density from NCC2022.

Appendix E

Solar PV Generation Modelling

Go to resource data

SYSTEM INFO

RESTORE DEFAULTS

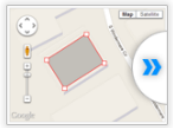
Modify the inputs below to run the simulation.

DC System Size (kW):	30
Module Type:	Standard
Array Type:	Fixed (roof mount)
System Losses (%):	14.08
Tilt (deg):	1.5
Azimuth (deg):	270

Loss Calculator

Rooftop Size Estimator

Click below to estimate the system size from your roof area on a map. (optional)



Advanced Parameters

Go to PVWatts results

Go to system info

RESULTS

Print Results

38,900 kWh/Year*

Month	Solar Radiation (kWh / m^2 / day)	AC Energy (kWh)
January	6.77	4,497
February	5.97	3,687
March	5.04	3,437
April	3.72	2,511
May	3.26	2,322
June	2.37	1,654
July	2.84	2,062
August	3.90	2,819
September	5.06	3,459
October	5.54	3,798
November	6.45	4,268
December	6.57	4,385
Annual	4.79	38,899

User Comments

Type here to add optional comments to printout.

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