



THE GABLES NEW PRIMARY SCHOOL

Net Zero Statement

Date: 08 November 2024

Project No.: LCE24495/1

Document No.: LCE24495-1-025

DOCUMENT ISSUE REGISTER

PROJECT: THE GABLES NEW PRIMARY SCHOOL

DOCUMENT NO: LCE24495-01-025

REVISION	DESCRIPTION	DATE ISSUED	AUTHOR	REVIEWED
REF1	REF Issue	23.09.2024	SR	JM
REF2	REF Issue	27.09.2024	SR	JM
REF3	REF Issue	15.10.2024	SR	JM
REF4	REF Issue	08.11.2024	SR	JM

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1. INTRODUCTION

This Net Zero Statement has been prepared by Lucid Consulting Engineers on behalf of the NSW Department of Education (the Applicant) to assess the potential environmental impacts that could arise from the development of The Gables New Primary School at Lot 301 DP 1287967 on Fontana Drive, Gables (the site).

This report accompanies a Review of Environment Factors that seeks approval for the construction and operation of a new primary school at the site, which involves the following works:

- Construction of school buildings, including learning hubs, a school hall and an administration and library building.
- Construction and operation of a public preschool.
- Delivery of a sports court and fields.
- Construction of car parking, waste storage and loading area.
- Associated site landscaping and open space improvements.
- Associated off-site infrastructure works to support the school, including (but not limited to) services, driveways and pedestrian crossings.

For a detailed project description, refer to the Review of Environmental Factors prepared by Ethos Urban.

1.1 SITE DESCRIPTION

The site is located on Cataract Road, Gables, within The Hills Local Government Area (LGA), approximately 50km northwest of the Sydney CBD and 10km north of the Rouse Hill Town Centre. It comprises one lot, legally described as Lot 301 DP 1287967, that measures approximately 2.2ha in area. The site is bound by Pennant Way to the north, Cataract Road to the east, Fontana Drive to the west and a vacant lot to the south.



Figure 1: Site Aerial.

1.2 STATEMENT OF SIGNIFICANCE

Based on the identification of potential issues, and an assessment of the nature and extent of the impacts of the proposed development, it is determined that:

- The extent and nature of potential impacts are low and will not have significant adverse effects on the locality, community and the environment.
- Potential impacts can be appropriately mitigated or managed to ensure that there is minimal effect on the locality, community.

1.3 REF REPORTING REQUIREMENTS

The following reporting requirements summary table identifies the REF Requirements and relevant reference within this report:

Table 1: REF Requirements.

Item	REF Requirement	Relevant Section of Report
1.0	Required by SI planning:	
	Sustainable Design Initiatives	Section 2.0
	Energy Consumption & GHG Emissions	Section 3.0

1.4 PROJECT TARGET

This Net Zero Statement has been prepared in accordance with the requirements of the State Environmental Planning Policy (Sustainable Buildings) 2022. The Gables New Primary School is targeting **fossil fuel-free** operation from commencement of building operations.

2. ENERGY EFFICIENCY

2.1 AVOIDANCE OF ON-SITE FOSSIL FUEL USAGE

The Gables Public School will be fossil fuel free from the beginning of operations. Table 2 provides a summary of electrified systems serving the site.

Table 2: Fossil fuel free systems

System/Process	Design Proposal
Space heating	Space heating will be provided by direct expansion (DX) plant in split system and variable refrigerant volume (VRV) configurations. These technologies will be powered by electricity only.
Domestic hot water heating	Domestic hot water (DHW) heating will be provided by heat pump generation systems. Heat pump systems will be powered by electricity only.
Cooking	The site will incorporate a canteen for students. Where required, cooking processes will be supported by electrified systems. This includes electric ovens, stovetops and microwaves.

2.2 TECHNICAL DESIGN FEATURES

Technical design features contributing to improved energy efficiency include the following key measures:

- The project will integrate advanced control and monitoring systems for active building operations, utilizing a central Building Management System (BMS) to manage energy and water metering. Educational displays will demonstrate building performance and the impact of solar PV generation. Detailed utility consumption data will be accessible on public screens, facilitating education for students and staff about the building's efficiency. This initiative aims to promote student awareness, encourage energy and water-efficient behaviours, and ensure effective verification of the utility metering and management systems, fostering a culture of sustainability within the school community.
- Use of heat recovery type VRV systems to maximise efficiency during periods of simultaneous heating and cooling.
- Low-flow fixtures to reduce water consumption and energy requirements for hot water heating.
- Use of LED lighting technology and efficient controls to optimise activation and leverage high daylight levels within learning spaces.

2.3 PASSIVE DESIGN FEATURES

This project incorporates several energy-reducing passive design features aimed at enhancing efficiency and comfort. Key strategies include:

- **Solar shading:** Due to site constraints, the orientation of buildings on site is unable to be optimised. To counter this, the proposed façade incorporates significant vertical shading systems to excluded direct sunlight and heat gain, while maintaining access to daylight.
- **Natural Ventilation:** Thoughtfully placed windows and vents facilitate cross-ventilation, reducing reliance on mechanical systems. This design promotes fresh air circulation and maintains comfortable indoor temperatures.
- **Insulation:** High-performance insulation materials are used in walls, roofs, and floors to minimize heat transfer, ensuring a stable indoor climate year-round and reducing energy consumption for heating and cooling.
- **Glazing Performance:** Energy-efficient glazing is installed to enhance daylighting while reducing heat loss and glare. The windows are designed to optimize thermal performance, contributing to overall energy savings.

Together, these features create a sustainable environment that lowers energy demand, enhances occupant comfort, and reduces the building's carbon footprint.

2.4 RENEWABLE ENERGY GENERATION AND STORAGE

This project incorporates a rooftop solar array with a peak generation capacity of 77kW. Future allowances have been incorporated for battery energy storage. However, at this stage of the project, it is not proposed that energy storage systems will be installed. The school's operational profile aligns closely with the availability of solar PV generation which maximises the volume of renewable energy consumed onsite and limits the benefit of energy storage.

3. ESTIMATED ENERGY CONSUMPTION AND GREEN HOUSE GAS EMISSIONS

3.1 ENERGY CONSUMPTION

Building energy consumption has been estimated based on a preliminary benchmarking analysis. Final energy modelling will be refined as the project progresses through detailed design. Our energy analysis also considers the impact of onsite solar generation. Table 3 provides a summary of estimated energy consumption, based on benchmarking data.

Table 3: Energy Consumption Benchmark

Parameter	Value	Unit
Benchmark Area Energy Consumption	35.7 ¹	kWh/m ²
The Gables Public School Approximate Floor Area	7,500	m ²
Estimated Building Energy Consumption	267,750	kWh
Enrolment Benchmark Energy Consumption	392 ¹	kWh/student
The Gables Public School Students	1000	Students
Estimated Building Energy Consumption	392,000	kWh
Estimated Building Energy Consumption (Benchmark Average)	329,875	kWh

Table 4 describes the estimated solar array generation. A utilisation factor has been included to estimate the impact of energy exported to the utility network. This is likely to occur in weekend periods when solar generation exceed building energy demand.

Table 4: Solar Generation Estimate

Parameter	Value	Unit
Solar Array Capacity	77	kW
Estimated Annual Generation Intensity	1,460 ²	kWh/kW
Total Estimated Energy Generation	112,420	kWh
Utilisation Factor	80%	
Total Energy Offset	89,936	kWh
Total Site Energy Consumption from Utility Network	239,939	kWh

3.2 GHG EMISSIONS

Greenhouse gas emissions will occur from energy consumption from the utility network. The NSW Whole-of-Government energy agreement incorporates 6% green power which will reduce overall emissions. Future increase of the Green Power component of this energy agreement will greatly assist the Gables School toward zero emissions in operation. Table 5 summarises greenhouse gas emissions due to electricity consumption from the utility network

¹ D Daly et al., Energy consumption in Australia primary schools: Influences and Metris, Energy and Buildings, 2022.

² Clean Energy Council, Guide to Installing Solar PV for Business and Industry,

Table 5: Greenhouse Gas Estimate

Parameter	Value	Unit
NSW Grid Emissions Intensity	0.79 ³	kgCO _{2-e} /kWh
Renewable Energy Factor	6%	
Total Site Energy Consumption from Utility Network	239,939	kWh
Estimated Year 1 GHG Emissions	178.18	tCO_{2-e}/yr

³ National Greenhouse Accounts Factors, DECCEEW 2023.

4. MITIGATION MEASURES

Table 6 summarises the mitigation measures described in this report.

Table 6: Migration measure summary

Project Stage <i>Design (D)</i> <i>Construction (C)</i> <i>Operation (O)</i>	Mitigation Measures	Relevant Section of Report
D	Incorporation of fossil fuel-free operation	Section 2.1
D/O	Incorporation of passive design principles, efficient building systems, and onsite energy generation to reduce site energy consumption.	Section 2.3 Section 2.4 Section 2.5

5. SIGN OFF



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