

Report

Sustainability Master Plan

LORETO SCHOOL, KIRRIBILLI

Loreto School



CONFIDENTIAL

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EXECUTIVE SUMMARY

Loreto Kirribilli School is currently undertaking redevelopment works as part of its 'Navigating the Future' 2015 – 2018 Strategic Plan.

The report has been prepared to accompany the project Stage 1 DA submission and has been prepared to address all conditions set out in the Secretary's Environmental Assessment Requirements (SEARS) - Section 78A (8A) of the Environmental Planning and Assessment Act Schedule 2 of the Environmental Planning and Assessment Regulation 2000.

The project is taking a best-for-school approach to the school development works and as such, a number of site-wide sustainability opportunities are currently proposed for the project, namely:

- Improved campus connectivity;
- Improved energy efficiency through achieving code-compliance for upgrade works;
- Improved health and wellness outcomes for pupils and staff; and

The proposed Learning Hub, to be located in the Eastern Precinct of The School, will target the following sustainability performance:

Component	Green Star	WELL	NCC
Learning Hub	5 Star Design & AsBuilt_v1.1	Silver or Gold level Core & Shell Certification	>20% Improvement on NCC Section J (Energy) minimum compliance

A review of other newly constructed school buildings and similar Learning Hubs in Australia has driven the above benchmarks for the project.

Key sustainability features proposed for Learning Hub are as follows:

- | | |
|----------------------------|---|
| Management | <ul style="list-style-type: none">■ Commissioning and tuning commitment■ Energy and water metering of major use components■ Best practice recycling waste storage facilities are provided |
| Indoor Environment Quality | <ul style="list-style-type: none">■ Increase in outside air by 50% (11.25l/s)■ Low/zero VOC fixtures and finishes have been specified |
| Energy | <ul style="list-style-type: none">■ High-efficiency building façade, HVAC plant & equipment■ The project is targeting a 20% improvement on NCC Section J. |
| Water | <ul style="list-style-type: none">■ Efficient fixtures and fittings■ Rainwater harvesting system has been incorporated■ Fire test water will be recycled |
| Materials | <ul style="list-style-type: none">■ A 30% reduction in Portland cement is being targeted■ Certified sustainable timber products is being targeted |



Management	<ul style="list-style-type: none">▪ Commissioning and tuning commitment▪ Energy and water metering of major use components▪ Best practice recycling waste storage facilities are provided▪ Up to 90% of on-site construction waste is being targeted
Land Use & Ecology	<ul style="list-style-type: none">▪ The project will improve the ecological value of the immediate site.
Emissions	<ul style="list-style-type: none">▪ The development will aim to minimise light pollution into the night sky▪ Zero ozone depleting insulation substances will be specified
Innovation	<ul style="list-style-type: none">▪ The project is targeting enhanced IEQ outcomes by WELL Certification.



1 INTRODUCTION

1.1 Project Background

Loreto Kirribilli is an independent Catholic day school with an enrolment of approximately 1,000 girls from Kindergarten to Year 12. The current Loreto Strategic Plan 2015-2018 “Navigating the future” identifies three themes that represent the School’s core business of Teaching and Learning in the context of the Loreto Community through the enabler of Sustainability. Under the theme of Sustainability, the school has embarked on the development of a masterplan to enable the strategic deployment of resources.

Loreto Kirribilli (‘The School’) is bound by Carabella Street to the south west and Elamang Avenue to the north east. The School campus is classed as having five key precincts, as shown below. This first stage of the staged DA application includes upgrade works to improve connectivity throughout the site, and a new ‘Learning Hub’ building to be located in the Western Precinct.



Figure 1: Project Location

1.2 This Report

This report outlines the sustainability approach and suggested design response for the Stage 1 DA Masterplan, to reflect a strong commitment to sustainability that aligns with The School’s 2015 – 2018 Strategic Plan.



This report has been prepared to address all conditions set out in the Secretary's Environmental Assessment Requirements (SEARS) - Section 78A (8A) of the Environmental Planning and Assessment Act Schedule 2 of the Environmental Planning and Assessment Regulation 2000. For this project, specifically:

- Clause 8. Ecologically Sustainable Development (ESD)
 - Detail how ESD principles (as defined in clause 7(4) of Schedule 2 of the Environmental Planning and Assessment Regulation 2000) will be incorporated in the design, construction and ongoing operation phases of the development.
 - Include a description of the measures that would be implemented to minimise consumption of resources, water (including water sensitive urban design) and energy.



2 SITE-WIDE OPPORTUNITIES

The 2015 – 2018 Strategic Plan allows the project to take a best-for-campus approach for sustainability. The sustainability philosophy for the site is summarised in this section.

2.1 Campus Connectivity

Connectivity throughout The School campus is a major component of the masterplan works and a scheme has been developed by FJMT that includes installation of vertical connection points at key locations within the site. These will enhance the permeability and walk-ability between precincts for both pupils and staff. Further information on this outcome is provided in FJMT's concept design response.

2.2 Wellness

Overview

The WELL Building Standard takes a holistic approach to health in the built environment addressing behaviour, operations and design. WELL is a performance-based system for measuring, certifying, and monitoring features of a project that impact human health and well-being, through air, water, nourishment, light, fitness, comfort and mind. By placing people at the heart of design, construction, operations and development decisions, the project will enhance pupil and staff health and well being.

WELL is a performance-based system for measuring, certifying, and monitoring features of a project that impact human health and well-being, through air, water, nourishment, light, fitness, comfort and mind. By placing people at the heart of design, construction, operations and development decisions, we have the ability to enhance staff health, well being and learning.

Benchmarks

Positive emotions, engagement and achievement are all influenced in part by positive health and wellbeing of both pupils and staff. To this end, The School will strengthen this commitment by targeting formal WELL Building Standard certification.

2.3 Energy

Overview

Energy efficiency is at the core of the upgrade masterplan for The School campus. A more efficient school will ultimately require less maintenance, reduce operating costs, free up capital for re-investment and result in a lower impact on the environment.

Operational Energy Use (and Greenhouse Gas Emissions) – Electricity [and gas] running costs for the site are assumed to be substantial. An opportunity exists to improve operational efficiency during the upgrade of services and construction of new assets.

The extent of renewable energy generation on site can also be significantly increased (acknowledging the heritage value of certain buildings) and there are a number of alternative finance mechanisms that could make this possible. It is estimated the site could install an additional 50kWp Solar PV system as a means to reduce overall energy operating costs in the short-medium term. This opportunity will be further investigated during design development.

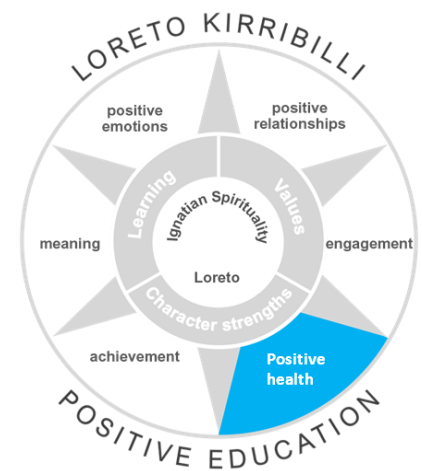


Figure 3: Loreto Education Principles



2.4 Water Sensitive Urban Design and Water Conservation

The development will aim to reduce potable water consumption and improve stormwater environmental performance via the following:

- Increase in rainwater harvesting capacity from roof areas and re-use for WC flushing and other appropriate uses within the precinct;
- Upgrade of existing and specification of water efficient fixtures and fittings for the Sustainability Hub;
- Recirculation of fire test water;



3 SUSTAINABILITY APPROACH

3.1 School Benchmarking

As part of the sustainability benchmarking process for the project, a review of sustainability performance of newly constructed school buildings was undertaken. The table below summarises this review.

Table 1: Summary Comparison of School Sustainability Performance

School Name	State	Type	Students	Sustainability Performance/ Benchmark
General School Buildings				
SCECGS Redlands School	NSW	Private	1,500	4 Star Green Star <i>In-principle</i>
Wenona Girls School	NSW	Private	1,040	4 Star Green Star <i>In-principle</i>
Surry Hills \$60m Inner City School	NSW	Public	1,200	4 Star Green Star <i>In-principle</i>
Church of England Grammar School	NSW	Private	1,575	Green Star <i>In-principle</i> (benchmark unknown)
Harrison School	ACT	Public	1,450	5 Star Green Star Certified
Gungahlin College	ACT	Public		5 Star Green Star Certified
Coombs Primary School	ACT	Public	720	5 Star Green Star Certified
Williamstown High School	VIC	Public		5 Star Green Star Certified
Victoria Schools PPP2	VIC	Public		5 Star Green Star <i>Targeting</i>
Wyndham Vale Entry School	QLD	Public		5 Star Green Star Certified
St. Benedicts Catholic School	QLD	Private		4 Star Green Star Certified
Learning Hubs				
Gold Creek Primary School - Environment Centre	QLD	Public		6 Star Green Star Certified
Wyndham School Environmental Education Centre	QLD	Public		6 Star Green Star Certified
Carey Baptist Grammar School Centre for Learning and Innovation	VIC	Private		4 Star Green Star Certified
Australian Centre for Indigenous Knowledge and Education	NT	Public		4 Star Green Star Certified

The sustainability review for schools, summarised in table 1, indicates the following with respect to School sustainability performance:

- Green Star is the primary sustainability certification scheme used to benchmark school/education building sustainability performance;
- New school buildings constructed in NSW tend not to commit to formal sustainability certification, instead targeting 'in-principle' compliance with Green Star which, from our education project experience, doesn't provide a best-practice outcome in reality;
- A reasonable number of newly constructed school general buildings in other states, most notably in the ACT and Queensland, have targeted formal Green Star certification;
- School/education buildings of special significance across Australia (e.g. Innovation, education or sustainability hubs) more often than not target formal sustainability certifications. As such, Loreto's innovation and sustainability will align and/or improve on this trend;



- WELL Building Standard certification hasn't been targeted by any primary or secondary school in Australia and represents a significant opportunity to place Loreto as a national leader.

3.2 Loreto Learning Hub Performance

A summary of the proposed targets for the Learning Hub are shown in the table below, which reflect the significance of the project, best practice and Loreto School aspirations.

Table 2: Learning Hub – Performance Targets

Component	Green Star	WELL	NCC
Learning Hub	5 Star Design & AsBuilt_v1.1	Silver or Gold level Core & Shell Certification	>20% Improvement on NCC Section J (Energy) minimum compliance



4 SCHOOL PRECINCT - DESIGN RESPONSE

A number of sustainability-related issues were identified as part of the due diligence works undertaken by NDY. These issues, applicable to the broader site, are summarised below:

- No energy metering strategy or demand separation exists for the site;
- The efficiency of electrical fixtures and fittings is inconsistent throughout all buildings. As a minimum, a replacement strategy should be put in place to ensure any new works;
- No zoned lighting, occupancy or daylight sensor control exists across the site, with the exception of the refurbished section of the Science Building. As a result, lighting in large spaces such as the gym, Centenary Hall and Auditorium remained on during non-occupied periods;
- Building fabric is generally low performance and would require improvement as part of any localised upgrade works;
- Some occupied areas in the school are insufficiently lit, which impacts on health and safety and learning potential;
- Rainwater collection exists for the Junior School Building only.

The following priority initiatives have therefore been identified that should be incorporated into the project at design development:

- Additional metering of on-site energy end use components is required to adequately determine the major sources of energy, as well as improve efficiency and trouble-shoot unusual excessive usage;
- Consolidation of existing plant and equipment maintenance schedules and an upgrade plan is required;
- Consider implementing building insulation works across the campus;
- Increase in rainwater harvesting capacity from roof areas and re-use for WC flushing and other appropriate uses within the precinct;



5 LEARNING HUB - DESIGN RESPONSE

The design response for the Learning Hub is articulated in this section in line with proposed overarching Green Star and WELL certification schemes.

5.1 Green Star

5.1.1 Overview

The Green Building Council of Australia (GBCA) has been developing Green Star rating tools since 2007. Originally provided as standalone tools to address different building types, the GBCA now offer '**Green Star Design& AsBuilt**' that addresses almost all building types, including education buildings. Design & AsBuilt is the most recognised sustainability rating framework in Australia and has a track record of influencing better building outcomes for its owners and occupants.

Green Star currently has 9 categories, all of which aim to address a key sustainability imperative. These categories are listed below:



Management

Aims to encourage and reward the adoption of practices and processes that support best practice sustainability outcomes throughout the different phases of a project's design, construction and ongoing operation.



IEQ

Aims to encourage and reward initiatives that enhance the comfort and well-being of occupants. The credits within this category address issues such as air quality, thermal comfort and acoustic comfort.



Energy

Aims to reward projects that are designed and constructed to reduce overall greenhouse emissions from operations by addressing energy demand reduction, use efficiency and generation from alternative sources.



Transport

Aims to reward projects that facilitate a reduction on the dependency of private car use as an important means of reducing overall greenhouse gas emissions, as well as to encourage the provision of alternative forms of transportation.



Water

Aims to encourage and reward initiatives that reduce the consumption of potable water through measures such as the incorporation of water efficient fixtures and building systems and water re-use.



Materials

Aims to assess the environmental impacts of 'point source' pollution generated by projects and reduce their effects on the atmosphere, watercourse and native animals.



Ecology

Aims to reduce the negative impacts on sites' ecological value as a result of urban development and reward projects that minimise harm and enhance the quality of local ecology.



Emissions

Aims to assess the environmental impacts of 'point source' pollution generated by projects and reduce their effects on the atmosphere, watercourse and native animals.



Innovation

Aims to recognise the implementation of innovative practices, processes and strategies that promote sustainability in the built environment.



There are 3 levels of certification available: **4 Star** (Industry Good Practice), **5 Star** (Australian Best Practice) and **6 Star** (International Best Practice).

Green Star categories contain some mandatory features, such as demonstrating energy and water efficiency through calculations and modelling. There is however a lot of flexibility in the rating tool that allows for projects to target sustainability areas most important to them.

5.1.2 Proposed Performance

The Development Concept sustainability performance has thus far been assessed with reference to Green Star – Design & As Built V1.1. Key features are proposed to be incorporated into the design to target compliance, pending final confirmation of the sustainability targets by the Principal. An early draft Green Star compliance pathway is included in Appendix A for information and a summary provided below.



The development has thus far been assessed with the potential of targeting 66/100 Points under Green Star, equating to 5 Star in-principle performance. A summary category points that could be targeted and key initiatives is provided below.

Table 3: Summary of Green Star In-principle Performance

Green Star Category	Points Targeted	Key Initiatives/Intended Outcomes
Management	12	<ul style="list-style-type: none"> Commissioning and tuning commitment Energy and water metering of major use components Best practice recycling waste storage facilities are provided
Indoor Environment Quality	14	<ul style="list-style-type: none"> Increase in outside air by 50% (11.25l/s) Low/zero VOC fixtures and finishes have been specified
Energy	6	<ul style="list-style-type: none"> The project is targeting 5 points for energy (credit 15) with a potential for additional points, subject to design development and renewable energy inclusions.
Transport	6	<ul style="list-style-type: none"> Excellent active transport facilities Precinct walk-ability and access to public transport links
Water	6	<ul style="list-style-type: none"> Efficient fixtures and fittings Rainwater harvesting system has been incorporated Fire test water will be recycled
Materials	5	<ul style="list-style-type: none"> A 30% reduction in Portland cement Certified sustainable timber products Up to 90% of on-site construction waste
Land Use & Ecology	2	<ul style="list-style-type: none"> The project will improve the ecological value of the immediate site.
Emissions	5	<ul style="list-style-type: none"> The development will aim to minimise light pollution into the night sky Zero ozone depleting insulation substances will be specified
Innovation	10	<ul style="list-style-type: none"> The project is targeting enhanced IEQ outcomes by WELL Certification.
TOTAL:	66/100	



5.2 WELL Building Standard Certification

5.2.1 Overview

The WELL Building Standard takes a holistic approach to health in the built environment addressing behaviour, operations and design. WELL is a performance-based system for measuring, certifying, and monitoring features of a project that impact human health and well-being, through air, water, nourishment, light, fitness, comfort and mind. By placing people at the heart of design, construction, operations and development decisions, the project will enhance occupant health and well being.

The WELL Building Standard is comprised of 7 concepts, each with a number of features that are either preconditions (must be accomplished to achieve a rating) or optimisations (optional features which will enable higher levels of certification).

5.2.2 WELL Concepts

AIR



Air pollution is the primary cause of premature mortality worldwide. It is attributed to one in eight deaths globally. Outdoor air quality is deteriorating for a number of reasons, primarily due to increased pollution from industry, increased traffic and agricultural activity. Indoor air quality is not only affected by these factors but also off-gassing from building materials and water leaks. Contaminants due to poor ventilation can cause a number of illnesses and contribute to asthma, allergies and upper respiratory illnesses. The health benefits of better air quality are well documented and comprehensive research indicates productivity improvements between 8-11% in environments with better air quality.

WATER



Drinking water contamination is a major public health issue in many parts of the world. Contaminants from industrial processes or those that are present naturally can pose serious health risks.

Chemicals such as chlorine and chloramine added in the water treatment process can lead to the formation of disinfectant by-products which can lead to certain health effects such as cancer at certain exposure levels. Precautionary yearly testing and record keeping (which already commonly occurs in Australia) is a WELL requirement.

NOURISHMENT



Longer working days and an increasingly time poor population has encouraged increasingly bad dietary choices. Snacking, larger portion sizes and food advertising means we are now consuming more calories (a 25% intake since the 1970s), more sugar and saturated fats. This has led to a variety of rising health issues. In 2012 63% of Australians over 18 were overweight or obese, a 7% increase from since 1995. This is attributing to increasing cases of cardiovascular disease, diabetes and cancer. The WELL standard seeks to implement design strategies and policies within the built environment that increase access to healthy food.



LIGHT



Light influences the human body in non-visual ways. Light governs our circadian rhythm and humans respond to a number of external cues that align physiological functions to the solar day.

Alertness, digestion and sleep patterns are all in some part governed by the quality of light. Well designed lighting systems are critical to occupant satisfaction and views out and daylighting can have significant impacts on productivity.

FITNESS



Undertaking regular activity is essential for weight management, chronic disease prevention and maintaining fitness. Promotion of physical activity in the work place can be done by encouraging walking to centralised facilities or promoting stair access. Workplaces are now more commonly providing exercise facilities and showers and lockers for occupants to cycle, walk and run to and from the office. Others may include corporate gym memberships in their benefits packages. Although research is only just emerging on the benefits of fitness to workplace productivity it has been found that those who cycle to work take less sick days.

COMFORT



The places we choose to live and work in should be comfortable spaces. The Comfort concept focuses on all elements of comfort including thermal, acoustic, ergonomic and olfactory. Focussing on these areas reduces the most common sources of physiological disruption, distraction and irritation. Thermal comfort particularly has a significant impact on workplace satisfaction. The concept focuses on giving occupants control of their environment and the ability to move to other areas of the office floor plate or use personal devices to control individual comfort. Noise distractions are also heavily regarded as a major source of discomfort.

MIND



More than 14% of deaths each year (approximately 8 million) are attributable to mental disorders. Stress is responsible for 60 to 90% of healthcare problems. In France alone, this equated to 2 billion Euros last year, approximately to 24% of government social security spending.

Creating workplaces that actively support mental wellbeing can have significant positive impacts. Direct and indirect interventions can be used to address this concept.



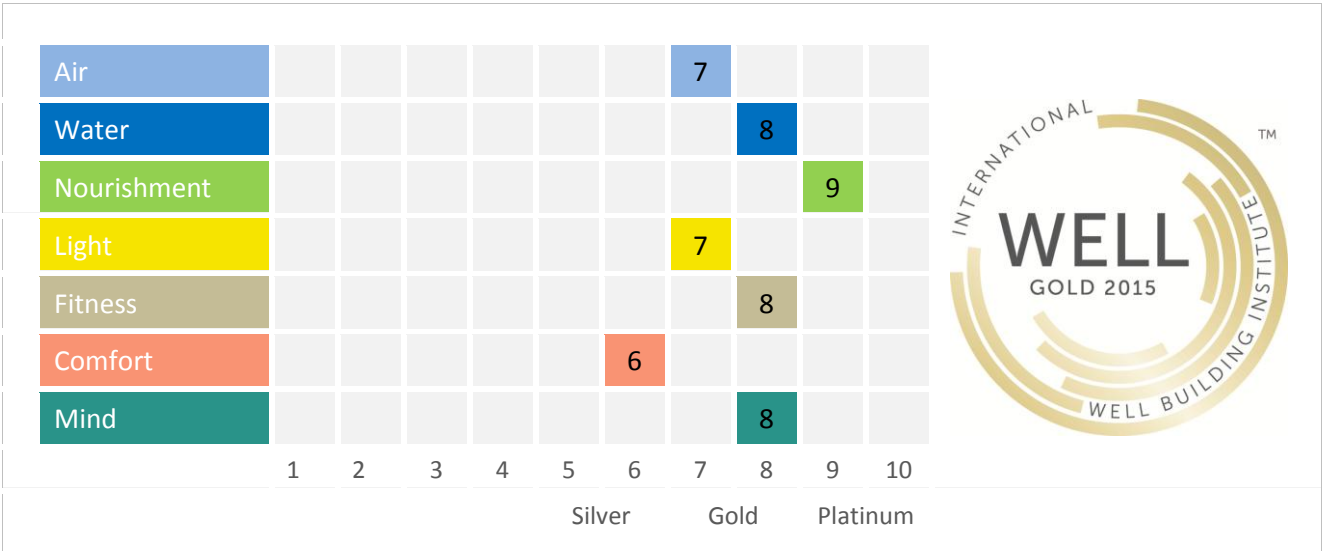
5.3.1 Certification Levels and Types

The WELL Building Standard is applicable for commercial and institutional buildings and can be applied to three types of projects:

- New and Existing Buildings;
- New and Existing Interiors; and
- Core and Shell.

All typologies can achieve silver, gold or platinum certification. All projects must achieve all precondition WELL features, plus at least one optimisation from each WELL concept. Thereafter, projects will achieve a higher level of certification based on the number of optimisation features they achieve (i.e. Gold and Platinum levels).

Table 4: Example WELL Scorecard Summary



5.3.2 Performance Testing and Verification

A fundamental aspect of the WELL Standard requires on-site performance testing of the following elements:

- Acoustic Noise Levels (dBA)
- Light levels (melanopic lux)
- Smells (olfactory)
- Air quality (various attributes)
- Water quality (various attributes)

Where possible we have made reference to any regional data (e.g. water quality reporting) to assess risk for this item. Varying degrees of certainty exist between criteria and this is reflected by the level of risk placed on respective features, in some instances risks are out of the control of Westpac.



5.3.3 Education Building Certification

WELL Education Certification is for any education building actively looking to improve wellness outcomes for students and staff. Under this certification scheme the project can achieve either a silver, gold or platinum rating.

5.3.4 Proposed Performance

The project is currently targeting **silver** level WELL Education building Certification, with an inspiration for gold, which means targeting all 26 pre-condition (mandatory) and at least 12 optimisation (optional) features. A summary category points targeted and key initiatives are provided below. Where possible the project has targeted additional features for (a) their overall value to the project and (b) to align with the tenant brief.



Table 5: Summary of WELL Core & Shell Certification Strategy

WELL Category	Key Initiatives/Intended Outcomes
Air	<ul style="list-style-type: none"> ▪ Increase in outside air by 50% (11.25l/s) ▪ Higher grade filtration of incoming air (F7 filters) ▪ Low/zero VOC fixtures and finishes
Water	<ul style="list-style-type: none"> ▪ Superior water quality, assessed according to 27 WELL criteria ▪ On-floor staff access to drinking stations for better hydration
Nourishment	<ul style="list-style-type: none"> ▪ Nutritional information and signage made public ▪ Healthy food advertising
Light	<ul style="list-style-type: none"> ▪ Circadian Lighting Design (measured in Melanopic Lux) ▪ 300 Photopic Lux achieved for >55% of office floor areas, for >50% of regular operating hours ▪ Solar glare control from intelligent façade design
Fitness	<ul style="list-style-type: none"> ▪ Precinct plaza and recreation space for students & staff ▪ Activated stairwells for occupant travel between floors
Comfort	<ul style="list-style-type: none"> ▪ Allowing for programmable temperature differential across office spaces ▪ Optimum thermal comfort conditions ▪ Limitation of exterior noise intrusion to 50dBA to office spaces
Mind	<ul style="list-style-type: none"> ▪ An accessible building health policy, wellness guide, and building orientation for regular occupants ▪ Biophilic outcomes



5.4 National Construction Code (NCC) Compliance – Section J

5.4.1 Overview

The National Construction Code, incorporating the Building Code of Australia (BCA), requires that building work on Classes 2-9 buildings meet minimum energy efficiency requirements under its Section J Energy Efficiency provisions. To comply, Building Certifiers and Certifying Authorities require Energy Efficiency Performance Assessment Reports to be prepared, assessing the building against the Deemed-to-Satisfy Provisions or using energy modelling at the Construction Certificate stage.



There are two approaches:

- Deemed-To-Satisfy (DtS)
- Verification using Energy Modelling (otherwise known as JV3)

Most buildings can be assessed using the DTS pathway. Section J requirements are minimum energy efficiency requirements, and the Deemed-To-Satisfy approach is a “blunt instrument” with many omissions. Requirements become more stringent every year, as the need to reduce greenhouse gas emissions from buildings becomes even more imperative.

Note that Buildings designed to minimum compliance under Section J will not pass 4/4.5 star NABERS assessments that are increasingly required by Government Departments and progressive developers in the property industry and by new Mandatory Disclosure of Energy Performance regulations. Likewise, compliance with Section J is insufficient to qualify under the Green Building Council’s Green Star program. Research has shown that compliance with Section J is equivalent to between 2.5 and 3.5 stars under the NABERS assessment process. While NABERS compliance is not required for this project, the principle remains that minimum Section J compliance will result in a below-best practice result for energy consumption.

5.4.2 Proposed Performance

The project should target at least a 20% improvement on minimum Section J requirements, demonstrated through simulation modelling. As part of this, the following design initiatives will help drive this improvement:

- A high performance, well insulated, building facade and building structure;
- Efficient lighting solutions and controls;
- Appropriate energy and water sub-metering to monitor and trouble-shoot excessive use;
- Efficient HVAC plant and equipment;
- BMS installation and diagnostics capability.

A Section J assessment will be undertaken post-Stage 1 DA as part of the design development process.



6 NEXT STEPS

The School has aspirations for the campus to demonstrate sustainability leadership through implementation of their 2015 – 2018 Strategic Plan. In consideration of the plan, The School has made a robust commitment to achieving sustainability targets outlined in this report.

Proposed project targets, a 5 Star Green Star rating, WELL certification and a 20% improvement on NCC Section J; will help deliver on Schools Strategy and demonstrate sustainability leadership to students, staff and the wider community.

We see the next steps being required following preparation of the Stage 1 DA documentation:

- Validation of Green Star and WELL design strategies and registration with the relevant bodies;
- Commencement of a NCC Section J assessment;
- Commencement of an energy balance assessment for The School campus.



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