

Kincoppal Rose Bay Project

Sustainable Development Report for SSDA

Kincoppal Rose Bay School

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1.0 Introduction

Cundall has been commissioned by Kincoppal Rose Bay School (the Applicant) to prepare this report in accordance with the technical requirements of the Secretary's Environmental Assessment Requirements (SEARs), and in support of the SSD-10393 for the development of a new Junior School and ELC Joigny Building at Kincoppal school, Rose Bay, Sydney.

Specifically this report addressed the following requirements of Section 8 - Ecologically Sustainable Development (ESD) of the Secretary's Environmental Assessment Requirements (SEARs) dated 9th January 2020.

Secretary's Environmental Assessment Requirements	Response in Section of this report
Detail how ESD Principles (as defined in clause 7(4) of Schedule 2 of the EPA Regulation) will be incorporated in the design and ongoing operation phases of the development.	2.0
<p>Include a framework for how the future development will be designed to consider and reflect national best practice sustainable building principles to improve environmental performance and reduce ecological impact. This should be based on a materiality assessment and include:</p> <ul style="list-style-type: none"> ▪ waste reduction design measures ▪ future proofing ▪ use of sustainable and low-carbon materials ▪ energy and water efficient design (including water sensitive urban design) ▪ and technology and use of renewable energy 	4.0 5.0
Demonstrate how environmental design will be achieved in accordance with GANSW Environmental Design in Schools Manual.	4.0 5.0
<p>Include preliminary consideration of building performance and mitigation of climate change, including consideration of Green Star Performance.</p> <p>Include an assessment against an accredited ESD rating system or an equivalent ESD performance. This should include a minimum rating scheme target level.</p>	6.0
<p>Provide a statement regarding how the design of the future development is responsive to the CSIRO projected impacts of climate change, specifically:</p> <ul style="list-style-type: none"> ▪ hotter days and more frequent heatwave events ▪ extended drought periods ▪ more extreme rainfall events ▪ gustier wind conditions ▪ how these will inform landscape design, material selection and social equity aspects (respite/shelter areas). 	7.0

Relevant Policies and Guidelines

NSW and ACT Government Regional Climate Modelling (NARClIM) climate change projections.

2.0 Project Description

2.1 The Site

The Kincoppal Rose Bay campus is approximately 6 hectares and shown in Figure 2.1. The school is located in the Eastern suburb of Sydney on New South Head Road. The Junior School redesign and ELC – Joigny Building extension is part of a larger masterplan for a significant upgrade to the school precinct and its buildings. It is noted that the new Junior School Building (located on Lots 2, 3, 4, and 5) and ELC Joigny Building (located on Lot 1) are shown in proposed Masterplan (**Site Plan**) (refer to Figure 2.2).

Figure 2.1 – Kincoppal Rose Bay School landholdings (source:)



Figure 2.2 – Site Plan: Location of proposed construction area (coloured) (Source:)



The key school elements within and surrounding the Site include:

- The Senior School Main Entry is located to the south-east of the Site and is surrounded by heritage listed Senior School buildings including the Chapel and the Mary Agnes O'Neil Library.
- The Junior School and ELC are situated at the North side of the campus
- Existing sports fields and MTC Sport Hall building is located to the East of the Site (which is outside the scope of this SSDA)
- Boarding accommodation is located at the centre of the School Campus
- Located next to the main school campus is the Maureen Tudehope Centre, which is a multi-purpose, state of the art centre that houses exceptional sports, music and performing arts facilities.

2.2 Kincoppal Rose Bay and the Surrounding context

Kincoppal Rose Bay - School of the Sacred Heart, is an independent Roman Catholic day and boarding school that caters early learning, primary and secondary education predominantly for girls. The school fosters a great sense of community and ethics, as well as religious values. In line, with being well-rounded, the school is striving to develop better sustainability awareness and understanding.

The School is situated approximately 21.4kms (30 minutes) from Sydney Airport and 8.8kms (25 minutes) from the CBD.

Rose Bay is accessible by car, ferry and bus. Public transport to the city, Bondi Junction and Edgecliff Station are provided by frequent buses (324, 325 and 386) which travels along New South Head Road. Trains to Bondi Junction and Edgecliff Station are on the Eastern Suburbs & Illawarra Line.

2.3 Project description

This SSDA proposed works comprise the following:

Precinct A:

- Early Learning Centre extension and Additional Carparking
- Junior School - Assembly, GLA, Trafficable Roof Space, Vertical Circulation Link and Amphitheatre
- Junior School Traffic Management – Proposed secondary entry, pick up and drop off and elevated foot bridge

Precinct B:

- Senior School – Main Entry Reception, Foyer, Administration, Leadership Office
- Senior School – Main Entry Forecourt, Landscaping, Accessible Entry Ramp
- Senior School – Year 8 Centre Level 3 GFA extension
- Traffic Management – Proposed pick up and drop off with widening of exit road
- Traffic Management – Bus and Car Parking

Precinct B (Concept DA):

- Senior School – Circulation Hub
- Senior School – Hughes Centre

Precinct C (Concept DA):

- Boarding Accommodation – extension

3.0 ESD Principles

3.1 Definition

Clause 7(4) of Schedule 2 of the *Environmental Planning and Assessment Regulation 2000*, defines the principles of ecologically sustainable development as follows:

- a) the **precautionary principle**, namely, that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. In the application of the precautionary principle, public and private decisions should be guided by:
 - (i) careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment, and
 - (ii) an assessment of the risk-weighted consequences of various options,
- b) **inter-generational equity**, namely, that the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations,
- c) **conservation of biological diversity and ecological integrity**, namely, that conservation of biological diversity and ecological integrity should be a fundamental consideration,
- d) **improved valuation, pricing and incentive mechanisms**, namely, that environmental factors should be included in the valuation of assets and services, such as:
 - (i) polluter pays, that is, those who generate pollution and waste should bear the cost of containment, avoidance or abatement,
 - (ii) the users of goods and services should pay prices based on the full life cycle of costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste,
 - (iii) environmental goals, having been established, should be pursued in the most cost effective way, by establishing incentive structures, including market mechanisms, that enable those best placed to maximise benefits or minimise costs to develop their own solutions and responses to environmental problems.

3.2 Response

This project responds to the above ESD principles as follows:

- 1. **Precautionary Principle** - The project will present no threat of serious or irreversible environmental damage. The project will deliver ecological restoration and habitat creation to improve the site, implement climate change adaptation principles, and apply industry best practice ESD initiatives. An appropriate due diligence has been and will continue to be conducted along the development process to ensure the precautionary principle is satisfied. Due diligence includes conducting required studies to address all SEARs environmental requirements and all statutory provisions in all relevant planning instruments, including the Biodiversity Conservation Act 2016, relevant SEPPs and LEPs.
- 2. **Inter-Generational Equity** - The buildings will provide healthy internal and external environments for teaching students today and in the future. The landscaping principles of ecological restoration and habitat creation will deliver benefit to current and future generations. The principle will be addressed by ensuring the development complies with the principles set out in the Government Architect New South Wales Environmental Design in Schools.
- 3. **Conservation of Biological Diversity and Ecological Integrity** – The school includes extensive grounds with the land use by buildings less than 40% of the whole site which maintains nature and local ecology in an urban waterfront location of Sydney. The landscape design will enhance the biological diversity and ecological integrity of the site.
- 4. **Improved Valuation, Pricing and Incentive Mechanisms** - The design and operation of the school will reduce energy and water consumption and greenhouse gas emissions. Life Cycle Costing will be used throughout the design process to justify capital investment and reduce ongoing impacts.

4.0 Sustainability Requirements

4.1 Overview

This section provides information on relevant sustainability requirements for the project and context for the Sustainability Framework and Initiatives described in Section 5.0. The framework and initiatives are consistent with national best practice sustainable building principles.

The following guidelines, regulations, standards and impacts were reviewed to establish the sustainable framework and initiatives:

1. National Construction Code 2019 Building Code of Australia (NCC)
2. Kincoppal Rose Bay values and current initiatives
3. Government Architect NSW - Environmental Design Guide for Schools (GANSW)
4. United Nations Sustainable Development Goals
5. One Planet Living principles
6. Green Star Design & As Built v1.3

4.2 National Construction Code 2019 Building Code of Australia

The National Construction Code (NCC) details the minimum necessary requirements for safety, health, amenity and sustainability in the design and construction of new buildings throughout Australia. The Building Code of Australia (BCA) forms part of the NCC. Section J of Volume 1 of the BCA sets minimum energy performance requirements for all new developments, including the performance of building fabric, glazing thermal performance, air-conditioning, ventilation, lighting, power and hot water.

Section J compliance can be demonstrated by complying with the Deemed-to-Satisfy (DTS) Provisions; otherwise, Performance Solution of the building design must be shown as compliant using an Assessment Method such as energy modelling in accordance with the JV3 section.

The Kincoppal Rose Bay Project design for new buildings or major refurbishments or extensions will comply with the BCA Volume 1 2019 Section J by achieving or exceeding with the DTS provisions, and if necessary, through JV3 energy modelling.

4.3 Kincoppal Rose Bay School Values

The values of the Sacred Heart education that support the school include The 5 Sacred Heart Goals, Social Justice and Positive Education. Specific to sustainability, a key goal of Kincoppal Rose Bay is “*a social awareness which impels to action*”.

Current sustainability program at Kincoppal school include the Solar My School Program, which helps schools navigate the path to solar success and understand how they are using their energy. In 2017, the school installed 338 panels to provide locally generated, green energy to power the School's sports, music and performing arts facilities, becoming the largest school solar power system in the Eastern Suburbs.

The key benefits of this program include:

- Saving 20-25% on facility's energy bills
- Producing clean green electricity each year, equivalent to running 745 school computers or 26 homes each year
- Avoid 130 tonnes of carbon emissions each year, equivalent to taking around 50 cars off the road annually.

4.4 Government Architect New South Wales Design Guide for Schools

The Design Guide for Schools was prepared by the NSW Government Architect (GANSW) in 2018 to promote and champion good design processes and outcomes for schools across NSW, to deliver schools that respond positively to their physical, social and environmental context, and to support the delivery of excellent learning environments. A key principle is sustainable, efficient and durable design:

1. Good design combines positive environmental, social and economic outcomes. Schools and school buildings should be designed to minimise the consumption of energy, water and natural resources and reduce waste and encourage recycling.
2. Schools should be designed to be durable, resilient and adaptable, enabling them to evolve over time to meet future requirements.

Whilst not a government school, the principals of guidelines still apply to the school being:

- **Air** – by provision of good air quality that can improve student wellbeing
- **Comfort** – by designing good learning spaces comfortable for all staff, students and visitors
- **Light** – by providing an access to daylight that can minimise electricity use
- **Noise** – by providing appropriate acoustic conditions in learning spaces, where applicable
- **Water** – by water efficiency measures and promoting awareness of the importance of water conservation
- **Landscape** – by promoting biodiversity through caring for native, local ecosystem
- **Materials** – by using durable, robust materials that last a long time

4.5 One Planet Living principles

One Planet Living, developed by BioRegional and World Wildlife Fund, is a global initiative based on ten guiding principles of sustainability: health and happiness, equity and local economy, culture and community, land and nature, sustainable water, local and sustainable food, travel and transport, materials and products, zero waste, and zero carbon energy. Due to this sustainable model, BioRegional has achieved worldwide acclaim and is one of the most globally respected environmental charities. One Planet Living is unlike formal prescriptive certification systems, as it is flexible in implementation, and much wider in scope.

	Health and happiness	Encouraging active, social, meaningful lives to promote good health and wellbeing
	Equity and local economy	Creating safe, equitable places to live and work which support local prosperity and international fair trade
	Culture and community	Nurturing local identity and heritage, empowering communities and promoting a culture of sustainable living
	Land and nature	Protecting and restoring land for the benefit of people and wildlife
	Sustainable water	Using water efficiently, protecting local water resources and reducing flooding and drought
	Local and sustainable food	Promoting sustainable humane farming and healthy diets high in local, seasonal organic food and vegetable protein
	Travel and transport	Reducing the need to travel, encouraging walking, cycling and low carbon transport
	Materials and products	Using materials from sustainable sources and promoting products which help people reduce consumption.
	Zero waste	Reducing consumption, re-using and recycling to achieve zero waste and zero pollution
	Zero carbon energy	Making buildings and manufacturing energy efficient and supplying all energy with renewables

4.6 UN Sustainable Development Goals

The Sustainable Development Goals (SDGs) were established at the United Nations Conference on Sustainable Development in Rio de Janeiro in 2012. The objective was to produce a set of universal goals that meet the urgent environmental, political and economic challenges facing our world. The SDGs replace the Millennium Development Goals (MDGs), which started a global effort in 2000 to tackle the indignity of poverty.

SDGs are a universal call to action to end poverty, protect the planet and ensure that all people enjoy peace and prosperity. These 17 Goals include areas such as climate change, economic inequality, innovation, sustainable consumption, peace and justice, among other priorities. The goals are interconnected – often the key to success on one will involve tackling issues more commonly associated with another.

Alignment with 13 out of 17 UN Sustainable Development Goals were identified within the framework for Kincoppal Rose Bay Project in Section 5.0.



4.7 Green Star

Green Star, developed and administered by the Green Building Council of Australia (GBCA), is a set of rating tools that deliver independent verification of sustainable outcomes throughout the life cycle of the built environment. The GBCA's mission is to "*lead the sustainable transformation of the built environment*" and it aims to achieve this by encouraging practices that:

1. Reduce the impact of climate change
2. Enhance the health and quality of life of inhabitants and the sustainability of the built environment
3. Restore and protect the planet's biodiversity and ecosystems
4. Ensure the ongoing optimum operational performance of buildings
5. Contribute to market transformation and a sustainable economy

Green Star - Design & As Built scheme assesses the sustainability outcomes from the design and construction of new buildings or major refurbishments and rates them on a scale from 4 (Best Practice) to 6 Stars (World Leadership). Green Star Design & As Built rating tool includes requirements across the following nine holistic impact categories:



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.



Indoor Environment Quality 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 address the consumption of resources for the project, by encouraging the selection of low-impact materials.



Land Use and 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.



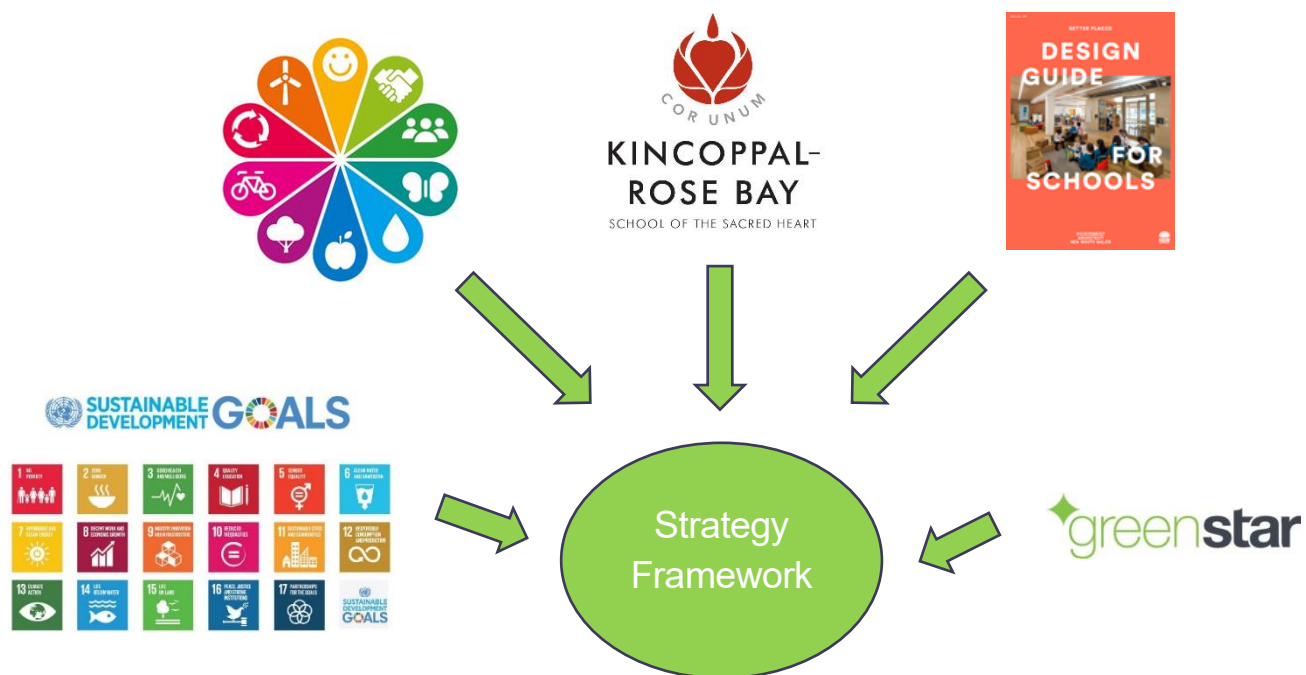
Innovation Aims to recognise the implementation of innovative practices, processes and strategies that promote sustainability in the built environment.

5.0 Sustainability Framework

5.1 Framework for the project

To develop a broad sustainability framework it has been recommended to use a modified version of the One Planet Living categories as the Sustainability Framework for the Kincoppal Rose Bay Project.

The framework aligns with the Green Star rating tool categories, but extends beyond these to address social and environmental issues not covered by the rating tool. Table 5.1 also shows how the framework also aligns with the UN Sustainable Development Goals (UN SDG) SSDA requirements, the Government Architect New South Wales Design Guide for Schools (GANSW).



This sustainability framework will inform design, construction and operational stages of the project. An integrated design approach will be adopted for the incorporation of ESD measures, with input from the ESD consultant from early planning through to construction phases.




















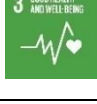














	Impact	Objective	Alignment with UN SDGs	Green Star Categories	SSDA requirements (and GANSW Design Guide)
	Zero Carbon Energy	Making buildings and infrastructure energy efficient and supplying all energy with renewables.	 	<ul style="list-style-type: none"> Energy 	<ul style="list-style-type: none"> energy efficient design use of renewable energy
	Health & Wellbeing	Encouraging active, social, meaningful lives and providing the buildings, infrastructure and spaces to support good health and wellbeing for all ages.		<ul style="list-style-type: none"> Indoor Environment Quality 	<ul style="list-style-type: none"> <i>Air (GANSW)</i> <i>Comfort (GANSW)</i> <i>Light (GANSW)</i> <i>Noise (GANSW)</i>
	Sustainable Water	Using water efficiently, protecting local water resources and reducing flooding, drought and water pollution.	 	<ul style="list-style-type: none"> Water 	<ul style="list-style-type: none"> water efficient design (including water sensitive urban design) <i>Water (GANSW)</i>
	Materials & Supply Chain	Using materials from sustainable sources, applying circular economy principles and prioritising products with transparent, ethical supply chains.		<ul style="list-style-type: none"> Materials 	<ul style="list-style-type: none"> use of sustainable and low-carbon materials <i>Materials (GANSW)</i>
	Zero Waste	Reducing consumption and re-using and recycling to work towards zero waste to landfill.	 	<ul style="list-style-type: none"> Management 	<ul style="list-style-type: none"> Waste reduction measures
	Land & Nature	Restore, preserve and protect land, biodiversity and natural capital for the benefit of people and wildlife.		<ul style="list-style-type: none"> Land Use & Ecology 	<ul style="list-style-type: none"> <i>Landscape (GANSW)</i>
	Sustainable Food	Promoting sustainable humane farming and healthy diets high in local, seasonal organic food and vegetable protein.	 		
	Travel & Transport	Reducing the need to travel and encouraging walking, cycling and low carbon transport.	 	<ul style="list-style-type: none"> Transport 	
	Community & Culture	Nurturing local identity and heritage, empowering communities and promoting a culture of sustainable living.	 		
	Equity & Economy	Creating safe, just and equitable places to live, work, learn & trade, and supporting local prosperity and fair trade.	 		
	Pollution	Minimising air, noise, land, water and night sky pollution.	 	<ul style="list-style-type: none"> Emissions 	
	Climate Risk & Adaptation	Applying practical actions to manage risks from climate impacts, protecting communities and strengthening the resilience of the local economy.		<ul style="list-style-type: none"> Management 	<ul style="list-style-type: none"> response to the CSIRO projected impacts of climate change









Table 5.1 - Sustainability Framework alignment

5.2 Sustainability Initiatives

The following initiatives are proposed in order to minimise consumption of resources, especially energy and water, and ensure delivery of an ecologically sustainable development. These will be reviewed and refined during design development. The initiatives will be consistent with best practice, as defined by a 4 star Green Star rating, the Government Architect New South Wales Design Guide for Schools (GANSW), and the values and goals of Kincoppal Rose Bay School.

These initiatives are the broader principles for the school masterplan from which each project will select the appropriate and relevant aspect. Not every item will be included in each project but rather selected as a guiding principle where relevant.

	Impact	Proposed Initiatives
	Zero Carbon Energy	<ol style="list-style-type: none"> 1. Passive design including glazing area & type, shading and insulation to exceed minimum requirements in Section J of NCC 2019 in new buildings or major extensions and refurbishments involving the external building envelope. 2. Natural ventilation of teaching spaces via openable windows to reduce heating and cooling energy. 3. Ceiling fans to provide air movement for thermal comfort to minimize demand for air conditioning. 4. LED lighting with lighting controls and timers. 5. Energy efficiency of lighting and mechanical systems to be minimum 10% better than NCC 2019 deemed to satisfy requirements. 6. Motion sensors or timer switches in classrooms and amenities (manual on, manual off, auto off strategy) to control lighting and A/C systems. 7. Photovoltaic panels will be installed on the campus as part of a site wide strategy. New buildings or existing roofs will be considered where PV is feasible and does not impact on the heritage or local planning requirements. 8. IT/Equipment purchasing policy to include energy efficiency requirements. 9. Metering and monitoring system to allow the college to review and benchmark energy consumption.
	Health & Wellbeing	<ol style="list-style-type: none"> 10. Passive design of building to provide high level of thermal comfort and protection from direct solar radiation. 11. Design of buildings to maximise daylight and views out. 12. Glare control through selected systems and devices, blinds, screen and fixed devices, where required. 13. LED lighting to provide quality of light, with illumination of both vertical and horizontal surfaces, and dimming control to suit the tasks. 14. Ceiling fans to provide thermal comfort. 15. Supplementary outside air with heat recovery to learning spaces to maintain low CO2 levels when windows are closed. 16. Design for aural comfort in open plan learning environments through careful consideration of acoustics. 17. Comfortable external spaces provided with air flow, shading, vegetation and reflective surfaces. 18. All new paints, adhesives, sealants, floor finishes and furniture are low off-gassing (Volatile Organic Compounds, Formaldehyde, etc). 19. CO2 sensors and alarms in all teaching spaces. 20. Additional water fountains to promote drinking water.

	Impact	Proposed Initiatives
	Sustainable Water	21. Low flow fixtures including sensor active taps. 22. Water meters to main items of water consumption where practical. 23. Rainwater collection from non-trafficable areas of roof as part of site-wide water collections strategy. 24. On-site stormwater detention, landscaping and pollutant traps to reduce surface water run-off and ensure water leaving site is clean.
	Materials & Supply Chain	25. Reduce embodied carbon during construction through specification of concrete with reduced Portland Cement content. 26. All timber to be FSC or PEFC certified. 27. Specify and procure where practical construction materials with high recycled content. 28. Steel to be sourced from a Responsible Steel Maker as defined by Green Star. 29. PVC Best Practice materials to be used across the project. 30. Select material finishes that can be cleaned using cleaning products that are low toxicity and eco-label certified. 31. Preference materials with environmental certifications. 32. Increase transparency in the Supply Chain of construction materials to minimize risks of environmental impacts and modern slavery. 33. Flexible and reconfigurable will be incorporated in designing classrooms and workspaces to reduce frequency of future fit-outs and associated material consumption and waste. 34. Suitable durability and protection measures and/or designed features/solutions will be used to prevent damage to vulnerable parts of the internal and external building and landscaping elements.
	Zero Waste	35. Reuse or recycle demolition materials during construction works. 36. Contractual target for 90% of demolition and construction waste diverted from landfill. 37. Areas for the collection of waste for recycling, composting and landfill. 38. Organic waste to be separated on site and sent to facility for recycling. 39. Material and waste storage spaces will be allocated to help eliminate single use plastics, particularly in food packaging (straws, bottles, cartons, films, cups, etc).
	Land & Nature	40. Landscaping to include native plant from the Sydney region. 41. Landscaping to provide shade and cooling
	Sustainable Food	42. Actively promote and advertise healthier food options. 43. Organic compostable food waste collection
	Travel & Transport	44. Reducing the need for single vehicle transport 45. Shuttle Bus for day students (approx. 150 per day across 7 transport routes). 46. Shuttle Bus for weekend sport.
	Community & Culture	47. Integrate aspects of sustainable living, and local culture and heritage in new building design and external spaces. 48. A heritage signage and art strategy will be created to highlight the history of the school (TBC)
	Equity & Economy	49. The new buildings will comply with best practice DDA requirements. The building will be designed to best practice CPTED principles. 50. Opportunities for apprentices and trainees to be employed by contractors working on the project will be encouraged.



	Impact	Proposed Initiatives
	Pollution	<p>51. External lighting will be designed to minimize night sky pollution.</p> <p>52. Artificial lighting will be on timeclocks and turned off at night if not required (internally and externally).</p> <p>53. An Environmental Management Plan will be implemented for all construction works.</p> <p>54. A Construction Noise and Vibration Management plan will be prepared.</p> <p>55. Screening of air conditioning and other plant is provided to reduce noise pollution.</p>
	Climate Risk & Adaptation	<p>56. A response to Climate Change will be prepared for the project.</p> <p>57. External shading, breezeways and vegetation to make external spaces more comfortable on extreme temperature days.</p> <p>58. Roof finishes will have high Solar Reflective Indexes (SRIs) – light colours – to reduce heat island effect.</p>

Table 5.2 - Sustainability Initiatives



These initiatives primarily relate to the building's design and construction. Further sustainability initiatives related to operation of the building and life long learning will be developed and implemented by the college during the design and construction stages.






5.3 Kincoppal Rose Base Project Stage 1 Sustainability Initiatives:






For Phase 1 the designs will be further developed and the following initiatives considered in more detail for each of the stages as listed below.

We have grouped the school buildings and the forecourt and traffic management projects into two groups due to their similar nature.

KRB Project Application – School Buildings:

	Impact	Proposed Initiatives	ELC Extension	Junior School	Senior School Main Entry Reception	Senior School Year 8 Centre
	Zero Carbon Energy	▪ Passive design including glazing area & type, shading and insulation to exceed minimum requirements in Section J of NCC 2019.	✓			
		▪ Natural ventilation of teaching spaces via openable windows to reduce heating and cooling energy.	✓	✓		✓
		▪ Ceiling fans to provide air movement for thermal comfort to minimize demand for air conditioning.	?	?		✓
		▪ Energy efficiency of lighting and mechanical systems to be minimum 10% better than NCC 2019 deemed to satisfy requirements.	✓	✓	✓	✓
		▪ LED Lighting	✓	✓	✓	✓
		▪ Photovoltaic panels to be considered where feasible on new or existing rooftops	?	✓		
		▪ IT/Equipment purchasing policy to include energy efficiency requirements.	✓	✓	✓	✓
		▪ Metering and monitoring system to allow the school to review and benchmark energy consumption.	✓	✓	✓	✓
	Health & Wellbeing	▪ Passive design of building to provide high level of thermal comfort and protection from direct solar radiation.	✓	✓	✓	✓
		▪ Design of building to maximise daylight and views out.	✓	✓	✓	✓
		▪ LED lighting to provide quality of light, with illumination of both vertical and horizontal surfaces, and dimming control to suit the tasks.	✓	✓	✓	✓
		▪ Ceiling fans to provide thermal comfort.	?	?		✓
		▪ Design for aural comfort in open plan learning environments through careful consideration of acoustics.	✓	✓	✓	✓
		▪ Comfortable external spaces provided with air flow, shading, and vegetation.	✓	✓		
		▪ All new paints, adhesives, sealants, floor finishes and furniture are low off-gassing (Volatile Organic Compounds, Formaldehyde, etc).	✓	✓	✓	✓

	Impact	Proposed Initiatives	ELC Extension	Junior School	Senior School Main Entry Reception	Senior School Year 8 Centre
		<ul style="list-style-type: none"> Additional water fountains to promote drinking water. 	✓	✓	✓	✓
	Sustainable Water	<ul style="list-style-type: none"> Low flow fixtures including sensor active taps. 	✓	✓	N/A	✓
		<ul style="list-style-type: none"> Water meters to main items of water consumption where practical. 	?	?	?	?
		<ul style="list-style-type: none"> Rainwater collection from non-trafficable areas of roof for landscape irrigation and/or educational use 	✓	✓		
	Materials & Supply Chain	<ul style="list-style-type: none"> Reduce embodied carbon during construction through specification of concrete with reduced Portland Cement content. 	✓	✓	✓	✓
		<ul style="list-style-type: none"> All timber to be FSC or PEFC certified. 	✓	✓	✓	✓
		<ul style="list-style-type: none"> Specify and procure where practical construction materials with high recycled content. 	✓	✓	✓	✓
		<ul style="list-style-type: none"> Steel will be sourced from a Responsible Steel Maker. 	✓	✓	✓	✓
		<ul style="list-style-type: none"> PVC Best Practice materials to be used across the project. 	✓	✓	✓	✓
		<ul style="list-style-type: none"> Select material finishes that can be cleaned using cleaning products that are low toxicity and eco-label certified. 	✓	✓	✓	✓
		<ul style="list-style-type: none"> Preference materials with environmental certifications. 	✓	✓	✓	✓
		<ul style="list-style-type: none"> Flexible and reconfigurable will be incorporated in designing classrooms and workspaces to reduce frequency of future fit-outs and associated material consumption and waste. 	✓	✓	✓	✓
		<ul style="list-style-type: none"> Suitable durability and protection measures and/or designed features/solutions will be used to prevent damage to vulnerable parts of the internal and external building and landscaping elements. 	✓	✓	✓	✓
	Zero Waste	<ul style="list-style-type: none"> Reuse or recycle demolition materials during construction works. 	✓	✓	✓	✓
		<ul style="list-style-type: none"> Contractual target for 90% of demolition and construction waste diverted from landfill. 	✓	✓	✓	✓
		<ul style="list-style-type: none"> Areas for the collection of waste for recycling, composting and landfill. 	✓	✓		
	Land & Nature	<ul style="list-style-type: none"> Landscaping to include native plant from the Sydney region. 	✓	✓	✓	
		<ul style="list-style-type: none"> Landscaping to provide shade and cooling. 	✓	✓		
	Sustainable Food	<ul style="list-style-type: none"> Actively promote and advertise healthier food options. 	✓	✓	✓	✓
		<ul style="list-style-type: none"> Organic compostable food waste collection 	✓	✓	✓	✓








	Impact	Proposed Initiatives	ELC Extension	Junior School	Senior School Main Entry Reception	Senior School Year 8 Centre
	Travel & Transport	▪ Shuttle Bus for day students (approx. 150 per day across 7 transport routes).	✓	✓	✓	✓
		▪ Shuttle Bus for weekend sport.	✓	✓	✓	✓
	Community & Culture	▪ Integrate aspects of sustainable living, and local culture and heritage in new building design and external spaces.	?	?	?	?
		▪ A heritage signage and art strategy will be created to highlight the history of the school (TBC)	?	?	?	?
	Equity & Economy	▪ The new buildings will comply with best practice DDA requirements.	✓	✓	✓	✓
		▪ Opportunities for apprentices and trainees to be employed by contractors working on the project will be encouraged.	✓	✓	✓	✓
	Pollution	▪ External lighting will be designed to minimize night sky pollution.	✓	✓	✓	✓
		▪ Artificial lighting will be on timeclocks and turned off at night if not required (internally and externally).	✓	✓	✓	✓
		▪ An Environmental Management Plan will be implemented for all construction works.	✓	✓	✓	✓
		▪ A Construction Noise and Vibration Management plan will be prepared.	✓	✓	✓	✓
		▪ Screening of air conditioning and other plant is provided to reduce noise pollution.	✓	✓	✓	✓
	Climate Risk & Adaptation	▪ A response to Climate Change will be prepared for the project.	✓	✓	✓	✓
		▪ External shading, breezeways and vegetation to make external spaces more comfortable on extreme temperature days.	✓	✓	✓	✓
		▪ Roof finishes will have high Solar Reflective Indexes (SRIs) – light colours – to reduce heat island effect.	✓	✓	✓	✓

Potential location of PV in Stage 1 includes:

- Junior School Roof (West Wing and East Wing)
- Early Learning Centre existing flat roof and extension roof

Recommend Rainwater Tanks to be added to the ELC and Junior School for irrigation and/or educational purposes.

KRB Project Application – Forecourt and Traffic Management

	Impact	Proposed Initiatives	KRB Project Application		
			Senior School Main Entry Forecourt	Traffic Management – Pick-up & Drop-off zone; Secondary Entry	Car Park & Bus Bay
	Zero Carbon Energy	<ul style="list-style-type: none"> All new lighting to be LED on timeclock control 	✓	✓	✓
	Sustainable Water	<ul style="list-style-type: none"> Where feasible rainwater tanks will be considered for irrigation, noting some areas may not be viable for tanks to be provided. 	✓		✓
	Materials & Supply Chain	<ul style="list-style-type: none"> Reduce embodied carbon during construction through specification of concrete with reduced Portland Cement content. All timber to be FSC or PEFC certified. Specify and procure where practical construction materials with high recycled content. Steel will be sourced from a Responsible Steel Maker. PVC Best Practice materials to be used across the project. Select material finishes that can be cleaned using cleaning products that are low toxicity and eco-label certified. Preference materials with environmental certifications. Suitable durability and protection measures and/or designed features/solutions will be used to prevent damage to vulnerable parts of the internal and external building and landscaping elements. 	✓	✓	✓
	Zero Waste	<ul style="list-style-type: none"> Reuse or recycle demolition materials during construction works. Contractual target for 90% of demolition and construction waste diverted from landfill. 	✓	✓	✓
	Land & Nature	<ul style="list-style-type: none"> Landscaping to include native planting from the Sydney region. 	✓	✓	✓
	Travel & Transport	<ul style="list-style-type: none"> Shuttle Bus for day students (approx. 150 per day across 7 transport routes). Shuttle Bus for weekend sport. 		✓	✓
	Pollution	<ul style="list-style-type: none"> External lighting will be designed to minimize night sky pollution. Artificial lighting will be on timeclocks and turned off at night if not required (internally and externally). An Environmental Management Plan will be implemented for all construction works. 	✓	✓	✓

6.0 Green Star equivalency

Kincoppal Rose Bay Project will be developed and constructed to a standard equivalent to the outcomes of a 4 Star Green Star Design & As Built v1.3 rating representing Industry Best Practice, but formal GBCA full certification will not be sought. Preliminary Green Star Pathway for the project has been prepared and the targeted credits are summarised in Table 6.1 below.

The exact credits can be adapted and adjusted during the design development so the project will maintain flexibility to change these credits whilst maintaining the overall target of 45 points.

Credit Code	Credit Category	Points Available	Points Targeted
	Management	14	11
1	Green Star Accredited Professional	1	1
2	Commissioning and Tuning	4	2
3	Adaptation and Resilience	2	2
4	Building Information	1	1
5	Commitment to Performance	2	1
6	Metering and Monitoring	1	1
7	Responsible Building Practices	2	2
8	Operational Waste	1	1
	Indoor Environment Quality	17	10
9	Indoor Air Quality	4	2
10	Acoustic Comfort	3	2
11	Lighting Comfort	3	2
12	Visual Comfort	3	1
13	Indoor Pollutants	2	2
14	Thermal Comfort	2	1
	Energy	22	3
15	Greenhouse Gas Emissions NCC 2019	20	3
16	Peak Electricity Demand Reduction	2	-
	Transport]	10	4
17	Sustainable Transport	10	4
	Water	12	4
18	Potable Water	12	4
	Materials	14	3
19	Life Cycle Impacts	7	1
20	Responsible Building Materials	3	1
21	Sustainable Products	3	-
22	Construction and Demolition Waste	1	1
	Land Use & Ecology	6	3
23	Ecological Value	3	1
24	Sustainable Sites	2	1
25	Heat Island Effect	1	1
	Emissions	5	4
26	Stormwater	2	1
27	Light Pollution	1	1
28	Microbial Control	1	1
29	Refrigerant Impacts	1	-
	Innovation	10	4
30	Community Benefits (Sharing School Facilities), Reconciliation Action Plan, Universal design (Access for People with Disabilities), Green Cleaning, Amenity Space (optional), Digital Infrastructure (optional)	10	4
	Total	110	45

Table 6.1 - Preliminary Green Star pathway

7.0 Climate Change Adaptation

7.1 CSIRO projected impacts of climate change

The Commonwealth Scientific and Industrial Research Organisation (CSIRO) is an Australian Government corporate entity, constituted by and operated under the provisions of the Science and Industry Research Act 1949. CSIRO informs on Australia's national future climate projections indicating that over coming decades Australia will experience:

1. Further increase in temperatures, with more extremely hot days and fewer extremely cool days
2. Ongoing sea level rise
3. Further warming and acidification of the oceans around Australia
4. More frequent, extensive, intense and longer-lasting marine heatwaves, suggesting in turn more frequent and severe bleaching events on the Great Barrier Reef, and potentially the loss of many types of coral throughout the tropical reef systems of Australia and globally
5. A decrease in cool-season rainfall across many regions of southern Australia, with more time spent in drought
6. More intense heavy rainfall throughout Australia, particularly for short-duration extreme rainfall events
7. An increase in the number of high fire weather danger days and a longer fire season for southern and eastern Australia
8. Fewer tropical cyclones, but a greater proportion of high-intensity storms, with ongoing large variations from year to year

An assessment of climate change scenarios and impacts on the project will be undertaken using at least two timescales relevant to the project lifespan. CSIRO or NSW Government projections will be used. The assessment will consider direct and indirect environmental, social and economic effects and impacts of changes in temperature, precipitation, relative humidity, wind speed, and sea level, and changes in the occurrence of heatwaves, drought, flood, storms, cyclones and bushfires.

Any risk items identified as 'high' or 'extreme' will be addressed by specific design responses, actions and responsibilities. The design of the Kincoppal Rose Bay Project will respond to the CSIRO projected impacts of climate change, specifically:

9. hotter days and more frequent heatwave events
10. extended drought periods
11. more extreme rainfall events
12. gustier wind conditions

Findings on the above will inform landscape design, material selection and social equity aspects (respite/shelter areas).

8.0 Glossary

Abbreviation	Meaning
BCA	Building Code of Australia – Volume 1 (2019)
CSIRO	Commonwealth Scientific and Industrial Research Organisation
Cundall	Cundall Johnston & Partners Pty Ltd
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999
ESD	Ecologically Sustainable Development
GANSW	New South Wales Government Architect's office
Green Star	Green Star Design & As-Built v1.3 published by Green Building Council of Australia
JV3	An alternative assessment methodology for Section J compliance
One Planet	One Planet Living principles developed by BioRegional and World Wildlife Fund
NCC	National Construction Code
SDGs	United Nations Sustainable Development Goals

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