ESD REPORT

NEW PRIMARY SCOOL AT WILTON JUNCTION

ESD SERVICES

JHA

CONSULTING ENGINEERS

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DOCUMENT CONTROL SHEET

Project Number	220295
Project Name	New Primary School at Wilton Junction
Report Phase	REF Submission
Description	ESD Report
Key Contact	Lachlan Brown

Prepared By

Company	JHA
Address	Level 20, 2 Market Street, Sydney NSW 2000
Phone	61-2-9437 1000
Email	Gary.Tang@jhaengineers.com.au
Website	www.jhaservices.com
Author	Tarun Sebastian Thottungal
Checked	Gary Tang
Authorised	Lawrence Yu

Revision History

Issued To	Revision and Date								
SINSW	REV	DRAFT	Rev A	Rev C	Rev D	Rev E	Rev F		
	DATE	22/11/23	11/12/23	06/11/24	24/01/25	30/01/25	31/01/25		
SINSW	REV	Rev G	Rev H	Rev I	Rev J	Rev K			
	DATE	14/02/25	18/02/25	21/02/25	24/02/25	07/03/25			
	REV								
	DATE								

CONTENTS

1 EXECUTIVE SUMMARY

This ESD Report has been prepared by JHA for the proposed a new primary school at 200 Fairway Drive, Wilton NSW 2571.

This report states the proposed ESD initiatives to achieve compliance with the following:

- Educational Facilities Standards and Guidelines v1.0 DG02;
- Educational Facilities Standards and Guidelines 2.0 0001c Design Checklist – Sustainability; and
- 5 Star Green Star Buildings v1 certification.
- Environmental Planning and Assessment Act 1979 (EP&A Act)
- State Environmental Planning Policy (Transport and Infrastructure) 2021 (SEPP TI)
- Guidelines for Division 5.1 assessments (the Guidelines) by the Department of Planning, Housing and Infrastructure (DPHI)
- Addendum Division 5.1 guidelines for schools by DPHI

This report should be read in conjunction with the Architectural drawings, EFSG v1.0 DG02, EFSG 2.0 0001c Design Checklist – Sustainability, and GS Buildings v1 Submission Guidelines and other consultant reports submitted as part of the application.

The ESD objectives are to encourage a balanced approach to designing new facilities for the primary school project; to be resource-efficient, and cost-effective in construction and operation; and to deliver enhanced sustainability benefits with respect to impacts on the environment and the health and well-being of students, staff and visitors whilst providing the best possible facilities for a constructive student learning experience.

Some of the key ESD commitments are listed below:

- Good access to natural daylight
- Well-designed openings to promote natural ventilation.
- Appropriate construction and glazing selection
- Energy-efficient air-conditioning systems
- LED luminaires
- Rainwater recycle tank
- Efficient water fixtures
- Water-wise Landscaping

2 INTRODUCTION

The ESD Report has been prepared to support a Review of Environmental Factors (REF) for the NSW Department of Education (DoE) for the construction and operation of the new primary school at Wilton Junction (the activity).

The purpose of the REF is to assess the potential environmental impacts of the activity prescribed by *State Environmental Planning Policy (Transport and Infrastructure) 2021* (T&I SEPP) as "development permitted without consent" on land carried out by or on behalf of a public authority under Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). The activity is to be undertaken pursuant to Chapter 3, Part 3.4, Section 3.37A of the T&I SEPP.

This document has been prepared in accordance with the Guidelines for Division 5.1 assessments (the Guidelines) by the Department of Planning, Housing and Infrastructure (DPHI) as well as the *Addendum Division 5.1 guidelines for schools*. The purpose of this report is to ensure the activity will be designed to comply with mandatory environmental and sustainability standards to achieve compliance.

2.1 PROPONENT

The NSW Department of Education (DoE) is the proponent and determining authority pursuant to Section 5.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

2.2 PURPOSE OF THE REPORT

The report responds to item (h), (J), (l), & (m) in Table A1 Environmental factors for hospital and school activities from the Addendum Division 5.1 Guidelines for Schools by DPHI, which is taken from Section 171(2) of the EP&A Regulation.

A summary of the relevant sections are provided in the table below.

Regulation/Guidelines Section	Requirement	Response	Report Section
Guidelines for Division 5.1 assessments	Considering environmental Factor: h) long-term effects on the environment Items (h1) & (h2) j) risk to the safety of the environment: Item (j1) l) pollution to the environment Items (l1) & (l3) m) environmental problems associated with disposal of waste Items (m1) & (m2)	The project incorporates the Educational Facilities Standards and Guidelines (EFSG) and the Green Star Design Building v1 (5 Star rating) to keep the impacts on the environment low.	See Sections 3 & 4, and Appendix A & B.

2.3 SITE DESCRIPTION

The current street address is 200 Fairway Drive, Wilton, 2571, NSW. The site forms part of the northern portion of Lot 1063 in Deposited Plan 1289197) that was previously subdivided by Landcom. The site is approximately 3.4ha hectares in size and is located within Wilton Junction which is part of the North Wilton Precinct.

As a result of precinct wide rezonings, the surrounding locality is transitioning from a semi-rural residential area to a highly urbanised area with new low to medium density residential development with supporting services. North Wilton

Precinct is approximately 85km south-west of the Sydney CBD, 30km north-west of Wollongong and 30km southwest of Campbelltown-Macarthur Strategic Centre. The precinct is located on the interchange with the Hume Highway, which connects the Southern Highlands with the Sydney metropolitan region to the northeast and Canberra to the south-west.

The proposed school site does not currently have road access, however, Landcom is expected to deliver the road network and surrounding public domain network in accordance with DA/2022/1279/1. Proposed Road 14 located on the eastern boundary of the site will ultimately provide future access to the site. The site contains several patches of remnant native vegetation particularly within the northern portion of the site. The central part of the site has been predominantly cleared and consists of grassland. An aerial photograph of the site is provided below.

Aerial photo of the site; (Source: Urbis)

2.4 PROPOSED ACTIVITY DESCRIPTION

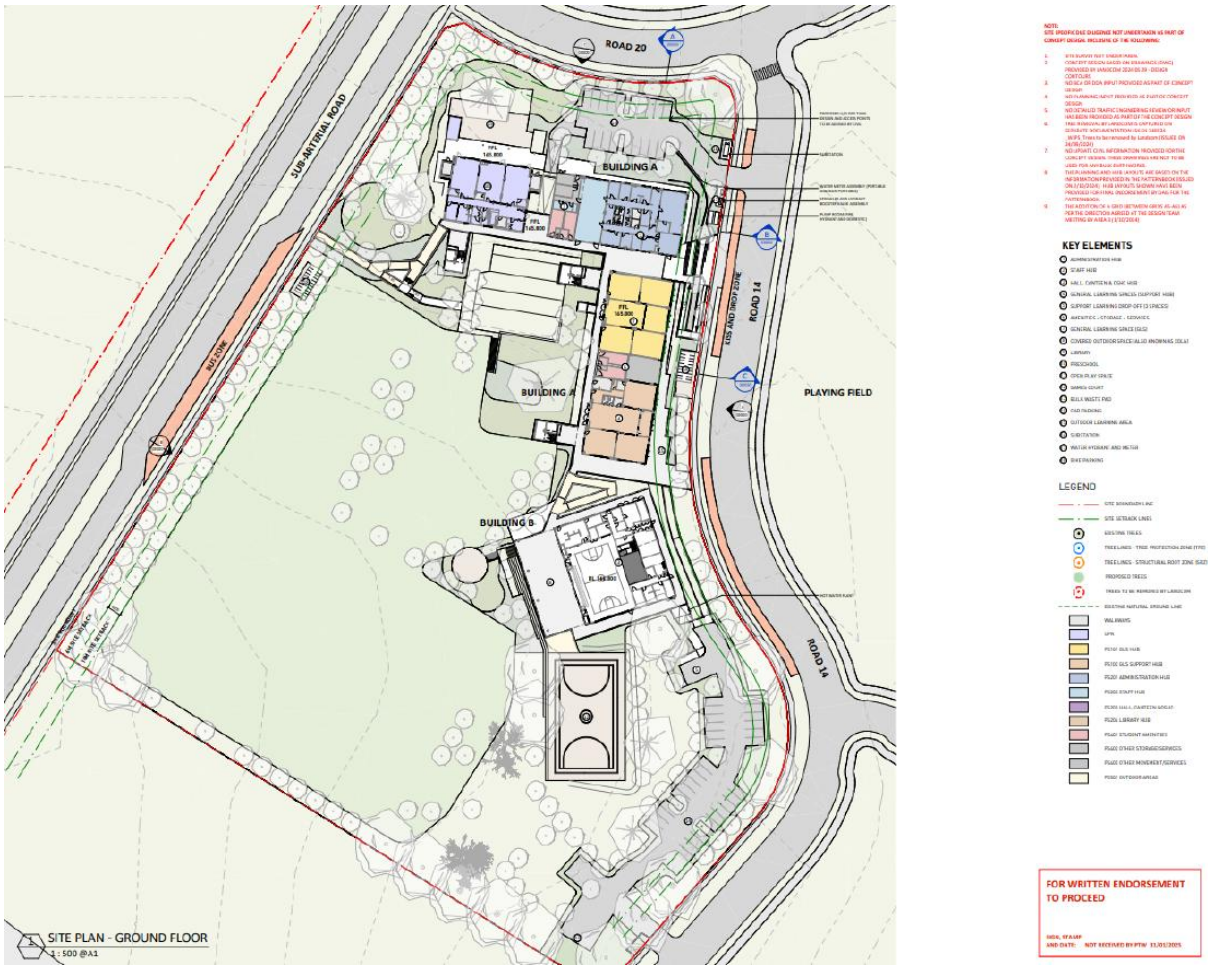
The proposed activity is for the construction and operation of a new primary school at Wilton Junction which will accommodate up to 552 students and 35 staff. Additionally, the proposal includes an integrated pre-school which will capacity for up to 60 students and 7 staff. In total, the new school will support up to 612 students and 42 staff.

The new school includes general and support learning spaces, a library, administrative areas and a staff hub. Core facilities include a standalone school hall and canteen, two carparks and a sports court.

Specifically, this proposal includes the following:

- Construction of a 3-storey learning hub which includes:
  - 24x General Learning Spaces
  - 3 x Support Learning Spaces
  - Staff hub including administrative areas and library.
  - Integrated public pre-school.
- Standalone hall and COLA with outside of school hours care (OSHC).
- Associated landscaping including sports court and separate outdoor play space for the preschool.
- Associated site utilities and services including installation of new 1500 kVA padmount substation and a new main switchboard.

- Main car park to the south of the site with 33 car spaces (including one accessible space).
- Separate car park for pre-school located to the north of the school with 18 spaces (including one accessible space).
- Main school pedestrian entrance proposed off Road 14.
- Earthworks.



Proposed Site Plan – Staging; (Source: PTW)

3 SUSTAINABILITY TARGETS

3.1 SUSTAINBLE BUILDING SEPP 2022

In accordance with Section 3.1 of Sustainable Building SEPP 2022, the General Sustainability Provisions is applicable to all non-residential activity that involves:

- *The erection of a new building, if the development has a capital investment value of $5 million or more;* or
- Alterations, enlargement or extension of an existing building, if the development has a capital investment value of $10 million or more.

The Sustainable Building SEPP 2022 is applicable to the project, and as such will incorporate practical sustainability measures applicable to the project type. An assessment against the relevant provisions of Section 3.2 of the Sustainable Buildings SEPP is provided in the following table.

Chapter 3.2	Project Specific Responses
1. The minimisation of waste from associated demolition and construction, including by the choice and reuse of building materials.	▪ Construction Waste Management Plan stating proposed strategies for minimizing waste generation, maximizing material reuse, recycling, and reprocessing, and reducing the volume of materials destined for landfill. Targeting up to 80% of construction and demolition waste generated to be diverted from landfill.
2. A reduction in peak demand for electricity, including through the use of energy efficiency technology.	▪ A high-efficiency air-cooled heat rejection system (surpass the minimum requirements of the NCC 2022 Section J Energy Efficiency Part J6). ▪ Energy-efficient LED lighting with suitable timer controls and/or daylight/occupancy sensors as appropriate.
3. A reduction in the reliance on artificial lighting and mechanical heating and cooling through passive design.	▪ Appropriate insulation and a light-coloured roof will be provided. ▪ High thermal performance glazing system. ▪ Appropriate combination of external shading devices (eaves etc.) and glazing location to maximise natural daylight and winter heat gains while minimising unwanted heat gains in summer.
4. The generation and storage of renewable energy.	▪ Provision of a roof-mounted photovoltaic system (PV).
5. The metering and monitoring of energy consumption.	▪ Sub-metering is to be provided to enable individual time-of-use energy data recording of the on-site renewable energy equipment & on-site electric vehicle charging equipment. The sub-meters required will be interlinked by a communication system that collates the time-of-use energy data to a single interface monitoring system where it can be stored, analysed, and reviewed.
6. The minimisation of consumption of potable water.	▪ Installed water-efficient fixtures and fittings meeting the minimum WELS Rating as nominated. ▪ Capturing rainwater for reuse in landscape irrigation and/or toilet flushing. ▪ Stormwater management plan including water-sensitive urban design (WSUD) ▪ Use of air-cooled heat rejection systems as opposed to water-based heat rejection

Refer to Section 4 of this report for details of how the proposed activity has considered and addressed the requirements of the General Sustainability Provisions.

3.2 EFSG SUSTAINABILITY TARGETS

3.2.1 OVERVIEW

The Educational Facilities Standards and Guidelines (EFSG) have been developed by the NSW Department of Education, to assist in the management, planning, design, construction and maintenance of new and refurbished school facilities. The EFSG is to be treated as a reference guide that provides a starting point to allow for a consistent standard of delivery across various types of school.

The proceeding sections outline how the project addresses each of the requirements of the EFSG v1.0 DG02 Design guideline and EFSG 2.0 0001c Design Checklist – Sustainability.

3.2.2 SCOPE

The NSW Government Resource Efficiency Policy (GREP) is a mandatory NSW Government policy to reduce the NSW Government's operating costs and lead by example in increasing resource efficiency through ESD principles. The GREP requires all new projects above 1,000m^2 and project costs over $10 million to be designed to the following standard:

- 5 Stars Green Star for projects located in metropolitan Sydney, Wollongong, and Newcastle,
- 4 Stars Green Star for projects located in other areas of NSW

The project has registered with Green Star Buildings v1 certification targeting a 5-star rating in line with the above requirement. The project has been registered with GBCA for a formal 5 Star Buildings v1 rating on 12 December 2022 (GS-9453B).

3.2.3 NSW GOVERNMENT RESOURCE EFFICIENCY POLICY

The purpose of the GREP is to reduce NSW government agency operating costs by implementing resource efficiency measures, and its implementation is mandatory for all NSW Government agencies, including the Department of Education. The policy includes measures, targets and minimum standards to drive efficiency in energy and water use and waste and also improve air quality.

3.2.4 ENERGY CONSERVATION

In accordance with the NSW Government Resource Efficiency Policy, all new facilities must be designed and built so that energy consumption is predicted to be at least 10% lower than if built to minimum compliance with National Construction Code requirements. The energy consumption reduction must be achieved without including renewable energy generation in the calculation.

3.2.5 CLIMATE CHANGE

In accordance with EFSG v1.0 DG02.08 Climate Change Adaptation and EFSG 2.0 0001c Design Checklist – Sustainability: 0.05 Climate Change Adaptation, an initial assessment of natural hazards and project vulnerability has been carried out in the previous phase of the project. The design measures that are to be undertaken by the project team to address the risks identified are provided in Section 4.12.

3.3 GREEN STAR BUILDINGS

The proposed activity is targeting a 5 Star GS Buildings v1 certification for all new buildings under the SINSW Campus Approach.

3.3.1 OVERVIEW

The Green Star rating system is a comprehensive tool for assessing the environmental performance of Australian buildings.

The Green Star framework incorporates ESD principles that are categorized into eight categories. Points are awarded across each category for ESD initiatives that are incorporated into the project. The GS buildings documentation is then verified through two rounds of independent assessments by the Green Building Council of Australia (GBCA). This section outlines the pathway for Wilton Junction Public School to achieve a 5-star certified rating under the GS Buildings v1.

3.3.2 THE GREEN STAR RATING SCALE

The Green Star rating is determined by comparing the percentage of available points achieved out of the total available points and meeting all "*Minimum Expectations*". The rating scale shown below details the thresholds for the star ratings awarded.

Minimum Points Threshold	Rating	Outcome
Compliant with NCC 219 or later	No Rating	Legal Compliance
All "*Minimum Expectations*" met	No Rating	Good Practice
All "*Minimum Expectations*" met + 15 Points	Four Star	Best Practice
All "*Minimum Expectations*" met + 35 Points	**Five Star**	**Australian Excellence**
All "*Minimum Expectations*" met + 70 Points	Six Star	World Leadership

Credit points available:

Category	Total Points Available
Responsible	17
Healthy	14
Resilient	8
Positive	30
Places	8
People	9
Nature	14
Leadership	1 point per Market Transformation claim (Upto 5 Points) + Unlimited points for Leadership challenges + 1 point per Sector Specific Credit
Total	**100 points + (Leadership Points)**

3.3.3 SINSW UMBRELLA GREEN STAR CREDIT RECOMMENDATIONS

To support the large volume of new schools that will be certified by the GBCA using the Green Star Tool, SINSW has partnered with the GBCA to streamline the documentation and assessment process for schools.

The SINSW Green Star Credit Recommendations spreadsheet has been developed to consider how each credit in Green Star may be applied to SINSW schools. The spreadsheet also details SINSW's preferred approach for projects to achieve each credit, including any pre-approved alternate approaches agreed to by the GBCA in response to a Technical Question. It provides references to relevant sections of the EFSG or other policies or guidelines, and examples of standard project documentation that could be used as supporting evidence in claiming credit.

3.3.4 TARGETED POINTS FOR THIS PROJECT

In accordance with GREP requirements, compliance with EFSG, and under the SINSW Green Star umbrella, the Green Star points that can be targeted for this project are tabled below.

Category	Points Targeted
Responsible	3
Healthy	8
Resilient	2
Positive	8
Places	4
People	5
Nature	6
Leadership	5
Total Score	**All "*Minimum Expectations*" met + 41 Points**
Buffer in Achieving 5-Star	6 Points

4 SUSTAINABLE DESIGN FRAMEWORK

4.1 FRAMEWORK

The sustainable design framework for this activity aims to incorporate the best practice design initiatives and ESD principles into the activity. The ESD initiatives and targets outlined within this framework have been compiled based on the following:

- National Construction Code 2022 Section J
- Green Star Buildings v1
- Principles of the Educational Facilities Standards and Guidelines (EFSG)
- Sustianble Building SEPP 2022

4.2 BUILDING ENVELOPE

Intelligent design and material selection ensure that thermal comfort is not entirely achieved by mechanical means. Passive design initiatives such as performance glazing, shading and the use of insulation will reduce demand on mechanical air conditioning systems resulting in a reduction in energy consumption and greenhouse gas emissions.

4.2.1 BUILDING ENVELOPE PERFORMANCE

The building fabric will be designed to meet or exceed the NCC 2022 Section J requirements for the building envelope. Thermal breaks will be incorporated into walls, floors, and roofs where appropriate to ensure a continuous thermal barrier on the building envelope, reducing the flow of thermal energy between conductive materials.

The indicative results on total construction R-value requirements demonstrating compliance with NCC 2022 Section J are provided below.

4.2.2 BUILDING FABRIC & GLAZING

The building fabric will be designed to provide a 10% improvement from the NCC 2022 Section J Part J4. The minimum performance requirements obtained under Section J Deemed-to-Satisfy provision, coupled with 10% additional for the activity (Class 9b) at the proposed location (Climate Zone 6) as per the NCC 2022 Section J - Energy Efficiency are below.

Building Elements	Indicative NCC 2022 Requirements (with 10% improvement)
Envelope Roof/Ceiling	Total R-Value of 3.6 (Downwards, Light Colour Roof Solar absorptance of the upper surface of a roof must be not more than 0.40)
Envelope Walls	Total R-Value of 1.6
Envelope Floors	Total R-Value of 2.2 (Downwards)

Note: The impact of thermal bridging must be considered within the total R-value calculation under NCC2022.

This will necessitate the use of insulation in the walls, floor, and roof for the building fabrics. Insulation reduces heat flow and consequent heat loss in winter and heat gain in summer. This minimises the heating and cooling load demand on the air conditioning systems. Light-coloured roof material with a low solar absorptance (SA) is recommended to be used to isolate more sunlight and reduce summer heat gain. It also has the effect of reducing elevated localised temperatures (the heat island effect) and potentially can improve the efficiency of solar PV panels as they perform more efficiently in reduced temperatures.

Glazing is a major source of unwanted heat gain in the summer and can cause significant heat loss in the winter due to its low insulation performance. It is thus recommended that windows be high-performance glazing systems. Performance glazing substantially reduces heat transmission. This particularly reduces heat loss in winter; therefore, internal heat gain from equipment, lighting and people are better contained. Also, performance glazing absorbs the infrared portion of

sunlight and reduces the amount of heat transferred into the conditioned space. This will correspond to a reduction of both heating and cooling loads.

The building will be designed to comply with NCC 2022 Section J Energy Efficiency and Green Star targets. The detailed Section J assessment will be carried out during schematic design stage of the project.

4.3 SHADING AND DAYLIGHTING

Solar access can enhance indoor environmental quality through access to daylighting and reduce lighting energy consumption. However, excessive solar access and hence, direct solar radiation heat can increase HVAC energy demand and can also cause thermal discomfort. The passive solar heating principle which aims to prevent solar heat gain in the summer and harvest it in the winter for a free source of heating, and the Passive cooling principle which prevents heat from entering the building during the summer months, are strategies that can conveniently take advantage of the site-specific solar access for optimised indoor environmental quality and reduction of HVAC energy demand through the use of tailored shadings.

The proposed building is to be designed to make the best use of the sun by using external high-performance horizontal eave shading to prevent the high summer sun from entering the building whilst allowing the low winter sun to enter the building for passive heating.

These passive design features allow for enriched daylighting and greater access to external views for occupants. Additional daylighting reduces the reliance on artificial light and benefits alertness, mood, and productivity. External views provide a connection to nature and the building and help to create an environment encouraging constructive experience.

4.4 NATURAL VENTILATION

Adequate natural air movement makes an important contribution to creating a comfortable indoor environment and reducing the need for mechanical ventilation by carrying accumulated heat out and replacing it with cooler external air. This is important during the summer months where heat build-up within spaces can be quickly removed with the availability of suitable breeze at the site.

The design team proposed to utilise natural ventilation and air circulation through operable windows.

4.5 ENERGY EFFICIENCY

Each climate zone under the Building Code has different design and conditioning requirements to minimise energy use for heating and cooling. A good balance of heating and cooling reduction techniques is required to create an energy-efficient activity.

4.5.1 HEATING, COOLING AND VENTILATION SYSTEMS

The air-conditioning and ventilation systems shall be designed to comply with and exceed the minimum requirements of NCC 2022 Section J6 requirement.

The occupied spaces will be having high-efficiency air conditioning as required. Air-cooled heat rejection system to be used as this will help minimise the impacts associated with harmful microbes (e.g. Legionella impact).

All bathrooms/toilets, laundries (if any), and general exhaust are to be naturally ventilated where possible, with mechanical ventilation required where necessary. The design will have a sufficient amount of exhaust fans to ensure liveability for the building users.

The control of the air conditioning system shall be designed to minimise energy consumption. Further, high-efficiency equipment for the HVAC system will be selected to assist with the energy conservation of the building.

Ductwork systems will be designed to reduce system pressure losses to reduce fan motor power. This includes the selection of equipment for reduced coil and fittings drops and being generous with ductwork sizes to reduce friction losses.

4.5.2 LIGHTING

Lighting is to be designed to comply with NCC 2022 Section J7. Also, the Lighting illumination density is to be according to NCC2022 Section J7D3. Fittings incorporating the latest lamp technologies to be installed to minimise energy use and provide efficient artificial lighting systems. The proposed activity shall be illuminated using LED fittings and be controlled via an automatic control system with timer controls, PIR occupancy sensors and microwave occupancy sensors.

Lighting in regularly occupied spaces shall be provided with a daylight sensor (PE Cells) to reduce light output or turn off lights when sufficient daylight is provided within the space. For large spaces, perimeter lighting shall be designated in a separate zone to make maximum use of daylight.

All the external luminaires proposed will be according to AS 4282:1997. This will make sure that the external luminaires do not emit light pollution to the night sky above a given benchmark.

4.5.3 CONTROLS

All HVAC installed shall be controlled by the HVAC group controller. Closed spaces such as storage rooms and cleaners' cupboards are to be provided with a wall switch. For BOH areas (not task-specific areas) PIR sensors are to be provided. Voltage control (dimming) should be provided where appropriate.

4.5.4 ELECTRICITY METERING

Electricity metering and sub-metering shall be specified in accordance with Section J and Green Star requirements to monitor and manage electricity consumption in the building. Sub-metering is to be provided to distinct locations (e.g. PV generation)

4.5.5 PHOTOVOLTAICS

Collecting solar energy has been chosen as a key ESD strategy for the project, with an aspirational goal of reducing the building's energy consumption and greenhouse gas emissions from a renewable source via the provision of a roof-mounted photovoltaic system. The size of the PV system is to be calculated by the electrical consultant.

4.6 INDOOR AIR QUALITY (IAQ)

The quality of indoor air has a significant impact on our health and environment. Poor indoor air quality results in adverse health effects such as allergies, asthma, etc. The ventilation system shall be designed to minimise the entry of outdoor pollutants as per ASHRAE Standard 62.1:2013 and should comply with AS1668.2:2012.

4.7 WATER CONSERVATION

The following initiatives are proposed to ensure that significant water saving is achieved.

4.7.1 FITTINGS AND FIXTURES

Water consumption shall be reduced by incorporating water-efficient fixtures and fittings in accordance with the Australian Government's Water Efficiency Labelling Scheme (WELS). The fixtures and fittings to meet the minimum WELS Rating. In addition, flow restrictors or taps with timed flows can be used to minimise water usage. Commercial appliances should perform at similar levels. The final WELS rating is subject to product selection and WHS requirements.

Water Fittings/fixtures	Minimum WELS Rating	Highest Available Rating (AS/NZS 6400-2016)
Showerhead rating	3 (>6.0, but <= 7.5L/min)	4
Toilet rating	4	5

Water Fittings/fixtures	Minimum WELS Rating	Highest Available Rating (AS/NZS 6400-2016)
Urinals	5	5
Taps and flow controllers	5	6
Dishwashers (if any)	5	6
Washing machines (if any)	4	6

4.7.2 RAINWATER COLLECTION AND REUSE

The project will consider the capturing of rainwater for reuse in toilet flushing and landscape irrigation. Rainwater tank with a minimum volume of 10L/m2 of GFA is to be provided to reduce potable water consumption.

4.7.3 WATER-SENSITIVE URBAN DESIGN

The project is to implement best practices of water-sensitive design by decreasing the total suspended solids in stormwater and by not using water for heat rejection. A detailed stormwater management plan including water-sensitive urban design (WSUD) to be completed by a civil/stormwater consultant.

4.8 SUSTAINABLE MATERIALS

4.8.1 EMBODIED CARBON

Life Cycle analysis is to be conducted to reduce the embodied carbon of the proposed building. The analysis needs to be done for the life cycle stages A1-A5. The project is to account for the total embodied carbon emissions (tCO2) from construction (including the energy consumed during construction) through the utilization of carbon-sequestering materials.

4.8.2 LOW VOC/LOW FORMALDEHYDE MATERIALS

Adhesives, sealants, flooring and paint products selected to contain low or no Volatile Organic Compounds (VOCs) and all engineered timber used in exposed or concealed applications are specified to contain low or no formaldehyde to avoid harmful emissions that can cause illness and discomfort for the building users.

4.8.3 SUSTAINABLE PRODUCTS

The project will aim to source materials from local manufacturers thus reducing the embodied carbon and supporting the local economy.

4.9 VISUAL COMFORT

The building design will ensure at least 40% of the regularly occupied areas receive a high level of daylight and blinds will be provided to reduce glare. Also, the building shall be designed to ensure at least 60% of the regularly occupied spaces have a clear line of sight to high-quality internal or external views.

4.10 TRANSPORT

4.10.1 LOW-EMISSION VEHICLE INFRASTRUCTURE

The activity is to provide a dedicated infrastructure to support the uptake of low-emission vehicles by providing dedicated EV parking spaces and bicycle parking facilities. EV parking spaces to provide necessary electrical instrasture and spatial

allocation to support future installation of EV charging. The project to focus on reducing private vehicle use and encouraging walking by implementing efficient Sustainable Transport Plan.

4.11 WASTE

Waste collection and disposal play an important role in the protection of the environment and the health of the population in the modern world. A waste management plan will be prepared to assess and monitor the waste management process during the construction and demolition, as well as a waste-produced during occupation within the activity. The waste management plan shall incorporate how to minimise the amount of waste generated, maximise the reuse, recycling and reprocessing of construction waste materials and minimise the volume of materials disposed to landfill. Refer to the waste consultant report for details.

4.12 CLIMATE CHANGE ADAPTATIONS

This activity will not cause any significant impact on the health, diversity and productivity of the environment and will provide a community benefit in the form of upgraded teaching, learning and working facilities. The project will contribute to a lively community environment and add architectural interest to the surrounding area

To mitigate the adverse impacts of climate change on the future of the school, the following responsible parties need to ensure the appropriate adaptation strategies to the identified Climate Risks are considered and implemented within the project design.

Climate Risks	Climate Risk Interventions	Responsible Parties
Bushfire: Hotter and dryer conditions result in higher frequency and/or severity of bushfire events.	▪ Investigate locations of vulnerability, and remove potential fuel sources surrounding the building such as removing dead vegetation as part of ongoing landscaping/maintenance works. ▪ Use of non-combustible construction materials as per regulation. ▪ Put in place an evacuation plan in case of a fire-threatening building. ▪ Ensure the building is well sealed to minimise risks of smoke infiltration. ▪ Provide motorised dampers on the outside air duct supply controlled by manual switches. ▪ Backup generator or connection point to provide power to safety-critical services. ▪ On-site renewable energy to reduce the maximum demand from the grid. ▪ Ensure critical data and information can be accessed offline.	Architect Bushfire Consultant Services Consultant Landscape SINSW
Heatwave: Hotter and dryer conditions resulting in higher frequency and/or duration of heatwaves/ extreme heat days (over 35 degrees Celsius)	▪ Incorporate passive thermal design principles in the design and construction of the building such as appropriate levels of shading devices and thermal insulation. ▪ Provide light-coloured roofs to reduce heat gains via the roof and help mitigate the urban heat island effect. ▪ Provide additional photovoltaic panels to provide renewable electricity to help offset the additional HVAC electricity demand.	Architect ESD Landscape Services Consultant SINSW

	▪ When replacing HVAC units at the end of service life, consider upsizing the capacity of units in line with the change in climatic conditions. ▪ In the near future, current temperature ratings for electrical equipment should be able to cope with projected temperature increases relevant to the component's design life. In the far future, equipment should be gradually upgraded as required to cope with more extreme conditions. ▪ Providing dedicated "Cool outdoor areas" where students and teachers can take shelter during extremely hot days when the power fails should be explored by the design team. This cool area should utilise passive design principles to moderate temperature during extreme days. Secondly, this cool area should consider ways to harness the cooling power of water to provide additional cooling. For example, provide shaded outdoor areas with drinking fountains as cool shelters during an extreme heat event.	

The project-specific Climate Change Risk and Adaptation Assessment has been prepared and attached as Appendix C.

5 MITIGATION AND EVALUATION

5.1 MITIGATION MEASURES

The following table captures all measures required to be implemented as a result of this ESD Rerport and Table from Section 2.2 of this report. Due to the quantity of the mitigation measures resulting from the ESD targets, they have been generalised below.

Project Stage	Mitigation Measures	Reason for Mitigation Measure	Section of Report
Design & Construction	All disciplines to incorporates the Educational Facilities Standards and Guidelines (EFSG) and the Green Star Design Building v1 (5 Star rating) to keep the impacts on the environment low. The design team to complete NABERS Emboided Emission Form & Net Zero Statement. The design team to provide design responses/confirmation to the proposed mitigation measures in Green Star Schedule (Appendix B). Green Star Design Submission to be made prior OC.	To implement a holistic approach to sustainability, by addressing the requirements from Educational Facilities Standards and Guidelines (EFSG) and the Green Star Design Building v1 (5 Star rating), which is representative of an Industry best practice outcome.	For a detailed overview of the measures refer to Sections 3 & 4, and Appendix A, B & C.
Operation	All disciplines to provide as-built package reflecting what's has been built is aligned with CC documentations. Green Star As-built Submission to be made within 1 year from OC.		

5.2 EVALUATION OF ENVIRONMNTAL IMPACT

With regards to the tables from Sections 2.2 & 5.1, the environmental impact caused by the activity is adequately mitigated through the recommended measures and the activity will not have *'significant impact on the environment'* (refer to Section 5.7 of the EP&A Act). To conclude,,

- The extent and nature of potential impacts are low and will not have a significant impact on the locality, community and the environment.
- Potential impacts can be appropriately mitigated or managed to ensure that there is minimal impact on the locality, community and/or the environment.
- The buildings must be designed to achieve high levels of daylight and for ventilation.

APPENDIX A – EFSG SCHEDULE

PROJECT:	New Primary School at Wilton Junction
REVISION	Rev K
AUTHOR	LG/GT

Sustainability Strategy Priority	Sustainability initiatives / requirements Where application, this is an extract only from the relevant EFSG. For full requirements refer to https://efsg.det.nsw.edu.au/	Project stage	Basis for Initiative	Crossover with Green Star	Recommended evidence to demonstrate compliance	Are these achievable to the project? Y or N or NA	ESD consultant comments	Example evidence This evidence needs to show that the requirement from column C has been met	Responsibility: (identify party responsible to provide evidence)
Act on climate change	**Improvement over NCC** All new facilities must be designed and built so that energy consumption is predicted to be at least 10% lower than if build to minimum compliance with National Construction Code requirements. Each building's system and façade must comply with the corresponding Section J requirements in the National Construction Code. That is, the building cannot show that their façade, or any system, performs worse than the reference building. The energy consumption reduction must be achieved without including renewable energy generation in the calculation.	Ph 2-5: Architectural Design	DG02.03 GREP	DAB c15E.0 GHG Emissions Reduction - Conditional Requirement GS Buildings - Credt: Energy Use	**1.** Energy modelling report / Predictive energy modelling and thermal comfort assessment. Report needs to show at least 10% improvement of building over minimum NCC requirements; and **2.** As-built evidence that model is an accurate representation of the building, e.g. drawings; and **3.** Specifications / calculations supporting modelling inputs, e.g. window energy rating scheme certificates, calculated R-values of walls, roofs, etc. 4. As an alternative to 2 and 3 above, a Statement by energy modeller confirming that the model accurately represents the building.	Y	Included in design. Project is targeting 5 Star Green Star certification which will achieve this as a mandatory requirement. Targeting minimum 10% improvement in energy efficiency compared to NCC requirements.	Project Energy Modelling Report	ESD
Act on climate change	**Passive design** The need for active cooling and heating shall be minimised by employing passive / sustainable design principles listed in DG 55, DG 06.02 and DG 27.12 as well as the GA NSW Environmental Design in Schools Guidelines. This includes: - Window size and shading to prioritise passive cooling in summer and heating in winter - Orientation - Thermal mass - building fabric colour and performance - shading	Ph 2-5: Architectural Design	DG55 DG06.02 DG27.12 GA NSW Environmental Design in Schools	DAB c15 GHG Emissions Reduction GS Buildings - Credt: Energy Use	**1.** Thermal modelling report **2.** As built evidence demonstrating measures implemented to reduce need for active cooling / heating **3.** Passive design report by Architect listing all passive design initiatives implemented	Y	Building fabric designed to comply with NCC Section J Part J1 Building Fabric requirements with min 10% improvement. Energy modelling report to demonstrate compliance.	Passive design report by Architect listing all passive design initiatives implemented Project Energy Modelling report	Head Contractor Architect Electrical Mechanical ESD
Act on climate change	**Energy efficient lighting design and modelling** - LED lighting must be installed - The design of the lighting systems and the selection of fittings is to be undertaken based on a Whole of Life approach, such as diodes and control gear with a long life - Section J part 6 maximum illumination power density provisions must be adhered to, along with all other elements of part 6 - System must support sustainable design principles including reducing energy consumption, such as timed or sensor feedback functionality - Lighting designs should be carried out utilising industry standard lighting design software such as AGI32, Dialux or Relux.	Ph 2-5: Services Design	DG2.3.1 DG63.01 DG63.04 DC63.05 DG63.03.02	DAB c15 GHG Emissions Reduction GS Buildings - Credt: Energy Use	**1.** Lighting drawings **2.** Lighting specifications / schedules **3.** Lighting modelling report showing compliant power densities		Electrical drawing to demonstrate energy efficient lighting has been installed	Lighting Schedule NCC 2019 Section J6 calculation or NCC 2022 Section J7 calculation whichever applicable.	Electrical
Act on climate change	**Lighting control and switching** - The use of lighting controls will assist in substantially improving energy efficiency on sites, and should be considered for all new lighting systems, in new build or site refurbishments. - Lighting control should be simple to operate and adhere to all requirements of DG 63.06 - Constant Light Output and Daylight Harvesting systems are recommended given their ability to reduce lighting energy whilst maintaining comfortably lit spaces. Consideration should be given to these strategies as stipulated in DG 63.06 - Including daylight sensors in rooms to reduce light output or turn off light when sufficient daylight is provided within the space - When the space is large and perimeter lighting is adjacent to windows, perimeter lighting is on a separate zone to make maximum use of daylight - Local switching should be provided where it is identified that the users can benefit from manual operation of the lighting and other lighting automation technology is considered cost prohibitive. The switching should be clearly marked and robust. Provisions for energy efficient switching in Schools are outlined within DG63 and DG65.	Ph 2-5: Services Design	DG63.06 DG63.07 DG65.03.01	DAB c15 GHG Emissions Reduction DAB c4 Building Information GS Buildings - Credt: Energy Use GS Buildings - Credt: Verfication and Handover	**1.** Electrical & lighting drawings showing switching groups and automatic controls **2.** Lighting modelling report showing compliant power densities **3.** Lighting operations and maintenance manual		Electrical & lighting drawings to show compliance.	Electrical to incorporate into design	Electrical
Act on climate change	**Energy efficient appliances & equipment** Electrical equipment must be at least 0.5 stars above the market average star rating or comply with high efficiency standards specified in the GREP HVAC system must have timed or sensor feedback functionality for energy conservation Systems shall be designed to minimise energy consumption. System design / equipment selection is to be based on whole of life cost analysis. Specific requirement are outlined in the EFSG.	Ph 2-5: Services Design	DG2.3.3 DG55	DAB c15 GHG Emissions Reduction GS Buildings - Credt: Energy Use	**1.** Schedule of appliances and equipment with their star ratings or performance standards, signed by head contractor or architect. All appliances and equipment required in the GREP must be listed, incl air conditioning equipment, electric motors, transformers, etc. **2.** As built mechanical drawings / statement from head contractor; **3.** Whole of life cost analysis demonstrating systems were selected based on WOL performance.		FFE Schedule to demonstrate compliance. Electrical equiment and HVAC system information to be provided by the electrical and mechanical engineers.	FFE Schedule to show compliance	Head Contractor Architect
Act on climate change	**Heat loss/gain** The design must take steps to control heat loss from the building during cooler winter months and heat gain during the warmer months. Refer to HVAC Design considerations in DG04.01	Ph 2-5: Services Design	DG04.01	DAB c15 GHG Emissions Reduction GS Buildings - Credt: Energy Use	**1.** Thermal modelling report **2.** As built evidence demonstrating that model is an accurate representation of the building **3.** Specifications/ calculations supporting modelling inputs		Mech Heat Load Calculation	Mech Heat Load Calculation	Mechanical
Act on climate change	**Indoor environment controls** - Both the thermal comfort and indoor air quality shall be controlled automatically within specified parameters. - Controls shall be simple and intuitive to use. - A "traffic light" light system (described in DG 55.01 Thermal Comfort and Indoor Air Quality Policy) should be used to inform users of the suitability of outdoor conditions to utilise natural ventilation.	Ph 2-5: Services Design	DG55 DG 55.01 Thermal Comfort and Indoor Air Quality Policy	DAB c15 GHG Emissions Reduction GS Buildings - Credt: Energy Use	**1.** As built evidence demonstrating controls have been installed as required. **2.** Commissioning report / statement by head contractor confirming controls have been set as required		Project mechanical design to demonstrate controls and as built evidence to show compliance	Mechanical to demonstrate compliance	Mechanical
Act on climate change	**Renewable energy** A grid connected solar PV system must be installed in line with DG66 requirements Where feasible, PV systems shall be installed to offset as much of the electricity consumed by the school as is practicable	Ph 2-5: Services Design	DG2.3.4 DG55	DAB c15 GHG Emissions Reduction; DAB c16 Peak Electricity Demand Reduction GS Buildings - Credt: Energy Use GS Buildings - Credt: Energy	**1.** As installed drawings of PV system **2.** Energy modelling report showing renewable energy generation		PV system proposed.	Electrical drawings for the PV system design, Energy Modelling report to include within modelling	Electrical
Act on climate change	**Battery Energy Storage System** A battery energy storage system shall only be designed in consultation with SINSW Sustainability sustainability.enquiries@det.nsw.edu.au	Ph 2-5: Services Design	DG66.8.3	DAB c15 GHG Emissions Reduction; DAB c16 Peak Electricity Demand Reduction	As installed drawings of battery storage system		TBC		Electrical
Act on climate change	**Heaters** Electric heating must be preferred over gas heating. Where gas heating is considered, it must be approved by SINSW Sustainability Heating equipment must be designed from a whole-of life perspective and: - Support sustainable design principles including reducing energy consumption and carbon emissions - Be accessible and serviceable - easy to maintain with minimal impact on school use when maintenance is being performed	Ph 2-5: Services Design	DG56	DAB c15 GHG Emissions Reduction	1. If reverse cycle air conditioning is installed, confirmation that gas heaters are not installed, OR **2.** Evidence that the gas heaters installed are energy efficient		No gas heaters or energy efficient gas heaters	Mechanical to demonstrate compliance	Mechanical

Act on climate change	**Water heaters** - Hot water and tempered water generation for schools must be carefully considered to ensure that a Whole of Life assessment is undertaken to minimise life cycle costs and carbon emissions - Environmentally friendly options such as solar heating (if vandal resistant) and heat pumps are preferred energy sources to minimise energy consumption.	Ph 2-5: Services Design	DG53.09	DAB c15 GHG Emissions Reduction	1. WOL cost assessment for hot water systems 2. Hydraulic drawings/schematics showing installed DHW systems		Hydraulic drawings/schematics showing installed DHW system	Hydraulic drawings	Hydraulic
Build resilience	**Site investigations for resilience** The following detailed reports/ surveys/ information should be considered in developing the business case: - Slope, drainage and erosion issues including flood risks (if any) - Geotechnical and soil conditions - Airborne pollutants - Bushfire risks - Appraisal of available services infrastructure - Climate change risk assessment must be undertaken considering at least two different climate change scenarios An environmental risk report will be required for developments proposed within sensitive natural environments or sites subject to natural risks (i.e. flood prone sites, bush fire areas).	Ph 1: Site Selection and Masterplan	DG03.02	DAB c3 Adaptation and Resilience	**1.** Detailed reports or surveys developed **2.** Environmental risk report **3.** Evidence demonstrating recommendations have been implemented and risks addressed through design responses.		Head contractor to provide reports or site survey to demonstrate compliance	detailed reports or surveys	Head Contractor
Build resilience	**Bushfire protection** Development applications on bush fire prone land must be accompanied by a Bush Fire Assessment Report demonstrating compliance with the aim and objectives of Planning for Bush Fire Protection and the specific objectives and performance criteria for the land use proposed. Local Authorities and the Rural Fire Service can provide advice on the design of buildings in bush fire prone areas. The Building Code of Australia and AS3959 "Construction of buildings in bushfire-prone areas" set out the requirements for buildings which are within close proximity to a defined bush fire zone. Mandatory landscape management strategies: - Keep the amount of fuel (leaves, twigs, logs, dead grass) in the vicinity of buildings to a minimum. - Ensure trees are located at away from buildings to avoid branches overhanging and leaves collecting on roofs. - Do not plant shrubs against buildings. - The crowns of trees planted on the hazard side of the development should not be contiguous. - Plant fire resistant trees and shrubs on the hazard side of the development to reduce the potential impact of wind, fire intensity, radiant heat, and rate of spread as well as intercepting burning embers. - Avoid combustible fencing materials. - Provide irrigation and garden sprinklers to water areas near the buildings (subject to water authority approval).	Ph 1: Site Selection and Masterplan	DG13.01	DAB c3 Adaptation and Resilience	**1.** Bush fire assessment report **2.** Statement by Architect / fire consultant outlining building strategies implemented in line with BCA and AS3959. **3.** Bush fire management plan outlining management strategies implemented **4.** Landscape plans detailing bush fire management measures implemented		Landscape consultant or relative consultant to provide drawing/reports to demonstrate compliance	Bushfire assessment report or plans	Landscape
Build resilience	**Climate change adaptation** Sites and school communities must be able to withstand natural and urban hazards and adaptively respond to climate change over time, especially for projects involving vulnerable communities e.g. climate generating exacerbated flood, storm surge, inundation, heatwaves, bush fires, extreme storm and other weather events. School facilities must be able to withstand natural hazards and adapt to shocks and stresses to avoid social and economic costs of interrupted operation and repairing or replacing damaged assets. To achieve this, increasing resilience to natural hazards must be considered in the business case development so that associated costs are budgeted. An initial assessment of natural hazards and project vulnerability must be carried out, in consultation with resilience experts, to inform the business case and identify hazards where further analysis is required. The assessment must report on at least two different timescales (2050 and 2070) and consider high emissions scenarios consistent with 2C and 4C for each timescale. The Intergovernmental Panel on Climate Change (IPCC) endorsed emissions scenarios should be used to dictate the assessed scenarios Where significant risks are identified in the initial assessment, a comprehensive climate change risk assessment must be undertaken. Any high or extreme risks identified must be addressed through design measures.	Ph 1: Site Selection and Masterplan	DG02.08	DAB c3 Adaptation and Resilience	**1.** Climate risk assessment, and **2.** Climate adaptation plan **3.** Emergency management plan	Y	Part of Green Star requirement, assessment and reports to demonstrate compliance	Climate Adaptation Plan and/or Emergency Management Plan	Head Contractor / ESD
Build resilience	**Weather protection** Circulation areas provided between administrative, staff and all student spaces (except Agriculture), should be protected from sun, rain and unfavourable winds.	Ph 2-5: Architectural Design	DG08.05	Not covered in Green Star	As built drawings showing circulation areas are protected as required		Designed to have covered walkways and verandah that demonstrate compliance to this requirement	As built drawing to show compliance	Architect
Build resilience	**Urban Heat Island Mitigation - Roof Colour** The roof colour will also have an impact on the thermal performance of the roof, therefore the product's Solar Reflectance Index (SRI) should be considered to mitigate the heat island effect. The product selected must meet the following three-year Solar Reflectance Index (SRI) requirements: For roof pitch < 15, minimum SRI of 64 For roof pitch > 15, minimum SRI of 34 Where a three-year SRI is not available, the following requirements must be met: For roof pitch < 15, minimum SRI of 82 For roof pitch > 15, minimum SRI of 39'	Ph 3-4: Product and Material Selection	DG20 Fabric	DAB c25 Heat Island Effect	**1.** Site Plan highlighting all relevant areas as referenced within the area schedule; **2.** Area Schedule listing the areas of each of the relevant site elements and where relevant, the SRI values and referencing plan drawings for the site; and **3.** Supplier Documentation material data sheet for compliant roofing and hardscape materials.		Part of Green Star requirement, architectural plans to demonstrate compliance. Light-coloured roofs to be specified to minimise heat gain and the heat island effect.	Architectural plans to demonstrate compliance	Architect
Consume responsibly	**Building User's Guide** Produce a Building User's Guide to enable the client to understand the building systems and operate systems to maximise efficiency. This must: - Clearly and concisely describe the operation of building and its services - Detail a reasonable maintenance program - Advise the user of the most suitable replacements for consumables	Ph 7-9: Construction, Commissioning Post Occupancy and Operation		DAS c4 Building Information	**1.** Building user's guide		Head contractor to provide Building User's Guide	Building User's guide	Head Contractor
Consume responsibly	**Stormwater management** Must aim to minimise the transportation of toxicants to waterways and other offsite environments, and maintain the existing hydrological regimes. Due diligence for flooding must be done early to inform building and landscaping design	Ph 1: Site Selection and Masterplan	DG2.4.3	DAB c26 Stormwater	**1.** Stormwater modelling report showing stormwater pollution and flows. **2.** Civil / Hydraulic drawings showing management measures. **3.** Water sensitive urban design report (if WSUD was use4)		Civil to demonstrate compliance	Civil drawings showing management measures	Civil/Hydraulic
Consume responsibly	**Drinking water catchment protection** For developments within drinking water catchment areas, a water cycle management study is to be included with the Development Application for Education Facility developments involving: - Agriculture facilities - Biosolids and effluent re-use schemes - Sewerage systems or works (including package sewerage treatment plants) - Stormwater or works involving the disposal of untreated runoff	Ph 1: Site Selection and Masterplan	DG51.07	GSC c24 Integrated Water Cycle	**1.** Water cycle management study **2.** Evidence that recommendations in the study have been followed / implemented		Not applicable.		Civil/Hydraulic
Consume responsibly	**Hazardous materials** Where a new school is to be developed a Hazardous materials study is to be conducted, including: - Asbestos Containing Materials (ACM) - Synthetic Mineral Fibres (SMF) - Polychlorinated Biphenyl's (PCB) - Lead Paint - Ozone Depleting Substances Any existing structures and all parts of the site should be examined in order to determine the presence of hazardous materials before commencement of any renovation or demolition. Inspection should be conducted in accordance with DG48. Where hazardous materials are found a Hazardous Materials Management Plan should be prepared	Ph 1: Site Selection and Masterplan	DG48.01	DAB 24.2 Contamination and Hazardous Materials	**1.** Hazardous materials study / site inspection report / survey **2.** Management plans for hazardous materials identified **3.** Remediation strategies implemented **4.** Environmental auditor certificates / clearance certificates		Head contractor to provide Hazardous Materials Management Plan	Hazardous materials management plan	Head Contractor

Consume responsibly	**Operational waste** A waste storage area must be included in all new school sites. The provision of space must include source separation including bin stations and appropriate signage of waste and receptacles for multiple waste streams, including: - Organics - Comingled containers - Paper & cardboard - Container deposit scheme - Soft plastic - General waste Designers must refer to AS 4123.7 Mobile waste containers - Colours, markings, and designation requirements for further guidance on bin colour, waste stream and waste type. Safe methods for vehicle access and the transfer of waste must also be considered. For new and refurbished schools, an operational waste management plan (OWMP) must be developed to establish operational waste targets, identify opportunities for reuse and recycling in the operation of the facilities and make adequate provision for the facilities to accommodate for the OWMP. The OWMP must address all requirements from DG 2.7.2	Ph 2: Concept Design - Space planning	DG02.7.1	DAB c8 Operational Waste	Operational waste management plan Operational waste reports showing diversion rates		Head contractor to provide Operational Waste Management Plan	Operational waste management plan	Head Contractor
Consume responsibly	**Building flexibility** Position structural members considering the future flexibility of the structure. Avoid ad hoc placing of columns internally, giving preference to uniformity in layout. Design all internal walls as non-load bearing to enable future flexibility.	Ph 2: Concept Design - Space planning	DG21.1.16	Not covered in Green Star	As built drawings or statement by relevant professional		Drawing to demonstrate building flexibility/statement	As built drawing to show compliance	Architect
Consume responsibly	**Hydraulic services** Hydraulic services should: - Support sustainable design principles including reducing water consumption and waste production. - Appropriately treat any trade waste to ensure minimal environmental impact - Be accessible and serviceable - easy to maintain with minimal impact on school use when maintenance is being performed - Use products with a long life span – many hydraulic services are concealed so durability is essential	Ph 2-5: Services Design	DG51.01	DAB c18 Potable Water	**1**. Hydraulic report showing sustainability initiatives implemented to reduce potable water consumption **2.** As built drawings showing trade waste arrestors		Fixtures to meet or exceed the minimum WELS rating requirement. Letter from Hydraulic to show the sustainability initiatives implemented to reduce potable water consumption	Letter from Hyd	Hydraulic
Consume responsibly	**Water sub-metering** In addition to the main water meter for the site provide sub meters for the following: - Mixed irrigation systems - Laboratory buildings - Amenities blocks - Canteens - Any other major water use on the site	Ph 2-5: Services Design	DG53.04	DAB c6.0 Metering	**1**. As built hydraulic drawings		As-built hydraulic drawing to show the sub-meters and comply the requirement	Hydraulic drawings	Hydraulic
Consume responsibly	**Rainwater collection** Include roof water harvesting and tank storage in new schools and where practical in existing schools to reduce the demand on drinking water supplies. Tank water can connect to drip irrigation systems for adjacent landscape/gardens with the major preference being for gravity fed supply to minimise ongoing maintenance. The rainwater tanks must be connected to toilets for toilet flushing. If this is not feasible, approval must be granted by SINSW.	Ph 2-5: Services Design	DG53.14 DG2.4.2 DG53.01	DAB c18B.2 Rainwater Reuse	**1.** As built hydraulic drawings showing tank connection to end uses and capacity		Drawing to show tank connection to end uses and capacity	Hydraulic/civil drawings to demonstrate compliance	Civil/Hydraulic
Consume responsibly	**Fire system water reuse** Where schools are required to install a sprinkler system for fire safety, it is recommended to install a closed loop system must be installed to capture and reuse fire systems testing and maintenance water, or by using an alternative non-potable water source.	Ph 2-5: Services Design	DG2.4.2	DAB c18B.5 Fire System Test Water	Fire engineering report		Not applicable.		
Consume responsibly	**Ground water** Where ground water is available for use for irrigation purposes in drought affected locations, enquiries must be undertaken with the Department of Planning, Industry and Environment to determine the suitability of a ground water system.	Ph 2-5: Services Design	DG53.03	DAB c18 Potable Water	1. Relevant due diligence report / investigation		Not applicable.		
Consume responsibly	**Trade waste** Arrestors for acid, grease, plaster and clay of adequate capacity must be installed to treat wastewater from science laboratories, kitchens, art rooms and canteens as required in DG52.	Ph 2-5: Services Design	DG52	Not covered in Green Star	**1.** As built drawings showing trade waste arrestors or **2.** Letter by Hydraulic Engineer confirming arrestor have been installed as required		Arrestors to be installed where required	Hydraulic design to show arrestors where required	Architect Hydraulic
Consume responsibly	**Water Fixture efficiency** All products must be rated to AS 6400 to the following minimum WELS ratings: - Tapware to 5 star flow rating requirements - Showers to have 3 star flow rating requirements - Water Closet Pans to 4 star flow rating requirements - Urinals to 5 star flow rating requirements - Flow restrictors can be used to minimise water usage and wastage for staff amenities - Taps with timed flow can be used to minimise water usage and wastage in student amenities. - New and replacement urinals must use manual in lieu of automatic flushing mechanisms. A microwave-activated urinal flushing system may be used as an alternative. In any case, all new water-using appliances must be at least 0.5 stars above the average WELS star rating by product type, except toilets and urinals, which must be purchased at the average WELS star rating. Where WELS rating is not available, use the alternative WaterMark rating scheme.	Ph 3-4: Product and Material Selection	DG53.02 DG2.4.1	DAB c18B.1 Potable Water - Sanitary Fixture Efficiency	1. Schedules of materials, fixtures, fittings and equipment with WELS/WaterMark ratings, demonstrating compliance and identifying those with flow restrictors and timed flow.		Fixtures to meet or exceed the minimum WELS rating requirement. FFE Schedule to demonstrate compliance	FFE Schedule to show compliance	Head Contractor Architect
Consume responsibly	**Life cycle assessment (environmental)** Environmental impacts of products and materials has been assessed and inform material selection	Ph 3-4: Product and Material Selection	DG01.03	DAB c19A - Life cycle assessment	Life cycle assessment report	Y	LCA Specialist to provide Life Cycle assessment report.	LCA Report, Peer Review Statement, Reference Building and proposed building documents	ESD
Consume responsibly	**Whole of life costing (WOL)** Total cost of ownership (TCO) assessment / Analysis of direct and indirect costs and benefits / Life cycle costing analysis When calculating the whole of life cost for the different materials / building elements or systems, the following must be considered: - the total initial capital cost of the system/s – including design, project management, builder and building services works in connections etc. - resources (energy and where applicable water) consumption. - Maintenance. - the replacement of component parts. - disposal costs - ecological sustainable options - durability - vandalism - safety The whole of life cost shall be calculated over the estimated life of the asset/s.	Ph 3-4: Product and Material Selection	DG01 All design guides for selection of materials and building systems	GSC c20 - Return on Investment	Life cycle costing report for relevant system		Services consultants to consider WOL in design and select systems accordingly.	Services consultants to provide WOL statement/memo to justify equipment selections.	Services consultants
Consume responsibly	**Sustainable materials** Construction materials must be selected based on the following: - Adequately and economically perform their intended functions, and also have lower adverse environmental impacts throughout their life cycle (refer to DG 3) - Contain reduced or no hazardous substances (e.g. low VOC) to ensure effective indoor environmental quality. Reduce the demand for rare or non-renewable resources. - Have low embodied energy and water. - Are made from or contain recycled materials or can be reused or recycled at the end of their useful life.	Ph 3-4: Product and Material Selection	DG02.05	DAB c21 Sustainable Products	**1.** Environmental Product Declarations of products / materials used; Product certificates (like GECA, FSC, et3) **2.** Suppliers' declarations confirming recycled contents in products **3.** Bill of quantities		Head contractor to provide Product certificate/statement to demonstrate compliance	Product certificate/statement	Head Contractor

Consume responsibly	**Sustainable timber** - No rainforest timbers, or timbers from high conservation forests, are to be used unless plantation grown. Use only recycled timber, engineered and glued timber composite products, or timber from plantations or from sustainably managed regrowth forests that is FSC, AFS or PEFC certified - All timber used is to be termite (white ant) resistant or treated to be termite resistant to the appropriate hazard level.	Ph 3-4: Product and Material Selection	DG2.5.1 DG21.05.01	DAB c20.2 Responsible Building Materials - Timber	**1.** Evidence of chain of custody **2.** Bill of quantities		Head contractor to provide Product certificate/statement to demonstrate compliance	Product certificate/statement	Head Contractor
Consume responsibly	**Built for disassembly** Consider the use of building materials which are able to be disassembled for re-use, in conjunction with considerations for the addition and removal of accommodation over time.	Ph 3-4: Product and Material Selection	DG02.07				Head contractor to provide statement to demonstrate compliance	Product certificate/statement	Head Contractor
Consume responsibly	**Concrete** - Use materials complying with AS based on the Whole of Life approach to materials selection. - Do not use breccia or dolerite in concrete mixes. - Fly ash is a manufacturing bi-product that can be used as a cement replacement but should limited to a maximum of 20% by weight of cement content.	Ph 3-4: Product and Material Selection	DG21.02	DAB c19B.1	**1.** Structural specifications and drawings **2**. Structural Engineer's report showing % cement replacement		Contractor to provide structural specifications and drawings to demonstrate compliance	Structural specification	Structural
Consume responsibly	**Construction waste** Targets must be established to increase diversion of waste sent to landfill, with a minimum diversion rate target of 90%. Consider opportunities for re-use and recycling of materials in the construction phase	Ph 7-9: Construction, Commissioning Post Occupancy and Operation	DG02.07	DAB c22 Construction and Demolition Waste	Construction waste reports showing percentage (minimum 90%) of waste re-used and recycled (diverted from landfill)		Contractor to provide construction waste report that demonstrate compliance	Waste report	Head Contractor
Consume responsibly	**Maintainability** All systems and equipment that is installed within a school is to be provided with suitable access to ensure that this equipment is safely and efficiently maintainable. In order to ensure that maintenance is available, on the completion of all buildings, drawings are to be provided showing the completed (As Built) building including all equipment and equipment access arrangements. Any mechanical ventilation system within the building must be designed to provide adequate access for maintenance, to both sides of all moisture and debris-catching components, within the air distribution system. Moisture-producing and debris-catching components include items such as cooling coils, heating coils, fan coil units, humidifiers and filters in the air handling system. The project team should demonstrate that there is a project level review process in place to ensure that the building has been designed as per the EFSG, that any issues identified have been closed out and that the outcomes can be communicated to the relevant facilities/ operations teams Maintenance required and cost of this maintenance are to be considered in assessment of the project's life cycle cost. Operation and Maintenance manuals (O&M Manuals) are to be provided, written in clear, concise English covering the various building elements, assemblies, equipment, service installations and systems incorporated into the Works.	Ph 2-5: Services Design	DG16.10 DG 01.04	DAB c2.1 Services and Maintainability Review DAB c9.1.2 Ventilation System Attributes DAB c4 Building Information	**1.** As built drawings including all equipment access arrangements for maintenance		Head contractor to provide Operation and Maintenance manuals	Operational and maintenance manual	Head Contractor
Foster connections	**Site investigations for place making / community connections** The following detailed reports/ surveys/ information should be considered in developing the business case: - Local environment/ character - Climate and microclimate - Heritage significance / impact - Appraisal of physical and visual factors affecting site development - Available transport/ road infrastructure servicing the site - Geo-technical and Soil reports will be required for each site to investigate the suitability of the topsoil and anticipated sub-grade materials for horticultural purposes. - Testing for toxic residues must be undertaken in all areas identified as being a possible risk - i.e. filled or dumped ground.	Ph 1: Site Selection and Masterplan	DG03.02	GSC c12 Culture, Heritage and Identity DAB 24.2 Contamination and Hazardous Materials	**1.** Relevant reports/surveys developed (these ideally include recommendations for further development stages) **2.** Evidence demonstrating recommendations / best practice solutions have been implemented/addressed.		PM to procure reports and/or site survey as appropriate to demonstrate compliance	Reports or site survey to demonstrate compliance	PM
Foster connections	**Ecological conservation** Schools sites must conserve for future generations, the biological diversity of genetic materials, species and ecosystems on that site and consider the surrounding natural environment. An Ecological Assessment Report must be prepared for the site in order to understand the existing conditions and future conservation strategies. The design of the facilities must provide unique and valuable environmental conservation learning opportunities and effective environmental modelling to the wider community. Schools must connect with nature and incorporate biophilic design principles. Open space must allow for exploration, and biodiversity and earth education to enhance the site's outdoor learning potential.	Ph 1: Site Selection and Masterplan	DG02.06	DAB c23 Ecological Value GSC c29 Ecological Value (incl Biodiversity Enhancement)	**1.** Biodiversity or ecological assessment / local flora and fauna survey **2.** Ecological Assessment Report which documents the following: - ecological values (current, future, and past) identified for the site and their protection measures - ecological impacts from light and noise pollution and water quality and their mitigation requirements - existing vegetated areas and biodiversity values being retained how biodiversity has been considered within the project's material supply chain - list of management strategies to protect the integrity of ecological values throughout project planning, construction, and occupancy community and local stakeholder expectations including Aboriginal or Torres Strait Islander groups and environmental groups - Adequate due diligence must be conducted where an area of biodiversity or high ecological value is identified on the site, where at least 50% of this area must be retained. **3.** Biodiversity management plan describing measures for the conservation and protection of threatened species or communities, biodiversity enhancement, tree protection, etc. **4.** Evidence demonstrating measures have been implemented to protect and enhance endangered species / ecological communities identified; to preserve or re-establish native flora; etc.		PM to procure Biodiversity Management plan that demonstrate compliance	Biodiversity Management Plan	PM
Foster connections	**Productive landscape** Consider including opportunities for development of community garden within the site and relationships with community groups for this to occur.	Ph 1: Site Selection and Masterplan	DG2.06	GSC c14.2 Local Food Production	Site plan demonstrating location and size of community garden		Landscape plans to demonstrate compliance, otherwise lodge departure with SINSW	Landscape to demonstrate community garden, otherwise departure with SINSW	Landscape
Foster connections	**Bicycle storage** Provide 1 space for every 20 students to AS2890.3 standard	Ph 2: Concept Design - Space planning	SG552 4.36	DAB c17 Sustainable Transport			Provide bicycle storage as per required	Architectural plans to demonstrate compliance	Architect
Foster connections	**Community use of facilities** Some school facilities are used out of hours for activities such as weekend church groups, sport events and public meetings. Liaise with the Project Director to gain an understanding of any shared use, or community use arrangements that are being considered for the site. New schools should be designed so that direct access to the open play space, fields , hall and gym can be achieved without the public gaining access to the buildings.	Ph 2: Concept Design - Space planning	DG16.08 Department of Education's Community Use of School Facilities Implementation Procedures	DAB c30B Community Benefits	**1.** Confirmation by the Architect that direct access has been provided to open space and any other facilities that could be shared with the community. **2**. A list of community engagement activities undertaken to develop a community benefits strategy. **3.** Plans clearly outlining how the outcomes from the community benefits strategy have been implemented in the project **4.** Joint-use or lease agreements where already in place		Architect to confirm that direct access has been provided to open space and could comply with this requirement	Architectural plans to demonstrate compliance	Architect

Foster connections	**Open play space** Open play space must be provided for students to access during recess, lunch breaks and for outdoor learning. Open play space can be comprised of - Paved and grassed areas - Rooftops and terraces - Covered outdoor areas The designated open play space must be easily monitored and managed by school staff. Where a joint use agreement can be negotiated with a local council or land owner, the required play space can be located off-site, providing the facilities are - In close proximity to the school - Easily accessible - Safe and secure Designs must aim to achieve a minimum of 10m2 per student. Where this figure is not achievable the proposed m2 per student of the completed project must not be less than the existing m2 per student currently on the site.	Ph 2: Concept Design - Space planning	DG10.03	Not covered in Green Star	Plan view drawings showing provision of open space		Architectural drawings to demonstrate compliance with open play space	Architectural drawings	Architect
Foster connections	**Staff room** Staff rooms should adequately accommodate staff work and recreation, and focus on indoor environment quality, enjoyment and interaction through provision of the following: •Daylight • Ventilation • Views • Landscaping/Indoor Plants • Acoustic Comfort	Ph 2: Concept Design - Space planning	EFSG Staff Unit	GSI c Amenity Space	**1.** Extracts from the EFSG requirements for staff rooms **2.** Evidence of staff room delivered accordingly		Architectural drawing to demonstrate the staff rooms are designed as required	Architectural drawings	Architect
Foster connections	**Reconciliation action plan (RAP)** The project should adopt formalised steps to provide opportunities for Aboriginal and Torres Strait Islander peoples Projects must implement strategies during design, construction and operation that contribute positively towards reconciliation with Australia's first people and address social inequalities within Australia is between Indigenous and non-Indigenous Australians. The project demonstrate a relationship to, and a role in delivering the action items within the Department of Education's RAP. This could include incorporation of Indigenous design strategies and indigenous designers, celebration of indigenous culture on the site through art or landscape, and procurement from indigenous suppliers and workers. Refer to the GA NSW 'Designing with Country' Discussion paper for guidance and examples. The project must adopt all relevant requirements within the NSW Government's Aboriginal Procurement Policy (January 2021)	Ph 2-5: Architectural Design	Department of Education's Reconciliation Action Plan NSW Government Aboriginal Procurement Policy GANSW 'Designing with Country' discussion paper x	DAB c30D Reconciliation Action Plan	**1.** Evidence of the project's relationship with the RAP, e.g. actions implemented in line with RAP, etc.		PM to procure Reconciliation Action Plan	Reconciliation Action Plan	PM
Foster connections	**Security** Safety in Design and Crime Prevention Through Environmental Design (CPTED) principles are to be implemented in project planning stage. Advice on the electronic surveillance systems can be sought early in the design phase. CCTV systems are required in several locations where indicated in the Rooms and Spaces Technical Data table, including: - Secondary clinic - Primary sick bay - Library	Ph 2-5: Services Design	DG14.10 DG65.08 DG65.10	GSC c15 Safe Places	**1.** Crime risk assessment or equivalent **2.** Evidence of designing out crime principles implemented **3.** Security services plans, schedules and forms by School Security Unit (SSU) **4.** SSU specification and evidence of input on project specification		School Security Unit to provide Security Services Plans, schedules and forms	Security services plans, schedules and forms	Head Contractor
Foster connections	**Digital infrastructure** New buildings and refurbishments are required to provide a common wireless solution compatible across the school, providing a consistent user experience and support mechanism. This involves the replacement of existing legacy wireless equipment, such as wireless access points and site switches	Ph 2-5: Services Design	DG64.12.02	GSC c22.2 Digital Infrastructure	**1.** Contracts describing the network infrastructure specification and operational requirements		Head contractor to provide contracts that describes the network infrastructure specification and operational requirements	Network contracts	Head Contractor
Foster connections	**Sustainable Transport Planning / Transport Assessment** Transport planning must prioritise the delivery of feasible, connected networks and rectify transport deficiencies. The **School Transport Assessmen**t process must prioritise critical transport infrastructure to satisfy community expectations and statutory planning obligations. The assessment seeks to address school travel demand efficiently, safely and sustainably by maximising the most active and sustainable transport modes and reducing car parking capital expenditure and car travel demand. The School Travel Plan must be developed to inform the design response, construction traffic management, travel plan and post-occupancy operations to meet daily travel demand to school	Ph 1: Site Selection and Masterplan	Schools Transport Practice Note	DAB c17 Sustainable Transport	1. Transport Assessment, which must address: • A review of the school's travel demand; • The establishment of transport modes to promote during construction and post-occupancy; • Identification of transport improvements required to meet school travel demand; • Actions to inform the site design, master plan, Construction Traffic and Pedestrian Management Plan and Travel Plan; • Actions to address road safety concerns; and • Compliance with the Transport Planning Advisory Note.		PM to procure Transport Assessment to demonstrate compliance with this requirement	Transport Assessment	PM
Unlock human potential	**Green cleaning** Designs should support the implementation of a Green Cleaning policy for the school, this may include: - Appropriate cleaning areas are to be provided to safely store chemicals and equipment. - Hand washing stations - Use of HEPA filtration in vacuum equipment - Use of materials and surfaces that are easily cleaned	Ph 7-9: Construction, Commissioning Post Occupancy and Operation	WoG Facilities M	GSP c6 Green Cleaning	**1.** WEB Clean School User Guide **2.** Green Cleaning specifications		SINSW to provide Green Cleaning specification which complies with this requirement	Green Cleaning Specification	SINSW
Unlock human potential	**Healthy canteen policy** The NSW Healthy School Canteens Strategy applies to all NSW Government schools (primary, secondary and central schools) with a canteen. The school should play a role in encouraging healthy dietary options in an effort to help reduce childhood obesity through food provided in the school canteens. As such, School canteens should be designed to encourage onsite preparation, storage, display and promotion of healthy 'everyday' foods.	Ph 2: Concept Design - Space planning	Department of Education's Healthy Canteen Policy	DAB c30D Integrating Healthy Environments	**1.** Research report behind Healthy Canteen Policy **2.** Evidence that policy initiative has been incorporated into the school under assessment.		SINSW to provide research report behind Healthy Canteen Policy	Develop reports to demonstrate compliance	SINSW
Unlock human potential	**Daylight glare control** Discomforting glare and brightness contrasts must be avoided. Designers must seek to: - Exclude direct sunlight from all learning spaces, libraries, administrative offices and staff studies for the period of 9.00am to 3.30pm including Eastern Daylight Saving Time between 21st September to 21st March (equinoxes). - Exclude direct sunlight from desk level in all learning spaces between 9am and 3:30pm. 'Sun exclusion and glare control can be achieved by the use of elements such as sun shades, eave extensions, tinted glazing, screens, vertical blades and the like'. Glare must only be controlled by blinds as a last resort. Designers must prepare sun diagrams in the design phase as a minimum requirement.	Ph 2-5: Architectural Design	DG12 DG07.01	DAB c12.0 Glare Reduction	**1.** Daylight glare modelling report / sun diagrams showing direct sunlight has been excluded as required. **2.** Drawings supporting inputs of model, showing location of blinds and any other glare control device		As-built drawing to have eaves/shading to the facades that has direct sunlight	Architectural drawings and/or daylight report	Architect

Unlock human potential	**Acoustic Performance** Design of internal spaces must address the following Acoustic outcomes: - **Internal Noise Levels** : An internal noise level assessment must be carried out for all new buildings to ensure comfortable acoustic conditions for the spaces occupied. The internal noise levels within the space must meet the limits stipulated in Table 11.06.1 of Section 11.06 Acoustic Performance Guidelines or be within the range stipulated in Table 1 of the AS/NZS 2107:2016 standard. The more stringent of the two should be met. - **Room to room noise control:** Sound insulation must be provided in accordance with the requirements of Table 11.06.2 "Guideline airborne and impact sound insulation requirements" and Table 11.06.3 "Sound insulation requirements (minimum design Rw)" . Doors, walls, operable walls, partitions etc. must meet prescriptive requirements for acoustic separation to provide privacy and comfort within relevant spaces. - **Minimum Speech Transmission** Index is > 0.60 for Teaching and learning spaces as per Table 11.06.4 - **Reverberation**: Reverberation time is fundamental to describing the 'acoustical liveliness' of a room. The reverberation time within a room must be within the range stipulated in table 11.06.1 of Section 11.6 Acoustic Performance Guidelines or Table 1 of the AS/NZS 2107:2016 standard. The more stringent of the two should be met.	Ph 2-5: Architectural Design	DG 11.06 DG 11.03 DG 11.02	DAB c10 Acoustic comfort	**1.** Report by qualified acoustics consultant demonstrating noise measurements are compliant. **2.** Detailed Drawings indicating sound insulation details and other relevant acoustic design features.		Acoustic report and/or drawings to demonstrate compliance	Acoustic report to confirm compliance with all acoustic requirements	Acoustic
Unlock human potential	**Noise emission (to the environment)** Generally noise emission to the environment from mechanical services noise sources (such as air conditioners) are the subject of a development consent conditions. In NSW the development consent conditions will refer to the Industrial Noise Policy (INP) or Local Council requirement. Where no condition regarding noise sources exists for a school development, noise emission from such sources should be designed, in-principle, to satisfy the requirements of the Industrial Noise Policy.	Ph 2-5: Architectural Design	DG11.04	Not covered in Green Star	1. Report by qualified acoustics consultant		Acoustic consultant to demonstrate compliance	Acoustic consultant to confirm compliance with acoustic design certificate for construction	Acoustic
Unlock human potential	**Fly free indoors** Fly screening must be provided in all schools to the doors, windows and other openings in food preparation, biology, and non-water-closet toilet spaces or where specifically nominated in the EFSG. Schools in localities where fly incidence constitutes a health hazard (especially trachoma or other nuisance) will require fly screens to all opening sashes.	Ph 2-5: Architectural Design	DG31.01	Not covered in Green Star	As-built drawings showing fly screening has been provided as required		Fly screens to where required, otherwise not applicable	If these areas are applicable to the proposed development, provide fly screening	Architect
Unlock human potential	**Accessibility** -All new facilities must meet current DTS provisions of the NCC and the associated standards. Generally AS 1428.1 is the minimum design standard for access and mobility. However, it is DoE's policy that any enhanced requirements noted in AS 1428.2 be incorporated in any new design. -Additionally, DoE have enhanced circulation requirements as noted in DG / CIRCULATION - Provide hearing augmentation system for areas that have amplification, generally within Gymnasium, libraries, movement studios and Communal Halls, provide a system to assist the aurally challenged to hear music and speech within the main auditorium and on the stage - Provide the International Symbol for Deafness to indicate that an assistive hearing device is installed.	Ph 2-5: Architectural Design	DG19.01 DG65.14	DAB 30D Universal design	**1.** Accessibility plan **2.** As-built drawings or other evidence demonstrating that minimum and enhanced accessibility requirements have been provided for walkways, corridors, ramps, etc. **3.** Photographic or other evidence of signage installed		Head contractor to provide photographic or other evidence of signage installed	Signage evidence	Head Contractor
Unlock human potential	**Access to Views** Building design must ensure that at least 60% of primary occupied spaces have a clear line of sight to high quality internal or external views. The space must be within 8m from the view. High quality views include: External views - vegetation, body of water, sky, or frequent outdoor movement (people, vehicles, animals) Internal views - landscaped area, water features, atrium' Note: Primary Spaces are defined as spaces that where students or staff are expected to work, or remain for an extended period of time, typically longer that 2 hours. This includes classrooms, laboratories, computer labs and office/administration areas.	Ph 2-5: Architectural Design	DG2.10	DAB c12.2 Views	**1.** Views Calculations and Mark-up this must be done in accordance with the GBCA's *Daylight and Views Hand Calculation Guide:* https://www.gbca.org.au/uploads/79/35919/Green%20Star_Daylight%20and%20Views%20Hand%20Calculation%20Guide%20May%202015%20RELEASE.pdf)	Y	Calculations and Mark-up to demonstrate compliance with the requirement	View Calculations and Markup according to GBCA	Architect ESD
Unlock human potential	**Access to Daylight** Designers must seek to maximise natural daylight in all learning and administration spaces to improve indoor amenity and create a pleasant environment and reduce energy usage through windows and skylights - Access to high levels of daylight must be ensured for at least 40% of primary occupied spaces per floor. A space is considered to have high levels of daylight if: the space has minimum 160 lux due to daylight during 80% of the nominated hours OR the following requirements are met: No overshadowing – external shading should not impinge on the direct 25 degree line from centre of the window Minimum 40% Visual Light Transmittance (VLT) for building glazing' Note: Primary Spaces are defined as spaces that where students or staff are expected to work, or remain for an extended period of time, typically longer that 2 hours. This includes classrooms, laboratories, computer labs and office/administration areas.	Ph 2-5: Architectural Design	DG2.3.1 DG12	DAB c12 Visual Comfort	**1.** Daylight modelling report demonstrating how natural daylight has been maximised in all habitable spaces; and **2.** As built drawings demonstrating that the model accurately represents the building (i.e. window size and location; skylights installed, etc.); and **3.** Specifications supporting inputs used in modelling (e.g. skylights and glass specs)	Y	Daylight modelling to demonstrate compliance	Green Star hand calculation and/or daylight modelling	Architect ESD
Unlock human potential	**Ventilation and Indoor Air Quality** The maximum Co2 concentration must not exceed **1,500ppm** for more than 20 consecutive minutes in each day A ventilation strategy must be developed to ensure that sufficient ventilation is provided to all spaces to meet the requirements of the BCA/NCC and associated standards. Specifically ventilation equipment must be designed from a whole-of-life perspective and support healthy indoor environments, energy efficiency and ease of maintenance. This must also meet requirements for: - Natural ventilation mode and cross ventilation: in line with DG5.01 - Mechanically Assisted cross ventilation: In two storey blocks where cross flow ventilation is not possible to the lower floor, mechanically assisted cross ventilation is to be provided to the lower floor learning spaces nominated in the EFSG, the design must adhere to DG57.18. - Roof ventilator control: in line with DG65.16 - Wind powered roof ventilators: Designed to suit local ambient climatic conditions to ensure correct sizes, locations and numbers as detailed in DG57.14 - Sanitary Spaces sufficient natural ventilation or mechanical ventilation, to disperse odours and /or humidity in line with - Cross ventilation is to be used where possible. - Provide mechanical ventilation to all Disabled Toilets. - Ventilation in storage spaces in line with DG5.05 - Ventilation in permanent learning spaces and libraries in line with DG55 - Outdoor air requirements and control of Indoor CO2 levels - designs must adhere to DG55.02 - Ventilation in printing rooms: The ventilation system is to be designed to serve the whole room and is not intended to provide localised exhaust at equipment. Adhere to ventilation requirements set out in DG57.07. - Chemical store ventilation: Provide mechanical exhaust system with high and low level exhaust points to all chemical stores, with a minimum of 15 air changes per hour flow rate. Adhere to ventilation requirements set out in DG57.09	Ph 2-5: Services Design	DG57.01 DG05.04 DG05.05 DG57.16 DG05.01 DG57.18 DG05.02 DG37 DG65.16 Thermal Comfort and Indoor Air Quality – Performance Brief	DAB c15 GHG Emissions Reduction	**1.** Cooling system strategy including WOL analysis **2.** Concept plans **3.** Construction drawings **4.** Trade-based specification **5.** As built drawings, including indication of windows and cross ventilation		Mechanical design to demonstrate compliance	Mechanical design to incorporate	Mechanical

Unlock human potential	**Lighting comfort** - Consider the furniture layouts to determine the orientation of luminaires. Especially when positioning luminaires in Materials Technology spaces to ensure adequate illumination on machines and work surfaces; - avoid potential stroboscopic effects and avoid shadows from ductwork - Mount luminaires as high as possible, but generally no higher than 4000mm AFFL (excluding Gymnasiums and Halls), to improve luminance uniformity and reduce direct glare in the direction of normal view - The standard lamp colour temperature is 4,000°K, except in certain toilet areas where the Design Guide requires the use of blue colours. - The Colour Rendering Index (CRI) for light sources must be minimum 80 or higher - Compliance with the uniformity requirements stipulated in Table 3.2 of the AS/NZS 1680 standard should be demonstrated by the presentation of the output from lighting design software. - The Unified Glare Rating (UGR) must be calculated in accordance with the procedure outlined in Clause 8.3.3 of AS/NZS 1680.1:2006 standard, and the calculated value must not exceed the maximum values specified in Table 8.2 of the standard - The maintained illuminance levels must meet the recommended levels as specified in the AS/NZS 1680 standard., and the maintained illuminance values achieve a uniformity of no less than the values given in Table 3.2 of AS 1680.1:2006, with an assumed standard maintenance factor of 0.8. - To ensure flicker-free lighting, the following luminaire requirements should be considered: LED lighting – electronic drivers with 12-bit or greater resolution - Modelling must provide output that clearly demonstrates that the proposed design is compliant with the standards including but not limited to the parameters listed in DG 63.03.02	Ph 2-5: Services Design	DG63.03	DAB c11 Lighting Comfort DAB c11.1 General Illuminance and Glare Reduction	**1.** Lighting drawings **2.** Architectural drawings **3.** Lighting specifications / schedules 4. Product data sheets **5.** Isolux plot drawings **6.** Lighting modelling report showing compliant uniformity and UGRs		Electrical design to demonstrate compliance with the requirement	Elec drawing Lighting calculation reports	Electrical
Unlock human potential	**Thermal comfort** The inclusion of active cooling within school facilities is directed by the Department's Air Cooling policy: 2.1 Schools with a long term average mean maximum January temperature of 33 oC and above: Generally, air conditioning is to be provided to all school buildings. 2.2 Schools with a long term average mean maximum January temperature of below 33oC: Air conditioning is to be installed in all permanent learning spaces and libraries forming part of each projects scope. - Thermal modelling is undertaken to demonstrate that learning spaces and libraries have been designed to achieve a predicted mean vote (PMV) of +/- 1 for 95% of occupied hours	Ph 2-5: Services Design	DG06.03 DG55.01 DG55.02	DAB c14 Thermal Comfort	**1.** Mechanical drawings showing HVAC systems installed, or **2.** Confirmation from sub-contractors that services have been installed and commissioned as required; and **3**. Modelling report showing required PMV is achieved. Modelling report to be done in line with methodology described in Draft thermal comfort and indoor air quality interim performance brief for DG55			Mech Design	Mechanical
Unlock human potential	**Microbial control** As a measure to prevent legionella, heated water to hand basins, showers etc. shall be stored at temperature above 65 C. Thermostatic mixing valves are to be used for tempered water generation at each point of use. Valves need to comply with microbe disinfection requirements - "Code of Practice for Thermostatic Mixing Valves NSW" as approved by the NSW Health Department.	Ph 2-5: Services Design	DG51.09 DG53.11	DAB c28 Microbial Control	1. Letter by hydraulic engineer confirming hot water is stored above 65 deg and that valves comply with code of practice.		Hydraulic to provide letter.	Letter confirming compliance.	Hydraulic
Unlock human potential	**External access lighting** External Access Lighting shall be provided to illuminate building entrances, footpaths, sheltered walkways, roadways and car park. External Access Lighting must: - Be minimal and designed to prevent glare to pedestrians, nearby residents and to motorists. Evidence of compliance with AS4282, AS/NZS 1158 and other applicable Australian Standards must be provided by the designer. - Be located so as to link various sources of illumination such as street lighting (for carpark and roadways) and internal security lighting (for footpaths, walkways and entrances). - Illuminate building entry doors. - Highlight 'accident-prone' areas such as changes in level, stairs and ramps. - Provide vertical illumination.	Ph 2-5: Services Design	DG63.08.01	DAB c27.0 Light Pollution to Neighbouring Bodies	**1.** As built drawings indicating the location of all external luminaires **2.** Letter by lighting designer describing glare prevention measures		Electrical drawings indicating the location of all external luminaries	Elec drawing	Electrical
Unlock human potential	Low VOC-emitting materials All surface coatings, and other volatile organic compound (VOC) emitting products including adhesives, sealants, carpets, carpet tiles, and carpet underlays, must be made from low-VOC emission materials. - Paints must meet the limits stipulated in the Australian Paint Approval Scheme's (APAS) VOC limits for low VOC paints. - Paints, adhesives and sealants must not exceed the maximum VOC limits stipulated in the Green Star Buildings rating tool. - Carpets must not exceed the total VOC limits stipulated in the Green Star Buildings tool.	Ph 3-4: Product and Material Selection	DG2.5.2	DAB c13 Indoor Pollutants	**1.** Product specifications, certificates, safety datasheets that demonstrate low-VOC contents **2.** Bill of quantities		Head contractor to provide product specifications, certificates, datasheets that demonstrate compliance with VOC contents	Product certificate/statement	Head Contractor
Unlock human potential	**Low formaldehyde-emitting materials** Only low formaldehyde-emitting engineered wood products should be used, such as those that meet the Australian Standards for formaldehyde emission limit E1 (NICNAS classification) or lower. The engineered wood products must not exceed the emissions limits stipulated in the Green Star Buildings rating tool. Engineered wood products include particleboard, plywood, Medium Density Fibreboard (MDF), Laminated Veneer Lumber (LVL), High-Pressure Laminate (HPL), Compact Laminate and decorative overlaid wood panels. This requirement excludes formwork.	Ph 3-4: Product and Material Selection	DG2.5.2	DAB c13 Indoor Pollutants	**1.** Product specifications, certificates, safety datasheets that demonstrate low-formaldehyde contents Bill of quantities		Head contractor to provide product specifications, certificates, datasheets that demonstrate compliance with formaldehyde contents	Product certificate/statement	Head Contractor
Unlock human potential	**Acoustic post-occupancy evaluation** Post Occupancy evaluations are often undertaken to assess the performance of recently completed or existing facilities. Where a Post Occupancy Evaluation is to be undertaken it should be conducted by the project team or acoustic engineer and should be undertaken of selected acoustic parameters only. Evaluation must include (as per the above criteria) - Internal noise levels, - Room acoustics, - Noise emission, - Room-to-room acoustics performance The noise measurement and documentation must be provided by a qualified acoustic consultant and in accordance with AS/NZS 2107:2016 Measurements shall be conducted in at least 10% of regularly occupied spaces.	Ph 7-9: Construction, Commissioning Post Occupancy and Operation	DG11.07	GSP c13 Internal Noise Levels	**1**. Commitment by SI to conduct acoustic post-occupancy evaluation		Acoustic report to demonstrate compliance	Acoustic report to confirm compliance with all acoustic requirements	Acoustic
Unlock human potential	**Pesticide free environments** Schools must be designed, constructed and maintained, without using chemicals for termite and other pest control. No chemical pesticides and termicide to be used. Preventive treatments to be by physical means and careful design to minimise risk	Ph 7-9: Construction, Commissioning Post Occupancy and Operation	DG2.5.3	Not covered in Green Star	Statement by head contractor that no pesticides or termites have been used.		Head contractor to provide statement that no pesticides or termites have been used	Statement of compliance	Head Contractor
Unlock human potential	**Healthy Places** The design of the project should address five key principles for Healthy Places, as defined in Green Star Communities credit 9.3. These are: - Walkability - Active and public transport, - Wayfinding -Good public space design - Social interaction	Ph 2-5: Architectural Design	DG2.5.4	Healthy Places [GSC 9.2]	**1.** Narrative providing examples of how each principle is being addressed, with examples from the Masterplan Report and Traffic/Transport Plan		As-built drawing to demonstrate that the design has address the five key principles for healthy places	Architectural drawings to demonstrate compliance	Architect

APPENDIX B – GREEN STAR MATRIX

greenstar Buildings

Project:	New Primary School at Wilton Junction	**Revision**	Rev K
Prepared by	GT/LG	**Date**	7/03/2025

Registration Date	12/12/2022	**Targeted GS Rating**	5 Star	
Climate Positive Pathway	Not Required	**Points targeted**	38	(minimum 35)
Minimum expectations met	Yes	**Buffer points**	3	

	Credit	Criteria Type	Points Available	5 Star Targeted	Green Star Compliance Requirements	Example Evidence	ESD (GSAP) Comments	Project Team Comments	Responsible Parties: Lead	SINSW	PM/HC	ESD	Architect	Landscape	Mechanical	Electrical	Hydraulic	Fire Service	Acoustic	VT	Waste	Civil	Structural	Traffic
Responsible			**17**	**3**																				
1	Industry Development	Credit Achievement	1	**1**	• At least one GSAP must be engaged as part of project team for the duration of the project. • Disclose costs of sustainability to GBCA by completing the 'Green Star Financial Transparency disclosure template' and provide a statement in support. • Market building achievements by providing professional photos and information to GBCA for a case study; copies of marketing material; samples of information to be displayed prominently to the public/users; plans/photos of where the certification will be displayed.	• Letter of appointment and scope of works for GSAP. • Sample meeting minutes demonstrated GSAP Input. • Letter from client confirming GSAP fulfilled their responsibilities. • Completed Green Star Financial Transparency disclosure template • Statement or report from quantity surveyor, project manager or Green Star AP. • Professional photos, developed samples of marketing materials, samples of information on sustainability & plans/photographs showing GS certification.	• Appoint GSAP from the start of the project. Contractor's ESD to hold valid GSAP status. Project GSAP: - Phase 1 to 3 - Gary Tang (JHA) - Phase 4 to 9 - TBC • GSAP must be appointed as one of the Green Star "Project Contacts" • Complete Green Star Financial Transparency disclosure template when required. • Provide support material for Green Star case study when required.	***06/10 JHA ESD (gary.tang@jhaengineers.com.au)*** - Financial transparency disclosure template requires the design team to advise Documentation Cost for each Green Star credit targeted and Head Contractor to advise the Implementation Cost for each Green Star credit targeted. Design team to provide prelim numbers before tendering and refine at 100% DD. ESD to provide a standard form for disciplines to complete at Stage 3 SD. - Support material for Green Star case study is only required after th project is certified.	ESD	X	X	X											
2	Responsible Construction	Minimum Expectation	**Mandatory**		• Builder has EMS certified to AS/NZS ISO14001, BS7750 or EU EMAS. • Site specific EMP is developed to cover all project works including demolition, excavation & construction and implemented from start of works. • 80% of construction waste is diverted from landfill. Waste contractor and processing facility to provide *'Disclosure Statements'* demonstrating compliance with *'Green Star Construction and Demolition Waste Reporting Criteria'* (target increased to 90% for an additional point). • Builder to provide sustainability training to all contractors/subcontractors onsite >3 days.	• An auditor report showing compliance with EMS. • Demolition or Site Drawings indicating the structures at the time of purchase, extend of demolition and retained structure and façade. • Cumulative waste report over the entire duration of construction and demolition work. • Disclosure statement outlining how the contractor or facility aligns with GS Construction & Demolition Waste Reporting criteria. • Evidence of Training materials and register of Attendance. • Compliance Verification Summaries from waste contractor & waste processing facilities.	Head Contractor to provide AS/NZS ISO14001 Certificate, EMP, construction waste management plan and evidence that suitable sustainability training is carried out.	***06/10 JHA ESD (gary.tang@jhaengineers.com.au)*** - NSW Gov Supplier prequalification scheme requires contractors under GC21 contract to have a corporate Environmental Management System (EMS) accreditation and project specific EMP. - EFSG DGN 0001C Sustainability - Section 0.10 requires minimum diversion rate target of 90%. - Sustainability training to site workers should be noted by Head Contractor. This is usually done as part of site induction training. ESD to assist with sustainability training slides when the head contractor is appointed.	PM/HC		X											
		Credit Achievement	1	**1**	90% of construction waste diverted from landfill in lieu of 80% minimum. Waste contractor and processing facility to provide 'Disclosure Statements' demonstrating compliance with 'Green Star Construction and Demolition Waste Reporting Criteria'.		Head Contractor to ensure compliance with this credit.	***06/10 JHA ESD (gary.tang@jhaengineers.com.au)*** - EFSG DGN 0001C Sustainability - Section 0.10 requires minimum diversion rate target of 90%.	PM/HC		X											
3	Verification and Handover	Minimum Expectation	**Mandatory**		Part 1 - Metering and Monitoring • Accessible energy and water metering for all common uses, major uses and major sources. • Non-Utility Meters must be NABERS compliant. • Monitoring system should clearly present the metered data and the monitoring strategy must be developed with a recognised standard, such as CIBSE TM39 Building Energy Metering.	Part 1 - Metering and Monitoring • Plan drawing showing location of all energy & water meter. • Schematic Plans demonstrating adequate meter coverage & appropriate calculations. • Letter of confirmation from contractor/meter provider/manager demonstrating the meters are continuously & automatically monitored & produces alert in case of inaccuracies. • Commissioning reports demonstrating correct operation of water readings, reporting and alarm generation. • Copy of Monitoring Strategy document, including calculations demonstrating all energy and water sources & uses are covered in terms of both usage and accuracy verification. • Accuracy certificates for meters. • Completed Metering Validation sheets/documents to demonstrate metering system meets the NABERS Protocol for validation of non-utility meters.	• Energy load for a single item exceeds 5% of the total energy use for the building, or 100kW, it must be independently metered. • Common water use consumes 10% of the project's water use, these must be independently metered. • Electrical to confirm compliance. Additional sub-metering is likely required to meet requirements. • The monitoring system must raise an alarm when the energy or water use increases beyond certain parameters and automatically issue an instant alert to the facilities manager.	***06/10 JHA ESD (gary.tang@jhaengineers.com.au)*** - Submetering & monitoring requirement should be noted by electrical team as they are not typically included in SINSW school design. The requirements were optional in DAB v1.3 but mandatory in Building v1. Cost uplift should be considered in the project's budgeting. ***16/10 ACOR Hyd*** - Private (subsidiary metering) will be provided to the hot water plant and rawinwater tank top-up	Electrical	X	X					X	X	X					
		Minimum Expectation	**Mandatory**		Part 2 - Commissioning and Tuning: • Project team to complete design intent report • Service and Maintainability Report demonstrating all design project team roles • Construction stage Commissioning Report demonstrating comprehensive pre-commissioning and commissioning to CIBSE or ASHRAE standard. • Airtightness must be included as part of the design and commissioning. • Provide Building tuning contract demonstrating a minimum 12 month post-occupancy tuning with quarterly measure/adjustment.	Part 2 - Commissioning and Tuning • Design Intent Report • Owner's Project Requirements document • Service & Maintainability Review report • Extract(s) from the Commissioning Report demonstrating that comprehensive pre-commissioning activities and commissioning activities have been performed. • Building Tuning Commitment or contract demonstrating that there is a requirement for a building tuning process. • Air tightness testing report detailing of test methodology, air flow rates and statement of the building air permeability achieved. • Signed confirmation from the testing practitioner and main contractor that the results have been sighted.	• Design Team to populate Design Intent Report with project specific information. • Design team to complete the Services and Maintainability Review template demonstrating project specific input from the design team, i.e. SINSW, services, architect, ESD, FM, Head Contractor, ICA have review commissionable, controllability, maintainability, operability, safety of all systems. All parties should sign off report before tender. • A comprehensive pre-commissioning and commissioning activities are to be performed for all nominated systems. • Client/Head Contractor to arrange Air Permeability Testing to be carried out when the construction is complete. Early engagement of airtightness test specialist may be required to provide design inputs. - SD: review of design including an air barrier system schematic. - Pre-construction: prepare air tightness commissioning plan and include it as part of project programme. - Construction: air tightness test to be carried out. • Head contractor is responsible to do the tuning process (from phase - 08) for all nominated building system. These include the quarterly adjustments, measurement for the first 12 months after occupation and review of manufacture warranties	***06/10 JHA ESD (gary.tang@jhaengineers.com.au)*** - Design Intent Report should clearly identify: 1. Targets for energy and water consumption for each building system. 2 Metering diagrams for energy and water. 3. Operational monitoring expectations for energy/water/IEQ 4. Describe function, operation & maintenance for building systems. 5. Air tightness test procedures and targets. ESD to provide design intent report, services to complete, SINSW to sign off/endorse. Generic SINSW Environmental Performance Targets (OPR) can be used to assist providing the design intent report. - TQ R-14417 SINSW commissioning procedure can be used for the purpose of commissioning requirement. - Air tightness test is mandatory and must be carried out for a total o either 5,000m2 or 20% of building's envelope area (whichever is greater). This item should be reflected within the project's budgeting/contract as it wasn't standard for SI projects. - Building tuning must be carried out quarterly for the first 12months after practical completion. This is also not addressed in SI D&C contract and should be scoped to the head contractor. ***19/10 JHA Mech (sam.daher@jhaengineers.com.au)*** We will be coordinating with ESD team the energy consumption for the mechanical equipment to aid in assessing the target for energy. We will desctibe in detail the function, operation and maintenance of all mechanical equipment.	PM/HC	X	X	X				X	X	X	X				

		Minimum Expectation	Mandatory		Part 3 - Building Information • Project team must provide operations and maintenance information for all nominated building systems to building owner/ designated representative. • Project team must develop a building logbook. • Building Users Guide as a source of up-to-date, relevant information for the building user and must be able to be updated and edited by the FM team and other appropriate stakeholders to ensure it remains current and relevant. All building user information must be available to the building owner and facilities management team at the time of practical completion.	Part 3 - Building Information • Operations and maintenance information • Building logbook • Building user information	Contractor is responsible for providing Operations and Maintenance Information in accordance with Green Star requirements.	***06/10 JHA ESD (gary.tang@jhaengineers.com.au)*** - Building logbook TQ R-15394 approves SINSW's FMWeb platform can be used as building logbook for the purpose of this credit. - SI NSW Building User Information Template is available for head contractor to complete. ***16/10 ACOR Hyd*** - Hydraulic services documents will be the design intent whcih includes plans and specification, calling up commissioning requirements (undertaken in Phase 3) ***19/10 JHA Mech (sam.daher@jhaengineers.com.au)*** Operation and maintenance instructions will be listed for each plant type in our mechanical specification. Also the mechanical contractor shall state in detail in their O&M Manual the maintenance procedures, mechanical equipment users guide and a table stipulating the recurrent maintenance checklist associated with each mechanical equipment. Please note the mechanical contractor's O&M and guide will be submitted for our review and approval.	PM/HC	X	X		X		X	X	X	X		X				
		Credit Achievement	1	1	For projects with a total building Services Value over $20m, both Soft Landings Approach and Independent Commissioning Agent are to be met. If its less than $20m then only Soft Landing Approach is required. • Comply with CIBSE (ANZ) 'The Soft Landings Framework Australia and New Zealand' includes: Briefing (Stage 1); Design development (Stage 2); Pre-handover (Stage 3) & Initial after care (Stag 4). Stage 5 recommend not required. • Engagement of Independent Commissioning Agent (ICA) to advise/monitor/verify commissioning/tuning of nominated systems throughout design/ tender/ construction/commissioning/ tuning phases. ICA to demonstrate experience and implementation of BSRIA framework. ICA to be engaged separately from the construction team to support independence.	• Evidence of implementation of BSRIA framework. • CV of the Independent Commissioning Agent detailing the qualifications and experience relevant to the project. • Letter from building owner confirming the appointment of an ICA.	• As per GBCA Response R-14422, projects within the Schools Infrastructure NSW Umbrella (GS-6039DA) may use the Commissioning and Temporary Schools Program Team in lieu of engaging a dedicated independent commissioning agent (ICA). • SINSW to provide evidence that the Commissioning and Temporary Schools Program Team has been engaged as the project's commissioning team.	***06/10 JHA ESD (gary.tang@jhaengineers.com.au)*** - This credit requires early engagement of SINSW's Commissioning and Temporary Schools Program Team to meet soft landing requirements. ***24/02 JHA ESD (gary.tang@jhaengineers.com.au)*** Services/Head Contractor to confirm Total Services Value is no more than $20m during phase 4. SINSW doesn't have capabilities to commit to soft landings at the moment.	PM/HC		X													
4	Responsible Resource Management	Minimum Expectation	Mandatory		• The building should provide bins or storage containers to building occupants & enable them to separate waste. Min waste streams include general, recycling, one other waste stream (organic/e-waste/batteries etc) plus any waste stream >5% total annual volume. • A dedicated area for waste storage & collection should be provided. The area should be sized to accommodate all bins for at least one collection cycle. • A waste specialist and/or contractor must sin-off on the designs if they are adequately sized and safely located.	• Site Plan and/or Architectural Plans highlighting the location of relevant waste facility areas, demonstrating the fulfilment of the requirement. • Calculations used to demonstrate that the dedicated waste storage area provided is adequately sized. • Details on how the dedicated waste collection areas meet the best practice guidelines, in line with the reference guideline.	Waste consultant required to prepare and implement an Operational Waste Management Plan (OWMP) for the project. Complying with the following: ● separation of waste streams ● dedicated waste storage area ● access to waste storage areas must adhere to best practice	***06/10 JHA ESD (gary.tang@jhaengineers.com.au)*** - Please be aware Whole of Government waste contract requires mi 6 waste streams - OWMP should be completed by a waste specialist (appointed by head contractor)	Architect				X								X			
	Healthy		14	8																				
10	Clean Air	Minimum Expectation	Mandatory		• Separation distances between pollution sources and outdoor air intakes must be designed to comply with ASHRAE Standard 62.1:2013 or AS 1668:2012 (whichever greater). • New/existing ductwork to be cleaned to an AIRAH, ASHRAE, ACR, SMACNA. • Provide 50% improvement of outdoor air required by AS 1668.2:2012 to each regularly occupied zone (primary and secondary spaces). • Pollutants from printing & photocopying, cooking and equipment's are to be limited by either removing the source of pollutants(low emission) or exhausting it directly to outside.	• Mechanical drawings for each ventilated space. • Architectural markups showing compliance with 50% more natural ventilation from AS1668.4. • Extract from the ventilation system specification for each system, • Extracts from the Environmental Management Plan that specify ventilation cleaning.	• Mechanical consultant must ensure the HVAC system is compliant with this credit. Green Star FAQ F-00148 access requirement for ducted units may apply. • SINSW have purchase contract in place with FUJIFILM to provide low emission printers and photocopiers to all schools. Compliance pathway refer to FAQ-F-00169 and FUJIFILM Low Emission Certificates. • For 50% more mechanical ventilation, refer to GBCA_R-29584. • For 50% more natural ventilation, architect should ensure 50% improvement from AS1668.4 is met for all naturally ventilated & mixed mode areas (7.5% for admin areas & 9.4% for other rooms "Regularly Occupied Areas" only)	***06/10 JHA ESD (gary.tang@jhaengineers.com.au)*** 50% extra OA - Mandatory and major cost item. - Mechanical ventilation must be provided, no natural ventilation pathway is available. - Implications on acoustic & arch due to mech upsizing must be considered. - ASHRAE 62.1 can't be used as the benchmark for extra OA compliance. - Alternative compliance pathway is to carry out CO2 modelling demonstrating CO2 level is maintained below 800ppm. Additional CO2 sensors are also required for this alternative pathway - Mechanical to advise and confirm. ***24/020 JHA ESD (gary.tang@jhaengineers.com.au)*** Per GBCA_R-29584, F5 filter and min OA of 13.5L/s can be used fo compliance with 50% more mechanical OA. 50% improvement from AS1668.4 for natural ventilation must be demonstrated via architectural facade design.	Mechanical		X				X									
		Minimum Expectation	Mandatory		• All LED lighting has 'no observable effect' per IEEE 1798-2015 • CRI to be 85 or higher for all internal/external lighting • Design to achieve best practice illuminance levels with a maintained illuminance per AS1680.1:2006 • Design maintained illuminance uniformity to comply with table 3.2 of AS1680.1:2006 when using 'maintenance factor method' per AS1680.4 • Light sources must have MacAdam Eclipse or SDCM of 3 or lower.		Electrical consultant to ensure compliance with this credit.	***06/10 JHA ESD (gary.tang@jhaengineers.com.au)*** Standard requirements. Electrical to advise and confirm.	Electrical				X			X								
		Minimum Expectation	Mandatory		• Bare light sources must be fitted with baffles, louvers, translucent diffusers etc. to control glare or Achieve UGR complying with Table 8.2 of AS/NZS 1680.1:2006; or lighting system comply clause 8.3.4 of AS1680.1:2006; or demonstrate UGR compliance with Table 8.2 per Clause 8.3.3 of AS1680.1:2006		Electrical consultant to ensure compliance with this credit.	***06/10 JHA ESD (gary.tang@jhaengineers.com.au)*** Standard requirements. Electrical to advise and confirm.	Electrical				X			X								
11	Light Quality	Minimum Expectation	Mandatory		Provide daylighting strategy report to show how design: • Maximises occupants in/near daylit areas during their daily activities • Ensures regularly occupied areas in reasonable proximity to daylight • Controls or mitigates external glare in the daylit spaces • Maximises daylight to spaces that prioritise learning, healing, and living: – For schools, how all classrooms have view & daylight • Provides occupants unrestricted access to daylit indoor public common spaces As part of the submission, the project team is required to submit: • Narrative describing the building's daylight/view/external glare strategy • Calculation of proportion regularly occupied areas with adequate daylight • An assessment against the five requirements above If above unable to be met, the project team must: • Outline barriers and mitigation measures undertaken taken	• Daylight modelling report or manual calculations • Lighting Drawings • Architectural Drawings • Lighting Specifications/Schedules • Product Data Sheets • Isolux Plot Drawings	Daylight strategy report during Phase 4.		ESD			X	X			X								
		Credit Achievement	2	2	Must Comply with Artificial Lighting or Daylight; • Artificial Lighting: - Horizontal illuminance level must meet or exceed AS/NZS 1680 for at least 90% of GFA. - At least one wall in the field of view of a regularly occupied area is to be illuminated. The total are of illuminated wall must represent at least 20% of the area of walls in the field of view. - Vertical illuminance in regularly occupied workspaces must ensure that 50% of the horizontal tas illuminance reaches the average eye height for 90% of primary space. • Daylight: - At least 40% of regular occupied areas should receive high level of daylight with no less than 20% of any floor or tendance (whichever small). Daylight Autonomy must be used. - The nominated plane for both viewing facades and skylights are to be shaded from direct sunligh for 80% of the nominated hours for each day of equinoxes and solstices; or blinds must provide glare reduction to at least 95% and must have a VLT of≤ 10% or modelling to demonstrate equivalent performance.		• Electrical & Architect to ensure compliance with artificial lighting requirements. • ESD to carry out daylight assessment during phase 3.	***06/10 JHA ESD (gary.tang@jhaengineers.com.au)*** - Electrical & architect to coordinate and ensure compliance with artificial lighting requirements. ***24/02 JHA ESD (gary.tang@jhaengineers.com.au)*** - Phase 3 daylight report shows 42.3% (Building A) & 45.1&% (Building B) compliance.	Electrical		X	X	X			X								
		Exceptional Performance	2	2	In conjunction with the Credit Achievement, the project must comply with both criteria (Mentioned above): • Artificial Lighting • Daylight		• Blinds (VLT<10%) must be provided to all windows and skylight to control glare.	***06/10 JHA ESD (gary.tang@jhaengineers.com.au)*** As above.	Architect		X	X	X			X								

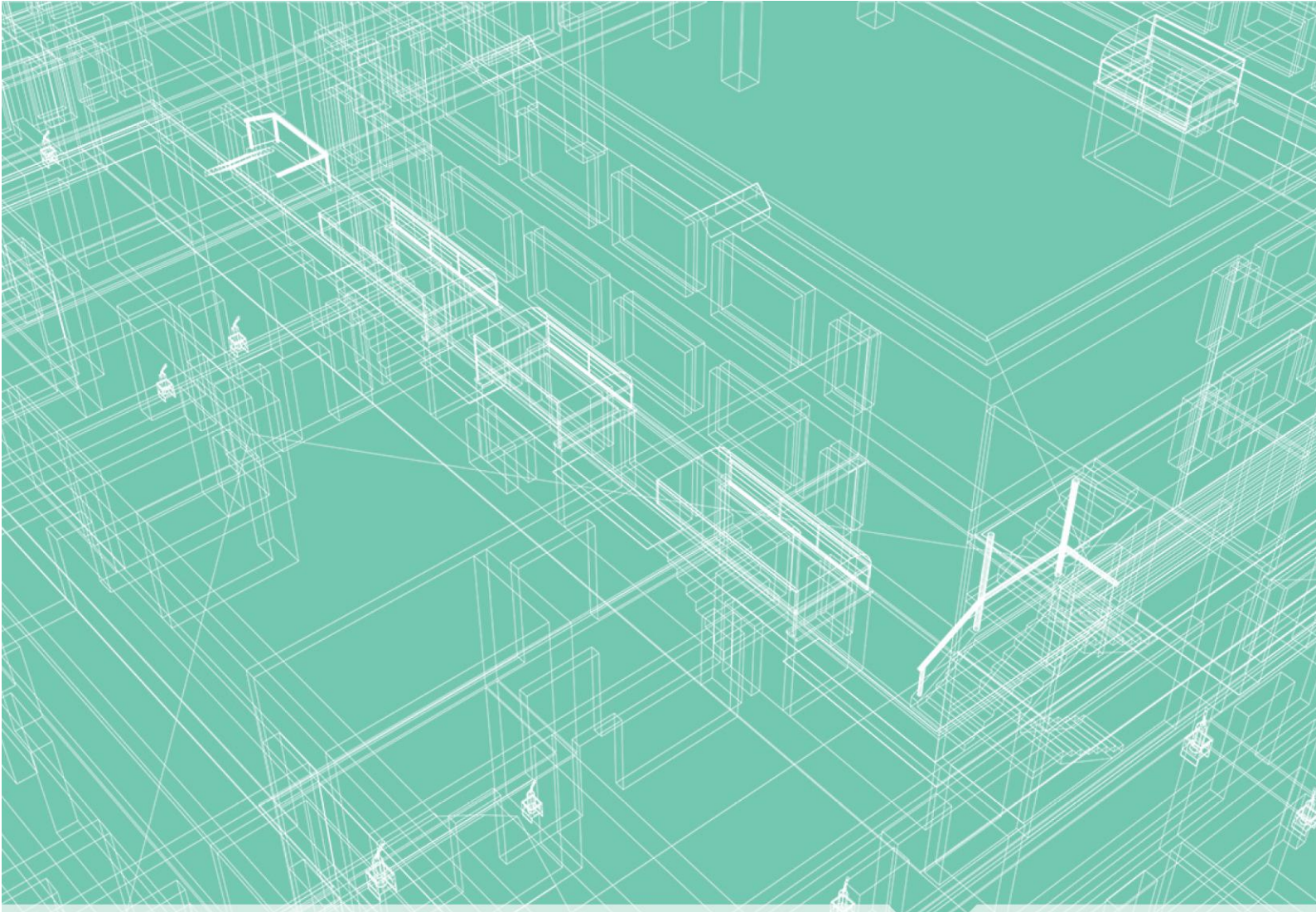
		Minimum Expectation	**Mandatory**		• An Acoustic report which includes the design strategy coving the requirements such as quiet enjoyment of space, functional use of space, control of intrusive or high levels of noise, privacy, noise transfer and speech intelligibility. • Document to include: standards/legislation/guidelines; performance metrics for acoustic criteria relative to legislation/best practice and a description of how design is intended to achieve proposed metrics.		Acoustic consultant to ensure compliance with this credit.	***06/10 JHA ESD (gary.tang@jhaengineers.com.au)*** Acoustic consultant to review and confirm. ***18/10 JHA Acoustics (jorge.reverter@jhaengineers.com.au)*** Acoustic report to describe the design strategy and confirm compliance.	Acoustic	**x**		**x**					**x**							
12	Acoustic Comfort	Credit Achievement	2	**2**	Acoustic report addressing credit criteria and confirming compliance including: • Maximum - internal ambient noise levels in regularly occupied areas≤ than upper range value as per AS2107:2016 (value relevant to activity type). For buildings with sleeping area the noise levels must not exceed recommended sleep disturbance criteria as defined in the NSW EPA Road Noise Policy 2011. • Minimum - internal ambient noise levels in regularly occupied areas≤ 5 dB below the lower range value as per AS 2107 :2016 (value relevant to activity type). • Acoustics Separation : sound insulation complies with Dw + LAeqT > X (typically X=75, walls with door X=60 & X=80 when privacy required (meeting/private offices/education)); or: Partitions achieve dB Rw of: 45 for all partitions without a door and glazed partitions without door; At least 40 for all partitions fronting a room; At least 35 for all partitions with door and at least 50 through floors between occupied spaces. • Impact noise transfer through floors complies with ISO 16283-2 where: - Floors are located above regularly occupied areas - Adjacent spaces belonging to different tenancies which share a floor must not exceed dB L'nT, w ≤ 60 (55 for floors above Class 2 &3). • Regularly occupied area reverberation time≤ max. 'Recommended Reverberation Time'(Table 1 AS/NZ 2107.2016).	• Acoustic Comfort strategy. • Detailed Drawings detailing the acoustic design features relevant to this credit. • Report by a qualified acoustics consultant confirming credit compliance. • Extracts from the commissioning report detailing relevant measured noise levels and target noise levels.	• For schools, all 5 acoustic criteria are applicable: - Maximum Internal Noise Levels - Minimum Internal Noise Levels - Acoustic Separation - Impact Noise Transfer - Reverberation Control (non-residential spaces only) • To achieve 2 points, the project must achieve at least 3 out of the 5 criteria. • Acoustic consultant to ensure compliance with this credit.	***06/10 JHA ESD (gary.tang@jhaengineers.com.au)*** TQ R-14412 Acoustic Separation may be used. Acoustic consultant to review and confirm. ***18/10 JHA Acoustics (jorge.reverter@jhaengineers.com.au)*** TQ R-14412 Acoustic Separation may be used. Acoustic report will not include detailed drawings as the acoustic design is included in the architectural documentation.	Acoustic	**x**		**x**					**x**							
13	Exposure to Toxins	Minimum Expectation	**Mandatory**		• At least 95% of the internally applied paints, adhesives, sealants and carpets must meet stipulated TVOC Limits. • No new engineering wood used or at least 95% should meet formaldehyde emission limits.	• Extracts from contract specifications for adhesives and sealants. • Specifications that demonstrate emission levels or formaldehyde contents . • Safety Data Sheets that demonstrate the compliant emission levels or formaldehyde content. • Product VOC test certificates that demonstrate emission levels or formaldehyde contents. • Product certificates that demonstrate certification under a recognised product certification scheme or recognised standard. • Invoices and proof of purchase to demonstrate costs of compliant materials. • Bill of Quantities from Quantity Surveyor or Cost planner, demonstrating material costs	All consultants to ensure their specifications comply with credit requirements.	***06/10 JHA ESD (gary.tang@jhaengineers.com.au)*** ESD to ensure requirements are included in ESD specs. Head Contractor to ensure compliance. ***16/10 ACOR Hyd*** - ACOR will include in specifications (undertaken in Phase 3) ***19/10 JHA Mech (sam.daher@jhaengineers.com.au)*** - Required paints, adhesives and sealants will be specified in our mechanical specification to comply with the credit requirement and we will request the mechanical contractor to provide us their products data and certificates once this is installed on site.	PM/HC	**x**		**x**		**x**	**x**	**x**	**x**						
		Minimum Expectation	**Mandatory**		Comprehensive hazardous materials survey carried out on existing buildings or structures on the site (to Environmental & WHS legislation). If asbestos, lead or PCBs in any existing structure are found it should be stabilised or removed and disposed in accordance with best practice guidelines.		No existing building on the site.	***06/10 JHA ESD (gary.tang@jhaengineers.com.au)*** Head Contractor to ensure compliance.	PM/HC	**x**														
15	Connection to Nature	Credit Achievement	1	**1**	Project to meet: [1] Views At least 60% of regularly occupied areas must have a clear sight internal or external view and all floor areas within 8m from a compliant view meet this credit criterion. And one of the following: [2] Plants & Nature-inspired Design Indoor plants with soil surface area totalling at least 500cm2 per 15m2 of regularly occupied spaces ; and Five nature inspired design interventions with following principles: - Elements that provide multiple natural sensory experiences; - Elements that reflect natural and cultural patterns and forms; - Using natural Materials; - Large scale and holistically incorporated natural motifs and art. <u>or</u> [3] Interaction with Nature 5% of occupied area or land inside boundary planted and accessible for interaction by occupants.	• Drawings showing access to views and/or line-of-site showing that no obstructions exist. • As build drawings showing the location of plants in the space. • Extracts from the ongoing management plan for plants. • Narrative of the five nature-inspired design features including design principles setting the project's ambition for connection to nature, along with evidence to support claims • Evidence of how occupants can interact with nature.	ESD to provide Views Hand Calculation as per GBCA's guidelines during Schematic Design (Phase -3).	***06/10 JHA ESD (gary.tang@jhaengineers.com.au)*** Architect/Landscape to confirm plants & nature inspired design and interaction with nature. ***20/10 PTW Landscape (Diane.Jones@ptw.com.au)*** No issue re landscape in general- it has applied to the other 5 star Green star Buildings schools that we are working on ***24/02 JHA ESD (gary.tang@jhaengineers.com.au)*** Phase 3 SD Views calcualtion shows 87.2% & 63.5% compliance.	Architect	**x**	**x**	**x**	**x**											
		Exceptional Performance	1	**1**	In conjunction with the Credit Achievement, the project must comply with all three of the following criteria: [1] Views [2] Plants & Nature-inspired Design [3] Interaction with Nature		Architect/Landscape to ensure compliance to this credit.	***06/10 JHA ESD (gary.tang@jhaengineers.com.au)*** As above. ***20/10 PTW Landscape (Diane.Jones@ptw.com.au)*** No issue re landscape in general- it has applied to the other 5 star Green star Buildings schools that we are working on	Architect	**x**		**x**	**x**										
Resilient			**8**	**2**																										
16	Climate Change Resilience	Minimum Expectation	**Mandatory**		• Complete Climate Change Pre-screening Checklist. • Checklist to be signed off by member of project leadership team and be shared with key project stakeholders.	• Climate change risk assessment. • Risk assessment criteria, including the likelihood and consequence tables, risk matrix, RCP and timescale, and any assumptions significant in the development of the assessment. • Details of the adaptation responses. • Evidence the assessment was communicated to design leads. • Project risk register, highlighting the 'high' or 'extreme' identified climate change risks.	ESD to complete Climate Change Pre-screening Checklist.	***06/10 JHA ESD (gary.tang@jhaengineers.com.au)*** Climate change pre-screening checklist has been included Climate Change Risk and Adaptation Assessment as required by credit achievement. ***16/10 ACOR Hyd*** - ACOR will participate in the Climate Adaptation Workshops ***19/10 JHA Mech (sam.daher@jhaengineers.com.au)*** JHA proposes to base its external design condition as stipulated on Airah which depends on the bureau of meteorological data by having the design based on outdoor temperature not exceeding the design temperature on more than 10 days a year for the last 5 years. Increasing by much can cause to oversize the AC systems and causing an increase in capital and operating cost for the economical life cycle of the plants however allowing for an additional 1°C on top for future climate change should be acceptable.	ESD	**x**	**x**	**x**		**x**	**x**	**x**	**x**						
		Credit Achievement	1	**1**	• Climate change risk and adaptation assessment and report by qualified professional and should align with AS 5334:2013 and follows principles of risk management as outlined in AS/NZ ISO 31000:2009. • All 'extreme' risk must be a addressed through specific design responses, • All 'High' risk must be addressed through design or future operational responses. • At least two risks identified must be addressed by specific design responses.		ESD to provide Climate Change Risk and adaptation assessment during Concept Design (Phase -2). All Disciplines to provide design responses.	***06/10 JHA ESD (gary.tang@jhaengineers.com.au)*** Climate change pre-screening checklist has been included Climate Change Risk and Adaptation Assessment as required by credit achievement. ***16/10 ACOR Hyd*** - ACOR will participate in the Climate Adaptation Workshops ***19/10 JHA Mech (sam.daher@jhaengineers.com.au)*** JHA proposes to base it external design condition as stipulated on Airah which depends on the bureau of meteorological data by having the design based on outdoor temperature not exceeding the design temperature on more than 10 days a year for the last 5 years. Increasing by much can cause to oversize the AC systems and causing an increase in capital and operating cost for the economical life cycle of the plants however allowing for an additional 1°C on top for future climate change should be acceptable.	ESD	**x**	**x**	**x**		**x**	**x**	**x**	**x**						

19	Heat Resilience	Credit Achievement	1	1	At least 75% of the whole site addresses heat island through the following: • Vegetation • Green Roofs • Roofing materials, including shading structures, having the following: – For roof pitched <15°– a three-year SRI ≥ 64 or initial ≥ 84 – For roof pitched >15°– a three-year SRI ≥ 34 or initial ≥39 • Unshaded hard-scaping elements with a three-year SRI of minimum 34 or an initial SRI of minimum 39. • Hardscaping elements shaded by overhanging vegetation. • Water bodies and/or water courses. • Site area shaded by permanent structure at noon on summer solstice.	• Site Plan highlighting all relevant areas as referenced within the area schedule. • Area Schedule listing the areas of each of the relevant site elements and where relevant, the SRI values and referencing plan drawings for the site. • Supplier Documentation material data sheet for compliant roofing and hardscape materials.	• Compliant Colorbond colours include Classic Cream, Surfmist. The initial SRI value for Surfmist is 82 and the 3yr aged SRI is 81. • Architect to ensure compliance with this credit.	***06/10 JHA ESD (gary.tang@jhaengineers.com.au)*** Light colour roof should be used. Paving contractor should be able to provide SRI values for pavemen before appointment.	Architect				X	X										
Positive			30	8																				
21	Upfront Carbon Emissions	Minimum Expectation	**Mandatory**		The buildings upfront carbon emissions are at least 10% less than reference building. ESD or Embodied Carbon specialist to be engaged and complete GBCA Upfront Carbon Emission calculator for (A1 to A3)	Completion of GBCA online calculator. Reduction is achieved for min 10%.	• No carbon offset can be used to achieve minimum expectations.	***06/10 JHA ESD (gary.tang@jhaengineers.com.au)*** 3 Reduction pathways - Reuse of existing (not available for WJPS) - Improvements through iterative design process - Alternative building material choices and quantities Initial Assessment (Reference Project) - develop in phase 4 DD stage. As-built Assessment (Proposed Project) - actual quantities used.	PM/HC		X	X	X									X	X	
22	Energy Use	Minimum Expectation	**Mandatory**		The buildings energy use is at least 10% less than a reference building.	• Energy modelling report • Extracts from specifications. • Extracts from commissioning reports. • As built drawings of the façade. • Evidence of renewable energy generation on-site (e.g., contracts, as built drawings). • Schedule identifying all on-site storage systems installed in the building.		***06/10 JHA ESD (gary.tang@jhaengineers.com.au)*** See below.	ESD		X	X			X	X	X			X				
		Credit Achievement	3	3	The buildings energy use is at least 20% less than a reference building.		• All services consultant to provide at least 10% improvement in energy efficiency compared to the minimum requirements in NCC Section J for their respective services. - Mechanical: EER to be 10% more efficient than NCC2022 (preview) Section J J6D12; and - Electrical: Lighting illumination density to be 10% less than the maximum allowance in NCC2022 Section J7D3; Automated lighting control systems, such as occupant detection and daylight adjustment, are provided. • Renewable energy accounted towards 30% of energy reduction.	***06/10 JHA ESD (gary.tang@jhaengineers.com.au)*** - Services to the prescriptive requirements (left) and ensure compliance. - PV to be sized by electrical to meet EFSG and suitable for the project. - On-site battery storage not recommended due to long ROI and the project is mainly for daytime use. ***24/02 JHA ESD (gary.tang@jhaengineers.com.au)*** Phase 3 - energy estimation shows 20% reduction is acheived.	ESD		X	X			X	X	X			X				
23	Energy Source	Minimum Expectation	**Mandatory**		Develop a Zero Carbon Action Plan and should be signed off by building owner or developer. - scope 1 (inc refrigerants)(and 2 emissions to 2050 w/o interventions - spatial impacts to achieve carbon positive. - cost assessment.	Zero Carbon Action Plan with supporting evidence.	• Additional costs to develop Zero Carbon Action Plan.	***06/10 JHA ESD (gary.tang@jhaengineers.com.au)*** TQ R-16910, for SINSW projects, ESD to develop Zero Carbon Action Plan **after the tender phase** and during the design phase, prior to construction. ***16/10 ACOR Hyd*** - SINSW to consider implementing heat pumps for hot water plant with natural refrigerant. Reducing Energy consumption. Comes with a cost uplift	ESD	X	X	X				X								
25	Water Use	Minimum Expectation	**Mandatory**		• All the fixtures and water using appliances meet minimum WELS rating: - Taps/dishwashers/urinals (5 Star), Toilets/Clothes washing (4 Star) & Showers (3 Star) or • The building uses 15% less potable water compared to a reference building.	• WELS certificates • Manufacturer's data	Architect to ensure compliance with this credit.	***06/10 JHA ESD (gary.tang@jhaengineers.com.au)*** Commercial appliance with no WELS rating must be provided with flow rate per wash and anticipated usage cycles per year.	Architect		X		X				X							
		Credit Achievement	3	3	In conjunction with *Minimum Expectation*, the building must: • Use 45% less potable water compared to a reference building. • Have infrastructure for recycled water.	• Drawing(s) for each typical floor showing isolation valves for floor-by-floor testing of the fire sprinkler system, and drawings of the water storage and re-use system(s). • Drawing(s) clearly showing the location of all heat rejection equipment installed on the project. • Drawings showing the landscape design and the irrigation system, listing the name, location, and plant species zone as it appears in the calculator. • Manufacturer's information showing that the application efficiency for the landscape irrigation system. • Manufacturer's information including backwash volume and frequency of filter cleaning • Drawing(s) of process cooling water usage loops. • Drawings and specifications of grey water infrastructure.	• Must have infrastructure for recycled water in the district where local council or Sydney water have planned for installation of recycled water infrastructure.	***12/02/2025 ACOR Hyd*** ACORCons-LETTER-000016. At present, we have documented for a 10,000L RWT, which is fed by a roof area of 360m^2. Note that the site is also serviced by a recycled water supply main, which we are using as the top-up (rather than using the drinking water supply). ***18/02 JHA ESD (gary.tang@jhaengineers.com.au)*** 10kL rainwater tank is approved based on the following: - Sydney Water recycled water main is connected to the rainwater tank for top-up. - The rainwater tank or recycled water main supplies all toilet flushing. - The rainwater tank is also connected to landscape irrigation. - Assumed that recycled water main provides a sufficient supply to meet all toilet flushing water demand. - No irrigation system proposed to "Landscape Planting Areas" per McI&P-INTM-000006.	Hydraulic		X		X				X							
26	Life Cycle Impacts	Credit Achievement	2	2	The project demonstrates a 30% reduction in life cycle impacts when compared to standard practice. Whole-of-building, whole-of-life (cradle to grave) comparative Life Cycle Assessment (LCA) per EN 15978 using modules (A to D).	• LCA Report • Peer Review Statement • LCA practitioner competencies statement or LCACP certificate for practitioner and pee reviewer. • Reference building documentation • Proposed building documentation	LCA specialist to be engaged. Targeting this credit will result in increased costs due to sustainable products, but should be achievable.	***06/10 JHA ESD (gary.tang@jhaengineers.com.au)*** LCA to be engaged by Head Contractor.	PM/HC		X													
Places			8	4																				
		Minimum Expectation	**Mandatory**		• Changing Facilities: - Showers facility: 0-49 Occupants=1 unisex, 50-99 Occupants = 2 Showers, 100-200 Occupants= 4 Showers and 200+ Occupants = 4 + 1 per 200 occupants above 200. - One locker per every 8 regular building occupant. • The facility must me accessible, inclusive & located in a safe and protected place.	• Transport Drawings showing the provision and location of changing facilities. • As built drawings showing the number and size of showers, and of lockers. • Site drawings or as built drawings showing how the changing facilities are safe and protected.	Architect to ensure compliance with this credit.	***12/10 JHA ESD (gary.tang@jhaengineers.com.au)*** As per TQ R-14416, SINSW projects may exclude students when calculating the required end-of-trip facilities and relevant signage. Showers and lockers should be provided for all staff as per the requirements for changing facilities.	Architect				X											

27	Movement and Place	Credit Achievement	3	**3**	• Bicycle parking facility separated from primary vehicle entrance. • Implement a Sustainable Transport Plan • Provide EV charging for 5% of parking space. Electrical infrastructure and a load management plan must be prepared to allow future installation of EV charging to 25% of all car parking spaces. Mix use of chargers must be declared. • Provide connections to car sharing parking spaces. • Reduce Private Vehicle use: - Emission reduction: 40%; Active mode encouragement: 90%; VKT reduction: 20% • Encourage walking :- max 10km/h roads, prioritise pedestrians & at least 10 amenities from 5 categories within 400m.	• Sustainable transport Plan including a site-specific transport assessment. • Site plans showing how pedestrian access has been prioritised. • As built drawings showing the number and location of bicycle parking facilities. • Manual calculations showing proximity to amenities.	As per GBCA Technical Question R-14426, projects within the Schools Infrastructure NSW Umbrella (GS-6039DA) may target Credit Achievement 'Developing a sustainable transport plan' under credit 27 Movement and Place within Green Star Buildings using the SINSW Schools Transport Assessment process.	***12/10 JHA ESD (gary.tang@jhaengineers.com.au)*** Transport to develop a School Travel Plan (STP) based off the SINSW STP Template, with consultation with Sustainable Transport Technical Advisor for SINSW. It is our understanding that the Rapid Transport Assessment (RTA) will not be sufficient to satisfy the credit requirement. ***24/10 Stantec Transport (volker.buhl@stantec.com)*** The provision of a school transport plan - This is a task competed in a later stage of the process (stage 4-8) when the school is planned in more detail and closer to opening day. We can make reference to a school transport plan and the need for it to be developed as part of the RTA to ensure it gets captured in the Green Star rating.	Traffic	**X**	**X**		**X**			**X**								**X**
30	Culture, Heritage and Identity	Credit Achievement	1	**1**	• The project must undertake a local analysis to identify culture, heritage and identity unique to the project site and engage local communities as part of the analysis<u>Or</u> • Three independent review during concept/schematic design stage, during design development & at building permit stage.	• Culture, Heritage, and Identity Report outlining key findings of the local analysis and how community engagement activities influenced the design • As built drawings, site drawings, architectural drawings showing how the culture, heritage, and identity is incorporated into the building's designs. Or • Evidence to demonstrate that a design review process has been undertaken. • Details of the panel members and their experience relevant to this credit's requirements. • A declaration from the project application confirming that the design review panel meets the independency requirements.	Note: The Design review panel must be independent of the project	***12/10 JHA ESD (gary.tang@jhaengineers.com.au)*** Potentially, SDRP may be used for the purpose of this credit. A TQ to be submitted to GBCA during phase 4.	SINSW	**X**	**X**		**X**											
People			9	7																				
31	Inclusive Construction Practices	Minimum Expectation	**Mandatory**		Builder must: • Provide separate gender inclusive amenities with a high degree of privacy • Provide gender-specific fit-for-purpose PPE for diverse body sizes/types • Implement policies to address discrimination/racism/bullying on-site • Introduce on-site redress procedures and corrective measures for incidents • Empower a diverse lead team to manage these policies on-site • Provide training to any contractors/subcontractors onsite for at least 3 days on site policies ,drug alcohol, and mental health.	• Description of the types of PPE available to construction workers. • Evidence of purchase of appropriate PPE. • Extracts from relevant policies that address discriminating, racism, and bullying. • Drawings of gender inclusive facilities. • Evidence of lead team diversity.	Contractor to ensure compliance to this credit.	***12/10 JHA ESD (gary.tang@jhaengineers.com.au)*** Contractor should note this requirement.	PM/HC		**X**													
		Credit Achievement	1	**1**	• Conduct a Needs Analysis of potential site workers and sub-contractors at tender. • Introduce at least five physical and mental programs to at least 80% of the workforce who attend the site for more than 3 days. • Provide evaluation report to contractor & developer on programs effectiveness.	• Needs Analysis report outlining engagement process and outcomes for training. • Extracts of evidence detailing the programs and policies implemented to promote health and wellbeing on site. • Evidence detailing the process to manage training, and track workers trained. Examples of evidence include extracts from the training policy, a report from a third-party provider, or similar. • Extracts of training such as screenshots, presentation, or similar, showing the information provided as part of training. • Evaluation report of the effectiveness of the training.	Contractor to ensure compliance to this credit.	***12/10 JHA ESD (gary.tang@jhaengineers.com.au)*** Contractor should note this requirement.	PM/HC		**X**													
32	Indigenous Inclusion	Credit Achievement	2	**2**	• Reconciliation Action Plan (RAP): - A key member of the project team be part of organisational RAP working group. - At least 90% of the RAP targets are met. - All implemented actions related to RAP are publically reported. <u>Or</u> • Demonstrate that the Australian Indigenous Design Charter guiding principles are incorporated in design.	Reconciliation Action Plan (RAP) • Extract from the Reconciliation Australia website demonstrating that the project's RAP is endorsed by Reconciliation Australia. • Extracts from the organisation's Annual Report or website (or similar) demonstrating that the RAP is publicly reported upon. • Reconciliation Action Plan Report (or similar) on the outcomes from the project's RAP demonstrating that at least 90% of the RAP targets have been met in the first reporting cycle. • Evidence that a key member of the project team is also on the RAP working group. • Outcomes document linking the project to an organisational RAP. Or Inclusion of Indigenous Design • Extract from indigenous engagement strategy. • Evidence of Aboriginal and Torres Strait Islander engagement from concept design throughout the project's life cycle. • As built drawings or photographic evidence of incorporated designs. • Evidence of information being made available to public (e.g. website) • Comparison against the four principles from the Australian Indigenous Design Charter.			PM/HC	**X**	**X**		**X**											
33	Procurement and Workforce Inclusion	Credit Achievement	2	**2**	• The project must develop and implement a Social Procurement Plan/Strategy that directs at least 2% of total contract value to employment opportunities for disadvantaged and under-represented groups. • Generate employment to disadvantage & under-represented by either directly, through workforce targets or indirectly through social procurement. A combination can be used as long as the total dollar spend on the above activities is equal or greater than the required 2% of the buildings total contract value.	• Social Procurement Plan • Evidence of workforce targets in main contracts and sub-contracts. • Evidence of social procurement targets in main contracts and sub-contracts. • Evidence that enterprises are independently certified by third party organisation.	Contractor to ensure compliance to this credit.	***12/10 JHA ESD (gary.tang@jhaengineers.com.au)*** Contractor should note this requirement.	PM/HC		**X**													
34	Design for Inclusion	Credit Achievement	2	**2**	Building is designed and constructed to be inclusive to diverse group of people, including: equal access; diverse wayfinding & inclusive spaces.	• As build drawings showing equal access to the building. • Evidence of diverse wayfinding, including photographs. • As build drawings showing inclusive spaces.	To be compliant, the building's design and construction must be able to be navigated and enjoyed by stakeholders of diverse ages, genders and physical and mental abilities. This applies to common spaces, bathroom facilities and amenities provided within the building. This must include - Equal access to building. provide equitable appealing, safe and secure access in manner that does not segregate or stigmatise uses through all principal entrance points and main thoroughfares inside and outside the building. - Diverse wayfinding. introduce visual, physical, olfactory and auditory solutions to help individuals navigate the site in a safe and enjoyable manner. - Inclusive spaces. introduce internal and external spaces for a diverse range of users, including parents, family restrooms, emergency rooms, quiet rooms and social interaction rooms. These rooms must be accessible to all users	***13/10 JHA ESD (gary.tang@jhaengineers.com.au)*** Architect to ensure compliance.	Architect				**X**											
Nature			14	6																				
35	Impacts to Nature	Minimum Expectation	**Mandatory**		• From the date of purchase no land clearing should occur on the following: Old-growth forest; Prime agricultural land; wetland of 'High National Importance'; aspects considered 'Matters of National Environmental Significance' listed under the Environmental Protection and Biodiversity Conservation Act (1999). • All the outdoor lighting complies with column 3 as per Table 2.1 of AS/NZS 4282:2019 • Demonstrate that reduction in light pollution is achieved by either: - Control of ULOR - Control of direct illuminance • Site specific wet land management plan to be prepared by qualified Ecologist or other profession	• Extracts from the Development Application • Zoning Plans • Light pollution - As Built drawings indicating the location of all external luminaires and showing the aiming point and mounting orientation of all external luminaires. - Luminaire schedule for all external lighting, nominating the type, lighting distribution and quantity of each luminaire and including the relevant photometric data such as ULOR. - Calculation Plots for all external lighting, showing that all grid points on the calculation plane return compliant Lux values. - Excerpt from lighting control system, or similar, demonstrating automatic deactivation of lights, based on external lux levels, where deactivation is required to achieve compliance. • If triggering the wetland requirements: - Wetland Management Plan - Evidence as per Waterway Protection credit.	Ecologist/Landscape Architect to confirm compliance with this credit. Electrical consultant to ensure outdoor lighting complies with this credit	***13/10 JHA ESD (gary.tang@jhaengineers.com.au)*** Ecologist/Landscape & Electrical to confirm. TQ R-14474, if the site is owned for more than 5 years, no requirements to prove the date of purchase. ***16/10 ACOR Hyd*** - reassign action to Civil Engineer ***20/10 PTW Landscape (Diane.Jones@ptw.com.au)*** The biodiversity issues have to be addressed by an ecologist. There are no current arborist and ecological reports for the site. ***15/10/24 PTW Arch (Katarina.vrdoljak@pyw.com.au)*** Refer to materplan report for Aborist and Ecologist reports.	Landscape		**X**		**X**	**X**		**X**								

		Credit Achievement	2	**2**	• Protect Ecological values: understand sites historical and current ecological context and identify any future ecological values to be incorporated on site. • Show how ecological values will be protected. • Areas deemed as an area of high biodiversity value, the project must retain at least 50% of that area.	• Ecological assessment report • Evidence that 50% of the site has been retained: - Narrative from Ecologist - As built drawings	Ecologist/Landscape Architect to complete Green Star ecological value calculator and ensure compliance with this credit.	***13/10 JHA ESD (gary.tang@jhaengineers.com.au)*** ESD to provide GBCA ecological calculator during phase 4. Ecologist/Landscape to complete. ***20/10 PTW Landscape (Diane.Jones@ptw.com.au)*** The biodiversity issues have to be addressed by an ecologist. There are no current arborist and ecological reports for the site. ***15/10/24 PTW Arch (Katarina.vrdoljak@pyw.com.au)*** Refer to materplan report for Aborist and Ecologist reports.	Landscape	**X**		**X**	**X**									
36	Biodiversity Enhancement	Credit Achievement	2	**2**	• Minimum landscaped area (horizontal/vertical) must be 15% of the site area or at a ratio of 1:500 of the GFA (whichever is the largest). • Greater than 60% of plants to be indigenous • site must include at least one significant (nesting) tree or equivalent habitat provision per 500m2 of landscaped area. • No invasive species are allowed, as per Australian Weeds Strategy 2017 to 2027. • landscape must not exceed the following percentage per type: (1) 10% of plants from one species (2) 20% of plants from one genus (3) 30% of plants from one family.	• Site Plans marked up with landscaping. • Schedules of plant species numbers and diversity. • Aerial Site Photographs marked up with landscaping. • Evidence of plant diversity (species, genus, and family). • Biodiversity management Plan	Ecologist/Landscape Architect to provide Biodiversity Management Plan.	***13/10 JHA ESD (gary.tang@jhaengineers.com.au)*** Landscape to ensure compliance. Please get council approved indigenous species. Example list: https://basix.nsw.gov.au/iframe/images/150.pdf TQ R-14545 allows to exclude all ovals and sporting fields/courts from calculation of "60% plants must be indigenous) and calculations of one significant (nesting) tree per 500m2 of landscape area. Reasoning must be provided why native grasses are not appropriate option for the grassed area; and all remaining landscaped areas mee the requirements. ***20/10 PTW Landscape (Diane.Jones@ptw.com.au)*** The biodiversity issues have to be addressed by an ecologist. There are no current arborist and ecological reports for the site.	Landscape			**X**	**X**									
39	Waterway Protection	Credit Achievement	2	**2**	• The project demonstrates a reduction in average annual stormwater discharge (ML/yr.) of 40% across the whole site. • Stormwater discharge achieves reduction targets of: 85% (TSS); 90% (gross pollutants); 45% (total Nitrogen); 65% total Phosphorus. • Chemical store/loading/fuelling/work areas provided with bunding, drained to trade waste/treatment devices & provided with roofs • If a site has more than 200m² of uncovered areas where vehicles are likely to transit and/or park, then hydrocarbon treatment devices must be installed, specified to remove at least 98% of hydrocarbons, sized to treat a 1-in-3 month ARI (4EY) flow. Electric vehicle only parking areas do not count towards the total.	Stormwater volume • Calculation/Modelling Report by a suitably qualified professional. The report should describe: - Civil and Landscape drawings showing the stormwater collection, storage and treatment facilities and detailing their functional elements. - Hydraulics drawings showing all the capture, storage, re-use piping and discharge route. - Site plans showing the total areas of uncovered areas where vehicles are likely to transit and/or park (e.g., roads, loading docks, refuelling bays, and car parking, etc.). Pollution Reduction Targets • Civil/Hydraulics/Landscape drawings showing the stormwater collection, storage, infiltration, and treatment facilities and detailing their functional elements. • Independently verified performance certification for each manufactured stormwater treatment device, proving its ability to achieve the pollution reduction targets.	Civil to confirm	***16/10 ACOR Hyd*** - Hyd concpet sketches and report allows for Rainwater capturing and harvesting ***19/10 BG&E Civil*** - Project will be limiting discharge from site due to requirement for OSD. Calculations need to be carried out to check if we are meeting the 40% reduction. The water qaulity targets will be meet throgh detailed modelling at a DA Stage. ***24/02 JHA ESD (gary.tang@jhaengineers.com.au)*** Civil to provide volumetric reduction result.	Civil	**X**		**X**									**X**	
Leadership			**5**	**0**																				

APPENDIX C CLIMATE CHANGE RISK AND ADAPTATION ASSESSMENT



CLIMATE CHANGE RISK AND ADAPTATION ASSESSMENT

NEW PRIMARY SCHOOL AT WILTON JUNCTION

ESD SERVICES

JHA

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DOCUMENT CONTROL SHEET

Project Number	220295
Project Name	New Primary School at Wilton Junction
Description	Climate Change Risk and Adaptation Assessment
Key Contact	Mathew Klumper

Prepared By

Company	JHA
Address	Level 20, 2 Market Street, Sydney NSW 2000
Phone	61-2-9437 1000
Email	Gary.Tang@jhaengineers.com.au
Website	www.jhaservices.com
Author	Felisa Garcia
Checked	Tarun Sebastian Thottungal
Authorised	Gary Tang

Revision History

Issued To	Revision and Date								
SINSW	REV	Draft	Rev A	Rev B	Rev C	Rev D	Rev E	Rev F	
	DATE	21/11/23	11/12/23	31/05/24	11/10/24	06/11/24	24/01/25	31/01/25	
SINSW	REV	Rev G	Rev H	Rev I	Rev J	Rev K			
	DATE	14/02/25	18/02/25	21/02/25	24/02/25	07/03/25			
	REV								
	DATE								

1 EXECUTIVE SUMMARY

A Climate Change Risk and Adaptation Assessment has been prepared for the proposed primary school located at 200 Fairway Drive, Wilton NSW 2571.

This report addressed the following requirements:

- Perform the assessment using information from the Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report Representative Concentration Pathway 8.5 (RCP8.5) or most recently published version.
- Perform the assessment using two timescales that are relevant to the project's anticipated lifespan: one medium-term timescale between 2040 to 2050, one long-term timescale between 2070 to 2090.
- Identify primary and secondary climate change variables as per AS5334:2013 Table 2.
- Define and include consequence and likelihood tables and risk matrix used to assess climate risks.
- Assess risk in consultation with multidisciplinary representatives from within the project team and a selection of relevant external stakeholders.
- Develop a register of risks to the building and surrounding infrastructure and provide treatment options for risks identified as "extreme" or "high".
- Communicate the results of the assessment to the leads of all design disciplines.
- At least two risks identified in the assessment must be addressed by specific design responses.

This report also addresses the environmental factors from the *Guidelines for Division 5.1 assessments* (the Guidelines) by the Department of Planning, Housing and Infrastructure (DPHI) as well as the *Addendum Division 5.1 guidelines for schools*.

The impacts of climate change were assessed across two time scales (2050 & 2070) and two Representative Concentration Pathways (RCP4.5 & RCP 8.5). Climate Futures matrices were used to determine the key climate projections based on multiple climate variables for this risk assessment. The key climate projections were used to inform the climate risk assessment.

The risk priority levels of the climate risks identified pre- and post-adaptation are summarised below:

Risk rating	2050 Pre-adaptation	2050 Post-adaptation	2070 Pre-adaptation	2070 Post-adaptation
Low	2	3	0	2
Medium	3	2	3	3
High	0	0	2	0
Extreme	0	0	0	0

The results of the climate risk assessment identified two high-risk items pre-adaptation. These high risks were mitigated to medium risks by the proposed adaptation actions. The responses to high risks are summarised as follows:

1. Higher average surface temperature and less rainfall conditions cause an increase in the frequency and/or severity of bushfire events directly damaging the building. This risk is mitigated by ensuring non-combustible building elements are used in the fabric of the building and by implementing good management practices to remove potential fuel sources around the building once the building is in operation.
2. Higher maximum daily temperature and lower humidity conditions result in higher frequency and/or duration of heat waves resulting in an insufficient capacity of the HVAC system to maintain thermal comfort. This risk is mitigated by the incorporation of passive thermal principles such as appropriate external shades and thermal insulation and by upgrading the capacity of the HVAC system once the current system has reached the end of its service life.

In summary, all risk items identified as 'high' or 'extreme' are addressed by specific design responses in addition to at least two risk items identified in the risk assessment being addressed by specific design responses.

CONTENTS

2 INTRODUCTION

This Climate Change Risk and Adaptation Assessment has been prepared to support a Review of Environmental Factors (REF) for the NSW Department of Education (DoE) for the construction and operation of the new primary school at Wilton Junction (the activity).

The purpose of the REF is to assess the potential environmental impacts of the activity prescribed by State Environmental Planning Policy (Transport and Infrastructure) 2021 (T&I SEPP) as "development permitted without consent" on land carried out by or on behalf of a public authority under Part 5 of the Environmental Planning and Assessment Act 1979 (EP&A Act). The activity is to be undertaken pursuant to Chapter 3, Part 3.4, Section 3.37A of the T&I SEPP.

This document has been prepared in accordance with the Guidelines for Division 5.1 assessments (the Guidelines) by the Department of Planning, Housing and Infrastructure (DPHI) as well as the Addendum Division 5.1 guidelines for schools. The purpose of this report is to assess potential risks associated with climate change and propose mitigation strategies by specific design responses.

2.1 PROPONENT

The NSW Department of Education (DoE) is the proponent and determining authority pursuant to Section 5.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

2.2 PURPOSE OF THE ASSESSMENT

In accordance with EFSG v1.0 DG02.08, EFSG 2.0 0001c Design Checklist and Green Star Buildings v1 requirements, the purpose of this assessment is to provide:

- Details of stakeholder consultation that was undertaken during plan preparation, incorporating their responses (see Section 2.5 & Appendix B).
- Summary of the project's characteristics (site, location, climatic characteristics) (see Sections 2.2 & 3).
- Assessment of climate change scenarios and impacts on the project using a two-time scale relevant to the project's anticipated lifespan (see Section 5).
- Identification of primary and secondary climate change variables relevant to the project and each risk (see Section 6, Appendix B)
- Summary of potential direct and indirect climate change impacts (environmental, social and economic) (see Section 6, Appendix B)
- A consequence and likelihood table with a risk matrix used to assess climate risks (see Section 6, Appendix B)
- Treatment options for Extreme and High risks identified in a register of risks relevant to the building (see Section 6, Appendix B)

This report examines and addresses items (h) & (j) in Table A1 Environmental factors for hospital and school activities from the Addendum Division 5.1 Guidelines for Schools by DPHI, which is taken from Section 171(2) of the EP&A Regulation. A summary of the relevant section is provided in the table below.

Regulation/Guidelines Section	Requirement	Response	Report Section
Guidelines for Division 5.1 assessments	Considering environmental Factor: h) long-term effects on the environment Climate Change (j) Risk to the safety of the environment	The project delivers a Climate Change Risk and Adaptation Assessment to assess the climate change scenarios and impacts, as well as identify the potential risks for the project and people.	See Sections 3 to 6

	Flood, Bushfire, Extreme heat, Climate Change Adaptation	This information helps to address the risks and prepare adaptation measures.	

2.3 SITE DESCRIPTION

The current street address is 200 Fairway Drive, Wilton, 2571, NSW. The site forms part of the northern portion of Lot 1063 in Deposited Plan 1289197) that was previously subdivided by Landcom. The site is approximately 3.4ha hectares in size and is located within Wilton Junction which is part of the North Wilton Precinct.

As a result of precinct wide rezonings, the surrounding locality is transitioning from a semi-rural residential area to a highly urbanised area with new low to medium density residential areas with supporting services. North Wilton Precinct is approximately 85km south-west of the Sydney CBD, 30km north-west of Wollongong and 30km southwest of Campbelltown-Macarthur Strategic Centre. The precinct is located on the interchange with the Hume Highway, which connects the Southern Highlands with the Sydney metropolitan region to the northeast and Canberra to the south-west.

The proposed school site does not currently have road access, however, Landcom is expected to deliver the road network and surrounding public domain network in accordance with DA/2022/1279/1. Proposed Road 14 located on the eastern boundary of the site will ultimately provide future access to the site. The site contains several patches of remnant native vegetation particularly within the northern portion of the site. The central part of the site has been predominantly cleared and consists of grassland. An aerial photograph of the site is provided below.

Aerial photo of the site; (Source: Urbis)

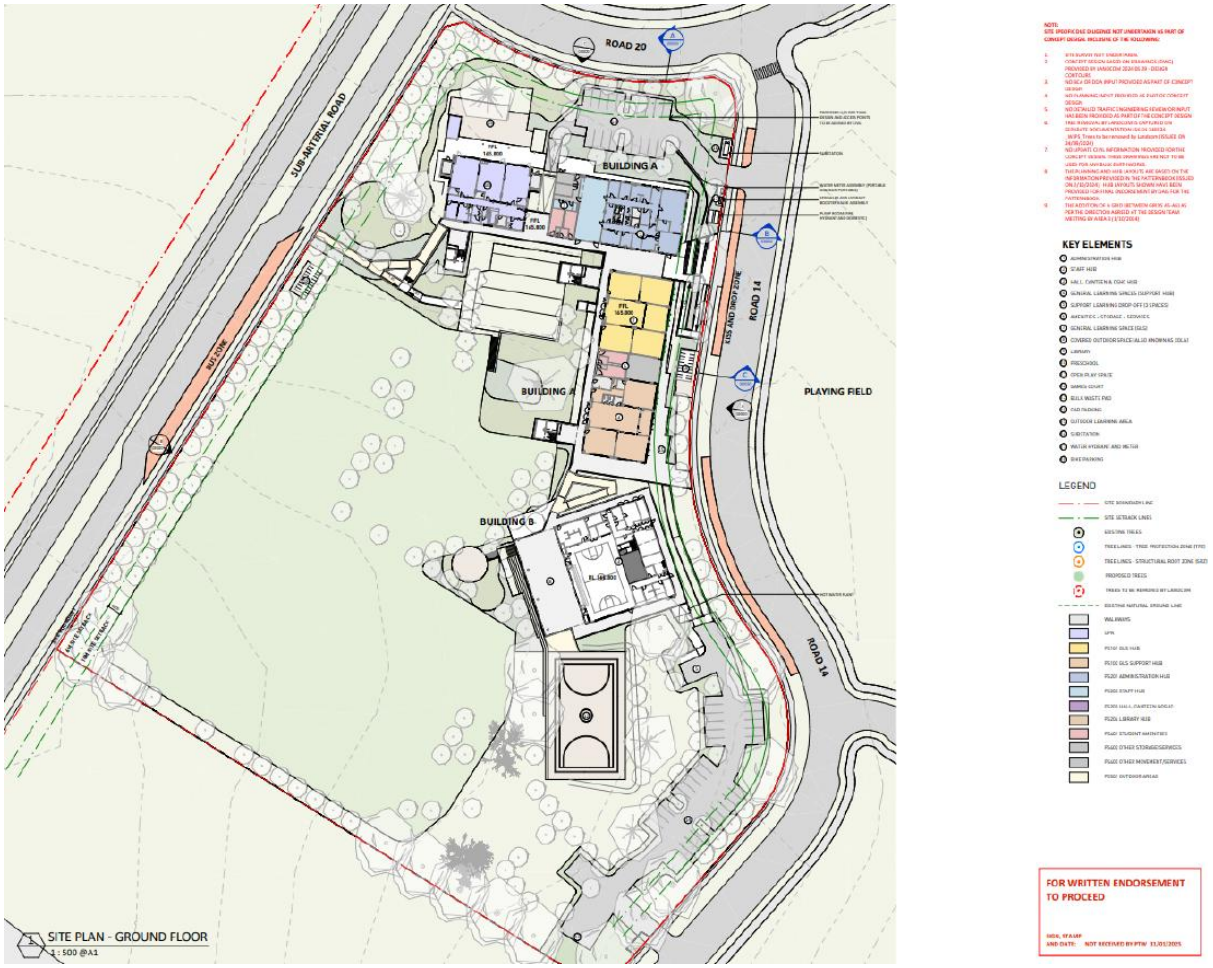
2.4 PROPOSED ACTIVITY DESCRIPTION

The proposed activity is for the construction and operation of a new primary school at Wilton Junction which will accommodate up to 552 students and 35 staff. Additionally, the proposal includes an integrated pre-school which will capacity for up to 60 students and 7 staff. In total, the new school will support up to 612 students and 42 staff.

The new school includes general and support learning spaces, a library, administrative areas and a staff hub. Core facilities include a standalone school hall and canteen, two carparks and a sports court.

Specifically, this proposal includes the following:

- Construction of a 3-storey learning hub which includes:
    - 24x General Learning Spaces
    - 3 x Support Learning Spaces
    - Staff hub including administrative areas and library.
    - Integrated public pre-school.
- Standalone hall and COLA with outside of school hours care (OSHC).
- Associated landscaping including sports court and separate outdoor play space for the preschool.
- Associated site utilities and services including installation of new 1500 kVA padmount substation and a new main switchboard.
- Main car park to the south of the site with 33 car spaces (including one accessible space).
- Separate car park for pre-school located to the north of the school with 18 spaces (including one accessible space).
- Main school pedestrian entrance proposed off Road 14.
- Earthworks and tree removal.



Proposed Site Plan – Staging; (Source: PTW)

2.5 REFERENCE DOCUMENTS AND STANDARDS

This Climate Change Risk and Adaptation Assessment will assess potential risks and propose mitigation strategies as necessary in accordance with the following documents and standards:

- Green Star Buildings v1 Submission Guidelines
- AS 5334:2013 Climate change adaptation for settlements and infrastructure
- ISO 31000-2009 – Risk Management – Principles and Guidance (adopted in Australia and New Zealand as AS/NZS ISO 31000:2009)

- IPCC Fifth Assessment Report (AR5)
- The AGO's Climate Change Risks and Impacts: A Guide for Government and Business
- NSW and ACT Regional Climate Modelling (NARCliM) climate change projections
- Addendum Division 5.1 Guidelines for Schools by the Department of Planning, Housing and Infrastructure (DPHI)

2.6 STAKEHOLDERS CONSULTATION

As a part of the Climate Change Risk Assessment process, the stakeholders consulted are listed below.

Stakeholder	Role
SINSW Jeremy Stott, Huss Mohsin, Christine Durrant, Adrian Ng, Luke Zajac	Client
AREA3 Mable Chew, Mathew Klumper, Rachel Danusaputra	Project Management
PTW Diane Jones, Katarina Vrdoljak, Marisa Sidoti	Architect
Urbis Christopher Croucamp	
BG&E Paul Sancandi, Stephen Hazlewood, Vahid Shamsaeifar, Mahmound Garmal	Structural & Civil
Acor Consultants Rhys Edwards, Mariella Vasquez	Hydraulic
JHA Consulting Engineers Mark Ritchie, Sam Daher, Hadi Jalgha, Sean Matthews, Gary Tang, Laura Golembowski, Brenton Burrows, Borris Skapik, George Petropoulos, Ferial Sam & Alex Frew	Electrical, Mechanical, Acoustic, ESD, Level 3, VT & AV
Stantec Volker Buhl	Transport
Genus Advisory Matthew Mead, Eraj Shrestha	Cost Management
McIntosh Glenn McIntosh	Landscape

3 PROJECT SITE CLIMATIC CHARACTERISTICS

The proposed new primary school at Wilton Junction is located in NCC Climate Zone 6, (mild temperate) with hot to very hot summers with moderate humidity and mild to cool winters with low humidity.

3.1 BASELINE CLIMATIC CONDITIONS

The baseline climatic conditions for the new primary school at Wilton Junction are taken from the Camden Airport weather station, which is approx. 22.3km away from the site location.

Weather station details:

- Site name: Camden Airport AWS
- Site number: 068192
- Latitude: 34.04 °S Longitude: 150.69 °E
- Elevation: 74 m
- Commenced: 1943
- Status: Open
- Last updated: 10 October 2024

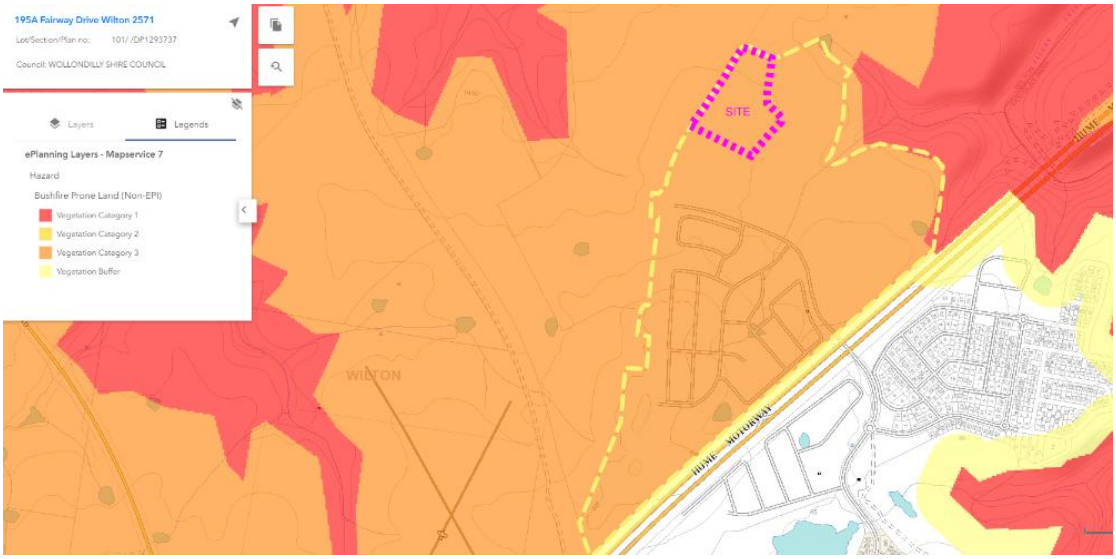
Statistic Element	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	An.
Maximum temperature													
Mean maximum temperature (Degrees C)	29.7	28.6	26.9	23.9	20.6	17.8	17.4	19.2	22.1	24.4	26.3	28.6	23.8
Highest temperature (Degrees C)	46.4	45.6	41.0	38.5	29.5	24.9	27.0	30.2	36.5	40.5	42.6	44.0	46.4
Mean number of days >= 35 Degrees C	4.8	2.8	0.9	0.1	0.0	0.0	0.0	0.0	0.1	0.6	1.8	3.6	14.7
Minimum temperature													
Mean minimum temperature (Degrees C)	17.0	16.8	14.9	11.0	7.0	4.6	3.1	4.0	6.8	10.1	13.0	15.3	10.3
Lowest temperature (°C)	7.9	7.2	5.9	-0.7	-2.2	-5.4	-6.0	-4.0	-1.8	1.3	3.8	5.7	-6.0
Mean number of days <= 2 Degrees C	0.0	0.0	0.0	0.1	3.1	9.3	14.0	11.0	2.9	0.1	0.0	0.0	40.5
Rainfall													
Mean rainfall (mm)	83.5	101.9	102.0	68.6	52.2	64.1	39.7	40.3	38.9	65.2	76.9	58.0	789.1
Highest rainfall (mm)	263.6	421.8	564.6	338.2	309.3	326.8	286.4	276.4	148.2	243.4	193.6	162.7	1887.4
Mean number of days of rain ≥ 25 mm	0.6	0.6	0.6	0.4	0.3	0.4	0.2	0.3	0.2	0.4	0.5	0.3	4.8
Solar & Cloudy Days													
Mean daily solar exposure (MJ/m2)	21.9	19.1	16.2	13.6	10.5	8.8	9.9	13.1	16.9	19.8	21.2	22.5	16.1
Mean number of cloudy days	10.8	10.2	9.6	8.8	8.9	7.2	6.4	5.0	6.5	9.1	9.5	8.6	100.6

3.2 PAST EXTREME EVENTS

Extreme events that have impacted a site in the past are indicative of possible extreme events that will impact the site in the future. The identification of past extreme events will help highlight the climate risks that should be the focus of this risk assessment.

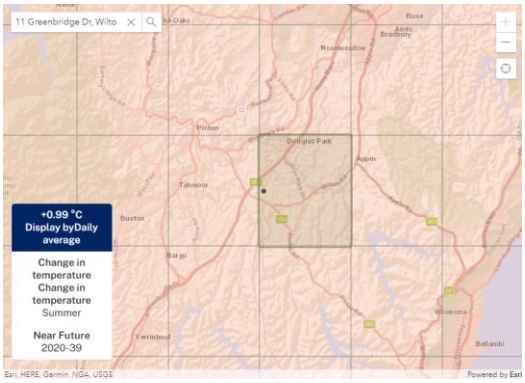
Past climatic events that have impacted the site and/or the Wollondilly Shire region are summarised below:

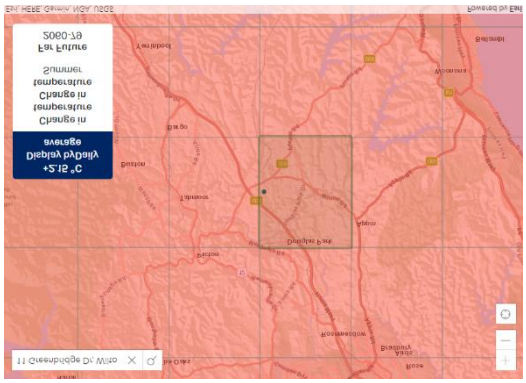
- Bushfire – In recent years there has been an increase in the number of high fire weather danger days, more severe fire weather and much longer fire seasons in NSW. The Wollondilly Shire local government area has previously experienced major bushfire events, for example, the 2019-20 Green Wattle Creek fire.
  According to NSW Rural Fire Service, the site is within a designated bushfire-prone area [source: https://www.rfs.nsw.gov.au/plan-and-prepare/building-in-a-bush-fire-area/planning-for-bush-fire-protection/bush-fire-prone-land/check-bfpl]. The site is also identified with Vegetation Category 3 (refer to the map below). Please refer to the "bushfire management plan" for detailed responses and management plans.



Bushfire Prone Land (Non-EPI); [Source: https://www.planningportal.nsw.gov.au/spatialviewer/#/find-a-property/lot]

- Heatwaves – A heatwave is defined as three or more days of high maximum and minimum temperatures that are unusual for that location. Over the period 1911–2013, heatwaves in parts of NSW have become longer, hotter and occur more often [Source: AdaptNSW Heatwaves Climate Change Impact Snapshot]. Hotter and more frequent heatwaves will contribute to the risk of bushfires. Research shows a link between excessive heat and childhood emergency department attendance for diseases such as asthma, fever, gastroenteritis, and electrolyte imbalances.
  Studies have also shown that learning performance can be impacted by higher temperatures. Warm buildings may decrease interest and alertness, distracting students, teachers and other staff. In hotter buildings, headaches and heat exhaustion symptoms may develop that can hinder academic performance. High temperatures may be accompanied by higher levels of humidity. Increased humidity can cause drowsiness in both students and staff. Studies have shown concentration performance is lower in humid, hot environments. From the below climate projection map, it is understood that Wilton can expect an increase of +99° C in daily average temperature during Summer in the near future (2030-39) and an increase of +2.18 ° C in the far future (2060-79).

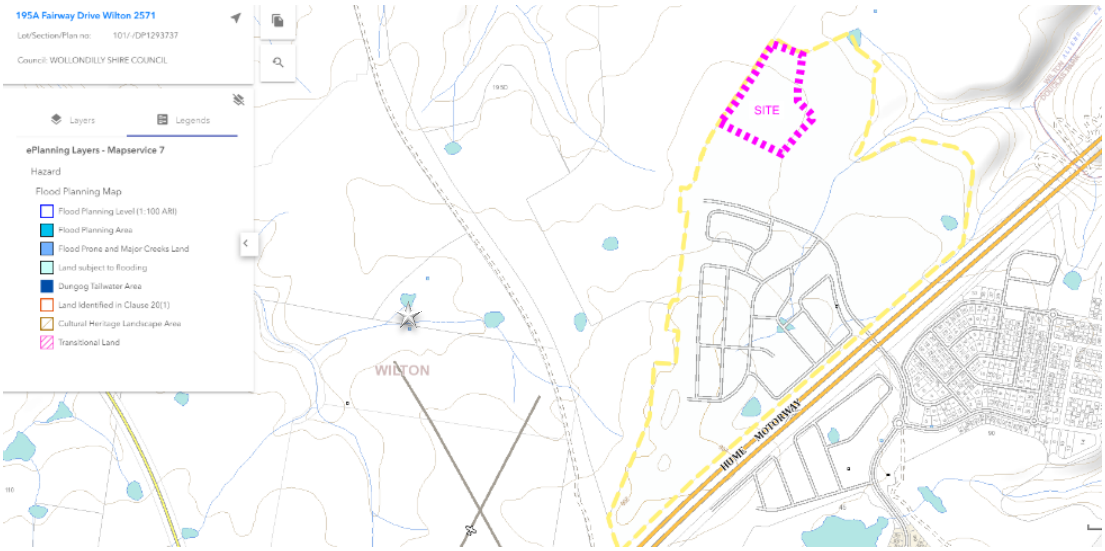




Climate Change Projection; [Source: https://www.climatechange.environment.nsw.gov.au/projections-map*]*

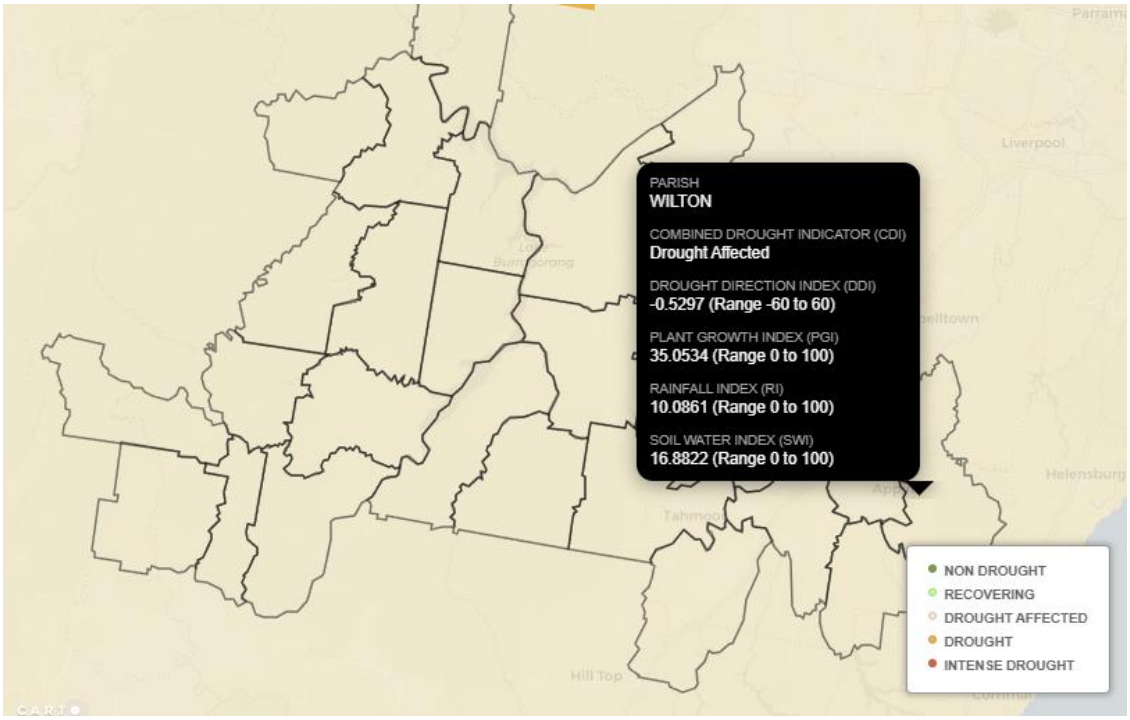
- Storms/Gustier Wind – Thunderstorms are the most common type of storm in New South Wales, causing more damage than any other short-duration weather event. They are most likely to hit Sydney from October to March. They can last from 10 minutes to several hours, with very strong winds, heavy rain and hail causing flash flooding, power outages and property damage. Historically, Wilton has experienced low rainfall intensity for 60-minute 1-in-100-year storm events. The predicted 3-day rain accumulation for Wilton NSW ranges from 71.3 mm up to 459 mm. This is based on the 60-minute rainfall intensity for a 1-in-100-year storm event in the area. [Source: Bureau of Meteorology http://www.bom.gov.au/water/designRainfalls/]

- Floods/Extreme Rain – From the NSW Planning Portal spatial viewer, it is concluded that the site is not located within a Flood Planning Area.



Flood Map – NSW Planning Portal; [Source: https://www.planningportal.nsw.gov.au/spatialviewer/#/find-a-property/lot]

- Extended drought periods – The site is identified as the "Drought Affected" area and has a history of droughts, with the most severe drought on record occurring from 1995 to 2007.



NSW Combined Drought Indicator; [Source: https://edis.dpi.nsw.gov.au/]

4 PRE-SCREENING CHECKLIST

Green Star Buildings v1, Credit 16 Climate Change Resilience Minimum Expectation – Climate Change Pre-screening Checklist.

Pre-screening item	Applies to project [Yes / No]	Has data regarding future climate exposure been reviewed? [Yes / No / NA]	Has a risk to the project been identified? [Yes / No / NA]	Has a risk treatment been identified? [Yes / No / NA]
The project area has previously been impacted by extreme climate events (e.g. storms/tropical cyclones, extreme rainfall and flooding, damaging winds, damaging hail, bushfires, heatwaves, drought, or coastal inundation).	Yes	Yes	Yes	Yes
The project is located in a cyclone zone.	No	NA	NA	NA
The is project located in or adjacent to a bushfire-prone area.	Yes	Yes	Yes	Yes
The project is located in or adjacent to a flood-prone area.	No	NA	NA	NA
The project is located at or adjacent to the coastline or tidally influenced waterway.	No	NA	NA	NA
The project will accommodate occupants vulnerable to the impacts of climate extremes (e.g. children, the elderly, low mobility, seeking medical treatment).	Yes	Yes	Yes	Yes

Note: If the pre-screening item does not apply to the project, the questions in the remaining three columns do not need to be checked off.

5 CLIMATE CHANGE SCENARIOS AND IMPACTS

5.1 REGIONAL OVERVIEW

The subject site is located within the East Coast South sub-cluster.

East Coast South sub-cluster

The East Coast south sub-cluster comprises Natural Resource Management (NRM) regions in the central part of the eastern seaboard of Australia. The area encompasses important headwater catchments for a high proportion of Australia's population.

The sub-cluster area has a predominantly sub-tropical climate, with regional variations such as some temperate influences in the south.

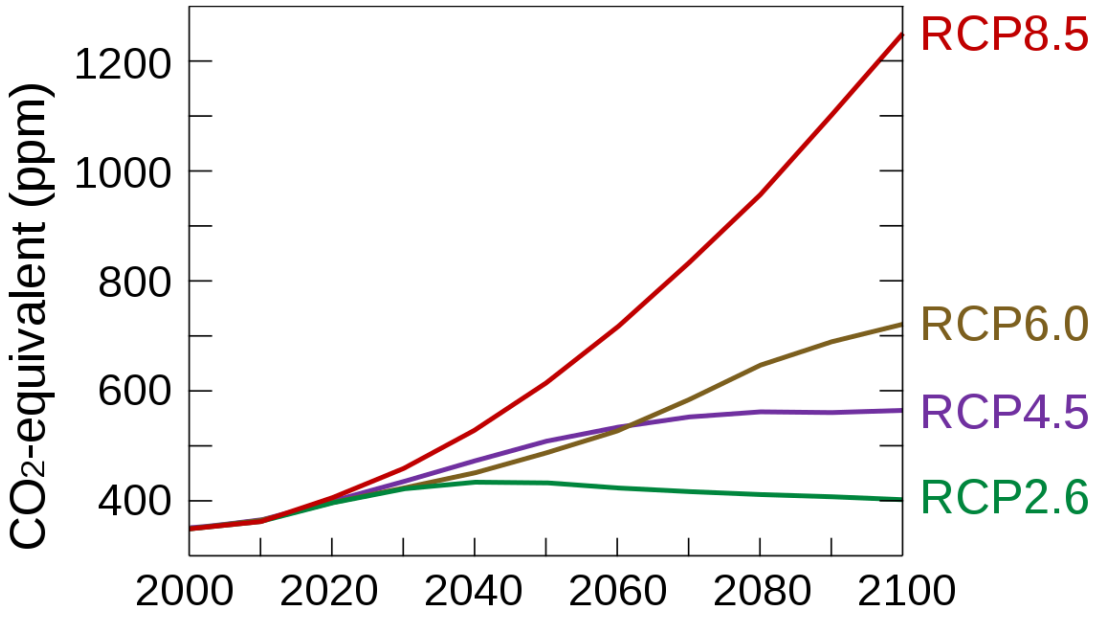
Key projection messages for this sub-cluster:

- Average temperatures will continue to increase in all seasons (very high confidence).
- More hot days and warm spells are projected with very high confidence. Fewer frosts are projected with high confidence.
- Temperatures have increased over the past century, with the rate of warming higher since 1960. The mean temperature increased between 1910 and 2013 by around 0.8°C. The recent decades have been the warmest on record for both daily minimum and daily maximum temperatures in the cluster.
- For the near future (2050), the annual average warming across all emissions scenarios is projected to be around 0.5 to 1.3°C above the climate of 1986 – 2005.
- By late in the century (2090), for a high emission scenario (RCP8.5) and projected range of warming is 2.9 to 4.6°C. Under an intermediate scenario (RCP4.5) the projected warming is 1.3 to 2.5°C.
- Decreases in winter rainfall are projected with medium confidence. Other changes are possible but unclear.
- Increased intensity of extreme rainfall events is projected, with high confidence.

- Mean sea level will continue to rise and the height of extreme sea-level events will also increase (very high confidence).
- A harsher fire-weather climate in the future (high confidence).
- On an annual and decadal basis, natural variability in the climate system can act to either mask or enhance any long-term human-induced trend, particularly in the next 20 years and for rainfall.

5.2 REPRESENTATIVE CONCENTRATION PATHWAY

In order to source relevant climate projections, appropriate Representative Concentration Pathway (RCPs) based on the Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment report are chosen. The RCPs provide plausible climate futures that may eventuate over the coming years. There are four pathways: RCP8.5, RCP6, RCP4.5, and RCP2.6, where the numbers of each RCP refer to the amount of radiative forcing produced by greenhouse gases in 2100.



IPCC Representative Concentration Pathway

The RCP 8.5 scenario has been selected as one future climate projection for this assessment as it is the most conservative pathway and because current emissions are tracking close to RCP 8.5. RCP 8.5 reflects a future with less curbing of emissions and a continued increase in fossil fuel use. It is generally taken as the basis for worst-case climate change scenarios.

The RCP 4.5 is chosen to represent a stabilisation pathway in which lower emissions are achieved by the application of some mitigation strategies and technologies. RCP 4.5 reflects a future where emissions peak around 2040, and the CO_2 concentration reaches 540 ppm by 2100.

5.3 PROJECTION TIME SCALE

The lifespan of the project components was considered to determine the appropriate projection time scale. Based on the components design life of a school building, the time series that is selected to understand the future climate impacts across the project's life are 2050 and 2070.

5.4 PROJECT SPECIFIC RISK STATEMENTS

Based on the project's baseline climatic characteristics and past extreme events, the following project-specific climate risk statements are formulated:

1. Hotter and dryer conditions cause an increase in the frequency and/or severity of bushfires and heatwave events.
2. Higher maximum temperatures and more humid conditions cause an increase in frequency and/or duration of extreme heat days (over 35 °C) and heatwave events.

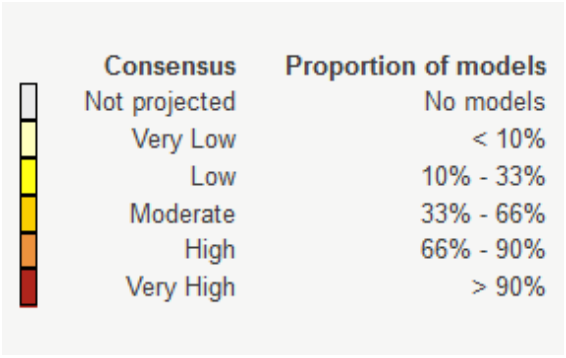
5.5 CLIMATE VARIABLES OF INTEREST

Based on the project's characteristics, the climate variables for this site are:

Events	Variables	Key Cases
Bushfires	Mean surface temperature and rainfall (Summer)	"Best Case": Climate Future with the least increase in mean surface temperature and the least decrease (or most increase) in rainfall (shorthand: "coolest and wettest") "Worst Case": Climate Future with the greatest increase in mean surface temperature and the greatest decrease (or least increase) in rainfall (shorthand: "hottest and driest")
Heatwaves	Maximum daily temperature and humidity (Annual)	"Best Case": Climate Future with the least increase in maximum daily temperature and the least increase (or most decrease) in humidity (shorthand: "coolest and least humid") "Worst Case": Climate Future with the greatest increase in maximum daily temperature and the greatest increase (or least decrease) in humidity (shorthand: "hottest and most humid")

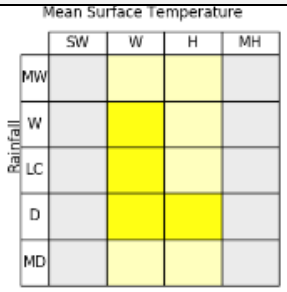
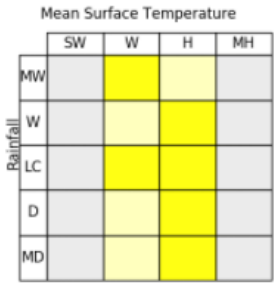
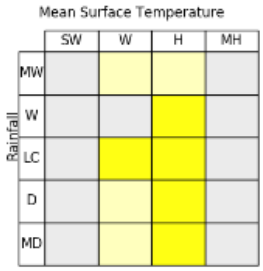
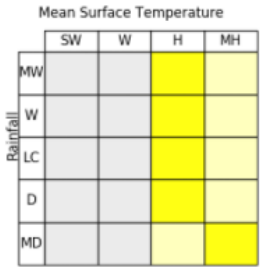
5.6 CLIMATE FUTURE PROJECTIONS

The series of climate futures matrices representing the combination of time periods and greenhouse gas scenarios and classified by the combined changes of the climate variables identified above are provided in the table below. All climate future matrices are sourced from CSIRO and Bureau of Meteorology, Climate Change in Australia website - www.climatechangeinaustralia.gov.au, cited 11/10/2024.



Colour legend of climate future projection consensus levels

5.6.1 SUMMER MEAN SURFACE TEMPERATURE AND RAINFALL (FOR BUSHFIRES)

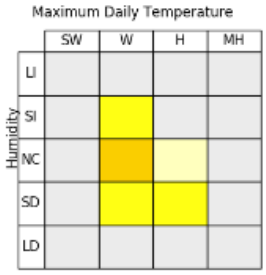
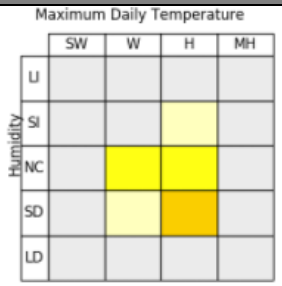
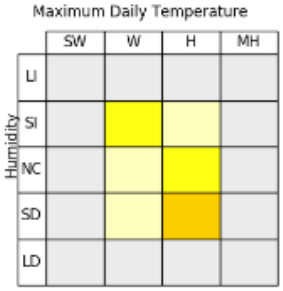
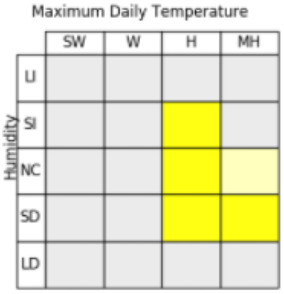
East Coast Climate Futures		Year	
		2050	2070
Emissions Scenarios	RCP 4.5		
	RCP 8.5		
Keys		**Maximum Daily Temperature** SW Slightly Warmer < 0.50 W Warmer 0.50 to 1.50 H Hotter 1.50 to 3.00 MH Much Hotter > 3.00	**Rainfall** MW Much Wetter > 15.00 W Wetter 5.00 to 15.00 LC Little Change -5.00 to 5.00 D Drier -15.00 to -5.00 MD Much Drier < -15.00

5.6.2 PROJECTED CLIMATE SCENARIOS FOR BUSHFIRES

Case	2050 Climate Future		2070 Climate Future	
	RCP 4.5	RCP 8.5	RCP 4.5	RCP 8.5
"Best" Coolest and wettest	Warmer and much wetter (Consensus: Very low)	Warmer and much wetter (Consensus: Very Low)	Warmer and much wetter (Consensus: Low)	Hotter and much wetter (Consensus: Low)
"Worst" Hottest and driest	Hotter and much drier (Consensus: Very low)	Hotter and much drier (Consensus: Low)	Hotter and much drier (Consensus: Low)	Much hotter and much drier (Consensus: Low)
"Maximum consensus"	Warmer and wetter to drier, Hotter and Drier (Consensus: Low)	Warmer and Little change, Hotter and wetter to much drier (Consensus: Low)	Warmer and much wetter, Warmer and little change, Hotter and wetter to much drier (Consensus: Low)	Hotter and much wetter to drier, Much hotter and much drier (Consensus: Low)

The projected climate scenarios indicate a summer that will be warmer and hotter in the near future. There is no strong consensus on whether rainfall will become wetter or drier in the near future but the hotter temperature may impact the risks of bushfire events.

5.6.3 ANNUAL MAXIMUM DAILY TEMPERATURE AND HUMIDITY (FOR HEATWAVES)

East Coast Climate Futures		Year	
		2050	2070
Emissions Scenarios	RCP 4.5		
	RCP 8.5		
Keys		**Annual Maximum Daily Temperature** SW Slightly Warmer < 0.50 W Warmer 0.50 to 1.50 H Hotter 1.50 to 3.00 MH Much Hotter > 3.00	**Annual Humidity** LI Large Increase > 10.00 SI Small Increase 1.00 to 10.00 NC No Change -1.00 to 1.00 SD Small Decrease -10.00 to -1.00 LD Large Decrease < -10.00

5.6.4 PROJECTED CLIMATE SCENARIOS FOR HEATWAVES

Case	2050 Climate Future		2070 Climate Future	
	RCP 4.5	RCP 8.5	RCP 4.5	RCP 8.5
"Best" Coolest and wettest	Warmer and small increase (Consensus: Low)	Warmer and small increase (Consensus: Low)	Hotter and small increase, warmer and no change (Consensus: Very low and low)	Hotter and small increase (Consensus: Low)
"Worst" Hottest and driest	Hotter and small decrease (Consensus: Low)	Hotter and small decrease (Consensus: Moderate)	Hotter and small decrease (Consensus: Moderate)	Much hotter and small decrease (Consensus: Low)
"Maximum consensus"	Warmer and no change (Consensus: Moderate)	Hotter and small decrease (Consensus: Moderate)	Hotter and small decrease (Consensus: Moderate)	Hotter and small increase to small decrease, Much hotter and small decrease (Consensus: Low)

The projected climate scenarios indicate the max daily temperature that will be hotter and warmer in the near future and the humidity has no change or small decrease. In these projected scenarios, the risk of heat waves will be increased.

6 CLIMATE RISK ASSESSMENT

The qualitative descriptions used in the risk assessment to categorise risks as low, medium, high and extreme depending on the likelihood and consequence are in accordance with the AGO's Climate Change Risks and Impacts: A Guide for Government and Business. Details of the qualitative descriptions are provided in Appendix A.

6.1 CLIMATE RISK MATRIX

Climate Variables and Risks	Climate Projections	Potential Climate Impacts	Pre-adaptation Actions						Proposed Adaptation Actions	Post-adaptation Actions						Summary of how measures reduce risk
			2050			2070				2050			2070			
			C	L	Rating	C	L	Rating		C	L	Rating	C	L	Rating	
Hotter and dryer conditions result in higher frequency and/or severity of bushfire and heatwave events.	The projected climate scenarios indicate a summer that will be warmer and hotter in the near future. There is no strong consensus on whether rainfall will become wetter or drier in the near future but the hotter temperature may impact the risks of bushfire events.	DIRECT: Increased bushfires risk due to warmer to hotter conditions may cause direct damage to the facilities.	Major	Rare	Low	Major	possible	High	Investigate locations of vulnerability, and remove potential fuel sources surrounding the building such as removing dead vegetation as part of ongoing landscaping/maintenance works. Use of non-combustible construction materials as per regulation. Put in place an evacuation plan in case of a fire-threatening building.	Major	Rare	Low	Major	Unlikely	Medium	The risk and impact of bushfires on the building will be reduced if good management practices are implemented. A properly considered evacuation plan will minimise the risks to occupants of the building.
		DIRECT: Increased bushfires risk due to warmer to hotter conditions may increase exposure to smoke and particulate for staff and students, impacting their health.	Minor	Possible	Medium	Minor	Possible	Medium	Ensure the building is well sealed to minimise risks of smoke infiltration. Provide motorised dampers on the outside air duct supply controlled by manual switch.	Minor	Unlikely	Low	Minor	Unlikely	Low	The risk and impact of smoke on occupants will be reduced if good management practices are implemented.
		INDIRECT: Increased bushfires risk may damage power infrastructure, disrupting the operation of the facility.	Moderate	Possible	Medium	Moderate	Possible	Medium	Consider a connection point for back up generator to provide power to safety-critical services. On-site renewable energy to reduce the maximum demand from the grid. Ensure critical data and information can be accessed offline.	Minor	Possible	Medium	Minor	Possible	Medium	The alternative power supply and ability to access information offline will facilitate the ongoing operation of the facility.

Hotter and dryer conditions resulting in higher frequency and/or duration of heatwaves/ extreme heat days (over 35 degrees Celsius)	The projected climate scenarios indicate the max daily temperature that will be hotter and warmer in the near future and the humidity has no change or small decrease. In these projected scenarios, the risk of heat waves will be increased.	DIRECT: Extreme heat will increase demand for the HVAC system and may impact the ability of the HVAC system to maintain the thermal comfort of occupants due to capacity constraints.	Moderate	Possible	Medium	Moderate	Likely	High	Incorporate passive thermal design principles in the design and construction of the building such as appropriate levels of shading devices and thermal insulation. Provide light-coloured roofs to reduce heat gains via the roof and help mitigate the urban heat island effect. Provide additional photovoltaic panels to provide renewable electricity to help offset the additional HVAC electricity demand. When replacing HVAC units at the end of service life, consider upsizing the capacity of units in line with the change in climatic conditions.	Moderate	Possible	Medium	Moderate	Possible	Medium	The incorporation of passive thermal design principles will help mitigate extreme heat risks in the near future. Appropriate upgrade of HVAC equipment at the end of their service life will help ensure the system will be capable of handling more extreme temperatures in the far future.
		DIRECT: Extreme heat may impact the operation of electrical equipment and infrastructures due to temperature exceeding design limits.	Minor	Unlikely	Low	Minor	Possible	Medium	In the near future, current temperature ratings for electrical equipment should be able to cope with projected temperature increases relevant to the component's design life. In the far future, equipment should be gradually upgraded as required to cope with more extreme conditions. Providing dedicated "Cool outdoor areas" where students and teachers can take shelter during extremely hot days when the power fails should be explored by the design team. This cool area should utilise passive design principles to moderate temperature during extreme days. Secondly, this cool area should consider ways to harness the cooling power of water to provide additional cooling. For example, provide shaded outdoor areas with drinking fountains as cool shelters during an extreme heat event.	Minor	Unlikely	Low	Minor	Unlikely	Low	Appropriate upgrade of electrical equipment at the end of their service life will help ensure the system will be capable of handling more extreme temperatures in the far future.

6.2 RESPONSES TO HIGH AND EXTREME RISKS

The risk assessment identified two high risks for the proposed activity by 2070 (zero high risks by 2050). No extreme risks were identified. The responses to high risks are summarised as follows:

1. Higher average surface temperature and less rainfall conditions cause an increase in the frequency and/or severity of bushfire events directly damaging the building. This risk is mitigated by ensuring non-combustible building elements are used in the fabric of the building and by implementing good management practices to remove potential fuel sources around the building once the building is in operation.
2. Higher maximum daily temperature and lower humidity conditions result in higher frequency and/or duration of heat waves resulting in an insufficient capacity of the HVAC system to maintain thermal comfort. This risk is mitigated by the incorporation of passive thermal principles such as appropriate external shades and thermal insulation and by upgrading the capacity of the HVAC system once the current system has reached the end of its service life.

6.3 RISKS SUMMARY

The table below shows all risk items identified as 'high' or 'extreme' are addressed by specific design responses and at least two risk items identified in the risk assessment are addressed by specific design responses.

Risk rating	2050 Pre-adaptation	2050 Post-adaptation	2070 Pre-adaptation	2070 Post-adaptation
Low	2	3	0	2
Medium	3	2	3	3
High	0	0	2	0
Extreme	0	0	0	0

7 CONCLUSIONS

A Change Risk and Adaptation Assessment has been prepared for the proposed primary school located at 200 Fairway Drive, Wilton NSW 2571.

Specifically, this Climate Change Risk and Adaptation Assessment addressed:

- The details of the stakeholder consultation that was undertaken during plan preparation are in Section 2.3 & Appendix B.
- The project's characteristics are in Sections 2.2 & 3.
- The assessment of climate change scenarios and impacts on the project is in Section 5.
- The identification of primary and secondary climate change variables relevant to the project and each risk is in Section 6 & Appendix B.
- The potential risks for the project and people are in Section 6 & Appendix B.
- The consequence and likelihood table with a risk matrix to assess climate risks in Section 6 & Appendix B.
- The actions to reduce 'high' and 'extreme' risks are identified in Section 6, Appendix B.

The assessment also addressed the environmental factors in accordance with items (h) & (j) in Table A1 Environmental factors for hospital and school activities from the Addendum Division 5.1 Guidelines for Schools by the Department of Planning, Housing and Infrastructure (DPHI).

The impacts of climate change were assessed across two time scales (2050 & 2070) with two Representative Concentration Pathways (RCP4.5 & RCP8.5). Climate Futures matrices were used to determine the key climate projections based on multiple climate variables for this risk assessment. The key climate projections were used to inform the Climate Risk Assessment.

The results of the Climate Risk Assessment identified two high-risk items pre-adaptation. These high risks were mitigated to medium risks by the proposed adaptation actions.

7.1 MITIGATION MEASURES

The following table captures all measures required to be implemented as a result of this Climate Change Risk & Adaptation Assessment report and the table from Section 2.2 of this report. Due to the quantity of mitigation measures resulting from this report, they have been generalised below. For a detailed overview of the measures refer to Section 6 of this report.

Project Stage	Mitigation Measures	Reason for Mitigation Measure	Section of Report
Design & Construction	All disciplines to incorporate Climate Change Risks and Impact Assessment adaptations and responses in their Construction Documentation	To ensure climate change adaptation is addressed. To ensure any climate change risks are managed. To ensure high and extreme risks are mitigated to medium or low risks	Refer Section 6
Operation	All disciplines to provide as-built package reflecting what's has been built is aligned with CC documentations (enforced by EFSG and GS frameworks)		

7.2 EVALUATION OF ENVIRONMENTAL IMPACTS

With regards to the tables from Sections 2.2 & 7.1, the environmental impact caused by the activity is adequately mitigated through the recommended measures and the activity will not have *'significant impact on the environment'* (refer to Section 5.7 of the EP&A Act). To conclude,

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

8 APPENDIX A – RISK ASSESSMENT FRAMEWORK

The following risk assessment framework is used to determine consequence and likelihood ratings. Based on these ratings, the risk rating has been determined.

Consequence Criteria

Rating	SUCCESS CRITERIA				
	Public safety	Local economy & growth	Community & lifestyle	Environment & sustainability	Public administration
Catastrophic	Large numbers of serious injuries or loss of lives	Regional decline leading to widespread business failure, loss of employment and hardship	The region would be seen as very unattractive, moribund and unable to support its community	Major widespread loss of environmental amenity and progressive irrecoverable environmental damage	Public administration would fall into decay and cease to be effective
Major	Isolated instances of serious injuries or loss of lives	Regional stagnation such that businesses are unable to thrive and employment does not keep pace with population growth	Severe and widespread decline in services and quality of life within the community	Severe loss of environmental amenity and a danger of continuing environmental damage	Public administration would struggle to remain effective and would be seen to be in danger of failing completely
Moderate	Small numbers of injuries	Significant general reduction in economic performance relative to current forecasts	General appreciable decline in services	Isolated but significant instances of environmental damage that might be reversed with intensive efforts	Public administration would be under severe pressure on several fronts
Minor	Serious near misses or minor injuries	Individually significant but isolated areas of reduction in economic performance relative to current forecasts	Isolated but noticeable examples of decline in services	Minor instances of environmental damage that could be reversed	Isolated instances of public administration being under severe pressure
Insignificant	Appearance of a threat but no actual harm	Minor shortfall relative to current forecasts	There would be minor areas in which the region was unable to maintain its current services	No environmental damage	There would be minor instances of public administration being under more than usual stress but it could be managed

Likelihood Criteria

Rating	Recurrent risks	Single events
Almost certain	Could occur several times per year	More likely than not – Probability greater than 50%.
Likely	May arise about once per year	As likely as not – 50/50 chance.
Possible	May arise once in ten years	Less likely than not but still appreciable – Probability less than 50% but still quite high.
Unlikely	May arise once in ten years to 25 years	Unlikely but not negligible – Probability low but noticeably greater than zero.
Rare	Unlikely during the next 25 years	Negligible – Probability very small, close to zero.

Risk Priority Levels

	Consequences				
Likelihood	Insignificant	Minor	Moderate	Major	Catastrophic
Almost certain	Medium	Medium	High	Extreme	Extreme
Likely	Low	Medium	High	High	Extreme
Possible	Low	Medium	Medium	High	High
Unlikely	Low	Low	Medium	Medium	Medium
Rare	Low	Low	Low	Low	Medium

The interpretation of the priority levels is usually as follows:

- Extreme risks demand urgent attention at the most senior level and cannot be simply accepted as a part of routine operations without executive sanction.
- High risks are the most severe that can be accepted as a part of routine operations without executive sanction but they will be the responsibility of the most senior operational management and reported upon at the executive level.
- Medium risks can be expected to form part of routine operations but they will be explicitly assigned to relevant managers for action, maintained under review and reported upon at senior management level.
- Low risks will be maintained under review but it is expected that existing controls will be sufficient and no further action will be required to treat them unless they become more severe.

9 APPENDIX B – CLIMATE RISK INTERVENTIONS REGISTER

PROJECT	220295 New Primary School at Wilton Junction
REVISION	Rev K- 07/03/2025
AUTHOR	LG/GT

Climate Risks	Climate Projection	Climate Impact	Proposed Adaptation Actions	Responsible Parties
Bushfire Hotter and dryer conditions result in higher frequency and/or severity of bushfire events	The projected climate scenarios indicate that summer will be warmer and hotter in the near future. There is no strong consensus whether rainfall will become wetter or drier in the near future but the hotter temperature may impact the risks of bushfire events.	Increased bushfires risk due to warmer to hotter conditions may cause direct damage to the facilities.	Investigate locations of vulnerability, and remove potential fuel sources surrounding the building such as removing dead vegetation as part of ongoing landscaping/maintenance works. Use of non-combustible construction materials as per regulation. Put in place an evacuation plan in case of a fire-threatening building.	Bushfire Consultant Architect Landscape
		Increased bushfires risk due to warmer to hotter conditions may increase exposure to smoke and particulate for staff and other workers, impacting their health.	Ensure the building is well sealed to minimise risks of smoke infiltration. Provide motorised dampers on the outside air duct supply controlled by manual switches.	Bushfire Consultant Services Consultant
		Increased bushfires risk may damage power infrastructure, disrupting the operation of the facility.	On-site renewable energy to reduce the maximum demand from the grid. Ensure critical data and information can be accessed offline.	Bushfire Consultant Services Consultant SINSW
Heatwave Hotter and dryer conditions resulting in higher frequency and/or duration of heatwaves/ extreme heat-days (over 35 degrees Celsius)	The projected climate scenarios indicate the max daily temperature that will be hotter and warmer in the near future and the humidity has no change or small decrease. In these projected scenarios, the risk of heat waves will be increased.	Extreme heat will increase demand for the HVAC system and may impact the ability of the HVAC system to maintain the thermal comfort of occupants due to capacity constraints.	Incorporate passive thermal design principles in the design and construction of the building such as appropriate levels of shading devices and thermal insulation. Provide light-coloured roofs to reduce heat gains via the roof and help mitigate the urban heat island effect. Provide additional photovoltaic panels to provide renewable electricity to help offset the additional HVAC electricity demand. When replacing HVAC units at the end of service life, consider upsizing the capacity of units in line with the change in climatic conditions.	ESD Architect Landscaping Services Consultant
		Extreme heat may impact the operation of electrical equipment and infrastructures due to temperature exceeding design limits.	In the near future, current temperature ratings for electrical equipment should be able to cope with projected temperature increases relevant to the component's design life. In the far future, equipment should be gradually upgraded as required to cope with more extreme conditions. Providing dedicated “Cool outdoor areas” where students and teachers can take shelter during extremely hot days when the power fails should be explored by the design team. This cool area should utilise passive design principles to moderate temperature during extreme days. Secondly, this cool area should consider ways to harness the cooling power of water to provide additional cooling. For example, provide shaded outdoor areas with drinking fountains as cool shelters during an extreme heat event.	SINSW Architect Services Consultant